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NARRABRI COAL SEAM GAS UTILISATION PROJECT

OPERATION ENVIRONMENTAL MANAGEMENT PLAN

9055-650-PLA-002

Document revision history

Date	Revision	Reason for Issue	Author	Reviewed	Endorsed	Approved
July 2009	1	Original prepared by Eastern Star Gas and approved by Department of Planning				
September 2014	2	Reformatted and minor amendments made to reflect Santos ENSW Standards		AJ	NV	KB
22 June 2017	3	Revision of OEMP to keep it current		LJB		
21 December 2017	4	Revision of OEMP taking into account DPE comments		RA		TD
28 June 2018	5	Internal review		RA		
31 May 2023	6	General revision	Onward Consulting	CA		

Onward document number:
WPPS-001A PLN

Acronyms and abbreviations

Acronym	Description
AIM	Audit and Inspection Manager
CoA	condition of approval
CSG	coal seam gas
EHS	Environmental, Health and Safety
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
IMS	Incident Management System
km	kilometre
m	metre
MW	megawatt
NCSG	Narrabri Coal Seam Gas
NSW	New South Wales
OEMP	Operations Environmental Management Plan (this document)
PIRMP	Pollution Incident Response Management Plan
Project	The Narrabri Coal Seam Gas Utilisation Project
SMS	Santos Management System
WPPS	Wilga Park Power Station
µg/m^3	microgram per cubic metre (air)

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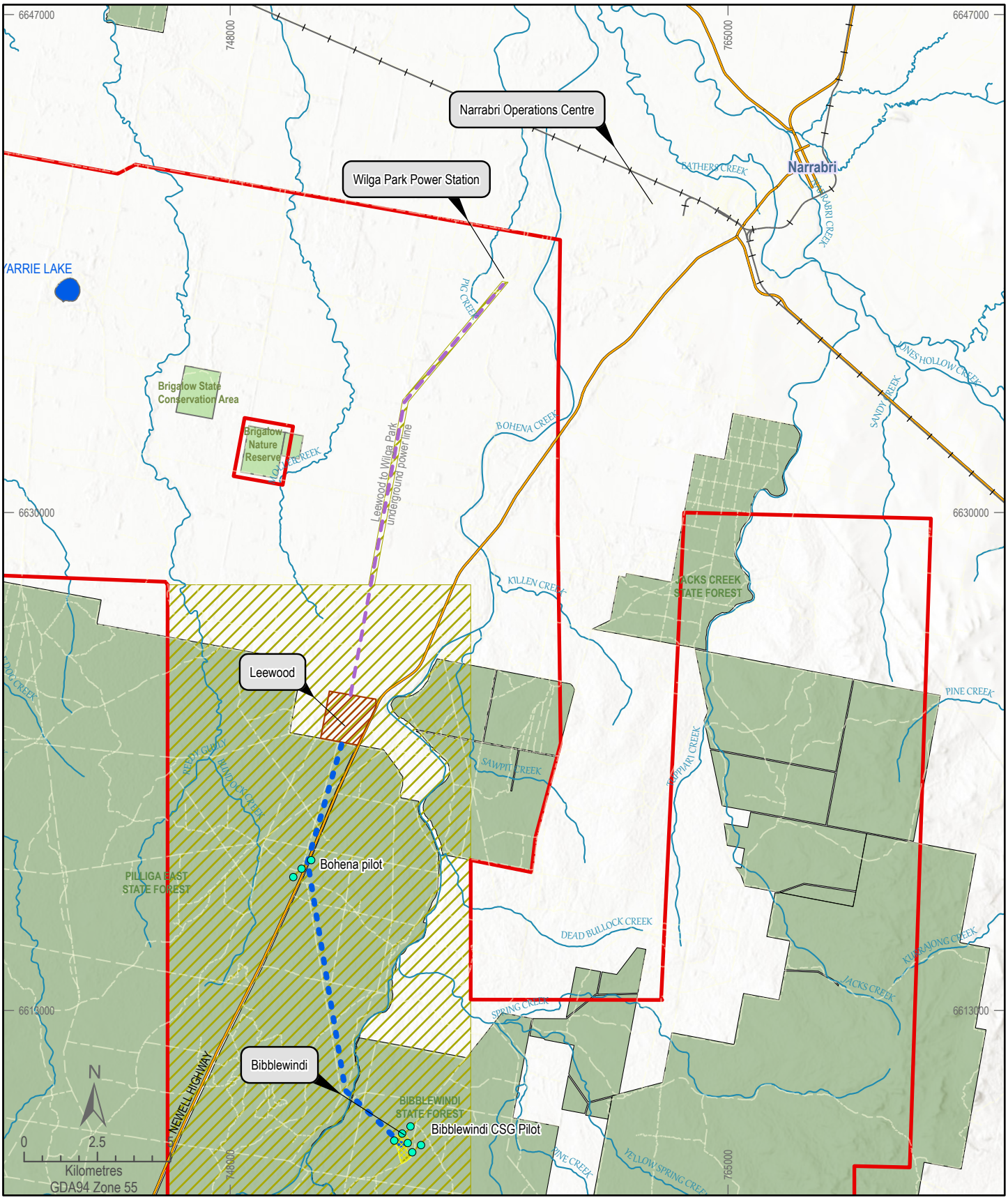
1. Introduction

Wilga Park Power station is located north of the Pilliga Forest approximately 12 kilometres from Narrabri. It encompasses a gas gathering system, a compressor and associated flare, a gas flow line from Bibblewindi to Wilga Park within a 10 metre (**m**) corridor with a riser at Leewood and an expansion of the existing Wilga Park Power Station from 12 to 40 megawatts (**MW)**. The locality plan of the Narrabri Gas Utilisation Project is shown in Figure 1.1. Development consent for the construction and operation of the Wilga Park Power Station was issued to Narrabri Power Limited by the Narrabri Shire Council in 2002. The power station, when operating, supplies electricity to the local 66kv network through a substation located adjacent to the power station.

The Narrabri Coal Seam Gas Utilisation Project (**NCSG**) (the **Project**), including Wilga Park Power Station and associated infrastructures, operates under an existing Part 3A approval under the *Environmental Planning and Assessment Act 1979* (NSW) (**EP&A Act**). The project approval was originally issued by the NSW Government Department of Planning to Eastern Star Gas Limited on 2 December 2008 with modifications approved between 2011 and 2019. Condition 6.3 of the approval required the proponent to prepare and implement an Operational Environmental Management Plan (**OEMP**). Eastern Star Gas Limited submitted the OEMP to the NSW Department of Planning on 1 July 2009, which was subsequently approved on 14 July 2009.

This document is a revision of the original OEMP so that the plan is current and reflects existing operations being carried out at the Narrabri Gas Project site.



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LEGEND

- NGP boundary
- Existing wells
- Leewood
- Bibblewindi
- Leewood to Wilga Park infrastructure corridor
- Bibblewindi to Leewood infrastructure corridor
- PAL2
- Highway
- Roads and tracks
- Railway
- Lakes and dams
- Watercourse
- State Forest
- Parks and reserves

NARRABRI GAS PROJECT

Figure 1-1

Narrabri CSG Utilisation Project Locality

2. Regulatory context and modifications

The Narrabri Coal Seam Gas Utilisation Project was assessed as a major project under the *Environment Planning and Assessment Act 1979* in December 2008 and comprises the following components:

- construction and operation of gas gathering systems at Bibblewindi and Bohena pilots;
- construction and operation of gas compression facilities at Bibblewindi and Bohena pilots;
- 32 kilometres (**km)** of buried gas flow lines connecting to the Wilga Park gas fired power station;
- staged expansion and operation of the Wilga Park power station from a capacity of 12 to 40 MW fuelled by gas from the Bibblewindi and Bohena pilots.

The works which have been undertaken under the approval to date include:

- construction of the gas gathering systems at the Bibblewindi and Bohena coal seam gas (**CSG**) Pilots;
- construction of the gas compression facilities for the Bibblewindi and Bohena CSG Pilots;
- construction of the 32 km buried gas flow line between the Bibblewindi and Bohena pilots and the Wilga Park Power Station;
- installation of four 3 MW gas generators at Wilga Park Power Station together with a switch room, gas conditioning skid, auxiliary transformers, ventilation fans, substation upgrade and other related equipment;
- removal of eight of the original twelve 1 MW gas generators;
- installation of an additional two 3 MW gas generators at the Wilga Park Power Station; and
- installation of a slug catcher at Wilga Park Power Station on the 32 km buried gas flow line.

The Minister for Planning approved a modification to the Project on 11 February 2011 (MP 07_0023 MOD 1). The modification changed condition of approval (**CoA**) 2.34, relating to the submission date for the compensatory habitat package required.

A further modification to the project was approved on 14 March 2012 (MP 07_0023 MOD 2) allowing the temporary use of the gas flow line to transfer produced water. The approval for this modification allowed the transfer of water until 28 February 2013.

On 18 July 2014, the Wilga Park Power Station (**WPPS**) was approved to receive gas from all wells located within PAL 2 and PPL 3 following the application of Santos NCSG Utilisation Project (MP 07_0023 MOD 3). This approval allowed for:

- the installation of a riser on the existing buried gas flow line which would allow materials (gas and liquids) to be diverted to the Leewood Produced Water Facility;
- the use of the gas flow line to transfer liquids (including fresh water, produced water and brine) between the Tintsfield ponds and the Bibblewindi Water Transfer facility and to the Leewood Produced Water Facility; and
- the use of coal seam gas from existing or future wells within PAL 2 or PPL 3 at the Wilga Park Power Station.

The most recent modification to the approval was in October 2019, for the installation of a slug catcher for capturing slugs of solids as a result of gas pipeline cleaning at the pipeline entry into the power station site.

The layout of the Wilga Park Power Station is shown in Figure 2.1.

