CAMDEN GAS PROJECT

Environmental Management Plan

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Revision Status:

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1	Aug 2008	External Consultant	A. Clifton	D. Kelly	
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4	July 2012	EMGA Mitchell McLennan	A. Clifton	M. Roy	
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1. Introduction

1.1. Scope of Environmental Management Plan (EMP)

This **document** is the AGL Upstream Investments Pty Limited (**AGL**) Environmental Management Plan (**EMP**) for the Camden Gas Project ('the project' or **CGP**) and describes AGL's system to manage potential environmental issues associated with the Project.

The CGP activities can be summarised as follows:

- The construction, operation, maintenance and rehabilitation of well sites and access roads;
- The construction, operation, maintenance and rehabilitation of the gas gathering systems;
- The operation and maintenance of the Rosalind Park Gas Plant (**RPGP**); and
- The operation and maintenance of the sales gas pipeline.

This EMP is applicable to these CGP activities.

1.2. Background to EMP

In the past separate environmental management plans were prepared to address specific requirements under the various approvals. A decision was made to consolidate these activities or site-specific management plans into one EMP (and Sub Plans) to facilitate uniform implementation of environmental management across the Project. The Environmental Management System (**EMS**) for the CGP includes:

- This EMP and the Sub Plans;
- Monitoring and reporting; and
- Independent Environmental Audits.

The requirements for the EMP are provided in Section 2.3 of this EMP. In summary:

- There are ten development consents for the CGP, and each requires the preparation and implementation of either, or both, a Construction Environmental Management Plan (**CEMP**) and an Operational Environmental Management Plan (**OEMP**). Some of the consents require the OEMP to be reviewed and updated annually.
- Whilst not all the consents have the same requirements, through this updated EMP AGL has identified and included the most stringent requirements from all the consents across the project to simplify the requirements and as part of best practice environmental management.
- This EMP has been developed to satisfy the requirements of the development consents for EMPs.
- There are also environmental management requirements under the Petroleum Production Leases (**PPLs**) for the project (PPL 1, 2, 4, 5 and 6), the Petroleum Operations Plan (**POP**), and the Environment Protection Licence (**EPL**), which are addressed in this EMP.

1.3. Objectives and Targets of EMP

The objective of this EMP is to describe the overall environmental management framework for the CGP, setting out what we are required to do, how we will do it and the monitoring we use to ensure compliance and improve operations.

It identifies the petroleum titles, development consents, Environment Protection Licence and relevant legislation. The EMP describes our activities, contains specific environmental management plans (Sub Plans) for key aspects of our operations, and sets out the processes for implementation, monitoring and review. Detailed site-specific information is provided in site specific plans which are referenced in the Sub Plans as applicable.

A POP is required to satisfy the conditions of PPLs 1, 2, 4, 5 and 6. Some of the requirements of the POP overlap with requirements of the development consents, so this EMP aims to also address the ongoing environmental management, rehabilitation and monitoring requirements of the POP.

Environmental compliance obligations relating to the CGP are incorporated in AGL's Compliance Management System, known as CMO Compliance (CMO). CMO manages regulatory compliance obligations across the CGP, and provides a summary of all the approval, licence and lease conditions for the project.

The EMP incorporates the environmental management requirements of the AGL Health Safety and Environment (HSE) Management System (**HSEMS**) which is based on the requirements of ISO 14001: 2015.

1.4. HSEMS and EMP Mapping

The AGL HSEMS provides standards and requirements to be referenced when developing business-specific HSE management systems and plans. AGL is developing HSE Standards and where possible or relevant, the EMP has been developed in accordance with the requirements of the HSEMS Standards and Standard Methodologies. The mapping of this EMP against HSEMS Standards and Standard Methodologies is provided in Table 1:1.

Table1:1 EMP and HSEMS Mapping

EMP Section	HSEMS Standard	HSEMS Standard Methodology/ Procedure
• 1.6 Environment Policy • 2 Legislative Requirements • 5.1 Structure and Responsibility	1 HSE Management System	1 HSE Governance and Compliance Procedure
• 4 Risk Management, Objectives and Targets	4.1 Risk Management	4.1 Risk Management Standard Methodology
• 4.2 Objectives and Targets • 6 Monitoring and Checking	2 HSE Planning, Goals and Targets	2 HSE Planning, Goals and Targets Standard Methodology
• 5.2 Training and Competence	13 Training and Competency	13 Training and Competency Standard Methodology
• 5.3 Internal and External Communication	6 Consultation and Communication	6 Consultation and Communication Standard Methodology
• 5.4 Reporting	Not yet developed	12.3 HSE Corporate Reporting Procedure
• 5.5 Document Control	5 Document Management	5 Document Management Standard Methodology
• 5.6 Technical Assurance	Not yet developed	Not yet developed
• 5.8 Contractors	3 Contractor HSE Management	3 Contractor HSE Management Standard Methodology
• 5.9 Emergency Response	10 Emergency Preparedness and Response	10 Emergency Preparedness and Response Standard Methodology

EMP Section	HSEMS Standard	HSEMS Standard Methodology/ Procedure
• 6.1 Environmental Monitoring and Measurement • 7.1 Environmental Performance Review	Not yet developed	15.2 HSE Action Management Standard Methodology 15.4 HSE Inspections Standard Methodology
• 6.5 Incident, Near Miss and Hazard Management	12 Hazard and Incident Management	12.1 Incident Management Procedure
• 6.6 Change Management	11 HSE Management of Change	11 HSE Management of Change Standard Methodology
• Appendix D Noise Management Sub Plan	9.5 Noise	9.5 Noise Standard Methodology
• Appendix E Flora and Fauna Management Sub Plan	9.6 Biodiversity	9.6 Biodiversity Standard Methodology
• Appendix F Soil and Water Management Sub Plan	9.1 Land 9.3 Surface Water	9.1 Land Standard Methodology 9.3 Surface Water Standard Methodology
• Appendix G Aboriginal Cultural Heritage Management Sub Plan	9.8 Cultural Heritage	9.8 Cultural Heritage Standard Methodology
• Appendix H European Cultural Heritage Management Sub Plan	9.8 Cultural Heritage	9.8 Cultural Heritage Standard Methodology
• Appendix I Landscape and Rehabilitation Management Sub Plan	9.1 Land	9.1 Land Standard Methodology
• Appendix J Air Quality Sub Plan	9.4 Air Emissions 9.9 Greenhouse Gas Emissions	9.4 Air Emissions Standard Methodology 9.9 Greenhouse Gas Emissions Standard Methodology
• Appendix K Waste Management Sub Plan	9.7 Waste	9.7 Waste Standard Methodology
• Appendix M Dangerous Goods and Hazardous Materials Management Sub Plan	7.10 Hazardous Chemicals and Substances	7.10 Hazardous Chemicals and Substances Standard Methodology
• Appendix N Emergency Response Plan (including Bushfire and Flood)	10 Emergency Preparedness and Response	10 Emergency Preparedness and Response Standard Methodology
• Appendix O Groundwater Management Plan	9.2 Groundwater	9.2 Groundwater Standard Methodology

1.5. Layout of EMP

This EMP for the CGP comprises the following key elements (generally in accordance with our target to build towards compliance with the requirements of the Environmental Management System ISO14001:2004):

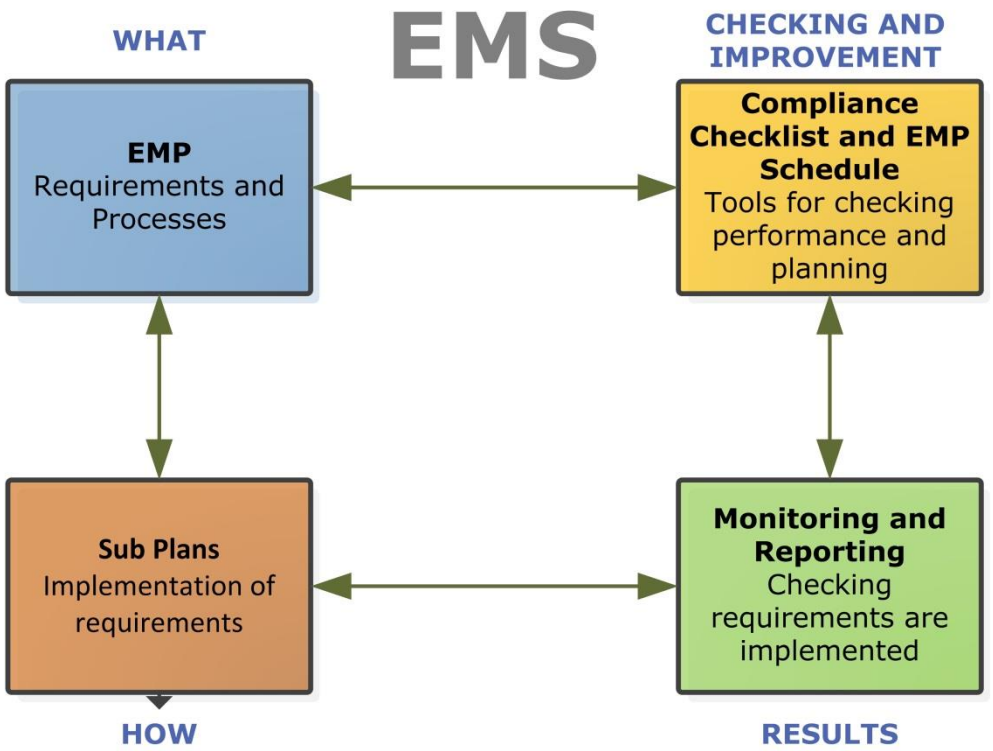
- Environmental Policy (Section 1.6);
- Summary of Legislative Requirements (Section 2);
- Description of Activities and Potential Environmental Impacts (Section 3);
- Risk Management, Objectives and Targets (Section 4);
- Implementation and Operation (Section 5);
- Monitoring and Checking (Section 6);
- Management Review (Section 7); and
- Environmental Management Sub Plans (in Appendices to this EMP).

Figure 1 assists in describing the context of this EMP.

1.6. Environmental Policy

All activities will be undertaken in accordance with the AGL Energy Environment Policy (refer **Appendix A**) that outlines our commitment to ongoing sound management of environmental aspects and performance.

Figure 1 Camden Gas Project Environmental Management System Framework



1.7. Table of Acronyms/Abbreviations

Table 1:2 Table of Acronyms/Abbreviations

Acronym	Definition
AEL	AGL Enterprise Library
AEPR	Annual Environmental Performance Report
AGL	AGL Upstream Investments Pty Limited
ARTC	Australian Rail and Track Corporation
BCA	NSW Biodiversity Conservation Act 2016
CAA	Controlled Activity Approval
CCC	Community Consultation Committee
CEMP	Construction Environmental Management Plan
CGP	Camden Gas Project
CO2	Carbon Dioxide
CP	Cathodic Protection
CSG	Coal Seam Gas
DA	Development Approval
DECCW	NSW Department of Environment, Climate Change and Water (now Office of Environment and Heritage)
DG	Director General
DP	Deposited Plan
DPI Water	Department of Primary Industries Water (formerly NSW Office of Water)
DPI&E	NSW Department of Planning, Industry, and Environment (formerly NSW Department of Planning and Environment)
DSEWPaC	Commonwealth Department of Sustainability, Environment, Water, Population and Communities
DPI&E-MEG	NSW Department of Planning, Industry and Environment – Mining, Exploration and Geoscience
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMAI	Elizabeth McArthur Agricultural Institute
EMP	Environmental Management Plan
EMS	Environmental Management System
EP&A Act	NSW Environmental Planning and Assessment Act 1979
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
EPA	NSW Environment Protection Authority
EPL	Environment Protection Licence
ERP	Emergency Response Plan
GPS	Geographic Positioning System
GSP	Gas Sales Pipeline

Acronym	Definition
HSE	Health Safety and Environment
JSEA	Job Safety and Environmental Analysis
KPI	Key Performance Indicator
kL	Kilolitre
mm	Millimetre
MP	Management Plan
NES	National Environmental Significance
NPI	National Pollutant Inventory
OEH	NSW Office of Environment and Heritage
OEMP	Operational Environmental Management Plan
PE	Polyethylene
PEL	Petroleum Exploration Licence
PEL2	Petroleum Exploration Licence 2
PIMP	Pipeline Integrity Management Plan
PIRMP	Pollution Incident Response Management Plan
POA	Petroleum (Onshore) Act 1991
POEO Act	NSW Protection of the Environment Operations Act 1997
POP	Petroleum Operations Plan
PPL	Petroleum Production Lease
PPM	Parts per million
QRA	Quantitative Risk Assessment
REF	Review of Environmental Factors
RMS	NSW Roads and Maritime Services
RPGP	Rosalind Park Gas Plant
SCA	Sydney Catchment Authority
SCADA	Supervisory Control and Data Acquisition
SEE	Statement of Environmental Effects
SIS	Surface to in-seam
SOP	Safety and Operating Plan
SWMP	Soil and Water Management Plan
TEG	Tri-ethylene glycol
WHS Reg	Work Health and Safety Regulation 2011

2. Legislative Requirements

2.1. Environmental Legislative Reporting Requirements

Table B:1 in **Appendix B** provides a summary of the primary environmental legislation applicable to the Project, the requirements of this legislation and how it may apply to AGL CGP.

2.2. Approvals, Licences, Permits and Leases

The standards, performance measures and statutory requirements with which the CGP are required to comply with are outlined in the consents, leases and licences listed in **Table B:2** in **Appendix B**.

The requirements of these controls are summarised in the Camden Gas Environmental Management Compliance Register (**refer to Section 6.2**) and incorporated into this EMP.

2.3. Requirements for an Environmental Management Plan

Table 2:1 lists the Development Consents, Project Approvals, Leases and Licences that require the preparation of an EMP as well as other relevant conditions. This EMP has been prepared to address these requirements.

Table 2:1 Preparation of EMP Requirements

Requirement for EMPs	Consent/ Lease/ Licence	Condition No.	EMP Section or Sub Plan
Operational Environmental Management Plan	DA 15-1-2002i	15 (Sch 3)	Whole EMP Document including Sub Plans
	DA 246-8-2002-i	11 (Sch 3)	
	DA 282-6-2003-i	2 (Sch 5)	
	DA 183-8-2004-i	21, 21A (Sch 2)	
	DA 9-1-2005	41 (Sch 2)	
	DA 171-7-2005	2 (Sch 4)	
	DA 75-4-2005	52 (Sch 2)	
	PA6_0137	1 (Sch 4) SoC 19	
	PA6_0138	1 (Sch 4) SoC 22	
Construction Environmental Management Plan	DA 282-6-2003-i	1 (Sch 5)	Whole EMP Document including Sub Plans
	DA 9-1-2005	39, 40 (Sch 2)	
	DA 171-7-2005	1 (Sch 4)	
	DA 75-4-2005	51 (Sch 2)	
	Pipeline Licence No. 30	7.3 (Annexure B)	
Environmental Management Plan (EMP) for construction and operation	PA 06_0291 DA 183-8-2004-i	1 (Sch 4) SoC 4	Whole EMP Document including Sub Plans

Requirement for EMPs	Consent/ Lease/ Licence	Condition No.	EMP Section or Sub Plan
Road Reserve Environmental Management Plan	DA 171-7-2005	31 (Sch 3)	Road Reserve Environmental Management Plan
Annual OEMP update and review	DA 282-6-2003-i	4 (Sch 5)	Section 7.1
	DA 183-8-2004-i	23 (Sch 2)	
OEMP update and review after Independent Audit	PA6_0138	7 (Sch 4)	Section 7.1
	PA6_0137	7 (Sch 4)	
	PA 06_0291	7 (Sch 4)	
Regular update and review of EMP	DA 15-1-2002i	18 (Sch 3)	Section 7.1
Petroleum Operations Plan (POP)	PPL 1, 2, 4, 5, 6	2 (Schedule A)	A separate POP has been prepared and is referenced in this EMP. The environmental requirements of a POP are addressed in this EMP.
	DA 15-1-2002-i	14 (Sch 3)	
	DA 246-8-2002-i	10 (Sch 3)	
	DA 183-8-2004 MOD	SoC 3	
Environment Protection Licence (EPL) - Licensed activities must be carried out in a competent manner	EPL No. 12003 DA 183-8-2004 MOD	Condition O1 SoC 2	Whole EMP Document including Sub Plans
Petroleum Production Lease - Implement all practicable measures to prevent and/ or minimise environmental harm	PPL 1, 2, 4, 5, 6	1 (Schedule A)	Whole EMP Document including Sub Plans
Petroleum Production Lease - Management and Rehabilitation of Lands (General)	PPL 1, 2, 4, 5, 6	5 (Schedule A)	Whole EMP Document including Sub Plans
Implement all practicable measures to prevent and/ or minimise harm to the environment	PA 06_0291 PA 06_0137 PA 06_0138 DA 183-8-2004 MOD DA 9-1-2005 DA 15-1-2002i 75-4-2005 DA 171-7-2005 DA 246-8-2002i DA 282-6-2003	1 (Sch 2) & SoC 1 (Appendix 3) 1 (Sch 2) & SoC 1 1 (Sch 2) & SoC 1 1 (Sch 2) & SoC 1 1 (Sch 2) 1 (Sch 3) 1 (Sch 2) 1 (Sch 2) 1 (Sch 3) 1 (Sch 3)	Whole EMP Document including Sub Plans
Commitments Register	DA 282-6-2003-i	18 (Sch 3)	Section 6.2

Table 2:2 lists the information required to be addressed in the EMP as required under the Development Consents, Project Approvals, Leases and Licences. This EMP has been prepared to address these requirements.

