

Request to evaluate proposed changes to the housing and accommodation conditions of the APLNG project

Version:	2
Released:	7 June, 2018
Document Owner:	Natasha Patterson, Strategic Approvals Manager
Review Date:	N/A

Contents

Contents	2
1. Executive Summary	3
2. Details of the proposed changes	4
3. Effects of, and reasons for, the proposed change relating to SPP 1/92	4
4. Effects of, and reasons for, the proposed change relating to the retention of villages	5
5. Other economic and social benefits of the project	12
6. Consultation and work with Maranoa Regional Council	14
7. Conclusion	14

1. Executive Summary

The purpose of this paper is to request that you evaluate a proposed change to the conditions of the APLNG project relating to housing and accommodation. The proposed change relates specifically to the retention of our temporary workers' accommodation facilities ("villages") that support our activities in the Reedy Creek and Combabula fields, which are within the Maranoa local government area. If the proposed changes are not made, Origin (as the Upstream Operator of the APLNG project), would have to further consider accommodating up to 655 people in Roma, which is approximately 105 kilometres from the Reedy Creek and Combabula Gas Processing Facility (GPF), from as early as May 2018.

Origin ceased using its villages¹ in the Western Downs local government area towards the end of 2017. As an alternative to continuing to use the existing villages within the Maranoa area, Origin has assessed the options of moving people to existing housing in Roma and towns near the Reedy Creek and Combabula fields, establishing new housing in those towns and establishing new accommodation facilities near the existing villages.

That assessment demonstrates that retention of the existing villages is the most suitable option, and is the only option (other than building new facilities near the existing villages) that meets minimum requirements for ensuring the health and safety of Origin personnel:

- The only towns that are a safe driving distance to the Reedy Creek and Combabula facilities are Yuleba and (arguably, in limited circumstances²) Wallumbilla. There is minimal³ available housing in the towns of Yuleba and Wallumbilla;
- Origin cannot meet its workplace health and safety duties if it requires its workforce to travel between Roma and those facilities and associated transient work fronts every day. In any event, there is not sufficient⁴ available housing in Roma either;
- Establishing sufficient new accommodation in Yuleba and Wallumbilla (or Roma, if that represented a safe outcome) would give rise to unsustainable housing growth (already seen elsewhere in the gas fields), and would have severe economic and social impacts. It would not provide any additional medium to long-term social or economic benefits to the communities near the gas fields;
- Maintaining the existing facilities has the least environmental effects;
- Maintaining the existing facilities has the least detrimental effects on the project, including:
 - o the safety, health and wellbeing of workers;
 - o Productivity; and
 - o Cost to produce gas (which is relevant to the economic benefits to be realised for Queensland).

Additionally, the APLNG project has already provided, and will continue to provide, significant economic and social benefits for regional communities in Queensland. APLNG and Origin will continue to focus on collaborating with those communities so that they can achieve their own aspirations.

A change to remove a reference to a repealed State Planning Policy is also sought.

¹ As set out in the EIS and the Coordinator-General's report, small mobile accommodation facilities provided with each drilling rig are still in use in both the Western Downs and Maranoa local government areas.

² Such as those parts of the tenure closest to Wallumbilla by road.

³ Public searches indicate that as at 6 March 2018, there are 3 houses available for rent in Yuleba and Wallumbilla.

⁴ Public searches indicate that as at 6 March 2018, there are approximately 60 houses available for rent in Roma.

2. Details of the proposed changes

The relevant existing condition is as follows:

Appendix 2: Conditions that apply to the gas fields

Condition 1

Temporary workers' accommodation – location

Prior to construction, consultation with the relevant local government authority is to be undertaken to determine the appropriate location for all TWAFs. Consideration must be given to regional and local planning issues.

TWAFs must not be constructed on land identified as Good Quality Agricultural Land Categories A and B, as described in State Planning Policy 1/92. In no case are they to remain in position for in excess of 5 years unless approved by the relevant local government authority.

The proposed replacement condition is as follows:

Appendix 2: Conditions that apply to the gas fields

Condition 1

Temporary workers' accommodation – location

Prior to construction, consultation with the relevant local government authority is to be undertaken to determine the appropriate location for all TWAFs. Consideration must be given to regional and local planning issues.

In the Western Downs local government area, TWAFs are not to be used as a TWAF for more than five (5) years without the written consent of the Western Downs Regional Council.

3. Effects of, and reasons for, the proposed change relating to SPP 1/92

In November 2010 when the Coordinator-General's report was prepared, there were limited mechanisms to manage the potential impacts of petroleum activities on good quality agricultural land. Such impacts were principally regulated through conditions included in environmental authorities issued pursuant to the *Environmental Protection Act 1994*. The condition was imposed to ensure that any potential impacts on good quality agricultural land were appropriately regulated.

In 2011, the *Strategic Cropping Land Act 2011* was enacted. That legislation has since been repealed (as has SPP 1/92), and the *Regional Planning Interests Act 2014* now regulates the potential impacts. The existence of the *Regional Planning Interests Act 2014* is such that there is no longer any need for the conditions.

