D4 | Roma Hub

Santos | PETRONAS

Report

GLNG EIS Supplement

CSG Field Roma Logistics Hub

NOVEMBER 2009

Prepared for

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Abbreviations

Abbreviation	Description
AADT	Annual average daily traffic
CoRTN	Calculation of Road Traffic Noise
CSG	Coal Seam Gas
DEEDI	Department of Employment, Economic Development & Innovation
DERM	Department of Environment and Resource Management
DTMR	Department of Transport and Main Roads
EIS	Environmental Impact Statement
EPA	Environmental Protection Act
GLNG	Gladstone Liquefied Natural Gas
IPA	Integrated Planning Act
PL	Petroleum Lease
PNL	Planning Noise Levels
RIP	Roads Implementation Program
SNL	Short term Noise Levels
SPA	Sustainable Planning Act

Executive Summary

To reduce the impacts to the community that may occur from the existing operations site at Currey Street, Santos proposes to construct a permanent logistical base for the Roma CSG field, located on the outskirts of the township of Roma.

The proposed site on Kimbler Road is zoned for industrial purposes and has ready access to the Warrego Highway from the Carnarvon Highway and Boundary Road. This report assesses the existing environmental constraints and concludes that the proposed site provides an ideal location. The main environmental impacts relate to noise and traffic, predominantly triggered by the location of a residential property 700 m from the proposed site. A noise assessment has been undertaken and is reported in Section 3.5.

The proposed site accords with the strategic and local planning policy framework for the area and provides a direct benefit to the Roma community through employment generation (as the workforce is expected to live in Roma) and, as part of the GLNG Project, the local, state and national economy.

1

Introduction

This report describes the logistic activities and infrastructure associated with the GLNG Project proposed for Roma town. Whilst the location of field development infrastructure has been under progressive determination during the preparation of the Environmental Impact Statement (refer EIS Section 1.4.1) and the EIS Supplement, Santos has identified an appropriate site for the establishment of a logistical base for field support in the Roma region.

1.1 Background

To assist in the logistical arrangements for the GLNG Project in the Roma region, Santos proposes to construct a permanent logistical base for the Roma CSG field (Roma Logistics Hub). The Roma Logistics Hub is proposed to be to be built on the corner of Blue Hills Road and Kimbler Road, located approximately 6.5 km south-east of the Roma township. The Roma Logistics Hub will consist of warehouses, offices and lay down areas for the storing and transporting of materials (i.e. pipe joints).

Activities at the Roma Logistics Hub will include receipt and storage of materials, dispatch to the CSG field on an as-required basis, routine maintenance and refurbishment of compression and drilling equipment and the provision of local procurement capability to support construction and operations.

The primary purpose of the Roma Logistics Hub is to provide support for the CSG field development. The proposed site has been selected to minimise impact on Roma town, to provide ready access to the Warrego Highway and to ensure there is adequate space to accommodate the increased volume of materials associated with the CSG field development and operation.

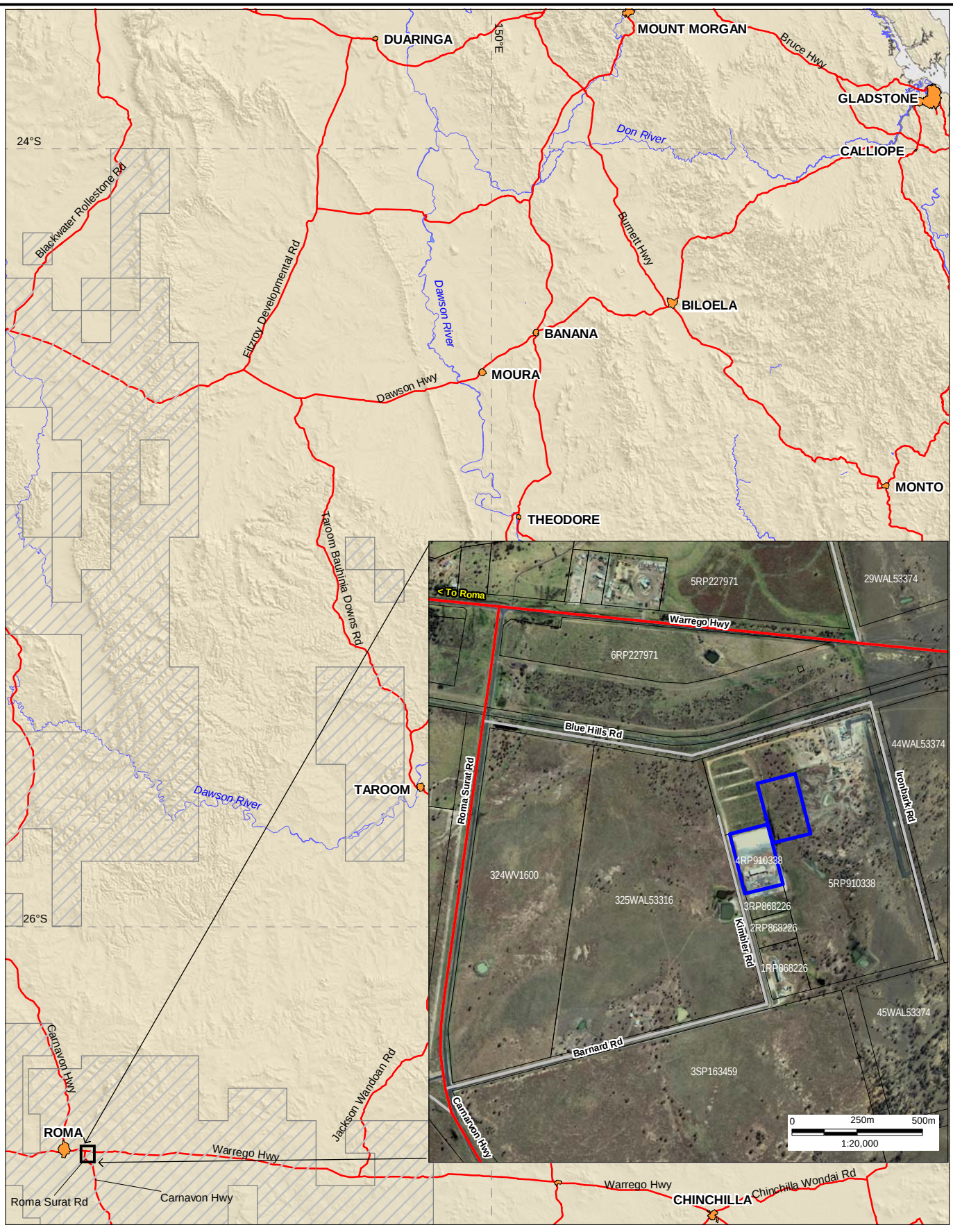
This report describes the existing environmental values of the proposed site, the estimated impacts on the surrounding land and community, and mitigation measures.