Table 2:2 Requirements of EMP (OEMP)

Requirement for EMP	Consent / Lease / Licence	Condition No.	EMP Section
Incorporate the various environmental management plans, monitoring plans, monitoring programs and other requirements set out in Schedule 3 of this approval.	PA6_0137 PA6_0138 PA 0291 DA 15-1-2002	1 (Sch 4) & SoC 19 1 (Sch 4) & SoC 22 1 (Sch 4) 15 (Sch 3)	Appendix D - O
Identify Statutory and other obligations that the Proponent is required to fulfil during the operation of this project.	PA6_0137 PA6_0138 PA 0291 DA 9-1-2005 DA 15-1-2002 DA 75-4-2005 DA 171-7-2005 DA 183-8-2004 DA 282-6-2003i	1 (Sch 4) & SoC 19 1 (Sch 4) & SoC 22 1 (Sch 4) 41 (Sch 2) 15 (Sch 3) 52 (Sch 2) 2 (Sch 4) 21 (Sch 2) 2 (Sch 5)	Table 2-1
Describe environmental policies and principles to be applied to the operation of the project.	PA6_0137 PA6_0138 PA 0291 DA 9-1-2005 DA 15-1-2002 DA 75-4-2005 DA 171-7-2005 DA 183-8-2004 DA 282-6-2003i	1 (Sch 4) & SoC 19 1 (Sch 4) & SoC 22 1 (Sch 4) 41 (Sch 2) 15 (Sch 3) 52 (Sch 2) 2 (Sch 4) 21 (Sch 2) 2 (Sch 5)	Section 5.7
Describe in general how the environmental performance of the project would be monitored and managed.	PA6_0137 PA6_0138 PA 0291	1 (Sch 4) & SoC 19 1 (Sch 4) & SoC 22 1 (Sch 4)	Section 4.2 Section 6.1
Describe the procedures that would be implemented to:	PA6_0137 PA6_0138 PA 0291	1 (Sch 4) & SoC 19 1 (Sch 4) & SoC 22 1 (Sch 4)	-
- Keep the local community and relevant agencies informed about environmental performance of the project;			Section 5.3.2 Section 5.4
- Receive, handle, respond to, and record complaints;			Section 5.3.4

Requirement for EMP	Consent / Lease / Licence	Condition No.	EMP Section
- Resolve any disputes that may arise during the course of the project;			Section 5.3.4
- Respond to any non-compliance;			Section 6.5
- Manage cumulative impacts; and			Section 3
- Respond to emergencies (including bushfires).			Appendix N (Emergency Response Plan)
Describe the role, responsibilities, authority and accountability of all the key personnel involved in environmental management of the project.	PA6_0137 PA6_0138 PA 0291 DA 9-1-2005 DA 15-1-2002 DA 75-4-2005 DA 171-7-2005 DA 183-8-2004 DA 282-6-2003i	1 (Sch 4) & SoC 19 1 (Sch 4) & SoC 22 1 (Sch 4) 41 (Sch 2) 15 (Sch 3) 52 (Sch 2) 2 (Sch 4) 21 (Sch 2) 2 (Sch 5)	Section 5.1 Table 5-1
Standards and performance measures to be applied to the development, and a means by which environmental performance can be periodically reviewed and improved.	DA 9-1-2005 DA 15-1-2002 DA 75-4-2005 DA 171-7-2005 DA 183-8-2004 DA 282-6-2003i	41 (Sch 2) 15 (Sch 3) 52 (Sch 2) 2 (Sch 4) 21 (Sch 2) 2 (Sch 5)	Section 4.2
Management policies to ensure that environmental performance goals are met and to comply with the conditions of consent.	DA 9-1-2005 DA 15-1-2002 DA 75-4-2005 DA 171-7-2005 DA 183-8-2004 DA 282-6-2003i	41 (Sch 2) 15 (Sch 3) 52 (Sch 2) 2 (Sch 4) 21 (Sch 2) 2 (Sch 5)	Section 6.2 Appendix A

2.4. Requirements for Environmental Sub Plans

Table 2:3 lists the Development Consents, Project Approvals, Leases, Licences and Codes of Practice that require the preparation of environmental Sub Plans. These Sub Plans are discussed further in Section **5.7.2**.

Table 2:3 List of Sub Plans included as Appendices to this EMP

Environmental Management Sub Plan	Relevant EMP Appendix	Relevant Requirement
Noise Management Sub Plan	Appendix D	DA 15-1-2002-i: 19 (Sch 3) DA 282-6-2003-i: 34, 38 & 42 (Sch 4) DA 75-4-2005: 19 & 20 (Sch 2) DA 171-7-2005: 4, 5 (Sch 3) PA 06_0137: 3 & 6 (Sch 3) & SoC 11 PA 06_0138: 3 & 6 (Sch 3) & SoC 11 PA 06_0291: 4 & 7 (Sch 3) & SoC 13 (App) EPL 12003 L5.10
Flora & Fauna Management Sub Plan	Appendix E	No specific requirement
Soil and Water Management Sub Plan	Appendix F	DA 15-1-2002-i: 20 & 21 (Sch 3) DA 282-6-2003-i: 84 & 84A (Sch 4) DA 183-8-2004-i: 14, 16 & 16A (Sch 2) & SoC 5 DA 75-4-2005: 25 (Sch 2) DA 171-7-2005: 11 (Sch 3) PA 06_0137: 8 (Sch 3) & SoC 15 PA 06_0138: 8 (Sch 3) & SoC 18 PA 06_0291: 9 (Sch 3) & SoC 16 (App 3)
Aboriginal Cultural Heritage Management Sub Plan	Appendix G	DA 171-7-2005: 41 (Sch 3) PA 06_0137: 13 (Sch 3) & SoC 16 PA 06_0138: 15 (Sch 3) & SoC 19 PA 06_0291: 20 (Sch 3) & SoC 17
European Heritage Management Sub Plan	Appendix H	No specific requirement
Landscape and Rehabilitation Management Sub Plan (including Weed Management Plan)	Appendix I	DA 15-1-2002-i: 23 & 25 (Sch 3) DA 282-6-2003-i: 13 (Sch 4) & 19A (Sch 4) PA 06_137: 17 (Sch 3) & SoC 8 PA 06_138: 19 (Sch 3) PA 06_0291: 18 (Sch 3) & SoC 8 (App 3) DA 75-4-2005: 42 (Sch 2) DA 183-8-2004-i: 17, (Sch 2) DA 9-1-2005: 29 (Sch 2) DA 171-7-2005: 37 (Sch 3)
Air Quality Management Sub Plan	Appendix J	DA 282-6-2003i: 57 (Sch 4)
Waste Management Sub Plan	Appendix K	DA 15-1-2002-i: 24 (Sch 3) DA 282-6-2003-i: 106 (Sch 4)
Traffic Management Sub Plan	Appendix L	DA 15-1-2002i: 22 (Sch 3) DA 171-7-2005: 31 (Sch 3) DA 282-6-2003i: 112 (Sch 4) PA 06_0291: 22 (Sch 3)

Environmental Management Sub Plan	Relevant EMP Appendix	Relevant Requirement
Dangerous Goods and Hazardous Materials Storage Sub Plan	Appendix M	No specific requirement.
Emergency Response Plan (including bushfire and flood management)	Appendix N	EPL 12003 O4.1 DA 282-6-2003-i: 92(a) & 119 (Sch 4) DA 183-8-2004i: 15 (Sch2) DA 9-1-2005: 20 & 32 (Sch 2) DA 75-4-2005: 29 & 44 (Sch 2) DA 171-7-2005: 12, 16 & 39 (Sch 3) PA 06_0137: 10 (Sch 3) & SoC 17 PA 06_0138: 9 & 11 (Sch 3) & SoC 20, 16 & 17 PA 06_0291: 12 & 14 (Sch 3) & SoC 15 & 18 Code of Practice for CSG – Fracture stimulation activities: Section 11 Code of Practice for CSG – Well Integrity: Section 2.2.5
Pollution Incident Response Management Plan (PIRMP)	Under separate cover	PPL 1, 2, 4, 5, 6: 4 (Schedule A) Part 5.7 POEO Act 2011 Code of Practice for CSG – Fracture stimulation activities: Section 11.3 Code of Practice for CSG – Well Integrity: Section 2.2.5.1
Groundwater Management Plan	Appendix O	WAL 24856, WAL 24736 WUA 10WA112288, 10WA112294
Sales Gas Pipeline Standard Operating Procedure	Under separate cover	Pipeline Licence No. 30 Condition 7.5

3. Description of Activities and Potential Environmental Impacts

3.1. Camden gas Project Overview

The Camden Gas Project is located in the Macarthur region 60 km southwest of Sydney, in the Wollondilly, Camden and Campbelltown Local Government Areas. The Project has been producing gas for the Sydney region since 2001 and consists of 144 gas wells (including wells that have been decommissioned), low-pressure underground gas gathering pipes and gas plant facilities.

AGL holds five PPLs in the area under the *Petroleum (Onshore) Act 1991* (POA) enabling the production, gathering and sale of CSG (refer to Appendix C for figures). PPLs include:

- PPL 1;
- PPL 2;
- PPL 4;
- PPL 5; and
- PPL 6.

Produced gas is gathered from wells through a low-pressure gas gathering system and transported to the Rosalind Park Gas Plant to be cleaned and compressed. The gas is then transported by a 500 metre Sales Pipeline into the Moomba to Sydney Natural Gas pipeline.

The project has grown substantially since 1998, from a prospect under exploration and assessment to become a small-scale pilot in 2001. The first development consents were granted in 2002, with further consents granted from 2004 onward.

The sections following will describe in detail the operations of the project in terms of specific activities and work phase (i.e. construction, operation/ maintenance and final rehabilitation).

Environmental assessments have identified that the construction stage of the project has a greater potential for environmental impact than the operational stage. However, these impacts are temporary and of minor significance once mitigation measures are implemented (as described in the Sub Plans to this EMP). Long term operational management procedures have been assessed as effectively mitigating any potential environmental issues including the potential cumulative impacts. The best practice approach to environmental management and continuous improvement processes also ensure effective mitigation of potential environmental and cumulative issues.

3.2. Codes of Practice

Construction, cement and casing integrity of a CSG well shall be undertaken in accordance with the following Codes (since their introduction):

- Code of Practice for Coal Seam Gas: Fracture Stimulation Activities (New South Wales Department of Trade and Investment, Regional Infrastructure and Services, 2012).
- Code of Practice for Coal Seam Gas: Well Integrity (New South Wales Department of Trade and Investment, Regional Infrastructure and Services, 2012).

AGL has no current plans to undertake construction of any further wells.

3.3. Well Surface Locations

The well surface locations or well sites are scattered throughout the PPLs and have been determined following extensive geological exploration and analysis.

Once the preferred geological target areas have been identified, the well site selection process then considers the environmental and social constraints of the area. These include land use (existing and future), topography, subsurface geology, flora and fauna, archaeology and noise. This detailed design information becomes part of the environmental assessment and approvals process for new gas fields and facilities.

Wells are named and numbered according to a two-letter abbreviation of the well field so that each well, even if it is co-located with a number of other wells, has its own unique name, for example EM17 or MP30.

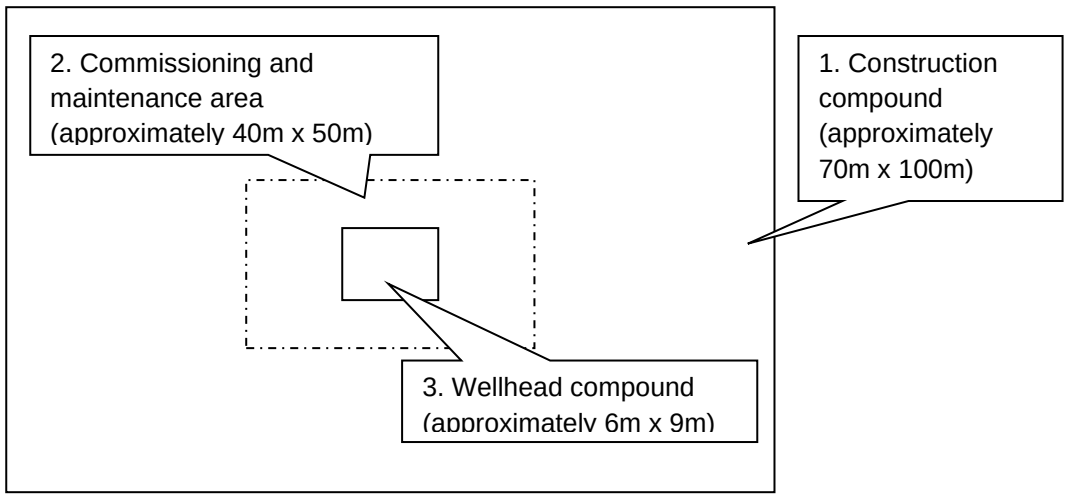
A well generally has 4 main stages in its life which are outlined below:

1. Drilling (construction, includes civil construction);
2. Commissioning (includes initial rehabilitation of the surplus construction area);
3. Production (operation and maintenance);
4. Well decommissioning and final rehabilitation.

A fenced construction compound is established for the drilling of the well. Once the well has been drilled and completed, the surplus construction area is rehabilitated, and a well commissioning area is retained.

When the construction compound has been fully rehabilitated and the well has reached a steady state of production, the fenced construction area is typically reduced either to a fenced commissioning area or to the wellhead compound for the operational phase of the well. The commissioning area is also used as required for periodic maintenance. These stages are illustrated in **Figure 2**.

Figure 2 Typical Well Footprint



3.3.1. Construction of Well Sites

Note: AGL has no current plans to undertake any further drilling, however, the process to construct a new well site location and drill a well are described for completeness.

The following activities are typically associated with the construction phase of the wells.

Construction and Preparation of Well Surface Locations

The preparation of the compound and construction works generally involves the following activities:

- Install silt fences and other environmental controls as required;
- Installation of approved road opening to property where necessary;
- Upgrade or installation of private access roads;
- Removal of topsoil over access ways and storage for rehabilitation;
- Truck in hard surface (typically shale) for access road base;
- Install drain culverts, cattle grids, fencing, gates, bed level crossing and other road works as necessary;
- Earthworks as required on a site-specific basis;
- Construct drilling compound and fence the perimeter as required by Health, Safety and Environment, and other requirements;
- Strip topsoil and stockpile, then cut and fill if required for a level drill pad area. This construction generally includes an up-slope diversion drain around the site to manage excessive surface flow. (The profile is returned as near as possible to the original profile during initial rehabilitation);
- Truck in hard surface (typically shale) for drill pad;
- Create a cut-back, flat operating area where wells are constructed on slopes. This construction generally includes an up-slope diversion drain around the site to manage excessive surface flow. The profile is returned (as near as possible) to the original profile during rehabilitation; and
- Rehabilitation of the surplus construction area when construction complete.

Access Roads

Access to well surface locations is typically along existing public roads and private access roads within the relevant property boundary. Earthworks may be required to construct or upgrade private access roads to new well surface locations to enable the drilling rig and support equipment access to the sites. Where practicable, existing private road access is used to minimise construction activity and environmental disturbance.

All private access roads used during operations are returned to their pre-operations state, or to a condition agreed by the landholder.

Drilling Activities

A variety of technologies are available for the drilling of wells are detailed below.

1. Under-balanced Vertical Drilling: The pressure of the overlying strata exceeds the pressure of the drilling fluid. Drilling penetration rates are maximised through the shallow, abrasive, medium hardness sands. Equipment required involves a drill rig equipped with air compressors and booster packages that provide the energy for the percussion air hammer to drive the drill bit and for fluid circulation. The drilling action employed uses a percussion air hammer, button bit and drill collars to provide the impact to break up formations. Under-balanced drilling also requires a lined drill pit or pits to capture the drill cuttings and produced water from the drilled formations.
2. Overbalanced Vertical Drilling: The pressure of drilling fluid exceeds the pressure of the overlying strata. Future use allows the drilling of wells where land access constraints or environmental features limit the use of drill pits. Apart from the drill rig, equipment focus is on drill fluid circulation and solid control systems. The drilling relies on applied weight on bit and rotation to penetrate and remove the formations. Weight is provided by running drill collars (heavy joints of pipe) behind the bit with rotation and torque provided by the rig's top drive or a downhole motor.
3. Directional Drilling: Has the advantage that bottom hole locations can be typically located up to some 400 m away from the surface location (depending on the vertical depth of the coal seam). Therefore, wells can be drilled into areas that are constrained for vertical well construction. In addition, multiple wells can be drilled from a single location and gas reserves that are potentially sterilised by surface

developments can be accessed from outside of the developed areas. The drilling of these wells requires similar surface equipment to the overbalanced drilling technique. Directional equipment and a steerable mud motor are added to the downhole equipment to allow control of the drilling angle and direction.

