

OPERATIONAL PLAN

Dalby Expansion Project (DXP) - Petroleum Lease - 194, 198, 230, 238, 252, 258, 260

(Granted 30 June 2011)

December 2011

TABLE OF CONTENTS

1.0 INTRODUCTION..... 1

 1.1 Document Scope 1

 1.2 Background 1

2.0 DESCRIPTION OF EXISTING AND PROPOSED PETROLEUM ACTIVITIES AND INFRASTRUCTURE 2

3.0 ENVIRONMENTALLY SENSITIVE AREAS 7

4.0 REHABILITATION 8

 4.1 Rehabilitation Activities 8

 4.2 Progressive Rehabilitation 9

5.0 CALCULATION OF FINANCIAL ASSURANCE10

APPENDICES:

A – MAPS



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1.0 INTRODUCTION

1.1 Document Scope

This Operational Plan (Plan) describes key aspects of Arrow Energy (Arrow) activities within the Dalby Expansion Project (DXP) which encompasses Petroleum Leases 194, 198, 230, 238, 252, 258 and 260, which is illustrated in **Appendix A**.

This Plan has been prepared in accordance with Conditions A5 to A8 of Environmental Authority (EA) No. PEN100449509, dated 30 June 2011.

Specifically, the Plan provides:

- Information about the petroleum activities to be carried out under this environmental authority, using the current Development Plan as an indication of the minimum level of activity;
- A description of existing infrastructure for conducting the petroleum activities;
- A map that records the location of the infrastructure;
- Details of proposed disturbance or vegetation clearing in an Environmentally Sensitive Area (ESA);
- A description of rehabilitation activities to be performed during the period of the Plan;
- A description of progressive rehabilitation to be carried out;
- Calculation of financial assurance for the proposed maximum disturbance expected during the period of the plan.

This Plan describes activities that are currently planned to be carried out over a three (3) year period (i.e. from 17 December 2010 to 17 December 2013).

1.2 Background

The DXP supplies Coal Seam Gas (CSG) from the Daandine and Tipton West gas fields near Dalby in the Surat Basin to the Daandine, Braemar 1, Braemar 2 and Swanbank E power stations. The DXP covers the existing producing fields in the Surat Basin and includes approval for up to 200 new production wells and associated infrastructure that will ensure Arrow will continue to meet its current domestic gas supply obligations.

The DXP is located around the township of Dalby, Queensland. The petroleum leases cover an approximate area of 1,270m² and extends as far as 50km around Dalby.

2.0 DESCRIPTION OF EXISTING AND PROPOSED PETROLEUM ACTIVITIES AND INFRASTRUCTURE

Activities to be carried out on the DXP are comprised of all those necessary to explore, test for production and produce CSG, as authorised under the *Petroleum and Gas (Production and Safety) Act. 2004*.

Exploration and production activities will include:

- Exploration activities, including but not limited to core holes and chip holes;
- Well site preparation and establishment of access roads (where existing access is not provided for);
- Drilling and completion of appraisal and production wells;
- Coal seam gas production;
- Construction and operation of water and gas gathering systems;
- Extraction of CSG;
- Well work over and maintenance;
- Waste management;
- Monitoring and compliance;
- Construction and operation of Aggregation and Utility dams;
- Water treatment facilities;
- Compression facilities;
- Groundwater monitoring well installation;
- Incidental activities to support the activities described above.

A description of the existing and proposed petroleum activities and infrastructure are presented in Table 1 and the location of existing infrastructure is presented in Appendix A

Arrow has not yet completed environmental or technical assessments for the specified placement of proposed infrastructure. Final locations for infrastructure will only be determined following these assessments and execution of a Land Access and Compensation Agreement with any affected landholders.

Note: All material work located on the DXP petroleum leases covered under this Operational Plan with the exception of the Tipton Reverse Osmosis (RO) Plant have been previously installed and constructed subject to previous environmental authorities and their conditions relevant at that period.

Table 1: Description of existing and proposed activities and infrastructure

INFRASTRUCTURE	PURPOSE	TECHNICAL / SITE DETAILS	CONSTRUCTION PROCESSES	OPERATIONAL PROCESSES /MAINTENANCE
DAMS				
Aggregation Dams	Dams will receive CSG water from the gathering system and transfer to the Water Treatment facilities or supply for beneficial use	<ul style="list-style-type: none"> - Dams range in size from approximately 2.5 ML to 2042 ML - Dams are designed in accordance with the Manual for Assessing Hazard Categories and Hydraulic Performance of Dams - Designed with a floor and side of material that will contain the wetting front that is the lining system. - 	<ul style="list-style-type: none"> - Site surveyed - Site vegetation cleared - Topsoil removed and stockpiled - Keyway for bank cut into natural ground - Cut and fill material; and water to be added to aid compaction - Internal floor and batters profiled - Dam fenced to prevent livestock and fauna entering dam - HDPE Liner, spillways etc installed for construction of new dams - Drill Monitoring bores installed - Inlet and outlet piping installed as required 	<ul style="list-style-type: none"> - Regular inspections to ensure integrity of dam and infrastructure (including any fencing) is intact and maintained - Testing of dam water as required - Operation of dams is outline in each Dam Operating Plan for that facility
WELLS				
Exploration wells (Chip holes and core holes)	To determine production potential based on coal bed characteristics (including depth, coal thickness, gas content, gas saturation, coal properties and permeability)	<ul style="list-style-type: none"> - Exploration Holes: <ul style="list-style-type: none"> ■ Drilling rig is used to drill exploration wells in the area of interest. - Chip & Core Holes: <ul style="list-style-type: none"> ■ A series of small core or chip holes (four inch or 100mm in diameter) are drilled- usually spaced kilometres apart spanning the area under consideration 	<ul style="list-style-type: none"> - Access roads and a flat drilling pad are cleared - Levelling of a drill pad undertaken if necessary - Site fenced (as required) - Soil stockpiled & topsoil separated - Ground pits excavated and / or tanks established to hold drill water - Excavation of a pit for a ground flare. - Well drilled as per Drill Plan - Testing undertaken 	<ul style="list-style-type: none"> - Erosion and sedimentation controls maintained as appropriate - Valve monitoring - Dewatering of the local area of coal seam under carefully controlled conditions - Flaring of gas

INFRASTRUCTURE	PURPOSE	TECHNICAL / SITE DETAILS	CONSTRUCTION PROCESSES	OPERATIONAL PROCESSES /MAINTENANCE
Production wells (includes development wells and pilot appraisal)	To produce gas to sell to market	<ul style="list-style-type: none"> - Standard DXP development well consists of vertical wells approximately 1.2 kms through to the coal seam to intersect the Walloon coal measures. - Pilot well typically consist of up to five wells clustered within a smaller area (usually in a grid pattern approx. 200 m apart) - Well groups set out in 700 to 1000 m grid spacing - Drill site normally prepared with dimensions of typically 70m by 60m - Once installed, drill site reduced to a minimum size (approximately 10m x 10m) that accommodates ancillary infrastructure (inc. wellhead, electric drive rotating screw pump (progressive cavity), gas/water separator, control valve, monitoring, metering and communications equipment). - Diameter of 200-250mm diameter (approx.) - Depth ranges between 350 to 650 metres (approx.) - Metal well casing held in place by pressure tested cement 	<ul style="list-style-type: none"> - Vegetation clearance or trimming. - Levelling of a drill pad if necessary - Site fenced (as required) - Soil stockpiled & topsoil separated - Ground pits excavated and / or tanks established to hold drill water - Excavation of a pit for a ground flare. - Well drilled as per Drill Plan - Wells are cased with steel and cement - Artificial lift equipment Installed with work over rig - Surface equipment installed including metering skid, power, pump controls, SCADA equipment etc - Progressive rehabilitation occurs during the construction process, as outlined below. 	<p>Key tasks during gas field maintenance include:</p> <ul style="list-style-type: none"> - Dewatering of the local area of coal seam under carefully controlled conditions - Wellhead, pump drive system & production skid maintenance(wells visited approx. every 2- 4 days once production water level is reached and gas production is stabilised) - Down hole water pump maintenance (pumps extracted and replaced occasionally when fail) - Down hole water level sensor replacement when failed - Electrical infrastructure maintenance. - Re-drilling wells (occasionally wells fail and require replacements or redrilling of laterals) - Well work over operations (involves flushing coal fines out of the well sump and/or replacement of pump & water level sensor to maintain flow of gas and water- required approx. every one to three years)
GAS AND WATER TRANSPORT				
Gas Gathering	Collection of Low	<ul style="list-style-type: none"> - Are constructed of nominally 63mm – 630mm diameter high-density 	<ul style="list-style-type: none"> - Clear and Grade gathering system - Remove topsoil from trench 	<ul style="list-style-type: none"> - Regular visits may be required to adjust the configuration of valves, vents and



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INFRASTRUCTURE	PURPOSE	TECHNICAL / SITE DETAILS	CONSTRUCTION PROCESSES	OPERATIONAL PROCESSES /MAINTENANCE
System Water Gathering System	Pressure Gas and Water from wells compressors and aggregation dams	polyethylene (HDPE) pipe - Varied lengths and diameters - HDPE as per AS 4130; SDR21, PN08 - Gas MAOP 440kPa; Water MAOP 840kPa - Nominal 750mm cover	location - String Pipe along easement - Weld Pipe - Pipeline trench excavated (excavator and/or trencher) - Pipeline lowered in - Padding material in rocky areas as required - Pipeline backfilled with spoil, - Backfill compacted as necessary - Topsoil material reinstated - Level off, seed and install pipeline signs	drains - System low points are drained as required - High Point vents and risers periodically maintained as required
Gas Compression				
Compressor Stations	Compression facilities will receive gas from the gathering systems and compress and dewater the gas prior to directing this to the sales gas pipelines.	- Designed to: - Receive gas from wells located within reasonable proximity of the facility - Remove any bulk water in the gas - Compress (multiple stage) of the gas received at the facility to pipeline transport pressure - Dehydrate gas to transport pipeline and/or LNG plant quality - (typically less than 10 µm water droplet size using separators and tri-ethylene glycol contacting column(s)).	- Site cleared (typically 100m x 100m) per compressor - Soil stockpiled & topsoil separated - Vegetation mulched - Earthworks (cut or fill) - Imported gravel material - Concreting - Pipe installation - Construction of flares - Site fenced (as required) - Industrial waste water collection - Control room and workshop areas installed	- Facility is generally manned over a 10 hour day shift with a call out facility to ensure response to plant upsets - Responsive and emergency maintenance can be conducted at any time
Water Treatment Facilities				



INFRASTRUCTURE	PURPOSE	TECHNICAL / SITE DETAILS	CONSTRUCTION PROCESSES	OPERATIONAL PROCESSES /MAINTENANCE
Reverse osmosis (RO) water treatment facility	To treat water to a beneficial reuse standard by reverse osmosis and filtration.	<ul style="list-style-type: none"> - Typically designed as modular units - Operating information transferred electronically to central operating personnel remote from the facility - Is likely to be comprised of: <ul style="list-style-type: none"> ■ Raw water feed dam ■ Brine collection dam ■ Utility dam for collection backwash water, sumps and providing additional capacity ■ for rainfall, flood and process upset conditions - Clear (treated) water dam 	<ul style="list-style-type: none"> - Site cleared (typically 100m x 100m) - Soil stockpiled & topsoil separated - Vegetation mulched. - Earthworks undertaken to create raised gravel pad - RO building with concrete floor constructed - Pre-assembled equipment, tanks and pumps installed - Install interconnecting pipe work - Cabling installed - Pipelines run to and from RO plant 	<ul style="list-style-type: none"> - Routine Operation and Maintenance activities include: <ul style="list-style-type: none"> ■ General inspection of the facility for correct operation ■ Water sampling for analysis, to confirm on-line controls are working correctly, and water of required quality ■ Unload, check and top up chemicals required for efficient operation of the facility ■ Initiate “Clean in Place” and similar routine operations for ongoing efficient operation of the - Chemicals are stored in the designated area at all times and the amount does not exceed the storage capacity limits - General wastes shall be taken off site disposed of at waste disposal facilities
Other infrastructure				
Site Offices	Coordination point for monitoring, maintaining and reporting on operational aspects	<ul style="list-style-type: none"> - Usually consists of demountable offices, co-located within the facility cleared area - May include a septic tank 	<ul style="list-style-type: none"> - Minimal ground disturbance necessary if demountables used. - May include works to establish sewage system 	<ul style="list-style-type: none"> - Minimal operations maintenance apart from office upkeep, grounds keeping and weed control - Sewage system maintained (pumped out as required)

3.0 ENVIRONMENTALLY SENSITIVE AREAS

Given the dispersed nature of Arrow infrastructure and facilities, there is a degree of flexibility with respect to associated site selection and Arrow avoids construction within ESA's to the greatest extent practicable.

However, given a range of constraints (including landform, accessibility, current land-use and the requirement for interconnectivity with existing infrastructure) construction within ESA areas (and/or associated buffers) may be unavoidable and is undertaken in strict compliance with the conditions of the EA.

Prior to the commencement of activities, an ecological assessment is carried out in accordance with Arrow's Ecological Impact Assessment Procedure. The purpose of this procedure is to ensure compliance with the *Nature Conservation Act 1992*, *Environmental Protection Act 1994* and the *Environmental Protection and Biodiversity Conservation Act 1999*.

4.0 REHABILITATION

4.1 Rehabilitation Activities

All land disturbed through petroleum activities will be rehabilitated in accordance with the EA conditions, Arrow's procedures and proven industry techniques.

Rehabilitation shall be undertaken progressively, commencing as soon as practicable following completion of any construction or operational works associated with petroleum activities.

Specific rehabilitation techniques employed in a given area will be tailored according to localised characteristics and may differ from site to site. As a minimum, rehabilitation shall ensure that a given site is:

- Safe to humans and wildlife;
- Non-polluting;
- Stable; and
- Able to sustain an agreed land use.

Table 2 summarises key rehabilitation activities likely to be employed, as a minimum, for each asset.

Table 2: Key rehabilitation activities

Infrastructure	Key activities to be performed
All Assets (general commitments)	<ul style="list-style-type: none"> - As soon as practicable following construction (and in some cases during construction), the footprint of activity / disturbance is reduced to the minimal size necessary for safe and practicable operations. - Landform and topsoils shall be reinstated (with appropriate sedimentation control mechanisms implemented in areas where erosion is likely) to replicate original contour lines and drainage. - Fertilisation or revegetation (seeding or planting of local provenance species) may be undertaken in certain areas where topsoil retention potential is reduced or natural revegetation is not successful. - Physical barriers shall be installed where required to limit disturbance to restored areas. - Representative species samples taken from cleared vegetation shall be stored in Arrow's Vegetation Clearing Register.
Dams	<ul style="list-style-type: none"> - Upon completion of construction activities, dam banks will be stabilised through revegetation as required. Contaminated land assessment will be undertaken and appropriate treatment implemented where required (usually prior to decommissioning). - Dam surface re-profiled to stable landform consistent with surrounding contours during decommissioning. - Alternately, dams may be decommissioned but left in-situ if agreed with relevant landholder (subject to approval by the regulator).
Wells	<ul style="list-style-type: none"> - Following construction, well site footprint is reduced (to approximately 10 m x 10 m) and disturbed areas rehabilitated (as per general soil and vegetation commitments described for all assets above). - When decommissioned, wells are plugged and abandoned (sealed with cement, plugged, marked and rendered safe) in accordance with relevant standards and site is restored. - Drilling rig is used to cut the well casing off approximately 1000mm below the ground surface and to plug the well with concrete. - Statutory sign post is erected on a nearby fence or other suitable structure. - Gathering pipelines are cut off below the ground surface and abandoned. - Well site fence is removed and the well site is rehabilitated to a land use consistent with the local area, or as agreed with the landholder.

	<ul style="list-style-type: none"> - All decommissioning of wells is conducted as per Petroleum and Gas (Production and Safety) Regulation 2004.
Temporary camps & waste	<ul style="list-style-type: none"> - Infrastructure will be dismantled and removed from site. - A hierarchy of waste management options will be applied to all waste generated during the decommissioning and operation of Arrow Energy facilities. - Following infrastructure removal the site footprint will be re-profiled and rehabilitated (as per general commitments described for all assets above).
Compression Facility	<ul style="list-style-type: none"> - Major plant and infrastructure will be dismantled and removed from site where practicable. - A hierarchy of waste management options will be applied to all waste generated during the decommissioning of Arrow facilities. - Following infrastructure removal the site footprint shall be re-profiled and rehabilitated (as per general commitments described for all assets above). - Areas of sites to which notifiable activities apply will be assessed and rehabilitated in accordance with regulatory guidelines.
Gathering Systems	<ul style="list-style-type: none"> - Gathering systems will be Flooded and capped and will remain below the ground surface, as per H4(e) and Australian Standards (AS2885). - Excavations (where pipelines have been accessed) will be backfilled and levelled. - All associated signage will be removed. - Revegetation of agricultural land determined in consultation with land holders.

4.2 Progressive Rehabilitation

Given the nature of exploration and production activities, full site rehabilitation will be carried out at the completion of relevant activities (e.g. in the case of drilling - the pad size is reduced to operational size after construction, and then fully rehabilitated after decommissioning of the well and associated infrastructure).

At present, and given the early stage of development on the DXP, rehabilitation efforts are focussed on progressively reinstating soils and promoting vegetation on existing well sites (and associated infrastructure) after construction and during operations.

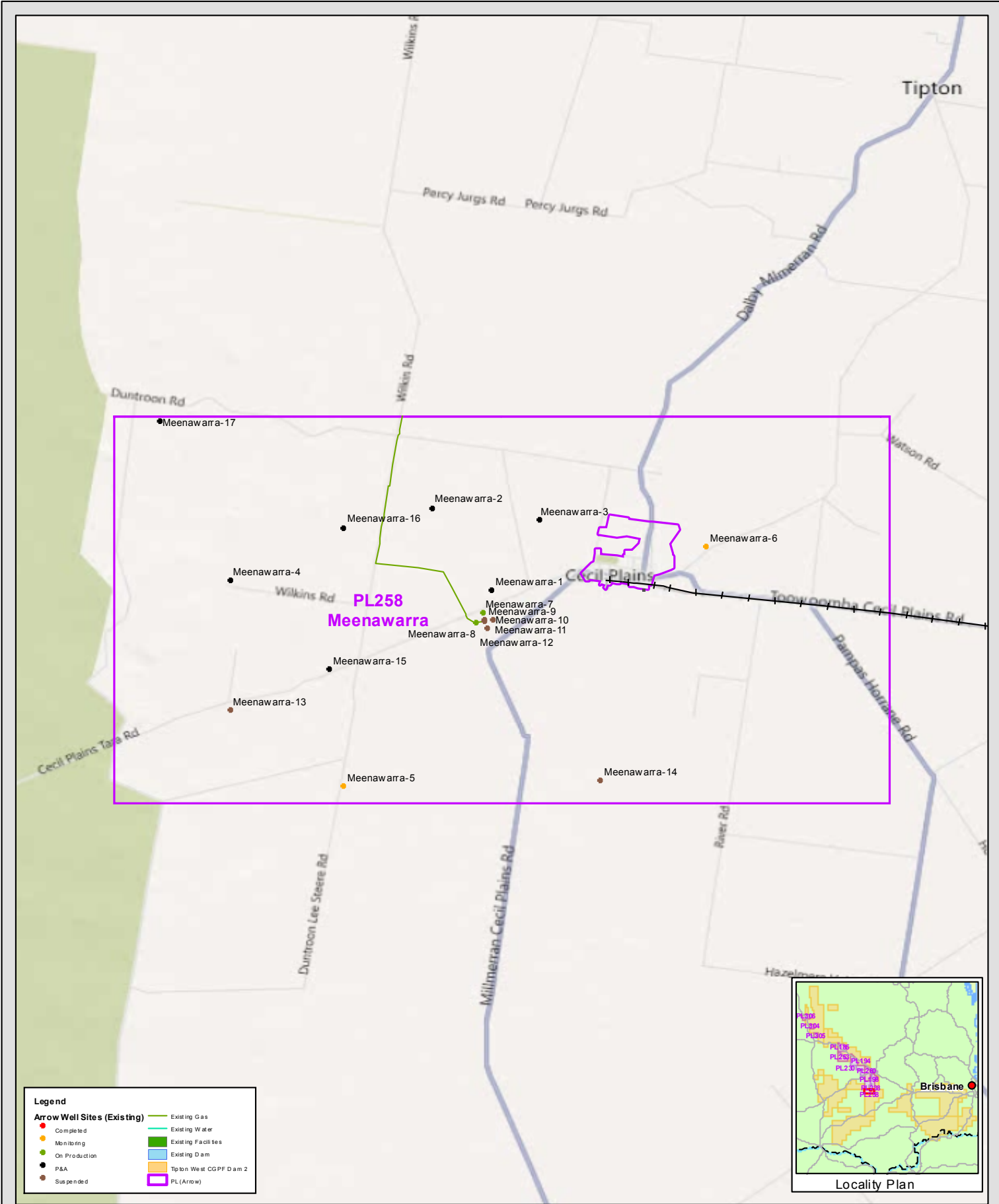
5.0 CALCULATION OF FINANCIAL ASSURANCE

The existing documentation and calculations in relation to financial assurance approved and currently held by DERM are considered appropriate at this point in time for the following reasons:

- The environmental authority has only recently been issued (June 2011)
- The amount of financial assurance has been recently approved by DERM and lodged by Arrow
- No further significant disturbance has taken place since that lodgement
- No exceedance of previously submitted and approved disturbance calculations is proposed in this Plan

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Appendix A – Maps



DXP Existing Infrastructure PL258

Source:
 Arrow Energy Pty Ltd
 Geosciences Australia
 Dept. Envir. and Resource Mgmt.

Date: 31/08/2011
Issued To: J Keys
Author: tstringer

0 3.5 7
 Kilometres

Scale: 1:119,160 @ A4
 Coordinate System: GCS GDA 1994



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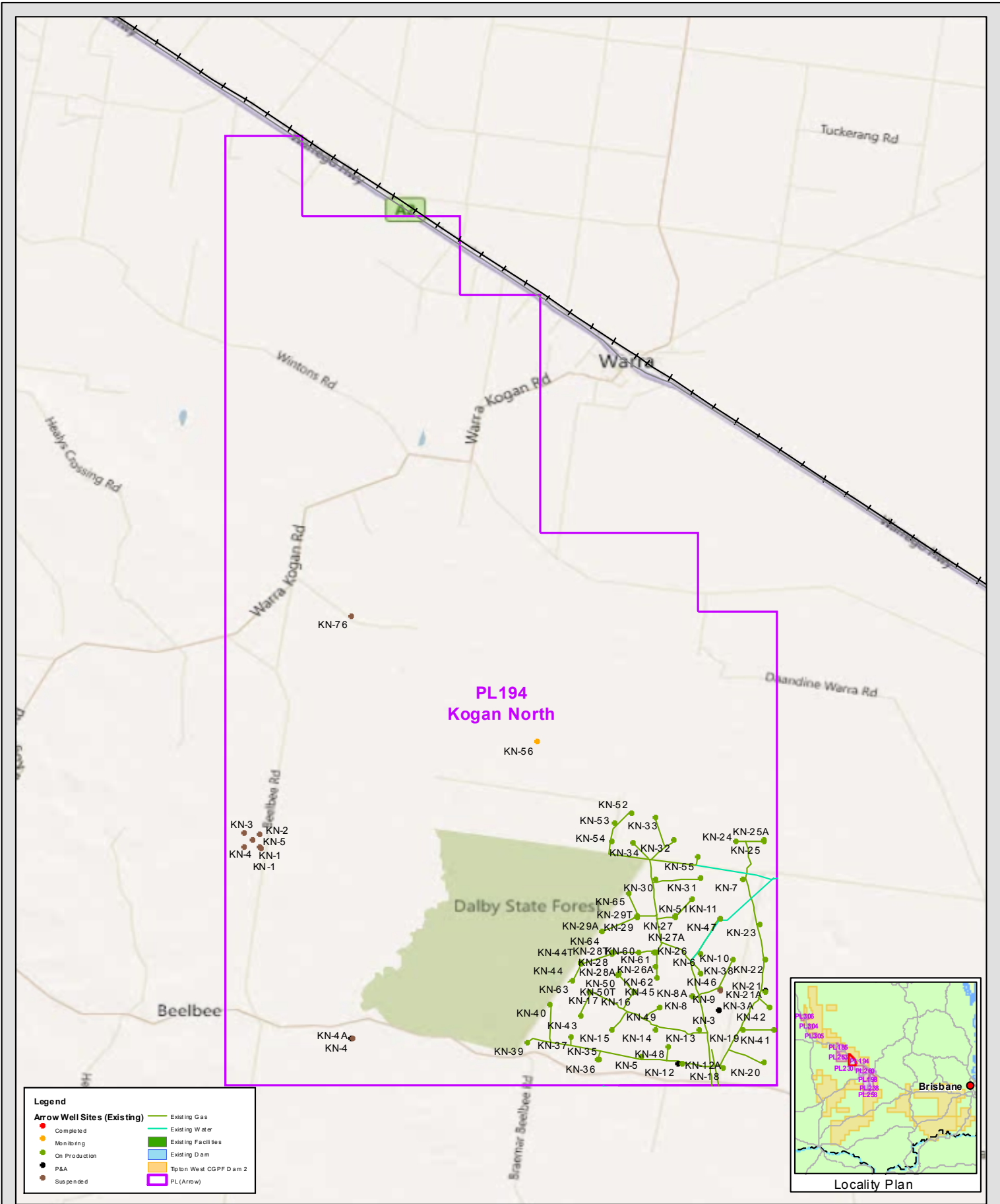
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The dimensions, areas, number of lots, size & location of corridor information are approximate only and may vary.

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DXP Existing Infrastructure PL194

Source: Arrow Energy Pty Ltd
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 Dept. Envir. and Resource Mgmt.
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 Author: tstringer

0 3.5 7
 Kilometres
 Scale: 1:116,660 @ A4
 Coordinate System: GCS GDA 1994



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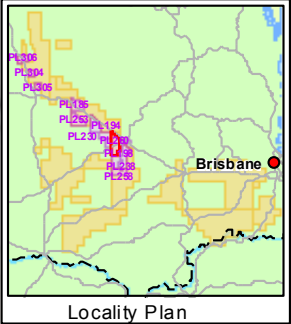
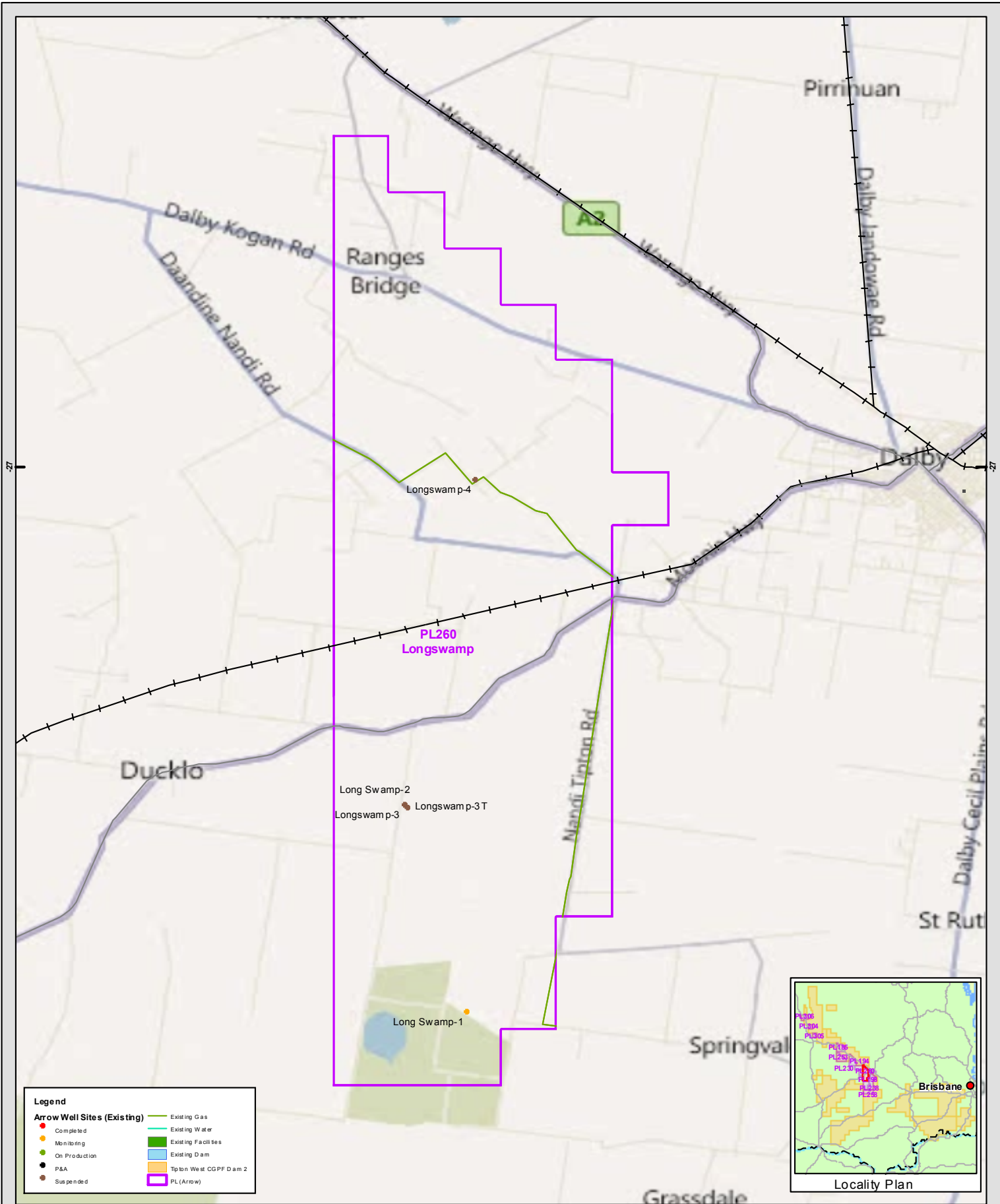
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Legend	
● Complete	— Existing Gas
● Monitoring	— Existing Water
● On Production	— Existing Facilities
● P&A	— Existing Dam
● Suspended	— Tiplon West CGPF Dam 2
	— PL (Arrow)

DXP Existing Infrastructure PL260

Source:
 Arrow Energy Pty Ltd
 Geosciences Australia
 Dept. Envir. and Resource Mgmt.

Date: 31/08/2011
Issued To: J Keyes
Author: tstringer

0 5 10
 Kilometres

Scale: 1:165,270 @ A4
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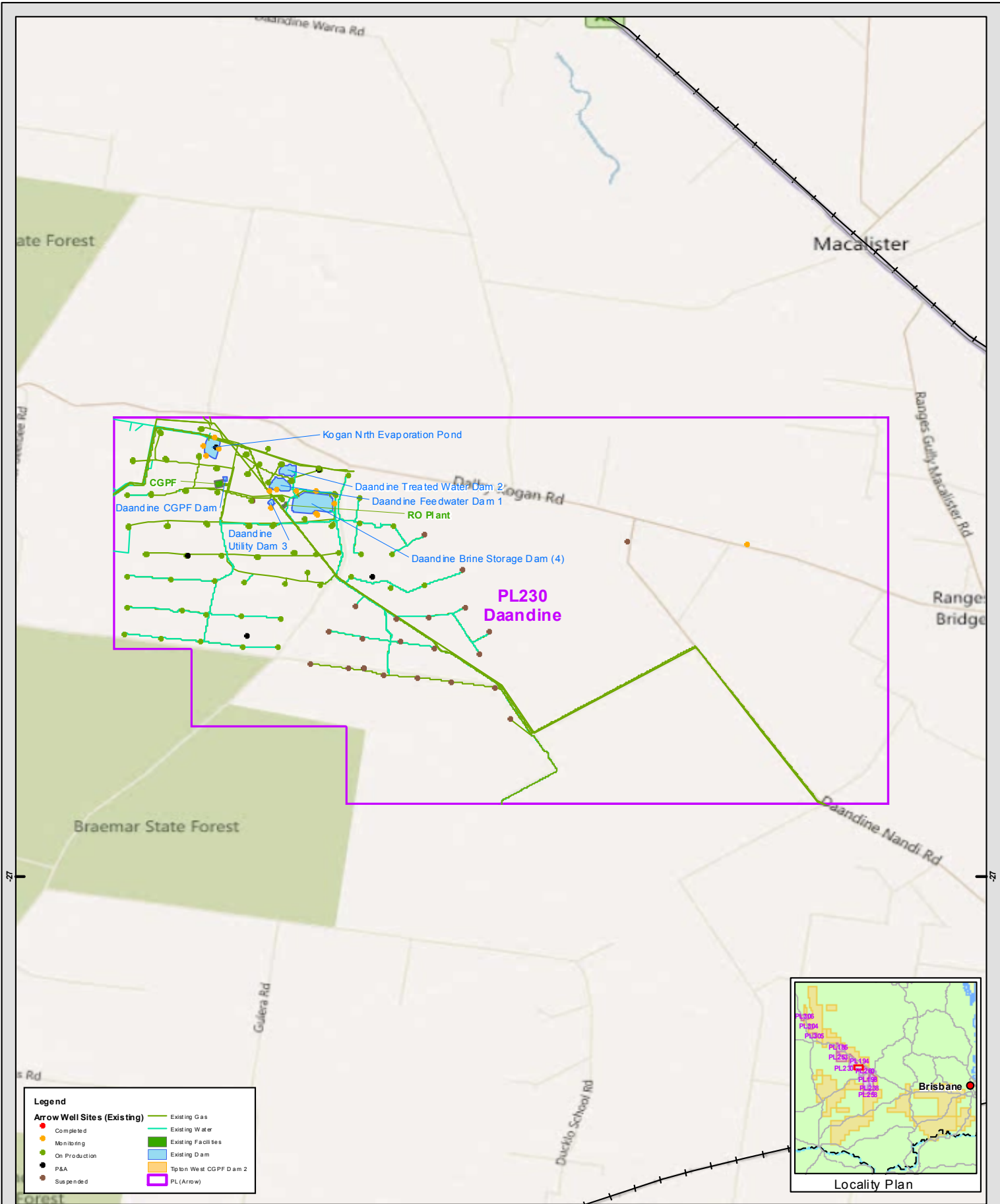
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DXP Existing Infrastructure PL230

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 Geosciences Australia
 Dept. Envir. and Resource Mgmt.

Date: 31/08/2011
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Author: tstringer

0 3.5 7
 Kilometres

Scale: 1:119,160 @ A4
 Coordinate System: GCS GDA 1994



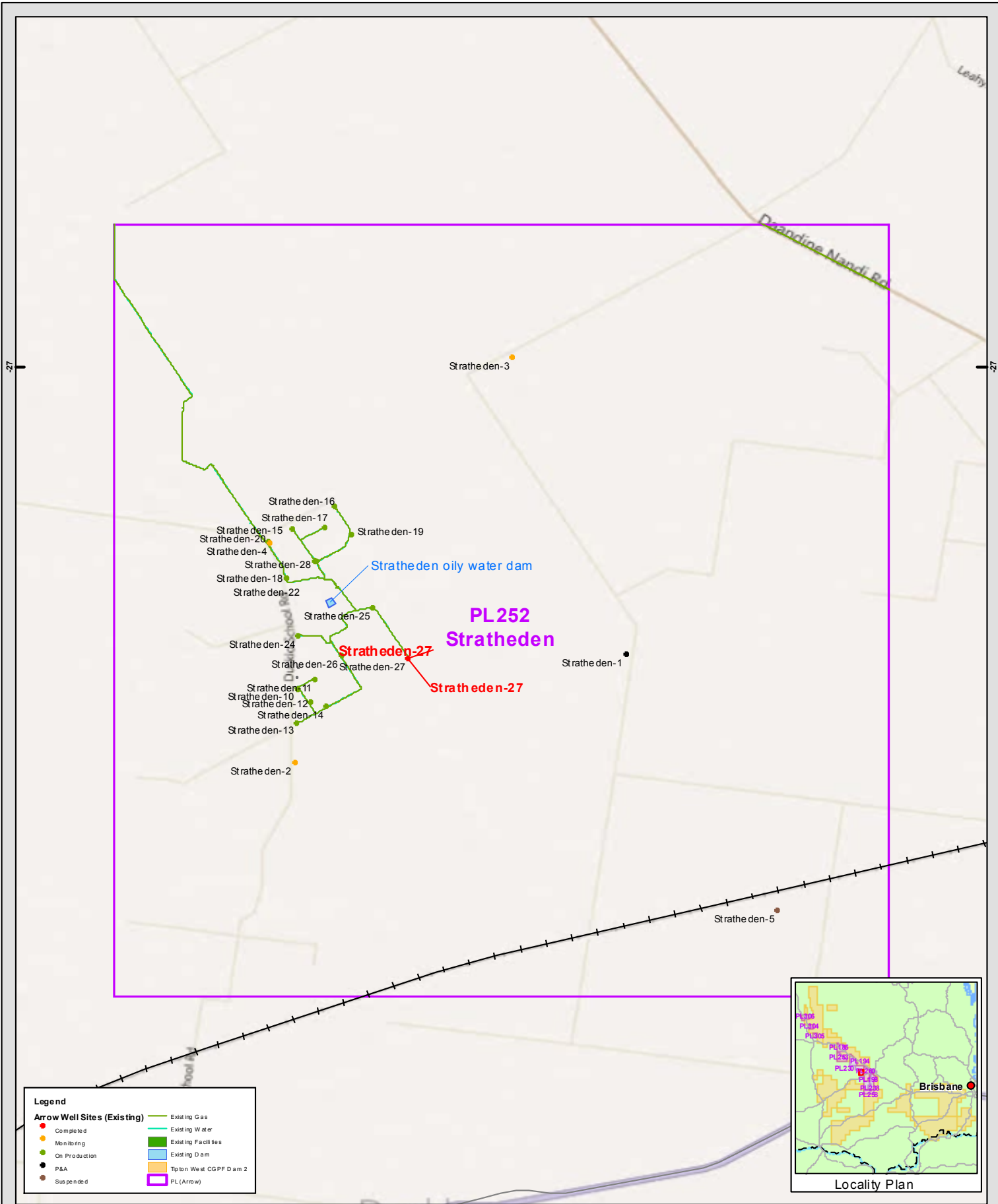
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DXP Existing Infrastructure PL252

Source:
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Author: tstringer

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 Scale: 1:59,580 @ A4
 Coordinate System: GCS GDA 1994



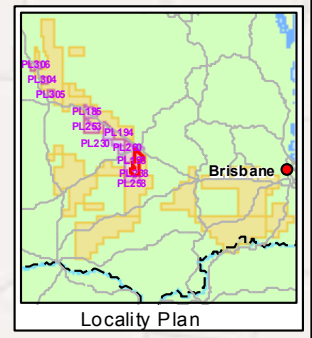
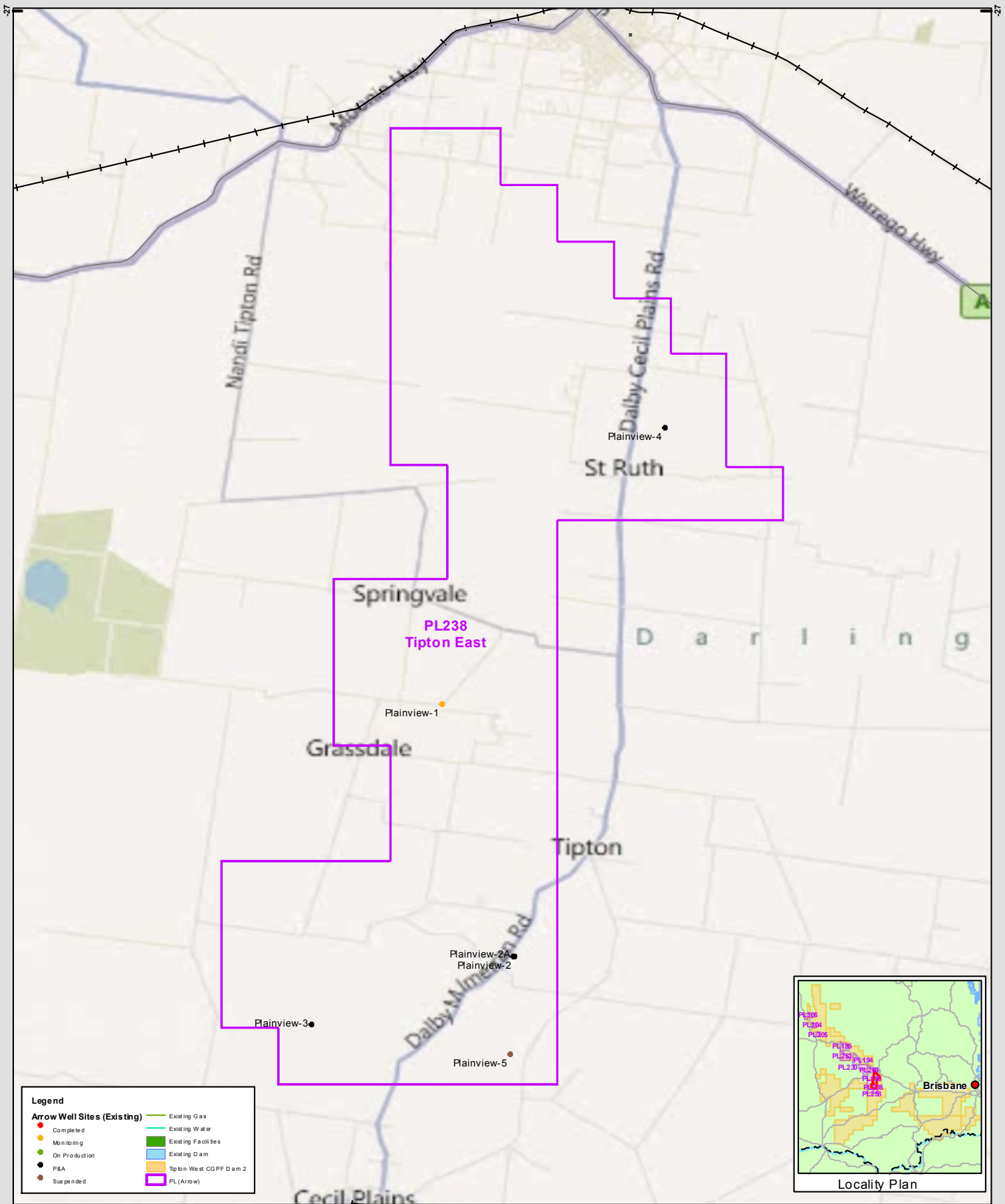
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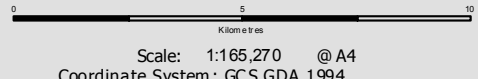
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DXP Existing Infrastructure PL238

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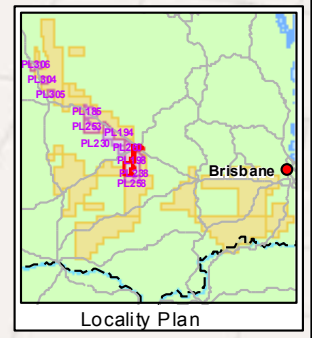
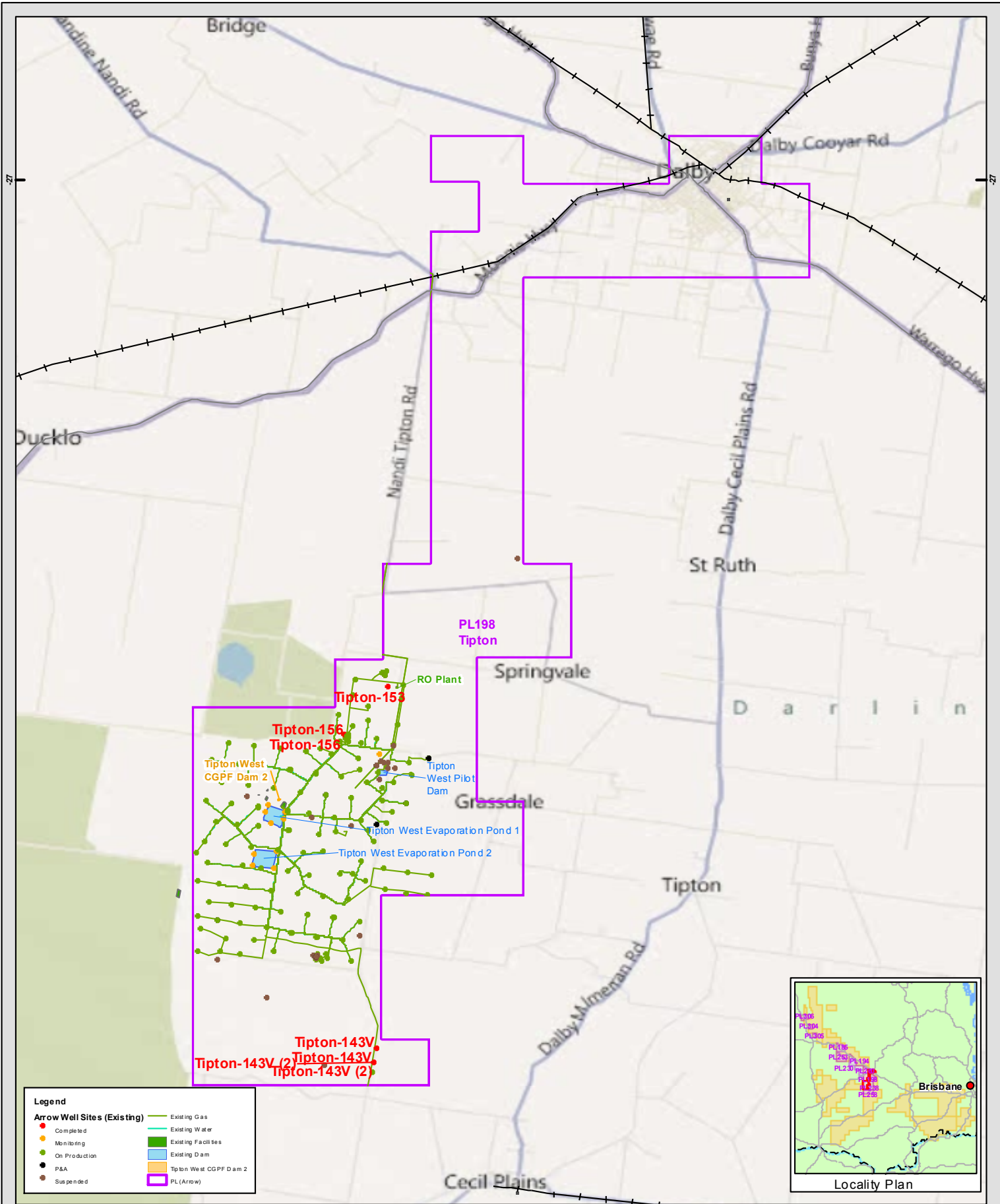
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DXP Existing Infrastructure PL198

Source:
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 Dept. Envir. and Resource Mgmt.

Date: 31/08/2011
Issued To: J Keys
Author: tstringer

0 5 10
 Kilometres

Scale: 1:194,430 @ A4
 Coordinate System: GCS GDA 1994



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Plan of Operations

Dalby Expansion Project (Environmental Authority EPPG00972513)

Petroleum Leases 194, 198, 230, 238, 252, 258, 260

1 October 2013 to 31 March 2015

Table of Contents

1.0	Introduction.....	1
1.1	Purpose and scope	1
1.2	Timeframe	1
1.3	Environmental Authority Holder Details.....	1
2.0	Lease and Land Description.....	3
2.1	Description of Leases	3
2.2	Description of the Land to which Each Lease Applies	3
2.2.1	Land Use.....	3
2.2.2	Properties and Sensitive Places	3
2.2.3	Heritage Places.....	4
2.3	Description of the Land to which the Plan Applies	4
3.0	Petroleum Activities and Infrastructure	8
3.1	Exploration, Appraisal and Production Drilling	9
3.1.1	Exploration Drilling and Appraisal	10
3.1.2	Production (Development) Drilling and Wells	11
3.2	Gas and Water Gathering Lines.....	12
3.3	Access Tracks	12
3.4	Powerlines	12
3.5	Gas Compression.....	13
3.5.1	Tipton West CGPF	13
3.5.2	Daandine CGPF.....	13
3.6	Water Management.....	13
3.6.1	Water Storage.....	13
3.6.2	Water Treatment.....	14
3.7	Groundwater Monitoring Bores	14
3.8	Borrow Pits	15
3.9	Laydown Areas.....	15
3.10	Other Petroleum Activities.....	15
4.0	Programmed and Approved Activities and Infrastructure	16
4.1	Daandine Expansion Project	16
4.2	Surat Tek Park Pipeline.....	16
4.3	Geotechnical Investigation	16
4.4	Soil Stabilisation Trial	17
5.0	Land Disturbance	18
5.1	Existing Disturbed Areas	18

6.0 Rehabilitation Program21

6.1 Rehabilitation21

6.2 Rehabilitation Monitoring Program22

6.3 Completed Rehabilitation22

6.4 Planned Rehabilitation24

7.0 Financial Assurance.....26

8.0 Environmental Authority Action Program.....27

8.1 Overview of Management Systems.....27

8.2 Arrow Energy HSEMS.....27

8.2.1 Overview27

8.3 Arrow Project Management System.....28

8.4 Department Specific Environmental Management Plans29

8.5 Approvals and Land Access Process.....29

8.6 Aspect-Specific Management Strategies29

8.6.1 Land30

8.6.2 Air.....32

8.6.3 Noise and Vibration.....33

8.6.4 Waste34

8.6.5 Water Management34

9.0 Compliance Statement.....37



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Figures

Figure 1 Overview of the location of the DXP area (attached).....	3
Figure 2 Block Identification Map and Cadastral Information for the DXP (attached).....	3
Figure 3 Mining tenures in the region surrounding the DXP (attached).....	3
Figure 4 Potentially Affected Properties (attached)	4
Figure 5 DXP infrastructure maps (attached)	9
Figure 6 Arrow HSE Management System	28

Tables

Table 1 Register of National Estate Place	4
Table 2 Environmental aspects addressed under <i>Arrow Environmental Management Plan</i>	4
Table 3 DXP RE systems that contribute to SSBVs.	5
Table 4 Existing well sites on the DXP by petroleum lease	9
Table 5 Operations dams located within the DXP	13
Table 6 Summary of groundwater monitoring well counts on the DXP by PL	15
Table 7 Estimated existing disturbance by infrastructure type.....	18
Table 8 Estimated existing disturbance by environmentally sensitive area type	19
Table 9 Estimated existing disturbance by Category B sensitive area type	19
Table 10 Estimated existing disturbance by Category C sensitive area type	20
Table 11 Estimated existing disturbance by other area type	20
Table 12 "Plugged and Abandoned" well sites during previous period of the Operational Plan.....	24
Table 13 Planned rehabilitation of decommissioned well sites.....	24

Appendices

Appendix A DXP Environmental Management Plan
Appendix B Environmentally Sensitive Area Maps
Appendix C Mapped SSBV Areas on the DXP
Appendix D Daandine Expansion Project – Land Access Maps
Appendix E Surat Tec Park Project – Land Access Maps
Appendix F Area 7 Geotechnical Investigation – Land Access Map
Appendix G Soil Stabilisation Trials – Land Access Map
Appendix H Statement of Financial Assurance
Appendix I Environmental Authority Action Program

1.0 Introduction

The Dalby Expansion Project (DXP) is a coal seam gas project that is being undertaken by Arrow Energy Pty Ltd (Arrow) on seven petroleum leases (PLs) located west of Dalby, Queensland. The petroleum activities conducted by Arrow within the DXP project area are authorised under Environmental Authority (EA) EPPG00972513.

Note that the previous EA number for this environmental authority was PEN100449509, and where reference to the previous EA number exists, this shall be considered to reference EPPG00972513.

1.1 Purpose and scope

This Plan of Operations has been prepared in accordance with Section 288 of the *Environmental Protection Act 1994 (EP Act)*, which requires the preparation of a Plan of Operations for EAs relating to PLs. Section 287 of the *EP Act* prohibits carrying out a petroleum activity under a PL unless a plan of operations complying with Section 288 of the *EP Act* has been submitted to the administering authority.

This document has been prepared to meet these requirements for petroleum activities undertaken by Arrow within the DXP project area as authorised under EPPG00972513.

The purpose of a plan of operations is to:

- Describe all relevant activities that will take place on the site during the period of the plan.
- Propose an action program for complying with the conditions of the EA.
- Present a rehabilitation program for existing and proposed significant land disturbance.
- Calculate the maximum financial assurance (FA) for the relevant project during the period of the plan.

As provided in Section 703 of the *EP Act*, and as outlined in the Queensland Department of Environment and Heritage Protection (EHP) *Guideline – Preparing a plan of operations for an environmental authority relating to a petroleum lease*, Arrow intend to submit an EA amendment application within 12 months of submittal of this document to remove conditions in the EA relating to matters included in this Plan of Operations. This will include the proposed removal of conditions relating to the Operational Plan in the current EA.

1.2 Timeframe

This Plan is effective for the period of 1 October 2013 to 31 March 2015.

1.3 Environmental Authority Holder Details

The DXP EA authorises environmental harm as a result of carrying out key authorised activities on Petroleum Leases (PLs) 194, 198, 230, 238, 252, 258 and 260 in the Surat Basin, Queensland.

The Principal and Joint Holders of the DXP EA are as follows:

Principal Holder

Arrow Energy Pty Ltd
111 Eagle Street
Brisbane QLD 4000

Joint Holders

Arrow CSG (Australia) Pty Ltd
Level 39
111 Eagle Street
Brisbane QLD 4000

Australian CBM Pty Ltd
Level 39
111 Eagle Street
Brisbane QLD 4000

Arrow (Tipton) Pty Ltd
Level 39
111 Eagle Street
Brisbane QLD 4000

Arrow (Tipton Two) Pty Ltd
Level 39
111 Eagle Street
Brisbane QLD 4000

Arrow (Daandine) Pty Ltd
Level 39
111 Eagle Street
Brisbane QLD 4000

Stanwell Corporation Limited
Level 12, Waterfront Place
1 Eagle Street
Brisbane QLD 4000

2.0 Lease and Land Description

Much of the required Plan of Operations information relating to lease and land description is detailed in the *Arrow Environmental Management Plan for the Dalby Expansion Project (99-V-PL-0027)*, and the *Arrow Surat Gas Project Environmental Impact Statement*. Both of these documents have been previously submitted to the Queensland Department of Environment and Heritage Protection (EHP). A copy of the *Arrow Environmental Management Plan* is also included in Appendix A. Relevant information in this document is referenced throughout Section 2.0.

2.1 Description of Leases

The Dalby Expansion Project (DXP) is located west of Dalby, and covers an area that extends approximately 45 km south, 30 km north and 50 km west of Dalby. The DXP area covers an approximate area of 127,103 hectares and incorporates the townships of Dalby and Cecil Plains. Seven petroleum tenures are incorporated within the DXP area, PL194, PL230, PL252, PL260, PL198, PL238 and PL258. The location and general details of these petroleum tenures are shown in Figure 1.

Figure 1 Overview of the location of the DXP area (attached)

2.2 Description of the Land to which Each Lease Applies

The DXP area is comprised of a total of 417 Block Identification Map (BIM) sub-blocks. The area and relevant sub-blocks for each of the DXP tenures are shown in Figure 2. The DXP encompasses (either wholly or partially) approximately 6,649 properties (as defined by individual Lot on Plans). Mining tenures overlaid with the DXP area are shown in Figure 3.

Figure 2 Block Identification Map and Cadastral Information for the DXP (attached)

Figure 3 Mining tenures in the region surrounding the DXP (attached)

2.2.1 Land Use

The land use in the area is strongly related to the different soil types and topography. Soils within the DXP area are dominated by heavy clays, which form rich agricultural soils around the Condamine River. Agricultural land use within the DXP area ranges from intensive agriculture on the Condamine River floodplain, where many paddocks have been laser-levelled to achieve effective flood irrigation, through to cattle grazing in more marginal areas located to the north and west. Limited agricultural activity exists in areas of higher elevation and within state forests.

Predominant land uses within the study area are cropping and grazing. The communities have displayed a high level of resilience through prolonged periods of drought, substantial floods and fluctuations in agricultural commodity prices. Land within the DXP area is predominantly freehold tenure. Crown land comprising conservation reserves and national parks is also present in the region.

2.2.2 Properties and Sensitive Places

Approximately 399 potential sensitive receptors (occupied buildings) have been identified within the DXP area, excluding the townships of Dalby and Cecil Plains. Sensitive places ground-truthed and mapped within the DXP area are shown in Figure 4. As part of environmental and social impact assessments conducted by Arrow, topographic maps, aerial photographs, satellite imagery, local knowledge, and information from stakeholder consultation were all used to identify sensitive receptor locations. Sensitive receptor locations

were then ground-truthed in the DXP area by Coffey Environments (Australia) Pty Ltd (contracted by Arrow Energy) in October 2009.

Figure 4 Potentially Affected Properties (attached)

2.2.3 Heritage Places

Within the project development area, 372 sites are listed on the Queensland Indigenous Cultural Heritage database. Of these, approximately 60% are stone artefact scatters, with a further 25% being scarred trees. There are extensive ethno-historical accounts of Indigenous activity in the project development area. One known Indigenous cultural heritage site listed on the Register of the National Estate is located wholly or partially within the DXP area, which is listed in Table 1.

Table 1 Register of National Estate Place

PLACE NAME	DESCRIPTION	LOCATION	WITHIN THE DXP AREA	Register of the National Estate Place ID (Listing Status)
Lake Broadwater Conservation Park	Known to be a particularly important place for Indigenous people, having been used for both residential and ceremonial purposes. Associations with an important creator being (i.e., the Rainbow Serpent) have also been identified.	10 km southwest of Dalby	Yes	18052 (indicative place)

Non-Indigenous visitation in the region dates back to the mid-nineteenth century. Since this period, there has been a diverse range of settlement and land uses, resulting in scattered archaeological sites.

Many of the known heritage sites within the DXP area are associated with early settlement and include early pastoral stations, towns, railway camps, schools and churches. Additional sites are associated with transport routes, such as railways, and their associated camps. Pastoralism left its mark in the area with fences, scattered pastoral stations and varied collections of farm machinery.

2.3 Description of the Land to which the Plan Applies

The environmental values for the area of the DXP are detailed in the *Arrow Environmental Management Plan for the Dalby Expansion Project (99-V-PL-0027)*. A copy of the *Arrow Environmental Management Plan* is included in Appendix A. Table 2 shows the environmental aspects listed in (EHP) *Guideline – Preparing a plan of operations for an environmental authority relating to a petroleum lease*, and provides the EMP sections containing information relevant to each of the aspects.

Table 2 Environmental aspects addressed under Arrow Environmental Management Plan

Aspect	DXP Environmental Management Plan Section
Environmentally Sensitive Areas	8.1.6 Environmentally Sensitive Areas (terrestrial) 9.1.3 Environmentally Sensitive Areas (aquatic)
State-significant biodiversity values	8.1.5 Biodiversity Offsets
Endangered, vulnerable, rare or near-threatened species	8.0 Terrestrial Flora and Fauna 8.1.1 Bioregions 8.1.2 Flora – Threatened Ecological Communities 8.1.3 Fauna – Endangered, Vulnerable or Near Threatened Species 9.0 Aquatic Ecology
Dominant ecosystems, topographic features and soils	7.0 Geology, Land and Soils 8.0 Terrestrial Flora and Fauna



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Strategic cropping land	7.1.5 Strategic Cropping Land
Watercourses, wetland, springs, wild river declaration areas	8.1.4. Wild Rivers 9.1.1 Permanent and Semi-permanent Water Courses 9.1.2 Ephemeral Watercourses 12.0 Water 12.1.1 Surface Waters – General Characteristics 12.1.2 Surface Waters – Wetlands 12.1.3 Surface Waters Hydrology 12.1.4 Groundwater
Floodplains	12.0 Water 12.1.2 Surface Waters – Wetlands

Maps of environmentally sensitive areas within the project area are provided in Appendix B. Note that these maps represent “as-mapped” environmentally sensitive areas, and do not necessarily represent validated areas as observed on the ground. Actual environmentally sensitive areas and boundaries will vary from that shown in these maps.

The Queensland Biodiversity Offset Policy came into effect on 3 October 2011 and applies to level 1 petroleum and gas activities under chapter 5A of the EP Act. Regional ecosystems that predominantly make up the State Significant Biodiversity Values (SSBV) that have been identified within the DXP area are identified in Table 3. Special case SSBVs are described in the Queensland Biodiversity Offsets Policy. Mapped SSBV areas within the DXP are shown on the area map in Appendix C.

Table 3 DXP RE systems that contribute to SSBVs.

SSBV	Short Description
Remnant Endangered regional ecosystems	
11.3.1	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open-forest on alluvial plains
11.4.3	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> shrubby open-forest on Cainozoic clay plain
Of Concern Remnant regional ecosystems	
11.3.17	Eucalyptus populnea woodland with <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> on alluvial plains
11.4.12	Eucalyptus populnea woodland on Cainozoic clay plains
11.3.2	Eucalyptus populnea woodland on alluvial plains
11.3.4	Eucalyptus tereticornis and/or Eucalyptus spp. tall woodland on alluvial plains
Remnant Endangered grasslands	
11.3.21	Dichanthium sericeum and/or <i>Astrebla</i> spp. grassland on alluvial plains. Cracking clay soils
Wetlands*	
11.3.27a	Lacustrine wetland (e.g. lake)
11.3.27b	Lacustrine wetland (e.g. lake).
11.3.27	Palustrine wetland (e.g. vegetated swamp).
11.3.27d	Palustrine wetland (e.g. vegetated swamp).
Watercourses*	

11.3.25	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines
11.3.18	Eucalyptus populnea, Callitris glaucophylla, Allocasuarina luehmannii shrubby woodland on alluvium
11.5.1	Eucalyptus crebra, Callitris glaucophylla, Angophora leiocarpa, Allocasuarina luehmannii woodland on Cainozoic sand plains/remnant surfaces
11.7.4	Eucalyptus decorticans and/or Eucalyptus spp., Corymbia spp., Acacia spp., Lysicarpus angustifolius on lateritic duricrust
11.7.7	Eucalyptus fibrosa subsp. nubila +/- Corymbia spp. +/- Eucalyptus spp. on lateritic duricrust
11.7.5	Shrubland on natural scalds on deeply weathered coarse-grained sedimentary rocks
11.5.4	Eucalyptus crebra, Callitris glaucophylla, C. endlicheri, E. chloroclada, Angophora leiocarpa on Cainozoic sand plains/remnant surfaces. Deep sands
Essential Habitat*	
11.5.20	Eucalyptus moluccana and/or E. microcarpa/ E. pilligaensis +/- E. crebra woodland on Cainozoic sand plains
11.7.4	Eucalyptus decorticans and/or Eucalyptus spp., Corymbia spp., Acacia spp., Lysicarpus angustifolius on lateritic duricrust
11.7.7	Eucalyptus fibrosa subsp. nubila +/- Corymbia spp. +/- Eucalyptus spp. on lateritic duricrust
11.3.27a	Lacustrine wetland (e.g. lake)
11.3.27d	Palustrine wetland (e.g. vegetated swamp).
11.7.5	Shrubland on natural scalds on deeply weathered coarse-grained sedimentary rocks
11.3.25	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines
11.5.1	Eucalyptus crebra, Callitris glaucophylla, Angophora leiocarpa, Allocasuarina luehmannii woodland on Cainozoic sand plains/remnant surfaces
11.3.18	Eucalyptus populnea, Callitris glaucophylla, Allocasuarina luehmannii shrubby woodland on alluvium
11.3.25	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines
Mature Endangered Regrowth	
11.3.17	Eucalyptus populnea woodland with Acacia harpophylla and/or Casuarina cristata on alluvial plains
11.4.3	Acacia harpophylla and/or Casuarina cristata shrubby open forest on Cainozoic clay plains
11.3.1	Acacia harpophylla and/or Casuarina cristata open forest on alluvial plains
11.4.12	Eucalyptus populnea woodland on Cainozoic clay plains
Mature Of Concern Regrowth	
11.3.2	Eucalyptus populnea woodland on alluvial plains
11.3.4	Eucalyptus tereticornis and/or Eucalyptus spp. tall woodland on alluvial plains
11.3.3	Eucalyptus coolabah woodland on alluvial plains
Connectivity	
11.5.20	Eucalyptus moluccana and/or E. microcarpa/ E. pilligaensis +/- E. crebra woodland on Cainozoic sand plains
11.5.1	Eucalyptus crebra, Callitris glaucophylla, Angophora leiocarpa, Allocasuarina

	luehmannii woodland on Cainozoic sand plains/remnant surfaces
11.7.7	Eucalyptus fibrosa subsp. nubila +/- Corymbia spp. +/- Eucalyptus spp. on lateritic duricrust
11.7.4	Eucalyptus decorticans and/or Eucalyptus spp., Corymbia spp., Acacia spp., Lysicarpus angustifolius on lateritic duricrust
11.5.4	Eucalyptus crebra, Callitris glaucophylla, C. endlicheri, E. chloroclada, Angophora leiocarpa on Cainozoic sand plains/remnant surfaces. Deep sands
11.7.5	Shrubland on natural scalds on deeply weathered coarse-grained sedimentary rocks
11.3.18	Eucalyptus populnea, Callitris glaucophylla, Allocasuarina luehmannii shrubby woodland on alluvium
11.3.25	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines

3.0 Petroleum Activities and Infrastructure

The Petroleum and Gas (Production and Safety) Act 2004 lists 5 key authorised activities for PLs as follows:

- Exploration, production and storage activities
- Construction and operation of petroleum pipelines
- Petroleum processing
- Processing produced water
- Incidental activities

Authorised petroleum activities that are required to directly or indirectly support CSG exploration, appraisal, field development and production include:

- Exploration drilling and appraisals
- Production drilling and field development
- Well work-overs and maintenance
- Installation and operation of gas and water gathering lines and pipelines
- Development and maintenance of access tracks
- Installation and operation of overhead and underground power lines
- Construction and operation of gas compression facilities
- Construction and operation of water storage dams
- Construction and operation of water treatment facilities
- Other incidental activities, which include, but are not limited to the following:
 - Site clearance involving clearing of vegetation and removal of topsoil
 - Construction and implementation of erosion and sediment controls
 - Dust suppression
 - Site rehabilitation
 - Sourcing of material from borrow/gravel pits
 - Installation and monitoring of groundwater monitoring wells
 - Construction and operation of mobile and temporary camps
 - Construction and operation of mobile and temporary offices
 - Construction and operation of vehicle and equipment wash down facilities
 - Construction and operation of maintenance facilities
 - Construction and operation of stores and warehouse facilities
 - Mobile power generation
 - Operation of water pumps
 - Installation of sumps for drilling fluids
 - Setup and operation of temporary water transfer equipment (e.g. setup of piping and pumps)
 - Pressure testing of piping and pipelines, including hydrostatic pressure testing
 - Chemical storage, including mobile chemical storage
 - Fuel storage, including mobile fuel storage
 - Installation of tanks for water storage
 - Construction and operation of equipment and materials laydown areas
 - Sewage treatment and disposal

The key authorised petroleum activities (including incidental activities) that have been undertaken as part of the development of the DXP, or that are otherwise planned for the future development of the DXP are described below. The locations of petroleum infrastructure described and referenced in this section are shown in Figure 5 (a through g), which correspond to tenement numbers PL194, PL198, PL230, PL238, PL252, PL258 and PL260, respectively. This map set should be referenced throughout this section.

Accompanying GIS geospatial datasets can be provided to EHP upon receipt of a request for this data that includes data/file format specifications and data delivery instructions.

Figure 5 DXP infrastructure maps (attached)

3.1 Exploration, Appraisal and Production Drilling

The approximate numbers of exploration, appraisal, and production wells (collectively referred to as CSG wells) on the DXP are summarised by tenement in **Table 4**. These figures include wells that have been “suspended” (not yet brought online for production) and well sites where the well has been “plugged and abandoned” (decommissioned).

Table 4 Existing well sites on the DXP by petroleum lease

TENEMENT NUMBER	NUMBER OF WELL SITES				
	ALL CSG WELLS	EXPLORATION WELLS	APPRAISAL (PILOT) WELLS	PRODUCTION (DEVELOPMENT) WELLS	WELLS ON PRODUCTION
PL194	81	7	6	68	58
PL198	177	3	39	135	142
PL230	120	3	6	111	91
PL238	6	6	0	0	0
PL252	31	7	24	0	16
PL258	17	11	6	0	1
PL260	5	3	2	0	0
TOTAL	437	40	83	314	308

Note: Well counts based on Arrow GIS data as of 21 August 2013

Locations for exploration, appraisal, and production drilling are selected based on desktop assessments, which consider geological, geographical, social, landholder and environmental factors and constraints. Access tracks are constructed and maintained to provide safe access to the sites. Where practicable, existing tracks or roads are used, and/or drill sites are located proximal to existing tracks and roads to minimise the amount of vegetation clearing and land disturbance that is required.

Exploration, appraisal and production wells are individually designed to comply with relevant industry regulations. Drilling is designed and conducted in a manner that hydraulically isolates aquifers from the surface and other aquifers using pressure-tested cement.

In preparation for drilling, sites are cleared and levelled and a gravel pad (“drill pad”) is installed as a base for the drill rig, drilling equipment, and site vehicles. The drill pad also serves to provide a barrier to bush and grass fires.

Drill sites are sized to accommodate the drilling rig and equipment, site office, storage of equipment and supplies, while allowing for the safe movement of vehicles and machinery and loading and unloading of equipment and materials. Mobile fuel and chemical storage facilities are also housed and operated on site. The overall disturbed area also includes an area for the temporary storage of vegetation, top soil stockpiles and spoil. The size of the disturbance for a drill site varies depending on the number and type of wells and site-specific equipment requirements. Although safety and feasibility constraints limit the extent to which drill sites can be down-sized, Arrow endeavours to keep the disturbance areas for drill sites to a minimum that can be practically achieved within such constraints.

As part of the clearance activities, erosion and sediment controls are installed in accordance with an Arrow drill site erosion and sediment control plan. Depending on the location, the perimeter of the drill pad may be fenced for safety and security, and to provide a barrier to livestock and large fauna.

Throughout the drilling process, water-based drilling fluids (or drill muds) are circulated down the drill hole and back to surface. Drilling fluids are integral to the drilling process. They are necessary to counter subsurface formation pressure, stabilise the formation and borehole wall, cool the drill string, and keep the borehole clear of drill cuttings by returning cuttings back to the surface in the circulated fluid. Drill fluids are also designed to minimise the loss of fluid to the surrounding formation. Note that Arrow does not use oil or synthetic oil based drilling fluids.

Historically, Arrow managed drill fluid and cutting separation by cycling fluids through a series of small settling pits, usually 3 or 4 pits in series located along the margin of the drill pad (this has historically been and still is a common and standard industry practice). Following the completion of drilling, fluids and cuttings are removed from the pits and disposed, reused, or recycled, and the pits are sampled (where required) and backfilled as part of site rehabilitation.

Although pits have been historically used, Arrow is transitioning to the use of above-ground tanks and separation equipment for drill fluid and cuttings management, which reduces the level of land disturbance. Most of Arrow's drill sites now employ above ground equipment for management of drill fluids and cuttings.

When a well is no longer required, it is 'plugged and abandoned,' a process which includes well decommissioning and site rehabilitation. Well decommissioning is completed in accordance with regulatory requirements, including the *Petroleum and Gas (Production and Safety) Regulation 2004* (Queensland) and the *Code of Practice for Construction and Abandoning Coal Seam Gas wells in Queensland* (Queensland Government, 2011). As part of the plug and abandonment process, the well is typically sealed with cement, and the wellhead / steel casing is cut off at approximately 1.5 m below the surface, sealed with metal cap, fitted with a metal identification plate, and buried. The land is then reshaped, stabilised, and rehabilitated, typically using topsoil that was isolated and stockpiled as part of the preparation of the drill site.

3.1.1 Exploration Drilling and Appraisal

Exploration drilling is used to determine parameters such as the location, extent, thickness, gas content, and gas saturation of coal seams. There are two main forms of exploratory wells, exploration wells and appraisal (or pilot) wells.

3.1.1.1 Exploration Wells

Exploration drilling and wells are primarily used to assess and characterise subsurface geological formations, and to determine the location, extent, thickness, and properties of coal seams/formations.

Following the drilling and installation of an exploration well, a series of down-hole tests are conducted to obtain geological data. After drilling is complete and all data has been gathered, the well is decommissioned and site rehabilitation commenced.

Alternatively, an exploration well can be converted into a permanent water monitoring bore to measure reservoir pressures within the coal seams and/or water pressures within known aquifers. Depending on the well's location relative to current producing wells or future production fields, the monitoring well can provide baseline data prior to the development of a coal seam gas field. Additional regulations apply when converting wells to water monitoring bores.

3.1.1.2 Appraisal (Pilot) Wells

Appraisal (or pilot) wells are used to assess the production potential of a particular area or field, and to help determine the most effective way of producing coal seam gas. Pilots are designed to mimic a small-scale production field, and are used to gather information about gas and water production rates, to trial field-specific well designs, and also to measure the quality of water that is produced.

Pilot testing involves the installation and testing of a small cluster of wells. The well cluster is usually configured as a central well surrounded by outlying wells positioned in a diamond or square pattern at a

spacing of approximately 200-250m. However, this configuration and spacing can vary depending on the characteristics of the specific gas field and land access and environmental constraints. The close proximity of the wells allows for relatively quick drawdown of water within the coal seam, which minimises the time required for testing.

Each well is completed with a downhole pump and production tubing which is used to extract water from the coal seam. By extracting water from the coal seam the well lowers the hydrostatic pressure on the seam which allows the gas to flow into the well and to the surface. Pumping from the well usually lasts between three and twelve months or until sufficient data on gas and water rates can be obtained. In some cases approval for an extended production test is requested from the administering authority, to allow for further testing of the gas and water reserves past twelve months.

The gas from each well is collected and flared at each pilot location.

A lined dam is generally associated with the pilot and is constructed to receive and store the produced coal CSG water. The size of the dam is determined using information collected during exploration and built large enough to store water for the entire testing period. In some instances, the CSG water can be connected into the existing water gathering system and sent to one of the major aggregation dams on site.

The data collected from the pilot is analysed and used to determine if the area can support a viable gas field. The data would then be used in future gas field development planning by optimising well spacing, water and gas infrastructure, water treatment options and pump sizes.

3.1.2 Production (Development) Drilling and Wells

Production wells (or development wells) are drilled to produce gas to sell to market and fulfil domestic gas supply contracts. The main production fields for the DXP include:

- Kogan North (PL194, Figure 5a)
- Tipton West (PL198, Figure 5b)
- Daandine (PL230, Figure 5c)
- Stratheden (PL252, Figure 5e)

After a production well is installed, the well pad and active operational area are reduced to a relatively small area around the wellhead, plus the access track to the wellhead. The active operational area includes the wellhead and auxiliary equipment, which typically includes: artificial lift equipment (pumps); wellhead gas/water separator; control valves; monitoring, instrumentation and communications equipment; and various connections to the gas and water gathering system. The operational area is fenced and signposted for safety and security purposes to prevent unauthorised entry to the area around the wellhead. The fencing also provides a barrier to livestock and large fauna.

Based on modelling, the average operational life of a production well is estimated to be 15 to 20 years. Well workovers typically take place every 1 to 5 years during a well life. Workover activities and land disturbance is similar to that conducted during the construction of a production well.

The majority of wells in the Surat Basin are vertical wells. However, Arrow is also trialling other well configurations, including multi-well pads with slant wells and/or deviated from vertical wells. Multi-well pads are larger than a well pad for a vertical well. However, the overall disturbance area is smaller than that for an equivalent number of vertical wells.

Arrow does not currently intend to carry out hydraulic fracturing (or hydraulic stimulation) of CSG-producing formations within the DXP project area. Hydraulic fracturing is the process of propagating small fractures within a target CSG-producing zone as a means to increase the recovery of gas from a coal formation.

Arrow is in the process of implementing drilling technology trials in an area of the DXP called the Surat Tek Park. The objectives of the Surat Tek Park project are to trial and prove drilling technologies that will minimise

landholder impact, environmental impact, land disturbance, cost and drilling duration. The Surat Tek Park project involves the installation of two groups of 7 production wells, drilled from two separate drill pads. On each pad, one vertical well and a total of six slant or deviated from vertical wells will be installed and trialled. The Surat Tek Park and both drill pads are located on the Arrow Energy owned property on PL252.

The techniques proposed as part of these drilling trials do not vary greatly from those currently used for the conventional vertical wells drilled by Arrow. As such the drilling trials at Surat Tek Park are not anticipated to introduce any additional impacts on environmental values.

3.2 Gas and Water Gathering Lines

Respectively, there are approximately 238km and 272km of gas and water gathering lines that form the DXP gathering system. The majority of gas and water gathering lines are co-located with each other (within the same disturbance), as well as co-located with tracks and roads.

The existing gathering system for the DXP consists of gas gathering lines and water gathering lines flowing from the well heads to gas compression and to water storage facilities, respectively. Gathering lines are typically 110 to 630 mm diameter High Density Poly Ethylene (HDPE) buried within maintained cleared corridors.

Water gathering lines include high point vents to collect any gas not separated from the water at the wellhead. Gas gathering lines similarly incorporate low point drains for the removal of water from the gas.

During installation, the cleared corridor width is minimised to the extent practicable, and otherwise conforms with the conditions of the EA, as applicable, where clearance widths are specified. Trenching equipment (backhoe, trench digger, etc.) is used to excavate a trench in which the gathering pipes are laid. Pipes are laid and connected together. Once the gathering system is connected, the trench is backfilled with spoil and is compacted and the surface levelled. Stockpiled topsoil is re-spread and the disturbed area is revegetated. Prior to commissioning, the gathering systems are leak and strength tested, as per code requirements. Gathering line construction and operation is carried out in accordance with the principles of the Australian Pipeline Industry Association (APIA) *Code of Environmental Practice – Onshore Pipelines* (APIA 2009).

3.3 Access Tracks

There are approximately 400km of tracks within the DXP project area that are used by Arrow. Note that this distance may include tracks that were not originally developed by Arrow (i.e. tracks used by Arrow, but which may have existed prior to the commencement of activities requiring the use of the track).

Access tracks are required on the gas fields to allow the servicing of well sites and other supporting infrastructure. Already established access tracks are used wherever practicable; however purpose built access tracks will be required to be constructed where existing tracks are not suitably located.

The clearance areas and track widths are minimised to the extent practicable, and otherwise conform with the conditions of the EA as applicable where track widths and clearance areas are specified. Take-off drains are typically located at regular intervals along a track.

Access tracks are typically co-located with other linear infrastructure, including water and gas gathering lines and powerlines.

3.4 Powerlines

There is a total of approximately 14 km of Arrow-owned overhead power lines within the DXP project area. Overhead powerlines are required to power infrastructure related to petroleum activities on the DXP, including wellhead and compressor facilities. For safety reasons, powerlines require a clear easement; therefore vegetation within, and encroaching upon the powerline easement is cut back. To minimise

disturbances, powerlines are co-located with pipeline easements and access tracks wherever possible. Where this does occur, the combined corridors widths for the two pieces of infrastructure are substantially reduced.

3.5 Gas Compression

There are two existing central gas processing facilities (CGPF), containing 13 compressor units in total, within the DXP. These facilities are the Tipton West CGPF (located on PL198), and the Daandine CGPF (located on PL230). Gas is conveyed to these facilities through the gas gathering network.

The CGPFs comprise multiple reciprocating compressor units, a triethylene glycol (TEG) dehydration unit, a cold vent, storage tanks, an oily water dam, a control centre and gas metering and control facilities. Gas from the production wells received by the CGPFs is subject to four stages of compression to achieve a pressure of approximately 10,200 kPag. The compressed gas is directed to a coalescing filter to remove entrained oil and water droplets before the gas is dehydrated in a TEG contacting column. The dry gas is directed to metering and distribution infrastructure and sent via high pressure gas pipelines to fulfil ongoing domestic sales agreements. Oily water is directed to the on-site oily water dam. The TEG used to dehydrate the compressed gas is continually regenerated by distilling off the absorbed water at low pressure.

The operational area of gas compression facilities includes operations offices as well as facilities for storage of chemicals, fuels, lubricants and other materials necessary for plant operation.

3.5.1 Tipton West CGPF

The Tipton West CGPF has the capacity to process up to 35 TJ of gas per day supplied from the existing gas fields within the DXP area. The CGPF is comprised of six gas-driven oil lubricated reciprocating compressor units. The disturbance footprint associated with the CGPF is approximately 4 ha.

3.5.2 Daandine CGPF

The Daandine CGPF is similar in design to the Tipton West CGPF. It has a slightly larger capacity (processing up to 42 TJ of gas per day) and is comprised of seven reciprocating compressor units. The disturbance footprint associated with the CGPF is approximately 4 ha.

3.6 Water Management

Arrow manages produced CSG water from its production fields (Tipton West, Daandine, Stratheden and Kogan North) through a combination of water storage dams and two water treatment facilities, which are located at Daandine and Tipton. The treatment facilities allow for the treatment and beneficial use of CSG water generated through production activities, in accordance with Arrow's *Coal Seam Gas Water and Salt Management Strategy (2013) (Doc no. 003-000-AA-5980-00003)* and Surat Basin *Coal Seam Gas Water Management Plan (2011) (Doc no. ENV11-133)*.

3.6.1 Water Storage

There are currently 16 operations dams located in the DXP area, which are listed in Table 5. These are used for a range of coal seam gas water management purposes including raw coal seam gas water aggregation, brine management and treated CSG water storage.

Table 5 Operations dams located within the DXP

DAM NAME	TENEMENT NUMBER	PURPOSE	FOOT PRINT AREA (ha)	STORAGE VOLUME AT DSA (ML)	STORAGE VOLUME AT HYDRAULIC CAPACITY (ML)	HAZARD CATEGORY	YEAR CONSTRUCTED
Tipton West Aggregation Dam 1	PL198	Aggregation	39.6	1,243	1782	High	2006
Tipton West Aggregation Dam 2	PL198	Aggregation	51	1,781	2502	High	2007
Tipton West Pilot Dam	PL198	Aggregation	5.2	88.6	111	Significant	2004
Tipton West CGPF Dam 1	PL198	Process	0.27	1.4	3.8	Significant	2006
Tipton West CGPF Dam 2	PL198	Process	0.42	-1	2.4	Low	2007
Tipton West Feedwater Dam	PL198	Aggregation	11.7	368	424	Significant	2011
Tipton West Brine Storage Dam	PL198	Brine Storage	32.1	830	1,072	High	2012
Tipton West Utility Dam	PL198	Process	2.9	-1	54	Significant	2011
Tipton West Treated Water Dam	PL198	Treated Water	11.7	-1	424	Low	2012
Kogan North Aggregation Dam	PL230	Aggregation	14.3	304.3	371.75	Significant	2005
Daandine Feedwater Dam	PL230	Aggregation	13.7	391.4	457.8	Significant	2009
Daandine Brine Storage Dam	PL230	Brine Water	42.1	1,128	1,458	Significant	2007
Daandine Treated Water Dam	PL230	Treated Water	9.4	-1	247	Significant	2009
Daandine CGPF Dam	PL230	Process	0.84	18.1	21.8	Significant	2009
Daandine Utility Dam	PL230	Process	2.1	27.2	36.2	Significant	2009
Stratheden Transfer Dam	PL252	Aggregation	0.82	15.7	21.8	Significant	2009

*Note1: Dams classified as having a Low hazard category for the 'failure to contain' scenario in the "Manual for Assessing Hazard Categories and Hydraulic Performance of Dams" (DEHP, 2012) do not require a Design Storage Allowance (DSA).
Data from Arrow Dam Register 7 August 2013.*

All of Arrow's dams associated with the management of coal seam water are operated and authorised in accordance with legislative requirements. This includes completing a hazard assessment for all dams that hold untreated CSG to determine if they are a Low, Significant or High hazard dam in accordance with EHPs *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*.

Note that the infrastructure maps (Figure 5a to Figure 5g) show a number of dams listed as either farm dams, irrigation dams, or landholder dams. Although some of the farm dams are owned by Arrow, they are authorised under a separate authority (e.g. development application) and do not form part of the petroleum activities administered under the EA for the DXP.

3.6.2 Water Treatment

Arrow's water treatment facilities at Daandine (PL230) and Tipton (PL198) utilise a process of microfiltration (MF) and Reverse Osmosis (RO). Both facilities have a treatment capacity of approximately 12 ML/day.

The operational area of the RO plants includes facilities for storage of chemicals and other materials as necessary for plant operation.

Existing approvals under the *Queensland Environmental Protection (Waste Management) Policy 2000* provide for beneficial uses of treated water for irrigation, stock watering, coal washing, industrial cooling and dust suppression. Uses of CSG water are also approved under the EA for the DXP.

3.7 Groundwater Monitoring Bores

The approximate numbers of groundwater monitoring bores on the DXP are summarised by tenement in Table 4. Each groundwater monitoring bore is designed and used for a particular purpose and function. These include:

- Monitoring of groundwater quality in the vicinity of water storage dams.
- Monitoring of aquifers at a regional level.
- Assessment of hydraulic connectivity between coal seams and aquifers.
- Assessment of groundwater quality where treated water is irrigated under a beneficial use approval.

The majority of the groundwater monitoring wells on the DXP are used for monitoring of groundwater quality in the vicinity of water storage dams and assessment of beneficial use irrigation trials.

Table 6 Summary of groundwater monitoring well counts on the DXP by PL

TENEMENT NUMBER	COUNT
	GROUNDWATER MONITORING WELLS
PL194	-
PL198	38
PL230	42
PL238	-
PL252	12
PL258	2
PL260	2
TOTAL	96

3.8 Borrow Pits

Borrow pits are required as a source of gravel and other materials necessary for the construction of well sites, access tracks, dams and storage areas. Note that not all of the borrow pits that Arrow utilises were established by Arrow. Some have been established by land holders or other operators within the project area.

3.9 Laydown Areas

Temporary laydown areas are used for unloading and storage of equipment and materials, including temporary storage of chemicals and fuels. Setup of laydown areas are essential to support the construction and installation of infrastructure. Laydown areas are preferentially located in areas that have already been cleared, where practicable. Arrow endeavours to minimise the level of disturbance and extent of clearing for laydown areas to the extent practicable.

3.10 Other Petroleum Activities

Petroleum activities conducted within the project area may include, but are not limited to any of the activities listed as “other incidental activities” in Section 3.0, above. Many of these listed activities are completed as a subset of higher level key authorised petroleum activities. In addition, these activities wouldn’t necessarily generate a separate disturbance area as they are often encompassed or conducted within the footprint of facilities and other higher level key authorised petroleum activities.

4.0 Programmed and Approved Activities and Infrastructure

Proposed works involving land disturbance is identified as “programmed and approved” at the commencement of the plan period if the approvals package has been released. It is at this phase in the project lifecycle that agreements with landholders have been executed, environmental constraints identified and addressed, and the locations of disturbance and infrastructure are known and approved. Note that some activities listed in this section may have already commenced, but are listed here because they have not yet been commissioned.

4.1 Daandine Expansion Project

The Daandine Expansion Project (DDEXP) consists of the engineering and design of new equipment and facilities to increase the production capacity of the existing Daandine Central Gas Process Facility (CGPF), which supplies coal seam sourced gas to the Braemar 2 Power Station. The upgrade will eventually include upgraded gas facilities, new wells and associated gathering systems in order to deliver the increased flow of produced gas to the existing Daandine CGPF. The project area is located within PL230 and PL252, approximately 7-15 km southeast of the Daandine CGPF.

Phase 1A of the DDEXP project has been approved, and will include the upgrade of existing tracks, construction of a small amount of new track, and installation of multi-well pads. The location of the approved infrastructure is shown in the land access maps provided in Appendix D. Note that the installation of the gathering system is not yet approved.

Three multi-well pads will be constructed as part of Phase 1A, each of which will contain a total of nine wells (27 wells in total). These will include the following Daandine (DA) field wells: DA200 to DA208; DA210 to DA218, and DA220 to DA228. The disturbance area will be approximately 2 ha per pad.

Approximately 13 km of existing access track will be upgraded and approximately 3 km of new track will be constructed, resulting in a total addition disturbance of approximately 16 ha. The project will require clearing of a 550 metre (0.66 ha) right-of-way through Category C ESA.

4.2 Surat Tek Park Pipeline

The Surat Tek Park Project (STP) consists of the construction of gathering system pipelines from two multi-well pads to increase the production capacity of the existing Daandine Central Gas Process Facility (CGPF), which supplies coal seam sourced gas to the Braemar 2 Power Station. The project area is located within PL230 and PL252. The STP pipeline, shown in Appendix E, has been approved for construction commencing in late 2013. The construction of the pipeline will result in a total disturbance area of approximately 21 ha.

4.3 Geotechnical Investigation

A geotechnical investigation is proposed on PL230. The geotechnical investigation will assess the subsurface, soil, rock, and groundwater conditions of the site and a topographic survey will map surface features of the site. The proposed disturbance will be limited to approximately 30 test pits, each measuring approximately 3m long x 0.9m wide x 3m deep. The total area of the test pits will be approximately 0.015ha. Some clearing will also be required for access tracks and pads, which will be limited to approximately 6m wide tracks and 20m x 20m pads. Any cleared trees and other woody vegetation will be mulched and spread on-site. The total disturbance area from this activity will be approximately 2.5ha. The investigation area is highlighted in Appendix F.

4.4 Soil Stabilisation Trial

A soil stabilisation trial has been designed to assess options for the optimisation of well pad and access track design and to examine potential cost saving, durable, weather and traffic resistant alternatives to fully gravelled access tracks for the Arrow LNG Project. A range of commercially available spray treatment stabilisers and matting will be applied to created access tracks and pads with a total disturbance area of 1.7ha. The investigations will include assessment of the soil and gravel behaviour under traffic loads and ambient conditions that are representative of those expected to occur during drilling activities under a seasonal range of ambient influences. The trial areas are shown in Appendix G.

5.0 Land Disturbance

The following summarises the land disturbances from Arrow’s existing activities and infrastructure, as well as estimated disturbances from “planned and approved” activities and infrastructure.

The disturbance data presented in this section was developed based on Arrow GIS datasets, using a combination of “as-built” clearance data and application of representative assumptions for infrastructure in cases where as-built clearance data is not available in the Arrow GIS system. The assumptions included application of standard “buffers” for linear infrastructure (e.g. pipelines, power lines, tracks) and standard clearance dimensions for well sites.

Note that the estimates below represent the original land disturbance area for respective infrastructure, and do not take into account areas where rehabilitation may have commenced, but achievement of the final rehabilitation state is not confirmed. For the purposes of this report, disturbed land where progressive or final rehabilitation has been commenced, is considered to still be “significantly disturbed” until such time that attainment of the final rehabilitated state is complete and confirmed through monitoring.

For disturbance data that is presented as totalled values, the values represent the aggregate disturbance. In other words, overlaps areas in disturbances between adjacent infrastructure (e.g. adjacent tracks, pipelines, and powerlines) are only counted once. Note that where disturbances are presented individually by disturbance type, the sum of these values does not represent the aggregate disturbance due to overlaps in disturbance areas between multiple infrastructure.

The estimated values presented below are the best representation of Arrow’s land disturbance based on currently available GIS data. These estimates will be improved and refined, likely resulting in overall reduced disturbance values, as the data itself is improved and refined. Towards this end, Arrow will be undertaking a comprehensive rehabilitation monitoring program, planned for commencement in Quarter 4 2013. Through this program, clearance areas will be “ground-truthed” and updated in the Arrow GIS system, which will result in more precise and accurate estimation of disturbance areas.

5.1 Existing Disturbed Areas

The estimated existing areas of disturbance are summarised in Table 7. The total estimated disturbed area as at the commencement of the plan period is approximately 2,120 ha. The total estimated undisturbed area at the commencement of the plan period is approximately 124,983 ha. For the purposes of this document, the undisturbed area refers to the area not disturbed as a result of petroleum activities conducted by Arrow.

The estimated existing areas of disturbance, including disturbances by environmentally sensitive area category, are summarised in Table 8.

A summary of the estimated existing areas of disturbance to sensitive areas by sensitive area type is provided in Table 9 through Table 11.

Table 7 Estimated existing disturbance by infrastructure type

TENEMENT NUMBER	DISTURBANCE AREA (ha)						
	AGGREGATE DISTURBANCE	DAMS	POWERLINES	TRACKS	PIPELINES	MAJOR FACILITIES	WELL SITES
PL194	221	0	0	182	58	1	33
PL198	966	155	46	467	187	88	93
PL230	631	82	2	390	168	13	65
PL238	26	0	5	19	0	0	3
PL252	70	0.8	0	46	21	2	17
PL258	45	0	0	29	9	0	9
PL260	162	0	0	82	0	0	3
TOTAL	2,120	238	53	1,214	442	103	223

Note: Due to overlap in disturbance between infrastructure, the aggregate disturbance does not necessarily equal the total disturbance area for all infrastructure types

Table 8 Estimated existing disturbance by environmentally sensitive area type

TENEMENT NUMBER	DISTURBANCE AREA (ha)			
	ALL AREAS	CATEGORY A ESA	CATEGORY B ESA	CATEGORY C ESA
PL194	221	0	0	25
PL198	966	0	4	3
PL230	631	0	3	18
PL238	26	0	0	0
PL252	70	0	6	0
PL258	45	0	0	1
PL260	162	0	7	30
TOTAL	2,120	0	20	77

Table 9 Estimated existing disturbance by Category B sensitive area type

TENEMENT NUMBER	CATEGORY B DISTURBANCE AREA (ha)	
	ENDANGERED REGIONAL ECOSYSTEMS	MATURE REGROWTH CONTAINING ENDANGERED REGIONAL ECOSYSTEMS
PL194	0	0
PL198	1	3
PL230	1	2
PL238	0	0
PL252	4	3
PL258	0	0
PL260	6	1
TOTAL	12	9

Note: Based on Arrow GIS disturbance data as of 21 August 2013

Table 10 Estimated existing disturbance by Category C sensitive area type

TENEMENT NUMBER	TOTAL DISTURBANCE AREA (ha)			
	ESSENTIAL HABITAT	ESSENTIAL HABITAT REGROWTH	OF CONCERN REGIONAL ECOSYSTEMS	RESOURCE RESERVES
PL194	0	0	25	0
PL198	0	0	3	0
PL230	0	0	11	7
PL238	0	0	0	0
PL252	0	0	0	0
PL258	0	0	1	0
PL260	18	0	12	0
TOTAL	18	0	52	7

Note: Based on Arrow GIS disturbance data as of 21 August 2013

Table 11 Estimated existing disturbance by other area type

TENEMENT NUMBER	TOTAL DISTURBANCE AREA (ha)				
	MATURE REGROWTH - OF CONCERN	STATE SIGNIFICANT BIODIVERSITY VALUE (without connectivity)	STATE SIGNIFICANT BIODIVERSITY VALUE (with connectivity)	REGIONAL ECOSYSTEM – NOT OF CONCERN	MATURE REGROWTH – NOT OF CONCERN
PL194	7	23	93	90	1
PL198	41	26	58	19	2
PL230	37	22	79	40	23
PL238	0	0	0	0	0
PL252	3	6	6	0	0
PL258	1	1	3	10	1
PL260	8	39	39	3	4
TOTAL	97	117	278	162	31

Note: Based on Arrow GIS disturbance data as of 21 August 2013

6.0 Rehabilitation Program

Rehabilitation is managed in accordance with the *Arrow Rehabilitation Procedure (99-H-PR-0088)*, *Arrow Rehabilitation Guideline (99-H-GDL-0081)* and *Arrow Rehabilitation Monitoring Guideline (99-H-GDL-0077)*, which form the basis of the rehabilitation monitoring program. These documents address the following rehabilitation elements:

- Progressive (or “interim”) and final rehabilitation.
- Site-specific environmental requirements.
- Rehabilitation objectives and planning.
- Landform reconstruction and stabilisation.
- Re-establishment of topsoil and revegetation.
- Re-establishment of habitat.
- Contaminated land assessment and remediation (when applicable).
- Ecological assessment, including pre-clearance assessments and analogue sites.
- Field and desktop data collection (forms).
- Rehabilitation monitoring.

6.1 Rehabilitation

Arrow undertakes progressive rehabilitation as soon as practicable after the completion of an activity causing disturbance to land. Rehabilitation activities typically include (but may not be limited to) the following rehabilitation measures:

- Backfilling of flowline trenches after pipe laying.
- Removal of compacted areas by mechanical means.
- Removal of drilling sumps and reducing the disturbed area around the completed operational well pad (this will include ensuring a stable surface around the operational well pad is maintained).
- Implementing erosion and sediment control measures, where required.
- Assessment and remediation of impacted soils, if applicable.
- Re-profiling significantly disturbed land to a stable landform similar to the original land contours.
- Re-establishing surface drainage lines on significantly disturbed land.
- Re-establishing vegetation diversity and cover and appropriate fauna habitat.

Final decommissioning and rehabilitation will occur at the end of individual infrastructure life, taking into consideration a variety of final land use options. The final land use will be determined by considering a number of factors, including but not limited to the following:

- Relevant legislative and regulatory requirements.
- Surrounding land uses.
- Landowner requirements.
- Surrounding sensitive receptors and receiving environment.
- The environmental, social and cultural values of the area.

The majority of Arrow infrastructure has an estimated life span of approximately 20 years. Therefore, progressive rehabilitation comprises the majority of rehabilitation activities that have been undertaken to date. Comparatively, there has been relatively little “final” rehabilitation that has commenced due to the relatively young age and limited amount of decommissioning of Arrow’s infrastructure. The majority of decommissioning work undertaken to date on the DXP has comprised the decommissioning of a limited number of CSG wells.

6.2 Rehabilitation Monitoring Program

As discussed in Section 5.0, Arrow will be undertaking a comprehensive rehabilitation monitoring program, which is planned for commencement in Quarter 4 2013. Through this program, disturbed sites on the DXP will be monitored and assessed against the rehabilitation conditions of the EA. This program will also be used to assess, on a site-specific basis, where rehabilitation maintenance is required. The rehabilitation monitoring will include evaluation of disturbances associated with wells, gathering lines, power lines, tracks, dams, and other facilities.

The rehabilitation monitoring program will also provide detailed land disturbance and rehabilitated (progressive and final) areas, to allow for quantification of disturbed and rehabilitated areas with a higher level of precision. The results of this monitoring program will be reported in the next revision of this Plan of Operations.

6.3 Completed Rehabilitation

Final rehabilitation that has been initiated under the period of the previous Operational Plan is summarised in Based on typical disturbance dimensions and progressive rehabilitation for well sites (operational footprint reduced to approximately 0.0144 ha for each site) and 437 total well sites, up to 200 ha of disturbance around well sites has been progressively remediated. Progressive rehabilitation of other infrastructure types cannot be quantified at this time, although the residual footprint for other infrastructure is relatively high in proportion to the original clearance area as compared to well sites. The amount of land disturbance that has been progressively rehabilitated in the vicinity of well sites and other infrastructure will be assessed as part of the rehabilitation monitoring program.

Table 12. This comprises rehabilitation of well sites that have been decommissioned, with a total area of approximately 11 ha where final rehabilitation has been initiated.

Based on typical disturbance dimensions and progressive rehabilitation for well sites (operational footprint reduced to approximately 0.0144 ha for each site) and 437 total well sites, up to 200 ha of disturbance around well sites has been progressively remediated. Progressive rehabilitation of other infrastructure types cannot be quantified at this time, although the residual footprint for other infrastructure is relatively high in proportion to the original clearance area as compared to well sites. The amount of land disturbance that has been progressively rehabilitated in the vicinity of well sites and other infrastructure will be assessed as part of the rehabilitation monitoring program.

Table 12 "Plugged and Abandoned" well sites during previous period of the Operational Plan

TENEMENT NUMBER	WELL ID	REHABILITATION COMPLETION DATE	APPROXIMATE AREA REHABILITATION INITIATED (ha)	WORK COMPLETED		
				RECONTOUR	RE-SPREAD TOPSOIL	RESEED
PL194	KN-11	31-Jan-12	0.5	Yes	Yes	Yes
PL194	KN-47	31-Jan-12	0.5	Yes	Yes	Yes
PL194	KN-76	19-Nov-12	0.5	Yes	Yes	Yes
PL194	KN-42	04-May-12	0.5	Yes	Yes	Yes
PL194	KN-7	17-Apr-12	0.5	Yes	Yes	Yes
PL194	KN-21	26-Apr-12	0.5	Yes	Yes	Yes
PL194	KN-22	20-Apr-12	0.5	Yes	Yes	Yes
PL194	KN-23	23-Apr-12	0.5	Yes	Yes	Yes
PL198	TP-20	18-Oct-12	0.5	Yes	Yes	Yes
PL198	TWP-3	25-Oct-12	0.5	Yes	Yes	Yes
PL198	TWP-11	28-Oct-12	0.5	Yes	Yes	Yes
PL198	TWP-9	06-Nov-12	0.5	Yes	Yes	Yes
PL198	TWP-14	16-Nov-12	0.5	Yes	Yes	Yes
PL198	TP-21	18-Nov-12	0.5	Yes	Yes	Yes
PL198	TP22	21-Nov-12	0.5	Yes	Yes	Yes
PL198	TP-26a	29-Nov-12	0.5	Yes	Yes	Yes
PL198	TWP-4A	04-Dec-12	0.5	Yes	Yes	Yes
PL198	TWP-5	13-Dec-12	0.5	Yes	Yes	Yes
PL198	TP-24	14-Dec-12	0.5	Yes	Yes	Yes
PL198	TP-2	15-Dec-12	0.5	Yes	Yes	Yes
PL198	TWP-7	16-Dec-12	0.5	Yes	Yes	Yes
PL198	TP-28T	19-Dec-12	0.5	Yes	Yes	Yes
PL198	TP-3	12-May-13	0.5	Yes	Yes	Yes

6.4 Planned Rehabilitation

Rehabilitation of decommissioned well sites that is planned for commencement in late 2013 through 2014 is summarised in Table 13.

Progressive rehabilitation of new infrastructure will be completed as described above in Section 6.0.

Table 13 Planned rehabilitation of decommissioned well sites

TENEMENT NUMBER	WELL ID	PLANNED REHABILITATION COMMENCEMENT DATE	APPROXIMATE AREA TO BE REHABILITATED (ha)	WORK COMPLETED		
				RECONTOUR	RE-SPREAD TOPSOIL	RESEED
PL194	KN-12	March 2014	0.5	Yes	Yes	Yes
PL198	TWP-4	October 2013	0.5	Yes	Yes	Yes
PL198	TWP-13	October 2013	0.5	Yes	Yes	Yes

7.0 Financial Assurance

A statement of financial assurance covering existing, programmed and approved, and other planned activities for the period of this Plan of Operations is provided in Appendix H.

8.0 Environmental Authority Action Program

8.1 Overview of Management Systems

Key management systems in use by Arrow to ensure compliance with regulatory requirements, including its EAs, include the Arrow Energy Health, Safety and Environmental Management System (HSEMS), department-specific Environmental Management Plans, and the Arrow Project Management System (APMS).

Under the Arrow HSEMS hierarchy, department-specific Environmental Management Plans (e.g. Operations, Domestic Construction, Exploration and Appraisals and Well Delivery departments) have been developed, which provide environmental requirements relating specifically to the work undertaken by respective departments.

In addition, aspect-specific processes have been developed to ensure that particular environmental requirements are addressed during the planning and execution of projects as well as operations and decommissioning.

The above systems and processes are described in further detail, below.

A detailed EA action program which maps the conditions in the EA to the standards, procedures, guidelines and actions that address the condition has been developed as required. A copy of this action program is provided in Appendix I.

8.2 Arrow Energy HSEMS

8.2.1 Overview

Arrow's Health Safety and Environment Management System (HSEMS) is the mandatory company-wide set of requirements that enables the organisation to effectively manage its Health, Safety and Environmental practices.

The HSEMS is a hierarchical document structure that describes what Arrow can do and how it can do it, to keep its staff and contractors safe and minimise the environmental impact of its activities. It is aligned with Australian Standard 4801 and International Standards Organisation 14001.

At the top of this structure are HSE Policies, which set the overall direction of the business. These Policies are supported by the HSE Standards which give instructions on how to comply with the company policies.

Beneath the Standards are HSE Procedures which describe the mandatory requirements to address specific HSE processes or practices. As well as procedures there are numerous tools (e.g. forms, registers and guidelines) which describe, in detail, what is expected of staff and contractors to enable compliance with the HSEMS.

HSE goals and targets are set out in Plans which sit across the HSEMS structure and range from legislatively required Safety Management Plans for many of Arrow's Operations Assets to Strategic and Operational Plans for other parts of the company.

The Arrow Energy's HSEMS is implemented by its employees and contractors who turn the elements of the Policies, Standards, Procedures, Guidelines, Forms, Checklists, Work Instructions and Plans into practice.

The documentation in the HSE Management System relates to the following five broad categories:

- Management System
- Personal Safety
- Health and Hygiene
- Environment
- Process Safety

The system is visually represented in Figure 6 below.

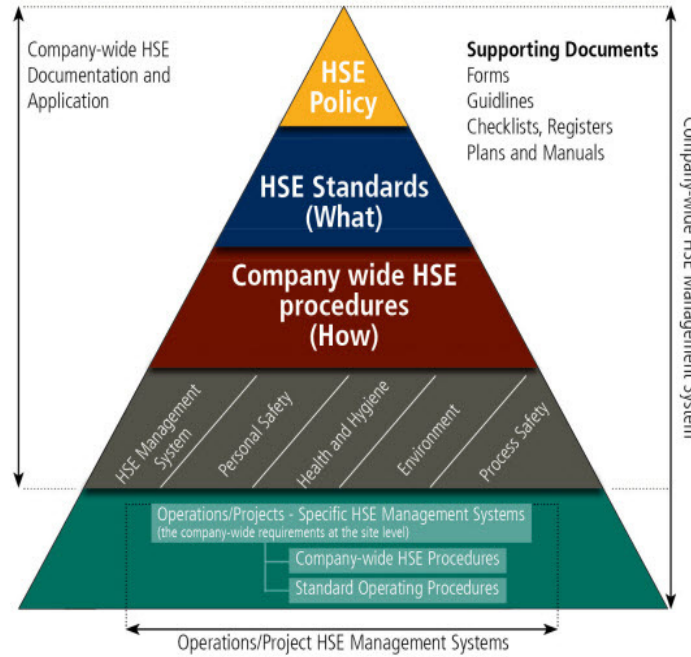


Figure 6 Arrow HSE Management System

Key environment-related standards contained in the HSEMS include:

- Air Quality
- Amenity
- Biodiversity
- Coal Seam Gas Water
- Groundwater
- Soil (Land Management)
- Waste

Specific procedures, guidelines and other tools relating to each are discussed in the aspect-specific management strategies outlined below and linked to compliance with specific EA conditions in the table contained in Appendix I.

8.3 Arrow Project Management System

The Arrow Project Management System (APMS) covers the processes related to executing capital projects. It applies to all Arrow staff and contractors in all locations, including those on direct contract, involved in capital projects. The system is outlined in the Manual – Arrow Project Management System Manual (Doc no. 99-PM-MN-0001), which relates to the Arrow Business Control Framework, including the Opportunity Realisation Process as one of the Company policies.

The APMS consists of the mandatory Arrow Project Standards, the recommended Project Guides, the Process Flow Diagrams (Swim lane diagrams) that give an overview of the activities per project phase, templates and best practices.

The Arrow Project Management System is based on an Opportunity Realisation Process (ORP) which is a decision driven, stage-gated process through which the opportunity matures in a project and delivers a facility. It is divided into six phases (Identify, Assess, Select, Define, Execute and Operate). At the end of each phase up to and including the Define phase, there will be a decision point called Decision Gate (DG). Here a decision is made about whether the project proceeds to the next phase, based on supported applicable assurance reviews.

8.4 Department Specific Environmental Management Plans

The environmental impacts of different activities are managed through Department-specific environmental management plans including Production Operations Environmental Management Plan, Drilling and Completions Environmental Management Plan and Exploration and Appraisal Environmental Management Plan. These documents identify relevant procedures and other control mechanisms to minimise potential environmental impacts of activities and ensure the requirements of environmental authorities and any other relevant legislation are met. In addition, they address matters including legislative requirements, roles and responsibilities, training, awareness and competence, communication, incident management, monitoring and assurance, risk management, complaints and community issues and continuous improvement and corrective action. They form part of the documentation that supports departmental Health, Safety and Environmental (HSE) Management Plans and hence the corporate Arrow HSE Plan 2013-2014 (99-H-PL-0019).

8.5 Approvals and Land Access Process

The land access approval process is outlined in the *Arrow Procedure for Land Access and Approval to Undertake Activities (Doc no. 99-LD-PR-0002)*. The procedure outlines the steps required to gain land access approval to conduct petroleum activities on private property under the *Petroleum and Gas (Production and Safety) Act 2004* and provides a coordination mechanism through which Land, Indigenous Relations (Cultural Heritage and Native Title), Environment and Overlapping Tenure requirements relating to land access are addressed.

Under this process, ecological assessments, including consideration of impacts on sensitive areas such as Environmentally Sensitive Areas (ESAs) are undertaken as per the Ecological Impact Assessment Procedure (Doc no. 99-H-PR-0081) prior to conducting petroleum activities that involve significant disturbance to land. The assessments include a desktop component from which an environmental constraints map is developed, and a field assessment component to verify actual site conditions including ecological values, vegetation communities, threatened species and habitat features occurring or likely to occur on the site. The procedure also ensures other regulatory requirements are met, e.g. *Environmental Protection Act 1994*, *Environment Protection and Biodiversity Conservation Act 1999* and *Nature Conservation Act 1994*.

Where constraints to site development are identified, these are communicated back to project teams and acceptable outcomes negotiated to ensure project compliance with EA and other regulatory requirements. The outcomes of the ecological impact assessment process including any conditions which need to be met during development of infrastructure are documented in the EA to Proceed and included in the Access and Approval Conditions issued with the final approved Land Access Request document. The final approved Land Access Request document similarly contains documentation confirming relevant cultural heritage and land access matters have been met including any conditions of approval.

8.6 Aspect-Specific Management Strategies

An overview of key elements of Arrow management systems relating to the broad categories of aspects in EAs is provided below.

A more detailed table indicating strategies, actions and documents relevant to ensuring compliance with individual EA conditions is included in Appendix I.

8.6.1 Land

Disturbance of land is required for many activities undertaken by Arrow Energy. Hence, robust procedures and processes are required to ensure environmental and social impacts are minimised when planning, designing, siting, constructing, operating, maintaining and decommissioning infrastructure.

EA conditions relating to land disturbance are predominantly captured in Schedule D of the EA.

The main HSEMS Standards relating to land disturbance are the Biodiversity Standard (Doc no. 99-H-MSS-0034) and Land Management (Soil) Standard (Doc no. 99-H-MSS-0036). The intent of the Biodiversity Standard is to protect and enhance biodiversity (flora, fauna and natural habitats) in the areas in which Arrow operates recognising the values of healthy, functioning terrestrial and aquatic natural systems. The intent of the Land Management (Soil) Standard is to ensure that quantities of soils disturbed during Arrow's activities are kept to a minimum and that any soil impacted is returned to an agreed condition to enable future land use.

Key procedures and processes used to support the Standards and ensure compliance with land-related EA conditions are discussed for each project stage below.

Irrespective of project stage, where physical site access is required, procedures such as the following are implemented to minimise the potential for spread of weeds and pathogens (e.g. through vehicle, machinery, equipment or material movements):

- Weed and Pathogen Management Procedure (Doc no. 99-H-PR-0030) and supporting guidelines, registers and forms including Weed and Pathogen Management Guideline (Doc no. 99-H-GDL-0076), species-specific Weed Species Pest Management Guidelines and Weed Control Application Guideline (Doc no. 99-H-GDL-0067). This procedure provides the framework to manage declared pest plants and pathogens and outlines the minimum requirements to comply with regulatory obligations and meet community stakeholder expectations.
- Vehicle and Machinery Hygiene Procedure (Doc no. 99-V-PR-0037) and supporting guidelines, registers and forms including vehicle inspection checklists and Vehicle/Machinery Weed Hygiene Declaration Form (Doc no. 99-V-FM-0030). The purpose of this procedure is to minimise the potential for the spread of weed reproductive material via vehicles, machinery, equipment and personal apparel and it provides methods to be followed to ensure Arrow Energy (Arrow) meets its regulatory obligations and community stakeholder expectations.

Chemical Management Procedure (Doc no. 99-H-PR-0016) details the minimum requirements for the use, storage and disposal of hazardous chemicals in the workplace and applies to all project stages.

8.6.1.1 Planning and Design

During planning and design stages of projects, the physical nature and location of infrastructure is determined. Hence project planning and design processes need to ensure appropriate consideration of any constraints to development based on EA requirements, proximity to environmentally sensitive areas, legislative and other relevant requirements. Mechanisms used achieve this include the APMS system for project planning, the HSEMS and the Land Access Approvals process. Relevant matters are included in contract documentation for design and/or construction of the proposed infrastructure.

Once preferred locations for infrastructure are established, the land access approval process is initiated. The Ecological Impact Assessment Procedure (Doc no. 99-H-PR-0081) and supporting guidelines, registers and forms, including Environmental Offsets Assessment Guideline (Doc no. 99-H-GDL-0062), are key documents supporting the environmental component of the land access approval process. The purpose of this procedure is to provide the processes to be used in assessing the ecological values of a site to:

- Achieve consistency and efficiency with ecological data collection and management.

- Ensure compliance with environmental permits and legislative requirements.
- Minimise disturbance to sensitive environmental features such as threatened wildlife (flora and fauna) and communities on the site and in the surrounding area, and to areas of high biodiversity value.
- Provide a site assessment process that allows monitoring of progress against rehabilitation objectives and identify areas of a worksite that will require offsetting or other mitigation measures.

The Environmental Offsets Assessment Guideline (Doc no. 99-H-GDL-0062) is intended to guide staff about how to comply with environmental offset requirements, ensuring that Arrow complies with Commonwealth and State legislation, regulations, policies and procedures.

8.6.1.2 Construction

Construction activities can have a significant impact on sites due to physical land disturbance including vegetation removal and topsoil stripping during site preparation. In addition to weed and pathogen management requirements, key HSEMS documents which support compliance with land-related EA conditions relevant to construction include:

- Fauna Management Procedure (Doc no. 99-H-PR-0075) and supporting guidelines, registers and forms including Fauna Management Guideline (99-H-GDL-0060). The purpose of this procedure is to inform all Arrow Energy staff and contractors of their obligations to protect and manage native terrestrial and aquatic fauna and habitat features whilst operating on Arrow controlled work sites.
- Land Disturbance Procedure (Doc no. 99-V-PR-0038) and supporting guidelines, registers and forms including Site Preparation and Vegetation Clearing Guideline (Doc no. 99-V-GDL-0008), Erosion and Sediment Control Guideline (Doc no. 99-V-GDL-0007), Soil Management Guideline (Doc no. 99-H-GDL-0099) and region-specific soil technical manuals. Templates for Erosion and Sediment Control Plans and Best Practice Access Track Requirements are also included in HSEMS documentation. This procedure outlines mandatory environmental standards to avoid, minimise or mitigate environmental harm associated with land disturbance activities.

Environmental management requirements for construction projects will be more specifically covered in contractor Construction Environmental Management Plans and site-specific erosion and sediment control plans developed for individual projects as required under contract documents and/or documents referenced above.

8.6.1.3 Operations/Maintenance

In addition to weed and pathogen management requirements, key HSEMS documents which support compliance with land-related EA conditions relevant to operations and maintenance include the Biodiversity Standard and Land Management (Soil) Standard and subordinate procedures to these documents including:

- Fauna Management Procedure (Doc no. 99-H-PR-0075) and supporting guidelines, registers and forms including Fauna Management Guideline (99-H-GDL-0060). Purpose as outlined in Section 8.6.1.2.
- Ecological Impact Assessment Procedure (Doc no. 99-H-PR-0081) and supporting guidelines, registers and forms including Environmental Offset Assessment Guideline (Doc no. 99-H-GDL-0062). Purpose as outlined in Section 8.6.1.1.
- Vertebrate Pest Management Procedure (Doc no. 99-H-PR-0119) and supporting guidelines, registers and forms including trapping, baiting and humane destruction guidelines. The purpose of this procedure is to outline the minimum environmental standards to comply with regulatory obligations and to meet community stakeholder expectations and provide a framework to manage the introduction and/or spread of pest animals into or from Arrow landholdings.
- Dalby Expansion Project Pest Management Plan 2012 - 2015 (Doc no. 99-V-PL-0022). The purpose of this document is to inform relevant authorities, stakeholders of the pest management planning requirements to address the management of the class 2 and 3 pest species on Arrow controlled sites within the Dalby Expansion Project area and support local government (Western Downs Regional Council) with managing pest species declared under local by-laws.

8.6.1.4 Decommissioning/Rehabilitation

Decommissioning works commonly involve similar potential for environmental impacts as construction works due to the land disturbance which may be required to physically remove and/or decommission infrastructure. Hence, procedures and processes etc. referenced for construction above may also be relevant to rehabilitation works.

Rehabilitation requirements are contained in the Rehabilitation Procedure (Doc no. 99-H-PR-0088) and supporting guidelines, registers and forms including:

- Rehabilitation Guideline (Doc no. 99-H-GDL-0081), which outlines minimum mandatory environmental standards to rehabilitate disturbed land following cessation of Arrow activities.
- Rehabilitation Monitoring Guideline (Doc no. 99-H-GDL-0077), which provides a method to monitor the success of rehabilitation activities over time across all Arrow controlled sites.

Details of rehabilitation and rehabilitation monitoring programs developed in line with these documents and EA requirements are discussed in Section 6.0.

8.6.2 Air

Impacts on air quality may result from activities undertaken by Arrow including fuel burning associated with compression facilities, well-heads and water treatment plants, venting of gas, drilling activities, operation of vehicles and equipment and fugitive emissions from gathering systems.

EA conditions relating to air quality are predominantly captured in Schedules F and I of the EA.

Air Quality Standard (Doc no. 99-H-MSS-0037) is intended to manage the assessment and risks associated with air emissions including dust, planned and fugitive emissions, accidental releases, fumes and mists associated with Arrow's operations. It is supported by Air Emissions Procedure (Doc no. 99-H-PR-0077), which establishes the mandatory requirements for managing air emissions arising from activities undertaken by Arrow and contractors working on behalf of Arrow Energy and applies to all project stages. Key additional supporting documents used to ensure compliance with air quality-related EA conditions are discussed for each project stage below.

Irrespective of project stage, where physical site access is required, Dust Management Guideline (Doc no. 99-H-GDL-0066) will be used to manage potential dust impacts from Arrow Energy activities. Traffic and Transport Environmental Aspects Procedure (Doc no. 99-V-PR-0016) establishes minimum environmental standards which are mandatory for minimising traffic and transport impacts including dust on sensitive receptors in the vicinity of Arrow's controlled workplaces.

Complaints will be managed in accordance with Arrow's Complaints Management System (CCA-POL-200110914_CMS).

8.6.2.1 Planning and Design

Air quality assessments including identification and modelling of potential emissions are conducted during project design stages in accordance with Air Quality Assessment Guideline (Doc no. 99-H-GDL-0063) to ensure project designs meet applicable EA and other regulatory requirements or commitments.

Plant and Equipment Air Emissions Guideline (Doc no. 99-H-GDL-0065) outlines recommended emissions standards for new plant and equipment.

8.6.2.2 Construction

Dust generation is a key potential impact on air quality during project construction stages. Dust management during construction will be undertaken in accordance with contractor Construction Environmental Management Plans and Arrow HSEMS documents including Dust Management Guideline (Doc no. 99-H-GDL-0066).

8.6.2.3 Operations/Maintenance

In addition to documents outlined above, key HSEMS documents which support compliance with air quality-related environmental authority conditions relevant to operations/maintenance include:

- Stack Emissions Monitoring Guideline (Doc no. 99-H-GDL-0064), which provides guidance for the implementation of stack emission monitoring programs to satisfy EA requirements.
- Stack Emissions Monitoring Manual (Doc no. 99-H-MN-0022), which supports the Stack Emissions Monitoring Guideline and provides more detailed guidance on the minimum quality requirements for conducting stack emissions monitoring activities where this is being done for environmental authority conditions compliance or for any other purpose. It is intended to act as an operating procedure and governs aspects of stack emissions monitoring activities including safety, methodology, reporting and site specific infrastructure.

8.6.2.4 Decommissioning/Rehabilitation

Air quality management requirements during decommissioning/rehabilitation will be managed as for construction activities.

8.6.3 Noise and Vibration

Noise and vibration may be generated from activities undertaken by Arrow Energy including vehicle and equipment/plant operation, flaring and venting and blasting. It is noted that blasting is not currently undertaken under this EA.

EA conditions relating to noise and vibration are predominantly captured in Schedules E and I of the EA.

Amenity – Management Standard (Doc no. 99-H-MSS-0040) is intended to manage the risks on amenity, such as visual sensitivities, low noise tolerances, light and odour sensitivities associated with Arrow's operations. In regards to noise and vibration, Environment Noise and Vibration Management Procedure (Doc no. 99-H-PR-0071) is a key supporting document to the Standard. This procedure establishes the mandatory requirements for managing environmental noise and vibration potentially arising from activities undertaken by Arrow.

Irrespective of project stage, noise and vibration impacts are required to be assessed prior to undertaking petroleum activities that will result in noise events that are likely to impact on a sensitive receptor as per EA requirements and this procedure. Hence, modelling/calculation of potential noise emissions will be undertaken where required. Where physical assessment of noise levels is required, this will be undertaken in accordance with EA requirements and Noise and Vibration Assessment Guideline (Doc no. 99-H-GDL-0042).

As per Environment Noise and Vibration Management Procedure (Doc no. 99-H-PR-0071) and the Noise Management Plan, complaints will be managed in accordance with Arrow's Complaints Management System (CCA-POL-200110914_CMS).

Traffic and Transport Environmental Aspects Procedure (Doc no. 99-V-PR-0016) establishes minimum environmental standards which are mandatory for minimising traffic and transport impacts including noise on sensitive receptors in the vicinity of Arrow's controlled workplaces.

8.6.3.1 Planning and Design

In addition to the documents referenced above, CSG Facilities – Noise Guideline (Doc no. 99-V-GDL-0004) outlines the minimum environmental requirements for noise to assist with the design of CSG Facilities and will be referenced during project design stages.

8.6.3.2 Construction

In addition to management measures outlined above, noise management for construction projects will be more specifically covered in contractor Construction Environmental Management Plans developed for individual projects.

8.6.3.3 Operations/Maintenance

In addition to the documents referenced above, a noise management plan is in place for DXP (David Moore and Associates, Rev 3 dated 7 February 2013) as required under the EA. It includes consideration of drilling, operational and construction activities and is based on outcomes of noise assessments conducted for DXP activities.

8.6.3.4 Decommissioning/Rehabilitation

Noise management requirements during decommissioning/rehabilitation will be managed as for construction activities.

8.6.4 Waste

Waste can be generated during all stages of project activity.

EA conditions relating to waste are predominantly captured in Schedule G of the EA.

Waste Management Standard (Doc no. 99-H-MSS-0036) is intended to manage the risks associated with waste generation, storage, treatment and disposal at Arrow sites.

Waste Management Procedure (Doc no. 99-H-PR-0073) supports the Standard by establishing the mandatory requirements for managing wastes generated from Arrow's operations, excluding greenhouse gases, waste energy and CSG water as these are covered in separate documents. This document requires facilities, construction projects and other areas of operation to develop and implement waste management plans which include identifying types of wastes, potential environmental risks, waste management practices, waste tracking system and methods and targets for reducing waste.

Key supporting documents to this procedure include:

- Waste Classification and Tracking Guideline (Doc no. 99-H-GDL-0071), which describes the process for managing disposal of regulated wastes.
- Drilling Site Wet Season Pit Water Management Guideline (Doc no. 99-H-GDL-0031), which establishes minimum standards for the selection and development of site-specific environmental control measures to manage drilling pit fluid levels during wet season drilling operations.

CSG water use is also regulated under Schedule G of the EA. The Surat Basin Coal Seam Gas Water Management Plan (Doc no. ENV11-133) has been prepared in accordance with EA requirements and outlines Arrow's strategy for the current and future management of CSG water in the Surat Basin. It includes defining a hierarchy of options for the disposal of CSG water from appraisal and production activities, establishing a management framework for each CSG water disposal option, identifying the environmental values potentially affected by activities addressed by the Plan and mechanisms for protection and actions to be taken if any of the measurement criteria are not satisfied.

Waste management for construction projects will be more specifically covered in contractor Construction Environmental Management Plans developed for individual projects.

8.6.5 Water Management

As outlined in Section 3.6, Arrow Energy is required to manage produced CSG water from its production fields to ensure it is stored and used in accordance with EA and other regulatory requirements.

Key management standards relating to water management include Coal Seam Gas Water – Management Standard (Doc no. 99-H-MSS-0035) and Groundwater – Management Standard (Doc no. 99-H-MSS-0041).

The intent of the Coal Seam Gas Water – Management Standard (Doc no. 99-H-MSS-0035) is to manage the risks associated with storage, use and disposal of coal seam gas water. The intent of Groundwater – Management Standard (Doc no. 99-H-MSS-0041) is to set Arrow Energy's approach to managing the concerns about the effect of coal seam gas drilling on groundwater quality and supply.

Key supporting documents to these standards include:

- Water Management Procedure (Doc no. 99-V-PR-0019), which establishes minimum environmental standards that are mandatory for conserving and protecting surface and groundwater resources from environmental pollution and degradation by managing liquid effluent streams.
- *Coal Seam Gas Water and Salt Management Strategy* (Doc no. 003-000-AA-5980-00003), which defines and communicates the management framework for coal seam gas (CSG) water, groundwater and salt to be implemented by Arrow.
- *Surat Basin Coal Seam Gas Water Management Plan* (Doc no. ENV11-133) (refer Section 8.6.4).
- Groundwater Monitoring Program: PEN100449509 (Doc no. 99-V-PL-0032), which provides guidance for the implementation of a groundwater monitoring program that satisfies the requirements of the EA.
- Water Quality Sampling Manual (Doc no. 99-V-MN-0001), which is intended to provide general specifications for the completion of water sampling programs at Arrow and includes general water quality sampling principals and operational procedures for water quality sampling which are consistent with relevant Australian Standards and recognised guidance documents.

8.6.5.1 Planning and Design

As per the *Surat Basin Coal Seam Gas Water Management Plan* (Doc no. ENV11-133), treated CSG water and brine will be segregated and stored in purpose built dams designed and constructed in accordance with DEHPs Manual for Assessing Hazard Categories and Hydraulic Performance of Dams. Dam design plans will be submitted to EHP as required to meet environmental authority requirements.

The location of proposed activities relative to springs, wetlands and other surface waters is identified through the Ecological Impact Assessment Procedure (Doc no. 99-H-PR-0081) as part of the Land Access Request process.

Potential impacts on these features as well as local and regional groundwater have been considered in the Surat Gas Project Environmental Impact Statement (EIS) studies and reports which are available on Arrow's website www.arrowenergy.com.au.

8.6.5.2 Construction

Management measures used during construction of dams will be as per other construction projects (e.g. see Section 8.6.1.2). Environmental management for dam construction projects will be more specifically covered in contractor Construction Environmental Management Plans developed for individual projects.

Use of treated CSG water during construction (e.g. for dust suppression) will only be undertaken in accordance with EA and other legislative requirements and management measures associated with this will be included in contractor Construction Environmental Management Plans developed for individual projects.

Potential impacts of construction activities on surface water or groundwater bodies will primarily be managed as outlined in Section 8.6.1.2 (e.g. through Construction Environmental Management Plans and site-specific erosion and sediment control plans developed for individual projects).

8.6.5.3 Operations/Maintenance

All of Arrow Energy's regulated dams will continue to be maintained and operated in a manner that is consistent with the design plans and certified 'as constructed' drawings for the duration of their operational life. Inspections, e.g. annual inspection and report, and observations (e.g. mandatory reporting level) will be undertaken as required to meet EA conditions.

Extracted groundwater is managed as per the Surat Basin Coal Seam Gas Water Management Plan (Doc no. ENV11-133). At present, infrastructure is not in place to facilitate the release of treated CSG water to an external water body such as the unnamed tributary of Wilkie Creek authorised under the EA. Hence, this does not form part of current water management practices. Should release of treated CSG water be proposed in the future, a Release Reduction Strategy will be developed and implemented as required under the EA and

releases will only occur as authorised under the EA. A Standard Operating Procedure or similar will be developed prior to any release events to ensure these conditions are met.

Use of treated CSG water for operational purposes will only be undertaken in accordance with EA and other legislative requirements.

Potential impacts on shallow groundwater underlying regulated dams are regularly assessed through the groundwater monitoring program required under the EA. The Groundwater Monitoring Program: PEN100449509 (Doc no. 99-V-PL-0032) documents the locations of groundwater monitoring wells, sampling and analytical requirements etc which comprise this program.

8.6.5.4 Decommissioning/Rehabilitation

Dam design plans will include a detailed plan for the decommissioning and rehabilitation of the dam at the end of its operational life as per EA requirements. Dams will be decommissioned in accordance with dam design plans, Rehabilitation Procedure (Doc no. 99-H-PR-0088) and supporting guidelines, registers and forms including:

- Rehabilitation Guideline (Doc no. 99-H-GDL-0081), which outlines minimum mandatory environmental standards to rehabilitate disturbed land following cessation of Arrow activities.
- Rehabilitation Monitoring Guideline (Doc no. 99-H-GDL-0077), which provides a method to monitor the success of rehabilitation activities over time across all Arrow controlled sites.

Groundwater monitoring bores will similarly be decommissioned at the end of their operational life.

9.0 Compliance Statement

Compliance Statement of Executive Officer in accordance with Section 288(1)(d) of the *Environmental Protection Act 1994*:

This Plan of Operations has been prepared in accordance with Section 288 of the Environmental Protection Act 1994 and complies with the conditions of Environmental Authority EPPG00972513, dated 8 March 2013. Should it be identified that there are conditions in the Environmental Authority to which the Plan of Operations does not comply, Arrow will amend the Plan of Operations and otherwise comply with such conditions.

The Financial Assurance amount of \$44,374,136 was calculated in accordance with EHP *Guideline - Financial assurance under the Environmental Protection Act 1994* (Document no. EM1010, Version 1, 31 May 2013, published on www.ehp.qld.gov.au) under Section 295(3)(b) of the *Environmental Protection Act 1994*.

Feng Jianhua
Chief Operating Officer
Arrow Energy Pty Ltd.

Date

Appendix A DXP Environmental Management Plan



Environmental Management Plan

(Tenures 194, 198, 230, 238, 252, 258 and 260)

**ENVIRONMENT MANAGEMENT PLAN
DALBY EXPANSION PROJECT**

Document Control: 99-V-PL-0027

REV: 2

STATUS:

Review Date:

DOC OWNER: ENVIRONMENT DEPARTMENT

ARROW ENERGY PROPRIETARY LIMITED

ENVIRONMENTAL MANAGEMENT PLAN FOR THE DALBY EXPANSION PROJECT

Disclosure to third parties

The reports and documents disclosed are the property of Arrow Energy Proprietary Limited (and its related and subsidiary companies) (collectively Arrow Energy) and are provided to the Department of Environment and Heritage Protection solely for the purposes of determining the application.

Except to the extent that the accompanying reports and documents are to be available to third parties pursuant to the public access provisions of the *Environmental Protection Act 1994* or any other Act or Regulation requiring disclosure to a particular third party, Arrow Energy requests that the reports and documents are not disseminated to third parties unless that party has made a valid application for the release of the report or documents pursuant to the *Right to Information Act 2009* and Arrow Energy has been given a reasonable right to respond to the request for documents considered for release.

CONTENTS

<u>1. INTRODUCTION</u>	8
1.1 PROJECT PROPONENT	10
<u>2. PURPOSE AND SCOPE OF EM PLAN</u>	12
2.1 PURPOSE	12
2.1.1 EM PLAN SCOPE.....	12
2.2 ENVIRONMENTAL AUTHORITIES AND ENVIRONMENTALLY RELEVANT ACTIVITIES.....	14
2.3 PETROLEUM TENURE	15
2.4 POTENTIALLY AFFECTED PROPERTIES.....	19
2.5 EIS TRIGGERS	21
2.6 FINANCIAL ASSURANCE	21
<u>3. ENVIRONMENTAL MANAGEMENT SYSTEM</u>	23
3.1 ENVIRONMENTAL POLICY	23
3.2 ENVIRONMENTAL MANAGEMENT PROCEDURES.....	23
3.3 ROLES AND RESPONSIBILITIES.....	24
3.4 TRAINING, AWARENESS AND COMPETENCE	26
3.5 INCIDENT MANAGEMENT	26
3.6 MONITORING AND ASSESSMENT.....	27
3.7 AUDITING	27
3.9 CONTINUOUS IMPROVEMENT AND CORRECTIVE ACTION	27
<u>4. DESCRIPTION OF PETROLEUM ACTIVITIES</u>	29
4.1 APPROVED ACTIVITIES	32
4.2 PROPOSED ACTIVITIES FOR APPROVAL	44
4.2.1 SEISMIC SURVEY	44
4.2.2 AMENDMENT TO LOCATION OF DISCHARGE POINT TO WILKIE CREEK.....	45
4.2.3 INJECTION TRIALS.....	45
<u>5. AIR</u>	46
5.1 EXISTING ENVIRONMENT	46
5.2 ENVIRONMENTAL VALUES.....	47
5.2.1 AIR QUALITY OBJECTIVES	48
5.2.2 SENSITIVE RECEPTORS WITHIN THE DXP	48
5.3 POTENTIAL IMPACTS ON ENVIRONMENTAL VALUES	48
5.3.1 EMISSIONS.....	49
5.4 MANAGEMENT OF POTENTIAL IMPACTS.....	51
5.4.1 CONTROL STRATEGIES.....	51
<u>6. DAMS</u>	54

6.1	DESIGN STANDARD FOR REGULATED DAMS.....	54
6.2	ENVIRONMENTAL VALUES.....	54
6.3	POTENTIAL IMPACTS ON ENVIRONMENTAL VALUES.....	54
6.4	MANAGEMENT OF POTENTIAL IMPACTS	55
6.4.1	CONTROL STRATEGIES.....	56
7.	<u>GEOLOGY, LAND AND SOILS</u>	<u>58</u>
7.1	EXISTING ENVIRONMENT	58
7.1.1	TERRAIN	58
7.1.2	GEOLOGY	58
7.1.3	SOILS	62
7.1.4	GOOD QUALITY AGRICULTURAL LAND	67
7.1.5	STRATEGIC CROPPING LAND	69
7.1.6	AGRICULTURAL ACTIVITIES.....	71
7.1.7	CONTAMINATED LAND.....	71
7.2	ENVIRONMENTAL VALUES.....	72
7.2.1	GEOLOGY, SOILS AND LANDFORM.....	72
7.3	POTENTIAL IMPACTS ON ENVIRONMENTAL VALUES	73
7.3.1	SOILS	74
7.3.2	POTENTIAL IMPACTS TO AGRICULTURAL LAND USE SUITABILITY	75
7.4	MANAGEMENT OF POTENTIAL IMPACTS.....	76
7.4.1	GEOLOGY, SOILS AND LANDFORMS	76
7.4.2	AGRICULTURAL LAND USE SUITABILITY	77
7.4.3	CONTROL STRATEGIES.....	78
8.	<u>TERRESTRIAL FLORA AND FAUNA</u>	<u>86</u>
8.1	EXISTING ENVIRONMENT	86
8.1.1	BIOREGIONS.....	86
8.1.2	FLORA-THREATENED ECOLOGICAL COMMUNITIES	86
8.1.3	FAUNA - ENDANGERED, VULNERABLE OR NEAR THREATENED SPECIES	92
8.1.4	WILD RIVERS.....	94
8.1.5	BIODIVERSITY OFFSETS.....	94
8.1.6	ENVIRONMENTALLY SENSITIVE AREAS.....	94
8.2	ENVIRONMENTAL VALUES.....	103
8.2.1	TERRESTRIAL FLORA AND FAUNA	103
8.3	POTENTIAL IMPACTS ON ENVIRONMENTAL VALUES	103
8.4	MANAGEMENT OF POTENTIAL IMPACTS.....	104
8.4.1	MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE	105
8.4.2	PROTECTED PLANTS AND ANIMALS.....	106
8.4.3	CONTROL STRATEGIES.....	106
9.	<u>AQUATIC ECOLOGY.....</u>	<u>112</u>
9.1	EXISTING ENVIRONMENT.....	112
9.1.1	PERMANENT AND SEMI-PERMANENT WATERCOURSES	112
9.1.2	EPHEMERAL WATERCOURSES.....	112
9.1.3	ENVIRONMENTALLY SENSITIVE AREAS.....	113
9.1.4	ENDANGERED, VULNERABLE OR NEAR THREATENED SPECIES	113
9.2	ENVIRONMENTAL VALUES.....	113
9.3	POTENTIAL IMPACTS ON ENVIRONMENTAL VALUES	114

9.4	MANAGEMENT OF POTENTIAL IMPACTS.....	115
9.4.1	CONTROL STRATEGIES.....	115
10.	<u>NOISE.....</u>	<u>119</u>
10.1	EXISTING ENVIRONMENT.....	119
10.2	ENVIRONMENTAL VALUES.....	119
10.2.1	SENSITIVE RECEPTORS WITHIN THE DXP.....	119
10.2.2	BASILINE MONITORING.....	120
10.3	POTENTIAL IMPACTS ON ENVIRONMENTAL VALUES.....	120
10.3.1	TRANSIENT NOISE SOURCES.....	121
10.4	MANAGEMENT OF POTENTIAL IMPACTS.....	126
10.4.1	CONTROL STRATEGIES.....	126
11.	<u>WASTE.....</u>	<u>128</u>
11.1	WASTE GENERATION.....	128
11.1.1	GENERAL AND HAZARDOUS WASTES.....	130
11.1.2	VEGETATION.....	130
11.1.3	SEWAGE.....	131
11.1.4	DRILLING FLUIDS AND SOLIDS.....	131
11.1.5	LOW POINT DRAIN CONDENSATION.....	132
11.2	COAL SEAM GAS WATER.....	132
11.2.1	COAL SEAM GAS WATER QUALITY.....	132
11.2.2	COAL SEAM GAS WATER MANAGEMENT STRATEGY.....	133
11.2.3	COAL SEAM GAS WATER MANAGEMENT OPTIONS.....	133
11.2.4	BRINE MANAGEMENT OPTIONS.....	134
11.3	ENVIRONMENTAL VALUES.....	134
11.4	POTENTIAL IMPACTS ON ENVIRONMENTAL VALUES.....	135
11.4.1	POTENTIAL BENEFICIAL USES OF WASTE GENERATION.....	135
11.4.2	POTENTIAL ADVERSE IMPACTS OF WASTE.....	135
11.5	MANAGEMENT OF POTENTIAL IMPACTS.....	136
11.5.1	CONTROL STRATEGIES.....	136
12.	<u>WATER.....</u>	<u>141</u>
12.1	EXISTING ENVIRONMENT.....	141
12.1.1	SURFACE WATERS – GENERAL CHARACTERISTICS.....	141
12.1.2	SURFACE WATERS – WETLANDS.....	144
12.1.3	SURFACE WATERS – HYDROLOGY.....	144
12.1.4	GROUNDWATER.....	148
12.2	ENVIRONMENTAL VALUES.....	158
12.3	POTENTIAL IMPACTS ON ENVIRONMENTAL VALUES.....	162
12.3.1	SURFACE WATER.....	162
12.3.2	GROUNDWATER.....	163
12.4	MANAGEMENT OF POTENTIAL IMPACTS TO WATERS.....	165
12.4.1	SURFACE WATERS.....	166
12.4.2	GROUNDWATER.....	166
12.4.3	CONTROL STRATEGIES.....	167
13.	<u>SOCIAL AMENITY.....</u>	<u>178</u>

13.1 EXISTING ENVIRONMENT	178
13.1.1 LAND TENURE	178
13.1.2 POPULATION CENTRES	180
13.1.3 NEARBY RESIDENCES	180
13.1.4 LANDSCAPE AND VISUAL AMENITY	181
13.1.5 ROADS AND TRANSPORT	181
13.1.6 CULTURAL HERITAGE	182
13.1.7 RELEVANT STAKEHOLDERS	183
13.2 ENVIRONMENTAL VALUES.....	183
13.2.1 LAND USE	183
13.2.2 LANDSCAPE AND VISUAL AMENITY	184
13.2.3 ROADS AND TRANSPORT	184
13.2.4 CULTURAL HERITAGE	185
13.3 POTENTIAL IMPACTS ON ENVIRONMENTAL VALUES.....	189
13.3.2 LANDSCAPE AND VISUAL AMENITY	190
13.3.3 ROADS AND INFRASTRUCTURE	191
13.3.4 CULTURAL HERITAGE	191
13.4 MANAGEMENT OF POTENTIAL IMPACTS.....	192
13.4.1 CONTROL STRATEGIES.....	192
<u>14. REHABILITATION</u>	<u>197</u>
<u>15. REFERENCES</u>	<u>200</u>
<u>16. ACRONYMS, ABBREVIATIONS AND UNITS.....</u>	<u>204</u>

FIGURES

FIGURE 1: OVERVIEW OF THE LOCATION OF THE DXP AREA.....	9
FIGURE 2: OVERVIEW OF ARROW ENERGY PETROLEUM ACREAGE IN QUEENSLAND.....	11
FIGURE 3: BLOCK IDENTIFICATION MAP (BIM) BLOCKS AND CADASTRAL INFORMATION FOR THE DXP.....	18
FIGURE 4: SENSITIVE RECEPTORS MAPPED WITHIN THE DXP (OCTOBER 2009)	20
FIGURE 5 LOCATION OF EXISTING LARGE INFRASTRUCTURE ASSOCIATED WITH THE DXP	30
FIGURE 6: LOCATION OF PROPOSED SURAT TEK PARK.....	36
FIGURE 7: WELL LAYOUT SCHEMATIC FOR PROPOSED SURAT TEK PARK.....	37
FIGURE 8: SURAT TEK PARK WELL TYPE SCHEMATIC.....	38
FIGURE 9 SURFACE GEOLOGY WITHIN THE DXP AREA	60
FIGURE 10 MAJOR SOIL TYPES WITHIN THE DXP AREA	63
FIGURE 11 DISTRIBUTION OF GOOD QUALITY AGRICULTURAL LAND IN THE DXP AREA	68
FIGURE 12 POTENTIAL STRATEGIC CROPPING LAND LOCATED WITHIN THE DXP	70
FIGURE 13: REGIONAL ECOSYSTEMS WITHIN THE DXP	89
FIGURE 14: ENVIRONMENTALLY SENSITIVE AREAS WITHIN THE DXP AREA.....	95
FIGURE 15 : NOISE CONTOURS – WITHOUT ACOUSTIC TREATMENT	125
FIGURE 16: SURFACE WATERS OF THE DXP	142
FIGURE 17: CONDAMINE RIVER FLOW DURATION CURVE AT BRIGALOW GAUGING STATION	146
FIGURE 18: CONDAMINE RIVER FLOW DURATION CURVES AT LOUDOUN'S BRIDGE GAUGING STATION.....	147
FIGURE 19: WILKIE CREEK FLOW DURATION CURVES FROM OAKLEY CREEK GAUGING STATION.....	148
FIGURE 20: STRATIGRAPHY AND GROUNDWATER SYSTEMS PRESENT WITHIN THE DXP	149
FIGURE 21: GROUNDWATER RESOURCES ACCESSED BY REGISTERED BORES WITHIN THE REGION.....	156
FIGURE 22: APPROXIMATE LOCATION OF REGISTERED WATER BORES AND ARROW PRODUCTION WELLS WITHIN THE DXP.....	157
FIGURE 23: PROPOSED MONITORING POINTS FOR WILKIE CREEK DISCHARGE	177
FIGURE 24: MINING TENURES IN THE REGION SURROUNDING THE DXP.....	179

FIGURE 25: HERITAGE SITES OF STATE HERITAGE SIGNIFICANCE IN THE DXP AREA	188
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TABLES

TABLE 1 REQUIREMENTS OF SECTION 310D OF THE EP ACT	13
TABLE 2: CHAPTER 5 ITEM 8 - APPLICABLE CHAPTER 4 ERA'S	14
TABLE 3: CURRENT ARROW ENERGY ENVIRONMENTAL MANAGEMENT PROCEDURES	24
TABLE 4: ARROW PERSONNEL AND ENVIRONMENTAL RESPONSIBILITIES	25
TABLE 5: SUMMARY OF EXISTING AND PROPOSED ACTIVITIES AND INFRASTRUCTURE ON THE DXP	31
TABLE 6: REGULATED DAMS LOCATED WITHIN THE DXP (SOURCE: URS MAY 2012, DAANDINE, TIPTON, KOGAN AND STRATHEDEN REGULATED DAM 2011 ANNUAL INSPECTIONS REPORT)	41
TABLE 7: KEY POLLUTANTS POTENTIALLY OCCURRING WITHIN THE DXP AREA.	46
TABLE 8: EMISSION SOURCES ASSOCIATED WITH EACH PHASE OF THE PROJECT.....	49
TABLE 9: CONTROL STRATEGIES FOR POTENTIAL IMPACTS TO AIR QUALITY AND GREENHOUSE GASES	51
TABLE 10: CONTROL STRATEGIES FOR POTENTIAL IMPACTS ASSOCIATED WITH REGULATED DAMS	56
TABLE 11: AGRICULTURAL LAND CLASSES	67
TABLE 12: VALUE OF THE EXISTING ENVIRONMENT: GEOLOGY, LANDFORM AND SOILS.....	72
TABLE 13: CONTROL STRATEGIES FOR POTENTIAL IMPACTS TO GEOLOGY, SOILS AND LANDFORMS.....	78
TABLE 14: THREATENED ECOLOGICAL COMMUNITIES	86
TABLE 15: WEEDS OF NATIONAL SIGNIFICANCE WHICH MAY BE PRESENT WITHIN THE DXP	88
TABLE 16: THREATENED FLORA SPECIES IDENTIFIED IN THE VICINITY OF THE DXP	8-90
TABLE 17: THREATENED FAUNA SPECIES IDENTIFIED WITHIN THE DXP AREA	92
TABLE 18: POTENTIALLY OCCURRING PEST SPECIES WITHIN THE DXP	94
TABLE 19: ENVIRONMENTALLY SENSITIVE AREAS IDENTIFIED WITHIN THE DXP AREA.....	96
TABLE 20: CONTROL STRATEGIES FOR POTENTIAL IMPACTS TO FLORA AND FAUNA	106
TABLE 21: CHARACTERISTICS OF THE EXISTING AQUATIC ENVIRONMENT	114
TABLE 22: CONTROL STRATEGIES FOR POTENTIAL IMPACTS TO AQUATIC FLORA AND FAUNA	116
TABLE 23 : CALCULATED RATING BACKGROUND LEVELS.....	120
TABLE 24: CONTROL STRATEGIES RELATING TO THE MANAGEMENT OF NOISE	126
TABLE 25: EXAMPLES OF WASTES GENERATED BY DXP ACTIVITIES	129
TABLE 26: COAL SEAM GAS WATER QUALITY IN THE WALLOON COAL MEASURES	133
TABLE 27: CONTROL STRATEGIES RELATING TO THE MANAGEMENT OF WASTE AND COAL SEAM GAS WATER.....	136
TABLE 28: SUMMARY OF AQUIFER CHARACTERISTICS, GROUNDWATER LEVELS AND QUALITY FOR GROUNDWATER USERS WITHIN THE DXP	12-151
TABLE 29: VALUES OF THE EXISTING ENVIRONMENT: SURFACE WATER	159
TABLE 30: SUMMARY OF GROUNDWATER VALUES	12-160
TABLE 31: CONTROL STRATEGIES FOR POTENTIAL IMPACTS TO WATERS.....	167
TABLE 32: POPULATION OF TOWNS AND CITIES IN AND AROUND THE DXP AREA (SOURCE: CGQ (2010), ABS (2001), ABS (2007)).....	180
TABLE 33: REGISTER OF THE NATIONAL ESTATE LISTED SITES WITH INDIGENOUS HERITAGE VALUES LOCATED WITHIN THE DXP AREA	182
TABLE 34: SENSITIVITY OF THE LANDSCAPES IN WHICH INDIGENOUS CULTURAL HERITAGE MAY OCCUR.....	185
TABLE 35: STATE LISTED HERITAGE SITES WITHIN THE DXP AREA.....	186
TABLE 36: CONTROL STRATEGIES RELATING TO THE MANAGEMENT OF IMPACTS TO THE SOCIAL ENVIRONMENT	192
TABLE 37: OVERVIEW OF TYPICAL REHABILITATION METHODS FOR COMMON SITE INFRASTRUCTURE	197

LIST OF APPENDICES

APPENDIX A	COPY OF ENVIRONMENTAL AUTHORITY PEN100449509
APPENDIX B	ARROW ENERGY ENVIRONMENT POLICY
APPENDIX C	EPBC AND WILDLIFE ONLINE SEARCH RESULTS
APPENDIX D	ARROW ENERGY ENVIRONMENTAL MANAGEMENT PROCEDURES
APPENDIX E	COAL SEAM GAS WATER MANAGEMENT PLAN – SURAT BASIN
APPENDIX F	COAL SEAM GAS WATER MANAGEMENT STRATEGY
APPENDIX G	DAANDINE WATER RELEASE STUDIES
APPENDIX H	INJECTION TRIAL PROGRAM

1. INTRODUCTION

Arrow Energy (Arrow) intends to increase the production capability of coal seam gas reserves within the Surat Basin. This expansion consists of an initial project development in the vicinity of existing gas fields near the township of Dalby in Southern Queensland. The project, known as the Dalby Expansion Project (DXP), is detailed in Section 3 of this document. Further expansion of production capabilities is proposed as part of a larger development known as the Surat Gas Project. A voluntary Environmental Impact Statement (EIS) for the proposed Surat Gas Project development was submitted to the former Department of Environment and Resource Management (DERM) in February 2012 and will form the basis of an additional EA application.

This Environmental Management (EM) Plan provides project specific information regarding potential environmental impacts and proposed mitigation measures associated with an expansion of DXP operations. Pursuant to Section 310U of the *Environmental Protection Act 1994* (EP Act), this EM Plan has been prepared in support of an application to DEHP to amend the existing Environmental Authority (EA) for the DXP (PEN100449509). This amendment reflects changes to Arrow's proposed operations and requests changes to specific current EA conditions.

Arrow is the holder of seven Petroleum Leases (PLs) located west of Dalby (Figure 1). Petroleum activities on these PLs (PL194, PL198, PL230, PL238, PL252, PL258 and PL260) are at varying stages of development for the exploration, appraisal, production and transportation of coal seam gas. Arrow is currently authorised to conduct petroleum activities on these tenures under existing EA PEN100449509 (Appendix A).

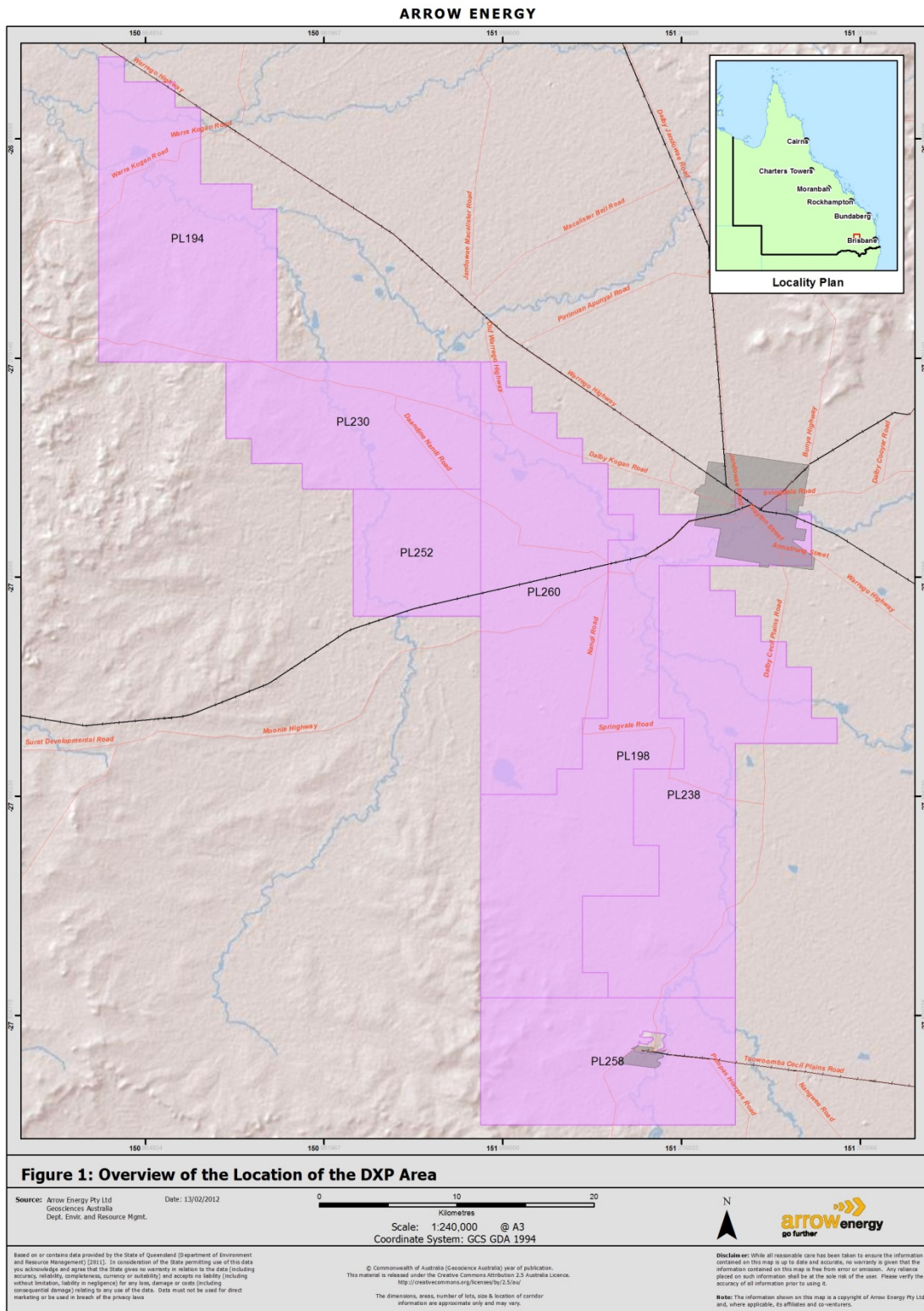


Figure 1: Overview of the Location of the DXP Area

1.1 PROJECT PROPONENT

Arrow is an integrated energy company with interests in coal seam gas field developments, pipeline infrastructure, electricity generation and a proposed liquefied natural gas (LNG) project.

Arrow is a Queensland-based wholly owned subsidiary of Arrow Energy Holdings Pty Ltd, representing a 50:50 joint venture between a subsidiary of Royal Dutch Shell plc and a subsidiary of PetroChina Company Limited (PetroChina). The joint venture took ownership of Arrow on 23 August 2010.

Royal Dutch Shell has had a presence in Australia since 1901. Current operations include petroleum refining, sale of petroleum products and retail businesses. The company maintains equity in the exploration and development of large gas resources off the coasts of Western Australia and the Northern Territory. Royal Dutch Shell is an internationally recognised leader in LNG production and has delivered some of the world's largest and most complex LNG projects, including facilities in Qatar, Nigeria, Russia and Southeast Asia. Through its subsidiary, Shell International Trading and Shipping Company Limited, Royal Dutch Shell operates one of the largest LNG carrier fleets in the world.

PetroChina is a subsidiary of China's largest state-owned oil and gas producer and distributor, China National Petroleum Corporation, being one of the world's largest oil companies. PetroChina was incorporated as a joint stock company in 1999 and has extensive experience in exploration, refining and marketing of oil and natural gas in China and other countries.

Arrow has interests in more than 65,000 km² of petroleum tenures, mostly within Queensland's Surat and Bowen basins. The company has interests in the Clarence-Moreton (including northern New South Wales), Coastal Tertiary, Ipswich, Styx and Nagoorin Graben basins.

Arrow's petroleum tenures are located close to Queensland's three key energy markets: Townsville, Gladstone and Brisbane. The Moranbah Gas Project in the Bowen Basin and the Tipton West, Daandine, Kogan North and Stratheden projects in the Surat Basin near Dalby comprise Arrow's existing coal seam gas production operations. These existing operations account for around 20% of Queensland's overall domestic gas production. Arrow's tenures are shown on Figure 2.

Arrow supplies gas to the Daandine, Braemar 1 and 2, Townsville and Swanbank E power stations, which participate in the National Electricity Market. With Arrow's full ownership of Braemar 2 and commercial arrangements in place for Daandine and Townsville power stations, Arrow has the ability to supply approximately 600 MW of power generation capacity.

In addition, Arrow has a joint venture partner, Stanwell, for PL 194.

2. PURPOSE AND SCOPE OF EM PLAN

2.1 PURPOSE

This EM Plan and accompanying appendices have been prepared to fulfil the legislative information requirements stipulated in Section 310U of the EP Act. The purpose of the EM Plan is to provide Department of Environment and Heritage Protection (DEHP) (formerly DERM) with sufficient information to enable DEHP to assess the application and determine suitable conditions to be applied to the amended EA.

This EM Plan provides a description of the proposed activities within the DXP area and their potential impacts on the environment.

2.1.1 EM Plan Scope

This EM Plan describes Arrow's approach to the management of potential environmental impacts associated with the current and future exploration, appraisal and production of coal seam gas as part of the DXP. This EM Plan has been developed in accordance with the DERM guideline entitled 'Preparing an environmental management plan for coal seam gas activities', dated 31 March 2010, and the provisions of Section 310D of the EP Act.

Specifically, this document is structured to:

- Provide an introduction to the project, identify the relevant resource authorities and outline the financial assurance requirements.
- Describe Arrow's health, safety and environmental management system (HSEMS).
- Outline existing and proposed activities on the DXP highlighting changes that have occurred since the project was first approved in December 2010 (the current EA PEN100449509 was issued on 17 December 2010 and then revised in June 2011).
- Describe the existing environment within the DXP area, including the identification of the relevant environmental values.
- Identify potential impacts arising from the petroleum project activities on the identified environmental values.
- Describe environmental management measures to minimise the identified potential environmental impacts.

A summary of the specific requirements of the EM Plan within Section 310D of the EP Act including references to where these requirements are addressed in the EM Plan are presented in Table 1 below.

This EMP is also accompanied by a CSG Water Management Plan (WMP) for activities in the Surat Basin, Queensland. The plan is entitled 'Arrow Energy Coal Seam Gas Water Management Plan – Surat Basin (refer to Appendix E) and has been developed in accordance with the EHP "Guideline for Preparing an Environmental Management Plan for CSG Activities" and the Queensland government's Coal Seam Gas Water Management Policy.

Arrow has developed a CSG Water Management Strategy, also provided in Appendix F, to define and communicate the management framework for CSG water. This strategy and the associated CSG water management plans for individual projects have been developed to maximize beneficial use and minimize the environmental impacts associated with waster use and disposal.

Table 1 Requirements of Section 310D of the EP Act

EM Plan Requirement	Section Reference
Description of the relevant resource authority for the environmental authority	Section 1
Description of all relevant activities that are the subject of the application	Section 3
Description of the land on which the activities are to be carried out	Section 1
Description of the environmental values likely to be affected by the activities	Sections 4 to 12
Description of the potential adverse and beneficial impacts of the activities on the environmental values	Sections 4 to 12
State the quantity of coal seam gas water reasonably expected to be generated in connection with carrying out each relevant coal seam gas activity	Arrow Energy Coal Seam Gas Water Management Plan – Surat Basin (Appendix E)
State the flow rate at which the applicant reasonably expects the water will be generated	
Describe the quality of the water, including changes in the water quality that the applicant reasonably expected will happen while each relevant coal seam gas activity is carried out	
Discuss the proposed management of the water including the use, treatment, storage or disposal of the water	Arrow Energy Coal Seam Gas Water Management Strategy (Appendix F)
State the measurable criteria against which the effectiveness of the management of the water will be monitored and assessed	
State the action that is proposed to be taken, if any of the management criteria are not satisfied, to ensure that criteria will be able to be satisfied in the future	
State environmental protection commitments for activities to protect or enhance the environmental values under best practice environmental management	Sections 4 to 13
Present enough other information to allow the administering authority to decide the application and conditions to be imposed on the environmental authority	Sections 1 to 14
Address any other matter prescribed under an environmental protection policy or regulation	Sections 1 to 14
Include a rehabilitation program for land proposed to be disturbed under each relevant resource authority for the application	Section 14
Propose an amount of financial assurance for the environmental authority.	Section 2.6

2.2 ENVIRONMENTAL AUTHORITIES AND ENVIRONMENTALLY RELEVANT ACTIVITIES

Arrow is the holder of the Level 1 EA PEN100449509 (Appendix A). Pursuant to Section 310U of the EP Act, Arrow is applying to amend EA PEN100449509 to provide for revised project activities and associated infrastructure. These existing and revised project activities are further discussed in Section 3.

It is intended that EA PEN100449509 will remain a level 1 EA as prescribed under section 23(1) of the *Environmental Protection Regulation 2008*. In addition to the Chapter 4 ERA's already approved this application proposes inclusion of ERA 58 – regulated waste treatment.

Petroleum activities under Schedule 5 item 8 are required under this application.

The following table lists all Chapter 4 ERA's (both current and proposed) which will apply to the DXP.

Table 2: Chapter 5 item 8 - Applicable Chapter 4 ERA's

ERA	Description	Applicable Project Activities
ERA 8 – chemical storage	10 m ³ or more of chemicals of class C1 or C2 combustible liquids under AS 1940 (Standards Australia, 2004b) or dangerous goods class 3.	Storage of chemicals.
ERA 14 – electricity generation	Electricity generation (the relevant activity) consists of generating electricity by using gas at a rated capacity of 10 megawatt (MW) electrical or more.	Power generation to supply gas compression and water treatment facilities.
ERA 15 – fuel burning	Fuel burning (the relevant activity) consists of using fuel-burning equipment that is capable of burning at least 500 kg of fuel in an hour.	Compressor units, generators, power generation, etc.
ERA 58 – regulated waste treatment	Regulated waste treatment (the relevant activity) consists of operating a facility for receiving and treating regulated waste or contaminated soil to render the waste or soil non-hazardous or less hazardous.	Coal seam gas water treatment, solid waste treatment.
ERA 60 – waste disposal	Operating a facility for disposing of more than 200,000 t of regulated waste.	Temporary storage of waste; both solid and liquid.
ERA 63 – sewage treatment	Operating one or more sewage treatment works at a site that has a total daily peak design capacity of more than 21 equivalent persons.	Sewage treatment facilities at construction camp sites or at production facility sites.
ERA 64 – water treatment	Water treatment (the relevant activity) consists of carrying out any of the following activities in a way that allows waste, whether treated or untreated, to be released into the environment: <ul style="list-style-type: none"> a. Desalinating 0.5 ML or more of water in a day. b. Treating 10 ML or more of raw water in a day. c. Carrying out advanced treatment of 5 ML or 	Coal seam gas water treatment process.

	more of water in a day.	
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2.2.1 Notifiable Activities

Notifiable activities are activities listed in Schedule 3 of the EP Act. Under the Act, landowners and local governments must inform DEHP that land has been or is being used for a notifiable activity. Land that has been or is being used for a notifiable activity is recorded on the Environmental Management Register (EMR), which is maintained by DEHP.

Where notifiable activities are identified, Arrow will submit the appropriate notifications in accordance with legislative requirements.

2.3 PETROLEUM TENURE

The DXP is located west of Dalby. A map presenting the location and general details of these petroleum tenures are shown in Figure 1.

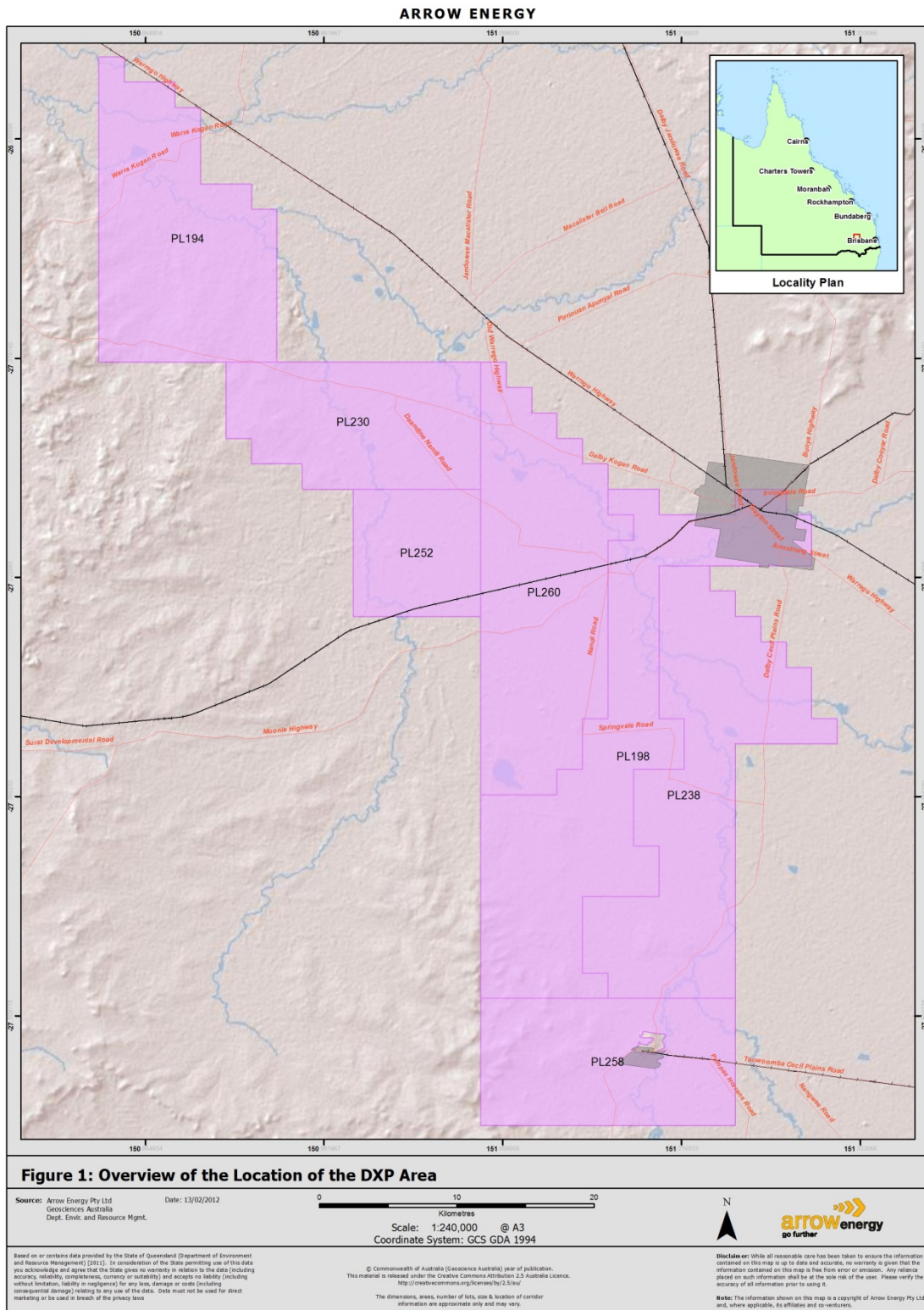


Figure 1 The DXP extends approximately 45 km south, 30 km north and 50 km west of Dalby. The DXP covers an approximate area of 127,103 hectares and is comprised of a

total of 417 Block Identification Map (BIM) sub-blocks. The area and relevant sub-blocks for each of the DXP tenures are shown in Figure 3.

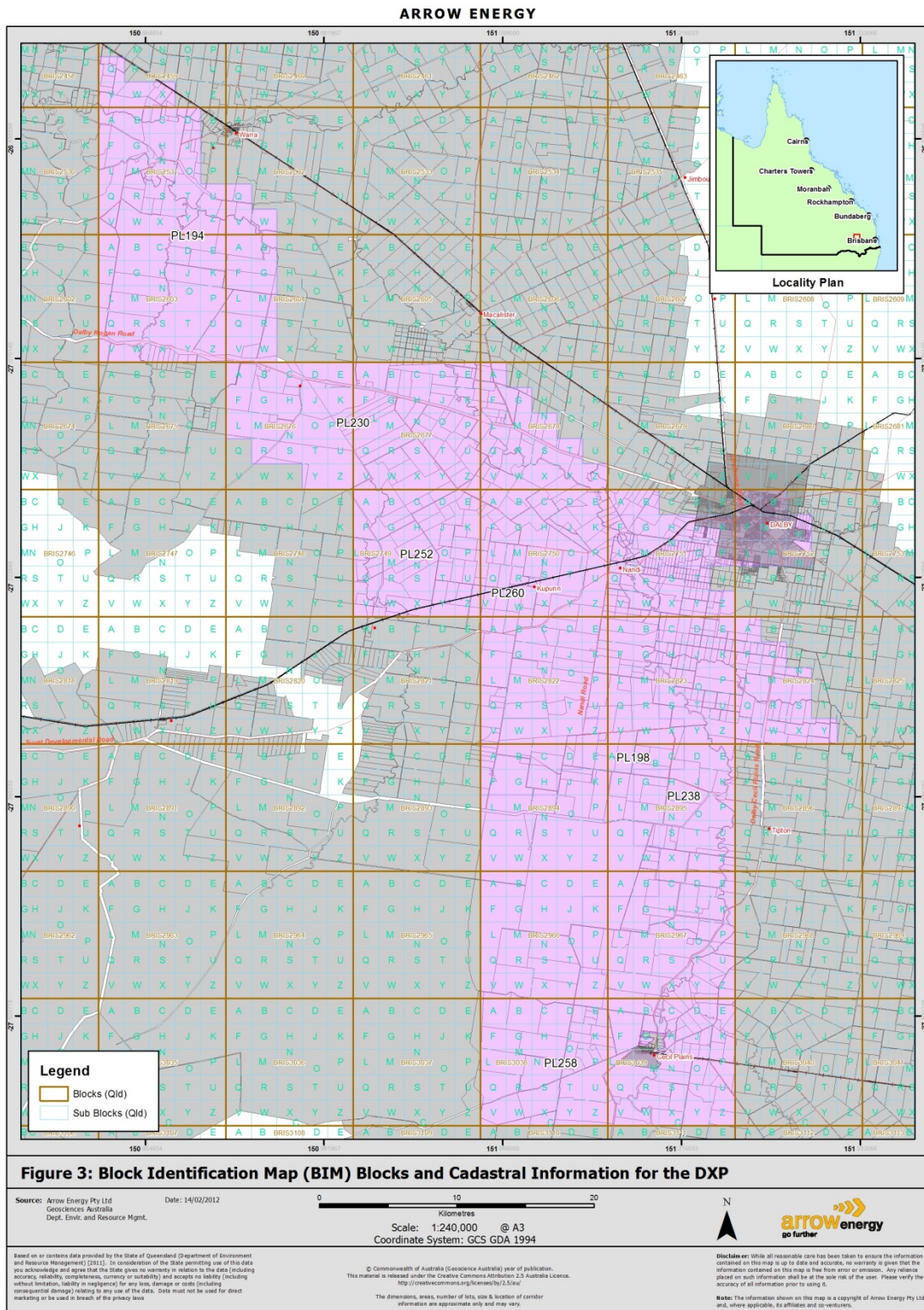


Figure 3: Block Identification Map (BIM) Blocks and Cadastral Information for the DXP

2.4 POTENTIALLY AFFECTED PROPERTIES

The identification, ground-truthing and mapping of sensitive receptors within the DXP area is ongoing and integral to the assessment of environmental impacts. As part of environmental and social impact assessments conducted by Arrow topographic maps, aerial photographs, satellite imagery, local knowledge, and information from stakeholder consultation were all used to identify potential sensitive receptor locations. Sensitive receptor locations were then ground-truthed in the DXP area in October 2009 by Coffey Environments (Australia) Pty Ltd (contracted by Arrow Energy). Approximately 400 potential sensitive receptors (buildings) have been identified within the DXP area, excluding the townships of Dalby and Cecil Plains. Sensitive receptor locations ground-truthed and mapped within the DXP area are shown in Figure 4.

Arrow Energy have contracted Coffey Environments to update the identification, ground-truthing and mapping of sensitive receptors in the DXP area and this work is due for completion late-2012.

Potential sensitive receptors are located throughout the DXP area and will consequently be an important consideration when planning project activities. As required, detailed planning and studies will be carried out to assess impacts at these locations to limit impacts, and environmental risk assessments will be carried out prior to construction.

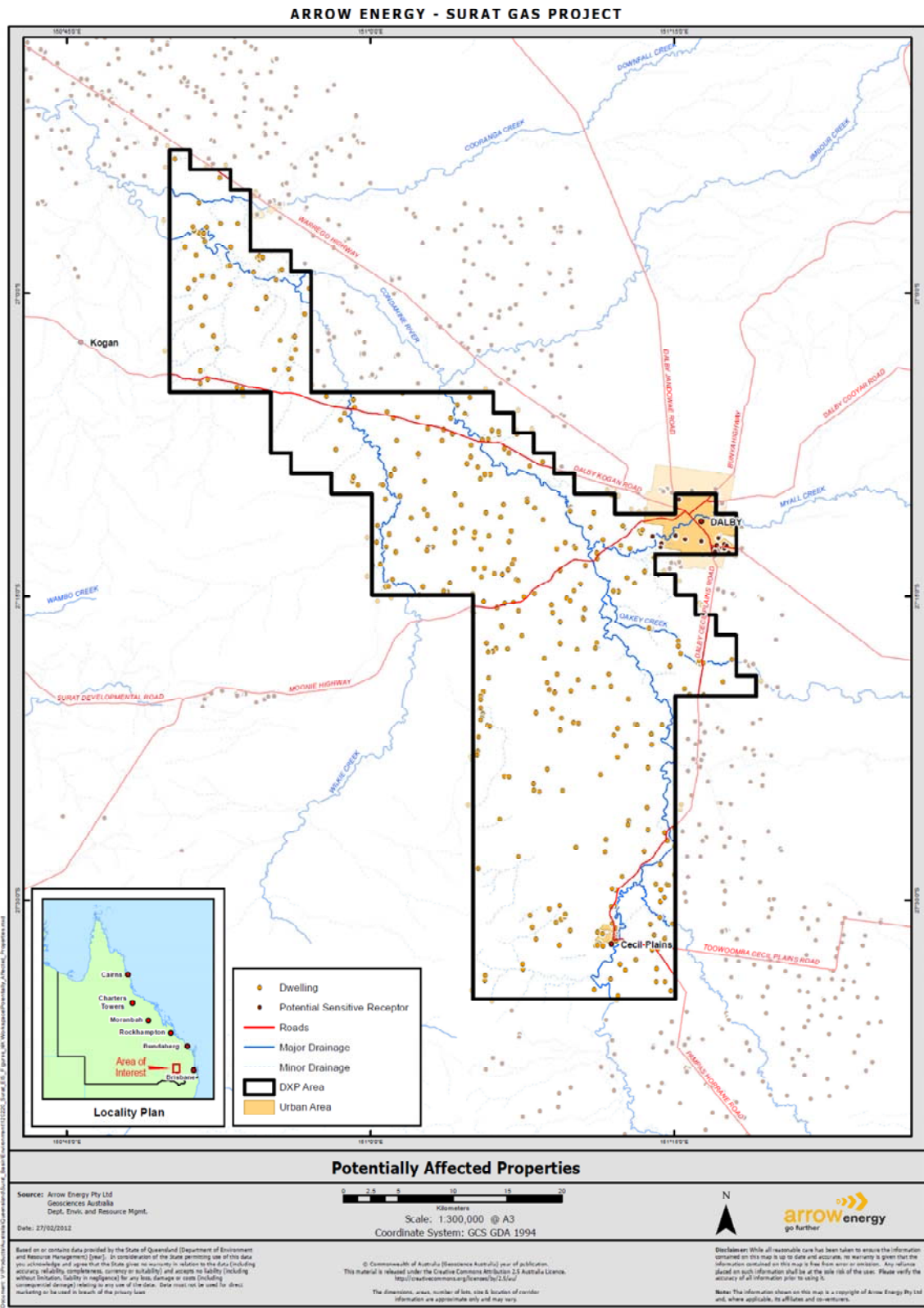


Figure 4: Sensitive Receptors mapped within the DXP (October 2009)

2.5 EIS TRIGGERS

As outlined in the DERM Guideline “Assessment and approval process for environmental authorities for Chapter 5A activities” the Environmental Impact Statement (EIS) triggers for petroleum activities are:

Will the proposed Chapter 5A activities:

- a) Have a significant impact on Category A or B environmentally sensitive areas?
- b) Involve activities in a marine area?
- c) Involve activities less than 500m from the highest astronomical tide?
- d) Involve the construction of a new pipeline of more than 150km under a petroleum authority?
- e) Include an environmentally relevant activity with an aggregate environmental score of greater than 165?
- f) Involve activities under a GHG injection and storage lease under the Greenhouse Gas Storage Act 2009?
- g) Involve the construction of a petroleum refining or processing facility?

It is not anticipated that activities proposed under this application will have a significant impact on Category A or B environmentally sensitive areas (see Section 8). Similarly, the proposed project will not involve:

- Activities in a marine area.
- Activities within 500 m of the highest astronomical tide.
- The construction of a new petroleum pipeline greater than 150km.
- Greenhouse gas injection or storage.
- An ERA with an aggregate environmental score greater than 165.
- The construction of a petroleum refining or processing facility.

Therefore, it is considered that this application does not require assessment through an EIS process.

All field development relating to the provision of gas for the proposed Arrow Energy LNG Plant on Curtis Island will be subject to a detailed Environmental Impact Statement (EIS) process, and will be done in full consultation with DEHP and other relevant government agencies and stakeholders. A separate EA application will be submitted at a later date in association with the Surat Gas Project EIS (Arrow, 2012) process.

2.6 FINANCIAL ASSURANCE

Sections 312O and 312P of the EP Act provide the administering authority with the power to require the holder of an Environmental Authority (EA) (Chapter 5A Activities) to provide a new or amended Financial Assurance. The purpose of Financial Assurance is to ensure compliance with the conditions of the EA and to guarantee sufficient funds are

available to the State Government should the company default on their environmental requirements or become bankrupt.

EHP requires that financial assurance is lodged for all Level 1 EA's (DERM 2011). The financial assurance estimate is required as a component of an EM Plan as prescribed under Section 310D of the EP Act. A granted EA will not be issued until the appropriate financial assurance has been received by EHP and the financial assurance will remain in force until EHP is satisfied that no claim on the assurance is likely. Financial assurance must be calculated to ensure that funds available to the government are commensurate with the level of activity as the project develops.

EHP presently holds \$17,144,697.50 of financial assurance for EA PEN100449509. However, given this EA amendment application is seeking the approval of additional petroleum activities for the DXP, Arrow is determining a new financial assurance estimate that includes the current amendment application proposed activities.

The financial assurance will include costs associated with the decommissioning and rehabilitation of all existing and proposed site infrastructure and associated disturbances to land undertaken as part of DXP activities.

The financial assurance estimate will be based on independent, third-party unit rates developed for key tasks using a conservative set of assumptions for each task. All costs have been developed in accordance with EHP requirements for Level 1 petroleum activities. It should be noted that the calculations will be completed in accordance with the EHP Guideline Calculating financial assurance for Level 1, Chapter 5A petroleum activities (January 2012), in particular adopting the EHP recommendations on costing of progressive rehabilitation.

3. ENVIRONMENTAL MANAGEMENT SYSTEM

Arrow is committed to the sound management of health, safety and the environment throughout all of its business activities. The company maintains an integrated HSEMS based on the principles of ISO 14001, Environmental Management Systems - Requirements with Guidance for Use (Standards Australia, 2004a) and AS/NZS 4801:2001, Occupational Health and Safety Management Systems - Specification with Guidance for Use (Standards Australia, 2001). The key elements of Arrow's HSEMS are further described in the following sections.

3.1 ENVIRONMENTAL POLICY

A copy of Arrow's environmental policy is attached as Appendix B. This policy governs the development and implementation of Arrow's HSEMS, and together these documents are the key tools used by Arrow to engage in activities and to supply services in an environmentally sustainable manner. By implementing the Arrow HSEMS and site based Environmental Management Procedures, Arrow will endeavour to:

- Conduct operations in compliance with all relevant environmental legislation, regulations, licences, permits, standards, approvals and authorities.
- Clearly allocate responsibilities for environmental performance at all levels within Arrow and its business associates and build environmental competency through provision of structured environmental training to its employees, contractors and other service providers.
- Seek continuous improvement in environmental performance through setting objectives and targets for environmental performance, provide sufficient financial and human resources to meet these objectives and targets, apply research and development and cleaner production principles and, where applicable, use environmentally sustainable products and resources.
- Apply best industry practice in the management, supply and delivery of coal seam gas.
- Communicate with the community and customers about commitments to this vision, its application and their view of Arrow's performance.

3.2 ENVIRONMENTAL MANAGEMENT PROCEDURES

As part of the Environmental Management Framework, a series of procedures have been developed detailing how operations shall be conducted to manage risks to the environment. These procedures outline specific considerations and controls that apply when planning for an activity and when carrying out the activity. Monitoring and staff responsibilities for specific actions are also discussed in each procedure, as are a list of other documents that may assist in the proper conduct of the activity. A list of Environmental Management Procedures relevant to DXP activities are presented in Table 3.

Table 3: Current Arrow Energy Environmental Management Procedures

Procedure	Document Number
Erosion and Topsoil Management Procedure (previously Erosion Controls and Rehabilitation of CSG Operations)	99-H-PR-0045
Operating Procedure for Sampling Associated Water	99-V-PR-0002
Environment Document Control Procedure	99-V-PR-0003
Aboveground Storage Tanks Procedure	99-V-PR-0004
Competence - Environmental Aspects Procedure	99-V-PR-0005
Development of Environmental Documents Procedure	99-V-PR-0006
Environmental Alert Procedure	99-V-PR-0007
Environmental Corrective Actions Procedure	99-V-PR-0008
Environmental Document Deviation Procedure	99-V-PR-0009
Environmental Regulatory Compliance Procedure	99-V-PR-0010
Office Environmental Aspects Procedure	99-V-PR-0011
Environmental Noise and Vibration Management Procedure	99-V-PR-0013
Land Clearing and Ground Disturbance Procedure	99-V-PR-0014
Rehabilitation Procedure	99-V-PR-0015
Traffic and Transport - Environmental Aspects Procedure	99-V-PR-0016
Visual and Landscape Procedure	99-H-PR-0076
Waste Management Procedure	99-V-PR-0018
Water Management Procedure	99-V-PR-0019
Weed and Pathogen Management Procedure	99-H-PR-0030
Air Emissions Procedure	99-V-PR-0022
Environmental Audit and Inspection Procedure	99-V-PR-0024
Procedure for reporting Methane Gas Releases	99-V-PR-0027
Ecological impact assessment procedure- upstream activities	99-H-PR-0081
Wildlife and Stock Management Procedure	99-H-PR-0075
Fauna Spotter/Catcher Procedure	99-H-PR-0048
Chemical Management Procedure	99-H-PR-0016
Fire Prevention Procedure	99-H-PR-0020
Relocating Wildlife Procedure	99-H-PR-0030
Incident Reporting Recording and Investigation Procedure	99-H-PR-0010
Soil Management Procedure	99-H-PR-0044

3.3 ROLES AND RESPONSIBILITIES

Arrow is accountable for the ongoing environmental management of DXP activities; however all employees and contractors are responsible for the environmental

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performance of their activities and must demonstrate compliance with Arrow procedures and policies and with any commitments made as part of the HSEMS and this EM Plan.

Key personnel have specific responsibilities with respect to environmental management. These personnel and their responsibilities are presented in Table 4.

Table 4: Arrow Personnel and Environmental Responsibilities

Role	Responsibility
Chief Executive Officer	<ul style="list-style-type: none"> • Performance of Arrow. • Corporate environmental policy. • Fostering a partnership that promotes 'ownership' of Arrow's environmental responsibilities
Chief Operating Officer	<ul style="list-style-type: none"> • Implementation of corporate and environmental policy. • Systems and resources to ensure compliance with environmental policy.
Vice President Health, Safety, and Environment	<ul style="list-style-type: none"> • Performance measurement and reporting, including recommendations for improvement and corrective actions.
General Manager: Environment and Water	<ul style="list-style-type: none"> • Authorised officer for signing environmental documentation. • Ensuring management and monitoring practices and procedures are documented and clearly communicated within the organization.
General Manager: Assets (South)	<ul style="list-style-type: none"> • Implementation of management and monitoring practices and procedures in all operation areas. • Resourcing. • Accountable for compliance.
Southern Operations Manager	<ul style="list-style-type: none"> • Environmental approvals implementation. • Development of operational procedures and practices relevant to the environment. • Coordinating incident response. • Reporting and compliance related issues. • Training in and implementing procedures, including those that address environmental management, at a site or operational level.
Employees and Contractors	<ul style="list-style-type: none"> • Following procedures that implement the requirements of the Arrow Energy HSE Standards; • Compliance with relevant environmental procedures and standards. • Coordinating incident response. • Reporting all incidents, defects, hazards and inadequacies of procedures so that appropriate review and corrective action can be taken;

	<ul style="list-style-type: none"> • Overseeing day to day activities. • Carrying out specific activities that ensure compliance with environmental authority conditions, including monitoring and data collection.
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3.4 TRAINING, AWARENESS AND COMPETENCE

Environmental awareness training and inductions appropriate to the level of risk and type of work being performed will be provided to all employees, contractors and visitors. Training plans will be developed to attain, improve and maintain personnel competencies and the overall environmental performance of Arrow. Additionally, plans will be reviewed following change, incident investigations and hazard studies. Training will generally:

- Cover all emergency response procedures.
- Review hazards and control measures.
- Review environmental standard operating procedures.
- Present consequences and impacts of departure from hazard and control measures.
- Reinforce the role of hazard and control measures in achieving company and business unit objectives and targets.
- Be regularly evaluated to ensure the required learning outcomes are being achieved.

Records of trainee assessments will be maintained to demonstrate achievement of competence. Re-training and other professional development activities will be identified and implemented as necessary to ensure personnel have the capacity to adequately perform their duties and carry out effective environmental management.

3.5 INCIDENT MANAGEMENT

Incident reporting and management is reinforced through environmental management procedures and incident reporting guidelines and are included and emphasised during training of personnel.

Environmental incidents are reported through the management line and are investigated to establish immediate response and system (root) causes and corrective actions, which are subsequently applied to prevent recurrences. The Asset Manager will ensure that external environmental reporting requirements in the event of any incident are fulfilled.

Arrow has plans and procedures for preparedness and response to emergencies. These are applied to both environmental and safety events.

3.6 MONITORING AND ASSESSMENT

Monitoring and reporting provides a direct measure of the project's impacts and/or consequences of its operations, together with an indication of the effectiveness of Arrow's HSEMS. Planned monitoring includes the following:

- Monitoring implementation of management plans.
- Regular inspection of construction and operational activities.
- Environmental monitoring of potential impacts over time (e.g. photo-monitoring, baseline and repeated assessments and audits).
- Reporting and analysis of regulated discharges, emissions and waste disposal.
- Any other prescribed monitoring in accordance with the conditions of the relevant EA.

3.7 AUDITING

Internal monitoring is undertaken as both scheduled and unscheduled activities. Regular audits are conducted for aspects of operations in conjunction with site Environmental Improvement Plans and review meetings. In addition, spot audits are undertaken during ad hoc site visits. External audits will be undertaken when required to evaluate compliance with the EA conditions and the HSEMS.

3.8 COMPLAINTS

Arrow is committed to managing all complaints in an accountable, transparent, timely and meaningful way. Arrow has in place a complaints management system which outlines how staff must handle, report and address complaints, which is consistent with the Australian Standard ISO 10002-2006 'Customer satisfaction – Guidelines for complaints handling in organisations'.

Complaints will be recorded in the complaints management system database. All complainants shall be treated courteously, and kept informed of the progress of their complaint throughout the complaint management process.

By monitoring complaints and recording their outcomes, Arrow will ensure continued improvement in its operations and activities through responding to complaints with meaningful feedback regarding potential improvements.

3.9 CONTINUOUS IMPROVEMENT AND CORRECTIVE ACTION

The HSEMS will be updated proactively and in response to the following:

- Audit outcomes and subsequent corrective actions,
- Changes in activities,
- Changes in procedures

- Improved technology.

Updates will reflect legislative amendments together with relevant project changes or issues that arise during petroleum project activities.

4. DESCRIPTION OF PETROLEUM ACTIVITIES

This EM Plan describes the following activities associated with the DXP:

- Approved and existing activities.
- Approved activities which are not yet developed.
- Proposed activities which have not yet been approved and are not yet developed.

The key existing and proposed DXP petroleum activities are summarised in Table 5 below. A more detailed description of existing and proposed activities is included in Sections 3.1 and 3.2. The locations of the major items of existing infrastructure within the DXP are illustrated in Figure 5.

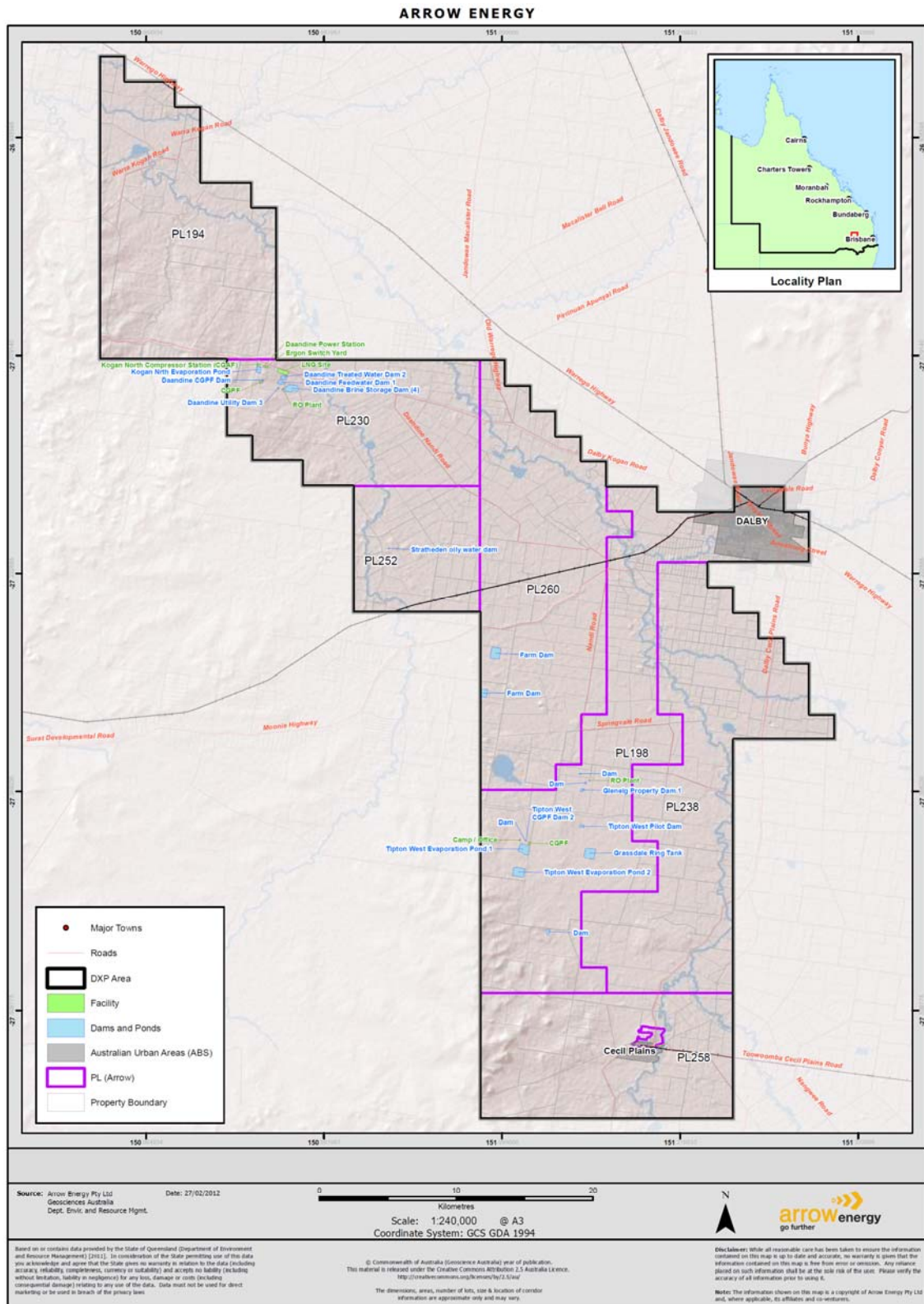


Figure 5 Location of existing large infrastructure associated with the DXP

Table 5: Summary of Existing and Proposed Activities and Infrastructure on the DXP

Activity	Approved and existing	Approved but not yet developed	Proposed (Not yet approved and not yet developed)
Coal seam gas exploration and production			
Seismic surveys (km)	0	0	200
Wells	455	236	0
Borrow pits (ha)	4		
Fuel burning and power generation			
Compressors *	13	27	0
Power station (40 MW)	0	2	0
Water storage and treatment			
Regulated Dams (>401 ML)**	8	7	0
Regulated Dams (<400 ML)**	7	1	0
Water treatment facilities (reverse osmosis) (>10ML/day)***	2	0	0
Sewage and wastewater			
Sewage Treatment Plants/Wastewater Treatment Systems (21 to 450 EP)	0	2 (<450 EP)	0
Sewage Treatment Plants/Wastewater Treatment Systems (< 21 EP)	0	3	0
Release to waterways			
Discharge of treated coal seam gas water to a watercourse		Discharge to an unnamed tributary of Wilkie Creek under wet weather conditions	Change of discharge point to Wilkie Creek on a variable flow basis
Groundwater injection			
Injection of groundwater into suitable aquifers			Undertake shallow and deep groundwater injection trials

*4 stage 5.89 TJ/d reciprocating compressors

**'Dams' include aggregation dams, brine storage dams, treated water dams and process dams.

***Daandine WTF is currently operational, and Tipton WTF is under construction.

4.1 APPROVED ACTIVITIES

This section provides information regarding the existing project activities that are approved for the DXP.

4.1.1 Drilling and Well Installation

There are 455 wells existing within the DXP, including exploration, appraisal and production wells in addition to monitoring bores.

A further 236 wells were approved under the current EA PEN100449509. These wells will be drilled as land access and other approvals are obtained and existing gas supply contracts require additional production to be brought online.

Production wells drilled on the DXP are predominantly vertical wells which are described further in Section 4.1.1.4.

4.1.1.1 Exploration Drilling

Exploration wells determine the location, extent, thickness, gas content and gas saturation of coal seams. Locations for drilling exploration wells are determined using a desktop assessment of geological, social, landholder and environmental factors.

Well locations are cleared and levelled to provide a platform for the drilling rig, allow the safe movement of vehicles and machinery and to provide a barrier to bush and grass fires. Access roads, a safety flare unit and a storage facility for produced water will also be constructed at the drill site. In most cases storage tanks will be used to hold drilling water. The site will be fenced for safety and to provide a barrier to cattle or other livestock.

The typical area of disturbance associated with an exploration well site is 8,100 m² (90 m x 90 m). Disturbed areas consist of the compacted well pad (for drilling machinery) and an area for the temporary storage of vegetation, top soil and spoil.

There are two main forms of exploratory drilling, being exploration wells and appraisal wells (also known as pilot wells) as discussed below.

4.1.1.2 Exploration Wells

Drilling rigs used to establish exploration wells are generally slightly larger than standard water bore drilling rigs. Throughout the drilling process, drilling fluids are circulated down the drill hole to balance underground pressure and to bring drill cuttings back to the surface. Arrow does not utilise oil or synthetic oil based drilling fluids in this process.

Following the drilling of the exploration well, a series of downhole tests are conducted. Each well is designed and installed in accordance with relevant industry regulations.

Once drilling is complete and all data has been gathered, the well is 'plugged and abandoned'. This involves sealing the hole from the bottom to the surface using cement. The steel casing is cut off 1.5 m below the surface, sealed with a metal identification plate and buried. The land is then rehabilitated to its pre-disturbed form using topsoil that was stockpiled as part of the preparation of the drill site.

Alternatively, an exploration well can be converted into a permanent monitoring bore to measure reservoir pressures within the coal seams and/or water pressures within known aquifers. Depending on the well's location relative to current producing wells or future production fields, the monitoring well can provide baseline readings prior to the development of a coal seam gas field. Additional regulations apply when converting wells to water monitoring bores.

4.1.1.3 Appraisal or Pilot Wells

Appraisal or pilot wells are used to determine the most effective way of producing coal seam gas. A pilot is designed to mimic a small-scale production field to gather information about maximum gas and water production rates, to trial the most effective well design at that location and also to measure the quality of water that is produced. Appraisal testing involves drilling a cluster of wells in one area in a diamond or square pattern with one central well and several wells surrounding it at approximately 200-250m apart. However, this can vary depending on the characteristics of the specific gas field and the land available for drilling. The close proximity of the wells allows the quickest drawdown within the coal seam to minimize the time required for testing as well as to determine estimated gas rates for the area.

As is the case with exploration wells, appraisal wells each have a specific design that is required to comply with strict regulatory requirements and long established petroleum industry techniques. The well is designed so that it isolates any known aquifers behind steel casing and is held in place with pressure tested cement.

Each well is completed with a downhole pump and production tubing which is used to extract water from the coal seam. By extracting water from the coal seam the well lowers the hydrostatic pressure on the seam which allows the gas to flow into the well and to the surface. Pumping from the well usually lasts between three and twelve months or until sufficient data on gas and water rates can be obtained. In some cases approval for an extended production test is requested from the administering authority, to allow for further testing of the gas and water reserves past twelve months. The gas from each well is collected and flared at each pilot location. A lined dam is generally associated with the pilot and is constructed to receive and store the produced coal seam gas water. The size of the dam is determined using information collected during exploration and built large enough to store water for the entire testing period. In some instances, the coal seam gas water can be connected into the existing water gathering system and sent to one of the major aggregation dams on site.

The data collected from the pilot is analysed and used to determine if the area can support a viable gas field. The data would then be used in future gas field development planning by optimising well spacing, water & gas infrastructure, water treatment options and pump sizes.

4.1.1.4 Production wells

Production wells are drilled to produce gas to sell to market and fulfil domestic gas supply contracts. Production wells are optimally set out in 900 m grid spacing; however this may range from 800 m to 1000 m dependent on the constraints present. Drilling is generally conducted 12 to 24 hours per day, seven days a week for approximately 14

days, subject to landowner and labour availability. Production wells are nominally drilled 300 to 800 m deep, however total depth is dependent on the coal reserves. To prevent the loss of water from upper groundwater aquifers, the top section of each well is cased with steel and cement. The casing of the upper strata in this way also serves to prevent cross contamination between aquifers.

Once the well is installed, the well site footprint is reduced to a size sufficient (approximately 12 m x 12 m) to accommodate the wellhead, electric drive rotating screw pump, wellhead gas/water separator, control valve, monitoring, metering and communications equipment and connection to gas and water gathering lines. Operational well sites are fenced and signposted to prevent public, stock or wildlife access to the well head. Once installed, Arrow's current modelling suggests an average well life of 15 to 20 years. Well workovers typically take place every 1 to 5 years during a well life. Workover activities are similar to those conducted during the construction of a production well with an associated disturbance area of 90 m x 90 m typically required.

To promote gas and water flow in the well, a number of different drilling techniques can be used. These include using an under-reamer at target depths in the well to ream out cavities in the coal seams, or accessing multiple coal seams through the drilling of multi-lateral or vertical wells accessed through the primary central bore hole.

No hydraulic fracturing (fracking) will be carried out on the DXP. Hydraulic fracturing which is the process of creating cracks in underground coal seams to increase the flow and recovery of gas or oil out of a well.

4.1.2 Drilling Technology Trials

Arrow is in the process of describing and designing an area within the DXP area called the Surat Tek Park. The aims of the Surat Tek Park is to trial and prove drilling technologies that will minimise landholder impact, environmental impact, land disturbance, cost and drilling duration.

The Surat Tek Park will consist of 14 wells, seven of which will be drilled on two separate drill pad locations in Quarter 3 2012. The Surat Tek Park and both drill pads are located on the Arrow Energy owned property Statheden on PL252.

On each pad, seven wells will be drilled consisting of one vertical well and six slant or deviated from vertical wells. The current surface layout concept involves placing the wells in a single line on a pad site measuring 190 m x 70 m, with the seven wellheads approximately 15 m to 25 m apart. Details of the two well pads, drilling methods and artificial lift types are provided below and presented in Figure 7 and Figure 8:

- Pad 1 – This pad will test well types that are deviated from the vertical using injected gas to artificially lift coal seam water from the well.
- Pad 2 - This pad will test conventional well types with electric submersible pumps to artificially lift coal seam water from the well. Wells drilled within this pad are expected to be approximately 475 m deep (vertical depth measured from ground surface).

The specific location of each drilling trial (and which drilling types are to be trialed at each location) will be dependent on coal depths in the area. Slant wells are most suited to deeper coal seams as they allow for the greatest amount of coal to be intersected with the least surface disturbance (due to the greater horizontal step out achieved over the increased depth to the coal). Wells that are deviated from the vertical (i.e., drilled at a greater angle from the vertical) are accordingly more suitable for accessing shallower coal seams.

The drilling of both deviated from vertical and the slant wells will use conventional drilling techniques; however a heavier than normal mud weight may be required to lift cuttings to surface along the slant or deviated section of the well.

Pitless drilling will be employed in the drilling technology trials to deliver and process drilling mud, thereby avoiding the need for surface storage pits. Surface mounted tanks, coarse filtration systems and pumps are used to recycle mud throughout the drilling process.

Water and gas will be handled via existing Arrow Energy infrastructure where capacity exists. Water will be handled via the existing Stratheden water line to the Daandine reverse osmosis treatment plant. Produced gas will be piped to the nearby Daandine Gas Compression Facility.

The techniques proposed as part of these drilling trials do not vary greatly from those currently used for the conventional vertical wells drilled by Arrow. The management measures described in this EMP are also applicable to activities on the Surat Tek Park. As such the drilling trials at Surat Tek Park are not anticipated to introduce any additional impacts on environmental values.

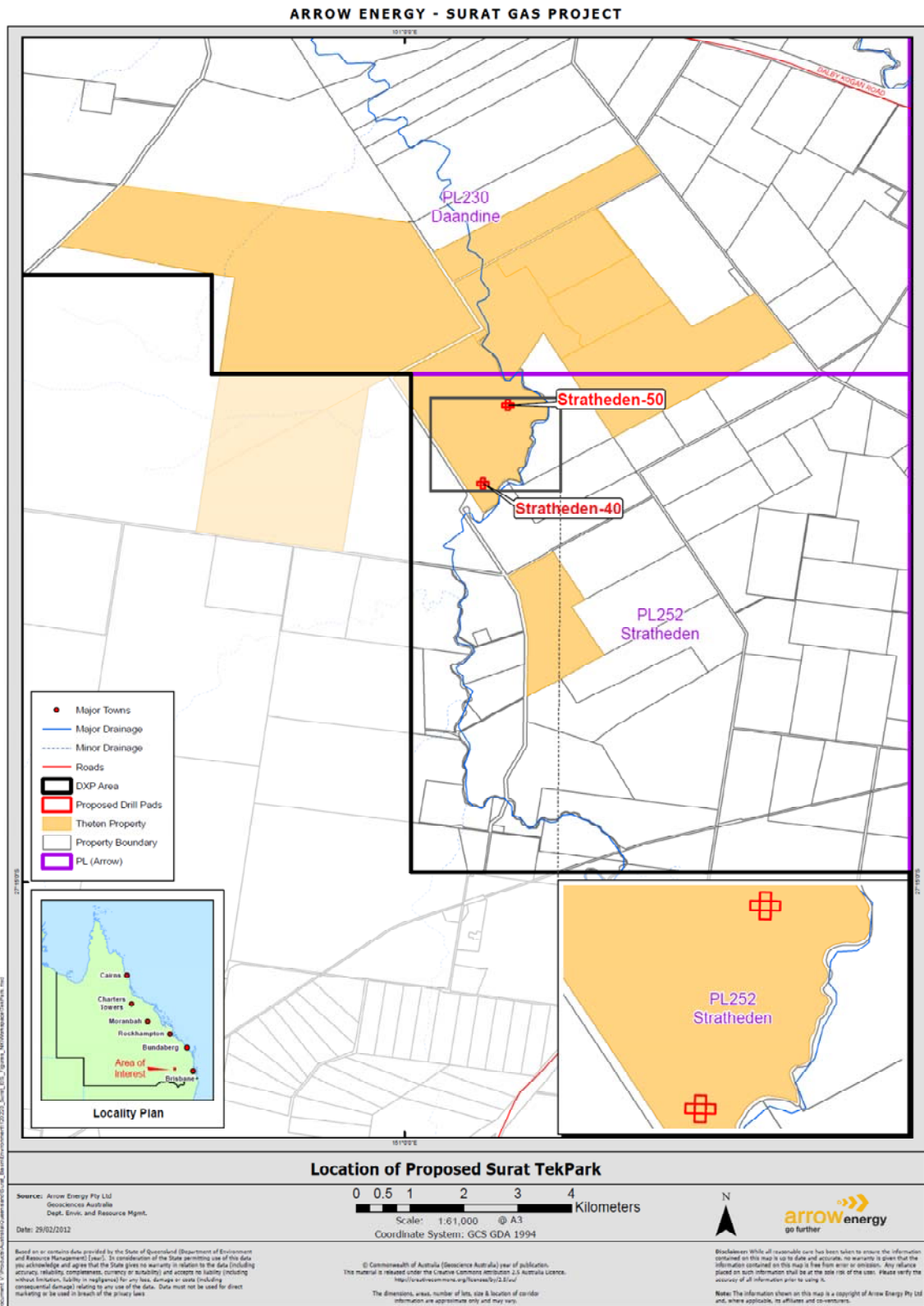
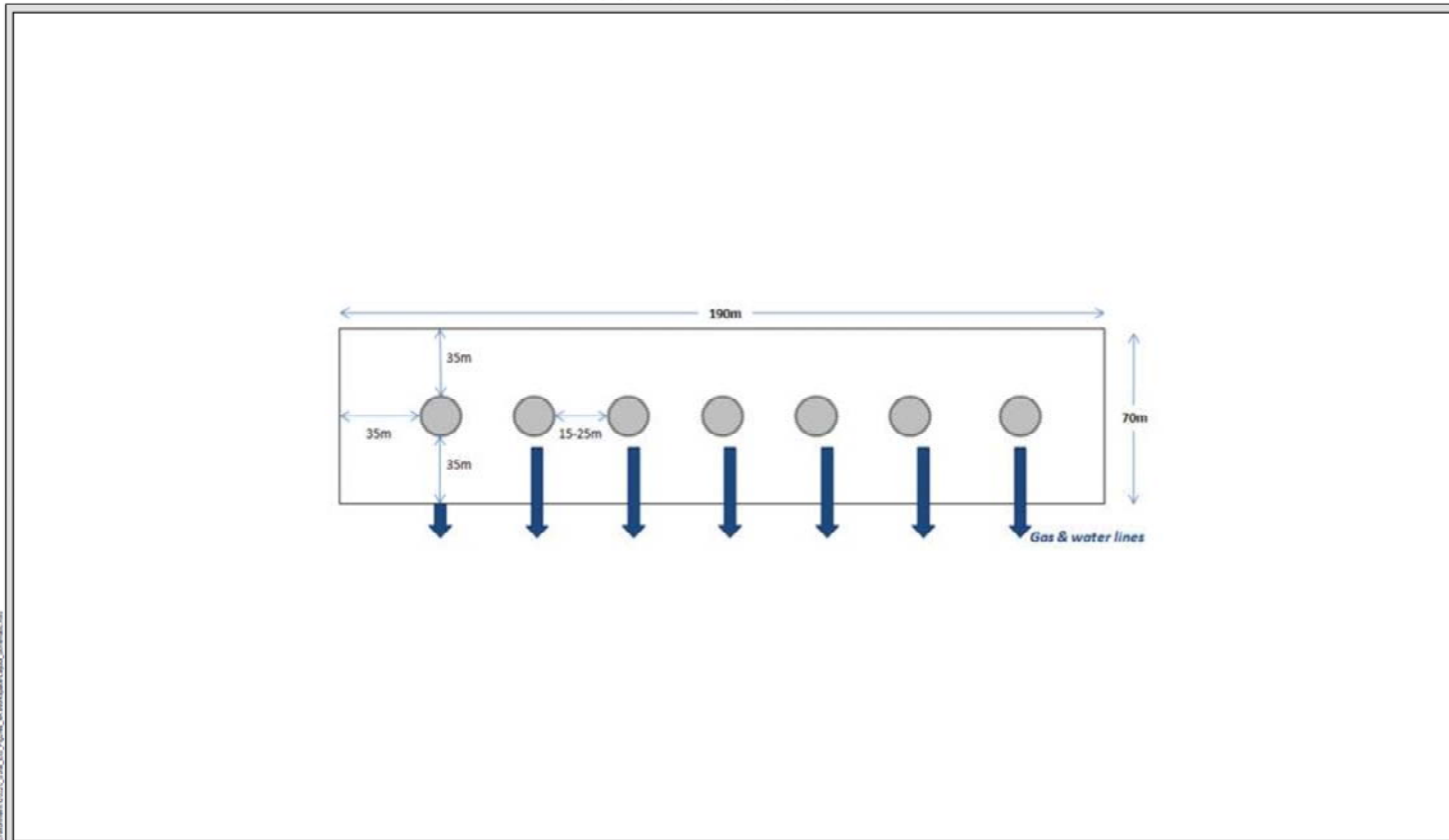


Figure 6: Location of Proposed Surat Tek Park

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Conceptual Well Layout

Source: Arrow Energy Pty Ltd
 Queensland Australia
 Dept. Envt. and Resource Mgmt.
 Date: 20/02/2012



Based on or contains data provided by the State of Queensland (Department of Environment and Resource Management [sic]), in consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or availability) and accepts no liability (including without limitation, liability in negligence for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the project terms.

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NOT FOR CONSTRUCTION

Figure 7: Well Layout Schematic for Proposed Surat Tek Park

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ARROW ENERGY - SURAT GAS PROJECT

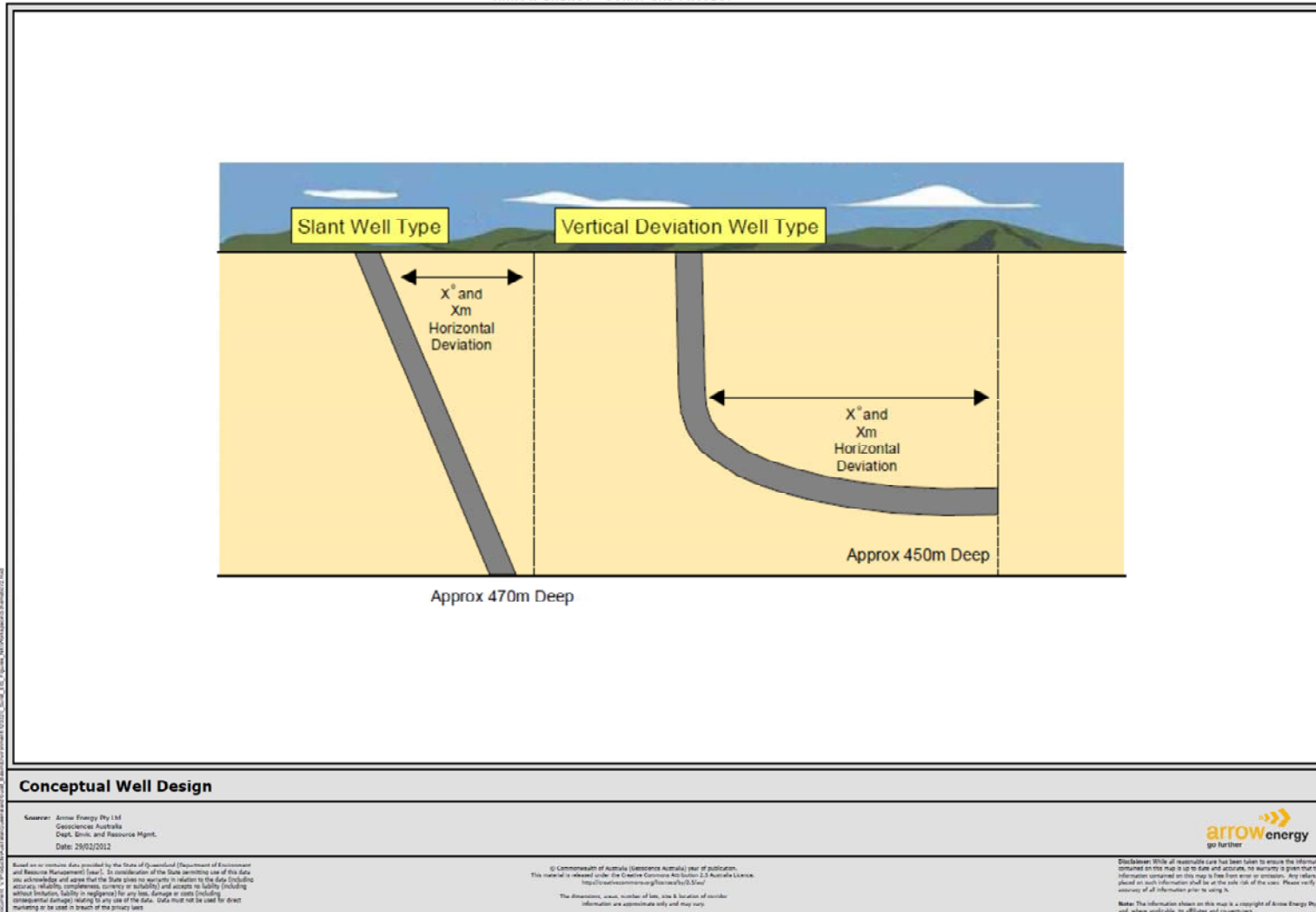


Figure 8: Surat Tek Park Well Type Schematic

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4.1.3 Exploration and Production Related Infrastructure

4.1.3.1 Gathering Lines

The existing gathering system for the DXP consists of gas gathering lines and water gathering lines flowing from the well heads to gas compression and to water storage facilities, respectively. Gathering lines are typically 110 to 630 mm diameter High Density Poly Ethylene (HDPE) buried within maintained cleared corridors.

Additional gathering lines required in accordance with this proposed EA amendment will be constructed as land access and other approvals are obtained and additional wells and water treatment facilities are brought online.

Water gathering lines include high point vents to collect any gas not separated from the water at the wellhead. Gas gathering lines similarly incorporate low point drains for the removal of water from the gas. High point vents operate automatically.

4.1.3.2 Access Tracks

Access tracks are required on the gas fields to allow the servicing of well sites and other supporting infrastructure. Already established access tracks are used wherever possible, however purpose built access tracks will be required to be constructed where existing tracks are not suitably located.

Typical access tracks are up to 12 m in width and are constructed with take-off drains to divert water away from the access corridors. Take-off drains are typically located at regular intervals along a track and extend for approximately 20m. Construction of dual carriageway roads require up to 20 m width and take off drains may be installed where required to decrease erosion.

4.1.3.3 Borrow Pits

Borrow pits are typically required as a source of gravel and other materials necessary for the construction of well sites, access tracks, dams and storage areas. There are a number of existing borrow pit locations across the DXP area, comprising approximately four hectare in area.

4.1.4 Fuel Burning and Power Generation

4.1.4.1 Fuel Burning

There are two existing compressor facilities (containing 13 compressor units in total) within the DXP. These existing facilities are the Tipton West Central Gas Processing Facility (CGPF) and the Daandine CGPF as described below.

A further 27 reciprocating compressors have been approved under the current EA PEN100449509. The compressor units will be constructed as additional wells are brought online and additional compression capacity is required.

Tipton West CGPF

This facility is operational and has the capacity to process up to 35 TJ of gas per day supplied from the existing gas fields within the DXP area. The CGPF is comprised of six

gas-driven oil lubricated reciprocating compressor units, a Triethylene glycol (TEG) dehydration unit, a cold vent, storage tanks, an oily water dam, a control centre and gas metering and control facilities. The approximate disturbance footprint associated with the CGPF is approximately four hectares.

Gas from the production wells is received by the CGPF and is subject to four stages of compression to achieve a pressure of approximately 10,200 kPag. The compressed gas is directed to a coalescing filter to remove entrained oil and water droplets before the gas is dehydrated in a TEG contacting column. The dry gas is directed to metering and distribution infrastructure and sent via high pressure gas pipelines to fulfil ongoing domestic sales agreements. Oily water is directed to the on-site oily water dam.

The TEG used to dehydrate the compressed gas is continually regenerated by distilling off the absorbed water at low pressure.

Daandine CGPF

This facility is also operational and is similar in design to the Tipton West CGPF. It has a slightly larger capacity (processing up to 42 TJ of gas per day) and is comprised of seven reciprocating compressor units, compared to the six present at the Tipton West CGPF.

4.1.4.2 Power Stations

Arrow has approval to develop two 40 MW power stations to power compression facilities and well heads. A power generation facility will likely comprise a series of high-efficiency coal-seam-gas-fired reciprocating engines with lean-burn technology to achieve high-efficiency generation (greater than 40%) with reduced emissions (low nitrogen oxide combustion technology). Each engine will be coupled to alternators generating directly at 11 kV. Power generation facilities will be located within or in close proximity to production facilities. An estimated 80m by 150m footprint will be required to accommodate a power generation facility. These facilities will supply power for gas compression, dehydration and water treatment.

4.1.5 Water storage and treatment

Arrow currently has approximately 300 to 350 existing gas production wells at Tipton West, Daandine, Stratheden and Kogan North across the associated PLs. Arrow currently manages the coal seam gas water generated in association with gas production from these fields with a 12 ML/day water treatment facility and associated storage at Daandine and a facility of similar capacity at Tipton is currently under construction. This will facilitate the treatment and beneficial use of coal seam gas water generated through production activities, in accordance with Arrow's Coal Seam Gas Water Management Strategy Basin and Coal Seam Water Management Plan - Surat (Appendix E). Further detail on the management of coal seam gas water and associated potential impacts on environmental values within the DXP are provided in Sections 6 and 12.

4.1.5.1 Regulated Dams

There are currently 16 regulated dams located in the DXP area. The locations of existing dams are illustrated in Figure 5.

These existing dams are utilised for a range of coal seam gas water management purposes including raw coal seam gas water aggregation, brine disposal and treated coal seam gas water storage as shown in Table 6.

A further seven regulated dams (>401 ML) have been approved under the current EA PEN100449509.

Table 6: Regulated Dams Located within the DXP (Source: URS May 2012, Daandine, Tipton, Kogan and Stratheden Regulated Dam 2011 Annual Inspections Report)

Dam Name	Dam Purpose	Area (ha)	Volume (ML)	Hazard Category	Date of Construction
Tipton West Aggregation Pond 1	Aggregation	34.13	1782	High	2006
Tipton West Aggregation Pond 2	Aggregation	44.60	2502	High	2007
Tipton West Pilot Dam	Aggregation	3.8	126	Significant	2004
Tipton West CGPF Dam 1	Process	0.27	4.18	Significant	2006
Tipton West CGPF Dam 2	Process	0.42	2.44	Low	2007
Tipton West Feedwater Dam	Aggregation	11.77	424	Significant	2011
Tipton West Treated Water Dam	Treated Water	11.77	424	N/A	2012
Tipton West Brine Storage Dam	Brine Storage	32.16	1072	High	2012
Tipton West Utility Dam	Process	2.94	54	Significant	2011
Kogan North Aggregation Dam	Aggregation	12	427	Significant	2005
Daandine Feedwater Dam	Aggregation	11.50	458	Significant	2009
Daandine Treated Water Dam	Treated Water	7.80	247	Significant	2009
Daandine Brine Storage Dam	Brine Water	38.10	1458	Significant	2007
Daandine Utility Dam	Process	1.3	48	Significant	2009
Daandine CGPF Dam	Process	0.63	22	Significant	2009
Stratheden Transfer Dam	Aggregation	0.63	22	Significant	2009

All of Arrow's dams associated with the management of coal seam water are operated and authorised in accordance with legislative requirements. This includes completing a hazard assessment for all dams that hold untreated coal seam water to determine if they are a Low, Significant or High hazard dam in accordance with DERMs Manual for Assessing Hazard Categories and Hydraulic Performance of Dams.

Details of significant or high hazard dams are maintained in Arrow's Regulated Dam Register. Dam design and operation are discussed in further detail in Section 6.

4.1.5.2 Water Treatment Facilities

Details of the two water treatment facilities associated with the DXP are provided below.

Daandine Water Treatment Facility

Arrow currently has an operational water treatment facility located at Daandine on PL230. Water treatment is achieved through a process of microfiltration (MF) and Reverse Osmosis (RO). The facility has a treatment capacity of 12 ML/day and it is expected to operate at a recovery rate of approximately 85% (dependent on feed water quality). Based on this rate of recovery and the plant availability rates, it is anticipated that there will be a maximum output of approximately 10 ML/d or 3,450 ML/year (based on operating 345 days/year). The approximate disturbance footprint of the MF/RO facility is 10,000 m².

Infrastructure associated with the water treatment facility includes:

- Feed Water Dam.
- Treated Water Dam.
- Brine Dam.
- Utility Dam.
- Groundwater monitoring bores (to detect seepage).
- Interconnecting pipelines (approximately 3 km).
- Export pipeline (approximately 12 km) from the water treatment facility to Arrow's Theten property.

Due to the high sodium absorption ratio (SAR – ratio of sodium to calcium and magnesium) of the treated coal seam gas water, SAR adjustment using calcium chloride may be required as part of the water treatment process to lower the SAR to ensure that treated water is suitable for beneficial use or disposal. Existing approvals under the *Queensland Environmental Protection (Waste Management) Policy 2000* provide for beneficial use of water from the Daandine facility for irrigation, stock watering, coal washing, industrial cooling and dust suppression.

Tipton Water Treatment Facility

A water treatment facility is currently under construction on PL198 in accordance with the current EA PEN100449509. Water treatment will be achieved through a process of microfiltration (MF) and Reverse Osmosis (RO). Pre-treatment will consist of disk filtration to remove the residual organics that have been identified in the feed supply. The facility will have a treatment capacity of 12 ML/day and is expected to operate at a recovery rate of between 85 to 90% (dependent on feed water quality). Based on this rate of recovery and the plant availability rates, it is anticipated that there will be a

maximum output of approximately 10 ML/d or 3,450 ML/year (based on operating 345 days/year). The approximate disturbance footprint of the MF/RO facility is 10,000m².

Infrastructure associated with the water treatment facility includes:

- Feed Water Dam.
- Treated Water Dam.
- Brine Dam.
- Utility Dam.
- Groundwater monitoring bores (to detect seepage).
- Interconnecting pipelines (approximately 11 km).

As per the process used at the Daandine water treatment facility, the quality of the treated water will be amended as required for beneficial use or disposal.

Current and proposed beneficial uses of water from the Tipton water treatment facility include irrigation, stock watering, coal washing, industrial cooling processes, urban use, construction and dust suppression.

The water treatment facility at Tipton is scheduled to be commissioned by October 2012.

4.1.6 Sewage and Wastewater

Temporary drilling camps with capacity for approximately 20 people may be located on the existing PL's to support seismic, exploration or appraisal activities. Sewage generated from these camps will not be released to land. Instead all sewage will be stored in tanks at the camp location and regularly trucked off-site for disposal at a licensed facility.

Arrow has approval under the current EA PEN100449509 for the construction of two Sewage Treatment Plants (<450 EP). These would only be constructed if deemed necessary to manage larger volumes of sewage such as may be associated with accommodation camps.

4.1.7 Rehabilitation

Arrow undertakes progressive rehabilitation across the DXP as soon as practicable after the completion of an activity causing disturbance to land. This typically includes (but may not be limited to) the following rehabilitation measures as part of DXP activities:

- Backfilling of flowline trenches after pipe laying.
- Removal of compacted areas by mechanical means.
- Removal of drilling sumps and reducing the disturbed area around the completed operational well pad. This will include ensuring a stable surface around the operational well pad is maintained.
- Implementing erosion and sediment control measures, where required.

- Remediating contaminated land.
- Re-profiling significantly disturbed land to a stable landform similar to the original land contours.
- Re-establishing surface drainage lines on significantly disturbed land.
- Re-establishing vegetation diversity and cover and appropriate fauna habitat.

Final decommissioning and rehabilitation will occur at the end of individual infrastructure life, taking into consideration a variety of final land use options. The final land use will be determined by considering a number of factors, including but not limited to the following:

- Relevant legislative and regulatory requirements.
- Surrounding land uses.
- Landowner requirements.
- Surrounding sensitive receptors and receiving environment.
- The environmental, social and cultural values of the area.

All rehabilitation activities will be undertaken in accordance with Arrow's Rehabilitation Procedure 99-V-PR-0015 (Appendix D), regulatory requirements and industry standards.

4.2 PROPOSED ACTIVITIES FOR APPROVAL

Activities on the DXP are presently a mixture of exploration and appraisal activities. These activities are designed to better understand the extent and characteristics of coal seam gas reserves present and to inform future field development activities. Arrow proposes to continue with this program of activities and it is anticipated that this will involve:

- The undertaking of 200 km of seismic surveying.
- The change to the location of the discharge point for the existing approved release of treated coal seam gas water from an un-named tributary of Wilkie Creek, under wet weather conditions, to Wilkie Creek on a variable flow basis.
- The undertaking of groundwater injection trials.

4.2.1 Seismic Survey

Arrow proposes to undertake 200 km of seismic survey throughout the DXP area. Seismic surveys are a surface based activity utilised to assess subterranean geological formations within a petroleum tenure. A seismic survey typically consists of a number of trucks or tractors with generators and vibrator pads which produce seismic waves. These waves are reflected back from different layers in the geological profile and are recorded by geophones. Geophones are installed into the shallow subsurface at regular intervals moving away from the source of the seismic waves. The geophones generally form a linear geometric distribution, or array, and the installation of the geophones can involve vegetation clearance and ground disturbance.

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Seismic is recorded in lines in a grid pattern. The data is later analysed to determine the most appropriate location to drill a well. In some circumstances, small shallow wells known as upholes, may be required to be drilled to accurately determine the depth of the shallow geological strata and generate more accurate seismic depth maps.

Disturbances to the environment resulting from seismic activities are minimal. Seismic trucks have the ability to navigate around significant vegetation and will utilise open spaces as far as practicable. Some site preparation may be required in certain instances which may consist of slashing grass, shrubs and small trees, stick raking and light grading where necessary to allow the safe access of the truck or tractor and seismic personnel. Every effort is made to minimise disturbance.

4.2.2 Amendment to Location of Discharge Point to Wilkie Creek

In circumstances where beneficial use options such as irrigation and coal washing are not available, an alternative means for the management of storage levels of treated water in dams may be required, particularly during wet weather events. Where beneficial use options are not available, Arrow's preferred water management options include a controlled release of treated water into Wilkie Creek under various weather and creek flow conditions. Discharge of treated water is currently approved under EA PEN100449509, however, the discharge point is into an un-named tributary of Wilkie Creek, and discharge is licensed under wet weather conditions. This amended EA application proposes to change the location of the discharge point to Wilkie Creek and the conditions to be on a variable flow basis.

The new location (E 303,004; N 6,995,465) of the discharge point is proposed to be included in the EA. The outlet into Wilkie Creek will be designed to minimise potential erosion and scouring at the point of discharge into the watercourse. The outlet will be inspected as required during operation for evidence of significant scouring / erosion and to ensure its appropriate function.

The proposed maximum rate of discharge of treated coal seam gas water to the Wilkie Creek is 115 L/second which equates to 10 ML/day. During each release event, treated coal seam gas water will discharge to Wilkie Creek for periods after storm events or river flows when the trigger flow rates have been exceeded.

A description of the existing environment, potential impacts and mitigation measures and recommendations are included in the Arrow Daandine Water Release Studies (refer to Appendix G).

4.2.3 Injection Trials

Arrow is currently addressing the option of injecting coal seam gas water into suitable aquifers. In order to address this option, an aquifer injection feasibility study is being undertaken, and will be followed by a deep injection trial in the course of the next 12-24 months. This is addressed in more detail in Section 12.4.2.1.

5. AIR

5.1 EXISTING ENVIRONMENT

The existing air quality environment within the DXP area is diverse and reflects the wide variety of land use within the DXP area and surrounding region. The air quality within the DXP area is influenced by proximity to anthropogenic activities such as coal and gas fired power stations, mining and industrial manufacturing. These activities are interspersed amongst predominately agricultural land use and bushland. Rural road networks connect a number of sparsely distributed small, regional towns. On occasion the DXP area is subject to regional air quality events associated with bushfires and dust storms. Sensitive places within the DXP area are shown in Figure 4.

A network of ambient pollutant monitoring stations is maintained by DEHP throughout southeast Queensland and other major centres throughout the state. The closest monitoring station is located in Toowoomba, east of the DXP area. Toowoomba has a relatively large population, approximately 125,000, while the largest population centre in the DXP area is Dalby, with a population of approximately 13,000.

A description of the key pollutants potentially occurring within the DXP area are detailed below in Table 7.

Table 7: Key pollutants potentially occurring within the DXP area.

Pollutant	Description/Potential Impact
Nitrogen oxides (NO _x)	<p>Nitrogen oxides (NO_x) from the DXP are principally associated with combustion of fuels including coal seam gas. Nitrogen oxides refers to a family of compounds formed by the combination of oxygen with nitrogen (principal components of air). Other sources include power generation, motor vehicles, soil, the use of nitrogen based fertilisers, and bush fire emissions.</p> <p>Nitrogen oxides can be associated with adverse health effects and ecological impacts. Excessive release of nitrogen oxides into the air can contribute to acid rain, eutrophication (increased nutrient load) of watercourses and formation of photochemical smog. Nitrogen dioxide (NO₂) is the most significant oxide of nitrogen in relation to human health impacts. Nitrogen dioxide exists in the atmosphere under complex chemical equilibrium with other nitrogen oxides, atmospheric oxidants (particularly ozone), photochemically active volatile organic compounds and sunlight.</p>
Particulate matter	<p>Particulate matter refers to suspended solids or liquids in air. Particulate matter is emitted from the DXP area via mechanical processes such as wind erosion, earth works, vehicle movements (particularly on unsealed surfaces) and incomplete combustion. Combustion of gas is generally not associated with high levels of particulate matter emission in comparison to other fuels. Particulate matter can be formed as a secondary product of photochemical smog. Particulate matter <10 micrometre (µm) (PM₁₀) and particulate matter <2.5 µm (PM_{2.5}) can remain suspended in the air for many days and are generally associated with greater health impacts than larger particle sizes. These small sized particles can enter the respiratory tract and impact human</p>

	<p>health.</p> <p>Larger particulate tends not remain airborne for extended periods under most conditions but can still create environmental impacts. Deposited particulate matter (dust) can impact amenity and create nuisance via the accumulation on surfaces, laundry and cars.</p>
Volatile organic compounds (VOC)	<p>The term VOCs is employed to describe a family of organic (carbon based) compounds emitted from natural and anthropogenic processes (including incomplete combustion and the use of petrol). Some species of VOC are toxic and can contribute to the formation of photochemical smog.</p> <p>Coal seam gas contains negligible VOCs since it is comprised primarily of methane, which does not exhibit the levels of toxicity or photochemical reactivity typical of some VOCs.</p>
Photochemical smog	<p>Photochemical smog is a complex mixture of pollutants formed by reactions between pollutants within the atmosphere. Ground level ozone (O₃) is the key pollutant of concern associated with photochemical smog and is commonly employed as an indicator of smog. Photochemically active VOCs can contribute to reactions that form ozone by reacting with nitrogen oxides in the presence of sunlight. Ozone is a strong oxidiser and is active in converting nitric oxide to the more hazardous nitrogen dioxide. The key to controlling the formation of photochemical smog is to control primary pollutants such as oxides of nitrogen and VOCs.</p>
Sulfur dioxide (SO ₂)	<p>SO₂ is formed when substances containing sulfur are burnt. The combustion of diesel and the operation of large coal-fired power stations within the DXP area will produce emissions of SO₂.</p> <p>Significant emissions of SO₂ are not associated with the DXP activities. Coal seam gas contains negligible quantities of sulfur. Diesel fuel employed within Australia is subject to strict sulfur limits.</p>
Carbon monoxide (CO)	<p>Produced from the incomplete combustion of carbon-based materials (including coal seam gas) potentially harmful to human health when exposed to sufficient concentrations. High levels of carbon monoxide are generally associated with heavy traffic. Well maintained gas operated equipment is not associated with significant carbon monoxide emissions.</p>
Odour	<p>Odour can lead to annoyance and some potential health effects. Hydrogen sulfide is a key odorant commonly associated with natural; however no significant hydrogen sulfide concentrations have been associated to date with coal seam methane. It is not anticipated that odour will be associated with key DXP operations but may be associated with ancillary operations such as sewage treatment.</p>

5.2 ENVIRONMENTAL VALUES

The environmental values to be enhanced or protected in and around the DXP area in accordance with the *Environmental Protection (Air) Policy 2008* include:

- The qualities of the air environment that are conducive to protecting the health and biodiversity of ecosystems.
- The qualities of the air environment that are conducive to human health and wellbeing.
- The qualities of the air environment that are conducive to protecting the aesthetics of the environment, including the appearance of buildings, structures and other property.
- The qualities of the air environment that are conducive to protecting agricultural use of the environment.

5.2.1 Air Quality Objectives

The air quality objectives for the DXP are:

- To construct and operate in a manner that minimises impacts on ambient air quality.
- Ensure the Environmental Protection (Air) Policy 2008 and National and National Environmental Protection Measures are met at sensitive receptors to maintain human and environmental health.

5.2.2 Sensitive Receptors within the DXP

As detailed in Section 2.4 a survey conducted in 2009 identified approximately 400 potential sensitive receptors (buildings) within the DXP area, excluding the townships of Dalby and Cecil Plains. Sensitive places ground-truthed and mapped within the DXP area are shown in Figure 4

Arrow Energy have contracted Coffey Environments to update the identification, ground-truthing and mapping of sensitive receptors in the DXP area and this work is due for completion late-2012. Potential sensitive receptors are located throughout the DXP area and will consequently be integral to the assessment of potential noise and air quality impacts.

5.3 POTENTIAL IMPACTS ON ENVIRONMENTAL VALUES

Activities associated with the DXP that have the potential to adversely impact air quality include:

- Combustion exhausts from the burning of fuel gas at the compressor facilities (4 stage 5.89TJ/day reciprocating compressors) and well heads.
- Combustion exhausts from the flare during well testing, appraisal and development.
- Fugitive emissions from vehicles and plant.
- Dust emissions from earthworks and vehicular activity.

5.3.1 Emissions

Air quality can potentially be impacted during construction and operations through to eventual decommissioning. Table 8 shows emission sources associated with each phase of the project.

Table 8: Emission sources associated with each phase of the project

Project Activity/ Emission Source	Phase	Source Characteristics	Type	Emissions
Production well installation	Construction	Once-off at each well location	Fugitive or point	Combustion emissions associated with drilling equipment and fugitive dust associated with vehicle and material movement.
		Stationary sources	Point	Combustion emissions. Ramp-up flaring prior to facility commission. Flaring would occur at the nearest facility.
Gas and water gathering line installation	Construction	Once-off associated with construction	Fugitive	Combustion emissions associated with construction equipment and fugitive dust associated with vehicle and material movement.
Production facility installation (and construction camps)	Construction	Once-off associated with construction	Fugitive	Combustion emissions associated with construction equipment and fugitive dust associated with construction.
Medium- and high-pressure gas pipeline installation	Construction	Once-off associated with construction	Fugitive	Combustion emissions associated with construction equipment and fugitive dust associated with vehicle and material movement.
Production well operation (wellhead engines): gas combustion and fugitive emissions	Operations	Continuous stationary sources	Point	Combustion emissions and unburnt gas (e.g., from valves, periodic emissions from well workovers).

Processing facility operation: pilot flaring and upset conditions flaring	Operations	Continuous stationary sources	Point	Combustion emissions.
Production facility operation: fugitive emissions	Operations	Continuous stationary sources	Fugitive	Unburnt gas (e.g., from valves, flanges, compressors and pumps).
Production facility operation: tri-ethylene glycol reboiler	Operations	Continuous stationary sources	Point	Combustion emissions and unburnt gas.
Production facility operation (power generation): gas combustion	Operations	Continuous stationary sources	Point	Combustion emissions.
Transport	Operations	Intermittent mobile sources	Fugitive	Combustion emissions and fugitive dust.
Production well, gathering line and pipeline decommissioning	Decommissioning	Once-off	Fugitive	Combustion emissions and unburnt gas, fugitive dust emissions associated with vehicle or material movement.
Production facility decommissioning	Decommissioning	Once-off	Fugitive	Combustion emissions and unburnt gas, fugitive dust emissions associated with vehicle or material movement.

5.3.1.1 Greenhouse Gases

Arrow Energy has legal obligations in relation to greenhouse emissions and energy management with respect to its DXP activities.

Arrow triggers corporate reporting thresholds under the Commonwealth *National Greenhouse and Energy Reporting Act (NGER) 2007*. This act requires Arrow to report its greenhouse emissions, energy production and energy consumption in line with methodologies set out under the regulations. These reports are subject to audit by the Commonwealth Department of Climate Change and Energy Efficiency. Emissions reported under the NGER legislation will be employed to determine Arrow's carbon liability under the *Clean Energy Act 2011*.

Key greenhouse emission sources from DXP activities may include:

- Fugitive emissions associated with the operation and maintenance of the gas gathering systems and well heads.
- Greenhouse emissions associated with the fuel and electricity employed to compress the produced coal seam gas.
- Energy employed to treat coal seam gas water.
- Vehicle emissions.

Arrow Energy has been reporting under this legislation since 2008/2009 and has developed systems and methodologies to gather and report the required information.

The *Clean Energy Act 2011* establishes a price on greenhouse emissions. Arrow will be required to hold emissions permits equal to its carbon liability from 1 July 2012. Arrow has a clear economic incentive to minimise the greenhouse emissions associated with its operations.

As a large energy user, Arrow also has obligations under the *Energy Efficiency Opportunities Act 2006*, which requires companies that use more than 0.5 PJ of energy (which includes Arrow Energy) to identify evaluate and publically report energy efficiency opportunities for projects which have a payback time of less than two years. The energy efficiency opportunities are identified via energy assessments. The timing and scope of the energy assessments is agreed with the Department of Resources Energy and Tourism in an Assessment and Reporting Schedule for each five year assessment period. Arrow has committed to complete energy assessments on the processes employed within the DXP area.

5.4 MANAGEMENT OF POTENTIAL IMPACTS

5.4.1 Control Strategies

Key control strategies to address potential impacts associated with air quality though all phases of the DXP are shown in Table 9.

Table 9: Control Strategies for Potential Impacts to Air Quality and Greenhouse Gases

Environmental Protection Objectives	
<ul style="list-style-type: none"> • To construct and operate in a manner that minimises impacts on ambient air quality. Ensure relevant air quality guidelines are met at sensitive receptors to maintain human and environmental health. • To minimise greenhouse gas emissions generated by project activities throughout the life of the project. 	
Environmental Issue	Control Strategies
<ul style="list-style-type: none"> • Decline in air quality through fuel combustion, fugitive emissions and dust generation from project 	<p><i>Planning and design:</i></p> <ul style="list-style-type: none"> • Conduct site-specific air quality modelling once site locations are known to ensure project-related air emissions meet EPP (Air) objectives at the nearest sensitive receptor. • Select equipment with consideration for low emissions to air

<p>activities.</p> <ul style="list-style-type: none"> • Contribution to greenhouse gas emissions. 	<p>(NO_x), high energy efficiency and fuel efficiency.</p> <ul style="list-style-type: none"> • Design facilities to meet relevant EPP (Air) objectives at sensitive receptors. • Minimise fuel consumption of vehicles by optimising transport logistics. • Select gaskets, seals and vehicle exhaust systems that are suitable for the task. • During all project phases, minimise greenhouse gas emissions by optimising transport logistics and minimising the footprint of disturbance. <p><i>Construction, operations and decommissioning:</i></p> <ul style="list-style-type: none"> • Ensure all engines, machinery equipment and pollution control mechanisms are efficiently maintained and operated. • Implement dust suppression measures for roads and construction sites to ensure that dust does not cause a nuisance. • Consider handling of dust-generating materials prior to transportation. • Consult with potentially affected landowners prior to undertaking activities. • Minimise the disturbance footprint and vegetation clearing. <p><i>Construction:</i></p> <ul style="list-style-type: none"> • Clear areas progressively and implement rehabilitation as soon as practicable following construction activities. • Minimise venting and flaring of gas as far as practicable and where safe to do so. <p><i>Operations:</i></p> <ul style="list-style-type: none"> • Minimise venting and flaring of gas as far as practicable and where safe to do so. <p><i>Decommissioning:</i></p> <ul style="list-style-type: none"> • Clear areas progressively and implement rehabilitation as soon as practicable following decommissioning activities. • Regular monitoring of rehabilitated areas will be undertaken until a stable landform is achieved.
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Monitoring Requirements

- Air quality assessment of combustion plant to ensure that the ground-level concentrations of relevant pollutants do not exceed EPP (Air) objectives throughout the lifetime of the project.
- Scheduled emissions testing of fuel burning equipment and combustion equipment to ensure values do not exceed limits set in the air quality assessments
- Operational equipment will be monitored for contaminants within 3 months after commissioning and biennially thereafter.
- Assess the energy-efficiency opportunities and estimate greenhouse gas emissions associated with the project in accordance with regulatory requirements. Calculate annual greenhouse gas emissions as required under the *National Greenhouse and Energy Reporting*

Act 2007 (Cwlth) and Energy Efficiency Opportunities program.

Performance Indicators

- Compliance with project air quality objectives at sensitive receptors.
- Compliance with relevant greenhouse gas programs.
- Complaints are recorded, managed and responded to.

6. DAMS

Dams are necessary for the storage of coal seam gas water and brine that are produced as part of coal seam gas extraction and coal seam gas water treatment for the DXP. In addition, water used for hydro-testing may be diverted to holding dams.

Water storage dams are assessed using the Manual for Assessing Hazard Categories and Hydraulic Performance of Dams prepared by DERM (2011a). If a dam is assessed as being in the significant or high-hazard category, it is considered a regulated dam and therefore registered with DEHP.

6.1 DESIGN STANDARD FOR REGULATED DAMS

Regulated dams must be constructed in accordance with the following internal and external standards and specifications:

- DERM, Manual for Assessing Hazard Categories and Hydraulic Performance of Dams, Version 2, June 2011.
- Environmental Authority PEN100449509.

6.2 ENVIRONMENTAL VALUES

Environmental values will vary with each proposed dam location, however, general environmental values to be protected may include:

- Land use capability, including maintaining the agricultural values of the land.
- The life, health and wellbeing of people.
- The diversity of ecological processes and associated ecosystems.
- The biological integrity of aquatic ecosystems and the suitability of waters for primary industry or recreational purposes.
- The suitability of groundwater for use in agriculture.

6.3 POTENTIAL IMPACTS ON ENVIRONMENTAL VALUES

Potential impacts of dams from associated project activities include:

- Dust and noise emissions from earthworks and vehicular activity.
- Loss of vegetation or habitat due to clearing requirements.
- Fauna mortality due to entrapment in dams.
- Salinisation of land surrounding dams due to spills, leaks and the inappropriate containment of coal seam water or brine.
- Salinisation of shallow groundwater in the vicinity of dams due to the long-term seepage and migration of coal seam water or brine.
- Disruption of overland flows.

- Surface water degradation and injury to people or property from a catastrophic release of a water storage dam.
- Loss of productive land through construction of dams.
- External events, such as flooding, extreme rainfall events, earthquake or land subsidence, causing dam overflow and subsequent surface water degradation.

The majority of potential impacts to the environment occur during construction activities, where noise and dust nuisance issues can become problematic if not managed correctly and disturbed earth is vulnerable to erosion from stormwater run-off. Larger volumes of fuels and potentially other hazardous substances (e.g. oils, lubricants etc.) may also be on-site during construction, which increases the potential for spills and land contamination (where not remediated) from activities such as re-fuelling.

Potential environmental impacts associated with the operation of dams are predominantly related to the lack of containment of coal seam gas water. A lack of containment may occur through uncontrolled releases of coal seam gas water from the dam (i.e. dam overtopping or dam failure) or through leaks and/or seepage through the floor and walls of the dam into shallow groundwater and the surrounding soils.

6.4 MANAGEMENT OF POTENTIAL IMPACTS

The primary mitigation measure is to design, construct and monitor dams in accordance with the Manual for Assessing Hazard Categories and Hydraulic Performance of Dams (DERM, 2011a), Queensland standards and DERM guidelines.

Dam locations are selected in consideration of all relevant environmental, social and safety factors to best minimise long-term disturbance to the environment and/or the identified environmental values. The location of existing dams within the DXP is illustrated in Figure 5.

Dam safety is controlled through dam safety guidelines, which apply for all facilities forming part of the DXP. Dams are accordingly designed and sized to account for predicted flood conditions and each dam is subject to separate approvals by the regulating authority. Each approval requires the incorporation of general and specific controls to avoid, mitigate or manage threats associated with flooding.

Potential environmental impacts associated with the construction of new dams are readily mitigated through the use of basic construction site controls, such as limiting construction hours, implementing stormwater diversions and erosion and sediment controls, correctly storing and handling fuels and hazardous substances and using dust suppressants. These impacts are only temporary in nature, thereby reducing the potential for significant long-term adverse impacts on the identified environmental values.

6.4.1 Control Strategies

Key control strategies to address potential impacts associated with dams through all phases of the DXP are shown in Table 10.

Table 10: Control Strategies for Potential Impacts Associated with Regulated Dams

Environmental Protection Objectives	
To ensure no uncontrolled release or leakage occurs; and that coal seam gas water and brine in regulated dams is appropriately managed.	
Environmental Issues	Control Strategies
<ul style="list-style-type: none"> Impacts on land use relative to the footprint of the dam. Hazard to people and infrastructure if the dam overtops or fails. Impacts from salinity through leakage of untreated coal seam gas water or of brine. Loss of habitat relative to the footprint of the dam. Diminished surface and groundwater quality if the dam overtops or fails. 	<p><i>Planning and design:</i></p> <ul style="list-style-type: none"> Consider local biological, groundwater and surface water conditions when identifying sites for coal seam gas water dams and brine dams. Design water dams in accordance with relevant legislation and Queensland standards and DERM guidelines. Leak detection systems will be installed on brine dams. Design and size dams to account for predicted flood conditions. <p><i>Construction:</i></p> <ul style="list-style-type: none"> Line banks of dam with an impervious lining. Design dams to have an egress (escape point) for wildlife. <p><i>Operations:</i></p> <ul style="list-style-type: none"> Establish maintenance and operational controls in accordance with the Dam Operating Plan. Weekly, monthly and annual inspections to ensure and/or identify dam integrity issues. Annual maintenance strategy to ensure preparedness for wet season. Water production and offtake forecasts to identify any potential short or long term water inventory concerns. <p><i>Decommissioning:</i></p> <ul style="list-style-type: none"> Implement a decommissioning and rehabilitation plan in accordance with the dam design plan.

Monitoring Requirements
<ul style="list-style-type: none">• Implement the Dam Operating Plan.• Routinely monitor water quality in dams.• Monitor dam levels.• Have a suitably qualified person routinely monitor the integrity and available storage of dams.
Performance Indicators
Operated and maintained in accordance with the certified design plan.

7. GEOLOGY, LAND AND SOILS

7.1 EXISTING ENVIRONMENT

7.1.1 Terrain

The Condamine River and its tributaries in the region have been influential in the development of the landform of the Darling Downs. The waterways show signs of channel migration, with clear meander scars and evidence of major channel avulsion. The combined processes of the degradation of the underlying sedimentary strata, channel meandering and migration, erosion from nearby igneous outcrops, and deposition from flooding events have generated a landform that comprises broad expanses of gently undulating land with some outcrops that have been resilient to the deposition and erosion processes.

The landscape of the DXP area is strongly linked to the underlying geology and geomorphological evolution of the area and is characterised by the Great Dividing Range highlands, the Kumbarilla Ridge uplands and the Condamine-Culgoa Drainage Basin (Condamine River and Balonne River). The following landforms and geomorphological processes were identified within the DXP area and contribute to the general features of the landscape:

- Upland features.
- Steep slopes.
- Gilgai.
- Gully erosion.
- Watercourses.

7.1.2 Geology

The Surat Basin is one of the major sedimentary basins within the Great Artesian Basin (GAB). Deposition of sediments into the Surat Basin began approximately 200 million years ago (Ma), in the Early Jurassic. During the Early Jurassic, deposition was mostly associated with river and lake environments (fluviolacustrine). By the Middle Jurassic, swamp environments predominated over much of the basin.

As the end of the Middle Jurassic approached (approximately 150 Ma), river systems again predominated and continued until the earliest Cretaceous. In the period following, the area experienced a marine transgression (inundation by the ocean), and shallow fresh water and marine sediments were deposited. The subsequent marine regression caused a fairly abrupt return to river and lake environments and swamp/marsh environments before sedimentation ceased in the Early Cretaceous, approximately 110 Ma. It is estimated that the maximum sediment thickness of the Surat Basin is 2,500m.

About 100 conventional (i.e. liquid crude oil and natural gas) petroleum accumulations have been discovered in the Surat Basin, of which approximately half are producing fields. Most accumulations occur in the Early Jurassic sands, with occasional gas

occurrences in the Middle and Late Jurassic. However, all are sourced from the Permian non-marine sediments of the underlying Bowen Basin and are not associated with the Walloon Coal Measures of the Surat Basin.

Organic material deposited in the swamp environments eventually became compressed organic layer(s) that over geological time became transformed into coal. The Surat Basin accordingly has a number of coal seam gas fields. These fields are presently exploited for gas supply to the domestic market, including a number of power stations and the Roma to Brisbane Pipeline.

Coal seam gas exploration and production is focussed on the Walloon Coal Measures, which formed during the Middle Jurassic. The Walloon Coal Measures are characterised by carbonaceous mudstone, siltstone, minor sandstone and coal, and contains the following formations:

- Juandah Formation.
- Tangalooma Sandstone.
- Taroom Coal Measures.
- Euromah Formation.

Of these four formations the Juandah and the Taroom Coal Measures are targeted for exploration and production and generally range in depth from 150m to 750m below ground surface across the DXP area. Surface geology within the DXP area is shown in Figure 9.

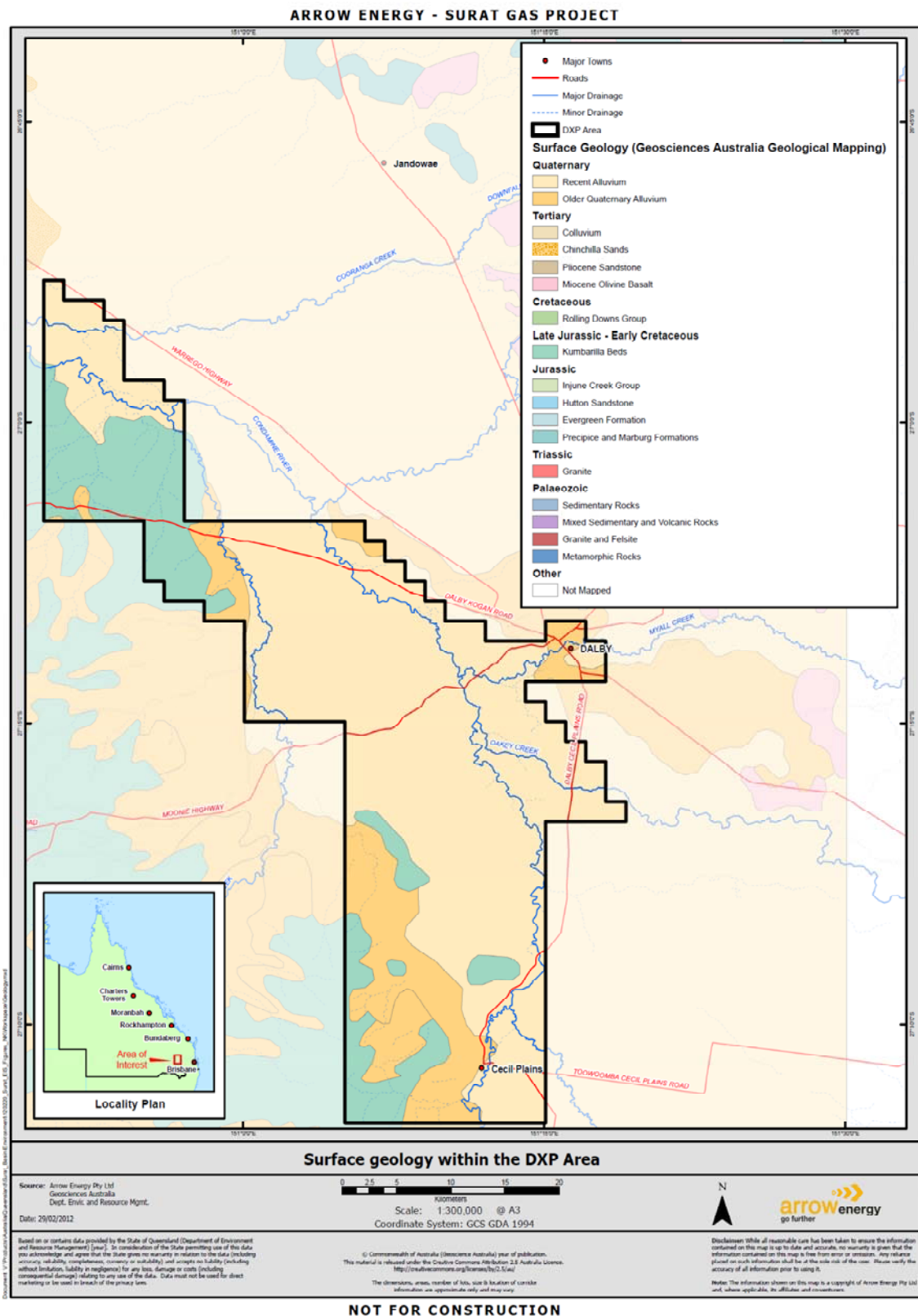


Figure 9 Surface geology within the DXP Area

Properties of the Walloon Coal Measures that influence the production of coal seams include:

- Geological factors, including structure, depth, faulting and cleating.
- Coal seam and confining strata porosity and permeability.
- Gas content, gas sorption capacity and pressure

7.1.3 Soils

Soil characteristics are strongly linked to formation process, relief and parent material. Seven broad soil types were identified in the DXP area and are characterised below (listed in the order of most to least clay content). They have been classified under the Australian Soil Classification System (Isbell, 2002). The geology, landform and soil characteristics contribute to terrain units, and represent the landscape environmental values and their sensitivity (i.e., how the landscape responds to disturbance). The distribution of terrain units and their association with soil types across the DXP area is shown Figure 10.

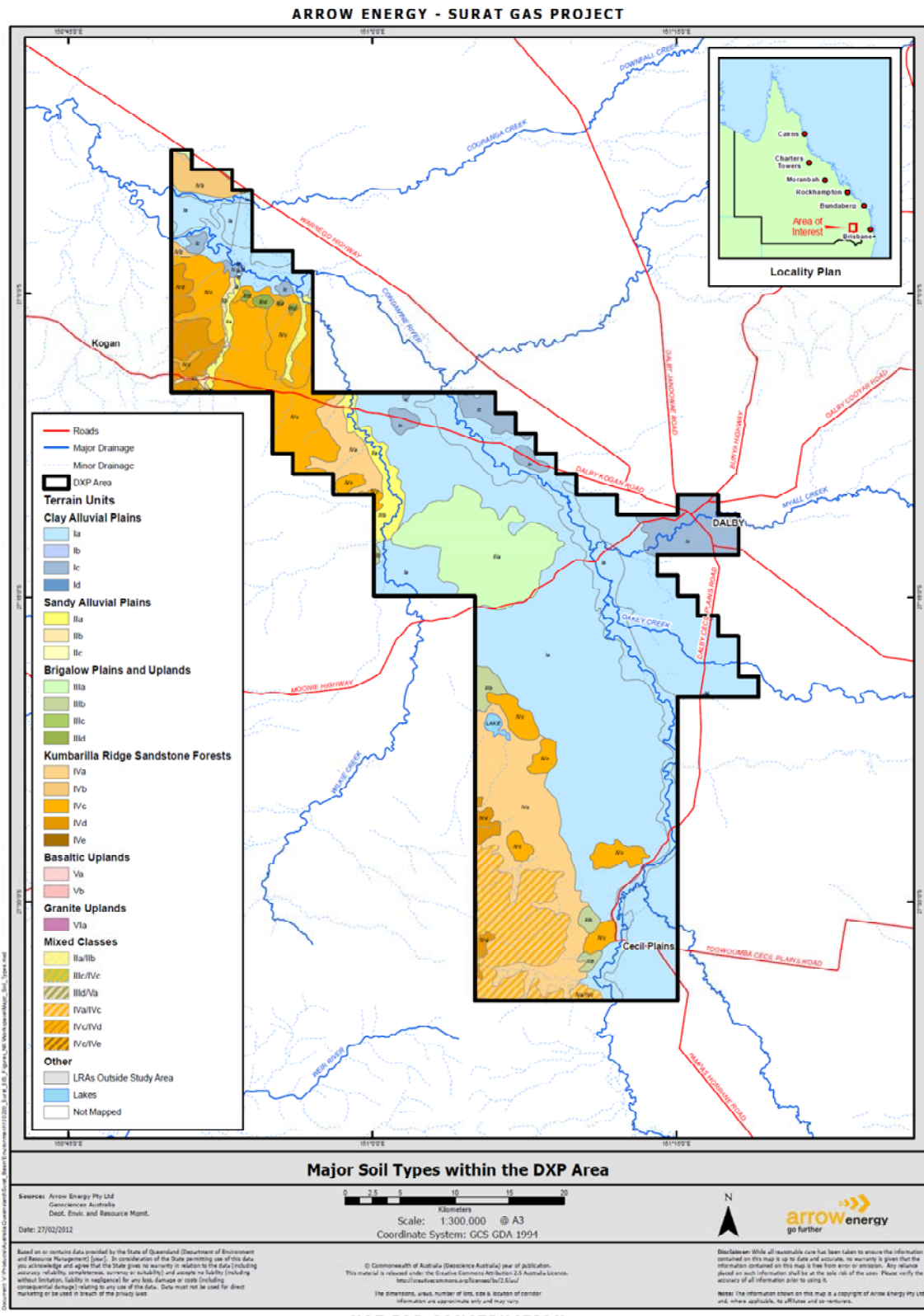


Figure 10 Major soil types within the DXP area

- Gilgai Clays: Gilgai clays occur on flat to gently undulating ground, usually on older alluvial sediments subject to seasonal flooding. These soils are characterised by a deep profile, which can be greater than 1.5 m thick. Gilgai clays are poorly drained and often water is retained within the gilgai depression. They are classified as Vertosols. This soil type is found within the Brigalow Plains and Uplands terrain unit.
- Cracking Clays: These clays are widespread throughout the DXP area, with two types identified:
 - Black cracking clays, which are of high value for agricultural production, are the dominant soil type along the Condamine River valley within the vicinity of Dalby, and to the south and east of Cecil Plains. They are generally well structured and have a deep to very deep profile. The shrink/swell properties of the clay minerals cause them to swell when wet and produce cracks greater than 5 mm wide, which can be observed when dry. They are classified as Vertosols. This soil type is found within the Clay Alluvial Plains and Brigalow Plains and Uplands terrain units.
 - Uniform cracking clays, which occur in areas around Miles, Chinchilla, Kogan and Brigalow on gentle slopes on a range of materials derived from alluvium, basalt and deeply weathered materials. These clays have poor internal drainage with variably deep profiles and are classified as Vertosols. This soil type is found within the Clay Alluvial Plains, Brigalow Plains and Uplands and Kumbarilla Ridge Sandstone Forests terrain units.
- Uniform Non-cracking Clays: These clays occur on gently undulating plains and rises, and upper slopes of hills. Although these soils are agriculturally highly productive, they can require erosion control measures. They usually have deep uniform or gradational profiles. These clays are classified as Dermosols. This soil type is found within the Sandy Alluvial Plains and Brigalow Plains and Uplands terrain units.
- Texture Contrast Soils: These soils are characterised by an abrupt textural contrast between the surface and subsoil horizons. In general, these soils have little agricultural value but are used for low-density grazing in some areas. Two types of texture contrast soils were identified in the DXP area:
 - Dispersive texture contrast soils, which are typically deep, prone to erosion and can be hardsetting. The subsoils are usually sodic and may be acidic. These soils are classified as Sodosols and Kurosols. This soil type is found within the Clay Alluvial Plains, Sandy Alluvial Plains, Brigalow Plains and Uplands and Kumbarilla Ridge Sandstone Forests terrain units.
 - Non-dispersive texture contrast soils, are common along undulating to moderately sloping land on the edges of the Kumbarilla Ridge. The profile is typically moderately deep to deep. They can be poorly drained, with a hardsetting surface. They are classified as Chromosols and Kurosols. This soil type is found within the Clay Alluvial Plains, Sandy Alluvial Plains,

Brigalow Plains and Uplands and Kumbarilla Ridge Sandstone Forests terrain units.

- Uniform Loams and Clays: Two types were identified within the DXP area:
 - Loams and clay loams found along the upper slopes and crests of the Kumbarilla Ridge and other uplands, and also along alluvial drainage channels. These soils can be bleached or gravelly, with acidic subsoils above a transitional zone into weathered rock. They are classified as Tenosols and Kandosols. This soil type is found within the Sandy Alluvial Plains and Kumbarilla Ridge Sandstone Forests terrain units.
 - Clays loams and clays that occur on the lower slopes and edges of sandstone uplands, in depressions and along drainage channels. They are classified as Rudosols, Tenosols and Kandosols. This soil type is found within the Sandy Alluvial Plains and Kumbarilla Ridge Sandstone Forests terrain units.
- Sands and Sandy Loams: These soils have a uniform or weakly gradational sandy texture. Two types were identified within the DXP area:
 - Alluvial sands, comprising alluvial and colluvial deposits, are found along sandy alluvial plains. They are typically loose-grained sandy soils with a moderately deep profile. These soils are classified as Rudosols and Tenosols. This soil type is found within the Sandy Alluvial Plains terrain unit.
 - Residual sands and sandy loams that are formed from quartzose sandstone and found on eroded plateau margins, uplands and sometimes on lower slopes. They are variable in depth and underlain by weathered rock. Subsoils are often acidic. These soils are classified as Rudosols, Tenosols and Kandosols. This soil type is found within the Sandy Alluvial Plains and Kumbarilla Ridge Sandstone Forests terrain units.
- Skeletal, Rocky or Gravelly Soils: These soils generally occur adjacent to rock outcrops in upland areas. They are typically shallow, with over 60% coarse fragments. They are classified as Rudosols and Tenosols. . This soil type is found within the Kumbarilla Ridge Sandstone Forests terrain unit.

7.1.3.1 Acid Sulfate Soil

Acid sulfate soils usually occur below 20m AHD, and are associated with anoxic, highly organic environments close to saline water. Although these conditions do not exist within the DXP area, acid sulfate soils can also occur at higher elevations inland in river and lake beds, irrigation channels, and in saline seepage areas where there are organically rich deposits. Some regional mapping presented in the National Acid Sulphate Soils Atlas (Geoscience Australia, 2011), shows areas of potential acid sulfate soils within the DXP area. However, these areas are of limited extent and are considered to represent locations associated with wetlands and watercourses where conditions

may be suitable for the formation of acid sulfate soils, rather than groundtruthed and proven instances of acid sulfate soils within the DXP area.

The combination of saline groundwater tables rising and salt becoming mobilised via surface water flows, can lead to the salinisation of inland aquatic ecosystems. In these instances, where there are high levels of salt in the landscape, high concentrations of sulfate, and therefore acid sulfate soils, can occur. Acid sulfate soils have been found in the uppermost reaches of the Condamine River catchment (located to the southeast of the DXP area), in effluent ponds and some north-draining streams and wetlands (EPHC & NRMCC, 2011), however it is reasonable for the project to progress on the assumption that acid sulfate soils will not be encountered during project activities. Should geotechnical investigations and testing during the course of the development encounter potential acid sulfate soils, site-specific control measures will be adapted accordingly.

7.1.4 Good Quality Agricultural Land

There are four classes of agricultural land defined in Queensland, as outlined in Table 11.

Table 11: Agricultural Land Classes

Class	Description
A	Cropland. Land suitable for current and potential crops. None to moderate limitation levels to production. Considered GQAL in all areas.
B	Limited cropland. Land marginal for current and potential crops due to severe limitations. Engineering and/or agronomic improvements may be required before the land is considered suitable for cropping. Suitable for pastures. Considered GQAL in most areas.
C	Pasture land. Land suitable only for improved or native pastures due to limitations that preclude continuous cultivation for crop production. Some areas may tolerate a short period of ground disturbance for pasture establishment. Not considered GQAL.
D	Non-agricultural land. Land not suitable for agricultural uses due to extreme limitations. This may be undisturbed land with significant habitat, conservation and/or catchment values or land that may be unsuitable due to very steep slopes, shallow soils, rock outcrop or poor drainage. Not considered GQAL.

The DXP area lies within the Darling Downs, an area of national agricultural importance (traditionally grain and cotton production). Clay soils, which have higher water-holding capacity and fertility, are considered to have a higher cropping potential than sands or shallow soils. The spatial distribution of GQAL within the DXP area is shown Figure 11 .

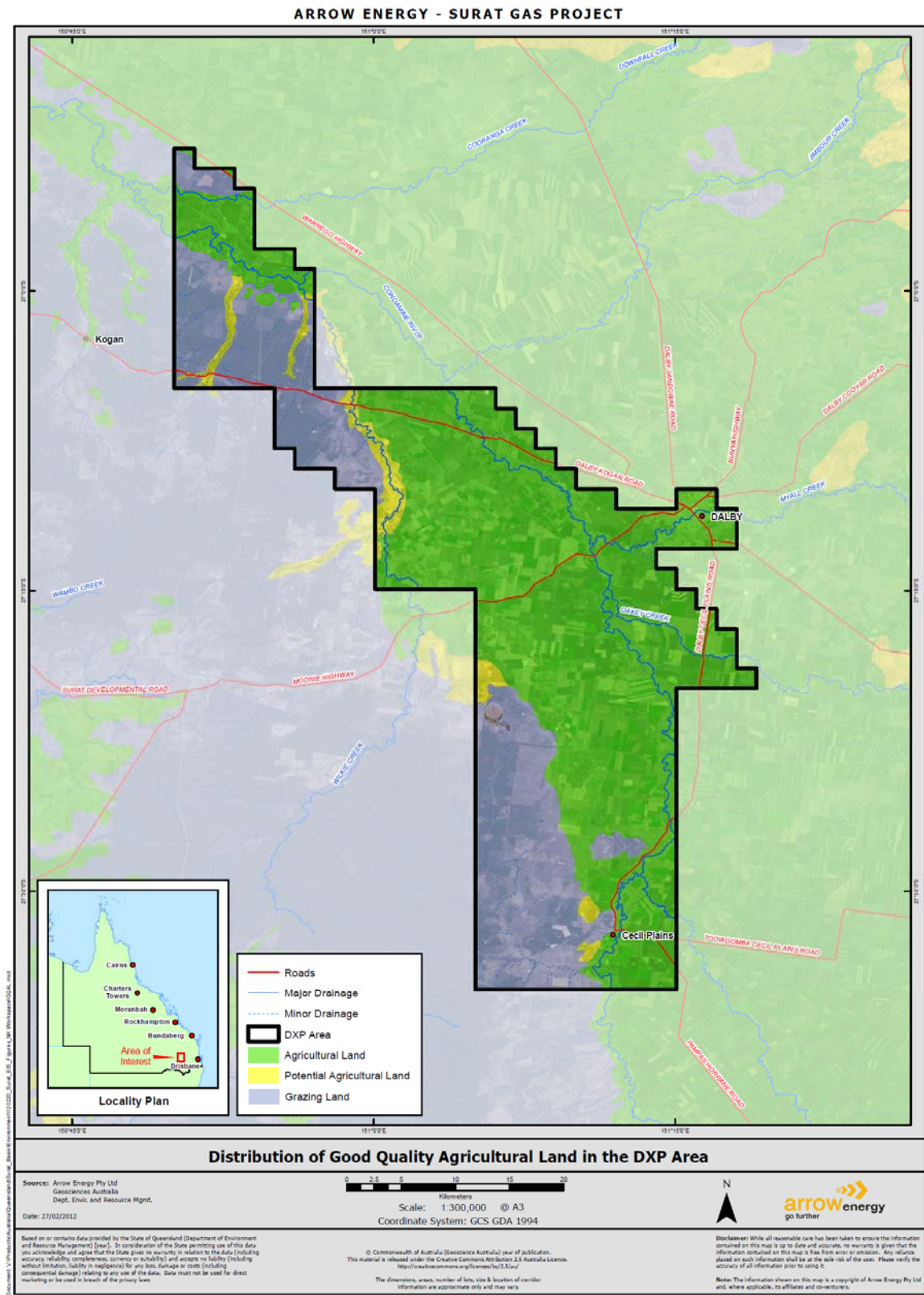


Figure 11 Distribution of good quality agricultural land in the DXP Area

Controlling Procedure: 99-V-PL-0027

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Most of the GQAL is located along the river valley floor of the Condamine River, as it has deep, cracking clays. Although it is prone to erosion, most of the GQAL is being used intensively within the DXP area.

Class C land occurs along the sandstone uplands of the Kumbarilla Ridge to the west of the DXP area and in the north on plateau areas. It is extensively used for cattle grazing.

7.1.5 Strategic Cropping Land

Strategic cropping land (SCL) is recognised by the Queensland Government as “an important, finite resource that is subject to competing land uses from the agriculture, resources and urban development sectors. The government aims to strike a balance between these sectors to help maintain the long-term viability of our food and fibre industries, and support economic growth for regional communities” (DERM 2011b).

On the 30 January 2012 the *Strategic Cropping Land Act 2011* (SCL Act), Strategic Cropping Land Regulation 2011 and State Planning Policy 1/12: Protection of Queensland’s Strategic Cropping Land commenced. The purposes of the SCL Act are to:

- (a) protect land that is highly suitable for cropping;
- (b) manage the impacts of development on that land; and
- (c) preserve the productive capacity of that land for future generations.

An SCL trigger map has been produced that is indicative of where SCL may potentially occur (DERM 2011c). Typically SCL is closely aligned to the GQAL categorisation and this is supported by its’ indicative presence within the DXP as shown in Figure 12

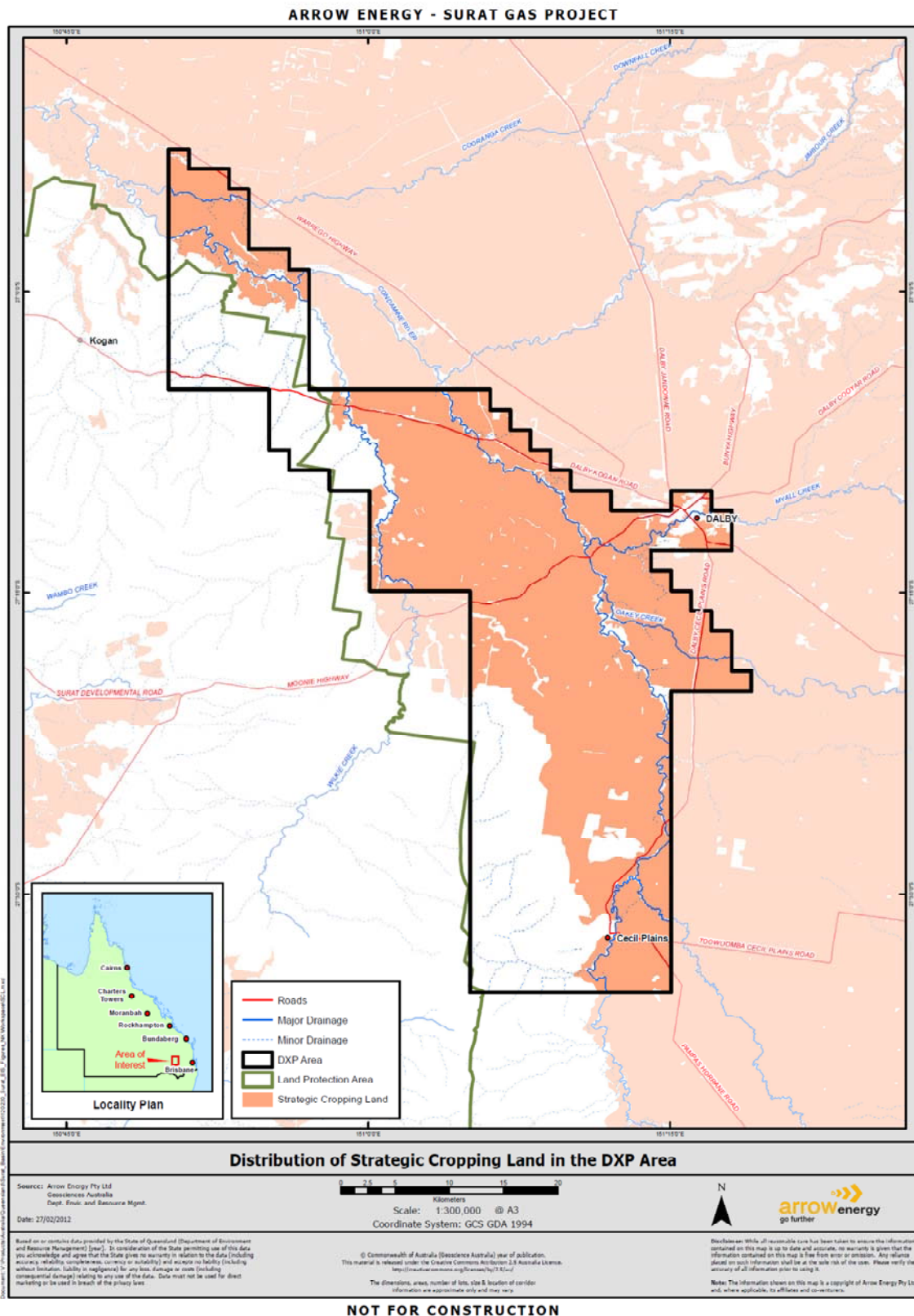


Figure 12 Potential strategic cropping land located within the DXP

The actual proportion of land classified as SCL within the DXP area, will be determined at a property level via ground level assessments against criteria defined in Schedule 1 of the SCL Act.

The DXP area is predominately located within the Eastern Darling Downs zone, with a small area near Kogan located within the Western Cropping zone.

7.1.6 Agricultural Activities

The main soil types used for agriculture in the DXP area are the Vertosols and Dermosols (both black soils). Vertosols are light to heavy clays, fertile in a natural, undisturbed state with nutrient reserves, and have highly reactive shrink-swell properties. Dermosols are similar to Vertosols. Sandy alluvial plains with deeper, sandy Rudosols, Tenosols and Kandosols (i.e., sands, sandy loams, loams and clay loams) are also present in the DXP area and are included in soils that define good-quality agricultural land (GQAL).

Summer and winter crops are both grown in the region. However, as there is generally higher summer rainfall in the DXP area and greater economic returns are received for summer crops, summer crops are generally preferred. Stubble retention and strip cropping are carried out in flood-prone areas, and both irrigated and dryland cropping systems are used. Grain and cotton crops are grown, with raw cotton transported to Brisbane for export. Grain is used for human consumption, feedlots and in industrial plants. Crops such as cotton and wheat are grown across the Darling Downs region, as are speciality pulse crops such as Adzuki beans, which are used in high-value niche exports. Several certified organic farms operate in the region.

Current agricultural activities across the broader Darling Downs region include:

- Dryland Broadacre Farming.
- Irrigated Broadacre Farming.
- Horticulture.
- Fruit.
- Vineyards.
- Livestock Industries.
- Timber Production.

7.1.7 Contaminated Land

Land can become contaminated through a range of activities and land uses. The Queensland Government defines such activities as notifiable activities under the EP Act. Although many of the listed notifiable activities are 'industrial' in nature, a significant number may be reasonably expected in an environment where agricultural activities predominate. Accordingly, many notifiable activities will have been carried out somewhere within the DXP area. Some affected land parcels may be listed on the EMR and CLR administered by DEHP, but others will not have been identified or reported. In

addition to the specified notifiable activities, uncontrolled and otherwise unidentified activities may also have contributed to contamination of land within the DXP area.

7.2 ENVIRONMENTAL VALUES

7.2.1 Geology, Soils and Landform

There are several geological, landform or soils features that have been registered on the Australian Register of the National Estate (although this has since been superseded by the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*), or are indicative sites, which are (or were) being assessed for inclusion on the Register of the National Estate. Within the DXP area, the Lake Broadwater Conservation Park is considered to be of national environmental significance.

Located along the eastern flanks of the Kumbarilla Ridge approximately 20 km southwest of Dalby (see Figure 14), Lake Broadwater is one of the few inland wetlands in southern Queensland. The heavy clay soils surrounding the lake support vegetation communities typical of the Brigalow Belt South Bioregion. The Lake Broadwater Conservation Park covers 1,200 ha, and the lake itself is approximately 350 ha in size and 4m deep when full. The park has been protected under the *Nature Conservation Act 1992* (NC Act) since 1994.

Based on the description of geology, landform and soils, the DXP area can be divided into 'terrain units', which represent areas of the landscape that have broadly similar 'environmental values' (i.e., characteristics, properties and behaviours). The DXP area can be divided into four broad terrain units. Table 12 summarises the geological, landform and soil values relating to each terrain unit.

Table 12: Value of the existing environment: geology, landform and soils

Existing Environment	Characteristics Contributing to the Value
Terrain Unit I – Clay Alluvial Plains	<ul style="list-style-type: none"> • No geoheritage features. • GQAL and strategic cropping land. • Sodic, saline subsoils susceptible to water erosion. • Soft soils prone to waterlogging; susceptible to flooding near the Condamine River and its tributaries. • Soils generally high in fertility, well-structured, deep cracking clays, with areas of texture contrast soils. • Will be difficult to rehabilitate to predisturbance condition. Particular areas will be more challenging due to lower fertility and distinct soil profiles.

Terrain Unit II – Sandy Alluvial Plains	<ul style="list-style-type: none"> • GQAL and strategic cropping land close to rivers and creeks. • Sodic, saline subsoils susceptible to water erosion, except along some watercourses. Sandy soils susceptible to wind erosion. • Loose sandy soils or soft clays prone to waterlogging. • Low-fertility sandy soils with poor rehabilitation potential, or high-fertility, well-structured soils difficult to rehabilitate.
Terrain Unit III – Brigalow Plains and Uplands	<ul style="list-style-type: none"> • GQAL and strategic cropping land. • Sodic, saline subsoils susceptible to water erosion. Texture contrast soils moderately susceptible to wind erosion. • Soft soils prone to waterlogging. • Well-structured clay soils and gilgai deep cracking clays will be difficult to rehabilitate. Areas of lower fertility with distinct soil profiles will be difficult to rehabilitate.
Terrain Unit IV – Sandstone Ridge	<ul style="list-style-type: none"> • Contains Lake Broadwater. • Low-relief areas classified as Class C (pasture land). All other areas classified as Class D (non-agricultural land). • Sodic, saline soils susceptible or highly susceptible to water erosion, moderately susceptible to wind erosion and prone to waterlogging. • Steep slopes associated with jumpups, plateaux or mesa edges, and cuesta escarpments locally increase sensitivity. • Soil profile and moderate to low fertility reduces rehabilitation potential.

7.3 POTENTIAL IMPACTS ON ENVIRONMENTAL VALUES

Potential impacts to geology, landform and soils values from project activities may include:

- Land degradation: erosion and associated sedimentation, compaction, dust generation and reduction in soil quality.
- Land contamination:
 - Disturbance of existing contaminated land.
 - Potential to cause land contamination through project activities.

Potential impacts are further discussed in Sections 7.3.1 and 7.3.2 below.

7.3.1 Soils

7.3.1.1 Potential Land Degradation

Land can be degraded as a result of erosion and associated sedimentation, dust generation and reduction in soils quality. Activities with the potential to cause these impacts during the life of the project include:

- Deposition downslope or downstream of eroded sediment as flow velocities decrease as an indirect result of project activities that cause erosion (e.g., seismic surveys, construction of exploration and production wells, gathering lines, production facilities and associated infrastructure).
- Soil compaction potentially affecting long-term crop productivity from spoil placement or vehicular trafficking of access tracks and laydown areas.
- Topographic alteration from the construction of borrow pits for the use of rock in construction activities.
- Increased surface or subsurface erosion and waterlogging resulting from flow concentration due to differential settlement of pipeline backfill and padding.
- Reprofiling of microrelief leading to patchy exposure of sodic and saline subsoils from inversion of the soil profile during backfill of materials during rehabilitation.
- Imported materials for rehabilitation purposes, particularly in areas of GQAL, affecting agriculture production.

7.3.1.2 Potential Land Contamination

Issues relating to contaminated land and project activities may involve the exposure of project workers to contaminated land and/or the disturbance of contaminated land as infrastructure is constructed and installed. During the life of the project, there is also the potential for Arrow activities to result in the contamination of land while conducting a notifiable activity or through the generation of various waste streams.

In these scenarios, potential impacts relate to the exposure to, and disturbance or release of, contaminants of concern into the receiving environment, specifically into high- or very-high-value greenfield areas. Contamination may also involve the introduction of different contaminants (i.e., those that would otherwise not be present) into lower-value areas. Activities with the potential to cause these impacts during the life of the project include:

- Site selection of project infrastructure over contaminated land.
- Disturbance of contaminated soil during seismic surveys and the drilling of exploration and coal seam gas wells.

- Disturbance of contaminated soil during excavation of trenches for the installation of gathering infrastructure, gas pipelines and other utilities associated with the development.
- Disturbance of contaminated soil during civil works associated with the construction of production facilities and dams.
- Uncontrolled movement of contaminated soil after disturbance by project activities.
- Transport to the surface of groundwater that has become contaminated through notifiable or uncontrolled activities (creating an exposure pathway that would otherwise not exist).
- Leaks and spills from or of:
 - Onsite fuel storage tanks.
 - Onsite chemical storage facilities.
 - Fuels and lubricants from the operation of earthmoving, drilling, and associated equipment.
 - Waste generated through the drilling of coal seam gas wells (e.g., waste drilling muds).
 - Hydrotest waters generated during pipeline installation activities.
 - Lubricants and chemicals from the operation of gas compression and associated equipment.
 - Chemicals from the operation of coal seam gas water treatment facilities.
 - Brine generated as a by-product of the treatment of coal seam gas water.

7.3.2 Potential Impacts to Agricultural Land Use Suitability

Potential impacts to the environmental or agricultural values of the DXP area can be summarised as follows:

- **Reduced Productivity and Increased Costs:** Caused by changes in farm configuration (e.g., creation of more headlands), disruption to farming practices (e.g., changes to irrigation infrastructure, interference with overland flow), unsuccessful rehabilitation and temporary loss of arable land.
- **Crop Losses or Disturbance to Stock:** Caused by drilling or construction occurring during inopportune times disrupting cropping or breeding (depending on the proximity to breeding animals and the nature and intensity of the disturbance), and unsuccessful rehabilitation.
- **Soil Disturbance:** Caused by compaction from traffic, mixing and inversion of soil horizons, settling of pipeline trenches or soil loss from erosion caused by construction activities.
- **Increased Costs of Farm Management:** Caused by increased operating overheads from management of coal seam gas activities and coordination of activities (e.g.,

spraying and withholding periods) and integration with farm plans. Increased costs may also result from limitations on development of farms to incorporate new technologies and farming techniques.

- Loss of Amenity: Caused by contractors and employees entering and working on properties, disruption to lifestyle, increased levels of noise and dust, and the visual impact of project infrastructure.

Project activities with the potential to cause adverse impacts on agricultural enterprises during the construction, operation and maintenance, and decommissioning phases of the project are described below:

- Loss of productive land (temporary and potentially permanently) from development of production facilities.
- Temporary or permanent disturbance and potential diminished productivity as a result of the development of wells, gathering systems, pipelines and access tracks.
- Reduced crop yield from unsuccessful rehabilitation.
- Disruption to farm operations such as tillage, planting, irrigation, weed control and harvesting from inappropriate placement of wells, gathering systems, pipelines and access tracks.
- Disruption to intensive farming enterprises including piggeries, chicken production, feedlots or dairy farming from inappropriate placement of production facilities, wells, gathering systems, pipelines and access tracks.
- Soil degradation from disturbance of the soil structure, resulting in impacts to fertility and biologic function and crop yield from all project activities.
- Changes to surface irrigation infrastructure including head ditches, bays and tail drains from placement of wells, gathering systems, pipelines and access tracks.
- Diversion of flows and changes to the hydrology of the landscape from poorly sited and constructed access tracks.
- Farm hygiene issues relating to weeds and disease management from construction and operation vehicles, plant and equipment.
- Site contamination from project activities.

7.4 MANAGEMENT OF POTENTIAL IMPACTS

7.4.1 Geology, Soils and Landforms

The primary means by which avoidance is achieved for potential geological-, landform- and soil- related impacts is through design and site selection. Arrow's level of control or influence over the management of contamination will depend on the tenure of the land on which they are conducting project activities. Where Arrow is the landowner, Arrow will have full responsibility for and control of management of any contamination that is

disturbed or caused. Otherwise, Arrow will have to consider the requirements of the landowner, while fulfilling its own obligations under the EP Act.

7.4.2 Agricultural Land Use Suitability

Each agricultural enterprise is unique and particular practices have been developed to maximise the productivity of the land. The planning, design and development of project infrastructure and undertaking of project activities will need to address the specific issues raised by each property i.e., coal seam gas development needs to be integrated with farm operation and development.

The primary mitigation for reducing potential impacts on agricultural land and agricultural enterprises will be through appropriate siting of infrastructure. Second to this will be the design and development of construction, operation and maintenance methods to enable the integration of project and farm activities.

The effectiveness of the proposed environmental management controls in addressing the identified impacts is being investigated through trials and case studies that are currently focussed on rehabilitation of black soils (Vertosols and Dermosols) and construction methods for work on those soils. Trials and case studies currently in progress include:

- A trial to demonstrate the effectiveness of the procedures developed for exploration chip and core drilling on black soils.
- Three separate case studies on different properties with different farming practices in intensively farmed land areas, involving working directly with the Arrow Intensively Farmed Land Committee and landholders to design coal seam gas developments on their land in a manner that minimises the impact on their land and farming activities.
- Drilling and development trials of techniques to reduce impacts on intensively farmed land, including:
 - The Surat Tek Park to trial drilling technologies to minimise landholder impact, environmental impact, land disturbance and drilling duration.
 - Implementing the use of surface tanks to manage drilling muds during the drilling process to eliminate the need to excavate pits in intensively farmed land areas.
 - Constructing and restoring a pipeline in black soils to demonstrate how existing surface profiles can be maintained and rehabilitated, reducing impacts on farming enterprises.

7.4.3 Control Strategies

Control strategies for the management of potential impacts on geology, soils and landforms within the DXP area are presented in Table 13 below.

Table 13: Control Strategies for Potential Impacts to Geology, Soils and Landforms

Environmental Protection Objectives	
<p>Geology, Soils and Landforms:</p> <ul style="list-style-type: none"> To maintain or restore soils and stabilise landforms to support the intended land use. To minimise alteration of drainage systems (natural and man-made). To implement erosion and sediment control techniques to minimise project impacts. To protect the Lake Broadwater Conservation Park from petroleum activities. To avoid or minimise the disturbance of contaminated land. To avoid the contamination of land or watercourses as a result of project activities (from construction to decommissioning). <p>Agricultural Land Use Suitability:</p> <ul style="list-style-type: none"> To avoid or reduce adverse impacts to agricultural infrastructure. To reduce adverse impacts to agricultural production (cropping and breeding). To reduce adverse impacts to farming practices (i.e., day-to-day agricultural activities). Maintain and/or restore soils to support the intended land use. 	
Environmental Issue	Control Strategies
<i>Geology, Soils and Landforms</i>	
<p>Land degradation – erosion and associated sedimentation, dust generation and reduction in soil quality.</p>	<p>Common strategies for all phases of work:</p> <ul style="list-style-type: none"> Develop and implement soil management procedures. Develop and implement site specific erosion and sediment control plans. Maintain the integrity of private roads and tracks and minimise dust generation, where appropriate, in consultation with relevant landowners and council. Use existing roads and tracks, where practicable. Implement dust suppression measures for roads and construction sites to ensure that dust does not cause a nuisance. Strip, salvage and stockpile topsoil near the work site separately to subsoils (in consultation with landowners). Ensure topsoil stockpiles have a maximum height of 2 m, where the future use is intended for rehabilitation, and are protected from erosion where possible. Where possible, mulch vegetation and reuse in site rehabilitation. Stockpile cleared or mulched vegetation along the inside edge of the work sites (separate from soil stockpiles), to aid the control of runoff and ensure stockpiled vegetation does

Controlling Procedure: 99-V-PL-0027

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	<p>not pose a bushfire hazard.</p> <ul style="list-style-type: none"> • Prevent subsurface water flows and erosion along the backfilled trench by appropriate means such as, trench blocks and compaction of backfilled soils. • Clear areas progressively and implement rehabilitation as soon as practicable following decommissioning activities. • Ensure erosion, drainage and sediment controls installed are appropriate to the nature of the activity undertaken (e.g. permanent or temporary controls required). <p>Exploration and appraisal:</p> <ul style="list-style-type: none"> • Exploration and appraisal drilling will occur only using a “pitless” drilling system. <p>Planning and design:</p> <ul style="list-style-type: none"> • Minimise the disturbance footprint and vegetation clearing. • Carry out ground investigations in soils prone to salinity prior to major earthworks to establish the depth at which saline conditions occur. • Design infrastructure located in cracking clays to withstand the differential shrink/swell ground movement. • Incorporate construction methods and treatments to deal with reactive gilgai and cracking clays in infrastructure design. • Time construction works and access to sites to avoid wetter periods, where practicable. • Design and plan the project to avoid steep slopes and areas dissected by gully networks, where practicable. Where these are unavoidable, ensure the required infrastructure (e.g., roads) is appropriately designed for erosion control purposes. <p>Construction:</p> <ul style="list-style-type: none"> • Avoid disrupting overland natural flow paths and, where avoidance is not practicable, maintain connectivity of flow in watercourses. • Do not disturb or remove flood banks and artificial levees except in consultation with parties benefitting from the structures and the relevant authorities. • Avoid disturbance of contour banks and irrigation bays. • Avoid mounding of soil along pipelines in irrigated paddocks, to the greatest extent practicable, allowing for settlement of backfill. • Conduct pipeline construction to minimise the duration of exposure of soils. • Backfill and rehabilitate excavations, particularly pipeline trenches and drilling sumps. Conduct backfilling in a manner that will promote successful rehabilitation, including capping
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	<p>of exposed subsoil with topsoil and replacement of the land surface to preconstruction levels to reduce trench subsidence and concentration of flow. Mounding of soils to allow for settling may be required in some areas. However, in laser-levelled paddocks, this may not be practicable, and backfilling will be carried out in consultation with the landowner.</p> <p>Operations:</p> <ul style="list-style-type: none"> • Discharge water from project activities at a rate and location that will not result in erosion. Install additional erosion protection measures, including energy dissipation structures, at discharge outlets. • Remedy areas of differential settlement associated with buried infrastructure that interrupt the pre-existing surface water flow within intensively cultivated areas. • Excavate any saline material during rehabilitation of coal seam water dams or brine dams and select an appropriate option for management for the material (e.g., treat for reuse, or dispose of in a registered landfill). • Develop rehabilitation plans based on environmental sensitivities
<p>Land contamination:</p> <ul style="list-style-type: none"> • Disturbance of existing contaminated land. • Potential to cause land contamination through project activities. 	<p>Common strategies for all phases of work:</p> <ul style="list-style-type: none"> • Apply appropriate international, Australian and industry standards and codes of practice for the handling of hazardous materials (such as chemicals, fuels and lubricants). • Develop and implement emergency response and spill response procedures to minimise any impacts that could occur as a result of releases of hazardous materials or any loss of containment of storage equipment. • Ensure appropriate spill response equipment, including containment and recovery equipment, is available on site. • Carry out corrective actions immediately upon the identification of any contamination of soil or groundwater that has occurred as a result of project activities. • Undertake an environmental site assessment in response to the identification of contamination that may have occurred as a result of project activities. • Complete excavation, remediation, characterisation and validation activities in response to the identification of contamination that may have occurred as a result of project activities. <p>Exploration and appraisal:</p> <ul style="list-style-type: none"> • Exploration and appraisal drilling will occur only using a “pitless” drilling system. This closed system will remove the need to dig pits to contain the drilling muds and all fluids

	<p>and solids will be contained in tanks and either removed from site (solids) or reused for further drilling (muds/liquids).</p> <p>Planning and design:</p> <ul style="list-style-type: none"> • Inspect and observe site locations for the presence of contamination prior to commencement of intrusive activities. • Apply appropriate Australian and industry standards and codes of practice for the design and installation of infrastructure associated with the storage of hazardous materials (such as chemicals, fuels and lubricants). • Avoid development on contaminated land through the completion of appropriate register searches and desktop investigations (i.e., avoid land or the contaminated portion of a parcel of land that is listed on the Contaminated Land Register or the Environmental Management Register, where practicable). <p>Construction:</p> <ul style="list-style-type: none"> • Avoid disturbance of contaminated soil and groundwater when it is identified or observed during intrusive works. <p>Operations:</p> <ul style="list-style-type: none"> • Incorporate into a discharge response plan or water management plan procedures for the controlled discharge of coal seam gas water under event conditions. Procedures will include conditions for discharge, stream flow data, notification and reporting.
<p><i>Agricultural Land Use Suitability</i></p>	
<p>General</p>	<ul style="list-style-type: none"> • Comply with the provisions of the P&G Act and the Land Access Code prior to accessing private land. All appropriate agreements will be in place prior to entry onto the land. Arrow will ensure all appropriate landowners are notified prior to access being required to allow stock to be moved and access routes to be cleared of machinery or materials. • Consult with landowners on the appropriate location for infrastructure and access routes (to well sites and to and along pipelines). Clearly identify the outcome of the discussions on scaled plans of the property and clearly indicate agreed access routes using signs, temporary fencing, barricade tape or traffic control measures. • Maintain the grievance process (complaint management system) for the community to register complaints, issues, comments and suggestions. • Ensure construction activities do not extend beyond the work site boundaries. • Design and install wells to meet the Code Of Practice • Ensure dams for untreated coal seam gas water and brine

	are not constructed on validated strategic cropping land (SCL) or good quality agricultural land (GQAL).
Reduced productivity and increased costs.	<ul style="list-style-type: none"> • Plan and integrate construction and operations activities in conjunction with all landholder activities. • Consult with landowners on the most appropriate method to minimise disruption to cultivation paddocks (including the introduction of additional headlands) and loss of productive land in controlled-traffic paddocks. • Maintain the integrity and efficiency of surface irrigation systems by adopting the following measures: <ul style="list-style-type: none"> – Locate infrastructure at or adjacent to the end of head ditches or tail drains and in a manner that does not significantly interfere with swept paths of boom irrigators to avoid severance or fragmentation of water delivery systems. – Locate wells, gathering lines and access tracks adjacent to boundary fences, where practicable. – Align gathering lines and access tracks perpendicular to the direction of head ditches and tail drains (i.e., parallel to the direction of surface flows and cultivation). • Investigate alternative drilling technologies such as using directional drilling to access coal measures, reducing gathering system pipe diameters and drilling multiple wells from one drill pad to potentially reduce the footprint on strategic cropping land. • Production well drilling will only occur using a "pitless" drilling system to manage drilling muds on black soils. • Remove sediment controls prior to cultivation and dispose in accordance with landowner requirements or in accordance with the waste management plan of the Arrow HSEMS.
Crop losses or disturbance to stock.	<ul style="list-style-type: none"> • Fence production well sites (i.e., 12m by 12m) to exclude unauthorized personnel, stock and wildlife from that area. • Inspect work sites and access routes for declared weeds and pest plants and animals prior to accessing the site. • Weed control will be undertaken as required. The method used will be dependent upon the type of weed identified, the degree of the infestation and the relevant landholder agreement. • Wash down vehicles and equipment that have potentially been in contact with weeds before entering new work sites. • Regrade work sites to original surface contours following reinstatement and ensure they are free-draining. • Maintain a minimum separation, as agreed with landowner, between animal enclosures and production wells and

	<p>facilities.</p> <ul style="list-style-type: none"> • Design access tracks in cultivation paddocks to maintain the existing hydrologic and hydraulic regime of the site, and in a way that does not cause erosion. • Locate pipelines to avoid or minimise impact on irrigation flow or current farming practices. If the ROW must cross actively farmed arable land, ensure soil cover above the pipeline is deep enough to allow normal cultivation practices to resume.
<p>Soil disturbance.</p>	<ul style="list-style-type: none"> • Develop site specific erosion and sediment control plans and install and maintain appropriate site-specific controls. • Maintain the operation and effectiveness of soil conservation structures by adopting the following measures: <ul style="list-style-type: none"> – Avoid breaching, diversion or disturbance of contour banks, waterways and dams. – Avoid earthworks that affect waterway function. – Locate wells, access tracks and gathering lines downhill and parallel to soil conservation structures. – Utilise existing access tracks and trafficked areas where possible. • Strip, salvage and stockpile topsoil near the work site separately to subsoils (in consultation with landowners). Ensure topsoil stockpiles have a maximum height of 2 m and are protected from erosion. • Stockpile imported fill for bedding of pipes adjacent to the trench and away from vegetation, topsoil and subsoil stockpiles. • Maintain sediment and erosion controls prior to and following storm events and periodically during long periods of rain. • Construct batters and embankments of drill pads and production facility benches at appropriate slopes and protect from erosion. • Suspend works when rainfall or storm events produce onsite conditions that, if trafficked or worked, would compromise the effectiveness of erosion and sediment control structures, or would lead to rutting and compaction of soils or mixing or inversion of soil horizons. • Backfill soils in the reverse order of removal where possible, and undertake backfilling progressively and regularly during pipeline construction. • Conduct backfilling in a manner that will promote successful rehabilitation. • Compact padding material and subsoils used to backfill pipeline trenches to reduce settling. Limit compaction to no

	<p>deeper than 0.5 m below natural surface level.</p> <ul style="list-style-type: none"> • Mounding of soils to allow for settling where required (e.g. may not be practical in laser-levelled paddocks and requires consultation with the landowner). • Remove excess imported fill and residual subsoil from the work site, and reuse or dispose in accordance with landowner requirements. • Deep rip and cross rip all construction areas and temporary access tracks to a depth of at least 0.4 m. Repeat following topsoil reinstatement to promote infiltration and assist the re-establishment of connections between soil horizons. • Visually inspect rehabilitated work sites for flow diversions and evidence of erosion associated with trench slumping or incomplete reinstatement of surface contours.
<p>Loss of amenity.</p>	<ul style="list-style-type: none"> • Clear areas progressively and implement rehabilitation as soon as practicable following construction and decommissioning activities. • Install gates of an appropriate standard to restrict access to authorised personnel, vehicles, plant and equipment.

Monitoring Requirements

- Inspect erosion and sediment control measures as required in line with the Erosion and Sediment control procedure.
- Inspect pipeline ROWs routinely until ground stabilisation and natural revegetation or pasture grasses or crops are established.
- Conduct ground investigations in soils prone to salinity prior to major earthworks.
- Undertake chemical monitoring of soils and groundwater where required.
- Routinely inspect spill containment controls and spill response kits.
- Visually inspect physical form downstream of watercourse discharge locations.
- Review and resolve landowner grievances.
- Ensure that the quality of coal seam gas water used for dust suppression meets the prescribed limits.

Performance Indicators

- Soil structure and landform conducive to natural revegetation and intended land use.
- No long-term adverse impacts to the Lake Broadwater Conservation Park as a result of Arrow's activities.
- Recovery or rehabilitation of all spilled contaminants.
- Development activities (and infrastructure) integrated with farming operations and intensive farming avoided where possible.
- Infrastructure sited to minimise loss of cultivated area and irrigation infrastructure.
- Operation and effectiveness of soil conservation structures maintained.
- Opportunities to schedule development and routine maintenance activities with the cropping cycle maximised.
- Access tracks in cultivation paddocks designed to maintain the existing hydrologic and

hydraulic regime of the site.

8. TERRESTRIAL FLORA AND FAUNA

8.1 EXISTING ENVIRONMENT

8.1.1 Bioregions

The DXP area falls within the Brigalow Belt Bioregion. Brigalow (*Acacia harpophylla* dominant and co-dominant) is a mosaic of open forest and woodland communities. Semi-evergreen vine thickets, heath and eucalypt open woodlands are scattered throughout this bioregion, with small pockets of eucalypt open forests.

The Brigalow Belt Bioregion has been heavily impacted over time, with the major impacts to biodiversity related to historical vegetation clearance, predominantly for agricultural purposes, the introduction and spread of weeds and animal pests, loss of habitat, changed fire regimes and altered hydrology. The major vegetation groups that have been cleared are acacia forests and woodlands, eucalypt woodlands, eucalypt open woodlands, tussock grasslands, rainforests and vine thickets (DSEWPC 2009).

8.1.2 Flora-Threatened Ecological Communities

The results of the Environment Protection and Biodiversity Conservation (EPBC) database search (Appendix C) identified five threatened ecological communities that may occur within the DXP area. These communities and their relative conservation status are listed in Table 14.

Table 14: Threatened Ecological Communities

Community Name	Status	Presence
Natural Grasslands on Basalt and Fine-textured Alluvial Plains of Northern New South Wales and Southern Queensland	Critically Endangered	Likely to occur within the DXP area
White Box -Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	May occur within the DXP area
Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant)	Endangered	Known to occur within the DXP area
Weeping Myall Woodlands	Endangered	Likely to occur within the DXP area
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	May occur within the DXP area

The Natural Grasslands on Basalt and Fine-textured Alluvial Plains of Northern New South Wales and Southern Queensland are grasslands typically comprised of perennial native grasses. This ecological community occurs from the Darling Downs in Queensland to Dubbo in New South Wales and is listed as critically endangered under the EPBC Act

due to the significant reduction of its geographic distribution. These grasslands are typically found on soils that are fine textured, such as cracking clays on flat to low slopes (DSEWPC 2008a). No Queensland regional ecosystems (RE) that comprise this community type have been mapped as present within the DXP.