1.2 Proposed Site for Roma Logistics Hub

The figure below shows the proposed site for the Roma Logistics Hub located along Kimbler Road, south of Blue Hills Road, on Lots 4 and 5 of RP910338. The proposed site is located approximately 6.5 km east of Roma. Kimbler Road connects to Boundary Road which intersects the Carnarvon Highway 1.8 km south of the Warrego Highway.

The proposed site:

- Is within the area of Petroleum Lease 6 operated by Santos; and
- Is within the Industry Zone as shown in Figure 3-1.



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Source: This map may contain data which is sourced and Copyright. Refer to Section 18.2 of the EIS for Ownership and Copyright.

Client	Project	Title
	GLADSTONE LNG PROJECT ENVIRONMENTAL IMPACT STATEMENT SUPPLEMENT ROMA HUB	**REGIONAL LOCATION MAP** **ROMA HUB**
	Drawn: CA | Approved: JB | Date: 13-11-2009	Figure: **1-1** | Rev:A
	Job No:**4262 6440** /6220 | File No: 42626440-g-2111.wor	**A4**

2

Roma Logistics Hub

2.1 Description of Proposed Activities

Santos currently has a logistics base located in Roma at the intersection of Dargal Road and Currey Street. These operations will be relocated to the Roma Logistics Hub, the proposed layout of which is set out in Figure 2-1.

The Roma Logistics Hub will be a shared facility between the drilling contractors, EPC contractor, vendors and Santos procurement and logistics. It is expected that the EPC contractor will utilise the centralised warehouse and lay down area at the proposed site, with bulk materials to be stored in the lay down areas and equipment and consumables requiring under cover storage to be stored in the warehouses. Modules and wide loads will be transported directly to their intended location and offloaded into final position. Bulk materials will be delivered by single trailer trucks to their required locations from the proposed site on a just in time basis.

Santos procurement and logistics will establish a warehouse and lay-down areas for drilling materials and equipment in Area A as shown below.

Figure 2-1 Roma Logistics Hub Layout

2.2 Approvals for Roma Logistics Hub

The Roma Logistics Hub forms an intrinsic component of the GLNG Project providing warehouses, offices and lay down areas for the storing and transporting of materials (i.e. pipe joints) to support the construction and ongoing operation of the GLNG Project.

Activities at the Roma Logistics Hub may include receipt and storage of materials and dispatch to the field on an as-required basis, routine maintenance and refurbishment of compression and drilling equipment as well as providing local procurement capability to support construction and operations. The activities to be undertaken at the Roma Logistics Hub are effectively an extension of those undertaken within the existing facility at the Dargal Road/Currey Street depot, with the additional requirements for the construction and operation of the GLNG components.

2 Roma Logistics Hub

The proposed location of the Roma Logistics Hub falls within the area of Petroleum Lease 6 which is held and operated by Santos. The environmental values discussed and impact assessments undertaken as part of this report will be used as a basis for the key statutory approvals required for construction and operation of the Roma Logistics Hub.

Regulatory Approvals Framework Options

There are two alternative statutory approvals processes available to Santos for the development of the Roma Logistics Hub, being processes related to:

- The assessment of authorised activities carried out wholly within the area of a petroleum authority (e.g. PL 6) under the *Petroleum Act 1923* (Qld) and *Petroleum and Gas (Production and Safety) Act 2004* (Qld) (together the "Petroleum Acts"); and
- The assessment of activities under the *Integrated Planning Act 1997* (Qld) (IPA) and local planning scheme, being the Roma Planning Scheme.

These approvals processes are alternatives to each other and are discussed in Sections 2.2.1 and 2.2.2 below. Both of these options are currently being considered by Santos and Santos will work with the appropriate regulatory authorities, Maranoa Regional Council, DEEDI and the Department of Infrastructure and Planning in establishing the most appropriate regulatory approvals process to use.

2.2.1 Approvals Process Under Petroleum Legislation

Where activities are authorised under the Petroleum Acts certain exemptions from the application of the IPA approvals process apply within the area of a petroleum authority. A number of these key approvals are outlined as follows:

Planning approvals

For those elements of the Roma Logistics Hub authorised under the Petroleum Acts (i.e. activities authorised under PL 6 and carried out within the area of PL 6), the planning approvals process will differ from the process for development not relying on the authority of a petroleum authority. Accordingly, the interrelation between IPA and the Petroleum Acts must be considered.

If a development is for an activity authorised under the Petroleum Acts and it occurs in the area of petroleum tenure, that development will be exempt from assessment against the Roma Planning Scheme under IPA.

However, developments that occur outside the area of a petroleum tenure, or are not authorised activities under petroleum tenure (e.g. construction of a permanent office), may be assessable development under IPA and assessed against the Roma Planning Scheme. This means that some form of development approval for a material change of use may be required.

Vegetation clearance

Where clearing occurs within the area of a petroleum authority, a development permit is not required for vegetarian clearance as such clearance is a specified purpose under IPA. Otherwise a development permit will be required to clear vegetation under the *Vegetation Management Act 1999* (Qld).

2 Roma Logistics Hub

Environmental approvals

If the relevant existing environmental authority for PL 6 [EA PEN100214408] does not contemplate the development of the Roma Logistics Hub and associated activities, then the environmental authority for PL 6 will also need to be amended.

The environmental impacts that will need to be assessed using this approval process are:

- Traffic impacts; and
- Noise impacts.

2.2.2 Approvals Process Under IPA and Local Planning Scheme

The Roma Logistics Hub may be assessed under IPA and the Roma Planning Scheme, in which case a different approvals process from that described above will apply. If Santos elects to use this route the process set out below will apply.

This process will, in any event, apply to any activity undertaken outside the area of PL 6 or which is not classified as an "incidental activity" to the PL. A number of these key approvals are outlined as follows:

Material Change of Use (planning) approvals

Where the Roma Logistics Hub is not located within, and/or authorised under, PL 6, additional approvals will be required under IPA and the Roma Planning Scheme. For example, development permits will be required for "assessable development" and operational work for a material change of use under IPA, which will be assessed by Maranoa Regional Council against the Roma Planning Scheme.

This report considers the matters that need to be assessed against the Roma Planning Scheme in accordance with the:

- Desired environmental outcomes;
- Overall outcomes for and purpose of a code;
- Performance Criteria for a code; and
- Acceptable Solutions for a Performance Criteria, or acceptable solutions for complying with a self-assessable code.

The desired environmental outcomes applicable for the Roma logistics hub are as follows:

Environment

Ecological sustainability is achieved by maintaining and improving biodiversity, water and air quality.

Economic

Industry, business and employment opportunities are improved and appropriately located to service the community and region, and encourage economic activity within the local area.

Community Well-Being & Lifestyle

Convenient access to roads and services is achieved through well located land uses and the efficient use and timely provision of infrastructure such as water, sewerage and roads, walkways and cycling facilities.

2 Roma Logistics Hub

Infrastructure networks such as road and rail, water cycle and electricity infrastructure are protected from encroachment by sensitive land uses which may adversely affect or limit the normal operation of that infrastructure.

Community wellbeing is not compromised by inappropriate development that impacts upon noise levels, traffic volume, lighting levels and local amenity.