The removal of the condition as it relates to repealed SPP 1/92 will not give rise to any change to the environmental effects of the project or related matters.

4. Effects of, and reasons for, the proposed change relating to the retention of villages

4.1 Housing and accommodation – impact assessment, conditions and commitments

The EIS process (including the Social Impact Assessment) identified that the workforce requirements for the construction and operational phases of the APLNG project gave rise to many potential social and economic impacts, including in relation to housing and accommodation. It is clear from the project documentation and the Coordinator-General's report that housing and accommodation was inextricably related to other potential social and economic impacts.

In addition to the condition relating specifically to retention of the villages, additional related conditions were imposed in relation to:

- Finalisation of the Social Impact Management Plan (SIMP);
- Community investment;
- Finalisation of the Integrated Housing and Accommodation Strategy (IHAS); and
- Camp building standards, sewerage systems, waste, amenity, water and related matters of concern to the local government authorities.

The IHAS for the project was specifically directed at mitigating against the impacts on housing affordability caused by increased demand but without creating unsustainable levels of housing growth. APLNG committed to:

- Provide temporary accommodation proximate to our major facilities, such as the gas processing facilities (GPFs), to cater for the significant increase in our construction workforce;
- Sustainably increase the number of permanent operations personnel living in towns close to the gas fields with a view to approximately 40% of the operations workforce living locally by 2025;
- Offset the short-term impacts by funding assistance programs directed at low to medium income households; and
- Fund and partner with others to deliver quality affordable housing and sustainable market-driven housing growth.

4.2 Housing and accommodation – current state

Pursuant to the conditions and commitments, accommodation villages were constructed near the Condabri, Reedy Creek and Combabula GPFs to accommodate our workforce, and take pressure off local housing and related infrastructure and essential services.

Relevant to this application, the combined \$50 million dollar construction costs for the Reedy Creek and Bungaroo villages (near Reedy Creek and Combabula GPFs) is broken down in Table 1.

Table 1: Cost of construction of the relevant facilities in the Maranoa local government area

Accommodation facilities	Investment
Reedy Creek Village	\$45.9 million
Bungaroo Village	\$8.8 ⁵ million ⁵
Total minimum investment	\$54.7 million

⁵ Bungaroo village was constructed in phases. \$8.8 million represents the cost for about half of its capacity.

Additionally, the facilities at the Talinga GPF (within the EIS area) and Spring Gully GPF (outside the EIS area) were retained. Office facilities and control rooms are co-located with the Condabri, Reedy Creek, Talinga and Spring Gully GPFs, and are the usual place of work for many of our personnel.

APLNG honoured its commitments to mitigate the anticipated short and medium- term impacts. APLNG funded assistance programs, and partnered to deliver affordable housing for people employed in providing essential services to local towns. A summary of the actions taken and associated investment against each short and medium-term commitment in the IHAS is set out in Table 2.

Table 2: IHAS Action and Investment

Timing	IHAS element	Action	Investment
Short-term	Fund the RentConnect Program	APLNG funded a RentConnect Officer to work in Miles and Chinchilla	\$65,000
	Implement and fund a housing support case management program	APLNG funded Housing Officers in Miles and Chinchilla	\$222,000
	Fund council town planning capacity	APLNG partnered with WDRC to fund additional town planning capacity	\$260,000
Medium Term	Facilitate and fund development Partnerships	APLNG facilitated and funded partnerships in Western Downs and Maranoa local government areas	\$4,050,000 (WDRC) \$1,875,000 (MRC)
	Develop Infrastructure investment	APLNG funded water and sewerage upgrades in Western Downs, and sewerage upgrades in Maranoa	\$1,290,000 (WDRC) \$1,500,000 (MRC)
Total investment			\$9,262,000

Whilst the strategy took pressure off local housing, it did not curtail the speculative investment in new housing stock foreshadowed in the IHAS. By 2017, there was a significant over-supply of housing in the Western Downs local government area.

In 2017, following extensive collaboration with the Western Downs Regional Council, Miles and District Chamber of Commerce (MDCC), Miles local community representatives and business leaders, the Honourable Ann Leahy MP and the Queensland Resources Council, we decided to cease using the Condabri and Talinga facilities (both located in the Western Downs local government area). In that region, our people now either live permanently in local towns, stay in local housing when they are working, or stay in workers' camps located in local towns and operated by others. Since we ceased using the Condabri and Talinga villages, members of the MDCC have indicated to us that the number of vacant homes in Miles and Chinchilla has reduced considerably.

Whilst we are not using the Condabri and Talinga villages, they do remain in position. We have not yet decided what to do with the physical infrastructure. One aspect of the requested change is to clarify that the requirement is not to use a camp for more than 5 years (as distinct from a requirement to not leave it in situ), which was the intent of the condition. Given the proximity of towns in the Western Downs local government area to the project activities, and the associated regional and town planning, housing and related issues in which the Western Downs Regional Council has an interest, we consider the requirement for its consent to continue to use a camp for more than five (5) years is appropriate.