The White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland community is listed as critically endangered under the EPBC Act, with less than 5% of this community remaining. This community can occur as either a woodland or a derived grassland, with White Box, Yellow Box or Blakely's Red Gum typically dominating the community where a tree layer remains present (DSEWPC 2006). No Queensland regional ecosystems that comprise this community type have been mapped as present within the DXP area.

The Brigalow (*Acacia harpophylla* dominant and co-dominant) community is listed as endangered under the EPBC Act (DSEWPC 2009). In Queensland this ecological community is defined to include 16 regional ecosystems of which two are mapped within the DXP (RE 11.3.1 and RE 11.4.3).

The Weeping Myall Woodlands community is also listed as endangered under the EPBC Act. The Weeping Myall Woodlands occur in a range of formations from open woodlands to woodlands, generally 4 m to 12 m high, in which Weeping Myall (*Acacia pendula*) is the sole or dominant overstorey species (DSEWPC 2008). In Queensland, the Weeping Myall Woodlands ecological community is restricted to small patches that occur within two regional ecosystems; RE 11.3.2 and RE 11.3.28. Both of these ecosystems have an 'of concern' status with respect to both *Vegetation Management Act 1999* and biodiversity. Regional ecosystem RE 11.3.2 is mapped as present within the DXP area.

The Coolibah-Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions community is listed as endangered under the EPBC Act. The community is found on the grey, self-mulching clays of periodically waterlogged floodplains, swamp margins, ephemeral wetlands, and stream levees. Much of the Coolibah – Black Box Woodlands have been cleared and what remains is degraded. Data has shown that decline of the ecological community in Queensland has been approximately 82%. In Queensland, the community comprises five regional ecosystems and elements of it may extend into other regional ecosystems, such as parts of RE 11.3.27 Freshwater Wetlands, where the wetlands are associated with fringing woodland, sometimes with Coolibah. Within the DXP area, two regional ecosystems (RE 11.3.27a and RE 11.3.27b) may potentially contain Coolibah-Black Box Woodlands.

8.1.2.1 Queensland Regional Ecosystems

A desktop review identified the presence of scattered remnants of not of concern, of concern and endangered regional ecosystems within the DXP area. Approximately 5% of the DXP area is comprised of remnants of endangered or of concern regional ecosystems. The distribution of endangered and of concern regional ecosystems are

illustrated in Figure 13. These regional ecosystems are described in further detail in Table 19.

8.1.2.2 Endangered, Vulnerable or Near Threatened Species

Flora – Threatened Species

The results of the EPBC and Wildlife Online database searches (Appendix C) identified 16 threatened flora species as potentially occurring within the DXP area, as listed in Table 16.

It should be noted that the results of the EPBC and Wildlife Online database searches are indicative only. The full results of the EPBC and Wildlife Online searches are attached in Appendix C.

8.1.2.3 Weed Species

The Commonwealth Government classifies Weeds of National Significance (WoNS) within Australia, based on their:

- Invasiveness and impact characteristics.
- Potential and current area of spread.
- Current primary industry, environmental and socio-economic impacts.

The results of the EPBC search indicate that there are seven WoNS potentially present within the DXP area. Details of these pest species including classification under the *Land Protection (Pest and Stock Route Management) Act 2002* are summarised in Table 15 below.

Table 15: Weeds of National Significance which may be Present within the DXP

Scientific Name	Common Name	Presence
<i>Lantana camara</i>	Lantana	L
<i>Lycium ferocissimum</i>	Boxthorn	L
<i>Parthenium hysterophorus</i>	Parthenium weed	L
<i>Pinus radiata</i>	Radiata Pine	L
<i>Prosopis spp.</i>	Mesquite	L
<i>Salvinia molesta</i>	Salvinia	L
<i>Salix spp. except S.babylonica, S.x calodendron & S.x reichardtiji</i>	Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow	L

L- Likely to occur within the DXP area

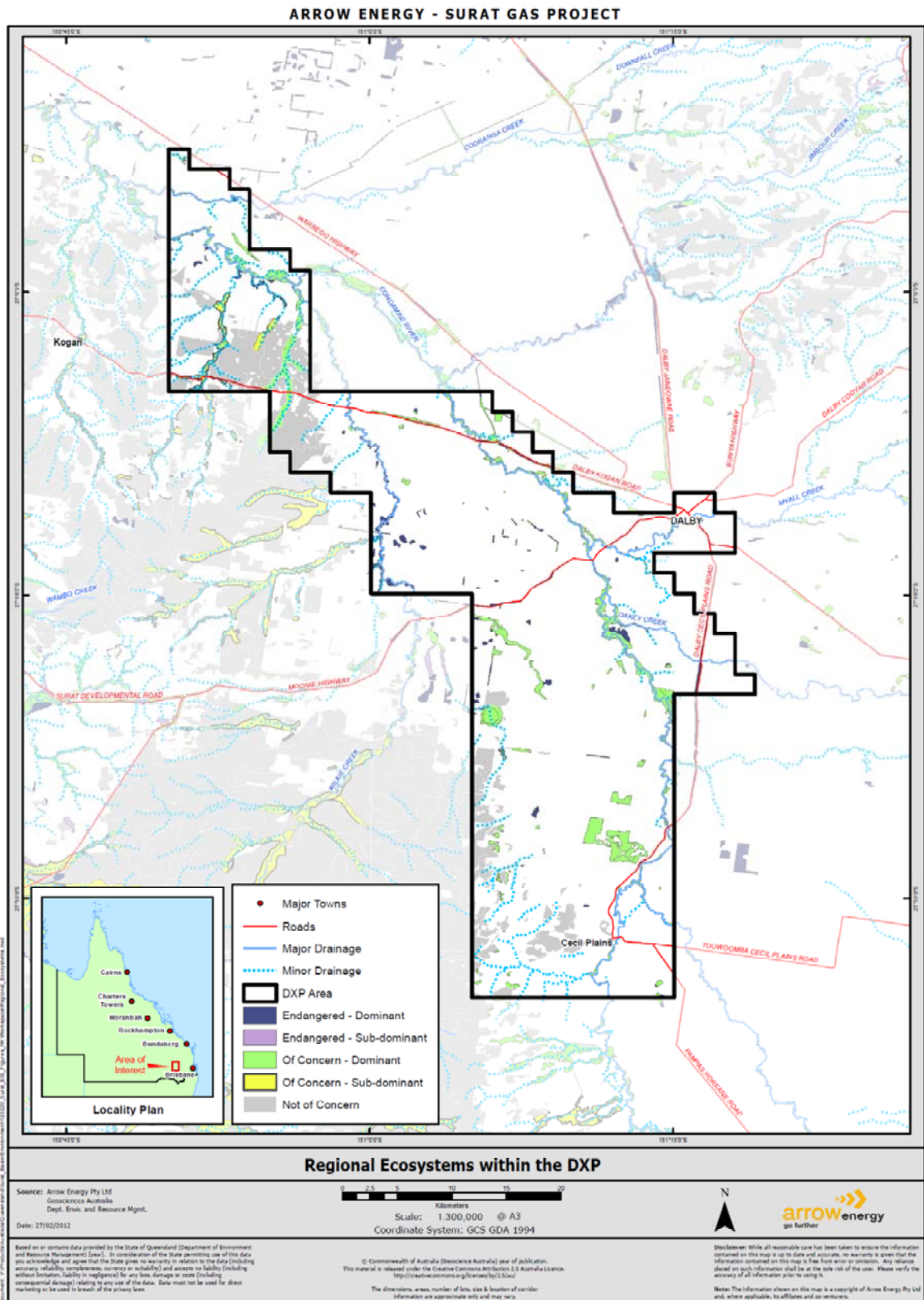


Figure 13: Regional Ecosystems within the DXP

Table 16: Threatened Flora Species Identified in the Vicinity of the DXP

Scientific Name	Common Name	EPBC Act Status	NC Act Status	Preferred Habitat	Occurrence
<i>Bothriochloa biloba</i>	Lobed Blue-grass	V	-	Grows in cleared eucalypt forests and relict grassland, often dominated by Purple Wiregrass (<i>Aristida ramosa</i>), Red-leg Grass (<i>Bothriochloa macra</i>), Red Grass (<i>B. decipiens</i>), Queensland Bluegrass (<i>Dichanthium sericeum</i>) or <i>Austrostipa aristiglumis</i> . Prefers heavier-textured soils such as brown or black clay soils.	R
<i>Cadellia pentastylis</i>	Ooline	V	V	Undulating terrain on a variety of soil types, between 300 metres and 450 metres.	L
<i>Cymbonotus maidenii</i>	-	-	E	Grows in isolated patches, mainly north of the Darling and Barwon Rivers, and in inland Queensland. Occurs on clay, usually in open grassland, along roadsides or beside waterholes or watercourses.	R
<i>Dichanthium queenslandicum</i>	King Blue-grass	V	V	Garnet south to Mundubbera.	L
<i>Digitaria porrecta</i>	Finger Panic Grass	E	NT	Native grassland, woodlands or open forest with a grassy understory on richer soils. Found along roadsides and travelling stock routes where there is light grazing and occasional fire.	L
<i>Eleocharis blakeana</i>	-	-	NT	Occurs on plains and low undulating country on poorly drained, clayey soils scrubs, and in small depressions along drainage lines in open forest and woodland communities.	R
<i>Fimbristylis vagans</i>	Wandering Fringe-rush	-	NT	Records found in Broadwater Conservation Park.	R
<i>Homopholis belsonii</i>	-	V	E	<i>Homopholis belsonii</i> occurs at elevations ranging from 200 m to 520 m above sea level. It is known to occur in dry woodland habitats on poor soils, such as those derived from basalt. It is generally found among fallen timber at the base of trees or shrubs, among branches and leaves of trees hanging to ground level or along the bottom of netting fences.	L
<i>Philothea sporadica</i>	-	V	V	Known from south-east Queensland, from just north of Tara, to approximately 12 km east of Kogan. <i>Philothea sporadica</i> is found on residual hills which are remnants of laterised Cretaceous sandstones, where the soils are shallow, uniform sandy loams to clay loams of extremely low fertility and poor condition (Dawson, 1972). It occurs primarily in low open forest of <i>Acacia burrowii</i> , <i>Eucalyptus exserta</i> , <i>E. crebra</i> , <i>E. fibrosa</i> subsp. <i>nubila</i> and <i>Callitris glaucophylla</i> .	R

<i>Picris barbarorum</i>	-	-	V	Uncommon, flowers July to November. Limited information on habitat is available.	R
<i>Picris evae</i>	Hawkweed	V	V	All recent collections appear to come from modified habitats such as weedy roadside vegetation. Its main habitat is open Eucalyptus forest and Dichanthium grassland, roadsides and cultivated areas (paddocks). Soils are black, dark grey or red-brown (specified as shallow, stony soil over basalt for one collection) and reddish clay-loam or medium clay soils. Hawkweed occurs in Eucalyptus open woodland with a grassy understorey composed of <i>Dichanthium spp.</i> Upper stratum species include Eucalyptus melliodora, E. crebra, E. populnea, E. albens, <i>Angophora subvelutina</i> , <i>Allocasuarina torulosa</i> , and <i>Casuarina cunninghamiana</i> .	L
<i>Rhapanticum australe</i>	Austral Cornflower, Native Thistle	V	V	On heavy clays derived from basalt. Austral Cornflower grows in eucalypt open forest with grassy understorey on roadsides and on road reserves with <i>Chloris gayana</i> , <i>Cirsium vulgare</i> , <i>Eucalyptus tereticornis</i> and <i>Angophora floribunda</i> on black clay soil.	L
<i>Solanum papaverifolium</i>	-	-	E	Found on lateritised plateaux in ironbark-Acacia blakei forest associated with such species as <i>Croton insularis</i> , <i>Phebalium nottii</i> , <i>Bertya opposens</i> and <i>Philothea ciliata</i> .	R
<i>Solanum stenopterum</i>	-	-	V	The species is now better known and its range is extended north to west of Townsville (Bean 2004) and it has been recorded from vine thicket, rainforest margins and Argirodendron-dominated rainforest	R
<i>Thesium australe</i>	Austral Toadflax	V	V	Occurs in grassland or grassy woodland. Often found in damp sites in association with Kangaroo Grass (<i>Themeda australis</i>). A root parasite that takes water and some nutrient from other plants, especially Kangaroo Grass.	L
<i>Tylophora linearis</i>	-	E	E	<i>Tylophora linearis</i> grows in dry scrub, open forest and woodlands associated with <i>Melaleuca uncinata</i> , <i>Eucalyptus fibrosa</i> , <i>E. sideroxylon</i> , <i>E. albens</i> , <i>Callitris endlicheri</i> , <i>C. glaucophylla</i> , <i>Allocasuarina luehmannii</i> , <i>Acacia hakeoides</i> , <i>A. lineata</i> , <i>Myoporum spp.</i> , and <i>Casuarina spp.</i>	L

E- Endangered, V- Vulnerable, NT- Near Threatened

L- Likely to occur within DXP, R- Recorded in DXP. Species detected in wildlife online or in HerbreCs are considered to be a record and are marked R.

8.1.3 Fauna - Endangered, Vulnerable or Near Threatened Species

The EPBC and Wildlife Online database searches identified 34 threatened fauna species or potential habitat for threatened fauna species recorded or likely to occur within the DXP and surrounding areas. Information on migratory and marine species likely to occur within the tenure was also collected. The results of the search are presented in Table 17.

The results of the database searches are indicative only. The complete DERM Wildlife online search results and EPBC results are located in Appendix C.

Table 17: Threatened Fauna Species Identified within the DXP area

Scientific Name	Common Name	EPBC Act Status	NC Act Status	Migratory	Marine	Occurrence
Birds						
<i>Accipiter novaehollandiae</i>	Grey Goshawk	-	NT	-	-	R
<i>Anthochaera phrygia</i>	Regent Honeyeater	E	E	Yes	-	R
<i>Botaurus poiciloptilus</i>	Australasian Bittern	E	-	-	-	R
<i>Calyptorhynchus lathami</i>	Glossy Black-Cockatoo	-	V	-	-	R
<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	-	NT	-	-	R
<i>Erythrotriorchis radiatus</i>	Red Goshawk	V	E	-	-	R
<i>Geophaps scripta scripta</i>	Squatter Pigeon	V	V	-	-	L
<i>Grantiella picta</i>	Painted Honeyeater	-	V	-	-	R
<i>Lathamus discolor</i>	Swift Parrot	E	E	-	Yes	L
<i>Lophochroa leadbeateri</i>	Major Mitchells Cockatoo	-	V	-	-	R
<i>Lophoictinia isura</i>	Square-tailed Kite	-	NT	-	-	R
<i>Melithreptus gularis</i>	Black-chinned Honeyeater	-	NT	-	-	R
<i>Neochmia ruficauda ruficauda</i>	Star Finch	E	E	-	-	L
<i>Neophema pulchella</i>	Turquoise Parrot	-	NT	-	-	R
<i>Nettapus coromandelianus</i>	Australian Cotton Pygmy-goose	-	NT	-	Yes	R
<i>Poephila cincta cincta</i>	Black-throated Finch	E	E	-	-	L
<i>Rostratula australis</i> (<i>Rostratula benghalensis. lat.</i>)	Australian Painted Snipe	V	V	Yes	Yes	R
Mammals						
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	V	-	-	L
<i>Chalinolobus picatus</i>	Little Pied Bat	-	NT	-	-	R
<i>Dasyurus hallucatus</i>	Northern Quoll	E	-	-	-	L
<i>Nyctophilus timoriensis</i>	Eastern/Greater Long-eared Bat	V	V	-	-	L

<i>Petrogale peniciliata</i>	Brush-tailed Rock-wallaby	V	V	-	-	L
<i>Phascolarctos cinereus</i>	Koala	-	V	-	-	R
Amphibians						
<i>Cyclorana verrucosa</i>	Rough Frog	-	NT	-	-	R
Reptiles						
<i>Anomalopus mackayi</i>	Five-clawed Worm-skink	V	E	-	-	R
<i>Delma torquata</i>	Collared Delma	V	V	-	-	L
<i>Egernia rugosa</i>	Yakka Skink	V	V	-	-	R
<i>Furina dunmalli</i>	Dunmall's Snake	V	V	-	-	L
<i>Hemiaspis damelii</i>	Grey Snake	-	E	-	-	R
<i>Paradelma orientalis</i>	Brigalow Scaly-foot	V	V	-	-	L
<i>Strophurus taenicauda</i>	Golden-tailed Gecko	-	NT	-	-	R
<i>Tympanocryptis pinguicollis</i>	Grassland Earless Dragon	E	E	-	-	L
Invertebrates						
<i>Jalmenus eubulus</i>	Pale Imperial Hairstreak	-	V	-	-	R
Migratory and Marine Species						
<i>Anseranas semipalmata</i>	Maggie Goose	-	-	-	Yes	L
<i>Anthochaera phrygia</i>	Regent Honeyeater	E	E	Yes	-	R
<i>Apus pacificus</i>	Fork-tailed Swift	-	-	Yes	Yes	L
<i>Ardea alba (Ardea modesta)</i>	Great Egret	-	-	Yes	Yes	L
<i>Ardea ibis</i>	Cattle Egret	-	-	Yes	Yes	L
<i>Gallinago hardwickii</i>	Latham's Snipe, Japanese Snipe	-	-	Yes	Yes	L
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	-	-	Yes	Yes	L
<i>Hirundapus caudacutus</i>	White-throated Needletail	-	-	Yes	Yes	L
<i>Lathamus discolor</i>	Swift Parrot	E	E	-	Yes	L
<i>Merops ornatus</i>	Rainbow Bee-eater	-	-	Yes	Yes	L
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	-	-	Yes	Yes	L
<i>Nettapus coromandelianus</i>	Australian Cotton Pygmy- goose	-	NT	-	Yes	L
<i>Rostratula australis (Rostratula benghalensis. lat.)</i>	Australian Painted Snipe	V	V	Yes	Yes	L

E- Endangered, V- Vulnerable, NT- Near Threatened

L- Likely to occur within the DXP area, R- Recorded in the DXP area

Species detected in wildlife online search results are considered to be a record and are marked R.

8.1.3.1 Pest Species

The EPBC Protected Matters database search and wildlife online searches indicated the possible presence of five introduced pest animal species within and surrounding the DXP area, as shown in Table 18 below.

Table 18: Potentially Occurring Pest Species within the DXP

Scientific Name	Common Name	Presence
<i>Bufo marinus</i>	Cane Toad	R
<i>Felis catus</i>	Wild Cat	R
<i>Oryctolagus cuniculus</i>	Rabbit	R
<i>Sus scrofa</i>	Wild Pig	R
<i>Vulpes vulpes</i>	Fox	R

R-Recorded in the DXP. Species detected in wildlife online search results are considered to be a record and are marked R.

8.1.4 Wild Rivers

There are nine wild rivers declared under the *Wild Rivers Act 2005*. The DXP area is not located within, or in proximity to any of the nine wild river areas. As such, it is considered that petroleum activities carried out within the DXP area will not impact upon, or be a source of contamination to Wild River areas.

8.1.5 Biodiversity Offsets

The Queensland Biodiversity Offset Policy came into effect on 3 October 2011 and applies to level 1 petroleum and gas activities under chapter 5A of the EP Act. Arrow has considered the implications of the Queensland Biodiversity Offset Policy (version 1, 3 October 2011) in the context of DXP. Given the location of proposed infrastructure has yet to be finalised it cannot be determined at this stage whether these activities will require the clearing of any State significant biodiversity values. Arrow is currently in the process of finalising a Biodiversity Offset Strategy which will potentially include the engagement of specialist consultants to formulate strategies to meet the biodiversity offset requirements where circumstances require. Arrow anticipates that the biodiversity offset draft EA conditions (March, 2012) will be included in the EA amendment approval.

8.1.6 Environmentally Sensitive Areas

Environmentally sensitive areas (ESAs) are specific areas that are recognised to possess significant environmental values. ESAs are divided into three categories based upon the conservation values of each of the areas. Category A and Category B ESAs are prescribed in Sections 25 and 26 of the EP Regulation, whilst Category C ESAs are defined by the conditions of the EA.

ESAs within the DXP area were identified using the DERM ESA web mapping search tool (DERM, 2011d). The results of the search, as listed in Table 19, indicate the presence of Category A, B and C ESAs within the DXP area (Figure 14).

Table 19: Environmentally Sensitive Areas Identified within the DXP area

Environmentally Sensitive Area	Regional Ecosystem ID	Biodiversity Status	Vegetation Management Act Status	Description
Category A				
Lake Broadwater Conservation Area				
Category B				
Endangered Regional Ecosystem	11.3.1	Endangered	Endangered	<i>Eucalyptus cambageana</i> woodland to open-forest with <i>Acacia harpophylla</i> or <i>A. argyrodendron</i> on Cainozoic clay plains
	11.3.17	Endangered	Of Concern	<i>Eucalyptus populnea</i> woodland with <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> on alluvial plains
	11.3.21	Endangered	Endangered	<i>Dichanthium sericeum</i> and/or <i>Astrelba spp.</i> grassland on alluvial plains. Cracking clay soils
	11.4.3	Endangered	Endangered	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> shrubby open forest on Cainozoic clay plains
	11.4.12	Endangered	Endangered	<i>Eucalyptus populnea</i> woodland on Cainozoic clay plains.
Category C				
Of Concern Regional Ecosystem	11.3.2	Of Concern	Of Concern	<i>Eucalyptus populnea</i> woodland on alluvial plains
	11.3.3	Of Concern	Of Concern	<i>Eucalyptus coolabah</i> woodland on alluvial plains
	11.3.4	Of Concern	Of Concern	<i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus spp.</i> tall woodland on alluvial plains
	11.3.25	Of Concern	Least Concern	<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines
	11.3.27a	Of Concern	Least Concern	Lacustrine freshwater wetland. Larger ephemeral - permanent water bodies (lakes).
	11.3.27b	Of Concern	Least Concern	Lacustrine freshwater wetland. Occurs on billabongs no longer connected to the channel flow.
	11.3.27d	Of Concern	Least Concern	Lacustrine freshwater wetland (e.g. vegetated swamp). Occurs fringing large lakes.
Essential Habitat	-	-	-	<i>Cymbonotus maidenii</i> Associated with RE 11.3.21 in PL238.

			Endangered in NC Act 1992.
-	-	-	<i>Digitaria porrecta</i> (Finger Panic Grass) Associated with REs 11.3.2, 11.3.3, 11.3.4, 11.3.21 and 11.3.25 in PL238. Endangered in EPBC 1999 and Near-threatened in NC Act 1992.
-	-	-	<i>Philothea sporadica</i> Associated with REs 11.7.4 and 11.7.7 in PL194. Vulnerable in NC Act 1992. <i>Jalmenus eubulus</i> (Imperial Hairstreak) Associated with REs 11.3.1 in PL260. Vulnerable in NC Act 1992.
-	-	-	<i>Solanum papaverifolium</i> Associated with REs 11.3.2, 11.3.21 and 11.3.25 in PL260. Endangered in NC Act 1992.
-	-	-	<i>Solanum stenopterum</i> Associated with RE 11.3.2 and 11.3.21 in PL 258. Vulnerable in NC Act 1992.
			<i>Grantiella picta</i> (Painted Honeyeater) Associated with 11.3.1, 11.3.2, 11.3.3, 11.3.4, 11.3.17, 11.3.25, 11.3.27a/b/d, 11.4.3 and 11.4.12 in PL198 and PL260. Vulnerable in NC Act 1992.
			<i>Chalinolobus picatus</i> (Little Pied Bat) Associated with REs 11.3.1, 11.3.3, 11.3.4, 11.3.17, 11.3.25, 11.3.27a/b/d, 11.4.3 and 11.4.12 in PL198 and PL260 Near-threatened-NC Act 1992.
-	-	-	<i>Cyclorana verrucosa</i> (Rough Frog) Associated with REs 11.3.2, 11.3.3, 11.3.4, 11.3.17, 11.3.25, 11.3.27a/b/d, 11.4.3 and 11.4.12 in PL198 and PL260 Near-threatened-NC Act 1992
-	-	-	<i>Strophurus taenicauda</i> (Golden-tailed Gecko) Associated with 11.3.1, 11.3.2, 11.3.3, 11.3.4, 11.3.17, 11.3.25, 11.3.27a/b/d, 11.4.3 and 11.4.12 in PL198 and PL260. Near-threatened-NC Act 1992

	-	-	-	<p><i>Hemiaspis damelii</i> (Grey Snake)</p> <p>Associated with 11.3.1, 11.3.2, 11.3.3, 11.3.4, 11.3.17, 11.3.25, 11.3.27a/b/d, 11.4.3 and 11.4.12 in PL238 and PL260.</p> <p>Endangered in NC Act 1992.</p>
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8.1.6.1 Access to ESAs

Due to the nature of the activities and the presence of referrable wetlands (Category C ESA), existing EA conditions and EA definitions are placing restrictions on the development and continuing operation of the activity. The following sub-sections discuss proposed specific changes to the current environmental authority conditions of relating to limited petroleum activities and ESAs.

Limited Petroleum Activities

Facilities including well head facilities (SCADA, pumps etc), compressor stations and WTFs, are powered via high voltage transmission lines. Because powerlines are infrastructure essential to the functioning of the gas field, Arrow Energy is seeking the inclusion of powerlines as a limited petroleum activity. Whilst every attempt is made to co-locate powerlines with existing tracks and gathering line networks, this is not always a practicable or feasible option to supply power to the field, due to:

- Gas field configuration; and
- The presence of existing easements and infrastructure owned by third parties. For example infrastructure constructed and operated for projects conducted on overlapping tenure. Powerline easements must be selected to avoid these existing easements and infrastructure.

Wells, which are a limited petroleum activity, are authorised to be constructed in certain ESAs, where currently powerlines are not explicitly authorised to be located. This concession by the administering authority to enable appropriate field development in some ESAs is not supported by an allowance to provide the required power supply infrastructure.

Under current conditions, the construction of linear infrastructure through areas where ESAs are overlapping is not authorised. Whilst Arrow Energy seeks to avoid such areas when locating project infrastructure, this is not always possible.

As such it is important that where necessary, gas gathering lines, water lines, access tracks (including supporting structures) and powerlines can intersect a referrable wetland and cross without triggering a formal EA amendment for each individual crossing.

Arrow Energy is therefore seeking access to referrable wetlands for the construction and operation of linear infrastructure only. Arrow Energy will not locate dams, wells, compressor facilities or any other types of non-linear infrastructure in these areas, except where specific approval is sought from the administering authority and only in exceptional circumstances. Arrow Energy will only undertake works through the mapped wetland and waterways during dry periods to minimise impacts to the sensitive areas. All works will be subject to field ecological assessments and

clearances to ensure that high value habitats, vegetation communities and individual plant species are not impacted. The vegetation present is relatively open, which will enable Arrow Energy to maximise the use of open / previously disturbed areas and minimise the extent of clearing necessary as far as practicable. Licensed fauna spotter catchers will also be utilised during any clearing activities.

In some situations it may be practicable for Arrow Energy to use Horizontal Directional Drilling (HDD) to avoid impacts to the mapped areas. However, given the width of the mapped area, it is not anticipated that this option will be viable in most instances due to economic reasons.

Corridor Widths for Linear Infrastructure

Arrow Energy is seeking an increase in the widths of corridors for linear infrastructure within ESAs. Currently, the EA model conditions allow for the following widths:

- 18 m for dual carriageway roads
- 6 m for access tracks not associated with a gas or water line;
- 12 m for a single water or gas gathering line;
- 18 m for a trench with one water gathering line and one parallel gas gathering pipeline;
- 25 m width for multiple trenches where there are three parallel gas or water gathering lines; and
- 7 m width for any additional trench for a water or gas line.

Arrow Energy cannot construct the necessary infrastructure within the areas provided in the model EA conditions above in a safe manner to people or to the environment. Based on actual operational needs and environment, health and safety aspects, Arrow Energy require the following widths for access through ESAs and other remnant vegetation:

Tracks only

- 21 metres for dual carriage access tracks not associated with pipelines or overhead power lines;
- 18 metres for single carriage access tracks not associated with pipelines or overhead power lines;

Tracks, Pipelines and Powerlines

- 27 metres for dual carriage access tracks with a single pipeline trench;
- 24 metres for single carriage access tracks with single pipeline trench;
- 32 metres for dual carriage access tracks associated with a single pipeline trench and/or overhead power lines;
- 29 metres for single carriage access tracks associated with an overhead power line and/or a single pipeline trench; and
- 23 metres in width for overhead power lines not associated with access tracks or pipelines;

Pipelines

- for pipelines, including provision for a utility corridor and access track:
 - 21 metres for a single water or gas gathering line; or
 - 25 metres for a trench containing one gas or water gathering line and one parallel gas or water gathering pipeline; and
 - 7 metres for any additional parallel trench for gas or water gathering lines.

Takeoff Drains, Powerline Stays & Vegetation Storage

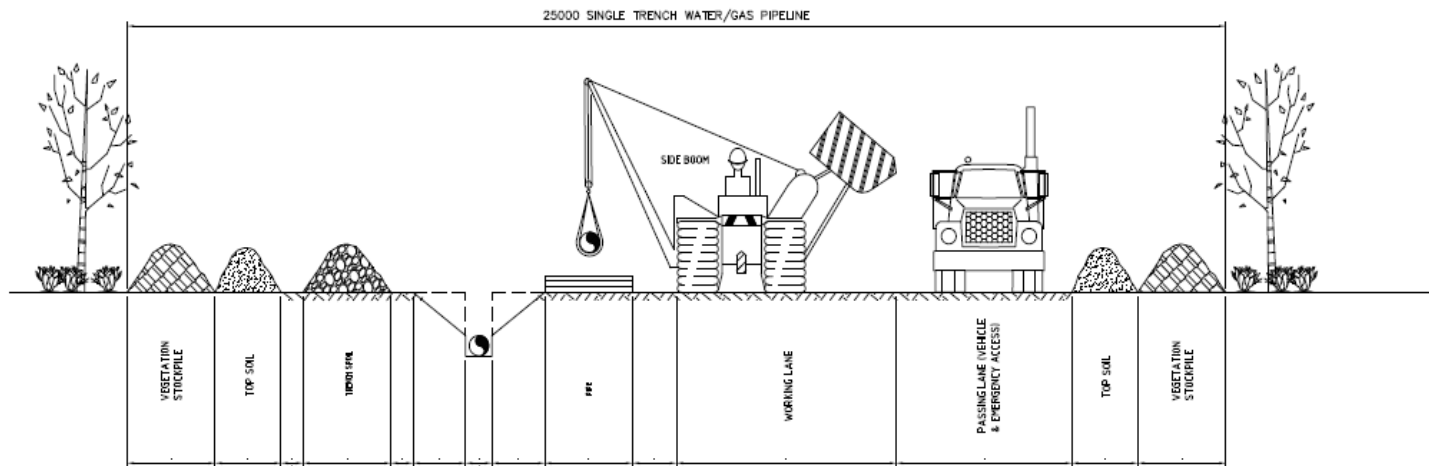
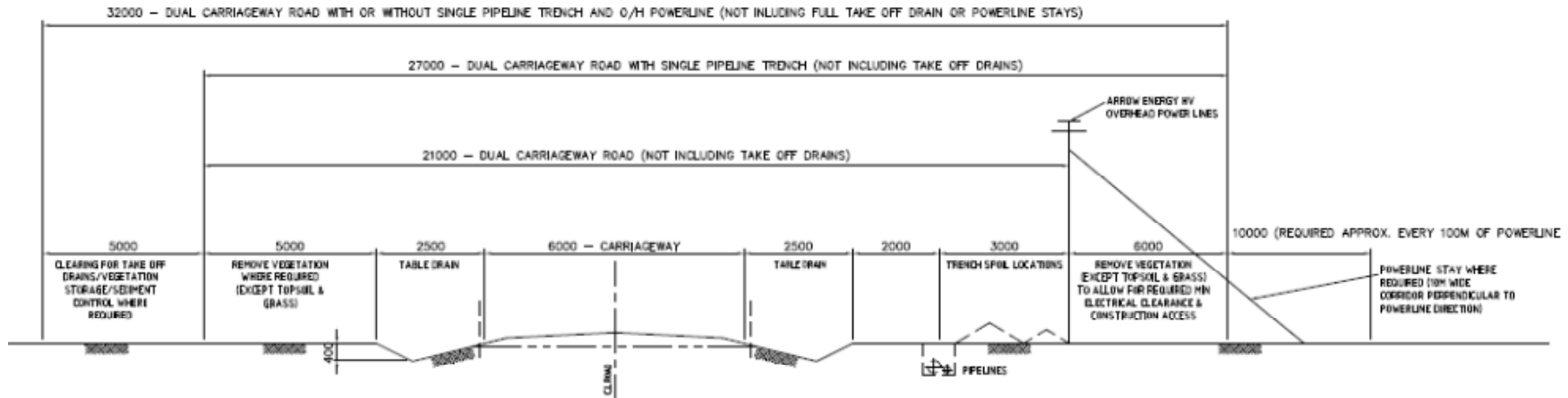
- 10 metres for take-off drains – required approximately every 100m of track. The drain is approximately 10m wide by 20m in length; and
- 10 metres for powerline stays – required approximately every 100m of track 10m wide by 14m from power poles.

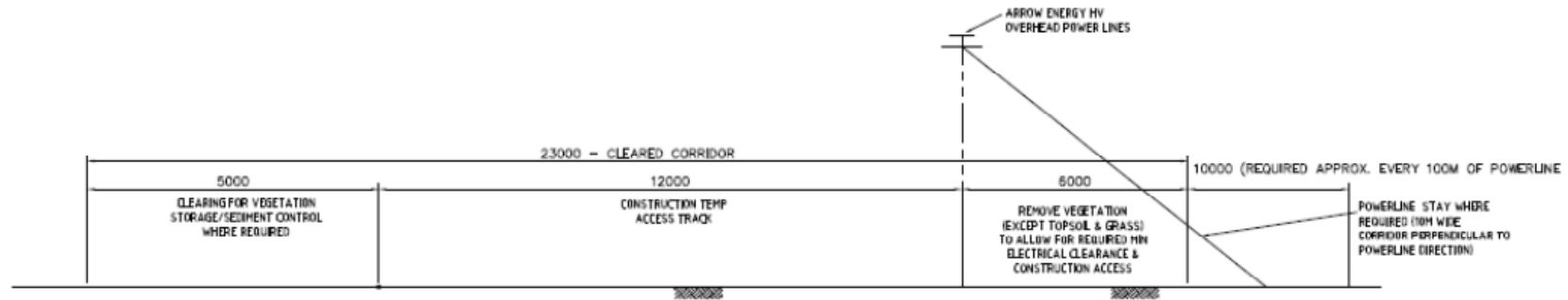
These widths are necessary to provide safe working conditions for construction teams and operators. The removal of spoil through trenching operations in narrow corridors can create very dangerous working conditions for construction teams – a situation that Arrow Energy is obligated to prevent. Reducing the corridor width does not allow for the required benching to ensure the trench walls provided a safe working environment, particular to low lying areas and creek crossings. The additional benching would utilise the area that would have been used for vegetation storage or takeoff drains on non low lying areas.

Dual carriage access tracks are typically constructed within a 32 m cleared corridor. This cleared width allows for the construction of table drains. Table drains are viewed by Arrow Energy as an essential erosion control measure which greatly assists in maintaining the integrity of the tracks and reduces the potential for erosion related issues (EP Act and International Erosion Control Association – Best Practise Erosion and Sediment Control) and minimises road maintenance works. Appropriate drainage on access tracks also allows for prolonged access to infrastructure during wet weather conditions and reduces the potential for the formation of unsafe road conditions. The below diagrams illustrate the requirements for the 32 m corridor widths.

Access tracks are also constructed with take-off drains. These are derived from the table drains and are designed to divert the water collected in the table drains away from the access tracks. These are constructed intermittently along the track length. The frequency and length of take-off drains is dependent on the topography present along the route, but are typically constructed every 100 m. Vegetation is selectively cleared outside the main 32 m corridor to construct the individual take-off drains, as seen in the above diagrams.

A 23 m cleared corridor is necessary for the powerline operation. Vegetation must be maintained at a sufficient distance from the powerlines, to maintain required electrical clearance. The powerlines also have stays (i.e. supports / tie-downs) associated with them and will require an additional 10m of vegetation clearing approximately every 100 m. The powerline stays come off the main powerlines to the ground at a 45° angle. Cleared easements must be maintained for the operational life of the powerline. The below diagram illustrates the corridor requirements for the construction of powerlines.





8.2 ENVIRONMENTAL VALUES

8.2.1 Terrestrial Flora and Fauna

Each terrestrial ecology environment identified within the DXP area contains unique attributes. The terrestrial ecology present within the DXP area can be described as containing 12 existing environments as a means of summarising the array of environmental values.

- EPBC Act Community: Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland (REs 11.3.21, 11.3.24). It is considered likely that this community occurs within the DXP area.
- EPBC Act Community: White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (RE 11.8.2a). It is possible that this community exists within the DXP area.
- Category A ESA, Lake Broadwater Conservation Park.
- Natural grassland road reserves (Dalby Kogan, Dalby Cecil Plains, and Dalby St George).
- EPBC Act Community: Brigalow (*Acacia harpophylla* dominant and co-dominant) (REs 11.3.1, 11.4.3, 11.4.10, 11.9.5, 11.9.6). This community is known to occur within the DXP area.
- EPBC Act Community: Weeping Myall Woodlands. It is considered likely that this community occurs within the DXP area.
- Category B ESAs: REs with an 'endangered' biodiversity status, not EPBC Act - listed: 11.3.17 and 11.4.12.
- Category C ESAs: REs with an 'of concern' biodiversity status: 11.3.2, 11.3.3, 11.3.4, 11.3.25, 11.3.27a, 11.3.27b and 11.3.27d.
- Stock routes and state or bioregional wildlife corridors.
- Essential habitat (supporting listed wildlife species).
- EPBC Act Community: Coolibah – Black Box Woodlands of the Darling Riverine Plains and Brigalow Belt South bioregions (RE 11.3.3).
- Other state forests and timber reserves.

8.3 POTENTIAL IMPACTS ON ENVIRONMENTAL VALUES

Direct impacts to flora species can be associated with clearing vegetation for project activities. Key potential impacts to intersected regional ecosystems include direct physical destruction from the clearing footprint and fragmenting viable habitat and loss of biodiversity. Indirect impacts to intersected and proximate regional ecosystems can include erosion and sedimentation from the construction processes and edge effects

(including weed invasion and fire). The introduction and proliferation of weed species can also have serious impacts on the ecological value of remnant vegetation.

Loss of habitat and foraging areas are generally the main potential impacts to fauna species associated with project activities, due to the clearing of vegetation or the proliferation of weed species. Fauna mortality may also result from entrapment in open trenches and in regulated dams and from collisions with project vehicles.

In summary, the key potential impacts to environmental values associated with flora and fauna include:

- Deterioration of the ecological value of land through disturbances resulting in fragmentation of vegetation, edge effects on vegetation, loss of vegetation and loss of habitat, that is associated with exploration and appraisal activities;
- Disturbance of soil and associated siltation in surface runoff or creation of erosion pathways;
- Weed and pathogen ingress due to vehicles and work crews entering areas; and
- Interaction with livestock and wildlife during operations resulting in mortality.

8.4 MANAGEMENT OF POTENTIAL IMPACTS

Impacts to ecologically significant vegetation communities and endangered, vulnerable and near threatened plants should be limited due to the relatively low presence of significant stands of remnant vegetation in the DXP area (Figure 13).

Direct impacts to flora and fauna can be readily avoided and managed, provided that the hierarchical approach of avoid, minimise, mitigate and offset is adhered to, activity specific mitigation measures are developed and implemented effectively and progressive rehabilitation is undertaken and maintained until such time that the disturbed area is stable and self-sustaining.

Before undertaking any construction activities that may impact vegetation, fauna or other habitat, Arrow undertakes a desktop site selection process followed by a detailed field based ecological assessment. Targeted field investigations take place to confirm species and/or habitat present, prior to undertaking petroleum activities. Key construction activities (such as clearing) are routinely supervised by ecologists to ensure that the activity is being conducted in a responsible manner and within the approved area in accordance with Arrow's Fauna Spotter/Catcher Procedure (99-H-PR-0048) and Land Clearing and Ground Disturbance Procedure (99-V-PR-0014). Where required, Arrow obtain the relevant permits from the QLD Parks and Wildlife Service for relocation or removal of species or for the tampering of an animal breeding place under the protection of the *Nature Conservation Act 1992*.

Provided that project activities are carefully planned, strict mitigation measures are implemented and adhered to, disturbances are kept to the minimum necessary and

rehabilitation works are carried out progressively and maintained effectively for the life of the project, the potential risks to flora and fauna will be minimised.

While the impacts described in Section 8.3 are possible, it is unlikely that they will be significant, given that:

- The nature of exploration and appraisal activities provide for flexibility in infrastructure locations, thereby allowing avoidance of sensitive areas with high ecological value.
- Infrastructure locations shall be planned and selected based on a range of environmental factors, but include avoidance of clearing vegetation wherever possible, (in particular vegetation classed as having significant values).
- Ecological assessments will be conducted prior to disturbances to ascertain the presence of site specific environmental sensitivities, such as protected species (and to avoid wherever practicable).
- The topography is predominantly flat throughout the DXP area such that soil and water impacts through clearing (e.g. erosion, slope failure, stormwater runoff and sedimentation) are less likely than on steeper terrain. Flat terrain is more conducive to containment of disturbance and the prevention of downstream impacts (e.g. sedimentation or pollution of proximate REs). Erosion and sediment control measures are detailed in Section 7.
- In areas containing habitat areas, clearing activities will be undertaken in the presence of a suitably qualified spotter catcher to minimise any impacts to fauna.

Project activities will also be planned to avoid ESAs wherever possible and to maintain the value of their mandated protection zones. Activities shall only be conducted within ESAs or protection zones in accordance with the conditions of the EA or where required, with the appropriate authorisations of the administering authority.

8.4.1 Matters of National Environmental Significance

As described in Section 8.1, desktop assessments of the DXP identified the potential presence of a number of MNES (refer to Table 14) including threatened ecological communities (TECs), threatened plant species as well as a number of threatened animal species listed as vulnerable or endangered under the EPBC Act.

Proposed areas for field project activities will be preferentially located in pre-existing disturbed areas and in strict accordance with Arrow's land access assessment process. Part of this process involves the identification and assessment of ecological values present at any location where petroleum activities are proposed. This process restricts the types of petroleum activities that can be carried out in certain environments based on the values present. With the proper implementation of this assessment process, it is considered that the proposed activities within the DXP area will not significantly impact on MNES and therefore do not warrant approval under the EPBC Act at this time. In the event that Arrow identifies any MNES with the potential to be impacted when

conducting site specific investigations prior to proposed disturbances, Arrow will then submit the appropriate referral in accordance with the relevant provisions under the EPBC Act.

8.4.2 Protected Plants and animals

Arrow holds a class exemption under the *Nature Conservation (Protected Plants) Conservation Plan 2000* which allows Arrow to clear least concern protected plants as part of petroleum activities within DXP area. Clearing must occur in accordance with the conditions of the exemption which include:

- Undertaking on-ground ecological assessments prior to planned disturbances to identify the presence of endangered, vulnerable and near threatened plants;
- Employing a suitably qualified and experienced person to undertake the ecological assessments;
- Maintaining a record of clearing activities where whole plants are taken under the exemption; and
- Mitigating damage from taking whole least concern plants through revegetation or promoting natural regeneration through on-going maintenance.

To take or remove endangered, vulnerable or near threatened flora species, Arrow will apply for the appropriate permits in accordance with the provisions of the NC Act.

Arrow has a species management program for tampering with animal breeding places under Section 88 of the *Nature Conservation Act 1992* and Section 332 of the *Nature Conservation (Wildlife management) Regulation 2006, dated November 2010*. The generic species management plan will be followed by implementing relevant procedures: Wildlife and Stock management (99-H-PR-0075), Fauna Spotter/Catcher Procedure (99-H-PR-0048), Ecological impact assessment procedure (99-H-PR-0081), and rehabilitation procedure (99-V-PR-0015).

8.4.3 Control Strategies

Management of potential impacts to terrestrial flora and fauna under the project is activity based. For each of the core field activities a specific set of applicable environmental procedures will be applied. Key control strategies to address potential impacts to flora and fauna, as described in the relevant procedures, are presented in Table 20.

Table 20: Control Strategies for Potential Impacts to Flora and Fauna

Environmental Protection Objectives
<ul style="list-style-type: none"> • To minimise habitat loss and fauna mortality. • To avoid or minimize adverse effects on and to protect terrestrial ecosystems and associated biodiversity and habitat.

<ul style="list-style-type: none"> To avoid or minimise adverse impacts on environmentally sensitive areas. To control the introduction or spread of new or existing exotic terrestrial flora or fauna. 	
Environmental Issue	Control Strategies
Access Tracks	<p>Construction</p> <ul style="list-style-type: none"> Disturbances in environmentally sensitive areas, regrowth and remnant vegetation and water courses must be avoided wherever practicable. Land clearing and vegetation removal will be minimised. Constructing parallel or multiple access tracks will be avoided wherever practicable. Existing fence lines or tracks should be utilised for access wherever practicable. Watercourse crossings should be minimised and crossing should be avoided where there are unstable bed or banks. Temporary access tracks shall be stabilised with crushed rock or similar materials to prevent or minimise erosion. Regular inspections to monitor erosion and siltation will be undertaken. Erosion and sediment controls will be maintained and replaced where necessary. <p>Operation</p> <ul style="list-style-type: none"> Vehicles shall use existing designated access tracks only. Fences and gates shall be left in the position they were originally found. Vehicles shall be within the safe load and width limits. Activities shall be conducted in compliance with the 99-V-PR-0016 Traffic and Transport - Environmental Aspects Procedure and 99-V-PR-0014 Land Clearing and Ground Disturbance Procedure.
Stock and Wildlife	<p>Stock</p> <ul style="list-style-type: none"> Stock access to active work areas will be restricted, where possible. Any restrictions placed on stock movements in the vicinity of work areas will be agreed with landholders so that disruption of stock is minimised. Gates, holding yards and other areas used to move or contain stock will be identified and discussed with landholders prior to site works. <p>Wildlife</p> <ul style="list-style-type: none"> An ecological assessment will be undertaken to determine any potential fauna habitat features, animal breeding places and the potential for threatened species, migratory species or special least concern animals. Prior to commencing vegetation clearing activities, a qualified spotter catcher shall assess the presence of any significant habitat features, that require:

	<ul style="list-style-type: none"> - Specific actions to minimize fauna injury. - Protection. - Clearance and relocation. • A qualified spotter catcher shall conduct a search of the area proposed to be cleared for the presence of fauna species. If fauna are detected, the spotter catcher shall assess the most appropriate method to avoid or minimize impacts to the individual. The following hierarchy of control shall be employed: <ul style="list-style-type: none"> - Avoid. - Minimise. - Mitigate. • Threatened Species Management Plans will be developed when project activities are identified as likely to impact on individuals or when works are undertaken within close proximity to threatened species. • Habitat corridors shall be created where possible to link 'islands' of habitats. • Habitat trees will be retained where possible. • Wide buffers of natural vegetation along creeks and rivers shall be retained to serve as corridors for species. • Suitable large, woody debris shall be retained where possible to provide cover and habitat. • Vehicles will be restricted to designated tracks and speed limits will be imposed. • Where activities may impose barriers to the movement of fauna for extended period of time, reasonable measures shall be implemented to facilitate fauna movement around or through the workplace. • Appropriate fauna exclusion and/or escape measures shall be implemented at regulated dams. • The time trenches are left open will be minimized. Exit points will be constructed using appropriate material and fauna refuges, such as sawdust-filled bags, will be placed regularly through areas of high faunal activity. • Activities shall be conducted in compliance with the 99-V-PR-0021 Wildlife and Stock Management Procedure and 99-H-PR-0048 Fauna Spotter Catcher Procedure. • Light spill from project activities will be minimised to reduce disturbance to nocturnal fauna. • Disturbance or harassment of wildlife and the unauthorized collection of flora and forest products is prohibited. • Foodscraps will be disposed of in a manner that prevents animal access. • During rehabilitation works, care will be taken when moving stockpiled logs and vegetation to avoid fauna mortality.
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<p>Vegetation Management</p>	<ul style="list-style-type: none"> • Ecological assessments must be undertaken in areas subject to proposed disturbances by conducting a: <ul style="list-style-type: none"> – Desktop study to identify the species/communities and status of those species/communities inhabiting the study area. – Field investigation to describe the existing environment and to verify and delineate the identified flora and fauna species/communities. • Activities will not occur within a Category A, B or C ESAs, or their associated buffer zones, unless specifically authorized by the conditions of the EA. • Activities will aim to be undertaken within cleared areas, with the aim of avoiding remnant and high value regrowth vegetation. • Minimise the disturbance footprint and vegetation clearing. • Minimise the width of construction Right of Ways (ROWs) within areas of sensitivity to the greatest extent possible without compromising the safety of the workers. • Gathering lines and tracks will be located to avoid watercourses, drainage lines and riparian areas where practicable. • Vegetation will be cleared in accordance with the conditions of the Environmental Authority. • Cleared vegetation must be stockpiled in a manner that facilitates re-spreading or salvaging and does not impede vehicle, stock or wildlife movements. • Trees not identified for removal will be protected from damage. Construction activities will limit the scraping of standing tree trunks and breaking of limbs by equipment as far as practicable. • Trees will be felled away from existing stands where practicable. Where trees unavoidably fall into a stand, the tree will be left in situ to emulate natural tree fall and provide habitat for ground-dwelling species, where practicable. • Where ever possible, vegetation shall be removed at ground level by cutting / slashing (rather than removing root stock) and then stored for reuse as mulch during site rehabilitation, or sediment and erosion control. • Access of vehicles and personnel to areas outside the cleared work zone shall be restricted so as to prevent further disturbance.
<p>Weeds and Pathogen Management</p>	<ul style="list-style-type: none"> • Prior to, during and after conducting activities, the presence of weed infestations on-site shall be assessed and results recorded and communicated to staff. • Operational and maintenance activities shall be planned so that movement of plant and equipment between properties, corridors or areas with weed infestations or evidence of pathogen infection is minimised. • All vehicles and personnel shall only enter and exit the site from designated access tracks and roads.

	<ul style="list-style-type: none"> • Weed control methods such as chipping, spraying or employing a contractor to carry out weed control, shall be utilised. • To minimise the risk of weed spread where practicable, topsoil shall be stockpiled and reused in the area it came from. • Materials shall be accompanied by a Weed Hygiene Declaration Form stating that the material is free of weeds before being accepted at site. • Where necessary, portable washdown facilities will be located near designated work areas for the duration of works and / or government provided washdown facilities are to be used if available. • Washdown facilities shall be such that any run-off is contained and does not transfer weed seeds, spores or infected soils to adjacent areas. • After washdown, vehicles must obtain a Weed Hygiene Declaration Form and display a sticker/tag that indicates the vehicle is clean and can enter the relevant site. • Develop and implement a training program to minimise and control the use of herbicides on Arrow sites. • Activities shall be conducted in compliance with the 99-H-PR-0030 Weed and Pathogen Management Procedure.
<p>Fire</p>	<ul style="list-style-type: none"> • Fire-fighting equipment shall be installed where required and routinely inspected and tested. • Where there is a fire risk to a facility from the surrounding environment, through bush fires, burning flora, ash and/or smoke, the following fire prevention activities shall be considered and/or implemented: <ul style="list-style-type: none"> – Plant growth shall be prevented in controlled and cleared areas such as firebreaks; – Access ways maintained by regularly removing weeds and dead undergrowth; – Dead wood and other combustible fuels, grass and litter shall be removed in the facilities perimeter area. • Activities shall be conducted in accordance with the 99-H-PR-0020-Fire Prevention Procedure.
<p>Rehabilitation</p>	<ul style="list-style-type: none"> • Rehabilitation will be undertaken as soon as practicable upon completion of the works. • The pre-construction field investigation baseline characterisation will be utilised when rehabilitating project sites. • Significant species will be translocated or propagated where it is deemed necessary for use during rehabilitation or in offsets in accordance with relevant legislation. • Woody debris, logs and rocks where possible will be retained for use in rehabilitation and will be spread over part or all of the corridor or well pad, or as a minimum, pile along the edge of the

	<p>corridor to provide refuge for crossing fauna.</p> <ul style="list-style-type: none"> • Plant species selected for the purposes of rehabilitation will be specific to the original ecosystem and of local provenance wherever practicable. • Excavations will be backfilled and rehabilitated, particularly pipeline trenches and drilling sumps. Backfilling will be conducted in a manner that will promote successful rehabilitation and may include capping of exposed subsoil with topsoil and replacement of the land surface to pre-construction levels to reduce trench subsidence and concentration of flow.
Performance Indicators	
<ul style="list-style-type: none"> • Any complaints received resulting from Arrow’s activities are appropriately investigated, actioned and closed out. • No evidence of vehicle deviation from designated access tracks resulting from Arrow’s activities. • No clearing outside marked clearing boundaries resulting from Arrow’s activities. • Minimise impacts to fauna or livestock resulting from Arrow’s activities. • No proliferation of weeds on the project site or immediate surrounds resulting from Arrow’s activities. • Evidence of appropriate vegetation stockpiling/mulching and respreading during, and following, construction relating to Arrow’s activities. • All Arrow’s onsite vehicles have certification of appropriate washdown / cleanliness. • Success of rehabilitation measures, via monitoring, relating to Arrow’s activities. 	

9. AQUATIC ECOLOGY

9.1 EXISTING ENVIRONMENT

Aquatic ecosystems within the DXP are diverse with permanent, semi-permanent and highly seasonal lotic (flowing water) and lentic (non-flowing water) environments present within the Condamine-Culgoa Drainage Basin.

Numerous watercourses were identified within the DXP, including the Condamine River. Permanent and semi permanent watercourses within the DXP are typically slow flowing and meandering during the dry season, with periods of higher flow during the wetter months. Ephemeral streams may experience short periods of high flow but also undergo long periods of low or zero flow during which time the streams become a series of waterholes or dry out completely.

9.1.1 Permanent and Semi-permanent Watercourses

Permanent and semi-permanent watercourses within the DXP include the Condamine River, Wilkie Creek, Oakey Creek and Braemar Creek. These systems contain water all year round, although in many cases are reduced to a series of isolated pools during the dry season.

Development and agricultural land use has resulted in the disturbance of the permanent and semi-permanent watercourses and their ecosystems. The disturbance ranges from minimal to highly altered. However, these ecosystems still provide good-quality aquatic habitats that are known to support a relatively diverse range of aquatic species including fish, turtles and invertebrates. In general the permanent and semi-permanent watercourses have uniform aquatic flora, fauna and macroinvertebrate communities across the DXP.

9.1.2 Ephemeral Watercourses

A high proportion of the ephemeral systems within the project area are unnamed systems that flow for very limited periods each year. These systems range from being moderately disturbed by existing land use activities to highly disturbed agricultural drainages.

In general, ephemeral watercourses within the DXP are not unique on a local or regional scale. These ecosystems contain no formal conservation status, no species, habitat or aquatic communities of special conservation significance, no fisheries values and no eco-tourism potential. They provide marginal aquatic habitat due to short periods during which they contain water, lack permanent connectivity to larger watercourses and minimal spawning/nursery habitat. However, they are critical for maintenance of water quality within the catchment.

Ephemeral watercourses are likely to be used opportunistically by aquatic fauna and flora that are tolerant of significant disturbance events and which can adapt to rapidly colonise and regenerate when conditions are suitable.

9.1.3 Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESA's) within the DXP area were identified using the DERM ESA web mapping search tool (DERM, 2011d). The following ESA's were identified:

- Lake Broadwater Conservation Park is located within the DXP and is classified as a Category A ESA. This site is likely to be seasonally inhabited by some aquatic species for foraging or spawning. These species potentially include the EPBC Act listed Murray Cod (*Maccullochella peelii peelii*). This site is important in maintaining hydrological and ecological processes and filtering water, sediment and other pollutants.
- The Narran Lakes Nature Reserve (in northern New South Wales) is listed as a site of international importance under the Ramsar Convention. The site is the terminal wetland of the Narran River, which is fed by the Condamine River. The Condamine River drains a substantial part of the DXP. Narran Lake provides significant habitat for migratory species.

9.1.4 Endangered, Vulnerable or Near Threatened Species

The EPBC and Wildlife Online database searches identified one threatened aquatic species or potential habitat for threatened aquatic species recorded or likely to occur within the DXP and surrounding areas. The Murray Cod (*Maccullochella peelii peelii*), listed as vulnerable under the EPBC Act, was identified as 'species or species habitat may occur' within the DXP. Based on assessment of the habitat present within the DXP it is likely that this species is present.

The results of the database searches are indicative only. The complete DERM Wildlife online search results and EPBC results are located in Appendix C.

9.2 ENVIRONMENTAL VALUES

Aquatic ecosystems in the DXP area include ESA's, permanent and semi-permanent watercourses and ephemeral watercourses. The existing aquatic ecology environment identified within the DXP is comprised of unique characteristics. Table 21 lists the characteristics of the existing aquatic environment identified within the DXP.

Table 21: Characteristics of the existing aquatic environment

Existing Environment	Characteristics
Lake Broadwater Conservation Park	<ul style="list-style-type: none"> • High degree of ecological intactness. • Valuable aquatic habitat, in particular for: <ul style="list-style-type: none"> – National and state listed aquatic fauna species of significance, including the Murray Cod. – Locally significant species. • Provision of important ecological processes for maintaining and filtering water quality, sediment and other pollutants.
Permanent and semi-permanent watercourses	<ul style="list-style-type: none"> • Valuable aquatic habitat in particular for: <ul style="list-style-type: none"> – National and state listed aquatic fauna species of significance, including the Murray Cod. – Locally significant species such as Golden Perch (<i>Macquaria ambigua</i>) and Silver Perch (<i>Bidyanus bidyanus</i>). • Species diversification: aquatic ecosystems (unique at a local scale), ranging from minimally to highly disturbed, contain many areas of good quality aquatic habitat that are known to support a relatively diverse range of aquatic species, including fish, turtles and invertebrates. • Spawning habitat for aquatic species is present but does not represent critical spawning habitat. • Deeper pools and remnant waterholes providing refuge for a range of aquatic species, and these communities 'seed' populations when wet season flows provide connectivity between watercourses. • Habitat for longer-lived species (than those from ephemeral systems), which are less likely to recolonise following disturbance (hence there is a greater possibility of these species or communities becoming locally extinct).
Ephemeral Watercourses	<ul style="list-style-type: none"> • Marginal aquatic habitat.

9.3 POTENTIAL IMPACTS ON ENVIRONMENTAL VALUES

The primary activity that could impact on aquatic ecological values within the DXP is the construction of road and pipeline watercourse crossings. Watercourse crossings will involve:

- Removal of riparian vegetation thereby exposing the ground surface and increasing its susceptibility to increased sedimentation in watercourses and erosion. Disturbance to watercourse banks can also destroy turtle and frog habitat and may lead to weed encroachment.
- Earthworks and vehicle movement within the watercourse leading to potential scouring of the bed and banks and subsequent sedimentation (with the potential for sedimentation to smother benthic fauna).

- The installation of temporary watercourse diversions which could create an instream barrier and disrupt the hydrology and the flow of the watercourse.

Further construction activities that could adversely impact the aquatic ecology include accidental spills or release of construction waste near or in watercourses causing contamination. Terrestrial earthworks during well site, pipeline and production facility construction could also cause sedimentation and the spread of exotic disease.

During operation, the following activities could impact on ecological values:

- Use of herbicides during maintenance of wellheads, production facility sites and pipeline easements.
- Accidental spills or release of waste or sanitary wastewater near or in watercourses.
- Discharge of coal seam gas water into watercourses under emergency circumstances when the dams are approaching maximum capacity during periods of prolonged rainfall, potentially leading to streambed erosion and changes of water chemistry affecting aquatic flora and fauna.
- Use of vehicles for maintenance activities on access tracks potentially causing sedimentation and the spread of exotic species.
- The performance of culverts installed on production facility access tracks.

In summary, potential impacts to aquatic ecological values from project activities within the DXP include:

- Erosion and sediment transport;
- Decline in water quality and increase in algal blooms;
- Introduction and spread of exotic species;
- Reduced movement of aquatic biota; and
- Habitat loss, modification or fragmentation.

9.4 MANAGEMENT OF POTENTIAL IMPACTS

Direct impacts to flora and fauna can be readily avoided and managed, provided that the hierarchical approach of avoid, minimise, mitigate and offset is adhered to, activity specific mitigation measures are developed and implemented effectively and progressive rehabilitation is undertaken and maintained until such time that the disturbed area is stable and self-sustaining.

9.4.1 Control Strategies

Management of potential impacts to aquatic flora and fauna under the project is activity based. For each of the core field activities a specific set of applicable environmental procedures will be applied. Key control strategies to address potential impacts to flora and fauna, as described in the relevant procedures, are presented in Table 22.

Table 22: Control Strategies for Potential Impacts to Aquatic Flora and Fauna

Environmental Protection Objectives	
<ul style="list-style-type: none"> • To minimise habitat loss and fauna mortality. • To avoid or minimize adverse effects on aquatic ecosystems and associated biodiversity and habitat. • To avoid or minimise adverse impacts on environmentally sensitive areas. • To control the introduction or spread of new or existing exotic aquatic flora or fauna. 	
Environmental Issue	Control Strategies
Access Tracks	<p>Construction</p> <ul style="list-style-type: none"> • Disturbances in environmentally sensitive areas and water courses will be avoided wherever practicable. • Land clearing and vegetation removal will be minimised within watercourses and their associated buffer zones. • Constructing parallel or multiple access tracks across watercourses will be avoided. • Watercourse crossings should be minimised and crossing should be avoided where there are unstable bed or banks. • Temporary access tracks shall be stabilised with crushed rock or similar materials to prevent or minimise erosion. • Culverts will be installed at water crossings, where required, in accordance with DERM’s Guideline – Activities in a watercourse, lake or spring associated within mining operations (DERM, 2010c). • Regular inspections to monitor erosion and siltation will be undertaken. • Erosion and sediment controls will be maintained and replaced where necessary. <p>Operation</p> <ul style="list-style-type: none"> • Vehicles will use existing designated access tracks only.
Vegetation Management	<ul style="list-style-type: none"> • Ecological assessments will be undertaken in areas subject to proposed disturbances by conducting a: <ul style="list-style-type: none"> – Desktop study to identify the species/communities and status of those species/communities inhabiting the study area. – Field investigation to describe the existing environment and to verify and delineate the identified flora and fauna species/communities. • Activities will not occur within a Category A, B or C ESAs, or their associated buffer zones, unless specifically authorized by the conditions of the EA. • Gathering lines and tracks will be located to avoid watercourses, drainage lines and riparian areas where practicable. • Vegetation will not be cleared, where possible:

	<ul style="list-style-type: none"> - In or within 200m from any referable wetland; and - In or within 100m of the high bank of any other watercourse.
<p>Aquatic Flora and Fauna</p>	<ul style="list-style-type: none"> • Potential impacts to Lake Broadwater Conservation Park will be managed through the implementation of the appropriate buffer identified in the EA. • Watercourse crossings will be minimised, where practicable, during route selection. Crossings will be at locations that avoid or minimise disturbance to aquatic flora, waterholes, watercourse junctions and watercourses with steep banks. • Transport of equipment across watercourses will be avoided unless an appropriate crossing that minimises disturbance to the bed and banks and riparian vegetation is available. • The width of ROWs will be narrower at watercourse crossings where practicable. • Watercourse crossings will be constructed in manner that minimises sediment release to watercourses, stream bed scouring, obstruction of water flows and disturbance of stream banks and riparian vegetation (i.e. the crossing will be located at a point of low velocity, and straight sections will be targeted, with the pipeline or road orientated as near to perpendicular to water flow as practicable). • Flumes used to construct watercourse crossings will be suitably sized to maintain flows and fish passage. The bed will be protected from scouring at the site of downstream discharge of any flumes or pipes. • If diversion of watercourse flows using pumps is required the pump intakes will be screened with mesh to protect aquatic fauna. • Where practicable, pipelines will be co-located into one watercourse crossing corridor. • Stockpiled material will be stored away from watercourses or drainage lines, maintaining a 100m buffer from the high bank of the watercourse.
<p>Weeds and Pathogen Management</p>	<ul style="list-style-type: none"> • Prior to, during and after conducting activities, the presence of weed infestations on-site shall be assessed and monitored, and the results recorded and communicated to relevant staff. • Operational and maintenance activities shall be planned so that movement of plant and equipment between properties, corridors or areas with weed infestations or evidence of pathogen infection is minimised. • Develop and implement a training program to minimise and control the use of herbicides on Arrow sites. • All vehicles and personnel shall only enter and exit sites from designated access tracks and roads. • Washdown facilities shall be designed to contain run-off and not transfer weed seeds, spores or infected soils to adjacent areas.

	<ul style="list-style-type: none"> • Activities shall be conducted in compliance with the 99-H-PR-0030 Weed and Pathogen Management Procedure.
<p>Rehabilitation</p>	<ul style="list-style-type: none"> • Rehabilitation will be undertaken as soon as practicable and within 12 months of completion of the works. • Rehabilitation will be undertaken in accordance with Arrow’s Rehabilitation Procedure. • The pre-construction field investigation baseline characterisation will be utilised when rehabilitating project sites. • Woody debris, logs and rocks retained for use in rehabilitation will be spread over part or all of the corridor, or as a minimum, pile along the edge of the corridor to provide refuge for crossing fauna. • Plant species selected for the purposes of rehabilitation will be specific to the original ecosystem and of local provenance wherever practicable. • Excavations will be backfilled and rehabilitated, particularly pipeline trenches and drilling sumps. Backfilling will be conducted in a manner that will promote successful rehabilitation and may include capping of exposed subsoil with topsoil and replacement of the land surface to pre-construction levels to reduce trench subsidence and concentration of flow.
<p>Performance Indicators</p>	
<ul style="list-style-type: none"> • Any complaints received resulting from Arrow’s activities are appropriately investigated, actioned and closed out. • Minimise impacts to aquatic fauna resulting from Arrow’s activities. • No proliferation of weeds on the project site or immediate surrounds resulting from Arrow’s activities. • Minimise the potential for increase in algal blooms or nutrient levels resulting from Arrow’s activities. 	

10. NOISE

This section provides a summary of the acoustic environment values within the DXP area and an assessment of the potential for these values to be affected by direct and indirect impacts associated with the DXP. Control strategies for the management of these impacts have been developed.

10.1 EXISTING ENVIRONMENT

The DXP is situated in a regional location, with the predominant land uses in the area being related to agriculture and the energy sector. Accordingly, the DXP is expected to have an acoustic environment characterised by natural sounds such as wind in trees and man-made sounds associated with urban and agricultural areas. Background noise levels are likely to be relatively low, particularly during the night, when some activities contributing to ambient noise levels cease operating. There are, however, some areas where existing facilities associated with the coal seam gas, power generation or mining industries may have an influence on the existing acoustic environment. The location of sensitive receptors throughout the DXP area reflects the typically low population density of agricultural areas.

10.2 ENVIRONMENTAL VALUES

The EP Act provides for the *Environmental Protection (Noise) Policy 2008* (EPP Noise) to deal specifically with environmental values relating to noise quality and levels. The environmental values to be protected from noise and vibration are the qualities of the acoustic environment conducive to the following:

- Protecting the health and biodiversity of ecosystems.
- Protecting human health and wellbeing by ensuring a suitable acoustic environment for individuals to do any of the following:
 - Sleep.
 - Study or learn.
 - Be involved in recreation, including relaxation and conversation.
- Protecting the amenity of the community.
- In relation to vibration only, protecting the structural and cosmetic integrity of cultural heritage sites and dwellings.

10.2.1 Sensitive Receptors within the DXP

As detailed in Section 2.4 a survey conducted in 2009 identified approximately 400 potential sensitive receptors (buildings) within the DXP area, excluding the townships of Dalby and Cecil Plains. Sensitive places ground-truthed and mapped within the DXP area are shown in Figure 4.

Arrow Energy have contracted Coffey Environments to update the identification, ground-truthing and mapping of sensitive receptors in the DXP area and this work is due for completion late-2012. Potential sensitive receptors are located throughout the DXP area and will consequently be integral to the assessment of potential noise and air quality impacts.

10.2.2 Baseline Monitoring

Baseline noise monitoring was carried out for the Surat Gas Project Curtis Island EIS (Arrow Energy, 2012) at four representative locations in the DXP area and confirmed low ambient (LAeq) and background (LA₉₀) noise levels in the absence of existing coal seam gas industry activities. Elevated levels were recorded at sensitive receptors in proximity to existing production facilities.

Using this baseline data, each monitoring location's rating background level was calculated and is summarised in Table 23. These background levels are considered to be representative of all seasons.

Table 23 : Calculated rating background levels

Monitoring Location	Industrial Noise Influence	Rating Background Level (dB(A))*		
		Day	Evening	Night
ML 1	Yes	26	29	26
ML 2	No	29	22	19
ML 3	No	25	22	19
ML 4	Yes	32	34	34

*The rating background level is the median of the daily lowest tenth percentile (lowest 10th percent) of background noise levels, giving an overall background noise level for an assessment period (day, evening or night) over a monitoring period of three to seven days.

No appreciable vibration sources could be detected during inspection of the four representative measurement locations.

10.3 POTENTIAL IMPACTS ON ENVIRONMENTAL VALUES

Potential impacts to the acoustic environment from project activities include:

- Environmental noise disturbance. This includes nuisance noise and background noise creep, which is when noise levels progressively creep higher over time.
- Vibration-induced human discomfort and structural damage.

Activities with the potential to cause these adverse impacts on the values of the acoustic environment during the construction, operations and decommissioning phases of the project include the following:

- Construction of the exploration, appraisal and production wells, which includes site preparation, drilling and well construction.
- Construction of the associated gas and water gathering pipelines.
- Construction of high-pressure gas pipelines that connect production facilities to one another and with the sales gas pipeline.
- Construction of the CGPFs and power generation facilities.
- Blasting during construction. Blasting is not anticipated during construction of the project, but it was considered in the assessment should the need arise.
- Operation of the production wells and the CGPFs.
- Operation of the power generators.
- Decommissioning of the production wells.
- Decommissioning of the production facilities.

10.3.1 Transient Noise Sources

Transient noise sources on the DXP will mostly relate to construction of infrastructure and consequently will be transient or of a short duration.

Noise levels were modelled based upon known sound levels of typical construction equipment.

For construction of production facilities, modelling predictions indicate that, under worst-case meteorological conditions where noise propagation is pronounced, the daytime long-term noise criterion of 40 dB(A) will be met at sites located 3 km or more from the facility site.

For construction of production wells and pipelines, modelling predictions indicate that noise criteria will be met at sensitive receptors 1 km or more from the construction activity.

10.3.2 Fixed and Operational Noise Sources

Sound propagation from a potential noise source was modelled to several reference

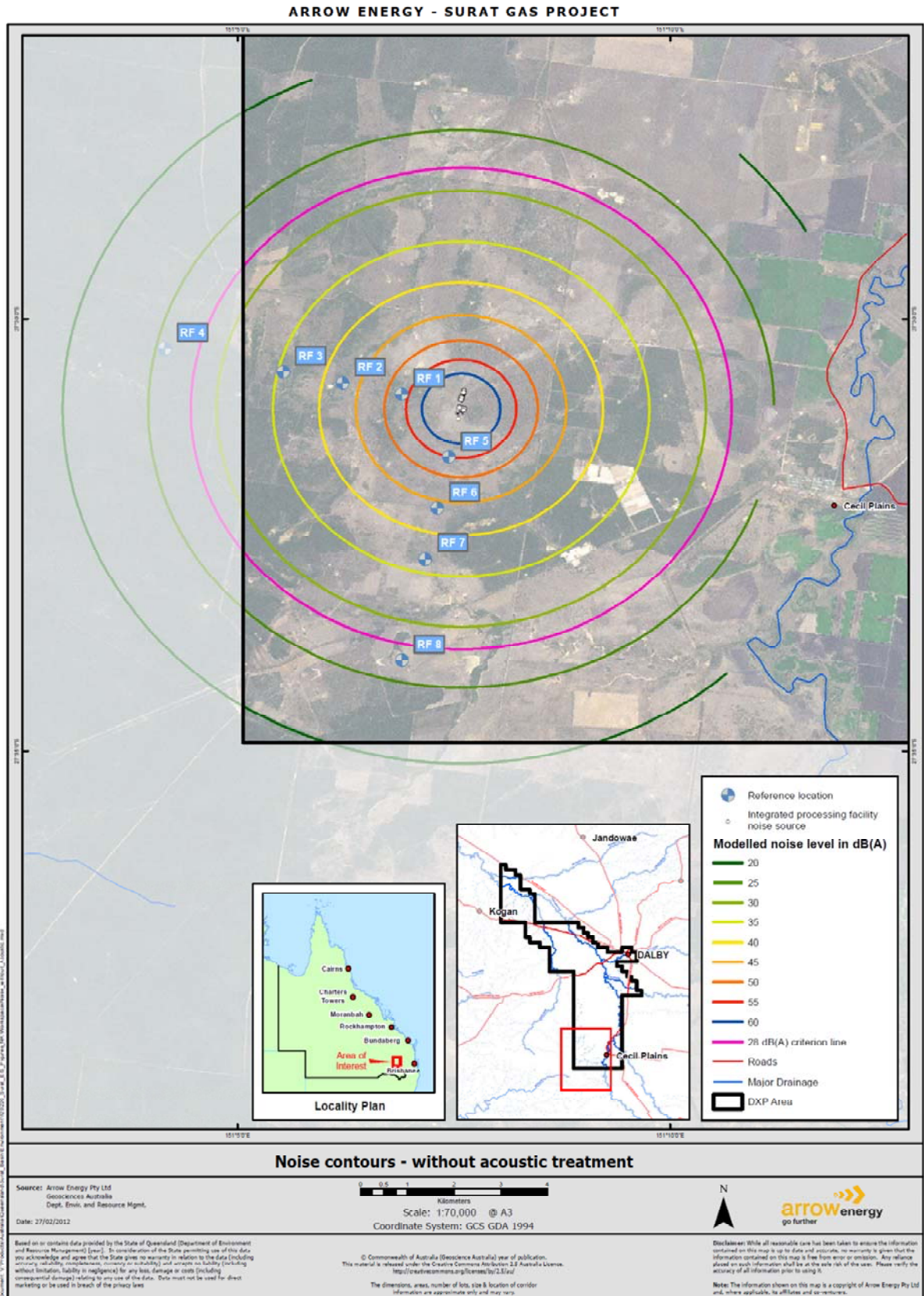
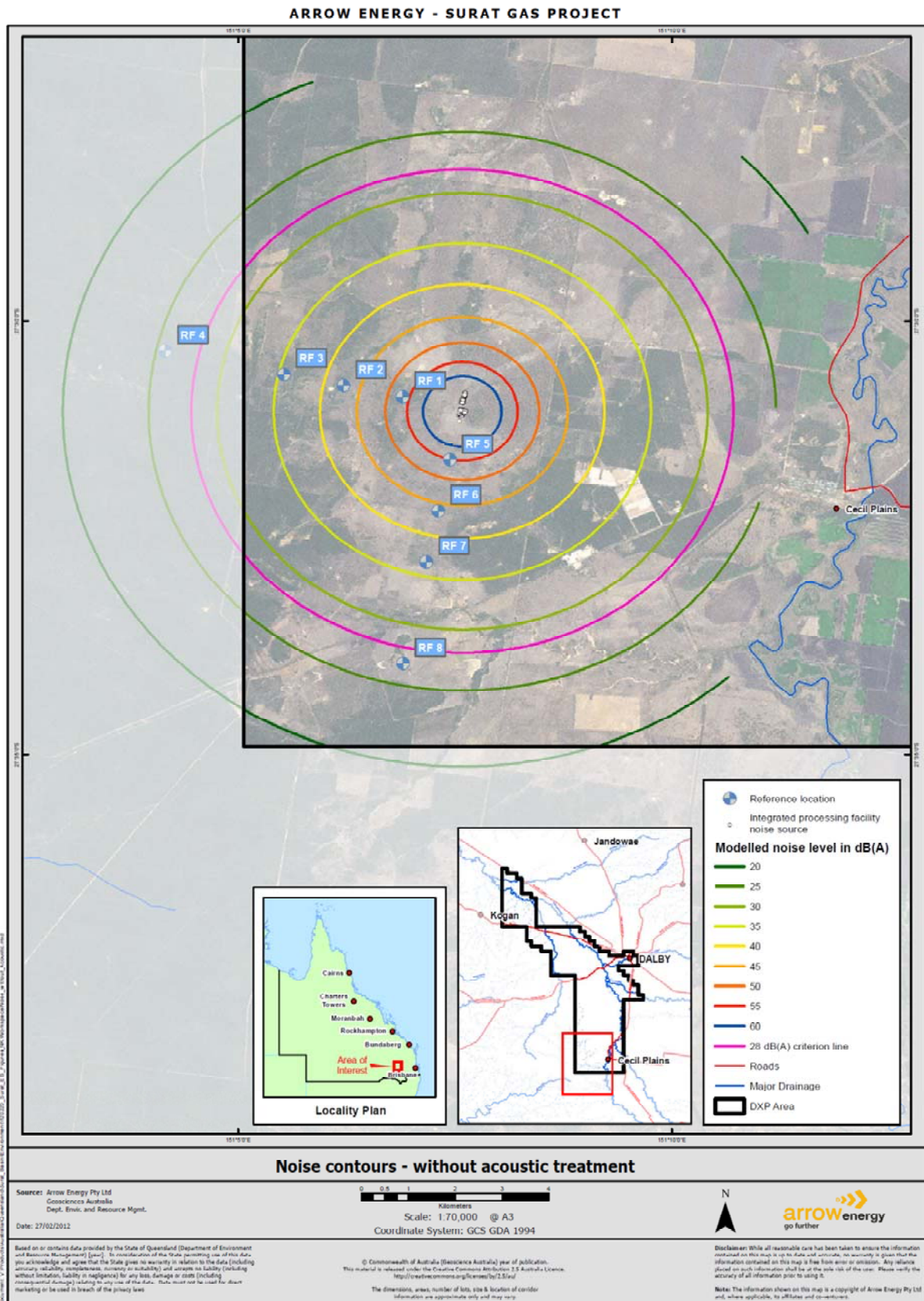


Figure 15) that were considered to be representative of possible locations of the closest sensitive receptors.

Production facility operational noise was modelled at each of the reference locations under the assumption of a worst-case noise scenario where all equipment is operating simultaneously and continuously. Further to this the modelling represents a worst-case scenario as the scenario uses an integrated processing facility whereby the production facilities (CGPFs and WTFs) were located within the same footprint. However, the production facilities on the DXP consisting of CGPFs and WTFs are located separately resulting in lower operational noise levels than that predicted by the modelling.

There will be no significant noise sources associated with the operation of water and gas pipelines as they will be located underground.

Vibration levels throughout the construction and operation of the project are expected to be below the threshold of human detection and not cause structural damage at sensitive receptors that are located at distances greater than 100 m from the activity.



NOT FOR CONSTRUCTION

Figure 15 : Noise contours – without acoustic treatment

10.4 MANAGEMENT OF POTENTIAL IMPACTS

A management hierarchy of avoid, minimise and manage impacts was applied when developing noise and vibration management measures.

Therefore, the primary mitigation measure will be the exploration of opportunities to maximise the distance of project development sites from the nearest sensitive receptors. The relatively sparse pattern of occupation throughout the DXP area provides opportunities to site the infrastructure to provide adequate separation and avoid cumulative noise impacts from existing infrastructure.

Equipment selection and facility design will consider best-practice noise attenuation technology to control and prevent background creep, contain and minimise variable noise, and avoid sleep disturbance.

Residual impacts are expected to be negligible as the impact assessment determined that relevant noise and vibration criteria can be achieved at sensitive receptors through the selection, design and siting of facilities.

10.4.1 Control Strategies

Control strategies for noise and vibration for all project-related activities from planning and design through to decommissioning are found in Table 24.

Table 24: Control Strategies Relating to the Management of Noise

Environmental Protection Objective	
<ul style="list-style-type: none"> To ensure that noise emissions from project activities comply with applicable noise and vibration criteria. To protect the amenity of sensitive receptors by reducing noise and vibration impacts from production facilities and associated workforce and infrastructure. 	
Environmental Issue	Control Strategies
Environmental noise disturbance.	<ul style="list-style-type: none"> Ensure all engines, machinery equipment and pollution control mechanisms are operated and efficiently maintained. Operate equipment and handle materials in a manner that does not cause unnecessary noise (e.g., excessive revving or dropping materials). Consider control or abatement measures such as relocation of the activity, hours of operation, alternative arrangements with potentially affected persons to reduce identified intrusive noise sources. Manage noise in accordance with the relevant environmental authority conditions. Where night-time activities are planned (10 p.m. to 6 a.m.) and are likely to exceed the prescribed noise criteria,

	<p>conduct prior consultation with affected parties.</p> <ul style="list-style-type: none"> • Consult with those who may be affected by increased noise levels due to construction activities with particular reference to the type and timing of works. • Maintain a complaints management system that captures noise complaints and records actions taken in response. If advised by the administering authority noise monitoring to investigate a noise complaint will be undertaken. • Selection of sites to consider the location of sensitive receptors. • Where Site-specific detailed noise modelling of production facilities is likely to exceed the established noise criteria at one or more sensitive receptors intrinsically quieter equipment or acoustic treatments will be considered in the design phase. • Where possible, locate facilities and equipment at a suitable distance to comply with noise limits at sensitive receptors.
<p>Vibration-induced human discomfort and structural damage.</p>	<ul style="list-style-type: none"> • Ensure all engines, machinery equipment and pollution control mechanisms are operated and maintained in accordance with manufacturers’ recommendations. • Selection of sites to consider the location of sensitive receptors. • Locate equipment associated with production wells and associated wellhead infrastructure at a distance of 200 m or more from a sensitive receptor. • Consider the following factors prior to any blasting operations being conducted: <ul style="list-style-type: none"> – The type of rock and stratigraphy being blasted and any associated faulting. – The distance of the blast site from sensitive receptors. – The type, size and number of charges used. – The depth and manner in which the charge is installed. – Methods of controlling blast noise and vibration, such as mats or smaller blasts.
<p>Monitoring Requirements</p>	
<ul style="list-style-type: none"> • Implement monitoring, inspection and maintenance of avoidance, mitigation and management measures to ensure the residual impacts of noise continue to be negligible throughout the lifetime of the project. • If directed by the administering authority in response to a valid noise complaint, undertake noise monitoring in accordance with the DERM (2000) Noise Measurement Manual or a later version of that document. 	
<p>Performance Indicators</p>	
<ul style="list-style-type: none"> • All complaints are registered, addressed and closed out. • Applicable noise and vibration levels are met at the sensitive receptor. 	

11. WASTE

This section provides a summary of identified waste streams expected to be generated by project activities and an assessment of the potential for identified environmental values to be affected by impacts associated with waste generated in each phase of the project.

Environmental protection objectives related to the management of waste have been developed and the mitigation and management measures to achieve these objectives identified. More specific details on waste stream generation and management measures are provided in the following sections:

- Section 5, Air
- Section 6, Dams
- Section 7, Geology, Land and Soils
- Sections 8 and 9, Flora and Fauna
- Section 12, Water
- Section 13, Social Environment
- Section 14, Rehabilitation

11.1 WASTE GENERATION

The EP Act defines a waste as any gas, liquid, solid or energy (or a combination of wastes) that is surplus to, or unwanted from, any industrial, commercial, domestic or other activity, whether or not of value.

With respect to the DXP activities, relatively small amounts of domestic and industrial wastes will be generated during the construction and operation of project related facilities. The volume of each waste type will depend on the scale of each activity being carried out at any one time. The types of wastes that could be generated from DXP construction and operational activities will likely involve a mix of regulated and non-regulated wastes including:

- General waste.
- Sewage.
- Putrescible waste.
- Solid inert wastes such as building rubble, concrete, bricks, timber, plastic, glass, metals and tyres.
- Hazardous wastes such as cleaning chemicals, waste oils, spill clean-up materials and batteries.
- Drill cuttings and cement returns.

- Drilling fluids not suitable for re-use.
- Oily water.
- Cleared vegetation.
- Waste cut/fill materials generated during dam construction.
- Coal seam gas water.
- Brine.

Examples of waste types and approximate volumes generated as part of Arrow's exploration and production activities are shown in Table 25.

Table 25: Examples of Wastes Generated by DXP Activities

Activity	Waste Material	Approximate Quantities	Disposal
Construction of Exploration, Appraisals & Production Wells.	Drill cuttings	11m ³ per well	Re-used in onsite rehabilitation or disposed off-site as Regulated Waste via licensed waste disposal contractor.
	Residual Muds, including clay stabilisers & additives.	75m ³ per well	Drill fluids recycled where possible, otherwise disposed of as a regulated waste via licensed waste disposal contractor.
	Hard Waste	0.5m ³ per well – wood pallets, scrap metal and general waste	Recycle where practicable, or removed by licensed waste disposal contractor.
Pipeline Installation	Scrap – welding rods / grinding discs	4 m ³ per week	Recycle where practicable, or removed by licensed waste disposal contractor
	Cleared vegetation	100 m ³ per 400 m drill string	Recycled where practicable or disposed off-site, or removed by licensed waste disposal contractor.
Operation and Maintenance	TEG	Partial internal change out 1 every 4 years (10m ³)	Licensed waste disposal contractor
	Activated carbon: spent activated carbon containing heavy organics, inorganic vanadium, boron compounds, elemental sulphur	2 per year per water treatment facility	Licensed waste disposal contractor
	Filter cartridges: cellulose based cartridges containing inorganic vanadium and boron compounds, elemental sulphur, potassium carbonate	25 per year per water treatment facility	Licensed waste disposal contractor

	and iron oxides		
	Membrane modules: polyamide membranes containing heavy organics	1 every 3 years per water treatment facility	Licensed waste disposal contractor
Facility Construction	Cleared Vegetation	50m ³ per well	Re used otherwise disposed of as organic waste via Licensed waste disposal contractor.
	Used Oil, Filters & Lubricants.	2m ³ per year.	Recycle where practicable, or removed by licensed waste disposal contractor.

11.1.1 General and Hazardous Wastes

Various streams of solid and liquid domestic and industrial wastes will be generated during each phase of the project and produced at various locations across the DXP area at any one time. A variety of storage facilities will be provided at each waste generating location to allow consolidation of wastes into specific waste streams. The contents of each storage facility can then be easily removed from each work area and the waste disposed of appropriately (i.e. to landfill, to recycling etc). All regulated wastes will be transported for off-site disposal by an appropriately licensed waste disposal contractor. The relevant waste tracking paperwork will be completed and copies retained on-site.

The accommodation of the workforce for the DXP will result in the generation of putrescible waste (food scraps, etc). Putrescible waste will require adequate storage (e.g. fully enclosed containers) and disposal in order to prevent the attraction of fauna (both native and introduced) and to prevent the generation of odours. All putrescible, recyclable and other general waste types will be taken off-site for recycling and disposal at an appropriately licensed facility.

Small volumes of hazardous wastes may be generated as part of project activities and include chemicals used for cleaning, waste oils and used spill clean-up materials. Hazardous wastes require careful storage, handling, transport and disposal. All hazardous and chemical waste will be suitably stored and handled in accordance with the relevant Australian Standards (e.g. AS 1940), fire safety regulations and relevant Arrow waste and chemical management procedures. Hazardous and/or regulated wastes will be taken off site by an appropriately licensed waste contractor for disposal at a regulated waste disposal facility authorised to accept such waste.

11.1.2 Vegetation

Some green waste will be generated as a result of any clearing of vegetation conducted as part of infrastructure sighting or clearing that is necessary to ensure the activities can be conducted safely (i.e. pipeline easement maintenance). Stockpiled vegetation will be re-spread wherever practicable to provide shelter for fauna, or mulched to assist in erosion and sediment control or rehabilitation.

11.1.3 Sewage

As discussed in Section 4.1.6, there are currently no permanent camps located on the DXP, but temporary drilling camps may be established to support seismic, exploration or appraisal activities. It is anticipated that the sewage waste stream associated with these small temporary camps will be stored and trucked off-site and therefore will not be released to land.

Treated waste generated by the two Aqua Nova Aerated Wastewater Treatment Systems, at the Daandine and Tipton CGPF sites are both less than 21 equivalent persons (EP). The effluent from each system is pumped to fenced-off subsurface irrigation areas (13 m x 5 m in area). As this system is enclosed, fugitive emissions are unlikely, and the system is serviced routinely. The systems are located in isolated areas where the nearest inhabitants are in excess of 2 km away from either facility. Surface water receptors for Daandine and Tipton are 800 m and 1200 m, respectively, away from the system and there are no Environmental Sensitive Areas within 2 km.

In the event that Arrow proceeds with construction of the two Sewage Treatment Plants (<450 EP) currently approved under the current EA PEN100449509, the treated effluent will be handled in a manner that will not result in environmental harm, and in accordance with EA conditions. These sewage treatment plants would be only be constructed if deemed necessary based on predicted workforce numbers and to manage volumes of sewage larger than current capacity.

11.1.4 Drilling Fluids and Solids

Arrow utilises water based drilling fluids in drilling operations that are comprised predominantly of fresh water with 2-3% salts. Salts are used to increase the mud weight and prevent natural clay in the formation from swelling. Some fluids may also contain small amounts of bentonite clay which is added to stabilise the formation and prevent the loss of any fluids. There may be other additives used such as polymers for stabilization, corrosion inhibitors, or biocides.

During drilling operations the drilling fluids are returned to the surface along with drill cuttings. The solids, comprising of mostly pulverised rock, are removed from the fluid either by settling pits or solids control equipment (shakers, de-sanders and de-silters, centrifuges and flocculation tanks) and the fluid re-used.

Where no solids control equipment is used, or where the solids control equipment does not adequately remove solids from the fluid, the fluid may become overloaded with solids and no longer be suitable for drilling. Once this occurs the fluid is either 'diluted' with fresh water and additives added, or removed from site for disposal or treatment for re-use and a new batch of drilling fluid mixed. The frequency of this depends on a number of factors including, well type and depth, geology and the type of solids control equipment used. Typically solids build up in the drilling fluid more frequently where settling pits and no solids control equipment are used, and less frequently when solids control equipment and surface tanks are used.

Arrow Energy is currently transitioning to drilling systems with improved solids control equipment and surface tanks rather than pits. This will provide greater opportunity to minimise the amount of fresh water and additives used for each well through the direct re-use of drilling fluid, thereby minimising the amount of liquid waste generated.

Where concurrent drilling activities are sufficiently close in proximity, centralised fluid processing facilities may be used to 'regenerate' fluids when they no longer become suitable for re-use.

Other than cement returns, the solids generated as by-products of the drilling process mainly comprise of drill cuttings with a component of drilling fluid (water plus additives). As such, the composition and consistency of the solids vary depending on a number of factors including, geology, drilling method (core or chip), drilling system and the drilling fluid used. A number of re-use, recycling and treatment options for the solids are currently being investigated. Options will be evaluated in the context of the waste and resource management hierarchy contained within the *Waste Reduction and Recycling Act 2011*.

11.1.5 Low Point Drain Condensation

Condensation from low point drains is collected in intermediate bulk containers stored at the surface. The condensation is then transported to aggregate dams for storage and subsequent treatment.

11.2 COAL SEAM GAS WATER

11.2.1 Coal Seam Gas Water Quality

Coal seam gas water is water extracted from coal seams in order to release gas from the coal. The volume and quality of the coal seam water resulting from a CSG appraisal well will vary from well to well and from tenure to tenure. Coal seam gas water production across the DXP area is variable but is estimated to average 2.2 gigalitres (GL) per annum.

The coal seam gas water quality from the Walloon Coal Measures can vary from fresh water to saline or highly turbid water. The quality of the coal seam gas water may also depend on the depth of the coal seam, but generally has the following characteristics:

- pH range between 7 and 11.
- Salinity generally ranging from 3,000 to 8,000 milligrams per litre (mg/L) (i.e., brackish) and total dissolved solids including sodium salts, bicarbonate salts, chlorides and others.
- Suspended solids from the well that will usually settle out over time.
- Ions including calcium, magnesium, potassium, fluoride, bromine, silicon and sulfate (as SO₄).
- Trace metals and low levels of nutrients.

Table 26 presents concentrations for a range of coal seam gas water quality parameters reported for samples collected from 67 existing production wells currently drawing coal seam gas water from the Walloon Coal Measures.

Table 26: Coal seam gas water quality in the Walloon Coal Measures

Water Quality Parameter	Unit	Minimum	Maximum	Mean
pH		7.1	11.4	8.1
Conductivity (a measure of salinity)	µS/cm	830	31,000	7,223
Total dissolved solids	mg/L	534	20,150	4,694
Calcium (Ca)	mg/L	4	1,160	136
Magnesium (Mg)	mg/L	2	850	113
Sodium (Na)	mg/L	135	6,950	1,420
Chloride (Cl)	mg/L	65	12,770	2,280
Bicarbonate (HCO ₃)	mg/L	5.2	1,980	561
Sulfate (SO ₄)	mg/L	0	355	43

The design of water treatment and storage facilities will consider Queensland's Coal Seam Gas Water Management Policy (DERM, 2010a) and the Manual for Assessing Hazard Categories and Hydraulic Performance of Dams prepared by DERM (2011).

11.2.2 Coal Seam Gas Water Management Strategy

The Coal Seam Gas Water Management Plan – Surat Basin (refer to Appendix E) seeks to manage coal seam gas water during the life of the project in a way that maximises beneficial use and minimises the environmental impacts associated with water use and disposal.

Arrow's Coal Seam Gas Water Management Strategy (Appendix F) seeks to maximise beneficial use of coal seam gas water in accordance with identified environmental values and minimise the environmental impacts associated with water use and disposal.

The strategy identifies the preferred and potential management options for coal seam gas water and associated brine or salt, including treatment, storage, beneficial use and disposal. The distribution of coal seam gas water to the different management options will be continually reviewed as planning for field development evolves and opportunities for beneficial use arise as outlined below.

11.2.3 Coal Seam Gas Water Management Options

Although coal seam gas water is considered a waste under the EP Act, the government may approve its use as a 'resource' on a case-by-case basis if the water has a beneficial use. When used beneficially, coal seam gas water ceases to be defined as a waste.

Under the *Environmental Protection Regulation 2008*, Section 64D, for activities involving the use or disposal of coal seam gas water, the administering authority must consider the coal seam gas water management policy.

The Coal Seam Gas Water Management Strategy and Coal Seam Water Management Plan – Surat Basin (refer to Appendix E) detail Arrow's preferred management options. In summary, these options include:

- Substitution of allocations, and subsequent beneficial uses, including:
 - Agriculture – Irrigation and stock;
 - Industrial uses (construction and processing);
 - Urban uses (town water supply).
- New Uses;
- Injection;
- Water to watercourses;
- Ocean outfall.

11.2.4 Brine Management Options

Brine is a significant by-product of the water treatment process and also requires specific measures to manage its storage, use or disposal.

Assuming an average salt concentration of 4,500 mg/L, Arrow expects that treatment of coal seam gas water will generate in the order of 4.5 t of salt per megalitre of coal seam gas water. Arrow will continue to monitor coal seam gas water quality as the development progresses.

The Coal Seam Gas Water Management Strategy and Coal Seam Management Plan – Surat Basin (refer to Appendix E) further detail Arrow's preferred management options for brine. In summary, these options include:

- Selective salt precipitation.
- Brine injection (suitable formation).
- Disposal to a suitably licensed landfill.
- Ocean outfall.

11.3 ENVIRONMENTAL VALUES

The key environmental values to be protected from waste streams are:

- **Soils and Land.** Land use capability, having regard to economic consideration, habitat for flora and fauna and quality of land, to guarantee environmental sustainability.

- **Air Quality.** Air quality that is suitable for sustaining human and environmental health and amenity.
- **Ecology.** The diversity of ecological process and associated ecosystems and suitability of flora and fauna habitats.
- **Water Resources.** Water quality that is suitable for sustaining human health, agriculture, visual amenity and suitability of aquatic ecosystems.
- **Visual Amenity.** Features of the existing environment that are important for visual amenity.
- **Health and Safety.** The life, health and wellbeing of people, including the project workers.

11.4 POTENTIAL IMPACTS ON ENVIRONMENTAL VALUES

11.4.1 Potential Beneficial Uses of Waste Generation

Waste and resource management is based on the *Waste Reduction and Recycling Act 2011* hierarchy beginning with waste avoidance, minimisation, reuse, recycling, recover, treat and finally, disposal. The opportunity exists for reuse or recycling of certain construction materials, compounds, and constituents that may otherwise become wastes and be disposed of without obtaining maximum benefit from reuse or recycling the resource. Examples include scrap metal, use of waste oil as fuel, the recycling of plastics, glass, reuse of treated coal seam gas water, drill fluids and cuttings, paper and related materials.

When assessing options within the waste and resource management hierarchy, incidental factors such as the efficiency of treatment processes, nature of any by-products produced and the impacts of any transportation requirements will also be considered.

11.4.2 Potential Adverse Impacts of Waste

Adverse waste management issues associated with project activities include:

- **Uncontrolled Releases of Waste.** Failure to properly manage waste storage and containment systems could potentially result in soil and water contamination and impacts to agricultural land and on visual amenity.
- **Controlled Releases of Waste or Emissions.** Discharge of waste water and air emissions could potentially lead to adverse health and ecological impacts, e.g., discharge of sewage and generation of air pollutants, such as nitrogen dioxide (NO₂).

Potential impacts related to the management of coal seam gas water throughout all phases of the project include:

- Diminished surface water and groundwater quality and subsequent impacts on ecosystems and third-party users (including users downstream).
- Altered physical form and changes to hydrology within watercourses.

11.5 MANAGEMENT OF POTENTIAL IMPACTS

Avoidance, mitigation and management measures have been proposed to achieve the identified environmental protection objectives. Avoidance, mitigation and management of potential waste impacts will be achieved primarily through implementation of a waste management hierarchy. Waste will be managed in accordance with the objectives of the *Waste Reduction and Recycling Act 2011*. Arrow will apply the following hierarchy of management options to all waste generated during the project activities:

- Avoid unnecessary resource consumption where possible.
- Source reduction. Reduce waste generation and disposal: avoid, eliminate, change or reduce practices that result in the generation of wastes.
- Re-use. Reuse waste materials that are in their original form.
- Recycle waste resources to make the same or different products.
- Recover waste resources where possible.
- Treat waste before disposal: render wastes safe by neutralisation or other treatment methods.
- Dispose of waste only if there is no viable alternative: dispose of waste products that can no longer be reused or recycled either through landfilling or incineration.

11.5.1 Control Strategies

Control strategies for the management of potential impacts related to wastes generated from DXP activities are presented in Table 27 below.

Table 27: Control Strategies Relating to the Management of Waste and Coal Seam Gas Water

Environmental Protection and Waste Management Objectives
<p>In accordance with the <i>Waste Reduction and Recycling Act 2011</i>:</p> <ul style="list-style-type: none"> • To use a waste management hierarchy and principles based on waste avoidance, reuse, recycling, recovery, treatment and disposal. • To minimise resource utilisation by re-use and recycling of waste. • To minimise impacts to the environment from the management of waste.

<ul style="list-style-type: none"> To reduce the quantity of waste that is sent to landfills by recycling and reuse of waste. <p>In accordance with Arrow’s Coal Seam Gas Water Management Strategy and Management Plan for the Surat Basin:</p> <ul style="list-style-type: none"> To maximise beneficial use of coal seam gas water and brine. To minimise impacts to the receiving environment associated with coal seam gas water use and disposal. 	
Environmental Issue	Control Strategies
<p>Management of regulated and non-regulated wastes generated by project activities.</p>	<p>Planning and design:</p> <ul style="list-style-type: none"> Develop and implement emergency response and spill response procedures to minimise any impacts that could occur as a result of releases of hazardous materials or any loss of containment of storage equipment. Apply appropriate Australian and industry standards and codes of practice for the design and installation of infrastructure associated with the storage of hazardous materials (such as chemicals, fuels and lubricants). Design water dams in accordance with relevant legislation and Queensland standards and DERM guidelines. Develop onsite waste storage areas in accordance with industry practice and relevant waste management regulations. Procure materials in bulk where practicable to minimise containers and movement of material. Design the storage capacity of coal seam gas water and brine dams to be sufficient to manage waste liquids until such time that permanent beneficial use or disposal options are approved and operational. Develop and implement training programs in the principles of the waste hierarchy to personnel handling wastes on a regular basis. <p>Construction, operations and decommissioning:</p> <ul style="list-style-type: none"> Allocate bins for different waste streams to achieve solid waste segregation to maximise recycling and reuse opportunities. Provide appropriate domestic waste disposal facilities at designated work sites to assist in segregation of waste. Manage contaminated soil or groundwater that cannot be avoided through physical investigation; manage quantification of the type, severity and extent of contamination; and remediate or manage in accordance with the Queensland Government’s Draft Guidelines for the Assessment and Management of Contaminated Land (DE, 1998) and any other relevant legislation. Contain coal seam gas water in dams for treatment. Arrow will implement a waste auditing and reporting system

	<p>for waste generating activities to:</p> <ul style="list-style-type: none"> – Capture waste data to enable continuous improvement of waste avoidance, reduction and management measures throughout the project life. – Assess whether action is required to fulfil set waste objectives and management. – Assess the adequacy of proposed disposal and management measures and identify where these measures need improvement. – Monitor potential environmental impacts to enable positive action to be implemented in case of incidents or accidents related to waste activities. <ul style="list-style-type: none"> • Store liquid waste generated (other than coal seam gas water and sewage) and periodically remove it for disposal or recycling. • Dispose of waste that cannot be reused or recycled at appropriately licensed facilities. • Store putrescible solid waste in covered containers to prevent odours, public health hazards and access by fauna. • Contain all waste fluids and solids resulting from drilling activities in appropriate containment structures prior to re-use, recycling, treatment or disposal. • Re-use wastes wherever practicable. Opportunities for re-use will be maximised by undertaking the following: <ul style="list-style-type: none"> – Reuse of cleared vegetation for mulch and soil erosion control. – Reuse of brine for production of potentially saleable salt products and implementing salt crystallisation (see Section 11.2 and Appendix E) – Segregation of wastewater streams, i.e., contaminated stormwater, waste waters and coal seam gas water. – Reuse of treated waste water for dust suppression, construction activities or irrigation. – Reuse of treated coal seam gas water for town water supply, where of appropriate quality. – Reuse of hydrotest water. – Reuse of treated water for agricultural use, industrial use, potable water supply or injection into aquifers. – Treatment and reuse of solid wastes, such as drilling cuttings, as soil conditioners, road base, other uses or construction material where practicable. • Use onsite waste treatment for waste streams such as sewage, coal seam gas water and other specified wastes. Sewage will be treated in package sewage treatment plants. Sewage treatment plants will be located at production and
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	<p>water treatment facilities and include settlement, digestion, aeration, clarification and disinfection equipment.</p> <ul style="list-style-type: none"> • Handle, store and dispose of regulated wastes in accordance with relevant standards and the <i>Environmental Protection (Waste Management) Regulation 2000</i>. • Comply with Queensland Government waste tracking requirements. • Segregated general waste will be treated if necessary and stored onsite prior to disposal. Segregation will include the separation of liquid from solid waste, separation of regulated from non-regulated waste, and separation of reusable and recyclable from non-reusable and non-recyclable waste.
<p>Management of coal seam gas water to control:</p> <ul style="list-style-type: none"> • Diminished surface water quality. • Diminished groundwater quality. • Diminished soil quality. • Altered physical form and changes to hydrology within watercourses due to discharge of coal seam gas water to watercourses. • Altered surface water supply and quality to downstream users due to discharge of coal seam gas water to watercourses. • Altered aquatic and terrestrial ecological processes. 	<ul style="list-style-type: none"> • Maintain water balance models for long-term planning and management of coal seam gas water. Review and update modelling in alignment with the production-forecasting schedule. • Identify strategies to minimise coal seam gas water surface storage and to promote increased efficiency. • Ensure coal seam gas water used for dust suppression on roads or for construction and operation activities is treated if required. <p>Planning and design:</p> <ul style="list-style-type: none"> • Develop and continually maintain the coal seam gas water management strategy throughout the project life to optimise the investigation and implementation of the potential coal seam gas water management options in alignment with the overall project development. <p>Operations:</p> <ul style="list-style-type: none"> • Discharge water from project activities at a rate and location that will not result in erosion. Install additional erosion protection measures, including energy dissipation structures, at discharge outlets. • Incorporate into a discharge response plan or water management plan procedures for the controlled discharge of coal seam gas water. Procedures will include conditions for discharge, stream flow data, notification and reporting. • Demonstrate the requirement for disposal when beneficial uses are unavailable, including details of the control measures that will be implemented.
<p>Monitoring Requirements</p>	
<p>Waste management:</p> <ul style="list-style-type: none"> • Inspect waste storage locations to ensure waste management measures are being adhered to. • Maintain a waste tracking system for regulated waste. • Maintain and update a water balance model that includes but is not limited to: 	

- Monitoring of volume and quality of coal seam gas water produced and treated.
- Monitoring of disposition volumes of treated and untreated coal seam gas water.

Coal seam gas water management:

- In accordance with the EA a visual inspection will be conducted of physical form integrity and monitor hydrology, turbidity, total suspended solids, pH, dissolved metals and total petroleum hydrocarbons upstream and downstream of authorised locations where water is to be discharged directly to a watercourse.
- Measure the volume and quality of treated coal seam gas water released to surface waters on a routine basis in accordance with regulatory requirements and approved release limits.
- Maintain and update a water balance model that includes but is not limited to:
 - Monitoring of volume and quality of coal seam gas water produced and treated.
 - Implementation of end point metering to monitor disposition volumes of treated and untreated coal seam gas water.
 - Monitoring of the volume of brine and its by-products used beneficially or disposed to landfill.
- Ensure that the quality of coal seam gas water used for dust suppression meets the prescribed limits.

Performance Indicators

Waste management:

- Evidence of appropriate handling and treatment of contaminated land resulting from Arrow's activities is maintained.
- Wastes resulting from Arrow's activities are appropriately segregated and stored on site.
- Regulated waste transport records relating to Arrow's activities are kept on site.
- Any contamination or spill incidents resulting from Arrow's activities are effectively contained, documented and closed out.

Coal seam gas water management:

- Beneficially use the majority of coal seam gas water.
- No releases of coal seam gas water or brine to watercourses or land except under authorised and controlled situations.
- Compliance with water quality objectives and no permanent impact to the physical form or hydrology of watercourses as a result of project activities.

12. WATER

12.1 EXISTING ENVIRONMENT

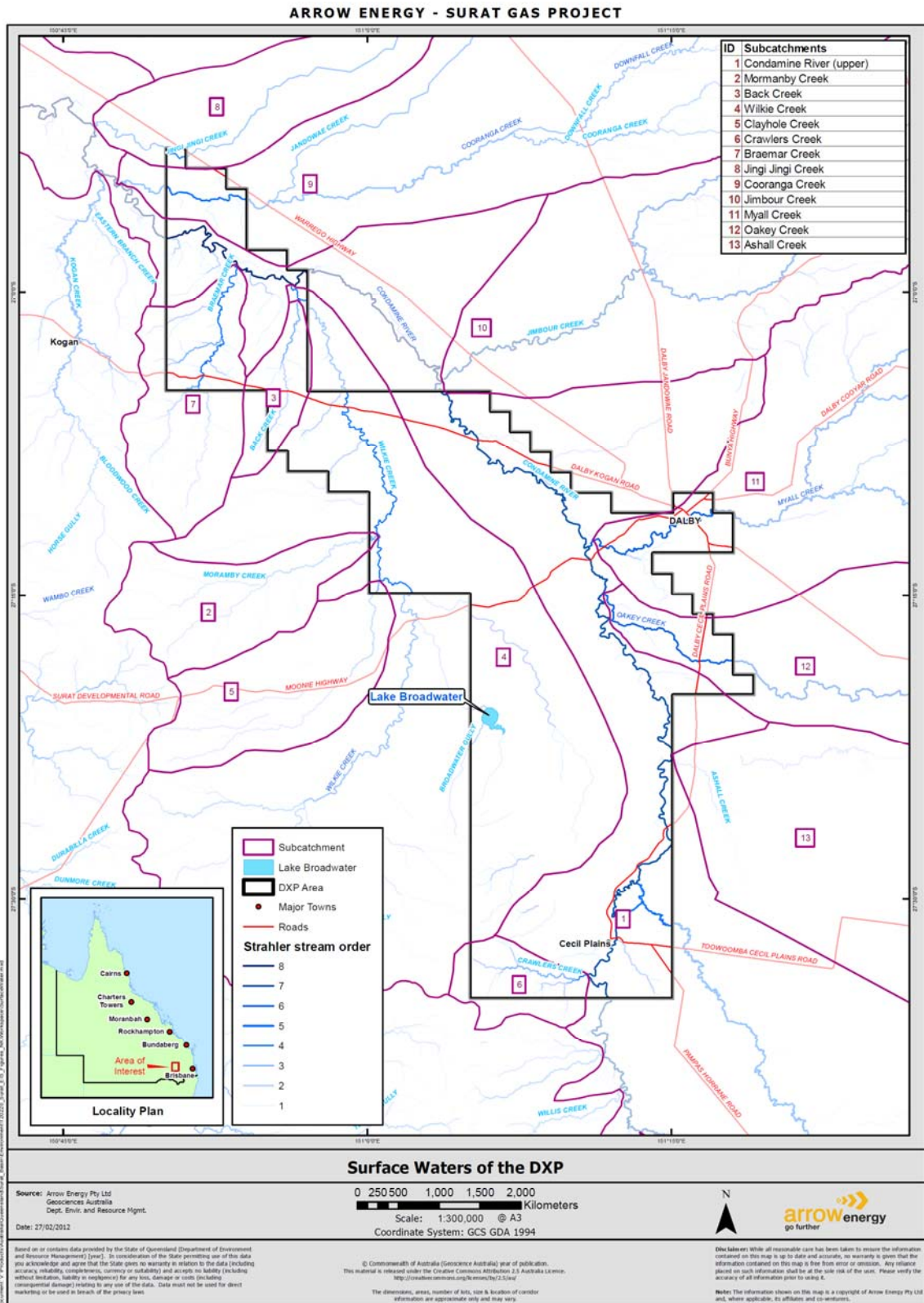
12.1.1 Surface waters – General Characteristics

The DXP is located within the Condamine-Culgoa Drainage Basin, which forms the northern headwaters of the Murray-Darling river system. The DXP lies within the sub-catchments of the Condamine River as listed below and shown in Figure 16.

- Condamine River.
- Cooranga Creek.
- Braemar Creek.
- Back Creek.
- Jingi Jingi Creek.
- Jimbour Creek.
- Wilkie Creek.
- Moramby Creek.
- Clayhole Creek.
- Myall Creek.
- Oakey Creek.
- Crawlers Creek.
- Ashall Creek.
- Including all tributaries and associated waterways.

Present and potential water uses for the catchments in the DXP area include agricultural (crop production and stock watering), pastoral, urban, mining and recreational use. Water is also drawn for drinking water supplies from a number of watercourses within the DXP area, including the Condamine River and adjoining streams.

Other water uses in the DXP area include recreation (e.g., swimming, fishing) and aesthetics. Lake Broadwater was recognised for its cultural value, and the Condamine River is likely to have cultural and spiritual values associated with it.



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Figure 16: Surface Waters of the DXP

Watercourses within the DXP area exhibit a range of conditions, but are generally slightly to moderately disturbed. Disturbance of watercourses has resulted in bed and bank erosion to varying levels. The changes to water flows throughout the year are likely to result in shifts in water quality across the seasons, with water quality during storm events differing from that of drying pools (e.g., reductions in dissolved oxygen in drying pools (DERM, 2009).

Key characteristics of available water quality data for the watercourses in the DXP area are summarised below.

- DERM (2009) identified several catchments flowing from the east into the Condamine River as being among the most saline areas of Queensland. Electrical conductivity concentrations vary with stream flow: highly variable concentrations were recorded in the Condamine River and in the Oakey Creek subcatchment at low stream levels, and generally low electrical conductivity concentrations were recorded at high stream levels. Across the DXP area, the pH and electrical conductivity levels were generally suitable for the protection of slightly to moderately disturbed ecosystems.
- Overall water quality indicators were variable and generally not consistent with guideline values developed for the protection of slightly to moderately disturbed ecosystems (ANZECC, 2000); however, the quality was generally comparable to reference data provided by DERM (2009) for relevant catchments in the vicinity of the DXP area.
- According to the mapped Queensland salinity zones, surface water within the Condamine-Culgoa Basin is of moderate to very high salinity.
- Turbidity was generally low during periods of low stream flow in the Condamine River and in the Oakey Creek subcatchment. During periods of high flow, turbidity was more variable but generally higher than low-flow periods.
- Dissolved oxygen concentrations across the area were below the guideline values established for the protection of slightly to moderately disturbed ecosystems and for human consumption. Dissolved oxygen was generally low in surface waters, and this is likely to reflect the non-permanent nature of many streams in the area.
- The nutrients recorded in the rivers within the DXP area were generally above guideline values nominated to protect surface waters from eutrophication. Total nitrogen, total phosphorus, fluoride and sulfate showed generally high variability during periods of low flow, with concentrations stabilising during high flows. Heavy metals (including copper, boron and zinc) in the Condamine River and the Oakey Creek subcatchment were highly variable during periods of low flow, but concentrations were generally low and more stable during periods of high flow.
- Some petroleum hydrocarbon compounds and phenols were detected in selected samples taken from the Condamine-Culgoa Basin during field survey events. In

addition, some petroleum hydrocarbon compounds were detected in selected samples taken from the Border Rivers Basin (at Muri Muri Creek).

- Silty substrates and poorly vegetated, unstable banks were observed in some watercourses; and this may contribute to the high suspended solids and elevated turbidity found in the watercourses. The high suspended solids and turbidity may also contribute to reduced dissolved oxygen concentrations. Elevated total metal concentrations relative to the dissolved metals fraction may also result from high suspended solids.

12.1.2 Surface waters – Wetlands

Three types of wetlands – riverine, lacustrine and palustrine – contribute to habitat diversity in the DXP area. Riverine wetlands are all deepwater habitats within a channel. The channels are naturally or artificially created; they periodically or continuously contain moving water or form a connecting link between two bodies of standing water. Lacustrine wetlands are large, open, water-dominated systems larger than 8 ha. The open lake part of Lake Broadwater is classified as lacustrine. This definition also applies to modified systems (e.g., dams), which possess characteristics similar to lacustrine systems (e.g., deep, standing or slow-moving waters). Palustrine wetlands are primarily vegetated non-channel environments of less than 8 ha. They include billabongs, swamps, bogs, springs and soaks and have more than 30% emergent vegetation. The vegetated swamp surrounding the open water lake at Lake Broadwater is classified as palustrine.

Palustrine and lacustrine wetlands have been identified as forming part of the Condamine River floodplain. Two wetland areas (Lake Broadwater and Long Swamp) are known to support a high number of listed flora species in addition to migratory species and additional listed fauna identified under the China-Australia Migratory Bird Agreement, Japan-Australia Migratory Bird Agreement and Republic of Korea–Australia Migratory Bird Agreement.

One wetland of national significance is located in the DXP area. Lake Broadwater, west of Dalby, is a semi-permanent freshwater lake used for recreational purposes (e.g., skiing, swimming, boating) and is classified as a conservation park. It is located in the Condamine River catchment and is classified as a Category A environmentally sensitive area (ESA). The lake is situated at the edge of the broad valley of the Condamine River and is connected to Wilkie Creek via the Broadwater Overflow and also connected to the Condamine River when in the river is in flood. The site is important in maintaining ecological processes and filtering water, sediment and other pollutants.

12.1.3 Surface waters – Hydrology

The Condamine River flows northwest through the DXP area before flowing east and joining the Balonne River. Watercourses of the DXP area within the Condamine-Culgoa Drainage Basin are dominated by low gradients and hence generally low-energy conditions.

Within the Condamine-Culgoa Basin, average rainfalls in excess of 25 mm in 24 hours may result in stream rises, minor flooding and local traffic disruptions extending downstream. Average catchment rainfalls in excess of 50 mm in 24 hours may cause significant stream rises, with the possibility of moderate to major flooding developing with local traffic disruption. Major floods occur regularly, on an average of every two years, and generally in the months of late spring, summer and autumn.

The Condamine River, which forms the northern headwaters of the Murray-Darling river system, is largely a continuous flowing river that distributes flood flows into such watercourses as Wilkie Creek during large flood events. Most other watercourses in the area are ephemeral, only flowing after rainfall events. Vegetation clearance, construction of weirs and dams, and extraction of water for irrigation has greatly altered the hydrology of the Condamine River. The Condamine River, being the largest watercourse in the region and in a major irrigation area, is monitored extensively with 12 gauging stations located within or near the DXP area. Flows in the Condamine River have been gauged for 63 years and have ranged from 0 m³ per second (October 1981) to 4,817 m³ per second (December 2010). Flows in its tributaries have ranged from 0 m³ per second (multiple dates) to 883 m³ per second (January 1956).

Flow data from two of DERM's stream flow gauging stations was reviewed and is considered indicative of the hydrology of the Condamine River within the DXP area. Details of the two gauging stations are provided below:

- Brigalow Gauging Station number 422336A, (latitude:-26.90428, longitude:150.783), located downstream of the confluence with Wilkie Creek, at the township of Brigalow (near Wara)
- Loudoun's Bridge Gauging Station number 422332A, (latitude:-27.2251, longitude: 151.8573), located at Loudoun's Bridge, upstream of the confluence with Wilkie Creek.

Figure 17 presents all flow data (excluding data with error codes) from the commencement of flow gauging in 1972 to January 2012 at the Brigalow gauging station (Station ID: 422336A). The figure also presents a near four decade analysis of the river flow (with the exception that the first two years of data in the 1970 to 1980 decade are missing and the last two years of flow data in the latest decade are included in the 2000 to 2012 period shown). The data shows that median flow (50% of samples) in the Condamine River has reduced significantly from over 100 ML/day in the 1970s to 0 ML/day in the 2000 to 2012 period.

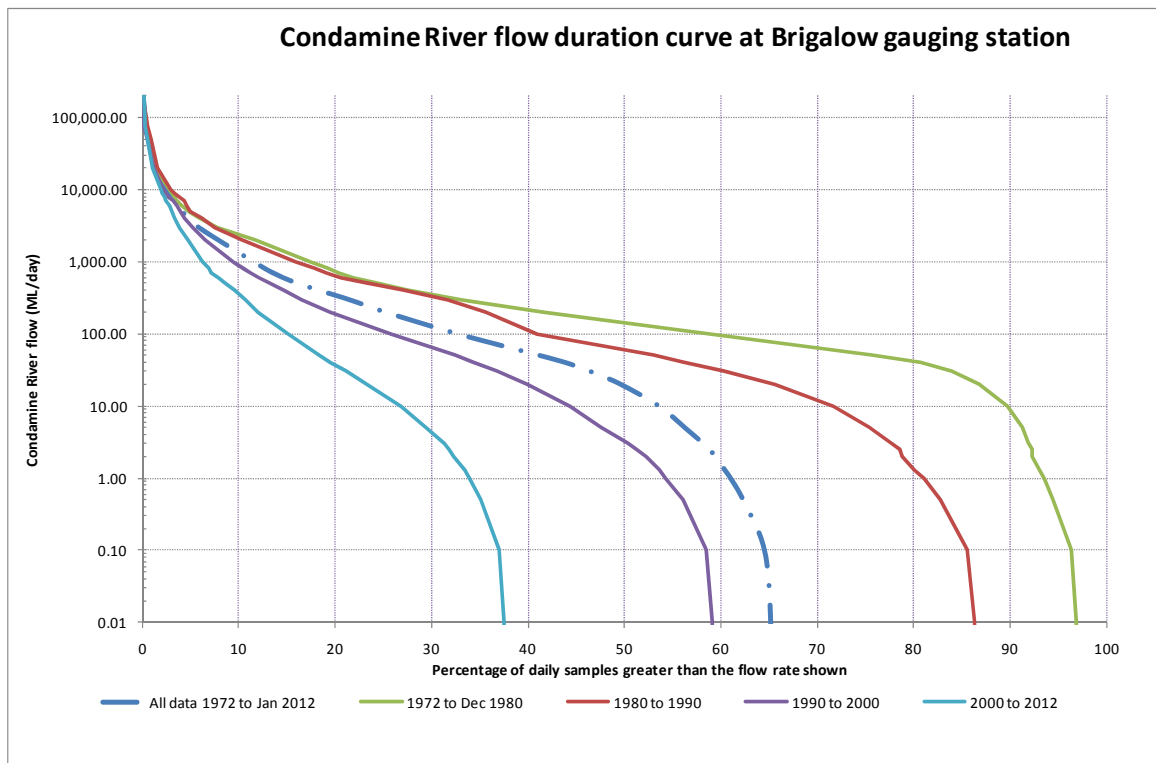


Figure 17: Condamine River flow duration curve at Brigalow gauging station

Figure 18 shows the flow duration curves for each decade (or part of the decade) taken at the Loudoun’s bridge stream flow station (Station ID: 422332A). By separating the 2010 – 2012 data from the previous decade (2000 – 2010), the impact of the major drought is evident in this period. The flow in the Condamine River from January 2010 to January 2012 has been greater than the earlier and pre-development flows (indicated by 1969 to 1980 data). A reduction in magnitude and duration of recession flow (lower flows) compared to earlier decades is also evident in the 2010 to 2012 data.

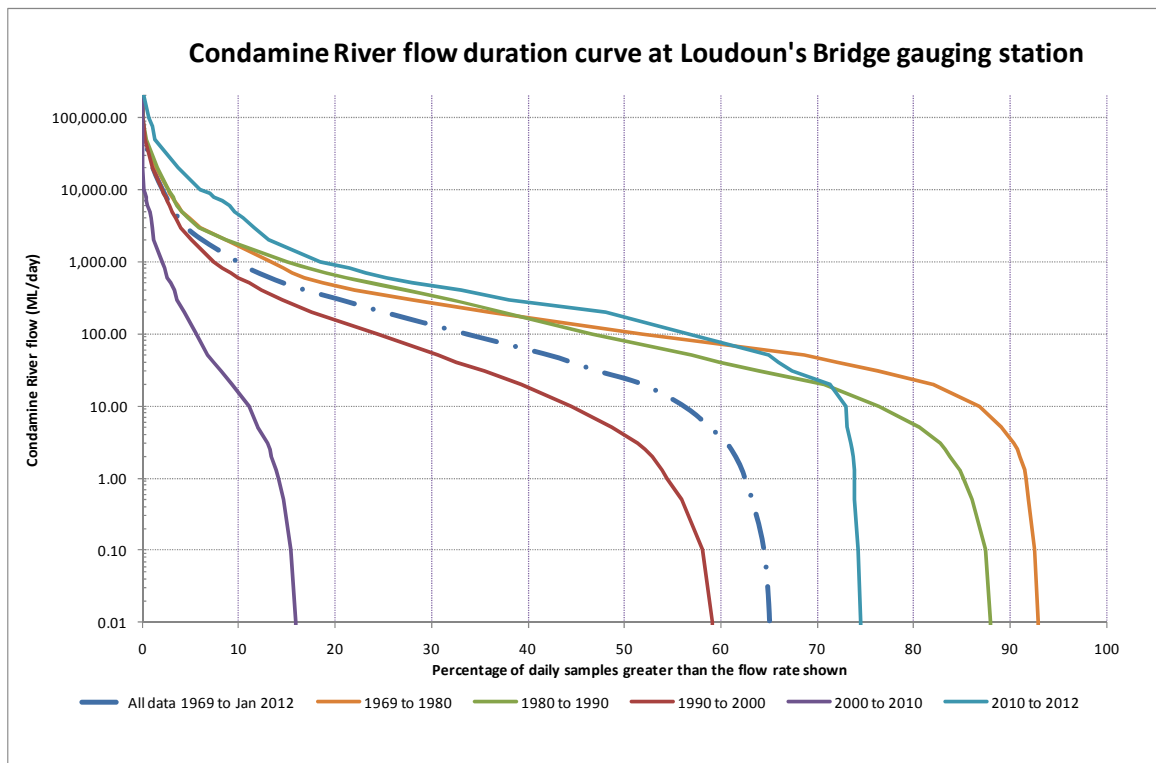


Figure 18: Condamine River flow duration curves at Loudoun's Bridge gauging station

There are no DERM flow gauging stations within the Wilkie Creek catchment, so historical data is not available. To establish representative flow patterns in Wilkie Creek, the Oakey Creek gauging station was used, as the two catchments are of similar size, located within close proximity of each other and contain similar land uses. Oakey Creek catchment has a surface area of 1970km², and Wilkie Creek catchment has a surface area of 1410 km². The stream flow gauging station used was the Oakey Creek station identification number 422350A at Fairview (latitude:-27.30339444, longitude: 151.27797222). Figure 19 shows that the earliest recorded (1980 to 1990) median flows were about 12 ML/day (in over 70% of samples collected). Flows were notably low in the period from 2000 to 2010, which coincides with a period of major drought, with recovery to a median flow of about 11 ML/day in the latest period of data shown (2010 to 2012).

Additional detail on existing surface water conditions at Wilkie Creek are included in Appendix G.

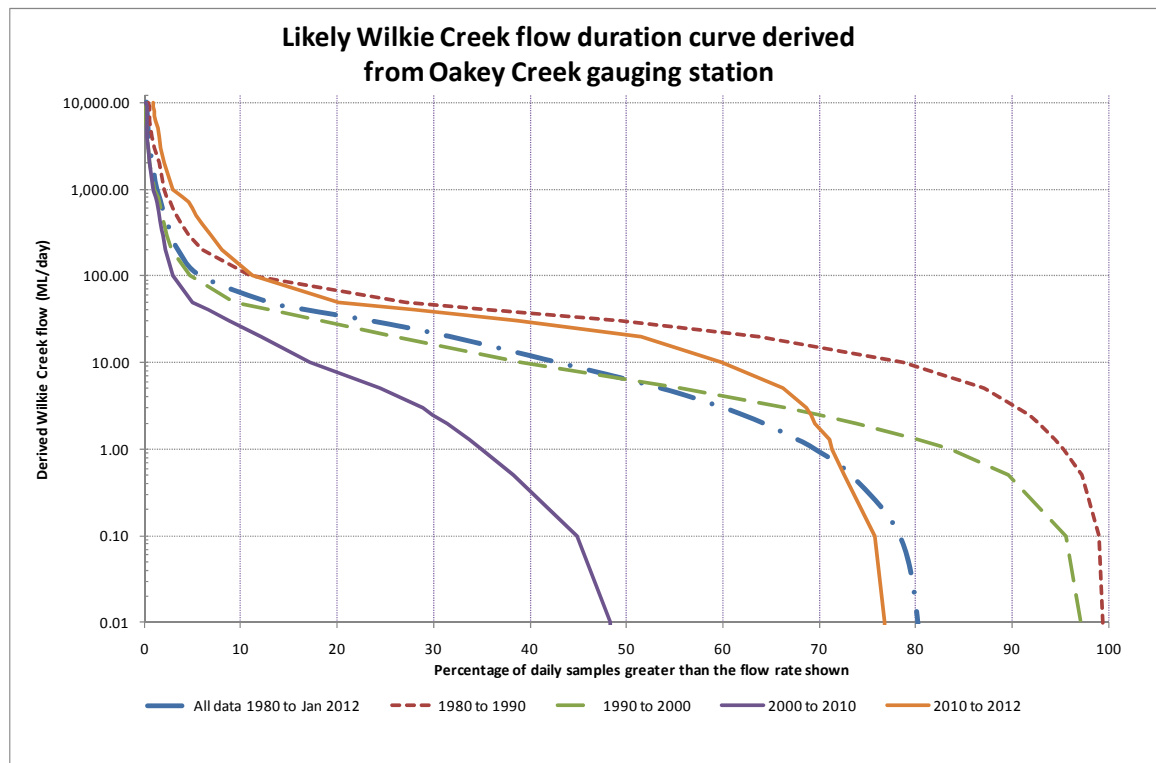


Figure 19: Wilkie Creek flow duration curves from Oakey Creek gauging station

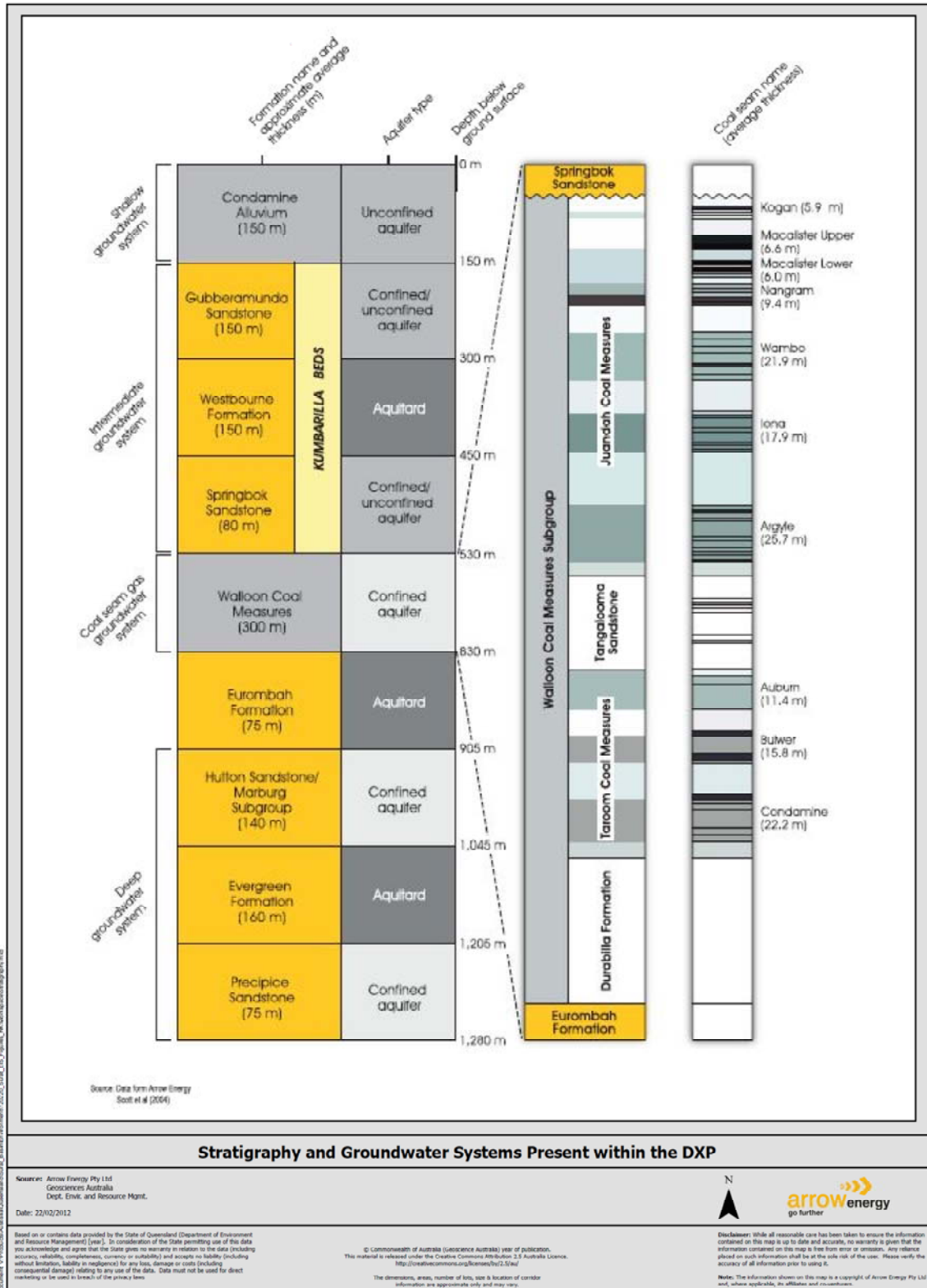
12.1.4 Groundwater

The properties and distribution of groundwater systems within the study area are a reflection of the geological evolution of the region. Sedimentation into the Surat Basin commenced approximately 200 million years ago, resulting in a sedimentary sequence with a maximum thickness of around 2,500 m. The geological sequence contains a series of interbedded groundwater-bearing formations (aquifers) and low-permeability, generally fine-grained formations (aquitards). The DXP area is also located on the eastern margin of the Great Artesian Basin (GAB), which is Australia's largest contiguous groundwater resource. The GAB is made up of a multilayered confined aquifer system and is up to 3,000 m thick.

Each aquifer is characterised by a set of intrinsic hydrogeological parameters, such as porosity, hydraulic conductivity and specific storage. These parameters control how the aquifers behave in the subsurface environment. Four groundwater systems have been identified within the DXP area on the basis of common aquifer characteristics and values, listed below and shown in Figure 20.

- Shallow groundwater system (Condamine Alluvium).
- Intermediate groundwater system (Mooga Sandstone, Gubberamunda Sandstone and Springbok Sandstone).
- Coal seam gas groundwater system (Walloon Coal Measures).
- Deep groundwater system (Hutton Sandstone and Precipice Sandstone)

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Figure 20: Stratigraphy and Groundwater Systems Present within the DXP

Groundwater-dependent ecosystems rely on groundwater for survival and can potentially include but are not limited to wetlands, vegetation, springs, river baseflows (where groundwater flows from aquifers to watercourses) and cave ecosystems. Ecosystems of the Condamine River are considered to be groundwater-dependent in areas where the Condamine Alluvium aquifer discharges to the Condamine River. While this process is interpreted to be limited (Barnett & Muller, 2008; Hillier, 2010), it is an important interaction between groundwater and surface water within the DXP area.

Significant surface waterbodies within the DXP area, such as Lake Broadwater, are not known to be groundwater-dependent. Lake Broadwater is situated at the edge of the broad valley of the Condamine River and is connected to surface watercourses, specifically Wilkie Creek via the Broadwater Overflow, and also the Condamine River, when in flood.

A summary of the groundwater systems within the DXP is presented in Table 28.

Table 28: Summary of Aquifer Characteristics, Groundwater Levels and Quality for Groundwater Users within the DXP

Groundwater System and associated aquifers	General characteristics
Shallow groundwater system: <ul style="list-style-type: none"> • Condamine Alluvium • Other unconfined aquifers 	<p>Groundwater is found extensively DXP area in these unconfined aquifers, with the Condamine Alluvium forming the main unconfined resource aquifer.</p> <p>The Condamine Alluvium overlies the sediments that form the Surat Basin and is predominantly associated with the Condamine River valley. The Condamine Alluvium is up to 150 m thick and comprises unconsolidated clay, silt, sand and gravel deposited through processes associated with the Condamine River and its tributaries. In places, it is interpreted that the Condamine Alluvium is incised into the Walloon Coal Measures (Hillier, 2010).</p> <p>Deposition of a 'hydraulic separation layer' (comprising clay and other low-permeability material) at the base of the Condamine Alluvium may restrict the movement of water between the Condamine Alluvium and Walloon Coal Measures. Current conceptual modelling implies that groundwater movement between the Walloon Coal Measures and overlying aquifers is low where these confining layers are present.</p> <p>These confining layers may be absent beneath some parts of the Condamine Alluvium where the alluvium is incised into the Walloon Coal Measures and the 'hydraulic separation layer' is not present.</p> <p>Shallow aquifers in the DXP area recharge predominantly from surface drainage, in particular from the main branch of the Condamine River (Huxley, 1982; SKM, 1999).</p> <p>The quality of the groundwater within the shallow groundwater system is generally variable and is influenced by surface recharge processes and interactions with deeper groundwater systems. The groundwater is slightly alkaline (average pH of 7.9) and ranges from fresh to very saline. Metal concentrations in the shallow groundwater system also vary, with elevated concentrations of iron and manganese limiting potable use of the water. The variability of the groundwater quality in this system allows a wide variety of uses but can also have limited uses in localised areas. The system is also more prone to modification due to the infiltration of pollutants, nutrients and agricultural chemicals, such as fertilisers, herbicides and pesticides, into the shallow subsurface profile due to land development, settlement and urbanisation.</p> <p>Groundwater in the Condamine Alluvium generally flows to the northwest, and available data indicates that groundwater elevations have declined from 1995 onwards. This decline is likely to relate to historical extraction of groundwater for irrigation, combined with long-term low recharge rates due to low rainfall. The estimated overall</p>

	decline ranges from a few centimetres to 10 m.
<p>Intermediate groundwater system:</p> <ul style="list-style-type: none"> • Gubberamunda Sandstone • Springbok Sandstone 	<p>The Gubberamunda Sandstone is medium to coarse grained, with minor components of siltstone and conglomerate, forming a permeable freshwater aquifer varying in thickness from less than 100 m to greater than 200 m in the central areas of the Surat Basin.</p> <p>The Springbok Sandstone is an aquifer that can produce substantial quantities of groundwater from highly permeable beds, particularly specific coarse-grained units that are informally called the 'Proud Sandstone'. It predominantly contains sandstone beds with some siltstone, mudstone and thin coal seams. This aquifer can often be gas charged due to leakage of coal seam gas from the underlying Walloon Coal Measures.</p> <p>There is limited discrete groundwater quality data available for the Gubberamunda and Springbok Sandstones; however, data is available for the Kumbarilla Beds, a formation that includes these units. For discussion and comparison purposes, data available for the Kumbarilla Beds is used to characterise the quality of the intermediate groundwater system. The available data indicates that groundwater within this system has variable quality, likely to reflect chemical evolution and mineral dissolution within the aquifer units (Herczeg et al., 1991). The groundwater is slightly alkaline (average pH of 8.2) and ranges from fresh to moderately saline. The variability of the groundwater quality in this system allows a wide variety of uses.</p> <p>Discrete groundwater elevation data for the aquifers within the intermediate groundwater system is limited; however, the data available for the Kumbarilla Beds indicates relatively uniform groundwater elevations prior to 1995 and a groundwater flow direction predominantly to the southwest. Limited discrete data for the Gubberamunda Sandstone indicates an overall groundwater flow direction from north to south. Groundwater elevation data available for the Springbok Sandstone shows a general flow direction from northwest to southeast. The dataset available for 1995 to 2009 shows relatively little change in the groundwater elevations over time; however, based on limited data, groundwater elevations have generally declined in the Springbok Sandstone since 1995.</p>
<p>Coal seam gas groundwater system:</p> <ul style="list-style-type: none"> • Walloon Coal Measures 	<p>Groundwater within this system is contained within confined aquifers of the Walloon Coal Measures. Within the DXP area, the Walloon Coal Measures range in thickness from 100 to 500 m and are formally subdivided into the following formations:</p> <ul style="list-style-type: none"> • Juandah Coal Measures • Tangalooma Sandstone. • Taroom Coal Measures. • Durabilla Formation.

	<p>The Juandah and Taroom Coal Measures consist of coal seams separated by a complex sequence of interbedded siltstones, mudstones and sandstones. The coal tends to occur as discontinuous thin stringers that can have limited lateral extent. Within the DXP area, the Tangalooma Sandstone is very discontinuous and consists of individual sand lenses rather than a consistent sheet, and therefore mapping is limited. The Durabilla Formation is predominantly interbedded mudstone, siltstone and sandstone. In places, this formation is described in conjunction with the Eurombah Formation, forming an aquitard between the Walloon Coal Measures and the underlying Hutton Sandstone/Marburg Subgroup.</p> <p>Groundwater quality information available for the Walloon Coal Measures indicates variable groundwater quality. It is interpreted that this variability is related to chemical evolution and mineral dissolution within the aquifer, together with the assorted rock types within this formation (Herczeg et al., 1991). Groundwater within the Walloon Coal Measures is generally slightly alkaline (average pH of 8.1) and saline. Individual measurements for total dissolved solids, however, range widely from fresh to very saline, with some concentrations approaching seawater salinity. This wide range indicates a corresponding wide range of uses, with limited uses in localised areas.</p> <p>Groundwater levels available for the Walloon Coal Measures show a dominant flow direction to the west, with a secondary flow direction to the east. More extensive data in the Dalby and Millmerran areas is available for the Walloon Coal Measures. These datasets show a variety of responses, with some bores having little variation in groundwater elevations since 1995 and others having more significant reductions. In particular, a monitoring bore installed in the Daandine area provides data from 2005 to 2007, reflecting the effects of initial Arrow coal seam gas activities. Groundwater levels recorded in this bore show a drawdown in the Walloon Coal Measures of nearly 30 m, with the rate of drawdown increasing from 2.5 m/a between 2005 and 2006 to 12.5 m/a between 2006 and 2007.</p>
<p>Deep groundwater system:</p> <ul style="list-style-type: none"> • Hutton Sandstone • Precipice Sandstone 	<p>The deep groundwater system contains confined aquifers characterised as porous, permeable medium- to coarse-grained quartzose sandstones that generate significant groundwater resources in the region. Within the DXP area, the deep groundwater system contains the Hutton Sandstone/Marburg Subgroup and the Precipice Sandstone, separated by the Evergreen Formation, which acts as an aquitard. The Hutton Sandstone/Marburg Subgroup is commonly 120 to 180 m thick and consists of fine- to medium-grained sandstone with some mudstone and siltstone. In the Surat Basin, the Hutton Sandstone grades into the Marburg Subgroup where it transitions into the Clarence-Moreton Basin.</p> <p>The Precipice Sandstone is generally coarse grained at the base, with a finer-grained upper section. It can vary in thickness from 50 m to over 100 m and is an aquifer that can produce significant quantities of high-quality groundwater.</p> <p>Based on limited data, groundwater quality within the Hutton Sandstone is variable but is generally fresh to brackish</p>

and alkaline (average pH of 8.4). A larger dataset is available for the Marburg Subgroup, which also indicates fresh to moderately saline and alkaline (average pH of 7.8) groundwater with overall variable quality, interpreted to reflect chemical evolution and mineral dissolution within the aquifers (Herczeg et al., 1991). The aquifers that make up the deep groundwater system within the DXP area form part of the GAB. The groundwater quality characteristics available for these aquifers are similar to the overall GAB groundwater quality, and the variability is related to chemical processes that occur as the groundwater migrates away from recharge areas.

No specific sites of cultural and spiritual importance related to this groundwater system were identified within the DXP area. However, aquifers in the deep groundwater system have historical cultural significance as artesian groundwater resources. Groundwater from the deep system can also support spiritually important springs, especially in more regional GAB discharge areas outside DXP area.

Groundwater from this system is of moderate to high biological importance due to higher water quality than other groundwater systems. Aquifers in the deep groundwater system have the potential to naturally discharge to surface features. They are of high biological importance due to the identified connection between them and mound springs in more regional GAB groundwater discharge areas.

Groundwater elevation data available for the Hutton Sandstone shows flow directions from north to south and northwest to northeast. Groundwater flow within the Precipice Sandstone generally originates from exposed recharge areas in the northeast, and subsequent groundwater flow is towards the Dawson River catchment to the southwest. Limited groundwater elevation data is available for the period after 1995, and four bores within the Hutton Sandstone and Marburg Subgroup do not show any significant reduction in groundwater elevations. In summary, the variability in the available baseline groundwater-level data reflects general groundwater variability across the DXP area.

Extraction of groundwater in the Surat Basin commenced prior to the 1900s, resulting in a large-scale decline in groundwater levels within key aquifer units. The distribution of registered bores across the region (including areas outside of the DXP) is shown in Figure 21: Groundwater Resources Accessed by Registered Bores within the region. Data from water bores registered with DERM shows that the majority of registered bores within the DXP area access groundwater within the Condamine Alluvium. The Queensland water entitlements registration database shows that the majority of bores within the DXP area are licensed for use as irrigation water supplies. The approximate location of registered bores and Arrow production wells located within the DXP area is shown in Figure 22.

ARROW ENERGY - SURAT GAS PROJECT

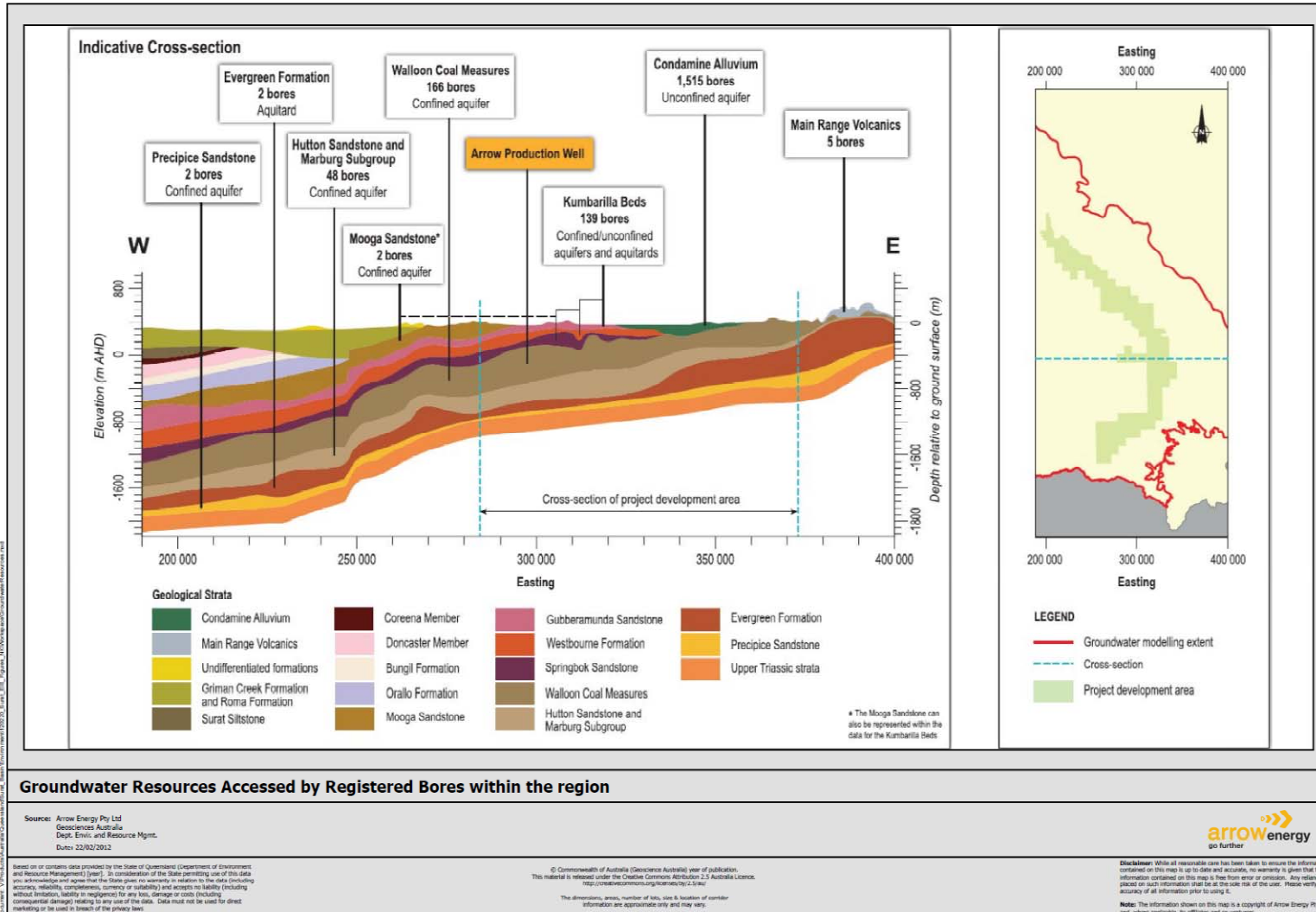


Figure 21: Groundwater Resources Accessed by Registered Bores within the region

ARROW ENERGY - SURAT GAS PROJECT

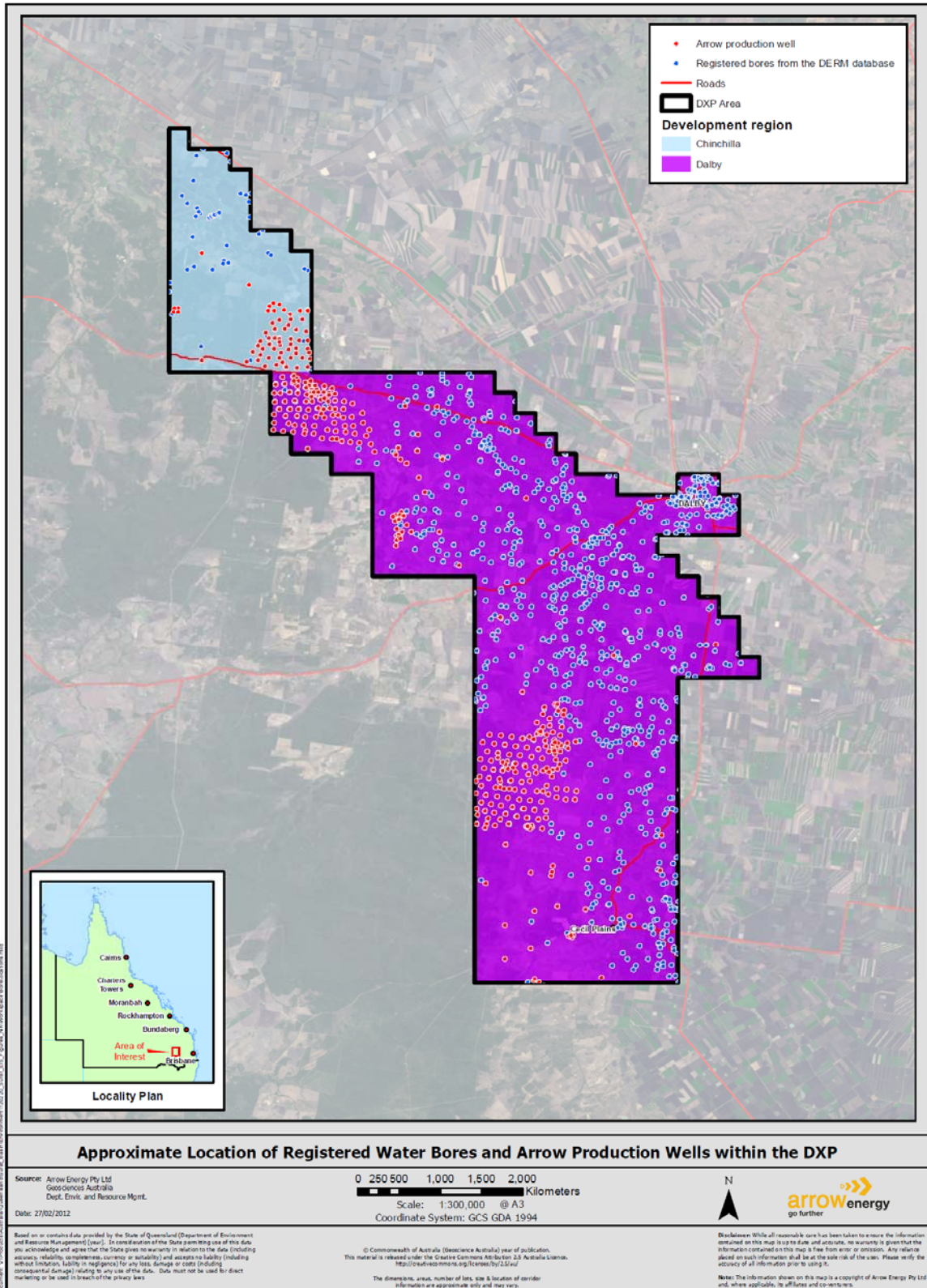


Figure 22: Approximate Location of Registered Water Bores and Arrow Production Wells within the DXP

12.2 ENVIRONMENTAL VALUES

The EP Act provides for the *Environmental Protection (Water) Policy 1997* (EPP Water) to deal specifically with environmental values relating to the quality of the water environment, including groundwater. It provides a framework for identifying the environmental values for waters, and establishing water quality guidelines and objectives to enhance or protect the environmental values. The environmental values as defined in the EPP Water can be grouped as follows:

- Waters are able to support biological environmental values, including:
 - High ecological value waters—the biological integrity of an aquatic ecosystem that is effectively unmodified or highly valued.
 - Slightly disturbed waters—the biological integrity of an aquatic ecosystem that has effectively unmodified biological indicators, but slightly modified physical, chemical or other indicators.
 - Moderately disturbed waters—the biological integrity of an aquatic ecosystem that is adversely affected by human activity to a relatively small but measurable degree.
 - Highly disturbed waters—the biological integrity of an aquatic ecosystem that is measurably degraded and of lower ecological value than waters mentioned above.
- Waters are able to support aesthetic and human interaction values, including:
 - Primary recreational use (i.e. full body contact, e.g. swimming, skiing)
 - Secondary recreational use (i.e. contact other than full body contact, e.g. boating, fishing).
- Waters are able to support consumptive or productive use values, including:
 - Primary industry or agricultural purposes;
 - Agricultural use;
 - Aquaculture use;
 - Producing aquatic foods for human consumption;
 - Drinking water; and
 - Industrial purposes.
- Waters are able to support anthropomorphic values, including:
 - Cultural and spiritual values.

Based on this, and the description of the existing environment above, the surface water environmental values to be enhanced or protected are summarised in Table 29.

Table 29: Values of the existing environment: surface water

Existing Environment	Characteristics Contributing to the Value
Wetlands (Lake Broadwater)	<ul style="list-style-type: none"> • High degree of ecological intactness. • Valuable aquatic habitat, in particular for: <ul style="list-style-type: none"> – National and state listed aquatic fauna species of significance, including the Murray cod. – Locally significant species. • Provides important ecological processes for maintaining water quality and filtering sediment and other pollutants.
Wetlands (other)	<ul style="list-style-type: none"> • Generally high degree of ecological intactness; however, site-specific variation occurs. • Support terrestrial and aquatic species. • Contribute to habitat diversity. • Provide aquatic habitat. • Provide ecological processes for maintaining water quality and filtering sediment and other pollutants.
High-order streams (permanent and semi-permanent watercourses)	<ul style="list-style-type: none"> • Moderate degree of ecological intactness with clear evidence of disturbance. • Continuous flow that supports benefits of downstream use. • Contribution to habitat diversity. • Drinking water • Sensitivity to disturbance. • Support of recreational activities. • Reduction of flood peaks and extending base flows.
Low-order streams (ephemeral watercourses)	<ul style="list-style-type: none"> • Provide marginal habitat. • Provide marginal ecological processes.

Each groundwater system identified within the DXP area has a variety of characteristics that define the sustainability of the groundwater resource in terms of quantity and quality. A combination of characteristics that define a groundwater system allow the groundwater to be relied upon in a number of ways, with groundwater values summarised in Table 30.

Table 30: Summary of groundwater values

Groundwater System	Ecological Value	Biological Integrity Able to be Maintained	Potential Consumptive and Productive uses	Cultural and Spiritual Values
Shallow: Condamine Alluvium	The system is more prone to modification due to the infiltration of pollutants, nutrients, and agricultural chemicals, such as fertilisers, herbicides and pesticides, into the shallow subsurface due to land development, settlement, and urbanisation. There are physical connections between this groundwater system and such surface features as the Condamine River.	Where physical connection between this groundwater system and surface features occurs, the groundwater quality is predominantly able to maintain slightly to moderately disturbed ecological systems.	Groundwater from this system has generally low to moderate total dissolved solids concentrations (average of approximately 1,300 mg/L), allowing a wide range of beneficial uses; however, it is predominantly suitable for agricultural use within the DXP area.	No specific sites are identified within the DXP area; however, where baseflow discharge to the Condamine River occurs, the Condamine Alluvium aquifer may indirectly support cultural values associated with the Condamine River.
Intermediate: Mooga Sandstone Gubberamunda Sandstone Springbok Sandstone	The ecological value of the intermediate groundwater system increases with depth, as this generally reflects increased isolation from potentially impacting human processes. There are no known areas of physical connection between this groundwater system and surface features within the DXP area; however, they may exist within the groundwater model extent.	If a physical connection between this groundwater system and surface features exists, the groundwater quality is predominantly able to maintain effectively undisturbed ecological systems and some slightly to moderately disturbed ecological systems.	Based on variable total dissolved solids concentrations (average of approximately 1,400 mg/L), groundwater from this system has a range of uses; however, it is predominantly suitable for agricultural use within the DXP area.	No specific sites are identified within the DXP area.

Summary of groundwater values (cont'd)

Groundwater System	Ecological Value	Biological Integrity Able to be Maintained	Potential Consumptive and Productive uses	Cultural and Spiritual Values
<p>Coal Seam Gas: Walloon Coal Measures</p>	<p>Groundwater from this system is generally considered to be of lower ecological value due to higher salinity, high sodium absorption ratio, and coal formation chemistry.</p> <p>There are no known areas of physical connection between this groundwater system and surface features within the DXP area; however, they may exist within the groundwater model extent.</p>	<p>If a physical connection between this groundwater system and surface features exists, the generally poor groundwater chemistry and salinity would likely fail to support ecological systems.</p>	<p>The aquifers within the coal seam groundwater system are generally considered to be of lower quality due to higher salinity (average total dissolved solids values of approximately 4,600 mg/L) and high sodium absorption ratios.</p> <p>The groundwater is generally suitable for stock watering and production of aquatic food for human consumption.</p>	<p>No specific sites are identified within the DXP area.</p>
<p>Deep: Hutton Sandstone/ Marburg Subgroup Precipice Sandstone</p>	<p>The deep groundwater system is generally considered to be of high ecological value due to lower salinity, isolation from potentially impacting human processes and the identified natural connection between the deep groundwater system and mound spring complexes in more regional Great Artesian Basin groundwater discharge areas.</p> <p>There no known areas of physical connection between this groundwater system and surface features within the DXP area, however, they may exist within the groundwater model extent.</p>	<p>If a physical connection between this groundwater system and surface features exists, groundwater quality from this system is predominantly able to maintain effectively undisturbed ecological systems and some slightly to moderately disturbed ecological systems.</p>	<p>Lower total dissolved solids concentrations (average of approximately 1,900 mg/L for the Hutton Sandstone) allow a wide range of uses; however, groundwater from this system is predominantly suitable for agricultural uses within the DXP area.</p>	<p>No specific sites are identified within the DXP area; however, aquifers in the deep groundwater system have historical cultural significance as artesian supply.</p>

12.3 POTENTIAL IMPACTS ON ENVIRONMENTAL VALUES

12.3.1 Surface Water

Potential impacts to surface water values from associated project activities are described for each project phase.

12.3.1.1 Construction

During construction of wells (exploration and production), gathering lines and production facilities, the following impacts could occur:

- Changes to physical form and diminished water quality from the removal of riparian vegetation and subsequent reduced bank stability and increased erosion and sediment mobilisation.
- Diminished water quality from the removal of terrestrial vegetation leading to increased runoff and sedimentation in the watercourses.
- Changes to hydrology, diminished water quality and changes to physical form from controlled and uncontrolled releases of hydrotest fluids.
- Diminished water quality from spills of hazardous materials or drilling muds.
- Damage to property from placement of infrastructure in floodplains.
- Diminished water quality from earthmoving and soil stockpiling leading to increased sedimentation in watercourses.
- Flooding, changes to physical form and changes to hydrology by placing infrastructure in surface water flow paths.
- Changes in physical form and water quality from pipeline or vehicle watercourse crossings causing bed and bank erosion and subsequent mobilisation of sediment.
- Changes in hydrology due to blockages in streams from pipeline watercourse crossings (open-cut crossings).
- Surface water quality degradation due to contaminated runoff from activities.

12.3.1.2 Operation

During operation of the wells and production facilities, the following impacts could occur:

- Changes to hydrology, diminished water quality and changes to physical form from controlled and uncontrolled releases of coal seam gas water and hydrotest fluids.
- Diminished water quality from increased runoff from compacted areas leading to sedimentation in the watercourses.
- Surface water degradation and injury to people or property from a catastrophic release of a water storage dam.
- Diminished water quality from spills of hazardous materials.
- Damage to property from placement of infrastructure in floodplains.

- Flooding, changes to physical form and changes to hydrology by placing infrastructure in surface water flow paths.
- Changes to hydrology caused by changed surface flow paths.
- Changes to physical form due to scour and generation of sediment at watercourse crossings caused by use and maintenance of access tracks.
- Surface water quality degradation due to contaminated runoff from activities.

12.3.1.3 Decommissioning

During decommissioning of wells, gathering lines and production facilities, the following impacts could occur:

- Diminished water quality from spills of hazardous materials.
- Diminished water quality from earthmoving and soil stockpiling leading to increased sedimentation in watercourses.
- Diminished water quality from increased runoff in cleared areas leading to sedimentation in the watercourses.
- Changes to physical form from activities causing sediment movement into watercourses due to the proximity of works to watercourses and wetlands.

12.3.2 Groundwater

Potential impacts to the groundwater values from associated project activities are described for each project phase.

Potential impacts to groundwater that are related to land contamination as a result of disturbance of existing contaminated land or project activities are discussed in Section 7.3.

12.3.2.1 Construction

The primary activities that could impact groundwater values are the construction of exploration and production wells and monitoring bores, gathering lines, production facilities and associated infrastructure (e.g., construction camps). These activities have the potential to impact on groundwater values in the following ways:

- Reduced rainwater infiltration and subsequent reductions in aquifer recharge from the surface due to the following:
 - Construction of impervious surface coverings associated with integrated production facilities.
 - Land disturbance activities resulting in reduced porosity and permeability of surface profiles.
- Incomplete or incorrect well installation resulting in interconnection of aquifers and consequential cross-contamination.
- Use of lubricants and drilling fluids during the drilling process resulting in localised contamination of aquifers.

- Leaks and spills at the wellhead during drilling draining and infiltrating into the boreholes leading to contamination of the intersected aquifers.

12.3.2.2 Operation

Coal seam gas water will be extracted from the Walloon Coal Measures, so direct impacts to the groundwater levels in this aquifer cannot be avoided. There also are potential indirect impacts to groundwater levels and quality in surrounding groundwater systems as a result of coal seam gas water extraction. This is discussed further below.

In addition to coal seam gas water extraction, other operations activities to be conducted by Arrow have the potential to affect groundwater, such as drilling wells and storing saline water, chemicals and fuels.

12.3.2.3 Coal Seam Gas Water Extraction

Depressurisation of the Walloon Coal Measures will lower aquifer pressures, potentially resulting in the following direct impacts:

- Reduced groundwater flow to groundwater-dependent ecosystems or areas of cultural and spiritual importance fed by the Walloon Coal Measures.
- Reduced groundwater supply to existing or future groundwater users accessing groundwater from the Walloon Coal Measures.

The extraction of coal seam gas water from the Walloon Coal Measures has the potential to indirectly impact upon other groundwater systems present within the DXP area. Subsequent depressurisation of adjacent aquifers has the potential to cause indirect aquifer interflow and groundwater drawdown, resulting in the following indirect impacts:

- Diminished groundwater quality in aquifers above and below the Walloon Coal Measures. This relates to groundwater mixing as drawdown in the Walloon Coal Measures induces flow across deeper and shallower aquifers, especially the Springbok and Hutton sandstones.
- Reduced groundwater flow to discharge features or areas of cultural and spiritual importance fed by the adjacent aquifers.
- Reduced groundwater supply to existing or future groundwater users accessing groundwater from the adjacent aquifers.
- Land subsidence and changes to surface water flow regimes and landforms.

Coal seam gas water production across the DXP area will be approximately 2.2 GL/a. These extraction rates are significantly less than the average (22 GL/a) used as the basis for modelling of unmitigated groundwater drawdown impacts as presented in the Surat Gas Project EIS (submitted to DERM in February 2012). The numerical model prepared for the Surat Gas Project EIS takes into account the expected coal seam gas water extracted as part of the DXP. Therefore, the groundwater drawdown predicted in the Surat Gas Project EIS represents an over estimate of what is likely to occur as a result of DXP activities, based on greater extraction over a broader area, and over a longer time period. Groundwater drawdown as a result of coal seam gas water extraction in the DXP area is expected to be an order of magnitude lower than the results of the numerical

model prepared for the Surat Gas Project EIS, with more localised drawdowns together with localised recharge mechanisms aiding recovery in the Walloon Coal Measures and the overlying and underlying aquifers.

12.3.2.4 Other Operational Activities

Surface activities during the operations phase of the project that can impact groundwater values are as follows:

- Leaks and spills of chemicals, fuels and oils stored at the surface in association with integrated production facilities may result in contamination of the intersected aquifers.
- Discharges of liquid domestic wastes and effluent to land have the potential to contaminate groundwater systems.

Activities related to the storage, treatment and transfer of coal seam gas water and its by-products during the operations phase of the project have the potential to impact on groundwater values as listed below:

- Seepage or leaks of untreated coal seam gas water and brine from storage facilities have the potential to contaminate the shallow groundwater system.
- Coal seam gas water discharged to streams has the potential to infiltrate the subsurface profile and contaminate the shallow groundwater system.
- Leaks and spills from subsurface infrastructure, e.g., gathering lines, could result in contamination of intersected aquifers.
- Seepage or leaks of coal seam gas water and its by-products from storage facilities (e.g., dam failure) have the potential to alter the shallow groundwater flow direction and associated recharge or discharge patterns.

12.3.2.5 Decommissioning

Potential impacts to groundwater values during decommissioning include incomplete or incorrect well decommissioning that may result in interconnection of aquifers and consequential cross-contamination.

12.4 MANAGEMENT OF POTENTIAL IMPACTS TO WATERS

Arrow's Coal Seam Gas Water Management Strategy (Appendix F) seeks to manage coal seam gas water during the life of the project to minimise the environmental impacts associated with water use and disposal. The conceptual coal seam gas water management strategy identifies the preferred and potential management options for coal seam gas water and associated brine or salt, including treatment, storage, beneficial use and disposal. The distribution of coal seam gas water to the different management options will be continually reviewed as planning for field development evolves and opportunities for beneficial use are further assessed.

12.4.1 Surface Waters

Avoidance, mitigation and management measures have been proposed to achieve the identified environmental and social protection objectives. The primary means by which avoidance is achieved is through design and site selection.

12.4.1.1 Release to Wilkie Creek

As discussed in Section 4.2.2 a preferred water management option is to undertake a controlled release of treated water into Wilkie Creek. The release of treated water as an emergency discharge is currently approved under EA PEN100449509. Arrow has assessed potential impacts associated with controlled releases of treated coal seam gas water to Wilkie Creek. This assessment has informed the management measures and the circumstances under which Arrow will discharge treated coal seam gas water to Wilkie Creek. Further details of the assessment are presented in Appendix G –Daandine Water Release Studies.

12.4.2 Groundwater

The primary mitigation measure for groundwater will involve the application of a hierarchy of management options that form the basis for an adaptive management framework. The adaptive management framework is structured to allow management decisions to be made based on an increased knowledge base developed over time. Groundwater management is also linked to Arrow's coal seam gas water management strategy by way of substitution of groundwater allocations and injection into suitable shallow and deep aquifers.

Currently, Arrow implement a groundwater monitoring program within the DXP area, with regular assessment of physical groundwater parameters (temperature, electrical conductivity, total dissolved solids, dissolved oxygen, pH and salinity) having been conducted since 2006.

Arrow is implementing a groundwater monitoring program for the larger Surat Gas Project, which encompasses the DXP area. This groundwater monitoring program will be used to increase the understanding of the hydrogeology of the Surat Basin, to identify potential impacts of coal seam gas groundwater-related activities, and to provide data for decision making and groundwater modelling. This groundwater monitoring program will include developing a network of groundwater monitoring sites using existing bores (Government and private) and installing additional groundwater monitoring bores in the shallow, intermediate, deep and Walloon Coal Measure groundwater systems. This groundwater monitoring network will consist of sites identified in the Underground Water Impact Report for the Surat Cumulative Management Area and additional sites determined by Arrow. The groundwater monitoring program will be used to fulfil Arrow's obligations under the *Water Act (2000)* and identify Project-related impacts including groundwater abstraction, water storage and water disposal or reuse.

The management of potential impacts to groundwater that are related to land contamination as a result of disturbance of existing contaminated land or the potential to cause land contamination through project activities are discussed in Section 7.

12.4.2.1 Injection Trial

A preferred water management option is the injection of coal seam gas water into aquifers. In order to address the viability of injection as a coal seam gas water management option, two stages of aquifer injection feasibility studies (Arrow 2010, Schlumberger 2009) of deep injection have been undertaken.

Arrow has planned to undertake a 6 month injection trial in the Tipton area. The trial will include the construction and installation of an injection well, water treatment infrastructure and monitoring wells. Details of the Injection Trial Program are provided in Appendix H Injection Trial Program.

If the trial proves injection to be feasible, the design of a full-scale injection system will be conducted, as one component of a portfolio of CSG-water management options for the Surat Gas Project.

12.4.3 Control Strategies

Control strategies for the management of potential impacts on the water environment are presented in Table 31 below.

Table 31: Control Strategies for Potential Impacts to Waters

Environmental Protection Objectives	
Surface Water: <ul style="list-style-type: none"> To protect Lake Broadwater Conservation Park. To avoid or minimise degradation in water quality, impedance of flow and changes to the physical characteristics of watercourses and wetlands. Groundwater: <ul style="list-style-type: none"> To minimise impacts due to altered groundwater levels. To minimise impacts to groundwater quality. 	
Environmental Issue	Control Strategies
Surface Water	
General	Planning and design: <ul style="list-style-type: none"> Manage potential impacts on Lake Broadwater Conservation Park (Category A ESA) through implementation of the relevant buffer proposed. Avoid permanent pools, chains of ponds, and alluvial islands, where practicable, when selecting watercourse crossing points. Stormwater contact with disturbed areas will be limited by diverting flows away from unsealed ground surfaces to minimise the transport of sediment via stormwater runoff. When siting facilities, avoid wetlands and consider the following: <ul style="list-style-type: none"> Stream processes that may result in channel migration (either over time or as a result of project activities) and areas that are highly

	<p>susceptible to erosion (i.e., dispersive soils).</p> <ul style="list-style-type: none"> – Downstream values of nearby watercourses or wetlands. – Minimising changes to natural drainage lines and flow paths. – Flooding regimes and areas subject to inundation. <ul style="list-style-type: none"> • Implement a 100-m buffer zone from the high bank of all watercourses to ensure that no development or clearance occurs within these buffers (other than construction of watercourse crossings for roads, pipelines and discharge infrastructure and associated stream monitoring equipment). • Minimise watercourse crossings, where practicable, during route selection. Where required, select crossing locations to avoid or minimise disturbance to aquatic flora, waterholes, watercourse junctions and watercourses with steep banks. • Develop site-specific management plans for permanent and semi-permanent watercourse crossings detailing construction and environmental management requirements, including consideration of the scour potential of the watercourse. • Implement a protocol for the discharge of coal seam gas water to watercourses in a controlled manner under relevant operational situations, taking the sensitivity of the receiving watercourse into consideration. Conduct discharge events in accordance with specific parameters, including release volumes, flows and duration, and water quality. <p>Construction:</p> <ul style="list-style-type: none"> • Construct watercourse crossings in a manner that minimises sediment release to watercourses, stream bed scouring (e.g., the crossing location will be at low-velocity, straight sections, with the pipeline or road orientated as near to perpendicular to water flow as practicable), obstruction of water flows and disturbance of stream banks and riparian vegetation (i.e., the crossing location will be at a point of low velocity, and straight sections will be targeted, with the pipeline or road orientated as near to perpendicular to water flow as practicable). Avoid, where practicable, the use of rock gabions, as they are unsuited to watercourses of the region. • Develop an erosion and sediment control plan and install and maintain appropriate site-specific controls. • Runoff will be directed through sedimentation basins, straw bales or a constructed wetland to reduce erosion and sediment contamination to waters. • Minimise the disturbance footprint and vegetation clearing. • Clear areas progressively and implement rehabilitation as soon as practicable following construction and decommissioning activities. • Control sediment runoff from stockpiles. • Grade soil away from watercourses. • Design water dams in accordance with relevant legislation and Queensland standards and DERM guidelines. <p>Operations:</p> <ul style="list-style-type: none"> • Maximise beneficial use of coal seam gas water. • Apply appropriate Australian and industry standards and codes of
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	<p>practice for the handling of hazardous materials (such as chemicals, fuels and lubricants).</p> <ul style="list-style-type: none"> • Apply appropriate Australian and industry standards and codes of practice for the design and installation of infrastructure associated with the storage of hazardous materials (such as chemicals, fuels and lubricants).
Changes to physical form.	<ul style="list-style-type: none"> • Design culverts and drains to maintain flow and prevent headward erosion. • Consider the bank and stream bed stability when siting watercourse crossings and, where practicable, utilise existing stable crossings or locations where bedrock control exists to minimise the risk of erosion and generation of sediment. • Minimise potential impacts on surface waters through implementation of the following measures during construction of watercourse crossings: <ul style="list-style-type: none"> – Delay clearance of stream banks until the watercourse crossing is due to be constructed, to the greatest extent practicable. Implement appropriate erosion and sediment control measures (e.g., silt fences, sediment basins and erosion berms) on watercourse approaches and banks and ensure prompt completion of construction. – Stockpile watercourse bed material in the watercourse channel adjacent to the construction ROW only when the watercourse is dry, and site the stockpile to avoid impacts on riparian vegetation and in-stream features. – Retain coarse alluvial material from watercourse crossings for backfill armouring over the finer unconsolidated material. – Stabilise and maintain stream banks following watercourse crossings. • Discharge water from project activities at a rate and location that will not result in erosion. Install additional erosion protection measures, including energy dissipation structures, at discharge outlets. • Inspect rehabilitated watercourse channels and banks following significant flow events and undertake remedial works as required.
Changes to hydrology.	<ul style="list-style-type: none"> • Check for flood warnings or subscribe to flood warning services where relevant during construction of watercourse crossings. • Plan construction of watercourse crossings to occur during periods of low rainfall and low flow, when practicable. • Decommission infrastructure in such a manner that it will not adversely affect overland or flood flows and in accordance with relevant legislation and regulations
Surface water quality degradation.	<ul style="list-style-type: none"> • Identify strategies to minimise coal seam gas water surface storage and to promote increased efficiency. • Avoid disrupting overland natural flow paths and, where avoidance is not practicable, maintain connectivity of flow in watercourses. • Develop and implement a hydrostatic testing procedure prior to commencement of hydrotest activities that includes but is not limited to the following measures: <ul style="list-style-type: none"> – Conduct consultation with landowners and relevant regulatory

	<p>authorities prior to sourcing and disposing of hydrotest water.</p> <ul style="list-style-type: none"> - Avoid or minimise harmful chemical additives and reuse hydrotest water on adjacent pipeline sections where practicable. - Ensure hydrotest water that is discharged or recycled for secondary uses meets relevant statutory water quality guidelines. <ul style="list-style-type: none"> • Ensure the use of coal seam gas water meets beneficial-use licence conditions. • Minimise potential impacts to surface waters caused by erosion and sedimentation through implementation of the following measures: <ul style="list-style-type: none"> - Locate soil stockpiles away from watercourses and wetlands to minimise potential for sediment runoff to enter the watercourse or wetland. • Install and maintain diversion drains to divert clean surface runoff water around production facilities and away from construction areas. • Develop and implement incident reporting, emergency response and corrective action systems or procedures. Include systems for reporting, investigation and communications of lessons learned. • Incorporate into an emergency response plan or water management plan procedures for the controlled discharge of coal seam gas water under emergency conditions. Procedures will include water balance modelling, weather monitoring and forecasting, stream flow data, notification and reporting. • Segregate stormwater discharge from potential contaminant process areas. • Establish water quality monitoring stations upstream and downstream of discharge points to watercourses as part of a monitoring program to ensure compliance with environmental authority conditions and relevant standards. • Use coal seam gas water for dust suppression on roads or for construction and operation activities authorised in the environmental authority in accordance with the water quality parameters described in the environmental authority. • Minimise the inventory of hazardous materials stored on site.
<p>Groundwater</p>	
<ul style="list-style-type: none"> • Reduced flows to groundwater-dependent ecosystems and areas of cultural and spiritual importance. • Reduced groundwater supply to existing or future groundwater users. 	<p>Planning and design:</p> <ul style="list-style-type: none"> • Prepare a baseline assessment plan to establish benchmark data in registered third-party bores (where possible) prior to the commencement of Arrow extraction activities in accordance with the Water Act, including the preparation and implementation of a groundwater monitoring and investigation strategy. • Undertake bore assessments of third-party bores (where possible) in accordance with the Water Act, including: <ul style="list-style-type: none"> - Having the Queensland Water Commission for the Surat Cumulative Management Area identify bores requiring assessment. - Developing make-good agreements that include the outcome of bore assessments and implementation of make-good measures in the event that impaired capacity occurs. • Continue an investigative program that will help quantify the

connectivity between the Condamine Alluvium and the Walloon Coal Measures. The program will involve:

- Monitoring the effects of groundwater extraction in the Walloon Coal Measures on the Condamine Alluvium to estimate horizontal and vertical hydraulic conductivity between the alluvium and the Walloon Coal Measures.
- An investigative drilling program that will provide greater definition of the interface between the two units and will evaluate the geological and hydrogeological properties of the material at the interface of the units.
- Groundwater chemistry studies to characterise mixing and migration between the units.
- Groundwater modelling, utilising the connectivity data obtained through investigative components of the program, to understand important processes in the system and predict potential impacts.
- Continue a program of aquifer testing in dedicated groundwater monitoring bores to increase the predictability of aquifer properties and groundwater movement.
- Collect relevant geological and hydrogeological data from existing and future production wells, monitoring bores and registered third-party bores (where possible) together with information collated collaboratively with other proponents and regulatory authorities.
- Update and calibrate the geological model and the numerical groundwater model with relevant data on an ongoing basis, including:
 - Aquifer thicknesses and interfaces between formations.
 - Aquifer properties, e.g., porosity, permeability.
 - The location of sensitive areas, e.g., groundwater discharge springs.
 - Observed responses in monitoring bores that reflect aquifer behaviour during coal seam gas extraction.
- Utilise the updated geological and numerical groundwater models to:
 - Make ongoing predictions regarding changes to groundwater levels and groundwater quality as the project develops.
 - Improve confidence in the understanding of the sensitivity and resilience of the aquifers within the identified groundwater systems.
- Perform groundwater modelling simulations to predict impacts on groundwater resources in overlying and underlying aquifers. This information will subsequently be used to evaluate the suitability of these resources for use in make-good measures.
- Verify the preferred water management strategy by modelling the effectiveness of substitution and injection (where conducted) in offsetting depressurisation impacts in aquifers.

Construction:

- Construct all coal seam gas production infrastructure in accordance with the standards described in the P&G Act and regulations to that act.
- Construct all monitoring bores in accordance with the minimum construction requirements for water bores in Australia (LWBC &

	<p>NMBSC, 2003) and the minimum standards for the construction and reconditioning of water bores that intersect the sediments of artesian basins in Queensland (DERM, 2004).</p> <ul style="list-style-type: none"> • Ensure well drilling is monitored by a suitably qualified geologist to ensure aquifers are accurately identified for correct well construction. <p>Operations:</p> <ul style="list-style-type: none"> • Consider injection of coal seam gas water or brine of a suitable quality (if proven technically feasible) into shallow or deep aquifers to offset depressurisation impacts in aquifers. • Manage potential impacts on identified spring complexes by: <ul style="list-style-type: none"> – Supporting the identification of specific aquifers that serve as a groundwater source for discharge springs. – Assessing springs that are predicted to be subject to unacceptable impacts through the source aquifer. – Developing monitoring and mitigation strategies to avoid or minimise unacceptable impacts. • Implement a well integrity management system during commissioning and operation of production wells. • Minimise impacts of groundwater depressurisation on sensitive areas (e.g., groundwater-dependent ecosystems). • Develop a procedure for investigating the impaired capacity of third-party bores. The investigation will be comprised (but not limited to) the following phased investigation response: <ul style="list-style-type: none"> – Verify groundwater levels in the nominated bores and investigate groundwater levels and groundwater quality in compliance monitoring bores against established trigger thresholds. – Request bore information and groundwater data from affected parties. – Review and assess data. – Advise bore owners in writing of findings. • If impaired capacity is confirmed (bore can no longer produce quality or quantity of groundwater for the authorised purpose, and the impact is due to coal seam gas activities), implement make-good measures in accordance with the Water Act. • Include where possible make-good measures such as substitution of groundwater allocations of equal or better quality to maintain user supply, deepening of bores, modification of pumps, or supply of groundwater from an alternative source. <p>Decommissioning:</p> <ul style="list-style-type: none"> • Decommission or repair all production wells and monitoring bores, either at the end of their operating life span or in the event of a failed integrity test in accordance with the minimum construction requirements for water bores in Australia (LWBC & NMBSC, 2003) and the P&G Act and regulations to that act. Should production wells be converted into monitoring bores, do so in accordance with relevant regulations
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Diminished groundwater quality.

Planning and design:

- Inspect and observe site locations for the presence of contamination prior to commencement of intrusive activities.
- Apply appropriate Australian and industry standards and codes of practice for the handling of hazardous materials (such as chemicals, fuels and lubricants).
- Apply appropriate Australian and industry standards and codes of practice for the design and installation of infrastructure associated with the storage of hazardous materials (such as chemicals, fuels and lubricants).
- Avoid development on contaminated land through the completion of appropriate register searches and desktop investigations (i.e., avoid land or the contaminated portion of a parcel of land that is listed on the Contaminated Land Register or the Environmental Management Register, where practicable).
- Conduct physical investigations on selected parcels of land to influence facility siting decisions on a localised scale (i.e., target the portion of land that is not contaminated by understanding the extent of contamination).
- Arrow will enforce a no hydraulic fracturing (fracking) policy in the DXP area.
- Prepare a baseline assessment plan to establish benchmark data in registered third-party bores (where possible) prior to the commencement of Arrow extraction activities in accordance with the Water Act, including the preparation and implementation of a groundwater monitoring and investigation strategy.
- Consider local biological, groundwater and surface water conditions when identifying sites for coal seam gas water dams and brine dams.
- Consider local groundwater conditions when identifying sites for the installation of buried infrastructure (e.g., gathering lines).

Construction:

- Avoid disturbance of contaminated soil and groundwater when it is identified or observed during intrusive works.
- Manage contaminated soil or groundwater that cannot be avoided through physical investigation; manage quantification of the type, severity and extent of contamination; and remediate or manage in accordance with the Queensland Government's Draft Guidelines for the Assessment and Management of Contaminated Land (DE, 1998).
- Construct all coal seam gas production infrastructure in accordance with the standards described in the P&G Act 2004 and regulations to that act.
- Construct all monitoring bores in accordance with the minimum construction requirements for water bores in Australia (LWBC & NMBSC, 2003) and the minimum standards for the construction and reconditioning of water bores that intersect the sediments of artesian basins in Queensland (DERM, 2004).
- Select drilling fluids to minimise potential groundwater impacts. Do not use oil-based drilling fluids.
- Ensure well drilling is monitored by a suitably qualified geologist to ensure aquifers are accurately identified for correct well construction.

Controlling Procedure: 99-V-PL-0023

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- Develop the construction, design and monitoring requirements for new dams (either raw water, treated water or brine dams) and determine the hazard category of the dam, in accordance with the requirements of the most recent version of the Manual for Assessing Hazard Categories and Hydraulic Performance of Dams (DERM, 2011b). Construct the dams under the supervision of a suitably qualified and experienced person in accordance with the relevant DERM schedule of conditions relating to dam design, construction, inspection and mandatory reporting requirements.
- Install groundwater monitoring bores near dams as a leak detection measure:
 - The number of monitoring bores and their location will take into account site-specific hydrogeology, preferential pathways and potential receptors of impacts.
 - Monitor bores installed near dams will have groundwater levels and relevant water quality parameters monitored on a routine basis.
 - The number of monitoring bores or associated monitoring frequencies will be increased and further investigation will be triggered where impacts are identified.

Operations:

- Develop and implement emergency response and spill response procedures to minimise any impacts that could occur as a result of releases of hazardous materials or any loss of containment of storage equipment.
- Carry out corrective actions immediately upon the identification of any contamination of soil or groundwater that has occurred as a result of project activities.
- Incorporate into an emergency response plan or water management plan procedures for the controlled discharge of coal seam gas water under emergency conditions. Procedures will include water balance modelling, weather monitoring and forecasting, stream flow data, notification and reporting.
- Store onsite materials in suitable containment systems constructed to industry standards and Australian standards (AS 1940-2004, The Storage and Handling of Flammable and Combustible Liquids (Standards Australia, 2004a), and AS 3780, The Storage and Handling of Corrosive Substances (Standards Australia, 2008), at a minimum. Maintain quality control and quality assurance procedures to monitor volumes and quantities. Bund aboveground storage areas to contain spills.
- Connect wastewater and sewerage systems to sewers where locally present. Alternatively, install wastewater treatment or reuse systems in accordance with AS/NZS 1547:2000, On-site Domestic Wastewater Management (Standards Australia, 2000); DERM guideline for managing sewerage infrastructure to reduce overflows and environmental impacts (DERM, 2010b); and Queensland water recycling guidelines (DERM, 2005).
- Store and manage all waste materials (domestic and industrial) in accordance with industry regulations and DERM conditions. Use licensed waste management contractors. Conduct audits of disposal

	<p>facilities, disposal permits and onsite operations to ensure adherence to regulations.</p> <p>Decommissioning:</p> <ul style="list-style-type: none"> Excavate any saline material during rehabilitation of coal seam water dams or brine dams and select an appropriate option for management for the material (e.g., treat for reuse, or dispose of in a registered landfill). Implement a decommissioning and rehabilitation plan in accordance with the dam design plan. Decommission or repair all production wells and monitoring bores, either at the end of their operating life span or in the event of a failed integrity test in accordance with the minimum construction requirements for water bores in Australia (LWBC & NMBSC, 2003) and the P&G Act and regulations to that act.
<ul style="list-style-type: none"> Altered groundwater flow patterns impacting supply to third-party users, groundwater-dependent ecosystems and areas of cultural and spiritual importance. Diminished rainwater infiltration and reduced aquifer recharge. 	<p>Planning and design:</p> <ul style="list-style-type: none"> Consider local biological, groundwater and surface water conditions when identifying sites for coal seam gas water dams and brine dams. Consider local groundwater conditions when identifying sites for the installation of buried infrastructure (e.g., gathering lines). Avoid unnecessary impervious surface coverings and minimise land footprint and vegetation clearing when designing facilities.
<ul style="list-style-type: none"> Land subsidence affecting surface water systems and landforms. 	<ul style="list-style-type: none"> Address the potential for surface deformation through participation by Arrow in a collaborative study with other proponents using historical and baseline data from the Advanced Land Observation Satellite covering a time-lapse period from January 2007 until January 2011. This will allow a detailed analysis of the region and will enable the analysis of the evolution of measured surface deformation in space and time. The assessment will correlate and calibrate data deliverables (calibrated global map and vector files for measurement points) from the Advanced Land Observation Satellite to show the mean deformation rate, identify areas of large-scale deformation and compare patterns with other information (e.g., geology, basin structure, extraction wells and injection data).

Monitoring Requirements

Surface Water:

- Inspect erosion and sediment control measures following significant rainfall events to ensure effectiveness of measures is maintained.
- Visually inspect physical form and monitor hydrology, turbidity and pH upstream and downstream of crossings immediately prior to, during and after construction of watercourse crossings.
- Routine visual inspections undertaken while carrying out activities in the beds or banks of watercourse, wetland or spring.
- Routinely inspect spill containment controls and spill response kits.
- Measure the volume and quality of treated coal seam gas water released to surface waters on a routine basis in accordance with regulatory requirements and approved release limits.
- Routinely monitor water quality in dams.

Groundwater:

The groundwater monitoring and inspection program is an intrinsic part of the adaptive management framework and requires several aspects, associated with site-specific controls around project infrastructure and more regional monitoring of groundwater levels and groundwater quality associated with Arrow's activities, as listed below:

- Install groundwater monitoring bores near dams as a leak detection measure:
 - The number of monitoring bores and their location will take into account site-specific hydrogeology, preferential pathways and potential receptors of impacts.
 - Monitor bores installed near dams will have groundwater levels and relevant water quality parameters monitored on a routine basis.
 - The number of monitoring bores or associated monitoring frequencies will be increased and further investigation will be triggered where impacts are identified.
- Prepare groundwater monitoring reports in accordance with the EP Act.
- Provide chemical monitoring of contaminated soils and groundwater in relevant monitoring bores.
- Ensure methods used to monitor groundwater levels and quality, together with monitoring frequencies and parameters, are in accordance with approved regulatory standards.
- Develop a structured database to host groundwater data from the project (i.e., groundwater levels and groundwater quality).
- Install an appropriate regional groundwater monitoring network (that satisfies Arrow's obligations as described in the underground water impact reports) to:
 - Establish baseline groundwater level and groundwater quality conditions.
 - Assess natural variation (i.e., seasonal variations) in groundwater levels.
 - Monitor groundwater levels during the operations phase.
 - Monitor groundwater quality during the operations phase.
 - Establish suitable datum levels for each aquifer system.
 - Target sensitive areas where more frequent monitoring and investigation is required (e.g., groundwater-dependent ecosystems).
 - Monitor groundwater drawdown as a result of coal seam gas extraction.
 - Monitor impacts in accordance with the Water Act and regulations.
 - Provide an 'early warning system' that identifies areas potentially impacted by project activities to allow early intervention.
- Comply with inspection and monitoring requirements developed by the Queensland Water Commission in relation to groundwater drawdown and springs.

Performance Indicators

Surface Water:

- No permanent impact to the physical form or hydrology of watercourses as a result of project activities.
- No unauthorised release of contaminants directly or indirectly into watercourses.

Groundwater:

- Groundwater-dependent ecosystems and areas of cultural and spiritual importance are not adversely affected.
- Existing groundwater users are not adversely affected.
- Groundwater quality in aquifers above and below the Walloon Coal Measures is not adversely affected.
- Natural groundwater flow patterns are maintained through use of smallest practicable project footprints.
- No potential impacts related to land subsidence based on the results of any measured surface deformation and subsidence resulting from Arrow activities.

ARROW ENERGY - SURAT GAS PROJECT

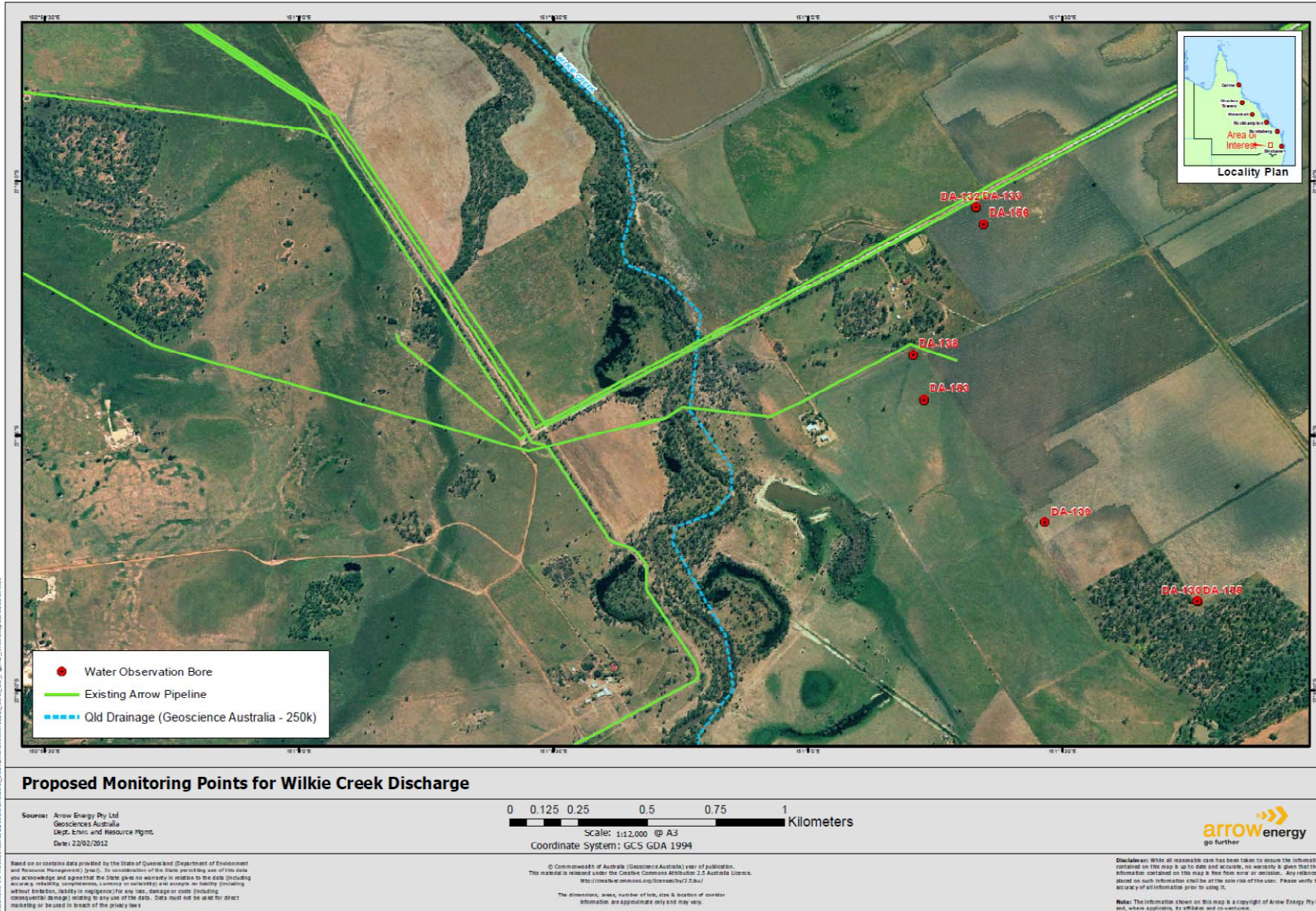


Figure 23: Proposed Monitoring Points for Wilkie Creek Discharge

Controlling Procedure: 99-V-PL-0023

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13. SOCIAL AMENITY

13.1 EXISTING ENVIRONMENT

13.1.1 Land Tenure

The land use in the area is strongly related to the different soil types and topography. Soils within the DXP area are dominated by heavy clays, which form rich agricultural soils around the Condamine River. Agricultural land use within the DXP area ranges from concentrated agriculture on the Condamine River floodplain, where many paddocks have been laser-levelled to achieve effective flood irrigation, through to cattle grazing in more marginal areas located to the north and west. Limited agricultural activity exists in areas of higher elevation and within state forests.

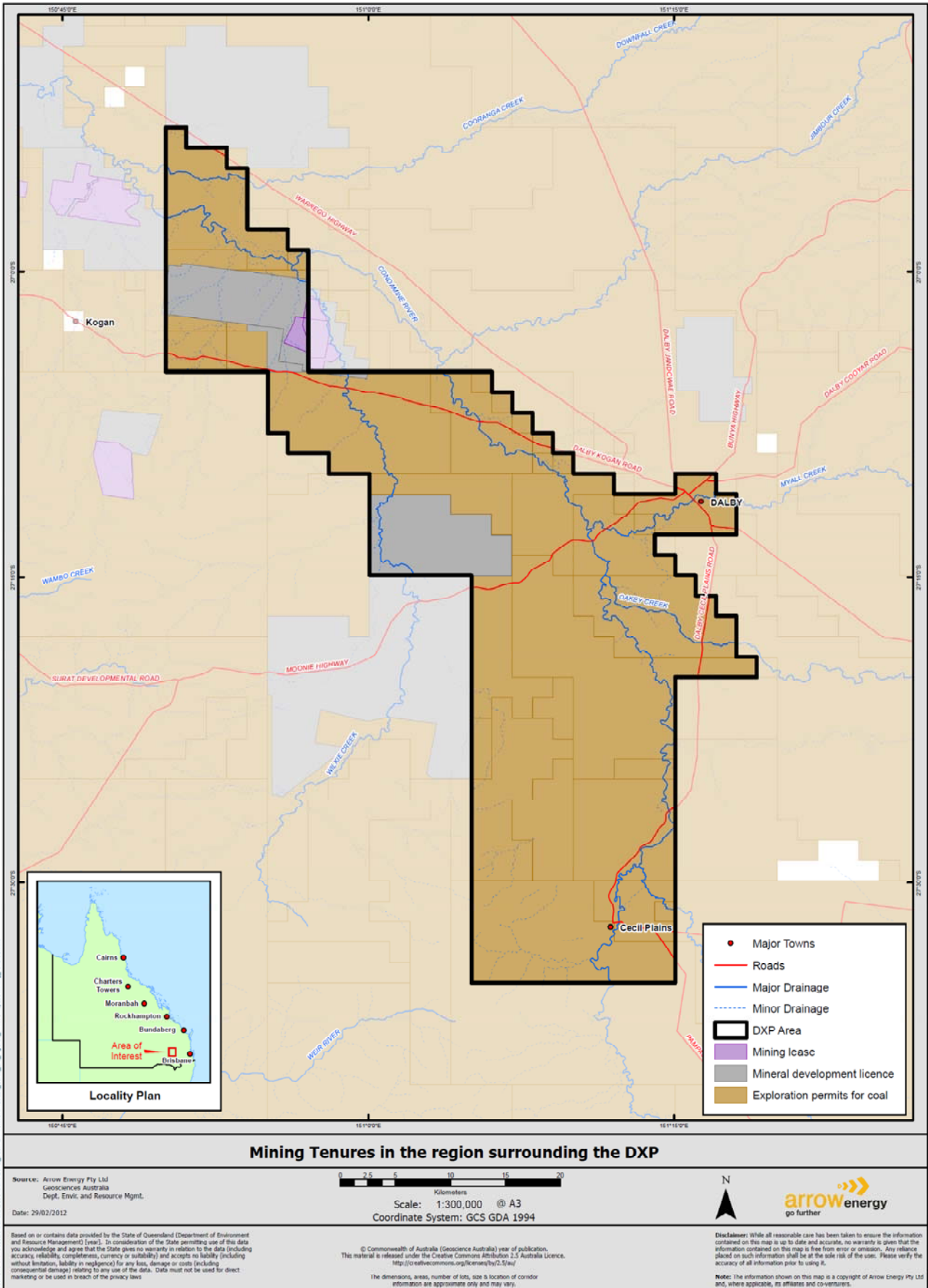
Predominant land uses within the study area are cropping and grazing. The communities have displayed a high level of resilience through prolonged periods of drought, substantial floods and fluctuations in agricultural commodity prices. Detailed information regarding the types of agricultural production that exist is described in Section 7.

Land within the DXP area is predominantly freehold tenure. Crown land comprising conservation reserves and national parks is also present in the region.

13.1.1.1 Resource Tenure

The Darling Downs contains deposits of commercially viable coal seam gas, crude oil and coal, with a number of communities in the region benefiting from the development of these energy resources. The extent of petroleum and mining tenures in proximity to the DXP area are shown in Figure 24.

ARROW ENERGY - SURAT GAS PROJECT



NOT FOR CONSTRUCTION

Figure 24: Mining Tenures in the region surrounding the DXP

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13.1.2 Population Centres

Population data of towns and cities in and around the DXP area is presented in Table 32.

Table 32: Population of towns and cities in and around the DXP area (Source: CGQ (2010), ABS (2001), ABS (2007))

Community	1881 Population	1921 Population	2001 Population	2006 Population	2006 Population Density
Cecil Plains	-	-	281	235	76 per km ²
Chinchilla	-	3,095	3,376	3,682	265 per km ²
Dalby	1,300	2,395	9,731	9,776	204 per km ²
Miles	-	-	1,196	1,164	277 per km ²
Millmerran	-	1,679	1,250	1,223	260 per km ²
Darling Downs Statistical Division* (including persons living outside towns)	31,480	93,778	-	213,754	2 per km ²

* The Darling Downs Statistical Division comprises the Goondiwindi, Southern Downs, Toowoomba and Western Downs regional councils.

The average population density of two persons per square kilometre across the Darling Downs Statistical Division is indicative of the fact that over half the regional population live on rural properties outside of towns. The size of rural properties within and around the DXP area varies. The average size of land parcels in Chinchilla and Kogan is 40 ha and 95 ha respectively. Dalby and Millmerran have average land parcels of 133 ha and 230 ha respectively.

13.1.3 Nearby Residences

As detailed in Section 2.4 a survey conducted in 2009 identified approximately 400 potential sensitive receptors (buildings) within the DXP area, excluding the townships of Dalby and Cecil Plains.

The identification, ground-truthing and mapping of sensitive receptors within the DXP area is integral to the assessment of potential noise and air quality impacts. As part of environmental and social impact assessments conducted by Coffey Environments (Australia) Pty Ltd (contracted by Arrow Energy), topographic maps, aerial photographs, satellite imagery, local knowledge, and information from stakeholder consultation were all used to identify sensitive receptor locations. Sensitive receptor locations were then ground-truthed in the DXP area by Arrow Energy in October 2009. Sensitive places ground-truthed and mapped within the DXP area are shown in Figure 4.

As illustrated in Figure 4, the potential sensitive receptors are located throughout the DXP area and will consequently be an important consideration when planning project activities.

13.1.4 Landscape and Visual Amenity

The existing environment contains a variety of landscapes, including broad, open, arable plains; elevated native forest; and wooded river valleys. The landscapes have been shaped by variations in geology, soils, landform, vegetation and the settlement and use by people.

Ten landscape character types have been identified within the DXP area on the basis of common landscape elements, attributes and values:

- Landscape Type A: Wooded River Valley.
- Landscape Type B: Settled Arable Plains.
- Landscape Type C: Sodic Transitional Pastures.
- Landscape Type D: Lowland Native Forest.
- Landscape Type E: Elevated Native Forest.
- Landscape Type F: Foothill Plains and Valleys.
- Landscape Type G: Lowland Brigalow Plains.
- Landscape Type H: Terraced Brigalow Farmland.
- Landscape Type I: Forested Steep Hills.
- Landscape Type J: Chromosol Undulating Lowlands.

The visual baseline is described in terms of views from selected representative viewpoints, which correspond to the location of residences, settlements, work places, recreational features, recognised vantage points, tourist trails and roads.

13.1.5 Roads and Transport

Major road and rail networks link the Darling Downs communities with Brisbane and other regional centres. The main highways linking townships within and around the DXP area are the Warrego, Gore and Leichardt Highways. A number of lower order roads link rural areas and communities within the DXP area. A regular passenger rail service connects the region with Brisbane via the Western Line.

The functional road types present within the DXP area include highways, regional connecting roads, rural connecting roads and rural access roads:

- Highway. Highways are high-order roads of a high standard, facilitating connectivity between regional centres.
- Regional Connecting Road. Regional connecting roads are high-order roads of a high standard, facilitating connectivity between townships.
- Rural Connecting Road. Rural connecting roads are lower-order roads facilitating connectivity between higher-order roads.
- Rural Access Road. Rural access roads are low-order roads predominately facilitating access to local uses.

13.1.6 Cultural Heritage

13.1.6.1 Indigenous Cultural Heritage

The existence of Indigenous cultural heritage within an area is generally dependent on the extent of previous Indigenous activity in the area and the extent to which development of the area has disturbed or destroyed Indigenous cultural heritage. Landscape features, combined with knowledge of existing land use and level of disturbance, help to identify areas most likely to contain Indigenous cultural heritage. For example, there is strong potential for Indigenous cultural heritage to exist near watercourses and in forested areas that have not been cleared. It is, however, less likely that evidence of Indigenous cultural heritage remains in disturbed areas, such as cultivated areas, roads, residential communities and industrial developments.

Within the project development area, 372 sites are listed on the Queensland Indigenous Cultural Heritage database. Of these, approximately 60% are stone artefact scatters, with a further 25% being scarred trees. There are extensive ethnohistorical accounts of Indigenous activity in the project development area. Cultural heritage sites and places that are not yet known are likely to be found within the project development area.

One known Indigenous cultural heritage site listed on the Register of the National Estate is located wholly or partially within the DXP area (Table 33).

Table 33: Register of the National Estate listed sites with Indigenous heritage values located within the DXP area

Place Name	Description	Location	Within DXP Area	Register of the National Estate Place ID (Listing Status)
Lake Broadwater Conservation Park	Known to be a particularly important place for Indigenous people, having been used for both residential and ceremonial purposes. Associations with an important creator being (i.e., the Rainbow Serpent) have also been identified.	10 km southwest of Dalby	Yes	18052 (indicative place)

The Bigambul People have registered native title applications that cover part of the project development area.

13.1.6.2 Non-Indigenous Cultural Heritage

Non-Indigenous visitation in the region dates back to the mid-nineteenth century. Since this period, there has been a diverse range of settlement and land uses, resulting in scattered archaeological sites.

Many of the known heritage sites within the DXP area are associated with early settlement and include early pastoral stations, towns, railway camps, schools and churches. Additional sites are associated with transport routes, such as railways, and their associated camps. Pastoralism left its mark in the area with fences, scattered pastoral stations and varied collections of farm machinery.

There is potential for other historic sites and places to exist that have not been found before. Areas most likely to contain previously unknown sites are those associated with major transport routes (particularly the railway lines), along stock routes and old stagecoach routes, as well as river corridors and vermin fences. Areas on disturbed land used for agricultural activities have a very low likelihood of containing intact non-Indigenous cultural heritage sites or artefacts. Non-Indigenous cultural heritage sites that are as yet to be discovered within the DXP area are likely to include artefact sites from grazing and agricultural industries of local heritage value.

13.1.7 Relevant Stakeholders

The following are stakeholders that may have direct or indirect interests in the DXP and the associated petroleum activities:

- State regulatory agencies and relevant government departments including:
 - The Department of Environment and Heritage Protection (DEHP),
 - The Department of Natural Resources and Mines (DNRM);
 - the Department of State Development, Infrastructure and Planning (DSDIP); and
 - the Department of Transport and Main Roads (DTMR);
- Local government – Western Downs Regional Council and Toowoomba Regional Council;
- Operators of existing utilities and infrastructure;
- Landholders and interest groups; and
- Cultural Heritage / Native Title claimants.

Other interested parties may be identified through further assessments and ongoing consultation with existing stakeholders.

13.2 ENVIRONMENTAL VALUES

13.2.1 Land Use

The key industries in the wider region surrounding the project area include agriculture, forestry, fishing, manufacturing and oil and gas exploration and production, as discussed in the following sections.

Agriculture

The Dalby / Chinchilla region supports a wide variety of agricultural practices including grain (wheat, barley, sorghum, cereals, coarse grains, legumes etc) and cotton production. Cattle grazing is also undertaken and Dalby is currently Queensland's largest livestock selling centre.

Oil and Gas Exploration and Production

The Surat Basin holds vast hydrocarbon resources including coal and CSG which are continually being explored, assessed and extracted for energy users on both a local and international scale.

Surat Basin CSG was first used to supply gas to the Swanbank E gas-fired power station (DEEDI, 2012). Production testing of Surat Basin gas started in around 2004, with commercial coal seam gas production commencing in early 2006 from the Kogan North field.

The wider Dalby region is now associated with an expanding oil and gas industry (including exploration, production and gas transmission), and has recognised the potential of this expanding market with businesses in the region diversifying into the supply of components, parts and services for the energy sector (WDRC 2012).

Recreation and Tourism

Recreation and tourism in the broader region is mainly associated with Dalby and its surrounds, where attractions include the Pioneer Park Museum and Heritage Trail, the Warra Heritage Centre, historic Jimbour Station and Winery, and the Jondaryan Woolshed and Station. The surrounding natural areas (including Lake Broadwater Conservation Park and Bunya Mountains National Park) provide opportunities for camping, walking, bird watching and boating.

Forestry

A number of state forests are situated within the broader region surrounding the project area. These state forests are managed by the Queensland Parks and Wildlife Services under the Forestry Act 1959 and are considered biodiversity reservoirs. Activities currently being undertaken in these parks includes timber harvesting; grazing; bee-keeping; quarrying; flora and fauna conservation; cultural heritage; water conservation and recreational activities.

13.2.2 Landscape and Visual Amenity

The visual amenity assessment within the DXP area considered protection of viewpoints from location of residences, settlements, work places, recreational features, recognised vantage points, tourist trails and roads.

13.2.3 Roads and Transport

The road environmental values are the functional road types present within the DXP area. Three key aspects of each functional road type have been identified as important to various users, neighbours and road authorities of the road network:

- Efficiency. Efficiency relates to aspects of the road network that facilitate the efficient operation of the network, e.g., linkages between higher-order roads, overall volumes of traffic and types of intersection.
- Safety. Safety includes aspects of the physical road infrastructure that relate to safety, e.g., bridges, rail crossings, cattle grids, school bus infrastructure and standard of road construction.
- Amenity. Amenity relates to aspects of the experience afforded to the passive participants of the road network (users of adjacent land), e.g., light, dust and noise nuisance due to changes in traffic volumes or road function.

13.2.4 Cultural Heritage

13.2.4.1 Indigenous Cultural Heritage

The environmental values to be protected are associated with either archaeological significance (i.e., including physical evidence) or cultural significance (i.e., of significance to Indigenous peoples for cultural, spiritual or historical reasons). Assets and artefacts in the existing environment include the following:

- Places with identified Indigenous values that are EPBC Act-listed and also included on the Register of the National Estate.
- Places that are included in the Queensland Indigenous Cultural Heritage Database. This database contains only broad information on each site, such as its type, date recorded, general location and Aboriginal party details. The details of many of these sites have been collected during cultural heritage assessments for other projects in the region.
- Places, objects and areas of cultural heritage value identified during previous investigations conducted by Aboriginal parties on behalf of Arrow. Where Aboriginal parties have allowed it, the details of these sites are retained in Arrow's GIS database.
- Places, objects and areas of cultural heritage value that are currently not identified, including those that become known through studies conducted prior to the commencement of construction activities. It is essential that these places, objects and areas of cultural heritage significance that are not yet known be recognised as an environmental value, as there is extensive evidence of the activity of Indigenous peoples across the DXP area and surroundings in terms of archaeological evidence and ethnohistorical accounts.

The value of the assets and artefacts in the environment are determined and attributed by the Indigenous people. It is the link between custom and folklore and spirituality that creates the value in places and in the inanimate objects that remain in the landscape. Table 34 summarises the landscape types and the likelihood that they contain cultural assets and values (as established by Bonhomme Craib & Associates (2009)).

Table 34: Sensitivity of the landscapes in which Indigenous cultural heritage may occur

Landscape Type	Cultural Assets and Values	Likelihood of Cultural Heritage Being Present
Defined waterways (including lagoons) and their immediate tributary areas on sandy or sandy loam soils	<ul style="list-style-type: none"> • Scarred trees. • Stone and shell scatters. • Axe-grinding grooves. • Burials. 	High to very high
Black soil gilgais	<ul style="list-style-type: none"> • Stone artefacts (high frequencies of 'tools'). • Hearths. 	Moderate
Ridges and rocky uplands	<ul style="list-style-type: none"> • Stone arrangements. • Wells. • Stone artefacts. 	Moderate to high

High terraces below 300 m above sea level on duplex or sandy loam soils	<ul style="list-style-type: none"> Scarred trees. Stone artefact scatters. 	Moderate
Ridges and escarpments	<ul style="list-style-type: none"> Wells. Quarries. Bora grounds or stone arrangements. 	Moderate to high
High plains above 300 m above sea level away from hydrological features	<ul style="list-style-type: none"> Isolated stone artefact or artefacts. Scarred trees. 	Low
Black soil plains (including open floodplain)	<ul style="list-style-type: none"> Scarred trees. Isolated stone artefact or artefacts. Stone sources and associated flaking. 	Low

13.2.4.2 Non-Indigenous Cultural Heritage

Within the DXP area, there are no sites of national significance; however, the Dalby war memorial was formerly registered on the Register of National Estate (until being transferred to the Queensland Heritage Register) and the Boonaraga Cactoblastis Memorial Hall is believed to display national listing qualities.

Six sites with state heritage significance have been identified in the DXP area (refer to Table 35; Figure 25), with one of these also registered with the National Trust of Queensland. All sites are located within the project's town exclusion areas.

Table 35: State listed heritage sites within the DXP area

Heritage Site	Description	Register
Dalby War Memorial and Memorial Park	A memorial to commemorate the contribution made by local residents to World War I. The soldier statue on the memorial is one of only two in Queensland that are cast in bronze.	<ul style="list-style-type: none"> Queensland Heritage Register (formerly entered on the Register of National Estate) National Trust of Queensland
Dalby swimming pool complex	The earliest Olympic-sized pool in Queensland outside Brisbane. Built in 1936.	Queensland Heritage Register
Dalby Town Council Chambers and offices (former)	The third council chambers to be built in the town. Built in 1936.	Queensland Heritage Register
St John's Anglican Church	A brick church built in 1922-1923.	Queensland Heritage Register
Dalby Fire Station	The central portion of the Dalby Fire Station dates from 1935 and includes extensions built in 1963 and 1957. It is the oldest and longest operating fire station in	Queensland Heritage Register

	regional Queensland.	
St Columba's Convent (former)	The convent is a substantial brick and timber building built in 1913 from donations made by parishioners. The convent was designed by local architect George Bernard Roskell. It illustrates the spread of the Catholic Church in regional Queensland and the contribution made by the Sisters of Mercy in its establishment of convents, schools and boarding accommodation. The order occupied St Columba's until 1990.	Queensland Heritage Register

13.3 POTENTIAL IMPACTS ON ENVIRONMENTAL VALUES

13.3.1.1 Community Impacts

The stakeholder group most likely to be impacted by proposed project activities will be landholders within the DXP area and surrounding local communities who may be indirectly impacted through increased traffic and disruption to access routes. Arrow continues to undertake consultation with affected landowners as detailed project planning progresses, so as to consider all aspects of the property, including the landholder's business activities. Arrow is committed to working with landholders to establish voluntary access agreements and to reach agreement on compensation arrangements and to ensure that all potentially adverse project impacts are avoided or mitigated to the satisfaction of all parties.

The project may result in increased traffic volumes and increased proportions of heavy vehicle traffic (i.e. trucks) together with potential deterioration of road infrastructure not designed for regular industrial and heavy vehicle traffic. A cumulative effect on the local council roads, due to the expansion of the energy industry throughout the region, is also likely.

Two additional impacts may include:

- Heavy goods transport and other project related vehicles may be required to utilise school bus routes as a result of the dispersed nature of the rural development and the CSG infrastructure; and,
- Increased petroleum plant, vehicles and equipment may be required to travel through townships and residential areas as many of the roads in the region do not bypass the townships.

Arrow will develop Traffic Management Plans (TMP) where required in order to minimise the impact on local communities. The TMP will include arrangements for activities such as short-term lane closures caused by construction activities, restricted traffic routes, and preferred times for travel and will be completed in consultation with relevant regulatory authorities (including local council and the Department of Transport and Main Roads) and will be undertaken well in advance of any planned activities.

Aesthetic impacts to the community will generally be temporary and predominantly confined to the construction phase. Long-term above-ground infrastructure associated with exploration activities is typically small and unobtrusive. Large infrastructure such as dams, will be sighted in consultation with landholders and will be designed to maintain visual amenity as far as practicable. Arrow has also recently undertaken extensive consultation with the community throughout the Surat Basin in an effort to discuss and address landholder concerns in relation to Arrow's operations in the area.

Arrow is committed to protecting and promoting the social and environmental values of the communities in which it works. By engaging with community groups, landholders, Indigenous groups, local businesses and Governments at all levels, Arrow can successfully work towards a plan for a sustainable and shared future. Accordingly, Arrow is in the process of building resources for landholder, environmental and community teams and activities to achieve this goal. Specific fact

sheets have also been developed to further explain Arrow's activities and are available on the Arrow website (<http://www.arrowenergy.com.au>).

To assist in Arrow's goal of a shared future with communities, Arrow has developed the Brighter Futures Community Investment Program, designed to enhance to the quality of life in the communities in which Arrow operates. Arrow will provide financial support for projects and initiatives that will make a credible and long-term contribution to local communities in the focus areas of health and safety, education and the environment.

13.3.2 Landscape and Visual Amenity

The primary construction activity that could impact landscape and visual amenity values is the construction of exploration and production wells, gathering lines, production facilities and associated infrastructure (e.g., construction camps). This activity will involve:

- Excavation, trenching, drilling, earthmoving, vegetation clearance or trimming, construction of infrastructure and temporary lighting that will disrupt landscape character, views and visual amenity.
- The presence of a workforce, construction camps and associated transport (e.g., large trucks, four-wheel-drive vehicles, graders, excavators and tractors).

The impact of the activity will vary depending on the nature of the construction activity (e.g., construction of a production well versus construction of a production facility), type of landscape and location of visual receptors.

During operations, the following project activities could impact upon landscape and visual amenity values:

- The presence and operation of production wells, gathering lines, power reticulation, production facilities and associated infrastructure that will disrupt landscape character, views and visual amenity.
- The presence of operation and maintenance crews, and associated transport.

The nature of the impact will largely be determined by the size of the infrastructure and the type of landscape.

Impacts upon landscape and visual amenity values during decommissioning include:

- Decommissioning, disassembly and removal of production wells, gathering lines, power reticulation, production facilities and associated infrastructure that will disrupt landscape character, views and visual amenity.
- The presence of a workforce and associated accommodation and transport (e.g., large trucks, four-wheel-drive vehicles, graders, excavators and tractors).

Waste generated in each project phase could also potentially impact landscape and visual amenity if not appropriately managed.

13.3.3 Roads and Infrastructure

Increases in traffic volumes across the road network within the DXP area can potentially impact the efficiency, safety and amenity of roads. The key traffic-generating activities that will occur during each phase of the project are as follows:

- Construction. Haulage of materials and equipment to depots and distribution from depots to works sites within the DXP area, installation of production wells, gas and water gathering infrastructure, construction of production facilities, roads to production facilities, dams associated with production facilities and construction camps.
- Operations. Operation and maintenance of well sites, gathering infrastructure and production facilities.
- Decommissioning. Decommissioning and rehabilitation of well sites, gathering infrastructure and production facilities.

Due to the staged development approach, there will be points in time when the construction, operations and decommissioning phases will be occurring concurrently across the DXP area.

Highways in the DXP area are built and operated at a standard that is likely to accommodate changed traffic conditions. Lower-order roads (rural connecting roads and rural access roads) are constructed for and operate with lower traffic volumes than higher-order roads, and they exhibit higher sensitivity to increases in traffic volumes.

13.3.4 Cultural Heritage

13.3.4.1 Indigenous Cultural Heritage

Cultural Heritage will be managed in accordance with the relevant management tools and cultural heritage agreements with the Aboriginal Party. Potential impacts on Indigenous cultural heritage values are considered to be most significantly associated with construction activities and, to a lesser extent, operations and, to an even lesser extent, decommissioning activities. Clearing activities and ground disturbance associated with the construction of the project have the potential to impact on known and unknown Indigenous cultural heritage, places, objects and evidence. Without the implementation of appropriate management controls, project activities could:

- Destroy, damage or disturb objects of physical heritage (i.e., archaeological evidence) in the landscape.
- Encroach upon or disturb places of cultural significance to Indigenous persons.

Arrow will uphold a firm commitment to the protection of cultural heritage values throughout all project phases.

13.3.4.2 Non-Indigenous Cultural Heritage

Project development will potentially impact upon non-Indigenous cultural heritage sites through direct ground disturbance activities and indirect disturbance through encroachment on sites during construction, operations and decommissioning.

13.4 MANAGEMENT OF POTENTIAL IMPACTS

13.4.1 Control Strategies

Control strategies for the management of potential impacts on the social environment are presented in Table 36 below.

Table 36: Control Strategies Relating to the Management of Impacts to the Social Environment

Environmental Protection Objectives	
<p><i>Indigenous and non-Indigenous Cultural Heritage:</i></p> <ul style="list-style-type: none"> To avoid or minimise and manage adverse impacts from project activities on known and unknown Indigenous cultural heritage sites and objects. To retain a documented record of the Indigenous cultural heritage that is found through the course of the project so that the history of the area is preserved for future generations. To avoid or minimise disturbance from project-related activities to non- Indigenous cultural heritage sites and artefacts. <p><i>Roads and Transport:</i></p> <ul style="list-style-type: none"> To minimise potential impacts to road amenity, safety and efficiency from project-generated traffic and transport. <p><i>Landscape and Visual:</i></p> <ul style="list-style-type: none"> To reduce short-term and long-term visual impacts on sensitive receptors. 	
Environmental Issue	Control Strategies
<p><i>Indigenous and non-Indigenous Cultural Heritage</i></p>	
<ul style="list-style-type: none"> Accidental destruction, damage or disturbance of objects of physical heritage in the landscape. Encroachment upon or disturbance of places of cultural significance to Indigenous persons during the course of construction or routine operations. 	<ul style="list-style-type: none"> Prepare CHMPs or equivalent agreements in accordance with the provisions of the Aboriginal Cultural Heritage Act 2003. Complete comprehensive initial cultural heritage assessments where disturbance is proposed (noting that this will be staged in line with proposed development schedules), with direct input from relevant Aboriginal parties. Assess the results of the initial cultural heritage assessments in collaboration with the Aboriginal parties and develop a program for the management of all significant Aboriginal areas and objects to be affected by the project. Include management measures required prior to construction and those required throughout the life of the project. Ensure places of Aboriginal cultural heritage significance are considered during detailed design. Ensure that operations gives effect to the avoidance principle as enunciated in the <i>Aboriginal Cultural Heritage Act 2003</i>. Maintain a GIS database of sites of Indigenous cultural heritage that are known or found during the course of investigations and works (where Aboriginal parties allow the listing of the sites). Obtain all necessary permits and approvals prior to the commencement of works. Ensure site inductions provide cultural heritage awareness for places and objects (to avoid) and the appropriate procedures to follow should there be any new discoveries.
<ul style="list-style-type: none"> Accidental destruction, 	<ul style="list-style-type: none"> Avoid known cultural heritage sites, where practicable, through site

Controlling Procedure: 99-V-PL-0023

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<p>damage or disturbance to non-Indigenous cultural heritage sites and artefacts.</p> <ul style="list-style-type: none"> • Encroachment on non-Indigenous cultural sites during the course of routine operations. 	<p>selection.</p> <ul style="list-style-type: none"> • Implement a ‘chance finds’ procedure for the discovery of unknown sites during construction as part of the cultural heritage management plan. This should include a stop work requirement on initial discovery, appropriate reporting and recording, and such management measures as avoidance, salvage or destruction. • Develop a cultural heritage management plan in consultation with the Queensland Heritage Office prior to commencement of ground disturbance works that will mitigate and manage potential impacts on non-Indigenous cultural heritage sites. • Conduct preconstruction clearance surveys of sites to identify the presence of heritage sites. • Develop site-specific cultural heritage management plans in consultation with the Queensland Heritage Office should construction be planned within 100 m of listed heritage sites. • Consult with the local community regarding the management of threatened historic sites and places. • Incorporate cultural heritage awareness into site induction procedures, including information on heritage values of the region, legal obligations and implementation of the ‘chance finds’ procedure. • Record and report unknown sites identified during construction as chance finds. The cultural heritage management plan will include all measures for managing the discovery of chance finds. • Notify the Queensland Heritage Office if any cultural heritage sites or items of significance are uncovered during construction. • Undertake archaeological assessment by a qualified heritage practitioner if cultural heritage sites or artefacts are uncovered during construction. • Maintain a database of all sites where non-Indigenous cultural heritage is known or found during the course of investigations and works. • Take particular care when working in those areas where significant heritage places are located within 500 m of proposed wells, pipelines or other infrastructure.
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Roads and Transport

<p>Increases in traffic volumes across the road network within the DXP area can potentially impact the efficiency, safety and amenity of roads.</p>	<p>Planning and design:</p> <ul style="list-style-type: none"> • Assess and identify works required to manage the increased traffic volumes and road safety issues associated with the project in road use management plans prepared and regularly reviewed in consultation with the relevant council or the Department of Transport and Main Roads. • Assess and identify the need to upgrade unsealed roads or widen sealed roads where project activities and traffic will create road safety issues. Such works will be done in consultation with the relevant council (if a local government road) or DTMR (if a state road). • Undertake threshold assessments to determine whether upgrading of rail crossings is warranted. • Implement driver training and fatigue awareness for employees and
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	<p>contractors.</p> <ul style="list-style-type: none"> • Implement an in-vehicle monitoring system for project vehicles. • Schedule roster changes to avoid peak traffic times. • Develop project logistics plans to provide safe movement of people and materials, as well as to minimise traffic volumes. • Develop journey management plans in consideration of high-risk roads. • Use heavy-vehicle routes that avoid unsuitable bridges. <p>Construction, Operations and Decommissioning:</p> <ul style="list-style-type: none"> • Where assessed necessary, provide protected turning lanes for entry to permanent facilities to address road safety issues. • Ensure access driveways to project facilities and infrastructure have appropriate sight distances. • Implement traffic controls, including signage (e.g., reduced speed limits, warning signs) and restrictions of movements (e.g., no travel during school bus pick-up and drop-off times). • Maintain the integrity of private roads and tracks and minimise dust generation, where appropriate, in consultation with relevant landowners and council. • Confine project traffic to designated roads and access tracks, where practicable. • Implement traffic controls, including signage (e.g., reduced speed limits, warning signs) and restrictions of movements (e.g., no travel during school bus pick-up and drop-off times). • Limit project traffic on school bus routes during pick-up and drop-off times on school days or install appropriate school bus infrastructure, e.g., signage or pull-over areas where necessary. • Make workers aware of school bus routes, as well as typical pick-up and drop-off times in the vicinity of the work sites. • Coordinate with local law enforcement for movement of heavy or oversized loads. • Implement journey management plans. • Manage project-related activities in the vicinity of existing stock routes in accordance with the <i>Land Protection (Pest and Stock Route Management) Act 2002</i>.
<p><i>Landscape and Visual</i></p>	
<p>Changes in landscape character.</p>	<ul style="list-style-type: none"> • Site each production facility in the landscape of lowest sensitivity, where practicable, such as next to existing industrial developments or existing coal seam gas facilities. • Hide or screen production facilities using natural landscape features or planted native vegetation barriers, where appropriate. Avoid removal of mature trees and other woodland features that screen views to facilities. Establish screening barriers using endemic species in advance of construction of the facilities. • Where it is not practicable to screen or integrate a facility into the landscape, consider designing the facility to be a feature in the landscape, taking into consideration the form, texture and arrangement of buildings and structures.

	<ul style="list-style-type: none"> • When clearing vegetation, seek to avoid creating gaps in stands or patches and to avoid isolating parcels of remnant vegetation from more continuous tracts. • Minimise the disturbance footprint and vegetation clearing. • Maintain the integrity of private roads and tracks and minimise dust generation, where appropriate, in consultation with relevant landowners and council. • Use existing roads and tracks, where practicable. • Where feasible, target dry weather periods when undertaking construction in sensitive landscape areas (e.g., waterway crossings) to minimise visual impacts due to sedimentation and erosion. • Clear areas progressively and implement rehabilitation as soon as practicable following construction and decommissioning activities. • Utilise landscape features and contours, where practicable, to integrate linear infrastructure (access tracks, gathering lines) into the landscape. • Minimise the width of roads and tracks. • Develop an erosion and sediment control plan and install and maintain appropriate site-specific controls. • Remove surface infrastructure and rehabilitate disturbed areas as soon as practicable to predisturbance landscape characteristics or consult with landowners regarding reinstatement objectives.
Diminished visual amenity.	<ul style="list-style-type: none"> • Use shrouded, downcast lighting to minimise spill and restrict it to the minimum required for safety and security. Design lighting in accordance with AS 4282-1997, Control of the Obtrusive Effects of Outdoor Lighting (Standards Australia, 1997). • Co-locate facilities where practicable and design infrastructure layouts to minimise the footprint (taking into consideration the elements that contribute to landscape character) to reduce visibility of the facilities. • Avoid visually sensitive locations and landscapes when siting facilities, where practicable. Seek backdrops when siting facilities to protect the skyline in distant views. Avoid siting facilities within view of sensitive viewpoints, particularly the bird hide and camping area at Lake Broadwater, expansive views from the Cunningham Highway, towns, schools and private residences. • When siting production facilities, maintain the maximum distance practicable from, and minimise visual disturbance to, the most sensitive visual receptors. Seek to maintain at least 500 m separation from sensitive viewpoints, particularly tourist trails, major roads, residences and built-up areas. • Consult with potentially impacted visual receptors (landowners and neighbours) in locating facilities. Seek to reduce the form and shape of facilities visible by landowners and residents. • Conduct planned maintenance flaring during daylight hours to minimise light spill, where practicable. • Where practicable, plan the movement of equipment and materials during times of least visual impact (i.e., work day start and end). • Locate topsoil and spoil mounds in visually unobtrusive locations, where practicable.

- Minimise construction time near sensitive visual receptors.
- Implement dust suppression measures for roads and construction sites to ensure that dust does not cause a nuisance.
- Maintain visual amenity controls used to reduce landscape and visual impacts. Replace lost trees or shrubs in screening barriers to ensure they establish and maintain an effective barrier.

Monitoring Requirements

Indigenous and non-Indigenous Cultural Heritage:

- Inspect known Indigenous sites identified as having the potential for being impacted by the project and subsequently acknowledged for avoidance, in accordance with the relevant approval and permit conditions including the cultural heritage management plan.
- Inspect known non-Indigenous sites identified as having the potential for being impacted by the project and subsequently acknowledged for avoidance, in accordance with the relevant approval and permit conditions including the cultural heritage management plan.

Roads and Transport:

- Routinely monitor integrity and amenity on project-related roads.
- Monitor compliance with the project’s road safety requirements through regular review of reports generated by the in-vehicle monitoring system.
- Conduct regular safety inspections of project vehicles.

Landscape and Visual:

- Inspect erosion and sediment control measures following rainfall events to ensure effectiveness of measures is maintained.

Performance Indicators

Indigenous and non-Indigenous Cultural Heritage:

- Compliance with the cultural heritage management plans developed for the project.

Roads and Transport:

- No permanent disruption to road efficiency.
- No third-party traffic-related incidents associated with the project.
- No net loss to road amenity.

Landscape and Visual:

- Compliance with design specifications (which will aim to integrate facilities and associated infrastructure into the landscape setting).

14. REHABILITATION

The timing and works undertaken as part of rehabilitation activities will be dependent on the activity type and the stage of the project. Some project activities such as seismic surveys and drilling are temporary in nature, enabling preliminary rehabilitation to be undertaken once the activity is completed. Longer term infrastructure that is present for the duration of the project will be subject to site specific decommissioning and rehabilitation plans developed in accordance with any regulatory requirements of the day and in discussion with the landholder.

Rehabilitation objectives can be specific to each individual site, however as a minimum Arrow shall ensure that each disturbance is rehabilitated to be:

- Safe to humans, wildlife and domestic animals.
- Non-polluting.
- Stable (landforms).
- Able to sustain an agreed land use.

Rehabilitation objectives are achieved by addressing potential environmental impacts that may arise from the future site use by containing and mitigating any contaminants or pollutants. Rehabilitated sites will require ongoing maintenance until such time that land stabilisation has occurred and the area is self-sustaining and/or is suitable for its intended use (e.g. cropping or grazing), and meeting criteria with environmental authority conditions

Management of site rehabilitation for areas disturbed from petroleum activities including dams, well sites, pipelines, seismic survey lines, tracks, roads and associated infrastructure is detailed in the Arrow 99-V-PR-0015 Rehabilitation Procedure, located in Appendix D. In addition to this procedure, Table 37 provides an overview of key rehabilitation activities for different types of infrastructure and activities proposed to be undertaken in the DXP area.

Table 37: Overview of Typical Rehabilitation Methods for Common Site Infrastructure

Environmental Protection Objectives	
<ul style="list-style-type: none"> • Ensure the site is safe for humans and animals. • Prevent impact to soils, surface water and groundwater. • Provide a stable landform. • Create a final state that can support an agreed land use and is compatible with surrounding land use. 	
Petroleum Activity Feature	Control Strategies
Production wells and monitoring bores	<ul style="list-style-type: none"> • Infrastructure decommissioned in accordance with the relevant regulatory standards to prevent gas and water leakage. • Rehabilitation of Arrow sites conducted in accordance with the Arrow Rehabilitation Procedure (99-V-PR-0015). • For active production well sites, initial landform reconstruction, topsoil replacement, and revegetation, completed outside the wellhead fence enclosure.

	<ul style="list-style-type: none"> • Petroleum-related infrastructure isolated, drained, purged and removed from site. • Non-petroleum related infrastructure may remain on site if agreed with landowner and DEHP. • Statutory signposts installed to mark the location of decommissioned wells. • A stable landform with a self-sustaining vegetation cover of appropriate species composition established to enable natural vegetation progression and minimal weed invasion.
Gas and water gathering systems	<ul style="list-style-type: none"> • Wells decommissioned in accordance with the relevant regulatory standards to prevent groundwater mixing and future leakage to groundwater systems. • Gathering lines decommissioned in accordance with the relevant regulatory standards to prevent gas and water leakage into the ground. • Contents of gathering lines collected to prevent discharge to receiving environment. • Solid or liquid wastes associated with facilities collected and removed to licensed waste facilities. • Any contaminated land remediated to appropriate human health and environmental standards.
High pressure gas pipelines	<ul style="list-style-type: none"> • Former wellheads reduced to as small as practicable, with ground surface shaped to promote natural drainage patterns and limit pooling of surface water. • Any underground infrastructure filled with an inert substance to prevent subsidence, where required. • Soil ripped or scarified in highly trafficked areas using suitable techniques to promote free drainage. • A stable landform with a self-sustaining vegetation cover of appropriate species composition established to enable natural vegetation progression and minimal weed invasion.
Production facilities and power generation facilities	<ul style="list-style-type: none"> • Ground conditions established that are conducive to natural regeneration. • A stable landform with a self-sustaining vegetation cover of appropriate species composition established to enable natural vegetation progression and minimal weed invasion.
Water treatment and storage facilities	<ul style="list-style-type: none"> • Dams and associated reticulation system may be left in situ if agreed with landowner and DEHP. • Where dams are removed, their contents will be drained and disposed of to appropriate waste facilities. • Brine residue will be removed as waste and disposed of at an appropriately licensed facility. • Any contaminated land will be remediated to appropriate human health and environmental standards. • Dam backfilled and ground surface shaped to promote natural drainage patterns and limit pooling of surface water. • Any underground infrastructure filled with an inert substance to prevent subsidence, where applicable. • Ground conditions conducive to natural regeneration.

	<ul style="list-style-type: none"> • A stable landform with a self-sustaining vegetation cover of appropriate species composition established to enable natural vegetation progression and minimal weed invasion.
<p>Supporting infrastructure</p>	<ul style="list-style-type: none"> • Modular infrastructure removed from the site and reused elsewhere. • Borrow pits contoured to establish a stable landform. • Permanent office infrastructure left in place for continued operation or third party use with landowner agreement. • Solid or liquid wastes associated with accommodation camps collected and removed to licensed waste facilities. • Any contaminated land remediated to appropriate human health and environmental standards. • Former disturbance area reduced to as small as practicable, with ground surface shaped. • A stable landform with a self-sustaining vegetation cover of appropriate species composition established to enable natural vegetation progression and minimal weed invasion.
<p>Monitoring Requirements</p>	
<ul style="list-style-type: none"> • Undertake annual verification to ensure mitigation measures are working as planned and to intervene early, should the desired objectives not be achieved. • Compliance with this management plan will be assessed during periodic HSEMS audits described in Section 3.7 of this environmental management plan. 	
<p>Performance Indicators</p>	
<ul style="list-style-type: none"> • Minimal impact to humans or animals. • No soils, surface water or groundwater contamination above applicable objectives. • Stable landform with a self-sustaining vegetation cover of appropriate species composition established with natural vegetation and minimal weed invasion. 	

15. REFERENCES

ABS. 2001. Community profile series 2001. Cat. No. 2001.0. Australian Bureau of Statistics. Canberra, Australian Capital Territory.

ABS. 2007. Community profile series 2006. Cat. No. 2001.0. Australian Bureau of Statistics. Canberra, Australian Capital Territory.

ANZECC. 2000. Australian and New Zealand guidelines for fresh and marine water quality. Department of Sustainability, Environment, Water, Population and Communities. Parkes, Australian Capital Territory.

Arrow Energy Pty Ltd. August 2010. Surat Basin Water Injection Feasibility Study Stage 2, 2010.

Australia ICOMOS. 2000. The Burra charter: The Australia ICOMOS charter for places of cultural significance 1999: with associated guidelines and code on the ethics of co-existence. Australia International Council on Monuments and Sites. Burwood, Victoria.

Barnett, B. G., and Muller, J. 2008. Upper Condamine groundwater model calibration report. Report prepared for the Australian Government from CSIRO Murray-Darling Basin Sustainable Yields Project. CSIRO. Australia.

Biosecurity Queensland. 2008. Petroleum industry (including coal seam methane gas) minimising pest spread advisory guidelines. Department of Primary Industries and Fisheries. Brisbane, Queensland.

Bonhomme Craib and Associates. 2009. Cultural heritage on Arrow Energy leases in the Surat Basin: an overview. Prepared by Bonhomme Craib and Associates for Arrow Energy, Mermaid Beach, Queensland.

Centre for the Government of Queensland. 2010. Queensland places database. A WWW publication accessed on 29 March 2010 at <http://queenslandplaces.com.au/darling-downs>. University of Queensland Centre for the Government of Queensland. Brisbane, Queensland.

DE. 1998. Draft guidelines for the assessment and management of contaminated land in Queensland. Department of Environment. Brisbane, Queensland.

DERM. 2000. Environmental Protection Agency Noise Measurement Manual. 3rd edition. Department of Environmental and Resource Management. Brisbane, Queensland.

DERM. 2004. Minimum standards for the construction and reconditioning of water bores that intersect the sediments of artesian basins in Queensland. Department of Environment and Resource Management. Brisbane, Queensland.

DERM. 2005. Queensland water recycling guidelines. Department of Environmental and Resource Management. Brisbane, Queensland.

DERM. 2009. Queensland water quality guidelines. Version 3. Department of Environment and Resource Management. Brisbane, Queensland.

DERM. 2010a. Coal seam gas water management policy. Department of Environment and Resource Management. Brisbane, Queensland.

DERM. 2010b. Guideline: framework for managing sewerage infrastructure to reduce overflows and environmental impacts. Department of Environmental and Resource Management. Brisbane, Queensland.

DERM. 2010c. Guideline: Activities in a watercourse, lake or spring associated with mining operations. Version 2. Department of Environment and Resource Management. Brisbane, Queensland.

DERM. 2011a. Manual for assessing hazard categories and hydraulic performance of dams. Version 2. Department of Environment and Resource Management. Brisbane, Queensland.

DERM. 2011b. Financial assurance for chapter 5A activities: information sheet. Department of Environment and Resource Management. Brisbane, Queensland.

DERM. 2011c. Biodiversity planning assessments (BAMM). Department of Environment and Resource Management. Brisbane, Queensland. A WWW publication accessed on 2 November 2011 at http://www.derm.qld.gov.au/wildlife-ecosystems/biodiversity/biodiversity_assessment_and_mapping_methodology_bamm.html

DERM. 2011d. Schedule 1 Zonal criteria for original zones to Strategic Cropping Land Act 2011. Queensland Government.

DERM 2011e. Coal Seam Gas Recycled Water Management Plan and Validation Guideline. Department of Environment and Resource Management. Brisbane, Queensland.

DSEWPC (2006) Department of Sustainability, Environment, Water, Population and Communities. *White Box – Yellow Box Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands*. Accessed online February 2011 at: <http://www.environment.gov.au/epbc/publications/pubs/box-gum.pdf>

DSEWPC (2008) Department of Sustainability, Environment, Water, Population and Communities Weeping Myall Woodlands – Species Profile and Threats Database accessed online February 2012 at: <http://www.environment.gov.au/cgi-bin/sprat/public/publicshowcommunity.pl?id=98>.

DSEWPC (2008a) Department of Sustainability, Environment, Water, Population and Communities. *Approved Conservation Advice for Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland*. Accessed online February 2012 at <http://www.environment.gov.au/biodiversity/threatened/communities/pubs/88-conservation-advice.pdf>

DSEWPC (2009) Department of Sustainability, Environment, Water, Population and Communities *Brigalow Belt Forests in Queensland* accessed online February 2012 at: <http://www.environment.gov.au/biodiversity/threatened/publications/brigalow.html>

EPHC and NRMCC. 2011. National guidance on acid sulfate soils: national guidance for the management of acid sulfate soils in inland aquatic ecosystems. Environment Protection and Heritage Council and the Natural Resource Management Ministerial Council. Canberra, Australian Capital Territory.

Geoscience Australia. 2011. Acid sulphate soils. A map produced on 29 August containing information received from Geosciences Australia. Geosciences Australia. Canberra, Australian Capital Territory.

Herczeg, A. L., Torgersen, T., Chivas, A. R., and Habermehl, M.A. 1991. Geochemistry of groundwater from the Great Artesian Basin, Australia. *Journal of Hydrology* 126:225–245.

Hillier, J. R. 2010. Groundwater connections between the Walloon coal measures and the alluvium of the Condamine River. Report prepared for Central Downs Irrigators Limited. Pittsworth, Queensland.

Huxley, W. J. 1982. The hydrogeology, hydrology and hydrochemistry of the Condamine River Valley alluvium. Volume 1. Masters research thesis prepared for the Queensland University of Technology. Brisbane, Queensland.

Isbell, R. F. 2002. The Australian soil classification. CSIRO Australia. Collingwood, Victoria.

Klohn Crippen Berger. July 2011. Injection of Coal Seam Gas Water into the Central Condamine Alluvium: Technical Feasibility Assessment. Final Report. Healthy Headwaters Coal Seam Gas Water Feasibility Study - prepared for the Department of Environment and Resource Management.

Lundie-Jenkins, G. and Payne, A. 2000. Recovery plan for the bull oak jewel butterfly (*Hypochrysops piceatus*) 1999–2003. Queensland Parks and Wildlife Service, Brisbane.

LWBC and NMBSC. 2003. Minimum construction requirements for water bores in Australia. 2nd ed. Land and Water Biodiversity Committee and National Minimum Bore Specifications Committee. Australia.

NHMRC, NRMCC. 2011. Australian Drinking Water Guidelines Paper 6 National Water Quality Management Strategy. National Health and Medical Research Council, National Resource Management Ministerial Council. Commonwealth of Australia, Canberra, ACT.

Schlumberger Water Services (Australia) Pty Ltd, July 2009. Surat Basin Water Injection Stage 1 Feasibility Study, 2009.

Sinclair Knight Merz. 1999. Conjunctive water use study: upper Condamine River interim report. October. Report prepared for the Murray-Darling Basin Commission, Department of Natural Resources. Darling Downs, Queensland.

Standards Australia. 1997. AS 4281. Control of obtrusive effects of outdoor lighting. Prepared by Standards Australia Limited. Sydney, Australia.

Standards Australia. 2000. AS/NZS 1547:2000. On-site domestic wastewater management. Prepared by Standards Australia Limited. Sydney, New South Wales.

Standards Australia. 2001. AS/NZS 4801:2001. Occupational health and safety management systems - specification with guidance for use. Prepared by Standards Australia Limited. Sydney, New South Wales

Standards Australia. 2004a. AS/NZS ISO 14001:2004. Environmental management systems - requirements with guidance for use. Prepared by Standards Australia Limited. Sydney, New South Wales.

Standards Australia. 2004b. AS 1940-2004. The storage and handling of flammable and combustible liquids. Prepared by Standards Australia Limited. Sydney, New South Wales.

Standards Australia. 2008. AS 3780. The storage and handling of corrosive substances. Prepared by Standards Australia Limited. Sydney, New South Wales.

Theis, C.V., 1935. The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using groundwater storage, Am. Geophys. Union Trans., vol. 16, pp. 519-524.

URS Australia, May 2012, "Daandine, Tipton, Kogan and Stratheden Regulated Dam 2011 Annual Inspections Report" Report prepared by URS Australia for Arrow Energy Ltd.

WDRC (2012) Western Downs Regional Profile. Western Downs Regional Council Website accessed at: <http://www.wdrc.qld.gov.au/wdrc-profile> cited March 2012

16. ACRONYMS, ABBREVIATIONS AND UNITS

°C	degrees Celsius
%	per cent
AHD	Australian height datum
Arrow	Arrow Energy
ARS	assessment and reporting schedule
atm	atmosphere
BIM	block identification map
CGPF	central gas processing facility
CLR	contaminated land register
CO	carbon monoxide
CSG	coal seam gas
dB(A)	Unit used to measure A-weighted sound pressure levels. A-weighting is an adjustment made to sound-level measurement to approximate the response of the human ear.
DERM	Department of Environment and Resource Management
DST	drill stem testing
DXP	Dalby Expansion Project
EA	environmental authority
EIS	environmental impact statement
EM Plan	environmental management plan
EMR	environmental management register
EP	Equivalent persons
EP Act	<i>Environmental Protection Act 1994</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EPP Air	Environmental Protection (Air) Policy 2008
EPP Noise	Environmental Protection (Noise) Policy 1997
EPP Waste	Environmental Protection (Waste Management) Policy 2000
EPP Water	Environmental Protection (Water) Policy 1997
ERA	environmentally relevant activities
ESA	environmentally sensitive area
GAB	Great Artesian Basin
GHG	greenhouse gas
GL	gigalitre
GL/a	gigalitre per annum
GQAL	good-quality agricultural land
HDPE	High Density Poly-ethylene

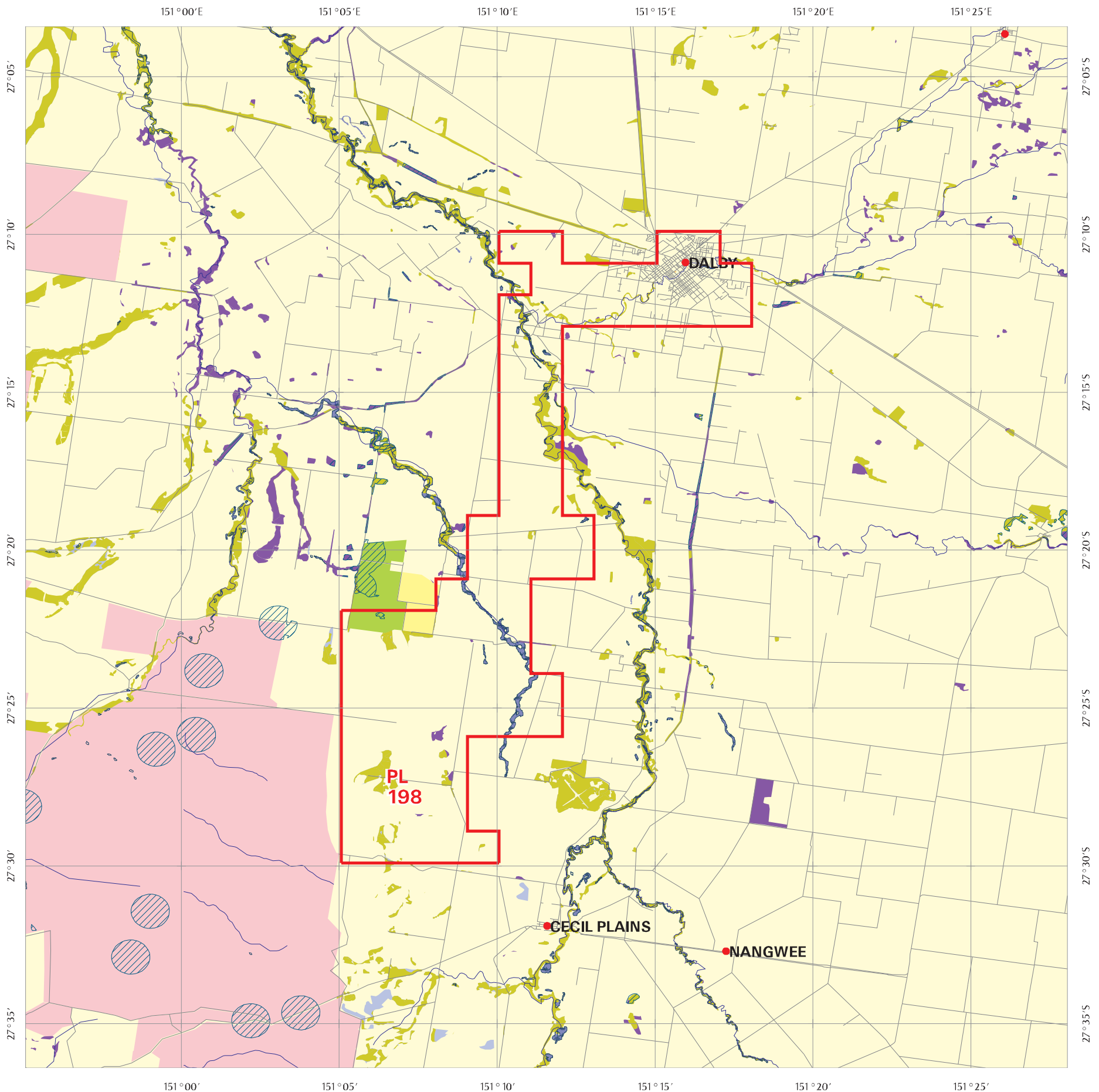
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HSEMS	health, safety and environmental management system
ha	hectare
hr	hour
kg	kilogram
kg/hr	kilogram per hour
km	kilometre
km ²	square kilometre
kPag	kilopascal gauge
kV	kilovolt
L	litre
L/day	litre per day
L/second	litre per second
L _{A90}	A-weighted sound pressure level that is exceeded for 90% of the 54 time of which a given sound is measured.
L _{Aeq}	The equivalent continuous A-weighted noise level.
LNG	liquefied natural gas
LP Act	Land Protection (Pest and Stock Route Management) Act 2002
m	metre
m ²	square metre
m ³	cubic metre
Ma	million years ago
MF	microfiltration
mg/L	milligrams per litre
mg/m ² /d	milligram per square metre per day
mm	millimetre
MNES	matters of national environmental significance
ML	mega litre
ML/day	mega litre per day
ML/year	mega litre per year
Mscf/d	million standard cubic feet per day
MW	mega watt
NC Act	<i>Nature Conservation Act 1992</i>
NGER	<i>National Greenhouse and Energy Reporting Act 2007</i>
NHMRC	National Health and Medical Research Council
NRMCC	National Resource Management Ministerial Council
NEPM	National Environment Protection Measures
NO ₂	nitrogen dioxide

NO _x	mono-nitrogen oxides
O ₃	ozone
P&G Act	<i>Petroleum and Gas (Production and Safety) Act 2001 (Qld)</i>
PetroChina	PetroChina Company Limited
pH	the negative decimal logarithm of the hydrogen ion activity in a solution
PJ	petajoule
PJ/a	petajoule per annum
PL	petroleum lease
PM _{2.5}	particulate matter with particles measuring 2.5 µm or less
PM ₁₀	particulate matter with particles measuring 10 µm or less
psi	pounds per square inch
RE	regional ecosystem
RBP	Roma Brisbane pipeline
RO	reverse osmosis
ROW(s)	right(s) of way
SAR	sodium absorption rate
SCL Act	<i>Strategic Cropping Land Act 2011</i>
SCL	Strategic cropping land
SO ₂	sulfur dioxide
SO ₄	sulfate
t	tonne
TEC	threatened ecological community
TEG	triethylene glycol
TJ	terajoule
TJ/d	terajoule per day
µm	micrometre or micron
µS/cm	microsiemens per centimetre
VOC	volatile organic compounds
WoNS	weeds of national significance
WTF	water treatment facility

Appendix B Environmentally Sensitive Area Maps



Legend

- Selected Petroleum Lease
- CATEGORY A**
- National Parks
- Conservation Parks
- Forest Reserves
- Wet Tropics World Heritage Area
- Great Barrier Reef Marine Park Region
- Marine Parks other than General Use Zones
- CATEGORY B**
- World Heritage Areas
- Queensland Heritage Register Places
- Ramsar Sites
- Cultural Heritage Registered Areas and DLA's other than Stanbroke
- Special Forestry Areas
- Fish Habitat Areas
- Koala Plan
- Coordinated Conservation Areas
- Endangered Regional Ecosystems (remnant and mature regrowth (biodiversity status))
- General Use Zones of Marine Parks
- Marine Plants

ENVIRONMENTALLY SENSITIVE AREAS - Chapter 5A activities (EP Act)

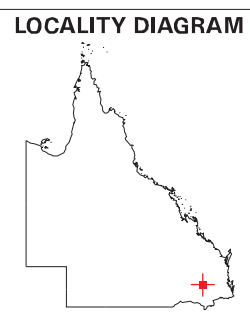
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Date: 01 Aug 13 Time: 07.38.31

Centered on Tenure:
PL 198



- CATEGORY C**
- Essential Habitat
- Referable Wetlands
- Declared Catchment Areas
- Nature Refuges
- Resources Reserves
- State Forests
- Timber Reserves
- Of Concern Regional Ecosystems (remnant and mature regrowth (biodiversity status))
- OTHERS**
- Towns
- Roads
- Rivers
- Springs
- Wild River High Preservation Areas
- Wild River Preservation Areas
- Chapter 5A Dominant Wetlands (51-100%)
- Chapter 5A Subdominant Wetlands (0-50%)
- Queensland

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0 2000 4000 6000 8000 10000m

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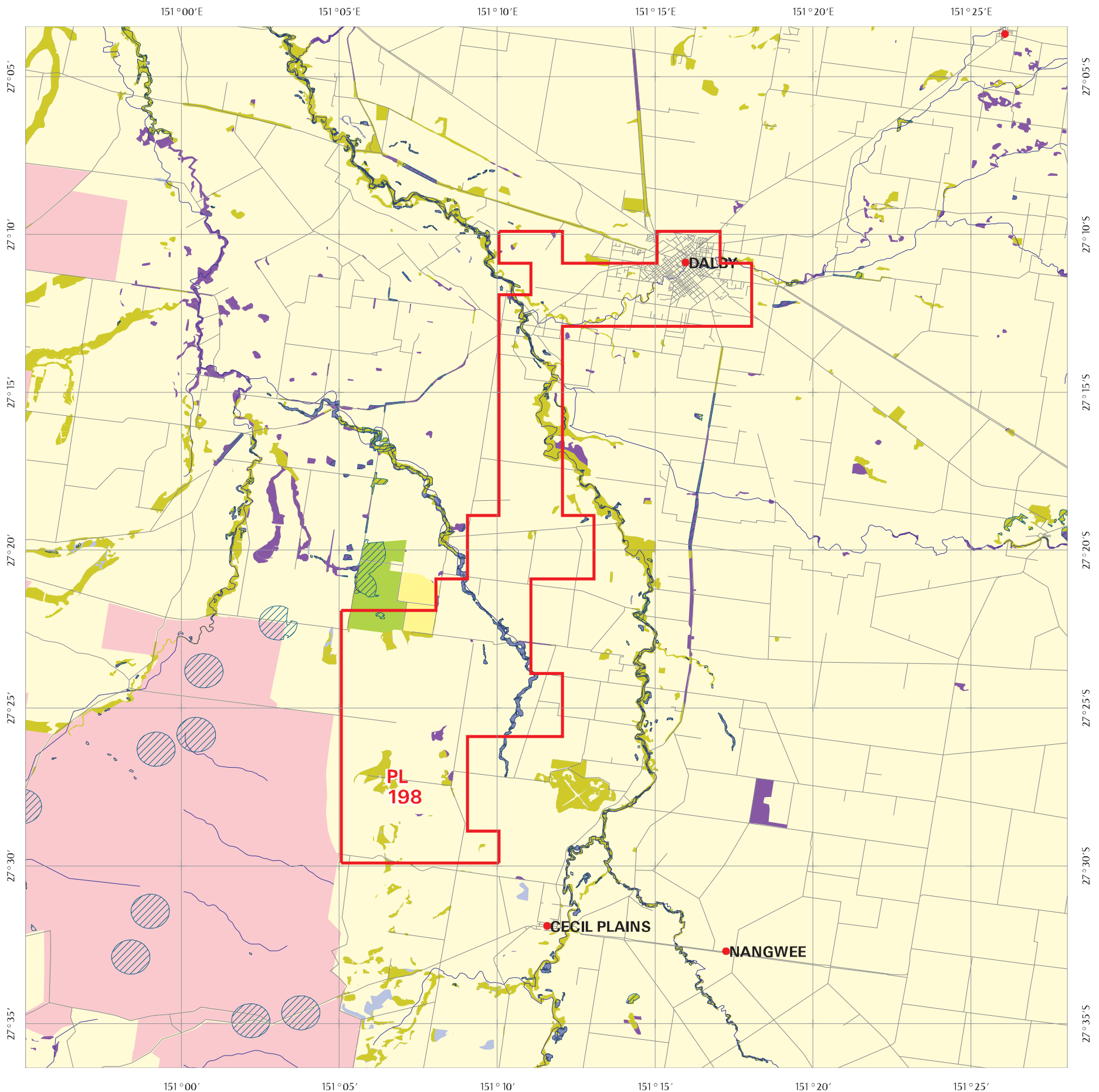
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Legend

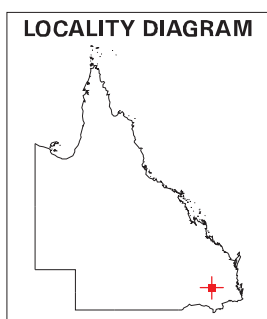
- Selected Petroleum Lease
- CATEGORY A**
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- Conservation Parks
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- General Use Zones of Marine Parks
- Marine Plants

ENVIRONMENTALLY SENSITIVE AREAS - Chapter 5A activities (EP Act)

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Date: 01 Aug 13 Time: 07.38.31

Centered on Tenure:
PL 198

- CATEGORY C**
- Essential Habitat
- Referable Wetlands
- Declared Catchment Areas
- Nature Refuges
- Resources Reserves
- State Forests
- Timber Reserves
- Of Concern Regional Ecosystems (remnant and mature regrowth (biodiversity status))
- OTHERS**
- Towns
- Roads
- Pitney Bowes Software 2012
- Rivers
- Springs
- Wild River High Preservation Areas
- Wild River Preservation Areas
- Chapter 5A Dominant Wetlands (51-100%)
- Chapter 5A Subdominant Wetlands (0-50%)
- Queensland



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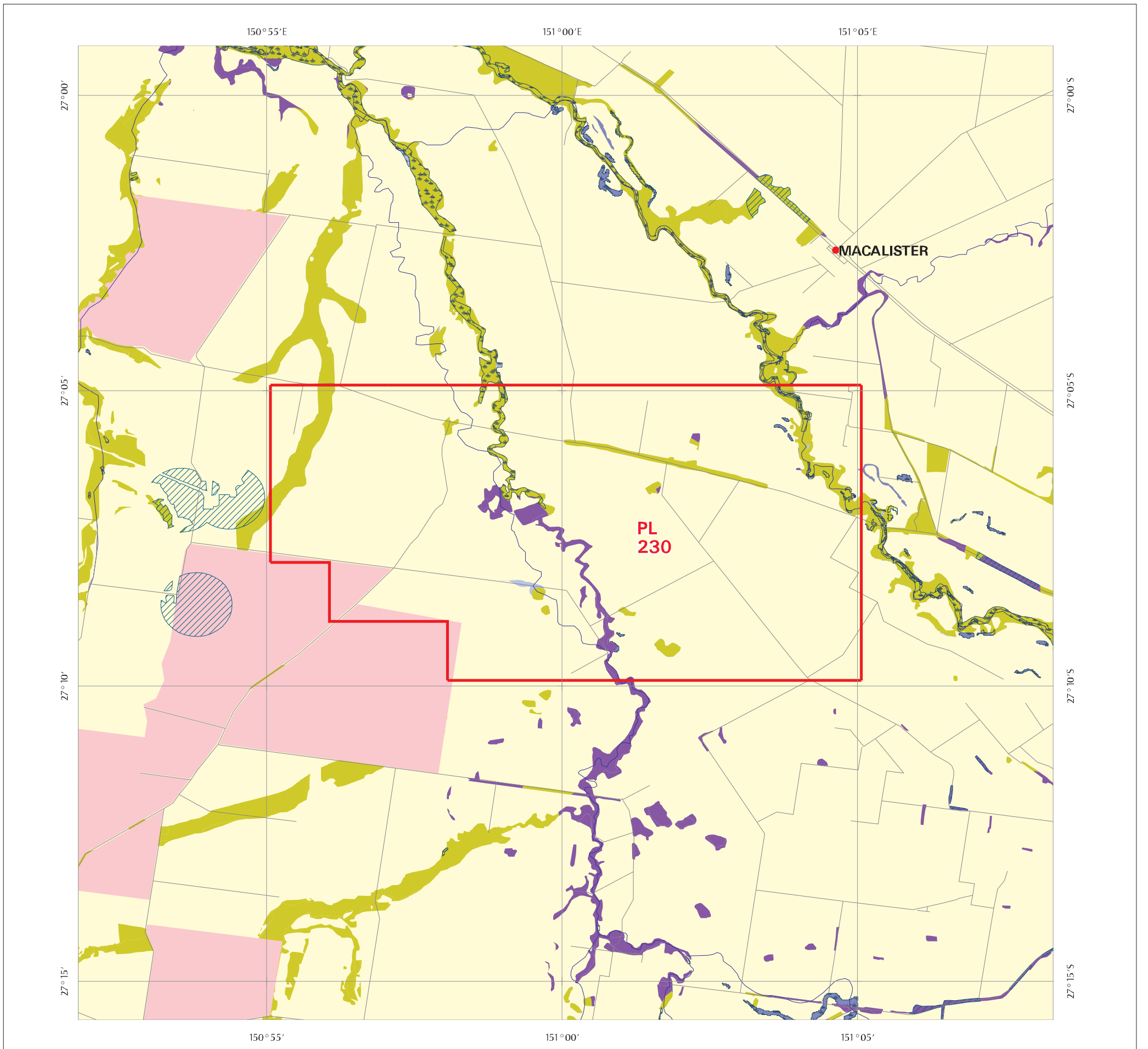
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- Marine Plants

ENVIRONMENTALLY SENSITIVE AREAS - Chapter 5A activities (EP Act)

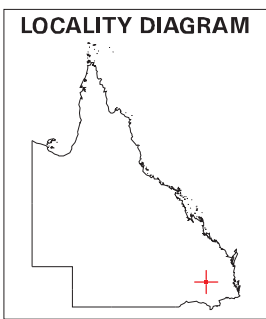
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Centered on Tenure:
PL 230



- CATEGORY C**
- Essential Habitat
- Referable Wetlands
- Declared Catchment Areas
- Nature Refuges
- Resources Reserves
- State Forests
- Timber Reserves
- Of Concern Regional Ecosystems (remnant and mature regrowth (biodiversity status))
- OTHERS**
- Towns
- Roads
- Rivers
- Springs
- Wild River High Preservation Areas
- Wild River Preservation Areas
- Chapter 5A Dominant Wetlands (51-100%)
- Chapter 5A Subdominant Wetlands (0-50%)
- Queensland

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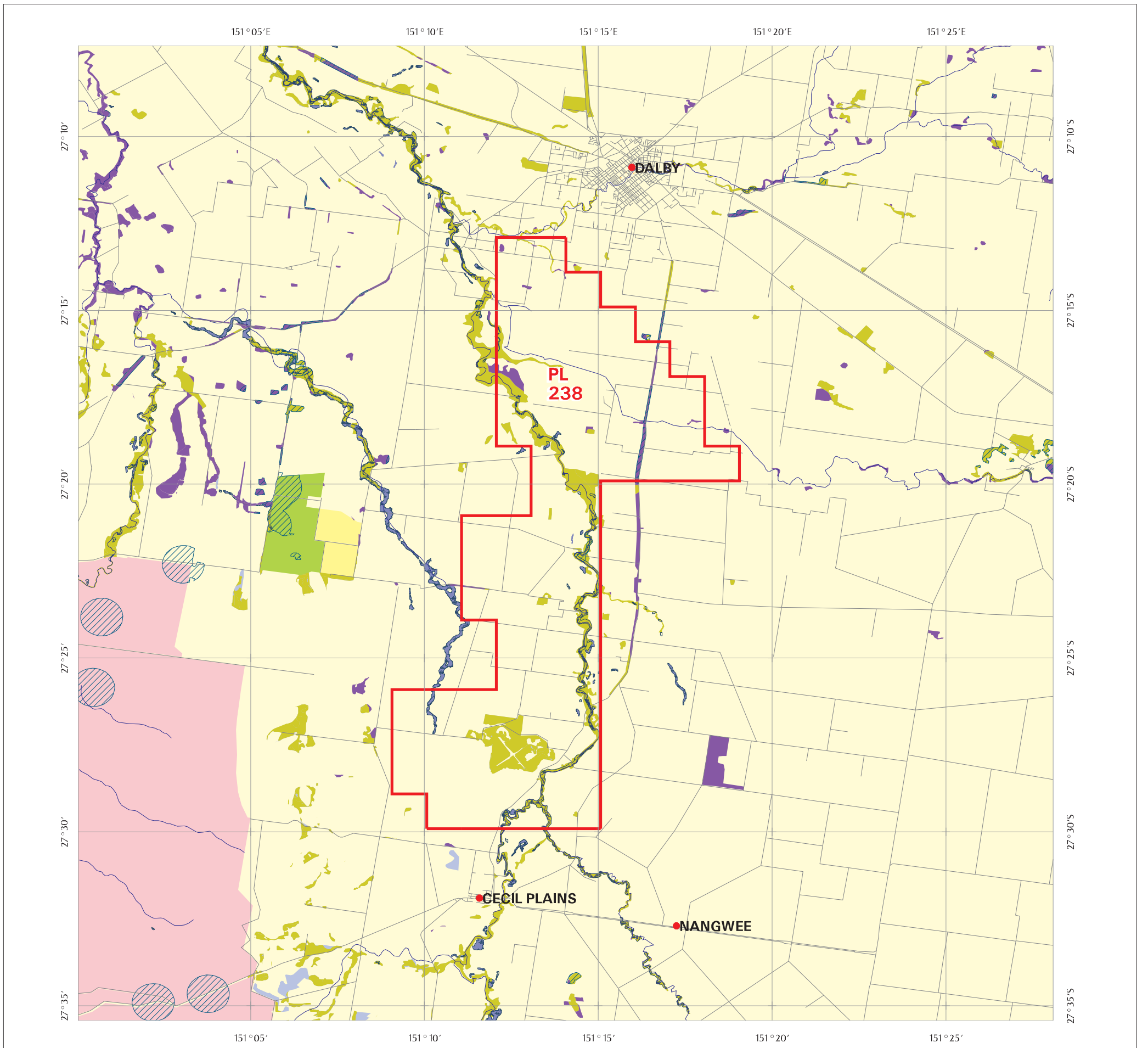
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ENVIRONMENTALLY SENSITIVE AREAS - Chapter 5A activities (EP Act)

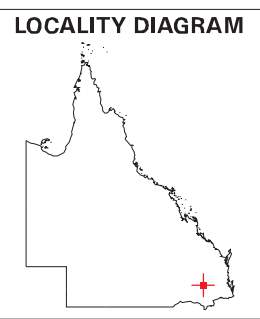
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Centered on Tenure:
PL 238



- CATEGORY C**
- Essential Habitat
- Referable Wetlands
- Declared Catchment Areas
- Nature Refuges
- Resources Reserves
- State Forests
- Timber Reserves
- Of Concern Regional Ecosystems (remnant and mature regrowth (biodiversity status))
- OTHERS**
- Towns
- Roads
- Rivers
- Springs
- Wild River High Preservation Areas
- Wild River Preservation Areas
- Chapter 5A Dominant Wetlands (51-100%)
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- Queensland

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0 2000 4000 6000 8000 10000m

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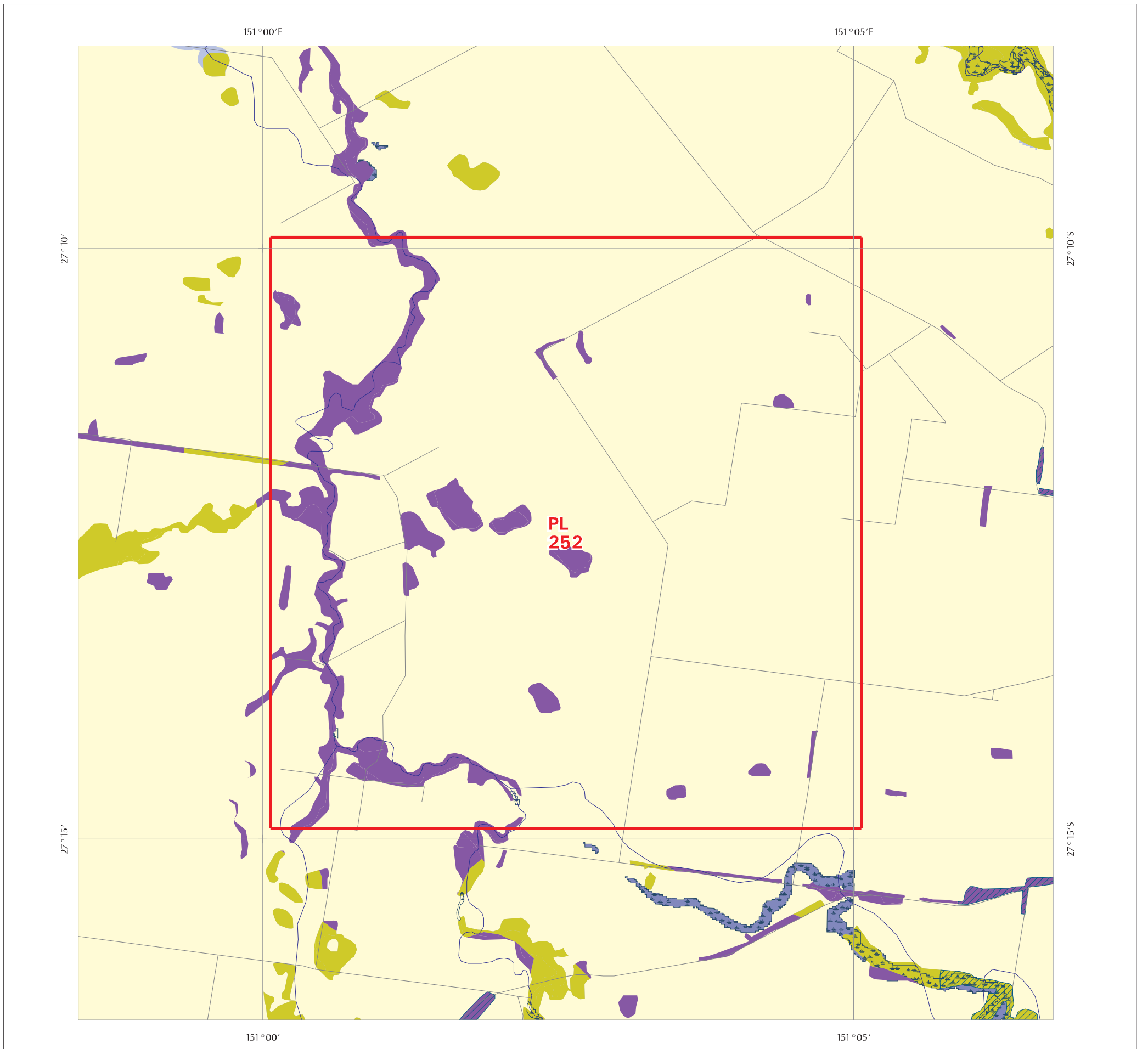
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ENVIRONMENTALLY SENSITIVE AREAS - Chapter 5A activities (EP Act)

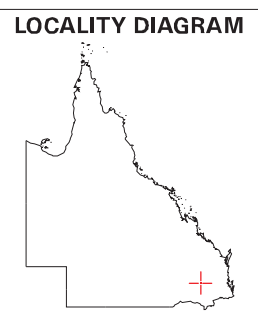
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Centered on Tenure:
PL 252



- CATEGORY C**
- Essential Habitat
- Referable Wetlands
- Declared Catchment Areas
- Nature Refuges
- Resources Reserves
- State Forests
- Timber Reserves
- Of Concern Regional Ecosystems (remnant and mature regrowth (biodiversity status))
- OTHERS**
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0 500 1000 1500 2000 2500m

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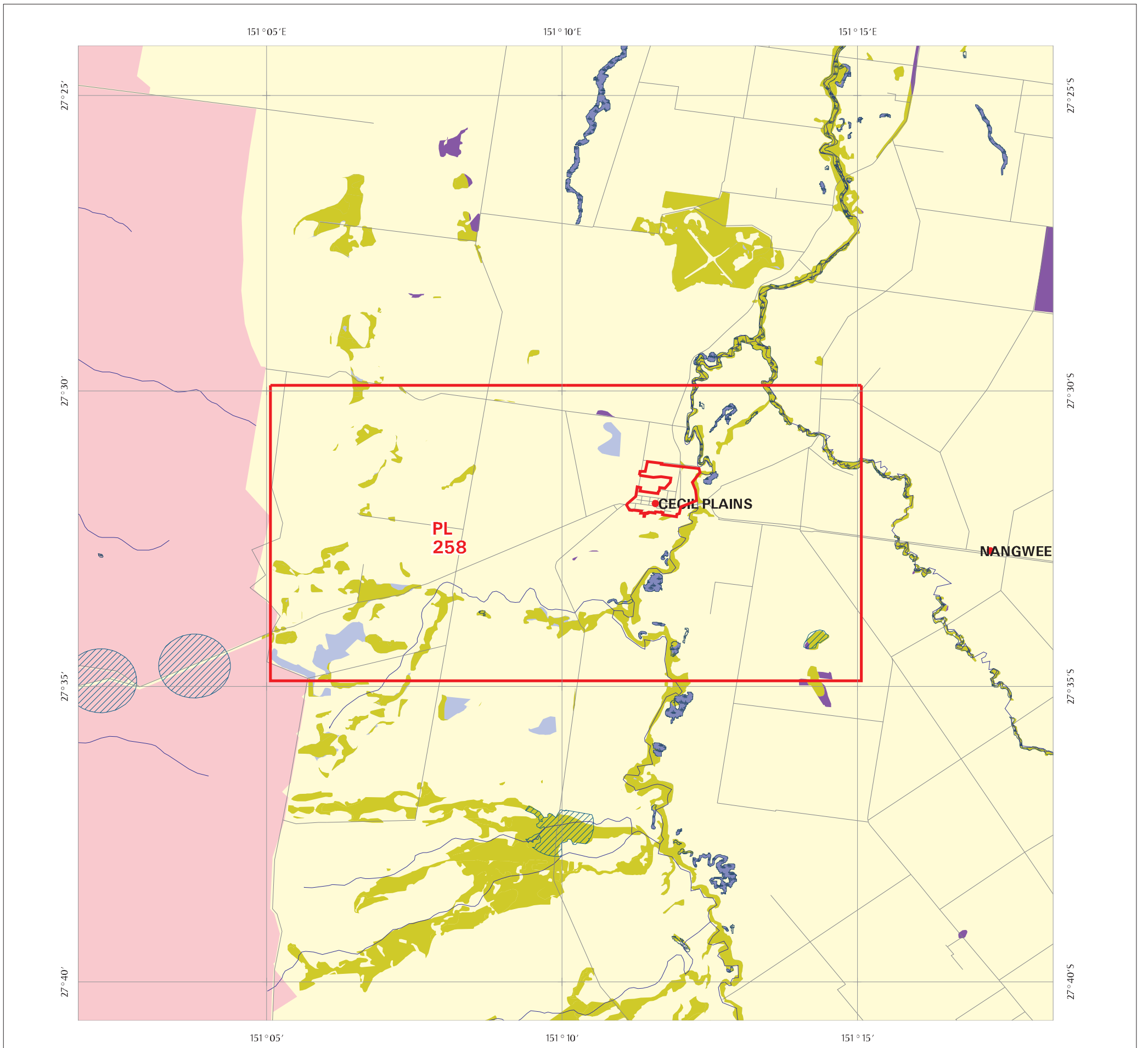
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ENVIRONMENTALLY SENSITIVE AREAS - Chapter 5A activities (EP Act)

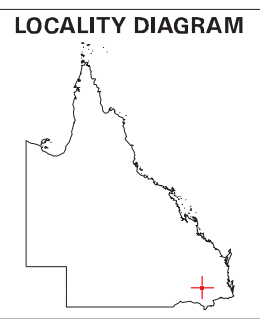
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Centered on Tenure:
PL 258



- CATEGORY C**
- Essential Habitat
- Referable Wetlands
- Declared Catchment Areas
- Nature Refuges
- Resources Reserves
- State Forests
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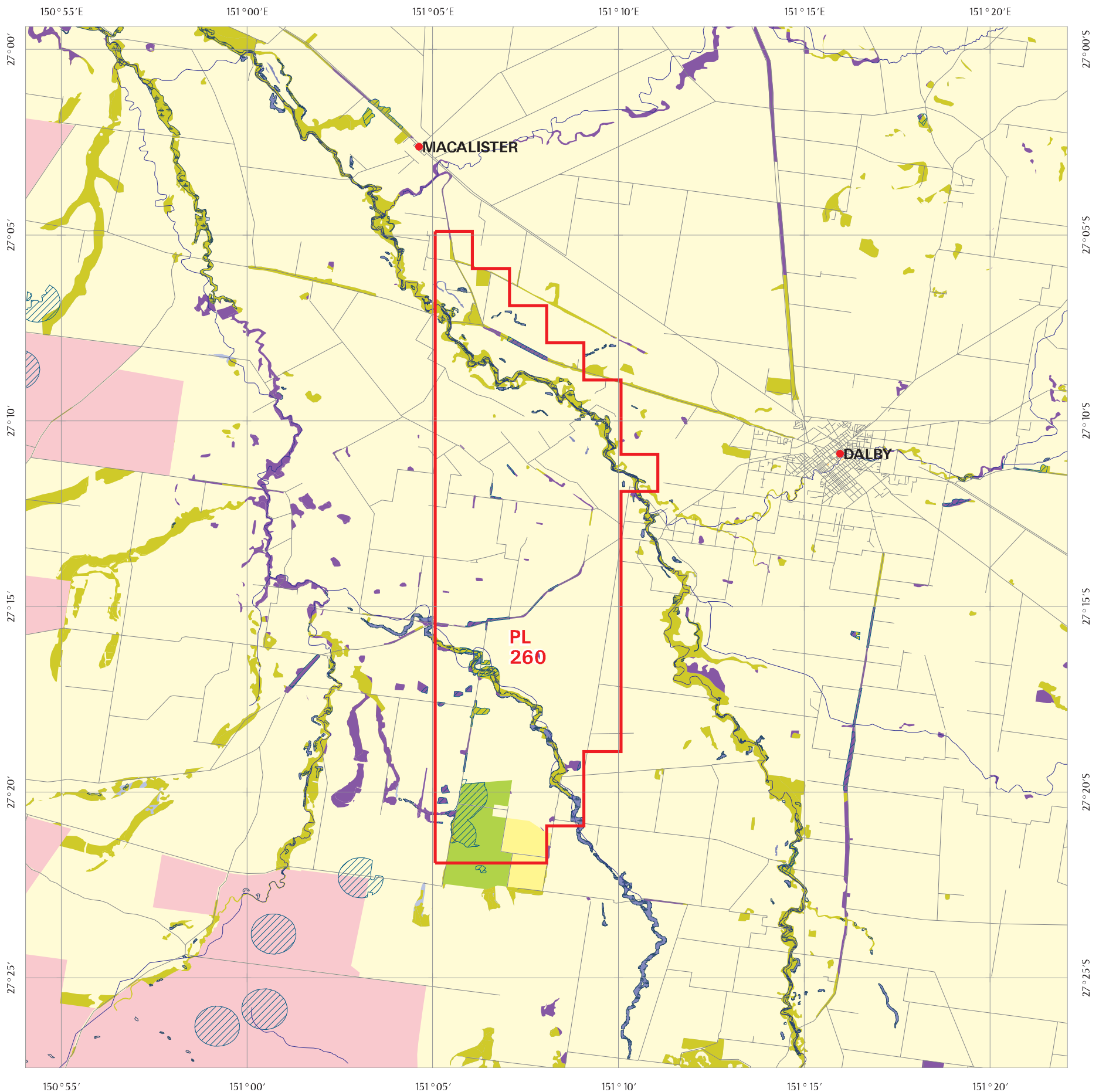
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ENVIRONMENTALLY SENSITIVE AREAS - Chapter 5A activities (EP Act)

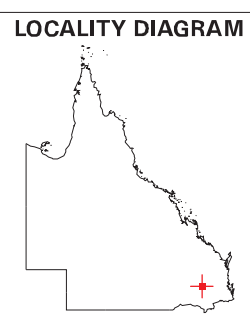
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Date: 01 Aug 13 Time: 07.56.43

Centered on Tenure:
PL 260



- CATEGORY C**
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- Referable Wetlands
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0 2000 4000 6000 8000 10000m

This scale bar is approximate only
Horizontal Datum: Geocentric Datum of Australia 1994 (GDA94)
This product is unprojected and is not suitable for measuring distances

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Regional ecosystem mapping (remnant biodiversity status) may incorporate amendments, resulting from property level assessments, to the release version of the mapping available on QGIS.

NOTE TO USER: Themes presented in this map are indicative only. Field survey may be required to verify the 'true' spatial extent and value. Not all environmentally sensitive areas are presented in this map. A user should refer to the particular circumstances relevant to their situation to assess the 'completeness' of themes provided.

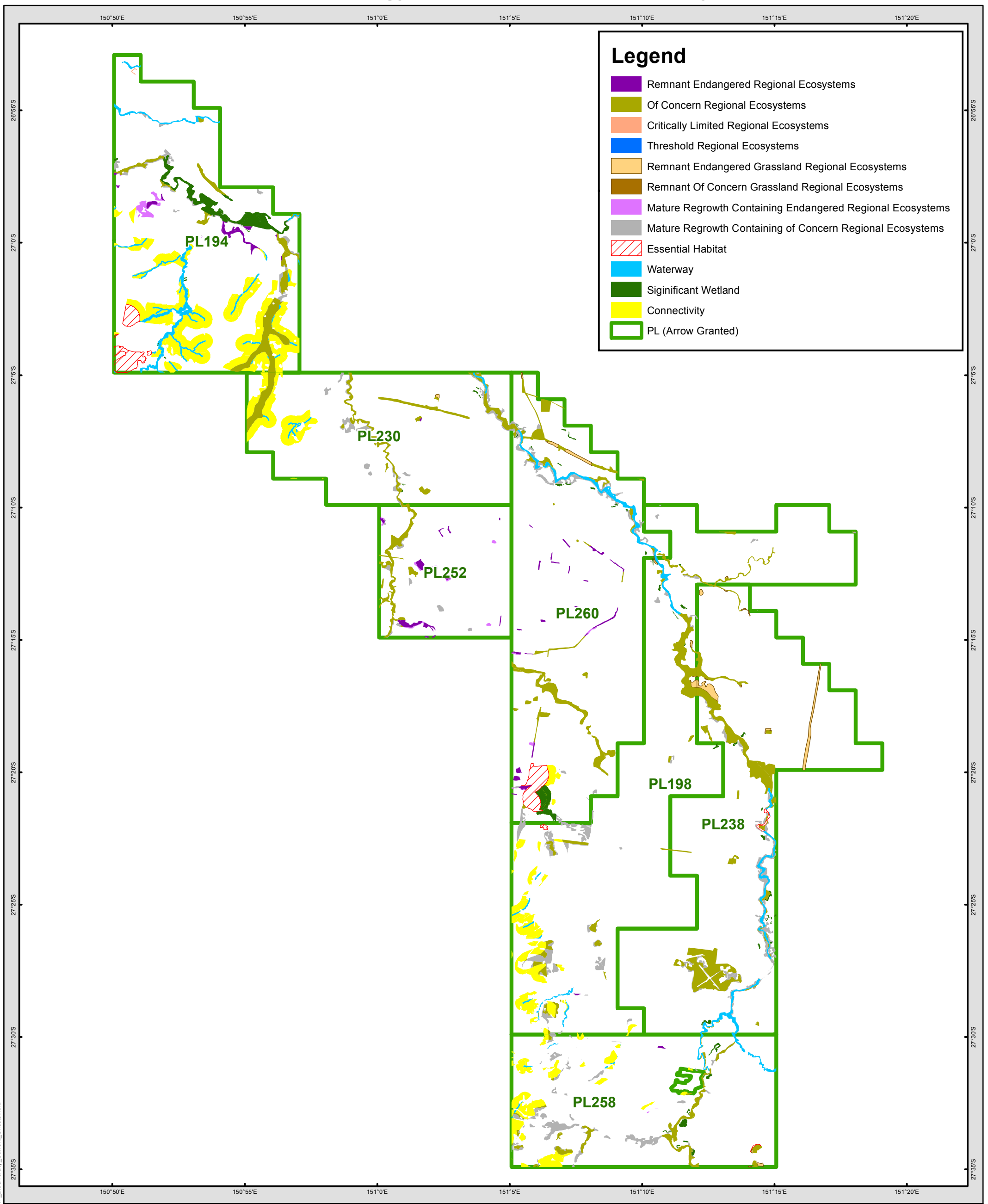
The user should note that some boundaries and indicated values are ambient and may change over time (e.g. regional ecosystem boundaries and conservation status, watercourse mapping etc).

The user should be aware that due to multiple overlapping themes/layers present, some themes/layers may be obscured by others. Ordering in the Legend does not accurately reflect the order by which themes/layers are displayed.

Mature Regrowth vegetation, depicting endangered and of concern regional ecosystems types, was incorporated as of 24/07/2012

Appendix C Mapped SSBV Areas on the DXP (Map)

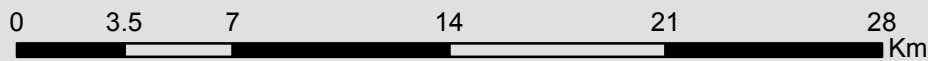
Arrow Energy - Current QLD offsets Policy



DXP State Biodiversity Offset Areas

Date: 23/09/2013

Source: Arrow Energy Pty Ltd
Geosciences Australia
DEHP



Coordinate System: GCS GDA 1994



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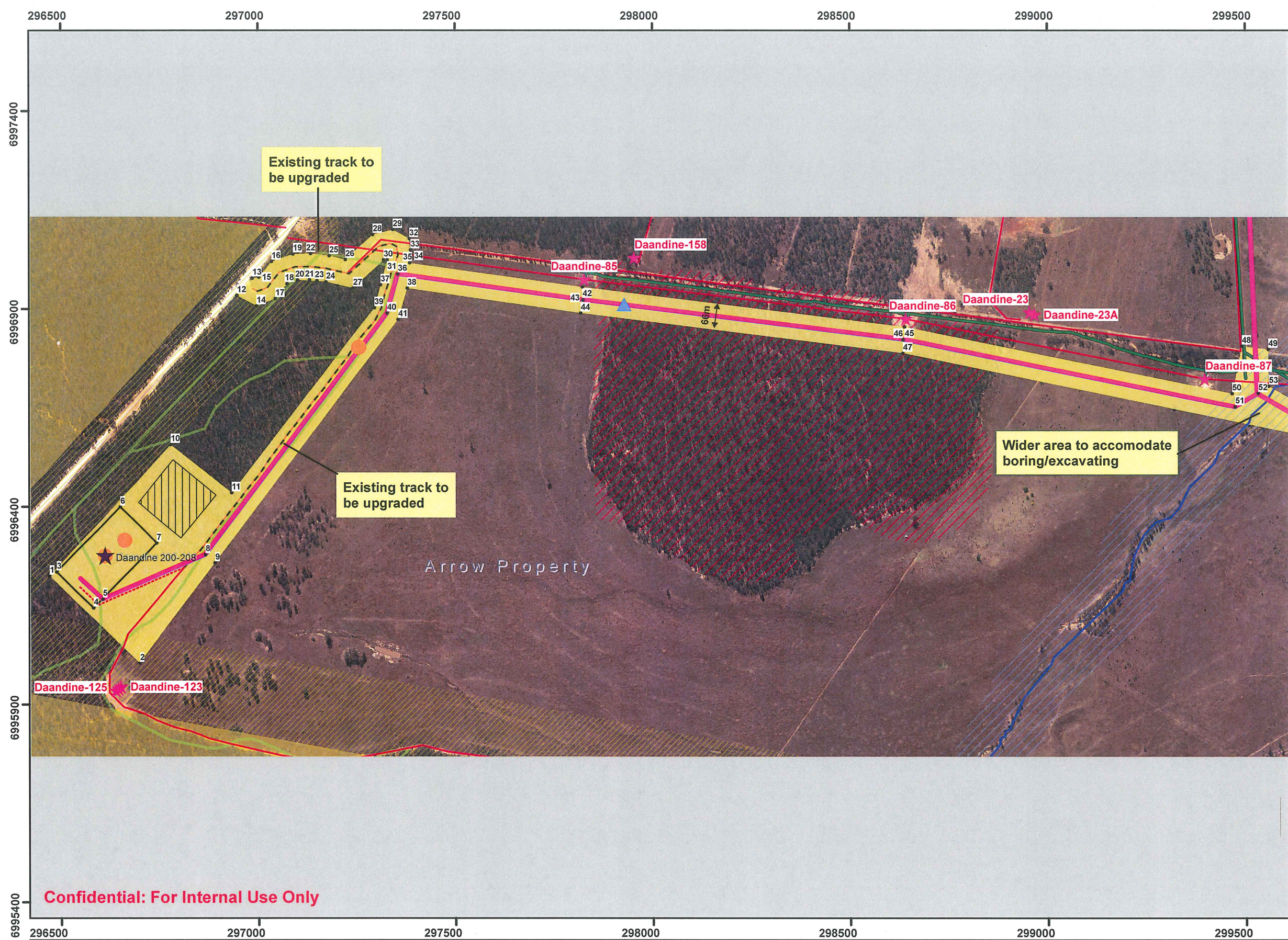
The dimensions, areas, number of lots, size & location of corridor information are approximate only and may vary.

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Appendix D Daandine Expansion Project – Land Access Maps



Legend

- Existing Arrow Well Sites (Pink star)
- DDEXP Wells**
 - Planned Pad Wells (Black star)
 - Planned Vertical Wells (Red star)
- Geotechnical Points**
 - Test Pit (Orange circle)
 - Borehole (Yellow circle)
- Valves & Drains**
 - Gas Relief Valve (Black triangle)
 - High Point Valve (Red triangle)
 - Low Point Drain (Blue triangle)
 - Water Line Valve (Green triangle)
- Pipelines**
 - DDEXP Phase 1 - Gas Pipeline (Pink line)
 - DDEXP Phase 1 - Water pipeline (Blue line)
 - Existing Gas / Water (Green line)
 - Fences (Red line)
 - Watercourse (Blue line)
- Tracks**
 - Existing Track - road type unknown (Red line)
 - Existing Dirt Track (Orange line)
 - Existing Gravel Track (Grey line)
 - New Track Required (Dashed red line)
 - Existing Dirt Track, upgrade required (Dashed orange line)
- Other Features**
 - Temporary Drilling Camps (Hatched rectangle)
 - Well Pads (White rectangle)
 - Remnant Vegetation - No Go Zone (Red hatched area)
 - LAR Assessment Area - Pending (Yellow area)
 - ESA Category A (Pink area)
 - ESA Category B (Purple area)
 - ESA Category C (Yellow area)
 - EPA Referrable Wetlands (Blue hatched area)
 - EPA Mature Regrowth (Green hatched area)
 - Category B 200m buffer (Red hatched area)
 - Category C 200m buffer (Yellow hatched area)
 - EPA Referrable Wetlands 200m Buffer (Blue hatched area)
 - Waterway Buffer 100m (Blue hatched area)

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0	Issued for Use	01.05.2013	DSm	KWw	SSo	JMI

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Status: IFU
 Issued To: N Bernoff
 Author: D Smith

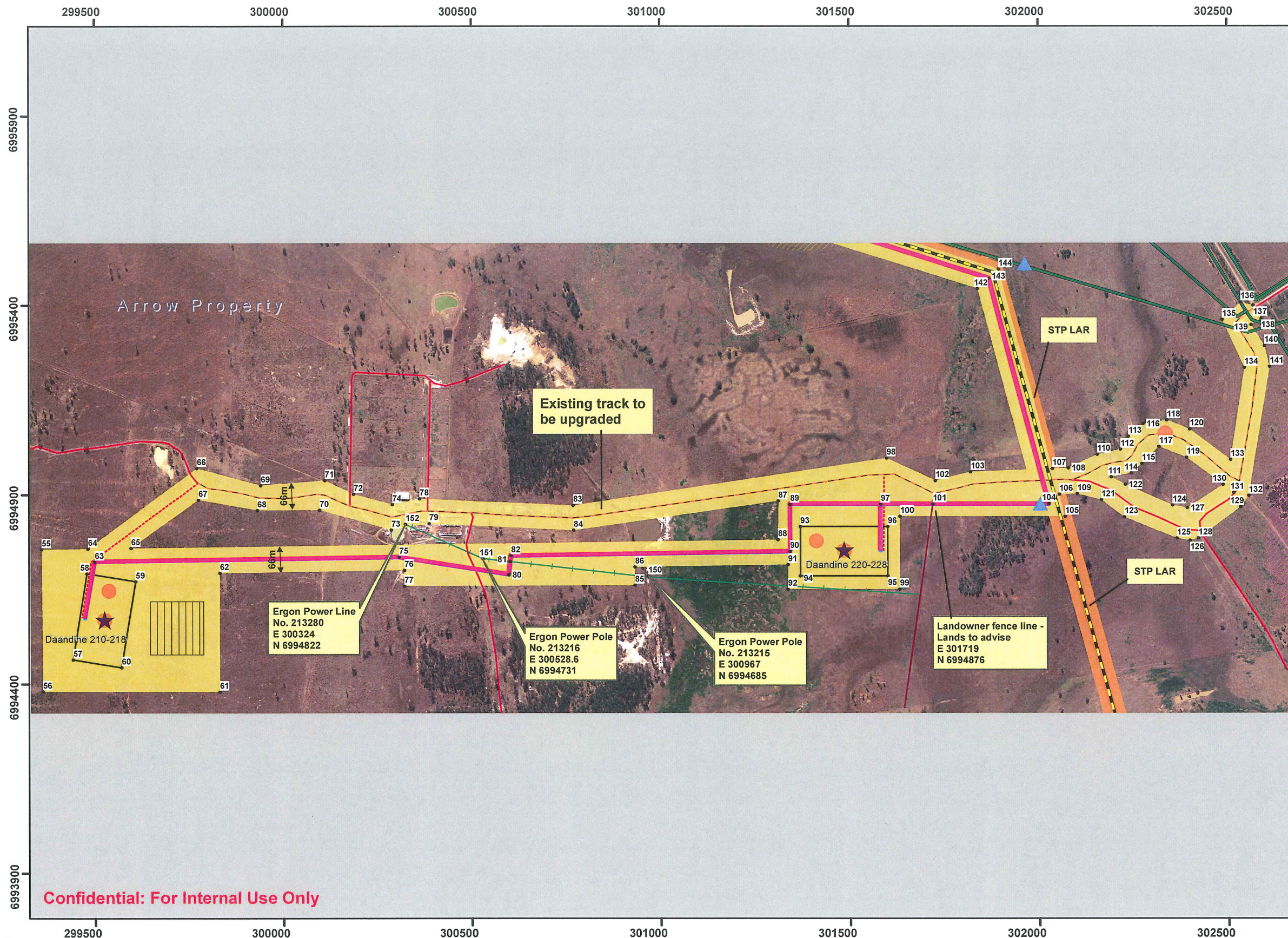
Source: Arrow Energy Limited
 Geosciences Australia
 Dept. Envir. and Resource Mgmt.

Scale @ A3 1:10,000
 Coordinate System
 GDA 1994 MGA Zone 56

A13: DAANDINE EXPANSION PROJECT

LAR 696.1 - Map 1

Arrow Document Number: 05-GI-MAP-0019
 Clough Document Number: 08553-DWG-01-G-0012



Legend

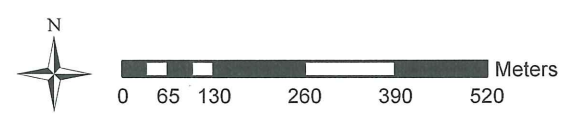
- Existing Arrow Well Sites
- DDEXP Wells**
 - Planned Pad Wells
 - Planned Vertical Wells
- Geotechnical Points**
 - Test Pit
 - Borehole
- Valves & Drains**
 - Gas Relief Valve
 - High Point Valve
 - Low Point Drain
 - Water Line Valve
- Pipelines**
 - DDEXP Phase 1 - Gas Pipeline
 - DDEXP Phase 1 - Water pipeline
 - Existing Gas / Water
 - Planned Gas & Water Surat Tek Park
 - Ergon Owned Power Lines
 - Fences
 - Watercourse
- Tracks**
 - Existing Track, unknown road type
 - Existing Dirt Track
 - Existing Gravel Track
 - New Track Required
 - Existing Dirt Track, upgrade required
 - Temporary Drilling Camps
 - Well Pads
 - LAR Assessment Area - Pending
 - LAR Assessment Pending, Surat Tek Park Pipeline ROW
 - ESA Category A
 - ESA Category B
 - ESA Category C
 - EPA Referrable Wetlands
 - EPA Mature Regrowth
 - Category B 200m buffer
 - Category C 200m buffer
 - EPA Referrable Wetlands 200m Buffer
 - Waterway Buffer 100m

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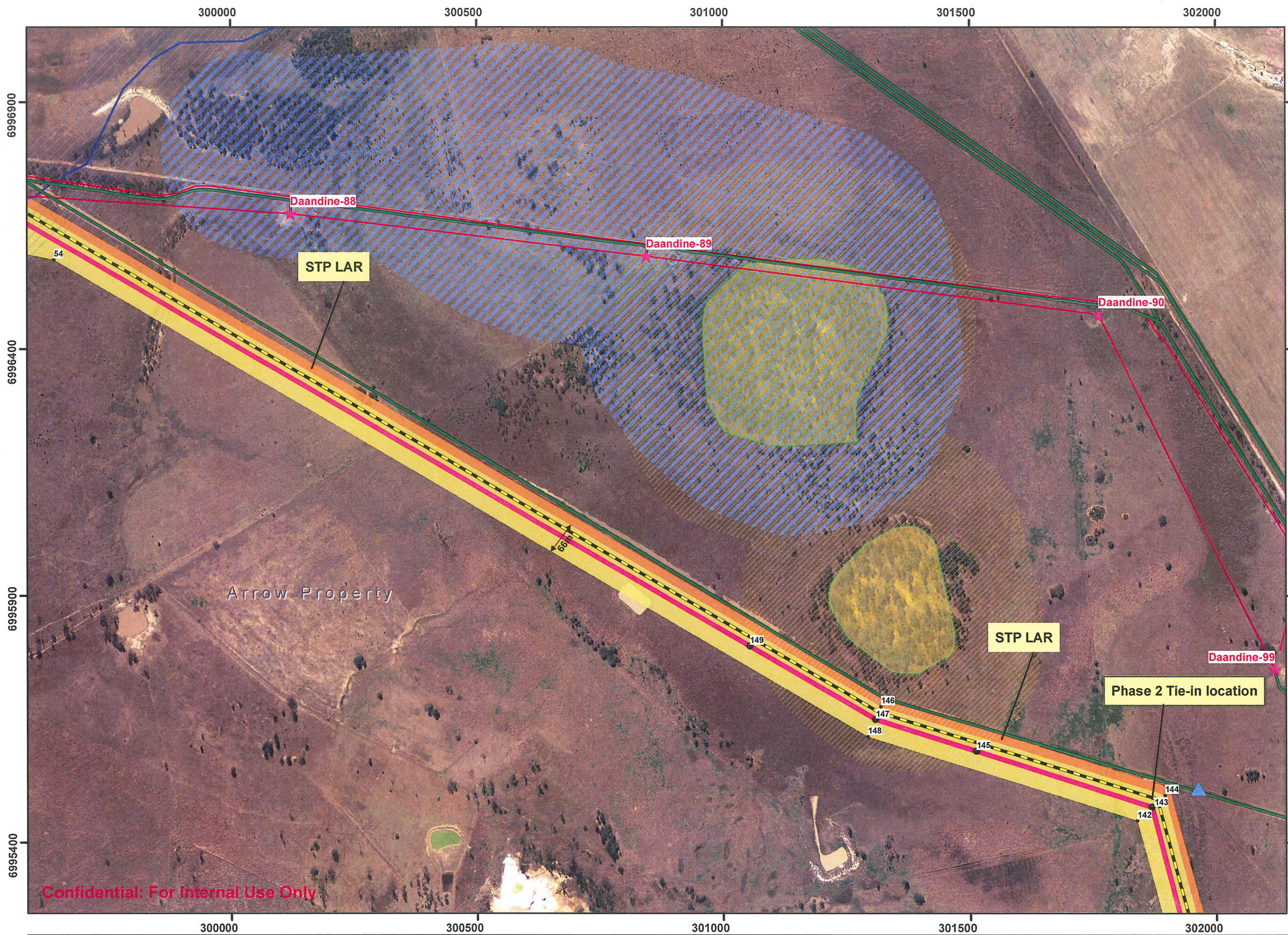
Scale @ A3 1:10,500
 Coordinate System
 GDA 1994 MGA Zone 56

A13: DAANDINE EXPANSION PROJECT

LAR 696.1 - Map 2

Arrow Document Number: 05-GI-MAP-0020
 Clough Document Number: 08553-DWG-01-G-0013

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Legend

Existing Arrow Well Sites

- Existing Arrow Well Sites (Pink star)

DDEXP Wells

- Planned Pad Wells (Black star)
- Planned Vertical Wells (Red star)

Geotechnical Points

- Test Pit (Orange circle)
- Borehole (Yellow circle)

Valves & Drains

- Gas Relief Valve (Black triangle)
- High Point Valve (Red triangle)
- Low Point Drain (Blue triangle)
- Water Line Valve (Green triangle)

Pipelines

- DDEXP Phase 1 - Gas Pipeline (Pink line)
- DDEXP Phase 1 - Water pipeline (Blue line)
- Existing Gas / Water (Green line)
- Planned Gas & Water Surat Tek Park (Yellow dashed line)

Fences

- Fences (Red line)
- Watercourse (Blue line)

Tracks

- Existing Track, unknown road type (Red line)
- Existing Dirt Track (Orange line)
- Existing Gravel Track (Black line)
- New Track required (Red dashed line)
- Existing Dirt Track, upgrade required (Orange dashed line)

Assessment Areas

- LAR Assessment Areas - Pending (Yellow hatched)
- LAR Assessment Pending, Surat Tek Park Pipeline ROW (Orange hatched)
- ESA Category A (Pink hatched)
- ESA Category B (Purple hatched)
- ESA Category C (Yellow hatched)

Wetlands & Buffers

- Referrable Wetlands (EPA) (Blue hatched)
- EPA Mature Regrowth (Green hatched)
- Category B 200m buffer (Pink hatched)
- Category C 200m buffer (Yellow hatched)
- EPA Referrable Wetlands 200m Buffer (Blue hatched)
- Waterway Buffer 100m (Blue hatched)

Rev.	Description	Date	Prep	CHKD	APPD
0	Issued for Use	01.05.2013	DSM	KWO	SSO

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 Coordinate System
 GDA 1994 MGA Zone 56

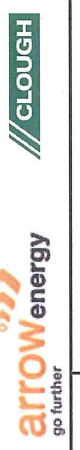
A13: DAANDINE EXPANSION PROJECT

LAR 696.1 - Map 3

Arrow Document Number: 05-GI-MAP-0021
 Clough Document Number: 08553-DWG-01-G-0014

LAR 696.1 - Coordinates Table

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3	296488.7	6996235.3	DDEXP	1	79	300387.2	6994824	DDEXP	2
4	296581.6	6996144.2	DDEXP	1	80	300597.4	6994688.7	DDEXP	2
5	296604.6	6996166.7	DDEXP	1	81	300600.4	6994722.8	DDEXP	2
6	296649.8	6996399.5	DDEXP	1	82	300602.5	6994738.8	DDEXP	2
7	296742.6	6996308.5	DDEXP	1	83	300767.6	6994872.1	DDEXP	2
8	296865.9	6996279.2	DDEXP	1	84	300769.5	6994806	DDEXP	2
9	296890.6	6996258.1	DDEXP	1	85	300931.2	6994660.9	DDEXP	2
10	296778.7	6996557.3	DDEXP	1	86	300931.2	6994709	DDEXP	2
11	296932.3	6996435.6	DDEXP	1	87	301309.9	6994883.4	DDEXP	2
12	296946.2	6996934.6	DDEXP	1	88	301309	6994781.3	DDEXP	2
13	296985.6	6996978.2	DDEXP	1	89	301341.7	6994874.7	DDEXP	2
14	296996.1	6996907.9	DDEXP	1	90	301341	6994750.4	DDEXP	2
15	297001.9	6996980.7	DDEXP	1	91	301336	6994715.4	DDEXP	2
16	297034.1	6997020.3	DDEXP	1	92	301335.8	6994650.4	DDEXP	2
17	297043.9	6996926.3	DDEXP	1	93	301368.9	6994815.8	DDEXP	2
18	297073.9	6996964.2	DDEXP	1	94	301368.8	6994685.8	DDEXP	2
19	297088.7	6997039.1	DDEXP	1	95	301598.8	6994685.7	DDEXP	2
20	297100.4	6996973.3	DDEXP	1	96	301598.9	6994815.7	DDEXP	2
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23	297149.6	6996971.8	DDEXP	1	99	301631.2	6994650.7	DDEXP	2
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27	297241.4	6996952.8	DDEXP	1	103	301819.5	6994960.2	DDEXP	2
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39	297294.3	6996903.2	DDEXP	1	115	302272.5	6994981.8	DDEXP	2
40	297326.9	6996889.5	DDEXP	1	116	302276.2	6995087.1	DDEXP	2
41	297354.6	6996873.5	DDEXP	1	117	302318	6995026.8	DDEXP	2
42	297822.8	6996955.6	DDEXP	1	118	302338	6995096.7	DDEXP	2
43	297824.1	6996923	DDEXP	1	119	302390.2	6994998.1	DDEXP	2
44	297818.3	6996889.6	DDEXP	1	120	302398.7	6995073.1	DDEXP	2
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53	299558.2	6996704.9	DDEXP	1	129	302533.2	6994867.1	DDEXP	2
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55	299357.8	6994755.7	DDEXP	2	131	302515.4	6994905.4	DDEXP	2
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57	299441.3	6994464.9	DDEXP	2	133	302506.9	6994992.4	DDEXP	2
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60	299569.6	6994443.8	DDEXP	2	136	302534.1	6995408.2	DDEXP	2
61	299829.5	6994379.4	DDEXP	2	137	302567.4	6995400.2	DDEXP	2
62	299830.1	6994693.4	DDEXP	2	138	302588.4	6995365.2	DDEXP	2
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67	299772.2	6994886.4	DDEXP	2	143	301868.3	6995471.8	DDEXP	2 & 3
68	299930.7	6994859	DDEXP	2	144	301894.7	6995496	DDEXP	2 & 3
69	299939.6	6994924.8	DDEXP	2	145	301511.4	6995585.1	DDEXP	3
70	300095	6994859.8	DDEXP	2	146	301319.5	6995675.5	DDEXP	3
71	300109	6994938.1	DDEXP	2	147	301308.6	6995648.9	DDEXP	3
72	300185.5	6994901.6	DDEXP	2	148	301292.7	6995614.7	DDEXP	3
73	300286	6994806.8	DDEXP	2	149	301054	6995797.9	DDEXP	3
74	300288.8	6994874.7	DDEXP	2	150	300966.6	6994685.4	DDEXP	2
75	300307.1	6994735.6	DDEXP	2	151	300528.6	6994730.8	DDEXP	2
76	300321.4	6994700.9	DDEXP	2	152	300324	6994821.9	DDEXP	2



A13: DAANDINE EXPANSION PROJECT
 Status: IFU
 Issued to: N. Bernoff
 Author: D. Smith
LAR 696.1 - Coordinates Table

Arrow Document Number: 05-GH-MAP-0022
 Clough Document Number: 08553-DWG-01-G-0015

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Source:
 Arrow Energy Limited, Geosciences Australia
 Dept. Envir. and Resource Mgmt.