The development Codes applicable to the Roma logistics hub are as follows:

- The Urban Area Code; and
- The Reconfiguring a Lot Code.

Material change of use for an environmentally relevant activity

A development permit for a material change of use for an environmentally relevant activity other than a petroleum activity will be required for "assessable development" (ss 3.1.4(1) and 3.1.5(3) IPA). For example, chemical storage of (generally) 50 tonnes or more of dangerous goods in containers of prescribed sizes, or 10 m³ or more of certain chemicals is classified as an environmentally relevant authority if it is carried out off the area of PL 6. An approval will also be required to become a registered operator under the Environmental Protection Act 1994 (Qld).

Vegetation Management Act 1999 (Qld)

Where clearing occurs outside the area of a petroleum authority, a development permit will be required to clear vegetation under the Vegetation Management Act 1999 (Qld).

The environmental impacts that will need to be assessed using this approval process are:

Surface and waste water;

- Air Quality;
- Traffic impacts;
- Noise impacts; and
- Visual impacts.

3

Assessment of Environmental Values and Potential Impacts

The following section provides an overview of the assessment criteria most relevant to the proposed Roma Logistics Hub, with land use, air quality, transport and noise identified as key issues. The proposed site has been heavily disturbed in preparation for industrial use so an assessment of ecological values was not undertaken.

3.1 Land Use

3.1.1 Site Description

The proposed site for the Roma Logistics Hub is located 6.5 km east of Roma adjacent to the Roma to Brisbane rail line, and south of the Warrego Highway (Figure 3-1). The land surrounding the site is typically rural with industrial areas to the west and north-west that include uses such as the Roma Sales Yard, gas fired power station, timber mills, stock feed manufacturing plant and sewage treatment facilities.

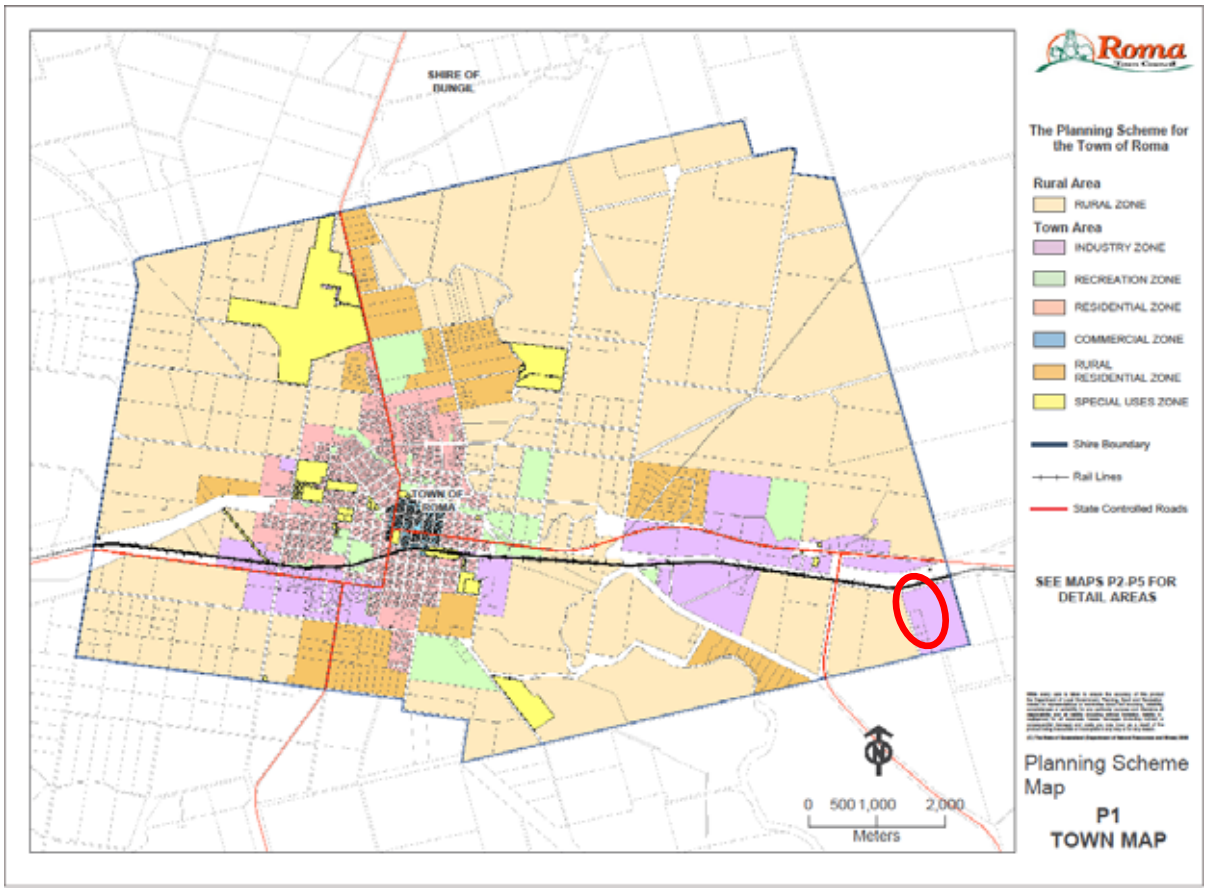

Figure 3-1 Roma Planning Scheme Zone Map (proposed site circled in red)

Maranoa-Balonne Regional Plan 2009

The *Maranoa-Balonne Regional Plan 2009* (the Plan) was released on 22 September 2009 under the provisions of the *Integrated Planning Act 1997* (IPA). The IPA was replaced by the *Sustainable Planning Act 2009* on 22 September 2009 but will remain in force until the end of 2009.

The Plan recognises the region's significant reserves of coal seam gas, conventional gas and petroleum and attributes a moderate growth within the region from these important resources. It also recognises that managing the growth associated from the development of these energy resources provides opportunities and challenges for the people who live and work in the region.

Although the traditional strengths of the regional economy were based on primary production, the Plan highlights the "pivotal role" that the energy (gas) reserves play in assisting Queensland to achieve its clean electricity generation targets. In addition to assisting the state to achieve these targets, Santos presence within the region has provided much needed community infrastructure, support programs and an overall economic and social benefit to the major regional activity centre of Roma and smaller regional centres such as Injune. This project aims to increase that presence and provide long term benefits for residents, business and industry within the region.

3.1.2 Roma Planning Scheme

The site lies within the Industry Zone which extends to the eastern boundary onto the adjacent allotments, with land zone Rural bordering the site to the west (refer Roma Planning Scheme Map).

The Roma Planning Scheme defines “Industrial Activities” as being premises used for activities involving the manufacture, production, servicing, storage and distribution of goods, articles, equipment or vehicles including:

- Extractive industry;
- Industry;
- Noxious or Offensive Industry;
- Service Station;
- Storage Facility; and
- Transport Terminal.

