Appendix D

Stakeholder and community consultation report

Santos
We have the energy.

Narrabri Gas Project

Environmental Impact Statement

August 2016

Appendix D

Stakeholder and community consultation report

Table of Contents

Table Index

Figure Index

Executive Summary

Background

The Proponent is proposing to develop natural gas in the Gunnedah Basin in New South Wales (NSW), southwest of Narrabri.

The Narrabri Gas Project (the project) seeks to develop and operate a gas production field, requiring the installation of gas wells, gas and water gathering systems, and supporting infrastructure. The natural gas produced would be treated at a central gas processing facility on a local rural property (Leewood), approximately 25 kilometres south-west of Narrabri. The gas would then be piped via a high-pressure gas transmission pipeline to market. This pipeline woulpd be part of a separate approvals process and is therefore not part of this development proposal.

Scope of Engagement

The proponent is working to establish and maintain enduring and mutually-beneficial relationships in the communities in which it operates and is committed to undertaking meaningful community engagement and consultation. By working in partnership with landholders and local communities, the proponent aims to appraise, develop and produce coal seam gas resources in New South Wales.

Santos has been consulting with the community in relation to the gas industry, a potential gas project and its exploration and appraisal activities since late 2011. This built on previous consultation activities by Eastern Star Gas as the former operators of Petroleum Exploration Licence (PEL) 238.

In July 2013, Santos announced that the focus of operations in NSW was to be in PEL 238 and that the company was seeking approval for a more focused exploration and appraisal program targeting areas in and around the Pilliga Forest to ascertain the commercial and technical viability of the project.

The proponent has a commitment to effectively engage with the community in relation to the planning for and conduct of activities in accordance with the NSW State Government Community Consultation Guidelines. Through comprehensive and proactive engagement, the proponent has aimed to identify and address stakeholder and community issues in the early stages of the project to ensure that they can be considered as part of the planning process.

An analysis of stakeholders was undertaken to gain a stronger insight into the character, interests and needs of the community. A stakeholder engagement plan was developed and stakeholder groups identified and categorised according to their level of perceived impacts and interests in the project.

Engagement methods and activities

There has been a range of communication methods and activities implemented to ensure that the proponent has comprehensively sought the views of the diverse community in relation to the proposed project. This has included the shopfronts at Narrabri and Gunnedah, monthly community site tours, public meetings, stakeholder briefings, website, 1800 free call service, email address, surveys, newsletters, fact sheets, advertisements, Facebook and Twitter accounts, displays and attendance at community events and agricultural shows.

The proponent has a program of consultation that includes:

- monthly community site tours advertised in the local newspaper and specific tours hosted for groups upon request
- face to face meetings with individuals, groups and entities with a specific interest in local activities
- regular meetings and information forums with local and State government staff and elected representatives
- Information forums for local contractors and businesses, including collaborative presentations with the Narrabri Chamber of Commerce
- on-site meetings in activity areas with neighbouring landholders
- Forums with Aboriginal representative groups.

The consultation and engagement of stakeholders and the community in the development of the EIS has been extensive. There is a comprehensive Community Consultation Plan in place; stakeholders have been identified; and a risk-based assessment undertaken on the level of impact or benefit that activities may potentially have on stakeholders and the community. There are well established consultation tools in place and this has provided numerous opportunities for stakeholders and members of the community to learn about, provide input to, and raise concerns about activities that the proponent is conducting, or planning to conduct.

In summary, from July 2013 to June 2016 there has been over 4,000 visitors to shopfronts in Narrabri and Gunnedah; more than 420 attendees at Narrabri Gas Project briefings hosted by the Narrabri Chamber of Commerce; over 1000 visitors to our information stand at AgQuip; and more than 350 field site tours and community events in the project area where Santos had staff available to provide information on our project; and exploration and appraisal activities; and for stakeholders and the community to ask questions, raise concerns and provide input.

The Narrabri Gas Project brochure was distributed by mail to 6500 Shire residents and 130 clubs and community groups. The NSW pages of the Santos website has attracted over 60,000 views and the Narrabri Gas Project website was created and has had 59,000 page views, with postings of more than 50 statements and around 100 news stories about various aspects of our work and the natural gas industry. The Santos ENSW Facebook page was created in February 2015 and has had 262 posts since that time with a combined reach of approx. 1,100,000.

Santos established an independently chaired Narrabri Community Committee on CSG that met on a monthly basis from August 2012 to October 2014 in Narrabri with representation from a cross-section of interested parties within the local community. Minutes and action items arising from these meetings are available on the Santos website and were distributed by participants across their networks for broader community dissemination.

In November 2014, the Minister for Resources and Energy formally appointed a Narrabri Gas Project Community Consultative Committee which replaced the Narrabri Community Committee. The NSW Land and Water Commissioner was appointed to Chair the new committee with the first meeting held in December 2014. The committee meets on a monthly basis in Narrabri and has representatives from key government, industry and community organisations including Narrabri Shire Council, NSW Land and Water Commission, , Department of Planning and Environment, Division of Resources and Energy, Department of Primary Industries (Water), Environment Protection Authority, Narrabri Chamber of Commerce, Narrabri Local Aboriginal Land Council, Country Women's Association of NSW, People for the Plains, Namoi Water, NSW Farmers, North West Local Land Services, Lower Namoi Cotton Growers Association and Santos.

In addition to consultation and engagement activities undertaken by the proponent there have also been a number of State Government initiatives or statutory activities that have captured and presented community attitudes to the coal seam gas industry in New South Wales over the period that engagement for the project has been undertaken. A number of responses to these activities have provided information specifically relating to the proponent's proposed activities for the project and the matters raised have been incorporated into consultation activities.

Engagement and consultation outcomes

Outcomes of the proponent's ongoing community consultation and engagement have been:

- Strengthened relationships with stakeholders, decision makers, potential champions and opponents
- Consulted with potential stakeholders and the community on issues that may impact or benefit them
- Implemented strategies to assist managing and minimising the risk of conflict, and resolved issues as they arose
- Provided timely, accurate and credible information to stakeholders and the broader community; and provided opportunities for interaction and feedback
- Facilitated positive Aboriginal cultural heritage outcomes by consulting with relevant parties and encouraging them to participate in decision making regarding the management of their cultural heritage.

Success of the consultation activities is demonstrated by the growing support for project activities in the Narrabri area and a decrease in the level of opposition to exploration and appraisal activities locally. A group called Yes2Gas has formed in Narrabri and is comprised of local individuals and businesses that are supportive of the NSW natural gas industry and the Narrabri Gas Project. Members of the group welcome the opportunities that project activities will bring to the local community including economic diversity, business and employment opportunities.

Members of national environmental groups such as The Wilderness Society and national community action groups such as the Lock the Gate Alliance continue to be vocal in their opposition to development of the natural gas industry in NSW. There is a small number of local people opposed to the activities being undertaken in the project area, with the organisation "People for the Plains" being a representative group. The group has formal membership on the Narrabri Gas Project CCC and this forum provides members of the group, through their representative, with the opportunity to learn about, provide input to, and raise concerns about activities that the proponent is conducting, or planning to conduct.

The key issues that remain matters of topical interest to stakeholders and the community include groundwater management, land access rights and compensation, the number and location of wells, drilling integrity, produced water management and treatment, project timing, local employment and economic benefits, Aboriginal participation and social impacts such as housing affordability and community infrastructure.

While the EIS, the statement of commitments, and likely conditions should address many of the concerns raised, these matters will remain focus areas for the proponent's ongoing commitment to open and transparent communication with stakeholders and the community. The proponent will continue to monitor and address these matters through existing communication channels.

Next steps

Immediately post lodgement of the EIS, the following activities will be undertaken:

- Hard copies (and electronic) of EIS available at public exhibition
- Information available on website in relation to environmental study findings
- Fact Sheets, posters, maps and other data available
- Letters to key stakeholders to advise of public exhibition process
- “How to” advice for making a submission process
- Advice notices in local media.

The Community Consultation Plan will continue to guide the effective and timely delivery of consultation activities. These activities will be regularly reviewed and adjusted over the period to reflect emerging stakeholders, issues, impacts and benefits and the additional knowledge gained through consultation activities. This will ensure that we build on the extensive work already undertaken to enable the community and key stakeholders to be fully informed about the project and continue to have opportunities to provide feedback on our planned activities. This will be achieved through use of well-established communication channels.

1 Background

1.1 Introduction

The Proponent is proposing to develop natural gas in the Gunnedah Basin in New South Wales (NSW), southwest of Narrabri (refer Figure 1-1).

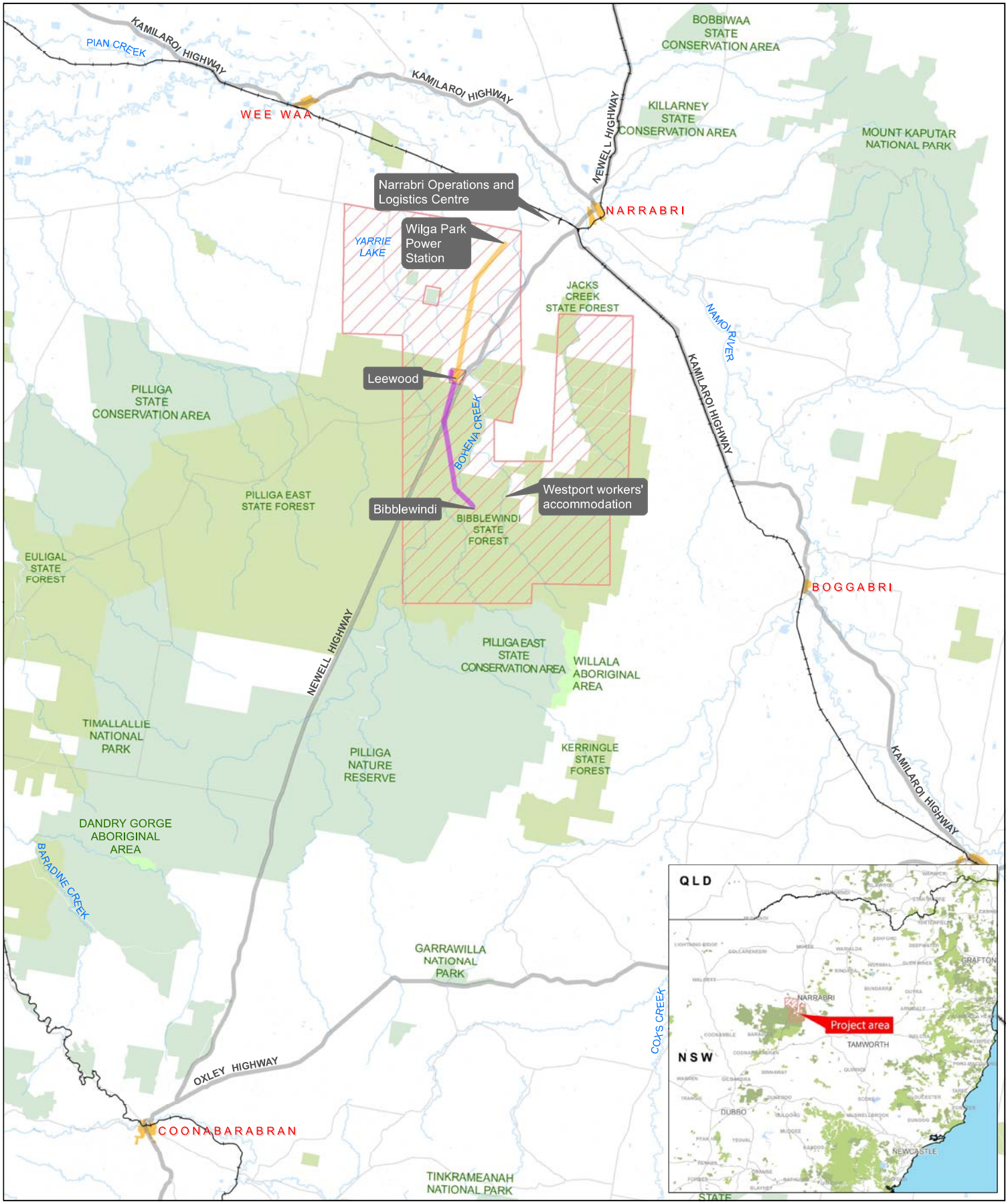
The Narrabri Gas Project (the project) seeks to develop and operate a gas production field, requiring the installation of gas wells, gas and water gathering systems, and supporting infrastructure. The natural gas produced would be treated at a central gas processing facility on a local rural property (Leewood), approximately 25 kilometres southwest of Narrabri. The gas would then be piped via a high-pressure gas transmission pipeline to market. This pipeline would be part of a separate approvals process and is therefore not part of this development proposal.

The primary objective of the project is to commercialise natural gas to be made available to the NSW gas market and to support the energy security needs of NSW. Production of natural gas under the project would deliver economic, environmental and social benefits to the Narrabri region and the broader NSW community. The key benefits of the project can be summarised as:

- Development of a new source of gas supply into NSW would lead to an improvement in energy security and independence to the State. This would give NSW gas markets greater choice when entering into gas purchase arrangements. Potential would also exist for improved competition on price. Improved competition on price would have flow on benefits for NSW's economic efficiency, productivity and prosperity.
- The provision of a reduced greenhouse gas emission fuel source for power generation in NSW as compared to traditional coal-fired power generation.
- Increased local production and regional economic development through employment and provision of services and infrastructure to the project.
- The establishment of a regional community benefit fund equivalent to five per cent of the royalty payment made to the NSW Government within the future production licence area. If matched by the NSW Government, the fund could reach $120 million over the next two decades.

1.2 Description of the project

The project would involve the construction and operation of a range of exploration and production activities and infrastructure including the continued use of some existing infrastructure. The key components of the project are presented in Table 1-1and are shown on Figure 1-1.



LEGEND

- Project area
- Leewood
- Urban
- State forest
- Parks and reserves
- Aboriginal areas
- Lakes and dams
- Watercourses
- Highways
- Major Roads
- Train line
- Leewood to Wilga Park infrastructure corridor
- Bibblewindi to Leewood infrastructure corridor

0 5 10 20
Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Narrabri Gas Project
EIS Technical Appendix

Regional context and location of key infrastructure

Job Number 21-22463
Revision A
Date 12 Mar 2015

Figure 1-1

C:\Users\AFoddy\Desktop\21_22463_KBM29.mxd [KBM: 221]

Level 15, 133 Castlereagh Street Sydney NSW 2000 T 61 2 9239 7100 F 61 2 9239 7199 E sydmail@ghd.com.au W www.ghd.com.au

Data source: NSW Department of Lands: DTDB and DCDB - 2012-13. Santos: Operational and Base Data - 2013. Created by: afoddy

Table 1-1 Key project components

Component	Infrastructure or activity
Major facilities	
Leewood	• a central gas processing facility for the compression, dehydration and treatment of gas • a central water management facility including storage and treatment of produced water and brine • optional power generation for the project • a safety flare • treated water management infrastructure to facilitate the transfer of treated water for irrigation, dust suppression, construction and drilling activities • other supporting infrastructure including storage and utility buildings, staff amenities, equipment shelters, car parking, and diesel and chemical storage • continued use of existing facilities such as the brine and produced water ponds • operation of the facility
Bibblewindi	• in-field compression facility • a safety flare • supporting infrastructure including storage and utility areas, treated water holding tank, and a communications tower • upgrades and expansion to the staff amenities and car parking • produced water, brine and construction water storage, including recommissioning of two existing ponds • continued use of existing facilities such as the 5ML water balance tank • operation of the expanded facility
Bibblewindi to Leewood infrastructure corridor	• widening of the existing corridor to allow for construction and operation of an additional buried medium pressure gas pipeline, a water pipeline, underground (up to 132 kV) power, and buried communications transmission lines
Leewood to Wilga Park underground power line	• installation and operation of an underground power line (up to 132 kV) within the existing gas pipeline corridor
Gas field	
Gas exploration, appraisal and production infrastructure	• seismic geophysical survey • installation of up to 850 new wells on a maximum of 425 well pads – new well types would include exploration, appraisal and production wells – includes well pad surface infrastructure • installation of water and gas gathering lines and supporting infrastructure • construction of new access tracks where required • water balance tanks • communications towers • conversion of existing exploration and appraisal wells to production

Component	Infrastructure or activity
Ancillary	• upgrades to intersections on the Newell Highway • expansion of worker accommodation at Westport • a treated water pipeline and diffuser from Leewood to Bohena Creek • treated water irrigation infrastructure including: – pipeline(s) from Leewood to the irrigation area(s) – treated water storage dam(s) offsite from Leewood • operation of the irrigation scheme

The project is expected to generate approximately 1,300 jobs during the construction phase and sustain around 200 jobs during the operational phase; the latter excluding an ongoing drilling workforce comprising approximately 100 jobs.

Subject to obtaining the required regulatory approvals, and a financial investment decision, construction of the project is expected to commence in early 2018, with first gas scheduled for 2019/2020.

Progressive construction of the gas processing and water management facilities is expected to take around three years and would be undertaken between approximately early/mid-2018 and early/mid-2021. The gas wells will be progressively drilled during the first 20 or so years of the project. For the purpose of impact assessment, a 25 year construction and operational period has been adopted (assessment period).

1.3 Project location

The project would be located in north-western NSW, approximately 20 kilometres south-west of Narrabri, within the Narrabri local government area (LGA) (see Figure 1-1).

The project area covers about 950 square kilometres (95,000 hectares), and the project footprint would directly impact about one per cent of that area.

The project area contains a portion of the region known as ‘the Pilliga’, which is an agglomeration of forested area covering more than 500,000 hectares in north-western NSW around Coonabarabran, Baradine and Narrabri. Nearly half of the Pilliga is allocated to conservation, managed under the NSW *National Parks and Wildlife Act 1974*. The Pilliga has spiritual meaning and cultural significance for the Aboriginal people of the region.

Other parts of the Pilliga were dedicated as State forest, and set aside for the purpose of ‘forestry, recreation and mineral extraction, with a strategic aim to “provide for exploration, mining, petroleum production and extractive industry” under the *Brigalow and Nandewar Community Conservation Area Act 2005*. The parts of the project area on state land are located within this section of the Pilliga.

The semi-arid climate of the region and general unsuitability of the soils for agriculture have combined to protect the Pilliga from widespread clearing. Commercial timber harvesting activities in the Pilliga were preceded by unsuccessful attempts in the mid-1800s to establish a wool production industry. Resource exploration has been occurring in the area since the 1960s; initially for oil, but more recently for coal and gas.

The ecology of the Pilliga has been fragmented and otherwise impacted by commercial timber harvesting and related activities over the last century through:

- the establishment of more than 5,000 kilometres of roads, tracks and trails
- the introduction of pest species
- the occurrence of drought and wildfire.

The project area avoids the Pilliga National Park, Pilliga State Conservation Area, Pilliga Nature Reserve and Brigalow Park Nature Reserve. Brigalow State Conservation Area is within the project area but would be protected by a 50 metre surface exclusion zone.

Agriculture is a major land use within the Narrabri LGA; about half of the LGA is used for agriculture, split between cropping and grazing. Although the majority of the project area would be within State forests, much of the remaining area is situated on agricultural land that supports dry-land cropping and livestock. No agricultural land in the project area is mapped by the NSW Government to be biophysical strategic agricultural land (BSAL) and detailed soil analysis has established the absence of BSAL. This has been confirmed by the issue of a BSAL Certificate for the project area by the NSW Government.

1.4 Planning Framework

The project is permissible with development consent under the *State Environmental Planning Policy (Mining, Petroleum and Extractive Industries) 2007*, and is identified as 'State significant development' under section 89C(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and the *State Environmental Planning Policy (State and Regional Development) 2011*.

The project is subject to the assessment and approval provisions of Division 4.1 of Part 4 of the EP&A Act. The Minister for Planning is the consent authority, who is able to delegate the consent authority function to the Planning Assessment Commission, the Secretary of the Department of Planning and Environment or to any other public authority.

The project is also a controlled action under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. The project was declared to be a controlled action on 5 December 2014, to be assessed under the bilateral agreement between the Commonwealth and NSW Governments, and triggering the following controlling provisions:

- listed threatened species and ecological communities
- a water resource, in relation to coal seam gas development and large coal mining development
- Commonwealth land.

This consultation report details stakeholder and community consultation activities and outcomes up to and including the 30 June 2016 as part of the EIS preparation and submission to the Minister for Planning.

2 Scope of engagement

Engagement regarding the project has been undertaken with relevant stakeholders to ensure that potential impacts have been identified and, where possible, avoided or minimised.

A stakeholder is defined as an individual, group of individuals, organisation or political entity with an interest in the outcome or decision. They may be, or perceive that they may be, directly or indirectly affected by the outcome of a decision (International Association for Public participation (IAP2), 2014).

2.1 Aims and objectives

Stakeholder and community consultation has been an integral component of the project development and EIS process. The aim of the consultation program for the project was and continues to deliver effective engagement with community members and stakeholders regarding the project, such that wider community awareness and acceptance of the project is achieved.

The objectives supporting this aim include:

- Identifying and strengthening relationships with stakeholders, decision makers, potential champions and opponents.
- Identifying potential stakeholder and community issues and implement strategies to assist manage and minimise the risk of conflict, and resolve issues.
- Developing an appropriate stakeholder and community engagement approach that seeks to provide timely, accurate and credible information to stakeholders and the broader community; and provides opportunities for interaction and feedback.
- Developing strategies that can build and maintain effective and sustainable relationships with stakeholders and communities based on open, transparent and trustworthy communication.
- To facilitate positive Aboriginal cultural heritage outcomes by affording an opportunity for Aboriginal people to participate in pre-clearance surveys and decision making regarding the management of their cultural heritage.

These objectives also aim to support government decision-making for legislative based assessment and approvals by providing accurate and comprehensive analysis of the type, significance and complexity of stakeholder issues and the relevant responses.

The general principles that have guided ongoing consultation and engagement activities meet or exceed the requirements documented in the NSW Government's Strategic Regional Land Use Policy Delivery Guidelines - *Guideline for community consultation requirements for the exploration of coal and petroleum, including coal seam gas* (NSW Trade & Investment, 2012) which includes:

- Detailed identification of all stakeholders.
- Undertaking activities to ensure all stakeholders are informed of the proposed program of work.
- Ensuring that stakeholders are aware of real or potential impacts.
- That the purpose of the consultation activities is clear – this includes what can be incorporated into project planning and what is non-negotiable.
- That the community is informed about expected levels of participation and commitments.

- Establishing channels of communications that allow good community feedback and identification of potential issues.
- Provision of feedback to the community on how their input has influenced decisions.
- Maintaining a register of complaints and feedback and actions taken to respond.

In March 2016, new guidelines were issued by the NSW Department of Industry (Division of Resources and Energy) titled *Exploration code of practice: community consultation.* The requirements of this code are now incorporated into consultation and engagement planning and implementation.

2.2 Strategy

A consultation and engagement strategy was prepared in June 2013 and informed the development of a detailed consultation plan. The engagement strategy included the following elements:

- Engaging in proactive, targeted and effective communication with key stakeholders prior to the lodgement of the Preliminary Environmental Assessment (PEA).
- Engaging in proactive, targeted and effective communication with all stakeholders during the development of the project.
- Building awareness and understanding of the project objectives, investigations, potential impacts, and benefits among key stakeholders in industry, government, and the community.
- Informing and actively engaging the community and key special interest groups about the project to identify and discuss the issues of concern to them.
- Ensuring that accurate, timely and relevant information is available to all stakeholders at all stages of the assessment process.
- Advising all stakeholders of the public exhibition and submission process prior to the lodgement of the EIS.
- Integrating EIS engagement activities for the project with existing engagement activities and communication channels by providing:
  - aligned and quality support
  - early and clear communication
  - timely response to address critical and emerging issues as required.

2.3 Engagement and consultation plan

A consultation plan was developed to guide effective and timely delivery of consultation activities during the EIS process. Consultation and engagement activities were regularly reviewed and adjusted over the period to reflect the emerging stakeholders, issues, impacts and benefits and the additional knowledge gained as the project scope and community understanding of the project matured during the period. The consultation plan included:

- Identification of a broad group of stakeholders potentially impacted by the project footprint.
- An overview of potential issues, risks/opportunities to manage during the project development and approval process.
- Engagement techniques for dissemination of, and access to, timely, accurate and credible information regarding the project.

- An integrated approach designed to support the commitment to build and maintain effective relationships with stakeholders and communities based on open, transparent and trustworthy communication.

The consultation plan was developed to integrate with existing engagement activities undertaken as part of the project development, while also interfacing the broader engagement and communication strategies. Consultation will continue throughout the EIS exhibition period, and subject to approval, continue during construction and operation of the project.

2.4 Stakeholder analysis

An analysis of stakeholders was undertaken to gain a stronger insight into the character, interests and needs of the community. The analysis identified around 350 stakeholder groups that were categorised according to their level of interest and their potential level of impact as described in Table 2-1.

Table 2-1 Stakeholder impact levels

Impact level	Description of impact level
High (to very high)	Significant or regular aspects of the project that will affect people's lives and lifestyles such as proximity to operational activities.
Medium	Occasional, or regular but infrequent aspects of the project that may be partial or avoidable/manageable.
Low	Infrequent and very occasional impacts of the project that will not affect the community's wellbeing.

The stakeholder analysis was updated as more information became available throughout development of the EIS.

The consultation plan has been designed to proactively engage with the medium to high priority stakeholders, who would have interest in, or are impacted by, the project. The level of participation for the project was influenced by stakeholder groupings, and included the following levels of engagement and consultation:

- Inform – aimed at community, business and industry in the broader regional and state-wide context.
- Consult - aimed at community groups, industry, business and residents not directly involved in the project but living and operating within the project area. This includes residents of Narrabri region, and surrounding townships within PEL 238; government departments; non-government organisations, local industry and business.
- Involve – aimed at key stakeholder groups directly involved in the project area. This includes neighbouring landholders; government departments listed as referral agencies; community groups and the entities represented on the community consultative committee.
- Collaborate – aimed at individuals and entities that are directly impacted by the project and/or involved in project decisions. This includes landholders on whose land the project activity will occur; local government in the relevant activity area; Registered Aboriginal Parties; and native title claimant groups.

The proposed project development sits within the boundaries of the Narrabri Shire Council area, and consequently the majority of engagement and consultation activities have been focussed within the Narrabri community. To inform the broader list of stakeholders, information regarding the EIS was distributed through existing communication channels.

2.5 Stakeholder identification and consultation approach

Stakeholders can be broadly grouped into:

- Local, State and Federal government departments and elected representatives
- Landholders
- Industry groups and regional organisations
- Aboriginal community, Local Aboriginal Land Councils and Registered Native Title Applicants
- Local community
- Local business and contractors
- Media.

For each stakeholder grouping the approach to consultation varied as described in Table 2-2.

Table 2-2 Consultation approach for stakeholder groups

Stakeholder group	Approach
Local, State and Federal Government departments and elected representatives	Collaborate/involve/consult
Industry groups and regional organisations	Involve/consult
Landholders – direct, activity area and regional context	Collaborate/involve
Local Aboriginal communities, Aboriginal Land Council and Registered Native Title Applicants	Collaborate/involve/consult
Local community (including clubs and community groups)	Collaborate/involve/consult
Local business and contractors	Involve/consult/inform
Media	Involve/consult/inform

2.5.1 Local, state and federal government

Consultation with local, state and federal government departments and elected representatives included representatives from the following entities:

Local government:

- Narrabri Shire Council
- Gunnedah Shire Council
- Warrumbungle Shire Council.

State government:

- Division of Resources and Energy (and the former NSW Office of Coal Seam Gas)
- Division of Crown Lands
- Division of Primary Industries (and the former NSW Office of Water)
- NSW Land and Water Commission
- NSW Department of Planning and Environment
- Forestry Corporation of NSW
- NSW Environment Protection Authority
- Office of the Chief Scientist and Engineer
- NSW Roads and Maritime Services
- NSW Department of Education and Communities
- NSW Department of Health
- NSW Office of Environment and Heritage
- Rural Fire Service
- NSW Police Force.

Federal government:

- Department of the Environment
- Department of Industry, Innovation and Science – Australian Astronomical Observatory (Siding Spring).