4. Horizontal Drilling / Surface to In-Seam (**SIS**): Horizontal wells are used to increase the drainage area of a reservoir and provide a means of stimulating the reservoir through the drilling process. The well is drilled vertically from the surface and gradually builds angle to intersect the seam near parallel with the seam dip angle. Once intersected, this portion of the well bore is cased, cemented and a smaller hole is subsequently drilled through the seam anywhere from about 1300 m to 2500m. It allows a significant reduction in the number of surface locations along with the ability to access previously sterilised gas reserves. This technique requires continuous drilling, and the drilling operation must therefore be conducted 24 hours a day, 7 days a week.

Hydraulic Fracturing

Wells to be fracture stimulated first require perforation of the steel casing to connect the wellbore and the coal seam(s). Once it has been completed, the fracture stimulation operation can then proceed. Hydraulic fracturing involves the injection of a slurry of sand and water at high pressure. This process stimulates the reservoir by providing a highly conductive flow path for gas and water that extends away from the wellbore and into the seam. The sand is locked in place by the pressure of the coal formation and the injected water and formation water can flow back out. As a result of the water production, the reservoir pressure is reduced at which time gas then begins to desorb from the coal and produce to the wellbore. The well then requires maintenance to clean the wellbore and to install the wellhead equipment.

Drilling and Hydraulic Fracturing Water Management

Drilling water is delivered either from previous drilling campaigns, from licensed stand-pipes or from other approved sources in the local area. For over-balanced, directional and horizontal wells, water and drilling mud is used in the construction of the well. The volume of water required for the drilling process varies depending on the type of drilling. Drilling mud and water is pumped from the well following construction and stored in tanks prior to disposal to a licensed facility.

Hydraulic fracturing water is delivered from licensed stand-pipes or other approved sources in the local area.

The volume required for hydraulic fracturing of a well is in the order of 250 to 500 kilolitres (kL) depending on the job design and geological parameters.

Following hydraulic fracturing (where required), the hydraulic fracturing flow back waters are removed from the coal seam and transported to licensed disposal facilities.

Dewatering pumps and associated equipment are used in approximately 15% of wells to remove the injected hydraulic fracturing flow back water and the formation water, which reduces reservoir pressure and allows gas desorption of the coal seam methane wells. Wells not requiring a dewatering pump are referred to as free flowing. This means that the reservoir pressure within the coal seam combined with a velocity string installed in the well, produce the fracture stimulation and formation water without the assistance of a downhole pump.

Drill Cuttings Management

Drill cuttings are collected and stored in holding tanks. The drill cuttings normally contain sandstone and coal.

The following options are available to manage the drill cuttings:

1. Drill cuttings are stored in tanks at the wellhead (usually used when drilling overbalanced). These tanks are used for recycle management and surge capacity. Drill cuttings are disposed of offsite at an appropriate licensed recycling facility.
2. Coal fines are captured by diverting these solids to a separate storage area where any excess water can drain into the pit (used in SIS drilling which produces a larger amount of coal material than other drilling types due to the length of the well drilled in coal). Coal fines are stored, transported from the site and disposed of offsite at an appropriate licensed recycling facility.

Redrilling & Refracture Stimulation

There may be instances where existing wells need to be redrilled or refracture stimulated for a variety of operational, geological or production reasons in accordance with the relevant development consent. The conditions generally require a refracture stimulation or redrilling management plan to be produced on a case by case basis to the satisfaction of the Director General (of DP&E) in consultation with the DPI&E-MEG.

Well Construction – Summary of Potential Environmental Issues

Table 3:1 provides a general summary of the potential environmental issues at the well construction stage of the project and shows the location of management measures within the EMS. Individual construction sites may also have other site-specific issues and these items will be managed in addition to those listed below

Table 3:1 Summary of Potential Environmental Issues for Well Construction

Potential Environmental issues for Well Construction	Refer to Sub Plan
Noise emissions	Noise Management Sub Plan
Cultural heritage	Aboriginal Cultural Heritage Management Sub Plan and European Heritage Management Sub Plan
Flora and fauna issues	Flora and Fauna Management Sub Plan
Erosion, sedimentation and water issues	Soil and Water Management Sub Plan
Groundwater	Groundwater Management Plan
Dust emissions	Air Quality Management Sub Plan
Waste generation/disposal	Waste Management Sub Plan
Community issues	Section 5.3.2 of Environmental Management Plan
Rehabilitation	Rehabilitation and Landscape Management Sub Plan
Emergency / Pollution incident	Emergency Response Plan and Pollution Incident Response Management Plan
Traffic	Traffic Management Sub Plan
Spill / Hazardous Materials	Dangerous Goods and Hazardous Materials Sub Plan

3.3.2. Production/Operation of Well Sites

The following activities are associated with the production / operational phase of a typical well surface location.

Surface Production Facility

The surface production facility is located within the wellhead compound and consists of the wellhead, variable choke, water/gas separator and the flow measuring instrumentation. The instrumentation has telemetry which transmits the critical well information to the gas plant control room which controls all wells remotely to ensure the safety and control of wells.

The surface production facility is typically enclosed in a fenced compound. An area surrounding the surface production facility is required periodically for maintenance, usually up to once every 5 years. Variations to this may be required subject to site constraints, new technical information or to fit with future land uses. Screening is generally provided where appropriate, using vegetation sourced from the local area including native trees endemic to the local area.

Enclosed well heads are typically used where appropriate on a site by site basis dependent upon the surrounding land uses, the need for acoustic attenuation or based on other operational issues.

Production Testing

Production testing of the CSG resource is undertaken for all new wells, involving the following program of works:

- Production testing of the well to ascertain the quantities of gas that will flow from the well; and
- Daily checks of gas flow rates and the well site equipment are carried out at each well surface location.

Production and Metering of Gas

During the production phase, gas is transported via low pressure pipeline to the RPGP for compression and sale. Operator involvement at the well surface location is minimised by the installation of various automated and remotely operated functions.

Telemetry is connected to all wells so the production data can be accessed and reviewed from the RPGP. The wells have numerous alarms and automatic shutdown functions which are based on a 'Cause and Effect' design. Any well can be shut-in or opened remotely from the gas plant control room once the wellhead communication equipment has been installed. Operational activities at each well surface location typically include:

- Routine daily/weekly inspections;
- Produced water collection and disposal; and
- Well workover maintenance.

Dewatering and Metering of Produced Water

During the early stages of commissioning and operation of gas wells, there is dewatering of the targeted coal seam. As part of increased water management activities across the CGP field, the bore licences require records to be maintained for all groundwater pumped/transported from all well sites. Operational activities at each well location typically include:

- Minimum of fortnightly/monthly inspections of separators, pipework, and water storage tanks;
- Monthly inspection of meters and recording of meter readings /pumped volumes;
- Collection and disposal of produced water from tanks; and
- Recording of trucked volumes (and reconciliation with metered volumes).

Maintenance of Well Sites

During the production or operational phase, the wells require an occasional 'workover' to maintain the efficiency of gas production. The workover typically involves a workover rig to run or remove a pipe for clearing the well bore of fill or obstructions. Workover activities are undertaken on a case by case basis as needed at individual wells, typically when a production issue has been identified. The typical maintenance regime is once in the first year of operation and then up to once every 5 years during the life of the well, although there are wells that have not yet needed maintenance. Workovers generally require a team of up to ten personnel and typically vary from between one day and one week.

Table 3:2 Summary of Potential Environmental Issues for Production/Operation of Well Sites

Potential Environmental issues for Production/ Operation of Well Sites	Refer to Sub Plan
Erosion and water issues	Soil and Water Management Sub Plan
Groundwater	Groundwater Management Plan
Waste generation/disposal	Waste Management Sub Plan
Noise issues	Noise Management Sub Plan
Emergency / pollution incident	Emergency Response Plan and Pollution Incident Response Management Plan
Community	Section 5.3.2 of EMP
Discharges to air	Air Quality Management Sub Plan
Spill / Hazardous Materials	Dangerous Goods and Hazardous Materials Sub Plan

3.3.3. Rehabilitation of Well Sites

Rehabilitation is generally undertaken in two stages; initial rehabilitation of surplus construction area following the commencement of gas production, and closure and final rehabilitation following well decommissioning. On completion of operations, all areas will be cleaned up and rehabilitated to return the land to pre-existing use and condition, or better, as agreed with the landholder.

Initial rehabilitation work involves:

- Emptying pit of water and backfill;
- Reshape the land if required (cut and fill works);
- Spread topsoil;
- Revegetation by spreading seed or planting native trees; and
- Remove compound fence and sediment controls

Final rehabilitation work involves:

- Sealing/ plugging and abandonment of wells in accordance with the NSW Code of Practice for Coal Seam Gas Well Integrity and the PPL conditions;
- Removing plant and equipment from wellheads and removal of fenced compounds;
- Filling in excavation; and
- Rehabilitation, contouring, and revegetation.

If wells are installed in an area which may impact on future mining, unless otherwise agreed, AGL is required by the DPI&E-MEG as part of its title conditions to remove the steel pipe/ casing from the coal seam so as not to impact on future mining operations, and to log the location of the well. These activities are undertaken during the closure and rehabilitation phase of the project.

*Table 3**Error! No text of specified style in document.**:3 Summary of Potential Environmental Issues for Rehabilitation of Well Sites*

Potential Environmental Issues	Refer to Sub Plan
Potential Environmental Issues - Initial Rehabilitation of Well Sites	
Waste generation/disposal	Waste Management Sub Plan
Erosion and sedimentation and water issues	Soil and Water Management Sub Plan
Rehabilitation	Rehabilitation and Landscape Management Sub Plan
Emergency / pollution incident	Emergency Response Plan and Pollution Incident Response Management Plan
Dust emissions	Air Quality Management Sub Plan
Potential Environmental Issues - Final Rehabilitation of Well Sites	
Community issues	Section 5.3.2 of Environmental Management Plan
Erosion and sedimentation and water issues	Soil and Water Management Sub Plan
Groundwater	Groundwater Management Plan
Dust emissions	Air Quality Management Sub Plan
Noise emissions	Noise Management Sub Plan
Waste generation/disposal	Waste Management Sub Plan
Rehabilitation	Rehabilitation and Landscape Management Sub Plan
Emergency / pollution incident	Emergency Response Plan and Pollution Incident Response Management Plan

3.4. Gas Gathering System

The gas gathering system route is designed, constructed and operated in accordance with the requirements of Australian Standard AS 4645.3:2008 Gas Distribution Networks – Plastic pipe systems. The gas gathering system is generally buried to a minimum depth of 750 mm and up to 1,200 mm in some areas, including unsealed and sealed road crossings, and creek and drainage line crossings.

3.4.1. Construction of the gas Gathering System

The construction of the gas gathering lines typically involves the following works:

- Survey of pipeline route;
- Clear and grade ‘Right of Way’ pipeline route including stripping of topsoil (where required);
- Stringing of pipe;
- Welding of pipe;
- Trenching including underboring where necessary;
- Lowering-in of pipe strings (including trench preparation and padding);
- Installation of tracer lines (for pipe tracing) as polyethylene (**PE**) pipe is non-conductive;
- Installation of gas marker tape above PE gas pipe;
- Backfilling and compaction of trench;
- Pressure testing of pipeline;
- Rehabilitation of ground along pipeline route;

- Installation of gas line signposts to mark and identify pipeline location;
- Registration of gas gathering line on 'Dial Before You Dig'; and
- Updating of the 'Camden Gathering Lines' map to include additional new gathering lines installed.

Low water traps are installed in low lying areas of the gathering system to allow removal of water that may collect to ensure efficiency of the gathering system and these are emptied as required. Ancillary water transfer systems have been co-located in the gas gathering line trenches and installed simultaneously where required.

Table 3:4 Summary of Potential Environmental Issues for Construction of Gas Gathering Lines

Gas Gathering Line Construction - Potential Environmental Issues	Refer to Sub Plan
Flora and fauna issues	Flora and Fauna Management Sub Plan
Erosion and sedimentation and water issues	Soil and Water Management Sub Plan
Dust emissions	Air Quality Management Sub Plan
Noise emissions	Noise Management Sub Plan
Cultural heritage	Aboriginal Cultural Heritage Management Sub Plan and European Heritage Management Sub Plan
Rehabilitation	Rehabilitation and Landscape Management Sub Plan
Community issues	Section 5.3.2of Environmental Management Plan
Waste generation/disposal	Waste Management Sub Plan
Emergency / pollution incident	Emergency Response Plan and Pollution Incident Response Management Plan
Traffic	Traffic Management Sub Plan

3.4.2. Operation/Maintenance of the Gas Gathering System

The gas gathering route is inspected annually by a specialist third party Gas Detection inspection service that performs a leakage survey of the below ground pipelines. The survey is conducted at 1 part per million (PPM) sensitivity for gases, in compliance with EPL 12003 Condition M7.2 and M7.3. The results of this annual leak detection survey are included in the annual Leak Detection and Repair Program Summary Report, which is submitted to the EPA in compliance with EPL 12003 Condition R4.2.

3.4.3. Final Rehabilitation of the Gas Gathering System

The preferred method of final rehabilitation for the gas gathering system is to purge with air or water to remove remaining gas, seal the pipes and then leave the valuable infrastructure in position for future beneficial use and to prevent any further environmental disturbance. This method would be subject to consultation with the land owner and should removal of the gas gathering system be required, the excavated trench would be backfilled and rehabilitated, including contouring and revegetating as has been outlined for the construction of the gathering system.

3.5. Rosalind Park Gas Plant

At the RPGP, the gas is pressurised to meet customer and pipeline requirements. The compressors run on gas delivered from the Project's gathering system. The RPGP operates 24 hours a day, seven days a week, except for shutdowns during planned maintenance, or in instances of equipment failure. In the case of planned maintenance, gas flows would be reduced in advance of the planned shutdown by reducing or stopping gas flow at the wellheads to accommodate for the throughput of the gas plant. Any excess gas is

burned in a flare at the RPGP site, to maintain safety and integrity of the RPGP, reduce visual impact and to reduce greenhouse gas impacts.

CSG contains water vapour which must be removed prior to the gas entering the sales line. A dehydration unit is used to do this, which uses a contactor column containing tri-ethylene glycol (TEG). The “wet” gas enters at the bottom of the column, where it comes into contact with the downward-moving glycol. The glycol absorbs the water from the gas. The gas, water and glycol are then separated, and the glycol is recycled back in a continuous process. Water vapour is discharged through a vent, and the gas is metered and piped for delivery to the customer.

Before the gas leaves the RPGP, a small amount of odorising agent is added, which gives the gas its characteristic smell and enables any downstream leaks to be immediately detected. Tertiary butyl mercaptan odorant is used for this purpose.

The RPGP delivers gas directly into the high-pressure Moomba to Sydney gas pipeline via a high-pressure pipeline under Pipeline Licence No. 30.

The RPGP is inspected annually by a specialist third party Gas Detection inspection service that performs a leakage survey of all infrastructure. The survey is conducted at 1 PPM sensitivity for gases, in compliance with EPL 12003 Condition M7.2 and M7.3. The results of this annual leak detection survey are included in the annual Leak Detection and Repair Program Summary Report, which is submitted to the EPA in compliance with EPL 12003 Condition R4.2.

Table 3:5 Summary of Potential Environmental Issues at Rosalind Park Gas Plant

Rosalind Park Gas Plant Operations - Potential Environmental Issues	Refer to Sub Plan
Air emissions	Air Quality Management Sub Plan
Noise emissions	Noise Management Sub Plan
Water issues	Soil and Water Management Sub Plan
Visual impact	Rehabilitation and Landscape Management Sub Plan
Waste generation/disposal	Waste Management Sub Plan
Chemical handling	Hazardous Materials and Dangerous Goods Sub Plan
Emergency / pollution incident	Emergency Response Plan and Pollution Incident Response Management Plan

3.6. Gas Sales Pipeline

The Gas Sales Pipeline (GSP) commences at the RPGP metering skid and runs approximately 545 m to the Menangle Creek Receipt Point on the Wilton to Horsley Licence 1 Pipeline. The GSP was commissioned in December 2004 pursuant to Pipeline Licence No 30 under the NSW Pipelines Act 1967.

The GSP was designed, constructed, tested, and is operated in accordance with the requirements of Australian Standard 2885.1 and Australian Standard 2885.3. The GSP is constructed of electric resistance welded pipe of 250 mm diameter and is 100% radiographed.

From the RPGP to the Menangle Creek Receipt Point the GSP is contained within a 20-metre-wide easement.

The GSP is cathodically protected using an ethane type cathodic protection (CP) system with sacrificial silicon-iron anodes applied to mitigate corrosion. There are three CP test points, permanently fitted with miniature stray log data loggers.

A Pipeline Management System (PMS), has been prepared for the GSP (under separate cover) and considers controls for general operation/maintenance and safety, in accordance with the Pipeline Licence No. 30.

3.7. Summary of Environmental Aspects and Relevant Environmental Management Sub Plans

Environmental Sub Plans have been developed to facilitate the management of issues summarised in Table 3-6, and to satisfy the requirements of various Consent Conditions for Management Plans to be developed, implemented and reported against (refer to Section 5.7.2 of this EMP).

Each Sub Plan includes the following information:

- The objectives and targets (from the KPIs table) for the specific aspect;
- Identification of key personnel responsible for major tasks;
- A summary of relevant statutory obligations including consent conditions and other requirements;
- A description of the mitigation measures to be implemented, including site specific details;
- An outline of monitoring requirements; and
- Reference to specific records that will be maintained.

