

Land use and tenure 8

Enter ►

Go back to contents ►



Contents

8	Land use and tenure	8-1
8.1	Introduction	8-1
8.2	Regulatory context	8-1
8.3	Assessment methodology	8-3
8.4	Environmental values	8-5
8.4.1	Land tenure	8-5
8.4.2	Resource tenements	8-5
8.4.3	Declared water storage catchments	8-7
8.4.4	Native Title	8-7
8.4.5	Land use	8-11
8.4.6	Infrastructure and utilities	8-16
8.5	Potential impacts	8-19
8.5.1	Compliance assessment	8-19
8.5.2	Significance assessment	8-19
8.6	Mitigation measures	8-20
8.7	Significance assessment	8-23
8.8	Conclusions	8-32

Tables

Table 8-1	Regulatory context of the GFD Project – land use and tenure	8-1
Table 8-2	Land tenure in the GFD Project area (cadastral allotments)	8-5
Table 8-3	Active Native Title claims/determinations in the GFD Project study area	8-7
Table 8-4	Indigenous land use agreements in the GFD Project area	8-8
Table 8-5	Area of agricultural land in the GFD Project study area (hectares)	8-11
Table 8-6	Priority Living Areas	8-11
Table 8-7	Protected agricultural areas in the GFD Project area (hectares)	8-12
Table 8-8	Potential impacts to land use and tenure	8-19
Table 8-9	Mitigation measures – land use and tenure	8-20
Table 8-10	Impact assessment – land use and tenure	8-24
Table 8-11	Residual significance – land use and tenure	8-32

Figures

Figure 8-1	GFD Project boundaries	8-4
Figure 8-2	Land tenure in the GFD Project area	8-6
Figure 8-3	Native Title in the GFD Project area	8-9
Figure 8-4	Indigenous land use agreements in the GFD Project area	8-10
Figure 8-5	Protected areas in the GFD Project area	8-13
Figure 8-6	Land uses in the GFD Project area	8-15
Figure 8-7	Transport infrastructure in the GFD Project area	8-17
Figure 8-8	Utilities in the GFD Project area	8-18

8 Land use and tenure

8.1 Introduction

This section describes the land use and tenure aspects of the GFD Project area and surrounds.

The GFD Project area includes a range of land uses, including areas of agricultural production (including Good Quality Agricultural Land, Protected Agricultural Areas and Strategic Cropping Areas), resource extraction, Native Title and protected areas with conservation and recreation values. In addition to this, the GFD Project area includes a number of urban areas, from larger rural centres such as Roma and Injune to smaller localities including Taroom, Wandoan, Springsure, Wallumbilla, and Yuleba. In keeping with the areas of agricultural production across the GFD Project area, rural residences are present outside of the urban areas.

The potential impacts arising from the GFD Project activities on land use and tenure are described, and mitigation measures are identified. Full details of the land use and tenure assessment are provided in Appendix J: Land use and tenure.

This section has been prepared in accordance with section 4.2.1 of the *Terms of reference for an environmental impact statement* issued March 2013. The index to locate where each ToR requirement is met within this EIS is included in Appendix B: Terms of reference cross-reference.

8.2 Regulatory context

This EIS has been prepared in accordance with the State and Commonwealth regulatory context described within Appendix C: Regulatory framework. The legislation, policies and guidelines that apply to the land use and tenure values and potential impacts of the GFD Project are outlined in Table 8-1.

Table 8-1 Regulatory context of the GFD Project – land use and tenure

Legislation, policy or guideline	Relevance to the GFD Project
<i>Nature Conservation Act 1992</i> (Qld) (NC Act) The NC Act provides for the conservation and protection of native flora and fauna species in Queensland and a framework for establishing, managing and the use of protected areas.	This EIS has identified protected areas under the NC Act and the mitigation measures proposed to manage the impact of the GFD Project on these.
<i>Petroleum and Gas (Production and Safety) Act 2004</i> (Qld) (P&G Act) The P&G Act regulates petroleum activities with the aim of developing a safe, efficient and viable petroleum and fuel gas industry in Queensland. Petroleum tenure is granted under the Act.	The GFD Project contains tenure granted under this Act. Santos GLNG will comply with the requirements of the Act in undertaking GFD Project activities.
<i>Petroleum Act 1923</i> (Qld) (Petroleum Act) Petroleum tenure was granted under the Petroleum Act prior to the development of the P&G Act. Petroleum leases may still be granted under this Act for holders of existing tenure (authority to prospect) granted under this Act. However, prospecting tenure cannot be applied for under the Petroleum Act.	The GFD Project contains tenure granted under this Act. Santos GLNG will comply with the requirements of the Act in undertaking GFD Project activities.
<i>Sustainable Planning Act 2009</i> (Qld) (SP Act) The SP Act seeks to achieve ecologically sustainable development by managing planning and development processes in a coordinated and integrated manner. The SP Act provides the overarching framework for Queensland's planning and development assessment system.	The GFD Project infrastructure and activities that are proposed within petroleum tenures will be exempt from the assessment provisions of the SP Act. However, there may be instances where GFD Project infrastructure or development activities are proposed outside of petroleum tenures. In such instances, the provisions of the SP Act may apply and relevant legislative provisions, plans and policies complied with.

Legislation, policy or guideline	Relevance to the GFD Project
<p><i>Regional Planning Interests Act 2014 (Qld) (RPI Act)</i></p> <p>The RPI Act identifies and protects areas of Queensland that are of regional interest. In doing this, the RPI Act seeks to manage the impact and support coexistence of resource activities and other regulated activities in areas of regional interest. The Act aims to ensure that land use planning protects:</p> <ul style="list-style-type: none"> • Living areas (termed Priority Living Areas) • High quality agricultural areas (termed Priority Agricultural Areas) • Strategic cropping land (termed Strategic Cropping Areas) • Important environmental areas (termed Strategic Environmental Areas). 	<p>This EIS identifies and describes all areas that are identified within the RPI Act. Santos GLNG will comply with the requirements of the Act in undertaking GFD Project activities.</p>
<p><i>State Planning Policy (SPP)</i></p> <p>The single SPP introduced in December 2013 defines Queensland Government policies about matters of State interest in land use planning and development.</p>	<p>The GFD Project supports the intent of the SPP as it provides for resource development to support Queensland's economic growth while also protecting the State's environmental and social values. The Santos GLNG management framework will be used to manage the GFD Project to ensure compatibility with the SPP.</p>
<p><i>Darling Downs Regional Plan and Central Queensland Regional Plan</i></p> <p>These plans specifically provide direction to resolve competing State interests relating to the agricultural and resources sectors and to enable the growth potential of the region's towns.</p>	<p>The GFD Project area is located within parts of both the Central Queensland and Darling Downs regional planning areas.</p> <p>The plans aim to protect Priority Agricultural Land Uses (PALU) while supporting co-existence opportunities for the resources sector and provide certainty for the future of towns through the identification of important towns as PLAs. PAAs are also identified in these plans and comprise the region's strategic areas containing highly productive agricultural land uses. In these areas, PALUs are the land use priority.</p>
<p>Local government planning schemes</p> <p>Chapter 3 of the SP Act provides local governments with the power to prepare local planning instruments, primarily in the form of planning schemes.</p>	<p>In accordance with the SP Act, an activity authorised under the P&G Act and subject to a petroleum lease is exempt from assessment against a local planning scheme. However, GFD Project components outside of a petroleum lease will be subject to the assessment against the relevant planning scheme. In such cases, applications will be submitted to the relevant council for approval.</p>

This EIS seeks to obtain primary approvals for the project including the Queensland Government Coordinator-Generals Report and Commonwealth Government *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) approval.

Application for or amendments to existing environmental authorities will occur subsequent to this EIS process. Other subsequent approvals required after the EIS process has been completed, corresponding triggers and legislative frameworks applicable to the GFD Project are identified in Section 2: Project approvals.

Approval of this EIS will trigger a number of subsequent approvals required for the GFD Project to proceed. Approvals will be required on tenure and off-tenure. Section 2: Project approvals summarises the key approvals necessary for the planning, construction, operations and decommissioning of the GFD Project. The triggers for each approval, the relevant administering authority and application details are provided. Consultation on the subsequent approvals will be ongoing with the administering authorities.

8.3 Assessment methodology

This assessment describes the land use and tenure values and assesses the GFD Project's potential impacts on these values.

Impacts were assessed using a combination of compliance and significance assessment methodologies, based on the nature of the regulatory regime that applies to a particular value or its sensitivity as follows:

- **Compliance assessment** — where compliance with a known guideline or policy is required, impacts were assessed using the compliance assessment methodology which assesses the degree to which the GFD Project complies with the relevant guideline or policy
- **Significance assessment** — where the sensitivity and vulnerability of land use or tenure values may be affected, impacts were assessed using the significance assessment methodology which considers the sensitivity of the underlying environment and the magnitude of a potential impact to assess its level of significance.