Political entities:

- Australian Labor Party
- Liberal Party
- Shooters and Fishers Party
- The Nationals
- Christian Democrat Party.

The scope of engagement with local, state and federal government departments and elected representatives was dependent on their level of interest in the project and was undertaken to:

- Keep government informed of project activities and where appropriate provided with regular project briefings
- Build awareness and understanding of project objectives and benefits among the Narrabri Shire Council staff and elected representatives
- Ensure that information and active engagement about project activities was accurate, timely and relevant
- Make sure communication was and remains two-way and that the concerns of the community are identified early and addressed appropriately.

2.5.2 Industry groups and regional organisations

Consultation with industry groups and regional organisations included representatives from the following groups and organisations:

Industry groups:

- Australian Petroleum Production and Exploration Association (APPEA)
- CSIRO Gas Industry Social Environmental Research Alliance (GISERA)
- NSW Minerals Council
- Energy Resource Information Centre
- New South Wales Irrigators Council
- New South Wales Farmers Association
- National Farmers Federation.

Regional organisations:

- NSW Farmers Association
- Namoi Water
- Local Land Services North West (previously LHPA)
- Cotton Australia
- Country Women's Association of NSW
- Lower Namoi Cotton Growers Association
- Northern Inland Region Committee for Regional Development Australia

The scope of engagement with industry peak bodies and regional organisations was undertaken to:

- Raise awareness of the EIS process and project approval
- Provide an opportunity for engagement on those specific areas of special interest
- Provide details on the management and mitigation of potential impacts
- Provide awareness on research and baseline data monitoring undertaken for the project.

2.5.3 Landholders

There are 255 titleholders that are private landholders in the project area. Some titles are held by multiple individuals, most commonly as part of a family arrangement.

In addition, six government landholders are located within the project area including:

- Narrabri Shire Council
- Forestry Corporation of NSW
- NSW Office of Environment and Heritage (National Parks & Wildlife Service)
- NSW Department Primary Industries (Lands)

- NSW Roads and Maritime Services
- Local Land Services North West.

Engagement with landholders outside of the project area has been undertaken through industry representative bodies such as NSW Farmers, NSW Irrigators, Cotton Australia, Local Land Services and Local government representatives.

The scope of engagement with landholders, primarily included face-to-face meetings, telephone conversations and group landholder briefings and was undertaken to:

- To build landholder awareness and understanding of project objectives and benefits
- Inform and actively engage landholders to ensure accurate, timely and relevant information is available
- Provide technical information needed to understand the activities that we propose
- To provide updates on project activities to landholders within project area
- To build relationships with landholders and answer questions on project activities
- Ensure clear understanding of landholder issues and resolution of these issues
- Foster open and transparent dialogue with agricultural communities in which the proponent operates.

2.5.4 Aboriginal community, Local Aboriginal Land Councils and registered Native Title Applicants

Consultation in accordance with the OEH *Aboriginal cultural heritage consultation requirements for proponents* (DECCW 2012) is well advanced. To date, there are over 550 Registered Aboriginal Parties (RAPs) including the registered native title applicant, several Local Aboriginal Land Councils (LALCs); other organisations and numerous individuals. The Aboriginal consultation process for the Project is ongoing.

The consultation process to date including detailed outcomes is described in Appendix N1 Cultural Heritage Technical Report and included representatives from the following groups and organisations:

Local Aboriginal Land Councils:

- Narrabri Local Aboriginal Land Council
- Wee Waa Local Aboriginal Land Council
- Baradine Local Aboriginal Land Council
- Pilliga Local Aboriginal Land Council
- Coonabarabran Local Aboriginal Land Council
- Red Chief Local Aboriginal Land Council
- Gomeroi Native Title Claimants.

2.5.5 Local Community

The scope of engagement with the local community included:

- Introducing the Narrabri Gas Project and seeking community input to identify and address potential impacts
- Informing and actively engaging the community to ensure accurate, timely and relevant information is available
- Providing technical information needed to understand the activities that we propose
- Enhancing the level of project knowledge among community members.

The Narrabri Gas Project CCC is a key forum to ensure comprehensive, adequate and representative community engagement. The Narrabri Gas Project CCC is comprised of nominated representatives of community groups that have a large membership base and broad representation of the community throughout the Narrabri area.

Santos was advised on 10 October 2014 that the Minister for Resources and Energy had approved the request to formally appoint a Narrabri Gas Project CCC and appointed Mr Jock Laurie, the NSW Land and Water Commissioner to Chair the committee. The first meeting of the committee was held in December 2014. The committee has representatives from key industry and community organisations, State and Local Government and Santos:

- NSW Farmers
- Narrabri Local Aboriginal Land Council
- Namoi Water
- Lower Namoi Cotton Growers Association
- Country Women's Association of NSW
- North West Local Land Services
- People for the Plains
- Narrabri Chamber of Commerce
- Narrabri Shire Council
- Land and Water Commission
- Department of Planning and Environment
- Division of Resources and Energy and the former Office of Coal Seam Gas
- Department of Primary Industries (Water) and the former NSW Office of Water
- Environment Protection Authority
- Santos.

In addition to the Community Consultative Committee, information and engagement with the local community included the following groups and organisations as shown in Table 2-3.

Table 2-3 Local community groups and organisations

Stakeholder category	Representatives	
Local service providers	Medical Service Providers	Narrabri High School
	Narrabri Hospital	Narrabri West Public School
	State Emergency Service	Narrabri St Francis Xavier's School
	NSW Fire and Rescue Service	TAFE New England Narrabri
	Ambulance Service of NSW	Narrabri Public School
	Rural Fire Service	
Community groups and clubs	APEX	Narrabri RSL Sub-Branch
	Friendly Face Helping Hands	Narrabri Lioness Club
	Narrabri Antique Vehicle Club	Narrabri Lions Club
	Narrabri Art and Craft Society	Narrabri Show Society
	Narrabri Men's Shed	Narrabri VIEW Club
	Narrabri Probus Club	NSW CWA
	Narrabri Rotary Club	Yarrie Lake Flora and Fauna Trust
Sporting clubs	Narrabri Blue Boars Rugby Union Club	Narrabri Polocrosse Club
	Narrabri Soccer Club	Narrabri AFL Club
	Wee Waa Rugby League Club	Narrabri and District Cricket Club
	Koori Netball Team	Narrabri Basketball Club
	Central Northern Rugby	Narrabri Clay Target Club
	Central Northern Cricket	Narrabri Cycling and Triathlon Club
	Narrabri Netball Association	Narrabri Rugby League Club
	Narrabri Jockey Club	Narrabri Amateur Fishing Club
Activist groups	Yes2Gas	The Wilderness Society
	Lock the Gate Alliance	People for the Plains
	Mullaley Gas Pipeline Accord	

2.5.6 Local business and contractors

The scope of engagement with local business and contractors included:

- Hosting and participating in business and contractor information forums.
- Introducing the project and its contractor procurement representatives to regional business communities.
- Providing information on procurement opportunities.
- Outlining requirements, processes and procedures required to potentially supply goods and services for the project.
- Providing the local business community with the opportunity to ask questions directly to the proponent and our contractors.

In excess of 125 local vendors, suppliers and contractors were consulted through various forums and meetings.

A collaborative partnership with the Narrabri Chamber of Commerce to provide information to their members and associates has also been implemented.

2.5.7 Media

Consultation with media included the following organisations:

- Narrabri Courier
- Namoi Valley Independent
- Northern Daily Leader
- ABC Radio news – Tamworth
- Prime 7
- NBN
- ABC Radio Rural report
- Max FM radio
- The Land newspaper
- SMH/AFR/Australian
- Queensland Country Life.

The scope of engagement with media representatives included:

- Build awareness and understanding of project objectives and benefits
- Proactive information and articles for the community and stakeholders on project activities.
- Advertisements and advertorials to key audiences to provide technically accurate information on the project.
- Provide technical information needed to understand the activities that we propose.

3 Engagement methods

3.1 Stages of consultation

The consultation process from July 2013 and has been aligned to coincide with EIS stages identified in Table 4-1. Stages 1, 2 and 3 have occurred whilst consultation activities for stages 4 to 6 are yet to be completed.

Table 3-1 EIS stages

Timeline	Stage	Consultation tools and activities
July 2013 to October 2014	Stage 1: Commencement of EIS process and lodgement of PEA and Commonwealth Referral	Identification of key stakeholders Preliminary scoping of potential issues Review of project information Prepare consultation plan Prepare information materials Send notification letter and information packs to stakeholders following lodgement of PEA Conduct briefings with key stakeholders following lodgement of PEA Narrabri CCC meeting Community site tours Monthly update
July 2014	Stage 2: Receipt of Director-General's environmental assessment requirements	Media release Community information sessions Landholder information sessions Narrabri CCC meeting Community site tours Monthly update
February 2014 to June 2016	Stage 3: EIS development	Media releases Government forums Community information sessions Landholder information sessions Face-to-face landholder meetings Face-to-face other stakeholder meetings Community events Community site tours Narrabri CCC meetings Monthly update Implementation of the 2010 OEH Aboriginal cultural heritage consultation requirements

Timeline	Stage	Consultation tools and activities
Future	Stage 4: Lodgement and public exhibition of EIS and call for public submissions	Hard copies (and electronic) of EIS available at public exhibition Letters to advise of public exhibition process “How to” advice for making a submission process Notices in local media Community information sessions Landholder information sessions Face-to-face landholder meetings Face-to-face other stakeholder meetings Community site tours Monthly update
Future	Stage 5: Response to sub G:\21\22463\EIS\Example formatting and templates\EIS Template Master missions	Letter to stakeholders informing them of next steps in the EIS process Media release Community site tours Monthly update
Future	Stage 6: Approval	Letter to stakeholders informing them of outcomes of the EIS process Media release Community site tours Monthly update

3.2 Consultation tools and activities

Figure 3-1 illustrates the link between the consultation tools and activities. Between July 2013 and June 2016, approximately 2850 stakeholders have been engaged in relation to the Project.

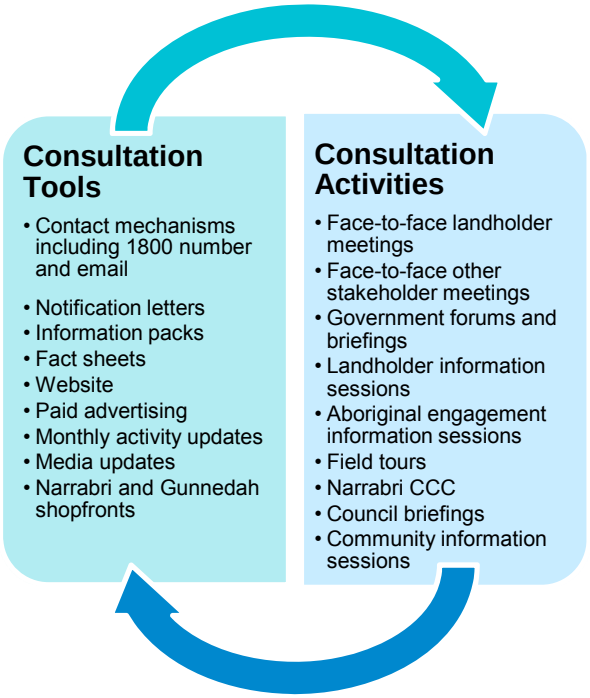


Figure 3-1 Consultation tools and activities

3.2.1 Narrabri and Gunnedah Shopfronts

Printed information and displays are located at both the Narrabri and Gunnedah shopfronts. Project personnel are generally available at the shopfronts from Monday to Friday between the hours of 9am and 5pm to respond to visitor enquiries.

There have been approximately 4,000 visitors to the Narrabri and Gunnedah shopfronts from July 2013 to June 2016. This is not inclusive of visitors assembling at the shopfront for site tours or those attending for administrative purposes.

3.2.2 Brochure and fact sheets

A brochure and series of fact sheets were developed to support consultation activities and provide a detailed overview of the key components of the project. A copy of the brochure was distributed broadly throughout the Narrabri LGA through an Australia Post letter box drop, with over 6,500 brochures delivered (refer to Table 3-2).

Table 3-2 Distribution of Narrabri Gas Project Brochure

Postcode	Locality Name	Number
2386	Nowley	26
2388	Bool Carroll	6
2388	Cuttabri	22
2388	Merah North	37
2388	Pilliga	165
2388	Spring Plains	24
2388	The Pilliga	7
2388	Wee Waa	1371
2388	Yarrie Lake	40
2390	Baan Baa	126
2390	Bohena Creek	54
2390	Edgeroi	58
2390	Harparary	19
2390	Jacks Creek	59
2390	Narrabri	4094
2390	Narrabri West	161
2390	Tarriaro	65
2390	Turrawan	57
2397	Bellata	327
	Total	6718

The brochure is supported by 7 fact sheets that contain more detailed information on the matters outlined in the brochure, with more than 4000 fact sheets distributed. The fact sheets cover the following topics:

- Project Overview.
- Santos in NSW.
- Working in the Pilliga.
- Working with Landholders.
- Drilling with Care.
- Protecting local aquifers.
- Native Title and the Right to Negotiate.

The brochure and fact sheets remain available to stakeholders electronically through the project website and hardcopies at the Narrabri and Gunnedah shopfronts. The brochure and fact sheets are also provided to stakeholders at information sessions, community events and forums as required.

In addition, Fact Sheets prepared by the NSW Division of Resources and Energy were available from the Narrabri shopfront and were provided to stakeholders at information sessions, site tours, community events and forums. The fact sheets included the following topics:

- Coal Seam Gas Fact Sheet 1 – What is Coal Seam Gas?
- Coal Seam Gas Fact Sheet 2 – Exploration and Production.
- Coal Seam Gas Fact Sheet 3 – How is Coal Seam Gas Extracted?

3.2.3 Monthly activity updates

A monthly activity update has been prepared since September 2013 and is emailed to key stakeholders and uploaded to the Narrabri Gas Project website providing an update on current and future activities. The report is disseminated by representative bodies and entities, (including the members of the Narrabri Gas Project Community Consultative Committee) to their members and associates. The updates have provided information on:

- decommissioning of wells
- workovers
- drilling of exploration core holes
- pilot wells.
- Leewood Facility.
- other work (including environmental baseline studies)
- site visits
- community
- other (Industry news or government activities or initiatives relevant to the project).

3.2.4 Media updates

A monthly update on work activities is advertised in the local Narrabri Courier newspaper. Advertisements are also placed monthly to promote attendance at Community Site Tours. Various media sources have also been utilised to increase information about the Project, to correct misinformation and to advertise and clarify key issues and milestones. Activities have included:

- Interviews and information have been routinely and regularly supplied to local print media with a more than 230 events recorded in the reporting period
- Updates given to local papers in relation to all important milestones
- More than 25 radio interviews
- Approximately 25 television interviews
- 20 letters to the editor
- 8 advertorial/opinion pieces
- 14 site visits by local and metropolitan journalists

- 24 advertisements to explain
  - Benefits of CSG
  - Signing of the MOU with the NSW Government
  - The Agreed Principles of Land Access document
  - The lodgement of the PEA.

3.2.5 Project Website

The proponent maintains a project website which identifies its activities in NSW (http://www.santos.com/exploration-acreage/nsw-csg.aspx). The website is regularly updated and relevant project information is made available on the website including media releases, fact sheets, environmental approval documents and details of upcoming consultation activities where applicable.

From July 2013 – June 2016, the NSW pages of Santos' website had received more than 60,000 page views. The most visited page was the Narrabri Gas Project page, followed by the Environmental Approvals page.

In addition, a new community website was established (www.narrabrigasproject.com.au) specifically for the Narrabri Gas Project in September 2014. The website has been designed to provide easy access to information on the project. It includes a feedback component where visitors to the site can email questions through (after registering), which will then be answered on the site.

The proponent began promoting the new website to local stakeholders and in the Narrabri Courier in late September 2014. As at 30 June 2016 the Narrabri Gas Project website had logged more than 22,150 separate sessions. On average, visitors have been staying on the site for around 3 minutes. More than 58,500 page views have been recorded with over 30% of these visits being returning visitors. The most visited page was the Home Page, followed by About Narrabri Gas Project, and Statements.

3.2.6 Other contact mechanisms

A variety of additional contact mechanisms have been established including a project email and 1800 information phone line. Contact details have been included on all project related communication materials.

The total number of enquiries received for the period from July 2013 to June 2016 included approximately 60 calls on the 1800 number and approximately 220 emails through project email.

4 Engagement activities

4.1 Local, state and federal government

A range of communication strategies were used to ensure government stakeholders were regularly informed of the project. These strategies included:

- Issue specific presentations to local, state and federal government
- Presentations at regional council meetings
- Meetings with key project managers across relevant agencies
- Regular meetings with staff from collaborative entities that have a high level of interest and involvement in the Project
- Regular Government Information Forums
- Distribution of Monthly Activity Updates
- Invitations to Government Information Forums
- Face to face meetings and briefing sessions held regularly with collaborative or regulatory entities
- Government representation on the Narrabri Gas Project CCC

A summary of the main topics and issues discussed include:

- Project overview, progress and timing
- groundwater modelling, monitoring and management
- baseline studies for water, ecology, air and noise
- produced water treatment and management strategies
- cultural heritage assessment and management
- air quality testing and monitoring
- land access policies, processes and compensation framework
- industry coexistence with agriculture and existing land uses
- social impact assessments including health, housing affordability, infrastructure and services
- facility lighting design (Dark Sky Region Planning Siding Spring Observatory)
- training and skills development opportunities
- local procurement and business opportunities
- local employment opportunities
- traffic management planning
- Regional Community Benefit Fund.

Table 4-4 summarises consultation activities.

Table 4-1 Summary of State Government and elected representative consultation events

Local government:	
Narrabri Shire Council	• Regular meetings with the Mayor, General Manager and Economic Development Officer • Presentation at Council meetings • Monthly Activity Update • Invitations to Government Information Forums • Council representatives on Narrabri Gas Project CCC • Meetings with project officers in relation to specific matters (eg., roads, planning) • Written notification of environmental surveys and investigations on Council administered land • Protest Activity Update distribution list
Gunnedah Shire Council	• Face-to-face meetings • Field tours • Project briefings as required
Warrumbungle Shire Council	• Face-to-face meetings • Project briefings as required
State government:	
Division of Resources and Energy and the former NSW Office of Coal Seam Gas	• Face-to-face meetings • Invitations to Government Information Forums • Field tours • Project briefings at key project milestones • Technical consultations • Regular meetings in relation to regulatory activities • Departmental representatives on Narrabri Gas Project CCC • Regular meetings with Community Liaison Officer • Monthly Activity Update • Protest Activity Update distribution list
Division of Crown Lands	• Face-to-face meetings • Invitations to Government Information Forums • Field tours • Meetings with project officers as landholders in PEL tenure • Written notification of environmental surveys and investigations on Crown Lands administered land • Monthly Activity Update • Invitations to Leewood neighbour's meetings

Local government:	
Division of Primary Industries and the former NSW Office of Water	• Face-to-face meetings • Invitations to Government Information Forums • Field tours • Project briefings • Technical consultations • Regular meetings in relation to regulatory activities • Departmental representatives' attendance at Narrabri Gas Project CCC • Monthly Activity Update
NSW Land and Water Commission	• Face-to-face meetings • Invitations to Government Information Forums • Field tours • Project briefings at key project milestones • Technical consultations • Commissioner Chair of Narrabri Gas Project CCC • Monthly Activity Update
NSW Department of Planning and Environment	• Face-to-face meetings • Invitations to Government Information Forums • Field tours • Project briefings at key project milestones • Technical consultations • Regular meetings in relation to regulatory activities • Departmental representatives attendance at Narrabri Gas Project CCC
Forestry Corporation of NSW	• Face-to-face meetings • Weekly updates when significant activity occurring • Invitations to Government Information Forums • Field tours • Regular meetings with project officers as landholders in PEL tenure • Representatives attend the RFS Mining Industry Fire Safety Group meeting • Written notification of environmental surveys and investigations on FCNSW administered land • Monthly Activity Update • Protest Activity Update distribution list • Invitations to Leewood neighbour's meetings

Local government:	
NSW Environment Protection Authority	• Face-to-face meetings • Invitations to Government Information Forums • Field tours • Project briefings at key project milestones • Technical consultations • Regular meetings in relation to regulatory activities • Departmental representatives on Narrabri Gas Project CCC • Monthly Activity Update
Office of the Chief Scientist and Engineer	• Face-to-face meetings • Field tours • Project briefings and technical consultations
NSW Roads and Maritime Services	• Face-to-face meetings • Invitations to Government Information Forums • Field tours • Technical consultations for the Narrabri Gas Project EIS • Written notification of environmental surveys and investigations on RMS administered land • Monthly Activity Update • Invitations to Leewood neighbour's meetings
NSW Department of Education and Communities	• Invitations to Government Information Forums • Field tours • Technical consultations for preparation of the Narrabri Gas Project EIS • Monthly Activity Update
NSW Department of Health	• Invitations to Government Information Forums • Field tours • Technical consultations for preparation of the Narrabri Gas Project EIS • Monthly Activity Update
NSW Office of Environment and Heritage	• Invitations to Government Information Forums • Field tours • Monthly Activity Update • Technical consultations for preparation of the Narrabri Gas Project EIS • Written notification of environmental surveys and investigations on NPWS administered land • Representatives attend the RFS Mining Industry Fire Safety Group meeting

Local government:	
Rural Fire Service	• Face to face meetings • Technical consultations for bushfire planning and preparation of the Narrabri Gas Project EIS • Invitations to Government Information Forums • Chair the RFS Mining Industry Fire Safety Group meeting • Field tours • Monthly Activity Update
NSW Police Force	• Face-to-face meetings • Field tours • Project briefings at key project milestones • Technical consultations • Monthly Activity Update • Protest Activity Update distribution list
Federal government:	
Department of the Environment	• Face-to-face meetings • Government forums and briefings • Field tours • Project briefings at key Narrabri Gas Project EIS milestones • Technical consultations for preparation of the Narrabri Gas Project EIS
Department of Industry, Innovation and Science – Australian Astronomical Observatory (Siding Spring)	• Face-to-face meetings • Field tours • Technical consultations for preparation of the Narrabri Gas Project EIS, particularly in relation to facility lighting for Dark Sky Region planning • Monthly Activity Update
Political entities:	
Australian Labor Party	• Face-to-face meetings and project briefings • Field tours
Liberal Party	• Face-to-face meetings and project briefings • Field tours
Shooters and Fishers Party	• Face-to-face meetings and project briefings • Field tour
The Nationals	• Face-to-face meetings and project briefings • Field tours
Christian Democrat Party	• Face-to-face meetings and project briefings • Field tour

4.2 Industry groups and regional organisations

A range of communication strategies has been used to ensure industry peak bodies and regional organisations were well informed of the project (refer to Table 4-2).

Table 4-2 Communication strategies utilised for industry groups and regional organisations

Industry groups and regional organisations:	
Industry groups:	
Australian Petroleum Production and Exploration Association (APPEA)	• Face-to-face meetings as required • Information sessions • Field tours • Project briefings / information on key initiatives • Technical consultations for preparation of the Narrabri Gas Project EIS • Community displays and events • Activity updates as required
CSIRO Gas Industry Social Environmental Research Alliance (GISERA)	• Presentation to Narrabri Gas Project CCC • Face-to-face meetings as required • Field tours • Project briefings / information on research and baseline data acquired • Activity updates as required
NSW Minerals Council	• Face-to-face meetings as required • Field tours • Project briefings / information on key initiatives • Technical consultations for preparation of the Narrabri Gas Project EIS • Activity updates as required
Energy Resource Information Centre	• Face-to-face meetings as required • Information sessions • Field tours • Project briefings / information on key initiatives • Activity updates as required
New South Wales Irrigators Council	• Face-to-face meetings as required • Information sessions • Field tours • Project briefings / information on key initiatives • Technical consultations for preparation of the Narrabri Gas Project EIS • Community displays and events at annual conference • Activity updates as required

Industry groups and regional organisations:	
	• Signatory to NSW Agreed Principles of Land Access
New South Wales Farmers Association	• Face-to-face meetings as required • Information sessions • Field tours • Project briefings / information on key initiatives • Technical consultations for preparation of the Narrabri Gas Project EIS • Information stand at annual conference • Monthly Activity Updates • Representative on Narrabri Gas Project CCC • Signatory to NSW Agreed Principles of Land Access
National Farmers Federation	• Face-to-face meetings as required • Information sessions • Field tours • Project briefings / information on key initiatives • Technical consultations for preparation of the Narrabri Gas Project EIS • Activity updates as required
Regional organisations:	
NSW Farmers Association	• Face-to-face meetings as required • Field tours • Project briefings / information on key initiatives • Technical consultations for preparation of the Narrabri Gas Project EIS • Monthly Activity Updates • Representative on Narrabri Gas Project CCC
Namoi Water	• Face-to-face meetings as required • Information sessions • Field tours • Project briefings / information on key initiatives • Technical consultations for preparation of the Narrabri Gas Project EIS • Monthly Activity Updates • Representative on Narrabri Gas Project CCC
Local Land Services North West (previously LHPA)	• Face-to-face meetings as required • Information sessions • Field tours • Project briefings / information on key initiatives

Industry groups and regional organisations:	
	• Technical consultations for preparation of the Narrabri Gas Project EIS • Monthly Activity Updates • Representative on Narrabri Gas Project CCC
Cotton Australia	• Face-to-face meetings as required • Information sessions • Field tours • Project briefings / information on key initiatives • Technical consultations for preparation of the Narrabri Gas Project EIS • Monthly Activity Updates • Signatory to NSW Agreed Principles of Land Access
Country Women's Association of NSW	• Face-to-face meetings as required • Information sessions • Field tours • Project briefings / information on key initiatives • Information stand at annual conference • Technical consultations for preparation of the Narrabri Gas Project EIS • Monthly Activity Updates • Representative on Narrabri Gas Project CCC
Lower Namoi Cotton Growers Association	• Face-to-face meetings as required • Field tours • Technical consultations for preparation of the Narrabri Gas Project EIS • Monthly Activity Updates • Representative on Narrabri Gas Project CCC
Northern Inland Region Committee for Regional Development Australia	• Face-to-face meetings as required • Technical consultations for preparation of the Narrabri Gas Project EIS • Monthly Activity Updates • Representative on Narrabri Gas Project CCC (through Narrabri Chamber of Commerce)

A summary of the main topics and issues raised included:

- Potential for water contamination and mitigation measures in place.
- Water monitoring efforts and data.
- Industry coexistence with agriculture and existing land uses.
- Rehabilitation and subsidence.
- Coal Seam Gas companies lodging larger value indemnity.
- Great Artesian Basin and protection of aquifers.
- Not accessing private land without landholder agreements.
- Risk management
- Well integrity
- Water management.

4.3 Landholders

A range of communication strategies have been used to ensure landholders in the project area and in the broader region are actively engaged and informed of the project (refer to Table 4-3).

Table 4-3 Communication strategies utilised for landholders

Landholders:	
Private landholders – direct: Landholders that host Santos activities on their property and with which Santos has an access arrangement in place (for example, Exploration Land Access Agreement, easement, written consent to undertake environmental studies).	• Regular face-to-face meetings as required • Information sessions • Field tours • Face to face briefings at key project milestones • Technical consultations for preparation of the Narrabri Gas Project EIS • Community displays and events, including local agricultural show and AgQuip • Written notification of survey, environmental investigations and activities on their land • Regular Leewood neighbours' meetings for landholders in property vicinity • Monthly Activity Update in local newspaper and emailed if subscribed • phone call to introduce the project • mail-out of brochure • follow up letter with an invitation to information forum • one-on-one meetings by arrangement • hosting landholder functions • sharing of studies and impact monitoring data with relevant landholders • seeking input into EIS development on those areas of interest/concern (e.g. agricultural, economic and social benefits and impacts)

Landholders:	
Private landholders – activity area: Landholders in the broader PEL 238 tenure area are engaged to enable information exchange and input to proposed activities and provide the opportunity to identify and resolve potential impacts that the activity may have on landholders in the activity area.	• Face-to-face meetings as required • Information sessions • Field tours • Technical consultations for preparation of the Narrabri Gas Project EIS • Community displays and events, including local agricultural show and AgQuip • Written notification of survey, environmental investigations and activities on their land • Regular Leewood neighbours' meetings for landholders in property vicinity • Monthly Activity Update in local newspaper and emailed if subscribed • phone call to introduce the project • mail-out of brochure • follow up letter with an invitation to information forum • one-on-one meetings by arrangement • hosting landholder functions • sharing of studies and impact monitoring data with relevant landholders • seeking input into EIS development on those areas of interest/concern (e.g. agricultural, economic and social benefits and impacts)
Private landholders – regional context: Engagement and consultation with landholders in the regional context has been undertaken in the main through established industry representative bodies such as NSW Farmers, NSW Irrigators, Cotton Australia, Local Land Services and Local Government representatives.	• Face-to-face meetings as required • Field tours • Community displays and events, including local agricultural show and AgQuip • Monthly Activity Update distributed to representative bodies for dissemination to members • Information communicated through media outlets and other established communication channels • Representatives of agricultural groups on Narrabri Gas Project CCC.