Rev	Description	Date	By
0	Issue for use	01/03/2015	DNB

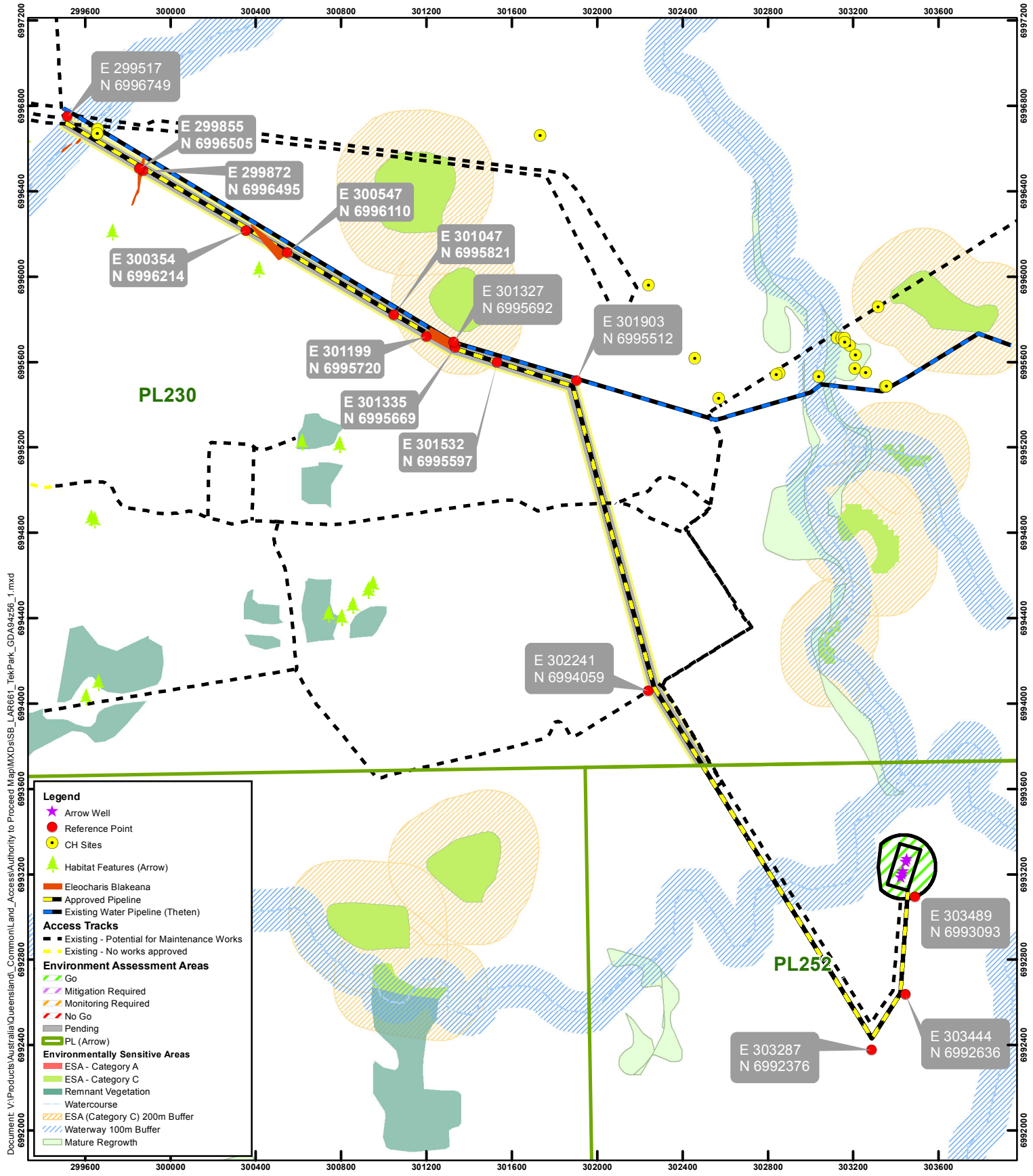
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Print Date: 2052013

Appendix E Surat Tec Park Project – Land Access Maps

Access & Approval Conditions Map



Document: V:\Products\Australia\Queensland\CommonLand_AccessAuthority to Proceed Map\MXDs\SB_LAR661_TekPark_GDA94z56_1.mxd

Legend

- ★ Arrow Well
- Reference Point
- CH Sites
- ▲ Habitat Features (Arrow)
- ▬ Eleocharis Blakeana
- ▬ Approved Pipeline
- ▬ Existing Water Pipeline (Theten)

Access Tracks

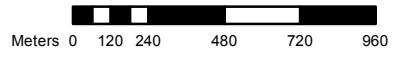
- ▬ Existing - Potential for Maintenance Works
- ▬ Existing - No works approved

Environment Assessment Areas

- ▬ Go
- ▬ Mitigation Required
- ▬ Monitoring Required
- ▬ No Go
- ▬ Pending
- ▬ PL (Arrow)

Environmentally Sensitive Areas

- ▬ ESA - Category A
- ▬ ESA - Category C
- ▬ Remnant Vegetation
- ▬ Watercourse
- ▬ ESA (Category C) 200m Buffer
- ▬ Waterway 100m Buffer
- ▬ Mature Regrowth



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Date	Revision Description	Eng	QA	App
1	25/06/13 Issued For Use	JC	LS	---
D	25/06/13 Added Eleocharis Blakeana - Issued For Review	JC	LS	---
0	05/04/13 Change Legend Approved Pipeline (Issued For Use)	AW	LK	---
C	04/04/13 Change of environmental constraints	AW	LK	---
B	07/11/12 Add SCL	TS	TS	---
A	30/10/12 First Draft Issued for Review	TS	TS	---



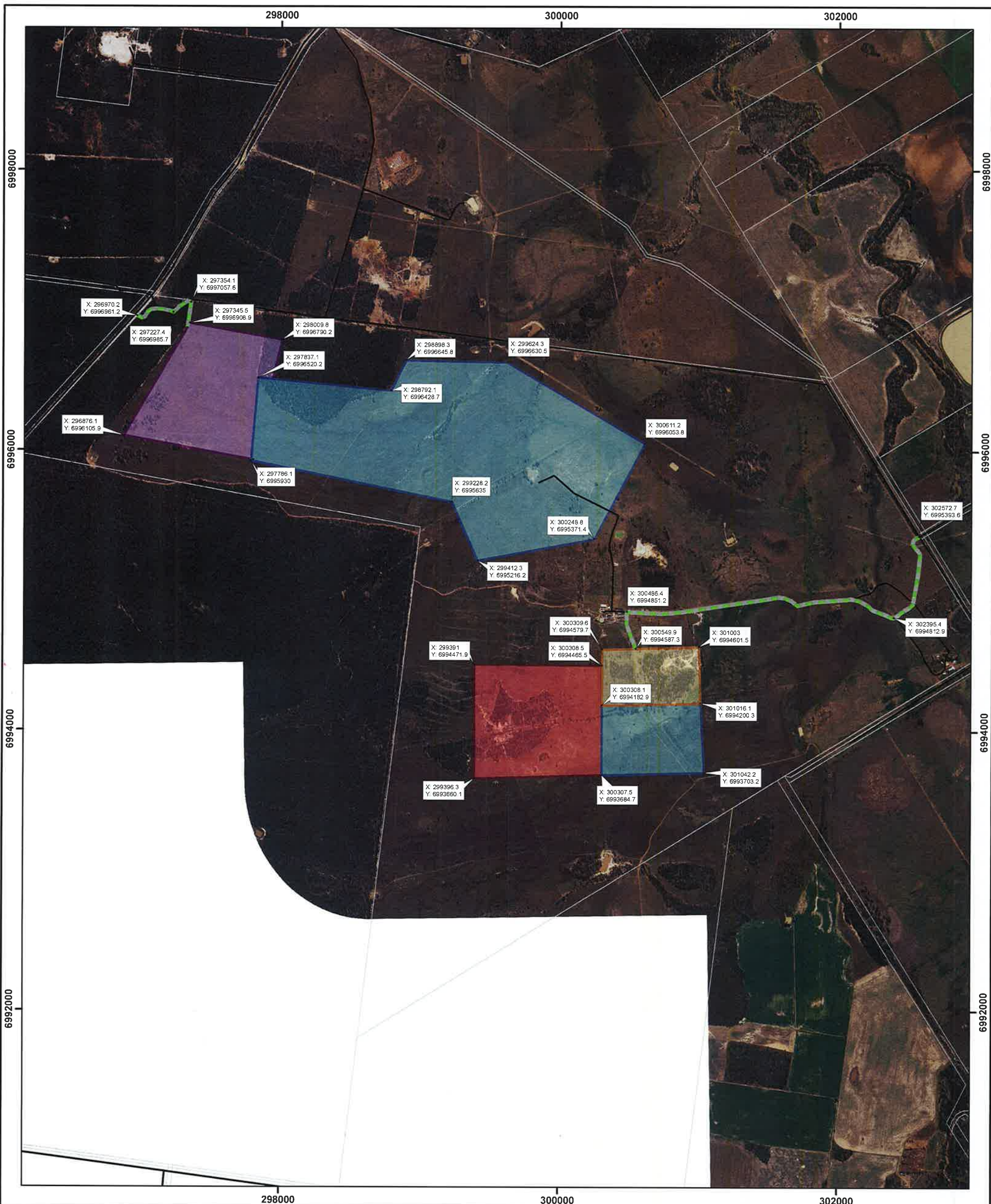
Status: IFU
Project Manager: T Shenstone
Author: A Williams

Scale @ A4: 1:24,000
Coordinate System:
 GDA 1994 MGA Zone 56

Source: Arrow Energy Limited
 Geosciences Australia
 Dept. Envir. and Resource Mgmt.

Surat Basin
Surat Tek Park Pipeline
LAR 661
(1)

Appendix F Area 7 Geotechnical Investigation – Land Access Map



— Road or Track
 — Parcel Boundary
Area Use
 Accomodation
 Borrow Pit
 Dams
 Gas Processing, Dams and Borrow Pits
Proposed Site Access Route
 Existing

Rev	Date	Revision Description	ORIG	CHK	ENG	QA	APPD
A	26/06/2013	Issued for Information	JL	CC	DS	GJB	

resources & energy

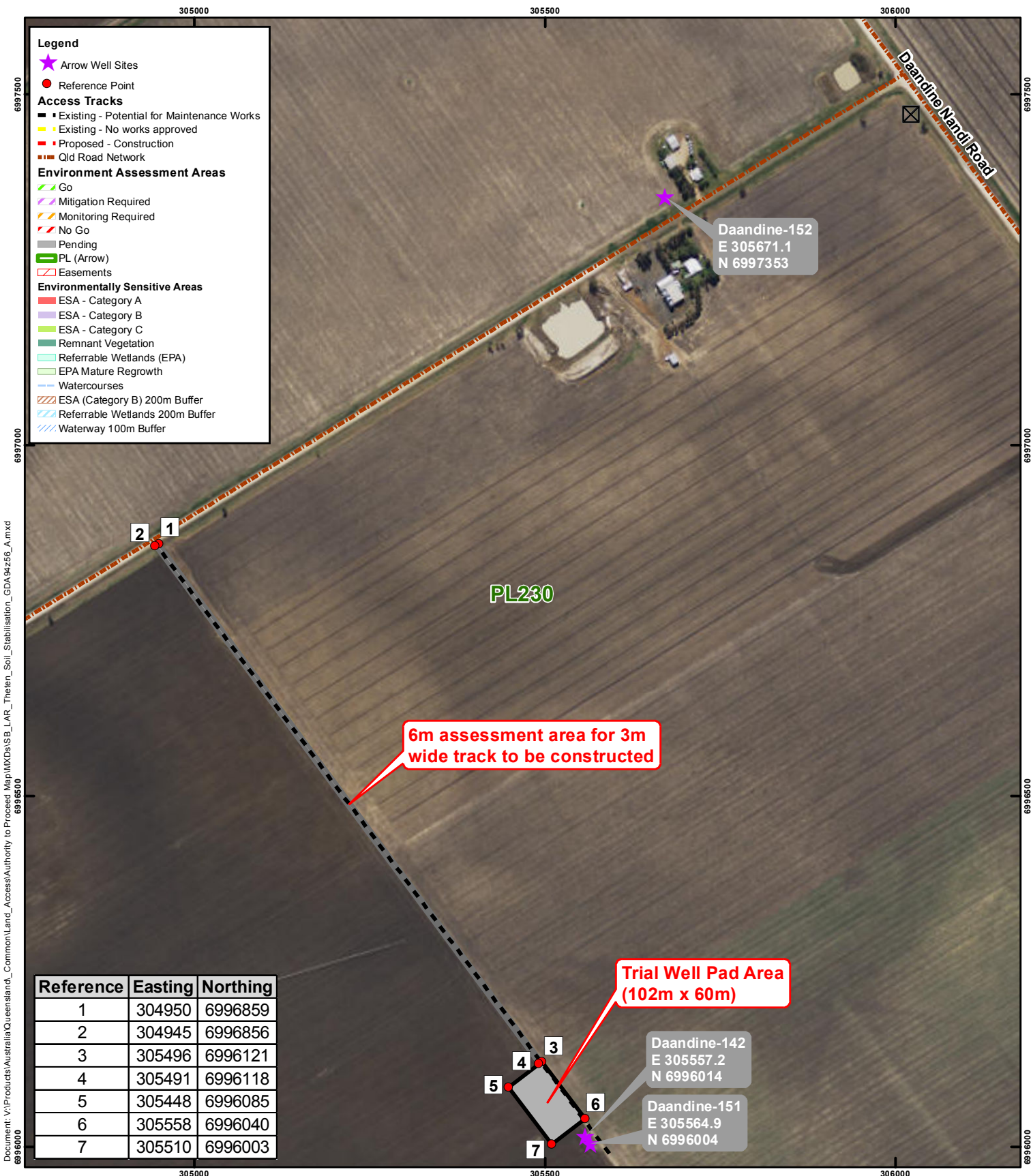
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 Map Gnd of Australia - Zone 56
 Geographic Datum of Australia 1994

Arrow Energy
SURAT GAS
CONCEPT SELECT PROJECT
Drainage Area 7
Geotech Scope of Work

Project No: 401001-00640 Figure: 401001-00640-60-GM-DOM-0135 Rev: A

Appendix G Soil Stabilisation Trials – Land Access Map

Access & Approval Conditions Map



Legend

- ★ Arrow Well Sites
- Reference Point
- Access Tracks**
 - ▬ Existing - Potential for Maintenance Works
 - ▬ Existing - No works approved
 - ▬ Proposed - Construction
 - ▬ Qld Road Network
- Environment Assessment Areas**
 - ▬ Go
 - ▬ Mitigation Required
 - ▬ Monitoring Required
 - ▬ No Go
 - ▬ Pending
 - ▬ PL (Arrow)
 - ▬ Easements
- Environmentally Sensitive Areas**
 - ▬ ESA - Category A
 - ▬ ESA - Category B
 - ▬ ESA - Category C
 - ▬ Remnant Vegetation
 - ▬ Referrable Wetlands (EPA)
 - ▬ EPA Mature Regrowth
 - ▬ Watercourses
 - ▬ ESA (Category B) 200m Buffer
 - ▬ Referrable Wetlands 200m Buffer
 - ▬ Waterway 100m Buffer

Reference	Easting	Northing
1	304950	6996859
2	304945	6996856
3	305496	6996121
4	305491	6996118
5	305448	6996085
6	305558	6996040
7	305510	6996003

6m assessment area for 3m wide track to be constructed

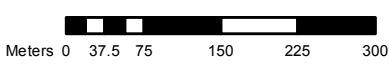
Trial Well Pad Area (102m x 60m)

Daandine-142
E 305557.2
N 6996014

Daandine-151
E 305564.9
N 6996004

Daandine-152
E 305671.1
N 6997353

PL230



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Date	Revision Description	JC	JC	JC	—	—	SM
		Org	Eng	CA	CA	CA	Apr
06/08/13	Issued for Review						



Status: IFR
Issued To: J Cheong
Author: J Clothier

Scale @ A4: 1:7,351
Coordinate System:
GDA 1994 MGA Zone 56

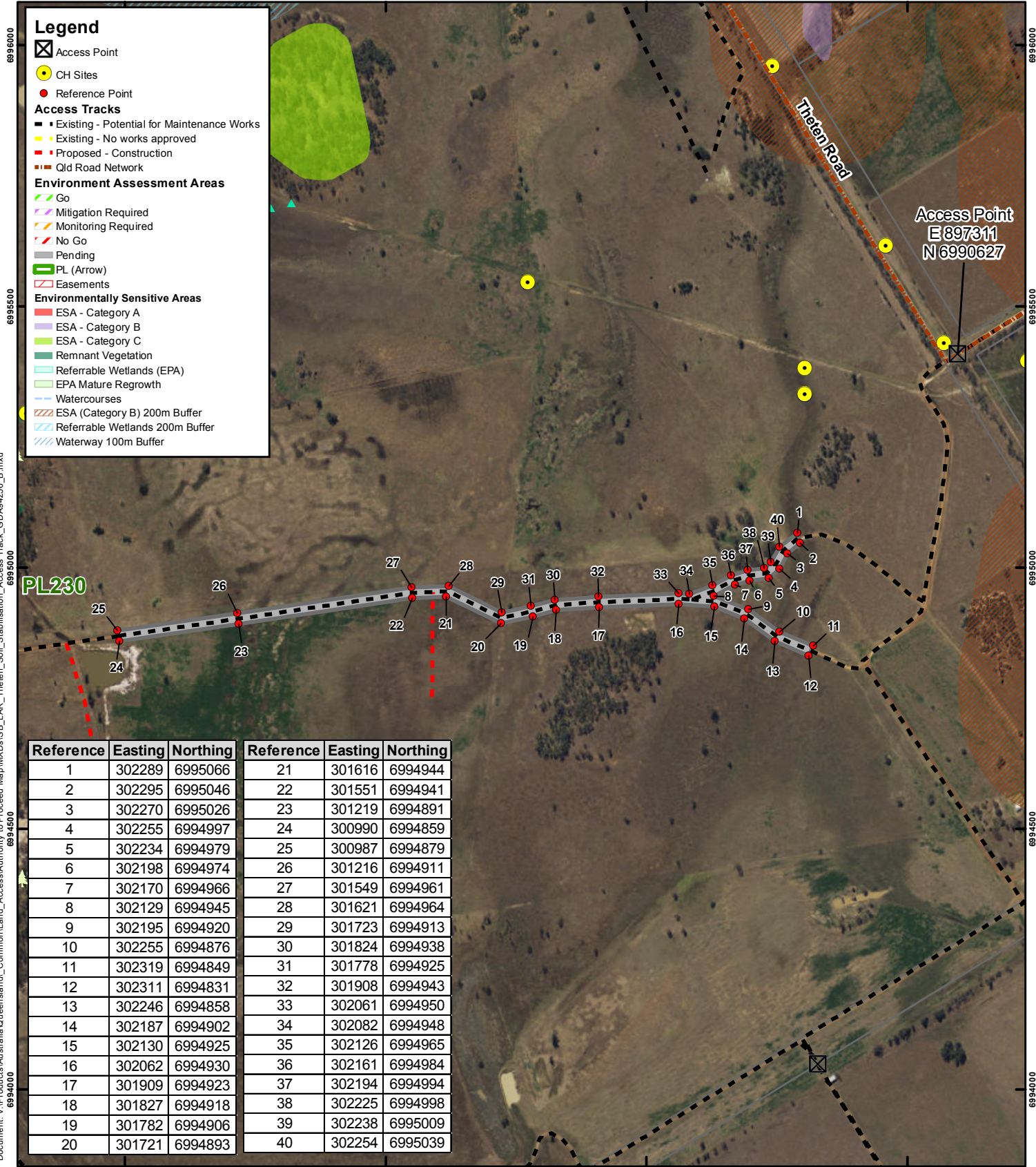
Source: Arrow Energy Limited
Geosciences Australia
Dept. Envir. and Resource Mgmt.

Surat Basin
Theten Soil Stabilisation
LARXXX
(A)

DRAFT

Access & Approval Conditions Map

301000 301500 302000 302500



Document: V:\Products\Australia\Queensland_CommonLand_AccessAuthority to Proceed Map\MXDs\SB_LAR_Thieler_Soil_Stabilisation_Access_Track_GDA94256_B.mxd

Reference	Easting	Northing	Reference	Easting	Northing
1	302289	6995066	21	301616	6994944
2	302295	6995046	22	301551	6994941
3	302270	6995026	23	301219	6994891
4	302255	6994997	24	300990	6994859
5	302234	6994979	25	300987	6994879
6	302198	6994974	26	301216	6994911
7	302170	6994966	27	301549	6994961
8	302129	6994945	28	301621	6994964
9	302195	6994920	29	301723	6994913
10	302255	6994876	30	301824	6994938
11	302319	6994849	31	301778	6994925
12	302311	6994831	32	301908	6994943
13	302246	6994858	33	302061	6994950
14	302187	6994902	34	302082	6994948
15	302130	6994925	35	302126	6994965
16	302062	6994930	36	302161	6994984
17	301909	6994923	37	302194	6994994
18	301827	6994918	38	302225	6994998
19	301782	6994906	39	302238	6995009
20	301721	6994893	40	302254	6995039



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Date	Revision Description	Eng	Env	LA	QA
24/09/13	Removed Infrastructure Layers - Issued for Review	JC	JC	—	JC
24/09/13	Issued for Review	JC	JC	—	SM



Status: IFR
Issued To: J Cheong
Author: J Clothier

Scale @ A4: 1:10,000
Coordinate System:
GDA 1994 MGA Zone 56

Source: Arrow Energy Limited
Geosciences Australia
Dept. Envir. and Resource Mgmt.

Surat Basin
Soil Stabilisation Access Track
LARXXX
(B)

Appendix H Statement of Financial Assurance

Dalby Expansion Project (DXP) Financial Assurance Summary

Arrow Energy retained EHS Support LLC (EHS Support), a U.S.-based environmental consulting firm with extensive financial assurance cost estimation experience in Queensland, to develop a third party financial assurance (FA) estimate for petroleum activities associated with the Dalby Expansion Project (DXP). This FA cost estimate covers a 1.5-year operational period for coal seam gas (CSG) development activities associated with the DXP and associated gas production areas.

In general the FA estimate includes the costs for rehabilitation of the following disturbances within the project area.

- Well pad rehabilitation activities associated with CSG wells during exploration, appraisal/development, and operational phases of the project. This includes:
 - Conversion of appraisal/development wells to production wells pads after successful completion of drilling and development activities.
 - Final rehabilitation of the well pad areas (including exploration and drilling trial pads) when well fields are decommissioned.
- Rehabilitation activities associated with backfilling of trenches and grading and revegetation of easements (post backfilling) for water and gas gathering pipelines in the field.
- Purging of gas gathering lines at project completion.
- Rehabilitation activities associated with stabilisation, grading and revegetation of road easements during construction, and final rehabilitation of roads following project completion.
- Rehabilitation of gas and water processing plant facilities through demolition and removal of infrastructure and grading and revegetation of areas.
- Removal of all gas field accumulation and process dams/ponds (including Turkey's nests), to include removal and disposal of sludge and liners, and grading and revegetation of the disturbed areas. This includes:
 - Management, treatment and disposal of water contained within accumulation dams/ponds. Water is assumed to be treated at the existing RO plants, and beneficially re-used or discharged per project approvals.
- Post rehabilitation monitoring of rehabilitated areas.

FA estimates for the periods from Oct. 2013 through Sept. 2014 (Year 1), and Oct. 2014 through Mar. 2015 (Year 2) are summarised in the attached Cash Flow, and EHP annual cost tables (Tables 1 through 3). The cost estimates are generated based on the maximum cost (maximum disturbance) estimated for each year (or half year) which encompass the FA period (Oct. 2013 - Mar. 2015). Considering the project lifecycle, estimates of the maximum FA requirements over the 1.5 year FA period are as follows (refer Table 1):

- Oct. 2013 – Sept. 2014 (Year 1): The total annual FA cost for this year is estimated at \$41,485,981 (including project management costs). Well pad and dams rehabilitation costs (\$22M) and water management costs (\$7M) comprise about 72% of the total estimated costs. Costs for removal and rehabilitation of water and gas processing facilities and other support infrastructure (\$7M), post rehabilitation monitoring (\$0.6M), and project management (\$4M) comprise the remaining costs.
- Sept. 2014 – Mar. 2015 (Year 2): – The total FA cost estimate for this period (remaining 6-months of the operations period covered by this FA estimate) is estimated at \$44,353,367, including project management and 3% CPI, and is the maximum cost for the FA period. Facilities development continues this year with the addition of new wells and associated roads, gas/water gathering lines, and overhead power lines. Wells rehabilitation (\$10M) and dams rehabilitation and water

management costs (\$20M) together comprise about 69% of the total rehabilitation costs this year, with facilities demolition and rehabilitation costs estimated at \$8M.

As shown in Table 1, the peak lifecycle FA cost during the 1.5-year period for the FA estimate occurs in the second year, when the maximum disturbance occurs. Costs for removal and rehabilitation of infrastructure increase with new construction. Costs for water management are assumed to be stable over the FA period as dams are existing and ROP operations are assumed to manage water generated.

Cost Basis for FA Estimates

The FA cost estimates are based on independent estimates developed for key tasks using third-party unit rates and a conservative set of assumptions for each task. All costs have been developed in accordance with Department of Environment and Heritage Protection (EHP) Guideline, Financial assurance under the Environmental Protection Act 1994 (the Guideline). In consideration of the intent and purpose of monitoring, maintenance and monitoring costs have been developed based on 5% of the earthwork related costs. This is considered appropriate as:

- The costs for rehabilitation already include contingencies for rework.
- A separate cost has been included in all estimates for revegetation and rework in the event that original seeding/vegetation regeneration is not successful.
- There are no monitoring and rehabilitation costs (post completion) for activities such as removal of infrastructure, demolition of facilities, waste disposal, water treatment and site investigations. On this basis 5% of total rehabilitation costs is not considered appropriate; rather costs should be focused on inspection and maintenance of the physical earthworks and revegetation activities completed to rehabilitate disturbed areas. On this basis, the EHP recommended 5% cost allocation is applied only to the earthworks activities associated with land disturbance rehabilitation.

To ensure that the FA estimates have been developed consistent with EHP guidance and also accurately reflect the lifecycle and disturbance associated with the various phases of project development, the different phases of drilling were considered as lifecycle costs with annual costs provided as the cost associated with the maximum disturbance (maximum cost) that would occur during the year. As a result the partial rehabilitation lifecycle has been reflected in the types of wells (appraisal/development vs. development/production well pad state) as provided in the rows in the cost estimate tables.

In developing the FA cost estimate unit rates, the project schedule and anticipated lifecycle of the project were used extensively to calculate the projected disturbances and schedule for partial and full rehabilitation. In addition to considering incremental disturbance and rehabilitation over the project lifecycle, changes in the nature of the disturbance between the development and operational phases were also considered. The concept of partial rehabilitation associated with the change in status from development to operational phases was considered for the following disturbances.

1. CSG well pads – The initial disturbance area created during the development phase for appraisal/development wells will be partially rehabilitated following well construction, reducing the disturbance area from 0.8 ha to 0.014 ha for the production/operational phase. Drilling and well fluids will be managed using a pit-less system, and fluids will be removed from the well pad area upon completion of drilling and appraisal activities. Rehabilitation activities between the appraisal and operations phase of the well lifecycle include grading and revegetation of the project area to reduce the disturbance area to the operational well pad footprint.

2. Roads – During development, the track and road easements will be typically be on the order of 20 metres in width. Once the road is constructed, disturbances adjacent to the operational road will be rehabilitated through grading and revegetation. Once rehabilitation activities are complete after development, the operational rehabilitation requirements will be limited to rehabilitation (grading and vegetating) of the operational width of the road or track (12 metres).

In addition to the partial rehabilitation activities between the appraisal and operational phases, the FA cost estimates developed for the DXP considered costs for the following.

1. Backfilling of trenches associated with the construction of water and gas pipelines.
2. Removal of dam structures associated with the accumulation dams within the project area.
3. Management of wastes including general debris, dam liners, sludge, and brine from reverse osmosis (RO) water treatment.
4. Management of accumulated waters within accumulation ponds and dams.
5. Removal of infrastructure at operational wells, CSG processing facilities, and water treatment facilities.
6. Contaminated land investigations associated with the storage and handling of fuels, chemicals, and wastes within operational facilities.
7. Grading and revegetation of all land disturbances.
8. Monitoring and project management.

Due to the short duration of development and testing activities, the incremental rehabilitation of disturbances for wells and roads has been assumed to occur within the same year of construction. Where new facilities are constructed (e.g., gas and water treatment plants, field accumulation dams), these facilities are assumed to become operational in the year they are constructed, thus rehabilitation costs included in annual estimates for these facilities include costs for management of wastes generated by the facilities (e.g., sludge and brine disposal for dams).

Key Assumptions and Inputs for FA Estimates

Key assumptions used in the generation of the cost estimates are embedded in the assumptions and descriptions provided in the attached cost calculation sheets. General Key assumptions for the rehabilitation program include the following.

- Arrow provided schedules and management plans used to identify assets and develop the FA Schedule that denotes when assets will be constructed/operated and when rehabilitation is assumed to be necessary for assets associated with the DXP.
- Well drilling and development activities utilize pit-less systems, thus drilling and well fluids will be managed using on grade equipment. Fluids will be removed from the drill site area and managed elsewhere. Tankage and other above grade equipment will be removed by contractors as these are re-usable assets.
- If the project is terminated part way through construction, contractors will remove all of their equipment (earthmoving equipment, etc.) at their cost. No allowance is provided for demobilisation of this equipment.
- Construction works for facilities (ponds, piping, roads, etc.) are assumed to be complete within the year in which they commence. The existing ROPs are assumed to sufficiently handle water production rates, thus ponds are assumed to be maintained at a maximum of 50% operating capacity during the FA period.
- Revegetation of disturbed areas will comprise respreading of topsoil and mulch where available and seeding/planting where needed to promote stable land form and regeneration of vegetation. To be conservative, costs for seeding all areas is

included in the FA estimate. This assumption is considered conservative and would allow costs for variance in application of seeding or planting of tube stock or other vegetation works where required to meet project specific requirements, as determined by assessment under the project environmental management and rehabilitation program.

- Seeding costs have been estimated based on both contractor costs estimates and Federal studies on seeding costs in Australia. In addition to seeding costs, equipment and labour costs have been included for grading activities that will be conducted in conjunction with seed spreading. Seeding costs for rehabilitation activities includes contingency costs for re-seeding if needed.
- Monitoring and maintenance costs are allowed to verify the successful regeneration of the rehabilitated areas. Monitoring costs are based on 5% of the total land disturbance rehabilitation costs (e.g., earthworks grading and seeding costs). For each annual estimate, the maximum monitoring cost (associated with maximum disturbance during the FA period) is included, to allow for monitoring of areas partially/fully rehabilitated during the FA period as well as areas to be rehabilitated in the future.
- Contractor project management costs are assumed to be at a minimum 10% of the contractor's total costs. In addition, time has been included within each work task for supervision by competent earthworks and demolition supervisors working on behalf of the contractor. Oversight management costs are assumed to be 10% of the total project cost (EHP Guidance recommendation).

Key Assumptions Trenching, Earthworks, Grading and Seeding

- As discussed above, the detailed project schedule has been used to develop estimates of disturbance and rehabilitation over time. For disturbances requiring earthworks, the costs have also considered the partial/interim rehabilitation activities that will be completed at road and pipeline easements and well pads during the development and operational phases of the project. The disturbed areas associated with well pads and easements will decrease from the development to operational phases as follows:
 - Appraisal/development well pad disturbances will be decreased from 0.8 ha to 0.014 ha with seeding allowed for initially and in potential follow on work a year after the initial rehabilitation. Though operational (production) well pads are assumed to be 0.014 ha, costs allow for 0.5 ha for rehabilitation to ensure adequate costs are included for mobilisation.
 - Pipeline easement disturbances are assumed to be on average 16 metres wide and will be graded and revegetated following pipeline installation as part of the construction works. At any time during construction it is assumed that up to 5 km of easement will require grading and revegetation (seeding). Vegetation in pipeline easements will be kept trimmed/slashed during the operational period to maintain safety clearances and access for inspections/maintenance. At decommissioning underground lines will remain in place and vegetation will be allowed to naturally regenerate; allowance for reseedling of easements is included in the FA if needed.
 - Road easements will be decreased from 20 metres to 12 metres in width.
- It is assumed that at a minimum, all trenches will be backfilled at the end of the construction activities in that area. The costs for backfilling of trenches are included in the FA cost estimate. It is assumed that up to 1 kilometre of trench may be open at any given time during construction of pipelines.
- On completion of the construction activities in each area, it is assumed, at a minimum, grading and revegetation of easements and roads (as discussed above) are completed. Thus grading and revegetation activities are completed concurrently

with construction activities. This is consistent with the operational plans and scope of works developed for these activities.

Key Assumptions for Removal of Dams and Ponds

- The volumes of soil berms at ponds to be managed for rehabilitation have been estimated based on drawings and specifications provided by Arrow. Using these volumes of soil and standard equipment production rates, costs have been calculated for the removal of dam walls and general grading of the area. Estimates of the volumes of soil and equipment production rates are included in the cost detail.
- Dam removal includes costs for liner removal (HDPE or compacted clay liner (CCL)) and management of potentially impacted sludge. It has been assumed that both the liner materials and sludge will be transported off-site for disposal.
- The water volumes for treatment are based on pond capacities and typical operating levels (assumed to be 50% capacity). Levels are assumed to remain consistent over the FA period with operation of the RO plants keeping up with production.
- Average brine concentration for CSG water is 4,500 mg/L. Prior to pond removal, residual accumulated water is assumed to be treated at the RO Plant. Permeate water will be beneficially re-used. Brine will be allowed to evaporate and the salt will be transported off site for disposal.
- The cost for treatment of the water is estimated at \$2,500 per megalitre (ML). Brine disposal costs are based on tonnage and include transport costs.



**ARROW UPSTREAM
FINAL**

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

October 2013 - March 2015

DATE: 19-Sep-13

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

TABLE 1: FINANCIAL ASSURANCE LIFE CYCLE

Disturbance Types	Unit Costs (full/partial)			Year 1 (Oct. 2013 - Sept. 2014)			Year 2 (Oct. 2014 - Mar. 2015)		
				Net Annual disturbance		Total	Net Annual disturbance		Total
				Net requiring full rehabilitation	Net requiring partial rehabilitation		Net requiring full rehabilitation	Net requiring partial rehabilitation	
	U _F	U _P	Unit	N _F = (F+D-X-Y)	N _P = (P+Y-Z)	M = (N _F ×U _F)+(N _P ×U _P)	N _F = (F+D-X-Y)	N _P = (P+Y-Z)	M = (N _F ×U _F)+(N _P ×U _P)
EXPLORATION WELLS/ CORE HOLES									
Grade and Seed Well Pad Area (0.8 ha)	\$ 8,088	\$ 2,975	well	43	-	\$ 347,784	43	-	\$ 347,784
CSG WELLS									
Appraisal/Development Well Pads									
Remove above ground infrastructure	\$ 4,571	\$ -	well	23	-	\$ 105,133	21	-	\$ 95,991
Liner & sludge removal & disposal	\$ 26,754	\$ -	well	23	-	\$ 615,342	21	-	\$ 561,834
Grading and Seeding	\$ 12,832	\$ 1,860	well	23	175	\$ 620,549	21	219	\$ 676,703
Development/Production Well Pads									
Remove above ground infrastructure	\$ 4,571	\$ -	well	466	-	\$ 2,130,086	512	-	\$ 2,340,352
Grading and Seeding	\$ 7,288	\$ 1,860	well	466	466	\$ 4,262,735	512	512	\$ 4,683,520
Turkeys Nests									
Liner & Sludge Removal and Disposal	\$ 4,710	\$ -	pond	10	-	\$ 47,100	10	-	\$ 47,100
Removal & Disposal Fluids	\$ 136,000	\$ -	pond	10	-	\$ 1,360,000	10	-	\$ 1,360,000
Grading and Seeding	\$ 4,614	\$ 744	pond	10	10	\$ 53,580	10	10	\$ 53,580
ROADS									
Initial Track Rehabilitation	\$ 4,655	\$ 1,162	km	37	37	\$ 215,236	74	74	\$ 430,472
Final Track Rehabilitation	\$ 6,983	\$ 775	total	431	431	\$ 3,343,608	468	468	\$ 3,630,647
GAS AND WATER GATHERING/TRANSFER PIPELINES									
Gathering Lines (18-m ROW)									
Backfilling	\$ 6,787	\$ -	km	1	-	\$ 6,787	1	-	\$ 6,787
Grading and Seeding	\$ 11,659	\$ 1,674	km	5	364	\$ 667,467	5	456	\$ 821,434
Purging of Gas from Pipeline	\$ 1,380	\$ -	km	364	-	\$ 502,393	456	-	\$ 629,371
BORROW PITS AND LAYDOWN YARDS									
Grading and Seeding - Borrow Pit	\$ 21,277	\$ 2,965	ha	4	4	\$ 96,968	4	4	\$ 96,968
Grading and Seeding - Laydown Yard	\$ 10,992	\$ 3,719	ha	-	-	\$ -	-	-	\$ -
UTILITIES									
Overhead Electrical									
Removal and Salvage of Copper Wire	\$ 7,616	\$ -	km	16	-	\$ 121,858	18	-	\$ 137,090
Resale Value of Copper Wire	\$ (25,387)	\$ -	km	16	-	\$ (121,858)	18	-	\$ (137,090)
Subtotal (net scrap demolition cost)*	\$ (17,771)	\$ -	\$ -	-	-	\$ -	-	-	\$ -
*Demolition of Above Grade Steel Structures and Process Units (proceeds applied from scrap not to exceed cost of removal and processing of salvageable assets)									
Pole Removal	\$ 6,937	\$ -	km	16	-	\$ 110,992	18	-	\$ 124,866
Reseeding pole locations	\$ 28	\$ -	km	16	-	\$ 448	18	-	\$ 504

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

TABLE 1: FINANCIAL ASSURANCE LIFE CYCLE

Disturbance Types	Unit Costs (full/partial)			Year 1 (Oct. 2013 - Sept. 2014)			Year 2 (Oct. 2014 - Mar. 2015)		
				Net Annual disturbance		Total	Net Annual disturbance		Total
				Net requiring full rehabilitation	Net requiring partial rehabilitation		Net requiring full rehabilitation	Net requiring partial rehabilitation	
	U _F	U _P	Unit	N _F = (F+D-X-Y)	N _P = (P+Y-Z)	M = (N _F ×U _F)+(N _P ×U _P)	N _F = (F+D-X-Y)	N _P = (P+Y-Z)	M = (N _F ×U _F)+(N _P ×U _P)
CENTRAL GAS PROCESSING FACILITY (CGPF 10-60 TJ/day)									
Demolition of Structures and Buildings (including concrete)	\$ 337,145	\$ -	total	2	-	\$ 674,290	2	-	\$ 674,290
Removal and Disposal of Debris	\$ 284,543	\$ -	total	2	-	\$ 569,086	2	-	\$ 569,086
Scrap and Salvage									
Demolition and Removal of Steel Structures and Process Units	\$ 518,276	\$ -	total	2	-	\$ 1,036,552	2	-	\$ 1,036,552
Resale Value of Copper, Steel and Hastelloy Scrap	\$ (1,522,030)	\$ -	total	2	-	\$ (1,036,552)	2	-	\$ (1,036,552)
Subtotal (net scrap demolition cost)*	\$ (1,003,754)								
*Demolition of Above Grade Steel Structures and Process Units (proceeds applied from scrap not to exceed cost of removal and processing of salvageable assets)									
Grading -stabilisation and finishing	\$ 10,992	\$ -	ha	8	-	\$ 87,936	8	-	\$ 87,936
Seeding of Cleared Areas	\$ 3,719	\$ 3,719	ha	8	2	\$ 37,190	8	2	\$ 37,190
Contaminated Land Assessments	\$ 46,735	\$ -	area	2	-	\$ 93,470	2	-	\$ 93,470
REVERSE OSMOSIS PLANT (ROP) - 12 ML/DAY									
Demolition of Structures and Buildings (including concrete)	\$ 285,953	\$ -	total	2	-	\$ 571,906	2	-	\$ 571,906
Removal and Disposal of Debris	\$ 110,715	\$ -	total	2	-	\$ 221,430	2	-	\$ 221,430
Scrap and Salvage									
Demolition and Removal of Steel Structures and Process Units	\$ 455,858	\$ -	total	2	-	\$ 911,716	2	-	\$ 911,716
Resale Value of Copper, Steel and Hastelloy Scrap	\$ (956,685)	\$ -	total	2	-	\$ (911,716)	2	-	\$ (911,716)
Subtotal (net scrap demolition cost)*	\$ (500,827)								
*Demolition of Above Grade Steel Structures and Process Units (proceeds applied from scrap not to exceed cost of removal and processing of salvageable assets)									
Grading -stabilisation and finishing	\$ 10,992	\$ -	ha	2.5	-	\$ 27,480	2.5	-	\$ 27,480
Seeding of Cleared Areas	\$ 3,719	\$ 3,719	ha	2.5	0.6	\$ 11,622	2.5	0.6	\$ 11,622
Contaminated Land Assessments	\$ 40,931	\$ -	area	2	-	\$ 81,862	2	-	\$ 81,862
DAM REMOVAL AND INVESTIGATION									
Dam Removal Costs (liner and sludge removal and disposal, grading and seeding, contingency reseeding 1 year after rehabilitation)									
3 ML HDPE lined dam	\$ 34,002	\$ 744	dam	2	-	\$ 68,004	2	-	\$ 68,004
20 ML HDPE lined dam	\$ 50,060	\$ 1,116	dam	3	-	\$ 150,180	3	-	\$ 150,180
50 ML HDPE lined dam	\$ 104,400	\$ 2,696	dam	1	-	\$ 104,400	1	-	\$ 104,400
90 ML HDPE lined dam	\$ 189,606	\$ 4,835	dam	1	-	\$ 189,606	1	-	\$ 189,606
250 ML HDPE lined dam	\$ 305,280	\$ 8,740	dam	1	-	\$ 305,280	1	-	\$ 305,280

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

TABLE 1: FINANCIAL ASSURANCE LIFE CYCLE

Disturbance Types	Unit Costs (full/partial)			Year 1 (oct. 2013 - Sept. 2014)			Year 2 (Oct. 2014 - Mar. 2015)		
				Net Annual disturbance			Net Annual disturbance		
				Net requiring full rehabilitation	Net requiring partial rehabilitation	Total	Net requiring full rehabilitation	Net requiring partial rehabilitation	Total
				$N_f = (F+D-X-Y)$	$N_p = (P+Y-Z)$	$M = (N_f \times U_f) + (N_p \times U_p)$	$N_f = (F+D-X-Y)$	$N_p = (P+Y-Z)$	$M = (N_f \times U_f) + (N_p \times U_p)$
	U_f	U_p	Unit						
400 ML HDPE lined dam	\$ 428,928	\$ 10,878	dam	3	-	\$ 1,286,784	3	-	\$ 1,286,784
830 ML HDPE lined dam	\$ 1,052,929	\$ 29,752	dam	1	-	\$ 1,052,929	1	-	\$ 1,052,929
400 ML CCL dam	\$ 787,462	\$ 10,878	dam	1	-	\$ 787,462	1	-	\$ 787,462
1130 ML CCL dam	\$ 2,594,923	\$ 39,050	dam	1	-	\$ 2,594,923	1	-	\$ 2,594,923
1250 ML CCL dam	\$ 2,370,237	\$ 36,260	dam	1	-	\$ 2,370,237	1	-	\$ 2,370,237
1800 ML CCL dam	\$ 3,038,616	\$ 47,417	dam	1	-	\$ 3,038,616	1	-	\$ 3,038,616
Fixed Investigation Cost (excludes treated water ponds which do not require investigation)									
Fixed Investigation Cost	\$ 26,682	\$ -	no.	4	-	\$ 106,728	4	-	\$ 106,728
Field Investigation Costs (excludes treated water ponds which do not require investigation)									
3 ML dam	\$ 3,815	\$ -	dam	2	-	\$ 7,630	2	-	\$ 7,630
20 ML dam	\$ 5,723	\$ -	dam	3	-	\$ 17,168	3	-	\$ 17,168
50 ML dam	\$ 13,830	\$ -	dam	1	-	\$ 13,830	1	-	\$ 13,830
90 ML dam	\$ 24,799	\$ -	dam	1	-	\$ 24,799	1	-	\$ 24,799
250 ML dam	\$ 44,829	\$ -	dam	1	-	\$ 44,829	1	-	\$ 44,829
400 ML dam	\$ 55,797	\$ -	dam	4	-	\$ 223,189	4	-	\$ 223,189
830 ML dam	\$ 152,608	\$ -	dam	1	-	\$ 152,608	1	-	\$ 152,608
1130 ML dam	\$ 55,797	\$ -	dam	1	-	\$ 55,797	1	-	\$ 55,797
1250 ML dam	\$ 200,298	\$ -	dam	1	-	\$ 200,298	1	-	\$ 200,298
1800 ML dam	\$ 185,991	\$ -	dam	1	-	\$ 185,991	1	-	\$ 185,991
WATER MANAGEMENT									
RO treatment and brine disposal	\$ 3,164	\$ -	ML	2,098	-	\$ 6,638,072	2,098	-	\$ 6,638,072
Existing Brine Requiring Disposal	\$ 664	\$ -	ML	987	-	\$ 654,989	987	-	\$ 655,121
Total rehabilitation costs for all disturbance types			T		\$ 37,136,829			\$ 38,558,666	
Maintenance and monitoring costs (5% of T)			MM*		\$ 651,565			\$ 667,152	
Project Management (10% of T)			PM		\$ 3,713,683			\$ 3,855,867	
CPI (3% of T + MM + PM)			T		\$ -			\$ 1,292,451	
GST - 10% of costs (T + MM + PM) (if not included above)					Included above			Included above	
TOTAL REHABILITATION COST FOR YEAR (T + MM + P)					\$ 41,502,077			\$ 44,374,136	

Note: all values in Australian dollars and inclusive of GST

U_f is the unit cost to completely rehabilitate un-rehabilitated disturbance.

U_p is the unit cost to complete rehabilitation of partially rehabilitated disturbance and includes applicable reseeding costs for existing and planned disturbance areas.

* Monitoring costs are based on an allocation of 5% of disturbance area rehabilitation (e.g., grading and seeding) cost as these are indicative of the activities that would be the focus of monitoring.

The sum of the rehabilitation costs is increased by 3% compounded annually for the number of years from the date at which the estimation of rehabilitation costs was made.

Annual costs are estimated based on activities conducted during a consecutive 12-month (one year) period.

FINAL

Table 2: REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

Permit reference number	PEN100449509
Project Name	Dalby Expansion Project
Total disturbance period (years)	1.5 years
Disturbance period (dates)	Oct. 2013 - Sept. 2014
Worksheet No	1

Disturbance Types	Unit Costs (full/partial)			Pre-existing disturbance (previous year's N _F & N _P)		Proposed new disturbance	Previous year's rehabilitation work on un-rehabilitated disturbance (F)		Previous year's completion of partial rehabilitation (P)	Net Annual disturbance		Total
	U _F	U _P	Unit	Requires full rehabilitation	Requires partial rehabilitation		Fully rehabilitated	Partially rehabilitated		Net requiring full rehabilitation	Net requiring partial rehabilitation	
				F	P	D	X	Y	Z	N _F = (F+D-X-Y)	N _P = (P+Y-Z)	M = (N _F xU _F)+(N _P xU _P)
EXPLORATION WELLS/ CORE HOLES												
Grade and Seed Well Pad Area (0.8 ha)	\$8,088	\$ 2,975	well	40		3				43	-	\$ 347,784
CSG WELLS												
Appraisal/Development Well Pads												
Remove above ground infrastructure	\$ 4,571	\$ -	well	83		92	152			23	-	\$ 105,133
Liner & sludge removal & disposal	\$ 26,754	\$ -	well	83		92	152			23	-	\$ 615,342
Grading and Seeding	\$ 12,832	\$ 1,860	well	83	175	92	152			23	175	\$ 620,549
Development/Production Well Pads												
Remove above ground infrastructure	\$4,571	\$ -	well	314		152				466	-	\$ 2,130,086
Grading and Seeding	\$7,288	\$ 1,860	well	314	466	152				466	466	\$ 4,262,735
Turkeys Nests												
Liner & Sludge Removal and Disposal	\$ 4,710	\$ -	pond	10						10	-	\$ 47,100
Removal & Disposal Fluids	\$ 136,000	\$ -	pond	10						10	-	\$ 1,360,000
Grading and Seeding	\$ 4,614	\$ 744	pond	10	10					10	10	\$ 53,580
ROADS												
Initial Track Rehabilitation	\$ 4,655	\$ 1,162	km		37	37				37	37	\$ 215,236
Final Track Rehabilitation	\$ 6,983	\$ 775	total	394	431	37				431	431	\$ 3,343,608
GAS AND WATER GATHERING/TRANSFER PIPELINES												
Gathering Lines (18-m ROW)												
Backfilling	\$ 6,787	\$ -	km			1				1	-	\$ 6,787
Grading and Seeding	\$ 11,659	\$ 1,674	km	272	364	92	359			5	364	\$ 667,467
Purging of Gas from Pipeline	\$ 1,380	\$ -	km	272		92				364	-	\$ 502,393
BORROW PITS AND LAYDOWN YARDS												
Grading and Seeding - Borrow Pit	\$ 21,277	\$ 2,965	ha	4	4					4	4	\$ 96,968
Grading and Seeding - Laydown Yard	\$ 10,992	\$ 3,719	ha							-	-	\$ -
UTILITIES												
Overhead Electrical												
Removal and Salvage of Copper Wire	\$7,616	\$ -	km	14		2				16	-	\$ 121,858
Resale Value of Copper Wire	(\$25,387)	\$ -	km	14		2				16	-	\$ (121,858)
Subtotal (net scrap demolition cost)*	(\$17,771)											
*Demolition of Above Grade Steel Structures and Process Units (proceeds applied from scrap not to exceed cost of removal and processing of salvageable assets)												
Pole Removal	\$6,937	\$ -	km	14		2				16	-	\$ 110,992
Reseeding pole locations	\$28	\$ -	km	14		2				16	-	\$ 448

FINAL

Table 2: REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

Permit reference number	PEN100449509
Project Name	Dalby Expansion Project
Total disturbance period (years)	1.5 years
Disturbance period (dates)	Oct. 2013 - Sept. 2014
Worksheet No	1

Disturbance Types	Unit Costs (full/partial)			Pre-existing disturbance (previous year's N _F & N _P)		Proposed new disturbance	Previous year's rehabilitation work on un-rehabilitated disturbance (F)		Previous year's completion of partial rehabilitation (P)	Net Annual disturbance		Total
	U _F	U _P	Unit	Requires full rehabilitation	Requires partial rehabilitation		Fully rehabilitated	Partially rehabilitated		Net requiring full rehabilitation	Net requiring partial rehabilitation	
				F	P	D	X	Y	Z	N _F = (F+D-X-Y)	N _P = (P+Y-Z)	M = (N _F xU _F)+(N _P xU _P)
CENTRAL GAS PROCESSING FACILITY (CGPF 10-60 TJ/day)												
Demolition of Structures and Buildings (including concrete)	\$ 337,145	\$ -	total	2						2	-	\$ 674,290
Removal and Disposal of Debris	\$ 284,543	\$ -	total	2						2	-	\$ 569,086
Scrap and Salvage												
Demolition and Removal of Steel Structures and Process Units	\$ 518,276	\$ -	total	2						2	-	\$ 1,036,552
Resale Value of Copper, Steel and Hastelloy Scrap	(\$1,522,030)	\$ -	total	2						2	-	\$ (1,036,552)
Subtotal (net scrap demolition cost)*	\$ (1,003,754)											
*Demolition of Above Grade Steel Structures and Process Units (proceeds applied from scrap not to exceed cost of removal and processing of salvageable assets)												
Grading -stabilisation and finishing	\$ 10,992	\$ -	ha	8						8	-	\$ 87,936
Seeding of Cleared Areas	\$ 3,719	\$ 3,719	ha	8	2					8	2	\$ 37,190
Contaminated Land Assessments	\$ 46,735	\$ -	area	2						2	-	\$ 93,470
REVERSE OSMOSIS PLANT (ROP) - 12 ML/DAY												
Demolition of Structures and Buildings (including concrete)	\$ 285,953	\$ -	total	2						2	-	\$ 571,906
Removal and Disposal of Debris	\$ 110,715	\$ -	total	2						2	-	\$ 221,430
Scrap and Salvage												
Demolition and Removal of Steel Structures and Process Units	\$ 455,858	\$ -	total	2						2	-	\$ 911,716
Resale Value of Copper, Steel and Hastelloy Scrap	(\$956,685)	\$ -	total	2						2	-	\$ (911,716)
Subtotal (net scrap demolition cost)*	\$ (500,827)											
*Demolition of Above Grade Steel Structures and Process Units (proceeds applied from scrap not to exceed cost of removal and processing of salvageable assets)												
Grading -stabilisation and finishing	\$ 10,992	\$ -	ha	2.5						2.5	-	\$ 27,480
Seeding of Cleared Areas	\$ 3,719	\$ 3,719	ha	2.5	0.6					2.5	0.6	\$ 11,622
Contaminated Land Assessments	\$ 40,931	\$ -	area	2						2	-	\$ 81,862
DAM REMOVAL AND INVESTIGATION												
Dam Removal Costs (liner and sludge removal and disposal, grading and seeding, contingency reseeding 1 year after rehabilitation)												
3 ML HDPE lined dam	\$ 34,002	\$ 744	dam	2						2	-	\$ 68,004
20 ML HDPE lined dam	\$ 50,060	\$ 1,116	dam	3						3	-	\$ 150,180
50 ML HDPE lined dam	\$ 104,400	\$ 2,696	dam	1						1	-	\$ 104,400
90 ML HDPE lined dam	\$ 189,606	\$ 4,835	dam	1						1	-	\$ 189,606
250 ML HDPE lined dam	\$ 305,280	\$ 8,740	dam	1						1	-	\$ 305,280
400 ML HDPE lined dam	\$ 428,928	\$ 10,878	dam	3						3	-	\$ 1,286,784
830 ML HDPE lined dam	\$ 1,052,929	\$ 29,752	dam	1						1	-	\$ 1,052,929

FINAL

Table 2: REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

Permit reference number	PEN100449509
Project Name	Dalby Expansion Project
Total disturbance period (years)	1.5 years
Disturbance period (dates)	Oct. 2013 - Sept. 2014
Worksheet No	1

Disturbance Types	Unit Costs (full/partial)			Pre-existing disturbance (previous year's N _F & N _P)		Proposed new disturbance	Previous year's rehabilitation work on un-rehabilitated disturbance (F)		Previous year's completion of partial rehabilitation (P)	Net Annual disturbance		Total
	U _F	U _P	Unit	Requires full rehabilitation	Requires partial rehabilitation		Fully rehabilitated	Partially rehabilitated		Net requiring full rehabilitation	Net requiring partial rehabilitation	
				F	P	D	X	Y	Z	N _F = (F+D-X-Y)	N _P = (P+Y-Z)	M = (N _F xU _F)+(N _P xU _P)
400 ML CCL dam	\$ 787,462	\$ 10,878	dam	1						1	-	\$ 787,462
1130 ML CCL dam	\$ 2,594,923	\$ 39,050	dam	1						1	-	\$ 2,594,923
1250 ML CCL dam	\$ 2,370,237	\$ 36,260	dam	1						1	-	\$ 2,370,237
1800 ML CCL dam	\$ 3,038,616	\$ 47,417	dam	1						1	-	\$ 3,038,616
Fixed Investigation Cost (excludes treated water ponds which do not require investigation)												
Fixed Investigation Cost	\$26,682	\$ -	no.	4						4	-	\$ 106,728
Field Investigation Costs (excludes treated water ponds which do not require investigation)												
3 ML dam	\$ 3,815	\$ -	dam	2						2	-	\$ 7,630
20 ML dam	\$ 5,723	\$ -	dam	3						3	-	\$ 17,168
50 ML dam	\$ 13,830	\$ -	dam	1						1	-	\$ 13,830
90 ML dam	\$ 24,799	\$ -	dam	1						1	-	\$ 24,799
250 ML dam	\$ 44,829	\$ -	dam	1						1	-	\$ 44,829
400 ML dam	\$ 55,797	\$ -	dam	4						4	-	\$ 223,189
830 ML dam	\$ 152,608	\$ -	dam	1						1	-	\$ 152,608
1130 ML dam	\$ 55,797	\$ -	dam	1						1	-	\$ 55,797
1250 ML dam	\$ 200,298	\$ -	dam	1						1	-	\$ 200,298
1800 ML dam	\$ 185,991	\$ -	dam	1						1	-	\$ 185,991
WATER MANAGEMENT												
RO treatment and brine disposal	\$ 3,164	\$ -	ML	2098						2,098	-	\$ 6,638,072
Existing Brine Requiring Disposal	\$ 664	\$ -	ML	987						987	-	\$ 654,989
Total rehabilitation costs for all disturbance types										T		\$ 37,136,829
Maintenance and monitoring costs (5% of T)										MM*		\$ 651,565
Project Management (10% of T)										PM		\$ 3,713,683
CPI (3% of T + MM + PM)										T		\$ -
GST - 10% of costs (T + MM + PM) if not included above										Included above		
TOTAL REHABILITATION COST FOR YEAR (T + MM + P)												\$ 41,502,077

Note: all values in Australian dollars and inclusive of GST

U_F is the unit cost to completely rehabilitate un-rehabilitated disturbance.

U_P is the unit cost to complete rehabilitation of partially rehabilitated disturbance and includes applicable reseeding costs for existing and planned disturbance areas.

* Monitoring costs are based on an allocation of 5% of grading and seeding cost as these are indicative of the activities that would be the focus of monitoring.

The sum of the rehabilitation costs is increased by 3% compounded annually for the number of years from the date at which the estimation of rehabilitation costs was made.

Annual costs are estimated based on activities conducted during a consecutive period (up to 12-months/one year).

Table 3: REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

Permit reference number	PEN 100449509
Project Name	Dalby Expansion Project
Total disturbance period (years)	1.5 years
Disturbance period (dates)	Oct. 2014 - Mar. 2015
Worksheet No	2

Disturbance Types	Unit Costs (full/partial)			Pre-existing disturbance (previous year's N _F & N _P)		Proposed new disturbance	Previous year's rehabilitation work on un-rehabilitated		Previous year's completion of partial rehabilitation (P)	Net Annual disturbance		Total
	U _F	U _P	Unit	Requires full rehabilitation	Requires partial rehabilitation		Fully rehabilitated	Partially rehabilitated		Net requiring full rehabilitation	Net requiring partial rehabilitation	
				F	P	D	X	Y	Z	N _F = (F+D-X-Y)	N _P = (P+Y-Z)	M = (N _F xU _F)+(N _P xU _P)
EXPLORATION WELLS/ CORE HOLES												
Grade and Seed Well Pad Area (0.8 ha)	\$8,088	\$ 2,975	well	43						43	-	\$ 347,784
CSG WELLS												
Appraisal/Development Well Pads												
Remove above ground infrastructure	\$ 4,571	\$ -	well	23		44	46			21	-	\$ 95,991
Liner & sludge removal & disposal	\$ 26,754	\$ -	well	23		44	46			21	-	\$ 561,834
Grading and Seeding	\$ 12,832	\$ 1,860	well	23	219	44	46			21	219	\$ 676,703
Development/Production Well Pads												
Remove above ground infrastructure	\$4,571	\$ -	well	466		46				512	-	\$ 2,340,352
Grading and Seeding	\$7,288	\$ 1,860	well	466	512	46				512	512	\$ 4,683,520
Turkeys Nests												
Liner & Sludge Removal and Disposal	\$ 4,710	\$ -	pond	10						10	-	\$ 47,100
Removal & Disposal Fluids	\$ 136,000	\$ -	pond	10						10	-	\$ 1,360,000
Grading and Seeding	\$ 4,614	\$ 744	pond	10	10					10	10	\$ 53,580
ROADS												
Initial Track Rehabilitation	\$ 4,655	\$ 1,162	km	37	74	37				74	74	\$ 430,472
Final Track Rehabilitation	\$ 6,983	\$ 775	total	431	468	37				468	468	\$ 3,630,647
GAS AND WATER GATHERING/TRANSFER PIPELINES												
Gathering Lines (18-m ROW)												
Backfilling	\$ 6,787	\$ -	km	1		1	1			1	-	\$ 6,787
Initial Grading and Seeding	\$ 11,659	\$ 1,674	km	5	456	92	92			5	456	\$ 821,434
Purging of Gas from Pipeline	\$ 1,380	\$ -	km	364		92				456	-	\$ 629,371
BORROW PITS AND LAYDOWN YARDS												
Grading and Seeding - Borrow Pit	\$ 21,277	\$ 2,965	ha	4	4					4	4	\$ 96,968
Grading and Seeding - Laydown Yard	\$ 10,992	\$ 3,719	ha							-	-	\$ -
UTILITIES												
Overhead Electrical												
Removal and Salvage of Copper Wire	\$7,616	\$ -	km	16		2				18	-	\$ 137,090
Resale Value of Copper Wire	(\$25,387)	\$ -	km	16		2				18	-	\$ (137,090)
Subtotal (net scrap demolition cost)*	(\$17,771)											
*Demolition of Above Grade Steel Structures and Process Units (proceeds applied from scrap not to exceed cost of removal and processing of salvageable assets)												
Pole Removal	\$6,937	\$ -	km	16		2				18	-	\$ 124,866
Reseeding pole locations	\$28	\$ -	km	16		2				18	-	\$ 504
CENTRAL GAS PROCESSING FACILITY (CGPF 10-60 TJ/day)												
Demolition of Structures and Buildings (including concrete)	\$ 337,145	\$ -	total	2						2	-	\$ 674,290
Removal and Disposal of Debris	\$ 284,543	\$ -	total	2						2	-	\$ 569,086

Permit reference number	PEN 100449509
Project Name	Dalby Expansion Project
Total disturbance period (years)	1.5 years
Disturbance period (dates)	Oct. 2014 - Mar. 2015
Worksheet No	2

Table 3: REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

Disturbance Types	Unit Costs (full/partial)			Pre-existing disturbance (previous year's N _F & N _P)		Proposed new disturbance	Previous year's rehabilitation work on un-rehabilitated		Previous year's completion of partial rehabilitation (P)	Net Annual disturbance		Total
	U _F	U _P	Unit	Requires full rehabilitation	Requires partial rehabilitation		Fully rehabilitated	Partially rehabilitated		Net requiring full rehabilitation	Net requiring partial rehabilitation	
				F	P	D	X	Y	Z	N _F = (F+D-X-Y)	N _P = (P+Y-Z)	M = (N _F xU _F)+(N _P xU _P)
Scrap and Salvage												
Demolition and Removal of Steel Structures and Process Units	\$ 518,276	\$ -	total	2						2	-	\$ 1,036,552
Resale Value of Copper, Steel and Hastelloy Scrap	(\$1,522,030)	\$ -	total	2						2	-	\$ (1,036,552)
Subtotal (net scrap demolition cost)*	\$ (1,003,754)											
<i>*Demolition of Above Grade Steel Structures and Process Units (proceeds applied from scrap not to exceed cost of removal and processing of salvageable assets)</i>												
Grading -stabilisation and finishing	\$ 10,992	\$ -	ha	8						8	-	\$ 87,936
Seeding of Cleared Areas	\$ 3,719	\$ 3,719	ha	8	2					8	2	\$ 37,190
Contaminated Land Assessments	\$ 46,735	\$ -	area	2						2	-	\$ 93,470
REVERSE OSMOSIS PLANT (ROP) - 12 ML/DAY												
Demolition of Structures and Buildings (including concrete)	\$ 285,953	\$ -	total	2						2	-	\$ 571,906
Removal and Disposal of Debris	\$ 110,715	\$ -	total	2						2	-	\$ 221,430
Scrap and Salvage												
Demolition and Removal of Steel Structures and Process Units	\$ 455,858	\$ -	total	2						2	-	\$ 911,716
Resale Value of Copper, Steel and Hastelloy Scrap	(\$956,685)	\$ -	total	2						2	-	\$ (911,716)
Subtotal (net scrap demolition cost)*	\$ (500,827)											
<i>*Demolition of Above Grade Steel Structures and Process Units (proceeds applied from scrap not to exceed cost of removal and processing of salvageable assets)</i>												
Grading -stabilisation and finishing	\$ 10,992	\$ -	ha	2.5						2.5	-	\$ 27,480
Seeding of Cleared Areas	\$ 3,719	\$ 3,719	ha	2.5	0.6					2.5	0.6	\$ 11,622
Contaminated Land Assessments	\$ 40,931	\$ -	area	2						2	-	\$ 81,862
DAM REMOVAL AND INVESTIGATION												
Dam Removal Costs (liner and sludge removal and disposal, grading and seeding, contingency reseeding 1 year after rehabilitation)												
3 ML HDPE lined dam	\$ 34,002	\$ 744	dam	2						2	-	\$ 68,004
20 ML HDPE lined dam	\$ 50,060	\$ 1,116	dam	3						3	-	\$ 150,180
50 ML HDPE lined dam	\$ 104,400	\$ 2,696	dam	1						1	-	\$ 104,400
90 ML HDPE lined dam	\$ 189,606	\$ 4,835	dam	1						1	-	\$ 189,606
250 ML HDPE lined dam	\$ 305,280	\$ 8,740	dam	1						1	-	\$ 305,280
400 ML HDPE lined dam	\$ 428,928	\$ 10,878	dam	3						3	-	\$ 1,286,784
830 ML HDPE lined dam	\$ 1,052,929	\$ 29,752	dam	1						1	-	\$ 1,052,929
400 ML CCL dam	\$ 787,462	\$ 10,878	dam	1						1	-	\$ 787,462
1130 ML CCL dam	\$ 2,594,923	\$ 39,050	dam	1						1	-	\$ 2,594,923
1250 ML CCL dam	\$ 2,370,237	\$ 36,260	dam	1						1	-	\$ 2,370,237
1800 ML CCL dam	\$ 3,038,616	\$ 47,417	dam	1						1	-	\$ 3,038,616

Permit reference number	PEN 100449509
Project Name	Dalby Expansion Project
Total disturbance period (years)	1.5 years
Disturbance period (dates)	Oct. 2014 - Mar. 2015
Worksheet No	2

Table 3: REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

Disturbance Types	Unit Costs (full/partial)			Pre-existing disturbance (previous year's N _F & N _P)		Proposed new disturbance	Previous year's rehabilitation work on un-rehabilitated		Previous year's completion of partial rehabilitation (P)	Net Annual disturbance		Total
	U _F	U _P	Unit	Requires full rehabilitation	Requires partial rehabilitation		Fully rehabilitated	Partially rehabilitated		Net requiring full rehabilitation	Net requiring partial rehabilitation	
				F	P	D	X	Y	Z	N _F = (F+D-X-Y)	N _P = (P+Y-Z)	M = (N _F xU _F)+(N _P xU _P)
Fixed Investigation Cost (excludes treated water ponds which do not require investigation)												
Fixed Investigation Cost	\$ 26,682	\$ -	no.	4						4	-	\$ 106,728
Field Investigation Costs (excludes treated water ponds which do not require investigation)												
3 ML dam	\$ 3,815	\$ -	dam	2						2	-	\$ 7,630
20 ML dam	\$ 5,723	\$ -	dam	3						3	-	\$ 17,168
50 ML dam	\$ 13,830	\$ -	dam	1						1	-	\$ 13,830
90 ML dam	\$ 24,799	\$ -	dam	1						1	-	\$ 24,799
250 ML dam	\$ 44,829	\$ -	dam	1						1	-	\$ 44,829
400 ML dam	\$ 55,797	\$ -	dam	4						4	-	\$ 223,189
830 ML dam	\$ 152,608	\$ -	dam	1						1	-	\$ 152,608
1130 ML dam	\$ 55,797	\$ -	dam	1						1	-	\$ 55,797
1250 ML dam	\$ 200,298	\$ -	dam	1						1	-	\$ 200,298
1800 ML dam	\$ 185,991	\$ -	dam	1						1	-	\$ 185,991
WATER MANAGEMENT												
RO treatment and brine disposal	\$ 3,164	\$ -	ML	2098						2,098	-	\$ 6,638,072
Existing Brine Requiring Disposal	\$ 664	\$ -	ML	987						987	-	\$ 655,121
Total rehabilitation costs for all disturbance types										T		\$ 38,558,666
Maintenance and monitoring costs (5% of T)										MM*		\$ 667,152
Project Management (10% of T)										PM		\$ 3,855,867
CPI (3% of T + MM + PM)										T		\$ 1,292,451
GST - 10% of costs (T + MM + PM) if not included above										Included above		
TOTAL REHABILITATION COST FOR YEAR (T + MM + P)												\$ 44,374,136

Note: all values in Australian dollars and inclusive of GST

U_F is the unit cost to completely rehabilitate un-rehabilitated disturbance.

U_P is the unit cost to complete rehabilitation of partially rehabilitated disturbance and includes applicable reseeding costs for existing and planned disturbance areas.

* Monitoring costs are based on an allocation of 5% of grading and seeding cost as these are indicative of the activities that would be the focus of monitoring.

The sum of the rehabilitation costs is increased by 3% compounded annually for the number of years from the date at which the estimation of rehabilitation costs was made.

Annual costs are estimated based on activities conducted during a consecutive period (up to 12-months/one year).

FINAL
REHABILITATION COSTS FOR DALBY EXPANSION PROJECT
Financial Assurance Schedule

Asset/Activity	Units	Existing	Year 1 (Oct. 2013 - Sept. 2014)				Year 2 (Oct. 2014 - Mar. 2015)		Comments/Assumptions
			Q4 2013	Q1 2014	Q2 2014	Q3 2014	Q4 2014	Q1 2015	
CSG WELLS	(ha)	Well Pads							
Exploration Well	0.8	40				3			Assumes well pads remain to end of FA period.
Drilling Trial Well Pads	2	2							Multi-well pad for drilling trials. Assumes will remain through the FA
Appraisal/Development CSG well	0.8	83	23	23	23	23	23	21	Assumes new wells on 0.8 ha pads that will be partially rehabilitated to operational well pad (0.014 ha) in quarter following installation.
Development/Production Wells	0.014	314	397	420	443	466	489	512	Includes existing and new wells partially rehabilitated during FA period to 0.014 ha operational well pad.
Asset/Activity	Units/Area	Existing	Year 1	Year 2	Comments				
INFRASTRUCTURE / SUPPORT FACILITIES		Assets	New Assets						
Roads/Access Tracks	km	394	37	37	Assumes 20-metre wide construction easement reduced to final 12-m wide final access track footprint				
Gas/Water Pipelines									
Gas Gathering Lines	km	238	39	39	Assumes 18-m wide easement (co-located water lines)				
Water Gathering Lines	km	272	92	92	Assumes 18-m wide easements (co-located with gas lines)				
Central Gas Processing Facility (CGPF)	8 ha	2			2 existng facilities (42 TJ/day Daandine plant and 35 TJ/day Tipton plant at 4 ha each)				
Reverse Osmosis Plant (ROP)	2.5 ha	2			2 existing facilities: Tipton and Daandine at 12 ML/day each, totalling 2.5 ha disturbance co-located with pipeline/road easements where possible. Vegetation is trimmed/cut back (not cleared). Assumes lines and poles to be removed.				
Overhead Power Lines	km	14	2	2					
Borrow Pits	ha	4			2 existing borrow pits totalling 4 ha				
DAMS/PONDS		ha	Dams assumed constructed with HDPE liner, or (where noted) with compacted clay liner (CCL)						
	0.15 ML	0.08	10		Turkeys nests used by multiple wells; assumes rehabilitation occurs over the course of the drilling program with up to 10 turkey's nest present at any given time.				
	3 ML	0.8	2		Tipton West CGPF Dams 1 and 2				
	20 ML	1.2	3		Daandine CGPF dam, Stratheden Transfer dam, and Daandine utility dam				
	50 ML	2.9	1		Tipton West Utility Dam				
	90 ML	5.2	1		Tipton West pilot dam				
	250 ML	9.4	1		Daandine treated water dam (no investigation)				
	400 ML	11.7	4		Tipton West feedwater dam, Tipton West treated water dam (no investigation), Daandine feedwater dam, and Kogan North aggregation dam (compacted clay liner)				
	830 ML	32	1		Tipton West brine dam				
	1130 ML	42	1		Daandine brine dam (compacted clay liner)				
	1250 ML	39	1		Tipton West Aggregation Pond 1 (compacted clay liner)				
	1800 ML	51	1		Tipton West Aggregation Pond 2 (compacted clay liner)				
Fixed Investigation Cost	No.	4			Assumes ponds will be investigated and reported jointly (excludes turkey's nests)				
WATER MANAGEMENT									
RO treatment and brine disposal	ML	2098			Water volumes for treatment based on typical pond operating capacities and is assumed to remain consistent over the FA period. It is assumed there is 984 ML of brine existing in ponds at the start of the FA. Costs are included for treatment and disposal of brine (generated by water volume to be treated and existing brine in ponds).				

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

Assumptions

- 1 The Financial Assurance (FA) schedule has been developed using available project schedules and environmental/operations plans and field observations to identify the assets associated with the project and when rehabilitation will be necessary for the assets.
- 2 Exploration well pads are assumed to be fully rehabilitated after drilling and exploration activities or partially rehabilitated to production well pads. The existing and new exploration wells to be constructed are assumed to remain in exploration phase throughout this FA period.
- 3 Coal seam gas (CSG) appraisal/development wells existing at the start of the FA period are assumed to be partially rehabilitated to reduce the disturbance area down to a 0.014 ha production well pad. New wells are assumed to be partially rehabilitated in the quarter following installation. Partial rehabilitation is assumed to comprise removal of appraisal/development infrastructure, removal of mud/cuttings pits and grading and revegetation of the disturbed area to reduce the disturbance down to the final production well pad area. Final rehabilitation of production well pads comprises removal of on-grade infrastructure and grading and revegetation of the disturbed area.
- 4 It is assumed that drilling and development activities will utilise pit-less systems with well fluids being removed when drilling is completed. Turkey's nests are assumed to be utilised in select locations for supply water/CSG development activities. Turkey's nests are assumed to be located on or proximal to select well pad areas. Rehabilitation of turkey's nests comprises removal and treatment of fluids, removal and disposal of the pit liner and sludge, and grading and revegetation of the disturbed area to promote a stable land form. Over the course of the drilling program turkey's nests are assumed to be rehabilitated. At any time over the course of the FA period up to 10 turkey's nests are assumed to be present in the well fields.
- 5 Gas and water gathering lines are assumed to exist at the start of the FA period with additional lines to be constructed over the course of the FA period concurrent with the well drilling program. Gathering lines are assumed to be constructed of HDPE pipe and installed below grade. The existing pipeline easements are assumed to have been previously rehabilitated. At decommissioning, it is assumed underground lines will remain in place. This is consistent with decommissioning practices in the Australian Pipeline Industry Associated Ltd – Code of Environmental Practice Onshore Pipelines, March 2009. Gas lines will be purged prior to decommissioning. Water lines would be emptied as part of dam closure and water management activities. Rehabilitation of the easements includes backfilling trenches and grading and seeding the disturbed area. It is assumed that the pipeline construction disturbance will be progressively rehabilitated as part of the construction works. For the purposes of FA, it is assumed at any time during construction that up to 1 km of trench is open and requires backfilling, and up to 5 km of easement requires grading and revegetation. Contingency costs for reseeding the easements in the year following rehabilitation are included.
- 6 Roads are assumed to exist at the start of the FA period with new roads to be constructed for access to well sites and facilities. Roads outside operational facilities (e.g., compressor stations) are assumed to be unpaved tracks. Rehabilitation of roads within facilities is included in the facilities removal and rehabilitation costs. Initial rehabilitation of the unpaved tracks outside facilities comprises grading and revegetation to reduce the construction disturbance area down to the final road footprint. Final road rehabilitation comprises grading and revegetation of the disturbed area to promote a stable land form.
- 7 Facilities assumed to exist or be proposed for construction/operation during FA period include:
 - 2 - Central Gas Processing Facilities (CGPF) - each with 6 or 7 gas compressors and TEG dehydration units. These facilities exist at the start of the FA period
 - 2 - Reverse Osmosis Plants (ROPs) - existing at start of FA periodRehabilitation of plant facilities will comprise demolition and removal of infrastructure and grading and revegetation of the disturbed areas. Where notifiable activities (e.g., fuel or chemical storage) have occurred environmental investigations will be completed.

Scrap value of steel structures and process units associated with plant facilities has been calculated and is used to offset the costs associated with demolition and removal of these units. Estimated net proceeds from scrap that would exceed the cost of removal and processing of salvageable units have been set to \$0 and are not used to off-set other demolition/rehabilitation costs. Separate financial assurance estimates are provided for demolition of non-salvageable structures and units, including concrete, and removal and disposal of demolition debris.
- 8 Two borrow pits exist that support construction works. Rehabilitation of these areas comprises grading and revegetation to promote a stable land form.
- 10 Dams/ponds associated with the operational facilities and infield ponds associated with CSG water aggregation and water treatment are assumed to exist at the start of the FA period. Removal and rehabilitation of the dams/ponds is assumed to comprise removal and disposal of liners (HDPE and CCL materials) and sludges, and grading and revegetation of the disturbed area. Costs for contaminated land investigations of aggregation/process and brine ponds are also included. Treated water ponds are assumed to require no investigation.

Costs for management of water in ponds and disposal of accumulated brine are also included. Water is assumed to be treated utilising the existing ROPs. Treated water will be beneficially re-used or disposed of in a manner consistent with project approvals. Brine management alternatives are currently being evaluated. For the purposes of FA, costs for transport and disposal of brine off site are included. Water volumes for treatment are based on typical operating pond levels. A total of 984 ML of brine is assumed to exist in ponds at the start of the FA.



FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

Assumptions

- 11 Contingency costs are included for revegetation (reseeding) in the year land disturbances are initially rehabilitated and carried forward to the subsequent year following rehabilitation (when the works would occur if needed).
- 12 Costs for post rehabilitation monitoring and maintenance are included. These costs are based on 5% of the total rehabilitation costs that would be the focus of monitoring (e.g., grading and seeding of disturbance areas). This is considered appropriate as there are no monitoring activities associated with facilities equipment demolition/removal, water treatment, or investigations once these works are completed. For each annual cost estimate, the maximum monitoring cost (associated with the maximum disturbance) during the FA period is included to ensure that monitoring costs are included for areas that may be partially/fully rehabilitated during the period. The cost basis for maintenance and monitoring each year is as follows.

	Year 1	Year 2
Cost basis (land rehabilitation cost) \$	13,031,302	\$ 13,343,048
Maintenance & Monitoring Cost (5% of basis) \$	651,565	\$ 667,152

REHABILITATION GRADING UNIT RATE

Area of Disturbance	Amount
Total Hectares	5

Revegetation - Earthmoving	Units	Rate	Cost	Assumptions/Comments
Dozer	100	\$150	\$15,000	Assume two dozers for one week; 50 hours per week
Grader	50	\$230	\$11,500	Assume one grader for one week; 50 hours per week
Labour	100	\$71	\$7,100	2 labourers for one week; 50 hours per week
Earthworks Supervisor	50	\$129	\$6,450	Assume one week; 50 hours per week
Utility Truck	15	\$88	\$1,320	Assumes 3 utility trucks for Earthworks Supervisor, Labourers and Operators for 5 days (1 week)
Toilets	2	\$121	\$242	Assumes 2 toilets for one week (per OSHA requirements)
Portable Generator and Supplied Fuel	1	\$1,085	\$1,085	Assumes one generator for one week with 300 litres of supplied fuel
Portable Office	1	\$250	\$250	Assume one week
Mobilisation	1	\$500	\$500	Allow
Subtotal			\$43,447	
Project Management Costs	10%		\$4,345	
Contingency (includes regrading)	15%		\$7,169	15% of total cost with allowance for accommodation and subsistence if needed.
Total Earthmoving (per Hectare)			\$54,960	

Rehabilitation Grading Unit Rate (\$/ha) \$ 10,992

Assumptions:
Unit rate for rehabilitation grading based on one week earthworks to complete 5 ha.
Contractors will be local with any accommodation requirements included in the contingency

REHABILITATION SEEDING - LEVEL AREAS

Area of Disturbance	Amount
Level Hectares	1

Revegetation - Seeding Level Areas	Units	Rate	Cost	Assumptions/Comments
Direct seeding (Equipment and Seed)	1	\$706	\$706	Average adjusted cost of Niche seeder with seed
Direct Seeding (Labour)	3.3	\$71	\$234	Assumes 3.3 labour hours/ha
Fencing and silt fencing	1	\$1,500	\$1,500	Allow
Mobilisation	1	\$500	\$500	Allow
Subtotal			\$2,940	
Project Management Costs	10%		\$294	
Contingency (includes reseeding)	15%		\$485	15% of total cost with allowance for accommodation and subsistence if needed.
Total Seeding (1 Hectares)			\$3,719	

SEEDING LEVEL AREAS - UNIT RATE (per ha)	\$ 3,719
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Assumptions:
 Based on one week earthworks.
 Site will be revegetated (seeded) with grass/native species to stabilise soils and promote natural revegetation processes.
 Contractors will be local with any accommodation requirements included in the contingency

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

EXPLORATION WELL PAD REHABILITATION

EXPLORATION WELL (CORE HOLE) PAD REHABILITATION

<i>Grading and Seeding of Bund Walls and Entire Area</i>	<i>Nr</i>	<i>Units</i>	<i>Rate</i>	<i>Cost</i>	<i>Assumptions/Comments</i>
D8 Bulldozer	4	hours	\$250	\$1,000	
Earthworks Supervisor	4	hours	\$129	\$516	
Mobilisation/Demobilisation	1	allow	\$1,500	\$1,500	
Support Truck with Level	1	day	\$120	\$120	
Maintenance of Silt Fencing	0.8	ha	\$1,500	\$1,200	Allowance
Seeding	0.8	ha	\$706	\$565	Cost based on industry seeding rates with Labour provided separately
Direct Seeding (Labour)	4	hr	\$71	\$284	Assumes 4 hr minimum
Fencing	1	allow	\$1,500	\$1,500	Prevent stock entry during revegetation period (includes installation and removal of 1 wire fence)
Subtotal for grading and seeding				\$6,685	
Contingency (10%)	10%			\$668	
Project Management (10%)	10%			\$735	
UNIT RATE - GRADING AND SEEDING				\$8,088	

TOTAL COST PER WELL PAD \$8,088

<i>Reseeding (1 year after rehabilitation)</i>	<i>Nr</i>	<i>Units</i>	<i>Seeding Unit Rate (\$/ha)</i>	<i>Cost</i>	<i>Assumptions/Comments</i>
Reseed partially rehabilitated well pad area	0.8	ha	\$3,719	\$2,975	Based on Rehabilitation Seeding Rate which includes mobilisation

Assumptions:

Assumes all exploration/drilling equipment owned and removed by contractors.
 Well pad rehabilitation to comprise grading and seeding of disturbance area. No pits/turkey's nests on site.
 Allowance included for reseeding in year after rehabilitation. Allows for 100% reseeding due to small size of area.

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

APPRAISAL/DEVELOPMENT - SINGLE WELL PAD REHABILITATION

APPRAISAL/DEVELOPMENT WELL - SINGLE WELL PAD REHABILITATION

<i>Removal of above ground infrastructure</i>	<i>Nr</i>	<i>Units</i>	<i>Rate</i>	<i>Cost</i>	<i>Assumptions/Comments</i>
Labour (2)	32	hours	\$71	\$2,272	assumes 2 labourers for 2 days, 8 hrs/day
Electrician	4	hours	\$145	\$580	
Gas Axe	1	allow	\$250	\$250	
Truck with Hiab	4	hours	\$125	\$500	
Support Truck (2)	2	day	\$88	\$176	labour transport
Subtotal infrastructure removal				\$3,778	
Contingency (10%)	10%			\$378	
Project Management (10%)	10%			\$416	
UNIT RATE - INFRASTRUCTURE REMOVAL				\$4,571	

<i>Removal and Disposal of Liner and Muds</i>	<i>Nr</i>	<i>Units</i>	<i>Rate</i>	<i>Cost</i>	<i>Assumptions/Comments</i>
Excavator (35T)	8	hours	\$175	\$1,400	Assumes one excavator for 8 hours
Truck Transportation	4	hours	\$120	\$480	
Disposal	220	tons	\$85	\$18,731	See Assumptions Below
Mobilisation/Demobilisation	1	allow	\$1,500	\$1,500	
Subtotal for removal and disposal				\$22,111	
Contingency Costs (10%)				\$2,211	
Project Management (10%)				\$2,432	
UNIT RATE - MUD AND LINER REMOVAL AND DISPOSAL				\$26,754	

<i>Grading and Seeding of Bund Walls and Entire Area</i>	<i>Nr</i>	<i>Units</i>	<i>Rate</i>	<i>Cost</i>	<i>Assumptions/Comments</i>
18 T Drott	8	hours	\$188	\$1,504	
Excavator (35T)	8	hours	\$175	\$1,400	
Earthworks Supervisor	8	hours	\$129	\$1,032	
Mobilisation/Demobilisation	1	allow	\$1,500	\$1,500	
Support Truck with Laser Level	1	day	\$120	\$120	
Silt Fencing	0.8	ha	\$1,500	\$1,200	
Seeding	0.8	ha	\$706	\$565	Assumes average adjusted cost of Niche seeder with seed
Direct Seeding (Labour)	4	hr	\$71	\$284	Assume 4 hr minimum
Fencing	1	allow	3000	\$3,000	Prevent stock entry during revegetation period (includes installation and removal of 2 wire fences)
Subtotal for grading and seeding				\$10,605	
Contingency Costs (10%)				\$1,060	
Project Management (10%)				\$1,167	
UNIT RATE - GRADING AND SEEDING				\$12,832	

TOTAL REHABILITATION COST				\$44,157	
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FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

APPRAISAL/DEVELOPMENT - SINGLE WELL PAD REHABILITATION

APPRAISAL/DEVELOPMENT WELL - SINGLE WELL PAD REHABILITATION					
Reseeding (1 year after rehabilitation)	Nr	Units	Seeding Unit Rate (\$/ha)	Cost	Assumptions/Comments
Reseed partially rehabilitated well pad area	0.5	ha	\$3,719	\$1,860	Based on Rehabilitation Reseeding Rate which includes mobilisation

Assumptions:

Development wells to be partially rehabilitated by removal of drilling and development equipment, removal of drilling mud pit and grading and revegetating the area to reduce disturbance from 0.8 ha to a final 0.014 ha well pad for operations.
 Water to be managed by pitless system or utilising turkeys nest located off well pad. Costs for rehabilitation of turkeys nests are estimated separately.
 Cut and remove all above grade steel piping.
 Scrap all steel infrastructure.
 Isolate and terminate any electrical/communications devices and remove electrical equipment.
 Transportation off-site for scrap. No cost off-set allowance made for scrap.
 Drilling mud pit and liner to be removed
 Drawings show 96 m² of pits excavated to 1.5 m
 Total of 115 m³ of drilling muds and cuttings in pits
 Density of mud = 1.9; assume 220 tonnes mud and cuttings
 Liner and muds to be transported off-site for non-hazardous disposal
 All dirt on side walls of dam to be regraded into area

Liner Dimensions	Width	Length	Area (m2)	Units	Assumptions
Area			96		
Walls and bund walls 0.8 x area			76.8		(assume 1: 2 slope)
Total Liner Area			173		
Weight of liner			0.36	tons	Based on manufacturer specifications of 210 kg per 100 m ²
Weight of sludge			220	tons	115 m ³ with a density of 1.9g/cc
Total Disposal Weight (liner and sludge)			220.36	tons	
Volume of Dirt for grading			500	m ³	96 m ³ in voids to be filled, bund walls 150 m ³ (50*3 *1). Nominal surface grade 250 m ³
Disposal Rate			\$ 85	ton	Assumed

Allowance for reseeding in year following rehabilitation. Assumes up to 25% of area requires reseeding, however allows for 0.5 ha minimum for adequate mobilisation costs.

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

PRODUCTION/OPERATIONAL - SINGLE WELL PAD REHABILITATION

PRODUCTION/OPERATIONAL - SINGLE WELL PAD REHABILITATION

<i>Removal of above ground infrastructure</i>	<i>Nr</i>	<i>Units</i>	<i>Rate</i>	<i>Cost</i>	<i>Assumptions/Comments</i>
Labour (2)	32	hours	\$71	\$2,272	assumes 2 labourers for 2 days, 8 hrs/day
Electrician	4	hours	\$145	\$580	
Gas Axe	1	allow	\$250	\$250	
Truck with Hiab	4	hours	\$125	\$500	
Support Truck (2)	2	day	\$88	\$176	labour transport
Subtotal infrastructure removal				\$3,778	
Contingency (10%)	10%			\$378	
Project Management (10%)	10%			\$416	
UNIT RATE - INFRASTRUCTURE REMOVAL				\$4,571	

<i>Grading and Seeding of Bund Walls and Entire Area</i>	<i>Nr</i>	<i>Units</i>	<i>Rate</i>	<i>Cost</i>	<i>Assumptions/Comments</i>
D8 Bulldozer	4	hours	\$250	\$1,000	Assumes D8 Earthmover
Earthworks Supervisor	4	hours	\$129	\$516	
Mobilisation/Demobilisation	1	allow	\$1,500	\$1,500	
Support Truck with Level	1	day	\$120	\$120	
Maintenance of Silt Fencing	0.5	ha	\$1,500	\$750	Allowance per ha
Seeding	0.5	ha	\$706	\$353	Cost based on industry seeding rates with Labour provided separately
Direct Seeding (Labour)	4	hr	\$71	\$284	Assumes 4 hr minimum
Fencing	1	allow	\$1,500	\$1,500	Prevent stock entry during revegetation period (includes installation and removal of 1 wire fence)
Subtotal for grading and seeding				\$6,023	
Contingency (10%)	10%			\$602	
Project Management (10%)	10%			\$663	
UNIT RATE - GRADING AND SEEDING				\$7,288	

TOTAL COST PER WELL PAD - YEAR OF CONSTRUCTION **\$11,859**

<i>Reseeding (1 year after rehabilitation)</i>	<i>Nr</i>	<i>Units</i>	<i>Seeding Unit Rate (\$/ha)</i>	<i>Cost</i>	<i>Assumptions/Comments</i>
Reseed partially rehabilitated well pad area	0.5	ha	\$3,719	\$1,860	Based on Rehabilitation Reseeding Rate which includes mobilisation

Assumptions:

Assumes capping and sealing of well completed previously (involves well head removal)
 Well pad rehabilitation to comprise removal of on grade equipment, and grading and seeding area disturbance area.
 Well pads are approximately 0.014 ha, but costs based on 0.5 ha minimum to allow for adequate mobilisation costs.
 Cut and remove all above grade steel piping.
 Scrap all steel infrastructure.
 Isolate and terminate any electrical/communications devices and remove electrical equipment.
 Transportation off-site for scrap. No cost off-set allowance made for scrap.
 Allowance for reseeding in year following rehabilitation (allows 0.5 ha minimum for adequate mobilisation costs).

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

Rehabilitation of Turkeys Nest

TURKEY'S NEST REMOVAL COSTS

Removal and Disposal of Liner	Nr	Units	Rate	Cost	Assumptions/Comments
Excavator (35T)	4	hours	\$175	\$700	
Earthworks Supervisor	4	hours	\$200	\$800	
Truck Transportation	4	hours	\$165	\$660	
Disposal	14.5	tons	\$85	\$1,232	See Assumptions Below
Equipment Mobilisation	1	allow	\$500	\$500	assumes initial mobilisation of equipment to project area included in well pad rehabilitation program costs
Subtotal for removal and disposal				\$3,892	
Contingency Costs (10%)				\$389	
Project Management (10%)				\$428	
SINGLE WELL PAD COST				\$4,710	

Grade and Seed Bund Walls and Entire Area	Nr	Units	Rate	Cost	Assumptions/Comments
18 T Drott	4	hours	\$188	\$752	
Excavator (35T)	4	hours	\$175	\$700	
Earthworks Supervisor	4	hours	\$129	\$516	
Support Truck with Laser Level	1	day	\$120	\$120	
Silt Fencing	0.2	ha	\$1,500	\$300	
Seeding	0.2	ha	\$706	\$141	Assumes average adjusted cost of Niche seeder with seed
Direct Seeding (Labour)	4	hr	\$71	\$284	Labour hour/ha = 3.3; 4-hr minimum
Fencing	1	allow	\$1,000	\$1,000	Prevent stock entry during revegetation period (includes installation and removal of 2 wire fences)
Subtotal for grading and seeding				\$3,813	
Contingency Costs (10%)				\$381	
Project Management (10%)				\$419	
SINGLE WELL PAD COST				\$4,614	

TOTAL REHABILITATION COST - Single Turkey's Nest	\$9,324
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Removal and Disposal of Fluids	Nr	Units	Rate	Cost	Assumptions/Comments
Transportation via Vacuum Truck (3 hours per truck)	200	hours	\$200	\$40,000	18,000 L/load; 3-hr loading and transport to treatment
Treatment and Disposal	1,200,000	litre	\$0.08	\$96,000	
SINGLE WELL PAD COST				\$136,000	

Re-Seeding 1 year after rehabilitation	No.	Units	Seeding Unit Rate (\$/ha)	Cost
Reseeding	0.2	ha	\$ 3,719	\$744

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

Rehabilitation of Turkeys Nest

Assumptions:

Turkeys nests are located infield and proximal to well pad areas. Assumes turkey nests to be removed concurrent with well pad rehabilitation program.
 Rehabilitation of turkeys nest to comprise removal, transport and treatment of fluids at water treatment facility, removal and disposal of sludge and liner, and grading and seeding disturbed area.
 All dirt on side walls of dam (bund materials) to be used to infill pit and regraded into area
 Liner and sludges to be transported off-site for non-hazardous disposal
 Assume turkeys nest is 30 x 25 x 2 m³ and built half above and half 1/2 below grade . The soil used in digging out the turkey nest used to build the berm walls.

Liner Dimensions	Width	Length	Area (m2)	Units	Assumptions
Base	30	25	750		
Walls (2)	4	25	200		(assume 1: 2 slope)
Walls (2)	4	30	240		
Total liner area			1190		
Weight of liner			2.5	tons	Based on manufacturer specifications of 210 kg per 100 m2
Removal of sludge			7.5	m3	Based on 1 cm of sludge being present on base of dam across 750 m ² with a density of 1.6g/cc
Weight of sludge			12	tons	
Total Disposal Weight			14.5	tons	
Volume of Dirt for grading			750	m3	berm soils
Fluids removal and disposal					
Assumes turkey nest is 80% full at decommissioning			1,200,000	litres	
Vacuum Truck Loads (18,000 L/load)			67	truck loads	
Fluids treatment and disposal					
			0.08	L	Assumed

FINAL
REHABILITATION COSTS FOR DALBY EXPANSION PROJECT
Initial Road Rehabilitation

INITIAL ROAD REHABILITATION COSTS - DAILY RATE

<i>Labour/Equipment</i>	<i>nr</i>	<i>Rate</i>	<i>Units</i>	<i>Cost</i>	<i>Assumptions/Comments</i>
Labourer	2	\$710	day	\$1,420	Based on Standard contractor rates
Earthworks Supervisor	0.5	\$1,290	day	\$645	Based on Standard contractor rates
Support Truck	1	\$120	day	\$120	for labour transport
Toilets	1	\$17	day	\$17	Based on Standard contractor rates
Office	1	\$36	day	\$36	Based on Standard contractor rates
D8 Earthmover	1	\$2,500	day	\$2,500	
Seeding	2	\$706	ha	\$1,412	
Seeding Labour	6.6	\$71	hr	\$469	Assume Standard contractor rate
Silt Fencing	2	\$1,500	ha	\$3,000	Allow \$1500 per ha
Subtotal				\$9,618	
Contingency 10% (allows for redo's)				\$962	
Project Management (PM) 10%				\$1,058	
TOTAL (2 ha per day)				\$11,638	

Initial Road Rehabilitation Cost (\$/km)	\$4,655
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<i>Re-Seeding Rehabilitated Area</i>	<i>No.</i>	<i>Units</i>	<i>Seeding Unit Rate (\$/ha)</i>	<i>Unit Rate (\$/km)</i>	<i>Assumptions/Comments</i>
Reseeding rehabilitated area	0.3	ha/km	\$3,719	\$1,162	Contingency for reseeding 1 year after rehabilitation; assumes 25% of area may require reseeding.

Reseeding Cost (\$/km)	\$1,162
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Assumptions
Restoration of road easement from 20 metres down to 12 metres (8 metres of area rehabilitated). As initial rehabilitation follows construction works, equipment is assumed to be locally available. Area to be graded and revegetated after disturbance Ha of disturbed area = 1.25 km road Assumed equivalent completed per day 2 ha

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

Final Road Easement Rehabilitation

FINAL ROAD EASEMENTS REHABILITATION COST

Labour/Equipment	nr	Rate	Units	Cost	Assumptions/Comments
Labourers	2	\$710	day	\$1,420	2 labourers; 10 hours per day
Earthworks Supervisor	0.5	\$1,290	day	\$645	
Support Truck	1	\$120	day	\$120	
Toilets	1	\$17	day	\$17	
Office	1	\$36	day	\$36	
D8 Earthmover	1	\$2,500	day	\$2,500	10 hours per day
Seeding	2	\$706	ha	\$1,412	
Seeding Labour	6.6	\$71	hr	\$469	Assumes 3.3 labour hrs/ha
Silt Fencing	2	\$1,500	ha	\$3,000	allow
Subtotal				\$9,618	
Contingency 10% (allows for redo's)				\$962	
Project Management (PM) 10%				\$1,058	
TOTAL DAILY RATE (2 ha/day)				\$11,638	

Road Easement Rehabilitation (\$/km)	\$6,983
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Mobilisation	\$3,000
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Re-Seeding 1 year after rehabilitation	No.	Units	Seeding Unit Rate (\$/ha)	Unit Rate (\$/km)	Assumptions/Comments
Road Reseeding	0.21	ha/km	\$3,719	\$775	mobilisation included; assumes 25% of area requires reseeding.

Road - Reseeding Cost (\$/km)	\$775
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Assumptions

Road Easements

Assume dirt roads with stormwater infrastructure installed. Rehabilitation includes grading and seeding with native grasses.

Road easement is 12 metres wide and unpaved.

Equivalent ha of road area

1 ha disturbed area equivalent km = 0.83 km of road

Assumed equivalent completed per day 2 ha

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

BORROW PIT REHABILITATION GRADING

BORROW PIT REHABILITATION

Total Hectares Disturbance	5
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UNIT RATE FOR SIDEWALL SOIL MOVEMENT FOR BATTER SLOPES

Batter Slope Grading	nr	Units	Rate	Cost	Assumptions/Comments
Labourers	10	day	\$ 710	\$ 7,100	2 labourers for 5 days, 10 hours/day
Earthworks Supervisor	5	day	\$ 1,290	\$ 6,450	10 hours /day
35T Excavator	10	day	\$ 1,750	\$ 17,500	2 excavators for 5 days, 10 hours /day
D8 Earthmover	5	day	\$ 2,500	\$ 12,500	10 hours /day
Utility Truck	10	day	\$ 88	\$ 880	2 trucks for 5 days labour transport
Equipment Mob/Demob	1	allow	\$ 1,500	\$ 1,500	Local movement of equipment
Subtotal				\$ 45,930	
Contingency 10% (allows for redo's)				\$ 4,593	
Project Management 10%				\$ 5,052	
TOTAL (5-ha pit, 5 work days)				\$ 55,575	

Sidewall / Batter Grading Unit Cost (\$/ha)	\$ 11,115
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Finish Grading	Units	Units	Rate	Cost	Assumptions/Comments
Labour	10	day	\$ 710	\$ 7,100	2 labourers for 5 days, 10 hours per day
Earthworks Supervisor	5	day	\$ 1,290	\$ 6,450	5 days, 10 hours per day
Grader	5	day	\$ 2,300	\$ 11,500	One grader for 5 days, 10 hours per day
Utility Truck	15	day	\$ 88	\$ 1,320	3 trucks for Supervisor, Labourers and Operators for 5 days
Toilets	2	week	\$ 121	\$ 242	2 toilets for one week
Portable Generator and Supplied Fuel	1	week	\$ 1,085	\$ 1,085	One generator for one week with 300 litres of supplied fuel
Portable Office	1	week	\$ 250	\$ 250	One week
Mobilisation/Demobilisation - Local	1	allow	\$ 500	\$ 500	local mobilisation of equipment
Subtotal				\$ 28,447	
Project Management Costs	10%			\$ 2,845	
Contingency (includes regrading)	15%			\$ 4,694	includes allowance for accommodation and subsistence if needed.
Total Earthmoving (per Hectare)				\$ 35,985	

Finish Grading Unit Cost (\$/ha)	\$ 7,197
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BORROW PIT - GRADING UNIT RATE (\$/ha) \$ 18,312

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

BORROW PIT REHABILITATION GRADING

BORROW PIT REHABILITATION

UNIT RATE FOR SEEDING

Seeding Borrow Pits	nr	Units	Rate	Cost	Assumptions/Comments
Hydroseeding batter walls	0.72	ha	\$ 16,396	\$ 11,805	includes mobilisation
Seeding level areas	4.28	ha	\$ 706	\$ 3,021	includes mobilisation
Subtotal Borrow Pit				\$ 14,826	

BORROW PIT - SEEDING UNIT RATE (\$/ha) \$ 2,965

Assumptions:

Where required, restoration will involve changing grade at batter/pit walls to achieve a maximum slope of approximately 30 degrees for stability.

Rate developed per ha based on assumed 5 ha borrow pit area 200x250 m², 4 metres deep

Volume of soils to be moved = 0.5 x 6.7 x 4 m³ (13 m³) per linear metre of wall

Periphery of pit in linear metres = 900

Volume of soil to be moved (m³) = 11700 m³

Finished batter area to be seeded (ha) = 0.72 ha

Production rate for equipment = 2500 m³ for two excavators and one D8 Earthmover. Estimate 5 days for sidewall/batter work.

Batter and finish grading works to be conducted concurrently. Batter areas to be hydroseeded. Level areas to be seeding by handcasting methods.

Equipment is assumed to be local. Local mobilisation costs to work area are included.

FINAL
REHABILITATION COSTS FOR DALBY EXPANSION PROJECT
Backfilling and Grading of Pipeline Trenches

TRENCH BACKFILLING - GAS GATHERING/TRANSFER PIPELINES (3 EXCAVATOR CREW)

Labour/Equipment	nr	Rate	Units	Cost	Assumptions/Comments
Labourers	2	\$710	day	\$1,420	2 labourers at 10 hours per day
Earthworks Supervisor	1	\$1,290	day	\$1,290	10 hours per day
35T Excavator	3	\$1,750	day	\$5,250	3 35-T Excavator 10 hours per day
Support Truck	2	\$88	day	\$176	Standard contractor rate
Toilets	1	\$17	day	\$17	Standard contractor rate
Office	1	\$36	day	\$36	Standard contractor rate
18T Drott	1	\$1,880	day	\$1,880	10 hours per day
Silt Fencing	0.30	\$1,500	ha	\$450	Allowance
Mobilisation/Demobilisation	1	\$1,500	allow	\$1,500	Allowance
Subtotal				\$12,019	
Contingency 10% (allows for redo's)				\$1,202	
Project Management 10%				\$1,322	
TOTAL Daily Rate				\$14,543	

Restoration cost (\$/km)	\$6,787
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Assumptions							
Trench Backfilling Type	Depth m	Width m	Area m2	Production Rate m3/day	Backfill Rate km/day	Backfill Rate km/day	Assumptions
					1 Excavator	3 Excavator Crew	
Gas and Water Gathering Pipelines	1	1.4	1.4	1000	0.71	2.14	1 m bury depth with 400 mm spacing between lines
Assumes 3 excavators backfilling trenches and Drott completing single grading pass after trench is backfilled. Trench to be mounded to allow for settlement. Topsoil will be stockpiled for reuse; topsoils and deeper soil horizons will be segregated to allow for reuse and effective rehabilitation.							

FINAL
REHABILITATION COSTS FOR DALBY EXPANSION PROJECT
Pipeline Easement Rehabilitation

PIPELINE EASEMENT REHABILITATION - DAILY RATE					
Labour/Equipment	nr	Rate	Units	Cost	Assumptions/Comments
Labourers	2	\$710	day	\$1,420	2 labourers, 10 hours per day
Earthworks Supervisor	0.5	\$1,290	day	\$645	10-hr day rate
Support Truck	2	\$88	day	\$176	staff transport
Toilets	1	\$17	day	\$17	
Office	1	\$36	day	\$36	
D8 Earthmover	1	\$2,500	day	\$2,500	10 hours per day
Seeding	2	\$706	ha	\$1,412	average cost per ha (Niche Seeder)
Silt Fencing	2	\$1,500	ha	\$3,000	Allow
Mobilisation	1	\$1,500	allow	\$1,500	Allow
Subtotal				\$10,706	
Contingency 10% (allows for redo's)				\$1,071	
Project Management 10%				\$1,178	
TOTAL (2 ha per day)				\$12,954	

Grade & Seed 18-metre corridor (\$/km)	\$11,659
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PIPELINE EASEMENT REHABILITATION - RESEEDING UNIT RATES					
Re-Seeding - 1 year after rehabilitation	No.	Units	Seeding Unit Rate (\$/ha)	Reseeding Cost (\$/km)	Assumptions/Comments
Reseed - 6 metre corridor	0.15	ha/km	\$3,719	\$558	assumes 25% of area requires reseeding
Reseed - 10 metre corridor	0.25	ha/km	\$3,719	\$930	assumes 25% of area requires reseeding
Reseed - 18 metre corridor	0.45	ha/km	\$3,719	\$1,674	assumes 25% of area requires reseeding

Assumptions:

Initial rehabilitation completed as part of construction works. It is assumed that up to 5 km of easement is under construction and may require rehabilitation.

Initial rehabilitation to comprise grading and seeding of construction corridor. Access route over corridor to be maintained during operations by slashing/trimming, Vegetation will be allowed to naturally regenerate when operations cease.

Access route maintained through slashing/trimming/ Vegetation will be allowed to naturally regenerate when operations cease.

Pipelines will be left in place after decommissioning, consistent with pipeline decommissioning practices in the Australian Pipeline Industry Associated Ltd – Code of Environmental Practice for Onshore Pipelines, March 2009.

Water lines will be empty and will not be purged. Gas lines will be purged upon decommissioning.

Assumed equivalent area rehabilitated per day 2 ha/day

Equivalent ha of disturbance per kilometre:

1 Ha equivalent disturbed area (18-metre corridor) = 0.56 km of transfer/transmission pipeline easement

Allowance for reseeding in year following rehabilitation. Assumes 25% of area requires reseeding

FINAL
REHABILITATION COSTS FOR DALBY EXPANSION PROJECT
Pipeline Purging

Purging of Pipelines	
Gas Lines to be purged	Rate (\$/km)
Gas Gathering Lines	\$1,380

Assumptions:

Rate of \$1340/km based on midstream (overland pipeline) cost estimate from other project experience in Queensland.
 Assumed purging of lines will be conducted concurrently with main pressurized gas pipeline to manage risks.
 Need to purge small gas lines and compressor lines prior to purging high pressure lines.
 Mobilisation costs are assumed to be included in the rate as the cost estimate is conservative in that purging costs for the smaller lines will be considerably less.

FINAL
REHABILITATION COSTS FOR DALBY EXPANSION PROJECT
Overhead Power Line Removal

Overhead Electrical Wire Removal, Transportation, and Salvage	Amount	Units	Assumptions/Comments
Wiring - 3 wires across 100 km	3,000	m	
Converted weight per m	960	kg/1000 linear meter	
Rate for scrap	\$8.63	\$/kg	
Total copper scrap value	\$24,841	\$/kg	
	\$25,387	\$/kg	
Total cost to remove copper	\$7,616	\$/kg	Typically assumed to be 30% of copper scrap.
Total removal and transportation	\$7,616	\$/kg	
Net proceeds from Scrap Copper Recovery = \$17,771 \$A			

Scrap value per km	\$254	scrap value offsets removal cost
Removal cost per km	\$76	

Assumptions :

- 1) Assumes a medium sized barge is utilized (rated for medium size barge is rated for 1000 tons or 50 roll offs).
- 2) Heavy industrial activity necessitates a assumption of on average 4/0 wiring
- 3) DC bus bars etc. not included in this weight assumption despite their weight being 100 times higher than wiring weights
- 4) Large electrical transmission cables likely to have diameters exceeding 1 inch core
- 5) Assume 50% of I&E cable is electrical with no copper allowance for comm cables

Size	Diameter	Cross-sectional area		Weight
AWG	inches	cir. mils	sq. inches	lb./1000 ft.
4/0	0.4600	211,600	0.1662	640.5
3/0	0.4096	167,800	0.1318	507.9
2/0	0.3648	133,100	0.1045	402.8
1/0	0.3249	105,500	0.08289	319.5
1	0.2893	83,690	0.06573	253.5
2	0.2576	66,370	0.05213	200.9
3	0.2294	52,630	0.04134	159.3
4	0.2043	41,740	0.03278	126.4
5	0.1819	33,100	0.02600	100.2
6	0.1620	26,250	0.02062	79.46
7	0.1443	20,820	0.01635	63.02
8	0.1285	16,510	0.01297	49.97
9	0.1144	13,090	0.01028	39.63
10	0.1019	10,380	0.008155	31.43

US AUS Exchange Rate:	\$0.98	
Date :	27-Jul-12	
	<u>\$/kg</u>	<u>\$/ton</u>
Copper Value*	\$8.44	\$8.63

*30-day average June 2011 <http://www.scrapmonster.com/moreprice/north-america/1/1>

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

OVERHEAD POWER LINE POLE REMOVAL

DAY RATE FOR REMOVAL OF POLES (40 PER DAY)					
Labour/Equipment	nr	Rate	Units	Cost	Assumptions/Comments
Labourers (3)	3	\$880	day	\$2,640	3 labourers for one 10-hr day
Earthworks supervisor	1	\$129	day	\$129	10-hr day
35T Excavators (2)	2	\$1,750	day	\$3,500	remove, cut and load poles; remove and load concrete footing, backfill hole with surrounding soils
Pole Grabber for 35-T Excavator	1	\$450	day	\$450	pole removal
Mechanical Shears for Excavator	1	\$840	day	\$840	Cut poles
Truck & Dog for debris transport	25	\$652	per load	\$16,300	
Debris Disposal	600	\$55	tonne	\$33,000	
Support Truck	2	\$88	day	\$176	2 trucks for labour transport
Toilets	1	\$17	day	\$17	
Seeding	0.4	\$706	ha	\$282	0.4 ha per 40 pole locations
Subtotal				\$57,335	
Contingency 10% (allows for redo's)				\$5,733	
Contractor Project Management				\$6,307	
TOTAL (40 Poles Per Day)				\$69,375	

Unit Rate - Pole Removals (\$/km) **\$6,937** assumes 4 poles per km

Reseeding (1 year after rehabilitation)	0.4	ha	\$ 706	\$ 282	allows reseeding of all 40 pole locations to allow for mobilisation charges
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Unit Rate - Reseeding (\$/km) **\$28** assumes 4 locations per km

Assumptions:

Overhead wires removed for scrap prior to pole removal

Assumes 40 concrete poles removed per day. Concrete poles and footing debris transported offsite for disposal. Transport and disposal costs are included.

Footing backfilled using excavator bucket and surrounding soils. Disturbed area to be graded and seeded (assumes 10x10 m² area per pole; 0.4 ha per 40 poles of disturbed area).

Assumes poles are concrete, 24-metres long and placed at 250-metre intervals.

40 poles removed per day

Weight of pole	10 tonnes
weight of concrete footing	5 tonnes
Weight of 40 poles and footing debris	600 tonnes
Truck loads debris (40 poles)	25 loads (assumes 24-T/load)
Trucking rate \$	652 per load 4-hr return trip; 24-T/load
Disposal Rate \$	55 per tonne (disposal of concrete debris)

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

Demolition and Scrap Value Summary - RO Plant

DEMOLITION, SCRAP AND SALVAGE COST SUMMARY

<i>RO Plant</i>	<i>Total</i>
Demolition of Structures Post-Salvage	\$285,953
Disposal of Demolition Debris	\$110,715
Scrapping and Salvage of Plant	\$455,858
Scrap Value (applicable for off-set of scrapping high value assets)	(\$956,685)
Total	(\$500,827)
Cost of Scrapping and Salvage with Scrap Value	\$0
Total Cost of Demolition	\$396,668

Notes

Demolition costs are covered by scrap value; however scrap value is used to offset costs for removal and processing of salvageable assets only.

Net scrap value applied does not exceed salvageable asset removal costs.

This is consistent with DEHP recommendation that the scrap value cannot be used to off-set other costs.

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

Demolition Debris and Scrap Value Calculations - RO Plant

Plant	m3	Tons	Notes/Assumptions
Volume of Concrete Buildings and Structures	250	600	Allowance for slabs and miscellaneous facilities

Assets at Site Requiring Removal							
	Nr	Unit Weight (tons)	Scrap Tonnage				Assumptions/Notes
			Steel (tons)	Cooper (tons)	Stainless (tons)	Hastelloy (tons)	
Tankage	3	NA					Polyethylene or HDPE tanks
Chemical Storage	1	NA					
Water Transfer Pumps (within facility)	15	10	10		15		
Booster Pumps and Brine Injection Pumps	5	5			5		
Water Amendment Pumps	1	25			25		brine and permeate
Water Blending Facility	1	25			25		
RO Plant	7	55	175		105		2ML/day units - skid mounted (1 standby)
Transformer Banks	1	25	10	15			
Electrical Switch Gear	1	8		5			allowance of 5 tons for electrical Bus bars
Electrical Wiring in Plant (HV)	10	0.96		9.6			0.96 T/m of 4/O electrical wiring in plant between generators and major elect. equip.
Totals			195	29.6	175	0	
Scrap Unit Rate (\$/T)			\$ 501	\$ 10,480	\$ 3,136	\$ 37,949	
Scrap Values			\$97,747	\$310,212	\$548,726	\$0	\$956,685

Note: Compressors have piping to transfer oil to and from the units and the volume of oil will trigger investigation requirements

Type of Metal	Metal Value US\$	Metal Value AUD (per ton)	Date	Source of Quote
Copper (per Kg)	\$9.91	\$10,480.12	30-day average July 2011	http://www.metalprices.com/metal/copper/copper-scrap-1-india
Rare Alloy (per Kg)	\$35.89	\$37,949.45	30-day average July 2011	http://www.metalprices.com/metal/super-alloys/super-alloy-hastelloy-c/
Steel (per kg)	\$0.474	\$501.27	Avg #1 Dealer Bundles as of 8 July 2011	http://www.metalprices.com/metal/ferrous-scrap-price-index/fe-spi-1-dealer-bundles-st-louis
Stainless (per kg)	\$2.97	\$3,135.58	30-day average July 2011	http://www.metalprices.com/metal/stainless-steel/stainless-steel-316-scrap-processor

US AUS Exchange Rate: 0.9456 USD/AUD

Date : 10-Aug-12

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

Demolition Debris and Scrap Value Calculations - RO Plant

Site Constructed Buildings Requiring Removal												
	Long (m)	Wide (m)	Area (m2)	Stud (m)	Nr	Demolition Volume			TOTAL EXT (UNIT)	TOTAL INT (UNIT)	DEMO TOTAL (UNIT)	Total Demo Quantities
						Ext. Walls	Concrete volume	Roof				
Controls and Pump Building - RO feed (includes office)	20.0	5.0	100.0	3.6	1	18	20	15.0	33.0	16.5	49.5	49.5
Total Area (m2)			100.0									
Total Volume (m3)												50
Total Tonnage												84
Total Concrete												20

Pre-Assembled Buildings Requiring Removal												
	Long (m)	Wide (m)	Area (m2)	Stud (m)	Nr	Demolition Volume			TOTAL EXT (UNIT)	TOTAL INT (UNIT)	DEMO TOTAL (UNIT)	Total Demo Quantities
						Ext. Walls	Concrete volume	Roof				
R/O Switch Room	5.0	5.0	25.0	2.4	1	4.8	5.0	3.8	8.6	6.8	15.4	15.4
Main High Voltage Switchroom	5.0	5.0	25.0	2.4	1	4.8	5.0	3.8	8.6	6.8	15.4	15.4
Main Low Voltage Switchrooms	5.0	5.0	25.0	2.4	1	4.8	5.0	3.8	8.6	6.8	15.4	15.4
Total Area (m2)			75.0									
Total Volume (m3)												46
Total Tonnage												78
Total Concrete												15.0

Volume based on 0.1 post demolition compacted thickness of 0.1 (this is conservative given void space in floor and walls)

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

Demolition Debris and Scrap Value Calculations - RO Plant

Disposal Cost for Demolition Debris			
		Tonnage	Notes/Assumptions
Constructed Building Debris		84	Total Demolition rubble excluding concrete.
Preassembled Building Debris		78	Total Demolition rubble excluding concrete.
Concrete		600	Allowance for slabs and miscellaneous facilities
Incidental Wastes		250	
TOTAL DISPOSAL TONNAGE		1,013	

	Unit Rate	Cost	Notes/Assumptions
Disposal Cost	\$55	\$55,695	Based on clean construction fill disposal rates
Trucking Cost	\$54	\$55,020	Based on 8 hour return trip at \$163/hour for 24 ton capacity rock
TOTAL DISPOSAL COST		\$110,715	

Assumptions

- 1) On termination of operations assumes feed water will be treated. Permeate will be beneficially re-used. Brine will be disposed of off-site.
- 2) Waste will be limited to solid wastes from the facility.
- 3) Chemicals, fuels and lubricants stored at the plant will be beneficially reused or properly disposed of offsite.
- 4) An allowance of 250 tons of incidental wastes has been allowed for in the costing.
- 5) Costs for dam closure and final water treatment included in Dam Management costs.

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

Scrap Salvage and Demolition Calculations - RO Plant

Amount of Steel	Amount	Units
Total m2 of structures	175	m2
Number of Buildings	4	
Number of Shelters	4	
Major Equipment Modules	12	
Volume of Concrete	250	m3
Total Concrete Tonnage	600	tons
Total Building Spoil Tonnage	163	tons
Total Incidental Wastes	250	tons
Total Waste	1,013	tons

Scraping and Salvage of Plant				
Cost for Scrapping	Nr	Rate	Cost	Assumptions/Comments
Electricians - Buildings and structures	288	\$145	\$41,760	2 electricians 12 hours to isolate and disconnect major equipment modules for salvage.
Labour for mechanical separation	480	\$127	\$60,960	40 man hours to separate and break up major equipment for salvage and shipping
General Labour for Loading and light manual Work	800	\$88	\$70,400	4 week program with 4 Labour units for gas axing etc
Crainage for Salvage and Equipment Scrapping	96	\$550	\$52,800	8 hours per equipment module in heavy lift crane (150 Ton capacity)
Utility Trucks	40	\$200	\$8,000	5 trucks for transportation of staff (work trucks include all tools, equipment, generator, etc.) for 4 weeks
Toilets	8	\$121	\$968	2 toilets for 4 weeks (per OSHA requirements)
Portable Generator and Supplied Fuel	3	\$1,085	\$3,255	1 generator at weekly rate with 300 litres of supplied fuel for 3 weeks
Portable Office	3	\$250	\$750	Assumes 3 weeks
Mobilisation/Demobilisation	1	\$10,000	\$10,000	Crane (1)
Transportation of Heavy Equipment	96	\$350	\$33,600	Modules transported by heavy transport for scrap or salvage. Assume slow transportation
Gas Cutting Equipment	10	\$2,500	\$25,000	10 days of work
Workforce Accommodation + subsistence	140	\$250	\$35,000	10 labour units 7 days per week for 2 weeks
Subtotal for scrapping			\$342,493	
Project Management Costs			\$34,249	10% of total cost
Contingency Costs			\$37,674	10% of total cost
Monitoring and H&S			\$41,442	
Total Scrapping/Salvage Costs			\$455,858	

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

Scrap Salvage and Demolition Calculations - RO Plant

Demolition of Structures Post-Salvage				
Costs for Demolition and Removal	Nr	Rate	Cost	Assumptions/Comments
Electricians - Buildings and structures	64	\$145	\$9,280	2 electricians for 4 hours each to isolate each building and structure. This is in addition to the module isolation costs.
Excavator with mechanical shears	300	\$280	\$84,000	Two 35 Ton Excavators with mechanical Shears for 3 weeks
Labour for mechanical separation of low value assets	120	\$88	\$10,560	Assume limited assets remaining after salvage but 120 hours of work
Crain and Wrecking Ball	7	\$450	\$3,150	Assume average demolition cost of 10 hours per 250 m2 structure
Rock Breaker For Concrete Slabs	10	\$97	\$970	One 35 ton breaker can break 200 m3 of concrete per day into size suitable for loading and transportation. Majority of slab on grade
18 T Loader for Debris	20	\$176	\$3,564	Based on tonnage of 500 tons per day of waste with 1 loader working full time.
Utility Trucks	60	\$200	\$12,000	4 trucks for transportation of staff (work trucks include all tools, equipment, generator, etc.) at \$200 per day for 3 weeks
Toilets	6	\$121	\$726	2 toilets for 3 weeks (per OSHA requirements)
Portable Generator and Supplied Fuel	4	\$1,085	\$4,340	one generator at weekly rate with 300 litres of supplied fuel per week
Portable Office	4	\$250	\$1,000	Assumes 4 weeks
Mobilisation/Demobilisation	4	\$5,000	\$20,000	Crane (1), Excavators with Mechanical Shears (2), Crain and Wrecking Ball (1), Loader (1)
General Labourers	600	\$71	\$42,600	Assume 4 labourers for 3 week demolition project for 50 hour working weeks (includes tra hours for opening and closing site)
Water Truck for Dust Suppression	150	\$151	\$22,650	3 weeks of dust suppression
Subtotal for demolition			\$214,840	
Contingency			\$21,484	10% of total Costs
Monitoring and H&S			\$23,632	10% of total Costs
Project Management Costs			\$25,996	10% of total cost
Total Demolition			\$285,953	

Assumptions:

Site will be graded and seeded to form stable land form and promote revegetation.
 All demolition rubble will be transported off-site for disposal
 All high value assets will be removed from site for scrap
 Chemicals, fuels and lubricants stored at the plant will be beneficially reused or properly disposed of offsite.
 Labourers will use off site accommodation given the limited size of the work force
 Plant units are skid units and main costs are removal of buildings and structures and demolition of concrete

FINAL
REHABILITATION COSTS FOR DALBY EXPANSION PROJECT
CENTRAL GAS PROCESSING FACILITY (CGPF)

DEMOLITION, SCRAP AND SALVAGE COST SUMMARY

CENTRAL GAS PROCESSING FACILITY (CGPF) 10-60 TJ/Day	Cost Summary
Demolition of Structures and Buildings (including concrete)	\$337,145
Removal and Disposal of Debris	\$284,543
Demolition and Removal of Steel Structures and Process Units	\$518,276
Resale Value of Copper, Steel and Hastelloy Scrap	(\$1,522,030)
Net scrap demolition cost*	(\$1,003,754)
Cost of Scraping and Salvage with Scrap Value	\$0
Total Cost of Demolition	\$621,688

Assumptions
 Demolition costs are covered by scrap value; however scrap value is used to offset costs for removal and processing of salvageable assets only.
 Net scrap value applied does not exceed salvageable asset removal costs.
 This is consistent with DEHP recommendation that the scrap value cannot be used to off-set other costs.

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

Demolition Debris and Scrap Value Calculations - CGPF 10-60 TJ/day

CGPF (10-60 TJ/day)	m ³	Tons	Notes/Assumptions
Volume of Concrete	1,000	2,400	Allow 1000 m ³ and 2.4 conversion
Volume Gravel Hardstand	1,000	1,700	Allow 10,000 m ² (100 mm thick) and 1.7 conversion

Assets at Site Requiring Removal							
Assets	Nr	Unit Weight (tons)	Scrap Tonnage				Assumptions/Notes
			Steel (tons)	Cooper (tons)	Stainless (tons)	Hastelloy (tons)	
High Pressure Compressor with Vessels		0	0	0			Skid Mounted
Low Pressure Compressors	7	52	350	14			Skid Mounted (10 mmscfd units)
Heat Exchangers (duplex units)	3	45	90		45		
TEG Reflux Columns	1	35	30		5		Skid Mounted
TEG Reboilers	2	45	40	2	48		Skid Mounted
11 kv 1500 Kw diesel generator for essential service	1	15	14	1			Skid Mounted
Evaporative Cooling Systems	2	15			30		
Water Tanks and Pumps	1	na					
Instrument and air compressor skid	1	20	20				Skid Mounted
Fuel Gas Conditioning Skids	1	35			35		
Compressor Oil/Water Treatment	1	20			20		Skid Mounted
Septic System	1	na					
Nitrogen Generator Package	1	NIL			0		Skid Mounted
Water Loading Station	1	na					
Chemical Storage	1	na					
Flare	1	50	49			1	
Transformer Banks	1	25	20	30			
Pigging Station	1	25	25				
Piping Sleepers		1	90				
Piping High Pressure	200	0.753	151				753 kg/m
Piping Low Pressure	300	0.31	93				310 kg/m for 500 mm inch pipe
Electrical Switch Gear	1	5		5			allowance of 5 tons for electrical Bus bars
Electrical Wiring in Plant (HV)	2	0.96		1.92			0.96 T/km of 4/O electrical wiring in plant which will be between generators and major electrical equipment
Totals			971.6	53.92	183	1	
Scrap Unit Rate (\$/T)			\$ 482	\$ 8,625	\$ 3,015	\$ 36,562	TOTAL
Scrap Values			\$468,672	\$465,084	\$551,712	\$36,562	\$1,522,030

Note: Compressors have piping to transfer oil to and from the units and the volume of oil will trigger investigation requirements
 No allowance for structural steel or electrical windings

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

Demolition Debris and Scrap Value Calculations - CGPF 10-60 TJ/day

Type of Metal	Metal Value US\$	Metal Value A\$ (per ton)	Date and Source of Quote	
Copper (per Kg)	\$8.44	\$8,625.45	30-day average June 2011	http://www.scrapmonster.com/moreprice/north-america/1/1
Rare Alloy (per Kg)	\$35.78	\$36,562.08	30-day average June 2011	http://www.metalprices.com/metal/super-alloys/super-alloy-hastelloy-c/
Steel (per ton)	\$0.472	\$482.37	Avg #1 Dealer Bundles as of 10 June 2011	http://www.metalprices.com/metal/ferrous-scrap-price-index/fe-spi-1-dealer-bundles-st-louis
Stainless (per ton)	\$2.95	\$3,014.82	30-day average June 2011	http://www.metalprices.com/metal/stainless-steel/stainless-steel-316-scrap-processor

US AUS Exchange Rate: 0.9785

Date : 27-Jul-12

Site Constructed Buildings Requiring Removal

	Long (m)	Wide (m)	Area (m ²)	Stud (m)	Nr	Demolition Volume			TOTAL EXT (UNIT)	TOTAL INT (UNIT)	DEMO TOTAL (UNIT)	Total Demo Quantities
						Ext. Walls	Floor	Roof				
Workshop and Storage Building	30.0	15.0	450.0	3.6	1	32.4	Concrete	67.5	99.9	50.0	149.9	149.9
Compressor Shelters (roof, no walls)	15.0	6.0	90.0	3.6	2		Concrete	13.5	13.5	0.0	13.5	27.0
Diesel Generator Shelter	10.0	4.0	40.0	3.6	1		Concrete	6.0	6.0	0.0	6.0	6.0
Maintenance Sheds	30.0	5.0	150.0	3.6	1	25.2	Concrete	22.5	47.7	0.0	47.7	47.7
Total Area (m²)			820.0		5							
Total Volume (m³)												231
Total Tonnage												393

Pre-Assembled Buildings Requiring Removal

	Long (m)	Wide (m)	Area (m ²)	Stud (m)	Nr	Demolition Volume			TOTAL EXT (UNIT)	TOTAL INT (UNIT)	DEMO TOTAL (UNIT)	Total Demo Quantities	
						Ext. Walls	Floor	Roof					
Control Centre	22.7	6.4	145.28	2.4	1	14.0		14.5	21.8	50.3	40.2	90.5	90.5
Main High Voltage Switchroom	8	3.6	72	2.4	1	5.6		7.2	10.8	23.6	18.9	42.4	42.4
Main Low Voltage Switchrooms	8	3.6	72	2.4	1	5.6		7.2	10.8	23.6	18.9	42.4	42.4
Admin Building	20.4	14.4	293.76	2.4	1	16.7		29.4	44.1	90.1	72.1	162.3	162.3
Crib Room & Washroom at control room	9	3.4	30.6	3.0	1	7.4		3.1	4.6	15.1	12.1	27.2	27.2
Ablution Block	12	3	36	2.4	1	7.2		3.6	5.4	16.2	13.0	29.2	29.2
Total Area (m²)			649.6		6								
Total Volume (m³)													394
Total Tonnage													670

Volume based on 0.1 post demolition compacted thickness of 0.1 (this is conservative given void space in floor and walls)

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

Demolition Debris and Scrap Value Calculations - CGPF 10-60 TJ/day

Disposal Cost for Demolition Debris			
		Tonnage	Notes/Assumptions
Constructed Building Debris		393	Total Demolition rubble excluding concrete.
Preassembled Building Debris		670	Total Demolition rubble excluding concrete.
Concrete		2,400	Assumes 2.4 conversion
TOTAL DISPOSAL TONNAGE		3,463	

Removal and disposal of debris	Unit Rate	Cost	Notes/Assumptions
Disposal Cost	\$55	\$190,465	Based on clean construction fill disposal rates
Trucking Cost	\$652	\$94,078	Based on 4 hour return trip for 24 ton capacity rock body
TOTAL DISPOSAL COST		\$284,543	

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

Scrap Salvage and Demolition Calculations - CGPF 10-60 TJ/DAY

CGPF (10-60 TJ/day)	Amount	Units
Area of Disturbance	4	ha
Volume of Gravel	1,000	m ³
Volume of Concrete	1,000	m ³
Total m ² of structures	1,470	m ²
Number of Buildings	6	
Number of Shelters	3	
Major Equipment Modules	13	

Scrapping and Salvage of Plant					
Cost for Scrapping	Nr	Units	Rate	Cost	Assumptions/Comments
Electricians - Buildings and structures	312	hours	\$ 145	\$ 45,240	2 electricians 12 hours to isolate and disconnect major equipment modules for salvage.
Labour for mechanical separation	520	hours	\$ 127	\$ 66,040	Assume 40 man hours to separate and break up major equipment for salvage and shipping
General Labour for Loading and light manual Work	640	hours	\$ 88	\$ 56,320	4 week program with 4 Labour units for gas axing etc
Crainage for Salvage and Equipment Scrapping	104	hours	\$ 550	\$ 57,200	Assume 8 hours per equipment module in heavy lift crane (150 Ton capacity)
Utility Trucks	125	day	\$ 200	\$ 25,000	5 trucks for transportation of staff (work trucks include all tools, equipment, generator, etc.) for 25 days
Toilets	12	week	\$ 121	\$ 1,452	2 toilets for 6 weeks (per OSHA requirements)
Portable Generator and Supplied Fuel	5	week	\$ 1,085	\$ 5,425	one generator at weekly rate with 300 litres of supplied fuel per week
Portable Office	5	week	\$ 250	\$ 1,250	Assumes 5 weeks
Mobilisation of Large Equipment	1	allow	\$ 10,000	\$ 10,000	Crane (1)
Transportation of Heavy Equipment	104	hours	\$ 350	\$ 36,400	Modules transported by heavy transport for scrap or salvage. Assume slow transportation at 8 hrs/module
Purging of gases from facilities and equipment	1	allow	\$ 100,000	\$ 100,000	Includes venting, nitrogen purging and isolation at inlet and outlet manifolds
Gas Cutting Equipment	20	day	\$ 1,200	\$ 24,000	Assumes 20 days of work
Subtotal for scrapping				\$ 428,327	
Project Management Costs				\$ 42,833	10% of total cost
Contingency Costs				\$ 47,116	10% of total cost
Monitoring, H&S, Incidentals				\$ 51,828	10% of total cost
Total Scrapping/Salvage Costs				\$ 518,276	

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

Scrap Salvage and Demolition Calculations - CGPF 10-60 TJ/DAY

Demolition of Structures Post-Salvage					
Costs for Demolition and Removal	Nr	Units	Rate	Cost	Assumptions/Comments
Electricians - Buildings and structures	72	hours	\$ 145	\$ 10,440	2 electricians for 4 hours each to isolate each building and structure. This is in addition to the module isolation costs.
Excavator with mechanical shears	200	hours	\$ 263	\$ 52,600	Two 35-Ton Excavators with mechanical Shears for 2 weeks
Labour for mechanical separation of low value assets	200	hours	\$ 127	\$ 25,400	Assume limited assets remaining after salvage but 200 hours of work
Crane and Wrecking Ball	59	hours	\$ 350	\$ 20,575	Assume average demolition at 10 hours per 250 m2 structure
Rock Breaker For Concrete Slabs	40	hours	\$ 97	\$ 3,880	Assume one 35-ton breaker can break 200 m ³ of concrete per 8-hr day into size suitable for loading and transportation. Majority of slab on grade.
18 T Loader for Gravel	27	hours	\$ 176	\$ 4,787	Based on 1700 tonnes. Assumes 1000 tons per day loaded with 2 loaders working full time.
18 T Loader for Debris	55	hours	\$ 176	\$ 9,752	Based on 3463 tonnes. Assumes 1000 tons per day loaded with 2 loaders working full time.
Utility Trucks	80	day	\$ 200	\$ 16,000	4 trucks for 20 days for transportation of staff (work trucks include all tools, equipment, generator, etc.)
Toilets	8	week	\$ 121	\$ 968	2 toilets for 54weeks (per OSHA requirements)
Portable Generator and Supplied Fuel	4	week	\$ 485	\$ 1,940	one generator at weekly rate with 300 L supplied fuel per week
Portable Office	4	week	\$ 250	\$ 1,000	
Mobilisation of Large Equipment	5	allow	\$ 5,000	\$ 25,000	Excavators with Mechanical Shears (2), Crane and Wrecking Ball (1), Loaders (2)
General Labourers	800	hours	\$ 71	\$ 56,800	Assume 4 labourers for 4 week demolition project, 50-hr work weeks
Water Truck for Dust Suppression	160	hours	\$ 151	\$ 24,160	4 weeks of dust suppression; 40-hr weeks
Subtotal for demolition				\$ 253,302	
Contingency	10%			\$ 25,330	
Monitoring and H&S	10%			\$ 27,863	
Project Management Costs	10%			\$ 30,650	
Total Demolition				\$ 337,145	

Assumptions:

Assumes 4 ha disturbance area with 1 ha gravel hardstand (100 mm thick). Equipment set on concrete pads.

All demolition rubble will be transported off-site for disposal. Gravel to be removed for beneficial re-use. Costs for loading gravel are included; transport costs are off set by value.

Plant units are skid units and main costs are removal of buildings and structures and demolition of concrete.

A modular sewage treatment plant (STP; <21 EP) is assumed to exist at the GPF. Removal of the STP facilities are included in the facility removal costs.

All high value assets will be removed from site for scrap.

Labourers will use off site accommodation camps

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

DAM REMOVAL COSTS - UNIT RATE CALCULATIONS

DAM SIZE	Area (ha)	Bund Walls (m3)	Soil Movement Rate (\$/m3)	Soil Movement Cost (\$/DAM)	Liner/Sludge Removal Rate (\$/ha)	Liner/Sludge Removal Cost ¹ (\$/DAM)	Liner Only Disposal Cost (\$/ha)	Sludge & Liner Disposal Rate (\$/ha)	Sludge & Liner Disposal Cost (\$/DAM)	Seeding, Silt Fencing, and Fencing Cost ² (\$/ha)	Seeding, Silt Fencing, and Fencing UNIT RATE (\$/DAM)	Pre-operation Total Rehabilitation Cost ³ (\$/DAM)	Operational Total Rehabilitation Cost ³ (\$/DAM)	Re-Seeding ⁴ 1-Year after Rehabilitation UNIT RATE (\$/DAM)
HDPE LINED DAMS														
3 ML	0.8	220	\$4.74	\$1,043	\$7,341	\$20,554	\$1,890	\$10,800	\$8,640	\$4,706	\$3,765	\$6,698	\$34,002	\$744
20 ML	1.2	1,680	\$4.74	\$7,963	\$7,341	\$23,490	\$2,836	\$10,800	\$12,960	\$4,706	\$5,647	\$16,446	\$50,060	\$1,116
50 ML	2.9	4,950	\$4.74	\$23,463	\$7,341	\$35,970	\$6,853	\$10,800	\$31,320	\$4,706	\$13,647	\$43,963	\$104,400	\$2,696
90 ML	5.2	11,840	\$4.74	\$56,122	\$7,341	\$52,854	\$12,288	\$10,800	\$56,160	\$4,706	\$24,470	\$92,880	\$189,606	\$4,835
250 ML	9.4	16,000	\$4.74	\$75,840	\$7,341	\$83,686	\$22,212	\$10,800	\$101,520	\$4,706	\$44,234	\$142,286	\$305,280	\$8,740
400 ML	11.7	31,000	\$4.74	\$146,940	\$7,341	\$100,571	\$27,647	\$10,800	\$126,360	\$4,706	\$55,057	\$229,644	\$428,928	\$10,878
830 ML	32	64,800	\$4.74	\$307,152	\$7,341	\$249,593	\$75,616	\$10,800	\$345,600	\$4,706	\$150,584	\$533,352	\$1,052,929	\$29,752
COMPACTED CLAY LINER (CCL) DAMS														
400 ML	11.7	30,500	\$4.74	\$144,570	\$14,330	\$181,991	<i>n/a</i>	\$34,688	\$405,844	\$4,706	\$55,057	\$199,627	\$787,462	\$10,878
1130 ML	42	68,400	\$4.74	\$324,216	\$14,330	\$616,190	<i>n/a</i>	\$34,688	\$1,456,875	\$4,706	\$197,642	\$521,858	\$2,594,923	\$39,050
1250 ML	39	55,000	\$4.74	\$260,700	\$14,330	\$573,200	<i>n/a</i>	\$34,688	\$1,352,813	\$4,706	\$183,524	\$444,224	\$2,370,237	\$36,260
1800 ML	51	60,000	\$4.74	\$284,400	\$14,330	\$745,160	<i>n/a</i>	\$34,688	\$1,769,063	\$4,706	\$239,993	\$524,393	\$3,038,616	\$47,417

NOTES:

- 1) Liner and Sludge Removal Unit Rate includes set up fee
- 2) Seeding Cost includes Fencing (\$1500/ha), Silt fencing (\$2500/ha) and Seeding (\$/ha) costs.
- 3) Pre-operation rehabilitation cost assumes no sludge or liner (HDPE or CCL) removal required; Operational dam rehabilitation cost includes removal and disposal of sludge and liner materials
- 4) Contingency cost allowance for reseeding in year following rehabilitation based on rehabilitation seeding unit rate and includes silt fencing and mobilisation costs. Assumes 25% of area requires reseeding

POST REHABILITATION MONITORING COSTS - 5% of land rehabilitation (grading and seeding works) costs

HDPE LINED DAMS	Grade & Seed Cost	Monitoring Cost (5%)	No. Dams	Monitoring Cost
3 ML	\$5,552	\$278	2	\$555
20 ML	\$14,726	\$736	3	\$2,209
50 ML	\$39,806	\$1,990	1	\$1,990
90 ML	\$85,427	\$4,271	1	\$4,271
250 ML	\$128,814	\$6,441	1	\$6,441
400 ML	\$212,875	\$10,644	3	\$31,931
830 ML	\$487,488	\$24,374	1	\$24,374
COMPACTED CLAY LINER (CCL) DAMS				
400 ML	\$210,505	\$10,525	1	\$10,525
1130 ML	\$560,908	\$28,045	1	\$28,045
1250 ML	\$480,484	\$24,024	1	\$24,024
1800 ML	\$571,810	\$28,591	1	\$28,591
TOTAL DAMS MONITORING COST				\$162,957

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

HDPE LINED DAMS REMOVAL COST CALCULATIONS

CALCULATION OF DAY RATE (per 2,500 m³) FOR SOIL MOVEMENT

Labour/Equipment	nr	Rate	Units	Cost	Assumptions/Comments
Labourers	1	\$710	day	\$710	Assumes 10 hours per day
Earthworks Supervisor	1	\$1,290	day	\$1,290	Assumes 10 hours per day
35T Excavator	2	\$1,750	day	\$3,500	Assumes two 35T Excavators 10 hours per day
Support Truck	2	\$120	day	\$240	Assumes two Support Trucks
Toilets	1	\$17	day	\$17	
Office	1	\$36	day	\$36	
D8 Earthmover	1	\$2,500	day	\$2,500	Assumes D8 Earthmover 10 hours per day
Mobilisation	1	\$1,500	allow	\$1,500	Allow
Subtotal				\$9,793	
Contingency 10% (allows for redo's)				\$979	
Project Management 10%				\$1,077	
TOTAL (2,500 m³ of soil)				\$11,850	

SOIL MOVEMENT COST (\$/m³)

\$4.74

DAM STRUCTURE ASSUMPTIONS AND SOIL BERM VOLUMES FOR SOIL MOVEMENT

HDPE LINED DAMS	Liner	Area (ha)	Wall Height (m)	Area of Wall (m ²)	Linear Length of Bund Walls (m)	Volume of Dirt in Bunds (m ³)	Volume of Berm Considering 1/2 of bund below grade (m ³)	Comments
3 ML	HDPE	0.8	1	2	220	440	220	assumes 4:1 slope
20 ML	HDPE	1.2	2	8	420	3,360	1,680	assumes 4:1 slope
50 ML	HDPE	2.9	3	18	550	9,900	4,950	assumes 4:1 slope
90 ML	HDPE	5.2	4	32	740	23,680	11,840	assumes 4:1 slope
250 ML	HDPE	9.4	4	32	1000	32,000	16,000	assumes 4:1 slope
400 ML	HDPE	11.7	5	50	1240	62,000	31,000	assumes 4:1 slope
830 ML	HDPE	32	6	72	1800	129,600	64,800	assumes 4:1 slope

Note: Assume all dams constructed with HDPE liner and walls are 1/2 below and 1/2 above grade with dam wall slopes of 4:1

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

HDPE LINED DAMS REMOVAL COST CALCULATIONS

CALCULATION OF SLUDGE AND LINER REMOVAL COST (\$/ha)

Labour/Equipment	nr	Rate	Units	Cost	Assumptions/Comments
Labourers	4	\$710	day	\$2,840	4 labourers for 10 hours/day
Earthworks Supervisor	1	\$1,290	day	\$1,290	10 hours/day
35T Excavator	2	\$1,750	day	\$3,500	two excavators, 10 hours/day
Support Truck	2	\$120	day	\$240	two support trucks for labour transport
Toilets	1	\$17	day	\$17	
Office	1	\$36	day	\$36	
Mobilisation	1	\$1,500	allow	\$1,500	Allow
Liner Cutting Tools	1	\$1,500	day	\$1,500	Cost for cutting tool on excavator
Posi Tracks Loader	1	\$1,210	day	\$1,210	10 hours/day removal of sludge out of dam
Subtotal				\$12,133	
Contingency 10% (allows for redo's)				\$1,213	
Project Management 10%				\$1,335	
TOTAL (2 ha/day)				\$14,681	

SLUDGE AND LINER REMOVAL COST (\$/ha)	\$7,341
LINER (ONLY) REMOVAL COST (\$/ha)	\$6,554
SET UP FEE	\$14,681

Allows 1 full day for all equipment to build access ramps and establishment

Assumptions (soil movement, sludge and liner removal)

Sludge has been cleaned off liner by excavator with bucket

Another excavator with cutting tool will cut liner into 15 m sections

Labourers will roll and secure liners

Excavators will be used to load liners and sludge onto trucks for disposal

Production rate 2 ha per day

ESTIMATION OF HDPE LINER AND SLUDGE DISPOSAL COST (\$/ha)

Dams	Area (ha)	Liner Weight (tons)	Sludge Weight (tons)	Total Waste (tons)	Truck Loads	T&D	Total Disposal and Trucking Cost
HDPE Lined Dams							
3 ML	0.8	17	60	77	3	\$2,700	\$8,640
20 ML	1.2	25	90	115	5	\$2,700	\$12,960
50 ML	2.9	61	218	278	12	\$2,700	\$31,320
90 ML	5.2	109	390	499	21	\$2,700	\$56,160
250 ML	9.4	197	705	902	38	\$2,700	\$101,520
400 ML	11.7	246	878	1123	47	\$2,700	\$126,360
830 ML	32.0	672	2400	3072	128	\$2,700	\$345,600

SLUDGE AND LINER DISPOSAL COST- (\$/ha)	\$10,800
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FINAL
REHABILITATION COSTS FOR DALBY EXPANSION PROJECT
HDPE LINED DAMS REMOVAL COST CALCULATIONS

ESTIMATION OF HDPE LINER ONLY DISPOSAL COST (\$/ha)					
Dams	Area (ha)	Liner Weight (tons)	Truck Loads	T&D	Total Disposal and Trucking Cost
3 ML	0.8	17	0.7	\$2,700	\$1,890
20 ML	1.2	25	1.1	\$2,700	\$2,835
50 ML	2.9	61	2.5	\$2,700	\$6,851
90 ML	5.2	109	4.6	\$2,700	\$12,285
250 ML	9.4	197	8.2	\$2,700	\$22,208
400 ML	11.7	246	10.2	\$2,700	\$27,641
830 ML	32.0	672	28.0	\$2,700	\$75,600

HDPE LINER (ONLY) DISPOSAL COST (\$/ha)	\$2,363
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Assumptions (liner and sludge removal and disposal)

Weight of 2mm liner 210 kg per 100 m² (based on manufacturer specs)

Assume 0.5 cm of sludge on liner that will have to be managed and disposed

No water in dams until operations commence. Assume water in dams has been removed prior to decommissioning.

Weight of sludge	1.5 tons/m ³	
Disposal Cost	85 \$/ton	
Trucking (at \$165 /hr)	\$660 \$/load	2 hr return trip with 2 hrs loading and unloading (covers demurrage)
	24 tons/load	

Waste is non-Hazardous and suitable for disposal in unlined landfill

Sludge will not be generated until brine and water generation commence

Assumes sludge will not be generated until dams are in full operation

Water Treatment:

Water remaining in dams at decommissioning will be pumped to and treated at existing facilities.

For dams not connected to treatment system network via pipelines, unit rates have been developed for collection and transport of water to a dam/facility within the system.

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

COMPACTED CLAY LINED (CCL) DAM REMOVAL COST CALCULATIONS

CALCULATION OF DAY RATE (per 2,500 m³) FOR SOIL MOVEMENT

Labour/Equipment	nr	Rate	Units	Cost	Assumptions/Comments
Labourers	1	\$710	day	\$710	Assumes 10 hours per day
Earthworks Supervisor	1	\$1,290	day	\$1,290	Assumes 10 hours per day
35T Excavator	2	\$1,750	day	\$3,500	Assumes two 35T Excavators 10 hours per day
Support Truck	2	\$120	day	\$240	Assumes two Support Trucks
Toilets	1	\$17	day	\$17	
Office	1	\$36	day	\$36	
D8 Earthmover	1	\$2,500	day	\$2,500	Assumes D8 Earthmover 10 hours per day
Mobilisation	1	\$1,500	allow	\$1,500	Allow
Subtotal				\$9,793	
Contingency 10% (allows for redo's)				\$979	
Project Management 10%				\$1,077	
TOTAL (2,500 m³ of soil)				\$11,850	

SOIL MOVEMENT COST (\$/m³)	\$4.74
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DAM STRUCTURE ASSUMPTIONS AND SOIL BERM VOLUMES FOR SOIL MOVEMENT

Brine Dam	Liner	Area (ha)	Wall Height (m)	Area of Wall (m ²)	Linear Length of Bund Walls (m)	Volume of Dirt in Bunds (m ³)	Volume of Berm Considering 1/2 of bund below grade (m ³)	Comments
400 ML	CCL	11.7	5	50	1220	61,000	30,500	assumes 4:1 slope
1130 ML	CCL	42	6	72	1900	136,800	68,400	assumes 4:1 slope
1250 ML	CCL	39	5	50	2200	110,000	55,000	assumes 4:1 slope
1800 ML	CCL	51	5	50	2400	120,000	60,000	assumes 4:1 slope

Note: Assume all walls are 1/2 below and 1/2 above grade with dam wall slopes of 4:1

Dams constructed with 10 mm compacted clay liner (CCL)

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

COMPACTED CLAY LINED (CCL) DAM REMOVAL COST CALCULATIONS

CALCULATION OF SLUDGE AND CCL REMOVAL COST (\$/ha)

Labour/Equipment	nr	Rate	Units	Cost	Assumptions/Comments
Labourers	4	\$710	day	\$2,840	2 labourers for 10 hours/day
Earthworks Supervisor	1	\$1,290	day	\$1,290	10 hours/day
35T Excavator	2	\$1,750	day	\$3,500	two excavators, 10 hours/day
Support Truck	2	\$120	day	\$240	two support trucks for labour transport
Toilets	1	\$17	day	\$17	
Office	1	\$36	day	\$36	
Mobilisation	1	\$1,500	allow	\$1,500	Allow
Posi Tracks Loader	2	\$1,210	day	\$2,420	2 loaders 10 hours/day removal of sludge out of dam
Subtotal				\$11,843	
Contingency 10% (allows for redo's)				\$1,184	
Project Management 10%				\$1,303	
TOTAL (1 ha/day)				\$14,330	

SLUDGE AND LINER REMOVAL COST (\$/ha)	\$14,330
SET UP FEE	\$14,330

Allows 1 full day for all equipment to build access ramps and establishment

Assumptions (soil movement, sludge and liner removal)

Assumes 2.5 cm of sludge and CCL liner to be removed
 Excavators will be used to load sludge onto trucks for disposal
 Production rate 2 ha per day

ESTIMATION OF SLUDGE/CCL LINER DISPOSAL COST (\$/ha)

Dams	Area (ha)	Sludge Weight (tons)	Truck Loads	T&D	Total Disposal and Trucking Cost
HDPE Lined Dams					
400 ML	11.7	4388	183	\$2,220	\$405,844
1130 ML	42.0	15750	656	\$2,220	\$1,456,875
1250 ML	39.0	14625	609	\$2,220	\$1,352,813
1800 ML	51.0	19125	797	\$2,220	\$1,769,063

SLUDGE AND LINER DISPOSAL COST - CCL LINED DAMS (\$/ha)		\$34,688
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FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

COMPACTED CLAY LINED (CCL) DAM REMOVAL COST CALCULATIONS

Assumptions (liner and sludge removal and disposal)

Assume dams constructed with 10 cm compacted clay liner (CCL).

Assumes 2.5 cm of sludge and CCL will have to be managed and disposed

No water in dams until operations commences. Assumes water in dams has been removed prior to decommissioning.

Weight of sludge/CCL	1.5	tons/m ³	
Disposal Cost	\$65	\$/ton	
Trucking (at \$165 /hr)	\$660	\$/load	2 hr return trip with 2 hrs loading and unloading (covers demurrage)
	24	tons/load	

Waste is non-Hazardous and suitable for disposal in unlined landfill

No sludge accumulation or CCL liner removal required until dam is operational

Water Treatment:

Water remaining in dams at decommissioning will be pumped to and treated at existing facilities.

For dams not connected to treatment system network via pipelines, unit rates have been developed for collection and transport of water to a dam/facility within the system.

FINAL
REHABILITATION COSTS FOR DALBY EXPANSION PROJECT
WATER AND BRINE MANAGEMENT

WATER AND BRINE MANAGEMENT COSTS

Water and Brine Management	No.	Units	Rate	Cost	Assumptions/Comments
Water treatment by ROP	100	ML	\$ 2,500	\$ 250,000	Assumes treatment at existing ROPs
Brine Disposal	450	tonnes	\$ 148	\$ 66,375	Assumes 4.5 tonnes/ML treated
Total Cost per 100 ML				\$ 316,375	

Water Management Unit Rate (\$/ML)	\$ 3,164
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Brine Transport & Disposal Rates	Tonnes	Truck Loads	Trucking Rate (\$/load)	Disposal Rate (\$/tonne)	Transport & Disposal Rate (\$/tonne)	Assumptions/Comments
Brine Management	450	18.75	\$ 660	\$ 120	\$ 148	24-ton loads; 4-hr round trip transport to include loading and unloading

Assumptions

Water is assumed to be treated by reverse osmosis (RO) utilising existing water treatment plants
 Treatment cost for RO are based on operations experience.
 Based on water quality assessments operations experience brine is assumed to be generated at a rate of 4.5 tonnes/ML of water treated.
 RO permeate will be beneficially used or discharged in accordance with project authorisations.
 Salts will be transported and disposed of off-site. Costs for removal and loading of salts in brine dams are included in the dam removal costs.
 Salt disposal rate assumes 33% moisture content boosting disposal rate from \$80/tonne to \$120/tonne

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

DAM INVESTIGATION - FIELD COSTS UNIT RATE CALCULATIONS

DAM SIZE	Area	No. Bores	No. Samples	Field Cost (\$/ha)	Field Cost UNIT RATE (\$/DAM)	Assumptions
3 ML	0.8	3	3	\$4,769	\$3,815.20	4 samples/ha (2 minimum)
20 ML	1.2	5	5	\$4,769	\$5,723	
50 ML	2.9	12	12	\$4,769	\$13,830	
90 ML	5.2	21	21	\$4,769	\$24,799	
250 ML	9.4	38	38	\$4,769	\$44,829	
400 ML	11.7	47	47	\$4,769	\$55,797	
830 ML	32	128	128	\$4,769	\$152,608	
1130 ML	11.7	47	47	\$4,769	\$55,797	
1250 ML	42	168	168	\$4,769	\$200,298	
1800 ML	39	156	156	\$4,769	\$185,991	

INVESTIGATION RATES	No.	Unit	Rate	Total	Assumptions
Fixed Costs	1	total	\$26,682	\$26,682	Fixed cost for up to 10 dams (or 50 ha) investigated and reported jointly
Field Investigation Cost	1	ha	\$4,769	\$4,769	Field cost based on 50 surface soil samples per day, includes mobilisation

Assumptions

Investigations assumed to be conducted concurrently as part of a dam investigation program.
 Fixed Costs allow for up to 10 dams (maximum of 50 ha) to be investigated and reported jointly
 Field Costs developed on a per ha basis for dams sampled sequential and assumes the following.
 Surface sampling frequency of 4 samples per ha with up to 50 surface soil samples collected by two field staff per day
 All samples analysed for VOC/SVOC, TPH and PAHs. Assumes 20% QA/QC sampling for analysis.
 Local accommodation to be used

FINAL
REHABILITATION COSTS FOR DALBY EXPANSION PROJECT
CONTAMINATED LAND INVESTIGATION - DAMS

FIXED COSTS

**Legal costs are not included in this estimate

		Assistant Engineer/Geologist/ Scientist		Staff Engineer/Geologist/ Scientist		Project Engineer/Geologist/		Senior Engineer/ Geologist/Scientist		Project Manager		Senior Project Manager		Principal/Program Director/Project Director		Designer/Draftsman/ Technician		Computer Analyst/Computer Programmer		Graphics/Technical Editor/Word Processor		Accounting/Admin. Assistant/Clerical/ Office Services			
Mean Billing Rate:		\$124		\$140		\$157		\$169		\$191		\$225		\$270		\$95		\$124		\$95		\$95			
Task No.	Description	Hrs:	Cost	Hrs:	Cost	Hrs:	Cost	Hrs:	Cost	Hrs:	Cost	Hrs:	Cost	Hrs:	Cost	Hrs:	Cost	Hrs:	Cost	Hrs:	Cost	Hrs:	Cost	Total Hrs.	Total Cost
1	Project Management		\$0		\$0		\$0		\$0	12	\$2,292		\$0	8	\$2,160		\$0		\$0		\$0	8	\$760	28	\$5,212
2	Health and Safety Plan		\$0	8	\$1,120	1	\$157		\$0	1	\$191		\$0	1	\$270	1	\$95		\$0	1	\$95		\$0	13	\$1,928
3	Field Coordination		\$0	4	\$560		\$0		\$0	8	\$1,528		\$0	2	\$540		\$0		\$0		\$0		\$0	14	\$2,628
4	Work Plan		\$0	8	\$1,120	1	\$157		\$0	2	\$382		\$0	2	\$540	8	\$760		\$0	2	\$190		\$0	23	\$3,149
5	Data Evaluation		\$0	8	\$1,120	4	\$628		\$0	2	\$382		\$0	1	\$270		\$0		\$0	4	\$380		\$0	19	\$2,780
6	Final Report		\$0	24	\$3,360	2	\$314		\$0	4	\$764		\$0	1	\$270	8	\$760		\$0	4	\$380	4	\$380	47	\$6,228
7	Mob/Demob	6	\$744	4	\$560		\$0		\$0		\$0		\$0		\$0		\$0		\$0		\$0		\$0	10	\$1,304
Sub-Totals		6	\$744		\$7,840		\$1,256		\$0		\$5,539		\$0		\$4,050		\$1,615		\$0		\$1,045		\$1,140	154	\$23,229

ODC 4.5

Sub-total Direct Time

Sub-total Expenses

Sub-Total Project Budget Estimate

Contingency 10% Guideline (fill in) Calculated Contingency Cost

Total Fixed Investigation Costs \$26,682

Up to 10 dams (or 50 ha) investigated and reported jointly

Other Direct Costs (ODC)

The ODC refers to Other Direct Costs and are billed at \$4.50 per labour hour. The breakdown is as follows:

Telephone	\$0.46
Computer & network	\$2.39
Reproduction & printing	\$0.95
Delivery & Mail	\$0.52
Miscellaneous	\$0.18
	\$4.50 per labour hour

External Expenses

Description	No. Units	Unit Cost	Cost
Materials & Supplies	1	\$100	\$100
Air Freight & Package Del	4	\$500	\$2,000
Postage & Mailing	0		\$0
PPE/Disposable	3	\$100	\$300
			\$0
Sub-Total			\$2,400
Mark-up 1.15			\$360
Total External Expenses			\$2,760

Total Internal Expenses

Total Sublet Expenses

Total External Expenses

Total Expenses \$2,760

UNIT COSTS PER HA FOR FIELD INVESTIGATION

		Assistant Engineer/Geologist/Scientist		Staff Engineer/Geologist/Scientist		Project Engineer/Geologist/		Senior Engineer/Geologist/Scientist		Project Manager		Senior Project Manager		Principal/Program Director/Project Director		Designer/Draftsman/Technician		Computer Analyst/Computer Programmer		Graphics/Technical Editor/Word Processor		Accounting/Admin. Assistant/Clerical/Office Services			
Mean Billing Rate:		\$124		\$140		\$157		\$169		\$191		\$225		\$270		\$95		\$124		\$95		\$95			
Task	Task	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost	Total Hrs.	Total Cost		
9	Field Investigation - Soil	8	\$992	8	\$1,120	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	16	\$2,112
10	Mob/Demob	2	\$248	2	\$280	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	4	\$528
Sub-Totals		10	\$1,240	10	\$1,400	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	20	\$2,640

ODC 4.5 \$118.80

Sub-total Direct Time \$2,640

Sub-total Expenses \$44,936

Sub-Total Project Budget Estimate \$47,695

Contingency 10% Guideline (fill in) **Calculated Contingency Cost** \$0

Cost per Ha for Field Investigation \$4,769

Assumes surface sampling on 10 ha (50 samples per day) by 2 field staff
Soil samples analysed for VOC/SVOC, TPH and PAHs; assumes 20% QA/QC for analysis.

Other Direct Costs (ODC)

are billed at \$4.50 per labour hour. The breakdown is as follows:

Telephone	\$0.46
Computer & network	\$2.39
Reproduction & printing	\$0.95
Delivery & Mail	\$0.52
Miscellaneous	\$0.18
	\$4.50 per labour hour

External Expenses

Description	No.	Rate	Cost
Materials & Supplies	0	\$100	\$0
Air Freight & Package Del	1	\$500	\$500
Postage & Mailing	0		\$0
PPE/Disposable	0	\$100	\$0
			\$0
Lodging & Per Diem	0.1	\$500	\$50
Sub-Total			\$550
Mark-up 1. 15			\$83
Total External Expenses			\$633

Total Internal Expenses \$0

Total Sublet Expenses \$44,304

Total External Expenses \$633

Total Expenses \$44,936

Sublet Services

Description	Units	Rate	Cost
Drilling/well install		\$2,200	\$0
Groundwater Field Expenses		\$0	\$0
Groundwater Lab analytical		\$0	\$0
Soil Field Work Expenses	1	\$990	\$990
Soil Lab analytical	1	\$36,035	\$36,035
Excavation /road clearing			\$0
Mobilisation	1	\$1,500	\$1,500
Sub-Total			\$38,525
Mark-up 1. 15			\$5,779
Total Sublet Expenses			\$44,304

Daily Expenses for Groundwater Field Work				
Equipment	Unit Cost	Units	No.	Total
Grundfos	\$900	week	0.0	\$0
Flow Cell	\$650	week	0.0	\$0
Generator	\$425	week	0.0	\$0
Tubing 100'	\$65	per 100 ft	0.0	\$0
DI Water 4L	\$40	per 4 L	0.0	\$0
Bailer Twine	\$5	roll	0.0	\$0
Bailers/Disposable	\$125	case (24)	0.0	\$0
PID	\$550	week	0.0	\$0
Air Rotary Rig	\$5,000	day	0.0	\$0
			TOTAL	\$0
			TOTAL w/mark-up	\$0.00

Daily Expenses for Soil Investigation Field Work				
Equipment	Unit Cost	Units	No.	Total
Hollow Stem Auger Rig	\$3,500	day	0.0	\$0
Air Rotary Drill Rig	\$5,000	day	0.0	\$0
Geoprobe	\$2,320	day	0.0	\$0
Soil Augers	\$280	day	2.0	\$560
T-cells	\$10	day	0.0	\$0
Gloves/disposables	\$100	day	2.0	\$200
PID	\$150	day	1.0	\$150
Decon Water	\$40	ea	2.0	\$80
			TOTAL	\$990
			TOTAL w/mark-up	\$1,139

GROUNDWATER			
Parameter	Units	Unit Cost	Total
Heavy Metals	0	\$42	\$0
VOC/SVOC	0	\$280	\$0
TPH/TRPH	0	\$55	\$0
TPH speciation (aliphatic/aromatic)		\$135	
PAHs and Phenols	0	\$95	\$0
Pesticides and PCBs	0	\$85	\$0
TPH/VOC	0	\$135	\$0
Alternate ICP/AES metals	0	\$70	\$0
Nitrate	0	\$22	\$0
Dioxins/Furans	0	\$725	\$0
GROUNDWATER QA/QC			
Duplicates	0	\$0	\$0
MS/MSD	0	\$0	\$0
Trip blanks	0	\$0	\$0
Equipment rinsate	0	\$0	\$0
Based on 10% validation rate			
		TOTAL =	\$0

SOIL			
Parameter	Units	Unit Cost	Total
Heavy Metals	0	\$42	\$0
VOC/SVOC	50	\$280	\$14,000
TPH/TRPH	50	\$55	\$2,750
TPH speciation (aliphatic/aromatic)	50	\$135	\$6,750
PAHs and Phenols	50	\$95	\$4,750
Pesticides and PCBs	0	\$85	\$0
TPH/VOC	0	\$135	\$0
Alternate ICP/AES metals	0	\$70	\$0
Nitrate	0	\$22	\$0
Dioxins/Furans	0	\$725	\$0
SOIL QA/QC			
Duplicates	5	\$565	\$2,825
MS/MSD	5	\$565	\$2,825
Trip blanks	3	\$335	\$1,005
Equipment rinsate	2	\$565	\$1,130
Based on 10% validation rate			
		TOTAL =	\$36,035

All samples analysed for VOC/SVOC, TPH and PAHs. Assumes 10% QA/QC sampling for analysis.

FINAL
REHABILITATION COSTS FOR DALBY EXPANSION PROJECT
Facilities Contaminated Land Assessments (Investigation)

FIXED COSTS

**Legal costs are not included in this estimate

Task	Task	Assistant Engineer/ Geologist/ Scientist		Staff Engineer/ Geologist/ Scientist		Project Engineer/ Geologist		Senior Engineer/ Geologist/ Scientist		Project Manager		Senior Project Manager		Principal/Program Director/Project Director		Designer/ Draftsman/ Technician		Computer Analyst/ Computer Programmer		Graphics/ Technical Editor/Word Processor		Accounting/ Admin. Assistant/ Clerical/ Office Services		Total Hrs.	Total Cost
		Hrs:	Cost	Hrs:	Cost	Hrs:	Cost	Hrs:	Cost	Hrs:	Cost	Hrs:	Cost	Hrs:	Cost	Hrs:	Cost	Hrs:	Cost	Hrs:	Cost	Hrs:	Cost		
	Name: Mean Billing Rate:		\$124		\$140		\$157		\$169		\$191		\$225		\$270		\$95		\$124		\$95		\$95		
1	Project Management		\$0		\$0		\$0		\$0	12	\$2,292		\$0	8	\$2,160		\$0		\$0		\$0	8	\$992	20	\$4,452
2	Health and Safety Plan	2	\$248	8	\$1,120		\$0		\$0	2	\$382		\$0	1	\$270	1	\$95		\$0	1	\$124		\$0	14	\$2,115
3	Work Plan		\$0	8	\$1,120		\$0	1	\$169	2	\$382		\$0	2	\$540	2	\$190		\$0	1	\$124		\$0	15	\$2,401
4	Field Investigation		\$0		\$0		\$0	1	\$169	2	\$382		\$0	1	\$270		\$0		\$0		\$0		\$0	4	\$821
5	Data Evaluation		\$0	8	\$1,120		\$0	4	\$676	2	\$382		\$0	2	\$540	1	\$95		\$0	4	\$496		\$0	17	\$2,813
6	Final Report		\$0	16	\$2,240		\$0	2	\$338	4	\$764		\$0	2	\$540	4	\$380		\$0	4	\$496		\$0	28	\$4,262
7	Mob/Demob	4	\$496	4	\$560		\$0		\$0		\$0		\$0		\$0		\$0		\$0		\$0		\$0	8	\$1,056
Sub-Totals		6	\$744	44	\$6,160	0	\$0	8	\$1,352	24	\$4,584	0	\$0	16	\$4,320	8	\$760	0	\$0	10	\$1,240	8	\$992	106	\$17,920

Other Direct Costs (ODC)

The ODC refers to Other Direct Costs and are billed at \$4.50 per labour hour. The breakdown is as follows:

Telephone	\$0.46
Computer & network	\$2.39
Reproduction & printing	\$0.95
Delivery & Mail	\$0.52
Miscellaneous	\$0.18
	\$4.50 per labour hour

Expenses (Fixed Cost)

Description	No.	Rate	Cost
Mobilisation Drilling Rig from Brisbane	1	\$7,500	\$7,500
Mobilisation 2-man Sampling Crew	1	\$2,000	\$2,000
Sub-Total			\$9,500
Mark up 15%			\$1,425
Total External Expenses			\$10,925

ODC \$4.50 /labour hr \$ 477

Sub-total Direct Time **\$ 17,920**

Sub-total Expenses **\$ 10,925**

Sub-Total Project Budget Estimate **\$ 29,322**

Contingency 10% Guideline (fill in) Calculated Contingency Cost \$ -

Total Project Budget Estimate - Fixed Costs **\$ 29,322**

Up to 10 Areas investigated and reported concurrently

Total Field Costs - Unit Rate (2 Areas) **\$ 11,609**

Total Field Costs - Unit Rate (1 Area) **\$ 5,804**

FINAL
REHABILITATION COSTS FOR DALBY EXPANSION PROJECT
Facilities Contaminated Land Assessments (Investigation)

UNIT COSTS PER DAY - FIELD INVESTIGATIONS

Name:	Assistant Engineer/Geologist/Scientist	Staff Engineer/Geologist/Scientist	Project Engineer/Geologist	Senior Engineer/Geologist/Scientist	Project Manager	Senior Project Manager	Principal/Program Director/Project Director	Designer/Draftsman/Technician	Computer Analyst/Computer Programmer	Graphics/Technical Editor/Word Processor	Accounting/Admin. Assistant/Clerical/Office Services	Total Hrs.	Total Cost										
Mean Billing Rate:	\$124	\$140	\$157	\$169	\$191	\$225	\$270	\$95	\$124	\$95	\$95												
Task	Task											Total Hrs.	Total Cost										
No.	Description	Hrs:	Cost	Hrs:	Cost	Hrs:	Cost	Hrs:	Cost	Hrs:	Cost	Hrs:	Cost	Hrs:	Cost	Hrs:	Cost	Hrs:	Cost	Hrs:	Cost	Total Hrs.	Total Cost
8	Field Investigation	8	\$992	8	\$1,120		\$0		\$0		\$0		\$0		\$0		\$0		\$0		\$0	16	\$2,112

Field Investigation Assumptions

Assumes all borings installed by Geoprobe
Bores drilled to depth of 2 metres below ground surface (mgs)
Two samples collected from each bore (at 0.5 and 2 metre depths)
Assumes 3 borings per investigation area
All samples analysed for TPH, VOC/SVOC, PAHs
QC sampling to be conducted at frequency of 20%

ODC	\$4.50 /labour hr	\$72
Sub-total Direct Time		\$2,112
Sub-total Expenses		\$9,425

Sub-Total Project Budget Estimate \$11,609

Contingency 10% Guideline (fill in) 0% Calculated Contingency Cost \$0

Other Direct Costs (ODC)

The ODC refers to Other Direct Costs and are billed at \$4.50 per labour hour. The breakdown is as follows:

Telephone	\$0.46
Computer & network	\$2.39
Reproduction & printing	\$0.95
Delivery & Mail	\$0.52
Miscellaneous	\$0.18
	\$4.50 per labour hour

Sublet Services

Description	No.	Rate	Cost
Soil Field Work Expenses	1	\$2,726	\$2,726
Soil Lab analytical	1	\$4,870	\$4,870
Drilling/well install		\$2,200	\$0
Groundwater Field Expenses		\$0	\$0
Groundwater Lab analytical		\$0	\$0
Sub-Total			\$7,596
Mark-up 1. 15			\$1,139
Total Sublet Expenses			\$8,735

External Expenses (Field Investigation)

Description	No.	Rate	Cost
Materials & Supplies		\$100.00	\$0
Air Freight & Pckg Del	1	\$500.00	\$500
Auto Rental	1	\$50.00	\$50
Meals	1	\$50.00	\$50
Sub-Total			\$600
Mark up 15%			\$90
Total External Expenses			\$690

Geoprobe costs based on 8 bores/day by 2 field staff (incl. setup time)

Total Internal Expenses	\$0
Total Sublet Expenses	\$8,735
Total External Expenses	\$690
Total Expenses	\$9,425

Daily Expenses for Groundwater Investigation Field Work			
Equipment	Unit Cost	Units	Total
Grundfos	\$900 week	0.0	\$0
Flow Cell	\$650 week	0.0	\$0
Generator	\$425 week	0.0	\$0
Tubing 100'	\$65 /100 feet	0.0	\$0
DI Water 4L	\$40 per 4 L	0.0	\$0
Bailer Twine	\$5 roll	0.0	\$0
Bailers/Disposable	\$125 case (24)	0.0	\$0
PID	\$550 week	0.0	\$0
Air Rotary Rig	\$5,000 day	0.0	\$0
		TOTAL	\$0
		TOTAL w/mark-up	\$0.00

Daily Expenses for Soil Investigation Field Work			
Equipment	Unit Cost	Units	Total
Hollow Stem Auger Rig	\$3,500 day	0	\$0
Air Rotary Drill Rig	\$5,000 day	0	\$0
Geoprobe	\$2,120 day	1	\$2,120
Soil Augers	\$250 day	0	\$0
T-cells	\$10 day	0	\$0
Gloves/disposables	\$100 day	1	\$100
PID	\$150 day	1	\$150
-	\$0 -	0	\$0
-	\$0 -	0	\$0
		TOTAL	\$2,370
		TOTAL w/mark-up	\$2,726

GROUNDWATER	Units	Rate	Cost
Heavy Metals	0	\$42	\$0
VOC/SVOC	0	\$280	\$0
TPH/TRPH	0	\$55	\$0
TPH speciation (aliphatic/aromatic)	0	\$135	\$0
PAHs and Phenols	0	\$95	\$0
Pesticides and PCBs	0	\$85	\$0
TPH/VOC	0	\$135	\$0
Alternate ICP/AES metals	0	\$70	\$0
Nitrate	0	\$22	\$0
Dioxins/Furans	0	\$725	\$0
GROUNDWATER QA/QC			
Duplicates	0	\$0	\$0
MS/MSD	0	\$0	\$0
Trip blanks	0	\$0	\$0
Equipment rinsate	0	\$0	\$0
Based on 20% validation rate and one rinsate/day			
		TOTAL =	\$0

SOIL	Units	Rate	Cost
Heavy Metals	0	\$42	\$0
VOC/SVOC	6	\$280	\$1,680
TPH/TRPH	0	\$55	\$0
TPH speciation (aliphatic/aromatic)	6	\$135	\$810
PAHs and Phenols	6	\$95	\$570
Pesticides and PCBs	0	\$85	\$0
TPH/VOC	0	\$135	\$0
Alternate ICP/AES metals	0	\$70	\$0
Nitrate	0	\$22	\$0
Dioxins/Furans	0	\$725	\$0
SOIL QA/QC			
Duplicates	1	\$510	\$510
MS/MSD	1	\$510	\$510
Trip blanks	1	\$280	\$280
Equipment rinsate	1	\$510	\$510
Based on 20% validation rate and one rinsate/day			
		TOTAL =	\$4,870

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

EQUIPMENT COSTS

	PER HOUR	GST	TOTAL
EXCAVATORS			
1 - 2 ton Excavator Hire	\$93.50	\$9.35	\$103
1 - 2 ton Excavator Augar Hire	\$22.00	\$2.20	\$24
1-2 ton Excavator Rockbreaker Hire	\$33.00	\$3.30	\$36
3 - 4 ton Excavator Hire	\$104.50	\$10.45	\$115
3 - 4 ton Excavator Augar Hire	\$33.00	\$3.30	\$36
3 - 4 ton Excavator Rockbreaker Hire	\$44.00	\$4.40	\$48
5 - 6 ton Excavator Hire	\$110.00	\$11.00	\$121
5 - 6 ton Excavator Augar Hire	\$33.00	\$3.30	\$36
5- 6 ton Excavator Ripper Hire	\$22.00	\$2.20	\$24
5 - 6 ton Excavator Rockbreaker Hire	\$55.00	\$5.50	\$61
8 ton Excavator Hire	\$121.00	\$12.10	\$133
8 ton Excavator Augar Hire	\$38.50	\$3.85	\$42
8 ton Excavator Rockbreaker Hire	\$55.00	\$5.50	\$61
12 - 13 ton Excavator Hire	\$126.50	\$12.65	\$139
12 - 13 ton Excavator Augar Hire	\$55.00	\$5.50	\$61
12 - 13 ton Excavator Rock Grab Hire	\$22.00	\$2.20	\$24
12 - 13 ton Excavator Rockbreaker Hire	\$55.00	\$5.50	\$61
20 ton Excavator Hire	\$137.50	\$13.75	\$151
20 ton Excavator Rock Grab Hire	\$22.00	\$2.20	\$24
20 ton Excavator Rockbreaker Hire	\$66.00	\$6.60	\$73
30 ton Excavator Hire	\$159.50	\$15.95	\$175
30 ton Excavator Rockbreaker Hire	\$88.00	\$8.80	\$97
35 ton Excavator Hire	\$159.50	\$15.95	\$175
35 ton Excavator Rockbreaker Hire	\$88.00	\$8.80	\$97
35-ton Excavator Liner Cutting Tool	\$136.00	\$13.60	\$150
BOBCATS			
Bobcat Hire	\$99.00	\$9.90	\$109
Bobcat Augar Hire	\$110.00	\$11.00	\$121
Bobcat Broom Hire	\$132.00	\$13.20	\$145
BOBCAT & EXCAVATOR & TIPPER COMBOS			
1 - 1.5 ton Mini Excavator Bobcat Combo Hire	\$99.00	\$9.90	\$109
2 - 3 ton Excavator Bobcat Combo Hire	\$104.50	\$10.45	\$115
4 ton Excavator Bobcat Combo Hire	\$110.00	\$11.00	\$121
5 ton Excavator Bobcat Combo Hire	\$115.50	\$11.55	\$127
BACKHOES			
Backhoe Hire	\$115.50	\$11.55	\$127
Backhoe Augar Hire	\$33.00	\$3.30	\$36
POSI TRACKS			
Mini Posi Tracks 1300	\$99.00	\$9.90	\$109
Standard Posi Tracks 1600	\$110.00	\$11.00	\$121
Large Posi Tracks 2000	\$121.00	\$12.10	\$133
Standard Posi Tracks 1600	\$110.00	\$11.00	\$121
Large Posi Tracks 2000	\$121.00	\$12.10	\$133

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

EQUIPMENT COSTS

	PER HOUR	GST	TOTAL
DROTTS			
8 - 10 ton Drott Hire	\$143.00	\$14.30	\$157
12 - 14 ton Drott Hire	\$148.50	\$14.85	\$163
18 ton Drott Hire (953)	\$170.50	\$17.05	\$188
DOZERS			
D6 Dozer Hire	P.O.A		
GRADERS			
12G Size Grader Hire	P.O.A		
VACUUM TRUCKS			
Super Vac	\$181.50	\$18.15	\$200
ROLLERS			
3 - 15 Ton Smooth Drum and Pad Foot (Dry Hire Only)	P.O.A		
TRUCKS			
10 m Tipper Hire	\$99.00	\$9.90	\$109
Truck & Dog Hire	\$148.50	\$14.85	\$163
Special Water Truck	\$137.50	\$13.75	\$151
Vacuum Trucks	\$132.00	\$13.20	\$145
Super Vac Truck (18,000-L)	\$181.81	\$18.18	\$200
	PER HOUR	GST	TOTAL
PERSONNEL			
Labour Hire	\$64.20	\$6.42	\$71
Earthworks Supervisor	\$117.70	\$11.77	\$129
MISCELLANEOUS			
Utility Hire (per day)	\$80.00	\$8.00	\$88
Toilet Hire (per toilet/per week)	\$110.00	\$11.00	\$121
CB Radios (per radio/per day)	\$11.00	\$1.10	\$12
Generator 13 kva (per week)	\$440.50	\$44.05	\$485
Supplied Fuel (per litre)	\$1.71	\$0.17	\$2
40 Foot Container (per week)	\$49.50	\$4.95	\$54
2" pump with hoses (per day)	\$283.80	\$28.38	\$312
3" pump with hoses (per day)	\$385.00	\$38.50	\$424
4" pump with hoses (per day)	\$385.00	\$38.50	\$424
6" pump with hoses (per day)	\$495.00	\$49.50	\$545
Roadbase	P.O.A.		
Shakedown Grid	P.O.A.		

Source: Standard Consultant Price List; Effective 1st July 2010

Rates were adjusted to reflect 10% increase for equipment and 7% increase for labour on 21st Sept 2011.

Rates were reviewed 1st January 2012 - no changes made

Rates (inclusive of GST) have been rounded to whole dollar values

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

EQUIPMENT COSTS

	Per Hour	GST	TOTAL
Other Assumed Rates			
Transport Truck	\$109.00	\$10.90	\$120
Electrician	\$132.00	\$13.20	\$145
Truck with Hiab	\$114.00	\$11.40	\$125
D8 Bulldozer	\$227.00	\$22.70	\$250
Grader	\$209.00	\$20.90	\$230
Dozer	\$136.00	\$13.60	\$150
18T loader	\$160.00	\$16.00	\$176
Constr. Specialty Labour	\$115.00	\$11.50	\$127
Const. General Labour	\$80.00	\$8.00	\$88
Mechanical shears for excavator	\$95.00	\$9.50	\$105
Waste Transport Truck	\$150.00	\$15.00	\$165
Crane (Light Lift)	\$227.00	\$22.70	\$250
Water Tanker Truck	\$227.00	\$22.70	\$250
Pump Truck	\$227.00	\$22.70	\$250
Module Transport Truck	\$123.00	\$12.30	\$135
Module Crainage	\$314.00	\$31.40	\$345
Hydraulic Lift/Heavy Crane (150-T)	\$500.00	\$50.00	\$550
Elevated Work Platform (man lift)	\$227.00	\$22.70	\$250
MISCELLANEOUS	UNIT RATE	GST	TOTAL
Office Trailer (per week)	\$227.00	\$22.70	\$250
Gas Axe (per day)	\$227.00	\$22.70	\$250
Construction Debris Disposal (per ton)	\$59.00	\$5.90	\$65
Utility Truck with Equipment and Generator (per day)	\$182.00	\$18.20	\$200
Support Truck With Laser Level (per day)	\$109.00	\$10.90	\$120

Rates based on historical project experience in Australia

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

Consultant Hourly Rates

	Standard Hourly Rates (Inc. GST)	Average Rate (Inc. GST)
Assistant Engineer/Geologist/Scientist	\$118 - \$129	\$124
Staff Engineer/Geologist/ Scientist	\$134 - \$147	\$140
Project Engineer/Geologist/Industrial Hygienist/Scientist	\$150 - \$165	\$157
Senior Engineer/Geologist/Scientist	\$161 - \$177	\$169
Project Manager	\$182 - \$200	\$191
Senior Project Manager	\$214 - \$235	\$225
Principal/Program Director/Project Director	\$257 - \$282	\$270
Designer/Draftsman/Technician	\$91 - \$100	\$95
Computer Analyst/Computer Programmer	\$118 - \$129	\$124
Graphics/Technical Editor/Word Processor	\$91 - \$100	\$95
Accounting/Admin. Assistant/Clerical/Office Services	\$91 - \$100	\$95

FINAL

REHABILITATION COSTS FOR DALBY EXPANSION PROJECT

Consultant Standard Expenses

DAILY EXPENSES for SOIL INVESTIGATION FIELD WORK

Equipment	Unit Cost	Units	
Equipment	Unit Cost	Units	
Hollow Stem Auger Rig	\$3,500	day	
Air Rotary Drill Rig	\$5,000	day	
Geoprobe	\$2,320	day	Based on \$290/ hour
Soil Augers	\$280	day	
T-cells	\$10	day	
Gloves/disposables	\$100	day	
PID	\$150	day	
-	\$0	-	
Standard mob/demob	\$7,500	ls	Based on \$7.50/ km

DAILY EXPENSES for GROUNDWATER INVESTIGATION FIELD WORK

Equipment	Unit Cost	Units	
Equipment	Unit Cost	Units	
Grundfos	\$900	week	
Flow Cell	\$650	week	
Generator	\$425	week	Based on \$85 per day
Tubing 100'	\$65	per 100 feet	
DI Water 4L	\$40	per 4 L	
Bailer Twine	\$5	roll	
Bailers/Disposable	\$125	case (24)	
PID	\$550	week	
Air Rotary Rig	\$5,000	day	
Standard mob/demob	\$7,500	ls	Based on \$7.50/ km

Baseline Analytical Requirements

Parameter	Unit Cost
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GROUNDWATER

Heavy Metals	\$42
VOC/SVOC	\$280
TPH/TRPH	\$55
TPH speciation (aliphatic/aromatic)	\$135
PAHs and Phenols	\$95
Pesticides and PCBs	\$85
TPH/VOC	\$135
Alternate ICP/AES metals	\$70
Nitrate	\$22
Dioxins/Furans	\$725

GROUNDWATER QA/QC

Duplicates*	\$637	
MS/MSD*	\$637	
Trip blanks	\$135	TPH and VOC
Equipment rinsate*	\$637	

* metals, TPH/TRPH (with speciation), VOC, SVOC, PAH, phenols, PCB and pesticides

SOIL

Heavy Metals	\$42
VOC/SVOC	\$280
TPH/TRPH	\$55
TPH speciation (aliphatic/aromatic)	\$135
PAHs and Phenols	\$95
Pesticides and PCBs	\$85
TPH/VOC	\$135
Alternate ICP/AES metals	\$70
Nitrate	\$22
Dioxins/Furans	\$725

SOIL QA/QC

Duplicates	\$637	
MS/MSD	\$637	
Trip blanks	\$135	TPH and VOC
Equipment rinsate	\$637	

* metals, TPH/TRPH (with speciation), VOC, SVOC, PAH, phenols, PCB and pesticides

CONTRACTOR COSTS OF DIRECT SEEDING BY SEEDER TYPE - ADJUSTED FOR CPI				
SEEDING ACTIVITY	2000 Average cost/ha with seed and cost range (\$)		CPI (3%) Compounded Over 12 years (\$)	Total Adjusted Cost Average Cost/ha (\$)
Niche seeders	\$ 495	(241 - 495)	\$ 211	\$ 706
Mouldboard	\$ 1,376	(1320 -1490)	\$ 586	\$ 1,962
Hydromulching	\$ 11,500	(8000 - 15000)	\$ 4,896	\$ 16,396
Irrigated seeding	\$ 12,850	12850+	\$ 5,471	\$ 18,321
Hand casting	\$ 30	(15 - 45)	\$ 13	\$ 43

Note: The above direct seeding costs were obtained from Table 13 of "The Cost of revegetation", Jacki Schirmer and John Field, ANU Forestry and FORTECH, Natural Heritage Trust; dated 2000. Provided below and available online at: <http://www.environment.gov.au/land/publications/costrev.html>.

* High end cost used as table notes indicate commercial contractor cost may be higher

TABLE 13: CONTRACTOR COSTS OF DIRECT SEEDING BY SEEDER TYPE

Seeding type	Average cost/ ha without seed and cost range (\$)	Average cost/ ha with seed and cost range (\$)	Labour hours per ha (hours)	GA hire rate per day/ property average and range (\$)*	Bio-climatic region	Sample size and details
Niche seeders**	165 (109-274)	390 (241-495)	1.6-3.3	27 (15-38)	3, 4, 5	13
Mouldboard**	N/A	1376 (1320-1430)	11	N/A	3, 4	2
Hydro-mulching***	N/A	11500 (8000-15000)	Not given	N/A	1	2
Irrigated row seeding****	N/A	12 850 +	570 +	N/A	6	1
Hand casting**	N/A	30 (15-45)	1.0-3.0	N/A	1, 2	3

* All hire rates given were based on hiring from landcare or other revegetation groups, not from commercial contractors. When a seeder is hired from a landcare group or other revegetation organisation, hire rates are often per day or per property rather than per hour.

** Per hectare rates for niche seeding, mouldboarding and hand casting were based on the assumption that an average 3.3 kilometres would be seeded per hectare.

*** Per hectare rates for hydromulching were based on obtaining quotes which gave the cost per metre squared for hydromulching this and multiplying it by 10 000 to obtain a per hectare cost.

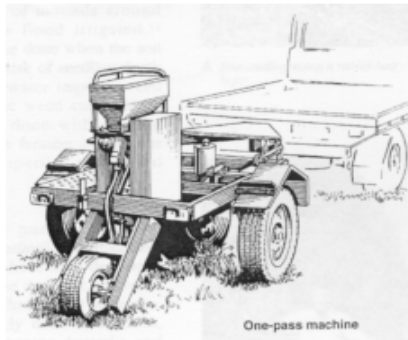
****Irrigated row seeding costs are for a site close to town in an arid region, and do not reflect the cost of irrigated row seeding in remote areas further from a town centre or for sites without adequate water pressure, in which more water points have to be laid. The + sign indicates that this is the lowest cost for irrigated row seeding that can be achieved under favourable conditions.

DESCRIPTIONS of NICHE SEEDING and HYDROMULCHING from PAGE 51 of "THE COST OF REVEGETATION"

Niche Seeding:

THE COST OF REVEGETATION

Niche seeders are seeders that can be attached to tractors and distribute seed at a set rate and depth along a row. Many niche seeders can deep rip and/or mound earth at the same time, thereby completing all ground preparation and seeding at the same time. The general design of a normal niche seeder can be seen in Figure 19. Figure 20 gives an example of a niche seeded row which has been scarified and seeded using a Rodden III niche seeder. Costs of seeding using niche seeders usually include deep ripping /cultivation costs, as a ripper or scarifier etc is attached to the niche seeder and carries out ground preparation and niche seeds at the same time.



Source: Dalton (1993)

FIGURE 19: DIAGRAM OF A STANDARD NICHE SEEDER

Mouldboarding involves spraying for weeds once in spring, then using a mouldboard plough to invert the soil, resulting in a well cultivated weed-free soil surface. This is followed by seeding 2 to 3 times the normal amount of seed mixed with sand (Dalton 1993). Mouldboarding is most effective on ex-pasture sites, as on ex-cropping sites weed seeds are usually distributed throughout the soil profile and therefore inverting the soil does not result in adequate weed control (Dalton 1993).

Hydromulching costs considerably more than other direct seeding methods as it includes spraying a liquid mulch to provide soil stability and protection for seed, as well as seeding. Hydro-mulching involves mixing seed, sometimes fertiliser, and wood fibre or paper mulch in a tank until an even liquid mix is achieved. The mix is then usually applied by pumping the mixture out through a hose over the direct seeding site. The mulch dries to form a thin stable layer on the soil surface, thereby minimising risk of erosion, providing some protection from removal of seed by animals, and retaining moisture to aid seed germination. The mulch layer is thin enough for germinating seedlings to break through (Buchanan 1989).



FIGURE 20: NICHE-SEEDED ROW

Irrigated row seeding is carried out in the arid region, and involves laying irrigation lines and then row seeding. In the arid region where water is not available for reticulation, dry direct

Appendix I Environmental Authority Action Program

**ACTION PROGRAM - ENVIRONMENTAL AUTHORITY EPPG00972513
(DXP)**

CONDITION NO.	CONDITION	ACTION PROGRAM
SCHEDULE A - GENERAL CONDITIONS		
A1	In the carrying out of the petroleum activity(ies), the holder of this environmental authority must not exceed the number and maximum size for each of the specified petroleum activities listed in Schedule A - Table 1 for each petroleum tenure.	All new projects will be reviewed against environmental authority conditions to ensure authorised petroleum activities listed in Schedule A - Table 1 are not exceeded. Amendments to environmental authority conditions will be sought where required to facilitate proposed works.
A2	This environmental authority does not authorise environmental harm unless a condition contained in this environmental authority explicitly authorises that harm. Where there is no condition, the lack of a condition shall not be construed as authorising harm.	Activities will be undertaken such that they do not cause environmental harm unless explicitly authorised under the environmental authority. The Arrow Energy Health, Safety and Environmental Management System (HSEMS) contains policies, standards, procedures and supporting information including standard operating procedures and guidelines to ensure activities do not cause environmental harm unless authorised.
A3	The holder of the environmental authority must: (a) install all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority; (b) maintain such measures, plant and equipment in their proper and effective condition; and (c) operate such measures, plant and equipment in a proper and effective manner.	All required plant and equipment necessary to ensure compliance with the conditions of this environmental authority will be installed, operated and maintained as required. Existing plant and equipment already in place includes groundwater monitoring wells and sample ports for air emissions testing. Operation and maintenance requirements for monitoring equipment will be covered in documents such as the Groundwater Monitoring Program (Doc no. 99-V-PL-0032) and the Stack Emissions Monitoring Manual (Doc no. 99-H-MN-0022). General operational and maintenance of assets is described in the Asset Operations and Maintenance Procedure (Doc no. 99-H-PR-0098).
A4	No change, replacement or alteration of any plant or equipment is permitted if the change, replacement or alteration materially increases, or is likely to increase, the environmental harm caused by the petroleum activity	Any changes to plant or equipment are required to be assessed under Arrow Energy's Management of Change procedure (Doc no. 99-H-PR-002). This procedure is designed to evaluate the potential risks of a proposed change, ensure the risk remains As Low As Reasonably Practicable (ALARP) and ensure changes are documented, communicated and understood by affected personnel. The Management of Change process includes consideration of risk of environmental harm.
A5	The holder of this environmental authority must develop an Operational Plan that provides detailed information about the activities to be carried out under the environmental authority.	An Operational Plan for the period 17 December 2010 to 17 December 2013 has been lodged with EHP.
A6	The activities identified in the Operational Plan must incorporate but not be limited to the petroleum activities set out in the approved Work Program and/or Development Plan for the relevant petroleum authority as required under the <i>Petroleum Act (1923)</i> or the <i>Petroleum and Gas (Production and Safety) Act 2004</i> .	This Plan of Operations has been prepared in accordance with Section 288 of the Environmental Protection Act 1994 (EP Act), which requires the preparation of a Plan of Operations for EAs relating to PLs. This document has been prepared to meet these requirements for petroleum activities undertaken by Arrow within the DXP project area as authorised under EPPG00972513.
A7	The Operational Plan must be consistent with the requirements of the environmental authority and include, but not be limited to: (a) a stated period, not exceeding three (3) years, to which the Operational Plan applies; (b) a description of the existing petroleum and incidental infrastructure; (c) a description of all proposed petroleum and incidental infrastructure that will be developed during the term of the Plan (d) a map or maps that: i. record the location of all existing petroleum and incidental infrastructure that exists at the commencement of the period of the Operational Plan, including but not limited to: • regulated dams; • wells; • transmission flow lines; • gas processing facilities; • water treatment facilities; • sewage treatment facilities; and • compressor stations ii. records the location of all programmed and approved future infrastructure that will be developed during the period of the Operational Plan. (e) proposed maximum disturbance area to be cleared under the life of the Operational Plan; (f) for proposed disturbance or vegetation clearing in an Environmentally Sensitive Area (ESA) provide details on the scale and extent of the disturbance or clearing of these areas specifically; (g) for forecasted vegetation clearing in an ESA that is an "Endangered" or "Of Concern Regional Ecosystem (RE)", the Operational Plan must provide details of environment offsets that are at least equivalent in environmental value of the disturbance caused to the ESA. (h) for each site to be disturbed, a plan of the rehabilitation activities to be performed during the period of the Operational Plan, including but not limited to a description of the following: i. location (e.g. tenure, coordinates) and disturbance type (e.g. well lease, flow line, access track); ii. pre-disturbance land use; iii. forecasted total area to be rehabilitated under the life of the Operational Plan; iv. reference sites for rehabilitated areas; v. floristic species to be planted in the rehabilitation and their proposed densities; vi. soil types of areas to be rehabilitated; vii. post-disturbance land use; viii. monitoring program to measure rehabilitation success; ix. rehabilitation specifications for all proposed petroleum activities and incidental infrastructure	As provided in Section 703 of the EP Act, and as outlined in the Queensland Department of Environment and Heritage Protection (EHP) Guideline – Preparing a plan of operations for an environmental authority relating to a petroleum lease, Arrow intend to submit an EA amendment application within 12 months of submittal of this document to remove conditions in the EA relating to matters included in this Plan of Operations. This will include the proposed removal of conditions relating to the Operational Plan in the current EA.
	which will achieve the standards stated in Schedule H- Rehabilitation; and x. a high level rehabilitation strategy for all proposed petroleum and incidental infrastructure which is not sited at the commencement of the Operational Plan; and (i) a description of the previous Operational Plan(s); and progressive rehabilitation carried out and the performance of rehabilitated sites in relation to the requirements and acceptance criteria set out in the environmental authority and the proposed rehabilitation activities carried out under the (j) the calculation of financial assurance for the proposed maximum disturbance expected during the period of the Operational Plan	
A8	All subsequent Plans must be submitted to the administering authority not less than three months prior to the expiry of the current Plan period, and must also include a record of disturbance to State significant biodiversity values of all petroleum activity(ies) that commenced after 8 March 2013 (the date of grant of this environmental authority).	

**ACTION PROGRAM - ENVIRONMENTAL AUTHORITY EPPG00972513
(DXP)**

CONDITION NO.	CONDITION	ACTION PROGRAM
A9	The holder of this environmental authority must: (a) provide to the administering authority financial assurance in the amount and form required from time to time by the administering authority for the authorised petroleum activities; and (b) review and maintain the amount of financial assurance based on the maximum disturbance from proposed and existing activities and rehabilitation to be undertaken during the period of the Operational Plan that is current from time to time.	Financial assurance has been lodged with EHP for all activities approved under the current environmental authority. Financial assurance will be reviewed for proposed new activities where an environmental authority amendment is required or where surrender of tenures is intended.
A10	The calculation of financial assurance must be in accordance with the most recent version of the Department of Environment and Heritage Protection's Guideline "Financial assurance for petroleum activities".	Financial assurance for proposed new activities will be calculated in accordance with the most recent version of the Department of Environment and Heritage Protection's Guideline "Financial assurance for petroleum activities" and lodged with EHP as required.
A11	<i>No condition A11 in 8 March 2013 version of EA</i>	-
A12	Conditions (D2) to (D17) and (D43) to (D46) in the Land Schedule relating to disturbance, only apply to petroleum activities which commenced after 15 March 2011 subject to the holder of this environmental authority having complied with all disturbance conditions of the relevant environmental authority that applied at the time the existing petroleum activity was constructed.	Potential environmental impacts resulting from land disturbance activities are assessed as part of the Land Access Request process as per the Ecological Impact Assessment Procedure (Doc no. 99-H-PR-0081) and associated documents.
A13	Compliance with the conditions of this environmental authority must be audited by an appropriately qualified third party auditor, nominated by the holder of this environmental authority and accepted by the administering authority, for each period of the Operational Plan required under Conditions (A5) to (A8).	Third party audits will be scheduled and undertaken for each period of the Operational Plan as required.
A14	Notwithstanding Condition (A13), the holder of this environmental authority may, prior to undertaking the third party audit, negotiate with the administering authority the scope and content of the third party audit. Note: Where minimal activities have been undertaken on a tenure, the negotiation of the scope of the third party audit may also include the postponing of the third party audit to an agreeable time between the holder of this environmental authority and the administering authority.	If required, the scope and content of the third party audit will be negotiated with the administering authority prior to undertaking the audit.
A15	The report prepared by the third party auditor for the relevant prior Operational Plan period must be submitted to the administering authority by the holder of this environmental authority with each revised Operational Plan submitted in accordance with Condition (A8).	The report prepared by the third party auditor for the relevant prior Operational Plan period will be submitted to the administering authority by the holder of the environmental authority with each revised Operational Plan submitted in accordance with Condition (A8).
A16	The third party auditor must certify (including a statutory declaration) the findings of the audit in the report.	The third party auditor will be required to certify (including a statutory declaration) the findings of the audit in the report.
A17	The financial cost of the third party audit is to be borne by the holder of this environmental authority.	The financial cost of the third party audit will be borne by the holder of the environmental authority.
A18	The holder of this environmental authority must immediately act upon any recommendations arising from the audit report by: (a) investigating any non-compliance issues identified; and (b) as soon as practicable, implementing measures or taking necessary action to ensure compliance with the requirements of this environmental authority.	On receipt of the final audit report, a plan will be developed detailing actions required to address the findings of the audit. This will include details of any investigations required into audit findings.
A19	Subject to Condition (A18), and not more than 60 business days following the submission of the audit report, the holder of this environmental authority must provide a written report to the administering authority addressing the: (a) actions taken by the holder to ensure compliance with this environmental authority; and (b) actions taken to prevent a recurrence of any non-compliance issues identified.	Arrow Energy will provide a written report to the administering authority not more than 60 business days following the submission of the audit report.
A20	A contingency plan for emergency environmental incidents which includes but is not limited to the impacts of flooding, must be developed and implemented to respond to environmental emergency events and incidents where environmental harm is caused or threatened.	A contingency plan for emergency environmental incidents which includes the impacts of flooding has been developed (Doc no.19-CEM-PL-0002) and implemented to respond to environmental emergency events and incidents where environmental harm is caused or threatened. The document is scheduled for yearly review as part of regular reviews of Arrow Energy HSEMS documentation.
A21	The contingency plan for emergency environmental incidents required under Condition (A20) must address the following matters as a minimum: (a) a clear definition of what constitutes an environmental emergency incident for the activity; (b) identification of the types of environmental incidents that may occur, relevant to the activities authorised to be carried out under this environmental authority; (c) response procedures to be implemented to prevent or minimise the risk of environmental harm arising from environmental emergency incidents; (d) response procedures to minimise the extent and duration of environmental harm caused by environmental emergency incidents; (e) the practices and procedures to be employed to restore the environment or mitigate any environmental harm caused; (f) communication procedures and lines of communication within and beyond the organisation to be employed in responding to environmental emergency incidents; (g) the resources to be used in response to environmental emergency incidents; (h) procedures to investigate the cause of any incidents, including releases, and where necessary, the remedial actions to be implemented to reduce the likelihood of recurrence of similar events; (i) a receiving environment (surface waters/land) monitoring program, to be specifically implemented in the event of a release to waters/land to examine/assess environmental impacts (for waters this must include upstream and downstream monitoring); (j) the provision and availability of documented procedures to staff attending any emergency environmental incident to enable them to effectively respond; (k) training of staff that will be called upon to respond to emergency environmental incidents to enable them to effectively respond; (l) timely and accurate reporting of the circumstance and nature of emergency environmental incidents to the administering authority in accordance with conditions of this environmental authority; (m) procedures for accessing monitoring points during emergency environmental incidents; and (n) procedures to notify any potentially impacted stakeholder who may be affected by an environmental emergency incident.	The document contains a mapping table indicating how each requirement of condition A21 is addressed.
A22	All records and results required by the conditions of this environmental authority must be kept for a minimum of five (5) years.	All records and results required by the conditions of this environmental authority will be kept for a minimum of five (5) years. Systems in place to support this include the Corporate HSEMS, a document control system and incident and complaint management systems.

**ACTION PROGRAM - ENVIRONMENTAL AUTHORITY EPPG00972513
(DXP)**

CONDITION NO.	CONDITION	ACTION PROGRAM
A23	All documentation required by this environmental authority (including but not limited to plans, systems, programs, procedures, results of audits, assessments, monitoring, inspections and complaint records) must be made available to the administering authority upon request.	All documentation required by this environmental authority will be made available to the administering authority upon request. It is noted a broad range of documentation was provided to EHP in February 2013 to support a Level C audit being undertaken.
A24	In the carrying out of the petroleum activity the holder of this environmental authority must not adversely impact on the cultural heritage values of any place registered on the Queensland Heritage Register.	Potential impacts on cultural heritage values of any place registered on the Queensland Heritage Register are considered through cultural heritage components of the Land Access Request process Arrow Energy uses to meet Petroleum and Gas (Production and Safety) Act 2004, environmental authority and other legislative requirements in regards to accessing land for petroleum activities.
A25	Testing, evaluating, developing and using natural underground reservoirs for petroleum storage or to store prescribed storage gases is not authorised under this environmental authority.	Testing, evaluating, developing and using natural underground reservoirs for petroleum storage or to store prescribed storage gases will not be undertaken unless authorised under this environmental authority.
A26	The stimulation of underground reservoirs is prohibited under this environmental authority.	The stimulation of underground reservoirs will not be undertaken unless authorised under this environmental authority.
A27	The disposal of solid salt on site, including encapsulation of solid salt in a landfill monocell, is prohibited under this environmental authority.	The disposal of solid salt on site, including encapsulation of solid salt in a landfill monocell, will not be undertaken unless authorised under this environmental authority.
SCHEDULE B – WATER		
B1	Contaminants that will or may cause environmental harm must not be directly or indirectly released to any waters except as permitted under this environmental authority.	Activities will be undertaken such that they do not cause environmental harm unless explicitly authorised under the environmental authority. The Arrow Energy Health, Safety and Environmental Management System (HSEMS) contains policies, standards, procedures and supporting information including standard operating procedures and guidelines to ensure activities do not cause environmental harm unless authorised. The HSEMS is supported by departmental and site-specific documents as required.
B2	An Erosion and Sediment Control Plan which has been certified by a suitably qualified person must be developed and implemented to minimise erosion and the release of sediment and contaminated stormwater to waters for all stages of the petroleum activities.	The Arrow Energy HSEMS includes a Land Disturbance Procedure (Doc no. 99-V-PR-0038) which outlines mandatory environmental standards to avoid, minimise or mitigate environmental harm associated with land disturbance activities. It is supported by additional documents including Site Preparation and Vegetation Clearing Guideline (Doc no. 99-V-GDL-0008), Erosion and Sediment Control Guideline (Doc no. 99-V-GDL-0007), Erosion and Sediment Control Plans for Well Pads, Best Practice Access Track Requirements and Soil Management Guideline (Doc no. 99-H-GDL-00099).
B3	The Erosion and Sediment Control Plan required by Condition (B2) must include but not be limited to: (a) diverting uncontaminated stormwater run-off around areas disturbed by petroleum activities or where contaminants or wastes are stored or handled that may contribute to stormwater; (b) contaminated stormwater runoff and incident rainfall is collected; and treated, reused, or released in accordance with the conditions of this environmental authority; (c) roofing or minimising the size of areas where contaminants or wastes are stored or handled; (d) revegetating disturbed areas as soon as practicable after the completion of works; (e) using alternate materials and or processes (such as dry absorbents) to clean up spills that will minimise the generation of contaminated waters; (f) erosion and sediment control structures are placed to minimise erosion of disturbed areas and prevent the contamination of any waters; (g) an inspection and maintenance program for the erosion and sediment control features; (h) provision for adequate access to maintain all erosion and sediment control measures especially during the wet season months from November to April; (i) additional erosion and sediment control measures for construction of wells and pipelines on slopes >10%; (j) surface water monitoring program designed to detect erosion and sediment runoff into watercourses; (k) identification of remedial actions that would be required to ensure compliance with the conditions of this environmental authority; and (l) details of community consultation strategies and processes to be used in further developing and implementing the Erosion and Sediment Control Plan.	The Land Disturbance Procedure (Doc no. 99-V-PR-0038) contains requirements for Erosion and Sediment Control Plans to be prepared for land disturbance activities. Erosion and sediment control plans will continue to be developed for land disturbance activities as required under this procedure.
B4	A copy of the Erosion and Sediment Control Plan must be submitted to any potentially affected landholders upon request.	A copy of relevant Erosion and Sediment Control Plans will be submitted to any potentially affected landholders upon request as required.
B5	The maintenance and cleaning of vehicles and any other equipment or plant must be carried out in areas from where the resultant contaminants cannot be released into any waters, roadside gutter or stormwater drainage system.	The maintenance and cleaning of vehicles and any other equipment or plant will not be carried out in areas from where the resultant contaminants can be released into any waters, roadside gutter or stormwater drainage system. Arrow Energy's HSEMS includes a Vehicle and Machinery Hygiene Procedure (Doc no. 99-V-PR-0037) and a Weed and Pathogen Management Guideline (Doc no. 99-H-GDL-0076) as well as other weed species pest management guidelines which include vehicle washdown requirements. Arrow Energy uses a range of dedicated public or private washdown facilities at strategic locations as part of its weed and pest management strategy. Portable washdown facilities may be used in some locations. Where clean-downs at site occur, locations are determined in consultation with the landholder to ensure no contaminants are released into any waters, roadside gutters or stormwater drainage. Maintenance of fleet vehicles is done by the lessor at a dedicated off-site location.
B6	In the carrying out of the petroleum activity the holder of this environmental authority must not clear vegetation or place fill, in or within: (a) 200 metres from any natural significant wetland; (b) 100 metres from any natural wetland, lakes or springs; or (c) 100 metres of the high bank of any other watercourse.	Sensitive ecological areas including wetlands, lakes, springs and watercourses will be identified through assessments undertaken during project planning stages as per Arrow Energy's Ecological Impact Assessment Procedure (Doc no. 99-H-PR-0081). Restrictions on activities in these areas are included in land access approval documents. Measures which can be taken to avoid or minimise impacts to sensitive areas where change in location of infrastructure cannot be avoided include using horizontal directional drilling for pipelines through areas where surface impacts are not acceptable, e.g. road or waterway crossings where appropriate.
B7	The holder of this environmental authority must not excavate or place fill in a way that interferes with the flow of water in a watercourse, wetland, or spring, including works that divert the course of flow of the water or works that impound the water.	Sensitive ecological areas including wetlands, lakes, springs and watercourses will be identified through assessments undertaken during project planning stages as per Arrow Energy's Ecological Impact Assessment Procedure (Doc no. 99-H-PR-0081). Restrictions on activities in these areas are included in land access approval documents and considered during project planning and execution stages.

**ACTION PROGRAM - ENVIRONMENTAL AUTHORITY EPPG00972513
(DXP)**

CONDITION NO.	CONDITION	ACTION PROGRAM
B8	<p>Despite Conditions (B6) and (B7), pipeline and road construction works may be undertaken in watercourses, wetlands or springs where there is no reasonable and practicable alternative (such as the use of horizontal directional drilling methods) for a maximum period of 10 days, provided that the works are conducted in accordance with the following order of preference:</p> <p>(a) conducting work in times of no flow; and (b) using all reasonable and practicable measures to reduce impacts in times of flow</p>	<p>Where no reasonable and practicable alternative exists for pipeline and road construction works in watercourses, wetlands or springs, works will be planned and executed to be undertaken within a maximum period of 10 days. Works will be preferentially scheduled in times of no flow or, where required to be undertaken in times of flow, all reasonable and practicable measures to reduce impacts will be used.</p> <p>A construction environmental management plan and erosion and sediment control plan documenting environmental management measures to minimise impacts of works will be prepared prior to commencement of works and implemented for all disturbance activities as per Land Disturbance Procedure (Doc no. 99-V-PR-0038) and Erosion and Sediment Control Guideline (Doc no. 99-V-GDL-0007).</p> <p>The DERM publication "Guideline - Activities in a watercourse, lake or spring associated with mining operations" shall be used as part of the risk assessment process for any works in a waterway and management measures required incorporated in environmental management documents, e.g. construction environmental management plan.</p>
B9	<p>Activities or works resulting in significant disturbance to the bed or banks of a watercourse or wetland, or a spring must:</p> <p>(a) only be undertaken where necessary for the construction and/or maintenance of roads, tracks and pipelines that are essential for carrying out the authorised petroleum activities and no reasonable or practicable alternative location exists;</p> <p>(b) be no greater than the minimum area necessary for the purpose of the significant disturbance;</p> <p>(c) be designed and undertaken by a suitably qualified person taking into account the matters listed in Section 5 - Planning Activities and Section 6 - Impact Management During Activities of the Department of Environment and Heritage Protection's "Guideline – Activities in a watercourse, lake or spring associated with mining operations" dated April 2008, or more recent editions as such become available; and</p> <p>(d) upon cessation of the activities or works, commence rehabilitation immediately such that the final rehabilitation is to a condition that will ensure the ongoing physical integrity and the natural ecosystem values of the site.</p>	<p>Where no reasonable and practicable alternative exists for activities or works resulting in significant disturbance to the bed or banks of a watercourse or wetland, or a spring, works will be planned and executed to be undertaken within the minimum area necessary and be designed and undertaken by a suitably qualified person taking into account the matters listed in Section 5 - Planning Activities and Section 6 - Impact Management During Activities of the Department of Environment and Heritage Protection's "Guideline – Activities in a watercourse, lake or spring associated with mining operations" dated April 2008, or more recent editions as such become available. Rehabilitation will be commenced as soon as practicably on cessation of works and be to a condition that will ensure the ongoing physical integrity and the natural ecosystem values of the site as per the Rehabilitation Procedure (Doc no. 99-H-PR-0088) and associated guideline (99-H-GDL-0081).</p> <p>A construction environmental management plan and erosion and sediment control plan documenting environmental management measures to minimise impacts of works will be prepared prior to commencement of works and implemented for all disturbance activities as per Land Disturbance Procedure (Doc no. 99-V-PR-0038) and Erosion and Sediment Control Guideline (Doc no. 99-V-GDL-0007).</p> <p>The DERM publication "Guideline - Activities in a watercourse, lake or spring associated with mining operations" shall be used as part of the risk assessment process for any works in a waterway and management measures required incorporated in environmental management documents, e.g. construction environmental management plan.</p>
B10	<p>Sediment control measures must be implemented to minimise any increase in water turbidity due to carrying out petroleum activities in the bed or banks of a watercourse or wetland, or a spring.</p>	<p>The Arrow Energy HSEMS includes a Land Disturbance Procedure (Doc no. 99-V-PR-0038) which outlines mandatory environmental standards to avoid, minimise or mitigate environmental harm associated with land disturbance activities. A certified erosion and sediment control plan will be prepared prior to commencement of works and implemented for all disturbance activities as per the Erosion and Sediment Control Guideline (Doc no. 99-V-GDL-0007).</p>
B11	<p>Routine, regular and frequent visual monitoring must be undertaken while carrying out construction work and/or any maintenance of completed works in a watercourse, wetland or spring.</p>	<p>A construction environmental management plan including monitoring requirements will be prepared prior to commencement of works and implemented for all disturbance activities. Monitoring requirements are also included in site-specific erosion and sediment control plans where relevant.</p>
B12	<p>If, due to the petroleum activities, water turbidity increases in the watercourse, wetland or spring outside contained areas, works must cease and the sediment control measures must be rectified to limit turbidity before activities recommence.</p>	<p>The Arrow Energy HSEMS includes a Land Disturbance Procedure (Doc no. 99-V-PR-0038) which outlines mandatory environmental standards to avoid, minimise or mitigate environmental harm associated with land disturbance activities.</p> <p>Actions to be taken to address impacts on water quality in watercourses, wetlands or springs outside contained areas will be documented in the certified erosion and sediment control plan which will be prepared and implemented for all disturbance activities as per the Erosion and Sediment Control Guideline (Doc no. 99-V-GDL-0007) which supports the Land Disturbance Procedure (Doc no. 99-V-PR-0038).</p>
B13	<p>All measures must be taken to minimise adverse impacts to or reversal of any river improvement works carried out in River Improvement Areas by Queensland's River Improvement Trusts.</p> <p>Note: Locations and details of River Improvement Areas and River Improvement Trusts are provided in the Schedule to the River Improvement Trust Regulation 1998.</p>	<p>During desktop assessments of proposed infrastructure as part of the Ecological Impact Assessment Procedure (Doc no. 99-H-PR-0081), the "River Improvement Trust Areas (Qld)" GIS layer will be utilised to identify works that occur in River Improvement Areas. When proposed works cannot avoid these areas, measures to minimise impacts will be considered in project design and execution stages. Examples of impact minimisation in these cases include the use of horizontal directional drilling (HDD) for the construction of pipelines underneath watercourses (i.e. avoiding River Improvement Areas), erosion and sediment control and prevention measures (e.g. rock protection works in the activity site to prevent bed and/or bank erosion), locating infrastructure in previously disturbed areas, aligning and designing structures to minimise the potential for scour and the use of existing crossings for temporary access during the construction or maintenance of infrastructure where possible.</p>
B14	<p>Where petroleum activities are carried out on floodplain areas, the holder of this environmental authority must ensure that petroleum and incidental activities do not:</p> <p>(a) concentrate flood flows that cause or threaten an adverse environmental impact;</p> <p>(b) divert flood flows from natural drainage paths and alter flow distribution;</p> <p>(c) increase the local duration of floods;</p> <p>(d) increase the risk of detaining flood flows;</p> <p>(e) pose an unacceptable risk to the safety of persons from flooding; or</p> <p>(f) pose an unacceptable risk of damage to property from flooding.</p>	<p>Flood studies have been undertaken for Tipton and Daandine production fields to ensure the requirements of this condition are met for infrastructure in floodplain areas. Additional flood studies will be undertaken as required to support planning for future development works.</p>

**ACTION PROGRAM - ENVIRONMENTAL AUTHORITY EPPG00972513
(DXP)**

CONDITION NO.	CONDITION	ACTION PROGRAM
B15	The extraction of groundwater as part of the petroleum activity from underground aquifers must not directly or indirectly cause environmental harm to any spring, wetland or other surface waters.	<p>Extracted groundwater is managed as per the Surat Basin Coal Seam Gas Water Management Plan (Doc no. ENV11-133). Release of treated CSG water will only be undertaken as permitted under this environmental authority.</p> <p>The location of proposed activities relative to springs, wetlands and other surface waters is identified through the Ecological Impact Assessment Procedure (Doc no. 99-H-PR-0081) as part of the Land Access Request process.</p> <p>Potential impacts on these features as well as local and regional groundwater have been considered in the Surat Gas Project Environmental Impact Statement (EIS) studies and reports which are available on Arrow Energy's website www.arrowenergy.com.au.</p>
B16	In a declared Wild River Area, petroleum activities must be consistent with the conditions stated in the relevant Wild River Declaration.	The location of proposed infrastructure relative to declared Wild River Areas is checked during desktop assessments undertaken under the Ecological Impact Assessment Procedure (Doc no. 99-H-PR-0081). Should works be proposed in declared Wild River Areas, access and approval conditions will document any conditions relevant to these areas.
B17	Where the conditions of this environmental authority conflict with the conditions of the Wild River Declaration, the conditions of the Wild River Declaration will prevail.	Noted, no action required.
B18	The release of contaminants to waters must only occur from the release points specified in Schedule B, Table 1 – Contaminant Release Points, Sources and Receiving Waters and depicted in Figure 1 attached to this environmental authority.	<p>At present, infrastructure is not in place to facilitate the release of treated CSG water to an external water body such as the unnamed tributary of Wilkie Creek. Hence, this does not form part of current water management practices. Should release of treated CSG water to the unnamed tributary of Wilkie Creek in accordance with environmental authority conditions be proposed in the future, all appropriate infrastructure to support this will be installed and a Standard Operating Procedure or similar will be developed and implemented to ensure compliance with environmental authority conditions.</p>
B19	The release of contaminants to waters must comply with the release limits and limit types as stated in Schedule B, Table 2 - Contaminated Release Limits for Release Point U1 when measured at the monitoring points specified in Schedule B, Table 1 - Contaminated Release Points, Sources and Receiving Waters for each quality characteristic.	
B20	The release of contaminants to waters from the release points must be monitored at the monitoring point specified in Schedule B, Table 1 - Contaminated Release Points, Sources and Receiving Waters for each quality characteristic and at the frequency specified in Schedule B, Table 2 - Contaminated Release Limits for Release Point U1.	
B21	In the event of a release of treated CSG water to Wilkie Creek, and before the commencement of the release, the holder of this environmental authority must install, operate and maintain a stream flow gauging station as specified in Schedule B, Table 3 - Contaminated Release During Flow Events to determine and record stream flows at a location 50 to 100 metres upstream from each release point as shown in Schedule B, Table 1 - Contaminated Release Points, Sources and Receiving Waters.	
B22	Notwithstanding any other condition of this environmental authority, the release of contaminants to waters must only take place during periods of natural flow events specified as minimum flow in Schedule B, Table 3 - Contaminated Release During Flow Events to for the contaminant release point(s) specified in Schedule B, Table 1 - Contaminated Release Points, Sources and Receiving Waters.	
B23	The volume released through the release point(s) must not exceed 0.8 m ³ /s and 20 ML/day.	
B24	Releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build up of sediment in such waters.	
B25	If water has been released from authorised release points listed in Schedule B, Table 1 - Contaminated Release Points, Sources and Receiving Waters, the holder of this environmental authority must undertake an annual assessment of the contaminants of treated CSG water to determine the risk of environmental harm from release of treated CSG water to surface waters. This should consider the contaminants mentioned in the ANZECC & ARMCANZ 2000 guidelines. This annual assessment must be included in the Annual Return.	
B26	Each monitoring and release point as specified in Schedule B, Table 2 - Contaminated Release Limits for Release Point U1 must be marked and readily identifiable from the banks of the unnamed tributary of Wilkie Creek prior to commencing any release of treated CSG water authorised under this environmental authority.	
B27	The water quality of the receiving waters must be monitored daily during discharge at a monitoring point 50-100 metres upstream and 200 metres downstream of release point U1 for the following water quality parameters: (a) Electrical conductivity (µS/cm) (b) pH (pH Unit) (c) Turbidity (NTU) (d) Suspended Solids (mg/L) (e) Calcium (mg/L) (f) Magnesium (mg/L) (g) Fluoride	
B28	The holder of this environmental authority must keep written records of all discharge events to the unnamed tributary of Wilkie Creek. The records must include, but not be limited to: (a) the volume of water released through the release point(s); (b) the release rate; (c) date and time of discharge; (d) water levels at Gauging Station GP1 during the discharge event; (e) water quality characteristics monitoring results; and (f) details of any observed impacts.	

**ACTION PROGRAM - ENVIRONMENTAL AUTHORITY EPPG00972513
(DXP)**

CONDITION NO.	CONDITION	ACTION PROGRAM
B29	As part of the Coal Seam Gas Water Management Plan the holder of the environmental authority must develop and implement an on-going Release Reduction Strategy to maximise CSG water reuse and minimise any release to waters and the storage of CSG water in holding dams. The strategy must address the following matters: (a) implementation of schemes to achieve maximum use of the water; (b) specific targets for achieving increased use of CSG water both treated and untreated; (c) a market analysis at least every three (3) years to identify existing and future opportunities for water use; (d) on-going review of emerging technologies and/or re-use options that could achieve significant reductions in mass loads of contaminants released to the environment; (e) investigation of the feasibility of alternative options, practices and procedures to further minimise the volume and concentration of contaminants released to waters; and (f) programs to implement feasible options to achieve increased water use and reduction in contaminant loads, including actions and timeframes for completion.	At present, infrastructure is not in place to facilitate the release of treated CSG water to an external water body such as the unnamed tributary of Wilkie Creek. Hence, this does not form part of current water management practices. Should release of treated CSG water to the unnamed tributary of Wilkie Creek in accordance with environmental authority conditions be proposed in the future, a Release Reduction Strategy will be developed and implemented as required under the environmental authority.
B30	A progress report on the Release Reduction Strategy must be submitted to the administering authority with each annual return. The report(s) must address at least the following matters: (a) details of the specific options, practices and procedures investigated; (b) details of new practices, procedures and programs implemented since the last reporting period and targets met; (c) where alternative options, practices and procedures are not considered feasible, the provision of justification to support that determination; and (d) details of the option(s) yet to be implemented, including the timeframes for implementation, and justification for the chosen option(s).	Progress reports on the Release Reduction Strategy will be submitted to the administering authority with each annual return once implemented.
B31	The release of contaminants directly or indirectly to waters: (a) must not produce any visible plume within receiving waters; nor (b) must not produce any slick or other visible or odorous evidence of oil, grease or petrochemicals nor contain visible floating oil, grease, scum, litter or other objectionable matter.	Arrow Energy assets will be operated in a manner such that the risk of release of contaminants directly or indirectly to waters not authorised under this environmental authority is mitigated to as low as reasonably practicable (ALARP) through adherence to HSEMS documents, environmental management plans and general good practice.
B32	A measuring device/ meter must be installed prior to commencement of release of treated CSG water and its installation must comply with the <i>Draft standards and specifications for measuring /metering disposal of treated CSG water</i> .	At present, infrastructure is not in place to facilitate the release of treated CSG water to an external water body such as the unnamed tributary of Wilkie Creek. Hence, this does not form part of current water management practices. Should release of treated CSG water to the unnamed tributary of Wilkie Creek in accordance with environmental authority conditions be proposed in the future, all appropriate infrastructure to support this will be installed and a Standard Operating Procedure or similar will be developed and implemented to ensure compliance with environmental authority conditions.
B33	Upon practical completion of the meter installation, the holder of this environmental authority must provide a completed 'meter installation form' signed by the installer and the environmental authority holder confirming that the installation complies with the manufacturer's specifications and/or national standards and/or Department of Environment and Heritage Protection's metering standards (whichever is applicable). Note: The Draft standards and specifications for measuring/metering disposal of treated CSG water is available from the administering authority upon request	
B34	The holder of this environmental authority must measure and record daily: (a) the volume released to surface waters from each release point at the monitoring point(s) in Schedule B, Table 1 - Contaminant Release Points, Sources and Receiving Waters; (b) the release rate; (c) for any change in the release rate: i. the date and time of the change; and ii. the new release rate	
B35	The holder of this environmental authority must provide the administrative authority with safe access to facilitate inspections, and must comply with any instructions issued by the administrative authority relevant to the operation of the pump and meter installation.	
B36	The holder of this environmental authority must notify the administering authority within five (5) business days of any meter malfunction or maintenance of the measuring device (meter).	
B37	The holder of this environmental authority must arrange for the repair or replacement of a malfunctioning meter within five business days of becoming aware of the malfunction and provide a repair and/or maintenance completion report within ten business days of the repair or maintenance.	
B38	Sewage pump stations must be fitted with a stand-by pump and a visible or audible high level alarm.	No sewage treatment plants >21 EP in capacity are currently present in DXP. New sewage treatment plants will be designed to the required standards.
B39	Treated effluent may only be released to land at the designated, fenced and delineated contaminant release area(s).	
B40	The contaminant release area(s) must be maintained in a proper and efficient condition so as to provide adequate assimilation, percolation, evaporation and transpiration of the released contaminants.	
B41	Treated effluent must not be applied by spray irrigation and must be applied in a manner that does not cause ponding or runoff of effluent beyond the contaminant release area(s).	
B42	When weather conditions or soil conditions preclude the release of contaminants, the contaminants must be directed to on-site storage or lawfully disposed of off-site.	
B43	Treated effluent must comply, at the sampling and in-situ measurement point(s), with each of the release limits specified in Schedule B, Table 4 - Treated Sewage Effluent Standards for each quality characteristic.	
B44	The release of contaminants to land must be monitored at the frequency and at the sampling and in-situ measurement point specified in Schedule B, Table 4 - Treated Sewage Effluent Standards and records of the monitoring results kept for at least five (5) years and made available to the administering authority on request.	
B45	The influent annual average daily dry weather flow of sewage must not exceed 60 kilolitres per day for each authorised sewage treatment plant under this environmental authority.	
SCHEDULE C – REGULATED DAMS		
C1	The name of each regulated dam must be clearly sign posted at the dam location at all times.	The name of each regulated dam is clearly signposted at the dam location as required.

**ACTION PROGRAM - ENVIRONMENTAL AUTHORITY EPPG00972513
(DXP)**

CONDITION NO.	CONDITION	ACTION PROGRAM
C2	Construction of any dam or modifications to an existing dam determined to be in the high hazard or significant hazard category in accordance with the most recent version of "Manual for Assessing Hazard Categories and Hydraulic Performance of Dams" is prohibited unless the required design plan details have been entered into the regulated dam Register and certified by the chief executive officer for the holder of the environmental authority, or their delegate, as being accurate and correct	Hazard category assessments are regularly performed at the time of design/construction of new dams, when the purpose of an existing dam changes or at the time of the annual dam inspection if required under the applicable Environmental Authority. The assessment is completed in accordance with the most recent version of "Manual for Assessing Hazard Categories and Hydraulic Performance of Dams". The details of the design plans are then incorporated into the Regulated Dams Register to ensure it is complete and accurate on any given day and then signed off by the delegates of Arrow Energy's chief executive officer.
C3	<p>The holder of this environmental authority must maintain a Register of regulated dams that must include, as a minimum, the following information for each regulated dam:</p> <p>(a) dam name, the coordinates for its location and date of entry in the register;</p> <p>(b) dam purpose and its proposed/actual contents;</p> <p>(c) hazard category assessed using the most recent version of "Manual for Assessing Hazard Categories and Hydraulic Performance of Dams" ;</p> <p>(d) details of the composition and construction of any liner;</p> <p>(e) dimensions (metres) and surface area (hectares) measured at the footprint of the dam;</p> <p>(f) maximum operational volume (megalitres);</p> <p>(g) design storage allowance at 1 November each year (megalitres);</p> <p>(h) mandatory reporting level (metres);</p> <p>(i) date construction was certified as compliant with the design plan;</p> <p>(j) name and qualifications of certifier;</p> <p>(k) dates on which the dam was inspected for structural and operational adequacy;</p> <p>(l) date on which the report of the annual structural and operational adequacy inspection was provided to the administering authority;</p> <p>(m) dates on which the dam was inspected for the detection of leakage through any liner; and</p> <p>(n) dates on which the dam was inspected for the purpose of annually ascertaining the available storage capacity on the 1 November each year.</p> <p>Note: The dam register in the approved departmental format is available for download at: http://www.ehp.qld.gov.au/management/coal-seam-gas/pdf/regulated_dam_register.xls.</p>	A Register of Regulated Dams containing all required information as specified in Condition (C3) of this Environmental Authority is progressively updated and maintained by Arrow Energy.
C4	The holder of this environmental authority must provisionally enter the required information in the Register of regulated dams when a design plan for a regulated dam is submitted to the administering authority.	The Register of Regulated Dams will be maintained as complete and current on any given day. The Register of Regulated Dams will be updated upon submission of a Design plan to the administering authority.
C5	The holder of this environmental authority must make a final entry of the required information in the Register of Regulated Dams once compliance with Condition C15 has been achieved.	A final entry of the required information into the Register of Regulated Dams will be made once 'as constructed' drawings and the certification of a suitably qualified and experienced person that the dam 'as constructed' will deliver the performance stated in the design plan and that it is compliant with conditions (C9) - (C14) of the environmental authority.
C6	The holder of this environmental authority must ensure that the information contained in the Register of regulated dams is complete and current on any given day.	The Register of Regulated Dams will be maintained as complete and current on any given day.
C7	All entries in the Register of regulated dams must be certified by the chief executive officer for the environmental authority holder, or their delegate, as being accurate and correct.	All entries in the Register of Regulated Dams will be checked and certified as correct by the chief executive officer's delegate as being accurate and correct prior to the register being supplied to any external party.
C8	The holder of this environmental authority must submit the Register of regulated dams or information contained in the Register available to the administering authority at each annual return and when requested to do so in the form requested by the administering authority	The Register of Regulated Dams has been and will continue to be routinely submitted to the administering authority with each annual return and when requested.
C9	<p>All aggregation dams must:</p> <p>(a) be designed with a floor and sides of material that will contain the wetting front and any entrained contaminants within the bounds of the containment system during its operational life including any period of decommissioning and rehabilitation; and</p> <p>(b) have a system that will detect any passage of the wetting front or entrained contaminants through the floor or sides of the dam and enable the repair of the containment system or its decommissioning and rehabilitation</p>	All aggregation dams have been constructed with either a compacted clay layer generally of 300mm thickness or with HDPE liner systems of varying thickness. Both lining systems are considered to be suitable to contain the wetting front and any entrained contaminants within the bounds of the containment system throughout the dams operational life. The containment system will be capable of detecting any passage of the wetting front or entrained contaminants through the floor or sides of the dam via groundwater monitoring bores strategically located around the aggregation dams. New aggregation dams will be designed in accordance with environmental authority conditions.
C10	<p>All brine dams must:</p> <p>(a) be designed with a floor and sides of material that will contain the wetting front and any entrained contaminants within the bounds of the containment system during its operational life including any period of decommissioning and rehabilitation;</p> <p>(b) have a system that will detect any passage of the wetting front or entrained contaminants through the floor or sides of the dam, enable the repair of the containment system or its decommissioning and rehabilitation; and</p> <p>(c) the collection and proper disposal of any contaminants that move beyond the bounds of the containment system.</p>	All brine dams constructed following the establishment of this condition have been constructed with a floor and sides of material that will contain the wetting front and any entrained contaminants within the bounds of the containment system during its operational life including any period of decommissioning and rehabilitation. This has been achieved through the installation of HDPE liner systems of varying thickness. A leak detection system has previously been included capable of detecting any passage of the wetting front or entrained contaminants through monitoring of the leak detection drainage sump and groundwater bores located around the perimeter of the dams. New brine dams will be designed in accordance with environmental authority conditions.
C11	<p>The holder of this environmental authority must ensure that regulated dams constructed after 15 March 2011:</p> <p>(a) are constructed to provide flood immunity such that the dam is adequately protected against overtopping and will be provided with erosion protection from external flooding events, at or above the Annual Exceedance Probability (AEP) specified for determining Spillway capacity; and</p> <p>(b) are not to be constructed in areas that are estimated to be submerged by a flooding event from a recognised watercourse, at or above an Annual Exceedance Probability (AEP) of 0.02 (1 in 50).</p>	Regulated dams constructed after 15 March 2011 have or will be constructed to provide the necessary flood immunity such that the dams are adequately protected against overtopping and will be provided with erosion protection from external flood events at or above the Annual Exceedance Probability (AEP) (as determined by a suitably qualified and experienced person). No regulated dam will be constructed in an area that is estimated to be submerged by a flood event from a recognised watercourse at or above an Annual Exceedance Probability (AEP) of 0.02 (1 in 50).
C12	All regulated dams must be designed in accordance with the requirements of the most recent version of "Manual for Assessing Hazard Categories and Hydraulic Performance of Dams" by and constructed under the supervision of a suitably qualified and experienced person	In order to determine whether a dam is regulated, a Hazard Category Assessment will be carried out prior to the construction of the dam, the resulting outcome of this assessment defines the relevant design and hydraulic performance criteria for the construction of the dam. This assessment and design will always be carried out in accordance with the most recent version of the 'Manual for Assessing Hazard Categories and Hydraulic Performance of Dams' by and constructed under the supervision of a suitably qualified and experienced person. Arrow Energy will comply with this requirement to ensure the risks associated with Dam Break, Failure to Contain and Contaminant Release can be mitigated.

**ACTION PROGRAM - ENVIRONMENTAL AUTHORITY EPPG00972513
(DXP)**

CONDITION NO.	CONDITION	ACTION PROGRAM
C13	The construction and operation of regulated dams is prohibited unless the holder of this environmental authority has submitted to the administering authority a copy of the design plan, together with the certification of a suitably qualified and experienced person that the regulated dam: (a) will deliver the performance stated in the design plan; (b) has had its hazard category assessed and been designed in accordance with the requirements of the most recent version of "Manual for Assessing Hazard Categories and Hydraulic Performance of Dams"; and (c) when constructed and operated, will be compliant in all respects with the relevant conditions of this environmental authority.	The construction and operation of all new regulated dams will have a design plan submitted together with a certification from a suitably qualified and experienced person that the regulated dam will deliver the performance stated in the design plan, has had a hazard category assessment completed in accordance with the most recent version of the "Manual for Assessing Hazard Categories and Hydraulic Performance of Dams" and will be and will be constructed and operated in accordance with the conditions of this environmental authority.
C14	The design plan must include, but not be limited to: (a) a statement of the relevant legislation, regulatory documents and engineering practice relied upon in the design plan; (b) a statement of the facts and data being used in the design plan and the limitations to the application and interpretation of that material; (c) an assessment of the hazard category of the proposed dam based on the identification of potential impacts on any relevant sensitive places for any applicable dam failure scenarios, including the cumulative impact should all dams fail at once; (d) detailed specifications for the design, operation, maintenance and decommissioning of the dam(s); (e) an operational plan that includes: (i) contingency / emergency response procedures designed to avoid / minimise discharges resulting from any overtopping or loss of structural integrity of the dam; and (ii) normal operating procedures and rules; (f) design, specification and operational rules for any related structures and systems used to prevent the overtopping of the proposed dam; (g) a detailed plan for the decommissioning and rehabilitation of the dam at the end of its operational life; (h) any other matter required by the certifying suitably qualified and experienced person; and (i) evidence supporting the claims of the certifier that they are a suitably qualified and experienced person.	Design plans will include but not be limited to the information stated in Condition C14 (a) through (h). Design reports for recent projects include: • 05-C-REP-0002 (2) - Design Report for Daandine CSG Water Storage Dams • 00-PM-REP-0075 (3) - TWTF Design Report for 00-CIV-001
C15	If, within the 20 business days following the lodgement of a certified design plan the administering authority notifies the holder of this environmental authority, in writing, that the design plan is not compliant with either: (b) the conditions of this environmental authority; or (c) the requirements set out in the most recent version of "Manual for Assessing Hazard Categories and Hydraulic Performance of Dams" then the construction and operation of the regulated dam is prohibited until the administering authority provides written advice that its construction may proceed.	In the event that a certified design plan is submitted and the administering authority notifies Arrow Energy within 20 business days of lodgement that the design plan is non-compliant, then the construction of the regulated dam will not proceed until written approval is received from the administering authority.
C16	When construction of any regulated dam is complete, the holder of this environmental authority must submit to the administering authority one hard copy and one electronic copy of a set of 'as constructed' drawings, together with the certification of a suitably qualified and experienced person that the dam 'as constructed' will deliver the performance stated in the design plan and at the time of certification it is compliant in all respects with Conditions (C9) to (C14) of this environmental authority.	Upon completion of the construction of any regulated dam, Arrow Energy will submit to the administering authority one hard copy and one electronic copy of a set of 'as constructed' drawings, together with the certification of a suitably qualified and experienced person that the dam 'as constructed' will deliver the performance stated in the design plan and that at the time of certification it is compliant in all respects with the conditions of this environmental authority. Arrow Energy will comply with this condition by submitting a Construction Certification Report to the administering authority once completed.
C17	Each regulated dam must be maintained and operated in a manner that is consistent with the design plan and the certified 'as constructed' drawings for the duration of its operational life and until decommissioned and rehabilitated.	All of Arrow Energy's regulated dams are and will continue to be maintained and operated in a manner that is consistent with the design plans and certified 'as constructed' drawings for the duration of their operational life and until decommissioned and rehabilitated.
C18	Upon any change in its purpose or stored contents of a regulated dam, the hazard category of the dam must be determined by a suitably qualified and experienced person prior to any such change.	In the event that any regulated dams purpose or stored contents changes, the hazard category of the dam will be re-assessed by a suitably qualified and experienced person prior to such a change.
C19	The Mandatory Reporting Level must be marked on each regulated dam in such a way that it is clearly observable during routine inspections of each dam.	The Mandatory Reporting Level (MRL) will be marked on each regulated dam in such a way that it is clearly observable during inspections of each dam. Arrow Energy will ensure that all dams have MRL and DSA marked for operational purposes and to ensure compliance with this condition.
C20	The holder of this environmental authority must notify the administering authority immediately when the level of the contents of any regulated dam reaches the Mandatory Reporting Level, and immediately act to prevent or, if unable to prevent, to minimise any actual or potential environmental harm.	The administering authority will be notified immediately when the storage volume of any regulated dam reaches the Mandatory Reporting Level. At this point immediate action will be taken to prevent or if unable to prevent, minimise any actual or potential environmental harm associated with the storage volume in dam. Operating guidelines outline the notification and reporting procedures associated with reaching the Mandatory Reporting Level of any regulated dam. These guidelines provide key contacts within Arrow Energy that need to be notified in order for immediate action to be taken as well as the reporting process to ensure the administering authority is notified immediately.
C21	Each regulated dam must be inspected annually by a suitably qualified and experienced person.	All regulated dams are inspected annually by suitably qualified and experienced persons. Arrow Energy engages a third party consultant to perform these works and provide recommended remediation works to ensure dam integrity and operational adequacy is maintained.
C22	At each annual inspection, each regulated dam must be assessed for: (a) its hazard category in accordance with the most recent version of "Manual for Assessing Hazard Categories and Hydraulic Performance of Dams"; and (b) condition and adequacy for dam safety; and (c) its structural, geotechnical and hydraulic performance against the criteria contained in the certified design plan.	The annual dam inspections undertaken under Condition (C21) will assess the matters listed in C22(a)-(c) as required.
C23	An assessment of the adequacy of the available storage in each regulated dam is to be made, based on an actual dam level observed in the month of October in each year, and the resultant estimate of the level in that dam as at 1 November in each year must be equal or less than the design storage allowance for the dam.	As a part of the annual dam inspections the water level in each regulated dam will be measured in the month of October and recorded using Arrow Energy's standard Annual DSA Assessment form. This report is used to estimate available storage at 1 November to ensure that the dam storage volume is equal to or less than the design storage allowance for each dam. This information is included in the Annual Dam Inspection Reports that are submitted upon request to the administering authority.

**ACTION PROGRAM - ENVIRONMENTAL AUTHORITY EPPG00972513
(DXP)**

CONDITION NO.	CONDITION	ACTION PROGRAM
C24	Where the assessment of the adequacy of the available storage in any regulated dam indicates that the design storage allowance will be exceeded, or at any other time the holder of this environmental authority becomes aware that the design storage allowance has been or will be exceeded, the holder of this environmental authority must immediately notify the administering authority, and immediately act to prevent or, if unable to prevent, to minimise any actual or potential environmental harm.	Arrow Energy aims to ensure that all regulated dams are managed below the Design Storage Allowance level at all times. In the event that the assessment indicates that the design storage allowance will be exceeded, or at any other time that the design storage allowance will be exceeded, Arrow Energy will notify the administering authority through the reporting procedures outlined in the Dam Operating Plans within 24 hours and take immediate action to prevent or minimise any actual or potential environmental harm.
C25	For each annual inspection, a copy of a report on the condition and adequacy of each regulated dam, certified by the suitably qualified and experienced person and including any recommended actions to be taken to ensure the integrity of each regulated dam, must be provided to the administering authority upon request.	A copy of the annual dam inspection report including any recommended actions to be taken will be provided to the administering authority upon request once Arrow Energy is satisfied that the document has been produced by the third party consultant to an acceptable standard and it has been certified by a suitably qualified and experienced person.
C26	The holder of this environmental authority must, upon receipt of the annual inspection report, consider the report and its recommendations, take action to ensure that each regulated dam will safely perform its intended function, and within one month of receiving the report, notify the administering authority in writing of the recommendations of the inspection report and the actions taken to ensure the integrity of each regulated dam.	Arrow Energy will, upon receipt of the annual inspection report, consider the report and its recommendations, and establish an action plan to ensure that the recommendations of the annual inspection are addressed in a timely manner to ensure each regulated dam will safely perform its intended function. Additionally, within one month of receiving the report, the administering authority will be notified in writing of the recommendations of the inspection report and the actions taken to ensure the integrity of each regulated dam as required.
SCHEDULE D — LAND		
D1	Contaminants that will or may cause environmental harm must not be directly or indirectly released to land except as permitted under this environmental authority.	Activities will be undertaken such that they do not cause environmental harm unless explicitly authorised under the environmental authority. The Arrow Energy Health, Safety and Environmental Management System (HSEMS) contains policies, standards, procedures and supporting information including standard operating procedures and guidelines to ensure activities do not cause environmental harm unless authorised. The HSEMS is supported by departmental and site-specific documents as required.
D2	Prior to conducting petroleum activities that involve significant disturbance to land, an assessment must be undertaken of the condition, type and ecological value of any vegetation in such areas where the activity is proposed to take place.	Ecological impact assessments in accordance with Arrow Energy's Ecological Impact Assessment Procedure (Doc no. 99-H-PR-0081) will be undertaken prior to conducting petroleum activities that involve significant disturbance to land. The assessments include an environmental desktop assessment which incorporates an environmental constraints map. The environmental constraints map will incorporate GIS layers provided by EHP. This map shall be at a scale sufficient to show the areas of the surrounding landscape that are mapped as protected environmental features. The procedure also requires an ecological field assessment to be completed by a suitably qualified Arrow Energy or contracted ecologist to identify and assess the ecological values, vegetation communities, threatened species and habitat features occurring or likely to occur on the site.
D3	The assessment required by Condition (D2) must be undertaken by a suitably qualified person and include the carrying out of field validation surveys, observations and mapping of any Category A, B or C Environmentally Sensitive Areas (ESA's) and the presence of species classed as endangered, vulnerable, rare or near threatened under the <i>Nature Conservation Act 1992</i> and for petroleum activities that commenced after 8 March 2013, areas containing State significant biodiversity values.	As per Arrow Energy's Ecological Impact Assessment Procedure (Doc no. 99-H-PR-0081), ecologists carrying out surveys must have appropriate skills and experience relevant to the nominated subject matter and be able to give authoritative assessment, advice and analysis to performance relative to the subject matter using the relevant protocols, standards, methods or literature. As part of the Ecological Impact Assessment Procedure (Doc no. 99-H-PR-0081), online searches for threatened species are conducted during the desktop assessment and include the wildlife online database (http://www.dehp.qld.gov.au/wildlife/wildlife-online/) and Protected Matters Search Tool (http://www.environmental.gov.au/epbc/pmst/). Likelihood of occurrence ratings are assigned for threatened species based on the searches and desktop mapping results. Targeted surveys shall be conducted for those species which have a medium to high impact risk. Mapped areas containing any Category A, B or C Environmentally Sensitive Areas (ESAs) or State significant biodiversity values (SSBVs) shall also be validated during the field survey assessment where required.
D4	If the assessment required by Conditions (D2) and (D3) indicates that a regional ecosystem (RE) mapped as 'Endangered' or 'Of Concern' by the Queensland Herbarium should be in a lower conservation value classification and the holder of this environmental authority wishes to undertake activities as if the ecosystem is of the lower conservation value they must notify the administering authority in writing before any significant disturbance to land takes place.	As per Arrow Energy's Ecological Impact Assessment Procedure (Doc no. 99-H-PR-0081), in the event a mapped Regional Ecosystem is found to be incorrect following the field validation survey, a map change report shall be submitted to EHP prior to any land disturbance occurring. The report will provide justification for the mapping change in the form of a map detailing the EHP Regional Ecosystem mapping, a map detailing the ground truthed Regional Ecosystem, the Regional Ecosystem validation data and supporting photographs of the focal area. Suitably qualified ecologists shall be responsible for collecting the data and the Arrow Energy Approvals team will submit the map change report to EHP.
D5	If, within the 20 business days following the lodgement of the notification under Condition (D4) the administering authority notifies the holder of this environmental authority, in writing, that the RE mapping requires further validation, then significant disturbance to land in the mapped regional ecosystem are prohibited until the administering authority provides written advice that significant disturbance to land may proceed	In the event that the administering authority notifies the holder of this environmental authority within 20 business days of lodgement of the notification under condition (D4) that the regional ecosystem mapping requires further validation, no significant disturbance to land within the project area will occur until EHP provides written advice that development can proceed. Arrow Energy will provide any documentation requested by EHP if further validation is required.

**ACTION PROGRAM - ENVIRONMENTAL AUTHORITY EPPG00972513
(DXP)**

CONDITION NO.	CONDITION	ACTION PROGRAM
D6	<p>The holder of this environmental authority, when carrying out petroleum activities must:</p> <p>(a) avoid, minimise or mitigate (in order of preference) any impacts on areas of vegetation or other areas of ecological value;</p> <p>(b) minimise disturbance to land that may otherwise result in land degradation;</p> <p>(c) ensure that for land that is to be significantly disturbed by petroleum activities:</p> <p>(i). the top layer of the soil profile is removed;</p> <p>(ii). stockpiled in a manner that will preserve its biological and chemical properties; and</p> <p>(iii). used for rehabilitation purposes (in accordance with Condition (H4));</p> <p>(d) avoid clearing mature trees; and</p> <p>(e) prior to carrying out field based activities, make all relevant staff, contractors or agents carrying out those activities, aware of the location of any category A, B or C ESA's and the requirements of this environmental authority.</p> <p>Note: This environmental authority does not authorise the taking of protected animals or the tampering with an animal breeding place as defined under the Nature Conservation Act 1992 and Regulations.</p>	<p>Projects will follow the hierarchy of avoiding, minimising, or mitigating (including offsets where required) any proposed disturbance to vegetation as part of planning processes. Decisions to clear or disturb vegetation shall be based on the hierarchy of preferred vegetation states to develop sites for infrastructure as per Arrow Energy's Ecological Impact Assessment Procedure (Doc no. 99-H-PR-0081) and supporting documents including the Site Preparation and Vegetation Clearing Guideline (Doc no. 99-V-GDL-0008). Sensitive ecological areas will be identified through assessments undertaken during project planning stages as per Arrow Energy's Ecological Impact Assessment Procedure (Doc no. 99-H-PR-0081).</p> <p>Topsoil shall be stockpiled in accordance with the Land Disturbance Procedure (Doc no. 99-V-PR-0038) and associated documents referenced in the procedure.</p> <p>Battery limits, including identified ecological constraints within and adjacent to the battery limits, are documented in the land access approval document which is then referenced by all parties undertaking works at the site. This document includes a site map defining the battery limits and ecological constraints including ESAs with coordinates. Site boundaries are pegged prior to commencement of work to ensure work areas are clearly defined and trees to be retained are clearly marked. The project manager is responsible for ensuring all relevant persons carrying out activities are aware of any ecological constraints associated with works and other requirements of the environmental authority.</p>
D7	<p>In accordance with Condition (D6), if significant disturbance to land is unavoidable, the holder of this environmental authority must not clear vegetation or place fill:</p> <p>(a) in a way which significantly isolates, fragments or dissects tracts of vegetation resulting in a reduction in the current level of ecosystem functioning, ecological connectivity (i.e. stepping stone or contiguous bioregional/local corridor networks) and/or results in an increase in threatening processes (e.g. potential impacts associated with edge effects or introduced species);</p> <p>(b) on slopes greater than 10% for activities other than pipelines and wells; or</p> <p>(c) in discharge areas.</p>	<p>Site constraints will be identified through assessments undertaken during the land access request process as per Arrow Energy's Ecological Impact Assessment Procedure (Doc no. 99-H-PR-0081). Outcomes of the assessments completed to support the land access approval process include providing feedback on suitability of locations of infrastructure, discussing alternative locations where proposed activities cannot be undertaken in accordance with environmental authority requirements and identifying relevant management measures (e.g. procedures) required during works.</p>
D8	<p>Clearing of remnant vegetation shall not exceed 10 metres in width for the purpose of establishing tracks and 20 metres in width for dual carriageway roads unless otherwise approved by the administering authority in writing.</p>	<p>Existing tracks shall be utilised whenever possible to access proposed disturbance areas. As per Arrow Energy's Ecological Impact Assessment Procedure (Doc no. 99-H-PR-0081), an environmental constraints map shall be produced for the Arrow Energy construction team and relevant contractors which specifies the location of access tracks and roads and provides coordinates that clearly delineate maximum clearance widths for tracks.</p>
D9	<p>Cleared vegetation must be stockpiled in a manner that facilitates respreading or salvaging and does not impede vehicle, stock or wildlife movements.</p>	<p>As per the Site Preparation and Vegetation Clearing Guideline (Doc no. 99-V-GDL-0008), stockpiling shall be carried out in a manner that facilitates respreading or salvaging and does not impede vehicle, stock or wildlife movements. Stockpile locations will be incorporated in design drawings to ensure these can be accommodated within approved battery limits.</p>
D10	<p>The holder of this environmental authority must ensure that petroleum activities:</p> <p>(a) are not conducted in any category A, B or C Environmentally Sensitive Areas (ESAs);</p> <p>(b) are not conducted within 200m of any category A, B or C ESAs; and</p> <p>(c) do not involve activities other than limited petroleum activities within 1km of a category A ESA (i.e. from 200m to 1km of the category A ESA), or within the protection zone of a category B or C ESA (i.e. from 200m to 500m of the category B or C ESA).</p> <p>Note: Indicative ESA mapping is available on the Department of Environment and Heritage Protection's website at: http://www.ehp.qld.gov.au/licences-permits/maps_of_environmentally_sensitive_areas.php</p>	<p>As per Arrow Energy's Ecological Impact Assessment Procedure (Doc no. 99-H-PR-0081), desktop and field assessments shall be conducted and an environmental constraints map shall be prepared to ensure the location of infrastructure can be assessed against sensitive areas, e.g. ESAs, to ensure that these are avoided where practicable and that environmental authority conditions are met for proposed works. Based on this assessment, appropriate conditions will be included in land access approval documents to ensure the requirements of these conditions are met.</p> <p>Decisions to clear or disturb vegetation shall be based on the hierarchy of preferred vegetation states to develop sites for infrastructure as per Arrow Energy's Ecological Impact Assessment Procedure (Doc no. 99-H-PR-0081) and supporting documents including the Site Preparation and Vegetation Clearing Guideline (Doc no. 99-V-GDL-0008). Where limited petroleum activities are proposed to be undertaken within buffers and/or ESAs specified in environmental authority conditions, Arrow Energy ecologists, in cooperation with Project Managers, shall seek locations that are in more preferred areas as described in environmental authority conditions. Proposed infrastructure shall be located away from areas that are least preferred in the hierarchy described to the extent practicable.</p>
D11	<p>Limited petroleum activities carried out in accordance with Condition (D10(c)) must be preferentially located in pre-existing areas of clearing or significant disturbance to the greatest practicable extent and avoid the clearing of mature trees.</p>	<p>In the event that no practicable alternative location exists for proposed limited petroleum activities, other than within 200m of, or in the Category B and C ESAs specified in Condition (D12), geological maps and other relevant environmental data shall be kept to demonstrate the lack of alternative locations. Prior to any significant disturbance occurring within State Forests or Timber Reserves, written approval from the responsible authority will be sought. Any conditions contained within the approval will be complied with unless in conflict with the conditions of this environmental authority. A copy of the written approval required under Condition (D13(b)(i)) will be provided to the administering authority upon request.</p>
D12	<p>Despite Condition (D10), limited petroleum activities may be undertaken within 200m of, or in the following specified Category B and C ESAs:</p> <p>(a) 'Endangered' regional ecosystems;</p> <p>(b) 'Of Concern' regional ecosystems;</p> <p>(c) State Forests;</p> <p>(d) Timber Reserves</p> <p>provided that they do not overlap with any other Category A, B or C ESA or its associated protection zone.</p>	<p>In the event that no practicable alternative location exists for proposed limited petroleum activities, other than within 200m of, or in the Category B and C ESAs specified in Condition (D12), geological maps and other relevant environmental data shall be kept to demonstrate the lack of alternative locations. Prior to any significant disturbance occurring within State Forests or Timber Reserves, written approval from the responsible authority will be sought. Any conditions contained within the approval will be complied with unless in conflict with the conditions of this environmental authority. A copy of the written approval required under Condition (D13(b)(i)) will be provided to the administering authority upon request.</p>
D13	<p>Where limited petroleum activities are proposed to be undertaken within 200m of, or in the Category B and C ESAs specified in Condition (D12), the holder of this environmental authority must:</p> <p>(a) be able to demonstrate that no reasonable or practicable alternative exists; and</p> <p>(b) where the ESA is a State Forest or Timber Reserve:</p> <p>(i). obtain written approval from the authority responsible for the administration of the Forestry Act 1959;</p> <p>(ii). comply with all restrictions and conditions contained within the approval required under Condition (D13(b)(i));</p> <p>(iii). where the conditions of the approval required under Condition (D13(b)(i)) conflict with the conditions of this environmental authority, comply with the conditions of this environmental authority; and</p> <p>(iv). provide a copy of the written approval required under Condition (D13(b)(i)) to the administering authority upon request.</p>	<p>In the event that no practicable alternative location exists for proposed limited petroleum activities, other than within 200m of, or in the Category B and C ESAs specified in Condition (D12), geological maps and other relevant environmental data shall be kept to demonstrate the lack of alternative locations. Prior to any significant disturbance occurring within State Forests or Timber Reserves, written approval from the responsible authority will be sought. Any conditions contained within the approval will be complied with unless in conflict with the conditions of this environmental authority. A copy of the written approval required under Condition (D13(b)(i)) will be provided to the administering authority upon request.</p>

**ACTION PROGRAM - ENVIRONMENTAL AUTHORITY EPPG00972513
(DXP)**

CONDITION NO.	CONDITION	ACTION PROGRAM
D14	Where limited petroleum activities are undertaken within 200m of, or in the Category B or C ESAs specified in Condition (D12), disturbance to land must only be located and carried out in areas according to the following order of preference: (a) pre-existing cleared areas or significantly disturbed areas less than 200m from a Category C ESA; (b) pre-existing cleared areas or significantly disturbed areas less than 200m from a Category B ESA; (c) undisturbed areas less than 200m from a Category C ESA; (d) undisturbed areas less than 200m from a Category B ESA; (e) pre-existing areas of significant disturbance within a Category C ESA (e.g. areas where significant clearing or thinning has been undertaken within a RE, and/or areas containing high densities of weed or pest species which has inhibited re-colonisation of native regrowth); (f) pre-existing areas of significant disturbance within a Category B ESA (e.g. areas where significant clearing or thinning has been undertaken within a RE, and/or areas containing high densities of weed or pest species which has inhibited re-colonisation of native regrowth); (g) areas where clearing of a Category C ESA is unavoidable; and (h) areas where clearing of a Category B ESA is unavoidable.	As per Arrow Energy's Ecological Impact Assessment Procedure (Doc no. 99-H-PR-0081), desktop and field assessments shall be conducted and an environmental constraints map shall be prepared to ensure the location of infrastructure can be assessed against sensitive areas, e.g. ESAs, to ensure that these are avoided where practicable and that environmental authority conditions are met for proposed works. Based on this assessment, appropriate conditions will be included in land access approval documents to ensure the requirements of these conditions are met. Decisions to clear or disturb vegetation shall be based on the hierarchy of preferred vegetation states to develop sites for infrastructure as per Arrow Energy's Ecological Impact Assessment Procedure (Doc no. 99-H-PR-0081) and supporting documents including the Site Preparation and Vegetation Clearing Guideline (Doc no. 99-V-GDL-0008). Where limited petroleum activities are proposed to be undertaken within buffers and/or ESAs specified in environmental authority conditions, Arrow Energy ecologists, in cooperation with Project Managers, shall seek locations that are in more preferred areas as described in environmental authority conditions. Following desktop and field survey assessments, proposed infrastructure shall be located away from areas that are least preferred in the hierarchy described to the extent practicable.
D15	Notwithstanding Conditions (D12) to (D14), where limited petroleum activities are proposed to be undertaken within 200m of, or in a Category B or C ESAs specified in Condition (D12), any vegetation clearing must not exceed any of the following areas: (a) if the disturbance relates to an Endangered or Of Concern RE, 10% of the remnant unit of Endangered or Of Concern RE as ground truthed and mapped before any activity commences as per Condition (D2) and (D3) of this environmental authority for the life of the project; and (b) more than 30m ² for the construction of a sump; or (c) six (6) metres in width for tracks; or (d) 12 metres in width for pipeline construction purposes.	
D16	For each well site within 200m of, or in a Category B or C ESA specified in Condition (D12), all reasonable and practical measures are taken to minimize the area cleared which must include but not be limited to, for each well site, ranked constraints mapping and a risk assessment which considers safety.	
D17	Details of any significant disturbance to land undertaken within 200m of, or in a Category B or C ESA, along with a record of the assessment required by Conditions (D2) and (D3) must be kept and submitted to the administering authority upon request.	As per Arrow Energy's Ecological Impact Assessment Procedure (Doc no. 99-H-PR-0081), data for all vegetation clearing is entered into Arrow Energy's vegetation clearing register and is available for inspection by EHP upon request. Records of ecological assessments will be kept and submitted to the administering authority upon request.
D18	Despite Condition (D10), the Daandine Brine Dam 2 and associated activities necessary for construction, operation, maintenance and monitoring of the dam, located within the area bound by the coordinates prescribed by Schedule D, Table 1 - Coordinates Enclosing the Disturbance Area for Daandine Brine Dam 2, are permitted within the protection zones of Category C Environmentally Sensitive Areas.	An environmental constraints map for the Daandine Brine Dam 2 project shall be created in accordance with the Ecological Impact Assessment Procedure (Doc no. 99-H-PR-0081) which clearly illustrates the approved disturbance area. All construction personal shall be made familiar with the permitted disturbance areas. No additional clearing of vegetation or placing of fill will occur outside the permitted disturbance area.
D19	The holder of this environmental authority must develop and implement soils management procedures, which have been certified by a suitably qualified person, for areas to be disturbed by petroleum activities prior to commencement of these petroleum activities to prevent or minimise the impacts of soil disturbance.	The Arrow Energy HSEMS includes a Land Disturbance Procedure (Doc no. 99-V-PR-0038) which outlines mandatory environmental standards to avoid, minimise or mitigate environmental harm associated with land disturbance activities. This procedure is supported by documents including Soil Management Guideline (Doc no.99-H-GDL-00099), Erosion and Sediment Control Guideline (Doc no. 99-V-GDL-0007), Site Preparation and Vegetation Clearing Guideline (Doc no. 99-V-GDL-0008) and Surat Gas Project Soil Technical Manual (Doc no. 003-000-RA-4880-00001).
D20	Despite condition D19, for areas of disturbance at the time of issue of this environmental authority, the holder of this environmental authority must develop and implement soils management procedures, which have been certified by a suitably qualified person by 18 July 2011.	
D21	The Soil Management Procedures required by condition D19 and D20 must include, but not necessarily be limited to: (a) identify soil units within areas to be disturbed by petroleum activities at a scale of 1:50,000, in accordance with the "Guidelines for Surveying Soil and Land Resources 2nd Edition" (McKenzie et al. 2008), "Australian Soil and Land Survey Handbook, 3rd Edition" (National Committee on Soil and Terrain 2009), "The Australian Soil Classification" (Isbell 2002) and "Guidelines for agricultural land evaluation in Queensland" (Queensland Department of Primary Industries Information Series Q190005 1990) or subsequent versions thereof; (b) establish baseline soils information for the soil units to be disturbed including soil depth, pH, electrical conductivity (EC), chloride, cations (aluminium, calcium, magnesium, potassium and sodium), exchangeable sodium percentage (ESP), particle size and soil fertility (including nitrogen, phosphorous, potassium, sulphur and micronutrients); (c) a soils monitoring program outlining parameters to be monitored, frequency of monitoring and maximum limits for each parameter for each soil unit; (d) identify the types of soils and soil units requiring specific management practices (e.g. saline or sodic soils) relevant to assessment for agricultural suitability, erodibility and rehabilitation (e) detailed topsoil and topsoil stockpile management procedures for each soil unit in the event of any significant soil disturbance; (f) detailed mitigation measures and procedures for each soil unit to manage the risk of adverse soil disturbance in carrying out of the petroleum activity(ies). (g) for pipelines, methods of keeping soil horizons separate on excavation, storage and backfilling; and (h) for areas of good quality agricultural land, detailed methods to be undertaken to minimise potential impacts.	Surat Gas Project Soil Technical Manual (Doc no. 003-000-RA-4880-00001) is the primary document addressing the requirements of condition D21. It contains a methodology for identifying soil types and appropriate management measures depending on activity proposed.
D22	A copy of the Soils Management Procedures must be submitted to any potentially affected landholders upon request	Copies of Management Procedures/Guidelines will be submitted to any potentially affected landholders upon request as required.

**ACTION PROGRAM - ENVIRONMENTAL AUTHORITY EPPG00972513
(DXP)**

CONDITION NO.	CONDITION	ACTION PROGRAM
D23	The holder of this environmental authority must determine the presence of acid sulfate soils prior to: (a) any excavation or otherwise removing 100m ³ or more of soil or sediment; or (b) filling of land involving 500m ³ or more of material with an average depth of 0.5 of a metre or greater.	The likelihood of encountering acid sulfate soils is assessed based on a desktop assessment of available National Acid Sulfate Soil Atlas, geological and topographical mapping as part of ecological assessments under taken as per the Ecological Impact Assessment Procedure (Doc no. 99-H-PR-0081) during the Land Access Request process. Where a risk of acid sulfate soils being present is identified in this process, an acid sulfate soil investigation will be undertaken prior to any excavation of 100m ³ or more of soil or sediment or filling of land involving 500m ³ or more of material with an average depth of 0.5 of a metre or greater. It is noted that there is considered to be a low likelihood of encountering acid sulfate soils while undertaking activities under the DXP environmental authority based on findings of the Surat Gas Project EIS (Coffey Environments, March 2012).
D24	The holder of this environmental authority must determine the presence of acid sulfate soils prior to any excavation or filling at, or in exceedance of, the thresholds in Condition (D23)(a) or (b) in any of the following areas: (a) areas to be disturbed where there are lithologies with sulfide bearing minerals; or (b) naturally saline areas (e.g. salt pans, lakes etc); or (c) wetland areas (e.g. mapped as Land zone three (3) on the regional ecosystem database preclear layer and/or areas mapped as wetlands under the QLD Wetlands program, Wetland Info); or (d) areas with elevation less than 2 metres AHD; or (e) areas with soil and sediment of recent geological age (Holocene); or (f) areas where marine or estuarine sediments and tidal lakes are present; or (g) low-lying coastal wetlands or back swamp areas, waterlogged or scalded areas; or (h) stranded beach ridges and adjacent swales, interdune swales or coastal sand dunes; or (i) coastal alluvial valleys; or (j) areas where the dominant vegetation is tolerant of salt, acid and/or waterlogging conditions (e.g. mangroves, salt couch).	Pre-disturbance geotechnical assessments and/or desktop review of available mapping is used to assess the potential presence or otherwise of acid sulfate soil in the listed areas. It is noted that areas listed in (d) - (j) are not expected to be encountered based on current information.
D25	Subject to Conditions (D23) and (D24) and prior to any disturbance of acid sulfate soils, the holder of this environmental authority must prepare an acid sulfate soil environmental management plan in accordance with Appendix 4 of the State Planning Policy 2/02 Guideline Acid Sulfate Soils.	Any required acid sulfate soil environmental management plans will be prepared and implemented by a suitably qualified person.
D26	The acid sulfate soil environmental management plan must be prepared and implemented by a suitably qualified person.	
D27	The holder of this environmental authority must comply with the acid sulphate soil environmental management plan.	Works will be undertaken in accordance with the acid sulfate soil environmental management plan where applicable.
D28	Fauna management procedures must be developed and implemented to ensure that petroleum activities (including, but not limited to, pipeline construction, dam construction and operation) are carried out in a manner that minimises the risk of injury, harm, or entrapment to wildlife and stock.	Fauna management procedures have been developed and implemented to ensure that petroleum activities (including, but not limited to, pipeline construction, dam construction and operation) are carried out in a manner that minimises the risk of harm to wildlife and stock. These are regularly reviewed as part of the Arrow Energy HSEMS system. Relevant documents include Fauna Management Procedure (99-H-PR-0075) and Fauna Management Guideline (99-H-GDL-0060).
D29	Well lease infrastructure and dams must be securely fenced and / or screened as soon as practicable, but within one (1) month after construction is completed to: (a) exclude and prevent the entrapment of livestock and wildlife; and (b) limit habitats for the introduction or spread of noxious fauna pest species.	These contain requirements for training and awareness of staff including qualifications required for fauna handling.
D30	The fauna management procedures must include training and awareness of staff and contractors and ensure that any planned fauna handling is undertaken by a suitably qualified person. Note: The procedures required by Conditions (D28) and (D30) should consider the "Australian Pipeline Industry Association Code of Environmental Practice – Onshore Pipelines" dated March 2009, or subsequent versions thereof.	Well lease infrastructure and dams will be securely fenced and / or screened as soon as practicable after construction is completed to exclude and prevent the entrapment of livestock and wildlife and limit habitats for the introduction or spread of noxious fauna pest species. The Land Disturbance Procedure (Doc no. 99-V-PR-0038) and associated Site Preparation and Vegetation Clearing Guideline (Doc no. 99-V-GDL-0008) require sites to be fenced in accordance with environmental authority requirements and in consideration of security, design and landholder requirements.
D31	In carrying out the petroleum activity(ies) the holder of this environmental authority must develop and implement an effective pest management program by 18 October 2011 which has been certified by a suitably qualified person that includes but is not limited to the following: (a) identification of pest species and infestation areas; (b) prevention and/or minimisation of the introduction and/or spread of pests; (c) control and management of pest outbreaks as a result of petroleum activities; and (d) details of community consultation in developing the pest management program. Note: The pest management program required by Condition (D31) should consider the "Petroleum Industry (including coal seam methane gas) Minimising Pest Spread Guidelines" dated June 2008, or subsequent versions thereof. This document is available for download from: http://www.dpi.qld.gov.au/documents/Biosecurity_EnvironmentalPests/IPA-Minimising-Pest-Spread-Advisory-Guidelines.pdf	Key documents used in managing biodiversity in regards to pest management contained in Arrow Energy's HSEMS include: • Dalby Expansion Project Pest Management Plan 2012 - 2015 (Doc no. 99-V-PL-0022) • Weed and Pathogen Management Procedure (Doc no. 99-H-PR-0030) • Vehicle & Machinery Weed Hygiene Procedure (Doc no. 99-V-PR-0037) • Vertebrate Pest Management Procedure (Doc no. 99-H-PR-0119)
D32	A copy of the pest management procedures must be made available to any potentially affected landholders upon request	Copies of the pest management procedures/guidelines will be made available to any potentially affected landholders upon request
D33	All explosives, hazardous chemicals, corrosive substances, toxic substances, gases, dangerous goods, flammable and combustible liquids (including petroleum products and associated piping and infrastructure) must be stored and handled in accordance with the relevant Australian Standard where such is available.	The Arrow Energy HSEMS includes a Chemical Management Procedure (Doc no. 99-H-PR-0016) which outlines the minimum HSE requirements for the use, storage and disposal of hazardous chemicals in the workplace.
D34	Notwithstanding the requirements of any Australian Standard, any liquids stored on site that have the potential to cause environmental harm must be stored in or serviced by an effective containment system that is impervious to the materials stored and managed to prevent the release of liquids to waters or land. Where no relevant Australian Standard is available, the following must be applied: (a) storage tanks must be bunded so that the capacity and construction of the bund is sufficient to contain at least 110% of a single storage tank or 100% of the largest storage tank plus 10% of the second largest storage tank in multiple storage areas; and (b) drum storages must be bunded so that the capacity and construction of the bund is sufficient to contain at least 25% of the maximum design storage volume within the bund.	Any liquids stored on site that have potential to cause environmental harm will be stored in accordance with environmental authority conditions. New facilities will be designed in accordance with environmental authority requirements.

**ACTION PROGRAM - ENVIRONMENTAL AUTHORITY EPPG00972513
(DXP)**

CONDITION NO.	CONDITION	ACTION PROGRAM
D35	All containment systems must be designed to minimise rainfall collection within the system.	
D36	Pipelines must be preferentially located alongside existing linear infrastructure such as roads, tracks and powerlines.	Land Disturbance Procedure (Doc no. 99-V-PR-0038) requires disturbance footprints to be minimised to the extent practicable. This is met through the field development planning process which preferentially locates linear infrastructure along existing roads, tracks or pipelines.
D37	Pipeline trenches must only be left open for the minimum time practicable.	The requirement to leave trenches open for the minimum time practicable will be included in project planning and construction environmental management plan documents. Pipeline Trenching Work Instruction (Doc no. 97-L-SWP-003) specifies the maximum length of trench to be open at any one time unless authorised and that trenches are to be backfilled and made safe prior to the completion of each day's work.
D38	The length of pipeline trench open at any one time must be minimised as far as practicable.	
D39	Completed pipeline construction areas must be: (a) a stable landform with no subsidence or erosion gullies for at least five (5) years; and (b) re-profiled to original contours and established drainage lines; and (c) be visually consistent with the surround land features (d) be reinstated to the pre-disturbed land use and soil suitability class.	Rehabilitation Procedure (Doc no. 99-H-PR-0088) indicate suitable interim and final rehabilitation criteria, including the pre-existing landform to be reinstated to achieve a stable landform with appropriate contours and drainage lines. Supporting documents to the Rehabilitation Procedure (Doc no. 99-H-PR-0088) include the Rehabilitation Guideline (Doc no. 99-H-GDL-0081) and Rehabilitation Monitoring Guideline (Doc no. 99-H-GDL-0077).
D40	The holder of this environmental authority must monitor reinstated pipeline corridors for subsidence at least every 20 business days for the first 120 business days after reinstatement to ensure compliance with Condition (D39).	Rehabilitation Monitoring Guideline (Doc no. 99-H-GDL-0077) outlines rehabilitation monitoring requirements including scheduling of inspections. Monitoring will be undertaken at the required frequency and inspection findings documented.
D41	Impacts to mapped State significant biodiversity values may only occur once the following have occurred: (a) an Offset Area Management Plan for those impacts has been submitted and accepted in writing by the administering authority; and (b) the Offset Area Management Plan is recorded within a signed deed of agreement between the holder of this environmental authority and the administering authority.	Impacts to mapped State significant biodiversity values shall only occur once an Offset Area Management Plan (OAMP) for the impact has been submitted and approved by EHP. The OAMP shall be recorded within a signed deed of agreement between Arrow Energy and EHP. The Environmental Offsets Assessment Guideline (99-H-GDL-0062) indicates the processes Arrow will follow to meet its environmental offset obligations.
D42	The deed of agreement must be implemented.	Arrow Energy will implement the deed of agreement, once signed by both parties.
D43	Offsets must be provided for impacts to mapped State Significant Biodiversity Values in accordance with the Queensland Biodiversity Offset Policy, and the signed deed of agreement.	Offset liability shall be identified as part of the Ecological Impact Assessment Procedure (Doc no. 99-H-PR-0081) and the Environmental Offsets Assessment Guideline (99-H-GDL-0062). Offsets shall be provided for field-verified impacts to mapped State Significant Biodiversity Values in accordance with the Queensland Biodiversity Offset Policy and the signed deed of agreement.
D44	Despite condition (D41), if the "Surat Tek Park pipeline" impact any mapped State significant biodiversity values, then by 31 December 2013 the holder of the EA is to undertake the following: (a) an Offset Area Management Plan for those impacts that has been submitted and accepted in writing by the administering authority; and (b) the Offset Area Management Plan is recorded within a signed deed of agreement between the holder of this environmental authority and the administering authority.	An ecological constraints map has been produced for the Surat Tek Park pipeline in accordance with the Ecological Impact Assessment procedure (Doc no. 99-H-PR-0081) and will be used for identification of offset liabilities. The map will be updated as new locations for infrastructure become available and any potential offset liability will be verified in the field.
SCHEDULE E – ENVIRONMENTAL NUISANCE		
E1	The release of odour, dust or any other airborne contaminant(s), or light from the petroleum activity(ies) must not cause an environmental nuisance at any sensitive place.	Arrow Energy manages the risks on amenity such as visual sensitivities, low noise tolerances, light and odour sensitivities through its Amenity Management Standard (99-H-MSS-0040). Procedures to manage amenity impacts include Environmental Noise & Vibration Management Procedure (99-H-PR-0071), Visual & Landscape Procedure (99-H-PR-0076), Traffic & Transport - Environmental Aspects Procedure (99-V-PR-0016), Air Emissions Procedure (99-H-PR-0077) and Dust Management Guideline (Doc no. 99-H-GDL-0066). All work carried out on Arrow sites must comply with these documents. Complaints are managed through Arrow Energy's Complaint Management System (Doc no. 20120925-POL-CMS). Incidents are managed through the Incident Management Procedure (Doc no. 99-H-PR-0112).
E2	Prior to undertaking petroleum activities that will result in short-term, medium-term or long term noise events that are likely to impact on a sensitive receptor, the holder of this environmental authority must model or calculate any potential noise emissions from the relevant petroleum activity and determine if noise emissions are likely to exceed the noise levels specified in Schedule E, Table 1 – Noise limits at Sensitive Receptors.	Arrow manages the risks on noise amenity through the Environmental Noise & Vibration Management Procedure (99-H-PR-0071) and supporting documents including Environmental Noise & Vibration Assessment Guideline (Doc no. 99-H-GDL-0042). All work carried out on Arrow sites must comply with this procedure. Complaints are managed through Arrow Energy's Complaint Management System (Doc no. 20120925-POL-CMS). Incidents are managed through Incident Management Procedure (Doc no. 99-H-PR-0112).
E3	If noise modelling or the calculations indicates that petroleum activities are likely to exceed the noise levels specified in Schedule E, Table 1 – Noise limits at sensitive receptors, the holder of this environmental authority must prepare a Noise Management Plan prior to undertaking petroleum activities, which demonstrates how the noise limits specified in Schedule E, Table 1 - Noise limits at sensitive receptors will be achieved in the event of a valid noise complaint.	Noise assessments of existing production infrastructure including drill rigs were undertaken in 2011/2012 by a specialist noise consultant. A noise management plan is in place for DXP.
E4	Despite condition E3, for any petroleum activities existing at the time of issue of this environmental authority, if noise modelling or the calculations indicates that petroleum activities are likely to exceed the noise levels specified in Schedule E, Table 1 - Noise limits at sensitive receptors, the holder of this environmental authority must implement a Noise Management Plan, which demonstrates how the noise limits specified in Schedule E, Table 1 - Noise limits at sensitive receptors will be achieved in the event of a valid noise complaint.	
E5	The Noise Management Plan must address, but not be limited to, the following matters: (a) a site based noise assessment to determine compliance with the noise limits in Schedule E, Table 1 – Noise limits at Sensitive Receptors (b) the measured and/or predicted noise level of these noise sources and activities at noise sensitive receptors, taking into account any tonal or impulsive noise impacts; (c) the reasonable and practicable control or abatement measures (including relocating the activity, hours of operation, or having an alternate arrangement in place with any potentially affected person) that can be undertaken to reduce identified intrusive noise sources; (d) the level of noise at noise sensitive receptors that would be achieved from implementing these measures; (e) the handling of future noise complaints; (f) community liaison and consultation including but not limited consultation processes for when night time activities (i.e. between 10:00 pm and 6:00 am) are likely to exceed 25dBA; and (g) training of staff and contractors in best available noise management practices.	

**ACTION PROGRAM - ENVIRONMENTAL AUTHORITY EPPG00972513
(DXP)**

CONDITION NO.	CONDITION	ACTION PROGRAM
E6	The emission of noise from the licensed place must not result in levels greater than those specified in Schedule E, Table 1 – Noise limits at Sensitive Receptors in the event of a valid complaint about noise being made to the administering authority.	
E7	If the noise subject to a complaint is tonal or impulsive, the adjustments detailed in Schedule E, Table 2 – Adjustments to be Added to Noise Levels at Sensitive Receptors are to be added to the measured noise level(s) to derive $L_{Aeq,adj,15min}$.	
E8	Where alternative arrangements are in place with any affected person as referred to by Condition (E5)(c), the noise limits in Schedule E, Table 1 – Noise limits at Sensitive Receptors do not apply at that location for the duration for which the alternative arrangements are in place.	
E9	Notwithstanding Condition (E2), emission of any noise below 315 Hz must not cause an environmental nuisance.	
E10	Low frequency noise from the petroleum activities is not considered to be an environmental nuisance under Condition (E9) if monitoring shows that noise emissions do not exceed the following limits: (a) 50 dB(Z) measured inside the sensitive receptor; and (b) the difference between the internal A-weighted and Z-weighted noise levels is no greater than 15 dB.	
E11	The holder of this environmental authority must develop a blast management plan in accordance with Australian Standard 2187 for each planned blasting activity before it is undertaken.	No blasting is currently planned on DXP. A blast management plan will be developed in accordance with relevant Australian Standards and environmental authority requirements prior to any blasting activity.
E12	The blast management plan required by Condition (E11) must include measures to minimise the likelihood of any adverse effects being caused by airblast overpressure and/or ground borne vibrations at any sensitive receptor and demonstrate current best practice environmental management.	
E13	All blasting must be carried out in a proper manner by a suitably qualified person.	
E14	All blasting must be carried out in accordance with the Blast Management Plan.	
E15	Noise from blasting operations must not exceed an airblast overpressure level, when measured at or extrapolated to any sensitive receptor, of 115 dB (linear peak) for nine (9) out of any ten (10) consecutive blasts initiated nor 120 dB (linear peak) at any time.	
E16	Ground-borne vibration peak particle velocity caused by blasting operations, when measured at or extrapolated to any sensitive receptor must not exceed more than 5 mm per second for nine (9) out of any ten (10) consecutive blasts initiated, or 10 mm per second at any time.	
SCHEDULE F – AIR		
F1	The only type of fuel to be burned in fuel burning or combustion equipment under normal operating conditions is coal seam gas.	All equipment listed in the register of fuel burning and combustion equipment and/or Schedule F, Table 2 - Releases of Contaminants to Air burns coal seam gas under normal operating conditions. Backup power generators for the CGPFs and water treatment plants are powered by diesel fuel.
F2	Contaminants releases to air emitted from fuel burning and combustion equipment point sources that are capable of burning at least 500kg in an hour must be directed vertically upwards without any impedance or hindrance.	No individual pieces of fuel burning or combustion equipment regulated under the DXP environmental authority are capable of burning greater than 500kg fuel/hour. Emissions from fuel burning and combustion equipment listed in Schedule F, Table 2 - Releases of Contaminants to Air are directed vertically upwards with minimal impedance expected.
F3	The holder of this environmental authority must maintain a register of fuel burning or combustion equipment that is capable of burning at least 500kg of fuel in an hour that must include, as a minimum, the following information for each piece of equipment: (a) fuel burning or combustion equipment name and location; (b) stack emission height (metres); (c) minimum efflux velocity (m/s); (d) mass emission rates (g/s); and (e) contaminant concentrations (mg/Nm ³ @ x %O ₂ dry gas at 0°Celsius and 1 atmosphere)	The requirement to maintain a register of stationary fuel burning equipment is contained in Arrow Energy's Air Emissions Procedure (Doc no. 99-H-PR-0077). A register of fuel burning or combustion equipment is maintained as required. This will be updated where required with new equipment when installed.
F4	The holder of this environmental authority must ensure that the information contained in the register of fuel burning or combustion equipment is always current and complete.	A register of fuel burning or combustion equipment is maintained as required. This will be updated where required with new equipment when installed.
F5	All entries in the register of fuel burning or combustion equipment must be certified by the chief executive officer for the tenure holder, or their delegate, as being accurate and correct.	All entries in the register of fuel burning or combustion equipment will be certified by the chief executive officer for the tenure holder, or their delegate, as being accurate and correct prior to providing to external parties.
F6	Prior to the installation and operation of any new fuel burning or combustion equipment, that is capable of burning at least 500kg of fuel in an hour, the holder of this environmental authority must conduct air dispersion modelling to calculate the ground level concentrations of emissions from all existing and proposed fuel burning or combustion equipment under maximum operating conditions (including other industry) within the ambient airshed and identify any potential impacts to air quality within the study area.	Arrow manages the risks on air quality through the Air Emissions Procedure (Doc no. 99-H-PR-0077). This procedure is supported by documents including the Air Quality Assessment Guideline (99-H-GDL-0063), Stack Emissions Monitoring Guideline (Doc no. 99-H-GDL-0084), Stack Emissions Monitoring Manual (Doc no. 99-H-MN-0022) and Plant and Equipment Air Emissions Guideline (Doc no. 99-H-GDL-0065). All work carried out on Arrow sites must comply with this procedure. Complaints are managed through Arrow Energy's Complaint Management System (Doc no. 20120925-POL-CMS). Incidents are managed through Incident Management Procedure (Doc no. 99-H-PR-0112).
F7	The holder of this environmental authority must ensure that the calculated ground level concentrations required under condition (F6) do not exceed the criteria for each air contaminant in Schedule F, Table 1 - Minimum Ground Level Concentration Criteria.	
F8	The holder of this environmental authority must undertake emissions testing within 3 months post commissioning of any fuel burning and combustion equipment capable of burning at least 500kg of fuel in an hour to verify the estimates used in the air dispersion modelling.	
F9	Where the results of the emissions testing required under condition (F8) indicate that the emission estimates used in the air dispersion modelling required under condition (F6) are exceeded, the holder of this environmental authority must: (a) provide details to the administering authority within ten (10) business days; (b) re-undertake the modelling based on the new information; and (c) determine and implement appropriate pollution control measures to bring the emissions into compliance with the limits specified in Schedule F, Table 1 – Maximum Ground Level Concentration Criteria.	
F10	Fuel burning or combustion equipment that is capable of burning at least 500kg of fuel in an hour must not be located in hubs or in places within 5km of a populated area unless it is specified in Schedule F, Table 2 - Release of Contaminants to Air.	

**ACTION PROGRAM - ENVIRONMENTAL AUTHORITY EPPG00972513
(DXP)**

CONDITION NO.	CONDITION	ACTION PROGRAM
F11	Fuel burning or combustion equipment located in hubs or in places within 5km of a populated area, that is capable of burning at least 500kg of fuel in an hour, must only release contaminants to the atmosphere at a height and a efflux velocity not less than the corresponding height and velocity stated for that release point (RP) as provided for in Schedule F, Table 2 - Release of Contaminants to Air.	
F12	Fuel burning or combustion equipment located in hubs or in places within 5km of a populated area, that is capable of burning at least 500kg of fuel in an hour, must not release contaminants to the atmosphere from a release point at a mass emission rate or concentration in excess of that stated in Schedule F, Table 2 - Release of Contaminants to Air.	
F13	The holder of this environmental authority must undertake emissions testing within 3 months of the issue of this environmental authority of all fuel burning and combustion equipment listed in Schedule F - Table 2 - Release of Contaminants to Air.	This testing was undertaken as required and reports provided to the administering authority with the 2011 annual return.
F14	The holder of this environmental authority must undertake air dispersion modelling using the results of the emission testing required under condition (F13) to verify that emissions will not result in an exceedance of the maximum ground level concentration for each air contaminant listed in Schedule F, Table 1 - Maximum Ground Level Concentration Criteria.	This modelling was undertaken as required and reports provided to the administering authority with the 2011 annual return.
F15	A report on the results of air emission testing and modelling required by conditions (F13) and (F14) must be provided to the administering authority with the next annual return.	Reports were provided to the administering authority with the 2011 annual return as required.
SCHEDULE G - WASTE		
G1	All general waste must be removed from the site and sent to a recycling facility or disposal facility licensed to accept the waste under the Environmental Protection Act 1994 except as permitted under another condition of this environmental authority.	Waste management plans are required to be developed for each area of operation under the Arrow Energy's Waste Management Procedure (Doc no. 99-H-PR-0073). All general waste will be removed from the site and sent to a recycling facility or disposal facility licensed to accept the waste under the <i>Environmental Protection Act 1994</i> except as permitted under another condition of this environmental authority.
G2	All regulated waste must be removed from the site by a person who holds a current authority to transport such waste under the provisions of the Environmental Protection Act 1994.	The Waste Management Procedure (Doc no. 99-H-PR-0073) requires all regulated wastes to be removed from the site by a waste contractor licensed to transport regulated waste.
G3	Waste must not be burned or allowed to be burned on the licensed site.	Under the Waste Management Procedure (Doc no. 99-H-PR-0073), all relevant legislative and regulatory (e.g. environmental authority) requirements are to be considered in development of waste management plans. Waste will not be burned or allowed to be burned on Arrow Energy sites.
G4	All waste fluids and muds resulting from drilling and exploration activities must be contained in a properly lined dam or containment structure for disposal, remediation or reuse where applicable.	Under the Waste Management Procedure (Doc no. 99-H-PR-0073), all relevant legislative and regulatory (e.g. environmental authority) requirements are to be considered in development of waste management plans. Hence, all waste fluids and muds resulting from drilling and exploration activities will be contained in a properly lined dam or containment structure for disposal, remediation or reuse where applicable. It is noted that Arrow Energy is now utilising "pitless" drilling methodologies which negate the need for in-ground pits to contain waste fluids and drilling muds. Tanks are used to contain all drilling fluids, allowing for reuse of water and disposal of drilling solids/sludge to appropriate waste facilities.
G5	A Coal Seam Gas Water Management Plan that includes but is not necessarily limited to the matters outlined in (a) and (b) must be implemented: (a) the matters required by sections 310D (5), 310D (6) and 662 of the Environmental Protection Act 1994; and (b) a management strategy for all integrated coal seam gas water management operations.	The Surat Basin Coal Seam Gas Water Management Plan (Doc no. ENV11-133) has been produced to cover all CSG water management activities at the DXP. The document covers all matters required under sections 310D(5), 310D(6) and 662 of the <i>Environmental Protection Act 1994</i> and provides a management strategy for the integrated water management network operated by Arrow Energy at DXP. Use and/or disposal of CSG water will only be undertaken as permitted under this environmental authority and other legislative requirements.
G6	Where any inconsistency exists between the conditions of this environmental authority and the Coal Seam Gas Water Management Plan, the conditions of this environmental authority prevail.	
G7	Coal seam gas water may be used for the following purposes within the areas of the relevant resource authority(ies), subject to conditions (G8), (G9), (G10) and (G11): (a) for dust suppression on roads and at other sites; and (b) for construction; and (c) for operational purposes.	
G8	Written approval from the relevant Local Government must be obtained prior to the application of coal seam gas water on any local government controlled roads in accordance with the condition (G7)(a).	
G9	Any coal seam gas water being used for the purposes listed in conditions (G7)(a) and (b) must meet the limits specified in Schedule G, Table 1 - Water Contaminant Release Limits for each of the water quality characteristics listed.	
G10	The use of coal seam gas water for the uses listed in conditions (G7)(a) and (b) must be carried out in a manner that: (a) vegetation is not damaged; (b) soil quality is not adversely impacted; (c) there is no surface ponding or runoff of the coal seam gas water from the application area; (d) minimises deep drainage below the root zone of any vegetation; (e) quality of shallow aquifers is not adversely affected; and (f) there are no releases of coal seam gas waters to any surface waters.	
G11	Any coal seam gas water released to the environment in accordance with conditions (G7)(a) and (G7)(b) must not have any properties that could cause, nor contain any contaminants in concentrations that are capable of causing environmental harm.	
G12	Coal seam gas water may be transferred to a third party to be used for the following purposes subject to compliance with (G13) and (G14): (a) dust suppression if the coal seam gas water quality complies with the limits specified in Schedule G, Table 1 - Water Contaminant Release Limits; (b) construction and operational purposes if the coal seam gas water quality complies with the limits specified in Schedule G, Table 1 - Water Contaminant Release Limits; (c) irrigation and livestock watering purposes; (d) the following industrial purposes: (i) coal washing; (ii) power stations; and (iii) water treatment facilities.	

**ACTION PROGRAM - ENVIRONMENTAL AUTHORITY EPPG00972513
(DXP)**

CONDITION NO.	CONDITION	ACTION PROGRAM
G13	Any coal seam gas water supplied to a third party for irrigation and/or livestock watering purposes in accordance with condition (G12)(c) must comply with the relevant trigger values contained in ANZECC and ARMCANZ Water Quality Guidelines 2000, or subsequent versions thereof.	
G14	If the responsibility of the coal seam gas water is given or transferred to a third party in accordance with condition (G12), the holder of environmental authority must ensure that: (a) the responsibility of the coal seam gas water is given or transferred in accordance with a written agreement (the third party agreement); and (b) the third party is made aware of the General Environmental Duty under section 319 of the Environmental Protection Act 1994.	
SCHEDULE H – REHABILITATION		
H1	The holder of this environmental authority must not abandon any dam but must decommission each dam so as to prevent and/or minimise any environmental harm.	Decommissioning and rehabilitation requirements are outlined in the dam design plans/dam operating plans, Rehabilitation Procedure (Doc no. 99-H-PR-0088) and supporting guidelines, registers and forms including Rehabilitation Guideline (Doc no. 99-H-GDL-0081) and Rehabilitation Monitoring Guideline (Doc no. 99-H-GDL-0077). Dams will be decommissioned and rehabilitated once no longer required for operations.
H2	As a minimum, decommissioning must be conducted such that each dam either: (a) becomes a stable landform similar to that of surrounding undisturbed areas, that no longer contains substances that will migrate into the environment; or (b) the administering authority and the landholder agree that the dam will be used by the landholder following the cessation of the petroleum activities.	
H3	Progressive rehabilitation of disturbed areas must commence as soon as practicable following the completion of any construction or operational works associated with the petroleum activities.	
H4	As soon as practicable but no later than 12 months (or longer period agreed in writing by the administering authority) after the end of petroleum activities causing significant disturbance to land, the holder of the authority must: (a) remediate contaminated land (e.g. dams containing salt); (b) reshape all significantly disturbed land to a stable landform similar to that of surrounding undisturbed areas; (c) on all significantly disturbed land: (i). re-establish surface drainage lines; (ii). reinstate the top layer of the soil profile; and (iii). promote establishment of vegetation. (d) undertake rehabilitation in a manner such that any actual and potential acid sulfate soils in or on the site are either not disturbed, or submerged, or treated so as to not be likely to cause environmental harm; and (e) decommission all inactive buried pipelines in accordance with the requirements of AS 2885 and ensuring that there will not be any subsequent subsidence of land along the pipeline route.	
H5	All significantly disturbed land caused by the carrying out of the petroleum activities must be rehabilitated to meet the following final acceptance criteria: (a) all significantly disturbed land is reinstated to the pre-disturbed land use unless otherwise agreed to between the environmental authority holder, the landholder and the administering authority; (b) all significantly disturbed land is reinstated to the pre-disturbed soil suitability class; (c) the landform is safe for humans and fauna; (d) the landform is stable with no subsidence or erosion gullies for at least five (5) years; (e) the minimum percent foliage cover of immediate surrounding area is maintained in the rehabilitated land for at least three (3) years; (f) a minimum of 80% of the flora species in the immediate surrounding area is maintained in the rehabilitated land for at least three (3) years; (g) a minimum of 80% of the fauna species diversity in the immediate surrounding area is maintained in the rehabilitated land for at least three (3) years; (h) erosion is minimised with appropriate sediment traps and erosion control measures installed as determined by a suitably qualified person; (i) the water quality of any residual void or water bodies constructed by petroleum activities meets criteria for subsequent uses and does not have potential to cause environmental harm. (j) there is no ongoing contamination to surface water; (k) there is no ongoing contamination to groundwater from dams or monocells (demonstrated via groundwater monitoring and leak detection); (l) the maintenance requirements for rehabilitated land is no greater than that required for the land prior to its disturbance by petroleum activities.	
H6	Regular maintenance and at least yearly monitoring of rehabilitated areas must take place to measure compliance with the requirements of Condition (H5).	
SCHEDULE I – MONITORING PROGRAMS		
I1	The holder of this environmental authority must develop and implement a monitoring program, the result of which will demonstrate compliance with the conditions of this environmental authority.	A monitoring program (Doc no. 99-V-PL-0001) has been developed and implemented to demonstrate compliance with the conditions of this environmental authority. It references other documents, e.g. Groundwater Monitoring Program: PEN100449509 (Doc no. 99-V-PL-0032). The monitoring program documents will be reviewed and updated as new infrastructure is developed or there are changes to environmental authority or legislative requirements.
I2	All monitoring under this environmental authority must be conducted by a suitably qualified person.	All monitoring will be undertaken by a suitably qualified person. Suitably qualified persons may include Arrow Energy staff and/or external contractors.

**ACTION PROGRAM - ENVIRONMENTAL AUTHORITY EPPG00972513
(DXP)**

CONDITION NO.	CONDITION	ACTION PROGRAM
13	All instruments, equipment and measuring devices used for measuring or monitoring in accordance with any condition of this environmental authority must be calibrated, and operated and maintained effectively.	<p>All instruments, equipment and measuring devices used for measuring or monitoring in accordance with any condition of this environmental authority will be calibrated, and operated and maintained effectively. Example of instruments, equipment and measuring devices used include water quality meters, noise sound level meters and gas analysers.</p> <p>Arrow Energy's Water Quality Sampling Manual (Doc no. 99-V-PR-0029) outlines procedures and requirements for the calibration, operation and maintenance of water sampling equipment.</p> <p>Where monitoring equipment is supplied by a rental supplier, the equipment will generally be calibrated by the rental supplier prior to Arrow Energy receiving the equipment and a calibration certificate supplied. Full instrument calibrations will be performed in accordance with the intervals recommended by the manufacturer and a calibration check will be performed on the equipment on a daily basis or immediately prior to use.</p> <p>Where monitoring is undertaken by consultants, calibration, operation and maintenance of equipment used for monitoring is the responsibility of that party.</p>
14	All laboratory analyses and tests required to be conducted under this environmental authority must be carried out by a laboratory that has NATA certification for such analyses and tests, except as otherwise authorised by the administering authority.	Arrow Energy require that all laboratory analyses and tests are / will be undertaken by NATA certified laboratories. The Groundwater Monitoring Program (Doc no. 99-V-PL-0001) and Water Quality Sampling Manual specify that water samples requiring analysis and tests for chemical parameters are submitted to a NATA certified laboratory. All laboratory analyses and tests required under this environmental authority have been carried out by laboratories with NATA certification where relevant as documented in monitoring reports.
15	<p>The method of water sampling required by this environmental authority must comply with the version of the Queensland Monitoring Water Quality Sampling Manual² that is current at the time the sampling is undertaken.</p> <p>Note: Condition (15) requires the version of the Queensland Monitoring Water Quality Sampling Manual that is current at the time the sampling is undertaken to be followed and where it is not followed because of exceptional circumstances this should be explained and reported with the results.</p> <p>² The version that is current as at the 8 March 2013 is <i>Monitoring and Sampling Manual 2009 - Environmental Protection (Water) Policy 2009 Version 2 September 2010</i>.</p>	Water quality monitoring will be carried out in accordance with Arrow Energy's Water Quality Sampling Manual (Doc no. 99-V-PR-0029) and other relevant standards/guidelines. The Water Quality Sampling Manual has been developed based on DERM's (2009) Monitoring and Sampling Manual 2009, AS/NZS 5667.1:1998 Water Quality - Sampling - Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples; and AS/NZS 5667.11:1998 Water Quality - Sampling - Guidance on sampling of groundwaters. The Water Quality Sampling Manual will be updated as required to ensure compliance with the current version of the Queensland Monitoring Water Quality Sampling Manual and other reference documents.
16	Any management or monitoring plans, systems, programs or procedures required to be developed and implemented by a condition of this environmental authority must be reviewed for performance and amended if required on an annual basis in accordance with the requirements for the particular plans, systems, programs and procedures.	The monitoring program document (Doc no. 99-V-PL-0001), associated supporting documents, e.g. Groundwater Monitoring Program: PEN100449509 (Doc no. 99-V-PL-0032), and other relevant documents required to be developed and implemented by a condition of this environmental authority will be reviewed on an annual basis as required.
17	<p>If monitoring conducted in accordance with this environmental authority indicates a condition or contaminant level that has caused, or has potential to cause, environmental harm, the environmental authority holder must:</p> <p>(a) as soon as is practicable, take the necessary actions to rectify the condition or contaminant level so as to avoid or minimise environmental harm; and</p> <p>(b) notify the administering authority of the condition or contaminant level and the actions taken to rectify it.</p>	Incidents are managed through Arrow Energy's Incident Management System including Incident Management Procedure (Doc no. 99-H-PR-0112), Statutory Notification Guideline (Doc no. 99-H-GDL-0029) and Investigation Process Guideline (Doc no. 99-H-GDL-0080).
18	<p>An annual monitoring report must be prepared each year and submitted to the administering authority upon request. This report shall include but not be limited to:</p> <p>(a) a summary of the previous 12 months monitoring results obtained under any monitoring programs required under this environmental authority and, a comparison of the previous 12 months monitoring results to both the limits set in this environmental authority and to relevant prior results; the date on which the samples was taken;</p> <p>(b) the time at which the samples was taken;</p> <p>(c) the monitoring point at which the sample was taken;</p> <p>(d) the release flow rate of any authorised discharges to waters from all release points;</p> <p>(e) the results of all monitoring and details of any exceedances with the conditions of this environmental authority and the dates and times these exceedances were reported to the administering authority.</p> <p>(f) a summary of all records of quantities of releases required to be kept under this environmental authority including the total volume of any authorised discharges to waters for the previous yearly period from all release points and the individual daily volume of any authorised discharges to waters from all release points;</p> <p>(g) details of all maintenance or work carried out on any discharge meter(s) and the impact (if any) on the release volume readings;</p> <p>(h) an evaluation/explanation of the data derived from any monitoring programs;</p> <p>(i) data analyses and interpretation to assess the nature and extent of any contamination and, if so, the level of environmental harm caused as a result of the contamination and the environmentally relevant activity; and</p> <p>(j) an outline of actions taken or proposed to minimise the risk of environmental harm from any condition or elevated contaminant level identified by the monitoring or recording programs.</p>	Annual monitoring reports will be prepared each year and submitted to the administering authority upon request as required.
19	The evaluation and explanation of data for the purposes of the annual monitoring report must be performed by a suitably qualified person.	The evaluation and explanation of data for the purposes of the annual monitoring report will be performed by suitably qualified persons as required.
110	The holder of this environmental authority must continue to conduct monitoring as per that prescribed in Conditions (111) to (117) for a minimum of five (5) years after the activities prescribed in Condition (A1) have ceased and submit the results annually in accordance with Condition (18).	Monitoring will be undertaken for the period required under this condition.