The situation in the Maranoa local government area is different, principally due to the distance between our major facilities and work fronts, and the local towns. We continue to accommodate the majority of our people that work in the Combabula, Reedy Creek and Spring Gully fields (regardless of where they permanently reside) in the Reedy Creek, Bungaroo and Spring Gully villages whilst they are working. This typically includes our gathering contractors' workforces. We continue to maintain an office in Roma staffed by permanent Roma residents. At present, 50 Origin employees live permanently in the Maranoa local government area. Many of those stay in villages when they are working.

4.3 *Assessment of alternatives to the retention of Reedy Creek and Bungaroo villages*⁶

Reedy Creek village is typically operated near its 450-person capacity. Bungaroo village has historically been operated at between 75-100% of its 205-person capacity, but is currently not in use due to the current location and level of activity and associated workforce. The location of the villages (including Spring Gully village) and nearby towns are shown in Figure 1. The map also identifies the location of gas processing facilities and offices. Activities associated with drilling and connecting new wells are transient and can be located anywhere within the tenure.

Origin cannot meet its workplace health and safety duties if it requires its workforce to travel between Roma and the Reedy Creek and Combabula facilities and associated transient work fronts every day. Roma is at least 80 minutes by road away from the Reedy Creek GPF. The feasible alternatives to the retention of the Reedy Creek and Bungaroo villages are:

- *Option 1:* Utilise existing accommodation in Yuleba, Wallumbilla, Wandoan and/ or Roma;
- *Option 2:* Fund or build new housing in Yuleba, Wallumbilla, Wandoan and/ or Roma; or
- *Option 3:* Construct new facilities proximate to Reedy Creek and Combabula fields.

When we began investigating whether we could cease using the Condabri and Talinga facilities, we re-assessed the associated land transport risk. Our residual land transport risk rating remains high. We do not accept that profile on an ongoing basis. We have a project specifically targeted at halving that risk profile as it relates to the movement of people and materials by June 2018. Our objective is to eliminate all unnecessary travel. Measures include significantly reducing our kilometres travelled by road.⁷

To support that, Origin developed a number of accommodation principles directed firstly to the safety, health and wellbeing of our workforce. In addition to our own commitment to ensuring the health and safety of our people, we have statutory duties to ensure, so far as is reasonably practicable, the health and safety of people working in our business. We cannot fail to discharge that duty.

Table 3 sets out an assessment of each of the options against the accommodation principles, and where relevant, the availability of accommodation.

⁶ Alternatives to the retention of Spring Gully village is not assessed here, as the condition does not apply to it (as it was outside the EIS area). The closest town, by road, to the Spring Gully GPF is approximately 80 kilometres away at Roma.

⁷ In the month of March 2017 alone, the Integrated Gas business unit (which is essentially the Upstream Operator of the project) travelled nearly 850,000 kilometres. That was projected to further increase every year.