The Roma Logistics Hub will fall within the Industrial Activities definition as being premises used for the purpose of industry, storage facility and transport terminal; where industry includes:

- Any manufacturing process whether or not such process results in the production of a finished article;
- Repairing and servicing of articles including vehicles, machinery, buildings or other structures, laundering of articles but not including on-site work on buildings or other structures;
- The storage or sale of any solid, liquid or gaseous fuel where such storage is not for a purpose separately defined herein;
- The storage of goods used in connection with or resulting from any of the above operations;
- The provision of amenities for persons engaged in such operations; and
- Any work of administration or accounting in connection with such operations.

The proposed use is defined as Industry within the planning scheme and if considered to be assessable development under the IPA/SPA then it would require Code assessment within the Industry Zone where the applicable codes would be the Urban Area Code and the Reconfiguring a Lot Code.

The Urban Area Code prescribes the following performance criteria categories for development within the Industrial Zone:

- Scale and setbacks;

- Vehicular traffic;
- Landscaping;
- Amenity;
- Building, Structure Design and Appearance;
- Operating Hours; and
- Delivery of Goods.

The Reconfiguring a Lot Code prescribes the following performance criteria categories for development in Urban and Rural areas:

- Lot size;
- Layout and Design;
- Sitting of Buildings and Structures;
- Electricity Supply and Transmission Line Easements;
- Street Lighting;
- Water Supply;
- Effluent Disposal;
- Stormwater;
- Vehicle Access;
- Roads, Firebreaks and Fire Maintenance Trails; and
- Construction Activities.

Santos will ensure that all development within the Roma Logistics Hub complies with the acceptable solutions provided within the Roma Planning Scheme and associated legislation (i.e. *EP Act 1994*).

The Roma Logistics Hub conforms to the requirements of the strategic framework which provides:

- Industrial Development will be allowed in the Industrial Zone with location assessed on the nature and extent of the Industry. The proposed site for the Roma Logistics Hub is located within the Industry Zone;
- All new uses and works are to be located, designed and managed in ways that maximise the efficiency of the town infrastructure, and compatibility with other uses, works, cultural heritage features and natural or cultural resources. The site is on the eastern outskirts of Roma town adjacent to the Warrego Highway and the rail line to Brisbane. All activities that include transportation of materials for development in the initial stages of the GLNG Project will be within the north eastern region and will negate the need for any transportation through Roma town; and
- Building and other works meet basic standards for health, safety and amenity. All buildings will be constructed in accordance with the requirements of the Building Act and Regulations and Building Code of Australia.

3.1.3 Conclusion

The planning scheme provides *"Industrial Development will be allowed in the Industrial Zone with location assessed on the nature and extent of the Industry".* The nature and extent of the proposed use is not considered to impose any further impacts to surrounding land uses than that which is reasonably expected given its location, outside the city frame with only one residential premise approximately 700 m from the site.

The proposed activities comply with the performance criteria and acceptable solutions in that the site is not located within close proximity to sensitive land uses or adjacent residences, where time

constraints for loading and unloading would impact on the amenity of the residential areas. The environmental impacts relating to noise, air and transport and traffic are identified further in this report.

3.2 Contaminated Land

The proposed site for the Roma Logistics Hub is not listed on DERM's Environmental Management Register or the Contaminated Land Register. Should any evidence of land contamination be encountered during construction, notification and management of the land would ensue.

3.3 Air Quality

The Roma Logistics Hub is not expected to generate emissions from operational activities, either within the site boundary or in accessing or exiting the site.

Santos will ensure that any air emissions from the premises do not cause environmental harm or nuisance to adjoining properties or sensitive land uses as required by the Maranoa Regional Council. Measures to minimise dust impacts such as watering unsealed surfaces will be put in place prior to construction commencing.

3.4 Traffic and Transport

Operations personnel working at the Roma Logistics Hub are expected to live in the town of Roma and work Monday through Friday, 48 weeks per year. It is expected that these personnel will be travelling to and from the Roma Logistics Hub once a day, Monday through Friday in private vehicles. The operational workforce for the Roma Logistics Hub is expected to increase gradually from 29 employees in 2010 to approximately 57 by 2014, and perhaps up to 62 beyond that.

3.4.1 Existing Environment

The Warrego Highway runs generally east-west beginning in Ipswich and running west through Toowoomba, Dalby, Miles and Roma and terminating at the Mitchell Highway in Charleville. The posted speed through Roma is 60 km/h. The Carnarvon Highway runs generally north-south from the Warrego Highway at Roma north to the Dawson Highway at Rolleston. The Carnarvon Highway is a two-lane roadway with wide shoulders and kerb parking through Roma. It continues south as a two-lane highway down to the New South Wales border at Mungindi before heading east to Garah.

Baseline traffic count data was sourced from the Department of Transport and Main Roads (DTMR), supplemented with data from previous traffic surveys undertaken by Austraffic in 2006. Traffic volumes were also obtained from the Maranoa Regional Council.

Roads Implementation Program 2009-10 to 2013-14

The *Roads Implementation Program 2009-10 to 20013-14* (RIP) notes that there are a number of projects that have recently been completed in the 2008-09 financial year. These include:

- Completed safety works in Roma comprising the upgrade of five intersections, including traffic lights at Quintin Street and McDowall Street; and
- Continuing the Roma-Taroom Road upgrade with 40 km of new construction south of Taroom and completed 25 km of widened road surface north of Roma.

3.4.2 Traffic Volumes

The Roma Logistics Hub will result in reduced traffic impacts on Roma from the development of the CSG field. Existing volumes are presented as annual average daily traffic (AADT) volumes. On the Warrego Highway between Roma and the Carnarvon Highway heading south, the AADT is 1,562 vehicles (including 400 or 25.61 % heavy vehicles). On the Carnarvon Highway on the segment located south of the Warrego Highway, the AADT is 425 vehicles (including 100 or 23.53 % heavy vehicles).

Projections of the volumes of traffic associated with the development of the CSG field have been undertaken. The projected volumes do not include existing traffic but include all traffic associated with the CSG field development as follows:

- Roma Logistics Hub traffic;
- Roma CSG field traffic; and
- Fairview CSG field traffic.

The projected volume of vehicles for the development of the CSG field on the Warrego Highway between Roma and the Carnarvon Highway heading south is 399 vehicles (including 268 or 61.17 % heavy vehicles) per day. On the Carnarvon Highway south of the Warrego Highway, the project volume is 275 vehicles (including 75 or 27.27 % heavy vehicles) per day. These volumes represent approximately 20 % and 40 % respectively of the total volumes that will be present on these road sections. Due to the volumes on these two links remaining below 2,000 trips per day with the addition of the development traffic, there is no change in the link capacity of these road sections.

The pavement impact analysis of these sections indicates that the section of the Warrego Highway between Roma and the Carnarvon Highway heading south has no bring forward costs but the Carnarvon Highway south of the Warrego Highway will require a development contribution to the bring forward costs.

It should be noted that the DTMR has plans to construct a Roma bypass linking the Warrego Highway to the Carnarvon Highway which will provide access to the Fairview CSG field without going through Roma. The Roma CSG field will be accessed from the Warrego Highway to the east of Roma.