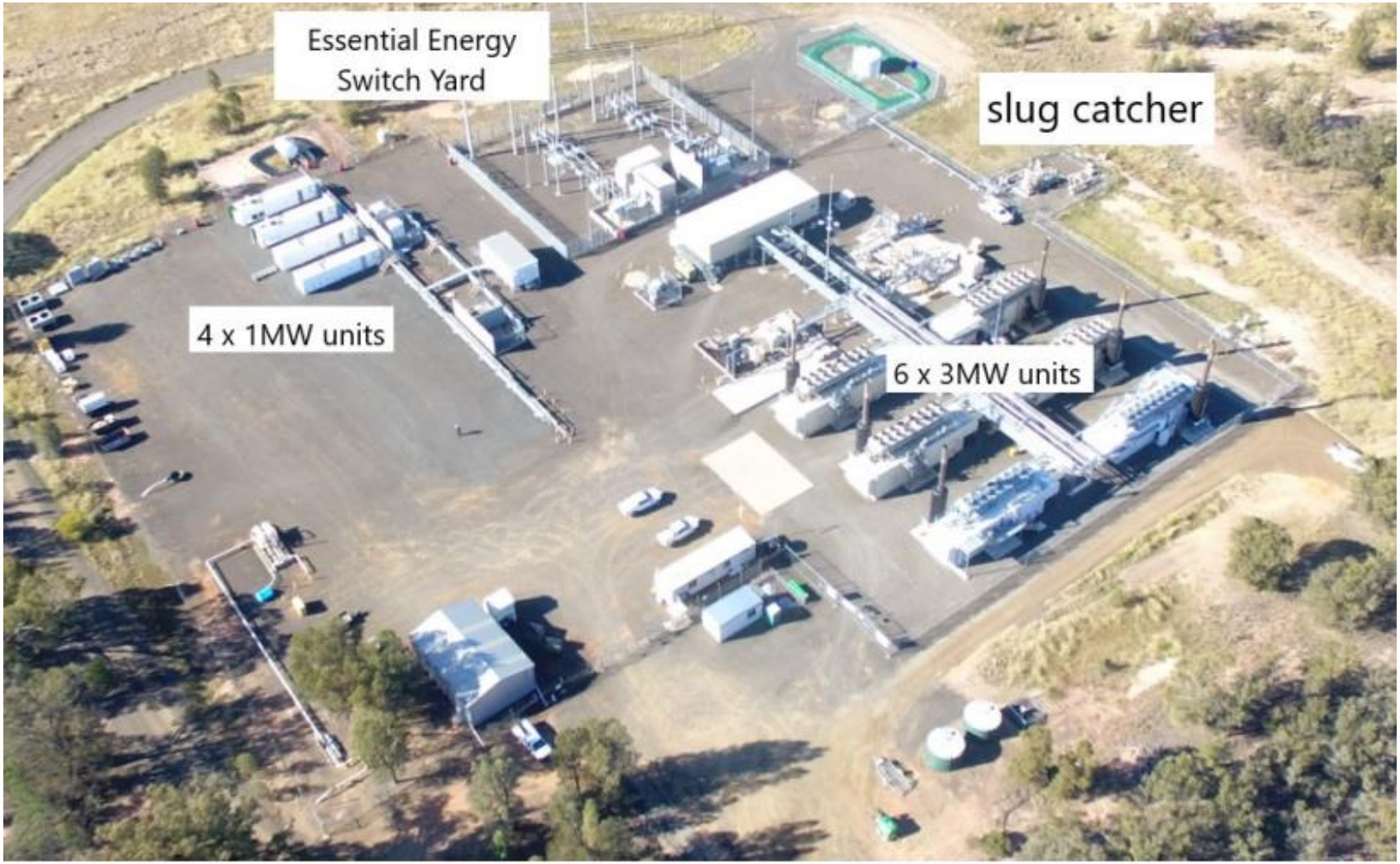

Figure 2.1 Wilga Park Power Station layout

3. Purpose

The purpose of the Operations Environmental Management Plan (**OEMP**) is to identify and detail the environmental management requirements, performance objectives and monitoring and reporting procedures for the NCSG Project. The OEMP also addresses the requirements of Condition 6.3(a) to (h) of the project approval issued by the Minister for Planning under the EP&A Act. These requirements outline matters to be incorporated into the Plan and have been listed in Table 3.1.

Table 3.1 Project Approval Condition 6.3

Project Approval Condition 6.3	OEMP Section
The Proponent shall prepare and implement an Operation Environmental Management Plan to detail the environmental management framework, practices and procedures to be followed during the operation of the project. The Plan shall include, but not necessarily be limited to:	
• Identification of all statutory and other obligations that the proponent is required to fulfil in relation to operation of the project, including approvals, licences, approvals and consultations;	5 and various
• A description of the roles and responsibilities for all relevant employees involved in the operation of the project;	7
• Overall environmental policies to be applied to the operation of the project;	6
• Standards and performance measures to be applied to the project, and a means by which environmental performance can be periodically reviewed and improved, where appropriate;	9
• Management policies to ensure environmental performance goals are met and to comply with the conditions of this approval;	6 & 9
• Specific details of how the following matters will be managed and monitored during operation:	
▪ measures to manage and monitor air quality in consultation with EPA to address the requirements of conditions 2.2 to 2.4 and 3.1 to 3.4;	9.1 and 13.2
▪ measures to manage and monitor noise and vibration in consultation with EPA to address requirements of conditions 2.5, 2.8 to 2.23 and 3.5;	9.2 and 13.3
▪ measures to manage and monitor site water including operational site water balance, storm water and wastewater management;	9.3 and 9.7
▪ measure to manage and monitor hazards including bushfire management; and	9.4, 9.5 and 9.6
▪ measures to manage and monitor landscaping measures and ecology (including measures associated with the biodiversity offset package under condition 2.34 and any remnant vegetation onsite);	9.9 and 9.10
• Details of land rehabilitation and decommissioning (including for the pipeline) upon completion of the project; and	11
• The environmental monitoring requirements outlined under conditions 3.1 to 3.6 of this approval, inclusive.	13
The Plan shall be submitted for the approval of the Secretary no later than one month prior to the commencement of any construction works associated with the project, or within such period otherwise agreed by the Secretary. Operations shall not commence until written approval has been received from the Secretary.	1

4. Objectives

The primary objective of the OEMP is to ensure:

- key environmental issues have been identified and proper management practices and procedures are in place to minimise environmental harm from the Project;
- all people onsite are fully informed of their responsibilities and accountabilities regarding the environment; and
- activities are conducted in a manner consistent with industry and Santos Ltd (**Santos**). standards and in compliance with relevant regulatory approvals and other statutory requirements.

The secondary objectives of the OEMP are to:

- encourage good environmental management practices through good planning and commitment to continuous improvement;
- identify roles and responsibilities of site personnel;
- outline environmental monitoring and reporting requirements and performance evaluation criteria;
- provide a framework to track, document and monitor compliance with statutory requirements and to ensure full compliance is achieved; and
- establish response procedures for environmental incidents (including community complaints) and contingency planning to ensure effective remedial measures and/or corrective action is taken.

5. Legislative framework

This OEMP has primarily been developed to meet the conditions of the project approval; however, there are a number of other general provisions in the *Protection of the Environment Operations Act 1997* (NSW) which places duty of care obligations on all persons in relation to managing impacts of their activities on the environment. Some of these key offence provisions, for which there are significant penalties, are listed below:

Section 115 Disposal of waste-harm to environment

If a person wilfully or negligently disposes of waste in a manner that harms or is likely to harm the environment:

(a) the person, and

(b) if the person is not the owner of the waste, the owner, are each guilty of an offence.

Section 116 Leaks, spillages and other escapes

1) If a person wilfully or negligently causes any substance to leak, spill or otherwise escape (whether or not from a container) in a manner that harms or is likely to harm the environment:

(a) the person, and

(b) if the person is not the owner of the substance, the owner, are each guilty of an offence

Section 120 Prohibition of pollution of waters

A person who pollutes any waters is guilty of an offence.

Section 124 & 139 Operation of Plant:

The occupier of any premises who operates any plant (other than control equipment) at those premises in such a manner as to cause the emission of pollution from those premises is guilty of an offence if the pollution so caused, or any part of it, is caused by the occupier's failure:

(a) to maintain the plant in an efficient condition, or

(b) to operate the plant in a proper and efficient manner.

Section 142A Pollution of land

A person who pollutes land is guilty of an offence.

Section 148 Pollution incidents causing or threatening material harm to be notified:

(1) Kinds of incidents to be notified

This Part applies where a pollution incident occurs in the course of an activity so that material harm to the environment is caused or threatened.

(2) Duty of person carrying on activity to notify

A person carrying on the activity must, immediately after the person becomes aware of the incident, notify each relevant authority of the incident and all relevant information about it."

6. Santos Environment, Health and Safety Policies

Santos' corporate environmental commitment is to 'a workplace where we all go home without illness of injury and manage the impact of our operations on the environment'. Santos' overarching corporate environmental policy statement is presented in Figure 6.1. Santos has also developed a comprehensive set of Health, Safety and Environment standards and procedures for the conduct of all company operations, which reflect and are in accordance with the values and principles outlined in the corporate environment, health and safety policy.

The company-wide Santos Management System (**SMS**) provides a structured framework for environmental and safety practices across Santos' activities and operations. The SMS comprises three parts that underpin the Environmental, Health and Safety (**EHS**) framework and describe requirements such as organisation structure, planning activities, responsibilities, resources, practices, procedures and processes for meeting the objectives of Santos' EHS policies. These are:

- Policies and Codes of Conduct;
- Management Standards (documents that define the requirements necessary to ensure that risks are systematically managed);
- Procedures, Technical Standards, Processes and Tools (documents that detail how to manage the risks of specific hazards to as low as reasonably practicable).

The standards are further supported by Business Unit/Function and asset/activity procedures, tools, guidelines and practices specific to work being undertaken. This OEMP has been developed in accordance with Santos' SMS.

Environment, Health & Safety

Santos SMS

Policy

Our Commitment

Santos is committed to being the safest gas company wherever we have a presence and preventing harm to people and the environment

Our Actions

We will:

1. Integrate environment, health and safety management requirements into the way we work
2. Comply with all relevant environmental, health and safety laws and continuously improve our management systems
3. Include environmental, health and safety considerations in business planning, decision making and asset management processes
4. Identify, control and monitor risks that have the potential for harm to people and the environment, so far as is reasonably practicable
5. Report, investigate and learn from our incidents
6. Consult and communicate with, and promote the participation of all workers to maintain a strong environment, health and safety culture
7. Empower our people, regardless of position, to "Stop the Job" when they feel it necessary to prevent harm to themselves, others or the environment
8. Work proactively and collaboratively with our stakeholders and the communities in which we operate
9. Set, measure, review and monitor objectives and targets to demonstrate proactive processes are in place to reduce the risk of harm to people and the environment
10. Report publicly on our environmental, health and safety performance

Governance

The Environment Health Safety and Sustainability Committee is responsible for reviewing the effectiveness of this policy.

This policy will be reviewed at appropriate intervals and revised when necessary to keep it current.