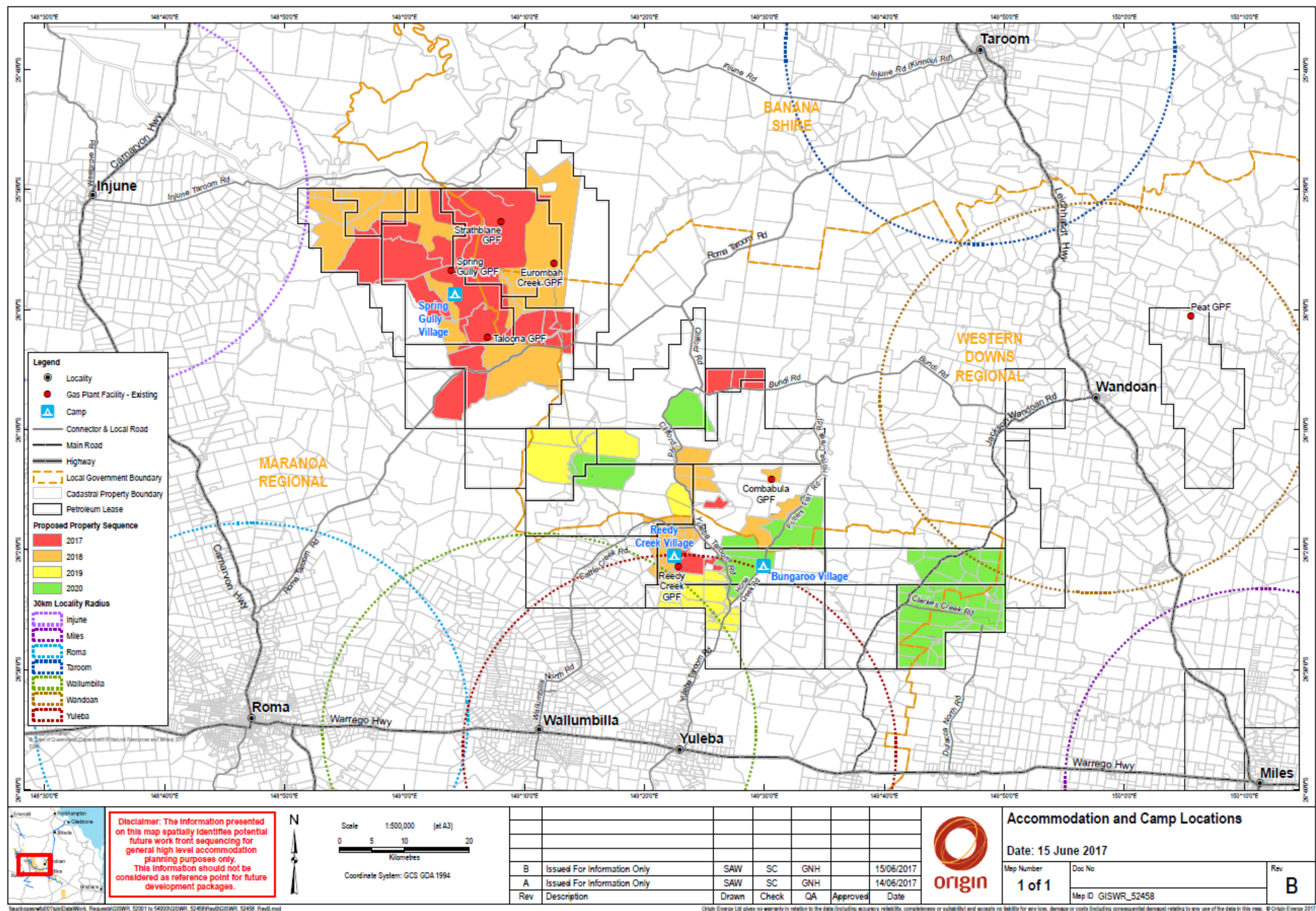


Figure 1 –

Table 3: Assessment of Accommodation Options

Accommodation Principle	Option 1	Option 2	Option 3	Current state
Personnel should be accommodated as close as practical to their primary work site. (Drivers: safety, productivity)	Yuleba is the only community within 45 minutes by road of the Reedy Creek and Combabula GPF. Wallumbilla is approximately one-hour by road to the facilities. After the existing villages, Yuleba and Wallumbilla are the closest accommodation options to the Reedy Creek and Combabula GPFs. Approximately 24% of the tenure and transient work fronts are within 45 minutes of local towns.		These options best deliver against this principle. The existing villages (and any potential additional facilities) are the closest accommodation to all of the major project facilities. 95% of the tenure and transient work fronts are within 45 minutes of the villages.	
Personnel will not travel for more than 45 minutes ⁸ , one-way, in normal conditions between Origin-provided accommodation and usual place of work. (Drivers: safety, productivity)	Yuleba is the only community within 45 minutes by road to Reedy Creek and Combabula GPFs. Approximately 24% of the tenure and transient work fronts are within 45 minutes by road of Yuleba (15%), Wallumbilla (8%) and Wandoan (1%).		These options best deliver against this principle. 95% of the tenure and transient work fronts are within 45 minutes by road of the villages.	
Origin-provided accommodation type (housing, hotel, bulk-accommodation) will be matched with workforce nature (permanent, short-term visitors, longer-term transient). (Drivers: local economic benefit, health & wellbeing)	Yuleba and Wallumbilla are the only relevant communities (for personnel that work at the Reedy Creek facilities). The most suitable accommodation type for these workers would be housing. As at 6 March 2018, public searches indicate there is 1 property for rent in Yuleba and 2 properties for rent in Wallumbilla.		Housing and bulk accommodation are the most suitable accommodation for permanent and longer-term transient workers (i.e. people drilling and connecting new wells). Bulk accommodation would be available for both options.	
Existing third-party accommodation is to be used in preference to establishing temporary accommodation facilities. (Driver: local economic benefit, cost)	These options best deliver against this principle.		This option is least able to deliver against this principle.	This option delivers against this principle as it is not proposed to establish new temporary accommodation facilities.
Where possible, accommodation	This option does not deliver against this principle, without investing in new		This option delivers against this principle	This option best delivers against this

⁸ Rig crews have a 30-minute maximum travel time due to the 24-hour nature of operations. The use of the small mobile accommodation facilities associated with rigs is not relevant to the condition, proposed change or the decision.

should also include the provision of adequate office and shared facilities (meeting rooms etc....) to reduce travel requirements for office-based workers. (Drivers: safety, productivity)	office and shared facilities to complement housing.		as any new purpose-built facilities would include appropriate office and shared facilities.	principle as office and shared facilities already exist.
Quality Wi-Fi communications ⁹ must be made available at accommodation facilities. (Driver: health & wellbeing)	This option delivers against this principle, noting that upgrade of the publicly accessible telecommunications facilities would be possible over time.		This option delivers against this principle as any new purpose-built facilities would include quality Wi-Fi.	This option best delivers against this principle as quality Wi-Fi already exists.
Overall ranking (on consistency with the principles) from 1 (highest ranking) to 4 (lowest ranking) – ignores availability of accommodation	Rank: 3 (Equal)	Rank: 3 (Equal)	Rank: 2	Rank: 1 This option (status quo) overall best delivers against all of the principles. Options 3 and 4 represent materially reduced land transport risk than options 1 and 2.
Other Considerations				
Environmental effects ¹⁰ Ranked from 1 (best option) to 4 (worst option)	Rank: 2 This option delivers against this principle. There is no additional environmental effect associated with maintaining existing dwellings. ¹¹	Rank: 3 This option delivers against this principle. Constructing new dwellings on suitably zoned land would have minimal additional environmental effect, and could be characterised as acceleration of	Rank: 4 This option would have the greatest adverse environmental effects of the 4 options. Construction would require additional disturbance.	Rank: 1 This option delivers against this principle. There is no additional environmental effect associated with maintaining the status quo.