3.5 Noise Assessment

This section assesses the potential noise impacts associated with the construction and operation of the Roma Logistics Hub as well as impacts from associated traffic movements. The noise assessment methodology and noise criteria used for this assessment are detailed in Heggies EIS Noise and Vibration Report (refer to EIS Appendix U).

Figure 3-2 below shows the location of the Roma Logistics Hub and the Roma township.

3 Assessment of Environmental Values and Potential Impacts

Figure 3-2 Roma Logistics Hub & Roma township

3.5.1 Noise Criteria

Construction Criteria

Activities at the Roma Logistics Hub which are associated with the construction phase of the GLNG Project (i.e. transportation and handling of pipe joints) are assessed against the construction noise criteria (see Table 3-1).

Table 3-1 Summary of Construction Noise Criteria

	Construction Noise	
	Monday to Saturday (6:30 am to 6:30 pm)	Monday to Saturday (6:30 pm to 6:30 am); Sundays and Public Holidays
Residential	No limit	50 dBA LAmax

3 Assessment of Environmental Values and Potential Impacts

Operational Criteria

Activities at the Roma Logistics Hub which are associated with the operational phase of the GLNG Project (i.e. maintenance of the pipeline and wells) are assessed against the operational noise criteria (see Table 3-2).

The only assessable operational noise associated with the Roma Logistics Hub is noise from loading equipment (i.e. forklifts, cranes etc) and idling trucks/4WDs. Operational noise levels are assumed to be intermittent and short term. These noise sources have therefore been assessed against the design criteria (LAeq (1 hour)).

The noise assessment methodology and noise criteria used for this assessment are detailed in Heggies EIS Noise and Vibration Report (refer to EIS Appendix U).

The noise criteria for the operational activities at the Roma Logistics Hub is summarised in Table 3-2.

Table 3-2 Summary of Limiting Operational Noise Criteria

Assessment Location	Design Criteria[1] LAeq(1hour) (dBA)			Sleep disturbance[2]
	Day	Evening	Night	LAmax (dBA)
Gas and Pipeline 1	40	37	31	50

Note: 1. Design criterion is the most stringent of the PNL and SNL as per DERM's *Ecoaccess Guideline: Planning for Noise Control*.

2. Sleep disturbance criteria have been adjusted to represent outdoor levels – day (7.00 am to 6.00 pm), evening (6.00 pm to 10.00 pm) and night (10.00 pm to 7.00 am).

The nominated operating hours for the Roma Logistics Hub are between 6:00 am to 5:30 pm, Monday to Sunday. Whilst the operating times mainly fall into the *day* design criteria (where a criterion of 40 dBA LAeq applies), the one hour period between 6:00 am and 7:00 am is to be assessed against the night criterion of 31 dBA (LAeq).

3.5.2 Road Traffic Noise Criteria

Where the use of the Roma Logistics Hub adds vehicles to an existing or upgraded road it is appropriate to consider the incremental change in noise levels due to the changes in traffic volume. A change of up to 3 dBA in the level of a dynamic noise (such as passing vehicles) is difficult for most people to detect, whilst a 3 dBA to 5 dBA change corresponds to a small but noticeable change in loudness. A 10 dBA change corresponds to an approximate doubling or halving in loudness.

For assessment purposes it is common to set the threshold of significance in relation to changes in the noise emission level from roads at 2 dBA.

3.5.3 Modelling Methodology

In order to calculate the noise emission levels at the nearest noise sensitive receptor from construction and operational equipment associated with the Roma Logistics Hub, offset calculations were conducted using a SoundPLAN noise model. Noise predictions for activities are based on the conservative assumption that there is flat, soft ground between the noise source and the receptor.

3 Assessment of Environmental Values and Potential Impacts

All noise predictions for the Roma Logistics Hub have been carried out utilising the CONCAWE prediction methodology within SoundPLAN, with the exception of road traffic noise predictions (which have been carried out using the CoRTN prediction method).

CONCAWE

The CONCAWE prediction method is specially designed for large facilities and incorporates the influence of wind effects and the stability of the atmosphere. The statistical accuracy of environmental noise predictions using CONCAWE was investigated by Marsh (Applied Acoustics 15 – 1982). Marsh concluded that CONCAWE was accurate to ±2 dBA in any one octave band between 63 Hz and 4 kHz and ± 1 dBA overall.

In accordance with the *Ecoaccess Guidelines: Planning for Noise Control* (Ecoaccess Guidelines), consideration must be given to the effects of prevailing and worst case meteorological conditions (wind, temperature, humidity and temperature inversions) on noise propagation during operational activities associated with the Roma Logistics Hub. The Ecoaccess Guidelines describes two alternative methods for assessing the effects of wind on noise emissions:

- By using a wind rose to determine whether wind is a feature based on the frequency of occurrence and wind speed and assessing the source-to-receptor components of winds that are relevant; and
- By assuming that wind is a feature of the area (foregoing the need to use a wind rose) and applying a maximum impact scenario.

For this assessment, wind has been assumed to be a feature of the area (in accordance with the second method listed above). A wind component was added to the worst case weather conditions.

The other component of worst case weather as described in the Ecoaccess Guidelines is temperature inversions. Meteorological data is analysed for the following default temperature inversion parameters (non-arid):

- 30 % occurrence for night time (6:00 pm-7:00 am) period during winter (June to August);
- Moderate inversions (F-class stability category); and
- 3^{o} C/100 m inversion strength with a 2 m/s source to receptor component (where applicable).

For this assessment, temperature inversion has been assumed to be a feature of the area and the default inversion parameters applied for the worst case weather conditions.

Table 3-3 summarises the meteorological conditions used for the assessment of activities which occur at the Roma Logistics Hub are associated with the operational phase of the GLNG Project.

Table 3-3 Meteorological Conditions – Natural and Worst Case

Parameter	Neutral Weather	Worst Case Weather
Temperature	10 °C	10 °C
Humidity	70 %	90 %
Pasquill Stability Category	D	F
Wind Speed	0 m/s	2 m/s (source to receptor)

3 Assessment of Environmental Values and Potential Impacts

CoRTN Road Traffic Noise Prediction Method

The Calculation of Road Traffic Noise (CoRTN) 1988 prediction technique was used to calculate the change in road traffic noise levels from the Roma Logistics Hub. These calculations account for traffic volumes, composition, vehicle speed, road gradient and the road surface. CoRTN is the recommended road traffic noise prediction technique in DTMR's Code *of Practice* (2008).

The road transport noise assessment methodology has been performed by calculating how traffic changes would alter the LA10 (18 hour) traffic noise level along the roadways using the CoRTN prediction algorithms. The LA10 (18 hour) parameter is the average of the hourly LA10 traffic noise level between the hours of 6:00 am and midnight.

Road traffic noise impacts associated with the construction and operational phases of the Roma Logistics Hub are discussed in Section 3.5.5.