Kevin Gallagher

Managing Director & CEO

Status: APPROVED

Document Owner:	David Banks, Chief Operating Officer		
Approved by:	The Board	Version:	3

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Figure 6.1 Santos Environment Health and Safety Policy

7. Roles and responsibilities

All Santos employees and contractors involved in the Project are responsible for the environmental performance of their activities and for complying with all legal requirements and obligations. All project personnel will be required to comply with approval requirements of the activities they undertake, and any potential environmental impacts from all activities will be managed in accordance with the Project's relevant management plans and protocols.

The key personnel roles on the Project are set out in Table 7.1.

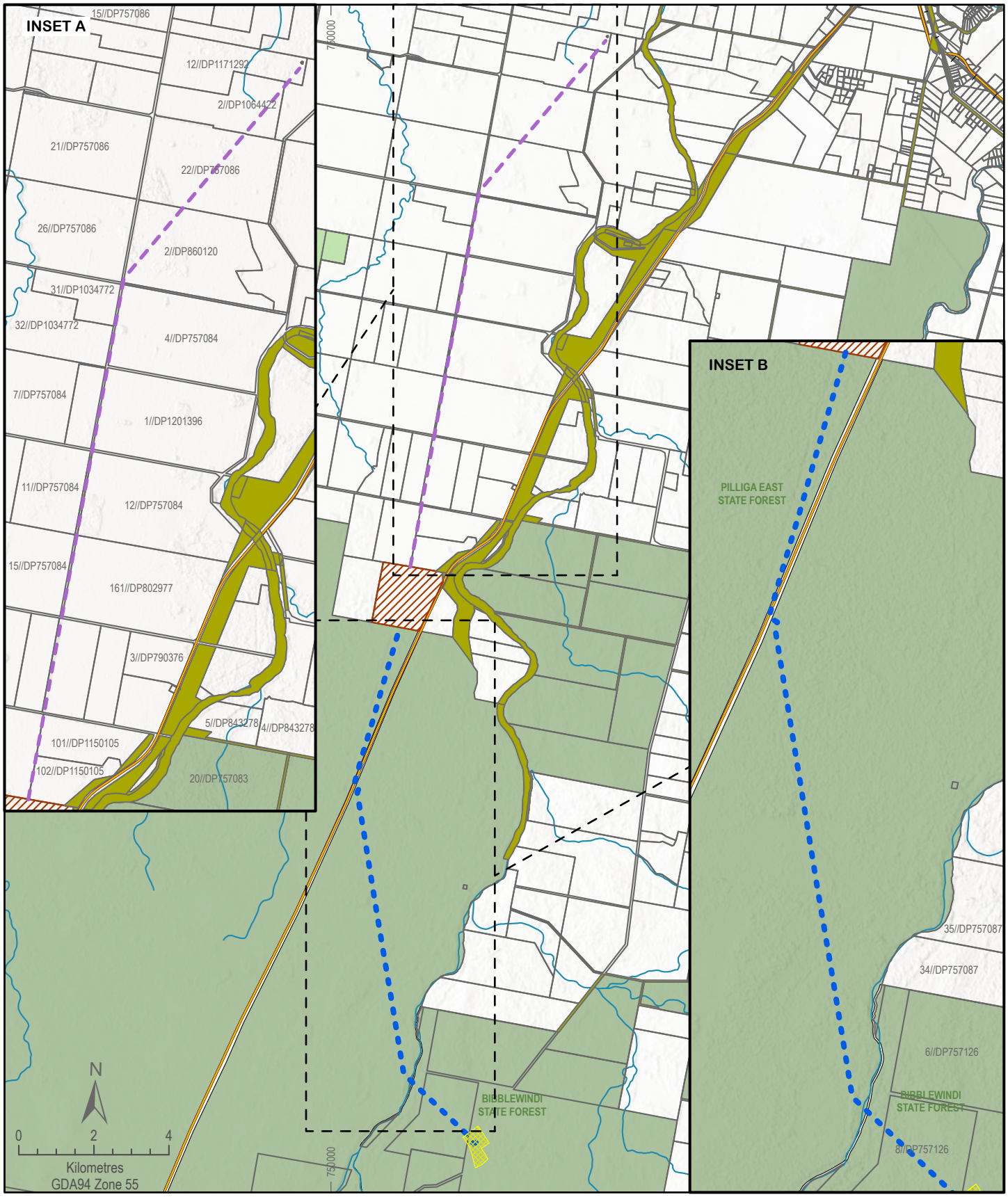
Table 7.1 Key personnel roles

Position / Role	Responsibility
Area Manager, Arcadia, Scotia and Narrabri Operations	• Overall responsibility for the operation of all gas transmission and electricity generation infrastructure. • Ensure the environmental performance of the project is consistent with the conditions of the project approval and existing Santos policies on Health, Safety and Environment. • Overall responsibility for legislative compliance, contractual obligations and resourcing to achieve the objectives of the OEMP.
HSER Manager - Onshore	• Reports to the Executive Vice President Onshore Oil and Gas • Accountable to ensure awareness of the compliance requirements of the OEMP. • Ensures adequate resources are available to advise on the implementation of the OEMP and to undertake assurance of compliance in its implementation.
Team Leader Narrabri Operations	• Reports to the Area Manager, Arcadia, Scotia and Narrabri Operations. • Maintains accountability, either directly or by delegation, for the overall management of the Project site and the operation of Project components. • Retains responsibility for the conveyance of the OEMP and its objectives to all employees and contractors entering site.
Team Leader Onshore Environment	• Reports to the HSER Manager - Onshore. • Maintains responsibility for the implementation, maintenance and monitoring of compliance with the OEMP. • Oversees the implementation of all management plans, protocols and strategies required under the CoC. • Consults with regulatory authorities as required. • Ensures required monitoring is undertaken, in cooperation with the Environmental Advisor. • Ensures required maintenance is undertaken, in cooperation with the Area Manager. • Provides measures for continual improvement to the plans and procedures. • Coordinates training for relevant employees and contractors of the requirements of the OEMP. • Prepares the annual reports, reviews and returns. • Coordinates the development of the site rehabilitation objectives and closure criteria in consultation with key stakeholders; and coordinates the completion of rehabilitation activities.

Position / Role	Responsibility
	• Liaises with regulatory authorities regarding environment management and community relations. • Reviews and updates the environment management documents referred to in this OEMP. • Responds to community complaints.
Environmental Advisor(s)	• Reports to the Team Leader – Onshore Environment. • Maintains accountability for the monitoring of compliance with the OEMP. • Advises operations field staff on environmental issues. • Responsible for assessing, developing and validating the implementation of erosion and sediment plans. • Raises environment awareness among Project personnel and contractors via environmental induction presentations, environmental training packages and toolbox talks. • Provides environmental training to relevant personnel as required. • Coordinates investigations of environmental incidents or complaints. • Manages environmental complaints in accordance with the complaints management procedure. • Coordinates the management of records and reporting of environmental monitoring and management data. • Responsible for site inspections, monitoring and surveys, including but not limited to the following environmental aspects: water; noise; biodiversity; rehabilitation; heritage; and waste.
Operator Maintainer, Operations	• Reports to the Team Leader Narrabri Operations. • Maintains accountability for the monitoring of compliance with the environmental obligations during the life of the operation. • Undertakes site inspections
Santos personnel and contractors	• Perform tasks in an environmentally responsible manner. • Notify the Environmental Advisor of any environmental incidents and exceedances. • Undertake all activities in accordance with the OEMP. • Participate in site inspections of own work areas as part of a continuous improvement process.

8. Land use

The gas flow line corridor between the Bibblewindi CSG Pilot and the WPPS traverses two main land use classifications, namely approximately 14 km within lands designated Crown Lands State Forest under the *Forestry Act 2012* and 18 km within lands designated Zone 1a (General Rural) under the Narrabri Local Environment Plan 2012.The distinction between these land use zones is shown in Figure 8.1.



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ONWARD CONSULTING

LEGEND

- Leewood
- Bibblewindi
- Crown land
- Lot and DP boundary
- Leewood to Wilga Park infrastructure corridor
- Bibblewindi to Leewood infrastructure corridor
- Highway
- Railway
- Watercourse
- State Forest
- Parks and reserves

NARRABRI GAS PROJECT

Figure 8-1

Land Use Zones - Narrabri CSG Utilisation Project

9. Environmental issues and management

Key environmental issues for the project have been identified below and are a combination of approval requirements and good practice environmental management practices and procedures implemented by Santos.

9.1 Air quality

An Air Quality and Greenhouse Gas Assessment for the Eastern Star Gas Utilisation Project was carried out in 2007 in relation to a proposed upgrade of the WPPS and CSG extraction and flow lines infrastructure.

The atmospheric dispersion modelling carried out in the assessment used the "Ausplume Gaussian Plume Dispersion Model Software (version 6.0)", developed by the Environment Protection Authority of Victoria. The impact of NO_2 emissions released from Wilga Park Power Station was assessed at the eight closest residential receptors to the station using two methods of calculating NO_2; one a highly conservative approach, and one which seeks to represent NO_2 chemistry more closely. The predicted results of the modelling indicate that for both methods the NO_2 concentrations to be below the health-based project limits of 246 microgram per cubic metre air (**µg/m^3**) (1-hour maximum) and 62 µg/m^3 (annual average) at all residential receptors.

Minor localised emissions of dust may be experienced during construction of any new CSG flow lines from the gas fields to the power station. However, due to the large buffer distance between the power station and the nearest residence and the low density of residences along the pipeline route, these impacts, if they arise, can be managed through good dust management practices.

Considering the above air quality modelling results, it is concluded that the Project (including any proposed upgrade to the Wilga Park Power Station) should not have a detrimental health impact upon the surrounding residential receptors or cause an air pollution nuisance.

Table 9.1 sets out the air quality requirements, their approval conditions and the actions/ measures to be taken to mitigate and manage air quality impacts from the Project.

Table 9.1 Air quality requirements

Key Issue(s)/Approval Requirements	Source	Management Action/Mitigation Measure
Air emissions from each generator exhaust stack not to exceed 450 mg/m³ nitrogen dioxide ($N0_2$) and/or nitric oxide (NO). (Approval condition 2.4)	Power generators or turbines up to a total combined maximum capacity of 12 MW.	• The turbines to be operated in accordance manufacturers manuals. • Daily inspections to ensure there are no visual emissions from the exhaust stacks. • Monitoring of pollutants emitted from exhaust stacks is required when generator capacity exceeds 12 MW. Condition 6.3(f)(i) requires consultation with the EPA on measures to monitor and manage air quality. Appendix A contains Santos' letter to the EPA, and Santos will conduct the monitoring in accordance with the methods described in that letter. Santos will undertake this monitoring at each stage of expansion. (Approval condition 2.3).