⁹ Reliable internet access is critical to mitigate health risks associated with isolation.

¹⁰ Section 35H(c) requires the environmental effects of the proposed change to be considered by the Coordinator-General. The effects associated with each option are considered here.

¹¹ Any increase in greenhouse gas emissions associated with increased road journeys has not been calculated in carrying out this assessment.

		land development.		
Effects on the project ¹² Ranked from 1 (best for project) to 4 (worst for project)	Rank: 3 This option is disadvantageous for the project: - Would result in increased and avoidable safety risk for our people - Potentially impact our ability to meet our employment obligations; - May require a reduction in working hours to mitigate increased travel time, which would adversely impact productivity and costs; - Requires further expenditure or investment on the development of facilities.	Rank: 4 This option is the least advantageous for the project: - Would result in increased and avoidable safety risk for our people - Potentially impact our ability to meet our employment obligations; - May require a reduction in working hours to mitigate increased travel time, which would adversely impact productivity and costs; - Requires further expenditure or investment in housing development.	Rank: 2 This is the second most advantageous for the project: - Ensures we meet workplace health and safety duties - Ensure we meet employment obligations (regarding safety and provision of suitable accommodation) - Has no effect on current productivity' But would require expenditure of approximately \$55 million¹³ on new accommodation facilities.	Rank: 1 This option is the most advantageous for the project: - Ensures we meet workplace health and safety duties - Ensure we meet employment obligations (regarding safety and provision of suitable accommodation) - Has no effect on current productivity - Does not require further expenditure on new accommodation facilities
Economic and social benefits	The only towns located close enough to the relevant tenures are Yuleba and Wallumbilla. There is limited housing available in those (and other nearby) towns. It is considered most likely that these two options would be utilised together. Our assessment (based on the experience during Phase 1 construction) is that whilst there could be a short term economic benefit, this would result in unsustainable levels of housing growth, which would be detrimental.		These two (2) options would not change the project's current economic and social benefits. Retaining accommodation near the major facilities will avoid unsustainable housing growth in towns in the area. Other economic and social benefits of the project are detailed below.	

¹² Section 35H(a) requires the effects of the proposed changes on the project to be considered by the Coordinator-General. The effects associated with each option are considered here.

¹³ Assuming the original cost was incurred.

Availability of accommodation	There is insufficient accommodation available for this option to standalone.	N/A. This option exists as it would establish new housing.	This accommodation is not currently available. It could be established faster than new dwellings in local towns.	This is the only option that provides sufficient accommodation now.
-------------------------------	--	--	--	---

5. Other economic and social benefits of the project

The proposed change relating to accommodation and the retention of the villages is a subset of a broader topic in relation to the economic and social benefits of the project for regional communities. The project and our assets span an extensive geographic area from near Tara and Condamine in the south east, to Biloela and Rolleston in the north and west. The nature of coal seam gas development is such that we are concurrently operating wells, gathering lines, gas processing facilities, water processing facilities and pipelines, whilst also constructing new wells and gathering lines. In the current financial year, we will drill and connect approximately 260 wells. Benefits to regional communities include regional employment, procurement of goods and services from regional businesses, upgrades of infrastructure utilised by communities, arrangements with our host landholders, community investment programs, extensive volunteering to support community events and rates paid to local government authorities.

5.1 Regional employment

Origin is a major regional employer. Our regional employees are typically involved in drilling and connecting new wells (construction) or operating our assets (operational employees). We also employ people in our Chinchilla, Miles, Roma, Condamine and Biloela offices.

During 2017, we took significant steps to further increase the proportion of our employees that live locally. We have historically provided employees who live in regional Queensland (within 150 kilometres of a GPF) with a financial incentive equal to 10% of their salary. We have added an additional fixed incentive for those people who choose to live within a daily commute of their workplace.

As set out above, in 2017 we moved all of our operational employees that stayed in the Condabri and Talinga villages and moved them to rental accommodation in Chinchilla and Miles (often remaining on a fly in/ fly out basis). Our construction employees that stayed in the Condabri and Talinga villages mostly moved into existing bulk accommodation facilities owned and operated by parties unrelated to ourselves in Miles and Chinchilla.

At the end of the 2017 financial year, Origin employed 531 people in regionally based roles, and paid \$89 million in wages. 157 of our employees had their permanent place of residence in the region, and 138 of those lived within a day's commute of their usual workplace. 91 fly in/ fly out employees were living in rental accommodation in towns (not in bulk accommodation facilities). This excludes our contractors' workforces, which are often larger, but vary considerably during the year in terms of numbers and location as they move with work packages.