Approximately 150 face-to-face meetings have been held with landholders in the project area, more than 350 field site tours and community events with 10 landholder specific information sessions where project staff have been in attendance to provide information and answer questions. There have been more than 900 emails, phone calls and/or letters of notification to landholders in relation to upcoming activities and landholder information sessions and events.

4.3.1 Principles of land access

The Principles of Land Access was signed on 28 March 2014 by Santos, AGL, NSW Farmers, Cotton Australia and the NSW Irrigators Council at NSW Parliament House. Two new signatories, Dairy Connect and the Country Women's Association of NSW, were added to the agreement on 10 September 2015. The Principles of Land Access are intended to give the community further confidence that Santos seeks respectful, long-term relationships with landholders. The principles include:

- Any landholder must be allowed to freely express their views on the type of drilling operations that should or should not take place on their land without criticism, pressure, harassment or intimidation. Any landholder is at liberty to say "yes" or "no" to the conduct of operation on their land.

- Gas companies will respect a landholder's wishes and not enter onto a landholder's property to conduct drilling operations where that landholder has clearly expressed the view that operations on their property would be unwelcome.
- The parties will uphold a landholder's decision to allow access for drilling operations and do not support attempts by third-party groups to interfere with any agreed operations. The parties condemn bullying, harassment and intimidation in relation to agreed drilling operations.

4.3.2 Proactive engagement at key stages

In December 2013 prior to the lodgement of the Preliminary Environmental Assessment a telephone call was made to all landholders within the project area for which a valid telephone number was known or accessible from available sources. Contact was made with 184 landholders. Telephone calls were followed up with a letter of invitation to attend one of three project area landholder information sessions. Landholders that were unable to be contacted by telephone were sent a letter with a copy of the project brochure and the contact details for the local project office if they required further information.

4.3.3 Contacting landholders without registered mail addresses

Letters were sent to all 255 private land title holders and the six government landholders, however as with sourcing telephone numbers, publicly available postal address information (predominantly from that listed on property title documentation) was relied upon for landholder addresses. As there are land parcels within the project area that do not have residential infrastructure in place, or the landowner does not reside on that property, a number of letters were returned as undeliverable by mail.

Subsequently further efforts to find an alternative valid mailing address included searching publicly available information sources such as telephone white page listings, internet searches and requests to Narrabri Shire Council to forward correspondence through their ratepayer address listings.

Santos already had established relationships with a number of landholders within the project area from contact associated with current and previous exploration and appraisal activities; baseline ecological and other environmental survey activities. Santos has had personal contact with in excess of 85% of landholders in the project area and has been able to source a valid mailing address for 96% of all landholders.

4.3.4 Landholder information sessions

Landholder information sessions have been held regularly since the lodgement of the Preliminary Environmental Assessment with invitations issued to landholders in the project area and advertised in The Narrabri Courier as summarised in Table 4-4.

Community site tours are held monthly and a number of landholders have attended these site tours, or tours specifically arranged as requested by landholders or agricultural industry representative entities.

Landholders living adjacent to the Leewood facility are provided monthly updates of current activities by email or mail (nominated format as identified as preferable by the specific landholder).

Table 4-4 Summary of Landholder information sessions

Timing	Location	Purpose	External invitations Issued	Attendees
12-Jul-13	Leewood	Leewood Neighbours meeting	15	8
30-Aug-13	Leewood	Leewood Neighbours meeting	15	9
10-Dec-13	Bowling Club Narrabri	Project Area Landholder Information Session	142	41
11-Dec-13	Crossing Theatre Narrabri	Project Area Landholder Information Session		17
12-Dec-13	Bowling Club Narrabri	Project Area Landholder Information Session		11
3-Feb-14	Leewood	Leewood Neighbours meeting	15	4
25-Feb-14	RSL Club Narrabri	Project Area Landholder Information Session	142	40
13-Apr-14	Yarrie Lake	Project Area Landholder Information Session and BBQ	142	17
1-Jul-14	Leewood	Leewood Neighbours meeting	15	14
13-Jul-14	Yarrie Lake	Project Area Landholder Information Session and BBQ		17
5-Dec-14	Narrabri Golf Club	Contractors, suppliers and landholders	120	97
7-May-15	Leewood	Leewood Neighbours meeting	15	3
25-Sep-15	Leewood	Leewood Neighbours meeting	16	1

4.3.5 Government landholders

A range of communication strategies have been used to ensure Government landholders in the project area are actively engaged and informed of the project (refer to Table 4-5).

Table 4-5 Communication strategies utilised for Government landholders

Government landholders	
Forestry Corporation of NSW	• Face-to-face meetings • Weekly updates when significant activity occurring • Invitations to Government Information Forums • Field tours • Regular meetings with project officers as landholders in PEL tenure • Representatives attend the RFS Mining Industry Fire Safety Group meeting • Written requests for consent for environmental surveys and investigations on FCNSW administered land • Monthly Activity Update • Invitations to Leewood neighbour's meetings • Protest Activity Update distribution list.

Government landholders	
Narrabri Shire Council	• Meetings with the Mayor, General Manager and Economic Development Officer at key project milestones • Presentation at Council meetings • Monthly Activity Update • Invitations to Government Information Forums • Council representatives on Narrabri Gas Project CCC • Meetings with project officers in relation to specific matters (eg., roads, planning) • Written requests for consent for environmental surveys and investigations on Council administered land • Protest Activity Update distribution list.
Division of Crown Lands	• Face-to-face meetings • Invitations to Government Information Forums • Field tours • Meetings with project officers as landholders in PEL tenure • Written requests for consent for environmental surveys and investigations on Crown Lands administered land • Monthly Activity Update • Invitations to Leewood neighbour's meetings.
Roads and Maritime Services	• Face-to-face meetings • Invitations to Government Information Forums • Field tours • Technical consultations for Leewood and EIS • Written requests for consent for environmental surveys and investigations on RMS administered land • Monthly Activity Update • Invitations to Leewood neighbour's meetings.
Local Land Services (North West)	• Face-to-face meetings • Invitations to Government Information Forums • Field tours • Monthly Activity Update • Written requests for consent for environmental surveys and investigations on LLS administered land • LLS representative on Narrabri Gas Project CCC.
Office of Environment and Heritage (NPWS)	• Invitations to Government Information Forums • Field tours • Monthly Activity Update • Written requests for consent for environmental surveys and investigations on NPWS administered land • Representatives attend the RFS Mining Industry Fire Safety Group meeting.

A summary of the main topics and issues raised by landholders and agricultural industry bodies during consultation have included:

- Land access policies, processes and compensation framework
- Diminution of land values for properties in CSG activity areas
- Industry coexistence with agriculture and existing land uses
- Social impact assessments including health, housing affordability, infrastructure and services
- Location and timing of gas wells and associated infrastructure

- Impact on groundwater resources
- Contamination and connectivity between aquifers
- Flood impacts
- Produced water management, storage and treatment (including salt management)
- Well integrity/engineering standards
- Drilling issues/standards
- Spill incidents
- Monitoring/science/research
- Perceived misinformation
- Local economy and development
- Rehabilitation
- Communications/engagement
- NSW regulatory and approval processes.

4.4 Aboriginal Community

Significant consultation with the Aboriginal community has occurred and is detailed in Appendix N1 Aboriginal Cultural Heritage Assessment of the EIS. A range of communication strategies have been used to ensure Aboriginal community members in the project area and in the broader region are actively engaged and informed of the project (refer to Table 4-6).

Table 4-6 Communication strategies utilised for Aboriginal stakeholders

Local Aboriginal Land Councils	
Narrabri Local Aboriginal Land Council	• Face-to-face meetings as required • Information sessions • Field tours • Project briefings / information on significant activities • Technical consultations for preparation of the Narrabri Gas Project EIS Community displays and events • Activity updates in local papers • Monthly Activity Updates • Representative on Narrabri Gas Project CCC
Wee Waa Local Aboriginal Land Council	• Face-to-face meetings as required • Information sessions • Field tours • Project briefings / information on relevant significant activities • Technical consultations for preparation of the Narrabri Gas Project EIS Community displays and events • Activity updates in local papers

Local Aboriginal Land Councils	
Baradine Local Aboriginal Land Council	• Face-to-face meetings as required • Information sessions • Field tours • Project briefings / information on relevant significant activities • Technical consultations for preparation of the Narrabri Gas Project EIS • Community displays and events • Activity updates in local papers
Pilliga Local Aboriginal Land Council	• Face-to-face meetings as required • Information sessions • Field tours • Project briefings / information on relevant significant activities • Technical consultations for preparation of the Narrabri Gas Project EIS • Community displays and events • Activity updates in local papers
Coonabarabran Local Aboriginal Land Council	• Face-to-face meetings as required • Information sessions • Field tours • Project briefings / information on relevant significant activities • Technical consultations for preparation of the Narrabri Gas Project EIS • Community displays and events • Activity updates in local papers
Red Chief Local Aboriginal Land Council	• Face-to-face meetings as required • Information sessions • Field tours • Project briefings / information on relevant significant activities • Technical consultations for preparation of the Narrabri Gas Project EIS • Community displays and events • Activity updates in local papers
Gomeroi Native Title Claimants	• Face-to-face meetings as required • Information sessions • Field tours • Technical consultations for preparation of the Narrabri Gas Project EIS • Activity updates in local papers • Formal consultation correspondence

A summary of the main topics and issues raised by the Aboriginal community during consultation have included:

- Consultation process and communication methods
- Importance of involving elders
- Importance of protecting cultural heritage and Aboriginal involvement in that
- Need for employment and training opportunities for local Aboriginal people
- Need for Aboriginal local people to benefit economically.

4.5 Local Community

The proponent has utilised a number of strategies to inform and consult on activities in the local community as detailed in Table 4-7. In addition, established communication channels include the provision of general information through the website and media announcements; the shopfronts at Narrabri and Gunnedah; monthly Community Site Tours; information stands at local agricultural shows and community events; and the sponsorship program which supports community and sporting groups. Approximately 350 field site tours and community events have been delivered to June 2016.

Santos also attends AgQuip annually, a major event for many businesses and individuals operating in the pastoral and agricultural sector of New South Wales. Over 1000 people have visited Santos' annual display at AgQuip since 2011. Santos has also participated in a further 120 community events and community site tours where project had staff available to provide information on our project and for stakeholders and the community to ask questions, raise concerns and provide input.

Table 4-7 Communication strategies utilised for the local community

Local and other community organisations	
General community, clubs and community groups:	
General Community	• Face-to-face meetings on request • Information sessions • Field tours (with feedback sheets) • CCC briefings • Technical consultations for preparation of the Narrabri Gas Project EIS • Participation and Information stands at community events • Activity updates in local papers
Clubs and Community Groups	• Face-to-face meetings on request • Information sessions • Field tours (with feedback sheets) • CCC briefings • Technical consultations for preparation of the Narrabri Gas Project EIS • Participation and Information stands at community events • Activity updates in local papers
Other community organisations:	
Yes2Gas	• Face-to-face meetings as required • Field tours • Respond to social media commentary when applicable • Monthly Activity Updates Yes2Gas Facebook page: A group of Narrabri residents and businesses that support the Narrabri Gas Project.
The Wilderness Society	• Respond to social media commentary when applicable The Wilderness Society is actively opposed to activities Santos is undertaking within PEL 238 - "We know resource companies are threatening our climate, our water supply and our most beautiful natural places. If we want a fair shot at a safe future, we must stop the irresponsible extraction of fossil fuels". "Our fossil fuels campaign seeks to keep globally significant reserves of oil, gas and coal in the ground by halting new large projects proposed in marine and terrestrial wilderness areas throughout Australia". Source: https://www.wilderness.org.au/campaigns/fossil-fuels

Local and other community organisations	
People for the Plains	• Face-to-face meetings as required • Field tour • Respond to social media commentary when applicable • Representative on Narrabri Gas Project CCC • Monthly Activity Updates People for the Plains Facebook page: "We are a group of Narrabri Region Residents who want to create a positive future through education and awareness of the issues around CSG & coal industries".
Lock the Gate	• Respond to social media commentary when applicable "The mission of the Lock the Gate Alliance is to protect Australia's natural, cultural and agricultural resources from inappropriate mining and to educate and empower all Australians to demand sustainable solutions to food and energy production…the rapid expansion of coal and coal seam gas development. A declaration was made: farmers would lock their gates to these rapacious industries". Source: http://www.lockthegate.org.au/about_us

4.5.1 Community Consultative Committee

The independently chaired Narrabri Community Committee on CSG has met on a monthly basis in Narrabri. The committee was established in August 2012 and had representation from a cross-section of interested parties within the local community including local government, education, community service representatives, local business and community members. Minutes and action items arising from these meetings are available on the Santos website and were distributed by members across their networks for broader community dissemination. The final meeting of the Santos Narrabri Community Committee on CSG was held on Wednesday 22 October 2014.

On 10 October 2014, the Minister for Resources and Energy formally appointed a Narrabri Gas Project Community Consultative Committee with Mr Jock Laurie, the NSW Land and Water Commissioner as Chair. The first meeting of the new committee was held in December 2014. The committee meets monthly and has representatives from key industry and community organisations, State and Local Government and Santos including:

- NSW Farmers
- Narrabri Local Aboriginal Land Council
- Namoi Water
- Lower Namoi Cotton Growers Association
- Country Women's Association of NSW
- North West Local Land Services
- People for the Plains
- Narrabri Chamber of Commerce
- Narrabri Shire Council
- Land and Water Commission
- Department of Planning and Environment
- Division of Resources and Energy - the former Office of Coal Seam Gas
- Department of Primary Industries and the former NSW Office of Water
- Environment Protection Authority
- Santos

4.5.2 Agricultural industry survey

FPC Water Solutions Pty Ltd (FPC) were engaged to:

- Identify opportunities for co-existence between CSG activities and irrigated agricultural land
- Identify opportunities/options for showcasing co-existence between the two industries

  Identify and clarify the key concerns/issues for irrigated agricultural land and assist in developing a strategy to address the issues with key stakeholders.

Interviews were held with the following key community members and stakeholder groups to inform the findings of this study:

- Namoi Water
- Auscott Pty Ltd
- Cotton Seed Distributors Ltd
- People for the Plains
- NSW Land and Water Commissioner
- NSW Irrigators Council
- local business and contractors
- local landholders and businesses

A summary of the main topics and issues discussed include:

- Opposition to development of resource industry associated with fossil fuels
- Project footprint, progress and timing
- Groundwater modelling, monitoring and management
- Baseline studies for water, ecology, air and noise
- Drilling integrity and practices
- Produced water treatment and management strategies
- Air quality testing and monitoring
- Bushfire preparedness and cooperation with fire management agencies
- Land access policies, processes and compensation framework
- Industry coexistence with agriculture and existing land uses
- Social impact assessments including health, housing affordability, infrastructure and services
- Local procurement and business opportunities
- Local employment opportunities
- Regional Community Benefit Fund.

4.6 Local businesses

A range of communication strategies are used to ensure that local business and contractors understand the project and potential opportunities (refer to Table 4-8).

Table 4-8 Communication strategies utilised for local business

Local businesses:	
Narrabri Chamber of Commerce	• Face-to-face meetings • Collaboratively host business and community Information sessions • Field tours • Activity updates in local papers • Monthly Activity Update • Contractor and Vendor Forums (twice annually) • Technical consultations for preparation of the Narrabri Gas Project EIS • Project briefings at key EIS milestones as required • Representative on the Narrabri Gas Project CCC
Local businesses and vendors	• Face-to-face meetings • Integrated Working Team Meetings (where current supplier) • Contractor and Vendor Forums (twice annually) • Field tours • CCC briefings (business community and Chamber of Commerce representatives) • Activity updates in local papers • Monthly Activity Updates • Technical consultations for preparation of the Narrabri Gas Project EIS • Project briefings at key Narrabri Gas Project EIS milestones as required

A summary of the main topics and issues discussed with local business and contractors included:

- Project approval process, in particular timing
- Project commencement and development schedule
- Employment opportunities in Narrabri area
- Purchasing from local suppliers.
- Opportunities to demonstrate support for the project
- impacts on groundwater quality and availability
- The management of salt from the project

- Potential use of treated water
- Well integrity during drilling activities
- Potential for drilling to induce seismicity
- The disbursement of community benefit fund including management of the funds
- The end location for gas (domestic or export)
- Expansion of the project beyond the current project area
- Financial assurances and guarantees
- Transmission pipeline
- Financial benefits to landholders
- Infrastructure location
- Potential for fracking.

4.7 Media

A range of communication strategies are used to ensure that media organisations understand the project and potential opportunities (refer to Table 4-9).

Table 4-9 Communication strategies utilised for the media

Media organisations	
Print: Narrabri Courier Namoi Valley Independent Northern Daily Leader The Land newspaper Sydney Morning Herald Australian Financial Review The Australian Queensland Country Life	• Field tours • Project briefings of key initiatives and project milestones • Community displays and events • Activity updates in local papers • Monthly Activity Updates • Interviews on key issues or activities • Letters to the Editor • Pro-active media releases
Radio: ABC Radio news – Tamworth and Dubbo ABC Radio Rural report Narrabri Max FM	• Field tours • Project briefings of key initiatives and project milestones • Interviews on key issues or activities • Pro-active media releases
Television: Prime 7 NBN ABC TV	• Field tours • Project briefings of key initiatives and project milestones • Interviews on key issues or activities

Media organisations	
Social media: Facebook Twitter Instagram Web	• Postings of key initiatives and project milestones • Promotion of community displays and events • Information videos • Links to Activity updates in local papers and website • Industry news • Respond to social media commentary • Respond to factually incorrect information on Santos' activities • Regular website updates with current information • Narrabri Gas Project CCC presentations, information and communiques to website

A summary of the main topics and issues discussed with media included:

- Project overview, approval process, progress and timing
- Groundwater modelling, monitoring and management
- Drilling integrity and practices
- Produced water treatment and management strategies
- Land access policies, processes and compensation framework
- Industry coexistence with agriculture and existing land uses
- Regional Community Benefit Fund
- Protest Activity
- Government regulation and compliance
- NSW gas industry and market predictions

4.8 Technical EIS Consultations

Consultation was undertaken with a number of stakeholders including state agencies, councils, local service providers and landholders to inform key technical components of the EIS. More specifically, consultation informed the social impact assessment and agricultural impact assessment to assist in understanding the potential impacts and benefits of the project on local services and agricultural practices, and gain feedback on potential mitigation and management strategies.

4.9 Community consultation undertaken by others

In addition to consultation and engagement activities undertaken by the proponent, there have been a number of State Government initiatives or statutory activities that have captured and presented community attitudes to the coal seam gas industry in New South Wales over the period that engagement for the project has been undertaken. A number of responses to these activities have provided information specifically relating to the proponent's proposed activities for the project and the matters raised have been incorporated into consultation activities. This includes:

Parliament of NSW, Legislative Council *Inquiry into Coal Seam Gas* – Final Report May 2012 - http://www.parliament.nsw.gov.au/prod/parlment/committee.nsf/0/29AE48525CFAEA7CCA2578E3001ABD1C

NSW Planning Assessment Commission meeting for assessment of the *Bibblewindi and Dewhurst Gas Exploration Pilot Expansion* – Final Report May 2014 - http://www.pac.nsw.gov.au/Projects/tabid/77/LGA/Narrabri%20Shire%20Council/Default.aspx

NSW Chief Scientist and Engineer *Independent Review of Coal Seam Gas Activities in NSW* – Final Report September 2014 - http://www.chiefscientist.nsw.gov.au/reports

NSW Independent Pricing and Regulatory Tribunal *Landholder compensation for gas exploration and production* – Final Report December 2015 - http://www.ipart.nsw.gov.au/Home/Industries/Gas/Reviews/Landholder_compensation/Landholder_compensation_for_gas_exploration_and_production

5 Consultation outcomes

5.1 Issues identified

During the consultation program, participants identified a range of impacts and benefits of the Project. Although feedback has differed based on individual stakeholders' interests, a number of consistent issues emerged as follows:

- air quality
- bushfire preparedness and management
- business and employment opportunities
- community benefits
- community health and safety
- contamination and pollution
- cultural heritage assessment and impact
- cumulative impacts
- environment
- erosion and sediment control
- groundwater
- land access
- land compensation
- land fragmentation
- land use and coexistence with agriculture
- noise
- pipeline
- produced water storage and treatment
- project timing
- regulation and compliance
- rehabilitation
- salt management
- social impacts
- sub-surface infrastructure
- traffic and transport
- visual impact
- waste management
- well integrity

Each theme is summarised in Table 5-1 as expressed by the stakeholders. This summary is a high level snapshot of community and stakeholder perceptions in relation to the Project rather than technical assessment of the potential impacts or benefits. Themes are not presented in a particular priority order or ranking. Table 5-1 presents the findings of the consultation activities from July 2014 to June 2016.

Consultation with key stakeholders and the community is ongoing with further consultation scheduled for 2016 including public exhibition of the EIS. Stakeholder feedback has been used to inform the project description, EIS technical studies and environmental and social management plans as outlined in Table 5-1.

Table 5-1 Summary of issues raised and responses

Theme	Issue	Summary	Key stakeholders				Response / changes made to the project / area addressed in the EIS
			Community	Government	Industry Associations	Landholders	
Air quality	Flares	Size and location of flares What emissions are associated with flares? Are there any particulates? Is nitrogen oxide released? What monitoring is undertaken?	■	■			The project design has limited the use of flares to one each at Bibblewindi and Leewood. These flares are required as a safety mechanism as part of gas compression and processing facilities. The flame of the flare during routine operations is likely to be around 1.5 metres, therefore it is unlikely to cause significant light spill. The flares have been located after considering impacts on nearby sensitive receptors. On occasions during exploration and appraisal where it is not feasible to link pilot wells to existing gas flow lines there will be a flare operated to service the pilot wells. There would be a maximum of six flares of this type. The assessment of the impact of flares has been completed as part of the project EIS (Appendix L Air Quality Impact Assessment).
	Dust	General concerns with the increase of dust in the area impact on vegetation within road corridors	■	■		■	Air emissions from construction activities are predicted to comply with air quality criteria at all identified sensitive receivers. Despite this, all reasonable and feasible measures will be implemented to ensure that project emissions do not exceed the relevant air quality criteria at occupied residences on private land. An air quality management plan would be implemented for the construction, operation and rehabilitation stages of the project. It would include a suite of mitigation measures that could be implemented to prevent, minimise and manage air emissions as well as an air quality monitoring program. Mitigation and management measures would include dust control methods (such as water sprays, carts and/or suppressants to minimise emissions) and construction zone speed limits. Indirect impacts on vegetation are assessed in Appendix J Ecological Impact Assessment.
	Salt	Salt from brine ponds blowing over soil and vegetation at Leewood	■				Brine ponds will contain salt in a liquid form and therefore solid salt will not be able to be blown out of the ponds.

Theme	Issue	Summary	Key stakeholders				Response / changes made to the project / area addressed in the EIS
			Community	Government	Industry Associations	Landholders	
Bushfire	Preparedness	Adherence to FCNSW and RFS requirements Staff and contractor bushfire awareness training emergency evacuation of staff/contractors		■		■	A site-specific Bushfire Management Plan would be prepared in conjunction with landholders and the NSW Rural Fire Service, with components under project control implemented for the study area to mitigate bushfire risk. The Bushfire Management Plan would include: formal preparedness procedures for staff and contractors formal rehearsed procedures for staff and contractors to respond to a formal bushfire warning being issued by emergency services, including identification of escape routes and refuge areas identification of specific asset protection zones around assets where vegetation management is required identification of appropriate construction standards for buildings and refuge areas Preparation of an annual works mitigation schedule to identify works required to be implemented to prepare asset protection and protection zones around assets, and asset maintenance to improve resilience to bushfires.
	Potential to cause a bushfire	Increased risks of ignition associated with construction activities Flares during operation	■			■	Appropriate mitigation measures are undertaken during construction activities to minimise ignition risk. The safety zones around flares will be designed in accordance with relevant Australian and International standards. The assessment of bushfire hazards has been completed as part of the project EIS including a description of the mitigations proposed (Appendix S).
	Access	Landholder alternative access through FCNSW exclusion zones in Santos operational areas				■	Access through the forest will continue to be managed by the landholder, FCNSW. After construction is completed, the operational area around the well heads will be reduced to approximately 0.25 hectares. Access on existing forestry roads will not be restricted.

Theme	Issue	Summary	Key stakeholders				Response / changes made to the project / area addressed in the EIS
			Community	Government	Industry Associations	Landholders	
	Infrastructure locations	Can the proponent provide spatial data to relevant organisations for planning and response purposes (eg., RFS, FCNSW, NSWPOL and Narrabri Shire Council)?		■			Spatial information provided to relevant organisations
Business and employment opportunities	Local employment	Capacity for the proponent to ensure local employment, opportunities, capability/capacity building, provision of career pathways for the youth.	■	■	■		The 200 general operations workers required for the project would include a mix of existing roles already based in Narrabri, support roles based in Sydney, Brisbane and Adelaide and new roles that would be created over the life of the project. Generally, employees would be sought from the local area with training programs instigated where skills are not currently available. It is anticipated that about 50 workers would relocate to Narrabri for employment during the operation of the project, effectively becoming permanent residents and members of the local population. The assessment of social impacts has been completed as part of the project EIS (Appendix T1).
	Supporting local business	What things are in place to support buying locally? Will the proponent help business to be able to meet procurement requirements?	■	■		■	The proponent has and continues to support the local community. A number of contractor forums have been held to help inform the local community of emerging opportunities. The proponent aims to maximise supply opportunities for competitive local businesses when bidding for contracts and/or supplying goods and services, however quotations and tenders will be assessed with the intent of selecting the most appropriate competitive offer. The proponent will contribute to and support initiatives that attract new investment, encourage employment creation and promote sustainable industry development within the areas in which it operates.

Theme	Issue	Summary	Key stakeholders				Response / changes made to the project / area addressed in the EIS
			Community	Government	Industry Associations	Landholders	
	Labour market	Consuming local available agricultural labour market			■	■	Economic modelling on the impact to other industries indicates that there may be some changes to the agricultural (0.32%) and mining (0.64%) industries. Workers in the existing mining industry possess skills that match the needs of the Narrabri Gas Project and is therefore expected to face stronger competition for labour. Further details are provided in Appendix U2. In addition the assessment of Agricultural impacts has been completed as part of the project EIS (Appendix K) and includes a discussion on the impacts to the labour market.
Community benefits	Sponsorship	Will Santos continue to support local sporting clubs and groups while they are waiting for the project to be assessed?	■				Santos will continue to work in partnership with the local community through sponsoring, supporting and participating in community events and activities across the areas of health, arts/culture, community wellbeing, education/youth, environment, health and indigenous related activities. The assessment of social and health impacts has been completed as part of the project EIS (Appendix T1).
Community health and safety	Health	Tara community in Qld say that CSG has caused health problems;	■			■	Queensland Health conducted a review of health complaints raised by a group of residents in Tara noting that complaints were not representative of the wider region. The outcome of the assessment was that there was no clear link between the health complaints and the impacts of the coal seam gas industry on air, water or soil within the community. Further details on the likelihood of potential health impacts are provided in Appendix T2 (Environmental Health Impact Assessment).