Construction Noise

The methodology for determining noise impacts associated with construction activities at the Roma Logistics Hub is discussed in the following section. This section addresses the assessment of the following construction noise sources:

- Loaders;
- Forklifts;
- Cranes (franner cranes and larger);
- Overhead gantry crane; and
- Idling trucks.

A list of the proposed construction equipment to be used and their associated maximum sound power level (sourced from Heggies' database) is presented in Table 3-4.

Table 3-4 Summary of Typical Maximum Sound Power Levels for Roma Logistics Hub

Item	Maximum SWL (dBA)
Loader	110
Forklift	104
Truck Crane	111
Overhead Gantry Crane	102
Idling Truck	110

Predicted construction noise levels will inevitably depend upon the number of plant items and equipment operating at any one time and on their precise location relative to the receptor(s). A receptor will experience a range of values representing "minimum" and "maximum" construction noise emissions depending upon:

- The location of the particular construction activity; and
- The likelihood of the various items of equipment operating simultaneously.

3 Assessment of Environmental Values and Potential Impacts

Operational Noise

The methodology for assessing noise impacts associated with operational activities at the Roma Logistics Hub is discussed in the following section. It has been assumed that the typical operational equipment at the Roma Logistics Hub will be similar to that of the construction phase however the frequency of activities will be significantly less.

Operational noise emissions have been assessed against the short-term intrusive noise criteria (LAeq (1 hour)) due to more intermittent and short-term noise emissions expected from loading equipment.

Operational noise sources will include loading equipment (forklifts and cranes), and idling trucks and 4WDs. A list of the proposed operational equipment to be used and their associated equivalent sound power level (sourced from Heggies' database) is presented in Table 3-5.

Table 3-5 Summary of Typical Equivalent Sound Power Levels for Roma Logistics Hub

Item	Equivalent SWL (dBA) [1]
Forklift	96
Truck Crane	103
Idling Truck	102
Idling 4WD	94

Note: 1. Equivalent SWL stated is 8 dBA lower than maximum SWL stated in Table 3-6. This is based on the relationship of 8 dBA difference between measured 1 minute LAeq and LAmax levels from intermittent noise sources such as mobile plant (i.e. forklifts, cranes and vehicles).

3.5.4 Results

Construction and operational noise level emissions have been predicted at the nearest sensitive receptor (Barnard Road residence) as shown in Figure 3-3. The Barnard Road residence is approximately 700 m south-west of the Roma Logistics Hub.

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Figure 3-3 Nearest Sensitive Receptor – Roma Logistics Hub

Construction Noise

Based on the noise sources associated with the Roma Logistics Hub stated in Table 3-5, predictions were undertaken at the Barnard Road residence to assess against the 50 dBA LAmax sleep disturbance noise criteria. Table 3-6 presents the predicted construction noise levels associated with activities from the Roma Logistics Hub at the Barnard Road residence.

Table 3-6 Predicted Sound Pressure Levels from Construction Activities

	Construction Noise Criteria (dBA) [1]	Predicted Sound Pressure Levels (LAmax) (dBA)
Barnard Road Residence	**50**	**40**

Note: 1. Monday to Saturday (6:30 pm to 6:30 am); Sundays and Public Holidays.

Construction noise is predicted to comply with the 50 dBA LAmax sleep disturbance noise criteria at the Barnard Road residence.

Operational Noise

Based on the noise sources associated with the Roma Logistics Hub stated in Table 3-5, predictions were undertake at the Barnard Road residence to assess against design criteria (LAeq (1hour)). Table 3-7 presents the predicted operational noise levels associated with activities occurring at the Roma Logistics Hub at the Barnard Road residence for both neutral and worst case weather conditions.

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Table 3-7 Predicted Sound Pressure Levels from Operational Activities

	Design Criteria LAeq(1hour) (dBA)		Predicted Sound Pressure Levels (LAmax) (dBA)	
	Day	Night	Neutral Weather	Worst Case Weather
Barnard Road Residence	40	31	30	35

Operational noise is predicted to comply for both day and night design criteria during neutral weather conditions, but is predicted to exceed the night design criterion during worst case weather (exceeds by 4 dBA). Mitigation measures are described in Section 3.5.6.

3.5.5 Road Traffic Noise

Vehicle Movements

Existing and future traffic patterns for the purposes of assessing the road traffic noise impact associated with construction activities at the Roma Logistics Hub are summarised in Table 3-8.

Table 3-8 Existing and Future Traffic Patterns for the Roma Logistics Hub

Road / Section	Existing Traffic			Future Traffic		
	AADT	% HV	Speed (km/h)	AADT	% HV	Speed (km/h)
Barnard Rd – Carnarvon Hwy to Depot	50 [1]	50.0	60	246	41.9	60
Carnarvon Hwy – South of Barnard Rd	425	25.6	100	499	36.6	100
Carnarvon Hwy – Barnard Rd to Warrego Hwy	425	25.6	100	723	25.8	100
Warrego Hwy – East of Carnarvon Hwy	1188	28.0	100	1374	37.8	100
Warrego Hwy – Carnarvon Hwy to Roma	1562	25.6	100	1821	26.3	100
Carnarvon Hwy – North of Roma to Knayers Rd	1790	17.6	80	1859	20.6	80
Carnarvon Hwy – North of Knayers Rd	1053	28.6	100	1122	33.0	100

Note: 1. Existing traffic volumes for Barnard Road include traffic from the EPC Contractors Warehouse located adjacent to the Roma Logistics Hub.

It is assumed that the future traffic volumes and percentage of heavy vehicles set out in Table 3-8 will only be present during the construction phase for the Roma Logistics Hub. Estimated heavy vehicle traffic volumes during the operational phase are low (less than one per day). Therefore, no assessment of road traffic noise impacts associated with the operational phase has been undertaken.

Road Traffic Noise

The effect during the construction phase of traffic on the noise emissions from roadways near the Roma Logistics Hub has been assessed. This assessment has been performed by calculating how traffic volume changes on the surrounding road network, attributable to the construction of the Roma Logistics Hub, would alter the LA10 (18 hour) level of noise emission from roadways using the CoRTN prediction algorithms.

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The LA10 (18 hour) parameter is the average of the hourly LA10 traffic noise level between the hours of 6:00 am and midnight. Based on the traffic volumes and compositions, Table 3-9 presents the expected increase in road traffic noise levels associated with vehicle movements to and from the Roma Logistics Hub during construction.

Table 3-9 Increase in Road Traffic Noise Levels due to GLNG Project Construction Vehicles

Road Segment	Predicted Increase in LA10(18hour) Noise Level (dBA)
	Construction Phase
Barnard Rd – Carnarvon Hwy to Depot	+6.3
Carnarvon Hwy – South of Barnard Rd	+1.6
Carnarvon Hwy – Barnard Rd to Warrego Hwy	+2.3
Warrego Hwy – East of Carnarvon Hwy	+1.4
Warrego Hwy – Carnarvon Hwy to Roma	+0.7
Carnarvon Hwy – North of Roma to Knayers Rd	+0.5
Carnarvon Hwy – North of Knayers Rd	+0.7

Note: 1. **Bold** numbers indicate an incremental change in noise level of greater than 2 dBA.