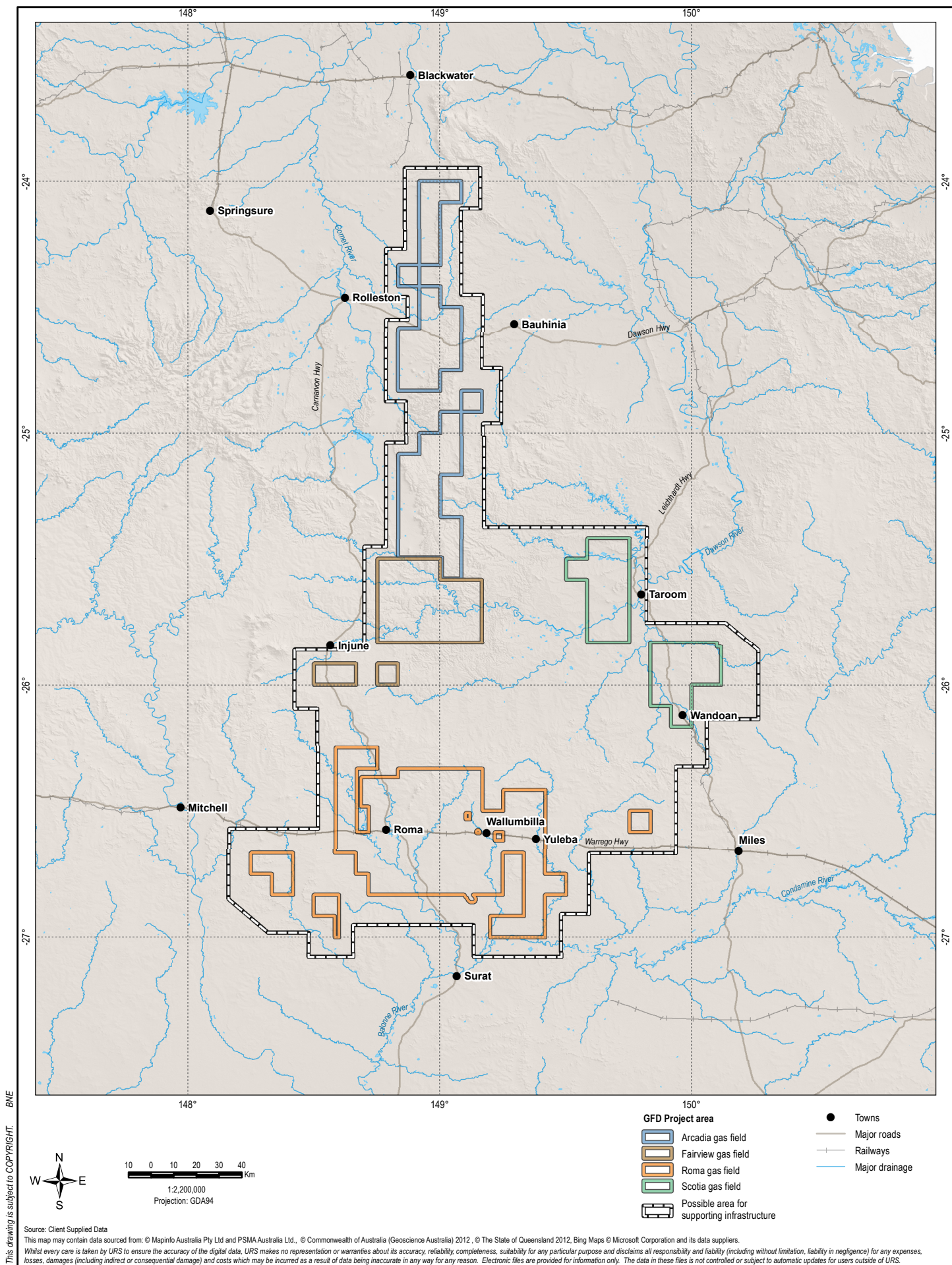
Full descriptions of the compliance and significance methodologies are described in section 5.6.3 of Section 5: Assessment framework, with the exception of the sensitivity and magnitude criteria which were adjusted for assessing land use impacts as detailed in Appendix J: Land use and tenure. A summary of the impact assessment is provided in section 8.5.2.

Due to the scale, complexity and size of the GFD Project, three areas were studied as part of this EIS:

- **GFD Project area** — refers to the total area covered by the petroleum tenements of the GFD Project and the adjacent possible area for supporting infrastructure
- **Gas fields** — refers to the four gas fields (Arcadia, Fairview, Roma, Scotia) which, when combined, form the GFD Project tenements. These tenements will host major surface infrastructure, such as wells and gas compression and water management facilities
- **Remainder** — refers to the area surrounding the gas fields, which may be impacted by off-tenement infrastructure. This may include gas and water transmission pipelines, groundwater monitoring bores, as well as roads and power lines needed to connect gas field activities to each other and to nearby infrastructure and services.

These areas are shown on Figure 8-1.

This EIS considers the potential impacts associated with both on tenure (e.g. production wells, gas compression facilities) and off-tenure infrastructure (e.g. accommodation facilities, gas and water pipelines) to ensure that all stakeholders gain an understanding of the breadth and scope of the GFD Project. Infrastructure that is not located within Santos GLNG petroleum tenure, such as accommodation facilities, gas and water pipelines, will be subject to approval processes separate to this EIS.



8.4 Environmental values

8.4.1 Land tenure

The GFD Project area contains 7,817 cadastral allotments under the tenures of freehold, lands lease, national park, reserve, state forest and unallocated State land. These tenures are listed in Table 8-2 and shown on Figure 8-2.

Table 8-2 Land tenure in the GFD Project area (cadastral allotments)

Gas field	Freehold	Lands lease	National park	Reserve	State forest	Unallocated State land
Arcadia	40	15	2	2	6	2
Fairview	112	18	2	10	5	1
Roma	6,461	144	0	159	8	77
Scotia	637	60	2	46	0	8
Remainder*	2,579	185	2	159	17	43
Total	9,829	422	8	376	36	131

Source: Santos GLNG, 2013

*Additional land area within the possible area for supporting infrastructure outside of the gas fields

Changes to the NC Act to be delivered through the *Nature Conservation and Other Legislation Amendment Act 2013* include the removal of a number of protected classes used in this report, including forest reserve, and resource reserve and is in the process of reclassifying land contained in removed classes. As a result, the to-be-abolished classes have been used for the purpose of this assessment.

8.4.2 Resource tenements

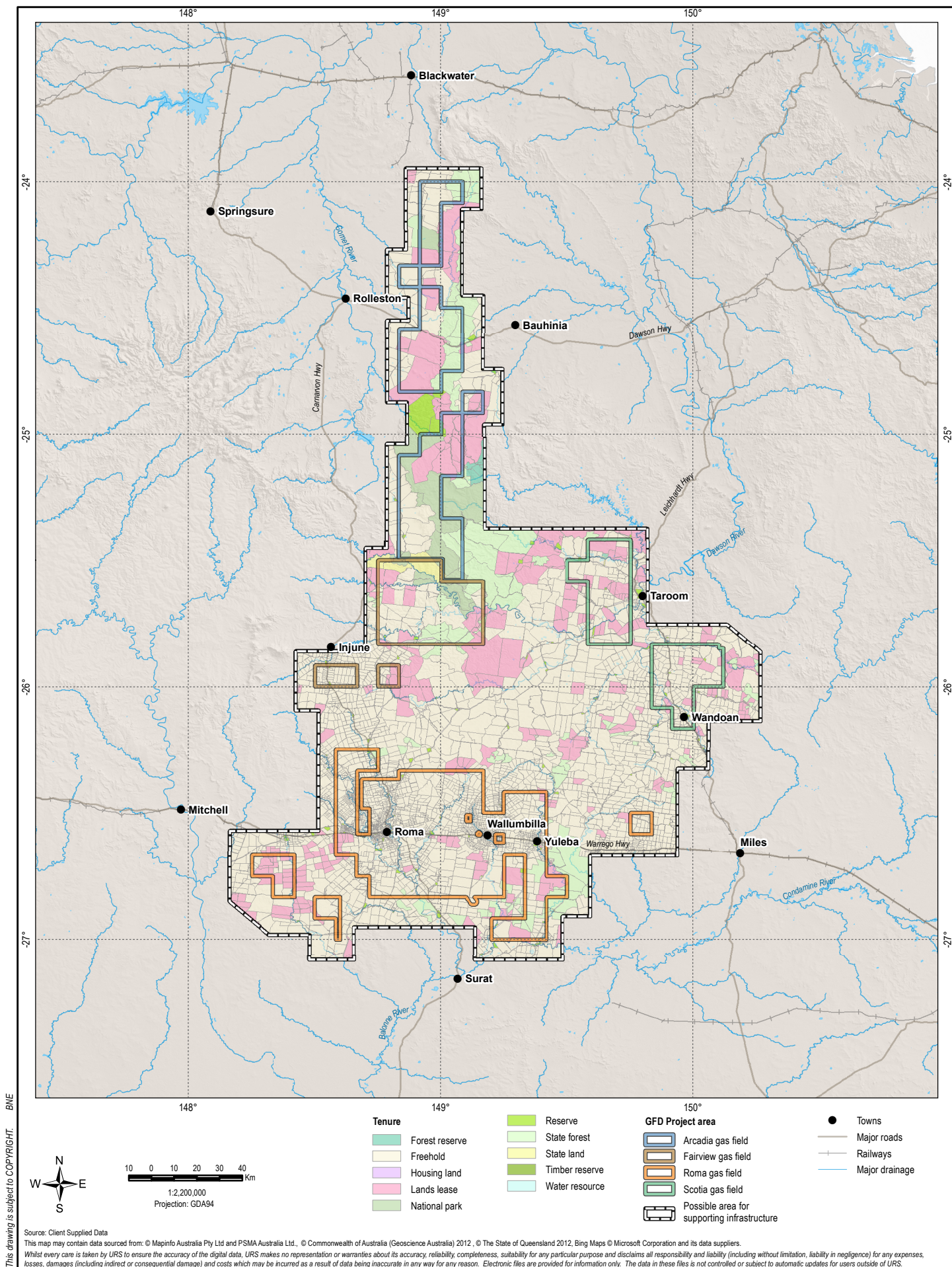
A number of resource tenements authorised under the *Mineral Resources Act 1989* (Qld) (MR Act), the Petroleum Act and the P&G Act are located within the GFD Project area. These tenements include:

- Authority to prospect (ATP)
- Petroleum pipeline licence (PPL)
- Petroleum lease application (PLA)
- Petroleum lease (PL)
- Petroleum facility licence (PFL)
- Petroleum survey licence (PSL)
- Mining lease (ML)
- Mining lease application (MLA)
- Mineral development licence (MDL)
- Exploratory permit for coal (EPC)
- Exploratory permit for minerals (EPM).

In addition to these, the GFD Project area includes a greenhouse gas tenement and two key resources areas.

The Santos GLNG tenements that comprise the GFD Project are detailed in Section 4: Project description. A discussion of other resource tenements within and surrounding the GFD Project area is provided in Appendix J: Land use and tenure.

Section 9: Land resources details Santos GLNG's approach to managing resource development where there are overlapping resource tenures.



8.4.3 Declared water storage catchments

Of the currently 20 declared catchment areas in Queensland administered by Department of Natural Resources and Mines (DNRM), none are located within the GFD Project area.

8.4.4 Native Title

Native Title is the recognition by the Commonwealth and State governments of the laws, rights and interests over land and water possessed by Indigenous Australians.

Table 8-3 identifies the registered Native Title claims and determinations that are located within the GFD Project area. Native Title claims within the GFD Project area are shown on Figure 8-3.

Proposed activities that may affect or impair Native Title are classed as 'future acts' under the Native Title Act.