Theme	Issue	Summary	Key stakeholders				Response / changes made to the project / area addressed in the EIS
			Community	Government	Industry Associations	Landholders	
	FIFO	Will there be a lot of FIFO workers in town causing problems in the community?	■				It is anticipated that there will be a proportion of the workforce that will be FIFO. Consultation with NSW Police Force and members of the community indicated that anti-social behaviour associated with FIFO workers had occurred in the past in existing FIFO communities, however developments in workforce management by mining and resource companies had effectively mitigated the potential impact. There will be a requirement for some FIFO workers during construction of the project, whilst operation of the project will generally be managed by workforce based in Narrabri and surrounds. The assessment of the social impacts to the community and mitigation measures that will be implemented has been completed as part of the project EIS (Appendix T1)
	Protest activity	Can the Police or Council do anything to stop protesters disrupting business in the main street	■				This is outside the scope of the EIS.

Theme	Issue	Summary	Key stakeholders				Response / changes made to the project / area addressed in the EIS
			Community	Government	Industry Associations	Landholders	
Contamination and pollution	Drilling	Drilling chemical use and the impact on aquifers the use of biocides Radioactive materials	■			■	Installation of the coal seam gas wells involves the use of drilling fluids, which have potential to interact with groundwater systems overlying the targeted coal seams. The potential for drilling fluid within the drill hole to interact with surrounding groundwater and potentially migrate off-site to existing groundwater users was assessed as a very low risk. Drilling fluid is predominantly comprised of water (more than 70 per cent) with the balance being weighting agents and additives which are added in varying proportions depending on the geological conditions and the objectives of the drilling activity. Additives commonly used include bentonite or polymer, which are used to form a temporary filter cake on the sides of the uncased well. This rapidly reduces the infiltration of drilling fluids into the formations through which the well extends. Depending on the logging activity to be undertaken, logging sources may use a live source such as Caesium or Beryllium whilst others use passive sensors that detect or use magnetics as a source to gather information. In NSW, the use of CS-137 is governed by the *Radiation Safety Act and the Radiation Safety Regulations* with oversight and enforcement from the Environment Protection Authority (EPA).
	Fluid treatment facility	The storage of chemicals and the potential for a pollution incident	■	■			Chapter 25 (Hazards, risk and safety) and Appendix S (Hazard and Risk Assessment) provide further details on the use and management of chemicals. In addition, potential contamination of soils from chemicals is provided in Chapter 14 (Soils and land contamination). Chemicals would be stored and handled in accordance with relevant Australian Standards, including AS 1940-2004 The storage and handling of flammable and combustible liquids.
	Transportation of chemicals on public roads	Increased transport movements; Are the chemicals dangerous goods; School bus routes	■				Chemicals would be stored and handled in accordance with relevant Australian Standards, including AS 1940-2004 The storage and handling of flammable and combustible liquids. Transport will be in accordance with all applicable regulatory requirements including the Australian Dangerous Goods Code and tracking requirements under environmental legislation.

Theme	Issue	Summary	Key stakeholders				Response / changes made to the project / area addressed in the EIS
			Community	Government	Industry Associations	Landholders	
	Aquifer contamination	How long would it take for detection if an aquifer were contaminated; does Santos hold insurance to cover for aquifer contamination; What monitoring is in place for aquifers					All wells will be drilled in accordance with the NSW Code of Practice on Well Integrity. When constructed in accordance with these standards the risk of groundwater contamination is negligible. In addition, the hydrostratigraphic profile within the project area indicates that high yielding ground water supplies in the Namoi Alluvium and Pilliga Sandstone are separated from the project's target coal seam gas bearing strata at depth by units of low permeability which effectively act as barriers to groundwater flow, inhibiting hydraulic connectivity. The assessment of groundwater including possible impacts to groundwater quality is included in Chapter 11 (Groundwater). The assessment concluded that the significance of impact would be low. Appendix G3 outlines the proposed surface water and groundwater monitoring plan including locations, what is monitored and a process to be followed if water quality samples are outside of the expected range. Operators are required to submit a financial assurance to the NSW Government to cover the costs of rehabilitation of activities.
			■			■	
	Reporting spills	When does Santos have to report a spill and who to;					Santos is required to report spills to the EPA in accordance with the Environment Protection Licence issued for the project and all regulatory requirements.
Biodiversity	Ecological	Is the information gathered from ecological surveys available to landholders and the public; Is the information provided to Parks and Wildlife for their records; What processes are put in place if a threatened species is identified in the area that operations are undertaken; How would workers know if a plant or animal they see is a threatened species;					Santos has undertaken comprehensive baseline surveys (over 13,000 person hours) within the project area. All threatened species records have been provided to the Office of Environment and Heritage. OEH upload the data onto their ATLAS wildlife database, where it is available to the public. Before areas are disturbed for CSG operations, site scale surveys are undertaken by ecological experts. Once the planned infrastructure is precisely located to minimise impacts, Santos' operational systems ensure that no impacts will occur, including to threatened species, outside the assessed footprint. Disturbance is confined to these assessed sites. An assessment of the ecological impacts has been completed as part of the project EIS (Appendix J).
			■	■		■	

Theme	Issue	Summary	Key stakeholders				Response / changes made to the project / area addressed in the EIS
			Community	Government	Industry Associations	Landholders	
Cumulative impacts	Groundwater	What impact will CSG water extraction have on the Water Sharing Plan for irrigators;				■	A numerical ground water model was developed by the proponent to investigate cumulative impacts and this was peer reviewed by the CSIRO (refer to Appendix F). Modelling has concluded that there will be minimal impact to aquifers. It is estimated that an average of 1.5 gigalitres per year (37.5 gigalitres over the 25-year assessment period for the project) of produced water would be extracted from the target coal seams. The Department of Primary Industries (Water) has assessed the volume of groundwater stored in the Gunnedah-Oxley Basin as around 9,000,000 gigalitres, and has set a long-term annual extraction limit for licensed users, while also allocating over 99 percent of stored groundwater as environmental water. The project, if approved, would become another regulated (licensed) water user along with existing irrigators, coal miners, industrial users and those drawing under licence for stock and domestic use.
	Productive agricultural land	Loss of strategic agricultural land			■		Comprehensive soil testing has confirmed that there is no BSAL located within the project area. A site verification certificate acknowledging the absence of BSAL in the project area was issued by the NSW Office of Environment and Heritage on 1 December 2015. Therefore, the project will not result in a loss of strategic agricultural land.
	Other State Forest users	Will the project have an impact on the area available for timber harvesting; can apiarists still have their hives in the project area				■	Given the dispersed nature of the gas field and the relatively small amount of surface clearing at each well, it is anticipated that there will be minimal impacts to other forest users, including apiary activities. Impacts associated with agricultural activities including apiary activities are addressed in Appendix K (Agricultural Impact Statement).

Theme	Issue	Summary	Key stakeholders				Response / changes made to the project / area addressed in the EIS
			Community	Government	Industry Associations	Landholders	
Erosion and sediment control	Standards	What standards do Santos have to adhere to? What erosion control is put in place for creek crossings Are areas compacted after excavation activities	■			■	Under its Environment Protection Licence, Santos must comply with the *Managing Urban Stormwater: Soils and Construction, (Landcom, 2004),* (the Blue Book) for erosion and sediment control. Erosion control and subsequent rehabilitation at creek crossings will depend on the nature of the creek as well as the construction activities being undertaken, however it will comply with the requirements of the Blue Book. An assessment of geology and soil erosion is being completed as part of the project EIS (Appendix H).
Export Pipeline	Route	Without a pipeline route identified, concerns with the end use of the gas, particularly if the gas is exported. Construction and approvals timeframes including the assessing Authority Inclusion of the pipeline in the current Project	■		■		The export pipeline does not form part of this project EIS.
	Land Access	can landholders refuse access for a pipeline to be constructed through their property, when will public consultation commence	■				The export pipeline does not form part of this project EIS.
Groundwater	Baseline assessments	What baseline assessments have been done on groundwater dependent ecosystems and is there ongoing monitoring to see if there are any impacts;	■			■	A cumulative ground water model has been developed by CDM Smith and peer reviewed by the CSIRO. The modelling has concluded that there will be minimal impact to aquifers An assessment of the groundwater impacts and groundwater models has been completed as part of the project EIS (Appendix F).

Theme	Issue	Summary	Key stakeholders				Response / changes made to the project / area addressed in the EIS
			Community	Government	Industry Associations	Landholders	
	Water portal	What information is available from the Santos Water Portal on groundwater monitoring; How often is the information updated; Can the portal be simplified so it's easier to use	■				The water portal is a tool for the general public to review baseline water quality data that has been collected in the area. The water portal is updated quarterly.
Land access	Land access	Lock the Gate campaign to stop CSG company representatives from coming onto property; property rights forums/debates/discussions in broader NSW community about ownership of mineral rights (and links to the Vegetation Management legislation in NSW)					Santos is a signatory to the *Agreed Principles of Land Access* signed by Santos, AGL, NSW Farmers, Cotton Australia, NSW Irrigators Council, Country Women's Association of NSW and Dairy Connect. The principles include: Any Landholder must be allowed to freely express their views on the type of drilling operations that should or should not take place on their land without criticism, pressure, harassment or intimidation. Any Landholder is at liberty to say "yes" or "no" to the conduct of operation on their land; Gas companies confirm that they will respect the Landholder's wishes and not enter onto a Landholder's property to conduct drilling operations where that Landholder has clearly expressed the view that operations on their property would be unwelcome; and The parties will uphold the Landholder's decision to allow access for drilling operations and do not support attempts by third party groups to interfere with any agreed operations. The parties condemn bullying, harassment and intimidation in relation to agreed drilling operations. Mineral rights are outside the scope of this EIS.
			■			■	

Theme	Issue	Summary	Key stakeholders				Response / changes made to the project / area addressed in the EIS
			Community	Government	Industry Associations	Landholders	
	Compensation	Amounts payable to landholders during exploration phase; amounts payable to landholders during production phase; Services Agreement responsibilities; ambiguity of available information.	■			■	A compensation framework is in place that provides an income stream for landholders who host exploration and drilling activities. The framework features a land-value based payment to compensate for the amount of land utilised by surface facilities and a fee for service to the landholder. In exchange for the fee for service, the landholder signs a Services Agreement and agrees to assist with general monitoring and upkeep of the sites located on their land. A land access agreement is also negotiated. In response for further clarity, the Fact Sheet was amended and updated through the consultation process.
	Fragmentation	What flexibility does the proponent have to position infrastructure to avoid fragmentation of a property; Is there an exclusion area around wells for livestock;				■	A Field Development Protocol will be implemented that enables the micrositing of infrastructure based on a series of rules and constraints. The location of infrastructure is always agreed with the landowner. An assessment of property and land use has been completed as part of the project EIS (Appendix K).
	Coexistence with agriculture	How do we coordinate activities so that the proponent isn't doing intense activity at the busiest time of year on the farm;				■	A Farm Management Plan will be developed with all landholders who choose to work with the proponent and will take into account the landholder's activities. An assessment of property and land use has been completed as part of the project EIS (Appendix K).
	State Government land	What permits and licences do you need to undertake activities on state owned land; Is compensation payable to State Government for activities on crown land or State Forest		■			Santos holds an Occupational Permit with the NSW Government that details the requirements for its activities in the State Forest, including compensation.

Theme	Issue	Summary	Key stakeholders				Response / changes made to the project / area addressed in the EIS
			Community	Government	Industry Associations	Landholders	
Noise	Facility noise	Wilga Park Power Station	■			■	The operation of Wilga Park Power Station is authorised under and existing approval and is not considered part of this project
		Facilities at Leewood and the impact on neighbours				■	An assessment of the noise impacts has been completed as part of the project EIS (Appendix M). Noise mitigation measures will be implemented during construction and operation to ensure compliance with relevant noise management levels at occupied sensitive receivers unless a private negotiated agreement is in place. With the implementation of mitigation treatments, operational noise levels from Leewood are predicted to comply with the noise criteria at all surrounding sensitive receivers during both calm and adverse meteorological conditions.
		Noise associated with drilling and vehicle movements at night	■			■	An assessment of the noise impacts has been completed as part of the project EIS (Appendix M). Noise mitigation measures will be implemented during drilling to ensure compliance with noise management levels at occupied sensitive receivers unless a private negotiated agreement is in place. This includes drilling activities at night time. A road traffic noise assessment found that noise levels would not significantly increase as a result of the project's activities.
Produced water storage and treatment	Leewood	Phases of construction; why weren't all planned components of facility included in one approval process; is there enough room to store the water produced if the reverse osmosis plant isn't built in 2015; what is the difference between Leewood ponds and evaporation ponds;	■	■			The ponds at Leewood are storage ponds. All produced water will be treated within the water treatment facility to enable beneficial use. A reverse osmosis plant is proposed to separate brine and water for further treatment. Evaporation ponds are an alternative water treatment approach and are not proposed as part of the Project.

Theme	Issue	Summary	Key stakeholders				Response / changes made to the project / area addressed in the EIS
			Community	Government	Industry Associations	Landholders	
	Water quality	How salty is the water; can it be used for any purpose without treatment; does it contain any added chemicals; is it too pure after going through RO plant, some minerals need to remain; Will the RO plant remove heavy metals.	■				Produced water will be treated to suitable quality to enable beneficial reuse. An assessment of existing water quality (Appendix G4) and the impacts associated with using amended water for irrigation (Appendix G2) has been completed as part of this project EIS.
	Water quantity	How much water will be produced from each well; how much water produced over the life of the project; does the amount of water from a well vary between different areas being drilled;	■				Over the 25-year assessment period it is estimated that up to 37.5GL will be produced with a peak of approximately 10 ML /day Between years 2 and 4. The 25-year average is around 4 ML / day.
	Pond integrity	How are the ponds constructed to ensure they don't leak; how does the telemetry work; what happens if the area floods as it has in the past; how long will the liners last;	■				The project description completed as part of the project EIS details the infrastructure to be constructed as part of the project. The proposed water and brine storage ponds would be constructed in accordance with the Exploration Code of Practice: Produced Water Management, Storage and Transfer (NSW Department of Industry, Resources and Energy (2015). A flood study was undertaken to assess a one in 100 year flood. This is considered a key flood risk management event under the NSW Floodplain Development Manual and was used to develop an understanding of the nature and extent of flooding in the catchment and, therefore, potential flooding impacts from the project. The only potential impact identified is minor localised changes as a result of the additional storage ponds at the Leewood facility. The affected area is currently vegetated with no residences or other buildings in place. Further details on flood modelling are provided in Appendix H (Hydrology and Geomorphology).

Theme	Issue	Summary	Key stakeholders				Response / changes made to the project / area addressed in the EIS
			Community	Government	Industry Associations	Landholders	
	Bibblewindi and Tintsfield	Will the Bibblewindi and Tintsfield ponds be used in the Project for produced water storage; who assesses that the ponds are suitable to be used again if there has been a leak in the past; how do you fix the liner and know that it is safe to use; will Bibblewindi pond be relined		■			The Bibblewindi and Tintsfield ponds may be used as part of the project and have been included as part of the project EIS. This includes the two existing ponds at Bibblewindi subject to works required for recommissioning to ensure they are appropriate for use.
	Treated water	Landholders seeking to be potential beneficiaries of treated water				■	This is outside the scope of the EIS
		Produced water being made available to RFS and FCNSW for fire-fighting purposes	■	■			This is outside the scope of the EIS
	Irrigation	Will treated water be made available to neighbouring landholders for irrigation; What crops will be irrigated at Leewood; Could the water used to irrigate encourage soil bacteria to flourish Will it be treated so that the pH of the soil matches that of soil where it is going to be irrigated				■	The irrigation study has identified the area that is suitable for irrigation within 20 kilometres of Leewood based on soil type and a range of crop types. It has also described the impacts to soil and land capability of using treated water. An assessment of the irrigation has been completed as part of the project EIS (Appendix G2).
Project timing	EIS	When will EIS be lodged; how long will it take to be assessed; how long is the public consultation phase; will it have to go to PAC; how long will PAC process take; how long before the proponent starts work if approved;		■			The assessment process is described in chapter four of the project EIS: Legislation and Approvals.

Theme	Issue	Summary	Key stakeholders				Response / changes made to the project / area addressed in the EIS
			Community	Government	Industry Associations	Landholders	
	Pipeline	How long will approvals take for a pipeline; how long will the pipeline take to construct;		■		■	This is outside the scope of the EIS
	Drilling	When can the proponent drill more wells; will they always have a drilling rig working if they are drilling 850 wells; where will you be drilling first; do you jump all over the place or work in one area for a long time and then move to another part of the project area;	■	■		■	The rate of drilling and the location of wells will be dependent on the gas composition and flow rates of wells as they are drilled.
	Project longevity	How long does a well last for; is there enough gas there to last for 25 years; could there be enough gas to go longer than 25 years; is it true that most CSG wells only last for 5 years	■			■	It is estimated that gas wells will operate for between 5-20 years. This is dependent on the location of the well, and the gas flowrate and composition.

Theme	Issue	Summary	Key stakeholders				Response / changes made to the project / area addressed in the EIS
			Community	Government	Industry Associations	Landholders	
Regulation and compliance	State Government	What government departments are responsible for oversight of CSG industry; do they have the resources to undertake audit and compliance activities; is that information made public		■			Ongoing operation of the Project will be monitored through the Environmental Protection Licence administered by the EPA. There are annual reporting requirements included in the licence conditions which include a statement of compliance with conditions. The Division of Resources and Energy within NSW Department of Industry is responsible for administering CSG titles and activity approvals granted under the *Petroleum (Onshore) Act 1991* and associated assessments under the *Environmental Planning and Assessment Act 1979*; and the application of workplace health and safety requirements under the *Petroleum (Onshore) Act 1991* and the Work Health and Safety Act 2011 (NSW) to petroleum operations; The Environment Protection Authority is responsible for monitoring and auditing title compliance, including in relation to rehabilitation and security deposits; and general enforcement and compliance of CSG operations within these acts
	Assessment framework	Why are some projects approved through a REF and others are done as an EIS		■			The Project is permissible with development consent under the *State Environmental Planning Policy (Mining, Petroleum and Extractive Industries) 2007*, and is identified as 'State significant development' under Section 89C(2) of the EP&A Act and the *State Environmental Planning Policy (State and Regional Development) 2011*. (refer to Chapter 4 of the EIS).
	Local Government	Does the Narrabri Shire Council have a say in what gets approved in the Shire		■			The project is subject to the assessment and approval provisions of Division 4.1 of Part 4 of the EP&A Act. Narrabri Shire will be a concurrence agency providing advice to the Department of Planning and Environment during the assessment process.

Theme	Issue	Summary	Key stakeholders				Response / changes made to the project / area addressed in the EIS
			Community	Government	Industry Associations	Landholders	
Rehabilitation	Timeframes	How long before Santos P&As and rehabilitates old well sites in the Forest;				■	This is outside the scope of the EIS
	Irrigation	Flushing of die back sites to disperse salts and effect on groundwater; leaching of salts from spill areas or old unlined pond areas affecting soil pH levels		■			This is outside the scope of the EIS
	Compliance and Audit	What government department is responsible for overseeing appropriate rehabilitation; do they have a robust audit process in place; what are the conditions and regulations that apply	■	■		■	The Department of Industry, Division of Resources and Energy and the Environment Protection Authority is responsible for monitoring and auditing rehabilitation and security deposits.
	Seed stock	Where does it come from for those sites that are reseeded; using seeds from similar area; why are only some sites reseeded in the forest		■		■	A rehabilitation strategy (Appendix V) has been completed as part of the project EIS
	Mulch	The reasons why it is used and at what thickness should it be applied; are sites compacted prior to being mulched?	■	■		■	A rehabilitation strategy (Appendix V) has been completed as part of the project EIS
	Erosion	What controls are in place for old sites or recently P&A'ed sites to stop erosion; monitoring; what rehab standards are applied and do Blue Book standards apply		■		■	This is outside the scope of the EIS

Theme	Issue	Summary	Key stakeholders				Response / changes made to the project / area addressed in the EIS
			Community	Government	Industry Associations	Landholders	
	Landholder sign-off	How much does a site have to return to normal before a landholder should sign-off on rehabilitation acceptance; what is the process for rehabilitation monitoring over the long term for subsidence; landholder acceptance of rehab and handover of FCNSW sites; will the landholder continue to get paid land access compensation if they refuse to sign-off on the landholder acceptance of rehabilitation;		■			A rehabilitation strategy (Appendix V) has been completed as part of the project EIS.
	FCNSW standards	Roads/tracks must be constructed and maintained at least to the requirements of the Brigalow Nandewar Integrated Forestry Operations Approval.		■		■	The construction of access tracks is detailed in Chapter 6 of the EIS. Maintenance of access tracks within the forest would be in accordance with the Occupational Permit with FCNSW.
Salt management	Brine	Storage and the length of time it will be held prior to treatment	■				Brine will be stored in brine ponds prior to treatment through the Brine concentrator and crystalliser.
	Salts produced	How much, type of salt, does drilling chemicals have in it	■	■	■	■	Typical components of drilling fluid are detailed in Chapter 6: Project Description of the EIS. A risk assessment of drilling fluid components is provided in Appendix T3.
	Crystallisation technology	How does it work, integrity of equipment and facility in relation to leaks, what the end salt product looks like, is it toxic?	■				Chapter 6: Project Description describes the proposed infrastructure to be located at Leewood including the Brine crystalliser. A salt balance is described in the EIS (chapter 7) with classification and management of the salt and brine waste stream described in chapter 28 Waste. A Hazard and risk assessment of equipment and infrastructure failure has been completed as part of the project EIS (Appendix S).

Theme	Issue	Summary	Key stakeholders				Response / changes made to the project / area addressed in the EIS
			Community	Government	Industry Associations	Landholders	
	Disposal of salt	Number of additional truck movements on local roads to move salt to registered facility; can it be used for anything beneficial; will the proponent make money out of selling the salt	■	■	■	■	An assessment of the traffic and transport has been completed as part of the project EIS (Appendix P). This includes an estimates of truck movements during operation of the project. Commercial opportunities to sell salt are outside the scope of the EIS.
Social impacts	Regional Community Benefit Fund	Who makes the decision to use the contributions and on what basis; will the money come back to the area that is affected by the project and not used elsewhere; will the Narrabri Shire Council have input into priorities for this fund; How long before funds are available in the RCBF	■	■			The regional development Fund is discussed in the Social Impact Assessment completed as part of the project EIS (Appendix T1) The proponent would report on its community investment initiatives and outcomes as part of the annual Sustainability Report.
Sub-surface infrastructure	Flowlines	How deep are flowlines buried Can you farm over the top of them? Can you move heavy farm machinery over the top of them				■	Flowlines will be buried with a minimum 750mm cover. Following construction of the flowlines it is anticipated that normal farming practices will continue. An assessment of agricultural impacts has been completed as part of the project EIS (Appendix K).
	Bores	Can an old well that Santos no longer needs to use be converted to a bore so that the landholder can use the water				■	This is outside the scope of the EIS.
Traffic and transport	Increased traffic	How many additional vehicles a day will be using the Newell Highway; lack of parking in the main street of Narrabri	■	■			It is anticipated that an additional 425 vehicles will travel on the Newell highway near Leewood during peak construction. This will be accommodated within the available capacity of the Newell Highway. An assessment of traffic and transport impacts has been completed as part of the project EIS (Appendix P).

Theme	Issue	Summary	Key stakeholders				Response / changes made to the project / area addressed in the EIS
			Community	Government	Industry Associations	Landholders	
	Forestry Roads	Who pays for the maintenance of FCNSW roads; speed limits on these roads; planning work programs and vehicle movements to consider harvesting operations, apiarists and other forest users; road signage in forest areas so people know directions and way out to Newell Highway in an emergency;		■			The ongoing management of forestry roads will remain the responsibility of FCNSW. Under Santos' agreement with FCNSW, damage to roads caused by the use of those roads by Santos would be repaired at no cost to FCNSW.
	Council Roads	Are there load limits on Council roads that apply; does the proponent pay to maintain Council roads that they use (other than registration); will there be funds available from Community Benefit Fund for roads, bridges and other transport infrastructure;		■			An assessment of traffic and transport impacts has been completed as part of the project EIS (Appendix P). The community benefit Fund is discussed in the Social Impact Assessment completed as part of the project EIS (Appendix T1) The proponent would report on its community investment initiatives and outcomes as part of the annual Sustainability Report.
Visual impact	Light	Impact on neighbour's amenity from flares	■			■	The assessment of visual impacts has been completed as part of the project EIS (Appendix Q). During night-time hours, light emitted from the small pilot flares (maximum of six across the project area) may be visible from sensitive receivers but the impacts would likely be reduced by the presence of intervening vegetation or the distance between potential sensitive receivers and the flares. It is anticipated that during maintenance activities or non-routine situations (which would be rare and of limited duration), the safety flares at Bibblewindi and Leewood may be visible at night..

Theme	Issue	Summary	Key stakeholders				Response / changes made to the project / area addressed in the EIS
			Community	Government	Industry Associations	Landholders	
	Light	Sliding Spring Observatory and Australia Telescope sites for astronomical observation		■			Light pollution is addressed as part of the visual impact assessment completed for the project EIS (Appendix Q). The NSW Department of Planning and Environment *Dark Sky Planning Guideline* (2016) principles will be considered when planning outdoor lighting The visual impact assessment found that pilot well flares and safety flares would not cause an impact on the long-term operation of Siding Spring Observatory, near Coonabarabran.
	Industrialised landscape	Change to amenity of agricultural landscape to industrial; Height of infrastructure including flares,	■				The assessment of visual impacts has been completed as part of the project EIS (Appendix Q).
Waste management	Drill cuttings	Where are the skip bins of drill cuttings disposed of?	■				The project description describes drill cuttings management and an assessment of waste (including drill cuttings) has been completed as part of the project EIS. All waste would be managed in accordance with relevant waste guidelines. It is proposed that drill cuttings would be beneficially re-used on well pads using a mix, turn, bury strategy. Drill cuttings not appropriate for beneficial reuse on well pads for rehabilitation purposes would be transported off site and disposed of at an appropriately licensed waste management facility. Following treatment and removal of the water for reuse, saline brine remains. The brine will be further treated through a concentration process, to turn it into a material that can be safely transported. Over the life of the project an average of around 50 tonnes of salt product would be produced per day, equating to an average of just over one B-double load per day.
Well integrity	Cement	Potential for the cement used in well casing to degrade and the mixing of aquifers occurs	■				All wells would be drilled and constructed in accordance with the *NSW Code of Practice for Well Integrity* as discussed in Chapter 6 (Project description). The Code of Practice outlines how drilling is to be undertaken in order to eliminate cross-contamination of aquifers.

Theme	Issue	Summary	Key stakeholders				Response / changes made to the project / area addressed in the EIS
			Community	Government	Industry Associations	Landholders	
	Steel	Effect of sulphate reducing bacteria on steel casing	■			■	All wells would be drilled and constructed in accordance with the *NSW Code of Practice for Well Integrity* as discussed in Chapter 6 (Project description). The Code of Practice outlines how drilling is to be undertaken in order to eliminate cross-contamination of aquifers.
	Drilling	Can drilling cause vertical cracking that will result in depressurisation of the aquifers The positive pressures occurring while drilling could push drilling mud out into the aquifers; How do we know that the casing wont fail when it stays there forever; What monitoring is done on old wells after they are plugged and abandoned Will drilling cause cross-contamination of aquifers? Professor Ingraffea has published information from US proving that most wells leak, why won't it happen here	■			■	All wells would be drilled and constructed in accordance with the *NSW Code of Practice for Well Integrity* as discussed in Chapter 6 (Project description). The Code of Practice outlines how drilling is to be undertaken in order to eliminate cross-contamination of aquifers.

Theme	Issue	Summary	Key stakeholders				Response / changes made to the project / area addressed in the EIS
			Community	Government	Industry Associations	Landholders	
	Location	How are the locations of old wells marked so they can be located in the future; How are horizontal drilling paths mapped; Can a horizontal well be drilled under a landholder's property without them knowing; Do you need a Land Access agreement to drill under a property if there is nothing on the surface;	■				Horizontal wells would be predominantly located between 500m and 1200m below the surface. Land access agreements only apply to properties where surface infrastructure would be located. An assessment of impacts to community and landholders has been completed as part of the project EIS (Appendix T1).
	Fracking	The proponent isn't intending to frack now but does that mean that they won't in the future; If the proponent wanted to frack, what approvals will they need	■	■			Hydraulic fracturing is not proposed as part of the current proposal. If the proponent decides to undertake hydraulic fracturing in the future, separate approvals would be required.