The Environmental Sub Plans are designed to be applied across the whole Project and include the general management measures for each issue and the relevant site-specific information and data to allow them to be used in different well fields to satisfy the requirements of different consents.

The issues listed in **Table 3:6** are those generally associated with the activity. Issues specific to certain sites will be captured and covered in the site design planning process.

Table 3:6 Summary of Activities and Relevant Environmental Sub Plan

Relevant Sub Plans → **Activity↓**	**Air quality Management**	**Noise Management**	**Soil and Water Management**	**Flora and Fauna Management**	**Community Management (Section 5.3.2 of EMP)**	**Rehabilitation and Landscape**	**Traffic Management**	**Aboriginal Heritage Management and European Heritage Management**	**Groundwater Management**	**Waste Management**	**Emergency Response (incl. bushfire and flood)**	**Dangerous Goods and Hazardous Materials Sub Plan**
Construction of wells												
Installation / upgrade of access roads	X		X	X	X	X	X	X			X	
Construction of drilling compound	X		X	X	X	X		X		X	X	X
Drilling activities	X	X	X		X				X	X	X	X
Fracture stimulation	X	X	X		X		X		X	X	X	X

Relevant Sub Plans → / Activity↓	Air quality Management	Noise Management	Soil and Water Management	Flora and Fauna Management	Community Management (Section 5.3.2 of EMP)	Rehabilitation and Landscape	Traffic Management	Aboriginal Heritage Management and European Heritage Management	Groundwater Management	Waste Management	Emergency Response (incl. bushfire and flood)	Dangerous Goods and Hazardous Materials Sub Plan
Construction of gas gathering system												
Trenching and pipe installation	X	X	X	X	X	X	X	X		X	X	
Backfilling and rehabilitation	X	X	X		X	X	X			X	X	
Well production / operation												
Water disposal			X						X	X	X	X
Dewatering	X								X	X	X	X
Well work over maintenance	X	X			X					X	X	
Initial well rehabilitation												
Emptying of pit water			X							X	X	X
Filling in excavation	X		X			X					X	
Rehabilitation, contouring and vegetation	X		X			X					X	
Gas gathering system and Gas Sales Pipeline operations												
Empty low water traps					X					X	X	
Gas Plant operations												
Operation of gas treatment plant	X	X	X			X				X	X	X
Final well rehabilitation												
Sealing/plugging and abandoning of wells		X			X				X	X	X	X
Filling in excavation	X	X	X		X						X	
Rehabilitation, contouring and vegetation	X	X	X		X	X					X	

4. Risk Management and Objectives and Targets.

4.1. Environmental Risk Management

4.1.1. AGL Risk Management

AGL has a risk management system that utilises the Fully Integrated Risk Management and Assessment Matrix (FIRM) and is aligned with the risk management standards and methodologies recommended by the Australian and New Zealand Risk Management Standard AS/NZS 31000:2009. Environmental risk assessment is undertaken in accordance with the AGL FIRM and HSEMS Risk Management Standard (AGL-HSE-STD-004.1) and Standard Methodology (AGL-HSE-SDM-004.1).

4.1.2. CGP Risk Register

The CGP project risk register shall incorporate environmental risks and shall be developed, updated and reviewed by the CGP Operations Superintendent or nominee. The CGP Environment Business Partner or nominee shall participate in risk workshops as appropriate to identify material environmental risks associated with the CGP. The CGP Operations Superintendent shall be responsible for the identification and management of project risks which shall be recorded in the CGP risk register.

Project risks that are ranked 'High' or above require a risk treatment plan.

4.1.3. CGP Environmental Risk Register

Environmental risks are identified, and control measures identified in an environmental aspects and impacts register (referred to as the environment risk register). A CGP environment risk register has been developed for CGP activities.

Environmental risks shall be assessed using the AGL FIRM risk assessment methodology.

The Environment Business Partner shall:

- manage and maintain the CGP environmental risk register
- undertake monitoring (inspections and audits) of raw environmental risks (i.e. untreated) rated 'High' or above.
- review the CGP environmental risk register on an annual basis in consultation with relevant CGP personnel and technical specialists, as required, taking into account changes to activities, legislation, codes of practice, materials and environmental incidents.
- following update of the environment risk register, provide an updated environmental risk register to the CGP Operations Superintendent for inclusion in revisions to the Project Risk Register.

The Environment Business Partner shall present the summary of raw environmental risks (i.e. untreated) rated 'High' or above and an assessment of the implementation of control measures annually to the Operations Superintendent.

4.1.4. Operations

Project specific environmental risks are typically identified and mitigated at the following stages:

- prior to approval: an environmental assessment (EA) is completed;
- when a change is proposed: an assessment of project approval concerns and environmental impacts is undertaken;
- during works: inspections and monitoring are carried out; and
- during works: Job Safety and Environmental Analysis (JSEA), site inductions and toolbox meetings.

4.1.5. Projects

Project specific environmental risks are typically identified and mitigated prior to approval when an EA is completed.

An EA for proposed work is conducted for new activities requiring approval in accordance with the EP&A Act. An environmental assessment typically assesses each identified potential environmental effect or issue, indicating the level of likely impacts and recommends mitigation measures to reduce the extent of impacts.

The recommended mitigation measures from each EA (or REF for exploration activities) are required to be implemented as part of the environmental management under the approval.

The EA typically involves the prioritisation of issues based on the risk of potential environmental effects and likely consequences. The issues assigned a higher priority are focused on in the EA and it can also involve a hazard and risk assessment. The EA then assesses each identified potential environmental effect or issue, indicating whether the issue is considered significant and if so, recommends mitigation measures to reduce the effects and consequences. The recommended mitigation measures from each EA for the CGP are required to be implemented as part of the environmental management plans under the Development Consents, which this EMP has been prepared to implement.

Where required, a quantitative hazard and risk assessment is undertaken for the risks to both human health and the environment. A Quantitative Risk Assessment (**QRA**) was prepared for the CGP CSG wells by (Planager 2002) to determine the risk associated with a set of eight different well configurations, each with one well head within one compound with each well located at a distance of several hundred metres away from another CSG well.

Subsequent to this risk assessment, the Department of Planning and Environment (then the Department of Infrastructure, Planning and Natural Resources) prepared Locational Guidelines - Development in Vicinity of Operating Coal Seam Methane Wells (May 2004) to provide advice to consent authorities across NSW in assessing proposals for development in the vicinity of existing and future operating CSG wells. The 2002 QRA and the Locational Guidelines developed separation distances from CSG wells for various types of development.

With directional and SIS drilling techniques, the bottom hole of a well can be located away from its surface location. As a result, multiple wells (up to six) can be drilled from a single surface location to access gas reserves that are restricted or inaccessible by surface developments. Further QRAs were completed by Planager in 2007 and 2010 to assess the risk associated with a configuration of CSG producing wells where up to six wells are located within a single compound.

4.2. Objectives, Targets and Key Performance Indicators

The environmental objectives and targets developed for the CGP are summarised in **Table 4:1**. Environmental Key Performance Indicators (**KPIs**) have been set by AGL to provide AGL with information to assess environmental performance.

4.2.1. Monitoring of Environmental Targets

The targets listed in Table 4:1 shall be monitored and EMP performance reported on annually within the Annual Environmental Performance Report.

Table:4:1 Objectives, Targets and Key Performance Indicators

Aspect	Objective	Targets and KPIs
Land use	To avoid unauthorised disturbance to land use or damage to infrastructure.	Zero complaints received from landowners relating to land disturbance or infrastructure
Soils and Terrain	To minimise soil disturbance, prevent contamination and associated impacts on riparian corridors and native vegetation and promote and maintain soil stability throughout the life of the project.	Zero complaints received from landowners or government agencies concerning land disturbance, contamination or soil stability.
Noise	Construction • To comply with the construction standards for noise control. • To minimise noise during the construction phase. • Limit work activities (other than drilling where approved for 24 hours/ 7 days) to daylight hours between 7:00am and 6:00pm weekdays and between 8:00am and 1:00pm on Saturday. No work on Sundays or public holidays except in emergencies. • Best available practice noise management measures for Construction works. Operation • To comply with the operations standards for noise control. • To ensure that there are no unresolved noise related complaints from the public. • Best practice noise management measures for Production Operation works.	Zero exceedances of noise criteria. Zero non-conformances with construction hours. Zero complaints received from nearby receivers.
Air Emissions	To adequately protect air quality by: • Controlling the quality and minimising the quantity of air emissions associated with compression of the coal seam gas resource. • Minimising the quantity of vehicle exhaust emissions. • Preventing dust generation during construction, maintenance and operations and rehabilitation activities. • Ensuring that any uncontrolled air emissions are reported, and corrective actions promptly implemented.	Zero exceedances of the in-stack and ambient criteria relevant to controlled air emissions. Zero incidents or complaints received concerning uncontrolled air emissions.

Aspect	Objective	Targets and KPIs
Water Protection	To minimise negative impacts on groundwater and surface water resources.	Zero water contamination incidents from construction and operational activities. Zero incidents concerning water levels or water quality during operations.
Noxious Weeds, Pathogens and Pest Species	To prevent the introduction and dispersal of noxious weeds, pathogens and pest species.	Close out identified weed introduction issues within two weeks.
Flora	To minimise the loss of remnant native vegetation and promptly carry out rehabilitation activities. To promote, monitor and maintain regrowth of rehabilitated vegetation cover to ensure that it is consistent with the surrounding environment and to the satisfaction of the landowner.	Zero unauthorised disturbance to flora. Zero complaints received from landowners concerning native vegetation disturbance.
Fauna	To ensure habitat disturbance is avoided during construction and operational activities and to protect fauna from physical harm.	No injured fauna.
Cultural Heritage	To protect and preserve cultural heritage in the project area.	No unauthorised damage to heritage sites.
Visual Amenity	To minimise the impacts to the visual characteristics of the project area and avoid unauthorised disturbance to land use or damage to infrastructure.	Zero complaints received from residents relating to visual impacts.
Waste	To minimise waste generation and disposal through the purchasing of environmentally friendly materials and implementation of reuse and recycling initiatives and ensuring that environmental impacts relating to waste management are reported and acted upon.	Waste disposal and recycling records are accurately maintained for Environmental Footprint Report and reviewed annually for improvement opportunities and zero non-conformances concerning waste management practices.
Dangerous Goods and Hazardous Materials	To manage the purchasing, storage, transport, handling and disposal of Dangerous Goods and Hazardous Materials (including waste Dangerous Goods and Hazardous Materials) during construction, operation and maintenance activities so as to minimise risk to the environment (soil, surface water, groundwater, or atmosphere).	Zero incidents from Dangerous Goods or Hazardous Materials entering the environment or causing harm or injury to personnel.
Resource Use	To ensure the efficient use of water, electricity, fuel and gas resources.	Resource usage records are accurately maintained for Environmental Footprint Report and reviewed annually for reduction opportunities.
Public Risk	To protect the health, safety and welfare of the public during construction and operational activities.	Zero incidents or complaints concerning public safety. Zero missed landowner notifications prior to maintenance activities.

Aspect	Objective	Targets and KPIs
Emergency Response	To quickly and effectively minimise adverse environmental impacts associated with an emergency.	Minimal impacts from emergency events.
Traffic	To outline traffic management measures for construction and operation activities of the CGP, to minimise the potential traffic impacts on public roads.	Zero incidents or complaints received regarding traffic disruption.

5. Implementation and Operation

5.1. Structure and Responsibility

AGL is responsible for overall environmental management of the project through the implementation of this EMS and the leadership of the Operations Superintendent. However, all personnel and contractors are accountable through conditions of employment or contracts. Each individual is responsible for ensuring that their work complies with all regulatory requirements, AGL commitments and the appropriate procedures.

The position descriptions provided in Table 5:1 are listed in the relevant Environmental Management Sub Plans as applicable.

The positions and accountabilities are shown in Table 5:1.

Table 5:1 Organisation and Accountabilities

Position	Accountabilities
Manager, Gas Operations	Accountable for environmental performance of the CGP. Directly responsible for the management of the field development and production activities, including implementation of environmental management. Reports to the General Manager, Gas and Renewables.
Operations Superintendent	Accountable for: • authorisation of the EMP; and • implementation of this EMP. Reports to the Manager, Gas Operations.
Environment Business Partner	Accountable for: • leading and /or attending investigations of environmental incident or near misses, as required; • recognising successful achievement of the CGP environmental KPI targets; and • tracking and reporting environmental performance. Directly responsible for the overseeing the implementation of this EMP, fulfilment of commitments contained in this EMP and reporting on EMP performance to the Operations Superintendent and Senior Manager - Environment Operations. Provides advice to the workforce, through the Operations Superintendent regarding the implementation of the EMP. Coordinates the monitoring, audit program and reporting program. Responsible for organising the review of the EMP as required or annually. Reports to the Senior Manager - Environment Operations.
Field and Rehabilitation Operator	Responsible for landowner consultation and the fulfilment of all applicable commitments contained in this EMP and Sub Plans. Reports to the Operations Superintendent.
Community Relations Manager	Responsible for landowner and community consultation and notification.

Position	Accountabilities
All Contractors	Responsible for ensuring that works are undertaken in line with the EMP compliance obligations, meeting regulatory requirements, and ensuring that all environmental objectives contained in the contracts are attained.
All other Supervisors, Field Engineers and Field Operators.	Field based personnel responsible for ensuring compliance with the environmental objectives of the EMP.

5.2. Training and Competence

Employees and contractors are required to complete an induction prior to commencing work at each site to ensure that all personnel are aware of their HSE responsibilities and have the necessary knowledge and skills to fulfil them.

The inductions cover general environmental issues where applicable, including:

- Management of sensitive areas;
- Erosion control;
- Water quality;
- Air quality;
- Cultural heritage management;
- Weed, pathogen and pest species control;
- Fauna and flora preservation;
- Bushfire management;
- Traffic and access;
- Noise;
- Chemical storage and handling;
- Emergency and Spill response;
- Pollution incident response;
- Waste management; and
- Protecting the amenity of landowners.

In addition, and where required, job specific training is conducted prior to the commencement of the work activities.

It is the responsibility of the contractors to consult with AGL to prepare and implement an induction and job specific training program applicable to their work scope.

AGL HSE staff are provided with a combination of internal and external training resources to ensure they are competent in correct use of environmental field monitoring equipment (such as noise loggers and water monitoring test kits) and keep up to date with environmental legislation requirements and best practice environmental management.

All specialist environmental consultants working on the CGP have been selected based on their experience, industry certification/ accreditation, skills base, and knowledge of AGL business requirements, ensuring professional quality service is continually provided particularly in the acoustic, archaeology, ecology and air quality areas.

5.3. Internal and External Communication

5.3.1. Key Communication Requirements

The key communication requirements are summarised in Table 5:2.