Table 8-3 Active Native Title claims/determinations in the GFD Project study area

Gas field	Claim/ determination number	Name	Federal court number
Arcadia	QC06/19	Karingbal People	QUD473/06
	QC06/5	Karingbal 2	QUD23/06
	QC08/5	Bidjara People	QUD216/08
	QC11/4	Brown River People	QUD245/11
	QC12/10	Wadja People	QUD422/12
	QC12/11	Kanolu People #1	QUD418/12
	QC12/12	Kanolu People #2	QUD421/12
	QC12/18	Bidjara People #7	QUD644/12
	QC12/9	Gaangalu Nation	QUD400/12
	QC97/55	Iman People 2	QUD6162/98
Fairview	QC08/10	Mandandanji People	QUD366/08
	QC08/5	Bidjara People	QUD216/08
	QC97/55	Iman People 2	QUD6162/98
Roma	QC08/10	Mandandanji People	QUD366/08
	QC12/13	Gunggari People #3	QUD548/12
Scotia	QC97/55	Iman People 2	QUD6162/98
Remainder*	Mandandanji People	QC08/10	QUD366/08
	Brown River People	QC11/4	QUD245/11
	Gunggari People # 4	QC12/14	QUD550/12

Source: DNRM, 2013*Additional land area within the possible area for supporting infrastructure outside of the gas fields

The GFD Project area contains State land where Native Title rights have not been extinguished and therefore Native Title claims can still be made.

An Indigenous land use agreement (ILUA) is one way to take into account the communal rights of the Native Title party and enable other parties to use the land and/or resources in the agreement area. Table 8-4 identifies the registered ILUAs located within the GFD Project area. ILUAs within the GFD Project area are shown on Figure 8-4.

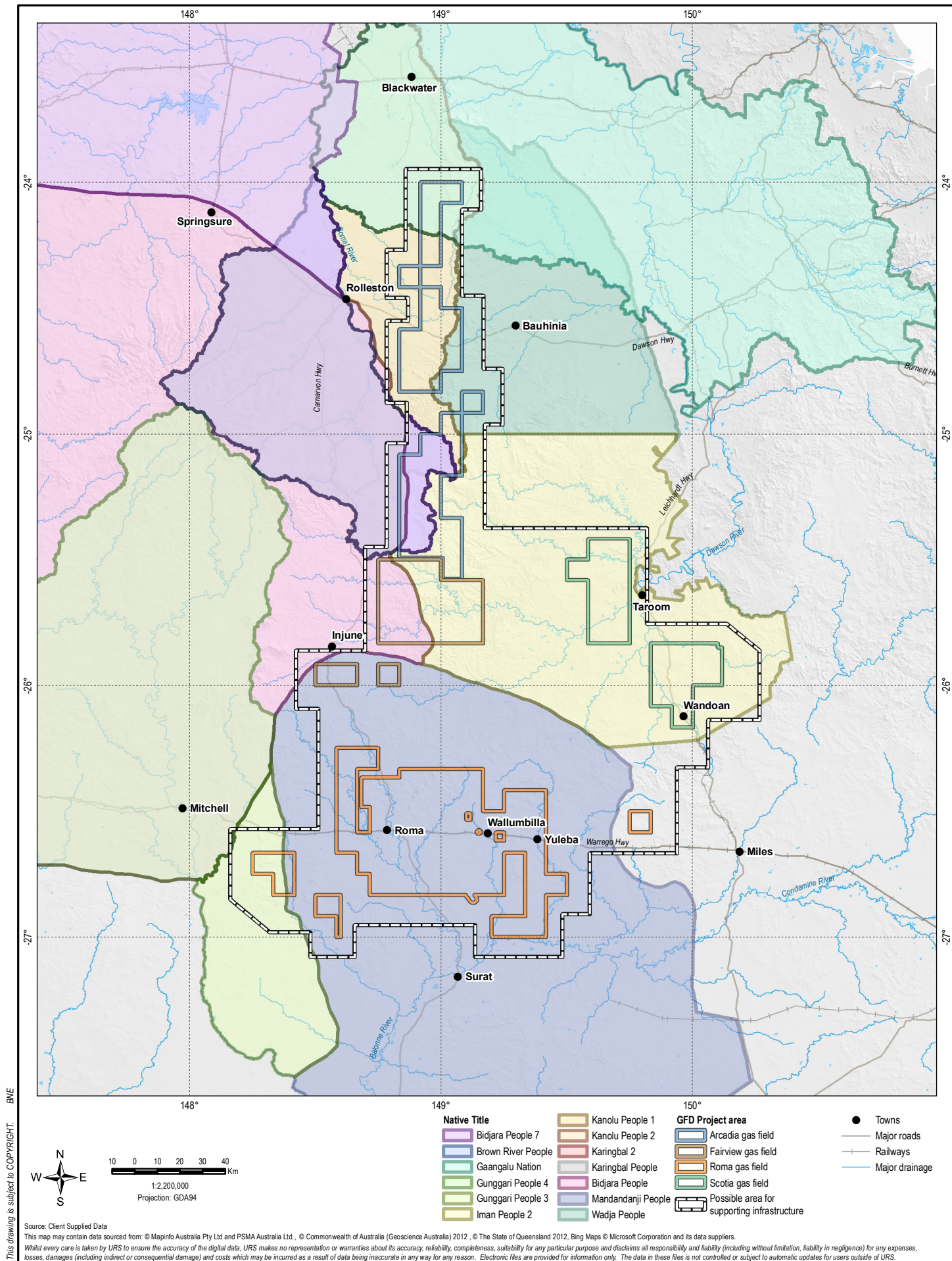
Table 8-4 Indigenous land use agreements in the GFD Project area

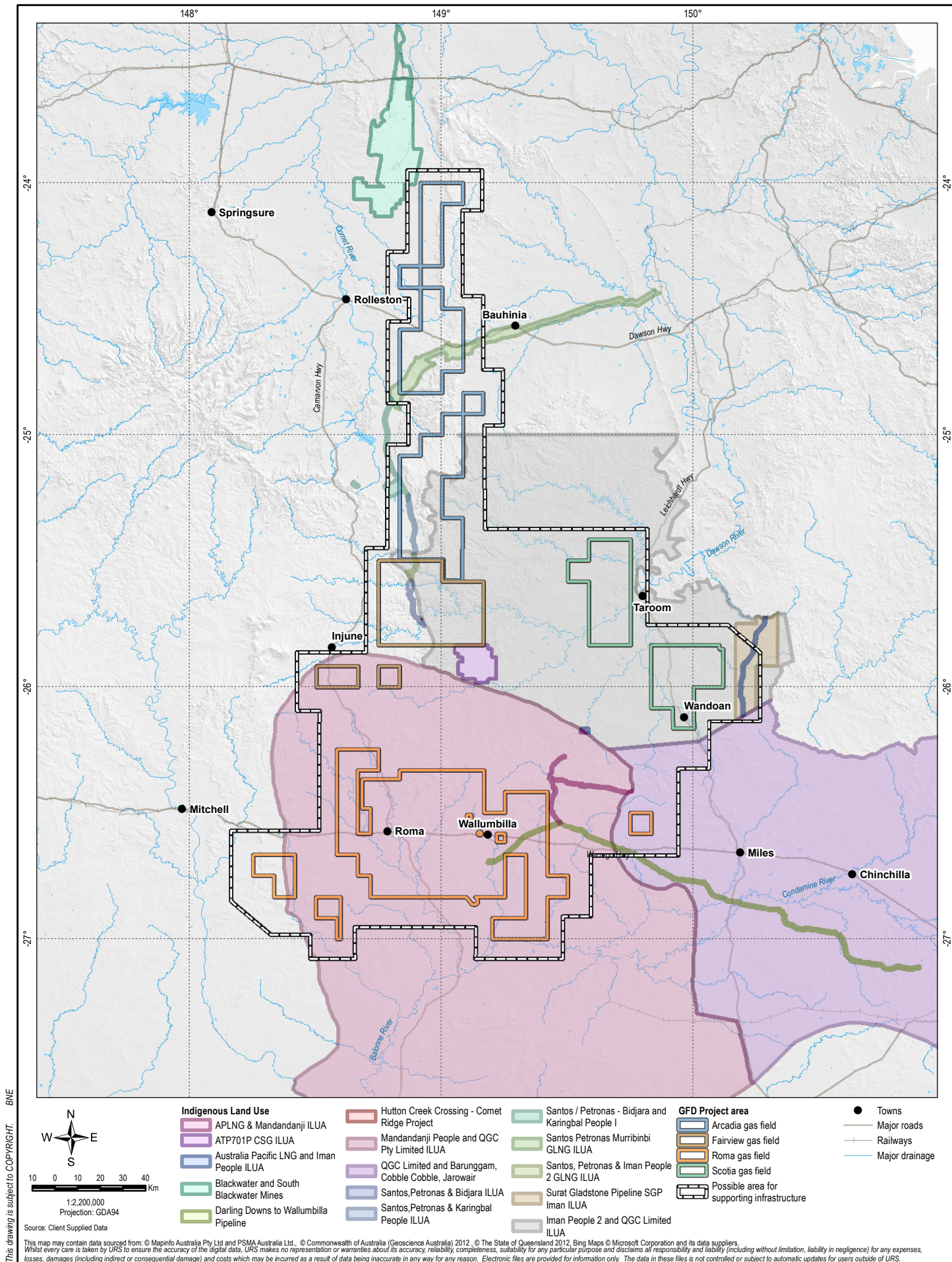
Gas field	Tribunal number	Name
Arcadia	QI2009/061	Santos GLNG and Petronas and Karingbal People ILUA
	QI2010/003	Iman People #2 and QGC Limited ILUA
	QI2010/010	Santos, Petronas and Iman People #2 GLNG ILUA
	QI2010/016	Santos / Petronas - Bidjara and Karingbal People ILUA
	QI2011/010	Santos Petronas Murribinbi GLNG ILUA
Fairview	QI2005/001	Hutton Creek Crossing - Comet Ridge Project
	QI2010/003	Iman People #2 and QGC Limited ILUA
	QI2010/010	Santos GLNG, Petronas and Iman People #2 GLNG ILUA
	QI2010/015	Santos and Petronas and Bidjara ILUA
	QI2010/034	Mandandanji People and QGC Pty Limited ILUA
Roma	QI2007/028	Darling Downs to Wallumbilla Pipeline(s)
	QI2010/006	QGC Limited and Barunggam, Cobble Cobble, Jarowair, Western Wakka Wakka and Yiman Groups
	QI2010/034	Mandandanji People and QGC Pty Limited ILUA
Scotia	QI2010/003	Iman People #2 and QGC Limited ILUA
Remainder*	QI2001/035	Blackwater and South Blackwater Mines
	QI2002/044	ATP701P CSG ILUA
	QI2010/004	Surat Gladstone Pipeline SGP Iman ILUA
	QI2011/025	Australia Pacific LNG and Iman People ILUA
	QI2011/047	APLNG & Mandandanji ILUA

Source: DNRm, 2013

*Additional land area within the possible area for supporting infrastructure outside of the gas fields

In addition, Santos GLNG has entered into agreements under future act provisions of the *Native Title Act 1993* (Cth) (often referred to as Section 31 agreements). Santos GLNG has entered into two Section 31 agreements with the Mandandanji people in relation to PL 314 and PL 315 and ATP 631, with the Karingbal people and Bidjarra People in relation to ATP 653 and may enter into further Section 31 agreements where appropriate.