**ACTION PROGRAM - ENVIRONMENTAL AUTHORITY EPPG00972513
(DXP)**

CONDITION NO.	CONDITION	ACTION PROGRAM
I11	<p>A Groundwater Monitoring Program, which must be implemented, must be able to detect any significant risks and changes to groundwater quality and level as a result of activities authorised under this environmental authority and must:</p> <p>(a) be developed, installed and maintained by a suitably qualified person in the fields of hydrogeology, groundwater sampling design and groundwater monitoring program design;</p> <p>(b) include locations of monitoring points, parameters to be measured, frequency of monitoring, monitoring methodology used, and trigger values;</p> <p>(c) include procedures to establish background groundwater quality;</p> <p>(d) a sufficient number of monitoring sites to provide information on the following:</p> <p>(i) seepage to groundwater and surrounding soils from any regulated dam authorised under this environmental authority and its effect on groundwater and soils; and</p> <p>(ii) background monitoring sites (i.e. groundwater quality in representative bore(s) that have not been affected by the activities authorised under this environmental authority);</p> <p>(e) conduct a geodetic survey of all groundwater monitoring bores to determine the relative water surface elevations, measured to the nearest millimetre in each bore and reported in metres relative to the AHD;</p> <p>(f) determine the hydraulic conductivity, groundwater flow direction and groundwater flow rate; and</p> <p>(g) include a rationale containing details on the program purpose, program conceptualisation and verification of assumptions.</p>	<p>A Groundwater Monitoring Program (GMP) (Doc no. 99-V-PL-0032) for DXP has been developed and implemented as required to meet environmental authority conditions. The GMP is supported by the Arrow Energy Water Quality Sampling Manual (Doc no. 99-V-PR-0029).</p>
I12	<p>All groundwater bores must be installed according to the standards outlined in the latest edition of the Department of Environment and Heritage Protection's Minimum Construction Requirements for Water Bores in Australia or the Minimum Standards for the Construction and Reconditioning of Water Bores that Intersect the Sediments of Artesian Basins in Queensland.</p>	
I13	<p>Groundwater monitoring bores must be constructed by, or under the supervision of a licensed Queensland water bore driller who has the correct endorsements on their licence for the type of activity being performed.</p>	
I14	<p>The Groundwater Monitoring Program must provide for monitoring of groundwater quality as often as necessary to detect impacts of the petroleum activities authorised under this environmental authority, but not for fewer parameters or less frequently than that specified in Schedule I, Table 1 – Minimum Groundwater Monitoring Parameters and Monitoring Frequency and in compliance with Condition (I15).</p>	
I15	<p>Groundwater samples taken as part of the Groundwater Monitoring Program must be analysed for, but not be limited to, the water quality parameters at the minimum frequencies specified in Schedule I, Table 1 – Minimum Groundwater Monitoring Parameters and Monitoring Frequency.</p>	
I16	<p>All groundwater monitoring bores must be maintained in an operative condition and be reasonably accessible at all times to any authorised person.</p>	
I17	<p>If groundwater monitoring indicates that any significant changes in groundwater quality caused by petroleum activities are detected, then information must be submitted to the administering authority within 10 business days of receipt of the analysis indicating these changes, including any proposed actions to mitigate the changes in groundwater quality.</p>	
I18	<p>The holder of this environmental authority must conduct a monitoring program of contaminants released to the atmosphere at each release point recorded in the register of fuel burning or combustion equipment for the contaminants and efflux velocities listed in Schedule F, Table 1 - Maximum Ground Level Concentration Criteria and at the frequencies specified in Schedule I, Table 3 - Monitoring Frequency for Contaminants.</p>	<p>As per the DXP monitoring program (Doc no. 99-V-PL-0001) and Air Emissions Procedure (Doc no. 99-H-PR-0077), a monitoring program of contaminants released to atmosphere at each release point recorded in the register of fuel burning and combustion equipment has been developed and implemented. Further guidance on implementation of the stack emission monitoring program is contained in the Stack Emissions Monitoring Guideline (Doc no. 99-H-GDL-0064) and the Stack Emissions Monitoring Manual (Doc no. 99-H-MN-0022).</p>
I19	<p>The monitoring program must include, but not necessarily be limited to:</p> <p>(a) monitoring provisions for the release points must comply with the most recent edition of AS4323.</p> <p>(b) tests for each sample taken at each release point specified in the register of fuel burning or combustion equipment (condition (F7)) including:</p> <p>(i). gas velocity, volume and mass flow rate.</p> <p>(ii). temperature.</p> <p>(iii). water vapour concentration (for non-continuous sampling).</p> <p>(c) representative samples of the contaminants discharged when operating under maximum operating conditions.</p> <p>(d) the collection of production rate and plant status during sampling periods: and</p> <p>(e) monitoring of contaminant release carried out in accordance with the latest edition of the Department of Environment and Heritage Protection's 'Air Quality Sampling Manual' 1997, as amended from time to time.</p>	

**ACTION PROGRAM - ENVIRONMENTAL AUTHORITY EPPG00972513
(DXP)**

CONDITION NO.	CONDITION	ACTION PROGRAM
I20	<p>When requested by the administering authority, contaminant monitoring and recording must be undertaken to investigate any complaint, and the results notified within 14 days to the administering authority. When monitoring is requested the following must be complied with:</p> <p>(a) the holder of this environmental authority must conduct and keep records of a monitoring program of contaminant release to the atmosphere at the release points, frequency, and the parameters specified in Schedule I, Table 4 - Required Monitoring which complies with the following:</p> <p>(b) Monitoring provision for the release points listed in Schedule I, Table 4 - Required Monitoring must comply with the Australian Standard AS4323.1 – 1995 'Stationary source emissions Method 1: Selection of sampling provisions' or subsequent versions as they become available.</p> <p>(c) The following tests must be performed for each required determination specified in Schedule I, Table 4 - Required Monitoring:</p> <ul style="list-style-type: none"> i. gas velocity and volume flow rate; ii. temperature and oxygen content; iii. water vapour concentration (moisture content). <p>(d) Where practicable samples taken must be representative of the contaminants discharged when emissions are expected to be at maximum rates.</p> <p>(e) During the sampling period the following additional information must be gathered:</p> <ul style="list-style-type: none"> i. fuel used; ii. number of equipment and operating units; and iii. reference to actual test methods and accuracies. 	<p>Incidents are managed through Arrow Energy's Incident Management System including Incident Management Procedure (Doc no. 99-H-PR-0112), Statutory Notification Guideline (Doc no. 99-H-GDL-0029) and Investigation Process Guideline (Doc no. 99-H-GDL-0080).</p> <p>Any monitoring required will be undertaken in accordance with the Stack Emissions Monitoring Guideline (Doc no. 99-H-GDL-0064), the Stack Emissions Monitoring Manual (Doc no. 99-H-MN-0022) and requirements of this condition.</p>
I21	<p>The holder of this environmental authority must undertake noise monitoring when requested by the administering authority to investigate a complaint of environmental nuisance at a sensitive receptor within the reasonable and practicable timeframe nominated by the administering authority, and report the results to the administering authority within three (3) business days of completion of the monitoring.</p>	<p>The DXP Noise Management Plan and Environmental Noise and Vibration Management Procedure (Doc no. 99-H-PR-0071) indicate how noise complaints will be addressed and managed through Arrow Energy's Complaints Management System (Doc no. CCA-POL-20010914_CMS).</p>
I22	<p>Noise monitoring and recording must include the following descriptor, characteristics and matters:</p> <p>(a) $L_{A,NT}$ (where N equals the statistical levels of 1, 10 and 90 and T=15);</p> <p>(b) $L_{Aeq,adj, 15 mins}$;</p> <p>(c) background noise level as $L_{A,90,T}$;</p> <p>(d) Max $L_{pA, 15 mins}$</p> <p>(e) the level and frequency of occurrence of impulsive or tonal noise and any adjustment and penalties to statistical levels;</p> <p>(f) atmospheric conditions including temperature, relative humidity and wind speed and directions;</p> <p>(g) effects due to any extraneous factors such as traffic noise;</p> <p>(h) location, date and time of monitoring;</p> <p>(i) if the complaint concerns low frequency noise, Max $L_{z, 15 min}$; and</p> <p>(j) If the complaint concerns low frequency noise, one third octave band measurements in dB(LIN) for centre frequencies in the 10 – 200 Hz range for both the noise source and the background noise in the absence of the noise source.</p>	
I23	<p>The method of measurement and reporting of noise levels and background sound pressure levels must comply with the latest edition of the administering authority's <i>Noise Measurement Manual</i> or the most recent version of Australian Standard 1055 Acoustics – description and measurement of environmental noise.</p>	
I24	<p>When the administering authority advises the holder of this environmental authority of a complaint alleging nuisance other than noise, the holder must investigate the complaint and advise the administering authority in writing of the action proposed or undertaken to resolve the complaint.</p>	<p>Complaints are managed through Arrow Energy's Complaint Management System (Doc no. 20120925-POL-CMS).</p>
I25	<p>When requested by the administering authority, the holder of this environmental authority must undertake monitoring as specified by the administering authority, within a reasonable and practical timeframe nominated by the administering authority to investigate any complaint of environmental harm at any sensitive place.</p>	
I26	<p>The results of the investigation (including an analysis and interpretation of the monitoring results) and abatement measures implemented must be provided to the administering authority within 10 business days of completion of the investigation, or receipt of the monitoring results, whichever is the latter.</p>	
I27	<p>If monitoring in accordance with Condition (I25) and (I26), indicates that emissions exceed the limits set in this environmental authority or are causing environmental nuisance, then the holder of this environmental authority must:</p> <p>(a) address the complaint including the use of alternative dispute resolution services if required; and/or</p> <p>(b) as soon as practicable implement abatement or attenuation measures so that light, dust, particulate or odour emissions from the authorised activities do not result in further environmental nuisance.</p>	
I28	<p>Notwithstanding any other condition of the environmental authority, the environmental authority does not authorise any environmental harm arising from any release to the atmosphere of any of the contaminants mentioned in Schedule 1, Table 5 - Contaminants and Benchmarks for Evaluation.</p>	<p>Noted, no action required.</p>

**ACTION PROGRAM - ENVIRONMENTAL AUTHORITY EPPG00972513
(DXP)**

CONDITION NO.	CONDITION	ACTION PROGRAM
I29	<p>For the purpose of ensuring and demonstrating compliance with Condition (I28), the holder of the environmental authority must implement the findings of the evaluation, conducted by a suitably qualified and experienced person and provided to the administering authority, of the potential environmental impacts of the contaminants mentioned in Schedule I, Table 5 - Contaminants and Benchmarks for Evaluation. The evaluation addresses all matters relevant to the assessment of potential for environmental impacts to occur and includes, but not be limited to:</p> <p>(a) Sampling, monitoring and analysis of the contaminants mentioned in Schedule I, Table 5 - Contaminants and Benchmarks for Evaluation for the range of plant operations likely to be encountered:</p> <ul style="list-style-type: none"> i. entail sufficient levels of detection to adequately characterise the emissions; and ii. be representative; and comply with relevant Department of Environment and Heritage Protection's monitoring methods including the quality control requirements inherent in those methods; <p>(b) Using the air pollution dispersion models, estimate Ground Level Concentrations at the most sensitive nearest receptor(s) (using efflux velocity, temperature and flow rate) for emissions of the contaminants mentioned in Schedule I, Table 5 - Contaminants and Benchmarks for Evaluation;</p> <p>(c) A comparison between the worst case measured emissions with the benchmarks maximum GLC mentioned in Schedule I, Table 5 - Contaminants and Benchmarks for Evaluation;</p> <p>(d) The use of methods and guidelines for modelling and assessment of air pollutants approved by the New South Wales Department of Environment and Climate Change or by the Victoria Environmental Protection Agency.</p>	<p>The potential environmental impacts of the contaminants mentioned in Schedule I, Table 5 - Contaminants and Benchmarks for Evaluation were evaluated as part of monitoring and modelling undertaken to meet conditions F13 and F14 of the environmental authority. The report was provided to the administering authority with the 2011 annual return. No specific actions requiring implementation were identified in the report.</p>
SCHEDULE J – COMMUNITY ISSUES		
J1	<p>The holder of this environmental authority must maintain a record of complaints and incidents causing environmental harm, and actions taken in response to the complaint or incident; and</p>	<p>Complaints are managed through Arrow Energy's Complaint Management System (Doc no. 20120925-POL-CMS). Incidents are managed through Arrow Energy's Incident Management Procedure (Doc no. 99-H-PR-0112).</p>
J2	<p>The holder of this environmental authority must record the following details for all complaints received and provide this information to the administering authority on request:</p> <ul style="list-style-type: none"> (a) name, address and contact number for complainant; (b) time and date of complaint; (c) reasons for the complaint as stated by the complainant; (d) investigations undertaken in response to the complaint; (e) conclusions formed; (f) actions taken to resolve complaint; (g) any abatement measures implemented to mitigate the cause of the complaint; and (h) name and contact details of the person responsible for resolving the complaint. 	
SCHEDULE K – NOTIFICATION PROCEDURES		
K1	<p>The holder of this environmental authority must telephone the administering authority's Pollution Hotline (telephone: 1300 130 372) and any affected landholder, occupier or their nominated representative as soon as practicable, but within 24 hours after becoming aware of:</p> <ul style="list-style-type: none"> (a) any release of contaminants not in accordance with the conditions of this environmental authority; or (b) any event where environmental harm has been caused or may be caused. 	<p>Incidents are managed through Arrow Energy's Incident Management System including Incident Management Procedure (Doc no. 99-H-PR-0112), Statutory Notification Guideline (Doc no. 99-H-GDL-0029) and Investigation Process Guideline (Doc no. 99-H-GDL-0080). Notifications are made and reporting is undertaken as required.</p>
K2	<p>Notwithstanding condition (K1), the holder of this Environmental Authority must telephone the administering authority's Pollution Hotline (Telephone: 1300 130 372) as soon as practicable, but within 24 hours after becoming aware of any non-compliance with any condition of this environmental authority.</p>	
K3	<p>Subject to Condition (K1), the holder of this environmental authority is required to report in the case of spills of contaminants (including but not limited to hydrocarbons, CSG water or mixtures of both) of the following volumes or kind:</p> <ul style="list-style-type: none"> (a) releases of any volume of contaminants to water; and (b) releases of volumes of contaminants greater than 200L of hydrocarbons, 1000L of brine or 5000L of coal seam gas water to land; and (c) releases of any volumes of contaminants where potential serious or material environmental harm has occurred or may occur. 	

**ACTION PROGRAM - ENVIRONMENTAL AUTHORITY EPPG00972513
(DXP)**

CONDITION NO.	CONDITION	ACTION PROGRAM
K4	<p>The notification of emergencies or incidents as required by Conditions (K1) and (K3) must include but not be limited to the following information:</p> <ul style="list-style-type: none"> (a) the environmental authority number and name of the holder; (b) the tenure type and number where the emergency or incident occurred; (c) the name and telephone number of the designated contact person; (d) the location of the emergency or incident; (e) the date and time that the emergency or incident occurred; (f) the date and time the holder of this environmental authority became aware of the emergency or incident; (g) details of the nature of the event and the circumstances in which it occurred; (h) the estimated quantity and type of any contaminants involved in the incident; (i) the actual or potential suspected cause of the emergency or incident; (j) a description of the land use at the site of the emergency or incident (e.g. grazing, pasture, forest etc) and/or the name of any relevant surface waters and other environmentally sensitive features; (k) a description of the possible impacts from the emergency or incident; (l) a description of whether stock and/or wildlife were exposed to any contaminants released and measures taken to prevent access for the duration of the emergency or incident; (m) any sampling conducted or proposed, relevant to the emergency or incident; (n) landholder details and details of landholder consultation; (o) immediate actions taken to control the impacts of the emergency or incident and how environmental harm was mitigated at the time of the emergency or incident; and (p) whether further examination/root cause analysis is required and if so, the expected date by when this examination will be completed and reported to the administering authority. 	
K5	<p>Within 10 business days following the initial notification of an emergency or incident or receipt of monitoring results or completion of the examination/root cause analysis, whichever is the later, a written report must be provided to the administering authority, including the following (where relevant to the emergency or incident):</p> <ul style="list-style-type: none"> (a) the root cause of the emergency or incident the confirmed quantities and types of any contaminants involved in the incident; (b) results and interpretation of any analysis of samples taken at the time of the emergency or incident; (c) a final assessment of the impacts from the emergency or incident including any actual or potential environmental harm that has occurred or may occur in the longer term as a result of the release; (d) the success or otherwise of actions taken at the time of the incident to prevent or minimise environmental harm; (e) results and current status of landholder consultation, including commitment to resolve any outstanding issues/concerns; and (f) actions and/or procedural changes to prevent a recurrence of the emergency or incident 	

ARROW ENERGY - SURAT GAS PROJECT

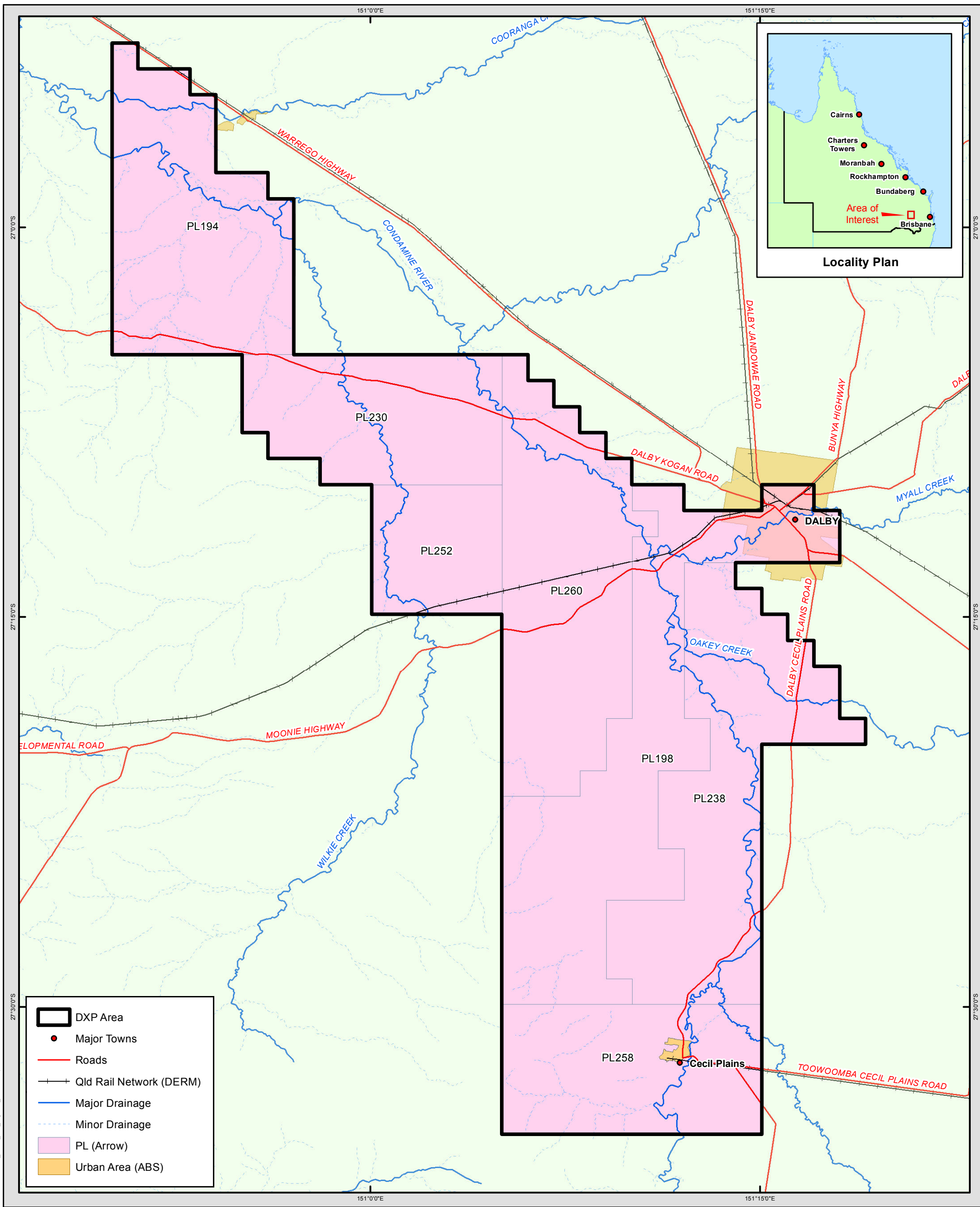
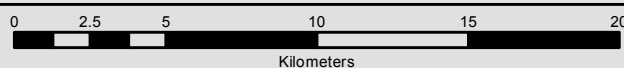


Figure 1: Overview of the Location of the DXP Area

Source: Arrow Energy Pty Ltd
Geosciences Australia
Dept. Envir. and Resource Mgmt.

Date: 30/08/2013



Scale: 1:250,000 @ A3
Coordinate System: GCS GDA 1994



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The dimensions, areas, number of lots, size & location of corridor information are approximate only and may vary.

Disclaimer: While all reasonable care has been taken to ensure the information contained on this map is up to date and accurate, no warranty is given that the information contained on this map is free from error or omission. Any reliance placed on such information shall be at the sole risk of the user. Please verify the accuracy of all information prior to using it.

Note: The information shown on this map is a copyright of Arrow Energy Pty Ltd and, where applicable, its affiliates and co-venturers.

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ARROW ENERGY - SURAT GAS PROJECT

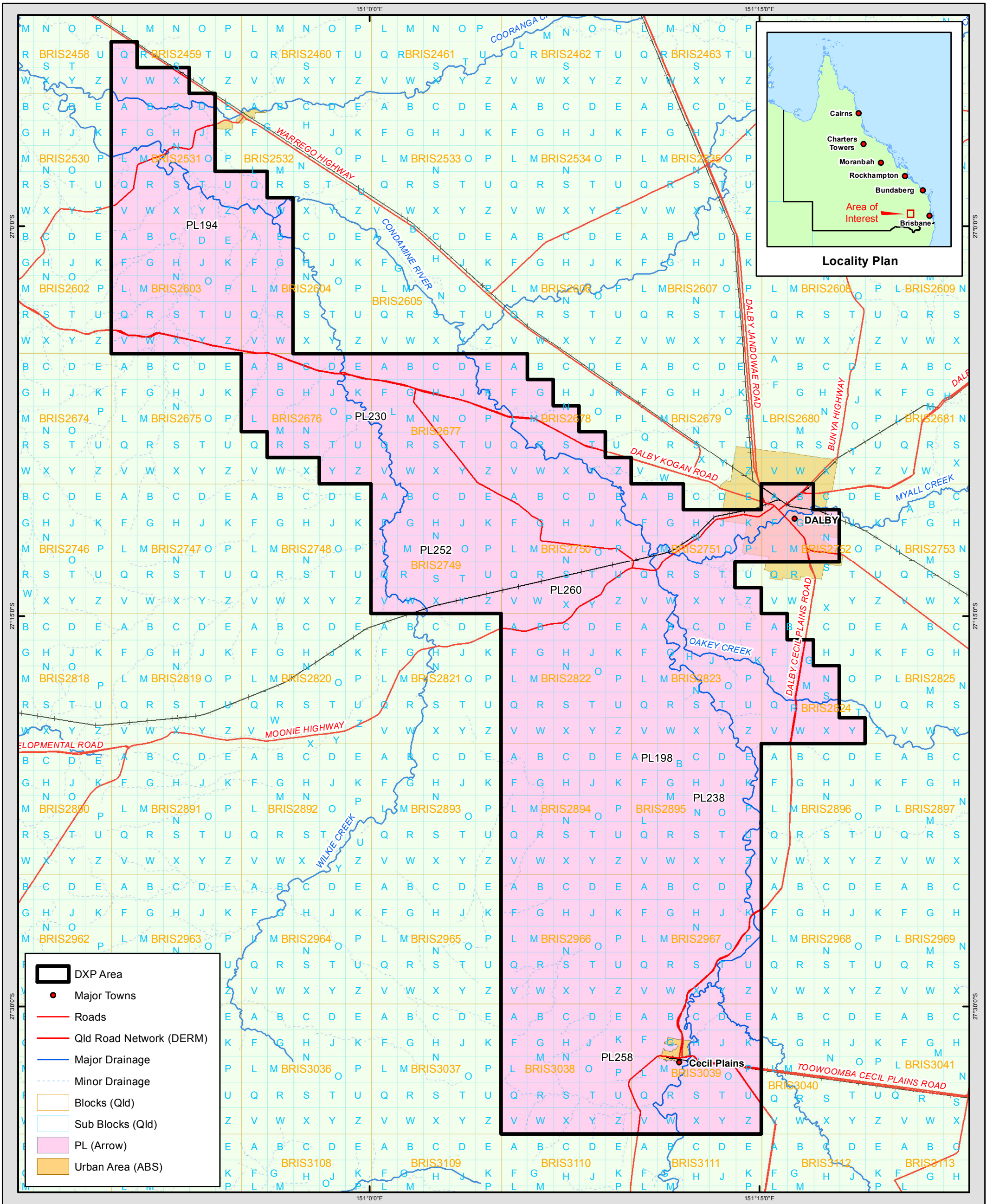
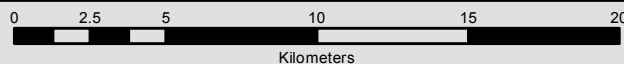


Figure 2: Block Identification Map (BIM) Blocks and Cadastral Information for the DXP

Source: Arrow Energy Pty Ltd
Geosciences Australia
Dept. Envir. and Resource Mgmt.

Date: 30/08/2013



Scale: 1:250,000 @ A3
Coordinate System: GCS GDA 1994



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ARROW ENERGY - SURAT GAS PROJECT

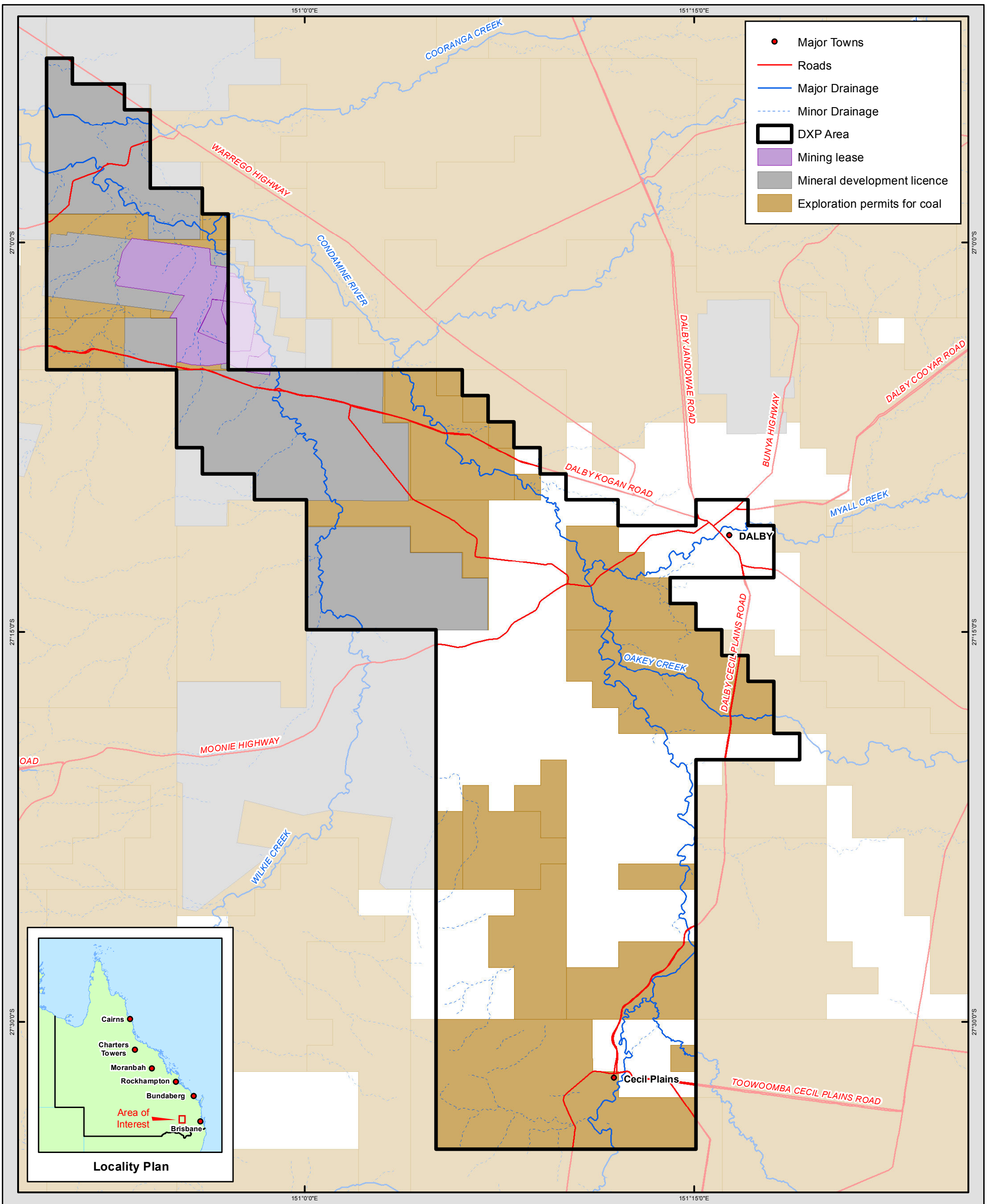
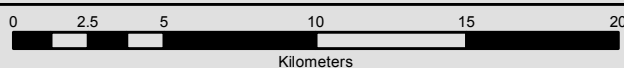


Figure 3: Mining Tenures in the region surrounding the DXP

Source: Arrow Energy Pty Ltd
Geosciences Australia
Dept. Envir. and Resource Mgmt.

Date: 30/08/2013



Scale: 1:250,000 @ A3
Coordinate System: GCS GDA 1994



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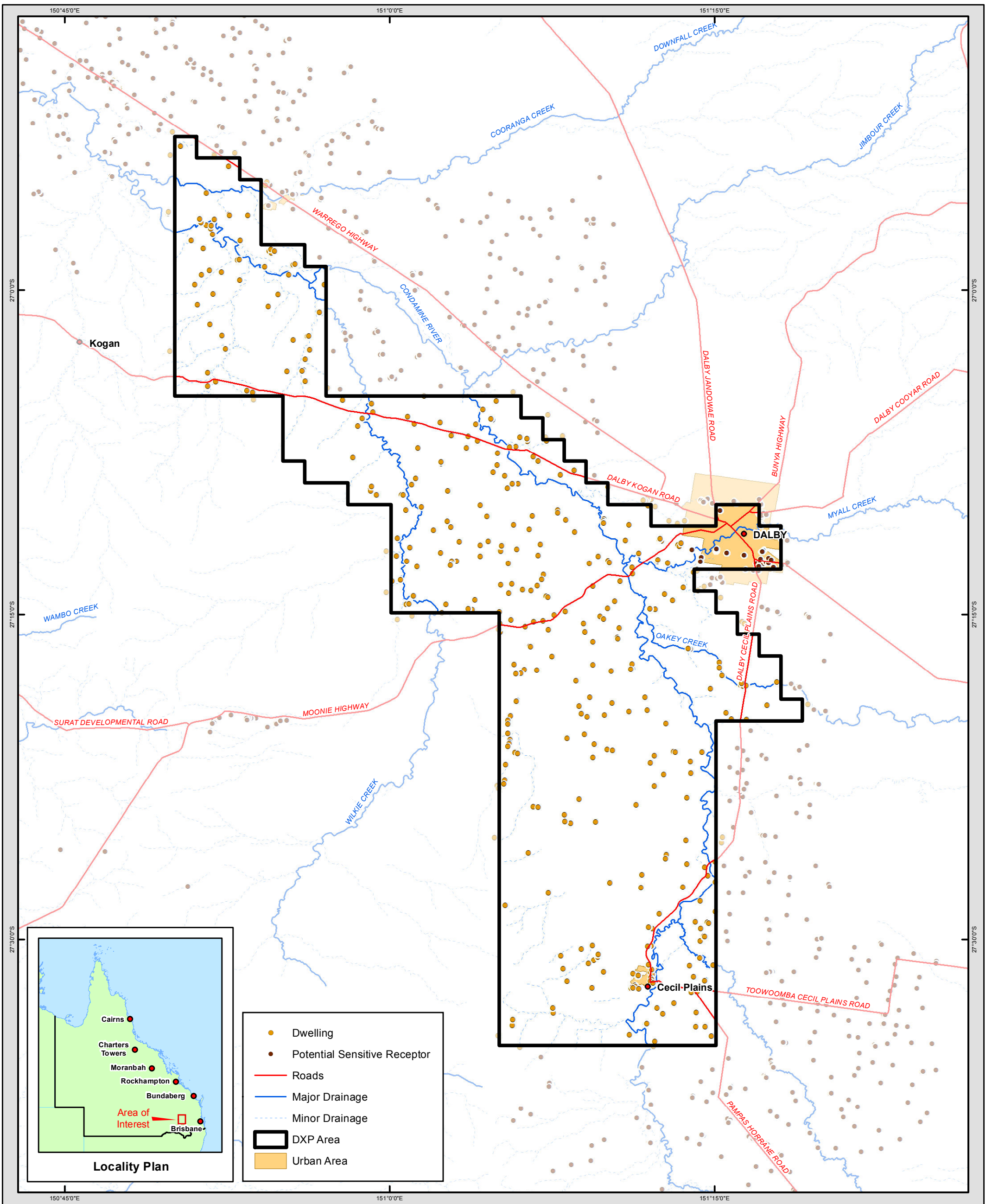
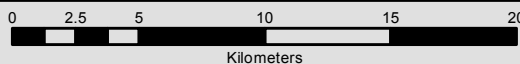


Figure 4: Potentially Affected Properties

Source: Arrow Energy Pty Ltd
Geosciences Australia
Dept. Envir. and Resource Mgmt.

Date: 30/08/2013



Scale: 1:300,000 @ A3
Coordinate System: GCS GDA 1994



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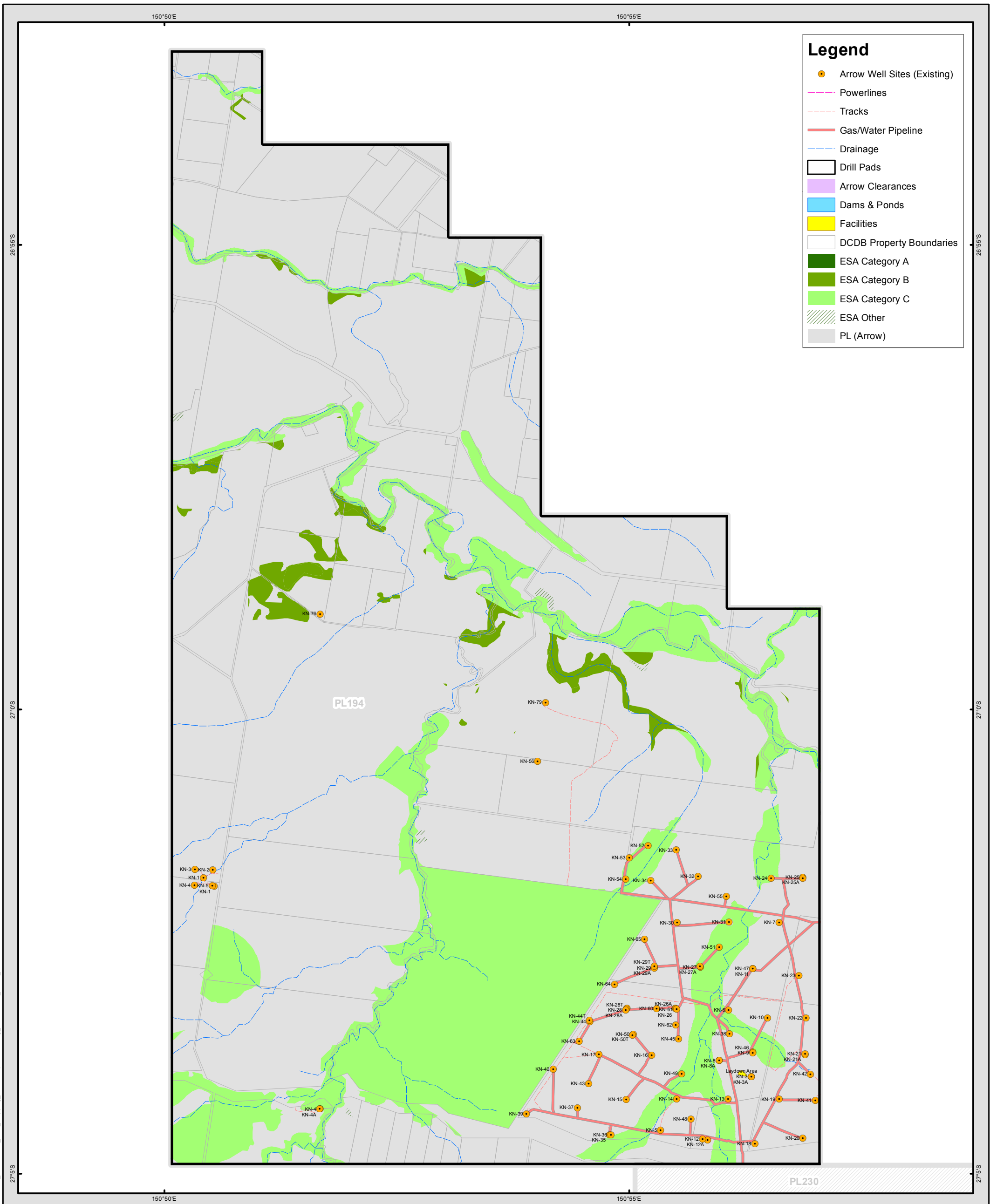
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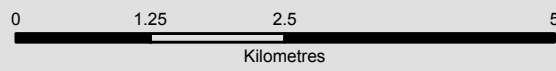


Legend

- Arrow Well Sites (Existing)
- Powerlines
- Tracks
- Gas/Water Pipeline
- Drainage
- Drill Pads
- Arrow Clearances
- Dams & Ponds
- Facilities
- DCDB Property Boundaries
- ESA Category A
- ESA Category B
- ESA Category C
- ▨ ESA Other
- PL (Arrow)

Figure 5a: Arrow Energy Existing Infrastructure on PL194

Date: 17/09/2013
 Source: Arrow Energy Pty Ltd
 Geosciences Australia
 DEHP



Coordinate System: GCS GDA 1994



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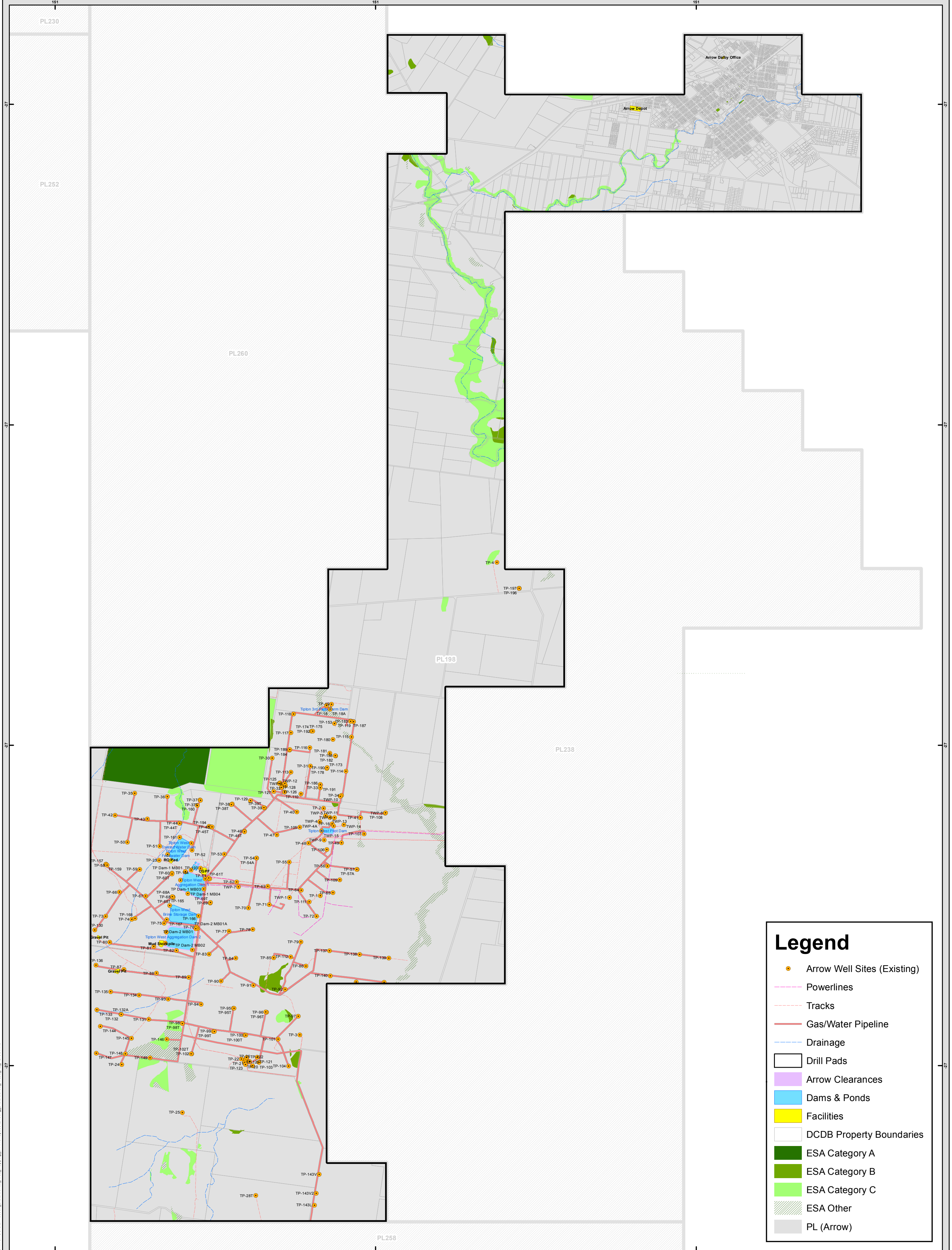
The dimensions, areas, number of lots, size & location of corridor information are approximate only and may vary.

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Legend

- Arrow Well Sites (Existing)
- Powerlines
- Tracks
- Gas/Water Pipeline
- Drainage
- Drill Pads
- Arrow Clearances
- Dams & Ponds
- Facilities
- DCDB Property Boundaries
- ESA Category A
- ESA Category B
- ESA Category C
- ESA Other
- PL (Arrow)

Source: Arrow Energy Pty Ltd
Geosciences Australia
Dept. Envir. and Resource Mgmt.

Date: 27/09/2013
Issued To: J Hayes
Author: jclother

Figure 5b: ArrowEnergy Existing Infrastructure on PL198

Scale: 1:72,150 @ A2
Coordinate System: GCS_GDA_1994



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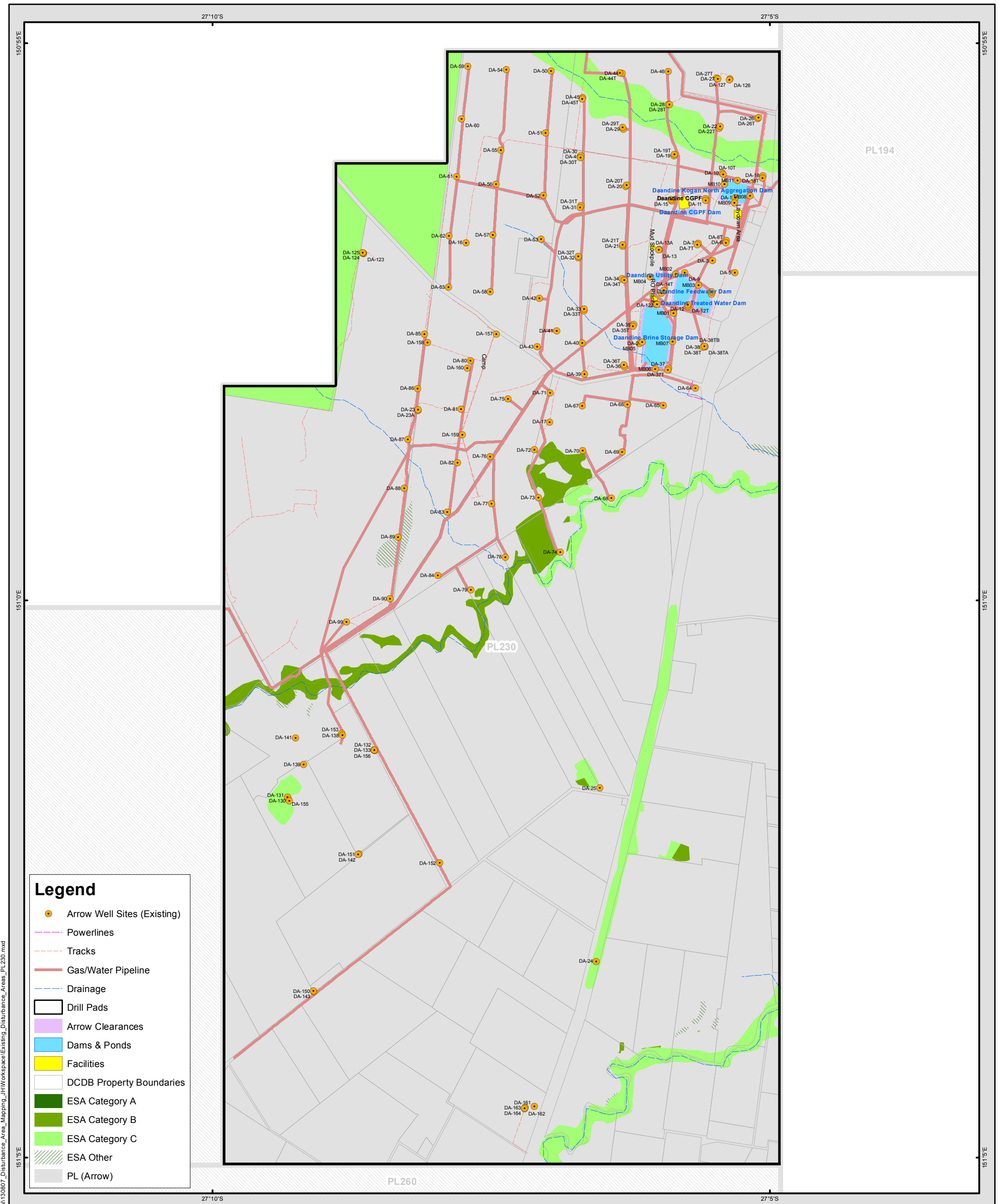
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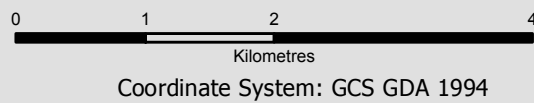


Legend

- Arrow Well Sites (Existing)
- Powerlines
- Tracks
- Gas/Water Pipeline
- Drainage
- Drill Pads
- Arrow Clearances
- Dams & Ponds
- Facilities
- DCDB Property Boundaries
- ESA Category A
- ESA Category B
- ESA Category C
- ESA Other
- PL (Arrow)

Figure 5c: Arrow Energy Existing Infrastructure on PL230

Date: 27/09/2013
 Source: Arrow Energy Pty Ltd
 Geosciences Australia
 DEHP



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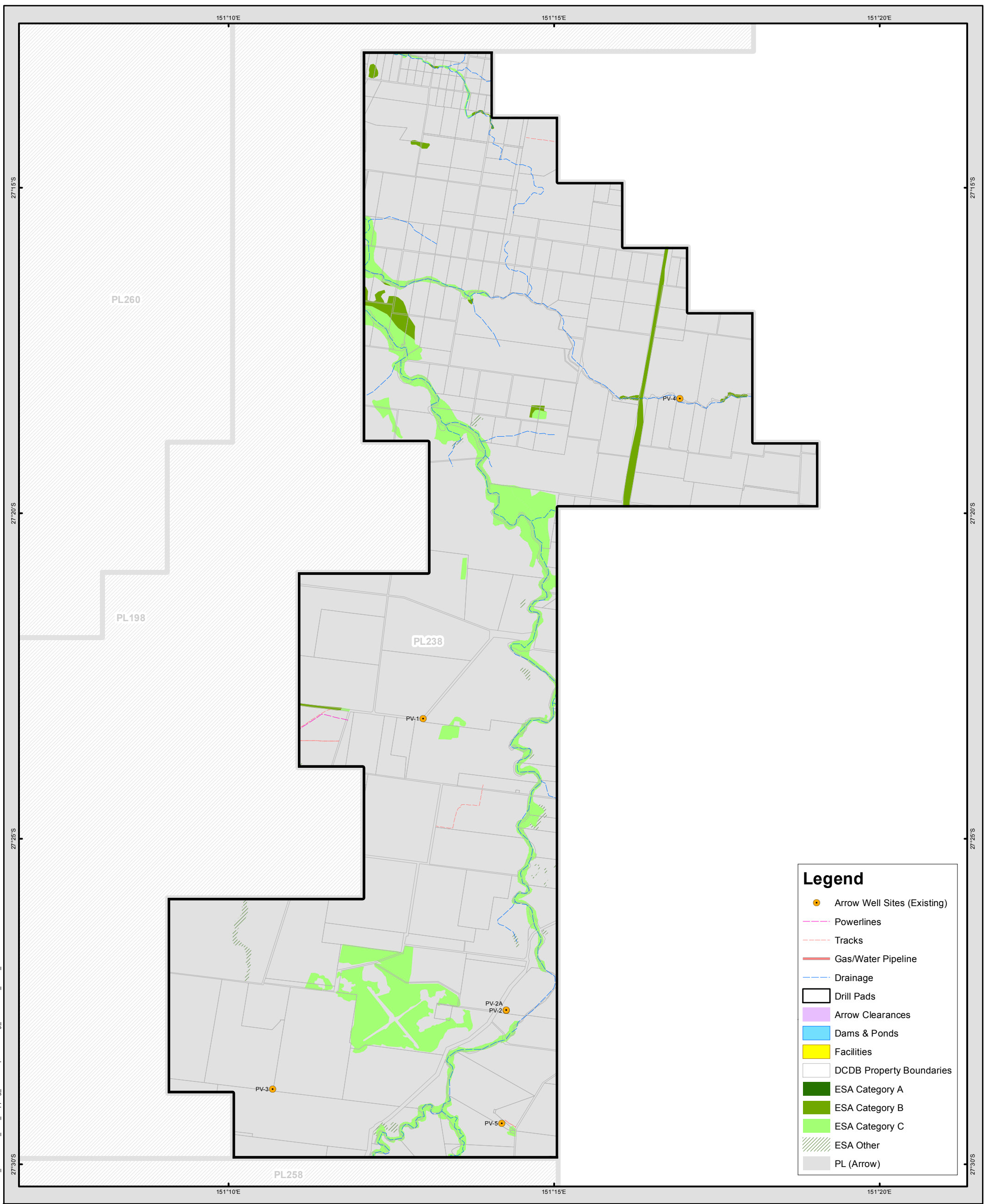
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Legend

- Arrow Well Sites (Existing)
- Powerlines
- Tracks
- Gas/Water Pipeline
- Drainage
- Drill Pads
- Arrow Clearances
- Dams & Ponds
- Facilities
- DCDB Property Boundaries
- ESA Category A
- ESA Category B
- ESA Category C
- ESA Other
- PL (Arrow)

Figure 5d: Arrow Energy Existing Infrastructure on PL238

Date: 17/09/2013
 Source: Arrow Energy Pty Ltd
 Geosciences Australia
 DEHP

0 2 4 8
 Kilometres
 Coordinate System: GCS GDA 1994



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Legend

● Arrow Well Sites (Existing)	□ Drill Pads	■ ESA Category A
— Powerlines	□ Arrow Clearances	■ ESA Category B
— Tracks	□ Dams & Ponds	■ ESA Category C
— Gas/Water Pipeline	□ Facilities	▨ ESA Other
— Drainage	□ DCDB Property Boundaries	■ PL (Arrow)

Figure 5e: Arrow Energy Existing Infrastructure on PL252

Date: 17/09/2013
 Source: Arrow Energy Pty Ltd
 Geosciences Australia
 DEHP

0 0.5 1 2
 Kilometres
 Coordinate System: GCS GDA 1994



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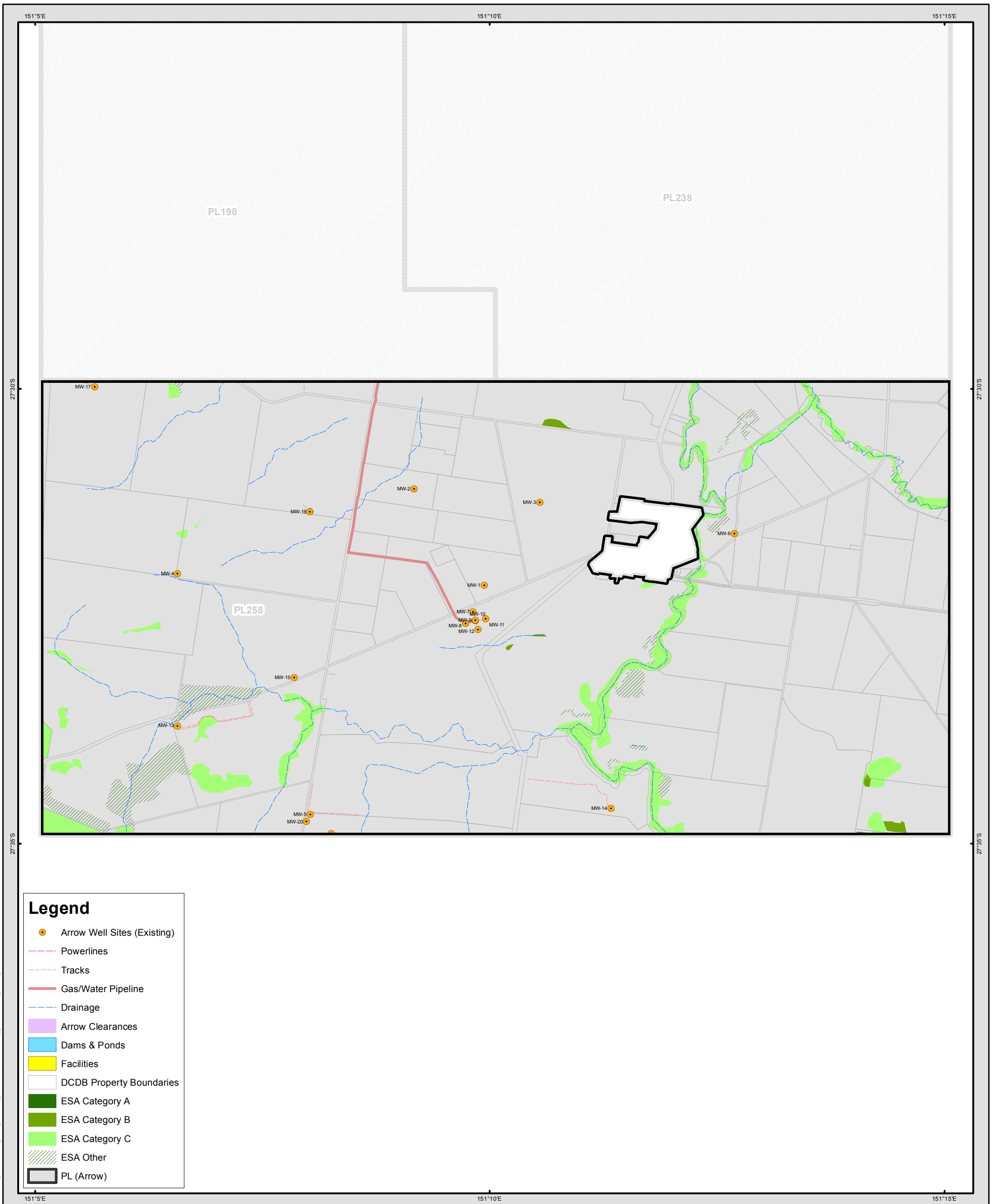
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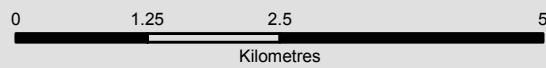
Legend

- Arrow Well Sites (Existing)
- Powerlines
- - - Tracks
- Gas/Water Pipeline
- Drainage
- Arrow Clearances
- Dams & Ponds
- Facilities
- DCDB Property Boundaries
- ESA Category A
- ESA Category B
- ESA Category C
- ESA Other
- PL (Arrow)

Figure 5f: Arrow Energy Existing Infrastructure on PL258

Date: 27/09/2013

Source: Arrow Energy Pty Ltd
Geosciences Australia
DEHP



Coordinate System: GCS GDA 1994



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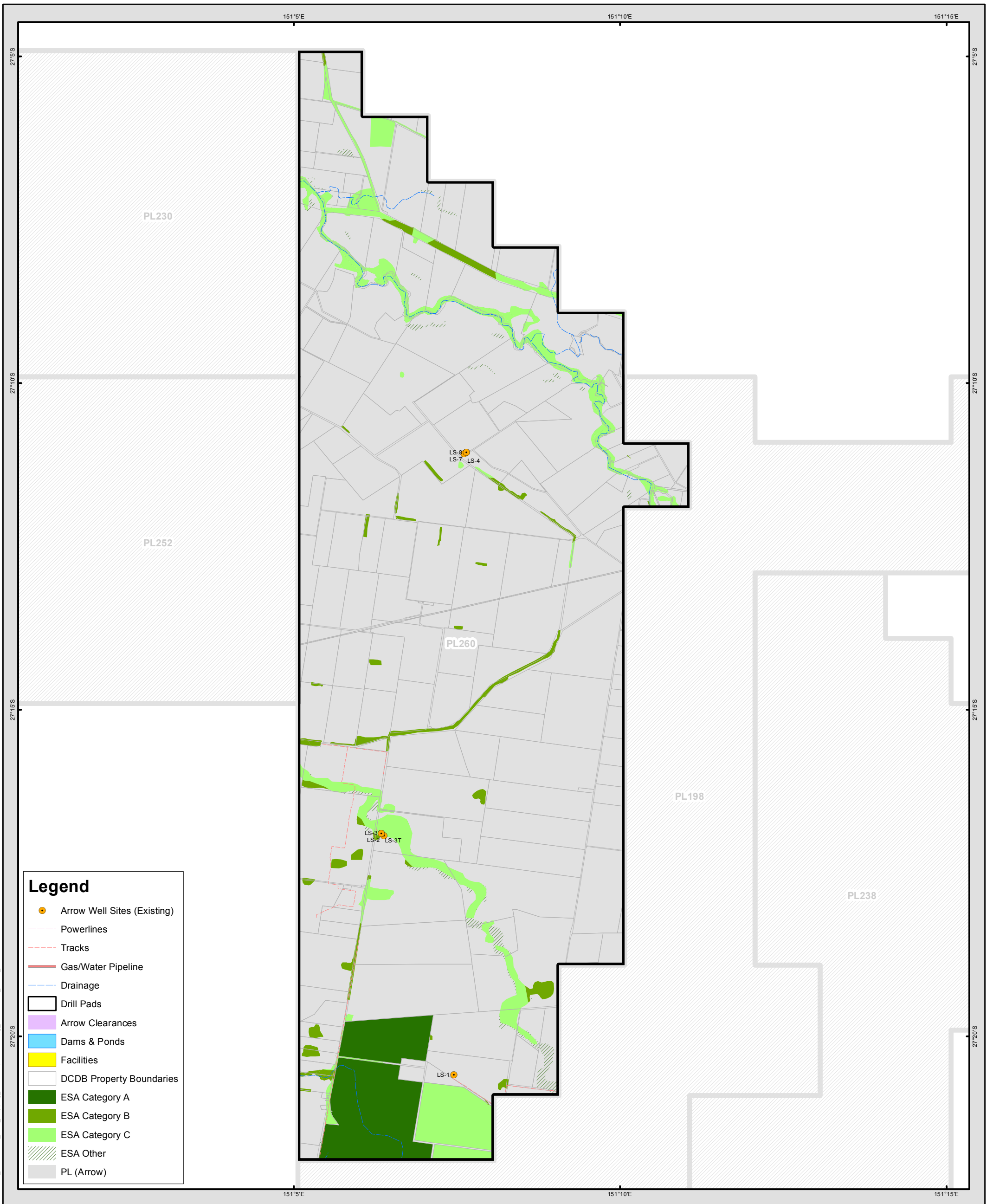
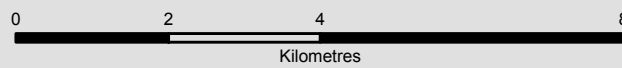


Figure 5g: Arrow Energy Existing Infrastructure on PL260

Date: 17/09/2013
 Source: Arrow Energy Pty Ltd
 Geosciences Australia
 DEHP



Coordinate System: GCS GDA 1994



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Compliance certificate

Strategic Cropping Land Act 2011

Strategic cropping land compliance certificate: SCLRD2013/000132

This certificate is given under s. 118 of the Strategic Cropping Land Act 2011, by the administering authority for the resource activities specified in this certificate, to be undertaken in accordance with the conditions in the specified part of the strategic cropping land standard conditions code for resource activities dated December 2012 (the SCL code).

This certificate was given on: **05 April 2013**

Certificate holder(s)	Address
Arrow Energy Pty Ltd	Level 19, 42-60 Albert Street, Brisbane, QLD 4000

This certificate is for **Part 3** of the SCL code.

This part of the SCL code entitles the holder to conduct resource activities on SCL or potential SCL that comply with Part 1, 2 or 3 of the SCL code (subject to all other required approvals).

Resource activities	Environmental authority	Location(s)
Water and gas pipelines, exploration wells, seismic surveys and proposed CSG treated water discharge release point.	PEN100449509	PL194, PL198, PL230, PL238, PL252, PL258, PL260

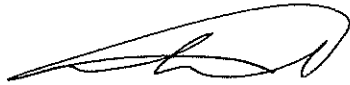
Notes:

1. Sections 76 and 77 of the *Strategic Cropping Land Act 2011* outline offences and penalties for permanently or temporarily impacting on strategic cropping land or potential strategic cropping land without a resource authority for the resource activity.

The conditions under the specified part of the SCL code for carrying out the resource activity on SCL or potential SCL are taken to be conditions of the environmental authority. Therefore, if conditions of the specified part of the SCL code are not complied with, there is no authority to undertake the resource activity.

Strategic Cropping Land compliance certificate

2. It is your responsibility to ensure that all required financial assurance is paid prior to carrying out, or allowing the carrying out of, any resource activities on strategic cropping land or potential strategic cropping land, in accordance with the SCL code.



Signature

05/04/2013

Date

Michael Watson

Project Manager
Delegate of the Chief Executive administering the
Strategic Cropping Land Act 2011
Department of Natural Resources and Mines

Enquiries:

Amy MacCartie
Natural Resource Management Officer
203 Tor Street, Toowoomba, QLD 4350
Phone: (07) 4529 1333
Fax: (07) 4529 1562

Permit

Environmental Protection Act 1994

Environmental authority EPPG00972513

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

Environmental authority number: EPPG00972513

Environmental authority takes effect on 19 August 2021

Environmental authority holder(s)

Names(s)	Registered address
ARROW ENERGY PTY LTD	Level 39 111 Eagle Street BRISBANE QLD 4001
AUSTRALIAN CBM PTY LTD	Level 39 111 Eagle Street BRISBANE CITY QLD 4000 Australia
ARROW (TIPTON) PTY. LTD.	Level 39 111 Eagle Street BRISBANE CITY QLD 4000 Australia
ARROW (DAANDINE) PTY. LTD.	Level 39 111 Eagle St BRISBANE CITY QLD 4000 Australia
ARROW CSG (AUSTRALIA) PTY LTD	Level 39 111 Eagle Street BRISBANE CITY QLD 4000 Australia
ARROW (TIPTON TWO) PTY LTD	Level 39 111 Eagle Street BRISBANE CITY QLD 4000 Australia
CLEANCO QUEENSLAND LIMITED	Comalco Place Level 32 12 Creek St BRISBANE CITY QLD 4000 Australia

Environmentally relevant activity and location details

Environmentally relevant activity/activities	Location(s)
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no- release works, with a total daily peak design capacity of, (a-i) 21 to 100EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL252

Resource Activity, Ancillary 14 - Electricity Generation, 1: Generating electricity by using gas at a rated capacity of 10MW electrical or more	PL238, PL258, PL252, PL194, PL198, PL230, PL260
Resource Activity, Ancillary 15 - Fuel burning, Using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour	PL238, PL258, PL252, PL194, PL198, PL230, PL260
Resource Activity, Ancillary 56 - Regulated Waste Storage Receiving and storing regulated waste	PL230
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no- release works, with a total daily peak design capacity of, (a-i) 21 to 100EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme.	PL198, PL230, PL260, PL238, PL258
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no- release works, with a total daily peak design capacity of, (b-i) more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL238, PL258, PL252, PL194, PL198, PL230, PL260
Resource Activity, Ancillary 64 - Water treatment, 2: Desalinating, in a day, the following quantity of water, allowing the release of waste to waters other than seawater, (b) more than 5ML	PL238, PL258, PL252, PL194, PL198, PL230, PL260
Resource Activity, Schedule 3, 06: A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL238, PL258, PL252, PL194, PL198, PL230, PL260
Resource Activity, Schedule 3, 07: A petroleum activity involving injection of a wastefluid into a natural underground reservoir or aquifer	PL238, PL258, PL252, PL194, PL198, PL230, PL260
Resource Activity, 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	PL238, PL258, PL252, PL194, PL198, PL230, PL260

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.

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

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

Date issued: 19 August 2021

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)

This environmental authority incorporates the following schedules:

- Schedule A – General
- Schedule B – Water
- Schedule BE – Coal Seam Gas Water Injection Trial
- Schedule C – Regulated Dams
- Schedule D – Land
- Schedule E – Acoustic
- Schedule F – Air
- Schedule G – Waste
- Schedule H – Rehabilitation
- Schedule I – Definitions

Words and phrases which are underlined are defined in *Schedule I – Definitions*.

Schedule A – General

- General 1 This environmental authority authorises the carrying out of the following resource activities:
- (a) The petroleum activities listed in *Schedule A, Table 1 – Authorised Petroleum Activities* to the extent they are carried out in accordance with the activity's corresponding total number and maximum disturbance;
 - (b) The following specified relevant activities:
 - i. Regulated waste storage – receiving and storing regulated waste other than tyres;
 - ii. Sewage treatment – operating sewage treatment works, other than no-release works, with a total daily peak design capacity of 21 to 100 EP;
 - (c) For the specified relevant activities listed in (General 1 (b)) above, another activity where Schedule 2 of the Environmental Protection Regulation 2008 (the Regulation) provides exemption for the activity, but only to the extent of the circumstances stated in Schedule 2 of the Regulation; and
 - (d) Incidental activities that are not otherwise specified relevant activities.
- General 2 This environmental authority does not authorise environmental harm unless a condition contained in this environmental authority explicitly authorises that harm. Where there is no condition, the lack of a condition shall not be construed as authorising harm.
- General 7 All monitoring must be undertaken by a suitably qualified person.
- General 8 If requested by the administering authority in relation to investigating a complaint, monitoring must be commenced within 10 business days.
- General 9 All laboratory analyses and tests must be undertaken by a laboratory that has NATA accreditation for such analyses and tests.
- General 10 Notwithstanding condition (General 9), 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.

Schedule A, Table 1 - Authorised Petroleum Activities

Petroleum Activity(ies)	Total Number of Authorised Petroleum Activities	Maximum Disturbance Authorised
Total coal seam gas wells, including: Core wells <u>Exploration wells</u> <u>Development wells</u> Production wells	1,566 wells	1,566 ha
Communication towers	10	10 units, 10 ha
Injection well(s) and associated facilities	1	4 ha
Compressor units	40	40 units, 8 ha
Central gas processing facilities	2	2 facilities, 8 ha
Regulated structures	22	22 dams
Water treatment facilities	2	12 ML/d (each), 2 ha
Sewage treatment plants	2	Less than 450 <u>EP</u> (each), 0.15 ha
Sewage treatment plants	10	Less than 100 <u>EP</u> (each), 0.15 ha
Power stations	1	40 MW, 1.2 ha

General 11 Monitoring and sampling must be carried out in accordance with the requirements of the following documents (as relevant to the sampling being undertaken), as amended from time to time:

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

- General 12 In addition to the requirements under Chapter 7, Part 1, Division 2 of the *Environmental Protection Act 1994*, the administering authority must be notified through the Pollution Hotline and in writing, as soon as possible, but within 48 hours of becoming aware of any of the following events:
- (a) any unauthorised significant disturbance to land
 - (b) potential or actual loss of structural or hydraulic integrity of a dam
 - (c) when the level of the contents of any regulated dam reaches the mandatory reporting level
 - (d) when a regulated dam will not have available storage to meet the design storage allowance on 1 November of any year
 - (e) potential or actual loss of well integrity
 - (f) when the seepage trigger action response procedure required under condition (Water 13(g)) is or should be implemented
 - (g) unauthorised releases of any volume of prescribed contaminants to waters
 - (h) unauthorised releases of volumes of contaminants, in any mixture, to land greater than:
 - i. 200 L of hydrocarbons; or
 - ii. 1 000 L of brine; or
 - iii. 5 000 L of untreated coal seam gas water; or
 - iv. 5 000 L of raw sewage; or
 - v. 10 000 L of treated sewage effluent.
 - (i) groundwater monitoring results from a landholder's active groundwater bore monitored under the stimulation impact monitoring program which is a 10% or greater increase from a previous baseline value for that bore and which renders the water unfit for its intended use
 - (j) monitoring results where two out of any five consecutive samples do not comply with the relevant limits in the environmental authority.
- General 13 Petroleum activities that cause significant disturbance to land must not be carried out until financial assurance has been given to administering authority as security for compliance with

the environmental authority and for any costs or expenses, or likely costs or expenses, mentioned in section 298 of the *Environmental Protection Act 1994*.

- General 16 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.
- General 17 All plant and equipment must be maintained and operated in their proper and effective condition.
- General 18 The following infrastructure must be signed with a unique reference name or number in such a way that it is clearly observable:
- (a) regulated dams and low consequence dams
 - (b) exploration, appraisal and development wells
 - (c) water treatment facilities
 - (d) brine encapsulation facilities
 - (e) landfill cells
 - (f) sewage treatment facilities
 - (g) specifically authorised discharge points to air and waters
 - (h) any chemical storage facility associated with the environmentally relevant activity of chemical storage

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- (i) field compressor stations
 - (j) central compressor stations
 - (k) gas processing facilities; and
 - (l) pipeline compressor stations.
- General 19 Measures to prevent fauna being harmed from entrapment must be implemented during the construction and operation of well infrastructure, dams and pipeline trenches.
- General 20 For activities involving significant disturbance to land, control measures that are commensurate to the site- specific risk of erosion, and risk of sediment release to waters must be implemented to:
- (a) allow stormwater to 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).
- General 21 Petroleum activities must not cause environmental nuisance at a sensitive place, other than where an alternative arrangement is in place.
- General 22 A certification must be prepared by a suitably qualified person within 30 business days of completing every plan, procedure, program and report required to be developed under this environmental authority, which demonstrates that:
- (a) relevant material, including current published guidelines (where available) have been considered in the written document
 - (b) the content of the written document is accurate and true; and
 - (c) the document meets the requirements of the relevant conditions of the environmental authority.
- General 23 All plans, procedures, programs, reports and methodologies required under this environmental authority must be written and implemented.
- General 24 All documents required to be developed under this environmental authority must be kept for five years.

- General 25 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.
- General 26 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 – Water

- Water 1 Contaminants that will or may cause environmental harm must not be directly or indirectly released to any waters, except as authorised by condition (B15).
- Water 2 The extraction of groundwater as part of the petroleum activity(ies) from underground aquifers must not directly or indirectly cause environmental harm to a wetland.
- Water 3 Petroleum activities must not occur in or within 200m of a:
- (a) wetland of high ecological significance, other than that authorised by *Schedule D, Table 3 — Significant residual impacts to prescribed environmental matters*
 - (b) Great Artesian Basin Spring
 - (c) subterranean cave GDE.
- Water 3A Despite condition (Water 3), petroleum activities may occur within 200m of a wetland of high ecological significance, provided they are directly associated with activities authorised per condition (Water 3(a)).
- Water 4 Only construction or maintenance of linear infrastructure is permitted in or within any wetland of other environmental value or in a watercourse.
- Water 5 A 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.
- Water 5 B 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.

Water 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 bankfull situation is not expected and that flow is maintained.

Water 7 The construction or maintenance of linear infrastructure authorised under condition (Water 4) must comply with the water quality limits as specified in *Schedule B, Table 1 – Release limits for construction or maintenance of linear infrastructure*.

Schedule B, Table 1 – Release limits for construction or maintenance of linear infrastructure

Water quality parameters	Units	Water quality limits
Turbidity	Nephelometric Turbidity Units (NTU)	For a <u>wetland of other environmental value</u> , 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 <u>watercourse</u> , 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 <u>wetland of other environmental value</u> , if background water turbidity is equal to, or below 45 NTU, a turbidity limit of no greater than 55 NTU applies, measured within a 50m radius of the construction or maintenance activity. For a <u>watercourse</u> , if background water turbidity is equal to, or below 45 NTU, a turbidity limit of no greater than 55 NTU applies, measured within 50m downstream of the construction or maintenance activity.
Hydrocarbons	-	For a <u>wetland of other environmental value</u> , or <u>watercourse</u> , no visible sheen or slick

Water 8 Monitoring must be undertaken at a frequency that is appropriate to demonstrate compliance with condition (Water 7).

Water 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 (GDA94) 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 (Water 8).

Water 10 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.

- Water 11 Petroleum activity(ies) on floodplains 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.
- Water 12 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 August 2019.
- Water 13 The seepage monitoring program required by condition (Water 12) 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 groundwater dependent ecosystems, landholder's active groundwater bores, or water supply bores
 - iii. provide for the early detection of negative impacts prior to reaching migration pathways to other formations (i.e. faults, areas of unconformities known to connect two or more formations)
 - (f) monitoring of groundwater at each background and seepage monitoring bore at least annually for the trigger parameters identified in condition (Water 13(b))

- (g) seepage trigger action response procedures for when trigger parameters and trigger levels identified in conditions (Water 13(b)) and (Water 13(c)) trigger the early detection of seepage, or upon becoming aware of any monitoring results that indicate potential groundwater contamination
- (h) a rationale detailing the program conceptualisation including assumptions, determinations, monitoring equipment, sampling methods and data analysis; and
- (i) provides for annual updates to the program for new containment facilities constructed in each annual return period.

Water 14 A bore drill log must be completed for each seepage monitoring bore in condition (Water 13) 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.

B15 The release of treated CSG water is authorised to occur in accordance with:

- (a) *Schedule B, Table 2 – Treated CSG Water Release Point, Source and Receiving Waters;*
- (b) *Schedule B Table 3 – Treated CSG Water Release Limits for Monitoring Point M1 – Daily Monitoring;* and
- (c) *Schedule B, Table 4 – Treated CSG Water Release Limits for Monitoring Point M1 – Quarterly Monitoring.*

B16 The quality of the treated CSG water being released must be:

- (a) monitored at the frequency specified, and
- (b) comply with each quality characteristic release limit and limit type,

specified in *Schedule B Table 3 – Treated CSG Water Release Limits for Monitoring Point M1 – Daily Monitoring* and *Schedule B, Table 4 – Treated CSG Water Release Limits for Monitoring Point M1 – Quarterly Monitoring* when measured at the monitoring point M1 specified in *Schedule B, Table 2 – Treated CSG Water Release Point, Source and Receiving Waters*.

Schedule B, Table 2 – Treated CSG Water Release Point, Source and Receiving Waters

Water Source and Location	Release Point	Location (GDA94, MGA zone 56)	Monitoring Point	Receiving Waters Description
Treated CSG Water from the reverse osmosis water treatment plant and treated water dam located on PL230	R1, defined as the outlet of discharge pipe to Wilkie Creek	6995465 mN 303004 mE	M1, defined as the sample point in the discharge pipeline point to release into Wilkie Creek	Wilkie Creek

Schedule B, Table 3 – Treated CSG Water Release Limits for Monitoring Point (M1) – Daily Monitoring

Quality Characteristic	Unit	Release Limit(s)	Limit Type	Monitoring Frequency
Electrical conductivity	µS/cm	580	80 th percentile, based on at least 5 samples with not less than 60 minutes between samples	Daily during release
pH	pH Unit	6.5 - 9	Range	Daily during release
Suspended Solids	mg/L	180	Maximum	Daily during release
Boron	mg/L	0.37	Maximum	Daily during release

Schedule B, Table 4 – Treated CSG Water Release Limits for Monitoring Point (M1) – Quarterly Monitoring

Quality characteristic	Unit	Maximum Release limit	Monitoring frequency
Aluminium	mg/L	0.2	The first release day of each quarter
Antimony	ml/L	0.003	
Arsenic	mg/L	0.007	
Barium	mg/L	0.7	
Bisphenol A	mg/L	0.2	
Boron	mg/L	4	
Bromide	mg/L	7	
BTEX			The first release day of each quarter
Benzene	mg/L	0.001	
Toluene	mg/L	0.8	
Ethylbenzene	mg/L	0.3	
Xylene (m & p)	mg/L	0.6	
Cadmium	mg/L	0.002	
Chromium	mg/L	0.05	
Copper	mg/L	2	

Quality characteristic	Unit	Maximum Release limit	Monitoring frequency
Cyanide	mg/L	0.08	The first release day of each quarter
Fluoride	mg/L	1.5	
Iodide	mg/L	0.5	
Iron	mg/L	0.3	
Lead	mg/L	0.01	
Manganese	mg/L	0.5	
Mercury	mg/L	0.001	
Molybdenum	mg/L	0.05	
Nickel	mg/L	0.02	
Nonylphenol	mg/L	0.5	
PAH (as B(a)P TEF) Species: benz[a]anthracene benzo[b+j]fluoranthene benzo[k]fluoranthene benzo[a]pyrene chrysene dibenz[a,h]anthracene indeno[1,2,3-cd]pyrene	TEF: 0.1 0.1 0.1 1.0 0.1 1.0 0.1	µg/L	The first release day of each quarter
Selenium	mg/L	0.01	
Silver	mg/L	0.1	
Strontium	mg/L	4	
Total Petroleum Hydrocarbons (TPH)	mg/L	0.2	
Vanadium	mg/L	0.05	
Zinc	mg/L	3	
Radium-226 Lead-210 Polonium-210 Radium-228	mSv/year	0.5 The dose for each parameter is summed to give the total dose which must be less than or equal to 0.5 mSv/year	

B17

If the monitoring required by condition (B16) indicates that any of the quality characteristic release limits specified in *Schedule B, Table 4 – Treated CSG Water Release Limits for Monitoring Point M1 – Quarterly Monitoring* have been exceeded at any time during any release of treated CSG water, the environmental authority holder must, within five (5) business days of notifying the administering authority of the exceedance, unless a longer time is agreed to by the administering authority:

- (a) complete an investigation into the exceedance, which includes an analysis of the (potential and actual) causes for the exceedance; and
- (b) provide a written report to the administering authority on completion of the investigation that includes:

- i. details of the investigation carried out;
- ii. any actions taken to prevent impacts to waters that may be used for drinking water;
- iii. the cause for the exceedance;
- iv. all water quality monitoring results pertaining to the investigation;
- v. any general observations;
- vi. methodology(ies) and any relevant calculations used; and
- vii. corrective actions to rectify the cause of the exceedance.

B18 Where an exceedance of a quality characteristic release limit specified in *Schedule B, Table 4 – Treated CSG Water Release Limits for Monitoring Point M1 – Quarterly Monitoring* is being investigated in accordance with condition (B17), the investigation and reporting required by condition (B17) is not required if a subsequent exceedance occurs, during investigation of the initial exceedance, which has resulted from the same cause that triggered the initial exceedance.

B19 Prior to commencing any release of treated CSG water authorised under this environmental authority, a stream flow gauging station (GP1) must be installed.

B20 The stream flow gauging station (GP1) must be installed in accordance with *Schedule B, Table 5 – Contaminant Release During Flow Events*.

Schedule B, Table 5 – Contaminant Release During Flow Events

Receiving water description	Gauging station description	Latitude or northing (GDA94)	Longitude or easting (GDA94)	Minimum Flow in Receiving Water Required for a Release Event	Flow recording Frequency
Wilkie Creek	Gauging station 1 (GP1)	50-100 metres upstream of Release Point R1	50-100 metres upstream of Release Point R1	0.14 m ³ /s	At 6 hour intervals during discharge (minimum twice daily)

B21 The flow rate of treated CSG water released from the release point authorised in *Schedule B, Table 2 – Treated CSG Water Release Point, Source and Receiving Waters* must not exceed a ratio of 1 part of the flow rate of the treated CSG water being released to 4 parts of the measured upstream receiving water flow rate.

- B22 The volume of treated CSG water released from the release point authorised in *Schedule B, Table 2 – Treated CSG Water Release Point, Source and Receiving Waters* must not exceed a maximum of 8ML/day.
- B23 The following characteristics of the treated CSG water released must be measured and recorded daily during all release events:
- (a) the volume of treated CSG water released through the release point R1;
 - (b) the date and time of release commencing and ceasing;
 - (c) the release rate;
 - (d) for any change in the release rate:
 - i. the date and time of the change;
 - ii. the new release rate; and
 - iii. water levels and flow rate during the discharge event.
 - (e) water levels and flow rate during the discharge event;
 - (f) water quality characteristics monitoring results; and
 - (g) details of any observed impacts/conditions.
- B24 Prior to commencing any release of treated CSG water authorised under this environmental authority, each monitoring and release point specified in *Schedule B, Table 2 – Treated CSG Water Release Point, Source and Receiving Waters* must be marked and readily identifiable from the banks of Wilkie Creek.
- B25 The quality of the receiving waters must be monitored daily during release of treated CSG water at locations representative of the receiving waters determined in accordance with condition (B31), for the following water quality characteristics:
- (a) Electrical conductivity ($\mu\text{S}/\text{cm}$);
 - (b) pH (pH Unit);
 - (c) Turbidity (NTU);
 - (d) Suspended Solids (mg/L);
 - (e) Calcium (mg/L);

- (f) Magnesium (mg/L);
- (g) Fluoride (mg/L);
- (h) Sulphate (mg/l); and
- (i) Boron (mg/L).
- B26 If water has been released from authorised release points listed in *Schedule B, Table 2 – Contaminated Release Points, Sources and Receiving Waters*, the holder of this environmental authority must undertake an annual assessment of the contaminants of treated CSG water to determine the risk of environmental harm from release of treated CSG water to surface waters. This should consider the contaminants mentioned in the ANZECC & ARMCANZ 2000 guidelines. This annual assessment must be included in the Annual Return.
- B27 Prior to the release of treated CSG water to Wilkie Creek a Receiving Environment Monitoring Program (REMP) must be developed and implemented to monitor, identify and describe any adverse impacts to surface water environmental values, water quality and flows due to the authorised release of treated CSG water to Wilkie Creek.
- B28 The REMP required by condition (B27) must include periodic monitoring for the effects of the release on the receiving environment as a result of treated CSG water releases to waters from the release location (R1) specified in Table B15 - Treated CSG Water Release Point, Source and Receiving Waters.
- B29 The quality of the receiving waters must be monitored at the locations specified in Schedule B, *Table 6 – Receiving Water Upstream Background Sites and Downstream Monitoring Points*.

Schedule B, Table 6 – Receiving Water Upstream Background Sites and Downstream Monitoring Points

Monitoring Points	Receiving Waters	Northing (GDA94)	Easting (GDA94)
Upstream background monitoring point			
Monitoring Point (M2)	Wilkie Creek	50 – 100 metres upstream of Release Point R1	50 – 100 metres upstream of Release Point R1
Downstream monitoring point			
Monitoring Point (M3)	Wilkie Creek	150 – 200 metres downstream of Release Point R1	150 - 200 metres downstream of Release Point R1

B30 The REMP required by Condition (B27) must:

- (a) assess the condition or state of receiving waters, including upstream conditions, spatially within the REMP area, considering background water quality characteristics based on accurate and reliable monitoring data that takes into consideration temporal variation (e.g. seasonality);
- (b) be designed to facilitate assessment against water quality objectives for the relevant environmental values that need to be protected;
- (c) include monitoring from background reference sites (e.g. upstream or background) and downstream sites from the release;
- (d) specify the frequency and timing of sampling required in order to reliably assess ambient conditions and to provide sufficient data to derive site specific background reference values in accordance with the Queensland Water Quality Guidelines 2006. This should include monitoring during periods of natural flow irrespective of other discharges;
- (e) include monitoring and assessment of dissolved oxygen saturation and temperature and all water quality parameters listed in Condition (B25);
- (f) include, where appropriate, monitoring of metals/metalloids in sediments (in accordance with ANZECC & ARMCANZ 2000, BATLEY and/or the most recent version of *AS5667.1 Guidance on Sampling of Bottom Sediments*);
- (g) include, where appropriate, monitoring of macroinvertebrates in accordance with the AusRivas methodology;
- (h) apply procedures and/or guidelines from ANZECC and ARMCANZ 2000 and other relevant guideline documents;
- (i) describe sampling and analysis methods and quality assurance and control; and
- (j) incorporate stream flow and hydrological information in the interpretations of water quality and biological data.

B31 A report outlining the findings of the REMP, including all monitoring results and interpretations in accordance with conditions (B27) to (B30) must be prepared annually. This must include a determination of the risk of environmental harm from release of treated CSG water to the receiving environment waters.

Schedule BE – Coal Seam Gas Water Injection Trial

BE1 The only fluids authorised to be injected into an aquifer(s) are those fluid types specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection*.

Schedule BE, Table 1 – Details of Authorised Fluid Injection

Well Location (GDA94, MGA zone 56)	Injection Well Number / Reference	Target Formation and Perforated Zone	Fluid Type	Maximum Injection Rate ML/d	Hydraulic Impact Zone	Water Quality Impact Zone
313669 mE 6967949 mN	Tipton-193	Precipice Formation, between 1040m to 1110m depth	Treated CSG water ¹	4	9,340 m radius from injection well	148 m radius from injection well

¹ Treated CSG water means any fluid that contains any proportion of treated CSG water, blended or otherwise.

BE2 Fluid injection must be in accordance with the quantities and locations listed in *Schedule BE, Table 1 – Details of Authorised Fluid Injection*.

BE3 The holder of this environmental authority must notify the administering authority the commencement date of the trial at least seven (7) days prior to its commencement.

BE4 The injection trial is limited to a period of 180 days of injection, followed by a six-month recovery period.

BE5 Injection must cease immediately upon becoming aware that environmental harm is caused or threatened to be caused as a result of the injection activities.

BE6 The construction of the Tipton-193 injection well must be carried out in accordance with the well construction requirements described in the most recent version of the Department of Environment and Heritage Protection's "CSG Water Injection Well Construction Requirements", as amended from time to time.

BE7 The Tipton-193 injection well must be mechanically functional such that there is no significant fluid movement into a water resource aquifer through vertical channels adjacent to the well bore hole.

BE8 The construction, operation and maintenance of the injection well specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* must be undertaken in a way that prevents and/or minimises impacts to the environmental values of the target formation and ensures the integrity of the bore.

BE9 The injection pressure must not exceed 90 percent of the formation fracture pressure.

BE10 The quality of the fluid being injected into the injection well specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* must comply with the contaminant limits prescribed in *Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid*.

Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid

Quality Characteristics	Release Limits	Limit Type
pH (pH units)	Minimum 6.5, Maximum 10	Range
Total Dissolved Solids (TDS) ¹	Mean TDS of injection fluid must not exceed median TDS of formation water measured in background water quality monitoring well	Maximum
Dissolved Oxygen	500 µg/L	Maximum
Total suspended solids	25 mg/L	Maximum

¹ Electrical conductivity is an acceptable proxy measurement for measuring TDS of the injection fluid. If used, the conversion from EC to TDS must be stated and confirmed with laboratory monitoring results.

BE11 A The quality of the fluid being injected into the injection well specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* must be monitored at the frequency specified in *Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid*.

BE11 B The administering authority must be notified in writing as soon as reasonably practicable, but within 48 hours of becoming aware of:

- (a) migration of injected fluid out of the target formation; or
- (b) a loss of hydraulic isolation of the target formation; or
- (c) the detection of groundwater contaminants that were not detected in background samples; or
- (d) an injection fluid monitoring result that does not comply with any one of the parameters in *Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid*.

Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid

Monitoring parameter	Unit	Monitoring frequency during injection
Temperature of target formation	°C	N/A
Injection fluid temperature	°C	Continuous
Inlet pressure	KPa	Continuous
Fluid flow rate	L/sec	Continuous
	ML/day	Daily
Dissolved Oxygen (DO)	µg/L	Daily
Electrical Conductivity	µS/cm	Daily
pH	pH units	Daily
Turbidity	NTU	Daily
Sodium	mg/L	Weekly
Potassium	mg/L	Weekly
Calcium	mg/L	Weekly
Magnesium	mg/L	Weekly
Chloride	mg/L	Weekly
Sulphate as SO ₄	mg/L	Weekly
Carbonate / Bicarbonate	mg/L	Weekly
Bromine	mg/L	Monthly
Fluoride	mg/L	Monthly
Iodide	mg/L	Weekly
Silica	mg/L	Monthly
Iodine	mg/L	Monthly
Nitrate	mg/L	Monthly
Total organic carbon	mg/L	Weekly
Total Dissolved Solids	mg/L	Weekly
Redox Potential	mV	Weekly
Total Hardness as CaCO ₃	mg/L	Weekly

Monitoring parameter	Unit	Monitoring frequency during injection
Total Alkalinity as CaCO ₃	mg/L	Weekly
Hydroxide alkalinity as CaCO ₃	mg/L	Weekly
Carbonate Alkalinity as CaCO ₃	mg/L	Weekly
Bicarbonate Alkalinity as CaCO ₃	mg/L	Weekly
Total suspended solids	mg/L	Weekly
Bromide	mg/L	Weekly
Aluminium	mg/L	Monthly
Arsenic	mg/L	Monthly
Barium	mg/L	Monthly
Boron	mg/L	Monthly
Copper	mg/L	Monthly
Iron	mg/L	Monthly
Manganese	mg/L	Monthly
Mercury	mg/L	Monthly
Nickel	mg/L	Monthly
Strontium	mg/L	Monthly
Zinc	mg/L	Monthly
Total Petroleum Hydrocarbons	µg/L	Monthly
<u>BTEX</u>	µg/L	Monthly

BE12 Notwithstanding conditions (BE9) and (BE10), the injection of treated CSG water into the injection well specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* must have considered the recommendations for water blending described in the following documents, where appropriate:

- (a) Surat Gas Project – Geochemical Blending and Compatibility Study: Tipton Injection Trials, March 2013; and
- (b) Surat Gas Project – Geochemical Blending and Compatibility Study: Tipton Injection Trials – Phase 2, March 2013.

- BE13 The holder of this environmental authority must provide for non-chemical disinfection of injection fluid if results of six-monthly testing of injected fluid show levels of coliform bacteria, sulphate reducing bacteria or iron fixing bacteria that has potential to cause adverse impacts on the groundwater within the target formation.
- BE14 An Injection Management Plan which has been certified by a suitably qualified person must be developed and implemented prior to the carrying out of the trial fluid injection activity(ies).
- BE15 The Injection Management Plan must include but not necessarily be limited to:
- (a) estimated volumes and rates of water to be injected;
 - (b) a description of the physical, chemical and biological components and their concentrations of the water to be produced;
 - (c) details of how and where the fluid will be produced, aggregated, stored and kept separate from other waters until it is treated and injected;
 - (d) details of where the fluid is proposed to be treated including a description of the treatment process;
 - (e) a water quality compatibility assessment which demonstrates that the injection fluid has inconsequential reactivity with the target formation and native groundwater it will come into contact with;
 - (f) the regional characteristics of the receiving environment;
 - (g) identification of the water quality impact zone and the hydraulic impact zone;
 - (h) identification of any fluid injection well, all existing bores, springs, lakes, wetlands, environmental assets and watercourses connected to groundwater, faults and other geologic features that occur within the water quality impact zone and the hydraulic impact zone;
 - (i) identification of the environmental values and water quality objectives of the potential water quality impact zone of the target formation in accordance with the *Environmental Protection (Water) Policy 2009* and the *Queensland Water Quality Guidelines 2009*;
 - (j) an assessment of the potential for migration of injection fluid or native groundwater out of the target formation through wells, bores, springs, connected watercourses, faults or other geologic features likely to impact on other aquifers;
 - (k) a risk assessment identifying potential hazards, their inherent risk, preventative measures for the management of potential hazards and details on sampling and analysis methods to verify preventative measures of potential hazards, including frequency and locations and quality assurance and control;

- (l) control measures that will be implemented for fluid storage, treatment and injection to prevent or control the release of a contaminant or waste to the environment other than the release authorised in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* and *Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid*;
- (m) verification methods to assess performance of the injection activities;
- (n) the indicators or other criteria against which the performance of fluid injection will be assessed;
- (o) procedures that will be adopted to regularly review the monitoring program;
- (p) reporting procedures to management and the administering authority should unforeseen or non-compliant monitoring results be recorded; and
- (q) procedures that will be implemented to prevent unauthorised environmental harm from unforeseen or non-compliant monitoring results.

BE16 A Receiving Environment Monitoring Program (REMP) for Injection Activities which has been certified by a suitably qualified person must be developed and implemented to monitor, identify and describe any adverse impacts to the following values of the target formation due to the injection of treated CSG water:

- (a) hydraulic response;
- (b) water quality response; and
- (c) any other groundwater environmental values identified.

BE17 The REMP for Injection Activities required by condition (BE16) must be developed and implemented prior to the carrying out of the trial fluid injection activity(ies).

BE18 The REMP for Injection Activities required by condition (BE16) must include, but not necessarily be limited to:

- (a) methods to validate the assumptions, predicted impacts and the effectiveness of the proposed preventative measures associated with the modelled water quality impact zone and hydraulic impact zone;
- (b) monitoring of the hydraulic response to the trial injection at the well(s) referred to in condition (BE18)(f)(ii);
- (c) monitoring of the water quality of the injection fluid during injection for the parameters listed in *Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid*;

- (d) monitoring of the water quality response following the completion of the injection trial recovery period through sampling of the target aquifer, within the water quality impact zone, for the parameters listed in *Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid*;
- (e) a definition of the background water quality of the Precipice Sandstone to be used for monitoring compliance with *Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid* and for reporting in the Injection Trial Report required by condition (BE19);
- (f) the installation and use of a minimum of two wells:
 - i. one of which accesses the target aquifer within the water quality impact zone; and
 - ii. the other of which is placed at an adequate distance to determine the extent of the hydraulic response to the injection;
- (g) methods for the analysis and interpretation and a description of the statistical basis on which conclusions will be drawn to verify the assumptions of the injection proposal; and
- (h) a demonstration of how the REMP will validate assumptions, predicted impacts and the effectiveness of quality assurance and control measures.

BE19 Upon completion and within two (2) months of the completion of the injection trial's recovery period the holder of the authority must submit to the administering authority an Injection Trial Report prepared by a suitably qualified person.

BE20 The Injection Trial Report must include, but not necessarily be limited to:

- (a) details of the injection well including but not limited to:
 - i. location details (GDA94);
 - ii. the inferred lithology *;
 - iii. casing details including type, outer diameter (mm), wall thickness (mm) and locations (depth from and to in metres);
 - iv. cementing details including type, hole diameter (mm), casing outer diameter (mm) and locations (depth from and to in metres);
 - v. calculated target formation fracture pressure; and
 - vi. target formation pressure prior to injection;

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- (b) a detailed interpretation of the logs and other tests conducted during drilling and construction or refurbishment of the well against their specific objectives;
 - (c) a completed well schematic diagram;
 - (d) a temperature survey;
 - (e) a cement integrity log;
 - (f) outcomes of the injection trial including, but not limited to:
 - i. well head injection rates versus formation pressure;
 - ii. target formation pressure within the hydraulic impact zone during and upon completion of the trial;
 - iii. hydraulic gradient of the target formation within the hydraulic impact zone upon completion of the trial;
 - iv. the effectiveness of aquitards (including the stability of the aquitard) and aquicludes of confining the injected fluid within the target formation; and
 - v. a detailed interpretation of the logs and other tests conducted during the injection trial against their specific objectives;
 - vi. validation of conceptual framework for injection; and
 - vii. additional hazards that were not identified earlier;
 - (g) the results of the REMP for Injection Activities;
 - (h) analysis of monitoring and operational data in terms of:
 - i. validation of conceptual framework for injection; and
 - ii. additional hazards that were not identified earlier;
 - (i) a revised risk analysis that identifies all potential hazards, likelihood of various risk elements and associated consequences;
 - (j) a revised water quality compatibility assessment which demonstrates that the injection fluid has inconsequential reactivity with the target formation and native groundwater it will come into contact with;
 - (k) a re-evaluation of the hydraulic impact zone; and
 - (l) a re-evaluation of the water quality impact zone.

* Inferred lithology means the best available description of the lithology based upon historical drilling records, interpretation of logs and any other information that the suitably qualified person may have discovered.

BE21 Following completion of the injection trial, a fluid injection cessation report which has been certified by a suitably qualified person must be submitted to the administering authority within two (2) months of completion of the injection trial's recovery period.

BE22 The fluid injection cessation report must include, but not necessarily be limited to:

- (a) volumes of fluid injected at each well;
- (b) a risk assessment statement providing details on identified hazards including their inherent risk, summary of the results from the verification monitoring, preventative measures and the residual risk; and
- (c) a monitoring report outlining the methods and results of verification monitoring undertaken to assess the performance of the injection activities and preventative measures for identified hazards.

Schedule C – Regulated Dams

- Dams 1 The consequence category of any structure must be assessed by a suitably qualified and experienced person in accordance with the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)* at the following times:
- (a) prior to the design and construction of the structure, if it is not an existing structure; or
 - (b) prior to any change in its purpose or the nature of its stored contents.
- Dams 2 A consequence assessment report and certification must be prepared for each structure assessed and the report may include a consequence assessment for more than one structure.
- Dams 3 Certification must be provided by the suitably qualified and experienced person who undertook the assessment, in the form set out in the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)*.
- Dams 4 Conditions (Dams 5) to (Dams 9) inclusive do not apply to existing structures.
- Dams 5 All regulated structures must be designed by, and constructed under the supervision of, a suitably qualified and experienced person in accordance with the requirements of the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/19338)*.
- Dams 6 Construction of a regulated structure is prohibited unless:
- (a) the holder of this environmental authority has submitted a consequence category assessment report and certification to the administering authority; and
 - (b) certification for the design, design plan and the associated operating procedures has been certified by a suitably qualified and experienced person in compliance with the relevant condition of this authority.
- Dams 7 Certification must be provided by the suitably qualified and experienced person who oversees the preparation of the design plan in the form set out in the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/19338)*, and must be recorded in the Register of Regulated Structures.
- Dams 8 Regulated structures must:
- (a) be designed and constructed in compliance with the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/19338)*;
 - (b) be designed and constructed with due consideration given to ensuring that the design integrity would not be compromised on account of:

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- i. floodwaters from entering the regulated dam from any watercourse or drainage line; and
 - ii. wall failure due to erosion by floodwaters arising from any watercourse or drainage line.
- (c) have the floor and sides of the dam designed and constructed to prevent or minimise the passage of the wetting front and any entrained contaminants through either the floor or sides of the dam during the operational life of the dam and for any period of decommissioning and rehabilitation of the dam.
- Dams 9 Certification by the suitably qualified and experienced person who supervises the construction must be submitted to the administering authority on the completion of construction of the regulated structure, and state that:
- (a) the 'as constructed' drawings and specifications meet the original intent of the design plan for that regulated structure;
 - (b) construction of the regulated structure is in accordance with the design plan.
- Dams 10 All affected persons must be provided with a copy of the emergency action plan in place for each regulated structure
- (a) for existing structures that are regulated structures, within 10 business days of this condition taking effect;
 - (b) prior to the operation of the new regulated structure; and
 - (c) if the emergency action plan is amended, within 5 business days of it being amended.
- Dams 11 Operation of a regulated structure, except for an existing structure, is prohibited.
- Dams 12 For existing structures that are regulated structures:
- (a) where the existing structure that is a regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the DSA volume across the system, the holder of this environmental authority must submit to the administering authority within 12months of the commencement of this condition a copy of the certified system design plan including that structure; and
 - (a) there must be a current operational plan for the existing structures.
- Dams 13 Each regulated structure must be maintained and operated, for the duration of its operational life until decommissioned and rehabilitated, in compliance with the current operational plan and, if applicable, the current design plan and associated certified 'as constructed' drawings.
- Dams 14 Conditions Dams 15 to Dams 18 inclusive only apply to Regulated Structures which have not been certified as low consequence category for 'failure to contain – overtopping'.

- Dams 15 The Mandatory Reporting Level (the MRL) must be marked on a regulated dam in such a way that during routine inspections of that dam, it is clearly observable.
- Dams 16 The holder of this environmental authority must, as soon as practical and within forty-eight (48) hours of becoming aware, notify the administering authority when the level of the contents of a regulated dam reaches the MRL.
- Dams 17 The holder of this environmental authority must, immediately on becoming aware that the MRL has been reached, act to prevent the occurrence of any unauthorised discharge from the regulated dam.
- Dams 18 The holder of this environmental authority must record any changes to the MRL in the Register of Regulated Structures.
- Dams 19 The holder of this environmental authority must assess the performance of each regulated dam or linked containment system over the preceding November to May period based on actual observations of the available storage in each regulated dam or linked containment system taken prior to 1 July of each year.
- Dams 20 By 1 November of each year, storage capacity must be available in each regulated dam (or network of linked containment systems with a shared DSA volume), to meet the Design Storage Allowance (DSA) volume for the dam (or network of linked containment systems).
- Dams 21 The holder of this environmental authority must, as soon as possible and within forty-eight (48) hours of becoming aware that the regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, notify the administering authority.
- Dams 22 The holder of this environmental authority must, immediately on becoming aware that a regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, act to prevent the occurrence of any unauthorised discharge from the regulated dam or linked containment systems.
- Dams 23 Each regulated structure must be inspected each calendar year by a suitably qualified and experienced person.
- Dams 24 At each annual inspection, the condition and adequacy of all components of the regulated structure must be assessed and a suitably qualified and experienced person must prepare an annual inspection report containing details of the assessment and include a recommendations section, with any recommended actions to ensure the integrity of the regulated structure or a positive statement that no recommendations are required.

- Dams 25 The suitably qualified and experienced person who prepared the annual inspection report must certify the report in accordance with the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)*.
- Dams 26 The holder of this environmental authority must, within 20 business days of receipt of the annual inspection report, provide to the administering authority:
- (a) The recommendations section of the annual inspection report; and
 - (b) If applicable, any actions being taken in response to those recommendations; and
 - (c) If, following receipt of the recommendations and (if applicable) recommended actions, the administering authority requests a copy of the annual inspection report from the holder of this environmental authority, provide this to the administering authority within 10 business days of receipt of the request.
- Dams 27 The holder of this environmental authority must provide a copy of any reports, documentation and certifications prepared under this environmental authority, including but not limited to any Register of Regulated Structures, consequence assessment, design plan and other supporting documentation, to a new holder on transfer of this environmental authority.
- Dams 30 A Register of Regulated Dams must be established and maintained by the holder of this environmental authority for each regulated dam.
- Dams 31 The holder of this environmental authority must provisionally enter the required information in the Register of Regulated Dams when a design plan for a regulated dam is submitted to the administering authority.
- Dams 32 The holder of this environmental authority must make a final entry of the required information in the Register of Regulated Structures once compliance with conditions Dams 11 and Dams 12 has been achieved.
- Dams 33 The holder of this environmental authority must ensure that the information contained in the Register of Regulated Dams is current and complete on any given day.
- Dams 34 All entries in the Register of Regulated Dams must be approved by the chief executive officer for the holder of this environmental authority, or their delegate, as being accurate and correct.
- Dams 35 The holder of this environmental authority must, at the same time as providing the annual return, supply to the administering authority a copy of the records contained in the Register of Regulated Dams, in the electronic format required by the administering authority.
- Dams 36 All existing structures that have not been assessed in accordance with either the Manual or the former *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams* must be assessed and certified in accordance with the Manual within 6 months of amendment of the authority adopting this schedule.

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- Dams 37 All existing structures must subsequently comply with the timetable for any further assessments in accordance with the Manual specified in *Schedule C, Table 1 – Transitional requirements for existing structures*, depending on the consequence category for each existing structure assessed in the most recent previous certification for that structure.
- Dams 38 *Schedule C, Table 1 – Transitional requirements for existing structures* ceases to apply for a structure once any of the following events has occurred:
- (a) it has been brought into compliance with the hydraulic performance criteria applicable to the structure under the Manual; or
 - (b) it has been decommissioned; or
 - (c) it has been certified as no longer being assessed as a regulated structure.
- Dams 39 Certification of the transitional assessment required by conditions Dams 36 and Dams 37 (as applicable) must be provided to the administering authority within 6 months of amendment of the authority adopting this schedule.

Schedule C, Table 1 - Transitional hydraulic performance requirements for existing structures

Transition period required for existing structures to achieve the requirements of the *Manual for Assessing Consequence Categories and Hydraulic Performance of Dams*

Compliance with criteria	High	Significant	Low
>90% and a history of good compliance performance in last 5 years	No transition required	No transition required	No transitional conditions apply. Review consequence assessment every 7 years.
>70% - ≤90%	Within 7 years, unless otherwise agreed with the <u>administering authority</u> , based on no history of unauthorised releases.	Within 10 years, unless otherwise agreed with the <u>administering authority</u> , based on no history of unauthorised releases.	No transitional conditions apply. Review consequence assessment every 7 years.
>50 - ≤70 percent	Within 5 years, unless otherwise agreed with the <u>administering authority</u> , based on no history of unauthorised releases.	Within 7 years, unless otherwise agreed with the <u>administering authority</u> , based on no history of unauthorised releases.	Review consequence assessment every 7 years.
≤50%	Within 5 years or as per compliance requirements (e.g. TEP timing)	Within 5 years or as per compliance requirements (e.g. TEP timing)	Review consequence assessment every 5 years.
Regulated levee designed to prevent the ingress of clean flood water <100% compliant ¹	Within 5 years unless otherwise agreed with the <u>administering authority</u> .		

¹ Levees designed for the diversion of contaminated waters or protection of the structural integrity of a dam are not to be considered as part of this provision. These levees are considered a key design element of the relevant dam and transitional periods should as such align to that relevant compliance criteria and consequence category.

Schedule D – Land

- Land 1 Contaminants must not be directly or indirectly released to land except for those releases authorised by this environmental authority.
- Land 2 Top soil must be managed in a manner that preserves its biological and chemical properties.
- Land 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.
- Land 4 Acid sulfate soils must be treated and managed in accordance with the latest edition of the *Queensland Acid Sulfate Soil Technical Manual*.
- Land 5 Chemicals and fuels stored, must be effectively contained and where relevant, meet Australian Standards, where such a standard is applicable.
- Land 6 Pipeline operation and maintenance must be in accordance, to the greatest practicable extent, with the relevant section of the *APGA Code of Environmental Practice: Onshore Pipelines (2017)* (or more recent editions).
- Land 7 Pipeline trenches must be backfilled and topsoils reinstated within three months after pipe laying.
- Land 8 Reinstatement and revegetation of the pipeline right of way must commence within 6 months after cessation of petroleum activities for the purpose of pipeline construction.
- Land 9 Backfilled, reinstated and revegetated pipeline trenches and right of ways must be:
- (a) a stable landform;
 - (b) re-profiled to a level consistent with surrounding soils;
 - (c) re-profiled to original contours and established drainage lines; and
 - (d) vegetated with groundcover which is not a pest species, and which is established and growing.
- Biodiversity 1 Prior to undertaking activities that result in significant disturbance to land in areas of native vegetation, confirmation of on-the-ground biodiversity values of the native vegetation communities at that location must be undertaken by a suitably qualified person.
- Biodiversity 2 A suitably qualified person must develop and certify a methodology so that condition (Biodiversity 1) can be complied with and which is appropriate to confirm on-the-ground biodiversity values.

- Biodiversity 3 For conditions (Biodiversity 4) to (Biodiversity 9), where mapped biodiversity values differ from those confirmed under conditions (Biodiversity 1) and (Biodiversity 2), petroleum activities may proceed in accordance with the conditions of the environmental authority based on the confirmed on-the-ground biodiversity value.
- Biodiversity 4 The location of the petroleum activity(ies) must be selected in accordance with the following site planning principles:
- (a) maximise the use of areas of pre-existing disturbance;
 - (b) in order of preference, avoid, minimise or mitigate any impacts, including cumulative impacts, on areas of native vegetation or other areas of ecological value;
 - (c) minimise disturbance to land that may result in land degradation ;
 - (d) in order of preference, avoid then minimise isolation, fragmentation, edge effects or dissection of tracts of native vegetation; and
 - (e) in order of preference, avoid then minimise clearing of native mature trees.
- Biodiversity 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 essential petroleum activity authorised in an environmentally sensitive area or its protection zone, be no greater than 40m in total width.
- Biodiversity 6 Despite Biodiversity 5 (c), Should the quality of protection zone land be deemed historically disturbed (subject to assessment by a suitably qualified person), or of low environmental value, then Biodiversity 5 (c) is silent.
- Biodiversity 8A Where petroleum activities are to be carried out in environmentally sensitive areas or their protection zones, the petroleum activities must be carried out in accordance with *Schedule D, Table 1— Authorised petroleum activities in environmentally sensitive areas and their protection zones*.
- Biodiversity 8B The petroleum activities authorised under condition (Biodiversity 8A) must not exceed the maximum footprint for the activities specified in *Schedule D, Table 2 – Maximum significant disturbance in environmentally sensitive areas and their protection zones*.

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

Environmentally sensitive area	Within the environmentally sensitive area	Primary protection zone of the environmentally sensitive area	Secondary protection zone of the environmentally sensitive area
<u>Category A environmentally sensitive areas</u>	No petroleum activities permitted.	Only <u>low impact petroleum activities</u> permitted.	Only <u>essential petroleum activities</u> permitted.
<u>Category B environmentally sensitive areas</u> that are other than 'endangered' <u>regional ecosystems</u>	Only <u>low impact petroleum activities</u> permitted.	Only <u>low impact petroleum activities</u> permitted.	Only <u>essential petroleum activities</u> permitted.
<u>Category B environmentally sensitive areas</u> that are 'endangered' <u>regional ecosystems</u>	Only <u>low impact petroleum activities</u> permitted.	Only <u>essential petroleum activities</u> permitted.	Only <u>essential petroleum activities</u> permitted.
<u>Category C environmentally sensitive areas</u> that are 'nature refuges' or 'koala habitat'	Only <u>low impact petroleum activities</u> permitted.	Only <u>low impact petroleum activities</u> permitted.	
<u>Category C environmentally sensitive areas</u> that are 'essential habitat', 'essential regrowth habitat', or 'of concern' <u>regional ecosystems</u>	Only <u>low impact petroleum activities</u> permitted.	Only <u>essential petroleum activities</u> permitted.	
<u>Category C environmentally sensitive areas</u> that are 'regional parks' (previously known as 'resources reserves')	Only <u>essential petroleum activities</u> permitted.	Only <u>essential petroleum activities</u> permitted.	
<u>Category C environmentally sensitive areas</u> that are 'state forests' or 'timber reserves'	Only <u>essential petroleum activities</u> permitted.	Petroleum activities permitted.	
Areas of vegetation that are 'critically limited'	Only <u>low impact petroleum activities</u> permitted.	Only <u>essential petroleum activities</u> permitted.	

Schedule D, Table 2 – Maximum significant disturbance in environmentally sensitive areas and their protection zones

Activity	Maximum Footprint
Ground disturbance within a <u>Category B Environmentally Sensitive Area</u>	0 ha
Ground disturbance within a <u>protection zone</u> of a <u>Category B Environmentally Sensitive Area</u>	6 ha
Ground disturbance within a <u>Category C Environmentally Sensitive Area</u>	14 ha
Ground disturbance within a <u>protection zone</u> of a <u>Category C Environmentally Sensitive Area</u>	70 ha

- Biodiversity 9 A report must be prepared for each annual return period for all petroleum activities that involved clearing of any environmentally sensitive area or protection zone which includes:
- records able to demonstrate compliance with conditions (Biodiversity 4), (Biodiversity 5), (Biodiversity 8A) and (Biodiversity 8B);
 - a description of the works;
 - 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
 - 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.
- Biodiversity 10 Significant residual impacts to prescribed environmental matters (other than if the impacts were authorised by an existing authority issued before the commencement of the *Environmental Offsets Act 2014*) are not authorised under this environmental authority or the *Environmental Offsets Act 2014* unless the impact(s) is specified in *Schedule D, Table 3 – Significant residual impacts to prescribed environmental matters*.
- Biodiversity 11 Records demonstrating that each impact to a prescribed environmental matter not listed in *Schedule D, Table 3 – Significant residual impacts to prescribed environmental matters* did not, or is not likely to, result in a significant residual impact to that matter must be:
- completed by an appropriately qualified person; and
 - kept for the life of the environmental authority.

Protecting biodiversity values, Table 3 — Significant residual impacts to prescribed environmental matters

Prescribed environmental matter	Location of impact	Maximum extent of impact
REGULATED VEGETATION		
<u>Endangered regional ecosystem</u>		
RE 11.3.21	PL260	3 ha
RE 11.4.2	PL194	2 ha
<u>Of concern regional ecosystem</u> (not within an urban area)		
RE 11.3.2	PL194, PL198, PL230, PL238, PL260	20 ha
RE 11.3.4	PL194, PL198, PL230, PL238, PL252, PL260	18 ha
RE 11.3.17	PL252, PL260	15 ha
<u>Regional ecosystems</u> (not within an urban area) that intersect a <u>wetland</u> on the vegetation management <u>wetlands</u> map		
RE 11.3.4	PL260	1 ha
RE 11.3.27	PL260	2 ha
<u>Regional ecosystems</u> (not within an urban area) within the defined distance from the defining banks of a relevant <u>watercourse</u> on the vegetation management <u>watercourse</u> map		
RE 11.3.2 (BVG 17a)	PL194, PL198, PL230, PL238, PL252, PL258, PL260	1 ha
11.3.4 (BVG 16c)	PL194, PL198, PL230, PL238, PL252, PL258, PL260	5 ha
11.3.18 (BVG 17a)	PL194, PL198, PL230, PL238, PL252, PL258, PL260	3 ha
11.3.25 (BVG 16a; 22c)	PL194, PL198, PL230, PL238, PL252, PL258, PL260	15 ha
11.4.12 (BVG 17a)	PL194, PL198, PL230, PL238, PL252, PL258, PL260	1 ha
11.5.1 (BVG 17a; 18b)	PL194, PL198, PL230, PL238, PL252, PL258, PL260	5 ha

Prescribed environmental matter	Location of impact	Maximum extent of impact
11.7.4 (BVG 12a)	PL194, PL198, PL230, PL238, PL252, PL258, PL260	0.5 ha
11.7.7 (BVG 12a)	PL194, PL198, PL230, PL238, PL252, PL258, PL260	1 ha
Essential habitat (not in an urban area) for endangered wildlife		
<i>Hemiaspis damelii</i>	PL230, PL260	6 ha
Essential habitat (not in an urban area) for vulnerable wildlife		
<i>Calyptorhynchus lathami</i>	PL260	1 ha
<i>Jalmenus eubulus</i>	PL260	0.5 ha
CONNECTIVITY AREAS		
Connectivity area that is a <u>regional ecosystem</u> (not in urban area)		
PL194	PL194	6.7 ha
PL198	PL198	2.3 ha
PL230	PL230	1.3 ha
PL260	PL260	1 ha
WETLANDS AND WATERCOURSES		
A <u>wetland</u> in a <u>wetland</u> protection area shown on the <u>Map of referable wetlands</u> (HES wetlands in GBR)	PL198, PL238, PL260	2.5 ha
A <u>wetland of high ecological significance</u> shown on the <u>Map of referable wetlands</u>	PL260	1.5 ha
PROTECTED WILDLIFE HABITAT		
An area shown as a high risk area on the flora survey trigger map that contains plants that are endangered or vulnerable wildlife		
<i>Picris barbarorum</i>	PL260	2.5 ha
<i>Solanum papaverifolium</i>	PL260	3 ha
Habitat for an animal that is vulnerable wildlife		

Prescribed environmental matter	Location of impact	Maximum extent of impact
<i>Acanthophis antarcticus</i>	PL194, PL198, PL230, PL238, PL252, PL258, PL260	370 ha
<i>Calyptorhynchus lathamii</i>	PL194, PL198, PL230, PL238, PL252, PL258, PL260	110 ha
<i>Jalmenus eubulus</i>	PL194, PL198, PL230, PL238, PL252, PL258, PL260	20 ha
<i>Tachyglossus aculeatus</i>	PL194, PL198, PL230, PL238, PL252, PL258, PL260	67 ha
Habitat for an animal that is endangered wildlife		
<i>Hemiaspis damelii</i>	PL194, PL198, PL230, PL238, PL252, PL258, PL260	255 ha
FISH HABITAT AREAS		
Fish passage (not in an urban area)	PL194, PL198, PL230, PL238, PL252, PL258, PL260	7 ha

Biodiversity 12 An environmental offset made in accordance with the *Environmental Offsets Act 2014* and Queensland Environmental Offsets Policy, as amended from time to time, must be undertaken for the maximum extent of impact to each prescribed environmental matter authorised in *Schedule D, Table 3— Significant residual impacts to prescribed environmental matters*, unless a lesser extent of the impact has been approved in accordance with condition (Biodiversity 14).

Biodiversity 13 The significant residual impacts to a prescribed environmental matter authorised in condition (Biodiversity 10) for which an environmental offset is required by condition (Biodiversity 12) may be carried out in stages. An environmental offset can be delivered for each stage of the impacts to prescribed environmental matters.

Biodiversity 14 Prior to the commencement of each stage, a report completed by an appropriately qualified person, that includes an analysis of the following must be provided to the administering authority:

- (a) for the forthcoming stage—the estimated significant residual impacts to each prescribed environmental matter; and
- (b) for the previous stage, if applicable—the actual significant residual impacts to each prescribed environmental matter, to date.

- Biodiversity 15 The report required by condition (Biodiversity 14) must be approved by the administering authority before a notice of election for the forthcoming stage, if applicable, is given to the administering authority.
- Biodiversity 16 A notice of election for the staged environmental offset referred to in condition (Biodiversity 15), if applicable, must be provided to the administering authority no less than three months before the proposed commencement of that stage, unless a lesser timeframe has been agreed to by the administering authority.
- Biodiversity 17 Within six months from the completion of the final stage of the project, a report completed by an appropriately qualified person, that includes the following matters must be provided to the administering authority:
- (a) an analysis of the actual impacts on prescribed environmental matters resulting from the final stage; and
 - (b) if applicable, a notice of election to address any outstanding offset debits for the authorised impacts.
- D17 Despite (Biodiversity 8A), the Daandine Brine Dam 2 with its associated activities necessary for construction, operation, maintenance and monitoring of the dam, are permitted to be located within the area bound by the coordinates prescribed in *Schedule D, Table 4 - Coordinates Enclosing the Disturbance Area for Daandine Brine Dam 2*.
- D18 Despite (Biodiversity 8A), the water release outlet and pipeline, with its associated activities necessary for construction, operation, maintenance and monitoring for the release of treated CSG water to Wilkie Creek, are permitted to be located within the area bound by the coordinates prescribed in *Schedule D Table 5 - Coordinates Enclosing the Disturbance Area for the Water Release Outlet and Pipeline*.
- D19 The construction of the water release outlet and pipeline must be located within the area bound by the coordinates prescribed by *Schedule D Table 5 - Coordinates Enclosing the Disturbance Area for the Water Release Outlet and Pipeline*.
- D20 Despite (Biodiversity 8A), the Tipton Treated Water Pipeline, with its associated activities necessary for construction, operation, maintenance, are permitted to be located within the area bound by the coordinates prescribed in *Schedule D, Table 6 – Coordinates Enclosing the Disturbance Area for Tipton Treated Water Pipeline*.
- D21 Despite (Biodiversity 8A), the disturbance footprints for the 'Longswamp 31 monitoring bore' and the 'Tipton 253 gas well' are permitted to be located within the areas prescribed in *Schedule D, Table 7 – Authorised footprint for disturbance to environmentally sensitive areas*.
- D22 Condition D21 does not authorise clearing of vegetation and requires that all waste, including residual drilling material, must be removed from the site.

Schedule D, Table 4 – Coordinates Enclosing the Disturbance Area for Daandine Brine Dam 2

Point	Northing (GDA94, Zone 56)	Easting (GDA94, Zone 56)
1	7001708	297524
2	7001153	297384
3	7001051	298345
4	7001418	298444
5	7001601	298406
6	7001620	298190

Schedule D Table 5 – Coordinates Enclosing the Disturbance Area for the Water Release Outlet and Pipeline

Point	Northing (GDA94, Zone 56)	Easting (GDA94, Zone 56)	Area of disturbance
Valve Pit	6995424	302897	0.18 ha
High Point on Bank	6995460	302991	
Outlet at Creek	6995465	303004	

Schedule D, Table 6 – Coordinates Enclosing the Disturbance Area for Tipton Treated Water Pipeline

Point	Easting (GDA94 Zone 56)	Northing (GDA94 Zone 56)
Section 1	310653	6969687
	310656	6969747
	310696	6969745
	310661	6970448
	310621	6970453
	310651	6970652
	310611	6970657
	310642	6970846
	310602	6970846
	310707	6971627
	310667	6971630
	310659	6972161
	310618	6972167
	310621	6973392
	310581	6973399
310613	6973550	
310573	6973550	

Point	Easting (GDA94 Zone 56)	Northing (GDA94 Zone 56)
	310639	6973650
	310539	6973550
	310608	6973650
	310568	6973650
	310639	6973550
	310539	6973650
Section 2	310617	6973719
	310577	6973724
	310722	6974060
	310682	6974065
	310717	6974172
	310677	6974177
	310714	6974221
	310675	6974217
	310692	6974378
	310654	6974365
	310692	6974378
	310567	6974521
	310617	6974514
	310563	6974528
	310613	6974522
	310499	6974536
	310594	6974610
	310497	6974636
Section 3	310534	6974847
	310494	6974835
	310534	6974857
	310494	6974862
	310528	6975192
	310488	6975197
	310526	6975351
	310486	6975347

Schedule D, Table 7 – Authorised footprint for disturbance to environmentally sensitive areas

Activity	Latitude	Longitude	Maximum operational footprint	ESA Type
Longswamp 31 shallow monitoring bore	151.095733°E	-27.343471°S	9 m ²	<u>Category A ESA</u>
Tipton 253 gas well	151.13539°E	-27.36818°S	19600 m ²	<u>Primary protection zone of Category C ESA</u>

Schedule E – Acoustic

- Noise 1 Notwithstanding condition (General 21), emission of noise from the petroleum activity(ies) at levels less than those specified in *Schedule E, Table 1—Noise nuisance limits* are not considered to be environmental nuisance.
- Noise 2 If the noise subject to a valid complaint is tonal or impulsive, the adjustments detailed in *Schedule E, Table 2—Adjustments to be added to noise levels at sensitive receptors* are to be added to the measured noise level(s) to derive L_{Aeq, adj, 15 min}.

Schedule E, Table 1—Noise nuisance limits¹

Time period	Metric	Short term noise event	Medium term noise event	Long term noise event
7:00am—6:00pm	<u>L_{Aeq, adj, 15 min}</u>	45 dBA	43 dBA	40 dBA
6:00pm—10:00pm	<u>L_{Aeq, adj, 15 min}</u>	40 dBA	38 dBA	35 dBA
10:00pm—6:00am	<u>L_{Aeq, adj, 15 min}</u>	28 dBA	28 dBA	28 dBA
	<u>Max L_{pA, 15mins}</u>	55 dBA	55 dBA	55 dBA
6:00am—7:00am	<u>L_{Aeq, adj, 15 min}</u>	40 dBA	38 dBA	35 dBA
Drilling activities undertaken from 10:00pm – 7:00am ²	<u>L_{Aeq, adj, 15min}</u>	28 dBA (measured indoors) 33 dBA (measured outdoors)		

¹ The noise limits in *Schedule E, Table 1 – Noise nuisance limits* have been set based on the following deemed background noise levels (LABG):

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

² Drilling activities (e.g. drilling, workover, completion activities) undertaken from 10:00 pm – 7:00 am must be temporary and mobile in nature, and must not contribute to long-term background noise creep.

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

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

- Noise 3 Notwithstanding condition (Noise 1), emission of any low frequency noise must not exceed either (Noise 3(a)) and (Noise 3(b)), or (Noise 3(c)) and (Noise 3(d)) in the event of a valid complaint about low frequency noise being made to the administering authority:
- (a) 60 dB(C) measured outside the sensitive receptor; and
 - (b) the difference between the external A-weighted and C-weighted noise levels is no greater than 20 dB; or
 - (c) 50 dB(Z) measured inside the sensitive receptor; and
 - (d) the difference between the internal A-weighted and Z-weighted (Max L_{pZ, 15 min}) noise levels is no greater than 15 dB.
- E10 Within 12 months of commissioning the units listed in Schedule E, Table 3 – Tipton Expansion Project units, the EA holder must, conduct noise monitoring under worst case noise propagation conditions to validate the pre-commissioning noise predictions at sensitive receptors.
- E11 The holder of this environmental authority must provide the administering authority with a report of the monitoring results required under condition (E10) that evaluates the accuracy of the pre-commissioning model predictions at sensitive receptors.

Schedule E, Table 3 – Tipton Expansion Project units

Resource Authority	Field	Facility	Unit Description	
PL198	Tipton	Tipton Central Gas Processing Facility	K-0007 Compressor 7	
			K-0007 Compressor 8	
			K-0007 Compressor 9	
			K-0007 Compressor 10	
				K-0015 Inlet Fuel Gas Compressor Engine
		Tipton Water Treatment Facility	Generator 1	
			Generator 2	
			Generator 3	
			Generator 4	



Resource Authority	Field	Facility	Unit Description
			Generator 5

Noise 4 A Blast Management Plan must be developed for each blasting activity in accordance with Australian Standard 2187.

Noise 5 Blasting operations must be designed to not exceed an airblast overpressure level of 120 dB (linear peak) at any time, when measured at or extrapolated to any sensitive place.

Noise 6 Blasting operations must be designed to not exceed a ground-borne vibration peak particle velocity of 10mm/s at any time, when measured at or extrapolated to any sensitive place.



Schedule F – Air

- Air 1 Unless venting is authorised under the *Petroleum and Gas (Production and Safety) Act 2004* or the *Petroleum Act 1923*, waste gas must be flared in a manner that complies with all of (Air 1(a)) and (Air 1(b)) and (Air 1(c)), or with (Air 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 enclosed flare.
- Air 2A A fuel burning or combustion facility must not be operated unless it is listed in *Schedule F, Table 1– Authorised point sources*.
- Air 2B If a fuel burning or combustion facility is listed in *Schedule F, 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 *Schedule F, Table 1—Authorised point sources* at the specified release point reference.
- Air 3 Point source air monitoring for each fuel burning or combustion facility listed in *Schedule F, Table 1– Authorised point sources* must:
- (a) be undertaken:
 - i. once in the first three months after each facility is first commissioned, and then
 - ii. annually or biennially thereafter at the frequency specified in *Schedule F, Table 2 – Annual Air Quality Monitoring*
 - (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 *Schedule F, Table 1– Authorised point sources* at each release point reference.

Schedule F, Table 1 — Authorised point sources

Tenure	Facility	Release Point Reference	Unit Description	Minimum Release Height (m)	Minimum Efflux Velocity (m/sec) ¹	NO _x as Nitrogen Dioxide	Carbon Monoxide
						Maximum Mass Emission Rate (g/sec) ¹	Maximum Mass Emission Rate (g/sec) ¹
PL 230	Daandine Central Gas Processing Facility	A1	K-0001 Compressor 1	10	30	3.0	5.5
		A2	K-0002 Compressor 2				
		A3	K-0003 Compressor 3				
		A4	K-0004 Compressor 4				
		A5	K-0005 Compressor 5				
		A6	K-0006 Compressor 6				
		A7	K-0007 Compressor 7				
		A8	K-9008 Compressor 8	17	17	1.4	4.8
		A9	K-9009 Compressor 9				
		A10	K-9010 Compressor 10				
				A11	K-9011 Inlet Fuel Screw Compressor Engine 11	8.5	30
PL 198	Tipton West Central Gas Processing Facility	A14	K-0001 Compressor 1	7.6	30	6.8	5.5
		A15	K-0002 Compressor 2				
		A16	K-0003 Compressor 3				
		A17	K-0004 Compressor 4				

Tenure	Facility	Release Point Reference	Unit Description	Minimum Release Height (m)	Minimum Efflux Velocity (m/sec) ¹	NO _x as Nitrogen Dioxide	Carbon Monoxide
						Maximum Mass Emission Rate (g/sec) ¹	Maximum Mass Emission Rate (g/sec) ¹
		A18	K-0005 Compressor 5	17	17	1.4	4.8
		A19	K-0006 Compressor 6				
		A20	K-0007 Compressor 7				
		A21	K-0008 Compressor 8				
		A22	K-0009 Compressor 9				
	A23	K-0010 Compressor 10					
	Tipton Water Treatment Facility ²	A24	K-0015 Inlet Fuel Gas Compressor Engine	8.5	38	1.5	1.0
		A25	Generator 1	7.5	27	1.5	1.5
		A26	Generator 2				
		A27	Generator 3				
		A28	Generator 4				
A29	Generator 5						

¹ Minimum efflux velocity, maximum mass emission and maximum concentration limits relate to plant maximum continuous ratings.

² The Water Treatment Facility's aggregated fuel consumption exceeds the 500 kg per hour threshold when all five generators are in simultaneous operation.

Schedule F, Table 2 – Annual Air Quality Monitoring

Release Point	Parameter ¹		Minimum Monitoring Frequency
	Mass emission rate (g/s)	Concentration (mg/Nm ³)	
A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, A13, A14, A15, A16, A17, A18, A19, A20, A21, A22, A23, A24, A25 ² , A26 ² , A27 ² , A28 ² , A29 ²	oxides of nitrogen (measured as NO ₂) carbon monoxide	oxides of nitrogen (measured as NO ₂) carbon monoxide	Biennial from commission

¹ Measured in flue gas at the 5% oxygen reference level

² Biennial monitoring is not required until at least four of the five generators are commissioned.

Schedule G – Waste

- Waste 1 Measures must be implemented so that waste is managed in accordance with the waste and resource management hierarchy and the waste and resource management principles.
- Waste 2 Waste, including waste fluids, but excluding waste used in closed-loop systems, must be transported off-site for lawful re-use, remediation, recycling or disposal, unless the waste is specifically authorised by conditions of this environmental authority to be disposed of or used on site.
- Waste 3 Waste fluids, other than flare precipitant stored in flare pits, or residual drilling material or drilling fluids stored in sumps, must be contained in either:
- (a) an above ground container; or
 - (b) a structure which contains the wetting front.
- Waste 4 Green waste may be used on-site for either rehabilitation or sediment and erosion control, or both.
- Waste 5 Vegetation waste may be burned if it relates to a state forest, timber reserve or forest entitlement area administered by the *Forestry Act 1959* and a permit has been obtained under the *Fire and Rescue Service Act 1990*.
- Waste 6 Pipeline waste water 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.
- Waste 7 Produced water may be re-used in drilling and well hole activities.
- Waste 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.

- Waste 9 Produced water may be used for construction and operation 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
 - (d) Does not harm vegetation surrounding the construction site.
- Waste 10 If there is any indication that any of the circumstances in condition (Waste 8)(b)(i) to (Waste 8)(b)(iv)) or (Waste 9)(a) to (Waste 9)(d)) is occurring, the use must cease immediately and the affected area must be remediated without delay.
- Waste 11 Treated sewage effluent or greywater can be released to land provided it:
- (a) meets or exceeds secondary treated class B standards for a treatment system with a daily peak design capacity of between 150 EP and 1500 EP; or
 - (b) meets or exceeds secondary treated class C standards for a treatment system with a daily peak design capacity of less than 150 EP.
- Waste 12 The release of treated sewage effluent or greywater authorised in condition (Waste 11) must:
- (a) be to a fenced and signed contaminant release area(s);
 - (b) not result in pooling or run-off or aerosols or spray drift or vegetation die-off;
 - (c) be to a contaminant release area(s) that is kept vegetated with groundcover, that is:
 - i. not a pest species;
 - ii. kept in a viable state for transpiration and nutrient uptake; and
 - iii. grazed or harvested and removed from the contaminant release area as needed, but not less than every three months.
- Waste 13 Notwithstanding condition (Waste 11), treated sewage effluent that meets or exceeds secondary treated class A standards may be used for dust suppression or construction activities, provided the use meets the criteria in condition (Waste 8) or (Waste 9), as relevant to the use.
- Waste 14 Sewage pump stations must be fitted with a:
- (a) stand-by pump; and

- (b) high level alarm to warn of imminent pump station overflow, that operates without mains power or with a back-up power source that starts automatically in the event of a power failure.
- Waste 15 If sumps are used to store residual drilling material or drilling fluids, they must only be used for the duration of drilling activities.
- Waste 16 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.
- Waste 17 Records must be kept to demonstrate compliance with condition (Waste 15) and (Waste 16).
- G12 Coal seam gas water may be transferred to a third party to be used for the following purposes subject to compliance with conditions (G13) and (G14):
- (a) dust suppression if the coal seam gas water quality complies with the limits specified in *Schedule G, Table 1 – Water Contaminant Release Limits*;
- (b) construction and operational purposes if the coal seam gas water quality complies with the limits specified in *Schedule G, Table 1 – Water Contaminant Release Limits*;
- (c) irrigation and livestock watering purposes;
- (d) the following industrial purposes:
- i. coal washing;
- ii. power stations; and
- iii. water treatment facilities.
- G13 Any coal seam gas water supplied to a third party for irrigation and/or livestock watering purposes in accordance with Condition (G12)(c) must comply with the relevant trigger values contained in ANZECC and ARMCANZ Water Quality Guidelines 2000, or subsequent versions thereof.

Schedule G, Table 1 – Water Contaminant Release Limits

Water Quality Characteristics	Unit	Limit	Limit Type
pH	pH units	6.0 to 9.0	Range

Water Quality Characteristics	Unit	Limit	Limit Type
Sodium Adsorption Ratio	ratio	6	80 th Percentile
		12	Maximum
Total Dissolved Solids	mg/L	1500	Maximum
Total Petroleum Hydrocarbons	mg/L	10	Maximum

G14

If the responsibility of coal seam gas water is given or transferred to a third party in accordance with Condition (G12), the holder of environmental authority must ensure that:

- (a) the responsibility of the coal seam gas water is given or transferred in accordance with a written agreement (the third party agreement); and
- (b) the third party is made aware of the General Environmental Duty under section 319 of the *Environmental Protection Act 1994*.

Schedule H – Rehabilitation

- Rehabilitation 1 A Rehabilitation Plan must be developed by a suitably qualified person and must include the:
- (a) rehabilitation goals; and
 - (b) procedures to be undertaken for rehabilitation that will:
 - i. achieve the requirements of conditions (Rehabilitation 2) to (Rehabilitation 8), inclusive; and
 - ii. provide for appropriate monitoring and maintenance.
- Rehabilitation 2 Significantly disturbed areas that are no longer required for the on-going petroleum activities, must be rehabilitated within 12 months (unless an exceptional circumstance in the area to be rehabilitated (e.g. a flood event) prevents this timeframe being met) and be maintained to meet the following acceptance criteria:
- (a) contaminated land resulting from petroleum activities is remediated and rehabilitated;
 - (b) the areas are:
 - i. non-polluting;
 - ii. a stable landform;
 - iii. re-profiled to contours consistent with the surrounding landform;
 - (c) surface drainage lines are re-established;
 - (d) top soil is reinstated; and
 - (e) either:
 - i. groundcover, that is not a pest species, is growing; or
 - ii. an alternative soil stabilisation methodology that achieves effective stabilisation is implemented and maintained.
- Rehabilitation 3 All significantly disturbed areas caused by petroleum activities which are not being or intended to be utilised by the landholder or overlapping tenure holder, must be rehabilitated to meet the following final acceptance criteria measured either against the highest ecological value adjacent land use or the pre-disturbed land use:

-
- (a) greater than or equal to 70% of native ground cover species richness
- (b) greater than or equal to the total per cent of ground cover
- (c) less than or equal to the per cent species richness of plant pest species; and
- (d) where the adjacent land use contains, or the pre-clearing land use contained, one or more regional ecosystem(s), then at least one regional ecosystem(s) from the same broad vegetation group, and with the equivalent biodiversity status or a biodiversity status with a higher conservation value as any of the regional ecosystem(s) in either the adjacent land or pre-disturbed land, must be present.
- Rehabilitation 4 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 (Biodiversity 1) and (Biodiversity 2)) 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 plant pest species;
- (d) greater than or equal to 50% of organic litter cover;
- (e) greater than or equal to 50% of total density of coarse woody material; and
- (f) all predominant species in the ecologically dominant layer, that define the pre-disturbance regional ecosystem(s) are present.
- Rehabilitation 5 Conditions (Rehabilitation 2), (Rehabilitation 3) and (Rehabilitation 4) continue to apply after this environmental authority has ended or ceased to have effect.
- Rehabilitation 8 Where there is a dam (including a low consequence dam) that is being or intended to be utilised by the landholder or overlapping tenure holder, the dam must be decommissioned to no longer accept inflow from the petroleum activity(ies) and the contained water must be of a quality suitable for the intended on-going uses(s) by the landholder or overlapping tenure holder.

Schedule I – Definitions

Words and phrases used throughout this environmental authority are defined below except where identified in the *Environmental Protection Act 1994* or its Regulations and Environmental Protection Policies. Where a word or term is not defined, the ordinary English meaning applies, and regard should be given to the Macquarie Dictionary.

Word or Phrase	Definition
acceptable standards for release to land	means wastewater of the following quality as determined by monitoring results or by characterisation: <ol style="list-style-type: none"> electrical conductivity (EC) not exceeding 3000μS/cm; sodium adsorption ratio (SAR) not exceeding 8; pH between 6.0 and 9.0; heavy metals (measured as total) meets the respective short term trigger value in section 4.2.6, Table 4.2.10—<i>Heavy metals and metalloids in Australian and New Zealand Guidelines for Fresh and Marine Water Quality</i>; 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 <u>significant disturbance</u> , or where there is no <u>ecosystem function</u> , the use of the land. An adjacent land use does not include an adjacent area that shows evidence of edge effect.
administering authority	means: <ol style="list-style-type: none"> 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 for all other matters—the Chief Executive of the Department of Environment and Science; or 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 <u>environmental nuisance</u> impact will be dealt with at a <u>sensitive place</u> , 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 <u>sensitive place</u> , 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 <u>rehabilitated</u> 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-

Word or Phrase	Definition																						
	disturbed site of interest where significant surveying effort has been undertaken to establish benchmark parameters.																						
annual return period	means the most current 12- <u>month</u> 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	<p>for the purposes of <u>residual drilling materials</u>, means the <u>residual drilling material</u> meet the following quality standards:</p> <p><u>Part A</u> In all cases:</p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Maximum concentration</th> </tr> </thead> <tbody> <tr> <td>pH</td> <td>6 to 10.5 (range)</td> </tr> <tr> <td>Electrical Conductivity</td> <td>20 dS/m (20,000 µS/cm)</td> </tr> <tr> <td>Chloride*</td> <td>8000 mg/L</td> </tr> </tbody> </table> <p>*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.</p> <p><u>Part B</u> If any of the following metals are a component of the drilling fluids, then for that metal:</p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Maximum concentration</th> </tr> </thead> <tbody> <tr> <td>Arsenic</td> <td>20 mg/kg</td> </tr> <tr> <td>Selenium</td> <td>5 mg/kg</td> </tr> <tr> <td>Boron</td> <td>100 mg/kg</td> </tr> <tr> <td>Cadmium</td> <td>3 mg/kg</td> </tr> <tr> <td>Chromium (total)</td> <td>400 mg/kg</td> </tr> <tr> <td>Copper</td> <td>100 mg/kg</td> </tr> </tbody> </table>	Parameter	Maximum concentration	pH	6 to 10.5 (range)	Electrical Conductivity	20 dS/m (20,000 µS/cm)	Chloride*	8000 mg/L	Parameter	Maximum concentration	Arsenic	20 mg/kg	Selenium	5 mg/kg	Boron	100 mg/kg	Cadmium	3 mg/kg	Chromium (total)	400 mg/kg	Copper	100 mg/kg
Parameter	Maximum concentration																						
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Cadmium	3 mg/kg																						
Chromium (total)	400 mg/kg																						
Copper	100 mg/kg																						



Word or Phrase	Definition																						
	<table border="1"> <tr> <td>Lead</td> <td>600 mg/kg</td> </tr> </table> <p>The limits in Part B and Part C refer to the post soil/by-product mix.</p> <p><u>Part C</u> If a hydrocarbon sheen is visible, the following hydrocarbon fractions:</p> <table border="1"> <thead> <tr> <th>TPH</th> <th>Maximum concentration</th> </tr> </thead> <tbody> <tr> <td>C6-C10</td> <td>170 mg/kg</td> </tr> <tr> <td>C10-C16</td> <td>150 mg/kg</td> </tr> <tr> <td>C16-C34</td> <td>1300 mg/kg</td> </tr> <tr> <td>C34-C40</td> <td>5600 mg/kg</td> </tr> <tr> <td>Total polycyclic aromatic hydrocarbons (PAH)</td> <td>20 mg/kg</td> </tr> <tr> <td>Phenols (halogenated)</td> <td>1 mg/kg</td> </tr> <tr> <td>Phenols (non-halogenated)</td> <td>60 mg/kg</td> </tr> <tr> <td>Monocyclic aromatic hydrocarbons (total sum of benzen, toluene, ethyl benzene, xylenes (includes ortho, para, and meta xylenes) and styrene)</td> <td>7 mg/kg</td> </tr> <tr> <td>Benzene</td> <td>1 mg/kg</td> </tr> </tbody> </table>	Lead	600 mg/kg	TPH	Maximum concentration	C6-C10	170 mg/kg	C10-C16	150 mg/kg	C16-C34	1300 mg/kg	C34-C40	5600 mg/kg	Total polycyclic aromatic hydrocarbons (PAH)	20 mg/kg	Phenols (halogenated)	1 mg/kg	Phenols (non-halogenated)	60 mg/kg	Monocyclic aromatic hydrocarbons (total sum of benzen, toluene, ethyl benzene, xylenes (includes ortho, para, and meta xylenes) and styrene)	7 mg/kg	Benzene	1 mg/kg
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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 <u>clearing</u> , logging, timber harvesting, or grazing activities have previously occurred, where high densities of weed or <u>pest</u> 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																						

Word or Phrase	Definition
	includes <u>waters</u> 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: <ul style="list-style-type: none"> operations of any kind and all things constructed, erected or installed for that <u>dam</u>; and any land used for those operations.
Australian Standard 3580	means any of the following publications: <ul style="list-style-type: none"> 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 <u>waters</u> , has the meaning in Schedule 12 of the <i>Environmental Protection Regulation 2008</i> and— <ol style="list-style-type: none"> includes an area covered, permanently or intermittently, by tidal or non-tidal <u>waters</u>; but does not include land adjoining or adjacent to the <u>bed</u> that is from time to time covered by floodwater.
being or intended to be utilised by the landholder or overlapping tenure holder	for <u>significantly disturbed</u> 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 <u>rehabilitation</u> standards for <u>revegetation</u> by the holder of the environmental authority are not required. For <u>dams</u> , 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 <u>dam</u> such that <u>rehabilitation</u> standards for <u>revegetation</u> by the holder of the environmental authority are not required.

Word or Phrase	Definition
biodiversity values	for the purposes of this environmental authority, means <u>environmentally sensitive areas</u> , <u>prescribed environmental matters</u> and <u>wetlands</u> .
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, Section 3 of the Environmental Protection Regulation 2019.
Category B Environmentally Sensitive Area	means any area listed in Schedule 19, Section 3 of the Environmental Protection Regulation 2019.
Category C Environmentally Sensitive Area	<p>means any of the following areas:</p> <ul style="list-style-type: none"> • nature refuges as defined in the conservation agreement for that refuge under the Nature Conservation Act 1992 • koala habitat areas as defined under the Nature Conservation (Koala) Conservation Plan 2006 • state forests or timber reserves as defined under the Forestry Act 1959 • regional parks (previously known as resource reserves) under the Nature Conservation Act 1992 • an area validated as 'essential habitat' from ground-truthing surveys in accordance with the Vegetation Management Act 1999 for a species of wildlife listed as endangered or vulnerable under the Nature Conservation Act 1992 • 'of concern <u>regional ecosystems</u>' that are remnant vegetation and identified in the database called 'RE description database' containing <u>regional ecosystem</u> numbers and descriptions.
certified or certification	<p>in relation to any matter other than a design plan, 'as constructed' drawings or an annual report regarding <u>dams</u> means, a Statutory Declaration by a <u>suitably qualified person</u> or <u>suitably qualified third party</u> accompanying the written <u>document</u> stating:</p> <ul style="list-style-type: none"> • the person's qualifications and experience relevant to the function • that the person has not knowingly included false, misleading or incomplete information in the <u>document</u> • that the person has not knowingly failed to reveal any relevant information or <u>document</u> to the <u>administering authority</u> • that the <u>document</u> addresses the relevant matters for the function and is factually correct; and • that the opinions expressed in the <u>document</u> are honestly and reasonably held.

Word or Phrase	Definition
clearing	has the meaning in the dictionary of the <i>Vegetation Management Act 2000</i> and for vegetation— <ol style="list-style-type: none"> a) means remove, cut down, ringbark, push over, poison or destroy in any way including by burning, flooding or draining; but b) does not include destroying standing vegetation by stock, or lopping a tree.
closed-loop systems	means using waste on site in a way that does not release waste or contaminants in the waste to the environment.
coal seam gas water	means underground water brought to the surface of the earth, or moved underground in connection with exploring for, or producing coal seam gas.
control measure	has the meaning in section 47 of the <i>Environmental Protection Regulation 2008</i> and means a device, equipment, <u>structure</u> , or management strategy used to prevent or control the release of a contaminant or waste to the environment.
critically limited regional ecosystem	means the <u>regional ecosystems</u> defined and listed in Appendix 5 of the Queensland Biodiversity Offset Policy.
daily peak design capacity	for sewage treatment works, has the meaning in Schedule 2, section 63(4) of the <i>Environmental Protection Regulation 2008</i> as the higher <u>equivalent person (EP)</u> for the works calculated using each of the formulae found in the definition for <u>EP</u> .
dam(s)	means a land-based <u>structure</u> 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 <u>structure</u> or <u>void</u> and <u>associated works</u> .
design storage allowance or DSA	means an available volume, estimated in accordance with the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ESR/2016/19337)</i> , published by the <u>administering authority</u> , as amended from time to time, that must be provided in a dam to an annual exceedance probability specified in that Manual.
designated precinct	has the meaning in Part 5 section 15(3) of the <i>Regional Planning Interests Regulation 2014</i> and means: <ul style="list-style-type: none"> • for a <u>strategic environmental area</u> mentioned in section 4(1) – the area identified as a designated precinct on the <u>strategic environmental area map</u> for the strategic environmental area; or • if a <u>strategic environmental area</u> is shown on a map in a regional plan – the area identified on the map as a designated precinct for the <u>strategic environmental area</u>
development wells	means a petroleum well which produces or stores petroleum. For clarity, a development well does not include an appraisal well.

Word or Phrase	Definition
document	<p>has the meaning in the <i>Acts Interpretation Act 1954</i> and means:</p> <ul style="list-style-type: none"> • 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	<p>has the meaning in the <i>Methodology for Surveying and Mapping of Regional Ecosystems and Vegetation Communities in Queensland</i> (Version 5.1 March 2020) and means the layer making the greatest contribution to the overall biomass of the site and the vegetation community (National Land and Water Resources Audit 2001). This is also referred to as the ecologically dominant stratum or the predominant canopy in woody ecosystems.</p>
ecosystem function	<p>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.</p>
enclosed flare	<p>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.</p>
environmental harm	<p>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 <u>environmental nuisance</u>. Environmental harm may be caused by an activity—</p> <ol style="list-style-type: none"> 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	<p>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—</p> <ol style="list-style-type: none"> 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.
environmental offset	<p>has the meaning in section 7 of the <i>Environmental Offsets Act 2014</i>.</p>
environmentally sensitive area	<p>means <u>Category A, B or C environmentally sensitive areas</u> (ESAs)</p>
equivalent person or EP	<p>has the meaning under section 3 of the <i>Planning Guidelines For Water Supply and Sewerage</i>, 2005, published by the Queensland Government. It is</p>

Word or Phrase	Definition
	<p>calculated in accordance with Schedule 2, Section 63(4) of the <i>Environmental Protection Regulation 2008</i> where:</p> <ul style="list-style-type: none"> • 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	<p>means activities that are essential to bringing the resource to the surface and are only the following:</p> <ul style="list-style-type: none"> • <u>low impact petroleum activities</u> • 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): <ul style="list-style-type: none"> ○ 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: <ul style="list-style-type: none"> ○ for single well sites, not exceeding 1.5 hectares disturbance ○ for multi-well sites, not exceeding 2.0 hectares disturbance • well sites with slope considerations (>2% slope) for cut and fill earthworks and drainage: <ul style="list-style-type: none"> ○ for single well sites, not exceeding 1.5 hectares disturbance ○ for multi-well sites, not exceeding 2.5 hectares disturbance • swell sites including a Communications Tower: <ul style="list-style-type: none"> ○ for single well sites, not exceeding 1.5 hectare disturbance ○ for multi-well sites, not exceeding 3.0 hectare disturbance • associated infrastructure located on a well site necessary for the construction and operations of wells: <ul style="list-style-type: none"> ○ water pumps and generators ○ <u>flare pits</u> ○ chemical / fuel storages ○ <u>sumps for residual drilling material</u> and drilling fluids ○ tanks, or dams which are not significant or high consequence dams to contain wastewater (e.g. <u>stimulation flow back waters</u>, <u>produced water</u>) ○ 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

Word or Phrase	Definition
	<ul style="list-style-type: none"> ○ 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 • on site disposal of <u>residual drilling material</u> as per condition (Waste 16) • communications towers, not exceeding 1.0 hectares disturbance • 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 <u>control measures</u>, <u>rehabilitation</u>).
existing authority	has the meaning in section 94 of the <i>Environmental Offsets Act 2014</i> .
exploration well	<p>means a petroleum well that is drilled to:</p> <ul style="list-style-type: none"> • 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. <p>For clarity, an exploration well does not include an appraisal or development well.</p>
flare pit	has the meaning in the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ESR/2016/19338)</i> , 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 <u>waste fluids</u> which result from the operation of a flare.
floodplains	<p>has the meaning in the <i>Water Act 2000</i> and means an area of reasonably flat land adjacent to a <u>watercourse</u> that—</p> <ul style="list-style-type: none"> • is covered from time to time by floodwater overflowing from the <u>watercourse</u>; and • does not, other than in an upper valley reach, confine floodwater to generally follow the path of the <u>watercourse</u>; and • has finer sediment deposits than the sediment deposits of any bench, bar or in-stream island of the <u>watercourse</u>.
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

Word or Phrase	Definition
	include water, other <u>liquids</u> fluids or solids, or a mixture that includes water and any other <u>liquids</u> 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	<p>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:</p> <ul style="list-style-type: none"> • 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 <u>wetland</u>. <p>A GAB spring includes a spring vent, spring complex or <u>watercourse</u> spring and includes the land to which water rises naturally from below the ground and the land over which the water then flows.</p> <p><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></p> <p><i>Note: The GAB springs dataset can be requested from the Queensland Government Herbarium</i></p>
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 <u>pest</u> species.
greywater	means wastewater generated from domestic activities such as laundry, dishwashing, and bathing. Greywater does not include sewage.
groundwater dependent ecosystem (GDE)	<p>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.</p> <p>For the purposes of the environmental authority, groundwater dependent ecosystems do not include those mapped as "unknown".</p>
growing	means to increase by natural development, as any living organism or part thereof by assimilation of nutriment; increase in size or substance.

Word or Phrase	Definition
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.
LA 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.
LAeq, adj, 15 mins	means an A-weighted sound pressure level of a continuous steady sound, adjusted for tonal character, that within a 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: <ul style="list-style-type: none"> • 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 <u>administering authority</u> of the <i>Water Act 2000</i> .
linear infrastructure	means powerlines, pipelines, 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 <u>sensitive receptor</u> , 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 <u>dam</u> that is not classified as high or significant as assessed using the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures</i> , published by the <u>administering authority</u> , as amended from time to time.
low impact petroleum activities	means petroleum activities which do not result in the <u>clearing</u> of native vegetation, cause disruption to soil profiles through earthworks or excavation or result in <u>significant disturbance</u> to land which cannot be <u>rehabilitated</u> immediately using hand tools after the activity is completed. Examples of such activities include but are not necessarily limited to soil surveys (excluding test

Word or Phrase	Definition
	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 <u>document</u> 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 <u>sensitive receptor</u> , persists for an aggregate period not greater than five days and does not re-occur for a period of at least four 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 <u>sump</u> by mixing with subsoil and which occurs in accordance with the following <u>methodology</u> : <ul style="list-style-type: none"> - the base of the subsoil and residual solid mixture must be separated from the groundwater table by at least one metre of a continuous layer of impermeable subsoil material (kw=10-8m/s) or subsoil with a clay content of greater than 20 percent; and - the residual solids is mixed with subsoil in the <u>sump</u> 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.

Word or Phrase	Definition
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— <ul style="list-style-type: none"> • 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> .
pest	Means a plant or animal, other than a native species of plant or animal, that is — <ul style="list-style-type: none"> a) an Invasive biosecurity matter under the <i>Biosecurity Act 2014</i>* b) a Controlled biosecurity matter or regulated biosecurity matter under the <i>Biosecurity Act 2014</i> or c) a Locally significant invasive species declared under <i>Local Government Act 2009</i> as local law. <p>*See Biosecurity Act 2014, schedule 1, part 3 or 4 or schedule 2, part 2. See also the notes to the Biosecurity Act 2014, schedules 1 and 2.</p> <p>Invasive biosecurity matter is defined to include invasive plants and animals as listed as prohibited and restricted matter in schedules 1 and 2 of the <i>Biosecurity Act 2014</i>.</p>
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 <u>significant disturbance</u> occurring at that location.
predominant species	has the meaning in the <i>Methodology for Surveying and Mapping of Regional Ecosystems and Vegetation Communities in Queensland</i> (Version 5.1 March 2020) 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> .
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> .

Word or Phrase	Definition
primary protection zone	means an area within 200m from the boundary of any <u>Category A, B or C ESA</u> .
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 <u>primary protection zone</u> of any <u>Category A, B or C ESA</u> or the <u>secondary protection zone</u> of any <u>Category A or B ESA</u> .
regional ecosystem	has the meaning in the <i>Methodology for Surveying and Mapping of Regional Ecosystems and Vegetation Communities in Queensland</i> (Version 5.1 March 2020) 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 <i>Regional Ecosystem Description Database</i> (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 <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ESR/2016/19339)</i> , published by the <u>administering authority</u> , as amended from time to time.
rehabilitation or rehabilitated	means the process of reshaping and <u>revegetating</u> land to restore it to a <u>stable</u> landform and in accordance with acceptance criteria and, where relevant, includes remediation of contaminated land. For the purposes of pipeline rehabilitation, rehabilitation includes <u>reinstatement</u> , <u>revegetation</u> 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, <u>watercourses</u> , culverts, fences and gates and other landscape(d) features) and is detailed in the <i>Australian Pipeline Industry Association (APIA) Code of Environmental Practice: Onshore Pipelines</i> (2013).
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 µg/L–0.020 µg/L.

Word or Phrase	Definition
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 <u>rehabilitation</u> 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 <u>stimulation</u> , including fracturing, that contain the following chemicals in more than the maximum amount prescribed under a regulation— <ul style="list-style-type: none"> 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 <u>Category A</u> or <u>Category B</u> ESA means an area within 100 metres from the boundary of the <u>primary protection zone</u> .
secondary treated class A standards	means treated sewage effluent or <u>greywater</u> which meets the following standards: <ul style="list-style-type: none"> • 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 <u>greywater</u> which meets the following standards: <ul style="list-style-type: none"> • 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

Word or Phrase	Definition
	<ul style="list-style-type: none"> e-coli, 80th percentile based on at least 5 samples with not less than 30 minutes between samples, 1000cfu per 100mL, maximum 10000cfu per 100mL.
secondary treated class C standards	<p>means treated sewage effluent or <u>greywater</u> which meets the following standards:</p> <ul style="list-style-type: none"> 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 100000cfu per 100mL.
sensitive place	<p>means:</p> <ul style="list-style-type: none"> 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 <u>sensitive receptor</u> for the purposes of the <i>Environmental Protection (Noise) Policy 2008</i>.
sensitive receptor	is defined in Schedule 2 of the <i>Environmental Protection (Noise) Policy 2008</i> , and means an area or place where noise is measured.
short term noise event	is a noise exposure, when perceived at a <u>sensitive receptor</u> , 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> .

Word or Phrase	Definition
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— (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 <u>rehabilitated</u> 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 <u>rehabilitation</u> 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 <u>administering authority</u> a statement of compliance about a <u>document</u> or work relating to a relevant activity. The condition must also state— (a) the criteria (the compliance criteria) the <u>document</u> or work must comply with; and (b) that the statement of compliance must state whether the <u>document</u> or work complies with the compliance criteria; and (c) the information (the supporting information) that must be provided to the <u>administering authority</u> to demonstrate compliance with the compliance criteria; and (d) when the statement of compliance and supporting information must be given to the <u>administering authority</u> .
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.
stimulation fluid	means the fluid injected underground to increase permeability. For clarity, the term <u>stimulation</u> fluid only applies to fluid injected down well post-perforation.
stimulation impact zone	means a 100m maximum radial distance from the <u>stimulation</u> 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 <u>dam</u> or levee.

Word or Phrase	Definition
subterranean cave <u>GDE</u>	<ul style="list-style-type: none"> • 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 <u>GDEs</u> are caves dependent on the subterranean presence of groundwater. Subterranean cave <u>GDEs</u> 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. <p><i>Note: the Subterranean <u>GDE</u> (caves) dataset can be displayed through the Queensland Government WetlandInfo mapping program.</i></p> <p><i>Note: the Subterranean <u>GDE</u> (caves) dataset can be obtained from the Queensland Government Information System.</i></p>
suitably qualified third party	<p>means a person who:</p> <p>(a) has qualifications and experience relevant to performing the function including but not limited to:</p> <ol style="list-style-type: none"> i. a bachelor's degree in science or engineering; and ii. 3 years' experience in undertaking soil contamination assessments; and <p>(b) is a member of at least one organisation prescribed in Schedule 8 of the <i>Environmental Protection Regulation 2008</i>; and</p> <p>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.</p>
sump	means a pit in which waste <u>residual drilling material</u> 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,

Word or Phrase	Definition
	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.
valid complaint	means all complaints unless considered by the <u>administering authority</u> 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— <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> a) polluter pays principle b) user pays principle c) proximity principle d) product stewardship principle.
waste fluids	has the meaning in section 13 of the Environmental Protection Act 1994 in conjunction with the common meaning of “fluid” which is “a substance which is capable of flowing and offers no permanent resistance to changes of shape”. Accordingly, to be a waste fluid, the waste must be a substance which is capable of flowing and offers no permanent resistance to changes of shape.
watercourse	has the meaning in Schedule 4 of the <i>Environmental Protection Act 1994</i> and means: <ul style="list-style-type: none"> a) a river, creek or stream in which water flows permanently or intermittently— <ul style="list-style-type: none"> i. in a natural channel, whether artificially improved or not; or ii. in an artificial channel that has changed the course of the watercourse. b) Watercourse includes the <u>bed</u> and banks and any other element of a river, creek or stream confining or containing water.

Word or Phrase	Definition
waters	includes all or any part of a creek, river, stream, lake, lagoon, swamp, <u>wetland</u> , spring, unconfined surface water, unconfined water in natural or artificial watercourses, <u>bed</u> 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	<p>for the purpose of this environmental authority, wetland means:</p> <ul style="list-style-type: none"> • areas shown on the <u>Map of referable wetlands</u> which is a <u>document</u> 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 <i>Environmental Protection Regulation 2008</i>; 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: <ul style="list-style-type: none"> ○ 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. <p>The term wetland includes riverine, lacustrine, estuarine, marine and palustrine wetlands; and it does not include a <u>Great Artesian Basin Spring</u> or a subterranean wetland that is a cave or aquifer.</p>
wetland of high ecological significance	means a <u>wetland</u> that meets the definition of a <u>wetland</u> and that is shown as a <u>wetland</u> of 'high ecological significance' or <u>wetland</u> of 'high ecological value' on the <u>Map of referable wetlands</u> .
wetland of other environmental value	means a <u>wetland</u> that meets the definition of a <u>wetland</u> and that is shown as a <u>wetland</u> of 'general environmental significance' or <u>wetland</u> of 'other environmental value' on the <u>Map of referable wetlands</u> .

END OF PERMIT

Matt Woodforth

From: Kate Wall
Sent: Tuesday, 1 March 2022 11:21 AM
To: Kerynne Birch
Cc: Rachel Burgess-Dean; Rachel Copp
Subject: RE: Arrow Energy DXP

Hi Kerynne,

A quick follow up question on the below material. Is there a difference in scoping table between the EA granted 8 March 2013 and the EA granted 2 May 2014?

From what I can tell by the material below, the 8 March 2013 EA is the first EA to include the 691 wells that are also identified in the scoping table in the 2014 approval.

Regards



Kate Wall

Director
DA Division
Department of State Development, Infrastructure,
Local Government and Planning

Microsoft teams – meet now

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*I acknowledge the traditional custodians of the lands and waters of Queensland.
I offer my respect to elders past, present and emerging as we work towards a just,
equitable and reconciled Australia.*



From: Kerynne Birch <Kerynne.Birch@des.qld.gov.au>
Sent: Monday, 28 February 2022 11:57 AM
To: Kate Wall <Kate.Wall@dsdilgp.qld.gov.au>
Cc: Rachel Burgess-Dean <Rachel.Burgess-Dean@des.qld.gov.au>; Rachel Copp <Rachel.Copp@des.qld.gov.au>
Subject: FW: Arrow Energy DXP

Hi Kate, thank you for your patience in waiting for this information, we have provided some background information in addition to specific information in response to your questions. Hopefully this provides a full picture of the situation for you to use in your considerations. I appreciate there's a lot of information so we're happy to discuss any of this information, if required.

We have also included a question for your regarding the Strategic Cropping land framework and it's application to this EA.

Cheers

Kerynne

Original EA application

- Prior to 2009 all tenures were on individual EAs.
- On 15 December 2009, a new EA application was submitted for a Level 1 petroleum activity which included all tenures to be on one EA (henceforth referred to as the DXP EA).
- Under the former EP Act (prior to commencement of the Greentape Reduction Act), an application for a Level 1 petroleum activity EA (including an EA amendment) required the submission of an Environmental Management Plan (EM Plan).
- An EM Plan was required to describe the proposal in full including such things as:
 - all relevant activities the subject of the application;
 - the land on which the activities are to be carried out;
 - the environmental values likely to be affected by the activities;
 - the potential adverse and beneficial impacts of the activities on the environmental values.
- The EM Plan submitted in 2009 to support the EA application stated that there were 455 wells approved under the development plans for each tenure, a total of 276 wells already drilled and proposed a further 300 new wells.
- The EA that resulted from the original EA application only accounted for the number of wells drilled (276) and the number of proposed wells (300) meaning that the EA accounted for 576 wells.
- The below table is an excerpt from the EM Plan.

Total New Well Development

Petroleum Lease	Number of Wells Approved Under Current Development Plans	Number of Approved Production Wells Already Drilled	Number of New Wells Required for Maintenance of Domestic Supply	Number of New Wells Required for Domestic Supply / Eventual Supply to LNG Sales Markets	Total Number of Production Wells Required to be Drilled
PL 194	60-65	64	25	0	25
PL 198	100	140	10	0	10
PL 230	60-75	72	40	0	40
PL 252	35-60	0	25	50	75
PL 238	50	0	0	50	50
PL 258	55	0	0	50	50
PL 260	50	0	0	50	50
Total	455	276	100	200	300

EA amendments (11 September 2012 and 9 January 2013)

- On 11 September 2012, the EA holders applied for an EA amendment to the DXP EA for the Tipton Injection trial and additional wells. However this application was withdrawn by the applicant and the wells included in this application were subsequently applied for and approved in a later application submitted on 9 January 2013 and granted on 8 March 2013.
- On 9 January 2013, the EA holders applied for an EA amendment to the DXP EA for the construction and operation of the Daandine Brine Dam and its associated infrastructure. Intent of authorisation of the requirement for an additional 115 wells was included in the EM Plan for the application and was discussed during negotiations associated with the EA amendment. The EM Plan included the number of wells (existing/authorised) and figures of indicative locations of these wells.

For consideration:

there was an EA in effect prior to the commencement of the RPI Act (13 June 2014).	EA dated 2 May 2014 EPPG00972513
the EA identifies the location, nature or extent of expected surface impacts of the resource activity (note resource activities are an activity for which a resource authority is required to lawfully carry out so an authorised activity for a petroleum authority (s22 P&G Act))	<p>The EA mentioned above includes a scoping table (Schedule A, Table 1 – Authorised Petroleum Activities) authorising the following across the tenures of the EA:</p> <ul style="list-style-type: none"> 691 coal seam gas wells (core/exploration/development/production wells); 200km of seismic surveys 1 injection well 40 compressor units 2 central gas processing facilities 2 sewage treatment plants 1 power station <p>The EA does not provide specific location information about the above aspects of the activity which is typical for an EA of this age. At the time of the application, applicants may not know the exact location of proposed activities and as such, have not carried out detailed assessments about environmental values of vegetation communities and associated impacts. Through the EA assessment process, DES is able to impose measures through EA conditions for minimising any adverse effects. EA conditions may restrict impacts occurring on particular vegetation communities or near sensitive areas. If an EA holder requires access to these areas to conduct activities, an additional EA amendment would be required to be submitted and assessed under the EP Act.</p>
the information provided in support of the EA application identifies the location, nature and extent of expected surface impacts including whether it identified what the expected surface impacts were	<p>As previously stated, under the former EP Act, an EA application for a Level 1 Petroleum activity required the submission of an EM Plan to support the application.</p> <p>2009 EA application EM Plan</p> <ul style="list-style-type: none"> Described the number of approved wells under the development plans for each tenure as 455; number of approved development wells already drilled 276 (meaning 179 wells remaining to be constructed); proposed wells 300. EM Plan Figure 4 is a map that shows current field development including well location. EM Plan Figure 5 is a map that shows proposed field development including well location. <p>2012 EM Plan (accompanied the EA amendment application dated 9 January 2013 and approved on 8 March 2013 which resulted in the addition of 115 wells)</p> <ul style="list-style-type: none"> the EM Plan considers that the 691 wells are already authorised, so the EM Plan describes these as 455 approved and existing wells, and 236 approved but not yet developed wells. Section 4 provides a description of petroleum activities (approved and existing; approved not yet developed and proposed activities) <ul style="list-style-type: none"> details of the typical disturbance types/areas associated with petroleum activities (wells, access tracks, borrow pits, dams) Figure 5 – is a map that shows the location of major existing infrastructure Figure 22 – is a map that shows the approximate location of registered water bores and Arrow production wells within the DXP Sections 5 – 13 provides information on potential impacts on environmental values and management/mitigation measures. <p>Notes:</p> <p>The EA application and EA amendment applications do not provide specifics in terms of coordinates for petroleum activities including wells, however the application material does provide figures which show the general location of the infrastructure across each tenure.</p> <p>At the time of the application, applicants may not know the exact location of proposed activities and as such, have not carried out detailed assessments about environmental values of vegetation communities and associated impacts. Through the EA assessment process, DES is able to impose measures through EA conditions for minimising any adverse effects. EA</p>

	<p>conditions may restrict impacts occurring on particular vegetation communities or near sensitive areas. If an EA holder requires access to these areas to conduct activities, an additional EA amendment would be required to be submitted and assessed under the EP Act.</p>																														
<p>other approvals relating to location, nature or extent of expected surface impacts required to be obtained under the EP Act or other Acts administered by DES</p>	<p>Under the former Strategic Cropping Land Act 2011 (SCL Act), if an applicant for an EA was proposing to undertake resource activities on Strategic Cropping Land (SCL) or potential SCL, the applicant may have needed to apply for an SCL compliance certificate or a SCL protection decision under the repealed SCL Act.</p> <p>Arrow indicated in several EA amendment applications relating to the DXP EA that they were undertaking resource activities on SCL and determined that an SCL compliance certificate application was required. The SCL decision has been attached for reference – Strategic cropping land compliance certificate SCLRD2013/000132 approved 5 April 2013.</p> <p>The SCL compliance decision states that it is for the following resource activities: water and gas pipelines, exploration wells, seismic surveys and proposed CSG treated water discharge release point. It is unclear what ‘exploration wells’ is referring to and if this encompasses production wells. As this was not an application required under the EP Act the specific application material is not available for review.</p> <p>Note: Part 8 of the <i>Regional Planning Interests Act 2014</i> (RPI Act) details the transitional provisions for the repeal of the <i>Strategic Cropping Land Act 2011</i>. Section 103 of the RPI Act provides the following:</p> <ul style="list-style-type: none"> • This section applies to an SCL compliance certificate, to the extent the certificate relates to a resource activity in an area that is in the strategic cropping area under this Act. • The person who holds the SCL compliance certificate is taken to have been issued a regional interests development approval (the transitioned approval) for the resource activity. <p>Questions for DSDILGP: Is the application for the SCL compliance decision available for review to confirm the activities that it relates to? Has a comparison been carried out to confirm whether the SCL compliance certificate has transitioned and is considered a RIDA under the RPI Act? It is noted that AgForce has asked this exact question of DES.</p> <p>Other Approvals There were a number of other approvals that were in place at the time. Please indicate if a review of these would be necessary.</p> <ul style="list-style-type: none"> • Plan of Operations (note, Plan of Operations are not approved by DES, but are a concurrent requirement on the operator). • Financial Assurance (now known as Estimated Rehabilitation Cost {ERC}) • Chapter 3 of the Water Act 2000 – Underground Water Impact Report (UWIR). Likely not relevant to this process. The activities would have been captured under the Surat Cumulative Management Area UWIR prepared by the Office of Groundwater Impact Assessment and would only be relevant to the take of underground water and making good impacted landholder bores. 																														
<p>there any other authorities relating to location, nature or extent of expected surface impacts required to be obtained under the EP Act or other Acts administered by DES</p>	<p>This is believed to be answered above.</p>																														
<p>there any conditions of the EA or other authorities relating to location, nature or extent of expected surface impacts that must be complied with before impact</p>	<p>The response to this question is in relation to the EA in effect prior to the commencement of the RPI Act - EA EPPG00972513 dated 2 May 2014 The EA contained a number of conditions that restrict the location, scale and intensity of the authorised activities:</p> <ul style="list-style-type: none"> • Scoping table – as shown above <p style="text-align: center;">Schedule A, Table 1 – Authorised Petroleum Activities</p> <table border="1"> <thead> <tr> <th>Petroleum Activity(ies)</th> <th>Total Number of Authorised Petroleum Activities</th> <th>Maximum Disturbance Authorised</th> </tr> </thead> <tbody> <tr> <td>Seismic surveys</td> <td>200 km</td> <td>200 km, 120 ha</td> </tr> <tr> <td>Total coal seam gas wells, including: <ul style="list-style-type: none"> • Core wells • Exploration wells • Development wells • Production wells </td> <td>691</td> <td>691 wells 691 ha</td> </tr> <tr> <td>Injection well(s) and associated facilities</td> <td>1</td> <td>4 ha</td> </tr> <tr> <td>Compressor units</td> <td>40</td> <td>40 units, 8 ha</td> </tr> <tr> <td>Central gas processing facilities</td> <td>2</td> <td>2 facilities, 8 ha</td> </tr> <tr> <td>Regulated dams</td> <td>22</td> <td>22 dams</td> </tr> <tr> <td>Water treatment facilities</td> <td>2</td> <td>12 ML/d (each), 2 ha</td> </tr> <tr> <td>Sewage treatment plants</td> <td>2</td> <td>< 450 EP (each), 0.15 ha</td> </tr> <tr> <td>Power stations</td> <td>1</td> <td>40 MW, 1.2 ha</td> </tr> </tbody> </table> <ul style="list-style-type: none"> • Constraints based planning in relation to activities near ESAs, watercourses, floodplains etc. • Environmental Offset conditions • Former Financial assurance (now known as ERC) 	Petroleum Activity(ies)	Total Number of Authorised Petroleum Activities	Maximum Disturbance Authorised	Seismic surveys	200 km	200 km, 120 ha	Total coal seam gas wells, including: <ul style="list-style-type: none"> • Core wells • Exploration wells • Development wells • Production wells 	691	691 wells 691 ha	Injection well(s) and associated facilities	1	4 ha	Compressor units	40	40 units, 8 ha	Central gas processing facilities	2	2 facilities, 8 ha	Regulated dams	22	22 dams	Water treatment facilities	2	12 ML/d (each), 2 ha	Sewage treatment plants	2	< 450 EP (each), 0.15 ha	Power stations	1	40 MW, 1.2 ha
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Kerynne Birch (She/Her)
Director, Energy and Extractive Resources Assessment
Environmental Services and Regulation
Department of Environment and Science
p Access refused
Level 7, 400 George Street, Brisbane QLD
GPO Box 2454, Brisbane QLD 4001

From: Kate Wall <Kate.Wall@dasilgp.qld.gov.au>
Sent: Thursday, 17 February 2022 12:57 PM
To: Kerynne Birch
Cc: Rachel Burgess-Dean
Subject: Arrow Energy DXP
Importance: High

Hi Kerynne

Would you have some time today to discuss some matters in relation to Arrow Energy's activities on their DXP EA?

For context, Planning is currently reviewing Arrow Energy's Dalby Expansion Project in the context of the Regional Planning Interest Act (RPI Act). Specifically, whether their activities to date are under the exemptions provided under section 24 of the RPI Act. I have included a snip of section 24 below for your reference.

24 Exemption—pre-existing resource activity

- (1) This section applies if, immediately before land becomes land in an area of regional interest, including on commencement of this section, a resource activity may be carried out lawfully on the land.
- (2) The resource activity is an *exempt resource activity* for the area of regional interest.
- (3) For subsection (1), a resource activity may be carried out lawfully on land if—
 - (a) the activity may be carried out lawfully on the land—
 - (i) under a resource authority or an environmental authority; and
 - (ii) without the need for any further authority or approval relating to the location, nature or extent of the expected surface impacts of the activity to be obtained under an Act or a condition of either authority; and
 - (b) information provided in, with or in support of the application for the resource or environmental authority (or an amendment of the application) identified the

Current as at 3 July 2017

Page 19

Authorised by the Parliamentary Counsel

Regional Planning Interests Act 2014
Part 2 Restrictions on resource and regulated activities in areas of regional interest
[s 24A]

location, nature and extent of the expected surface impacts of the activity.

A key element of the above section is the environmental authority and whether:

- there was an EA in effect prior to the commencement of the RPI Act (13 June 2014)
- the EA identifies the location, nature or extent of expected surface impacts of the resource activity (note resource activities are an activity for which a resource authority is required to lawfully carry out so an authorised activity for a petroleum authority (s22 P&G Act))
- the information provided in support of the EA application identifies the location, nature and extent of expected surface impacts including whether it identified what the expected surface impacts were
- other approvals relating to location, nature or extent of expected surface impacts required to be obtained under the EP Act or other Acts administered by DES
- there any other authorities relating to location, nature or extent of expected surface impacts required to be obtained under the EP Act or other Acts administered by DES
- there any conditions of the EA or other authorities relating to location, nature or extent of expected surface impacts that must be complied with before impact

I am seeking some urgent advice from DES in relation to the above dot points. As far I have been able to identify, there was an EA granted 2 May 2014 (attached) that would be relevant for addressing these issues. I also recognise the application material from 2014 may not be easily accessible. However, your assistance on this matter would be greatly appreciated.

Regards



Kate Wall

Director

DA Division

Department of State Development, Infrastructure,
Local Government and Planning

Microsoft teams – *meet now*

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*I acknowledge the traditional custodians of the lands and waters of Queensland.
I offer my respect to elders past, present and emerging as we work towards a just,
equitable and reconciled Australia.*



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Sophie Smith

From: Kerynne Birch <Kerynne.Birch@des.qld.gov.au>
Sent: Tuesday, 1 March 2022 3:10 PM
To: Kate Wall
Cc: Rachel Burgess-Dean; Rachel Copp
Subject: RE: Arrow Energy DXP

Hi Kate,

The scoping tables are essentially the same except that the 2013 version has a 'proposed' column whereas the 2014 version has incorporated the existing/proposed activities in one.

Scoping table from EA dated 8 March 2013				Scoping table from EA dated 2 May 2014		
Schedule A, Table 1 – Authorised Petroleum Activities				Schedule A, Table 1 – Authorised Petroleum Activities		
Petroleum Activity(ies)	Number of Existing Petroleum Activities	Number of Proposed Petroleum Activities	Maximum Disturbance Authorised	Petroleum Activity(ies)	Total Number of Authorised Petroleum Activities	Maximum Disturbance Authorised
Seismic surveys	0	200 km	200 km, 120 ha	Seismic surveys	200 km	200 km, 120 ha
Total coal seam gas wells, including:				Total coal seam gas wells, including:		
• Core wells				• Core wells	691	691 wells 691 ha
• Exploration wells	436	255	691 wells 691 ha	• Exploration wells		
• Development wells				• Development wells		
• Production wells				• Production wells		
Compressor units	40	0	40 units, 8 ha	Injection well(s) and associated facilities	1	4 ha
Central gas processing facilities	2	0	2 facilities, 8 ha	Compressor units	40	40 units, 8 ha
Regulated dams	22	0	22 dams	Central gas processing facilities	2	2 facilities, 8 ha
Water treatment facilities	2	0	12 ML/d (each), 2 ha	Regulated dams	22	22 dams
Sewage treatment plants	2	0	< 450 EP (each), 0.15 ha	Water treatment facilities	2	12 ML/d (each), 2 ha
Power stations	1	0	40 MW, 1.2 ha	Sewage treatment plants	2	< 450 EP (each), 0.15 ha
				Power stations	1	40 MW, 1.2 ha

Cheers

Kerynne



Kerynne Birch (She/Her)
Director, Energy and Extractive Resources Assessment
Environmental Services and Regulation
Department of Environment and Science

Access refused
Level 7, 400 George Street, Brisbane QLD
GPO Box 2454, Brisbane QLD 4001

From: Kate Wall <Kate.Wall@dasilgp.qld.gov.au>
Sent: Tuesday, 1 March 2022 11:21 AM
To: Kerynne Birch
Cc: Rachel Burgess-Dean; Rachel Copp
Subject: RE: Arrow Energy DXP

Hi Kerynne,

A quick follow up question on the below material. Is there a difference in scoping table between the EA granted 8 March 2013 and the EA granted 2 May 2014?

From what I can tell by the material below, the 8 March 2013 EA is the first EA to include the 691 wells that are also identified in the scoping table in the 2014 approval.

Regards



Kate Wall
Director
DA Division
Department of State Development, Infrastructure,
Local Government and Planning

Microsoft teams – meet now

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equitable and reconciled Australia.*



From: Kerynne Birch <Kerynne.Birch@des.qld.gov.au>

Sent: Monday, 28 February 2022 11:57 AM

To: Kate Wall <Kate.Wall@dsdilgp.qld.gov.au>

Cc: Rachel Burgess-Dean <Rachel.Burgess-Dean@des.qld.gov.au>; Rachel Copp <Rachel.Copp@des.qld.gov.au>

Subject: FW: Arrow Energy DXP

Hi Kate, thank you for your patience in waiting for this information, we have provided some background information in addition to specific information in response to your questions. Hopefully this provides a full picture of the situation for you to use in your considerations. I appreciate there's a lot of information so we're happy to discuss any of this information, if required.

We have also included a question for your regarding the Strategic Cropping land framework and it's application to this EA.

Cheers

Kerynne

Original EA application

- Prior to 2009 all tenures were on individual EAs.
- On 15 December 2009, a new EA application was submitted for a Level 1 petroleum activity which included all tenures to be on one EA (henceforth referred to as the DXP EA).
- Under the former EP Act (prior to commencement of the Greentape Reduction Act), an application for a Level 1 petroleum activity EA (including an EA amendment) required the submission of an Environmental Management Plan (EM Plan).
- An EM Plan was required to describe the proposal in full including such things as:
 - all relevant activities the subject of the application;
 - the land on which the activities are to be carried out;
 - the environmental values likely to be affected by the activities;
 - the potential adverse and beneficial impacts of the activities on the environmental values.

- The EM Plan submitted in 2009 to support the EA application stated that there were 455 wells approved under the development plans for each tenure, a total of 276 wells already drilled and proposed a further 300 new wells.
- The EA that resulted from the original EA application only accounted for the number of wells drilled (276) and the number of proposed wells (300) meaning that the EA accounted for 576 wells.
- The below table is an excerpt from the EM Plan.

Total New Well Development

Petroleum Lease	Number of Wells Approved Under Current Development Plans	Number of Approved Production Wells Already Drilled	Number of New Wells Required for Maintenance of Domestic Supply	Number of New Wells Required for Domestic Supply / Eventual Supply to LNG Sales Markets	Total Number of Production Wells Required to be Drilled
PL 194	60-65	64	25	0	25
PL 198	100	140	10	0	10
PL 230	60-75	72	40	0	40
PL 252	35-60	0	25	50	75
PL 238	50	0	0	50	50
PL 258	55	0	0	50	50
PL 260	50	0	0	50	50
Total	455	276	100	200	300

EA amendments (11 September 2012 and 9 January 2013)

- On 11 September 2012, the EA holders applied for an EA amendment to the DXP EA for the Tipton Injection trial and additional wells. However this application was withdrawn by the applicant and the wells included in this application were subsequently applied for and approved in a later application submitted on 9 January 2013 and granted on 8 March 2013.
- On 9 January 2013, the EA holders applied for an EA amendment to the DXP EA for the construction and operation of the Daandine Brine Dam and its associated infrastructure. Intent of authorisation of the requirement for an additional 115 wells was included in the EM Plan for the application and was discussed during negotiations associated with the EA amendment. The EM Plan included the number of wells (existing/authorised) and figures of indicative locations of these wells.

For consideration:

there was an EA in effect prior to the commencement of the RPI Act (13 June 2014).	EA dated 2 May 2014 EPPG00972513
the EA identifies the location, nature or extent of expected surface impacts of the resource activity (note resource activities are an activity for which	The EA mentioned above includes a scoping table (Schedule A, Table 1 – Authorised Petroleum Activities) authorising the following across the tenures of the EA: <ul style="list-style-type: none"> • 691 coal seam gas wells (core/exploration/development/production wells);

<p>a resource authority is required to lawfully carry out so an authorised activity for a petroleum authority (s22 P&G Act))</p>	<ul style="list-style-type: none"> • 200km of seismic surveys • 1 injection well • 40 compressor units • 2 central gas processing facilities • 2 sewage treatment plants • 1 power station <p>The EA does not provide specific location information about the above aspects of the activity which is typical for an EA of this age. At the time of the application, applicants may not know the exact location of proposed activities and as such, have not carried out detailed assessments about environmental values of vegetation communities and associated impacts. Through the EA assessment process, DES is able to impose measures through EA conditions for minimising any adverse effects. EA conditions may restrict impacts occurring on particular vegetation communities or near sensitive areas. If an EA holder requires access to these areas to conduct activities, an additional EA amendment would be required to be submitted and assessed under the EP Act.</p>
<p>the information provided in support of the EA application identifies the location, nature and extent of expected surface impacts including whether it identified what the expected surface impacts were</p>	<p>As previously stated, under the former EP Act, an EA application for a Level 1 Petroleum activity required the submission of an EM Plan to support the application.</p> <p>2009 EA application EM Plan</p> <ul style="list-style-type: none"> • Described the number of approved wells under the development plans for each tenure as 455; number of approved development wells already drilled 276 (meaning 179 wells remaining to be constructed); proposed wells 300. • EM Plan Figure 4 is a map that shows current field development including well location. • EM Plan Figure 5 is a map that shows proposed field development including well location. <p>2012 EM Plan (accompanied the EA amendment application dated 9 January 2013 and approved on 8 March 2013 which resulted in the addition of 115 wells)</p> <ul style="list-style-type: none"> • the EM Plan considers that the 691 wells are already authorised, so the EM Plan describes these as 455 approved and existing wells, and 236 approved but not yet developed wells. • Section 4 provides a description of petroleum activities (approved and existing; approved not yet developed and proposed activities) <ul style="list-style-type: none"> ○ details of the typical disturbance types/areas associated with petroleum activities (wells, access tracks, borrow pits, dams) ○ Figure 5 – is a map that shows the location of major existing infrastructure ○ Figure 22 – is a map that shows the approximate location of registered water bores and Arrow production wells within the DXP

	<ul style="list-style-type: none"> • Sections 5 – 13 provides information on potential impacts on environmental values and management/mitigation measures. <p>Notes:</p> <p>The EA application and EA amendment applications do not provide specifics in terms of coordinates for petroleum activities including wells, however the application material does provide figures which show the general location of the infrastructure across each tenure.</p> <p>At the time of the application, applicants may not know the exact location of proposed activities and as such, have not carried out detailed assessments about environmental values of vegetation communities and associated impacts. Through the EA assessment process, DES is able to impose measures through EA conditions for minimising any adverse effects. EA conditions may restrict impacts occurring on particular vegetation communities or near sensitive areas. If an EA holder requires access to these areas to conduct activities, an additional EA amendment would be required to be submitted and assessed under the EP Act.</p>
<p>other approvals relating to location, nature or extent of expected surface impacts required to be obtained under the EP Act or other Acts administered by DES</p>	<p>Under the former Strategic Cropping Land Act 2011 (SCL Act), if an applicant for an EA was proposing to undertake resource activities on Strategic Cropping Land (SCL) or potential SCL, the applicant may have needed to apply for an SCL compliance certificate or a SCL protection decision under the repealed SCL Act.</p> <p>Arrow indicated in several EA amendment applications relating to the DXP EA that they were undertaking resource activities on SCL and determined that an SCL compliance certificate application was required. The SCL decision has been attached for reference – Strategic cropping land compliance certificate SCLRD2013/000132 approved 5 April 2013.</p> <p>The SCL compliance decision states that it is for the following resource activities: water and gas pipelines, exploration wells, seismic surveys and proposed CSG treated water discharge release point. It is unclear what ‘exploration wells’ is referring to and if this encompasses production wells. As this was not an application required under the EP Act the specific application material is not available for review.</p> <p>Note: Part 8 of the <i>Regional Planning Interests Act 2014</i> (RPI Act) details the transitional provisions for the repeal of the <i>Strategic Cropping Land Act 2011</i>. Section 103 of the RPI Act provides the following:</p>

	<ul style="list-style-type: none"> • This section applies to an SCL compliance certificate, to the extent the certificate relates to a resource activity in an area that is in the strategic cropping area under this Act. • The person who holds the SCL compliance certificate is taken to have been issued a regional interests development approval (the transitioned approval) for the resource activity. <p>Questions for DSDILGP: Is the application for the SCL compliance decision available for review to confirm the activities that it relates to? Has a comparison been carried out to confirm whether the SCL compliance certificate has transitioned and is considered a RIDA under the RPI Act?</p> <p>It is noted that AgForce has asked this exact question of DES.</p> <p>Other Approvals</p> <p>There were a number of other approvals that were in place at the time. Please indicate if a review of these would be necessary.</p> <ul style="list-style-type: none"> • Plan of Operations (note, Plan of Operations are not approved by DES, but are a concurrent requirement on the operator). • Financial Assurance (now known as Estimated Rehabilitation Cost {ERC}) • Chapter 3 of the Water Act 2000 – Underground Water Impact Report (UWIR). Likely not relevant to this process. The activities would have been captured under the Surat Cumulative Management Area UWIR prepared by the Office of Groundwater Impact Assessment and would only be relevant to the take of underground water and making good impacted landholder bores.
<p>there any other authorities relating to location, nature or extent of expected surface impacts required to be obtained under the EP Act or other Acts administered by DES</p>	<p>This is believed to be answered above.</p>
<p>there any conditions of the EA or other authorities relating to location, nature or extent of expected surface impacts that must be complied with before impact</p>	<p>The response to this question is in relation to the EA in effect prior to the commencement of the RPI Act - EA EPPG00972513 dated 2 May 2014 The EA contained a number of conditions that restrict the location, scale and intensity of the authorised activities:</p> <ul style="list-style-type: none"> • Scoping table – as shown above

Schedule A, Table 1 – Authorised Petroleum Activities

Petroleum Activity(ies)	Total Number of Authorised Petroleum Activities	Maximum Disturbance Authorised
Seismic surveys	200 km	200 km, 120 ha
Total coal seam gas wells, including: <ul style="list-style-type: none"> • Core wells • Exploration wells • Development wells • Production wells 	691	691 wells 691 ha
Injection well(s) and associated facilities	1	4 ha
Compressor units	40	40 units, 8 ha
Central gas processing facilities	2	2 facilities, 8 ha
Regulated dams	22	22 dams
Water treatment facilities	2	12 ML/d (each), 2 ha
Sewage treatment plants	2	< 450 EP (each), 0.15 ha
Power stations	1	40 MW, 1.2 ha

- Constraints based planning in relation to activities near ESAs, watercourses, floodplains etc.
- Environmental Offset conditions
- Former Financial assurance (now known as ERC)



Kerynne Birch (She/Her)
 Director, Energy and Extractive Resources Assessment
 Environmental Services and Regulation
 Department of Environment and Science

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 Level 7, 400 George Street, Brisbane QLD
 GPO Box 2454, Brisbane QLD 4001

From: Kate Wall <Kate.Wall@dcdilgp.qld.gov.au>
Sent: Thursday, 17 February 2022 12:57 PM
To: Kerynne Birch

Cc: Rachel Burgess-Dean
Subject: Arrow Energy DXP
Importance: High

Hi Kerynne

Would you have some time today to discuss some matters in relation to Arrow Energy's activities on their DXP EA?

For context, Planning is currently reviewing Arrow Energy's Dalby Expansion Project in the context of the Regional Planning Interest Act (RPI Act). Specifically, whether their activities to date are under the exemptions provided under section 24 of the RPI Act. I have included a snip of section 24 below for your reference.

24 Exemption—pre-existing resource activity

- (1) This section applies if, immediately before land becomes land in an area of regional interest, including on commencement of this section, a resource activity may be carried out lawfully on the land.
- (2) The resource activity is an *exempt resource activity* for the area of regional interest.
- (3) For subsection (1), a resource activity may be carried out lawfully on land if—
 - (a) the activity may be carried out lawfully on the land—
 - (i) under a resource authority or an environmental authority; and
 - (ii) without the need for any further authority or approval relating to the location, nature or extent of the expected surface impacts of the activity to be obtained under an Act or a condition of either authority; and
 - (b) information provided in, with or in support of the application for the resource or environmental authority (or an amendment of the application) identified the

Current as at 3 July 2017

Page 19

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Regional Planning Interests Act 2014

Part 2 Restrictions on resource and regulated activities in areas of regional interest

[s 24A]

location, nature and extent of the expected surface impacts of the activity.

A key element of the above section is the environmental authority and whether:

- there was an EA in effect prior to the commencement of the RPI Act (13 June 2014)
- the EA identifies the location, nature or extent of expected surface impacts of the resource activity (note resource activities are an activity for which a resource authority is required to lawfully carry out so an authorised activity for a petroleum authority (s22 P&G Act))
- the information provided in support of the EA application identifies the location, nature and extent of expected surface impacts including whether it identified what the expected surface impacts were

- other approvals relating to location, nature or extent of expected surface impacts required to be obtained under the EP Act or other Acts administered by DES
- there any other authorities relating to location, nature or extent of expected surface impacts required to be obtained under the EP Act or other Acts administered by DES
- there any conditions of the EA or other authorities relating to location, nature or extent of expected surface impacts that must be complied with before impact

I am seeking some urgent advice from DES in relation to the above dot points. As far I have been able to identify, there was an EA granted 2 May 2014 (attached) that would be relevant for addressing these issues. I also recognise the application material from 2014 may not be easily accessible. However, your assistance on this matter would be greatly appreciated.

Regards



Kate Wall

Director

DA Division

Department of State Development, Infrastructure,
Local Government and Planning

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Sophie Smith

From: Kerynne Birch <Kerynne.Birch@des.qld.gov.au>
Sent: Thursday, 17 February 2022 3:37 PM
To: Kate Wall
Cc: Rachel Burgess-Dean
Subject: RE: Arrow Energy DXP

Hi Kate, a quick clarifying question re the request. The EA in question was subject to approximately 7 discreet applications between December 2009 and April 2014. Do you want us to focus on the original application from 2009? Or the most recent application?

Cheers

Kerynne



Kerynne Birch (She/Her)
Director, Energy and Extractive Resources Assessment
Environmental Services and Regulation
Department of Environment and Science

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Level 7, 400 George Street, Brisbane QLD
GPO Box 2454, Brisbane QLD 4001

From: Kate Wall <Kate.Wall@dsdilgp.qld.gov.au>
Sent: Thursday, 17 February 2022 3:10 PM
To: Kerynne Birch
Cc: Rachel Burgess-Dean
Subject: RE: Arrow Energy DXP

Thanks Kerynne,

I appreciate the quick response. If they have any questions or want some clarification I'm happy to take a call on the matter.

Regards



Kate Wall
Director
DA Division
Department of State Development, Infrastructure,
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From: Kerynne Birch <Kerynne.Birch@des.qld.gov.au>
Sent: Thursday, 17 February 2022 3:06 PM
To: Kate Wall <Kate.Wall@dsdilgp.qld.gov.au>
Cc: Rachel Burgess-Dean <Rachel.Burgess-Dean@des.qld.gov.au>
Subject: RE: Arrow Energy DXP

Hi Kate, I'm dealing with a couple of urgent matters today, however I will ask my team to review this with urgency. I will touch base with you regarding progress.

Cheers

Kerynne



Kerynne Birch (She/Her)
Director, Energy and Extractive Resources Assessment
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Part 2 Restrictions on resource and regulated activities in areas of regional interest

[s 24A]

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A key element of the above section is the environmental authority and whether:

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Director, Energy and Extractive Resources Assessment
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Department of Environment and Science

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Part 2 Restrictions on resource and regulated activities in areas of regional interest

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Regards



Kate Wall

Director

DA Division

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I offer my respect to elders past, present and emerging as we work towards a just,
equitable and reconciled Australia.*



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Matt Woodforth

From: Kerynne Birch <Kerynne.Birch@des.qld.gov.au>
Sent: Monday, 28 February 2022 11:57 AM
To: Kate Wall
Cc: Rachel Burgess-Dean; Rachel Copp
Subject: FW: Arrow Energy DXP
Attachments: 6 DXP SCLRD2013.000132 (05.04.2013).pdf; Strategic Cropping Land Standard Conditions Code for Resource Activities.pdf

Hi Kate, thank you for your patience in waiting for this information, we have provided some background information in addition to specific information in response to your questions. Hopefully this provides a full picture of the situation for you to use in your considerations. I appreciate there's a lot of information so we're happy to discuss any of this information, if required.

We have also included a question for your regarding the Strategic Cropping land framework and it's application to this EA.

Cheers

Kerynne

Original EA application

- Prior to 2009 all tenures were on individual EAs.
- On 15 December 2009, a new EA application was submitted for a Level 1 petroleum activity which included all tenures to be on one EA (henceforth referred to as the DXP EA).
- Under the former EP Act (prior to commencement of the Greentape Reduction Act), an application for a Level 1 petroleum activity EA (including an EA amendment) required the submission of an Environmental Management Plan (EM Plan).
- An EM Plan was required to describe the proposal in full including such things as:
 - all relevant activities the subject of the application;
 - the land on which the activities are to be carried out;
 - the environmental values likely to be affected by the activities;
 - the potential adverse and beneficial impacts of the activities on the environmental values.
- The EM Plan submitted in 2009 to support the EA application stated that there were 455 wells approved under the development plans for each tenure, a total of 276 wells already drilled and proposed a further 300 new wells.
- The EA that resulted from the original EA application only accounted for the number of wells drilled (276) and the number of proposed wells (300) meaning that the EA accounted for 576 wells.
- The below table is an excerpt from the EM Plan.

Total New Well Development

Petroleum Lease	Number of Wells Approved Under Current Development Plans	Number of Approved Production Wells Already Drilled	Number of New Wells Required for Maintenance of Domestic Supply	Number of New Wells Required for Domestic Supply / Eventual Supply to LNG Sales Markets	Total Number of Production Wells Required to be Drilled
PL 194	60-65	64	25	0	25
PL 198	100	140	10	0	10
PL 230	60-75	72	40	0	40
PL 252	35-60	0	25	50	75
PL 238	50	0	0	50	50
PL 258	55	0	0	50	50
PL 260	50	0	0	50	50
Total	455	276	100	200	300

EA amendments (11 September 2012 and 9 January 2013)

- On 11 September 2012, the EA holders applied for an EA amendment to the DXP EA for the Tipton Injection trial and additional wells. However this application was withdrawn by the applicant and the wells included in this application were subsequently applied for and approved in a later application submitted on 9 January 2013 and granted on 8 March 2013.
- On 9 January 2013, the EA holders applied for an EA amendment to the DXP EA for the construction and operation of the Daandine Brine Dam and its associated infrastructure. Intent of authorisation of the requirement for an additional 115 wells was included in the EM Plan for the application and was discussed during negotiations associated with the EA amendment. The EM Plan included the number of wells (existing/authorised) and figures of indicative locations of these wells.

For consideration:

there was an EA in effect prior to the commencement of the RPI Act (13 June 2014).	EA dated 2 May 2014 EPPG00972513
the EA identifies the location, nature or extent of expected surface impacts of the resource activity (note resource activities are an activity for which a resource authority is required to lawfully carry out so an authorised activity for a petroleum authority (s22 P&G Act))	<p>The EA mentioned above includes a scoping table (Schedule A, Table 1 – Authorised Petroleum Activities) authorising the following across the tenures of the EA:</p> <ul style="list-style-type: none"> • 691 coal seam gas wells (core/exploration/development/production wells); • 200km of seismic surveys • 1 injection well • 40 compressor units • 2 central gas processing facilities • 2 sewage treatment plants • 1 power station <p>The EA does not provide specific location information about the above aspects of the activity which is typical for an EA of this age. At the time of the application, applicants may not know the exact location of proposed activities and as such, have not carried out detailed assessments about environmental values of vegetation communities and associated impacts. Through the EA assessment process, DES is able to impose measures through EA conditions for minimising</p>

	<p>any adverse effects. EA conditions may restrict impacts occurring on particular vegetation communities or near sensitive areas. If an EA holder requires access to these areas to conduct activities, an additional EA amendment would be required to be submitted and assessed under the EP Act.</p>
<p>the information provided in support of the EA application identifies the location, nature and extent of expected surface impacts including whether it identified what the expected surface impacts were</p>	<p>As previously stated, under the former EP Act, an EA application for a Level 1 Petroleum activity required the submission of an EM Plan to support the application.</p> <p>2009 EA application EM Plan</p> <ul style="list-style-type: none"> • Described the number of approved wells under the development plans for each tenure as 455; number of approved development wells already drilled 276 (meaning 179 wells remaining to be constructed); proposed wells 300. • EM Plan Figure 4 is a map that shows current field development including well location. • EM Plan Figure 5 is a map that shows proposed field development including well location. <p>2012 EM Plan (accompanied the EA amendment application dated 9 January 2013 and approved on 8 March 2013 which resulted in the addition of 115 wells)</p> <ul style="list-style-type: none"> • the EM Plan considers that the 691 wells are already authorised, so the EM Plan describes these as 455 approved and existing wells, and 236 approved but not yet developed wells. • Section 4 provides a description of petroleum activities (approved and existing; approved not yet developed and proposed activities) <ul style="list-style-type: none"> ○ details of the typical disturbance types/areas associated with petroleum activities (wells, access tracks, borrow pits, dams) ○ Figure 5 – is a map that shows the location of major existing infrastructure ○ Figure 22 – is a map that shows the approximate location of registered water bores and Arrow production wells within the DXP • Sections 5 – 13 provides information on potential impacts on environmental values and management/mitigation measures. <p>Notes:</p> <p>The EA application and EA amendment applications do not provide specifics in terms of coordinates for petroleum activities including wells, however the application material does provide figures which show the general location of the infrastructure across each tenure.</p> <p>At the time of the application, applicants may not know the exact location of proposed activities and as such, have not carried out detailed assessments about environmental values of vegetation communities and associated impacts. Through the EA assessment process, DES is able to impose measures through EA conditions for minimising any adverse effects. EA conditions may restrict impacts occurring on particular vegetation communities or near sensitive areas. If an EA holder requires access to these areas to conduct activities, an additional EA amendment would be required to be submitted and assessed under the EP Act.</p>
<p>other approvals relating to location, nature or extent of expected surface impacts required to be obtained under the EP Act or other Acts administered by DES</p>	<p>Under the former Strategic Cropping Land Act 2011 (SCL Act), if an applicant for an EA was proposing to undertake resource activities on Strategic Cropping Land (SCL) or potential SCL, the applicant may have needed to apply for an SCL compliance certificate or a SCL protection decision under the repealed SCL Act.</p> <p>Arrow indicated in several EA amendment applications relating to the DXP EA that they were undertaking resource activities on SCL and determined that an SCL compliance certificate application was required. The SCL decision has been attached for reference – Strategic cropping land compliance certificate SCLRD2013/000132 approved 5 April 2013.</p> <p>The SCL compliance decision states that it is for the following resource activities: water and gas pipelines, exploration wells, seismic surveys and proposed CSG treated water discharge release point. It is unclear what ‘exploration wells’ is referring to and if this encompasses production wells. As this was not an application required under the EP Act the specific application material is not available for review.</p> <p>Note: Part 8 of the <i>Regional Planning Interests Act 2014</i> (RPI Act) details the transitional provisions for the repeal of the <i>Strategic Cropping Land Act 2011</i>. Section 103 of the RPI Act provides the following:</p> <ul style="list-style-type: none"> • This section applies to an SCL compliance certificate, to the extent the certificate relates to a resource activity in an area that is in the strategic cropping area under this Act. • The person who holds the SCL compliance certificate is taken to have been issued a regional interests development approval (the transitioned approval) for the resource activity. <p>Questions for DSDILGP: Is the application for the SCL compliance decision available for review to confirm the activities that it relates to? Has a comparison been carried out to confirm whether the SCL compliance certificate has transitioned and is considered a RIDA under the RPI Act? It is noted that AgForce has asked this exact question of DES.</p> <p>Other Approvals</p> <p>There were a number of other approvals that were in place at the time. Please indicate if a review of these would be necessary.</p> <ul style="list-style-type: none"> • Plan of Operations (note, Plan of Operations are not approved by DES, but are a concurrent requirement on the operator). • Financial Assurance (now known as Estimated Rehabilitation Cost {ERC})

	<ul style="list-style-type: none"> Chapter 3 of the Water Act 2000 – Underground Water Impact Report (UWIR). Likely not relevant to this process. The activities would have been captured under the Surat Cumulative Management Area UWIR prepared by the Office of Groundwater Impact Assessment and would only be relevant to the take of underground water and making good impacted landholder bores. 																														
there any other authorities relating to location, nature or extent of expected surface impacts required to be obtained under the EP Act or other Acts administered by DES	This is believed to be answered above.																														
there any conditions of the EA or other authorities relating to location, nature or extent of expected surface impacts that must be complied with before impact	<p>The response to this question is in relation to the EA in effect prior to the commencement of the RPI Act - EA EPPG00972513 dated 2 May 2014 The EA contained a number of conditions that restrict the location, scale and intensity of the authorised activities:</p> <ul style="list-style-type: none"> Scoping table – as shown above <p style="text-align: center;">Schedule A, Table 1 – Authorised Petroleum Activities</p> <table border="1"> <thead> <tr> <th>Petroleum Activity(ies)</th> <th>Total Number of Authorised Petroleum Activities</th> <th>Maximum Disturbance Authorised</th> </tr> </thead> <tbody> <tr> <td>Seismic surveys</td> <td>200 km</td> <td>200 km, 120 ha</td> </tr> <tr> <td>Total coal seam gas wells, including: <ul style="list-style-type: none"> Core wells Exploration wells Development wells Production wells </td> <td>691</td> <td>691 wells 691 ha</td> </tr> <tr> <td>Injection well(s) and associated facilities</td> <td>1</td> <td>4 ha</td> </tr> <tr> <td>Compressor units</td> <td>40</td> <td>40 units, 8 ha</td> </tr> <tr> <td>Central gas processing facilities</td> <td>2</td> <td>2 facilities, 8 ha</td> </tr> <tr> <td>Regulated dams</td> <td>22</td> <td>22 dams</td> </tr> <tr> <td>Water treatment facilities</td> <td>2</td> <td>12 ML/d (each), 2 ha</td> </tr> <tr> <td>Sewage treatment plants</td> <td>2</td> <td>< 450 EP (each), 0.15 ha</td> </tr> <tr> <td>Power stations</td> <td>1</td> <td>40 MW, 1.2 ha</td> </tr> </tbody> </table> <ul style="list-style-type: none"> Constraints based planning in relation to activities near ESAs, watercourses, floodplains etc. Environmental Offset conditions Former Financial assurance (now known as ERC) 	Petroleum Activity(ies)	Total Number of Authorised Petroleum Activities	Maximum Disturbance Authorised	Seismic surveys	200 km	200 km, 120 ha	Total coal seam gas wells, including: <ul style="list-style-type: none"> Core wells Exploration wells Development wells Production wells 	691	691 wells 691 ha	Injection well(s) and associated facilities	1	4 ha	Compressor units	40	40 units, 8 ha	Central gas processing facilities	2	2 facilities, 8 ha	Regulated dams	22	22 dams	Water treatment facilities	2	12 ML/d (each), 2 ha	Sewage treatment plants	2	< 450 EP (each), 0.15 ha	Power stations	1	40 MW, 1.2 ha
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Kerynne Birch (She/Her)
Director, Energy and Extractive Resources Assessment
Environmental Services and Regulation
Department of Environment and Science
p Access refused
Level 7, 400 George Street, Brisbane QLD
GPO Box 2454, Brisbane QLD 4001

From: Kate Wall <Kate.Wall@dasilgp.qld.gov.au>
Sent: Thursday, 17 February 2022 12:57 PM
To: Kerynne Birch
Cc: Rachel Burgess-Dean
Subject: Arrow Energy DXP
Importance: High

Hi Kerynne

Would you have some time today to discuss some matters in relation to Arrow Energy’s activities on their DXP EA?

For context, Planning is currently reviewing Arrow Energy’s Dalby Expansion Project in the context of the Regional Planning Interest Act (RPI Act). Specifically, whether their activities to date are under the exemptions provided under section 24 of the RPI Act. I have included a snip of section 24 below for your reference.

24 Exemption—pre-existing resource activity

- (1) This section applies if, immediately before land becomes land in an area of regional interest, including on commencement of this section, a resource activity may be carried out lawfully on the land.
- (2) The resource activity is an *exempt resource activity* for the area of regional interest.
- (3) For subsection (1), a resource activity may be carried out lawfully on land if—
 - (a) the activity may be carried out lawfully on the land—
 - (i) under a resource authority or an environmental authority; and
 - (ii) without the need for any further authority or approval relating to the location, nature or extent of the expected surface impacts of the activity to be obtained under an Act or a condition of either authority; and
 - (b) information provided in, with or in support of the application for the resource or environmental authority (or an amendment of the application) identified the

Current as at 3 July 2017

Page 19

Authorised by the Parliamentary Counsel

Regional Planning Interests Act 2014
Part 2 Restrictions on resource and regulated activities in areas of regional interest
[s 24A]

location, nature and extent of the expected surface impacts of the activity.

A key element of the above section is the environmental authority and whether:

- there was an EA in effect prior to the commencement of the RPI Act (13 June 2014)
- the EA identifies the location, nature or extent of expected surface impacts of the resource activity (note resource activities are an activity for which a resource authority is required to lawfully carry out so an authorised activity for a petroleum authority (s22 P&G Act))
- the information provided in support of the EA application identifies the location, nature and extent of expected surface impacts including whether it identified what the expected surface impacts were
- other approvals relating to location, nature or extent of expected surface impacts required to be obtained under the EP Act or other Acts administered by DES
- there any other authorities relating to location, nature or extent of expected surface impacts required to be obtained under the EP Act or other Acts administered by DES
- there any conditions of the EA or other authorities relating to location, nature or extent of expected surface impacts that must be complied with before impact

I am seeking some urgent advice from DES in relation to the above dot points. As far I have been able to identify, there was an EA granted 2 May 2014 (attached) that would be relevant for addressing these issues. I also recognise the application material from 2014 may not be easily accessible. However, your assistance on this matter would be greatly appreciated.

Regards



Kate Wall

Director
DA Division
Department of State Development, Infrastructure,
Local Government and Planning

Microsoft teams – *meet now*

Access refused in accordance with sect
Level 13, 1 William Street, Brisbane QLD 4000
PO Box 15009, CITY EAST QLD 4002

statedevelopment.qld.gov.au



I acknowledge the traditional custodians of the lands and waters of Queensland. I offer my respect to elders past, present and emerging as we work towards a just, equitable and renewed Australia.



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Compliance certificate

Strategic Cropping Land Act 2011

Strategic cropping land compliance certificate: SCLRD2013/000132

This certificate is given under s. 118 of the Strategic Cropping Land Act 2011, by the administering authority for the resource activities specified in this certificate, to be undertaken in accordance with the conditions in the specified part of the strategic cropping land standard conditions code for resource activities dated December 2012 (the SCL code).

This certificate was given on: **05 April 2013**

Certificate holder(s)	Address
Arrow Energy Pty Ltd	Level 19, 42-60 Albert Street, Brisbane, QLD 4000

This certificate is for **Part 3** of the SCL code.

This part of the SCL code entitles the holder to conduct resource activities on SCL or potential SCL that comply with Part 1, 2 or 3 of the SCL code (subject to all other required approvals).

Resource activities	Environmental authority	Location(s)
Water and gas pipelines, exploration wells, seismic surveys and proposed CSG treated water discharge release point.	PEN100449509	PL194, PL198, PL230, PL238, PL252, PL258, PL260

Notes:

- Sections 76 and 77 of the *Strategic Cropping Land Act 2011* outline offences and penalties for permanently or temporarily impacting on strategic cropping land or potential strategic cropping land without a resource authority for the resource activity.

The conditions under the specified part of the SCL code for carrying out the resource activity on SCL or potential SCL are taken to be conditions of the environmental authority. Therefore, if conditions of the specified part of the SCL code are not complied with, there is no authority to undertake the resource activity.

Strategic Cropping Land compliance certificate

2. It is your responsibility to ensure that all required financial assurance is paid prior to carrying out, or allowing the carrying out of, any resource activities on strategic cropping land or potential strategic cropping land, in accordance with the SCL code.



Signature

05/04/2013

Date

Michael Watson

Project Manager
Delegate of the Chief Executive administering the
Strategic Cropping Land Act 2011
Department of Natural Resources and Mines

Enquiries:

Amy MacCartie
Natural Resource Management Officer
203 Tor Street, Toowoomba, QLD 4350
Phone: (07) 4529 1333
Fax: (07) 4529 1562

Strategic Cropping Land

Standard conditions code for resource activities

*This standard conditions code has been made under the Strategic Cropping Land Regulation 2011.
This code contains standard conditions that apply to certain resource activities that are triggered for
assessment under the Strategic Cropping Land Act 2011*



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Contents

Contents	3
1. Introduction	4
2. Application requirements	8
3. Authorisation of this Code	9
4. Scope of this Code	9
5. When this Code takes effect	9
6. Enforcement of this Code	10
7. Other requirements	10
8. Amendment of this Code	10
9. Further information or enquiries	10
10. Part 1 – Standard conditions code and advisory notes	11
11. Part 2 – Standard conditions and advisory notes	12
12. Part 3–Standard conditions and advisory notes	18
13. Definitions	30
Schedule 1: Financial assurance	33

1. Introduction

The *Strategic Cropping Land Act 2011* (SCL Act) allows for certain **resource activities** that have a temporary impact on SCL or potential SCL to apply for a compliance certificate to operate under a standard conditions code.

Under section 81 of the *Strategic Cropping Land Act 2011*, this code cannot be used for a resource activity that will have a permanent impact in a protection area.

The SCL standard conditions code for resource activities (the Code) expedites the assessment process while still ensuring that there are appropriate standards of management and protection of SCL and potential SCL. Where a proponent intends to undertake a **resource activity** on SCL or potential SCL that is not provided for within this Code, or where the proponent can not comply with the conditions of this Code, a full SCL development assessment will be required, that is, an SCL protection decision.

The conditions of this Code seek to protect SCL and potential SCL by conditioning resource activities to avoid and minimise the impacts on SCL or potential SCL (SCL principles). The potential impacts include for example:

- surface area disturbance
- mixing of soil layers
- compaction of soil
- erosion
- subsidence
- changing the physical, biological and chemical structure of the soil
- temporary impedance of cropping.

In the first instance, proponents should avoid locating **resource activities** directly on SCL or potential SCL. Where this is not possible, strategies to minimise the impacts of **resource activities** on SCL or potential SCL should be employed (e.g. working with the landholder to develop an agreed farm management plan which could address key issues such as the timing of activities, minimal disturbance well leases, directional drilling, multi well pad drilling, reducing exploration drill pad size, using existing **access tracks** and co-locating infrastructure).

This Code works on the basis that the holder must first avoid, then minimise the impacts on SCL and potential SCL through prescribing the types of **resource activities** that are permissible under this Code and the way in which those activities are to be carried out.

How the code works

The code contains three parts, with each part providing for different resource activities. The resource activities for each part are listed in the first column; the standard conditions are in the second column and advisory notes are in the third column.

An applicant for a compliance certificate must decide which part of the code to apply for based on the resource activities that are proposed to undertaken on SCL or potential SCL and the conditions for undertaking those activities.

The applicant must then complete a compliance certificate application form (which forms part of the environmental authority application form) and declare in that form which part of the code they are applying for and certify that they will comply with the conditions of that part of the code.

Provided all application requirements are met, the chief executive (or delegate) will give the applicant a compliance certificate which will clearly identify which part of the code the applicant must comply with. The applicant is bound by the conditions of that part of the code which are taken to be conditions of the environmental authority or resource authority.

Part 1

Part 1 of this Code applies to resource activities that will have no additional impact on SCL or potential SCL beyond what was previously authorised for the land.

This Part applies to situations where there was an approved resource activity under the environmental authority and the activity, footprint size and impact are not changing but an amendment is required in how the activity is conducted (e.g. the location of the footprint is changing).

An application for a compliance certificate under Part 1 of the Code is required. Financial assurance is not required.

Part 2

Part 2 of this Code applies to **resource activities** that are considered to have a minimal and temporary impact on SCL or potential SCL. They are generally surface **resource activities** that are limited to excavations using hand-held tools and **light vehicles**. These **resource activities** do not require the construction of **formed, gravelled or sealed access tracks**. An application for a compliance certificate under Part 2 of the Code is required. Financial assurance is not required.

The **resource activities** provided for under Part 2 of this Code are focussed on a subset of the types of activities carried out under a survey licence, authority to prospect, water monitoring authority or data acquisition authority under the *Petroleum and Gas (Production and Safety) Act 2004*; prospecting permit, exploration permit, or small mining claim under the *Mineral Resources Act 1989*; a greenhouse gas (GHG) exploration permit or GHG injection and storage data acquisition authority under the *Greenhouse Gas Storage Act 2009*; or a geothermal exploration permit under a Geothermal Act (*Geothermal Energy Act 2010* and *Geothermal Exploration Act 2004* – repealed).

Proponents operating under Part 2 of this Code are also entitled to conduct the activities provided for in Part 1 of this Code, in accordance with those conditions.

Some **resource activities** under higher tenures (e.g. petroleum lease, mineral development licence or mining lease) may be able to comply with Part 2 of this Code where the only activities undertaken directly on SCL or potential SCL are the activities provided for in Part 2 (or Part 1) of this Code.

The following activities are only provided for under Part 2 of this Code, in accordance with the conditions:

- Hand mining and excavation (size limited)
- **Sample pits** and **geotechnical pits** (size limited)
- Stockpiling soil
- **Access tracks** (slashed only - not **formed, gravelled or sealed**)
- Dust suppression
- Surveying not involving site preparation (aerial, electrical, geophysical and environmental surveys, pegging)
- Exploratory drilling and core holes (size and method limited)
- Water monitoring activities

Part 3

Part 3 of this Code applies to **resource activities** that are considered to have a low and temporary impact on SCL or potential SCL and provides for a wider range of **resource activities** than those activities provided for in Part 2 of this Code. A compliance certificate application for Part 3 of this Code has a higher fee than Parts 1 and 2; and financial assurance may be required.

The resource activities provided for under Part 3 of this Code are focussed on a subset of the types of activities carried out under an authority to prospect or petroleum lease under the Petroleum and Gas (Production and Safety) Act 2004; an exploration permit, mining claim or mining lease under the Mineral Resources Act 1989; a GHG injection and storage lease under the Greenhouse Gas Storage Act 2009; or a geothermal production lease under the Geothermal Energy Act 2010.

Proponents operating under Part 3 of this Code are also entitled to conduct the activities provided for in Parts 1 and 2 of this Code, in accordance with those conditions.

Some **resource activities** under higher tenures (e.g. mineral development licence or mining lease) will be able to comply with Part 3 of the Code where the only activities undertaken directly on SCL or potential SCL are the activities provided for in Part 3 (and Part 1 and 2) of this Code.

The following activities are only provided for under Part 3 of this Code, in accordance with the conditions:

- Excavation
- Buried linear infrastructure including gathering lines, power lines
- **Sample pits and geotechnical pits**
- Stockpiling soil
- **Well leases**
- **Lay down areas**
- Chemical and fuel storage
- Sumps
- **Access tracks (formed or gravelled)**
- **Geophysical surveying**
- Exploratory drilling and core holes
- Water monitoring bores
- Temporary camps and accommodation

Part 3 of this Code contains conditions that require financial assurance for particular resource activities, which are outlined in Schedule 1.

Schedule 1 of this Code must be used to calculate the required financial assurance payable to the State. Where required by this Code, financial assurance must be paid prior to commencement of the **resource activity** on SCL or potential SCL. Financial assurance may be used by the State to restore temporary impacts on SCL back to pre-development condition, should the proponent default on their obligations. Financial assurance required under this Code is in addition to any other security required under a **resource authority** or **environmental authority**. Financial assurance obligations transfer to any new **holder** of an **environmental authority** or **resource authority**.

Advisory notes for many of the standard conditions of this Code provide explanatory material and suggest practices and measures that may be adopted by the **holder** to meet the requirements of the condition. Advisory notes are intended as a guide only. These advisory notes have no regulatory status and are not a mandatory compliance requirement.

Key terms and phrases used in this Code are bolded and defined at the end of this Code. Where a term is not defined in this Code, the definition in the SCL Act and its Regulation must be used. If a word remains undefined, its ordinary meaning applies.

2. Application requirements

Applicants applying under Part 1, 2 or 3 of this Code should submit their SCL compliance certificate application at the same time as their application for an **environmental authority** (or application to amend an environmental authority). The application for a compliance certificate is contained within the environmental authority application form.

The applicant, as part of their application, must declare that resource activities will be undertaken in accordance with the relevant part of the Code.

Statutory compliance certificate application requirements for Parts 1, 2 and 3 of this Code:

Application requirement (ss. 84, 85 & 117 of the <i>Strategic Cropping Land Act 2011</i>)	How to satisfy application requirement
Be made to the chief executive in the approved form	Use the SCL compliance certificate application form available on the Department's website www.dnrm.qld.gov.au
Describe the land on which the activity is to be carried out, and state the real property description of each lot that forms it	Use a general location description e.g. 10km SW of Dalby; and Provide resource authority numbers; blocks and sub-blocks or real property descriptions to identify the land. The real property descriptions do not need to be provided if the resource authority number or blocks and sub-blocks have been provided.
Describe the resource activity	Provide as much detail as possible about the specific resource activities proposed to be undertaken on SCL or potential SCL.
Be accompanied by the fee prescribed under a regulation.	Pay the relevant fee at the time of application.
Requirement that land be, or elected to be, treated as SCL	Complete the relevant part of the application form.
Location requirements (a) The location of all SCL or potential SCL on the land (b) Where the development is proposed to be carried out on SCL or potential SCL, wherever possible (c) All of the footprint of the development	Provide a map(s) that identifies the resource authority boundaries and the SCL and potential SCL within those boundaries. Provide the specific locations of resource activities wherever possible, particularly for resource activities on SCL or potential SCL and major infrastructure. As a minimum the applicant should provide information describing the maximum possible footprint on SCL or potential SCL and the general location of the footprint.

When the administering authority is satisfied that the application contains all of the required information, an SCL compliance certificate will be given to the applicant either before, or at the same time as, the environmental authority. An environmental authority (including an amended environmental authority) can not be issued until the SCL compliance certificate has been given.

3. Authorisation of this Code

The Code is provided for under section 81 of the SCL Act, and made under the Strategic Cropping Land Regulation 2011.

4. Scope of this Code

A proponent may apply for a compliance certificate under Parts 1, 2 or 3 of this Code for an application for:

- a new environmental authority; or
- an amendment to an existing environmental authority.

This Code does not serve to authorise the carrying out of **resource activities**. The conditions imposed by this Code operate to prevent or manage impacts on SCL or potential SCL that, in the absence of this Code, may be authorised to occur under the **environmental authority** or **resource authority**.

The conditions of this Code only apply to the **resource activities** on SCL or potential SCL and the subject of the compliance certificate application. In other words, the conditions do not have any effect on **resource activities** on SCL or potential SCL that have already received approval. For example, the conditions of this Code do not apply to an application for a temporary camp that was approved prior to the commencement of the SCL Act (30 January 2012).

Conditions of this Code only apply to those **resource activities** that occur directly on SCL or potential SCL. For example, where multiple wells are proposed within a project area, only those wells that occur directly on SCL or potential SCL are subject to the conditions of Part 3 of this Code.

All conditions of the Part of this Code that the applicant elected to comply with are imposed on the **environmental authority**, and must be complied with. If there is any inconsistency between the conditions of the relevant Part of this Code and another condition of, or imposed on, the **environmental authority** or **resource authority**, this Code prevails to the extent of the inconsistency. For example, where the code has more restrictive conditions than the environmental authority, the conditions of this Code prevail.

However, in cases where the **environmental authority** places more restrictive conditions on a **resource activity** than a condition of this Code, by complying with the conditions of the **environmental authority**, the activity will comply with the conditions of this Code. Therefore no inconsistency exists.

5. When this Code takes effect

This Code is in effect from 21 December 2012.

6. Enforcement of this Code

Sections 76, 77 and 78 of the SCL Act outline offences and penalties for permanently or temporarily impacting on SCL or potential SCL without a **resource authority** for the **resource activity**.

Proponents can apply to operate under the conditions of this Code. Conditions are imposed on the **environmental authority** for the **resource activity**. If the conditions of the relevant part of the Code are not complied with, it is a breach of a condition of the **environmental authority** for that resource activity, and therefore a breach of the SCL Act.

The conditions of this Code do not prevent the **holder** from using the emergency activity defence under section 79 of the SCL Act if, due to an emergency endangering the life or health of a person or the structural safety of a building or structure or the safety of infrastructure, SCL or potential SCL is permanently or temporarily impacted by the development.

7. Other requirements

In addition to the conditions in this Code, the proponent must comply with all other relevant Commonwealth, State or local government legislative requirements. Operating under this Code does not remove the requirement to gain a resource authority to undertake resource activities under relevant resource legislation and an environmental authority under the Environmental Protection Act 1994.

8. Amendment of this Code

This Code may be amended from time to time; however, amendments do not take effect until they are made by the Strategic Cropping Land Regulation 2011.

9. Further information or enquiries

Further information is available at www.dnrm.qld.gov.au or by contacting the relevant Department of Natural Resources and Mines regional office.

General enquiries regarding this Code should be directed to sclenquiries@dnrm.qld.gov.au, or call 13 QGOV (13 74 68).

10. Part 1 – Standard conditions code and advisory notes

COLUMN 1 Resource Activity	COLUMN 2 Standard Conditions	COLUMN 3 Advisory notes
<p>1. Permitted resource activities provided for in Part 1 of this Code</p>	<p>1.1 The only resource activities permitted to be undertaken on SCL or potential SCL under Part 1 of this Code are activities that have already been authorised by the environmental authority and the change to that resource activity will have no additional impact on SCL or potential SCL beyond the impact already authorised by the environmental authority.</p> <p>1.2 Any SCL conditions (conditions of the Code or SCL protection conditions) that applied to a resource activity that is now operating under Part 1 of this code continue to apply to that resource activity.</p> <p>1.3 Conditions of Part 1 of this Code do not apply to any land that is SCL or potential SCL, and is subsequently recorded in the decision register as decided non-SCL, when that land is recorded as decided non-SCL.</p>	<p>Under section 81 of the <i>Strategic Cropping Land Act 2011</i>, this code cannot be used for a resource activity that will have a permanent impact in a protection area.</p> <p>A change to the location of a resource activity, where there is no increase in the size of the footprint or intensity of the activity, is acceptable under Part 1, condition 1.1.</p> <p>Guidance material regarding the application of Part 1 of this code is available on the Department's website www.dnrm.qld.gov.au</p>

11. Part 2 – Standard conditions and advisory notes

COLUMN 1 Resource Activity	COLUMN 2 Standard Conditions	COLUMN 3 Advisory notes
<p>1. Permitted resource activities provided for in Part 2 of this Code</p>	<p>1.1 Resource activities must not be located directly on SCL or potential SCL, unless there is no reasonable or practicable alternative location for the activity that is not directly on SCL or potential SCL.</p> <p>1.2 The only resource activities permitted to be undertaken on SCL or potential SCL under Part 2 of this Code are those activities that are explicitly provided for in the conditions of Part 2 of this Code.</p> <p>1.3 Part 2 authorises the conduct of resource activities explicitly provided for in Part 1 of this Code in accordance with the conditions under Part 1.</p> <p>1.4 Conditions of Part 2 of this Code do not apply to any land that is SCL or potential SCL, and is subsequently recorded in the decision register as decided non-SCL, when that land is recorded as decided non-SCL.</p> <p>1.5 The holder must keep a record of:</p> <ol style="list-style-type: none"> all resource activities undertaken on SCL or potential SCL; the date the resource activity commenced; the precise location of the resource activity; the date the resource activity ended; restoration activities undertaken to return the site to pre-development condition; and the date restoration was completed. <p>1.6 The holder must keep records for a minimum of five (5) years after the completion of restoration activities.</p> <p>1.7 The holder must provide records to the administering authority upon request.</p>	<p>The resource activities not provided for in Part 2 of this Code include:</p> <ul style="list-style-type: none"> those considered to have a permanent impact on SCL or potential SCL; or those that have a temporary impact but require a case-by-case assessment (i.e. protection decision); or resource activities to which Part 3 of this Code applies. <p>For example, the following resource activities are not provided for under Part 2 of this Code:</p> <ul style="list-style-type: none"> well construction machine mining (surface and underground) coal handling and preparation plants and related surface infrastructure rigid surface pipelines (does not include lay flat hoses) buried linear infrastructure (e.g. pipelines) rail lines haul roads levee banks creek diversions camps and accommodation waste disposal and waste landfill dams, ponds and sumps compressor stations water treatment plants sewerage treatment plants borrow pits chemical or fuel storage sealed, gravelled or formed access tracks lay down areas seismic survey using explosives clear felling vegetation bulk sampling <p>For the purposes of condition 1.1</p>

		<p>'no reasonable or practicable alternative location' means that the resource activity can not practically be located off SCL or potential SCL.</p> <p>For the purposes of condition 1.4 (d), records of each resource activity should include, as a minimum, georeferenced map or GPS coordinates sufficient to identify where activities are or have occurred. For example, a GPS log of points along a seismic survey line.</p>
<p>2. Hand mining, sample pits, geotechnical pits and soil sampling (not including exploratory drilling)</p>	<p>2.1 The total surface area impacted by soil excavation at any one time must not exceed: (a) 4m² per hectare (pro rata) for a resource authority that is greater than one hectare in size; or (b) 4m² for a resource authority that is less than one hectare in size.</p> <p>2.2 Excavation must only be conducted using hand-held tools.</p> <p>2.3 The excavation and storage of soil must be done in a way that prevents mixing of topsoil and subsoil.</p> <p>2.4 Topsoil and subsoil may only be removed from the site for the purposes of, and in quantities required for, assaying.</p>	<p>This condition is particularly applicable to holders of small mining claims and prospecting permits.</p> <p>The 4m² surface area impact limit (per hectare or resource authority) on soil excavations manages the cumulative impact of the resource activity and encourages progressive restoration.</p> <p>For resource authorities over 1 ha in size, the 4m² limit would apply per hectare.</p> <p>For the purposes of condition 2.4, materials such as gemstones, metals or minerals found do not constitute part of the topsoil or subsoil.</p>
<p>3. Any resource activity carried out under Part 2 of this Code that requires soil to be stockpiled.</p>	<p>3.1 Excavated topsoil and subsoil must be stockpiled separately.</p> <p>3.2 Stockpiles of topsoil and subsoil originating from SCL or potential SCL must remain uncompacted.</p> <p>3.3 Stockpiles of topsoil or subsoil originating from land other than SCL or potential SCL must not be located on SCL or potential SCL.</p> <p>3.4 Stockpiling soil under conditions 3.1 – 3.3 is limited to the soil excavated for resource activities under Part 2 of</p>	<p>Stockpiles of SCL or potential SCL are permitted to be located on SCL or potential SCL, in accordance with the conditions of Part 2 of this Code.</p> <p>Stockpiles of non-SCL or non-potential SCL are not permitted to be stockpiled on SCL or potential SCL.</p>

	<p>this Code.</p>	
<p>4. Access tracks</p>	<p>4.1 Access tracks must not be sealed, gravelled or formed.</p> <p>4.2 Existing access tracks must not be upgraded to formed, gravelled or sealed access tracks.</p> <p>4.3 Access tracks must not result in the concentration of run-off water to the extent that it causes visible soil erosion.</p>	<p>Slashing, using hand-held tools, a tractor or mower to establish and maintain a clear path of travel or line of sight is acceptable under this Code.</p> <p>Existing access tracks should be used wherever possible to minimise additional impacts.</p> <p>This condition does not limit the repair or maintenance to existing access tracks, even if the existing track is formed, gravelled or sealed.</p> <p>Temporary roadway, in the form of rubber matting or sheet metal, to assist with access on rain affected ground during the wet season, is acceptable under this condition.</p>
<p>5. Surveying</p>	<p>5.1 Surveying must not involve site preparation, clearing, explosives, or earthworks, using equipment other than hand-held tools.</p>	<p>Surveying includes geophysical (e.g. seismic), environmental and other surveys for siting of infrastructure and routes; for example, walking the area, remote sensing techniques, aerial reconnaissance surveys, ground surveys for flora and fauna studies (e.g. pitfall traps), cultural heritage surveys and assessment of river and creek crossings.</p> <p>Surveying requiring higher impact activities such as clearing or mechanical earthworks is provided for under Part 3 of this Code.</p> <p>Slashing or trimming of vegetation, using hand-held tools, a tractor or mower to establish and maintain a clear path of travel or line of sight is acceptable under this condition.</p> <p>Vehicles may be used to undertake surveying, but must not be used for site preparation.</p>
<p>6. Drilling</p>	<p>6.1 Drilling may only be conducted using</p>	<p>This condition may apply to the</p>

	<p>a soil auger or coring rig mounted on a light vehicle; or using hand-held tools.</p> <p>6.2 Drilling holes or core holes must not exceed 300 mm in diameter.</p> <p>6.3 Drilling holes or core holes must not be cased.</p>	<p>petroleum, gas and minerals industries.</p> <p>Drilling for the purposes of geotechnical surveys is provided for in this condition.</p> <p>Condition 6 relates to drilling core holes and does not provide for the construction of a well. Well construction is an activity provided for in Part 3 of this code.</p>
<p>7. Water monitoring activities</p>	<p>7.1 Water monitoring activities are limited to:</p> <ul style="list-style-type: none"> a) gathering information about, or undertaking an assessment of, a water bore; b) monitoring effects of the exercise of underground water rights for the tenure; c) plugging and abandoning a water observation bore; d) gathering information for preparing an underground water impact report or final report under the <i>Water Act 2000</i>, chapter 3. 	<p>Existing water bores should be used wherever possible, in agreement with the landholder.</p> <p>Construction of new water bores is provided for under Part 3 of this Code.</p> <p>This condition may apply to the petroleum, gas and minerals industries.</p>
<p>8. Dust suppression</p>	<p>8.1 Water or liquid used for dust suppression on land that must be restored to SCL must satisfy the following requirements:</p> <ul style="list-style-type: none"> a) the maximum electrical conductivity (EC) must not exceed 1,300 $\mu\text{S}/\text{cm}$; b) the maximum sodium adsorption ratio (SAR) must not exceed 6; c) the maximum bicarbonate ion concentration must not exceed 100 mg/L; and d) the pH range must be between 6.5 and 9.0. <p>8.2 Water or liquid used for dust suppression on land that is not required to be restored to SCL must satisfy the dust suppression requirements in the environmental authority.</p>	<p>Repeated applications of water for dust suppression is similar to frequent, light applications of irrigation water.</p> <p>Land that is not required to be restored to SCL may include land that is already permanently impacted or land that is being used for resource activities that were approved prior to the commencement of the SCL Act (and hence a compliance certificate or protection decision was not required for the activity). For example, if access tracks were approved under the environmental authority prior to the SCL Act commencement (30 January 2012), the land used for access tracks would not need to be restored to SCL in accordance with SCL conditions (instead it would need to be rehabilitated in</p>

		<p>accordance with the environmental authority) and dust suppression on these roads should be in accordance with the environmental authority conditions.</p> <p>Condition 8.1 does not negate the need to comply with any other dust suppression or water quality parameters conditioned under the environmental authority.</p>
<p>9. Restoration requirements for resource activities under Part 2 of this Code.</p>	<p>9.1 All resource activities carried out under Part 2 of this Code must end and any impacts to SCL or potential SCL must be restored back to pre-development condition within 50 years of the activity commencing or as required by the environmental authority or resource authority, whichever is sooner.</p> <p>9.2 As soon as practicable, but within 3 months after the completion of resource activity, restoration must be commenced in accordance with (a) to (f):</p> <ol style="list-style-type: none"> a) All equipment and materials used for the resource activity must be removed, unless provided for in another condition of Part 2 of this Code. b) Equipment and material removed under condition 9.2(a) must not be disposed of in any way on SCL or potential SCL. c) All topsoil and subsoil excavated for the resource activity must be reinstated in a manner which ensures the topsoil and subsoil is consistent with topsoil and subsoil in adjacent soil undisturbed by the resource activity; except for soil excavated under condition 2.4. d) The soil surface must be re-contoured to a level consistent to that of surrounding land. e) Where soil has been compacted by a resource activity, it must be cultivated or ripped and returned to a level of compaction equivalent to that of adjacent 	<p>Restoration of resource activities should commence as soon as the resource activity has ended (for example; where operations at one sample pit have ended, restoration should commence even though other sample pits may still be in operation) unless there are extenuating circumstances (e.g. extreme weather conditions) that delay restoration activities.</p> <p>Soil excavated for sampling or assaying under this Code does not need to be reinstated.</p> <p>Equipment and materials refers to what is brought or generated on site, for example, equipment and structures, sheeting and waste.</p>

	<p>undisturbed soils.</p> <p>f) A self-sustaining vegetative ground cover species should be promoted.</p>	
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12. Part 3—Standard conditions and advisory notes

COLUMN 1 Resource activity	COLUMN 2 Standard conditions	COLUMN 3 Advisory notes
<p>1. Permitted resource activities under Part 3 of this Code.</p>	<p>1.1 Resource activities must not be located directly on SCL or potential SCL, unless there is no reasonable or practicable alternative location for the activity that is not directly on SCL or potential SCL.</p> <p>1.2 The only resource activities permitted to be undertaken on SCL or potential SCL under Part 3 of this Code are those activities that are explicitly provided for in the conditions of Part 3 of this Code.</p> <p>1.3 Part 3 authorises the conduct of resource activities explicitly provided for in Parts 1 and 2 of this Code in accordance with the conditions under Parts 1 and 2 respectively.</p> <p>1.4 Conditions of Part 3 of this Code do not apply to any land that is SCL or potential SCL, and is subsequently recorded in the decision register as decided non-SCL, when that land is recorded as decided non-SCL.</p> <p>1.5 The holder must keep a record of:</p> <ol style="list-style-type: none"> all resource activities undertaken on SCL or potential SCL; the pre-development condition of the site on which a resource activity occurs; the date the resource activity commenced; the precise location of the resource activity the date the resource activity ended; restoration activities undertaken to return the site to pre-development condition; and the date restoration was completed. <p>1.6 The holder must keep records for a minimum of five (5) years after the</p>	<p>Resource authority holders who elect to comply with Part 3 of this Code are also eligible to undertake the activities provided for in Part 2 of this Code, in accordance with those conditions—only one application under Part 3 of the Code is required.</p> <p>The resource activities not provided for in Part 3 of this Code include:</p> <ul style="list-style-type: none"> those that will have a permanent impact on SCL or potential SCL; or those that have a temporary impact but require case-by-case assessment under the <i>Strategic Cropping Land Act 2011</i> (i.e. protection decision). <p>For example, the following resource activities are not provided for under Part 3 of this Code:</p> <ul style="list-style-type: none"> mining (surface and underground) coal handling and preparation plants and related surface infrastructure rigid surface pipelines (not including lay flat pipes) sealed access tracks rail lines haul roads levee banks creek diversions waste disposal and waste landfill dams and ponds compressor stations water treatment plants fixed sewerage treatment plants borrow pits

COLUMN 1 Resource activity	COLUMN 2 Standard conditions	COLUMN 3 Advisory notes
	<p>completion of restoration activities.</p> <p>1.7 The holder must provide records to the administering authority upon request.</p>	<p>For the purposes of condition 1.1 'no reasonable or practicable alternative location' means that the resource activity can not practically be located off SCL or potential SCL.</p> <p>For the purposes of condition 1.4 (d), records of each resource activity should include, as a minimum, georeferenced map or GPS coordinates sufficient to identify where activities are or have occurred. For example, a GPS log of points along a seismic survey line.</p>
<p>2. Financial assurance for resource activities under Part 3 of this Code</p>	<p>2.1 The holder operating under Part 3 of this Code must submit financial assurance to the administering authority for the resource activities provided for in Schedule 1 of this Code.</p> <p>2.2 Financial assurance must be provided to the administering authority prior to carrying out, or allowing the carrying out of, the resource activity on SCL or potential SCL.</p> <p>2.3 The holder operating under Part 3 of this Code must review and maintain the amount of financial assurance based on the maximum area of impact from the proposed and existing resource activities on SCL or potential SCL. Any additional financial assurance required for an increase in the area of impact on SCL or potential SCL, must be submitted to the administering authority prior to carrying out the additional impact.</p> <p>2.4 The calculation of financial assurance must be in accordance with Schedule 1 of this Code.</p> <p>2.5 The financial assurance must be in the form of an unconditional bank guarantee.</p>	<p>Where the holder of an environmental authority or resource authority changes, the new holder must not carry out, or allow the carrying out of, a resource activity under the authority unless the new holder has submitted adequate financial assurance to the administering authority.</p> <p>Resource proponents may review and submit financial assurance at any point in time, provided that the financial assurance is provided before the particular resource activity is undertaken on SCL or potential SCL. However, adequate financial assurance (calculated in accordance with Schedule 1), must be held by the administering authority at any point in time.</p> <p>Holders may consider submitting financial assurance as part of a rolling 3 – 5 year plan. The calculation may take into consideration progressive restoration that has been completed.</p> <p>Calculation of financial assurance should be done with reference to any guideline developed by the administering authority.</p>

COLUMN 1 Resource activity	COLUMN 2 Standard conditions	COLUMN 3 Advisory notes
	<p>2.6 The financial assurance must remain in place until:</p> <p>a) a third party auditor has certified that the conditions of this Code have been met; and</p> <p>b) the administering authority is satisfied that the conditions of this Code have been met and that no claim is likely to be made on the assurance.</p>	<p>Financial assurance requirements under this Code do not apply to resource activities that are not subject to the SCL Act (e.g. projects considered to be transitional under the SCL Act).</p> <p>Reference to “existing resource activities” in condition 2.3 refers to those resource activities subject to the SCL Act where financial assurance is required (financial assurance may already be held but not discharged). This is important to consider during the review of financial assurance as progressive restoration occurs.</p> <p>Records and photos of restoration activities may be kept to aid in demonstrating their completion for the purposes of discharging financial assurance. Records could include information about the area that has been restored, general site characteristics and benchmark information (restoration parameters).</p>
<p>3. Permitted resource activities carried out under Part 3 of this Code that require soil excavation</p>	<p>3.1 Topsoil and subsoil must be excavated in a way that prevents mixing of:</p> <p>(a) topsoil and subsoil; and</p> <p>(b) topsoil or subsoil with any other excavated material.</p> <p>3.2 Excavated topsoil may be either stockpiled in accordance with conditions 4.1 to 4.9 of Part 3 of this Code; or spread to a depth of no more than 100 mm across surrounding land.</p>	<p>Spreading topsoil is an alternative to stockpiling which is subject to condition 4.</p>
<p>4. Permitted resource activities carried out under Part 3 of this Code that requires soil to be stockpiled</p>	<p>4.1 Excavated topsoil and subsoil must be stockpiled separately.</p> <p>4.2 Stockpiles must be constructed and maintained in a way that preserves the biological and chemical integrity of the topsoil and subsoil.</p>	<p>Wherever practicable, stockpiles should be located away from SCL or potential SCL.</p> <p>Stockpiles should not be located in the flooding zone of drainage lines and waterways.</p>

COLUMN 1 Resource activity	COLUMN 2 Standard conditions	COLUMN 3 Advisory notes
	<p>4.3 Individual stockpiles that will remain in place for longer than six (6) months must remain uncompacted and be no more than 2 m in height.</p> <p>4.4 Suitable erosion and sediment control measures must be installed, maintained and monitored around stockpiles at all times to prevent erosion of soil from the stockpile.</p> <p>4.5 Within six (6) weeks of the establishment of a stockpile, the holder must promote the establishment of a self-sustaining vegetative ground cover species on the stockpile.</p> <p>4.6 Following establishment, a self-sustaining vegetative ground cover of at least 70% must be maintained for the life of the stockpile.</p> <p>4.7 Stockpiles must not result in the concentration of run-off water to the extent that it causes visible soil erosion.</p> <p>4.8 Livestock must be prevented from accessing stockpiles.</p> <p>4.9 Excavated subsoil which will not be reinstated to its originating location must not be stored or stockpiled on SCL or potential SCL for more than six (6) months; and must not be spread or disposed of on SCL or potential SCL.</p>	<p>Temporary stockpiles (i.e. in place for less than 6 weeks) may be managed for erosion by using alternative measures e.g. geotextile cover or similar. Stockpiles in place for longer than 6 weeks will need a self-sustaining vegetative ground cover, as provided for in conditions 4.5 and 4.6.</p> <p>The selection of an appropriate vegetative ground cover species should be agreed with the landowner. Crops, such as forage crops and deep rooted crops such as lucerne and clover, may help to alleviate compaction, improve soil structure and increase soil organic material.</p> <p>The method for measuring the vegetative ground cover percentage (foliage cover) is defined in the publication: The National Committee on Soil and Terrain. 2009. Australian Soil and Land Survey Field Handbook, Third Edition. CSIRO Publishing.</p> <p>Condition 4.9 refers to the excess subsoil that has been excavated for activities such as pipelines which will not be reinstated.</p>
<p>5. Cumulative impact of resources activities (undertaken in accordance with Part 3 of this Code)</p>	<p>5.1 At any time during the operational phase of the resource activity, the combined area of:</p> <ul style="list-style-type: none"> a) formed or gravelled access tracks; b) formed or gravelled well leases; c) sample pits and geotechnical pits; d) sumps and voids; e) formed or gravelled lay down areas; f) formed or gravelled drill pads; 	<p>The purpose of this condition is to ensure that impacts on SCL and potential SCL are avoided and minimised to the greatest extent practicable. For example, operations should be staged in a way that the cumulative impact on SCL or potential SCL is minimised; and that best practice is employed to minimise the area of impact of the resource activity. Further, progressive restoration of temporarily impacted SCL or</p>

COLUMN 1 Resource activity	COLUMN 2 Standard conditions	COLUMN 3 Advisory notes
	<p>g) buried linear infrastructure right of way; and h) stockpiles; must not exceed 2.5% of the total area of SCL and potential SCL within the resource authority.</p>	<p>potential SCL should occur as soon as possible.</p> <p>Possible ways to minimise the cumulative impact may include: Avoid locating resource activities directly on SCL and potential SCL in the first instance; or minimal disturbance well leases, directional drilling, multi well pad drilling, using existing access tracks, co-locating infrastructure (e.g. pipeline right of way and access tracks).</p> <p>The following are examples of infrastructure and activities that are not included in the cumulative impact calculation:</p> <ul style="list-style-type: none"> • surveys (e.g. seismic) • slashed access tracks • lay down areas that are not formed, gravelled or sealed • construction footprint of any resource activity • resource activities that have been fully restored to pre-development condition; • resource activities not subject to the SCL Act (e.g. resource activities considered to be transitional under the SCL Act) <p>If a pre-existing access track is widened, the additional area must be included in the cumulative impact calculation. For example, if the width of an existing access track is 2 m and is widened to 6 m, the area included in the 'combined area' is 4 m multiplied by the length of the widened access track.</p>
<p>6. Buried linear infrastructure, including: water pipelines, gas gathering lines, powerlines</p>	<p>6.1 Buried linear infrastructure must not be greater than 750 mm in diameter.</p> <p>6.2 Buried linear infrastructure and any material (other than topsoil or subsoil) such as gravel, concrete or sand encasing the infrastructure, must be located deeper than 900 mm from the land surface.</p>	<p>Buried linear infrastructure should be co-located with access tracks and/or other linear infrastructure where practicable to minimise surface disturbance.</p> <p>Where strip cropping or controlled traffic farming systems are in place, buried linear infrastructure should</p>

COLUMN 1 Resource activity	COLUMN 2 Standard conditions	COLUMN 3 Advisory notes
		be located parallel with typical farm machinery paths.
7. Access tracks	<p>7.1 Access tracks must not exceed 6 m in width, except for passing lanes of no more than 50 m in length and an additional 4 m in width (bringing the access track to a total width of no more than 10 m), spaced not less than every 1000 m along the access track.</p> <p>7.2 Access tracks must not be sealed.</p> <p>7.3 Access tracks must not result in the concentration of run-off water to the extent that it causes visible soil erosion.</p> <p>7.4 Any gravelled area must be managed to prevent mixing with soil.</p>	<p>Wherever possible, existing access tracks should be used or upgraded instead of constructing new access tracks.</p> <p>Access tracks crossing overland flow paths should be located perpendicular to the flow of water and should not be built up more than 100 mm above the adjacent soil surface.</p> <p>Access tracks crossing grassed waterways should be perpendicular to the flow of water and should not disrupt the flow of water in the waterways.</p> <p>Geotextile or similar material may be appropriate to prevent mixing of construction material with soil.</p>
8. Exploratory drilling for coal and minerals	<p>8.1 Drill pads must not result in the concentration of run-off water to the extent that it causes visible soil erosion.</p> <p>8.2 Drill pads must not exceed 1 ha each.</p> <p>8.3 Drill pads must not be sealed.</p> <p>8.4 Any gravelled area must be managed to prevent mixing with soil.</p>	<p>This condition applies to exploratory drilling for coal and minerals.</p> <p>Geotextile or similar material may be appropriate to prevent mixing of construction material with soil.</p>
9. Well leases for petroleum and gas	<p>9.1 Well leases must not result in the concentration of run-off water to the extent that it causes visible soil erosion.</p> <p>9.2 Well leases must not exceed 1 ha per well during the establishment or maintenance of the well.</p> <p>9.3 Within six months of establishment or maintenance of wells, the size of the well lease must be reduced to</p>	<p>This condition applies to petroleum and gas wells.</p> <p>The <i>Petroleum and Gas (Production and Safety) Act 2004</i> and regulation requires that CSG wells must be constructed in accordance with the Code of practice for constructing and abandoning coal seam gas wells in Queensland (2011). The Code of practice is available on the Department of Natural Resources and Mines website at</p>

COLUMN 1 Resource activity	COLUMN 2 Standard conditions	COLUMN 3 Advisory notes
	<p>no more than 200 m² per well.</p> <p>9.4 Well leases must not be sealed.</p> <p>9.5 Any gravelled area must be managed to prevent gravel mixing with soil.</p>	<p>www.dnrm.qld.gov.au</p> <p>Wells should not be located on the inside area of any pivot or lateral move irrigation footprint or on irrigation infrastructure (e.g. head ditches, supply channels or tail drains).</p> <p>Geotextile or similar material may be appropriate to prevent mixing of construction material with soil.</p>
<p>10. Sumps, voids, mobile storage tanks</p>	<p>10.1 Waste must not be disposed of in, on, or under SCL or potential SCL.</p> <p>10.2 Sumps or voids for temporarily storing waste or other material must only be located on well leases or drilling pads.</p> <p>10.3 Sumps and voids for temporarily storing waste must be lined to prevent the movement of the wetting front.</p> <p>10.4 Mobile storage tanks; sumps and voids must be managed to prevent overflow of waste onto SCL or potential SCL.</p>	<p>Sumps and voids are typically used for the temporary storage of drill muds or stimulation fluids, and flare pits.</p> <p>Lining sumps and voids using a compacted heavy clay liner with appropriate physico-chemical properties may be suitable to meet condition 10.3 unless a higher standard is required by the environmental authority.</p> <p>Temporary storage tanks may be located on SCL or potential SCL in accordance with the conditions, and do not need to be located on the well lease or drill pad.</p> <p>The holder should also take appropriate measures to prevent overland flow from entering the sump or void to reduce the likelihood of overflow occurring, in accordance with condition 10.4.</p>
<p>11. Lay down area and chemical and fuel storage</p>	<p>11.1 Lay down areas must not be sealed.</p> <p>11.2 Any gravelled area must be managed to prevent mixing with soil.</p> <p>11.3 Lay down areas must not result in the concentration of run-off water to the extent that it causes visible soil erosion.</p> <p>11.4 Chemical and fuel storage must</p>	

COLUMN 1 Resource activity	COLUMN 2 Standard conditions	COLUMN 3 Advisory notes
	be managed to prevent contamination of SCL or potential SCL.	
12. Surveys involving site preparation	12.1 Any site preparation for surveys and the carrying out of any surveys must maintain the land surface at a level consistent of that of surrounding landscape.	Site preparation may involve the use of stick raking, small blade or small subsurface explosive charge.
13. Sample pits and geotechnical pits for soil, minerals, rock, coal or other geological material	13.1 The total surface area of each sample pit and geotechnical pit must not exceed 10 m ² in size.	
14. Construction of water monitoring bore	14.1 The holder may construct a water monitoring bore.	Water monitoring activities under Part 3 of this Code may apply to various resource authority types, including water monitoring authorities. Other activities related to water bores are provided for in Part 2 of this Code (e.g. monitoring).
15. Temporary camps and mobile sewage treatment plants	15.1 Temporary camps and associated mobile sewage treatment plants must be located on lay down areas. 15.2 Mobile sewage treatment plant(s) associated with a temporary camp is limited to a total daily peak design capacity of 21 equivalent persons or less per camp. 15.3 Temporary camps must not accommodate more than the number of people accommodated by a mobile sewage treatment plant provided for in condition 15.2. 15.4 Mobile sewage treatment plants	The threshold for the mobile sewage treatment plant total daily peak design capacity is in accordance with the Environmental Protection Regulation 2008. The conditions that pertain to lay down areas apply to the site for temporary camps and associated sewage treatment plants. Financial assurance calculations must take account of the lay down area on which the camp and mobile sewage treatment plant are located. Subject to the conditions of the environmental authority, condition 15.5 does not limit the discharge of

COLUMN 1 Resource activity	COLUMN 2 Standard conditions	COLUMN 3 Advisory notes
	<p>that are not associated with a temporary camp are limited to a total daily peak design capacity of 21 equivalent persons or less.</p> <p>15.5 Effluent from sewage treatment plants may only be discharged to land that is SCL or potential SCL if it satisfies the following requirements:</p> <ul style="list-style-type: none"> a) the maximum electrical conductivity (EC) must not exceed 1,300 µS/cm; b) the maximum sodium adsorption ratio (SAR) must not exceed 6; c) the maximum bicarbonate ion concentration must not exceed 100 mg/L; d) the pH range must be between 6.5 and 9.0; e) the maximum fluoride concentration must not exceed 1 mg/L; f) the maximum total phosphorus must not exceed 20mg/L; g) the maximum total nitrogen must not exceed 30mg/L; h) the maximum biological oxygen demand must not exceed 20mg/L; and i) the maximum irrigation rate must not exceed 4 mm/day across the irrigation area. 	<p>effluent to land that is not SCL or potential SCL.</p>
<p>16. Restoration requirement for resource activities under Part 3 of this Code.</p>	<p>16.1 All resource activities carried out under Part 3 of this Code must end and any impacts to SCL and potential SCL must be restored back to pre-development condition within 50 years of the activity commencing or as required by the environmental authority or resource authority, whichever is sooner.</p> <p>16.2 All buried pipelines must be decommissioned in accordance with Australian Standard 2885</p>	<p>Any resource activity and the associated restoration back to pre-development condition that is of longer than 50 years total duration is considered a permanent impact under the SCL Act and cannot be undertaken under this Code.</p> <p>The 50 year timeframe is taken to start from the construction of each particular resource activity (e.g. well, access track establishment).</p> <p>The <i>Petroleum and Gas</i></p>

COLUMN 1 Resource activity	COLUMN 2 Standard conditions	COLUMN 3 Advisory notes
	<p>current at time of decommissioning.</p> <p>16.3 Restoration, in accordance with conditions 16.4 – 16.9, must be commenced as soon as practicable, but within the timeframes specified below:</p> <ul style="list-style-type: none"> a) Exploratory drill holes and drill pads - within 6 months of completion of drilling. b) Access tracks - within 6 months of the decommissioning of the infrastructure that the track provided access to. c) Buried linear infrastructure – within 6 months of the installation of the infrastructure. d) Sample pits and geotechnical pits - within 3 months of completion of sampling or testing. e) All other resource activities – within 6 months of operation of the resource activity ceasing. <p>16.4 All equipment and materials used for the resource activity (e.g. road base, under track drainage systems) must be removed following decommissioning, unless provided for in another condition of this Code.</p> <p>16.5 Equipment and material removed under condition 16.4 must not be disposed of in any way on SCL or potential SCL.</p> <p>16.6 On completion of the exploration or production activity, the well or drill hole must be plugged with the upper surface of the plug located at least 1000 mm below the soil surface.</p> <p>16.7 Where soil has been compacted by a resource activity under this</p>	<p><i>(Production and Safety) Act 2004</i> and regulation requires that CSG wells must be abandoned in accordance with the Code of practice for constructing and abandoning coal seam gas wells in Queensland (2011). The Code of practice is available on the Department of Natural Resources and Mines website at www.dnrm.qld.gov.au</p> <p>The method for measuring the vegetative ground cover percentage is defined in the publication: The National Committee on Soil and Terrain. 2009. Australian Soil and Land Survey Field Handbook, Third Edition. CSIRO Publishing.</p> <p>When undertaking ripping activities in compacted areas, consideration should be given to the moisture level of the soil to ensure that ripping is effective i.e. not contributing to further compaction. Deep tillage is only recommended when soils are dried to the depth of the tillage.</p> <p>Vegetative ground cover may be established through seeding, planting or promoting germination of soil seed stock.</p> <p>The selection of an appropriate vegetative ground cover species should be agreed with the landowner. Crops, such as forage crops and deep rooted crops such as Lucerne and Clover, may help to alleviate compaction, improve soil structure and increase soil organic material.</p> <p>Monitoring of restoration activities should include monitoring for subsidence, erosion and vegetative cover.</p>

COLUMN 1 Resource activity	COLUMN 2 Standard conditions	COLUMN 3 Advisory notes
	<p>Code at any depth up to 600 mm, it must be cultivated or ripped and returned to a level of compaction equivalent to that of adjacent undisturbed soils.</p> <p>16.8 Filling voids must be done in a way that ensures the topsoil and subsoil is reinstated consistent with the adjacent soil undisturbed by the resource activity.</p> <p>16.9 The soil surface must be re-contoured to a level consistent to that of the surrounding land.</p> <p>16.10 Within six weeks of the work being completed under conditions 16.4 to 16.9, the holder must promote the establishment of a self-sustaining vegetative ground cover species or crop.</p> <p>16.11 Following establishment, if the land is not returned to crop, a self sustaining vegetative ground cover of at least 50% must be maintained for a minimum of one year.</p> <p>16.12 Despite conditions 16.1 to 16.11, the holder may leave access tracks in place (without restoration) where:</p> <ul style="list-style-type: none"> a) it has been agreed to, in writing, by the holder, landholder and the administering authority, current at the time restoration is due to take place; and b) it can be demonstrated that the access track will support the landholder's operation of the property. <p>16.13 Despite conditions 16.4, the holder may leave buried linear infrastructure in place where there is a low risk of future subsidence.</p>	

COLUMN 1 Resource activity	COLUMN 2 Standard conditions	COLUMN 3 Advisory notes
	16.14 The holder must undertake monitoring of restoration activities for at least one (1) year following the completion of restoration activities to demonstrate that all impacts to SCL or potential SCL are restored back to pre-development condition.	

13. Definitions

Access track

Route of passage for machinery, vehicles or other plant equipment.

Administering authority

The chief executive or their authorised delegate (e.g. an authorised officer) of the department administering the *Strategic Cropping Land Act 2011*.

Buried linear infrastructure

Linear infrastructure installed underground - includes buried pipelines (water, gas and transmission), power lines and communication cables.

Decision register

The decision register as defined under the *Strategic Cropping Land Act 2011*.

Drill pad

The discrete area set aside for all activities associated with the drilling of an exploratory drill hole for coal and minerals. This includes the area required for sumps.

Environmental authority

An environmental authority as defined under the *Environmental Protection Act 1994*, schedule 4.

Footprint

For the purposes of Part 1, condition 1.1, footprint means the footprint of the authorised resource activity, including the resource activity infrastructure or proposed infrastructure relating to the resource activity (where proposed infrastructure, this includes the construction footprint of the proposed resource activity infrastructure).

Formed

An area that has been constructed using earthworks, including grading, surface levelling, compaction, adding drains etc, without the addition of gravel, road base or similar material. Formed does not include the slashing of grass.

Geotechnical pit

A pit excavated for the purposes of geotechnical testing.

Grassed waterways

Constructed waterways that convey runoff water in cropped areas. These waterways are typically uncropped with a perennial grass cover maintained on them.

Gravelled

An area that has been constructed with the use of gravel, road base or similar material.

Holder

The **holder** of an authority refers to the current **environmental authority** or **resource authority holder(s)**.

Lay down area

An area of land that is used to temporarily store materials and equipment such as pipes, during construction; and temporary camps.

Light vehicle

A vehicle that is 5 tonnes or less (based on Australian Driver Licence Gross Vehicle Weight (GVM) for a light vehicle).

Maintenance

For the purposes of **well leases**, maintenance refers to the workover of a well.

Operational phase

For the purposes of cumulative impact, the operational phase of a resource activity:

- a) starts when the construction phase of the resource activity has been completed; and
- b) ends when restoration of the resource activity has been completed; or
- c) for the purposes of an access track, ends when the access track fulfils the requirements of condition 16.12 in Part 3 of the Code.

Construction is taken to be completed when a resource activity is capable of being functional, regardless of whether or not, at that point in time, it is functional. For example the following resource activities would be considered to be in the operational phase:

- a well lease, after a well has undergone well completion, regardless of whether the well has been connected to a gathering network or not;
- a sump, after a void has been excavated and is ready to be used for storing drilling muds, regardless of whether it is currently storing drilling muds or not;
- a drill pad (for exploratory mineral/coal drilling), after the drill pad has been constructed to the point where a drill rig could get access and commence exploratory drilling, regardless of whether a drill rig is present on the drill pad or not.

Restoration is taken to be completed when all restoration conditions (under the relevant part of this Code) for a particular resource activity have been met.

Overland flow path

Areas, such as on the Darling Downs, that are subject to erosive flooding, with the characteristics of very gentle slopes (commonly slopes of <0.5%.) that carry shallow sheets of water during rainfall events, ranging from tens to hundreds of metres wide. In these areas, strip cropping is the generally practiced as a soil conservation measure.

Pre-development condition

Pre-development condition as defined under the *Strategic Cropping Land Act 2011*.

Resource Act

A Resource Act as defined under the *Strategic Cropping Land Act 2011*.

Resource activity

Resource activity as defined under the *Strategic Cropping Land Act 2011*.

Resource authority

Resource authority as defined under the *Strategic Cropping Land Act 2011*.

Sample pit

A pit excavated for the purposes of soil sampling.

Sealed

Bitumen, concrete or similar material applied to a surface.

Sewage treatment

As defined under the Environmental Protection Regulation 2008.

Slashing

The cutting of grass, crop residue or other vegetation using a tractor mounted slasher, a mower or hand-held tool to provide a clear path of travel or establish a line of sight.

Subsoil

Soil material from below the 'A' horizonsⁱ of a soil profile but above bedrockⁱⁱ, weathered rock², a hard pan² or continuous gravel layer².

Suitably qualified person

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

Sump

See definition for **void**.

Temporary camp is defined as:

- (a) carried out at various locations (unfixed) using transportable buildings (e.g. dongas) and or equipment; and
- (b) that does not result in the building of any permanent structures or any physical change of the landform at the locations (other than minor alterations solely necessary for access and setup including, for example, access ways, footings and temporary storage areas).

Third party auditor

A **suitably qualified person** who is either a certified **third party auditor** or an internal auditor employed by the **holder**, and the person is independent of the day-to-day management and operation of the **resource activity(ies)** operating under this Code.

Topsoil

Soil from the 'A' horizonsⁱⁱⁱ of a soil profile.

Void

Any man-made open excavation in the ground. Includes sumps and pits but not the excavation hole associated with a well or drill hole (which have specific conditions for restoration).

Well lease

The discrete area set aside for all activities associated with the drilling and operation of a petroleum or gas well. This includes the area required for sumps and **voids** (e.g. for the temporary storage of drilling muds) and flare pits.

ⁱ Soil horizons are defined in: The National Committee on Soil and Terrain. 2009. Australian Soil and Land Survey Field Handbook, Third Edition. CSIRO Publishing

ⁱⁱ Terms defined in Schedule 1 of the *Strategic Cropping Land Act 2011*

ⁱⁱⁱ Soil horizons are defined in: The National Committee on Soil and Terrain. 2009. Australian Soil and Land Survey Field Handbook, Third Edition. CSIRO Publishing

Schedule 1: Financial assurance

The final assurance required under Part 3 of this Code must be calculated using the values in Table 1 to 3 below, and is based on the year the impact commences and the period of impact. Where financial assurance has been calculated under the *Environmental Protection Act 1994*, the component covering the rehabilitation costs for **resource activities** on SCL or potential SCL may be deducted from the SCL financial assurance calculated in accordance with Table 1 to 3.

Example

- If a 20-year coal seam gas project commences in 2013, has 50 wells and 10.5 hectares of **gravelled well lease** and **access tracks**, then the total assurance is \$1,048,604.50 (i.e. wells = \$6,455 × 50 + gravelled **well lease**/tracks \$69,129 × 10.5).
- If a 5-year coal exploration project commences in 2013, has 50 drill holes and 10.5 hectares of **gravelled drill pads** and **access tracks**, then the total assurance is \$673,045.50 (i.e. drill holes = \$4,143 × 50 + gravelled **well lease**/tracks \$44,371 × 10.5).

Table 1: Financial assurance for wells and exploratory drill/core holes (\$/well or drill hole)

Year the impact commences	\$/well, drill or core hole for period of impact (years)									
	1–5 years	6–10 years	11–15 years	16–20 years	21–25 years	26–30 years	31–35 years	36–40 years	41–45 years	46–49 years
2012	\$4,023	\$4,663	\$5,406	\$6,267	\$7,265	\$8,423	\$9,764	\$11,319	\$13,122	\$14,769
2013	\$4,143	\$4,803	\$5,568	\$6,455	\$7,483	\$8,675	\$10,057	\$11,659	\$13,516	\$15,212
2014	\$4,268	\$4,947	\$5,735	\$6,649	\$7,708	\$8,936	\$10,359	\$12,009	\$13,921	\$15,669
2015	\$4,396	\$5,096	\$5,907	\$6,848	\$7,939	\$9,204	\$10,669	\$12,369	\$14,339	\$16,139
2016	\$4,528	\$5,249	\$6,085	\$7,054	\$8,177	\$9,480	\$10,990	\$12,740	\$14,769	\$16,623
2017	\$4,663	\$5,406	\$6,267	\$7,265	\$8,423	\$9,764	\$11,319	\$13,122	\$15,212	\$17,121
2018	\$4,803	\$5,568	\$6,455	\$7,483	\$8,675	\$10,057	\$11,659	\$13,516	\$15,669	\$17,635
2019	\$4,947	\$5,735	\$6,649	\$7,708	\$8,936	\$10,359	\$12,009	\$13,921	\$16,139	\$18,164
2020	\$5,096	\$5,907	\$6,848	\$7,939	\$9,204	\$10,669	\$12,369	\$14,339	\$16,623	\$18,709
2021	\$5,249	\$6,085	\$7,054	\$8,177	\$9,480	\$10,990	\$12,740	\$14,769	\$17,121	\$19,270
2022	\$5,406	\$6,267	\$7,265	\$8,423	\$9,764	\$11,319	\$13,122	\$15,212	\$17,635	\$19,848

Table 2: Financial assurance for buried linear infrastructure, sumps, voids, formed drill pads, formed well leases, formed lay down areas and formed access tracks (\$/ha)

Year the impact commences	\$/ha for period of impact (years)									
	1–5 years	6–10 years	11–15 years	16–20 years	21–25 years	26–30 years	31–35 years	36–40 years	41–45 years	46–49 years
2012	\$8,300	\$9,622	\$11,155	\$12,932	\$14,991	\$17,379	\$20,147	\$23,356	\$27,076	\$30,475
2013	\$8,549	\$9,911	\$11,490	\$13,320	\$15,441	\$17,901	\$20,752	\$24,057	\$27,889	\$31,389
2014	\$8,806	\$10,208	\$11,834	\$13,719	\$15,904	\$18,438	\$21,374	\$24,779	\$28,725	\$32,330
2015	\$9,070	\$10,515	\$12,189	\$14,131	\$16,382	\$18,991	\$22,015	\$25,522	\$29,587	\$33,300
2016	\$9,342	\$10,830	\$12,555	\$14,555	\$16,873	\$19,560	\$22,676	\$26,288	\$30,475	\$34,299
2017	\$9,622	\$11,155	\$12,932	\$14,991	\$17,379	\$20,147	\$23,356	\$27,076	\$31,389	\$35,328
2018	\$9,911	\$11,490	\$13,320	\$15,441	\$17,901	\$20,752	\$24,057	\$27,889	\$32,330	\$36,388
2019	\$10,208	\$11,834	\$13,719	\$15,904	\$18,438	\$21,374	\$24,779	\$28,725	\$33,300	\$37,480
2020	\$10,515	\$12,189	\$14,131	\$16,382	\$18,991	\$22,015	\$25,522	\$29,587	\$34,299	\$38,604
2021	\$10,830	\$12,555	\$14,555	\$16,873	\$19,560	\$22,676	\$26,288	\$30,475	\$35,328	\$39,762
2022	\$11,155	\$12,932	\$14,991	\$17,379	\$20,147	\$23,356	\$27,076	\$31,389	\$36,388	\$40,955

Table 3: Financial assurance for gravelled drill pads, gravelled well leases, gravelled lay down areas and gravelled access tracks (\$/ha)

Year the impact commences	\$/ha for period of impact (years)									
	1–5 years	6–10 years	11–15 years	16–20 years	21–25 years	26–30 years	31–35 years	36–40 years	41–45 years	46–49 years
2012	\$43,079	\$49,940	\$57,894	\$67,115	\$77,805	\$90,197	\$104,563	\$121,217	\$140,524	\$158,161
2013	\$44,371	\$51,438	\$59,631	\$69,129	\$80,139	\$92,903	\$107,700	\$124,854	\$144,740	\$162,906
2014	\$45,702	\$52,981	\$61,420	\$71,202	\$82,543	\$95,690	\$110,931	\$128,599	\$149,082	\$167,793
2015	\$47,073	\$54,571	\$63,262	\$73,338	\$85,019	\$98,561	\$114,259	\$132,457	\$153,554	\$172,827
2016	\$48,485	\$56,208	\$65,160	\$75,539	\$87,570	\$101,518	\$117,687	\$136,431	\$158,161	\$178,012
2017	\$49,940	\$57,894	\$67,115	\$77,805	\$90,197	\$104,563	\$121,217	\$140,524	\$162,906	\$183,352
2018	\$51,438	\$59,631	\$69,129	\$80,139	\$92,903	\$107,700	\$124,854	\$144,740	\$167,793	\$188,853
2019	\$52,981	\$61,420	\$71,202	\$82,543	\$95,690	\$110,931	\$128,599	\$149,082	\$172,827	\$194,518
2020	\$54,571	\$63,262	\$73,338	\$85,019	\$98,561	\$114,259	\$132,457	\$153,554	\$178,012	\$200,354
2021	\$56,208	\$65,160	\$75,539	\$87,570	\$101,518	\$117,687	\$136,431	\$158,161	\$183,352	\$206,364
2022	\$57,894	\$67,115	\$77,805	\$90,197	\$104,563	\$121,217	\$140,524	\$162,906	\$188,853	\$212,555

Department of Environment and Heritage Protection

Permit¹

Environmental Protection Act 1994

Environmental authority

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

Permit¹ number: EPPG00972513

Project Name: Arrow Energy Dalby Expansion Project

Environmental authority takes effect 02 May 2014

The anniversary date of this environmental authority is **17 December**. An annual return and the payment of the annual fee will be due each year on this day.

Environmental authority holder(s)

Name	Registered address
Arrow Energy Pty Ltd	Level 39 111 Eagle Street BRISBANE CITY QLD 4000
Australian CBM Pty Ltd	Level 39 111 Eagle Street BRISBANE CITY QLD 4000
Arrow CSG (Australia) Pty Ltd	Level 39 111 Eagle Street BRISBANE CITY QLD 4000
Arrow (Tipton) Pty Ltd	Level 39 111 Eagle Street BRISBANE CITY QLD 4000
Arrow (Tipton Two) Pty Ltd	Level 39 111 Eagle Street BRISBANE CITY QLD 4000
Arrow (Daandine) Pty Ltd	Level 39 111 Eagle Street BRISBANE CITY QLD 4000
Stanwell Corporation Limited	Level 13, 42 Albert Street BRISBANE CITY QLD 4000

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



Environmentally relevant activity and location details

Environmentally relevant activity(ies)	Location(s)
Schedule 2A – 6 – a petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL194 PL198
Schedule 2A – 7 – a petroleum activity involving injection of a waste fluid into a natural underground reservoir or aquifer	PL230 PL238
Schedule 2A – 8 – a petroleum activity or GHG storage activity, other than a petroleum activity an activity mentioned in any of items 1 to 7, that includes 1 or more activities mentioned in schedule 2 for which an aggregate environmental score is stated, namely: Electricity generation – generating electricity by using gas at a rated capacity of 10MW electrical or more Fuel burning – using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour Waste disposal – operating a facility for disposing of, in a year, more than 200 000t of regulated waste and any, or any combination, of the following – (a) general waste; (b) limited regulated waste; (c) if the facility is in a scheduled area – no more than 5t of untreated clinical waste in a year Sewage treatment – operating sewage treatment works, other than no-release works, with a total daily peak design capacity of more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme Water treatment – desalinating, in a day, more than 5ML of water, allowing the release of waste to waters other than seawater	PL252 PL258 PL260

Additional information for applicants

Environmentally relevant activities

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

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

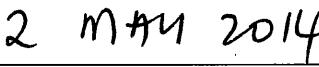
A person carrying out an ERA must also be a registered suitable operator under the *Environmental Protection Act 1994* (EP Act).

Contaminated land

It is a requirement of the EP Act that if an owner or occupier of land becomes aware a notifiable activity (as defined in Schedule 3 and Schedule 4) is being carried out on the land, or that the land has been, or

is being, contaminated by a hazardous contaminant, the owner or occupier must, within 22 business days after becoming so aware, give written notice to the chief executive.


Signature


Date

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

Enquiries:
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Phone: (07) 3330 5620
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Responsibilities under the *Environmental Protection Act 1994*

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

General environmental duty

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

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

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

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

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

Duty to notify

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

The duty to notify arises where:

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

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

Notifiable activities

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

Some relevant offences under the *Environmental Protection Act 1994*

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

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

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

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

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

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

Causing environmental nuisance (section 440)

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

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

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

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

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

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

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

Littering (section 103)

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

Illegal dumping of waste (section 104)

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

Responsibilities under other legislation

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

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

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

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

This environmental authority consists of the following schedules:

Schedule A	General Conditions
Schedule B	Water
Schedule BE	Coal Seam Gas Water Injection Trial
Schedule C	Regulated Dams
Schedule D	Land
Schedule E	Environmental Nuisance
Schedule F	Air
Schedule G	Waste
Schedule H	Rehabilitation
Schedule I	Monitoring Programs
Schedule J	Community Issues
Schedule K	Notification Procedures
Schedule L	Definitions

SCHEDULE A – GENERAL CONDITIONS

Authorised Petroleum Activities

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

Schedule A, Table 1 – Authorised Petroleum Activities

Petroleum Activity(ies)	Total Number of Authorised Petroleum Activities	Maximum Disturbance Authorised
Seismic surveys	200 km	200 km, 120 ha
Total coal seam gas wells, including: <ul style="list-style-type: none"> • Core wells • Exploration wells • Development wells • Production wells 	691	691 wells 691 ha
Injection well(s) and associated facilities	1	4 ha
Compressor units	40	40 units, 8 ha
Central gas processing facilities	2	2 facilities, 8 ha
Regulated dams	22	22 dams
Water treatment facilities	2	12 ML/d (each), 2 ha
Sewage treatment plants	2	< 450 EP (each), 0.15 ha
Power stations	1	40 MW, 1.2 ha

Prevent or Minimise Likelihood of Environmental Harm

- (A2) This environmental authority does not authorise environmental harm unless a condition contained in this environmental authority explicitly authorises that harm. Where there is no condition, the lack of a condition shall not be construed as authorising harm.

Maintenance of Measures, Plant and Equipment

- (A3) The holder of the environmental authority must:
- (a) install all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority;
 - (b) maintain such measures, plant and equipment in their proper and effective condition; and
 - (c) operate such measures, plant and equipment in a proper and effective manner.
- (A4) No change, replacement or alteration of any plant or equipment is permitted if the change, replacement or alteration materially increases, or is likely to increase, the environmental harm caused by the petroleum activity.

Financial Assurance

- (A5) Petroleum activities that cause **significant disturbance to land** must not be carried out until financial assurance has been given to the administering authority as security for compliance with the environmental authority and for any costs or expenses, or likely costs or expenses, mentioned in section 298 of the *Environmental Protection Act 1994*.

- (A6) Prior to any changes in petroleum activities which would result in an increase to the maximum significant disturbance since financial assurance was last given to the administering authority, the holder of the environmental authority must amend the financial assurance and give the administering authority the increased amount of financial assurance.

Existing petroleum activities

- (A7) Conditions (D2) to (D17) and (D43) to (D46) in the Land Schedule relating to disturbance, only apply to petroleum activities which commenced after 15 March 2011 subject to the holder of the environmental authority having complied with all disturbance conditions of the relevant environmental authority that applied at the time the existing petroleum activity was constructed.

Third Party Audit

- (A7) A third party auditor, nominated by the holder of this environmental authority and accepted by the administering authority, must audit compliance with the conditions of this environmental authority at a minimum frequency of every three (3) years.
- (A8) Notwithstanding Condition (A7) and prior to undertaking the third party audit, the scope and content of the third party audit can be negotiated with the administering authority.

Note: Where minimal activities have been undertaken on a tenure, the negotiation of the scope of the third party audit may also include the postponing of the third party audit to an agreeable time between the holder of this environmental authority and the administering authority.

- (A9) An audit report of the audit required by Condition (A7) must be prepared and certified by the third party auditor presenting the findings of each audit carried out.
- (A10) The financial cost of the third party audit is to be borne by the holder of this environmental authority.
- (A11) The holder of this environmental authority must immediately act upon any recommendations arising from the audit report by:
- (a) investigating any non-compliance issues identified; and
 - (b) as soon as practicable, implementing measures or taking necessary action to ensure compliance with the requirements of this environmental authority.
- (A12) Subject to Condition (A11), and not more than 60 business days following the submission of the audit report, the holder of this environmental authority must provide a written report to the administering authority addressing the:
- (a) actions taken by the holder to ensure compliance with this environmental authority; and
 - (b) actions taken to prevent a recurrence of any non-compliance issues identified.
- (A13) The audit report required by Condition (A9) and the written response to the audit report required by Condition (A12) must be submitted to the administering authority with the subsequent annual return.

Contingency Plan for Emergency Environmental Incidents

- (A14) A contingency plan for emergency environmental incidents which includes but is not limited to the impacts of flooding and the injection of treated CSG water, must be developed and implemented to respond to environmental emergency events and incidents where environmental harm is caused or threatened.
- (A15) The contingency plan for emergency environmental incidents required under Condition (A14) must address the following matters as a minimum:
- (a) a clear definition of what constitutes an environmental emergency incident for the activity;

- (b) identification of the types of environmental incidents that may occur, relevant to the activities authorised to be carried out under this environmental authority;
- (c) response procedures to be implemented to prevent or minimise the risk of environmental harm arising from environmental emergency incidents;
- (d) response procedures to minimise the extent and duration of environmental harm caused by environmental emergency incidents;
- (e) the practices and procedures to be employed to restore the environment or mitigate any environmental harm caused;
- (f) communication procedures and lines of communication within and beyond the organisation to be employed in responding to environmental emergency incidents;
- (g) the resources to be used in response to environmental emergency incidents;
- (h) procedures to investigate the cause of any incidents, including releases, and where necessary, the remedial actions to be implemented to reduce the likelihood of recurrence of similar events;
- (i) a receiving environment monitoring program (REMP) to be specifically implemented in the event of an unauthorised release to waters or land to examine and assess environmental impacts. For monitoring of waters, this program must include upstream, downstream and impact site monitoring procedures. For soils monitoring, sufficient samples must be taken from the soil profile at both a reference site and the impact site as a minimum;
- (j) the provision and availability of documented procedures to staff attending any emergency environmental incident to enable them to effectively respond;
- (k) training of staff that will be called upon to respond to emergency environmental incidents to enable them to effectively respond;
- (l) timely and accurate reporting of the circumstance and nature of emergency environmental incidents to the administering authority in accordance with conditions of this environmental authority;
- (m) procedures for accessing monitoring points during emergency environmental incidents; and
- (n) procedures to notify any potentially impacted stakeholder who may be affected by an environmental emergency incident.

Documentation and Records Management

- (A16) All records and results required by the conditions of this environmental authority must be kept for a minimum of five (5) years.
- (A17) All documentation required by this environmental authority (including but not limited to plans, systems, programs, procedures, results of audits, assessments, monitoring, inspections and complaint records) must be made available to the administering authority upon request.

Cultural Heritage

- (A18) In the carrying out of the petroleum activity the holder of this environmental authority must not adversely impact on the cultural heritage values of any place registered on the Queensland Heritage Register.

Underground Gas Storage

- (A19) Testing, evaluating, developing and using natural underground reservoirs for petroleum storage or to store **prescribed storage gases** is not authorised under this environmental authority.

Stimulation of Underground Reservoirs

- (A20) The **stimulation** of underground reservoirs is prohibited under this environmental authority.

Encapsulation of Solid Salt in a Landfill Monocell

- (A21) The disposal of solid salt on site, including encapsulation of solid salt in a **landfill monocell**, is prohibited under this environmental authority.

SCHEDULE B – WATER

Contaminant Release

- (B1) Contaminants that will or may cause environmental harm must not be directly or indirectly released to any **waters** except as authorised by Condition (B19).
- (B2) The release of contaminants directly or indirectly to waters authorised by Condition (B19):
 - (a) must not produce any visible plume within the receiving waters; and
 - (b) must not produce any slick or other visible or odorous evidence of oil, grease or petrochemicals nor contain visible floating oil, grease, scum, litter or other objectionable matter.

Erosion and Sediment Control

- (B3) The Erosion and Sediment Control Plan which has been certified by a **suitably qualified person** must be implemented to minimise erosion and the release of sediment and contaminated stormwater to waters for all stages of the petroleum activities.
- (B4) The Erosion and Sediment Control Plan required by Condition (B2) must include but not be limited to:
 - (a) diverting uncontaminated stormwater run-off around areas disturbed by petroleum activities or where contaminants or wastes are stored or handled that may contribute to stormwater;
 - (b) contaminated stormwater runoff and incident rainfall is collected; and treated, reused, or released in accordance with the conditions of this environmental authority;
 - (c) roofing or minimising the size of areas where contaminants or wastes are stored or handled;
 - (d) revegetating disturbed areas as soon as practicable after the completion of works;
 - (e) using alternate materials and or processes (such as dry absorbents) to clean up spills that will minimise the generation of contaminated waters;
 - (f) erosion and sediment control structures are placed to minimise erosion of disturbed areas and prevent the contamination of any waters;
 - (g) an inspection and maintenance program for the erosion and sediment control features;
 - (h) provision for adequate access to maintain all erosion and sediment control measures especially during the wet season months from November to April;
 - (i) additional erosion and sediment control measures for **construction** of wells and pipelines on slopes >10%;
 - (j) surface water monitoring program designed to detect erosion and sediment runoff into **watercourses**;
 - (k) identification of remedial actions that would be required to ensure compliance with the conditions of this environmental authority; and
 - (l) details of community consultation strategies and processes to be used in further developing and implementing the Erosion and Sediment Control Plan.
- (B5) A copy of the Erosion and Sediment Control Plan must be submitted to any potentially affected landholders upon request.

Maintenance and Cleaning

- (B6) The maintenance and cleaning of vehicles and any other equipment or plant must be carried out in areas from where the resultant contaminants cannot be released into any waters, roadside gutter or stormwater drainage system.

Watercourses, Wetlands and Springs

- (B7) In the carrying out of the petroleum activity the holder of this environmental authority must not clear vegetation or place **fill**, in or within:
- (a) 200 metres from any natural significant **wetland**;
 - (b) 100 metres from any natural wetland, **lakes** or **springs**; or
 - (c) 100 metres of the **high bank** of any other watercourse.
- (B8) The holder of this environmental authority must not excavate or place fill in a way that interferes with the flow of water in a watercourse, wetland, or spring, including works that divert the course of flow of the water or works that impound the water.
- (B9) Despite Conditions (B7) and (B8), pipeline and road construction works may be undertaken in watercourses, wetlands or springs where there is no reasonable and practicable alternative (such as the use of horizontal directional drilling methods) for a maximum period of 10 days, provided that the works are conducted in accordance with the following order of preference:
- (a) conducting work in times of no flow; and
 - (b) using all reasonable and practicable measures to reduce impacts in times of flow.
- (B10) Activities or works resulting in **significant disturbance** to the bed or banks of a watercourse or wetland, or a spring must:
- (a) only be undertaken where necessary for the construction and/or maintenance of roads, tracks and pipelines that are essential for carrying out the authorised petroleum activities and no reasonable or practicable alternative location exists;
 - (b) be no greater than the minimum area necessary for the purpose of the significant disturbance;
 - (c) be designed and undertaken by a suitably qualified person taking into account the matters listed in Section 5 - Planning Activities and Section 6 - Impact Management During Activities of the Department of Environment and Heritage Protection's "*Guideline – Activities in a watercourse, lake or spring associated with mining operations*" dated April 2008, or more recent editions as such become available; and
 - (d) upon cessation of the activities or works, commence rehabilitation immediately such that the final rehabilitation is to a condition that will ensure the ongoing physical integrity and the natural ecosystem values of the site.
- (B11) Sediment control measures must be implemented to minimise any increase in water turbidity due to carrying out petroleum activities in the bed or banks of a watercourse or wetland, or a spring.
- (B12) Routine, regular and frequent visual monitoring must be undertaken while carrying out construction work and/or any maintenance of completed works in a watercourse, wetland or spring.
- (B13) If, due to the petroleum activities, water turbidity increases in the watercourse, wetland or spring outside contained areas, works must cease and the sediment control measures must be rectified to limit turbidity before activities recommence.
- (B14) All measures must be taken to minimise adverse impacts to or reversal of any river improvement works carried out in River Improvement Areas by Queensland's River Improvement Trusts.

Note: Locations and details of River Improvement Areas and River Improvement Trusts are provided in the Schedule to the River Improvement Trust Regulation 1998.

Floodplains

- (B15) Where petroleum activities are carried out on floodplain areas, the holder of this environmental authority must ensure that petroleum and incidental activities do not:

- (a) concentrate flood flows that cause or threaten an adverse environmental impact;
- (b) divert flood flows from natural drainage paths and alter flow distribution;
- (c) increase the local duration of floods;
- (d) increase the risk of detaining flood flows;
- (e) pose an **unacceptable risk** to the safety of persons from flooding; or
- (f) pose an unacceptable risk of damage to property from flooding.

Groundwater

- (B16) The extraction of groundwater as part of the petroleum activity from underground aquifers must not directly or indirectly cause environmental harm to any spring, wetland or other surface waters.

Wild Rivers

- (B17) In a declared Wild River Area, petroleum activities must be consistent with the conditions stated in the relevant **Wild River Declaration**.
- (B18) Where the conditions of this environmental authority conflict with the conditions of the Wild River Declaration, the conditions of the Wild River will Declaration prevail.

Release to Waters of Treated CSG Water

- (B19) The release of treated CSG water is authorised to occur in accordance with *Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters* and *Schedule B Table 2 – Treated CSG Water Release Limits for Monitoring Point (M1)*.
- (B20) The release of treated CSG water to waters is authorised to occur in accordance with *Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters*

Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters

Water Source and Location	Release Point	Location	Monitoring Point	Receiving Waters Description
Treated CSG Water from the reverse osmosis water treatment plant and treated water dam located on PL230	R1, defined as the outlet of discharge pipe to Wilkie Creek	6,995,465 N 303,004 E (Easting and northing locations given as per GDA94, Map Zone 56)	M1, defined as the sample point in the discharge pipeline point to release into Wilkie Creek	Wilkie Creek

- (B21) The quality of the treated CSG water being released must comply with each quality characteristic release limit and limit type and the monitoring frequency specified in *Schedule B, Table 2 – Treated CSG Water Release Limits for Monitoring Point (M1)* when measured at the monitoring point (M1) specified in *Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters*.

Schedule B Table 2 – Treated CSG Water Release Limits for Monitoring Point (M1)

Quality Characteristic	Unit	Release Limit(s)	Limit Type	Monitoring Frequency
Electrical conductivity	µS/cm	580	80 th percentile	Based on at least 5 samples with not less than 60 minutes between samples daily during release
pH	pH Unit	6.5 - 9	Range	Daily during release
Suspended Solids	mg/L	180	Maximum	Daily during release
Boron	mg/L	0.37	Maximum	Daily during release

- (B22) Prior to commencing any release of treated CSG water authorised under this environmental authority, a stream flow gauging station (GP1) must be installed.
- (B23) Upon practical completion of the meter installation, a completed 'meter installation form' must be signed by the installer and the environmental authority holder to confirm that the installation complies with the manufacturer's specifications and/or national standards and/or the Department of Environment and Heritage Protection's metering standards (whichever is applicable).
- (B24) The stream flow gauging station (GP1) must be installed in accordance with *Schedule B, Table 3 – Contaminant Release During Flow Events*.

Schedule B, Table 3 – Contaminant Release During Flow Events

Receiving water description	Gauging station description	Latitude or northing (GDA94)	Longitude or easting (GDA94)	Minimum Flow in Receiving Water Required for a Release Event	Flow recording Frequency
Wilkie Creek	Gauging station 1 (GP1)	50-100 metres upstream of Release Point R1	50-100 metres upstream of Release Point R1	0.14 m ³ /s	at 6 hour intervals during discharge (minimum twice daily)

- (B25) The stream flow gauging station (GP1) must be operated to determine daily stream flows in accordance with *Schedule B, Table 3 – Contaminant Release During Flow Events*.
- (B26) The flow rate of treated CSG water released from the release point authorised in *Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters* must not exceed a ratio of 1 part of the flow rate of the treated CSG water being released to 4 parts of the measured upstream receiving water flow rate.
- (B27) The volume of treated CSG water released from the release point authorised in *Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters* must not exceed a maximum of 10ML/day.
- (B28) The following characteristics of the release must be measured and recorded daily during all release events:
- (a) the volume of treated CSG water released through the release point R1;
 - (b) the date and time of release commencing and ceasing
 - (c) the release rate;
 - (d) for any change in the release rate:
 - (i) the date and time of the change; and
 - (ii) the new release rate; and

- (iii). Water levels and flow rate during the discharge event.
- (e) water levels and flow rate during the discharge event; and
- (f) water quality characteristics monitoring results;
- (g) details of any observed impacts/conditions.
- (B29) Prior to commencing any release of treated CSG water authorised under this environmental authority, each monitoring and release point specified in *Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters* must be marked and readily identifiable from the banks of Wilkie Creek.
- (B30) The quality of the receiving waters must be monitored daily during release of treated CSG water at locations representative of the receiving waters determined in accordance with Condition (B34), for the following water quality characteristics:
- (a) Electrical conductivity ($\mu\text{S}/\text{cm}$)
- (b) pH (pH Unit)
- (c) Turbidity (NTU)
- (d) Suspended Solids (mg/L)
- (e) Calcium (mg/L)
- (f) Magnesium (mg/L)
- (g) Fluoride (mg/L)
- (h) Sulphate (mg/l) and
- (i) Boron (mg/L).
- (B31) If water has been released from authorised release points listed in *Schedule B, Table 1 – Contaminated Release Points, Sources and Receiving Waters*, the holder of this environmental authority must undertake an annual assessment of the contaminants of treated CSG water to determine the risk of environmental harm from release of treated CSG water to surface waters. This should consider the contaminants mentioned in the ANZECC & ARMCANZ 2000 guidelines. This annual assessment must be included in the Annual Return.

Receiving Environment Management Program – REMP

- (B32) Prior to the release of treated CSG water to Wilkie Creek a Receiving Environment Monitoring Program (REMP) must be developed and implemented to monitor, identify and describe any adverse impacts to surface water environmental values, water quality and flows due to the authorised release of treated CSG water to Wilkie Creek.
- (B33) The REMP required by Condition (B32) must include periodic monitoring for the effects of the release on the receiving environment as a result of treated CSG water releases to waters from the release location (R1) specified in *Schedule B – Table 1 Treated CSG Water Release Point, Source and Receiving Waters*.
- (B34) The quality of the receiving waters must be monitored at the locations specified in *Schedule B, Table 4 – Receiving Water Upstream Background Sites and Downstream Monitoring Points*.

Table 4 – Receiving Water Upstream Background Sites and Downstream Monitoring Points.

Monitoring Points	Receiving Waters	Latitude of Northing (GDA94)	Longitude or Easting (GDA94)
Upstream background monitoring point			
Monitoring Point (M2)	Wilkie Creek	50 – 100 metres upstream of Release Point R1	50 – 100 metres upstream of Release Point R1
Downstream monitoring point			
Monitoring Point (M3)	Wilkie Creek	150 – 200 metres downstream of Release Point R1	150 – 200 metres downstream of Release Point R1

- (B35) The REMP required by Condition (B32) must:
- (a) assess the condition or state of receiving waters, including upstream conditions, spatially within the REMP area, considering background water quality characteristics based on accurate and reliable monitoring data that takes into consideration temporal variation (e.g. seasonality);
 - (b) be designed to facilitate assessment against water quality objectives for the relevant environmental values that need to be protected;
 - (c) include monitoring from background reference sites (e.g. upstream or background) and downstream sites from the release;
 - (d) specify the frequency and timing of sampling required in order to reliably assess ambient conditions and to provide sufficient data to derive site specific background reference values in accordance with the *Queensland Water Quality Guidelines 2006*. This should include monitoring during periods of natural flow irrespective of other discharges;
 - (e) include monitoring and assessment of dissolved oxygen saturation and temperature and all water quality parameters listed in Condition (B30);
 - (f) include, where appropriate, monitoring of metals/metalloids in sediments (in accordance with ANZECC & ARMCANZ 2000, BATLEY and/or the most recent version of AS5667.1 *Guidance on Sampling of Bottom Sediments*);
 - (g) include, where appropriate, monitoring of macroinvertebrates in accordance with the AusRivas methodology;
 - (h) apply procedures and/or guidelines from ANZECC and ARMCANZ 2000 and other relevant guideline documents;
 - (i) describe sampling and analysis methods and quality assurance and control; and
 - (j) incorporate stream flow and hydrological information in the interpretations of water quality and biological data.
- (B36) A report outlining the findings of the REMP, including all monitoring results and interpretations in accordance with conditions (B32) to (B35) must be prepared annually. This must include a determination of the risk of environmental harm from release of treated CSG water to the receiving environment waters.
- (B37) The annual assessment must be prepared annually and made available on request to the administering authority.

Water Release Reduction Strategy

- (B38) An on-going Release Reduction Strategy to maximise CSG water reuse and minimise any release to waters and the storage of CSG water in holding dams must be developed and implemented.
- (B39) The strategy must address the following matters:
- (a) implementation of schemes to achieve maximum use of the water;
 - (b) specific targets for achieving increased use of CSG water both treated and untreated;
 - (c) a market analysis at least every three (3) years to identify existing and future opportunities for water use;
 - (d) on-going review of emerging technologies and/or re-use options that could achieve significant reductions in mass loads of contaminants released to the environment;
 - (e) investigation of the feasibility of alternative options, practices and procedures to further minimise the volume and concentration of contaminants released to waters; and
 - (f) programs to implement feasible options to achieve increased water use and reduction in contaminant loads, including actions and timeframes for completion.
- (B40) A progress report on the Release Reduction Strategy must be submitted to the administering authority with each annual return. The report(s) must address at least the following matters:
- (a) details of the specific options, practices and procedures investigated;
 - (b) details of new practices, procedures and programs implemented since the last reporting period and targets met;

- (c) where alternative options, practices and procedures are not considered feasible, the provision of justification to support that determination; and
 - (d) details of the option(s) yet to be implemented, including the timeframes for implementation, and justification for the chosen option(s).
- (B41) The holder of this environmental authority must provide the administrative authority with safe access to facilitate inspections, and must comply with any instructions issued by the administrative authority relevant to the operation of the pump and meter installation.
- (B42) The holder of this environmental authority must notify the administering authority within five (5) business days of any meter malfunction or maintenance of the measuring device (meter).
- (B43) The holder of this environmental authority must arrange for the repair or replacement of a malfunctioning meter within five business days of becoming aware of the malfunction and provide a repair and/or maintenance completion report within ten business days of the repair or maintenance.

Sewage Treatment Works (21 – 450 EP)**Release of Treated Sewage Effluent Contaminants to Land**

- (B44) Sewage pump stations must be fitted with a stand-by pump and a visible or audible high level alarm.
- (B45) Treated effluent may only be released to land at the designated, fenced and delineated contaminant release area(s).
- (B46) The contaminant release area(s) must be maintained in a proper and efficient condition so as to provide adequate assimilation, percolation, evaporation and transpiration of the released contaminants.
- (B47) Treated effluent must not be applied by spray irrigation and must be applied in a manner that does not cause ponding or runoff of effluent beyond the contaminant release area(s).
- (B48) When weather conditions or soil conditions preclude the release of contaminants, the contaminants must be directed to on-site storage or lawfully disposed of off-site.

Quality of Contaminants Released from the Sewage Treatment Works

- (B49) Treated effluent must comply, at the sampling and in-situ measurement point(s), with each of the release limits specified in *Schedule B, Table 4 - Treated Sewage Effluent Standards* for each quality characteristic.
- (B50) The release of contaminants to land must be monitored at the frequency and at the sampling and in-situ measurement point specified in *Schedule B, Table 4 - Treated Sewage Effluent Standards* and records of the monitoring results kept for at least five (5) years and made available to the administering authority on request.
- (B51) The influent annual average daily dry weather flow of sewage must not exceed 60 kilolitres per day for each authorised sewage treatment plant under this environmental authority.

Schedule B, Table 4 – Treated Sewage Effluent Standards

Quality Characteristic	Sampling and in-situ measurement Point Location	Limit Type	Release Limit	Frequency
5-day Biochemical Oxygen Demand (inhibited)	Release pipe from sewage treatment plant located on PL198;	Maximum	20 mg/L	Monthly
Suspended Solids		Maximum	30 mg/L	
pH		Range	6.0 to 9.0	
E-Coli	Release pipe from sewage treatment plant located on PL230	80 th percentile based on at least 5 samples with not less than 30 minutes between samples.	1000 cfu per 100 mL	
		Maximum	10000 cfu per 100 ml	

SCHEDULE BE – COAL SEAM GAS WATER INJECTION TRIAL

- (BE1) The only fluids authorised to be injected into an aquifer(s) are those fluid types specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection*.
- (BE2) Fluid injection must be in accordance with the quantities and locations listed in *Schedule BE, Table 1 – Details of Authorised Fluid Injection*.

Schedule BE, Table 1 – Details of Authorised Fluid Injection

Well Location (Easting Northing, Map Zone 56)	Injection Well Number / Reference	Target Formation and Perforated Zone	Fluid Type	Maximum Injection Rate ML/d	Hydraulic Impact Zone	Water Quality Impact Zone
313669 E 6967949 N	Tipton-193	Precipice Formation, between 1040 m to 1110 m depth	Treated CSG water ¹	4	9,340 m radius from injection well	148 m radius from injection well

- (BE3) The holder of this environmental authority must notify the administering authority the commencement date of the trial at least seven (7) days prior to its commencement.
- (BE4) The injection trial is limited to a period of 180 days of injection, followed by a six-month recovery period.

Well Integrity

- (BE5) The construction of the Tipton-193 injection well must be carried out in accordance with the well construction requirements described in the most recent version of the Department of Environment and Heritage Protection's "CSG Water Injection Well Construction Requirements", as amended from time to time.
- (BE6) The Tipton-193 injection well must be mechanically functional such that there is no significant fluid movement into a water resource aquifer through vertical channels adjacent to the well bore hole.
- (BE7) The construction, operation and maintenance of the injection well specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* must be undertaken in a way that prevents and/or minimises impacts to the environmental values of the target formation and ensures the integrity of the bore.
- (BE8) The injection pressure must not exceed 90% of the formation fracture pressure.

Injection Fluid Quality

- (BE9) The quality of the fluid being injected into the injection well specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* must comply with the contaminant limits prescribed in *Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid*.

¹ Treated CSG water means any fluid that contains any proportion of treated CSG water, blended or otherwise.

Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid

Quality Characteristics	Release Limits	Limit Type
pH (pH units)	Minimum 6.5, Maximum 10	Range
Total Dissolved Solids (TDS) ²	Mean TDS of injection fluid must not exceed median TDS of formation water measured in background water quality monitoring well	Maximum
Dissolved Oxygen	500 µg/L	Maximum
Total suspended solids	25 mg/L	Maximum

(BE10) The quality of the fluid being injected into the injection well specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* must be monitored at the frequency specified in *Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid*.

Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid

Monitoring parameter	Unit	Monitoring frequency during injection
Temperature of target formation	°C	N/A
Injection fluid temperature	°C	Continuous
Inlet pressure	KPa	Continuous
Fluid flow rate	L/sec	Continuous
	ML/day	Daily
Dissolved Oxygen (DO)	µg/L	Daily
Electrical Conductivity	µS/cm	Daily
pH	pH units	Daily
Turbidity	NTU	Daily
Sodium	mg/L	Weekly
Potassium	mg/L	Weekly
Calcium	mg/L	Weekly
Magnesium	mg/L	Weekly
Chloride	mg/L	Weekly
Sulphate as SO ₄	mg/L	Weekly
Carbonate / Bicarbonate	mg/L	Weekly
Bromine	mg/L	Monthly
Fluoride	mg/L	Monthly
Iodide	mg/L	Weekly
Silica	mg/L	Monthly
Iodine	mg/L	Monthly
Nitrate	mg/L	Monthly
Total organic carbon	mg/L	Weekly
Total Dissolved Solids	mg/L	Weekly
Redox Potential	mV	Weekly
Total Hardness as CaCO ₃	mg/L	Weekly
Total Alkalinity as CaCO ₃	mg/L	Weekly

² Electrical conductivity (EC) is an acceptable proxy measurement for measuring TDS of the injection fluid. If used, the conversion from EC to TDS must be stated and confirmed with laboratory monitoring results.

Hydroxide alkalinity as CaCO ₃	mg/L	Weekly
Carbonate Alkalinity as CaCO ₃	mg/L	Weekly
Bicarbonate Alkalinity as CaCO ₃	mg/L	Weekly
Total suspended solids	mg/L	Weekly
Bromide	mg/L	Weekly
Aluminium	mg/L	Monthly
Arsenic	mg/L	Monthly
Barium	mg/L	Monthly
Boron	mg/L	Monthly
Copper	mg/L	Monthly
Iron	mg/L	Monthly
Manganese	mg/L	Monthly
Mercury	mg/L	Monthly
Nickel	mg/L	Monthly
Strontium	mg/L	Monthly
Zinc	mg/L	Monthly
Total Petroleum Hydrocarbons	µg/L	Monthly
BTEX	µg/L	Monthly

(BE11) Notwithstanding Conditions (BE9) and (BE10), the injection of treated CSG water into the injection well specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* must have considered the recommendations for water blending described in the following documents, where appropriate:

- (a) *Surat Gas Project – Geochemical Blending and Compatibility Study: Tipton Injection Trials, March 2013*; and
- (b) *Surat Gas Project – Geochemical Blending and Compatibility Study: Tipton Injection Trials – Phase 2, March 2013*.

(BE12) The holder of this environmental authority must provide for non-chemical disinfection of injection fluid if results of six-monthly testing of injected fluid show levels of coliform bacteria, sulphate reducing bacteria or iron fixing bacteria that has potential to cause adverse impacts on the groundwater within the target formation.

Injection Management Plan

(BE13) An Injection Management Plan which has been certified by a suitably qualified person must be developed and implemented prior to the carrying out of the trial fluid injection activity(ies).

(BE14) The Injection Management Plan must include but not necessarily be limited to:

- (a) estimated volumes and rates of water to be injected;
- (b) a description of the physical, chemical and biological components and their concentrations of the water to be produced;
- (c) details of how and where the fluid will be produced, aggregated, stored and kept separate from other waters until it is treated and injected;
- (d) details of where the fluid is proposed to be treated including a description of the treatment process;
- (e) a water quality compatibility assessment which demonstrates that the injection fluid has inconsequential reactivity with the target formation and native groundwater it will come into contact with;

- (f) the regional characteristics of the receiving environment;
- (g) identification of the water quality impact zone and the hydraulic impact zone;
- (h) identification of any fluid injection well, all existing bores, springs, lakes, wetlands, environmental assets and watercourses connected to groundwater, faults and other geologic features that occur within the water quality impact zone and the hydraulic impact zone;
- (i) identification of the environmental values and water quality objectives of the potential water quality impact zone of the target formation in accordance with the *Environmental Protection (Water) Policy 2009* and the *Queensland Water Quality Guidelines 2009*;
- (j) an assessment of the potential for migration of injection fluid or native groundwater out of the target formation through wells, bores, springs, connected watercourses, faults or other geologic features likely to impact on other aquifers;
- (k) a risk assessment identifying potential hazards, their inherent risk, preventative measures for the management of potential hazards and details on sampling and analysis methods to verify preventative measures of potential hazards, including frequency and locations and quality assurance and control;
- (l) control measures that will be implemented for fluid storage, treatment and injection to prevent or control the release of a contaminant or waste to the environment other than the release authorised in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* and *Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid*;
- (m) verification methods to assess performance of the injection activities;
- (n) the indicators or other criteria against which the performance of fluid injection will be assessed;
- (o) procedures that will be adopted to regularly review the monitoring program;
- (p) reporting procedures to management and the administering authority should unforeseen or non-compliant monitoring results be recorded; and
- (q) procedures that will be implemented to prevent unauthorised environmental harm from unforeseen or non-compliant monitoring results.

Receiving Environment Monitoring Program – Injection Activities

- (BE15) A Receiving Environment Monitoring Program (REMP) for Injection Activities which has been certified by a suitably qualified person must be developed and implemented to monitor, identify and describe any adverse impacts to the following values of the target formation due to the injection of treated CSG water:
- (a) hydraulic response;
 - (b) water quality response; and
 - (c) any other groundwater environmental values identified.
- (BE16) The REMP for Injection Activities required by Condition (BE15) must be developed and implemented prior to the carrying out of the trial fluid injection activity(ies).
- (BE17) The REMP for Injection Activities required by Condition (BE15) must include, but not necessarily be limited to:
- (a) methods to validate the assumptions, predicted impacts and the effectiveness of the proposed preventative measures associated with the modelled water quality impact zone and hydraulic impact zone;
 - (b) monitoring of the hydraulic response to the trial injection at the well(s) referred to in Condition (BE17)(f)(ii);
 - (c) monitoring of the water quality of the injection fluid during injection for the parameters listed in *Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid*;

- (d) monitoring of the water quality response following the completion of the injection trial recovery period through sampling of the target aquifer, within the water quality impact zone, for the parameters listed in *Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid*;
- (e) a definition of the background water quality of the Precipice Sandstone to be used for monitoring compliance with *Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid* and for reporting in the Injection Trial Report required by Condition (BE18);
- (f) the installation and use of a minimum of two wells:
 - (i). one of which accesses the target aquifer within the water quality impact zone; and
 - (ii). the other of which is placed at an adequate distance to determine the extent of the hydraulic response to the injection;
- (g) methods for the analysis and interpretation and a description of the statistical basis on which conclusions will be drawn to verify the assumptions of the injection proposal; and
- (h) a demonstration of how the REMP will validate assumptions, predicted impacts and the effectiveness of quality assurance and control measures.

Reporting Requirements for Fluid Injection Trials

(BE18) Upon completion and within two (2) months of the completion of the injection trial's recovery period the holder of the authority must submit to the administering authority an Injection Trial Report prepared by a suitably qualified person.

(BE19) The Injection Trial Report must include, but not necessarily be limited to:

- (a) details of the injection well including but not limited to:
 - (i). location details (GDA94);
 - (ii). the inferred lithology³;
 - (iii). casing details including type, outer diameter (mm), wall thickness (mm) and locations (depth from and to in metres);
 - (iv). cementing details including type, hole diameter (mm), casing outer diameter (mm) and locations (depth from and to in metres);
 - (v). calculated target formation fracture pressure; and
 - (vi). target formation pressure prior to injection;
- (b) a detailed interpretation of the logs and other tests conducted during drilling and construction or refurbishment of the well against their specific objectives;
- (c) a completed well schematic diagram;
- (d) a temperature survey;
- (e) a cement integrity log;
- (f) outcomes of the injection trial including, but not limited to:
 - (i). well head injection rates versus formation pressure;
 - (ii). target formation pressure within the hydraulic impact zone during and upon completion of the trial;
 - (iii). hydraulic gradient of the target formation within the hydraulic impact zone upon completion of the trial;
 - (iv). the effectiveness of aquitards (including the stability of the aquitard) and aquicludes of confining the injected fluid within the target formation; and
 - (v). a detailed interpretation of the logs and other tests conducted during the injection trial against their specific objectives;
 - (vi). validation of conceptual framework for injection; and
 - (vii). additional hazards that were not identified earlier;
- (g) the results of the Receiving Environment Monitoring Program for Injection Activities;

³ Inferred lithology means the best available description of the lithology based upon historical drilling records, interpretation of logs and any other information that the suitably qualified person may have discovered.

- (h) analysis of monitoring and operational data in terms of:
 - (i). validation of conceptual framework for injection; and
 - (ii). additional hazards that were not identified earlier;
- (i) a revised risk analysis that identifies all potential hazards, likelihood of various risk elements and associated consequences;
- (j) a revised water quality compatibility assessment which demonstrates that the injection fluid has inconsequential reactivity with the target formation and native groundwater it will come into contact with;
- (k) a re-evaluation of the hydraulic impact zone; and
- (l) a re-evaluation of the water quality impact zone.

Injection Cessation Report

(BE20) Following completion of the injection trial, a fluid injection cessation report which has been certified by a suitably qualified person must be submitted to the administering authority within two (2) months of completion of the injection trial's recovery period.

(BE21) The fluid injection cessation report must include, but not necessarily be limited to:

- (a) volumes of fluid injected at each well;
- (b) a risk assessment statement providing details on identified hazards including their inherent risk, summary of the results from the verification monitoring, preventative measures and the residual risk; and
- (c) a monitoring report outlining the methods and results of verification monitoring undertaken to assess the performance of the injection activities and preventative measures for identified hazards.

SCHEDULE C – REGULATED DAMS

- (C1) The name of each **regulated dam** must be clearly sign posted at the dam location at all times.
- (C2) Construction of any dam or modifications to an existing dam determined to be in the high **hazard** or significant **hazard category** in accordance with the most recent version of "*Manual for Assessing Consequence Categories and Hydraulic Performance of Structures*" is prohibited unless the required **design plan** details have been entered into the regulated dam Register and certified by the chief executive officer for the holder of the environmental authority, or their delegate, as being accurate and correct.

Regulated Dam Register

- (C3) The holder of this environmental authority must maintain a Register of regulated dams that must include, as a minimum, the following information for each regulated dam:
 - (a) dam name, the coordinates for its location and date of entry in the register;
 - (b) dam purpose and its proposed/actual contents;
 - (c) hazard category assessed using the most recent version of "*Manual for Assessing Consequence Categories and Hydraulic Performance of Structures*";
 - (d) details of the composition and construction of any liner;
 - (e) dimensions (metres) and surface area (hectares) measured at the footprint of the dam;
 - (f) maximum operational volume (megalitres);
 - (g) design storage allowance at 1 November each year (megalitres);
 - (h) mandatory reporting level (metres);
 - (i) date construction was certified as compliant with the design plan;
 - (j) name and qualifications of certifier;
 - (k) dates on which the dam was inspected for structural and operational adequacy;
 - (l) date on which the report of the annual structural and operational adequacy inspection was provided to the administering authority;
 - (m) dates on which the dam was inspected for the detection of leakage through any liner; and
 - (n) dates on which the dam was inspected for the purpose of annually ascertaining the available storage capacity on the 1 November each year.

Note: The dam register in the approved departmental format is available for download at: http://www.ehp.qld.gov.au/management/coal-seam-gas/pdf/regulated_dam_register.xls

- (C4) The holder of this environmental authority must provisionally enter the required information in the Register of regulated dams when a design plan for a regulated dam is submitted to the administering authority.
- (C5) The holder of this environmental authority must make a final entry of the required information in the Register of Regulated Dams once compliance with condition C15 has been achieved.
- (C6) The holder of this environmental authority must ensure that the information contained in the Register of regulated dams is complete and current on any given day.
- (C7) All entries in the Register of regulated dams must be certified by the chief executive officer for the environmental authority holder, or their delegate, as being accurate and correct.
- (C8) The holder of this environmental authority must submit the Register of regulated dams or information contained in the Register available to the administering authority at each annual return and when requested to do so in the form requested by the administering authority.

Construction and Operational Requirements for New Dams

- (C9) All **aggregation dams** must:

- (a) be designed with a floor and sides of material that will contain the wetting front and any entrained contaminants within the bounds of the containment system during its operational life including any period of decommissioning and rehabilitation; and
- (b) have a system that will detect any passage of the wetting front or entrained contaminants through the floor or sides of the dam and enable the repair of the containment system or its decommissioning and rehabilitation.

(C10) All **brine** dams must:

- (a) be designed with a floor and sides of material that will contain the wetting front and any entrained contaminants within the bounds of the containment system during its operational life including any period of decommissioning and rehabilitation;
- (b) have a system that will detect any passage of the wetting front or entrained contaminants through the floor or sides of the dam, enable the repair of the containment system or its decommissioning and rehabilitation; and
- (c) the collection and proper disposal of any contaminants that move beyond the bounds of the containment system.

(C11) The holder of this environmental authority must ensure that regulated dams constructed after 15 March 2011:

- (a) are constructed to provide flood immunity such that the dam is adequately protected against overtopping and will be provided with erosion protection from external flooding events, at or above the Annual Exceedence Probability (AEP) specified for determining Spillway capacity; and
- (b) are not to be constructed in areas that are estimated to be submerged by a flooding event from a recognised watercourse, at or above an Annual Exceedence Probability (AEP) of 0.02 (1 in 50).

(C12) All regulated dams must be designed in accordance with the requirements of the most recent version "*Manual for Assessing Consequence Categories and Hydraulic Performance of Structures*" by and constructed under the supervision of a **suitably qualified and experienced person**.

Regulated Dam Design Plan and 'As Constructed' Certification

(C13) The construction and operation of regulated dams is prohibited unless the holder of this environmental authority has submitted to the administering authority a copy of the design plan, together with the **certification** of a **suitably qualified and experienced person** that the regulated dam:

- (a) will deliver the performance stated in the design plan;
- (b) has had its hazard category assessed and been designed in accordance with the requirements of the most recent version of "*Manual for Assessing Consequence Categories and Hydraulic Performance of Structures*" and
- (c) when constructed and operated, will be compliant in all respects with the relevant conditions of this environmental authority.

(C14) The design plan must include, but not be limited to:

- (a) a statement of the relevant legislation, regulatory documents and engineering practice relied upon in the design plan;
- (b) a statement of the facts and data being used in the design plan and the limitations to the application and interpretation of that material;
- (c) an assessment of the hazard category of the proposed dam based on the identification of potential impacts on any relevant sensitive places for any applicable dam failure scenarios, including the cumulative impact should all dams fail at once;
- (d) detailed specifications for the design, operation, maintenance and decommissioning of the dam(s);
- (e) an operational plan that includes:

- (i) contingency / emergency response procedures designed to avoid / minimise discharges resulting from any overtopping or loss of structural integrity of the dam; and
 - (ii) normal operating procedures and rules;
 - (f) design, specification and operational rules for any related structures and systems used to prevent the overtopping of the proposed dam;
 - (g) a detailed plan for the decommissioning and rehabilitation of the dam at the **end** of its operational life;
 - (h) any other matter required by the certifying suitably qualified and experienced person; and
 - (i) evidence supporting the claims of the certifier that they are a suitably qualified and experienced person.
- (C15) If, within the 20 business days following the lodgement of a certified design plan the administering authority notifies the holder of this environmental authority, in writing, that the design plan is not compliant with either:
- (a) the conditions of this environmental authority; or
 - (b) the requirements set out in the most recent version of "*Manual for Assessing Consequence Categories and Hydraulic Performance of Structures*"

then the construction and operation of the regulated dam is prohibited until the administering authority provides written advice that its construction may proceed.

- (C16) When construction of any regulated dam is complete, the holder of this environmental authority must submit to the administering authority one hard copy and one electronic copy of a set of 'as constructed' drawings, together with the certification of a suitably qualified and experienced person that the dam 'as constructed' will deliver the performance stated in the design plan and at the time of certification it is compliant in all respects with Conditions (C9) to (C14) of this environmental authority.
- (C17) Each regulated dam must be maintained and operated in a manner that is consistent with the design plan and the certified 'as constructed' drawings for the duration of its operational life and until decommissioned and rehabilitated.
- (C18) Upon any change in its purpose or stored contents of a regulated dam, the hazard category of the dam must be determined by a suitably qualified and experienced person prior to any such change.

Mandatory Reporting Level

- (C19) The Mandatory Reporting Level must be marked on each regulated dam in such a way that it is clearly observable during routine inspections of each dam.
- (C20) The holder of this environmental authority must notify the administering authority immediately when the level of the contents of any regulated dam reaches the Mandatory Reporting Level, and immediately act to prevent or, if unable to prevent, to minimise any actual or potential environmental harm.

Annual Inspection and Report

- (C21) Each regulated dam must be inspected annually by a suitably qualified and experienced person.
- (C22) At each annual inspection, each regulated dam must be assessed for:
- (a) its hazard category in accordance with the most recent version of "*Manual for Assessing Consequence Categories and Hydraulic Performance of Structures*"; and
 - (b) condition and adequacy for dam safety; and
 - (c) its structural, geotechnical and hydraulic performance against the criteria contained in the certified design plan.

- (C23) An assessment of the adequacy of the available storage in each regulated dam is to be made, based on an actual dam level observed in the month of October in each year, and the resultant estimate of the level in that dam as at 1 November in each year must be equal or less than the design storage allowance for the dam.
- (C24) Where the assessment of the adequacy of the available storage in any regulated dam indicates that the design storage allowance will be exceeded, or at any other time the holder of this environmental authority becomes aware that the design storage allowance has been or will be exceeded, the holder of this environmental authority must immediately notify the administering authority, and immediately act to prevent or, if unable to prevent, to minimise any actual or potential environmental harm.
- (C25) For each annual inspection, a copy of a report on the condition and adequacy of each regulated dam, certified by the suitably qualified and experienced person and including any recommended actions to be taken to ensure the integrity of each regulated dam, must be provided to the administering authority upon request.
- (C26) The holder of this environmental authority must, upon receipt of the annual inspection report, consider the report and its recommendations, take action to ensure that each regulated dam will safely perform its intended function, and within one month of receiving the report, notify the administering authority in writing of the recommendations of the inspection report and the actions taken to ensure the integrity of each regulated dam.

SCHEDULE D – LAND

General

- (D1) Contaminants that will or may cause environmental harm must not be directly or indirectly released to land except as permitted under this environmental authority.

Disturbance to Land – General

- (D2) Prior to conducting petroleum activities that involve significant disturbance to land, an assessment must be undertaken of the condition, type and ecological value of any vegetation in such areas where the activity is proposed to take place.
- (D3) The assessment required by Condition (D2) must be undertaken by a suitably qualified person and include the carrying out of field validation surveys, observations and mapping of any **Category A, B or C Environmentally Sensitive Areas (ESA's)** and the presence of species classed as endangered, vulnerable, rare or near threatened under the *Nature Conservation Act 1992* and for petroleum activities that commenced after 8 March 2013, areas containing State significant biodiversity values.
- (D4) If the assessment required by Conditions (D2) and (D3) indicates that a regional ecosystem (RE) mapped as 'Endangered' or 'Of Concern' by the Queensland Herbarium should be in a lower conservation value classification and the holder of this environmental authority wishes to undertake activities as if the ecosystem is of the lower conservation value they must notify the administering authority in writing before any significant disturbance to land takes place.
- (D5) The holder of this environmental authority, when carrying out petroleum activities must:
- (a) avoid, minimise or mitigate (in order of preference) any impacts on areas of vegetation or other areas of ecological value;
 - (b) minimise disturbance to land that may otherwise result in land degradation;
 - (c) ensure that for land that is to be **significantly disturbed** by petroleum activities:
 - (i) the top layer of the soil profile is removed;
 - (ii) stockpiled in a manner that will preserve its biological and chemical properties; and
 - (iii) used for **rehabilitation** purposes (in accordance with Condition (H4));
 - (d) avoid clearing mature trees; and
 - (e) prior to carrying out field based activities, make all relevant staff, contractors or agents carrying out those activities, aware of the location of any category A, B or C ESA's and the requirements of this environmental authority.

Note: This environmental authority does not authorise the taking of protected animals or the tampering with an animal breeding place as defined under the Nature Conservation Act 1992 and Regulations.

- (D6) In accordance with Condition (D5), if significant disturbance to land is unavoidable, the holder of this environmental authority must not clear vegetation or place fill:
- (a) in a way which significantly isolates, fragments or dissects tracts of vegetation resulting in a reduction in the current level of ecosystem functioning, ecological connectivity (i.e. stepping stone or contiguous bioregional/local corridor networks) and/or results in an increase in **threatening processes** (e.g. potential impacts associated with edge effects or introduced species);
 - (b) on slopes greater than 10% for activities other than pipelines and wells; or
 - (c) in **discharge areas**.
- (D7) Clearing of remnant vegetation shall not exceed 10 metres in width for the purpose of establishing tracks and 20 metres in width for dual carriageway roads unless otherwise authorised by a condition of this EA.
- (D8) Cleared vegetation must be stockpiled in a manner that facilitates respreading or salvaging and does not impede vehicle, stock or wildlife movements.

Disturbance to Land – Environmentally Sensitive Areas

- (D9) The holder of this environmental authority must ensure that petroleum activities, except as otherwise authorised by Condition (D17), (D18), (D19) and (D20) of this environmental authority:
- (a) are not conducted in any category A, B or C Environmentally Sensitive Areas (ESAs);
 - (b) are not conducted within 200m of any category A, B or C ESAs; and
 - (c) do not involve activities other than limited petroleum activities within the protection zone of a category A ESA (i.e. from 200m to 1km of the category A ESA), or within the protection zone of a category B or C ESA (i.e. from 200m to 500m of the category B or C ESA).

Note: Indicative ESA mapping is available on the Department of Environment and Heritage Protection's website at http://www.ehp.qld.gov.au/licences-permits/maps_of_environmentally_sensitive_areas.php

- (D10) Limited petroleum activities carried out in accordance with Condition (D9)(c) must be preferentially located in pre-existing areas of clearing or significant disturbance to the greatest practicable extent and avoid the clearing of mature trees.
- (D11) Despite Condition (D10), limited petroleum activities may be undertaken within 200m of, or in the following specified Category B and C ESAs:
- (a) 'Endangered' regional ecosystems;
 - (b) 'Of Concern' regional ecosystems;
 - (c) State Forests;
 - (d) Timber Reserves

provided that they do not overlap with any other Category A, B or C ESA or its associated protection zone.

- (D12) Where limited petroleum activities are proposed to be undertaken within 200m of, or in the Category B and C ESAs specified in Condition (D11), the holder of this environmental authority must:
- (a) be able to demonstrate that no reasonable or practicable alternative exists; and
 - (b) where the ESA is a State Forest or Timber Reserve:
 - (i). obtain written approval from the authority responsible for the administration of the *Forestry Act 1959*;
 - (ii). comply with all restrictions and conditions contained within the approval required under Condition (D12)(b)(i));
 - (iii). where the conditions of the approval required under Condition (D12)(b)(i) conflict with the conditions of this environmental authority, comply with the conditions of this environmental authority; and
 - (iv). provide a copy of the written approval required under Condition (D12)(b)(i) to the administering authority upon request.
- (D13) Where limited petroleum activities are undertaken within 200m of, or in the Category B or C ESAs specified in Condition (D11), disturbance to land must only be located and carried out in areas according to the following order of preference:
- (a) pre-existing cleared areas or significantly disturbed areas less than 200m from a Category C ESA;
 - (b) pre-existing cleared areas or significantly disturbed areas less than 200m from a Category B ESA;
 - (c) undisturbed areas less than 200m from a Category C ESA;
 - (d) undisturbed areas less than 200m from a Category B ESA;
 - (e) pre-existing areas of significant disturbance within a Category C ESA (e.g. areas where significant clearing or thinning has been undertaken within a RE, and/or areas containing

- high densities of weed or pest species which has inhibited re-colonisation of native regrowth);
- (f) pre-existing areas of significant disturbance within a Category B ESA (e.g. areas where significant clearing or thinning has been undertaken within a RE, and/or areas containing high densities of weed or pest species which has inhibited re-colonisation of native regrowth);
 - (g) areas where clearing of a Category C ESA is unavoidable; and
 - (h) areas where clearing of a Category B ESA is unavoidable.
- (D14) Notwithstanding Conditions (D11) to (D13), where limited petroleum activities are proposed to be undertaken within 200m of, or in a Category B or C ESAs specified in Condition (D11), any vegetation clearing must not exceed any of the following areas:
- (a) if the disturbance relates to an Endangered or Of Concern RE, 10% of the **remnant unit** of Endangered or Of Concern RE as ground truthed and mapped before any activity commences as per Condition (D2) and (D3) of this environmental authority for the life of the project; and
 - (b) more than 30m² for the construction of a sump; or
 - (c) Described in Schedule D, Table 1 – Authorised vegetation clearing widths for linear infrastructure in ESAs and ESA buffers.

Schedule D, Table 1 – Authorised vegetation clearing widths for linear infrastructure in ESAs and ESA buffers

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

- (D15) For each well site within 200m of, or in a Category B or C ESA specified in Condition (D11), all reasonable and practical measures are taken to minimize the area cleared which must include but not be limited to, for each well site, ranked constraints mapping and a risk assessment which considers safety.
- (D16) Details of any significant disturbance to land undertaken within 200m of, or in a Category B or C ESA, along with a record of the assessment required by Conditions (D2) and (D3) must be kept and submitted to the administering authority upon request.
- (D17) Despite Condition (D9), the Daandine Brine Dam 2 and associated activities necessary for construction, operation, maintenance and monitoring of the dam, located within the area bound by the coordinates prescribed by *Schedule D, Table 1 – Coordinates Enclosing the Disturbance Area for Daandine Brine Dam 2*, are permitted within the protection zones of Category C Environmentally Sensitive Areas.

Schedule D, Table 1 – Coordinates Enclosing the Disturbance Area for Daandine Brine Dam 2

Point	Latitude or Northing (GDA94, Zone 56)	Longitude or Easting (GDA94, Zone 56)
1	7001708	297524
2	7001153	297384
3	7001051	298345
4	7001418	298444
5	7001601	298406
6	7001620	298190

- (D18) Despite Condition (D9), the water release outlet and pipeline and associated activities necessary for construction, operation, maintenance and monitoring for the release of treated CSG water to Wilkie Creek at the specified release point in *Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters* are authorised to occur in a Category B ESA and its associated protection zones.
- (D19) The construction of the water release outlet and pipeline are located within the area bound by the coordinates prescribed by *Schedule D, Table 2 – Coordinates Enclosing the Disturbance Area for the Water Release Outlet and Pipeline*.

Schedule D, Table 2 - Coordinates Enclosing the Disturbance Area for the Water Release Outlet and Pipeline.

Point	Latitude or Northing (GDA94, Zone 56)	Latitude or Easting (GDA94, Zone 56)	Area of disturbance
Valve Pit	6,995,424	302,897	0.18 ha
High Point on Bank	6,995,460	302,991	
Outlet at Creek	6,995,465	303,004	

- (D20) Despite condition D9, the Tipton Treated Water Pipeline and associated activities for construction, operation and maintenance, located within the area bound by the coordinates prescribed by Schedule D, Table 3 – Coordinates Enclosing the Disturbance Area for Tipton Treated Water Pipeline, are permitted.

Schedule D, Table 3 - Coordinates Enclosing the Disturbance Area for Tipton Treated Water Pipeline

Point	Longitude or Easting (GDA94 Zone 56)	Latitude or Northing (GDA94 Zone 56)
Section 1	310652.74	6969686.79
	310656.46	6969747.37
	310696.37	6969744.59
	310661.46	6970447.79
	310621.2	6970452.8
	310651.4	6970651.7
	310611.1	6970656.7
	310641.76	6970845.55
	310601.68	6970846.23
	310707.02	6971627.3
	310667.1	6971629.9
	310658.71	6972161.37
	310618.1	6972166.9
	310621.4	6973392.1
	310581.2	6973398.7
	310613.31	6973549.7
	310573.47	6973549.7
	310638.9	6973649.7
	310538.9	6973549.7
	310608.18	6973649.7
	310568.35	6973649.7
	310638.9	6973549.7
	310538.9	6973649.7
Section 2	310617.24	6973719.35
	310576.78	6973723.95
	310722.26	6974060.43
	310681.96	6974065.49
	310716.82	6974171.95
	310676.51	6974177.14
	310714.46	6974220.51
	310674.59	6974216.76
	310692.43	6974377.64
	310653.85	6974364.72
	310692.43	6974377.64
	310567.32	6974520.53
	310616.71	6974514.14
	310563.13	6974528.08
	310612.67	6974521.66
	310498.88	6974536.4
	310593.85	6974610.18
310497.34	6974636.39	
Section 3	310533.76	6974846.47
	310493.94	6974834.72
	310533.6	6974856.85
	310493.52	6974862.31
	310528.48	6975191.65
	310488.41	6975196.69
	310526.05	6975350.54
310485.78	6975347.13	

Soil Management

- (D21) The holder of this environmental authority must develop and implement soils management procedures, which have been certified by a suitably qualified person, for areas to be disturbed by petroleum activities prior to commencement of these petroleum activities to prevent or minimise the impacts of soil disturbance.
- (D22) Despite condition D21, for areas of disturbance at the time of issue of this environmental authority, the holder of this environmental authority must develop and implement soils management procedures, which have been certified by a suitably qualified person by 18 July 2011.
- (D23) The Soil Management Procedures required by conditions D21 and D22 must include, but not necessarily be limited to:
- (a) identify soil units within areas to be disturbed by petroleum activities at a scale of 1:50 000, in accordance with the "Guidelines for Surveying Soil and Land Resources, 2nd Edition" (McKenzie et al. 2008), "Australian Soil and Land Survey Handbook, 3rd Edition" (National Committee on Soil and Terrain 2009), "The Australian Soil Classification" (Isbell 2002) and "Guidelines for agricultural land evaluation in Queensland" (Queensland Department of Primary Industries Information Series QI90005 1990) or subsequent versions thereof;
 - (b) establish baseline soils information for the soil units to be disturbed including soil depth, pH, electrical conductivity (EC), chloride, cations (aluminium, calcium, magnesium, potassium and sodium), exchangeable sodium percentage (ESP), particle size and soil fertility (including nitrogen, phosphorous, potassium, sulphur and micronutrients);
 - (c) a soils monitoring program outlining parameters to be monitored, frequency of monitoring and maximum limits for each parameter for each soil unit;
 - (d) identify the types of soils and soil units requiring specific management practices (e.g. saline or sodic soils) relevant to assessment for agricultural suitability erodibility and rehabilitation
 - (e) detailed topsoil and topsoil stockpile management procedures for each soil unit in the event of any significant soil disturbance;
 - (f) detailed mitigation measures and procedures for each soil unit to manage the risk of adverse soil disturbance in the carrying out of the petroleum activity(ies);
 - (g) for pipelines, methods of keeping soil horizons separate on excavation, storage and backfilling; and
 - (h) for areas of good quality agricultural land, detailed methods to be undertaken to minimise potential impacts.
- (D24) A copy of the Soils Management Procedures must be submitted to any potentially affected landholders upon request.

Acid Sulfate Soils

- (D25) The holder of this environmental authority must determine the presence of **acid sulfate soils** prior to:
- (a) any excavation or otherwise removing 100m³ or more of soil or sediment; or
 - (b) filling of land involving 500m³ or more of material with an average depth of 0.5 of a metre or greater.
- (D26) The holder of this environmental authority must determine the presence of acid sulfate soils prior to any excavation or filling at, or in exceedance of, the thresholds in Condition (D23)(a) or (b) in any of the following areas:

- (a) areas to be disturbed where there are lithologies with sulfide bearing minerals; or
 - (b) naturally saline areas (.e.g. salt pans, lakes etc); or
 - (c) wetland areas (e.g. mapped as Land zone three (3) on the regional ecosystem database preclear layer and/or areas mapped as wetlands under the QLD Wetlands program, WetlandInfo); or
 - (d) areas with elevation less than 2 metres AHD; or
 - (e) areas with soil and sediment of recent geological age (Holocene); or
 - (f) areas where marine or estuarine sediments and tidal lakes are present; or
 - (g) low-lying coastal wetlands or back swamp areas, waterlogged or scalded areas; or
 - (h) stranded beach ridges and adjacent swales, interdune swales or coastal sand dunes; or
 - (i) coastal alluvial valleys; or
 - (j) areas where the dominant vegetation is tolerant of salt, acid and/or waterlogging conditions (e.g. mangroves, saltcouch).
- (D27) Subject to Conditions (D23) and (D24) and prior to any disturbance of acid sulfate soils, the holder of this environmental authority must prepare an acid sulfate soil environmental management plan in accordance with Appendix 4 of the State Planning Policy 2/02 Guideline Acid Sulfate Soils.
- (D28) The acid sulfate soil environmental management plan must be prepared and implemented by a suitably qualified person.
- (D29) The holder of this environmental authority must comply with the acid sulphate soil environmental management plan.

Fauna Management

- (D30) Fauna management procedures must be developed and implemented to ensure that petroleum activities (including, but not limited to, pipeline construction, dam construction and operation) are carried out in a manner that minimises the risk of injury, harm, or entrapment to wildlife and stock.
- (D31) **Well lease infrastructure** and dams must be securely fenced and / or screened as soon as practicable, but within one (1) month after construction is completed to:
- (a) exclude and prevent the entrapment of livestock and wildlife; and
 - (b) limit habitats for the introduction or spread of noxious fauna pest species.
- (D32) The fauna management procedures must include training and awareness of staff and contractors and ensure that any planned fauna handling is undertaken by a suitably qualified person.

Note: The procedures required by Conditions (D30) and (D32) should consider the "Australian Pipeline Industry Association Code of Environmental Practice – Onshore Pipelines" dated October 2013, or subsequent versions thereof.

Pest management

- (D33) In carrying out the petroleum activity(ies) the holder of this environmental authority must develop and implement an effective pest management program by 18 October 2011 which has been certified by a suitably qualified person that includes but is not limited to the following:
- (a) identification of pest species and infestation areas;
 - (b) prevention and/or minimisation of the introduction and/or spread of pests;
 - (c) control and management of pest outbreaks as a result of petroleum activities; and
 - (d) details of community consultation in developing the pest management program.

Note: The pest management program required by Condition (D33) should consider the "Petroleum Industry (including coal seam methane gas) Minimising Pest Spread Guidelines" dated June 2008, or subsequent versions thereof. This document is available for download from:

http://www.dpi.qld.gov.au/documents/Biosecurity_EnvironmentalPests/IPA-Minimising-Pest-Spread-Advisory-Guidelines.pdf

(D34) A copy of the pest management procedures must be made available to any potentially affected landholders upon request.

Chemical and Fuel Storage

(D35) All explosives, hazardous chemicals, corrosive **substances**, toxic substances, gases, dangerous goods, flammable and combustible liquids (including petroleum products and associated piping and infrastructure) must be stored and handled in accordance with the relevant Australian Standard where such is available.

(D36) Notwithstanding the requirements of any Australian Standard, any liquids stored on site that have the potential to cause environmental harm must be stored in or serviced by an effective containment system that is impervious to the materials stored and managed to prevent the release of liquids to waters or land. Where no relevant Australian Standard is available, the following must be applied:

- (a) storage tanks must be **bunded** so that the capacity and construction of the bund is sufficient to contain at least 110% of a single storage tank or 100% of the largest storage tank plus 10% of the second largest storage tank in multiple storage areas; and
- (b) drum storages must be bunded so that the capacity and construction of the bund is sufficient to contain at least 25% of the maximum design storage volume within the bund.

(D37) All containment systems must be designed to minimise rainfall collection within the system.

Pipelines

(D38) Pipelines must be preferentially located alongside existing linear infrastructure such as roads, tracks and powerlines.

(D39) Pipeline trenches must only be left open for the minimum time practicable.

(D40) The length of pipeline trench open at any one time must be minimised as far as practicable.

(D41) Completed pipeline construction areas must be:

- (a) a stable landform with no subsidence or erosion gullies for at least five (5) years;
- (b) be re-profiled to original contours and established drainage lines;
- (c) be visually consistent with the surround land features; and
- (d) be reinstated to the pre-disturbed land use and soil suitability class.

(D42) The holder of this environmental authority must monitor reinstated pipeline corridors for subsidence at least every 20 business days for the first 120 business days after reinstatement to ensure compliance with Condition (D39).

Impacts to State Significant Biodiversity Values

(D43) Impacts to State significant biodiversity values are not authorised, except as permitted by conditions (D44) and (D45).

(D44) Impacts to State significant biodiversity values can only occur if an offset is available that meets the relevant offset rules for that State significant biodiversity value.

(D45) The offset required by (D44) must:

- (a) for land-based offsets:
 - (i) meet the relevant offset rules for the State significant biodiversity value being impacted;
 - (ii) be legally secured within 12 months of the impact occurring; and

- (iii) remain in force until the relevant offset objectives have been met;
- (b) for offset payments:
 - (i) meet the relevant offset rules for the State significant biodiversity value being impacted;
 - (ii) not be made for a critically limited regional ecosystem or a threshold regional ecosystem; and
 - (iii) be made within 4 months of the impact occurring.
- (D46) If conditions (D43) to (D46) have been triggered during an annual return period, the annual return must include the following details:
 - (a) the type of State significant biodiversity value that was impacted;
 - (b) the date the impact to each State significant biodiversity value commenced;
 - (c) a GIS shape-file that shows the location and spatial extent of the residual impact to the State significant biodiversity value;
 - (d) the type of offset being provided for the State significant biodiversity value;
 - (e) how the offset meets the relevant offset rules;
 - (f) an offset area management plan that demonstrates how the relevant offset objectives will be met; and
 - (g) the date the offset was either legally-secured or the offset payment was made.

SCHEDULE E – ENVIRONMENTAL NUISANCE

Odour, dust and other airborne contaminants

- (E1) The release of odour, dust or any other airborne contaminant(s), or light from the petroleum activity(ies) must not cause an environmental nuisance at any **sensitive place**.

Noise

- (E2) Prior to undertaking petroleum activities that will result in **short-term, medium-term or long term noise events** that are likely to impact on a sensitive receptor, the holder of this environmental authority must model or calculate any potential noise emissions from the relevant petroleum activity and determine if noise emissions are likely to exceed the noise levels specified in *Schedule E, Table 1 – Noise limits at Sensitive Receptors*.
- (E3) If noise modelling or the calculations indicates that petroleum activities are likely to exceed the noise levels specified in *Schedule E, Table 1 – Noise limits at sensitive receptors*, the holder of this environmental authority must prepare a Noise Management Plan prior to undertaking petroleum activities, which demonstrates how the noise limits specified in *Schedule E, Table 1 – Noise limits at sensitive receptors* will be achieved in the event of a valid noise complaint.
- (E4) Despite condition E3, for any petroleum activities existing at the time of issue of this environmental authority, if noise modelling or the calculations indicates that petroleum activities are likely to exceed the noise levels specified in *Schedule E, Table 1 – Noise limits at sensitive receptors*, the holder of this environmental authority must implement a Noise Management Plan, which demonstrates how the noise limits specified in *Schedule E, Table 1 – Noise limits at sensitive receptors* will be achieved in the event of a valid noise complaint.
- (E5) The Noise Management Plan must address, but not be limited to, the following matters:
- (a) a location based noise assessment to determine compliance with the noise limits in *Schedule E, Table 1 – Noise limits at Sensitive Receptors*
 - (b) the measured and/or predicted noise level of these noise sources and activities at noise sensitive receptors, taking into account any tonal or impulsive noise impacts;
 - (c) the reasonable and practicable control or abatement measures (including relocating the activity, hours of operation, or having an **alternate arrangement** in place with any potentially affected person) that can be undertaken to reduce identified intrusive noise sources;
 - (d) the level of noise at noise sensitive receptors that would be achieved from implementing these measures;
 - (e) the handling of future noise complaints;
 - (f) community liaison and consultation including but not limited consultation processes for when night time activities (i.e. between 10:00 pm and 6:00 am) are likely to exceed 25dBA; and
 - (g) training of staff and contractors in best available noise management practices.
- (E6) The emission of noise from the licensed place must not result in levels greater than those specified in *Schedule E, Table 1 – Noise limits at Sensitive Receptors* in the event of a valid complaint about noise being made to the administering authority.

Schedule E, Table 1 – Noise Limits at Sensitive Receptors

Time Period	Metric	Short Term Noise Event	Medium Term Noise Event	Long Term Noise Event
7:00am – 6:00pm	$L_{Aeq,adj,15\ min}$ Max $L_{pA, 15\ mins}$	45 dBA 55 dBA	43 dBA 51 dBA	40 dBA 45 dBA
6:00pm – 10:00pm	$L_{Aeq,adj,15\ min}$ Max $L_{pA, 15\ mins}$	40 dBA 50 dBA	38 dBA 46 dBA	35 dBA 40 dBA
10:00pm – 6:00am	$L_{Aeq,adj,15\ min}$ Max $L_{pA, 15\ mins}$	28 dBA 38 dBA	28 dBA 36 dBA	28 dBA 33 dBA
6:00am – 7:00am	$L_{Aeq,adj,15\ min}$ Max $L_{pA, 15\ mins}$	40 dBA 50 dBA	38 dBA 46 dBA	35 dBA 40 dBA

L_{Aeq} and Max L_{pA} are to be measured over any 15 minute period
Deemed background noise levels (L_{ABG}) for Schedule E, Table 1 – Noise Limits at Sensitive Receptors are:
7:00 am - 6:00pm: 35 dBA
6:00 pm – 10:00 pm: 30 dBA
10:00 pm – 6:00 am: 25 dBA
6:00 am – 7:00 am: 30 dBA

- (E7) If the noise subject to a complaint is tonal or impulsive, the adjustments detailed in Schedule E, Table 2 – Adjustments to be Added to Noise Levels at Sensitive Receptors are to be added to the measured noise level(s) to derive $L_{Aeq, adj, 15\ min}$.

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

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

- (E8) Where alternative arrangements are in place with any affected person as referred to by Condition (E5)(c), the noise limits in Schedule E, Table 1 – Noise limits at Sensitive Receptors do not apply at that location for the duration for which the alternative arrangements are in place.

Low Frequency Noise

- (E9) Notwithstanding Condition (E2), emission of any noise below 315 Hz must not cause an environmental nuisance.
- (E10) Low frequency noise from the petroleum activities is not considered to be an environmental nuisance under Condition (E9) if monitoring shows that noise emissions do not exceed the following limits:
- (a) 50 dB(Z) measured inside the sensitive receptor; and
 - (b) the difference between the internal A-weighted and Z-weighted noise levels is no greater than 15 dB.

Vibration and Blasting Activities

- (E11) The holder of this environmental authority must develop a blast management plan in accordance with Australian Standard 2187 for each planned blasting activity before it is undertaken.

- (E12) The blast management plan required by Condition (E11) must include measures to minimise the likelihood of any adverse effects being caused by airblast overpressure and/or ground borne vibrations at any sensitive receptor and demonstrate current best practice environmental management.
- (E13) All blasting must be carried out in a proper manner by a suitably qualified person.
- (E14) All blasting must be carried out in accordance with the Blast Management Plan.
- (E15) Noise from blasting operations must not exceed an airblast overpressure level, when measured at or extrapolated to any sensitive receptor, of 115 dB (linear peak) for nine (9) out of any ten (10) consecutive blasts initiated nor 120 dB (linear peak) at any time.
- (E16) Ground-borne vibration peak particle velocity caused by blasting operations, when measured at or extrapolated to any sensitive receptor must not exceed more than 5 mm per second for nine (9) out of any ten (10) consecutive blasts initiated, or 10 mm per second at any time.

SCHEDULE F – AIR

Fuel Burning or Combustion Equipment

- (F1) The only type of fuel to be burned in fuel burning or combustion equipment under normal operating conditions is coal seam gas.
- (F2) Contaminants releases to air emitted from fuel burning and combustion equipment point sources that are capable of burning at least 500 kg in an hour must be directed vertically upwards without any impedence or hindrance.
- (F3) The holder of this environmental authority must maintain a register of fuel burning and combustion equipment that is capable of burning at least 500 kg of fuel in an hour that must include, as a minimum, the following information for each piece of equipment:
 - (a) fuel burning or combustion equipment name and location;
 - (b) stack emission height (metres);
 - (c) minimum efflux velocity (m/s);
 - (d) mass emission rates (g/s); and
 - (e) contaminant concentrations (mg/Nm³ @ x %O₂ dry gas at 0°Celsius and 1 atmosphere).
- (F4) The holder of this environmental authority must ensure that the information contained in the register of fuel burning and combustion equipment is always current and complete.
- (F5) All entries in the register of fuel burning and combustion equipment must be certified by the chief executive officer for the tenure holder, or their delegate, as being accurate and correct.

Fuel Burning or Combustion Equipment Located Outside Hubs or Populated Areas

- (F6) Prior to the installation and operation of any new fuel burning or combustion equipment, that is capable of burning at least 500 kg of fuel in an hour, the holder of this environmental authority must conduct air dispersion modelling to calculate the ground level concentrations of emissions from all existing and proposed fuel burning or combustion equipment under maximum operating conditions (including other industry) within the ambient airshed and identify any potential impacts to air quality within the study area.
- (F7) The holder of this environmental authority must ensure that the calculated ground level concentrations required under Condition (F6) do not exceed the criteria for each air contaminant in *Schedule F, Table 1 – Maximum Ground Level Concentration Criteria*.

Schedule F, Table 1 – Maximum Ground Level Concentration Criteria

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

- (F8) The holder of this environmental authority must undertake emissions testing within 3 months post commissioning of any fuel burning and combustion equipment capable of burning at least 500 kg of fuel in an hour to verify the estimates used in the air dispersion modelling.
- (F9) Where the results of the emissions testing required under Condition (F8) indicate that the emission estimates used in the air dispersion modelling required under Condition (F6) are exceeded, the holder of this environmental authority must:

- (a) provide details to the administering authority within 10 **business days**;
- (b) re-undertake the modelling based on the new information; and
- (c) determine and implement appropriate pollution control measures to bring the emissions into compliance with the limits specified in *Schedule F, Table 1 – Maximum Ground Level Concentration Criteria*.

Fuel Burning and Combustion Equipment in Hubs and / or Places within 5 km of Populated Areas

- (F10) Fuel burning or combustion equipment that is capable of burning at least 500 kg of fuel in an hour must not be located in hubs or in places within 5km of a populated area unless it is specified in *Schedule F, Table 2 – Release of Contaminants to Air*.
- (F11) Fuel burning or combustion equipment located in hubs or in places within 5km of a populated area, that is capable of burning at least 500 kg of fuel in an hour, must only release contaminants to the atmosphere at a height and a efflux velocity not less than the corresponding height and velocity stated for that release point (RP) as provided for in *Schedule F, Table 2 - Release of Contaminants to Air*.
- (F12) Fuel burning or combustion equipment located in hubs or in places within 5km of a populated area, that is capable of burning at least 500 kg of fuel in an hour, must not release contaminants to the atmosphere from a release point at a mass emission rate or concentration in excess of that stated in *Schedule F, Table 2 - Release of Contaminants to Air*.

Schedule F, Table 2 - Releases of Contaminants to Air

Resource Authority	Field	Facility	Release Point No. (EA)	Unit Description	Release Height (m)	Minimum Efflux Velocity (m/sec)	NOx		CO	
							Maximum Release limit	Release limit type	Maximum Release limit	Release limit type
PL 230	Daandine	DD CGPF	A1	K-0001 Compressor 1	8.1	30	6.8	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A2	K-0002 Compressor 2	8.1	30	6.8	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A3	K-0003 Compressor 3	8.1	30	6.8	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A4	K-0004 Compressor 4	8.1	30	6.8	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A5	K-0005 Compressor 5	8.1	30	6.8	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A6	K-0006 Compressor 6	8.1	30	6.8	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A7	K-0007 Compressor 7	8.1	30	6.8	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A8	TEG Reboiler	6.8	14	100	ppm	na	na
PL 230	Daandine	DD CGPF	A9	Diesel Backup Generator	1.3	29	na	na	na	na

Permit
Environmental Authority EPPG00972513

Resource Authority	Field	Facility	Release Point No. (EA)	Unit Description	Release Height (m)	Minimum Efflux Velocity (m/sec)	NOx		CO	
							Maximum Release limit	Release limit type	Maximum Release limit	Release limit type
PL230	Daandine	TBA	TBA	Power Generation for RO Plant	TBA	TBA	TBA	TBA	TBA	TBA
PL 198	Tipton	TW CGPF	A10	K-0001 Compressor 1	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A11	K-0002 Compressor 2	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A12	K-0003 Compressor 3	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A13	K-0004 Compressor 4	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A14	K-0005 Compressor 5	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A15	K-0006 Compressor 6	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A16	TEG Reboiler	6.8	14	100	ppm	na	na
PL 198	Tipton	TW CGPF	A17	Diesel Backup Generator	1.3	29	na	na	na	na

Note 1: Minimum efflux velocity, maximum mass emission and maximum concentration are calculated at the Maximum Continuous Rating.

- (F13) The holder of this environmental authority must undertake emissions testing within 3 months of the issue of this environmental authority of all fuel burning and combustion equipment listed in Schedule F, Table 2 – Release of Contaminants to Air.
- (F14) The holder of this environmental authority must undertake air dispersion modelling using the results of the emission testing required under Condition (F13) to verify that emissions will not result in an exceedance of the maximum ground level concentration for each air contaminant listed in Schedule F, Table 1 – Maximum Ground Level Concentration Criteria.
- (F15) A report on the results of air emission testing and modelling required by conditions (F13) and (F14) must be provided to the administering authority with the next annual return.

SCHEDULE G – WASTE

General

- (G1) All general and regulated waste must be removed from the site and sent to a site that is lawfully able to accept the waste under the *Environmental Protection Act 1994* except as permitted under another condition of this environmental authority.
- (G2) All regulated waste removed from the site must be undertaken by a person who holds a current authority to transport such waste under the provisions of the *Environmental Protection Act 1994*.
- (G3) Waste must not be burned or allowed to be burned on the licensed site.
- (G4) All waste fluids and muds resulting from drilling and exploration activities must be contained in a properly lined dam or containment structure for disposal, remediation or reuse where applicable.

Coal Seam Gas Water Management Plan

- (G5) A Coal Seam Gas Water Management Plan that includes but is not necessarily limited to the matters outlined in (a) and (b) must be implemented:
 - (a) the matters required by sections 310D (5), 310D (6) and 662 of the *Environmental Protection Act 1994*; and
 - (b) a management strategy for all integrated coal seam gas water management operations.
- (G6) Where any inconsistency exists between the conditions of this environmental authority and the Coal Seam Gas Water Management Plan, the conditions of this environmental authority prevail.

Coal Seam Gas Water Use

- (G7) Coal seam gas water may be used for the following purposes within the areas of the relevant resource authority(ies), subject to conditions (G8), (G9), (G10) and (G11):
 - (a) for dust suppression on roads and at other **sites**; and
 - (b) for **construction**; and
 - (c) for **operational purposes**.
- (G8) Written approval from the relevant Local Government must be obtained prior to the application of coal seam gas water on any local government controlled roads in accordance with Condition (G7)(a).
- (G9) Any coal seam gas water being used for the purposes listed in conditions (G7)(a) and (b) must meet the limits specified in *Schedule G, Table 1 – Water Contaminant Release Limits* for each of the water quality characteristics listed:

Schedule G, Table 1 – Water Contaminant Release Limits

Water Quality Characteristics	Unit	Limit	Limit Type
pH	pH units	6.0 to 9.0	Range
Sodium Adsorption Ratio	ratio	6	80 th Percentile
		12	Maximum
Total Dissolved Solids	mg/L	1500	Maximum
Total Petroleum Hydrocarbons	mg/L	10	Maximum

- (G10) The use of coal seam gas water for the uses listed in conditions (G7)(a) and (b) must be carried out in a manner that:
- (a) vegetation is not damaged;
 - (b) soil quality is not adversely impacted;
 - (c) there is no surface ponding or runoff of the coal seam gas water from the application area;
 - (d) minimises deep drainage below the root zone of any vegetation;
 - (e) quality of shallow aquifers is not adversely affected; and
 - (f) there are no releases of coal seam gas waters to any surface waters.
- (G11) Any coal seam gas water released to the environment in accordance with conditions (G7)(a) and (G7)(b) must not have any properties that could cause, nor contain any contaminants in concentrations that are capable of causing environmental harm.

Supply of Coal Seam Gas Water to a Third Party

- (G12) Coal seam gas water may be transferred to a third party to be used for the following purposes subject to compliance with (G13) and (G14):
- (a) dust suppression if the coal seam gas water quality complies with the limits specified in *Schedule G, Table 1 – Water Contaminant Release Limits*;
 - (b) construction and operational purposes if the coal seam gas water quality complies with the limits specified in *Schedule G, Table 1 – Water Contaminant Release Limits*;
 - (c) **irrigation and livestock watering purposes**;
 - (d) the following industrial purposes:
 - (i) coal washing;
 - (ii) power stations; and
 - (iii) water treatment facilities.
- (G13) Any coal seam gas water supplied to a third party for irrigation and/or livestock watering purposes in accordance with Condition (G12)(c) must comply with the relevant trigger values contained in *ANZECC and ARMCANZ Water Quality Guidelines 2000*, or subsequent versions thereof.
- (G14) If the responsibility of coal seam gas water is given or transferred to a third party in accordance with Condition (G12), the holder of environmental authority must ensure that:
- (a) the responsibility of the coal seam gas water is given or transferred in accordance with a written agreement (the third party agreement); and
 - (b) the third party is made aware of the General Environmental Duty under section 319 of the *Environmental Protection Act 1994*.

SCHEDULE H – REHABILITATION

- (H1) The holder of this environmental authority must not abandon any dam but must decommission each dam so as to prevent and/or minimise any environmental harm.
- (H2) As a minimum, decommissioning must be conducted such that each dam either:
- (a) becomes a stable landform similar to that of the surrounding undisturbed areas, that no longer contains substances that will migrate into the environment; or
 - (b) the administering authority and the landholder agree that the dam will be used by the landholder following the cessation of the petroleum activities
- (H3) Progressive rehabilitation of disturbed areas must commence as soon as practicable following the completion of any construction or operational works associated with the petroleum activities.
- (H4) As soon as practicable but no later than 12 months (or longer period agreed in writing by the administering authority) after the end of petroleum activities causing significant disturbance to land, the holder of the authority must:
- (a) remediate contaminated land (e.g. dams containing salt);
 - (b) reshape all significantly disturbed land to a stable landform similar to that of surrounding undisturbed areas;
 - (c) on all significantly disturbed land:
 - (i) re-establish surface drainage lines;
 - (ii) reinstate the top layer of the soil profile; and
 - (iii) promote establishment of vegetation.
 - (d) undertake rehabilitation in a manner such that any actual and potential acid sulfate soils in or on the site are either not disturbed, or submerged, or treated so as to not be likely to cause environmental harm; and
 - (e) decommission all inactive buried pipelines in accordance with the requirements of AS 2885 and ensuring that there will not be any subsequent subsidence of land along the pipeline route.
- (H5) All significantly disturbed land caused by the carrying out of the petroleum activities must be rehabilitated to meet the following final acceptance criteria:
- (a) all significantly disturbed land is reinstated to the pre-disturbed land use unless otherwise agreed to between the environmental authority holder, the landholder and the administering authority;
 - (b) all significantly disturbed land is reinstated to the pre-disturbed soil suitability class;
 - (c) the landform is safe for humans and fauna;
 - (d) the landform is stable with no subsidence or erosion gullies for at least five (5) years;
 - (e) the minimum percent foliage cover of immediate surrounding area is maintained in the rehabilitated land for at least three (3) years;
 - (f) a minimum of 80% of the flora species in the immediate surrounding area is maintained in the rehabilitated land for at least three (3) years;
 - (g) a minimum of 80% of the fauna species diversity in the immediate surrounding area is maintained in the rehabilitated land for at least three (3) years;
 - (h) erosion is minimised with appropriate sediment traps and erosion control measures installed as determined by a suitably qualified person;
 - (i) the water quality of any residual void or water bodies constructed by petroleum activities meets criteria for subsequent uses and does not have potential to cause environmental harm.
 - (j) there is no ongoing contamination to surface water;
 - (k) there is no ongoing contamination to groundwater from dams or monocells (demonstrated via groundwater monitoring and leak detection);
 - (l) the maintenance requirements for rehabilitated land is no greater than that required for the land prior to its disturbance by petroleum activities.
- (H6) Regular maintenance and at least yearly monitoring of rehabilitated areas must take place to measure compliance with the requirements of Condition (H5).

SCHEDULE I – MONITORING PROGRAMS

General

- (1) The holder of this environmental authority must develop and implement a monitoring program, the result of which will demonstrate compliance with the conditions of this environmental authority.
- (12) All monitoring under this environmental authority must be conducted by a suitably qualified person.
- (13) All instruments, equipment and measuring devices used for measuring or monitoring in accordance with any condition of this environmental authority must be calibrated, and operated and maintained effectively.
- (14) All laboratory analyses and tests required to be conducted under this environmental authority must be carried out by a laboratory that has NATA certification for such analyses and tests, except as otherwise authorised by the administering authority.
- (15) The method of water sampling required by this environmental authority must comply with the version of the *Queensland Monitoring Water Quality Sampling Manual*⁴ that is current at the time the sampling is undertaken.

Note: Condition (15) requires the version of the Queensland Monitoring Water Quality Sampling Manual that is current at the time the sampling is undertaken to be followed and where it is not followed because of exceptional circumstances this should be explained and reported with the results.

- (16) Any management or monitoring plans, systems, programs or procedures required to be developed and implemented by a condition of this environmental authority must be reviewed for performance and amended if required on an annual basis in accordance with the requirements for the particular plans, systems, programs and procedures.
- (17) If monitoring conducted in accordance with this environmental authority indicates a condition or contaminant level that has caused, or has potential to cause, environmental harm, the environmental authority holder must:
 - (a) as soon as is practicable, take the necessary actions to rectify the condition or contaminant level so as to avoid or minimise environmental harm; and
 - (b) notify the administering authority of the condition or contaminant level and the actions taken to rectify it.
- (18) An annual monitoring report must be prepared each year and submitted to the administering authority upon request. This report shall include but not be limited to:
 - (a) a summary of the previous 12 months monitoring results obtained under any monitoring programs required under this environmental authority and, a comparison of the previous 12 months monitoring results to both the limits set in this environmental authority and to relevant prior results; the date on which the samples was taken;
 - (b) the time at which the samples was taken;
 - (c) the monitoring point at which the sample was taken;
 - (d) the release flow rate of any authorised discharges to waters from all release points;
 - (e) the results of all monitoring and details of any exceedences with the conditions of this environmental authority and the dates and times these exceedences were reported to the administering authority.
 - (f) a summary of all records of quantities of releases required to be kept under this environmental authority including the total volume of any authorised discharges to waters for the previous yearly period from all release points and the individual daily volume of any authorised discharges to waters from all release points;

⁴ The version that is current as at the 8 March 2013 is *Monitoring and Sampling Manual 2009 – Environmental Protection (Water) Policy 2009 Version 2 September 2010*.

- (g) details of all maintenance or work carried out on any discharge meter(s) and the impact (if any) on the release volume readings;
 - (h) an evaluation/explanation of the data derived from any monitoring programs;
 - (i) data analyses and interpretation to assess the nature and extent of any contamination and, if so, the level of environmental harm caused as a result of the contamination and the environmentally relevant activity; and
 - (j) an outline of actions taken or proposed to minimise the risk of environmental harm from any condition or elevated contaminant level identified by the monitoring or recording programs.
- (I9) The evaluation and explanation of data for the purposes of the annual monitoring report must be performed by a suitably qualified person.
- (I10) The holder of this environmental authority must continue to conduct monitoring as per that prescribed in Conditions (I11) to (I17) for a minimum of five (5) years after the activities prescribed in Condition (A1) have ceased and submit the results annually in accordance with Condition (I8).

Groundwater Monitoring

- (I11) The Groundwater Monitoring Program, which must be implemented, must be able to detect any significant risks and changes to groundwater quality and level as a result of activities authorised under this environmental authority and must:
- (a) be developed, installed and maintained by a suitably qualified person in the fields of hydrogeology, groundwater sampling design and groundwater monitoring program design;
 - (b) include locations of monitoring points, parameters to be measured, frequency of monitoring, monitoring methodology used, and trigger values;
 - (c) include procedures to establish background groundwater quality;
 - (d) a sufficient number of monitoring sites to provide information on the following:
 - (i) seepage to groundwater and surrounding soils from any regulated dam authorised under this environmental authority and its effect on groundwater and soils; and
 - (ii) background monitoring sites (i.e. groundwater quality in representative bore(s) that have not been affected by the activities authorised under this environmental authority);
 - (e) conduct a geodetic survey of all groundwater monitoring bores to determine the relative water surface elevations, measured to the nearest millimetre in each bore and reported in metres relative to the AHD;
 - (f) determine the hydraulic conductivity, groundwater flow direction and groundwater flow rate; and
 - (g) include a rationale containing details on the program purpose, program conceptualisation and verification of assumptions.
- (I12) All groundwater bores must be installed according to the standards outlined in the latest edition of the Department of Environment and Heritage Protection's *Minimum Construction Requirements for Water Bores in Australia or the Minimum Standards for the Construction and Reconditioning of Water Bores that Intersect the Sediments of Artesian Basins in Queensland*.
- (I13) Groundwater monitoring bores must be constructed by, or under the supervision of a licensed Queensland water bore driller who has the correct endorsements on their licence for the type of activity being performed.
- (I14) The Groundwater Monitoring Program must provide for monitoring of groundwater quality as often as necessary to detect impacts of the petroleum activities authorised under this environmental authority, but not for fewer parameters or less frequently than that specified in *Schedule 1, Table 1 – Minimum Groundwater Monitoring Parameters and Monitoring Frequency* and in compliance with Condition (I15).

- (115) Groundwater samples taken as part of the Groundwater Monitoring Program must be analysed for, but not be limited to, the water quality parameters at the minimum frequencies specified in *Schedule I, Table 1 – Minimum Groundwater Monitoring Parameters and Monitoring Frequency*.

Schedule I, Table 1 – Minimum Groundwater Monitoring Parameters and Monitoring Frequency

Groundwater parameter	Monitoring frequency
Flow [m/hr]	Biannually
Water level to the nearest millimetre [m AHD]	Biannually
Groundwater Pressure in Geological Strata [kPa]	Biannually
pH	Biannually
Electrical conductivity [μ S/m]	Biannually
Total Dissolved Solids [mg/L]	Biannually
Temperature [$^{\circ}$ C]	Biannually
Dissolved Oxygen [mg/L]	Biannually
Alkalinity as CaCO ₃ [mg/L]	Biannually
Residual Alkali [mq/L]	Biannually
Anions (bicarbonate, carbonate, hydroxide, chloride, fluoride, sulphate) [mg/L]	Biannually
Cations (aluminium, calcium, magnesium, potassium, sodium) [mg/L]	Biannually
Silica [mg/L]	Biannually
Total and dissolved Iron, manganese, zinc, aluminium, boron, copper, phosphorous [mg/L]	Biannually
Ammonia, nitrate, nitrite [m/L]	Biannually
Total Petroleum Hydrocarbons [mg/L]	Biannually
Polycyclic Aromatic Hydrocarbons [mg/L]	Biannually
Benzene, Toulene, Ethyl-benzene, Xylenes (BTEX) [mg/L]	Biannually

- (116) All groundwater monitoring bores must be maintained in an operative condition and be reasonably accessible at all times to any authorised person.
- (117) If groundwater monitoring indicates that any significant changes in groundwater quality caused by petroleum activities are detected, then information must be submitted to the administering authority within 10 business days of receipt of the analysis indicating these changes, including any proposed actions to mitigate the changes in groundwater quality.

Air Monitoring (Point Source)

- (118) The holder of this environmental authority must conduct a monitoring program of contaminants released to the atmosphere at each release point recorded in the register of fuel burning and combustion equipment for the contaminants and efflux velocities listed in *Schedule F, Table 1 – Maximum Ground Level Concentration Criteria* and at the frequencies specified in *Schedule I, Table 3 – Monitoring Frequency for Contaminants*.

Schedule I, Table 3 – Monitoring Frequency for Contaminants

Contaminant	Monitoring frequency
NOx as Nitrogen Dioxide	Within three (3) months after commissioning of any fuel burning equipment; and annually thereafter.
Carbon monoxide	

- (119) The monitoring program must include, but not necessarily be limited to:
- (a) monitoring provisions for the release points which complies with the most recent edition of **Australian Standard 4323**.
 - (b) tests for each sample taken at each release point specified in the register of fuel burning or combustion equipment (Condition (F7)) including:

- (i) gas velocity, volume and mass flow rate;
- (ii) temperature; and
- (iii) water vapour concentration (for non-continuous sampling);
- (c) representative samples of the contaminants discharged when operating under maximum operating conditions;
- (d) the collection of production rate and plant status during sampling periods; and
- (e) monitoring of contaminant release carried out in accordance with the latest edition of the Department of Environment and Heritage Protection's "Air Quality Sampling Manual" 1997, as amended from time to time.

Monitoring of Contaminant Releases to the Atmosphere

- (I20) When requested by the administering authority, contaminant monitoring and recording must be undertaken to investigate any complaint, and the results notified with 14 days to the administering authority. When monitoring is requested the following must be complied with:
- (a) the holder of this environmental authority must conduct and keep records of a monitoring program of contaminant release to the atmosphere at the release points, frequency, and the parameters specified in *Schedule I, Table 4 – Required Monitoring* which complies with the following:
 - (b) Monitoring provision for the release points listed in *Schedule I, Table 4 – Required Monitoring* must comply with the Australian Standard AS4323.1 – 1995 'Stationary source emissions Method 1: Selection of sampling provisions' or subsequent versions as they become available.
 - (c) The following tests must be performed for each required determination specified in *Schedule I, Table 4 – Required Monitoring* :
 - (i) gas velocity and volume flow rate;
 - (ii) temperature and oxygen content;
 - (iii) water vapour concentration (moisture content).
 - (d) Where practicable samples taken must be representative of the contaminants discharged when emissions are expected to be at maximum rates.
 - (e) During the sampling period the following additional information must be gathered:
 - (i) fuel used;
 - (ii) number of equipment and operating units; and
 - (iii) reference to actual test methods and accuracies.

Schedule I, Table 4 – Required Monitoring

Determination Required	Release Point Numbers	Frequency ²
Mass emission rate (g/s) and concentration (mg/Nm ³) of oxides of nitrogen (NOx) in the flue gas at the 5% oxygen reference level.	Stacks A1, A2, A3, A4, A5, A6, A7, A8 A9	Within three months upon the granting of the environmental authority and then annually thereafter

²Note: Out of the seven (7) release points A1 to A7, at least three (3) stacks must be monitored each year on a rotational basis.

Noise Monitoring

- (I21) The holder of this environmental authority must undertake noise monitoring when requested by the administering authority to investigate a complaint of environmental nuisance at a sensitive receptor within the reasonable and practicable timeframe nominated by the administering authority, and report the results to the administering authority within three (3) business days of completion of the monitoring.
- (I22) Noise monitoring and recording must include the following descriptor, characteristics and matters:

- (a) $L_{AN,T}$ (where N equals the statistical levels of 1, 10 and 90 and T=15);
 - (b) $L_{Aeq\ adj, 15\ mins}$;
 - (c) background noise level as $L_{A\ 90, T}$;
 - (d) Max $L_{pA, 15\ mins}$
 - (e) the level and frequency of occurrence of impulsive or tonal noise and any adjustment and penalties to statistical levels;
 - (f) atmospheric conditions including temperature, relative humidity and wind speed and directions;
 - (g) effects due to any extraneous factors such as traffic noise;
 - (h) location, date and time of monitoring;
 - (i) if the complaint concerns low frequency noise, Max $L_{pZ, 15\ min}$; and
 - (j) If the complaint concerns low frequency noise, one third octave band measurements in dB(LIN) for centre frequencies in the 10 – 200 Hz range for both the noise source and the background noise in the absence of the noise source.
- (I23) The method of measurement and reporting of noise levels and background sound pressure levels must comply with the latest edition of the administering authority's *Noise Measurement Manual* or the most recent version of Australian Standard 1055 Acoustics – description and measurement of environmental noise.

Nuisance Monitoring (other than Noise)

- (I24) When the administering authority advises the holder of this environmental authority of a complaint alleging nuisance other than noise, the holder must investigate the complaint and advise the administering authority in writing of the action proposed or undertaken to resolve the complaint.
- (I25) When requested by the administering authority, the holder of this environmental authority must undertake monitoring as specified by the administering authority, within a reasonable and practical timeframe nominated by the administering authority to investigate any complaint of environmental harm at any sensitive place.
- (I26) The results of the investigation (including an analysis and interpretation of the monitoring results) and abatement measures implemented must be provided to the administering authority within 10 business days of completion of the investigation, or receipt of the monitoring results, whichever is the latter.
- (I27) If monitoring in accordance with Condition (I25) and (I26), indicates that emissions exceed the limits set in this environmental authority or are causing environmental nuisance, then the holder of this environmental authority must:
- (a) address the complaint including the use of alternative dispute resolution services if required; and/or
 - (b) as soon as practicable implement abatement or attenuation measures so that light, dust, particulate or odour emissions from the authorised activities do not result in further environmental nuisance.

Impact Assessment

- (I28) Notwithstanding any other condition of the environmental authority, the environmental authority does not authorise any environmental harm arising from any release to the atmosphere of any of the contaminants mentioned in *Schedule 1, Table 5 – Contaminants and Benchmarks for Evaluation*.
- (I29) For the purpose of ensuring and demonstrating compliance with Condition (I28), the holder of the environmental authority must implement the findings of the evaluation, conducted by a suitably qualified and experienced person and provided to the administering authority, of the potential environmental impacts of the contaminants mentioned in *Schedule 1, Table 5 – Contaminants and Benchmarks for Evaluation*. The evaluation addresses all matters relevant to

the assessment of potential for environmental impacts to occur and includes, but not be limited to:

- (a) Sampling, monitoring and analysis of the contaminants mentioned in *Schedule I, Table 5 – Contaminants and Benchmarks for Evaluation* for the range of plant operations likely to be encountered:
 - i. entail sufficient levels of detection to adequately characterise the emissions; and
 - ii. be representative; and complies with relevant Department of Environment and Heritage Protection's monitoring methods including the quality control requirements inherent in those methods;
- (b) Using the air pollution dispersion models, an estimation of Ground Level Concentrations at the most sensitive nearest receptor(s) (using efflux velocity, temperature and flow rate) for emissions of the contaminants mentioned in *Schedule I, Table 5 – Contaminants and Benchmarks for Evaluation*;
- (c) A comparison between the worst case measured emissions with the benchmarks maximum GLC mentioned in *Schedule I, Table 5 – Contaminants and Benchmarks for Evaluation*;
- (d) The use of methods and guidelines for modelling and assessment of air pollutants approved by the New South Wales Department of Environment and Climate Change or by the Victoria Environmental Protection Agency.

Schedule I, Table 5 – Contaminants and Benchmarks for Evaluation

Contaminant	Averaging Periods	Maximum GLC concentration
Nitrogen dioxide	1 hour – health and wellbeing	250 µg/m ³ (at 0 °C)
	1 year – health and wellbeing	62 µg/m ³ (at 0 °C)
	1 year – health and biodiversity of ecosystems	33 µg/m ³ (at 0 °C)

SCHEDULE J – COMMUNITY ISSUES

- (J1) The holder of this environmental authority must maintain a record of complaints and incidents causing environmental harm, and actions taken in response to the complaint or incident; and

- (J2) The holder of this environmental authority must record the following details for all complaints received and provide this information to the administering authority on request:
 - (a) name, address and contact number for complainant;
 - (b) time and date of complaint;
 - (c) reasons for the complaint as stated by the complainant;
 - (d) investigations undertaken in response to the complaint;
 - (e) conclusions formed;
 - (f) actions taken to resolve complaint;
 - (g) any abatement measures implemented to mitigate the cause of the complaint; and
 - (h) name and contact details of the person responsible for resolving the complaint.

SCHEDULE K – NOTIFICATION PROCEDURES

- (K1) The holder of this environmental authority must telephone the administering authority's Pollution Hotline (telephone: 1300 130 372) and any affected landholder, occupier or their nominated representative as soon as practicable, but within 24 hours after becoming aware of:
- (a) any release of contaminants not in accordance with the conditions of this environmental authority; or
 - (b) any event where environmental harm has been caused or may be caused.
- (K2) Notwithstanding Condition (K1), the holder of this environmental authority must telephone the administering authority's Pollution Hotline (telephone: 1300 130 372) as soon as practicable, but within 24 hours after becoming aware of any non-compliance with any condition of this environmental authority.
- (K3) Subject to Condition (K1), the holder of this environmental authority is required to report in the case of spills of contaminants (including but not limited to hydrocarbons, CSG water or mixtures of both) of the following volumes or kind:
- (a) releases of any volume of contaminants to water; and
 - (b) releases of volumes of contaminants greater than 200L of hydrocarbons, 1000 L of brine or 5 000 L of coal seam gas water to land; and
 - (c) releases of any volumes of contaminants where potential serious or material environmental harm has occurred or may occur.
- (K4) The notification of emergencies or incidents as required by Conditions (K1) and (K3) must include but not be limited to the following information:
- (a) the environmental authority number and name of the holder;
 - (b) the tenure type and number where the emergency or incident occurred;
 - (c) the name and telephone number of the designated contact person;
 - (d) the location of the emergency or incident;
 - (e) the date and time that the emergency or incident occurred;
 - (f) the date and time the holder of this environmental authority became aware of the emergency or incident;
 - (g) details of the nature of the event and the circumstances in which it occurred;
 - (h) the estimated quantity and type of any contaminants involved in the incident;
 - (i) the actual or potential suspected cause of the emergency or incident;
 - (j) a description of the land use at the site of the emergency or incident (*eg. grazing, pasture, forest etc*) and/or the name of any relevant surface waters and other environmentally sensitive features;
 - (k) a description of the possible impacts from the emergency or incident;
 - (l) a description of whether stock and/or wildlife were exposed to any contaminants released and measures taken to prevent access for the duration of the emergency or incident;
 - (m) any sampling conducted or proposed, relevant to the emergency or incident;
 - (n) landholder details and details of landholder consultation;
 - (o) immediate actions taken to control the impacts of the emergency or incident and how environmental harm was mitigated at the time of the emergency or incident; and
 - (p) whether further examination/root cause analysis is required and if so, the expected date by when this examination will be completed and reported to the administering authority.
- (K5) Within 10 business days following the initial notification of an emergency or incident or receipt of monitoring results or completion of the examination/root cause analysis, whichever is the later, a written report must be provided to the administering authority, including the following (where relevant to the emergency or incident):
- (a) the root cause of the emergency or incident the confirmed quantities and types of any contaminants involved in the incident;
 - (b) results and interpretation of any analysis of samples taken at the time of the emergency or incident;

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

Fluid Injection Notification

- (K6) The Department of Environment and Heritage Protection must be notified in writing as soon as reasonably practicable, but within 48 hours of becoming aware of:
- (a) migration of injected fluid out of the target formation; or
 - (b) a loss of hydraulic isolation of the target formation; or
 - (c) the detection of groundwater contaminants that were not detected in background samples; or
 - (d) an injection fluid monitoring result that does not comply with any one of the parameters in *Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid*.

SCHEDULE L DEFINITIONS

Note: Where a term is not defined in this environmental authority the definition in the Environmental Protection Act 1994, its regulations and Environmental Protection Policies or the Petroleum and Gas (Production and Safety) Act 2004 and its regulations must be used in that order.

"acid sulfate soils" means soil or sediment containing highly acidic soil horizons or layers affected by the oxidation of iron sulfides (*actual acid sulfate soils*) and/or soil or sediment containing iron sulfides or other sulfidic material that has not been exposed to air and oxidised (*potential acid sulfate soils*). The term acid sulfate soil generally includes both actual and potential acid sulfate soils. Actual and potential acid sulfate soils are often found in the same soil profile, with actual acid sulfate soils generally overlying potential acid sulfate soil horizons.

"active" for the purposes of landholders' groundwater bores means bores that are able to continue to provide a reasonable yield of water in terms of quantity for the bores authorised purpose or use.

"aggregation dam" means a dam that is used to aggregate and contain CSG water prior to use, treatment or disposal of that water (by means other than evaporation). The primary purpose of the dam must not be to evaporate the water even though this will naturally occur.

"affected land" means land on which an event has caused or threatens serious or material environmental harm.

"AHD" means Australian Height Datum.

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

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

"appraisal well" means a petroleum well that is drilled to test the potential of 1 or more natural underground reservoirs for producing or storing petroleum.

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

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

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

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

"black earth" also known as vertosols and is a soil order of the Australian Soil Classification. These are clay soils with shrink/swell properties that display strong cracks when dry and/or lenticular structural aggregates at depth. They have a high soil fertility and a large water holding capacity.

"bore" means a water observation bore or a water supply bore.

"brine" means either saline water with a total dissolved solid concentration greater than 40 000mg/l or CSG water after it has been concentrated through water treatment processes and/or evaporation.

"bund or banded" in relation to spill containment systems for fabricated or manufactured tanks or containers designed to a recognised standard means an embankment or wall of brick, stone, concrete or other impervious material which may form part or all of the perimeter of a compound and provides a barrier to retain liquid. Since the bund is the main part of a spill containment system, the whole system (or banded area) is sometimes colloquially referred to within industry as the bund. The bund is designed to contain spillages and leaks from liquids used, stored or processed above ground and to facilitate

clean-up operations. As well as being used to prevent pollution of the receiving environment, bunds are also used for fire protection, product recovery and process isolation.

“**BTEX**” means benzene, ethylbenzene, toluene, xylene.

“**category A ESA**” means any area listed in Section 25 of the *Environmental Protection Regulation 2008*.

“**category B ESA**” means any area listed in Section 26 of the *Environmental Protection Regulation 2008*.

“**category C ESA**” means any of the following areas:

- Nature Refuges as defined under the *Nature Conservation Act 1992*;
- Koala Habitat Areas as defined under the *Nature Conservation Act 1992*;
- State Forests or Timber Reserves as defined under the *Forestry Act 1959*;
- Declared catchment areas under the *Water Act 2000*;
- Resources reserves under the *Nature Conservation Act 1992*
- An area identified as “Essential Habitat” for a species of wildlife listed as endangered, vulnerable, rare or near threatened under the *Nature Conservation Act 1992*;
- An area identified as “Essential Regrowth Habitat” under the *Vegetation Management Act 1999* for a species of wildlife listed as endangered, vulnerable, rare or near threatened under the *Nature Conservation Act 1992* for petroleum activities that commenced after 8 March 2013 (the date of grant of this environmental authority); and
- “Of concern” regional ecosystems identified in the database maintained by the Department of Environment and Heritage Protection called ‘Regional ecosystem description database’ containing regional ecosystem numbers and descriptions.

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

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

“**certification**” or “**certified**” in relation to any other matter in this environmental authority means a written statement from a suitably qualified person that the content of a document is accurate and true and meets the required intent of the document.

“**clearing**” means:

- in relation to grass, scrub or bush—the removal of vegetation by disturbing root systems and exposing underlying soil (including burning), but does not include—
 - the flattening or compaction of vegetation by vehicles if the vegetation remains living; or
 - the slashing or mowing of vegetation to facilitate access tracks; or
 - the clearing of noxious or introduced plant species; and
- in relation to trees—cutting down, ringbarking, pushing over, poisoning or destroying in any way.

“**construction**” in relation to a dam includes building a new dam and modifying or lifting an existing dam.

“**construction and operational purposes**” in relation to the use of coal seam gas water means the construction, use, modification, maintenance, replacement, operation and decommissioning of industrial sites.

“**coal seam gas water**” means underground water brought to the surface of the earth, or otherwise interfered with, in connection with exploring for or producing coal seam gas. Coal seam gas water is a waste, as defined under s13 of the *Environmental Protection Act 1994*.

“**critically limited regional ecosystem**” means the ecosystems identified in Appendix 5 of the Queensland Biodiversity Offset Policy (Department of Environment and Resource Management, 2011).

“CSG water dams” include any type of dam (storage or evaporation) used to contain groundwater that is necessarily or unavoidably brought to the surface in the process of coal seam gas exploration or production.

“dam” means a land-based structure or a void that is designed to contain, divert or control **flowable** substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and **associated works**. A dam does *not* mean a fabricated or manufactured tank or container, designed and constructed to an Australian Standard that deals with strength and structural integrity of that tank or container.

“deed of agreement” means a legal agreement between the holder of the environmental authority and the administering authority. The deed of agreement governs the obligations of the holder of the environmental authority in relation to the *Queensland Biodiversity Offset Policy*. For clarity, the term deed of agreement in this environmental authority includes any subsequent version or amendment of the signed deed of agreement.

“design plan” means the documentation required to describe the physical dimensions of the dam, the materials and standards to be used for construction of the dam, and the criteria to be used for operating the dam. The documents must include design and investigation reports, specifications and certifications, together with the planned decommissioning and rehabilitation works and outcomes. A design plan may include ‘as constructed’ drawings.

“development well” means a petroleum well that is drilled to produce or store petroleum.

“discharge area” means:

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

“ecosystem functioning” means the interactions between and within living and nonliving components of an ecosystem and generally correlates with the size, shape and location of an area of vegetation.

“end” means the stopping of the particular activity that has caused a significant disturbance in a particular area. It refers to, among other things, the end of a seismic survey or the end of a drilling operation. It does not refer to the end of all related activities such as rehabilitation. In other words, it does not refer to the ‘completion’ of the petroleum activity, the time at which the petroleum authority ends or the time that the land in question ceases to be part of an authority.

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

“existing regulated dam” means a dam for which construction has substantially commenced on 17 December 2012.

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

- (a) conducting a geochemical, geological or geophysical survey
- (b) drilling a well
- (c) carrying out testing in relation to a well
- (d) taking a sample for chemical or other analysis

“evaporation dam” means a land based structure designed to contain or impound CSG water, the purpose of which is to contain or impound the water, until the water content has been removed by evaporation.

“fill” means any kind of material in solid form (whether or not naturally occurring) capable of being deposited at a place but does not include material that forms a part of, or is associated with, a structure constructed in a watercourse, wetland or spring including a bridge, road, causeway, pipeline, rock revetment, drain outlet works, erosion prevention structure or fence.

“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.

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

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

“hazard category” means a category, either low significant or high, into which a dam is assessed as a result of the application of tables and other criteria in the Department of Environment and Heritage Protection’s *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams (Version 1.0, 2008)* or any updated version of the Manual that becomes available from time to time

“heritage place” means any place that may be of cultural heritage significance, or any place with potential to contain archaeological artefacts that are an important source of information about Queensland’s history.

“high bank” means the defining terrace or bank or, if no bank is present, the point on the active floodplain, which confines the average annual peak flows in a watercourse.

“highly erodible soils” means very unstable soils that are generally described as Sodosols with hard – setting, fine sandy loam to silty clay loam surfaces (solodics, solodised solonetz and solonetz) or soils with a dispersible layer located less than 25cm deep or soils less than 25cm deep.

“hub” means more than one large compressor station and multiple items of fuel burning or combustion units located within three (3) km of each other and capable of burning fuel at a rate >500 kg/hr.

“hydraulic performance” means the capacity of a regulated dam to contain or safely pass flowable substances based on a probability (AEP) of performance failure specified for the relevant hazard category in the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams* published by EHP on its website.

“impacts to mapped State significant biodiversity values” means to have a negative effect on a State significant biodiversity value, as identified by the Queensland Biodiversity Offset Policy (Department of Environment and Resource Management, 2011) Examples may include, but are not necessarily limited to residual impact from:

- clearing, removal or fragmentation of vegetation
- interference or disturbance of fauna habitat

“impacts to watercourse, wetland, lake or spring with state significant biodiversity values” means to have a negative effect on a watercourse, wetland, lake or spring with state significant biodiversity values as identified in Appendix 1 of the *Queensland Biodiversity Offsets Policy* (Department of Environment and Resource Management, 2011) resulting from petroleum activities that commenced after 8 March 2013.

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

“infrastructure” means water storage dams, roads and tracks, equipment, buildings and other structures built for the purpose and duration of the conduct of the petroleum activities, but does not include other facilities required for the long term management of the impact of those activities or the protection of potential resources. Such other facilities include dams other than water storage dams (e.g. evaporation dams), pipelines and assets, that have been decommissioned, rehabilitated, and lawfully recognised as being subject to subsequent transfer with ownership of the land.

“irrigation” means the application of water to any agricultural or silvicultural crop or to a garden cultivated for domestic use.

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

"lake" means:

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

"land-based offset" means direct offsets, indirect offsets, and offset transfers.

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

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

"legally secured" in relation to land-based offsets means any of the following legally binding mechanisms:

- gazetted as a protected area (e.g., a nature refuge) under the *Nature Conservation Act 1992*;
- declaration of an area of high nature conservation values under the *Vegetation Management Act 1999*;
- use of a covenant under the *Land Title Act 1994* or *Land Act 1994*; or
- another mechanism administered and approved by the State.

"Levee" means a dyke or bund that is designed only to provide for the containment and diversion of stormwater or flood flows from a contributing catchment, or containment and diversion of flowable materials resulting from unplanned releases from other works of infrastructure, during the progress of those stormwater or flood flows or those unplanned releases; and does not store any significant volume of water or flowable substances at any other times.

"limited petroleum activities" mean only activities including:

- (a) geophysical surveys (including seismic activities);
- (b) well sites;
- (c) well pads;
- (d) sumps;
- (e) flare pits;
- (f) flow lines; and
- (g) supporting access tracks.

For clarity, limited petroleum activities do not include:

- (a) the construction of infrastructure for processing or storing petroleum or by-products;
- (b) dams;
- (c) compressor stations;
- (d) campsites/workforce accommodation;
- (e) power supplies;
- (f) waste disposal; or
- (g) other supporting infrastructure for the project.

"linear infrastructure" means powerlines, pipelines, roads and access tracks.

"livestock watering purposes" means the supply of water to any livestock.

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

"mapped State significant biodiversity values" means the regional ecosystems, essential habitat, wetlands, watercourses, legally secured offset areas and connectivity areas provided in Appendix 1 of the *Queensland Biodiversity Offset Policy* (Department of Environment and Resource Management, 2011) that are mapped in State mapping.

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

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

“mg/L” means milligrams per litre.

“medium term noise event” is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than five days and does not re-occur for a period of at least four weeks. Re-occurrence is deemed to apply where a noise of comparable level is observed at the same receptor location for a period of one hour or more, even if it originates from a different source or source location.

“meter” means a device for measuring, or giving an output signal proportional to, quantities of water passed and/or the rate of flow in a pipe.”

“Offset Area Management Plan (OAMP)” means a plan that meets the requirements listed under the heading ‘Specific requirements for offset area management plans’ in Criteria A3 – Information requirement of the Queensland Biodiversity Offset Policy (Department of Environment and Resource Management, 2011).

“overland flow water” means water, including floodwater, flowing over land, otherwise than in a watercourse or lake:

- after having fallen as rain or in any other way; or
- after rising to the surface naturally from underground.

“permanent infrastructure” includes any infrastructure (roads, tracks, bridges, culverts, dams, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads, pipelines etc), which is to be left by agreement with the landowner.

“pest” means species:

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

“populated area” includes towns and cities which have a population of 500 or more people and with a minimum density of 40 people/km².

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

“regulated dam” means any dam in the significant or high hazard category as assessed using the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams (Version 1.0, 2008)* or any updated version of the Manual that becomes available from time to time

“rehabilitation” means the process of reshaping and revegetating land to restore it to a stable landform and in accordance with the acceptance criteria set out in this environmental authority and, where relevant, includes remediation of contaminated land

“relevant offset objectives” means the relevant criteria listed under the heading ‘When an offset ceases to have effect’ in Criteria A2 – Legally securing biodiversity offsets of the Queensland Biodiversity Offset Policy (Department of Environment and Resource Management, 2011).

“relevant offset rules” means the relevant criteria included in the Queensland Biodiversity Offset Policy (Department of Environment and Resource Management, 2011) including but not necessarily limited to:

- for all offsets, the relevant criteria of Criteria B1 – Offset Rules except where an offset payment is used for which Part A and Part B Criteria do not apply; and
- for land-based offsets, the relevant criteria of Criteria B1 – Offset Rules as well as Criteria A1 – Obtaining Ecological Equivalence.

“remnant unit” means a continuous area of remnant vegetation representative of a single Regional Ecosystem type or a single heterogeneous unit (multiple Regional Ecosystem types that cannot be distinguished individually due to the scale of mapping).

“sensitive place” means:

- a dwelling (including residential allotment, mobile home or caravan park, residential marina or other residential premises, motel, hotel or hostel); or
- a library, childcare centre, kindergarten, school, university or other educational institution;

- a medical centre, surgery or hospital; or
- a protected area; or
- a public park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment; or
- a work place used as an office or for business or commercial purposes, which is not part of the petroleum activities and does not include employees accommodation or public roads.

“sensitive receptor” means an area or place where noise (including low frequency, vibration and blasting) is measured investigate whether nuisance impacts are occurring and includes:

- a dwelling (including residential allotment, mobile home or caravan park, residential marina or other residential premises, motel, hotel or hostel; or
- a library, childcare centre, kindergarten, school, university or other educational institution;
- a medical centre, surgery or hospital; or
- a protected area; or
- a public park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment; or
- a work place used as an office or for business or commercial purposes, which is not part of the petroleum activities and does not include employees accommodation or public roads.

“short term noise event” is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than eight hours and does not re-occur for a period of at least seven days. Re-occurrence is deemed to apply where a noise of comparable level is observed at the same receptor location for a period of one hour or more, even if it originates from a different source or source location.

“significantly disturbed land or significant disturbance to land” means disturbance to land as defined in section 28 of the *Environmental Protection Regulation 2008*.

“site” means the petroleum authority(ies) to which the environmental authority relates.

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

“stable” in relation to land, means landform dimensions are or will be stable within **tolerable limits** now and in the foreseeable future. Stability includes consideration of geotechnical stability, settlement and consolidation allowances, bearing capacity (trafficability), erosion resistance and geochemical stability with respect to seepage, leachate and related contaminant generation.

“state heritage place” means a place entered in the Queensland heritage register under Part 4 of the *Queensland Heritage Act 1992*.

“State significant biodiversity values” means those regional ecosystems, essential habitat, wetlands, watercourses, legally secured offset areas and connectivity areas provided in Appendix 1 of the Queensland Biodiversity Offsets Policy (Department of Environment and Resource Management, 2011).

“stimulation” means a technique used to increase the permeability of a natural underground reservoir, including for example, cavitation, hydraulic fracturing/hydrofracturing, fracture acidizing and the use of proppant treatments.

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

“suitably qualified and experienced person” in relation to a hazard assessment of a dam, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit at any time:

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

“suitably qualified and experienced person” in relation to dams means one who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the Professional Engineers Act 1988, OR registered as a National Professional Engineer (NPER) with the Institution of Engineers Australia, OR holds equivalent professional qualifications to the satisfaction of the administering authority for the Act; AND the administering authority for the Act is satisfied that person has knowledge, suitable experience and demonstrated expertise in relevant fields, as set out below:

- knowledge of engineering principles related to the structures, geomechanics, hydrology, hydraulics, chemistry and environmental impact of dams; and
- a total of five (5) years of suitable experience and demonstrated expertise in the geomechanics of dams with particular emphasis on stability, geology and geochemistry, and
- a total of five (5) years of suitable experience and demonstrated expertise each, in three (3) of the following categories:
 - investigation and design of dams.
 - Construction, operation and maintenance of dams.
 - hydrology with particular reference to flooding, estimation of extreme storms, water management or meteorology.
 - hydraulics with particular reference to sediment transport and deposition, erosion control, beach processes.
 - hydrogeology with particular reference to seepage, groundwater.
 - solute transport processes and monitoring thereof.
 - dam safety.

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

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

“threshold regional ecosystem” means the ecosystems identified in Appendix 6 of the Queensland Biodiversity Offset Policy (Department of Environment and Resource Management, 2011).

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

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

“unacceptable risk” is when the results of a hazard assessment indicates that there is both a high consequence and a high likelihood of an event occurring such that the risk is classified as “high”, “very high” or “extreme”.

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

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

“waters” includes all or any part of a creek, river, stream, lake, lagoon, dam, swamp, wetland, spring, unconfined surface water, unconfined water in natural or artificial watercourses, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and underground water.

“watercourse” has the meaning provided in s 5 of the *Water Act 2000* and includes the bed and banks and any other element of a river, creek or stream confining or containing water.

“watercourse, wetland, lake or spring with State significant biodiversity values” are those described in Appendix 1 of the *Queensland Biodiversity Offsets Policy* (Department of Environment and Resource Management, 2011).

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

“wetland” means an area shown as a wetland on a ‘Map of referable wetlands’, a document approved by the chief executive (environment). A map of referable wetlands can be viewed at www.ehp.qld.gov.au

“wild river declaration” means a statutory instrument under the *Wild Rivers Act 2005*. A declaration lists the relevant natural values to be preserved and delineates certain parts of the wild river area and the different constraints that may apply in these areas. With reference to environmental authorities for petroleum, each declaration also specifies conditions to be included in a new authority if the activity is to be located within the wild river area.

“20th percentile release limits” means that not more than four (4) of the measured values is to exceed the stated release limit for any five (5) consecutive samples where:

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

“25th percentile release limits” means that not more than three (3) of the measured values is to exceed the stated release limit for any four (4) consecutive samples where:

- (1) the consecutive samples are taken over a four (4) month period; and
- (2) the consecutive samples are taken at approximately equal periods.

“75th percentile release limits” means that not more than one (1) of the measured values is to exceed the stated release limit for any four (4) consecutive samples where:

- (1) the consecutive samples are taken over a four (4) month period; and
- (2) the consecutive samples are taken at approximately equal periods.

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

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

End of Conditions

Notice

Environmental Protection Act

Decision to grant an application for a level 1 environmental authority (chapter 5A activities)

This statutory notice is issued by the administering authority pursuant to sections 310M of the Environmental Protection Act 1994 to advise you of a decision or action.

Arrow Energy Pty Ltd
AM-60
Level 19
42-60 Albert Street
BRISBANE QLD 4000

Your reference : PL 194, PL198, PL230, PL238, PL252, PL258 and PL260 / PEN100449509
Our reference : 343728/ BNE43018

Attention: Ms Carolyn Collins

Re: Application for a level 1 environmental authority (chapter 5A activities) by Arrow Energy Pty Ltd on Petroleum Lease (PL) PL 194, PL198, PL230, PL238, PL252, PL258 and PL260.

The above mentioned application was received by the Department of Environment and Resource Management (DERM) on 17 December 2009. The administering authority has decided to grant the application pursuant to section 310M of the *Environmental Protection Act 1994* as follows:


Principal Holder	Joint Holder(s)	Resource Authority	Environmental Authority (EA) number	Decision
Arrow Energy Pty Ltd	Arrow CSG (Australia) Australian CBM Pty Ltd Arrow (Tipton) Pty Ltd Arrow (Tipton Two) Pty Ltd Arrow (Daandine) Pty Ltd CS Energy Limited	PL 194 PL198 PL230 PL238 PL252 PL258 PL260	PEN100449509	Granted on 17 December 2010

Decision to grant an application for a level 1 environmental authority
(chapter 5A activities)

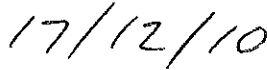
The administering authority gives notice relating to this application to all the applicants by giving it to the principal applicant.

Please note that environmental authority PEN100448509 will be issued to Arrow Energy Pty Ltd once the administering authority has received financial assurance in accordance with legislative requirements.

Should you have any queries in relation to this Notice, please contact Christine Juergensen of the Department of Environment and Resource Management on telephone (07) 3330 5614.



Signature



Date

Rod Kent
Delegate of Administering Authority
Environmental Protection Act 1994

Enquiries:
Petroleum and Gas Unit
Department of Environment and Resource
Management
Floor 7, 400 George Street
BRISBANE QLD 4000
GPO Box 2454
BRISBANE QLD 4001
Phone: (07) 3330 5349
Fax: (07) 3330 5634

Environmental Protection Act 1994
Level 1 Environmental Authority (chapter 5A activities)

DERM Permit¹ Number: PEN100449509

Under section 310M of the *Environmental Protection Act 1994* this permit is issued to:

Principal Holder	Joint Holders	
Arrow Energy Pty Ltd AM-60 Level 19 42-60 Albert Street BRISBANE QLD 4000	Arrow CSG (Australia) Pty Ltd Arrow Energy Ltd AM-60 Level 19 42 Albert Street BRISBANE QLD 4000	Arrow (Tipton Two) Pty Ltd AM-60 Level 19 42 Albert Street BRISBANE QLD 4000
	Australian CBM Pty Ltd AM-60 Level 19 42 Albert Street BRISBANE QLD 4000	Arrow (Daandine) Pty Ltd AM-60 Level 19 42 Albert Street BRISBANE QLD 4000
	Arrow (Tipton) Pty Ltd AM-60 Level 19 42 Albert Street BRISBANE QLD 4000	CS Energy Limited Level 21 Central Plaza Two 66 Eagle Street BRISBANE QLD 4000

In respect to carrying out a Level 1 chapter 5A activity(ies) as per Section 23 of the *Environmental Protection Regulation 2008* on the relevant resource authorities listed below:

Project Name	Petroleum Authority Type(s) and Number(s)
Arrow Energy Dalby Expansion Project	Petroleum Lease (PL) PL 194, PL198, PL230, PL238, PL252, PL258 and PL260

This environmental authority takes effect from 17 December 2010.

The anniversary date of this environmental authority is 17 December.

This environmental authority is subject to the attached schedule of conditions.

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

R Kent

17/12/10
Date

Rod Kent
Delegate of Administering Authority
Department of Environment and Resource Management

Additional advice about the approval

1. This approval is for the carrying out the following level 1 chapter 5A activity(ies):

Level 1 chapter 5A activity:
6. A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam.
8. A petroleum activity, other than a petroleum activity mentioned in items 1 to 7, that includes 1 or more chapter 4 activities for which an aggregate environmental score is stated, namely: ERA 14 – Electricity generation by using gas at a rated capacity of 10MW electrical or more. ERA 15 – Fuel burning consists of using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour. ERA 60 (1) (d) – Operating a facility for disposing of, in a year more than 200,000t of regulated waste. ERA 63 (2) (b) – Sewage treatment with a total daily peak design capacity of more than 100 to 1500EP. ERA 64 (2) (b) – Desalinating, in a day, more than 5ML, allowing the release of waste to waters other than seawater.

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

- *Aboriginal Cultural Heritage Act 2003*;
- The contaminated land provisions of the *Environmental Protection Act 1994*;
- *Forestry Act 1959*;
- *Nature Conservation Act 1992*;
- *Water Act 2000*; and
- *Water Supply (Safety and Reliability) Act 2008*

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

3. This approval for the carrying out of a level 1 petroleum activity is not an acceptance of impacts on water levels or pressure heads in groundwater aquifers in or surrounding coal seams. The holder of this environmental authority may have obligations to minimise or mitigate these impacts under other state legislation.

4. This environmental authority consists of the following Schedules

Schedule A	General Conditions	Schedule G	Waste
Schedule B	Water	Schedule H	Rehabilitation
Schedule C	Regulated dams	Schedule I	Monitoring Programs
Schedule D	Land	Schedule J	Community Issues
Schedule E	Environmental Nuisance	Schedule K	Notification Procedures
Schedule F	Air	Schedule L	Definitions

SCHEDULE A – GENERAL CONDITIONS

Authorised Petroleum Activities

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

Schedule A, Table 1 – Authorised Petroleum Activities

Petroleum Authority No.	Petroleum Activity	Number	Maximum size (where applicable)
PL194	Seismic	0	N/A
	Core Well	0	N/A
	Exploration Well	0	N/A
	Development Well	0	N/A
	Production Well	89	N/A
	Compressor	0	N/A
	Regulated Dam	0	> 401 ML
	Regulated Dam	0	< 400 ML
	Reverse Osmosis Plant	0	N/A
	Sewage Treatment Plant	0	N/A
PL198	Seismic	0	N/A
	Core Well	0	N/A
	Exploration Well	0	N/A
	Development Well	0	N/A
	Production Well	150	N/A
	Compressor	20	> 500 kg/hr fuel burning
	Regulated Dam	7	> 401 ML
	Regulated Dam	2	< 400 ML
	Reverse Osmosis Plant	1	12 ML /d (maximum input)
	Sewage Treatment Plant	1	< 450 EP
	Power station	1	40 MW
PL230	Seismic	0	N/A
	Core Well	0	N/A
	Exploration Well	0	N/A
	Development Well	0	N/A
	Production Well	112	N/A
	Compressor	20	> 500 kg/hr fuel burning
	Regulated Dam	7	> 401 ML
	Regulated Dam	5	< 400 ML
	Reverse Osmosis Plant	1	12 ML /d (maximum input)
	Sewage Treatment Plant	1	< 450 EP
	Power station	1	40 MW
PL238	Seismic	0	N/A
	Core Well	0	N/A
	Exploration Well	0	N/A
	Development Well	0	N/A
	Production Well	50	N/A
	Compressor	0	N/A
	Regulated Dam	0	> 401 ML
	Regulated Dam	0	< 400 ML
	Reverse Osmosis Plant	0	N/A
	Sewage Treatment Plant	0	N/A
PL252	Seismic	0	N/A

	Core Well	0	N/A
	Exploration Well	0	N/A
	Development Well	0	N/A
	Production Well	75	N/A
	Compressor	0	N/A
	Regulated Dam	0	> 401 ML
	Regulated Dam	1	< 400 ML
	Reverse Osmosis Plant	0	N/A
	Sewage Treatment Plant	0	N/A
PL258	Seismic	0	NA
	Core Well	0	NA
	Exploration Well	0	NA
	Development Well	0	N/A
	Production Well	50	N/A
	Compressor	0	N/A
	Regulated Dam	0	> 401 ML
	Regulated Dam	0	< 400 ML
	Reverse Osmosis Plant	0	N/A
	Sewage Treatment Plant	0	N/A
PL260	Seismic	0	N/A
	Core Well	0	N/A
	Exploration Well	0	N/A
	Development Well	0	N/A
	Production Well	50	N/A
	Compressor Station	0	N/A
	Regulated Dam	0	> 401 ML
	Regulated Dam	0	< 400 ML
	Reverse Osmosis Plant	0	N/A
	Sewage Treatment Plant	0	N/A

Prevent or Minimise Likelihood of Environmental Harm

- (A2) This environmental authority does not authorise environmental harm unless a condition contained in this environmental authority explicitly authorises that harm. Where there is no condition, the lack of a condition shall not be construed as authorising harm.

Maintenance of Measures, Plant and Equipment

- (A3) The holder of the environmental authority must:
- install all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority;
 - maintain such measures, plant and equipment in their proper and effective condition; and
 - operate such measures, plant and equipment in a proper and effective manner.
- (A4) No change, replacement or alteration of any plant or equipment is permitted if the change, replacement or alteration materially increases, or is likely to increase, the environmental harm caused by the petroleum activity.

Operational Plan

- (A5) The holder of this environmental authority must develop an Operational Plan that provides detailed information about the activities to be carried out under the environmental authority.
- (A6) The activities identified in the Operational Plan must incorporate but not be limited to the petroleum activities set out in the approved Work Program and/or Development Plan for the

relevant petroleum authority as required under the *Petroleum Act (1923)* or the *Petroleum and Gas (Production and Safety) Act 2004*.

- (A7) The Operational Plan must be consistent with the requirements of the environmental authority and include, but not be limited to:
- (a) a stated period, not exceeding three (3) years, to which the Operational Plan applies;
 - (b) a description of the existing petroleum and **incidental infrastructure**;
 - (c) a description of all proposed petroleum and incidental infrastructure that will be developed during the term of the Plan
 - (d) a map or maps that:
 - (i) record the location of all existing petroleum and incidental infrastructure that exists at the commencement of the period of the Operational Plan, including but not limited to:
 - regulated dams;
 - wells;
 - transmission flow lines;
 - gas processing facilities;
 - water treatment facilities;
 - sewage treatment facilities; and
 - compressor stations
 - (ii) records the location of all programmed and approved future **infrastructure** that will be developed during the period of the Operational Plan.
 - (e) proposed maximum disturbance area to be cleared under the life of the Operational Plan;
 - (f) for proposed disturbance or vegetation clearing in an Environmentally Sensitive Area (ESA) provide details on the scale and extent of the disturbance or **clearing** of these areas specifically;
 - (g) for forecasted vegetation clearing in an ESA that is an "Endangered" or "Of Concern Regional Ecosystem (RE)", the Operational Plan must provide details of environment offsets that are at least equivalent in environmental value of the disturbance caused to the ESA.
 - (h) for each **site** to be disturbed, a plan of the rehabilitation activities to be performed during the period of the Operational Plan, including but not limited to a description of the following:
 - (i) location (e.g. tenure, coordinates) and disturbance type (e.g. well lease, flow line, access track);
 - (ii) pre-disturbance land use;
 - (iii) forecasted total area to be rehabilitated under the life of the Operational Plan;
 - (iv) reference sites for rehabilitated areas;
 - (v) floristic species to be planted in the rehabilitation and their proposed densities;;
 - (vi) soil types of areas to be rehabilitated;
 - (vii) post-disturbance land use;
 - (viii) monitoring program to measure rehabilitation success;
 - (ix) rehabilitation specifications as per the Schedule A, Table 2 for all proposed petroleum activities and incidental infrastructure; and
 - (x) a high level rehabilitation strategy for all proposed petroleum and incidental infrastructure which is not sited at the commencement of the Operational Plan; and
 - (i) a description of the progressive rehabilitation carried out and the performance of rehabilitated sites in relation to the requirements and acceptance criteria set out in the environmental authority and the proposed rehabilitation activities carried out under the previous Operational Plan(s); and
 - (j) the calculation of financial assurance for the proposed maximum disturbance expected during the period of the Operational Plan.
- (A8) A subsequent Operational Plan must be submitted to the administering authority with the annual return that precedes the expiry of the current Operational Plan.

Schedule A, Table 2 – Planned Rehabilitation Specifications

Petroleum activity feature	Rehabilitation Goal	Rehabilitation objectives	Indicators	Completion criteria
All petroleum activity features	1. Safe	Site safe for humans and animals	(a) Landform re-established	(a) No subsidence or major erosion gullies
	2. Non-polluting	Sediment and erosion control structures in place Storm water runoff does not pollute nearby watercourses	(a) Sediment traps and design of erosion control measures (b) Surface water monitoring	(a) Certification by a suitably qualified and experienced person of the performance of control structures (b) Monitoring complies with release limits
	3. Stable	Minimise erosion	(a) Re-establish surface drainage lines (b) Vegetation cover	(a) No subsidence or areas of major erosion within three (3) years of rehabilitation (b) 50% cover (flat to gently sloping) up to 75% cover (moderate to steep sloping) consisting of vegetation similar to immediate surrounding area cover recorded over a period of 3 years from rehabilitation. (c) Vegetation cover is equivalent to immediate surrounding area, where land use is cultivation (crops or pasture).
	4. Self-sustaining	Establish a rehabilitated system that is self-sustaining over time	(a) Species diversity (b) Presence of key species	(a) Evidence that 20% of the immediate surrounding species diversity achieved and maintained within three (3) years of rehabilitation. However, where soil conditions are substantially different after operation, objective is to establish other vegetation which fulfils the function of the vegetation immediately surrounding the area. (b) Evidence that 50% of the key species that are evident in the immediate surrounding ecosystem are present over a period of three (3) years from rehabilitation. (c) Where agriculture is the planned land use, the species should be those commonly used for pasture or crops known to be successful in soils of similar texture, drainage status, pH, and fertility.

Financial Assurance

- (A9) The holder of this environmental authority must:
- (a) provide to the administering authority financial assurance in the amount and form required from time to time by the administering authority for the authorised petroleum activities; and
 - (b) review and maintain the amount of financial assurance based on the maximum disturbance from proposed and existing activities and rehabilitation to be undertaken during the period of the Operational Plan that is current from time to time.
- (A10) The calculation of financial assurance must be in accordance with the most recent version of the Department of Environment and Resource Management's Guideline "Financial assurance for petroleum activities".
- (A11) The financial assurance is to remain in force until the administering authority is satisfied that no claim is likely to be made on the assurance.

Existing petroleum activities

- (A12) Conditions (D2) to (D17) in the Land Schedule relating to disturbance only apply to petroleum activities which commenced after *[insert date of grant]* subject to:
- (a) the holder of this environmental authority conducting an audit of the existing petroleum activities which commenced before *[insert date of grant]* against the land disturbance conditions of the previous environmental authority dated *[date of grant of superceeded environmental authority]*; and
 - (b) the audit report being provided to the administering authority with the next annual return following the issue of this environment authority.

Note: Condition (A12) is not required for new applications. It is only necessary if the application relates to an amendment where there are existing petroleum activities.

Third Party Audit

- (A13) Compliance with the conditions of this environmental authority must be audited by an appropriately qualified **third party auditor**, nominated by the holder of this environmental authority and accepted by the administering authority, for each period of the Operational Plan required under Conditions (A5) to (A8).
- (A14) Notwithstanding Condition (A13), the holder of this environmental authority may, prior to undertaking the third party audit, negotiate with the administering authority the scope and content of the third party audit.

Note: Where minimal activities have been undertaken on a tenure, the negotiation of the scope of the third party audit may also include the postponing of the third party audit to an agreeable time between the holder of this environmental authority and the administering authority.

- (A15) The report prepared by the third party auditor for the relevant prior Operational Plan period must be submitted to the administering authority by the holder of this environmental authority with each revised Operational Plan submitted in accordance with Condition (A8).
- (A16) The third party auditor must certify (including a statutory declaration) the findings of the audit in the report.
- (A17) The financial cost of the third party audit is to be borne by the holder of this environmental authority.
- (A18) The holder of this environmental authority must immediately act upon any recommendations arising from the audit report by:

- (a) investigating any non-compliance issues identified; and
 - (b) as soon as practicable, implementing measures or taking necessary action to ensure compliance with the requirements of this environmental authority.
- (A19) Subject to Condition (A18), and not more than 60 business days following the submission of the audit report, the holder of this environmental authority must provide a written report to the administering authority addressing the:
- (a) actions taken by the holder to ensure compliance with this environmental authority; and
 - (b) actions taken to prevent a recurrence of any non-compliance issues identified.

Contingency Plan for Emergency Environmental Incidents

- (A20) A contingency plan for emergency environmental incidents must be developed and implemented to respond to environmental emergency events and incidents where environmental harm is caused or threatened.
- (A21) The contingency plan for emergency environmental incidents required under Condition (A20) must address the following matters as a minimum:
- (a) a clear definition of what constitutes an environmental emergency incident for the activity;
 - (b) identification of the types of environmental incidents that may occur, relevant to the activities authorised to be carried out under this environmental authority;
 - (c) response procedures to be implemented to prevent or minimise the risk of environmental harm arising from environmental emergency incidents;
 - (d) response procedures to minimise the extent and duration of environmental harm caused by environmental emergency incidents;
 - (e) the practices and procedures to be employed to restore the environment or mitigate any environmental harm caused;
 - (f) communication procedures and lines of communication within and beyond the organisation to be employed in responding to environmental emergency incidents;
 - (g) the resources to be used in response to environmental emergency incidents;
 - (h) procedures to investigate the cause of any incidents, including releases, and where necessary, the remedial actions to be implemented to reduce the likelihood of recurrence of similar events;
 - (i) a receiving environment (surface waters/land) monitoring program, to be specifically implemented in the event of a release to waters/land to examine/assess environmental impacts (for waters this must include upstream and downstream monitoring);
 - (j) the provision and availability of documented procedures to staff attending any emergency environmental incident to enable them to effectively respond;
 - (k) training of staff that will be called upon to respond to emergency environmental incidents to enable them to effectively respond;
 - (l) timely and accurate reporting of the circumstance and nature of emergency environmental incidents to the administering authority in accordance with conditions of this environmental authority;
 - (m) procedures for accessing monitoring points during emergency environmental incidents; and
 - (n) procedures to notify any potentially impacted stakeholder who may be affected by an environmental emergency incident.

Documentation and Records Management

- (A22) All records and results required by the conditions of this environmental authority must be kept for a minimum of five (5) years.
- (A23) All documentation required by this environmental authority (including but not limited to plans, systems, programs, procedures, results of audits, assessments, monitoring, inspections and complaint records) must be made available to the administering authority upon request.

Cultural Heritage

- (A24) In the carrying out of the petroleum activity the holder of this environmental authority must not adversely impact on the cultural heritage values of any place registered on the Queensland Heritage Register.

Underground Gas Storage

- (A25) Testing, evaluating, developing and using natural underground reservoirs for petroleum storage or to store **prescribed storage gases** is not authorised under this environmental authority.

Stimulation of Underground Reservoirs

- (A26) The **stimulation** of underground reservoirs is prohibited under this environmental authority.

Encapsulation of Solid Salt in a Landfill Monocell

- (A27) The disposal of solid salt on site, including encapsulation of solid salt in a **landfill monocell**, is prohibited under this environmental authority.

SCHEDULE B – WATER

Contaminant Release

- (B1) Contaminants that will or may cause environmental harm must not be directly or indirectly released to any **waters** except as permitted under this environmental authority.

Erosion and Sediment Control

- (B2) An Erosion and Sediment Control Plan which has been **certified** by a **suitably qualified person** must be developed and implemented to minimise erosion and the release of sediment and contaminated stormwater to waters for all stages of the petroleum activities.
- (B3) The Erosion and Sediment Control Plan required by Condition (B2) must include but not be limited to:
- (a) diverting uncontaminated stormwater run-off around areas disturbed by petroleum activities or where contaminants or wastes are stored or handled that may contribute to stormwater;
 - (b) contaminated stormwater runoff and incident rainfall is collected; and treated, reused, or released in accordance with the conditions of this environmental authority;
 - (c) roofing or minimising the size of areas where contaminants or wastes are stored or handled;
 - (d) revegetating disturbed areas as soon as practicable after the completion of works;
 - (e) using alternate materials and or processes (such as dry absorbents) to clean up spills that will minimise the generation of contaminated waters;
 - (f) erosion and sediment control structures are placed to minimise erosion of disturbed areas and prevent the contamination of any waters;
 - (g) an inspection and maintenance program for the erosion and sediment control features;
 - (h) provision for adequate access to maintain all erosion and sediment control measures especially during the wet season months from November to April;
 - (i) additional erosion and sediment control measures for **construction** of wells and pipelines on slopes >10%;
 - (j) surface water monitoring program designed to detect erosion and sediment runoff into **watercourses**;
 - (k) identification of remedial actions that would be required to ensure compliance with the conditions of this environmental authority; and
 - (l) details of community consultation strategies and processes to be used in further developing and implementing the Erosion and Sediment Control Plan.
- (B4) A copy of the Erosion and Sediment Control Plan must be submitted to any potentially affected landholders upon request.

Maintenance and Cleaning

- (B5) The maintenance and cleaning of vehicles and any other equipment or plant must be carried out in areas from where the resultant contaminants cannot be released into any waters, roadside gutter or stormwater drainage system.

Watercourses, Wetlands and Springs

- (B6) In the carrying out of the petroleum activity the holder of this environmental authority must not clear vegetation or place **fill**, in or within:
- (a) 200 metres from any natural significant **wetland**;
 - (b) 100 metres from any natural wetland, **lakes** or **springs**; or
 - (c) 100 metres of the **high bank** of any other watercourse.

- (B7) The holder of this environmental authority must not excavate or place fill in a way that interferes with the flow of water in a watercourse, wetland, or spring, including works that divert the course of flow of the water or works that impound the water.
- (B8) Despite Conditions (B6) and (B7), pipeline and road construction works may be undertaken in watercourses, wetlands or springs where there is no reasonable and practicable alternative (such as the use of horizontal directional drilling methods) for a maximum period of 10 days, provided that the works are conducted in accordance with the following order of preference:
- (a) conducting work in times of no flow; and
 - (b) using all reasonable and practicable measures to reduce impacts in times of flow.
- (B9) Activities or works resulting in **significant disturbance** to the bed or banks of a watercourse or wetland, or a spring must:
- (a) only be undertaken where necessary for the construction and/or maintenance of roads, tracks and pipelines that are essential for carrying out the authorised petroleum activities and no reasonable or practicable alternative location exists;
 - (b) be no greater than the minimum area necessary for the purpose of the significant disturbance;
 - (c) be designed and undertaken by a suitably qualified person taking into account the matters listed in Section 5 - Planning Activities and Section 6 - Impact Management During Activities of DERM's "*Guideline – Activities in a watercourse, lake or spring associated with mining operations*" dated April 2008, or more recent editions as such become available; and
 - (d) upon cessation of the activities or works, commence rehabilitation immediately such that the final rehabilitation is to a condition that will ensure the ongoing physical integrity and the natural ecosystem values of the site.
- (B10) Sediment control measures must be implemented to minimise any increase in water turbidity due to carrying out petroleum activities in the bed or banks of a watercourse or wetland, or a spring.
- (B11) Routine, regular and frequent visual monitoring must be undertaken while carrying out construction work and/or any maintenance of completed works in a watercourse, wetland or spring.
- (B12) If, due to the petroleum activities, water turbidity increases in the watercourse, wetland or spring outside contained areas, works must cease and the sediment control measures must be rectified to limit turbidity before activities recommence.
- (B13) All measures must be taken to minimise adverse impacts to or reversal of any river improvement works carried out in River Improvement Areas by Queensland's River Improvement Trusts.

Note: Locations and details of River Improvement Areas and River Improvement Trusts are provided in the Schedule to the River Improvement Trust Regulation 1998.

Floodplains

- (B14) Where petroleum activities are carried out on floodplain areas, the holder of this environmental authority must ensure that petroleum and incidental activities do not:
- (a) concentrate flood flows that cause or threaten an adverse environmental impact;
 - (b) divert flood flows from natural drainage paths and alter flow distribution;
 - (c) increase the local duration of floods;
 - (d) increase the risk of detaining flood flows;
 - (e) pose an **unacceptable risk** to the safety of persons from flooding; or
 - (f) pose an unacceptable risk of damage to property from flooding.

Groundwater

(B15) The extraction of groundwater as part of the petroleum activity from underground aquifers must not directly or indirectly cause environmental harm to any spring, wetland or other surface waters.

Wild Rivers

(B16) In a declared Wild River Area, petroleum activities must be consistent with the conditions stated in the relevant **Wild River Declaration**.

(B17) Where the conditions of this environmental authority conflict with the conditions of the Wild River Declaration, the conditions of the Wild River will Declaration prevail.

Release to Waters of Treated CSG Water

(B18) The release of contaminants to waters must only occur from the release points specified in Schedule B, Table 1 – Contaminant Release Points, Sources and Receiving Waters and depicted in Figure 1 attached to this environmental authority.

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

Release Point	Latitude or Northing (GDA94)	Longitude or Easting (GDA94)	Contaminant Source and Location	Monitoring Point	Receiving Waters Description
U1, defined as the outlet of discharge pipe to unnamed tributary of Wilkie Creek	-27° 5' 35"	150° 58' 9"	Treated CSG water from the RO plant located on PL230	U1	Unnamed tributary of Wilkie Creek

(B19) The release of contaminants to waters must comply with the release limits and limit types as stated in Schedule B, Table 2 when measured at the monitoring points specified in Schedule B, Table 1 for each quality characteristic.

Schedule B, Table 2 – Contaminant Release Limits for Release Point U1

Quality Characteristic	Release Limits	Limit Type	Monitoring Frequency
Electrical conductivity (µS/cm)	580	Maximum	Daily during discharge
pH (pH Unit)	6.5 - 9	Range	
Suspended Solids (mg/L)	180	Maximum	
Cations and anions (mg/L)	Calcium (cation) 34 Magnesium (cation) 26 Sulphate (anion) 9.6	Maximum	

(B20) The release of contaminants to waters from the release points must be monitored at the monitoring point specified in Schedule B, Table 1 for each quality characteristic and at the frequency specified in Schedule B, Table 2.

Contaminant Release

- (B21) The holder of this environmental authority must install, operate and maintain a stream flow gauging station as specified in Schedule B, Table 3 to determine and record stream flows at a location 50 to 100 metres upstream from each release point as shown in Schedule B, Table 1.
- (B22) Notwithstanding any other condition of this environmental authority, the release of contaminants to waters must only take place during periods of natural flow events specified as minimum flow in Schedule B, Table 3 for the contaminant release point(s) specified in Schedule B, Table 1.

Schedule B, Table 3 – Contaminant Release during Flow Events

Receiving water description	Gauging station description	Latitude or northing (GDA94)	Longitude or easting (GDA94)	Minimum Flow in Receiving Water Required for a Release Event	Flow recording Frequency
Unnamed tributary of Wilkie Creek	Gauging station 1 (GP1)	50-100 metres upstream of Release Point U1	50-100 metres upstream of Release Point U1	0.8 m ³ /s (equivalent to 0.5 metres on Gauging station 1)	at 6 hour intervals during discharge (minimum twice daily)

- (B23) The volume released through the release point(s) must not exceed 0.8 m³/s and 20 ML/day.
- (B24) Releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build up of sediment in such waters.

Characterisation of Other Contaminants

- (B25) If water has been released from authorised release points listed in Schedule B, Table 1, the holder of this environmental authority must undertake an annual assessment of the contaminants of treated CSG water to determine the risk of environmental harm from release of treated CSG water to surface waters. This should consider the contaminants mentioned in the ANZECC & ARMCANZ 2000 guidelines. This annual assessment must be included in the Annual Return.

Event Based Surface Water Monitoring

- (B26) Each monitoring and release point as specified in Schedule B, Table 2 must be marked and readily identifiable from the banks of the unnamed tributary of Wilkie Creek.
- (B27) The water quality of the receiving waters must be monitored daily during discharge at a monitoring point 50-100 metres upstream and 200 metres downstream of release point U1 for the following water quality parameters:
- (a) Electrical conductivity (µS/cm)
 - (b) pH (pH Unit)
 - (c) Turbidity (NTU)
 - (d) Suspended Solids (mg/L)
 - (e) Calcium (mg/L)
 - (f) Magnesium (mg/L)
 - (g) Fluoride
- (B28) The holder of this environmental authority must keep written records of all discharge events to the unnamed tributary of Wilkie Creek. The records must include, but not be limited to:
- (a) The volume of water released through the release point(s);
 - (b) the release rate;
 - (c) date and time of discharge;

- (d) water levels at Gauging Station GP1 during the discharge event;
- (e) water quality characteristics monitoring results; and
- (f) details of any observed impacts.

Water General

(B29) The release of contaminants directly or indirectly to waters:

- (a) must not produce any visible discolouration of receiving waters; nor
- (b) must produce any slick or other visible or odorous evidence of oil, grease or petrochemicals nor contain visibly floating oil, grease, scum, litter or other objectionable matter.

Water Release Reduction Strategy

(B30) As part of the Coal Seam Gas Water Management Plan the holder of the environmental authority must develop and implement an on-going Release Reduction Strategy to maximise CSG water reuse and minimise any release to waters and the storage of CSG water in holding dams. The strategy must address the following matters:

- (a) implementation of schemes to achieve maximum use of the water;
- (b) specific targets for achieving increased use of CSG water both treated and untreated;
- (c) a market analysis at least every three (3) years to identify existing and future opportunities for water use;
- (d) on-going review of emerging technologies and/or re-use options that could achieve significant reductions in mass loads of contaminants released to the environment;
- (e) investigation of the feasibility of alternative options, practices and procedures to further minimise the volume and concentration of contaminants released to waters; and
- (f) programs to implement feasible options to achieve increased water use and reduction in contaminant loads, including actions and timeframes for completion.

(B31) A progress report on the Release Reduction Strategy must be submitted to the administering authority with each annual return. The report(s) must address at least the following matters:

- (a) details of the specific options, practices and procedures investigated;
- (b) details of new practices, procedures and programs implemented since the last reporting period and targets met;
- (c) where alternative options, practices and procedures are not considered feasible, the provision of justification to support that determination; and
- (d) details of the option(s) yet to be implemented, including the timeframes for implementation, and justification for the chosen option(s).

Water General

(B32) The release of contaminants directly or indirectly to waters:

- (c) must not produce any visible plume within receiving waters; nor
- (d) must not produce any slick or other visible or odorous evidence of oil, grease or petrochemicals nor contain visible floating oil, grease, scum, litter or other objectionable matter.

Metering of treated CSG water releases

(B33) A measuring device/ meter must be installed prior to commencement of release of treated CSG water and its installation must comply with the *'Draft standards and specifications for measuring /metering disposal of treated CSG water'*.

(B34) Upon practical completion of the meter installation, the holder of this environmental authority must provide a completed 'meter installation form' signed by the installer and the environmental

authority holder confirming that the installation complies with the manufacturer's specifications and/or national standards and/or DERM's metering standards (whichever is applicable).

Note: The Draft standards and specifications for measuring/metering disposal of treated CSG water is available from the administering authority upon request.

- (B35) The holder of this environmental authority must measure and record daily:
- (a) the volume released to surface waters from each release point at the monitoring point(s) in Schedule B, Table 1 - Contaminant Release Points, Sources and Receiving Waters;
 - (b) the release rate;
 - (c) for any change in the release rate:
 - (i). the date and time of the change; and
 - (ii). the new release rate.
- (B36) The holder of this environmental authority must provide the administrative authority with safe access to facilitate inspections, and must comply with any instructions issued by the administrative authority relevant to the operation of the pump and meter installation.
- (B37) The holder of this environmental authority must notify the administering authority within five (5) business days of any meter malfunction or maintenance of the measuring device (meter).
- (B38) The holder of this environmental authority must arrange for the repair or replacement of a malfunctioning meter within five business days of becoming aware of the malfunction and provide a repair and/or maintenance completion report within ten business days of the repair or maintenance.

Sewage Treatment Works (21 – 450 EP)

Release of Treated Sewage Effluent Contaminants to Land

- (B39) Sewage pump stations must be fitted with a stand-by pump and a visible or audible high level alarm.
- (B40) Treated effluent may only be released to land at the designated, fenced and delineated contaminant release area(s).
- (B41) The contaminant release area(s) must be maintained in a proper and efficient condition so as to provide adequate assimilation, percolation, evaporation and transpiration of the released contaminants.
- (B42) Treated effluent must not be applied by spray irrigation and must be applied in a manner that does not cause ponding or runoff of effluent beyond the contaminant release area(s).
- (B43) When weather conditions or soil conditions preclude the release of contaminants, the contaminants must be directed to on-site storage or lawfully disposed of off-site.

Quality of Contaminants Released from the Sewage Treatment Works

- (B44) Treated effluent must comply, at the sampling and in-situ measurement point(s), with each of the release limits specified in Schedule B, Table 4 - Treated Sewage Effluent Standards for each quality characteristic.
- (B45) The release of contaminants to land must be monitored at the frequency and at the sampling and in-situ measurement point specified in Schedule B, Table 4 - Treated Sewage Effluent Standards and records of the monitoring results kept for at least five (5) years and made available to the administering authority on request.

(B46) The influent annual average daily dry weather flow of sewage must not exceed 60 kilolitres per day for each authorised sewage treatment plant under this environmental authority.

Schedule B, Table 4 - Treated Sewage Effluent Standards

Quality Characteristic	Sampling and in-situ measurement Point Location	Limit Type	Release Limit	Frequency
5-day Biochemical Oxygen Demand (inhibited)	Release pipe from sewage treatment plant located on PL198;	Maximum	20 mg/L	Monthly
Suspended Solids		Maximum	30 mg/L	
pH		Range	6.0 to 9.0	
E-Coli	Release pipe from sewage treatment plant located on PL230	80 th percentile based on at least 5 samples with not less than 30 minutes between samples.	1000 cfu per 100 mL	
		Maximum	10000 cfu per 100 ml	

SCHEDULE C – REGULATED DAMS

- (C1) The name of each **regulated dam** must be clearly sign posted at the dam location at all times.
- (C2) Construction of any dam or modifications to an existing dam determined to be in the high **hazard** or significant **hazard category** in accordance with the most recent version of "*Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*" is prohibited unless the required **design plan** details have been entered into the regulated dam Register and certified by the chief executive officer for the holder of the environmental authority, or their delegate, as being accurate and correct.

Regulated Dam Register

- (C3) The holder of this environmental authority must maintain a Register of regulated dams that must include, as a minimum, the following information for each regulated dam:
- (a) dam name, the coordinates for its location and date of entry in the register;
 - (b) dam purpose and its proposed/actual contents;
 - (c) hazard category assessed using the most recent version of "*Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*";
 - (d) details of the composition and construction of any liner;
 - (e) dimensions (metres) and surface area (hectares) measured at the footprint of the dam;
 - (f) maximum operational volume (megalitres);
 - (g) design storage allowance at 1 November each year (megalitres);
 - (h) mandatory reporting level (metres);
 - (i) date construction was certified as compliant with the design plan;
 - (j) name and qualifications of certifier;
 - (k) dates on which the dam was inspected for structural and operational adequacy;
 - (l) date on which the report of the annual structural and operational adequacy inspection was provided to the administering authority;
 - (m) dates on which the dam was inspected for the detection of leakage through any liner; and
 - (n) dates on which the dam was inspected for the purpose of annually ascertaining the available storage capacity on the 1 November each year.

*Note: The dam register in the approved departmental format is available for download at:
http://www.derm.qld.gov.au/environmental_management/coal-seam-gas/environment.html.*

- (C4) The holder of this environmental authority must provisionally enter the required information in the Register of regulated dams when a design plan for a regulated dam is submitted to the administering authority.
- (C5) The holder of this environmental authority must make a final entry of the required information in the Register of regulated dams once compliance with Condition (C17) has been achieved.
- (C6) The holder of this environmental authority must ensure that the information contained in the Register of regulated dams is complete and current on any given day.
- (C7) All entries in the Register of regulated dams must be certified by the chief executive officer for the environmental authority holder, or their delegate, as being accurate and correct.
- (C8) The holder of this environmental authority must submit the Register of regulated dams or information contained in the Register available to the administering authority at each annual return and when requested to do so in the form requested by the administering authority.

Construction and Operational Requirements for New Dams

- (C9) All **aggregation dams** must:

- (a) be designed with a floor and sides of material that will contain the wetting front and any entrained contaminants within the bounds of the containment system during its operational life including any period of decommissioning and rehabilitation; and
 - (b) have a system that will detect any passage of the wetting front or entrained contaminants through the floor or sides of the dam and enable the repair of the containment system or its decommissioning and rehabilitation.
- (C10) By 1 October 2011, all **brine** dams must:
- (a) be designed with a floor and sides of material that will contain the wetting front and any entrained contaminants within the bounds of the containment system during its operational life including any period of decommissioning and rehabilitation;
 - (b) have a system that will detect any passage of the wetting front or entrained contaminants through the floor or sides of the dam, enable the repair of the containment system or its decommissioning and rehabilitation; and
 - (c) the collection and proper disposal of any contaminants that move beyond the bounds of the containment system.
- (C11) The holder of this environmental authority must ensure that regulated dams:
- (a) are constructed to provide flood immunity such that the dam is adequately protected against overtopping and will be provided with erosion protection from external flooding events, at or above the Annual Exceedence Probability (AEP) specified for determining Spillway capacity; and
 - (b) are not to be constructed in areas that are estimated to be submerged by a flooding event from a recognised watercourse, at or above an Annual Exceedence Probability (AEP) of 0.02 (1 in 50).
- (C12) All regulated dams must be designed in accordance with the requirements of the most recent version of *"Manual for Assessing Hazard Categories and Hydraulic Performance of Dams"* by and constructed under the supervision of a **suitably qualified and experienced person**.

Regulated Dam Design Plan and 'As Constructed' Certification

- (C13) The construction and operation of regulated dams is prohibited unless the holder of this environmental authority has submitted to the administering authority a copy of the design plan, together with the **certification** of a **suitably qualified and experienced person** that the regulated dam:
- (a) will deliver the performance stated in the design plan;
 - (b) has had its hazard category assessed and been designed in accordance with the requirements of the most recent version of *"Manual for Assessing Hazard Categories and Hydraulic Performance of Dams"*; and
 - (c) when constructed and operated, will be compliant in all respects with the relevant conditions of this environmental authority.
- (C14) The design plan must include, but not be limited to:
- (a) a statement of the relevant legislation, regulatory documents and engineering practice relied upon in the design plan;
 - (b) a statement of the facts and data being used in the design plan and the limitations to the application and interpretation of that material;
 - (c) an assessment of the hazard category of the proposed dam based on the identification of potential impacts on any relevant sensitive places for any applicable dam failure scenarios, including the cumulative impact should all dams fail at once;
 - (d) detailed specifications for the design, operation, maintenance and decommissioning of the dam(s);

- (e) an operational plan that includes contingency / emergency response procedures designed to avoid / minimise discharges resulting from any overtopping or loss of structural integrity of the dam;
 - (f) design, specification and operational rules for any related structures and systems used to prevent the overtopping of the proposed dam;
 - (g) a detailed plan for the decommissioning and rehabilitation of the dam at the end of its operational life;
 - (h) any other matter required by the certifying suitably qualified and experienced person; and
 - (i) evidence supporting the claims of the certifier that they are a suitably qualified and experienced person.
- (C15) If, within the 20 business days following the lodgement of a certified design plan the administering authority notifies the holder of this environmental authority, in writing, that the design plan is not compliant with either:
- (b) the conditions of this environmental authority; or
 - (c) the requirements set out in the most recent version of "*Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*"

then the construction and operation of the regulated dam is prohibited until the administering authority provides written advice that its construction may proceed.

- (C16) When construction of any regulated dam is complete, the holder of this environmental authority must submit to the administering authority one hard copy and one electronic copy of a set of 'as constructed' drawings, together with the certification of a suitably qualified and experienced person that the dam 'as constructed' will deliver the performance stated in the design plan and at the time of certification it is compliant in all respects with Conditions (C9) to (C14) of this environmental authority.
- (C17) Each regulated dam must be maintained and operated in a manner that is consistent with the design plan and the certified 'as constructed' drawings for the duration of its operational life and until decommissioned and rehabilitated.
- (C18) Upon any change in its purpose or stored contents of a regulated dam, the hazard category of the dam must be determined by a suitably qualified and experienced person prior to any such change.

Mandatory Reporting Level

- (C19) The Mandatory Reporting Level must be marked on each regulated dam in such a way that it is clearly observable during routine inspections of each dam.
- (C20) The holder of this environmental authority must notify the administering authority immediately when the level of the contents of any regulated dam reaches the Mandatory Reporting Level, and immediately act to prevent or, if unable to prevent, to minimise any actual or potential environmental harm.

Annual Inspection and Report

- (C21) Each regulated dam must be inspected annually by a suitably qualified and experienced person.
- (C22) At each annual inspection, each regulated dam must be assessed for:
- (a) its hazard category in accordance with the most recent version of "*Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*", and
 - (b) condition and adequacy for dam safety; and
 - (c) its structural, geotechnical and hydraulic performance against the criteria contained in the certified design plan.

- (C23) An assessment of the adequacy of the available storage in each regulated dam is to be made, based on an actual dam level observed in the month of October in each year, and the resultant estimate of the level in that dam as at 1 November in each year must be equal or less than the design storage allowance for the dam.
- (C24) Where the assessment of the adequacy of the available storage in any regulated dam indicates that the design storage allowance will be exceeded, or at any other time the holder of this environmental authority becomes aware that the design storage allowance has been or will be exceeded, the holder of this environmental authority must immediately notify the administering authority, and immediately act to prevent or, if unable to prevent, to minimise any actual or potential environmental harm.
- (C25) For each annual inspection, a copy of a report on the condition and adequacy of each regulated dam, certified by the suitably qualified and experienced person and including any recommended actions to be taken to ensure the integrity of each regulated dam, must be provided to the administering authority upon request.
- (C26) The holder of this environmental authority must, upon receipt of the annual inspection report, consider the report and its recommendations, take action to ensure that each regulated dam will safely perform its intended function, and within one month of receiving the report, notify the administering authority in writing of the recommendations of the inspection report and the actions taken to ensure the integrity of each regulated dam.

SCHEDULE D — LAND

General

- (D1) Contaminants that will or may cause environmental harm must not be directly or indirectly released to land except as permitted under this environmental authority.

Disturbance to Land – General

- (D2) Prior to conducting petroleum activities that involve significant disturbance to land, an assessment must be undertaken of the condition, type and ecological value of any vegetation in such areas where the activity is proposed to take place.
- (D3) The assessment required by Condition (D2) must be undertaken by a suitably qualified person and include the carrying out of field validation surveys, observations and mapping of any **Category A, B or C Environmentally Sensitive Areas (ESA's)** and the presence of species classed as endangered, vulnerable, rare or near threatened under the *Nature Conservation Act 1992*.
- (D4) If the assessment required by Conditions (D2) and (D3) indicates that a regional ecosystem (RE) mapped as 'Endangered' or 'Of Concern' by the Queensland Herbarium should be in a lower conservation value classification and the holder of this environmental authority wishes to undertake activities as if the ecosystem is of the lower conservation value they must notify the administering authority in writing before any significant disturbance to land takes place.
- (D5) If, within the 20 business days following the lodgement of the notification under Condition (D4) the administering authority notifies the holder of this environmental authority, in writing, that the RE mapping requires further validation, then significant disturbance to land in the mapped regional ecosystem are prohibited until the administering authority provides written advice that significant disturbance to land may proceed.
- (D6) The holder of this environmental authority, when carrying out petroleum activities must:
- (a) avoid, minimise or mitigate (in order of preference) any impacts on areas of vegetation or other areas of ecological value;
 - (b) minimise disturbance to land that may otherwise result in land degradation;
 - (c) ensure that for land that is to be **significantly disturbed** by petroleum activities:
 - (i). the top layer of the soil profile is removed;
 - (ii). stockpiled in a manner that will preserve its biological and chemical properties; and
 - (iii). used for **rehabilitation** purposes (in accordance with Condition (H4));
 - (d) avoid clearing mature trees; and
 - (e) prior to carrying out field based activities, make all relevant staff, contractors or agents carrying out those activities, aware of the location of any category A, B or C ESA's and the requirements of this environmental authority.

Note: This environmental authority does not authorise the taking of protected animals or the tampering with an animal breeding place as defined under the Nature Conservation Act 1992 and Regulations.

- (D7) In accordance with Condition (D6), if significant disturbance to land is unavoidable, the holder of this environmental authority must not clear vegetation or place fill:
- (a) in a way which significantly isolates, fragments or dissects tracts of vegetation resulting in a reduction in the current level of ecosystem functioning, ecological connectivity (i.e. stepping stone or contiguous bioregional/local corridor networks) and/or results in an increase in **threatening processes** (e.g. potential impacts associated with edge effects or introduced species);
 - (b) on slopes greater than 10% for activities other than pipelines and wells; or
 - (c) in **discharge areas**.

- (D8) Clearing of remnant vegetation shall not exceed 10 metres in width for the purpose of establishing tracks and 20 metres in width for dual carriageway roads unless otherwise approved by the administering authority in writing.
- (D9) Cleared vegetation must be stockpiled in a manner that facilitates respreading or salvaging and does not impede vehicle, stock or wildlife movements.

Disturbance to Land – Environmentally Sensitive Areas

- (D10) The holder of this environmental authority must ensure that petroleum activities:
- (a) are not conducted in any Category A, B or C ESA;
 - (b) are not conducted within 200m of any category A, B or C ESAs (protection zone); and
 - (c) do not involve activities other than **limited petroleum activities** within 1km of a category A ESA, or within 500m of a listed category B or C ESA (buffer zone).

Note: Indicative ESA mapping is available on the Department of Environment and Resource Management website at:

http://www.derm.qld.gov.au/ecoaccess/maps_of_environmentally_sensitive_areas.php

- (D11) Limited petroleum activities carried out in accordance with Condition (D10(c)) must be preferentially located in pre-existing areas of clearing or significant disturbance to the greatest practicable extent and avoid the clearing of mature trees.

- (D12) Despite Condition (D10), limited petroleum activities may be undertaken within 200m of, or in the following specified Category B and C ESAs:

- (a) 'Endangered' regional ecosystems;
- (b) 'Of Concern' regional ecosystems;
- (c) State Forests;
- (d) Timber Reserves

provided that they do not overlap with any other Category A, B or C ESA or its associated protection zone.

- (D13) Where limited petroleum activities are proposed to be undertaken within 200m of, or in the Category B and C ESAs specified in Condition (D12), the holder of this environmental authority must:

- (a) be able to demonstrate that no reasonable or practicable alternative exists; and
- (b) where the ESA is a State Forest or Timber Reserve:
 - (i). obtain written approval from the authority responsible for the administration of the *Forestry Act 1959*;
 - (ii). comply with all restrictions and conditions contained within the approval required under Condition (D13(b)(i));
 - (iii). where the conditions of the approval required under Condition (D13(b)(i)) conflict with the conditions of this environmental authority, comply with the conditions of this environmental authority; and
 - (iv). provide a copy of the written approval required under Condition (D13(b)(i)) to the administering authority upon request.

- (D14) Where limited petroleum activities are undertaken within 200m of, or in the Category B or C ESAs specified in Condition (D12), disturbance to land must only be located and carried out in areas according to the following order of preference:

- (a) pre-existing cleared areas or significantly disturbed areas less than 200m from a Category C ESA;
- (b) pre-existing cleared areas or significantly disturbed areas less than 200m from a Category B ESA;

- (c) undisturbed areas less than 200m from a Category C ESA;
 - (d) undisturbed areas less than 200m from a Category B ESA;
 - (e) pre-existing areas of significant disturbance within a Category C ESA (e.g. areas where significant clearing or thinning has been undertaken within a RE, and/or areas containing high densities of weed or **pest** species which has inhibited re-colonisation of native regrowth);
 - (f) pre-existing areas of significant disturbance within a Category B ESA (e.g. areas where significant clearing or thinning has been undertaken within a RE, and/or areas containing high densities of weed or pest species which has inhibited re-colonisation of native regrowth);
 - (g) areas where clearing of a Category C ESA is unavoidable; and
 - (h) areas where clearing of a Category B ESA is unavoidable.
- (D15) Notwithstanding Conditions (D12) to (D14), where limited petroleum activities are proposed to be undertaken within 200m of, or in a Category B or C ESAs specified in Condition (D12), any vegetation clearing must not exceed any of the following areas:
- (a) if the disturbance relates to an Endangered or Of Concern RE, 10% of the **remnant unit** of Endangered or Of Concern RE as ground truthed and mapped before any activity commences as per Condition (D2) and (D3) of this environmental authority for the life of the project; and
 - (b) more than 30m² for the construction of a sump; or
 - (c) six (6) metres in width for tracks; or
 - (d) 12 metres in width for pipeline construction purposes.
- (D16) For each well site within 200m of, or in a Category B or C ESA specified in Condition (D12), all reasonable and practical measures are taken to minimize the area cleared which must include but not be limited to, for each well site, ranked constraints mapping and a risk assessment which considers safety.
- (D17) Details of any significant disturbance to land undertaken within 200m of, or in a Category B or C ESA, along with a record of the assessment required by Conditions (D2) and (D3) must be kept and submitted to the administering authority upon request.

Offsets

- (D18) If the holder of this environmental authority requires access to Endangered Regional ecosystems, 'Of Concern' Regional Ecosystems, State Forests or Timber Reserves, the environmental authority holder must enter in to an environmental offset agreement with the administering authority which is at least equivalent to the value of any disturbed 'Endangered' or 'Of Concern' RE within six (6) months after submitting an Operational Plan in accordance with Conditions (A5) – (A8).
- (D19) The environmental authority holder must implement any environmental offset agreement entered into in accordance with Condition (D18) as soon as practicable after finalisation.

Soil Management

- (D20) The holder of this environmental authority must develop and implement soils management procedures for areas to be disturbed by petroleum activities prior to commencement of petroleum activities which has been certified by a suitably qualified person to prevent or minimise the impacts of soil disturbance. These procedures must include but not be limited to:
- (a) establish baseline soils information for areas to be disturbed including soil depth, pH, electrical conductivity (EC), chloride, cations (aluminium, calcium, magnesium, potassium and sodium), exchangeable sodium percentage (ESP), particle size and soil fertility (including nitrogen, phosphorous, potassium, sulphur and micronutrients);
 - (b) a soils monitoring program outlining parameters to be monitored, frequency of monitoring and maximum limits for each parameter;

- (c) identify soil units within areas to be disturbed by petroleum activities at a scale of 1:50 000, in accordance with the "Guidelines for Surveying Soil and Land Resources, 2nd Edition" (McKenzie et al. 2008), "Australian Soil and Land Survey Handbook, 3rd Edition" (National Committee on Soil and Terrain 2009) and "The Australian Soil Classification" (Isbell 2002) or subsequent versions thereof;
- (d) develop soil descriptions that are relevant to assessment for agricultural suitability, **topsoil** assessment, erodibility and rehabilitation, for example:
 - (i). shallow cracking clay soils;
 - (ii). deep cracking clay soils;
 - (iii). deep saline and/or sodic cracking clay soils with melonholes;
 - (iv). thin surface, sodic duplex soils;
 - (v). medium to thick surface (say >15 cm), sodic duplex soils; and
 - (vi). non-sodic duplex soils;
- (e) detailed topsoil and topsoil stockpile management procedures in the event of any significant soil disturbance;
- (f) detailed mitigation measures and procedures to manage the risk of adverse soil disturbance in the carrying out of the petroleum activity(ies);
- (g) for pipelines, methods of keeping soil horizons separate on excavation, storage and backfilling; and
- (h) for areas of good quality agricultural land, detailed methods to be undertaken to minimise potential impacts.

(D21) A copy of the Soils Management Procedures must be submitted to any potentially affected landholders upon request.

Acid Sulfate Soils

(D22) The holder of this environmental authority must determine the presence of **acid sulfate soils** prior to:

- (a) any excavation or otherwise removing 100m³ or more of soil or sediment; or
- (b) filling of land involving 500m³ or more of material with an average depth of 0.5 of a metre or greater .

(D23) The holder of this environmental authority must determine the presence of acid sulfate soils prior to any excavation or filling at, or in exceedance of, the thresholds in Condition (D22)(a) or (b) in any of the following areas:

- (a) areas to be disturbed where there are lithologies with sulfide bearing minerals; or
- (b) naturally saline areas (.eg. salt pans, lakes etc); or
- (c) wetland areas (e.g. mapped as Land zone three (3) on the regional ecosystem database preclear layer and/or areas mapped as wetlands under the QLD Wetlands program, Wetland/Info); or
- (d) areas with elevation less than 2 metres AHD; or
- (e) areas with soil and sediment of recent geological age (Holocene); or
- (f) areas where marine or estuarine sediments and tidal lakes are present; or
- (g) low-lying coastal wetlands or back swamp areas, waterlogged or scalded areas; or
- (h) stranded beach ridges and adjacent swales, interdune swales or coastal sand dunes; or
- (i) coastal alluvial valleys; or
- (j) areas where the dominant vegetation is tolerant of salt, acid and/or waterlogging conditions (e.g. mangroves, saltcouch).

(D24) Subject to Conditions (D22) and (D23) and prior to any disturbance of acid sulfate soils, the holder of this environmental authority must prepare an acid sulfate soil environmental management plan in accordance with Appendix 4 of the State Planning Policy 2/02 Guideline. Acid Sulfate Soils.

(D25) The acid sulfate soil environmental management plan must be prepared and implemented by a suitably qualified person.

- (D26) The holder of this environmental authority must comply with the acid sulphate soil environmental management plan.

Fauna Management

- (D27) Fauna management procedures must be developed and implemented to ensure that petroleum activities (including, but not limited to, pipeline construction, dam construction and operation) are carried out in a manner that minimises the risk of injury, harm, or entrapment to wildlife and stock.
- (D28) **Well lease infrastructure** and dams must be securely fenced and / or screened as soon as practicable, but within one (1) month after construction is completed to:
- (a) exclude and prevent the entrapment of livestock and wildlife; and
 - (b) limit habitats for the introduction or spread of noxious fauna pest species.
- (D29) The fauna management procedures must include training and awareness of staff and contractors and ensure that any planned fauna handling is undertaken by a suitably qualified person.

Note: The procedures required by Conditions (D27) and (D29) should consider the "Australian Pipeline Industry Association Code of Environmental Practice – Onshore Pipelines" dated March 2009, or subsequent versions thereof.

Pest management

- (D30) In carrying out the petroleum activity(ies) the holder of this environmental authority must develop and implement an effective pest management program which has been certified by a suitably qualified person that includes but is not limited to the following:
- (a) identification of pest species and infestation areas;
 - (b) prevention and/or minimisation of the introduction and/or spread of pests;
 - (c) control and management of pest outbreaks as a result of petroleum activities; and
 - (d) details of community consultation in developing the pest management program.

Note: The pest management program required by Condition (D30) should consider the "Petroleum Industry (including coal seam methane gas) Minimising Pest Spread Guidelines" dated June 2008, or subsequent versions thereof. This document is available for download from:
http://www.dpi.qld.gov.au/documents/Biosecurity_EnvironmentalPests/IPA-Minimising-Pest-Spread-Advisory-Guidelines.pdf

- (D31) A copy of the pest management procedures must be made available to any potentially affected landholders upon request.

Chemical and Fuel Storage

- (D32) All explosives, hazardous chemicals, corrosive **substances**, toxic substances, gases, dangerous goods, flammable and combustible liquids (including petroleum products and associated piping and infrastructure) must be stored and handled in accordance with the relevant Australian Standard where such is available.
- (D33) Notwithstanding the requirements of any Australian Standard, any liquids stored on site that have the potential to cause environmental harm must be stored in or serviced by an effective containment system that is impervious to the materials stored and managed to prevent the release of liquids to waters or land. Where no relevant Australian Standard is available, the following must be applied:

- (a) storage tanks must be **bunded** so that the capacity and construction of the bund is sufficient to contain at least 110% of a single storage tank or 100% of the largest storage tank plus 10% of the second largest storage tank in multiple storage areas; and
- (b) drum storages must be bunded so that the capacity and construction of the bund is sufficient to contain at least 25% of the maximum design storage volume within the bund.

(D34) All containment systems must be designed to minimise rainfall collection within the system.

Pipelines

(D35) Pipelines must be preferentially located alongside existing linear infrastructure such as roads, tracks and powerlines.

(D36) Pipeline trenches must only be left open for the minimum time practicable.

(D37) The length of pipeline trench open at any one time must be minimised as far as practicable.

(D38) Completed pipeline construction areas must be:

- (a) a **stable** landform with no subsidence or erosion gullies for at least five (5) years; and
- (b) re-profiled to original contours and established drainage lines; and
- (c) be visually consistent with the surround land features.

(D39) The holder of this environmental authority must monitor reinstated pipeline corridors for subsidence at least every 20 business days for the first 120 business days after reinstatement to ensure compliance with Condition (D38).

SCHEDULE – ENVIRONMENTAL NUISANCE

Odour, dust and other airborne contaminants

- (E1) The release of odour, dust or any other airborne contaminant(s), or light from the petroleum activity(ies) must not cause an environmental nuisance at any **sensitive place**.

Noise

- (E2) Prior to undertaking petroleum activities that will result in **short-term, medium-term or long term noise events** that are likely to impact on a sensitive receptor, the holder of this environmental authority must model or calculate any potential noise emissions from the relevant petroleum activity and determine if noise emissions are likely to exceed the noise levels specified in Schedule E, Table 1 – Noise limits at Sensitive Receptors.
- (E3) If noise modelling or the calculations indicates that petroleum activities are likely to exceed the noise levels specified in Schedule E, Table 1 – Noise limits at Sensitive Receptors at a noise sensitive receptor, the holder of this environmental authority must prepare a Noise Management Plan which demonstrates how the noise limits specified in Schedule E, Table 1 – Noise limits at Sensitive Receptors will be achieved in the event of a valid noise complaint.
- (E4) The Noise Management Plan must address, but not be limited to, the following matters:
- (a) a site based noise assessment to determine compliance with the noise limits in Schedule E, Table 1 – Noise limits at Sensitive Receptors
 - (b) the measured and/or predicted noise level of these noise sources and activities at noise sensitive receptors, taking into account any tonal or impulsive noise impacts;
 - (c) the reasonable and practicable control or abatement measures (including relocating the activity, hours of operation, or having an **alternate arrangement** in place with any potentially affected person) that can be undertaken to reduce identified intrusive noise sources;
 - (d) the level of noise at noise sensitive receptors that would be achieved from implementing these measures;
 - (e) the handling of future noise complaints;
 - (f) community liaison and consultation including but not limited consultation processes for when night time activities (i.e. between 10:00 pm and 6:00 am) are likely to exceed 25dBA; and
 - (g) training of staff and contractors in best available noise management practices.
- (E5) The emission of noise from the licensed place must not result in levels greater than those specified in Schedule E, Table 1 – Noise limits at Sensitive Receptors in the event of a valid complaint about noise being made to the administering authority.
- (E6) Where alternative arrangements are in place with any affected person as referred to by Condition (E4)(c), the noise limits in Schedule E, Table 1 – Noise limits at Sensitive Receptors as $L_{Aeq, adj, 15 min}$ do not apply at that location for the duration for which the alternative arrangements are in place.

Schedule E, Table 1 – Noise Limits at Sensitive Receptors

Time Period		Short Term Noise Event	Medium Term Noise Event	Long Term Noise Event
7:00am – 6:00pm	$L_{Aeq,adj,15\ min}$ Max $L_{pA, 15\ mins}$	45 dBA 55 dBA	43 dBA 51 dBA	40 dBA 45 dBA
6:00pm – 10:00pm	$L_{Aeq,adj,15\ min}$ Max $L_{pA, 15\ mins}$	40 dBA 50 dBA	38 dBA 46 dBA	35 dBA 40 dBA
10:00pm – 6:00am	$L_{Aeq,adj,15\ min}$ Max $L_{pA, 15\ mins}$	28 dBA 38 dBA	28 dBA 36 dBA	28 dBA 33 dBA
6:00am – 7:00am	$L_{Aeq,adj,15\ min}$ Max $L_{pA, 15\ mins}$	40 dBA 50 dBA	38 dBA 46 dBA	35 dBA 40 dBA

L_{Aeq} and Max L_{pA} are to be measured over any 15 minute period
Deemed background noise levels (L_{ABG}) for Schedule E, Table 1 - Noise Limits at Sensitive Receptors are:

7:00 am - 6:00pm: 35 dBA
6:00 pm – 10:00 pm: 30 dBA
10:00 pm – 6:00 am: 25 dBA
6:00 am – 7:00 am: 30 dBA

- (E7) If the noise subject to a complaint is tonal or impulsive, the adjustments detailed in Schedule E, Table 2 – Adjustments to be Added to Noise Levels at Sensitive Receptors are to be added to the measured noise level(s) to derive $L_{Aeq, adj, 15\ min}$.

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

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

- (E8) Where alternative arrangements are in place with any affected person as referred to by Condition (E4)(c), the noise limits in Schedule E, Table 1 – Noise limits at Sensitive Receptors do not apply at that location for the duration for which the alternative arrangements are in place.

Low Frequency Noise

- (E9) Notwithstanding Condition (E2), emission of any noise below 315 Hz must not cause an environmental nuisance.
- (E10) Low frequency noise from the petroleum activities is not considered to be an environmental nuisance under Condition (E8) if monitoring shows that noise emissions do not exceed the following limits:
- 50 dB(Z) measured inside the sensitive receptor; and
 - the difference between the internal A-weighted and Z-weighted noise levels is no greater than 15 dB.

Vibration and Blasting Activities

- (E11) The holder of this environmental authority must develop a blast management plan in accordance with Australian Standard 2187 for each planned blasting activity before it is undertaken.

- (E12) The blast management plan required by Condition (E10) must include measures to minimise the likelihood of any adverse effects being caused by airblast overpressure and/or ground borne vibrations at any sensitive receptor and demonstrate current best practice environmental management.
- (E13) All blasting must be carried out in a proper manner by a suitably qualified person.
- (E14) Noise from blasting operations must not exceed an airblast overpressure level, when measured at or extrapolated to any sensitive receptor, of 115 dB (linear peak) for nine (9) out of any ten (10) consecutive blasts initiated nor 120 dB (linear peak) at any time.
- (E15) Ground-borne vibration peak particle velocity caused by blasting operations, when measured at or extrapolated to any sensitive receptor must not exceed more than 5 mm per second for nine (9) out of any ten (10) consecutive blasts initiated, or 10 mm per second at any time.

SCHEDULE F – AIR

Fuel Burning or Combustion Equipment

- (F1) Contaminants emitted from fuel burning and combustion equipment point sources that are capable of burning at least 500kg in an hour must be directed vertically upwards.
- (F2) Fuel burning equipment that is capable of burning at least 500kg in an hour must not be operated in **hubs** or within five (5) kilometres of populated areas.
- (F3) Prior to the installation of any new or additional fuel burning and combustion equipment that is capable of burning at least 500kg of fuel in an hour, following the issue of this environmental authority, the holder of this environmental authority must conduct air dispersion modelling to calculate the ground level concentrations of emissions from the fuel burning or combustion equipment under maximum operating conditions within the relevant airshed and identify any potential impacts to air quality within the study area.
- (F4) The holder of this environmental authority must ensure that the calculated ground level concentrations required under Condition (F3) do not exceed the criteria in Schedule F - Table 1 – Maximum Ground Level Concentration Criteria for each air contaminant.

Schedule F, Table 1 – Maximum Ground Level Concentration Criteria

Contaminant	Concentration at 0°Celsius	Units	Averaging time
NOx as Nitrogen Dioxide	250	µg/m ³	1 hour
NOx as Nitrogen Dioxide	33	µg/m ³	1 year
Carbon monoxide	11	mg/m ³	8 hour

- (F5) The holder of this environmental authority must undertake verification monitoring of the air dispersion modelling post commissioning of fuel burning equipment that is capable of burning at least 500kg of fuel in an hour.
- (F6) Where the verification monitoring required under Condition (F5) demonstrates that the air dispersion modelling under-predicted actual concentrations, the holder of this environmental authority must:
 - (a) provide details to the administering authority within ten (10) business days;
 - (b) re-undertake the modelling based on the new information; and
 - (c) determine and implement appropriate pollution control measures to bring the emissions into compliance with the limits specified in Schedule F, Table 1 – Maximum Ground Level Concentration Criteria.
- (F7) The holder of this environmental authority must maintain a Register of Fuel Burning or Combustion Equipment that is capable of burning at least 500kg of fuel in an hour that must include, as a minimum, the following information for each of the equipment:
 - (a) Fuel Burning or Combustion Equipment Name and Location;
 - (b) Stack emission height (metres);
 - (c) Minimum efflux velocity (m/s);
 - (d) Mass emission rates (g/s); and
 - (e) Contaminant concentrations (mg/Nm³ @ x %O₂ dry gas at 0°Celsius and 1 atmosphere).
- (F8) The holder of this environmental authority must ensure that the information contained in the Register of Fuel Burning or Combustion Equipment is complete and current on any given day.

- (F9) All entries in the Register of Fuel Burning or Combustion Equipment must be certified by the chief executive officer for the tenure holder, or their delegate, as being accurate and correct.

SCHEDULE G – WASTE

General

- (G1) All general waste must be removed from the site and sent to a recycling facility or disposal facility licensed to accept the waste.
- (G2) All regulated waste must be removed from the site by a person who holds a current authority to transport such waste under the provisions of the *Environmental Protection Act 1994* and sent to a recycling facility or disposal facility licensed to accept the waste.
- (G3) Waste must not be burned or allowed to be burned on the licensed site.
- (G4) All waste fluids and muds resulting from drilling and exploration activities must be contained in a dam or containment structure for disposal, remediation or reuse where applicable.

Coal Seam Gas Water Management

- (G5) The CSG Environmental Management Plan as required by sections 310D and 662 of the *Environmental Protection Act 1994*, must include, in addition to the matters specified in those sections, a water management strategy that includes actions and milestones for the whole project area which minimises the development footprint of the project but does not allow for CSG water to be disposed of, as the primary means, in **evaporation dams**, unless otherwise approved by the administering authority.
- (G6) The holder of this environmental authority must implement the coal seam gas water management plan (CWM Plan) [*insert date of Plan*] for the authorised petroleum activities.
- (G7) The holder of this environmental authority must ensure that coal seam gas water is contained, is not released to land or waters and is only used for purposes specifically authorised:
 - (a) under this environmental authority; or
 - (b) under Section 186 of the *Petroleum and Gas (Production and Safety) Act 2004*; or
 - (c) under Section 86 of the *Petroleum Act 1923*; or
 - (d) under an approval of resource for **beneficial use** as provided for under the *Environmental Protection Act 1994*.
- (G8) The holder of this environmental authority must ensure that the coal seam gas water to be used for domestic or stock purposes meets the ANZECC 2000 Water Quality Guidelines, or subsequent versions thereof, for stock and domestic purposes.
- (G9) Coal seam gas water released to the environment in accordance with Condition (G7) must not have any properties that could cause, nor contain any contaminants in concentrations that are capable of causing environmental harm.
- (G10) Where any inconsistency exists between the conditions of this environmental authority and the CWM Plan, the conditions of this environmental authority prevail.

Note: CSG water that is beneficially used under an approval issued under the Environmental Protection (Waste Management) Regulation 2000 will be regulated under the conditions of that approval.

Coal Seam Gas Water Use for Dust Suppression

- (G11) CSG water produced from the authorised petroleum activities may only be used for dust suppression:
 - (a) on roads; and/or
 - (b) for construction and operational purposes for activities authorised by this environmental authority.

- (G12) CSG water produced from the authorised petroleum activities may be used for dust suppression provided that:
- (a) the water quality meets the limits specified in Schedule G, Table 1 – Dust suppression water contaminant release limits for each of the water quality characteristics; and
 - (c) on local government controlled roads, written approval from the relevant Local Government has been given to the environmental authority holder.

Schedule G, Table 1 – Dust suppression water contaminant release limits.

Water Quality Characteristics	Unit	Limit	Limit Type
pH	ph Units	6.0 to 9.0	Range
Sodium Adsorption Ratio	ratio	8*	80 th Percentile
		12*	Maximum
Total Suspended Solids	mg/L	30	Maximum
Total Dissolved Solids	mg/L	2000*	Maximum
Total Petroleum Hydrocarbons	mg/L	10	Maximum

**Note: These values may be reduced depending on soil type and mineralogy.*

- (G13) Use of CSG water for dust suppression activities must be carried out in a manner that:
- (a) vegetation is not damaged;
 - (b) soil quality is not adversely impacted;
 - (c) there is no surface ponding or runoff of the CSG water from the application area;
 - (d) minimises deep drainage below the root zone of any vegetation;
 - (e) quality of shallow aquifers is not adversely affected; and
 - (f) there are no releases of CSG waters to any surface waters.

CSG water, treated water or brine injection where there is no potential for material impacts to drinking water

Note: Applications made under Chapter 5A of the Environmental Protection Act 1994 for injection of fluid from CSG operations into aquifers must be accompanied by a risk assessment outlining potential environmental impacts and proposed mitigation measures for the activity in accordance with the application requirements in DERM's draft guideline "Injection of fluid waste from coal seam gas activities". In circumstances where injection has not previously been undertaken in the aquifer(s) and at the locality, subject to the application, DERM will require a trial (<12 months) designed to determine the feasibility of injection as a disposal option for CSG water, treated water or brine, to be undertaken. Upon completion of an injection trial, the proponent may apply to the administering authority for an amendment to the environmental authority to use injection as a long term waste disposal option.

Certain activities where injection of fluid from CSG operations require separate and additional approval from the Office of Water Supply Regulator under the Water Supply (Safety and Reliability) Act 2008 .

- (GB1) The only fluids authorised to be injected into an aquifer(s) are those fluid types into the aquifer formations and at quantities and locations listed in Schedule GB, Table 1 – Details of Authorised Fluid Injection.

Schedule GB, Table 1 – Details of Authorised Fluid Injection

Well Location (Lat & Long or Map Ref)	Well Number/ Reference	Target Formation	Fluid Type	Water Quality ^[1] Impact Zone	Hydraulic Impact Zone
		Precipice Sandstone			

- (GB2) If the holder of this environmental authority becomes aware that environmental harm is caused or threatened to be caused, as a result of injection activities, injection must cease immediately.
- (GB3) The holder of this environmental authority is authorised to inject CSG water and / or treated water into the Precipice Sandstone for a period of three (3) months provided that requirements of Condition (GB4) and Condition (GB5) have been met. To remove any doubt, this environmental authority does not authorise the injection of brine into the Precipice Sandstone.
- (GB4) Prior to the commencement of injection activities, the holder of this environmental authority must
- (a) notify the administering authority of the proposed start date for the injection activities;
 - (b) provide information as required in Schedule GB, Table 1 and Schedule GB, Table 2; and
 - (c) prepare a risk assessment outlining potential environmental impacts and proposed mitigation measures for the activity in accordance with the application requirements in DERM's draft guideline "Injection of fluid waste from coal seam gas activities".
- (GB5) Once the administering authority has assessed the risk assessment report required in Condition (GB4), the administering authority will provide written notification to the holder of this environmental authority within 20 business days after making a decision whether the injection activities can commence.
- (GB6) The construction of injection wells must be carried out in accordance with well construction requirements in the most recent version of DERM's document "*Interim standards for the construction of injection wells*" and comply with any relevant conditions of this environmental authority.
- (GB7) Injection well(s) authorised by this environmental authority must have appropriate records and documents which support and indicate mechanical integrity and which hold a certificate of mechanical integrity prepared and signed by a suitably qualified person(s), available for inspection such that:
- (a) there is no significant leakage in the casing, tubing, or packer; and
 - (b) there is no significant fluid movement into a water resource aquifer through vertical channels adjacent to the well bore hole.
- (GB8) Fluid used in well injection must comply with the contaminant limits prescribed in Schedule GB, Table 2 – Specific Contaminant Limits for Injection Fluid.

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

Schedule GB, Table 2 – Specific Contaminant Limits for Injection Fluid

Well Number/ Reference	Contaminant Limit				
	Total Suspended Solids (mg/L, max)	Dissolved Oxygen (ppm, max)	Salinity (ppm, max)	[Microbiological Contaminant XXXX] (xxx, max/min)	[Contaminant XXXX] (xxx, max/min)

Note: No injection is authorised without having determined specific limits in Condition (GB6). Specific limits in Condition (GB6) will be populated based on the target aquifer information and injection fluid quality characterisation provided as part of the Environmental Management Plan accompanying the application. The risk assessment required to accompany applications for injection will be the mechanism for identifying the type of microbiological contaminants and contaminants other than salinity required to be included in Schedule GB, Table 2 – Specific Contaminant Limits for Injection Fluid.

(GB9) The holder of this environmental authority must:

- (a) locate an annulus packer at the junction of the aquitard and the target formation within the production casing;
- (b) install injection tubing extending through the packer into the target formation;
- (c) use an inert fluid in the annulus between the injection tubing and the production casing;
- (d) only carry out injection through the injection tubing;
- (e) install a system to record any loss of containment of the inert fluid; and
- (f) for injection at depth less than 100 m, ensure the injection operation does not exceed the dry overburden pressure of the base of the overlying aquitard; and
- (g) for injection at depth greater than 100 m, ensure the injection operation does not exceed 90% of the formation fracture pressure.

Note 1: There may be additional requirements for Condition (GB7) based upon the risk assessment provided as part of Environmental Management Plan accompanying the application.

Note 2: If the injection is being undertaken as part of a trial, the requirements of Condition (GB7)(a) to (e) may not be required if the proponent can demonstrate through their risk assessment that these items are not required.

Injection Monitoring Program

(GB10) The holder of this environmental authority must implement the injection monitoring program described in a risk assessment which has been approved by the administering authority subject to Conditions (CG4) and (GB5)].

(GB11) The injection monitoring program must be implemented by a suitably qualified person.

Note: Injection reporting requirements depend on whether the injection is part of a trial or operational injection. Details of required monitoring should be clearly described in the risk assessment as part of the Environmental Management Plan accompanying the application, as described in DERM's draft guideline: "Application requirements – injection of waste fluid from coal seam gas activities".

Reporting Requirements for Injection Trials

(GB12) Upon completion of an injection trial, the holder of the authority must submit to the administering authority an Injection Trial Report prepared by a suitably qualified person that includes the following information:

For any well:

- (a) details of the well including but not limited to:
 - (i). location details (GDA94);
 - (ii). the inferred lithology^[4];
 - (iii). casing details [type, outer diameter (mm), wall thickness (mm) & locations (depth from & to in metres)];
 - (iv). cementing details [type, hole diameter (mm), casing outer diameter (mm) and locations (depth from & to in metres)];
 - (v). target formation fracture pressure; and
 - (vi). target formation pressure prior to injection;
- (b) a detailed interpretation of the logs and other tests conducted during drilling and construction or refurbishment of the well against their specific objectives;
- (c) a completed well schematic diagram;
- (d) a temperature survey;
- (e) a casing integrity assessment technique such as:
 - (i). radioactive tracer survey;
 - (ii). oxygen activation log;
 - (iii). cement integrity log; or
 - (iv). an equivalent survey technique approved by the administering authority;
 - (v). well head injection rates versus formation pressure;
 - (vi). target formation pressure within the hydraulic impact zone^[5] during and upon completion of the trial;
 - (vii). hydraulic gradient of the target formation within the hydraulic impact zone upon completion of the trial;
 - (viii). the effectiveness of aquitards (including the stability of the aquitard) and aquicludes of confining the injected fluid within the target formation; and
 - (ix). a detailed interpretation of the logs and other tests conducted during the injection trial against their specific objectives;
- (f) the results of the monitoring program as required by Condition (GB8);
- (g) analysis of monitoring and operational data in terms of:
 - (i). validation of conceptual framework for injection; and
 - (ii). additional hazards that were not identified earlier;
- (h) a revised risk analysis that identifies all potential hazards, likelihood of various risk elements and associated consequences
- (i) a re-evaluation of the hydraulic impact zone; and
- (j) a re-evaluation of the water quality impact zone.

Additional requirements for a new well:

- (k) information considered in the design of the well and casing string; and
- (l) detailed lithology (e.g. strata description and locations (depth from and to in metres) including details on the location of water bearing beds and water quality details).

Reporting Requirements for Operational Injection

(GB13) The holder of this environmental authority must submit an annual report with each annual return, prepared by a suitably qualified person to the administering authority summarizing the results of the monitoring program and providing interpretation and analysis of the information as required by Condition (GB8) including but not limited to the following:

- (a) the results of the monitoring program as required by Condition (GB8);
- (b) monthly summaries of injection conditions;
- (c) commentary on changes to injection fluid characteristics or sources;

^[4] Inferred lithology means the best available description of the lithology based upon historical drilling records, interpretation of logs and any other information that the suitably qualified person may have discovered.

^[5] For details on defining the water quality impact zone and the hydraulic impact zone, refer to Chapter 7.3 of the Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2) Managed Aquifer Recharge.

- (d) annulus performance;
- (e) packer isolation tests;
- (f) mechanical integrity tests;
- (g) pressure of the target formation;
- (h) stability of overlying aquitard;
- (i) an updated risk assessment providing details on potential hazards including their inherent risk, preventative measures & monitoring and the residual risk;
- (j) quantity of fluid injected;
- (k) quality parameters of fluid injected; and
- (l) any well closure report required under Condition (GB15).

Well Closure

(GB14) The holder of this environmental authority must, within six (6) months prior to the cessation of injection at a well, develop and submit a well closure plan for the well including but not limited to the following:

- (a) details of when and under what circumstances the injection well will be decommissioned;
- (b) sealing details including the method, type of material to be used and the location and the depth (metres) from ground surface of the bottom of the seal will be located;
- (c) any proposed test or measure to be made; and
- (d) the estimated cost of closure.

(GB15) Actions outlined in the well closure plan must be completed within three (3) months of the cessation of activities at the injection well.

(GB16) Upon completion of injection activities at an injection well, a well closure report demonstrating compliance with the well closure plan as required by Condition (GB13) for that well must be prepared by a suitably qualified person and submitted to the administering authority with the next annual return.

Injection Cessation Report

(GB17) The holder of this environmental authority must, within 60 business days of the completion of injection activities, submit an injection cessation report to the administering authority that includes but is not limited to:

- (e) volumes of fluid injected at each well;
- (f) a risk assessment statement providing details on identified hazards including their inherent risk, summary of the results from the verification monitoring, preventative measures and the residual risk; and
- (g) a monitoring report outlining the methods and results of verification monitoring undertaken to assess the performance of the injection activities and preventative measures for identified hazards.

SCHEDULE H – REHABILITATION

- (H1) The holder of this environmental authority must not abandon any dam but must decommission each dam so as to prevent and/or minimise any environmental harm.
- (H2) As a minimum, decommissioning must be conducted such that each dam either:
- (a) becomes a stable landform similar to that of surrounding undisturbed areas, that no longer contains substances that will migrate into the environment; or
 - (b) is approved or authorised by the administering authority for use by the landholder following cessation of the petroleum activities.
- (H3) Progressive rehabilitation of disturbed areas must commence as soon as practicable following the completion of any construction or operational works associated with the petroleum activities.
- (H4) As soon as practicable but no later than 12 months (or longer period agreed in writing by the administering authority) after the end of petroleum activities causing significant disturbance to land, the holder of the authority must:
- (a) remediate contaminated land (e.g. dams containing salt);
 - (b) reshape all significantly disturbed land to a stable landform similar to that of surrounding undisturbed areas;
 - (c) on all significantly disturbed land:
 - (i). re-establish surface drainage lines;
 - (ii). reinstate the top layer of the soil profile; and
 - (iii). promote establishment of vegetation.
 - (d) undertake rehabilitation in a manner such that any actual and potential acid sulfate soils in or on the site are either not disturbed, or submerged, or treated so as to not be likely to cause environmental harm; and
 - (e) decommission all inactive buried pipelines in accordance with the requirements of AS 2885 and ensuring that there will not be any subsequent subsidence of land along the pipeline route.
- (H5) All significantly disturbed land caused by the carrying out of the petroleum activities must be rehabilitated to meet the following final acceptance criteria:
- (a) all significantly disturbed land is reinstated to the pre-disturbed land use unless otherwise agreed to between the environmental authority holder, the landholder and the administering authority;
 - (b) all significantly disturbed land is reinstated to the pre-disturbed soil suitability class;
 - (c) the landform is safe for humans and fauna;
 - (d) the landform is stable with no subsidence or erosion gullies for at least five (5) years;
 - (e) the minimum percent foliage cover of immediate surrounding area is maintained in the rehabilitated land for at least three (3) years;
 - (f) a minimum of 80% of the flora species in the immediate surrounding area is maintained in the rehabilitated land for at least three (3) years;
 - (g) a minimum of 80% of the fauna species diversity in the immediate surrounding area is maintained in the rehabilitated land for at least three (3) years;
 - (h) erosion is minimised with appropriate sediment traps and erosion control measures installed as determined by a suitably qualified person;
 - (i) the water quality of any residual void or water bodies constructed by petroleum activities meets criteria for subsequent uses and does not have potential to cause environmental harm.
 - (j) there is no ongoing contamination to surface water;
 - (k) there is no ongoing contamination to groundwater from dams or monocytes (demonstrated via groundwater monitoring and leak detection);
 - (l) the maintenance requirements for rehabilitated land is no greater than that required for the land prior to its disturbance by petroleum activities.

(H6) Regular maintenance and at least yearly monitoring of rehabilitated areas must take place to measure compliance with the requirements of Condition (H5).

SCHEDULE I – MONITORING PROGRAMS

General

- (11) The holder of this environmental authority must develop and implement a monitoring program, the result of which will demonstrate compliance with the conditions of this environmental authority.
- (12) All monitoring under this environmental authority must be conducted by a suitably qualified person.
- (13) All instruments, equipment and measuring devices used for measuring or monitoring in accordance with any condition of this environmental authority must be calibrated, and operated and maintained effectively.
- (14) All laboratory analyses and tests required to be conducted under this environmental authority must be carried out by a laboratory that has NATA certification for such analyses and tests, except as otherwise authorised by the administering authority.
- (15) The method of water sampling required by this environmental authority must comply with that set out in the most recent version of the *Monitoring and Sampling Manual – Environmental Protection (Water) Policy* published by the administering authority.

Note: Condition (15) requires the Monitoring and Sampling Manual – Environmental Protection (Water) Policy 2009 to be followed and where it is not followed because of exceptional circumstances this should be explained and reported with the results.

- (16) Any management or monitoring plans, systems, programs or procedures required to be developed and implemented by a condition of this environmental authority must be reviewed for performance and amended if required on an annual basis in accordance with the requirements for the particular plans, systems, programs and procedures.
- (17) If monitoring conducted in accordance with this environmental authority indicates a condition or contaminant level that has caused, or has potential to cause, environmental harm, the environmental authority holder must:
 - (a) as soon as is practicable, take the necessary actions to rectify the condition or contaminant level so as to avoid or minimise environmental harm; and
 - (b) notify the administering authority of the condition or contaminant level and the actions taken to rectify it.
- (18) An annual monitoring report must be prepared each year and submitted to the administering authority upon request. This report shall include but not be limited to:
 - (a) a summary of the previous 12 months monitoring results obtained under any monitoring programs required under this environmental authority and, a comparison of the previous 12 months monitoring results to both the limits set in this environmental authority and to relevant prior results; the date on which the samples was taken;
 - (b) the time at which the samples was taken;
 - (c) the monitoring point at which the sample was taken;
 - (d) the release flow rate of any authorised discharges to waters from all release points;
 - (e) the results of all monitoring and details of any exceedences with the conditions of this environmental authority and the dates and times these exceedences were reported to the administering authority.
 - (f) a summary of all records of quantities of releases required to be kept under this environmental authority including the total volume of any authorised discharges to waters for the previous yearly period from all release points and the individual daily volume of any authorised discharges to waters from all release points;

- (g) details of all maintenance or work carried out on any discharge meter(s) and the impact (if any) on the release volume readings;
 - (h) an evaluation/explanation of the data derived from any monitoring programs;
 - (i) data analyses and interpretation to assess the nature and extent of any contamination and, if so, the level of environmental harm caused as a result of the contamination and the environmentally relevant activity; and
 - (j) an outline of actions taken or proposed to minimise the risk of environmental harm from any condition or elevated contaminant level identified by the monitoring or recording programs.
- (I9) The evaluation and explanation of data for the purposes of the annual monitoring report must be performed by a suitably qualified person.
- (I10) The holder of this environmental authority must continue to conduct monitoring as per that prescribed in Conditions (I11) to (I17) for a minimum of five (5) years after the activities prescribed in Condition (A1) have ceased and submit the results annually in accordance with Condition (I8).

Groundwater Monitoring

- (I11) A Groundwater Monitoring Program must be developed and implemented within 40 business days of this environmental authority taking effect which is able to detect any significant risks and changes to groundwater quality and level as a result of activities authorised under this environmental authority and must:
- (a) be developed, installed and maintained by a suitably qualified person in the fields of hydrogeology, groundwater sampling design and groundwater monitoring program design;
 - (b) include locations of monitoring points, parameters to be measured, frequency of monitoring, monitoring methodology used, and trigger values;
 - (c) include procedures to establish background groundwater quality;
 - (d) a sufficient number of monitoring sites to provide information on the following:
 - (i) seepage to groundwater and surrounding soils from any regulated dam authorised under this environmental authority and its effect on groundwater and soils; and
 - (ii) background monitoring sites (i.e. groundwater quality in representative bore(s) that have not been affected by the activities authorised under this environmental authority);
 - (e) conduct a geodetic survey of all groundwater monitoring bores to determine the relative water surface elevations, measured to the nearest millimetre in each bore and reported in metres relative to the AHD;
 - (f) determine the hydraulic conductivity, groundwater flow direction and groundwater flow rate; and
 - (g) include a rationale containing details on the program purpose, program conceptualisation and verification of assumptions.
- (I12) All groundwater bores must be installed according to the standards outlined in the latest edition of the Department of Environment and Resource Management's *Minimum Construction Requirements for Water Bores in Australia or the Minimum Standards for the Construction and Reconditioning of Water Bores that Intersect the Sediments of Artesian Basins in Queensland*.
- (I13) Groundwater monitoring bores must be constructed by, or under the supervision of a licensed Queensland water bore driller who has the correct endorsements on their licence for the type of activity being performed.
- (I14) The Groundwater Monitoring Program must provide for monitoring of groundwater quality as often as necessary to detect impacts of the petroleum activities authorised under this environmental authority, but not for fewer parameters or less frequently than that specified in Schedule I, Table 1 – Minimum Groundwater Monitoring Parameters and Monitoring Frequency and in compliance with Condition (I15).

- (115) Groundwater samples taken as part of the Groundwater Monitoring Program must be analysed for, but not be limited to, the water quality parameters at the minimum frequencies specified in Schedule I, Table 1 – Minimum Groundwater Monitoring Parameters and Monitoring Frequency.

Schedule I, Table 1 – Minimum Groundwater Monitoring Parameters and Monitoring Frequency

Groundwater parameter	Monitoring frequency
Flow [m/hr]	Biannually
Water level to the nearest millimetre [m AHD]	Biannually
Groundwater Pressure in Geological Strata [kPa]	Biannually
pH	Biannually
Electrical conductivity [μ S/m]	Biannually
Total Dissolved Solids [mg/L]	Biannually
Temperature [$^{\circ}$ C]	Biannually
Dissolved Oxygen [mg/L]	Biannually
Alkalinity as CaCO ₃ [mg/L]	Biannually
Residual Alkali [mg/L]	Biannually
Anions (bicarbonate, carbonate, hydroxide, chloride, fluoride, sulphate) [mg/L]	Biannually
Cations (aluminium, calcium, magnesium, potassium, sodium) [mg/L]	Biannually
Silica [mg/L]	Biannually
Total and dissolved Iron, manganese, zinc, aluminium, boron, copper, phosphorous [mg/L]	Biannually
Ammonia, nitrate, nitrite [m/L]	Biannually
Total Petroleum Hydrocarbons [mg/L]	Biannually
Polycyclic Aromatic Hydrocarbons [mg/L]	Biannually
Benzene, Toulene, Ethyl-benzene, Xylenes (BTEX) [mg/L]	Biannually

- (116) All groundwater monitoring bores must be maintained in an operative condition and be reasonably accessible at all times to any authorised person.
- (117) If groundwater monitoring indicates that any significant changes in groundwater quality caused by petroleum activities are detected, then information must be submitted to the administering authority within 10 business days of receipt of the analysis indicating these changes, including any proposed actions to mitigate the changes in groundwater quality.

Air Monitoring (Point Source)

- (118) The holder of this environmental authority must conduct a monitoring program of contaminants released to the atmosphere at each release point recorded in the Register of Fuel Burning or Combustion Equipment (as required by Condition (F5) for the contaminants and at the frequency listed in Schedule I, Table 2.

Schedule I, Table 2 – Monitoring Frequency for Contaminants

Contaminant	Monitoring frequency
NOx as Nitrogen Dioxide	Within 3 months after commissioning of the fuel burning equipment; and Twice a year for the first two (2) years of operation; and annually thereafter.
Carbon monoxide	

- (119) The monitoring program must comply with the following:
- (a) Monitoring provisions for the release points must comply with the most recent edition of AS4323.1 Stationary source emissions method 1: Selection of sampling provisions.
 - (b) The following tests must be performed for each sample taken at each release point specified in the Register of Fuel Burning or Combustion Equipment (Condition (F5)):
 - (i). Gas velocity, volume and mass flow rate.

- (ii). Temperature.
- (iii). Water vapour concentration (for non-continuous sampling).
- (c) Samples taken must be representative of the contaminants discharged when operating under maximum operating conditions.
- (d) During the sampling period the following additional information must be gathered:
 - (i). Production rate.
 - (ii). Plant status.
- (e) Monitoring of contaminant release must be carried out in accordance with the latest edition of the administering authority's Air Quality Sampling Manual.

Noise Monitoring

- (I20) The holder of this environmental authority must undertake noise monitoring when requested by the administering authority to investigate a complaint of environmental nuisance at a sensitive receptor within the reasonable and practicable timeframe nominated by the administering authority, and report the results to the administering authority within three (3) business days of completion of the monitoring.
- (I21) Noise monitoring and recording must include the following descriptor, characteristics and matters:
 - (a) $L_{AN,T}$ (where N equals the statistical levels of 1, 10 and 90 and T=15);
 - (b) $L_{Aeq, adj, 15 mins}$;
 - (c) background noise level as $L_{A 90, T}$;
 - (d) $Max L_{pA, 15 mins}$
 - (e) the level and frequency of occurrence of impulsive or tonal noise and any adjustment and penalties to statistical levels;
 - (f) atmospheric conditions including temperature, relative humidity and wind speed and directions;
 - (g) effects due to any extraneous factors such as traffic noise;
 - (h) location, date and time of monitoring;
 - (i) if the complaint concerns low frequency noise, $Max L_{pz, 15 min}$; and
 - (j) If the complaint concerns low frequency noise, one third octave band measurements in dB(LIN) for centre frequencies in the 10 – 200 Hz range for both the noise source and the background noise in the absence of the noise source.
- (I22) The method of measurement and reporting of noise levels and background sound pressure levels must comply with the latest edition of the administering authority's *Noise Measurement Manual* or the most recent version of Australian Standard 1055 Acoustics – description and measurement of environmental noise.

Nuisance Monitoring (other than Noise)

- (I23) When the administering authority advises the holder of this environmental authority of a complaint alleging nuisance other than noise, the holder must investigate the complaint and advise the administering authority in writing of the action proposed or undertaken to resolve the complaint.
- (I24) When requested by the administering authority, the holder of this environmental authority must undertake monitoring as specified by the administering authority, within a reasonable and practical timeframe nominated by the administering authority to investigate any complaint of environmental harm at any sensitive place.
- (I25) The results of the investigation (including an analysis and interpretation of the monitoring results) and abatement measures implemented must be provided to the administering authority within 10 business days of completion of the investigation, or receipt of the monitoring results, whichever is the latter.

- (126) If monitoring in accordance with Condition (124) and (125), indicates that emissions exceed the limits set in this environmental authority or are causing environmental nuisance, then the holder of this environmental authority must:
- (a) address the complaint including the use of alternative dispute resolution services if required; and/or
 - (b) as soon as practicable implement abatement or attenuation measures so that light, dust, particulate or odour emissions from the authorised activities do not result in further environmental nuisance.

Transitional Environmental Program (TEP) For Specified Activities on PL230

Groundwater Monitoring

- (127) The holder of this environmental authority must prepare and submit a Groundwater Monitoring Program to the administering authority by 19 February 2010. If the administering authority gives to the holder of this environmental authority any comment on the Groundwater Monitoring Program within 21 days of receiving the document, the holder of this environmental authority must have due regard to those comments when implementing the Groundwater Monitoring Program.
- (128) The Groundwater Monitoring Program must be developed by a person possessing appropriate qualifications and experience in the fields of hydrogeology and groundwater sampling design.
- (129) The Groundwater Monitoring Program must be able to detect any significant changes to groundwater quality and groundwater levels due to activities authorised under this environmental authority. The Groundwater Monitoring Program must include:
- (a) a groundwater monitoring network designed and installed for the authorised petroleum activities;
 - (b) a sufficient number of monitoring sites to provide information on the following:
 - 1. seepage from any regulated dam authorised under this authority and its effect on groundwater;
 - 2. background monitoring sites (i.e. groundwater quality in representative bore(s) that have not been affected by any contaminants released to groundwater associated with activities authorised under this authority).
 - (c) the location of monitoring points, parameters to be measured, frequency of monitoring, monitoring methodology used, trigger values;
 - (d) the development of procedures to establish background ground water quality; and
 - (e) the installation and maintenance by a person possessing appropriate qualifications and experience in the fields of hydrogeology and groundwater monitoring program design.
- (130) The Groundwater Monitoring Program must provide for monitoring of groundwater quality as often as necessary to detect impacts of the petroleum activities, but not less frequently than biannually (every six (6) months) for the first year of carrying out the petroleum activities and annually thereafter.
- (131) Groundwater samples taken as part of the Groundwater Monitoring Program must be analysed for at least the following water quality parameters:
- (a) pH (pH scale);
 - (b) Electrical conductivity (mS/cm);
 - (c) Sodium Adsorption Ratio; and
 - (d) any other possible contaminants associated with the petroleum activities.
- (132) Prior to any groundwater sampling, groundwater levels must be measured to the nearest millimetre and reported in metres.

- (133) All groundwater monitoring bores must be maintained in an operative condition and be reasonably accessible at all times to any authorised person.
- (134) All determinations of groundwater quality and the evaluation/explanation must be performed by a person or body possessing appropriate experience and qualifications to perform the required determinations. This must include, but not be limited to, an assessment as to whether there is any groundwater contamination.
- (135) If groundwater contamination caused by the petroleum activities is encountered, the following must be considered to satisfy requirements under Condition (134):
- (a) the level of environmental harm caused as a result of such contamination;
 - (b) the conduction of a geodetic survey of all monitor bores to determine the relative water surface elevations of each bore and reported in metres relative to the Australian Height Datum; and
 - (d) the determination of groundwater flow direction, groundwater flow rate and hydraulic conductivity.

Groundwater Monitoring Analysis Reporting

- (136) The holder of this environmental authority must ensure that the groundwater monitoring data gathered in accordance with this environmental authority is analysed and interpreted to assess the nature and extent of any environmental impact of the environmentally relevant activity. The data, analysis and assessment must be submitted to the administering authority:
- (a) on request; and
 - (b) with each Annual Return; and
 - (c) when any significant changes in water level and/or deterioration in groundwater quality is detected within 14 days of receipt of analysis.
- (137) If groundwater monitoring indicates that changes as described in Condition (129) occur, then the information required must include any proposed actions to mitigate the changes in groundwater quality as well as means to prevent the event recurring.

Fuel Burning – Gas

- (138) Contaminants must be released to the atmosphere from a release point at a height and a flow rate not less than the corresponding height and velocity stated for that release point in Schedule I, Table 3.
- (139) Contaminants must not be released to the atmosphere from a release point at a mass emission rate / concentration, as measured at a monitoring point, in excess of the levels stated in Schedule I, Table 3.

Schedule I, Table 3 – Compressor Station Release Points and Contaminant Limits

Release point number	Minimum release height (metres)	Minimum velocity (m/sec)	Contaminant release	Maximum mass release limit ¹ (g/sec)
A1 – Compressor Stack K-0001	8.1	36	NOx	6.5
A2 – Compressor Stack K-0002	8.1	36	NOx	6.5
A3 - Compressor Stack K-0003	8.1	36	NOx	6.5
A4 - Compressor Stack K-0004	8.1	36	NOx	6.5

Release point number	Minimum release height (metres)	Minimum velocity (m/sec)	Contaminant release	Maximum mass release limit ¹ (g/sec)
A5 - Compressor Stack K-0005	8.1	36	NOx	6.5
A6 - Compressor Stack K-0006	8.1	36	NOx	6.5
A7 - Compressor Stack K-0007	8.1	36	NOx	6.5
A8 - TEG Unit Burner Stack	6.8	14	NOx	100 ppm
A9 - Diesel Generator Stack	1.3	29	NOx	Not specified

¹ Note: The above NOx limits are applicable at all times except start-up, shut down and calibration of emission monitoring devices. The maximum start-up period allowed is 30 minutes.

Monitoring of Contaminant Releases to the Atmosphere

- (140) When requested by the administering authority, contaminant monitoring and recording must be undertaken to investigate any complaint, and the results notified with 14 days to the administering authority. When monitoring is requested the following must be complied with:
- (a) the holder of this environmental authority must conduct and keep records of a monitoring program of contaminant release to the atmosphere at the release points, frequency, and the parameters specified in Schedule I, Table 4 which complies with the following:
 - (b) Monitoring provision for the release points listed in Schedule I, Table 4 must comply with the Australian Standard AS4323.1 – 1995 'Stationary source emissions Method 1: Selection of sampling provisions' or subsequent versions as they become available.
 - (c) The following tests must be performed for each required determination specified in Schedule I, Table 4:
 - i. gas velocity and volume flow rate;
 - ii. temperature and oxygen content;
 - iii. water vapour concentration (moisture content).
 - (d) Where practicable samples taken must be representative of the contaminants discharged when emissions are expected to be at maximum rates.
 - (e) During the sampling period the following additional information must be gathered:
 - i. fuel used;
 - ii. number of equipment and operating units; and
 - iii. reference to actual test methods and accuracies.

Schedule I, Table 4 – Required Monitoring

Determination Required	Release Point Numbers	Frequency ²
Mass emission rate (g/s) and concentration (mg/Nm ³) of oxides of nitrogen (NOx) in the flue gas at the 5% oxygen reference level.	Stacks A1, A2, A3, A4, A5, A6, A7, A8 A9	Within three months upon the granting of the environmental authority and then annually thereafter

²Note: Out of the seven (7) release points A1 to A7, at least three (3) stacks must be monitored each year on a rotational basis.

Impact Assessment

- (I41) Notwithstanding any other condition of the environmental authority, the environmental authority does not authorise any environmental harm arising from any release to the atmosphere of any of the contaminants mentioned in Schedule 1, Table 5.
- (I42) For the purpose of ensuring and demonstrating compliance with Condition (I41), the holder of the environmental authority must, by 1 October 2009, engage a **suitably qualified and experienced person** and provide to the administering authority an evaluation of the potential environmental impacts of the contaminants mentioned in Schedule 1, Table 5. The evaluation must address all matters relevant to the assessment of potential for environmental impacts to occur. This must include, but not be limited to:
 - (a) Sampling, monitoring and analysis of the contaminants mentioned in Schedule I, Table 5 for the range of plant operations likely to be encountered:
 - i. Entail sufficient levels of detection to adequately characterise the emissions; and
 - ii. be representative; and comply with relevant Department of Environment and Resource Management’s monitoring methods including the quality control requirements inherent in those methods;
 - (b) Using the air pollution dispersion models, estimate Ground Level Concentrations at the most sensitive nearest receptor(s) (using efflux velocity, temperature and flow rate) for emissions of the contaminants mentioned in Schedule I, Table 5;
 - (c) Make a comparison between the worst case measured emissions with the benchmarks maximum GLC mentioned in Schedule I, Table 5;
 - (d) Use the methods and guidelines for modelling and assessment of air pollutants approved by the New South Wales Department of Environment and Climate Change or by the Victoria Environmental Protection Agency.
 - (e) The holder of the environmental authority must consult with the administering authority on the development of this impact assessment prior to its implementation; and
 - (f) The holder of this environmental authority must undertake and complete the above assessment and submit a report to the administering authority by no later than the due date of 1 October 2009.

Schedule 1, Table 5 – Contaminants and Benchmarks for Evaluation

Contaminant	Averaging Periods	Maximum GLC concentration
Nitrogen dioxide	1 hour – health and wellbeing	250 µg/m ³ (at 0 °C)
	1 year – health and wellbeing	62 µg/m ³ (at 0 °C)
	1 year – health and biodiversity of ecosystems	33 µg/m ³ (at 0 °C)

SCHEDULE J – COMMUNITY ISSUES

- (J1) The holder of this environmental authority must maintain a record of complaints and incidents causing environmental harm, and actions taken in response to the complaint or incident; and
- (J2) The holder of this environmental authority must record the following details for all complaints received and provide this information to the administering authority on request:
- (a) name, address and contact number for complainant;
 - (b) time and date of complaint;
 - (c) reasons for the complaint as stated by the complainant;
 - (d) investigations undertaken in response to the complaint;
 - (e) conclusions formed;
 - (f) actions taken to resolve complaint;
 - (g) any abatement measures implemented to mitigate the cause of the complaint; and
 - (h) name and contact details of the person responsible for resolving the complaint.

SCHEDULE K NOTIFICATION PROCEDURES

- (K1) The holder of this environmental authority must telephone the administering authority's Pollution Hotline (telephone: 1300 130 372) and any affected landholder, occupier or their nominated representative as soon as practicable, but within 24 hours after becoming aware of:
- (a) any release of contaminants not in accordance with the conditions of this environmental authority; or
 - (b) any other non-compliance with any condition of this environmental authority; or
 - (c) any event where environmental harm has been caused or may be caused; or
- (K2) Subject to Condition (K1), the holder of this environmental authority is required to report in the case of spills of contaminants (including but not limited to hydrocarbons, CSG water or mixtures of both) of the following volumes or kind:
- (a) releases of any volume of contaminants to water; and
 - (b) releases of volumes of contaminants greater than 200L of hydrocarbons, 1000 L of brine or 5 000 L of coal seam gas water to land; and
 - (c) releases of any volumes of contaminants where potential serious or material environmental harm has occurred or may occur.
- (K3) The notification of emergencies or incidents as required by Conditions (K1) and (K2) must include but not be limited to the following information:
- (a) the environmental authority number and name of the holder;
 - (b) the tenure type and number where the emergency or incident occurred;
 - (c) the name and telephone number of the designated contact person;
 - (d) the location of the emergency or incident;
 - (e) the date and time that the emergency or incident occurred;
 - (f) the date and time the holder of this environmental authority became aware of the emergency or incident;
 - (g) details of the nature of the event and the circumstances in which it occurred;
 - (h) the estimated quantity and type of any contaminants involved in the incident;
 - (i) the actual or potential suspected cause of the emergency or incident;
 - (j) a description of the land use at the site of the emergency or incident (eg. grazing, pasture, forest etc) and/or the name of any relevant surface waters and other environmentally sensitive features;
 - (k) a description of the possible impacts from the emergency or incident;
 - (l) a description of whether stock and/or wildlife were exposed to any contaminants released and measures taken to prevent access for the duration of the emergency or incident;
 - (m) any sampling conducted or proposed, relevant to the emergency or incident;
 - (n) landholder details and details of landholder consultation;
 - (o) immediate actions taken to control the impacts of the emergency or incident and how environmental harm was mitigated at the time of the emergency or incident; and
 - (p) whether further examination/root cause analysis is required and if so, the expected date by when this examination will be completed and reported to the administering authority.
- (K4) Within 10 business days following the initial notification of an emergency or incident or receipt of monitoring results or completion of the examination/root cause analysis, whichever is the later, a written report must be provided to the administering authority, including the following (where relevant to the emergency or incident):
- (a) the root cause of the emergency or incident the confirmed quantities and types of any contaminants involved in the incident;
 - (b) results and interpretation of any analysis of samples taken at the time of the emergency or incident;
 - (c) a final assessment of the impacts from the emergency or incident including any actual or potential environmental harm that has occurred or may occur in the longer term as a result of the release;

- (d) the success or otherwise of actions taken at the time of the incident to prevent or minimise environmental harm;
 - (e) results and current status of landholder consultation, including commitment to resolve any outstanding issues/concerns; and
 - (f) actions and/or procedural changes to prevent a recurrence of the emergency or incident.
- (K5) As soon as practicable after becoming aware of one of the circumstances described in Conditions (B25) or (B26), the holder of this environmental authority must:
- (a) implement the rectification measures identified in the emergency response and contingency plans within risk the assessment;
 - (b) notify the administering authority of rectification measures implemented;
 - (c) monitor the success of rectification measures; and
 - (d) notify the administering authority of the success of the rectification measures implemented.

SCHEDULE L DEFINITIONS

Note: Where a term is not defined in this environmental authority the definition in the Environmental Protection Act 1994, its regulations and Environmental Protection Policies or the Petroleum and Gas (Production and Safety) Act 2004 and its regulations must be used in that order.

"acid sulfate soils" means soil or sediment containing highly acidic soil horizons or layers affected by the oxidation of iron sulfides (*actual acid sulfate soils*) and/or soil or sediment containing iron sulfides or other sulfidic material that has not been exposed to air and oxidised (*potential acid sulfate soils*). The term acid sulfate soil generally includes both actual and potential acid sulfate soils. Actual and potential acid sulfate soils are often found in the same soil profile, with actual acid sulfate soils generally overlying potential acid sulfate soil horizons.

"active" for the purposes of landholders' groundwater bores means bores that are able to continue to provide a reasonable yield of water in terms of quantity for the bores authorised purpose or use.

"aggregation dam" means a dam that is used to aggregate and contain CSG water prior to use, treatment or disposal of that water (by means other than evaporation). The primary purpose of the dam must not be to evaporate the water even though this will naturally occur.

"affected land" means land on which an event has caused or threatens serious or material environmental harm.

"AHD" means Australian Height Datum.

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

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

"appraisal well" means a petroleum well that is drilled to test the potential of 1 or more natural underground reservoirs for producing or storing petroleum.

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

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

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

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

"beneficial use" means

- with respect to dams, that the current or proposed owner of the land on which a dam stands, has found a use for that dam that is:
 - of benefit to that owner in that it adds real value to their business or to the general community,
 - in accordance with relevant provisions of the *Environmental Protection Act 1994*,
 - sustainable by virtue of written undertakings given by that owner to maintain that dam, and

- the transfer and use have been approved or authorised under any relevant legislation.
Or
- with respect to coal seam gas water, refer the DERM's Operational Policy *Management of water produced in association with petroleum activities (CSG water)* and *Notice of decision to approve a resource for beneficial use – CSG water* which can be accessed on DERM's website at www.derm.qld.gov.au.

“black earth” also known as vertosols and is a soil order of the Australian Soil Classification. These are clay soils with shrink/swell properties that display strong cracks when dry and/or lenticular structural aggregates at depth. They have a high soil fertility and a large water holding capacity.

“bore” means a water observation bore or a water supply bore.

“brine” means either saline water with a total dissolved solid concentration greater than 40 000mg/l or CSG water after it has been concentrated through water treatment processes and/or evaporation.

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

“BTEX” means benzene, ethylbenzene, toluene, xylene.

“category A ESA” means any area listed in Section 25 of the *Environmental Protection Regulation 2008*.

“category B ESA” means any area listed in Section 26 of the *Environmental Protection Regulation 2008*.

“category C ESA” means any of the following areas:

- Nature Refuges as defined under the *Nature Conservation Act 1992*;
- Koala Habitat Areas as defined under the *Nature Conservation Act 1992*;
- State Forests or Timber Reserves as defined under the *Forestry Act 1959*;
- Declared catchment areas under the *Water Act 2000*;
- Resources reserves under the *Nature Conservation Act 1992*
- An area identified as “Essential Habitat” for a species of wildlife listed as endangered, vulnerable, rare or near threatened under the *Nature Conservation Act 1992*;
- Any wetland shown on the Map of Referable Wetlands available from DERM's website; or
- “Of concern” regional ecosystems identified in the database maintained by DERM called ‘Regional ecosystem description database’ containing regional ecosystem numbers and descriptions.

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

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

“**certification**” or “**certified**” in relation to any other matter in this environmental authority means a written statement from a suitably qualified person that the content of a document is accurate and true and meets the required intent of the document.

“**clearing**” means:

- in relation to grass, scrub or bush—the removal of vegetation by disturbing root systems and exposing underlying soil (including burning), but does not include—
 - the flattening or compaction of vegetation by vehicles if the vegetation remains living; or
 - the slashing or mowing of vegetation to facilitate access tracks; or
 - the clearing of noxious or introduced plant species; and
- in relation to trees—cutting down, ringbarking, pushing over, poisoning or destroying in any way.

“**construction**” in relation to a dam includes building a new dam and modifying or lifting an existing dam.

“**CSG water**” means groundwater that is necessarily or unavoidably brought to the surface in the process of coal seam gas exploration or production. CSG water typically contains significant concentrations of salts, has a high sodium adsorption ratio (SAR) and may contain other contaminants that have the potential to cause environmental harm if released to land or waters through inappropriate management. CSG water is a waste, as defined under s13 of the EP Act.

“**CSG water dams**” include any type of dam (storage or evaporation) used to contain groundwater that is necessarily or unavoidably brought to the surface in the process of coal seam gas exploration or production.

“**dam**” means a land-based structure or a void that is designed to contain, divert or control **flowable** substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and **associated works**. A dam does *not* mean a fabricated or manufactured tank or container, designed and constructed to an Australian Standard that deals with strength and structural integrity of that tank or container.

“**design plan**” means the documentation required to describe the physical dimensions of the dam, the materials and standards to be used for construction of the dam, and the criteria to be used for operating the dam. The documents must include design and investigation reports, specifications and certifications, together with the planned decommissioning and rehabilitation works and outcomes. A design plan may include ‘as constructed’ drawings.

“**development well**” means a petroleum well that is drilled to produce or store petroleum.

“**discharge area**” means:

- (a) that part of the land surface where groundwater discharge produces a net movement of water out of the groundwater; and
- (b) identified by an assessment process consistent with the document: Salinity Management Handbook, Queensland Department of Natural Resources, 1997; or
- (c) identified by an approved salinity hazard map held by the Department of Environment and Resource Management.

“**ecosystem functioning**” means the interactions between and within living and nonliving components of an ecosystem and generally correlates with the size, shape and location of an area of vegetation.

“**end**” means the stopping of the particular activity that has caused a significant disturbance in a particular area. It refers to, among other things, the end of a seismic survey or the end of a drilling operation. It does not refer to the end of all related activities such as rehabilitation. In other words, it does not refer to the ‘completion’ of the petroleum activity, the time at which the petroleum authority ends or the time that the land in question ceases to be part of an authority.

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

“existing regulated dam” means a dam for which construction has substantially commenced on DD/MM/YYYY

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

- (a) conducting a geochemical, geological or geophysical survey
- (b) drilling a well
- (c) carrying out testing in relation to a well
- (d) taking a sample for chemical or other analysis

“evaporation dam” means a land based structure designed to contain or impound CSG water, the purpose of which is to contain or impound the water, until the water content has been removed by evaporation.

“fill” means any kind of material in solid form (whether or not naturally occurring) capable of being deposited at a place but does not include material that forms a part of, or is associated with, a structure constructed in a watercourse, wetland or spring including a bridge, road, causeway, pipeline, rock revetment, drain outlet works, erosion prevention structure or fence.

“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.

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

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

“hazard category” means a category, either low significant or high, into which a dam is assessed as a result of the application of tables and other criteria in *DERM’s Manual for Assessing Hazard Categories and Hydraulic Performance of Dams (Version 1.0, 2008)* or any updated version of the Manual that becomes available from time to time

“heritage place” means any place that may be of cultural heritage significance, or any place with potential to contain archaeological artefacts that are an important source of information about Queensland’s history.

“high bank” means the defining terrace or bank or, if no bank is present, the point on the active floodplain, which confines the average annual peak flows in a watercourse.

“highly erodible soils” means very unstable soils that are generally described as Sodosols with hard – setting, fine sandy loam to silty clay loam surfaces (solodics, solodised solonetz and solonetz) or soils with a dispersible layer located less than 25cm deep or soils less than 25cm deep.

“hub” means more than one large compressor station and multiple items of fuel burning or combustion units located within three (3) km of each other and capable of burning fuel at a rate >500 kg/hr.

“hydraulic performance” means the capacity of a regulated dam to contain or safely pass flowable substances based on a probability (AEP) of performance failure specified for the relevant hazard category in the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams (Version 1.0, 2008)* published by the Environmental Protection Agency on its website.

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

“infrastructure” means water storage dams, roads and tracks, equipment, buildings and other structures built for the purpose and duration of the conduct of the petroleum activities, but does not include other facilities required for the long term management of the impact of those activities or the protection of potential resources. Such other facilities include dams other than water storage dams (e.g.

evaporation dams), pipelines and assets, that have been decommissioned, rehabilitated, and lawfully recognised as being subject to subsequent transfer with ownership of the land.

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

"lake" means:

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

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

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

"levee" means a dyke or bund that is designed only to provide for the containment and diversion of stormwater or flood flows from a contributing catchment, or containment and diversion of flowable materials resulting from unplanned releases from other works of infrastructure, during the progress of those stormwater or flood flows or those unplanned releases; and does not store any significant volume of water or flowable substances at any other times.

"limited petroleum activities" mean only activities including:

- (a) geophysical surveys (including seismic activities);
- (b) well sites;
- (c) well pads;
- (d) sumps;
- (e) flare pits;
- (f) flow lines; and
- (g) supporting access tracks.

For clarity, limited petroleum activities do not include:

- (a) the construction of infrastructure for processing or storing petroleum or by-products;
- (b) dams;
- (c) compressor stations;
- (d) campsites/workforce accommodation;
- (e) power supplies;
- (f) waste disposal; or
- (g) other supporting infrastructure for the project.

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

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

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

"mg/L" means milligrams per litre.

"medium term noise event" is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than five days and does not re-occur for a period of at least four weeks. Re-occurrence is deemed to apply where a noise of comparable level is observed at the same receptor location for a period of one hour or more, even if it originates from a difference source or source location.

"meter" means a device for measuring, or giving an output signal proportional to, quantities of water passed and/or the rate of flow in a pipe."

“**overland flow water**” means water, including floodwater, flowing over land, otherwise than in a watercourse or lake:

- after having fallen as rain or in any other way; or
- after rising to the surface naturally from underground.

“**permanent infrastructure**” includes any infrastructure (roads, tracks, bridges, culverts, dams, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads, pipelines etc), which is to be left by agreement with the landowner.

“**pest**” means species:

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

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

“**regulated dam**” means any dam in the significant or high hazard category as assessed using the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams (Version 1.0, 2008)* or any updated version of the Manual that becomes available from time to time

“**rehabilitation**” means the process of reshaping and revegetating land to restore it to a stable landform and in accordance with the acceptance criteria set out in this environmental authority and, where relevant, includes remediation of contaminated land

“**remnant unit**” means a continuous area of remnant vegetation representative of a single Regional Ecosystem type or a single heterogeneous unit (multiple Regional Ecosystem types that cannot be distinguished individually due to the scale of mapping).

“**sensitive place**” means:

- a dwelling (including residential allotment, mobile home or caravan park, residential marina or other residential premises, motel, hotel or hostel); or
- a library, childcare centre, kindergarten, school, university or other educational institution;
- a medical centre, surgery or hospital; or
- a protected area; or
- a public park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment; or
- a work place used as an office or for business or commercial purposes, which is not part of the petroleum activities and does not include employees accommodation or public roads.

“**sensitive receptor**” means an area or place where noise (including low frequency, vibration and blasting) is measured investigate whether nuisance impacts are occurring and includes:

- a dwelling (including residential allotment, mobile home or caravan park, residential marina or other residential premises, motel, hotel or hostel); or
- a library, childcare centre, kindergarten, school, university or other educational institution;
- a medical centre, surgery or hospital; or
- a protected area; or
- a public park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment; or
- a work place used as an office or for business or commercial purposes, which is not part of the petroleum activities and does not include employees accommodation or public roads.

“**short term noise event**” is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than eight hours and does not re-occur for a period of at least seven days. Re-occurrence is deemed to apply where a noise of comparable level is observed at the same receptor location for a period of one hour or more, even if it originates from a different source or source location.

“**significantly disturbed land or significant disturbance to land**” means disturbance to land as defined in section 28 of the *Environmental Protection Regulation 2008*.

“**site**” means the petroleum authority(ies) to which the environmental authority relates.

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

“stable” in relation to land, means landform dimensions are or will be stable within **tolerable limits** now and in the foreseeable future. Stability includes consideration of geotechnical stability, settlement and consolidation allowances, bearing capacity (trafficability), erosion resistance and geochemical stability with respect to seepage, leachate and related contaminant generation.

“state heritage place” means a place entered in the Queensland heritage register under Part 4 of the *Queensland Heritage Act 1992*.

“stimulation” means a technique used to increase the permeability of a natural underground reservoir, including for example, cavitation, hydraulic fracturing/hydrofracturing, fracture acidizing and the use of proppant treatments.

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

“suitably qualified and experienced person” in relation to a hazard assessment of a dam, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit at any time:

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

“suitably qualified and experienced person” in relation to dams means one who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the Professional Engineers Act 1988, OR registered as a National Professional Engineer (NPER) with the Institution of Engineers Australia, OR holds equivalent professional qualifications to the satisfaction of the administering authority for the Act; AND the administering authority for the Act is satisfied that person has knowledge, suitable experience and demonstrated expertise in relevant fields, as set out below:

- knowledge of engineering principles related to the structures, geomechanics, hydrology, hydraulics, chemistry and environmental impact of dams; and
- a total of five (5) years of suitable experience and demonstrated expertise in the geomechanics of dams with particular emphasis on stability, geology and geochemistry, and
- a total of five (5) years of suitable experience and demonstrated expertise each, in three (3) of the following categories:
 - investigation and design of dams.
 - Construction, operation and maintenance of dams.
 - hydrology with particular reference to flooding, estimation of extreme storms, water management or meteorology.
 - hydraulics with particular reference to sediment transport and deposition, erosion control, beach processes.
 - hydrogeology with particular reference to seepage, groundwater.
 - solute transport processes and monitoring thereof.
 - dam safety.

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

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

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

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

“unacceptable risk” is when the results of a hazard assessment indicates that there is both a high consequence and a high likelihood of an event occurring such that the risk is classified as “high”, “very high” or “extreme”.

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

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

“waters” includes all or any part of a creek, river, stream, lake, lagoon, dam, swamp, wetland, spring, unconfined surface water, unconfined water in natural or artificial watercourses, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and underground water.

“watercourse” has the meaning provided in s 5 of the *Water Act 2000* and includes the bed and banks and any other element of a river, creek or stream confining or containing water.

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

“wetland” means an area shown as a wetland on a ‘Map of referable wetlands’, a document approved by the chief executive (environment). A map of referable wetlands can be viewed at www.derm.qld.gov.au.

“wild river declaration” means a statutory instrument under the *Wild Rivers Act 2005*. A declaration lists the relevant natural values to be preserved and delineates certain parts of the wild river area and the different constraints that may apply in these areas. With reference to environmental authorities for petroleum, each declaration also specifies conditions to be included in a new authority if the activity is to be located within the wild river area.

“20th percentile release limits” means that not more than four (4) of the measured values is to exceed the stated release limit for any five (5) consecutive samples where:

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

“25th percentile release limits” means that not more than three (3) of the measured values is to exceed the stated release limit for any four (4) consecutive samples where:

- (1) the consecutive samples are taken over a four (4) month period; and
- (2) the consecutive samples are taken at approximately equal periods.

“75th percentile release limits” means that not more than one (1) of the measured values is to exceed the stated release limit for any four (4) consecutive samples where:

- (1) the consecutive samples are taken over a four (4) month period; and
- (2) the consecutive samples are taken at approximately equal periods.

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

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

End of Conditions

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Sophie Smith

From: Morag Elliott
Sent: Thursday, 3 March 2022 3:16 PM
To: Kate Wall
Cc: Phil Joyce
Subject: FW: Urgent advice from Resources needed

Hi Kate

See response from Resources below regarding development plans.

Please let me know if this answers your question or if you need more info from Resources thanks.

Morag Elliott
Manager
Development Assessment Division , Planning Group
Department of State Development,
Infrastructure, Local Government and Planning

p Access refused in

Level 13, 1 William Street, Brisbane QLD 4000
PO Box 15009 CITY EAST QLD 4002

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I acknowledge the traditional custodians of the lands and waters of Queensland. I offer my respect to elders past, present and emerging as we work towards a just, equitable and reconciled Australia.



From: Wendy Chan <Wendy.Chan@resources.qld.gov.au>
Sent: Thursday, 3 March 2022 1:26 PM
To: Morag Elliott <Morag.Elliott@dsdilgp.qld.gov.au>
Subject: RE: Urgent advice from Resources needed

Hi Morag,

I just left a message for you to return my call. I just wanted to chat about your question below and make sure I understood it.

- The Department of Resources approves a development plan for a petroleum lease.
- A development plan provides detailed information about the nature and extent of the activities to be carried out under the lease during the plan period.

- Section 141 of the P&G Act sets out the criteria that must be considered in deciding to approve a proposed development plan include the nature and extent of the activities, and when and where the activities are proposed to be carried out.

Does that answer your question?

Thanks
Wendy



Wendy Chan
Director
Petroleum Assessment Hub |
Georesources
Department of Resources

M:

E: Wendy.Chan@resources.qld.gov.au

A: 1 William Street, Brisbane QLD
4000 | GPO Box 15216, Brisbane
QLD 4001

From: Morag Elliott <Morag.Elliott@dsdilgp.qld.gov.au>

Sent: Wednesday, 2 March 2022 12:33 PM

To: Wendy Chan

Subject: RE: Urgent advice from Resources needed

Hi Wendy

Thank you for that Wendy.

So just to confirm - is the development plan for the lease an approval? ie is there a decision to approve/refuse the plan or is more about accepting that the contents of the plan meet the requirements of the Act (or not)?

Thanks Wendy.

Morag Elliott
Manager
Development Assessment Division , Planning Group
Department of State Development,
Infrastructure, Local Government and Planning

p

Level 13, 1 William Street, Brisbane QLD 4000
PO Box 15009 CITY EAST QLD 4002

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From: Wendy Chan <Wendy.Chan@resources.qld.gov.au>
Sent: Monday, 28 February 2022 1:50 PM
To: Morag Elliott <Morag.Elliott@dildilgp.qld.gov.au>
Cc: Lana Bartholomew <Lana.Bartholomew@resources.qld.gov.au>; Darren Moor <Darren.Moor@resources.qld.gov.au>; Gillian Naylor <Gillian.Naylor@resources.qld.gov.au>; Alice Prince <Alice.Prince@resources.qld.gov.au>
Subject: FW: Urgent advice from Resources needed

Hi Morag,

Please find detailed below our response to your questions of 21.02.2022:

- The *Petroleum and Gas (Production and Safety) Act 2004* provides for authorised activities that a holder is entitled to carry out in relation to the authority.
 - For petroleum leases, the key authorised activities are outlined in section 109 and include exploration activities, testing for petroleum production and petroleum production. Incidental activities under section 112 are also authorised activities and include things such as constructing or operating communications systems, compressors, roads and evaporation ponds amongst other things. As such, if used for any of these purposes, Resources considers that deviated wells and directional drilling are authorised activities for the purposes of the *Petroleum and Gas Act (Production and Safety) Act 2004*.
 - However, a petroleum lease cannot be granted unless a relevant Environmental Authority is issued under the *Environmental Protection Act 1994*. An Environmental Authority conditions how specific authorised activities can be carried out including particular drilling methods.
- Under the *Petroleum and Gas (Production and Safety) Act 2004*, it is a mandatory condition that petroleum lease holders comply with the Act. The *Petroleum and Gas (Production and Safety) Act 2004* must be read together with the *Mineral and Energy Resources (Common Provisions) Act 2014*. The *Mineral and Energy Resources (Common Provisions) Act 2016* requires that a person must not enter private land to conduct authorised activities unless the authority holder has given each owner and occupier of the land an entry notice about the entry (ss 38.39).
- Yes. The Department of Resources approves a development plan for a petroleum lease. The development plan period is 5 years, and later development plans are required to be lodged prior to the expiry of each 5 year term. A development plan provides detailed information about the nature and extent of the activities to be carried out under the lease during the plan period.
 - This information is to ensure that resource management decisions can be made and appropriate development of the lease occurs.
 - Under section 141, the criteria that must be considered in deciding to approve a proposed development plan include the nature and extent of the activities, and when and where the activities are proposed to be carried out.
 - In addition, Chapter 3 of the *Mineral and Energy Resources (Common Provisions) Act 2014* includes the State's land access framework. Companies must comply with the requirement under this Act which include the requirements for negotiating land access with landholders and occupiers. Whilst not an approval as such, negotiations for a conduct and compensation agreement with a landholder or occupier may affect the location, nature or extent of authorised activities.
 - Additionally, under the land access framework, a company cannot enter restricted land within the lease without landholder consent. Restricted land is an area 200m laterally around certain buildings

- including those used as a residence, childcare centre, hospital or business. Restricted land is also created 50m laterally around an artesian well, bore, dam or water storage facility, a principal stockyard, or a cemetery or burial place.
- It should be noted that restricted land only applies to leases granted after the commencement of the *Mineral and Energy Resources (Common Provisions) Act 2014* (note this Act commenced in September 2016). Prior to that any authorised activity occurring within 600m of a school or occupied residence triggered the requirement for a conduct and compensation agreement.
- In terms of regulatory approvals that may impact on these matters, you should also check with the Department of Environment and Science and Resources Safety and Health Queensland as well.
- No. However, Chapter 3 of the *Mineral and Energy Resources (Common Provisions) Act 2014* includes the State's land access framework. Companies must comply with the requirement under this Act which include the requirements for negotiating land access with landholders and occupiers. Whilst not an approval as such, negotiations for a conduct and compensation agreement with a landholder/occupier may affect the location, nature or extent of authorised activities. In terms of regulatory approvals that may impact on these matters, you should also check with the Department of Environment and Science and Resources Safety and Health Queensland as well.
- Yes. It is a mandatory condition of the petroleum lease that the holder has a development plan for the lease and that the holder complies with the development plan. As noted above, the development plan provides detailed information about the nature and extent of the activities to be carried out under the lease to ensure that resource management decisions can be made and appropriate development of the lease occurs.

Please let me know if you have any questions.

Thanks
Wendy



Wendy Chan
Director
Petroleum Assessment Hub |
Georesources
Department of Resources

M:

E:

Wendy.Chan@resources.qld.gov.au

A: 1 William Street, Brisbane QLD

4000 | GPO Box 15216, Brisbane

QLD 4001

From: Morag Elliott <Morag.Elliott@dasilgp.qld.gov.au>

Sent: Monday, 21 February 2022 10:34 AM

To: Alice Prince

Subject: RE: Urgent advice from Resources needed

Hi Alice

As discussed, Planning is currently reviewing Arrow Energy's Dalby Expansion Project in the context of the RPI Act. Specifically, whether their activities to date are under the exemptions provided under section 24 of the RPI Act:

24 Exemption—pre-existing resource activity

- (1) This section applies if, immediately before land becomes land in an area of regional interest, including on commencement of this section, a resource activity may be carried out lawfully on the land.
- (2) The resource activity is an *exempt resource activity* for the area of regional interest.
- (3) For subsection (1), a resource activity may be carried out lawfully on land if—
 - (a) the activity may be carried out lawfully on the land—
 - (i) under a resource authority or an environmental authority; and
 - (ii) without the need for any further authority or approval relating to the location, nature or extent of the expected surface impacts of the activity to be obtained under an Act or a condition of either authority; and
 - (b) information provided in, with or in support of the application for the resource or environmental authority (or an amendment of the application) identified the

Current as at 3 July 2017

Page 19

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Regional Planning Interests Act 2014
Part 2 Restrictions on resource and regulated activities in areas of regional interest

[s 24A]

location, nature and extent of the expected surface impacts of the activity.

A key element of the above section is the petroleum tenures under the P&G Act.

Thanks Alice.

Morag Elliott
Manager
Development Assessment Division , Planning Group
Department of State Development,
Infrastructure, Local Government and Planning

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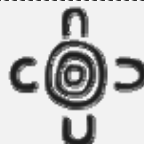
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From: Alice Prince <Alice.Prince@resources.qld.gov.au>
Sent: Monday, 21 February 2022 9:18 AM
To: Morag Elliott <Morag.Elliott@dsdilgp.qld.gov.au>
Subject: RE: Urgent advice from Resources needed

Hi Morag

Some of these questions are a bit open ended from my perspective. Can I ask what/who are we answering or what context the answers will be used. I'm just wondering if it is best for me to consult Policy/P&G in compiling a response.

Alice Prince

Manager

Engagement Team | Engagement and Compliance Unit | Georesources

Department of Resources

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www.resources.qld.gov.au

From: Morag Elliott <Morag.Elliott@dsdilgp.qld.gov.au>
Sent: Monday, 21 February 2022 9:10 AM
To: Alice Prince
Subject: Urgent advice from Resources needed
Importance: High

Hi Alice

Are you able to help with these urgent queries or advise who could assist?

- Does Resources consider 'directional drilling' and 'deviated wells' an authorised activity under s22 the Petroleum and Gas (Production and Safety) Act 2004 in its own right? (Tenure references are PL194, PL198, PL230, PL238, PL252, PL258, PL260)
- Is an entry notice required as a condition of authority?
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- Are there any other authorities relating to location, nature or extent of expected surface impacts required to be obtained under the P&G Act or other Acts administered by Resources?
- Are there any conditions of the petroleum tenure approval or other authorities relating to location, nature or extent of expected surface impacts that must be complied with before impact?

Thanks Alice.

Morag Elliott
Manager

Development Assessment Division , Planning Group
Department of State Development,
Infrastructure, Local Government and Planning

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Sophie Smith

From: Morag ELLIOTT
Sent: Tuesday, 28 June 2022 1:10 PM
To: Kate Wall
Subject: FW: Urgent advice from Resources needed

Hi Kate

Was the information in this email information you relied upon?

Morag Elliott
Manager

p. Access refused in

From: Wendy Chan <Wendy.Chan@resources.qld.gov.au>
Sent: Monday, 28 February 2022 1:50 PM
To: Morag Elliott <Morag.Elliott@dsdilgp.qld.gov.au>
Cc: Lana Bartholomew <Lana.Bartholomew@resources.qld.gov.au>; Darren Moor <Darren.Moor@resources.qld.gov.au>; Gillian Naylor <Gillian.Naylor@resources.qld.gov.au>; Alice Prince <Alice.Prince@resources.qld.gov.au>
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Thanks
Wendy



Wendy Chan
Director
Petroleum Assessment Hub |
Georesources
Department of Resources

M:

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A: 1 William Street, Brisbane QLD
4000 | GPO Box 15216, Brisbane
QLD 4001

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Current as at 3 July 2017

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Regional Planning Interests Act 2014

Part 2 Restrictions on resource and regulated activities in areas of regional interest

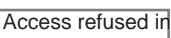
[s 24A]

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A key element of the above section is the petroleum tenures under the P&G Act.

Thanks Alice.

Morag Elliott
Manager
Development Assessment Division , Planning Group
Department of State Development,
Infrastructure, Local Government and Planning

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From: Alice Prince <Alice.Prince@resources.qld.gov.au>

Sent: Monday, 21 February 2022 9:18 AM

To: Morag Elliott <Morag.Elliott@dsdilgp.qld.gov.au>

Subject: RE: Urgent advice from Resources needed

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Alice Prince

Manager

Engagement Team | Engagement and Compliance Unit | Georesources

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Sent: Monday, 21 February 2022 9:10 AM

To: Alice Prince

Subject: Urgent advice from Resources needed

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Thanks Alice.

Morag Elliott
Manager
Development Assessment Division , Planning Group
Department of State Development,
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Table of Contents

Table of Contents	2
Permit details	3
Holders	4
Area	5
Term history	7
Native title	7
Purpose and minerals	7
Related permits	7
Financial	7
Activities	8

▼ Permit details	
Permit ID:	PL 194
Status:	Granted
Lodged date:	26/09/2002
Grant date:	09/12/2004
Commencement date:	09/12/2004
Expiry date:	08/12/2034
Plan/program expiry date:	30/06/2026
Current term:	30 years
Work program type:	
Conditions:	
Locality:	KOGAN FIELD, TOWN OF WARRA, SURAT BASIN
Remarks:	
Act permit granted under:	Petroleum Act 1923
Act now administered under:	Petroleum and Gas (Production and Safety) Act 2004

▼ Holders

Authorised holder representative (AHR)

FERGUSON, Suzanne
C/- Tenement Manager GPO Box 5262 Brisbane QLD 4001

Holders

Holder name	Share %	Status	Held from	Held to	Authorised holder
* CLEANCO QUEENSLAND LIMITED Level 32, 12 Creek Street Brisbane QLD 4000	50.00000000000000	Current	30/04/2020		No
* ARROW CSG (AUSTRALIA) PTY LTD C/- Tenement Manager GPO Box 5262 Brisbane QLD 4001	15.00000000000000	Current	05/10/2010		No
* AUSTRALIAN CBMPTY LTD C/- Tenement Manager GPO Box 5262 BRISBANE QLD 4001	35.00000000000000	Current	02/03/2010		Yes
STANWELL CORPORATION LIMITED	50.00000000000000	Former	27/10/2011	30/04/2020	
SHELL CSG (AUSTRALIA) PTY LTD	15.00000000000000	Former	02/03/2010	05/10/2010	
AUSTRALIAN CBMPTY LTD	50.00000000000000	Former	09/12/2004	02/03/2010	
CS ENERGY LIMITED	50.00000000000000	Former	09/12/2004	27/10/2011	
AUSTRALIAN CBMPTY LTD	100.00000000000000	Former	26/09/2002	09/12/2004	

Tenancy type: Tenancy in Common

▼ Area

Location:	View Map
Mining district:	Dalby
Local authority:	Western Downs Regional Council
Area:	64 Sub-blocks
Exclusions:	1. Any granted Mining Leases for Coal
Marked out date:	

Sub-blocks

BIM	Block	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Brisbane	2459																Q					V	W	X		
Brisbane	2531	A	B	C	D		F	G	H	J		L	M	N	O		Q	R	S	T	U	V	W	X	Y	Z
Brisbane	2532																Q						V	W		
Brisbane	2603	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Brisbane	2604	A	B				F	G				L	M				Q	R					V	W		

Background land

No data available

Survey plans

Plan No.	Description	Date received	Locality	Volume	Folio
MP38310	PWLs "Kogan North #16, #26, #26A, #28, #28A, #44, #45 & #50"	04/01/2008	KOGAN		
MP38311	PWLs "Kogan North #17, #35, 36, 37, 39, 40 & #43"	04/01/2008	KOGAN		
MP38285	PWLs "Kogan North #11, #23, #27, #27A, #29, #29A, #31 & #51"	04/01/2008	KOGAN		
MP38305	PWL - KOGAN NORTH 8, 30	04/01/2008	KOGAN AND MACALISTER		
MP38306	PWLs "Kogan North #5, #12, #12A, #14, #15, #48 & #49"	04/01/2008	KOGAN		
MP38307	PWLs "Kogan North #6, #9, #10, #21, #21A, #38 & #46"	04/01/2008	KOGAN		
MP38308	PWLs "Kogan North #7, #24, #25, #32, 33, #34"	04/01/2008	KOGAN		
MP38309	PWLs "Kogan North #13, #18, 19, #20, #41 & #42"	04/01/2008	KOGAN		
MP38491	PWLs "Kogan North #47, #52, 53, 54, 55, 60, 61, 62"	02/03/2009	KOGAN		
MP38634	PWL - "Kogan North #56"	02/12/2009	KOGAN		
MP38729	PWL - "Kogan North #63, 64, 65"	09/03/2010	KOGAN		
MP38747	PWL - "Kogan North #25A, 28T, 29T, 44T & 50T"	26/03/2010	KOGAN		
MP38945	PWL - "Kogan North #76"	18/08/2010	BRIGALOW		
MP43676	PWL - KOGAN NORTH 79	15/01/2014	KOGAN		
MP44699	PWL - KOGAN NORTH 80, 81, 82, 83, 84, 85, 86, 87, 88	27/06/2016	KOGAN		
MP43989	PWL - KOGAN NORTH 89, KOGAN NORTH 90, KOGAN NORTH 91	18/01/2018	KOGAN		
MP45808	PWL OF KOGAN NORTH 92, KOGAN NORTH 93, KOGAN NORTH 94	20/04/2018	KOGAN		
MP45823	PWL of Kogan North 95, Kogan North 97 & Kogan North 98	26/09/2019	KOGAN		

Relinquishment details

No data available

Sub-blocks retained

No data available

Term history							
Term	Date notice issued	Date lodged	Date approved	Date commenced	Date term ends	Term	Act granted under
2004 - 2034		26/09/2002	09/12/2004	09/12/2004	08/12/2034	30 years	Petroleum Act 1923

Native title	
Outcome	Process
Pre-existing rights based Act	Pre-existing Right Based Act

Purpose and minerals	
Purpose	
PETROLEUM	
Minerals	
Coal Seam Gas	

Related permits	
Pre-requisite permits:	ATP 676P
Dependent permits:	DAA2019

Financial	
Rent details	
Area units:	192
Rate/unit area:	\$162.00

▼ Activities

Activity name	Activity / Dealing No	Status	Date received	Expected completion	Date completed	Remarks
Transfer a mortgage	314381	Registered	28/05/2020		01/06/2020	Application accepted
Add excluded land	208831	Approved	26/05/2017		21/06/2017	Approval given to add any land that may be subject to native title to PL194.
Later Development Plan Due		Requested	12/06/2014	30/06/2015		LDP DUE 30/06/2015.
Coordination arrangement	132352	Approved	22/02/2012		20/03/2019	
Change of holder name	1019581	Closed	05/10/2010	05/10/2010	05/10/2010	Changed name from SHELL CSG (AUSTRALIA) PTY LTD to ARROW CSG (AUSTRALIA) PTY LTD
Later Development Plan		Closed	05/05/2010	30/06/2010	19/11/2010	LDP DUE 30/06/2010. LDP LODGED ON 30/04/2010 FOR A 5 YEAR PERIOD COMMENCING 01/07/2010. LDP APPROVED 19/11/10.
Later Development Plan		Closed	27/06/2005	31/12/2010	08/07/2010	LODGED 27/6/05. LDP FOR THE PERIOD OF 01/07/2005 TO 30/06/2010. LDP FORWARDED TO TAS FOR ASSESSMENT. TAS COMPLETED 18/02/2009 BY IBRAHIM HUSSEIN, JAMES BURGE HAS ALSO CHECK THE TAS AS OF 30/06/2010. LDP CAN PROCEED. LDP APPROVED 8/7/10 FOR PERIOD 1/7/05 TO 30/6/10.
Mortgage	1004473	Registered	16/04/2005	30/04/2005	27/05/2005	Indication of approval for Deed of Mortgage and Charge in favour of CS Energy Ltd. Indication approved 27-MAY-2005

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Table of Contents

Table of Contents	2
Permit details	3
Holders	4
Area	5
Term history	7
Native title	7
Purpose and minerals	7
Related permits	7
Financial	7
Activities	8

▼ Permit details

Permit ID:	PL 198
Status:	Granted
Lodged date:	29/01/2003
Grant date:	09/12/2004
Commencement date:	09/12/2004
Expiry date:	08/12/2034
Plan/program expiry date:	30/06/2025
Current term:	30 years
Work program type:	
Conditions:	
Locality:	Clarence Morton Basin, TIPTON WEST FIELD, TOWN OF DALBY
Remarks:	
Act permit granted under:	Petroleum Act 1923
Act now administered under:	Petroleum and Gas (Production and Safety) Act 2004

▼ Holders

Authorised holder representative (AHR)

FERGUSON, Suzanne
C/- Tenement Manager GPO Box 5262 Brisbane QLD 4001

Holders

Holder name	Share %	Status	Held from	Held to	Authorised holder
* ARROW CSG (AUSTRALIA) PTY LTD C/- Tenement Manager GPO Box 5262 Brisbane QLD 4001	30.0000000000000	Current	05/10/2010		No
* ARROW (TIPTON TWO) PTY LTD GPO Box 5262 Brisbane QLD 4001	28.0000000000000	Current	09/03/2010		No
* ARROW (TIPTON) PTY. LTD. GPO Box 5262 Brisbane QLD 4001	42.0000000000000	Current	18/01/2010		Yes
SHELL CSG (AUSTRALIA) PTY LTD	12.0000000000000	Former	09/03/2010	05/10/2010	
SHELL CSG (AUSTRALIA) PTY LTD	18.0000000000000	Former	18/01/2010	05/10/2010	
ARROW (TIPTON TWO) PTY LTD	40.0000000000000	Former	09/09/2009	09/03/2010	
ARROW (TIPTON) PTY. LTD.	60.0000000000000	Former	22/02/2008	18/01/2010	
BEACH PETROLEUM (SURAT) PTY LTD	40.0000000000000	Former	22/02/2008	09/09/2009	
ARROW (TIPTON) PTY. LTD.	100.0000000000000	Former	03/10/2007	22/02/2008	
ARROW ENERGY NL	100.0000000000000	Former	23/04/2007	03/10/2007	
ARROW ENERGY NL	80.0000000000000	Former	09/12/2004	23/04/2007	
COMET RIDGE LTD	20.0000000000000	Former	09/12/2004	23/04/2007	
ARROW ENERGY NL	100.0000000000000	Former	29/01/2003	09/12/2004	

Tenancy type: Tenancy in Common

Area

Location:	View Map
Mining district:	Dalby
Local authority:	Toowoomba Regional Council, Western Downs Regional Council
Area:	85 Sub-blocks
Exclusions:	
Marked out date:	

Sub-blocks

BIM	Block	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Brisbane	2751	A	B					G	H	J	K	L	M	N	O	P	Q	R				V	W			
Brisbane	2752	A	B				F	G	H			L	M	N												
Brisbane	2822																									Z
Brisbane	2823	A	B				F	G				L	M				Q	R				V	W	X		
Brisbane	2894					E				J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Brisbane	2895	A	B	C			F					L					Q					V	W			
Brisbane	2966	A	B	C	D	E	F	G	H	J		L	M	N	O		Q	R	S	T		V	W	X	Y	Z
Brisbane	2967	A	B																							

Background land

No data available

Survey plans

Plan No.	Description	Date received	Locality	Volume	Folio
MP39185	PWL - "Tipton #153"		SPRINGVALE		
MP37933	PWL TIPTON 24, TIPTON 23	07/09/2006	GRASSDALE & CECIL PLAINS		
MP38286	PWLs - "Tipton #26(A), 103, 120, 121, 122, 123 & 124"	04/01/2008	CECIL PLAINS		
MP38290	PWL - TIPTON 31, 33, 34, 41, 108	04/01/2008	SPRINGVALE & GRASSDALE		
MP38303	PWLs - "Tipton #35, #36, #42, #43, #50 & #51"	04/01/2008	GRASSDALE		
MP38304	PWLs - "Tipton #93, 94, #95, #98, #99 & #102"	04/01/2008	CECIL PLAINS		
MP38297	PWL - TIPTON 64, 65, 72, 109, 111	04/01/2008	GRASSDALE		
MP38298	PWL - TIPTON 61, 62, 63, 70, 71	04/01/2008	GRASSDALE		
MP38299	PWLs - "Tipton #39, #40, #47, #54, #54A, #55 & #105."	04/01/2008	GRASSDALE		
MP38300	PWLs - " TIPTON #37, #38, #44, 45, #46, #52 & #53."	04/01/2008	GRASSDALE		
MP38301	PWLs - " Tipton #45, #69 & #76"	04/01/2008	GRASSDALE		
MP38302	PWL - TIPTON 96, 97, 100, 101, 104	04/01/2008	GRASSDALE		

Plan No.	Description	Date received	Locality	Volume	Folio
MP38291	PWL - TIPTON 30, 32, 110, 113, 125, 126, 127, 128	04/01/2008	SPRINGVALE		
MP38292	PWLs "Tipton #48, #49, #56, #57, #57A, #106 & 107"	04/01/2008	GRASSDALE		
MP38293	PWLs " Tipton #79, #85, #86, #92 & #112"	04/01/2008	GRASSDALE		
MP38294	PWLs "Tipton #77, #78, #83, #84, #90 & #91"	04/01/2008	GRASSDALE		
MP38295	PWLs " Tipton #73, 74, 75, 80, 81, 82, 87, 88 & 89"	04/01/2008	GRASSDALE & CECIL PLAINS		
MP38296	PWLs - " Tipton #58, 59, 60 & 66, 67, 68"	04/01/2008	GRASSDALE		
MP38501	PWLs - "Tipton #114, 115, 116, 117, 118, 119"	02/03/2009	SPRINGVALE		
MP38502	PWLs "Tipton #130, #134, 135, 136"	02/03/2009	GRASSDALE- CECIL PLAINS		
MP38503	PWLs - "Tipton #137, 138, 139, 140, 141, 142"	02/03/2009	GRASSDALE		
MP38504	PWLs - "Tipton #145 & #147, 148, 149"	02/03/2009	CECIL PLAINS		
MP38498	PWL - "Tipton #37T, 38T, 39T & #44T, 45T, 46T"	02/03/2009	GRASSDALE		
MP38497	PWLs - " Tipton #25 & #28T"	02/03/2009	CECIL PLAINS		
MP38499	PWLs - "Tipton #60T, #61T, #68T & #69T"	02/03/2009	GRASSDALE		
MP38500	PWLs - "Tipton #95T, #96T, #98T, #99T, #100T & #102T"	02/03/2009	GRASSDALE		
MP38506	PWLs - " Tipton #131, #132, #132A, #133 & #144"	12/03/2009	CECIL PLAINS		
MP38507	PWL "Tipton #129"	12/03/2009	GRASSDALE		
MP38743	PWL - "Tipton #143V1 & #143V(2) and #143L"	09/03/2010	CECIL PLAINS		
MP38736	PWL - "Tipton #146"	09/03/2010	CECIL PLAINS		
MP38746	PWL - "Tipton #68A"	09/03/2010	GRASSDALE		
MP39175	PWL - "Tipton #156"	07/04/2011	SPRINGVALE		
MP43667	PWL - TIPTON 193 & 194	05/11/2013	GRASSDALE		
MP43664	PWL - TIPTON 195, 196, 196A, 197	05/11/2013	NANDI		
MP44007	PWL - TIPTON 157, 158 & 159A	10/12/2014	GRASSDALE		
MP44701	PWL - TIPTON 211, 213, 214, 216	20/10/2016	GRASSDALE		
MP44714	PWL - TIPTON 210, TIPTON 212, TIPTON 217, TIPTON 218, TIPTON 219	18/01/2018	GRASSDALE		
MP45814	PWL OF TIPTON 233, TIPTON 240, TIPTON 245, TIPTON 283 & TIPTON 316	05/10/2018	GRASSDALE & CECIL PLAINS		

Plan No.	Description	Date received	Locality	Volume	Folio
MP45824	PWL OF TIPTON 255, TIPTON 258, TIPTON 261 & TIPTON 310	26/09/2019	SPRINGVALE		
MP45825	PWL OF TIPTON 242, TIPTON 270, TIPTON 271, TIPTON 282, TIPTON 291 & TIPTON 294	26/09/2019	CECIL PLAINS & GRASSDALE		
MP45829	PWL OF TIPTON 248, TIPTON 249, TIPTON 250, TIPTON 265, TIPTON 268, TIPTON 269, TIPTON 272, TIPTON 273, TIPTON 280, TIPTON 293 & TIPTON 300	30/12/2019	GRASSDALE		

Relinquishment details

No data available

Sub-blocks retained

No data available

Term history

Term	Date notice issued	Date lodged	Date approved	Date commenced	Date term ends	Term	Act granted under
2004 - 2034		29/01/2003	09/12/2004	09/12/2004	08/12/2034	30 years	Petroleum Act 1923

Native title

Outcome	Process
Land subject to Native Title is excluded from the permit area	Predominantly Exclusive Land

Purpose and minerals

Purpose
PETROLEUM
Minerals
Coal Seam Gas

Related permits

Pre-requisite permits: ATP 683P
--

Financial

Rent details

Area units:	255
Rate/unit area:	\$162.00

▼ Activities						
Activity name	Activity / Dealing No	Status	Date received	Expected completion	Date completed	Remarks
Later Development Plan Due		Requested	12/06/2014	08/12/2015		LDP DUE 8/12/2015.
Later Development Plan		Closed	07/10/2010	08/12/2010	19/11/2010	LDP DUE ON 8/12/2010. LDP LODGED ON 07/10/2010 WITHIN REQUIRED TIMEFRAME, FOR A FIVE (5) YEAR PERIOD COMMENCING 09/12/2010. CHECKLIST COMPLETED. FORWARDED TO TAS FOR ASSESSMENT ON 13/10/2010. LDP APPROVED 19/11/10.
Change of holder name	1019581	Closed	05/10/2010	05/10/2010	05/10/2010	Changed name from SHELL CSG (AUSTRALIA) PTY LTD to ARROW CSG (AUSTRALIA) PTY LTD
Change of holder name	1016426	Closed	09/09/2009	09/09/2009	09/09/2009	Changed name from BEACH PETROLEUM(SURAT) PTY LTD to ARROW (TIPTON TWO) PTY LTD
Agreement		Closed	12/07/2007	31/12/2008	12/07/2007	PRIORITY DEED FOR PL 198 AND ATP 683 - JOINT OPERATING AGREEMENT - TIPTON WEST JOINT VENTURE - BETWEEN BEACH PETROLEUM(SURAT) PTY LTD, ARROW (TIPTON) PTY LTD, COMMONWEALTH BANK OF AUSTRALIA AND CBA CORPORATE SERVICES (NSW) PTY LTD.
Later Development Plan		Closed	18/12/2005	25/04/2007	03/10/2007	REQUEST FOR FEE OF \$4400 SENT TO HOLDER - 28/02/06. LDP LODGED IN QDEX ON 18-DEC-2005. FEE OF \$440 PAID BY EFT, LATE PENALTY NOT REQUIRED. ASSESSED BY TAS, READY FOR APPROVAL. APPROVED - 3/10/2007.

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Table of Contents

Table of Contents	2
Permit details	3
Holders	4
Area	5
Term history	6
Native title	6
Purpose and minerals	6
Related permits	6
Financial	7
Activities	8

▼ Permit details	
Permit ID:	PL 230
Status:	Granted
Lodged date:	06/04/2005
Grant date:	19/12/2005
Commencement date:	19/12/2005
Expiry date:	18/12/2035
Plan/program expiry date:	30/06/2025
Current term:	30 years
Work program type:	
Conditions:	
Locality:	Surat Basin; BRISBANE
Remarks:	.
Act permit granted under:	Petroleum and Gas (Production and Safety) Act 2004
Act now administered under:	Petroleum and Gas (Production and Safety) Act 2004

▼ Holders

Authorised holder representative (AHR)

FERGUSON, Suzanne
C/- Tenement Manager GPO Box 5262 Brisbane QLD 4001

Holders

Holder name	Share %	Status	Held from	Held to	Authorised holder
* ARROW CSG (AUSTRALIA) PTY LTD C/- Tenement Manager GPO Box 5262 Brisbane QLD 4001	30.0000000000000	Current	05/10/2010		No
* ARROW (DAANDINE) PTY. LTD. GPO Box 5262 Brisbane QLD 4001	70.0000000000000	Current	15/10/2009		Yes
SHELL CSG (AUSTRALIA) PTY LTD	30.0000000000000	Former	15/10/2009	05/10/2010	
ARROW DAANDINE PTY LTD	100.0000000000000	Former	15/05/2006	15/10/2009	
ARROW ENERGY NL	100.0000000000000	Former	17/05/2005	15/05/2006	

Tenancy type: Tenancy in Common

Area

Location:	View Map
Mining district:	Dalby
Local authority:	Western Downs Regional Council
Area:	46 Sub-blocks
Exclusions:	
Marked out date:	

Sub-blocks

BIM	Block	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Brisbane	2676	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P		R	S	T	U				Y	Z
Brisbane	2677	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

Background land

No data available

Survey plans

Plan No.	Description	Date received	Locality	Volume	Folio
MP37794	PWL - DAANDINE 2	27/09/2005	KOGAN		
MP38315	PWLs "Daandine #13, #21, #32, 33, #34"	04/01/2008	KOGAN		
MP38316	PWLs " Daandine #19, #20, #28, 29, 30, 31"	04/01/2008	KOGAN		
MP38305	PWL - DAANDINE 15, 25	04/01/2008	KOGAN AND MACALISTER		
MP38312	PWL - DAANDINE 5, 6, 7, 8	04/01/2008	KOGAN		
MP38313	PWLs " Daandine #10, #11, #18, #22, #26, & #27"	04/01/2008	KOGAN		
MP38314	PWLs " Daandine #12, #14, #35, 36, 37, #38"	04/01/2008	KOGAN		
MP38494	PWL "Daandine #24"	02/03/2009	RANGES BRIDGE		
MP38495	PWLs "Daandine # 39, 40, 41, 42, 43"	02/03/2009	KOGAN		
MP38496	PWLs "Daandine #44 & #45"	02/03/2009	KOGAN		
MP38745	PWL - "Daandine #23 & #23A"	04/03/2010	KOGAN		
MP38733	PWL - Daandine 6T,7T,8T,10T,11T,12T,13A,14T,15T,18T,19T,20T,21T,22T, 26T, 28T,29T, 30T,31T, 32T, 33T, 34T, 35T, 36T, 37T,38T(B), 44T,45T, 46, 53	09/03/2010	KOGAN		
MP38728	PWL - "Daandine 50, 51, 52, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63"	09/03/2010	KOGAN		
MP38731	PWL - "Daandine 64, 65, 66, 67 & 69, 70, 71, 72, 73"	09/03/2010	KOGAN		
MP38750	PWL - "Daandine #27T"	26/03/2010	KOGAN		
MP38863	PWL - Daandine #68, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 99	18/08/2010	KOGAN & MACALISTER		
MP38950	PWL - Daandine 38T & 38T(A)	20/08/2010	KOGAN		
MP39608	PWL - DAANDINE 120, 121, 122	07/06/2013	KOGAN		
MP43657	PWL - DAANDINE 123, 124, 125	27/06/2013	KOGAN		
MP43660	PWL - DAANDINE 126, 127	27/06/2013	KOGAN		
MP43678	PWL - DAANDINE 220, 221, 222, 223, 224, 225, 226, 227, 228	18/03/2014	KOGAN		
MP43679	PWL - DAANDINE 211, 212, 213, 214, 215, 216, 217, 218	18/03/2014	KOGAN		
MP43680	PWL - DAANDINE 202, 204, 206, 207, 208	18/03/2014	KOGAN		

Plan No.	Description	Date received	Locality	Volume	Folio
MP44001	PWL - DAANDINE 134, 254	10/12/2014	KOGAN		
MP44004	PWL - DAANDINE 161, 162, 163, 164	10/12/2014	RANGES BRIDGE		
MP44008	PWL - DAANDINE 252, 253	10/12/2014	KOGAN		
MP44698	PWL - DAANDINE 157, 158, 159, 160	02/09/2015	KOGAN		
MP44710	PWL - DAANDINE 264	26/06/2017	RANGES BRIDGE		
MP44715	PWL = DAANDINE 170, DAANDINE 171, DAANDINE 172, DAANDINE 173, DAANDINE 174,	18/01/2018	KOGAN RANGES BRIDGE		
MP45803	PWL of Daandine 175, 176, 177	02/03/2018	Kogan		
MP45804		02/03/2018	Kogan		
MP45812	PWL OF DAANDINE 116, DAANDINE 232, DAANDINE 234, DAANDINE 236, DAANDINE 238, DAANDINE 282, DAANDINE 284, DAANDINE 286, DAANDINE 288, DAANDINE 302 AND DAANDINE 308	23/08/2018	RANGES BRIDGE		
MP45815	PWL OF DAANDINE 165, DAANDINE 166, DAANDINE 167 & DAANDINE 168	05/10/2018	KOGAN		
MP45817	PWL OF DAANDINE 179, DAANDINE 180, DAANDINE 181, DAANDINE 182, DAANDINE 183 & DAANDINE 184	12/03/2019	KOGAN & RANGES BRIDGE		
MP45820	PWL OF DAANDINE 242, 244, 246 & 248	09/04/2019	RANGES BRIDGE		
MP45828	PWL OF DAANDINE 104, DAANDINE 107, DAANDINE 114, DAANDINE 292, DAANDINE 294, DAANDINE 296 & DAANDINE 298	30/12/2019	MACALISTER & RANGES BRIDGE		

Relinquishment details

No data available

Sub-blocks retained

No data available

Term history

Term	Date notice issued	Date lodged	Date approved	Date commenced	Date term ends	Term	Act granted under
2005 - 2035		06/04/2005	19/12/2005	19/12/2005	18/12/2035	30 years	Petroleum and Gas (Production and Safety) Act 2004

Native title

Outcome	Process
Land subject to Native Title is excluded from the permit area	Predominantly Exclusive Land

Purpose and minerals

Purpose
PETROLEUM
Minerals
Coal Seam Gas

Related permits

Pre-requisite permits:	ATP 790
------------------------	---------

▼ Financial

Rent details

Area units:	138
Rate/unit area:	\$162.00

▼ Activities						
Activity name	Activity / Dealing No	Status	Date received	Expected completion	Date completed	Remarks
Coordination arrangement	347504	Approved	28/04/2021		30/07/2021	Coordination Arrangement between the holders of PLs 252 and 230 has been approved by the Minister's delegate on 27/07/21.
Later Development Plan Due		Requested	24/06/2014	18/12/2015		LDP DUE 18/12/2015.
Later Development Plan		Closed	18/10/2010	18/12/2010	19/11/2010	LDP IS DUE 18/12/2010. LDP LODGED WITHIN REQUIRED TIMEFRAME. CHECKLIST COMPLETED. FOR FIVE (5) YEAR PERIOD FROM 19 DECEMBER 2010 TO 18 DECEMBER 2015. FORWARDED TO TAS ON 18/10/2010. LDP APPROVED 19/11/10.
Coordination arrangement	131805	Approved	11/10/2010		20/03/2019	Coordination Arrangement cancelled by Ministers Delegate on 27/07/2021. New Coordination Arrangement has been approved 27/07/2021 between the holders of PLs 230 and 252 refer to activity number 347504 for further details.
Change of holder name	1019581	Closed	05/10/2010	05/10/2010	05/10/2010	Changed name from SHELL CSG (AUSTRALIA) PTY LTD to ARROW CSG (AUSTRALIA) PTY LTD

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Table of Contents

Table of Contents	2
Permit details	3
Holders	4
Area	5
Term history	5
Native title	6
Purpose and minerals	6
Related permits	6
Financial	6
Activities	6

▼ Permit details

Permit ID:	PL 238
Status:	Granted
Lodged date:	12/04/2006
Grant date:	29/10/2009
Commencement date:	29/10/2009
Expiry date:	28/10/2039
Plan/program expiry date:	30/06/2025
Current term:	30 years
Work program type:	
Conditions:	<p>Entry into relevant arrangement (a) The holders of PL 238 must enter into contract(s), coordination arrangement(s) or other arrangement(s) (relevant arrangement(s)) to supply petroleum produced from the area of PL 238, where the relevant arrangement(s) provide for: i. the supply of petroleum produced from the area of PL 238 to occur by no later than 31 December 2018; and ii. the volume of petroleum produced from the area of PL 238 to equal or exceed 300TJ by 31 December 2019. (b) The holders of PL 238 must provide the following to the department administered by the Minister by no later than 30 June 2017: i. evidence of the relevant arrangement(s) to supply petroleum produced from the area of PL 238 which meets the requirements of clause (a); and ii. a written declaration that the petroleum produced from the area of PL 238 will meet all or some of the petroleum required to be supplied under the relevant arrangement. (c) The Minister may determine that s/he is not satisfied that the holders of PL 238 have entered into relevant arrangement(s) if the Minister reasonably believes: i. a relevant arrangement relating to PL 238 is not an arms-length commercial transaction; or ii. supply under the relevant arrangement is unlikely to be carried out.</p>
Locality:	Clarence Morton Basin, SOUTH OF DALBY
Remarks:	
Act permit granted under:	Petroleum and Gas (Production and Safety) Act 2004
Act now administered under:	Petroleum and Gas (Production and Safety) Act 2004

▼ Holders

Authorised holder representative (AHR)

FERGUSON, Suzanne
C/- Tenement Manager GPO Box 5262 Brisbane QLD 4001

Holders

Holder name	Share %	Status	Held from	Held to	Authorised holder
* ARROW CSG (AUSTRALIA) PTY LTD C/- Tenement Manager GPO Box 5262 Brisbane QLD 4001	30.00000000000000	Current	05/10/2010		No
* ARROW (TIPTON) PTY. LTD. GPO Box 5262 Brisbane QLD 4001	42.00000000000000	Current	26/03/2010		Yes
* ARROW (TIPTON TWO) PTY LTD GPO Box 5262 Brisbane QLD 4001	28.00000000000000	Current	26/03/2010		No
SHELL CSG (AUSTRALIA) PTY LTD	30.00000000000000	Former	26/03/2010	05/10/2010	
ARROW (TIPTON TWO) PTY LTD	40.00000000000000	Former	09/09/2009	26/03/2010	
ARROW (TIPTON) PTY. LTD.	42.00000000000000	Former	02/04/2009	26/03/2010	
SHELL CSG (AUSTRALIA) PTY LTD	18.00000000000000	Former	02/04/2009	26/03/2010	
ARROW (TIPTON) PTY. LTD.	60.00000000000000	Former	12/04/2006	02/04/2009	
BEACH PETROLEUM (SURAT) PTY LTD	40.00000000000000	Former	12/04/2006	09/09/2009	

Tenancy type: Tenancy in Common

Area

Location:	View Map
Mining district:	Dalby
Local authority:	Toowoomba Regional Council, Western Downs Regional Council
Area:	75 Sub-blocks
Exclusions:	
Marked out date:	

Sub-blocks

BIM	Block	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Brisbane	2751																		S	T				X	Y	Z
Brisbane	2823			C	D	E			H	J	K			N	O	P			S	T	U				Y	Z
Brisbane	2824	A					F	G				L	M	N			Q	R	S			V	W	X	Y	
Brisbane	2895				D	E		G	H	J	K		M	N	O	P		R	S	T	U			X	Y	Z
Brisbane	2966										K					P					U					
Brisbane	2967			C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

Background land

No data available

Survey plans

Plan No.	Description	Date received	Locality	Volume	Folio
MP38843	PWL "Plainview #4"	18/08/2010	ST RUTH		
MP38748	PWL - PLAINVIEW 27, PLAINVIEW 28	18/01/2018	GRASSDALE		
MP45807	PWL OF PLAINVIEW 34	20/04/2018	GRASSDALE		
MP45816	PWL OF PLAINVIEW 29, PLAINVIEW 30, PLAINVIEW 31, PLAINVIEW 32, PLAINVIEW 33 & PLAINVIEW 35	23/10/2018	SPRINGVALE		
MP45822	PWWL OF PLAINVIEW 36 AND PLAINVIEW 37	26/06/2019	SPRINGVALE		

Relinquishment details

No data available

Sub-blocks retained

No data available

Term history

Term	Date notice issued	Date lodged	Date approved	Date commenced	Date term ends	Term	Act granted under
2009 - 2039		12/04/2006	29/10/2009	29/10/2009	28/10/2039	30 years	Petroleum and Gas (Production and Safety) Act 2004

▼ Native title

Outcome	Process
Land subject to Native Title is excluded from the permit area	Predominantly Exclusive Land

▼ Purpose and minerals

Purpose
PETROLEUM
Minerals
Coal Seam Gas

▼ Related permits

Pre-requisite permits: ATP 683

▼ Financial

Rent details

Area units:	225
Rate/unit area:	\$162.00

▼ Activities

Activity name	Activity / Dealing No	Status	Date received	Expected completion	Date completed	Remarks
Add excluded land	213514	Approved	19/07/2017		23/08/2017	Approval given to add excluded land namely land that may be subject to native title.
Later Development Plan Due		Closed	28/10/2014	28/10/2014	28/10/2014	LDP DUE 28/10/2014. LATER DEVELOPMENT PLAN RECEIVED 28/10/2014 FOR THE PERIOD OF 29/10/2014 - 28/10/2019.
Change of holder name	1019581	Closed	05/10/2010	05/10/2010	05/10/2010	Changed name from SHELL CSG (AUSTRALIA) PTY LTD to ARROW CSG (AUSTRALIA) PTY LTD
Change of holder name	1016426	Closed	09/09/2009	09/09/2009	09/09/2009	Changed name from BEACH PETROLEUM(SURAT) PTY LTD to ARROW (TIPTON TWO) PTY LTD

PL 252 Resource authority public report

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Table of Contents

Table of Contents	2
Permit details	3
Holders	4
Area	5
Term history	5
Native title	6
Purpose and minerals	6
Related permits	6
Financial	6
Activities	7

▼ Permit details	
Permit ID:	PL 252
Status:	Granted
Lodged date:	19/02/2007
Grant date:	20/09/2008
Commencement date:	20/09/2008
Expiry date:	19/09/2038
Plan/program expiry date:	30/06/2025
Current term:	30 years
Work program type:	
Conditions:	
Locality:	Surat Basin; SOUTH-WEST OF DALBY WITHIN THE WALLOON COAL MEASURES
Remarks:	.
Act permit granted under:	Petroleum and Gas (Production and Safety) Act 2004
Act now administered under:	Petroleum and Gas (Production and Safety) Act 2004

▼ Holders

Authorised holder representative (AHR)

FERGUSON, Suzanne
C/- Tenement Manager GPO Box 5262 Brisbane QLD 4001

Holders

Holder name	Share %	Status	Held from	Held to	Authorised holder
* ARROW ENERGY PTY LTD GPO Box 562 Brisbane QLD 4001	70.000000000000	Current	06/01/2011		Yes
* ARROW CSG (AUSTRALIA) PTY LTD C/- Tenement Manager GPO Box 5262 Brisbane QLD 4001	30.000000000000	Current	05/10/2010		No
ARROW ENERGY LTD	70.000000000000	Former	21/12/2009	06/01/2011	
SHELL CSG (AUSTRALIA) PTY LTD	30.000000000000	Former	21/12/2009	05/10/2010	
ARROW ENERGY LTD	100.000000000000	Former	08/07/2008	21/12/2009	
ARROW ENERGY NL	100.000000000000	Former	19/02/2007	08/07/2008	

Tenancy type: Tenancy in Common

Area

Location:	View Map
Mining district:	Dalby
Local authority:	Western Downs Regional Council
Area:	25 Sub-blocks
Exclusions:	
Marked out date:	

Sub-blocks

BIM	Block	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Brisbane	2749	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

Background land

No data available

Survey plans

Plan No.	Description	Date received	Locality	Volume	Folio
MP38492	PWLs - "Stratheden #10, 11, 12, 13, 14"	02/03/2009	DUCKLO		
MP38493	PWL - STRATHEDEN 16, 18, 19	02/03/2009	DUCKLO		
MP38744	PWL - "Stratheden #15"	09/03/2010	DUCKLO		
MP38734	PWL - "Stratheden #17, 20, 22 & 24, 25, 26, 27"	09/03/2010	DUCKLO		
MP38853	PWL - "Stratheden #5"	18/08/2010	DUCKLO		
MP39583	PWL - Stratheden #60 & 61	12/11/2012	RANGES BRIDGE		
MP39593	PWL - Stratheden #40, 41, 42, 43, 44, 45, 46	14/12/2012	RANGES BRIDGE		
MP43663	PWL - STRATHEDEN 62, 63, 64, 65, 66, 67, 68, 69	14/10/2013	DUCKLO		
MP45812	PWL OF STRATHEDEN 111, STRATHEDEN 112, STRATHEDEN 113, STRATHEDEN 114, STRATHEDEN 115 AND STRATHEDEN 116	23/08/2018	RANGES BRIDGE		

Relinquishment details

No data available

Sub-blocks retained

No data available

Term history

Term	Date notice issued	Date lodged	Date approved	Date commenced	Date term ends	Term	Act granted under
2008 - 2038		19/02/2007	20/09/2008	20/09/2008	19/09/2038	30 years	Petroleum and Gas (Production and Safety) Act 2004

▼ Native title

Outcome	Process
All land subject to Native Title (<10%) is excluded from the permit area	Predominantly Exclusive Land

▼ Purpose and minerals

Purpose
PETROLEUM
Minerals
Coal Seam Gas

▼ Related permits

Pre-requisite permits:	ATP 790
Applied from permits:	WMA2014 ; WMA2015 ; WMA2016
Dependent permits:	WMA2; WMA3 ; WMA4 ; WMA5 ; WMA2017

▼ Financial

Rent details	
Area units:	75
Rate/unit area:	\$162.00

▼ Activities

Activity name	Activity / Dealing No	Status	Date received	Expected completion	Date completed	Remarks
Coordination arrangement	367017	Under assessment	08/12/2021			
Coordination arrangement	347504	Approved	28/04/2021		30/07/2021	Coordination Arrangement between the holders of PLs 252 and 230 has been approved by the Minister's delegate on 27/07/21.
Add excluded land	213520	Approved	19/07/2017		23/08/2017	Approval given to add excluded land namely land that may be subject to native title.
Later Development Plan Due		Requested	24/06/2014	19/09/2018		LDP DUE 19/09/2018.
Later Development Plan		Closed	06/06/2013	30/06/2014	18/06/2014	LDP DUE 19-SEP-2013. LDP RECEIVED 06/06/13, WITHIN TIMEFRAME, FOR PERIOD OF 5 YRS FROM 20/09/2013 TO 19/09/2018. CHECKLIST COMPLETED. TAS REQUIRED. LDP FORWARDED TO DELEGATE FOR APPROVAL 20/05/14. LDP APPROVED BY REGIONAL DIRECTOR ON 18/06/14 FOR THE PERIOD TILL 19/09/2018.
Change of holder name	1020891	Closed	06/01/2011	06/01/2011	06/01/2011	Changed name from ARROW ENERGY LTD to ARROW ENERGY PTY LTD
Coordination arrangement	131810	Approved	11/10/2010		20/03/2019	Coordination Arrangement cancelled by Ministers Delegate on 27/07/2021. New Coordination Arrangement has been approved 27/07/2021 between the holders of PLs 230 and 252 refer to activity number 347504 for further details.
Change of holder name	1019581	Closed	05/10/2010	05/10/2010	05/10/2010	Changed name from SHELL CSG (AUSTRALIA) PTY LTD to ARROW CSG (AUSTRALIA) PTY LTD
Change of holder name	1012587	Closed	08/07/2008	08/07/2008	08/07/2008	Changed name from ARROW ENERGY NL to ARROW ENERGY LTD
Later Development Plan		Closed	22/02/2007	19/04/2007	20/09/2008	INITIAL DEVELOPMENT PLAN LODGED WITH APPLICATION FOR A TERM OF 5 YEARS TO COMMENCE 20 SEP 2008 TO EXPIRE 19 SEP 2013

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Table of Contents

Table of Contents	2
Permit details	3
Holders	4
Area	5
Term history	5
Native title	5
Purpose and minerals	5
Related permits	6
Financial	6
Activities	6

▼ Permit details

Permit ID:	PL 258
Status:	Granted
Lodged date:	01/10/2007
Grant date:	06/12/2010
Commencement date:	01/01/2011
Expiry date:	31/12/2040
Plan/program expiry date:	30/06/2025
Current term:	30 years
Work program type:	
Conditions:	<p>Entry into relevant arrangement (a) The holders of PL 258 must enter into contract(s), coordination arrangement(s) or other arrangement(s) (relevant arrangement(s)) to supply petroleum produced from the area of PL 258, where the relevant arrangement(s) provide for: i. the supply of petroleum produced from the area of PL 258 to occur by no later than 31 December 2018; and ii. the volume of petroleum produced from the area of PL 258 to equal or exceed 300TJ by 31 December 2019. (b) The holders of PL 258 must provide the following to the department administered by the Minister by no later than 30 June 2017: i. evidence of the relevant arrangement(s) to supply petroleum produced from the area of PL 258 which meets the requirements of clause (a); and ii. a written declaration that the petroleum produced from the area of PL 258 will meet all or some of the petroleum required to be supplied under the relevant arrangement. (c) The Minister may determine that s/he is not satisfied that the holders of PL 258 have entered into relevant arrangement(s) if the Minister reasonably believes: i. a relevant arrangement relating to PL 258 is not an arms-length commercial transaction; or ii. supply under the relevant arrangement is unlikely to be carried out.</p>
Locality:	Surat Basin; CECIL PLAINS
Remarks:	
Act permit granted under:	Petroleum and Gas (Production and Safety) Act 2004
Act now administered under:	Petroleum and Gas (Production and Safety) Act 2004

▼ Holders

Authorised holder representative (AHR)

FERGUSON, Suzanne
C/- Tenement Manager GPO Box 5262 Brisbane QLD 4001

Holders

Holder name	Share %	Status	Held from	Held to	Authorised holder
* ARROW CSG (AUSTRALIA) PTY LTD C/- Tenement Manager GPO Box 5262 Brisbane QLD 4001	30.00000000000000	Current	05/10/2010		No
* ARROW (TIPTON) PTY. LTD. GPO Box 5262 Brisbane QLD 4001	42.00000000000000	Current	18/08/2010		Yes
* ARROW (TIPTON TWO) PTY LTD GPO Box 5262 Brisbane QLD 4001	28.00000000000000	Current	18/08/2010		No
SHELL CSG (AUSTRALIA) PTY LTD	30.00000000000000	Former	18/08/2010	05/10/2010	
ARROW (TIPTON TWO) PTY LTD	40.00000000000000	Former	09/09/2009	18/08/2010	
ARROW (TIPTON) PTY. LTD.	42.00000000000000	Former	02/04/2009	18/08/2010	
SHELL CSG (AUSTRALIA) PTY LTD	18.00000000000000	Former	02/04/2009	18/08/2010	
ARROW (TIPTON) PTY. LTD.	60.00000000000000	Former	01/10/2007	02/04/2009	
BEACH PETROLEUM (SURAT) PTY LTD	40.00000000000000	Former	01/10/2007	09/09/2009	

Tenancy type: Tenancy in Common

▼ Area

Location:	View Map
Mining district:	Dalby
Local authority:	Toowoomba Regional Council
Area:	15000.0000 Hectares
Exclusions:	
Marked out date:	

Sub-blocks

No data available

Background land

No data available

Survey plans

Plan No.	Description	Date received	Locality	Volume	Folio
MP44712	PWL - MEENAWARRA 21	26/06/2017	CECIL PLAINS		
MP45811	PWL OF MEENAWARRA 29, MEENAWARRA 30, MEENAWARRA 31 & MEENAWARRA 32	20/04/2018	CECIL PLAINS		
MP45819	PWL OF MEENAWARRA 33, MEENAWARRA 34, MEENAWARRA 35, MEENAWARRA 36, MEENAWARRA 37 & MEENAWARRA 38	28/03/2019	CECIL PLAINS		

Relinquishment details

No data available

Sub-blocks retained

No data available

▼ Term history

Term	Date notice issued	Date lodged	Date approved	Date commenced	Date term ends	Term	Act granted under
2011 - 2040		01/10/2007	06/12/2010	01/01/2011	31/12/2040	30 years	Petroleum and Gas (Production and Safety) Act 2004

▼ Native title

Outcome	Process
Land subject to Native Title is excluded from the permit area	Predominantly Exclusive Land

▼ Purpose and minerals

Purpose
PETROLEUM
Minerals
Coal Seam Gas

▼ Related permits

Pre-requisite permits: ATP 683 - TO BE GRANTED UNDER P&G ACT.

▼ Financial

Rent details

Area units: 150
Rate/unit area: \$162.00

▼ Activities

Activity name	Activity / Dealing No	Status	Date received	Expected completion	Date completed	Remarks
Later Development Plan Due		Requested	12/06/2014	31/12/2015		LDP DUE 31/12/2015.
Change of holder name	1019581	Closed	05/10/2010	05/10/2010	05/10/2010	Changed name from SHELL CSG (AUSTRALIA) PTY LTD to ARROW CSG (AUSTRALIA) PTY LTD
Change of holder name	1016426	Closed	09/09/2009	09/09/2009	09/09/2009	Changed name from BEACH PETROLEUM (SURAT) PTY LTD to ARROW (TIPTON TWO) PTY LTD

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Table of Contents

Table of Contents	2
Permit details	3
Holders	4
Area	5
Term history	5
Native title	6
Purpose and minerals	6
Related permits	6
Financial	6
Activities	6

▼ Permit details

Permit ID:	PL 260
Status:	Granted
Lodged date:	08/01/2008
Grant date:	16/03/2011
Commencement date:	01/04/2011
Expiry date:	31/03/2041
Plan/program expiry date:	30/06/2025
Current term:	30 years
Work program type:	
Conditions:	<p>Entry into relevant arrangement (a) The holders of PL 260 must enter into contract(s), coordination arrangement(s) or other arrangement(s) (relevant arrangement(s)) to supply petroleum produced from the area of PL 260, where the relevant arrangement(s) provide for: i. the supply of petroleum produced from the area of PL 260 to occur by no later than 31 December 2018; and ii. the volume of petroleum produced from the area of PL 260 to equal or exceed 300TJ by 31 December 2019. (b) The holders of PL 260 must provide the following to the department administered by the Minister by no later than 30 June 2017: i. evidence of the relevant arrangement(s) to supply petroleum produced from the area of PL 260 which meets the requirements of clause (a); and ii. a written declaration that the petroleum produced from the area of PL 260 will meet all or some of the petroleum required to be supplied under the relevant arrangement. (c) The Minister may determine that s/he is not satisfied that the holders of PL 260 have entered into relevant arrangement(s) if the Minister reasonably believes: i. a relevant arrangement relating to PL 260 is not an arm's length commercial transaction; or ii. supply under the relevant arrangement is unlikely to be carried out.</p>
Locality:	Clarence Morton Basin, SOUTH OF DALBY
Remarks:	Prerequisite tenure Id's ATP 683
Act permit granted under:	Petroleum and Gas (Production and Safety) Act 2004
Act now administered under:	Petroleum and Gas (Production and Safety) Act 2004

▼ Holders

Authorised holder representative (AHR)

FERGUSON, Suzanne
C/- Tenement Manager GPO Box 5262 Brisbane QLD 4001

Holders

Holder name	Share %	Status	Held from	Held to	Authorised holder
* ARROW CSG (AUSTRALIA) PTY LTD C/- Tenement Manager GPO Box 5262 Brisbane QLD 4001	30.00000000000000	Current	05/10/2010		No
* ARROW (TIPTON TWO) PTY LTD GPO Box 5262 Brisbane QLD 4001	28.00000000000000	Current	09/08/2010		No
* ARROW (TIPTON) PTY. LTD. GPO Box 5262 Brisbane QLD 4001	42.00000000000000	Current	02/04/2009		Yes
SHELL CSG (AUSTRALIA) PTY LTD	30.00000000000000	Former	09/08/2010	05/10/2010	
ARROW (TIPTON TWO) PTY LTD	40.00000000000000	Former	09/09/2009	09/08/2010	
SHELL CSG (AUSTRALIA) PTY LTD	18.00000000000000	Former	02/04/2009	09/08/2010	
ARROW (TIPTON) PTY. LTD.	60.00000000000000	Former	22/01/2008	02/04/2009	
BEACH PETROLEUM (SURAT) PTY LTD	40.00000000000000	Former	22/01/2008	09/09/2009	

Tenancy type: Tenancy in Common

Area

Location:	View Map
Mining district:	Dalby
Local authority:	Western Downs Regional Council
Area:	72 Sub-blocks
Exclusions:	
Marked out date:	

Sub-blocks

BIM	Block	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Brisbane	2678	A					F	G				L	M	N			Q	R	S	T		V	W	X	Y	Z
Brisbane	2750	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Brisbane	2751						F																			
Brisbane	2822	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	
Brisbane	2894	A	B	C	D		F	G	H																	

Background land

No data available

Survey plans

Plan No.	Description	Date received	Locality	Volume	Folio
MP43668	PWL - LONGSWAMP 7 & 8	05/11/2013	RANGES BRIDGE		
MP38962	PWL - LONGSWAMP 25, LONGSWAMP 26	18/01/2018	SPRINGVALE		
MP45800	PWL - LONGSWAMP 27	06/02/2018	Nandi		
MP45805	PWL OF LONGSWAMP 32, LONGSWAMP 33, LONGSWAMP 34, LONGSWAMP 35	20/04/2018	DUCKLO		
MP45806	PWL OF LONGSWAMP 28, LONGSWAMP 29, LONGSWAMP 30, LONGSWAMP 30R & LONGSWAMP 31	20/04/2018	NANDI & DUCKLO		

Relinquishment details

No data available

Sub-blocks retained

No data available

Term history

Term	Date notice issued	Date lodged	Date approved	Date commenced	Date term ends	Term	Act granted under
2011 - 2041		08/01/2008	16/03/2011	01/04/2011	31/03/2041	30 years	Petroleum and Gas (Production and Safety) Act 2004

▼ Native title

Outcome	Process
Land subject to Native Title is excluded from the permit area	Predominantly Exclusive Land

▼ Purpose and minerals

Purpose
Gas, OIL
Minerals
Coal Seam Gas

▼ Related permits

Pre-requisite permits: ATP683 (CONSENT GIVEN) P&G ACT
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▼ Financial

Rent details

Area units:	216
Rate/unit area:	\$162.00

▼ Activities

Activity name	Activity / Dealing No	Status	Date received	Expected completion	Date completed	Remarks
Coordination arrangement	367017	Under assessment	08/12/2021			
Add excluded land	213527	Approved	19/07/2017		23/08/2017	Approval given to add excluded land namely land that may be subject to native title.
Later Development Plan Due		Requested	12/06/2014	31/03/2016		LDP DUE 31/03/2016.
Change of holder name	1019581	Closed	05/10/2010	05/10/2010	05/10/2010	Changed name from SHELL CSG (AUSTRALIA) PTY LTD to ARROW CSG (AUSTRALIA) PTY LTD
Change of holder name	1016426	Closed	09/09/2009	09/09/2009	09/09/2009	Changed name from BEACH PETROLEUM (SURAT) PTY LTD to ARROW (TIPTON TWO) PTY LTD

Pages 744 through 778 redacted for the following reasons:

-----Access refused in accordance with section 47(3)(a) of the RTI Act. Exempt information under section 48 and schedule 3, section 7 of the RTI Act. Access refused in accordance with section 47(3)(a) of the RTI Act. Exempt information under section 48 and schedule 3, section 8 of the RTI Act.

Department of Environment and Heritage Protection

Permit¹

Environmental Protection Act 1994

Environmental authority

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

Permit¹ number: EPPG00972513

Project Name: Dalby Expansion Project

Environmental authority takes effect 13 April 2016

The anniversary date of this environmental authority is **17 December**. An annual return and the payment of the annual fee will be due each year on this day.

Environmental authority holder(s)

Name	Registered address
Arrow Energy Pty Ltd ACN: 078 521 936	Level 39 111 Eagle Street BRISBANE CITY QLD 4000
Australian CBM Pty Ltd ACN: 067 312 029	Level 39 111 Eagle Street BRISBANE CITY QLD 4000
Arrow CSG (Australia) Pty Ltd ACN: 054 260 650	Level 39 111 Eagle Street BRISBANE CITY QLD 4000
Arrow (Tipton) Pty Ltd ACN: 114 927 507	Level 39 111 Eagle Street BRISBANE CITY QLD 4000
Arrow (Tipton Two) Pty Ltd ACN: 117 853 755	Level 39 111 Eagle Street BRISBANE CITY QLD 4000
Arrow (Daandine) Pty Ltd ACN: 114 927 481	Level 39 111 Eagle Street BRISBANE CITY QLD 4000
Stanwell Corporation Limited ACN: 078 848 674	Level 13 42 Albert Street BRISBANE CITY QLD 4000

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



Environmentally relevant activity and location details

Environmentally relevant activity(ies)	Location(s)
<p>Resource activity that is a petroleum activity prescribed in Schedule 2A of the <i>Environmental Protection Regulation 2008</i>:</p> <p>6 – a petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam</p> <p>7 – a petroleum activity involving injection of a waste fluid into a natural underground reservoir or aquifer</p> <p>8 – a petroleum activity or GHG storage activity, other than a petroleum activity an activity mentioned in any of items 1 to 7, that includes 1 or more activities mentioned in schedule 2 for which an aggregate environmental score is stated, namely:</p> <p>Electricity generation – generating electricity by using gas at a rated capacity of 10MW electrical or more</p> <p>Fuel burning – using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour</p> <p>Waste disposal – operating a facility for disposing of, in a year, more than 200 000t of regulated waste and any, or any combination, of the following –</p> <p>(a) general waste;</p> <p>(b) limited regulated waste;</p> <p>(c) if the facility is in a scheduled area – no more than 5t of untreated clinical waste in a year</p> <p>Sewage treatment – operating sewage treatment works, other than no-release works, with a total daily peak design capacity of more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme</p> <p>Water treatment – desalinating, in a day, more than 5ML of water, allowing the release of waste to waters other than seawater</p>	<p>Petroleum Lease (PL) 194</p> <p>PL198</p> <p>PL230</p> <p>PL238</p> <p>PL252</p> <p>PL258</p> <p>PL260</p>

Additional information for applicants**Environmentally relevant activities**

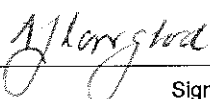
The description of any environmentally relevant activity (ERA) for which an environmental authority is issued is a restatement of the ERA as defined by legislation at the time the approval is issued. Where there is any inconsistency between that description of an ERA and the conditions stated by an environmental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

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

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

Contaminated land

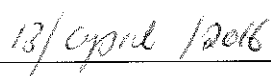
It is a requirement of the EP Act that if an owner or occupier of land becomes aware a notifiable activity (as defined in Schedule 3 and Schedule 4) is being carried out on the land, or that the land has been, or is being, contaminated by a hazardous contaminant, the owner or occupier must, within 22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



Signature

Andrew Langford

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



Date

Enquiries:

Petroleum and Gas (Assessment)
Department of Environment
and Heritage Protection
Floor 7, 400 George Street
GPO Box 2454
BRISBANE QLD 4001
Phone: (07) 3330 5715
Fax: (07) 3330 5634

This environmental authority consists of the following schedules:

Schedule A	General Conditions
Schedule B	Water
Schedule BE	Coal Seam Gas Water Injection Trial
Schedule C	Regulated Dams
Schedule D	Land
Schedule E	Environmental Nuisance
Schedule F	Air
Schedule G	Waste
Schedule H	Rehabilitation
Schedule I	Monitoring Programs
Schedule J	Community Issues
Schedule K	Notification Procedures
Schedule L	Definitions

SCHEDULE A – GENERAL CONDITIONS**Authorised Petroleum Activities**

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

Schedule A, Table 1 – Authorised Petroleum Activities

Petroleum Activity(ies)	Total Number of Authorised Petroleum Activities	Maximum Disturbance Authorised
Seismic (km)	200 km	200 km, 120 ha
Total coal seam gas wells, including: <ul style="list-style-type: none"> • Core wells • Exploration wells • Development wells • Production wells 	691	691 wells 691 ha
Injection well(s) and associated facilities	1	4 ha
Compressor units	40	40 units, 8 ha
Central gas processing facilities	2	2 facilities, 8 ha
Regulated structures	22	22 dams
Water treatment facilities	2	12 ML/d (each), 2 ha
Sewage treatment plants	2	< 450 EP (each), 0.15 ha
Power stations	1	40 MW, 1.2 ha

Prevent or Minimise Likelihood of Environmental Harm

- (A2) This environmental authority does not authorise environmental harm unless a condition contained in this environmental authority explicitly authorises that harm. Where there is no condition, the lack of a condition shall not be construed as authorising harm.

Maintenance of Measures, Plant and Equipment

- (A3) The holder of the environmental authority must:
- (a) install all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority;
 - (b) maintain such measures, plant and equipment in their proper and effective condition; and
 - (c) operate such measures, plant and equipment in a proper and effective manner.
- (A4) No change, replacement or alteration of any plant or equipment is permitted if the change, replacement or alteration materially increases, or is likely to increase, the environmental harm caused by the petroleum activity.

Financial Assurance

- (A5) Petroleum activities that cause significant disturbance to land must not be carried out until financial assurance has been given to the administering authority as security for compliance with the environmental authority and for any costs or expenses, or likely costs or expenses, mentioned in section 298 of the *Environmental Protection Act 1994*.

- (A6) Prior to any changes in petroleum activities which would result in an increase to the maximum significant disturbance since financial assurance was last given to the administering authority, the holder of the environmental authority must amend the financial assurance and give the administering authority the increased amount of financial assurance.

Existing petroleum activities

- (A7) Conditions (D2) to (D17) and (D41) to (D44) in the Land Schedule relating to disturbance, only apply to petroleum activities which commenced after 15 March 2011 subject to the holder of the environmental authority having complied with all disturbance conditions of the relevant environmental authority that applied at the time the existing petroleum activity was constructed.

Third Party Audit

- (A7) A third party auditor, nominated by the holder of this environmental authority and accepted by the administering authority, must audit compliance with the conditions of this environmental authority at a minimum frequency of every three (3) years.
- (A8) Notwithstanding Condition (A7) and prior to undertaking the third party audit, the scope and content of the third party audit can be negotiated with the administering authority.

Note: Where minimal activities have been undertaken on a tenure, the negotiation of the scope of the third party audit may also include the postponing of the third party audit to an agreeable time between the holder of this environmental authority and the administering authority.

- (A9) An audit report of the audit required by Condition (A7) must be prepared and certified by the third party auditor presenting the findings of each audit carried out.
- (A10) The financial cost of the third party audit is to be borne by the holder of this environmental authority.
- (A11) The holder of this environmental authority must immediately act upon any recommendations arising from the audit report by:
- (a) investigating any non-compliance issues identified; and
 - (b) as soon as practicable, implementing measures or taking necessary action to ensure compliance with the requirements of this environmental authority.
- (A12) Subject to Condition (A11), and not more than 60 business days following the submission of the audit report, the holder of this environmental authority must provide a written report to the administering authority addressing the:
- (a) actions taken by the holder to ensure compliance with this environmental authority; and
 - (b) actions taken to prevent a recurrence of any non-compliance issues identified.
- (A13) The audit report required by Condition (A9) and the written response to the audit report required by Condition (A12) must be submitted to the administering authority with the subsequent annual return.

Contingency Plan for Emergency Environmental Incidents

- (A14) A contingency plan for emergency environmental incidents which includes but is not limited to the impacts of flooding and the injection of treated CSG water, must be developed and implemented to respond to environmental emergency events and incidents where environmental harm is caused or threatened.
- (A15) The contingency plan for emergency environmental incidents required under Condition (A14) must address the following matters as a minimum:
- (a) a clear definition of what constitutes an environmental emergency incident for the activity;
 - (b) identification of the types of environmental incidents that may occur, relevant to the activities authorised to be carried out under this environmental authority;

- (c) response procedures to be implemented to prevent or minimise the risk of environmental harm arising from environmental emergency incidents;
- (d) response procedures to minimise the extent and duration of environmental harm caused by environmental emergency incidents;
- (e) the practices and procedures to be employed to restore the environment or mitigate any environmental harm caused;
- (f) communication procedures and lines of communication within and beyond the organisation to be employed in responding to environmental emergency incidents;
- (g) the resources to be used in response to environmental emergency incidents;
- (h) procedures to investigate the cause of any incidents, including releases, and where necessary, the remedial actions to be implemented to reduce the likelihood of recurrence of similar events;
- (i) a receiving environment monitoring program (REMP) to be specifically implemented in the event of an unauthorised release to waters or land to examine and assess environmental impacts. For monitoring of waters, this program must include upstream, downstream and impact site monitoring procedures. For soils monitoring, sufficient samples must be taken from the soil profile at both a reference site and the impact site as a minimum;
- (j) the provision and availability of documented procedures to staff attending any emergency environmental incident to enable them to effectively respond;
- (k) training of staff that will be called upon to respond to emergency environmental incidents to enable them to effectively respond;
- (l) timely and accurate reporting of the circumstance and nature of emergency environmental incidents to the administering authority in accordance with conditions of this environmental authority;
- (m) procedures for accessing monitoring points during emergency environmental incidents; and
- (n) procedures to notify any potentially impacted stakeholder who may be affected by an environmental emergency incident.

Documentation and Records Management

- (A16) All records and results required by the conditions of this environmental authority must be kept for a minimum of five (5) years.
- (A17) All documentation required by this environmental authority (including but not limited to plans, systems, programs, procedures, results of audits, assessments, monitoring, inspections and complaint records) must be made available to the administering authority upon request.

Cultural Heritage

- (A18) In the carrying out of the petroleum activity the holder of this environmental authority must not adversely impact on the cultural heritage values of any place registered on the Queensland Heritage Register.

Underground Gas Storage

- (A19) Testing, evaluating, developing and using natural underground reservoirs for petroleum storage or to store prescribed storage gases is not authorised under this environmental authority.

Stimulation of Underground Reservoirs

- (A20) The stimulation of underground reservoirs is prohibited under this environmental authority.

Encapsulation of Solid Salt in a Landfill Monocell

- (A21) The disposal of solid salt on site, including encapsulation of solid salt in a landfill monocell, is prohibited under this environmental authority.

SCHEDULE B – WATER**Contaminant Release**

- (B1) Contaminants that will or may cause environmental harm must not be directly or indirectly released to any waters except as authorised by Condition (B19).
- (B2) The release of contaminants directly or indirectly to waters authorised by Condition (B19):
- (a) must not produce any visible plume within the receiving waters; and
 - (b) must not produce any slick or other visible or odorous evidence of oil, grease or petrochemicals nor contain visible floating oil, grease, scum, litter or other objectionable matter.

Erosion and Sediment Control

- (B3) The Erosion and Sediment Control Plan which has been certified by a suitably qualified person must be implemented to minimise erosion and the release of sediment and contaminated stormwater to waters for all stages of the petroleum activities.
- (B4) The Erosion and Sediment Control Plan required by Condition (B3) must include but not be limited to:
- (a) diverting uncontaminated stormwater run-off around areas disturbed by petroleum activities or where contaminants or wastes are stored or handled that may contribute to stormwater;
 - (b) contaminated stormwater runoff and incident rainfall is collected; and treated, reused, or released in accordance with the conditions of this environmental authority;
 - (c) roofing or minimising the size of areas where contaminants or wastes are stored or handled;
 - (d) revegetating disturbed areas as soon as practicable after the completion of works;
 - (e) using alternate materials and or processes (such as dry absorbents) to clean up spills that will minimise the generation of contaminated waters;
 - (f) erosion and sediment control structures are placed to minimise erosion of disturbed areas and prevent the contamination of any waters;
 - (g) an inspection and maintenance program for the erosion and sediment control features;
 - (h) provision for adequate access to maintain all erosion and sediment control measures especially during the wet season months from November to April;
 - (i) additional erosion and sediment control measures for construction of wells and pipelines on slopes >10%;
 - (j) surface water monitoring program designed to detect erosion and sediment runoff into watercourses;
 - (k) identification of remedial actions that would be required to ensure compliance with the conditions of this environmental authority; and
 - (l) details of community consultation strategies and processes to be used in further developing and implementing the Erosion and Sediment Control Plan.
- (B5) A copy of the Erosion and Sediment Control Plan must be submitted to any potentially affected landholders upon request.

Maintenance and Cleaning

- (B6) The maintenance and cleaning of vehicles and any other equipment or plant must be carried out in areas from where the resultant contaminants cannot be released into any waters, roadside gutter or stormwater drainage system.

Watercourses, Wetlands and Springs

- (B7) In the carrying out of the petroleum activity the holder of this environmental authority must not clear vegetation or place fill, in or within:
- (a) 200 metres from any natural significant wetland;
 - (b) 100 metres from any natural wetland, lakes or springs; or
 - (c) 100 metres of the high bank of any other watercourse.

- (B8) The holder of this environmental authority must not excavate or place fill in a way that interferes with the flow of water in a watercourse, wetland, or spring, including works that divert the course of flow of the water or works that impound the water.
- (B9) Despite Conditions (B7) and (B8), pipeline and road construction works may be undertaken in watercourses, wetlands or springs where there is no reasonable and practicable alternative (such as the use of horizontal directional drilling methods) for a maximum period of 10 days, provided that the works are conducted in accordance with the following order of preference:
- (a) conducting work in times of no flow; and
 - (b) using all reasonable and practicable measures to reduce impacts in times of flow.
- (B10) Activities or works resulting in significant disturbance to the bed or banks of a watercourse or wetland, or a spring must:
- (a) only be undertaken where necessary for the construction and/or maintenance of roads, tracks and pipelines that are essential for carrying out the authorised petroleum activities and no reasonable or practicable alternative location exists;
 - (b) be no greater than the minimum area necessary for the purpose of the significant disturbance;
 - (c) be designed and undertaken by a suitably qualified person taking into account the matters listed in Section 5 - Planning Activities and Section 6 - Impact Management During Activities of the Department of Environment and Heritage Protection's *"Guideline – Activities in a watercourse, lake or spring associated with mining operations"* dated April 2008, or more recent editions as such become available; and
 - (d) upon cessation of the activities or works, commence rehabilitation immediately such that the final rehabilitation is to a condition that will ensure the ongoing physical integrity and the natural ecosystem values of the site.
- (B11) Sediment control measures must be implemented to minimise any increase in water turbidity due to carrying out petroleum activities in the bed or banks of a watercourse or wetland, or a spring.
- (B12) Routine, regular and frequent visual monitoring must be undertaken while carrying out construction work and/or any maintenance of completed works in a watercourse, wetland or spring.
- (B13) If, due to the petroleum activities, water turbidity increases in the watercourse, wetland or spring outside contained areas, works must cease and the sediment control measures must be rectified to limit turbidity before activities recommence.
- (B14) All measures must be taken to minimise adverse impacts to or reversal of any river improvement works carried out in River Improvement Areas by Queensland's River Improvement Trusts.

Note: Locations and details of River Improvement Areas and River Improvement Trusts are provided in the Schedule to the River Improvement Trust Regulation 1998.

Floodplains

- (B15) Where petroleum activities are carried out on floodplain areas, the holder of this environmental authority must ensure that petroleum and incidental activities do not:
- (a) concentrate flood flows that cause or threaten an adverse environmental impact;
 - (b) divert flood flows from natural drainage paths and alter flow distribution;
 - (c) increase the local duration of floods;
 - (d) increase the risk of detaining flood flows;
 - (e) pose an unacceptable risk to the safety of persons from flooding; or
 - (f) pose an unacceptable risk of damage to property from flooding.

Groundwater

(B16) The extraction of groundwater as part of the petroleum activity from underground aquifers must not directly or indirectly cause environmental harm to any spring, wetland or other surface waters.

Wild Rivers

(B17) In a declared Wild River Area, petroleum activities must be consistent with the conditions stated in the relevant Wild River Declaration.

(B18) Where the conditions of this environmental authority conflict with the conditions of the Wild River Declaration, the conditions of the Wild River will Declaration prevail.

Release to Waters of Treated CSG Water

(B19) The release of treated CSG water is authorised to occur in accordance with *Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters* and *Schedule B Table 2 – Treated CSG Water Release Limits for Monitoring Point (M1)*.

Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters

Water Source and Location	Release Point	Location	Monitoring Point	Receiving Waters Description
Treated CSG Water from the reverse osmosis water treatment plant and treated water dam located on PL230	R1, defined as the outlet of discharge pipe to Wilkie Creek	6,995,465 N303,004 E (Easting and northing locations given as per GDA94, Map Zone 56)	M1, defined as the sample point in the discharge pipeline point to release into Wilkie Creek	Wilkie Creek

(B20) The quality of the treated CSG water being released must comply with each quality characteristic release limit and limit type and the monitoring frequency specified in *Schedule B, Table 2 – Treated CSG Water Release Limits for Monitoring Point (M1)* and *Schedule B, Table 3 – Treated CSG Water Release Limits for Monitoring Point (M1)* when measured at the monitoring point (M1) specified in *Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters*.

Schedule B Table 2 – Treated CSG Water Release Limits for Monitoring Point (M1)

Quality Characteristic	Unit	Release Limit(s)	Limit Type	Monitoring Frequency
Electrical conductivity	µS/cm	580	80 th percentile	Based on at least 5 samples with not less than 60 minutes between samples daily during release
pH	pH Unit	6.5 - 9	Range	Daily during release
Suspended Solids	mg/L	180	Maximum	Daily during release
Boron	mg/L	0.37	Maximum	Daily during release

Schedule B, Table 3 – Treated CSG Water Release Limits for Monitoring Point (M1)

Quality characteristic	Unit	Maximum Release limit	Monitoring frequency
Aluminium	mg/L	0.2	The first release day of each quarter
Antimony	ml/L	0.003	
Arsenic	mg/L	0.007	
Barium	mg/L	0.7	
Bisphenol A	mg/L	0.2	
Boron	mg/L	4	
Bromide	mg/L	7	
BTEX			
Benzene	mg/L	0.001	
Toluene	mg/L	0.8	
Ethylbenzene	mg/L	0.3	
Xylene (m & p)	mg/L	0.6	
Cadmium	mg/L	0.002	
Chromium	mg/L	0.05	
Copper	mg/L	2	
Cyanide	mg/L	0.08	
Fluoride	mg/L	1.5	
Iodide	mg/L	0.5	
Iron	mg/L	0.3	
Lead	mg/L	0.01	
Manganese	mg/L	0.5	
Mercury	mg/L	0.001	
Molybdenum	mg/L	0.05	
Nickel	mg/L	0.02	
Nonylphenol	mg/L	0.5	
PAH (as B(a)P TEF)		0.01	
Species:	TEF:		
benz[a]anthracene	0.1	µg/L	
benzo[b+j]fluoranthene	0.1		
benzo[k]fluoranthene	0.1		
benzo[a]pyrene	1.0		
chrysene	0.1		
dibenz[a,h]anthracene	1.0		
indeno[1,2,3-cd]pyrene	0.1		
Selenium	mg/L	0.01	
Silver	mg/L	0.1	
Strontium	mg/L	4	
Total Petroleum Hydrocarbons (TPH)	mg/L	0.2	
Vanadium	mg/L	0.05	
Zinc	mg/L	3	
Radium-226 Lead-210 Polonium-210 Radium-228	mSv/year	0.5 <i>The dose for each parameter is summed to give the total dose which must be less than or equal to 0.5 mSv/year</i>	

- (B21) If the monitoring required by condition (B20) indicates that any of the quality characteristic release limits specified in *Schedule B, Table 3 – Treated CSG Water Release Limits for Monitoring Point (M1)* have been exceeded at any time during any release of treated CSG water, the environmental authority holder must, within five (5) business days of notifying the administering authority of the exceedance, unless a longer time is agreed to by the administering authority:
- (a) complete an investigation into the exceedance, which includes an analysis of the (potential and actual) causes for the exceedance; and
 - (b) provide a written report to the administering authority on completion of the investigation that includes:
 - (i) details of the investigation carried out;
 - (ii) any actions taken to prevent impacts to waters that may be used for drinking water;
 - (iii) the cause for the exceedance;
 - (iv) all water quality monitoring results pertaining to the investigation;
 - (v) any general observations;
 - (vi) methodology(ies) and any relevant calculations used; and
 - (vii) corrective actions to rectify the cause of the exceedance.
- (B22) Where an exceedance of a quality characteristic release limit specified in *Schedule B, Table 3 – Treated CSG Water Release Limits for Monitoring Point (M1)* is being investigated in accordance with condition (B21), the investigation and reporting required by condition (B22) is not required if a subsequent exceedance occurs, during investigation of the initial exceedance, which has resulted from the same cause that triggered the initial exceedance.

Flow Monitoring

- (B23) Prior to commencing any release of treated CSG water authorised under this environmental authority, a stream flow gauging station (GP1) must be installed.
- (B24) Upon practical completion of the meter installation, a completed 'meter installation form' must be signed by the installer and the environmental authority holder to confirm that the installation complies with the manufacturer's specifications and/or national standards and/or the Department of Environment and Heritage Protection's metering standards (whichever is applicable).
- (B25) The stream flow gauging station (GP1) must be installed in accordance with *Schedule B, Table 4 – Contaminant Release During Flow Events*.

Schedule B, Table 4 – Contaminant Release During Flow Events

Receiving water description	Gauging station description	Latitude or northing (GDA94)	Longitude or easting (GDA94)	Minimum Flow in Receiving Water Required for a Release Event	Flow recording Frequency
Wilkie Creek	Gauging station 1 (GP1)	50-100 metres upstream of Release Point R1	50-100 metres upstream of Release Point R1	0.14 m ³ /s	at 6 hour intervals during discharge (minimum twice daily)

- (B26) The stream flow gauging station (GP1) must be operated to determine daily stream flows in accordance with *Schedule B, Table 4 – Contaminant Release During Flow Events*.
- (B27) The flow rate of treated CSG water released from the release point authorised in *Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters* must not exceed a ratio of 1 part

- of the flow rate of the treated CSG water being released to 4 parts of the measured upstream receiving water flow rate.
- (B28) The volume of treated CSG water released from the release point authorised in *Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters* must not exceed a maximum of 8ML/day.
- (B29) The following characteristics of the release must be measured and recorded daily during all release events:
- (a) the volume of treated CSG water released through the release point R1;
 - (b) the date and time of release commencing and ceasing;
 - (c) the release rate;
 - (d) for any change in the release rate:
 - (i) the date and time of the change;
 - (ii) the new release rate; and
 - (iii) water levels and flow rate during the discharge event.
 - (e) water levels and flow rate during the discharge event;
 - (f) water quality characteristics monitoring results; and
 - (g) details of any observed impacts/conditions.
- (B30) Prior to commencing any release of treated CSG water authorised under this environmental authority, each monitoring and release point specified in *Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters* must be marked and readily identifiable from the banks of Wilkie Creek.
- (B31) The quality of the receiving waters must be monitored daily during release of treated CSG water at locations representative of the receiving waters determined in accordance with Condition (B35), for the following water quality characteristics:
- (a) Electrical conductivity ($\mu\text{S}/\text{cm}$)
 - (b) pH (pH Unit)
 - (c) Turbidity (NTU)
 - (d) Suspended Solids (mg/L)
 - (e) Calcium (mg/L)
 - (f) Magnesium (mg/L)
 - (g) Fluoride (mg/L)
 - (h) Sulphate (mg/l) and
 - (i) Boron (mg/L).
- (B32) If water has been released from authorised release points listed in *Schedule B, Table 1 – Contaminated Release Points, Sources and Receiving Waters*, the holder of this environmental authority must undertake an annual assessment of the contaminants of treated CSG water to determine the risk of environmental harm from release of treated CSG water to surface waters. This should consider the contaminants mentioned in the ANZECC & ARMCANZ 2000 guidelines. This annual assessment must be included in the Annual Return.

Receiving Environment Management Program – REMP

- (B33) Prior to the release of treated CSG water to Wilkie Creek a Receiving Environment Monitoring Program (REMP) must be developed and implemented to monitor, identify and describe any adverse impacts to surface water environmental values, water quality and flows due to the authorised release of treated CSG water to Wilkie Creek.
- (B34) The REMP required by Condition (B33) must include periodic monitoring for the effects of the release on the receiving environment as a result of treated CSG water releases to waters from the release location (R1) specified in *Schedule B – Table 1 Treated CSG Water Release Point, Source and Receiving Waters*.
- (B35) The quality of the receiving waters must be monitored at the locations specified in *Schedule B, Table 5 – Receiving Water Upstream Background Sties and Downstream Monitoring Points*.

Schedule B, Table 5 – Receiving Water Upstream Background Sites and Downstream Monitoring Points.