6 Next steps

Immediately post lodgement of the EIS, the following activities will be undertaken:

- Hard copies (and electronic) of EIS available at public exhibition
- Information available on website in relation to environmental study findings
- Fact Sheets, maps and other data available
- Letters to key stakeholders to advise of public exhibition process
- “How to” advice for making a submission process
- Advice notices in local media.

The Community Consultation Plan will continue to guide the effective and timely delivery of consultation activities and will be regularly reviewed and adjusted to reflect emerging stakeholders, issues, impacts and benefits and the additional knowledge gained through consultation activities.

This will ensure that we build on the extensive work already undertaken to enable the community and key stakeholders to be fully informed about the project and continue to have opportunities to provide feedback on our planned activities. The objectives of the consultation strategy are to:

- Strengthen and further develop relationships with stakeholders, decision makers, potential champions and opponents.
- Identify potential stakeholder and community issues and implement strategies to assist managing and minimising the risk of conflict, and resolving issues.
- Understand and access valuable local knowledge from the community and stakeholders.
- Implement a community engagement approach which provides timely, accurate and credible information to stakeholders and the broader community and provides opportunities for interaction and feedback.
- To facilitate positive Aboriginal cultural heritage outcomes by consulting with relevant parties and encouraging them to participate in decision making regarding the management of their cultural heritage.

This will be achieved through the communication channels that are well-established and which have proven to be highly effective for consultation during the preparation of the EIS:

Consultation Activity	Frequency
Narrabri Gas Project CCC	• Monthly
Information Forums	• Regular information forums will continue to be held. This includes specific forums for landholders, Leewood neighbours, Aboriginal Community, Contractors and Suppliers, and Government agencies as well as general community information events • Frequency will depend on the stakeholder group's level of interest in the activities being undertaken or proposed
Face to face meetings	• Regular face to face meetings will continue to be held with key stakeholders relevant to their level of interest in activities
Community Site Tours	• Monthly Community Site Tours to visit operational sites will continue to be advertised in the local newspaper and on the project website • Site tours will continue to be provided upon request from interested community groups and other stakeholders
Communication tools	• The Energy NSW email, 1800 Telephone number will remain in place and referenced on the website and external printed documentation
Website	• Website will be maintained and regularly updated with information • Proposed activities will be promoted • Feedback facility maintained and promoted
Brochures and fact sheets	• Brochures and fact sheets will be regularly reviewed and updated as necessary • New publications will be produced as required
Activity Update Reports	• Monthly activity updates will continue to be prepared • Updates will be emailed to key stakeholders and uploaded to the website and included at least monthly in the local newspaper • Updates will be distributed to the Narrabri Gas Project CCC members to disseminate to members of their respective organisations
Media Updates	• Advertisements, advertorials, and media releases on key announcements will continue
Social Media	• Santos' Facebook and Twitter pages will continue to provide information through social media channels
Narrabri shopfront	• Shopfront will be retained • Shopfront will have printed information and displays
Attendance at community events and agricultural shows	• Santos will continue to attend local agricultural shows, AgQuip and other relevant community events
Consultation Records	• A database will continue to be used to record consultation records

7 References

International Association of Public Participation (IAP2) (2014) Code of Ethics. Accessed on 11 June 2014 at www.iap2.org.au/about-us/about/code-of-ethics

NSW Trade & Investment (2012) *Strategic Regional Land Use Policy Delivery Guideline – Guideline for community consultation requirements for exploration.*

NSW Department of Industry, Division of Resources and Energy (2016) *Exploration code of practice: community consultation.*

NSW Department of Planning and Environment (2016). *Dark Sky Planning Guideline: Protecting the observing conditions at Siding Springs*. 27pp.

Appendix A – Consultation material

Santos
We have the energy.

Narrabri Gas Project

Our plans to develop natural gas for New South Wales

What's to come

About Santos

Santos is an Australian energy pioneer, established in Adelaide in 1954. Since then we've grown to become one of Australia's largest producers of natural gas to the domestic market supplying homes, businesses and major industries across the country.

The oil and gas projects that we operate in Australia have delivered royalties and taxes to State and Federal Governments over the last five years of $1.5 billion.

Santos directly employs over 3,000 people across Australia and Asia and provides employment for more than 4,000 contractors.

Our foundations are based on safe, sustainable operations and working in partnership with communities, governments, business partners and shareholders.

We have the energy

Thank you for your interest in Santos and our activities in New South Wales. This booklet outlines our plans to develop natural gas for NSW and is aimed at answering questions you may have around our planned activities.

Our proposed natural gas development, the Narrabri Gas Project, could supply almost half the State's gas needs through the extraction of natural gas from coal seams in the Narrabri area, north west NSW.

In Queensland, coal seam gas has been produced safely for more than 20 years and now accounts for about 90 per cent of that State's gas supply and 30 per cent of the east coast gas demand.

Our partner in the Narrabri Gas Project is another of Australia's largest energy companies, EnergyAustralia, which services the energy needs of over 2.8 million households and business accounts across the country. EnergyAustralia's Tallawarra power station near Wollongong, is one of Australia's most environmentally efficient, large scale, gas-fired facilities and is making a significant contribution to reducing NSW's greenhouse gas emissions. This is in line with Santos' commitment to provide clean energy to NSW via the Narrabri Gas Project.

As we've expanded our NSW operations, we've heard the concerns of the community in relation to the potential impact on agriculture and water. We do not shy away from open discussions and are committed to share with the community clear information on our proposed project, processes and activities.

We have a long track record in Australia of responsible and safe operations, respectful engagement with landholders and as a responsible corporate citizen in the communities in which we operate. We are committed to help meet the energy needs of NSW by providing natural gas to homes and industries across the State, while bringing a major boost to economic and community development in the Narrabri region.

If you would like more information about Santos or the Narrabri Gas Project, please contact our team via freecall 1800 071 278, email energy.nsw@santos.com or in person at one of our regional offices.

Peter Mitchley
General Manager, Energy NSW
Santos Limited
Sydney

A balanced energy solution

The Narrabri Gas Project is an opportunity to deliver substantial quantities of natural gas to the NSW market with minimal impact on the environment, rural communities and agriculture while creating significant local and regional benefits.

The critical role energy plays in modern life often goes unnoticed, except in the rare moments when energy is not available, or becomes too costly for many to afford. If we can't turn on the lights, cook our food, have a hot shower, or if our place of work sends us home because they don't have the energy needed to run their business, energy security suddenly becomes very real.

Natural gas provides energy to about 60 per cent of homes in Australia and meets 45 per cent of manufacturing industry requirements. Natural gas is an ideal complement to renewable energy sources like solar and wind power, ensuring reliable supply when the sun does not shine or wind does not blow. Even with renewables playing an increasing role in the energy mix going forward, clean burning natural gas is forecast to supply more than 30 per cent of global energy requirements for decades to come.

NSW is facing significant changes to how its supply of natural gas will be delivered, with traditional supplies from other states likely to be increasingly difficult and costly to source.

The clear solution is for NSW to develop its own reserves of natural gas to secure energy supply for many decades.

The Narrabri Gas Project could provide almost half of NSW's gas needs and will deliver significant employment and economic benefits to the local area and more broadly to the State.

We are very mindful that those benefits need to be delivered while minimising the impacts to the environment and ensuring the profitability of other local industries, like agriculture, is not compromised.

We are gathering important baseline data on water and air in the north west region and increasing our knowledge of local flora and fauna in the Pilliga where many of our activities will be located. We are confident this scientific data combined with our high operating standards and more than 20 years' experience in extracting coal seam gas in Queensland, will ensure essential energy is provided while minimising the impact of our work.

We have in place a community engagement plan for our Project which will allow us to work together with communities to identify and maximise social benefits to the local area, while delivering our business outcomes.

We firmly believe that the development of the Project is the most viable option in providing a clean, sustainable and balanced energy solution.

A pilot well near Narrabri

Natural gas is critical

New South Wales receives the majority of its gas from interstate and produces less than 5 per cent of its domestic gas needs. With long term gas contracts expiring over the next two to three years, ensuring continued affordable supply will be difficult, which could result in significant financial and job losses.

NSW was previously not thought to be endowed with abundant and accessible natural gas. To overcome this disadvantage, large pipelines were built over the last 40 years to bring gas from other states, assuring NSW of all the natural gas it needed.

NSW currently imports over 95 per cent of its natural gas from the Gippsland Basin in Victoria, the Cooper Basin in South Australia and from the coal seam gas fields in Queensland.

The long term contracts supplying this gas to NSW expire over the next two to three years. This is just as the other states seek to use their gas for their own economic benefit and as commencement of liquified natural gas (LNG) exports from Queensland see annual gas demand triple.

Unless NSW can develop an alternate source of natural gas, the State is likely to face much higher prices than if there was plentiful and certain supply for all domestic, commercial and industrial gas users.

As well as being used by more than one million homes and businesses in NSW, natural gas provides an essential fuel for a diverse number of industrial processes like food production, manufacturing, smelting, making plastics, glass and bricks and even the production of the fertiliser so crucial to the agricultural sector.

Our analysis estimates over 15,000 industrial jobs in NSW are directly dependent on gas supply as a critical business input, with up to a further 2.5 million people estimated to be employed by companies that use natural gas. In the face of higher prices, industrial users are likely to cut their use of natural gas resulting in significant financial and job losses.

We now know NSW has a solution which can meet these gas supply challenges.

In the last 20 years, coal seam gas has emerged as a major energy source. Natural gas from coal seams now provides almost all of Queensland's gas supply.

We believe the coal seam gas reserves of the Narrabri Gas Project could make a similarly significant contribution in NSW – supplying up to half of the State's natural gas requirements.

The Narrabri Gas Project

Santos' plans to develop natural gas for New South Wales.

North west NSW contains some of the largest deposits of natural gas in eastern Australia.

The area overlies a large geological feature known as the Gunnedah Basin. Sediments deposited in the Basin over many millions of years buried layers of decaying vegetation and other organic matter. These became the seams of coal which contain the natural gas we are targeting.

Previous exploration in the Narrabri area has given us a good understanding of gas deposits in the area and underlines our confidence in the Narrabri Gas Project.

The Narrabri Gas Project is located near the town of Narrabri, approximately 500 kilometres north west of Sydney, within Petroleum Exploration Lease 238 (PEL 238).

The Project area covers around 98,000 hectares in the Pilliga and on private land. It avoids Strategic Agricultural Land to the maximum extent possible and excludes the Conservation Area and Nature Reserve section of the Pilliga. The proposed field operations will take up less than one per cent of the Project area, approximately 900 hectares mostly in the Pilliga.

Our activities will be located in the parts of the Pilliga designated by the NSW Government for logging, natural gas development and other commercial activities and access will be subject to agreement with the NSW Forestry Corporation.

The Gomeroi People's native title claim extends over these areas of the Pilliga. We will work towards an agreement with the native title parties.

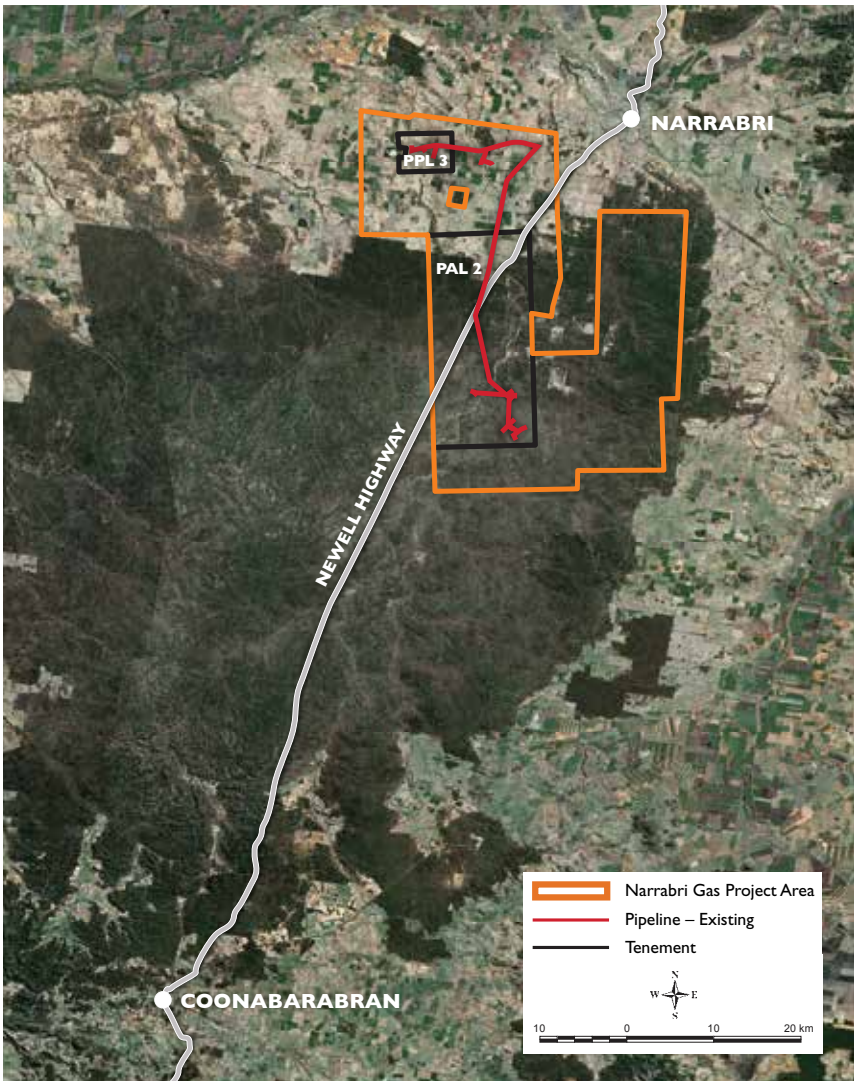
The Project area includes some private land. We will only locate well sites on private land subject to the landholders' willingness to be involved with our activities.

To connect the gas into the NSW domestic market, a transmission pipeline running south will be constructed.

Subject to timely assessment and approvals processes, the Project could start delivering gas to NSW by 2017.

The Project will have an operational life of over 20 years. As individual wells are decommissioned over the life of the Project, surface facilities will be removed and the well sites will be rehabilitated. Similarly, the pipeline corridor will be rehabilitated immediately following construction.

As the Project develops, some aspects may change before an application is lodged with the Government. Changes will occur in response to matters raised by the Government or community, or where we identify better ways of undertaking the Project. We will continue to keep the local community and the Government informed of any changes to our plans.



The two main components of the Narrabri Gas Project will be the gas field where natural gas is produced and the pipeline which will transport the gas into the New South Wales market.

Key facts about the gas field:

- The Project could produce up to 200 terajoules of gas per day which is equivalent to half of NSW's natural gas needs.

Infrastructure will include:

- Up to 850 individual production wells or up to 425 well sets.
- A central water management and treatment facility, located outside the Pilliga, to store and treat the produced water for reuse.
- A central gas processing unit at the water treatment facility, to treat and compress the natural gas to Australian pipeline requirements.
- A small gas processing unit and water pumping station to transfer the gas and water extracted from the coal seams to the central processing facility.
- Supporting infrastructure including the upgrade of the Narrabri Operations Centre, workers accommodation, power generation and distribution networks.

Key facts about the pipeline:

- The pipeline will run south to connect into existing infrastructure.
- It will be routed to avoid prime agricultural land to the maximum extent possible.
- The pipeline will be buried at least 750 millimetres (2½ feet) below the ground, allowing existing activities, including farming, to continue over the top of it once construction is complete.
- Temporary construction facilities, such as pipe laydown areas, camps and other facilities located along the pipeline route will be required during construction. These sites will be rehabilitated after use.

A gas well near Narrabri

Weighing up the benefits

The multi-billion dollar Narrabri Gas Project will have substantial long term benefits for the local Narrabri area, as well as the regional and NSW economy.

The Narrabri Gas Project will deliver widespread benefits including direct and indirect jobs, substantial royalties and energy security for New South Wales.

Jobs

The Project will employ approximately 1,200 people during the construction phase and up to 200 people during the operational phase. It will also contribute to the regional economy via direct job creation locally, direct supply chain contracts and additional indirect jobs. Many sectors of the community will benefit including professional services, public sector, retail, construction, manufacturing and transport.

"Santos establishing this project in Narrabri will enable my business to grow and is creating other employment locally. I'm excited by the opportunities the industry provides to the town and the community."

Ron Campbell,
Business owner, Narrabri

State royalties and regional benefits

The Project is expected to contribute over $1.6 billion in royalty payments over the life of the Project, directly to the NSW Government, helping to deliver hospitals, schools, roads, police services, public transport and other state-based infrastructure and public services.

To ensure the communities that host our work directly benefit, we will establish a Regional Community Benefit Fund. Our contribution to the Fund will equate to five per cent of the Narrabri Gas Project's annual royalty payment and will be matched by the NSW Government.

The Fund is expected to deliver around $160 million to the region for improved infrastructure, services and facilities to benefit the regional community.

A report by the Allen Consulting Group estimates "...more than two fifths of the benefits will accrue directly back to the regional economy".

The Narrabri Gas Project will deliver:

- 1,200 jobs during construction
- Up to 200 ongoing jobs
- Regional and local benefits
- Safe, clean energy for NSW
- Royalties of $1.6 billion to fund regional and state services over the life of the Project

Drilling with care

Santos adopts the highest industry standards when drilling wells to ensure natural gas is produced safely and the groundwater is protected.

Standards are now codified within the NSW Code of Practice for Coal Seam Gas – Well Integrity, issued in September 2012. The Code establishes a best practice framework for the design, construction and maintenance of each well and has undergone expert peer review co-ordinated by the NSW Chief Scientist and Engineer. Complying with the Code of Practice is a condition of our licence to explore and produce natural gas in the Project area.

In accordance with the Code and consistent with industry best practice, all wells drilled during the life of the Project will be designed to ensure they are safe and environmentally sound and protect the underground aquifers.

Hydraulic fracture stimulation

Hydraulic fracture stimulation (commonly referred to as 'fraccing' or 'fracking') is used to improve the flow of gas and can convert a non-productive well into a productive well.

This technology has been done safely and sustainably in Australia for more than 40 years and over the past 65 years has been used safely on more than two million wells worldwide (**naturalcsg.com.au**).

We currently have no plans to use hydraulic fracture stimulation in the Project area. Geological data indicates it would not increase gas flows in the coal seams we are targeting. If additional geologic data supported the use of the technology in the future, a range of additional Government approvals would be required and community consultation would be undertaken.

Some of the features we adopt to meet these high standards include:

- All our wells contain at least two layers of steel and cement which serve to isolate the coal seams we target from the overlying geologic formations and aquifers.
- The steel casing is designed to withstand operational pressures during drilling operations, testing and production, resist corrosive subsurface conditions and maintain the integrity of the casing.
- The cement used in our wells is specially formulated to protect the steel and to be as strong as the rock into which the well is drilled.
- Once the cement is in place, it is pressure tested to ensure there are no migration pathways and the well is sealed between the rock and production casing.

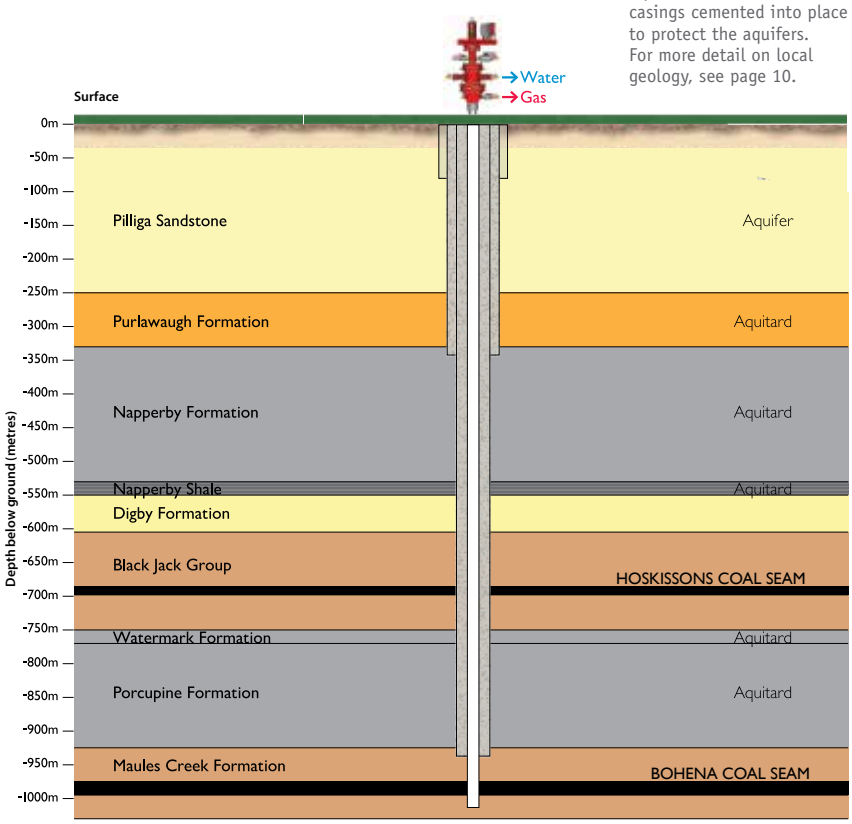
We conduct regular monitoring and maintenance of all our wells. Routine operational visits are undertaken to test well head pressure and equipment and inspect casing. Our wells are also monitored remotely in real time and can be shut in manually or automatically if a problem arises.

Once a well is no longer required, it is decommissioned. The entire well is sealed with cement to ensure beneficial aquifers are protected long after the well is decommissioned.

The standards used when drilling Australian coal seam gas wells are world's best practice and have safety measures which far exceed those used in traditional water bores.

A typical vertical Narrabri coal seam gas well.

The grey vertical columns represent the steel well casings cemented into place to protect the aquifers. For more detail on local geology, see page 10.



Looking after local water

Santos appreciates the critical role water plays in our regional communities. The protection of water resources is one of our highest priorities.

To produce coal seam gas, water must first be extracted from the coal seams. This release of pressure allows the natural gas to flow. The water extracted during coal seam gas production is not the same water accessed by agricultural and community bores and is not taken from the Great Artesian Basin. In the Narrabri area it comes from the very deep saline coal seams located 500-1000m below the surface.

Groundwater and surface water in and around the Narrabri region is used to provide drinking water, as well as support local farming activities and the biodiversity of the Pilliga. There are over 4,700 registered bores in the Narrabri Shire and more than 18,500 in the Namoi Catchment. We want to make sure that these existing water users as well as the natural environment are not adversely affected by our activities.

It is estimated over the life of the Narrabri Gas Project, an average of 1.5 gigalitres (GL) per annum of salty water will be extracted from the coal seams. To put this in context, 1.5GL is about the amount of water needed to annually irrigate approximately 250 hectares of cotton.

In the Namoi Water Catchment, the amount of water allocated for all use is around 550GL per annum. Our Project's plans to extract an average of 1.5 GL per year represents a very small proportion of the water currently allocated for use.

The water extracted by the Project must be licenced and is regulated by both the NSW Government through its water sharing plans, and by the Commonwealth Government through the Murray Darling Basin Plan.

In the Project area, the aquifers including the Pilliga sandstone, which is an extension of the Great Artesian Basin, generally lie between 5 and 300 metres below the surface. The coal seams we are targeting lie about 500 metres to more than 1,000 metres underground (see diagram in Drilling with care section).

Between the shallow aquifers and the coal seams lie multiple layers of solid rock known as aquitards. These rock layers act as barriers impeding the flow of water either upwards or downwards. If these barriers were not in place, the quality of water in the aquifers, such as the Pilliga sandstone, would be the same quality as the much saltier water in the deeper coal seams.

This local geology, which isolates the coal seams, allows the extraction of natural gas without impacting the shallow aquifers in the region.

We have also worked to gather an extensive amount of scientific data about water resources in the region. We have used this data to develop a comprehensive groundwater model.

The modelling based on this data has found there would be little or no impact on the shallow aquifers from coal seam gas extraction in the area. These findings are similar to those of the independently conducted Namoi Catchment Water Study released in 2012.

Both studies predicted there would be less than 0.5 metre drawdown over 90 years in the shallow aquifers overlying the Project area. This is within the range of existing seasonal variations which occur in the water levels of the shallow aquifers.

Managing our water

Careful management and beneficial reuse of the water produced during our operations is one of our key focus areas.

The water we extract during our operations is saline. The water does not contain significant levels of other chemical elements, but it is about half as salty as seawater. Once desalinated, this water can be put to beneficial use.

We will manage the water that is extracted in a tightly controlled manner to ensure it doesn't impact the environment. Once the produced water is brought to the surface through the well, it will be transported via an underground flow line to our Leewood Water Treatment Facility, outside the Pilliga.

At Leewood, the water will be stored in purpose-built double lined storage ponds with inbuilt systems to monitor the integrity of the ponds.

The water produced will be treated and desalinated to meet relevant NSW and Commonwealth guidelines for reuse.

At this stage, and based on the extensive experience from our operations in Queensland, it is estimated around 80 per cent of the produced water will be suitable for reuse following treatment.

In our Queensland operations, the treated water is being used for irrigation and to recharge the Roma town water supply.

We are investigating similar beneficial reuse options for the water we extract in the Narrabri area.

Taking care of salt

Following treatment and removal of the water for reuse, saline brine remains.

The brine will be further treated through a concentration process, to turn it into a heavy slurry or a solid that can be safely transported.

The average salt production over the life of the Project would be around 50 tonnes per day or approximately two truckloads per day.

The salt extracted in the Project area contains high concentrations of bicarbonate which is commonly used in cooking and in a number of industrial processes. We are considering the conversion of some of this salt into saleable products. Another option would be to send the salt to waste treatment and containment facilities regulated by the NSW Environment Protection Authority.

Disposing of large quantities of concentrated salt is not new. The Murray Darling Basin Commission intercepts about half a million tonnes per annum or around 1,000 tonnes of salt each day prior to it entering the River Murray.[1]

The salt is relocated to evaporation ponds away from the river to concentrate and then is crystallised, harvested and sold for various commercial uses or allowed to seep into saline regional aquifers.

[1] Keeping Salt out of the Murray. Murray Darling Basin Commission Factsheet – March 2008

Checks and balances

Santos will deliver energy from the Narrabri Gas Project safely, sustainably and with minimal impact on the environment, industry and the local communities.

Monitoring

We have developed a groundwater monitoring program covering not only the area where planned activities will take place, but also the broader region. The program is designed to improve the understanding of the natural variability in water levels, flows and chemistry across the region and includes the establishment of baseline conditions for streams, creeks, rivers and groundwater systems across the region.

As part of this program, we have conducted a regional survey of both government and landholder bores. We are also installing a network of deep and shallow aquifer monitoring bores. These bores will enhance the coverage of monitoring locations across the region and provide far more detailed monitoring of groundwater movement than has been achieved to date.

The data from our bores will be made available through an online water portal system, which is already established for our Queensland operations. This will enable the community to view our monitoring activities and access information about the groundwater systems.

Understanding emissions

Often the presence of naturally occurring methane, for example in shallow farm bores, is the first indicator that substantial natural gas reserves may exist in an area.

To better understand the naturally occurring methane levels, Santos has commenced comprehensive air studies across the Narrabri Gas Project area and the region, collecting background or baseline data on the levels of methane in the atmosphere prior to development.

Collection of this data will continue during the development and operation of the Project, providing a baseline which will allow us to ensure our work is not adding additional levels of methane to the existing naturally occurring concentrations in the environment today.

The Commonwealth Government has also commissioned the Commonwealth Scientific and Industrial Research Organisation (CSIRO) to conduct a study of emissions from coal seam gas wells. This study will confirm or update, if necessary, the methods used to calculate the greenhouse emissions for the industry.

We support relevant, robust research that can be used to provide more accurate information about emissions from coal seam gas production. To that end, we are providing practical and objective assistance to the CSIRO study.