8.4.5 Land use

The GFD Project area supports a variety of land uses including agriculture, resource extraction, urban and rural residences, and a variety of conservation, tourism and recreational activities. The primary land uses across the GFD Project area are shown on Figure 8-6.

8.4.5.1 Agriculture

The predominant land use within the GFD Project area is agriculture, including livestock grazing (pastoral activities) and dryland cropping. Irrigated cropping and horticultural activities also occur in minor areas. As shown on Table 8-5, agriculture (predominantly grazing) is the primary land use across the GFD Project gas fields. The extent of grazing throughout the GFD Project area is shown on Figure 8-6.

Table 8-5 Area of agricultural land in the GFD Project study area (hectares)

Gas field	Cropping	Perennial horticulture	Irrigated perennial horticulture	Livestock grazing	Intensive animal production	Irrigated cropping*
Arcadia	4,868	-	-	174,266	-	-
Fairview	372	-	-	119,690	-	257
Roma	73,453	9	18	376,101	75	841
Scotia	25,947	-	-	132,449	35	-
Remainder**	167,530	-	4	1,665,763	192	1,558

Source: Santos GLNG, 2013. *Irrigated cropping represents Santos GLNG's irrigation practices

**Additional land area within the possible area for supporting infrastructure outside of the gas fields

8.4.5.2 Protected areas

New statutory regional plans have been prepared for Central Queensland and Darling Downs and are given force under the RPI Act. These regional plans introduce provisions to manage competing State interests, such as the agricultural and resource sectors, through the identification of four areas of regional interest. These areas are known as Priority Living Areas (PLAs), Priority Agricultural Areas (PAAs), Strategic Cropping Areas (SCAs) and Strategic Environmental Areas (SEAs).

Priority Living Areas

Priority Living Areas include the settlement itself, rural residential areas associated with the settlement area, and a two kilometre buffer area around the settlement area. Priority living areas have been introduced to provide greater certainty of investment in the development of the region's towns and urban settlements by setting aside an area for town expansion. A resource activity is not permitted in a Priority Living Area unless the activity is exempt or a regional interest's development approval has been granted for the activity. The Priority Living Areas within the GFD Project area and beyond are listed in Table 8-6.

Table 8-6 Priority Living Areas

GFD Project area	Outside of GFD Project area with the potential to be influenced by the GFD Project	
<ul style="list-style-type: none"> Roma Wallumbilla Yuleba Wandoan 	<ul style="list-style-type: none"> Miles Mitchell Injune Blackwater 	<ul style="list-style-type: none"> Bluff Surat Taroom

Priority Agricultural Areas

PAA's identify a region's high value, intensive agricultural areas. The regional plans also identify Priority Agricultural Land Uses (PALUs) which are land uses classified by the Australian Land Use and Management Classification as any of the following:

- Cropping
- Grazing irrigated modified pastures
- Horticulture (including intensive, irrigated perennial, irrigated seasonal, perennial and seasonal)
- Irrigated cropping
- Irrigated land in transition
- Irrigated plantation forestry.

Where a resource activity is proposed on land being used for a PALU in a PAA, the regional plan gives priority to the PALU through the application of co-existence criteria. These criteria define outcomes that need to be met to achieve co-existence within the PAA between the PALU and the proposed resource activity. The extent of PAA's and PALUs within the GFD Project gas fields is summarised in Table 8-7 and Figure 8-5 shows their extent within the GFD Project study area.

Table 8-7 Protected agricultural areas in the GFD Project area (hectares)

Gas field	PAA	PALU
Arcadia	6,992	4,867
Fairview	0	629
Roma	0	74,316
Scotia	0	25,946
Remainder*	20,626	169,099

*Additional land area within the possible area for supporting infrastructure outside of the gas fields

Strategic Cropping Areas

The RPI Act seeks to ensure the productive capacity of land considered highly suitable for cropping is protected from the impacts of development and where impacts are unavoidable, those impacts are managed. The RPI Act integrates the repealed *Strategic Cropping Land Act 2011* (Qld) policy framework for 'on-tenure' resource activities.

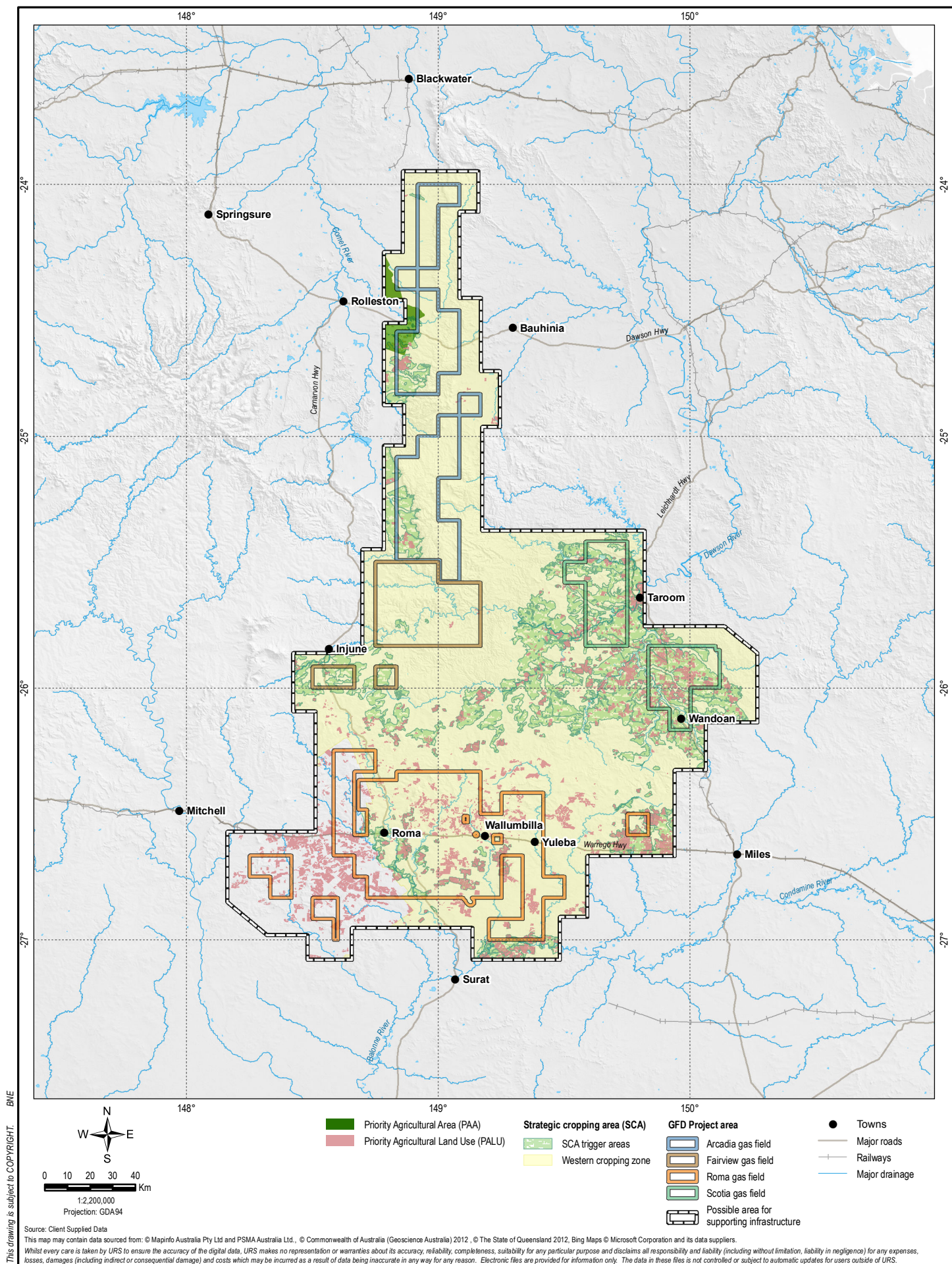
The RPI Act carries forward Strategic Cropping Land policies through:

- Declaring the SCA as an area of regional interest
- Applying the *SCA Assessment Criteria* to activities within the SCA that are not also located on a PALU within a PAA
- Providing for the chief executive to condition mitigation as part of a regional interest's development approval issued for an activity in the SCA.

A compliance certificate or protection decision issued under the *Strategic Cropping Land Act 2011* becomes a regional interest's development approval under the RPI Act.

The extent of SCA within the GFD Project area is summarised in section 9.2.4.5 of Section 9: Land resources.

Further details regarding the administration of SCA and the GFD Project's compliance with the strategic cropping land policy framework are included in appendix A of Appendix J: Land use and tenure.



Strategic Environmental Areas

SEAs are identified within the regional plans and other statutory instruments. The environmental values found within the GFD Project area are identified within Section 13: Surface water, Section 18: Terrestrial ecology, and Section 19: Aquatic ecology.

8.4.5.3 Forestry

Forestry for millable timber and ancillary land uses to forestry such as quarrying, beekeeping and timber reserves are present throughout the GFD Project area. In addition, there are a number of timber processing facilities within the GFD Project area sourcing the region's native cypress and hardwood forestry products.

Forestry areas within the GFD Project area are shown on Figure 8-6.

At present, it is proposed that any Santos GLNG constructed borrow pits will be located in the gas fields. Alternatively materials may be sourced from third parties, who are appropriately licensed, including State-owned quarries. Detail on the quarries proposed to be used for the GFD Project is provided in section 4.6.5 of Section 4: Project description.

8.4.5.4 Resource developments

The dominant existing resource development activity in the GFD Project area is the GLNG Project. GLNG Project infrastructure already developed (or approved for development) includes up to 2,650 production wells; linear and fixed infrastructure such as access roads, gathering lines and transmission pipelines; facilities for gas compression and water management; and supporting services including accommodation facilities and laydown areas.