Key Issue(s)/Approval Requirements	Source	Management Action/Mitigation Measure
Air emissions not to pose an aviation hazard and vertical exhaust velocity not to exceed 4.3 m/second. Approval condition 2.30.	Power generators or turbines up to a total combined maximum capacity of 12 MW.	• Ensure that before the capacity of the power station exceeds 12 MW, power station design details to be provided the Commonwealth Departments of Defence and the Civil Aviation Safety Authority. The Secretary DPE is to be advised of the outcome. (Approval condition 2.30).
Nuisance dust emissions.	Access tracks and roads. Other disturbed areas.	• Control dust using water as suppressant.

9.2 Noise and vibration

The Wilga Park Power Station originally comprised twelve individual 1 MW Jenbacher gas reciprocating engine driven generators and associated transformer and switchyard facilities. Each generator set is enclosed in a 12 m^3 shipping container fully lined with acoustic material cover by perforated sheet metal. Acoustic louvers are fitted to ventilation openings and doors are fully sealed with rubber gaskets.

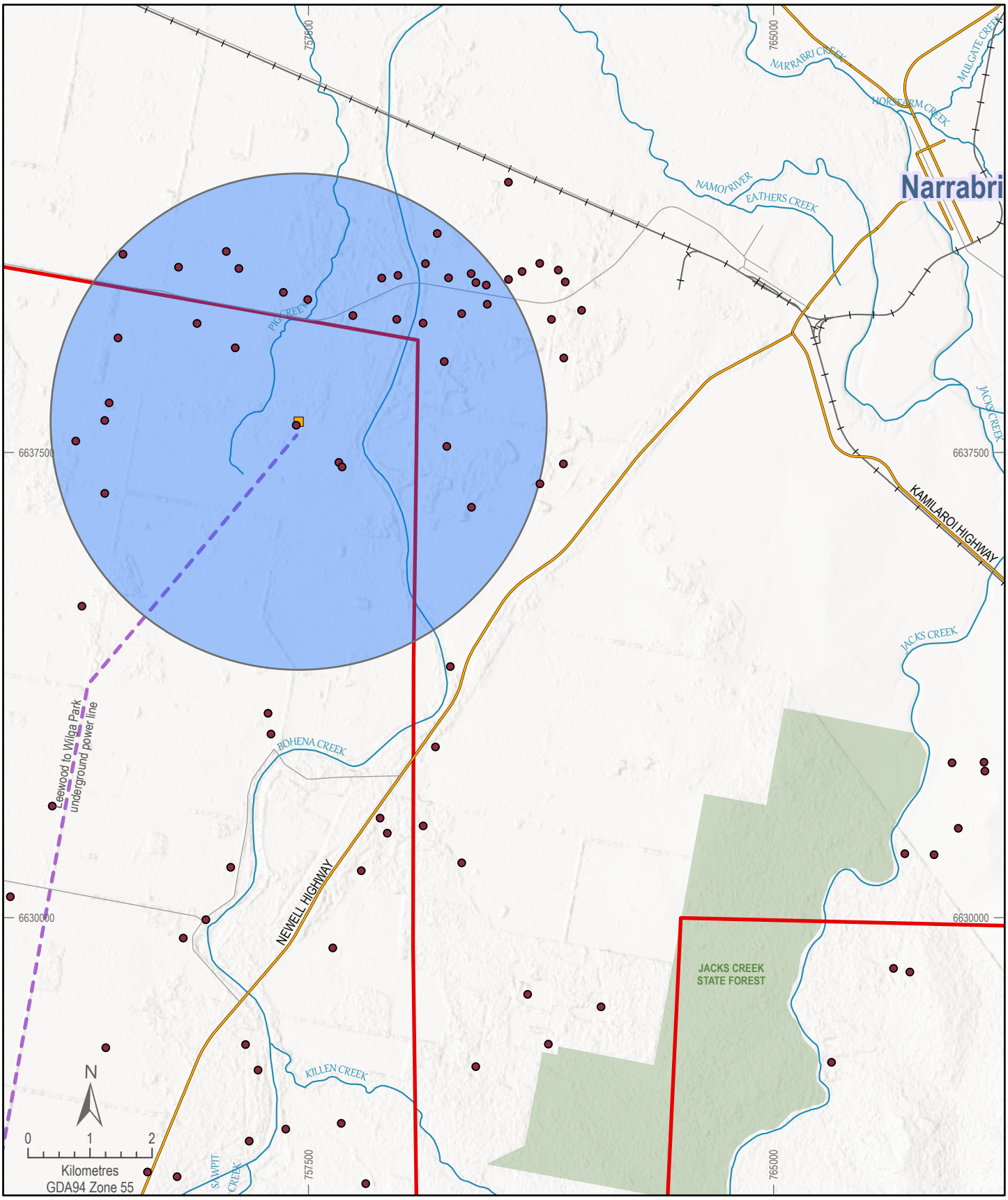
In 2009 to 2010, four 3 MW new generators were brought onto the site and are operational. Eight of the 1 MW generator sets were removed in 2011 for operational reasons. An additional two 3 MW generators were brought onto site and as of 2022; four 1 MW generators and six 3 MW generators are operational resulting in peak output of 22 MW.

A noise impact assessment was undertaken in August 2007 for the NCSG Utilisation Project. Noise emissions from the site, construction activities and vehicle movements associated with the Project were assessed against (the then) NSW Department of Environment and Climate Change criteria. The assessment found no exceedance of the noise criteria during any period (day, evening, night) under adverse weather conditions for noise propagation at any residential receiver. The main potential for noise impacts associated with the project identified in the assessment was any upgrade of the WPPS from 10 to 40 MW nominal capacity.

Residences within 4 km of the WPPS are shown in Figure 9.1.

Noise output from the WPPS would have changed since the original assessment, however noise monitoring has been routinely completed in accordance with the Project Approval (Condition 3.5) since exceeding the 12 MW trigger. The most recent noise monitoring completed in 2022 did not identify any non-compliances nor have there been any noise complaints received since the power station began generating above 12 MW and subsequently 16 MW.

Noise and vibration requirements and associated mitigation and management measures are set out in Table 9.2.



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ONWARD CONSULTING

LEGEND

- NGP boundary
- Wilga Park Power Station
- Leewood to Wilga Park infrastructure corridor
- Sensitive receivers
- 4 km buffer
- Highway
- Major roads
- Railway
- Watercourse
- State Forest

NARRABRI GAS PROJECT

Figure 9-1

Residences and Property within 4km of Wilga Park Power Station

Table 9.2 Noise and vibration requirements

Key Issue(s)/Approval Requirements	Source	Management Action/Mitigation Measure
Construction noise that will result in an audible noise at a residential premise must only be undertaken during the following hours: • **7:00 am to 6:00 pm Monday to Friday (incl.)** • **8:00 am to 1:00 pm Saturday.** • **At no time on Sundays or public holidays.** (Approval condition 2.6).	Any future expansion of the power station or maintenance work. Constructing new water and gas flow lines.	• Ensure that construction work that is likely to give rise to an audible noise at a residential premise is undertaken within the stipulated times in the approval. • If it is necessary to undertake construction work outside the specified hours prior written approval to obtained from the Secretary. (Approval condition 2.7)
Operational noise from the power station with a capacity of less than 12 MW.	Power generators/turbines up to a total combined maximum capacity of 12 MW.	• There are no limits specified in project approval conditions. • Ensure power generators are properly operated and maintained
Operational noise from the power station with a capacity greater than 12 MW must not cause noise when measured at a residential premise must not exceed: • **an LAeq (15 minute) 35 dBA; and** • **during night periods an LA1 of 45 dBA** Note: The noise limits above only apply under wind speeds up to ms-1 (measured 10 m above ground level), or under temperature inversion conditions of up to 3ºC/100 m and winds speeds of up to 2m/s at 10 m above the ground. (Approval condition 2.8) Ensure the vibration resulting from the construction and operation of the project at a capacity of more than 12 MW does not exceed the preferred vibration values for low probability of adverse comment presented in *Assessing Vibration: A Technical Guideline* (DECC, February 2006), at any affected residential dwelling). (Approval condition 2.5)	Power generators/ turbines with total combined maximum capacity of greater than 12 MW.	• Identify and record information on existing sensitive receivers and any vacant land zoned residential. • Undertake noise audits to ensure compliance with noise limits following any expansion or significant change such that power generation exceeds 12 MW capacity. Condition 6.3(f)(ii) requires consultation with the EPA on measures to monitor and manage noise and vibration. Appendix A contains Santos' letter to the EPA, and Santos will conduct the monitoring in accordance with the methods described in that letter. Santos will undertake this monitoring at each stage of expansion • Where the noise limits cannot be complied with all reasonable and feasible noise abatement measures at source are to be implemented. • Refer to conditions 2.8 to 2.15 (inclusive) of the project approval which outlines these requirements in full. • Condition 6.3(f)(ii) requires consultation with the EPA on measures to monitor and manage noise and vibration. Appendix A contains Santos' letter to the EPA, that letter proposed no vibration monitoring.

9.3 Surface waters and stormwater management

Disturbed and/or exposed soils cleared of protective ground cover are potentially subject to erosion and structural degradation as a result of construction activities, stormwater runoff and wind. While erosion and sedimentation are natural processes, accelerated erosion occurs on construction sites and to this end a proper and effective Erosion and Sediment Control Plan will be implemented to provide the necessary strategies and procedures to minimise any adverse environmental impacts to land and waterways. The relevant surface water requirements are listed in Table 9.3.