You may have heard about the significant changes we are making to our operating model. We are arranging ourselves around our assets, with a lot less supporting roles. We have recently removed approximately 650 roles (or 40% of our workforce). We are still in a stabilising phase, and anticipate that we will end up with approximately 50% of all roles being regionally based¹⁴, up from approximately one-third now.¹⁵ Due to the number of roles being removed, there will be less total people in regional roles

¹⁴ These roles will be occupied by a mix of people that permanently reside in the regions, and people that fly in/ fly out of the gas fields.

¹⁵ The changes to the operating model are ongoing, and we do not know the final proportion of employees that will live permanently in the region.

in the short term, but it will position us to sustainably increase the number of employees living in regional towns. We will maintain our financial incentives. We have moved some roles that were traditionally located in Brisbane to being field-based. Importantly in the context of housing and accommodation, this positions us to steadily increase our live local numbers and ensure a balance between growth and stability in the housing market.

5.2 Regional procurement

Our approach to procurement preferences sourcing from regional suppliers. For the purpose of our Regional Buy Program, we define a business as “regional” if it is registered within the Maranoa, Western Downs or Banana local government areas. We have established a dedicated web portal to simplify our engagement with small to medium businesses in these areas. We ask our major contractors to develop and implement Regional Participation Plans, outlining how they will maximise procurement and employment in the region. During the 2017 financial year, APLNG spent \$87.5 million¹⁶ in the region across 190 regional suppliers. We’ve only recently started seeking regional participation information from our contractors. 29 of our contractors collectively spent \$55.2 million across 349 regional suppliers last financial year, and we know the full regional spend is considerably higher.

This spend involves many types of goods and services, ranging from engineering to envelope printing. However, the largest categories of goods and services sourced in the region are engineering and technical services, repairs and maintenance, health safety and environmental equipment and services, and facilities and site management.

5.3 Infrastructure Upgrades

APLNG has contributed to the upgrade of various infrastructure that is either publicly owned, or utilised by local communities. That includes the funding of water and sewerage infrastructure referred to above. Other examples include the \$24 million spent upgrading the Miles Airport (owned by the Western Downs Regional Council), \$1.5 million contribution to the upgrade of Roma airport (also supported by other CSG operators) and \$425,000 provided for the upgrade of the Thangool Airport in the Banana local government area. We have also contributed more than \$100 million towards road upgrades that has resulted in much safer roads in the region. We will continue to contribute to road upgrades and maintenance through ongoing arrangements with local government.

5.4 Arrangements with landholders

We provide significant benefits to the many landholders we partner with to develop our gas infrastructure. During the 2017 financial year alone, we committed to paying an additional \$70 million to landholders in compensation for development wells.

5.5 Community investment and volunteering

APLNG continues to financially support community events through our community investment program, and our people give their time to ensure community events are successful. We typically sponsor local shows, festivals and other events, and work closely with the business chambers and local schools.

5.6 Local government rates

APLNG owns property in the Western Downs, Maranoa and Banana local government areas, and pays approximately \$1 million in rates annually to each of the Western Downs Regional Council and Maranoa Regional Council (totalling \$2 million annually).

¹⁶ This excludes significant credit card expenditure that cannot be reported due to merchant details not allowing business locations to be identified.

6. Consultation and work with Maranoa Regional Council

Our engagement with the Western Downs Regional Council and other stakeholders in relation to accommodation and housing in Miles, Chinchilla and surrounding areas is detailed above. We have also been working with Maranoa Regional Council for several months to discuss the retention of the Reedy Creek and Bungaroo villages. In November 2017, we formally advised the council of our intention to change the condition relating to retention of the villages. During these discussions, we've outlined our accommodation principles, which are designed to minimise road exposure (distance travelled) and the inherent safety risks associated with mass vehicle movements. We also discussed our other operational requirements (including productivity) and obligation to provide accommodation of suitable standards to our workforce. Our understanding is that the council recognises that there is a shortfall of suitable accommodation facilities near our GPFs. Whilst council seems supportive of the retention of the villages, they also seek Origin's support to drive further growth in the number of regionally based workers residing in towns in the Maranoa regions.

At its December 2017 meeting, the council resolved to write to Origin seeking that APLNG and Origin uphold a commitment to higher rates of regionally based staff to reside locally with the urban centres of the Maranoa region, and provide council with a detailed plan of the actions that will be implemented to achieve this, along with the planned timeframes.

On 1 February 2018, we spoke to Ms. Julie Reitano, the Chief Executive Officer of Maranoa Regional Council, and advised of the changes to our operating model. We advised that we don't anticipate any noticeable decrease in the number of our employees that live in Roma and other towns within the region. At the end of the current operating model changes, additional people may relocate to the region. The newly appointed Spring Gully and Denison Asset General Manager, Mr. Dave Atkin, is relocating with his family to Roma. We are retaining our Roma Office, staffed entirely by local residents.

On 1 March 2018, Maranoa Regional Council accepted our invitation to establish a small working group so that we can co-develop a plan as to how we can work together to encourage more of Origin's permanent employees to live in the Maranoa local government area, and each play our own part in the sustainable growth of the region. We have also asked the council to join us in discussions regarding the retention of the villages with you, in preference to us having separate discussions.