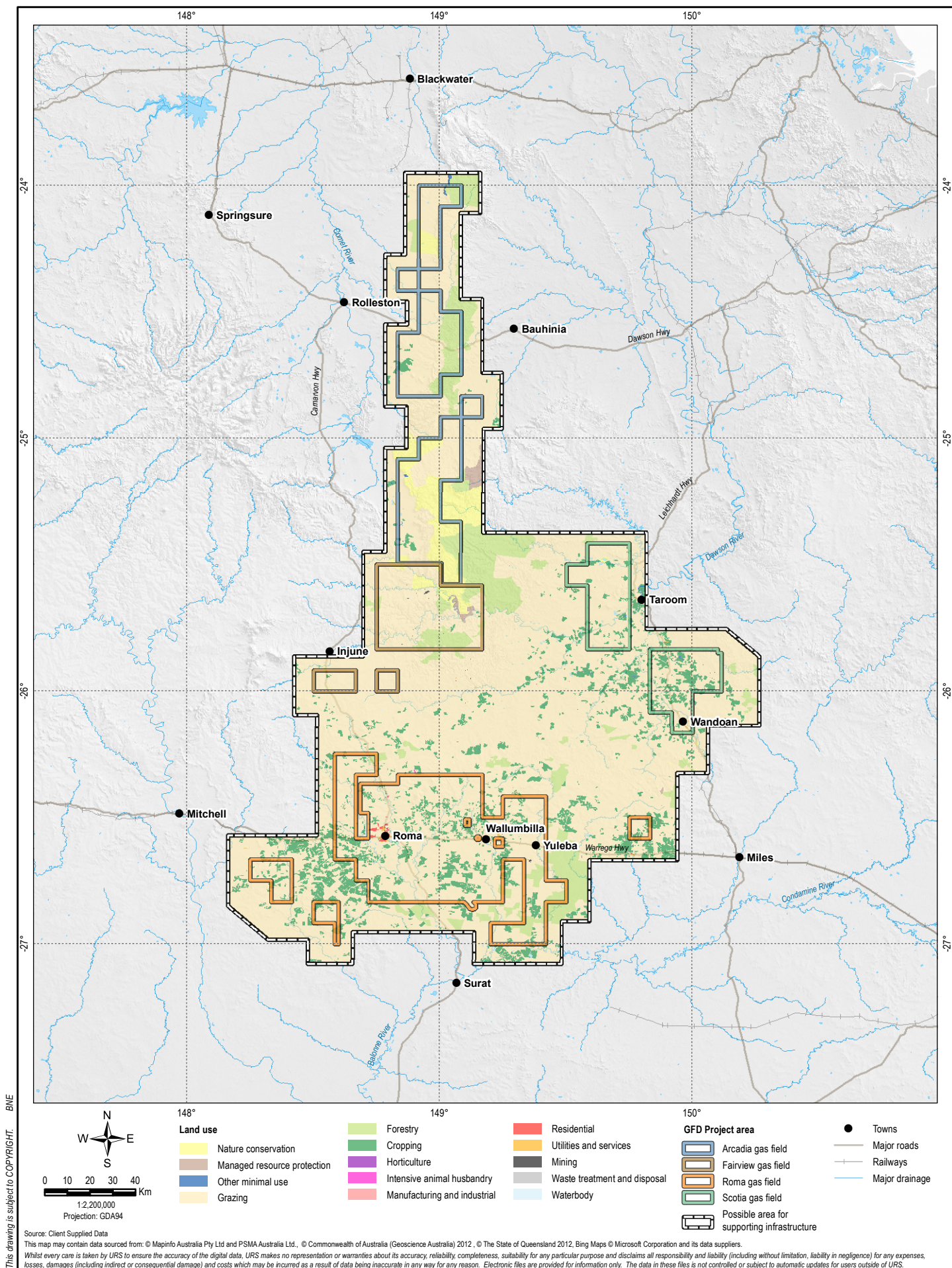
There are three other coal seam gas to LNG projects present within the GFD Project area that overlap with the GFD Project in terms of timing, resources and co-location opportunities. These include the Australia Pacific LNG (APLNG) Project, the Queensland Curtis LNG (QCLNG) Project and the Arrow Energy (Bowen and Surat) Gas Project. There are a range of coal mining projects present throughout the GFD Project area, which are at varying stages of development. These include the Norwood Coal Project, Elimatta Project, Wandoan Coal Project, Bundi Coal Project, and North Surat Collingwood Project.

In addition, the GFD Project area includes the Yuleba Silica Sand Mine as well as numerous exploration tenements which allow exploration activities including remote sensing, seismic surveys, drilling and sampling.

Other resource projects that are within 50 km of the GFD Project area but outside the possible area for supporting infrastructure are discussed in Section 26: Cumulative impacts.

8.4.5.5 Conservation, tourism and recreation

The GFD Project area contains a range of protected areas which hold conservation, tourism and recreational values by virtue of their undeveloped and in most instances, natural status. These are shown on Figure 8-6 and discussed in detail within Appendix J: Land use and tenure.



8.4.6 Infrastructure and utilities

8.4.6.1 Transport infrastructure

The GFD Project area contains a variety of transport infrastructure which is shown on Figure 8-7. This includes an extensive transport network including road, rail and aviation facilities. Major roads, including highways and other State-controlled roads include that are likely to be used by the GFD Project include:

- Carnarvon Highway
- Leichhardt Highway
- Warrego Highway
- Dawson Highway
- Blackwater-Rolleston Road
- Fitzroy Development Road
- Roma-Condamine Road
- Roma Southern Road
- Roma Taroom Road.

The primary rail line present in GFD Project area is the Western Line, which runs from Brisbane to Cunnamulla and services Roma.

The GFD Project area includes Civil Aviation Safety Authority certified aerodromes in Roma and Taroom. The GFD Project area also includes a large number of private, unnamed landing grounds and small aerodromes.

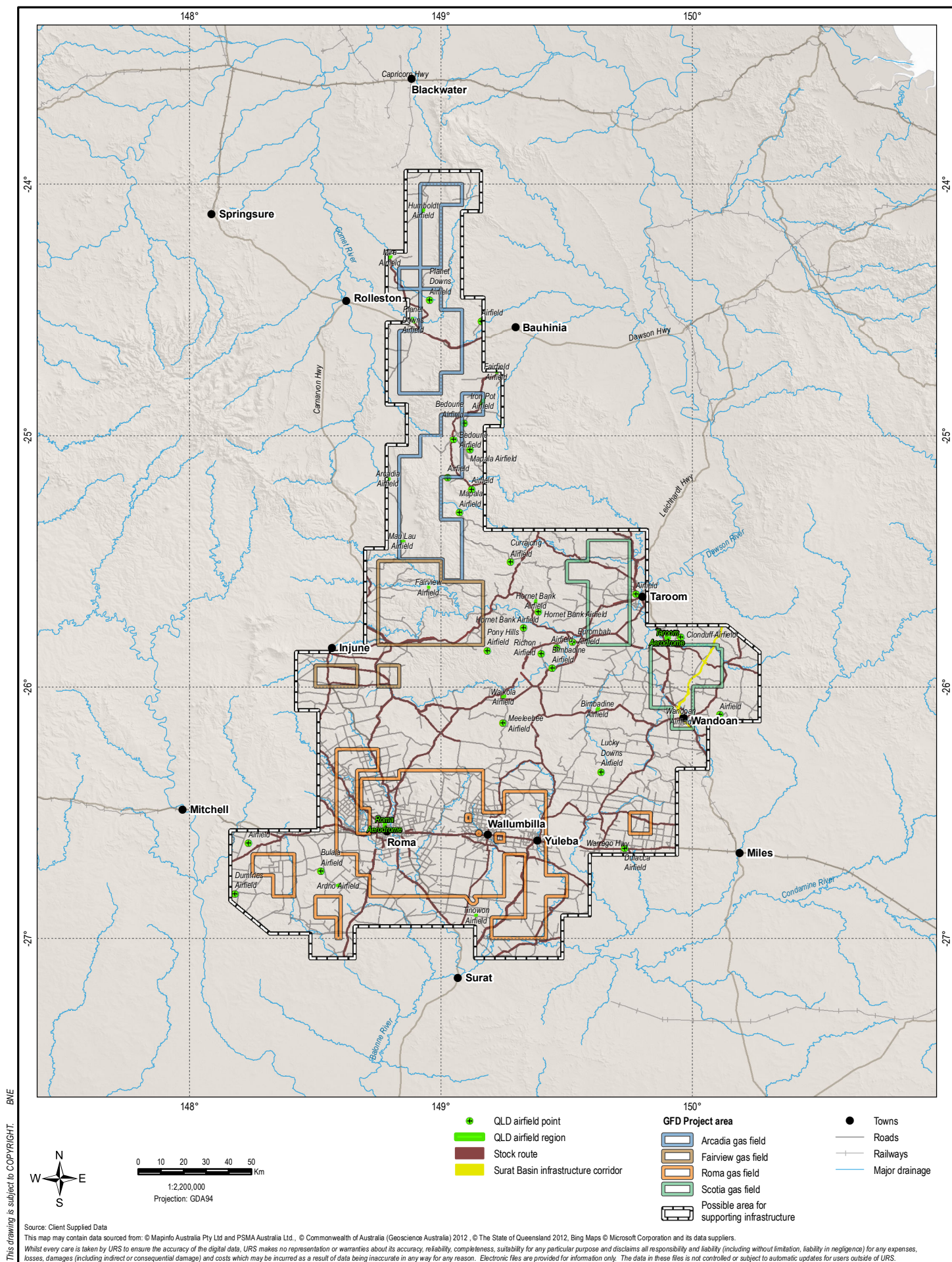
The transport infrastructure within the GFD Project area (including stock routes) is discussed further in Appendix J: Land use and tenure and Section 11: Traffic and transport.