Table 9.3 Surface water requirements

Key Issue(s) / Approval Requirements	Source	Management Action/Mitigation Measure
Potential to release contaminated stormwater and sediment to waterways during wet weather.	Disturbed areas such as well lease pads, pipeline easements and work sites.	• Ensure that an effective Erosion and Sediment Control Plan or similar has been developed and is being implemented. Minimise the area of land disturbance when planning for a new development. • Diversion bunds or drains to be constructed around proposed disturbance areas to direct clean stormwater around them. • Soil stockpiles to be located away from watercourses and with measures in place to secure the stockpile to prevent soil loss during wet weather and windblown dust. • Stabilize and rehabilitate disturbed areas as soon as is reasonably practical to do so following completion of works. • Erosion and sediment control devices to be properly maintained and remain effective until the disturbed area is rehabilitated.
Potential for the discharge sediment and other pollutants to land or waters during construction activities. (Approval condition 2.25).	Construction activity involving land disturbance.	• Ensure activity is carried out in accordance with Landcom's *Managing Urban Stormwater: Soils and Conservation* (Ref:http://www.environment.nsw.gov.au/resources/water/BlueBookVol1.pdf). (Approval condition 2.25)
Water quality impacts on waterways.	Provision of linear infrastructure (e.g. pipelines and tracks) where creeks and watercourses crossings are needed.	• Waterway crossings will be designed by a suitably qualified person, consistent with the NSW Guidelines for Controlled activities. • DPI Fisheries to be consulted in planning the construction methodology for waterway crossings. • Open trenching works in, or within 20 m of, watercourses to not be undertaken during significant rainfall events. • Construction activities are not to impede lateral water flows. • Waterway crossings will be rehabilitated such that the natural flow of water is unimpeded and stream bank stability is maintained to prevent erosion. This rehabilitation work must be completed within 3 months of the completion of waterway crossing works and to the satisfaction of the Secretary. (Approval condition 2.26)

9.4 Hazards – Wilga Park Power Station

The potential hazards and risks to the environment from the operation of the power station are spillage from the receipt, storage and use at the site of the three following potentially hazardous materials:

- lubricating oil
- coolant additive
- corrosion inhibitor

These materials are contained and handled within appropriate enclosures, either in the internal storage facility within the workshop (coolant additives) or the bunded oil storage areas.

Appropriate spill kits are available on site to manage any spills released directly or indirectly to the environment in the unlikely event a spillage occurs. It is noted that all three products are not classified as dangerous goods under the Australian Code for Transportation of Dangerous Goods by Road & Rail.

Table 9.4 outlines the hazardous goods requirements.

Table 9.4 Hazardous goods requirements

Key Issue(s)/Approval Requirements	Source	Management Action/Mitigation Measure
Spillage of hazardous materials and/or chemicals to the environment.	Hazardous material and/or chemicals used at the power station.	• Ensure that hazardous material and chemicals are stored within impervious bunds or bunded areas in accordance with the relevant Australian Standards. (Approval condition 2.29) • Readily accessible spill kits to be made available.

9.5 Hazards – operation of gas flow line

Table 9.5 below summarises potential hazards and risks relating to the operation of the gas flow line.

The consequence for each hazard/threat has been considered from public, employee, environmental and economic perspectives in the risk assessment with mitigation strategies incorporated into project design, construction and operations planning.

Table 9.5 Hazard risk register

Hazard	Hazard Frequency	Consequence/Risk Rating
Third Party Interference	Rare	Severe/Low
Fracture of Flow Line	Almost never	Severe/Low
Overpressure of Flow Line	Unlikely	Minor/Low
Escape of Flammable Contents	Almost never	Severe/Low
Pipe Exposure at Road Crossing	Unlikely	Minor/Low
Pipe Exposure at Creek Crossing	Unlikely	Minor/Low

The pipeline has been designed and constructed to a high standard and in accordance with relevant Australian Standards which ensures its integrity during operation and minimises hazard risk to the greatest extent practicable. The pipeline easement is inspected every six months and integrity testing is carried out in accordance with the manufacturers' recommendations.

9.6 Hazards – bushfires

Santos has developed a Fire Management Plan (Ref: 0041-150-PLA-0004 November 2022) for its Narrabri CSG Project that is designed to provide clear direction for Santos' Energy NSW operations on preventative measures to minimise the risk of ignition along with management and response measures in the event a bushfire in the area of its operations. The high standard of the design, construction and maintenance of the pipeline to ensure its integrity is also an important factor in recognising that the risk of bushfire from a leak/vent of gas is negligible. The requirements for bushfire, and the management and mitigation measures are summarised in Table 9.6.

Table 9.6 Bushfire requirements

Key Issue(s)/Approval Requirements	Source	Management Action/Mitigation Measure
Prevention of Bushfires and Management of Bushfire Threat.	Bushfire threat to Santos assets and the broader community area.	• Ensure that the Bushfire Management Plan has identified all the potential fire risks associated with its operation and that the business unit is fully prepared and able to appropriately respond in the event of a bush fire. • Ensure that all staff are aware of their responsibilities under the Plan and that they are properly trained to respond to bush fire incidents and emergencies. • A fire tanker with a capacity of not less than 400 litres is to be on standby at all times together with adequate devices and appliance to prevent or retard the spread of fire. • No open burning to be carried out without the consent of the local fire authority and landholder. • CSG wells will be remotely isolated if well will be impacted by fire. • Firebreaks/asset protection zones to be provided and maintained at critical infrastructure. • Ensure compliance with relevant statutory requirements for bushfire management.

9.7 Hazards – slug catcher

Mod 7 for the Narrabri CSG Utilisation Project involved the addition of conditions surrounding the construction and use of a slug catcher, water tank and associated infrastructure. Condition 2.31 (A) requires a Hazard and Operability (HAZOP) study to be undertaken prior to construction that must:

- be undertaken by a suitably qualified and independent person;
- be consistent with the Hazardous industry Planning Advisory Paper No. 8, '*HAZOP Guidelines'* (Department of Planning, 2011); and
- consider concurrent operations and any tie-ins between any new and existing plant.

This report was completed in July 2014 by Udhe Shedden Australia Pty Ltd (now thyssenkrupp Uhde Australia), to satisfy requirements of EHSMS 09 Hazard Study 3. The results of the study can still be applied to current operations and fulfills the requirements under the Project Approval. Recommendations from HAZOP study are provided in Table 9.7.

Table 9.7 HAZOP requirements

Key Issue(s)/Approval Requirements	Source	Management Action/Mitigation Measure
Santos must implement the recommendations of the Hazard and Operability Study required under condition 2.31 (A). (Condition 2.31 (B)	Operation of slug catcher.	• Temperature protection at Bibblewindi Compressor Station to be reviewed and improved, if necessary, by the Compressor project. • Maintenance procedures to require that during XV-00006 maintenance and bypass of the slug catcher, operation shall be free flow (i.e. Bibblewindi compressor shutdown) to avoid power station overpressure. • PSV sizing at slug catcher to be reviewed for 2 phase relief. • Determine if ambient conditions allow dead leg freezing and, if so, provide winterization. • Pigging procedure required to ensure correct line-up during pigging and that pigging only occurs under free flow conditions. • Nitrogen purging required from pig receiver through to power station to air free.

9.8 Waste

Only small quantities of solid and liquid waste are currently being generated by this project and coming mainly from the operation of the power station; comprising waste oils and coolants and general domestic waste.

Table 9.8 outlines the waste requirements for the Project.

Table 9.8 Waste requirements

Key Issue(s)/Approval Requirements	Source	Management Action/Mitigation Measure
Proper disposal of solid and liquid wastes generated by the project.	Wilga Park Power Station.	• Develop and implement a Waste Management Plan for the project based on the waste reduction hierarchy of avoid, reuse, recycle, recover, treat and dispose (Ref: Document Number 0011-650-PLA-0002-Rev.2 ENSW Operations Waste Management Plan Feb 2014 on Team Binder). • Any liquid and/or non-liquid waste for processing, resource recovery or disposal at the premises to be assessed and classified in accordance with the DECC Waste Classification Guidelines, prior to despatch from the site. (Approval condition 2.28) • Ensure no wastes are received at the site form sources outside the site. (Approval condition 2.27). • Ensure all waste generated on site is not disposed of at the site. (Approval condition 2.27) • Regulated waste will be collected by licensed contractors for off-site disposal. • General and recyclable waste will be transported and disposed off-site at appropriate and lawful facilities. • Appropriate waste/recycling receptacles will be provided and will include covered rubbish bins for disposal of domestic waste. • Manage on-site sewage treatment and disposal in accordance with the requirements of Narrabri Shire Council.

9.9 Pests and weeds

Without appropriate mitigation strategies in place, there is potential for weed species to be spread along the gas flow line corridor during any construction activity involving land disturbance. For the scope of this project, a weed is defined as being any plant species that is growing where it should not be and is not limited to noxious or declared weeds.

Tale 9.9 summarises the requirements for the Project to mitigate and measure pests and weeds.

Table 9.9 Pests and weeds requirements

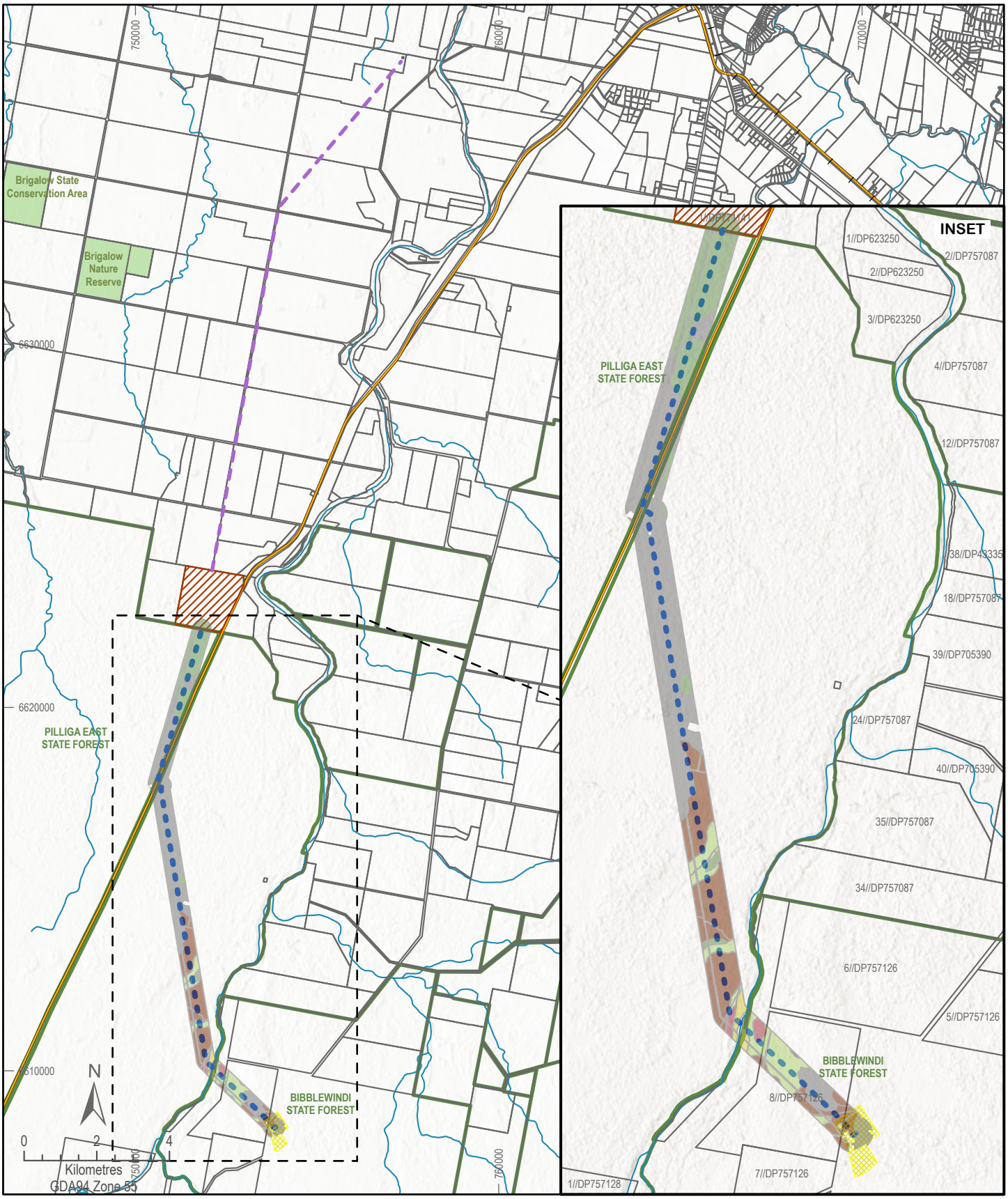
Key Issue(s)/Approval Requirements	Source	Management Action/Mitigation Measure
Weeds being transferred from “dirty” to “clean” areas within the project area.	Mobile plant equipment and vehicles used in construction activities.	• A proper and effective Weed/Pest Management Plan has been developed and being implemented. • Plant equipment and vehicles are properly cleaned and maintained in accordance with the Pest Management Plan to minimise the risk of weed transfer • Plant equipment and vehicle wash down should result in the removal of all soils, mud and vegetative matter and in accordance with Santos’ internal wash down and inspection procedures.