Our infrastructure in NSW will be constructed, operated and monitored in accordance with best practice standards. This will ensure emissions are minimised as the Project is developed.

The Santos Water Portal

In October 2011, Santos was the first coal seam gas company to launch an online portal to make publicly available all water quality and bore level testing results from our CSG operations in Queensland's Surat and Bowen Basins.

Information on all water quality and water bore level test results from our NSW operations will be available to the public from late 2013 at **www.santoswaterportal.com.au**

Staff monitoring shallow groundwater levels.

Safety matters

We are guided by Santos' Health and Safety Vision: "We all go home from work without injury or illness".

At Santos safety is a core value. We are committed to conducting our business in a manner that prevents injury or illness to members of the community, our employees, and our contractors, and strive for best practice in health and safety management.

The health, safety and environment practices in the Narrabri operations have undergone a comprehensive review and overhaul since we took over from the previous operator.

We believe that:

- no business objective will take priority over health and safety — safety before schedule
- all injuries and incidents are preventable
- no task is so important or urgent that it cannot be done safely
- without diminishing management's obligations, the responsibility and accountability for health and safety rests with every individual

Safety governance and management systems

We have put in place a safety governance structure that has been designed to produce a consistent and aligned approach to safety management, with the goal of achieving international industry top quartile safety performance.

The Santos Environment, Health and Safety Management System forms the backbone of our environment, health and safety approach, enabling us to achieve our environment, health and safety objectives. The management system provides the foundation for achieving safety compliance under both the Work Health and Safety Act 2011 and the Petroleum Gas (Production and Safety) Act 2004 and regulations.

Industry regulations

Changes have also taken place with regard to industry regulations. Although already highly regulated, the release of the NSW Codes of Practice for Coal Seam Gas Wells provide strict and definite guidelines for the drilling and completion of gas wells. The Codes have been developed using standards and past experiences from the oil and gas industry. The NSW Government also set up the Office of Coal Seam Gas to oversee regulation of the industry.

Any work we undertake will be carried out according to these new industry Codes of Practice and in addition the company has set up its own Zero Cubed (0^3) policy for its operations — Zero Injuries, Zero Spills and Zero Equipment Damage.

Protecting biodiversity

We estimate more than half our operations will be located in the Pilliga. With appropriate environmental protections in place, specific areas can be used for the development of natural gas while protecting the unique environment of the Pilliga.

In 2005, the NSW Government undertook a comprehensive review of land use in the Pilliga. A key outcome of the Brigalow and Nandewar Bioregions regional assessment resulted in around 240,000 hectares, or almost half of the Pilliga, being protected under the National Parks and Wildlife Act. Other parts of the Pilliga were dedicated as State Forest, and set aside for the purposes of "forestry, recreation and mineral extraction". One of the strategic aims for the areas zoned State Forest was to "provide for exploration, mining, petroleum production and extractive industry"[2]. This is the section of the Pilliga where we are seeking to work.

[2] NSW Government – Brigalow and Nandewar Community Conservation Area Agreement (2009)

The Pilliga is woodland and forest covering approximately 500,000 hectares in north west NSW.

Much of its area has a long history as a working forest, with vegetation disturbed and fragmented through farming, fires and logging activity. There are more than 5,000 kilometres of existing roads, forest tracks, fire breaks and other easements throughout the Pilliga.

In order to gain a comprehensive knowledge of the biodiversity of the Pilliga, we are carrying out a number of ecological surveys. These are building on extensive biodiversity surveys already undertaken in the Narrabri Gas Project area, with over 3,500 person hours of surveys carried out over several years.

Surveys are undertaken from autumn and extend through to spring capturing seasonal variation in flora and fauna populations. The aim of this work is to provide an understanding of the conservation values from both a local and regional perspective to ensure we minimise and manage the impact of our activities.

Some of the measures we will undertake to minimise our impact in the Pilliga include:

Avoiding sensitive areas

- Detailed site assessments will allow us to identify areas of cultural heritage and particular ecological sensitivity.
- Horizontal drilling allows us the flexibility to avoid these sensitive sites and reduce the amount of surface disturbance from our work.

Mitigating impacts

- Using existing roads and tracks where possible and locating water treatment facilities outside the Pilliga to minimise clearing.
- Progressive rehabilitation of our works sites when construction is complete.
- Returning vegetation to its original state when well sites have been decommissioned.

Offsetting the land impacted by our work

- We will work with National Parks to identify land with a similar ecological value to the land on which we are working. We will then acquire this land and it will be protected in perpetuity.

Other environmental initiatives

- Strict vehicle wash down procedures and weed management control to prevent the spread of weeds.
- Contribution to pest control programs to assist in the reduction of feral predators that impact native fauna.

As the Project progresses, we will work closely with State and Commonwealth government agencies to ensure the ecological significance of the Pilliga is protected.

Ecological surveys are an important part of Santos' work in the Pilliga

A well site in the Pilliga, near Narrabri

Working with landholders

We value and respect all those who are the custodians and owners of land where we work and have a long track record of working with landholders in regional areas.

The Narrabri Gas Project area includes State-owned and private land. We estimate our gas field activities will take up around 900 hectares mostly in the Pilliga.

On private land

We have been very clear about our commitment to locate well sites on private land only when landholders are happy to host our activities. In our more advanced Queensland operations, we have voluntary land access agreements in place with over 300 landholders demonstrating that agriculture and natural gas can be developed side by side.

In NSW, we have put in place a compensation plan which provides a significant additional income stream for landholders who agree to work with us. We also agree on individual Farm Management Plan to ensure landholders are clear about all aspects of our work on their land and they are satisfied the profitability and sustainability of their business will not be compromised.

We work with the landholders to ensure they are comfortable with details like the location of our facilities on their property, access arrangements and timing of work.

The financial remuneration features a land-value based payment to compensate for the amount of land utilised by the Narrabri Gas Project's surface facilities and a landholder fee for service.

Those involved in the longer term production phase of our operations will share in a Landholder Incentive Fund.

The Fund will be equivalent to 5 per cent of the Narrabri Gas Project's annual royalty payment and landholders' shares will be proportionate to the amount of their land utilised as part of the entire Project.

By working in partnership with private landholders we want to ensure the north west continues to prosper through further investment and job creation, without impact on the agricultural productivity of the region.

"My farm has a pilot well and I am compensated for that area but the rest of the paddock has never looked better with healthy crops from boundary to boundary. Good seasons are important but the payments from Santos are helpful as they aren't reliant on the weather."

Scott Higgins,
Landholder

On State land

Our activities on State land in the Pilliga will be subject to an access agreement with the NSW Forestry Corporation.

The Project area on State land in the Pilliga is located within the Gomeroi People's native title claim and much of it is within the boundaries of the Narrabri Local Area Land Council.

We have met with and will continue to actively engage with the relevant Aboriginal parties for native title and the management of cultural heritage. We will work towards an agreement with the native title parties in relation to the land on which we plan to operate.

We will fully inform Aboriginal communities and consult with them on our activities. We are committed to working in a way that respects Aboriginal culture and ensures Aboriginal stakeholders share in the social and economic benefits of the Narrabri Gas Project.

Narrabri Chamber of Commerce President Richard Orr and Santos Energy NSW General Manager Peter Mitchley at the opening of Santos' Narrabri shopfront.

Partnering with the community

At Santos, we aim to become a valued and respected member of the local communities which host our activities.

We work in partnership with our local communities to ensure they share in the benefits of our work and are well informed about our operations in their area.

We sponsor, support and participate in community events and activities which deliver tangible benefits to a broad cross section of the community, investing in initiatives across areas including health, community well-being, indigenous programs, arts and culture.

We are proud that our operations team based in Narrabri is largely made up of local workers and we use local contractors and suppliers to support our operations whenever possible.

There are a number of ways we offer to assist local contractors to become compliant with the levels required for Environment, Health and Safety under Santos' Contractor and Supplier Management Standard.

These include using specialist Santos staff, experienced in the areas such as environment, health and safety, contract management and auditing, to work with the local contractors to put in place appropriate systems, policies and work practices.

Mayor Conrad Bolton accepting Santos' donation of five 300,000 litre water tanks to Narrabri Shire Council, two of which are located at Narrabri Airport to support the Rural Fire Service. (Photo courtesy of the Narrabri Courier)

We may also offer financial assistance, or do all we can to help drive down the costs associated with these requirements, to help encourage local contractors to become compliant.

We work through these systems and standards with the contractor, help implement ideas through improvement plans, and assist with attaining the levels required for sign-off as a fully pre-qualified Santos contractor or supplier.

We are committed to effective engagement with the community and to answering questions about our work as they arise. We provide transparent, accurate and up-to-date information on our operations via regular and timely project updates, targeted briefings, our website, information sessions, site tours and a freecall telephone number so information about our work is easily accessible.

We also have main street shopfronts in both Narrabri and Gunnedah, for those members of the community who would prefer to speak personally to a member of our team.

Doing it by the book

The natural gas industry is one of the most highly regulated industries in Australia. Over the last two years both the State and Commonwealth Governments have put in place a range of tough new measures designed to enhance the already extensive regulation.

The natural gas industry in NSW operates in a tightly controlled environment, including oversight by:

- NSW Environment Protection Authority
- NSW Office of Water
- NSW Land and Water Commissioner
- NSW Department of Planning and Infrastructure
- NSW Department of Trade and Investment – Office of Coal Seam Gas
- Commonwealth Department of Sustainability, Environment, Water, Population and Communities
- Commonwealth Independent Expert Scientific Committee

Before any work can begin on the Narrabri Gas Project, separate approvals will be required from both the State and Commonwealth Governments.

First, we will submit to the NSW Government regulator a description of the Project. This is known as a Request for Director-General's Requirements. This document will be made publicly available by the Government.

The regulator will review the document and direct us to the work to be included in the Environmental Impact Statement (EIS). The EIS is an important step in the Project planning and State and Commonwealth Government approval process. It identifies any potential environmental, social and economic benefits and impacts. The EIS will outline strategies to minimise potential impacts.

While the State review is underway, the Narrabri Gas Project will be referred to the Commonwealth Government which will also consider the assessment and issue its own requirements.

In response to the directions from the State and Commonwealth Governments, we will prepare the EIS.

The EIS will include extensive studies covering a wide range of issues including, but not limited to, natural habitat, ecology, groundwater, surface water, agriculture, soil, cultural heritage and social impacts. The studies will be undertaken by expert consultants and will identify plans to manage the potential impacts.

The EIS will be lodged with the Commonwealth and State Governments for determination.

If the Project is approved by both the State and Commonwealth Governments, it will be subject to numerous conditions requiring monitoring and ongoing management of our activities, as well as oversight by a number of NSW government agencies including the Environment Protection Authority.

While these rigorous assessment processes are underway, we will work towards an appropriate agreement with the native title parties.

Extensive community consultation will occur at various stages throughout the assessment process. There will be a number of opportunities for members of the public and stakeholders to have their say on the Project.

In addition to the community consultation undertaken by the State and Commonwealth Governments, we will continue to actively engage with the community.

If you'd like to find out more

Santos places a strong focus on talking openly and honestly with all interested parties as part of our proactive engagement program.

Speak to us in person at one of our shopfronts or contact us via email or phone.

Freecall: 1800 071 278
Email: energy.nsw@santos.com
Website: santos.com/nsw
Twitter: @SantosLtd

Narrabri shopfront
125 Maitland Street
Narrabri New South Wales 2390
Telephone: 02 6792 9035
Open Monday to Friday
from 9.00am to 5.00pm

Gunnedah shopfront
206 Conadilly Street
Gunnedah New South Wales 2380
Telephone: 02 6741 5100
Facsimile: 02 6741 5101
Open Monday to Friday
from 9.00am to 5.00pm

Santos

We have the energy.

The Narrabri Gas Project
Overview

Santos
We have the energy.

Santos plans to develop its coal seam gas reserves in the Narrabri area in north west New South Wales to provide a much needed source of natural gas for the State.

The Narrabri Gas Project could supply up to half of the natural gas used by NSW homes, small businesses, major industries and electricity generators every day and bring substantial economic benefits to Narrabri and the region.

Project details

The two main components of the Narrabri Gas Project will be the gas field where natural gas is produced and the pipeline which will transport the natural gas to the NSW market.

The Narrabri Gas Project will undergo a comprehensive assessment process and require approval from the State and Commonwealth Governments.

The Project area covers around 98,000 hectares in the Pilliga and on private land. The proposed gas field operations will take up less than one per cent of the Project area and will be mostly in the Pilliga.

Access to the Pilliga will be subject to agreement with the NSW Forestry Corporation and will be focussed in areas specifically zoned by the NSW Government for gas development. The Gomeroi People's native title claim extends over these areas and we will work towards an agreement with the native title parties.

We are committed to locating well sites on private land only when landholders agree to host our activities. These landholders will receive a compensation package. We will also agree on a management plan to ensure the landholder is clear about all aspects of our work on their land and is satisfied the profitability and sustainability of their business will not be compromised.

The pipeline to connect the gas into the NSW domestic market will run south from the Narrabri area and link up with existing pipeline infrastructure.

The Project will be delivered safely, sustainably and with minimal impact on local communities, local industry and the environment.

Project benefits

+ Could supply up to 50% of NSW's natural gas needs
+ 1200 jobs during construction
+ Up to 200 ongoing jobs
+ **$1.6 billion** in royalty payments to the State over the life of the project
+ Regional Community Benefit Fund providing an estimated **$160 million** for regional programs and infrastructure

Key facts about the gas field

+ Up to 850 production wells
+ Wells monitored to provide continual information about water and gas volumes and well site security
+ A central water management and treatment facility to store and treat produced water for reuse
+ A central gas processing facility to treat and compress the natural gas

Key facts about the pipeline

+ The pipeline will be buried at least 750 millimetres (2½ feet) below the ground
+ Existing activities, including farming, can continue on the surface once construction is complete
+ It will be routed to avoid prime agricultural land as much as possible

Minimising our impacts

We are mindful the benefits of the Project need to be delivered while minimising impacts to the environment and the local community.

We are undertaking a variety of ecological studies in the Pilliga and have developed a number of operational strategies to minimise our impact on this unique environment.

To gain a better understanding of water resources in the area, we have completed an extensive study of regional groundwater and are setting up a network of water monitoring bores.

We are working with the University of Adelaide to carry out air testing throughout the region to record methane levels.

It is important to gather this baseline data on water and air before the Project begins so we can accurately detect any impacts our work is having as we go forward and can mitigate any impact.

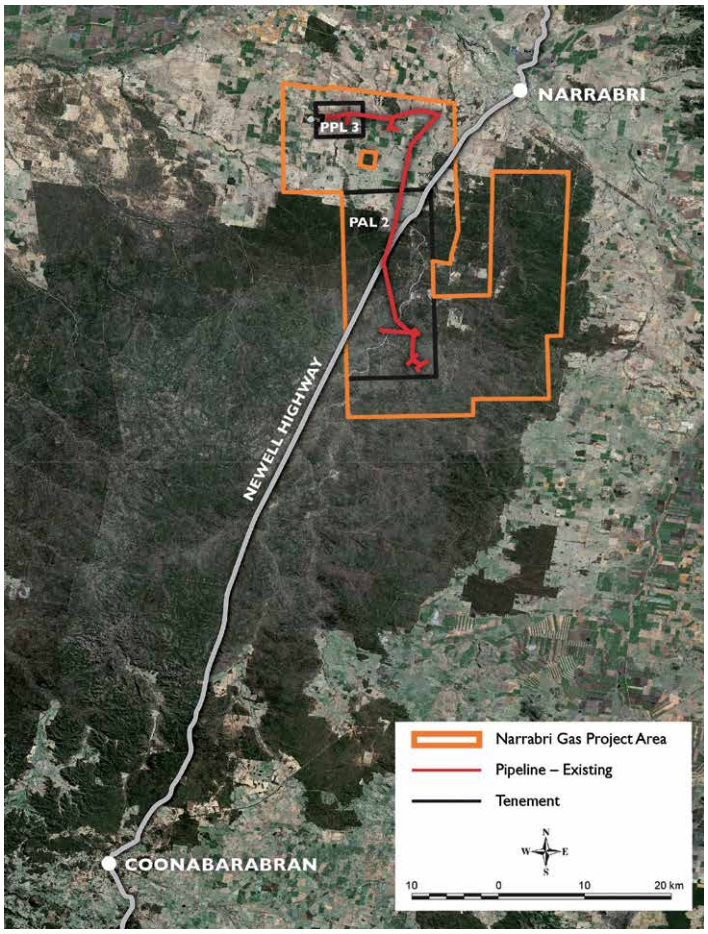
Where we are now

We are undertaking an exploration and appraisal program in the Project area to gain more information about the natural gas resource. While this is on-going, the comprehensive assessment process for the Narrabri Gas Project will be underway:

+ An outline of the Project is submitted to the State and Commonwealth Governments for review and made publicly available
+ The State and Commonwealth Governments set the requirements for Santos to prepare the Environmental Impact Statement (EIS) for the Project
+ The EIS will include extensive environmental and social studies and plans to manage potential impacts
+ Santos will conduct extensive community consultation as part of the EIS process
+ The EIS is submitted to the State and Commonwealth Government for comprehensive review and assessment

We will continue to engage with the local community throughout the assessment process and seek community input on aspects of the Project.

Project area



About Santos

An Australian energy pioneer since 1954, Santos is one of Australia's largest domestic gas producers with more than 3,000 employees and a long history of safe, responsible operations.

For more information

santos.com/nsw
Freecall: 1800 071 278
energy.nsw@santos.com
Twitter: @SantosLtd

Narrabri shopfront
125 Maitland Street
Narrabri
New South Wales 2390
Telephone: 02 6792 9035
Open Monday to Friday
from 9.00am to 5.00pm

Gunnedah shopfront
206 Conadilly Street
Gunnedah
New South Wales 2380
Telephone: 02 6741 5100
Open Monday to Friday
from 9.00am to 5.00pm

The Narrabri Gas Project
Santos in NSW

Santos
We have the energy.

Santos is an Australian energy company that has been supplying natural gas to New South Wales from South Australia for almost 40 years.

We began exploring for coal seam gas in NSW in 2008, mainly in the areas around Gunnedah and the Upper Hunter. In November 2011, Santos acquired Narrabri-based Eastern Star Gas and the company's operations in and around the Pilliga.

Since then we have carried out a comprehensive $17 million review, upgrade and rehabilitation of the existing facilities and sites in the Narrabri area. We are currently undertaking an exploration program in the region.

Our field staff are based at the Santos Operations Centre in Narrabri and we also have shopfront-style offices on the main streets of both Narrabri and Gunnedah. These offices are designed to be information centres for anyone interested in finding out more about what we do.

We also hold regular community open days and information sessions and our team give presentations on our work to local community groups and business organisations. We conduct community tours of our operations in and around the Pilliga, which are advertised locally and open to all.

Santos uses local suppliers and contractors whenever practicable and provides sponsorship and support to a wide range of local community events, initiatives and organisations.

Our aim is to work in partnership with the local community to ensure the economic and social benefits of our work flow to the areas which host our activities.

About Santos

+ Santos is one of Australia's largest domestic gas producers
+ Santos was founded in Adelaide in 1954
+ Our name was originally an acronym for South Australia Northern Territory Oil Search
+ Santos has been supplying natural gas to NSW since 1976
+ We operate in all mainland Australian states and the Northern Territory
+ Our growing Asian business has interests in Indonesia, Papua New Guinea and Vietnam
+ We employ more than 3,000 people and engage over 4,000 contractors

Coal seam gas

+ Coal seam gas is natural gas, predominantly methane
+ Natural gas has many uses:
  - Heating and cooking in the home
  - Electricity generation, as a low-emission alternative to coal
  - Powering commercial and industrial equipment
  - Feedstock for industrial processes like smelting manufacturing, food processing and fertiliser production
  - Compressed natural gas can power vehicles, like many of Australia's bus fleets
+ Gas extraction can co-exist with other land uses
+ Gas supports renewable energy sources like wind and solar, providing peaking power in times of high demand
+ Santos has more than 20 years' experience extracting coal seam gas in Queensland
+ More than 90% of Queensland's natural gas comes from coal seams
+ To extract coal seam gas:
  - A well is drilled through the ground to the coal seam
  - The water contained in the coal seam is extracted and brought to the surface
  - This releases the pressure in the coal seam, allowing the gas to flow
  - During the process, the coal is not removed – it stays in place underground

Current work

Santos is carrying out an exploration program based in and around the Pilliga south of Narrabri. The exploration program will allow us to gather more information about the gas resource in the area.

The upcoming exploration program includes the drilling of 15 exploration and appraisal wells (or pilots) and one core hole. It also includes restarting existing pilots that have been shut in since shortly after Santos took over the Narrabri operations in November 2011.

The Commonwealth Government has assessed the exploration program under the Environment Protection and Biodiversity Conservation (EPBC) Act. The Commonwealth determined the program would not have a significant impact on Matters of National Environment Significance (MNES) and water resources and granted approval for the exploration program.

The appropriate State approvals have been granted for the initial part of the exploration program, with later parts currently under assessment.

Work on a water storage facility to handle water produced during our operations is underway at Leewood, a Santos-owned property south of Narrabri.

We are also carrying out ecological studies in and around the Pilliga, air-testing to determine background methane levels in the region and installing a network of water monitoring bores. This work will enable us to gather additional scientific data to increase our understanding of the local environment and ensure we can minimise any impact of our activities.

Narrabri Gas Project

While exploration is ongoing, the comprehensive Commonwealth and State assessment process for a development project based on the resources around Narrabri will be underway.

We estimate our proposed Narrabri Gas Project could supply up to half of the natural gas that New South Wales homes, businesses, industries and electricity generators use every day.

The Project will comprise a gas field and a pipeline running south to connect with existing infrastructure to transport the gas to market.

The Project area covers 98,000 hectares in and around the Pilliga. The gas field operations will take up less than one per cent of that Project area and will be located mainly within the areas of the Pilliga specifically zoned for natural gas development.

With NSW currently importing 95% of its natural gas from other states, the Narrabri Gas Project is an opportunity to provide a clean, safe energy source to NSW while delivering significant economic benefits to the region and the State.

Project benefits

- 1,200 jobs during construction
- Up to 200 ongoing jobs
- $1.6 billion in royalty payments to the State
- $160 million Regional Community Benefit Fund to support regional programs and infrastructure

Natural gas well near Narrabri

About Santos

An Australian energy pioneer since 1954, Santos is one of Australia's largest domestic gas producers with more than 3,000 employees and a long history of safe, responsible operations.

For more information

santos.com/nsw
Freecall: 1800 071 278
energy.nsw@santos.com
Twitter: @SantosLtd

Narrabri shopfront
125 Maitland Street
Narrabri
New South Wales 2390
Telephone: 02 6792 9035
Open Monday to Friday
from 9.00am to 5.00pm

Gunnedah shopfront
206 Conadilly Street
Gunnedah
New South Wales 2380
Telephone: 02 6741 5100
Open Monday to Friday
from 9.00am to 5.00pm

The Narrabri Gas Project
Protecting local aquifers

Santos
We have the energy.

Santos appreciates the critical role water plays in regional communities.

We will work to ensure existing water users in the Narrabri region and the natural environment are not impacted by our activities.

There are a number of reasons why natural gas extraction will not impact water resources. These include the local geology, the drilling techniques we employ, the knowledge of local groundwater and the stringent regulatory assessments of our work.

Local geology

In our Project area, the aquifer known as the Pilliga sandstone, which is a part of the Great Artesian Basin, generally lies between 5 and 300 metres below the surface. The coal seams we are targeting lie about 500 metres to more than 1,000 metres underground.

Between the Pilliga sandstone and the coal seams lie multiple layers of solid rock known as aquitards.

These rock layers act as barriers to the flow of water either upwards or downwards out of the Pilliga sandstone. If these barriers were not in place, the quality of water in the Pilliga sandstone would be the same quality as the much saltier water in the deeper coal seams.

This geology, which isolates the coal seams, allows the extraction of natural gas without impacting the shallow aquifers.

Drilling techniques

Santos adheres to the highest industry standards when drilling wells. Steel casings are cemented in place to isolate and protect the aquifers. The steel and cement used are designed to withstand operational pressures during production.

After drilling, Santos conducts regular integrity and maintenance inspections of all wells. The wells are monitored in real time and can be shut in remotely if required.

When a well stops producing gas, it is decommissioned. Surface facilities are removed and the entire well is sealed with cement to ensure aquifers are protected, long after the well is decommissioned.

In addition to our own stringent operating standards, regulations around the drilling of wells and well integrity are now contained in the NSW Code of Practice for Coal Seam Gas – Well Integrity.

Gas wells in the Narrabri area target coal seams lying 500 to more than 1,000 metres underground

Coal seam gas and water

To produce coal seam gas, water must first be extracted from the coal seams. This releases pressure and allows the natural gas to flow.

In the Narrabri Gas Project area:

+ The water extracted is not the water accessed by agricultural and community bores
+ It is not taken from the Great Artesian Basin
+ It comes from the coal seams 500–1,000m below the surface
+ The water is highly saline

Knowledge of local groundwater

Santos has gained a good understanding of groundwater in the region.

We conducted an extensive regional groundwater study which included a regional bore survey and monitoring of government and landholder bores.

Cumulative modelling based on this data found there would be little or no impact on the shallow aquifers from natural gas extraction in the area. These findings are similar to those of the independently conducted Namoi Catchment Water Study released in 2012.

Both studies predicted there would be less than 0.5 metre drawdown over 90 years in the shallow aquifers overlying the Project area. This is within the range of existing seasonal variations in the water levels of the shallow aquifers.

Groundwater monitoring

We are monitoring groundwater in the region to establish baseline water data before the Project gets underway and ensure we are able to accurately monitor the aquifers during the life of the Project.

We are also installing a network of aquifer monitoring bores to enhance the coverage of monitoring locations across the region.

The data from Santos' bores is available to the public through an online water portal system at www.santoswaterportal.com.au.

Regulations

The natural gas industry in NSW is one of the most highly regulated in the country. State Government bodies involved in the regulation of the industry include:

+ NSW Office of Coal Seam Gas
+ NSW Environment Protection Authority
+ NSW Office of Water
+ NSW Land and Water Commissioner
+ NSW Department of Planning and Infrastructure

On a Commonwealth level, the Environmental Protection and Biodiversity Conservation (EPBC) Act requires the assessment of impacts on the environment and water resources, including referral to the Independent Expert Scientific Committee (IESC). When necessary, conditions are put in place to manage potential impacts.

The assessment process for work we carry out is rigorous and in almost all cases requires both State and Commonwealth assessment and approval.

Shallow groundwater monitoring

Project overview

The Narrabri Gas Project could supply up to half of the natural gas used by NSW homes, small businesses, major industries and electricity generators every day

Operations will be focussed on land in and around the Pilliga, near Narrabri

The Project will create over 1,200 jobs during construction and bring substantial economic benefits to Narrabri and the region, while delivering a clean, reliable source of energy to NSW

About Santos

An Australian energy pioneer since 1954, Santos is one of Australia's largest domestic gas producers with more than 3,000 employees and a long history of safe, responsible operations.

For more information

santos.com/nsw
Freecall: 1800 071 278
energy.nsw@santos.com
Twitter: @SantosLtd

Narrabri shopfront
125 Maitland Street
Narrabri
New South Wales 2390
Telephone: 02 6792 9035
Open Monday to Friday
from 9.00am to 5.00pm

Gunnedah shopfront
206 Conadilly Street
Gunnedah
New South Wales 2380
Telephone: 02 6741 5100
Open Monday to Friday
from 9.00am to 5.00pm

The Narrabri Gas Project
Working with landholders

Santos
We have the energy.

Santos respects landholders and has a long history of working with landholders in regional areas.

The Narrabri Gas Project area includes both State owned land and private land mostly in and around the Pilliga. We have been very clear about our commitment to drill wells on private land only when the landholder agrees to work with us and a land access agreement is in place.

In our more advanced Queensland operations, we have voluntary land access agreements with over 300 landholders, demonstrating agriculture activities and natural gas development can exist side by side.