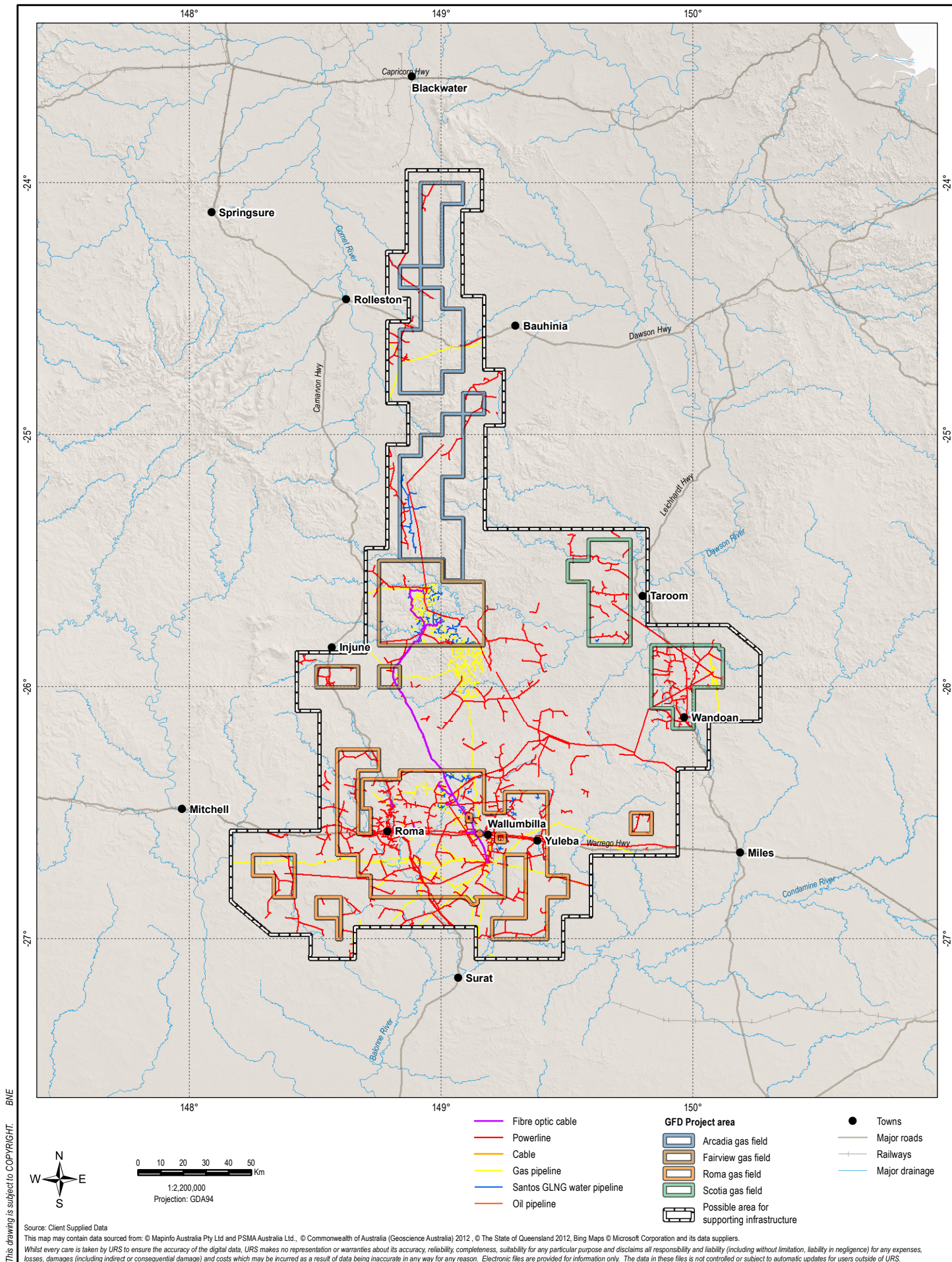
8.4.6.2 Utilities

Existing utilities that service the GFD Project area include:

- Urban, industrial and agricultural water supply infrastructure and pipelines
- Conventional and unconventional petroleum pipelines
- Gas production infrastructure servicing the Australia Pacific LNG, Queensland Gas Company and Santos GLNG projects
- Powerlink and Ergon electricity distribution infrastructure
- Telecommunications infrastructure such as fibre optic cables.

These are identified on Figure 8-8.





8.5 Potential impacts

8.5.1 Compliance assessment

The compliance assessment found that the GFD Project achieves a high level of compliance with the relevant land use planning frameworks, as detailed within appendix A of Appendix J: Land use and tenure. In areas where the GFD Project may impact SCA, the benefits that will accrue to the region and the State as a result of the GFD Project are considered to constitute an 'overriding need' in terms of net public benefit.

8.5.2 Significance assessment

The significance assessment identified the potential impacts to underlying land use and tenure as detailed in Table 8-8.

Table 8-8 Potential impacts to land use and tenure

Existing land use	Potential impact
Agriculture and primary production	<ul style="list-style-type: none"> • Loss of productive land • Diminished productivity • Disturbance of soil structure • Changes to surface water and irrigation flow patterns • Disruption to landholder operations • Weed and pest introduction.
Forestry resources	<ul style="list-style-type: none"> • Restrictions of access to forestry resources • Loss or premature harvesting of millable timber • Reduction of the amount of land available for growing timber • Interference with logging operations • Additional traffic on logging tracks.
Residential areas — urban	<ul style="list-style-type: none"> • Shortage of accommodation facilities • Shortage of available and appropriately zoned and serviced residential land • Increased demand for retail, commercial and industrial uses.
Residential areas – rural	<ul style="list-style-type: none"> • Noise and vibration • Dust • Increased traffic on local roads • Lighting.
Mining, petroleum and extractive industries	<ul style="list-style-type: none"> • Restrictions to the extraction of other resources • Restrictions to the exploration for other resources.
Conservation, tourism and recreational values	<ul style="list-style-type: none"> • Disturbance to vegetation and/or habitats • Reduced amenity affecting existing tourism and recreational values.
Impacts to transport infrastructure	<ul style="list-style-type: none"> • Disturbance to or interference with the operations of transport infrastructure such as roads, rail, aerodromes and landing grounds, and stock routes.
Utilities and services	<ul style="list-style-type: none"> • Disturbance to or interference with existing high voltage transmissions lines, gas pipelines, water pipelines or telecommunications facilities.

8.6 Mitigation measures

Santos GLNG is committed to implementing the mitigation measures in Table 8-9 to manage potential land use and tenure related impacts. These measures will be incorporated into Santos GLNG's management framework for the GFD Project, as described in Appendix Y: Draft EM plan.

Table 8-9 Mitigation measures – land use and tenure

Management plan	Mitigation measures
GFD Project environmental protocol for constraints planning and field development (the Constraints protocol)	<p>The Constraints protocol applies to all gas field related activities. The scope of the Constraints protocol is to:</p> <ul style="list-style-type: none"> • Enable Santos GLNG to comply with all relevant State and Federal statutory approvals and legislation • Support Santos GLNG's environmental policies and the General Environmental Duty (GED) as outlined in the <i>Environmental Protection Act 1994</i> (Qld) • Promote the avoidance, minimisation, mitigation and management of direct and indirect adverse environmental impacts associated with land disturbances • Minimise cumulative impacts on environmental values. <p>The Constraints protocol provides a framework to guide placement of infrastructure and adopts the following management principles:</p> <ul style="list-style-type: none"> • Avoidance — avoiding direct and indirect impacts • Minimisation — minimise potential impacts • Mitigation — implement mitigation and management measures • Remediation and rehabilitation — actively remediate and rehabilitate impacted areas • Offset — offset residual adverse impacts in accordance with regulatory requirements. <p>The Constraints protocol enables the systematic identification and assessment of environmental values and the application of development constraints to effectively avoid and / or manage environmental impacts.</p> <p>The land use constraints identified in the constraints planning process will be considered to ensure that GFD Project infrastructure with potentially high or moderate impacts will be generally avoided in no-go and surface development exclusion areas such as forest reserves (under the NC Act), as well as in areas of high or moderate land use constraints, such as State forests and timber reserves (under the Forestry Act).</p> <p>No above-ground GFD Project facilities will be established in designated stock routes. However, there is potential for minor short-term impacts to stock routes during construction activities. This may occur due to the temporary closure of some stock routes for safety purposes to allow for material delivery, construction of buried linear infrastructure, or the safe conduct of construction activities in close proximity to the stock route. Stock route infrastructure such as watering points, bores, windmills and holding yards within the GFD Project area is not expected to be impacted by the GFD Project as it will be avoided during field development planning.</p>
Decommissioning and abandonment management plan (DAMP)	<p>The DAMP describes the management framework in place for when petroleum activities cease. The objectives of the plan are to:</p> <ul style="list-style-type: none"> • Undertake decommissioning of assets in a manner that complies with regulatory requirements and minimises the risk of environmental harm • Undertake decommissioning activities in a manner that meets stakeholder expectations • Leave a landform that is stable and compatible with intended post-closure land use • Provide for the beneficial reuse of Santos GLNG infrastructure constructed to third parties (e.g. landholders or local authorities) where an appropriate agreement has been signed by both parties and regulatory authorities are satisfied.

Management plan	Mitigation measures
Draft environmental management plan (Draft EM plan)	<p>The Draft EM plan identifies the environmental values potentially affected by the GFD Project and proposes measures to manage the risk of potential adverse impact to these environmental values. The Draft EM Plan comprises:</p> <ul style="list-style-type: none"> • Environmental values potentially affected by the GFD Project • Environmental management objectives and associated management measures • Environmental monitoring and reporting • Coal seam water management • Proposed conditions. <p>The Draft EM plan includes provision for monitoring environmental parameters relevant to land use issues including soils, noise, dust and ecology.</p>
Erosion and sediment control management plan (ESCMP)	<p>The ESCMP identifies erosion and sedimentation risk and provides an erosion and sediment control strategy that incorporates understanding of the risk inherent to local land resource characteristics.</p> <p>The ESCMP is supported by the Erosion and Sediment Control Manual, which provides erosion, sediment and drainage controls in line with best practice guidelines. Appropriate dust management strategies will be implemented to protect residential amenity and agricultural productivity. For example, construction activities will aim to reduce exposure of disturbed areas to the minimum time period required, with progressive revegetation or rehabilitation as soon as practicable after the completion of construction.</p>
Fauna management plan (FMP)	<p>The FMP provides Santos GLNG's strategy to manage fauna during the construction and operations phases of the GFD Project. The plan:</p> <ul style="list-style-type: none"> • Identifies fauna species present within the gas fields • Prioritises management of both livestock and wildlife • Provides mitigation measures to minimise impacts to fauna from Santos GLNG activities.
Land access and landholder engagement strategy	<p>Santos GLNG has adopted an early engagement strategy where landholders that may be affected by GFD Project activities are able to discuss the potential location, timing and impacts of infrastructure on their property or business, and how Santos GLNG can help to minimise those impacts. This early engagement strategy has been developed in accordance with the <i>Land Access Code</i> (Department of Employment, Economic Development and Innovation, 2010).</p> <p>Santos GLNG is required to negotiate a conduct and compensation agreement under the P&G Act with landholders on whose land the petroleum activities will be carried out. The locations of wells, gathering lines, and access tracks will be finalised in consultation with the landholder as part of the negotiations.</p>
Noise management plan (NMP)	<p>The NMP identifies potential noise impacts from Santos GLNG activities and provides a strategy, methods and controls to:</p> <ul style="list-style-type: none"> • Avoid — plan the activity and engage with potentially affected stakeholders • Minimise — implement noise mitigation measures to minimise noise impacts • Manage — conduct monitoring, review mitigation methods and ensure compliance with Santos GLNG procedures. <p>Relevant noise management strategies will be implemented to protect residential amenity such as:</p> <ul style="list-style-type: none"> • Risk/constraint analysis to be undertaken prior to new operation or installation of new equipment that has the potential to create noise nuisance • Undertaking noise assessments to determine compliance with the stipulated noise limits • Procedures implemented for handling noise complaints, and for community liaison and consultation • Details of petroleum activities and measured and/ or predicted noise levels of noise sources associated with those activities • Reasonable and practicable control or abatement measures to ensure compliance with the established noise limits • Mediation processes to be used in the event that noise complaints are not able to be resolved.