9.10 Landscape and ecology

Field surveys prior to the construction of the pipeline identified three native communities dominating PAL 2 and hence the area covered by the project area. The communities are:

- *Corymbia trachyphloia-Eucalyptus dwyeri* Woodland;
- *Eucalyptus crebra* Dry Open Forest; and
- Pilliga Box *Eucalyptus pilligaensis* Dry Open Forest.

Figure 9.2 presents the locations of each of the three vegetation communities within the gas flow line corridor and Table 9.10 summarises the structure and principal flora types within these vegetation communities.



Santos

ONWARD CONSULTING

LEGEND

- Leewood
- Bibblewindi
- Leewood to Wilga Park infrastructure corridor
- Bibblewindi to Leewood infrastructure corridor
- Lot and DP boundary
- Highway
- Railway
- Watercourse
- State Forest
- Parks and reserves

Vegetation community

- 88 Pilliga Box - White Cypress Pine - Buloke shrubby woodland
- 202 Fuzzy Box Woodland on alluvial brown loam soils
- 398 Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats
- 399 Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland)
- 401 Rough-barked Apple - red gum - cypress pine woodland on sandy flats
- 40X White Bloodwood – Dirty Gum – Rough Barked Apple heathy open woodland on deep sand

NARRABRI GAS PROJECT

Figure 9-2

Gas Flowline Corridor
Vegetation Communities

Table 9.10 Summary of dominant vegetation communities in the Project Area

Vegetation Community	Summary
Corymbia trachyphloia- Eucalyptus dwyeri Woodland	Either or both Brown bloodwood & Dwyers Red Gum are present. Bloodwood dominates because of its taller stature; Dwyer red gum is typically 'mallee' in form. Midstratum includes *Allocasuarina gymnanthera*, *Aotus m*ollis, *Brachyloma daphnoides*, *Calytrix tetrag*ona, *Dodonea peduncularis*, *Grevillea floribunda* and *Homoranthus flavescens*. Ground layer typically sparse with *Actinotus h*elianthii, *Helichrysum c*ollinum, *Shoenus ericatorum* and various *Aristida* spp. Community is typically sparse & open stands of bloodwood ≥20m and red gum to ≥15m. Mid density stands of heath shrubs or white cypress (scattered saplings). Ground layers typically sparse. Found in the Bibblewindi area on poor sandy soils with good drainage
Eucalyptus crebra Dry Open Forest	Narrow leaved Ironbark is always present and usually dominant. Other common species include White pine *Callitris gl*aucophylla and bull oak *Allocasuarina luehmannii*. Midstratum of hopbushes *Dodonea s*pp, *Calytrix tetrag*ona, wattles *Acacia* spp, and broom bitter pea *Daviesia genistifolia*. Ground layer most diverse, with mat-rushes *Lomandra* spp, sawsedge *Gahnia aspera*, flax lily *Dianella longifolia*, wild onion *Bulbine semibarbata*, *Laxmannia gracilis*, *Calandrinia* spp, *Goodenia* spp, bluebells *Wahlenbergia* spp, cutleaf daisy *Brachycome multifida* and the fern *Cheilanthes austrotenuifolia* very common. Open stands of narrow leaved ironbark at around 20m tall with or without white cypress and bull oak over the midstratum with scattered stands or sparse individual sclerophyllous shrub. Sparse to mid-dense ground layer of forbs, grasses and graminoids. Community occurs on silty sand with adequate drainage
Pilliga Box Eucalyptus pilligaensis Dry Open Forest	Pilliga box *Eucalyptus pilligaensis* is the dominant species, and Bull oak is common. White cypress and Narrowl eaved ironbark are less common. Mid stratum vegetation is very sparse or absent. Ground layer vegetation is dominated by grasses such as *Paspalidium distans* and *Eragrostis sterilis* elsewhere. Other common species include burr-daisy *Calotis cuneifolia*, bluebells *Wahlenbergia* spp, the grassy sedge *Carex inversa*, saw sedge *Gahnia aspera*, and mat-rushes *Lomandra* spp. This community typically consists of mature trees over occasional stands of coppice and dense regrowth and sparse grasses and forbs. This community occurs in the southern part of the Study Area, often on darker silty soils. No threatened species were detected in this community in the Study Area. The community is potential habitat for the threatened species *Diuris tricolor*, *Polygala linariifolia*, and *Rulingia procumbens*. This community is classified as Pilliga Outwash Dry Sclerophyll Forests (Keith 2004) or Type 193 White Cypress Pine – Box (Forestry Commission 1989). It is not listed as endangered under the BC Act or EPBC Act.

The open agricultural land between the East Pilliga State Forest and the Wilga Park Power Station is either improved pasture or cropping paddock and has not been subject to a specific flora survey effort, as there was no need to modify or remove existing vegetation to facilitate the installation of the Bibblewindi - Wilga Park gas flow line for these areas.

Table 9.11 summarises the requirements of the Project for landscape and ecology.

Table 9.11 Landscape and ecology requirements

Key Issue(s)/Approval Requirements	Source	Management Action/Mitigation Measure
Land disturbance and vegetation clearing is limited as far as practicable. (Approval condition 2.33)	Land disturbance and vegetation clearing during construction activities	• When vegetation clearing activities are undertaken maximise the retention of significant vegetation and mature trees. (Approval condition 2.33).
Offset package (agreed to by Namoi Catchment Authority and OEH to be provided by Santos) as a compensatory habitat package. (Approval condition 2.34) *Note: The environmental values of the offset area will need to be maintained and/or enhanced until such time ownership of the land is transferred to the NSW Govt.*	Warialda Offset (DP751132)	• Ensure offset area is securely fenced to prevent access by stock
Visual impacts of development to be minimised. (Approval condition 2.37)	Planning new development	• Urban design and landscaping measures to be developed and implemented and report provided to the Secretary DPE prior to the commencement of construction activities. (Approval condition 2.37)
The presence of previously unidentified Aboriginal objects in the course of construction activity. (Approval condition 2.35)	Land Disturbance and Construction Activities	• Work to cease immediately. • OEH to be notified in accordance with the *National Parks and Wildlife Act 1974* and works not to recommence until written authorisation or otherwise is received from OEH. (Approval condition 2.35)
The presence of previously unidentified historical relics in the course of construction activity. (Approval condition 2.36)	Land Disturbance and Construction Activities	• Work to cease immediately and the Heritage Office notified in accordance with the *Heritage Act 1977*. • Work only to commence with the written approval of the Heritage Office. (Approval condition 2.36)

10. Contingency planning and incident management

10.1 Emergency and incident management

During the operational phase, the Santos Management System provides guidance and direction for managing all environmental incidents and complaints. All incidents, hazards/near misses and complaints are categorized according to SMS requirements, with immediate internal notification to respective management levels commensurate with severity and level of environmental harm caused or threatened.

Santos has developed the following key documents relating to emergency and incident management:

- Management Standard SMS-MS11-ST1 Emergency and Crisis Management.
- Management Standard SMS-MS11-ST2 Incident Reporting, Investigation and Learning.
- NSW Incident Management Plan.
- NSW Emergency Response Plan, and
- Narrabri Gas Project Pollution Incident Response Management Plan (**PIRMP**).

Santos' system of emergency response is detailed in Figure 10.1.

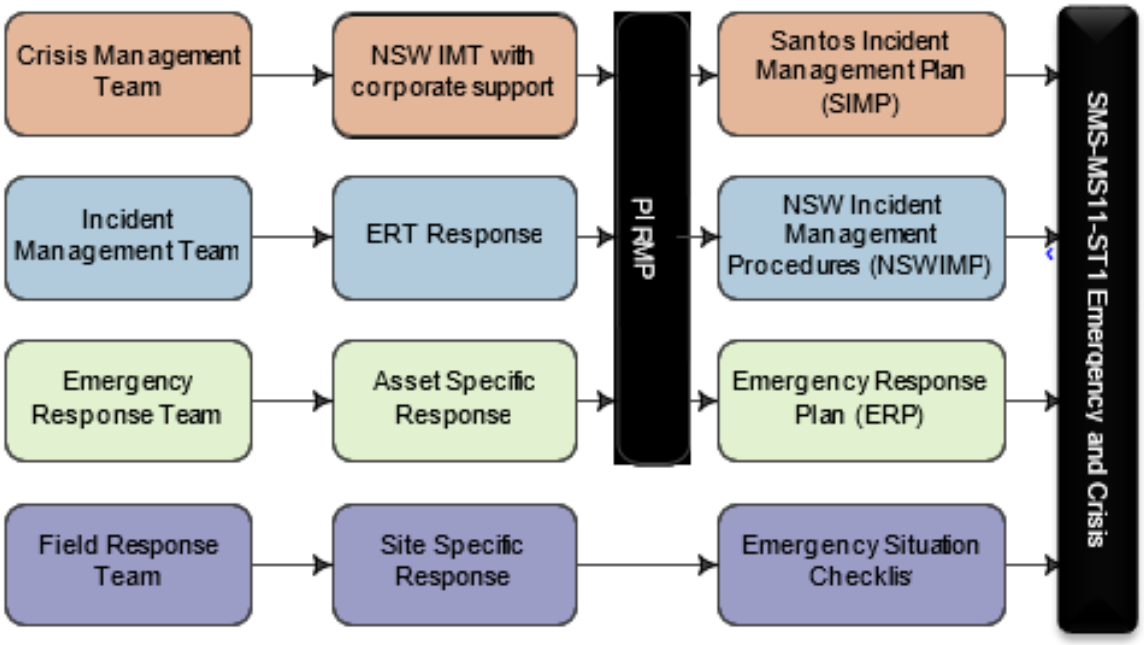


Figure 10.1 Emergency Response Framework

All incidents including environmental incidents, near misses, non-conformance events and complaints are recorded electronically and managed through the Santos' EHS Toolbox in the Incident Management System (**IMS**) and Audit and Inspection Manager (**AIM**).