We have continued to engage with the Maranoa Regional Council on this issue.

7. Conclusion

The five-year anniversaries of the Reedy Creek and Bungaroo villages are:

- 8 May 2018 (Reedy Creek); and
- 27 March 2019 (Bungaroo).

In the case of the Reedy Creek village in particular, we therefore seek your urgent consideration. In that regard, we also ask you to note our extensive consultation with both local government authorities over an extended period of time. Prior to the discussions regarding the closure of the villages in the Western Downs local government area, that included inviting both local government authorities to participate in discussions regarding broader regional economic participation issues. That is still our strong preference rather than working through issues on a piecemeal basis.

We have sought to address the environmental effects of the proposed change, its effect on the project, and the related economic and social matters in this document such that you can properly consider the criteria detailed in section 35H of the *State Development and Public Works Organisation Act 1971*.

In our view, there is no sensible option other than to retain the existing Reedy Creek and Bungaroo villages. We cannot meet our workplace health and safety duties if our people are to commute from Roma. There simply is insufficient housing in the towns proximate to the Reedy Creek and Combabula

fields. Establishing new housing of the required scale in the Maranoa region would be detrimental, and give rise to unsustainable housing growth. Establishing new purpose-built accommodation facilities is an option, but it is difficult to see any advantage other than it would enable us to meet our duties. That option to replicate existing facilities would be high cost, and would inevitably redirect our expenditure to something that has no benefit for the communities in which we operate.

The project has already afforded significant economic benefits to the Western Downs, Maranoa and other local government areas in which we operate. We are fully committed to continuing to work with our communities so that they can meet their own aspirations, and have sustainable levels of growth. Closing the villages is not a means to achieve that.

We would appreciate an opportunity to discuss these matters with you. Maranoa Regional Council has confirmed its willingness to join a tripartite discussion.

(Ends)

RESPONSE TO COORDINATOR-GENERAL REQUEST FOR INFORMATION

For Origin Energy

Independent review of data from Origin Energy and research on affected communities to respond to the information request from the Coordinator-General's Office regarding the APLNG pre-lodgement application to change the CG Conditions regarding the duration of APLNG temporary workforce accommodation facilities

June 2018

PAGE INTENTIONALLY LEFT BLANK

EXECUTIVE SUMMARY

In 2016/17 Origin transitioned its workforce out of Condabri and Talinga camps, with Operations workers and some contractors moving into local housing (rentals or permanent move) and most others moving into pre-existing and operating 3rd party camps in Miles (Eastwood Village) and Chinchilla (Base Camp). A limited number of workers were housed in short to medium duration accommodation in the form of hotels / motels in Condamine, Miles and Chinchilla based on work fronts and the nature of work. Origin was able to implement this model due to several factors including proximity of the towns and 3rd party camps to major facilities and fields, availability of suitable housing in those towns, acceptable levels of health services and recreational facilities (mainly gym equipment) in those towns, and access to high speed internet.

The situation in the Western Gas Fields is different, with neighbouring communities at the limits of the Origin determined maximum daily one-way driving distance, and those communities lacking suitable housing stock, health services and recreational facilities, access to internet and pre-existing and operating 3rd party camps. For Origin the safety and welfare of its workforce is paramount, with camps required to have adequate sports and recreation facilities including gyms, courts, exercise programs and organised sports, as well as mental health services. Additionally, workers are provided with individual rooms with air conditioning, their own ensuite, cable TV with movies, readily accessible telephone and/or mobile reception, and high-speed internet. These provisions are designed to maximise the comfort of workers while at the camps, and ensure they have access to a healthy lifestyle, including healthy options for meals. Maintenance of these provisions for workers housed outside the camps was a major consideration in the transition of workers from Condabri and Talinga camps in 2017.

Specifically, the communities in the Western Gas Fields have several limiting factors that also need to be considered in determining the viability of sustainably housing workers for the duration of the Project. Wallumbilla is an almost exclusively agriculture-based economy (and culture) with a strong civic pride. An influx of workers constituting a ~75-150% increase in the population of Wallumbilla (pop 311, (ABS, 2005 to 2015)) would significantly alter the community dynamic and balance of power within the community and put significant pressure on the population from the large proportion of males within the workforce. This can manifest in real and perceived impacts on the male population in terms of a sense of helplessness from the incursion of other males (i.e. marginalization in society which may lead to antisocial behaviour and violence, particularly at pubs and other functions serving alcohol (Miles Police, 2017)), and in the female population in terms of security and societal stability.