Monitoring Points	Receiving Waters	Latitude of Northing (GDA94)	Longitude or Easting (GDA94)
Upstream background monitoring point			
Monitoring Point (M2)	Wilkie Creek	50 – 100 metres upstream of Release Point R1	50 – 100 metres upstream of Release Point R1
Downstream monitoring point			
Monitoring Point (M3)	Wilkie Creek	150 – 200 metres downstream of Release Point R1	150 – 200 metres downstream of Release Point R1

- (B36) The REMP required by Condition (B33) must:
- (a) assess the condition or state of receiving waters, including upstream conditions, spatially within the REMP area, considering background water quality characteristics based on accurate and reliable monitoring data that takes into consideration temporal variation (e.g. seasonality);
 - (b) be designed to facilitate assessment against water quality objectives for the relevant environmental values that need to be protected;
 - (c) include monitoring from background reference sites (e.g. upstream or background) and downstream sites from the release;
 - (d) specify the frequency and timing of sampling required in order to reliably assess ambient conditions and to provide sufficient data to derive site specific background reference values in accordance with the *Queensland Water Quality Guidelines 2006*. This should include monitoring during periods of natural flow irrespective of other discharges;
 - (e) include monitoring and assessment of dissolved oxygen saturation and temperature and all water quality parameters listed in Condition (B31);
 - (f) include, where appropriate, monitoring of metals/metalloids in sediments (in accordance with ANZECC & ARMCANZ 2000, BATLEY and/or the most recent version of AS5667.1 *Guidance on Sampling of Bottom Sediments*);
 - (g) include, where appropriate, monitoring of macroinvertebrates in accordance with the AusRivas methodology;
 - (h) apply procedures and/or guidelines from ANZECC and ARMCANZ 2000 and other relevant guideline documents;
 - (i) describe sampling and analysis methods and quality assurance and control; and
 - (j) incorporate stream flow and hydrological information in the interpretations of water quality and biological data.
- (B37) A report outlining the findings of the REMP, including all monitoring results and interpretations in accordance with conditions (B33) to (B36) must be prepared annually. This must include a determination of the risk of environmental harm from release of treated CSG water to the receiving environment waters.
- (B38) The annual assessment must be prepared annually and made available on request to the administering authority.

Water Release Reduction Strategy

- (B39) An on-going Release Reduction Strategy to maximise CSG water reuse and minimise any release to waters and the storage of CSG water in holding dams must be developed and implemented.
- (B40) The strategy must address the following matters:
- (a) implementation of schemes to achieve maximum use of the water;
 - (b) specific targets for achieving increased use of CSG water both treated and untreated;
 - (c) a market analysis at least every three (3) years to identify existing and future opportunities for water use;

- (d) on-going review of emerging technologies and/or re-use options that could achieve significant reductions in mass loads of contaminants released to the environment;
 - (e) investigation of the feasibility of alternative options, practices and procedures to further minimise the volume and concentration of contaminants released to waters; and
 - (f) programs to implement feasible options to achieve increased water use and reduction in contaminant loads, including actions and timeframes for completion.
- (B41) A progress report on the Release Reduction Strategy must be submitted to the administering authority with each annual return. The report(s) must address at least the following matters:
- (a) details of the specific options, practices and procedures investigated;
 - (b) details of new practices, procedures and programs implemented since the last reporting period and targets met;
 - (c) where alternative options, practices and procedures are not considered feasible, the provision of justification to support that determination; and
 - (d) details of the option(s) yet to be implemented, including the timeframes for implementation, and justification for the chosen option(s).
- (B42) The holder of this environmental authority must provide the administrative authority with safe access to facilitate inspections, and must comply with any instructions issued by the administrative authority relevant to the operation of the pump and meter installation.
- (B43) The holder of this environmental authority must notify the administering authority within five (5) business days of any meter malfunction or maintenance of the measuring device (meter).
- (B44) The holder of this environmental authority must arrange for the repair or replacement of a malfunctioning meter within five business days of becoming aware of the malfunction and provide a repair and/or maintenance completion report within ten business days of the repair or maintenance.

Sewage Treatment Works (21 – 450 EP)

Release of Treated Sewage Effluent Contaminants to Land

- (B45) Sewage pump stations must be fitted with a stand-by pump and a visible or audible high level alarm.
- (B46) Treated effluent may only be released to land at the designated, fenced and delineated contaminant release area(s).
- (B47) The contaminant release area(s) must be maintained in a proper and efficient condition so as to provide adequate assimilation, percolation, evaporation and transpiration of the released contaminants.
- (B48) Treated effluent must not be applied by spray irrigation and must be applied in a manner that does not cause ponding or runoff of effluent beyond the contaminant release area(s).
- (B49) When weather conditions or soil conditions preclude the release of contaminants, the contaminants must be directed to on-site storage or lawfully disposed of off-site.

Quality of Contaminants Released from the Sewage Treatment Works

- (B50) Treated effluent must comply, at the sampling and in-situ measurement point(s), with each of the release limits specified in *Schedule B, Table 5 - Treated Sewage Effluent Standards* for each quality characteristic.
- (B51) The release of contaminants to land must be monitored at the frequency and at the sampling and in-situ measurement point specified in *Schedule B, Table 5 - Treated Sewage Effluent Standards* and records of the monitoring results kept for at least five (5) years and made available to the administering authority on request.
- (B52) The influent annual average daily dry weather flow of sewage must not exceed 60 kilolitres per day for each authorised sewage treatment plant under this environmental authority.

Schedule B, Table 5 – Treated Sewage Effluent Standards

Quality Characteristic	Sampling and in-situ measurement Point Location	Limit Type	Release Limit	Frequency
5-day Biochemical Oxygen Demand (inhibited)	Release pipe from sewage treatment plant located on PL198;	Maximum	20 mg/L	Monthly
Suspended Solids		Maximum	30 mg/L	
pH		Range	6.0 to 9.0	
E-Coli	Release pipe from sewage treatment plant located on PL230	80 th percentile based on at least 5 samples with not less than 30 minutes between samples.	1000 cfu per 100 mL	
		Maximum	10000 cfu per 100 ml	

SCHEDULE BE – COAL SEAM GAS WATER INJECTION TRIAL

(BE1) The only fluids authorised to be injected into an aquifer(s) are those fluid types specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection*.

(BE2) Fluid injection must be in accordance with the quantities and locations listed in *Schedule BE, Table 1 – Details of Authorised Fluid Injection*.

Schedule BE, Table 1 – Details of Authorised Fluid Injection

Well Location (Easting Northing, Map Zone 56)	Injection Well Number / Reference	Target Formation and Perforated Zone	Fluid Type	Maximum Injection Rate ML/d	Hydraulic Impact Zone	Water Quality Impact Zone
313669 E 6967949 N	Tipton-193	Precipice Formation, between 1040 m to 1110 m depth	Treated CSG water ¹	4	9,340 m radius from injection well	148 m radius from injection well

(BE3) The holder of this environmental authority must notify the administering authority the commencement date of the trial at least seven (7) days prior to its commencement.

(BE4) The injection trial is limited to a period of 180 days of injection, followed by a six-month recovery period.

(BE5) Injection must cease immediately upon becoming aware that environmental harm is caused or threatened to be caused as a result of the injection activities.

Well Integrity

(BE6) The construction of the Tipton-193 injection well must be carried out in accordance with the well construction requirements described in the most recent version of the Department of Environment and Heritage Protection's "CSG Water Injection Well Construction Requirements", as amended from time to time.

(BE7) The Tipton-193 injection well must be mechanically functional such that there is no significant fluid movement into a water resource aquifer through vertical channels adjacent to the well bore hole.

(BE8) The construction, operation and maintenance of the injection well specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* must be undertaken in a way that prevents and/or minimises impacts to the environmental values of the target formation and ensures the integrity of the bore.

(BE9) The injection pressure must not exceed 90% of the formation fracture pressure.

Injection Fluid Quality

(BE10) The quality of the fluid being injected into the injection well specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* must comply with the contaminant limits prescribed in *Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid*.

¹ Treated CSG water means any fluid that contains any proportion of treated CSG water, blended or otherwise.

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Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid

Quality Characteristics	Release Limits	Limit Type
pH (pH units)	Minimum 6.5, Maximum 10	Range
Total Dissolved Solids (TDS) ²	Mean TDS of injection fluid must not exceed median TDS of formation water measured in background water quality monitoring well	Maximum
Dissolved Oxygen	500 µg/L	Maximum
Total suspended solids	25 mg/L	Maximum

(BE11) The quality of the fluid being injected into the injection well specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* must be monitored at the frequency specified in *Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid*.

Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid

² Electrical conductivity (EC) is an acceptable proxy measurement for measuring TDS of the injection fluid. If used, the conversion from EC to TDS must be stated and confirmed with laboratory monitoring results.

Monitoring parameter	Unit	Monitoring frequency during injection
Temperature of target formation	°C	N/A
Injection fluid temperature	°C	Continuous
Inlet pressure	KPa	Continuous
Fluid flow rate	L/sec	Continuous
	ML/day	Daily
Dissolved Oxygen (DO)	µg/L	Daily
Electrical Conductivity	µS/cm	Daily
pH	pH units	Daily
Turbidity	NTU	Daily
Sodium	mg/L	Weekly
Potassium	mg/L	Weekly
Calcium	mg/L	Weekly
Magnesium	mg/L	Weekly
Chloride	mg/L	Weekly
Sulphate as SO ₄	mg/L	Weekly
Carbonate / Bicarbonate	mg/L	Weekly
Bromine	mg/L	Monthly
Fluoride	mg/L	Monthly
Iodide	mg/L	Weekly
Silica	mg/L	Monthly
Iodine	mg/L	Monthly
Nitrate	mg/L	Monthly
Total organic carbon	mg/L	Weekly
Total Dissolved Solids	mg/L	Weekly
Redox Potential	mV	Weekly
Total Hardness as CaCO ₃	mg/L	Weekly
Total Alkalinity as CaCO ₃	mg/L	Weekly
Hydroxide alkalinity as CaCO ₃	mg/L	Weekly
Carbonate Alkalinity as CaCO ₃	mg/L	Weekly
Bicarbonate Alkalinity as CaCO ₃	mg/L	Weekly
Total suspended solids	mg/L	Weekly
Bromide	mg/L	Weekly
Aluminium	mg/L	Monthly
Arsenic	mg/L	Monthly
Barium	mg/L	Monthly
Boron	mg/L	Monthly
Copper	mg/L	Monthly
Iron	mg/L	Monthly
Manganese	mg/L	Monthly
Mercury	mg/L	Monthly
Nickel	mg/L	Monthly
Strontium	mg/L	Monthly
Zinc	mg/L	Monthly
Total Petroleum Hydrocarbons	µg/L	Monthly

BTEX	µg/L	Monthly
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- (BE12) Notwithstanding Conditions (BE9) and (BE10), the injection of treated CSG water into the injection well specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* must have considered the recommendations for water blending described in the following documents, where appropriate:
- (a) *Surat Gas Project – Geochemical Blending and Compatibility Study: Tipton Injection Trials, March 2013*; and
 - (b) *Surat Gas Project – Geochemical Blending and Compatibility Study: Tipton Injection Trials – Phase 2, March 2013*.
- (BE13) The holder of this environmental authority must provide for non-chemical disinfection of injection fluid if results of six-monthly testing of injected fluid show levels of coliform bacteria, sulphate reducing bacteria or iron fixing bacteria that has potential to cause adverse impacts on the groundwater within the target formation.

Injection Management Plan

- (BE14) An Injection Management Plan which has been certified by a suitably qualified person must be developed and implemented prior to the carrying out of the trial fluid injection activity(ies).
- (BE15) The Injection Management Plan must include but not necessarily be limited to:
- (a) estimated volumes and rates of water to be injected;
 - (b) a description of the physical, chemical and biological components and their concentrations of the water to be produced;
 - (c) details of how and where the fluid will be produced, aggregated, stored and kept separate from other waters until it is treated and injected;
 - (d) details of where the fluid is proposed to be treated including a description of the treatment process;
 - (e) a water quality compatibility assessment which demonstrates that the injection fluid has inconsequential reactivity with the target formation and native groundwater it will come into contact with;
 - (f) the regional characteristics of the receiving environment;
 - (g) identification of the water quality impact zone and the hydraulic impact zone;
 - (h) identification of any fluid injection well, all existing bores, springs, lakes, wetlands, environmental assets and watercourses connected to groundwater, faults and other geologic features that occur within the water quality impact zone and the hydraulic impact zone;
 - (i) identification of the environmental values and water quality objectives of the potential water quality impact zone of the target formation in accordance with the *Environmental Protection (Water) Policy 2009* and the *Queensland Water Quality Guidelines 2009*;
 - (j) an assessment of the potential for migration of injection fluid or native groundwater out of the target formation through wells, bores, springs, connected watercourses, faults or other geologic features likely to impact on other aquifers;
 - (k) a risk assessment identifying potential hazards, their inherent risk, preventative measures for the management of potential hazards and details on sampling and analysis methods to verify preventative measures of potential hazards, including frequency and locations and quality assurance and control;
 - (l) control measures that will be implemented for fluid storage, treatment and injection to prevent or control the release of a contaminant or waste to the environment other than the release authorised in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* and *Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid*;
 - (m) verification methods to assess performance of the injection activities;
 - (n) the indicators or other criteria against which the performance of fluid injection will be assessed;
 - (o) procedures that will be adopted to regularly review the monitoring program;

- (p) reporting procedures to management and the administering authority should unforeseen or non-compliant monitoring results be recorded; and
- (q) procedures that will be implemented to prevent unauthorised environmental harm from unforeseen or non-compliant monitoring results.

Receiving Environment Monitoring Program – Injection Activities

- (BE16) A Receiving Environment Monitoring Program (REMP) for Injection Activities which has been certified by a suitably qualified person must be developed and implemented to monitor, identify and describe any adverse impacts to the following values of the target formation due to the injection of treated CSG water:
- (a) hydraulic response;
 - (b) water quality response; and
 - (c) any other groundwater environmental values identified.
- (BE17) The REMP for Injection Activities required by Condition (BE16) must be developed and implemented prior to the carrying out of the trial fluid injection activity(ies).
- (BE18) The REMP for Injection Activities required by Condition (BE16) must include, but not necessarily be limited to:
- (a) methods to validate the assumptions, predicted impacts and the effectiveness of the proposed preventative measures associated with the modelled water quality impact zone and hydraulic impact zone;
 - (b) monitoring of the hydraulic response to the trial injection at the well(s) referred to in Condition (BE18)(f)(ii);
 - (c) monitoring of the water quality of the injection fluid during injection for the parameters listed in *Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid*;
 - (d) monitoring of the water quality response following the completion of the injection trial recovery period through sampling of the target aquifer, within the water quality impact zone, for the parameters listed in *Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid*;
 - (e) a definition of the background water quality of the Precipice Sandstone to be used for monitoring compliance with *Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid* and for reporting in the Injection Trial Report required by Condition (BE19);
 - (f) the installation and use of a minimum of two wells:
 - (i) one of which accesses the target aquifer within the water quality impact zone; and
 - (ii) the other of which is placed at an adequate distance to determine the extent of the hydraulic response to the injection;
 - (g) methods for the analysis and interpretation and a description of the statistical basis on which conclusions will be drawn to verify the assumptions of the injection proposal; and
 - (h) a demonstration of how the REMP will validate assumptions, predicted impacts and the effectiveness of quality assurance and control measures.

Reporting Requirements for Fluid Injection Trials

- (BE19) Upon completion and within two (2) months of the completion of the injection trial's recovery period the holder of the authority must submit to the administering authority an Injection Trial Report prepared by a suitably qualified person.
- (BE20) The Injection Trial Report must include, but not necessarily be limited to:
- (a) details of the injection well including but not limited to:
 - (i) location details (GDA94);

- (ii) the inferred lithology³;
- (iii) casing details including type, outer diameter (mm), wall thickness (mm) and locations (depth from and to in metres);
- (iv) cementing details including type, hole diameter (mm), casing outer diameter (mm) and locations (depth from and to in metres);
- (v) calculated target formation fracture pressure; and
- (vi) target formation pressure prior to injection;
- (b) a detailed interpretation of the logs and other tests conducted during drilling and construction or refurbishment of the well against their specific objectives;
- (c) a completed well schematic diagram;
- (d) a temperature survey;
- (e) a cement integrity log;
- (f) outcomes of the injection trial including, but not limited to:
 - (i) well head injection rates versus formation pressure;
 - (ii) target formation pressure within the hydraulic impact zone during and upon completion of the trial;
 - (iii) hydraulic gradient of the target formation within the hydraulic impact zone upon completion of the trial;
 - (iv) the effectiveness of aquitards (including the stability of the aquitard) and aquicludes of confining the injected fluid within the target formation; and
 - (v) a detailed interpretation of the logs and other tests conducted during the injection trial against their specific objectives;
 - (vi) validation of conceptual framework for injection; and
 - (vii) additional hazards that were not identified earlier;
- (g) the results of the REMP for Injection Activities;
- (h) analysis of monitoring and operational data in terms of:
 - (i). validation of conceptual framework for injection; and
 - (ii). additional hazards that were not identified earlier;
- (i) a revised risk analysis that identifies all potential hazards, likelihood of various risk elements and associated consequences;
- (j) a revised water quality compatibility assessment which demonstrates that the injection fluid has inconsequential reactivity with the target formation and native groundwater it will come into contact with;
- (k) a re-evaluation of the hydraulic impact zone; and
- (l) a re-evaluation of the water quality impact zone.

Injection Cessation Report

(BE21) Following completion of the injection trial, a fluid injection cessation report which has been certified by a suitably qualified person must be submitted to the administering authority within two (2) months of completion of the injection trial's recovery period.

(BE22) The fluid injection cessation report must include, but not necessarily be limited to:

- (a) volumes of fluid injected at each well;
- (b) a risk assessment statement providing details on identified hazards including their inherent risk, summary of the results from the verification monitoring, preventative measures and the residual risk; and

³ Inferred lithology means the best available description of the lithology based upon historical drilling records, interpretation of logs and any other information that the suitably qualified person may have discovered.

- (c) a monitoring report outlining the methods and results of verification monitoring undertaken to assess the performance of the injection activities and preventative measures for identified hazards.

20

SCHEDULE C – REGULATED DAMS

Assessment of consequence category

- (C1) The consequence category of any structure must be assessed by a suitably qualified and experienced person in accordance with the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)* at the following times:
- (a) prior to the design and construction of the structure, if it is not an existing structure; or
 - (b) if it is an existing structure, prior to the adoption of this schedule; or
 - (c) prior to any change in its purpose or the nature of its stored contents.
- (C2) A consequence assessment report and certification must be prepared for each structure assessed and the report may include a consequence assessment for more than one structure.
- (C3) Certification must be provided by the suitably qualified and experienced person who undertook the assessment, in the form set out in the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*.

Design and construction of a regulated structure

- (C4) Conditions (C5) to (C9) inclusive do not apply to existing structures.
- (C5) All regulated structures must be designed by, and constructed under the supervision of, a suitably qualified and experienced person in accordance with the requirements of the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*.
- (C6) Construction of a regulated structure is prohibited unless the holder has submitted a consequence category assessment report and certification to the administering authority has been certified by a suitably qualified and experienced person for the design and design plan and the associated operating procedures in compliance with the relevant condition of this authority.
- (C7) Certification must be provided by the suitably qualified and experienced person who oversees the preparation of the design plan in the form set out in the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*, and must be recorded in the Regulated Dams/Levees register.
- (C8) Regulated structures must:
- (a) be designed and constructed in accordance with and conform to the requirements of the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*;
 - (b) be designed and constructed with due consideration given to ensuring that the design integrity would not be compromised on account of:
 - (i) floodwaters from entering the regulated dam from any watercourse or drainage line; and
 - (ii) wall failure due to erosion by floodwaters arising from any watercourse or drainage line.
 - (c) have the floor and sides of the dam designed and constructed to prevent or minimise the passage of the wetting front and any entrained contaminants through either the floor or sides of the dam during the operational life of the dam and for any period of decommissioning and rehabilitation of the dam.
- (C9) Certification by the suitably qualified and experienced person who supervises the construction must be submitted to the administering authority on the completion of construction of the regulated structure, and state that:
- (a) the 'as constructed' drawings and specifications meet the original intent of the design plan for that regulated structure;
 - (b) construction of the regulated structure is in accordance with the design plan.

Operation of a regulated structure

- (C10) Operation of a regulated structure, except for an existing structure, is prohibited unless:
- (a) the holder has submitted to the administering authority:
 - (i) one paper copy and one electronic copy of the design plan and certification of the 'design plan' in accordance with condition (C6), and
 - (ii) a set of 'as constructed' drawings and specifications, and
 - (iii) certification of those 'as constructed drawings and specifications' in accordance with condition (C9), and
 - (iv) where the regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the DSA volume across the system, a copy of the certified system design plan.
 - (v) the requirements of this authority relating to the construction of the regulated structure have been met;
 - (vi) the holder has entered the details required under this authority, into a Register of Regulated Dams; and
 - (vii) there is a current operational plan for the regulated structures.
- (C11) For existing structures that are regulated structures:
- (a) where the existing structure that is a regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the DSA volume across the system, the holder must submit to the administering authority within within twelve (12) months of the commencement of this condition a copy of the certified system design plan including that structure; and
 - (b) There must be a current operational plan for the existing structures.
- (C12) Each regulated structure must be maintained and operated, for the duration of its operational life until decommissioned and rehabilitated, in a manner that is consistent with the current operational plan and, if applicable, the current design plan and associated certified 'as constructed' drawings.

Mandatory reporting level

- (C13) Conditions C14 to C17 inclusive only apply to Regulated Structures which have not been certified as low consequence category for 'failure to contain – overtopping'.
- (C14) The Mandatory Reporting Level (the MRL) must be marked on a regulated dam in such a way that during routine inspections of that dam, it is clearly observable.
- (C15) The holder must, as soon as practical and within forty-eight (48) hours of becoming aware, notify the administering authority when the level of the contents of a regulated dam reaches the MRL.
- (C16) The holder must, immediately on becoming aware that the MRL has been reached, act to prevent the occurrence of any unauthorised discharge from the regulated dam.
- (C17) The holder must record any changes to the MRL in the Register of Regulated Structures.

Design storage allowance

- (C18) The holder must assess the performance of each regulated dam or linked containment system over the preceding November to May period based on actual observations of the available storage in each regulated dam or linked containment system taken prior to 1 July of each year.

- (C19) By 1 November of each year, storage capacity must be available in each regulated dam (or network of linked containment systems with a shared DSA volume), to meet the Design Storage Allowance (DSA) volume for the dam (or network of linked containment systems).
- (C20) The holder must, as soon as possible and within forty-eight (48) hours of becoming aware that the regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, notify the administering authority.
- (C21) The holder must, immediately on becoming aware that a regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, act to prevent the occurrence of any unauthorised discharge from the regulated dam or linked containment systems.

Annual inspection report

- (C22) Each regulated structure must be inspected each calendar year by a suitably qualified and experienced person.
- (C23) At each annual inspection, the condition and adequacy of all components of the regulated structure must be assessed and a suitably qualified and experienced person must prepare an annual inspection report containing details of the assessment and include recommended actions to ensure the integrity of the regulated structure.
- (C24) The suitably qualified and experienced person who prepared the annual inspection report must certify the report in accordance with the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*.
- (C25) The holder must:
- (a) Within 20 business days of receipt of the annual inspection report, provide to the administering authority:
 - (i) The recommendations section of the annual inspection report; and
 - (ii) If applicable, any actions being taken in response to those recommendations; and
 - (b) If, following receipt of the recommendations and (if applicable) actions, the administering authority requests a full copy of the annual inspection report from the holder, provide this to the administering authority within 10 business days⁶ of receipt of the request.

Transfer arrangements

- (C26) The holder must provide a copy of any reports, documentation and certifications prepared under this authority, including but not limited to any Register of Regulated Structures, consequence assessment, design plan and other supporting documentation, to a new holder on transfer of this authority.

Register of regulated dams

- (C27) A Register of Regulated Dams must be established and maintained by the holder for each regulated dam.
- (C28) The holder must provisionally enter the required information in the Register of Regulated Dams when a design plan for a regulated dam is submitted to the administering authority.
- (C29) The holder must make a final entry of the required information in the Register of Regulated Dams once compliance with condition (C10) and (C11) has been achieved.

- (C30) The holder must ensure that the information contained in the Register of Regulated Dams is current and complete on any given day.
- (C31) All entries in the Register of Regulated Dams must be approved by the chief executive officer for the holder of this authority, or their delegate, as being accurate and correct.
- (C32) The holder must, at the same time as providing the annual return, supply to the administering authority a copy of the records contained in the Register of Regulated Dams, in the electronic format required by the administering authority.

Transitional arrangements

- (C33) All existing structures that have not been assessed in accordance with either the Manual or the former Manual for Assessing Hazard Categories and Hydraulic Performance of Dams must be assessed and certified in accordance with the Manual within 6 months of amendment of the authority adopting this schedule.
- (C34) All existing structures must subsequently comply with the timetable for any further assessments in accordance with the Manual specified in Table 1 (Transitional requirements for existing structures), depending on the consequence category for each existing structure assessed in the most recent previous certification for that structure.
- (C35) Table 1 ceases to apply for a structure once any of the following events has occurred:
- it has been brought into compliance with the hydraulic performance criteria applicable to the structure under the Manual; or
 - it has been decommissioned; or
 - it has been certified as no longer being assessed as a regulated structure.
- (C36) Certification of the transitional assessment required by C35 and C36 (as applicable) must be provided to the administering authority within six (6) months of amendment of the authority adopting this schedule.

Schedule C, Table 1 – Transitional hydraulic performance requirements for existing structures

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

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

SCHEDULE D – LAND

General

- (D1) Contaminants that will or may cause environmental harm must not be directly or indirectly released to land except as permitted under this environmental authority.

Disturbance to Land – General

- (D2) Prior to conducting petroleum activities that involve significant disturbance to land, an assessment must be undertaken of the condition, type and ecological value of any vegetation in such areas where the activity is proposed to take place.
- (D3) The assessment required by Condition (D2) must be undertaken by a suitably qualified person and include the carrying out of field validation surveys, observations and mapping of any Category A, B or C Environmentally Sensitive Areas (ESA's) and the presence of species classed as endangered, vulnerable, rare or near threatened under the *Nature Conservation Act 1992* and for petroleum activities that commenced after 8 March 2013, areas containing State significant biodiversity values.
- (D4) If the assessment required by Conditions (D2) and (D3) indicates that a regional ecosystem (RE) mapped as 'Endangered' or 'Of Concern' by the Queensland Herbarium should be in a lower conservation value classification and the holder of this environmental authority wishes to undertake activities as if the ecosystem is of the lower conservation value they must notify the administering authority in writing before any significant disturbance to land takes place.
- (D5) The holder of this environmental authority, when carrying out petroleum activities must:
- (a) avoid, minimise or mitigate (in order of preference) any impacts on areas of vegetation or other areas of ecological value;
 - (b) minimise disturbance to land that may otherwise result in land degradation;
 - (c) ensure that for land that is to be significantly disturbed by petroleum activities:
 - (i) the top layer of the soil profile is removed;
 - (ii) stockpiled in a manner that will preserve its biological and chemical properties; and
 - (iii) used for rehabilitation purposes (in accordance with Condition (H4));
 - (d) avoid clearing mature trees; and
 - (e) prior to carrying out field based activities, make all relevant staff, contractors or agents carrying out those activities, aware of the location of any category A, B or C ESA's and the requirements of this environmental authority.

Note: This environmental authority does not authorise the taking of protected animals or the tampering with an animal breeding place as defined under the Nature Conservation Act 1992 and Regulations.

- (D6) In accordance with Condition (D5), if significant disturbance to land is unavoidable, the holder of this environmental authority must not clear vegetation or place fill:
- (a) in a way which significantly isolates, fragments or dissects tracts of vegetation resulting in a reduction in the current level of ecosystem functioning, ecological connectivity (i.e. stepping stone or contiguous bioregional/local corridor networks) and/or results in an increase in threatening processes (e.g. potential impacts associated with edge effects or introduced species);
 - (b) on slopes greater than 10% for activities other than pipelines and wells; or
 - (c) in discharge areas.
- (D7) Clearing of remnant vegetation shall not exceed ten (10) metres in width for the purpose of establishing tracks and 20 metres in width for dual carriageway roads unless otherwise authorised by a condition of this EA.
- (D8) Cleared vegetation must be stockpiled in a manner that facilitates respreading or salvaging and does not impede vehicle, stock or wildlife movements.

Disturbance to Land – Environmentally Sensitive Areas

- (D9) The holder of this environmental authority must ensure that petroleum activities, except as otherwise authorised by Condition (D17), (D18), (D19) and (D20) of this environmental authority:
- (a) are not conducted in any category A, B or C Environmentally Sensitive Areas (ESAs);
 - (b) are not conducted within 200m of any category A, B or C ESAs; and
 - (c) do not involve activities other than limited petroleum activities within the protection zone of a category A ESA (i.e. from 200m to 1km of the category A ESA), or within the protection zone of a category B or C ESA (i.e. from 200m to 500m of the category B or C ESA).

Note: Indicative ESA mapping is available on the Department of Environment and Heritage Protection's website at http://www.ehp.qld.gov.au/licences-permits/maps_of_environmentally_sensitive_areas.php

- (D10) Limited petroleum activities carried out in accordance with Condition (D9)(c) must be preferentially located in pre-existing areas of clearing or significant disturbance to the greatest practicable extent and avoid the clearing of mature trees.

- (D11) Despite Condition (D10), limited petroleum activities may be undertaken within 200m of, or in the following specified Category B and C ESAs:

- (a) 'Endangered' regional ecosystems;
- (b) 'Of Concern' regional ecosystems;
- (c) State Forests;
- (d) Timber Reserves

provided that they do not overlap with any other Category A, B or C ESA or its associated protection zone.

- (D12) Where limited petroleum activities are proposed to be undertaken within 200m of, or in the Category B and C ESAs specified in Condition (D11), the holder of this environmental authority must:

- (a) be able to demonstrate that no reasonable or practicable alternative exists; and
- (b) where the ESA is a State Forest or Timber Reserve:
 - (i) obtain written approval from the authority responsible for the administration of the *Forestry Act 1959*;
 - (ii) comply with all restrictions and conditions contained within the approval required under Condition (D12)(b)(i));
 - (iii) where the conditions of the approval required under Condition (D12)(b)(i) conflict with the conditions of this environmental authority, comply with the conditions of this environmental authority; and
 - (iv) provide a copy of the written approval required under Condition (D12)(b)(i) to the administering authority upon request.

- (D13) Where limited petroleum activities are undertaken within 200m of, or in the Category B or C ESAs specified in Condition (D11), disturbance to land must only be located and carried out in areas according to the following order of preference:

- (a) pre-existing cleared areas or significantly disturbed areas less than 200m from a Category C ESA;
- (b) pre-existing cleared areas or significantly disturbed areas less than 200m from a Category B ESA;
- (c) undisturbed areas less than 200m from a Category C ESA;
- (d) undisturbed areas less than 200m from a Category B ESA;
- (e) pre-existing areas of significant disturbance within a Category C ESA (e.g. areas where significant clearing or thinning has been undertaken within a RE, and/or areas containing high densities of weed or pest species which has inhibited re-colonisation of native regrowth);
- (f) pre-existing areas of significant disturbance within a Category B ESA (e.g. areas where significant clearing or thinning has been undertaken within a RE, and/or areas containing high densities of weed or pest species which has inhibited re-colonisation of native regrowth);
- (g) areas where clearing of a Category C ESA is unavoidable; and
- (h) areas where clearing of a Category B ESA is unavoidable.

- (D14) Notwithstanding Conditions (D11) to (D13), where limited petroleum activities are proposed to be undertaken within 200m of, or in a Category B or C ESAs specified in Condition (D11), any vegetation clearing must not exceed any of the following areas:
- (a) if the disturbance relates to an Endangered or Of Concern RE, 10% of the remnant unit of Endangered or Of Concern RE as ground truthed and mapped before any activity commences as per Condition (D2) and (D3) of this environmental authority for the life of the project; and
 - (b) more than 30m² for the construction of a sump; or
 - (c) Described in Schedule D, Table 1 – Authorised vegetation clearing widths for linear infrastructure in ESAs and ESA buffers.

Schedule D, Table 1 – Authorised vegetation clearing widths for linear infrastructure in ESAs and ESA buffers

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

- (D15) For each well site within 200m of, or in a Category B or C ESA specified in Condition (D11), all reasonable and practical measures are taken to minimize the area cleared which must include but not be limited to, for each well site, ranked constraints mapping and a risk assessment which considers safety.
- (D16) Details of any significant disturbance to land undertaken within 200m of, or in a Category B or C ESA, along with a record of the assessment required by Conditions (D2) and (D3) must be kept and submitted to the administering authority upon request.
- (D17) Despite Condition (D9), the Daandine Brine Dam 2 and associated activities necessary for construction, operation, maintenance and monitoring of the dam, located within the area bound by the coordinates prescribed by *Schedule D, Table 1 – Coordinates Enclosing the Disturbance Area for Daandine Brine Dam 2*, are permitted within the protection zones of Category C Environmentally Sensitive Areas.

Schedule D, Table 1 – Coordinates Enclosing the Disturbance Area for Daandine Brine Dam 2

Point	Latitude or Northing (GDA94, Zone 56)	Longitude or Easting (GDA94, Zone 56)
1	7001708	297524
2	7001153	297384
3	7001051	298345
4	7001418	298444
5	7001601	298406
6	7001620	298190

- (D18) Despite Condition (D9), the water release outlet and pipeline and associated activities necessary for construction, operation, maintenance and monitoring for the release of treated CSG water to Wilkie Creek at the specified release point in *Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters* are authorised to occur in a Category B ESA and its associated protection zones.
- (D19) The construction of the water release outlet and pipeline are located within the area bound by the coordinates prescribed by *Schedule D, Table 2 – Coordinates Enclosing the Disturbance Area for the Water Release Outlet and Pipeline*.

Schedule D, Table 2 - Coordinates Enclosing the Disturbance Area for the Water Release Outlet and Pipeline.

Point	Latitude or Northing (GDA94, Zone 56)	Latitude or Easting (GDA94, Zone 56)	Area of disturbance
Valve Pit	6,995,424	302,897	0.18 ha
High Point on Bank	6,995,460	302,991	
Outlet at Creek	6,995,465	303,004	

- (D20) Despite condition D9, the Tipton Treated Water Pipeline and associated activities for construction, operation and maintenance, located within the area bound by the coordinates prescribed by *Schedule D, Table 3 – Coordinates Enclosing the Disturbance Area for Tipton Treated Water Pipeline*, are permitted.

Schedule D, Table 3 - Coordinates Enclosing the Disturbance Area for Tipton Treated Water Pipeline

Point	Longitude or Easting (GDA94 Zone 56)	Latitude or Northing (GDA94 Zone 56)
Section 1	310652.74	6969686.79
	310656.46	6969747.37
	310696.37	6969744.59
	310661.46	6970447.79
	310621.2	6970452.8
	310651.4	6970651.7
	310611.1	6970656.7
	310641.76	6970845.55
	310601.68	6970846.23
	310707.02	6971627.3
	310667.1	6971629.9
	310658.71	6972161.37
	310618.1	6972166.9
	310621.4	6973392.1
	310581.2	6973398.7
	310613.31	6973549.7
	310573.47	6973549.7
	310638.9	6973649.7
	310538.9	6973549.7
	310608.18	6973649.7
	310568.35	6973649.7
310638.9	6973549.7	
310538.9	6973649.7	
Section 2	310617.24	6973719.35
	310576.78	6973723.95
	310722.26	6974060.43
	310681.96	6974065.49
	310716.82	6974171.95
	310676.51	6974177.14
	310714.46	6974220.51
	310674.59	6974216.76
	310692.43	6974377.64
	310653.85	6974364.72
	310692.43	6974377.64
	310567.32	6974520.53
	310616.71	6974514.14
	310563.13	6974528.08
	310612.67	6974521.66
	310498.88	6974536.4
	310593.85	6974610.18
310497.34	6974636.39	
Section 3	310533.76	6974846.47
	310493.94	6974834.72
	310533.6	6974856.85
	310493.52	6974862.31
	310528.48	6975191.65
	310488.41	6975196.69
	310526.05	6975350.54
310485.78	6975347.13	

Soil Management

- (D21) The holder of this environmental authority must develop and implement soils management procedures, which have been certified by a suitably qualified person, for areas to be disturbed by petroleum activities prior to commencement of these petroleum activities to prevent or minimise the impacts of soil disturbance.
- (D22) Despite condition D21, for areas of disturbance at the time of issue of this environmental authority, the holder of this environmental authority must develop and implement soils management procedures, which have been certified by a suitably qualified person by 18 July 2011.
- (D23) The Soil Management Procedures required by conditions D21 and D22 must include, but not necessarily be limited to:
- (a) identify soil units within areas to be disturbed by petroleum activities at a scale of 1:50 000, in accordance with the "Guidelines for Surveying Soil and Land Resources, 2nd Edition" (McKenzie et al. 2008), "Australian Soil and Land Survey Handbook, 3rd Edition" (National Committee on Soil and Terrain 2009), "The Australian Soil Classification" (Isbell 2002) and "Guidelines for agricultural land evaluation in Queensland" (Queensland Department of Primary Industries Information Series QI90005 1990) or subsequent versions thereof;
 - (b) establish baseline soils information for the soil units to be disturbed including soil depth, pH, electrical conductivity (EC), chloride, cations (aluminium, calcium, magnesium, potassium and sodium), exchangeable sodium percentage (ESP), particle size and soil fertility (including nitrogen, phosphorous, potassium, sulphur and micronutrients);
 - (c) a soils monitoring program outlining parameters to be monitored, frequency of monitoring and maximum limits for each parameter for each soil unit;
 - (d) identify the types of soils and soil units requiring specific management practices (e.g. saline or sodic soils) relevant to assessment for agricultural suitability erodibility and rehabilitation
 - (e) detailed topsoil and topsoil stockpile management procedures for each soil unit in the event of any significant soil disturbance;
 - (f) detailed mitigation measures and procedures for each soil unit to manage the risk of adverse soil disturbance in the carrying out of the petroleum activity(ies);
 - (g) for pipelines, methods of keeping soil horizons separate on excavation, storage and backfilling; and
 - (h) for areas of good quality agricultural land, detailed methods to be undertaken to minimise potential impacts.
- (D24) A copy of the Soils Management Procedures must be submitted to any potentially affected landholders upon request.

Acid Sulfate Soils

- (D25) The holder of this environmental authority must determine the presence of acid sulfate soils prior to:
- (a) any excavation or otherwise removing 100m³ or more of soil or sediment; or
 - (b) filling of land involving 500m³ or more of material with an average depth of 0.5 of a metre or greater.
- (D26) The holder of this environmental authority must determine the presence of acid sulfate soils prior to any excavation or filling at, or in exceedance of, the thresholds in Condition (D23)(a) or (b) in any of the following areas:
- (a) areas to be disturbed where there are lithologies with sulfide bearing minerals; or
 - (b) naturally saline areas (e.g. salt pans, lakes etc); or
 - (c) wetland areas (e.g. mapped as Land zone three (3) on the regional ecosystem database preclear layer and/or areas mapped as wetlands under the QLD Wetlands program, WetlandInfo); or
 - (d) areas with elevation less than 2 metres AHD; or
 - (e) areas with soil and sediment of recent geological age (Holocene); or
 - (f) areas where marine or estuarine sediments and tidal lakes are present; or
 - (g) low-lying coastal wetlands or back swamp areas, waterlogged or scalded areas; or

- (h) stranded beach ridges and adjacent swales, interdune swales or coastal sand dunes; or
 - (i) coastal alluvial valleys; or
 - (j) areas where the dominant vegetation is tolerant of salt, acid and/or waterlogging conditions (e.g. mangroves, saltcouch).
- (D27) Subject to Conditions (D23) and (D24) and prior to any disturbance of acid sulfate soils, the holder of this environmental authority must prepare an acid sulfate soil environmental management plan in accordance with Appendix 4 of the State Planning Policy 2/02 Guideline Acid Sulfate Soils.
- (D28) The acid sulfate soil environmental management plan must be prepared and implemented by a suitably qualified person.
- (D29) The holder of this environmental authority must comply with the acid sulphate soil environmental management plan.

Fauna Management

- (D30) Measures to prevent fauna being harmed from entrapment must be implemented during the construction and operation of well infrastructure, dams and pipeline trenches.

Pest management

- (D31) In carrying out the petroleum activity(ies) the holder of this environmental authority must develop and implement an effective pest management program by 18 October 2011 which has been certified by a suitably qualified person that includes but is not limited to the following:
- (a) identification of pest species and infestation areas;
 - (b) prevention and/or minimisation of the introduction and/or spread of pests;
 - (c) control and management of pest outbreaks as a result of petroleum activities; and
 - (d) details of community consultation in developing the pest management program.

Note: The pest management program required by Condition (D31) should consider the "Petroleum Industry (including coal seam methane gas) Minimising Pest Spread Guidelines" dated June 2008, or subsequent versions thereof. This document is available for download from: http://www.dpi.qld.gov.au/documents/Biosecurity_EnvironmentalPests/IPA-Minimising-Pest-Spread-Advisory-Guidelines.pdf

- (D32) A copy of the pest management procedures must be made available to any potentially affected landholders upon request.

Chemical and Fuel Storage

- (D33) All explosives, hazardous chemicals, corrosive substances, toxic substances, gases, dangerous goods, flammable and combustible liquids (including petroleum products and associated piping and infrastructure) must be stored and handled in accordance with the relevant Australian Standard where such is available.
- (D34) Notwithstanding the requirements of any Australian Standard, any liquids stored on site that have the potential to cause environmental harm must be stored in or serviced by an effective containment system that is impervious to the materials stored and managed to prevent the release of liquids to waters or land. Where no relevant Australian Standard is available, the following must be applied:
- (a) storage tanks must be bunded so that the capacity and construction of the bund is sufficient to contain at least 110% of a single storage tank or 100% of the largest storage tank plus 10% of the second largest storage tank in multiple storage areas; and
 - (b) drum storages must be bunded so that the capacity and construction of the bund is sufficient to contain at least 25% of the maximum design storage volume within the bund.
- (D35) All containment systems must be designed to minimise rainfall collection within the system.

Pipelines

- (D36) Pipelines must be preferentially located alongside existing linear infrastructure such as roads, tracks and powerlines.
- (D37) Pipeline trenches must only be left open for the minimum time practicable.
- (D38) The length of pipeline trench open at any one time must be minimised as far as practicable.
- (D39) Completed pipeline construction areas must be:
- (a) a stable landform with no subsidence or erosion gullies for at least five (5) years;
 - (b) be re-profiled to original contours and established drainage lines;
 - (c) be visually consistent with the surround land features; and
 - (d) be reinstated to the pre-disturbed land use and soil suitability class.
- (D40) The holder of this environmental authority must monitor reinstated pipeline corridors for subsidence at least every 20 business days for the first 120 business days after reinstatement to ensure compliance with Condition (D39).

Impacts to State Significant Biodiversity Values

- (D41) Impacts to State significant biodiversity values are not authorised, except as permitted by conditions (D42) and (D43).
- (D42) Impacts to State significant biodiversity values can only occur if an offset is available that meets the relevant offset rules for that State significant biodiversity value.
- (D43) The offset required by (D42) must:
- (a) for land-based offsets:
 - (i) meet the relevant offset rules for the State significant biodiversity value being impacted;
 - (ii) be legally secured within 12 months of the impact occurring; and
 - (iii) remain in force until the relevant offset objectives have been met;
 - (b) for offset payments:
 - (i) meet the relevant offset rules for the State significant biodiversity value being impacted;
 - (ii) not be made for a critically limited regional ecosystem or a threshold regional ecosystem; and
 - (iii) be made within 4 months of the impact occurring.
- (D44) If conditions (D41) to (D44) have been triggered during an annual return period, the annual return must include the following details:
- (a) the type of State significant biodiversity value that was impacted;
 - (b) the date the impact to each State significant biodiversity value commenced;
 - (c) a GIS shape-file that shows the location and spatial extent of the residual impact to the State significant biodiversity value;
 - (d) the type of offset being provided for the State significant biodiversity value;
 - (e) how the offset meets the relevant offset rules;
 - (f) an offset area management plan that demonstrates how the relevant offset objectives will be met; and
 - (g) the date the offset was either legally-secured or the offset payment was made.

SCHEDULE E – ENVIRONMENTAL NUISANCE**Odour, dust and other airborne contaminants**

- (E1) The release of odour, dust or any other airborne contaminant(s), or light from the petroleum activity(ies) must not cause an environmental nuisance at any sensitive place.

Noise

- (E2) Prior to undertaking petroleum activities that will result in short-term, medium-term or long term noise events that are likely to impact on a sensitive receptor, the holder of this environmental authority must model or calculate any potential noise emissions from the relevant petroleum activity and determine if noise emissions are likely to exceed the noise levels specified in *Schedule E, Table 1 – Noise limits at Sensitive Receptors*.
- (E3) If noise modelling or the calculations indicates that petroleum activities are likely to exceed the noise levels specified in *Schedule E, Table 1 – Noise limits at sensitive receptors*, the holder of this environmental authority must prepare a Noise Management Plan prior to undertaking petroleum activities, which demonstrates how the noise limits specified in *Schedule E, Table 1 – Noise limits at sensitive receptors* will be achieved in the event of a valid noise complaint.
- (E4) Despite condition E3, for any petroleum activities existing at the time of issue of this environmental authority, if noise modelling or the calculations indicates that petroleum activities are likely to exceed the noise levels specified in *Schedule E, Table 1 – Noise limits at sensitive receptors*, the holder of this environmental authority must implement a Noise Management Plan, which demonstrates how the noise limits specified in *Schedule E, Table 1 – Noise limits at sensitive receptors* will be achieved in the event of a valid noise complaint.
- (E5) The Noise Management Plan must address, but not be limited to, the following matters:
- (a) a location based noise assessment to determine compliance with the noise limits in *Schedule E, Table 1 – Noise limits at Sensitive Receptors*
 - (b) the measured and/or predicted noise level of these noise sources and activities at noise sensitive receptors, taking into account any tonal or impulsive noise impacts;
 - (c) the reasonable and practicable control or abatement measures (including relocating the activity, hours of operation, or having an alternate arrangement in place with any potentially affected person) that can be undertaken to reduce identified intrusive noise sources;
 - (d) the level of noise at noise sensitive receptors that would be achieved from implementing these measures;
 - (e) the handling of future noise complaints;
 - (f) community liaison and consultation including but not limited consultation processes for when night time activities (i.e. between 10:00 pm and 6:00 am) are likely to exceed 25dBA; and
 - (g) training of staff and contractors in best available noise management practices.
- (E6) The emission of noise from the licensed place must not result in levels greater than those specified in *Schedule E, Table 1 – Noise limits at Sensitive Receptors* in the event of a valid complaint about noise being made to the administering authority.

Schedule E, Table 1 – Noise Limits at Sensitive Receptors

Time Period	Metric	Short Term Noise Event	Medium Term Noise Event	Long Term Noise Event
7:00am – 6:00pm	L _{Aeq,adj,15 min} Max L _{pA, 15 mins}	45 dBA 55 dBA	43 dBA 51 dBA	40 dBA 45 dBA
6:00pm – 10:00pm	L _{Aeq,adj,15 min} Max L _{pA, 15 mins}	40 dBA 50 dBA	38 dBA 46 dBA	35 dBA 40 dBA
10:00pm – 6:00am	L _{Aeq,adj,15 min} Max L _{pA, 15 mins}	28 dBA 38 dBA	28 dBA 36 dBA	28 dBA 33 dBA
6:00am – 7:00am	L _{Aeq,adj,15 min} Max L _{pA, 15 mins}	40 dBA 50 dBA	38 dBA 46 dBA	35 dBA 40 dBA

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

Deemed background noise levels (L_{ABG}) for Schedule E, Table 1 – Noise Limits at Sensitive Receptors are:

7:00 am - 6:00pm: 35 dBA
 6:00 pm – 10:00 pm: 30 dBA
 10:00 pm – 6:00 am: 25 dBA
 6:00 am – 7:00 am: 30 dBA

- (E7) If the noise subject to a complaint is tonal or impulsive, the adjustments detailed in *Schedule E, Table 2 – Adjustments to be Added to Noise Levels at Sensitive Receptors* are to be added to the measured noise level(s) to derive L_{Aeq, adj, 15 min}.

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

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

- (E8) Where alternative arrangements are in place with any affected person as referred to by Condition (E5)(c), the noise limits in *Schedule E, Table 1 – Noise limits at Sensitive Receptors* do not apply at that location for the duration for which the alternative arrangements are in place.

Low Frequency Noise

- (E9) Notwithstanding Condition (E2), emission of any noise below 315 Hz must not cause an environmental nuisance.
- (E10) Low frequency noise from the petroleum activities is not considered to be an environmental nuisance under Condition (E9) if monitoring shows that noise emissions do not exceed the following limits:
- 50 dB(Z) measured inside the sensitive receptor; and
 - the difference between the internal A-weighted and Z-weighted noise levels is no greater than 15 dB.

Vibration and Blasting Activities

- (E11) The holder of this environmental authority must develop a blast management plan in accordance with Australian Standard 2187 for each planned blasting activity before it is undertaken.
- (E12) The blast management plan required by Condition (E11) must include measures to minimise the likelihood of any adverse effects being caused by airblast overpressure and/or ground borne vibrations at any sensitive receptor and demonstrate current best practice environmental management.

- (E13) All blasting must be carried out in a proper manner by a suitably qualified person.
- (E14) All blasting must be carried out in accordance with the Blast Management Plan.
- (E15) Noise from blasting operations must not exceed an airblast overpressure level, when measured at or extrapolated to any sensitive receptor, of 115 dB (linear peak) for nine (9) out of any ten (10) consecutive blasts initiated nor 120 dB (linear peak) at any time.
- (E16) Ground-borne vibration peak particle velocity caused by blasting operations, when measured at or extrapolated to any sensitive receptor must not exceed more than 5 mm per second for nine (9) out of any ten (10) consecutive blasts initiated, or 10 mm per second at any time.

SCHEDULE F – AIR

Venting and flaring

- (F1) Unless venting is authorised under the *Petroleum and Gas (Production and Safety) Act 2004* or the *Petroleum Act 1923*, waste gas must be flared in a manner that complies with all of (Air 1(a)) and (Air 1(b)) and (Air 1(c)), or with (Air 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 enclosed flare.

Fuel Burning or Combustion Equipment

- (F2) The only type of fuel to be burned in fuel burning or combustion equipment under normal operating conditions is coal seam gas.
- (F3) Contaminant releases to air emitted from fuel burning and combustion equipment point sources that are capable of burning at least 500 kg in an hour must be directed vertically upwards without any impedance or hindrance.
- (F4) The holder of this environmental authority must maintain a register of fuel burning and combustion equipment that is capable of burning at least 500 kg of fuel in an hour that must include, as a minimum, the following information for each piece of equipment:
- (a) fuel burning or combustion equipment name and location;
 - (b) stack emission height (metres);
 - (c) minimum efflux velocity (m/s);
 - (d) mass emission rates (g/s); and
 - (e) contaminant concentrations (mg/Nm³ @ x %O₂ dry gas at 0°Celsius and 1 atmosphere).
- (F5) The holder of this environmental authority must ensure that the information contained in the register of fuel burning and combustion equipment is always current and complete.
- (F6) All entries in the register of fuel burning and combustion equipment must be certified by the chief executive officer for the tenure holder, or their delegate, as being accurate and correct.

Fuel Burning or Combustion Equipment Located Outside Hubs or Populated Areas

- (F7) Prior to the installation and operation of any new fuel burning or combustion equipment, that is capable of burning at least 500 kg of fuel in an hour, the holder of this environmental authority must conduct air dispersion modelling to calculate the ground level concentrations of emissions from all existing and proposed fuel burning or combustion equipment under maximum operating conditions (including other industry) within the ambient airshed and identify any potential impacts to air quality within the study area.
- (F8) The holder of this environmental authority must ensure that the calculated ground level concentrations required under Condition (F7) do not exceed the criteria for each air contaminant at sensitive receptors in *Schedule F, Table 1 – Maximum Ground Level Concentration Criteria*.

Schedule F, Table 1 – Maximum Ground Level Concentration Criteria

Contaminant	Concentration at 0°Celsius	Units	Averaging time	Relevant Sensitive Receptors
Nitrogen Dioxide	250	µg/m ³	1 hour	Human Health
Nitrogen Dioxide	62	µg/m ³	1 year	Human Health
Nitrogen Dioxide	33	µg/m ³	1 year	Ecosystems
Carbon Monoxide	11	mg/m ³	8 hour	Human Health

- (F9) The holder of this environmental authority must undertake emissions testing within 3 months post commissioning of any fuel burning and combustion equipment capable of burning at least 500 kg of fuel in an hour to verify the estimates used in the air dispersion modelling.
- (F10) Where the results of the emissions testing required under Condition (F9) indicate that the emission estimates used in the air dispersion modelling required under Condition (F7) are exceeded, the holder of this environmental authority must:
- (a) provide details to the administering authority within 10 **business days**;
 - (b) re-undertake the modelling based on the new information; and
 - (c) determine and implement appropriate pollution control measures to bring the emissions into compliance with the limits specified in *Schedule F, Table 1 – Maximum Ground Level Concentration Criteria*.

Fuel Burning and Combustion Equipment in Hubs and / or Places within 5 km of Populated Areas

- (F11) Fuel burning or combustion equipment that is capable of burning at least 500 kg of fuel in an hour must not be located in hubs or in places within 5km of a populated area unless it is specified in *Schedule F, Table 2 – Release of Contaminants to Air*.
- (F12) Fuel burning or combustion equipment located in hubs or in places within 5km of a populated area, that is capable of burning at least 500 kg of fuel in an hour, must only release contaminants to the atmosphere at a height and an efflux velocity not less than the corresponding height and velocity stated for that release point (RP) as provided for in *Schedule F, Table 2 - Release of Contaminants to Air*.
- (F13) Fuel burning or combustion equipment located in hubs or in places within 5km of a populated area, that is capable of burning at least 500 kg of fuel in an hour, must not release contaminants to the atmosphere from a release point at a mass emission rate in excess of that stated in *Schedule F, Table 2 - Release of Contaminants to Air*.

Schedule F, Table 2a - Releases of Contaminants to Air

Resource Authority	Field	Facility	Release Point No. (EA)	Unit Description	Minimum Release Height (m)	Minimum Efflux Velocity (m/sec)	NO _x		CO	
							Maximum Release limit	Release limit type	Maximum Release limit	Release limit type
PL 230	Daandine	DD CGPF	A1	K-0001 Compressor 1	8.1	30	6.8	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A2	K-0002 Compressor 2	8.1	30	6.8	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A3	K-0003 Compressor 3	8.1	30	6.8	g/sec	5.5	g/sec

Resource Authority	Field	Facility	Release Point No. (EA)	Unit Description	Minimum Release Height (m)	Minimum Efflux Velocity (m/sec)	NOx		CO	
							Maximum Release limit	Release limit type	Maximum Release limit	Release limit type
PL 230	Daandine	DD CGPF	A4	K-0004 Compressor 4	8.1	30	6.8	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A5	K-0005 Compressor 5	8.1	30	6.8	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A6	K-0006 Compressor 6	8.1	30	6.8	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A7	K-0007 Compressor 7	8.1	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A14	K-0001 Compressor 1	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A15	K-0002 Compressor 2	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A16	K-0003 Compressor 3	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A17	K-0004 Compressor 4	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A18	K-0005 Compressor 5	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A19	K-0006 Compressor 6	7.6	30	6.8	g/sec	5.5	g/sec

Note 1: Minimum efflux velocity, maximum mass emission and maximum concentration are calculated at the Maximum Continuous Rating.

Note 2: This table is only valid up until 29 October 2015.

Schedule F, Table 2b - Releases of Contaminants to Air

Resource Authority	Field	Facility	Release Point No. (EA)	Unit Description	Minimum Release Height (m)	Minimum Efflux Velocity (m/sec)	NOx		CO	
							Maximum Release limit	Release limit type	Maximum Release limit	Release limit type
PL 230	Daandine	DD CGPF	A1	K-0001 Compressor 1	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A2	K-0002 Compressor 2	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A3	K-0003 Compressor 3	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A4	K-0004 Compressor 4	10	30	3.0	g/sec	5.5	g/sec

Resource Authority	Field	Facility	Release Point No. (EA)	Unit Description	Minimum Release Height (m)	Minimum Efflux Velocity (m/sec)	NOx		CO	
							Maximum Release limit	Release limit type	Maximum Release limit	Release limit type
PL 230	Daandine	DD CGPF	A5	K-0005 Compressor 5	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A6	K-0006 Compressor 6	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A7	K-0007 Compressor 7	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A8	K-9008 Compressor 8	17	17	1.4	g/sec	4.8	g/sec
PL 230	Daandine	DD CGPF	A9	K-9009 Compressor 9	17	17	1.4	g/sec	4.8	g/sec
PL 230	Daandine	DD CGPF	A10	K-9010 Compressor 10	17	17	1.4	g/sec	4.8	g/sec
PL 198	Tipton	TW CGPF	A14	K-0001 Compressor 1	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A15	K-0002 Compressor 2	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A16	K-0003 Compressor 3	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A17	K-0004 Compressor 4	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A18	K-0005 Compressor 5	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A19	K-0006 Compressor 6	7.6	30	6.8	g/sec	5.5	g/sec

Note 1: Minimum efflux velocity, maximum mass emission and maximum concentration are calculated at the Maximum Continuous Rating.

Note 2: This table comes into effect on 30 October 2015.

- (F14) The holder of this environmental authority must undertake emissions testing within 3 months of the issue of this environmental authority of all fuel burning and combustion equipment listed in *Schedule F, Table 2 – Release of Contaminants to Air*.
- (F15) The holder of this environmental authority must undertake air dispersion modelling using the results of the emission testing required under Condition (F14) to verify that emissions will not result in an exceedance of the maximum ground level concentration for each air contaminant listed in *Schedule F, Table 1 – Maximum Ground Level Concentration Criteria*.
- (F16) A report on the results of air emission testing and modelling required by conditions (F14) and (F15) must be provided to the administering authority with the next annual return.

SCHEDULE G – WASTE

General

- (G1) All general and regulated waste must be removed from the site and sent to a site that is lawfully able to accept the waste under the *Environmental Protection Act 1994* except as permitted under another condition of this environmental authority.
- (G2) All regulated waste removed from the site must be undertaken by a person who holds a current authority to transport such waste under the provisions of the *Environmental Protection Act 1994*.
- (G3) Waste must not be burned or allowed to be burned on the licensed site.
- (G4) All waste fluids and muds resulting from drilling and exploration activities must be contained in a properly lined dam or containment structure for disposal, remediation or reuse where applicable.

Coal Seam Gas Water Management Plan

- (G5) A Coal Seam Gas Water Management Plan that includes but is not necessarily limited to the matters outlined in (a) and (b) must be implemented:
 - (a) the matters required by sections 310D (5), 310D (6) and 662 of the *Environmental Protection Act 1994*; and
 - (b) a management strategy for all integrated coal seam gas water management operations.
- (G6) Where any inconsistency exists between the conditions of this environmental authority and the Coal Seam Gas Water Management Plan, the conditions of this environmental authority prevail.

Coal Seam Gas Water Use

- (G7) Written approval from the relevant Local Government must be obtained prior to the application of coal seam gas water on any local government controlled roads in accordance with Condition (G9).
- (G8) Produced water may be re-used in drilling and well hole activities.
- (G9) 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.
- (G10) Produced water may be used for construction and operation 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
 - (d) Does not harm vegetation surrounding the construction site.
- (G11) If there is any indication that any of the circumstances in condition (G9)(b)(i) to (G9)(b)(iv) or (G10)(a) to (G10)(d) is occurring the use must cease immediately and the affected area must be remediated without delay.

Supply of Coal Seam Gas Water to a Third Party

- (G12) Coal seam gas water may be transferred to a third party to be used for the following purposes subject to compliance with (G13) and (G14):

- (a) dust suppression if the coal seam gas water quality complies with the limits specified in *Schedule G, Table 1 – Water Contaminant Release Limits*;
- (b) construction and operational purposes if the coal seam gas water quality complies with the limits specified in *Schedule G, Table 1 – Water Contaminant Release Limits*;
- (c) irrigation and livestock watering purposes;
- (d) the following industrial purposes:
 - (i) coal washing;
 - (ii) power stations; and
 - (iii) water treatment facilities.

Schedule G, Table 1 – Water Contaminant Release Limits

Water Quality Characteristics	Unit	Limit	Limit Type
pH	pH units	6.0 to 9.0	Range
Sodium Adsorption Ratio	ratio	6	80 th Percentile
		12	Maximum
Total Dissolved Solids	mg/L	1500	Maximum
Total Petroleum Hydrocarbons	mg/L	10	Maximum

- (G13) Any coal seam gas water supplied to a third party for irrigation and/or livestock watering purposes in accordance with Condition (G12)(c) must comply with the relevant trigger values contained in *ANZECC and ARMCANZ Water Quality Guidelines 2000*, or subsequent versions thereof.
- (G14) If the responsibility of coal seam gas water is given or transferred to a third party in accordance with Condition (G12), the holder of environmental authority must ensure that:
- (a) the responsibility of the coal seam gas water is given or transferred in accordance with a written agreement (the third party agreement); and
 - (b) the third party is made aware of the General Environmental Duty under section 319 of the *Environmental Protection Act 1994*.

Residual drilling material

- (G15) If sumps are used to store residual drilling material or drilling fluids, they must only be used for the duration of drilling activities.
- (G16) 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.
- (G17) Records must be kept to demonstrate compliance with condition (G15) and (G16).

SCHEDULE H – REHABILITATION

- (H1) The holder of this environmental authority must not abandon any dam but must decommission each dam so as to prevent and/or minimise any environmental harm.
- (H2) As a minimum, decommissioning must be conducted such that each dam either:
- (a) becomes a stable landform similar to that of the surrounding undisturbed areas, that no longer contains substances that will migrate into the environment; or
 - (b) the administering authority and the landholder agree that the dam will be used by the landholder following the cessation of the petroleum activities
- (H3) Progressive rehabilitation of disturbed areas must commence as soon as practicable following the completion of any construction or operational works associated with the petroleum activities.
- (H4) As soon as practicable but no later than 12 months (or longer period agreed in writing by the administering authority) after the end of petroleum activities causing significant disturbance to land, the holder of the authority must:
- (a) remediate contaminated land (e.g. dams containing salt);
 - (b) reshape all significantly disturbed land to a stable landform similar to that of surrounding undisturbed areas;
 - (c) on all significantly disturbed land:
 - (i) re-establish surface drainage lines;
 - (ii) reinstate the top layer of the soil profile; and
 - (iii) promote establishment of vegetation.
 - (d) undertake rehabilitation in a manner such that any actual and potential acid sulfate soils in or on the site are either not disturbed, or submerged, or treated so as to not be likely to cause environmental harm; and
 - (e) decommission all inactive buried pipelines in accordance with the requirements of AS 2885 and ensuring that there will not be any subsequent subsidence of land along the pipeline route.
- (H5) All significantly disturbed land caused by the carrying out of the petroleum activities must be rehabilitated to meet the following final acceptance criteria:
- (a) all significantly disturbed land is reinstated to the pre-disturbed land use unless otherwise agreed to between the environmental authority holder, the landholder and the administering authority;
 - (b) all significantly disturbed land is reinstated to the pre-disturbed soil suitability class;
 - (c) the landform is safe for humans and fauna;
 - (d) the landform is stable with no subsidence or erosion gullies for at least five (5) years;
 - (e) the minimum percent foliage cover of immediate surrounding area is maintained in the rehabilitated land for at least three (3) years;
 - (f) a minimum of 80% of the flora species in the immediate surrounding area is maintained in the rehabilitated land for at least three (3) years;
 - (g) a minimum of 80% of the fauna species diversity in the immediate surrounding area is maintained in the rehabilitated land for at least three (3) years;
 - (h) erosion is minimised with appropriate sediment traps and erosion control measures installed as determined by a suitably qualified person;
 - (i) the water quality of any residual void or water bodies constructed by petroleum activities meets criteria for subsequent uses and does not have potential to cause environmental harm.
 - (j) there is no ongoing contamination to surface water;
 - (k) there is no ongoing contamination to groundwater from dams or monowells (demonstrated via groundwater monitoring and leak detection);
 - (l) the maintenance requirements for rehabilitated land is no greater than that required for the land prior to its disturbance by petroleum activities.
- (H6) Regular maintenance and at least yearly monitoring of rehabilitated areas must take place to measure compliance with the requirements of Condition (H5).

SCHEDULE I – MONITORING PROGRAMS

General

- (11) The holder of this environmental authority must develop and implement a monitoring program, the result of which will demonstrate compliance with the conditions of this environmental authority.
- (12) All monitoring under this environmental authority must be conducted by a suitably qualified person.
- (13) All instruments, equipment and measuring devices used for measuring or monitoring in accordance with any condition of this environmental authority must be calibrated, and operated and maintained effectively.
- (14) All laboratory analyses and tests required to be conducted under this environmental authority must be carried out by a laboratory that has NATA certification for such analyses and tests, except as otherwise authorised by the administering authority.
- (15) The method of water sampling required by this environmental authority must comply with the version of the *Queensland Monitoring Water Quality Sampling Manual*⁴ that is current at the time the sampling is undertaken.

Note: Condition (15) requires the version of the Queensland Monitoring Water Quality Sampling Manual that is current at the time the sampling is undertaken to be followed and where it is not followed because of exceptional circumstances this should be explained and reported with the results.

- (16) Notwithstanding condition (15), when sampling a water quality limit in *Schedule B, Table 3 – Treated CSG Water Release Limits for Monitoring Point (M1)* records a test result of "no result" or "laboratory error", a supplementary sample must be collected and tested as soon as practicable after the initial sampling event.
- (17) Any management or monitoring plans, systems, programs or procedures required to be developed and implemented by a condition of this environmental authority must be reviewed for performance and amended if required on an annual basis in accordance with the requirements for the particular plans, systems, programs and procedures.
- (18) If monitoring conducted in accordance with this environmental authority indicates a condition or contaminant level that has caused, or has potential to cause, environmental harm, the environmental authority holder must:
 - (a) as soon as is practicable, take the necessary actions to rectify the condition or contaminant level so as to avoid or minimise environmental harm; and
 - (b) notify the administering authority of the condition or contaminant level and the actions taken to rectify it.
- (19) An annual monitoring report must be prepared each year and submitted to the administering authority upon request. This report shall include but not be limited to:
 - (a) a summary of the previous twelve (12) months monitoring results obtained under any monitoring programs required under this environmental authority and, a comparison of the previous twelve (12) months monitoring results to both the limits set in this environmental authority and to relevant prior results; the date on which the samples was taken;
 - (b) the time at which the samples was taken;
 - (c) the monitoring point at which the sample was taken;
 - (d) the release flow rate of any authorised discharges to waters from all release points;
 - (e) the results of all monitoring and details of any exceedences with the conditions of this environmental authority and the dates and times these exceedences were reported to the administering authority.
 - (f) a summary of all records of quantities of releases required to be kept under this environmental authority including the total volume of any authorised discharges to waters for the previous yearly

⁴ The version that is current as at the 8 March 2013 is *Monitoring and Sampling Manual 2009 – Environmental Protection (Water) Policy 2009 Version 2 September 2010*.

02

- period from all release points and the individual daily volume of any authorised discharges to waters from all release points;
- (g) details of all maintenance or work carried out on any discharge meter(s) and the impact (if any) on the release volume readings;
 - (h) an evaluation/explanation of the data derived from any monitoring programs;
 - (i) data analyses and interpretation to assess the nature and extent of any contamination and, if so, the level of environmental harm caused as a result of the contamination and the environmentally relevant activity; and
 - (j) an outline of actions taken or proposed to minimise the risk of environmental harm from any condition or elevated contaminant level identified by the monitoring or recording programs.
- (I10) The evaluation and explanation of data for the purposes of the annual monitoring report must be performed by a suitably qualified person.
- (I11) The holder of this environmental authority must continue to conduct monitoring as per that prescribed in Conditions (I12) to (I18) for a minimum of five (5) years after the activities prescribed in Condition (A1) have ceased and submit the results annually in accordance with Condition (I9).

Groundwater Monitoring

- (I12) The Groundwater Monitoring Program, which must be implemented, must be able to detect any significant risks and changes to groundwater quality and level as a result of activities authorised under this environmental authority and must:
- (a) be developed, installed and maintained by a suitably qualified person in the fields of hydrogeology, groundwater sampling design and groundwater monitoring program design;
 - (b) include locations of monitoring points, parameters to be measured, frequency of monitoring, monitoring methodology used, and trigger values;
 - (c) include procedures to establish background groundwater quality;
 - (d) a sufficient number of monitoring sites to provide information on the following:
 - (i) seepage to groundwater and surrounding soils from any regulated dam authorised under this environmental authority and its effect on groundwater and soils; and
 - (ii) background monitoring sites (i.e. groundwater quality in representative bore(s) that have not been affected by the activities authorised under this environmental authority);
 - (e) conduct a geodetic survey of all groundwater monitoring bores to determine the relative water surface elevations, measured to the nearest millimetre in each bore and reported in metres relative to the AHD;
 - (f) determine the hydraulic conductivity, groundwater flow direction and groundwater flow rate; and
 - (g) include a rationale containing details on the program purpose, program conceptualisation and verification of assumptions.
- (I13) All groundwater bores must be installed according to the standards outlined in the latest edition of the Department of Environment and Heritage Protection's *Minimum Construction Requirements for Water Bores in Australia or the Minimum Standards for the Construction and Reconditioning of Water Bores that Intersect the Sediments of Artesian Basins in Queensland*.
- (I14) Groundwater monitoring bores must be constructed by, or under the supervision of a licensed Queensland water bore driller who has the correct endorsements on their licence for the type of activity being performed.
- (I15) The Groundwater Monitoring Program must provide for monitoring of groundwater quality as often as necessary to detect impacts of the petroleum activities authorised under this environmental authority, but not for fewer parameters or less frequently than that specified in *Schedule I, Table 1 – Minimum Groundwater Monitoring Parameters and Monitoring Frequency* and in compliance with Condition (I16).
- (I16) Groundwater samples taken as part of the Groundwater Monitoring Program must be analysed for, but not be limited to, the water quality parameters at the minimum frequencies specified in *Schedule I, Table 1 – Minimum Groundwater Monitoring Parameters and Monitoring Frequency*.

Schedule I, Table 1 – Minimum Groundwater Monitoring Parameters and Monitoring Frequency

Groundwater parameter	Monitoring frequency
Flow [m/hr]	Biannually
Water level to the nearest millimetre [m AHD]	Biannually
Groundwater Pressure in Geological Strata [kPa]	Biannually
pH	Biannually
Electrical conductivity [μ S/m]	Biannually
Total Dissolved Solids [mg/L]	Biannually
Temperature [°C]	Biannually
Dissolved Oxygen [mg/L]	Biannually
Alkalinity as CaCO ₃ [mg/L]	Biannually
Residual Alkali [mg/L]	Biannually
Anions (bicarbonate, carbonate, hydroxide, chloride, fluoride, sulphate) [mg/L]	Biannually
Cations (aluminium, calcium, magnesium, potassium, sodium) [mg/L]	Biannually
Silica [mg/L]	Biannually
Total and dissolved Iron, manganese, zinc, aluminium, boron, copper, phosphorous [mg/L]	Biannually
Ammonia, nitrate, nitrite [m/L]	Biannually
Total Petroleum Hydrocarbons [mg/L]	Biannually
Polycyclic Aromatic Hydrocarbons [mg/L]	Biannually
Benzene, Toulene, Ethyl-benzene, Xylenes (BTEX) [mg/L]	Biannually

- (117) All groundwater monitoring bores must be maintained in an operative condition and be reasonably accessible at all times to any authorised person.
- (118) If groundwater monitoring indicates that any significant changes in groundwater quality caused by petroleum activities are detected, then information must be submitted to the administering authority within 10 business days of receipt of the analysis indicating these changes, including any proposed actions to mitigate the changes in groundwater quality.

Air Monitoring (Point Source)

- (119) The holder of this environmental authority must conduct a monitoring program of contaminants released to the atmosphere at each release point recorded in the register of fuel burning and combustion equipment for the contaminants and efflux velocities listed in *Schedule F, Table 2 - Releases of Contaminants to Air* and at the frequencies specified in *Schedule I, Table 3 – Monitoring Frequency for Contaminants*.

Schedule I, Table 3 – Monitoring Frequency for Contaminants

Contaminant	Monitoring frequency
NO _x as Nitrogen Dioxide	Within three (3) months after commissioning of any fuel burning equipment; and annually thereafter.
Carbon monoxide	

- (120) The monitoring program must include, but not necessarily be limited to:
- monitoring provisions for the release points which complies with the most recent edition of Australian Standard 4323.
 - tests for each sample taken at each release point specified in the register of fuel burning or combustion equipment including:
 - gas velocity, volume and mass flow rate;
 - temperature; and
 - water vapour concentration (for non-continuous sampling);

- (c) representative samples of the contaminants discharged when operating under maximum operating conditions;
- (d) the collection of production rate and plant status during sampling periods; and
- (e) monitoring of contaminant release carried out in accordance with the latest edition of the Department of Environment and Heritage Protection's "Air Quality Sampling Manual" 1997, as amended from time to time.

Monitoring of Contaminant Releases to the Atmosphere

- (I21) When requested by the administering authority, contaminant monitoring and recording must be undertaken to investigate any complaint, and the results notified with 14 days to the administering authority. When monitoring is requested the following must be complied with:
- (a) the holder of this environmental authority must conduct and keep records of a monitoring program of contaminant release to the atmosphere at the release points, frequency, and the parameters specified in *Schedule I, Table 4 – Required Monitoring* which complies with the following:
 - (b) Monitoring provision for the release points listed in *Schedule I, Table 4 – Required Monitoring* must comply with the Australian Standard AS4323.1 – 1995 'Stationary source emissions Method 1: Selection of sampling provisions' or subsequent versions as they become available.
 - (c) The following tests must be performed for each required determination specified in *Schedule I, Table 4 – Required Monitoring* :
 - (i) gas velocity and volume flow rate;
 - (ii) temperature and oxygen content;
 - (iii) water vapour concentration (moisture content).
 - (d) Where practicable samples taken must be representative of the contaminants discharged when emissions are expected to be at maximum rates.
 - (e) During the sampling period the following additional information must be gathered:
 - (i) fuel used;
 - (ii) number of equipment and operating units; and
 - (iii) reference to actual test methods and accuracies.

Schedule I, Table 4a – Required Monitoring

Determination Required	Release Point Numbers	Frequency ²
Mass emission rate (g/s) and concentration (mg/Nm ³) of oxides of nitrogen (NO _x) in the flue gas at the 5% oxygen reference level.	Stacks A1, A2, A3, A4, A5, A6, A7, A14, A15, A16, A17, A18, A19.	Within three months upon the granting of the environmental authority and then annually thereafter

²Note: Out of the seven (7) release points A1 to A7, at least three (3) stacks must be monitored each year on a rotational basis.

Note: This table is only valid until 29 October 2015.

Schedule I, Table 4b – Required Monitoring

Determination Required	Release Point Numbers	Frequency ²
Mass emission rate (g/s) and concentration (mg/Nm ³) of oxides of nitrogen (NO _x) in the flue gas at the 5% oxygen reference level.	Stacks A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A14, A15, A16, A17, A18, A19.	Within three months upon the granting of the environmental authority and then annually thereafter

²Note: Out of the seven (7) release points A1 to A7, at least three (3) stacks must be monitored each year on a rotational basis.

Note: This table comes into effect on 30 October 2015.

Noise Monitoring

- (I22) The holder of this environmental authority must undertake noise monitoring when requested by the administering authority to investigate a complaint of environmental nuisance at a sensitive receptor within the reasonable and practicable timeframe nominated by the administering authority, and report the results to the administering authority within three (3) business days of completion of the monitoring.
- (I23) Noise monitoring and recording must include the following descriptor, characteristics and matters:
- $L_{AN,T}$ (where N equals the statistical levels of 1, 10 and 90 and $T=15$);
 - $L_{Aeq\ adj, 15\ mins}$;
 - background noise level as $L_{A\ 90, T}$;
 - Max $L_{pA, 15\ mins}$
 - the level and frequency of occurrence of impulsive or tonal noise and any adjustment and penalties to statistical levels;
 - atmospheric conditions including temperature, relative humidity and wind speed and directions;
 - effects due to any extraneous factors such as traffic noise;
 - location, date and time of monitoring;
 - if the complaint concerns low frequency noise, Max $L_{pZ, 15\ min}$; and
 - If the complaint concerns low frequency noise, one third octave band measurements in dB(LIN) for centre frequencies in the 10 – 200 Hz range for both the noise source and the background noise in the absence of the noise source.
- (I24) The method of measurement and reporting of noise levels and background sound pressure levels must comply with the latest edition of the administering authority's *Noise Measurement Manual* or the most recent version of Australian Standard 1055 Acoustics – description and measurement of environmental noise.

Nuisance Monitoring (other than Noise)

- (I25) When the administering authority advises the holder of this environmental authority of a complaint alleging nuisance other than noise, the holder must investigate the complaint and advise the administering authority in writing of the action proposed or undertaken to resolve the complaint.
- (I26) When requested by the administering authority, the holder of this environmental authority must undertake monitoring as specified by the administering authority, within a reasonable and practical timeframe nominated by the administering authority to investigate any complaint of environmental harm at any sensitive place.
- (I27) The results of the investigation (including an analysis and interpretation of the monitoring results) and abatement measures implemented must be provided to the administering authority within 10 business days of completion of the investigation, or receipt of the monitoring results, whichever is the latter.
- (I28) If monitoring in accordance with Condition (I26) and (I27), indicates that emissions exceed the limits set in this environmental authority or are causing environmental nuisance, then the holder of this environmental authority must:
- address the complaint including the use of alternative dispute resolution services if required; and/or
 - as soon as practicable implement abatement or attenuation measures so that light, dust, particulate or odour emissions from the authorised activities do not result in further environmental nuisance.

Impact Assessment

- (I29) Notwithstanding any other condition of the environmental authority, the environmental authority does not authorise any environmental harm arising from any release to the atmosphere of any of the contaminants mentioned in *Schedule 1, Table 5 – Contaminants and Benchmarks for Evaluation*.

- (130) For the purpose of ensuring and demonstrating compliance with Condition (I29), the holder of the environmental authority must implement the findings of the evaluation, conducted by a suitably qualified and experienced person and provided to the administering authority, of the potential environmental impacts of the contaminants mentioned in *Schedule I, Table 5 – Contaminants and Benchmarks for Evaluation*. The evaluation addresses all matters relevant to the assessment of potential for environmental impacts to occur and includes, but not be limited to:
- (a) Sampling, monitoring and analysis of the contaminants mentioned in *Schedule I, Table 5 – Contaminants and Benchmarks for Evaluation* for the range of plant operations likely to be encountered:
 - (i) entail sufficient levels of detection to adequately characterise the emissions; and
 - (ii) be representative; and complies with relevant Department of Environment and Heritage Protection's monitoring methods including the quality control requirements inherent in those methods;
 - (b) Using the air pollution dispersion models, an estimation of Ground Level Concentrations at the most sensitive nearest receptor(s) (using efflux velocity, temperature and flow rate) for emissions of the contaminants mentioned in *Schedule I, Table 5 – Contaminants and Benchmarks for Evaluation*;
 - (c) A comparison between the worst case measured emissions with the benchmarks maximum GLC mentioned in *Schedule I, Table 5 – Contaminants and Benchmarks for Evaluation*;
 - (d) The use of methods and guidelines for modelling and assessment of air pollutants approved by the New South Wales Department of Environment and Climate Change or by the Victoria Environmental Protection Agency.

Schedule I, Table 5 – Contaminants and Benchmarks for Evaluation

Contaminant	Averaging Periods	Maximum GLC concentration
Nitrogen dioxide	1 hour – health and wellbeing	250 µg/m ³ (at 0 °C)
	1 year – health and wellbeing	62 µg/m ³ (at 0 °C)
	1 year – health and biodiversity of ecosystems	33 µg/m ³ (at 0 °C)

SCHEDULE J – COMMUNITY ISSUES

- (J1) The holder of this environmental authority must maintain a record of complaints and incidents causing environmental harm, and actions taken in response to the complaint or incident; and
- (J2) The holder of this environmental authority must record the following details for all complaints received and provide this information to the administering authority on request:
- (a) name, address and contact number for complainant;
 - (b) time and date of complaint;
 - (c) reasons for the complaint as stated by the complainant;
 - (d) investigations undertaken in response to the complaint;
 - (e) conclusions formed;
 - (f) actions taken to resolve complaint;
 - (g) any abatement measures implemented to mitigate the cause of the complaint; and
 - (h) name and contact details of the person responsible for resolving the complaint.

SCHEDULE K – NOTIFICATION PROCEDURES

- (K1) The holder of this environmental authority must telephone the administering authority's Pollution Hotline (telephone: 1300 130 372) and any affected landholder, occupier or their nominated representative as soon as practicable, but within 24 hours after becoming aware of:
- (a) any release of contaminants not in accordance with the conditions of this environmental authority;
or
 - (b) any event where environmental harm has been caused or may be caused.
- (K2) Notwithstanding Condition (K1), the holder of this environmental authority must telephone the administering authority's Pollution Hotline (telephone: 1300 130 372) as soon as practicable, but within 24 hours after becoming aware of any non-compliance with any condition of this environmental authority.
- (K3) Notwithstanding condition (K1), the holder of this environmental authority must telephone the local Public Health Unit (<http://www.health.qld.gov.au/cho/default.asp>) as soon as reasonably practicable, but within 24 hours after becoming aware of any release of contaminants not in accordance with condition (B20 and (B21).
- (K4) Subject to Condition (K1), the holder of this environmental authority is required to report in the case of spills of contaminants (including but not limited to hydrocarbons, CSG water or mixtures of both) of the following volumes or kind:
- (a) releases of any volume of contaminants to water; and
 - (b) releases of volumes of contaminants greater than 200L of hydrocarbons, 1000 L of brine or 5000 L of coal seam gas water to land; and
 - (c) releases of any volumes of contaminants where potential serious or material environmental harm has occurred or may occur.
- (K5) The notification of emergencies or incidents as required by Conditions (K1) and (K5) must include but not be limited to the following information:
- (a) the environmental authority number and name of the holder;
 - (b) the tenure type and number where the emergency or incident occurred;
 - (c) the name and telephone number of the designated contact person;
 - (d) the location of the emergency or incident;
 - (e) the date and time that the emergency or incident occurred;
 - (f) the date and time the holder of this environmental authority became aware of the emergency or incident;
 - (g) details of the nature of the event and the circumstances in which it occurred;
 - (h) the estimated quantity and type of any contaminants involved in the incident;
 - (i) the actual or potential suspected cause of the emergency or incident;
 - (j) a description of the land use at the site of the emergency or incident (*eg.* grazing, pasture, forest etc) and/or the name of any relevant surface waters and other environmentally sensitive features;
 - (k) a description of the possible impacts from the emergency or incident;
 - (l) a description of whether stock and/or wildlife were exposed to any contaminants released and measures taken to prevent access for the duration of the emergency or incident;
 - (m) any sampling conducted or proposed, relevant to the emergency or incident;
 - (n) landholder details and details of landholder consultation;
 - (o) immediate actions taken to control the impacts of the emergency or incident and how environmental harm was mitigated at the time of the emergency or incident; and
 - (p) whether further examination/root cause analysis is required and if so, the expected date by when this examination will be completed and reported to the administering authority.
- (K6) Within ten (10) business days following the initial notification of an emergency or incident or receipt of monitoring results or completion of the examination/root cause analysis, whichever is the later, a written report must be provided to the administering authority, including the following (where relevant to the emergency or incident):

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

Fluid Injection Notification

- (K7) The Department of Environment and Heritage Protection must be notified in writing as soon as reasonably practicable, but within 48 hours of becoming aware of:
- (a) migration of injected fluid out of the target formation; or
 - (b) a loss of hydraulic isolation of the target formation; or
 - (c) the detection of groundwater contaminants that were not detected in background samples; or
 - (d) an injection fluid monitoring result that does not comply with any one of the parameters in Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid.

SCHEDULE L DEFINITIONS

Note: Where a term is not defined in this environmental authority the definition in the Environmental Protection Act 1994, its regulations and Environmental Protection Policies or the Petroleum and Gas (Production and Safety) Act 2004 and its regulations must be used in that order.

acid sulfate soils	means soil or sediment containing highly acidic soil horizons or layers affected by the oxidation of iron sulfides (<i>actual acid sulfate soils</i>) and/or soil or sediment containing iron sulfides or other sulfidic material that has not been exposed to air and oxidised (<i>potential acid sulfate soils</i>). The term acid sulfate soil generally includes both actual and potential acid sulfate soils. Actual and potential acid sulfate soils are often found in the same soil profile, with actual acid sulfate soils generally overlying potential acid sulfate soil horizons.
active	for the purposes of landholders' groundwater bores means bores that are able to continue to provide a reasonable yield of water in terms of quantity for the bores authorised purpose or use.
affected land	means land on which an event has caused or threatens serious or material environmental harm.
AHD	means Australian Height Datum.
alternative arrangement	means a written agreement between the holder of this environmental authority and an affected or potentially affected person at a sensitive receptor for a defined noise nuisance impact and may include an agreed period of time for which the arrangement is in place. An agreement for alternative arrangements may include, but not necessarily be limited to a range of noise abatement measures to be installed at a sensitive receptor and/or provision of alternative accommodation for the duration of the defined noise nuisance impact.
analytes	means a chemical parameter determined by either physical measurement in the field or by laboratory analysis.
annual exceedance probability or AEP	means the probability that at least one event in excess of a particular magnitude will occur in any given year.
annual inspection report	means an assessment prepared by a suitably qualified and experienced person containing details of the assessment against the most recent consequence assessment report and design plan (or system design plan); (a) against recommendations contained in previous annual inspections reports; (b) against recognised dam safety deficiency indicators; (c) for changes in circumstances potentially leading to a change in consequence category; (d) for conformance with the conditions of this authority; (e) for conformance with the 'as constructed' drawings; (f) for the adequacy of the available storage in each regulated dam, based on an actual observation or observations taken after 31 May each year but prior to 1 November of that year, of accumulated sediment, state of the containment barrier and the level of liquids in the dam (or network of linked containment systems); (g) for evidence of conformance with the current operational plan
appraisal well	means a petroleum well that is drilled to test the potential of 1 or more natural underground reservoirs for producing or storing petroleum.
Approved quality criteria	for the purposes of residual drilling materials, means the residual drilling material meet the following quality standards: Part A in all cases:

Parameter	Maximum concentration
pH	6 – 10.5 (range)
Electrical Conductivity	20dS/m
Chloride*	8000mg/L

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

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

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

Parameter	Maximum concentration
Arsenic	20mg/kg
Selenium	5mg/kg
Boron	100mg/kg
Cadmium	3mg/kg
Chromium (total)	400mg/kg
Copper	11mg/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	170 mg/kg
C10-C16	150 mg/kg
C16-C34	1300 mg/kg
C34-C40	5600 mg/kg
Total polycyclic aromatic hydrocarbons (PAH)	20 mg/kg
Phenols (halogenated)	1 mg/kg
Phenols (non-halogenated)	60 mg/kg
Monocyclic aromatic hydrocarbons (total sum of benzene, toluene, ethyl benzene, xylenes (includes ortho, para, and meta xylenes) and styrene)	7 mg/kg
Benzene	1 mg/kg

assessed or assessment

by a suitably qualified and experienced person in relation to a consequence assessment of a dam, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit of the assessment:

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

20

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: <ul style="list-style-type: none"> • operations of any kind and all things constructed, erected or installed for that dam; and • any land used for those operations.
authority	means an environmental authority or a development approval.
background noise level	means the sound pressure level, measured in the absence of the noise under investigation, as the L A90,T being the A-weighted sound pressure level exceeded for 90 percent of the measurement time period T of not less than 15 minutes, using Fast response.
bed and banks	for a watercourse or wetland means land over which the water of the watercourse or wetland normally flows or that is normally covered by the water, whether permanently or intermittently; but does not include land adjoining or adjacent to the bed or banks that is from time to time covered by floodwater.
black earth	also known as vertosols and is a soil order of the Australian Soil Classification. These are clay soils with shrink/swell properties that display strong cracks when dry and/or lenticular structural aggregates at depth. They have a high soil fertility and a large water holding capacity.
bore	means a water observation bore or a water supply bore.
brine	means either saline water with a total dissolved solid concentration greater than 40 000mg/l or CSG water after it has been concentrated through water treatment processes and/or evaporation.
bund or bunded	in relation to spill containment systems for fabricated or manufactured tanks or containers designed to a recognised standard means an embankment or wall of brick, stone, concrete or other impervious material which may form part or all of the perimeter of a compound and provides a barrier to retain liquid. Since the bund is the main part of a spill containment system, the whole system (or bunded area) is sometimes colloquially referred to within industry as the bund. The bund is designed to contain spillages and leaks from liquids used, stored or processed above ground and to facilitate clean-up operations. As well as being used to prevent pollution of the receiving environment, bunds are also used for fire protection, product recovery and process isolation.
BTEX	means benzene, toluene, ethylbenzene, xylene.
category A ESA	means any area listed in Schedule 12, Part 1, Section 1 of the Environmental Protection Regulation 2008.
category B ESA	means any area listed in Schedule 12, Part 1, Section 2 of the Environmental Protection Regulation 2008.
category C ESA	means any of the following areas: <ul style="list-style-type: none"> • Nature Refuges as defined under the <i>Nature Conservation Act 1992</i>; • Koala Habitat Areas as defined under the <i>Nature Conservation Act 1992</i>; • State Forests or Timber Reserves as defined under the <i>Forestry Act 1959</i>; • Declared catchment areas under the <i>Water Act 2000</i>; • Resources reserves under the <i>Nature Conservation Act 1992</i> • An area identified as "Essential Habitat" for a species of wildlife listed as endangered, vulnerable, rare or near threatened under the <i>Nature Conservation Act 1992</i>; • An area identified as "Essential Regrowth Habitat" under the <i>Vegetation Management Act 1999</i> for a species of wildlife listed as endangered, vulnerable, rare or near threatened under the <i>Nature Conservation Act 1992</i> for petroleum

	<p>activities that commenced after 8 March 2013 (the date of grant of this environmental authority); and</p> <ul style="list-style-type: none"> • “Of concern” regional ecosystems identified in the database maintained by the Department of Environment and Heritage Protection called ‘Regional ecosystem description database’ containing regional ecosystem numbers and descriptions.
certification	<p>in relation to dams means assessment and approval must be undertaken by a suitably qualified and experienced person in relation to any assessment or documentation required by the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures</i>, including design plans, ‘as constructed’ drawings and specifications, construction, operation or an annual report regarding regulated structures, undertaken in accordance with the Board of Professional Engineers of Queensland Policy Certification by RPEQs (ID: 1.4 (2A)).</p>
certifying, certify, or certified	<p>have a corresponding meaning to certification.</p>
clearing	<p>means:</p> <ul style="list-style-type: none"> • in relation to grass, scrub or bush—the removal of vegetation by disturbing root systems and exposing underlying soil (including burning), but does not include— <ul style="list-style-type: none"> ○ the flattening or compaction of vegetation by vehicles if the vegetation remains living; or ○ the slashing or mowing of vegetation to facilitate access tracks; or ○ the clearing of noxious or introduced plant species; and • in relation to trees—cutting down, ringbarking, pushing over, poisoning or destroying in any way.
“construction or constructed”	<p>in relation to a dam includes building a new dam and modifying or lifting an existing dam, but does not include investigations and testing necessary for the purpose of preparing a design plan.</p>
construction and operational purposes	<p>in relation to the use of coal seam gas water means the construction, use, modification, maintenance, replacement, operation and decommissioning of industrial sites.</p>
coal seam gas water	<p>means underground water brought to the surface of the earth, or otherwise interfered with, in connection with exploring for or producing coal seam gas. Coal seam gas water is a waste, as defined under s13 of the <i>Environmental Protection Act 1994</i>.</p>
consequence	<p>in relation to a structure as defined, means the potential for environmental harm resulting from the collapse or failure of the structure to perform its primary purpose of containing, diverting or controlling flowable substances.</p>
consequence category	<p>means a category, either low, significant or high, into which a dam is assessed as a result of the application of tables and other criteria in the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i>.</p>
critically limited regional ecosystem	<p>means the ecosystems identified in Appendix 5 of the Queensland Biodiversity Offset Policy (Department of Environment and Heritage Protection, 2014).</p>
CSG water dams	<p>include any type of dam (storage or evaporation) used to contain groundwater that is necessarily or unavoidably brought to the surface in the process of coal seam gas exploration or production.</p>
dam	<p>means a land-based structure or a void that contains, diverts or controls flowable substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and associated works.</p>
dam crest volume	<p>means the volume of material (liquids and/or solids) that could be within the walls of a dam at any time when the upper level of that material is at the crest level of that dam. That is, the instantaneous maximum volume within the walls, without regard to flows entering or leaving (for example, via spillway).</p>
deed of agreement	<p>means a legal agreement between the holder of the environmental authority and the administering authority. The deed of agreement governs the obligations of the holder</p>

	of the environmental authority in relation to the <i>Queensland Biodiversity Offset Policy</i> . For clarity, the term deed of agreement in this environmental authority includes any subsequent version or amendment of the signed deed of agreement.
design plan	” is a document setting out how all identified consequence scenarios are addressed in the planned design and operation of a regulated structure.
design storage allowance or DSA	means an available volume, estimated in accordance with the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i> published by the administering authority, must be provided in a dam as at 1 November each year in order to prevent a discharge from that dam to an annual exceedance probability (AEP) specified in that Manual.
development well	means a petroleum well that is drilled to produce or store petroleum.
discharge area	means: (a) that part of the land surface where groundwater discharge produces a net movement of water out of the groundwater; and (b) identified by an assessment process consistent with the document: <i>Salinity Management Handbook</i> , Queensland Department of Natural Resources, 1997; or (c) identified by an approved salinity hazard map held by the Department of Environment and Heritage Protection.
ecosystem functioning	means the interactions between and within living and nonliving components of an ecosystem and generally correlates with the size, shape and location of an area of vegetation.
emergency action plan	means documentation forming part of the operational plan held by the holder or a nominated responsible officer, that identifies emergency conditions that sets out procedures and actions that will be followed and taken by the dam owner and operating personnel in the event of an emergency. The actions are to minimise the risk and consequences of failure, and ensure timely warning to downstream communities and the implementation of protection measures. The plan must require dam owners to annually update contact.
enclosed flare	means a device where the residual gas is burned in a cylindrical or rectilinear enclosure that includes a burning system and a damper where air for the combustion reaction is admitted.
end	means the stopping of the particular activity that has caused a significant disturbance in a particular area. It refers to, among other things, the end of a seismic survey or the end of a drilling operation. It does not refer to the end of all related activities such as rehabilitation. In other words, it does not refer to the ‘completion’ of the petroleum activity, the time at which the petroleum authority ends or the time that the land in question ceases to be part of an authority.
equivalent person” or “EP	means an equivalent person under volume 1, section 2 of the <i>Guidelines for Planning and Design of Sewerage Schemes</i> , October 1991, published by the Water Resources Commission, Department of Primary Industries, Fisheries and Forestry.
evaporation dam	means a land based structure designed to contain or impound CSG water, the purpose of which is to contain or impound the water, until the water content has been removed by evaporation.
existing structure	means a structure that was in existence or whose design plan has substantially commenced, prior to the adoption of this schedule of conditions under the authority (12 August 2014).
exploring for petroleum	means carrying out an activity for the purpose of finding petroleum or natural underground reservoirs as per section 14 of the <i>Petroleum and Gas (Production and Safety) Act 2004</i> for example including: (a) conducting a geochemical, geological or geophysical survey (b) drilling a well (c) carrying out testing in relation to a well taking a sample for chemical or other analysis

fill	means any kind of material in solid form (whether or not naturally occurring) capable of being deposited at a place but does not include material that forms a part of, or is associated with, a structure constructed in a watercourse, wetland or spring including a bridge, road, causeway, pipeline, rock revetment, drain outlet works, erosion prevention structure or fence.
flare pit	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.
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.
foreseeable future	means the period used for assessing the total probability of an event occurring. Permanent structures and ecological sustainability should be expected to still exist at the end of a 150 year foreseeable future with an acceptably low probability of failure before that time.
hazard	in relation to a dam as defined, means the potential for environmental harm resulting from the collapse or failure of the dam to perform its primary purpose of containing, diverting or controlling flowable substances.
heritage place	means any place that may be of cultural heritage significance, or any place with potential to contain archaeological artefacts that are an important source of information about Queensland's history.
high bank	means the defining terrace or bank or, if no bank is present, the point on the active floodplain, which confines the average annual peak flows in a watercourse.
highly erodible soils	means very unstable soils that are generally described as Sodosols with hard –setting, fine sandy loam to silty clay loam surfaces (solodics, solodised solonetz and solonetz) or soils with a dispersible layer located less than 25cm deep or soils less than 25cm deep.
holder	means: (a) where this document is an environmental authority, any person who is the holder of, or is acting under, that environmental authority; or (b) where this document is a development approval, any person who is the registered operator for that development approval.
hub	means more than one large compressor station and multiple items of fuel burning or combustion units located within three (3) km of each other and capable of burning fuel at a rate >500 kg/hr.
hydraulic performance	means the capacity of a regulated dam to contain or safely pass flowable substances based on the design criteria specified for the relevant consequence category in the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i> .
impacts to mapped State significant biodiversity values	means to have a negative effect on a State significant biodiversity value, as identified by the Queensland Biodiversity Offset Policy (Department of Environment and Heritage Protection, 2014) Examples may include, but are not necessarily limited to residual impact from: <ul style="list-style-type: none"> clearing, removal or fragmentation of vegetation interference or disturbance of fauna habitat
impacts to watercourse, wetland, lake or spring with state significant biodiversity values	means to have a negative effect on a watercourse, wetland, lake or spring with state significant biodiversity values as identified in Appendix 1 of the <i>Queensland Biodiversity Offsets Policy</i> (Department of Environment and Heritage Protection, 2014) resulting from petroleum activities that commenced after 8 March 2013.

impulsive sound	means sound characterised by brief excursions of sound pressure (acoustic impulses) that significantly exceed the background sound pressure. The duration of a single impulsive sound is usually less than one second.
infrastructure	means water storage dams, roads and tracks, equipment, buildings and other structures built for the purpose and duration of the conduct of the petroleum activities, but does not include other facilities required for the long term management of the impact of those activities or the protection of potential resources. Such other facilities include dams other than water storage dams (e.g. evaporation dams), pipelines and assets, that have been decommissioned, rehabilitated, and lawfully recognised as being subject to subsequent transfer with ownership of the land.
irrigation	means the application of water to any agricultural or silvicultural crop or to a garden cultivated for domestic use.
LA _{eq, adj, 15 mins}	means an A-weighted sound pressure level of a continuous steady sound, adjusted for tonal character, that within a 15 minute period has the same square sound pressure as a sound level that varies with time.
lake	means: (a) a lagoon, swamp or other natural collection of water, whether permanent or intermittent; and (b) the bed and banks and any other element confining or containing the water.
land-based offset	means direct offsets, indirect offsets, and offset transfers.
landfill monocell	means a specialised, isolated landfill facility where a single specific waste type is exclusively disposed (i.e. salt).
leachate	means a liquid that has passed through or emerged from, or is likely to have passed through or emerged from, a material stored, processed or disposed of on site which contains soluble, suspended or miscible contaminants likely to have been derived from the said material.
legally secured	in relation to <u>land-based offsets</u> means any of the following legally binding mechanisms: <ul style="list-style-type: none"> • gazettal as a protected area (e.g., a nature refuge) under the <i>Nature Conservation Act 1992</i>; • declaration of an area of high nature conservation values under the <i>Vegetation Management Act 1999</i>; • use of a covenant under the <i>Land Title Act 1994</i> or <i>Land Act 1994</i>; or • another mechanism administered and approved by the State.
levee	means a dyke or bund that is designed only to provide for the containment and diversion of stormwater or flood flows from a contributing catchment, or containment and diversion of flowable materials resulting from unplanned releases from other works of infrastructure, during the progress of those stormwater or flood flows or those unplanned releases; and does not store any significant volume of water or flowable substances at any other times.
limited petroleum activities	mean only activities including: <ul style="list-style-type: none"> (a) geophysical surveys (including seismic activities); (b) well sites; (c) well pads; (d) sumps; (e) flare pits; (f) flow lines; and (g) supporting access tracks. <p>For clarity, limited petroleum activities do not include:</p> <ul style="list-style-type: none"> (a) the construction of infrastructure for processing or storing petroleum or by-products; (b) dams; (c) compressor stations;

	(d) campsites/workforce accommodation; (e) power supplies; (f) waste disposal; or other supporting infrastructure for the project.
linear infrastructure	means powerlines, pipelines, roads and access tracks.
livestock watering purposes	means the supply of water to any livestock.
long term noise event	is a noise exposure, when perceived at a sensitive receptor, persists for a period of greater than five (5) days, even when there are respite periods when the noise is inaudible within those five (5) days.
low consequence dam	means any dam that is not a high or significant consequence category as assessed using the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i> .
mandatory reporting level or MRL	means a warning and reporting level determined in accordance with the criteria in the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i> published by the administering authority.
manual	means the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i> published by the administering authority.
mapped State significant biodiversity values	means the regional ecosystems, essential habitat, wetlands, watercourses, legally secured offset areas and connectivity areas provided in Appendix 1 of the <i>Queensland Biodiversity Offset Policy</i> (Department of Environment and Heritage Protection, 2014) that are mapped in State mapping.
Max L_{pZ} , 15 min	means the maximum value of the Z-weighted sound pressure level measured over 15 minutes.
Max L_{pA} , 15 min	means the absolute maximum instantaneous A-weighted sound pressure level, measured over 15 minutes.
mg/L	means milligrams per litre.
medium term noise event	is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than five days and does not re-occur for a period of at least four weeks. Re-occurrence is deemed to apply where a noise of comparable level is observed at the same receptor location for a period of one hour or more, even if it originates from a difference source or source location.
meter	means a device for measuring, or giving an output signal proportional to, quantities of water passed and/or the rate of flow in a pipe."
mix-bury-cover method	means the stabilisation of residual drilling solids in the bottom of a sump by mixing with subsoil and which occurs in accordance with the following methodology: <ul style="list-style-type: none"> • 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 ($k_w=10-8m/s$) or subsoil with a clay content of greater than 20%; and • the residual solids is mixed with subsoil in the sump and cover; and • the subsoil and residual solids is mixed at least three parts subsoil to one part waste (v/v); and • a minimum of one metre of clean subsoil must be placed over the subsoil and residual solids mixture; and • topsoil is replaced.
modification or modifying	(see definition of 'construction').

Offset Area Management Plan (OAMP)	means a plan that meets the requirements listed under the heading 'Specific requirements for offset area management plans' in Criteria A3 – Information requirement of the Queensland Biodiversity Offset Policy (Department of Environment and Heritage Protection, 2014).
operational plan	includes: (a) normal operating procedures and rules (including clear documentation and definition of process inputs in the DSA allowance); (b) contingency and emergency action plans including operating procedures designed to avoid and/or minimise environmental impacts including threats to human life resulting from any overtopping or loss of structural integrity of the regulated structure.
overland flow water	means water, including floodwater, flowing over land, otherwise than in a watercourse or lake: <ul style="list-style-type: none">• after having fallen as rain or in any other way; or• after rising to the surface naturally from underground.
permanent infrastructure	includes any infrastructure (roads, tracks, bridges, culverts, dams, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads, pipelines etc), which is to be left by agreement with the landowner.
pest	means species: (a) declared under the <i>Land Protection (Pest and Stock route Management) Act 2002</i> ; (b) declared under Local Government model local laws; and (c) which may become invasive in the future.
populated area	includes towns and cities which have a population of 500 or more people and with a minimum density of 40 people/km ² .
prescribed storage gases	has the meaning provided in section 12 of the <i>Petroleum and Gas (Production and Safety) Act 2004</i> .
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 associated water for a petroleum tenure.
quarter	means the following periods of a calendar year: <ul style="list-style-type: none">• 1 January to 31 March inclusive;• 1 April to 30 June inclusive;• 1 July to 30 September inclusive; and• 1 October to 31 December inclusive.
Register of Regulated Dams	includes: (a) Date of entry in the register; (b) Name of the dam, its purpose and intended/actual contents; (c) The consequence category of the dam as assessed using the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635); (d) Dates, names, and reference for the design plan plus dates, names, and reference numbers of all document(s) lodged as part of a design plan for the dam; (e) Name and qualifications of the suitably qualified and experienced person who certified the design plan and 'as constructed' drawings; (f) For the regulated dam, other than in relation to any levees – (i) The dimensions (metres) and surface area (hectares) of the dam measured at the footprint of the dam; (ii) Coordinates (latitude and longitude in GDA94) within five metres at any point from the outside of the dam including its storage area (iii) Dam crest volume (megalitres); (iv) Spillway crest level (metres AHD). (v) Maximum operating level (metres AHD); (vi) Storage rating table of stored volume versus level (metres AHD);

	<p>(vii) Design storage allowance (megalitres) and associated level of the dam (metres AHD);</p> <p>(viii) Mandatory reporting level (metres AHD);</p> <p>(g) The design plan title and reference relevant to the dam;</p> <p>(h) The date construction was certified as compliant with the design plan;</p> <p>(i) The name and details of the suitably qualified and experienced person who certified that the constructed dam was compliant with the design plan;</p> <p>(j) Details of the composition and construction of any liner;</p> <p>(k) The system for the detection of any leakage through the floor and sides of the dam;</p> <p>(l) Dates when the regulated dam underwent an annual inspection for structural and operational adequacy, and to ascertain the available storage volume for 1 November of any year;</p> <p>(m) Dates when recommendations and actions arising from the annual inspection were provided to the administering authority;</p> <p>Dam water quality as obtained from any monitoring required under this authority as at 1 November of each year.</p>
regulated dam	means any dam in the significant or high consequence category as assessed using the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i> published by the administering authority.
regulated structure	includes land-based containment structures, levees, bunds and voids, but not a tank or container designed and constructed to an Australian Standard that deals with strength and structural integrity.
rehabilitation	means the process of reshaping and revegetating land to restore it to a stable landform and in accordance with the acceptance criteria set out in this environmental authority and, where relevant, includes remediation of contaminated land.
relevant offset objectives	means the relevant criteria listed under the heading 'When an offset ceases to have effect' in Criteria A2 – Legally securing biodiversity offsets of the Queensland Biodiversity Offset Policy (Department of Environment and Heritage Protection, 2014).
relevant offset rules	means the relevant criteria included in the Queensland Biodiversity Offset Policy (Department of Environment and Heritage Protection, 2014) including but not necessarily limited to: <ul style="list-style-type: none"> • for all offsets, the relevant criteria of Criteria B1 – Offset Rules except where an offset payment is used for which Part A and Part B Criteria do not apply; and • for land-based offsets, the relevant criteria of Criteria B1 – Offset Rules as well as Criteria A1 – Obtaining Ecological Equivalence.
remnant unit	means a continuous area of remnant vegetation representative of a single Regional Ecosystem type or a single heterogeneous unit (multiple Regional Ecosystem types that cannot be distinguished individually due to the scale of mapping).
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.
sensitive place	means: <ul style="list-style-type: none"> • a dwelling (including residential allotment, mobile home or caravan park, residential marina or other residential premises, motel, hotel or hostel); or • a library, childcare centre, kindergarten, school, university or other educational institution; • a medical centre, surgery or hospital; or • a protected area; or • a public park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment; or • a work place used as an office or for business or commercial purposes, which is not part of the petroleum activities and does not include employees accommodation or public roads.

sensitive receptor	means an area or place where noise (including low frequency, vibration and blasting) is measured investigate whether nuisance impacts are occurring and includes: <ul style="list-style-type: none"> • a dwelling (including residential allotment, mobile home or caravan park, residential marina or other residential premises, motel, hotel or hostel; or • a library, childcare centre, kindergarten, school, university or other educational institution; • a medical centre, surgery or hospital; or • a protected area; or • a public park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment; or • a work place used as an office or for business or commercial purposes, which is not part of the petroleum activities and does not include employees accommodation or public roads.
short term noise event	is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than eight hours and does not re-occur for a period of at least seven days. Re-occurrence is deemed to apply where a noise of comparable level is observed at the same receptor location for a period of one hour or more, even if it originates from a different source or source location.
significantly disturbed land or significant disturbance to land	has the meaning in Schedule 12, section 4 of the Environmental Protection Regulation 2008. Land is significantly disturbed if— <p>(a) it is contaminated land; or</p> <p>(b) it has been disturbed and human intervention is needed to rehabilitate it—</p> <p>(i) to a condition required under the relevant environmental authority; or</p> <p>(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.</p>
site	means the petroleum authority(ies) to which the environmental authority relates.
spillway	means a weir, channel, conduit, tunnel, gate or other structure designed to permit discharges from the dam, normally under flood conditions or in anticipation of flood conditions.
spring	means the land to which water rises naturally from below the ground and the land over which the water then flows.
stable	in relation to land, means landform dimensions are or will be stable within tolerable limits now and in the foreseeable future. Stability includes consideration of geotechnical stability, settlement and consolidation allowances, bearing capacity (trafficability), erosion resistance and geochemical stability with respect to seepage, leachate and related contaminant generation.
state heritage place	means a place entered in the Queensland heritage register under Part 4 of the <i>Queensland Heritage Act 1992</i> .
State significant biodiversity values	means those regional ecosystems, essential habitat, wetlands, watercourses, legally secured offset areas and connectivity areas provided in Appendix 1 of the Queensland Biodiversity Offsets Policy (Department of Environment and Heritage Protection, 2014).
stimulation	means a technique used to increase the permeability of a natural underground reservoir, including for example, cavitation, hydraulic fracturing/hydrofracturing, fracture acidizing and the use of proppant treatments.
structure	means dam or levee.

suitably qualified person	means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis to performance relative to the subject matter using the relevant protocols, standards, methods or literature.
suitably qualified and experienced person	<p>in relation to regulated structures means a person who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the <i>Professional Engineers Act 2002</i>, and has demonstrated competency and relevant experience:</p> <ul style="list-style-type: none"> • for regulated dams, an RPEQ who is a civil engineer with the required qualifications in dam safety and dam design. • for regulated levees, an RPEQ who is a civil engineer with the required qualifications in the design of flood protection embankments. <p>Note: It is permissible that a suitably qualified and experienced person obtain subsidiary certification from an RPEQ who has demonstrated competence and relevant experience in either geomechanics, hydraulic design or engineering hydrology.</p>
system design plan	means a plan that manages an integrated containment system that shares the required DSA and/or ESS volume across the integrated containment system.
third party auditor	means a suitably qualified person who is either a certified third party auditor or an internal auditor employed by the holder of the environmental authority and the person is independent of the day to day management and operation of activities covered by this environmental authority.
threatening processes	means processes, features and actions that can have a detrimental effect upon the health and viability of an area of vegetation. For example altered hydrology, land use practices, invasion by pest and weed species, land degradation, edge effects and fragmentation.
threshold regional ecosystem	means the ecosystems identified in Appendix 6 of the Queensland Biodiversity Offset Policy (Department of Environment and Resource Management, 2011).
tolerable limits	means a range of parameters regarded as being sufficient to meet the objective of protecting relevant environmental values. For example, a range of settlement for a failings capping, rather than a single value, could still meet the objective of draining the cap quickly, preventing damage and limiting infiltration and percolation.
topsoil	means the surface (top) layer of a soil profile, which is more fertile, darker in colour, better structured and supports greater biological activity than underlying layers. The surface layer may vary in depth depending on soil forming factors, including parent material, location and slope, but generally is not greater than about 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.
unacceptable risk	is when the results of a hazard assessment indicates that there is both a high consequence and a high likelihood of an event occurring such that the risk is classified as "high", "very high" or "extreme".
valid complaint	means a complaint the administering authority considers is not frivolous, nor vexatious, nor based on mistaken belief.
void	means any constructed, open excavation in the ground.
watercourse	has the meaning provided in s 5 of the <i>Water Act 2000</i> and includes the bed and banks and any other element of a river, creek or stream confining or containing water.
watercourse, wetland, lake or spring with State significant biodiversity values	are those described in Appendix 1 of the <i>Queensland Biodiversity Offsets Policy</i> (Department of Environment and Heritage Protection, 2014).

waters	includes all or any part of a river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water in natural or artificial watercourses, bed and banks of a watercourse, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and groundwater.
well lease infrastructure	means infrastructure required for the construction and completion of a well including but not limited to cellar pits, dams and drill sumps.
wetland	means an area shown as a wetland on a 'Map of referable wetlands', a document approved by the chief executive (environment). A map of referable wetlands can be viewed at www.ehp.qld.gov.au
wild river declaration	means a statutory instrument under the <i>Wild Rivers Act 2005</i> . A declaration lists the relevant natural values to be preserved and delineates certain parts of the wild river area and the different constraints that may apply in these areas. With reference to environmental authorities for petroleum, each declaration also specifies conditions to be included in a new authority if the activity is to be located within the wild river area.
20th percentile release limits	means that not more than four (4) of the measured values is to exceed the stated release limit for any five (5) consecutive samples where: (1) the consecutive samples are taken over a five (5) month period; and (2) the consecutive samples are taken at approximately equal periods.
25th percentile release limits	means that not more than three (3) of the measured values is to exceed the stated release limit for any four (4) consecutive samples where: (1) the consecutive samples are taken over a four (4) month period; and (2) the consecutive samples are taken at approximately equal periods.
75th percentile release limits	means that not more than one (1) of the measured values is to exceed the stated release limit for any four (4) consecutive samples where: (1) the consecutive samples are taken over a four (4) month period; and (2) the consecutive samples are taken at approximately equal periods.
80th percentile release limits	means that not more than one (1) of the measured values is to exceed the stated release limit for any five (5) consecutive samples where: (1) the consecutive samples are taken over a five (5) month period; and (2) the consecutive samples are taken at approximately equal periods.

End of Conditions

Department of Environment and Heritage Protection

Permit¹

Environmental Protection Act 1994

Environmental authority

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

Permit¹ number: EPPG00972513

Project Name: Dalby Expansion Project

Environmental authority takes effect 08 November 2016

The anniversary date of this environmental authority is **17 December**. An annual return and the payment of the annual fee will be due each year on this day.

Environmental authority holder(s)

Name	Registered address
Arrow Energy Pty Ltd ACN: 078 521 936	Level 39 111 Eagle Street BRISBANE CITY QLD 4000
Australian CBM Pty Ltd ACN: 067 312 029	Level 39 111 Eagle Street BRISBANE CITY QLD 4000
Arrow CSG (Australia) Pty Ltd ACN: 054 260 650	Level 39 111 Eagle Street BRISBANE CITY QLD 4000
Arrow (Tipton) Pty Ltd ACN: 114 927 507	Level 39 111 Eagle Street BRISBANE CITY QLD 4000
Arrow (Tipton Two) Pty Ltd ACN: 117 853 755	Level 39 111 Eagle Street BRISBANE CITY QLD 4000
Arrow (Daandine) Pty Ltd ACN: 114 927 481	Level 39 111 Eagle Street BRISBANE CITY QLD 4000
Stanwell Corporation Limited ACN: 078 848 674	Level 13 42 Albert Street BRISBANE CITY QLD 4000

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



Environmentally relevant activity and location details

Environmentally relevant activity(ies)	Location(s)
<p>Resource activity that is a petroleum activity prescribed in Schedule 2A of the <i>Environmental Protection Regulation 2008</i>:</p> <p>6 – a petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam</p> <p>7 – a petroleum activity involving injection of a waste fluid into a natural underground reservoir or aquifer</p> <p>8 – a petroleum activity or GHG storage activity, other than a petroleum activity an activity mentioned in any of items 1 to 7, that includes 1 or more activities mentioned in schedule 2 for which an aggregate environmental score is stated, namely:</p> <p>Electricity generation – generating electricity by using gas at a rated capacity of 10MW electrical or more</p> <p>Fuel burning – using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour</p> <p>Waste disposal – operating a facility for disposing of, in a year, more than 200 000t of regulated waste and any, or any combination, of the following –</p> <p>(a) general waste;</p> <p>(b) limited regulated waste;</p> <p>(c) if the facility is in a scheduled area – no more than 5t of untreated clinical waste in a year</p> <p>Sewage treatment – operating sewage treatment works, other than no-release works, with a total daily peak design capacity of more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme</p> <p>Water treatment – desalinating, in a day, more than 5ML of water, allowing the release of waste to waters other than seawater</p>	<p>Petroleum Lease (PL) 194</p> <p>PL198</p> <p>PL230</p> <p>PL238</p> <p>PL252</p> <p>PL258</p> <p>PL260</p>

Additional information for applicants**Environmentally relevant activities**

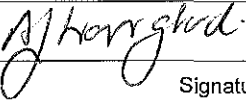
The description of any environmentally relevant activity (ERA) for which an environmental authority is issued is a restatement of the ERA as defined by legislation at the time the approval is issued. Where there is any inconsistency between that description of an ERA and the conditions stated by an environmental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

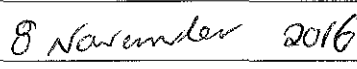
An environmental authority authorises the carrying out of an ERA and does not authorise any environmental harm unless a condition stated by the authority specifically authorises environmental harm.

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

Contaminated land

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


Signature


Date

Andrew Langford

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

Enquiries:

Petroleum and Gas (Assessment)
Department of Environment
and Heritage Protection
Floor 7, 400 George Street
GPO Box 2454
BRISBANE QLD 4001
Phone: (07) 3330 5715
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This environmental authority consists of the following schedules:

Schedule A	General Conditions
Schedule B	Water
Schedule BE	Coal Seam Gas Water Injection Trial
Schedule C	Regulated Dams
Schedule D	Land
Schedule E	Environmental Nuisance
Schedule F	Air
Schedule G	Waste
Schedule H	Rehabilitation
Schedule I	Monitoring Programs
Schedule J	Community Issues
Schedule K	Notification Procedures
Schedule L	Definitions

SCHEDULE A – GENERAL CONDITIONS

Authorised Petroleum Activities

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

Schedule A, Table 1 – Authorised Petroleum Activities

Petroleum Activity(ies)	Total Number of Authorised Petroleum Activities	Maximum Disturbance Authorised
Seismic	NA	120 ha
Total coal seam gas wells, including: <ul style="list-style-type: none"> • Core wells • Exploration wells • Development wells • Production wells 	691	691 wells 691 ha
Injection well(s) and associated facilities	1	4 ha
Compressor units	40	40 units, 8 ha
Central gas processing facilities	2	2 facilities, 8 ha
Regulated structures	22	22 dams
Water treatment facilities	2	12 ML/d (each), 2 ha
Sewage treatment plants	2	< 450 EP (each), 0.15 ha
Power stations	1	40 MW, 1.2 ha

Prevent or Minimise Likelihood of Environmental Harm

(A2) This environmental authority does not authorise environmental harm unless a condition contained in this environmental authority explicitly authorises that harm. Where there is no condition, the lack of a condition shall not be construed as authorising harm.

Maintenance of Measures, Plant and Equipment

(A3) The holder of the environmental authority must:

- (a) install all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority;
- (b) maintain such measures, plant and equipment in their proper and effective condition; and
- (c) operate such measures, plant and equipment in a proper and effective manner.

(A4) No change, replacement or alteration of any plant or equipment is permitted if the change, replacement or alteration materially increases, or is likely to increase, the environmental harm caused by the petroleum activity.

Financial Assurance

- (A5) Petroleum activities that cause significant disturbance to land must not be carried out until financial assurance has been given to the administering authority as security for compliance with the environmental authority and for any costs or expenses, or likely costs or expenses, mentioned in section 298 of the *Environmental Protection Act 1994*.
- (A6) Prior to any changes in petroleum activities which would result in an increase to the maximum significant disturbance since financial assurance was last given to the administering authority, the holder of the environmental authority must amend the financial assurance and give the administering authority the increased amount of financial assurance.

Existing petroleum activities

- (A7) Conditions (D2) to (D17) and (D33) to (D36) in the Land Schedule relating to disturbance, only apply to petroleum activities which commenced after 15 March 2011 subject to the holder of the environmental authority having complied with all disturbance conditions of the relevant environmental authority that applied at the time the existing petroleum activity was constructed.

Third Party Audit

- (A8) A third party auditor, nominated by the holder of this environmental authority and accepted by the administering authority, must audit compliance with the conditions of this environmental authority at a minimum frequency of every three (3) years.
- (A9) Notwithstanding Condition (A7) and prior to undertaking the third party audit, the scope and content of the third party audit can be negotiated with the administering authority.

Note: Where minimal activities have been undertaken on a tenure, the negotiation of the scope of the third party audit may also include the postponing of the third party audit to an agreeable time between the holder of this environmental authority and the administering authority.

- (A10) An audit report of the audit required by Condition (A8) must be prepared and certified by the third party auditor presenting the findings of each audit carried out.
- (A11) The financial cost of the third party audit is to be borne by the holder of this environmental authority.
- (A12) The holder of this environmental authority must act upon any recommendations arising from the audit report by:
- (a) investigating any non-compliance issues identified; and
 - (b) as soon as practicable, implementing measures or taking necessary action to ensure compliance with the requirements of this environmental authority.
- (A13) Subject to Condition (A12), and not more than 60 business days following the submission of the audit report, the holder of this environmental authority must provide a written report to the administering authority addressing the:
- (a) actions taken by the holder to ensure compliance with this environmental authority; and
 - (b) actions taken to prevent a recurrence of any non-compliance issues identified.

- (A14) The audit report required by Condition (A10) and the written response to the audit report required by Condition (A13) must be submitted to the administering authority with the subsequent annual return.

Contingency Plan for Emergency Environmental Incidents

- (A15) A contingency plan for emergency environmental incidents which includes but is not limited to the impacts of flooding and the injection of treated CSG water, must be developed and implemented to respond to environmental emergency events and incidents where environmental harm is caused or threatened.
- (A16) The contingency plan for emergency environmental incidents required under Condition (A15) must address the following matters as a minimum:
- (a) a clear definition of what constitutes an environmental emergency incident for the activity;
 - (b) identification of the types of environmental incidents that may occur, relevant to the activities authorised to be carried out under this environmental authority;
 - (c) response procedures to be implemented to prevent or minimise the risk of environmental harm arising from environmental emergency incidents;
 - (d) response procedures to minimise the extent and duration of environmental harm caused by environmental emergency incidents;
 - (e) the practices and procedures to be employed to restore the environment or mitigate any environmental harm caused;
 - (f) communication procedures and lines of communication within and beyond the organisation to be employed in responding to environmental emergency incidents;
 - (g) the resources to be used in response to environmental emergency incidents;
 - (h) procedures to investigate the cause of any incidents, including releases, and where necessary, the remedial actions to be implemented to reduce the likelihood of recurrence of similar events;
 - (i) a receiving environment monitoring program (REMP) to be specifically implemented in the event of an unauthorised release to waters or land to examine and assess environmental impacts. For monitoring of waters, this program must include upstream, downstream and impact site monitoring procedures. For soils monitoring, sufficient samples must be taken from the soil profile at both a reference site and the impact site as a minimum;
 - (j) the provision and availability of documented procedures to staff attending any emergency environmental incident to enable them to effectively respond;
 - (k) training of staff that will be called upon to respond to emergency environmental incidents to enable them to effectively respond;
 - (l) timely and accurate reporting of the circumstance and nature of emergency environmental incidents to the administering authority in accordance with conditions of this environmental authority;
 - (m) procedures for accessing monitoring points during emergency environmental incidents; and
 - (n) procedures to notify any potentially impacted stakeholder who may be affected by an environmental emergency incident.

Documentation and Records Management

- (A17) All records and results required by the conditions of this environmental authority must be kept for a minimum of five (5) years.
- (A18) All documentation required by this environmental authority (including but not limited to plans, systems, programs, procedures, results of audits, assessments, monitoring, inspections and complaint records) must be made available to the administering authority upon request.

Cultural Heritage

(A19) In the carrying out of the petroleum activity the holder of this environmental authority must not adversely impact on the cultural heritage values of any place registered on the Queensland Heritage Register.

Underground Gas Storage

(A20) Testing, evaluating, developing and using natural underground reservoirs for petroleum storage or to store prescribed storage gases is not authorised under this environmental authority.

Stimulation of Underground Reservoirs

(A21) The stimulation of underground reservoirs is prohibited under this environmental authority.

Encapsulation of Solid Salt in a Landfill Monocell

(A22) The disposal of solid salt on site, including encapsulation of solid salt in a landfill monocell, is prohibited under this environmental authority.

SCHEDULE B – WATER**Contaminant Release**

- (B1) Contaminants that will or may cause environmental harm must not be directly or indirectly released to any waters except as authorised by Condition (B15).
- (B2) The release of contaminants directly or indirectly to waters authorised by Condition (B15):
- (a) must not produce any visible plume within the receiving waters; and
 - (b) must not produce any slick or other visible or odorous evidence of oil, grease or petrochemicals nor contain visible floating oil, grease, scum, litter or other objectionable matter.

Erosion and Sediment Control

- (B3) For activities involving significant disturbance to land, control measures that are commensurate to the sitespecific 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).

Maintenance and Cleaning

- (B4) The maintenance and cleaning of vehicles and any other equipment or plant must be carried out in areas from where the resultant contaminants cannot be released into any waters, roadside gutter or stormwater drainage system.

Watercourses, Wetlands and Springs

- (B5) In the carrying out of the petroleum activity the holder of this environmental authority must not clear vegetation or place fill, in or within:
- (a) 200 metres from any natural significant wetland;
 - (b) 100 metres from any natural wetland, lakes or springs; or
 - (c) 100 metres of the high bank of any other watercourse.
- (B6) The holder of this environmental authority must not excavate or place fill in a way that interferes with the flow of water in a watercourse, wetland, or spring, including works that divert the course of flow of the water or works that impound the water.
- (B7) Despite Conditions (B5) and (B6), pipeline and road construction works may be undertaken in watercourses, wetlands or springs where there is no reasonable and practicable alternative (such as the use of horizontal directional drilling methods), provided that the works are conducted in accordance with the following order of preference:
- (a) conducting work in times of no flow; and
 - (b) using all reasonable and practicable measures to reduce impacts in times of flow.

- (B8) Activities or works resulting in significant disturbance to the bed or banks of a watercourse or wetland, or a spring must:
- (a) only be undertaken where necessary for the construction and/or maintenance of roads, tracks and pipelines that are essential for carrying out the authorised petroleum activities and no reasonable or practicable alternative location exists;
 - (b) be no greater than the minimum area necessary for the purpose of the significant disturbance;
 - (c) be designed and undertaken by a suitably qualified person taking into account the matters listed in Section 5 - Planning Activities and Section 6 - Impact Management During Activities of the Department of Environment and Heritage Protection's "*Guideline – Activities in a watercourse, lake or spring associated with mining operations*" dated April 2008, or more recent editions as such become available; and
 - (d) upon cessation of the activities or works, commence rehabilitation immediately such that the final rehabilitation is to a condition that will ensure the ongoing physical integrity and the natural ecosystem values of the site.
- (B9) Sediment control measures must be implemented to minimise any increase in water turbidity due to carrying out petroleum activities in the bed or banks of a watercourse or wetland, or a spring.
- (B10) Routine, regular and frequent visual monitoring must be undertaken while carrying out construction work and/or any maintenance of completed works in a watercourse, wetland or spring.
- (B11) If, due to the petroleum activities, water turbidity increases in the watercourse, wetland or spring outside contained areas, works must cease and the sediment control measures must be rectified to limit turbidity before activities recommence.
- (B12) All measures must be taken to minimise adverse impacts to or reversal of any river improvement works carried out in River Improvement Areas by Queensland's River Improvement Trusts.

Note: Locations and details of River Improvement Areas and River Improvement Trusts are provided in the Schedule to the River Improvement Trust Regulation 1998.

Floodplains

- (B13) Where petroleum activities are carried out on floodplain areas, the holder of this environmental authority must ensure that petroleum and incidental activities do not:
- (a) concentrate flood flows that cause or threaten an adverse environmental impact;
 - (b) divert flood flows from natural drainage paths and alter flow distribution;
 - (c) increase the local duration of floods;
 - (d) increase the risk of detaining flood flows;
 - (e) pose an unacceptable risk to the safety of persons from flooding; or
 - (f) pose an unacceptable risk of damage to property from flooding.

Groundwater

- (B14) The extraction of groundwater as part of the petroleum activity from underground aquifers must not directly or indirectly cause environmental harm to any spring, wetland or other surface waters.

Release to Waters of Treated CSG Water

(B15) The release of treated CSG water is authorised to occur in accordance with *Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters* and *Schedule B Table 2 – Treated CSG Water Release Limits for Monitoring Point (M1)*.

Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters

Water Source and Location	Release Point	Location	Monitoring Point	Receiving Waters Description
Treated CSG Water from the reverse osmosis water treatment plant and treated water dam located on PL230	R1, defined as the outlet of discharge pipe to Wilkie Creek	6,995,465 N303,004 E (Easting and northing locations given as per GDA94, Map Zone 56)	M1, defined as the sample point in the discharge pipeline point to release into Wilkie Creek	Wilkie Creek

(B16) The quality of the treated CSG water being released must comply with each quality characteristic release limit and limit type and the monitoring frequency specified in *Schedule B, Table 2 – Treated CSG Water Release Limits for Monitoring Point (M1)* and *Schedule B, Table 3 – Treated CSG Water Release Limits for Monitoring Point (M1)* when measured at the monitoring point (M1) specified in *Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters*.

Schedule B Table 2 – Treated CSG Water Release Limits for Monitoring Point (M1)

Quality Characteristic	Unit	Release Limit(s)	Limit Type	Monitoring Frequency
Electrical conductivity	µS/cm	580	80 th percentile	Based on at least 5 samples with not less than 60 minutes between samples daily during release
pH	pH Unit	6.5 - 9	Range	Daily during release
Suspended Solids	mg/L	180	Maximum	Daily during release
Boron	mg/L	0.37	Maximum	Daily during release

Schedule B, Table 3 – Treated CSG Water Release Limits for Monitoring Point (M1)

Quality characteristic	Unit	Maximum Release limit	Monitoring frequency
Aluminium	mg/L	0.2	The first release day of each quarter
Antimony	ml/L	0.003	
Arsenic	mg/L	0.007	
Barium	mg/L	0.7	
Bisphenol A	mg/L	0.2	
Boron	mg/L	4	
Bromide	mg/L	7	

BTEX		
Benzene	mg/L	0.001
Toluene	mg/L	0.8
Ethylbenzene	mg/L	0.3
Xylene (m & p)	mg/L	0.6
Cadmium	mg/L	0.002
Chromium	mg/L	0.05
Copper	mg/L	2
Cyanide	mg/L	0.08
Fluoride	mg/L	1.5
Iodide	mg/L	0.5
Iron	mg/L	0.3
Lead	mg/L	0.01
Manganese	mg/L	0.5
Mercury	mg/L	0.001
Molybdenum	mg/L	0.05
Nickel	mg/L	0.02
Nonylphenol	mg/L	0.5
PAH (as B(a)P TEF)		0.01
<u>Species:</u>	<u>TEF:</u>	
benz[a]anthracene	0.1	µg/L
benzo[b+j]fluoranthene	0.1	
benzo[k]fluoranthene	0.1	
benzo[a]pyrene	1.0	
chrysene	0.1	
dibenz[a,h]anthracene	1.0	
indeno[1,2,3-cd]pyrene	0.1	
Selenium	mg/L	0.01
Silver	mg/L	0.1
Strontium	mg/L	4
Total Petroleum Hydrocarbons (TPH)	mg/L	0.2
Vanadium	mg/L	0.05
Zinc	mg/L	3
Radium-226 Lead-210 Polonium-210 Radium-228	mSv/year	0.5 <i>The dose for each parameter is summed to give the total dose which must be less than or equal to 0.5 mSv/year</i>

- (B17) If the monitoring required by condition (B16) indicates that any of the quality characteristic release limits specified in *Schedule B, Table 3 – Treated CSG Water Release Limits for Monitoring Point (M1)* have been exceeded at any time during any release of treated CSG water, the environmental authority holder must, within five (5) business days of notifying the administering authority of the exceedance, unless a longer time is agreed to by the administering authority:
- complete an investigation into the exceedance, which includes an analysis of the (potential and actual) causes for the exceedance; and
 - provide a written report to the administering authority on completion of the investigation that includes:
 - details of the investigation carried out;
 - any actions taken to prevent impacts to waters that may be used for drinking water;
 - the cause for the exceedance;
 - all water quality monitoring results pertaining to the investigation;
 - any general observations;
 - methodology(ies) and any relevant calculations used; and

(vii) corrective actions to rectify the cause of the exceedance.

- (B18) Where an exceedance of a quality characteristic release limit specified in *Schedule B, Table 3 – Treated CSG Water Release Limits for Monitoring Point (M1)* is being investigated in accordance with condition (B17), the investigation and reporting required by condition (B18) is not required if a subsequent exceedance occurs, during investigation of the initial exceedance, which has resulted from the same cause that triggered the initial exceedance.

Flow Monitoring

- (B19) Prior to commencing any release of treated CSG water authorised under this environmental authority, a stream flow gauging station (GP1) must be installed.
- (B20) Upon practical completion of the meter installation, a completed 'meter installation form' must be signed by the installer and the environmental authority holder to confirm that the installation complies with the manufacturer's specifications and/or national standards and/or the Department of Environment and Heritage Protection's metering standards (whichever is applicable).
- (B21) The stream flow gauging station (GP1) must be installed in accordance with *Schedule B, Table 4 – Contaminant Release During Flow Events*.

Schedule B, Table 4 – Contaminant Release During Flow Events

Receiving water description	Gauging station description	Latitude or northing (GDA94)	Longitude or easting (GDA94)	Minimum Flow in Receiving Water Required for a Release Event	Flow recording Frequency
Wilkie Creek	Gauging station 1 (GP1)	50-100 metres upstream of Release Point R1	50-100 metres upstream of Release Point R1	0.14 m ³ /s	at 6 hour intervals during discharge (minimum twice daily)

- (B22) The stream flow gauging station (GP1) must be operated to determine daily stream flows in accordance with *Schedule B, Table 4 – Contaminant Release During Flow Events*.
- (B23) The flow rate of treated CSG water released from the release point authorised in *Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters* must not exceed a ratio of 1 part of the flow rate of the treated CSG water being released to 4 parts of the measured upstream receiving water flow rate.
- (B24) The volume of treated CSG water released from the release point authorised in *Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters* must not exceed a maximum of 8ML/day.
- (B25) The following characteristics of the release must be measured and recorded daily during all release events:
- the volume of treated CSG water released through the release point R1;
 - the date and time of release commencing and ceasing;
 - the release rate;
 - for any change in the release rate:
 - the date and time of the change;

- (ii) the new release rate; and
 - (iii) water levels and flow rate during the discharge event.
 - (e) water levels and flow rate during the discharge event;
 - (f) water quality characteristics monitoring results; and
 - (g) details of any observed impacts/conditions.
- (B26) Prior to commencing any release of treated CSG water authorised under this environmental authority, each monitoring and release point specified in *Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters* must be marked and readily identifiable from the banks of Wilkie Creek.
- (B27) The quality of the receiving waters must be monitored daily during release of treated CSG water at locations representative of the receiving waters determined in accordance with Condition (B33), for the following water quality characteristics:
- (a) Electrical conductivity ($\mu\text{S}/\text{cm}$)
 - (b) pH (pH Unit)
 - (c) Turbidity (NTU)
 - (d) Suspended Solids (mg/L)
 - (e) Calcium (mg/L)
 - (f) Magnesium (mg/L)
 - (g) Fluoride (mg/L)
 - (h) Sulphate (mg/l) and
 - (i) Boron (mg/L).
- (B28) If water has been released from authorised release points listed in *Schedule B, Table 1 – Contaminated Release Points, Sources and Receiving Waters*, the holder of this environmental authority must undertake an annual assessment of the contaminants of treated CSG water to determine the risk of environmental harm from release of treated CSG water to surface waters. This should consider the contaminants mentioned in the ANZECC & ARMCANZ 2000 guidelines. This annual assessment must be included in the Annual Return.

Receiving Environment Management Program – REMP

- (B29) Prior to the release of treated CSG water to Wilkie Creek a Receiving Environment Monitoring Program (REMP) must be developed and implemented to monitor, identify and describe any adverse impacts to surface water environmental values, water quality and flows due to the authorised release of treated CSG water to Wilkie Creek.
- (B30) The REMP required by Condition (B29) must include periodic monitoring for the effects of the release on the receiving environment as a result of treated CSG water releases to waters from the release location (R1) specified in *Schedule B – Table 1 Treated CSG Water Release Point, Source and Receiving Waters*.
- (B31) The quality of the receiving waters must be monitored at the locations specified in *Schedule B, Table 5 – Receiving Water Upstream Background Sties and Downstream Monitoring Points*.

Schedule B, Table 5 – Receiving Water Upstream Background Sites and Downstream Monitoring Points.

Monitoring Points	Receiving Waters	Latitude of Northing (GDA94)	Longitude or Easting (GDA94)
Upstream background monitoring point			
Monitoring Point (M2)	Wilkie Creek	50 – 100 metres upstream of Release Point R1	50 – 100 metres upstream of Release Point R1
Downstream monitoring point			
Monitoring Point (M3)	Wilkie Creek	150 – 200 metres downstream of Release Point R1	150 – 200 metres downstream of Release Point R1

- (B32) The REMP required by Condition (B29) must:
- (a) assess the condition or state of receiving waters, including upstream conditions, spatially within the REMP area, considering background water quality characteristics based on accurate and reliable monitoring data that takes into consideration temporal variation (e.g. seasonality);
 - (b) be designed to facilitate assessment against water quality objectives for the relevant environmental values that need to be protected;
 - (c) include monitoring from background reference sites (e.g. upstream or background) and downstream sites from the release;
 - (d) specify the frequency and timing of sampling required in order to reliably assess ambient conditions and to provide sufficient data to derive site specific background reference values in accordance with the *Queensland Water Quality Guidelines 2006*. This should include monitoring during periods of natural flow irrespective of other discharges;
 - (e) include monitoring and assessment of dissolved oxygen saturation and temperature and all water quality parameters listed in Condition (B27);
 - (f) include, where appropriate, monitoring of metals/metalloids in sediments (in accordance with ANZECC & ARMCANZ 2000, BATLEY and/or the most recent version of AS5667.1 *Guidance on Sampling of Bottom Sediments*);
 - (g) include, where appropriate, monitoring of macroinvertebrates in accordance with the AusRivas methodology;
 - (h) apply procedures and/or guidelines from ANZECC and ARMCANZ 2000 and other relevant guideline documents;
 - (i) describe sampling and analysis methods and quality assurance and control; and
 - (j) incorporate stream flow and hydrological information in the interpretations of water quality and biological data.
- (B33) A report outlining the findings of the REMP, including all monitoring results and interpretations in accordance with conditions (B29) to (B32) must be prepared annually. This must include a determination of the risk of environmental harm from release of treated CSG water to the receiving environment waters.
- (B34) The annual assessment must be prepared annually and made available on request to the administering authority.

Water Release Reduction Strategy

- (B35) An on-going Release Reduction Strategy to maximise CSG water reuse and minimise any release to waters and the storage of CSG water in holding dams must be developed and implemented.

- (B36) The strategy must address the following matters:
- (a) implementation of schemes to achieve maximum use of the water;
 - (b) specific targets for achieving increased use of CSG water both treated and untreated;
 - (c) a market analysis at least every three (3) years to identify existing and future opportunities for water use;
 - (d) on-going review of emerging technologies and/or re-use options that could achieve significant reductions in mass loads of contaminants released to the environment;
 - (e) investigation of the feasibility of alternative options, practices and procedures to further minimise the volume and concentration of contaminants released to waters; and
 - (f) programs to implement feasible options to achieve increased water use and reduction in contaminant loads, including actions and timeframes for completion.
- (B37) A progress report on the Release Reduction Strategy must be submitted to the administering authority with each annual return. The report(s) must address at least the following matters:
- (a) details of the specific options, practices and procedures investigated;
 - (b) details of new practices, procedures and programs implemented since the last reporting period and targets met;
 - (c) where alternative options, practices and procedures are not considered feasible, the provision of justification to support that determination; and
 - (d) details of the option(s) yet to be implemented, including the timeframes for implementation, and justification for the chosen option(s).
- (B38) The holder of this environmental authority must provide the administrative authority with safe access to facilitate inspections, and must comply with any instructions issued by the administrative authority relevant to the operation of the pump and meter installation.
- (B39) The holder of this environmental authority must notify the administering authority within five (5) business days of any meter malfunction or maintenance of the measuring device (meter).
- (B40) The holder of this environmental authority must arrange for the repair or replacement of a malfunctioning meter within five business days of becoming aware of the malfunction and provide a repair and/or maintenance completion report within ten business days of the repair or maintenance.

Sewage Treatment Works (21 – 450 EP)

Release of Treated Sewage Effluent Contaminants to Land

- (B41) Sewage pump stations must be fitted with a stand-by pump and a visible or audible high level alarm.
- (B42) Treated effluent may only be released to land at the designated, fenced and delineated contaminant release area(s).
- (B43) The contaminant release area(s) must be maintained in a proper and efficient condition so as to provide adequate assimilation, percolation, evaporation and transpiration of the released contaminants.
- (B44) Treated effluent must not be applied by spray irrigation and must be applied in a manner that does not cause ponding or runoff of effluent beyond the contaminant release area(s).
- (B45) When weather conditions or soil conditions preclude the release of contaminants, the contaminants must be directed to on-site storage or lawfully disposed of off-site.

Quality of Contaminants Released from the Sewage Treatment Works

- (B46) Treated effluent must comply, at the sampling and in-situ measurement point(s), with each of the release limits specified in *Schedule B, Table 5 - Treated Sewage Effluent Standards* for each quality characteristic.
- (B47) The release of contaminants to land must be monitored at the frequency and at the sampling and in-situ measurement point specified in *Schedule B, Table 5 - Treated Sewage Effluent Standards* and records of the monitoring results kept for at least five (5) years and made available to the administering authority on request.
- (B48) The influent annual average daily dry weather flow of sewage must not exceed 60 kilolitres per day for each authorised sewage treatment plant under this environmental authority.

Schedule B, Table 5 – Treated Sewage Effluent Standards

Quality Characteristic	Sampling and in-situ measurement Point Location	Limit Type	Release Limit	Frequency
5-day Biochemical Oxygen Demand (inhibited)	Release pipe from sewage treatment plant located on PL198;	Maximum	20 mg/L	Monthly
Suspended Solids		Maximum	30 mg/L	
pH		Range	6.0 to 9.0	
E-Coli	Release pipe from sewage treatment plant located on PL230	80 th percentile based on at least 5 samples with not less than 30 minutes between samples.	1000 cfu per 100 mL	
		Maximum	10000 cfu per 100 ml	

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SCHEDULE BE – COAL SEAM GAS WATER INJECTION TRIAL

- (BE1) The only fluids authorised to be injected into an aquifer(s) are those fluid types specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection*.
- (BE2) Fluid injection must be in accordance with the quantities and locations listed in *Schedule BE, Table 1 – Details of Authorised Fluid Injection*.

Schedule BE, Table 1 – Details of Authorised Fluid Injection

Well Location (Easting Northing, Map Zone 56)	Injection Well Number / Reference	Target Formation and Perforated Zone	Fluid Type	Maximum Injection Rate ML/d	Hydraulic Impact Zone	Water Quality Impact Zone
313669 E 6967949 N	Tipton-193	Precipice Formation, between 1040 m to 1110 m depth	Treated CSG water ¹	4	9,340 m radius from injection well	148 m radius from injection well

- (BE3) The holder of this environmental authority must notify the administering authority the commencement date of the trial at least seven (7) days prior to its commencement.
- (BE4) The injection trial is limited to a period of 180 days of injection, followed by a six-month recovery period.
- (BE5) Injection must cease immediately upon becoming aware that environmental harm is caused or threatened to be caused as a result of the injection activities.

Well Integrity

- (BE6) The construction of the Tipton-193 injection well must be carried out in accordance with the well construction requirements described in the most recent version of the Department of Environment and Heritage Protection’s “CSG Water Injection Well Construction Requirements”, as amended from time to time.
- (BE7) The Tipton-193 injection well must be mechanically functional such that there is no significant fluid movement into a water resource aquifer through vertical channels adjacent to the well bore hole.
- (BE8) The construction, operation and maintenance of the injection well specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* must be undertaken in a way that prevents and/or minimises impacts to the environmental values of the target formation and ensures the integrity of the bore.
- (BE9) The injection pressure must not exceed 90% of the formation fracture pressure.

Injection Fluid Quality

- (BE10) The quality of the fluid being injected into the injection well specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* must comply with the contaminant limits prescribed in *Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid*.

¹ Treated CSG water means any fluid that contains any proportion of treated CSG water, blended or otherwise.

Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid

Quality Characteristics	Release Limits	Limit Type
pH (pH units)	Minimum 6.5, Maximum 10	Range
Total Dissolved Solids (TDS) ²	Mean TDS of injection fluid must not exceed median TDS of formation water measured in background water quality monitoring well	Maximum
Dissolved Oxygen	500 µg/L	Maximum
Total suspended solids	25 mg/L	Maximum

(BE11) The quality of the fluid being injected into the injection well specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* must be monitored at the frequency specified in *Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid*.

² Electrical conductivity (EC) is an acceptable proxy measurement for measuring TDS of the injection fluid. If used, the conversion from EC to TDS must be stated and confirmed with laboratory monitoring results.

Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid

Monitoring parameter	Unit	Monitoring frequency during injection
Temperature of target formation	°C	N/A
Injection fluid temperature	°C	Continuous
Inlet pressure	KPa	Continuous
Fluid flow rate	L/sec	Continuous
	ML/day	Daily
Dissolved Oxygen (DO)	µg/L	Daily
Electrical Conductivity	µS/cm	Daily
pH	pH units	Daily
Turbidity	NTU	Daily
Sodium	mg/L	Weekly
Potassium	mg/L	Weekly
Calcium	mg/L	Weekly
Magnesium	mg/L	Weekly
Chloride	mg/L	Weekly
Sulphate as SO ₄	mg/L	Weekly
Carbonate / Bicarbonate	mg/L	Weekly
Bromine	mg/L	Monthly
Fluoride	mg/L	Monthly
Iodide	mg/L	Weekly
Silica	mg/L	Monthly
Iodine	mg/L	Monthly
Nitrate	mg/L	Monthly
Total organic carbon	mg/L	Weekly
Total Dissolved Solids	mg/L	Weekly
Redox Potential	mV	Weekly
Total Hardness as CaCO ₃	mg/L	Weekly
Total Alkalinity as CaCO ₃	mg/L	Weekly
Hydroxide alkalinity as CaCO ₃	mg/L	Weekly
Carbonate Alkalinity as CaCO ₃	mg/L	Weekly
Bicarbonate Alkalinity as CaCO ₃	mg/L	Weekly
Total suspended solids	mg/L	Weekly
Bromide	mg/L	Weekly
Aluminium	mg/L	Monthly
Arsenic	mg/L	Monthly
Barium	mg/L	Monthly
Boron	mg/L	Monthly
Copper	mg/L	Monthly
Iron	mg/L	Monthly
Manganese	mg/L	Monthly
Mercury	mg/L	Monthly
Nickel	mg/L	Monthly
Strontium	mg/L	Monthly
Zinc	mg/L	Monthly
Total Petroleum Hydrocarbons	µg/L	Monthly
BTEX	µg/L	Monthly

- (BE12) Notwithstanding Conditions (BE9) and (BE10), the injection of treated CSG water into the injection well specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* must have considered the recommendations for water blending described in the following documents, where appropriate:
- (a) *Surat Gas Project – Geochemical Blending and Compatibility Study: Tipton Injection Trials, March 2013*; and
 - (b) *Surat Gas Project – Geochemical Blending and Compatibility Study: Tipton Injection Trials – Phase 2, March 2013*.
- (BE13) The holder of this environmental authority must provide for non-chemical disinfection of injection fluid if results of six-monthly testing of injected fluid show levels of coliform bacteria, sulphate reducing bacteria or iron fixing bacteria that has potential to cause adverse impacts on the groundwater within the target formation.

Injection Management Plan

- (BE14) An Injection Management Plan which has been certified by a suitably qualified person must be developed and implemented prior to the carrying out of the trial fluid injection activity(ies).
- (BE15) The Injection Management Plan must include but not necessarily be limited to:
- (a) estimated volumes and rates of water to be injected;
 - (b) a description of the physical, chemical and biological components and their concentrations of the water to be produced;
 - (c) details of how and where the fluid will be produced, aggregated, stored and kept separate from other waters until it is treated and injected;
 - (d) details of where the fluid is proposed to be treated including a description of the treatment process;
 - (e) a water quality compatibility assessment which demonstrates that the injection fluid has inconsequential reactivity with the target formation and native groundwater it will come into contact with;
 - (f) the regional characteristics of the receiving environment;
 - (g) identification of the water quality impact zone and the hydraulic impact zone;
 - (h) identification of any fluid injection well, all existing bores, springs, lakes, wetlands, environmental assets and watercourses connected to groundwater, faults and other geologic features that occur within the water quality impact zone and the hydraulic impact zone;
 - (i) identification of the environmental values and water quality objectives of the potential water quality impact zone of the target formation in accordance with the *Environmental Protection (Water) Policy 2009* and the *Queensland Water Quality Guidelines 2009*;
 - (j) an assessment of the potential for migration of injection fluid or native groundwater out of the target formation through wells, bores, springs, connected watercourses, faults or other geologic features likely to impact on other aquifers;
 - (k) a risk assessment identifying potential hazards, their inherent risk, preventative measures for the management of potential hazards and details on sampling and analysis methods to verify preventative measures of potential hazards, including frequency and locations and quality assurance and control;
 - (l) control measures that will be implemented for fluid storage, treatment and injection to prevent or control the release of a contaminant or waste to the environment other than the release authorised in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* and *Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid*;
 - (m) verification methods to assess performance of the injection activities;
 - (n) the indicators or other criteria against which the performance of fluid injection will be assessed;
 - (o) procedures that will be adopted to regularly review the monitoring program;

- (p) reporting procedures to management and the administering authority should unforeseen or non-compliant monitoring results be recorded; and
- (q) procedures that will be implemented to prevent unauthorised environmental harm from unforeseen or non-compliant monitoring results.

Receiving Environment Monitoring Program – Injection Activities

(BE16) A Receiving Environment Monitoring Program (REMP) for Injection Activities which has been certified by a suitably qualified person must be developed and implemented to monitor, identify and describe any adverse impacts to the following values of the target formation due to the injection of treated CSG water:

- (a) hydraulic response;
- (b) water quality response; and
- (c) any other groundwater environmental values identified.

(BE17) The REMP for Injection Activities required by Condition (BE16) must be developed and implemented prior to the carrying out of the trial fluid injection activity(ies).

(BE18) The REMP for Injection Activities required by Condition (BE16) must include, but not necessarily be limited to:

- (a) methods to validate the assumptions, predicted impacts and the effectiveness of the proposed preventative measures associated with the modelled water quality impact zone and hydraulic impact zone;
- (b) monitoring of the hydraulic response to the trial injection at the well(s) referred to in Condition (BE18)(f)(ii);
- (c) monitoring of the water quality of the injection fluid during injection for the parameters listed in *Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid*;
- (d) monitoring of the water quality response following the completion of the injection trial recovery period through sampling of the target aquifer, within the water quality impact zone, for the parameters listed in *Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid*;
- (e) a definition of the background water quality of the Precipice Sandstone to be used for monitoring compliance with *Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid* and for reporting in the Injection Trial Report required by Condition (BE19);
- (f) the installation and use of a minimum of two wells:
 - (i) one of which accesses the target aquifer within the water quality impact zone; and
 - (ii) the other of which is placed at an adequate distance to determine the extent of the hydraulic response to the injection;
- (g) methods for the analysis and interpretation and a description of the statistical basis on which conclusions will be drawn to verify the assumptions of the injection proposal; and
- (h) a demonstration of how the REMP will validate assumptions, predicted impacts and the effectiveness of quality assurance and control measures.

Reporting Requirements for Fluid Injection Trials

(BE19) Upon completion and within two (2) months of the completion of the injection trial's recovery period the holder of the authority must submit to the administering authority an Injection Trial Report prepared by a suitably qualified person.

(BE20) The Injection Trial Report must include, but not necessarily be limited to:

- (a) details of the injection well including but not limited to:
 - (i) location details (GDA94);

- (ii) the inferred lithology³;
- (iii) casing details including type, outer diameter (mm), wall thickness (mm) and locations (depth from and to in metres);
- (iv) cementing details including type, hole diameter (mm), casing outer diameter (mm) and locations (depth from and to in metres);
- (v) calculated target formation fracture pressure; and
- (vi) target formation pressure prior to injection;
- (b) a detailed interpretation of the logs and other tests conducted during drilling and construction or refurbishment of the well against their specific objectives;
- (c) a completed well schematic diagram;
- (d) a temperature survey;
- (e) a cement integrity log;
- (f) outcomes of the injection trial including, but not limited to:
 - (i) well head injection rates versus formation pressure;
 - (ii) target formation pressure within the hydraulic impact zone during and upon completion of the trial;
 - (iii) hydraulic gradient of the target formation within the hydraulic impact zone upon completion of the trial;
 - (iv) the effectiveness of aquitards (including the stability of the aquitard) and aquicludes of confining the injected fluid within the target formation; and
 - (v) a detailed interpretation of the logs and other tests conducted during the injection trial against their specific objectives;
 - (vi) validation of conceptual framework for injection; and
 - (vii) additional hazards that were not identified earlier;
- (g) the results of the REMP for Injection Activities;
- (h) analysis of monitoring and operational data in terms of:
 - (i). validation of conceptual framework for injection; and
 - (ii). additional hazards that were not identified earlier;
- (i) a revised risk analysis that identifies all potential hazards, likelihood of various risk elements and associated consequences;
- (j) a revised water quality compatibility assessment which demonstrates that the injection fluid has inconsequential reactivity with the target formation and native groundwater it will come into contact with;
- (k) a re-evaluation of the hydraulic impact zone; and
- (l) a re-evaluation of the water quality impact zone.

Injection Cessation Report

(BE21) Following completion of the injection trial, a fluid injection cessation report which has been certified by a suitably qualified person must be submitted to the administering authority within two (2) months of completion of the injection trial's recovery period.

(BE22) The fluid injection cessation report must include, but not necessarily be limited to:

- (a) volumes of fluid injected at each well;
- (b) a risk assessment statement providing details on identified hazards including their inherent risk, summary of the results from the verification monitoring, preventative measures and the residual risk; and

³ Inferred lithology means the best available description of the lithology based upon historical drilling records, interpretation of logs and any other information that the suitably qualified person may have discovered.

- (c) a monitoring report outlining the methods and results of verification monitoring undertaken to assess the performance of the injection activities and preventative measures for identified hazards.

SCHEDULE C – REGULATED DAMS

Assessment of consequence category

- (C1) The consequence category of any structure must be assessed by a suitably qualified and experienced person in accordance with the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)* at the following times:
- (a) prior to the design and construction of the structure, if it is not an existing structure; or
 - (b) if it is an existing structure, prior to the adoption of this schedule; or
 - (c) prior to any change in its purpose or the nature of its stored contents.
- (C2) A consequence assessment report and certification must be prepared for each structure assessed and the report may include a consequence assessment for more than one structure.
- (C3) Certification must be provided by the suitably qualified and experienced person who undertook the assessment, in the form set out in the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*.

Design and construction of a regulated structure

- (C4) Conditions (C5) to (C9) inclusive do not apply to existing structures.
- (C5) All regulated structures must be designed by, and constructed under the supervision of, a suitably qualified and experienced person in accordance with the requirements of the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*.
- (C6) Construction of a regulated structure is prohibited unless the holder has submitted a consequence category assessment report and certification to the administering authority has been certified by a suitably qualified and experienced person for the design and design plan and the associated operating procedures in compliance with the relevant condition of this authority.
- (C7) Certification must be provided by the suitably qualified and experienced person who oversees the preparation of the design plan in the form set out in the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*, and must be recorded in the Regulated Dams/Levees register.
- (C8) Regulated structures must:
- (a) be designed and constructed in accordance with and conform to the requirements of the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*;
 - (b) be designed and constructed with due consideration given to ensuring that the design integrity would not be compromised on account of:
 - (i) floodwaters from entering the regulated dam from any watercourse or drainage line; and
 - (ii) wall failure due to erosion by floodwaters arising from any watercourse or drainage line.
 - (c) have the floor and sides of the dam designed and constructed to prevent or minimise the passage of the wetting front and any entrained contaminants through either the floor or sides of the dam during the operational life of the dam and for any period of decommissioning and rehabilitation of the dam.
- (C9) Certification by the suitably qualified and experienced person who supervises the construction must be submitted to the administering authority on the completion of construction of the regulated structure, and state that:

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

Operation of a regulated structure

- (C10) Operation of a regulated structure, except for an existing structure, is prohibited unless:
 - (a) the holder has submitted to the administering authority:
 - (i) one paper copy and one electronic copy of the design plan and certification of the 'design plan' in accordance with condition (C6), and
 - (ii) a set of 'as constructed' drawings and specifications, and
 - (iii) certification of those 'as constructed drawings and specifications' in accordance with condition (C9), and
 - (iv) where the regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the DSA volume across the system, a copy of the certified system design plan.
 - (v) the requirements of this authority relating to the construction of the regulated structure have been met;
 - (vi) the holder has entered the details required under this authority, into a Register of Regulated Dams; and
 - (vii) there is a current operational plan for the regulated structures.
- (C11) For existing structures that are regulated structures:
 - (a) where the existing structure that is a regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the DSA volume across the system, the holder must submit to the administering authority within twelve (12) months of the commencement of this condition a copy of the certified system design plan including that structure; and
 - (b) There must be a current operational plan for the existing structures.
- (C12) Each regulated structure must be maintained and operated, for the duration of its operational life until decommissioned and rehabilitated, in a manner that is consistent with the current operational plan and, if applicable, the current design plan and associated certified 'as constructed' drawings.

Mandatory reporting level

- (C13) Conditions (C14) to (C17) inclusive only apply to Regulated Structures which have not been certified as low consequence category for 'failure to contain – overtopping'.
- (C14) The Mandatory Reporting Level (the MRL) must be marked on a regulated dam in such a way that during routine inspections of that dam, it is clearly observable.
- (C15) The holder must, as soon as practical and within forty-eight (48) hours of becoming aware, notify the administering authority when the level of the contents of a regulated dam reaches the MRL.
- (C16) The holder must, immediately on becoming aware that the MRL has been reached, act to prevent the occurrence of any unauthorised discharge from the regulated dam.
- (C17) The holder must record any changes to the MRL in the Register of Regulated Structures.

Design storage allowance

- (C18) The holder must assess the performance of each regulated dam or linked containment system over the preceding November to May period based on actual observations of the available storage in each regulated dam or linked containment system taken prior to 1 July of each year.
- (C19) By 1 November of each year, storage capacity must be available in each regulated dam (or network of linked containment systems with a shared DSA volume), to meet the Design Storage Allowance (DSA) volume for the dam (or network of linked containment systems).
- (C20) The holder must, as soon as possible and within forty-eight (48) hours of becoming aware that the regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, notify the administering authority.
- (C21) The holder must, immediately on becoming aware that a regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, act to prevent the occurrence of any unauthorised discharge from the regulated dam or linked containment systems.

Annual inspection report

- (C22) Each regulated structure must be inspected each calendar year by a suitably qualified and experienced person.
- (C23) At each annual inspection, the condition and adequacy of all components of the regulated structure must be assessed and a suitably qualified and experienced person must prepare an annual inspection report containing details of the assessment and include recommended actions to ensure the integrity of the regulated structure.
- (C24) The suitably qualified and experienced person who prepared the annual inspection report must certify the report in accordance with the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*.
- (C25) The holder must:
- (a) Within 20 business days of receipt of the annual inspection report, provide to the administering authority:
 - (i) The recommendations section of the annual inspection report; and
 - (ii) If applicable, any actions being taken in response to those recommendations; and
 - (b) If, following receipt of the recommendations and (if applicable) actions, the administering authority requests a full copy of the annual inspection report from the holder, provide this to the administering authority within 10 business days of receipt of the request.

Transfer arrangements

- (C26) The holder must provide a copy of any reports, documentation and certifications prepared under this authority, including but not limited to any Register of Regulated Structures, consequence assessment, design plan and other supporting documentation, to a new holder on transfer of this authority.

Register of regulated dams

- (C27) A Register of Regulated Dams must be established and maintained by the holder for each regulated dam.
- (C28) The holder must provisionally enter the required information in the Register of Regulated Dams when a design plan for a regulated dam is submitted to the administering authority.
- (C29) The holder must make a final entry of the required information in the Register of Regulated Dams once compliance with condition (C10) and (C11) has been achieved.
- (C30) The holder must ensure that the information contained in the Register of Regulated Dams is current and complete on any given day.
- (C31) All entries in the Register of Regulated Dams must be approved by the chief executive officer for the holder of this authority, or their delegate, as being accurate and correct.
- (C32) The holder must, at the same time as providing the annual return, supply to the administering authority a copy of the records contained in the Register of Regulated Dams, in the electronic format required by the administering authority.

Transitional arrangements

- (C33) All existing structures that have not been assessed in accordance with either the Manual or the former *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams* must be assessed and certified in accordance with the Manual within 6 months of amendment of the authority adopting this schedule.
- (C34) All existing structures must subsequently comply with the timetable for any further assessments in accordance with the Manual specified in Table 1 (Transitional requirements for existing structures), depending on the consequence category for each existing structure assessed in the most recent previous certification for that structure.
- (C35) Table 1 ceases to apply for a structure once any of the following events has occurred:
- it has been brought into compliance with the hydraulic performance criteria applicable to the structure under the Manual; or
 - it has been decommissioned; or
 - it has been certified as no longer being assessed as a regulated structure.
- (C36) Certification of the transitional assessment required by C35 and C36 (as applicable) must be provided to the administering authority within six (6) months of amendment of the authority adopting this schedule.

Schedule C, Table 1 – Transitional hydraulic performance requirements for existing structures

Transition period required for existing structures to achieve the requirements of the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Dams</i>			
Compliance with criteria	High	Significant	Low
>90% and a history of good compliance performance in last 5 years	No transition required	No transition required	No transitional conditions apply. Review consequence

			assessment every 7 years.
>70%-≤90%	Within 7 years, unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	Within 10 years, unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	No transitional conditions apply. Review consequence assessment every 7 years.
>50-≤70%	Within 5 years, unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	Within 7 years, unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	Review consequence assessment every 7 years.
≤50%	Within 5 years or as per compliance requirements (e.g. TEP timing)	Within 5 years or as per compliance requirements (e.g. TEP timing)	Review consequence assessment every 5 years.

SCHEDULE D – LAND

General

- (D1) Contaminants that will or may cause environmental harm must not be directly or indirectly released to land except as permitted under this environmental authority.

Disturbance to Land – General

- (D2) Prior to conducting petroleum activities that involve significant disturbance to land, an assessment must be undertaken of the condition, type and ecological value of any vegetation in such areas where the activity is proposed to take place.
- (D3) The assessment required by Condition (D2) must be undertaken by a suitably qualified person and include the carrying out of field validation surveys, observations and mapping of any Category A, B or C Environmentally Sensitive Areas (ESA's) and the presence of species classed as endangered, vulnerable, rare or near threatened under the *Nature Conservation Act 1992* and for petroleum activities that commenced after 8 March 2013, areas containing State significant biodiversity values.
- (D4) If the assessment required by Conditions (D2) and (D3) indicates that a regional ecosystem (RE) mapped as 'Endangered' or 'Of Concern' by the Queensland Herbarium should be in a lower conservation value classification and the holder of this environmental authority wishes to undertake activities as if the ecosystem is of the lower conservation value they must notify the administering authority in writing before any significant disturbance to land takes place.
- (D5) The holder of this environmental authority, when carrying out petroleum activities must:
- (a) avoid, minimise or mitigate (in order of preference) any impacts on areas of vegetation or other areas of ecological value;
 - (b) minimise disturbance to land that may otherwise result in land degradation;
 - (c) ensure that for land that is to be significantly disturbed by petroleum activities:
 - (i) the top layer of the soil profile is removed;
 - (ii) stockpiled in a manner that will preserve its biological and chemical properties; and
 - (iii) used for rehabilitation purposes (in accordance with Condition (H4));
 - (d) avoid clearing mature trees; and
 - (e) prior to carrying out field based activities, make all relevant staff, contractors or agents carrying out those activities, aware of the location of any category A, B or C ESA's and the requirements of this environmental authority.

Note: This environmental authority does not authorise the taking of protected animals or the tampering with an animal breeding place as defined under the Nature Conservation Act 1992 and Regulations.

- (D6) In accordance with Condition (D5), if significant disturbance to land is unavoidable, the holder of this environmental authority must not clear vegetation or place fill:
- (a) in a way which significantly isolates, fragments or dissects tracts of vegetation resulting in a reduction in the current level of ecosystem functioning, ecological connectivity (i.e. stepping stone or contiguous bioregional/local corridor networks) and/or results in an increase in threatening processes (e.g. potential impacts associated with edge effects or introduced species);
 - (b) on slopes greater than 10% for activities other than pipelines and wells; or
 - (c) in discharge areas.

- (D7) Clearing of remnant vegetation shall not exceed ten (10) metres in width for the purpose of establishing tracks and 20 metres in width for dual carriageway roads unless otherwise authorised by a condition of this EA.
- (D8) Cleared vegetation must be stockpiled in a manner that facilitates respreading or salvaging and does not impede vehicle, stock or wildlife movements.

Disturbance to Land – Environmentally Sensitive Areas

- (D9) The holder of this environmental authority must ensure that petroleum activities, except as otherwise authorised by Condition (D17), (D18), (D19) and (D20) of this environmental authority:
- (a) are not conducted in any category A, B or C Environmentally Sensitive Areas (ESAs);
 - (b) are not conducted within 200m of any category A, B or C ESAs; and
 - (c) do not involve activities other than limited petroleum activities within the protection zone of a category A ESA (i.e. from 200m to 1km of the category A ESA), or within the protection zone of a category B or C ESA (i.e. from 200m to 500m of the category B or C ESA).

Note: Indicative ESA mapping is available on the Department of Environment and Heritage Protection's website at http://www.ehp.qld.gov.au/licences-permits/maps_of_environmentally_sensitive_areas.php

- (D10) Limited petroleum activities carried out in accordance with Condition (D9)(c) must be preferentially located in pre-existing areas of clearing or significant disturbance to the greatest practicable extent and avoid the clearing of mature trees.
- (D11) Despite Condition (D10), limited petroleum activities may be undertaken within 200m of, or in the following specified Category B and C ESAs:
- (a) 'Endangered' regional ecosystems;
 - (b) 'Of Concern' regional ecosystems;
 - (c) State Forests;
 - (d) Timber Reserves

provided that they do not overlap with any other Category A, B or C ESA or its associated protection zone.

- (D12) Where limited petroleum activities are proposed to be undertaken within 200m of, or in the Category B and C ESAs specified in Condition (D11), the holder of this environmental authority must:
- (a) be able to demonstrate that no reasonable or practicable alternative exists; and
 - (b) where the ESA is a State Forest or Timber Reserve:
 - (i) obtain written approval from the authority responsible for the administration of the *Forestry Act 1959*;
 - (ii) comply with all restrictions and conditions contained within the approval required under Condition (D12)(b)(i);
 - (iii) where the conditions of the approval required under Condition (D12)(b)(i) conflict with the conditions of this environmental authority, comply with the conditions of this environmental authority; and
 - (iv) provide a copy of the written approval required under Condition (D12)(b)(i) to the administering authority upon request.

- (D13) Where limited petroleum activities are undertaken within 200m of, or in the Category B or C ESAs specified in Condition (D11), disturbance to land must only be located and carried out in areas according to the following order of preference:
- (a) pre-existing cleared areas or significantly disturbed areas less than 200m from a Category C ESA;
 - (b) pre-existing cleared areas or significantly disturbed areas less than 200m from a Category B ESA;
 - (c) undisturbed areas less than 200m from a Category C ESA;
 - (d) undisturbed areas less than 200m from a Category B ESA;
 - (e) pre-existing areas of significant disturbance within a Category C ESA (e.g. areas where significant clearing or thinning has been undertaken within a RE, and/or areas containing high densities of weed or pest species which has inhibited re-colonisation of native regrowth);
 - (f) pre-existing areas of significant disturbance within a Category B ESA (e.g. areas where significant clearing or thinning has been undertaken within a RE, and/or areas containing high densities of weed or pest species which has inhibited re-colonisation of native regrowth);
 - (g) areas where clearing of a Category C ESA is unavoidable; and
 - (h) areas where clearing of a Category B ESA is unavoidable.
- (D14) Notwithstanding Conditions (D11) to (D13), where limited petroleum activities are proposed to be undertaken within 200m of, or in a Category B or C ESAs specified in Condition (D11), any vegetation clearing must not exceed any of the following areas:
- (a) if the disturbance relates to an Endangered or Of Concern RE, 10% of the remnant unit of Endangered or Of Concern RE as ground truthed and mapped before any activity commences as per Condition (D2) and (D3) of this environmental authority for the life of the project; and
 - (b) more than 30m² for the construction of a sump; or
 - (c) Described in Schedule D, Table 1 – Authorised vegetation clearing widths for linear infrastructure in ESAs and ESA buffers.

Schedule D, Table 1 – Authorised vegetation clearing widths for linear infrastructure in ESAs and ESA buffers

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

(d) dual carriage access tracks with overhead power lines only, or dual carriage access tracks with overhead power lines and a single pipeline	32
(e) additional clearing for take-off drains associated with (C)(a), (b), (c) or (d)	10
(f) Maximum ROW width for multiple pipelines that are co-located with access tracks	50
(D) Power lines:	
(a) overhead power lines not associated with access tracks or pipelines	23
(b) additional clearing for power line stays associated with (C)(a), (b), (c), (d), or (D)(a)	10

- (D15) For each well site within 200m of, or in a Category B or C ESA specified in Condition (D11), all reasonable and practical measures are taken to minimize the area cleared which must include but not be limited to, for each well site, ranked constraints mapping and a risk assessment which considers safety.
- (D16) Details of any significant disturbance to land undertaken within 200m of, or in a Category B or C ESA, along with a record of the assessment required by Conditions (D2) and (D3) must be kept and submitted to the administering authority upon request.
- (D17) Despite Condition (D9), the Daandine Brine Dam 2 and associated activities necessary for construction, operation, maintenance and monitoring of the dam, located within the area bound by the coordinates prescribed by *Schedule D, Table 1 – Coordinates Enclosing the Disturbance Area for Daandine Brine Dam 2*, are permitted within the protection zones of Category C Environmentally Sensitive Areas.

Schedule D, Table 1 – Coordinates Enclosing the Disturbance Area for Daandine Brine Dam 2

Point	Latitude or Northing (GDA94, Zone 56)	Longitude or Easting (GDA94, Zone 56)
1	7001708	297524
2	7001153	297384
3	7001051	298345
4	7001418	298444
5	7001601	298406
6	7001620	298190

- (D18) Despite Condition (D9), the water release outlet and pipeline and associated activities necessary for construction, operation, maintenance and monitoring for the release of treated CSG water to Wilkie Creek at the specified release point in *Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters* are authorised to occur in a Category B ESA and its associated protection zones.
- (D19) The construction of the water release outlet and pipeline are located within the area bound by the coordinates prescribed by *Schedule D, Table 2 – Coordinates Enclosing the Disturbance Area for the Water Release Outlet and Pipeline*.

Schedule D, Table 2 - Coordinates Enclosing the Disturbance Area for the Water Release Outlet and Pipeline.

Point	Latitude or Northing (GDA94, Zone 56)	Longitude or Easting (GDA94, Zone 56)	Area of disturbance
Valve Pit	6,995,424	302,897	0.18 ha
High Point on Bank	6,995,460	302,991	
Outlet at Creek	6,995,465	303,004	

(D20) Despite condition (D9), the Tipton Treated Water Pipeline and associated activities for construction, operation and maintenance, located within the area bound by the coordinates prescribed by *Schedule D, Table 3 – Coordinates Enclosing the Disturbance Area for Tipton Treated Water Pipeline*, are permitted.

Schedule D, Table 3 - Coordinates Enclosing the Disturbance Area for Tipton Treated Water Pipeline

Point	Longitude or Easting (GDA94 Zone 56)	Latitude or Northing (GDA94 Zone 56)
Section 1	310652.74	6969686.79
	310656.46	6969747.37
	310696.37	6969744.59
	310661.46	6970447.79
	310621.2	6970452.8
	310651.4	6970651.7
	310611.1	6970656.7
	310641.76	6970845.55
	310601.68	6970846.23
	310707.02	6971627.3
	310667.1	6971629.9
	310658.71	6972161.37
	310618.1	6972166.9
	310621.4	6973392.1
	310581.2	6973398.7
	310613.31	6973549.7
	310573.47	6973549.7
	310638.9	6973649.7
	310538.9	6973549.7
	310608.18	6973649.7
	310568.35	6973649.7
	310638.9	6973549.7
	310538.9	6973649.7
Section 2	310617.24	6973719.35
	310576.78	6973723.95
	310722.26	6974060.43
	310681.96	6974065.49
	310716.82	6974171.95
	310676.51	6974177.14
	310714.46	6974220.51
	310674.59	6974216.76
	310692.43	6974377.64
	310653.85	6974364.72
	310692.43	6974377.64
	310567.32	6974520.53
	310616.71	6974514.14
	310563.13	6974528.08
	310612.67	6974521.66
	310498.88	6974536.4
310593.85	6974610.18	
310497.34	6974636.39	
Section 3	310533.76	6974846.47
	310493.94	6974834.72
	310533.6	6974856.85

	310493.52	6974862.31
	310528.48	6975191.65
	310488.41	6975196.69
	310526.05	6975350.54
	310485.78	6975347.13

Soil Management

- (D21) Topsoil must be managed in a manner that preserves its biological and chemical properties.
- (D22) 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.

Acid Sulfate Soils

- (D23) Acid sulfate soils must be treated and managed in accordance with the latest edition of the *Queensland Acid Sulfate Soil Technical Manual*.

Fauna Management

- (D24) Measures to prevent fauna being harmed from entrapment must be implemented during the construction and operation of well infrastructure, dams and pipeline trenches.

Pest management

- (D25) In carrying out the petroleum activity(ies) the holder of this environmental authority must develop and implement an effective pest management program by 18 October 2011 which has been certified by a suitably qualified person that includes but is not limited to the following:
- (a) identification of pest species and infestation areas;
 - (b) prevention and/or minimisation of the introduction and/or spread of pests;
 - (c) control and management of pest outbreaks as a result of petroleum activities; and
 - (d) details of community consultation in developing the pest management program.

Note: The pest management program required by Condition (D25) should consider the "Petroleum Industry (including coal seam methane gas) Minimising Pest Spread Guidelines" dated June 2008, or subsequent versions thereof. This document is available for download from: http://www.dpi.qld.gov.au/documents/Biosecurity_EnvironmentalPests/IPA-Minimising-Pest-Spread-Advisory-Guidelines.pdf

- (D26) A copy of the pest management procedures must be made available to any potentially affected landholders upon request.

Chemical and Fuel Storage

- (D27) Chemicals and fuels stored, must be effectively contained and where relevant, meet Australian Standards, where such a standard is applicable.

Pipelines

- (D28) Pipelines must be preferentially located alongside existing linear infrastructure such as roads, tracks and powerlines.

- (D29) Pipeline trenches must only be left open for the minimum time practicable.
- (D30) The length of pipeline trench open at any one time must be minimised as far as practicable.
- (D31) Completed pipeline construction areas must be:
 - (a) a stable landform with no subsidence or erosion gullies for at least five (5) years;
 - (b) be re-profiled to original contours and established drainage lines;
 - (c) be visually consistent with the surround land features; and
 - (d) be reinstated to the pre-disturbed land use and soil suitability class.
- (D32) The holder of this environmental authority must monitor reinstated pipeline corridors for subsidence at least every 20 business days for the first 120 business days after reinstatement to ensure compliance with Condition (D31).

Impacts to State Significant Biodiversity Values

- (D33) Impacts to State significant biodiversity values are not authorised, except as permitted by conditions (D34) and (D35).
- (D34) Impacts to State significant biodiversity values can only occur if an offset is available that meets the relevant offset rules for that State significant biodiversity value.
- (D35) The offset required by (D34) must:
 - (a) for land-based offsets:
 - (i) meet the relevant offset rules for the State significant biodiversity value being impacted;
 - (ii) be legally secured within 12 months of the impact occurring; and
 - (iii) remain in force until the relevant offset objectives have been met;
 - (b) for offset payments:
 - (i) meet the relevant offset rules for the State significant biodiversity value being impacted;
 - (ii) not be made for a critically limited regional ecosystem or a threshold regional ecosystem; and
 - (iii) be made within 4 months of the impact occurring.
- (D36) If conditions (D33) to (D35) have been triggered during an annual return period, the annual return must include the following details:
 - (a) the type of State significant biodiversity value that was impacted;
 - (b) the date the impact to each State significant biodiversity value commenced;
 - (c) a GIS shape-file that shows the location and spatial extent of the residual impact to the State significant biodiversity value;
 - (d) the type of offset being provided for the State significant biodiversity value;
 - (e) how the offset meets the relevant offset rules;
 - (f) an offset area management plan that demonstrates how the relevant offset objectives will be met; and
 - (g) the date the offset was either legally-secured or the offset payment was made.

SCHEDULE E – ENVIRONMENTAL NUISANCE

Odour, dust and other airborne contaminants

- (E1) The release of odour, dust or any other airborne contaminant(s), or light from the petroleum activity(ies) must not cause an environmental nuisance at any sensitive place.

Noise

- (E2) Prior to undertaking petroleum activities that will result in short-term, medium-term or long term noise events that are likely to impact on a sensitive receptor, the holder of this environmental authority must model or calculate any potential noise emissions from the relevant petroleum activity and determine if noise emissions are likely to exceed the noise levels specified in *Schedule E, Table 1 – Noise limits at Sensitive Receptors*.
- (E3) If noise modelling or the calculations indicates that petroleum activities are likely to exceed the noise levels specified in *Schedule E, Table 1 – Noise limits at sensitive receptors*, the holder of this environmental authority must prepare a Noise Management Plan prior to undertaking petroleum activities, which demonstrates how the noise limits specified in *Schedule E, Table 1 – Noise limits at sensitive receptors* will be achieved in the event of a valid noise complaint.
- (E4) Despite condition E3, for any petroleum activities existing at the time of issue of this environmental authority, if noise modelling or the calculations indicates that petroleum activities are likely to exceed the noise levels specified in *Schedule E, Table 1 – Noise limits at sensitive receptors*, the holder of this environmental authority must implement a Noise Management Plan, which demonstrates how the noise limits specified in *Schedule E, Table 1 – Noise limits at sensitive receptors* will be achieved in the event of a valid noise complaint.
- (E5) The Noise Management Plan must address, but not be limited to, the following matters:
- (a) a location based noise assessment to determine compliance with the noise limits in *Schedule E, Table 1 – Noise limits at Sensitive Receptors*
 - (b) the measured and/or predicted noise level of these noise sources and activities at noise sensitive receptors, taking into account any tonal or impulsive noise impacts;
 - (c) the reasonable and practicable control or abatement measures (including relocating the activity, hours of operation, or having an alternate arrangement in place with any potentially affected person) that can be undertaken to reduce identified intrusive noise sources;
 - (d) the level of noise at noise sensitive receptors that would be achieved from implementing these measures;
 - (e) the handling of future noise complaints;
 - (f) community liaison and consultation including but not limited consultation processes for when night time activities (i.e. between 10:00 pm and 6:00 am) are likely to exceed 25dBA; and
 - (g) training of staff and contractors in best available noise management practices.
- (E6) The emission of noise from the licensed place must not result in levels greater than those specified in *Schedule E, Table 1 – Noise limits at Sensitive Receptors* in the event of a valid complaint about noise being made to the administering authority.

Schedule E, Table 1 – Noise Limits at Sensitive Receptors

Time Period	Metric	Short Term Noise Event	Medium Term Noise Event	Long Term Noise Event
7:00am – 6:00pm	$L_{Aeq,adj, 15 \text{ min}}$ Max $L_{pA, 15 \text{ mins}}$	45 dBA 55 dBA	43 dBA 51 dBA	40 dBA 45 dBA
6:00pm – 10:00pm	$L_{Aeq,adj, 15 \text{ min}}$ Max $L_{pA, 15 \text{ mins}}$	40 dBA 50 dBA	38 dBA 46 dBA	35 dBA 40 dBA
10:00pm – 6:00am	$L_{Aeq,adj, 15 \text{ min}}$ Max $L_{pA, 15 \text{ mins}}$	28 dBA 38 dBA	28 dBA 36 dBA	28 dBA 33 dBA
6:00am – 7:00am	$L_{Aeq,adj, 15 \text{ min}}$ Max $L_{pA, 15 \text{ mins}}$	40 dBA 50 dBA	38 dBA 46 dBA	35 dBA 40 dBA

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

Deemed background noise levels (L_{ABG}) for Schedule E, Table 1 – Noise Limits at Sensitive Receptors are:

7:00 am - 6:00pm:	35 dBA
6:00 pm – 10:00 pm:	30 dBA
10:00 pm – 6:00 am:	25 dBA
6:00 am – 7:00 am:	30 dBA

- (E7) If the noise subject to a complaint is tonal or impulsive, the adjustments detailed in *Schedule E, Table 2 – Adjustments to be Added to Noise Levels at Sensitive Receptors* are to be added to the measured noise level(s) to derive $L_{Aeq, adj, 15 \text{ min}}$.

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

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

- (E8) Where alternative arrangements are in place with any affected person as referred to by Condition (E5)(c), the noise limits in *Schedule E, Table 1 – Noise limits at Sensitive Receptors* do not apply at that location for the duration for which the alternative arrangements are in place.

Low Frequency Noise

- (E9) Notwithstanding Condition (E2), emission of any noise below 315 Hz must not cause an environmental nuisance.
- (E10) Low frequency noise from the petroleum activities is not considered to be an environmental nuisance under Condition (E9) if monitoring shows that noise emissions do not exceed the following limits:
- 50 dB(Z) measured inside the sensitive receptor; and
 - the difference between the internal A-weighted and Z-weighted noise levels is no greater than 15 dB.

Vibration and Blasting Activities

- (E11) The holder of this environmental authority must develop a blast management plan in accordance with Australian Standard 2187 for each planned blasting activity before it is undertaken.
- (E12) The blast management plan required by Condition (E11) must include measures to minimise the likelihood of any adverse effects being caused by airblast overpressure and/or ground borne vibrations at any sensitive receptor and demonstrate current best practice environmental management.
- (E13) All blasting must be carried out in a proper manner by a suitably qualified person.
- (E14) All blasting must be carried out in accordance with the Blast Management Plan.
- (E15) Noise from blasting operations must not exceed an airblast overpressure level, when measured at or extrapolated to any sensitive receptor, of 115 dB (linear peak) for nine (9) out of any ten (10) consecutive blasts initiated nor 120 dB (linear peak) at any time.
- (E16) Ground-borne vibration peak particle velocity caused by blasting operations, when measured at or extrapolated to any sensitive receptor must not exceed more than 5 mm per second for nine (9) out of any ten (10) consecutive blasts initiated, or 10 mm per second at any time.

SCHEDULE F – AIR**Venting and flaring**

- (F1) Unless venting is authorised under the *Petroleum and Gas (Production and Safety) Act 2004* or the *Petroleum Act 1923*, waste gas must be flared in a manner that complies with all of (F1(a)) and (F1(b)) and (F1(c)), or with (F1(d)):
- (a) an automatic ignition system is used, and
 - (b) a flame is visible at all times while the waste gas is being flared, and
 - (c) there are no visible smoke emissions other than for a total period of no more than 5 minutes in any 2 hours, or
 - (d) it uses an enclosed flare.

Fuel Burning or Combustion Equipment

- (F2) The only type of fuel to be burned in fuel burning or combustion equipment under normal operating conditions is coal seam gas.
- (F3) Contaminant releases to air emitted from fuel burning and combustion equipment point sources that are capable of burning at least 500 kg in an hour must be directed vertically upwards without any impedence or hindrance.
- (F4) The holder of this environmental authority must maintain a register of fuel burning and combustion equipment that is capable of burning at least 500 kg of fuel in an hour that must include, as a minimum, the following information for each piece of equipment:
- (a) fuel burning or combustion equipment name and location;
 - (b) stack emission height (metres);
 - (c) minimum efflux velocity (m/s);
 - (d) mass emission rates (g/s); and
 - (e) contaminant concentrations (mg/Nm³ @ x %O₂ dry gas at 0°Celsius and 1 atmosphere).
- (F5) The holder of this environmental authority must ensure that the information contained in the register of fuel burning and combustion equipment is always current and complete.
- (F6) All entries in the register of fuel burning and combustion equipment must be certified by the chief executive officer for the tenure holder, or their delegate, as being accurate and correct.

Fuel Burning or Combustion Equipment Located Outside Hubs or Populated Areas

- (F7) Prior to the installation and operation of any new fuel burning or combustion equipment, that is capable of burning at least 500 kg of fuel in an hour, the holder of this environmental authority must conduct air dispersion modelling to calculate the ground level concentrations of emissions from all existing and proposed fuel burning or combustion equipment under maximum operating conditions (including other industry) within the ambient airshed and identify any potential impacts to air quality within the study area.
- (F8) The holder of this environmental authority must ensure that the calculated ground level concentrations required under Condition (F7) do not exceed the criteria for each air contaminant at sensitive receptors in *Schedule F, Table 1 – Maximum Ground Level Concentration Criteria*.

Schedule F, Table 1 – Maximum Ground Level Concentration Criteria

Contaminant	Concentration at 0°Celsius	Units	Averaging time	Relevant Sensitive Receptors
Nitrogen Dioxide	250	µg/m ³	1 hour	Human Health
Nitrogen Dioxide	62	µg/m ³	1 year	Human Health
Nitrogen Dioxide	33	µg/m ³	1 year	Ecosystems
Carbon Monoxide	11	mg/m ³	8 hour	Human Health

- (F9) The holder of this environmental authority must undertake emissions testing within 3 months post commissioning of any fuel burning and combustion equipment capable of burning at least 500 kg of fuel in an hour to verify the estimates used in the air dispersion modelling.
- (F10) Where the results of the emissions testing required under Condition (F9) indicate that the emission estimates used in the air dispersion modelling required under Condition (F7) are exceeded, the holder of this environmental authority must:
- provide details to the administering authority within 10 **business days**;
 - re-undertake the modelling based on the new information; and
 - determine and implement appropriate pollution control measures to bring the emissions into compliance with the limits specified in *Schedule F, Table 1 – Maximum Ground Level Concentration Criteria*.

Fuel Burning and Combustion Equipment in Hubs and / or Places within 5 km of Populated Areas

- (F11) Fuel burning or combustion equipment that is capable of burning at least 500 kg of fuel in an hour must not be located in hubs or in places within 5km of a populated area unless it is specified in *Schedule F, Table 2 – Release of Contaminants to Air*.
- (F12) Fuel burning or combustion equipment located in hubs or in places within 5km of a populated area, that is capable of burning at least 500 kg of fuel in an hour, must only release contaminants to the atmosphere at a height and an efflux velocity not less than the corresponding height and velocity stated for that release point (RP) as provided for in *Schedule F, Table 2 - Release of Contaminants to Air*.
- (F13) Fuel burning or combustion equipment located in hubs or in places within 5km of a populated area, that is capable of burning at least 500 kg of fuel in an hour, must not release contaminants to the atmosphere from a release point at a mass emission rate in excess of that stated in *Schedule F, Table 2 - Release of Contaminants to Air*.

Schedule F, Table 2 - Releases of Contaminants to Air

Resource Authority	Field	Facility	Release Point No. (EA)	Unit Description	Minimum Release Height (m)	Minimum Efflux Velocity (m/sec)	NOx		CO	
							Maximum Release limit	Release limit type	Maximum Release limit	Release limit type
PL 230	Daandine	DD CGPF	A1	K-0001 Compressor 1	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A2	K-0002 Compressor 2	10	30	3.0	g/sec	5.5	g/sec

Resource Authority	Field	Facility	Release Point No. (EA)	Unit Description	Minimum Release Height (m)	Minimum Efflux Velocity (m/sec)	NOx		CO	
							Maximum Release limit	Release limit type	Maximum Release limit	Release limit type
PL 230	Daandine	DD CGPF	A3	K-0003 Compressor 3	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A4	K-0004 Compressor 4	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A5	K-0005 Compressor 5	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A6	K-0006 Compressor 6	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A7	K-0007 Compressor 7	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A8	K-9008 Compressor 8	17	17	1.4	g/sec	4.8	g/sec
PL 230	Daandine	DD CGPF	A9	K-9009 Compressor 9	17	17	1.4	g/sec	4.8	g/sec
PL 230	Daandine	DD CGPF	A10	K-9010 Compressor 10	17	17	1.4	g/sec	4.8	g/sec
PL 198	Tipton	TW CGPF	A14	K-0001 Compressor 1	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A15	K-0002 Compressor 2	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A16	K-0003 Compressor 3	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A17	K-0004 Compressor 4	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A18	K-0005 Compressor 5	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A19	K-0006 Compressor 6	7.6	30	6.8	g/sec	5.5	g/sec

Note 1: Minimum efflux velocity, maximum mass emission and maximum concentration are calculated at the Maximum Continuous Rating.

Note 2: This table comes into effect on 30 October 2015.

(F14) The holder of this environmental authority must undertake emissions testing within 3 months of the issue of this environmental authority of all fuel burning and combustion equipment listed in *Schedule F, Table 2 – Release of Contaminants to Air*.

(F15) The holder of this environmental authority must undertake air dispersion modelling using the results of the emission testing required under Condition (F14) to verify that emissions will not result in an

exceedance of the maximum ground level concentration for each air contaminant listed in *Schedule F, Table 1 – Maximum Ground Level Concentration Criteria*.

- (F16) A report on the results of air emission testing and modelling required by conditions (F14) and (F15) must be provided to the administering authority with the next annual return.

SCHEDULE G – WASTE

General

- (G1) All general and regulated waste must be removed from the site and sent to a site that is lawfully able to accept the waste under the *Environmental Protection Act 1994* except as permitted under another condition of this environmental authority.
- (G2) All regulated waste removed from the site must be undertaken by a person who holds a current authority to transport such waste under the provisions of the *Environmental Protection Act 1994*.
- (G3) Waste must not be burned or allowed to be burned on the licensed site.
- (G4) All waste fluids and muds resulting from drilling and exploration activities must be contained in a properly lined dam or containment structure for disposal, remediation or reuse where applicable.

Coal Seam Gas Water Management Plan

- (G5) A Coal Seam Gas Water Management Plan that includes but is not necessarily limited to the matters outlined in (a) and (b) must be implemented:
 - (a) the matters required by sections 310D (5), 310D (6) and 662 of the *Environmental Protection Act 1994*; and
 - (b) a management strategy for all integrated coal seam gas water management operations.
- (G6) Where any inconsistency exists between the conditions of this environmental authority and the Coal Seam Gas Water Management Plan, the conditions of this environmental authority prevail.

Coal Seam Gas Water Use

- (G7) Written approval from the relevant Local Government must be obtained prior to the application of coal seam gas water on any local government controlled roads in accordance with Condition (G9).
- (G8) Produced water may be re-used in drilling and well hole activities.
- (G9) 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.
- (G10) Produced water may be used for construction and operation 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
 - (d) Does not harm vegetation surrounding the construction site.
- (G11) If there is any indication that any of the circumstances in condition (G8)(b)(i) to (G8)(b)(iv)) or (G9)(a) to (G9)(d)) is occurring the use must cease immediately and the affected area must be remediated without delay.

Supply of Coal Seam Gas Water to a Third Party

- (G12) Coal seam gas water may be transferred to a third party to be used for the following purposes subject to compliance with (G13) and (G14):
- (a) dust suppression if the coal seam gas water quality complies with the limits specified in *Schedule G, Table 1 – Water Contaminant Release Limits*;
 - (b) construction and operational purposes if the coal seam gas water quality complies with the limits specified in *Schedule G, Table 1 – Water Contaminant Release Limits*;
 - (c) irrigation and livestock watering purposes;
 - (d) the following industrial purposes:
 - (i) coal washing;
 - (ii) power stations; and
 - (iii) water treatment facilities.

Schedule G, Table 1 – Water Contaminant Release Limits

Water Quality Characteristics	Unit	Limit	Limit Type
pH	pH units	6.0 to 9.0	Range
Sodium Adsorption Ratio	ratio	6	80 th Percentile
		12	Maximum
Total Dissolved Solids	mg/L	1500	Maximum
Total Petroleum Hydrocarbons	mg/L	10	Maximum

- (G13) Any coal seam gas water supplied to a third party for irrigation and/or livestock watering purposes in accordance with Condition (G12)(c) must comply with the relevant trigger values contained in *ANZECC and ARMCANZ Water Quality Guidelines 2000*, or subsequent versions thereof.
- (G14) If the responsibility of coal seam gas water is given or transferred to a third party in accordance with Condition (G12), the holder of environmental authority must ensure that:
- (a) the responsibility of the coal seam gas water is given or transferred in accordance with a written agreement (the third party agreement); and
 - (b) the third party is made aware of the General Environmental Duty under section 319 of the *Environmental Protection Act 1994*.

Residual drilling material

- (G15) If sumps are used to store residual drilling material or drilling fluids, they must only be used for the duration of drilling activities.
- (G16) 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.

(G17) Records must be kept to demonstrate compliance with condition (G15) and (G16).

50

SCHEDULE H – REHABILITATION

Rehabilitation planning

- (H1) A Rehabilitation Plan must be developed by a suitably qualified person and must include the:
- (a) rehabilitation goals; and
 - (b) procedures to be undertaken for rehabilitation that will:
 - i. achieve the requirements of conditions (H2) to (H8), inclusive; and
 - ii. provide for appropriate monitoring and maintenance.

Transitional rehabilitation

- (H2) Significantly disturbed areas that are no longer required for the on-going petroleum activities, must be rehabilitated within 12 months (unless an exceptional circumstance in the area to be rehabilitated (e.g. a flood event) prevents this timeframe being met) and be maintained to meet the following acceptance criteria:
- (a) contaminated land resulting from petroleum activities is remediated and rehabilitated
 - (b) the areas are:
 - i. non-polluting
 - ii. a stable landform
 - iii. re-profiled to contours consistent with the surrounding landform
 - (c) surface drainage lines are re-established
 - (d) top soil is reinstated; and
 - (e) either:
 - i. groundcover, that is not a declared pest species, is growing; or
 - ii. an alternative soil stabilisation methodology that achieves effective stabilisation is implemented and maintained.

Final rehabilitation acceptance criteria

- (H3) All significantly disturbed areas caused by petroleum activities which are not being or intended to be utilised by the landholder or overlapping tenure holder, must be rehabilitated to meet the following final acceptance criteria measured either against the highest ecological value adjacent land use or the pre-disturbed land use:
- (a) greater than or equal to 70% of native ground cover species richness
 - (b) greater than or equal to the total per cent of ground cover
 - (c) less than or equal to the per cent species richness of declared plant pest species; and
 - (d) where the adjacent land use contains, or the pre-clearing land use contained, one or more regional ecosystem(s), then at least one regional ecosystem(s) from the same broad vegetation group, and with the equivalent biodiversity status or a biodiversity status with a higher conservation value as any of the regional ecosystem(s) in either the adjacent land or pre-disturbed land, must be present.

Final rehabilitation acceptance criteria in environmentally sensitive area

- (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 must be met:
- (a) greater than or equal to 70% of native ground cover species richness



- (b) greater than or equal to the total per cent ground cover
- (c) less than or equal to the per cent species richness of declared plant pest species
- (d) greater than or equal to 50% of organic litter cover
- (e) greater than or equal to 50% of total density of coarse woody material; and
- (f) all predominant species in the ecologically dominant layer, that define the pre-disturbance regional ecosystem(s) are present.

Continuing conditions

- (H5) Conditions (H2), (H3) and (H4) continue to apply after this environmental authority has ended or ceased to have effect.

Remaining dams

- (H6) Where there is a dam (including a low consequence dam) that is being or intended to be utilised by the landholder or overlapping tenure holder, the dam must be decommissioned to no longer accept inflow from the petroleum activity(ies) and the contained water must be of a quality suitable for the intended on-going uses(s) by the landholder or overlapping tenure holder.

SCHEDULE I – MONITORING PROGRAMS

General

- (11) The holder of this environmental authority must develop and implement a monitoring program, the result of which will demonstrate compliance with the conditions of this environmental authority.
- (12) All monitoring under this environmental authority must be conducted by a suitably qualified person.
- (13) All instruments, equipment and measuring devices used for measuring or monitoring in accordance with any condition of this environmental authority must be calibrated, and operated and maintained effectively.
- (14) All laboratory analyses and tests required to be conducted under this environmental authority must be carried out by a laboratory that has NATA certification for such analyses and tests, except as otherwise authorised by the administering authority.
- (15) The method of water sampling required by this environmental authority must comply with the version of the *Queensland Monitoring Water Quality Sampling Manual*⁴ that is current at the time the sampling is undertaken.

Note: Condition (15) requires the version of the Queensland Monitoring Water Quality Sampling Manual that is current at the time the sampling is undertaken to be followed and where it is not followed because of exceptional circumstances this should be explained and reported with the results.

- (16) Notwithstanding condition (15), when sampling a water quality limit in *Schedule B, Table 3 – Treated CSG Water Release Limits for Monitoring Point (M1)* records a test result of “no result” or “laboratory error”, a supplementary sample must be collected and tested as soon as practicable after the initial sampling event.
- (17) Any management or monitoring plans, systems, programs or procedures required to be developed and implemented by a condition of this environmental authority must be reviewed for performance and amended if required on an annual basis in accordance with the requirements for the particular plans, systems, programs and procedures.
- (18) If monitoring conducted in accordance with this environmental authority indicates a condition or contaminant level that has caused, or has potential to cause, environmental harm, the environmental authority holder must:
 - (a) as soon as is practicable, take the necessary actions to rectify the condition or contaminant level so as to avoid or minimise environmental harm; and
 - (b) notify the administering authority of the condition or contaminant level and the actions taken to rectify it.
- (19) An annual monitoring report must be prepared each year and submitted to the administering authority upon request. This report shall include but not be limited to:
 - (a) a summary of the previous twelve (12) months monitoring results obtained under any monitoring programs required under this environmental authority and, a comparison of the previous twelve

⁴ The version that is current as at the 8 March 2013 is *Monitoring and Sampling Manual 2009 – Environmental Protection (Water) Policy 2009 Version 2 September 2010*.



- (12) months monitoring results to both the limits set in this environmental authority and to relevant prior results; the date on which the samples was taken;
- (b) the time at which the samples was taken;
 - (c) the monitoring point at which the sample was taken;
 - (d) the release flow rate of any authorised discharges to waters from all release points;
 - (e) the results of all monitoring and details of any exceedences with the conditions of this environmental authority and the dates and times these exceedences were reported to the administering authority.
 - (f) a summary of all records of quantities of releases required to be kept under this environmental authority including the total volume of any authorised discharges to waters for the previous yearly period from all release points and the individual daily volume of any authorised discharges to waters from all release points;
 - (g) details of all maintenance or work carried out on any discharge meter(s) and the impact (if any) on the release volume readings;
 - (h) an evaluation/explanation of the data derived from any monitoring programs;
 - (i) data analyses and interpretation to assess the nature and extent of any contamination and, if so, the level of environmental harm caused as a result of the contamination and the environmentally relevant activity; and
 - (j) an outline of actions taken or proposed to minimise the risk of environmental harm from any condition or elevated contaminant level identified by the monitoring or recording programs.
- (I10) The evaluation and explanation of data for the purposes of the annual monitoring report must be performed by a suitably qualified person.
- (I11) The holder of this environmental authority must continue to conduct monitoring as per that prescribed in Conditions (I12) to (I18) for a minimum of five (5) years after the activities prescribed in Condition (A1) have ceased and submit the results annually in accordance with Condition (I9).

Groundwater Monitoring

- (I12) The Groundwater Monitoring Program, which must be implemented, must be able to detect any significant risks and changes to groundwater quality and level as a result of activities authorised under this environmental authority and must:
- (a) be developed, installed and maintained by a suitably qualified person in the fields of hydrogeology, groundwater sampling design and groundwater monitoring program design;
 - (b) include locations of monitoring points, parameters to be measured, frequency of monitoring, monitoring methodology used, and trigger values;
 - (c) include procedures to establish background groundwater quality;
 - (d) a sufficient number of monitoring sites to provide information on the following:
 - (i) seepage to groundwater and surrounding soils from any regulated dam authorised under this environmental authority and its effect on groundwater and soils; and
 - (ii) background monitoring sites (i.e. groundwater quality in representative bore(s) that have not been affected by the activities authorised under this environmental authority);
 - (e) conduct a geodetic survey of all groundwater monitoring bores to determine the relative water surface elevations, measured to the nearest millimetre in each bore and reported in metres relative to the AHD;
 - (f) determine the hydraulic conductivity, groundwater flow direction and groundwater flow rate; and
 - (g) include a rationale containing details on the program purpose, program conceptualisation and verification of assumptions.

- (I13) All groundwater bores must be installed according to the standards outlined in the latest edition of the Department of Environment and Heritage Protection's *Minimum Construction Requirements for Water Bores in Australia or the Minimum Standards for the Construction and Reconditioning of Water Bores that Intersect the Sediments of Artesian Basins in Queensland*.
- (I14) Groundwater monitoring bores must be constructed by, or under the supervision of a licensed Queensland water bore driller who has the correct endorsements on their licence for the type of activity being performed.
- (I15) The Groundwater Monitoring Program must provide for monitoring of groundwater quality as often as necessary to detect impacts of the petroleum activities authorised under this environmental authority, but not for fewer parameters or less frequently than that specified in *Schedule I, Table 1 – Minimum Groundwater Monitoring Parameters and Monitoring Frequency* and in compliance with Condition (I16).
- (I16) Groundwater samples taken as part of the Groundwater Monitoring Program must be analysed for, but not be limited to, the water quality parameters at the minimum frequencies specified in *Schedule I, Table 1 – Minimum Groundwater Monitoring Parameters and Monitoring Frequency*.

Schedule I, Table 1 – Minimum Groundwater Monitoring Parameters and Monitoring Frequency

Groundwater parameter	Monitoring frequency
Flow [m/hr]	Biannually
Water level to the nearest millimetre [m AHD]	Biannually
Groundwater Pressure in Geological Strata [kPa]	Biannually
pH	Biannually
Electrical conductivity [μ S/m]	Biannually
Total Dissolved Solids [mg/L]	Biannually
Temperature [°C]	Biannually
Dissolved Oxygen [mg/L]	Biannually
Alkalinity as CaCO ₃ [mg/L]	Biannually
Residual Alkali [mq/L]	Biannually
Anions (bicarbonate, carbonate, hydroxide, chloride, fluoride, sulphate) [mg/L]	Biannually
Cations (aluminium, calcium, magnesium, potassium, sodium) [mg/L]	Biannually
Silica [mg/L]	Biannually
Total and dissolved Iron, manganese, zinc, aluminium, boron, copper, phosphorous [mg/L]	Biannually
Ammonia, nitrate, nitrite [m/L]	Biannually
Total Petroleum Hydrocarbons [mg/L]	Biannually
Polycyclic Aromatic Hydrocarbons [mg/L]	Biannually
Benzene, Toulene, Ethyl-benzene, Xylenes (BTEX) [mg/L]	Biannually

- (I17) All groundwater monitoring bores must be maintained in an operative condition and be reasonably accessible at all times to any authorised person.
- (I18) If groundwater monitoring indicates that any significant changes in groundwater quality caused by petroleum activities are detected, then information must be submitted to the administering authority within 10 business days of receipt of the analysis indicating these changes, including any proposed actions to mitigate the changes in groundwater quality.

Air Monitoring (Point Source)

- (119) The holder of this environmental authority must conduct a monitoring program of contaminants released to the atmosphere at each release point recorded in the register of fuel burning and combustion equipment for the contaminants and efflux velocities listed in *Schedule F, Table 2 - Releases of Contaminants to Air* and at the frequencies specified in *Schedule I, Table 3 - Monitoring Frequency for Contaminants*.

Schedule I, Table 3 - Monitoring Frequency for Contaminants

Contaminant	Monitoring frequency
NOx as Nitrogen Dioxide	Within three (3) months after commissioning of any fuel burning equipment; and annually thereafter.
Carbon monoxide	

- (120) The monitoring program must include, but not necessarily be limited to:
- (a) monitoring provisions for the release points which complies with the most recent edition of Australian Standard 4323.
 - (b) tests for each sample taken at each release point specified in the register of fuel burning or combustion equipment including:
 - (i) gas velocity, volume and mass flow rate;
 - (ii) temperature; and
 - (iii) water vapour concentration (for non-continuous sampling);
 - (c) representative samples of the contaminants discharged when operating under maximum operating conditions;
 - (d) the collection of production rate and plant status during sampling periods; and
 - (e) monitoring of contaminant release carried out in accordance with the latest edition of the Department of Environment and Heritage Protection's "Air Quality Sampling Manual" 1997, as amended from time to time.

Monitoring of Contaminant Releases to the Atmosphere

- (121) When requested by the administering authority, contaminant monitoring and recording must be undertaken to investigate any complaint, and the results notified with 14 days to the administering authority. When monitoring is requested the following must be complied with:
- (a) the holder of this environmental authority must conduct and keep records of a monitoring program of contaminant release to the atmosphere at the release points, frequency, and the parameters specified in *Schedule I, Table 4 - Required Monitoring* which complies with the following:
 - (b) Monitoring provision for the release points listed in *Schedule I, Table 4 - Required Monitoring* must comply with the Australian Standard AS4323.1 - 1995 'Stationary source emissions Method 1: Selection of sampling provisions' or subsequent versions as they become available.
 - (c) The following tests must be performed for each required determination specified in *Schedule I, Table 4 - Required Monitoring* :
 - (i) gas velocity and volume flow rate;
 - (ii) temperature and oxygen content;
 - (iii) water vapour concentration (moisture content).
 - (d) Where practicable samples taken must be representative of the contaminants discharged when emissions are expected to be at maximum rates.
 - (e) During the sampling period the following additional information must be gathered:

- (i) fuel used;
- (ii) number of equipment and operating units; and
- (iii) reference to actual test methods and accuracies.

Schedule I, Table 4 – Required Monitoring

Determination Required	Release Point Numbers	Frequency ²
Mass emission rate (g/s) and concentration (mg/Nm ³) of oxides of nitrogen (NOx) in the flue gas at the 5% oxygen reference level.	Stacks A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A14, A15, A16, A17, A18, A19.	Within three months upon the granting of the environmental authority and then annually thereafter

²Note: Out of the seven (7) release points A1 to A7, at least three (3) stacks must be monitored each year on a rotational basis. Out of the three (3) release points A8 to A10, at least two (2) stacks must be monitored each year on a rotational basis. Out of the six (6) release points A14 to A19, at least three (3) stacks must be monitored each year on a rotational basis.

Note: This table comes into effect on 30 October 2015.

Noise Monitoring

- (I22) The holder of this environmental authority must undertake noise monitoring when requested by the administering authority to investigate a complaint of environmental nuisance at a sensitive receptor within the reasonable and practicable timeframe nominated by the administering authority, and report the results to the administering authority within three (3) business days of completion of the monitoring.
- (I23) Noise monitoring and recording must include the following descriptor, characteristics and matters:
- (a) $L_{AN,T}$ (where N equals the statistical levels of 1, 10 and 90 and T=15);
 - (b) $L_{Aeq,adj,15 mins}$;
 - (c) background noise level as $L_{A,90,T}$;
 - (d) Max $L_{pA,15 mins}$
 - (e) the level and frequency of occurrence of impulsive or tonal noise and any adjustment and penalties to statistical levels;
 - (f) atmospheric conditions including temperature, relative humidity and wind speed and directions;
 - (g) effects due to any extraneous factors such as traffic noise;
 - (h) location, date and time of monitoring;
 - (i) if the complaint concerns low frequency noise, Max $L_{pZ,15 min}$; and
 - (j) If the complaint concerns low frequency noise, one third octave band measurements in dB(LIN) for centre frequencies in the 10 – 200 Hz range for both the noise source and the background noise in the absence of the noise source.
- (I24) The method of measurement and reporting of noise levels and background sound pressure levels must comply with the latest edition of the administering authority's *Noise Measurement Manual* or the most recent version of Australian Standard 1055 Acoustics – description and measurement of environmental noise.

Nuisance Monitoring (other than Noise)

- (I25) When the administering authority advises the holder of this environmental authority of a complaint alleging nuisance other than noise, the holder must investigate the complaint and advise the administering authority in writing of the action proposed or undertaken to resolve the complaint.
- (I26) When requested by the administering authority, the holder of this environmental authority must undertake monitoring as specified by the administering authority, within a reasonable and practical timeframe nominated by the administering authority to investigate any complaint of environmental harm at any sensitive place.
- (I27) The results of the investigation (including an analysis and interpretation of the monitoring results) and abatement measures implemented must be provided to the administering authority within 10 business days of completion of the investigation, or receipt of the monitoring results, whichever is the latter.
- (I28) If monitoring in accordance with Condition (I26) and (I27), indicates that emissions exceed the limits set in this environmental authority or are causing environmental nuisance, then the holder of this environmental authority must:
- (a) address the complaint including the use of alternative dispute resolution services if required; and/or
 - (b) as soon as practicable implement abatement or attenuation measures so that light, dust, particulate or odour emissions from the authorised activities do not result in further environmental nuisance.

Impact Assessment

- (I29) Notwithstanding any other condition of the environmental authority, the environmental authority does not authorise any environmental harm arising from any release to the atmosphere of any of the contaminants mentioned in *Schedule 1, Table 5 – Contaminants and Benchmarks for Evaluation*.
- (I30) For the purpose of ensuring and demonstrating compliance with Condition (I29), the holder of the environmental authority must implement the findings of the evaluation, conducted by a suitably qualified and experienced person and provided to the administering authority, of the potential environmental impacts of the contaminants mentioned in *Schedule 1, Table 5 – Contaminants and Benchmarks for Evaluation*. The evaluation addresses all matters relevant to the assessment of potential for environmental impacts to occur and includes, but not be limited to:
- (a) Sampling, monitoring and analysis of the contaminants mentioned in *Schedule 1, Table 5 – Contaminants and Benchmarks for Evaluation* for the range of plant operations likely to be encountered:
 - (i) entail sufficient levels of detection to adequately characterise the emissions; and
 - (ii) be representative; and complies with relevant Department of Environment and Heritage Protection's monitoring methods including the quality control requirements inherent in those methods;
 - (b) Using the air pollution dispersion models, an estimation of Ground Level Concentrations at the most sensitive nearest receptor(s) (using efflux velocity, temperature and flow rate) for emissions of the contaminants mentioned in *Schedule 1, Table 5 – Contaminants and Benchmarks for Evaluation*;

- (c) A comparison between the worst case measured emissions with the benchmarks maximum GLC mentioned in *Schedule I, Table 5 – Contaminants and Benchmarks for Evaluation*;
- (d) The use of methods and guidelines for modelling and assessment of air pollutants approved by the New South Wales Department of Environment and Climate Change or by the Victoria Environmental Protection Agency.

Schedule I, Table 5 – Contaminants and Benchmarks for Evaluation

Contaminant	Averaging Periods	Maximum GLC concentration
Nitrogen dioxide	1 hour – health and wellbeing	250 µg/m ³ (at 0 °C)
	1 year – health and wellbeing	62 µg/m ³ (at 0 °C)
	1 year – health and biodiversity of ecosystems	33 µg/m ³ (at 0 °C)

SCHEDULE J – COMMUNITY ISSUES

- (J1) The holder of this environmental authority must maintain a record of complaints and incidents causing environmental harm, and actions taken in response to the complaint or incident; and
- (J2) The holder of this environmental authority must record the following details for all complaints received and provide this information to the administering authority on request:
- (a) name, address and contact number for complainant;
 - (b) time and date of complaint;
 - (c) reasons for the complaint as stated by the complainant;
 - (d) investigations undertaken in response to the complaint;
 - (e) conclusions formed;
 - (f) actions taken to resolve complaint;
 - (g) any abatement measures implemented to mitigate the cause of the complaint; and
 - (h) name and contact details of the person responsible for resolving the complaint.

SCHEDULE K – NOTIFICATION PROCEDURES

- (K1) In addition to the requirements under Chapter 7, Part 1, Division 2 of the *Environmental Protection Act 1994*, the administering authority must be notified through the Pollution Hotline and in writing, as soon as possible, but within 48 hours of becoming aware of any of the following events:
- (a) any unauthorised significant disturbance to land
 - (b) potential or actual loss of structural or hydraulic integrity of a dam
 - (c) when the level of the contents of any regulated dam reaches the mandatory reporting level
 - (d) when a regulated dam will not have available storage to meet the design storage allowance on 1 November of any year
 - (e) potential or actual loss of well integrity
 - (f) any unexplained increase in the seepage data recorded as a result of condition (112)(d)(i) and (ii)
 - (g) unauthorised releases of any volume of prescribed contaminants to waters
 - (h) unauthorised releases of volumes of contaminants, in any mixture, to land greater than:
 - i. 200 L of hydrocarbons; or
 - ii. 200 L of stimulation additives; or
 - iii. 500 L of stimulation fluids; or
 - iv. 1 000 L of brine; or
 - v. 5 000 L of untreated coal seam gas water; or
 - vi. 5 000 L of raw sewage; or
 - vii. 10 000 L of treated sewage effluent.
 - (i) the use of restricted stimulation fluids
 - (j) groundwater monitoring results from a landholder's active groundwater bore monitored under the stimulation impact monitoring program which is a 10% or greater increase from a previous baseline value for that bore and which renders the water unfit for its intended use
 - (k) monitoring results where two out of any five consecutive samples do not comply with the relevant limits in the environmental authority.

Fluid Injection Notification

- (K2) The Department of Environment and Heritage Protection must be notified in writing as soon as reasonably practicable, but within 48 hours of becoming aware of:
- (a) migration of injected fluid out of the target formation; or
 - (b) a loss of hydraulic isolation of the target formation; or
 - (c) the detection of groundwater contaminants that were not detected in background samples; or
 - (d) an injection fluid monitoring result that does not comply with any one of the parameters in *Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid*.

SCHEDULE L DEFINITIONS

Note: Where a term is not defined in this environmental authority the definition in the Environmental Protection Act 1994, its regulations and Environmental Protection Policies or the Petroleum and Gas (Production and Safety) Act 2004 and its regulations must be used in that order.

acid sulfate soils	means soil or sediment containing highly acidic soil horizons or layers affected by the oxidation of iron sulfides (<i>actual acid sulfate soils</i>) and/or soil or sediment containing iron sulfides or other sulfidic material that has not been exposed to air and oxidised (<i>potential acid sulfate soils</i>). The term acid sulfate soil generally includes both actual and potential acid sulfate soils. Actual and potential acid sulfate soils are often found in the same soil profile, with actual acid sulfate soils generally overlying potential acid sulfate soil horizons.								
active	for the purposes of landholders' groundwater bores means bores that are able to continue to provide a reasonable yield of water in terms of quantity for the bores authorised purpose or use.								
AHD	means Australian Height Datum.								
alternative arrangement	means a written agreement between the holder of this environmental authority and an affected or potentially affected person at a sensitive receptor for a defined noise nuisance impact and may include an agreed period of time for which the arrangement is in place. An agreement for alternative arrangements may include, but not necessarily be limited to a range of noise abatement measures to be installed at a sensitive receptor and/or provision of alternative accommodation for the duration of the defined noise nuisance impact.								
annual exceedance probability or AEP	means the probability that at least one event in excess of a particular magnitude will occur in any given year.								
annual inspection report	means an assessment prepared by a suitably qualified and experienced person containing details of the assessment against the most recent consequence assessment report and design plan (or system design plan); (a) against recommendations contained in previous annual inspections reports; (b) against recognised dam safety deficiency indicators; (c) for changes in circumstances potentially leading to a change in consequence category; (d) for conformance with the conditions of this authority; (e) for conformance with the 'as constructed' drawings; (f) for the adequacy of the available storage in each regulated dam, based on an actual observation or observations taken after 31 May each year but prior to 1 November of that year, of accumulated sediment, state of the containment barrier and the level of liquids in the dam (or network of linked containment systems); (g) for evidence of conformance with the current operational plan								
Approved quality criteria	for the purposes of residual drilling materials, means the residual drilling material meet the following quality standards: Part A in all cases: <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</td> </tr> <tr> <td>Chloride*</td> <td>8000mg/L</td> </tr> </tbody> </table>	Parameter	Maximum concentration	pH	6 – 10.5 (range)	Electrical Conductivity	20dS/m	Chloride*	8000mg/L
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Electrical Conductivity	20dS/m								
Chloride*	8000mg/L								

	<p>*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.</p> <p>Part B If any of the following metals are a component of the drilling fluids, then for that metal:</p> <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>11mg/kg</td> </tr> <tr> <td>Lead</td> <td>600mg/kg</td> </tr> </tbody> </table> <p>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:</p> <table border="1"> <thead> <tr> <th>TPH</th> <th>Maximum concentration</th> </tr> </thead> <tbody> <tr> <td>C6-C10</td> <td>170 mg/kg</td> </tr> <tr> <td>C10-C16</td> <td>150 mg/kg</td> </tr> <tr> <td>C16-C34</td> <td>1300 mg/kg</td> </tr> <tr> <td>C34-C40</td> <td>5600 mg/kg</td> </tr> <tr> <td>Total polycyclic aromatic hydrocarbons (PAH)</td> <td>20 mg/kg</td> </tr> <tr> <td>Phenols (halogenated)</td> <td>1 mg/kg</td> </tr> <tr> <td>Phenols (non-halogenated)</td> <td>60 mg/kg</td> </tr> <tr> <td>Monocyclic aromatic hydrocarbons (total sum of benzene, toluene, ethyl benzene, xylenes (includes ortho, para, and meta xylenes) and styrene)</td> <td>7 mg/kg</td> </tr> <tr> <td>Benzene</td> <td>1 mg/kg</td> </tr> </tbody> </table>	Parameter	Maximum concentration	Arsenic	20mg/kg	Selenium	5mg/kg	Boron	100mg/kg	Cadmium	3mg/kg	Chromium (total)	400mg/kg	Copper	11mg/kg	Lead	600mg/kg	TPH	Maximum concentration	C6-C10	170 mg/kg	C10-C16	150 mg/kg	C16-C34	1300 mg/kg	C34-C40	5600 mg/kg	Total polycyclic aromatic hydrocarbons (PAH)	20 mg/kg	Phenols (halogenated)	1 mg/kg	Phenols (non-halogenated)	60 mg/kg	Monocyclic aromatic hydrocarbons (total sum of benzene, toluene, ethyl benzene, xylenes (includes ortho, para, and meta xylenes) and styrene)	7 mg/kg	Benzene	1 mg/kg
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<p>assessed or assessment</p>	<p>by a suitably qualified and experienced person in relation to a consequence assessment of a dam, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit of the assessment:</p> <ul style="list-style-type: none"> (a) exactly what has been assessed and the precise nature of that determination; (b) the relevant legislative, regulatory and technical criteria on which the assessment has been based; (c) the relevant data and facts on which the assessment has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and (d) the reasoning on which the assessment has been based using the relevant data and facts, and the relevant criteria. 																																				

associated water	means underground water taken or interfered with, if the taking or interference happens during the course of, or results from, the carrying out of another authorised activity under a petroleum authority, such as a petroleum well, and includes waters also known as produced formation water. The term includes all contaminants suspended or dissolved within the water.
associated works	in relation to a dam, means: <ul style="list-style-type: none"> • operations of any kind and all things constructed, erected or installed for that dam; and • any land used for those operations.
authority	means an environmental authority or a development approval.
background noise level	means the sound pressure level, measured in the absence of the noise under investigation, as the L A90,T being the A-weighted sound pressure level exceeded for 90 percent of the measurement time period T of not less than 15 minutes, using Fast response.
bed and banks	for a watercourse or wetland means land over which the water of the watercourse or wetland normally flows or that is normally covered by the water, whether permanently or intermittently; but does not include land adjoining or adjacent to the bed or banks that is from time to time covered by floodwater.
bore	means a water observation bore or a water supply bore.
brine	means either saline water with a total dissolved solid concentration greater than 40 000mg/l or CSG water after it has been concentrated through water treatment processes and/or evaporation.
bund or bunded	in relation to spill containment systems for fabricated or manufactured tanks or containers designed to a recognised standard means an embankment or wall of brick, stone, concrete or other impervious material which may form part or all of the perimeter of a compound and provides a barrier to retain liquid. Since the bund is the main part of a spill containment system, the whole system (or bunded area) is sometimes colloquially referred to within industry as the bund. The bund is designed to contain spillages and leaks from liquids used, stored or processed above ground and to facilitate clean-up operations. As well as being used to prevent pollution of the receiving environment, bunds are also used for fire protection, product recovery and process isolation.
BTEX	means benzene, toluene, ethylbenzene, xylene.
category A ESA	means any area listed in Schedule 12, Part 1, Section 1 of the Environmental Protection Regulation 2008.
category B ESA	means any area listed in Schedule 12, Part 1, Section 2 of the Environmental Protection Regulation 2008.
category C ESA	means any of the following areas: <ul style="list-style-type: none"> • Nature Refuges as defined under the <i>Nature Conservation Act 1992</i>; • Koala Habitat Areas as defined under the <i>Nature Conservation Act 1992</i>; • State Forests or Timber Reserves as defined under the <i>Forestry Act 1959</i>; • Declared catchment areas under the <i>Water Act 2000</i>; • Resources reserves under the <i>Nature Conservation Act 1992</i> • An area identified as "Essential Habitat" for a species of wildlife listed as endangered, vulnerable, rare or near threatened under the <i>Nature Conservation Act 1992</i>; • An area identified as "Essential Regrowth Habitat" under the <i>Vegetation Management Act 1999</i> for a species of wildlife listed as endangered, vulnerable, rare or near threatened under the <i>Nature Conservation Act 1992</i> for petroleum activities that commenced after 8 March 2013 (the date of grant of this environmental authority); and

	<ul style="list-style-type: none"> • “Of concern” regional ecosystems identified in the database maintained by the Department of Environment and Heritage Protection called ‘Regional ecosystem description database’ containing regional ecosystem numbers and descriptions.
certification	in relation to dams means assessment and approval must be undertaken by a suitably qualified and experienced person in relation to any assessment or documentation required by the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures</i> , including design plans, ‘as constructed’ drawings and specifications, construction, operation or an annual report regarding regulated structures, undertaken in accordance with the Board of Professional Engineers of Queensland Policy Certification by RPEQs (ID: 1.4 (2A)).
certifying, certify, or certified	have a corresponding meaning to certification.
clearing	means: <ul style="list-style-type: none"> • in relation to grass, scrub or bush—the removal of vegetation by disturbing root systems and exposing underlying soil (including burning), but does not include— <ul style="list-style-type: none"> ○ the flattening or compaction of vegetation by vehicles if the vegetation remains living; or ○ the slashing or mowing of vegetation to facilitate access tracks; or ○ the clearing of noxious or introduced plant species; and • in relation to trees—cutting down, ringbarking, pushing over, poisoning or destroying in any way.
“construction or constructed”	in relation to a dam includes building a new dam and modifying or lifting an existing dam, but does not include investigations and testing necessary for the purpose of preparing a design plan.
construction and operational purposes	in relation to the use of coal seam gas water means the construction, use, modification, maintenance, replacement, operation and decommissioning of industrial sites.
coal seam gas water	means underground water brought to the surface of the earth, or otherwise interfered with, in connection with exploring for or producing coal seam gas. Coal seam gas water is a waste, as defined under s13 of the <i>Environmental Protection Act 1994</i> .
consequence	in relation to a structure as defined, means the potential for environmental harm resulting from the collapse or failure of the structure to perform its primary purpose of containing, diverting or controlling flowable substances.
consequence category	means a category, either low, significant or high, into which a dam is assessed as a result of the application of tables and other criteria in the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i> .
critically limited regional ecosystem	means the ecosystems identified in Appendix 5 of the Queensland Biodiversity Offset Policy (Department of Environment and Heritage Protection, 2014).
dam	means a land-based structure or a void that contains, diverts or controls flowable substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and associated works.
dam crest volume	means the volume of material (liquids and/or solids) that could be within the walls of a dam at any time when the upper level of that material is at the crest level of that dam. That is, the instantaneous maximum volume within the walls, without regard to flows entering or leaving (for example, via spillway).
deed of agreement	means a legal agreement between the holder of the environmental authority and the administering authority. The deed of agreement governs the obligations of the holder of the environmental authority in relation to the <i>Queensland Biodiversity Offset Policy</i> . For clarity, the term deed of agreement in this environmental authority includes any subsequent version or amendment of the signed deed of agreement.
design plan	” is a document setting out how all identified consequence scenarios are addressed in the planned design and operation of a regulated structure.

design storage allowance or DSA	means an available volume, estimated in accordance with the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i> published by the administering authority, must be provided in a dam as at 1 November each year in order to prevent a discharge from that dam to an annual exceedance probability (AEP) specified in that Manual.
development well	means a petroleum well that is drilled to produce or store petroleum.
discharge area	means: (a) that part of the land surface where groundwater discharge produces a net movement of water out of the groundwater; and (b) identified by an assessment process consistent with the document: <i>Salinity Management Handbook</i> , Queensland Department of Natural Resources, 1997; or (c) identified by an approved salinity hazard map held by the Department of Environment and Heritage Protection.
ecosystem functioning	means the interactions between and within living and nonliving components of an ecosystem and generally correlates with the size, shape and location of an area of vegetation.
emergency action plan	means documentation forming part of the operational plan held by the holder or a nominated responsible officer, that identifies emergency conditions that sets out procedures and actions that will be followed and taken by the dam owner and operating personnel in the event of an emergency. The actions are to minimise the risk and consequences of failure, and ensure timely warning to downstream communities and the implementation of protection measures. The plan must require dam owners to annually update contact.
enclosed flare	means a device where the residual gas is burned in a cylindrical or rectilinear enclosure that includes a burning system and a damper where air for the combustion reaction is admitted.
end	means the stopping of the particular activity that has caused a significant disturbance in a particular area. It refers to, among other things, the end of a seismic survey or the end of a drilling operation. It does not refer to the end of all related activities such as rehabilitation. In other words, it does not refer to the 'completion' of the petroleum activity, the time at which the petroleum authority ends or the time that the land in question ceases to be part of an authority.
equivalent person" or "EP	means an equivalent person under volume 1, section 2 of the <i>Guidelines for Planning and Design of Sewerage Schemes</i> , October 1991, published by the Water Resources Commission, Department of Primary Industries, Fisheries and Forestry.
evaporation dam	means a land based structure designed to contain or impound CSG water, the purpose of which is to contain or impound the water, until the water content has been removed by evaporation.
existing structure	means a structure that was in existence or whose design plan has substantially commenced, prior to the adoption of this schedule of conditions under the authority (12 August 2014).
fill	means any kind of material in solid form (whether or not naturally occurring) capable of being deposited at a place but does not include material that forms a part of, or is associated with, a structure constructed in a watercourse, wetland or spring including a bridge, road, causeway, pipeline, rock revetment, drain outlet works, erosion prevention structure or fence.
flare pit	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.
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.
foreseeable future	means the period used for assessing the total probability of an event occurring. Permanent structures and ecological sustainability should be expected to still exist at the end of a 150 year foreseeable future with an acceptably low probability of failure before that time.
hazard	in relation to a dam as defined, means the potential for environmental harm resulting from the collapse or failure of the dam to perform its primary purpose of containing, diverting or controlling flowable substances.
high bank	means the defining terrace or bank or, if no bank is present, the point on the active floodplain, which confines the average annual peak flows in a watercourse.
holder	means: (a) where this document is an environmental authority, any person who is the holder of, or is acting under, that environmental authority; or (b) where this document is a development approval, any person who is the registered operator for that development approval.
hub	means more than one large compressor station and multiple items of fuel burning or combustion units located within three (3) km of each other and capable of burning fuel at a rate >500 kg/hr.
hydraulic performance	means the capacity of a regulated dam to contain or safely pass flowable substances based on the design criteria specified for the relevant consequence category in the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i> .
impacts to mapped State significant biodiversity values	means to have a negative effect on a State significant biodiversity value, as identified by the Queensland Biodiversity Offset Policy (Department of Environment and Heritage Protection, 2014) Examples may include, but are not necessarily limited to residual impact from: <ul style="list-style-type: none"> • clearing, removal or fragmentation of vegetation • interference or disturbance of fauna habitat
impacts to watercourse, wetland, lake or spring with state significant biodiversity values	means to have a negative effect on a watercourse, wetland, lake or spring with state significant biodiversity values as identified in Appendix 1 of the <i>Queensland Biodiversity Offsets Policy</i> (Department of Environment and Heritage Protection, 2014) resulting from petroleum activities that commenced after 8 March 2013.
infrastructure	means water storage dams, roads and tracks, equipment, buildings and other structures built for the purpose and duration of the conduct of the petroleum activities, but does not include other facilities required for the long term management of the impact of those activities or the protection of potential resources. Such other facilities include dams other than water storage dams (e.g. evaporation dams), pipelines and assets, that have been decommissioned, rehabilitated, and lawfully recognised as being subject to subsequent transfer with ownership of the land.
irrigation	means the application of water to any agricultural or silvicultural crop or to a garden cultivated for domestic use.
L _{Aeq} , adj, 15 mins	means an A-weighted sound pressure level of a continuous steady sound, adjusted for tonal character, that within a 15 minute period has the same square sound pressure as a sound level that varies with time.
lake	means: (a) a lagoon, swamp or other natural collection of water, whether permanent or intermittent; and (b) the bed and banks and any other element confining or containing the water.
land-based offset	means direct offsets, indirect offsets, and offset transfers.

landfill monocell	means a specialised, isolated landfill facility where a single specific waste type is exclusively disposed (i.e. salt).
leachate	means a liquid that has passed through or emerged from, or is likely to have passed through or emerged from, a material stored, processed or disposed of on site which contains soluble, suspended or miscible contaminants likely to have been derived from the said material.
legally secured	in relation to <u>land-based offsets</u> means any of the following legally binding mechanisms: <ul style="list-style-type: none"> • gazettal as a protected area (e.g., a nature refuge) under the <i>Nature Conservation Act 1992</i>; • declaration of an area of high nature conservation values under the <i>Vegetation Management Act 1999</i>; • use of a covenant under the <i>Land Title Act 1994</i> or <i>Land Act 1994</i>; or • another mechanism administered and approved by the State.
levee	means a dyke or bund that is designed only to provide for the containment and diversion of stormwater or flood flows from a contributing catchment, or containment and diversion of flowable materials resulting from unplanned releases from other works of infrastructure, during the progress of those stormwater or flood flows or those unplanned releases; and does not store any significant volume of water or flowable substances at any other times.
limited petroleum activities	mean only activities including: <ol style="list-style-type: none"> (a) geophysical surveys (including seismic activities); (b) well sites; (c) well pads; (d) sumps; (e) flare pits; (f) flow lines; and (g) supporting access tracks. <p>For clarity, limited petroleum activities do not include:</p> <ol style="list-style-type: none"> (a) the construction of infrastructure for processing or storing petroleum or by-products; (b) dams; (c) compressor stations; (d) campsites/workforce accommodation; (e) power supplies; (f) waste disposal; or other supporting infrastructure for the project.
linear infrastructure	means powerlines, pipelines, roads and access tracks.
livestock watering purposes	means the supply of water to any livestock.
long term noise event	is a noise exposure, when perceived at a sensitive receptor, persists for a period of greater than five (5) days, even when there are respite periods when the noise is inaudible within those five (5) days.
low consequence dam	means any dam that is not a high or significant consequence category as assessed using the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i> .
mandatory reporting level or MRL	means a warning and reporting level determined in accordance with the criteria in the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i> published by the administering authority.
manual	means the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i> published by the administering authority.

mapped State significant biodiversity values	means the regional ecosystems, essential habitat, wetlands, watercourses, legally secured offset areas and connectivity areas provided in Appendix 1 of the <i>Queensland Biodiversity Offset Policy</i> (Department of Environment and Heritage Protection, 2014) that are mapped in State mapping.
Max L_{pZ} , 15 min	means the maximum value of the Z-weighted sound pressure level measured over 15 minutes.
Max L_{pA} , 15 min	means the absolute maximum instantaneous A-weighted sound pressure level, measured over 15 minutes.
mg/L	means milligrams per litre.
medium term noise event	is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than five days and does not re-occur for a period of at least four weeks. Re-occurrence is deemed to apply where a noise of comparable level is observed at the same receptor location for a period of one hour or more, even if it originates from a difference source or source location.
meter	means a device for measuring, or giving an output signal proportional to, quantities of water passed and/or the rate of flow in a pipe."
mix-bury-cover method	means the stabilisation of residual drilling solids in the bottom of a sump by mixing with subsoil and which occurs in accordance with the following methodology: <ul style="list-style-type: none"> • the base of the subsoil and residual solid mixture must be separated from the groundwater table by at least one metre of a continuous layer of impermeable subsoil material (kw=10–8m/s) or subsoil with a clay content of greater than 20%; and • the residual solids is mixed with subsoil in the sump and cover; and • the subsoil and residual solids is mixed at least three parts subsoil to one part waste (v/v); and • a minimum of one metre of clean subsoil must be placed over the subsoil and residual solids mixture; and • topsoil is replaced.
modification or modifying	(see definition of 'construction').
Offset Area Management Plan (OAMP)	means a plan that meets the requirements listed under the heading 'Specific requirements for offset area management plans' in Criteria A3 – Information requirement of the <i>Queensland Biodiversity Offset Policy</i> (Department of Environment and Heritage Protection, 2014).
operational plan	includes: <ol style="list-style-type: none"> (a) normal operating procedures and rules (including clear documentation and definition of process inputs in the DSA allowance); (b) contingency and emergency action plans including operating procedures designed to avoid and/or minimise environmental impacts including threats to human life resulting from any overtopping or loss of structural integrity of the regulated structure.
pest	means species: <ol style="list-style-type: none"> (a) declared under the <i>Land Protection (Pest and Stock route Management) Act 2002</i>; (b) declared under Local Government model local laws; and (c) which may become invasive in the future.
populated area	includes towns and cities which have a population of 500 or more people and with a minimum density of 40 people/km ² .
prescribed storage gases	has the meaning provided in section 12 of the <i>Petroleum and Gas (Production and Safety) Act 2004</i> .

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 associated water for a petroleum tenure.
quarter	means the following periods of a calendar year: <ul style="list-style-type: none"> • 1 January to 31 March inclusive; • 1 April to 30 June inclusive; • 1 July to 30 September inclusive; and • 1 October to 31 December inclusive.
Register of Regulated Dams	includes: <ol style="list-style-type: none"> (a) Date of entry in the register; (b) Name of the dam, its purpose and intended/actual contents; (c) The consequence category of the dam as assessed using the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i>; (d) Dates, names, and reference for the design plan plus dates, names, and reference numbers of all document(s) lodged as part of a design plan for the dam; (e) Name and qualifications of the suitably qualified and experienced person who certified the design plan and 'as constructed' drawings; (f) For the regulated dam, other than in relation to any levees – <ol style="list-style-type: none"> (i) The dimensions (metres) and surface area (hectares) of the dam measured at the footprint of the dam; (ii) Coordinates (latitude and longitude in GDA94) within five metres at any point from the outside of the dam including its storage area (iii) Dam crest volume (megalitres); (iv) Spillway crest level (metres AHD). (v) Maximum operating level (metres AHD); (vi) Storage rating table of stored volume versus level (metres AHD); (vii) Design storage allowance (megalitres) and associated level of the dam (metres AHD); (viii) Mandatory reporting level (metres AHD); (g) The design plan title and reference relevant to the dam; (h) The date construction was certified as compliant with the design plan; (i) The name and details of the suitably qualified and experienced person who certified that the constructed dam was compliant with the design plan; (j) Details of the composition and construction of any liner; (k) The system for the detection of any leakage through the floor and sides of the dam; (l) Dates when the regulated dam underwent an annual inspection for structural and operational adequacy, and to ascertain the available storage volume for 1 November of any year; (m) Dates when recommendations and actions arising from the annual inspection were provided to the administering authority; Dam water quality as obtained from any monitoring required under this authority as at 1 November of each year.
regulated dam	means any dam in the significant or high consequence category as assessed using the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i> published by the administering authority.
regulated structure	includes land-based containment structures, levees, bunds and voids, but not a tank or container designed and constructed to an Australian Standard that deals with strength and structural integrity.

rehabilitation	means the process of reshaping and revegetating land to restore it to a stable landform and in accordance with the acceptance criteria set out in this environmental authority and, where relevant, includes remediation of contaminated land.
relevant offset objectives	means the relevant criteria listed under the heading 'When an offset ceases to have effect' in Criteria A2 – Legally securing biodiversity offsets of the Queensland Biodiversity Offset Policy (Department of Environment and Heritage Protection, 2014).
relevant offset rules	means the relevant criteria included in the Queensland Biodiversity Offset Policy (Department of Environment and Heritage Protection, 2014) including but not necessarily limited to: <ul style="list-style-type: none"> • for all offsets, the relevant criteria of Criteria B1 – Offset Rules except where an offset payment is used for which Part A and Part B Criteria do not apply; and • for land-based offsets, the relevant criteria of Criteria B1 – Offset Rules as well as Criteria A1 – Obtaining Ecological Equivalence.
remnant unit	means a continuous area of remnant vegetation representative of a single Regional Ecosystem type or a single heterogeneous unit (multiple Regional Ecosystem types that cannot be distinguished individually due to the scale of mapping).
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.
sensitive place	means: <ul style="list-style-type: none"> • a dwelling (including residential allotment, mobile home or caravan park, residential marina or other residential premises, motel, hotel or hostel; or • a library, childcare centre, kindergarten, school, university or other educational institution; • a medical centre, surgery or hospital; or • a protected area; or • a public park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment; or • a work place used as an office or for business or commercial purposes, which is not part of the petroleum activities and does not include employees accommodation or public roads.
sensitive receptor	means an area or place where noise (including low frequency, vibration and blasting) is measured investigate whether nuisance impacts are occurring and includes: <ul style="list-style-type: none"> • a dwelling (including residential allotment, mobile home or caravan park, residential marina or other residential premises, motel, hotel or hostel; or • a library, childcare centre, kindergarten, school, university or other educational institution; • a medical centre, surgery or hospital; or • a protected area; or • a public park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment; or • a work place used as an office or for business or commercial purposes, which is not part of the petroleum activities and does not include employees accommodation or public roads.
short term noise event	is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than eight hours and does not re-occur for a period of at least seven days. Re-occurrence is deemed to apply where a noise of comparable level is observed at the same receptor location for a period of one hour or more, even if it originates from a different source or source location.
significantly disturbed land or significant disturbance to land	has the meaning in Schedule 12, section 4 of the Environmental Protection Regulation 2008. Land is significantly disturbed if—

	<p>(a) it is contaminated land; or</p> <p>(b) it has been disturbed and human intervention is needed to rehabilitate it—</p> <p style="padding-left: 40px;">(i) to a condition required under the relevant environmental authority; or</p> <p style="padding-left: 40px;">(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.</p>
site	means the petroleum authority(ies) to which the environmental authority relates.
spillway	means a weir, channel, conduit, tunnel, gate or other structure designed to permit discharges from the dam, normally under flood conditions or in anticipation of flood conditions.
spring	means the land to which water rises naturally from below the ground and the land over which the water then flows.
stable	in relation to land, means landform dimensions are or will be stable within tolerable limits now and in the foreseeable future. Stability includes consideration of geotechnical stability, settlement and consolidation allowances, bearing capacity (trafficability), erosion resistance and geochemical stability with respect to seepage, <u>leachate</u> and related contaminant generation.
State significant biodiversity values	means those regional ecosystems, essential habitat, wetlands, watercourses, legally secured offset areas and connectivity areas provided in Appendix 1 of the Queensland Biodiversity Offsets Policy (Department of Environment and Heritage Protection, 2014).
stimulation	means a technique used to increase the permeability of a natural underground reservoir, including for example, cavitation, hydraulic fracturing/hydrofracturing, fracture acidizing and the use of proppant treatments.
structure	means dam or levee.
suitably qualified person	means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis to performance relative to the subject matter using the relevant protocols, standards, methods or literature.
suitably qualified and experienced person	<p>in relation to regulated structures means a person who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the <i>Professional Engineers Act 2002</i>, and has demonstrated competency and relevant experience:</p> <ul style="list-style-type: none"> • for regulated dams, an RPEQ who is a civil engineer with the required qualifications in dam safety and dam design. • for regulated levees, an RPEQ who is a civil engineer with the required qualifications in the design of flood protection embankments. <p>Note: It is permissible that a suitably qualified and experienced person obtain subsidiary certification from an RPEQ who has demonstrated competence and relevant experience in either geomechanics, hydraulic design or engineering hydrology.</p>
system design plan	means a plan that manages an integrated containment system that shares the required DSA and/or ESS volume across the integrated containment system.
third party auditor	means a suitably qualified person who is either a certified third party auditor or an internal auditor employed by the holder of the environmental authority and the person is independent of the day to day management and operation of activities covered by this environmental authority.
threatening processes	means processes, features and actions that can have a detrimental effect upon the health and viability of an area of vegetation. For example altered hydrology, land use practices, invasion by pest and weed species, land degradation, edge effects and fragmentation.

threshold regional ecosystem	means the ecosystems identified in Appendix 6 of the Queensland Biodiversity Offset Policy (Department of Environment and Heritage Protection, 2014).
tolerable limits	means a range of parameters regarded as being sufficient to meet the objective of protecting relevant environmental values. For example, a range of settlement for a tailings capping, rather than a single value, could still meet the objective of draining the cap quickly, preventing damage and limiting infiltration and percolation.
topsoil	means the surface (top) layer of a soil profile, which is more fertile, darker in colour, better structured and supports greater biological activity than underlying layers. The surface layer may vary in depth depending on soil forming factors, including parent material, location and slope, but generally is not greater than about 300mm in depth from the natural surface.
unacceptable risk	is when the results of a hazard assessment indicates that there is both a high consequence and a high likelihood of an event occurring such that the risk is classified as "high", "very high" or "extreme".
valid complaint	means a complaint the administering authority considers is not frivolous, nor vexatious, nor based on mistaken belief.
void	means any constructed, open excavation in the ground.
watercourse	has the meaning provided in s 5 of the <i>Water Act 2000</i> and includes the bed and banks and any other element of a river, creek or stream confining or containing water.
watercourse, wetland, lake or spring with State significant biodiversity values	are those described in Appendix 1 of the <i>Queensland Biodiversity Offsets Policy</i> (Department of Environment and Heritage Protection, 2014).
waters	includes all or any part of a river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water in natural or artificial watercourses, bed and banks of a watercourse, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and groundwater.
wetland	means an area shown as a wetland on a 'Map of referable wetlands', a document approved by the chief executive (environment). A map of referable wetlands can be viewed at www.ehp.qld.gov.au

End of Conditions

Department of Environment and Heritage Protection

Permit¹

Environmental Protection Act 1994

Environmental authority

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

Permit¹ number: EPPG00972513

Project Name: Dalby Expansion Project

Environmental authority takes effect 9 May 2017

The anniversary date of this environmental authority is **17 December**. An annual return and the payment of the annual fee will be due each year on this day.

Environmental authority holder(s)

Name	Registered address
Arrow Energy Pty Ltd ACN: 078 521 936	Level 39 111 Eagle Street BRISBANE CITY QLD 4000
Australian CBM Pty Ltd ACN: 067 312 029	Level 39 111 Eagle Street BRISBANE CITY QLD 4000
Arrow CSG (Australia) Pty Ltd ACN: 054 260 650	Level 39 111 Eagle Street BRISBANE CITY QLD 4000
Arrow (Tipton) Pty Ltd ACN: 114 927 507	Level 39 111 Eagle Street BRISBANE CITY QLD 4000
Arrow (Tipton Two) Pty Ltd ACN: 117 853 755	Level 39 111 Eagle Street BRISBANE CITY QLD 4000
Arrow (Daandine) Pty Ltd ACN: 114 927 481	Level 39 111 Eagle Street BRISBANE CITY QLD 4000
Stanwell Corporation Limited ACN: 078 848 674	Level 13 42 Albert Street BRISBANE CITY QLD 4000

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



Environmentally relevant activity and location details

Environmentally relevant activity(ies)	Location(s)
<p>Resource activity that is a petroleum activity prescribed in Schedule 2A of the <i>Environmental Protection Regulation 2008</i>:</p> <p>6 – a petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam</p> <p>7 – a petroleum activity involving injection of a waste fluid into a natural underground reservoir or aquifer</p> <p>8 – a petroleum activity or GHG storage activity, other than a petroleum activity an activity mentioned in any of items 1 to 7, that includes 1 or more activities mentioned in schedule 2 for which an aggregate environmental score is stated, namely:</p> <p>Electricity generation – generating electricity by using gas at a rated capacity of 10MW electrical or more</p> <p>Fuel burning – using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour</p> <p>Waste disposal – operating a facility for disposing of, in a year, more than 200 000t of regulated waste and any, or any combination, of the following –</p> <p>(a) general waste;</p> <p>(b) limited regulated waste;</p> <p>(c) if the facility is in a scheduled area – no more than 5t of untreated clinical waste in a year</p> <p>Sewage treatment – operating sewage treatment works, other than no-release works, with a total daily peak design capacity of more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme</p> <p>Water treatment – desalinating, in a day, more than 5ML of water, allowing the release of waste to waters other than seawater</p>	<p>Petroleum Lease (PL) 194 PL198 PL230 PL238 PL252 PL258 PL260</p>

Additional information for applicants**Environmentally relevant activities**

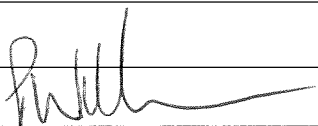
The description of any environmentally relevant activity (ERA) for which an environmental authority is issued is a restatement of the ERA as defined by legislation at the time the approval is issued. Where there is any inconsistency between that description of an ERA and the conditions stated by an environmental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

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

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

Contaminated land

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



Signature

9/5/17

Date

Phillip Wilkinson

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

Enquiries:

Petroleum and Gas (Assessment)
Department of Environment
and Heritage Protection
Floor 7, 400 George Street
GPO Box 2454
BRISBANE QLD 4001
Phone: (07) 3330 5715
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2

This environmental authority consists of the following schedules:

Schedule A	General Conditions
Schedule B	Water
Schedule BE	Coal Seam Gas Water Injection Trial
Schedule C	Regulated Dams
Schedule D	Land
Schedule E	Environmental Nuisance
Schedule F	Air
Schedule G	Waste
Schedule H	Rehabilitation
Schedule I	Monitoring Programs
Schedule J	Community Issues
Schedule K	Notification Procedures
Schedule L	Definitions

23

SCHEDULE A – GENERAL CONDITIONS

Authorised Petroleum Activities

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

Schedule A, Table 1 – Authorised Petroleum Activities

Petroleum Activity(ies)	Total Number of Authorised Petroleum Activities	Maximum Disturbance Authorised
Seismic	NA	120 ha
Total coal seam gas wells, including: <ul style="list-style-type: none"> • Core wells • Exploration wells • Development wells • Production wells 	691	691 wells 691 ha
Injection well(s) and associated facilities	1	4 ha
Compressor units	40	40 units, 8 ha
Central gas processing facilities	2	2 facilities, 8 ha
Regulated structures	22	22 dams
Water treatment facilities	2	12 ML/d (each), 2 ha
Sewage treatment plants	2	< 450 EP (each), 0.15 ha
Power stations	1	40 MW, 1.2 ha

Prevent or Minimise Likelihood of Environmental Harm

(A2) This environmental authority does not authorise environmental harm unless a condition contained in this environmental authority explicitly authorises that harm. Where there is no condition, the lack of a condition shall not be construed as authorising harm.

Maintenance of Measures, Plant and Equipment

(A3) The holder of the environmental authority must:

- (a) install all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority;
- (b) maintain such measures, plant and equipment in their proper and effective condition; and
- (c) operate such measures, plant and equipment in a proper and effective manner.

(A4) No change, replacement or alteration of any plant or equipment is permitted if the change, replacement or alteration materially increases, or is likely to increase, the environmental harm caused by the petroleum activity.

RW

Financial Assurance

- (A5) Petroleum activities that cause significant disturbance to land must not be carried out until financial assurance has been given to the administering authority as security for compliance with the environmental authority and for any costs or expenses, or likely costs or expenses, mentioned in section 298 of the *Environmental Protection Act 1994*.
- (A6) Prior to any changes in petroleum activities which would result in an increase to the maximum significant disturbance since financial assurance was last given to the administering authority, the holder of the environmental authority must amend the financial assurance and give the administering authority the increased amount of financial assurance.

Existing petroleum activities

- (A7) Conditions (D2) to (D17) and (D33) to (D36) in the Land Schedule relating to disturbance, only apply to petroleum activities which commenced after 15 March 2011 subject to the holder of the environmental authority having complied with all disturbance conditions of the relevant environmental authority that applied at the time the existing petroleum activity was constructed.

Third Party Audit

- (A8) A third party auditor, nominated by the holder of this environmental authority and accepted by the administering authority, must audit compliance with the conditions of this environmental authority at a minimum frequency of every three (3) years.
- (A9) Notwithstanding Condition (A7) and prior to undertaking the third party audit, the scope and content of the third party audit can be negotiated with the administering authority.

Note: Where minimal activities have been undertaken on a tenure, the negotiation of the scope of the third party audit may also include the postponing of the third party audit to an agreeable time between the holder of this environmental authority and the administering authority.

- (A10) An audit report of the audit required by Condition (A8) must be prepared and certified by the third party auditor presenting the findings of each audit carried out.
- (A11) The financial cost of the third party audit is to be borne by the holder of this environmental authority.
- (A12) The holder of this environmental authority must act upon any recommendations arising from the audit report by:
- (a) investigating any non-compliance issues identified; and
 - (b) as soon as practicable, implementing measures or taking necessary action to ensure compliance with the requirements of this environmental authority.
- (A13) Subject to Condition (A12), and not more than 60 business days following the submission of the audit report, the holder of this environmental authority must provide a written report to the administering authority addressing the:
- (a) actions taken by the holder to ensure compliance with this environmental authority; and
 - (b) actions taken to prevent a recurrence of any non-compliance issues identified.

- (A14) The audit report required by Condition (A10) and the written response to the audit report required by Condition (A13) must be submitted to the administering authority with the subsequent annual return.

Contingency Plan for Emergency Environmental Incidents

- (A15) A contingency plan for emergency environmental incidents which includes but is not limited to the impacts of flooding and the injection of treated CSG water, must be developed and implemented to respond to environmental emergency events and incidents where environmental harm is caused or threatened.
- (A16) The contingency plan for emergency environmental incidents required under Condition (A15) must address the following matters as a minimum:
- (a) a clear definition of what constitutes an environmental emergency incident for the activity;
 - (b) identification of the types of environmental incidents that may occur, relevant to the activities authorised to be carried out under this environmental authority;
 - (c) response procedures to be implemented to prevent or minimise the risk of environmental harm arising from environmental emergency incidents;
 - (d) response procedures to minimise the extent and duration of environmental harm caused by environmental emergency incidents;
 - (e) the practices and procedures to be employed to restore the environment or mitigate any environmental harm caused;
 - (f) communication procedures and lines of communication within and beyond the organisation to be employed in responding to environmental emergency incidents;
 - (g) the resources to be used in response to environmental emergency incidents;
 - (h) procedures to investigate the cause of any incidents, including releases, and where necessary, the remedial actions to be implemented to reduce the likelihood of recurrence of similar events;
 - (i) a receiving environment monitoring program (REMP) to be specifically implemented in the event of an unauthorised release to waters or land to examine and assess environmental impacts. For monitoring of waters, this program must include upstream, downstream and impact site monitoring procedures. For soils monitoring, sufficient samples must be taken from the soil profile at both a reference site and the impact site as a minimum;
 - (j) the provision and availability of documented procedures to staff attending any emergency environmental incident to enable them to effectively respond;
 - (k) training of staff that will be called upon to respond to emergency environmental incidents to enable them to effectively respond;
 - (l) timely and accurate reporting of the circumstance and nature of emergency environmental incidents to the administering authority in accordance with conditions of this environmental authority;
 - (m) procedures for accessing monitoring points during emergency environmental incidents; and
 - (n) procedures to notify any potentially impacted stakeholder who may be affected by an environmental emergency incident.

Documentation and Records Management

- (A17) All records and results required by the conditions of this environmental authority must be kept for a minimum of five (5) years.
- (A18) All documentation required by this environmental authority (including but not limited to plans, systems, programs, procedures, results of audits, assessments, monitoring, inspections and complaint records) must be made available to the administering authority upon request.

Cultural Heritage

(A19) In the carrying out of the petroleum activity the holder of this environmental authority must not adversely impact on the cultural heritage values of any place registered on the Queensland Heritage Register.

Underground Gas Storage

(A20) Testing, evaluating, developing and using natural underground reservoirs for petroleum storage or to store prescribed storage gases is not authorised under this environmental authority.

Stimulation of Underground Reservoirs

(A21) The stimulation of underground reservoirs is prohibited under this environmental authority.

Encapsulation of Solid Salt in a Landfill Monocell

(A22) The disposal of solid salt on site, including encapsulation of solid salt in a landfill monocell, is prohibited under this environmental authority.

RW

SCHEDULE B – WATER

Contaminant Release

- (B1) Contaminants that will or may cause environmental harm must not be directly or indirectly released to any waters except as authorised by Condition (B15).
- (B2) The release of contaminants directly or indirectly to waters authorised by Condition (B15):
- (a) must not produce any visible plume within the receiving waters; and
 - (b) must not produce any slick or other visible or odorous evidence of oil, grease or petrochemicals nor contain visible floating oil, grease, scum, litter or other objectionable matter.

Erosion and Sediment Control

- (B3) For activities involving significant disturbance to land, control measures that are commensurate to the sitespecific 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).

Maintenance and Cleaning

- (B4) The maintenance and cleaning of vehicles and any other equipment or plant must be carried out in areas from where the resultant contaminants cannot be released into any waters, roadside gutter or stormwater drainage system.

Watercourses, Wetlands and Springs

- (B5) In the carrying out of the petroleum activity the holder of this environmental authority must not clear vegetation or place fill, in or within:
- (a) 200 metres from any natural significant wetland;
 - (b) 100 metres from any natural wetland, lakes or springs; or
 - (c) 100 metres of the high bank of any other watercourse.
- (B6) The holder of this environmental authority must not excavate or place fill in a way that interferes with the flow of water in a watercourse, wetland, or spring, including works that divert the course of flow of the water or works that impound the water.
- (B7) Despite Conditions (B5) and (B6), pipeline and road construction works may be undertaken in watercourses, wetlands or springs where there is no reasonable and practicable alternative (such as the use of horizontal directional drilling methods), provided that the works are conducted in accordance with the following order of preference:
- (a) conducting work in times of no flow; and
 - (b) using all reasonable and practicable measures to reduce impacts in times of flow.

- (B8) Activities or works resulting in significant disturbance to the bed or banks of a watercourse or wetland, or a spring must:
- (a) only be undertaken where necessary for the construction and/or maintenance of roads, tracks and pipelines that are essential for carrying out the authorised petroleum activities and no reasonable or practicable alternative location exists;
 - (b) be no greater than the minimum area necessary for the purpose of the significant disturbance;
 - (c) be designed and undertaken by a suitably qualified person taking into account the matters listed in Section 5 - Planning Activities and Section 6 - Impact Management During Activities of the Department of Environment and Heritage Protection's "*Guideline – Activities in a watercourse, lake or spring associated with mining operations*" dated April 2008, or more recent editions as such become available; and
 - (d) upon cessation of the activities or works, commence rehabilitation immediately such that the final rehabilitation is to a condition that will ensure the ongoing physical integrity and the natural ecosystem values of the site.
- (B9) Sediment control measures must be implemented to minimise any increase in water turbidity due to carrying out petroleum activities in the bed or banks of a watercourse or wetland, or a spring.
- (B10) Routine, regular and frequent visual monitoring must be undertaken while carrying out construction work and/or any maintenance of completed works in a watercourse, wetland or spring.
- (B11) If, due to the petroleum activities, water turbidity increases in the watercourse, wetland or spring outside contained areas, works must cease and the sediment control measures must be rectified to limit turbidity before activities recommence.
- (B12) All measures must be taken to minimise adverse impacts to or reversal of any river improvement works carried out in River Improvement Areas by Queensland's River Improvement Trusts.

Note: Locations and details of River Improvement Areas and River Improvement Trusts are provided in the Schedule to the River Improvement Trust Regulation 1998.

Floodplains

- (B13) Where petroleum activities are carried out on floodplain areas, the holder of this environmental authority must ensure that petroleum and incidental activities do not:
- (a) concentrate flood flows that cause or threaten an adverse environmental impact;
 - (b) divert flood flows from natural drainage paths and alter flow distribution;
 - (c) increase the local duration of floods;
 - (d) increase the risk of detaining flood flows;
 - (e) pose an unacceptable risk to the safety of persons from flooding; or
 - (f) pose an unacceptable risk of damage to property from flooding.

Groundwater

- (B14) The extraction of groundwater as part of the petroleum activity from underground aquifers must not directly or indirectly cause environmental harm to any spring, wetland or other surface waters.

Release to Waters of Treated CSG Water

(B15) The release of treated CSG water is authorised to occur in accordance with *Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters* and *Schedule B Table 2 – Treated CSG Water Release Limits for Monitoring Point (M1)*.

Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters

Water Source and Location	Release Point	Location	Monitoring Point	Receiving Waters Description
Treated CSG Water from the reverse osmosis water treatment plant and treated water dam located on PL230	R1, defined as the outlet of discharge pipe to Wilkie Creek	6,995,465 N303,004 E (Easting and northing locations given as per GDA94, Map Zone 56)	M1, defined as the sample point in the discharge pipeline point to release into Wilkie Creek	Wilkie Creek

(B16) The quality of the treated CSG water being released must comply with each quality characteristic release limit and limit type and the monitoring frequency specified in *Schedule B, Table 2 – Treated CSG Water Release Limits for Monitoring Point (M1)* and *Schedule B, Table 3 – Treated CSG Water Release Limits for Monitoring Point (M1)* when measured at the monitoring point (M1) specified in *Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters*.

Schedule B Table 2 – Treated CSG Water Release Limits for Monitoring Point (M1)

Quality Characteristic	Unit	Release Limit(s)	Limit Type	Monitoring Frequency
Electrical conductivity	µS/cm	580	80 th percentile	Based on at least 5 samples with not less than 60 minutes between samples daily during release
pH	pH Unit	6.5 - 9	Range	Daily during release
Suspended Solids	mg/L	180	Maximum	Daily during release
Boron	mg/L	0.37	Maximum	Daily during release

Schedule B, Table 3 – Treated CSG Water Release Limits for Monitoring Point (M1)

Quality characteristic	Unit	Maximum Release limit	Monitoring frequency
Aluminium	mg/L	0.2	The first release day of each quarter
Antimony	ml/L	0.003	
Arsenic	mg/L	0.007	
Barium	mg/L	0.7	
Bisphenol A	mg/L	0.2	
Boron	mg/L	4	
Bromide	mg/L	7	

22

BTEX		
Benzene	mg/L	0.001
Toluene	mg/L	0.8
Ethylbenzene	mg/L	0.3
Xylene (m & p)	mg/L	0.6
Cadmium	mg/L	0.002
Chromium	mg/L	0.05
Copper	mg/L	2
Cyanide	mg/L	0.08
Fluoride	mg/L	1.5
Iodide	mg/L	0.5
Iron	mg/L	0.3
Lead	mg/L	0.01
Manganese	mg/L	0.5
Mercury	mg/L	0.001
Molybdenum	mg/L	0.05
Nickel	mg/L	0.02
Nonylphenol	mg/L	0.5
PAH (as B(a)P TEF)		0.01
<u>Species:</u>	<u>TEF:</u>	
benz[a]anthracene	0.1	µg/L
benzo[b+j]fluoranthene	0.1	
benzo[k]fluoranthene	0.1	
benzo[a]pyrene	1.0	
chrysene	0.1	
dibenz[a,h]anthracene	1.0	
indeno[1,2,3-cd]pyrene	0.1	
Selenium	mg/L	
Silver	mg/L	0.1
Strontium	mg/L	4
Total Petroleum Hydrocarbons (TPH)	mg/L	0.2
Vanadium	mg/L	0.05
Zinc	mg/L	3
Radium-226	mSv/year	0.5
Lead-210		<i>The dose for each parameter is summed to give the total dose which must be less than or equal to 0.5 mSv/year</i>
Polonium-210		
Radium-228		

- (B17) If the monitoring required by condition (B16) indicates that any of the quality characteristic release limits specified in *Schedule B, Table 3 – Treated CSG Water Release Limits for Monitoring Point (M1)* have been exceeded at any time during any release of treated CSG water, the environmental authority holder must, within five (5) business days of notifying the administering authority of the exceedance, unless a longer time is agreed to by the administering authority:
- complete an investigation into the exceedance, which includes an analysis of the (potential and actual) causes for the exceedance; and
 - provide a written report to the administering authority on completion of the investigation that includes:
 - details of the investigation carried out;
 - any actions taken to prevent impacts to waters that may be used for drinking water;
 - the cause for the exceedance;
 - all water quality monitoring results pertaining to the investigation;
 - any general observations;
 - methodology(ies) and any relevant calculations used; and

(vii) corrective actions to rectify the cause of the exceedance.

- (B18) Where an exceedance of a quality characteristic release limit specified in *Schedule B, Table 3 – Treated CSG Water Release Limits for Monitoring Point (M1)* is being investigated in accordance with condition (B17), the investigation and reporting required by condition (B18) is not required if a subsequent exceedance occurs, during investigation of the initial exceedance, which has resulted from the same cause that triggered the initial exceedance.

Flow Monitoring

- (B19) Prior to commencing any release of treated CSG water authorised under this environmental authority, a stream flow gauging station (GP1) must be installed.
- (B20) Upon practical completion of the meter installation, a completed 'meter installation form' must be signed by the installer and the environmental authority holder to confirm that the installation complies with the manufacturer's specifications and/or national standards and/or the Department of Environment and Heritage Protection's metering standards (whichever is applicable).
- (B21) The stream flow gauging station (GP1) must be installed in accordance with *Schedule B, Table 4 – Contaminant Release During Flow Events*.

Schedule B, Table 4 – Contaminant Release During Flow Events

Receiving water description	Gauging station description	Latitude or northing (GDA94)	Longitude or easting (GDA94)	Minimum Flow in Receiving Water Required for a Release Event	Flow recording Frequency
Wilkie Creek	Gauging station 1 (GP1)	50-100 metres upstream of Release Point R1	50-100 metres upstream of Release Point R1	0.14 m ³ /s	at 6 hour intervals during discharge (minimum twice daily)

- (B22) The stream flow gauging station (GP1) must be operated to determine daily stream flows in accordance with *Schedule B, Table 4 – Contaminant Release During Flow Events*.
- (B23) The flow rate of treated CSG water released from the release point authorised in *Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters* must not exceed a ratio of 1 part of the flow rate of the treated CSG water being released to 4 parts of the measured upstream receiving water flow rate.
- (B24) The volume of treated CSG water released from the release point authorised in *Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters* must not exceed a maximum of 8ML/day.
- (B25) The following characteristics of the release must be measured and recorded daily during all release events:
- the volume of treated CSG water released through the release point R1;
 - the date and time of release commencing and ceasing;
 - the release rate;
 - for any change in the release rate:
 - the date and time of the change;

- (ii) the new release rate; and
 - (iii) water levels and flow rate during the discharge event.
 - (e) water levels and flow rate during the discharge event;
 - (f) water quality characteristics monitoring results; and
 - (g) details of any observed impacts/conditions.
- (B26) Prior to commencing any release of treated CSG water authorised under this environmental authority, each monitoring and release point specified in *Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters* must be marked and readily identifiable from the banks of Wilkie Creek.
- (B27) The quality of the receiving waters must be monitored daily during release of treated CSG water at locations representative of the receiving waters determined in accordance with Condition (B33), for the following water quality characteristics:
- (a) Electrical conductivity ($\mu\text{S}/\text{cm}$)
 - (b) pH (pH Unit)
 - (c) Turbidity (NTU)
 - (d) Suspended Solids (mg/L)
 - (e) Calcium (mg/L)
 - (f) Magnesium (mg/L)
 - (g) Fluoride (mg/L)
 - (h) Sulphate (mg/l) and
 - (i) Boron (mg/L).
- (B28) If water has been released from authorised release points listed in *Schedule B, Table 1 – Contaminated Release Points, Sources and Receiving Waters*, the holder of this environmental authority must undertake an annual assessment of the contaminants of treated CSG water to determine the risk of environmental harm from release of treated CSG water to surface waters. This should consider the contaminants mentioned in the ANZECC & ARM CANZ 2000 guidelines. This annual assessment must be included in the Annual Return.

Receiving Environment Management Program – REMP

- (B29) Prior to the release of treated CSG water to Wilkie Creek a Receiving Environment Monitoring Program (REMP) must be developed and implemented to monitor, identify and describe any adverse impacts to surface water environmental values, water quality and flows due to the authorised release of treated CSG water to Wilkie Creek.
- (B30) The REMP required by Condition (B29) must include periodic monitoring for the effects of the release on the receiving environment as a result of treated CSG water releases to waters from the release location (R1) specified in *Schedule B – Table 1 Treated CSG Water Release Point, Source and Receiving Waters*.
- (B31) The quality of the receiving waters must be monitored at the locations specified in *Schedule B, Table 5 – Receiving Water Upstream Background Sties and Downstream Monitoring Points*.

Schedule B, Table 5 – Receiving Water Upstream Background Sites and Downstream Monitoring Points.

Monitoring Points	Receiving Waters	Latitude of Northing (GDA94)	Longitude or Easting (GDA94)
Upstream background monitoring point			
Monitoring Point (M2)	Wilkie Creek	50 – 100 metres upstream of Release Point R1	50 – 100 metres upstream of Release Point R1
Downstream monitoring point			
Monitoring Point (M3)	Wilkie Creek	150 – 200 metres downstream of Release Point R1	150 – 200 metres downstream of Release Point R1

(B32) The REMP required by Condition (B29) must:

- (a) assess the condition or state of receiving waters, including upstream conditions, spatially within the REMP area, considering background water quality characteristics based on accurate and reliable monitoring data that takes into consideration temporal variation (e.g. seasonality);
- (b) be designed to facilitate assessment against water quality objectives for the relevant environmental values that need to be protected;
- (c) include monitoring from background reference sites (e.g. upstream or background) and downstream sites from the release;
- (d) specify the frequency and timing of sampling required in order to reliably assess ambient conditions and to provide sufficient data to derive site specific background reference values in accordance with the *Queensland Water Quality Guidelines 2006*. This should include monitoring during periods of natural flow irrespective of other discharges;
- (e) include monitoring and assessment of dissolved oxygen saturation and temperature and all water quality parameters listed in Condition (B27);
- (f) include, where appropriate, monitoring of metals/metalloids in sediments (in accordance with ANZECC & ARM CANZ 2000, BATLEY and/or the most recent version of AS5667.1 *Guidance on Sampling of Bottom Sediments*);
- (g) include, where appropriate, monitoring of macroinvertebrates in accordance with the AusRivas methodology;
- (h) apply procedures and/or guidelines from ANZECC and ARM CANZ 2000 and other relevant guideline documents;
- (i) describe sampling and analysis methods and quality assurance and control; and
- (j) incorporate stream flow and hydrological information in the interpretations of water quality and biological data.

(B33) A report outlining the findings of the REMP, including all monitoring results and interpretations in accordance with conditions (B29) to (B32) must be prepared annually. This must include a determination of the risk of environmental harm from release of treated CSG water to the receiving environment waters.

(B34) The annual assessment must be prepared annually and made available on request to the administering authority.

Water Release Reduction Strategy

(B35) An on-going Release Reduction Strategy to maximise CSG water reuse and minimise any release to waters and the storage of CSG water in holding dams must be developed and implemented.

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- (B36) The strategy must address the following matters:
- (a) implementation of schemes to achieve maximum use of the water;
 - (b) specific targets for achieving increased use of CSG water both treated and untreated;
 - (c) a market analysis at least every three (3) years to identify existing and future opportunities for water use;
 - (d) on-going review of emerging technologies and/or re-use options that could achieve significant reductions in mass loads of contaminants released to the environment;
 - (e) investigation of the feasibility of alternative options, practices and procedures to further minimise the volume and concentration of contaminants released to waters; and
 - (f) programs to implement feasible options to achieve increased water use and reduction in contaminant loads, including actions and timeframes for completion.
- (B37) A progress report on the Release Reduction Strategy must be submitted to the administering authority with each annual return. The report(s) must address at least the following matters:
- (a) details of the specific options, practices and procedures investigated;
 - (b) details of new practices, procedures and programs implemented since the last reporting period and targets met;
 - (c) where alternative options, practices and procedures are not considered feasible, the provision of justification to support that determination; and
 - (d) details of the option(s) yet to be implemented, including the timeframes for implementation, and justification for the chosen option(s).
- (B38) The holder of this environmental authority must provide the administrative authority with safe access to facilitate inspections, and must comply with any instructions issued by the administrative authority relevant to the operation of the pump and meter installation.
- (B39) The holder of this environmental authority must notify the administering authority within five (5) business days of any meter malfunction or maintenance of the measuring device (meter).
- (B40) The holder of this environmental authority must arrange for the repair or replacement of a malfunctioning meter within five business days of becoming aware of the malfunction and provide a repair and/or maintenance completion report within ten business days of the repair or maintenance.

Sewage Treatment Works (21 – 450 EP)

Release of Treated Sewage Effluent Contaminants to Land

- (B41) Sewage pump stations must be fitted with a stand-by pump and a visible or audible high level alarm.
- (B42) Treated effluent may only be released to land at the designated, fenced and delineated contaminant release area(s).
- (B43) The contaminant release area(s) must be maintained in a proper and efficient condition so as to provide adequate assimilation, percolation, evaporation and transpiration of the released contaminants.
- (B44) Treated effluent must not be applied by spray irrigation and must be applied in a manner that does not cause ponding or runoff of effluent beyond the contaminant release area(s).
- (B45) When weather conditions or soil conditions preclude the release of contaminants, the contaminants must be directed to on-site storage or lawfully disposed of off-site.

Quality of Contaminants Released from the Sewage Treatment Works

- (B46) Treated effluent must comply, at the sampling and in-situ measurement point(s), with each of the release limits specified in *Schedule B, Table 5 - Treated Sewage Effluent Standards* for each quality characteristic.
- (B47) The release of contaminants to land must be monitored at the frequency and at the sampling and in-situ measurement point specified in *Schedule B, Table 5 - Treated Sewage Effluent Standards* and records of the monitoring results kept for at least five (5) years and made available to the administering authority on request.
- (B48) The influent annual average daily dry weather flow of sewage must not exceed 60 kilolitres per day for each authorised sewage treatment plant under this environmental authority.

Schedule B, Table 5 – Treated Sewage Effluent Standards

Quality Characteristic	Sampling and in-situ measurement Point Location	Limit Type	Release Limit	Frequency
5-day Biochemical Oxygen Demand (inhibited)	Release pipe from sewage treatment plant located on PL198;	Maximum	20 mg/L	Monthly
Suspended Solids		Maximum	30 mg/L	
pH		Range	6.0 to 9.0	
E-Coli	Release pipe from sewage treatment plant located on PL230	80 th percentile based on at least 5 samples with not less than 30 minutes between samples.	1000 cfu per 100 mL	
		Maximum	10000 cfu per 100 ml	

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SCHEDULE BE – COAL SEAM GAS WATER INJECTION TRIAL

- (BE1) The only fluids authorised to be injected into an aquifer(s) are those fluid types specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection*.
- (BE2) Fluid injection must be in accordance with the quantities and locations listed in *Schedule BE, Table 1 – Details of Authorised Fluid Injection*.

Schedule BE, Table 1 – Details of Authorised Fluid Injection

Well Location (Easting Northing, Map Zone 56)	Injection Well Number / Reference	Target Formation and Perforated Zone	Fluid Type	Maximum Injection Rate ML/d	Hydraulic Impact Zone	Water Quality Impact Zone
313669 E 6967949 N	Tipton-193	Precipice Formation, between 1040 m to 1110 m depth	Treated CSG water ¹	4	9,340 m radius from injection well	148 m radius from injection well

- (BE3) The holder of this environmental authority must notify the administering authority the commencement date of the trial at least seven (7) days prior to its commencement.
- (BE4) The injection trial is limited to a period of 180 days of injection, followed by a six-month recovery period.
- (BE5) Injection must cease immediately upon becoming aware that environmental harm is caused or threatened to be caused as a result of the injection activities.

Well Integrity

- (BE6) The construction of the Tipton-193 injection well must be carried out in accordance with the well construction requirements described in the most recent version of the Department of Environment and Heritage Protection’s “CSG Water Injection Well Construction Requirements”, as amended from time to time.
- (BE7) The Tipton-193 injection well must be mechanically functional such that there is no significant fluid movement into a water resource aquifer through vertical channels adjacent to the well bore hole.
- (BE8) The construction, operation and maintenance of the injection well specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* must be undertaken in a way that prevents and/or minimises impacts to the environmental values of the target formation and ensures the integrity of the bore.
- (BE9) The injection pressure must not exceed 90% of the formation fracture pressure.

Injection Fluid Quality

- (BE10) The quality of the fluid being injected into the injection well specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* must comply with the contaminant limits prescribed in *Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid*.

¹ Treated CSG water means any fluid that contains any proportion of treated CSG water, blended or otherwise.

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Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid

Quality Characteristics	Release Limits	Limit Type
pH (pH units)	Minimum 6.5, Maximum 10	Range
Total Dissolved Solids (TDS) ²	Mean TDS of injection fluid must not exceed median TDS of formation water measured in background water quality monitoring well	Maximum
Dissolved Oxygen	500 µg/L	Maximum
Total suspended solids	25 mg/L	Maximum

(BE11) The quality of the fluid being injected into the injection well specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* must be monitored at the frequency specified in *Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid*.

² Electrical conductivity (EC) is an acceptable proxy measurement for measuring TDS of the injection fluid. If used, the conversion from EC to TDS must be stated and confirmed with laboratory monitoring results.

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Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid

Monitoring parameter	Unit	Monitoring frequency during injection
Temperature of target formation	°C	N/A
Injection fluid temperature	°C	Continuous
Inlet pressure	KPa	Continuous
Fluid flow rate	L/sec	Continuous
	ML/day	Daily
Dissolved Oxygen (DO)	µg/L	Daily
Electrical Conductivity	µS/cm	Daily
pH	pH units	Daily
Turbidity	NTU	Daily
Sodium	mg/L	Weekly
Potassium	mg/L	Weekly
Calcium	mg/L	Weekly
Magnesium	mg/L	Weekly
Chloride	mg/L	Weekly
Sulphate as SO ₄	mg/L	Weekly
Carbonate / Bicarbonate	mg/L	Weekly
Bromine	mg/L	Monthly
Fluoride	mg/L	Monthly
Iodide	mg/L	Weekly
Silica	mg/L	Monthly
Iodine	mg/L	Monthly
Nitrate	mg/L	Monthly
Total organic carbon	mg/L	Weekly
Total Dissolved Solids	mg/L	Weekly
Redox Potential	mV	Weekly
Total Hardness as CaCO ₃	mg/L	Weekly
Total Alkalinity as CaCO ₃	mg/L	Weekly
Hydroxide alkalinity as CaCO ₃	mg/L	Weekly
Carbonate Alkalinity as CaCO ₃	mg/L	Weekly
Bicarbonate Alkalinity as CaCO ₃	mg/L	Weekly
Total suspended solids	mg/L	Weekly
Bromide	mg/L	Weekly
Aluminium	mg/L	Monthly
Arsenic	mg/L	Monthly
Barium	mg/L	Monthly
Boron	mg/L	Monthly
Copper	mg/L	Monthly
Iron	mg/L	Monthly
Manganese	mg/L	Monthly
Mercury	mg/L	Monthly
Nickel	mg/L	Monthly
Strontium	mg/L	Monthly
Zinc	mg/L	Monthly
Total Petroleum Hydrocarbons	µg/L	Monthly
BTEX	µg/L	Monthly

- (BE12) Notwithstanding Conditions (BE9) and (BE10), the injection of treated CSG water into the injection well specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* must have considered the recommendations for water blending described in the following documents, where appropriate:
- (a) *Surat Gas Project – Geochemical Blending and Compatibility Study: Tipton Injection Trials, March 2013*; and
 - (b) *Surat Gas Project – Geochemical Blending and Compatibility Study: Tipton Injection Trials – Phase 2, March 2013*.
- (BE13) The holder of this environmental authority must provide for non-chemical disinfection of injection fluid if results of six-monthly testing of injected fluid show levels of coliform bacteria, sulphate reducing bacteria or iron fixing bacteria that has potential to cause adverse impacts on the groundwater within the target formation.

Injection Management Plan

- (BE14) An Injection Management Plan which has been certified by a suitably qualified person must be developed and implemented prior to the carrying out of the trial fluid injection activity(ies).
- (BE15) The Injection Management Plan must include but not necessarily be limited to:
- (a) estimated volumes and rates of water to be injected;
 - (b) a description of the physical, chemical and biological components and their concentrations of the water to be produced;
 - (c) details of how and where the fluid will be produced, aggregated, stored and kept separate from other waters until it is treated and injected;
 - (d) details of where the fluid is proposed to be treated including a description of the treatment process;
 - (e) a water quality compatibility assessment which demonstrates that the injection fluid has inconsequential reactivity with the target formation and native groundwater it will come into contact with;
 - (f) the regional characteristics of the receiving environment;
 - (g) identification of the water quality impact zone and the hydraulic impact zone;
 - (h) identification of any fluid injection well, all existing bores, springs, lakes, wetlands, environmental assets and watercourses connected to groundwater, faults and other geologic features that occur within the water quality impact zone and the hydraulic impact zone;
 - (i) identification of the environmental values and water quality objectives of the potential water quality impact zone of the target formation in accordance with the *Environmental Protection (Water) Policy 2009* and the *Queensland Water Quality Guidelines 2009*;
 - (j) an assessment of the potential for migration of injection fluid or native groundwater out of the target formation through wells, bores, springs, connected watercourses, faults or other geologic features likely to impact on other aquifers;
 - (k) a risk assessment identifying potential hazards, their inherent risk, preventative measures for the management of potential hazards and details on sampling and analysis methods to verify preventative measures of potential hazards, including frequency and locations and quality assurance and control;
 - (l) control measures that will be implemented for fluid storage, treatment and injection to prevent or control the release of a contaminant or waste to the environment other than the release authorised in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* and *Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid*;
 - (m) verification methods to assess performance of the injection activities;
 - (n) the indicators or other criteria against which the performance of fluid injection will be assessed;
 - (o) procedures that will be adopted to regularly review the monitoring program;

- (p) reporting procedures to management and the administering authority should unforeseen or non-compliant monitoring results be recorded; and
- (q) procedures that will be implemented to prevent unauthorised environmental harm from unforeseen or non-compliant monitoring results.

Receiving Environment Monitoring Program – Injection Activities

- (BE16) A Receiving Environment Monitoring Program (REMP) for Injection Activities which has been certified by a suitably qualified person must be developed and implemented to monitor, identify and describe any adverse impacts to the following values of the target formation due to the injection of treated CSG water:
- (a) hydraulic response;
 - (b) water quality response; and
 - (c) any other groundwater environmental values identified.
- (BE17) The REMP for Injection Activities required by Condition (BE16) must be developed and implemented prior to the carrying out of the trial fluid injection activity(ies).
- (BE18) The REMP for Injection Activities required by Condition (BE16) must include, but not necessarily be limited to:
- (a) methods to validate the assumptions, predicted impacts and the effectiveness of the proposed preventative measures associated with the modelled water quality impact zone and hydraulic impact zone;
 - (b) monitoring of the hydraulic response to the trial injection at the well(s) referred to in Condition (BE18)(f)(ii);
 - (c) monitoring of the water quality of the injection fluid during injection for the parameters listed in *Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid*;
 - (d) monitoring of the water quality response following the completion of the injection trial recovery period through sampling of the target aquifer, within the water quality impact zone, for the parameters listed in *Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid*;
 - (e) a definition of the background water quality of the Precipice Sandstone to be used for monitoring compliance with *Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid* and for reporting in the Injection Trial Report required by Condition (BE19);
 - (f) the installation and use of a minimum of two wells:
 - (i) one of which accesses the target aquifer within the water quality impact zone; and
 - (ii) the other of which is placed at an adequate distance to determine the extent of the hydraulic response to the injection;
 - (g) methods for the analysis and interpretation and a description of the statistical basis on which conclusions will be drawn to verify the assumptions of the injection proposal; and
 - (h) a demonstration of how the REMP will validate assumptions, predicted impacts and the effectiveness of quality assurance and control measures.

Reporting Requirements for Fluid Injection Trials

- (BE19) Upon completion and within two (2) months of the completion of the injection trial's recovery period the holder of the authority must submit to the administering authority an Injection Trial Report prepared by a suitably qualified person.
- (BE20) The Injection Trial Report must include, but not necessarily be limited to:
- (a) details of the injection well including but not limited to:
 - (i) location details (GDA94);

- (ii) the inferred lithology³;
- (iii) casing details including type, outer diameter (mm), wall thickness (mm) and locations (depth from and to in metres);
- (iv) cementing details including type, hole diameter (mm), casing outer diameter (mm) and locations (depth from and to in metres);
- (v) calculated target formation fracture pressure; and
- (vi) target formation pressure prior to injection;
- (b) a detailed interpretation of the logs and other tests conducted during drilling and construction or refurbishment of the well against their specific objectives;
- (c) a completed well schematic diagram;
- (d) a temperature survey;
- (e) a cement integrity log;
- (f) outcomes of the injection trial including, but not limited to:
 - (i) well head injection rates versus formation pressure;
 - (ii) target formation pressure within the hydraulic impact zone during and upon completion of the trial;
 - (iii) hydraulic gradient of the target formation within the hydraulic impact zone upon completion of the trial;
 - (iv) the effectiveness of aquitards (including the stability of the aquitard) and aquicludes of confining the injected fluid within the target formation; and
 - (v) a detailed interpretation of the logs and other tests conducted during the injection trial against their specific objectives;
 - (vi) validation of conceptual framework for injection; and
 - (vii) additional hazards that were not identified earlier;
- (g) the results of the REMP for Injection Activities;
- (h) analysis of monitoring and operational data in terms of:
 - (i). validation of conceptual framework for injection; and
 - (ii). additional hazards that were not identified earlier;
- (i) a revised risk analysis that identifies all potential hazards, likelihood of various risk elements and associated consequences;
- (j) a revised water quality compatibility assessment which demonstrates that the injection fluid has inconsequential reactivity with the target formation and native groundwater it will come into contact with;
- (k) a re-evaluation of the hydraulic impact zone; and
- (l) a re-evaluation of the water quality impact zone.

Injection Cessation Report

(BE21) Following completion of the injection trial, a fluid injection cessation report which has been certified by a suitably qualified person must be submitted to the administering authority within two (2) months of completion of the injection trial's recovery period.

(BE22) The fluid injection cessation report must include, but not necessarily be limited to:

- (a) volumes of fluid injected at each well;
- (b) a risk assessment statement providing details on identified hazards including their inherent risk, summary of the results from the verification monitoring, preventative measures and the residual risk; and

³ Inferred lithology means the best available description of the lithology based upon historical drilling records, interpretation of logs and any other information that the suitably qualified person may have discovered.

- (c) a monitoring report outlining the methods and results of verification monitoring undertaken to assess the performance of the injection activities and preventative measures for identified hazards.

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SCHEDULE C – REGULATED DAMS**Assessment of consequence category**

- (C1) The consequence category of any structure must be assessed by a suitably qualified and experienced person in accordance with the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)* at the following times:
- (a) prior to the design and construction of the structure, if it is not an existing structure; or
 - (b) if it is an existing structure, prior to the adoption of this schedule; or
 - (c) prior to any change in its purpose or the nature of its stored contents.
- (C2) A consequence assessment report and certification must be prepared for each structure assessed and the report may include a consequence assessment for more than one structure.
- (C3) Certification must be provided by the suitably qualified and experienced person who undertook the assessment, in the form set out in the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*.

Design and construction of a regulated structure

- (C4) Conditions (C5) to (C9) inclusive do not apply to existing structures.
- (C5) All regulated structures must be designed by, and constructed under the supervision of, a suitably qualified and experienced person in accordance with the requirements of the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*.
- (C6) Construction of a regulated structure is prohibited unless the holder has submitted a consequence category assessment report and certification to the administering authority has been certified by a suitably qualified and experienced person for the design and design plan and the associated operating procedures in compliance with the relevant condition of this authority.
- (C7) Certification must be provided by the suitably qualified and experienced person who oversees the preparation of the design plan in the form set out in the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*, and must be recorded in the Regulated Dams/Levees register.
- (C8) Regulated structures must:
- (a) be designed and constructed in accordance with and conform to the requirements of the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*;
 - (b) be designed and constructed with due consideration given to ensuring that the design integrity would not be compromised on account of:
 - (i) floodwaters from entering the regulated dam from any watercourse or drainage line; and
 - (ii) wall failure due to erosion by floodwaters arising from any watercourse or drainage line.
 - (c) have the floor and sides of the dam designed and constructed to prevent or minimise the passage of the wetting front and any entrained contaminants through either the floor or sides of the dam during the operational life of the dam and for any period of decommissioning and rehabilitation of the dam.
- (C9) Certification by the suitably qualified and experienced person who supervises the construction must be submitted to the administering authority on the completion of construction of the regulated structure, and state that:

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

Operation of a regulated structure

- (C10) Operation of a regulated structure, except for an existing structure, is prohibited unless:
- (a) the holder has submitted to the administering authority:
 - (i) one paper copy and one electronic copy of the design plan and certification of the 'design plan' in accordance with condition (C6), and
 - (ii) a set of 'as constructed' drawings and specifications, and
 - (iii) certification of those 'as constructed drawings and specifications' in accordance with condition (C9), and
 - (iv) where the regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the DSA volume across the system, a copy of the certified system design plan.
 - (v) the requirements of this authority relating to the construction of the regulated structure have been met;
 - (vi) the holder has entered the details required under this authority, into a Register of Regulated Dams; and
 - (vii) there is a current operational plan for the regulated structures.
- (C11) For existing structures that are regulated structures:
- (a) where the existing structure that is a regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the DSA volume across the system, the holder must submit to the administering authority within twelve (12) months of the commencement of this condition a copy of the certified system design plan including that structure; and
 - (b) There must be a current operational plan for the existing structures.
- (C12) Each regulated structure must be maintained and operated, for the duration of its operational life until decommissioned and rehabilitated, in a manner that is consistent with the current operational plan and, if applicable, the current design plan and associated certified 'as constructed' drawings.

Mandatory reporting level

- (C13) Conditions (C14) to (C17) inclusive only apply to Regulated Structures which have not been certified as low consequence category for 'failure to contain – overtopping'.
- (C14) The Mandatory Reporting Level (the MRL) must be marked on a regulated dam in such a way that during routine inspections of that dam, it is clearly observable.
- (C15) The holder must, as soon as practical and within forty-eight (48) hours of becoming aware, notify the administering authority when the level of the contents of a regulated dam reaches the MRL.
- (C16) The holder must, immediately on becoming aware that the MRL has been reached, act to prevent the occurrence of any unauthorised discharge from the regulated dam.
- (C17) The holder must record any changes to the MRL in the Register of Regulated Structures.

Design storage allowance

- (C18) The holder must assess the performance of each regulated dam or linked containment system over the preceding November to May period based on actual observations of the available storage in each regulated dam or linked containment system taken prior to 1 July of each year.
- (C19) By 1 November of each year, storage capacity must be available in each regulated dam (or network of linked containment systems with a shared DSA volume), to meet the Design Storage Allowance (DSA) volume for the dam (or network of linked containment systems).
- (C20) The holder must, as soon as possible and within forty-eight (48) hours of becoming aware that the regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, notify the administering authority.
- (C21) The holder must, immediately on becoming aware that a regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, act to prevent the occurrence of any unauthorised discharge from the regulated dam or linked containment systems.

Annual inspection report

- (C22) Each regulated structure must be inspected each calendar year by a suitably qualified and experienced person.
- (C23) At each annual inspection, the condition and adequacy of all components of the regulated structure must be assessed and a suitably qualified and experienced person must prepare an annual inspection report containing details of the assessment and include recommended actions to ensure the integrity of the regulated structure.
- (C24) The suitably qualified and experienced person who prepared the annual inspection report must certify the report in accordance with the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*.
- (C25) The holder must:
- (a) Within 20 business days of receipt of the annual inspection report, provide to the administering authority:
 - (i) The recommendations section of the annual inspection report; and
 - (ii) If applicable, any actions being taken in response to those recommendations; and
 - (b) If, following receipt of the recommendations and (if applicable) actions, the administering authority requests a full copy of the annual inspection report from the holder, provide this to the administering authority within 10 business days of receipt of the request.

Transfer arrangements

- (C26) The holder must provide a copy of any reports, documentation and certifications prepared under this authority, including but not limited to any Register of Regulated Structures, consequence assessment, design plan and other supporting documentation, to a new holder on transfer of this authority.

Register of regulated dams

- (C27) A Register of Regulated Dams must be established and maintained by the holder for each regulated dam.
- (C28) The holder must provisionally enter the required information in the Register of Regulated Dams when a design plan for a regulated dam is submitted to the administering authority.
- (C29) The holder must make a final entry of the required information in the Register of Regulated Dams once compliance with condition (C10) and (C11) has been achieved.
- (C30) The holder must ensure that the information contained in the Register of Regulated Dams is current and complete on any given day.
- (C31) All entries in the Register of Regulated Dams must be approved by the chief executive officer for the holder of this authority, or their delegate, as being accurate and correct.
- (C32) The holder must, at the same time as providing the annual return, supply to the administering authority a copy of the records contained in the Register of Regulated Dams, in the electronic format required by the administering authority.

Transitional arrangements

- (C33) All existing structures that have not been assessed in accordance with either the Manual or the former *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams* must be assessed and certified in accordance with the Manual within 6 months of amendment of the authority adopting this schedule.
- (C34) All existing structures must subsequently comply with the timetable for any further assessments in accordance with the Manual specified in Table 1 (Transitional requirements for existing structures), depending on the consequence category for each existing structure assessed in the most recent previous certification for that structure.
- (C35) Table 1 ceases to apply for a structure once any of the following events has occurred:
 - (a) it has been brought into compliance with the hydraulic performance criteria applicable to the structure under the Manual; or
 - (b) it has been decommissioned; or
 - (c) it has been certified as no longer being assessed as a regulated structure.
- (C36) Certification of the transitional assessment required by C35 and C36 (as applicable) must be provided to the administering authority within six (6) months of amendment of the authority adopting this schedule.

Schedule C, Table 1 – Transitional hydraulic performance requirements for existing structures

Transition period required for existing structures to achieve the requirements of the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Dams</i>			
Compliance with criteria	High	Significant	Low
>90% and a history of good compliance performance in last 5 years	No transition required	No transition required	No transitional conditions apply. Review consequence

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			assessment every 7 years.
>70%-≤90%	Within 7 years, unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	Within 10 years, unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	No transitional conditions apply. Review consequence assessment every 7 years.
>50-≤70%	Within 5 years, unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	Within 7 years, unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	Review consequence assessment every 7 years.
≤50%	Within 5 years or as per compliance requirements (e.g. TEP timing)	Within 5 years or as per compliance requirements (e.g. TEP timing)	Review consequence assessment every 5 years.

SCHEDULE D – LAND**General**

- (D1) Contaminants that will or may cause environmental harm must not be directly or indirectly released to land except as permitted under this environmental authority.

Disturbance to Land – General

- (D2) Prior to conducting petroleum activities that involve significant disturbance to land, an assessment must be undertaken of the condition, type and ecological value of any vegetation in such areas where the activity is proposed to take place.
- (D3) The assessment required by Condition (D2) must be undertaken by a suitably qualified person and include the carrying out of field validation surveys, observations and mapping of any Category A, B or C Environmentally Sensitive Areas (ESA's) and the presence of species classed as endangered, vulnerable, rare or near threatened under the *Nature Conservation Act 1992* and for petroleum activities that commenced after 8 March 2013, areas containing State significant biodiversity values.
- (D4) If the assessment required by Conditions (D2) and (D3) indicates that a regional ecosystem (RE) mapped as 'Endangered' or 'Of Concern' by the Queensland Herbarium should be in a lower conservation value classification and the holder of this environmental authority wishes to undertake activities as if the ecosystem is of the lower conservation value they must notify the administering authority in writing before any significant disturbance to land takes place.
- (D5) The holder of this environmental authority, when carrying out petroleum activities must:
- (a) avoid, minimise or mitigate (in order of preference) any impacts on areas of vegetation or other areas of ecological value;
 - (b) minimise disturbance to land that may otherwise result in land degradation;
 - (c) ensure that for land that is to be significantly disturbed by petroleum activities:
 - (i) the top layer of the soil profile is removed;
 - (ii) stockpiled in a manner that will preserve its biological and chemical properties; and
 - (iii) used for rehabilitation purposes (in accordance with Condition (H4));
 - (d) avoid clearing mature trees; and
 - (e) prior to carrying out field based activities, make all relevant staff, contractors or agents carrying out those activities, aware of the location of any category A, B or C ESA's and the requirements of this environmental authority.

Note: This environmental authority does not authorise the taking of protected animals or the tampering with an animal breeding place as defined under the Nature Conservation Act 1992 and Regulations.

- (D6) In accordance with Condition (D5), if significant disturbance to land is unavoidable, the holder of this environmental authority must not clear vegetation or place fill:
- (a) in a way which significantly isolates, fragments or dissects tracts of vegetation resulting in a reduction in the current level of ecosystem functioning, ecological connectivity (i.e. stepping stone or contiguous bioregional/local corridor networks) and/or results in an increase in threatening processes (e.g. potential impacts associated with edge effects or introduced species);
 - (b) on slopes greater than 10% for activities other than pipelines and wells; or
 - (c) in discharge areas.

- (D7) Clearing of remnant vegetation shall not exceed ten (10) metres in width for the purpose of establishing tracks and 20 metres in width for dual carriageway roads unless otherwise authorised by a condition of this EA.
- (D8) Cleared vegetation must be stockpiled in a manner that facilitates respreading or salvaging and does not impede vehicle, stock or wildlife movements.

Disturbance to Land – Environmentally Sensitive Areas

- (D9) The holder of this environmental authority must ensure that petroleum activities, except as otherwise authorised by Condition (D17), (D18), (D19) and (D20) of this environmental authority:
- (a) are not conducted in any category A, B or C Environmentally Sensitive Areas (ESAs);
 - (b) are not conducted within 200m of any category A, B or C ESAs; and
 - (c) do not involve activities other than limited petroleum activities within the protection zone of a category A ESA (i.e. from 200m to 1km of the category A ESA), or within the protection zone of a category B or C ESA (i.e. from 200m to 500m of the category B or C ESA).

Note: Indicative ESA mapping is available on the Department of Environment and Heritage Protection's website at http://www.ehp.qld.gov.au/licences-permits/maps_of_environmentally_sensitive_areas.php

- (D10) Limited petroleum activities carried out in accordance with Condition (D9)(c) must be preferentially located in pre-existing areas of clearing or significant disturbance to the greatest practicable extent and avoid the clearing of mature trees.
- (D11) Despite Condition (D10), limited petroleum activities may be undertaken within 200m of, or in the following specified Category B and C ESAs:
- (a) 'Endangered' regional ecosystems;
 - (b) 'Of Concern' regional ecosystems;
 - (c) State Forests;
 - (d) Timber Reserves

provided that they do not overlap with any other Category A, B or C ESA or its associated protection zone.

- (D12) Where limited petroleum activities are proposed to be undertaken within 200m of, or in the Category B and C ESAs specified in Condition (D11), the holder of this environmental authority must:
- (a) be able to demonstrate that no reasonable or practicable alternative exists; and
 - (b) where the ESA is a State Forest or Timber Reserve:
 - (i) obtain written approval from the authority responsible for the administration of the *Forestry Act 1959*;
 - (ii) comply with all restrictions and conditions contained within the approval required under Condition (D12)(b)(i));
 - (iii) where the conditions of the approval required under Condition (D12)(b)(i) conflict with the conditions of this environmental authority, comply with the conditions of this environmental authority; and
 - (iv) provide a copy of the written approval required under Condition (D12)(b)(i) to the administering authority upon request.

- (D13) Where limited petroleum activities are undertaken within 200m of, or in the Category B or C ESAs specified in Condition (D11), disturbance to land must only be located and carried out in areas according to the following order of preference:
- (a) pre-existing cleared areas or significantly disturbed areas less than 200m from a Category C ESA;
 - (b) pre-existing cleared areas or significantly disturbed areas less than 200m from a Category B ESA;
 - (c) undisturbed areas less than 200m from a Category C ESA;
 - (d) undisturbed areas less than 200m from a Category B ESA;
 - (e) pre-existing areas of significant disturbance within a Category C ESA (e.g. areas where significant clearing or thinning has been undertaken within a RE, and/or areas containing high densities of weed or pest species which has inhibited re-colonisation of native regrowth);
 - (f) pre-existing areas of significant disturbance within a Category B ESA (e.g. areas where significant clearing or thinning has been undertaken within a RE, and/or areas containing high densities of weed or pest species which has inhibited re-colonisation of native regrowth);
 - (g) areas where clearing of a Category C ESA is unavoidable; and
 - (h) areas where clearing of a Category B ESA is unavoidable.
- (D14) Notwithstanding Conditions (D11) to (D13), where limited petroleum activities are proposed to be undertaken within 200m of, or in a Category B or C ESAs specified in Condition (D11), any vegetation clearing must not exceed any of the following areas:
- (a) if the disturbance relates to an Endangered or Of Concern RE, 10% of the remnant unit of Endangered or Of Concern RE as ground truthed and mapped before any activity commences as per Condition (D2) and (D3) of this environmental authority for the life of the project; and
 - (b) more than 30m² for the construction of a sump; or
 - (c) Described in Schedule D, Table 1 – Authorised vegetation clearing widths for linear infrastructure in ESAs and ESA buffers.

Schedule D, Table 1 – Authorised vegetation clearing widths for linear infrastructure in ESAs and ESA buffers

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

(d) dual carriage access tracks with overhead power lines only, or dual carriage access tracks with overhead power lines and a single pipeline	32
(e) additional clearing for take-off drains associated with (C)(a), (b), (c) or (d)	10
(f) Maximum ROW width for multiple pipelines that are co-located with access tracks	50
(D) Power lines:	
(a) overhead power lines not associated with access tracks or pipelines	23
(b) additional clearing for power line stays associated with (C)(a), (b), (c), (d), or (D)(a)	10

- (D15) For each well site within 200m of, or in a Category B or C ESA specified in Condition (D11), all reasonable and practical measures are taken to minimize the area cleared which must include but not be limited to, for each well site, ranked constraints mapping and a risk assessment which considers safety.
- (D16) Details of any significant disturbance to land undertaken within 200m of, or in a Category B or C ESA, along with a record of the assessment required by Conditions (D2) and (D3) must be kept and submitted to the administering authority upon request.
- (D17) Despite Condition (D9), the Daandine Brine Dam 2 and associated activities necessary for construction, operation, maintenance and monitoring of the dam, located within the area bound by the coordinates prescribed by *Schedule D, Table 1 – Coordinates Enclosing the Disturbance Area for Daandine Brine Dam 2*, are permitted within the protection zones of Category C Environmentally Sensitive Areas.

Schedule D, Table 1 – Coordinates Enclosing the Disturbance Area for Daandine Brine Dam 2

Point	Latitude or Northing (GDA94, Zone 56)	Longitude or Easting (GDA94, Zone 56)
1	7001708	297524
2	7001153	297384
3	7001051	298345
4	7001418	298444
5	7001601	298406
6	7001620	298190

- (D18) Despite Condition (D9), the water release outlet and pipeline and associated activities necessary for construction, operation, maintenance and monitoring for the release of treated CSG water to Wilkie Creek at the specified release point in *Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters* are authorised to occur in a Category B ESA and its associated protection zones.
- (D19) The construction of the water release outlet and pipeline are located within the area bound by the coordinates prescribed by *Schedule D, Table 2 – Coordinates Enclosing the Disturbance Area for the Water Release Outlet and Pipeline*.

Schedule D, Table 2 - Coordinates Enclosing the Disturbance Area for the Water Release Outlet and Pipeline.

Point	Latitude or Northing (GDA94, Zone 56)	Longitude or Easting (GDA94, Zone 56)	Area of disturbance
Valve Pit	6,995,424	302,897	0.18 ha
High Point on Bank	6,995,460	302,991	
Outlet at Creek	6,995,465	303,004	

(D20) Despite condition (D9), the Tipton Treated Water Pipeline and associated activities for construction, operation and maintenance, located within the area bound by the coordinates prescribed by *Schedule D, Table 3 – Coordinates Enclosing the Disturbance Area for Tipton Treated Water Pipeline*, are permitted.

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Schedule D, Table 3 - Coordinates Enclosing the Disturbance Area for Tipton Treated Water Pipeline

Point	Longitude or Easting (GDA94 Zone 56)	Latitude or Northing (GDA94 Zone 56)
Section 1	310652.74	6969686.79
	310656.46	6969747.37
	310696.37	6969744.59
	310661.46	6970447.79
	310621.2	6970452.8
	310651.4	6970651.7
	310611.1	6970656.7
	310641.76	6970845.55
	310601.68	6970846.23
	310707.02	6971627.3
	310667.1	6971629.9
	310658.71	6972161.37
	310618.1	6972166.9
	310621.4	6973392.1
	310581.2	6973398.7
	310613.31	6973549.7
	310573.47	6973549.7
	310638.9	6973649.7
	310538.9	6973549.7
	310608.18	6973649.7
	310568.35	6973649.7
	310638.9	6973549.7
	310538.9	6973649.7
Section 2	310617.24	6973719.35
	310576.78	6973723.95
	310722.26	6974060.43
	310681.96	6974065.49
	310716.82	6974171.95
	310676.51	6974177.14
	310714.46	6974220.51
	310674.59	6974216.76
	310692.43	6974377.64
	310653.85	6974364.72
	310692.43	6974377.64
	310567.32	6974520.53
	310616.71	6974514.14
	310563.13	6974528.08
	310612.67	6974521.66
	310498.88	6974536.4
	310593.85	6974610.18
310497.34	6974636.39	
Section 3	310533.76	6974846.47
	310493.94	6974834.72
	310533.6	6974856.85

	310493.52	6974862.31
	310528.48	6975191.65
	310488.41	6975196.69
	310526.05	6975350.54
	310485.78	6975347.13

Soil Management

- (D21) Topsoil must be managed in a manner that preserves its biological and chemical properties.
- (D22) 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.