EHS Incident and near misses are investigated to identify the causal factors and associated underlying systemic weaknesses (root causes).

SMS-MS11-ST2 Incident Reporting, Investigation and Learning outlines the process in which to determine the correct level of incident investigation. For significant incidents, the Tap Root investigation process is used.

10.2 Environmental incident reporting

Statutory obligations for environmental incident reporting are included within:

- The *Environment Planning and Assessment Act 1979* approval conditions.
- The *Protection of the Environment Operations Act 1997*.

Santos SMS provides the mechanism for managing incidents. All incidents, hazards / near misses are categorized according to SMS requirements, with immediate internal notification to respective management levels commensurate with severity. This process is illustrated in Figure 10.2 below.

Condition 7.1 of SSD 07_0023 requires the Secretary to be notified of any incident with actual or potential significant off-site impacts on people or the biophysical environment within 12 hours of becoming aware of the incident. Written details of the incident are to be provided to the Secretary within seven days of the date on which the incident occurred.

For incidents causing or threatening to cause material harm, Santos is required by the POEO Act to immediately notify the respective agencies EPA, DRE as well as NSW Health, WorkCover NSW, Local Council and Fire and Rescue NSW. The notification must be made by telephoning the Environment Line service on 131 555.

In accordance with Section 147 of the POEO Act, harm to the environment is material harm if:

- it involves actual or potential harm to the health or safety of human beings or to ecosystems, that is not trivial, or
- it results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000 (including the reasonable costs and expenses that would be incurred to prevent, mitigate or make good harm to the environment).

The SSD 07-0023 requires that a written report on the incident is provided to the relevant agencies within 7 days of the date of the incident.

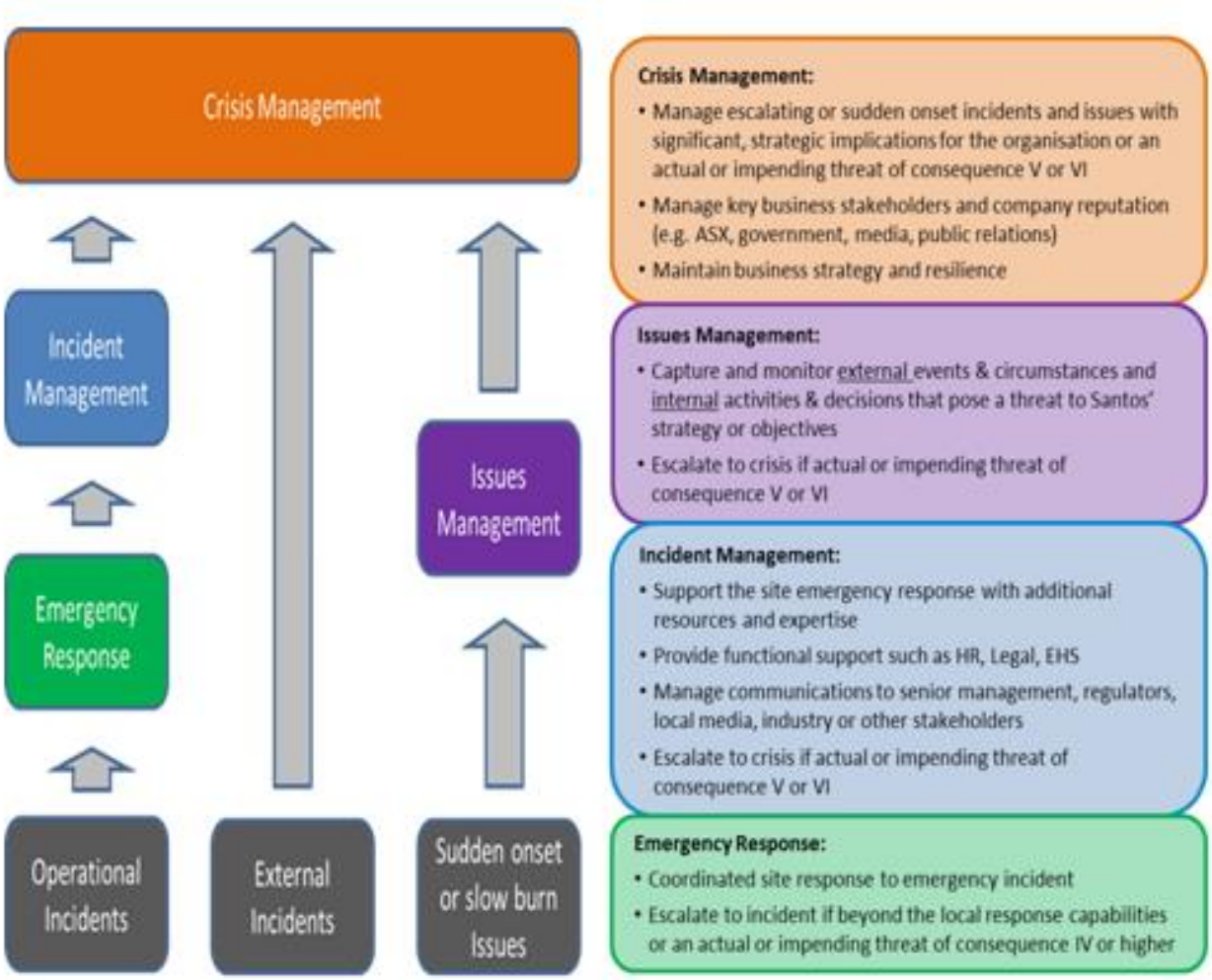


Figure 10.2 Emergency response procedure

11. Rehabilitation and decommissioning

A 10 m wide pipeline corridor linking the Bibblewindi and the Bohena CSG pilots and the Wilga Park Power Station has been constructed. The corridor required the removal of most of the vegetation within the 10 m wide corridor for the length of the flow line at those locations where the pipeline route:

- occurs within the forested zone; and cannot make use of existing roads and access tracks; or
- has been located upon the cleared lands but still required some modification or removal of vegetation in situ.

The buried flow line has line of sight markers at regular intervals and/or where it passes below fence lines, roads and other utilities.

Prior to the commencement of the Bibblewindi to Wilga Park gas flow line installation in 2009, brush (including logs from felled trees) and topsoil were removed from the easement separately and stockpiled within the easement corridor. Following installation, the topsoil was first reinstated followed by the brush to allow for natural rehabilitation existing native species. A 3 m section of the easement was not reinstated to allow for access along the corridor. This is required for the ongoing access to the gas flow line for maintenance purposes.

During 2013 and 2014 Santos constructed a water pipeline within and along the existing easement to transfer stored associated water in the Bibblewindi ponds to the newly constructed dams at the new Leewood Water Facility. The same methodology described above was implemented with disturbed areas resulting from the construction works being reinstated in a timely manner. Decommissioning of pipeline systems will be carried out in accordance with Australian Standard AS 2885 series of standards.

12. Training and awareness

An Environmental Training and Awareness Program has been developed by Santos for the operation of the Narrabri Gas Project.

The program for staff and contractors consists of level 1 and 2 on-line induction courses which contains key information on the environmental issues related to the operation of the project and includes the following components:

- Santos Environment, Health and Safety Policy;
- Responsibilities of Santos Personnel;
- Management structure and role definition;
- Records management;
- External contractor requirements;
- Operating conditions and environmental controls
- Noise management;
- Waste management;
- Bushfire management; and
- Emergency response procedures.

In addition, for staff and contractors going to site it is a requirement to undertake a Level 3 Induction on site and prior to commencing any work. This induction contains site specific information on significant EHS hazards and controls implemented to minimise risk as well as site specific emergency response protocols. The Level 3 Induction is specific to the Narrabri Gas field and will include the requirement for mandatory compliance with environmental approvals plans and procedures by all personnel working on the Project.

Santos Corporate Human Resources maintains the system of recording successful completion of Level 1 and Level 2 EHS inductions. The project will maintain a system to record successful completion of Level Three inductions. Santos contractors will maintain a system that records all contractor personnel inductions and training competencies to demonstrate relevant EHS competencies, including those required by legislation.

13. Monitoring and reporting

13.1 Statutory Approval reporting requirements

In the Final Statement of Commitments for the EIS, the proponent committed to providing an Annual Environmental Management Report to DPE within two months of the anniversary of the commencement of site activities. Although the conditions of approval did not require such a report, the commitment is binding under condition 1.1 of the approval.

13.2 Air quality monitoring

Monitoring of air pollution parameters at each generator stack discharge point is required to be undertaken under the approval conditions when the capacity of the power station exceeds 12 MW as per Table 13.1 below, and in accordance with the Approved Methods for the Sampling and Analysis of Pollutants in New South Wales (DEC, 2007), unless otherwise agreed to by EPA.