The expected increase in road traffic noise levels associated with vehicle movements to and from the Roma Logistics Hub is predicted to be less than 2 dBA for all subject roads expect Barnard Road during the construction phase. Therefore, no adverse impact is anticipated for these subject roads (excluding Barnard Road).

The expected increase in road traffic noise levels associated with vehicle movements to and from the Roma Logistics Hub on Barnard Road is predicted to be greater than 2 dBA during the construction phase.

3.5.6 Mitigation Measures

Construction Noise

Where practicable, the majority of the construction phase, activities will be carried out from 6:30 am to 6:30 pm, Monday to Saturday, when ambient noise levels are higher.

Although it is predicted that construction activities will not adversely affect the Barnard Road residence, the following noise mitigation strategies will be implemented during work performed before 6:30 am (Monday to Saturday) and on Sundays and Public Holidays. These strategies have been adopted from AS2436-1981 Guide to Noise Control on Construction, Maintenance and Demolition Sites which sets out practical recommendations to assist in mitigating construction noise emissions.

Source Noise Control Strategies

- The quietest plant and equipment that can economically undertake the work will be selected;
- There will be regular maintenance of equipment to keep it in good working order;
- Mobile plant and other diesel powered equipment will be fitted with residential class mufflers;
- The use of truck exhaust brakes will be minimised;
- Work Practice Control Strategies;

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- Where practicable, the coincidence of plant and equipment working simultaneously close together will be avoided;
- Operators of construction equipment will be made aware of techniques to minimise noise emission through a continuous process of operator education;
- For transportation and handling of pipes joints, metal against metal banging will be avoided by lining the truck trailers with a rubber mat;
- Whilst reversing alarms cannot be avoided in construction areas, Santos will source “quiet” white-noise alarms and self-adjusting alarms which adjust emission levels relative to the local background noise level; and
- Horn signals will be kept at a low volume, where feasible.

Community Liaison Strategies

- Existing community consultation frameworks will be used to provide access to information for the community;
- Residents will be made aware of the times and duration that they will be affected; and
- A complaints mechanism will be provided and a nominated person will receive, log, track and respond to complaints within an appropriate timeframe and to record what action was taken.

Operational Noise

During neutral weather conditions, compliance with the day and night design criteria is achieved for operational activities.

During worst case weather conditions, compliance with the day design criterion is achieved. The night operational noise criterion is predicted to be exceeded by up to 4 dBA (only between 6:00 pm and 2:00 am).

Operational activities will be minimised (i.e. limited to 4WD and forklift movements only) during between 6:00 am and 7:00 am to achieve compliance with the night design criterion during worst case weather conditions. Truck deliveries will be managed so as to arrive/depart between the 7:00 am and 5:30 pm.

Road Traffic Noise

During the construction phase, the expected increase in road traffic noise levels associated with vehicle movements to and from the Roma Logistics Hub is predicted to be less than 2 dBA for all subject roads except Barnard Road.

The expected increase in road traffic noise levels at the Barnard Road residence is 6.3 dBA. It is anticipated that this increase will for the construction phase only and the Barnard Road residence already experiences intermittent exceedances of the 50 dBA LAmax sleep disturbance noise criteria due to the existing vehicle volumes and heavy vehicle percentages. The following mitigation measures will limit adverse impacts on the Barnard Road:

- Heavy vehicle movements to and from the Roma Logistics Hub will be limited to between 6:30 am and 6:30pm, Monday to Saturday;
- Diesel powered equipment will be fitted with residential class mufflers;
- The use of truck exhaust brakes will be minimised; and
- Residents will be made aware of the times and duration that they will be affected.

3.6 Visual Impacts

The proposed structural elements of the Roma Logistics Hub are warehouse buildings and open air hard stand areas, similar to the existing structures (which include an existing warehouse facility and hard-stand area with the remaining portion being vacant land). The surrounding land use and topography is not considered to promote these structural elements to such an extent as to cause any noticeable impacts to the visual landscape.

There are negligible impacts to areas directly adjacent the proposed site, however as this entire area has been designated as an industrial area, the structural elements of the Roma Logistics Hub are to be expected. There are no adjacent land uses that may be affected visually due to its distance from sensitive land uses and its isolation from developed areas and view points.

3.7 Waste Water and Stormwater

It is assumed that consistent with the building of a structure like the Roma Logistics Hub, that the appropriate storm water and waste water mitigation measures and plans for similar industrial uses will be utilised. These have not been specifically assessed in this report but it is assumed that the standard measures required by Maranoa Regional Council for this type of development will apply and the relevant mitigation measures arising have been considered.

3.8 Vegetation Management

An inspection of the site has revealed that there is no vegetation of significance or concern on the proposed site (refer to Section 4) which has been largely disturbed in preparation for industrial use, therefore an assessment of the ecological values is not required and a development permit to clear vegetation under the *Vegetation Management Act 1999* (Qld) will not be required.

4

Site Photographs

The following photographs taken on 14 October 2009 provide a visual assessment of the site proposed for the Roma Logistics Hub.

Figure 4-1 View of site looking south from southern boundary

4 Site Photographs

Figure 4-2 View south along Kimbler Road (note existing buildings)

4 Site Photographs

Figure 4-3 View south-west from the south-western boundary

4 Site Photographs

Figure 4-4 View of site from the western boundary looking east

4 Site Photographs

Figure 4-5 View from the western boundary looking west (towards the Rural Residential zoned land)

Figure 4-6 View from the western boundary of the existing warehouse facility in Kimbler Road

4 Site Photographs

Figure 4-7 View from the south western boundary looking north east into the site

5

Summary of Environmental Values and Potential Impacts

5.1 Summary of Assessment of Environmental Values and Impacts

The existing environmental values, potential impacts and mitigation measures for the Roma Logistics Hub are summarised in Table 5 -1 below.

Table 5-1 Summary Assessment of Environmental Impacts

Environmental Aspect	Summary of Existing Environmental Values	Description of Impact(s)	Management Plan
Contaminated Land	The proposed site is not listed on DERM's Environmental Management Register or the Contaminated Land Register. A portion of the site has been used previously as a warehouse, while the remaining land is vacant.	Land disturbance due to site preparation for the proposed buildings and hard-standing.	Should any evidence of land contamination be encountered during construction, notification and management of the land would ensue.
Air Quality	The proposed site is located a significant distance from sensitive receptors. A residential property is located approximately 700 m from the proposed site.	The Roma Logistics Hub is not expected to generate emissions from operational activities, either within the site boundary or in accessing or exiting the site.	Santos will ensure that any air emissions from the premises do not cause environmental harm or nuisance to adjoining properties or sensitive land uses as required by the Maranoa Regional Council. Measures to minimise dust impacts such as watering unsealed surfaces will be put in place prior to construction commencing.
Land Use	The proposed site is contained within the Industry Zone of the Roma planning scheme, with the Urban Area Code and Reconfiguring a Lot Code applicable to the assessment of development in this area. The site contains an existing industrial (storage warehouse) with the remainder of the property being vacant land. There are several desired environmental outcomes applicable to the proposed logistics hub and the relevant codes provides performance criteria and acceptable solutions for development within the Industry Zone. The use proposed accords with the assessment criteria within the applicable codes and is an appropriate activity within the Industry Zone.	Expected impacts are limited to noise and traffic/transport movements that may interfere with the general amenity of one property owner who resides adjacent the site along Boundary Road (which intersects with Kimber Road).	An assessment of the impacts to transport and traffic (being predominantly related to noise) has been undertaken and is included in this report. Santos will consult with this landholder prior to lodgement of applications for approval to further assess any mitigation strategies that can be put in place to alleviate any potential impacts.