Table 5:2 Key Communication Requirements

Key Communication Requirement	Condition / Licence No.
Prior to the commencement of activities, AGL must make efforts to provide notice of disturbing activities, in particular drilling operations, to immediate neighbours.	DA 183-8-2004-i: SoC 50
Notification of activities prior to the commencement of activities on each site. For notification requirements of adjoining landowners where relevant see the Noise Management Sub Plan (**Appendix D**)	PPL 1, 2, 4, 5 and 6: 8 (Sch A)
Prior to planned works (including maintenance) notification shall be given to potentially affected residences and identified sensitive noise receivers at least 14 days prior to work commencing.	DA 9-1-2005: 38 (Sch 2) DA 246-8-2002i: 7 (Sch 3) PA 06_0291: 24 (Sch 3)
Prior to proposed redrilling/refraccing work notification shall be given to potentially affected residences and other noise sensitive receivers at least 14 days prior to work commencing.	DA 282-6-2003i: 45 (Sch 3)
Prior to undertaking work involving the redrilling and/or re-fraccing of wells AGL shall request approval from the DP&E.	PA 06_0138: 16 (Sch 3) PA06_0137: 14 (Sch 3) PA 06_0291: 25 (Sch 3) DA 15-1-2002: 9 (Sch 3) DA 246-8-2002i: 5 (Sch 3)
A Community Consultative Committee to oversee the environmental performance of the development shall be established. Regular information is to be provided on the environmental performance and management with the minutes to be available for public inspection at Camden Council, Campbelltown City Council and Wollondilly Shire Council and copies to DP&E and DPI&E-MEG.	DA 15-1-2002i: 90 - 92 (Sch 3) DA 246-8-2002-i: 31 (Sch 3) DA 282-6-2003-i: 17 - 18 (Sch 5) DA 171-7-2005: 11 (Sch 4) DA 75-4-2005: 61 (Sch 2) PA 06_0137: 8 (Sch 4) PA 06_0138: 8 (Sch 4) PA 06_0291: 8 (Sch 4)
Copy of the Environmental Management Plan to be provided to EPA, DPI&E-MEG, DPI Water, Campbelltown Council, Wollondilly Council and Camden Council.	DA 15-1-2002i: 17 (Sch 3) DA 282-6-2003-i: 3 (Sch 5) DA 183-8-2004-i: 22 (Sch 2)
The Geographical Positioning System (**GPS**) co-ordinates and digital survey data for gas well sites and gas gathering systems and the wellhead configurations is to be provided to Camden, Campbelltown and Wollondilly Councils within their respective Local Government Area.	DA 282-6-2003-i: 15 - 17 (Sch 3) DA 183-8-2004-i: 6 - 8 (Sch 2) DA 9-1-2005: 7 - 9 (Sch 2) DA 75-4-2005: 13 -15 (Sch 2) DA 171-7-2005: 18-20 (Sch 2) PA 06_137: 8 (Sch 2) & SoC 2 & 3 PA 06_138: 8 (Sch 2) & SoC 2 & 3 PA 06_291: 13 (Sch 2) & SoC 2 & 3

Key Communication Requirement	Condition / Licence No.
During the life of the project copies of the following documents and information (and any subsequent revisions) are to be placed on website: (a) all current environmental management plans, strategies and programs; (b) all Independent Environmental Audits; (c) all AEPRs; (d) environmental monitoring data required under EPL 12003 within 14 days of receipt; (e) a copy of the PIRMP; and (f) a summary of all environmental monitoring results Plans (a) – (c) are also to be given to relevant agencies and CCC.	PA 06_137: 9 (Sch 4) PA 06_138: 9 (Sch 4) PA 06_291: 9 - 10 (Sch 4) EPL 12003
AGL must keep a legible record of all complaints made in relation to pollution arising from any activity to which the EPL applies.	EPL 12003: M5.1 to M5.4 DA 15-1-2002i: 29 (Sch 3), Dot point 4 (Sch 4) (addressed in EPL 12003 condition M5.1 to M5.4) DA 75-4-2005: 59 (Sch 2) DA 171-7-2005: 9 (Sch 4) DA 282-6-2003-i: 19 (Sch 5) DA 246-8-2002-i: 15 (Sch 3)
A telephone complaints line must operate for the purposes of receiving any complaints in relation to activities at the premises or by vehicle or mobile plant.	EPL 12003: M6.1 to M6.3 DA 75-4-2005: 60 (Sch 2) DA 171-7-2005: 10 (Sch 4) DA 15-1-2002i: Dot point 5 (Sch 4) (addressed in EPL 12003 condition M6.1 to M6.3)
A Community Awareness Protocol to be prepared and activated if a leak of mercaptan odorant occurs from the Gas Treatment Plant and/or associated facilities to advise nearby residents and appropriate authorities. (See Emergency Response Plan in Appendix N).	DA 282-6-2003-i: 20 (Sch 5)
AGL to consult with the RMS prior to under-boring: (a) the South Western (F5) Freeway; (b) any road in the vicinity of the Jim Affleck Bridge; and (c) the proposed link road between Menangle Road and the F5; including obtaining the RMS's requirements for construction and undertaking the works to the RMS's satisfaction.	PA 06_0291 :23 & 23B (Sch 3)
AGL to consult with the Australian Rail and Track Corporation (**ARTC**) prior to under-boring the Main Southern Railway Line, including submission of detailed design plans and obtaining ARTC's requirements for construction.	PA 06_0291:23A (Sch 3)
AGL to consult with the Sydney Catchment Authority (**SCA**) prior to under-boring of the Upper Canal, including conducting monitoring to the satisfaction of the SCA.	PA 06_0291:9A (Sch 3)

Key Communication Requirement	Condition / Licence No.
AGL to consult with the Botanic Gardens Trust prior to under-boring within the Australian Botanic Garden, Mount Annan, taking into consideration the "Guidelines for developments adjoining land and water managed by the DECCW [now OEH]"(OEH 2010)	PA 06_0291:23C (Sch 3)

5.3.2. External Communication

AGL has an extensive external communication program to proactively communicate with the community, local councils and regulatory authorities.

Community

AGL pro-actively engages the community, in order to keep landowners, neighbours, residents, local councils and relevant Government agencies informed of the CGP and ensure that the interests of the community are addressed. AGL has raised awareness of its activities and created a strong relationship with the community through a range of community engagement initiatives which include:

- Regular and ongoing consultation with landholders;
- Numerous site tours and Community Open Days;
- Distribution of newsletters and other community consultation material;
- Operation of a project website (www.agl.com.au/camdengasproject);
- Operation of an emergency hotline; and
- Ongoing operation of the Community Consultation Committee.

Significant consultation takes place in person directly with each landowner. This ensures that their interests can be quickly understood and specifically addressed.

Telephone contact details are provided to surrounding residences during work and displayed at each well in the event that members of the public have further questions or issues regarding the project.

A Community Notification Protocol is included in the Pollution Incident Response Management Plan to advise nearby residents in the event that an incident occurs which causes actual or potential material harm to the environment.

The Community Consultation Committee (CCC) was formed in early 2003 from the base of a community advisory panel formed under the Petroleum Assessment Lease in 2001. The CCC is a forum to oversee the environmental performance of the CGP. The committee meets four times per year, with meetings held more often if necessary and consists of:

- An independent Chairperson;
- A representative of Camden Council;
- A representative of Campbelltown City Council;
- A representative of Wollondilly Shire Council;
- Four Community Members;
- Two representatives of Local Environment groups; and
- Two representatives of AGL.

Minutes of the CCC are maintained by AGL and forwarded to the CCC participants which includes the local councils and government agencies. Minutes are also uploaded to the project website www.agl.com.au/camdengasproject.

Councils

The CGP is within the Campbelltown, Camden and Wollondilly local council areas. AGL communicates with Council representatives through the CCC (refer above), through consultation on new development areas of the Project, by providing update briefings to senior Council staff and copies of the Annual Environmental Performance Reports and Independent Audits. There is also communication with Council staff in relation to ongoing operations with appropriate staff members on issues such as roads.

Regulatory authorities

AGL reports to the various regulatory authorities as required by its Consent and Title conditions, Environment Protection Licence (refer Section 5.4 for details on reporting requirements), and Water Licences (refer Section 5.4 for details on reporting requirements).

In addition, AGL communicates with staff of the DPI&E, DPI&E-MEG, EPA, and DPI Water through regular update meetings and informal discussions on an ongoing basis throughout the year.

Incident (Material Harm) Notification

In the event of an actual or potential incident of material harm to the environment, the Camden Environment Business Partner and/or the Camden Operations Superintendent will notify the relevant stakeholders as per the PIRMP. The relevant stakeholders include fire bridge (in the event of fire), EPA, NSW Ministry of Health (Camperdown), Camden Council, Campbelltown City Council, Wollondilly Shire Council and SafeWork NSW.

5.3.3. Internal Communication

AGL communicates internally through the following forums:

- Daily Tool Box Meetings;
- Daily Visual Board Meetings; and
- Monthly HSE meetings where field personnel meet to discuss site level issues including environmental issues

5.3.4. Complaints Management

Complaints can be received through the following channels:

- By telephone to the general office number, to the Community Relations Manager's number, on the contact numbers provided in newsletters and upcoming work notifications, or via the emergency hotline number provided on all gas gathering marker signs and well sites;
- Through the Project website www.agl.com.au/camdengasproject , via email AGLCommunity@agl.com.au or phone; and
- Directly to personnel on site.

Complaints are recorded and may also be listed on the incident management database (refer Section 6.5) if it relates to an incident.

5.4. Reporting

AGL has a number of environmental reporting requirements specified by its Conditions of Consent, Licences and other approvals and internal practices. A summary of the ongoing reporting requirements is provided in **Table 5:3**. Other one-off reporting requirements are tracked using the CMO system.

AEPRs are prepared to meet the requirements of the DPI&E and fulfil the requirement of the DPI&E-MEG for an Annual Environmental Management Report and are submitted to both the Director General of the DPI&E and the Deputy Director General of the DPI&E-MEG.

In addition, AGL fulfils its internal reporting requirements relating to the reporting of incidents and non-conformances as required (discussed in **Section 6.5**).

Table 5:3 Key Environmental Reporting Requirements

Key Reporting Requirement	To Who	Condition / Licence No.	Reporting Period	Responsibility	Timing
Prepare and submit Annual Environmental Performance Report (**AEPR**)	Director General of DPI&E Copies to: EPA, DPI&E-MEG, Camden, Campbelltown, Wollondilly Councils and publicly available.	DA 15-1-2002i: 34 – 36 (Sch 3) DA 246-8-2002-i: 16 (Sch 3) DA 282-6-2003-i: 5, 7 (Sch 5) DA 183-8-2004-i: 24 (Sch 2) DA 9-1-2005: 42 (Sch 2) DA 171-7-2005: 4 (Sch 4) DA 75-4-2005: 54 – 56 (Sch 2) PA 06_0137: 3, 4 (Sch 4) & SoC 20 PA 06_0138: 3, 4 (Sch 4) & SoC 23 PA 06_0291: 3, 4 (Sch 4)	Financial year	Environment Business Partner	Annually Financial year
Prepare and submit Annual Environmental Management Report (submitted by AGL as the AEPR above)	DPI&E-MEG	PPL 1, 2, 4, 5, 6: 3 (Sch A)	Financial year	Environment Business Partner	Annually Financial year

Key Reporting Requirement	To Who	Condition / Licence No.	Reporting Period	Responsibility	Timing
Prepare and submit Annual Return at the end of each reporting period. The Annual Return must include a: - Noise compliance monitoring report; - Leak Detection and Repair Program summary report; - Groundwater Monitoring Report; and - Updated spatial information.	EPA	DA 15-1-2002-i: 33 (Sch 3), 6 (Sch 4) DA 282-6-2003-i: 40 (Sch 4), 16 (Sch 5) DA 171-7-2005: 3 (Sch 4) DA 75-4-2005: 53 (Sch 2) EPL 12003: R1.1 to R4.6	22 December to 21 December	Environment Business Partner	Annually Submit Annual Return within 60 days of reporting period.
Commission and submit an Independent Environmental Audit – Operation	DPI&E EPA DPI&E-MEG	DA 15-1-2002-i: 37 (Sch 3) DA 246-8-2002-i: 17 (Sch 3) DA 282-6-2003-i: 10, 11 (Sch 5) DA 183-8-2004-i: 25 (Sch 2) DA 9-1-2005: 44 (Sch 2) DA 171-7-2005: 7 (Sch 4) DA 75-4-2005: 58 (Sch 2)	Bi-annually for two financial years	Environment Business Partner	Every two years Submit within 2 months of commissioning the audit
Commission and submit an Independent Environmental Audit – Operation	DPI&E EPA DPI&E-MEG	PA 06_0137: 5, 6 (Sch 4), SoC 21 & 22 PA 06_0138: 5, 6 (Sch 4), SoC 24 & 25 PA 06_0291: 5, 6 (Sch 4)	Tri-annually for three financial years	Environment Business Partner	Every three years Submit within 3 months of completing the audit
Hazard Audit	DPI&E	DA 282-6-2003-i: 95 (Sch 4) DA 9-1-2005: 34, 35 (Sch 2) DA 75-4-2005: 31 (Sch 2)	Submit to DG within one month of completing the audit.	Health and Safety Business Partner	Every three years

Key Reporting Requirement	To Who	Condition / Licence No.	Reporting Period	Responsibility	Timing
Independent Audit - Vegetation and Landscape Management Plan / Landscape Planting Plan	DPI&E Site owner	DA 282-6-2003-i: 18, 19B (Sch 4)	Bi-annually for two financial years	Environment Business Partner	Every two financial years
National Pollution Inventory Report	EPA	Protection of the Environment Operations (General) Regulation 1998, Clause 57	Submit by 30 September each year	Environment Business Partner	Annually Financial year
Publish all EPL monitoring data on the AGL website within 14 days of obtaining it.	AGL Website	Section 66(6) of the Protection of the Environment Operations (POEO) Act EPL 12003	Various reporting periods	Environment Business Partner	Within 14 days of obtaining monitoring data.
Report immediately any incidents that cause or have the potential to cause material harm to the environment (refer to PIRMP and EPL).	DG of DPI&E, and EPA Deputy DG of DPI&E-MEG EPA, Ministry for Health, SafeWork NSW, local council, Fire and Rescue, Community	DA 15-1-2001-I: 27 DA 246-8-2002-i: 13 (Sch 3) DA 282-6-2003-i: 94 (Sch 4) Part 5.7 of the Protection of the Environment Operations (POEO) Act EPL 12003: R2 PPL 1, 2, 4, 5, 6: 4 (Sch A)		Environment Business Partner	Immediately
Report any exceedance of goals / limits / performance criteria in approval within 7 days	DG of DPI&E and any relevant authorities	PA 06_0137: 2 (Sch 4) PA 06_0138: 2 (Sch 4) PA 06_0291: 2 (sch 4)		Environment Business Partner	Within seven days

Key Reporting Requirement	To Who	Condition / Licence No.	Reporting Period	Responsibility	Timing
Annual AGL Sustainability Report which includes sections on environmental management, greenhouse, greenhouse footprint and community performance	Publicly available	Internal requirement	Financial year	Environment Business Partner	Annually

5.5. Document Control

Documents prepared for the CGP will be prepared in accordance with the Gas Operations Document Control Procedure and Document Management Methodology (AGL_HSE_SDM_005).

The procedure was developed to ensure that only current, relevant documents are available where essential and that accurate document control is performed. Under this procedure, documents must be authorised and include the correct issue number, revision of work instructions, specifications, procedures and other key documents and data.

5.6. Technical Assistance

The Executive and HSE Reporting Sign-off Procedure provides the process for management of Environment reports that are required to be submitted annually to relevant regulatory authorities, in accordance with legislative requirements and other requirements prescribed by regulatory licenses held by AGL.

The Annual Return for EPL 12003 must be reviewed by an independent third party prior to sign-off by AGL's Company Secretary and Director and submission to the EPA.

5.7. Operational Controls

5.7.1. General Operating Principles

AGL endeavours to minimise the environmental impact of its activities. The following general operating principles are implemented as part of the CGP:

- Locations for wells, access roads and gas gathering lines are chosen to avoid areas of significant vegetation and heritage items, with infrastructure usually placed in areas that are already cleared and degraded in consultation with the landowner;
- Wells and gas gathering lines are sited on the periphery of the land and along existing tracks and road verges to fit as much as possible with the primary land use.
- Operations are managed in ongoing consultation with the landowner.

5.7.2. EMP Environmental Management Sub Plans

Specific sub plans have been developed to facilitate the management of issues identified in Table 3-6 which summarises activities by Sub Plan and to satisfy the requirements of various Consent Conditions for Management Plans to be developed, implemented and reported against (Table 2-3).

These Sub Plans are designed to be applied across the whole Project and include the general management measures for each issue and the relevant site-specific information and data to allow them to be used in different well fields to satisfy the requirements of different consents.

Each Sub Plan includes the following information:

- The objectives and targets (from the KPIs table) for the specific aspect
- Identification of key personnel responsible for major tasks;
- A summary of relevant statutory obligations;
- A description of the mitigation measures to be implemented, including site specific details and requirements;
- An outline of monitoring requirements; and
- Reference to specific records that will be maintained.

Table 2:3 lists the sub plans included as Appendices to this EMP.

5.7.3. Operation/Maintenance of Gas Sales Pipeline

A PMS has been prepared for the Gas Sales Pipeline. Those controls included in the PMS, which also manage potential environmental issues, are re-iterated below. The Operations Superintendent is responsible for ensuring the PMS is implemented.

- The electronic facilities at natural gas sites link the telemetered sites to the computer based Supervisory Control and Data Acquisition (SCADA) system based at the RPGP. RPGP operations are responsible for the 24-hour control and supervision of the pipeline system;
- AGL capture the operational and maintenance activities on the pipeline with the use of the MEX maintenance system;
- Cathodic protection system checks are carried out to ensure that the pipeline remains protected, and, if changes are noted, that action is taken to protect the system. Protection circuit checks are undertaken every year and Protection Surveys undertaken at least once a year;
- Where the pipeline is damaged or corroded to the extent that continued operation would be unsafe, it is the Company's policy that the pipeline shall be shut down or the operating pressure reduced to a safe level until such time as a repair is effected; and
- General housekeeping issues are observed via the regular surveillance of the pipeline and facilities or, by persons completing regular maintenance at a site.

Pipeline Patrol

Ground patrols of the Gas Sales Pipeline are conducted by AGL personnel every 3 months. The route is accessible to authorised personnel and clear access to the valve station is maintained. Surveillance criteria of the pipeline patrols includes the checks for the following:

- Unauthorised 3rd party access;
- Evidence of construction or impending construction activity;
- Impediments to access;
- Trench subsidence;
- Pipeline exposure;
- Scouring at the watercourse crossing;
- Problems with drainage;
- Potential or active erosion;
- Bare patches or vegetation discolouration;
- Weed infestation or tree regrowth above pipeline; and
- Warning signs in good condition.

Further details are provided in the PMS and PIMP.

5.8. Contractors

5.8.1. HSEMS

Contractor Management shall be undertaken in accordance with the HSEMS Contractor Management Standard (AGL_HSE_STD-003) and HSEMS Risk Management Standard (AGL-HSE_STD-004.1).

5.8.2. Environmental Contract Clauses

An Environment Clause Library which contains sample contract clauses for various contracts types across AGL has been prepared by the Environment Team. The purpose of the Library is to provide a systematic and risk-based approach to the development of environment content for a range of contracts.