Management plan	Mitigation measures
Pest and weed management plan (PWMP)	<p>The management of pest and weed species will be undertaken in accordance with the PWMP. The plan includes measures such as:</p> <ul style="list-style-type: none"> • Identification of pest and weed species and areas of infestation • Avoidance of traversing and placing infrastructure in areas of known infestation • Prevention of the spread of pest and weed species by implementing appropriate work practices and promotion of risk awareness • Control of identified pest and weeds through containment, reduction or eradication as required by legislation. • Engage stakeholders including landholders and local communities in assisting Santos GLNG in the identification and management of pests and weeds at Santos GLNG assets and activities. <p>Santos GLNG will review local government's pest and weed management plans and apply measures from these to the PWMP where it is appropriate.</p>
Rehabilitation management plan	<p>The Rehabilitation management plan outlines the rehabilitation objectives for Project-related disturbances within the GFD Project area. This includes the phasing of rehabilitation to first achieve stabilisation and subsequently final rehabilitation for disturbances to land (i.e. ground surface).</p> <p>The Rehabilitation management plan:</p> <ul style="list-style-type: none"> • Describes Santos GLNG's approach to rehabilitation • Identifies key rehabilitation objectives and criteria to deem rehabilitation success • Outlines general rehabilitation actions to be undertaken by Santos GLNG when rehabilitation a disturbance • Provides an overview of monitoring and maintenance actions to be conducted on rehabilitated areas.
Road-use management plan	<p>The Road-use management plan was developed to manage the impact associated with the implementation of the Santos GLNG Project. It will be adapted to manage the potential impacts resulting from the GFD Project. The objectives of the plan include:</p> <ul style="list-style-type: none"> • Manage the efficiency of the road network impacted including State-controlled roads and local government roads • Ensure user safety and safe operation of vehicles • Minimise impacts on road infrastructure condition • Minimise traffic related complaints and incidents to maintain community amenity. <p>This plan will be revised for the GFD Project as appropriate and is not included in this EIS.</p>
Significant species management plan (SSMP)	<p>The plan provides an overview of the strategy, methods and controls implemented by Santos GLNG to manage adverse impacts to <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth) listed significant species and their habitats, and threatened ecological communities. Specifically, the SSMP:</p> <ul style="list-style-type: none"> • Identifies and profiles significant species and threatened ecological communities that are present, or may occur, within the gas fields • Identifies key threats to significant species and threatened ecological communities caused by activities within the gas fields • Outlines general mitigation measures to be implemented by Santos GLNG to minimise the potential adverse impact of key threats to significant species and threatened ecological communities caused by Santos GLNG activities.

Management plan	Mitigation measures
Social impact management plan (SIMP)	<p>The SIMP established for the GLNG Project will be implemented across the GFD Project. The plan outlines the roles, responsibilities and rights of Santos GLNG, the government, impacted communities and other stakeholders in relation to the GFD Project. In particular, it outlines the framework for community engagement, management strategies to avoid, mitigate or minimise potential impacts and to maximise opportunities and benefits arising throughout the life of the GFD Project, as well as a monitoring and reporting process.</p> <p>The GLNG Project SIMP will be supplemented by issue action plans relating to the GFD Project that focus on the following key areas as agreed with the Coordinated Project Delivery Division of the Coordinator-General's office:</p> <ul style="list-style-type: none"> • Water and environment • Community safety • Social infrastructure • Community wellbeing and liveability • Local industry participation and training • Aboriginal engagement and participation. <p>The SIMP is an operational document that is updated to reflect the ongoing needs of Santos GLNG and the communities it operates in. It is available on the web at: http://www.santosglng.com/resource-library/community/social-impact-management-plan-community-handbook.aspx</p>

8.7 Significance assessment

As discussed in section 8.3, impacts were assessed using the significance assessment methodology. As the GFD Project area covers a large geographical area, the general nature of potential impacts to environmental values associated with GFD Project activities are identified and assessed within this section.

Table 8-10 summarises the assessment undertaken for the potential impacts of the GFD Project on land use and tenure values. For each identified potential impact, the assessment considered:

- The potential pre-mitigated significance, which that only the Constraints protocol has been applied and the potential impacts are at their greatest
- The mitigation measures that will be used to manage the potential impacts on land use and tenure values. These measures will reduce the magnitude of the potential impacts
- The residual significance of the potential impact after the implementation of mitigation measures. The residual significance takes into account the potential for impact that remains after the mitigation measures are applied.

Table 8-10 Impact assessment – land use and tenure

Potential impact	Phase	Pre-mitigated significance			Mitigation and management measures	Residual significance	
		Sensitivity	Magnitude	Significance		Magnitude	Significance
Impacts on agriculture and primary production							
Loss of productive land	Construction	Moderate	Moderate	Moderate	The Land access and landholder engagement strategy will be employed to reduce the potential for GFD Project activities to impact upon landholder operations. The DAMP will be implemented to mitigate and manage impacts resulting from the cessation of petroleum activities. The plan includes measures as identified in Table 8-9. The Rehabilitation management plan will be implemented to enable the return of disturbed areas to a pre-clearance state or another stable landform consistent with the surrounding undisturbed area or to final acceptance criteria. The plan includes measures as identified in Table 8-9.	Low	Low
	Operations		Low	Low		Low	Low
	Decommissioning		Low	Low		Low	Low
Diminished productivity	Construction	Moderate	Moderate	Moderate		Low	Low
	Operations		Low	Low		Low	Low
	Decommissioning		Low	Low		Low	Low
Disturbance of soil structure	Construction	Moderate	Moderate	Moderate		Low	Low
	Operations		Low	Low		Low	Low
	Decommissioning		Low	Low		Low	Low
Changes to surface water and irrigation flow patterns	Construction	Moderate	Moderate	Moderate		Low	Low
	Operations		Low	Low		Low	Low
	Decommissioning		Low	Low		Low	Low
Disruption to landholder operations	Construction	Moderate	Moderate	Moderate		Low	Low
	Operations		Low	Low		Low	Low
	Decommissioning		Low	Low		Low	Low
Weed and pest introduction	Construction	Moderate	Low	Low	Implement the management principles contained in the PWMP as identified in Table 8-9.	Low	Low
	Operations		Low	Low		Low	Low
	Decommissioning		Low	Low		Low	Low
Loss of forestry resources							
Restrictions of access to forestry resources	Construction	Moderate	Low	Low	A permit is required under the <i>Forestry Act 1959</i> (Qld) prior to interfering with forest products on a State forest, timber reserve or forest entitlement area. Such permits are subject to provisions and conditions, including	Low	Low
	Operations		Low	Low		Low	Low
	Decommissioning		Low	Low		Low	Low

Potential impact	Phase	Pre-mitigated significance			Mitigation and management measures	Residual significance	
		Sensitivity	Magnitude	Significance		Magnitude	Significance
Loss or premature harvesting of millable timber	Construction	Moderate	Moderate	Moderate		Low	Low
	Operations		Low	Low		Low	Low
	Decommissioning		Low	Low		Low	Low
Reduction of the amount of land available for growing timber	Construction	Moderate	Low	Low		Low	Low
	Operations		Low	Low		Low	Low
	Decommissioning		Low	Low		Low	Low
Interference with logging operations	Construction	Moderate	Moderate	Moderate		Low	Low
	Operations		Low	Low		Low	Low
	Decommissioning		Low	Low		Low	Low
Additional traffic on logging tracks	Construction	Moderate	Low	Low		Low	Low
	Operations		Low	Low		Low	Low
	Decommissioning		Low	Low		Low	Low

Impacts residential areas – urban areas (PLAs)

Increased competition for accommodation facilities	Construction	Moderate	Moderate	Moderate	<p>The established SIMP will be implemented across the GFD Project. The plan outlines the roles, responsibilities and rights of Santos GLNG, the government, impacted communities and other stakeholders in relation to the GFD Project. In particular, it outlines the framework for community engagement, management strategies to avoid, mitigate or minimise potential impacts and to maximise opportunities and benefits arising throughout the life of the GFD Project, as well as a monitoring and reporting process.</p> <p>The SIMP will be supplemented by the following action plans as agreed with the Coordinated Project Delivery Division of the Coordinator-General's office:</p> <ul style="list-style-type: none"> • Workforce management action plan • Housing and accommodation action plan • Stakeholder engagement action plan • Community health and wellbeing action plan. 	Low	Low
	Operations		Low	Low		Low	Low
	Decommissioning		Low	Low		Low	Low
Increased competition for available and appropriately zoned and serviced residential land	Construction	Moderate	Moderate	Moderate		Low	Low
	Operations		Low	Low		Low	Low
	Decommissioning		Low	Low		Low	Low
Increased demand for retail, commercial and industrial uses	Construction	Moderate	Moderate	Moderate		Low	Low
	Operations		Low	Low		Low	Low
	Decommissioning		Low	Low		Low	Low

Potential impact	Phase	Pre-mitigated significance			Mitigation and management measures	Residual significance	
		Sensitivity	Magnitude	Significance		Magnitude	Significance
					<p>The SIMP will be used to assess and develop a range of strategies that could be applied, associated with impacts on residential land uses such as:</p> <ul style="list-style-type: none"> Actively monitor the housing market and engage with key stakeholders to ensure appropriate housing strategies are in place prior to field development Use purpose built temporary and permanent workforce accommodation facilities, located outside major communities Assist members of the community vulnerable to housing affordability pressures. This may include rental assistance subsidies, capacity building programs, and strategies to release identify supply constraints. 		