Table 13.1 Approved methods for the sampling and analysis of pollutants in NSW

Pollutant/Parameter	Units of Measure	Method	Frequency
Nitrogen dioxide (NO2) or nitric oxide (NO), or both (as NO2)	mgm-3	TM 11	Upon the commencement of operation of the Power Station at a capacity of more than 12 megawatts and annually thereafter. Santos consulted with the NSW EPA regarding the monitoring methods. Monitoring will be undertaken in accordance with the methods in Appendix A.
Velocity	ms-1	TM-2	
Volumetric flow rate	m3s-1	TM-2	
Temperature	oC	TM-2	
Moisture content in stack gases	%	TM-22	
Dry gas density	kgm-3	TM-23	
Molecular weight of stack gases	g.gmol-1	TM-23	
Oxygen	%	TM-25	

13.3 Noise monitoring

Table 13.2 Noise monitoring requirements

Requirement/Approval Condition	Frequency/ Timing
Undertake a program to confirm the noise emission performance of the project. The program shall include, but not necessarily be limited to: • noise monitoring consistent with the guidelines provided in the New South Wales Industrial Noise Policy (EPA,2 000), to assess compliance with the maximum allowable noise contributions specified in Table 2 of condition 2 .8 of this approval In relation to the locations specified in condition 2 .8: and • details of any entries in the Complaints Register (condition 5.3 of this approval) relating to noise impacts. A report providing the results of the program shall be submitted to the Secretary and the EPA.	• Noise monitoring program to be undertaken within 90 days of the commencement of the operation of the power station at a capacity of more than 12 MW and at every stage that new generation capacity is added to the power station or, as otherwise agreed by the Secretary and during a period in which the powers station is operating under normal operating conditions (considering all operational generators at the time). • Santos consulted with the EPA regarding the monitoring methods. Monitoring will be undertaken in accordance with the methods in Appendix A. • Within 28 days of completion of the noise assessment required under condition 3.5.

13.4 Hazard audit reporting

Table 13.3 Hazard reporting requirements

Requirement/Approval Condition	Frequency/Timing
Commission and submit for approval a Hazard Audit Report for the Project to the Secretary in accordance with condition 3.6 of the approval.	Within 90 days of, and for each of the following events: • the commencement of the operation of the power station using CSG from the Bibblewindi and Bohena pilots; • the commencement of operation of the power station at a capacity of more than 12 MW; and • the commencement of operation of the power station at a capacity of more than 40 MW.

13.5 Landscape and ecological monitoring

Table 13.4 Landscape and ecological monitoring

Requirement/Approval Condition	Frequency/Timing
Monitoring disturbed areas for the presence of, and the control of introduced weeds as a result of Santos activities in the project area.	Monitoring for weeds to be undertaken regularly during construction activities and for previously disturbed areas on a semi-regular basis during operations or as specified in individual land holder agreements.

13.6 Santos compliance

An internal environmental inspection schedule has been developed for the Wilga Park Power Station and associated flow lines using a program called Landfolio. The frequency of workplace inspections was determined using a risk-based approach and for this project involves bi-annual inspections of the power station. A reminder will be issued to the person assigned to undertaking the inspections, and their supervisor. The inspections are carried out by a Santos environmental advisor using a comprehensive compliance checklist.

The checklist contains all obligations from the conditions of approval, as well as all commitments made in the EIS.

The inspections are stored in Landfolio and any work required from these inspections is tracked through Santos' EHS Toolbox.

Appendix A – Letter to the EPA

Santos

11 May 2018

NSW EPA
Mark Clyne
Head of Operations
Gas Regulation,
NSW Environment Protection Authority

Our ref: 21/22463
221736
Your ref:

Dear Mark

Wilga Park Power Station
Consultation obligations with the EPA for Project Approval 07_0023

1 Introduction

Santos NSW (Eastern) Limited (Santos) is the operator of the Wilga Park Power Station (WPPS) which was approved in 2008. The Department of Planning and Environment (Department) Minister's condition of approval (Conditions) for the project required the preparation of an Operational Environmental Management Plan (OEMP) in Condition 6.3. The OEMP has been updated and reviewed by the Department on several occasions since 2009.

1.1 Intention of this letter

Project Approval 07_0023 places standards on the proponent with regard to air, noise and vibration, once the WPPS is operating above 12 MW capacity. The WPPS is currently operating under a 12 MW capacity however Santos intend to increase capacity above 12 MW. Prior to increasing capacity Santos will update the OEMP in accordance with the requirements of Condition 6.3 with respect to the proposed measures to manage and monitor air quality, noise and vibration, in consultation with the NSW Environment Protection Authority (EPA). The existing OEMP contemplates operating above 12MW, but only addresses consultation with the EPA and does not include any specifics on the proposed measures to air quality, noise and vibration.

The WPPS is currently operating under a 12 MW capacity however Santos intend to increase capacity above 12 MW. Prior to increasing capacity Santos will update the OEMP to include any consultation with the NSW Environmental Protection Authority (EPA) with respect to the proposed measures to manage and monitor air quality, noise and vibration.

The following documents are appended for convenience to assist this consultation process with the EPA:

- The Planning Approvals and Conditions (Appendix A)
- The latest version of the OEMP (4 May 2018) (Appendix B)
- The email from the Department (27 November 2017) with comments for consideration on the OEMP (Appendix C) with regards to consulting with the EPA

It is requested that the EPA review the information contained within this letter and provide comment as you consider appropriate with regard to the measures to monitor and manage air quality, noise and vibration.

2 Proposed Monitoring Approach

The monitoring approach in this section is proposed to be included in the OEMP.

2.1 Air quality Monitoring

2.1.1 Point source emission sampling

Within 90 days of the commencement of operation of the WPPS at a capacity greater than 12 MW, and at every subsequent stage new generation capacity is added, point source emission sampling will be undertaken to confirm the air quality emissions from the WPPS and confirm compliance with Condition 2.4. Note point source emission sampling will also be undertaken annually to comply with Condition 3.1. Point source emission sampling will be undertaken as follows:

- The measurement location will be at the exhaust stack discharge point of each gas generator in accordance with the *Approved Methods for the Sampling and Analysis of Air Pollutions in New South Wales (DECC, 2007)*.
- The pollutant concentrations and emission parameters measured will include all parameters specified in Condition 3.1.
- Measurements will be undertaken when the WPPS is operating under normal operating conditions of the new generation capacity that is being assessed.

In the event that the point source emission sampling identifies stack discharge concentrations greater than the limits in Condition 2.4, then Santos will prepare a Point Source Emission Report and submit to the Department within 2 months from completion of sampling. The Point Source Emission Report will include the following:

- Details of remedial measures to reduce the point source emissions levels to below the limits.
- A timeline to implement the remedial measures.
- Details of entries into the complaints register relating to air quality.

2.1.2 Air quality impact assessment

Within 90 days of the commencement of operation of the WPPS at a capacity greater than 40 MW an air quality impact assessment will be undertaken in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutions in New South Wales (DECC, 2005)* using the point source emission sampling undertaken at the capacity above 40 MW.

In the event that the air quality impact assessment indicates ground-level concentration above the ground-level concentration levels predicted in the documents contained within Condition 1.1, then an Air Quality Impact Assessment Report will be prepared and submitted to the Department within 2 months

from completion of the air quality impact assessment. The Air Quality Impact Assessment Report will include the following:

- Details of reasonable and feasible remedial measures to reduce the ground-level concentration levels to below the ground-level concentration levels predicted in the documents contained within Condition 1.1
- Details of remedial measures to reduce the ground-level concentration levels to below the limits detailed in the *Approved Methods for the Modelling and Assessment of Air Pollutions in New South Wales (DECC, 2005)*
- A timeline to implement the remedial measures
- Details of entries into the complaints register relating to air quality

2.2 Noise Monitoring

Within 90 days of the commencement of operation of the WPPS at a capacity greater than 12 MW, and at every subsequent stage new generation capacity is added a noise monitoring program will be undertaken to confirm the noise emissions from the WPPS and confirm compliance with Condition 2.8 and 2.9.

Direct noise measurements will be undertaken at all of the locations identified in Condition 2.8 of the Planning Approval when direct measurements are practical. The Noise Policy for Industry (EPA, 2017) states that *'direct measurements at receiver locations are effective when the compliance location is dominated by noise from the industrial premises under investigation'*. When the WPPS is the dominant noise source at the receiver, operator attended measurements will be undertaken based on the following method which is in accordance with the Noise Policy for Industry (EPA, 2017):

- Measurements will be undertaken using a NATA calibrated Type 1 Sound Level Meter (SLM)
- Field calibration checks will be performed at the start and finish of the measurement session and all results discarded if variance is greater than +/-0.5 dB
- The SLM will be paused during any significant extraneous events not generated by the WPPS. The WPPS is a continuous noise source and the difference between the L_{Aeq} and L_{A90} is expected to me small, as such the $L_{A90(15min)}$ will be used as the assessment parameter to ensure extraneous noise is excluded.
- One-third octave levels will be recoded and used to exclude insect noise should it be prevalent at the time of monitoring
- The $L_{Aeq(15min)}$ measurements will be set to linear averaging
- The L_{Amax} and $L_{A90(15min)}$ measurements will be set to Fast response
- The C-weighting levels will be measured to confirm if the WPPS is subject to low frequency modification factors as per Condition 2.9
- Measurements will be undertaken when the WPPS is operating under normal operating conditions of the new generation capacity that is being assessed

- Wind speed, direction and meteorological conditions prevailing during the monitoring period will be recorded with an onsite weather station
- Monitoring will be undertaken during the night time period
- Monitoring will be undertaken over three consecutive nights to account for variations in meteorological conditions

In the event that direct noise measurements are impractical the Noise Policy for Industry Section 7 will be used for guidance to monitor performance as follows:

- Direct attended measurements will be undertaken at intermediate locations
- A detailed noise model will be prepared using the CONCAWE algorithm implemented in SoundPlan and based on near field noise source measurements at the WPPS.
- The noise model will be calibrated and validated at the intermediate locations
- The model will consider adverse meteorological conditions for assessment of compliance with Condition 2.8

A noise monitoring report will be prepared and submitted to the Department and the EPA within 28 days of completion of the monitoring program. The noise monitoring report will include:

- Details of entries into the complaints register relating to noise
- The reporting requirements of the Noise Policy for Industry (EPA, 2017) Section 7.1.3.

Should the noise monitoring report identify exceedances to Condition 2.8 and 2.9 then the requirements in Condition 2.10 to 2.23 will be implemented as appropriate.

2.3 Vibration Impacts

The WPPS infrastructure does not include any equipment which generates significant vibration therefore vibration resulting from operation of the WPPS above 12 MW will not exceed the preferred vibration values in *Assessing Vibration: A Technical Guideline (DECC, February 2006)* at any affected residential dwelling.

As such measures to manage and measure operational vibration from the WPPS after increasing capacity above 12 MW have not been proposed.

Sincerely
GHD Pty Ltd

Evan Milton
Principal Engineer - Air, Noise and Vibration Manager
02 9239 7205