In New South Wales we have a compensation framework in place that provides an income stream for landholders who host our exploration and drilling activities. The framework features a land-value based payment to compensate for the amount of land utilised by Santos' surface facilities and a fee for service to the landholder. In exchange for the fee for service, the landholder signs a Services Agreement and agrees to assist with general monitoring and upkeep of the sites located on their land. A land access agreement is also negotiated.

We work with landholders involved in all stages of our activities to ensure they are comfortable with how we work on their land in consideration of their lifestyle and business interests.

Project overview

The Narrabri Gas Project could supply up to half of the natural gas used by NSW homes, small businesses, major industries and electricity generators every day

Operations will be focussed on land in and around the Pilliga, near Narrabri

The Project will create over 1,200 jobs during construction and bring substantial economic benefits to Narrabri and the region, while delivering a clean, reliable source of energy to NSW

When entering into a Land Access Agreement and Services Agreement with a landholder, Santos will:

+ Be honest and transparent
+ Pay reasonable legal costs incurred by the landholder to finalise an agreement
+ Conduct our operations to the highest health and safety standards
+ Carry out a plan to minimise noise, dust and light from our activities
+ Monitor the landholder's water bore by measuring water levels and quality
+ Rehabilitate the land progressively during our operations

Working with Santos

+ A member of our Land Access team will be in contact to ask if you are interested in working with us
+ If you would like to find out more, we'll arrange to meet with you and provide information and answer questions you may have
+ Following the initial meeting, if you would like to progress further, a scout of your property is arranged to determine if there are any ecological or cultural heritage impediments to the proposed site
+ We then work with you to prepare an agreed checklist containing details to be considered prior to undertaking proposed activities on your property. This may include infrastructure locations, agreed access routes, hours of operation and timing of agricultural activities like cropping which we consider when planning our activities
+ These details are documented in a Farm Management Plan
+ A Land Access Agreement and Services Agreement are prepared and compensation amounts finalised
+ We encourage landholders to have the documents reviewed and Santos will pay reasonable legal costs on the landholder's behalf to finalise an agreement
+ When the agreement is signed compensation for the first year is paid
+ Fourteen days before work is scheduled to commence we will contact you to advise details. At this time neighbours will also be notified of impending work
+ The infrastructure on your property will be regularly monitored and a member of our Land Access team will maintain regular contact with you

Compensation

Exploration and appraisal

Exploration and appraisal is carried out to gather additional information on geology and natural gas composition. It involves the drilling of core holes and pilot wells.

Exploration and appraisal compensation

In these examples, calculations are based on land valued at $1,000 per hectare, with facilities over one hectare of land (an average well site).

Year One

+ Santos pays 120% of the land value of the area used for our facilities
+ The land value is based on the landholder's rates notice
+ $30,000 fee for service per landholder per annum, paid in a lump sum

Compensation:
$1,200 for land utilised + $30,000 fee for service
Total: **$31,200** for Year One

Year Two onwards

+ Santos pays 60% of the land value of the area used for our facilities
+ The land value is based on the landholder's rates notice
+ $30,000 fee for service (paid at $2,500 per month)

Compensation:
$600 for land utilised + $30,000 fee for service
Total: **$30,600** for Year Two and each year following for as long as activities remain on the land

Production

The production stage follows exploration and appraisal. During this stage production and transmission of gas occurs. If production facilities are located on your land, a different form of agreement will be entered into, as a typical production well has a life span of 20–30 years.

Production compensation

Calculations are again based on land valued at $1,000 per hectare, with facilities over one hectare of land (an average well site).

Year One

+ Santos pays 120% of the land value of the area used for our facilities
+ The land value is based on the landholder's rates notice
+ $30,000 fee for service per landholder per annum, paid in a lump sum

Compensation:
$1,200 for land utilised + $30,000 fee for service
Total: **$31,200** for Year One

Year Two onwards

Rather than receiving a land value based payment, landholders involved in the longer term production phase will share in a Landholders Incentive Fund.

+ The Fund will be equivalent to 5% of Santos' statutory annual royalty payment
+ Landholders will receive a share of the Fund proportionate to the amount of their land being utilised by Santos
+ A landholder with 2–3 production wells on their property would receive approximately $50,000 per year (inclusive of the $30,000 annual fee for service)

About Santos

An Australian energy pioneer since 1954, Santos is one of Australia's largest domestic gas producers with more than 3,000 employees and a long history of safe, responsible operations.

For more information

santos.com/nsw
Freecall: 1800 071 278
energy.nsw@santos.com
Twitter: @SantosLtd

Narrabri shopfront
125 Maitland Street
Narrabri
New South Wales 2390
Telephone: 02 6792 9035
Open Monday to Friday
from 9.00am to 5.00pm-

Gunnedah shopfront
206 Conadilly Street
Gunnedah
New South Wales 2380
Telephone: 02 6741 5100
Open Monday to Friday
from 9.00am to 5.00pm

The Narrabri Gas Project
Native Title and the Right to Negotiate

Santos
We have the energy.

September 2014

Santos' aim is to create enduring and mutually beneficial relationships with Aboriginal communities across all our Australian operations, including the Narrabri Gas Project

The Gomeroi People

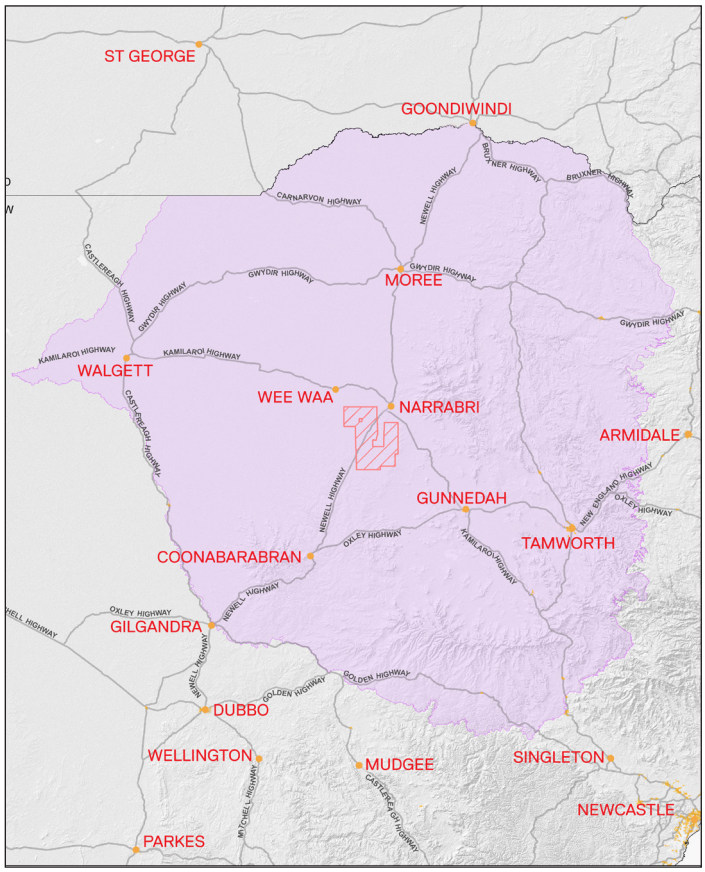
The Gomeroi People's native title claim extends over the Narrabri Gas Project area.

Santos is negotiating with the elected representatives of the Gomeroi People, the nineteen members of the Gomeroi Applicant Group, on a native title agreement for the Narrabri Gas Project.

These negotiations are a requirement of the Native Title Act and consider how the project impacts on the Gomeroi People's native title rights and interests. These negotiations include discussion on what can be done to avoid or minimise any impacts, and how the Gomeroi People can be compensated where this impact cannot be avoided.

Santos recognises that any native title negotiation with the Gomeroi People must address:

+ A commitment by Santos to the highest standard of operations
+ A clear framework for the Gomeroi's involvement in the management of Aboriginal cultural heritage
+ An appropriate compensation framework for any impact to native title rights and interests



Gomeroi People Claim and Narrabri Gas Project area

Project overview

The Narrabri Gas Project could supply up to half of the natural gas used by NSW homes, small business, major industries and electricity generators every day.

Operations will be focussed on land in and around the Pilliga, near Narrabri.

The Project will create over 1,200 jobs during construction and bring substantial economic benefits to Narribri and the region, while delivering a clean, reliable source of enegry to NSW.

Supporting informed decision-making

To support the Gomeroi Applicants in their decision making process, Santos has agreed to assist the Applicant Group:

+ Obtain independent advice on important aspects of the Project
+ Meet and share information with members of the Gomeroi People's native title claim group during the Right to Negotiate process
+ Support the Gomeroi Applicants' request for any agreement to be considered and accepted by the broader Gomeroi People native title claim group

Right to Negotiate Process and Timeframe

Santos has been meeting with the Gomeroi Applicant Group since the Gomeroi People's claim was registered in 2012. These meetings have focused on presentation of information about Santos, natural gas operations and the proposed Narrabri Gas Project.

In May 2014, the Right to Negotiate process commenced between Santos and The Gomeroi Applicant Group. It is expected that this process will be completed in 2015.

Steps in the negotiation process

Step 1

+ Santos applies for licences to produce gas
+ NSW Office of Coal Seam Gas advertises "Section 29 Notice"
+ These notices were advertised in May 2014

Step 2

+ Santos and the Gomeroi Applicant Group meet to negotiate in good faith
+ These meetings take place over at least 6 months but negotiations can take longer if required to reach an agreement

Step 3

+ Agreement has been reached
+ Gomeroi Applicant Group consult and seek acceptance of Gomeroi People claim group membership

Step 4

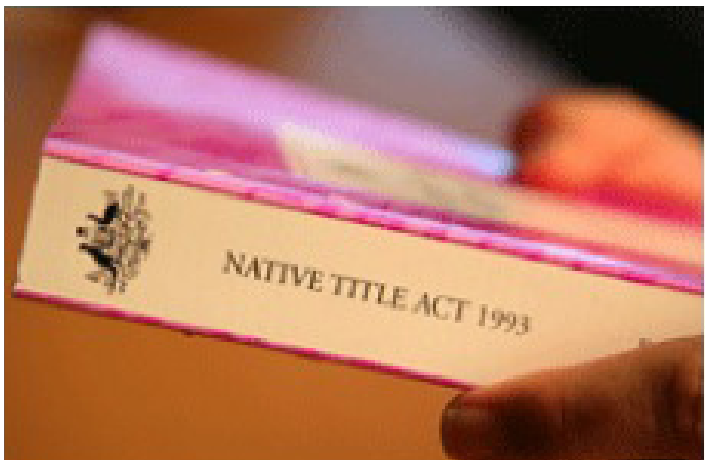
+ Following acceptance the Gomeroi Applicant Group will sign native title documents
+ Documents include compensation to be paid by Santos, and any other agreed initiatives

Step 5

+ Documents signed by Santos and the Office of Coal Seam Gas
+ Licences can be granted consistent with the Native Title Act

Step 6

+ Gomeroi People Native Title Claim Group will establish a corporation to receive funds and use them for the benefit of the Gomeroi People.



Narrabri Gas Project and the Native Title Act

+ As part of the Narrabri Gas Project, Santos has applied for licences to produce gas for the NSW energy market
+ Under the Native Title Act, Santos must negotiate with the Gomeroi People's Applicant Group (19 elected representatives) regarding the granting of these licences
+ This Right to Negotiate is not a right of veto but gives the Gomeroi Applicant Group the opportunity to discuss the effect of the project on native title rights and interests, with the aim of reaching agreement with Santos
+ The Right to Negotiate requires Santos and the Gomeroi Applicant Group to negotiate in good faith. This means that parties must negotiate with an open mind and a genuine desire to reach agreement

Working with the Aboriginal community

Just as we respect and acknowledge native title rights and interests, Santos understands that the Aboriginal communities of the NSW north-west have rich and diverse histories.

Santos is working with local and regional Aboriginal communities and organisations including the Gomeroi Applicants, and Local Aboriginal Lands Councils. We aim to ensure that Aboriginal people in Narrabri and surrounding regions are able to share the benefit of a successful project, whether that be through employment, training, education or other initiatives.

About Santos

An Australian energy pioneer since 1954, Santos is one of Australia's largest domestic gas producers with more than 3,000 employees and a long history of safe, responsible operations.

For more information

santos.com/nsw
Freecall: 1800 071 278
energy.nsw@santos.com
Twitter: @SantosLtd

Narrabri shopfront
125 Maitland Street
Narrabri
New South Wales 2390
Telephone: 02 6792 9035
Open Monday to Friday
from 9.00am to 5.00pm

Gunnedah shopfront
206 Conadilly Street
Gunnedah
New South Wales 2380
Telephone: 02 6741 5100
Open Monday to Friday
from 9.00am to 5.00pm

The Narrabri Gas Project
Working in the Pilliga

Santos
We have the energy.

More than half our Narrabri Gas Project operations will be located in the Pilliga.

With the appropriate environmental protections in place we believe specific areas of the Pilliga can be used for the development of a natural gas project while protecting the area's unique environment.

Working in the Pilliga

+ Our activities are focussed in parts of the Pilliga designated for the development of natural gas and other industries
+ At full production, our activities will cover less than half a percent of the Pilliga's 500,000 hectares
+ Access will be via agreement with NSW Forestry Corporation
+ We will work towards an agreement with the Gomeroi Native Title claimants
+ Government assessment and approval will include consideration of impacts on native habitat and water resources
+ When a well is decommissioned the land is returned to its original state

A gas well in the Pilliga

About the Pilliga

+ The Pilliga is an area of forest and woodland covering around 500,000 hectares between the towns of Narrabri and Coonabarabran in north west NSW.
+ The Pilliga has a long history as a working forest. There are more than 5,000 km of existing roads, forest tracks, fire breaks and other easements throughout the Pilliga. Much of the Pilliga has been accessed by the timber industry for sleeper cutting and cypress harvesting. Other sections have been used for sheep and cattle grazing. These activities, along with regular wildfires and the introduction of invasive species, have modified the Pilliga over time and influenced its ecology.
+ In 2005, the NSW Government completed a comprehensive review of land use in the Pilliga. A key outcome of the Brigalow and Nandewar Bioregions regional assessment resulted in around 240,000 hectares, or almost half of the Pilliga, being protected under the National Parks and Wildlife Act. Other parts of the Pilliga were dedicated as State Forest, and set aside for the purposes of "forestry, recreation and mineral extraction". One of the strategic aims for the areas zoned State Forest was to "provide for exploration, mining, petroleum production and extractive industry[2]". This is the section of the Pilliga where we are seeking to work.

[2] NSW Government – Brigalow and Nandewar Community Conservation Area Agreement (2009)

Santos has environmental strategies in place to protect the Pilliga and minimise impact of the Project. These include:

Obtaining ecological data to increase our understanding of the environment:

+ Conducting ecological surveys on flora and fauna
+ Building on the 3,500 hours of surveys carried out since 2002
+ Extensive groundwater studies undertaken
+ Air testing to record baseline methane levels at sites in the Pilliga and across the region

Avoiding work in significant areas:

+ Site assessments to identify areas of cultural heritage and ecological significance
+ Lateral drilling allows Santos to avoid sensitive sites
+ This drilling technique reduces well numbers and surface disturbance

Mitigating any impact by minimising our environmental footprint:

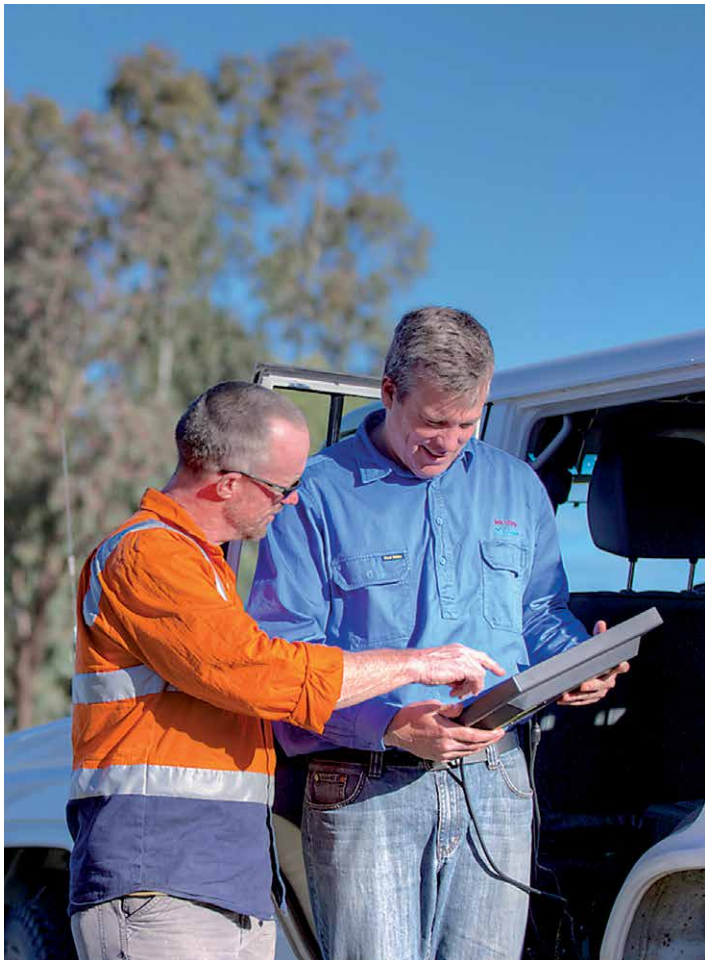
+ Using existing road and access tracks when possible to minimise clearing
+ Locating the majority of our water handling and treatment facilities outside the Pilliga
+ Progressive rehabilitation to reduce the size of cleared areas once construction complete
+ Complete rehabilitation of sites when wells have been decommissioned

Offsetting the land we use:

+ Santos will be required to offset the land in the Pilliga impacted by the Project
+ Santos is committed to working with the Office of Environment and Heritage to identify an appropriate offsets package
+ Any land offsets will be acquired by Santos and will be protected in perpetuity

Environmental initiatives to preserve and improve local ecology:

+ Strict vehicle wash-down procedures and weed management control
+ Contribution to control programs to assist in the reduction of pest animals is planned



Air testing to record methane levels in the Narrabri area

Project overview

The Narrabri Gas Project could supply up to half of the natural gas used by NSW homes, small businesses, major industries and electricity generators every day

Operations will be focussed on land in and around the Pilliga, near Narrabri

The Project will create over 1,200 jobs during construction and bring substantial economic benefits to Narrabri and the region, while delivering a clean, reliable source of energy to NSW

About Santos

An Australian energy pioneer since 1954, Santos is one of Australia's largest domestic gas producers with more than 3,000 employees and a long history of safe, responsible operations.

For more information

santos.com/nsw
Freecall: 1800 071 278
energy.nsw@santos.com
Twitter: @SantosLtd

Narrabri shopfront
125 Maitland Street
Narrabri
New South Wales 2390
Telephone: 02 6792 9035
Open Monday to Friday
from 9.00am to 5.00pm

Gunnedah shopfront
206 Conadilly Street
Gunnedah
New South Wales 2380
Telephone: 02 6741 5100
Open Monday to Friday
from 9.00am to 5.00pm

The Narrabri Gas Project
Drilling with care

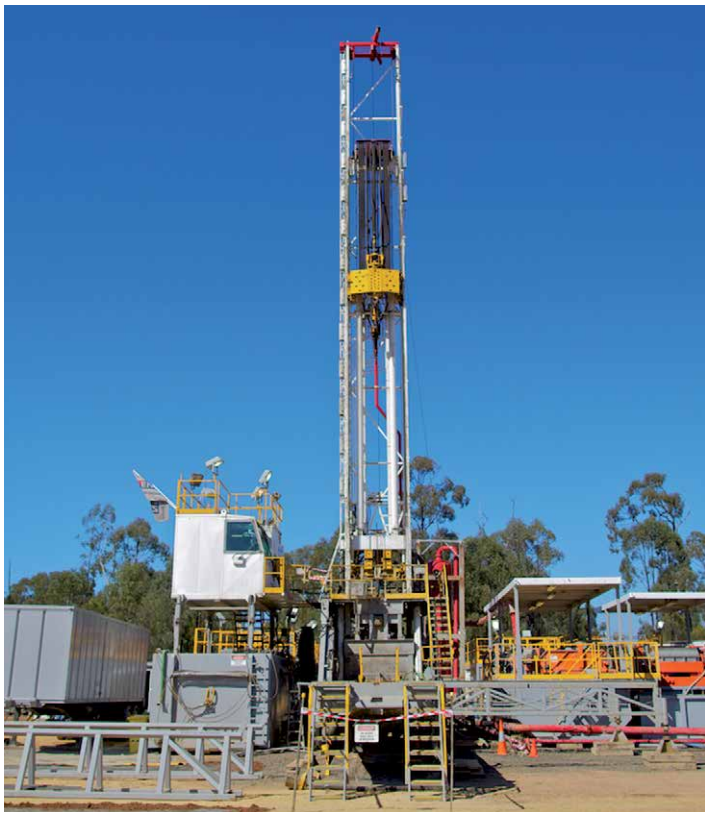
Santos
We have the energy.

Santos adopts the highest industry standards to ensure natural gas is produced safely and groundwater is protected.

The NSW Code of Practice for Coal Seam Gas – Well Integrity was also issued in September 2012. This Code establishes a best practice framework for the design, construction and maintenance of each well and has undergone peer review co-ordinated by the NSW Chief Scientist and Engineer.

Complying with the Code of Practice is a condition of our licence to explore and produce gas in the Project area. Some of the features we adopt to meet these standards include:

- All our producing gas wells contain at least two layers of steel and cement across the Great Artesian Basin
- These layers isolate the coal seams we are targeting from aquifers and other geologic formations
- The steel pipe used in our wells is designed to withstand operational pressures during drilling operations, testing and production
- The cement used in our wells is laboratory tested and designed for the environment in which it is placed
- Once the cement is in place the casing is pressure tested to ensure well integrity
- We conduct regular monitoring and maintenance on all of our wells
- Routine operational visits are undertaken to test equipment and inspect the steel pipe
- Wells are also monitored remotely in real time and can be shut in manually or automatically if a problem arises
- Once a well is no longer required, it is decommissioned
- Surface facilities are removed and the entire well is sealed with cement to ensure aquifers are protected, long after the well is decommissioned
- Rehabilitation of the site returns vegetation to its original state



A drill rig operating near Narrabri

Lateral drilling

Lateral drilling will be an important part of the drilling program in the Narrabri area. Rather than drilling traditional vertical wells, Santos plans to drill vertically then steer horizontally or "laterally" along the coal seams.

The naturally occurring fractures in the coals around Narrabri are particularly suited to this technology. Santos expects it will significantly improve the flow of gas to the surface by intersecting the coal in this way, reducing the need for other technologies designed to promote gas flow, like hydraulic fracturing or "fracking".

Lateral drilling has the added benefit of reducing the amount of surface disturbance and increasing the spacing between well pads, as laterals can be drilled underground in various directions from a central well pad, accessing more of the coal seams. With traditional vertical wells, a surface pad is required for each well and additional wells are generally needed to produce the same amount of gas.

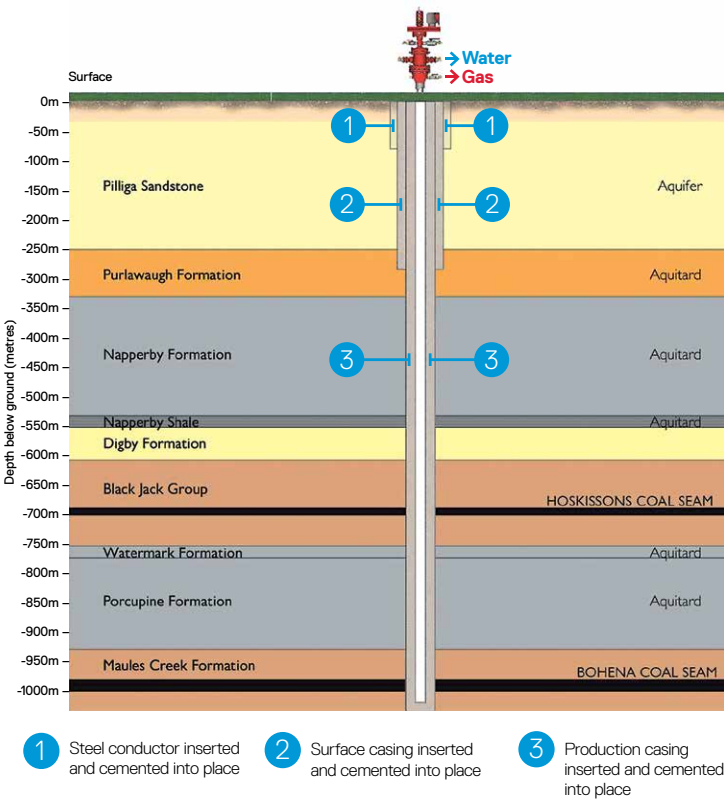
Santos wells are designed to:

+ Protect the environment, particularly underground sources of water
+ Minimise risk to personnel and the public
+ Comply with the NSW Codes of Practice for Coal Seam Gas – Well Integrity, and meet international standards
+ Maximise the production life of the well

How we drill a natural gas well:

+ A 14 inch steel pipe, the conductor, is cemented 10–20 metres into the ground
+ The conductor holds back the loose soil near the surface
+ We drill through the conductor until we reach a geological rock layer through which substances, like water and gas, cannot easily pass. These layers are known as aquitards
+ A second steel pipe, the 9–5/8 inch surface casing, is run to the bottom of the hole, into the rock layer and cemented to surface
+ The surface casing is then pressure tested to ensure well integrity
+ We drill through the surface casing a few metres and pressure test again ensuring the cement is bonded to the rock and steel
+ Drilling continues down through the target coal seams and into the rock below
+ A third steel pipe, the production casing, is run inside the surface casing
+ This 7 inch production casing runs from the surface down into the coal seam and is cemented back to surface
+ The wellhead is positioned on top of the well to allow production of natural gas and water

Typical vertical Narrabri coal seam gas well



Project overview

The Narrabri Gas Project could supply up to half of the natural gas used by NSW homes, small businesses, major industries and electricity generators every day

Operations will be focussed on land in and around the Pilliga, near Narrabri

The Project will create over 1,200 jobs during construction and bring substantial economic benefits to Narrabri and the region, while delivering a clean, reliable source of energy to NSW

Hydraulic fracture stimulation

+ Current information on the geology of the coal seams in the Project area indicates gas flow would not be improved by hydraulic stimulation (commonly referred to as "fraccing" or "fracking")
+ Hydraulic fracture stimulation (commonly referred to as 'fraccing' or 'fracking') is used to improve the flow of gas and increase the productivity of a well
+ This technology has been used safely and sustainably in Australia for more than 40 years
+ Over the past 65 years hydraulic fracture stimulation has been used safely on more than two million wells worldwide (naturalcsg.com.au)
+ If additional geologic data supported the use of the technique to improve gas flow in the Narrabri Project area in the future, a range of additional Government approvals would be required and community consultation would be undertaken

About Santos

An Australian energy pioneer since 1954, Santos is one of Australia's largest domestic gas producers with more than 3,000 employees and a long history of safe, responsible operations.

For more information

santos.com/nsw
Freecall: 1800 071 278
energy.nsw@santos.com
Twitter: @SantosLtd

Narrabri shopfront
125 Maitland Street
Narrabri
New South Wales 2390
Telephone: 02 6792 9035
Open Monday to Friday
from 9.00am to 5.00pm

Gunnedah shopfront
206 Conadilly Street
Gunnedah
New South Wales 2380
Telephone: 02 6741 5100
Open Monday to Friday
from 9.00am to 5.00pm

The Narrabri Gas Project
Leewood Phase 2 – Water Treatment Facility

Santos
We have the energy.

Managing the water produced during the extraction of natural gas from coal seams is a critical part of our work in the Narrabri area.

Santos has constructed an approved state-of-the-art water storage facility at the company's Leewood property on the Newell Highway, 24 kilometres south of Narrabri.