Impacts residential areas – rural

Noise and vibration	Construction	Moderate	Low	Low	<p>Noise and vibration will be managed in accordance with the NMP identified in Table 8-9.</p> <p>The limitation of disturbed areas and progressive rehabilitation (to assist in dust minimisation) will be implemented as detailed in the ESCMP. Appropriate dust management strategies will be implemented to protect residential amenity and agricultural productivity such as:</p> <ul style="list-style-type: none"> Construction activities will aim to reduce exposure of disturbed areas to the minimum time period required, with progressive revegetation or rehabilitation as soon as practicable after the completion of construction. Dust suppression (water, mulching or alternative measures) will be applied to exposed surfaces that are generating dust. <p>The Road-use management plan was developed to manage the impact associated with the implementation of the Santos GLNG Project, and will be either adapted or a new plan developed to manage the potential impacts resulting from the GFD Project.</p>	Low	Low
	Operations		Low	Low		Low	Low
	Decommissioning		Low	Low		Low	Low
Dust	Construction	Moderate	Low	Low		Low	Low
	Operations		Low	Low		Low	Low
	Decommissioning		Low	Low		Low	Low
Increased traffic on local roads	Construction	Moderate	Low	Low		Low	Low
	Operations		Low	Low		Low	Low
	Decommissioning		Low	Low		Low	Low
Lighting	Construction	Moderate	Low	Low		Low	Low
	Operations		Low	Low		Low	Low
	Decommissioning		Low	Low		Low	Low

Potential impact	Phase	Pre-mitigated significance			Mitigation and management measures	Residual significance	
		Sensitivity	Magnitude	Significance		Magnitude	Significance
					<p>The objectives of the plan include:</p> <ul style="list-style-type: none"> Manage the efficiency of the road network impacted including State-controlled roads and local government roads Ensure user safety and safe operation of vehicles Minimise impacts on road infrastructure Minimise traffic related complaints and incidents. <p>Impacts associated with night lighting will be managed and mitigated through the Draft EM Plan and the SIMP.</p> <p>In accordance with the Draft EM Plan, lighting disturbance's will be minimised where practicable by:</p> <ul style="list-style-type: none"> Directing lighting away from sensitive receptors, including houses, homesteads, tourists roads and recreational areas Engineering solutions to limit light spillage where practicable. <p>Complaints concerning night lighting will be managed according to the dispute resolution process outlined within the SIMP.</p>		
Impacts to mining, petroleum and extractive industries							
Restrictions to the extraction of other resources	Construction	Moderate	Moderate	Moderate	<p>Santos GLNG will establish agreements with overlapping tenure holders to minimise impacts of the GFD Project on the exploration for and/or mining of mineral resources within the GFD Project area. These agreements will include issues such as safety and environmental management as well as commercial and operational aspects.</p>	Moderate	Moderate
	Operations		Moderate	Moderate		Low	Low
	Decommissioning		Low	Low		Low	Low
Restrictions to the exploration for other resources	Construction	Moderate	Moderate	Moderate	<p>For other extractive operations such as those associated with the Warriar KRA (KRA 85), Santos GLNG will seek agreement with the operators to ensure compatibility with any proposed GFD Project activities.</p>	Low	Low
	Operations		Moderate	Moderate		Low	Low
	Decommissioning		Low	Low		Low	Low

Potential impact	Phase	Pre-mitigated significance			Mitigation and management measures	Residual significance	
		Sensitivity	Magnitude	Significance		Magnitude	Significance
Impacts to conservation, tourism and recreational values							
Disturbance to vegetation and/or habitats	Construction	Moderate	Moderate	Moderate	The SSMP provides an overview of the strategy, methods and controls implemented by Santos GLNG to manage adverse impacts EPBC Act-listed significant species and their habitats, and threatened communities. Specifically, the SSMP: <ul style="list-style-type: none">Identifies and profiles significant species and threatened ecological communities that are present, or may occur, within the gas fieldsIdentifies key threats to significant species and threatened ecological communities caused by activities within the gas fieldsOutlines general mitigation measures to be implemented by Santos GLNG to minimise the potential adverse impact of key threats to significant species and threatened communities caused by Santos GLNG activities. The FMP will be implemented to mitigate and manage potential impacts to fauna during vegetation clearing. The plan details: <ul style="list-style-type: none">A description of the current distribution of fauna within the project area highlighting species of conservation significanceManagement strategies and procedures to be implemented to minimise impacts to fauna speciesMonitoring and reporting requirements. The management of pest and weed species will be undertaken in accordance with the PWMP as detailed in Table 8-9. The Rehabilitation management plan will be implemented to enable the return of disturbed areas to a pre-clearance state or another stable landform consistent with the surrounding undisturbed area or to final acceptance criteria. The plan includes measures identified Table 8-8..	Moderate	Moderate
	Operations		Low	Low		Low	Low
	Decommissioning		Low	Low		Low	Low

Potential impact	Phase	Pre-mitigated significance			Mitigation and management measures	Residual significance	
		Sensitivity	Magnitude	Significance		Magnitude	Significance
Reduced amenity affecting existing tourism and recreational values	Construction	Low	Moderate	Low	<p>Noise and vibration will be managed in accordance with the NMP. Relevant noise management strategies will be implemented to protect tourism and recreational amenity such as:</p> <ul style="list-style-type: none"> • Risk/constraint analysis methods to be undertaken prior to new operation or installation of new equipment that has the potential to create noise or vibration nuisance • Procedures and methods to undertake noise assessments to determine compliance with the stipulated noise limits • Procedures for handling noise complaints, and procedures for community liaison and consultation • Details of petroleum activities and measured and/or predicted noise levels of noise sources associated with those activities • Reasonable and practicable control or abatement measures to ensure compliance with the established noise and vibration limits • Mediation processes to be used in the event that noise complaints are not able to be resolved. <p>The limitation of disturbed areas and progressive rehabilitation (to assist in dust minimisation) will be implemented as detailed in the ESCMP. Appropriate dust management strategies will be implemented to protect residential amenity and agricultural productivity such as:</p> <ul style="list-style-type: none"> • Construction activities will aim to reduce exposure of disturbed areas to the minimum time period required, with progressive revegetation or rehabilitation as soon as practicable after the completion of construction. • Dust suppression (water, mulching or alternative measures) will be applied to exposed surfaces that are generating dust. 	Low	Negligible
	Operations		Low	Low		Low	Negligible
	Decommissioning		Low	Low		Low	Negligible

Potential impact	Phase	Pre-mitigated significance			Mitigation and management measures	Residual significance	
		Sensitivity	Magnitude	Significance		Magnitude	Significance
					<p>The Road-use management plan was developed to manage the impact associated with the implementation of the Santos GLNG Project, and will be either adapted or a new plan developed to manage the potential impacts resulting from the GFD Project. The objectives of the plan include:</p> <ul style="list-style-type: none"> • Manage the efficiency of the road network impacted including State-controlled roads and local government roads • Ensure user safety and safe operation of vehicles • Minimise impacts on road infrastructure • Minimise traffic related complaints and incidents. <p>This plan will be revised for the GFD Project, as appropriate and is not included in this EIS.</p>		

Impacts to transport infrastructure

Disturbance to or interference with the operations of transport infrastructure, such as roads, rail activities, aerodromes and landing grounds and stock routes	Construction	Moderate	Moderate	Moderate	<p>Santos GLNG will negotiate a conduct and compensation agreement under the P&G Act with landholders on whose land the petroleum activities will be carried out. The locations of wells, gathering lines, and access tracks will be finalised in consultation with the landholder as part of the negotiations.</p> <p>Impacts to road infrastructure will be mitigated through implementing measures contained in the Road-use management plan identified Table 8-9.</p> <p>Where a gas or water gathering line is required to cross under a railway line it will be either bored or directionally drilled thereby avoiding direct impacts.</p> <p>No above-ground GFD Project facilities will be established in designated stock routes.</p>	Low	Low
	Operations		Low	Low		Low	Low
	Decommissioning		Low	Low		Low	Low

Potential impact	Phase	Pre-mitigated significance			Mitigation and management measures	Residual significance	
		Sensitivity	Magnitude	Significance		Magnitude	Significance
Impacts to utilities and services							
Disturbance to or interference with existing high voltage transmissions lines, gas pipelines, water pipelines or telecommunication s facilities	Construction	Moderate	Low	Low	Santos GLNG will negotiate a conduct and compensation agreement under the P&G Act with landholders on whose land the petroleum activities will be carried out. The locations of wells, gathering lines, and access tracks will be finalised in consultation with the landholder as part of the negotiations.	Low	Low
	Operations		Low	Low		Low	Low
	Decommissioning		Low	Low		Low	Low

8.8 Conclusions

The residual land use and tenure impacts that remain after the application of mitigation and management measures are detailed in Table 8-11. The significance assessment found that the residual impacts of the GFD Project are expected to be low.

Table 8-11 Residual significance – land use and tenure

Existing land use	Potential impacts	Residual significance		
		Construction	Operations	Decommissioning
Agriculture and primary production	Loss of productive land	Low	Low	Low
	Diminished productivity	Low	Low	Low
	Disturbance of soil structure	Low	Low	Low
	Changes to surface water and irrigation flow patterns	Low	Low	Low
	Disruption to landholder operations	Low	Low	Low
	Weed and pest introduction	Low	Low	Low
Forestry resources	Restrictions of access to forestry resources	Low	Low	Low
	Loss or premature harvesting of millable timber	Low	Low	Low
	Reduction of the amount of land available for growing timber	Low	Low	Low
	Interference with logging operations	Low	Low	Low
	Additional traffic on logging tracks	Low	Low	Low
Residential areas – urban	Shortage of accommodation facilities	Low	Low	Low
	Shortage of residential land	Low	Low	Low
	Increased demand for retail, commercial and industrial uses	Low	Low	Low
Residential areas – rural	Noise and vibration	Low	Low	Low
	Dust	Low	Low	Low
	Increased traffic on local roads	Low	Low	Low
	Lighting	Low	Low	Low
Mining, petroleum and extractive industries	Restrictions to the extraction of other resources	Moderate	Low	Low
	Restrictions to the exploration for other resources	Low	Low	Low
Conservation, tourism and recreational values	Disturbance to vegetation and/or habitats	Moderate	Low	Low
	Reduced amenity affecting existing tourism and recreational values	Negligible	Negligible	Negligible
Transport infrastructure	Disturbance to or interference with the operations of transport infrastructure, such as roads, rail activities, aerodromes and landing grounds and stock routes	Low	Low	Low
Utilities and services	Disturbance to or interference with existing high voltage transmissions lines, gas pipelines, water pipelines or telecommunications facilities	Low	Low	Low