The aim of the clauses is to establish minimum requirements with the expectation that there will continue to be collaboration and discussion relating to specific environmental liabilities on a case by case basis. It is

principally a tool that will be used by AGL's legal team and as such the master document will be controlled by AGL's Corporate Lawyer.

It is acknowledged that there are various personnel within the CGP that may be involved in the drafting of contracts. The library is a working document that is subject to change – the clauses are examples only and will require input from AGL Legal to ensure relevant clauses are incorporated as applicable during contract development.

5.8.3. Contractor CEMP Guidelines

A Contractor CEMP Guideline is available for inclusion in Request for Tender packages to provide the minimum environmental management requirements that must be met or exceeded for proposed works.

5.9. Emergency Response

An Emergency Response Plan (AEL #8610896) has been prepared for the CGP in accordance with the requirements of AGL Emergency Preparedness and Response Standard (AGL-HSE-STD-010) and EPL 12003 Condition O4.

The Emergency Response Plan includes reference the CGP PIRMP. The PIRMP is reviewed and tested annually.

6. Monitoring and Checking

6.1. Environmental Monitoring and Measurement

The following tools are used to monitor and measure environmental performance and compliance with this EMP:

- Environmental Management Sub Plan Compliance Audits;
- Daily workover report by workover Rig Manager (records any spills or other incidents);
- Critical Control Checks;
- Critical Control Verifications; and
- Environment Walks.

Completed forms are maintained at RPGP and non-compliance issues which cannot be closed out immediately are dealt with via the non-conformance procedure as appropriate (outlined in **Section 6.5**).

Issue-specific monitoring is discussed in more detail in the Sub Plans.

6.1.1. Monitoring of Environmental Key Performance Indicators

The targets and KPIs listed in **Table 4:1** will be monitored and reported in the AEPR which is prepared to satisfy the requirements of the DP&E and DPI&E-MEG.

6.2. Legislative Compliance Management (Environmental Compliance Register)

Environmental compliance obligations relating to the CGP are incorporated in AGL's compliance management system. The compliance management system manages regulatory compliance obligations across the CGP, and provides a summary of all the approval, licence and lease conditions for the project.

The compliance management system is an important tool for managing and tracking compliance with all of the project's environmental commitments.

The compliance management system is updated each time a new approval, licence or lease is granted or modified.

6.3. Complaints Management

Complaints can be received through the following channels:

- by telephone to the CGP office number (02 4633 5200), to the Community Relations Manager's number, on the contact numbers provided in newsletters and upcoming work notifications, or via the community hotline number (1800 039 600);
- through the CGP website http://www.agl.com.au/camden/;
- via email AGLCommunity@agl.com.au; andd
- directly to personnel on site.

Complaints are recorded on Consultation Manager and may also be recorded in the incident reporting system if the complaint has been verified as an environmental incident.

Environmental complaints shall be kept in accordance with EPL 12003 requirements and records shall include:

- the date and time of the complaint;
- the method by which the complaint was made;

- any personal details of the complainant which were provided by the complainant, or if no such details were provided, a note to that effect;
- the nature of the complaint;
- the action taken by AGL in relation to the complaint, including any follow-up contact with the complainant; and
- if no action was taken by AGL, the reason why no action was taken.

All complaints shall be investigated to identify the cause of the complaint and corrective actions shall be implemented as necessary. If the complaint is verified by the Environment Business Partner as an environmental incident, near miss or hazard; the complaint shall also be registered in the incident reporting system.

6.4. Audit Requirements

The following audits are undertaken as means of further assessing the environmental performance of the CGP:

- Independent environmental compliance audits bi-annually or tri-annually;
- Environmental Management Sub Plan Compliance Audits;
- Potential regulatory authority audits; and
- Internal audits in response to incidents, changes, events or non-conformances.

Independent environmental compliance audits are conducted to assess the environmental performance of the project, assess compliance with the relevant standards, performance measures and statutory requirements and review the adequacy of the EMP. These audits are undertaken during the projects operational activities to meet the requirement of the Conditions of Consent (refer Table 5-3).

The audits are undertaken by an independent person whose appointment is approved by the Director General of DPI&E. The audit reports are submitted to government authorities and relevant local councils and any non-conformances identified by the audit are included and actions to rectify non-conformances reported in the Annual Environmental Performance Report.

6.5. Incident Management, Non-Conformance, and Corrective/Preventative Action

All incidents including environmental incidents, near misses, hazards and complaints are recorded electronically through the incident reporting system. Incidents shall be managed in accordance with AGL's Incident, Near Miss and Hazard Management Procedure (AGL-HSE-PRO-012.1). The obligations to notify regulatory authorities are included in **Table 5:3** of this EMP.

These on-line reports can be entered by any employee who has witnessed or been part of an incident. A notification is sent to the relevant team leader. The team leader is responsible for carrying out the investigation of the incident and ensuring the corrective actions are completed.

The CGP Environment Business Partner is informed when environment related hazards, near misses and incidents are entered into the incident reporting system.

Reporting requirements for environmental incidents under regulatory instruments are included in **Table 5:3.**

Any environment related Notices or Orders issued by regulatory authorities are to be forwarded to the Environment Business Partner (or their delegate). The Environment Business Partner (or their delegate) will then distribute to all key internal stakeholders for consultation and preparation of an agreed response. All agreed requirements must be adhered to.

6.6. Change Management

Change is an integral part of AGL's business. However, change can introduce new hazards into the workplace if not managed correctly or can even invalidate previous risk assessments and control strategies. Changes must be managed to ensure that environmental risks arising from such changes remain at acceptable levels.

Company personnel, contractors, management or external sources may identify the need to implement a change and as such all contractors and external sources should raise any proposed or suggested changes with an appropriate person and the proposed change should be entered into a Change Request Form.

A Management of Change procedure has been developed titled "Plant Modification and Design Change Request". This procedure ensures:

- All modifications to equipment, systems and procedures are carried out in a manner so as not to produce a hazard to safety, environment, production or plant operability; and
- All modifications to equipment, systems and procedures are reviewed by authorized personnel and approved prior to implementation

7. Management Review

7.1. Management Review and Continual Improvement

A review of the EMP occurs after the findings of the Independent Environmental Audit or any other relevant audit have been received; however, reviews may also be conducted in response to:

- A new Project Approval and/or modification or changes to licences or permits;
- When directed by the Director-General of the DPI&E or Deputy Director-General of DPI&E-MEG;
- Changes in operation(s);
- Request by a subcontractor;
- Changes in staffing structure;
- Changes in applicable legislation
- Changes in the construction or operational methods;
- Changes in site conditions;
- Changes in working environment;
- Monitoring results;
- Community complaints;
- A corrective or preventative action identified as a result of non-conformance; and
- Any other issue that may affect the accuracy or adequacy of information contained within the EMP.

An annual review of the EMP review is undertaken by the Environment Business Partner.

AGL recognises that management review is a cornerstone of the management system, providing an opportunity to regularly assess the operation of the system,its continuing suitability and to refine any improvements that are implemented.

AGL is therefore committed to regularly reviewing and continually improving its environmental performance. AGL conducts a review of the Environmental Management System at least every two years to ensure the systems continuing suitability and effectiveness in satisfying the Company's Environment policy and objectives. The scope of the review is comprehensive. The Review includes:

- Findings of the independent audit,
- Performance against Key Performance Indicators;
- Major non-conformances or incidents recorded;
- Issues raised by government authorities (if any); and
- Scheduling of internal audits;

Reviews are documented. This includes any observations, conclusions and recommendations. Management shall approve the Company's related procedures, and any subsequent changes or modifications.

The reviews are part of the continuous improvement cycle of:

- Setting performance standards;
- Measurement of performance;
- Comparison against standard; and
- Corrective or remedial actions.

Appendix A: AGL Environment Policy

Health Safety
& Environment
Look. Think. Act.

AGL Health, Safety and Environment Policy

Vision

AGL's aspiration is for Zero Harm to our people and the environment.

Policy Scope

The AGL Health, Safety and Environment **(HSE)** Policy applies to all AGL employees, contractors, products, services and joint ventures under AGL's operational control. Our HSE Management System sets out how we implement this Policy.

Our Commitment

To conduct our business in a way that prevents harm to our people, our customers and the community, and minimises our impact on the environment AGL will:

1. Visibly lead our people to promote a strong HSE culture across all aspects of our business, taking **care in every action** to minimise harm to people and the environment.

2. Demonstrate **integrity always** through prioritisation of HSE considerations in the way we work in order to meet or exceed the requirements of our compliance obligations.

3. **Deliver our best** by proactively identifying, effectively controlling and monitoring, and ensuring awareness of, the HSE risks that have the potential to harm people and the environment.

4. Consult and work collaboratively with our employees, contractors and the community on HSE issues. **Better together.**

5. **Shape tomorrow** by setting, measuring, and reviewing our objectives, priorities and targets to demonstrate proactive processes are in place to continuously reduce HSE risk exposure and improve HSE performance.

6. Support employees who are injured at work to return to safe and sustainable work as soon as possible, and make reasonable adjustments, where appropriate, for non– work related injuries and illnesses.

Graeme Hunt
CEO and Managing Director
AGL Energy Limited

April 2021

Appendix B: Legislative Reporting Requirements

Table B:1 Summary of Environmental Legislative Reporting Requirements

Legislation and Regulatory Body	Approval/ Licence Requirements	Relevance to Camden Gas Project Activities
Environmental Planning and Assessment Act 1979 (EP&A Act) (DPI&E)	Part 3A – Environmental Assessment (EA) to obtain Concept Approval and/or Project Approval from Minister for Planning and Infrastructure Part 4 – SEE or EIS and Development Consent from Council / Minister for Planning and Infrastructure	Any project that requires an REF, EIS, SEE or EA. There are currently 10 DAs and Project Approvals related to the CGP.
Petroleum (Onshore) Act 1991 (POA) (DI- DRE)	Requires consideration to be given to protection of the environment before a petroleum lease is granted.	AGL holds 5 petroleum production leases (PPLs) for the CGP. All activities can only be carried out under the authority of a petroleum title.
Protection of the Environment Operations Act 1997 (POEO Act) (EPA)	An Environment Protection Licence (EPL No.12003) is held for petroleum refining for RPGP, all well sites and gas gathering lines.	AGL, its employees and agents have an obligation to conform to the requirements of the Act. If operations change a licence variation may be required. If an incident of potential or actual material harm occurs. Monitoring data under the EPL must be published on the AGL website within 14 days of receipt.
Protection of the Environment Operations (General) Regulation 2009 (EPA)	The regulation sets out fees in relation to EPLs and notices. Gives effect to the National Pollutant Inventory (NPI).	AGL are required to submit air emission data annually as part of the NPI.
Heritage Act 1977 (OEH)	Approval is required to disturb/destroy relics or do certain things that will affect an object subject to an Interim Heritage Order or listed on the State Heritage Register. An excavation permit is required under certain circumstances.	Approval may be required if works will disturb a relic or an object subject to an Interim Heritage Order or listed on the State Heritage Register.
National Parks and Wildlife Act 1974 (OEH)	A permit is required to excavate archaeological sites and relics. S87(1) (unless under Part 3A of the EP&A Act). A consent to destroy, deface or damage a relic or Aboriginal place is required under Section 90(2) of the Act (unless consent is provided under Part 3A of the EP&A Act).	The Act is relevant if items, sites or relics are discovered during the course of the works.

Legislation and Regulatory Body	Approval/ Licence Requirements	Relevance to Camden Gas Project Activities
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) (DEWSPaC)	All environmental assessment undertaken under the EP&A Act must consider matters of National Environmental Significance (NES) as well as any Commonwealth land. If a significant impact is proposed the approval of the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities is required.	The Act applies if any action that has, will have or is likely to have a significant impact: - on a matter of NES; or - on Commonwealth land (whether action takes place inside or outside Commonwealth land.
Work, Health and Safety Regulation 2011 (WHS Reg) (SafeWork NSW)	Chapter 7 deals with hazardous chemicals and dangerous goods. Hazardous chemicals and dangerous goods are required to be labelled and placarded and quantities notified to SafeWork NSW when stored above the manifest quantities. The CGP does not currently require a Dangerous Goods Notification.	Hazardous chemicals and dangerous goods are required to be used, handled and stored in accordance with this regulation. If levels of Hazardous chemicals and dangerous goods increase an assessment should be undertaken to confirm whether a Dangerous Goods Notification would be required.
Biodiversity Conservation Act 2016 (BCA) (OEH)	The Act provides for the protection of threatened flora and fauna native to NSW and threatened populations, communities and critical habitat.	The Act applies if any threatened species, populations, communities and/or critical habitat listed under the Act is potentially affected by the activity or impacted on or off the work site, as a consequence of the activity.
Water Act 1912 (DPI Water)	Bore licences are required for all drilling and dewatering activities (under Part V of the *Water Act 1912*). The licence must be obtained prior to the construction of any bore (or well) that intersects the water table or deeper aquifer zone. Licences are required for core holes, stratigraphic test/pilot holes, production wells and monitoring networks. In addition, the driller who is constructing these bore holes/wells must hold an appropriate class of drillers licence under the *Water Act 1912*. Water Act licences are being transitioned to Water Access Licences and works approvals under the *Water Management Act 2000* following commencement of the Greater Metropolitan Region Unregulated River and Groundwater Water Sharing Plans in July 2011.	The production well licences and wellfield allocation authorise the dewatering activities required for gas production. An annual allocation of 30 ML per year applies for the whole CGP. Other licences are mainly registration mechanisms for geological and hydrogeological data to be lodged with the DPI Water. The monitoring data from the monitoring bore network is required to satisfy the compliance conditions on the production well licences.

Legislation and Regulatory Body	Approval/ Licence Requirements	Relevance to Camden Gas Project Activities
Water Management Act 2000 (DPI Water)	Controlled Activity Approval (CAA) required for controlled activities when working on 'waterfront land' within 40 m of a watercourse – the Act replaces the previous requirement for a Part 3A Permit under the repealed Rivers and Foreshore Improvement Act 1948.	The Act applies if working on or under 'waterfront land' i.e. within 40 m of a watercourse, or extracting water, or undertaking interference activities, then approvals may be required. There are existing Part 3A Permits and CAA's in place for parts of the Camden Gas Project.
Roads Act 1993 (NSW Roads and – Maritime Service - RMS)	Section 138 of the Roads Act requires authority consent for any activities likely to impact on the operational efficiency of the road network.	Obtain Road Occupancy Licence if construction activities likely to impact on traffic.
Contaminated Land Management Act 1997 (EPA)	Must report to EPA if land contamination presents "a significant risk of harm". EPL12003 R2 Notification of Environmental Harm	The Act is relevant if contaminated land is found or suspected.
Rural Fires Act 1997 (NSW Rural Fire Services – RFS)	The district fire control office in charge of the local fire station must be informed before the lighting of any fires. No open flame on total fire ban days. Duty to take steps to prevent bushfires.	The Act is relevant if fires are to be lit or if undertaking fire risk activities.
National Greenhouse and Energy Reporting Act 2007 (Commonwealth Department of Climate Change and Energy Efficiency)	Must report greenhouse gas emissions, energy consumption and production if the corporate group emits 125 kilotonnes or more greenhouse gases (CO2 equivalent), or produces or consume 500 terajoules or more of energy.	The Act is relevant to the AGL Energy group of companies, including the CGP. The Project is required to report all greenhouse gas emissions, energy consumption and production on a financial year basis. Data reported will also be used under the proposed Commonwealth carbon pricing scheme (Clean Energy Future).
Code of Practice for Coal Seam Gas – Well Integrity 2012 (DPI&E-MEG)	This code advises CSG titleholders how to comply with a condition of title for CSG exploration, extraction or production under the Petroleum (Onshore) Act 1991 (PO Act) and the Petroleum (Onshore) Regulation 2007 to ensure that well operations are carried out safely, without risk to health and without detriment to the environment. This code of practice applies to the design, construction, production, maintenance and ultimate abandonment of CSG wells in NSW.	AGL shall undertake petroleum production in compliance with the Code. The Code requires (for example): - Risk Management Planning; - Safety Management Plan; - Environmental Management Plan (this can be in the form of an REF); - Emergency Response Plan; - Annual Reporting of operations conducted per year; - Notification to Drill; - Well Completion Reports;

Legislation and Regulatory Body	Approval/ Licence Requirements	Relevance to Camden Gas Project Activities
Code of Practice for Coal Seam Gas – Fracture Stimulation Activities 2012 (DPI&E-MEG)	The purpose of this code is to ensure that fracture stimulation activities are conducted in a safe manner and that communities, the environment and water resources are protected. The Code requires a Fracture Stimulation Management Plan (FSMP). The FSMP shall include, among other things, the following key sections: - A Risk Assessment identifying the risks, likelihood and consequences, and mitigation measures to deal with the risk; - A detailed description of the design of the fracture stimulation activity, including the characterisation of aquifers and NSW geological formations; - An assessment of impacts on aquifers; - The title-holder must prepare an Emergency Plan and an Environmental Incident Response Plan (EIRP) (or PIRMP), setting out details of responses in the event of an environmental pollution event.	This Code applies to the conduct of CSG fracture stimulation activities. AGL shall prepare a FSMP, and have it approved by DPI&E-MEG, prior to conducting fracture stimulation activities. AGL shall prepare a PIRMP in accordance with Part 5.7 of the POEO Act.