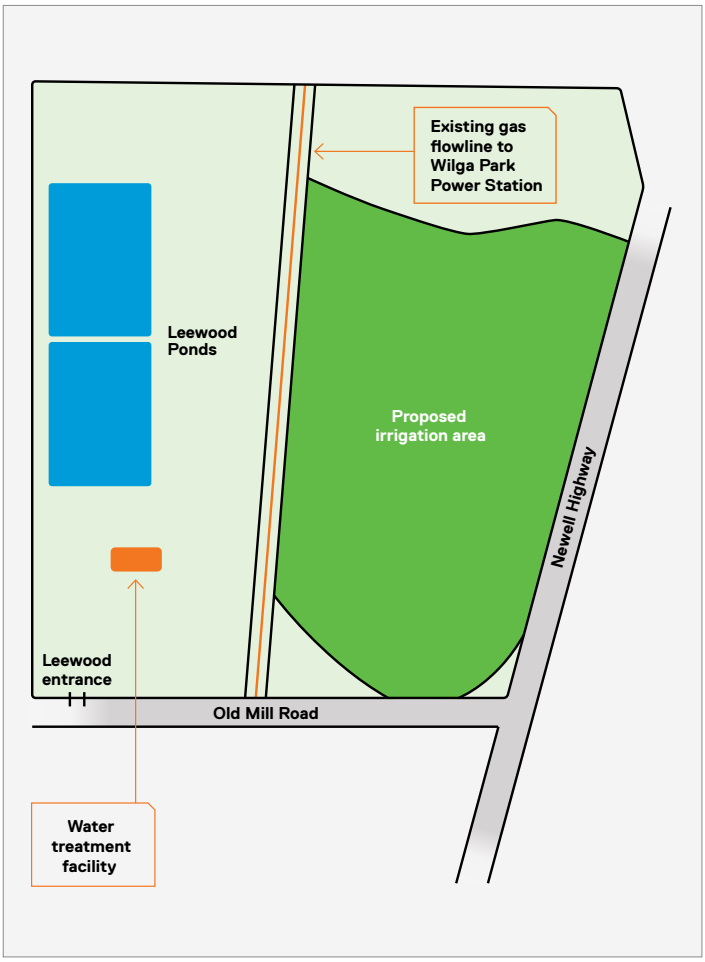
The two double-lined 300 megalitre storage ponds, constructed as part of the first phase of work at Leewood, now hold most of the water extracted during our exploration and appraisal program, as well as the legacy brine from previous operations.

Santos will now seek approval for phase 2 of work at Leewood. This will include construction of water and brine treatment facilities and associated infrastructure, such as pipelines and pumps, to treat produced water from Santos' exploration and appraisal program for approximately three to five years.

If approved we estimate between 65–70% of the water treated will be able to be reused.

Leewood Phase 2 will be assessed by the Government via a Review of Environmental Factors (REF), under Part 5 of the Environmental Planning and Assessment Act 1979 (EP&A Act). The REF document provides details of proposed plans, assesses any potential impacts and details how these impacts will be mitigated.

The facilities have been designed and located to minimise environmental, cultural heritage and community impacts. A traffic management plan will also be implemented to minimise the potential impact of additional truck movements during construction.



Proposed layout of the Leewood property

Narrabri Gas Project Overview

The Narrabri Gas Project could supply up to half of the natural gas used by NSW homes, small businesses, major industries and electricity generators every day

Operations will be focussed on land in and around the Pilliga, near Narrabri

The Project will create over 1,200 jobs during construction and bring substantial economic benefits to Narrabri and the region, while delivering a clean, reliable source of energy to NSW

Leewood Phase 2 Scope

Construction of Leewood Phase 2 will take around 12 months and will include the following infrastructure:

+ A water treatment plant, including a reverse osmosis plant and brine concentrator
+ Associated pipework to transfer water and brine around the facility
+ Treated water storage
+ Treated water irrigation system

Water

During the exploration and appraisal stage, Santos estimates an average of one megalitre of treated water will be generated per day.

It is planned that the treated water will be used to irrigate a section of the Leewood property.

Fodder crops will be planted and a combination of pivot and drip irrigation will be used. As Leewood is not currently used for agricultural purposes, the proposed irrigation area will improve the productivity of this land.

Small volumes of treated water will also be used for operational activities like construction and dust suppression.

In addition, provision will be made for potential use by local landholders.

All water will be thoroughly tested prior to use to ensure it is of a suitable quality for these activities and complies with NSW and Australian Guidelines.

Salt

The minerals dissolved in the water from coal seams are commonly referred to as 'salts' and will remain in a brine solution after the reverse osmosis process.

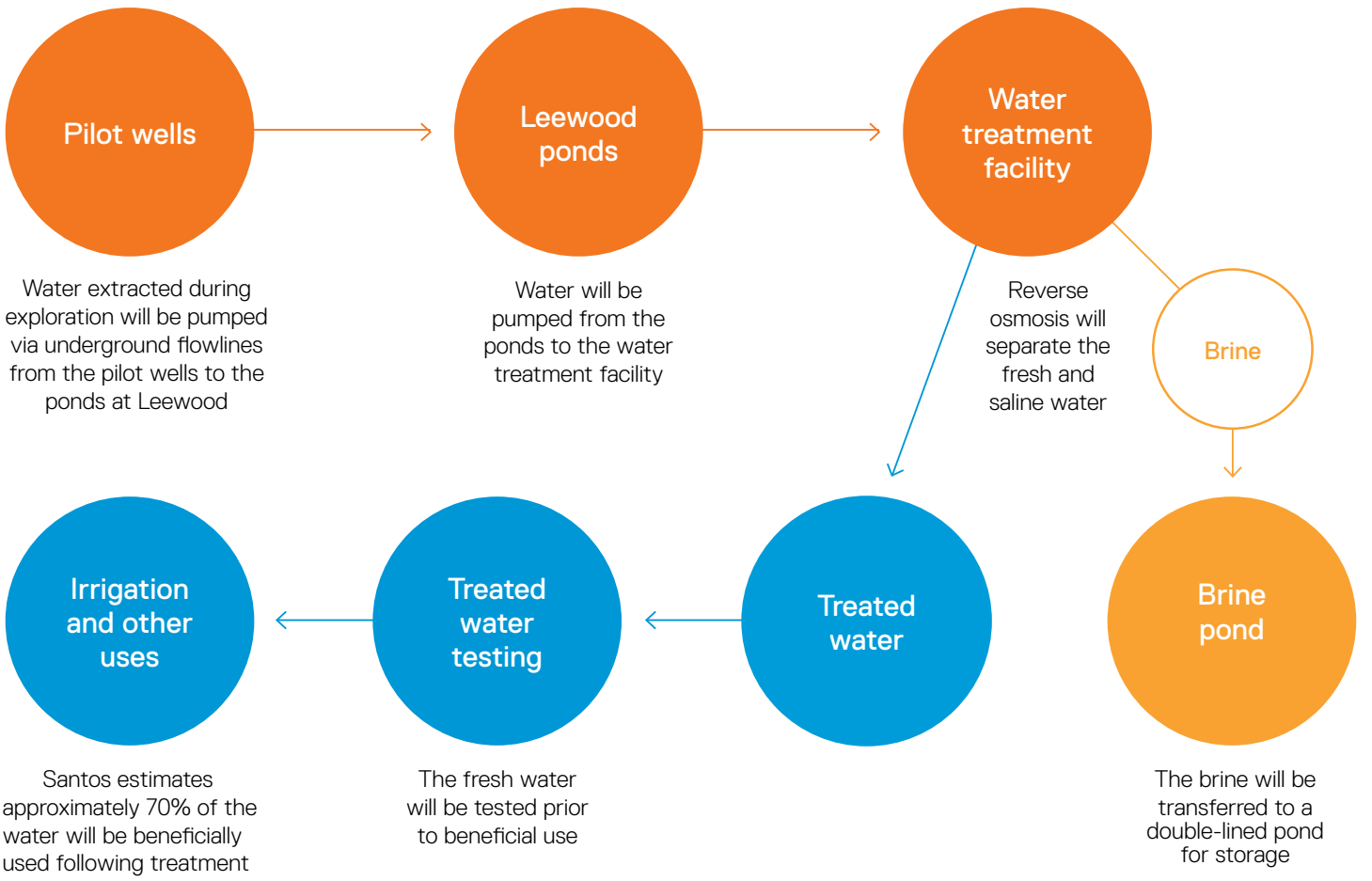
These salts will then pass through a brine concentrator for further treatment.

The remaining salts will be contained in a concentrated brine and stored in one of the newly constructed double lined ponds at Leewood during the exploration and appraisal stage.

Santos will work with industry experts to develop salt handling solutions which will be put in place when the Project moves into the development phase. Salts produced during the exploration and appraisal program will then be processed.

Santos will strictly adhere to all regulatory guidelines set out by the NSW Office of Coal Seam Gas (OCSG) and the Environmental Protection Agency (EPA) for dealing with salt as a by-product.

The process



About Santos

An Australian energy pioneer since 1954, Santos is one of Australia's largest domestic gas producers with more than 3,000 employees and a long history of safe, responsible operations.

For more information

santos.com/nsw
Freecall: 1800 071 278
energy.nsw@santos.com
Twitter: @SantosLtd

Narrabri shopfront
125 Maitland Street
Narrabri
New South Wales 2390
Telephone: 02 6792 9035
Open Monday to Friday
from 9.00am to 5.00pm

Gunnedah shopfront
206 Conadilly Street
Gunnedah
New South Wales 2380
Telephone: 02 6741 5100
Open Monday to Friday
from 9.00am to 5.00pm

COAL SEAM GAS
FACT SHEET

WHAT IS **COAL SEAM GAS?**

Coal seam gas (CSG) is a naturally occurring gas found in coal seams hundreds of metres beneath the earth's surface.

CSG, like conventional natural gas, is comprised mostly of methane (CH_4) and is a type of petroleum that was formed from the compressed remains of plants over millions of years.

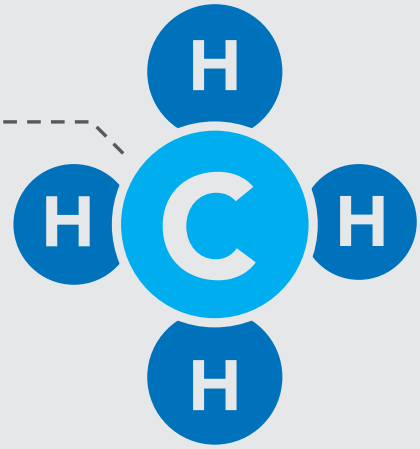
Coal seam and natural gas make up the gas supply piped into more than one million homes and businesses in NSW for use in everyday cooking, heating and manufacturing.

In fact, over 30 per cent of the eastern Australian gas network is fed by coal seam gas.

CSG is used to generate electricity in gas-fired power stations as a low emission alternative to electricity produced from coal.

Ten gases that make up clean, unpolluted air:

Nitrogen (N_2)	78.084%
Oxygen (O_2)	20.946%
Argon (Ar)	0.934%
Carbon Dioxide (CO_2)	0.0383%
Neon (Ne)	0.001818%
Helium (He)	0.000524%
Methane (CH_4)	0.000179%
Krypton (Kr)	0.000114%
Hydrogen (H_2)	0.000055%
Xenon (Xe)	0.000009%



COAL SEAM GAS FACT SHEET

> Coal seam gas is a naturally occurring gas.

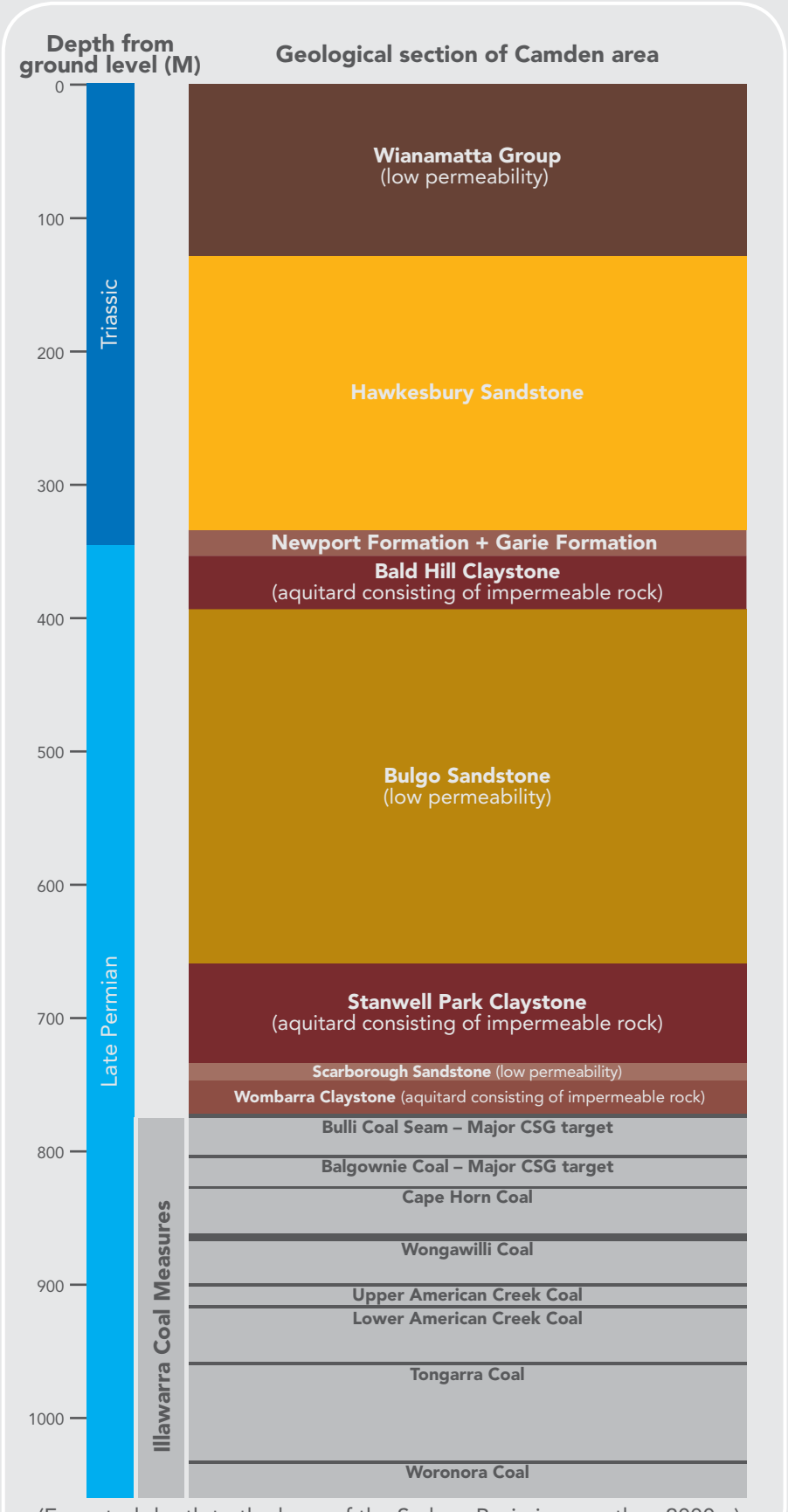
In Australia, the major CSG resources are found in Queensland's Bowen and Surat Basins, in NSW in the Gunnedah, Gloucester and Sydney basins, and on the NSW-Queensland border in the Clarence-Moreton basin.

CSG is part of the gas supply used in Australian homes and industry, and is becoming increasingly important in the nation's energy market as Australia moves to a lower carbon economy.

CSG has been safely produced in Australia since commercial production began in central Queensland in 1996. For more than 10 years, the Camden Gas Project has been operating successfully in south-western Sydney.

Australian CSG producers have become international leaders in world-best practice technologies and production and the NSW Government has introduced some of the toughest regulations in the world to safeguard the health of communities and protect the State's valuable land and water resources.

AGL's Camden Gas Project



(Expected depth to the base of the Sydney Basin is more than 2000m)

COAL SEAM GAS
FACT SHEET

NSW

EXPLORATION & PRODUCTION

Exploration and production of natural gas from coal seams (CSG) began in Australia in 1996, although it was first produced during the early days of coal mining.

CSG was extracted at the Sydney Harbour Colliery in Balmain in the early 1900s. It was compressed and sold as an industrial and motor fuel. Production reached its peak in 1944 when more than 11 million cubic feet of gas was produced.

Today, CSG exploration and production in NSW is subject to some of the toughest regulations in the world to ensure the protection of the environment and the safety of our communities. Exploration and production can proceed only after detailed multiagency assessments which address environmental, community, health and water concerns.

The NSW Government has banned several exploration and production practices used in CSG activities in other parts of the world, including the use of harmful chemicals in the hydraulic fracturing process. It has also banned evaporation ponds to encourage the treatment and re-use of water extracted in the process.

The NSW Government has introduced regulations which ban all new coal seam gas exploration and production activity in or within 2 kilometres of existing and future residential areas. Coal seam gas activity will also be banned within the areas identified as the Upper Hunter equine and viticulture Critical Industry Clusters.

A hold on exploration and extraction of CSG in the 'Special Areas' zone of the Sydney drinking water catchment also now applies pending an investigation by the NSW Chief Scientist and Engineer on the impact of these activities.

Stringent well integrity standards were also imposed in 2012 to protect aquifers and our precious water resources.

A desktop study is typically the first stage of exploration. After identifying prospective deposits through geological studies and geophysical surveys, engineers move into the field to drill a core hole (up to

> The data gathered from the drilling provides comprehensive geological information.

20 centimetres in diameter) to obtain a sample of what is below the surface.

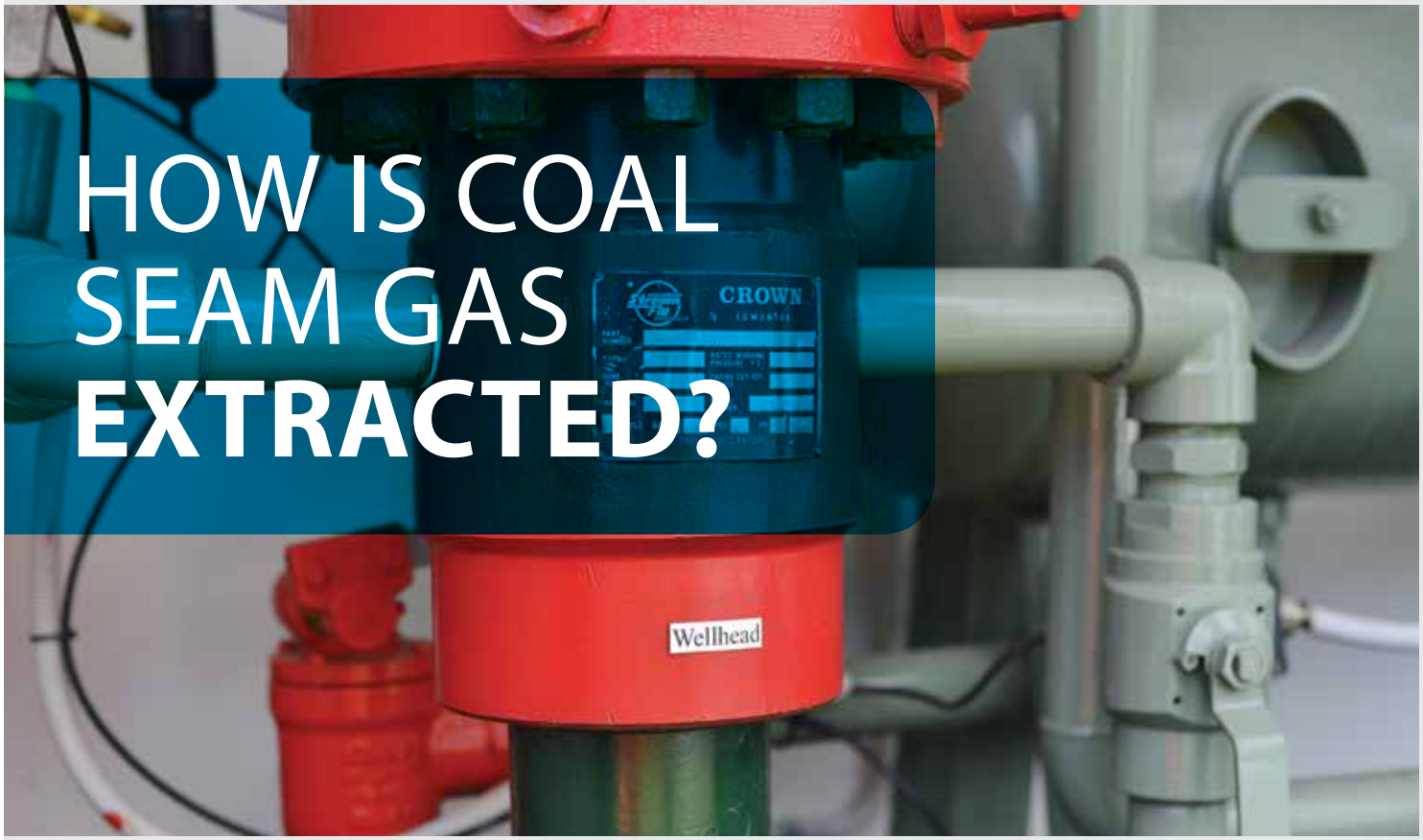
The data gathered from the drilling provides comprehensive geological information and details of the gas content in the coal seam.

Once testing is complete, core holes are cemented and plugged and the site is fully rehabilitated by the exploration company, in line with NSW Government requirements.

Geologists at work during the exploration process, NSW Hunter Valley.

COAL SEAM GAS
FACT SHEET

NSW



HOW IS COAL SEAM GAS **EXTRACTED?**

Coal seam gas (CSG) is extracted from deep below the ground using world-best practice techniques that protect the community and our environment.

Extraction techniques

There are different ways of extracting CSG from below the ground. They include vertical drilling and horizontal or directional drilling. Hydraulic fracturing is sometimes used to release gas from a coal seam. The well is usually only fracture stimulated once during its lifetime.

Hydraulic fracturing

Hydraulic fracturing has been used by the oil and gas industry since 1948. In Australia, the practice can be traced back over 40 years where it was used in the production of energy resources including conventional natural gas. Hundreds of natural gas wells in South Australia's Cooper Basin have been fracture stimulated since the 1970s.

The process has also been used in NSW to enhance water flows from water bores. However, in CSG production fracturing is becoming less common as companies move towards horizontal drilling to enhance methane production.

In situations where the fracturing process is used, fluid is pumped under pressure into the coal seam to open up fractures.

The fluid is typically a mixture of sand, water and minor additives that open up cracks in the seam to create a path for water to flow back to the surface.

The process depressurises the coal seam, allowing the gas in the pores of the coal to be released and flow to the surface.

COAL SEAM GAS FACT SHEET

> Fracturing fluid is 97-99% sand and water.

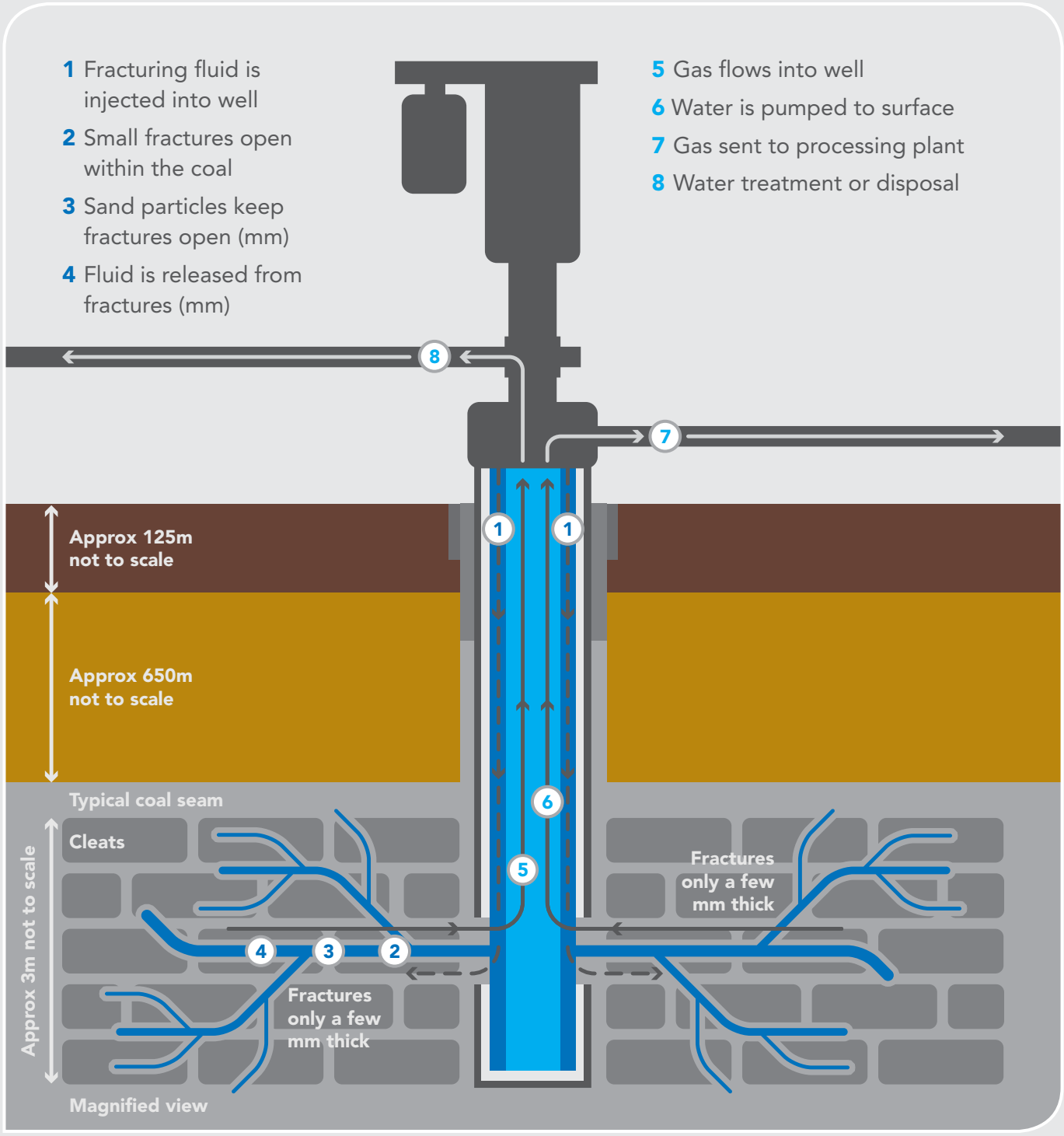
The gas and liquid are brought to the surface via a pipe which is encased in layers of concrete and metal to prevent any leakage into permeable layers, including aquifers. On the surface, the gas is separated from the water.

The produced water is safely disposed of, or treated and recycled for industrial purposes or irrigation.

The gas is sent to a compressor station and may then be used in power stations, or join the natural gas supply for use by households and businesses.

Banned chemicals

To protect ground water, surface water and the environment, the NSW Government has banned the use of harmful chemicals known as BTEX. These chemicals are used in some overseas hydraulic fracturing operations.



COAL SEAM GAS FACT SHEET

> "Harmful chemicals have been banned."

Fracturing fluid is 97-99% sand and water[1], with a small amount of commonly-used biodegradable compounds included to prevent bacterial growth and to turn the fluid into a gel so it can be pumped more easily.

The biodegradable compounds include the following household chemicals:

- Guar gum (found in ice-cream);
- Surfactants (in soap and toothpaste);
- Sodium hypochlorite and hydrochloric acid (in swimming pools);
- Acetic acid (in vinegar).

The permitted components, already highly-diluted, are further diluted by the water in the coal seam.

Samples of CSG drilling additives and CSG fracture stimulation additives may be taken at any time by Government inspectors to verify compliance.

Any chemicals used in the extraction of CSG must be disclosed as part of the application process and are published on the NSW Trade & Investment – Division of Resource & Energy's website. Government agencies assessing the application determine whether the use of those chemicals is safe for both the community and environment.

Horizontal drilling

More recent techniques such as horizontal drilling are emerging as an alternative to hydraulic fracturing and are increasingly used in NSW.

Horizontal drilling occurs at deep levels underground and reduces the number of visible vertical wells located above ground.

Once the coal seam has been located, the well bore is encased and pressure-cemented at ground level. Smaller holes are drilled horizontally into the coal seam to stimulate pathways through which the gas can flow into the well, thereby eliminating the need for hydraulic fracturing.

[1] www.csiro.au

A CSG production well operating on NSW farmland.