Acid Sulfate Soils

- (D23) Acid sulfate soils must be treated and managed in accordance with the latest edition of the *Queensland Acid Sulfate Soil Technical Manual*.

Fauna Management

- (D24) Measures to prevent fauna being harmed from entrapment must be implemented during the construction and operation of well infrastructure, dams and pipeline trenches.

Pest management

- (D25) In carrying out the petroleum activity(ies) the holder of this environmental authority must develop and implement an effective pest management program by 18 October 2011 which has been certified by a suitably qualified person that includes but is not limited to the following:
- identification of pest species and infestation areas;
 - prevention and/or minimisation of the introduction and/or spread of pests;
 - control and management of pest outbreaks as a result of petroleum activities; and
 - details of community consultation in developing the pest management program.

Note: The pest management program required by Condition (D25) should consider the "Petroleum Industry (including coal seam methane gas) Minimising Pest Spread Guidelines" dated June 2008, or subsequent versions thereof. This document is available for download from: http://www.dpi.qld.gov.au/documents/Biosecurity_EnvironmentalPests/IPA-Minimising-Pest-Spread-Advisory-Guidelines.pdf

- (D26) A copy of the pest management procedures must be made available to any potentially affected landholders upon request.

Chemical and Fuel Storage

- (D27) Chemicals and fuels stored, must be effectively contained and where relevant, meet Australian Standards, where such a standard is applicable.

Pipelines

- (D28) Pipelines must be preferentially located alongside existing linear infrastructure such as roads, tracks and powerlines.

- (D29) Pipeline trenches must only be left open for the minimum time practicable.
- (D30) The length of pipeline trench open at any one time must be minimised as far as practicable.
- (D31) Completed pipeline construction areas must be:
- (a) a stable landform with no subsidence or erosion gullies for at least five (5) years;
 - (b) be re-profiled to original contours and established drainage lines;
 - (c) be visually consistent with the surround land features; and
 - (d) be reinstated to the pre-disturbed land use and soil suitability class.
- (D32) The holder of this environmental authority must monitor reinstated pipeline corridors for subsidence at least every 20 business days for the first 120 business days after reinstatement to ensure compliance with Condition (D31).

Impacts to State Significant Biodiversity Values

- (D33) Impacts to State significant biodiversity values are not authorised, except as permitted by conditions (D34) and (D35).
- (D34) Impacts to State significant biodiversity values can only occur if an offset is available that meets the relevant offset rules for that State significant biodiversity value.
- (D35) The offset required by (D34) must:
- (a) for land-based offsets:
 - (i) meet the relevant offset rules for the State significant biodiversity value being impacted;
 - (ii) be legally secured within 12 months of the impact occurring; and
 - (iii) remain in force until the relevant offset objectives have been met;
 - (b) for offset payments:
 - (i) meet the relevant offset rules for the State significant biodiversity value being impacted;
 - (ii) not be made for a critically limited regional ecosystem or a threshold regional ecosystem; and
 - (iii) be made within 4 months of the impact occurring.
- (D36) If conditions (D33) to (D35) have been triggered during an annual return period, the annual return must include the following details:
- (a) the type of State significant biodiversity value that was impacted;
 - (b) the date the impact to each State significant biodiversity value commenced;
 - (c) a GIS shape-file that shows the location and spatial extent of the residual impact to the State significant biodiversity value;
 - (d) the type of offset being provided for the State significant biodiversity value;
 - (e) how the offset meets the relevant offset rules;
 - (f) an offset area management plan that demonstrates how the relevant offset objectives will be met; and
 - (g) the date the offset was either legally-secured or the offset payment was made.

SCHEDULE E – ENVIRONMENTAL NUISANCE**Odour, dust and other airborne contaminants**

- (E1) The release of odour, dust or any other airborne contaminant(s), or light from the petroleum activity(ies) must not cause an environmental nuisance at any sensitive place.

Noise

- (E2) Prior to undertaking petroleum activities that will result in short-term, medium-term or long term noise events that are likely to impact on a sensitive receptor, the holder of this environmental authority must model or calculate any potential noise emissions from the relevant petroleum activity and determine if noise emissions are likely to exceed the noise levels specified in *Schedule E, Table 1 – Noise limits at Sensitive Receptors*.
- (E3) If noise modelling or the calculations indicates that petroleum activities are likely to exceed the noise levels specified in *Schedule E, Table 1 – Noise limits at sensitive receptors*, the holder of this environmental authority must prepare a Noise Management Plan prior to undertaking petroleum activities, which demonstrates how the noise limits specified in *Schedule E, Table 1 – Noise limits at sensitive receptors* will be achieved in the event of a valid noise complaint.
- (E4) Despite condition E3, for any petroleum activities existing at the time of issue of this environmental authority, if noise modelling or the calculations indicates that petroleum activities are likely to exceed the noise levels specified in *Schedule E, Table 1 – Noise limits at sensitive receptors*, the holder of this environmental authority must implement a Noise Management Plan, which demonstrates how the noise limits specified in *Schedule E, Table 1 – Noise limits at sensitive receptors* will be achieved in the event of a valid noise complaint.
- (E5) The Noise Management Plan must address, but not be limited to, the following matters:
- (a) a location based noise assessment to determine compliance with the noise limits in *Schedule E, Table 1 – Noise limits at Sensitive Receptors*
 - (b) the measured and/or predicted noise level of these noise sources and activities at noise sensitive receptors, taking into account any tonal or impulsive noise impacts;
 - (c) the reasonable and practicable control or abatement measures (including relocating the activity, hours of operation, or having an alternate arrangement in place with any potentially affected person) that can be undertaken to reduce identified intrusive noise sources;
 - (d) the level of noise at noise sensitive receptors that would be achieved from implementing these measures;
 - (e) the handling of future noise complaints;
 - (f) community liaison and consultation including but not limited consultation processes for when night time activities (i.e. between 10:00 pm and 6:00 am) are likely to exceed 25dBA; and
 - (g) training of staff and contractors in best available noise management practices.
- (E6) The emission of noise from the licensed place must not result in levels greater than those specified in *Schedule E, Table 1 – Noise limits at Sensitive Receptors* in the event of a valid complaint about noise being made to the administering authority.

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Schedule E, Table 1 – Noise Limits at Sensitive Receptors

Time Period	Metric	Short Term Noise Event	Medium Term Noise Event	Long Term Noise Event
7:00am – 6:00pm	$L_{Aeq,adj,15\ min}$ Max $L_{pA, 15\ mins}$	45 dBA 55 dBA	43 dBA 51 dBA	40 dBA 45 dBA
6:00pm – 10:00pm	$L_{Aeq,adj,15\ min}$ Max $L_{pA, 15\ mins}$	40 dBA 50 dBA	38 dBA 46 dBA	35 dBA 40 dBA
10:00pm – 6:00am	$L_{Aeq,adj,15\ min}$ Max $L_{pA, 15\ mins}$	28 dBA 38 dBA	28 dBA 36 dBA	28 dBA 33 dBA
6:00am – 7:00am	$L_{Aeq,adj,15\ min}$ Max $L_{pA, 15\ mins}$	40 dBA 50 dBA	38 dBA 46 dBA	35 dBA 40 dBA

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

Deemed background noise levels (L_{ABG}) for Schedule E, Table 1 – Noise Limits at Sensitive Receptors are:

7:00 am - 6:00pm: 35 dBA
 6:00 pm – 10:00 pm: 30 dBA
 10:00 pm – 6:00 am: 25 dBA
 6:00 am – 7:00 am: 30 dBA

- (E7) If the noise subject to a complaint is tonal or impulsive, the adjustments detailed in Schedule E, Table 2 – Adjustments to be Added to Noise Levels at Sensitive Receptors are to be added to the measured noise level(s) to derive $L_{Aeq, adj, 15\ min}$.

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

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

- (E8) Where alternative arrangements are in place with any affected person as referred to by Condition (E5)(c), the noise limits in Schedule E, Table 1 – Noise limits at Sensitive Receptors do not apply at that location for the duration for which the alternative arrangements are in place.

Low Frequency Noise

- (E9) Notwithstanding Condition (E2), emission of any noise below 315 Hz must not cause an environmental nuisance.
- (E10) Low frequency noise from the petroleum activities is not considered to be an environmental nuisance under Condition (E9) if monitoring shows that noise emissions do not exceed the following limits:
- 50 dB(Z) measured inside the sensitive receptor; and
 - the difference between the internal A-weighted and Z-weighted noise levels is no greater than 15 dB.

Vibration and Blasting Activities

- (E11) The holder of this environmental authority must develop a blast management plan in accordance with Australian Standard 2187 for each planned blasting activity before it is undertaken.
- (E12) The blast management plan required by Condition (E11) must include measures to minimise the likelihood of any adverse effects being caused by airblast overpressure and/or ground borne vibrations at any sensitive receptor and demonstrate current best practice environmental management.
- (E13) All blasting must be carried out in a proper manner by a suitably qualified person.
- (E14) All blasting must be carried out in accordance with the Blast Management Plan.
- (E15) Noise from blasting operations must not exceed an airblast overpressure level, when measured at or extrapolated to any sensitive receptor, of 115 dB (linear peak) for nine (9) out of any ten (10) consecutive blasts initiated nor 120 dB (linear peak) at any time.
- (E16) Ground-borne vibration peak particle velocity caused by blasting operations, when measured at or extrapolated to any sensitive receptor must not exceed more than 5 mm per second for nine (9) out of any ten (10) consecutive blasts initiated, or 10 mm per second at any time.

SCHEDULE F – AIR**Venting and flaring**

- (F1) Unless venting is authorised under the *Petroleum and Gas (Production and Safety) Act 2004* or the *Petroleum Act 1923*, waste gas must be flared in a manner that complies with all of (F1(a)) and (F1(b)) and (F1(c)), or with (F1(d)):
- (a) an automatic ignition system is used, and
 - (b) a flame is visible at all times while the waste gas is being flared, and
 - (c) there are no visible smoke emissions other than for a total period of no more than 5 minutes in any 2 hours, or
 - (d) it uses an enclosed flare.

Fuel Burning or Combustion Equipment

- (F2) The only type of fuel to be burned in fuel burning or combustion equipment under normal operating conditions is coal seam gas.
- (F3) Contaminant releases to air emitted from fuel burning and combustion equipment point sources that are capable of burning at least 500 kg in an hour must be directed vertically upwards without any impedance or hindrance.
- (F4) The holder of this environmental authority must maintain a register of fuel burning and combustion equipment that is capable of burning at least 500 kg of fuel in an hour that must include, as a minimum, the following information for each piece of equipment:
- (a) fuel burning or combustion equipment name and location;
 - (b) stack emission height (metres);
 - (c) minimum efflux velocity (m/s);
 - (d) mass emission rates (g/s); and
 - (e) contaminant concentrations (mg/Nm³ @ x %O₂ dry gas at 0°Celsius and 1 atmosphere).
- (F5) The holder of this environmental authority must ensure that the information contained in the register of fuel burning and combustion equipment is always current and complete.
- (F6) All entries in the register of fuel burning and combustion equipment must be certified by the chief executive officer for the tenure holder, or their delegate, as being accurate and correct.

Fuel Burning or Combustion Equipment Located Outside Hubs or Populated Areas

- (F7) Prior to the installation and operation of any new fuel burning or combustion equipment, that is capable of burning at least 500 kg of fuel in an hour, the holder of this environmental authority must conduct air dispersion modelling to calculate the ground level concentrations of emissions from all existing and proposed fuel burning or combustion equipment under maximum operating conditions (including other industry) within the ambient airshed and identify any potential impacts to air quality within the study area.
- (F8) The holder of this environmental authority must ensure that the calculated ground level concentrations required under Condition (F7) do not exceed the criteria for each air contaminant at sensitive receptors in *Schedule F, Table 1 – Maximum Ground Level Concentration Criteria*.

Schedule F, Table 1 – Maximum Ground Level Concentration Criteria

Contaminant	Concentration at 0°Celsius	Units	Averaging time	Relevant Sensitive Receptors
Nitrogen Dioxide	250	µg/m ³	1 hour	Human Health
Nitrogen Dioxide	62	µg/m ³	1 year	Human Health
Nitrogen Dioxide	33	µg/m ³	1 year	Ecosystems
Carbon Monoxide	11	mg/m ³	8 hour	Human Health

- (F9) The holder of this environmental authority must undertake emissions testing within 3 months post commissioning of any fuel burning and combustion equipment capable of burning at least 500 kg of fuel in an hour to verify the estimates used in the air dispersion modelling.
- (F10) Where the results of the emissions testing required under Condition (F9) indicate that the emission estimates used in the air dispersion modelling required under Condition (F7) are exceeded, the holder of this environmental authority must:
- (a) provide details to the administering authority within 10 **business days**;
 - (b) re-undertake the modelling based on the new information; and
 - (c) determine and implement appropriate pollution control measures to bring the emissions into compliance with the limits specified in *Schedule F, Table 1 – Maximum Ground Level Concentration Criteria*.

Fuel Burning and Combustion Equipment in Hubs and / or Places within 5 km of Populated Areas

- (F11) Fuel burning or combustion equipment that is capable of burning at least 500 kg of fuel in an hour must not be located in hubs or in places within 5km of a populated area unless it is specified in *Schedule F, Table 2 – Release of Contaminants to Air*.
- (F12) Fuel burning or combustion equipment located in hubs or in places within 5km of a populated area, that is capable of burning at least 500 kg of fuel in an hour, must only release contaminants to the atmosphere at a height and an efflux velocity not less than the corresponding height and velocity stated for that release point (RP) as provided for in *Schedule F, Table 2 - Release of Contaminants to Air*.
- (F13) Fuel burning or combustion equipment located in hubs or in places within 5km of a populated area, that is capable of burning at least 500 kg of fuel in an hour, must not release contaminants to the atmosphere from a release point at a mass emission rate in excess of that stated in *Schedule F, Table 2 - Release of Contaminants to Air*.

Schedule F, Table 2 - Releases of Contaminants to Air

Resource Authority	Field	Facility	Release Point No. (EA)	Unit Description	Minimum Release Height (m)	Minimum Efflux Velocity (m/sec)	NOx		CO	
							Maximum Release limit	Release limit type	Maximum Release limit	Release limit type
PL 230	Daandine	DD CGPF	A1	K-0001 Compressor 1	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A2	K-0002 Compressor 2	10	30	3.0	g/sec	5.5	g/sec

Resource Authority	Field	Facility	Release Point No. (EA)	Unit Description	Minimum Release Height (m)	Minimum Efflux Velocity (m/sec)	NOx		CO	
							Maximum Release limit	Release limit type	Maximum Release limit	Release limit type
PL 230	Daandine	DD CGPF	A3	K-0003 Compressor 3	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A4	K-0004 Compressor 4	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A5	K-0005 Compressor 5	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A6	K-0006 Compressor 6	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A7	K-0007 Compressor 7	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A8	K-9008 Compressor 8	17	17	1.4	g/sec	4.8	g/sec
PL 230	Daandine	DD CGPF	A9	K-9009 Compressor 9	17	17	1.4	g/sec	4.8	g/sec
PL 230	Daandine	DD CGPF	A10	K-9010 Compressor 10	17	17	1.4	g/sec	4.8	g/sec
PL 230	Daandine	DD CGPF	A11	K-9011 Inlet Fuel Screw Compressor Engine 11	8.5	30	1.5	g/sec	1.0	g/sec
PL 198	Tipton	TW CGPF	A14	K-0001 Compressor 1	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A15	K-0002 Compressor 2	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A16	K-0003 Compressor 3	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A17	K-0004 Compressor 4	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A18	K-0005 Compressor 5	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A19	K-0006 Compressor 6	7.6	30	6.8	g/sec	5.5	g/sec

Note 1: Minimum efflux velocity, maximum mass emission and maximum concentration are calculated at the Maximum Continuous Rating.

Note 2: This table comes into effect on 30 October 2015.

(F14) The holder of this environmental authority must undertake emissions testing within 3 months of the issue of this environmental authority of all fuel burning and combustion equipment listed in *Schedule F, Table 2 – Release of Contaminants to Air*.

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- (F15) The holder of this environmental authority must undertake air dispersion modelling using the results of the emission testing required under Condition (F14) to verify that emissions will not result in an exceedance of the maximum ground level concentration for each air contaminant listed in *Schedule F, Table 1 – Maximum Ground Level Concentration Criteria*.
- (F16) A report on the results of air emission testing and modelling required by conditions (F14) and (F15) must be provided to the administering authority with the next annual return.

SCHEDULE G – WASTE**General**

- (G1) All general and regulated waste must be removed from the site and sent to a site that is lawfully able to accept the waste under the *Environmental Protection Act 1994* except as permitted under another condition of this environmental authority.
- (G2) All regulated waste removed from the site must be undertaken by a person who holds a current authority to transport such waste under the provisions of the *Environmental Protection Act 1994*.
- (G3) Waste must not be burned or allowed to be burned on the licensed site.
- (G4) All waste fluids and muds resulting from drilling and exploration activities must be contained in a properly lined dam or containment structure for disposal, remediation or reuse where applicable.

Coal Seam Gas Water Management Plan

- (G5) A Coal Seam Gas Water Management Plan that includes but is not necessarily limited to the matters outlined in (a) and (b) must be implemented:
- (a) the matters required by sections 310D (5), 310D (6) and 662 of the *Environmental Protection Act 1994*; and
 - (b) a management strategy for all integrated coal seam gas water management operations.
- (G6) Where any inconsistency exists between the conditions of this environmental authority and the Coal Seam Gas Water Management Plan, the conditions of this environmental authority prevail.

Coal Seam Gas Water Use

- (G7) Written approval from the relevant Local Government must be obtained prior to the application of coal seam gas water on any local government controlled roads in accordance with Condition (G9).
- (G8) Produced water may be re-used in drilling and well hole activities.
- (G9) 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.
- (G10) Produced water may be used for construction and operation 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
 - (d) Does not harm vegetation surrounding the construction site.
- (G11) If there is any indication that any of the circumstances in condition (G8)(b)(i) to (G8)(b)(iv)) or (G9)(a) to (G9)(d)) is occurring the use must cease immediately and the affected area must be remediated without delay.

Supply of Coal Seam Gas Water to a Third Party

- (G12) Coal seam gas water may be transferred to a third party to be used for the following purposes subject to compliance with (G13) and (G14):
- (a) dust suppression if the coal seam gas water quality complies with the limits specified in *Schedule G, Table 1 – Water Contaminant Release Limits*;
 - (b) construction and operational purposes if the coal seam gas water quality complies with the limits specified in *Schedule G, Table 1 – Water Contaminant Release Limits*;
 - (c) irrigation and livestock watering purposes;
 - (d) the following industrial purposes:
 - (i) coal washing;
 - (ii) power stations; and
 - (iii) water treatment facilities.

Schedule G, Table 1 – Water Contaminant Release Limits

Water Quality Characteristics	Unit	Limit	Limit Type
pH	pH units	6.0 to 9.0	Range
Sodium Adsorption Ratio	ratio	6	80 th Percentile
		12	Maximum
Total Dissolved Solids	mg/L	1500	Maximum
Total Petroleum Hydrocarbons	mg/L	10	Maximum

- (G13) Any coal seam gas water supplied to a third party for irrigation and/or livestock watering purposes in accordance with Condition (G12)(c) must comply with the relevant trigger values contained in *ANZECC and ARMCANZ Water Quality Guidelines 2000*, or subsequent versions thereof.
- (G14) If the responsibility of coal seam gas water is given or transferred to a third party in accordance with Condition (G12), the holder of environmental authority must ensure that:
- (a) the responsibility of the coal seam gas water is given or transferred in accordance with a written agreement (the third party agreement); and
 - (b) the third party is made aware of the General Environmental Duty under section 319 of the *Environmental Protection Act 1994*.

Residual drilling material

- (G15) If sumps are used to store residual drilling material or drilling fluids, they must only be used for the duration of drilling activities.
- (G16) 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.
- (G17) Records must be kept to demonstrate compliance with condition (G15) and (G16).

SCHEDULE H – REHABILITATION**Rehabilitation planning**

- (H1) A Rehabilitation Plan must be developed by a suitably qualified person and must include the:
- (a) rehabilitation goals; and
 - (b) procedures to be undertaken for rehabilitation that will:
 - i. achieve the requirements of conditions (H2) to (H8), inclusive; and
 - ii. provide for appropriate monitoring and maintenance.

Transitional rehabilitation

- (H2) Significantly disturbed areas that are no longer required for the on-going petroleum activities, must be rehabilitated within 12 months (unless an exceptional circumstance in the area to be rehabilitated (e.g. a flood event) prevents this timeframe being met) and be maintained to meet the following acceptance criteria:
- (a) contaminated land resulting from petroleum activities is remediated and rehabilitated
 - (b) the areas are:
 - i. non-polluting
 - ii. a stable landform
 - iii. re-profiled to contours consistent with the surrounding landform
 - (c) surface drainage lines are re-established
 - (d) top soil is reinstated; and
 - (e) either:
 - i. groundcover, that is not a declared pest species, is growing; or
 - ii. an alternative soil stabilisation methodology that achieves effective stabilisation is implemented and maintained.

Final rehabilitation acceptance criteria

- (H3) All significantly disturbed areas caused by petroleum activities which are not being or intended to be utilised by the landholder or overlapping tenure holder, must be rehabilitated to meet the following final acceptance criteria measured either against the highest ecological value adjacent land use or the pre-disturbed land use:
- (a) greater than or equal to 70% of native ground cover species richness
 - (b) greater than or equal to the total per cent of ground cover
 - (c) less than or equal to the per cent species richness of declared plant pest species; and
 - (d) where the adjacent land use contains, or the pre-clearing land use contained, one or more regional ecosystem(s), then at least one regional ecosystem(s) from the same broad vegetation group, and with the equivalent biodiversity status or a biodiversity status with a higher conservation value as any of the regional ecosystem(s) in either the adjacent land or pre-disturbed land, must be present.

Final rehabilitation acceptance criteria in environmentally sensitive area

- (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 must be met:
- (a) greater than or equal to 70% of native ground cover species richness
 - (b) greater than or equal to the total per cent ground cover

- (c) less than or equal to the per cent species richness of declared plant pest species
- (d) greater than or equal to 50% of organic litter cover
- (e) greater than or equal to 50% of total density of coarse woody material; and
- (f) all predominant species in the ecologically dominant layer, that define the pre-disturbance regional ecosystem(s) are present.

Continuing conditions

- (H5) Conditions (H2), (H3) and (H4) continue to apply after this environmental authority has ended or ceased to have effect.

Remaining dams

- (H6) Where there is a dam (including a low consequence dam) that is being or intended to be utilised by the landholder or overlapping tenure holder, the dam must be decommissioned to no longer accept inflow from the petroleum activity(ies) and the contained water must be of a quality suitable for the intended on-going uses(s) by the landholder or overlapping tenure holder.

SCHEDULE I – MONITORING PROGRAMS**General**

- (11) The holder of this environmental authority must develop and implement a monitoring program, the result of which will demonstrate compliance with the conditions of this environmental authority.
- (12) All monitoring under this environmental authority must be conducted by a suitably qualified person.
- (13) All instruments, equipment and measuring devices used for measuring or monitoring in accordance with any condition of this environmental authority must be calibrated, and operated and maintained effectively.
- (14) All laboratory analyses and tests required to be conducted under this environmental authority must be carried out by a laboratory that has NATA certification for such analyses and tests, except as otherwise authorised by the administering authority.
- (15) The method of water sampling required by this environmental authority must comply with the version of the *Queensland Monitoring Water Quality Sampling Manual*⁴ that is current at the time the sampling is undertaken.

Note: Condition (15) requires the version of the Queensland Monitoring Water Quality Sampling Manual that is current at the time the sampling is undertaken to be followed and where it is not followed because of exceptional circumstances this should be explained and reported with the results.

- (16) Notwithstanding condition (15), when sampling a water quality limit in *Schedule B, Table 3 – Treated CSG Water Release Limits for Monitoring Point (M1)* records a test result of “no result” or “laboratory error”, a supplementary sample must be collected and tested as soon as practicable after the initial sampling event.
- (17) Any management or monitoring plans, systems, programs or procedures required to be developed and implemented by a condition of this environmental authority must be reviewed for performance and amended if required on an annual basis in accordance with the requirements for the particular plans, systems, programs and procedures.
- (18) If monitoring conducted in accordance with this environmental authority indicates a condition or contaminant level that has caused, or has potential to cause, environmental harm, the environmental authority holder must:
- (a) as soon as is practicable, take the necessary actions to rectify the condition or contaminant level so as to avoid or minimise environmental harm; and
 - (b) notify the administering authority of the condition or contaminant level and the actions taken to rectify it.
- (19) An annual monitoring report must be prepared each year and submitted to the administering authority upon request. This report shall include but not be limited to:
- (a) a summary of the previous twelve (12) months monitoring results obtained under any monitoring programs required under this environmental authority and, a comparison of the previous twelve

⁴ The version that is current as at the 8 March 2013 is *Monitoring and Sampling Manual 2009 – Environmental Protection (Water) Policy 2009 Version 2 September 2010*.

- (12) months monitoring results to both the limits set in this environmental authority and to relevant prior results; the date on which the samples was taken;
- (b) the time at which the samples was taken;
 - (c) the monitoring point at which the sample was taken;
 - (d) the release flow rate of any authorised discharges to waters from all release points;
 - (e) the results of all monitoring and details of any exceedences with the conditions of this environmental authority and the dates and times these exceedences were reported to the administering authority.
 - (f) a summary of all records of quantities of releases required to be kept under this environmental authority including the total volume of any authorised discharges to waters for the previous yearly period from all release points and the individual daily volume of any authorised discharges to waters from all release points;
 - (g) details of all maintenance or work carried out on any discharge meter(s) and the impact (if any) on the release volume readings;
 - (h) an evaluation/explanation of the data derived from any monitoring programs;
 - (i) data analyses and interpretation to assess the nature and extent of any contamination and, if so, the level of environmental harm caused as a result of the contamination and the environmentally relevant activity; and
 - (j) an outline of actions taken or proposed to minimise the risk of environmental harm from any condition or elevated contaminant level identified by the monitoring or recording programs.
- (110) The evaluation and explanation of data for the purposes of the annual monitoring report must be performed by a suitably qualified person.
- (111) The holder of this environmental authority must continue to conduct monitoring as per that prescribed in Conditions (I12) to (I18) for a minimum of five (5) years after the activities prescribed in Condition (A1) have ceased and submit the results annually in accordance with Condition (I19).

Groundwater Monitoring

- (112) The Groundwater Monitoring Program, which must be implemented, must be able to detect any significant risks and changes to groundwater quality and level as a result of activities authorised under this environmental authority and must:
- (a) be developed, installed and maintained by a suitably qualified person in the fields of hydrogeology, groundwater sampling design and groundwater monitoring program design;
 - (b) include locations of monitoring points, parameters to be measured, frequency of monitoring, monitoring methodology used, and trigger values;
 - (c) include procedures to establish background groundwater quality;
 - (d) a sufficient number of monitoring sites to provide information on the following:
 - (i) seepage to groundwater and surrounding soils from any regulated dam authorised under this environmental authority and its effect on groundwater and soils; and
 - (ii) background monitoring sites (i.e. groundwater quality in representative bore(s) that have not been affected by the activities authorised under this environmental authority);
 - (e) conduct a geodetic survey of all groundwater monitoring bores to determine the relative water surface elevations, measured to the nearest millimetre in each bore and reported in metres relative to the AHD;
 - (f) determine the hydraulic conductivity, groundwater flow direction and groundwater flow rate; and
 - (g) include a rationale containing details on the program purpose, program conceptualisation and verification of assumptions.

- (I13) All groundwater bores must be installed according to the standards outlined in the latest edition of the Department of Environment and Heritage Protection's *Minimum Construction Requirements for Water Bores in Australia or the Minimum Standards for the Construction and Reconditioning of Water Bores that Intersect the Sediments of Artesian Basins in Queensland*.
- (I14) Groundwater monitoring bores must be constructed by, or under the supervision of a licensed Queensland water bore driller who has the correct endorsements on their licence for the type of activity being performed.
- (I15) The Groundwater Monitoring Program must provide for monitoring of groundwater quality as often as necessary to detect impacts of the petroleum activities authorised under this environmental authority, but not for fewer parameters or less frequently than that specified in *Schedule I, Table 1 – Minimum Groundwater Monitoring Parameters and Monitoring Frequency* and in compliance with Condition (I16).
- (I16) Groundwater samples taken as part of the Groundwater Monitoring Program must be analysed for, but not be limited to, the water quality parameters at the minimum frequencies specified in *Schedule I, Table 1 – Minimum Groundwater Monitoring Parameters and Monitoring Frequency*.

Schedule I, Table 1 – Minimum Groundwater Monitoring Parameters and Monitoring Frequency

Groundwater parameter	Monitoring frequency
Flow [m/hr]	Biannually
Water level to the nearest millimetre [m AHD]	Biannually
Groundwater Pressure in Geological Strata [kPa]	Biannually
pH	Biannually
Electrical conductivity [μ S/m]	Biannually
Total Dissolved Solids [mg/L]	Biannually
Temperature [$^{\circ}$ C]	Biannually
Dissolved Oxygen [mg/L]	Biannually
Alkalinity as CaCO ₃ [mg/L]	Biannually
Residual Alkali [mq/L]	Biannually
Anions (bicarbonate, carbonate, hydroxide, chloride, fluoride, sulphate) [mg/L]	Biannually
Cations (aluminium, calcium, magnesium, potassium, sodium) [mg/L]	Biannually
Silica [mg/L]	Biannually
Total and dissolved Iron, manganese, zinc, aluminium, boron, copper, phosphorous [mg/L]	Biannually
Ammonia, nitrate, nitrite [m/L]	Biannually
Total Petroleum Hydrocarbons [mg/L]	Biannually
Polycyclic Aromatic Hydrocarbons [mg/L]	Biannually
Benzene, Toulene, Ethyl-benzene, Xylenes (BTEX) [mg/L]	Biannually

- (I17) All groundwater monitoring bores must be maintained in an operative condition and be reasonably accessible at all times to any authorised person.
- (I18) If groundwater monitoring indicates that any significant changes in groundwater quality caused by petroleum activities are detected, then information must be submitted to the administering authority within 10 business days of receipt of the analysis indicating these changes, including any proposed actions to mitigate the changes in groundwater quality.

Air Monitoring (Point Source)

- (I19) The holder of this environmental authority must conduct a monitoring program of contaminants released to the atmosphere at each release point recorded in the register of fuel burning and combustion equipment for the contaminants and efflux velocities listed in *Schedule F, Table 2 - Releases of Contaminants to Air* and at the frequencies specified in *Schedule I, Table 3 – Monitoring Frequency for Contaminants*.

Schedule I, Table 3 – Monitoring Frequency for Contaminants

Contaminant	Monitoring frequency
NOx as Nitrogen Dioxide	Within three (3) months after commissioning of any fuel burning equipment; and annually thereafter.
Carbon monoxide	

- (I20) The monitoring program must include, but not necessarily be limited to:
- (a) monitoring provisions for the release points which complies with the most recent edition of Australian Standard 4323.
 - (b) tests for each sample taken at each release point specified in the register of fuel burning or combustion equipment including:
 - (i) gas velocity, volume and mass flow rate;
 - (ii) temperature; and
 - (iii) water vapour concentration (for non-continuous sampling);
 - (c) representative samples of the contaminants discharged when operating under maximum operating conditions;
 - (d) the collection of production rate and plant status during sampling periods; and
 - (e) monitoring of contaminant release carried out in accordance with the latest edition of the Department of Environment and Heritage Protection's "Air Quality Sampling Manual" 1997, as amended from time to time.

Monitoring of Contaminant Releases to the Atmosphere

- (I21) When requested by the administering authority, contaminant monitoring and recording must be undertaken to investigate any complaint, and the results notified with 14 days to the administering authority. When monitoring is requested the following must be complied with:
- (a) the holder of this environmental authority must conduct and keep records of a monitoring program of contaminant release to the atmosphere at the release points, frequency, and the parameters specified in *Schedule I, Table 4 – Required Monitoring* which complies with the following:
 - (b) Monitoring provision for the release points listed in *Schedule I, Table 4 – Required Monitoring* must comply with the Australian Standard AS4323.1 – 1995 'Stationary source emissions Method 1: Selection of sampling provisions' or subsequent versions as they become available.
 - (c) The following tests must be performed for each required determination specified in *Schedule I, Table 4 – Required Monitoring* :
 - (i) gas velocity and volume flow rate;
 - (ii) temperature and oxygen content;
 - (iii) water vapour concentration (moisture content).
 - (d) Where practicable samples taken must be representative of the contaminants discharged when emissions are expected to be at maximum rates.
 - (e) During the sampling period the following additional information must be gathered:

- (i) fuel used;
- (ii) number of equipment and operating units; and
- (iii) reference to actual test methods and accuracies.

Schedule I, Table 4 – Required Monitoring

Determination Required	Release Point Numbers	Frequency ²
Mass emission rate (g/s) and concentration (mg/Nm ³) of oxides of nitrogen (NOx) in the flue gas at the 5% oxygen reference level.	Stacks A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A14, A15, A16, A17, A18, A19.	Within three months upon the granting of the environmental authority and then annually thereafter

²Note: Out of the seven (7) release points A1 to A7, at least three (3) stacks must be monitored each year on a rotational basis. Out of the four (4) release points A8 to A11, at least two (2) stacks must be monitored each year on a rotational basis. Out of the six (6) release points A14 to A19, at least three (3) stacks must be monitored each year on a rotational basis. Note: This table comes into effect on 30 October 2015.

Noise Monitoring

- (I22) The holder of this environmental authority must undertake noise monitoring when requested by the administering authority to investigate a complaint of environmental nuisance at a sensitive receptor within the reasonable and practicable timeframe nominated by the administering authority, and report the results to the administering authority within three (3) business days of completion of the monitoring.
- (I23) Noise monitoring and recording must include the following descriptor, characteristics and matters:
- (a) $L_{AN,T}$ (where N equals the statistical levels of 1, 10 and 90 and T=15);
 - (b) $L_{Aeq,adj, 15 mins}$;
 - (c) background noise level as $L_{A 90, T}$;
 - (d) Max $L_{pA, 15 mins}$
 - (e) the level and frequency of occurrence of impulsive or tonal noise and any adjustment and penalties to statistical levels;
 - (f) atmospheric conditions including temperature, relative humidity and wind speed and directions;
 - (g) effects due to any extraneous factors such as traffic noise;
 - (h) location, date and time of monitoring;
 - (i) if the complaint concerns low frequency noise, Max $L_{pZ, 15 min}$; and
 - (j) If the complaint concerns low frequency noise, one third octave band measurements in dB(LIN) for centre frequencies in the 10 – 200 Hz range for both the noise source and the background noise in the absence of the noise source.
- (I24) The method of measurement and reporting of noise levels and background sound pressure levels must comply with the latest edition of the administering authority's *Noise Measurement Manual* or the most recent version of Australian Standard 1055 Acoustics – description and measurement of environmental noise.

Nuisance Monitoring (other than Noise)

- (I25) When the administering authority advises the holder of this environmental authority of a complaint alleging nuisance other than noise, the holder must investigate the complaint and advise the administering authority in writing of the action proposed or undertaken to resolve the complaint.
- (I26) When requested by the administering authority, the holder of this environmental authority must undertake monitoring as specified by the administering authority, within a reasonable and practical timeframe nominated by the administering authority to investigate any complaint of environmental harm at any sensitive place.
- (I27) The results of the investigation (including an analysis and interpretation of the monitoring results) and abatement measures implemented must be provided to the administering authority within 10 business days of completion of the investigation, or receipt of the monitoring results, whichever is the latter.
- (I28) If monitoring in accordance with Condition (I26) and (I27), indicates that emissions exceed the limits set in this environmental authority or are causing environmental nuisance, then the holder of this environmental authority must:
- (a) address the complaint including the use of alternative dispute resolution services if required; and/or
 - (b) as soon as practicable implement abatement or attenuation measures so that light, dust, particulate or odour emissions from the authorised activities do not result in further environmental nuisance.

Impact Assessment

- (I29) Notwithstanding any other condition of the environmental authority, the environmental authority does not authorise any environmental harm arising from any release to the atmosphere of any of the contaminants mentioned in *Schedule I, Table 5 – Contaminants and Benchmarks for Evaluation*.
- (I30) For the purpose of ensuring and demonstrating compliance with Condition (I29), the holder of the environmental authority must implement the findings of the evaluation, conducted by a suitably qualified and experienced person and provided to the administering authority, of the potential environmental impacts of the contaminants mentioned in *Schedule I, Table 5 – Contaminants and Benchmarks for Evaluation*. The evaluation addresses all matters relevant to the assessment of potential for environmental impacts to occur and includes, but not be limited to:
- (a) Sampling, monitoring and analysis of the contaminants mentioned in *Schedule I, Table 5 – Contaminants and Benchmarks for Evaluation* for the range of plant operations likely to be encountered:
 - (i) entail sufficient levels of detection to adequately characterise the emissions; and
 - (ii) be representative; and complies with relevant Department of Environment and Heritage Protection's monitoring methods including the quality control requirements inherent in those methods;
 - (b) Using the air pollution dispersion models, an estimation of Ground Level Concentrations at the most sensitive nearest receptor(s) (using efflux velocity, temperature and flow rate) for emissions of the contaminants mentioned in *Schedule I, Table 5 – Contaminants and Benchmarks for Evaluation*;

- (c) A comparison between the worst case measured emissions with the benchmarks maximum GLC mentioned in *Schedule I, Table 5 – Contaminants and Benchmarks for Evaluation*;
- (d) The use of methods and guidelines for modelling and assessment of air pollutants approved by the New South Wales Department of Environment and Climate Change or by the Victoria Environmental Protection Agency.

Schedule I, Table 5 – Contaminants and Benchmarks for Evaluation

Contaminant	Averaging Periods	Maximum GLC concentration
Nitrogen dioxide	1 hour – health and wellbeing	250 µg/m ³ (at 0 °C)
	1 year – health and wellbeing	62 µg/m ³ (at 0 °C)
	1 year – health and biodiversity of ecosystems	33 µg/m ³ (at 0 °C)

SCHEDULE J – COMMUNITY ISSUES

- (J1) The holder of this environmental authority must maintain a record of complaints and incidents causing environmental harm, and actions taken in response to the complaint or incident; and
- (J2) The holder of this environmental authority must record the following details for all complaints received and provide this information to the administering authority on request:
- (a) name, address and contact number for complainant;
 - (b) time and date of complaint;
 - (c) reasons for the complaint as stated by the complainant;
 - (d) investigations undertaken in response to the complaint;
 - (e) conclusions formed;
 - (f) actions taken to resolve complaint;
 - (g) any abatement measures implemented to mitigate the cause of the complaint; and
 - (h) name and contact details of the person responsible for resolving the complaint.

SCHEDULE K – NOTIFICATION PROCEDURES

- (K1) In addition to the requirements under Chapter 7, Part 1, Division 2 of the *Environmental Protection Act 1994*, the administering authority must be notified through the Pollution Hotline and in writing, as soon as possible, but within 48 hours of becoming aware of any of the following events:
- (a) any unauthorised significant disturbance to land
 - (b) potential or actual loss of structural or hydraulic integrity of a dam
 - (c) when the level of the contents of any regulated dam reaches the mandatory reporting level
 - (d) when a regulated dam will not have available storage to meet the design storage allowance on 1 November of any year
 - (e) potential or actual loss of well integrity
 - (f) any unexplained increase in the seepage data recorded as a result of condition (I12)(d)(i) and (ii)
 - (g) unauthorised releases of any volume of prescribed contaminants to waters
 - (h) unauthorised releases of volumes of contaminants, in any mixture, to land greater than:
 - i. 200 L of hydrocarbons; or
 - ii. 200 L of stimulation additives; or
 - iii. 500 L of stimulation fluids; or
 - iv. 1 000 L of brine; or
 - v. 5 000 L of untreated coal seam gas water; or
 - vi. 5 000 L of raw sewage; or
 - vii. 10 000 L of treated sewage effluent.
 - (i) the use of restricted stimulation fluids
 - (j) groundwater monitoring results from a landholder's active groundwater bore monitored under the stimulation impact monitoring program which is a 10% or greater increase from a previous baseline value for that bore and which renders the water unfit for its intended use
 - (k) monitoring results where two out of any five consecutive samples do not comply with the relevant limits in the environmental authority.

Fluid Injection Notification

- (K2) The Department of Environment and Heritage Protection must be notified in writing as soon as reasonably practicable, but within 48 hours of becoming aware of:
- (a) migration of injected fluid out of the target formation; or
 - (b) a loss of hydraulic isolation of the target formation; or
 - (c) the detection of groundwater contaminants that were not detected in background samples; or
 - (d) an injection fluid monitoring result that does not comply with any one of the parameters in *Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid*.

SCHEDULE L DEFINITIONS

Note: Where a term is not defined in this environmental authority the definition in the Environmental Protection Act 1994, its regulations and Environmental Protection Policies or the Petroleum and Gas (Production and Safety) Act 2004 and its regulations must be used in that order.

acid sulfate soils	means soil or sediment containing highly acidic soil horizons or layers affected by the oxidation of iron sulfides (<i>actual acid sulfate soils</i>) and/or soil or sediment containing iron sulfides or other sulfidic material that has not been exposed to air and oxidised (<i>potential acid sulfate soils</i>). The term acid sulfate soil generally includes both actual and potential acid sulfate soils. Actual and potential acid sulfate soils are often found in the same soil profile, with actual acid sulfate soils generally overlying potential acid sulfate soil horizons.								
active	for the purposes of landholders' groundwater bores means bores that are able to continue to provide a reasonable yield of water in terms of quantity for the bores authorised purpose or use.								
AHD	means Australian Height Datum.								
alternative arrangement	means a written agreement between the holder of this environmental authority and an affected or potentially affected person at a sensitive receptor for a defined noise nuisance impact and may include an agreed period of time for which the arrangement is in place. An agreement for alternative arrangements may include, but not necessarily be limited to a range of noise abatement measures to be installed at a sensitive receptor and/or provision of alternative accommodation for the duration of the defined noise nuisance impact.								
annual exceedance probability or AEP	means the probability that at least one event in excess of a particular magnitude will occur in any given year.								
annual inspection report	means an assessment prepared by a suitably qualified and experienced person containing details of the assessment against the most recent consequence assessment report and design plan (or system design plan); (a) against recommendations contained in previous annual inspections reports; (b) against recognised dam safety deficiency indicators; (c) for changes in circumstances potentially leading to a change in consequence category; (d) for conformance with the conditions of this authority; (e) for conformance with the 'as constructed' drawings; (f) for the adequacy of the available storage in each regulated dam, based on an actual observation or observations taken after 31 May each year but prior to 1 November of that year, of accumulated sediment, state of the containment barrier and the level of liquids in the dam (or network of linked containment systems); (g) for evidence of conformance with the current operational plan								
Approved quality criteria	for the purposes of residual drilling materials, means the residual drilling material meet the following quality standards: Part A in all cases: <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</td> </tr> <tr> <td>Chloride*</td> <td>8000mg/L</td> </tr> </tbody> </table>	Parameter	Maximum concentration	pH	6 – 10.5 (range)	Electrical Conductivity	20dS/m	Chloride*	8000mg/L
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Electrical Conductivity	20dS/m								
Chloride*	8000mg/L								

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	<p>*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.</p> <p>Part B If any of the following metals are a component of the drilling fluids, then for that metal:</p> <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>11mg/kg</td> </tr> <tr> <td>Lead</td> <td>600mg/kg</td> </tr> </tbody> </table> <p>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:</p> <table border="1"> <thead> <tr> <th>TPH</th> <th>Maximum concentration</th> </tr> </thead> <tbody> <tr> <td>C6-C10</td> <td>170 mg/kg</td> </tr> <tr> <td>C10-C16</td> <td>150 mg/kg</td> </tr> <tr> <td>C16-C34</td> <td>1300 mg/kg</td> </tr> <tr> <td>C34-C40</td> <td>5600 mg/kg</td> </tr> <tr> <td>Total polycyclic aromatic hydrocarbons (PAH)</td> <td>20 mg/kg</td> </tr> <tr> <td>Phenols (halogenated)</td> <td>1 mg/kg</td> </tr> <tr> <td>Phenols (non-halogenated)</td> <td>60 mg/kg</td> </tr> <tr> <td>Monocyclic aromatic hydrocarbons (total sum of benzene, toluene, ethyl benzene, xylenes (includes ortho, para, and meta xylenes) and styrene)</td> <td>7 mg/kg</td> </tr> <tr> <td>Benzene</td> <td>1 mg/kg</td> </tr> </tbody> </table>	Parameter	Maximum concentration	Arsenic	20mg/kg	Selenium	5mg/kg	Boron	100mg/kg	Cadmium	3mg/kg	Chromium (total)	400mg/kg	Copper	11mg/kg	Lead	600mg/kg	TPH	Maximum concentration	C6-C10	170 mg/kg	C10-C16	150 mg/kg	C16-C34	1300 mg/kg	C34-C40	5600 mg/kg	Total polycyclic aromatic hydrocarbons (PAH)	20 mg/kg	Phenols (halogenated)	1 mg/kg	Phenols (non-halogenated)	60 mg/kg	Monocyclic aromatic hydrocarbons (total sum of benzene, toluene, ethyl benzene, xylenes (includes ortho, para, and meta xylenes) and styrene)	7 mg/kg	Benzene	1 mg/kg
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<p>assessed or assessment</p>	<p>by a suitably qualified and experienced person in relation to a consequence assessment of a dam, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit of the assessment:</p> <ul style="list-style-type: none"> (a) exactly what has been assessed and the precise nature of that determination; (b) the relevant legislative, regulatory and technical criteria on which the assessment has been based; (c) the relevant data and facts on which the assessment has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and (d) the reasoning on which the assessment has been based using the relevant data and facts, and the relevant criteria. 																																				

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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: <ul style="list-style-type: none"> • operations of any kind and all things constructed, erected or installed for that dam; and • any land used for those operations.
authority	means an environmental authority or a development approval.
background noise level	means the sound pressure level, measured in the absence of the noise under investigation, as the L A90,T being the A-weighted sound pressure level exceeded for 90 percent of the measurement time period T of not less than 15 minutes, using Fast response.
bed and banks	for a watercourse or wetland means land over which the water of the watercourse or wetland normally flows or that is normally covered by the water, whether permanently or intermittently; but does not include land adjoining or adjacent to the bed or banks that is from time to time covered by floodwater.
bore	means a water observation bore or a water supply bore.
brine	means either saline water with a total dissolved solid concentration greater than 40 000mg/l or CSG water after it has been concentrated through water treatment processes and/or evaporation.
bund or bunded	in relation to spill containment systems for fabricated or manufactured tanks or containers designed to a recognised standard means an embankment or wall of brick, stone, concrete or other impervious material which may form part or all of the perimeter of a compound and provides a barrier to retain liquid. Since the bund is the main part of a spill containment system, the whole system (or bunded area) is sometimes colloquially referred to within industry as the bund. The bund is designed to contain spillages and leaks from liquids used, stored or processed above ground and to facilitate clean-up operations. As well as being used to prevent pollution of the receiving environment, bunds are also used for fire protection, product recovery and process isolation.
BTEX	means benzene, toluene, ethylbenzene, xylene.
category A ESA	means any area listed in Schedule 12, Part 1, Section 1 of the Environmental Protection Regulation 2008.
category B ESA	means any area listed in Schedule 12, Part 1, Section 2 of the Environmental Protection Regulation 2008.
category C ESA	means any of the following areas: <ul style="list-style-type: none"> • Nature Refuges as defined under the <i>Nature Conservation Act 1992</i>; • Koala Habitat Areas as defined under the <i>Nature Conservation Act 1992</i>; • State Forests or Timber Reserves as defined under the <i>Forestry Act 1959</i>; • Declared catchment areas under the <i>Water Act 2000</i>; • Resources reserves under the <i>Nature Conservation Act 1992</i> • An area identified as "Essential Habitat" for a species of wildlife listed as endangered, vulnerable, rare or near threatened under the <i>Nature Conservation Act 1992</i>; • An area identified as "Essential Regrowth Habitat" under the <i>Vegetation Management Act 1999</i> for a species of wildlife listed as endangered, vulnerable, rare or near threatened under the <i>Nature Conservation Act 1992</i> for petroleum activities that commenced after 8 March 2013 (the date of grant of this environmental authority); and

	<ul style="list-style-type: none"> • “Of concern” regional ecosystems identified in the database maintained by the Department of Environment and Heritage Protection called ‘Regional ecosystem description database’ containing regional ecosystem numbers and descriptions.
certification	in relation to dams means assessment and approval must be undertaken by a suitably qualified and experienced person in relation to any assessment or documentation required by the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures</i> , including design plans, ‘as constructed’ drawings and specifications, construction, operation or an annual report regarding regulated structures, undertaken in accordance with the Board of Professional Engineers of Queensland Policy Certification by RPEQs (ID: 1.4 (2A)).
certifying, certify, or certified	have a corresponding meaning to certification.
clearing	means: <ul style="list-style-type: none"> • in relation to grass, scrub or bush—the removal of vegetation by disturbing root systems and exposing underlying soil (including burning), but does not include— <ul style="list-style-type: none"> ○ the flattening or compaction of vegetation by vehicles if the vegetation remains living; or ○ the slashing or mowing of vegetation to facilitate access tracks; or ○ the clearing of noxious or introduced plant species; and • in relation to trees—cutting down, ringbarking, pushing over, poisoning or destroying in any way.
“construction or constructed”	in relation to a dam includes building a new dam and modifying or lifting an existing dam, but does not include investigations and testing necessary for the purpose of preparing a design plan.
construction and operational purposes	in relation to the use of coal seam gas water means the construction, use, modification, maintenance, replacement, operation and decommissioning of industrial sites.
coal seam gas water	means underground water brought to the surface of the earth, or otherwise interfered with, in connection with exploring for or producing coal seam gas. Coal seam gas water is a waste, as defined under s13 of the <i>Environmental Protection Act 1994</i> .
consequence	in relation to a structure as defined, means the potential for environmental harm resulting from the collapse or failure of the structure to perform its primary purpose of containing, diverting or controlling flowable substances.
consequence category	means a category, either low, significant or high, into which a dam is assessed as a result of the application of tables and other criteria in the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i> .
critically limited regional ecosystem	means the ecosystems identified in Appendix 5 of the Queensland Biodiversity Offset Policy (Department of Environment and Heritage Protection, 2014).
dam	means a land-based structure or a void that contains, diverts or controls flowable substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and associated works.
dam crest volume	means the volume of material (liquids and/or solids) that could be within the walls of a dam at any time when the upper level of that material is at the crest level of that dam. That is, the instantaneous maximum volume within the walls, without regard to flows entering or leaving (for example, via spillway).
deed of agreement	means a legal agreement between the holder of the environmental authority and the administering authority. The deed of agreement governs the obligations of the holder of the environmental authority in relation to the <i>Queensland Biodiversity Offset Policy</i> . For clarity, the term deed of agreement in this environmental authority includes any subsequent version or amendment of the signed deed of agreement.
design plan	” is a document setting out how all identified consequence scenarios are addressed in the planned design and operation of a regulated structure.

design storage allowance or DSA	means an available volume, estimated in accordance with the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i> published by the administering authority, must be provided in a dam as at 1 November each year in order to prevent a discharge from that dam to an annual exceedance probability (AEP) specified in that Manual.
development well	means a petroleum well that is drilled to produce or store petroleum.
discharge area	means: (a) that part of the land surface where groundwater discharge produces a net movement of water out of the groundwater; and (b) identified by an assessment process consistent with the document: <i>Salinity Management Handbook</i> , Queensland Department of Natural Resources, 1997; or (c) identified by an approved salinity hazard map held by the Department of Environment and Heritage Protection.
ecosystem functioning	means the interactions between and within living and nonliving components of an ecosystem and generally correlates with the size, shape and location of an area of vegetation.
emergency action plan	means documentation forming part of the operational plan held by the holder or a nominated responsible officer, that identifies emergency conditions that sets out procedures and actions that will be followed and taken by the dam owner and operating personnel in the event of an emergency. The actions are to minimise the risk and consequences of failure, and ensure timely warning to downstream communities and the implementation of protection measures. The plan must require dam owners to annually update contact.
enclosed flare	means a device where the residual gas is burned in a cylindrical or rectilinear enclosure that includes a burning system and a damper where air for the combustion reaction is admitted.
end	means the stopping of the particular activity that has caused a significant disturbance in a particular area. It refers to, among other things, the end of a seismic survey or the end of a drilling operation. It does not refer to the end of all related activities such as rehabilitation. In other words, it does not refer to the 'completion' of the petroleum activity, the time at which the petroleum authority ends or the time that the land in question ceases to be part of an authority.
equivalent person" or "EP	means an equivalent person under volume 1, section 2 of the <i>Guidelines for Planning and Design of Sewerage Schemes</i> , October 1991, published by the Water Resources Commission, Department of Primary Industries, Fisheries and Forestry.
evaporation dam	means a land based structure designed to contain or impound CSG water, the purpose of which is to contain or impound the water, until the water content has been removed by evaporation.
existing structure	means a structure that was in existence or whose design plan has substantially commenced, prior to the adoption of this schedule of conditions under the authority (12 August 2014).
fill	means any kind of material in solid form (whether or not naturally occurring) capable of being deposited at a place but does not include material that forms a part of, or is associated with, a structure constructed in a watercourse, wetland or spring including a bridge, road, causeway, pipeline, rock revetment, drain outlet works, erosion prevention structure or fence.
flare pit	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.
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,

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	other liquids fluids or solids, or a mixture that includes water and any other liquids fluids or solids either in solution or suspension.
foreseeable future	means the period used for assessing the total probability of an event occurring. Permanent structures and ecological sustainability should be expected to still exist at the end of a 150 year foreseeable future with an acceptably low probability of failure before that time.
hazard	in relation to a dam as defined, means the potential for environmental harm resulting from the collapse or failure of the dam to perform its primary purpose of containing, diverting or controlling flowable substances.
high bank	means the defining terrace or bank or, if no bank is present, the point on the active floodplain, which confines the average annual peak flows in a watercourse.
holder	means: (a) where this document is an environmental authority, any person who is the holder of, or is acting under, that environmental authority; or (b) where this document is a development approval, any person who is the registered operator for that development approval.
hub	means more than one large compressor station and multiple items of fuel burning or combustion units located within three (3) km of each other and capable of burning fuel at a rate >500 kg/hr.
hydraulic performance	means the capacity of a regulated dam to contain or safely pass flowable substances based on the design criteria specified for the relevant consequence category in the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i> .
impacts to mapped State significant biodiversity values	means to have a negative effect on a State significant biodiversity value, as identified by the Queensland Biodiversity Offset Policy (Department of Environment and Heritage Protection, 2014) Examples may include, but are not necessarily limited to residual impact from: <ul style="list-style-type: none"> • clearing, removal or fragmentation of vegetation • interference or disturbance of fauna habitat
impacts to watercourse, wetland, lake or spring with state significant biodiversity values	means to have a negative effect on a watercourse, wetland, lake or spring with state significant biodiversity values as identified in Appendix 1 of the <i>Queensland Biodiversity Offsets Policy</i> (Department of Environment and Heritage Protection, 2014) resulting from petroleum activities that commenced after 8 March 2013.
infrastructure	means water storage dams, roads and tracks, equipment, buildings and other structures built for the purpose and duration of the conduct of the petroleum activities, but does not include other facilities required for the long term management of the impact of those activities or the protection of potential resources. Such other facilities include dams other than water storage dams (e.g. evaporation dams), pipelines and assets, that have been decommissioned, rehabilitated, and lawfully recognised as being subject to subsequent transfer with ownership of the land.
irrigation	means the application of water to any agricultural or silvicultural crop or to a garden cultivated for domestic use.
LA _{eq, adj} , 15 mins	means an A-weighted sound pressure level of a continuous steady sound, adjusted for tonal character, that within a 15 minute period has the same square sound pressure as a sound level that varies with time.
lake	means: (a) a lagoon, swamp or other natural collection of water, whether permanent or intermittent; and (b) the bed and banks and any other element confining or containing the water.
land-based offset	means direct offsets, indirect offsets, and offset transfers.

landfill monocell	means a specialised, isolated landfill facility where a single specific waste type is exclusively disposed (i.e. salt).
leachate	means a liquid that has passed through or emerged from, or is likely to have passed through or emerged from, a material stored, processed or disposed of on site which contains soluble, suspended or miscible contaminants likely to have been derived from the said material.
legally secured	in relation to <u>land-based offsets</u> means any of the following legally binding mechanisms: <ul style="list-style-type: none"> • gazettal as a protected area (e.g., a nature refuge) under the <i>Nature Conservation Act 1992</i>; • declaration of an area of high nature conservation values under the <i>Vegetation Management Act 1999</i>; • use of a covenant under the <i>Land Title Act 1994</i> or <i>Land Act 1994</i>; or • another mechanism administered and approved by the State.
levee	means a dyke or bund that is designed only to provide for the containment and diversion of stormwater or flood flows from a contributing catchment, or containment and diversion of flowable materials resulting from unplanned releases from other works of infrastructure, during the progress of those stormwater or flood flows or those unplanned releases; and does not store any significant volume of water or flowable substances at any other times.
limited petroleum activities	mean only activities including: <ol style="list-style-type: none"> (a) geophysical surveys (including seismic activities); (b) well sites; (c) well pads; (d) sumps; (e) flare pits; (f) flow lines; and (g) supporting access tracks. <p>For clarity, limited petroleum activities do not include:</p> <ol style="list-style-type: none"> (a) the construction of infrastructure for processing or storing petroleum or by-products; (b) dams; (c) compressor stations; (d) campsites/workforce accommodation; (e) power supplies; (f) waste disposal; or other supporting infrastructure for the project.
linear infrastructure	means powerlines, pipelines, roads and access tracks.
livestock watering purposes	means the supply of water to any livestock.
long term noise event	is a noise exposure, when perceived at a sensitive receptor, persists for a period of greater than five (5) days, even when there are respite periods when the noise is inaudible within those five (5) days.
low consequence dam	means any dam that is not a high or significant consequence category as assessed using the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i> .
mandatory reporting level or MRL	means a warning and reporting level determined in accordance with the criteria in the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i> published by the administering authority.
manual	means the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i> published by the administering authority.

mapped State significant biodiversity values	means the regional ecosystems, essential habitat, wetlands, watercourses, legally secured offset areas and connectivity areas provided in Appendix 1 of the <i>Queensland Biodiversity Offset Policy</i> (Department of Environment and Heritage Protection, 2014) that are mapped in State mapping.
Max L_{pZ} , 15 min	means the maximum value of the Z-weighted sound pressure level measured over 15 minutes.
Max L_{pA} , 15 min	means the absolute maximum instantaneous A-weighted sound pressure level, measured over 15 minutes.
mg/L	means milligrams per litre.
medium term noise event	is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than five days and does not re-occur for a period of at least four weeks. Re-occurrence is deemed to apply where a noise of comparable level is observed at the same receptor location for a period of one hour or more, even if it originates from a difference source or source location.
meter	means a device for measuring, or giving an output signal proportional to, quantities of water passed and/or the rate of flow in a pipe.”
mix-bury-cover method	means the stabilisation of residual drilling solids in the bottom of a sump by mixing with subsoil and which occurs in accordance with the following methodology: <ul style="list-style-type: none"> • 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 ($k_w=10-8m/s$) or subsoil with a clay content of greater than 20%; and • the residual solids is mixed with subsoil in the sump and cover; and • the subsoil and residual solids is mixed at least three parts subsoil to one part waste (v/v); and • a minimum of one metre of clean subsoil must be placed over the subsoil and residual solids mixture; and • topsoil is replaced.
modification or modifying	(see definition of ‘construction’).
Offset Area Management Plan (OAMP)	means a plan that meets the requirements listed under the heading ‘Specific requirements for offset area management plans’ in Criteria A3 – Information requirement of the <i>Queensland Biodiversity Offset Policy</i> (Department of Environment and Heritage Protection, 2014).
operational plan	includes: <ol style="list-style-type: none"> (a) normal operating procedures and rules (including clear documentation and definition of process inputs in the DSA allowance); (b) contingency and emergency action plans including operating procedures designed to avoid and/or minimise environmental impacts including threats to human life resulting from any overtopping or loss of structural integrity of the regulated structure.
pest	means species: <ol style="list-style-type: none"> (a) declared under the <i>Land Protection (Pest and Stock route Management) Act 2002</i>; (b) declared under Local Government model local laws; and (c) which may become invasive in the future.
populated area	includes towns and cities which have a population of 500 or more people and with a minimum density of 40 people/km ² .
prescribed storage gases	has the meaning provided in section 12 of the <i>Petroleum and Gas (Production and Safety) Act 2004</i> .

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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 associated water for a petroleum tenure.
quarter	means the following periods of a calendar year: <ul style="list-style-type: none"> • 1 January to 31 March inclusive; • 1 April to 30 June inclusive; • 1 July to 30 September inclusive; and • 1 October to 31 December inclusive.
Register of Regulated Dams	includes: <ol style="list-style-type: none"> (a) Date of entry in the register; (b) Name of the dam, its purpose and intended/actual contents; (c) The consequence category of the dam as assessed using the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635); (d) Dates, names, and reference for the design plan plus dates, names, and reference numbers of all document(s) lodged as part of a design plan for the dam; (e) Name and qualifications of the suitably qualified and experienced person who certified the design plan and 'as constructed' drawings; (f) For the regulated dam, other than in relation to any levees – <ol style="list-style-type: none"> (i) The dimensions (metres) and surface area (hectares) of the dam measured at the footprint of the dam; (ii) Coordinates (latitude and longitude in GDA94) within five metres at any point from the outside of the dam including its storage area (iii) Dam crest volume (megalitres); (iv) Spillway crest level (metres AHD). (v) Maximum operating level (metres AHD); (vi) Storage rating table of stored volume versus level (metres AHD); (vii) Design storage allowance (megalitres) and associated level of the dam (metres AHD); (viii) Mandatory reporting level (metres AHD); (g) The design plan title and reference relevant to the dam; (h) The date construction was certified as compliant with the design plan; (i) The name and details of the suitably qualified and experienced person who certified that the constructed dam was compliant with the design plan; (j) Details of the composition and construction of any liner; (k) The system for the detection of any leakage through the floor and sides of the dam; (l) Dates when the regulated dam underwent an annual inspection for structural and operational adequacy, and to ascertain the available storage volume for 1 November of any year; (m) Dates when recommendations and actions arising from the annual inspection were provided to the administering authority; Dam water quality as obtained from any monitoring required under this authority as at 1 November of each year.
regulated dam	means any dam in the significant or high consequence category as assessed using the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i> published by the administering authority.
regulated structure	includes land-based containment structures, levees, bunds and voids, but not a tank or container designed and constructed to an Australian Standard that deals with strength and structural integrity.

rehabilitation	means the process of reshaping and revegetating land to restore it to a stable landform and in accordance with the acceptance criteria set out in this environmental authority and, where relevant, includes remediation of contaminated land.
relevant offset objectives	means the relevant criteria listed under the heading 'When an offset ceases to have effect' in Criteria A2 – Legally securing biodiversity offsets of the Queensland Biodiversity Offset Policy (Department of Environment and Heritage Protection, 2014).
relevant offset rules	means the relevant criteria included in the Queensland Biodiversity Offset Policy (Department of Environment and Heritage Protection, 2014) including but not necessarily limited to: <ul style="list-style-type: none"> • for all offsets, the relevant criteria of Criteria B1 – Offset Rules except where an offset payment is used for which Part A and Part B Criteria do not apply; and • for land-based offsets, the relevant criteria of Criteria B1 – Offset Rules as well as Criteria A1 – Obtaining Ecological Equivalence.
remnant unit	means a continuous area of remnant vegetation representative of a single Regional Ecosystem type or a single heterogeneous unit (multiple Regional Ecosystem types that cannot be distinguished individually due to the scale of mapping).
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.
sensitive place	means: <ul style="list-style-type: none"> • a dwelling (including residential allotment, mobile home or caravan park, residential marina or other residential premises, motel, hotel or hostel; or • a library, childcare centre, kindergarten, school, university or other educational institution; • a medical centre, surgery or hospital; or • a protected area; or • a public park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment; or • a work place used as an office or for business or commercial purposes, which is not part of the petroleum activities and does not include employees accommodation or public roads.
sensitive receptor	means an area or place where noise (including low frequency, vibration and blasting) is measured investigate whether nuisance impacts are occurring and includes: <ul style="list-style-type: none"> • a dwelling (including residential allotment, mobile home or caravan park, residential marina or other residential premises, motel, hotel or hostel; or • a library, childcare centre, kindergarten, school, university or other educational institution; • a medical centre, surgery or hospital; or • a protected area; or • a public park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment; or • a work place used as an office or for business or commercial purposes, which is not part of the petroleum activities and does not include employees accommodation or public roads.
short term noise event	is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than eight hours and does not re-occur for a period of at least seven days. Re-occurrence is deemed to apply where a noise of comparable level is observed at the same receptor location for a period of one hour or more, even if it originates from a different source or source location.
significantly disturbed land or significant disturbance to land	has the meaning in Schedule 12, section 4 of the Environmental Protection Regulation 2008. Land is significantly disturbed if—

	<p>(a) it is contaminated land; or</p> <p>(b) it has been disturbed and human intervention is needed to rehabilitate it—</p> <p style="padding-left: 20px;">(i) to a condition required under the relevant environmental authority; or</p> <p style="padding-left: 20px;">(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.</p>
site	means the petroleum authority(ies) to which the environmental authority relates.
spillway	means a weir, channel, conduit, tunnel, gate or other structure designed to permit discharges from the dam, normally under flood conditions or in anticipation of flood conditions.
spring	means the land to which water rises naturally from below the ground and the land over which the water then flows.
stable	in relation to land, means landform dimensions are or will be stable within tolerable limits now and in the foreseeable future. Stability includes consideration of geotechnical stability, settlement and consolidation allowances, bearing capacity (trafficability), erosion resistance and geochemical stability with respect to seepage, <u>leachate</u> and related contaminant generation.
State significant biodiversity values	means those regional ecosystems, essential habitat, wetlands, watercourses, legally secured offset areas and connectivity areas provided in Appendix 1 of the Queensland Biodiversity Offsets Policy (Department of Environment and Heritage Protection, 2014).
stimulation	means a technique used to increase the permeability of a natural underground reservoir, including for example, cavitation, hydraulic fracturing/hydrofracturing, fracture acidizing and the use of proppant treatments.
structure	means dam or levee.
suitably qualified person	means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis to performance relative to the subject matter using the relevant protocols, standards, methods or literature.
suitably qualified and experienced person	<p>in relation to regulated structures means a person who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the <i>Professional Engineers Act 2002</i>, and has demonstrated competency and relevant experience:</p> <ul style="list-style-type: none"> • for regulated dams, an RPEQ who is a civil engineer with the required qualifications in dam safety and dam design. • for regulated levees, an RPEQ who is a civil engineer with the required qualifications in the design of flood protection embankments. <p>Note: It is permissible that a suitably qualified and experienced person obtain subsidiary certification from an RPEQ who has demonstrated competence and relevant experience in either geomechanics, hydraulic design or engineering hydrology.</p>
system design plan	means a plan that manages an integrated containment system that shares the required DSA and/or ESS volume across the integrated containment system.
third party auditor	means a suitably qualified person who is either a certified third party auditor or an internal auditor employed by the holder of the environmental authority and the person is independent of the day to day management and operation of activities covered by this environmental authority.
threatening processes	means processes, features and actions that can have a detrimental effect upon the health and viability of an area of vegetation. For example altered hydrology, land use practices, invasion by pest and weed species, land degradation, edge effects and fragmentation.

threshold regional ecosystem	means the ecosystems identified in Appendix 6 of the Queensland Biodiversity Offset Policy (Department of Environment and Heritage Protection, 2014).
tolerable limits	means a range of parameters regarded as being sufficient to meet the objective of protecting relevant environmental values. For example, a range of settlement for a tailings capping, rather than a single value, could still meet the objective of draining the cap quickly, preventing damage and limiting infiltration and percolation.
topsoil	means the surface (top) layer of a soil profile, which is more fertile, darker in colour, better structured and supports greater biological activity than underlying layers. The surface layer may vary in depth depending on soil forming factors, including parent material, location and slope, but generally is not greater than about 300mm in depth from the natural surface.
unacceptable risk	is when the results of a hazard assessment indicates that there is both a high consequence and a high likelihood of an event occurring such that the risk is classified as "high", "very high" or "extreme".
valid complaint	means a complaint the administering authority considers is not frivolous, nor vexatious, nor based on mistaken belief.
void	means any constructed, open excavation in the ground.
watercourse	has the meaning provided in s 5 of the <i>Water Act 2000</i> and includes the bed and banks and any other element of a river, creek or stream confining or containing water.
watercourse, wetland, lake or spring with State significant biodiversity values	are those described in Appendix 1 of the <i>Queensland Biodiversity Offsets Policy</i> (Department of Environment and Heritage Protection, 2014).
waters	includes all or any part of a river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water in natural or artificial watercourses, bed and banks of a watercourse, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and groundwater.
wetland	means an area shown as a wetland on a 'Map of referable wetlands', a document approved by the chief executive (environment). A map of referable wetlands can be viewed at www.ehp.qld.gov.au

End of Conditions

Permit

Environmental Protection Act 1994

Environmental authority EPPG00972513

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

Environmental authority number: EPPG00972513**Environmental authority takes effect on 21 September 2017****Environmental authority holder(s)**

Name(s)	Registered address
Stanwell Corporation Limited	Level 13 AM-6042 Albert Street BRISBANE CITY QLD 4000 Australia
AUSTRALIAN CBM PTY LTD	Level 39 111 Eagle Street BRISBANE CITY QLD 4000 Australia
ARROW (TIPTON) PTY. LTD.	Level 39 111 Eagle Street BRISBANE CITY QLD 4000 Australia
ARROW (DAANDINE) PTY. LTD.	Level 39 111 Eagle St BRISBANE CITY QLD 4000 Australia
ARROW CSG (AUSTRALIA) PTY LTD	Level 39111 Eagle Street BRISBANE CITY QLD 4000 Australia
ARROW (TIPTON TWO) PTY LTD	Level 39 111 Eagle Street BRISBANE CITY QLD 4000 Australia
ARROW ENERGY PTY LTD	Level 39111 Eagle Street BRISBANE QLD 4001

Environmentally relevant activity and location details

Environmentally relevant activity/activities	Location(s)
Resource Activity, Schedule 2A, 06: A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL252
Resource Activity, Schedule 2A, 06: A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL194
Resource Activity, Schedule 2A, 06: A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL198
Resource Activity, Schedule 2A, 06: A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL230
Resource Activity, Schedule 2A, 06: A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL260

Environmental authority

Environmentally relevant activity/activities	Location(s)
Resource Activity, Schedule 2A, 06: A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL238
Resource Activity, Schedule 2A, 06: A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL258
Resource Activity, Schedule 2A, 07: A petroleum activity involving injection of a wastefluid into a natural underground reservoir or aquifer	PL252
Resource Activity, Schedule 2A, 07: A petroleum activity involving injection of a wastefluid into a natural underground reservoir or aquifer	PL194
Resource Activity, Schedule 2A, 07: A petroleum activity involving injection of a wastefluid into a natural underground reservoir or aquifer	PL198
Resource Activity, Schedule 2A, 07: A petroleum activity involving injection of a wastefluid into a natural underground reservoir or aquifer	PL230
Resource Activity, Schedule 2A, 07: A petroleum activity involving injection of a wastefluid into a natural underground reservoir or aquifer	PL260
Resource Activity, Schedule 2A, 07: A petroleum activity involving injection of a wastefluid into a natural underground reservoir or aquifer	PL238
Resource Activity, Schedule 2A, 07: A petroleum activity involving injection of a wastefluid into a natural underground reservoir or aquifer	PL258
Resource Activity, Schedule 2A, 08: A petroleum or GHG storage activity, other than items 1 to 7, that includes an activity from Schedule 2 with an AES	PL252
Resource Activity, Schedule 2A, 08: A petroleum or GHG storage activity, other than items 1 to 7, that includes an activity from Schedule 2 with an AES	PL194
Resource Activity, Schedule 2A, 08: A petroleum or GHG storage activity, other than items 1 to 7, that includes an activity from Schedule 2 with an AES	PL198
Resource Activity, Schedule 2A, 08: A petroleum or GHG storage activity, other than items 1 to 7, that includes an activity from Schedule 2 with an AES	PL230
Resource Activity, Schedule 2A, 08: A petroleum or GHG storage activity, other than items 1 to 7, that includes an activity from Schedule 2 with an AES	PL260

Environmental authority

Environmentally relevant activity/activities	Location(s)
Resource Activity, Schedule 2A, 08: A petroleum or GHG storage activity, other than items 1 to 7, that includes an activity from Schedule 2 with an AES	PL238
Resource Activity, Schedule 2A, 08: A petroleum or GHG storage activity, other than items 1 to 7, that includes an activity from Schedule 2 with an AES	PL258
Resource Activity, Ancillary 15 - Fuel burning, Using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour	PL252
Resource Activity, Ancillary 15 - Fuel burning, Using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour	PL194
Resource Activity, Ancillary 15 - Fuel burning, Using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour	PL198
Resource Activity, Ancillary 15 - Fuel burning, Using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour	PL230
Resource Activity, Ancillary 15 - Fuel burning, Using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour	PL260
Resource Activity, Ancillary 15 - Fuel burning, Using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour	PL238
Resource Activity, Ancillary 15 - Fuel burning, Using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour	PL258
Resource Activity, Ancillary 14 - Electricity Generation, 1: Generating electricity by using gas at a rated capacity of 10MW electrical or more	PL252
Resource Activity, Ancillary 14 - Electricity Generation, 1: Generating electricity by using gas at a rated capacity of 10MW electrical or more	PL194
Resource Activity, Ancillary 14 - Electricity Generation, 1: Generating electricity by using gas at a rated capacity of 10MW electrical or more	PL198
Resource Activity, Ancillary 14 - Electricity Generation, 1: Generating electricity by using gas at a rated capacity of 10MW electrical or more	PL230
Resource Activity, Ancillary 14 - Electricity Generation, 1: Generating electricity by using gas at a rated capacity of 10MW electrical or more	PL260

Environmental authority

Environmentally relevant activity/activities	Location(s)
Resource Activity, Ancillary 14 - Electricity Generation, 1: Generating electricity by using gas at a rated capacity of 10MW electrical or more	PL238
Resource Activity, Ancillary 14 - Electricity Generation, 1: Generating electricity by using gas at a rated capacity of 10MW electrical or more	PL258
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (b-i) more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL252
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (b-i) more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL194
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (b-i) more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL198
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (b-i) more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL230
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (b-i) more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL260
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (b-i) more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL238
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (b-i) more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL258

Environmental authority

Environmentally relevant activity/activities	Location(s)
Resource Activity, Ancillary 64 - Water treatment, 2: Desalinating, in a day, the following quantity of water, allowing the release of waste to waters other than seawater, (b) more than 5ML	PL252
Resource Activity, Ancillary 64 - Water treatment, 2: Desalinating, in a day, the following quantity of water, allowing the release of waste to waters other than seawater, (b) more than 5ML	PL194
Resource Activity, Ancillary 64 - Water treatment, 2: Desalinating, in a day, the following quantity of water, allowing the release of waste to waters other than seawater, (b) more than 5ML	PL198
Resource Activity, Ancillary 64 - Water treatment, 2: Desalinating, in a day, the following quantity of water, allowing the release of waste to waters other than seawater, (b) more than 5ML	PL230
Resource Activity, Ancillary 64 - Water treatment, 2: Desalinating, in a day, the following quantity of water, allowing the release of waste to waters other than seawater, (b) more than 5ML	PL260
Resource Activity, Ancillary 64 - Water treatment, 2: Desalinating, in a day, the following quantity of water, allowing the release of waste to waters other than seawater, (b) more than 5ML	PL238
Resource Activity, Ancillary 64 - Water treatment, 2: Desalinating, in a day, the following quantity of water, allowing the release of waste to waters other than seawater, (b) more than 5ML	PL258

Additional information for applicantsEnvironmentally 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:

Environmental authority

- 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.

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

Enquiries:
Petroleum and Gas Unit
Department of Environment and Heritage Protection
Phone: 3330 5715
Email: petroleumandgas@ehp.qld.gov.au

Date issued: 21 September 2017

This environmental authority consists of the following schedules:

Schedule A	General Conditions
Schedule B	Water
Schedule BE	Coal Seam Gas Water Injection Trial
Schedule C	Regulated Dams
Schedule D	Land
Schedule E	Environmental Nuisance
Schedule F	Air
Schedule G	Waste
Schedule H	Rehabilitation
Schedule I	Monitoring Programs
Schedule J	Community Issues
Schedule K	Notification Procedures
Schedule L	Definitions

Legislative Requirements and Conditions of Environmental Authority

SCHEDULE A - GENERAL CONDITIONS

Authorised Petroleum Activities

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

Schedule A, Table 1 - Authorised Petroleum Activities

Petroleum Activity(ies)	Total Number of Authorised Petroleum Activities	Maximum Disturbance Authorised
Seismic	NA	120 ha
Total coal seam gas wells, including: <ul style="list-style-type: none"> • core wells • Exploration wells • Development wells • Production wells 	691	691 wells 691 ha
Injection well(s) and associated facilities	1	4 ha
Compressor units	40	40 units, 8 ha
Central gas processing facilities	2	2 facilities, 8 ha
Regulated structures	22	22 dams
Water treatment facilities	2	12 ML/d (each), 2 ha
Sewage treatment plants	2	Less than 450 EP (each), 0.15 ha
Power stations	1	40 MW, 1.2 ha

Prevent or Minimise Likelihood of Environmental Harm

- A2 This environmental authority does not authorise environmental harm unless a condition contained in this environmental authority explicitly authorises that harm. Where there is no condition, the lack of a condition shall not be construed as authorising harm.

Maintenance of Measures, Plant and Equipment

- A3 The holder of the environmental authority must:
- (a) install all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority;
 - (b) maintain such measures, plant and equipment in their proper and effective condition; and
 - (c) operate such measures, plant and equipment in a proper and effective manner.

- A4 No change, replacement or alteration of any plant or equipment is permitted if the change, replacement or alteration materially increases, or is likely to increase, the environmental harm caused by the petroleum activity.

Financial Assurance

- A5 Petroleum activities that cause significant disturbance to land must not be carried out until financial assurance has been given to administering authority as security for compliance with the environmental authority and for any costs or expenses, or likely costs or expenses, mentioned in section 298 of the *Environmental Protection Act 1994*.
- A6 Prior to any changes in petroleum activities which would result in an increase to the maximum significant disturbance since financial assurance was last given to the administering authority, the holder of the environmental authority must amend the financial assurance and give the administering authority the increased amount of financial assurance.

Existing petroleum activities

- A7 Conditions (D2) to (D17) and (D33) to (D36) in the Land Schedule relating to disturbance, only apply to petroleum activities which commenced after 15 March 2011 subject to the holder of the environmental authority having complied with all disturbance conditions of the relevant environmental authority that applied at the time the exiting petroleum activity was constructed.

Third Party Audit

- A8 A third party auditor, nominated by the holder of the environmental authority and accepted by the administering authority, must audit compliance with the conditions of this environmental authority at a minimum frequency of every three (3) years.
- A9 Notwithstanding Condition (A7) and prior to undertaking the third party audit, the scope and content of the third party audit can be negotiated with the administering authority.
Note: Where minimal activities have been undertaken on a tenure, the negotiation of the scope of the third party audit may also include the postponing of the third party audit to an agreeable time between the holder of this environmental authority and the administering authority.
- A10 An audit report of the audit required by Condition (A8) must be prepared and certified by the third party auditor presenting the findings of each audit carried out.
- A11 The financial cost of the third party audit is to be borne by the holder of this environmental authority.
- A12 The holder of this environmental authority must act upon any recommendations arising from the audit report by:
(a) investigating any non-compliance issues identified; and
(b) as soon as practicable, implementing measures or taking necessary action to ensure compliance with the requirements of this environmental authority.

- A13 Subject to Condition (A12), and not more than 60 business days following the submission of the audit report, the holder of this environmental authority must provide a written report to the administering authority addressing the:
- (a) actions taken by the holder to ensure compliance with this environmental authority; and
 - (b) actions taken to prevent a recurrence of any non-compliance issues identified.
- A14 The audit report required by Condition (A10) and the written response to the audit report required by Condition (A13) must be submitted to the administering authority with the subsequent annual return.

Contingency Plan for Emergency Environmental Incidents

- A15 A contingency plan for emergency environmental incidents which includes but is not limited to the impacts of flooding and the injection of treated CSG water, must be developed and implemented to respond to environmental emergency events and incidents where environmental harm is caused or threatened.
- A16 The contingency plan for emergency environmental incidents required under Condition (A15) must address the following matter as a minimum:
- (a) a clear definition of what constitutes an environmental emergency incident for the activity;
 - (b) identification of the types of environmental incidents that may occur, relevant to the activities authorised to be carried out under this environmental authority;
 - (c) response procedures to be implemented to prevent or minimise the risk of environmental harm arising from environmental emergency incidents;
 - (d) response procedures to minimise the extent and duration of environmental harm caused by environmental emergency incidents;
 - (e) the practices and procedures to be employed to restore the environment or mitigate any environmental harm caused;
 - (f) communication procedures and lines of communication within and beyond the organisation to be employed in responding to environmental emergency incidents;
 - (g) the resources to be used in response to environmental emergency incidents;
 - (h) procedures to investigate the cause of any incidents, including releases, and where necessary, the remedial actions to be implemented to reduce the likelihood of recurrence of similar events;
 - (i) a receiving environment monitoring program (REMP) to be specifically implemented in the event of an unauthorised release to waters or land to examine and assess environmental impacts. For monitoring of waters, this program must include upstream, downstream and impact site monitoring procedures. For soils monitoring, sufficient samples must be taken from the soil profile at both reference site and the impact site as a minimum;
 - (j) the provision and availability of documented procedures to staff attending any emergency environmental incident to enable them to effectively respond;
 - (k) training of staff that will be called upon to respond to emergency environmental incidents to enable them to effectively respond;
 - (l) timely and accurate reporting of the circumstance and nature of emergency environmental incidents to the administering authority in accordance with conditions of this environmental authority;
 - (m) procedures for accessing monitoring points during emergency environmental incidents; and
 - (n) procedures to notify any potentially impacted stakeholder who may be affected by an environmental emergency incident.

Documentation and Records Management

- A17 All records and results required by the conditions of this environmental authority must be kept for a minimum of five (5) years.
- A18 All documentation required by this environmental authority (including but not limited to plans, systems, programs, procedures, results of audits, assessments, monitoring, inspections and complaints records) must be made available to the administering authority upon request.

Cultural Heritage

- A19 In the carrying out of the petroleum activity the holder of this environmental authority must not adversely impact on the cultural heritage values of any place registered on the Queensland Heritage Register

Underground Gas Storage

- A20 Testing, evaluating, developing and using natural underground reservoirs for petroleum storage or to store prescribed storage gases is not authorised under this environmental authority.

Stimulation of Underground Reservoirs

- A21 The stimulation of underground reservoirs is prohibited under this environmental authority.

Encapsulation of Solid Salt in a Landfill Monocell

- A22 The disposal of solid salt on site, including encapsulation of solid salt in a landfill monocell, is prohibited under this environmental authority.

SCHEDULE B - WATER

Contaminant Release

- B1 Contaminants that will or may cause environmental harm must not be directly or indirectly released to any waters except as authorised by Conditions (B15).
- B2 The release of contaminants directly or indirectly to waters authorised by Condition (B15):
(a) must not produce any visible plume within the receiving waters; and
(b) must not produce any slick or other visible or odorous evidence of oil, grease or petrochemicals nor contain visible floating oil, grease, scum, litter or other objectionable matter.

Erosion and Sediment Control

- B3 For activities involving significant disturbance to land, control measures that are commensurate to the sitespecific 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).

Maintenance and Cleaning

- B4 The maintenance and cleaning of vehicles and any other equipment or plant must be carried out in areas from where the resultant contaminants cannot be released into any waters, roadside gutter or stormwater drainage system.

Watercourses, Wetlands and Springs

- B5 In the carrying out of the petroleum activity the holder of this environmental authority must not clear vegetation or place fill, in or within:
- (a) 200 metres from any natural significant wetland;
 - (b) 100 metres from any natural wetland, lakes or springs; or
 - (c) 100 metres of the high bank of any other watercourse.
- B6 The holder of this environmental authority must not excavate or replace fill in a way that interferes with the flow of water in a watercourse, wetland or spring, including works that divert the course of the flow of the water or works that impound the water.
- B7 Despite Conditions (B5) and (B6), pipeline and road construction works may be undertaken in watercourses, wetlands or springs, where there is no reasonable and practicable alternative (such as the use of horizontal directional drilling methods), provided that the works are conducted in accordance with the following order of preference:
- (a) conducting work in times of no flow; and
 - (b) using all reasonable and practicable measures to reduce impacts in times of flow.
- B8 Activities or works resulting in significant disturbance to the bed or banks of a watercourse or wetland, or a spring must:
- (a) only be undertaken where necessary for the construction and/or maintenance of roads, tracks and pipelines that are essential for carrying out the authorised petroleum activities and no reasonable or practicable alternative location exists;
 - (b) be no greater than the minimum area necessary for the purpose of the significant disturbance;
 - (c) be designed and undertaken by a suitably qualified person taking into account the matters listed in Section 5 - Planning Activities and Section 6 - Impact Management During Activities of the Department of Environment and Heritage Protection's "Guideline - Activities in a watercourse, lake or spring associated with mining operations" dated April 2008, or more recent editions as such become available; and
 - (d) upon cessation of the activities or works, commence rehabilitation immediately such that the final rehabilitation is to a condition that will ensure the ongoing physical integrity and the natural ecosystem values of the site.
- B9 Sediment control measures must be implemented to minimise any increase in water turbidity due to carrying out petroleum activities in the bed or banks of a watercourse or wetland, or a spring.

- B10 Routine, regular and frequent visual monitoring must be undertaken while carrying out construction work and/or any maintenance of completed works in a watercourse, wetland or spring.
- B11 If, due to the petroleum activities, water turbidity increases in the watercourse, wetland or spring outside contained areas, works must cease and the sediment control measures must be rectified to limit turbidity before activities recommence.
- B12 All measures must be taken to minimise adverse impacts to or reversal of any river improvement works carried out in River Improvement Areas by Queensland's River Improvement Trusts.
Note: Locations and details of River Improvement Areas and River Improvement Trusts are provided in the Schedule to the River Improvement Trust Regulation 1998.

Floodplains

- B13 Where petroleum activities are carried out on floodplain areas, the holder of this environmental authority must ensure that petroleum and incidental activities do not:
- (a) concentrate flood flows that cause or threaten an adverse environmental impact;
 - (b) divert flood flows from natural drainage paths and alter flow distribution;
 - (c) increase the local duration of floods;
 - (d) increase the risk of detaining flood flows;
 - (e) pose an unacceptable risk to the safety of persons from flooding; or
 - (f) pose an unacceptable risk of damage to property from flooding.

Groundwater

- B14 The extraction of groundwater as part of the petroleum activity from underground aquifers must not directly or indirectly cause environmental harm to any spring, wetland or other surface waters.

Release to Waters of Treated CSG Water

- B15 The release of treated CSG water is authorised to occur in accordance with Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters and Schedule B Table 2 – Treated CSG Water Release Limits for Monitoring Point (M1).

Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters

Water Source and Location	Release Point	Location	Monitoring Point	Receiving Waters Description
Treated CSG Water from the reverse osmosis water treatment plant and treated water dam located on PL230	R1, defined as the outlet of discharge pipe to Wilkie Creek	6,995,465 N303,004 E (Easting and northing locations given as per GDA94, Map Zone 56)	M1, defined as the sample point in the discharge pipeline point to release into Wilkie Creek	Wilkie Creek

B16 The quality of the treated CSG water being released must comply with each quality characteristic release limit and limit type and the monitoring frequency specified in Schedule B, Table 2 – Treated CSG Water Release Limits for Monitoring Point (M1) and Schedule B, Table 3 – Treated CSG Water Release Limits for Monitoring Point (M1) when measured at the monitoring point (M1) specified in Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters.

Schedule B Table 2 – Treated CSG Water Release Limits for Monitoring Point (M1)

Quality Characteristic	Unit	Release Limit(s)	Limit Type	Monitoring Frequency
Electrical conductivity	µS/cm	580	80 th percentile	Based on at least 5 samples with not less than 60 minutes between samples daily during release
pH	pH Unit	6.5 - 9	Range	Daily during release
Suspended Solids	mg/L	180	Maximum	Daily during release
Boron	mg/L	0.37	Maximum	Daily during release

Schedule B, Table 3 – Treated CSG Water Release Limits for Monitoring Point (M1)

Quality characteristic	Unit	Maximum Release limit	Monitoring frequency
Aluminium	mg/L	0.2	The first release day of each quarter
Antimony	ml/L	0.003	
Arsenic	mg/L	0.007	
Barium	mg/L	0.7	
Bisphenol A	mg/L	0.2	
Boron	mg/L	4	
Bromide	mg/L	7	
BTEX			
Benzene	mg/L	0.001	
Toluene	mg/L	0.8	
Ethylbenzene	mg/L	0.3	
Xylene (m & p)	mg/L	0.6	
Cadmium	mg/L	0.002	
Chromium	mg/L	0.05	
Copper	mg/L	2	
Cyanide	mg/L	0.08	
Fluoride	mg/L	1.5	
Iodide	mg/L	0.5	
Iron	mg/L	0.3	
Lead	mg/L	0.01	
Manganese	mg/L	0.5	
Mercury	mg/L	0.001	
Molybdenum	mg/L	0.05	
Nickel	mg/L	0.02	
Nonylphenol	mg/L	0.5	

PAH (as B(a)P TEF)			0.01
Species:	TEF:		
benz[a]anthracene	0.1		
benzo[b+j]fluoranthene	0.1		
benzo[k]fluoranthene	0.1	µg/L	
benzo[a]pyrene	1.0		
chrysene	0.1		
dibenz[a,h]anthracene	1.0		
indeno[1,2,3-cd]pyrene	0.1		
Selenium		mg/L	0.01
Silver		mg/L	0.1
Strontium		mg/L	4
Total Petroleum Hydrocarbons (TPH)		mg/L	0.2
Vanadium		mg/L	0.05
Zinc		mg/L	3
Radium-226 Lead-210 Polonium-210 Radium-228		mSv/year	0.5 The dose for each parameter is summed to give the total dose which must be less than or equal to 0.5 mSv/year

B17 If the monitoring required by condition (B16) indicates that any of the quality characteristic release limits specified in Schedule B, Table 3 – Treated CSG Water Release Limits for Monitoring Point (M1) have been exceeded at any time during any release of treated CSG water, the environmental authority holder must, within five (5) business days of notifying the administering authority of the exceedance, unless a longer time is agreed to by the administering authority:

- (a) complete an investigation into the exceedance, which includes an analysis of the (potential and actual) causes for the exceedance; and
- (b) provide a written report to the administering authority on completion of the investigation that includes:
 - (i) details of the investigation carried out;
 - (ii) any actions taken to prevent impacts to waters that may be used for drinking water;
 - (iii) the cause for the exceedance;
 - (iv) all water quality monitoring results pertaining to the investigation;
 - (v) any general observations;
 - (vi) methodology(ies) and any relevant calculations used; and
 - (vii) corrective actions to rectify the cause of the exceedance.

B18 Where an exceedance of a quality characteristic release limit specified in Schedule B, Table 3 – Treated CSG Water Release Limits for Monitoring Point (M1) is being investigated in accordance with condition (B17), the investigation and reporting required by condition (B18) is not required if a subsequent exceedance occurs, during investigation of the initial exceedance, which has resulted from the same cause that triggered the initial exceedance.

Flow Monitoring

- B19 Prior to commencing any release of treated CSG water authorised under this environmental authority, a stream flow gauging station (GP1) must be installed.
- B20 Upon practical completion of the meter installation, a completed 'meter installation form' must be signed by the installer and the environmental authority holder to confirm that the installation complies with the manufacturer's specifications and/or national standards and/or the Department of Environment and Heritage Protection's metering standards (whichever is applicable).
- B21 The stream flow gauging station (GP1) must be installed in accordance with Schedule B, Table 4 – Contaminant Release During Flow Events.

Schedule B, Table 4 – Contaminant Release During Flow Events

Receiving water description	Gauging station description	Latitude or northing (GDA94)	Longitude or easting (GDA94)	Minimum Flow in Receiving Water Required for a Release Event	Flow recording Frequency
Wilkie Creek	Gauging station 1 (GP1)	50-100 metres upstream of Release Point R1	50-100 metres upstream of Release Point R1	0.14 m ³ /s	at 6 hour intervals during discharge (minimum twice daily)

- B22 The stream flow gauging station (GP1) must be operated to determine daily stream flows in accordance with Schedule B, Table 4 – Contaminant Release During Flow Events.
- B23 The flow rate of treated CSG water released from the release point authorised in Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters must not exceed a ratio of 1 part of the flow rate of the treated CSG water being released to 4 parts of the measured upstream receiving water flow rate.
- B24 The volume of treated CSG water released from the release point authorised in Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters must not exceed a maximum of 8ML/day.
- B25 The following characteristics of the release must be measured and recorded daily during all release events:
- (a) the volume of treated CSG water released through the release point R1;
 - (b) the date and time of release commencing and ceasing;
 - (c) the release rate;
 - (d) for any change in the release rate:
 - (i) the date and time of the change;
 - (ii) the new release rate; and
 - (iii) water levels and flow rate during the discharge event.
 - (e) water levels and flow rate during the discharge event;

- (f) water quality characteristics monitoring results; and
- (g) details of any observed impacts/conditions.

- B26 Prior to commencing any release of treated CSG water authorised under this environmental authority, each monitoring and release point specified in Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters must be marked and readily identifiable from the banks of Wilkie Creek.
- B27 The quality of the receiving waters must be monitored daily during release of treated CSG water at locations representative of the receiving waters determined in accordance with Condition (B33), for the following water quality characteristics:
- (a) Electrical conductivity ($\mu\text{S}/\text{cm}$)
 - (b) pH (pH Unit)
 - (c) Turbidity (NTU)
 - (d) Suspended Solids (mg/L)
 - (e) Calcium (mg/L)
 - (f) Magnesium (mg/L)
 - (g) Fluoride (mg/L)
 - (h) Sulphate (mg/l) and
 - (i) Boron (mg/L).
- B28 If water has been released from authorised release points listed in Schedule B, Table 1 – Contaminated Release Points, Sources and Receiving Waters, the holder of this environmental authority must undertake an annual assessment of the contaminants of treated CSG water to determine the risk of environmental harm from release of treated CSG water to surface waters. This should consider the contaminants mentioned in the ANZECC & ARMCANZ 2000 guidelines. This annual assessment must be included in the Annual Return.

Receiving Environment Management Program – REMP

- B29 Prior to the release of treated CSG water to Wilkie Creek a Receiving Environment Monitoring Program (REMP) must be developed and implemented to monitor, identify and describe any adverse impacts to surface water environmental values, water quality and flows due to the authorised release of treated CSG water to Wilkie Creek.
- B30 The REMP required by Condition (B29) must include periodic monitoring for the effects of the release on the receiving environment as a result of treated CSG water releases to waters from the release location (R1) specified in Table B15 - Treated CSG Water Release Point, Source and Receiving Waters.
- B31 The quality of the receiving waters must be monitored at the locations specified in Schedule B, *Table 5 – Receiving Water Upstream Background Sties and Downstream Monitoring Points*.

Schedule B, Table 5 – Receiving Water Upstream Background Sites and Downstream Monitoring Points.

Monitoring Points	Receiving Waters	Latitude of Northing (GDA94)	Longitude or Easting (GDA94)
Upstream background monitoring point			
Monitoring Point (M2)	Wilkie Creek	50 - 100 metres upstream of Release Point R1	50 - 10 metres upstream of Release Point R1
Downstream monitoring point			
Monitoring Point (M3)	Wilkie Creek	150 - 20 metres downstream of Release Point R1	150 - 200 metres downstream of Release Point R1

- B32 The REMP required by Condition (B29) must:
- (a) assess the condition or state of receiving waters, including upstream conditions, spatially within the REMP area, considering background water quality characteristics based on accurate and reliable monitoring data that takes into consideration temporal variation (e.g. seasonality);
 - (b) be designed to facilitate assessment against water quality objectives for the relevant environmental values that need to be protected;
 - (c) include monitoring from background reference sites (e.g. upstream or background) and downstream sites from the release;
 - (d) specify the frequency and timing of sampling required in order to reliably assess ambient conditions and to provide sufficient data to derive site specific background reference values in accordance with the Queensland Water Quality Guidelines 2006. This should include monitoring during periods of natural flow irrespective of other discharges;
 - (e) include monitoring and assessment of dissolved oxygen saturation and temperature and all water quality parameters listed in Condition (B27);
 - (f) include, where appropriate, monitoring of metals/metalloids in sediments (in accordance with ANZECC & ARMICANZ 2000, BATLEY and/or the most recent version of AS5667.1 Guidance on Sampling of Bottom Sediments);
 - (g) include, where appropriate, monitoring of macroinvertebrates in accordance with the AusRivas methodology;
 - (h) apply procedures and/or guidelines from ANZECC and ARMICANZ 2000 and other relevant guideline documents;
 - (i) describe sampling and analysis methods and quality assurance and control; and
 - (j) incorporate stream flow and hydrological information in the interpretations of water quality and biological data.
- B33 A report outlining the findings of the REMP, including all monitoring results and interpretations in accordance with conditions (B29) to (B32) must be prepared annually. This must include a determination of the risk of environmental harm from release of treated CSG water to the receiving environment waters.
- B34 The annual assessment must be prepared annually and made available on request to the administering authority.

Water Release Reduction Strategy

- B35 An on-going Release Reduction Strategy to maximise CSG water reuse and minimise any release to waters and the storage of CSG water in holding dams must be developed and implemented.
- B36 The strategy must address the following matters:
- (a) implementation of schemes to achieve maximum use of the water;
 - (b) specific targets for achieving increased use of CSG water both treated and untreated;
 - (c) a market analysis at least every three (3) years to identify existing and future opportunities for water use;
 - (d) on-going review of emerging technologies and/or re-use options that could achieve significant reductions in mass loads of contaminants released to the environment;
 - (e) investigation of the feasibility of alternative options, practices and procedures to further minimise the volume and concentration of contaminants released to waters; and
 - (f) programs to implement feasible options to achieve increased water use and reduction in contaminant loads, including actions and timeframes for completion.
- B37 A progress report on the Release Reduction Strategy must be submitted to the administering authority with each annual return. The report(s) must address at least the following matters:
- (a) details of the specific options, practices and procedures investigated;
 - (b) details of new practices, procedures and programs implemented since the last reporting period and targets met;
 - (c) where alternative options, practices and procedures are not considered feasible, the provision of justification to support that determination; and
 - (d) details of the option(s) yet to be implemented, including the timeframes for implementation, and justification for the chosen option(s).
- B38 The holder of this environmental authority must provide the administrative authority with safe access to facilitate inspections, and must comply with any instructions issued by the administrative authority relevant to the operation of the pump and meter installation.
- B39 The holder of this environmental authority must notify the administering authority within five (5) business days of any meter malfunction or maintenance of the measuring device (meter).
- B40 The holder of this environmental authority must arrange for the repair or replacement of a malfunctioning meter within five business days of becoming aware of the malfunction and provide a repair and/or maintenance completion report within ten business days of the repair or maintenance.

Sewage Treatment Works (21 – 450 EP)

Release of Treated Sewage Effluent Contaminants to Land

- B41 Sewage pump stations must be fitted with a stand-by pump and a visible or audible high level alarm.

- B42 Treated effluent may only be released to land at the designated, fenced and delineated contaminant release area(s).
- B43 The contaminant release area(s) must be maintained in a proper and efficient condition so as to provide adequate assimilation, percolation, evaporation and transpiration of the released contaminants
- B44 Treated effluent must not be applied by spray irrigation and must be applied in a manner that does not cause ponding or runoff of effluent beyond the contaminant release area(s).
- B45 When weather conditions or soil conditions preclude the release of contaminants, the contaminants must be directed to on-site storage or lawfully disposed of off-site.

Quality of Contaminants Released from the Sewage Treatment Works

- B46 Treated effluent must comply, at the sampling and in-situ measurement point(s), with each of the release limits specified in Schedule B, Table 5 - Treated Sewage Effluent Standards for each quality characteristic.
- B47 The release of contaminants to land must be monitored at the frequency and at the sampling and in-situ measurement point specified in Schedule B, Table 5 - Treated Sewage Effluent Standards and records of the monitoring results kept for at least five (5) years and made available to the administering authority on request.
- B48 The influent annual average daily dry weather flow of sewage must not exceed 60 kilolitres per day for each authorised sewage treatment plant under this environmental authority.

Schedule B, Table 5 – Treated Sewage Effluent Standards

Quality Characteristic	Sampling and in-situ measurement Point Location	Limit Type	Release Limit	Frequency
5-day Biochemical Oxygen Demand (inhibited)	Release pipe from sewage treatment plant located on PL198;	Maximum	20 mg/L	Monthly
Suspended Solids		Maximum	30 mg/L	
pH		Range	6.0 to 9.0	
E-Coli	Release pipe from sewage treatment plant located on PL230	80 th percentile based on at least 5 samples with not less than 30 minutes between samples.	1000 cfu per 100 mL	

		Maximum	10000 cfu per 100 ml	
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SCHEDULE BE - COAL SEAM GAS WATER INJECTION TRIAL

BE1 The only fluids authorised to be injected into an aquifer(s) are those fluid types specified in Schedule BE, Table 1 – Details of Authorised Fluid Injection.

BE2 Fluid injection must be in accordance with the quantities and locations listed in Schedule BE, Table 1 – Details of Authorised Fluid Injection.

Schedule BE, Table 1 – Details of Authorised Fluid Injection

Well Location (Easting Northing, Map Zone 56)	Injection Well Number / Reference	Target Formation and Perforated Zone	Fluid Type	Maximum Injection Rate ML/d	Hydraulic Impact Zone	Water Quality Impact Zone
313669 E 6967949 N	Tipton-193	Precipice Formation, between 1040m to 1110 m depth	Treated CSG water ¹	4	9,340 m radius from injection well	148 m radius from injection well

1: Treated CSG water means any fluid that contains any proportion of treated CSG water, blended or otherwise.

BE3 The holder of this environmental authority must notify the administering authority the commencement date of the trial at least seven (7) days prior to its commencement.

BE4 The injection trial is limited to a period of 180 days of injection, followed by a six-month recovery period.

BE5 Injection must cease immediately upon becoming aware that environmental harm is caused or threatened to be caused as a result of the injection activities.

Well Integrity

BE6 The construction of the Tipton-193 injection well must be carried out in accordance with the well construction requirements described in the most recent version of the Department of Environment and Heritage Protection’s “CSG Water Injection Well Construction Requirements”, as amended from time to time.

BE7 The Tipton-193 injection well must be mechanically functional such that there is no significant fluid movement into a water resource aquifer through vertical channels adjacent to the well bore hole.

BE8 The construction, operation and maintenance of the injection well specified in Schedule BE, Table 1 – Details of Authorised Fluid Injection must be undertaken in a way that prevents and/or minimises impacts to the environmental values of the target formation and ensures the integrity of the bore.

BE9 The injection pressure must not exceed 90 percent of the formation fracture pressure

Injection Fluid Quality

BE10 The quality of the fluid being injected into the injection well specified in Schedule BE, Table 1 – Details of Authorised Fluid Injection must comply with the contaminant limits prescribed in Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid.

Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid

Quality Characteristics	Release Limits	Limit Type
pH (pH units)	Minimum 6.5, Maximum 10	Range
Total Dissolved Solids (TDS) ²	Mean TDS of injection fluid must not exceed median TDS of formation water measured in background water quality monitoring well	Maximum
Dissolved Oxygen	500 µg/L	Maximum
Total suspended solids	25 mg/L	Maximum

²: Electrical conductivity is an acceptable proxy measurement for measuring TDS of the injection fluid. If used, the conversion from EC to TDS must be stated and confirmed with laboratory monitoring results.

BE11 The quality of the fluid being injected into the injection well specified in Schedule BE, Table 1 – Details of Authorised Fluid Injection must be monitored at the frequency specified in Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid.

Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid

Monitoring parameter	Unit	Monitoring frequency during injection
Temperature of target formation	°C	N/A
Injection fluid temperature	°C	Continuous
Inlet pressure	KPa	Continuous
Fluid flow rate	L/sec	Continuous
	ML/day	Daily
Dissolved Oxygen (DO)	µg/L	Daily
Electrical Conductivity	µS/cm	Daily
pH	pH units	Daily
Turbidity	NTU	Daily
Sodium	mg/L	Weekly
Potassium	mg/L	Weekly
Calcium	mg/L	Weekly
Magnesium	mg/L	Weekly
Chloride	mg/L	Weekly
Sulphate as SO ₄	mg/L	Weekly
Carbonate / Bicarbonate	mg/L	Weekly

Bromine	mg/L	Monthly
Fluoride	mg/L	Monthly
Iodide	mg/L	Weekly
Silica	mg/L	Monthly
Iodine	mg/L	Monthly
Nitrate	mg/L	Monthly
Total organic carbon	mg/L	Weekly
Total Dissolved Solids	mg/L	Weekly
Redox Potential	mV	Weekly
Total Hardness as CaCO ₃	mg/L	Weekly
Total Alkalinity as CaCO ₃	mg/L	Weekly
Hydroxide alkalinity as CaCO ₃	mg/L	Weekly
Carbonate Alkalinity as CaCO ₃	mg/L	Weekly
Bicarbonate Alkalinity as CaCO ₃	mg/L	Weekly
Total suspended solids	mg/L	Weekly
Bromide	mg/L	Weekly
Aluminium	mg/L	Monthly
Arsenic	mg/L	Monthly
Barium	mg/L	Monthly
Boron	mg/L	Monthly
Copper	mg/L	Monthly
Iron	mg/L	Monthly
Manganese	mg/L	Monthly
Mercury	mg/L	Monthly
Nickel	mg/L	Monthly
Strontium	mg/L	Monthly
Zinc	mg/L	Monthly
Total Petroleum Hydrocarbons	µg/L	Monthly
BTEX	µg/L	Monthly

BE12 Notwithstanding Conditions (BE9) and (BE10), the injection of treated CSG water into the injection well specified in Schedule BE, Table 1 – Details of Authorised Fluid Injection must have considered the recommendations for water blending described in the following documents, where appropriate:

- (a) Surat Gas Project – Geochemical Blending and Compatibility Study: Tipton Injection Trials, March 2013; and
- (b) Surat Gas Project – Geochemical Blending and Compatibility Study: Tipton Injection Trials – Phase 2, March 2013.

BE13 The holder of this environmental authority must provide for non-chemical disinfection of injection fluid if results of six-monthly testing of injected fluid show levels of coliform bacteria, sulphate reducing bacteria or iron fixing bacteria that has potential to cause adverse impacts on the groundwater within the target formation.

Injection Management Plan

BE14 An Injection Management Plan which has been certified by a suitably qualified person must be developed and implemented prior to the carrying out of the trial fluid injection activity(ies).

- BE15 The Injection Management Plan must include but not necessarily be limited to:
- (a) estimated volumes and rates of water to be injected;
 - (b) a description of the physical, chemical and biological components and their concentrations of the water to be produced;
 - (c) details of how and where the fluid will be produced, aggregated, stored and kept separate from other waters until it is treated and injected;
 - (d) details of where the fluid is proposed to be treated including a description of the treatment process;
 - (e) a water quality compatibility assessment which demonstrates that the injection fluid has inconsequential reactivity with the target formation and native groundwater it will come into contact with;
 - (f) the regional characteristics of the receiving environment;
 - (g) identification of the water quality impact zone and the hydraulic impact zone;
 - (h) identification of any fluid injection well, all existing bores, springs, lakes, wetlands, environmental assets and watercourses connected to groundwater, faults and other geologic features that occur within the water quality impact zone and the hydraulic impact zone;
 - (i) identification of the environmental values and water quality objectives of the potential water quality impact zone of the target formation in accordance with the Environmental Protection (Water) Policy 2009 and the Queensland Water Quality Guidelines 2009;
 - (j) an assessment of the potential for migration of injection fluid or native groundwater out of the target formation through wells, bores, springs, connected watercourses, faults or other geologic features likely to impact on other aquifers;
 - (k) a risk assessment identifying potential hazards, their inherent risk, preventative measures for the management of potential hazards and details on sampling and analysis methods to verify preventative measures of potential hazards, including frequency and locations and quality assurance and control;
 - (l) control measures that will be implemented for fluid storage, treatment and injection to prevent or control the release of a contaminant or waste to the environment other than the release authorised in Schedule BE, Table 1 – Details of Authorised Fluid Injection and Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid;
 - (m) verification methods to assess performance of the injection activities;
 - (n) the indicators or other criteria against which the performance of fluid injection will be assessed;
 - (o) procedures that will be adopted to regularly review the monitoring program;
 - (p) reporting procedures to management and the administering authority should unforeseen or non-compliant monitoring results be recorded; and
 - (q) procedures that will be implemented to prevent unauthorised environmental harm from unforeseen or non-compliant monitoring results.

Receiving Environment Monitoring Program – Injection Activities

- BE16 A Receiving Environment Monitoring Program (REMP) for Injection Activities which has been certified by a suitably qualified person must be developed and implemented to monitor, identify and describe any adverse impacts to the following values of the target formation due to the injection of treated CSG water:
- (a) hydraulic response;
 - (b) water quality response; and
 - (c) any other groundwater environmental values identified.
- BE17 The REMP for Injection Activities required by Condition (BE16) must be developed and implemented prior to the carrying out of the trial fluid injection activity(ies).
- BE18 The REMP for Injection Activities required by Condition (BE16) must include, but not necessarily be limited to:

- (a) methods to validate the assumptions, predicted impacts and the effectiveness of the proposed preventative measures associated with the modelled water quality impact zone and hydraulic impact zone;
- (b) monitoring of the hydraulic response to the trial injection at the well(s) referred to in Condition (BE18)(f)(ii);
- (c) monitoring of the water quality of the injection fluid during injection for the parameters listed in Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid;
- (d) monitoring of the water quality response following the completion of the injection trial recovery period through sampling of the target aquifer, within the water quality impact zone, for the parameters listed in Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid;
- (e) a definition of the background water quality of the Precipice Sandstone to be used for monitoring compliance with Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid and for reporting in the Injection Trial Report required by Condition (BE19);
- (f) the installation and use of a minimum of two wells:
 - (i) one of which accesses the target aquifer within the water quality impact zone; and
 - (ii) the other of which is placed at an adequate distance to determine the extent of the hydraulic response to the injection;
- (g) methods for the analysis and interpretation and a description of the statistical basis on which conclusions will be drawn to verify the assumptions of the injection proposal; and
- (h) a demonstration of how the REMP will validate assumptions, predicted impacts and the effectiveness of quality assurance and control measures.

Reporting Requirements for Fluid Injection Trials

- BE19 Upon completion and within two (2) months of the completion of the injection trial's recovery period the holder of the authority must submit to the administering authority an Injection Trial Report prepared by a suitably qualified person.
- BE20 The Injection Trial Report must include, but not necessarily be limited to:
- (a) details of the injection well including but not limited to:
 - (i) location details (GDA94);
 - (ii) the inferred lithology³;
 - (iii) casing details including type, outer diameter (mm), wall thickness (mm) and locations (depth from and to in metres);
 - (iv) cementing details including type, hole diameter (mm), casing outer diameter (mm) and locations (depth from and to in metres);
 - (v) calculated target formation fracture pressure; and
 - (vi) target formation pressure prior to injection;
 - (b) a detailed interpretation of the logs and other tests conducted during drilling and construction or refurbishment of the well against their specific objectives;
 - (c) a completed well schematic diagram;
 - (d) a temperature survey;
 - (e) a cement integrity log;
 - (f) outcomes of the injection trial including, but not limited to:
 - (i) well head injection rates versus formation pressure;
 - (ii) target formation pressure within the hydraulic impact zone during and upon completion of the trial;
 - (iii) hydraulic gradient of the target formation within the hydraulic impact zone upon completion of the trial;

- (iv) the effectiveness of aquitards (including the stability of the aquitard) and aquicludes of confining the injected fluid within the target formation; and
 - (v) a detailed interpretation of the logs and other tests conducted during the injection trial against their specific objectives;
 - (vi) validation of conceptual framework for injection; and
 - (vii) additional hazards that were not identified earlier;
- (g) the results of the REMP for Injection Activities;
- (h) analysis of monitoring and operational data in terms of:
- (i) validation of conceptual framework for injection; and
 - (ii) additional hazards that were not identified earlier;
- (i) a revised risk analysis that identifies all potential hazards, likelihood of various risk elements and associated consequences;
- (j) a revised water quality compatibility assessment which demonstrates that the injection fluid has inconsequential reactivity with the target formation and native groundwater it will come into contact with;
- (k) a re-evaluation of the hydraulic impact zone; and
- (l) a re-evaluation of the water quality impact zone.
- ³:Inferred lithology means the best available description of the lithology based upon historical drilling records, interpretation of logs and any other information that the suitably qualified person may have discovered.

BE21 Injection Cessation Report

Following completion of the injection trial, a fluid injection cessation report which has been certified by a suitably qualified person must be submitted to the administering authority within two (2) months of completion of the injection trial's recovery period.

BE22 The fluid injection cessation report must include, but not necessarily be limited to:

- (a) volumes of fluid injected at each well;
- (b) a risk assessment statement providing details on identified hazards including their inherent risk, summary of the results from the verification monitoring, preventative measures and the residual risk; and
- (c) a monitoring report outlining the methods and results of verification monitoring undertaken to assess the performance of the injection activities and preventative measures for identified hazards.

SCHEDULE C - REGULATED DAMS

Assessment of consequence category

- C1 The consequence category of any structure must be assessed by a suitably qualified and experienced person in accordance with the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635) at the following times:
- (a) prior to the design and construction of the structure, if it is not an existing structure; or
 - (b) if it is an existing structure, prior to the adoption of this schedule; or
 - (c) prior to any change in its purpose or the nature of its stored contents.
- C2 A consequence assessment report and certification must be prepared for each structure assessed and the report may include a consequence assessment for more than one structure.

- C3 Certification must be provided by the suitably qualified and experienced person who undertook the assessment, in the form set out in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635).

Design and construction of a regulated structure

- C4 Conditions (C5) to (C9) inclusive do not apply to existing structures.
- C5 All regulated structures must be designed by, and constructed under the supervision of, a suitably qualified and experienced person in accordance with the requirements of the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635).
- C6 Construction of a regulated structure is prohibited unless the holder has submitted a consequence category assessment report and certification to the administering authority has been certified by a suitably qualified and experienced person for the design and design plan and the associated operating procedures in compliance with the relevant condition of this authority.
- C7 Certification must be provided by the suitably qualified and experienced person who oversees the preparation of the design plan in the form set out in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635), and must be recorded in the Regulated Dams/Levees register.
- C8 Regulated structures must:
(a) be designed and constructed in accordance with and conform to the requirements of the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635);
(b) be designed and constructed with due consideration given to ensuring that the design integrity would not be compromised on account of:
(i) floodwaters from entering the regulated dam from any watercourse or drainage line; and
(ii) wall failure due to erosion by floodwaters arising from any watercourse or drainage line.
(c) have the floor and sides of the dam designed and constructed to prevent or minimise the passage of the wetting front and any entrained contaminants through either the floor or sides of the dam during the operational life of the dam and for any period of decommissioning and rehabilitation of the dam.
- C9 Certification by the suitably qualified and experienced person who supervises the construction must be submitted to the administering authority on the completion of construction of the regulated structure, and state that:
(a) the 'as constructed' drawings and specifications meet the original intent of the design plan for that regulated structure;
(b) construction of the regulated structure is in accordance with the design plan.

Operation of a regulated structure

- C10 Operation of a regulated structure, except for an existing structure, is prohibited unless: the holder has submitted to the administering authority:
(i) one paper copy and one electronic copy of the design plan and certification of the 'design plan' in accordance with condition (C6), and

- (ii) a set of 'as constructed' drawings and specifications, and
- (iii) certification of those 'as constructed drawings and specifications' in accordance with condition (C9), and
- (iv) where the regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the DSA volume across the system, a copy of the certified system design plan.
- (v) the requirements of this authority relating to the construction of the regulated structure have been met;
- (vi) the holder has entered the details required under this authority, into a Register of Regulated Dams; and
- (vii) there is a current operational plan for the regulated structures

- C11 For existing structures that are regulated structures:
- (a) where the existing structure that is a regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the DSA volume across the system, the holder must submit to the administering authority within twelve (12) months of the commencement of this condition a copy of the certified system design plan including that structure; and
 - (b) There must be a current operational plan for the existing structures.
- C12 Each regulated structure must be maintained and operated, for the duration of its operational life until decommissioned and rehabilitated, in a manner that is consistent with the current operational plan and, if applicable, the current design plan and associated certified 'as constructed' drawings.

Mandatory reporting level

- C13 Conditions (C14) to (C17) inclusive only apply to Regulated Structures which have not been certified as low consequence category for 'failure to contain – overtopping'.
- C14 The Mandatory Reporting Level (the MRL) must be marked on a regulated dam in such a way that during routine inspections of that dam, it is clearly observable.
- C15 The holder must, as soon as practical and within forty-eight (48) hours of becoming aware, notify the administering authority when the level of the contents of a regulated dam reaches the MRL.
- C16 The holder must, immediately on becoming aware that the MRL has been reached, act to prevent the occurrence of any unauthorised discharge from the regulated dam.
- C17 The holder must record any changes to the MRL in the Register of Regulated Structures.

Design storage allowance

- C18 The holder must assess the performance of each regulated dam or linked containment system over the preceding November to May period based on actual observations of the available storage in each regulated dam or linked containment system taken prior to 1 July of each year.

- C19 By 1 November of each year, storage capacity must be available in each regulated dam (or network of linked containment systems with a shared DSA volume), to meet the Design Storage Allowance (DSA) volume for the dam (or network of linked containment systems).
- C20 The holder must, as soon as possible and within forty-eight (48) hours of becoming aware that the regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, notify the administering authority.
- C21 The holder must, immediately on becoming aware that a regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, act to prevent the occurrence of any unauthorised discharge from the regulated dam or linked containment systems.

Annual inspection report

- C22 Each regulated structure must be inspected each calendar year by a suitably qualified and experienced person.
- C23 At each annual inspection, the condition and adequacy of all components of the regulated structure must be assessed and a suitably qualified and experienced person must prepare an annual inspection report containing details of the assessment and include recommended actions to ensure the integrity of the regulated structure.
- C24 The suitably qualified and experienced person who prepared the annual inspection report must certify the report in accordance with the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635).
- C25 The holder must:
(a) Within 20 business days of receipt of the annual inspection report, provide to the administering authority:
(i) The recommendations section of the annual inspection report; and
(ii) If applicable, any actions being taken in response to those recommendations; and
(b) If, following receipt of the recommendations and (if applicable) actions, the administering authority requests a full copy of the annual inspection report from the holder, provide this to the administering authority within 10 business days of receipt of the request.

Transfer arrangements

- C26 The holder must provide a copy of any reports, documentation and certifications prepared under this authority, including but not limited to any Register of Regulated Structures, consequence assessment, design plan and other supporting documentation, to a new holder on transfer of this authority.

Register of regulated dams

- C27 A Register of Regulated Dams must be established and maintained by the holder for each regulated dam.

- C28 The holder must provisionally enter the required information in the Register of Regulated Dams when a design plan for a regulated dam is submitted to the administering authority.
- C29 The holder must make a final entry of the required information in the Register of Regulated Dams once compliance with condition (C10) and (C11) has been achieved.
- C30 The holder must ensure that the information contained in the Register of Regulated Dams is current and complete on any given day.
- C31 All entries in the Register of Regulated Dams must be approved by the chief executive officer for the holder of this authority, or their delegate, as being accurate and correct.
- C32 The holder must, at the same time as providing the annual return, supply to the administering authority a copy of the records contained in the Register of Regulated Dams, in the electronic format required by the administering authority.

Transitional arrangements

- C33 All existing structures that have not been assessed in accordance with either the Manual or the former Manual for Assessing Hazard Categories and Hydraulic Performance of Dams must be assessed and certified in accordance with the Manual within 6 months of amendment of the authority adopting this schedule.
- C34 All existing structures must subsequently comply with the timetable for any further assessments in accordance with the Manual specified in Table 1 (Transitional requirements for existing structures), depending on the consequence category for each existing structure assessed in the most recent previous certification for that structure.
- C35 Table 1 ceases to apply for a structure once any of the following events has occurred:
(a) it has been brought into compliance with the hydraulic performance criteria applicable to the structure under the Manual; or
(b) it has been decommissioned; or
(c) it has been certified as no longer being assessed as a regulated structure.
- C36 Certification of the transitional assessment required by C35 and C36 (as applicable) must be provided to the administering authority within six (6) months of amendment of the authority adopting this schedule.

Schedule C, Table 1 - Transitional hydraulic performance requirements for existing structures

Transition period required for existing structures to achieve the requirements of the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Dams</i>			
Compliance with criteria	High	Significant	Low
>90% and a history of good compliance performance in last 5 years	No transition required	No transition required	No transitional conditions apply. Review consequence assessment every 7 years.
>70% - ≤90%	Within 7 years, unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	Within 10 years, unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	No transitional conditions apply. Review consequence assessment every 7 years.
>50 - ≤70 percent	Within 5 years, unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	Within 7 years, unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	Review consequence assessment every 7 years.
≤50%	Within 5 years or as per compliance requirements (e.g. TEP timing)	Within 5 years or as per compliance requirements (e.g. TEP timing)	Review consequence assessment every 5 years.

SCHEDULE D - LAND

General

D1 Contaminants that will or may cause environmental harm must not be directly or indirectly released to land except as permitted under this environmental authority.

Disturbance to Land – General

D2 Prior to conducting petroleum activities that involve significant disturbance to land, an assessment must be undertaken of the condition, type and ecological value of any vegetation in such areas where the activity is proposed to take place.

- D3 The assessment required by Condition (D2) must be undertaken by a suitably qualified person and include the carrying out of field validation surveys, observations and mapping of any Category A, B or C Environmentally Sensitive Areas (ESA's) and the presence of species classed as endangered, vulnerable, rare or near threatened under the Nature Conservation Act 1992 and for petroleum activities that commenced after 8 March 2013, areas containing State significant biodiversity values.
- D4 If the assessment required by Conditions (D2) and (D3) indicates that a regional ecosystem (RE) mapped as 'Endangered' or 'Of Concern' by the Queensland Herbarium should be in a lower conservation value classification and the holder of this environmental authority wishes to undertake activities as if the ecosystem is of the lower conservation value they must notify the administering authority in writing before any significant disturbance to land takes place.
- D5 The holder of this environmental authority, when carrying out petroleum activities must:
- (a) avoid, minimise or mitigate (in order of preference) any impacts on areas of vegetation or other areas of ecological value;
 - (b) minimise disturbance to land that may otherwise result in land degradation;
 - (c) ensure that for land that is to be significantly disturbed by petroleum activities:
 - (i) the top layer of the soil profile is removed;
 - (ii) stockpiled in a manner that will preserve its biological and chemical properties; and
 - (iii) used for rehabilitation purposes (in accordance with Condition (H4));
 - (d) avoid clearing mature trees; and
 - (e) prior to carrying out field based activities, make all relevant staff, contractors or agents carrying out those activities, aware of the location of any category A, B or C ESA's and the requirements of this environmental authority.
- Note: This environmental authority does not authorise the taking of protected animals or the tampering with an animal breeding place as defined under the Nature Conservation Act 1992 and Regulations.
- D6 In accordance with Condition (D5), if significant disturbance to land is unavoidable, the holder of this environmental authority must not clear vegetation or place fill:
- (a) in a way which significantly isolates, fragments or dissects tracts of vegetation resulting in a reduction in the current level of ecosystem functioning, ecological connectivity (i.e. stepping stone or contiguous bioregional/local corridor networks) and/or results in an increase in threatening processes (e.g. potential impacts associated with edge effects or introduced species);
 - (b) on slopes greater than 10% for activities other than pipelines and wells; or
 - (c) in discharge areas.
- D7 Clearing of remnant vegetation shall not exceed ten (10) metres in width for the purpose of establishing tracks and 20 metres in width for dual carriageway roads unless otherwise authorised by a condition of this EA.
- D8 Cleared vegetation must be stockpiled in a manner that facilitates respreading or salvaging and does not impede vehicle, stock or wildlife movements.

Disturbance to Land – Environmentally Sensitive Areas

- D9 The holder of this environmental authority must ensure that petroleum activities, except as otherwise authorised by Condition (D17), (D18), (D19), (D20) and (D21) of this environmental authority:
- (a) are not conducted in any category A, B or C Environmentally Sensitive Areas (ESAs);
 - (b) are not conducted within 200m of any category A, B or C ESAs; and

(c) do not involve activities other than limited petroleum activities within the protection zone of a category A ESA (i.e. from 200m to 1km of the category A ESA), or within the protection zone of a category B or C ESA (i.e. from 200m to 500m of the category B or C ESA).

Note: Indicative ESA mapping is available on the Department of Environment and Heritage Protection's website at http://www.ehp.qld.gov.au/licences-permits/maps_of_environmentally_sensitive_areas.php

- D10 Limited petroleum activities carried out in accordance with Condition (D9)(c) must be preferentially located in pre-existing areas of clearing or significant disturbance to the greatest practicable extent and avoid the clearing of mature trees.
- D11 Despite Condition (D10), limited petroleum activities may be undertaken within 200m of, or in the following specified Category B and C ESAs:
- (a) 'Endangered' regional ecosystems;
 - (b) 'Of Concern' regional ecosystems;
 - (c) State Forests;
 - (d) Timber Reserves
- provided that they do not overlap with any other Category A, B or C ESA or its associated protection zone.
- D12 Where limited petroleum activities are proposed to be undertaken within 200m of, or in the Category B and C ESAs specified in Condition (D11), the holder of this environmental authority must:
- (a) be able to demonstrate that no reasonable or practicable alternative exists; and
 - (b) where the ESA is a State Forest or Timber Reserve:
 - (i) obtain written approval from the authority responsible for the administration of the Forestry Act 1959;
 - (ii) comply with all restrictions and conditions contained within the approval required under Condition (D12)(b)(i);
 - (iii) where the conditions of the approval required under Condition (D12)(b)(i) conflict with the conditions of this environmental authority, comply with the conditions of this environmental authority; and
 - (iv) provide a copy of the written approval required under Condition (D12)(b)(i) to the administering authority upon request.
- D13 Where limited petroleum activities are undertaken within 200m of, or in the Category B or C ESAs specified in Condition (D11), disturbance to land must only be located and carried out in areas according to the following order of preference:
- (a) pre-existing cleared areas or significantly disturbed areas less than 200m from a Category C ESA;
 - (b) pre-existing cleared areas or significantly disturbed areas less than 200m from a Category B ESA;
 - (c) undisturbed areas less than 200m from a Category C ESA;
 - (d) undisturbed areas less than 200m from a Category B ESA;
 - (e) pre-existing areas of significant disturbance within a Category C ESA (e.g. areas where significant clearing or thinning has been undertaken within a RE, and/or areas containing high densities of weed or pest species which has inhibited re-colonisation of native regrowth);
 - (f) pre-existing areas of significant disturbance within a Category B ESA (e.g. areas where significant clearing or thinning has been undertaken within a RE, and/or areas containing high densities of weed or pest species which has inhibited re-colonisation of native regrowth);
 - (g) areas where clearing of a Category C ESA is unavoidable; and
 - (h) areas where clearing of a Category B ESA is unavoidable.

D14 Notwithstanding Conditions (D11) to (D13), where limited petroleum activities are proposed to be undertaken within 200m of, or in a Category B or C ESAs specified in Condition (D11), any vegetation clearing must not exceed any of the following areas:

- (a) if the disturbance relates to an Endangered or Of Concern RE, 10% of the remnant unit of Endangered or Of Concern RE as ground truthed and mapped before any activity commences as per Condition (D2) and (D3) of this environmental authority for the life of the project; and
- (b) more than 30m² for the construction of a sump; or
- (c) Described in Schedule D Table 1 - Authorised vegetation clearing widths for linear infrastructure in ESAs and ESA buffers.

Schedule D Table 1 - Authorised vegetation clearing widths for linear infrastructure in ESAs and ESA buffers

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

- D15 For each well site within 200m of, or in a Category B or C ESA specified in Condition (D11), all reasonable and practical measures are taken to minimize the area cleared which must include but not be limited to, for each well site, ranked constraints mapping and a risk assessment which considers safety.
- D16 Details of any significant disturbance to land undertaken within 200m of, or in a Category B or C ESA, along with a record of the assessment required by Conditions (D2) and (D3) must be kept and submitted to the administering authority upon request.
- D17 Despite Condition (D9), the Daandine Brine Dam 2 and associated activities necessary for construction, operation, maintenance and monitoring of the dam, located within the area bound by the coordinates prescribed by Schedule D. Table 1 - Coordinates Enclosing the Disturbance Area for Daandine Brine Dam 2, are permitted within the protection zones of Category C Environmentally Sensitive Areas.

Schedule D. Table 1 - Coordinates Enclosing the Disturbance Area for Daandine Brine Dam 2

Point	Latitude or Northing (GDA94, Zone 56)	Longitude or Easting (GDA94, Zone 56)
1	7001708	297524
2	7001153	297384
3	7001051	298345
4	7001418	298444
5	7001601	298406
6	7001620	298190

- D18 Despite Condition (D9), the water release outlet and pipeline and associated activities necessary for construction, operation, maintenance and monitoring for the release of treated CSG water to Wilkie Creek at the specified release point in Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters are authorised to occur in a Category B ESA and its associated protection zones.
- D19 The construction of the water release outlet and pipeline are located within the area bound by the coordinates prescribed by Schedule D Table 2 - Coordinates Enclosing the Disturbance Area for the Water Release Outlet and Pipeline.

Schedule D Table 2 - Coordinates Enclosing the Disturbance Area for the Water Release Outlet and Pipeline.

Point	Latitude or Northing (GDA94, Zone 56)	Longitude or Easting (GDA94, Zone 56)	Area of disturbance
Valve Pit	6,995,424	302,897	0.18 ha
High Point on Bank	6,995,460	302,991	
Outlet at Creek	6,995,465	303,004	

- D20 Despite condition (D9), the Tipton Treated Water Pipeline and associated activities for construction, operation and maintenance, located within the area bound by the coordinates prescribed by Schedule D, Table 3 – Coordinates Enclosing the Disturbance Area for Tipton Treated Water Pipeline, are permitted.

Schedule D, Table 3 - Coordinates Enclosing the Disturbance Area for Tipton Treated Water Pipeline

Point	Longitude or Easting (GDA94 Zone 56)	Latitude or Northing (GDA94 Zone 56)
Section 1	310652.74	6969686.79
	310656.46	6969747.37
	310696.37	6969744.59
	310661.46	6970447.79
	310621.2	6970452.8
	310651.4	6970651.7
	310611.1	6970656.7
	310641.76	6970845.55
	310601.68	6970846.23
	310707.02	6971627.3
	310667.1	6971629.9
	310658.71	6972161.37
	310618.1	6972166.9
	310621.4	6973392.1
	310581.2	6973398.7
	310613.31	6973549.7
	310573.47	6973549.7
	310638.9	6973649.7
	310538.9	6973549.7
	310608.18	6973649.7
	310568.35	6973649.7
	310638.9	6973549.7
	310538.9	6973649.7
	Section 2	310617.24
310576.78		6973723.95
310722.26		6974060.43
310681.96		6974065.49
310716.82		6974171.95
310676.51		6974177.14
310714.46		6974220.51
310674.59		6974216.76
310692.43		6974377.64
310653.85		6974364.72
310692.43		6974377.64
310567.32		6974520.53
310616.71		6974514.14
310563.13		6974528.08
310612.67		6974521.66
310498.88	6974536.4	

	310593.85	6974610.18
	310497.34	6974636.39
Section 3	310533.76	6974846.47
	310493.94	6974834.72
	310533.6	6974856.85
	310493.52	6974862.31
	310528.48	6975191.65
	310488.41	6975196.69
	310526.05	6975350.54
	310485.78	6975347.13

- D21 Despite condition (D9), the activity prescribed in Schedule D, Table 3 – Authorised footprint for Longswamp 31 shallow monitoring bore is authorised to be undertaken at the location and within the footprint prescribed in Schedule D, Table 3.

Schedule D, Table 3 – Authorised footprint for Longswamp 31 shallow monitoring bore

Activity	Easting	Northing	Maximum operational footprint
Longswamp 31 shallow monitoring bore	151.095733 ^o E	-27.343471 ^o S	9 m ²

- D22 Condition (D21) does not authorise clearing of vegetation and requires that all waste, including residual drilling material, must be removed from the site.

Soil Management

- D23 Topsoil must be managed in a manner that preserves its biological and chemical properties.
- D24 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.

Acid Sulfate Soils

- D25 Acid sulfate soils must be treated and managed in accordance with the latest edition of the Queensland Acid Sulfate Soil Technical Manual.

Fauna Management

- D26 Measures to prevent fauna being harmed from entrapment must be implemented during the construction and operation of well infrastructure, dams and pipeline trenches.

Pest management

- D27 In carrying out the petroleum activity(ies) the holder of this environmental authority must develop and implement an effective pest management program by 18 October 2011 which has been certified by a suitably qualified person that includes but is not limited to the following:
- (a) identification of pest species and infestation areas;
 - (b) prevention and/or minimisation of the introduction and/or spread of pests;
 - (c) control and management of pest outbreaks as a result of petroleum activities; and
 - (d) details of community consultation in developing the pest management program.

Note: The pest management program required by Condition (D27) should consider the "Petroleum Industry (including coal seam methane gas) Minimising Pest Spread Guidelines" dated June 2008, or subsequent versions thereof. This document is available for download from: http://www.dpi.qld.gov.au/documents/Biosecurity_EnvironmentalPests/IPA-Minimising-Pest-Spread-Advisory-Guidelines.pdf

- D28 A copy of the pest management procedures must be made available to any potentially affected landholders upon request.
- D29 Chemical and Fuel Storage
Chemicals and fuels stored, must be effectively contained and where relevant, meet Australian Standards, where such a standard is applicable.

Pipelines

- D30 Pipelines must be preferentially located alongside existing linear infrastructure such as roads, tracks and powerlines.
- D31 Pipeline trenches must only be left open for the minimum time practicable.
- D32 The length of pipeline trench open at any one time must be minimised as far as practicable.
- D33 Completed pipeline construction areas must be:
- (a) a stable landform with no subsidence or erosion gullies for at least five (5) years;
 - (b) be re-profiled to original contours and established drainage lines;
 - (c) be visually consistent with the surround land features; and
 - (d) be reinstated to the pre-disturbed land use and soil suitability class.
- D34 The holder of this environmental authority must monitor reinstated pipeline corridors for subsidence at least every 20 business days for the first 120 business days after reinstatement to ensure compliance with Condition (D33).
- D35 Impacts to State Significant Biodiversity Values
Impacts to State significant biodiversity values are not authorised, except as permitted by conditions (D36) and (D37).

- D36 Impacts to State significant biodiversity values can only occur if an offset is available that meets the relevant offset rules for that State significant biodiversity value.
- D37 The offset required by (D36) must:
- (a) for land-based offsets:
 - (i) meet the relevant offset rules for the State significant biodiversity value being impacted;
 - (ii) be legally secured within 12 months of the impact occurring; and
 - (iii) remain in force until the relevant offset objectives have been met;
 - (b) for offset payments:
 - (i) meet the relevant offset rules for the State significant biodiversity value being impacted;
 - (ii) not be made for a critically limited regional ecosystem or a threshold regional ecosystem; and
 - (iii) be made within 4 months of the impact occurring.
- D38 If conditions (D35) to (D37) have been triggered during an annual return period, the annual return must include the following details:
- (a) the type of State significant biodiversity value that was impacted;
 - (b) the date the impact to each State significant biodiversity value commenced;
 - (c) a GIS shape-file that shows the location and spatial extent of the residual impact to the State significant biodiversity value;
 - (d) the type of offset being provided for the State significant biodiversity value;
 - (e) how the offset meets the relevant offset rules;
 - (f) an offset area management plan that demonstrates how the relevant offset objectives will be met; and
 - (g) the date the offset was either legally-secured or the offset payment was made.

SCHEDULE E - ENVIRONMENTAL NUISANCE

- E1 Odour, dust and other airborne contaminants
The release of odour, dust or any other airborne contaminant(s), or light from the petroleum activity(ies) must not cause an environmental nuisance at any sensitive place.
- Noise**
- E2 Prior to undertaking petroleum activities that will result in short-term, medium-term or long term noise events that are likely to impact on a sensitive receptor, the holder of this environmental authority must model or calculate any potential noise emissions from the relevant petroleum activity and determine if noise emissions are likely to exceed the noise levels specified in Schedule E, Table 1 – Noise limits at Sensitive Receptors.
- E3 If noise modelling or the calculations indicates that petroleum activities are likely to exceed the noise levels specified in Schedule E, Table 1 – Noise limits at sensitive receptors, the holder of this environmental authority must prepare a Noise Management Plan prior to undertaking petroleum activities, which demonstrates how the noise limits specified in Schedule E, Table 1 – Noise limits at sensitive receptors will be achieved in the event of a valid noise complaint.
- E4 Despite condition E3, for any petroleum activities existing at the time of issue of this environmental authority, if noise modelling or the calculations indicates that petroleum activities are likely to exceed the noise levels specified in Schedule E, Table 1 – Noise limits at sensitive receptors, the holder of this environmental authority

must implement a Noise Management Plan, which demonstrates how the noise limits specified in Schedule E, Table 1 – Noise limits at sensitive receptors will be achieved in the event of a valid noise complaint.

- E5 The Noise Management Plan must address, but not be limited to, the following matters:
- (a) a location based noise assessment to determine compliance with the noise limits in Schedule E, Table 1 – Noise limits at Sensitive Receptors
 - (b) the measured and/or predicted noise level of these noise sources and activities at noise sensitive receptors, taking into account any tonal or impulsive noise impacts;
 - (c) the reasonable and practicable control or abatement measures (including relocating the activity, hours of operation, or having an alternate arrangement in place with any potentially affected person) that can be undertaken to reduce identified intrusive noise sources;
 - (d) the level of noise at noise sensitive receptors that would be achieved from implementing these measures;
 - (e) the handling of future noise complaints;
 - (f) community liaison and consultation including but not limited consultation processes for when night time activities (i.e. between 10:00 pm and 6:00 am) are likely to exceed 25dBA; and
 - (g) training of staff and contractors in best available noise management practices.
- E6 The emission of noise from the licensed place must not result in levels greater than those specified in Schedule E, Table 1 – Noise limits at Sensitive Receptors in the event of a valid complaint about noise being made to the administering authority.

Schedule E, Table 1 – Noise Limits at Sensitive Receptors

Time Period	Metric	Short Term Noise Event	Medium Term Noise Event	Long Term Noise Event
7:00am – 6:00pm	$L_{Aeq,adj,15\ min}$ Max $L_{pA, 15\ mins}$	45 dBA 55 dBA	43 dBA 51 dBA	40 dBA 45 dBA
6:00pm – 10:00pm	$L_{Aeq,adj,15\ min}$ Max $L_{pA, 15\ mins}$	40 dBA 50 dBA	38 dBA 46 dBA	35 dBA 40 dBA
10:00pm – 6:00am	$L_{Aeq,adj,15\ min}$ Max $L_{pA, 15\ mins}$	28 dBA 38 dBA	28 dBA 36 dBA	28 dBA 33 dBA
6:00am – 7:00am	$L_{Aeq,adj,15\ min}$ Max $L_{pA, 15\ mins}$	40 dBA 50 dBA	38 dBA 46 dBA	35 dBA 40 dBA

L_{Aeq} and Max L_{pA} are to be measured over any 15 minute period
Deemed background noise levels (LABG) for Schedule E, Table 1 – Noise Limits at Sensitive Receptors are:
7:00 am - 6:00pm: 35 dBA
6:00 pm – 10:00 pm: 30 dBA
10:00 pm – 6:00 am: 25 dBA
6:00 am – 7:00 am: 30 dBA

- E7 If the noise subject to a complaint is tonal or impulsive, the adjustments detailed in Schedule E, Table 2 – Adjustments to be Added to Noise Levels at Sensitive Receptors are to be added to the measured noise level(s) to derive $L_{Aeq, adj, 15\ min}$.

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

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

E8 Where alternative arrangements are in place with any affected person as referred to by Condition (E5)(c), the noise limits in Schedule E, Table 1 – Noise limits at Sensitive Receptors do not apply at that location for the duration for which the alternative arrangements are in place.

Low Frequency Noise

- E9 Notwithstanding Condition (E2), emission of any noise below 315 Hz must not cause an environmental nuisance.
- E10 Low frequency noise from the petroleum activities is not considered to be an environmental nuisance under Condition (E9) if monitoring shows that noise emissions do not exceed the following limits:
- (a) 50 dB(Z) measured inside the sensitive receptor; and
 - (b) the difference between the internal A-weighted and Z-weighted noise levels is no greater than 15 dB.

Vibration and Blasting Activities

- E11 The holder of this environmental authority must develop a blast management plan in accordance with Australian Standard 2187 for each planned blasting activity before it is undertaken.
- E12 The blast management plan required by Condition (E11) must include measures to minimise the likelihood of any adverse effects being caused by airblast overpressure and/or ground borne vibrations at any sensitive receptor and demonstrate current best practice environmental management.
- E13 All blasting must be carried out in a proper manner by a suitably qualified person.
- E14 All blasting must be carried out in accordance with the Blast Management Plan.
- E15 Noise from blasting operations must not exceed an airblast overpressure level, when measured at or extrapolated to any sensitive receptor, of 115 dB (linear peak) for nine (9) out of any ten (10) consecutive blasts initiated nor 120 dB (linear peak) at any time.
- E16 Ground-borne vibration peak particle velocity caused by blasting operations, when measured at or extrapolated to any sensitive receptor must not exceed more than 5 mm per second for nine (9) out of any ten (10) consecutive blasts initiated, or 10 mm per second at any time.

SCHEDULE F - AIR

Venting and flaring

- F1 Unless venting is authorised under the Petroleum and Gas (Production and Safety) Act 2004 or the Petroleum Act 1923, waste gas must be flared in a manner that complies with all of (F1(a)) and (F1(b)) and (F1(c)), or with (F1(d)):
- (a) an automatic ignition system is used, and
 - (b) a flame is visible at all times while the waste gas is being flared, and
 - (c) there are no visible smoke emissions other than for a total period of no more than 5 minutes in any 2 hours, or
 - (d) it uses an enclosed flare.

Fuel Burning or Combustion Equipment

- F2 The only type of fuel to be burned in fuel burning or combustion equipment under normal operating conditions is coal seam gas.
- F3 Contaminant releases to air emitted from fuel burning and combustion equipment point sources that are capable of burning at least 500 kg in an hour must be directed vertically upwards without any impedance or hindrance.
- F4 The holder of this environmental authority must maintain a register of fuel burning and combustion equipment that is capable of burning at least 500 kg of fuel in an hour that must include, as a minimum, the following information for each piece of equipment:
- (a) fuel burning or combustion equipment name and location;
 - (b) stack emission height (metres);
 - (c) minimum efflux velocity (m/s);
 - (d) mass emission rates (g/s); and
 - (e) contaminant concentrations (mg/Nm³ at x % O₂ dry gas at 0° Celsius and 1 atmosphere).
- F5 The holder of this environmental authority must ensure that the information contained in the register of fuel burning and combustion equipment is always current and complete.
- F6 All entries in the register of fuel burning and combustion equipment must be certified by the chief executive officer for the tenure holder, or their delegate, as being accurate and correct.

Fuel Burning or Combustion Equipment Located Outside Hubs or Populated Areas

- F7 Prior to the installation and operation of any new fuel burning or combustion equipment, that is capable of burning at least 500 kg of fuel in an hour, the holder of this environmental authority must conduct air dispersion modelling to calculate the ground level concentrations of emissions from all existing and proposed fuel burning or combustion equipment under maximum operating conditions (including other industry) within the ambient airshed and identify any potential impacts to air quality within the study area.

- F8 The holder of this environmental authority must ensure that the calculated ground level concentrations required under Condition (F7) do not exceed the criteria for each air contaminant at sensitive receptors in *Schedule F, Table 1 – Maximum Ground Level Concentration Criteria*.*Schedule*

Schedule F, Table 1 – Maximum Ground Level Concentration Criteria

Contaminant	Concentration at 0 degree Celsius	Units	Averaging time	Relevant Sensitive Receptors
Nitrogen Dioxide	250	µ/m ³	1 hour	Human Health
Nitrogen Dioxide	62	µ /m ³	1 year	Human Health
Nitrogen Dioxide	33	µ /m ³	1 year	Ecosystems
Carbon Monoxide	11	mg/m ³	8 hour	Human Health

- F9 The holder of this environmental authority must undertake emissions testing within 3 months post commissioning of any fuel burning and combustion equipment capable of burning at least 500 kg of fuel in an hour to verify the estimates used in the air dispersion modelling.
- F10 Where the results of the emissions testing required under Condition (F9) indicate that the emission estimates used in the air dispersion modelling required under Condition (F7) are exceeded, the holder of this environmental authority must:
- (a) provide details to the administering authority within 10 business days;
 - (b) re-undertake the modelling based on the new information; and
 - (c) determine and implement appropriate pollution control measures to bring the emissions into compliance with the limits specified in Schedule F, Table 1 – Maximum Ground Level Concentration Criteria

Fuel Burning and Combustion Equipment in Hubs and / or Places within 5 km of Populated Areas

- F11 Fuel burning or combustion equipment that is capable of burning at least 500 kg of fuel in an hour must not be located in hubs or in places within 5km of a populated area unless it is specified in Schedule F, Table 2 – Release of Contaminants to Air.
- F12 Fuel burning or combustion equipment located in hubs or in places within 5km of a populated area, that is capable of burning at least 500 kg of fuel in an hour, must only release contaminants to the atmosphere at a height and an efflux velocity not less than the corresponding height and velocity stated for that release point (RP) as provided for in Schedule F, Table 2 - Release of Contaminants to Air.
- F13 Fuel burning or combustion equipment located in hubs or in places within 5km of a populated area, that is capable of burning at least 500 kg of fuel in an hour, must not release contaminants to the atmosphere from a release point at a mass emission rate in excess of that stated in Schedule F, Table 2 - Release of Contaminants to Air.

Schedule F, Table 2 - Releases of Contaminants to Air

Resource Authority	Field	Facility	Release Point No. (EA)	Unit Description	Minimum Release Height (m)	Minimum Efflux Velocity (m/sec)	NOx		CO	
							Maximum Release limit	Release limit type	Maximum Release limit	Release limit type
PL 230	Daandine	DD CGPF	A1	K-0001 Compressor 1	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A2	K-0002 Compressor 2	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A3	K-0003 Compressor 3	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A4	K-0004 Compressor 4	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A5	K-0005 Compressor 5	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A6	K-0006 Compressor 6	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A7	K-0007 Compressor 7	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A8	K-9008 Compressor 8	17	17	1.4	g/sec	4.8	g/sec
PL 230	Daandine	DD CGPF	A9	K-9009 Compressor 9	17	17	1.4	g/sec	4.8	g/sec
PL 230	Daandine	DD CGPF	A10	K-9010 Compressor 10	17	17	1.4	g/sec	4.8	g/sec
PL 230	Daandine	DD CGPF	A11	K-9011 Inlet Fuel Screw Compressor Engine 11	8.5	30	1.5	g/sec	1.0	g/sec
PL 198	Tipton	TW CGPF	A14	K-0001 Compressor 1	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A15	K-0002 Compressor 2	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A16	K-0003 Compressor 3	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A17	K-0004 Compressor 4	7.6	30	6.8	g/sec	5.5	g/sec

Resource Authority	Field	Facility	Release Point No. (EA)	Unit Description	Minimum Release Height (m)	Minimum Efflux Velocity (m/sec)	NOx		CO	
							Maximum Release limit	Release limit type	Maximum Release limit	Release limit type
PL 198	Tipton	TW CGPF	A18	K-0005 Compressor 5	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A19	K-0006 Compressor 6	7.6	30	6.8	g/sec	5.5	g/sec

Note 1: Minimum efflux velocity, maximum mass emission and maximum concentration are calculated at the Maximum Continuous Rating.

Note 2: This table comes into effect on 30 October 2015.

- F14 The holder of this environmental authority must undertake emissions testing within 3 months of the issue of this environmental authority of all fuel burning and combustion equipment listed in Schedule F, Table 2 – Release of Contaminants to Air.
- F15 The holder of this environmental authority must undertake air dispersion modelling using the results of the emission testing required under Condition (F14) to verify that emissions will not result in an exceedance of the maximum ground level concentration for each air contaminant listed in Schedule F, Table 1 – Maximum Ground Level Concentration Criteria.
- F16 A report on the results of air emission testing and modelling required by conditions (F14) and (F15) must be provided to the administering authority with the next annual return.

SCHEDULE G - WASTE

General

- G1 All general and regulated waste must be removed from the site and sent to a site that is lawfully able to accept the waste under the Environmental Protection Act 1994 except as permitted under another condition of this environmental authority.
- G2 All regulated waste removed from the site must be undertaken by a person who holds a current authority to transport such waste under the provisions of the Environmental Protection Act 1994.
- G3 Waste must not be burned or allowed to be burned on the licensed site.
- G4 All waste fluids and muds resulting from drilling and exploration activities must be contained in a properly lined dam or containment structure for disposal, remediation or reuse where applicable.

Coal Seam Gas Water Management Plan

- G5 A Coal Seam Gas Water Management Plan that includes but is not necessarily limited to the matters outlined in (a) and (b) must be implemented:
- (a) the matters required by sections 310D (5), 310D (6) and 662 of the Environmental Protection Act 1994; and
 - (b) a management strategy for all integrated coal seam gas water management operations.

- G6 Where any inconsistency exists between the conditions of this environmental authority and the Coal Seam Gas Water Management Plan, the conditions of this environmental authority prevail.

Coal Seam Gas Water Use

- G7 Written approval from the relevant Local Government must be obtained prior to the application of coal seam gas water on any local government controlled roads in accordance with Condition (G9).

- G8 Produced water may be re-used in drilling and well hole activities.

- G9 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.

- G10 Produced water may be used for construction and operation 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
 - (d) Does not harm vegetation surrounding the construction site.

- G11 If there is any indication that any of the circumstances in condition (G8)(b)(i) to (G8)(b)(iv) or (G9)(a) to (G9)(d) is occurring the use must cease immediately and the affected area must be remediated without delay.

Supply of Coal Seam Gas Water to a Third Party

- G12 Coal seam gas water may be transferred to a third party to be used for the following purposes subject to compliance with (G13) and (G14):
- (a) dust suppression if the coal seam gas water quality complies with the limits specified in Schedule G, Table 1 – Water Contaminant Release Limits;
 - (b) construction and operational purposes if the coal seam gas water quality complies with the limits specified in Schedule G, Table 1 – Water Contaminant Release Limits;
 - (c) irrigation and livestock watering purposes;
 - (d) the following industrial purposes:
 - (i) coal washing;
 - (ii) power stations; and
 - (iii) water treatment facilities.

Schedule G, Table 1 – Water Contaminant Release Limits

Water Quality Characteristics	Unit	Limit	Limit Type
pH	pH units	6.0 to 9.0	Range
Sodium Adsorption Ratio	ratio	6	80 th Percentile
		12	Maximum
Total Dissolved Solids	mg/L	1500	Maximum
Total Petroleum Hydrocarbons	mg/L	10	Maximum

- G13 Any coal seam gas water supplied to a third party for irrigation and/or livestock watering purposes in accordance with Condition (G12)(c) must comply with the relevant trigger values contained in ANZECC and ARMCANZ Water Quality Guidelines 2000, or subsequent versions thereof.
- G14 If the responsibility of coal seam gas water is given or transferred to a third party in accordance with Condition (G12), the holder of environmental authority must ensure that:
- (a) the responsibility of the coal seam gas water is given or transferred in accordance with a written agreement (the third party agreement); and
 - (b) the third party is made aware of the General Environmental Duty under section 319 of the Environmental Protection Act 1994.

Residual drilling material

- G15 If sumps are used to store residual drilling material or drilling fluids, they must only be used for the duration of drilling activities.
- G16 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.
- G17 Records must be kept to demonstrate compliance with condition (G15) and (G16).

SCHEDULE H - REHABILITATION

Rehabilitation planning

- H1 A Rehabilitation Plan must be developed by a suitably qualified person and must include the:
- (a) rehabilitation goals; and
 - (b) procedures to be undertaken for rehabilitation that will:
 - i. achieve the requirements of conditions (H2) to (H8), inclusive; and
 - ii. provide for appropriate monitoring and maintenance.

Transitional; rehabilitation

- H2 Significantly disturbed areas that are no longer required for the on-going petroleum activities, must be rehabilitated within 12 months (unless an exceptional circumstance in the area to be rehabilitated (e.g. a flood event) prevents this timeframe being met) and be maintained to meet the following acceptance criteria:
- (a) contaminated land resulting from petroleum activities is remediated and rehabilitated
 - (b) the areas are:
 - (i) non-polluting
 - (ii) a stable landform
 - (iii) re-profiled to contours consistent with the surrounding landform
 - (c) surface drainage lines are re-established
 - (d) top soil is reinstated; and
 - (e) either:
 - (i) groundcover, that is not a declared pest species, is growing; or
 - (ii) an alternative soil stabilisation methodology that achieves effective stabilisation is implemented and maintained.

Final rehabilitation acceptance criteria

- H3 All significantly disturbed areas caused by petroleum activities which are not being or intended to be utilised by the landholder or overlapping tenure holder, must be rehabilitated to meet the following final acceptance criteria measured either against the highest ecological value adjacent land use or the pre-disturbed land use:
- (a) greater than or equal to 70 percent of native ground cover species richness
 - (b) greater than or equal to the total per cent of ground cover
 - (c) less than or equal to the per cent species richness of declared plant pest species; and
 - (d) where the adjacent land use contains, or the pre-clearing land use contained, one or more regional ecosystem(s), then at least one regional ecosystem(s) from the same broad vegetation group, and with the equivalent biodiversity status or a biodiversity status with a higher conservation value as any of the regional ecosystem(s) in either the adjacent land or pre-disturbed land, must be present.

Final rehabilitation acceptance in environmental sensitive area

- 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 must be met:
- (a) greater than or equal to 70 percent 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 percent of organic litter cover
 - (e) greater than or equal to 50 percent of total density of coarse woody material; and
 - (f) all predominant species in the ecologically dominant layer, that define the pre-disturbance regional ecosystem(s) are present.

Continuing conditions

- H5 Conditions (H2), (H3) and (H4) continue to apply after this environmental authority has ended or ceased to have effect.

Page 48 of 70

Remaining dams

- H6 Where there is a dam (including a low consequence dam) that is being or intended to be utilised by the landholder or overlapping tenure holder, the dam must be decommissioned to no longer accept inflow from the petroleum activity(ies) and the contained water must be of a quality suitable for the intended on-going uses(s) by the landholder or overlapping tenure holder.

SCHEDULE I - MONITORING PROGRAMS

General

- I1 The holder of this environmental authority must develop and implement a monitoring program, the result of which will demonstrate compliance with the conditions of this environmental authority.
- I2 All monitoring under this environmental authority must be conducted by a suitably qualified person.
- I3 All instruments, equipment and measuring devices used for measuring or monitoring in accordance with any condition of this environmental authority must be calibrated, and operated and maintained effectively.
- I4 All laboratory analyses and tests required to be conducted under this environmental authority must be carried out by a laboratory that has NATA certification for such analyses and tests, except as otherwise authorised by the administering authority.
- I5 The method of water sampling required by this environmental authority must comply with the version of the Queensland Monitoring Water Quality Sampling Manual⁴ that is current at the time the sampling is undertaken. Note: Condition (I5) requires the version of the Queensland Monitoring Water Quality Sampling Manual that is current at the time the sampling is undertaken to be followed and where it is not followed because of exceptional circumstances this should be explained and reported with the results. The version that is current as at the 8 March 2013 is Monitoring and Sampling Manual 2009 - Environmental Protection (Water) Policy 2009 Version 2 September 2010.
- I6 Notwithstanding condition (I5), when sampling a water quality limit in Schedule B, Table 3 – Treated CSG Water Release Limits for Monitoring Point (M1) records a test result of “no result” or “laboratory error”, a supplementary sample must be collected and tested as soon as practicable after the initial sampling event.
- I7 Any management or monitoring plans, systems, programs or procedures required to be developed and implemented by a condition of this environmental authority must be reviewed for performance and amended if required on an annual basis in accordance with the requirements for the particular plans, systems, programs and procedures.
- I8 If monitoring conducted in accordance with this environmental authority indicates a condition or contaminant level that has caused, or has potential to cause, environmental harm, the environmental authority holder must:
(a) as soon as is practicable, take the necessary actions to rectify the condition or contaminant level so as to avoid or minimise environmental harm; and

(b) notify the administering authority of the condition or contaminant level and the actions taken to rectify it

- 19 An annual monitoring report must be prepared each year and submitted to the administering authority upon request. This report shall include but not be limited to:
- (a) a summary of the previous twelve (12) months monitoring results obtained under any monitoring programs required under this environmental authority and, a comparison of the previous twelve (12) months monitoring results to both the limits set in this environmental authority and to relevant prior results; the date on which the samples was taken;
 - (b) the time at which the samples was taken;
 - (c) the monitoring point at which the sample was taken;
 - (d) the release flow rate of any authorised discharges to waters from all release points;
 - (e) the results of all monitoring and details of any exceedences with the conditions of this environmental authority and the dates and times these exceedences were reported to the administering authority.
 - (f) a summary of all records of quantities of releases required to be kept under this environmental authority including the total volume of any authorised discharges to waters for the previous yearly period from all release points and the individual daily volume of any authorised discharges to waters from all release points;
 - (g) details of all maintenance or work carried out on any discharge meter(s) and the impact (if any) on the release volume readings;
 - (h) an evaluation/explanation of the data derived from any monitoring programs;
 - (i) data analyses and interpretation to assess the nature and extent of any contamination and, if so, the level of environmental harm caused as a result of the contamination and the environmentally relevant activity; and
 - (j) an outline of actions taken or proposed to minimise the risk of environmental harm from any condition or elevated contaminant level identified by the monitoring or recording programs.
- 110 The evaluation and explanation of data for the purposes of the annual monitoring report must be performed by a suitably qualified person.
- 111 The holder of this environmental authority must continue to conduct monitoring as per that prescribed in Conditions (I12) to (I18) for a minimum of five (5) years after the activities prescribed in Condition (A1) have ceased and submit the results annually in accordance with Condition (I9).

Groundwater Monitoring

- 112 The Groundwater Monitoring Program, which must be implemented, must be able to detect any significant risks and changes to groundwater quality and level as a result of activities authorised under this environmental authority and must:
- (a) be developed, installed and maintained by a suitably qualified person in the fields of hydrogeology, groundwater sampling design and groundwater monitoring program design;
 - (b) include locations of monitoring points, parameters to be measured, frequency of monitoring, monitoring methodology used, and trigger values;
 - (c) include procedures to establish background groundwater quality;
 - (d) a sufficient number of monitoring sites to provide information on the following:
 - (i) seepage to groundwater and surrounding soils from any regulated dam authorised under this environmental authority and its effect on groundwater and soils; and

- (ii) background monitoring sites (i.e. groundwater quality in representative bore(s) that have not been affected by the activities authorised under this environmental authority);
 - (e) conduct a geodetic survey of all groundwater monitoring bores to determine the relative water surface elevations, measured to the nearest millimetre in each bore and reported in metres relative to the AHD;
 - (f) determine the hydraulic conductivity, groundwater flow direction and groundwater flow rate; and
 - (g) include a rationale containing details on the program purpose, program conceptualisation and verification of assumptions.
- I13 All groundwater bores must be installed according to the standards outlined in the latest edition of the Department of Environment and Heritage Protection's Minimum Construction Requirements for Water Bores in Australia or the Minimum Standards for the Construction and Reconditioning of Water Bores that Intersect the Sediments of Artesian Basins in Queensland.
- I14 Groundwater monitoring bores must be constructed by, or under the supervision of a licensed Queensland water bore driller who has the correct endorsements on their licence for the type of activity being performed.
- I15 The Groundwater Monitoring Program must provide for monitoring of groundwater quality as often as necessary to detect impacts of the petroleum activities authorised under this environmental authority, but not for fewer parameters or less frequently than that specified in Schedule I, Table 1 – Minimum Groundwater Monitoring Parameters and Monitoring Frequency and in compliance with Condition (I16).
- I16 Groundwater samples taken as part of the Groundwater Monitoring Program must be analysed for, but not be limited to, the water quality parameters at the minimum frequencies specified in Schedule I, Table 1 – Minimum Groundwater Monitoring Parameters and Monitoring Frequency.

Schedule I, Table 1 – Minimum Groundwater Monitoring Parameters and Monitoring Frequency

Groundwater parameter	Monitoring frequency
Flow [m/hr]	Biannually
Water level to the nearest millimetre [m AHD]	Biannually
Groundwater Pressure in Geological Strata [kPa]	Biannually
pH	Biannually
Electrical conductivity [μ S/m]	Biannually
Total Dissolved Solids [mg/L]	Biannually
Temperature [$^{\circ}$ C]	Biannually
Dissolved Oxygen [mg/L]	Biannually
Alkalinity as CaCO ₃ [mg/L]	Biannually
Residual Alkali [mq/L]	Biannually
Anions (bicarbonate, carbonate, hydroxide, chloride, fluoride, sulphate)	Biannually
Cations (aluminium, calcium, magnesium, potassium, sodium) [mg/L]	Biannually
Silica [mg/L]	Biannually
Total and dissolved Iron, manganese, zinc, aluminium, boron, copper, phosphorous [mg/L]	Biannually
Ammonia, nitrate, nitrite [m/L]	Biannually

Total Petroleum Hydrocarbons [mg/L]	Biannually
Polycyclic Aromatic Hydrocarbons [mg/L]	Biannually
Benzene, Toulene, Ethyl-benzene, Xylenes (BTEX) [mg/L]	Biannually

- I17 All groundwater monitoring bores must be maintained in an operative condition and be reasonably accessible at all times to any authorised person.
- I18 If groundwater monitoring indicates that any significant changes in groundwater quality caused by petroleum activities are detected, then information must be submitted to the administering authority within 10 business days of receipt of the analysis indicating these changes, including any proposed actions to mitigate the changes in groundwater quality.

Air Monitoring (Point Source)

- I19 The holder of this environmental authority must conduct a monitoring program of contaminants released to the atmosphere at each release point recorded in the register of fuel burning and combustion equipment for the contaminants and efflux velocities listed in *Schedule F, Table 2 - Releases of Contaminants to Air* and at the frequencies specified in *Schedule I, Table 3 – Monitoring Frequency for Contaminants*.

Schedule I, Table 3 – Monitoring Frequency for Contaminants

Contaminant	Monitoring frequency
NOx as Nitrogen Dioxide	Within three (3) months after commissioning of any fuel burning equipment; and annually thereafter.
Carbon monoxide	

- I20 The monitoring program must include, but not necessarily be limited to:
- (a) monitoring provisions for the release points which complies with the most recent edition of Australian Standard 4323.
 - (b) tests for each sample taken at each release point specified in the register of fuel burning or combustion equipment including:
 - (i) gas velocity, volume and mass flow rate;
 - (ii) temperature; and
 - (iii) water vapour concentration (for non-continuous sampling);
 - (c) representative samples of the contaminants discharged when operating under maximum operating conditions;
 - (d) the collection of production rate and plant status during sampling periods; and
 - (e) monitoring of contaminant release carried out in accordance with the latest edition of the Department of Environment and Heritage Protection's "Air Quality Sampling Manual" 1997, as amended from time to time.

Monitoring of Contaminant Releases to the Atmosphere

- I21 When requested by the administering authority, contaminant monitoring and recording must be undertaken to investigate any complaint, and the results notified with 14 days to the administering authority. When monitoring is requested the following must be complied with:

- (a) the holder of this environmental authority must conduct and keep records of a monitoring program of contaminant release to the atmosphere at the release points, frequency, and the parameters specified in Schedule I, Table 4 – Required Monitoring which complies with the following:
- (b) Monitoring provision for the release points listed in Schedule I, Table 4 – Required Monitoring must comply with the Australian Standard AS4323.1 – 1995 ‘Stationary source emissions Method 1: Selection of sampling provisions’ or subsequent versions as they become available.
- (c) The following tests must be performed for each required determination specified in Schedule I, Table 4 – Required Monitoring :
- (i) gas velocity and volume flow rate;
 - (ii) temperature and oxygen content;
 - (iii) water vapour concentration (moisture content).
- (d) Where practicable samples taken must be representative of the contaminants discharged when emissions are expected to be at maximum rates.
- (e) During the sampling period the following additional information must be gathered:
- (i) fuel used;
 - (ii) number of equipment and operating units; and
 - (iii) reference to actual test methods and accuracies.

Schedule I, Table 4 - Required Monitoring

Determination Required	Release Point Numbers	Frequency ²
Mass emission rate (g/s) and concentration (mg/Nm ³) of oxides of nitrogen (NOx) in the flue gas at the 5% oxygen reference level.	Stacks A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A14, A15, A16, A17, A18, A19.	Within three months upon the granting of the environmental authority and then annually thereafter

²Note: Out of the seven (7) release points A1 to A7, at least three (3) stacks must be monitored each year on a rotational basis. Out of the four (4) release points A8 to A11, at least two (2) stacks must be monitored each year on a rotational basis. Out of the six (6) release points A14 to A19, at least three (3) stacks must be monitored each year on a rotational basis.

Note: This table comes into effect on 30 October 2015.

Noise Monitoring

- I22 The holder of this environmental authority must undertake noise monitoring when requested by the administering authority to investigate a complaint of environmental nuisance at a sensitive receptor within the reasonable and practicable timeframe nominated by the administering authority, and report the results to the administering authority within three (3) business days of completion of the monitoring.
- I23 Noise monitoring and recording must include the following descriptor, characteristics and matters:
- (a) $L_{AN,T}$ (where N equals the statistical levels of 1, 10 and 90 and T=15);
 - (b) $L_{Aeq,adi, 15 mins}$;
 - (c) background noise level as $L_{A 90, T}$;
 - (d) $Max L_{pA, 15 mins}$
 - (e) the level and frequency of occurrence of impulsive or tonal noise and any adjustment and penalties to statistical levels;
 - (f) atmospheric conditions including temperature, relative humidity and wind speed and directions;
 - (g) effects due to any extraneous factors such as traffic noise;

- (h) location, date and time of monitoring;
- (i) if the complaint concerns low frequency noise, Max L_{pz, 15 min}; and
- (j) If the complaint concerns low frequency noise, one third octave band measurements in dB(LIN) for centre frequencies in the 10 - 200 Hz range for both the noise source and the background noise in the absence of the noise source.

I24 The method of measurement and reporting of noise levels and background sound pressure levels must comply with the latest edition of the administering authority's Noise Measurement Manual or the most recent version of Australian Standard 1055 Acoustics - description and measurement of environmental noise.

Nuisance Monitoring (other than Noise)

I25 When the administering authority advises the holder of this environmental authority of a complaint alleging nuisance other than noise, the holder must investigate the complaint and advise the administering authority in writing of the action proposed or undertaken to resolve the complaint.

I26 When requested by the administering authority, the holder of this environmental authority must undertake monitoring as specified by the administering authority, within a reasonable and practical timeframe nominated by the administering authority to investigate any complaint of environmental harm at any sensitive place.

I27 The results of the investigation (including an analysis and interpretation of the monitoring results) and abatement measures implemented must be provided to the administering authority within 10 business days of completion of the investigation, or receipt of the monitoring results, whichever is the latter.

I28 If monitoring in accordance with Condition (I26) and (I27), indicates that emissions exceed the limits set in this environmental authority or are causing environmental nuisance, then the holder of this environmental authority must:

- (a) address the complaint including the use of alternative dispute resolution services if required; and/or
- (b) as soon as practicable implement abatement or attenuation measures so that light, dust, particulate or odour emissions from the authorised activities do not result in further environmental nuisance.

Impact Assessment

I29 Notwithstanding any other condition of the environmental authority, the environmental authority does not authorise any environmental harm arising from any release to the atmosphere of any of the contaminants mentioned in Schedule I, Table 5 – Contaminants and Benchmarks for Evaluation.

I30 For the purpose of ensuring and demonstrating compliance with Condition (I29), the holder of the environmental authority must implement the findings of the evaluation, conducted by a suitably qualified and experienced person and provided to the administering authority, of the potential environmental impacts of the contaminants mentioned in Schedule I, Table 5 - Contaminants and Benchmarks for Evaluation. The evaluation addresses all matters relevant to the assessment of potential for environmental impacts to occur and includes, but not be limited to:

- (a) Sampling, monitoring and analysis of the contaminants mentioned in Schedule I, Table 5 - Contaminants and Benchmarks for Evaluation for the range of plant operations likely to be encountered:
 - (i) entail sufficient levels of detection to adequately characterise the emissions; and

- (ii) be representative; and complies with relevant Department of Environment and Heritage Protection's monitoring methods including the quality control requirements inherent in those methods;
- (b) Using the air pollution dispersion models, an estimation of Ground Level Concentrations at the most sensitive nearest receptor(s) (using efflux velocity, temperature and flow rate) for emissions of the contaminants mentioned in Schedule I, Table 5 - Contaminants and Benchmarks for Evaluation;
- (c) A comparison between the worst case measured emissions with the benchmarks maximum GLC mentioned in Schedule I, Table 5 - Contaminants and Benchmarks for Evaluation;
- (d) The use of methods and guidelines for modelling and assessment of air pollutants approved by the New South Wales Department of Environment and Climate Change or by the Victoria Environmental Protection Agency.

Schedule I, Table 5 - Contaminants and Benchmarks for Evaluation

Contaminant	Averaging Periods	Maximum GLC concentration
Nitrogen dioxide	1 hour — health and wellbeing	250 µg/m ³ (at 0 °C)
	1 year — health and wellbeing	62 µg/m ³ (at 0 °C)
	1 year — health and biodiversity of ecosystems	33 µg/m ³ (at 0 °C)

SCHEDULE J - COMMUNITY ISSUES

- J1 The holder of this environmental authority must maintain a record of complaints and incidents causing environmental harm, and actions taken in response to the complaint or incident; and
- J2 The holder of this environmental authority must record the following details for all complaints received and provide this information to the administering authority on request:
 - (a) name, address and contact number for complainant;
 - (b) time and date of complaint;
 - (c) reasons for the complaint as stated by the complainant;
 - (d) investigations undertaken in response to the complaint;
 - (e) conclusions formed;
 - (f) actions taken to resolve complaint;
 - (g) any abatement measures implemented to mitigate the cause of the complaint; and
 - (h) name and contact details of the person responsible for resolving the complaint.

SCHEDULE K - NOTIFICATION PROCEDURES

- K1 In addition to the requirements under Chapter 7, Part 1, Division 2 of the Environmental Protection Act 1994, the administering authority must be notified through the Pollution Hotline and in writing, as soon as possible, but within 48 hours of becoming aware of any of the following events:
 - (a) any unauthorised significant disturbance to land
 - (b) potential or actual loss of structural or hydraulic integrity of a dam
 - (c) when the level of the contents of any regulated dam reaches the mandatory reporting level
 - (d) when a regulated dam will not have available storage to meet the design storage allowance on 1 November of any year
 - (e) potential or actual loss of well integrity

- (f) any unexplained increase in the seepage data recorded as a result of condition (I12)(d)(i) and (ii)
- (g) unauthorised releases of any volume of prescribed contaminants to waters
- (h) unauthorised releases of volumes of contaminants, in any mixture, to land greater than:
 - (i) 200 L of hydrocarbons; or
 - (ii) 200 L of stimulation additives; or
 - (iii) 500 L of stimulation fluids; or
 - (iv) 1 000 L of brine; or
 - (v) 5 000 L of untreated coal seam gas water; or
 - (vi) 5 000 L of raw sewage; or
 - (vii) 10 000 L of treated sewage effluent.
- (i) the use of restricted stimulation fluids
- (j) groundwater monitoring results from a landholder's active groundwater bore monitored under the stimulation impact monitoring program which is a 10 % or greater increase from a previous baseline value for that bore and which renders the water unfit for its intended use
- (k) monitoring results where two out of any five consecutive samples do not comply with the relevant limits in the environmental authority.

Fluid Injection Notification

- K2 The Department of Environment and Heritage Protection must be notified in writing as soon as reasonably practicable, but within 48 hours of becoming aware of:
- (a) migration of injected fluid out of the target formation; or
 - (b) a loss of hydraulic isolation of the target formation; or
 - (c) the detection of groundwater contaminants that were not detected in background samples; or
 - (d) an injection fluid monitoring result that does not comply with any one of the parameters in Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid.

SCHEDULE L - DEFINITIONS

- L *Note:* Where a term is not defined in this environmental authority the definition in the Environmental Protection Act 1994, its regulations and Environmental Protection Policies or the Petroleum and Gas (Production and Safety) Act 2004 and its regulations must be used in that order.

acid sulfate soils	means soil or sediment containing highly acidic soil horizons or layers affected by the oxidation of iron sulfides (actual acid sulfate soils) and/or soil or sediment containing iron sulfides or other sulfidic material that has not been exposed to air and oxidised (potential acid sulfate soils). The term acid sulfate soil generally includes both actual and potential acid sulfate soils. Actual and potential acid sulfate soils are often found in the same soil profile, with actual acid sulfate soils generally overlying potential acid sulfate soil horizons.
active	for the purposes of landholders' groundwater bores means bores that are able to continue to provide a reasonable yield of water in terms of quantity for the bores authorised purpose or use.
AHD	means Australian Height Datum.

alternative arrangement	means a written agreement between the holder of this environmental authority and an affected or potentially affected person at a sensitive receptor for a defined noise nuisance impact and may include an agreed period of time for which the arrangement is in place. An agreement for alternative arrangements may include, but not necessarily be limited to a range of noise abatement measures to be installed at a sensitive receptor and/or provision of alternative accommodation for the duration of the defined noise nuisance impact.								
annual exceedance probability or AEP	means the probability that at least one event in excess of a particular magnitude will occur in any given year.								
annual inspection report	means an assessment prepared by a suitably qualified and experienced person containing details of the assessment against the most recent consequence assessment report and design plan (or system design plan); <ul style="list-style-type: none"> (a) against recommendations contained in previous annual inspections reports; (b) against recognised dam safety deficiency indicators; (c) for changes in circumstances potentially leading to a change in consequence category; (d) for conformance with the conditions of this authority; (e) for conformance with the 'as constructed' drawings; (f) for the adequacy of the available storage in each regulated dam, based on an actual observation or observations taken after 31 May each year but prior to 1 November of that year, of accumulated sediment, state of the containment barrier and the level of liquids in the dam (or network of linked containment systems); (g) for evidence of conformance with the current operational plan 								
Approved quality criteria	for the purpose of residual drilling materials, means the residual drilling material meet the following quality standards: Part A in all cases: <table border="1" style="margin-left: 40px; width: 60%;"> <thead> <tr> <th>Parameter</th> <th>Maximum concentration</th> </tr> </thead> <tbody> <tr> <td>pH</td> <td>6 to 10.5 (range)</td> </tr> <tr> <td>Electrical Conductivity</td> <td>20dS/m</td> </tr> <tr> <td>Chloride*</td> <td>800 mg/L</td> </tr> </tbody> </table>	Parameter	Maximum concentration	pH	6 to 10.5 (range)	Electrical Conductivity	20dS/m	Chloride*	800 mg/L
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Electrical Conductivity	20dS/m								
Chloride*	800 mg/L								

	<p>*Chloride analysis is only required if an additive containing chloride was used in the drilling process. The limits in Part A must be measured in the clarified filtrate of oversaturated solids prior to mixing. Part B If any of the following metals are a component of the drilling fluids, then for that metal:</p> <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>11 mg/kg</td> </tr> <tr> <td>Lead</td> <td>600mg/kg</td> </tr> </tbody> </table> <p>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:</p> <table border="1"> <thead> <tr> <th>TPH</th> <th>Maximum concentration</th> </tr> </thead> <tbody> <tr> <td>C6-C10</td> <td>170 mg/kg</td> </tr> <tr> <td>C10-C16</td> <td>150 mg/kg</td> </tr> <tr> <td>C16-C34</td> <td>1300 mg/kg</td> </tr> <tr> <td>C34-C40</td> <td>5600 mg/kg</td> </tr> <tr> <td>Total polycyclic aromatic hydrocarbons (PAH)</td> <td>20 mg/kg</td> </tr> <tr> <td>Phenols (halogenated)</td> <td>1 mg/kg</td> </tr> <tr> <td>Phenols (non-halogenated)</td> <td>60 mg/kg</td> </tr> <tr> <td>Monocyclic aromatic hydrocarbons (total sum of benzen, toluene, ethyl benzene, xylenes (includes ortho, para, and meta xylenes) and styrene)</td> <td>7 mg/kg</td> </tr> <tr> <td>Benzene</td> <td>1 mg/kg</td> </tr> </tbody> </table>	Parameter	Maximum concentration	Arsenic	20mg/kg	Selenium	5mg/kg	Boron	100mg/kg	Cadmium	3mg/kg	Chromium (total)	400mg/kg	Copper	11 mg/kg	Lead	600mg/kg	TPH	Maximum concentration	C6-C10	170 mg/kg	C10-C16	150 mg/kg	C16-C34	1300 mg/kg	C34-C40	5600 mg/kg	Total polycyclic aromatic hydrocarbons (PAH)	20 mg/kg	Phenols (halogenated)	1 mg/kg	Phenols (non-halogenated)	60 mg/kg	Monocyclic aromatic hydrocarbons (total sum of benzen, toluene, ethyl benzene, xylenes (includes ortho, para, and meta xylenes) and styrene)	7 mg/kg	Benzene	1 mg/kg
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<p>assessed or assessment</p>	<p>by a suitably qualified and experienced person in relation to a consequence assessment of a dam, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit of the assessment:</p> <ul style="list-style-type: none"> (a) exactly what has been assessed and the precise nature of that determination; (b) the relevant legislative, regulatory and technical criteria on which the assessment has been based; (c) the relevant data and facts on which the assessment has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and (d) the reasoning on which the assessment has been based using the relevant data and facts, and the relevant criteria. 																																				

associated water	means underground water taken or interfered with, if the taking or interference happens during the course of, or results from, the carrying out of another authorised activity under a petroleum authority, such as a petroleum well, and includes waters also known as produced formation water. The term includes all contaminants suspended or dissolved within the water.
associated works	in relation to a dam, means: <ul style="list-style-type: none"> • operations of any kind and all things constructed, erected or installed for that dam; and • any land used for those operations.
authority	means an environmental authority or a development approval.
background noise level	means the sound pressure level, measured in the absence of the noise under investigation, as the L A90,T being the A-weighted sound pressure level exceeded for 90 percent of the measurement time period T of not less than 15 minutes, using Fast response.
bed and banks	for a watercourse or wetland means land over which the water of the watercourse or wetland normally flows or that is normally covered by the water, whether permanently or intermittently; but does not include land adjoining or adjacent to the bed or banks that is from time to time covered by floodwater.
bore	means a water observation bore or a water supply bore.
brine	means either saline water with a total dissolved solid concentration greater than 40 000mg/l or CSG water after it has been concentrated through water treatment processes and/or evaporation.
bund or bunded	in relation to spill containment systems for fabricated or manufactured tanks or containers designed to a recognised standard means an embankment or wall of brick, stone, concrete or other impervious material which may form part or all of the perimeter of a compound and provides a barrier to retain liquid. Since the bund is the main part of a spill containment system, the whole system (or bunded area) is sometimes colloquially referred to within industry as the bund. The bund is designed to contain spillages and leaks from liquids used, stored or processed above ground and to facilitate clean-up operations. As well as being used to prevent pollution of the receiving environment, bunds are also used for fire protection, product recovery and process isolation.
BTEX	means benzene, toluene, ethylbenzene, xylene.
category A ESA	means any area listed in Schedule 12, Part 1, Section 1 of the Environmental Protection Regulation 2008.
category B ESA	means any area listed in Schedule 12, Part 1, Section 2 of the Environmental Protection Regulation 2008.
category C ESA	means any of the following areas: <ul style="list-style-type: none"> • Nature Refuges as defined under the Nature Conservation Act 1992; • Koala Habitat Areas as defined under the Nature Conservation Act 1992; • State Forests or Timber Reserves as defined under the Forestry Act 1959; • Declared catchment areas under the Water Act 2000; • Resources reserves under the Nature Conservation Act 1992

	<ul style="list-style-type: none"> • An area identified as "Essential Habitat" for a species of wildlife listed as endangered, vulnerable, rare or near threatened under the Nature Conservation Act 1992; • An area identified as "Essential Regrowth Habitat" under the Vegetation Management Act 1999 for a species of wildlife listed as endangered, vulnerable, rare or near threatened under the Nature Conservation Act 1992 for petroleum activities that commenced after 8 March 2013 (the date of grant of this environmental authority); and • "Of concern" regional ecosystems identified in the database maintained by the Department of Environment and Heritage Protection called 'Regional ecosystem description database' containing regional ecosystem numbers and descriptions.
certification	in relation to dams means assessment and approval must be undertaken by a suitably qualified and experienced person in relation to any assessment or documentation required by the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures, including design plans, 'as constructed' drawings and specifications, construction, operation or an annual report regarding regulated structures, undertaken in accordance with the Board of Professional Engineers of Queensland Policy Certification by RPEQs (ID: 1.4 (2A)).
certifying, certify, or certified	have a corresponding meaning to certification.
clearing	means: <ul style="list-style-type: none"> • in relation to grass, scrub or bush - the removal of vegetation by disturbing root systems and exposing underlying soil (including burning), but does not include - • the flattening or compaction of vegetation by vehicles if the vegetation remains living; or • the slashing or mowing of vegetation to facilitate access tracks; or • the clearing of noxious or introduced plant species; and • in relation to trees - cutting down, ringbarking, pushing over, poisoning or destroying in any way.
"construction or constructed"	in relation to a dam includes building a new dam and modifying or lifting an existing dam, but does not include investigations and testing necessary for the purpose of preparing a design plan.
construction and operational purposes	in relation to the use of coal seam gas water means the construction, use, modification, maintenance, replacement, operation and decommissioning of industrial sites.
coal seam gas water	means underground water brought to the surface of the earth, or otherwise interfered with, in connection with exploring for or producing coal seam gas. Coal seam gas water is a waste, as defined under s13 of the Environmental Protection Act 1994.
consequence	in relation to a structure as defined, means the potential for environmental harm resulting from the collapse or failure of the structure to perform its primary purpose of containing, diverting or controlling flowable substances.
consequence category	means a category, either low, significant or high, into which a dam is assessed as a result of the application of tables and other criteria in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635).

critically limited regional ecosystem	means the ecosystems identified in Appendix 5 of the Queensland Biodiversity Offset Policy (Department of Environment and Heritage Protection, 2014).
dam	means a land-based structure or a void that contains, diverts or controls flowable substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and associated works.
dam crest volume	means the volume of material (liquids and/or solids) that could be within the walls of a dam at any time when the upper level of that material is at the crest level of that dam. That is, the instantaneous maximum volume within the walls, without regard to flows entering or leaving (for example, via spillway).
deed of agreement	means a legal agreement between the holder of the environmental authority and the administering authority. The deed of agreement governs the obligations of the holder of the environmental authority in relation to the Queensland Biodiversity Offset Policy. For clarity, the term deed of agreement in this environmental authority includes any subsequent version or amendment of the signed deed of agreement.
design plan	" is a document setting out how all identified consequence scenarios are addressed in the planned design and operation of a regulated structure.
design storage allowance or DSA	means an available volume, estimated in accordance with the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635) published by the administering authority, must be provided in a dam as at 1 November each year in order to prevent a discharge from that dam to an annual exceedance probability (AEP) specified in that Manual.
development well	means a petroleum well that is drilled to produce or store petroleum.
discharge area	means: <ul style="list-style-type: none"> (a) that part of the land surface where groundwater discharge produces a net movement of water out of the groundwater; and (b) identified by an assessment process consistent with the document: Salinity Management Handbook, Queensland Department of Natural Resources, 1997; or (c) identified by an approved salinity hazard map held by the Department of Environment and Heritage Protection.
ecosystem functioning	means the interactions between and within living and nonliving components of an ecosystem and generally correlates with the size, shape and location of an area of vegetation.
emergency action plan	means documentation forming part of the operational plan held by the holder or a nominated responsible officer, that identifies emergency conditions that sets out procedures and actions that will be followed and taken by the dam owner and operating personnel in the event of an emergency. The actions are to minimise the risk and consequences of failure, and ensure timely warning to downstream communities and the implementation of protection measures. The plan must require dam owners to annually update contact.
enclosed flare	means a device where the residual gas is burned in a cylindrical or rectilinear enclosure that includes a burning system and a damper where air for the combustion reaction is admitted.
end	means the stopping of the particular activity that has caused a significant disturbance in a particular area. It refers to, among other things, the end of a seismic survey or the end of a drilling operation. It

	does not refer to the end of all related activities such as rehabilitation. In other words, it does not refer to the 'completion' of the petroleum activity, the time at which the petroleum authority ends or the time that the land in question ceases to be part of an authority.
equivalent person" or "EP	means an equivalent person under volume 1, section 2 of the Guidelines for Planning and Design of Sewerage Schemes, October 1991, published by the Water Resources Commission, Department of Primary Industries, Fisheries and Forestry.
evaporation dam	means a land based structure designed to contain or impound CSG water, the purpose of which is to contain or impound the water, until the water content has been removed by evaporation.
existing structure	means a structure that was in existence or whose design plan has substantially commenced, prior to the adoption of this schedule of conditions under the authority (12 August 2014).
fill	means any kind of material in solid form (whether or not naturally occurring) capable of being deposited at a place but does not include material that forms a part of, or is associated with, a structure constructed in a watercourse, wetland or spring including a bridge, road, causeway, pipeline, rock revetment, drain outlet works, erosion prevention structure or fence.
flare pit	means containment area where any hydrocarbon that is discovered in an overpressured 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.
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.
foreseeable future	means the period used for assessing the total probability of an event occurring. Permanent structures and ecological sustainability should be expected to still exist at the end of a 150 year foreseeable future with an acceptably low probability of failure before that time.
hazard	in relation to a dam as defined, means the potential for environmental harm resulting from the collapse or failure of the dam to perform its primary purpose of containing, diverting or controlling flowable substances.
high bank	means the defining terrace or bank or, if no bank is present, the point on the active floodplain, which confines the average annual peak flows in a watercourse.
holder	means: (a) where this document is an environmental authority, any person who is the holder of, or is acting under, that environmental authority; or (b) where this document is a development approval, any person who is the registered operator for that development approval.
hub	means more than one large compressor station and multiple items of fuel burning or combustion units located within three (3) km of each other and capable of burning fuel at a rate > 500 kg/hr.
hydraulic performance	means the capacity of a regulated dam to contain or safely pass flowable substances based on the design criteria specified for the relevant consequence category in the Manual for Assessing

	Consequence Categories and Hydraulic Performance of Structures (EM635).
impacts to mapped State significant biodiversity values	means to have a negative effect on a State significant biodiversity value, as identified by the Queensland Biodiversity Offset Policy (Department of Environment and Heritage Protection, 2014) Examples may include, but are not necessarily limited to residual impact from: <ul style="list-style-type: none"> - clearing, removal or fragmentation of vegetation - interference or disturbance of fauna habitat
impacts to watercourse, wetland, lake or spring with state significant biodiversity values	means to have a negative effect on a watercourse, wetland, lake or spring with state significant biodiversity values as identified in Appendix 1 of the Queensland Biodiversity Offsets Policy (Department of Environment and Heritage Protection, 2014) resulting from petroleum activities that commenced after 8 March 2013.
infrastructure	means water storage dams, roads and tracks, equipment, buildings and other structures built for the purpose and duration of the conduct of the petroleum activities, but does not include other facilities required for the long term management of the impact of those activities or the protection of potential resources. Such other facilities include dams other than water storage dams (e.g. evaporation dams), pipelines and assets, that have been decommissioned, rehabilitated, and lawfully recognised as being subject to subsequent transfer with ownership of the land.
irrigation	means the application of water to any agricultural or silvicultural crop or to a garden cultivated for domestic use.
LAeq, adj, 15 mins	means an A-weighted sound pressure level of a continuous steady sound, adjusted for tonal character, that within a 15 minute period has the same square sound pressure as a sound level that varies with time.
lake	means: <ul style="list-style-type: none"> (a) a lagoon, swamp or other natural collection of water, whether permanent or intermittent; and (b) the bed and banks and any other element confining or containing the water.
land-based offset	means direct offsets, indirect offsets, and offset transfers.
landfill monocell	means a specialised, isolated landfill facility where a single specific waste type is exclusively disposed (i.e. salt).
leachate	means a liquid that has passed through or emerged from, or is likely to have passed through or emerged from, a material stored, processed or disposed of on site which contains soluble, suspended or miscible contaminants likely to have been derived from the said material.
legally secured	in relation to <u>land-based offsets</u> means any of the following legally binding mechanisms: <ul style="list-style-type: none"> • gazettal as a protected area (e.g., a nature refuge) under the Nature Conservation Act 1992; • declaration of an area of high nature conservation values under the Vegetation Management Act 1999; • use of a covenant under the Land Title Act 1994 or Land Act 1994; or • another mechanism administered and approved by the State.
levee	means a dyke or bund that is designed only to provide for the containment and diversion of stormwater or flood flows from a contributing catchment, or containment and diversion of flowable



	materials resulting from unplanned releases from other works of infrastructure, during the progress of those stormwater or flood flows or those unplanned releases; and does not store any significant volume of water or flowable substances at any other times.
limited petroleum activities	mean only activities including: (a) geophysical surveys (including seismic activities); (b) well sites; (c) well pads; (d) sumps; (e) flare pits; (f) flow lines; and (g) supporting access tracks. For clarity, limited petroleum activities do not include: (a) the construction of infrastructure for processing or storing petroleum or byproducts; (b) dams; (c) compressor stations; (d) campsites/workforce accommodation; (e) power supplies; (f) waste disposal; or other supporting infrastructure for the project.
linear infrastructure	means powerlines, pipelines, roads and access tracks.
livestock watering purposes	means the supply of water to any livestock.
long term noise event	is a noise exposure, when perceived at a sensitive receptor, persists for a period of greater than five (5) days, even when there are respite periods when the noise is inaudible within those five (5) days.
low consequence dam	means any dam that is not a high or significant consequence category as assessed using the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635).
mandatory reporting level or MRL	means a warning and reporting level determined in accordance with the criteria in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635) published by the administering authority.
manual	means the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635) published by the administering authority.
mapped State significant biodiversity values	means the regional ecosystems, essential habitat, wetlands, watercourses, legally secured offset areas and connectivity areas provided in Appendix 1 of the Queensland Biodiversity Offset Policy (Department of Environment and Heritage Protection, 2014) that are mapped in State mapping.
Max L_{pz} , 15 min	means the maximum value of the Z-weighted sound pressure level measured over 15 minutes.
Max L_{pA} , 15 min	means the absolute maximum instantaneous A-weighted sound pressure level, measured over 15 minutes.
mg/L	means milligrams per litre.
medium term noise event	is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than five days and does not re-occur for a period of at least four weeks. Re-occurrence is deemed to apply where a noise of comparable level is observed at the same receptor location for a period of one hour or more, even if it originates from a difference source or source location.

meter	means a device for measuring, or giving an output signal proportional to, quantities of water passed and/or the rate of flow in a pipe."
mix-bury-cover method	means the stabilisation of residual drilling solids in the bottom of a sump by mixing with subsoil and which occurs in accordance with the following methodology: <ul style="list-style-type: none"> - the base of the subsoil and residual solid mixture must be separated from the groundwater table by at least one metre of a continuous layer of impermeable subsoil material (kw=10-8m/s) or subsoil with a clay content of greater than 20 percent; 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.
modification or modifying	(see definition of `construction`).
Offset Area Management Plan (OAMP)	means a plan that meets the requirements listed under the heading 'Specific requirements for offset area management plans' in Criteria A3-Information requirement of the Queensland Biodiversity Offset Policy (Department of Environment and Heritage Protection, 2014).
operational plan	includes: <ul style="list-style-type: none"> (a) normal operating procedures and rules (including clear documentation and definition of process inputs in the DSA allowance); (b) contingency and emergency action plans including operating procedures designed to avoid and/or minimise environmental impacts including threats to human life resulting from any overtopping or loss of structural integrity of the regulated structure.
pest	means species: <ul style="list-style-type: none"> (a) declared under the Land Protection (Pest and Stock route Management) Act 2002; (b) declared under Local Government model local laws; and (c) which may become invasive in the future.
populated area	includes towns and cities which have a population of 500 or more people and with a minimum density of 40 people/km ² .
prescribed storage gases	has the meaning provided in section 12 of the Petroleum and Gas (Production and Safety) Act 2004.
produced water	has the meaning in section 15A of the Petroleum and Gas (Production and Safety) Act 2004 and means CSG water or associated water for a petroleum tenure.
quarter	means the following periods of a calendar year: <ul style="list-style-type: none"> 1 January to 31 March inclusive; 1 April to 30 June inclusive; 1 July to 30 September inclusive; and 1 October to 31 December inclusive.
Register of Regulated Dams	includes: <ul style="list-style-type: none"> (a) Date of entry in the register; (b) Name of the dam, its purpose and intended/actual contents;

	<p>(c) The consequence category of the dam as assessed using the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635);</p> <p>(d) Dates, names, and reference for the design plan plus dates, names, and reference numbers of all document(s) lodged as part of a design plan for the dam;</p> <p>(e) Name and qualifications of the suitably qualified and experienced person who certified the design plan and 'as constructed' drawings;</p> <p>(f) For the regulated dam, other than in relation to any levees –</p> <ul style="list-style-type: none"> (i) The dimensions (metres) and surface area (hectares) of the dam measured at the footprint of the dam; (ii) Coordinates (latitude and longitude in GDA94) within five metres at any point from the outside of the dam including its storage area (iii) Dam crest volume (megalitres); (iv) Spillway crest level (metres AHD). (v) Maximum operating level (metres AHD); (vi) Storage rating table of stored volume versus level (metres AHD); (vii) Design storage allowance (megalitres) and associated level of the dam (metres AHD); (viii) Mandatory reporting level (metres AHD); <p>(g) The design plan title and reference relevant to the dam;</p> <p>(h) The date construction was certified as compliant with the design plan;</p> <p>(i) The name and details of the suitably qualified and experienced person who certified that the constructed dam was compliant with the design plan;</p> <p>(j) Details of the composition and construction of any liner;</p> <p>(k) The system for the detection of any leakage through the floor and sides of the dam;</p> <p>(l) Dates when the regulated dam underwent an annual inspection for structural and operational adequacy, and to ascertain the available storage volume for 1 November of any year;</p> <p>(m) Dates when recommendations and actions arising from the annual inspection were provided to the administering authority;</p> <p>(n) Dam water quality as obtained from any monitoring required under this authority as at 1 November of each year.</p>
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.
regulated structure	includes land-based containment structures, levees, bunds and voids, but not a tank or container designed and constructed to an Australian Standard that deals with strength and structural integrity.
rehabilitation	means the process of reshaping and revegetating land to restore it to a stable landform and in accordance with the acceptance criteria set out in this environmental authority and, where relevant, includes remediation of contaminated land.

relevant offset objectives	means the relevant criteria listed under the heading 'When an offset ceases to have effect' in Criteria A2 - Legally securing biodiversity offsets of the Queensland Biodiversity Offset Policy (Department of Environment and Heritage Protection, 2014).
relevant offset rules	means the relevant criteria included in the Queensland Biodiversity Offset Policy (Department of Environment and Heritage Protection, 2014) including but not necessarily limited to: (a) for all offsets, the relevant criteria of Criteria B1 - Offset Rules except where an offset payment is used for which Part A and Part B Criteria do not apply; and (b) for land-based offsets, the relevant criteria of Criteria B1 - Offset Rules as well as Criteria A1 - Obtaining Ecological Equivalence.
remnant unit	means a continuous area of remnant vegetation representative of a single Regional Ecosystem type or a single heterogeneous unit (multiple Regional Ecosystem types that cannot be distinguished individually due to the scale of mapping).
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.
sensitive place	means: <ul style="list-style-type: none"> - a dwelling (including residential allotment, mobile home or caravan park, residential marina or other residential premises, motel, hotel or hostel; or - a library, childcare centre, kindergarten, school, university or other educational institution; - a medical centre, surgery or hospital; or - a protected area; or - a public park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment; or - a work place used as an office or for business or commercial purposes, which is not part of the petroleum activities and does not include employees accommodation or public roads.
sensitive receptor	means an area or place where noise (including low frequency, vibration and blasting) is measured investigate whether nuisance impacts are occurring and includes: <ul style="list-style-type: none"> - a dwelling (including residential allotment, mobile home or caravan park, residential marina or other residential premises, motel, hotel or hostel; or - a library, childcare centre, kindergarten, school, university or other educational institution; - a medical centre, surgery or hospital; or - a protected area; or - a public park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment; or - a work place used as an office or for business or commercial purposes, which is not part of the petroleum activities and does not include employees accommodation or public roads.
short term noise event	is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than eight hours and does not re-occur

	for a period of at least seven days. Re-occurrence is deemed to apply where a noise of comparable level is observed at the same receptor location for a period of one hour or more, even if it originates from a different source or source location.
significantly disturbed land or significant disturbance to land	has the meaning in Schedule 12, section 4 of the Environmental Protection Regulation 2008. Land is significantly disturbed if - (a) it is contaminated land; or (b) it has been disturbed and human intervention is needed to rehabilitate it- (i) to a condition required under the relevant environmental authority; or (ii) if the environmental authority does not require the land to be rehabilitated to a particular condition—to the condition it was in immediately before the disturbance
site	means the petroleum authority(ies) to which the environmental authority relates.
spillway	means a weir, channel, conduit, tunnel, gate or other structure designed to permit discharges from the dam, normally under flood conditions or in anticipation of flood conditions.
spring	means the land to which water rises naturally from below the ground and the land over which the water then flows.
stable	in relation to land, means landform dimensions are or will be stable within tolerable limits now and in the foreseeable future. Stability includes consideration of geotechnical stability, settlement and consolidation allowances, bearing capacity (trafficability), erosion resistance and geochemical stability with respect to seepage, <u>leachate</u> and related contaminant generation.
State significant biodiversity values	means those regional ecosystems, essential habitat, wetlands, watercourses, legally secured offset areas and connectivity areas provided in Appendix 1 of the Queensland Biodiversity Offsets Policy (Department of Environment and Heritage Protection, 2014).
stimulation	means a technique used to increase the permeability of a natural underground reservoir, including for example, cavitation, hydraulic fracturing/hydrofracking, fracture acidizing and the use of proppant treatments.
structure	means dam or levee.
suitably qualified person	means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis to performance relative to the subject matter using the relevant protocols, standards, methods or literature.
suitably qualified and experienced person	in relation to regulated structures means a person who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the Professional Engineers Act 2002, and has demonstrated competency and relevant experience: - for regulated dams, an RPEQ who is a civil engineer with the required qualifications in dam safety and dam design. - for regulated levees, an RPEQ who is a civil engineer with the required qualifications in the design of flood protection embankments. Note: It is permissible that a suitably qualified and experienced person obtain subsidiary certification from an RPEQ who has demonstrated

	competence and relevant experience in either geomechanics, hydraulic design or engineering hydrology.
system design plan	means a plan that manages an integrated containment system that shares the required DSA and/or ESS volume across the integrated containment system.
third party auditor	means a suitably qualified person who is either a certified third party auditor or an internal auditor employed by the holder of the environmental authority and the person is independent of the day to day management and operation of activities covered by this environmental authority.
threatening processes	means processes, features and actions that can have a detrimental effect upon the health and viability of an area of vegetation. For example altered hydrology, land use practices, invasion by pest and weed species, land degradation, edge effects and fragmentation.
threshold regional ecosystem	means the ecosystems identified in Appendix 6 of the Queensland Biodiversity Offset Policy (Department of Environment and Heritage Protection, 2014).
tolerable limits	means a range of parameters regarded as being sufficient to meet the objective of protecting relevant environmental values. For example, a range of settlement for a tailings capping, rather than a single value, could still meet the objective of draining the cap quickly, preventing damage and limiting infiltration and percolation.
topsoil	means the surface (top) layer of a soil profile, which is more fertile, darker in colour, better structured and supports greater biological activity than underlying layers. The surface layer may vary in depth depending on soil forming factors, including parent material, location and slope, but generally is not greater than about 300mm in depth from the natural surface.
unacceptable risk	is when the results of a hazard assessment indicates that there is both a high consequence and a high likelihood of an event occurring such that the risk is classified as "high", "very high" or "extreme".
valid complaint	means a complaint the administering authority considers is not frivolous, nor vexatious, nor based on mistaken belief.
void	means any constructed, open excavation in the ground.
watercourse	has the meaning provided in s 5 of the Water Act 2000 and includes the bed and banks and any other element of a river, creek or stream confining or containing water.
watercourse, wetland, lake or spring with State significant biodiversity values	are those described in Appendix 1 of the Queensland Biodiversity Offsets Policy (Department of Environment and Heritage Protection, 2014).
waters	includes all or any part of a river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water in natural or artificial watercourses, bed and banks of a watercourse, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and groundwater.
wetland	means an area shown as a wetland on a 'Map of referable wetlands', a document approved by the chief executive (environment). A map of referable wetlands can be viewed at www.ehp.qld.gov.au

End of conditions



Permit

Environmental Protection Act 1994

Environmental authority EPPG00972513

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

Environmental authority number: EPPG00972513**Environmental authority takes effect on 10 May 2018****Environmental authority holder(s)**

Name(s)	Registered address
Stanwell Corporation Limited	Level 13 AM-60 42 Albert Street BRISBANE CITY QLD 4000 Australia
AUSTRALIAN CBM PTY LTD	Level 39 111 Eagle Street BRISBANE CITY QLD 4000 Australia
ARROW (TIPTON) PTY. LTD.	Level 39 111 Eagle Street BRISBANE CITY QLD 4000 Australia
ARROW (DAANDINE) PTY. LTD.	Level 39 111 Eagle St BRISBANE CITY QLD 4000 Australia
ARROW CSG (AUSTRALIA) PTY LTD	Level 39 111 Eagle Street BRISBANE CITY QLD 4000 Australia
ARROW (TIPTON TWO) PTY LTD	Level 39 111 Eagle Street BRISBANE CITY QLD 4000 Australia
ARROW ENERGY PTY LTD	Level 39 111 Eagle Street BRISBANE QLD 4001

Environmentally relevant activity and location details

Environmentally relevant activity/activities	Location(s)
Resource Activity, Schedule 2A, 06: A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL252
Resource Activity, Schedule 2A, 06: A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL194
Resource Activity, Schedule 2A, 06: A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL198
Resource Activity, Schedule 2A, 06: A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL230
Resource Activity, Schedule 2A, 06: A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL260

Environmental authority

Environmentally relevant activity/activities	Location(s)
Resource Activity, Schedule 2A, 06: A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL238
Resource Activity, Schedule 2A, 06: A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL258
Resource Activity, Schedule 2A, 07: A petroleum activity involving injection of a wastefluid into a natural underground reservoir or aquifer	PL252
Resource Activity, Schedule 2A, 07: A petroleum activity involving injection of a wastefluid into a natural underground reservoir or aquifer	PL194
Resource Activity, Schedule 2A, 07: A petroleum activity involving injection of a wastefluid into a natural underground reservoir or aquifer	PL198
Resource Activity, Schedule 2A, 07: A petroleum activity involving injection of a wastefluid into a natural underground reservoir or aquifer	PL230
Resource Activity, Schedule 2A, 07: A petroleum activity involving injection of a wastefluid into a natural underground reservoir or aquifer	PL260
Resource Activity, Schedule 2A, 07: A petroleum activity involving injection of a wastefluid into a natural underground reservoir or aquifer	PL238
Resource Activity, Schedule 2A, 07: A petroleum activity involving injection of a wastefluid into a natural underground reservoir or aquifer	PL258
Resource Activity, Schedule 2A, 08: A petroleum or GHG storage activity, other than items 1 to 7, that includes an activity from Schedule 2 with an AES	PL252
Resource Activity, Schedule 2A, 08: A petroleum or GHG storage activity, other than items 1 to 7, that includes an activity from Schedule 2 with an AES	PL194
Resource Activity, Schedule 2A, 08: A petroleum or GHG storage activity, other than items 1 to 7, that includes an activity from Schedule 2 with an AES	PL198
Resource Activity, Schedule 2A, 08: A petroleum or GHG storage activity, other than items 1 to 7, that includes an activity from Schedule 2 with an AES	PL230
Resource Activity, Schedule 2A, 08: A petroleum or GHG storage activity, other than items 1 to 7, that includes an activity from Schedule 2 with an AES	PL260

Environmental authority

Environmentally relevant activity/activities	Location(s)
Resource Activity, Schedule 2A, 08: A petroleum or GHG storage activity, other than items 1 to 7, that includes an activity from Schedule 2 with an AES	PL238
Resource Activity, Schedule 2A, 08: A petroleum or GHG storage activity, other than items 1 to 7, that includes an activity from Schedule 2 with an AES	PL258
Resource Activity, Ancillary 15 - Fuel burning, Using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour	PL252
Resource Activity, Ancillary 15 - Fuel burning, Using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour	PL194
Resource Activity, Ancillary 15 - Fuel burning, Using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour	PL198
Resource Activity, Ancillary 15 - Fuel burning, Using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour	PL230
Resource Activity, Ancillary 15 - Fuel burning, Using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour	PL260
Resource Activity, Ancillary 15 - Fuel burning, Using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour	PL238
Resource Activity, Ancillary 15 - Fuel burning, Using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour	PL258
Resource Activity, Ancillary 14 - Electricity Generation, 1: Generating electricity by using gas at a rated capacity of 10MW electrical or more	PL252
Resource Activity, Ancillary 14 - Electricity Generation, 1: Generating electricity by using gas at a rated capacity of 10MW electrical or more	PL194
Resource Activity, Ancillary 14 - Electricity Generation, 1: Generating electricity by using gas at a rated capacity of 10MW electrical or more	PL198
Resource Activity, Ancillary 14 - Electricity Generation, 1: Generating electricity by using gas at a rated capacity of 10MW electrical or more	PL230
Resource Activity, Ancillary 14 - Electricity Generation, 1: Generating electricity by using gas at a rated capacity of 10MW electrical or more	PL260

Environmental authority

Environmentally relevant activity/activities	Location(s)
Resource Activity, Ancillary 14 - Electricity Generation, 1: Generating electricity by using gas at a rated capacity of 10MW electrical or more	PL238
Resource Activity, Ancillary 14 - Electricity Generation, 1: Generating electricity by using gas at a rated capacity of 10MW electrical or more	PL258
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (b-i) more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL252
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (b-i) more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL194
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (b-i) more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL198
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (b-i) more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL230
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (b-i) more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL260
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (b-i) more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL238
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (b-i) more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL258

Environmental authority

Environmentally relevant activity/activities	Location(s)
Resource Activity, Ancillary 64 - Water treatment, 2: Desalinating, in a day, the following quantity of water, allowing the release of waste to waters other than seawater, (b) more than 5ML	PL252
Resource Activity, Ancillary 64 - Water treatment, 2: Desalinating, in a day, the following quantity of water, allowing the release of waste to waters other than seawater, (b) more than 5ML	PL194
Resource Activity, Ancillary 64 - Water treatment, 2: Desalinating, in a day, the following quantity of water, allowing the release of waste to waters other than seawater, (b) more than 5ML	PL198
Resource Activity, Ancillary 64 - Water treatment, 2: Desalinating, in a day, the following quantity of water, allowing the release of waste to waters other than seawater, (b) more than 5ML	PL230
Resource Activity, Ancillary 64 - Water treatment, 2: Desalinating, in a day, the following quantity of water, allowing the release of waste to waters other than seawater, (b) more than 5ML	PL260
Resource Activity, Ancillary 64 - Water treatment, 2: Desalinating, in a day, the following quantity of water, allowing the release of waste to waters other than seawater, (b) more than 5ML	PL238
Resource Activity, Ancillary 64 - Water treatment, 2: Desalinating, in a day, the following quantity of water, allowing the release of waste to waters other than seawater, (b) more than 5ML	PL258

Additional information for applicantsEnvironmentally 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:

Environmental authority

- 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.

Clancy Mackaway
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Environmental Protection Act 1994

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This environmental authority consists of the following schedules:

Schedule A	General Conditions
Schedule B	Water
Schedule BE	Coal Seam Gas Water Injection Trial
Schedule C	Regulated Dams
Schedule D	Land
Schedule E	Environmental Nuisance
Schedule F	Air
Schedule G	Waste
Schedule H	Rehabilitation
Schedule I	Monitoring Programs
Schedule J	Community Issues
Schedule K	Notification Procedures
Schedule L	Definitions

Legislative Requirements and Conditions of Environmental Authority

SCHEDULE A - GENERAL CONDITIONS

Authorised Petroleum Activities

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

Schedule A, Table 1 - Authorised Petroleum Activities

Petroleum Activity(ies)	Total Number of Authorised Petroleum Activities	Maximum Disturbance Authorised
Seismic	NA	120 ha
Total coal seam gas wells, including: <ul style="list-style-type: none"> • core wells • Exploration wells • Development wells • Production wells 	691	691 wells 691 ha
Injection well(s) and associated facilities	1	4 ha
Compressor units	40	40 units, 8 ha
Central gas processing facilities	2	2 facilities, 8 ha
Regulated structures	22	22 dams
Water treatment facilities	2	12 ML/d (each), 2 ha
Sewage treatment plants	2	Less than 450 EP (each), 0.15 ha
Power stations	1	40 MW, 1.2 ha

Prevent or Minimise Likelihood of Environmental Harm

- A2 This environmental authority does not authorise environmental harm unless a condition contained in this environmental authority explicitly authorises that harm. Where there is no condition, the lack of a condition shall not be construed as authorising harm.

Maintenance of Measures, Plant and Equipment

- A3 The holder of the environmental authority must:
- (a) install all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority;
 - (b) maintain such measures, plant and equipment in their proper and effective condition; and
 - (c) operate such measures, plant and equipment in a proper and effective manner.
- A4 No change, replacement or alteration of any plant or equipment is permitted if the change, replacement or alteration materially increases, or is likely to increase, the environmental harm caused by the petroleum activity.

Financial Assurance

- A5 Petroleum activities that cause significant disturbance to land must not be carried out until financial assurance has been given to administering authority as security for compliance with the environmental authority and for any costs or expenses, or likely costs or expenses, mentioned in section 298 of the *Environmental Protection Act 1994*.
- A6 Prior to any changes in petroleum activities which would result in an increase to the maximum significant disturbance since financial assurance was last given to the administering authority, the holder of the environmental authority must amend the financial assurance and give the administering authority the increased amount of financial assurance.

Existing petroleum activities

- A7 Conditions (D2) to (D17) and (D33) to (D36) in the Land Schedule relating to disturbance, only apply to petroleum activities which commenced after 15 March 2011 subject to the holder of the environmental authority having complied with all disturbance conditions of the relevant environmental authority that applied at the time the exiting petroleum activity was constructed.

Third Party Audit

- A8 A third party auditor, nominated by the holder of the environmental authority and accepted by the administering authority, must audit compliance with the conditions of this environmental authority at a minimum frequency of every three (3) years.
- A9 Notwithstanding Condition (A7) and prior to undertaking the third party audit, the scope and content of the third party audit can be negotiated with the administering authority.
Note: Where minimal activities have been undertaken on a tenure, the negotiation of the scope of the third party audit may also include the postponing of the third party audit to an agreeable time between the holder of this environmental authority and the administering authority.
- A10 An audit report of the audit required by Condition (A8) must be prepared and certified by the third party auditor presenting the findings of each audit carried out.
- A11 The financial cost of the third party audit is to be borne by the holder of this environmental authority.

- A12 The holder of this environmental authority must act upon any recommendations arising from the audit report by:
- (a) investigating any non-compliance issues identified; and
 - (b) as soon as practicable, implementing measures or taking necessary action to ensure compliance with the requirements of this environmental authority.
- A13 Subject to Condition (A12), and not more than 60 business days following the submission of the audit report, the holder of this environmental authority must provide a written report to the administering authority addressing the:
- (a) actions taken by the holder to ensure compliance with this environmental authority; and
 - (b) actions taken to prevent a recurrence of any non-compliance issues identified.
- A14 The audit report required by Condition (A10) and the written response to the audit report required by Condition (A13) must be submitted to the administering authority with the subsequent annual return.

Contingency Plan for Emergency Environmental Incidents

- A15 A contingency plan for emergency environmental incidents which includes but is not limited to the impacts of flooding and the injection of treated CSG water, must be developed and implemented to respond to environmental emergency events and incidents where environmental harm is caused or threatened.
- A16 The contingency plan for emergency environmental incidents required under Condition (A15) must address the following matter as a minimum:
- (a) a clear definition of what constitutes an environmental emergency incident for the activity;
 - (b) identification of the types of environmental incidents that may occur, relevant to the activities authorised to be carried out under this environmental authority;
 - (c) response procedures to be implemented to prevent or minimise the risk of environmental harm arising from environmental emergency incidents;
 - (d) response procedures to minimise the extent and duration of environmental harm caused by environmental emergency incidents;
 - (e) the practices and procedures to be employed to restore the environment or mitigate any environmental harm caused;
 - (f) communication procedures and lines of communication within and beyond the organisation to be employed in responding to environmental emergency incidents;
 - (g) the resources to be used in response to environmental emergency incidents;
 - (h) procedures to investigate the cause of any incidents, including releases, and where necessary, the remedial actions to be implemented to reduce the likelihood of recurrence of similar events;
 - (i) a receiving environment monitoring program (REMP) to be specifically implemented in the event of an unauthorised release to waters or land to examine and assess environmental impacts. For monitoring of waters, this program must include upstream, downstream and impact site monitoring procedures. For soils monitoring, sufficient samples must be taken from the soil profile at both reference site and the impact site as a minimum;
 - (j) the provision and availability of documented procedures to staff attending any emergency environmental incident to enable them to effectively respond;
 - (k) training of staff that will be called upon to respond to emergency environmental incidents to enable them to effectively respond;

- (l) timely and accurate reporting of the circumstance and nature of emergency environmental incidents to the administering authority in accordance with conditions of this environmental authority;
- (m) procedures for accessing monitoring points during emergency environmental incidents; and
- (n) procedures to notify any potentially impacted stakeholder who may be affected by an environmental emergency incident.

Documentation and Records Management

- A17 All records and results required by the conditions of this environmental authority must be kept for a minimum of five (5) years.
- A18 All documentation required by this environmental authority (including but not limited to plans, systems, programs, procedures, results of audits, assessments, monitoring, inspections and complaints records) must be made available to the administering authority upon request.

Cultural Heritage

- A19 In the carrying out of the petroleum activity the holder of this environmental authority must not adversely impact on the cultural heritage values of any place registered on the Queensland Heritage Register

Underground Gas Storage

- A20 Testing, evaluating, developing and using natural underground reservoirs for petroleum storage or to store prescribed storage gases is not authorised under this environmental authority.

Stimulation of Underground Reservoirs

- A21 The stimulation of underground reservoirs is prohibited under this environmental authority.

Encapsulation of Solid Salt in a Landfill Monocell

- A22 The disposal of solid salt on site, including encapsulation of solid salt in a landfill monocell, is prohibited under this environmental authority.

SCHEDULE B - WATER

Contaminant Release

- B1 Contaminants that will or may cause environmental harm must not be directly or indirectly released to any waters except as authorised by Conditions (B15).
- B2 The release of contaminants directly or indirectly to waters authorised by Condition (B15):
 - (a) must not produce any visible plume within the receiving waters; and
 - (b) must not produce any slick or other visible or odorous evidence of oil, grease or petrochemicals nor contain visible floating oil, grease, scum, litter or other objectionable matter.

Erosion and Sediment Control

- B3 For activities involving significant disturbance to land, control measures that are commensurate to the sitespecific 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).

Maintenance and Cleaning

- B4 The maintenance and cleaning of vehicles and any other equipment or plant must be carried out in areas from where the resultant contaminants cannot be released into any waters, roadside gutter or stormwater drainage system.

Watercourses, Wetlands and Springs

- B5 In the carrying out of the petroleum activity the holder of this environmental authority must not clear vegetation or place fill, in or within:
- (a) 200 metres from any natural significant wetland;
 - (b) 100 metres from any natural wetland, lakes or springs; or
 - (c) 100 metres of the high bank of any other watercourse.
- B6 The holder of this environmental authority must not excavate or replace fill in a way that interferes with the flow of water in a watercourse, wetland or spring, including works that divert the course of the flow of the water or works that impound the water.
- B7 Despite Conditions (B5) and (B6), pipeline and road construction works may be undertaken in watercourses, wetlands or springs, where there is no reasonable and practicable alternative (such as the use of horizontal directional drilling methods), provided that the works are conducted in accordance with the following order of preference:
- (a) conducting work in times of no flow; and
 - (b) using all reasonable and practicable measures to reduce impacts in times of flow.
- B8 Activities or works resulting in significant disturbance to the bed or banks of a watercourse or wetland, or a spring must:
- (a) only be undertaken where necessary for the construction and/or maintenance of roads, tracks and pipelines that are essential for carrying out the authorised petroleum activities and no reasonable or practicable alternative location exists;
 - (b) be no greater than the minimum area necessary for the purpose of the significant disturbance;
 - (c) be designed and undertaken by a suitably qualified person taking into account the matters listed in Section 5 - Planning Activities and Section 6 - Impact Management During Activities of the Department of Environment and Heritage Protection's "Guideline - Activities in a watercourse, lake or spring associated with mining operations" dated April 2008, or more recent editions as such become available; and
 - (d) upon cessation of the activities or works, commence rehabilitation immediately such that the final rehabilitation is to a condition that will ensure the ongoing physical integrity and the natural ecosystem values of the site.

- B9 Sediment control measures must be implemented to minimise any increase in water turbidity due to carrying out petroleum activities in the bed or banks of a watercourse or wetland, or a spring.
- B10 Routine, regular and frequent visual monitoring must be undertaken while carrying out construction work and/or any maintenance of completed works in a watercourse, wetland or spring.
- B11 If, due to the petroleum activities, water turbidity increases in the watercourse, wetland or spring outside contained areas, works must cease and the sediment control measures must be rectified to limit turbidity before activities recommence.
- B12 All measures must be taken to minimise adverse impacts to or reversal of any river improvement works carried out in River Improvement Areas by Queensland's River Improvement Trusts.
Note: Locations and details of River Improvement Areas and River Improvement Trusts are provided in the Schedule to the River Improvement Trust Regulation 1998.

Floodplains

- B13 Where petroleum activities are carried out on floodplain areas, the holder of this environmental authority must ensure that petroleum and incidental activities do not:
- (a) concentrate flood flows that cause or threaten an adverse environmental impact;
 - (b) divert flood flows from natural drainage paths and alter flow distribution;
 - (c) increase the local duration of floods;
 - (d) increase the risk of detaining flood flows;
 - (e) pose an unacceptable risk to the safety of persons from flooding; or
 - (f) pose an unacceptable risk of damage to property from flooding.

Groundwater

- B14 The extraction of groundwater as part of the petroleum activity from underground aquifers must not directly or indirectly cause environmental harm to any spring, wetland or other surface waters.

Release to Waters of Treated CSG Water

- B15 The release of treated CSG water is authorised to occur in accordance with Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters and Schedule B Table 2 – Treated CSG Water Release Limits for Monitoring Point (M1).

Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters

Water Source and Location	Release Point	Location	Monitoring Point	Receiving Waters Description
Treated CSG Water from the reverse osmosis water treatment plant and treated	R1, defined as the outlet of discharge pipe to Wilkie Creek	6,995,465 N303,004 E (Easting and northing locations given as per	M1, defined as the sample point in the discharge pipeline point to release into	Wilkie Creek

water dam located on PL230		GDA94, Map Zone 56)	Wilkie Creek	
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B16 The quality of the treated CSG water being released must comply with each quality characteristic release limit and limit type and the monitoring frequency specified in Schedule B, Table 2 – Treated CSG Water Release Limits for Monitoring Point (M1) and Schedule B, Table 3 – Treated CSG Water Release Limits for Monitoring Point (M1) when measured at the monitoring point (M1) specified in Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters.

Schedule B Table 2 – Treated CSG Water Release Limits for Monitoring Point (M1)

Quality Characteristic	Unit	Release Limit(s)	Limit Type	Monitoring Frequency
Electrical conductivity	µS/cm	580	80 th percentile	Based on at least 5 samples with not less than 60 minutes between samples daily during release
pH	pH Unit	6.5 - 9	Range	Daily during release
Suspended Solids	mg/L	180	Maximum	Daily during release
Boron	mg/L	0.37	Maximum	Daily during release

Schedule B, Table 3 – Treated CSG Water Release Limits for Monitoring Point (M1)

Quality characteristic	Unit	Maximum Release limit	Monitoring frequency
Aluminium	mg/L	0.2	The first release day of each quarter
Antimony	ml/L	0.003	
Arsenic	mg/L	0.007	
Barium	mg/L	0.7	
Bisphenol A	mg/L	0.2	
Boron	mg/L	4	
Bromide	mg/L	7	
BTEX			
Benzene	mg/L	0.001	
Toluene	mg/L	0.8	
Ethylbenzene	mg/L	0.3	
Xylene (m & p)	mg/L	0.6	
Cadmium	mg/L	0.002	
Chromium	mg/L	0.05	
Copper	mg/L	2	
Cyanide	mg/L	0.08	
Fluoride	mg/L	1.5	
Iodide	mg/L	0.5	
Iron	mg/L	0.3	
Lead	mg/L	0.01	
Manganese	mg/L	0.5	
Mercury	mg/L	0.001	
Molybdenum	mg/L	0.05	
Nickel	mg/L	0.02	

Nonylphenol		mg/L	0.5
PAH (as B(a)P TEF)			0.01
Species:	TEF:		
benz[a]anthracene	0.1	µg/L	
benzo[b+j]fluoranthene	0.1		
benzo[k]fluoranthene	0.1		
benzo[a]pyrene	1.0		
chrysene	0.1		
dibenz[a,h]anthracene	1.0		
indeno[1,2,3-cd]pyrene	0.1		
Selenium		mg/L	0.01
Silver		mg/L	0.1
Strontium		mg/L	4
Total Petroleum Hydrocarbons (TPH)		mg/L	0.2
Vanadium		mg/L	0.05
Zinc		mg/L	3
Radium-226 Lead-210 Polonium-210 Radium-228		mSv/year	0.5 The dose for each parameter is summed to give the total dose which must be less than or equal to 0.5 mSv/year

B17 If the monitoring required by condition (B16) indicates that any of the quality characteristic release limits specified in Schedule B, Table 3 – Treated CSG Water Release Limits for Monitoring Point (M1) have been exceeded at any time during any release of treated CSG water, the environmental authority holder must, within five (5) business days of notifying the administering authority of the exceedance, unless a longer time is agreed to by the administering authority:

(a) complete an investigation into the exceedance, which includes an analysis of the (potential and actual) causes for the exceedance; and

(b) provide a written report to the administering authority on completion of the investigation that includes:

- (i) details of the investigation carried out;
- (ii) any actions taken to prevent impacts to waters that may be used for drinking water;
- (iii) the cause for the exceedance;
- (iv) all water quality monitoring results pertaining to the investigation;
- (v) any general observations;
- (vi) methodology(ies) and any relevant calculations used; and
- (vii) corrective actions to rectify the cause of the exceedance.

B18 Where an exceedance of a quality characteristic release limit specified in Schedule B, Table 3 – Treated CSG Water Release Limits for Monitoring Point (M1) is being investigated in accordance with condition (B17), the investigation and reporting required by condition (B18) is not required if a subsequent exceedance occurs, during investigation of the initial exceedance, which has resulted from the same cause that triggered the initial exceedance.

Flow Monitoring

- B19 Prior to commencing any release of treated CSG water authorised under this environmental authority, a stream flow gauging station (GP1) must be installed.
- B20 Upon practical completion of the meter installation, a completed 'meter installation form' must be signed by the installer and the environmental authority holder to confirm that the installation complies with the manufacturer's specifications and/or national standards and/or the Department of Environment and Heritage Protection's metering standards (whichever is applicable).
- B21 The stream flow gauging station (GP1) must be installed in accordance with Schedule B, Table 4 – Contaminant Release During Flow Events.

Schedule B, Table 4 – Contaminant Release During Flow Events

Receiving water description	Gauging station description	Latitude or northing (GDA94)	Longitude or easting (GDA94)	Minimum Flow in Receiving Water Required for a Release Event	Flow recording Frequency
Wilkie Creek	Gauging station 1 (GP1)	50-100 metres upstream of Release Point R1	50-100 metres upstream of Release Point R1	0.14 m ³ /s	at 6 hour intervals during discharge (minimum twice daily)

- B22 The stream flow gauging station (GP1) must be operated to determine daily stream flows in accordance with Schedule B, Table 4 – Contaminant Release During Flow Events.
- B23 The flow rate of treated CSG water released from the release point authorised in Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters must not exceed a ratio of 1 part of the flow rate of the treated CSG water being released to 4 parts of the measured upstream receiving water flow rate.
- B24 The volume of treated CSG water released from the release point authorised in Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters must not exceed a maximum of 8ML/day.
- B25 The following characteristics of the release must be measured and recorded daily during all release events:
- (a) the volume of treated CSG water released through the release point R1;
 - (b) the date and time of release commencing and ceasing;
 - (c) the release rate;
 - (d) for any change in the release rate:
 - (i) the date and time of the change;
 - (ii) the new release rate; and
 - (iii) water levels and flow rate during the discharge event.
 - (e) water levels and flow rate during the discharge event;
 - (f) water quality characteristics monitoring results; and

(g) details of any observed impacts/conditions.

- B26 Prior to commencing any release of treated CSG water authorised under this environmental authority, each monitoring and release point specified in Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters must be marked and readily identifiable from the banks of Wilkie Creek.
- B27 The quality of the receiving waters must be monitored daily during release of treated CSG water at locations representative of the receiving waters determined in accordance with Condition (B33), for the following water quality characteristics:
- (a) Electrical conductivity ($\mu\text{S}/\text{cm}$)
 - (b) pH (pH Unit)
 - (c) Turbidity (NTU)
 - (d) Suspended Solids (mg/L)
 - (e) Calcium (mg/L)
 - (f) Magnesium (mg/L)
 - (g) Fluoride (mg/L)
 - (h) Sulphate (mg/l) and
 - (i) Boron (mg/L).
- B28 If water has been released from authorised release points listed in Schedule B, Table 1 – Contaminated Release Points, Sources and Receiving Waters, the holder of this environmental authority must undertake an annual assessment of the contaminants of treated CSG water to determine the risk of environmental harm from release of treated CSG water to surface waters. This should consider the contaminants mentioned in the ANZECC & ARMCANZ 2000 guidelines. This annual assessment must be included in the Annual Return.

Receiving Environment Management Program – REMP

- B29 Prior to the release of treated CSG water to Wilkie Creek a Receiving Environment Monitoring Program (REMP) must be developed and implemented to monitor, identify and describe any adverse impacts to surface water environmental values, water quality and flows due to the authorised release of treated CSG water to Wilkie Creek.
- B30 The REMP required by Condition (B29) must include periodic monitoring for the effects of the release on the receiving environment as a result of treated CSG water releases to waters from the release location (R1) specified in Table B15 - Treated CSG Water Release Point, Source and Receiving Waters.
- B31 The quality of the receiving waters must be monitored at the locations specified in Schedule B, *Table 5 – Receiving Water Upstream Background Sites and Downstream Monitoring Points*.

Schedule B, Table 5 – Receiving Water Upstream Background Sites and Downstream Monitoring Points.

Monitoring Points	Receiving Waters	Latitude of Northing (GDA94)	Longitude or Easting (GDA94)
Upstream background monitoring point			
Monitoring Point (M2)	Wilkie Creek	50 - 100 metres upstream of Release Point R1	50 - 10 metres upstream of Release Point R1
Downstream monitoring point			
Monitoring Point (M3)	Wilkie Creek	150 - 20 metres downstream of Release Point R1	150 - 200 metres downstream of Release Point R1

- B32 The REMP required by Condition (B29) must:
- (a) assess the condition or state of receiving waters, including upstream conditions, spatially within the REMP area, considering background water quality characteristics based on accurate and reliable monitoring data that takes into consideration temporal variation (e.g. seasonality);
 - (b) be designed to facilitate assessment against water quality objectives for the relevant environmental values that need to be protected;
 - (c) include monitoring from background reference sites (e.g. upstream or background) and downstream sites from the release;
 - (d) specify the frequency and timing of sampling required in order to reliably assess ambient conditions and to provide sufficient data to derive site specific background reference values in accordance with the Queensland Water Quality Guidelines 2006. This should include monitoring during periods of natural flow irrespective of other discharges;
 - (e) include monitoring and assessment of dissolved oxygen saturation and temperature and all water quality parameters listed in Condition (B27);
 - (f) include, where appropriate, monitoring of metals/metalloids in sediments (in accordance with ANZECC & ARMCANZ 2000, BATLEY and/or the most recent version of AS5667.1 Guidance on Sampling of Bottom Sediments);
 - (g) include, where appropriate, monitoring of macroinvertebrates in accordance with the AusRivas methodology;
 - (h) apply procedures and/or guidelines from ANZECC and ARMCANZ 2000 and other relevant guideline documents;
 - (i) describe sampling and analysis methods and quality assurance and control; and
 - (j) incorporate stream flow and hydrological information in the interpretations of water quality and biological data.
- B33 A report outlining the findings of the REMP, including all monitoring results and interpretations in accordance with conditions (B29) to (B32) must be prepared annually. This must include a determination of the risk of environmental harm from release of treated CSG water to the receiving environment waters.
- B34 The annual assessment must be prepared annually and made available on request to the administering authority.

Water Release Reduction Strategy

- B35 An on-going Release Reduction Strategy to maximise CSG water reuse and minimise any release to waters and the storage of CSG water in holding dams must be developed and implemented.
- B36 The strategy must address the following matters:
- (a) implementation of schemes to achieve maximum use of the water;
 - (b) specific targets for achieving increased use of CSG water both treated and untreated;
 - (c) a market analysis at least every three (3) years to identify existing and future opportunities for water use;
 - (d) on-going review of emerging technologies and/or re-use options that could achieve significant reductions in mass loads of contaminants released to the environment;
 - (e) investigation of the feasibility of alternative options, practices and procedures to further minimise the volume and concentration of contaminants released to waters; and
 - (f) programs to implement feasible options to achieve increased water use and reduction in contaminant loads, including actions and timeframes for completion.
- B37 A progress report on the Release Reduction Strategy must be submitted to the administering authority with each annual return. The report(s) must address at least the following matters:
- (a) details of the specific options, practices and procedures investigated;
 - (b) details of new practices, procedures and programs implemented since the last reporting period and targets met;
 - (c) where alternative options, practices and procedures are not considered feasible, the provision of justification to support that determination; and
 - (d) details of the option(s) yet to be implemented, including the timeframes for implementation, and justification for the chosen option(s).
- B38 The holder of this environmental authority must provide the administrative authority with safe access to facilitate inspections, and must comply with any instructions issued by the administrative authority relevant to the operation of the pump and meter installation.
- B39 The holder of this environmental authority must notify the administering authority within five (5) business days of any meter malfunction or maintenance of the measuring device (meter).
- B40 The holder of this environmental authority must arrange for the repair or replacement of a malfunctioning meter within five business days of becoming aware of the malfunction and provide a repair and/or maintenance completion report within ten business days of the repair or maintenance.

Sewage Treatment Works (21 – 450 EP)

Release of Treated Sewage Effluent Contaminants to Land

- B41 Sewage pump stations must be fitted with a stand-by pump and a visible or audible high level alarm.
- B42 Treated effluent may only be released to land at the designated, fenced and delineated contaminant release area(s).

- B43 The contaminant release area(s) must be maintained in a proper and efficient condition so as to provide adequate assimilation, percolation, evaporation and transpiration of the released contaminants
- B44 Treated effluent must not be applied by spray irrigation and must be applied in a manner that does not cause ponding or runoff of effluent beyond the contaminant release area(s).
- B45 When weather conditions or soil conditions preclude the release of contaminants, the contaminants must be directed to on-site storage or lawfully disposed of off-site.

Quality of Contaminants Released from the Sewage Treatment Works

- B46 Treated effluent must comply, at the sampling and in-situ measurement point(s), with each of the release limits specified in Schedule B, Table 5 - Treated Sewage Effluent Standards for each quality characteristic.
- B47 The release of contaminants to land must be monitored at the frequency and at the sampling and in-situ measurement point specified in Schedule B, Table 5 - Treated Sewage Effluent Standards and records of the monitoring results kept for at least five (5) years and made available to the administering authority on request.
- B48 The influent annual average daily dry weather flow of sewage must not exceed 60 kilolitres per day for each authorised sewage treatment plant under this environmental authority.

Schedule B, Table 5 – Treated Sewage Effluent Standards

Quality Characteristic	Sampling and in-situ measurement Point Location	Limit Type	Release Limit	Frequency
5-day Biochemical Oxygen Demand (inhibited)	Release pipe from sewage treatment plant located on PL198;	Maximum	20 mg/L	Monthly
Suspended Solids		Maximum	30 mg/L	
pH		Range	6.0 to 9.0	
E-Coli	Release pipe from sewage treatment plant located on PL230	80 th percentile based on at least 5 samples with not less than 30 minutes between samples.	1000 cfu per 100 mL	
		Maximum	10000 cfu per 100 ml	

SCHEDULE BE - COAL SEAM GAS WATER INJECTION TRIAL

- BE1 The only fluids authorised to be injected into an aquifer(s) are those fluid types specified in Schedule BE, Table 1 – Details of Authorised Fluid Injection.
- BE2 Fluid injection must be in accordance with the quantities and locations listed in Schedule BE, Table 1 – Details of Authorised Fluid Injection.

Schedule BE, Table 1 – Details of Authorised Fluid Injection

Well Location (Easting Northing, Map Zone 56)	Injection Well Number / Reference	Target Formation and Perforated Zone	Fluid Type	Maximum Injection Rate ML/d	Hydraulic Impact Zone	Water Quality Impact Zone
313669 E 6967949 N	Tipton-193	Precipice Formation, between 1040m to 1110 m depth	Treated CSG water ¹¹	4	9,340 m radius from injection well	148 m radius from injection well

¹¹: Treated CSG water means any fluid that contains any proportion of treated CSG water, blended or otherwise.

- BE3 The holder of this environmental authority must notify the administering authority the commencement date of the trial at least seven (7) days prior to its commencement.
- BE4 The injection trial is limited to a period of 180 days of injection, followed by a six-month recovery period.
- BE5 Injection must cease immediately upon becoming aware that environmental harm is caused or threatened to be caused as a result of the injection activities.

Well Integrity

- BE6 The construction of the Tipton-193 injection well must be carried out in accordance with the well construction requirements described in the most recent version of the Department of Environment and Heritage Protection's "CSG Water Injection Well Construction Requirements", as amended from time to time.
- BE7 The Tipton-193 injection well must be mechanically functional such that there is no significant fluid movement into a water resource aquifer through vertical channels adjacent to the well bore hole.
- BE8 The construction, operation and maintenance of the injection well specified in Schedule BE, Table 1 – Details of Authorised Fluid Injection must be undertaken in a way that prevents and/or minimises impacts to the environmental values of the target formation and ensures the integrity of the bore.
- BE9 The injection pressure must not exceed 90 percent of the formation fracture pressure

Injection Fluid Quality

BE10 The quality of the fluid being injected into the injection well specified in Schedule BE, Table 1 – Details of Authorised Fluid Injection must comply with the contaminant limits prescribed in Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid.

Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid

Quality Characteristics	Release Limits	Limit Type
pH (pH units)	Minimum 6.5, Maximum 10	Range
Total Dissolved Solids (TDS) ²	Mean TDS of injection fluid must not exceed median TDS of formation water measured in background water quality monitoring well	Maximum
Dissolved Oxygen	500 µg/L	Maximum
Total suspended solids	25 mg/L	Maximum

²: Electrical conductivity is an acceptable proxy measurement for measuring TDS of the injection fluid. If used, the conversion from EC to TDS must be stated and confirmed with laboratory monitoring results.

BE11 The quality of the fluid being injected into the injection well specified in Schedule BE, Table 1 – Details of Authorised Fluid Injection must be monitored at the frequency specified in Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid.

Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid

Monitoring parameter	Unit	Monitoring frequency during injection
Temperature of target formation	°C	N/A
Injection fluid temperature	°C	Continuous
Inlet pressure	KPa	Continuous
Fluid flow rate	L/sec	Continuous
	ML/day	Daily
Dissolved Oxygen (DO)	µg/L	Daily
Electrical Conductivity	µS/cm	Daily
pH	pH units	Daily
Turbidity	NTU	Daily
Sodium	mg/L	Weekly
Potassium	mg/L	Weekly
Calcium	mg/L	Weekly
Magnesium	mg/L	Weekly
Chloride	mg/L	Weekly
Sulphate as SO ₄	mg/L	Weekly
Carbonate / Bicarbonate	mg/L	Weekly
Bromine	mg/L	Monthly
Fluoride	mg/L	Monthly
Iodide	mg/L	Weekly
Silica	mg/L	Monthly
Iodine	mg/L	Monthly
Nitrate	mg/L	Monthly
Total organic carbon	mg/L	Weekly
Total Dissolved Solids	mg/L	Weekly
Redox Potential	mV	Weekly
Total Hardness as CaCO ₃	mg/L	Weekly

Total Alkalinity as CaCO ₃	mg/L	Weekly
Hydroxide alkalinity as CaCO ₃	mg/L	Weekly
Carbonate Alkalinity as CaCO ₃	mg/L	Weekly
Bicarbonate Alkalinity as CaCO ₃	mg/L	Weekly
Total suspended solids	mg/L	Weekly
Bromide	mg/L	Weekly
Aluminium	mg/L	Monthly
Arsenic	mg/L	Monthly
Barium	mg/L	Monthly
Boron	mg/L	Monthly
Copper	mg/L	Monthly
Iron	mg/L	Monthly
Manganese	mg/L	Monthly
Mercury	mg/L	Monthly
Nickel	mg/L	Monthly
Strontium	mg/L	Monthly
Zinc	mg/L	Monthly
Total Petroleum Hydrocarbons	µg/L	Monthly
BTEX	µg/L	Monthly

- BE12 Notwithstanding Conditions (BE9) and (BE10), the injection of treated CSG water into the injection well specified in Schedule BE, Table 1 – Details of Authorised Fluid Injection must have considered the recommendations for water blending described in the following documents, where appropriate:
- (a) Surat Gas Project – Geochemical Blending and Compatibility Study: Tipton Injection Trials, March 2013; and
 - (b) Surat Gas Project – Geochemical Blending and Compatibility Study: Tipton Injection Trials – Phase 2, March 2013.

- BE13 The holder of this environmental authority must provide for non-chemical disinfection of injection fluid if results of six-monthly testing of injected fluid show levels of coliform bacteria, sulphate reducing bacteria or iron fixing bacteria that has potential to cause adverse impacts on the groundwater within the target formation.

Injection Management Plan

- BE14 An Injection Management Plan which has been certified by a suitably qualified person must be developed and implemented prior to the carrying out of the trial fluid injection activity(ies).
- BE15 The Injection Management Plan must include but not necessarily be limited to:
- (a) estimated volumes and rates of water to be injected;
 - (b) a description of the physical, chemical and biological components and their concentrations of the water to be produced;
 - (c) details of how and where the fluid will be produced, aggregated, stored and kept separate from other waters until it is treated and injected;
 - (d) details of where the fluid is proposed to be treated including a description of the treatment process;
 - (e) a water quality compatibility assessment which demonstrates that the injection fluid has inconsequential reactivity with the target formation and native groundwater it will come into contact with;
 - (f) the regional characteristics of the receiving environment;
 - (g) identification of the water quality impact zone and the hydraulic impact zone;

- (h) identification of any fluid injection well, all existing bores, springs, lakes, wetlands, environmental assets and watercourses connected to groundwater, faults and other geologic features that occur within the water quality impact zone and the hydraulic impact zone;
- (i) identification of the environmental values and water quality objectives of the potential water quality impact zone of the target formation in accordance with the Environmental Protection (Water) Policy 2009 and the Queensland Water Quality Guidelines 2009;
- (j) an assessment of the potential for migration of injection fluid or native groundwater out of the target formation through wells, bores, springs, connected watercourses, faults or other geologic features likely to impact on other aquifers;
- (k) a risk assessment identifying potential hazards, their inherent risk, preventative measures for the management of potential hazards and details on sampling and analysis methods to verify preventative measures of potential hazards, including frequency and locations and quality assurance and control;
- (l) control measures that will be implemented for fluid storage, treatment and injection to prevent or control the release of a contaminant or waste to the environment other than the release authorised in Schedule BE, Table 1 – Details of Authorised Fluid Injection and Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid;
- (m) verification methods to assess performance of the injection activities;
- (n) the indicators or other criteria against which the performance of fluid injection will be assessed;
- (o) procedures that will be adopted to regularly review the monitoring program;
- (p) reporting procedures to management and the administering authority should unforeseen or non-compliant monitoring results be recorded; and
- (q) procedures that will be implemented to prevent unauthorised environmental harm from unforeseen or non-compliant monitoring results.

Receiving Environment Monitoring Program – Injection Activities

- BE16 A Receiving Environment Monitoring Program (REMP) for Injection Activities which has been certified by a suitably qualified person must be developed and implemented to monitor, identify and describe any adverse impacts to the following values of the target formation due to the injection of treated CSG water:
- (a) hydraulic response;
 - (b) water quality response; and
 - (c) any other groundwater environmental values identified.
- BE17 The REMP for Injection Activities required by Condition (BE16) must be developed and implemented prior to the carrying out of the trial fluid injection activity(ies).
- BE18 The REMP for Injection Activities required by Condition (BE16) must include, but not necessarily be limited to:
- (a) methods to validate the assumptions, predicted impacts and the effectiveness of the proposed preventative measures associated with the modelled water quality impact zone and hydraulic impact zone;
 - (b) monitoring of the hydraulic response to the trial injection at the well(s) referred to in Condition (BE18)(f)(ii);
 - (c) monitoring of the water quality of the injection fluid during injection for the parameters listed in Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid;
 - (d) monitoring of the water quality response following the completion of the injection trial recovery period through sampling of the target aquifer, within the water quality impact zone, for the parameters listed in Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid;

- (e) a definition of the background water quality of the Precipice Sandstone to be used for monitoring compliance with Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid and for reporting in the Injection Trial Report required by Condition (BE19);
- (f) the installation and use of a minimum of two wells:
 - (i) one of which accesses the target aquifer within the water quality impact zone; and
 - (ii) the other of which is placed at an adequate distance to determine the extent of the hydraulic response to the injection;
- (g) methods for the analysis and interpretation and a description of the statistical basis on which conclusions will be drawn to verify the assumptions of the injection proposal; and
- (h) a demonstration of how the REMP will validate assumptions, predicted impacts and the effectiveness of quality assurance and control measures.

Reporting Requirements for Fluid Injection Trials

- BE19 Upon completion and within two (2) months of the completion of the injection trial's recovery period the holder of the authority must submit to the administering authority an Injection Trial Report prepared by a suitably qualified person.
- BE20 The Injection Trial Report must include, but not necessarily be limited to:
- (a) details of the injection well including but not limited to:
 - (i) location details (GDA94);
 - (ii) the inferred lithology ³;
 - (iii) casing details including type, outer diameter (mm), wall thickness (mm) and locations (depth from and to in metres);
 - (iv) cementing details including type, hole diameter (mm), casing outer diameter (mm) and locations (depth from and to in metres);
 - (v) calculated target formation fracture pressure; and
 - (vi) target formation pressure prior to injection;
 - (b) a detailed interpretation of the logs and other tests conducted during drilling and construction or refurbishment of the well against their specific objectives;
 - (c) a completed well schematic diagram;
 - (d) a temperature survey;
 - (e) a cement integrity log;
 - (f) outcomes of the injection trial including, but not limited to:
 - (i) well head injection rates versus formation pressure;
 - (ii) target formation pressure within the hydraulic impact zone during and upon completion of the trial;
 - (iii) hydraulic gradient of the target formation within the hydraulic impact zone upon completion of the trial;
 - (iv) the effectiveness of aquitards (including the stability of the aquitard) and aquicludes of confining the injected fluid within the target formation; and
 - (v) a detailed interpretation of the logs and other tests conducted during the injection trial against their specific objectives;
 - (vi) validation of conceptual framework for injection; and
 - (vii) additional hazards that were not identified earlier;
 - (g) the results of the REMP for Injection Activities;
 - (h) analysis of monitoring and operational data in terms of:
 - (i) validation of conceptual framework for injection; and
 - (ii) additional hazards that were not identified earlier;
 - (i) a revised risk analysis that identifies all potential hazards, likelihood of various risk elements and associated consequences;

(j) a revised water quality compatibility assessment which demonstrates that the injection fluid has inconsequential reactivity with the target formation and native groundwater it will come into contact with;

(k) a re-evaluation of the hydraulic impact zone; and

(l) a re-evaluation of the water quality impact zone.

³:Inferred lithology means the best available description of the lithology based upon historical drilling records, interpretation of logs and any other information that the suitably qualified person may have discovered.

BE21 Injection Cessation Report

Following completion of the injection trial, a fluid injection cessation report which has been certified by a suitably qualified person must be submitted to the administering authority within two (2) months of completion of the injection trial's recovery period.

BE22 The fluid injection cessation report must include, but not necessarily be limited to:

(a) volumes of fluid injected at each well;

(b) a risk assessment statement providing details on identified hazards including their inherent risk, summary of the results from the verification monitoring, preventative measures and the residual risk; and

(c) a monitoring report outlining the methods and results of verification monitoring undertaken to assess the performance of the injection activities and preventative measures for identified hazards.

SCHEDULE C - REGULATED DAMS

Assessment of consequence category

C1 The consequence category of any structure must be assessed by a suitably qualified and experienced person in accordance with the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635) at the following times:

(a) prior to the design and construction of the structure, if it is not an existing structure; or

(b) if it is an existing structure, prior to the adoption of this schedule; or

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

C2 A consequence assessment report and certification must be prepared for each structure assessed and the report may include a consequence assessment for more than one structure.

C3 Certification must be provided by the suitably qualified and experienced person who undertook the assessment, in the form set out in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635).

Design and construction of a regulated structure

C4 Conditions (C5) to (C9) inclusive do not apply to existing structures.

C5 All regulated structures must be designed by, and constructed under the supervision of, a suitably qualified and experienced person in accordance with the requirements of the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635).

- C6 Construction of a regulated structure is prohibited unless the holder has submitted a consequence category assessment report and certification to the administering authority has been certified by a suitably qualified and experienced person for the design and design plan and the associated operating procedures in compliance with the relevant condition of this authority.
- C7 Certification must be provided by the suitably qualified and experienced person who oversees the preparation of the design plan in the form set out in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635), and must be recorded in the Regulated Dams/Levees register.
- C8 Regulated structures must:
- (a) be designed and constructed in accordance with and conform to the requirements of the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635);
 - (b) be designed and constructed with due consideration given to ensuring that the design integrity would not be compromised on account of:
 - (i) floodwaters from entering the regulated dam from any watercourse or drainage line; and
 - (ii) wall failure due to erosion by floodwaters arising from any watercourse or drainage line.
 - (c) have the floor and sides of the dam designed and constructed to prevent or minimise the passage of the wetting front and any entrained contaminants through either the floor or sides of the dam during the operational life of the dam and for any period of decommissioning and rehabilitation of the dam.
- C9 Certification by the suitably qualified and experienced person who supervises the construction must be submitted to the administering authority on the completion of construction of the regulated structure, and state that:
- (a) the 'as constructed' drawings and specifications meet the original intent of the design plan for that regulated structure;
 - (b) construction of the regulated structure is in accordance with the design plan.

Operation of a regulated structure

- C10 Operation of a regulated structure, except for an existing structure, is prohibited unless: the holder has submitted to the administering authority:
- (i) one paper copy and one electronic copy of the design plan and certification of the 'design plan' in accordance with condition (C6), and
 - (ii) a set of 'as constructed' drawings and specifications, and
 - (iii) certification of those 'as constructed drawings and specifications' in accordance with condition (C9), and
 - (iv) where the regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the DSA volume across the system, a copy of the certified system design plan.
 - (v) the requirements of this authority relating to the construction of the regulated structure have been met;
 - (vi) the holder has entered the details required under this authority, into a Register of Regulated Dams; and
 - (vii) there is a current operational plan for the regulated structures
- C11 For existing structures that are regulated structures:

- (a) where the existing structure that is a regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the DSA volume across the system, the holder must submit to the administering authority within twelve (12) months of the commencement of this condition a copy of the certified system design plan including that structure; and
- (b) There must be a current operational plan for the existing structures.

C12 Each regulated structure must be maintained and operated, for the duration of its operational life until decommissioned and rehabilitated, in a manner that is consistent with the current operational plan and, if applicable, the current design plan and associated certified 'as constructed' drawings.

Mandatory reporting level

C13 Conditions (C14) to (C17) inclusive only apply to Regulated Structures which have not been certified as low consequence category for 'failure to contain – overtopping'.

C14 The Mandatory Reporting Level (the MRL) must be marked on a regulated dam in such a way that during routine inspections of that dam, it is clearly observable.

C15 The holder must, as soon as practical and within forty-eight (48) hours of becoming aware, notify the administering authority when the level of the contents of a regulated dam reaches the MRL.

C16 The holder must, immediately on becoming aware that the MRL has been reached, act to prevent the occurrence of any unauthorised discharge from the regulated dam.

C17 The holder must record any changes to the MRL in the Register of Regulated Structures.

Design storage allowance

C18 The holder must assess the performance of each regulated dam or linked containment system over the preceding November to May period based on actual observations of the available storage in each regulated dam or linked containment system taken prior to 1 July of each year.

C19 By 1 November of each year, storage capacity must be available in each regulated dam (or network of linked containment systems with a shared DSA volume), to meet the Design Storage Allowance (DSA) volume for the dam (or network of linked containment systems).

C20 The holder must, as soon as possible and within forty-eight (48) hours of becoming aware that the regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, notify the administering authority.

C21 The holder must, immediately on becoming aware that a regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, act to prevent the occurrence of any unauthorised discharge from the regulated dam or linked containment systems.

Annual inspection report

- C22 Each regulated structure must be inspected each calendar year by a suitably qualified and experienced person.
- C23 At each annual inspection, the condition and adequacy of all components of the regulated structure must be assessed and a suitably qualified and experienced person must prepare an annual inspection report containing details of the assessment and include recommended actions to ensure the integrity of the regulated structure.
- C24 The suitably qualified and experienced person who prepared the annual inspection report must certify the report in accordance with the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635).
- C25 The holder must:
(a) Within 20 business days of receipt of the annual inspection report, provide to the administering authority:
(i) The recommendations section of the annual inspection report; and
(ii) If applicable, any actions being taken in response to those recommendations; and
(b) If, following receipt of the recommendations and (if applicable) actions, the administering authority requests a full copy of the annual inspection report from the holder, provide this to the administering authority within 10 business days of receipt of the request.

Transfer arrangements

- C26 The holder must provide a copy of any reports, documentation and certifications prepared under this authority, including but not limited to any Register of Regulated Structures, consequence assessment, design plan and other supporting documentation, to a new holder on transfer of this authority.

Register of regulated dams

- C27 A Register of Regulated Dams must be established and maintained by the holder for each regulated dam.
- C28 The holder must provisionally enter the required information in the Register of Regulated Dams when a design plan for a regulated dam is submitted to the administering authority.
- C29 The holder must make a final entry of the required information in the Register of Regulated Dams once compliance with condition (C10) and (C11) has been achieved.
- C30 The holder must ensure that the information contained in the Register of Regulated Dams is current and complete on any given day.
- C31 All entries in the Register of Regulated Dams must be approved by the chief executive officer for the holder of this authority, or their delegate, as being accurate and correct.

C32 The holder must, at the same time as providing the annual return, supply to the administering authority a copy of the records contained in the Register of Regulated Dams, in the electronic format required by the administering authority.

Transitional arrangements

C33 All existing structures that have not been assessed in accordance with either the Manual or the former Manual for Assessing Hazard Categories and Hydraulic Performance of Dams must be assessed and certified in accordance with the Manual within 6 months of amendment of the authority adopting this schedule.

C34 All existing structures must subsequently comply with the timetable for any further assessments in accordance with the Manual specified in Table 1 (Transitional requirements for existing structures), depending on the consequence category for each existing structure assessed in the most recent previous certification for that structure.

C35 Table 1 ceases to apply for a structure once any of the following events has occurred:
 (a) it has been brought into compliance with the hydraulic performance criteria applicable to the structure under the Manual; or
 (b) it has been decommissioned; or
 (c) it has been certified as no longer being assessed as a regulated structure.

C36 Certification of the transitional assessment required by C35 and C36 (as applicable) must be provided to the administering authority within six (6) months of amendment of the authority adopting this schedule.

Schedule C, Table 1 - Transitional hydraulic performance requirements for existing structures

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

>70% - ≤90%	Within 7 years, unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	Within 10 years, unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	No transitional conditions apply. Review consequence assessment every 7 years.
>50 - ≤70 percent	Within 5 years, unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	Within 7 years, unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	Review consequence assessment every 7 years.
≤50%	Within 5 years or as per compliance requirements (e.g. TEP timing)	Within 5 years or as per compliance requirements (e.g. TEP timing)	Review consequence assessment every 5 years.

SCHEDULE D - LAND

General

- D1 Contaminants that will or may cause environmental harm must not be directly or indirectly released to land except as permitted under this environmental authority.

Disturbance to Land – General

- D2 Prior to conducting petroleum activities that involve significant disturbance to land, an assessment must be undertaken of the condition, type and ecological value of any vegetation in such areas where the activity is proposed to take place.
- D3 The assessment required by Condition (D2) must be undertaken by a suitably qualified person and include the carrying out of field validation surveys, observations and mapping of any Category A, B or C Environmentally Sensitive Areas (ESA's) and the presence of species classed as endangered, vulnerable, rare or near threatened under the Nature Conservation Act 1992 and for petroleum activities that commenced after 8 March 2013, areas containing State significant biodiversity values.
- D4 If the assessment required by Conditions (D2) and (D3) indicates that a regional ecosystem (RE) mapped as 'Endangered' or 'Of Concern' by the Queensland Herbarium should be in a lower conservation value classification and the holder of this environmental authority wishes to undertake activities as if the ecosystem is of the lower conservation value they must notify the administering authority in writing before any significant disturbance to land takes place.
- D5 The holder of this environmental authority, when carrying out petroleum activities must:
(a) avoid, minimise or mitigate (in order of preference) any impacts on areas of vegetation or other areas of ecological value;

- (b) minimise disturbance to land that may otherwise result in land degradation;
- (c) ensure that for land that is to be significantly disturbed by petroleum activities:
 - (i) the top layer of the soil profile is removed;
 - (ii) stockpiled in a manner that will preserve its biological and chemical properties; and
 - (iii) used for rehabilitation purposes (in accordance with Condition (H4));
- (d) avoid clearing mature trees; and
- (e) prior to carrying out field based activities, make all relevant staff, contractors or agents carrying out those activities, aware of the location of any category A, B or C ESA's and the requirements of this environmental authority.

Note: This environmental authority does not authorise the taking of protected animals or the tampering with an animal breeding place as defined under the Nature Conservation Act 1992 and Regulations.

- D6 In accordance with Condition (D5), if significant disturbance to land is unavoidable, the holder of this environmental authority must not clear vegetation or place fill:
- (a) in a way which significantly isolates, fragments or dissects tracts of vegetation resulting in a reduction in the current level of ecosystem functioning, ecological connectivity (i.e. stepping stone or contiguous bioregional/local corridor networks) and/or results in an increase in threatening processes (e.g. potential impacts associated with edge effects or introduced species);
 - (b) on slopes greater than 10% for activities other than pipelines and wells; or
 - (c) in discharge areas.
- D7 Clearing of remnant vegetation shall not exceed ten (10) metres in width for the purpose of establishing tracks and 20 metres in width for dual carriageway roads unless otherwise authorised by a condition of this EA.
- D8 Cleared vegetation must be stockpiled in a manner that facilitates respreading or salvaging and does not impede vehicle, stock or wildlife movements.

Disturbance to Land – Environmentally Sensitive Areas

- D9 The holder of this environmental authority must ensure that petroleum activities, except as otherwise authorised by Condition (D17), (D18), (D19), (D20) and (D21) of this environmental authority:
- (a) are not conducted in any category A, B or C Environmentally Sensitive Areas (ESAs);
 - (b) are not conducted within 200m of any category A, B or C ESAs; and
 - (c) do not involve activities other than limited petroleum activities within the protection zone of a category A ESA (i.e. from 200m to 1km of the category A ESA), or within the protection zone of a category B or C ESA (i.e. from 200m to 500m of the category B or C ESA).
- Note: Indicative ESA mapping is available on the Department of Environment and Heritage Protection's website at http://www.ehp.qld.gov.au/licences-permits/maps_of_environmentally_sensitive_areas.php
- D10 Limited petroleum activities carried out in accordance with Condition (D9)(c) must be preferentially located in pre-existing areas of clearing or significant disturbance to the greatest practicable extent and avoid the clearing of mature trees.
- D11 Despite Condition (D10), limited petroleum activities may be undertaken within 200m of, or in the following specified Category B and C ESAs:
- (a) 'Endangered' regional ecosystems;
 - (b) 'Of Concern' regional ecosystems;
 - (c) State Forests;
 - (d) Timber Reserves

provided that they do not overlap with any other Category A, B or C ESA or its associated protection zone.

- D12 Where limited petroleum activities are proposed to be undertaken within 200m of, or in the Category B and C ESAs specified in Condition (D11), the holder of this environmental authority must:
- (a) be able to demonstrate that no reasonable or practicable alternative exists; and
 - (b) where the ESA is a State Forest or Timber Reserve:
 - (i) obtain written approval from the authority responsible for the administration of the Forestry Act 1959;
 - (ii) comply with all restrictions and conditions contained within the approval required under Condition (D12)(b)(i);
 - (iii) where the conditions of the approval required under Condition (D12)(b)(i) conflict with the conditions of this environmental authority, comply with the conditions of this environmental authority; and
 - (iv) provide a copy of the written approval required under Condition (D12)(b)(i) to the administering authority upon request.
- D13 Where limited petroleum activities are undertaken within 200m of, or in the Category B or C ESAs specified in Condition (D11), disturbance to land must only be located and carried out in areas according to the following order of preference:
- (a) pre-existing cleared areas or significantly disturbed areas less than 200m from a Category C ESA;
 - (b) pre-existing cleared areas or significantly disturbed areas less than 200m from a Category B ESA;
 - (c) undisturbed areas less than 200m from a Category C ESA;
 - (d) undisturbed areas less than 200m from a Category B ESA;
 - (e) pre-existing areas of significant disturbance within a Category C ESA (e.g. areas where significant clearing or thinning has been undertaken within a RE, and/or areas containing high densities of weed or pest species which has inhibited re-colonisation of native regrowth);
 - (f) pre-existing areas of significant disturbance within a Category B ESA (e.g. areas where significant clearing or thinning has been undertaken within a RE, and/or areas containing high densities of weed or pest species which has inhibited re-colonisation of native regrowth);
 - (g) areas where clearing of a Category C ESA is unavoidable; and
 - (h) areas where clearing of a Category B ESA is unavoidable.
- D14 Notwithstanding Conditions (D11) to (D13), where limited petroleum activities are proposed to be undertaken within 200m of, or in a Category B or C ESAs specified in Condition (D11), any vegetation clearing must not exceed any of the following areas:
- (a) if the disturbance relates to an Endangered or Of Concern RE, 10% of the remnant unit of Endangered or Of Concern RE as ground truthed and mapped before any activity commences as per Condition (D2) and (D3) of this environmental authority for the life of the project; and
 - (b) more than 30m² for the construction of a sump; or
 - (c) Described in Schedule D Table 1 - Authorised vegetation clearing widths for linear infrastructure in ESAs and ESA buffers.

Schedule D Table 1 - Authorised vegetation clearing widths for linear infrastructure in ESAs and ESA buffers

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

- D15 For each well site within 200m of, or in a Category B or C ESA specified in Condition (D11), all reasonable and practical measures are taken to minimize the area cleared which must include but not be limited to, for each well site, ranked constraints mapping and a risk assessment which considers safety.
- D16 Details of any significant disturbance to land undertaken within 200m of, or in a Category B or C ESA, along with a record of the assessment required by Conditions (D2) and (D3) must be kept and submitted to the administering authority upon request.
- D17 Despite Condition (D9), the Daandine Brine Dam 2 and associated activities necessary for construction, operation, maintenance and monitoring of the dam, located within the area bound by the coordinates prescribed by Schedule D. Table 1 - Coordinates Enclosing the Disturbance Area for Daandine Brine Dam 2, are permitted within the protection zones of Category C Environmentally Sensitive Areas.

Schedule D. Table 1 - Coordinates Enclosing the Disturbance Area for Daandine Brine Dam 2

Point	Latitude or Northing (GDA94, Zone 56)	Longitude or Easting (GDA94, Zone 56)
1	7001708	297524
2	7001153	297384
3	7001051	298345
4	7001418	298444
5	7001601	298406
6	7001620	298190

D18 Despite Condition (D9), the water release outlet and pipeline and associated activities necessary for construction, operation, maintenance and monitoring for the release of treated CSG water to Wilkie Creek at the specified release point in Schedule B, Table 1 – Treated CSG Water Release Point, Source and Receiving Waters are authorised to occur in a Category B ESA and its associated protection zones.

D19 The construction of the water release outlet and pipeline are located within the area bound by the coordinates prescribed by Schedule D Table 2 - Coordinates Enclosing the Disturbance Area for the Water Release Outlet and Pipeline.

Schedule D Table 2 - Coordinates Enclosing the Disturbance Area for the Water Release Outlet and Pipeline.

Point	Latitude or Northing (GDA94, Zone 56)	Longitude or Easting (GDA94, Zone 56)	Area of disturbance
Valve Pit	6,995,424	302,897	0.18 ha
High Point on Bank	6,995,460	302,991	
Outlet at Creek	6,995,465	303,004	

D20 Despite condition (D9), the Tipton Treated Water Pipeline and associated activities for construction, operation and maintenance, located within the area bound by the coordinates prescribed by Schedule D, Table 3 – Coordinates Enclosing the Disturbance Area for Tipton Treated Water Pipeline, are permitted.

Schedule D, Table 3 - Coordinates Enclosing the Disturbance Area for Tipton Treated Water Pipeline

Point	Longitude or Easting (GDA94 Zone 56)	Latitude or Northing (GDA94 Zone 56)
Section 1	310652.74	6969686.79
	310656.46	6969747.37
	310696.37	6969744.59
	310661.46	6970447.79
	310621.2	6970452.8
	310651.4	6970651.7
	310611.1	6970656.7
	310641.76	6970845.55
	310601.68	6970846.23
	310707.02	6971627.3

	310667.1	6971629.9
	310658.71	6972161.37
	310618.1	6972166.9
	310621.4	6973392.1
	310581.2	6973398.7
	310613.31	6973549.7
	310573.47	6973549.7
	310638.9	6973649.7
	310538.9	6973549.7
	310608.18	6973649.7
	310568.35	6973649.7
	310638.9	6973549.7
	310538.9	6973649.7
Section 2	310617.24	6973719.35
	310576.78	6973723.95
	310722.26	6974060.43
	310681.96	6974065.49
	310716.82	6974171.95
	310676.51	6974177.14
	310714.46	6974220.51
	310674.59	6974216.76
	310692.43	6974377.64
	310653.85	6974364.72
	310692.43	6974377.64
	310567.32	6974520.53
	310616.71	6974514.14
	310563.13	6974528.08
	310612.67	6974521.66
	310498.88	6974536.4
	310593.85	6974610.18
	310497.34	6974636.39
Section 3	310533.76	6974846.47
	310493.94	6974834.72
	310533.6	6974856.85
	310493.52	6974862.31
	310528.48	6975191.65
	310488.41	6975196.69
	310526.05	6975350.54
	310485.78	6975347.13

D21 Despite condition (D9), the activities prescribed in Schedule D, Table 3 – Authorised footprint for disturbance to environmentally sensitive areas, are authorised to be undertaken at the location and within the footprint prescribed in Schedule D, Table 3.

Schedule D, Table 3 – Authorised footprint for disturbance to environmentally sensitive areas

Activity	Easting	Northing	Maximum operational footprint	ESA Type
Longswamp 31 shallow monitoring bore	151.095733°E	-27.343471°S	9 m2	Category A ESA
Tipton 253 gas well	151.13539°E	-27.36818°S	19600 m2	Primary protection zone of Category C ESA

D22 Condition (D21) does not authorise clearing of vegetation and requires that all waste, including residual drilling material, must be removed from the site.

Soil Management

D23 Topsoil must be managed in a manner that preserves its biological and chemical properties.

D24 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.

Acid Sulfate Soils

D25 Acid sulfate soils must be treated and managed in accordance with the latest edition of the Queensland Acid Sulfate Soil Technical Manual.

Fauna Management

D26 Measures to prevent fauna being harmed from entrapment must be implemented during the construction and operation of well infrastructure, dams and pipeline trenches.

Pest management

D27 In carrying out the petroleum activity(ies) the holder of this environmental authority must develop and implement an effective pest management program by 18 October 2011 which has been certified by a suitably qualified person that includes but is not limited to the following:

- (a) identification of pest species and infestation areas;
- (b) prevention and/or minimisation of the introduction and/or spread of pests;
- (c) control and management of pest outbreaks as a result of petroleum activities; and
- (d) details of community consultation in developing the pest management program.

Note: The pest management program required by Condition (D27) should consider the "Petroleum Industry (including coal seam methane gas) Minimising Pest Spread Guidelines" dated June 2008, or subsequent versions thereof. This

document is available for download from: http://www.dpi.qld.gov.au/documents/Biosecurity_EnvironmentalPests/IPA-Minimising-Pest-Spread-Advisory-Guidelines.pdf

- D28 A copy of the pest management procedures must be made available to any potentially affected landholders upon request.
- D29 Chemical and Fuel Storage
Chemicals and fuels stored, must be effectively contained and where relevant, meet Australian Standards, where such a standard is applicable.

Pipelines

- D30 Pipelines must be preferentially located alongside existing linear infrastructure such as roads, tracks and powerlines.
- D31 Pipeline trenches must only be left open for the minimum time practicable.
- D32 The length of pipeline trench open at any one time must be minimised as far as practicable.
- D33 Completed pipeline construction areas must be:
(a) a stable landform with no subsidence or erosion gullies for at least five (5) years;
(b) be re-profiled to original contours and established drainage lines;
(c) be visually consistent with the surround land features; and
(d) be reinstated to the pre-disturbed land use and soil suitability class.
- D34 The holder of this environmental authority must monitor reinstated pipeline corridors for subsidence at least every 20 business days for the first 120 business days after reinstatement to ensure compliance with Condition (D33).
- D35 Impacts to State Significant Biodiversity Values
Impacts to State significant biodiversity values are not authorised, except as permitted by conditions (D36) and (D37).
- D36 Impacts to State significant biodiversity values can only occur if an offset is available that meets the relevant offset rules for that State significant biodiversity value.
- D37 The offset required by (D36) must:
(a) for land-based offsets:
(i) meet the relevant offset rules for the State significant biodiversity value being impacted;
(ii) be legally secured within 12 months of the impact occurring; and
(iii) remain in force until the relevant offset objectives have been met;
(b) for offset payments:
(i) meet the relevant offset rules for the State significant biodiversity value being impacted;

- (ii) not be made for a critically limited regional ecosystem or a threshold regional ecosystem; and
- (iii) be made within 4 months of the impact occurring.

- D38 If conditions (D35) to (D37) have been triggered during an annual return period, the annual return must include the following details:
- (a) the type of State significant biodiversity value that was impacted;
 - (b) the date the impact to each State significant biodiversity value commenced;
 - (c) a GIS shape-file that shows the location and spatial extent of the residual impact to the State significant biodiversity value;
 - (d) the type of offset being provided for the State significant biodiversity value;
 - (e) how the offset meets the relevant offset rules;
 - (f) an offset area management plan that demonstrates how the relevant offset objectives will be met; and
 - (g) the date the offset was either legally-secured or the offset payment was made.

SCHEDULE E - ENVIRONMENTAL NUISANCE

- E1 Odour, dust and other airborne contaminants
The release of odour, dust or any other airborne contaminant(s), or light from the petroleum activity(ies) must not cause an environmental nuisance at any sensitive place.
- Noise**
- E2 Prior to undertaking petroleum activities that will result in short-term, medium-term or long term noise events that are likely to impact on a sensitive receptor, the holder of this environmental authority must model or calculate any potential noise emissions from the relevant petroleum activity and determine if noise emissions are likely to exceed the noise levels specified in Schedule E, Table 1 – Noise limits at Sensitive Receptors.
- E3 If noise modelling or the calculations indicates that petroleum activities are likely to exceed the noise levels specified in Schedule E, Table 1 – Noise limits at sensitive receptors, the holder of this environmental authority must prepare a Noise Management Plan prior to undertaking petroleum activities, which demonstrates how the noise limits specified in Schedule E, Table 1 – Noise limits at sensitive receptors will be achieved in the event of a valid noise complaint.
- E4 Despite condition E3, for any petroleum activities existing at the time of issue of this environmental authority, if noise modelling or the calculations indicates that petroleum activities are likely to exceed the noise levels specified in Schedule E, Table 1 – Noise limits at sensitive receptors, the holder of this environmental authority must implement a Noise Management Plan, which demonstrates how the noise limits specified in Schedule E, Table 1 – Noise limits at sensitive receptors will be achieved in the event of a valid noise complaint.
- E5 The Noise Management Plan must address, but not be limited to, the following matters:
- (a) a location based noise assessment to determine compliance with the noise limits in Schedule E, Table 1 – Noise limits at Sensitive Receptors
 - (b) the measured and/or predicted noise level of these noise sources and activities at noise sensitive receptors, taking into account any tonal or impulsive noise impacts;
 - (c) the reasonable and practicable control or abatement measures (including relocating the activity, hours of operation, or having an alternate arrangement in place with any potentially affected person) that can be undertaken to reduce identified intrusive noise sources;

- (d) the level of noise at noise sensitive receptors that would be achieved from implementing these measures;
- (e) the handling of future noise complaints;
- (f) community liaison and consultation including but not limited consultation processes for when night time activities (i.e. between 10:00 pm and 6:00 am) are likely to exceed 25dBA; and
- (g) training of staff and contractors in best available noise management practices.

E6 The emission of noise from the licensed place must not result in levels greater than those specified in Schedule E, Table 1 – Noise limits at Sensitive Receptors in the event of a valid complaint about noise being made to the administering authority.

Schedule E, Table 1 – Noise Limits at Sensitive Receptors

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
	Max $L_{pA, 15\ mins}$	55 dBA	51 dBA	45 dBA
6:00pm – 10:00pm	$L_{Aeq,adj,15\ min}$	40 dBA	38 dBA	35 dBA
	Max $L_{pA, 15\ mins}$	50 dBA	46 dBA	40 dBA
10:00pm – 6:00am	$L_{Aeq,adj,15\ min}$	28 dBA	28 dBA	28 dBA
	Max $L_{pA, 15\ mins}$	38 dBA	36 dBA	33 dBA
6:00am – 7:00am	$L_{Aeq,adj,15\ min}$	40 dBA	38 dBA	35 dBA
	Max $L_{pA, 15\ mins}$	50 dBA	46 dBA	40 dBA

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

Deemed background noise levels (LABG) for Schedule E, Table 1 – Noise Limits at Sensitive Receptors are:

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

6:00 pm – 10:00 pm: 30 dBA

10:00 pm – 6:00 am: 25 dBA

6:00 am – 7:00 am: 30 dBA

E7 If the noise subject to a complaint is tonal or impulsive, the adjustments detailed in Schedule E, Table 2 – Adjustments to be Added to Noise Levels at Sensitive Receptors are to be added to the measured noise level(s) to derive $L_{Aeq, adj, 15\ min}$.

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

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

E8 Where alternative arrangements are in place with any affected person as referred to by Condition (E5)(c), the noise limits in Schedule E, Table 1 – Noise limits at Sensitive Receptors do not apply at that location for the duration for which the alternative arrangements are in place.

E9 Tipton Expansion Project

Within 3 months of commissioning of the units listed in Schedule E, Table 3 – Tipton Expansion Project units, the holder of this environmental authority must, if noise modelling or the calculations indicates that petroleum activities are likely to exceed the noise levels specified in Schedule E, Table 1 – Noise limits at sensitive receptors, take action to comply with the noise levels by undertaking one or more of the following:

- a) Implement noise mitigation measures that will achieve compliance with the noise levels specified in Schedule E, Table 1 – Noise limits at sensitive receptors;
- b) Enter into an alternative arrangement.

Schedule E, Table 3 - Tipton Expansion Project units

Resource Authority	Field	Facility	Unit Description
PL 198	Tipton	TW CGPF	K-0007 Compressor 7
PL 198	Tipton	TW CGPF	K-0008 Compressor 8
PL 198	Tipton	TW CGPF	K-0009 Compressor 9
PL 198	Tipton	TW CGPF	K-0010 Compressor 10
PL 198	Tipton	TW CGPF	K-0015 Inlet Fuel Gas Compressor Engine
PL 198	Tipton	TWTF	Generator 1
PL 198	Tipton	TWTF	Generator 2
PL 198	Tipton	TWTF	Generator 3
PL 198	Tipton	TWTF	Generator 4
PL 198	Tipton	TWTF	Generator 5

E10 Within 12 months of commissioning the units listed in Schedule E, Table 3 – Tipton Expansion Project units, the EA holder must, conduct noise monitoring under worst case noise propagation conditions to validate the pre-commissioning noise predictions at sensitive receptors.

E11 The holder of this environmental authority must provide the administering authority with a report of the monitoring results required under condition (E10) that evaluates the accuracy of the pre-commissioning model predictions at sensitive receptors.

Low Frequency Noise

E12 Notwithstanding Condition (E2), emission of any noise below 315 Hz must not cause an environmental nuisance.

E13 Low frequency noise from the petroleum activities is not considered to be an environmental nuisance under Condition (E9) if monitoring shows that noise emissions do not exceed the following limits:
 (a) 50 dB(Z) measured inside the sensitive receptor; and
 (b) the difference between the internal A-weighted and Z-weighted noise levels is no greater than 15 dB.

Vibration and Blasting Activities

E14 The holder of this environmental authority must develop a blast management plan in accordance with Australian Standard 2187 for each planned blasting activity before it is undertaken.

- E15 The blast management plan required by Condition (E11) must include measures to minimise the likelihood of any adverse effects being caused by airblast overpressure and/or ground borne vibrations at any sensitive receptor and demonstrate current best practice environmental management.
- E16 All blasting must be carried out in a proper manner by a suitably qualified person.
- E17 All blasting must be carried out in accordance with the Blast Management Plan.
- E18 Noise from blasting operations must not exceed an airblast overpressure level, when measured at or extrapolated to any sensitive receptor, of 115 dB (linear peak) for nine (9) out of any ten (10) consecutive blasts initiated nor 120 dB (linear peak) at any time.
- E19 Ground-borne vibration peak particle velocity caused by blasting operations, when measured at or extrapolated to any sensitive receptor must not exceed more than 5 mm per second for nine (9) out of any ten (10) consecutive blasts initiated, or 10 mm per second at any time.

SCHEDULE F - AIR

Venting and flaring

- F1 Unless venting is authorised under the Petroleum and Gas (Production and Safety) Act 2004 or the Petroleum Act 1923, waste gas must be flared in a manner that complies with all of (F1(a)) and (F1(b)) and (F1(c)), or with (F1(d)):
- (a) an automatic ignition system is used, and
 - (b) a flame is visible at all times while the waste gas is being flared, and
 - (c) there are no visible smoke emissions other than for a total period of no more than 5 minutes in any 2 hours, or
 - (d) it uses an enclosed flare.

Fuel Burning or Combustion Equipment

- F2 The only type of fuel to be burned in fuel burning or combustion equipment under normal operating conditions is coal seam gas.
- F3 Contaminant releases to air emitted from fuel burning and combustion equipment point sources that are capable of burning at least 500 kg in an hour must be directed vertically upwards without any impedence or hindrance.
- F4 The holder of this environmental authority must maintain a register of fuel burning and combustion equipment that is capable of burning at least 500 kg of fuel in an hour that must include, as a minimum, the following information for each piece of equipment:
- (a) fuel burning or combustion equipment name and location;
 - (b) stack emission height (metres);
 - (c) minimum efflux velocity (m/s);
 - (d) mass emission rates (g/s); and
 - (e) contaminant concentrations (mg/Nm³ at x % O₂ dry gas at 0° Celsius and 1 atmosphere).

- F5 The holder of this environmental authority must ensure that the information contained in the register of fuel burning and combustion equipment is always current and complete.
- F6 All entries in the register of fuel burning and combustion equipment must be certified by the chief executive officer for the tenure holder, or their delegate, as being accurate and correct.

Fuel Burning or Combustion Equipment Located Outside Hubs or Populated Areas

- F7 Prior to the installation and operation of any new fuel burning or combustion equipment, that is capable of burning at least 500 kg of fuel in an hour, the holder of this environmental authority must conduct air dispersion modelling to calculate the ground level concentrations of emissions from all existing and proposed fuel burning or combustion equipment under maximum operating conditions (including other industry) within the ambient airshed and identify any potential impacts to air quality within the study area.
- F8 The holder of this environmental authority must ensure that the calculated ground level concentrations required under Condition (F7) do not exceed the criteria for each air contaminant at sensitive receptors in *Schedule F, Table 1 – Maximum Ground Level Concentration Criteria.Schedule*

Schedule F, Table 1 – Maximum Ground Level Concentration Criteria

Contaminant	Concentration at 0 degree Celsius	Units	Averaging time	Relevant Sensitive Receptors
Nitrogen Dioxide	250	µg/m ³	1 hour	Human Health
Nitrogen Dioxide	62	µg /m ³	1 year	Human Health
Nitrogen Dioxide	33	µg /m ³	1 year	Ecosystems
Carbon Monoxide	11	mg/m ³	8 hour	Human Health

- F9 The holder of this environmental authority must undertake emissions testing within 3 months post commissioning of any fuel burning and combustion equipment capable of burning at least 500 kg of fuel in an hour to verify the estimates used in the air dispersion modelling.
- F10 Where the results of the emissions testing required under Condition (F9) indicate that the emission estimates used in the air dispersion modelling required under Condition (F7) are exceeded, the holder of this environmental authority must:
- (a) provide details to the administering authority within 10 business days;
 - (b) re-undertake the modelling based on the new information; and
 - (c) determine and implement appropriate pollution control measures to bring the emissions into compliance with the limits specified in Schedule F, Table 1 – Maximum Ground Level Concentration Criteria

Fuel Burning and Combustion Equipment in Hubs and / or Places within 5 km of Populated Areas

F11

Fuel burning or combustion equipment that is capable of burning at least 500 kg of fuel in an hour must not be located in hubs or in places within 5km of a populated area unless it is specified in Schedule F, Table 2 – Release of Contaminants to Air.

- F12 Fuel burning or combustion equipment located in hubs or in places within 5km of a populated area, that is capable of burning at least 500 kg of fuel in an hour, must only release contaminants to the atmosphere at a height and an efflux velocity not less than the corresponding height and velocity stated for that release point (RP) as provided for in Schedule F, Table 2 - Release of Contaminants to Air.
- F13 Fuel burning or combustion equipment located in hubs or in places within 5km of a populated area, that is capable of burning at least 500 kg of fuel in an hour, must not release contaminants to the atmosphere from a release point at a mass emission rate in excess of that stated in Schedule F, Table 2 - Release of Contaminants to Air.

Schedule F, Table 2 - Releases of Contaminants to Air

Resource Authority	Field	Facility	Release Point No. (EA)	Unit Description	Minimum Release Height (m)	Minimum Efflux Velocity (m/sec)	NOx		CO	
							Maximum Release limit	Release limit type	Maximum Release limit	Release limit type
PL 230	Daandine	DD CGPF	A1	K-0001 Compressor 1	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A2	K-0002 Compressor 2	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A3	K-0003 Compressor 3	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A4	K-0004 Compressor 4	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A5	K-0005 Compressor 5	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A6	K-0006 Compressor 6	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A7	K-0007 Compressor 7	10	30	3.0	g/sec	5.5	g/sec
PL 230	Daandine	DD CGPF	A8	K-9008 Compressor 8	17	17	1.4	g/sec	4.8	g/sec
PL 230	Daandine	DD CGPF	A9	K-9009 Compressor 9	17	17	1.4	g/sec	4.8	g/sec
PL 230	Daandine	DD CGPF	A10	K-9010 Compressor 10	17	17	1.4	g/sec	4.8	g/sec

Resource Authority	Field	Facility	Release Point No. (EA)	Unit Description	Minimum Release Height (m)	Minimum Efflux Velocity (m/sec)	NOx		CO	
							Maximum Release limit	Release limit type	Maximum Release limit	Release limit type
PL 230	Daandine	DD CGPF	A11	K-9011 Inlet Fuel Screw Compressor Engine 11	8.5	30	1.5	g/sec	1.0	g/sec
PL 198	Tipton	TW CGPF	A14	K-0001 Compressor 1	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A15	K-0002 Compressor 2	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A16	K-0003 Compressor 3	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A17	K-0004 Compressor 4	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A18	K-0005 Compressor 5	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A19	K-0006 Compressor 6	7.6	30	6.8	g/sec	5.5	g/sec
PL 198	Tipton	TW CGPF	A20	K-0007 Compressor 7	17	17	1.4	g/sec	4.8	g/sec
PL 198	Tipton	TW CGPF	A21	K-0008 Compressor 8	17	17	1.4	g/sec	4.8	g/sec
PL 198	Tipton	TW CGPF	A22	K-0009 Compressor 9	17	17	1.4	g/sec	4.8	g/sec
PL 198	Tipton	TW CGPF	A23	K-0010 Compressor 10	17	17	1.4	g/sec	4.8	g/sec
PL 198	Tipton	TW CGPF	A24	K-0015 Inlet Fuel Gas Compressor Engine	8.5	38	1.5	g/sec	1.0	g/sec
PL 198	Tipton	T WTF ⁽³⁾	A25	Generator 1	7.5	27	1.5	g/sec	1.5	g/sec
PL 198	Tipton	T WTF ⁽³⁾	A26	Generator 2	7.5	27	1.5	g/sec	1.5	g/sec
PL 198	Tipton	T WTF ⁽³⁾	A27	Generator 3	7.5	27	1.5	g/sec	1.5	g/sec

Resource Authority	Field	Facility	Release Point No. (EA)	Unit Description	Minimum Release Height (m)	Minimum Efflux Velocity (m/sec)	NOx		CO	
							Maximum Release limit	Release limit type	Maximum Release limit	Release limit type
PL 198	Tipton	T WTF ⁽³⁾	A28	Generator 4	7.5	27	1.5	g/sec	1.5	g/sec
PL 198	Tipton	T WTF ⁽³⁾	A29	Generator 5	7.5	27	1.5	g/sec	1.5	g/sec

Note 1: Minimum efflux velocity, maximum mass emission and maximum concentration are calculated at the Maximum Continuous Rating.

Note 2: This table comes into effect on 30 October 2015.

Note 3: With all five generators in operation, the Water Treatment Facility aggregated fuel consumption exceeds the 500 Kg per hour threshold for consideration as a registered fuel burning source (Condition F4).

- F14 The holder of this environmental authority must undertake emissions testing within 3 months of the commissioning of all fuel burning and combustion equipment listed in Schedule F, Table 2 – Release of Contaminants to Air.
- F15 The holder of this environmental authority must undertake air dispersion modelling using the results of the emission testing required under Condition (F14) to verify that emissions will not result in an exceedance of the maximum ground level concentration for each air contaminant listed in Schedule F, Table 1 – Maximum Ground Level Concentration Criteria.
- F16 A report on the results of air emission testing and modelling required by conditions (F14) and (F15) must be provided to the administering authority with the next annual return.

SCHEDULE G - WASTE

General

- G1 All general and regulated waste must be removed from the site and sent to a site that is lawfully able to accept the waste under the Environmental Protection Act 1994 except as permitted under another condition of this environmental authority.
- G2 All regulated waste removed from the site must be undertaken by a person who holds a current authority to transport such waste under the provisions of the Environmental Protection Act 1994.
- G3 Waste must not be burned or allowed to be burned on the licensed site.
- G4 All waste fluids and muds resulting from drilling and exploration activities must be contained in a properly lined dam or containment structure for disposal, remediation or reuse where applicable.

Coal Seam Gas Water Management Plan

- G5 A Coal Seam Gas Water Management Plan that includes but is not necessarily limited to the matters outlined in (a) and (b) must be implemented:
- (a) the matters required by sections 310D (5), 310D (6) and 662 of the Environmental Protection Act 1994; and
 - (b) a management strategy for all integrated coal seam gas water management operations.
- G6 Where any inconsistency exists between the conditions of this environmental authority and the Coal Seam Gas Water Management Plan, the conditions of this environmental authority prevail.

Coal Seam Gas Water Use

- G7 Written approval from the relevant Local Government must be obtained prior to the application of coal seam gas water on any local government controlled roads in accordance with Condition (G9).
- G8 Produced water may be re-used in drilling and well hole activities.
- G9 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.
- G10 Produced water may be used for construction and operation 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
 - (d) Does not harm vegetation surrounding the construction site.
- G11 If there is any indication that any of the circumstances in condition (G8)(b)(i) to (G8)(b)(iv) or (G9)(a) to (G9)(d) is occurring the use must cease immediately and the affected area must be remediated without delay.

Supply of Coal Seam Gas Water to a Third Party

- G12 Coal seam gas water may be transferred to a third party to be used for the following purposes subject to compliance with (G13) and (G14):
- (a) dust suppression if the coal seam gas water quality complies with the limits specified in Schedule G, Table 1 – Water Contaminant Release Limits;
 - (b) construction and operational purposes if the coal seam gas water quality complies with the limits specified in Schedule G, Table 1 – Water Contaminant Release Limits;
 - (c) irrigation and livestock watering purposes;
 - (d) the following industrial purposes:
 - (i) coal washing;
 - (ii) power stations; and
 - (iii) water treatment facilities.

Schedule G, Table 1 – Water Contaminant Release Limits

Water Quality Characteristics	Unit	Limit	Limit Type
pH	pH units	6.0 to 9.0	Range
Sodium Adsorption Ratio	ratio	6	80 th Percentile
		12	Maximum
Total Dissolved Solids	mg/L	1500	Maximum
Total Petroleum Hydrocarbons	mg/L	10	Maximum

- G13 Any coal seam gas water supplied to a third party for irrigation and/or livestock watering purposes in accordance with Condition (G12)(c) must comply with the relevant trigger values contained in ANZECC and ARMCANZ Water Quality Guidelines 2000, or subsequent versions thereof.
- G14 If the responsibility of coal seam gas water is given or transferred to a third party in accordance with Condition (G12), the holder of environmental authority must ensure that:
- (a) the responsibility of the coal seam gas water is given or transferred in accordance with a written agreement (the third party agreement); and
 - (b) the third party is made aware of the General Environmental Duty under section 319 of the Environmental Protection Act 1994.

Residual drilling material

- G15 If sumps are used to store residual drilling material or drilling fluids, they must only be used for the duration of drilling activities.
- G16 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.
- G17 Records must be kept to demonstrate compliance with condition (G15) and (G16).

SCHEDULE H - REHABILITATION

Rehabilitation planning

- H1 A Rehabilitation Plan must be developed by a suitably qualified person and must include the:
- (a) rehabilitation goals; and
 - (b) procedures to be undertaken for rehabilitation that will:
 - i. achieve the requirements of conditions (H2) to (H8), inclusive; and
 - ii. provide for appropriate monitoring and maintenance.

Transitional; rehabilitation

- H2 Significantly disturbed areas that are no longer required for the on-going petroleum activities, must be rehabilitated within 12 months (unless an exceptional circumstance in the area to be rehabilitated (e.g. a flood event) prevents this timeframe being met) and be maintained to meet the following acceptance criteria:
- (a) contaminated land resulting from petroleum activities is remediated and rehabilitated
 - (b) the areas are:
 - (i) non-polluting
 - (ii) a stable landform
 - (iii) re-profiled to contours consistent with the surrounding landform
 - (c) surface drainage lines are re-established
 - (d) top soil is reinstated; and
 - (e) either:
 - (i) groundcover, that is not a declared pest species, is growing; or
 - (ii) an alternative soil stabilisation methodology that achieves effective stabilisation is implemented and maintained.

Final rehabilitation acceptance criteria

- H3 All significantly disturbed areas caused by petroleum activities which are not being or intended to be utilised by the landholder or overlapping tenure holder, must be rehabilitated to meet the following final acceptance criteria measured either against the highest ecological value adjacent land use or the pre-disturbed land use:
- (a) greater than or equal to 70 percent of native ground cover species richness
 - (b) greater than or equal to the total per cent of ground cover
 - (c) less than or equal to the per cent species richness of declared plant pest species; and
 - (d) where the adjacent land use contains, or the pre-clearing land use contained, one or more regional ecosystem(s), then at least one regional ecosystem(s) from the same broad vegetation group, and with the equivalent biodiversity status or a biodiversity status with a higher conservation value as any of the regional ecosystem(s) in either the adjacent land or pre-disturbed land, must be present.

Final rehabilitation acceptance in environmental sensitive area

- 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 must be met:
- (a) greater than or equal to 70 percent 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 percent of organic litter cover
 - (e) greater than or equal to 50 percent of total density of coarse woody material; and
 - (f) all predominant species in the ecologically dominant layer, that define the pre-disturbance regional ecosystem(s) are present.

Continuing conditions

- H5 Conditions (H2), (H3) and (H4) continue to apply after this environmental authority has ended or ceased to have effect.

Remaining dams

- H6 Where there is a dam (including a low consequence dam) that is being or intended to be utilised by the landholder or overlapping tenure holder, the dam must be decommissioned to no longer accept inflow from the petroleum activity(ies) and the contained water must be of a quality suitable for the intended on-going uses(s) by the landholder or overlapping tenure holder.

SCHEDULE I - MONITORING PROGRAMS

General

- I1 The holder of this environmental authority must develop and implement a monitoring program, the result of which will demonstrate compliance with the conditions of this environmental authority.
- I2 All monitoring under this environmental authority must be conducted by a suitably qualified person.
- I3 All instruments, equipment and measuring devices used for measuring or monitoring in accordance with any condition of this environmental authority must be calibrated, and operated and maintained effectively.
- I4 All laboratory analyses and tests required to be conducted under this environmental authority must be carried out by a laboratory that has NATA certification for such analyses and tests, except as otherwise authorised by the administering authority.
- I5 The method of water sampling required by this environmental authority must comply with the version of the Queensland Monitoring Water Quality Sampling Manual⁴ that is current at the time the sampling is undertaken
Note: Condition (I5) requires the version of the Queensland Monitoring Water Quality Sampling Manual that is current at the time the sampling is undertaken to be followed and where it is not followed because of exceptional circumstances this should be explained and reported with the results.
The version that is current as at the 8 March 2013 is Monitoring and Sampling Manual 2009 - Environmental Protection (Water) Policy 2009 Version 2 September 2010.
- I6 Notwithstanding condition (I5), when sampling a water quality limit in Schedule B, Table 3 – Treated CSG Water Release Limits for Monitoring Point (M1) records a test result of “no result” or “laboratory error”, a supplementary sample must be collected and tested as soon as practicable after the initial sampling event.
- I7 Any management or monitoring plans, systems, programs or procedures required to be developed and implemented by a condition of this environmental authority must be reviewed for performance and amended if required on an annual basis in accordance with the requirements for the particular plans, systems, programs and procedures.
- I8 If monitoring conducted in accordance with this environmental authority indicates a condition or contaminant level that has caused, or has potential to cause, environmental harm, the environmental authority holder must:
(a) as soon as is practicable, take the necessary actions to rectify the condition or contaminant level so as to avoid or minimise environmental harm; and
(b) notify the administering authority of the condition or contaminant level and the actions taken to rectify it

- 19 An annual monitoring report must be prepared each year and submitted to the administering authority upon request. This report shall include but not be limited to:
- (a) a summary of the previous twelve (12) months monitoring results obtained under any monitoring programs required under this environmental authority and, a comparison of the previous twelve (12) months monitoring results to both the limits set in this environmental authority and to relevant prior results; the date on which the samples was taken;
 - (b) the time at which the samples was taken;
 - (c) the monitoring point at which the sample was taken;
 - (d) the release flow rate of any authorised discharges to waters from all release points;
 - (e) the results of all monitoring and details of any exceedences with the conditions of this environmental authority and the dates and times these exceedences were reported to the administering authority.
 - (f) a summary of all records of quantities of releases required to be kept under this environmental authority including the total volume of any authorised discharges to waters for the previous yearly period from all release points and the individual daily volume of any authorised discharges to waters from all release points;
 - (g) details of all maintenance or work carried out on any discharge meter(s) and the impact (if any) on the release volume readings;
 - (h) an evaluation/explanation of the data derived from any monitoring programs;
 - (i) data analyses and interpretation to assess the nature and extent of any contamination and, if so, the level of environmental harm caused as a result of the contamination and the environmentally relevant activity; and
 - (j) an outline of actions taken or proposed to minimise the risk of environmental harm from any condition or elevated contaminant level identified by the monitoring or recording programs.
- 110 The evaluation and explanation of data for the purposes of the annual monitoring report must be performed by a suitably qualified person.
- 111 The holder of this environmental authority must continue to conduct monitoring as per that prescribed in Conditions (I12) to (I18) for a minimum of five (5) years after the activities prescribed in Condition (A1) have ceased and submit the results annually in accordance with Condition (I9).

Groundwater Monitoring

- 112 The Groundwater Monitoring Program, which must be implemented, must be able to detect any significant risks and changes to groundwater quality and level as a result of activities authorised under this environmental authority and must:
- (a) be developed, installed and maintained by a suitably qualified person in the fields of hydrogeology, groundwater sampling design and groundwater monitoring program design;
 - (b) include locations of monitoring points, parameters to be measured, frequency of monitoring, monitoring methodology used, and trigger values;
 - (c) include procedures to establish background groundwater quality;
 - (d) a sufficient number of monitoring sites to provide information on the following:
 - (i) seepage to groundwater and surrounding soils from any regulated dam authorised under this environmental authority and its effect on groundwater and soils; and
 - (ii) background monitoring sites (i.e. groundwater quality in representative bore(s) that have not been affected by the activities authorised under this environmental authority);
 - (e) conduct a geodetic survey of all groundwater monitoring bores to determine the relative water surface elevations, measured to the nearest millimetre in each bore and reported in metres relative to the AHD;
 - (f) determine the hydraulic conductivity, groundwater flow direction and groundwater flow rate; and

(g) include a rationale containing details on the program purpose, program conceptualisation and verification of assumptions.

- I13 All groundwater bores must be installed according to the standards outlined in the latest edition of the Department of Environment and Heritage Protection's Minimum Construction Requirements for Water Bores in Australia or the Minimum Standards for the Construction and Reconditioning of Water Bores that Intersect the Sediments of Artesian Basins in Queensland.
- I14 Groundwater monitoring bores must be constructed by, or under the supervision of a licensed Queensland water bore driller who has the correct endorsements on their licence for the type of activity being performed.
- I15 The Groundwater Monitoring Program must provide for monitoring of groundwater quality as often as necessary to detect impacts of the petroleum activities authorised under this environmental authority, but not for fewer parameters or less frequently than that specified in Schedule I, Table 1 – Minimum Groundwater Monitoring Parameters and Monitoring Frequency and in compliance with Condition (I16).
- I16 Groundwater samples taken as part of the Groundwater Monitoring Program must be analysed for, but not be limited to, the water quality parameters at the minimum frequencies specified in Schedule I, Table 1 – Minimum Groundwater Monitoring Parameters and Monitoring Frequency.

Schedule I, Table 1 – Minimum Groundwater Monitoring Parameters and Monitoring Frequency

Groundwater parameter	Monitoring frequency
Flow [m/hr]	Biannually
Water level to the nearest millimetre [m AHD]	Biannually
Groundwater Pressure in Geological Strata [kPa]	Biannually
pH	Biannually
Electrical conductivity [μ S/m]	Biannually
Total Dissolved Solids [mg/L]	Biannually
Temperature [$^{\circ}$ C]	Biannually
Dissolved Oxygen [mg/L]	Biannually
Alkalinity as CaCO ₃ [mg/L]	Biannually
Residual Alkali [mq/L]	Biannually
Anions (bicarbonate, carbonate, hydroxide, chloride, fluoride, sulphate)	Biannually
Cations (aluminium, calcium, magnesium, potassium, sodium) [mg/L]	Biannually
Silica [mg/L]	Biannually
Total and dissolved Iron, manganese, zinc, aluminium, boron, copper, phosphorous [mg/L]	Biannually
Ammonia, nitrate, nitrite [m/L]	Biannually
Total Petroleum Hydrocarbons [mg/L]	Biannually
Polycyclic Aromatic Hydrocarbons [mg/L]	Biannually
Benzene, Toulene, Ethyl-benzene, Xylenes (BTEX) [mg/L]	Biannually

- 117 All groundwater monitoring bores must be maintained in an operative condition and be reasonably accessible at all times to any authorised person.
- 118 If groundwater monitoring indicates that any significant changes in groundwater quality caused by petroleum activities are detected, then information must be submitted to the administering authority within 10 business days of receipt of the analysis indicating these changes, including any proposed actions to mitigate the changes in groundwater quality.

Air Monitoring (Point Source)

- 119 The holder of this environmental authority must conduct a monitoring program of contaminants released to the atmosphere at each release point recorded in the register of fuel burning and combustion equipment for the contaminants and efflux velocities listed in *Schedule F, Table 2 - Releases of Contaminants to Air* and at the frequencies specified in *Schedule I, Table 3 – Monitoring Frequency for Contaminants*.

Schedule I, Table 3 – Monitoring Frequency for Contaminants

Contaminant	Monitoring frequency
NOx as Nitrogen Dioxide	Within three (3) months after commissioning of any fuel burning equipment; and annually thereafter.
Carbon monoxide	

- 120 The monitoring program must include, but not necessarily be limited to:
- (a) monitoring provisions for the release points which complies with the most recent edition of Australian Standard 4323.
 - (b) tests for each sample taken at each release point specified in the register of fuel burning or combustion equipment including:
 - (i) gas velocity, volume and mass flow rate;
 - (ii) temperature; and
 - (iii) water vapour concentration (for non-continuous sampling);
 - (c) representative samples of the contaminants discharged when operating under maximum operating conditions;
 - (d) the collection of production rate and plant status during sampling periods; and
 - (e) monitoring of contaminant release carried out in accordance with the latest edition of the Department of Environment and Heritage Protection's "Air Quality Sampling Manual" 1997, as amended from time to time.

Monitoring of Contaminant Releases to the Atmosphere

- 121 When requested by the administering authority, contaminant monitoring and recording must be undertaken to investigate any complaint, and the results notified with 14 days to the administering authority. When monitoring is requested the following must be complied with:
- (a) the holder of this environmental authority must conduct and keep records of a monitoring program of contaminant release to the atmosphere at the release points, frequency, and the parameters specified in Schedule I, Table 4 – Required Monitoring which complies with the following:
 - (b) Monitoring provision for the release points listed in Schedule I, Table 4 – Required Monitoring must comply with the Australian Standard AS4323.1 – 1995 'Stationary source emissions Method 1: Selection of sampling provisions' or subsequent versions as they become available.
 - (c) The following tests must be performed for each required determination specified in Schedule I, Table 4 – Required Monitoring :

- (i) gas velocity and volume flow rate;
 - (ii) temperature and oxygen content;
 - (iii) water vapour concentration (moisture content).
- (d) Where practicable samples taken must be representative of the contaminants discharged when emissions are expected to be at maximum rates.
- (e) During the sampling period the following additional information must be gathered:
- (i) fuel used;
 - (ii) number of equipment and operating units; and
 - (iii) reference to actual test methods and accuracies.

Schedule I, Table 4 - Required Monitoring

Determination Required	Release Point Numbers	Frequency ²
Mass emission rate (g/s) and concentration (mg/Nm ³) of oxides of nitrogen (NO _x) in the flue gas at the 5% oxygen reference level.	Stacks A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A14, A15, A16, A17, A18, A19, A20, A21, A22, A23, A24, A25, A26, A27, A28, A29.	Within three months upon the commissioning of the equipment then annually thereafter

²Note: Out of the seven (7) release points A1 to A7, at least three (3) stacks must be monitored each year on a rotational basis. Out of the four (4) release points A8 to A11, at least two (2) stacks must be monitored each year on a rotational basis. Out of the six (6) release points A14 to A19, at least three (3) stacks must be monitored each year on a rotational basis. Out of the five (5) release points A20 to A24, three (3) stacks must be monitored each year on a rotational basis. Out of the five (5) release points A25 to A29 at least two (2) stacks must be monitored each year on a rotational basis. Annual monitoring of the five (5) water treatment facility release points A25 to A29 is only required to commence once the additional generators are commissioned.
Note: This table comes into effect on 30 October 2015.

Noise Monitoring

- I22 The holder of this environmental authority must undertake noise monitoring when requested by the administering authority to investigate a complaint of environmental nuisance at a sensitive receptor within the reasonable and practicable timeframe nominated by the administering authority, and report the results to the administering authority within three (3) business days of completion of the monitoring.
- I23 Noise monitoring and recording must include the following descriptor, characteristics and matters:
- (a) $L_{AN,T}$ (where N equals the statistical levels of 1, 10 and 90 and T=15);
 - (b) $L_{Aeq,adi, 15 mins}$;
 - (c) **background noise level** as $L_{A 90, T}$;
 - (d) $Max L_{pA, 15 mins}$
 - (e) the level and frequency of occurrence of impulsive or tonal noise and any adjustment and penalties to statistical levels;
 - (f) atmospheric conditions including temperature, relative humidity and wind speed and directions;
 - (g) effects due to any extraneous factors such as traffic noise;
 - (h) location, date and time of monitoring;
 - (i) if the complaint concerns low frequency noise, $Max L_{pZ, 15 min}$; and

(j) If the complaint concerns low frequency noise, one third octave band measurements in dB(LIN) for centre frequencies in the 10 - 200 Hz range for both the noise source and the background noise in the absence of the noise source.