Table B:2 Summary of Approvals, Licences, Permits and Leases

Name / No.	Issued by	Description	Date of Issue	Date of Expiry/ Renewal
Petroleum Production Lease (PPL) No.1	DPI&E-MEG	Lease granted to undertake production operations in lease area shown in Appendix B.	2 September 2002	1 September 2023
PPL No.2	DPI&E-MEG	Lease granted to undertake production operations in lease area shown in Appendix B.	10 October 2002	9 October 2023
PPL No.4	DPI&E-MEG	Lease granted to undertake production operations in lease area shown in Appendix B.	6 October 2004	5 October 2025
PPL No.5	DPI&E-MEG	Lease granted to undertake production operations in lease area shown in Appendix B.	28 February 2007	27 February 2028
PPL No. 6	DPI&E-MEG	Lease granted to undertake production operations in lease area shown in Appendix B.	29 May 2008	28 May 2029
DA 15-1-2002i Field – RBTP, Apap, Joe Stanley, Johndilo, Loganbrae, Lipscombe, Mahon	DPI&E	Approval granted “The Camden Gas Project Stage 1” development described as: - The continued operation of the existing 20 production wells; - Operation of 5 additional wells not yet completed and/or drilled; - Operation of the existing and proposed gas gathering system; - Operation of the existing gas treatment plant (RBTP); - Production of up to 93,000 GL/month from the treatment plant; - Sale and distribution of gas to the AGL gas network; and - Operation of the existing site office and pipe yard depot.	23 July 2002	21 years from the date the PPL (PPL 1) was granted (therefore expires 1 September 2023
MOD 53-4-2006	DPI&E	Modification granted for construction, drilling and operation of a directional well (LB11) from LB09	16 May 2006	

Name / No.	Issued by	Description	Date of Issue	Date of Expiry/ Renewal
DP&E letter of approval 9 February 2007	DPI&E	Re-drilling Management Plan for the AP01 and MH01 wells.	9 February 2007	
MOD 24-3-2007	DPI&E	Modification granted for the construction, drilling and operation of 2 Surface to In-Seam (SIS) wells (AP02/AP03) at AP01.	4 July 2007	
MOD 3	DPI&E	Modification granted for the Kay Park and Loganbrae Gas Gathering Line twinning modification Project.	01 July 2008	
DA 246-8-2002i Field – Kay Park	DPI&E	Approval granted for the following Development: -The connection of 3 existing wells (KP01, KP02, and KP03) to the Ray Beddoe Treatment Plant, and the continued production and sale of methane gas from the 3 wells.	20 September 2002	21 years from the date the PPL (PPL 2) was granted (therefore expires 9 October 2023)
DA 246-8-2002i Field- Kay Park MOD 25-3-2007	DPI&E	Modification granted for the following development: - the construction, drilling and operation of 2 SIS wells (KP05 and KP06) at KP01.	04 July 2007	
DA 246-8-2002i Field- Kay Park MOD 2	DPI&E	Modification granted for the Kay Park and Loganbrae Gas Gathering Line twinning modification Project.	04 August 2008	
DA 246-8-2002i Field- Kay Park MOD 3	DPI&E	Modification granted for the following development: - the construction, drilling and operation of 1 SIS well (KP05) and 1 directional well (KP06) at KP01.	3 December 2008	
DA 246-8-2002i Field – Kay Park MOD 4	DPI&E	Modification granted for the following development: - the construction, drilling and operation of 2 SIS wells (KP05 and KP06) at KP01.	20 April 2011	

Name / No.	Issued by	Description	Date of Issue	Date of Expiry/ Renewal
DA 282-6-2003-i Fields – RPGP, Rosalind Park, Wandinong, EMAI (EM01-20, 38-40), Glenlee (GL05, 07-10, 14-17)	Land and Environment Court	Approval granted for Stage 2 Development described as: - construction and drilling of 20 wells on the EMAI site; - Operation and production of gas from the existing (drilled) 23 wells and 20 wells to be constructed (a total of 43 wells); - Construction and operation of the gas gathering system; - Construction and operation of the gas treatment plant (RPGP), associated workshop and office facilities; and - Production of up to 14.5 petajoules per annum from the gas treatment plant.	16 June 2004	21 years from the date the PPL (PPL 4) was granted (therefore expires 5 October 2025)
DA 282-6-2003-i MOD 10	DPI&E	Modification granted for construction of an access road to well RP09 and twinning a section of the existing gas gathering line between well RP08 and the Rosalind Park Gas Plant.	16 March 2009	
DA 282-6-2003-i MOD 11	DPI&E	Modification granted for re-routing of damaged gas gathering line at Glenlee 06.	18 September 2009	
DA 282-6-2003-i MOD 12	DPI&E	Modification granted for changes to monitoring and reporting of noise, air quality and waste at the Rosalind Park Gas Plant.	25 November 2010	
DA 282-6-2003-i MOD 13	DPI&E	Modification granted for to delete conditions that are replicated in Environment Protection Licence 12003.	27 March 2017	
MOD 72-7-2004	DPI&E	Modification granted for the consent to include land omitted from the development consent, a requirement for an EMP for works in the Campbelltown City Council road reserve, and to allow works to commence prior to the granting of a production lease.	20 August 2004	

Name / No.	Issued by	Description	Date of Issue	Date of Expiry/ Renewal
MOD 5-1-2005	DPI&E	Modification granted for amendment to EMAI Access Road (18-11-2004 Map Ref M240329) and Gathering System (18-11-2004 Map Ref M240328).	14 February 2005	
MOD 42-3-2005	DPI&E	Modification Application 42-3-2005 and the letter from Sydney Gas Operations Pty Ltd to the Department dated 14 March 2005 titled *Camden Gas Project Stage II – Modification Application*, and the accompanying attachments.	8 June 2005	
MOD 52-4-2006	DPI&E	Modification granted for the construction, drilling and operation of 1 directional well (GL16) from GL07 and 2 directional wells (GL14 and GL15) from GL10.	16 May 2006	
MOD 119-10-2006	DPI&E	Modification granted for the construction, drilling and operation of 1 directional well (GL16) from GL07 and 1 directional well (GL15) and 1 Surface to in-seam well (GL14) from GL10.	22 October 2006	
MOD 124-10-2006	DPI&E	Modification granted for the construction, drilling and operation of 1 directional well (GL16) from GL07 and 2 Surface to in-seam wells (GL14 and GL15) from GL10.	1 November 2006	
MOD 11-2-2007	DPI&E	Modification granted for the relocation of the Rosalind Park Gas Plant access road.	2 May 2007	
MOD 26-3-2007	DPI&E	Modification granted for the construction, drilling and operation of 1 SIS well (EM38) at EM20 and upgrading (twinning) of the gas gathering line between MP14-GL10, GL10-GL05, GL05-GL07 and RP03-RP08.	4 July 2007	

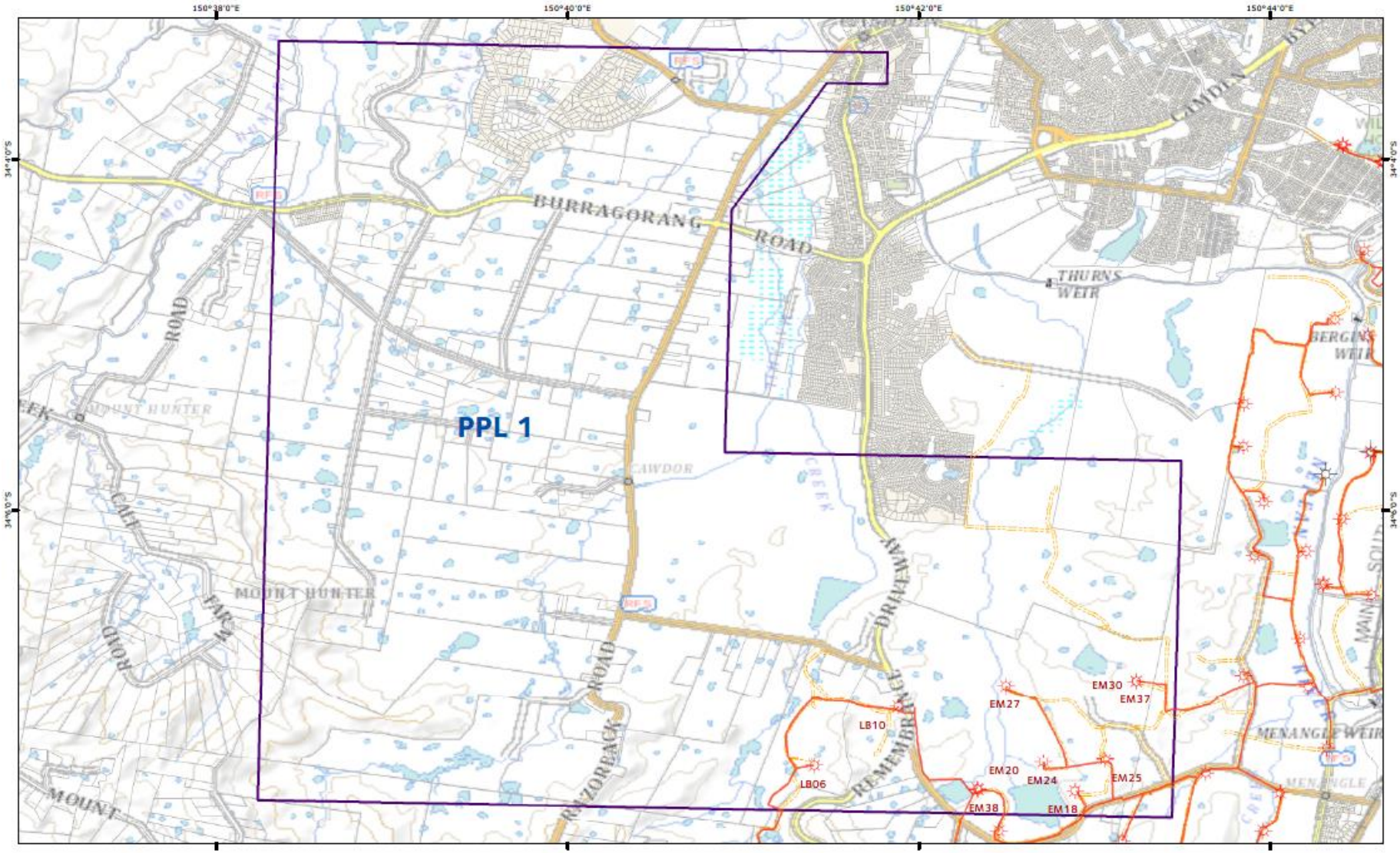
Name / No.	Issued by	Description	Date of Issue	Date of Expiry/ Renewal
MOD 9	DPI&E	Modification granted for construction, drilling and operation of 2 SIS wells (EM39) at EM02 and (GL17) at GL05 and the upgrading (twinning)of the gas gathering line from EM39 to the junction of the gas gathering line and road to the EM03 well, and connection of the new wells to the existing gas gathering system	11 April 2008	
DA-183-8-2004i Fields – Mount Taurus and Menangle Park (MP13-17, MP30)	DPI&E	Approval granted for the following Development: - Connection of 15 existing coal seam methane wells to the Rosalind Park Gas Plant from the Mount Taurus and Menangle Park properties, for the production of methane gas; and - Construction of a Dam at the MT1 gas well site.	16 December 2004	21 years from the date the PPL (PPL 4) was granted (therefore expires 5 October 2025)
MOD 27-3-2007	DPI&E	Modification granted for the construction, drilling and operation of 1 SIS well (MP30) at MP13 and upgrading (twinning) of the gas gathering line between MP13 and MP14.	4 July 2007	
MOD 13-10-2011	DPI&E	Construction, drilling and operation of 1 surface to in-seam well (MP25) adjacent to MP16 and upgrading (twinning) of the gas gathering line between MP16 and MP13/30.	9 July 2012	

Name / No.	Issued by	Description	Date of Issue	Date of Expiry/ Renewal
DA 9-1-2005 Field – Glenlee (incl. EM21/2, GL02, 04, 06, 11-13)	DPI&E	Approval granted for: – Construction and drilling of well GL11; – Construction of a gas gathering system between four wells at Glenlee and two wells at EMAI; – Connection of 6 coal seam methane wells to the previously approved Stage 2 Camden Gas Project Gas Treatment Plant, for the production of methane gas	26 May 2005	21 years from the date the PPL (PPL 4) was granted (therefore expires 5 October 2025)
DA 9-1-2005 Field – Glenlee (incl. EM21/2) MOD 3	DPI&E	Modification granted for use of exotic pasture species in rehabilitation at wells in Glenlee and two wells at EMAI.	16 November 2010	
MOD 51-4-2006	DPI&E	Modification issued for the construction, drilling and operation of a directional well from each of GL02 (GL12) and GL11 (GL13).	16 May 2006	
MOD 28-3-2007	DPI&E	Modification granted for the upgrading (twinning) of the gas gathering line between GL02 and GL05.	4 July 2007	
DA 75-4-2005 Field – Sugarloaf	DPI&E	Approval granted for the following Development: - Construction and drilling of 7 wells; - Construction of a gas gathering system and access roads; - Connection of the wells to the Stage 2 Camden Gas Project – Gas Treatment Plant; and - Production of methane gas.	07 October 2005	21 years from the date the PPL (PPL 4) was granted (therefore expires 5 October 2025)
MOD 3	DPI&E	Modification granted for gas gathering line connection between SL02 and MP22.	20 April 2011	
MOD 29-3-2007	DPI&E	Modification granted for the construction, drilling and operation of 2 SIS wells (SL08 and SL09) at SL03.	4 July 2007	

Name / No.	Issued by	Description	Date of Issue	Date of Expiry/ Renewal
MOD 2	DPI&E	Twinning of gas gathering line from SL03 and SL09 to Rosalind Park Gas Plant	10 January 2010	
DA 171-7-2005 Field - El Bethel NB. Not commenced	DPI&E	Approval granted for the following Development: - Construction and drilling of 10 wells (EB01 – EB10); - Construction of a gas and water gathering system and access roads; - Connection of the wells to the Rosalind Park Gas Plant; and - Production of methane gas.	25 March 2006	21 years from the date the PPL (PPL 4) was granted (therefore expires 5 October 2025)
PA 06_0137 Field - Razorback	DPI&E	Approval granted for the following Development: - Construction and drilling of wells RB03-RB12 and gas gathering lines.	9 December 2006	21 years from the date the PPL (PPL 4) was granted (therefore expires 5 October 2025)
PA 06_0138 Field – EMAI (EM23-37)	DPI&E	Approval granted for the following Development: - Construction and drilling of wells EM23-36 and gas gathering lines.	9 December 2006	21 years from the date the PPL (PPL 4) was granted (therefore expires 5 October 2025)
PA 06_0138 MOD 1	DPI&E	Additional directional well (EM37) at EM30 well surface location.	6 July 2007	
PA 06_0291	DPI&E	Approval granted for the drilling and operation of 4 well surface locations in Spring Farm and 12 well surface locations in Menangle Park, with no more than 6 wells at each well surface location. Approval also granted for associated gas gathering lines, access and for the production and sale of gas.	04 September 2008	21 years from the date of the approval or on expiry of PPL 4 or PPL 5, whichever is the sooner.
PA 06_0291 MOD 1	DPI&E	Modification granted for under-boring of the Main Southern Railway Line between wells MP06 and MP11 and relocation of the gas gathering route between wells MP11 and MP23 via MP19.	7 January 2011	

Name / No.	Issued by	Description	Date of Issue	Date of Expiry/ Renewal
PA 06_0291 MOD 2	DPI&E	Modification granted for construction and operation of a gas gathering network between wells MP03 and MP05, on the northern side of the Main Southern Railway Line, and for construction of a link from well MP22 to the existing well at SL02.	20 April 2011	
EPL No. 12003	EPA	Premises include all the wells, the gas gathering lines and the Rosalind Park Gas Plant which is licensed for the following activities: - Petroleum refining (>200,000 – 500,000 T).	22 December 2004	Anniversary date 22 December, review date 01 May 2018
Pipeline Licence No.30	DTIRIS	Licence to operate a pipeline to convey Coal Seam Methane between Rosalind Park Gas Plant and the Alinta Gas Networks Natural Gas Pipeline Number 1.	19 May 2004	19 May 2024
Works/ Use Approval 10WA112288	DPI Water	Water Supply Works (production well sites licensed at various locations)	1 July 2011	22 May 2026
Works/ Use Approval 10WA112294	DPI Water	Water Supply Works (production well sites licensed at various locations)	1 July 2011	3 April 2026

Appendix C: Petroleum Production Lease (PPL) Figures



Author: Gas Operations
Date: 13/11/2020
Ref: 1646R1

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PPL 1 Surface Infrastructure