5 Summary of Environmental Values and Potential Impacts

Noise and Vibration	The construction noise associated with the Roma Logistics Hub is noise from loaders, forklifts, cranes and idling trucks. The operational noise associated with the Roma Logistics Hub is noise from loading equipment (i.e. forklifts, cranes etc) and idling trucks/4WDs.	Construction noise is predicted to comply with the relevant criteria at the nearest sensitive receptor, the Barnard Road residence. Operational noise is predicted to meet the day and night criteria during neutral weather conditions, but is predicted to exceed the night criteria during worst case weather.Error! Reference source not found.	For the majority of the construction phase, activities will be carried out from 6:30 am to 6:30 pm, Monday to Saturday, when ambient noise levels are higher. During operation, activities will be minimised (i.e., limited to 4WD and forklift movements only) between 6:00 am and 7:00 pm. To minimise adverse impacts from vehicle movements, the use of residential class mufflers on diesel powered equipment, minimising the use of truck exhaust bakes and making residents aware of the times and the duration that they will be affected.
Traffic and Transport	The Roma Logistics Hub is located a sufficient distance from the built up area of Roma with ready access to the Warrego Highway and the Carnarvon Highway. One residential property is located along the access route (Barnard Road). The area of the proposed site supports industrial activities and the traffic and transport mode proposed is supported by the existing infrastructure.	The impacts from transport and traffic expected from the proposed use will be limited to one property and will largely be confined to traffic noise. No loss of access to this property will occur from the proposed activities.	To minimise adverse impacts from vehicle movements, the use of residential class mufflers on diesel powered equipment, minimising the use of truck exhaust bakes and making residents aware of the times and the duration that they will be affected.
Ecology	The proposed site has been significantly disturbed in preparation for industrial development and no ecological values are ascribed to the site.	There are no identifiable impacts to the ecology of the proposed site.	There are no requirements for addressing impacts to ecological values of the proposed site.
Visual	The proposed site includes an existing warehouse facility and hard-stand area with the remaining portion being vacant land. The site is isolated from the developed areas of Roma and significantly distant from sensitive land use view points.	There are no identifiable visual impacts to the site and or surrounding land uses from the proposed site.	There are no requirements for addressing impacts to the visual landscape from the proposed site.

5 Summary of Environmental Values and Potential Impacts

Stormwater and Waste Water	The proposed structures will require consideration to be given for appropriate stormwater control measures that may include retention of natural drainage patterns, retention of vegetation on drainage lines, vegetated drains, flow retardation and porous pavements where applicable. The site for the proposed logistics hub has an even gradual slope and will not promote discharge that may cause a nuisance to adjacent properties from development.	The construction and operation of all components of the Roma Logistics Hub will not pose a risk to water quality or create a nuisance from ponding of adjacent properties from overland flow. All design and implementation of stormwater and waste water management systems will be consistent with the requirements of the Maranoa Regional Council.	An assessment of the proposed systems of stormwater runoff (including from roads, roofs, driveways etc) shall be provided. This will include provision to demonstrate the long term sustainability of any proposed effluent systems where impacts to the hydrology of the area are identified. There may be a requirement for further reports regarding the proposed effluent systems, and what measures to manage and mitigate impacts on water quality from liquid and solid waste other than sewage effluent that should be put in place. Santos will undertake to comply with the provisions for stormwater management and water quality by preparing appropriate EMPs for the construction activities and operational maintenance as required by the Maranoa Regional Council.

6

Conclusions

The Roma Logistics Hub will alleviate impacts on Roma from the supply and distribution of construction materials associated with the development of the Roma CSG fields for the GLNG Project. The proposed site for the Roma Logistics Hub is located within an area zoned for industrial purposes with an existing industrial use similar to that proposed in operation.

The site falls within the area of Petroleum Lease 6 which is held and operated by Santos. There are 2 alternative statutory approvals processes available to Santos for the development of the Roma Logistics Hub, that give regard to authorised activities carried out wholly within the area of a petroleum authority (e.g. PL 6) and the assessment of activities under the *Integrated Planning Act 1997* (Qld) (IPA) and local planning scheme.

Planning analysis has concluded that the use of the proposed site is in accordance with the strategic intent of the regional policy framework and the local planning scheme. The proposed site ensures that the vast majority of vehicle movements and associated noise generated are sufficiently distant from the main town area that the impacts are negligible.

A review of the environmental considerations of the site and proposed activities has been undertaken which include contaminated land, air quality, noise and vibration, traffic and transport and ecology. Noise emissions from the proposed site from transport activities have been identified as the main impacts. A range of mitigation measures will be implemented to minimise the impacts.

Santos will consult and work with the appropriate regulatory authorities, Maranoa Regional Council, DEEDI and the Department of Infrastructure and Planning and the local community to develop the Roma Logistics Hub.

7

References

Maranoa regional Council, July 2008, Roma Town Council Planning Scheme, (adopted by the Local Government on the 22nd November 2006), Maranoa Regional Council.

Department of Infrastructure and Planning and Maranoa and Districts Regional Coordination Committee, Draft Maranoa and Districts Regional Plan August 2008.

Australian Standard AS 2436 (1981). Guide to Noise Control on Construction, Maintenance and Demolition Sites. Standards Australia.

Department of Environment and Resource Management (2004), Ecoaccess Guidelines: Planning for Noise Control.

Heggies, (2009). Santos Gladstone LNG Environmental Impact Statement – Noise and Vibration (Terrestrial). (Reference: 20-2014-R1R4, dated 22 May 2009).

8

Limitations

URS Australia Pty Ltd (URS) has prepared this report in accordance with the usual care and thoroughness of the consulting profession. It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report. It is prepared in accordance with the scope of work and for the purpose outlined in the Proposal dated 15th July 2009.

The methodology adopted and sources of information used by URS are outlined in this report. URS has made no independent verification of this information beyond the agreed scope of works and URS assumes no responsibility for any inaccuracies or omissions. No indications were found during our investigations that information contained in this report as provided to URS was false.

This report was prepared between 11 September 2009 and 26 October 2009 and is based on the conditions encountered and information reviewed at the time of preparation. URS disclaims responsibility for any changes that may have occurred after this time.

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