I24 The method of measurement and reporting of noise levels and background sound pressure levels must comply with the latest edition of the administering authority's Noise Measurement Manual or the most recent version of Australian Standard 1055 Acoustics - description and measurement of environmental noise.

Nuisance Monitoring (other than Noise)

I25 When the administering authority advises the holder of this environmental authority of a complaint alleging nuisance other than noise, the holder must investigate the complaint and advise the administering authority in writing of the action proposed or undertaken to resolve the complaint.

I26 When requested by the administering authority, the holder of this environmental authority must undertake monitoring as specified by the administering authority, within a reasonable and practical timeframe nominated by the administering authority to investigate any complaint of environmental harm at any sensitive place.

I27 The results of the investigation (including an analysis and interpretation of the monitoring results) and abatement measures implemented must be provided to the administering authority within 10 business days of completion of the investigation, or receipt of the monitoring results, whichever is the latter.

I28 If monitoring in accordance with Condition (I26) and (I27), indicates that emissions exceed the limits set in this environmental authority or are causing environmental nuisance, then the holder of this environmental authority must:

- (a) address the complaint including the use of alternative dispute resolution services if required; and/or
- (b) as soon as practicable implement abatement or attenuation measures so that light, dust, particulate or odour emissions from the authorised activities do not result in further environmental nuisance.

Impact Assessment

I29 Notwithstanding any other condition of the environmental authority, the environmental authority does not authorise any environmental harm arising from any release to the atmosphere of any of the contaminants mentioned in Schedule I, Table 5 – Contaminants and Benchmarks for Evaluation.

I30 For the purpose of ensuring and demonstrating compliance with Condition (I29), the holder of the environmental authority must implement the findings of the evaluation, conducted by a suitably qualified and experienced person and provided to the administering authority, of the potential environmental impacts of the contaminants mentioned in Schedule I, Table 5 - Contaminants and Benchmarks for Evaluation. The evaluation addresses all matters relevant to the assessment of potential for environmental impacts to occur and includes, but not be limited to:

(a) Sampling, monitoring and analysis of the contaminants mentioned in Schedule I, Table 5 - Contaminants and Benchmarks for Evaluation for the range of plant operations likely to be encountered:

- (i) entail sufficient levels of detection to adequately characterise the emissions; and
- (ii) be representative; and complies with relevant Department of Environment and Heritage Protection's monitoring methods including the quality control requirements inherent in those methods;

- (b) Using the air pollution dispersion models, an estimation of Ground Level Concentrations at the most sensitive nearest receptor(s) (using efflux velocity, temperature and flow rate) for emissions of the contaminants mentioned in Schedule I, Table 5 - Contaminants and Benchmarks for Evaluation;
- (c) A comparison between the worst case measured emissions with the benchmarks maximum GLC mentioned in Schedule I, Table 5 - Contaminants and Benchmarks for Evaluation;
- (d) The use of methods and guidelines for modelling and assessment of air pollutants approved by the New South Wales Department of Environment and Climate Change or by the Victoria Environmental Protection Agency.

Schedule I, Table 5 - Contaminants and Benchmarks for Evaluation

Contaminant	Averaging Periods	Maximum GLC concentration
Nitrogen dioxide	1 hour — health and wellbeing	250 µg/m ³ (at 0 °C)
	1 year — health and wellbeing	62 µg/m ³ (at 0 °C)
	1 year — health and biodiversity of ecosystems	33 µg/m ³ (at 0 °C)

SCHEDULE J - COMMUNITY ISSUES

- J1 The holder of this environmental authority must maintain a record of complaints and incidents causing environmental harm, and actions taken in response to the complaint or incident; and

- J2 The holder of this environmental authority must record the following details for all complaints received and provide this information to the administering authority on request:
 - (a) name, address and contact number for complainant;
 - (b) time and date of complaint;
 - (c) reasons for the complaint as stated by the complainant;
 - (d) investigations undertaken in response to the complaint;
 - (e) conclusions formed;
 - (f) actions taken to resolve complaint;
 - (g) any abatement measures implemented to mitigate the cause of the complaint; and
 - (h) name and contact details of the person responsible for resolving the complaint.

SCHEDULE K - NOTIFICATION PROCEDURES

- K1 In addition to the requirements under Chapter 7, Part 1, Division 2 of the Environmental Protection Act 1994, the administering authority must be notified through the Pollution Hotline and in writing, as soon as possible, but within 48 hours of becoming aware of any of the following events:
 - (a) any unauthorised significant disturbance to land
 - (b) potential or actual loss of structural or hydraulic integrity of a dam
 - (c) when the level of the contents of any regulated dam reaches the mandatory reporting level
 - (d) when a regulated dam will not have available storage to meet the design storage allowance on 1 November of any year
 - (e) potential or actual loss of well integrity
 - (f) any unexplained increase in the seepage data recorded as a result of condition (I12)(d)(i) and (ii)
 - (g) unauthorised releases of any volume of prescribed contaminants to waters
 - (h) unauthorised releases of volumes of contaminants, in any mixture, to land greater than:
 - (i) 200 L of hydrocarbons; or

- (ii) 200 L of stimulation additives; or
 - (iii) 500 L of stimulation fluids; or
 - (iv) 1 000 L of brine; or
 - (v) 5 000 L of untreated coal seam gas water; or
 - (vi) 5 000 L of raw sewage; or
 - (vii) 10 000 L of treated sewage effluent.
- (i) the use of restricted stimulation fluids
- (j) groundwater monitoring results from a landholder's active groundwater bore monitored under the stimulation impact monitoring program which is a 10 % or greater increase from a previous baseline value for that bore and which renders the water unfit for its intended use
- (k) monitoring results where two out of any five consecutive samples do not comply with the relevant limits in the environmental authority.

Fluid Injection Notification

- K2 The Department of Environment and Heritage Protection must be notified in writing as soon as reasonably practicable, but within 48 hours of becoming aware of:
- (a) migration of injected fluid out of the target formation; or
 - (b) a loss of hydraulic isolation of the target formation; or
 - (c) the detection of groundwater contaminants that were not detected in background samples; or
 - (d) an injection fluid monitoring result that does not comply with any one of the parameters in Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid.

SCHEDULE L - DEFINITIONS

- L *Note:* Where a term is not defined in this environmental authority the definition in the Environmental Protection Act 1994, its regulations and Environmental Protection Policies or the Petroleum and Gas (Production and Safety) Act 2004 and its regulations must be used in that order.

acid sulfate soils	means soil or sediment containing highly acidic soil horizons or layers affected by the oxidation of iron sulfides (actual acid sulfate soils) and/or soil or sediment containing iron sulfides or other sulfidic material that has not been exposed to air and oxidised (potential acid sulfate soils). The term acid sulfate soil generally includes both actual and potential acid sulfate soils. Actual and potential acid sulfate soils are often found in the same soil profile, with actual acid sulfate soils generally overlying potential acid sulfate soil horizons.
active	for the purposes of landholders' groundwater bores means bores that are able to continue to provide a reasonable yield of water in terms of quantity for the bores authorised purpose or use.
AHD	means Australian Height Datum.
alternative arrangement	means a written agreement between the holder of this environmental authority and an affected or potentially affected person at a sensitive receptor for a defined noise nuisance impact and may include an agreed period of time for which the arrangement is in place. An agreement for alternative arrangements may include, but not necessarily be limited to a range of noise abatement measures to be installed at a sensitive receptor and/or provision of alternative accommodation for the duration of the defined noise nuisance impact.

annual exceedance probability or AEP	means the probability that at least one event in excess of a particular magnitude will occur in any given year.								
annual inspection report	<p>means an assessment prepared by a suitably qualified and experienced person containing details of the assessment against the most recent consequence assessment report and design plan (or system design plan);</p> <ul style="list-style-type: none"> (a) against recommendations contained in previous annual inspections reports; (b) against recognised dam safety deficiency indicators; (c) for changes in circumstances potentially leading to a change in consequence category; (d) for conformance with the conditions of this authority; (e) for conformance with the 'as constructed' drawings; (f) for the adequacy of the available storage in each regulated dam, based on an actual observation or observations taken after 31 May each year but prior to 1 November of that year, of accumulated sediment, state of the containment barrier and the level of liquids in the dam (or network of linked containment systems); (g) for evidence of conformance with the current operational plan 								
Approved quality criteria	<p>for the purpose of residual drilling materials, means the residual drilling material meet the following quality standards:</p> <p>Part A in all cases:</p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Maximum concentration</th> </tr> </thead> <tbody> <tr> <td>pH</td> <td>6 to 10.5 (range)</td> </tr> <tr> <td>Electrical Conductivity</td> <td>20dS/m</td> </tr> <tr> <td>Chloride*</td> <td>800 mg/L</td> </tr> </tbody> </table>	Parameter	Maximum concentration	pH	6 to 10.5 (range)	Electrical Conductivity	20dS/m	Chloride*	800 mg/L
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Chloride*	800 mg/L								

	<p>*Chloride analysis is only required if an additive containing chloride was used in the drilling process. The limits in Part A must be measured in the clarified filtrate of oversaturated solids prior to mixing. Part B If any of the following metals are a component of the drilling fluids, then for that metal:</p> <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>11 mg/kg</td> </tr> <tr> <td>Lead</td> <td>600mg/kg</td> </tr> </tbody> </table> <p>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:</p> <table border="1"> <thead> <tr> <th>TPH</th> <th>Maximum concentration</th> </tr> </thead> <tbody> <tr> <td>C6-C10</td> <td>170 mg/kg</td> </tr> <tr> <td>C10-C16</td> <td>150 mg/kg</td> </tr> <tr> <td>C16-C34</td> <td>1300 mg/kg</td> </tr> <tr> <td>C34-C40</td> <td>5600 mg/kg</td> </tr> <tr> <td>Total polycyclic aromatic hydrocarbons (PAH)</td> <td>20 mg/kg</td> </tr> <tr> <td>Phenols (halogenated)</td> <td>1 mg/kg</td> </tr> <tr> <td>Phenols (non-halogenated)</td> <td>60 mg/kg</td> </tr> <tr> <td>Monocyclic aromatic hydrocarbons (total sum of benzen, toluene, ethyl benzene, xylenes (includes ortho, para, and meta xylenes) and styrene)</td> <td>7 mg/kg</td> </tr> <tr> <td>Benzene</td> <td>1 mg/kg</td> </tr> </tbody> </table>	Parameter	Maximum concentration	Arsenic	20mg/kg	Selenium	5mg/kg	Boron	100mg/kg	Cadmium	3mg/kg	Chromium (total)	400mg/kg	Copper	11 mg/kg	Lead	600mg/kg	TPH	Maximum concentration	C6-C10	170 mg/kg	C10-C16	150 mg/kg	C16-C34	1300 mg/kg	C34-C40	5600 mg/kg	Total polycyclic aromatic hydrocarbons (PAH)	20 mg/kg	Phenols (halogenated)	1 mg/kg	Phenols (non-halogenated)	60 mg/kg	Monocyclic aromatic hydrocarbons (total sum of benzen, toluene, ethyl benzene, xylenes (includes ortho, para, and meta xylenes) and styrene)	7 mg/kg	Benzene	1 mg/kg
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Monocyclic aromatic hydrocarbons (total sum of benzen, toluene, ethyl benzene, xylenes (includes ortho, para, and meta xylenes) and styrene)	7 mg/kg																																				
Benzene	1 mg/kg																																				
<p>assessed or assessment</p>	<p>by a suitably qualified and experienced person in relation to a consequence assessment of a dam, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit of the assessment:</p> <ul style="list-style-type: none"> (a) exactly what has been assessed and the precise nature of that determination; (b) the relevant legislative, regulatory and technical criteria on which the assessment has been based; (c) the relevant data and facts on which the assessment has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and (d) the reasoning on which the assessment has been based using the relevant data and facts, and the relevant criteria. 																																				

associated water	means underground water taken or interfered with, if the taking or interference happens during the course of, or results from, the carrying out of another authorised activity under a petroleum authority, such as a petroleum well, and includes waters also known as produced formation water. The term includes all contaminants suspended or dissolved within the water.
associated works	in relation to a dam, means: <ul style="list-style-type: none"> • operations of any kind and all things constructed, erected or installed for that dam; and • any land used for those operations.
authority	means an environmental authority or a development approval.
background noise level	means the sound pressure level, measured in the absence of the noise under investigation, as the L A90,T being the A-weighted sound pressure level exceeded for 90 percent of the measurement time period T of not less than 15 minutes, using Fast response.
bed and banks	for a watercourse or wetland means land over which the water of the watercourse or wetland normally flows or that is normally covered by the water, whether permanently or intermittently; but does not include land adjoining or adjacent to the bed or banks that is from time to time covered by floodwater.
bore	means a water observation bore or a water supply bore.
brine	means either saline water with a total dissolved solid concentration greater than 40 000mg/l or CSG water after it has been concentrated through water treatment processes and/or evaporation.
bund or bunded	in relation to spill containment systems for fabricated or manufactured tanks or containers designed to a recognised standard means an embankment or wall of brick, stone, concrete or other impervious material which may form part or all of the perimeter of a compound and provides a barrier to retain liquid. Since the bund is the main part of a spill containment system, the whole system (or bunded area) is sometimes colloquially referred to within industry as the bund. The bund is designed to contain spillages and leaks from liquids used, stored or processed above ground and to facilitate clean-up operations. As well as being used to prevent pollution of the receiving environment, bunds are also used for fire protection, product recovery and process isolation.
BTEX	means benzene, toluene, ethylbenzene, xylene.
category A ESA	means any area listed in Schedule 12, Part 1, Section 1 of the Environmental Protection Regulation 2008.
category B ESA	means any area listed in Schedule 12, Part 1, Section 2 of the Environmental Protection Regulation 2008.
category C ESA	means any of the following areas: <ul style="list-style-type: none"> • Nature Refuges as defined under the Nature Conservation Act 1992; • Koala Habitat Areas as defined under the Nature Conservation Act 1992; • State Forests or Timber Reserves as defined under the Forestry Act 1959; • Declared catchment areas under the Water Act 2000; • Resources reserves under the Nature Conservation Act 1992 • An area identified as "Essential Habitat" for a species of wildlife listed as endangered, vulnerable, rare or near threatened under the Nature Conservation Act 1992;

	<ul style="list-style-type: none"> • An area identified as "Essential Regrowth Habitat" under the Vegetation Management Act 1999 for a species of wildlife listed as endangered, vulnerable, rare or near threatened under the Nature Conservation Act 1992 for petroleum activities that commenced after 8 March 2013 (the date of grant of this environmental authority); and • "Of concern" regional ecosystems identified in the database maintained by the Department of Environment and Heritage Protection called 'Regional ecosystem description database' containing regional ecosystem numbers and descriptions.
certification	in relation to dams means assessment and approval must be undertaken by a suitably qualified and experienced person in relation to any assessment or documentation required by the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures, including design plans, 'as constructed' drawings and specifications, construction, operation or an annual report regarding regulated structures, undertaken in accordance with the Board of Professional Engineers of Queensland Policy Certification by RPEQs (ID: 1.4 (2A)).
certifying, certify, or certified	have a corresponding meaning to certification.
clearing	means: <ul style="list-style-type: none"> • in relation to grass, scrub or bush - the removal of vegetation by disturbing root systems and exposing underlying soil (including burning), but does not include - • the flattening or compaction of vegetation by vehicles if the vegetation remains living; or • the slashing or mowing of vegetation to facilitate access tracks; or • the clearing of noxious or introduced plant species; and • in relation to trees - cutting down, ringbarking, pushing over, poisoning or destroying in any way.
"construction or constructed"	in relation to a dam includes building a new dam and modifying or lifting an existing dam, but does not include investigations and testing necessary for the purpose of preparing a design plan.
construction and operational purposes	in relation to the use of coal seam gas water means the construction, use, modification, maintenance, replacement, operation and decommissioning of industrial sites.
coal seam gas water	means underground water brought to the surface of the earth, or otherwise interfered with, in connection with exploring for or producing coal seam gas. Coal seam gas water is a waste, as defined under s13 of the Environmental Protection Act 1994.
consequence	in relation to a structure as defined, means the potential for environmental harm resulting from the collapse or failure of the structure to perform its primary purpose of containing, diverting or controlling flowable substances.
consequence category	means a category, either low, significant or high, into which a dam is assessed as a result of the application of tables and other criteria in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635).
critically limited regional ecosystem	means the ecosystems identified in Appendix 5 of the Queensland Biodiversity Offset Policy (Department of Environment and Heritage Protection, 2014).

dam	means a land-based structure or a void that contains, diverts or controls flowable substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and associated works.
dam crest volume	means the volume of material (liquids and/or solids) that could be within the walls of a dam at any time when the upper level of that material is at the crest level of that dam. That is, the instantaneous maximum volume within the walls, without regard to flows entering or leaving (for example, via spillway).
deed of agreement	means a legal agreement between the holder of the environmental authority and the administering authority. The deed of agreement governs the obligations of the holder of the environmental authority in relation to the Queensland Biodiversity Offset Policy. For clarity, the term deed of agreement in this environmental authority includes any subsequent version or amendment of the signed deed of agreement.
design plan	" is a document setting out how all identified consequence scenarios are addressed in the planned design and operation of a regulated structure.
design storage allowance or DSA	means an available volume, estimated in accordance with the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635) published by the administering authority, must be provided in a dam as at 1 November each year in order to prevent a discharge from that dam to an annual exceedance probability (AEP) specified in that Manual.
development well	means a petroleum well that is drilled to produce or store petroleum.
discharge area	means: <ul style="list-style-type: none"> (a) that part of the land surface where groundwater discharge produces a net movement of water out of the groundwater; and (b) identified by an assessment process consistent with the document: Salinity Management Handbook, Queensland Department of Natural Resources, 1997; or (c) identified by an approved salinity hazard map held by the Department of Environment and Heritage Protection.
ecosystem functioning	means the interactions between and within living and nonliving components of an ecosystem and generally correlates with the size, shape and location of an area of vegetation.
emergency action plan	means documentation forming part of the operational plan held by the holder or a nominated responsible officer, that identifies emergency conditions that sets out procedures and actions that will be followed and taken by the dam owner and operating personnel in the event of an emergency. The actions are to minimise the risk and consequences of failure, and ensure timely warning to downstream communities and the implementation of protection measures. The plan must require dam owners to annually update contact.
enclosed flare	means a device where the residual gas is burned in a cylindrical or rectilinear enclosure that includes a burning system and a damper where air for the combustion reaction is admitted.
end	means the stopping of the particular activity that has caused a significant disturbance in a particular area. It refers to, among other things, the end of a seismic survey or the end of a drilling operation. It does not refer to the end of all related activities such as rehabilitation. In other words, it does not refer to the 'completion' of the petroleum activity, the time at which the petroleum authority ends or the time that the land in question ceases to be part of an authority.

equivalent person" or "EP	means an equivalent person under volume 1, section 2 of the Guidelines for Planning and Design of Sewerage Schemes, October 1991, published by the Water Resources Commission, Department of Primary Industries, Fisheries and Forestry.
evaporation dam	means a land based structure designed to contain or impound CSG water, the purpose of which is to contain or impound the water, until the water content has been removed by evaporation.
existing structure	means a structure that was in existence or whose design plan has substantially commenced, prior to the adoption of this schedule of conditions under the authority (12 August 2014).
fill	means any kind of material in solid form (whether or not naturally occurring) capable of being deposited at a place but does not include material that forms a part of, or is associated with, a structure constructed in a watercourse, wetland or spring including a bridge, road, causeway, pipeline, rock revetment, drain outlet works, erosion prevention structure or fence.
flare pit	means containment area where any hydrocarbon that is discovered in an overpressured 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.
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.
foreseeable future	means the period used for assessing the total probability of an event occurring. Permanent structures and ecological sustainability should be expected to still exist at the end of a 150 year foreseeable future with an acceptably low probability of failure before that time.
hazard	in relation to a dam as defined, means the potential for environmental harm resulting from the collapse or failure of the dam to perform its primary purpose of containing, diverting or controlling flowable substances.
high bank	means the defining terrace or bank or, if no bank is present, the point on the active floodplain, which confines the average annual peak flows in a watercourse.
holder	means: (a) where this document is an environmental authority, any person who is the holder of, or is acting under, that environmental authority; or (b) where this document is a development approval, any person who is the registered operator for that development approval.
hub	means more than one large compressor station and multiple items of fuel burning or combustion units located within three (3) km of each other and capable of burning fuel at a rate > 500 kg/hr.
hydraulic performance	means the capacity of a regulated dam to contain or safely pass flowable substances based on the design criteria specified for the relevant consequence category in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635).
impacts to mapped State significant biodiversity values	means to have a negative effect on a State significant biodiversity value, as identified by the Queensland Biodiversity Offset Policy

	(Department of Environment and Heritage Protection, 2014) Examples may include, but are not necessarily limited to residual impact from: - clearing, removal or fragmentation of vegetation - interference or disturbance of fauna habitat
impacts to watercourse, wetland, lake or spring with state significant biodiversity values	means to have a negative effect on a watercourse, wetland, lake or spring with state significant biodiversity values as identified in Appendix 1 of the Queensland Biodiversity Offsets Policy (Department of Environment and Heritage Protection, 2014) resulting from petroleum activities that commenced after 8 March 2013.
infrastructure	means water storage dams, roads and tracks, equipment, buildings and other structures built for the purpose and duration of the conduct of the petroleum activities, but does not include other facilities required for the long term management of the impact of those activities or the protection of potential resources. Such other facilities include dams other than water storage dams (e.g. evaporation dams), pipelines and assets, that have been decommissioned, rehabilitated, and lawfully recognised as being subject to subsequent transfer with ownership of the land.
irrigation	means the application of water to any agricultural or silvicultural crop or to a garden cultivated for domestic use.
LAeq, adj, 15 mins	means an A-weighted sound pressure level of a continuous steady sound, adjusted for tonal character, that within a 15 minute period has the same square sound pressure as a sound level that varies with time.
lake	means: (a) a lagoon, swamp or other natural collection of water, whether permanent or intermittent; and (b) the bed and banks and any other element confining or containing the water.
land-based offset	means direct offsets, indirect offsets, and offset transfers.
landfill monocell	means a specialised, isolated landfill facility where a single specific waste type is exclusively disposed (i.e. salt).
leachate	means a liquid that has passed through or emerged from, or is likely to have passed through or emerged from, a material stored, processed or disposed of on site which contains soluble, suspended or miscible contaminants likely to have been derived from the said material.
legally secured	in relation to <u>land-based offsets</u> means any of the following legally binding mechanisms: <ul style="list-style-type: none"> • gazettal as a protected area (e.g., a nature refuge) under the Nature Conservation Act 1992; • declaration of an area of high nature conservation values under the Vegetation Management Act 1999; • use of a covenant under the Land Title Act 1994 or Land Act 1994; or • another mechanism administered and approved by the State.
levee	means a dyke or bund that is designed only to provide for the containment and diversion of stormwater or flood flows from a contributing catchment, or containment and diversion of flowable materials resulting from unplanned releases from other works of infrastructure, during the progress of those stormwater or flood flows or those unplanned releases; and does not store any significant volume of water or flowable substances at any other times.

limited petroleum activities	mean only activities including: (a) geophysical surveys (including seismic activities); (b) well sites; (c) well pads; (d) sumps; (e) flare pits; (f) flow lines; and (g) supporting access tracks. For clarity, limited petroleum activities do not include: (a) the construction of infrastructure for processing or storing petroleum or byproducts; (b) dams; (c) compressor stations; (d) campsites/workforce accommodation; (e) power supplies; (f) waste disposal; or other supporting infrastructure for the project.
linear infrastructure	means powerlines, pipelines, roads and access tracks.
livestock watering purposes	means the supply of water to any livestock.
long term noise event	is a noise exposure, when perceived at a sensitive receptor, persists for a period of greater than five (5) days, even when there are respite periods when the noise is inaudible within those five (5) days.
low consequence dam	means any dam that is not a high or significant consequence category as assessed using the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635).
mandatory reporting level or MRL	means a warning and reporting level determined in accordance with the criteria in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635) published by the administering authority.
manual	means the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635) published by the administering authority.
mapped State significant biodiversity values	means the regional ecosystems, essential habitat, wetlands, watercourses, legally secured offset areas and connectivity areas provided in Appendix 1 of the Queensland Biodiversity Offset Policy (Department of Environment and Heritage Protection, 2014) that are mapped in State mapping.
Max L_{pz} , 15 min	means the maximum value of the Z-weighted sound pressure level measured over 15 minutes.
Max L_{pA} , 15 min	means the absolute maximum instantaneous A-weighted sound pressure level, measured over 15 minutes.
mg/L	means milligrams per litre.
medium term noise event	is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than five days and does not re-occur for a period of at least four weeks. Re-occurrence is deemed to apply where a noise of comparable level is observed at the same receptor location for a period of one hour or more, even if it originates from a difference source or source location.
meter	means a device for measuring, or giving an output signal proportional to, quantities of water passed and/or the rate of flow in a pipe."
mix-bury-cover method	means the stabilisation of residual drilling solids in the bottom of a sump by mixing with subsoil and which occurs in accordance with the following methodology:

	<ul style="list-style-type: none"> - the base of the subsoil and residual solid mixture must be separated from the groundwater table by at least one metre of a continuous layer of impermeable subsoil material (kw=10-8m/s) or subsoil with a clay content of greater than 20 percent; 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.
modification or modifying	(see definition of `construction`).
Offset Area Management Plan (OAMP)	means a plan that meets the requirements listed under the heading 'Specific requirements for offset area management plans' in Criteria A3-Information requirement of the Queensland Biodiversity Offset Policy (Department of Environment and Heritage Protection, 2014).
operational plan	includes: <ul style="list-style-type: none"> (a) normal operating procedures and rules (including clear documentation and definition of process inputs in the DSA allowance); (b) contingency and emergency action plans including operating procedures designed to avoid and/or minimise environmental impacts including threats to human life resulting from any overtopping or loss of structural integrity of the regulated structure.
pest	means species: <ul style="list-style-type: none"> (a) declared under the Land Protection (Pest and Stock route Management) Act 2002; (b) declared under Local Government model local laws; and (c) which may become invasive in the future.
populated area	includes towns and cities which have a population of 500 or more people and with a minimum density of 40 people/km ² .
prescribed storage gases	has the meaning provided in section 12 of the Petroleum and Gas (Production and Safety) Act 2004.
produced water	has the meaning in section 15A of the Petroleum and Gas (Production and Safety) Act 2004 and means CSG water or associated water for a petroleum tenure.
quarter	means the following periods of a calendar year: <ul style="list-style-type: none"> 1 January to 31 March inclusive; 1 April to 30 June inclusive; 1 July to 30 September inclusive; and 1 October to 31 December inclusive.
Register of Regulated Dams	includes: <ul style="list-style-type: none"> (a) Date of entry in the register; (b) Name of the dam, its purpose and intended/actual contents; (c) The consequence category of the dam as assessed using the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635); (d) Dates, names, and reference for the design plan plus dates, names, and reference numbers of all document(s) lodged as part of a design plan for the dam;

	<p>(e) Name and qualifications of the suitably qualified and experienced person who certified the design plan and 'as constructed' drawings;</p> <p>(f) For the regulated dam, other than in relation to any levees –</p> <ul style="list-style-type: none"> (i) The dimensions (metres) and surface area (hectares) of the dam measured at the footprint of the dam; (ii) Coordinates (latitude and longitude in GDA94) within five metres at any point from the outside of the dam including its storage area (iii) Dam crest volume (megalitres); (iv) Spillway crest level (metres AHD). (V) Maximum operating level (metres AHD); (Vi) Storage rating table of stored volume versus level (metres AHD); (Vii) Design storage allowance (megalitres) and associated level of the dam (metres AHD); (viii) Mandatory reporting level (metres AHD); <p>(g) The design plan title and reference relevant to the dam;</p> <p>(h) The date construction was certified as compliant with the design plan;</p> <p>(i) The name and details of the suitably qualified and experienced person who certified that the constructed dam was compliant with the design plan;</p> <p>(j) Details of the composition and construction of any liner;</p> <p>(k) The system for the detection of any leakage through the floor and sides of the dam;</p> <p>(l) Dates when the regulated dam underwent an annual inspection for structural and operational adequacy, and to ascertain the available storage volume for 1 November of any year;</p> <p>(m) Dates when recommendations and actions arising from the annual inspection were provided to the administering authority;</p> <p>(n) Dam water quality as obtained from any monitoring required under this authority as at 1 November of each year.</p>
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.
regulated structure	includes land-based containment structures, levees, bunds and voids, but not a tank or container designed and constructed to an Australian Standard that deals with strength and structural integrity.
rehabilitation	means the process of reshaping and revegetating land to restore it to a stable landform and in accordance with the acceptance criteria set out in this environmental authority and, where relevant, includes remediation of contaminated land.
relevant offset objectives	means the relevant criteria listed under the heading 'When an offset ceases to have effect' in Criteria A2 - Legally securing biodiversity offsets of the Queensland Biodiversity Offset Policy (Department of Environment and Heritage Protection, 2014).
relevant offset rules	means the relevant criteria included in the Queensland Biodiversity Offset Policy (Department of Environment and Heritage Protection, 2014) including but not necessarily limited to:

	<p>(a) for all offsets, the relevant criteria of Criteria B1 - Offset Rules except where an offset payment is used for which Part A and Part B Criteria do not apply; and</p> <p>(b) for land-based offsets, the relevant criteria of Criteria B1 - Offset Rules as well as Criteria A1 - Obtaining Ecological Equivalence.</p>
remnant unit	means a continuous area of remnant vegetation representative of a single Regional Ecosystem type or a single heterogeneous unit (multiple Regional Ecosystem types that cannot be distinguished individually due to the scale of mapping).
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.
sensitive place	<p>means:</p> <ul style="list-style-type: none"> - a dwelling (including residential allotment, mobile home or caravan park, residential marina or other residential premises, motel, hotel or hostel; or - a library, childcare centre, kindergarten, school, university or other educational institution; - a medical centre, surgery or hospital; or - a protected area; or - a public park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment; or - a work place used as an office or for business or commercial purposes, which is not part of the petroleum activities and does not include employees accommodation or public roads.
sensitive receptor	<p>means an area or place where noise (including low frequency, vibration and blasting) is measured investigate whether nuisance impacts are occurring and includes:</p> <ul style="list-style-type: none"> - a dwelling (including residential allotment, mobile home or caravan park, residential marina or other residential premises, motel, hotel or hostel; or - a library, childcare centre, kindergarten, school, university or other educational institution; - a medical centre, surgery or hospital; or - a protected area; or - a public park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment; or - a work place used as an office or for business or commercial purposes, which is not part of the petroleum activities and does not include employees accommodation or public roads.
short term noise event	is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than eight hours and does not re-occur for a period of at least seven days. Re-occurrence is deemed to apply where a noise of comparable level is observed at the same receptor location for a period of one hour or more, even if it originates from a different source or source location.
significantly disturbed land or significant disturbance to land	has the meaning in Schedule 12, section 4 of the Environmental Protection Regulation 2008. Land is significantly disturbed if - (a) it is contaminated land; or

	(b) it has been disturbed and human intervention is needed to rehabilitate it- (i) to a condition required under the relevant environmental authority; or (ii) if the environmental authority does not require the land to be rehabilitated to a particular condition—to the condition it was in immediately before the disturbance
site	means the petroleum authority(ies) to which the environmental authority relates.
spillway	means a weir, channel, conduit, tunnel, gate or other structure designed to permit discharges from the dam, normally under flood conditions or in anticipation of flood conditions.
spring	means the land to which water rises naturally from below the ground and the land over which the water then flows.
stable	in relation to land, means landform dimensions are or will be stable within tolerable limits now and in the foreseeable future. Stability includes consideration of geotechnical stability, settlement and consolidation allowances, bearing capacity (trafficability), erosion resistance and geochemical stability with respect to seepage, <u>leachate</u> and related contaminant generation.
State significant biodiversity values	means those regional ecosystems, essential habitat, wetlands, watercourses, legally secured offset areas and connectivity areas provided in Appendix 1 of the Queensland Biodiversity Offsets Policy (Department of Environment and Heritage Protection, 2014).
stimulation	means a technique used to increase the permeability of a natural underground reservoir, including for example, cavitation, hydraulic fracturing/hydrofracturing, fracture acidizing and the use of proppant treatments.
structure	means dam or levee.
suitably qualified person	means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis to performance relative to the subject matter using the relevant protocols, standards, methods or literature.
suitably qualified and experienced person	in relation to regulated structures means a person who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the Professional Engineers Act 2002, and has demonstrated competency and relevant experience: - for regulated dams, an RPEQ who is a civil engineer with the required qualifications in dam safety and dam design. - for regulated levees, an RPEQ who is a civil engineer with the required qualifications in the design of flood protection embankments. Note: It is permissible that a suitably qualified and experienced person obtain subsidiary certification from an RPEQ who has demonstrated competence and relevant experience in either geomechanics, hydraulic design or engineering hydrology.
system design plan	means a plan that manages an integrated containment system that shares the required DSA and/or ESS volume across the integrated containment system.
third party auditor	means a suitably qualified person who is either a certified third party auditor or an internal auditor employed by the holder of the environmental authority and the person is independent of the day to

	day management and operation of activities covered by this environmental authority.
threatening processes	means processes, features and actions that can have a detrimental effect upon the health and viability of an area of vegetation. For example altered hydrology, land use practices, invasion by pest and weed species, land degradation, edge effects and fragmentation.
threshold regional ecosystem	means the ecosystems identified in Appendix 6 of the Queensland Biodiversity Offset Policy (Department of Environment and Heritage Protection, 2014).
tolerable limits	means a range of parameters regarded as being sufficient to meet the objective of protecting relevant environmental values. For example, a range of settlement for a tailings capping, rather than a single value, could still meet the objective of draining the cap quickly, preventing damage and limiting infiltration and percolation.
topsoil	means the surface (top) layer of a soil profile, which is more fertile, darker in colour, better structured and supports greater biological activity than underlying layers. The surface layer may vary in depth depending on soil forming factors, including parent material, location and slope, but generally is not greater than about 300mm in depth from the natural surface.
unacceptable risk	is when the results of a hazard assessment indicates that there is both a high consequence and a high likelihood of an event occurring such that the risk is classified as "high", "very high" or "extreme".
valid complaint	means a complaint the administering authority considers is not frivolous, nor vexatious, nor based on mistaken belief.
void	means any constructed, open excavation in the ground.
watercourse	has the meaning provided in s 5 of the Water Act 2000 and includes the bed and banks and any other element of a river, creek or stream confining or containing water.
watercourse, wetland, lake or spring with State significant biodiversity values	are those described in Appendix 1 of the Queensland Biodiversity Offsets Policy (Department of Environment and Heritage Protection, 2014).
waters	includes all or any part of a river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water in natural or artificial watercourses, bed and banks of a watercourse, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and groundwater.
wetland	means an area shown as a wetland on a 'Map of referable wetlands', a document approved by the chief executive (environment). A map of referable wetlands can be viewed at www.ehp.qld.gov.au
worst case noise propagation conditions	includes several combinations of the following: a) During the winter month of June, July and August; b) Under both moderate and strong temperature inversion conditions; c) Under downward wind conditions (for example south or south westerly); d) At wind speed of between 0 to 5 meters per second.

End of conditions

Permit

Environmental Protection Act 1994

Environmental authority EPPG00972513

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

Environmental authority number: EPPG00972513

Environmental authority takes effect on 1 May 2020

Environmental authority holder(s)

Names(s)	Registered address
ARROW ENERGY PTY LTD	Level 39 111 Eagle Street BRISBANE QLD 4001
AUSTRALIAN CBM PTY LTD	Level 39 111 Eagle Street BRISBANE CITY QLD 4000 Australia
ARROW (TIPTON) PTY. LTD.	Level 39 111 Eagle Street BRISBANE CITY QLD 4000 Australia
ARROW (DAANDINE) PTY. LTD.	Level 39 111 Eagle St BRISBANE CITY QLD 4000 Australia
ARROW CSG (AUSTRALIA) PTY LTD	Level 39 111 Eagle Street BRISBANE CITY QLD 4000 Australia
ARROW (TIPTON TWO) PTY LTD	Level 39 111 Eagle Street BRISBANE CITY QLD 4000 Australia
CLEANCO QUEENSLAND LIMITED	Comalco Place Level 32 12 Creek St BRISBANE CITY QLD 4000 Australia

Environmentally relevant activity and location details

Environmentally relevant activity/activities	Location(s)
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (a-i) 21 to 100EP if treated effluent is discharged	PL252

from the works to an infiltration trench or through an irrigation scheme	
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (a-i) 21 to 100EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme.	PL194
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (a-i) 21 to 100EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL198
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (a-i) 21 to 100EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL230
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (a-i) 21 to 100EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL260
Resource Activity, Schedule 3, 06: A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL238
Resource Activity, Schedule 3, 06: A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL258
Resource Activity, Schedule 3, 06: A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL252
Resource Activity, Schedule 3, 06: A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL194

Resource Activity, Schedule 3, 06: A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL198
Resource Activity, Schedule 3, 06: A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL230
Resource Activity, Schedule 3, 06: A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL260
Resource Activity, Schedule 3, 07: A petroleum activity involving injection of a wastefluid into a natural underground reservoir or aquifer	PL238
Resource Activity, Schedule 3, 07: A petroleum activity involving injection of a wastefluid into a natural underground reservoir or aquifer	PL258
Resource Activity, Schedule 3, 07: A petroleum activity involving injection of a wastefluid into a natural underground reservoir or aquifer	PL252
Resource Activity, Schedule 3, 07: A petroleum activity involving injection of a wastefluid into a natural underground reservoir or aquifer	PL194
Resource Activity, Schedule 3, 07: A petroleum activity involving injection of a wastefluid into a natural underground reservoir or aquifer	PL198
Resource Activity, Schedule 3, 07: A petroleum activity involving injection of a wastefluid into a natural underground reservoir or aquifer	PL230
Resource Activity, Schedule 3, 07: A petroleum activity involving injection of a wastefluid into a natural underground reservoir or aquifer	PL260
Resource Activity, 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	PL238
Resource Activity, 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	PL258

Resource Activity, 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	PL252
Resource Activity, 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	PL194
Resource Activity, 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	PL198
Resource Activity, 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	PL230
Resource Activity, 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	PL260
Resource Activity, Ancillary 15 - Fuel burning, Using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour	PL238
Resource Activity, Ancillary 15 - Fuel burning, Using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour	PL258
Resource Activity, Ancillary 15 - Fuel burning, Using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour	PL252
Resource Activity, Ancillary 15 - Fuel burning, Using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour	PL194
Resource Activity, Ancillary 15 - Fuel burning, Using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour	PL198
Resource Activity, Ancillary 15 - Fuel burning, Using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour	PL230
Resource Activity, Ancillary 15 - Fuel burning, Using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour	PL260

Resource Activity, Ancillary 14 - Electricity Generation, 1: Generating electricity by using gas at a rated capacity of 10MW electrical or more	PL238
Resource Activity, Ancillary 14 - Electricity Generation, 1: Generating electricity by using gas at a rated capacity of 10MW electrical or more	PL258
Resource Activity, Ancillary 14 - Electricity Generation, 1: Generating electricity by using gas at a rated capacity of 10MW electrical or more	PL252
Resource Activity, Ancillary 14 - Electricity Generation, 1: Generating electricity by using gas at a rated capacity of 10MW electrical or more	PL194
Resource Activity, Ancillary 14 - Electricity Generation, 1: Generating electricity by using gas at a rated capacity of 10MW electrical or more	PL198
Resource Activity, Ancillary 14 - Electricity Generation, 1: Generating electricity by using gas at a rated capacity of 10MW electrical or more	PL230
Resource Activity, Ancillary 14 - Electricity Generation, 1: Generating electricity by using gas at a rated capacity of 10MW electrical or more	PL260
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (b-i) more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL238
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (b-i) more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL258
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (b-i) more than 100 but not more than 1500EP if	PL252

treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (b-i) more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL194
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (b-i) more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL198
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (b-i) more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL230
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (b-i) more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL260
Resource Activity, Ancillary 64 - Water treatment, 2: Desalinating, in a day, the following quantity of water, allowing the release of waste to waters other than seawater, (b) more than 5ML	PL238
Resource Activity, Ancillary 64 - Water treatment, 2: Desalinating, in a day, the following quantity of water, allowing the release of waste to waters other than seawater, (b) more than 5ML	PL258
Resource Activity, Ancillary 64 - Water treatment, 2: Desalinating, in a day, the following quantity of water, allowing the release of waste to waters other than seawater, (b) more than 5ML	PL230

Resource Activity, Ancillary 64 - Water treatment, 2: Desalinating, in a day, the following quantity of water, allowing the release of waste to waters other than seawater, (b) more than 5ML	PL252
Resource Activity, Ancillary 64 - Water treatment, 2: Desalinating, in a day, the following quantity of water, allowing the release of waste to waters other than seawater, (b) more than 5ML	PL194
Resource Activity, Ancillary 64 - Water treatment, 2: Desalinating, in a day, the following quantity of water, allowing the release of waste to waters other than seawater, (b) more than 5ML	PL198
Resource Activity, Ancillary 64 - Water treatment, 2: Desalinating, in a day, the following quantity of water, allowing the release of waste to waters other than seawater, (b) more than 5ML	PL260
Resource Activity, Ancillary 56 - Regulated Waste Storage Receiving and storing regulated waste	PL230
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (a-i) 21 to 100EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL238
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (a-i) 21 to 100EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL258

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.

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

Enquiries:
Energy and Extractive Resources
Department of Environment and Science
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Date issued: 1 May 2020

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)

This environmental authority incorporates the following schedules:

- Schedule A – General
- Schedule B – Water
- Schedule BE – Coal Seam Gas Water Injection Trial
- Schedule C – Regulated Dams
- Schedule D – Land
- Schedule E – Acoustic
- Schedule F – Air
- Schedule G – Waste
- Schedule H – Rehabilitation
- Schedule I – Definitions

Words and phrases which are underlined are defined in *Schedule I – Definitions*.

Schedule A – General

- General 1 This environmental authority authorises the carrying out of the following resource activities:
- (a) The petroleum activities listed in *Schedule A, Table 1 – Authorised Petroleum Activities* to the extent they are carried out in accordance with the activity's corresponding total number and maximum disturbance;
 - (b) The following specified relevant activities:
 - i. Regulated waste storage – receiving and storing regulated waste other than tyres;
 - ii. Sewage treatment – operating sewage treatment works, other than no-release works, with a total daily peak design capacity of 21 to 100 EP;
 - (c) For the specified relevant activities listed in (General 1 (b)) above, another activity where Schedule 2 of the Environmental Protection Regulation 2008 (the Regulation) provides exemption for the activity, but only to the extent of the circumstances stated in Schedule 2 of the Regulation; and
 - (d) Incidental activities that are not otherwise specified relevant activities.
- General 2 This environmental authority does not authorise environmental harm unless a condition contained in this environmental authority explicitly authorises that harm. Where there is no condition, the lack of a condition shall not be construed as authorising harm.
- General 7 All monitoring must be undertaken by a suitably qualified person.
- General 8 If requested by the administering authority in relation to investigating a complaint, monitoring must be commenced within 10 business days.
- General 9 All laboratory analyses and tests must be undertaken by a laboratory that has NATA accreditation for such analyses and tests.
- General 10 Notwithstanding condition (General 9), 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.

Schedule A, Table 1 - Authorised Petroleum Activities

Petroleum Activity(ies)	Total Number of Authorised Petroleum Activities	Maximum Disturbance Authorised
Total coal seam gas wells, including: Core wells <u>Exploration wells</u> <u>Development wells</u> Production wells	1,566 wells	1,566 ha
Communication towers	10	10 units, 10 ha
Injection well(s) and associated facilities	1	4 ha
Compressor units	40	40 units, 8 ha
Central gas processing facilities	2	2 facilities, 8 ha
Regulated structures	22	22 dams
Water treatment facilities	2	12 ML/d (each), 2 ha
Sewage treatment plants	2	Less than 450 EP (each), 0.15 ha
Sewage treatment plants	10	Less than 100 EP (each), 0.15 ha
Power stations	1	40 MW, 1.2 ha

General 11 Monitoring and sampling must be carried out in accordance with the requirements of the following documents (as relevant to the sampling being undertaken), as amended from time to time:

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

- General 12 In addition to the requirements under Chapter 7, Part 1, Division 2 of the *Environmental Protection Act 1994*, the administering authority must be notified through the Pollution Hotline and in writing, as soon as possible, but within 48 hours of becoming aware of any of the following events:
- (a) any unauthorised significant disturbance to land
 - (b) potential or actual loss of structural or hydraulic integrity of a dam
 - (c) when the level of the contents of any regulated dam reaches the mandatory reporting level
 - (d) when a regulated dam will not have available storage to meet the design storage allowance on 1 November of any year
 - (e) potential or actual loss of well integrity
 - (f) when the seepage trigger action response procedure required under condition (Water 14(g)) is or should be implemented
 - (g) unauthorised releases of any volume of prescribed contaminants to waters
 - (h) unauthorised releases of volumes of contaminants, in any mixture, to land greater than:
 - i. 200 L of hydrocarbons; or
 - ii. 1 000 L of brine; or
 - iii. 5 000 L of untreated coal seam gas water; or
 - iv. 5 000 L of raw sewage; or
 - v. 10 000 L of treated sewage effluent.
 - (i) groundwater monitoring results from a landholder's active groundwater bore monitored under the stimulation impact monitoring program which is a 10% or greater increase from a previous baseline value for that bore and which renders the water unfit for its intended use
 - (j) monitoring results where two out of any five consecutive samples do not comply with the relevant limits in the environmental authority.

- General 13 Petroleum activities that cause significant disturbance to land must not be carried out until financial assurance has been given to administering authority as security for compliance with

the environmental authority and for any costs or expenses, or likely costs or expenses, mentioned in section 298 of the *Environmental Protection Act 1994*.

- General 16 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.
- General 17 All plant and equipment must be maintained and operated in their proper and effective condition.
- General 18 The following infrastructure must be signed with a unique reference name or number in such a way that it is clearly observable:
- (a) regulated dams and low consequence dams
 - (b) exploration, appraisal and development wells
 - (c) water treatment facilities
 - (d) brine encapsulation facilities
 - (e) landfill cells
 - (f) sewage treatment facilities
 - (g) specifically authorised discharge points to air and waters
 - (h) any chemical storage facility associated with the environmentally relevant activity of chemical storage

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- (i) field compressor stations
 - (j) central compressor stations
 - (k) gas processing facilities; and
 - (l) pipeline compressor stations.
- General 19 Measures to prevent fauna being harmed from entrapment must be implemented during the construction and operation of well infrastructure, dams and pipeline trenches.
- General 20 For activities involving significant disturbance to land, control measures that are commensurate to the site- specific risk of erosion, and risk of sediment release to waters must be implemented to:
- (a) allow stormwater to 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).
- General 21 Petroleum activities must not cause environmental nuisance at a sensitive place, other than where an alternative arrangement is in place.
- General 22 A certification must be prepared by a suitably qualified person within 30 business days of completing every plan, procedure, program and report required to be developed under this environmental authority, which demonstrates that:
- (a) relevant material, including current published guidelines (where available) have been considered in the written document
 - (b) the content of the written document is accurate and true; and
 - (c) the document meets the requirements of the relevant conditions of the environmental authority.
- General 23 All plans, procedures, programs, reports and methodologies required under this environmental authority must be written and implemented.
- General 24 All documents required to be developed under this environmental authority must be kept for five years.

- General 25 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.
- General 26 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 – Water

- Water 1 Contaminants that will or may cause environmental harm must not be directly or indirectly released to any waters, except as authorised by condition (B15).
- Water 2 The extraction of groundwater as part of the petroleum activity(ies) from underground aquifers must not directly or indirectly cause environmental harm to a wetland.
- Water 3 Petroleum activities must not occur in or within 200m of a:
- (a) wetland of high ecological significance, other than that authorised by *Schedule D, Table 3 — Significant residual impacts to prescribed environmental matters*
 - (b) Great Artesian Basin Spring
 - (c) subterranean cave GDE.
- Water 3A Despite condition (Water 3), petroleum activities may occur within 200m of a wetland of high ecological significance, provided they are directly associated with activities authorised per condition (Water 3(a)).
- Water 4 Only construction or maintenance of linear infrastructure is permitted in or within any wetland of other environmental value or in a watercourse.
- Water 5 A 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.
- Water 5 B 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.

- Water 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 bankfull situation is not expected and that flow is maintained.

- Water 7 The construction or maintenance of linear infrastructure authorised under condition (Water 4) must comply with the water quality limits as specified in *Schedule B, Table 1 – Release limits for construction or maintenance of linear infrastructure*.

Schedule B, Table 1 – Release limits for construction or maintenance of linear infrastructure

Water quality parameters	Units	Water quality limits
Turbidity	Nephelometric Turbidity Units (NTU)	For a <u>wetland of other environmental value</u> , 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 <u>watercourse</u> , 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 <u>wetland of other environmental value</u> , if background water turbidity is equal to, or below 45 NTU, a turbidity limit of no greater than 55 NTU applies, measured within a 50m radius of the construction or maintenance activity. For a <u>watercourse</u> , if background water turbidity is equal to, or below 45 NTU, a turbidity limit of no greater than 55 NTU applies, measured within 50m downstream of the construction or maintenance activity.
Hydrocarbons	-	For a <u>wetland of other environmental value</u> , or <u>watercourse</u> , no visible sheen or slick

- Water 8 Monitoring must be undertaken at a frequency that is appropriate to demonstrate compliance with condition (Water 7).

- Water 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 (GDA94) 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 (Water 8).

- Water 10 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.

- Water 11 Petroleum activity(ies) on floodplains 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.
- Water 12 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 August 2019.
- Water 13 The seepage monitoring program required by condition (Water 12) 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 groundwater dependent ecosystems, landholder's active groundwater bores, or water supply bores
 - iii. provide for the early detection of negative impacts prior to reaching migration pathways to other formations (i.e. faults, areas of unconformities known to connect two or more formations)
 - (f) monitoring of groundwater at each background and seepage monitoring bore at least quarterly for the trigger parameters identified in condition (Water 13(b))

- (g) seepage trigger action response procedures for when trigger parameters and trigger levels identified in conditions (Water 13(b)) and (Water 13(c)) trigger the early detection of seepage, or upon becoming aware of any monitoring results that indicate potential groundwater contamination
- (h) a rationale detailing the program conceptualisation including assumptions, determinations, monitoring equipment, sampling methods and data analysis; and
- (i) provides for annual updates to the program for new containment facilities constructed in each annual return period.

Water 14 A bore drill log must be completed for each seepage monitoring bore in condition (Water 13) 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.

B15 The release of treated CSG water is authorised to occur in accordance with:

- (a) *Schedule B, Table 2 – Treated CSG Water Release Point, Source and Receiving Waters;*
- (b) *Schedule B Table 3 – Treated CSG Water Release Limits for Monitoring Point M1 – Daily Monitoring;* and
- (c) *Schedule B, Table 4 – Treated CSG Water Release Limits for Monitoring Point M1 – Quarterly Monitoring.*

B16 The quality of the treated CSG water being released must be:

- (a) monitored at the frequency specified, and
- (b) comply with each quality characteristic release limit and limit type,

specified in *Schedule B Table 3 – Treated CSG Water Release Limits for Monitoring Point M1 – Daily Monitoring* and *Schedule B, Table 4 – Treated CSG Water Release Limits for Monitoring Point M1 – Quarterly Monitoring* when measured at the monitoring point M1 specified in *Schedule B, Table 2 – Treated CSG Water Release Point, Source and Receiving Waters*.

Schedule B, Table 2 – Treated CSG Water Release Point, Source and Receiving Waters

Water Source and Location	Release Point	Location (GDA94, MGA zone 56)	Monitoring Point	Receiving Waters Description
Treated CSG Water from the reverse osmosis water treatment plant and treated water dam located on PL230	R1, defined as the outlet of discharge pipe to Wilkie Creek	6995465 mN 303004 mE	M1, defined as the sample point in the discharge pipeline point to release into Wilkie Creek	Wilkie Creek

Schedule B, Table 3 – Treated CSG Water Release Limits for Monitoring Point (M1) – Daily Monitoring

Quality Characteristic	Unit	Release Limit(s)	Limit Type	Monitoring Frequency
Electrical conductivity	µS/cm	580	80 th percentile, based on at least 5 samples with not less than 60 minutes between samples	Daily during release
pH	pH Unit	6.5 - 9	Range	Daily during release
Suspended Solids	mg/L	180	Maximum	Daily during release
Boron	mg/L	0.37	Maximum	Daily during release

Schedule B, Table 4 – Treated CSG Water Release Limits for Monitoring Point (M1) – Quarterly Monitoring

Quality characteristic	Unit	Maximum Release limit	Monitoring frequency
Aluminium	mg/L	0.2	The first release day of each quarter
Antimony	ml/L	0.003	
Arsenic	mg/L	0.007	
Barium	mg/L	0.7	
Bisphenol A	mg/L	0.2	
Boron	mg/L	4	
Bromide	mg/L	7	
BTEX			The first release day of each quarter
Benzene	mg/L	0.001	
Toluene	mg/L	0.8	
Ethylbenzene	mg/L	0.3	
Xylene (m & p)	mg/L	0.6	
Cadmium	mg/L	0.002	
Chromium	mg/L	0.05	
Copper	mg/L	2	

Quality characteristic	Unit	Maximum Release limit	Monitoring frequency
Cyanide	mg/L	0.08	The first release day of each quarter
Fluoride	mg/L	1.5	
Iodide	mg/L	0.5	
Iron	mg/L	0.3	
Lead	mg/L	0.01	
Manganese	mg/L	0.5	
Mercury	mg/L	0.001	
Molybdenum	mg/L	0.05	
Nickel	mg/L	0.02	
Nonylphenol	mg/L	0.5	
PAH (as B(a)P TEF) Species: benz[a]anthracene benzo[b+j]fluoranthene benzo[k]fluoranthene benzo[a]pyrene chrysene dibenz[a,h]anthracene indeno[1,2,3-cd]pyrene	TEF: 0.1 0.1 0.1 1.0 0.1 1.0 0.1	µg/L	The first release day of each quarter
Selenium	mg/L	0.01	
Silver	mg/L	0.1	
Strontium	mg/L	4	
Total Petroleum Hydrocarbons (TPH)	mg/L	0.2	
Vanadium	mg/L	0.05	
Zinc	mg/L	3	
Radium-226 Lead-210 Polonium-210 Radium-228	mSv/year	0.5 The dose for each parameter is summed to give the total dose which must be less than or equal to 0.5 mSv/year	

B17

If the monitoring required by condition (B16) indicates that any of the quality characteristic release limits specified in *Schedule B, Table 4 – Treated CSG Water Release Limits for Monitoring Point M1 – Quarterly Monitoring* have been exceeded at any time during any release of treated CSG water, the environmental authority holder must, within five (5) business days of notifying the administering authority of the exceedance, unless a longer time is agreed to by the administering authority:

- (a) complete an investigation into the exceedance, which includes an analysis of the (potential and actual) causes for the exceedance; and
- (b) provide a written report to the administering authority on completion of the investigation that includes:

- i. details of the investigation carried out;
- ii. any actions taken to prevent impacts to waters that may be used for drinking water;
- iii. the cause for the exceedance;
- iv. all water quality monitoring results pertaining to the investigation;
- v. any general observations;
- vi. methodology(ies) and any relevant calculations used; and
- vii. corrective actions to rectify the cause of the exceedance.

B18 Where an exceedance of a quality characteristic release limit specified in *Schedule B, Table 4 – Treated CSG Water Release Limits for Monitoring Point M1 – Quarterly Monitoring* is being investigated in accordance with condition (B17), the investigation and reporting required by condition (B17) is not required if a subsequent exceedance occurs, during investigation of the initial exceedance, which has resulted from the same cause that triggered the initial exceedance.

B19 Prior to commencing any release of treated CSG water authorised under this environmental authority, a stream flow gauging station (GP1) must be installed.

B20 The stream flow gauging station (GP1) must be installed in accordance with *Schedule B, Table 5 – Contaminant Release During Flow Events*.

Schedule B, Table 5 – Contaminant Release During Flow Events

Receiving water description	Gauging station description	Latitude or northing (GDA94)	Longitude or easting (GDA94)	Minimum Flow in Receiving Water Required for a Release Event	Flow recording Frequency
Wilkie Creek	Gauging station 1 (GP1)	50-100 metres upstream of Release Point R1	50-100 metres upstream of Release Point R1	0.14 m ³ /s	At 6 hour intervals during discharge (minimum twice daily)

B21 The flow rate of treated CSG water released from the release point authorised in *Schedule B, Table 2 – Treated CSG Water Release Point, Source and Receiving Waters* must not exceed a ratio of 1 part of the flow rate of the treated CSG water being released to 4 parts of the measured upstream receiving water flow rate.

- B22 The volume of treated CSG water released from the release point authorised in *Schedule B, Table 2 – Treated CSG Water Release Point, Source and Receiving Waters* must not exceed a maximum of 8ML/day.
- B23 The following characteristics of the treated CSG water released must be measured and recorded daily during all release events:
- (a) the volume of treated CSG water released through the release point R1;
 - (b) the date and time of release commencing and ceasing;
 - (c) the release rate;
 - (d) for any change in the release rate:
 - i. the date and time of the change;
 - ii. the new release rate; and
 - iii. water levels and flow rate during the discharge event.
 - (e) water levels and flow rate during the discharge event;
 - (f) water quality characteristics monitoring results; and
 - (g) details of any observed impacts/conditions.
- B24 Prior to commencing any release of treated CSG water authorised under this environmental authority, each monitoring and release point specified in *Schedule B, Table 2 – Treated CSG Water Release Point, Source and Receiving Waters* must be marked and readily identifiable from the banks of Wilkie Creek.
- B25 The quality of the receiving waters must be monitored daily during release of treated CSG water at locations representative of the receiving waters determined in accordance with condition (B31), for the following water quality characteristics:
- (a) Electrical conductivity ($\mu\text{S}/\text{cm}$);
 - (b) pH (pH Unit);
 - (c) Turbidity (NTU);
 - (d) Suspended Solids (mg/L);
 - (e) Calcium (mg/L);

- (f) Magnesium (mg/L);
- (g) Fluoride (mg/L);
- (h) Sulphate (mg/l); and
- (i) Boron (mg/L).
- B26 If water has been released from authorised release points listed in *Schedule B, Table 2 – Contaminated Release Points, Sources and Receiving Waters*, the holder of this environmental authority must undertake an annual assessment of the contaminants of treated CSG water to determine the risk of environmental harm from release of treated CSG water to surface waters. This should consider the contaminants mentioned in the ANZECC & ARMCANZ 2000 guidelines. This annual assessment must be included in the Annual Return.
- B27 Prior to the release of treated CSG water to Wilkie Creek a Receiving Environment Monitoring Program (REMP) must be developed and implemented to monitor, identify and describe any adverse impacts to surface water environmental values, water quality and flows due to the authorised release of treated CSG water to Wilkie Creek.
- B28 The REMP required by condition (B27) must include periodic monitoring for the effects of the release on the receiving environment as a result of treated CSG water releases to waters from the release location (R1) specified in Table B15 - Treated CSG Water Release Point, Source and Receiving Waters.
- B29 The quality of the receiving waters must be monitored at the locations specified in Schedule B, *Table 6 – Receiving Water Upstream Background Sites and Downstream Monitoring Points*.

Schedule B, Table 6 – Receiving Water Upstream Background Sites and Downstream Monitoring Points

Monitoring Points	Receiving Waters	Northing (<u>GDA94</u>)	Easting (<u>GDA94</u>)
Upstream background monitoring point			
Monitoring Point (M2)	Wilkie Creek	50 – 100 metres upstream of Release Point R1	50 – 10 metres upstream of Release Point R1
Downstream monitoring point			
Monitoring Point (M3)	Wilkie Creek	150 – 200 metres downstream of Release Point R1	150 - 200 metres downstream of Release Point R1

B30 The REMP required by Condition (B27) must:

- (a) assess the condition or state of receiving waters, including upstream conditions, spatially within the REMP area, considering background water quality characteristics based on accurate and reliable monitoring data that takes into consideration temporal variation (e.g. seasonality);
- (b) be designed to facilitate assessment against water quality objectives for the relevant environmental values that need to be protected;
- (c) include monitoring from background reference sites (e.g. upstream or background) and downstream sites from the release;
- (d) specify the frequency and timing of sampling required in order to reliably assess ambient conditions and to provide sufficient data to derive site specific background reference values in accordance with the Queensland Water Quality Guidelines 2006. This should include monitoring during periods of natural flow irrespective of other discharges;
- (e) include monitoring and assessment of dissolved oxygen saturation and temperature and all water quality parameters listed in Condition (B25);
- (f) include, where appropriate, monitoring of metals/metalloids in sediments (in accordance with ANZECC & ARMCANZ 2000, BATLEY and/or the most recent version of *AS5667.1 Guidance on Sampling of Bottom Sediments*);
- (g) include, where appropriate, monitoring of macroinvertebrates in accordance with the AusRivas methodology;
- (h) apply procedures and/or guidelines from ANZECC and ARMCANZ 2000 and other relevant guideline documents;
- (i) describe sampling and analysis methods and quality assurance and control; and
- (j) incorporate stream flow and hydrological information in the interpretations of water quality and biological data.

B31 A report outlining the findings of the REMP, including all monitoring results and interpretations in accordance with conditions (B27) to (B30) must be prepared annually. This must include a determination of the risk of environmental harm from release of treated CSG water to the receiving environment waters.

Schedule BE – Coal Seam Gas Water Injection Trial

BE1 The only fluids authorised to be injected into an aquifer(s) are those fluid types specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection*.

Schedule BE, Table 1 – Details of Authorised Fluid Injection

Well Location (GDA94, MGA zone 56)	Injection Well Number / Reference	Target Formation and Perforated Zone	Fluid Type	Maximum Injection Rate ML/d	Hydraulic Impact Zone	Water Quality Impact Zone
313669 mE 6967949 mN	Tipton-193	Precipice Formation, between 1040m to 1110m depth	Treated CSG water ¹	4	9,340 m radius from injection well	148 m radius from injection well

¹ Treated CSG water means any fluid that contains any proportion of treated CSG water, blended or otherwise.

BE2 Fluid injection must be in accordance with the quantities and locations listed in *Schedule BE, Table 1 – Details of Authorised Fluid Injection*.

BE3 The holder of this environmental authority must notify the administering authority the commencement date of the trial at least seven (7) days prior to its commencement.

BE4 The injection trial is limited to a period of 180 days of injection, followed by a six-month recovery period.

BE5 Injection must cease immediately upon becoming aware that environmental harm is caused or threatened to be caused as a result of the injection activities.

BE6 The construction of the Tipton-193 injection well must be carried out in accordance with the well construction requirements described in the most recent version of the Department of Environment and Heritage Protection's "CSG Water Injection Well Construction Requirements", as amended from time to time.

BE7 The Tipton-193 injection well must be mechanically functional such that there is no significant fluid movement into a water resource aquifer through vertical channels adjacent to the well bore hole.

BE8 The construction, operation and maintenance of the injection well specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* must be undertaken in a way that prevents and/or minimises impacts to the environmental values of the target formation and ensures the integrity of the bore.

BE9 The injection pressure must not exceed 90 percent of the formation fracture pressure.

BE10 The quality of the fluid being injected into the injection well specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* must comply with the contaminant limits prescribed in *Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid*.

Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid

Quality Characteristics	Release Limits	Limit Type
pH (pH units)	Minimum 6.5, Maximum 10	Range
Total Dissolved Solids (TDS) ¹	Mean TDS of injection fluid must not exceed median TDS of formation water measured in background water quality monitoring well	Maximum
Dissolved Oxygen	500 µg/L	Maximum
Total suspended solids	25 mg/L	Maximum

¹ Electrical conductivity is an acceptable proxy measurement for measuring TDS of the injection fluid. If used, the conversion from EC to TDS must be stated and confirmed with laboratory monitoring results.

BE11 A The quality of the fluid being injected into the injection well specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* must be monitored at the frequency specified in *Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid*.

BE11 B The administering authority must be notified in writing as soon as reasonably practicable, but within 48 hours of becoming aware of:

- (a) migration of injected fluid out of the target formation; or
- (b) a loss of hydraulic isolation of the target formation; or
- (c) the detection of groundwater contaminants that were not detected in background samples; or
- (d) an injection fluid monitoring result that does not comply with any one of the parameters in *Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid*.

Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid

Monitoring parameter	Unit	Monitoring frequency during injection
Temperature of target formation	°C	N/A
Injection fluid temperature	°C	Continuous
Inlet pressure	KPa	Continuous
Fluid flow rate	L/sec	Continuous
	ML/day	Daily
Dissolved Oxygen (DO)	µg/L	Daily
Electrical Conductivity	µS/cm	Daily
pH	pH units	Daily
Turbidity	NTU	Daily
Sodium	mg/L	Weekly
Potassium	mg/L	Weekly
Calcium	mg/L	Weekly
Magnesium	mg/L	Weekly
Chloride	mg/L	Weekly
Sulphate as SO ₄	mg/L	Weekly
Carbonate / Bicarbonate	mg/L	Weekly
Bromine	mg/L	Monthly
Fluoride	mg/L	Monthly
Iodide	mg/L	Weekly
Silica	mg/L	Monthly
Iodine	mg/L	Monthly
Nitrate	mg/L	Monthly
Total organic carbon	mg/L	Weekly
Total Dissolved Solids	mg/L	Weekly
Redox Potential	mV	Weekly
Total Hardness as CaCO ₃	mg/L	Weekly

Monitoring parameter	Unit	Monitoring frequency during injection
Total Alkalinity as CaCO ₃	mg/L	Weekly
Hydroxide alkalinity as CaCO ₃	mg/L	Weekly
Carbonate Alkalinity as CaCO ₃	mg/L	Weekly
Bicarbonate Alkalinity as CaCO ₃	mg/L	Weekly
Total suspended solids	mg/L	Weekly
Bromide	mg/L	Weekly
Aluminium	mg/L	Monthly
Arsenic	mg/L	Monthly
Barium	mg/L	Monthly
Boron	mg/L	Monthly
Copper	mg/L	Monthly
Iron	mg/L	Monthly
Manganese	mg/L	Monthly
Mercury	mg/L	Monthly
Nickel	mg/L	Monthly
Strontium	mg/L	Monthly
Zinc	mg/L	Monthly
Total Petroleum Hydrocarbons	µg/L	Monthly
<u>BTEX</u>	µg/L	Monthly

BE12 Notwithstanding conditions (BE9) and (BE10), the injection of treated CSG water into the injection well specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* must have considered the recommendations for water blending described in the following documents, where appropriate:

- (a) Surat Gas Project – Geochemical Blending and Compatibility Study: Tipton Injection Trials, March 2013; and
- (b) Surat Gas Project – Geochemical Blending and Compatibility Study: Tipton Injection Trials – Phase 2, March 2013.

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- BE13 The holder of this environmental authority must provide for non-chemical disinfection of injection fluid if results of six-monthly testing of injected fluid show levels of coliform bacteria, sulphate reducing bacteria or iron fixing bacteria that has potential to cause adverse impacts on the groundwater within the target formation.
- BE14 An Injection Management Plan which has been certified by a suitably qualified person must be developed and implemented prior to the carrying out of the trial fluid injection activity(ies).
- BE15 The Injection Management Plan must include but not necessarily be limited to:
- (a) estimated volumes and rates of water to be injected;
 - (b) a description of the physical, chemical and biological components and their concentrations of the water to be produced;
 - (c) details of how and where the fluid will be produced, aggregated, stored and kept separate from other waters until it is treated and injected;
 - (d) details of where the fluid is proposed to be treated including a description of the treatment process;
 - (e) a water quality compatibility assessment which demonstrates that the injection fluid has inconsequential reactivity with the target formation and native groundwater it will come into contact with;
 - (f) the regional characteristics of the receiving environment;
 - (g) identification of the water quality impact zone and the hydraulic impact zone;
 - (h) identification of any fluid injection well, all existing bores, springs, lakes, wetlands, environmental assets and watercourses connected to groundwater, faults and other geologic features that occur within the water quality impact zone and the hydraulic impact zone;
 - (i) identification of the environmental values and water quality objectives of the potential water quality impact zone of the target formation in accordance with the *Environmental Protection (Water) Policy 2009* and the *Queensland Water Quality Guidelines 2009*;
 - (j) an assessment of the potential for migration of injection fluid or native groundwater out of the target formation through wells, bores, springs, connected watercourses, faults or other geologic features likely to impact on other aquifers;
 - (k) a risk assessment identifying potential hazards, their inherent risk, preventative measures for the management of potential hazards and details on sampling and analysis methods to verify preventative measures of potential hazards, including frequency and locations and quality assurance and control;

- (l) control measures that will be implemented for fluid storage, treatment and injection to prevent or control the release of a contaminant or waste to the environment other than the release authorised in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* and *Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid*;
- (m) verification methods to assess performance of the injection activities;
- (n) the indicators or other criteria against which the performance of fluid injection will be assessed;
- (o) procedures that will be adopted to regularly review the monitoring program;
- (p) reporting procedures to management and the administering authority should unforeseen or non-compliant monitoring results be recorded; and
- (q) procedures that will be implemented to prevent unauthorised environmental harm from unforeseen or non-compliant monitoring results.

BE16 A Receiving Environment Monitoring Program (REMP) for Injection Activities which has been certified by a suitably qualified person must be developed and implemented to monitor, identify and describe any adverse impacts to the following values of the target formation due to the injection of treated CSG water:

- (a) hydraulic response;
- (b) water quality response; and
- (c) any other groundwater environmental values identified.

BE17 The REMP for Injection Activities required by condition (BE16) must be developed and implemented prior to the carrying out of the trial fluid injection activity(ies).

BE18 The REMP for Injection Activities required by condition (BE16) must include, but not necessarily be limited to:

- (a) methods to validate the assumptions, predicted impacts and the effectiveness of the proposed preventative measures associated with the modelled water quality impact zone and hydraulic impact zone;
- (b) monitoring of the hydraulic response to the trial injection at the well(s) referred to in condition (BE18)(f)(ii);
- (c) monitoring of the water quality of the injection fluid during injection for the parameters listed in *Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid*;

- (d) monitoring of the water quality response following the completion of the injection trial recovery period through sampling of the target aquifer, within the water quality impact zone, for the parameters listed in *Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid*;
- (e) a definition of the background water quality of the Precipice Sandstone to be used for monitoring compliance with *Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid* and for reporting in the Injection Trial Report required by condition (BE19);
- (f) the installation and use of a minimum of two wells:
 - i. one of which accesses the target aquifer within the water quality impact zone; and
 - ii. the other of which is placed at an adequate distance to determine the extent of the hydraulic response to the injection;
- (g) methods for the analysis and interpretation and a description of the statistical basis on which conclusions will be drawn to verify the assumptions of the injection proposal; and
- (h) a demonstration of how the REMP will validate assumptions, predicted impacts and the effectiveness of quality assurance and control measures.

BE19 Upon completion and within two (2) months of the completion of the injection trial's recovery period the holder of the authority must submit to the administering authority an Injection Trial Report prepared by a suitably qualified person.

BE20 The Injection Trial Report must include, but not necessarily be limited to:

- (a) details of the injection well including but not limited to:
 - i. location details (GDA94);
 - ii. the inferred lithology *;
 - iii. casing details including type, outer diameter (mm), wall thickness (mm) and locations (depth from and to in metres);
 - iv. cementing details including type, hole diameter (mm), casing outer diameter (mm) and locations (depth from and to in metres);
 - v. calculated target formation fracture pressure; and
 - vi. target formation pressure prior to injection;

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- (b) a detailed interpretation of the logs and other tests conducted during drilling and construction or refurbishment of the well against their specific objectives;
 - (c) a completed well schematic diagram;
 - (d) a temperature survey;
 - (e) a cement integrity log;
 - (f) outcomes of the injection trial including, but not limited to:
 - i. well head injection rates versus formation pressure;
 - ii. target formation pressure within the hydraulic impact zone during and upon completion of the trial;
 - iii. hydraulic gradient of the target formation within the hydraulic impact zone upon completion of the trial;
 - iv. the effectiveness of aquitards (including the stability of the aquitard) and aquicludes of confining the injected fluid within the target formation; and
 - v. a detailed interpretation of the logs and other tests conducted during the injection trial against their specific objectives;
 - vi. validation of conceptual framework for injection; and
 - vii. additional hazards that were not identified earlier;
 - (g) the results of the REMP for Injection Activities;
 - (h) analysis of monitoring and operational data in terms of:
 - i. validation of conceptual framework for injection; and
 - ii. additional hazards that were not identified earlier;
 - (i) a revised risk analysis that identifies all potential hazards, likelihood of various risk elements and associated consequences;
 - (j) a revised water quality compatibility assessment which demonstrates that the injection fluid has inconsequential reactivity with the target formation and native groundwater it will come into contact with;
 - (k) a re-evaluation of the hydraulic impact zone; and
 - (l) a re-evaluation of the water quality impact zone.

* Inferred lithology means the best available description of the lithology based upon historical drilling records, interpretation of logs and any other information that the suitably qualified person may have discovered.

BE21 Following completion of the injection trial, a fluid injection cessation report which has been certified by a suitably qualified person must be submitted to the administering authority within two (2) months of completion of the injection trial's recovery period.

BE22 The fluid injection cessation report must include, but not necessarily be limited to:

- (a) volumes of fluid injected at each well;
- (b) a risk assessment statement providing details on identified hazards including their inherent risk, summary of the results from the verification monitoring, preventative measures and the residual risk; and
- (c) a monitoring report outlining the methods and results of verification monitoring undertaken to assess the performance of the injection activities and preventative measures for identified hazards.

Schedule C – Regulated Dams

- Dams 1 The consequence category of any structure must be assessed by a suitably qualified and experienced person in accordance with the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)* at the following times:
- (a) prior to the design and construction of the structure, if it is not an existing structure; or
 - (b) prior to any change in its purpose or the nature of its stored contents.
- Dams 2 A consequence assessment report and certification must be prepared for each structure assessed and the report may include a consequence assessment for more than one structure.
- Dams 3 Certification must be provided by the suitably qualified and experienced person who undertook the assessment, in the form set out in the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)*.
- Dams 4 Conditions (Dams 5) to (Dams 9) inclusive do not apply to existing structures.
- Dams 5 All regulated structures must be designed by, and constructed under the supervision of, a suitably qualified and experienced person in accordance with the requirements of the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/19338)*.
- Dams 6 Construction of a regulated structure is prohibited unless:
- (a) the holder of this environmental authority has submitted a consequence category assessment report and certification to the administering authority; and
 - (b) certification for the design, design plan and the associated operating procedures has been certified by a suitably qualified and experienced person in compliance with the relevant condition of this authority.
- Dams 7 Certification must be provided by the suitably qualified and experienced person who oversees the preparation of the design plan in the form set out in the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/19338)*, and must be recorded in the Register of Regulated Structures.
- Dams 8 Regulated structures must:
- (a) be designed and constructed in compliance with the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/19338)*;
 - (b) be designed and constructed with due consideration given to ensuring that the design integrity would not be compromised on account of:

- i. floodwaters from entering the regulated dam from any watercourse or drainage line; and
 - ii. wall failure due to erosion by floodwaters arising from any watercourse or drainage line.
- (c) have the floor and sides of the dam designed and constructed to prevent or minimise the passage of the wetting front and any entrained contaminants through either the floor or sides of the dam during the operational life of the dam and for any period of decommissioning and rehabilitation of the dam.
- Dams 9 Certification by the suitably qualified and experienced person who supervises the construction must be submitted to the administering authority on the completion of construction of the regulated structure, and state that:
- (a) the 'as constructed' drawings and specifications meet the original intent of the design plan for that regulated structure;
 - (b) construction of the regulated structure is in accordance with the design plan.
- Dams 10 All affected persons must be provided with a copy of the emergency action plan in place for each regulated structure
- (a) for existing structures that are regulated structures, within 10 business days of this condition taking effect;
 - (b) prior to the operation of the new regulated structure; and
 - (c) if the emergency action plan is amended, within 5 business days of it being amended.
- Dams 11 Operation of a regulated structure, except for an existing structure, is prohibited.
- Dams 12 For existing structures that are regulated structures:
- (a) where the existing structure that is a regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the DSA volume across the system, the holder of this environmental authority must submit to the administering authority within 12months of the commencement of this condition a copy of the certified system design plan including that structure; and
 - (a) there must be a current operational plan for the existing structures.
- Dams 13 Each regulated structure must be maintained and operated, for the duration of its operational life until decommissioned and rehabilitated, in compliance with the current operational plan and, if applicable, the current design plan and associated certified 'as constructed' drawings.
- Dams 14 Conditions Dams 15 to Dams 18 inclusive only apply to Regulated Structures which have not been certified as low consequence category for 'failure to contain – overtopping'.

- Dams 15 The Mandatory Reporting Level (the MRL) must be marked on a regulated dam in such a way that during routine inspections of that dam, it is clearly observable.
- Dams 16 The holder of this environmental authority must, as soon as practical and within forty-eight (48) hours of becoming aware, notify the administering authority when the level of the contents of a regulated dam reaches the MRL.
- Dams 17 The holder of this environmental authority must, immediately on becoming aware that the MRL has been reached, act to prevent the occurrence of any unauthorised discharge from the regulated dam.
- Dams 18 The holder of this environmental authority must record any changes to the MRL in the Register of Regulated Structures.
- Dams 19 The holder of this environmental authority must assess the performance of each regulated dam or linked containment system over the preceding November to May period based on actual observations of the available storage in each regulated dam or linked containment system taken prior to 1 July of each year.
- Dams 20 By 1 November of each year, storage capacity must be available in each regulated dam (or network of linked containment systems with a shared DSA volume), to meet the Design Storage Allowance (DSA) volume for the dam (or network of linked containment systems).
- Dams 21 The holder of this environmental authority must, as soon as possible and within forty-eight (48) hours of becoming aware that the regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, notify the administering authority.
- Dams 22 The holder of this environmental authority must, immediately on becoming aware that a regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, act to prevent the occurrence of any unauthorised discharge from the regulated dam or linked containment systems.
- Dams 23 Each regulated structure must be inspected each calendar year by a suitably qualified and experienced person.
- Dams 24 At each annual inspection, the condition and adequacy of all components of the regulated structure must be assessed and a suitably qualified and experienced person must prepare an annual inspection report containing details of the assessment and include a recommendations section, with any recommended actions to ensure the integrity of the regulated structure or a positive statement that no recommendations are required.

- Dams 25 The suitably qualified and experienced person who prepared the annual inspection report must certify the report in accordance with the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)*.
- Dams 26 The holder of this environmental authority must, within 20 business days of receipt of the annual inspection report, provide to the administering authority:
- (a) The recommendations section of the annual inspection report; and
 - (b) If applicable, any actions being taken in response to those recommendations; and
 - (c) If, following receipt of the recommendations and (if applicable) recommended actions, the administering authority requests a copy of the annual inspection report from the holder of this environmental authority, provide this to the administering authority within 10 business days of receipt of the request.
- Dams 27 The holder of this environmental authority must provide a copy of any reports, documentation and certifications prepared under this environmental authority, including but not limited to any Register of Regulated Structures, consequence assessment, design plan and other supporting documentation, to a new holder on transfer of this environmental authority.
- Dams 30 A Register of Regulated Dams must be established and maintained by the holder of this environmental authority for each regulated dam.
- Dams 31 The holder of this environmental authority must provisionally enter the required information in the Register of Regulated Dams when a design plan for a regulated dam is submitted to the administering authority.
- Dams 32 The holder of this environmental authority must make a final entry of the required information in the Register of Regulated Structures once compliance with conditions Dams 11 and Dams 12 has been achieved.
- Dams 33 The holder of this environmental authority must ensure that the information contained in the Register of Regulated Dams is current and complete on any given day.
- Dams 34 All entries in the Register of Regulated Dams must be approved by the chief executive officer for the holder of this environmental authority, or their delegate, as being accurate and correct.
- Dams 35 The holder of this environmental authority must, at the same time as providing the annual return, supply to the administering authority a copy of the records contained in the Register of Regulated Dams, in the electronic format required by the administering authority.
- Dams 36 All existing structures that have not been assessed in accordance with either the Manual or the former *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams* must be assessed and certified in accordance with the Manual within 6 months of amendment of the authority adopting this schedule.

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- Dams 37 All existing structures must subsequently comply with the timetable for any further assessments in accordance with the Manual specified in *Schedule C, Table 1 – Transitional requirements for existing structures*, depending on the consequence category for each existing structure assessed in the most recent previous certification for that structure.
- Dams 38 *Schedule C, Table 1 – Transitional requirements for existing structures* ceases to apply for a structure once any of the following events has occurred:
- (a) it has been brought into compliance with the hydraulic performance criteria applicable to the structure under the Manual; or
 - (b) it has been decommissioned; or
 - (c) it has been certified as no longer being assessed as a regulated structure.
- Dams 39 Certification of the transitional assessment required by conditions Dams 36 and Dams 37 (as applicable) must be provided to the administering authority within 6 months of amendment of the authority adopting this schedule.

Schedule C, Table 1 - Transitional hydraulic performance requirements for existing structures

Transition period required for existing structures to achieve the requirements of the *Manual for Assessing Consequence Categories and Hydraulic Performance of Dams*

Compliance with criteria	High	Significant	Low
>90% and a history of good compliance performance in last 5 years	No transition required	No transition required	No transitional conditions apply. Review consequence assessment every 7 years.
>70% - ≤90%	Within 7 years, unless otherwise agreed with the <u>administering authority</u> , based on no history of unauthorised releases.	Within 10 years, unless otherwise agreed with the <u>administering authority</u> , based on no history of unauthorised releases.	No transitional conditions apply. Review consequence assessment every 7 years.
>50 - ≤70 percent	Within 5 years, unless otherwise agreed with the <u>administering authority</u> , based on no history of unauthorised releases.	Within 7 years, unless otherwise agreed with the <u>administering authority</u> , based on no history of unauthorised releases.	Review consequence assessment every 7 years.
≤50%	Within 5 years or as per compliance requirements (e.g. TEP timing)	Within 5 years or as per compliance requirements (e.g. TEP timing)	Review consequence assessment every 5 years.
Regulated levee designed to prevent the ingress of clean flood water <100% compliant ¹	Within 5 years unless otherwise agreed with the <u>administering authority</u> .		

¹ Levees designed for the diversion of contaminated waters or protection of the structural integrity of a dam are not to be considered as part of this provision. These levees are considered a key design element of the relevant dam and transitional periods should as such align to that relevant compliance criteria and consequence category.

Schedule D – Land

- Land 1 Contaminants must not be directly or indirectly released to land except for those releases authorised by this environmental authority.
- Land 2 Top soil must be managed in a manner that preserves its biological and chemical properties.
- Land 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.
- Land 4 Acid sulfate soils must be treated and managed in accordance with the latest edition of the *Queensland Acid Sulfate Soil Technical Manual*.
- Land 5 Chemicals and fuels stored, must be effectively contained and where relevant, meet Australian Standards, where such a standard is applicable.
- Land 6 Pipeline operation and maintenance must be in accordance, to the greatest practicable extent, with the relevant section of the *APGA Code of Environmental Practice: Onshore Pipelines (2017)* (or more recent editions).
- Land 7 Pipeline trenches must be backfilled and topsoils reinstated within three months after pipe laying.
- Land 8 Reinstatement and revegetation of the pipeline right of way must commence within 6 months after cessation of petroleum activities for the purpose of pipeline construction.
- Land 9 Backfilled, reinstated and revegetated pipeline trenches and right of ways must be:
- (a) a stable landform;
 - (b) re-profiled to a level consistent with surrounding soils;
 - (c) re-profiled to original contours and established drainage lines; and
 - (d) vegetated with groundcover which is not a pest species, and which is established and growing.
- Biodiversity 1 Prior to undertaking activities that result in significant disturbance to land in areas of native vegetation, confirmation of on-the-ground biodiversity values of the native vegetation communities at that location must be undertaken by a suitably qualified person.
- Biodiversity 2 A suitably qualified person must develop and certify a methodology so that condition (Biodiversity 1) can be complied with and which is appropriate to confirm on-the-ground biodiversity values.

- Biodiversity 3 For conditions (Biodiversity 4) to (Biodiversity 9), where mapped biodiversity values differ from those confirmed under conditions (Biodiversity 1) and (Biodiversity 2), petroleum activities may proceed in accordance with the conditions of the environmental authority based on the confirmed on-the-ground biodiversity value.
- Biodiversity 4 The location of the petroleum activity(ies) must be selected in accordance with the following site planning principles:
- (a) maximise the use of areas of pre-existing disturbance;
 - (b) in order of preference, avoid, minimise or mitigate any impacts, including cumulative impacts, on areas of;
 - (c) native vegetation or other areas of ecological value;
 - (d) minimise disturbance to land that may result in land degradation ;
 - (e) in order of preference, avoid then minimise isolation, fragmentation, edge effects or dissection of tracts of native vegetation; and
 - (f) in order of preference, avoid then minimise clearing of native mature trees.
- Biodiversity 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 essential petroleum activity authorised in an environmentally sensitive area or its protection zone, be no greater than 40m in total width.
- Biodiversity 8A Where petroleum activities are to be carried out in environmentally sensitive areas or their protection zones, the petroleum activities must be carried out in accordance with *Schedule D, Table 1— Authorised petroleum activities in environmentally sensitive areas and their protection zones*.
- Biodiversity 8B The petroleum activities authorised under condition (Biodiversity 8) must not exceed the maximum footprint for the activities specified in *Schedule D, Table 2 – Maximum significant disturbance in environmentally sensitive areas and their protection zones*.

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

Environmentally sensitive area	Within the environmentally sensitive area	Primary protection zone of the environmentally sensitive area	Secondary protection zone of the environmentally sensitive area
<u>Category A environmentally sensitive areas</u>	No petroleum activities permitted.	Only <u>low impact petroleum activities</u> permitted.	Only <u>essential petroleum activities</u> permitted.
<u>Category B environmentally sensitive areas that are other than 'endangered' regional ecosystems</u>	Only <u>low impact petroleum activities</u> permitted.	Only <u>low impact petroleum activities</u> permitted.	Only <u>essential petroleum activities</u> permitted.
<u>Category B environmentally sensitive areas that are 'endangered' regional ecosystems</u>	Only <u>low impact petroleum activities</u> permitted.	Only <u>essential petroleum activities</u> permitted.	Only <u>essential petroleum activities</u> permitted.
<u>Category C environmentally sensitive areas that are 'nature refuges' or 'koala habitat'</u>	Only <u>low impact petroleum activities</u> permitted.	Only <u>low impact petroleum activities</u> permitted.	
<u>Category C environmentally sensitive areas that are 'essential habitat', 'essential regrowth habitat', or 'of concern' regional ecosystems</u>	Only <u>low impact petroleum activities</u> permitted.	Only <u>essential petroleum activities</u> permitted.	
<u>Category C environmentally sensitive areas that are 'regional parks' (previously known as 'resources reserves')</u>	Only <u>essential petroleum activities</u> permitted.	Only <u>essential petroleum activities</u> permitted.	
<u>Category C environmentally sensitive areas that are 'state forests' or 'timber reserves'</u>	Only <u>essential petroleum activities</u> permitted.	Petroleum activities permitted.	
Areas of vegetation that are 'critically limited'	Only <u>low impact petroleum activities</u> permitted.	Only <u>essential petroleum activities</u> permitted.	

Schedule D, Table 2 – Maximum significant disturbance in environmentally sensitive areas and their protection zones

Activity	Maximum Footprint
Ground disturbance within a <u>Category B Environmentally Sensitive Area</u>	0 ha
Ground disturbance within a <u>protection zone of a Category B Environmentally Sensitive Area</u>	6 ha
Ground disturbance within a <u>Category C Environmentally Sensitive Area</u>	14 ha
Ground disturbance within a <u>protection zone of a Category C Environmentally Sensitive Area</u>	70 ha

- Biodiversity 9 A report must be prepared for each annual return period for all petroleum activities that involved clearing of any environmentally sensitive area or protection zone which includes:
- records able to demonstrate compliance with conditions (Biodiversity 4), (Biodiversity 5), (Biodiversity 8) and (Biodiversity 8A);
 - a description of the works;
 - 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
 - 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.
- Biodiversity 10 Significant residual impacts to prescribed environmental matters (other than if the impacts were authorised by an existing authority issued before the commencement of the *Environmental Offsets Act 2014*) are not authorised under this environmental authority or the *Environmental Offsets Act 2014* unless the impact(s) is specified in *Schedule D, Table 3 – Significant residual impacts to prescribed environmental matters*.
- Biodiversity 11 Records demonstrating that each impact to a prescribed environmental matter not listed in *Schedule D, Table 3 – Significant residual impacts to prescribed environmental matters* did not, or is not likely to, result in a significant residual impact to that matter must be:
- completed by an appropriately qualified person; and
 - kept for the life of the environmental authority.

Protecting biodiversity values, Table 3 — Significant residual impacts to prescribed environmental matters

Prescribed environmental matter	Location of impact	Maximum extent of impact	Maximum extent of impact – Stage 1 (Years 2019 – 2023 inclusive)
REGULATED VEGETATION			
Endangered <u>regional ecosystem</u> – insert RE ID			
RE 11.3.1	NA	MNES ¹	MNES
RE 11.3.21	PL260	3 ha	1 ha
RE 11.4.3	NA	MNES	MNES
RE 11.4.2	PL194	2 ha	1 ha
Of concern <u>regional ecosystem</u> (not within an urban area) – insert RE ID			
RE 11.3.2	PL194, PL198, PL230, PL238, PL260	20 ha	14 ha
RE 11.3.4	PL194, PL198, PL230, PL238, PL252, PL260	18 ha	9 ha
RE 11.3.17	PL252, PL260	15 ha	10 ha
<u>Regional ecosystems</u> (not within an urban area) that intersect a <u>wetland</u> on the vegetation management <u>wetlands</u> map – insert RE ID			
RE 11.3.4	PL260	1 ha	1 ha
RE 11.3.27	PL260	2 ha	2 ha
<u>Regional ecosystems</u> (not within an urban area) within the defined distance from the defining banks of a relevant <u>watercourse</u> on the vegetation management <u>watercourse</u> map – insert RE ID (and Broad Vegetation Group)			
RE 11.3.2 (BVG 17a)	PL194, PL198, PL230, PL238, PL252, PL258, PL260	1 ha	0.5 ha

Prescribed environmental matter	Location of impact	Maximum extent of impact	Maximum extent of impact – Stage 1 (Years 2019 – 2023 inclusive)
11.3.4 (BVG 16c)	PL194, PL198, PL230, PL238, PL252, PL258, PL260	5 ha	3 ha
11.3.18 (BVG 17a)	PL194, PL198, PL230, PL238, PL252, PL258, PL260	3 ha	3 ha
11.3.25 (BVG 16a; 22c)	PL194, PL198, PL230, PL238, PL252, PL258, PL260	15 ha	3 ha
11.4.12 (BVG 17a)	PL194, PL198, PL230, PL238, PL252, PL258, PL260	1 ha	1 ha
11.5.1 (BVG 17a; 18b)	PL194, PL198, PL230, PL238, PL252, PL258, PL260	5 ha	5 ha
11.7.4 (BVG 12a)	PL194, PL198, PL230, PL238, PL252, PL258, PL260	0.5 ha	0.5 ha
11.7.7 (BVG 12a)	PL194, PL198, PL230, PL238, PL252, PL258, PL260	1 ha	1 ha
Essential habitat (not in an urban area) for endangered wildlife			
<i>Hemiaspis damelii</i>	PL260	6 ha	6 ha

Prescribed environmental matter	Location of impact	Maximum extent of impact	Maximum extent of impact – Stage 1 (Years 2019 – 2023 inclusive)
Essential habitat (not in an urban area) for vulnerable wildlife – <i>insert species name</i>			
<i>Adclarkia cameroni</i>	NA	MNES	MNES
<i>Calyptorhynchus lathami</i>	PL260	1 ha	1 ha
<i>Jalmenus eubulus</i>	PL260	0.5 ha	0.5 ha
<i>Petauroides volans (Greater Glider)</i>	NA	MNES	MNES
<i>Phascolarctos cinereus (Koala)</i>	NA	MNES	MNES
<i>Rostratula australis</i>	NA	MNES	MNES
Connectivity areas			
Connectivity area that is a <u>regional ecosystem</u> (not in urban area)			

Prescribed environmental matter	Location of impact	Maximum extent of impact	<u>Maximum extent of impact</u> – Stage 1 (Years 2019 – 2023 inclusive)
PL194	PL194	6.7 ha	6.7 ha
PL198	PL198	2.3 ha	2.3 ha
PL230	PL230	1.3 ha	1.3 ha
PL260	PL260	1 ha	1 ha
Wetlands and watercourses			
A <u>wetland</u> in a <u>wetland</u> protection area shown on the <u>Map of referable wetlands</u> (HES wetlands in GBR) – <i>insert reference</i>	PL198, PL238, PL260	2.5 ha	2.5 ha
A <u>wetland</u> of high ecological significance shown on the <u>Map of referable wetlands</u> – <i>insert reference</i>	PL260	1.5 ha	1.5 ha
<u>Designated precincts in strategic environmental areas</u>			
<u>Designated precinct</u> in a <u>strategic environmental areas</u> – <i>insert reference</i>	NA	0 ha	0 ha

Prescribed environmental matter	Location of impact	Maximum extent of impact	<u>Maximum extent of impact</u> – Stage 1 (Years 2019 – 2023 inclusive)
Protected wildlife habitat			
An area shown as a high risk area on the flora survey trigger map that contains plants that are endangered or vulnerable wildlife – <i>insert area and species names</i>			
<i>Homopholis belsonii</i>	NA	MNES	MNES
<i>Philothea sporadica</i>	NA	MNES	MNES
<i>Picris barbarorum</i>	PL260	2.5 ha	0 ha
<i>Solanum papaverifolium</i>	PL260	3 ha	0 ha
An area not shown as a high risk area on the flora survey trigger map that contains plants that are endangered or vulnerable wildlife – <i>insert area and species names</i>	NA	0 ha	0 ha
A non-juvenile koala habitat tree located in an area shown as a bushland habitat, high value <u>rehabilitation</u> habitat or medium value <u>rehabilitation</u> habitat in the 'Map of Assessable Development Area Koala Habitat Values' – <i>insert reference</i>	NA	0 ha	0 ha

Prescribed environmental matter	Location of impact	Maximum extent of impact	Maximum extent of impact – Stage 1 (Years 2019 – 2023 inclusive)
Habitat for an animal that is endangered wildlife – <i>insert area and species name</i>			
Habitat for an animal that is vulnerable wildlife – <i>insert area and species name</i>			
<i>Acanthophis antarcticus</i>	PL194, PL198, PL230, PL238, PL252, PL258, PL260	370 ha	350 ha
<i>Calyptorhynchus lathami</i>	PL194, PL198, PL230, PL238, PL252, PL258, PL260	110 ha	100 ha
<i>Furina dunmalli</i>	NA	MNES	MNES
<i>Grantiella picta</i>	NA	MNES	MNES
<i>Hemiaspis damelii</i>	PL194, PL198, PL230, PL238, PL252, PL258, PL260	255 ha	127 ha
<i>Jalmenus eubulus</i>	PL194, PL198, PL230, PL238, PL252, PL258, PL260	20 ha	10 ha
<i>Nyctophilus corbeni</i>	NA	MNES	MNES

Prescribed environmental matter	Location of impact	Maximum extent of impact	Maximum extent of impact – Stage 1 (Years 2019 – 2023 inclusive)
<i>Petauroides volans</i>	NA	MNES	MNES
<i>Phascolarctos cinereus</i>	NA	MNES	MNES
Habitat for an animal that is special least concern wildlife – <i>insert area and species name</i>			
<i>Tachyglossus aculeatus</i>	PL194, PL198, PL230, PL238, PL252, PL258, PL260	67 ha	67 ha
Protected areas			
National park – insert reference	NA	0 ha	0 ha
Regional park – insert reference	NA	0 ha	0 ha
Nature refuge – insert reference	NA	0 ha	0 ha

Prescribed environmental matter	Location of impact	Maximum extent of impact	<u>Maximum extent of impact</u> – Stage 1 (Years 2019 – 2023 inclusive)
Highly protected zones of State marine parks			
Conservation park zone – insert reference	NA	0 ha	0 ha
Marine national park zone – insert reference	NA	0 ha	0 ha
Preservation zone – insert reference	NA	0 ha	0 ha
Other zones – insert reference	NA	0 ha	0 ha
Fish habitat areas			
A declared fish habitat area – insert reference	NA	0 ha	0 ha
Waterway providing for fish passage			

Prescribed environmental matter	Location of impact	Maximum extent of impact	<u>Maximum extent of impact</u> – Stage 1 (Years 2019 – 2023 inclusive)
Fish passage (not in an urban area) – insert reference	PL194, PL198, PL230, PL238, PL252, PL258, PL260	7 ha	5 ha
Marine plants			
Marine plant (not in an urban area) – insert reference	NA	0 ha	0 ha
Legally secured offset area			
Legally secured offset area – <i>insert reference</i>	NA	0 ha	0 ha

Biodiversity 12 An environmental offset made in accordance with the *Environmental Offsets Act 2014* and Queensland Environmental Offsets Policy, as amended from time to time, must be undertaken for the maximum extent of impact to each prescribed environmental matter authorised in *Schedule D, Table 3— Significant residual impacts to prescribed environmental matters*, unless a lesser extent of the impact has been approved in accordance with condition (Biodiversity 14).

Biodiversity 13 The significant residual impacts to a prescribed environmental matter authorised in condition (Biodiversity 10) for which an environmental offset is required by condition (Biodiversity 12) may be carried out in stages. An environmental offset can be delivered for each stage of the impacts to prescribed environmental matters.

Biodiversity 14 Prior to the commencement of each stage, a report completed by an appropriately qualified person, that includes an analysis of the following must be provided to the administering authority:

- (a) for the forthcoming stage—the estimated significant residual impacts to each prescribed environmental matter; and

- (b) for the previous stage, if applicable—the actual significant residual impacts to each prescribed environmental matter, to date.
- Biodiversity 15 The report required by condition (Biodiversity 14) must be approved by the administering authority before a notice of election for the forthcoming stage, if applicable, is given to the administering authority.
- Biodiversity 16 A notice of election for the staged environmental offset referred to in condition (Biodiversity 15), if applicable, must be provided to the administering authority no less than three months before the proposed commencement of that stage, unless a lesser timeframe has been agreed to by the administering authority.
- Biodiversity 17 Within six months from the completion of the final stage of the project, a report completed by an appropriately qualified person, that includes the following matters must be provided to the administering authority:
- (a) an analysis of the actual impacts on prescribed environmental matters resulting from the final stage; and
 - (b) if applicable, a notice of election to address any outstanding offset debits for the authorised impacts.
- D17 Despite (Biodiversity 8), the Daandine Brine Dam 2 with its associated activities necessary for construction, operation, maintenance and monitoring of the dam, are permitted to be located within the area bound by the coordinates prescribed in *Schedule D, Table 4 - Coordinates Enclosing the Disturbance Area for Daandine Brine Dam 2*.
- D18 Despite (Biodiversity 8), the water release outlet and pipeline, with its associated activities necessary for construction, operation, maintenance and monitoring for the release of treated CSG water to Wilkie Creek, are permitted to be located within the area bound by the coordinates prescribed in *Schedule D Table 5 - Coordinates Enclosing the Disturbance Area for the Water Release Outlet and Pipeline*.
- D19 The construction of the water release outlet and pipeline must be located within the area bound by the coordinates prescribed by *Schedule D Table 5 - Coordinates Enclosing the Disturbance Area for the Water Release Outlet and Pipeline*.
- D20 Despite (Biodiversity 8), the Tipton Treated Water Pipeline, with its associated activities necessary for construction, operation, maintenance, are permitted to be located within the area bound by the coordinates prescribed in *Schedule D, Table 6 – Coordinates Enclosing the Disturbance Area for Tipton Treated Water Pipeline*.
- D21 Despite (Biodiversity 8), the disturbance footprints for the 'Longswamp 31 monitoring bore' and the 'Tipton 253 gas well' are permitted to be located within the areas prescribed in *Schedule D, Table 7 – Authorised footprint for disturbance to environmentally sensitive areas*.

D22

Condition TBC (old D21) does not authorise clearing of vegetation and requires that all waste, including residual drilling material, must be removed from the site.

Schedule D, Table 4 – Coordinates Enclosing the Disturbance Area for Daandine Brine Dam 2

Point	Northing (GDA94, Zone 56)	Easting (GDA94, Zone 56)
1	7001708	297524
2	7001153	297384
3	7001051	298345
4	7001418	298444
5	7001601	298406
6	7001620	298190

Schedule D Table 5 – Coordinates Enclosing the Disturbance Area for the Water Release Outlet and Pipeline

Point	Northing (GDA94, Zone 56)	Easting (GDA94, Zone 56)	Area of disturbance
Valve Pit	6995424	302897	0.18 ha
High Point on Bank	6995460	302991	
Outlet at Creek	6995465	303004	

Schedule D, Table 6 – Coordinates Enclosing the Disturbance Area for Tipton Treated Water Pipeline

Point	Easting (GDA94 Zone 56)	Northing (GDA94 Zone 56)
Section 1	310653	6969687
	310656	6969747
	310696	6969745
	310661	6970448
	310621	6970453
	310651	6970652
	310611	6970657
	310642	6970846
	310602	6970846
	310707	6971627
	310667	6971630
	310659	6972161
	310618	6972167

Point	Easting (GDA94 Zone 56)	Northing (GDA94 Zone 56)
	310621	6973392
	310581	6973399
	310613	6973550
	310573	6973550
	310639	6973650
	310539	6973550
	310608	6973650
	310568	6973650
	310639	6973550
	310539	6973650
Section 2	310617	6973719
	310577	6973724
	310722	6974060
	310682	6974065
	310717	6974172
	310677	6974177
	310714	6974221
	310675	6974217
	310692	6974378
	310654	6974365
	310692	6974378
	310567	6974521
	310617	6974514
	310563	6974528
	310613	6974522
Section 3	310499	6974536
	310594	6974610
	310497	6974636
	310534	6974847
	310494	6974835
	310534	6974857
	310494	6974862
	310528	6975192
310488	6975197	
310526	6975351	
310486	6975347	

Schedule D, Table 7 – Authorised footprint for disturbance to environmentally sensitive areas

Activity	Latitude	Longitude	Maximum operational footprint	ESA Type
Longswamp 31 shallow monitoring bore	151.095733°E	-27.343471°S	9 m ²	<u>Category A ESA</u>
Tipton 253 gas well	151.13539°E	-27.36818°S	19600 m ²	<u>Primary protection zone of Category C ESA</u>

Schedule E – Acoustic

- Noise 1 Notwithstanding condition (General 21), emission of noise from the petroleum activity(ies) at levels less than those specified in *Schedule E, Table 1—Noise nuisance limits* are not considered to be environmental nuisance.
- Noise 2 If the noise subject to a valid complaint is tonal or impulsive, the adjustments detailed in *Schedule E, Table 2—Adjustments to be added to noise levels at sensitive receptors* are to be added to the measured noise level(s) to derive L_{Aeq, adj, 15 min}.

Schedule E, Table 1—Noise nuisance limits¹

Time period	Metric	Short term noise event	Medium term noise event	Long term noise event
7:00am—6:00pm	<u>L_{Aeq, adj, 15 min}</u>	45 dBA	43 dBA	40 dBA
6:00pm—10:00pm	<u>L_{Aeq, adj, 15 min}</u>	40 dBA	38 dBA	35 dBA
10:00pm—6:00am	<u>L_{Aeq, adj, 15 min}</u>	28 dBA	28 dBA	28 dBA
	<u>Max L_{pA, 15mins}</u>	55 dBA	55 dBA	55 dBA
6:00am—7:00am	<u>L_{Aeq, adj, 15 min}</u>	40 dBA	38 dBA	35 dBA
Drilling activities undertaken from 10:00pm – 7:00am ²	<u>L_{Aeq, adj, 15min}</u>	28 dBA (measured indoors) 33 dBA (measured outdoors)		

¹ The noise limits in *Schedule E, Table 1 – Noise nuisance limits* have been set based on the following deemed background noise levels (LABG):

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

² Drilling activities (e.g. drilling, workover, completion activities) undertaken from 10:00 pm – 7:00 am must be temporary and mobile in nature, and must not contribute to long-term background noise creep.

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

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

- Noise 3 Notwithstanding condition (Noise 1), emission of any low frequency noise must not exceed either (Noise 3(a)) and (Noise 3(b)), or (Noise 3(c)) and (Noise 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
 - the difference between the internal A-weighted and Z-weighted (Max L_{pZ, 15 min}) noise levels is no greater than 15 dB.
- E10 Within 12 months of commissioning the units listed in Schedule E, Table 3 – Tipton Expansion Project units, the EA holder must, conduct noise monitoring under worst case noise propagation conditions to validate the pre-commissioning noise predictions at sensitive receptors.
- E11 The holder of this environmental authority must provide the administering authority with a report of the monitoring results required under condition (E10) that evaluates the accuracy of the pre-commissioning model predictions at sensitive receptors.

Schedule E, Table 3 – Tipton Expansion Project units

Resource Authority	Field	Facility	Unit Description
PL198	Tipton	Tipton Central Gas Processing Facility	K-0007 Compressor 7
			K-0007 Compressor 8
			K-0007 Compressor 9
			K-0007 Compressor 10
			K-0015 Inlet Fuel Gas Compressor Engine
		Tipton Water Treatment Facility	Generator 1
			Generator 2
			Generator 3
			Generator 4

Resource Authority	Field	Facility	Unit Description
			Generator 5

Noise 4 A Blast Management Plan must be developed for each blasting activity in accordance with Australian Standard 2187.

Noise 5 Blasting operations must be designed to not exceed an airblast overpressure level of 120 dB (linear peak) at any time, when measured at or extrapolated to any sensitive place.

Noise 6 Blasting operations must be designed to not exceed a ground-borne vibration peak particle velocity of 10mm/s at any time, when measured at or extrapolated to any sensitive place.



Schedule F – Air

- Air 1 Unless venting is authorised under the *Petroleum and Gas (Production and Safety) Act 2004* or the *Petroleum Act 1923*, waste gas must be flared in a manner that complies with all of (Air 1(a)) and (Air 1(b)) and (Air 1(c)), or with (Air 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 enclosed flare.
- Air 2A A fuel burning or combustion facility must not be operated unless it is listed in *Schedule F, Table 1– Authorised point sources*.
- Air 2B If a fuel burning or combustion facility is listed in *Schedule F, 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 *Schedule F, Table 1—Authorised point sources* at the specified release point reference.
- Air 3 Point source air monitoring for each fuel burning or combustion facility listed in *Schedule F, Table 1– Authorised point sources* must:
- (a) be undertaken:
 - i. once in the first three months after each facility is first commissioned, and then
 - ii. annually or biennially thereafter at the frequency specified in *Schedule F, Table 2 – Annual Air Quality Monitoring*
 - (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 *Schedule F, Table 1– Authorised point sources* at each release point reference.

Schedule F, Table 1 — Authorised point sources

Tenure	Facility	Release Point Reference	Unit Description	Minimum Release Height (m)	Minimum Efflux Velocity (m/sec) ¹	NO _x as Nitrogen Dioxide	Carbon Monoxide
						Maximum Mass Emission Rate (g/sec) ¹	Maximum Mass Emission Rate (g/sec) ¹
PL 230	Daandine Central Gas Processing Facility	A1	K-0001 Compressor 1	10	30	3.0	5.5
		A2	K-0002 Compressor 2				
		A3	K-0003 Compressor 3				
		A4	K-0004 Compressor 4				
		A5	K-0005 Compressor 5				
		A6	K-0006 Compressor 6	17	17	1.4	4.8
		A7	K-0007 Compressor 7				
		A8	K-9008 Compressor 8				
		A9	K-9009 Compressor 9				
		A10	K-9010 Compressor 10				
		A11	K-9011 Inlet Fuel Screw Compressor Engine 11				
PL 198	Tipton West Central Gas Processing Facility	A14	K-0001 Compressor 1	7.6	30	6.8	5.5
		A15	K-0002 Compressor 2				
		A16	K-0003 Compressor 3				
		A17	K-0004 Compressor 4				

Tenure	Facility	Release Point Reference	Unit Description	Minimum Release Height (m)	Minimum Efflux Velocity (m/sec) ¹	NO _x as Nitrogen Dioxide	Carbon Monoxide
						Maximum Mass Emission Rate (g/sec) ¹	Maximum Mass Emission Rate (g/sec) ¹
		A18	K-0005 Compressor 5	17	17	1.4	4.8
		A19	K-0006 Compressor 6				
		A20	K-0007 Compressor 7				
		A21	K-0008 Compressor 8				
		A22	K-0009 Compressor 9				
		A23	K-0010 Compressor 10				
	Tipton Water Treatment Facility ²	A24	K-0015 Inlet Fuel Gas Compressor Engine	8.5	38	1.5	1.0
		A25	Generator 1	7.5	27	1.5	1.5
		A26	Generator 2				
		A27	Generator 3				
		A28	Generator 4				
		A29	Generator 5				

¹ Minimum efflux velocity, maximum mass emission and maximum concentration limits relate to plant maximum continuous ratings.

² The Water Treatment Facility's aggregated fuel consumption exceeds the 500 kg per hour threshold when all five generators are in simultaneous operation.

Schedule F, Table 2 – Annual Air Quality Monitoring

Release Point	Parameter ¹		Minimum Monitoring Frequency
	Mass emission rate (g/s)	Concentration (mg/Nm ³)	
A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, A13, A14, A15, A16, A17, A18, A19, A20, A21, A22, A23, A24, A25 ² , A26 ² , A27 ² , A28 ² , A29 ²	oxides of nitrogen (measured as NO ₂) carbon monoxide	oxides of nitrogen (measured as NO ₂) carbon monoxide	Biennial from commission

¹ Measured in flue gas at the 5% oxygen reference level

² Biennial monitoring is not required until at least four of the five generators are commissioned.

Schedule G – Waste

- Waste 1 Measures must be implemented so that waste is managed in accordance with the waste and resource management hierarchy and the waste and resource management principles.
- Waste 2 Waste, including waste fluids, but excluding waste used in closed-loop systems, must be transported off-site for lawful re-use, remediation, recycling or disposal, unless the waste is specifically authorised by conditions of this environmental authority to be disposed of or used on site.
- Waste 3 Waste fluids, other than flare precipitant stored in flare pits, or residual drilling material or drilling fluids stored in sumps, must be contained in either:
- (a) an above ground container; or
 - (b) a structure which contains the wetting front.
- Waste 4 Green waste may be used on-site for either rehabilitation or sediment and erosion control, or both.
- Waste 5 Vegetation waste may be burned if it relates to a state forest, timber reserve or forest entitlement area administered by the *Forestry Act 1959* and a permit has been obtained under the *Fire and Rescue Service Act 1990*.
- Waste 6 Pipeline waste water 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.
- Waste 7 Produced water may be re-used in drilling and well hole activities.
- Waste 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.

- Waste 9 Produced water may be used for construction and operation 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
 - (d) Does not harm vegetation surrounding the construction site.
- Waste 10 If there is any indication that any of the circumstances in condition (Waste 8)(b)(i) to (Waste 8)(b)(iv)) or (Waste 9)(a) to (Waste 9)(d)) is occurring, the use must cease immediately and the affected area must be remediated without delay.
- Waste 11 Treated sewage effluent or greywater can be released to land provided it:
- (a) meets or exceeds secondary treated class B standards for a treatment system with a daily peak design capacity of between 150 EP and 1500 EP; or
 - (b) meets or exceeds secondary treated class C standards for a treatment system with a daily peak design capacity of less than 150 EP.
- Waste 12 The release of treated sewage effluent or greywater authorised in condition (Waste 11) must:
- (a) be to a fenced and signed contaminant release area(s);
 - (b) not result in pooling or run-off or aerosols or spray drift or vegetation die-off;
 - (c) be to a contaminant release area(s) that is kept vegetated with groundcover, that is:
 - i. not a pest species;
 - ii. kept in a viable state for transpiration and nutrient uptake; and
 - iii. grazed or harvested and removed from the contaminant release area as needed, but not less than every three months.
- Waste 13 Notwithstanding condition (Waste 11), treated sewage effluent that meets or exceeds secondary treated class A standards may be used for dust suppression or construction activities, provided the use meets the criteria in condition (Waste 8) or (Waste 9), as relevant to the use.
- Waste 14 Sewage pump stations must be fitted with a:
- (a) stand-by pump; and

- (b) high level alarm to warn of imminent pump station overflow, that operates without mains power or with a back-up power source that starts automatically in the event of a power failure.
- Waste 15 If sumps are used to store residual drilling material or drilling fluids, they must only be used for the duration of drilling activities.
- Waste 16 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.
- Waste 17 Records must be kept to demonstrate compliance with condition (Waste 15) and (Waste 16).
- G12 Coal seam gas water may be transferred to a third party to be used for the following purposes subject to compliance with conditions (G13) and (G14):
- (a) dust suppression if the coal seam gas water quality complies with the limits specified in *Schedule G, Table 1 – Water Contaminant Release Limits*;
- (b) construction and operational purposes if the coal seam gas water quality complies with the limits specified in *Schedule G, Table 1 – Water Contaminant Release Limits*;
- (c) irrigation and livestock watering purposes;
- (d) the following industrial purposes:
- i. coal washing;
 - ii. power stations; and
 - iii. water treatment facilities.
- G13 Any coal seam gas water supplied to a third party for irrigation and/or livestock watering purposes in accordance with Condition (G12)(c) must comply with the relevant trigger values contained in ANZECC and ARMCANZ Water Quality Guidelines 2000, or subsequent versions thereof.

Schedule G, Table 1 – Water Contaminant Release Limits

Water Quality Characteristics	Unit	Limit	Limit Type
pH	pH units	6.0 to 9.0	Range

Water Quality Characteristics	Unit	Limit	Limit Type
Sodium Adsorption Ratio	ratio	6	80 th Percentile
		12	Maximum
Total Dissolved Solids	mg/L	1500	Maximum
Total Petroleum Hydrocarbons	mg/L	10	Maximum

G14

If the responsibility of coal seam gas water is given or transferred to a third party in accordance with Condition (G12), the holder of environmental authority must ensure that:

- (a) the responsibility of the coal seam gas water is given or transferred in accordance with a written agreement (the third party agreement); and
- (b) the third party is made aware of the General Environmental Duty under section 319 of the *Environmental Protection Act 1994*.

Schedule H – Rehabilitation

- Rehabilitation 1 A Rehabilitation Plan must be developed by a suitably qualified person and must include the:
- (a) rehabilitation goals; and
 - (b) procedures to be undertaken for rehabilitation that will:
 - i. achieve the requirements of conditions (Rehabilitation 2) to (Rehabilitation 8), inclusive; and
 - ii. provide for appropriate monitoring and maintenance.
- Rehabilitation 2 Significantly disturbed areas that are no longer required for the on-going petroleum activities, must be rehabilitated within 12 months (unless an exceptional circumstance in the area to be rehabilitated (e.g. a flood event) prevents this timeframe being met) and be maintained to meet the following acceptance criteria:
- (a) contaminated land resulting from petroleum activities is remediated and rehabilitated;
 - (b) the areas are:
 - i. non-polluting;
 - ii. a stable landform;
 - iii. re-profiled to contours consistent with the surrounding landform;
 - (c) surface drainage lines are re-established;
 - (d) top soil is reinstated; and
 - (e) either:
 - i. groundcover, that is not a pest species, is growing; or
 - ii. an alternative soil stabilisation methodology that achieves effective stabilisation is implemented and maintained.
- Rehabilitation 3 All significantly disturbed areas caused by petroleum activities which are not being or intended to be utilised by the landholder or overlapping tenure holder, must be rehabilitated to meet the following final acceptance criteria measured either against the highest ecological value adjacent land use or the pre-disturbed land use:

-
- (a) greater than or equal to 70% of native ground cover species richness
- (b) greater than or equal to the total per cent of ground cover
- (c) less than or equal to the per cent species richness of plant pest species; and
- (d) where the adjacent land use contains, or the pre-clearing land use contained, one or more regional ecosystem(s), then at least one regional ecosystem(s) from the same broad vegetation group, and with the equivalent biodiversity status or a biodiversity status with a higher conservation value as any of the regional ecosystem(s) in either the adjacent land or pre-disturbed land, must be present.
- Rehabilitation 4 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 (Biodiversity 1) and (Biodiversity 2)) 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 plant pest species;
- (d) greater than or equal to 50% of organic litter cover;
- (e) greater than or equal to 50% of total density of coarse woody material; and
- (f) all predominant species in the ecologically dominant layer, that define the pre-disturbance regional ecosystem(s) are present.
- Rehabilitation 5 Conditions (Rehabilitation 2), (Rehabilitation 3) and (Rehabilitation 4) continue to apply after this environmental authority has ended or ceased to have effect.
- Rehabilitation 8 Where there is a dam (including a low consequence dam) that is being or intended to be utilised by the landholder or overlapping tenure holder, the dam must be decommissioned to no longer accept inflow from the petroleum activity(ies) and the contained water must be of a quality suitable for the intended on-going uses(s) by the landholder or overlapping tenure holder.

Schedule I – Definitions

Words and phrases used throughout this environmental authority are defined below except where identified in the *Environmental Protection Act 1994* or its Regulations and Environmental Protection Policies. Where a word or term is not defined, the ordinary English meaning applies, and regard should be given to the Macquarie Dictionary.

Word or Phrase	Definition
acceptable standards for release to land	means wastewater of the following quality as determined by monitoring results or by characterisation: <ol style="list-style-type: none"> electrical conductivity (EC) not exceeding 3000μS/cm; sodium adsorption ratio (SAR) not exceeding 8; pH between 6.0 and 9.0; heavy metals (measured as total) meets the respective short term trigger value in section 4.2.6, Table 4.2.10—<i>Heavy metals and metalloids in Australian and New Zealand Guidelines for Fresh and Marine Water Quality</i>; 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 <u>significant disturbance</u> , or where there is no <u>ecosystem function</u> , the use of the land. An adjacent land use does not include an adjacent area that shows evidence of edge effect.
administering authority	means: <ol style="list-style-type: none"> 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 for all other matters—the Chief Executive of the Department of Environment and Science; or 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 <u>environmental nuisance</u> impact will be dealt with at a <u>sensitive place</u> , 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 <u>sensitive place</u> , 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 <u>rehabilitated</u> 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-

Word or Phrase	Definition																						
	disturbed site of interest where significant surveying effort has been undertaken to establish benchmark parameters.																						
annual return period	means the most current 12- <u>month</u> 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	<p>for the purposes of <u>residual drilling materials</u>, means the <u>residual drilling material</u> meet the following quality standards:</p> <p><u>Part A</u> In all cases:</p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Maximum concentration</th> </tr> </thead> <tbody> <tr> <td>pH</td> <td>6 to 10.5 (range)</td> </tr> <tr> <td>Electrical Conductivity</td> <td>20 dS/m (20,000 µS/cm)</td> </tr> <tr> <td>Chloride*</td> <td>8000 mg/L</td> </tr> </tbody> </table> <p>*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.</p> <p><u>Part B</u> If any of the following metals are a component of the drilling fluids, then for that metal:</p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Maximum concentration</th> </tr> </thead> <tbody> <tr> <td>Arsenic</td> <td>20 mg/kg</td> </tr> <tr> <td>Selenium</td> <td>5 mg/kg</td> </tr> <tr> <td>Boron</td> <td>100 mg/kg</td> </tr> <tr> <td>Cadmium</td> <td>3 mg/kg</td> </tr> <tr> <td>Chromium (total)</td> <td>400 mg/kg</td> </tr> <tr> <td>Copper</td> <td>100 mg/kg</td> </tr> </tbody> </table>	Parameter	Maximum concentration	pH	6 to 10.5 (range)	Electrical Conductivity	20 dS/m (20,000 µS/cm)	Chloride*	8000 mg/L	Parameter	Maximum concentration	Arsenic	20 mg/kg	Selenium	5 mg/kg	Boron	100 mg/kg	Cadmium	3 mg/kg	Chromium (total)	400 mg/kg	Copper	100 mg/kg
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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 <u>clearing</u> , logging, timber harvesting, or grazing activities have previously occurred, where high densities of weed or <u>pest</u> 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																						

Word or Phrase	Definition
	includes <u>waters</u> 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: <ul style="list-style-type: none"> operations of any kind and all things constructed, erected or installed for that <u>dam</u>; and any land used for those operations.
Australian Standard 3580	means any of the following publications: <ul style="list-style-type: none"> 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 <u>waters</u> , has the meaning in Schedule 12 of the <i>Environmental Protection Regulation 2008</i> and— <ol style="list-style-type: none"> includes an area covered, permanently or intermittently, by tidal or non-tidal <u>waters</u>; but does not include land adjoining or adjacent to the <u>bed</u> that is from time to time covered by floodwater.
being or intended to be utilised by the landholder or overlapping tenure holder	for <u>significantly disturbed</u> 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 <u>rehabilitation</u> standards for <u>revegetation</u> by the holder of the environmental authority are not required. For <u>dams</u> , 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 <u>dam</u> such that <u>rehabilitation</u> standards for <u>revegetation</u> by the holder of the environmental authority are not required.

Word or Phrase	Definition
biodiversity values	for the purposes of this environmental authority, means <u>environmentally sensitive areas</u> , <u>prescribed environmental matters</u> and <u>wetlands</u> .
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 Environmental Protection Regulation 2008.
Category B Environmentally Sensitive Area	means any area listed in Schedule 12, Section 2 of the Environmental Protection Regulation 2008.
Category C Environmentally Sensitive Area	<p>means any of the following areas:</p> <ul style="list-style-type: none"> • nature refuges as defined in the conservation agreement for that refuge under the Nature Conservation Act 1992 • koala habitat areas as defined under the Nature Conservation (Koala) Conservation Plan 2006 • state forests or timber reserves as defined under the Forestry Act 1959 • regional parks (previously known as resource reserves) under the Nature Conservation Act 1992 • an area validated as 'essential habitat' from ground-truthing surveys in accordance with the Vegetation Management Act 1999 for a species of wildlife listed as endangered or vulnerable under the Nature Conservation Act 1992 • 'of concern <u>regional ecosystems</u>' that are remnant vegetation and identified in the database called 'RE description database' containing <u>regional ecosystem</u> numbers and descriptions.
certified or certification	<p>in relation to any matter other than a design plan, 'as constructed' drawings or an annual report regarding <u>dams</u> means, a Statutory Declaration by a <u>suitably qualified person</u> or <u>suitably qualified third party</u> accompanying the written <u>document</u> stating:</p> <ul style="list-style-type: none"> • the person's qualifications and experience relevant to the function • that the person has not knowingly included false, misleading or incomplete information in the <u>document</u> • that the person has not knowingly failed to reveal any relevant information or <u>document</u> to the <u>administering authority</u> • that the <u>document</u> addresses the relevant matters for the function and is factually correct; and • that the opinions expressed in the <u>document</u> are honestly and reasonably held.

Word or Phrase	Definition
clearing	has the meaning in the dictionary of the <i>Vegetation Management Act 2000</i> and for vegetation— <ol style="list-style-type: none"> a) means remove, cut down, ringbark, push over, poison or destroy in any way including by burning, flooding or draining; but b) does not include destroying standing vegetation by stock, or lopping a tree.
closed-loop systems	means using waste on site in a way that does not release waste or contaminants in the waste to the environment.
coal seam gas water	means underground water brought to the surface of the earth, or moved underground in connection with exploring for, or producing coal seam gas.
control measure	has the meaning in section 47 of the <i>Environmental Protection Regulation 2008</i> and means a device, equipment, <u>structure</u> , or management strategy used to prevent or control the release of a contaminant or waste to the environment.
critically limited regional ecosystem	means the <u>regional ecosystems</u> defined and listed in Appendix 5 of the Queensland Biodiversity Offset Policy.
daily peak design capacity	for sewage treatment works, has the meaning in Schedule 2, section 63(4) of the <i>Environmental Protection Regulation 2008</i> as the higher <u>equivalent person (EP)</u> for the works calculated using each of the formulae found in the definition for <u>EP</u> .
dam(s)	means a land-based <u>structure</u> 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 <u>structure</u> or <u>void</u> and <u>associated works</u> .
design storage allowance or DSA	means an available volume, estimated in accordance with the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ESR/2016/19337)</i> , published by the <u>administering authority</u> , as amended from time to time, that must be provided in a dam to an annual exceedance probability specified in that Manual.
designated precinct	has the meaning in Part 5 section 15(3) of the <i>Regional Planning Interests Regulation 2014</i> and means: <ul style="list-style-type: none"> • for a <u>strategic environmental area</u> mentioned in section 4(1) – the area identified as a designated precinct on the <u>strategic environmental area map</u> for the strategic environmental area; or • if a <u>strategic environmental area</u> is shown on a map in a regional plan – the area identified on the map as a designated precinct for the <u>strategic environmental area</u>
development wells	means a petroleum well which produces or stores petroleum. For clarity, a development well does not include an appraisal well.

Word or Phrase	Definition
document	has the meaning in the <i>Acts Interpretation Act 1954</i> and means: <ul style="list-style-type: none"> • 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 <i>Methodology for Surveying and Mapping of Regional Ecosystems and Vegetation Communities in Queensland</i> (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 <u>environmental nuisance</u> . Environmental harm may be caused by an activity— <ol style="list-style-type: none"> 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— <ol style="list-style-type: none"> 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.
environmental offset	has the meaning in section 7 of the <i>Environmental Offsets Act 2014</i> .
environmentally sensitive area	means <u>Category A, B or C environmentally sensitive areas</u> (ESAs)
equivalent person or EP	has the meaning under section 3 of the <i>Planning Guidelines For Water Supply and Sewerage</i> , 2005, published by the Queensland Government. It is

Word or Phrase	Definition
	<p>calculated in accordance with Schedule 2, Section 63(4) of the <i>Environmental Protection Regulation 2008</i> where:</p> <ul style="list-style-type: none"> • 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	<p>means activities that are essential to bringing the resource to the surface and are only the following:</p> <ul style="list-style-type: none"> • <u>low impact petroleum activities</u> • 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): <ul style="list-style-type: none"> ○ 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: <ul style="list-style-type: none"> ○ for single well sites, not exceeding 1.5 hectares disturbance ○ for multi-well sites, not exceeding 2.0 hectares disturbance • well sites with slope considerations (>2% slope) for cut and fill earthworks and drainage: <ul style="list-style-type: none"> ○ for single well sites, not exceeding 1.5 hectares disturbance ○ for multi-well sites, not exceeding 2.5 hectares disturbance • swell sites including a Communications Tower: <ul style="list-style-type: none"> ○ for single well sites, not exceeding 1.5 hectare disturbance ○ for multi-well sites, not exceeding 3.0 hectare disturbance • associated infrastructure located on a well site necessary for the construction and operations of wells: <ul style="list-style-type: none"> ○ water pumps and generators ○ <u>flare pits</u> ○ chemical / fuel storages ○ <u>sumps for residual drilling material</u> and drilling fluids ○ tanks, or dams which are not significant or high consequence dams to contain wastewater (e.g. <u>stimulation flow back waters</u>, <u>produced water</u>) ○ 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

Word or Phrase	Definition
	<ul style="list-style-type: none"> ○ 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 • on site disposal of <u>residual drilling material</u> as per condition (Waste 16) • communications towers, not exceeding 1.0 hectares disturbance • 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 <u>control measures</u>, <u>rehabilitation</u>).
existing authority	has the meaning in section 94 of the <i>Environmental Offsets Act 2014</i> .
exploration well	<p>means a petroleum well that is drilled to:</p> <ul style="list-style-type: none"> • 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. <p>For clarity, an exploration well does not include an appraisal or development well.</p>
flare pit	has the meaning in the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ESR/2016/19338)</i> , 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 <u>waste fluids</u> which result from the operation of a flare.
floodplains	<p>has the meaning in the <i>Water Act 2000</i> and means an area of reasonably flat land adjacent to a <u>watercourse</u> that—</p> <ul style="list-style-type: none"> • is covered from time to time by floodwater overflowing from the <u>watercourse</u>; and • does not, other than in an upper valley reach, confine floodwater to generally follow the path of the <u>watercourse</u>; and • has finer sediment deposits than the sediment deposits of any bench, bar or in-stream island of the <u>watercourse</u>.
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

Word or Phrase	Definition
	include water, other <u>liquids</u> fluids or solids, or a mixture that includes water and any other <u>liquids</u> 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	<p>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:</p> <ul style="list-style-type: none"> • 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 <u>wetland</u>. <p>A GAB spring includes a spring vent, spring complex or <u>watercourse</u> spring and includes the land to which water rises naturally from below the ground and the land over which the water then flows.</p> <p><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></p> <p><i>Note: The GAB springs dataset can be requested from the Queensland Government Herbarium</i></p>
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 <u>pest</u> species.
greywater	means wastewater generated from domestic activities such as laundry, dishwashing, and bathing. Greywater does not include sewage.
groundwater dependent ecosystem (GDE)	<p>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.</p> <p>For the purposes of the environmental authority, groundwater dependent ecosystems do not include those mapped as "unknown".</p>
growing	means to increase by natural development, as any living organism or part thereof by assimilation of nutriment; increase in size or substance.

Word or Phrase	Definition
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.
LA 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.
LAeq, adj, 15 mins	means an A-weighted sound pressure level of a continuous steady sound, adjusted for tonal character, that within a 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: <ul style="list-style-type: none"> • 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 <u>administering authority</u> of the <i>Water Act 2000</i> .
linear infrastructure	means powerlines, pipelines, 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 <u>sensitive receptor</u> , 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 <u>dam</u> that is not classified as high or significant as assessed using the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures</i> , published by the <u>administering authority</u> , as amended from time to time.
low impact petroleum activities	means petroleum activities which do not result in the <u>clearing</u> of native vegetation, cause disruption to soil profiles through earthworks or excavation or result in <u>significant disturbance</u> to land which cannot be <u>rehabilitated</u> immediately using hand tools after the activity is completed. Examples of such activities include but are not necessarily limited to soil surveys (excluding test

Word or Phrase	Definition
	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 <u>document</u> 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 <u>sensitive receptor</u> , persists for an aggregate period not greater than five days and does not re-occur for a period of at least four 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 <u>sump</u> by mixing with subsoil and which occurs in accordance with the following <u>methodology</u> : <ul style="list-style-type: none"> - the base of the subsoil and residual solid mixture must be separated from the groundwater table by at least one metre of a continuous layer of impermeable subsoil material (kw=10-8m/s) or subsoil with a clay content of greater than 20 percent; and - the residual solids is mixed with subsoil in the <u>sump</u> 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.

Word or Phrase	Definition
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— <ul style="list-style-type: none"> • 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> .
pest	Means a plant or animal, other than a native species of plant or animal, that is — <ul style="list-style-type: none"> a) an <i>Invasive biosecurity matter</i> under the <i>Biosecurity Act 2014</i>* b) a Controlled biosecurity matter or regulated biosecurity matter under the <i>Biosecurity Act 2014</i> or c) a Locally significant invasive species declared under <i>Local Government Act 2009</i> as local law. <p>*See Biosecurity Act 2014, schedule 1, part 3 or 4 or schedule 2, part 2. See also the notes to the Biosecurity Act 2014, schedules 1 and 2.</p> <p><i>Invasive biosecurity matter</i> is defined to include invasive plants and animals as listed as prohibited and restricted matter in schedules 1 and 2 of the <i>Biosecurity Act 2014</i>.</p>
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 <u>significant disturbance</u> occurring at that location.
predominant species	has the meaning in the <i>Methodology for Surveying and Mapping of Regional Ecosystems and Vegetation Communities in Queensland</i> (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> .
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> .

Word or Phrase	Definition
primary protection zone	means an area within 200m from the boundary of any <u>Category A, B or C ESA</u> .
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 <u>primary protection zone</u> of any <u>Category A, B or C ESA</u> or the <u>secondary protection zone</u> of any <u>Category A or B ESA</u> .
regional ecosystem	has the meaning in the <i>Methodology for Surveying and Mapping of Regional Ecosystems and Vegetation Communities in Queensland</i> (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 <i>Regional Ecosystem Description Database</i> (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 <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ESR/2016/19339)</i> , published by the <u>administering authority</u> , as amended from time to time.
rehabilitation or rehabilitated	means the process of reshaping and <u>revegetating</u> land to restore it to a <u>stable</u> landform and in accordance with acceptance criteria and, where relevant, includes remediation of contaminated land. For the purposes of pipeline rehabilitation, rehabilitation includes <u>reinstatement</u> , <u>revegetation</u> 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, <u>watercourses</u> , culverts, fences and gates and other landscape(d) features) and is detailed in the <i>Australian Pipeline Industry Association (APIA) Code of Environmental Practice: Onshore Pipelines</i> (2013).
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 µg/L–0.020 µg/L.

Word or Phrase	Definition
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 <u>rehabilitation</u> 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 <u>stimulation</u> , including fracturing, that contain the following chemicals in more than the maximum amount prescribed under a regulation— <ul style="list-style-type: none"> 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 <u>Category A</u> or <u>Category B</u> ESA means an area within 100 metres from the boundary of the <u>primary protection zone</u> .
secondary treated class A standards	means treated sewage effluent or <u>greywater</u> which meets the following standards: <ul style="list-style-type: none"> • 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 <u>greywater</u> which meets the following standards: <ul style="list-style-type: none"> • 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

Word or Phrase	Definition
	<ul style="list-style-type: none"> e-coli, 80th percentile based on at least 5 samples with not less than 30 minutes between samples, 1000cfu per 100mL, maximum 10000cfu per 100mL.
secondary treated class C standards	<p>means treated sewage effluent or <u>greywater</u> which meets the following standards:</p> <ul style="list-style-type: none"> 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 100000cfu per 100mL.
sensitive place	<p>means:</p> <ul style="list-style-type: none"> 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 <u>sensitive receptor</u> for the purposes of the <i>Environmental Protection (Noise) Policy 2008</i>.
sensitive receptor	is defined in Schedule 2 of the <i>Environmental Protection (Noise) Policy 2008</i> , and means an area or place where noise is measured.
short term noise event	is a noise exposure, when perceived at a <u>sensitive receptor</u> , 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> .

Word or Phrase	Definition
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— (a) to a condition required under the relevant environmental authority; or (b) if the environmental authority does not require the land to be <u>rehabilitated</u> 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 <u>rehabilitation</u> 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 <u>administering authority</u> a statement of compliance about a <u>document</u> or work relating to a relevant activity. The condition must also state— (a) the criteria (the compliance criteria) the <u>document</u> or work must comply with; and (b) that the statement of compliance must state whether the <u>document</u> or work complies with the compliance criteria; and (c) the information (the supporting information) that must be provided to the <u>administering authority</u> to demonstrate compliance with the compliance criteria; and (d) when the statement of compliance and supporting information must be given to the <u>administering authority</u> .
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.
stimulation fluid	means the fluid injected underground to increase permeability. For clarity, the term <u>stimulation</u> fluid only applies to fluid injected down well post-perforation.
stimulation impact zone	means a 100m maximum radial distance from the <u>stimulation</u> 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 <u>dam</u> or levee.

Word or Phrase	Definition
subterranean cave <u>GDE</u>	<ul style="list-style-type: none"> • 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 <u>GDEs</u> are caves dependent on the subterranean presence of groundwater. Subterranean cave <u>GDEs</u> 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. <p><i>Note: the Subterranean <u>GDE</u> (caves) dataset can be displayed through the Queensland Government WetlandInfo mapping program.</i></p> <p><i>Note: the Subterranean <u>GDE</u> (caves) dataset can be obtained from the Queensland Government Information System.</i></p>
suitably qualified third party	<p>means a person who:</p> <p>(a) has qualifications and experience relevant to performing the function including but not limited to:</p> <ol style="list-style-type: none"> i. a bachelor's degree in science or engineering; and ii. 3 years' experience in undertaking soil contamination assessments; and <p>(b) is a member of at least one organisation prescribed in Schedule 8 of the <i>Environmental Protection Regulation 2008</i>; and</p> <p>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.</p>
sump	means a pit in which waste <u>residual drilling material</u> 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,

Word or Phrase	Definition
	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.
valid complaint	means all complaints unless considered by the <u>administering authority</u> 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— <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> a) polluter pays principle b) user pays principle c) proximity principle d) product stewardship principle.
waste fluids	has the meaning in section 13 of the Environmental Protection Act 1994 in conjunction with the common meaning of “fluid” which is “a substance which is capable of flowing and offers no permanent resistance to changes of shape”. Accordingly, to be a waste fluid, the waste must be a substance which is capable of flowing and offers no permanent resistance to changes of shape.
watercourse	has the meaning in Schedule 4 of the <i>Environmental Protection Act 1994</i> and means: <ul style="list-style-type: none"> a) a river, creek or stream in which water flows permanently or intermittently— <ul style="list-style-type: none"> i. in a natural channel, whether artificially improved or not; or ii. in an artificial channel that has changed the course of the watercourse. b) Watercourse includes the <u>bed</u> and banks and any other element of a river, creek or stream confining or containing water.

Word or Phrase	Definition
waters	includes all or any part of a creek, river, stream, lake, lagoon, swamp, <u>wetland</u> , spring, unconfined surface water, unconfined water in natural or artificial watercourses, <u>bed</u> 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	<p>for the purpose of this environmental authority, wetland means:</p> <ul style="list-style-type: none"> • areas shown on the <u>Map of referable wetlands</u> which is a <u>document</u> 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 <i>Environmental Protection Regulation 2008</i>; 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: <ul style="list-style-type: none"> ○ 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. <p>The term wetland includes riverine, lacustrine, estuarine, marine and palustrine wetlands; and it does not include a <u>Great Artesian Basin Spring</u> or a subterranean wetland that is a cave or aquifer.</p>
wetland of high ecological significance	means a <u>wetland</u> that meets the definition of a <u>wetland</u> and that is shown as a <u>wetland</u> of 'high ecological significance' or <u>wetland</u> of 'high ecological value' on the <u>Map of referable wetlands</u> .
wetland of other environmental value	means a <u>wetland</u> that meets the definition of a <u>wetland</u> and that is shown as a <u>wetland</u> of 'general environmental significance' or <u>wetland</u> of 'other environmental value' on the <u>Map of referable wetlands</u> .

Permit

Environmental Protection Act 1994

Environmental authority EPPG00972513

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

Environmental authority number: EPPG00972513

Environmental authority takes effect on 15 March 2021

Environmental authority holder(s)

Names(s)	Registered address
ARROW ENERGY PTY LTD	Level 39 111 Eagle Street BRISBANE QLD 4001
AUSTRALIAN CBM PTY LTD	Level 39 111 Eagle Street BRISBANE CITY QLD 4000 Australia
ARROW (TIPTON) PTY. LTD.	Level 39 111 Eagle Street BRISBANE CITY QLD 4000 Australia
ARROW (DAANDINE) PTY. LTD.	Level 39 111 Eagle St BRISBANE CITY QLD 4000 Australia
ARROW CSG (AUSTRALIA) PTY LTD	Level 39 111 Eagle Street BRISBANE CITY QLD 4000 Australia
ARROW (TIPTON TWO) PTY LTD	Level 39 111 Eagle Street BRISBANE CITY QLD 4000 Australia
CLEANCO QUEENSLAND LIMITED	Comalco Place Level 32 12 Creek St BRISBANE CITY QLD 4000 Australia

Environmentally relevant activity and location details

Environmentally relevant activity/activities	Location(s)
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no- release works, with a total daily peak design capacity of, (a-i) 21 to 100EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL252

Resource Activity, Ancillary 14 - Electricity Generation, 1: Generating electricity by using gas at a rated capacity of 10MW electrical or more	PL238, PL258, PL252, PL194, PL198, PL230, PL260
Resource Activity, Ancillary 15 - Fuel burning, Using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour	PL238, PL258, PL252, PL194, PL198, PL230, PL260
Resource Activity, Ancillary 56 - Regulated Waste Storage Receiving and storing regulated waste	PL230
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no- release works, with a total daily peak design capacity of, (a-i) 21 to 100EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme.	PL198, PL230, PL260, PL238, PL258
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no- release works, with a total daily peak design capacity of, (b-i) more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL238, PL258, PL252, PL194, PL198, PL230, PL260
Resource Activity, Ancillary 64 - Water treatment, 2: Desalinating, in a day, the following quantity of water, allowing the release of waste to waters other than seawater, (b) more than 5ML	PL238, PL258, PL252, PL194, PL198, PL230, PL260
Resource Activity, Schedule 3, 06: A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL238, PL258, PL252, PL194, PL198, PL230, PL260
Resource Activity, Schedule 3, 07: A petroleum activity involving injection of a wastefluid into a natural underground reservoir or aquifer	PL238, PL258, PL252, PL194, PL198, PL230, PL260
Resource Activity, 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	PL238, PL258, PL252, PL194, PL198, PL230, PL260

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.

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

Enquiries:
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Date issued: 15 March 2021

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)

This environmental authority incorporates the following schedules:

- Schedule A – General
- Schedule B – Water
- Schedule BE – Coal Seam Gas Water Injection Trial
- Schedule C – Regulated Dams
- Schedule D – Land
- Schedule E – Acoustic
- Schedule F – Air
- Schedule G – Waste
- Schedule H – Rehabilitation
- Schedule I – Definitions

Words and phrases which are underlined are defined in *Schedule I – Definitions*.

Schedule A – General

- General 1 This environmental authority authorises the carrying out of the following resource activities:
- (a) The petroleum activities listed in *Schedule A, Table 1 – Authorised Petroleum Activities* to the extent they are carried out in accordance with the activity's corresponding total number and maximum disturbance;
 - (b) The following specified relevant activities:
 - i. Regulated waste storage – receiving and storing regulated waste other than tyres;
 - ii. Sewage treatment – operating sewage treatment works, other than no-release works, with a total daily peak design capacity of 21 to 100 EP;
 - (c) For the specified relevant activities listed in (General 1 (b)) above, another activity where Schedule 2 of the Environmental Protection Regulation 2008 (the Regulation) provides exemption for the activity, but only to the extent of the circumstances stated in Schedule 2 of the Regulation; and
 - (d) Incidental activities that are not otherwise specified relevant activities.
- General 2 This environmental authority does not authorise environmental harm unless a condition contained in this environmental authority explicitly authorises that harm. Where there is no condition, the lack of a condition shall not be construed as authorising harm.
- General 7 All monitoring must be undertaken by a suitably qualified person.
- General 8 If requested by the administering authority in relation to investigating a complaint, monitoring must be commenced within 10 business days.
- General 9 All laboratory analyses and tests must be undertaken by a laboratory that has NATA accreditation for such analyses and tests.
- General 10 Notwithstanding condition (General 9), 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.

Schedule A, Table 1 - Authorised Petroleum Activities

Petroleum Activity(ies)	Total Number of Authorised Petroleum Activities	Maximum Disturbance Authorised
Total coal seam gas wells, including: Core wells <u>Exploration wells</u> <u>Development wells</u> Production wells	1,566 wells	1,566 ha
Communication towers	10	10 units, 10 ha
Injection well(s) and associated facilities	1	4 ha
Compressor units	40	40 units, 8 ha
Central gas processing facilities	2	2 facilities, 8 ha
Regulated structures	22	22 dams
Water treatment facilities	2	12 ML/d (each), 2 ha
Sewage treatment plants	2	Less than 450 EP (each), 0.15 ha
Sewage treatment plants	10	Less than 100 EP (each), 0.15 ha
Power stations	1	40 MW, 1.2 ha

General 11 Monitoring and sampling must be carried out in accordance with the requirements of the following documents (as relevant to the sampling being undertaken), as amended from time to time:

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

General 12 In addition to the requirements under Chapter 7, Part 1, Division 2 of the *Environmental Protection Act 1994*, the administering authority must be notified through the Pollution Hotline and in writing, as soon as possible, but within 48 hours of becoming aware of any of the following events:

- (a) any unauthorised significant disturbance to land
- (b) potential or actual loss of structural or hydraulic integrity of a dam
- (c) when the level of the contents of any regulated dam reaches the mandatory reporting level
- (d) when a regulated dam will not have available storage to meet the design storage allowance on 1 November of any year
- (e) potential or actual loss of well integrity
- (f) when the seepage trigger action response procedure required under condition (Water 14(g)) is or should be implemented
- (g) unauthorised releases of any volume of prescribed contaminants to waters
- (h) unauthorised releases of volumes of contaminants, in any mixture, to land greater than:
 - i. 200 L of hydrocarbons; or
 - ii. 1 000 L of brine; or
 - iii. 5 000 L of untreated coal seam gas water; or
 - iv. 5 000 L of raw sewage; or
 - v. 10 000 L of treated sewage effluent.
- (i) groundwater monitoring results from a landholder's active groundwater bore monitored under the stimulation impact monitoring program which is a 10% or greater increase from a previous baseline value for that bore and which renders the water unfit for its intended use
- (j) monitoring results where two out of any five consecutive samples do not comply with the relevant limits in the environmental authority.

General 13 Petroleum activities that cause significant disturbance to land must not be carried out until financial assurance has been given to administering authority as security for compliance with

the environmental authority and for any costs or expenses, or likely costs or expenses, mentioned in section 298 of the *Environmental Protection Act 1994*.

- General 16 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.
- General 17 All plant and equipment must be maintained and operated in their proper and effective condition.
- General 18 The following infrastructure must be signed with a unique reference name or number in such a way that it is clearly observable:
- (a) regulated dams and low consequence dams
 - (b) exploration, appraisal and development wells
 - (c) water treatment facilities
 - (d) brine encapsulation facilities
 - (e) landfill cells
 - (f) sewage treatment facilities
 - (g) specifically authorised discharge points to air and waters
 - (h) any chemical storage facility associated with the environmentally relevant activity of chemical storage

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- (i) field compressor stations
 - (j) central compressor stations
 - (k) gas processing facilities; and
 - (l) pipeline compressor stations.
- General 19 Measures to prevent fauna being harmed from entrapment must be implemented during the construction and operation of well infrastructure, dams and pipeline trenches.
- General 20 For activities involving significant disturbance to land, control measures that are commensurate to the site- specific risk of erosion, and risk of sediment release to waters must be implemented to:
- (a) allow stormwater to 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).
- General 21 Petroleum activities must not cause environmental nuisance at a sensitive place, other than where an alternative arrangement is in place.
- General 22 A certification must be prepared by a suitably qualified person within 30 business days of completing every plan, procedure, program and report required to be developed under this environmental authority, which demonstrates that:
- (a) relevant material, including current published guidelines (where available) have been considered in the written document
 - (b) the content of the written document is accurate and true; and
 - (c) the document meets the requirements of the relevant conditions of the environmental authority.
- General 23 All plans, procedures, programs, reports and methodologies required under this environmental authority must be written and implemented.
- General 24 All documents required to be developed under this environmental authority must be kept for five years.

- General 25 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.
- General 26 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 – Water

- Water 1 Contaminants that will or may cause environmental harm must not be directly or indirectly released to any waters, except as authorised by condition (B15).
- Water 2 The extraction of groundwater as part of the petroleum activity(ies) from underground aquifers must not directly or indirectly cause environmental harm to a wetland.
- Water 3 Petroleum activities must not occur in or within 200m of a:
- (a) wetland of high ecological significance, other than that authorised by *Schedule D, Table 3 — Significant residual impacts to prescribed environmental matters*
 - (b) Great Artesian Basin Spring
 - (c) subterranean cave GDE.
- Water 3A Despite condition (Water 3), petroleum activities may occur within 200m of a wetland of high ecological significance, provided they are directly associated with activities authorised per condition (Water 3(a)).
- Water 4 Only construction or maintenance of linear infrastructure is permitted in or within any wetland of other environmental value or in a watercourse.
- Water 5 A 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.
- Water 5 B 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.

Water 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 bankfull situation is not expected and that flow is maintained.

Water 7 The construction or maintenance of linear infrastructure authorised under condition (Water 4) must comply with the water quality limits as specified in *Schedule B, Table 1 – Release limits for construction or maintenance of linear infrastructure*.

Schedule B, Table 1 – Release limits for construction or maintenance of linear infrastructure

Water quality parameters	Units	Water quality limits
Turbidity	Nephelometric Turbidity Units (NTU)	For a <u>wetland of other environmental value</u> , 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 <u>watercourse</u> , 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 <u>wetland of other environmental value</u> , if background water turbidity is equal to, or below 45 NTU, a turbidity limit of no greater than 55 NTU applies, measured within a 50m radius of the construction or maintenance activity. For a <u>watercourse</u> , if background water turbidity is equal to, or below 45 NTU, a turbidity limit of no greater than 55 NTU applies, measured within 50m downstream of the construction or maintenance activity.
Hydrocarbons	-	For a <u>wetland of other environmental value</u> , or <u>watercourse</u> , no visible sheen or slick

Water 8 Monitoring must be undertaken at a frequency that is appropriate to demonstrate compliance with condition (Water 7).

Water 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 (GDA94) 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 (Water 8).

Water 10 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.

- Water 11 Petroleum activity(ies) on floodplains 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.
- Water 12 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 August 2019.
- Water 13 The seepage monitoring program required by condition (Water 12) 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 groundwater dependent ecosystems, landholder's active groundwater bores, or water supply bores
 - iii. provide for the early detection of negative impacts prior to reaching migration pathways to other formations (i.e. faults, areas of unconformities known to connect two or more formations)
 - (f) monitoring of groundwater at each background and seepage monitoring bore at least annually for the trigger parameters identified in condition (Water 13(b))

- (g) seepage trigger action response procedures for when trigger parameters and trigger levels identified in conditions (Water 13(b)) and (Water 13(c)) trigger the early detection of seepage, or upon becoming aware of any monitoring results that indicate potential groundwater contamination
- (h) a rationale detailing the program conceptualisation including assumptions, determinations, monitoring equipment, sampling methods and data analysis; and
- (i) provides for annual updates to the program for new containment facilities constructed in each annual return period.

Water 14 A bore drill log must be completed for each seepage monitoring bore in condition (Water 13) 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.

B15 The release of treated CSG water is authorised to occur in accordance with:

- (a) *Schedule B, Table 2 – Treated CSG Water Release Point, Source and Receiving Waters;*
- (b) *Schedule B Table 3 – Treated CSG Water Release Limits for Monitoring Point M1 – Daily Monitoring;* and
- (c) *Schedule B, Table 4 – Treated CSG Water Release Limits for Monitoring Point M1 – Quarterly Monitoring.*

B16 The quality of the treated CSG water being released must be:

- (a) monitored at the frequency specified, and
- (b) comply with each quality characteristic release limit and limit type,

specified in *Schedule B Table 3 – Treated CSG Water Release Limits for Monitoring Point M1 – Daily Monitoring* and *Schedule B, Table 4 – Treated CSG Water Release Limits for Monitoring Point M1 – Quarterly Monitoring* when measured at the monitoring point M1 specified in *Schedule B, Table 2 – Treated CSG Water Release Point, Source and Receiving Waters*.

Schedule B, Table 2 – Treated CSG Water Release Point, Source and Receiving Waters

Water Source and Location	Release Point	Location (GDA94, MGA zone 56)	Monitoring Point	Receiving Waters Description
Treated CSG Water from the reverse osmosis water treatment plant and treated water dam located on PL230	R1, defined as the outlet of discharge pipe to Wilkie Creek	6995465 mN 303004 mE	M1, defined as the sample point in the discharge pipeline point to release into Wilkie Creek	Wilkie Creek

Schedule B, Table 3 – Treated CSG Water Release Limits for Monitoring Point (M1) – Daily Monitoring

Quality Characteristic	Unit	Release Limit(s)	Limit Type	Monitoring Frequency
Electrical conductivity	µS/cm	580	80 th percentile, based on at least 5 samples with not less than 60 minutes between samples	Daily during release
pH	pH Unit	6.5 - 9	Range	Daily during release
Suspended Solids	mg/L	180	Maximum	Daily during release
Boron	mg/L	0.37	Maximum	Daily during release

Schedule B, Table 4 – Treated CSG Water Release Limits for Monitoring Point (M1) – Quarterly Monitoring

Quality characteristic	Unit	Maximum Release limit	Monitoring frequency
Aluminium	mg/L	0.2	The first release day of each quarter
Antimony	ml/L	0.003	
Arsenic	mg/L	0.007	
Barium	mg/L	0.7	
Bisphenol A	mg/L	0.2	
Boron	mg/L	4	
Bromide	mg/L	7	
BTEX			The first release day of each quarter
Benzene	mg/L	0.001	
Toluene	mg/L	0.8	
Ethylbenzene	mg/L	0.3	
Xylene (m & p)	mg/L	0.6	
Cadmium	mg/L	0.002	
Chromium	mg/L	0.05	
Copper	mg/L	2	

Quality characteristic	Unit	Maximum Release limit	Monitoring frequency
Cyanide	mg/L	0.08	The first release day of each quarter
Fluoride	mg/L	1.5	
Iodide	mg/L	0.5	
Iron	mg/L	0.3	
Lead	mg/L	0.01	
Manganese	mg/L	0.5	
Mercury	mg/L	0.001	
Molybdenum	mg/L	0.05	
Nickel	mg/L	0.02	
Nonylphenol	mg/L	0.5	
PAH (as B(a)P TEF) Species:	TEF:	0.01	The first release day of each quarter
benz[a]anthracene	0.1	µg/L	
benzo[b+j]fluoranthene	0.1		
benzo[k]fluoranthene	0.1		
benzo[a]pyrene	1.0		
chrysene	0.1		
dibenz[a,h]anthracene	1.0		
indeno[1,2,3-cd]pyrene	0.1		
Selenium	mg/L	0.01	
Silver	mg/L	0.1	
Strontium	mg/L	4	The first release day of each quarter
Total Petroleum Hydrocarbons (TPH)	mg/L	0.2	
Vanadium	mg/L	0.05	
Zinc	mg/L	3	
Radium-226 Lead-210 Polonium-210 Radium-228	mSv/year	0.5 The dose for each parameter is summed to give the total dose which must be less than or equal to 0.5 mSv/year	

B17

If the monitoring required by condition (B16) indicates that any of the quality characteristic release limits specified in *Schedule B, Table 4 – Treated CSG Water Release Limits for Monitoring Point M1 – Quarterly Monitoring* have been exceeded at any time during any release of treated CSG water, the environmental authority holder must, within five (5) business days of notifying the administering authority of the exceedance, unless a longer time is agreed to by the administering authority:

- (a) complete an investigation into the exceedance, which includes an analysis of the (potential and actual) causes for the exceedance; and
- (b) provide a written report to the administering authority on completion of the investigation that includes:

- i. details of the investigation carried out;
- ii. any actions taken to prevent impacts to waters that may be used for drinking water;
- iii. the cause for the exceedance;
- iv. all water quality monitoring results pertaining to the investigation;
- v. any general observations;
- vi. methodology(ies) and any relevant calculations used; and
- vii. corrective actions to rectify the cause of the exceedance.

B18 Where an exceedance of a quality characteristic release limit specified in *Schedule B, Table 4 – Treated CSG Water Release Limits for Monitoring Point M1 – Quarterly Monitoring* is being investigated in accordance with condition (B17), the investigation and reporting required by condition (B17) is not required if a subsequent exceedance occurs, during investigation of the initial exceedance, which has resulted from the same cause that triggered the initial exceedance.

B19 Prior to commencing any release of treated CSG water authorised under this environmental authority, a stream flow gauging station (GP1) must be installed.

B20 The stream flow gauging station (GP1) must be installed in accordance with *Schedule B, Table 5 – Contaminant Release During Flow Events*.

Schedule B, Table 5 – Contaminant Release During Flow Events

Receiving water description	Gauging station description	Latitude or northing (GDA94)	Longitude or easting (GDA94)	Minimum Flow in Receiving Water Required for a Release Event	Flow recording Frequency
Wilkie Creek	Gauging station 1 (GP1)	50-100 metres upstream of Release Point R1	50-100 metres upstream of Release Point R1	0.14 m ³ /s	At 6 hour intervals during discharge (minimum twice daily)

B21 The flow rate of treated CSG water released from the release point authorised in *Schedule B, Table 2 – Treated CSG Water Release Point, Source and Receiving Waters* must not exceed a ratio of 1 part of the flow rate of the treated CSG water being released to 4 parts of the measured upstream receiving water flow rate.

- B22 The volume of treated CSG water released from the release point authorised in *Schedule B, Table 2 – Treated CSG Water Release Point, Source and Receiving Waters* must not exceed a maximum of 8ML/day.
- B23 The following characteristics of the treated CSG water released must be measured and recorded daily during all release events:
- (a) the volume of treated CSG water released through the release point R1;
 - (b) the date and time of release commencing and ceasing;
 - (c) the release rate;
 - (d) for any change in the release rate:
 - i. the date and time of the change;
 - ii. the new release rate; and
 - iii. water levels and flow rate during the discharge event.
 - (e) water levels and flow rate during the discharge event;
 - (f) water quality characteristics monitoring results; and
 - (g) details of any observed impacts/conditions.
- B24 Prior to commencing any release of treated CSG water authorised under this environmental authority, each monitoring and release point specified in *Schedule B, Table 2 – Treated CSG Water Release Point, Source and Receiving Waters* must be marked and readily identifiable from the banks of Wilkie Creek.
- B25 The quality of the receiving waters must be monitored daily during release of treated CSG water at locations representative of the receiving waters determined in accordance with condition (B31), for the following water quality characteristics:
- (a) Electrical conductivity ($\mu\text{S}/\text{cm}$);
 - (b) pH (pH Unit);
 - (c) Turbidity (NTU);
 - (d) Suspended Solids (mg/L);
 - (e) Calcium (mg/L);

- (f) Magnesium (mg/L);
- (g) Fluoride (mg/L);
- (h) Sulphate (mg/l); and
- (i) Boron (mg/L).
- B26 If water has been released from authorised release points listed in *Schedule B, Table 2 – Contaminated Release Points, Sources and Receiving Waters*, the holder of this environmental authority must undertake an annual assessment of the contaminants of treated CSG water to determine the risk of environmental harm from release of treated CSG water to surface waters. This should consider the contaminants mentioned in the ANZECC & ARMCANZ 2000 guidelines. This annual assessment must be included in the Annual Return.
- B27 Prior to the release of treated CSG water to Wilkie Creek a Receiving Environment Monitoring Program (REMP) must be developed and implemented to monitor, identify and describe any adverse impacts to surface water environmental values, water quality and flows due to the authorised release of treated CSG water to Wilkie Creek.
- B28 The REMP required by condition (B27) must include periodic monitoring for the effects of the release on the receiving environment as a result of treated CSG water releases to waters from the release location (R1) specified in Table B15 - Treated CSG Water Release Point, Source and Receiving Waters.
- B29 The quality of the receiving waters must be monitored at the locations specified in Schedule B, *Table 6 – Receiving Water Upstream Background Sites and Downstream Monitoring Points*.

Schedule B, Table 6 – Receiving Water Upstream Background Sites and Downstream Monitoring Points

Monitoring Points	Receiving Waters	Northing (<u>GDA94</u>)	Easting (<u>GDA94</u>)
Upstream background monitoring point			
Monitoring Point (M2)	Wilkie Creek	50 – 100 metres upstream of Release Point R1	50 – 10 metres upstream of Release Point R1
Downstream monitoring point			
Monitoring Point (M3)	Wilkie Creek	150 – 200 metres downstream of Release Point R1	150 - 200 metres downstream of Release Point R1

B30

The REMP required by Condition (B27) must:

- (a) assess the condition or state of receiving waters, including upstream conditions, spatially within the REMP area, considering background water quality characteristics based on accurate and reliable monitoring data that takes into consideration temporal variation (e.g. seasonality);
- (b) be designed to facilitate assessment against water quality objectives for the relevant environmental values that need to be protected;
- (c) include monitoring from background reference sites (e.g. upstream or background) and downstream sites from the release;
- (d) specify the frequency and timing of sampling required in order to reliably assess ambient conditions and to provide sufficient data to derive site specific background reference values in accordance with the Queensland Water Quality Guidelines 2006. This should include monitoring during periods of natural flow irrespective of other discharges;
- (e) include monitoring and assessment of dissolved oxygen saturation and temperature and all water quality parameters listed in Condition (B25);
- (f) include, where appropriate, monitoring of metals/metalloids in sediments (in accordance with ANZECC & ARMCANZ 2000, BATLEY and/or the most recent version of *AS5667.1 Guidance on Sampling of Bottom Sediments*);
- (g) include, where appropriate, monitoring of macroinvertebrates in accordance with the AusRivas methodology;
- (h) apply procedures and/or guidelines from ANZECC and ARMCANZ 2000 and other relevant guideline documents;
- (i) describe sampling and analysis methods and quality assurance and control; and
- (j) incorporate stream flow and hydrological information in the interpretations of water quality and biological data.

B31

A report outlining the findings of the REMP, including all monitoring results and interpretations in accordance with conditions (B27) to (B30) must be prepared annually. This must include a determination of the risk of environmental harm from release of treated CSG water to the receiving environment waters.

Schedule BE – Coal Seam Gas Water Injection Trial

BE1 The only fluids authorised to be injected into an aquifer(s) are those fluid types specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection*.

Schedule BE, Table 1 – Details of Authorised Fluid Injection

Well Location (GDA94, MGA zone 56)	Injection Well Number / Reference	Target Formation and Perforated Zone	Fluid Type	Maximum Injection Rate ML/d	Hydraulic Impact Zone	Water Quality Impact Zone
313669 mE 6967949 mN	Tipton-193	Precipice Formation, between 1040m to 1110m depth	Treated CSG water ¹	4	9,340 m radius from injection well	148 m radius from injection well

¹ Treated CSG water means any fluid that contains any proportion of treated CSG water, blended or otherwise.

BE2 Fluid injection must be in accordance with the quantities and locations listed in *Schedule BE, Table 1 – Details of Authorised Fluid Injection*.

BE3 The holder of this environmental authority must notify the administering authority the commencement date of the trial at least seven (7) days prior to its commencement.

BE4 The injection trial is limited to a period of 180 days of injection, followed by a six-month recovery period.

BE5 Injection must cease immediately upon becoming aware that environmental harm is caused or threatened to be caused as a result of the injection activities.

BE6 The construction of the Tipton-193 injection well must be carried out in accordance with the well construction requirements described in the most recent version of the Department of Environment and Heritage Protection's "CSG Water Injection Well Construction Requirements", as amended from time to time.

BE7 The Tipton-193 injection well must be mechanically functional such that there is no significant fluid movement into a water resource aquifer through vertical channels adjacent to the well bore hole.

BE8 The construction, operation and maintenance of the injection well specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* must be undertaken in a way that prevents and/or minimises impacts to the environmental values of the target formation and ensures the integrity of the bore.

BE9 The injection pressure must not exceed 90 percent of the formation fracture pressure.

BE10 The quality of the fluid being injected into the injection well specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* must comply with the contaminant limits prescribed in *Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid*.

Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid

Quality Characteristics	Release Limits	Limit Type
pH (pH units)	Minimum 6.5, Maximum 10	Range
Total Dissolved Solids (TDS) ¹	Mean TDS of injection fluid must not exceed median TDS of formation water measured in background water quality monitoring well	Maximum
Dissolved Oxygen	500 µg/L	Maximum
Total suspended solids	25 mg/L	Maximum

¹ Electrical conductivity is an acceptable proxy measurement for measuring TDS of the injection fluid. If used, the conversion from EC to TDS must be stated and confirmed with laboratory monitoring results.

BE11 A The quality of the fluid being injected into the injection well specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* must be monitored at the frequency specified in *Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid*.

BE11 B The administering authority must be notified in writing as soon as reasonably practicable, but within 48 hours of becoming aware of:

- (a) migration of injected fluid out of the target formation; or
- (b) a loss of hydraulic isolation of the target formation; or
- (c) the detection of groundwater contaminants that were not detected in background samples; or
- (d) an injection fluid monitoring result that does not comply with any one of the parameters in *Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid*.

Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid

Monitoring parameter	Unit	Monitoring frequency during injection
Temperature of target formation	°C	N/A
Injection fluid temperature	°C	Continuous
Inlet pressure	KPa	Continuous
Fluid flow rate	L/sec	Continuous
	ML/day	Daily
Dissolved Oxygen (DO)	µg/L	Daily
Electrical Conductivity	µS/cm	Daily
pH	pH units	Daily
Turbidity	NTU	Daily
Sodium	mg/L	Weekly
Potassium	mg/L	Weekly
Calcium	mg/L	Weekly
Magnesium	mg/L	Weekly
Chloride	mg/L	Weekly
Sulphate as SO ₄	mg/L	Weekly
Carbonate / Bicarbonate	mg/L	Weekly
Bromine	mg/L	Monthly
Fluoride	mg/L	Monthly
Iodide	mg/L	Weekly
Silica	mg/L	Monthly
Iodine	mg/L	Monthly
Nitrate	mg/L	Monthly
Total organic carbon	mg/L	Weekly
Total Dissolved Solids	mg/L	Weekly
Redox Potential	mV	Weekly
Total Hardness as CaCO ₃	mg/L	Weekly

Monitoring parameter	Unit	Monitoring frequency during injection
Total Alkalinity as CaCO ₃	mg/L	Weekly
Hydroxide alkalinity as CaCO ₃	mg/L	Weekly
Carbonate Alkalinity as CaCO ₃	mg/L	Weekly
Bicarbonate Alkalinity as CaCO ₃	mg/L	Weekly
Total suspended solids	mg/L	Weekly
Bromide	mg/L	Weekly
Aluminium	mg/L	Monthly
Arsenic	mg/L	Monthly
Barium	mg/L	Monthly
Boron	mg/L	Monthly
Copper	mg/L	Monthly
Iron	mg/L	Monthly
Manganese	mg/L	Monthly
Mercury	mg/L	Monthly
Nickel	mg/L	Monthly
Strontium	mg/L	Monthly
Zinc	mg/L	Monthly
Total Petroleum Hydrocarbons	µg/L	Monthly
<u>BTEX</u>	µg/L	Monthly

BE12 Notwithstanding conditions (BE9) and (BE10), the injection of treated CSG water into the injection well specified in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* must have considered the recommendations for water blending described in the following documents, where appropriate:

- (a) Surat Gas Project – Geochemical Blending and Compatibility Study: Tipton Injection Trials, March 2013; and
- (b) Surat Gas Project – Geochemical Blending and Compatibility Study: Tipton Injection Trials – Phase 2, March 2013.

- BE13 The holder of this environmental authority must provide for non-chemical disinfection of injection fluid if results of six-monthly testing of injected fluid show levels of coliform bacteria, sulphate reducing bacteria or iron fixing bacteria that has potential to cause adverse impacts on the groundwater within the target formation.
- BE14 An Injection Management Plan which has been certified by a suitably qualified person must be developed and implemented prior to the carrying out of the trial fluid injection activity(ies).
- BE15 The Injection Management Plan must include but not necessarily be limited to:
- (a) estimated volumes and rates of water to be injected;
 - (b) a description of the physical, chemical and biological components and their concentrations of the water to be produced;
 - (c) details of how and where the fluid will be produced, aggregated, stored and kept separate from other waters until it is treated and injected;
 - (d) details of where the fluid is proposed to be treated including a description of the treatment process;
 - (e) a water quality compatibility assessment which demonstrates that the injection fluid has inconsequential reactivity with the target formation and native groundwater it will come into contact with;
 - (f) the regional characteristics of the receiving environment;
 - (g) identification of the water quality impact zone and the hydraulic impact zone;
 - (h) identification of any fluid injection well, all existing bores, springs, lakes, wetlands, environmental assets and watercourses connected to groundwater, faults and other geologic features that occur within the water quality impact zone and the hydraulic impact zone;
 - (i) identification of the environmental values and water quality objectives of the potential water quality impact zone of the target formation in accordance with the *Environmental Protection (Water) Policy 2009* and the *Queensland Water Quality Guidelines 2009*;
 - (j) an assessment of the potential for migration of injection fluid or native groundwater out of the target formation through wells, bores, springs, connected watercourses, faults or other geologic features likely to impact on other aquifers;
 - (k) a risk assessment identifying potential hazards, their inherent risk, preventative measures for the management of potential hazards and details on sampling and analysis methods to verify preventative measures of potential hazards, including frequency and locations and quality assurance and control;

- (l) control measures that will be implemented for fluid storage, treatment and injection to prevent or control the release of a contaminant or waste to the environment other than the release authorised in *Schedule BE, Table 1 – Details of Authorised Fluid Injection* and *Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid*;
- (m) verification methods to assess performance of the injection activities;
- (n) the indicators or other criteria against which the performance of fluid injection will be assessed;
- (o) procedures that will be adopted to regularly review the monitoring program;
- (p) reporting procedures to management and the administering authority should unforeseen or non-compliant monitoring results be recorded; and
- (q) procedures that will be implemented to prevent unauthorised environmental harm from unforeseen or non-compliant monitoring results.

BE16 A Receiving Environment Monitoring Program (REMP) for Injection Activities which has been certified by a suitably qualified person must be developed and implemented to monitor, identify and describe any adverse impacts to the following values of the target formation due to the injection of treated CSG water:

- (a) hydraulic response;
- (b) water quality response; and
- (c) any other groundwater environmental values identified.

BE17 The REMP for Injection Activities required by condition (BE16) must be developed and implemented prior to the carrying out of the trial fluid injection activity(ies).

BE18 The REMP for Injection Activities required by condition (BE16) must include, but not necessarily be limited to:

- (a) methods to validate the assumptions, predicted impacts and the effectiveness of the proposed preventative measures associated with the modelled water quality impact zone and hydraulic impact zone;
- (b) monitoring of the hydraulic response to the trial injection at the well(s) referred to in condition (BE18)(f)(ii);
- (c) monitoring of the water quality of the injection fluid during injection for the parameters listed in *Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid*;

- (d) monitoring of the water quality response following the completion of the injection trial recovery period through sampling of the target aquifer, within the water quality impact zone, for the parameters listed in *Schedule BE, Table 3 – Monitoring Parameters and Frequencies for Injection Fluid*;
- (e) a definition of the background water quality of the Precipice Sandstone to be used for monitoring compliance with *Schedule BE, Table 2 – Specific Contaminant Limits for Injection Fluid* and for reporting in the Injection Trial Report required by condition (BE19);
- (f) the installation and use of a minimum of two wells:
 - i. one of which accesses the target aquifer within the water quality impact zone; and
 - ii. the other of which is placed at an adequate distance to determine the extent of the hydraulic response to the injection;
- (g) methods for the analysis and interpretation and a description of the statistical basis on which conclusions will be drawn to verify the assumptions of the injection proposal; and
- (h) a demonstration of how the REMP will validate assumptions, predicted impacts and the effectiveness of quality assurance and control measures.

BE19 Upon completion and within two (2) months of the completion of the injection trial's recovery period the holder of the authority must submit to the administering authority an Injection Trial Report prepared by a suitably qualified person.

BE20 The Injection Trial Report must include, but not necessarily be limited to:

- (a) details of the injection well including but not limited to:
 - i. location details (GDA94);
 - ii. the inferred lithology *;
 - iii. casing details including type, outer diameter (mm), wall thickness (mm) and locations (depth from and to in metres);
 - iv. cementing details including type, hole diameter (mm), casing outer diameter (mm) and locations (depth from and to in metres);
 - v. calculated target formation fracture pressure; and
 - vi. target formation pressure prior to injection;

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- (b) a detailed interpretation of the logs and other tests conducted during drilling and construction or refurbishment of the well against their specific objectives;
 - (c) a completed well schematic diagram;
 - (d) a temperature survey;
 - (e) a cement integrity log;
 - (f) outcomes of the injection trial including, but not limited to:
 - i. well head injection rates versus formation pressure;
 - ii. target formation pressure within the hydraulic impact zone during and upon completion of the trial;
 - iii. hydraulic gradient of the target formation within the hydraulic impact zone upon completion of the trial;
 - iv. the effectiveness of aquitards (including the stability of the aquitard) and aquicludes of confining the injected fluid within the target formation; and
 - v. a detailed interpretation of the logs and other tests conducted during the injection trial against their specific objectives;
 - vi. validation of conceptual framework for injection; and
 - vii. additional hazards that were not identified earlier;
 - (g) the results of the REMP for Injection Activities;
 - (h) analysis of monitoring and operational data in terms of:
 - i. validation of conceptual framework for injection; and
 - ii. additional hazards that were not identified earlier;
 - (i) a revised risk analysis that identifies all potential hazards, likelihood of various risk elements and associated consequences;
 - (j) a revised water quality compatibility assessment which demonstrates that the injection fluid has inconsequential reactivity with the target formation and native groundwater it will come into contact with;
 - (k) a re-evaluation of the hydraulic impact zone; and
 - (l) a re-evaluation of the water quality impact zone.

* Inferred lithology means the best available description of the lithology based upon historical drilling records, interpretation of logs and any other information that the suitably qualified person may have discovered.

BE21 Following completion of the injection trial, a fluid injection cessation report which has been certified by a suitably qualified person must be submitted to the administering authority within two (2) months of completion of the injection trial's recovery period.

BE22 The fluid injection cessation report must include, but not necessarily be limited to:

- (a) volumes of fluid injected at each well;
- (b) a risk assessment statement providing details on identified hazards including their inherent risk, summary of the results from the verification monitoring, preventative measures and the residual risk; and
- (c) a monitoring report outlining the methods and results of verification monitoring undertaken to assess the performance of the injection activities and preventative measures for identified hazards.

Schedule C – Regulated Dams

- Dams 1 The consequence category of any structure must be assessed by a suitably qualified and experienced person in accordance with the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)* at the following times:
- (a) prior to the design and construction of the structure, if it is not an existing structure; or
 - (b) prior to any change in its purpose or the nature of its stored contents.
- Dams 2 A consequence assessment report and certification must be prepared for each structure assessed and the report may include a consequence assessment for more than one structure.
- Dams 3 Certification must be provided by the suitably qualified and experienced person who undertook the assessment, in the form set out in the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)*.
- Dams 4 Conditions (Dams 5) to (Dams 9) inclusive do not apply to existing structures.
- Dams 5 All regulated structures must be designed by, and constructed under the supervision of, a suitably qualified and experienced person in accordance with the requirements of the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/19338)*.
- Dams 6 Construction of a regulated structure is prohibited unless:
- (a) the holder of this environmental authority has submitted a consequence category assessment report and certification to the administering authority; and
 - (b) certification for the design, design plan and the associated operating procedures has been certified by a suitably qualified and experienced person in compliance with the relevant condition of this authority.
- Dams 7 Certification must be provided by the suitably qualified and experienced person who oversees the preparation of the design plan in the form set out in the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/19338)*, and must be recorded in the Register of Regulated Structures.
- Dams 8 Regulated structures must:
- (a) be designed and constructed in compliance with the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/19338)*;
 - (b) be designed and constructed with due consideration given to ensuring that the design integrity would not be compromised on account of:

- i. floodwaters from entering the regulated dam from any watercourse or drainage line; and
- ii. wall failure due to erosion by floodwaters arising from any watercourse or drainage line.
- (c) have the floor and sides of the dam designed and constructed to prevent or minimise the passage of the wetting front and any entrained contaminants through either the floor or sides of the dam during the operational life of the dam and for any period of decommissioning and rehabilitation of the dam.
- Dams 9 Certification by the suitably qualified and experienced person who supervises the construction must be submitted to the administering authority on the completion of construction of the regulated structure, and state that:
- (a) the 'as constructed' drawings and specifications meet the original intent of the design plan for that regulated structure;
- (b) construction of the regulated structure is in accordance with the design plan.
- Dams 10 All affected persons must be provided with a copy of the emergency action plan in place for each regulated structure
- (a) for existing structures that are regulated structures, within 10 business days of this condition taking effect;
- (b) prior to the operation of the new regulated structure; and
- (c) if the emergency action plan is amended, within 5 business days of it being amended.
- Dams 11 Operation of a regulated structure, except for an existing structure, is prohibited.
- Dams 12 For existing structures that are regulated structures:
- (a) where the existing structure that is a regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the DSA volume across the system, the holder of this environmental authority must submit to the administering authority within 12 months of the commencement of this condition a copy of the certified system design plan including that structure; and
- (a) there must be a current operational plan for the existing structures.
- Dams 13 Each regulated structure must be maintained and operated, for the duration of its operational life until decommissioned and rehabilitated, in compliance with the current operational plan and, if applicable, the current design plan and associated certified 'as constructed' drawings.
- Dams 14 Conditions Dams 15 to Dams 18 inclusive only apply to Regulated Structures which have not been certified as low consequence category for 'failure to contain – overtopping'.

- Dams 15 The Mandatory Reporting Level (the MRL) must be marked on a regulated dam in such a way that during routine inspections of that dam, it is clearly observable.
- Dams 16 The holder of this environmental authority must, as soon as practical and within forty-eight (48) hours of becoming aware, notify the administering authority when the level of the contents of a regulated dam reaches the MRL.
- Dams 17 The holder of this environmental authority must, immediately on becoming aware that the MRL has been reached, act to prevent the occurrence of any unauthorised discharge from the regulated dam.
- Dams 18 The holder of this environmental authority must record any changes to the MRL in the Register of Regulated Structures.
- Dams 19 The holder of this environmental authority must assess the performance of each regulated dam or linked containment system over the preceding November to May period based on actual observations of the available storage in each regulated dam or linked containment system taken prior to 1 July of each year.
- Dams 20 By 1 November of each year, storage capacity must be available in each regulated dam (or network of linked containment systems with a shared DSA volume), to meet the Design Storage Allowance (DSA) volume for the dam (or network of linked containment systems).
- Dams 21 The holder of this environmental authority must, as soon as possible and within forty-eight (48) hours of becoming aware that the regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, notify the administering authority.
- Dams 22 The holder of this environmental authority must, immediately on becoming aware that a regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, act to prevent the occurrence of any unauthorised discharge from the regulated dam or linked containment systems.
- Dams 23 Each regulated structure must be inspected each calendar year by a suitably qualified and experienced person.
- Dams 24 At each annual inspection, the condition and adequacy of all components of the regulated structure must be assessed and a suitably qualified and experienced person must prepare an annual inspection report containing details of the assessment and include a recommendations section, with any recommended actions to ensure the integrity of the regulated structure or a positive statement that no recommendations are required.

- Dams 25 The suitably qualified and experienced person who prepared the annual inspection report must certify the report in accordance with the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)*.
- Dams 26 The holder of this environmental authority must, within 20 business days of receipt of the annual inspection report, provide to the administering authority:
- (a) The recommendations section of the annual inspection report; and
 - (b) If applicable, any actions being taken in response to those recommendations; and
 - (c) If, following receipt of the recommendations and (if applicable) recommended actions, the administering authority requests a copy of the annual inspection report from the holder of this environmental authority, provide this to the administering authority within 10 business days of receipt of the request.
- Dams 27 The holder of this environmental authority must provide a copy of any reports, documentation and certifications prepared under this environmental authority, including but not limited to any Register of Regulated Structures, consequence assessment, design plan and other supporting documentation, to a new holder on transfer of this environmental authority.
- Dams 30 A Register of Regulated Dams must be established and maintained by the holder of this environmental authority for each regulated dam.
- Dams 31 The holder of this environmental authority must provisionally enter the required information in the Register of Regulated Dams when a design plan for a regulated dam is submitted to the administering authority.
- Dams 32 The holder of this environmental authority must make a final entry of the required information in the Register of Regulated Structures once compliance with conditions Dams 11 and Dams 12 has been achieved.
- Dams 33 The holder of this environmental authority must ensure that the information contained in the Register of Regulated Dams is current and complete on any given day.
- Dams 34 All entries in the Register of Regulated Dams must be approved by the chief executive officer for the holder of this environmental authority, or their delegate, as being accurate and correct.
- Dams 35 The holder of this environmental authority must, at the same time as providing the annual return, supply to the administering authority a copy of the records contained in the Register of Regulated Dams, in the electronic format required by the administering authority.
- Dams 36 All existing structures that have not been assessed in accordance with either the Manual or the former *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams* must be assessed and certified in accordance with the Manual within 6 months of amendment of the authority adopting this schedule.

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- Dams 37 All existing structures must subsequently comply with the timetable for any further assessments in accordance with the Manual specified in *Schedule C, Table 1 – Transitional requirements for existing structures*, depending on the consequence category for each existing structure assessed in the most recent previous certification for that structure.
- Dams 38 *Schedule C, Table 1 – Transitional requirements for existing structures* ceases to apply for a structure once any of the following events has occurred:
- (a) it has been brought into compliance with the hydraulic performance criteria applicable to the structure under the Manual; or
 - (b) it has been decommissioned; or
 - (c) it has been certified as no longer being assessed as a regulated structure.
- Dams 39 Certification of the transitional assessment required by conditions Dams 36 and Dams 37 (as applicable) must be provided to the administering authority within 6 months of amendment of the authority adopting this schedule.

Schedule C, Table 1 - Transitional hydraulic performance requirements for existing structures

Transition period required for existing structures to achieve the requirements of the *Manual for Assessing Consequence Categories and Hydraulic Performance of Dams*

Compliance with criteria	High	Significant	Low
>90% and a history of good compliance performance in last 5 years	No transition required	No transition required	No transitional conditions apply. Review consequence assessment every 7 years.
>70% - ≤90%	Within 7 years, unless otherwise agreed with the <u>administering authority</u> , based on no history of unauthorised releases.	Within 10 years, unless otherwise agreed with the <u>administering authority</u> , based on no history of unauthorised releases.	No transitional conditions apply. Review consequence assessment every 7 years.
>50 - ≤70 percent	Within 5 years, unless otherwise agreed with the <u>administering authority</u> , based on no history of unauthorised releases.	Within 7 years, unless otherwise agreed with the <u>administering authority</u> , based on no history of unauthorised releases.	Review consequence assessment every 7 years.
≤50%	Within 5 years or as per compliance requirements (e.g. TEP timing)	Within 5 years or as per compliance requirements (e.g. TEP timing)	Review consequence assessment every 5 years.
Regulated levee designed to prevent the ingress of clean flood water <100% compliant ¹	Within 5 years unless otherwise agreed with the <u>administering authority</u> .		

¹ Levees designed for the diversion of contaminated waters or protection of the structural integrity of a dam are not to be considered as part of this provision. These levees are considered a key design element of the relevant dam and transitional periods should as such align to that relevant compliance criteria and consequence category.

Schedule D – Land

- Land 1 Contaminants must not be directly or indirectly released to land except for those releases authorised by this environmental authority.
- Land 2 Top soil must be managed in a manner that preserves its biological and chemical properties.
- Land 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.
- Land 4 Acid sulfate soils must be treated and managed in accordance with the latest edition of the *Queensland Acid Sulfate Soil Technical Manual*.
- Land 5 Chemicals and fuels stored, must be effectively contained and where relevant, meet Australian Standards, where such a standard is applicable.
- Land 6 Pipeline operation and maintenance must be in accordance, to the greatest practicable extent, with the relevant section of the *APGA Code of Environmental Practice: Onshore Pipelines (2017)* (or more recent editions).
- Land 7 Pipeline trenches must be backfilled and topsoils reinstated within three months after pipe laying.
- Land 8 Reinstatement and revegetation of the pipeline right of way must commence within 6 months after cessation of petroleum activities for the purpose of pipeline construction.
- Land 9 Backfilled, reinstated and revegetated pipeline trenches and right of ways must be:
- (a) a stable landform;
 - (b) re-profiled to a level consistent with surrounding soils;
 - (c) re-profiled to original contours and established drainage lines; and
 - (d) vegetated with groundcover which is not a pest species, and which is established and growing.
- Biodiversity 1 Prior to undertaking activities that result in significant disturbance to land in areas of native vegetation, confirmation of on-the-ground biodiversity values of the native vegetation communities at that location must be undertaken by a suitably qualified person.
- Biodiversity 2 A suitably qualified person must develop and certify a methodology so that condition (Biodiversity 1) can be complied with and which is appropriate to confirm on-the-ground biodiversity values.

- Biodiversity 3 For conditions (Biodiversity 4) to (Biodiversity 9), where mapped biodiversity values differ from those confirmed under conditions (Biodiversity 1) and (Biodiversity 2), petroleum activities may proceed in accordance with the conditions of the environmental authority based on the confirmed on-the-ground biodiversity value.
- Biodiversity 4 The location of the petroleum activity(ies) must be selected in accordance with the following site planning principles:
- (a) maximise the use of areas of pre-existing disturbance;
 - (b) in order of preference, avoid, minimise or mitigate any impacts, including cumulative impacts, on areas of;
 - (c) native vegetation or other areas of ecological value;
 - (d) minimise disturbance to land that may result in land degradation ;
 - (e) in order of preference, avoid then minimise isolation, fragmentation, edge effects or dissection of tracts of native vegetation; and
 - (f) in order of preference, avoid then minimise clearing of native mature trees.
- Biodiversity 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 essential petroleum activity authorised in an environmentally sensitive area or its protection zone, be no greater than 40m in total width.
- Biodiversity 8A Where petroleum activities are to be carried out in environmentally sensitive areas or their protection zones, the petroleum activities must be carried out in accordance with *Schedule D, Table 1— Authorised petroleum activities in environmentally sensitive areas and their protection zones*.
- Biodiversity 8B The petroleum activities authorised under condition (Biodiversity 8) must not exceed the maximum footprint for the activities specified in *Schedule D, Table 2 – Maximum significant disturbance in environmentally sensitive areas and their protection zones*.

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

Environmentally sensitive area	Within the environmentally sensitive area	Primary protection zone of the environmentally sensitive area	Secondary protection zone of the environmentally sensitive area
<u>Category A environmentally sensitive areas</u>	No petroleum activities permitted.	Only <u>low impact petroleum activities</u> permitted.	Only <u>essential petroleum activities</u> permitted.
<u>Category B environmentally sensitive areas that are other than 'endangered' regional ecosystems</u>	Only <u>low impact petroleum activities</u> permitted.	Only <u>low impact petroleum activities</u> permitted.	Only <u>essential petroleum activities</u> permitted.
<u>Category B environmentally sensitive areas that are 'endangered' regional ecosystems</u>	Only <u>low impact petroleum activities</u> permitted.	Only <u>essential petroleum activities</u> permitted.	Only <u>essential petroleum activities</u> permitted.
<u>Category C environmentally sensitive areas that are 'nature refuges' or 'koala habitat'</u>	Only <u>low impact petroleum activities</u> permitted.	Only <u>low impact petroleum activities</u> permitted.	
<u>Category C environmentally sensitive areas that are 'essential habitat', 'essential regrowth habitat', or 'of concern' regional ecosystems</u>	Only <u>low impact petroleum activities</u> permitted.	Only <u>essential petroleum activities</u> permitted.	
<u>Category C environmentally sensitive areas that are 'regional parks' (previously known as 'resources reserves')</u>	Only <u>essential petroleum activities</u> permitted.	Only <u>essential petroleum activities</u> permitted.	
<u>Category C environmentally sensitive areas that are 'state forests' or 'timber reserves'</u>	Only <u>essential petroleum activities</u> permitted.	Petroleum activities permitted.	
Areas of vegetation that are 'critically limited'	Only <u>low impact petroleum activities</u> permitted.	Only <u>essential petroleum activities</u> permitted.	

Schedule D, Table 2 – Maximum significant disturbance in environmentally sensitive areas and their protection zones

Activity	Maximum Footprint
Ground disturbance within a <u>Category B Environmentally Sensitive Area</u>	0 ha
Ground disturbance within a <u>protection zone</u> of a <u>Category B Environmentally Sensitive Area</u>	6 ha
Ground disturbance within a <u>Category C Environmentally Sensitive Area</u>	14 ha
Ground disturbance within a <u>protection zone</u> of a <u>Category C Environmentally Sensitive Area</u>	70 ha

- Biodiversity 9 A report must be prepared for each annual return period for all petroleum activities that involved clearing of any environmentally sensitive area or protection zone which includes:
- records able to demonstrate compliance with conditions (Biodiversity 4), (Biodiversity 5), (Biodiversity 8) and (Biodiversity 8A);
 - a description of the works;
 - 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
 - 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.
- Biodiversity 10 Significant residual impacts to prescribed environmental matters (other than if the impacts were authorised by an existing authority issued before the commencement of the *Environmental Offsets Act 2014*) are not authorised under this environmental authority or the *Environmental Offsets Act 2014* unless the impact(s) is specified in *Schedule D, Table 3 – Significant residual impacts to prescribed environmental matters*.
- Biodiversity 11 Records demonstrating that each impact to a prescribed environmental matter not listed in *Schedule D, Table 3 – Significant residual impacts to prescribed environmental matters* did not, or is not likely to, result in a significant residual impact to that matter must be:
- completed by an appropriately qualified person; and
 - kept for the life of the environmental authority.

Protecting biodiversity values, Table 3 — Significant residual impacts to prescribed environmental matters

Prescribed environmental matter	Location of impact	Maximum extent of impact
REGULATED VEGETATION		
<u>Endangered regional ecosystem</u>		
RE 11.3.21	PL260	3 ha
RE 11.4.2	PL194	2 ha
<u>Of concern regional ecosystem</u> (not within an urban area)		
RE 11.3.2	PL194, PL198, PL230, PL238, PL260	20 ha
RE 11.3.4	PL194, PL198, PL230, PL238, PL252, PL260	18 ha
RE 11.3.17	PL252, PL260	15 ha
<u>Regional ecosystems</u> (not within an urban area) that intersect a <u>wetland</u> on the vegetation management <u>wetlands</u> map		
RE 11.3.4	PL260	1 ha
RE 11.3.27	PL260	2 ha
<u>Regional ecosystems</u> (not within an urban area) within the defined distance from the defining banks of a relevant <u>watercourse</u> on the vegetation management <u>watercourse</u> map		
RE 11.3.2 (BVG 17a)	PL194, PL198, PL230, PL238, PL252, PL258, PL260	1 ha
11.3.4 (BVG 16c)	PL194, PL198, PL230, PL238, PL252, PL258, PL260	5 ha
11.3.18 (BVG 17a)	PL194, PL198, PL230, PL238, PL252, PL258, PL260	3 ha
11.3.25 (BVG 16a; 22c)	PL194, PL198, PL230, PL238, PL252, PL258, PL260	15 ha
11.4.12 (BVG 17a)	PL194, PL198, PL230, PL238, PL252, PL258, PL260	1 ha
11.5.1 (BVG 17a; 18b)	PL194, PL198, PL230, PL238, PL252, PL258, PL260	5 ha

Prescribed environmental matter	Location of impact	Maximum extent of impact
11.7.4 (BVG 12a)	PL194, PL198, PL230, PL238, PL252, PL258, PL260	0.5 ha
11.7.7 (BVG 12a)	PL194, PL198, PL230, PL238, PL252, PL258, PL260	1 ha
Essential habitat (not in an urban area) for endangered wildlife		
<i>Hemiaspis damelii</i>	PL230, PL260	6 ha
Essential habitat (not in an urban area) for vulnerable wildlife		
<i>Calyptorhynchus lathami</i>	PL260	1 ha
<i>Jalmenus eubulus</i>	PL260	0.5 ha
CONNECTIVITY AREAS		
Connectivity area that is a <u>regional ecosystem</u> (not in urban area)		
PL194	PL194	6.7 ha
PL198	PL198	2.3 ha
PL230	PL230	1.3 ha
PL260	PL260	1 ha
WETLANDS AND WATERCOURSES		
A <u>wetland</u> in a <u>wetland</u> protection area shown on the <u>Map of referable wetlands</u> (HES wetlands in GBR)	PL198, PL238, PL260	2.5 ha
A <u>wetland of high ecological significance</u> shown on the <u>Map of referable wetlands</u>	PL260	1.5 ha
PROTECTED WILDLIFE HABITAT		
An area shown as a high risk area on the flora survey trigger map that contains plants that are endangered or vulnerable wildlife		
<i>Picris barbarorum</i>	PL260	2.5 ha
<i>Solanum papaverifolium</i>	PL260	3 ha
Habitat for an animal that is vulnerable wildlife		

Prescribed environmental matter	Location of impact	Maximum extent of impact
<i>Acanthophis antarcticus</i>	PL194, PL198, PL230, PL238, PL252, PL258, PL260	370 ha
<i>Calyptorhynchus lathami</i>	PL194, PL198, PL230, PL238, PL252, PL258, PL260	110 ha
<i>Jalmenus eubulus</i>	PL194, PL198, PL230, PL238, PL252, PL258, PL260	20 ha
<i>Tachyglossus aculeatus</i>	PL194, PL198, PL230, PL238, PL252, PL258, PL260	67 ha
Habitat for an animal that is endangered wildlife		
<i>Hemiaspis damelii</i>	PL194, PL198, PL230, PL238, PL252, PL258, PL260	255 ha
FISH HABITAT AREAS		
Fish passage (not in an urban area)	PL194, PL198, PL230, PL238, PL252, PL258, PL260	7 ha

Biodiversity 12 An environmental offset made in accordance with the *Environmental Offsets Act 2014* and Queensland Environmental Offsets Policy, as amended from time to time, must be undertaken for the maximum extent of impact to each prescribed environmental matter authorised in *Schedule D, Table 3— Significant residual impacts to prescribed environmental matters*, unless a lesser extent of the impact has been approved in accordance with condition (Biodiversity 14).

Biodiversity 13 The significant residual impacts to a prescribed environmental matter authorised in condition (Biodiversity 10) for which an environmental offset is required by condition (Biodiversity 12) may be carried out in stages. An environmental offset can be delivered for each stage of the impacts to prescribed environmental matters.

Biodiversity 14 Prior to the commencement of each stage, a report completed by an appropriately qualified person, that includes an analysis of the following must be provided to the administering authority:

- (a) for the forthcoming stage—the estimated significant residual impacts to each prescribed environmental matter; and
- (b) for the previous stage, if applicable—the actual significant residual impacts to each prescribed environmental matter, to date.

- Biodiversity 15 The report required by condition (Biodiversity 14) must be approved by the administering authority before a notice of election for the forthcoming stage, if applicable, is given to the administering authority.
- Biodiversity 16 A notice of election for the staged environmental offset referred to in condition (Biodiversity 15), if applicable, must be provided to the administering authority no less than three months before the proposed commencement of that stage, unless a lesser timeframe has been agreed to by the administering authority.
- Biodiversity 17 Within six months from the completion of the final stage of the project, a report completed by an appropriately qualified person, that includes the following matters must be provided to the administering authority:
- (a) an analysis of the actual impacts on prescribed environmental matters resulting from the final stage; and
 - (b) if applicable, a notice of election to address any outstanding offset debits for the authorised impacts.
- D17 Despite (Biodiversity 8), the Daandine Brine Dam 2 with its associated activities necessary for construction, operation, maintenance and monitoring of the dam, are permitted to be located within the area bound by the coordinates prescribed in *Schedule D, Table 4 - Coordinates Enclosing the Disturbance Area for Daandine Brine Dam 2*.
- D18 Despite (Biodiversity 8), the water release outlet and pipeline, with its associated activities necessary for construction, operation, maintenance and monitoring for the release of treated CSG water to Wilkie Creek, are permitted to be located within the area bound by the coordinates prescribed in *Schedule D Table 5 - Coordinates Enclosing the Disturbance Area for the Water Release Outlet and Pipeline*.
- D19 The construction of the water release outlet and pipeline must be located within the area bound by the coordinates prescribed by *Schedule D Table 5 - Coordinates Enclosing the Disturbance Area for the Water Release Outlet and Pipeline*.
- D20 Despite (Biodiversity 8), the Tipton Treated Water Pipeline, with its associated activities necessary for construction, operation, maintenance, are permitted to be located within the area bound by the coordinates prescribed in *Schedule D, Table 6 – Coordinates Enclosing the Disturbance Area for Tipton Treated Water Pipeline*.
- D21 Despite (Biodiversity 8), the disturbance footprints for the 'Longswamp 31 monitoring bore' and the 'Tipton 253 gas well' are permitted to be located within the areas prescribed in *Schedule D, Table 7 – Authorised footprint for disturbance to environmentally sensitive areas*.
- D22 Condition TBC (old D21) does not authorise clearing of vegetation and requires that all waste, including residual drilling material, must be removed from the site.

Schedule D, Table 4 – Coordinates Enclosing the Disturbance Area for Daandine Brine Dam 2

Point	Northing (GDA94, Zone 56)	Easting (GDA94, Zone 56)
1	7001708	297524
2	7001153	297384
3	7001051	298345
4	7001418	298444
5	7001601	298406
6	7001620	298190

Schedule D Table 5 – Coordinates Enclosing the Disturbance Area for the Water Release Outlet and Pipeline

Point	Northing (GDA94, Zone 56)	Easting (GDA94, Zone 56)	Area of disturbance
Valve Pit	6995424	302897	0.18 ha
High Point on Bank	6995460	302991	
Outlet at Creek	6995465	303004	

Schedule D, Table 6 – Coordinates Enclosing the Disturbance Area for Tipton Treated Water Pipeline

Point	Easting (GDA94 Zone 56)	Northing (GDA94 Zone 56)
Section 1	310653	6969687
	310656	6969747
	310696	6969745
	310661	6970448
	310621	6970453
	310651	6970652
	310611	6970657
	310642	6970846
	310602	6970846
	310707	6971627
	310667	6971630
	310659	6972161
	310618	6972167
	310621	6973392
	310581	6973399
310613	6973550	
310573	6973550	

Point	Easting (GDA94 Zone 56)	Northing (GDA94 Zone 56)
	310639	6973650
	310539	6973550
	310608	6973650
	310568	6973650
	310639	6973550
	310539	6973650
Section 2	310617	6973719
	310577	6973724
	310722	6974060
	310682	6974065
	310717	6974172
	310677	6974177
	310714	6974221
	310675	6974217
	310692	6974378
	310654	6974365
	310692	6974378
	310567	6974521
	310617	6974514
	310563	6974528
	310613	6974522
	310499	6974536
310594	6974610	
310497	6974636	
Section 3	310534	6974847
	310494	6974835
	310534	6974857
	310494	6974862
	310528	6975192
	310488	6975197
	310526	6975351
	310486	6975347

Schedule D, Table 7 – Authorised footprint for disturbance to environmentally sensitive areas

Activity	Latitude	Longitude	Maximum operational footprint	ESA Type
Longswamp 31 shallow monitoring bore	151.095733°E	-27.343471°S	9 m ²	<u>Category A ESA</u>
Tipton 253 gas well	151.13539°E	-27.36818°S	19600 m ²	<u>Primary protection zone of Category C ESA</u>

Schedule E – Acoustic

Noise 1 Notwithstanding condition (General 21), emission of noise from the petroleum activity(ies) at levels less than those specified in *Schedule E, Table 1—Noise nuisance limits* are not considered to be environmental nuisance.

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

Schedule E, Table 1—Noise nuisance limits¹

Time period	Metric	Short term noise event	Medium term noise event	Long term noise event
7:00am—6:00pm	<u>L_{Aeq, adj. 15 min}</u>	45 dBA	43 dBA	40 dBA
6:00pm—10:00pm	<u>L_{Aeq, adj. 15 min}</u>	40 dBA	38 dBA	35 dBA
10:00pm—6:00am	<u>L_{Aeq, adj. 15 min}</u>	28 dBA	28 dBA	28 dBA
	<u>Max L_{pA, 15mins}</u>	55 dBA	55 dBA	55 dBA
6:00am—7:00am	<u>L_{Aeq, adj. 15 min}</u>	40 dBA	38 dBA	35 dBA
Drilling activities undertaken from 10:00pm – 7:00am ²	<u>L_{Aeq, adj. 15min}</u>	28 dBA (measured indoors) 33 dBA (measured outdoors)		

¹ The noise limits in *Schedule E, Table 1 – Noise nuisance limits* have been set based on the following deemed background noise levels (LABG):

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

² Drilling activities (e.g. drilling, workover, completion activities) undertaken from 10:00 pm – 7:00 am must be temporary and mobile in nature, and must not contribute to long-term background noise creep.

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

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

- Noise 3 Notwithstanding condition (Noise 1), emission of any low frequency noise must not exceed either (Noise 3(a)) and (Noise 3(b)), or (Noise 3(c)) and (Noise 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
 - the difference between the internal A-weighted and Z-weighted (Max L_{pZ, 15 min}) noise levels is no greater than 15 dB.
- E10 Within 12 months of commissioning the units listed in Schedule E, Table 3 – Tipton Expansion Project units, the EA holder must, conduct noise monitoring under worst case noise propagation conditions to validate the pre-commissioning noise predictions at sensitive receptors.
- E11 The holder of this environmental authority must provide the administering authority with a report of the monitoring results required under condition (E10) that evaluates the accuracy of the pre-commissioning model predictions at sensitive receptors.

Schedule E, Table 3 – Tipton Expansion Project units

Resource Authority	Field	Facility	Unit Description	
PL198	Tipton	Tipton Central Gas Processing Facility	K-0007 Compressor 7	
			K-0007 Compressor 8	
			K-0007 Compressor 9	
			K-0007 Compressor 10	
				K-0015 Inlet Fuel Gas Compressor Engine
		Tipton Water Treatment Facility	Generator 1	
			Generator 2	
			Generator 3	
			Generator 4	

Resource Authority	Field	Facility	Unit Description
			Generator 5

Noise 4 A Blast Management Plan must be developed for each blasting activity in accordance with Australian Standard 2187.

Noise 5 Blasting operations must be designed to not exceed an airblast overpressure level of 120 dB (linear peak) at any time, when measured at or extrapolated to any sensitive place.

Noise 6 Blasting operations must be designed to not exceed a ground-borne vibration peak particle velocity of 10mm/s at any time, when measured at or extrapolated to any sensitive place.



Schedule F – Air

- Air 1 Unless venting is authorised under the *Petroleum and Gas (Production and Safety) Act 2004* or the *Petroleum Act 1923*, waste gas must be flared in a manner that complies with all of (Air 1(a)) and (Air 1(b)) and (Air 1(c)), or with (Air 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 enclosed flare.
- Air 2A A fuel burning or combustion facility must not be operated unless it is listed in *Schedule F, Table 1– Authorised point sources*.
- Air 2B If a fuel burning or combustion facility is listed in *Schedule F, 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 *Schedule F, Table 1—Authorised point sources* at the specified release point reference.
- Air 3 Point source air monitoring for each fuel burning or combustion facility listed in *Schedule F, Table 1– Authorised point sources* must:
- (a) be undertaken:
 - i. once in the first three months after each facility is first commissioned, and then
 - ii. annually or biennially thereafter at the frequency specified in *Schedule F, Table 2 – Annual Air Quality Monitoring*
 - (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 *Schedule F, Table 1– Authorised point sources* at each release point reference.

Schedule F, Table 1 — Authorised point sources

Tenure	Facility	Release Point Reference	Unit Description	Minimum Release Height (m)	Minimum Efflux Velocity (m/sec) ¹	NO _x as Nitrogen Dioxide	Carbon Monoxide
						Maximum Mass Emission Rate (g/sec) ¹	Maximum Mass Emission Rate (g/sec) ¹
PL 230	Daandine Central Gas Processing Facility	A1	K-0001 Compressor 1	10	30	3.0	5.5
		A2	K-0002 Compressor 2				
		A3	K-0003 Compressor 3				
		A4	K-0004 Compressor 4				
		A5	K-0005 Compressor 5				
		A6	K-0006 Compressor 6				
		A7	K-0007 Compressor 7				
		A8	K-9008 Compressor 8	17	17	1.4	4.8
		A9	K-9009 Compressor 9				
		A10	K-9010 Compressor 10				
		A11	K-9011 Inlet Fuel Screw Compressor Engine 11	8.5	30	1.5	1.0
PL 198	Tipton West Central Gas Processing Facility	A14	K-0001 Compressor 1	7.6	30	6.8	5.5
		A15	K-0002 Compressor 2				
		A16	K-0003 Compressor 3				
		A17	K-0004 Compressor 4				

Tenure	Facility	Release Point Reference	Unit Description	Minimum Release Height (m)	Minimum Efflux Velocity (m/sec) ¹	NO _x as Nitrogen Dioxide	Carbon Monoxide
						Maximum Mass Emission Rate (g/sec) ¹	Maximum Mass Emission Rate (g/sec) ¹
		A18	K-0005 Compressor 5	17	17	1.4	4.8
		A19	K-0006 Compressor 6				
		A20	K-0007 Compressor 7				
		A21	K-0008 Compressor 8				
		A22	K-0009 Compressor 9				
		A23	K-0010 Compressor 10				
	Tipton Water Treatment Facility ²	A24	K-0015 Inlet Fuel Gas Compressor Engine	8.5	38	1.5	1.0
		A25	Generator 1	7.5	27	1.5	1.5
		A26	Generator 2				
		A27	Generator 3				
		A28	Generator 4				
		A29	Generator 5				

¹ Minimum efflux velocity, maximum mass emission and maximum concentration limits relate to plant maximum continuous ratings.

² The Water Treatment Facility's aggregated fuel consumption exceeds the 500 kg per hour threshold when all five generators are in simultaneous operation.

Schedule F, Table 2 – Annual Air Quality Monitoring

Release Point	Parameter ¹		Minimum Monitoring Frequency
	Mass emission rate (g/s)	Concentration (mg/Nm ³)	
A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, A13, A14, A15, A16, A17, A18, A19, A20, A21, A22, A23, A24, A25 ² , A26 ² , A27 ² , A28 ² , A29 ²	oxides of nitrogen (measured as NO ₂) carbon monoxide	oxides of nitrogen (measured as NO ₂) carbon monoxide	Biennial from commission

¹ Measured in flue gas at the 5% oxygen reference level

² Biennial monitoring is not required until at least four of the five generators are commissioned.

Schedule G – Waste

- Waste 1 Measures must be implemented so that waste is managed in accordance with the waste and resource management hierarchy and the waste and resource management principles.
- Waste 2 Waste, including waste fluids, but excluding waste used in closed-loop systems, must be transported off-site for lawful re-use, remediation, recycling or disposal, unless the waste is specifically authorised by conditions of this environmental authority to be disposed of or used on site.
- Waste 3 Waste fluids, other than flare precipitant stored in flare pits, or residual drilling material or drilling fluids stored in sumps, must be contained in either:
- (a) an above ground container; or
 - (b) a structure which contains the wetting front.
- Waste 4 Green waste may be used on-site for either rehabilitation or sediment and erosion control, or both.
- Waste 5 Vegetation waste may be burned if it relates to a state forest, timber reserve or forest entitlement area administered by the *Forestry Act 1959* and a permit has been obtained under the *Fire and Rescue Service Act 1990*.
- Waste 6 Pipeline waste water 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.
- Waste 7 Produced water may be re-used in drilling and well hole activities.
- Waste 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.

- Waste 9 Produced water may be used for construction and operation 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
 - (d) Does not harm vegetation surrounding the construction site.
- Waste 10 If there is any indication that any of the circumstances in condition (Waste 8)(b)(i) to (Waste 8)(b)(iv)) or (Waste 9)(a) to (Waste 9)(d)) is occurring, the use must cease immediately and the affected area must be remediated without delay.
- Waste 11 Treated sewage effluent or greywater can be released to land provided it:
- (a) meets or exceeds secondary treated class B standards for a treatment system with a daily peak design capacity of between 150 EP and 1500 EP; or
 - (b) meets or exceeds secondary treated class C standards for a treatment system with a daily peak design capacity of less than 150 EP.
- Waste 12 The release of treated sewage effluent or greywater authorised in condition (Waste 11) must:
- (a) be to a fenced and signed contaminant release area(s);
 - (b) not result in pooling or run-off or aerosols or spray drift or vegetation die-off;
 - (c) be to a contaminant release area(s) that is kept vegetated with groundcover, that is:
 - i. not a pest species;
 - ii. kept in a viable state for transpiration and nutrient uptake; and
 - iii. grazed or harvested and removed from the contaminant release area as needed, but not less than every three months.
- Waste 13 Notwithstanding condition (Waste 11), treated sewage effluent that meets or exceeds secondary treated class A standards may be used for dust suppression or construction activities, provided the use meets the criteria in condition (Waste 8) or (Waste 9), as relevant to the use.
- Waste 14 Sewage pump stations must be fitted with a:
- (a) stand-by pump; and

- (b) high level alarm to warn of imminent pump station overflow, that operates without mains power or with a back-up power source that starts automatically in the event of a power failure.
- Waste 15 If sumps are used to store residual drilling material or drilling fluids, they must only be used for the duration of drilling activities.
- Waste 16 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.
- Waste 17 Records must be kept to demonstrate compliance with condition (Waste 15) and (Waste 16).
- G12 Coal seam gas water may be transferred to a third party to be used for the following purposes subject to compliance with conditions (G13) and (G14):
- (a) dust suppression if the coal seam gas water quality complies with the limits specified in *Schedule G, Table 1 – Water Contaminant Release Limits*;
- (b) construction and operational purposes if the coal seam gas water quality complies with the limits specified in *Schedule G, Table 1 – Water Contaminant Release Limits*;
- (c) irrigation and livestock watering purposes;
- (d) the following industrial purposes:
- i. coal washing;
 - ii. power stations; and
 - iii. water treatment facilities.
- G13 Any coal seam gas water supplied to a third party for irrigation and/or livestock watering purposes in accordance with Condition (G12)(c) must comply with the relevant trigger values contained in ANZECC and ARMCANZ Water Quality Guidelines 2000, or subsequent versions thereof.

Schedule G, Table 1 – Water Contaminant Release Limits

Water Quality Characteristics	Unit	Limit	Limit Type
pH	pH units	6.0 to 9.0	Range

Water Quality Characteristics	Unit	Limit	Limit Type
Sodium Adsorption Ratio	ratio	6	80 th Percentile
		12	Maximum
Total Dissolved Solids	mg/L	1500	Maximum
Total Petroleum Hydrocarbons	mg/L	10	Maximum

G14

If the responsibility of coal seam gas water is given or transferred to a third party in accordance with Condition (G12), the holder of environmental authority must ensure that:

- (a) the responsibility of the coal seam gas water is given or transferred in accordance with a written agreement (the third party agreement); and
- (b) the third party is made aware of the General Environmental Duty under section 319 of the *Environmental Protection Act 1994*.

Schedule H – Rehabilitation

- Rehabilitation 1 A Rehabilitation Plan must be developed by a suitably qualified person and must include the:
- (a) rehabilitation goals; and
 - (b) procedures to be undertaken for rehabilitation that will:
 - i. achieve the requirements of conditions (Rehabilitation 2) to (Rehabilitation 8), inclusive; and
 - ii. provide for appropriate monitoring and maintenance.
- Rehabilitation 2 Significantly disturbed areas that are no longer required for the on-going petroleum activities, must be rehabilitated within 12 months (unless an exceptional circumstance in the area to be rehabilitated (e.g. a flood event) prevents this timeframe being met) and be maintained to meet the following acceptance criteria:
- (a) contaminated land resulting from petroleum activities is remediated and rehabilitated;
 - (b) the areas are:
 - i. non-polluting;
 - ii. a stable landform;
 - iii. re-profiled to contours consistent with the surrounding landform;
 - (c) surface drainage lines are re-established;
 - (d) top soil is reinstated; and
 - (e) either:
 - i. groundcover, that is not a pest species, is growing; or
 - ii. an alternative soil stabilisation methodology that achieves effective stabilisation is implemented and maintained.
- Rehabilitation 3 All significantly disturbed areas caused by petroleum activities which are not being or intended to be utilised by the landholder or overlapping tenure holder, must be rehabilitated to meet the following final acceptance criteria measured either against the highest ecological value adjacent land use or the pre-disturbed land use:

-
- (a) greater than or equal to 70% of native ground cover species richness
- (b) greater than or equal to the total per cent of ground cover
- (c) less than or equal to the per cent species richness of plant pest species; and
- (d) where the adjacent land use contains, or the pre-clearing land use contained, one or more regional ecosystem(s), then at least one regional ecosystem(s) from the same broad vegetation group, and with the equivalent biodiversity status or a biodiversity status with a higher conservation value as any of the regional ecosystem(s) in either the adjacent land or pre-disturbed land, must be present.
- Rehabilitation 4 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 (Biodiversity 1) and (Biodiversity 2)) 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 plant pest species;
- (d) greater than or equal to 50% of organic litter cover;
- (e) greater than or equal to 50% of total density of coarse woody material; and
- (f) all predominant species in the ecologically dominant layer, that define the pre-disturbance regional ecosystem(s) are present.
- Rehabilitation 5 Conditions (Rehabilitation 2), (Rehabilitation 3) and (Rehabilitation 4) continue to apply after this environmental authority has ended or ceased to have effect.
- Rehabilitation 8 Where there is a dam (including a low consequence dam) that is being or intended to be utilised by the landholder or overlapping tenure holder, the dam must be decommissioned to no longer accept inflow from the petroleum activity(ies) and the contained water must be of a quality suitable for the intended on-going uses(s) by the landholder or overlapping tenure holder.

Schedule I – Definitions

Words and phrases used throughout this environmental authority are defined below except where identified in the *Environmental Protection Act 1994* or its Regulations and Environmental Protection Policies. Where a word or term is not defined, the ordinary English meaning applies, and regard should be given to the Macquarie Dictionary.

Word or Phrase	Definition
acceptable standards for release to land	means wastewater of the following quality as determined by monitoring results or by characterisation: <ol style="list-style-type: none"> electrical conductivity (EC) not exceeding 3000μS/cm; sodium adsorption ratio (SAR) not exceeding 8; pH between 6.0 and 9.0; heavy metals (measured as total) meets the respective short term trigger value in section 4.2.6, Table 4.2.10—<i>Heavy metals and metalloids in Australian and New Zealand Guidelines for Fresh and Marine Water Quality</i>; 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 <u>significant disturbance</u> , or where there is no <u>ecosystem function</u> , the use of the land. An adjacent land use does not include an adjacent area that shows evidence of edge effect.
administering authority	means: <ol style="list-style-type: none"> 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 for all other matters—the Chief Executive of the Department of Environment and Science; or 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 <u>environmental nuisance</u> impact will be dealt with at a <u>sensitive place</u> , 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 <u>sensitive place</u> , 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 <u>rehabilitated</u> 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-

Word or Phrase	Definition																						
	disturbed site of interest where significant surveying effort has been undertaken to establish benchmark parameters.																						
annual return period	means the most current 12- <u>month</u> 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	<p>for the purposes of <u>residual drilling materials</u>, means the <u>residual drilling material</u> meet the following quality standards:</p> <p><u>Part A</u> In all cases:</p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Maximum concentration</th> </tr> </thead> <tbody> <tr> <td>pH</td> <td>6 to 10.5 (range)</td> </tr> <tr> <td>Electrical Conductivity</td> <td>20 dS/m (20,000 µS/cm)</td> </tr> <tr> <td>Chloride*</td> <td>8000 mg/L</td> </tr> </tbody> </table> <p>*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.</p> <p><u>Part B</u> If any of the following metals are a component of the drilling fluids, then for that metal:</p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Maximum concentration</th> </tr> </thead> <tbody> <tr> <td>Arsenic</td> <td>20 mg/kg</td> </tr> <tr> <td>Selenium</td> <td>5 mg/kg</td> </tr> <tr> <td>Boron</td> <td>100 mg/kg</td> </tr> <tr> <td>Cadmium</td> <td>3 mg/kg</td> </tr> <tr> <td>Chromium (total)</td> <td>400 mg/kg</td> </tr> <tr> <td>Copper</td> <td>100 mg/kg</td> </tr> </tbody> </table>	Parameter	Maximum concentration	pH	6 to 10.5 (range)	Electrical Conductivity	20 dS/m (20,000 µS/cm)	Chloride*	8000 mg/L	Parameter	Maximum concentration	Arsenic	20 mg/kg	Selenium	5 mg/kg	Boron	100 mg/kg	Cadmium	3 mg/kg	Chromium (total)	400 mg/kg	Copper	100 mg/kg
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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 <u>clearing</u> , logging, timber harvesting, or grazing activities have previously occurred, where high densities of weed or <u>pest</u> 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																						

Word or Phrase	Definition
	includes <u>waters</u> 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: <ul style="list-style-type: none"> • operations of any kind and all things constructed, erected or installed for that <u>dam</u>; and • any land used for those operations.
Australian Standard 3580	means any of the following publications: <ul style="list-style-type: none"> • 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 <u>waters</u> , has the meaning in Schedule 12 of the <i>Environmental Protection Regulation 2008</i> and— <ol style="list-style-type: none"> a) includes an area covered, permanently or intermittently, by tidal or non-tidal <u>waters</u>; but b) does not include land adjoining or adjacent to the <u>bed</u> that is from time to time covered by floodwater.
being or intended to be utilised by the landholder or overlapping tenure holder	for <u>significantly disturbed</u> 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 <u>rehabilitation</u> standards for <u>revegetation</u> by the holder of the environmental authority are not required. For <u>dams</u> , 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 <u>dam</u> such that <u>rehabilitation</u> standards for <u>revegetation</u> by the holder of the environmental authority are not required.

Word or Phrase	Definition
biodiversity values	for the purposes of this environmental authority, means <u>environmentally sensitive areas</u> , <u>prescribed environmental matters</u> and <u>wetlands</u> .
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 Environmental Protection Regulation 2008.
Category B Environmentally Sensitive Area	means any area listed in Schedule 12, Section 2 of the Environmental Protection Regulation 2008.
Category C Environmentally Sensitive Area	means any of the following areas: <ul style="list-style-type: none"> • nature refuges as defined in the conservation agreement for that refuge under the Nature Conservation Act 1992 • koala habitat areas as defined under the Nature Conservation (Koala) Conservation Plan 2006 • state forests or timber reserves as defined under the Forestry Act 1959 • regional parks (previously known as resource reserves) under the Nature Conservation Act 1992 • an area validated as 'essential habitat' from ground-truthing surveys in accordance with the Vegetation Management Act 1999 for a species of wildlife listed as endangered or vulnerable under the Nature Conservation Act 1992 • 'of concern <u>regional ecosystems</u>' that are remnant vegetation and identified in the database called 'RE description database' containing <u>regional ecosystem</u> numbers and descriptions.
certified or certification	in relation to any matter other than a design plan, 'as constructed' drawings or an annual report regarding <u>dams</u> means, a Statutory Declaration by a <u>suitably qualified person</u> or <u>suitably qualified third party</u> accompanying the written <u>document</u> stating: <ul style="list-style-type: none"> • the person's qualifications and experience relevant to the function • that the person has not knowingly included false, misleading or incomplete information in the <u>document</u> • that the person has not knowingly failed to reveal any relevant information or <u>document</u> to the <u>administering authority</u> • that the <u>document</u> addresses the relevant matters for the function and is factually correct; and • that the opinions expressed in the <u>document</u> are honestly and reasonably held.

Word or Phrase	Definition
clearing	has the meaning in the dictionary of the <i>Vegetation Management Act 2000</i> and for vegetation— <ol style="list-style-type: none"> a) means remove, cut down, ringbark, push over, poison or destroy in any way including by burning, flooding or draining; but b) does not include destroying standing vegetation by stock, or lopping a tree.
closed-loop systems	means using waste on site in a way that does not release waste or contaminants in the waste to the environment.
coal seam gas water	means underground water brought to the surface of the earth, or moved underground in connection with exploring for, or producing coal seam gas.
control measure	has the meaning in section 47 of the <i>Environmental Protection Regulation 2008</i> and means a device, equipment, <u>structure</u> , or management strategy used to prevent or control the release of a contaminant or waste to the environment.
critically limited regional ecosystem	means the <u>regional ecosystems</u> defined and listed in Appendix 5 of the Queensland Biodiversity Offset Policy.
daily peak design capacity	for sewage treatment works, has the meaning in Schedule 2, section 63(4) of the <i>Environmental Protection Regulation 2008</i> as the higher <u>equivalent person (EP)</u> for the works calculated using each of the formulae found in the definition for <u>EP</u> .
dam(s)	means a land-based <u>structure</u> 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 <u>structure</u> or <u>void</u> and <u>associated works</u> .
design storage allowance or DSA	means an available volume, estimated in accordance with the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ESR/2016/19337)</i> , published by the <u>administering authority</u> , as amended from time to time, that must be provided in a dam to an annual exceedance probability specified in that Manual.
designated precinct	has the meaning in Part 5 section 15(3) of the <i>Regional Planning Interests Regulation 2014</i> and means: <ul style="list-style-type: none"> • for a <u>strategic environmental area</u> mentioned in section 4(1) – the area identified as a designated precinct on the <u>strategic environmental area map</u> for the strategic environmental area; or • if a <u>strategic environmental area</u> is shown on a map in a regional plan – the area identified on the map as a designated precinct for the <u>strategic environmental area</u>
development wells	means a petroleum well which produces or stores petroleum. For clarity, a development well does not include an appraisal well.

Word or Phrase	Definition
document	has the meaning in the <i>Acts Interpretation Act 1954</i> and means: <ul style="list-style-type: none"> • 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 <i>Methodology for Surveying and Mapping of Regional Ecosystems and Vegetation Communities in Queensland</i> (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 <u>environmental nuisance</u> . Environmental harm may be caused by an activity— <ol style="list-style-type: none"> whether the harm is a direct or indirect result of the activity; or 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— <ol style="list-style-type: none"> aerosols, fumes, light, noise, odour, particles or smoke; or an unhealthy, offensive or unsightly condition because of contamination; or 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 <u>Category A, B or C environmentally sensitive areas</u> (ESAs)
equivalent person or EP	has the meaning under section 3 of the <i>Planning Guidelines For Water Supply and Sewerage</i> , 2005, published by the Queensland Government. It is

Word or Phrase	Definition
	<p>calculated in accordance with Schedule 2, Section 63(4) of the <i>Environmental Protection Regulation 2008</i> where:</p> <ul style="list-style-type: none"> • 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	<p>means activities that are essential to bringing the resource to the surface and are only the following:</p> <ul style="list-style-type: none"> • <u>low impact petroleum activities</u> • 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): <ul style="list-style-type: none"> ○ 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: <ul style="list-style-type: none"> ○ for single well sites, not exceeding 1.5 hectares disturbance ○ for multi-well sites, not exceeding 2.0 hectares disturbance • well sites with slope considerations (>2% slope) for cut and fill earthworks and drainage: <ul style="list-style-type: none"> ○ for single well sites, not exceeding 1.5 hectares disturbance ○ for multi-well sites, not exceeding 2.5 hectares disturbance • swell sites including a Communications Tower: <ul style="list-style-type: none"> ○ for single well sites, not exceeding 1.5 hectare disturbance ○ for multi-well sites, not exceeding 3.0 hectare disturbance • associated infrastructure located on a well site necessary for the construction and operations of wells: <ul style="list-style-type: none"> ○ water pumps and generators ○ <u>flare pits</u> ○ chemical / fuel storages ○ <u>sumps for residual drilling material</u> and drilling fluids ○ tanks, or dams which are not significant or high consequence dams to contain wastewater (e.g. <u>stimulation flow back waters</u>, <u>produced water</u>) ○ 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

Word or Phrase	Definition
	<ul style="list-style-type: none"> ○ 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 • on site disposal of <u>residual drilling material</u> as per condition (Waste 16) • communications towers, not exceeding 1.0 hectares disturbance • 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 <u>control measures, rehabilitation</u>).
existing authority	has the meaning in section 94 of the <i>Environmental Offsets Act 2014</i> .
exploration well	<p>means a petroleum well that is drilled to:</p> <ul style="list-style-type: none"> • 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. <p>For clarity, an exploration well does not include an appraisal or development well.</p>
flare pit	has the meaning in the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ESR/2016/19338)</i> , 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 <u>waste fluids</u> which result from the operation of a flare.
floodplains	<p>has the meaning in the <i>Water Act 2000</i> and means an area of reasonably flat land adjacent to a <u>watercourse</u> that—</p> <ul style="list-style-type: none"> • is covered from time to time by floodwater overflowing from the <u>watercourse</u>; and • does not, other than in an upper valley reach, confine floodwater to generally follow the path of the <u>watercourse</u>; and • has finer sediment deposits than the sediment deposits of any bench, bar or in-stream island of the <u>watercourse</u>.
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

Word or Phrase	Definition
	include water, other <u>liquids</u> fluids or solids, or a mixture that includes water and any other <u>liquids</u> 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	<p>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:</p> <ul style="list-style-type: none"> • 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 <u>wetland</u>. <p>A GAB spring includes a spring vent, spring complex or <u>watercourse</u> spring and includes the land to which water rises naturally from below the ground and the land over which the water then flows.</p> <p><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></p> <p><i>Note: The GAB springs dataset can be requested from the Queensland Government Herbarium</i></p>
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 <u>pest</u> species.
greywater	means wastewater generated from domestic activities such as laundry, dishwashing, and bathing. Greywater does not include sewage.
groundwater dependent ecosystem (GDE)	<p>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.</p> <p>For the purposes of the environmental authority, groundwater dependent ecosystems do not include those mapped as "unknown".</p>
growing	means to increase by natural development, as any living organism or part thereof by assimilation of nutriment; increase in size or substance.

Word or Phrase	Definition
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.
LA 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.
LAeq, adj, 15 mins	means an A-weighted sound pressure level of a continuous steady sound, adjusted for tonal character, that within a 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: <ul style="list-style-type: none"> • 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 <u>administering authority</u> of the <i>Water Act 2000</i> .
linear infrastructure	means powerlines, pipelines, 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 <u>sensitive receptor</u> , 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 <u>dam</u> that is not classified as high or significant as assessed using the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures</i> , published by the <u>administering authority</u> , as amended from time to time.
low impact petroleum activities	means petroleum activities which do not result in the <u>clearing</u> of native vegetation, cause disruption to soil profiles through earthworks or excavation or result in <u>significant disturbance</u> to land which cannot be <u>rehabilitated</u> immediately using hand tools after the activity is completed. Examples of such activities include but are not necessarily limited to soil surveys (excluding test

Word or Phrase	Definition
	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 <u>document</u> 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 <u>sensitive receptor</u> , persists for an aggregate period not greater than five days and does not re-occur for a period of at least four 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 <u>sump</u> by mixing with subsoil and which occurs in accordance with the following <u>methodology</u> : <ul style="list-style-type: none"> - the base of the subsoil and residual solid mixture must be separated from the groundwater table by at least one metre of a continuous layer of impermeable subsoil material (kw=10-8m/s) or subsoil with a clay content of greater than 20 percent; and - the residual solids is mixed with subsoil in the <u>sump</u> 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.

Word or Phrase	Definition
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— <ul style="list-style-type: none"> • 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> .
pest	Means a plant or animal, other than a native species of plant or animal, that is — <ol style="list-style-type: none"> a) an Invasive biosecurity matter under the <i>Biosecurity Act 2014</i>* b) a Controlled biosecurity matter or regulated biosecurity matter under the <i>Biosecurity Act 2014</i> or c) a Locally significant invasive species declared under <i>Local Government Act 2009</i> as local law. <p>*See Biosecurity Act 2014, schedule 1, part 3 or 4 or schedule 2, part 2. See also the notes to the Biosecurity Act 2014, schedules 1 and 2.</p> <p>Invasive biosecurity matter is defined to include invasive plants and animals as listed as prohibited and restricted matter in schedules 1 and 2 of the <i>Biosecurity Act 2014</i>.</p>
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 <u>significant disturbance</u> occurring at that location.
predominant species	has the meaning in the <i>Methodology for Surveying and Mapping of Regional Ecosystems and Vegetation Communities in Queensland</i> (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> .
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> .

Word or Phrase	Definition
primary protection zone	means an area within 200m from the boundary of any <u>Category A, B or C ESA</u> .
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 <u>primary protection zone</u> of any <u>Category A, B or C ESA</u> or the <u>secondary protection zone</u> of any <u>Category A or B ESA</u> .
regional ecosystem	has the meaning in the <i>Methodology for Surveying and Mapping of Regional Ecosystems and Vegetation Communities in Queensland</i> (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 <i>Regional Ecosystem Description Database</i> (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 <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ESR/2016/19339)</i> , published by the <u>administering authority</u> , as amended from time to time.
rehabilitation or rehabilitated	means the process of reshaping and <u>revegetating</u> land to restore it to a <u>stable</u> landform and in accordance with acceptance criteria and, where relevant, includes remediation of contaminated land. For the purposes of pipeline rehabilitation, rehabilitation includes <u>reinstatement</u> , <u>revegetation</u> 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 topography, <u>watercourses</u> , culverts, fences and gates and other landscape(d) features) and is detailed in the <i>Australian Pipeline Industry Association (APIA) Code of Environmental Practice: Onshore Pipelines</i> (2013).
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 µg/L–0.020 µg/L.

Word or Phrase	Definition
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 <u>rehabilitation</u> 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 <u>stimulation</u> , including fracturing, that contain the following chemicals in more than the maximum amount prescribed under a regulation— <ul style="list-style-type: none"> 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 <u>Category A</u> or <u>Category B</u> ESA means an area within 100 metres from the boundary of the <u>primary protection zone</u> .
secondary treated class A standards	means treated sewage effluent or <u>greywater</u> which meets the following standards: <ul style="list-style-type: none"> • 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 <u>greywater</u> which meets the following standards: <ul style="list-style-type: none"> • 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

Word or Phrase	Definition
	<ul style="list-style-type: none"> e-coli, 80th percentile based on at least 5 samples with not less than 30 minutes between samples, 1000cfu per 100mL, maximum 10000cfu per 100mL.
secondary treated class C standards	<p>means treated sewage effluent or <u>greywater</u> which meets the following standards:</p> <ul style="list-style-type: none"> 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 100000cfu per 100mL.
sensitive place	<p>means:</p> <ul style="list-style-type: none"> 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 <u>sensitive receptor</u> for the purposes of the <i>Environmental Protection (Noise) Policy 2008</i>.
sensitive receptor	is defined in Schedule 2 of the <i>Environmental Protection (Noise) Policy 2008</i> , and means an area or place where noise is measured.
short term noise event	is a noise exposure, when perceived at a <u>sensitive receptor</u> , 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> .

Word or Phrase	Definition
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— (a) to a condition required under the relevant environmental authority; or (b) if the environmental authority does not require the land to be <u>rehabilitated</u> 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 <u>rehabilitation</u> 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 <u>administering authority</u> a statement of compliance about a <u>document</u> or work relating to a relevant activity. The condition must also state— (a) the criteria (the compliance criteria) the <u>document</u> or work must comply with; and (b) that the statement of compliance must state whether the <u>document</u> or work complies with the compliance criteria; and (c) the information (the supporting information) that must be provided to the <u>administering authority</u> to demonstrate compliance with the compliance criteria; and (d) when the statement of compliance and supporting information must be given to the <u>administering authority</u> .
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.
stimulation fluid	means the fluid injected underground to increase permeability. For clarity, the term <u>stimulation</u> fluid only applies to fluid injected down well post-perforation.
stimulation impact zone	means a 100m maximum radial distance from the <u>stimulation</u> 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 <u>dam</u> or levee.

Word or Phrase	Definition
subterranean cave <u>GDE</u>	<ul style="list-style-type: none"> • 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 <u>GDEs</u> are caves dependent on the subterranean presence of groundwater. Subterranean cave <u>GDEs</u> 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. <p><i>Note: the Subterranean <u>GDE</u> (caves) dataset can be displayed through the Queensland Government WetlandInfo mapping program.</i></p> <p><i>Note: the Subterranean <u>GDE</u> (caves) dataset can be obtained from the Queensland Government Information System.</i></p>
suitably qualified third party	<p>means a person who:</p> <p>(a) has qualifications and experience relevant to performing the function including but not limited to:</p> <ol style="list-style-type: none"> i. a bachelor's degree in science or engineering; and ii. 3 years' experience in undertaking soil contamination assessments; and <p>(b) is a member of at least one organisation prescribed in Schedule 8 of the <i>Environmental Protection Regulation 2008</i>; and</p> <p>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.</p>
sump	means a pit in which waste <u>residual drilling material</u> 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,

Word or Phrase	Definition
	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.
valid complaint	means all complaints unless considered by the <u>administering authority</u> 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— <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> a) polluter pays principle b) user pays principle c) proximity principle d) product stewardship principle.
waste fluids	has the meaning in section 13 of the Environmental Protection Act 1994 in conjunction with the common meaning of “fluid” which is “a substance which is capable of flowing and offers no permanent resistance to changes of shape”. Accordingly, to be a waste fluid, the waste must be a substance which is capable of flowing and offers no permanent resistance to changes of shape.
watercourse	has the meaning in Schedule 4 of the <i>Environmental Protection Act 1994</i> and means: <ul style="list-style-type: none"> a) a river, creek or stream in which water flows permanently or intermittently— <ul style="list-style-type: none"> i. in a natural channel, whether artificially improved or not; or ii. in an artificial channel that has changed the course of the watercourse. b) Watercourse includes the <u>bed</u> and banks and any other element of a river, creek or stream confining or containing water.

Word or Phrase	Definition
waters	includes all or any part of a creek, river, stream, lake, lagoon, swamp, <u>wetland</u> , spring, unconfined surface water, unconfined water in natural or artificial watercourses, <u>bed</u> 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	<p>for the purpose of this environmental authority, wetland means:</p> <ul style="list-style-type: none"> • areas shown on the <u>Map of referable wetlands</u> which is a <u>document</u> 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 <i>Environmental Protection Regulation 2008</i>; 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: <ul style="list-style-type: none"> ○ 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. <p>The term wetland includes riverine, lacustrine, estuarine, marine and palustrine wetlands; and it does not include a <u>Great Artesian Basin Spring</u> or a subterranean wetland that is a cave or aquifer.</p>
wetland of high ecological significance	means a <u>wetland</u> that meets the definition of a <u>wetland</u> and that is shown as a <u>wetland</u> of 'high ecological significance' or <u>wetland</u> of 'high ecological value' on the <u>Map of referable wetlands</u> .
wetland of other environmental value	means a <u>wetland</u> that meets the definition of a <u>wetland</u> and that is shown as a <u>wetland</u> of 'general environmental significance' or <u>wetland</u> of 'other environmental value' on the <u>Map of referable wetlands</u> .

END OF PERMIT



Queensland

Regional Planning Interests Act 2014

Current as at 3 July 2017

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Queensland

Regional Planning Interests Act 2014

Contents

		Page
Part 1	Preliminary	
Division 1	Introduction	
1	Short title	7
2	Commencement	7
Division 2	Purposes and application of Act	
3	Purposes and achievement	7
4	Act binds all persons	8
5	Relationship with resource Acts and Environmental Protection Act	8
Division 3	Interpretation	
Subdivision 1	Dictionary	
6	Dictionary	9
Subdivision 2	Definitions about areas of regional interest	
7	Area of regional interest	9
8	Priority agricultural area	9
9	Priority living area	10
10	Strategic cropping area	10
11	Strategic environmental area	11
Subdivision 3	Definitions about Acts and authorities under them	
12	Resource Act and resource activity	11
13	Resource authority	12
14	Environmental authority	13
15	Authority holder	13
Subdivision 4	Other definitions	
16	Regional interests development approval	14
17	Regulated activity	14
Subdivision 5	References in provisions	
18	References in provisions	14

Contents

Part 2	Restrictions on resource and regulated activities in areas of regional interest	
Division 1	Restrictions	
19	Restrictions on carrying out resource activity or regulated activity	16
20	Failure to comply with conditions	17
21	Emergency activity defence	17
Division 2	Exempt resource activities	
22	Exemption—agreement of land owner	18
23	Exemption—activity carried out for less than 1 year	19
24	Exemption—pre-existing resource activity	19
24A	Exemption—wild river area under the repealed Wild Rivers Act 2005	20
25	Exemption—pre-existing regulated activity	21
Part 3	Regional interests development approvals	
Division 1	Preliminary	
26	Meaning of assessing agency and assessor	21
27	When does a resource activity or regulated activity impact an area of regional interest	21
Division 2	Applying	
28	Who may apply for regional interests development approval	22
29	Requirements for making assessment application	22
30	Owner of land given copy of assessment application	23
Division 3	Amending or withdrawing application	
31	Amending	23
32	Withdrawal of application	24
33	Owner of land given notice of amendment or withdrawal	24
Division 4	Public notification of particular applications	
34	Application of div 4	24
35	Applicant must notify	25
36	Consequence of failure to notify	26
37	Properly made submissions	26
38	Submissions must be published or available for inspection	27
Division 5	Referral to assessing agency	
39	Application of div 5	28
40	Assessing agency's functions	28
41	Assessing agency's assessment of application	28
42	Assessing agency's response to application	29

43	Ministerial directions to assessing agency	29
Division 6	Additional information etc. for application	
44	Requirement notice	30
45	Consequence of noncompliance with requirement notice	31
46	Additional advice or comment about assessment application ...	32
Division 7	Deciding application	
47	Chief executive must decide application	32
48	Decision generally	33
49	Criteria for decision	33
50	Conditions generally	34
Division 8	Steps after deciding application	
51	Notice about decision	35
52	Public notification of decision	35
53	Issuing approval	36
54	When approval takes effect	36
Division 9	Amending approval	
55	Amending approval	37
56	Notice about decision	38
57	Giving effect to amendment	38
Division 10	Miscellaneous	
58	Approval attaches to land	39
59	Regional interests conditions paramount	39
Part 4	Mitigation	
Division 1	Provisions for SCL mitigation conditions	
60	Application of pt 4	39
61	What is mitigated SCL land	40
62	What is mitigation	40
63	What are mitigation measures	40
64	What is a mitigation deed	40
65	What are the mitigation criteria	41
Division 2	Mitigation fund	
66	Mitigation fund continued	41
67	Purpose and administration	41
68	Payments from fund	42
69	Reporting requirement for mitigation measures	42
Division 3	Miscellaneous provisions	

Contents

70	Mitigation deed binds holder's successors	42
Part 5	Appeals and declarations	
71	Definitions for pt 5	43
72	Appeal to Planning and Environment Court	43
73	Appeal period	44
73A	How appeals are started	44
74	Respondent for appeal	44
75	Notice of appeal to other parties	45
76	Stay of operation of decision	45
77	Who must prove case for appeal	46
77A	Appeal decision	46
78	Declarations	47
Part 6	Miscellaneous provisions	
Division 1	Evidence	
79	Evidentiary aids generally	47
Division 2	Offence proceedings	
80	Division of offences against Act	49
81	Proceedings for indictable offences	49
82	Limitation on who may summarily hear indictable offence proceedings 50	
83	Proceeding for summary offences	50
84	Alternative offences	51
85	Court may make orders	52
Division 3	Investigation and enforcement	
86	Authorised persons under the Vegetation Management Act 1999	53
87	Authorised persons under a Local Government Act	54
88	Authorised persons under the Environmental Protection Act ...	55
89	Ministerial direction to investigate	55
Division 4	General	
90	Guidelines	56
91	No compensation because of Act	56
92	Delegation by chief executive	56
93	Protection of officials from liability	57
94	Approved forms	57
95	Regulation-making power	57
Part 7	Repeal	

96	Repeal	58
Part 8	Transitional provisions for repeal of Strategic Cropping Land Act 2011	
97	Definitions for pt 8	58
98	Validation application	58
99	Resource activities excluded from repealed Act are exempt resource activities	59
100	Conditions imposed for future environmental authority or mining lease relating to EPC 891	59
101	Application for SCL protection decision	60
102	SCL protection decision	61
103	SCL compliance certificate	62
104	Mitigation requirements	63
105	Right of appeal on commencement	63
106	Appeals started at commencement	64
107	Stop work notices and restoration notices	64
Part 8A	Transitional provision for State Development, Infrastructure and Planning (Red Tape Reduction) and Other Legislation Amendment Act 2014	
107A	References to former terms	65
Part 9	Transitional provision for Planning (Consequential) and Other Legislation Amendment Act 2016	
108	Existing appeals	66
Schedule 1	Dictionary	67

Regional Planning Interests Act 2014

An Act to manage the impact of resource activities and other regulated activities on areas of the State that contribute, or are likely to contribute, to Queensland's economic, social and environmental prosperity

Part 1 Preliminary

Division 1 Introduction

1 Short title

This Act may be cited as the *Regional Planning Interests Act 2014*.

2 Commencement

This Act commences on a day to be fixed by proclamation.

Division 2 Purposes and application of Act

3 Purposes and achievement

- (1) The purposes of this Act are to—
- (a) identify areas of Queensland that are of regional interest because they contribute, or are likely to contribute, to Queensland's economic, social and environmental prosperity; and
 - (b) give effect to the policies about matters of State interest stated in regional plans; and

- (c) manage, including in ways identified in regional plans—
 - (i) the impact of resource activities and other regulated activities on areas of regional interest; and
 - (ii) the coexistence, in areas of regional interest, of resource activities and other regulated activities with other activities, including, for example, highly productive agricultural activities.
- (2) To achieve its purposes, this Act provides for a transparent and accountable process for the impact of proposed resource activities and regulated activities on areas of regional interest to be assessed and managed.

4 Act binds all persons

- (1) This Act binds all persons, including the State and, to the extent the legislative power of the Parliament permits, the Commonwealth and the other States.
- (2) However, the Commonwealth or a State can not be prosecuted for an offence against this Act.

5 Relationship with resource Acts and Environmental Protection Act

- (1) This Act applies despite any resource Act, the Environmental Protection Act, the Planning Act or the *Water Act 2000* (each the *other Act*).
- (2) A restriction or requirement under this Act applies as well as any restriction or requirement under the other Act.

Note—

See also section 59 (Regional interests conditions paramount).

Division 3 Interpretation

Subdivision 1 Dictionary

6 Dictionary

The dictionary in schedule 1 defines particular words used in this Act.

Note—

For the meanings of some words in particular contexts, see also section 18.

Subdivision 2 Definitions about areas of regional interest

7 Area of regional interest

Each of the following is an *area of regional interest*—

- (a) a priority agricultural area;
- (b) a priority living area;
- (c) the strategic cropping area;
- (d) a strategic environmental area.

8 Priority agricultural area

(1) A *priority agricultural area* is an area that—

- (a) includes 1 or more areas used for a priority agricultural land use, whether it also includes other areas or features, including, for example, a regionally significant water source; and
- (b) is either—
 - (i) shown on a map in a regional plan as a priority agricultural area; or

- (ii) prescribed under a regulation.
- (2) A *priority agricultural land use* is highly productive agriculture—
 - (a) of a type identified in a regional plan for an area of regional interest; or
 - (b) of a type prescribed under a regulation for an area of regional interest.
- (3) A *regionally significant water source* is a water source prescribed under a regulation.

9 Priority living area

A *priority living area* is an area—

- (a) shown on a map in a regional plan as a priority living area; and
- (b) that includes the existing settled area of a city, town or other community and other areas necessary or desirable—
 - (i) for the future growth of the existing settled area; and
 - (ii) as a buffer between the existing or a future settled area and resource activities.

10 Strategic cropping area

- (1) The *strategic cropping area* consists of the areas shown on the SCL trigger map as strategic cropping land.
- (2) In this section—

strategic cropping land means land that is, or is likely to be, highly suitable for cropping because of a combination of the land's soil, climate and landscape features.

11 Strategic environmental area

- (1) A *strategic environmental area* is an area that—
- (a) contains 1 or more environmental attributes for the area; and
 - (b) is either—
 - (i) shown on a map in a regional plan as a strategic environmental area; or
 - (ii) prescribed under a regulation.

Examples of areas that may be shown or prescribed as strategic environmental areas—

- the Steve Irwin Wildlife Reserve on Cape York Peninsula
- the channel country of western Queensland

- (2) In this section—

environmental attribute, for an area, means an attribute of the environment identified as an environmental attribute for the area under a regional plan or regulation.

Subdivision 3 Definitions about Acts and authorities under them

12 Resource Act and resource activity

- (1) A *resource Act* is any of the following—
- (a) *Geothermal Energy Act 2010*;
 - (b) *Greenhouse Gas Storage Act 2009*;
 - (c) *Mineral Resources Act 1989*;
 - (d) *Petroleum Act 1923*;
 - (e) *Petroleum and Gas (Production and Safety) Act 2004*.
- (2) A *resource activity* is—
- (a) an activity for which a resource authority is required to lawfully carry out; or

- (b) for a provision about a resource authority or proposed resource authority—an authorised activity for the authority or proposed authority (if granted) under the relevant resource Act.
- (3) In this Act, a reference to a resource activity includes a reference to the carrying out of the activity.
- (4) In this section—
relevant resource Act means the resource Act under which the authority is granted, or the proposed authority will, if granted, be granted.

13 **Resource authority**

A *resource authority* is any of the following—

- (a) a geothermal tenure under the *Geothermal Energy Act 2010*;
- (b) a GHG permit or GHG lease under the *Greenhouse Gas Storage Act 2009*;
- (c) each of the following under the *Mineral Resources Act 1989*—
 - (i) a mining tenement other than a prospecting permit;
 - (ii) an approval that grants rights over land;
- (d) a 1923 Act petroleum tenure under the *Petroleum Act 1923*;
- (e) the following petroleum authorities under the *Petroleum and Gas (Production and Safety) Act 2004*—
 - (i) an authority to prospect;
 - (ii) a petroleum lease;
 - (iii) a pipeline licence;
 - (iv) a petroleum facility licence;
- (f) a licence, permit, pipeline licence, primary licence, secondary licence or special prospecting authority

granted under the *Petroleum (Submerged Lands) Act 1982*;

- (g) an agreement or lease under or mentioned in any of the following Acts—
- (i) *Alcan Queensland Pty. Limited Agreement Act 1965*;
 - (ii) *Central Queensland Coal Associates Agreement Act 1968*;
 - (iii) *Central Queensland Coal Associates Agreement and Queensland Coal Trust Act 1984*;
 - (iv) *Central Queensland Coal Associates Agreement (Amendment) Act 1986*;
 - (v) *Central Queensland Coal Associates Agreement Amendment Act 1989*;
 - (vi) *Commonwealth Aluminium Corporation Pty. Limited Agreement Act 1957*;
 - (vii) *Mount Isa Mines Limited Agreement Act 1985*;
 - (viii) *Queensland Nickel Agreement Act 1970*;
 - (ix) *Queensland Nickel Agreement Act 1988*;
 - (x) *Thiess Peabody Coal Pty. Ltd. Agreement Act 1962*;
 - (xi) *Thiess Peabody Mitsui Coal Pty. Ltd. Agreements Act 1965*.

14 Environmental authority

An *environmental authority* is an environmental authority as defined under the Environmental Protection Act, schedule 4.

15 Authority holder

An *authority holder*, for a provision about a resource activity, is the person who holds a resource authority or an environmental authority for the resource activity.

Subdivision 4 Other definitions

16 *Regional interests development approval*

- (1) A *regional interests development approval* is an approval issued under section 53 that approves the carrying out of a resource activity or regulated activity in an area of regional interest following an assessment of the extent of the expected impact of the activity on the area.
- (2) A regional interests development approval includes any regional interest conditions of the approval.

17 *Regulated activity*

- (1) A *regulated activity*, for an area of regional interest, is an activity—
 - (a) likely to have a widespread and irreversible impact on the area of regional interest; and
 - (b) prescribed under a regulation for the area.
- (2) In this Act, a reference to a regulated activity includes a reference to the carrying out of the activity.

Subdivision 5 References in provisions

18 References in provisions

- (1) This section applies for any provision of this Act.
- (2) A reference to an application for a resource authority includes a reference to an application for any of the following for an existing resource authority—
 - (a) an amendment;
 - (b) a renewal;
 - (c) a re-grant.

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- (3) A reference to an application for an environmental authority includes a reference to an application for a major amendment to the environmental authority.
 - (4) For a provision about an assessment application—
 - (a) a reference to the applicant, or to a person who may make an application, includes a reference to the following—
 - (i) the person who has made or may make the application;
 - (ii) anyone else in whom the benefit of the application vests from time to time; and
 - (b) a reference to the land is a reference to the land the subject of the application; and
 - (c) if the application is about a resource activity or regulated activity—a reference to the activity is a reference to the activity the subject of the application; and
 - (d) a reference to the regional interests development approval is a reference to the approval issued, or that may be issued, as a result of the application.
 - (5) For a provision about a decision, a reference to the land is a reference to the land the subject of the decision.
 - (6) For a provision about a regional interests development approval, resource authority or environmental authority, a reference to the land is a reference to the land the subject of the approval or authority, or to which it attaches.
 - (7) In a provision about a resource activity or a regulated activity in an area of regional interest, or having an impact on an area of regional interest, a reference to an area of regional interest is, for the strategic cropping area, a reference to an area that is in the strategic cropping area.
 - (8) In this section—

major amendment, for an application to amend an environmental authority, means the amendment proposed in the application if—

- (a) an assessment level decision for the application has been made under the Environmental Protection Act, section 228; and
- (b) the decision is that the proposed amendment is a major amendment under that Act.

Part 2 Restrictions on resource and regulated activities in areas of regional interest

Division 1 Restrictions

19 Restrictions on carrying out resource activity or regulated activity

- (1) A person must not wilfully carry out, or allow the carrying out of, a resource activity or regulated activity in an area of regional interest unless the person holds, or is acting under, a regional interests development approval for the activity.

Maximum penalty—6,250 penalty units or 5 years imprisonment.

- (2) A person must not carry out, or allow the carrying out of, a resource activity or regulated activity in an area of regional interest unless the person holds, or is acting under, a regional interests development approval for the activity.

Maximum penalty—4,500 penalty units.

- (3) Subsection (2) is an alternative offence for subsection (1).

Note—

For the effect of subsection (3), see section 84.

- (4) This section does not apply to a resource activity that is an exempt resource activity or exempt regulated activity for the area of regional interest.

20 Failure to comply with conditions

- (1) This section applies to a person who is the holder of, or is acting under, a regional interests development approval.
- (2) The person must not wilfully contravene a condition of the approval.
Maximum penalty—6,250 penalty units or 5 years imprisonment.
- (3) The person must not contravene a condition of the approval.
Maximum penalty—4,500 penalty units.
- (4) Subsection (3) is an alternative offence for subsection (2).

Note—

For the effect of subsection (4), see section 84.

21 Emergency activity defence

It is a defence to a proceeding for an offence against this part for the defendant to prove—

- (a) the carrying out of the resource activity or regulated activity was because of an emergency endangering—
- (i) the life or health of a person; or
 - (ii) the structural safety of a building or structure or the safety of infrastructure; and
- (b) the defendant gave the department notice of the activity as soon as practicable after starting it; and
- (c) the defendant took all reasonable steps—
- (i) to ensure the impact of the activity on the regional priority area is restorable; or
 - (ii) if the impact is not restorable—to limit the impact.

Division 2 Exempt resource activities

22 Exemption—agreement of land owner

- (1) This section applies if the authority holder for a resource activity is not the owner of the land (the *land owner*).
- (2) The resource activity is an *exempt resource activity* for a priority agricultural area or area that is in the strategic cropping area if—
 - (a) either—
 - (i) if a conduct and compensation agreement requirement applies to the authority holder under a resource Act—
 - (A) the land owner and the authority holder are parties to a conduct and compensation agreement under the resource Act, other than because of the order of a court; and
 - (B) the authority holder has complied with the requirement; or
 - (ii) the land owner has voluntarily entered into a written agreement with the authority holder and the carrying out of the activity is consistent with the agreement; and
 - (b) the activity is not likely to have a significant impact on the priority agricultural area or area that is in the strategic cropping area; and
 - (c) the activity is not likely to have an impact on land owned by a person other than the land owner.
- (3) For subsection (2)(c), a resource activity has an impact on land if the activity has an impact on—
 - (a) for land in a priority agricultural area—the suitability of the land to be used for a priority agricultural land use for the area; or

- (b) for land in an area that is in the strategic cropping area—the land’s soil, climate and landscape features that make that area highly suitable, or likely to be highly suitable, for cropping.

23 Exemption—activity carried out for less than 1 year

A resource activity is an *exempt resource activity* for a priority agricultural area or area in the strategic cropping area if the activity is being carried out—

- (a) on a property in the area; and
- (b) within the period of 1 year starting on the day the first activity under the resource authority started to be carried out on the property.

24 Exemption—pre-existing resource activity

- (1) This section applies if, immediately before land becomes land in an area of regional interest, including on commencement of this section, a resource activity may be carried out lawfully on the land.
- (2) The resource activity is an *exempt resource activity* for the area of regional interest.
- (3) For subsection (1), a resource activity may be carried out lawfully on land if—
 - (a) the activity may be carried out lawfully on the land—
 - (i) under a resource authority or an environmental authority; and
 - (ii) without the need for any further authority or approval relating to the location, nature or extent of the expected surface impacts of the activity to be obtained under an Act or a condition of either authority; and
 - (b) information provided in, with or in support of the application for the resource or environmental authority (or an amendment of the application) identified the

location, nature and extent of the expected surface impacts of the activity.

24A Exemption—wild river area under the repealed Wild Rivers Act 2005

- (1) This section applies to a resource activity if the activity—
 - (a) is carried out on land that—
 - (i) is in a strategic environmental area; and
 - (ii) was in a wild river area under the repealed *Wild Rivers Act 2005* (a **former wild river area**) immediately before the repeal of that Act; and
 - (b) is carried out under an environmental authority given, or applied for, before the repeal of the *Wild Rivers Act 2005*.
- (2) To the extent the resource activity is carried out in the former wild river area, it is an **exempt resource activity** for the strategic environmental area.
- (3) However, subsection (2) ceases to apply to the resource activity if—
 - (a) after the repeal of the *Wild Rivers Act 2005*, the authority holder makes an amendment application under the Environmental Protection Act, section 224 to amend the environmental authority; and
 - (b) the amendment application is approved; and
 - (c) the amendment involves either of the following—
 - (i) an increase in the area of land subject to expected surface impacts from the activity;
 - (ii) a change to the location of the land subject to expected surface impacts from the activity.

25 Exemption—pre-existing regulated activity

- (1) This section applies if, immediately before land becomes land in an area of regional interest, including on commencement of this section, a regulated activity may be lawfully carried out on the land under the Planning Act or the repealed *Sustainable Planning Act 2009*.
- (2) The regulated activity is an *exempt regulated activity* for the area of regional interest.

**Part 3 Regional interests
development approvals**

Division 1 Preliminary

26 Meaning of *assessing agency* and *assessor*

- (1) An *assessing agency* for an assessment application is an entity prescribed under a regulation.

Example—

A local government may be prescribed to be an assessment agency for an assessment application relating to a priority living area in the local government's area.

- (2) Each of the following is an *assessor* for an assessment application—
 - (a) the chief executive;
 - (b) if the application is referable—an assessing agency for the application.

**27 When does a resource activity or regulated activity
impact an area of regional interest**

In this Act, a resource activity or a regulated activity has an *impact* on an area of regional interest if the impact—

- (a) affects—
 - (i) a feature, quality, characteristic or other attribute of the area; or
 - (ii) the suitability of land in the area to be used for a particular purpose; and
- (b) relates to a matter mentioned in the following—
 - (i) for a priority agricultural area—section 8(1)(a);
 - (ii) for a priority living area—section 9(b);
 - (iii) for the strategic cropping area—section 10(1);
 - (iv) for a strategic environmental area—section 11(1)(a).

Division 2 Applying

28 Who may apply for regional interests development approval

- (1) An eligible person (the *applicant*) may apply for a regional interests development approval for a resource activity to be carried out in an area of regional interest (an *assessment application*).
- (2) Also, a person (also the *applicant*) who intends to carry out a regulated activity in an area of regional interest may apply for a regional interests development approval for the activity to be carried out in the area (also an *assessment application*).
- (3) In this section—

eligible person means a person who holds, or has applied or may apply for, an environmental authority or resource authority (the *relevant authorities*) for the resource activity.

29 Requirements for making assessment application

An assessment application must be—

-
- (a) made to the chief executive in the approved form; and
 - (b) accompanied by a report—
 - (i) assessing the resource activity or regulated activity's impact on the area of regional interest; and
 - (ii) identifying any constraints on the configuration or operation of the activity; and
 - (c) accompanied by the fee prescribed under a regulation.

30 Owner of land given copy of assessment application

- (1) This section applies to an assessment application if—
 - (a) the application is not notifiable; and
 - (b) the applicant is not the owner of the land.
- (2) The applicant must give the owner a copy of the application within the prescribed time frame.

Division 3 Amending or withdrawing application

31 Amending

- (1) The applicant may amend an assessment application to do the following (a *permitted amendment*) if the amended application complies with section 29—
 - (a) make a minor amendment;
 - (b) make an amendment the chief executive is satisfied would not adversely affect the chief executive's ability to decide the amended application.
- (2) A permitted amendment—
 - (a) may be made at any time before the application is decided; and
 - (b) must be made by notice to the chief executive.

- (3) An assessment application can not be amended other than to make a permitted amendment.

32 Withdrawal of application

- (1) The applicant may give the chief executive a notice withdrawing an assessment application at any time before it is decided.
- (2) The withdrawal takes effect when the notice is given.
- (3) The chief executive may, but need not, refund all or part of any fee paid for the application if it is withdrawn.

33 Owner of land given notice of amendment or withdrawal

- (1) This section applies if—
 - (a) an assessment application is not notifiable; and
 - (b) the applicant is not the owner of the land; and
 - (c) the application is amended under section 31 or withdrawn under section 32.
- (2) The applicant must give the owner notice of the amendment or withdrawal within the prescribed time frame.

Division 4 Public notification of particular applications

34 Application of div 4

- (1) This division applies to a notifiable assessment application.
- (2) An assessment application is *notifiable* if—
 - (a) a regulation prescribes it as notifiable; and
 - (b) an exemption is not granted under subsection (3) by the chief executive within the prescribed time frame.

- (3) The chief executive may, on the written request of the applicant, grant an exemption from notification for an assessment application if satisfied there has been sufficient notification under another Act or law of the resource activity or regulated activity to the public.
- (4) An assessment application is also *notifiable* if the chief executive has given the applicant a requirement notice requiring the applicant to notify the application under this division.

35 Applicant must notify

- (1) The applicant must—
 - (a) publish a notice about the assessment application in the way prescribed under a regulation; and
 - (b) if the applicant is not the owner of the land—give the owner a notice about the application.
- (2) The notice must—
 - (a) be in the approved form; and
 - (b) state the following—
 - (i) that submissions about the assessment application may be made to an assessor for the application;
 - (ii) the day by which submissions about the application must be received (the *closing day*);
 - (iii) that the making of a submission does not give rise to a right of appeal against a decision about the application.
- (3) The approved form must include information about the way in which submissions must be lodged with an assessor for the application, including whether the submissions may be made electronically.
- (4) The closing day must be a day that is after the end of the notification period prescribed under a regulation for the application.

36 Consequence of failure to notify

- (1) This section applies if the applicant has not complied with section 35 within the period that ends—
 - (a) 20 business days after the day the assessment application was made; or
 - (b) on a later day decided by an assessor for the application by notice.
- (2) The chief executive may—
 - (a) if the chief executive considers there is enough information about the relevant matters for the application—decide the application on the basis of that information; or
 - (b) refuse to decide the application until the applicant has complied with section 35 to the chief executive's satisfaction; or
 - (c) decide the application is lapsed.

37 Properly made submissions

A submission about an assessment application is *properly made* if the submission—

- (a) is in writing; and
- (b) states the name of each person who made the submission; and
- (c) states an address for service for at least 1 of the persons who made the submission; and
- (d) is received by the closing day for making submissions; and
- (e) is made to an assessor for the application in the way stated in the notice about the application.

38 Submissions must be published or available for inspection

- (1) This section applies to each submission about an assessment application that is properly made.
- (2) The assessor for the application must, within the prescribed time frame—
 - (a) publish a copy of the submission on the assessor’s website; or
 - (b) make the submission available at the assessor’s office for inspection.
- (3) If a submission is available for inspection at the assessor’s office, a person may—
 - (a) inspect the submission free of charge at any time the office is open for business; and
 - (b) obtain a copy of the submission, or part of the submission, from the assessor.
- (4) The assessor may charge a person for supplying a copy of the submission, or part of the submission.
- (5) The charge must not be more than the cost to the assessor of making and supplying the copy.
- (6) In this section—

office, of an assessor, means—

 - (a) if the assessor is an assessing agency—the assessing agency’s office and any other place decided by the assessing agency; or
 - (b) if the assessor is the chief executive—the department’s office and any other place approved by the chief executive.

Division 5 Referral to assessing agency

39 Application of div 5

- (1) This division applies to a referable assessment application.
- (2) An assessment application is *referable* if a regulation prescribes the application as referable.

40 Assessing agency's functions

An assessing agency has, for assessing and responding to the part of the application giving rise to the referral, the functions prescribed under a regulation.

41 Assessing agency's assessment of application

- (1) The chief executive must give the assessing agency for the application a copy of the application within the prescribed time frame.
- (2) The assessing agency must, within the limits of its functions, assess the application and, in doing so, consider all of the following—
 - (a) the extent of the expected impact of the resource activity or regulated activity on the area of regional interest;
 - (b) any criteria for the assessment prescribed under a regulation;
 - (c) if the assessment is for a notifiable assessment application—all properly made submissions received by the assessing agency about the application;
 - (d) if the assessing agency is a local government—any criteria under the local government's planning scheme for assessing the application.

42 Assessing agency's response to application

- (1) The assessing agency may give the chief executive a response to the application.
- (2) The response may, within the limits of the assessing agency's functions—
 - (a) do any or all of the following—
 - (i) recommend conditions (each an *assessing agency condition*) to form part of any regional interests approval;
Note—
Under section 50(1)(a), a condition may, among other things, limit or restrict the carrying out of a resource activity or regulated activity on the land or part of it.
 - (ii) recommend the refusal of all or part of the application;
 - (iii) provide advice about the application; or
 - (b) tell the chief executive that the assessing agency has no requirements or advice relating to the application.
- (3) However, the response may only be given within the prescribed time frame.
- (4) If the response includes assessing agency conditions or refusing all or part of an application, it must include reasons for the conditions or the refusal.
- (5) If the assessment application is notifiable and section 36(2)(a) or (3)(a) does not apply, the assessing agency's response must not be given to the chief executive before the closing day for submissions about the application.
- (6) The assessing agency must give the applicant a copy of the response within the prescribed time frame.

43 Ministerial directions to assessing agency

- (1) The Minister may, by notice, give a direction to an assessing agency for an assessment application—

- (a) if the Minister is satisfied its response is not within its functions—to reissue its response in a stated way and within a stated period to ensure the response is within the functions; or
 - (b) if the Minister is satisfied the assessing agency has not assessed the application under this Act—to issue or reissue its response in a stated way and within a stated period to ensure the assessing agency has assessed the application under this Act.
- (2) The Minister may give the direction even if the agency’s assessment period for the assessment application has ended under section 42(3).
- (3) The direction must state the reasons for the decision to give it.
- (4) The Minister must give the applicant a copy of the direction.
- (5) The assessing agency must comply with the direction.
- (6) If the Minister gives the direction, the chief executive can not decide the assessment application until the assessing agency’s response is reissued.

Division 6 Additional information etc. for application

44 Requirement notice

- (1) An assessor for an assessment application may, by notice given within the prescribed time frame, require (a *requirement notice*) the applicant to do all or any of the following within a stated reasonable period—
- (a) complete or correct the application if it appears to an assessor to be incorrect, incomplete or defective;
 - (b) give an assessor additional information about, or relevant to, the application;
 - (c) if the assessor is the chief executive—notify the application under division 4;

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- (d) give an assessor an independent report by an appropriately qualified person, or a statutory declaration, verifying all or any of the following—
 - (i) any information included in the application;
 - (ii) any additional information required under paragraph (b).
 - (2) The requirement notice may require the statutory declaration—
 - (a) to be made by an appropriately qualified independent person or by the applicant; and
 - (b) if the applicant is a corporation—to be made for the applicant by an executive officer of the applicant corporation.
 - (3) The applicant must bear any costs incurred in complying with the requirement notice.
 - (4) An assessor may extend the stated period.

45 Consequence of noncompliance with requirement notice

- (1) This section applies if a requirement notice has, in the opinion of the assessor that gave it, been contravened.
- (2) The chief executive may, if the requirement notice was made by the chief executive or the chief executive receives a notice under subsection (4)—
 - (a) if the chief executive considers there is enough information about the relevant matters for the application—decide the application on the basis of that information; or
 - (b) refuse to decide the application until the requirement notice is complied with to the chief executive's satisfaction; or
 - (c) decide the application is lapsed.
- (3) If the assessor was the assessing agency, it may—

- (a) if it considers there is enough information about the relevant matters—give its response to the application; or
 - (b) refuse to assess the application until the requirement notice is complied with to its satisfaction.
- (4) The assessing agency must give the chief executive notice of the refusal.

46 Additional advice or comment about assessment application

- (1) The chief executive must ask the Gasfields Commission for advice about an assessment application if—
- (a) the application relates to a resource activity in a priority agricultural area, the strategic cropping area or a priority living area; and
 - (b) either—
 - (i) the application is notifiable; or
 - (ii) in the chief executive's opinion, the expected surface impacts of the resource activity are significant.
- (2) The chief executive or an assessing agency may ask any other person for advice or comment about an assessment application.

Example—

The chief executive may appoint a panel of experts to provide advice to the chief executive about an assessment application or a particular matter relevant to the application.

Division 7 Deciding application

47 Chief executive must decide application

- (1) The chief executive must, within the prescribed time frame, consider and decide under this division each assessment application.

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- (2) If the application is notifiable and section 36(2)(a) does not apply, a decision can not be made about the application before the closing day for submissions.

48 Decision generally

- (1) The chief executive must decide to—
- (a) approve all or part of the application and grant a regional interests development approval; or
 - (b) refuse the application.
- (2) If the chief executive decides to grant a regional interests development approval, the chief executive may also decide to grant the approval with conditions (each a *regional interests condition*).
- (3) To remove any doubt, it is declared that if the chief executive approves only part of an application, the balance of the application is refused.

49 Criteria for decision

- (1) In deciding an assessment application, the chief executive must consider all of the following—
- (a) the extent of the expected impact of the resource activity or regulated activity on the area of regional interest;
 - (b) any criteria for the decision prescribed under a regulation;
 - (c) if the decision is for a notifiable assessment application—all properly made submissions received by the chief executive about the application;
 - (d) if the decision is for a referable assessment application—any advice about the application included in an assessing agency's response;
 - (e) any advice about the application given by the Gasfields Commission.

- (2) Also, the chief executive may consider any other matter the chief executive considers relevant.

50 Conditions generally

- (1) A regional interests condition may—
- (a) limit or restrict the carrying out of a resource activity or regulated activity, including, for example, by—
 - (i) requiring the applicant to start or complete the carrying out of the activity by a stated date or within a stated period; or
 - (ii) requiring the applicant to ensure the impact of the activity is limited or restricted to a stated level; or
 - (b) require the applicant to install and operate stated plant or equipment in a stated way within a stated period; or
 - (c) for a resource activity or regulated activity to be carried out in an area that is the strategic cropping area—require the applicant to have mitigation in place before carrying out the activity on land in the area; or
 - (d) require the applicant to do, or refrain from doing, anything else the chief executive considers is necessary or desirable to achieve this Act's purposes.
- (2) However, a condition must either—
- (a) be relevant to, but not an unreasonable imposition on, the resource activity or regulated activity; or
 - (b) be reasonably required to manage the impact of the activity on an area of regional interest.
- (3) A condition under subsection (1)(c) is an *SCL mitigation condition*.

Division 8 Steps after deciding application

51 Notice about decision

- (1) The chief executive must give the applicant a decision notice about the decision.
- (2) The chief executive must give a copy of the decision notice to—
 - (a) if the applicant is not the owner of the land—the owner of the land; and
 - (b) if the assessment application is referable—each assessing agency for the application; and
 - (c) if the Gasfields Commission gave the chief executive advice about the assessment application—the Gasfields Commission.
- (3) If the applicant has applied for an environmental authority for the resource activity or regulated activity, the decision notice may be included in, or accompany, a notice under the Environmental Protection Act for the environmental authority application.
- (4) If the chief executive's decision about the assessment application is inconsistent with advice about the application given to the chief executive by either of the following, the decision notice must include reasons for the inconsistency—
 - (a) a local government that was an assessing agency for the application;
 - (b) the Gasfields Commission.
- (5) The decision notice or copy of the decision notice must be given within the prescribed time frame.

52 Public notification of decision

- (1) The chief executive must, within the prescribed time frame, publish a notice about the decision—
 - (a) on the department's website; or

- (b) in a newspaper circulating generally in the area of the land.
- (2) The notice must—
 - (a) identify the resource activity or regulated activity, the applicant and the land; and
 - (b) briefly describe any conditions imposed on the resource activity or regulated activity by the decision; and
 - (c) state that an affected land owner may appeal against the decision, the period within which an appeal must be started and how the right to appeal is to be exercised.

53 Issuing approval

- (1) As soon as practicable after deciding to grant a regional interests development approval, the chief executive must issue the approval.
- (2) The regional interests development approval must—
 - (a) be in the approved form; and
 - (b) state the following—
 - (i) a description of the land;
 - (ii) the resource activity or regulated activity approved;
 - (iii) the area of regional interest for which the activity is approved;
 - (iv) any regional interests conditions on which the approval is granted.

54 When approval takes effect

- (1) A regional interests development approval takes effect on the later of the following—
 - (a) the day after the appeal period for the decision to grant the approval ends;

-
- (b) another day stated in the approval.
- (2) A decision notice for the decision to grant the approval must state that the decision takes effect when the appeal period for the decision ends.
- (3) In this section—
- appeal period*, for a decision to grant a regional interests development approval, means the period ending on the last day on which an appeal against the decision may be started under section 73(1).

Division 9 Amending approval

55 Amending approval

- (1) The holder of a regional interests development approval may, in writing, ask the chief executive to make either of the following amendments (each a *requested amendment*) to the approval—
- (a) a minor amendment;
- (b) an amendment the chief executive is satisfied would not adversely change the impact of the resource activity or regulated activity on the area of regional interest.
- (2) Before deciding whether to make a requested amendment, the chief executive may give the holder of the approval a notice requiring the holder to notify the application under division 4 within a reasonable stated period.
- (3) If, in the chief executive's opinion, the holder has contravened the notice, the chief executive may refuse to decide whether to make the requested amendment until the notice has been complied with to the chief executive's satisfaction.
- (4) The holder of the approval must bear any costs incurred in complying with the notice.
- (5) In deciding whether to make a requested amendment, the chief executive must consider the matters mentioned in

section 49 to the extent the chief executive considers it is appropriate to do so.

56 Notice about decision

- (1) As soon as practicable after deciding whether to make a requested amendment to a regional interests development approval, the chief executive must give the holder of the approval a decision notice about the decision.
- (2) The chief executive must give a copy of the decision notice to—
 - (a) if the holder is not the owner of the land—the owner of the land; and
 - (b) if the assessment application for the approval was referable—each assessing agency for the application; and
 - (c) if the Gasfields Commission gave the chief executive advice about the assessment application for the approval—the Gasfields Commission.

57 Giving effect to amendment

As soon as practicable after deciding to make a requested amendment to a regional interests development approval, the chief executive must—

- (a) amend the approval to give effect to the requested amendment; and
- (b) issue the amended approval to the holder.

Division 10 Miscellaneous

58 Approval attaches to land

While it continues in effect, a regional interests development approval attaches to the land despite any change in the land's ownership or occupation.

59 Regional interests conditions paramount

- (1) This section applies to a regional interests development approval for a priority agricultural area or the strategic cropping area.
- (2) If there is any inconsistency between the conditions of the approval and a condition of the relevant authority, the conditions of the approval prevail to the extent of the inconsistency.
- (3) For subsection (2), it does not matter when the approval, authority or conditions were granted or imposed in relation to each other.

Part 4 Mitigation

Division 1 Provisions for SCL mitigation conditions

60 Application of pt 4

This part applies for the holder of a regional interests development approval if the approval includes an SCL mitigation condition.

61 What is *mitigated SCL land*

Mitigated SCL land is the land to which the SCL mitigation condition applies.

62 What is *mitigation*

- (1) *Mitigation*, for mitigated SCL land, means that either of the following, or a combination of the following, has taken place for the land's mitigation value—
 - (a) a payment to the mitigation fund;
 - (b) the entering into of a mitigation deed.
- (2) The *mitigation value* of mitigated SCL land is the amount prescribed under a regulation.

63 What are *mitigation measures*

- (1) *Mitigation measures* are the carrying out of activities to address the loss of the productive capacity of mitigated SCL land.
- (2) Also, for a mitigation deed, mitigation measures may include a combination of activities mentioned in subsection (1) and a payment to the mitigation fund.

64 What is a *mitigation deed*

A *mitigation deed* is a deed to which the chief executive and the holder of a regional interests development approval are parties that—

- (a) is about the mitigation value of mitigated SCL land; and
- (b) complies with the requirements prescribed under a regulation.

65 What are the *mitigation criteria*

- (1) The *mitigation criteria* are that mitigation measures (under a mitigation deed or under a payment from the mitigation fund) must—
 - (a) aim to increase the productivity of cropping in the State; and
 - (b) provide a public, rather than a private, benefit; and
 - (c) aim to provide an enduring effect; and
 - (d) be quantifiable and able to be independently valued; and
 - (e) benefit the largest possible number of cropping agribusinesses; and
 - (f) if a cropping activity or cropping system existed for mitigated SCL land to which the measures relate— provide a benefit to that type of activity or system in the relevant local area.
- (2) In deciding what is a relevant local area for subsection (1)(f), regard must be had to catchments and local government areas.

Division 2 Mitigation fund

66 Mitigation fund continued

The strategic cropping land mitigation fund (the *mitigation fund*) established under the repealed *Strategic Cropping Land Act 2011* is continued in existence under this Act.

67 Purpose and administration

- (1) The mitigation fund's purpose is to record amounts received under a mitigation condition and to pay amounts from it under this part.
- (2) Accounts for the mitigation fund must be kept as part of the department's departmental accounts under the *Financial Accountability Act 2009*, section 69.

- (3) However, amounts received for the mitigation fund may be deposited with other amounts of the department in its departmental financial institution account under the *Financial Accountability Act 2009*, section 83.

68 Payments from fund

- (1) Amounts are payable from the mitigation fund only for—
- (a) mitigation measures; or
 - (b) expenses incurred by the chief executive in performing functions under this part.
- (2) However, the chief executive may make a payment for mitigation measures only if the chief executive is satisfied the measures comply with the mitigation criteria.

69 Reporting requirement for mitigation measures

A payment from the mitigation fund may be made only on the condition that its recipient must give the chief executive periodic reports about—

- (a) the progress of the mitigation measures funded; and
- (b) amounts spent on the measures.

Division 3 Miscellaneous provisions

70 Mitigation deed binds holder's successors

A mitigation deed binds each of the successors in law of the holder of each regional interests development approval who is a party to it, including successors for the area of the development approval.

Examples of successors in law—

- a personal representative, successor in title, assign

Part 5 Appeals and declarations

71 Definitions for pt 5

In this part—

affected land owner, for a regional interests decision, means an owner of land (*affected land*) that may be adversely affected by the resource activity or regulated activity because of—

- (a) the proximity of the affected land to the land the subject of the decision; and
- (b) the impact the activity may have on an area of regional interest.

court means the Planning and Environment Court.

regional interests decision means each of the following decisions—

- (a) a decision to grant a regional interests development approval;
- (b) a decision to impose a condition on a regional interests development approval;
- (c) a decision to refuse all or part of an assessment application;
- (d) a decision to make, or refuse to make, a requested amendment to a regional interests development approval.

72 Appeal to Planning and Environment Court

The following may appeal (an *appeal*) against a regional interests decision to the court—

- (a) the applicant;
- (b) if the applicant is not the owner of the land—the owner of the land;

- (c) an affected land owner.

Note—

See the *Planning and Environment Court Act 2016* for provisions about the powers, processes and procedures of the court.

73 Appeal period

- (1) An appeal may be started only within 20 business days after—
 - (a) for a person who received a decision notice, or a copy of a decision notice, for the decision—the notice was received; or
 - (b) for an affected land owner for a regional interests decision—notice of the decision was published under section 52.
- (2) However, the court may at any time extend the time for starting the appeal.

73A How appeals are started

- (1) An appeal is started by lodging a written notice of appeal with the registrar of the court.
- (2) The notice of appeal must be in the approved form and succinctly state the grounds of the appeal.

74 Respondent for appeal

- (1) The chief executive is the respondent for the appeal.
- (2) If the appellant is not the applicant for the decision, the applicant is a co-respondent for the appeal.
- (3) If the appellant is not the owner of the land for the decision, the owner of the land may apply to the court to be a co-respondent for the appeal.
- (4) If the appeal is about an assessing agency's response, the assessing agency is a co-respondent for the appeal.

- (5) If the appeal is only about an assessing agency's response, the chief executive may apply to the court to withdraw from the appeal.

75 Notice of appeal to other parties

- (1) An appellant must, within 10 business days after starting an appeal, give notice of the appeal to each of the following—
- (a) a respondent or co-respondent for the appeal;
 - (b) if the appellant is not the owner of land for the regional interests decision—the owner of the land.
- (2) The notice must state—
- (a) the grounds of the appeal; and
 - (b) if the person given the notice is the owner of the land—that the person may apply to the court to be a co-respondent for the appeal.

76 Stay of operation of decision

- (1) The starting of an appeal does not stay the operation of the decision appealed against.
- (2) However, the court may stay the operation of the decision to secure the effectiveness of the appeal.
- (3) A stay—
- (a) may be given on reasonable conditions as the court considers appropriate; and
 - (b) operates until the first of the following happens—
 - (i) the period fixed by the court ends;
 - (ii) the appeal is decided, withdrawn or dismissed; and
 - (c) may be revoked or amended by the court.

77 Who must prove case for appeal

- (1) In an appeal by the applicant for a regional interests decision, it is for the appellant to establish the appeal should be upheld.
- (2) In an appeal by either of the following, it is for the applicant for a regional interests decision to establish the appeal should be dismissed—
 - (a) if the applicant is not the owner of the land—the owner of the land;
 - (b) an affected land owner.

77A Appeal decision

- (1) In deciding an appeal, the court must decide (the *appeal decision*) to do 1 of the following for the regional interests decision appealed against—
 - (a) confirm it;
 - (b) change it;
 - (c) set it aside and—
 - (i) make a decision replacing it; or
 - (ii) return the matter to the entity that made the decision appealed against with directions the court considers appropriate.
- (2) The appeal decision may also include other orders, declarations or directions the court considers appropriate.
- (3) The appeal decision, other than to the extent it is an excluded decision, is taken, for this Act (other than this part), to have been made by the entity that made the decision appealed against.
- (4) An *excluded decision* is a decision—
 - (a) to confirm the decision appealed against; or
 - (b) to return the matter as mentioned in subsection (1)(c)(ii).

78 Declarations

- (1) Any person may start a proceeding in the court seeking a declaration about any of the following—
 - (a) a matter done, to be done or that should have been done under this Act;
 - (b) the construction of—
 - (i) this Act; or
 - (ii) a regional plan to the extent it relates to this Act;
 - (c) the lawfulness, under this Act, of the carrying out of a resource activity or a regulated activity.
- (2) The court may also make an order about any declaration it makes under subsection (1).

Part 6 Miscellaneous provisions

Division 1 Evidence

79 Evidentiary aids generally

- (1) A certificate purporting to be signed by the chief executive stating any of the following matters is evidence of the matter—
 - (a) a stated document is—
 - (i) a direction or decision, or a copy of a direction or decision, given or made under this Act; or
 - (ii) a notice or other document, or a copy of a notice or other document, given under this Act;
 - (b) on a stated day, or during a stated period, a stated person was or was not the holder of a regional interests development approval for a stated resource activity or regulated activity;

- (c) on a stated day, or during a stated period, a regional interests development approval—
 - (i) was or was not in force for a stated person, resource activity or regulated activity; or
 - (ii) was or was not subject to a stated condition;
 - (d) on a stated day, a stated person was given a stated notice or direction under this Act;
 - (e) a stated amount is payable under this Act by a stated person and has not been paid.
- (2) A certificate purporting to be signed by the chief executive (environment) stating any of the following matters is evidence of the matter—
- (a) on a stated day, or during a stated period, a stated person was or was not the holder of an environmental authority for a stated resource activity or regulated activity;
 - (b) on a stated day, or during a stated period, an environmental authority—
 - (i) was or was not in force for a stated person, resource activity or regulated activity; or
 - (ii) was or was not subject to a stated condition.
- (3) A certificate purporting to be signed by the chief executive of a department administering a resource Act stating any of the following matters is evidence of the matter—
- (a) on a stated day, or during a stated period, a stated person was or was not the holder of a resource authority under the resource Act for a stated resource activity;
 - (b) on a stated day, or during a stated period, a resource authority under the resource Act—
 - (i) was or was not in force for a stated person or resource activity; or
 - (ii) was or was not subject to a stated condition.

Division 2 Offence proceedings

80 Division of offences against Act

- (1) An offence against this Act for which the maximum penalty is 500 penalty units or more is an indictable offence, and a crime.
- (2) Any other offence against this Act is a summary offence.

81 Proceedings for indictable offences

- (1) A proceeding for an indictable offence against this Act may, at the prosecution's election, be taken summarily or on indictment.
- (2) A magistrate must not hear an indictable offence summarily if, at any stage of the hearing, the magistrate is satisfied—
 - (a) the defendant, if convicted, may not be adequately punished on summary conviction because of the nature or seriousness of the offence; or
 - (b) on the application of the defendant, the offence should not be heard summarily because of exceptional circumstances.
- (3) If subsection (2) applies—
 - (a) the magistrate must proceed by way of an examination of witnesses for an indictable offence; and
 - (b) a plea of the person charged at the start of the proceeding must be disregarded; and
 - (c) evidence brought in the proceeding before the magistrate decided to act under subsection (2) is taken to be evidence in the proceeding for the committal of the person for trial or sentence; and
 - (d) before committing the person for trial or sentence, the magistrate must make a statement to the person under the *Justices Act 1886*, section 104(2)(b).

- (4) The maximum penalty of imprisonment that may be summarily imposed for an indictable offence is 100 penalty units or 3 years imprisonment.

82 Limitation on who may summarily hear indictable offence proceedings

- (1) A proceeding must be before a magistrate if it is a proceeding—
- (a) for the summary conviction of a person on a charge for an indictable offence; or
 - (b) for an examination of witnesses for a charge for an indictable offence.
- (2) However, if a proceeding for an indictable offence is brought before a justice who is not a magistrate, jurisdiction is limited to taking or making a procedural action or order under the *Justices of the Peace and Commissioners for Declarations Act 1991*.

83 Proceeding for summary offences

- (1) A proceeding for a summary offence against this Act must start within the later of the following periods to end—
- (a) 1 year after the commission of the offence;
 - (b) within 1 year after the offence comes to the complainant's knowledge, but within 5 years after the offence is committed.
- (2) For subsection (1), an offence under part 2 does not come to the complainant's knowledge merely because the complainant receives a remotely sensed image that may provide evidence of the offence.
- (3) In this section—
- remotely sensed image* means information acquired about an object or phenomenon without making physical contact with it.

Example—

an image obtained by using aerial sensor technology to detect or classify the object or phenomenon by way of electromagnetic radiation emitted from aircraft or satellites or other propagated signals

84 Alternative offences

- (1) This section applies if—
 - (a) a section of this Act provides that an offence against a subsection of the section (the *smaller offence*) is an alternative offence for an offence against another subsection of the section (the *larger offence*); and
 - (b) in a proceeding for an offence against the larger offence, the trier of fact—
 - (i) is not satisfied the defendant is guilty of the larger offence; but
 - (ii) is satisfied the defendant is guilty of the smaller offence.
- (2) The trier of fact may find the defendant guilty of the smaller offence.
- (3) If the defendant is found guilty of the smaller offence, the defendant is liable to be punished for the smaller offence.
- (4) To remove any doubt, it is declared that—
 - (a) this section applies regardless of whether—
 - (i) the proceeding for the larger offence is summary or on indictment; or
 - (ii) the trier of fact is a judge or a jury; and
 - (b) this section applies even if an indictment for the larger offence does not include the smaller offence.

85 Court may make orders

- (1) A court hearing a proceeding for an offence against this Act may make an order in relation to the defendant as the court considers appropriate.
- (2) The order may be in addition to, or in substitution for, any penalty the court may otherwise impose.
- (3) The order may, for example, require the defendant—
 - (a) to stop carrying out a resource activity or regulated activity; or
 - (b) to demolish or remove from the land stated buildings, structures, plant or equipment related to the carrying out of a resource activity or regulated activity; or
 - (c) to restore, as far as practicable, land to the condition the land was in before the carrying out of a resource activity or regulated activity started; or
 - (d) to do, or not to do, another act to ensure a resource activity or regulated activity complies with a regional interests development approval; or
 - (e) for a resource activity or regulated activity that has started—to apply for a regional interests development approval.
- (4) The order must state the date by, or period within, which the order must be complied with.
- (5) A person must comply with the order unless the person has a reasonable excuse.

Maximum penalty—1,665 penalty units or imprisonment for 12 months.

Division 3 Investigation and enforcement

86 Authorised persons under the Vegetation Management Act 1999

- (1) This section applies for a priority agricultural area and the strategic cropping area.
- (2) The functions of an authorised person (natural resources) under the *Vegetation Management Act 1999* include to ensure compliance with this Act (the **further function**).
- (3) For the purposes of subsection (2)—
 - (a) an authorised person (natural resources) may exercise the person's powers under the *Vegetation Management Act 1999*, part 3 (other than part 3, division 1, subdivisions 7 and 8) to perform the further function; and
 - (b) an authorised person (natural resources) may enter a place under section 30 of that Act if the place is—
 - (i) the subject of a regional interests development approval; and
 - (ii) entered during daylight hours; and
 - (c) on an application by an authorised person (natural resources), a magistrate may issue a warrant for a place under section 33 of that Act only if the magistrate is satisfied there are reasonable grounds for suspecting—
 - (i) there is a particular thing or activity (the **evidence**) that may provide evidence of an offence against this Act; and
 - (ii) the evidence is at the place or, within the next 7 days, may be at the place.

- (4) In this section—

authorised person (natural resources) means an authorised officer under the *Vegetation Management Act 1999*.

87 Authorised persons under a Local Government Act

- (1) This section applies for a priority living area.
- (2) The functions of an authorised person (local government) under the *Local Government Act 2009* or the *City of Brisbane Act 2010* include to ensure compliance with this Act (the **further function**).
- (3) For the purposes of subsection (2)—
 - (a) an authorised person under the *Local Government Act 2009* may exercise the person's powers under chapter 5, part 2, division 1 of that Act to perform the further function; and
 - (b) an authorised person under the *City of Brisbane Act 2010* may exercise the person's powers under chapter 5, part 2, division 1 of that Act to perform the further function; and
 - (c) on an application by an authorised person (local government), a magistrate may issue a warrant for a place under section 130 of the *Local Government Act 2009* or section 119 of the *City of Brisbane Act 2010* only if the magistrate is satisfied there are reasonable grounds for suspecting—
 - (i) there is a particular thing or activity (the **evidence**) that may provide evidence of an offence against this Act; and
 - (ii) the evidence is at the place or, within the next 7 days, may be at the place; and
 - (d) a reference in the *Local Government Act 2009* or the *City of Brisbane Act 2010* to the Local Government Acts is taken to include a reference to this Act.
- (4) In this section—

authorised person (local government) means an authorised person under the *Local Government Act 2009* or the *City of Brisbane Act 2010*.

88 Authorised persons under the Environmental Protection Act

- (1) This section applies for a strategic environmental area.
- (2) The functions of an authorised person (environment) under the Environmental Protection Act include to ensure compliance with this Act (the *further function*).
- (3) For the purposes of subsection (2)—
 - (a) an authorised person (environment) may exercise the person's powers under the Environmental Protection Act, chapter 9 to perform the further function; and
 - (b) an authorised person (environment) may enter a place under section 452 of that Act if the place is—
 - (i) the subject of a regional interests development approval; and
 - (ii) entered during daylight hours; and
 - (c) on an application by an authorised person (environment), a magistrate may issue a warrant for a place under section 456 of that Act only if the magistrate is satisfied there are reasonable grounds for suspecting—
 - (i) there is a particular thing or activity (the *evidence*) that may provide evidence of an offence against this Act; and
 - (ii) the evidence is at the place or, within the next 7 days, may be at the place.
- (4) In this section—

authorised person (environment) means an authorised person under the Environmental Protection Act.

89 Ministerial direction to investigate

- (1) The Minister may, by notice, direct the relevant chief executive to cause an authorised person to exercise the

person's functions under section 86, 87 or 88 in relation to a stated matter related to ensuring compliance with this Act.

- (2) The department's annual report must include details of each direction given under this section during the year.

Division 4 General

90 Guidelines

- (1) The chief executive may make guidelines giving advice about—
 - (a) assessment applications; or
 - (b) prescribed criteria for deciding assessment applications.
- (2) The chief executive must publish any guidelines made under subsection (1) on the department's website.

91 No compensation because of Act

- (1) No compensation is payable by the State or an official—
 - (a) for, or in connection with, the enactment, making or operation of this Act or any statutory instrument under it; or
 - (b) because the carrying out of an activity is made unlawful, or is conditional or restricted, under this Act.

- (2) In this section—

compensation means any amount, whether by way of compensation, reimbursement or otherwise.

92 Delegation by chief executive

The chief executive may delegate the chief executive's functions under this Act to an appropriately qualified public service employee.

93 Protection of officials from liability

- (1) An official does not incur civil liability for an act done, or omission made, honestly and without negligence under this Act.
- (2) If subsection (1) prevents a civil liability attaching to an official, the liability instead attaches to the State.
- (3) In this section—
official means any of the following—
 - (a) the Minister;
 - (b) the chief executive;
 - (c) an assessing agency.

94 Approved forms

- (1) The chief executive may approve forms for use under this Act.
- (2) A form approved for use under this Act may be combined with, or used together with, an approved form under another Act.

95 Regulation-making power

- (1) The Governor in Council may make regulations under this Act.
- (2) A regulation may provide—
 - (a) for fees payable under this Act and the matters for which they are payable; and
 - (b) for a maximum penalty of 20 penalty units for contravention of the regulation.

Part 7 Repeal

96 Repeal

The Strategic Cropping Land Act 2011, No. 47 is repealed.

Part 8 Transitional provisions for repeal of Strategic Cropping Land Act 2011

97 Definitions for pt 8

In this part—

commencement means the day on which the provision in which the term is used commences.

mitigation fund see the repealed Act, section 148.

repealed Act means the repealed *Strategic Cropping Land Act 2011*.

SCL protection decision see the repealed Act, section 91(1)(b).

transitioned decision means a decision for which an information notice was given under the repealed Act, section 102 or 105(6).

98 Validation application

- (1) This section applies to a validation application made under the repealed Act, section 40 if, at the commencement, the application had not been decided, withdrawn or lapsed.
- (2) The chief executive (natural resources) must deal with and decide, or continue to deal with and decide, the validation

application under the repealed Act as if this Act has not been enacted.

- (3) After making a decision about a validation application, the chief executive (natural resources) must ensure the SCL trigger map under this Act is consistent with the decision by, if necessary, amending the map—
- (a) if the decision is to record any of the land the subject of the application as SCL—to include the land as an area, or part of an area, in the strategic cropping area shown on the map; and
- (b) if the decision is to record any of the land as decided non-SCL—to remove the land from the strategic cropping area shown on the map.
- (4) In this section—

decided non-SCL see the repealed Act, section 9(3).

SCL see the repealed Act, section 9(2).

validation application see the repealed Act, section 40(1).

99 Resource activities excluded from repealed Act are exempt resource activities

A resource activity is an *exempt resource activity* for the strategic cropping area under this Act if the environmental authority or resource authority for the activity was issued or granted—

- (a) before 30 January 2012; or
- (b) as a result of an application that was excluded under the repealed Act, chapter 9, part 3, division 2 or 3.

100 Conditions imposed for future environmental authority or mining lease relating to EPC 891

- (1) This section applies for any environmental authority or mining lease granted because of an application for an

environmental authority or a mining lease relating to EPC 891.

- (2) It is a condition of the lease that no open cut mining can be carried out under the lease.
- (3) It is a condition of the environmental authority that its holder must use all reasonable endeavours to rehabilitate all impacts on the land from underground coal mining carried out under the lease.
- (4) This section does not limit or otherwise affect a power under this Act, the *Mineral Resources Act 1989* or the Environmental Protection Act to impose other conditions on the lease or authority, or a resource activity for the lease or authority, that are not inconsistent with these conditions.
- (5) In this section—

EPC means an exploration permit for coal under the *Mineral Resources Act 1989*.

mining lease means a mining lease under the *Mineral Resources Act 1989*.

101 Application for SCL protection decision

- (1) This section applies to an application for an SCL protection decision for a resource activity made under the repealed Act, section 95 if—
 - (a) at the commencement, the application had not been decided or withdrawn; and
 - (b) the application is for a resource activity in an area that is in the strategic cropping area under this Act.
- (2) The chief executive (natural resources) must deal with and decide, or continue to deal with and decide, the application under the repealed Act as if this Act has not been enacted.

102 SCL protection decision

- (1) This section applies to each of the following SCL protection decisions, to the extent the decision is for a resource activity in an area that is in the strategic cropping area under this Act—
 - (a) one for a resource activity made under the repealed Act;
 - (b) one made as a result of an application mentioned in section 101;
 - (c) one made as a result of an appeal mentioned in section 105 or 106.
- (2) The applicant for the decision is taken to have been issued a regional interests development approval (the *transitioned approval*) for the resource activity in the strategic cropping area.
- (3) To the extent the decision imposed an SCL protection condition prohibiting the carrying out of all or part of the resource activity—
 - (a) subsection (2) does not apply; and
 - (b) the carrying out of the activity, or part of the activity, is taken to have been the subject of an assessment application, or part of an application, refused under section 48.
- (4) An SCL protection condition imposed by the decision, other than an SCL condition mentioned in subsection (3) or a financial assurance condition, is taken to be a regional interests condition imposed on the transitioned authority.
- (5) A condition mentioned in subsection (4) stops being a condition of an environmental authority or a resource authority for the resource activity.

Note—

Under the repealed Act, section 103, an SCL condition is taken to be a condition of a relevant environmental authority or resource authority.

(6) The chief executive may issue, under section 53, a regional interests development approval to the applicant for the transitioned approval.

(7) In this section—

applicant means a person who applied for the decision.

financial assurance condition see the repealed Act, section 100(4).

SCL protection conditions—

1 See the repealed Act, section 99(1)(b).

2 *SCL protections conditions* includes a condition mentioned in paragraph 1 as imposed or amended as a result of an appeal mentioned in section 105 or 106.

103 SCL compliance certificate

(1) This section applies to an SCL compliance certificate, to the extent the certificate relates to a resource activity in an area that is in the strategic cropping area under this Act.

(2) The person who holds the SCL compliance certificate is taken to have been issued a regional interests development approval (the *transitioned approval*) for the resource activity.

(3) The conditions under the standard conditions code for carrying out the resource activity are taken to be regional interests conditions imposed on the transitioned authority.

(4) The chief executive may issue, under section 53, a regional interests development approval to the applicant for the transitioned approval.

(5) In this section—

SCL compliance certificate see the repealed Act, section 116.

standard conditions code means the standard conditions code in force under the repealed Act immediately before its repeal.

104 Mitigation requirements

- (1) This section applies if, immediately before the commencement, under the repealed Act, section 104(2), it is taken to be a condition of a resource authority that its holder must comply with the mitigation requirement (the *transitioned mitigation requirement*).
- (2) The transitioned mitigation requirement is taken to be an SCL mitigation condition imposed on a regional interests development approval issued to the resource activity holder under section 102.
- (3) For subsection (2)—
 - (a) a payment made to the mitigation fund under the repealed Act for the mitigation requirement is taken to be a payment made to the mitigation fund under part 4 of this Act for the SCL mitigation condition; and
 - (b) a mitigation deed entered into under the repealed Act for the mitigation requirement is taken to be a mitigation deed entered into under part 4 of this Act for the SCL mitigation condition.
- (4) In this section—
mitigation requirement see the repealed Act, section 11(7).

105 Right of appeal on commencement

- (1) This section applies if, on the commencement—
 - (a) a person had a right to appeal against a transitioned decision that relates to the carrying out of a resource activity in an area that is in the strategic cropping area under this Act; and
 - (b) the person had not started the appeal.
- (2) The person may appeal against the decision and the Land Court must hear and decide the appeal as if this Act has not been enacted.

106 Appeals started at commencement

- (1) This section applies if—
 - (a) a person started an SCL appeal before the commencement; and
 - (b) the appeal is against a transitioned decision that relates to the carrying out of a resource activity in an area that is in the strategic cropping area under this Act; and
 - (c) on the commencement the appeal has not been decided or withdrawn.
- (2) The Land Court must hear and decide, or continue to hear and decide, the SCL appeal as if this Act has not been enacted.
- (3) In this section—

SCL appeal means an appeal to the Land Court under the repealed Act, section 109 against a transitioned decision.

107 Stop work notices and restoration notices

- (1) This section applies if, before the commencement, a person was given a stop work notice or a restoration notice for the carrying out of a resource activity in an area that is in the strategic cropping area under this Act.
- (2) The person must comply with the notice.
- (3) For subsection (2), the repealed Act, other than section 171, continues to apply as if this Act has not been enacted.
- (4) In this section—

restoration notice see the repealed Act, section 160(2).
stop work notice see the repealed Act, section 157(2).

Part 8A Transitional provision for State Development, Infrastructure and Planning (Red Tape Reduction) and Other Legislation Amendment Act 2014

107A References to former terms

A reference in an Act or a document to a term of the repealed *Wild Rivers Act 2005* (the *former term*) stated in column 1 of the following table may, if the context permits, be taken to be a reference to the term stated opposite the former term in column 2 of the table—

	Column 1	Column 2
1	wild river area	strategic environmental area
2	wild river preservation area	strategic environmental area
3	wild river high preservation area	designated precinct in a strategic environmental area as defined in the <i>Regional Planning Interests Regulation 2014</i>
4	wild river special floodplain management area	designated precinct in a strategic environmental area as defined in the <i>Regional Planning Interests Regulation 2014</i>

Part 9 Transitional provision for Planning (Consequential) and Other Legislation Amendment Act 2016

108 Existing appeals

- (1) This section applies if—
 - (a) a person started an appeal to the Planning and Environment Court under former part 5 before the commencement; and
 - (b) the appeal had not been decided before the commencement.
- (2) The Planning and Environment Court must hear, or continue to hear, the appeal under former part 5 as if the amending Act had not been enacted.
- (3) In this section—

amending Act means the *Planning (Consequential) and Other Legislation Amendment Act 2016*.

former part 5 means part 5 as in force immediately before the commencement.

Schedule 1 Dictionary

section 6

affected land owner, for part 5, see section 71.

appeal see section 72.

applicant, for a provision about an assessment application, see section 28.

approved form means a form approved by the chief executive under section 94.

area of regional interest see section 7.

assessing agency, for an assessment application, see section 26(1).

assessing agency condition see section 42(2)(a)(i).

assessment application see section 28.

assessor, for an assessment application, see section 26(2).

authority holder see section 15.

chief executive (environment) means the chief executive of the department administering the Environmental Protection Act.

chief executive (natural resources) means the chief executive of the natural resources department.

closing day, for submissions about an assessment application, see section 35(2)(b)(ii).

court, for part 5, see section 71.

cropping includes the following—

- (a) the yield of any form of cultivated crop for any purpose, including, for example, for food, fibre, fodder or medicinal purposes;
- (b) the growing of trees to produce, or as a component for, food, fibre or a medicinal product;

(c) harvesting a timber plantation.

decision notice, for a decision, means a notice stating the following—

- (a) the decision and the reasons for it;
- (b) the rights of appeal under part 5 against the decision;
- (c) the period in which any appeal under part 5 must be started;
- (d) how rights of appeal under part 5 are to be exercised.

environmental authority see section 14.

Environmental Protection Act means the *Environmental Protection Act 1994*.

exempt regulated activity, for an area of regional interest, see section 25(2).

exempt resource activity, for an area of regional interest, see section 22(2), 23, 24(2), 24A(2) or 99.

expected surface impacts, of a resource activity, means the expected impacts of carrying out the activity on the surface of the land where the activity is to be carried out.

Gasfields Commission means the commission under the *Gasfields Commission Act 2013*.

impact, for a resource activity or regulated activity on an area of regional interest, see section 27.

information includes a document.

lot means—

- (a) a lot under the *Land Title Act 1994*; or
- (b) a separate, distinct parcel of land for which an interest is recorded in a register under the *Land Act 1994*.

mitigated SCL land see section 61.

mitigation see section 62(1).

mitigation criteria see section 65(1).

mitigation deed see section 64.

mitigation fund see section 66.

mitigation measures see section 63(1).

mitigation value, of mitigated SCL land, see section 62(2).

natural resources department means the department that administers the *Land Act 1994*.

notice means written notice.

notifiable, for an assessment application, see section 34(2) and (4).

owner, of land, means—

- (a) the person for the time being entitled to receive the rent for the land or who would be entitled to receive the rent for it if it were let to a tenant at a rent; or
- (b) the lessee of a lease issued under the *Land Act 1994* for agricultural, grazing or pastoral purposes.

party, to an appeal, means the applicant and each respondent or co-respondent for the appeal.

Planning Act means the *Planning Act 2016*.

prescribed time frame, for a matter, means the time frame prescribed under a regulation for the matter.

priority agricultural area see section 8(1).

priority agricultural land use see section 8(2).

priority living area see section 9.

properly made, for a submission about an assessment application, see section 37.

property means—

- (a) if an area managed as a single agricultural enterprise consists of 1 lot—the lot; or
- (b) otherwise—all the lots that—
 - (i) are owned by the same person or have 1 or more common owners; and
 - (ii) are managed as a single agricultural enterprise; and

- (iii) form a single discrete area because 1 lot is adjacent, in whole or part, to another lot in that single discrete area (other than for any road or watercourse between any of the lots).

referable, for an assessment application, see section 39(2).

regional interests condition see section 48(2).

regional interests decision, for part 5, see section 71.

regional interests development approval see section 16.

regional plan means a regional plan under the Planning Act.

regulated activity see section 17(1).

relevant authorities see section 28(3), definition *eligible person*.

relevant matters, for an assessment application, means—

- (a) for deciding the application—the matters mentioned in section 49(1); or
- (b) for giving an assessing agency's response—the matters mentioned in section 41(2).

requested amendment see section 55(1).

requirement notice see section 44(1).

resource Act see section 12(1).

resource activity see section 12(2).

resource authority see section 13.

road see the Planning Act, schedule 2.

SCL mitigation condition see section 50(3).

SCL trigger map means the electronic map called 'Trigger Map for Strategic Cropping Land in Queensland' approved by the chief executive (natural resources) and published on the website of the natural resources department.

strategic cropping area see section 10(1).

strategic environmental area see section 11(1).

watercourse see the *Water Act 2000*, section 5.