Kilometres
0 1 2
Scale 1:50,000 @A4

Geocentric Datum of Australia 1994

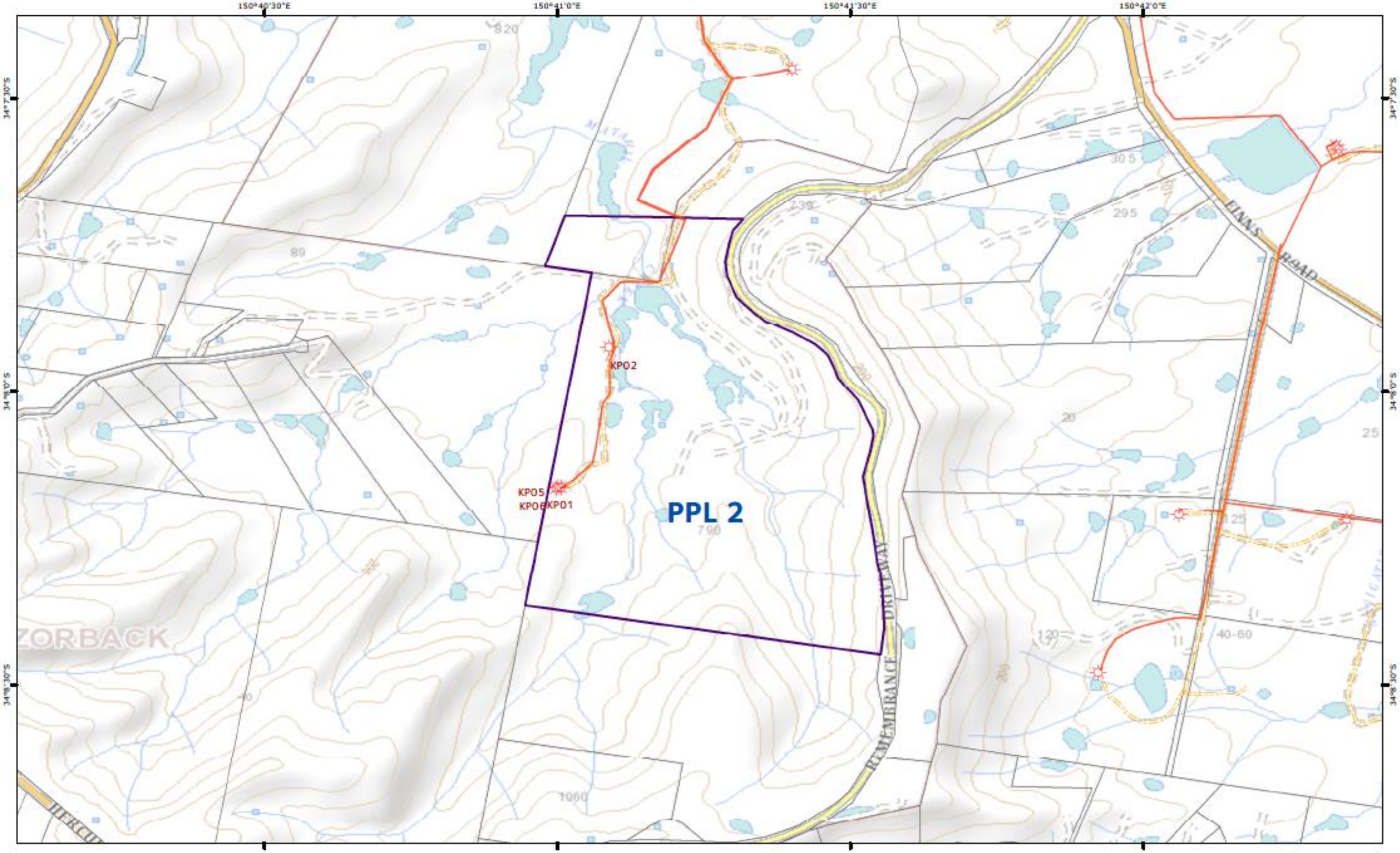
Sources: AGL Energy Limited, Omnilink PSMA Data, LPI Imagery

Legend

- Producing
- Suspended
- Shut in
- Gathering Pipeline
- Access Road
- PPL 1
- Property Boundaries

N

Service Layer Credits: © Department of Finance, Services & Innovation 2018



Author: Gas Operations

Date: 13/11/2020

Ref: 1647R1

PPL 2 Surface Infrastructure

Metres

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Scale 1:15,000 @A4

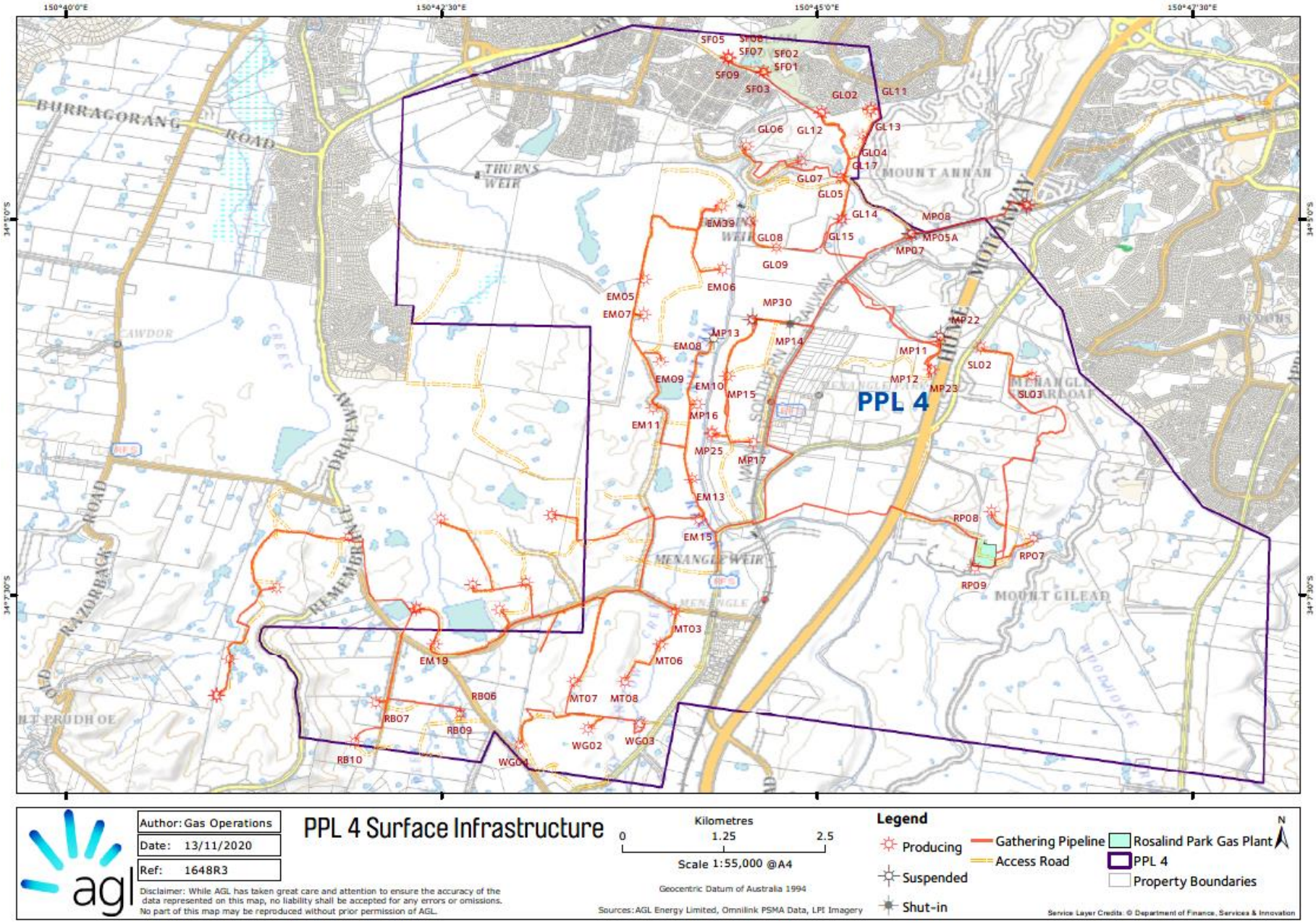
Geocentric Datum of Australia 1994

Sources: AGL Energy Limited, Omnilink PSMA Data, LPI Imagery

Legend

- Producing
- Suspended
- Shut in
- Gathering Pipeline
- Access Road
- PPL 2
- Property Boundaries

N



Author:	Gas Operations
Date:	13/11/2020
Ref:	1648R3

PPL 4 Surface Infrastructure

Kilometres
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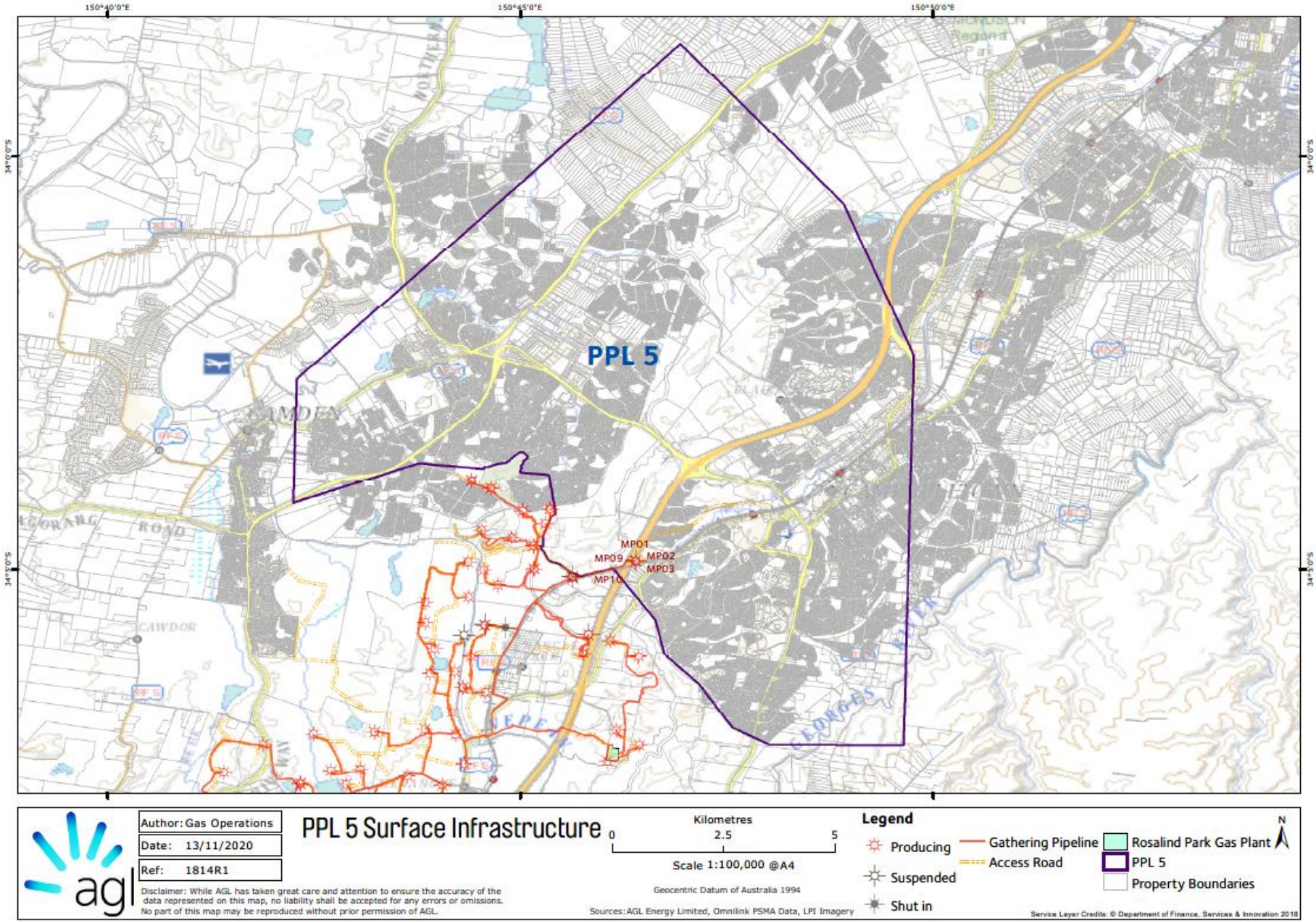
Geocentric Datum of Australia 1994

Sources: AGL Energy Limited, Omnilink PSMA Data, LPI Imagery

Legend

- Producing
- Suspended
- Shut-in
- Gathering Pipeline
- Access Road
- Rosalind Park Gas Plant
- PPL 4
- Property Boundaries

N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150°45'0"E
150°50'0"E
34°0'0"S
34°5'0"S
PPL 5
MP01
MP09
MP02
MP03
MP10
CAMDEN
CAWDOR
ROAD
Author: Gas Operations
Date: 13/11/2020
Ref: 1814R1
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PPL 5 Surface Infrastructure
Kilometres
0
2.5
5
Scale 1:100,000 @A4
Geocentric Datum of Australia 1994
Sources: AGL Energy Limited, Omnilink PSMA Data, LPI Imagery
Legend
Producing
Suspended
Shut in
Gathering Pipeline
Access Road
Rosalind Park Gas Plant
PPL 5
Property Boundaries
N
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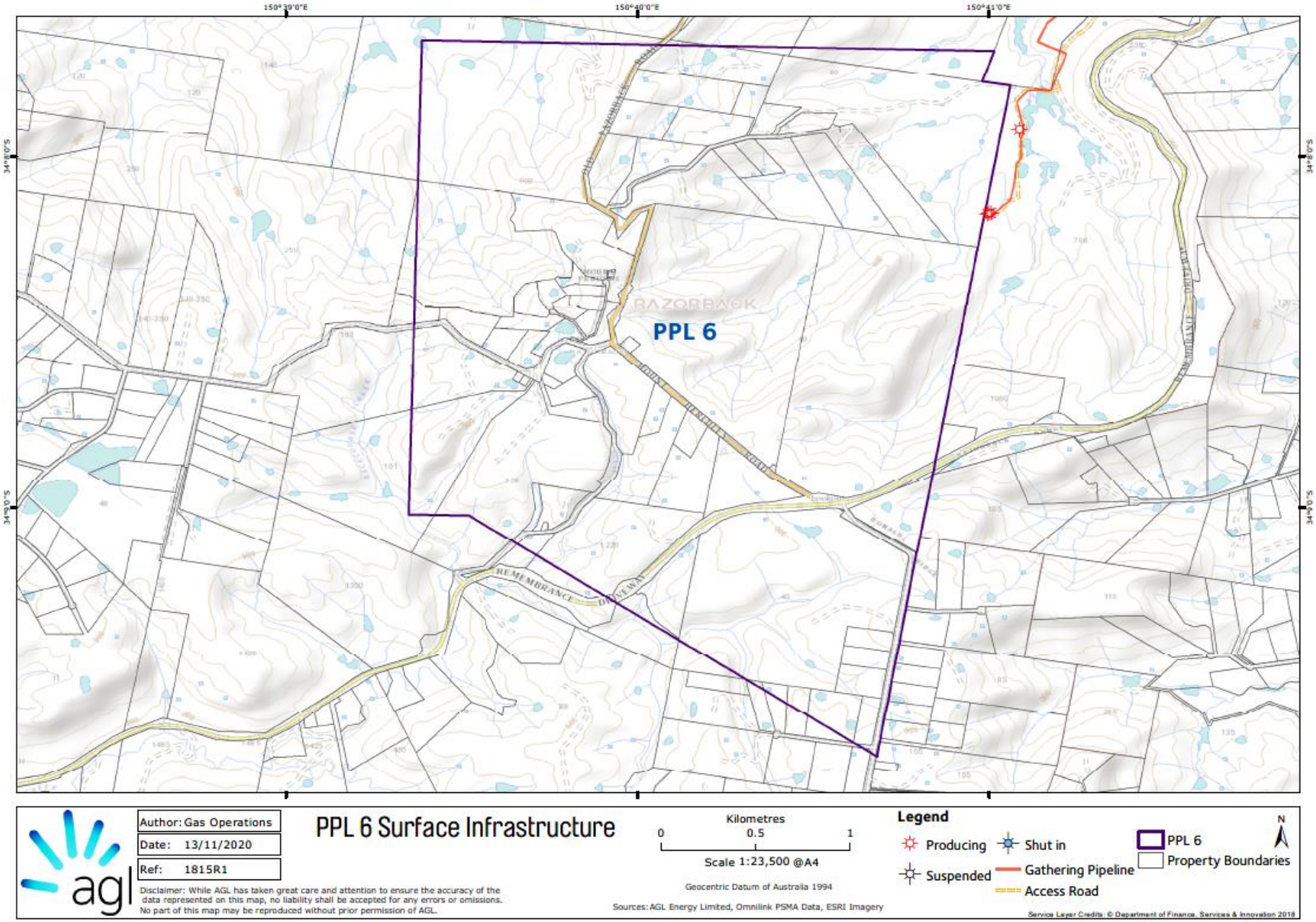

Appendix D: Noise Management Sub Plan

Appendix E: Flora and Fauna Management Sub Plan

Appendix F: Soil and Water Management Sub Plan

Appendix G: Aboriginal Cultural Heritage Management Sub Plan

Appendix H: European Heritage Management Sub Plan

Appendix I: Landscape and Rehabilitation Management Sub Plan

Appendix J: Air Quality Management Sub Plan

Appendix K: Waste Management Sub Plan

Appendix L: Traffic Management Sub Plan

Appendix M: Dangerous Goods and Hazardous Materials Storage Sub Plan

Appendix N: Emergency Response Plan

Appendix O: Groundwater Management Plan