In Wallumbilla, the housing stock is older Queenslanders and wood houses not deemed suitable for workers (Miles Realtors, 2017). This would require construction of new housing for an extremely variable-sized workforce, some of whom are permanent and many who are temporary contractors requiring accommodation for extended periods of time intermittently throughout the year. This would put upward pressure on housing in the short-term by speculators who would benefit from new house construction allocated to the workforce but not benefit from purchasing unsuitable older houses, and in the long-term this is likely to devalue older housing stock due to the prevalence of newer housing stock, particularly at the end of the Project life in ~20 years, when supply outstrips demand (Origin Energy, 2017a). There would also be periods of time where large numbers of new-built houses for the workers would be vacant, due to a lack of demand associated with the absence of contractor activities as is common in field development phases of oil and gas projects. Wallumbilla also does not have adequate recreational facilities to cater for the workforce, or health (physical and

mental) services and staff, and the NBN roll out is not scheduled until April to June 2019 (NBN Co, 2018a). The alternative is to move a 3rd party camp to the area (or activate the mothballed camp south of town) which would likely result in little to no change to the community in terms of positive economic opportunities for local businesses but would impact on worker health and safety due to the extended commute. If the camp remained south of Wallumbilla this would require workers to cross the Warrego Highway without a traffic light or adequately marked crossing.

In Yuleba, the housing stock is also older Queenslanders and wood houses with the same requirement for new builds and the subsequent effects as Wallumbilla. Yuleba also does not have a sewage system which means lots cannot be subdivided due to the requirement for a septic field (Roma Realtors, 2018). The town has fewer businesses and services than Wallumbilla, no NBN roll out plan (NBN Co, 2018b), and a large portion of the population is on some form of welfare or a pension (Roma Realtors, 2018). An increase in housing prices, even short-term could result in evictions of low income renters and mass selling by some residents looking to profit.

In both communities there is a high likelihood an increase in housing prices from speculators could see a sizeable portion of the population sell, either to recoup losses from over-capitalisation if they purchased during the CSG construction boom (generally out of town speculators), or locals moving out to gain financially from the high prices (Origin Energy, 2017a). This is an unacceptable risk that would inevitably occur in some form based on the experiences of Miles and Chinchilla, and the requirement to build new houses to accommodate the workforce. Furthermore, it would take years to construct the 90+ four-bedroom, two-bathroom brick houses required to meet the peak demands for workers currently housed in Reedy Creek Village alone. If the workforce was instead moved into 3rd party camps the result would be little to no economic gain for the communities but would impact on worker health and safety due to the extended commute.

Origin views worker choice of where they live as a barometer for the attractiveness and liveability of communities near the gas fields, and particularly the Central Processing Facilities (CPFs). In the Eastern Gas Fields, twenty-one (32.8%) Operations workers lived local in 2016, many moving prior to the Living Local Policy applied to them, or in a much more limited fashion than exists now. This showed the positive perception many workers had towards local communities, generally because of the travel distance to work, the desire to move out of the camp environment and into a community, and the availability of services and amenities in these communities. For contractors the numbers were lower, generally because of the transitory nature as they move around various gas fields depending on where their work fronts are and how the fields ultimately develop (Origin Energy, 2017a). The commute to work and the liveability of communities (real or perceived) within a commutable distance are major factors in decisions to live in the Western Gas Field.

It is therefore not likely to result in a community benefit, would likely result in a net financial loss to Origin, and would increase health and safety risks for workers if the Western Gas Field camps were to be mothballed or closed, and their workforce moved to neighbouring communities based on the issues outlined above, the lessons from the housing speculation in the Eastern Gas Fields, and the move in the Eastern Gas Fields to suitably situated and resourced communities (Origin Energy, 2017a). A more satisfactory outcome would be for Origin and Maranoa Regional Council (MRC) to explore regional development opportunities and explore opportunities and barriers for more workers to move locally through alternative measures, strategies, and policies. Part of the collaboration with MRC on determining manageable, sustainable solutions for living local could include discussions with Wallumbilla and Yuleba community members and groups to determine their desire for change, and in what form, in order to identify opportunities and barriers to living local, and realistic expectations for community investment and development.

TABLE OF CONTENTS

Executive Summary	0
1.0 Introduction	1
2.0 Context	1
3.0 Workforce Profile	7
4.0 Operating Model	11
4.1 Living Local Policy	11
4.2 Current State of the Local Housing Market	13
4.2.1 Context	13
4.2.2 Historical Real Estate Data	15
4.2.3 Current Real Estate Data	18
4.2.4 Short-Stay Accommodation	19
4.2.5 Cumulative Accommodation Impacts	20
4.2.6 Planned Housing Developments	20
5.0 Conclusion	20
References	23

PAGE INTENTIONALLY LEFT BLANK

1.0 INTRODUCTION

In December 2017, Origin Energy (Origin) pre-lodged a request of the Coordinator-General to evaluate a proposed change the project conditions regarding the duration of Australia Pacific LNG's (APLNG) temporary workforce accommodation facilities (TWAfs, aka camps, aka Villages). The CG office subsequently issued a request for information (RFI).

A follow-up meeting was arranged with representatives from the CG's office, Origin and Red Sun Land Consulting (RSLC) on 30 April 2018 to discuss the content and intent of the RFI, and for Origin to provide context relating to the AP LNG Project and its relevant interactions with neighbouring communities. From the meeting it was determined that the intent of the RFI was to seek clarification on the rationale for changing the EA condition, and providing more certainty that the impacts of the change had been adequately considered and managed by Origin. A primary driver for this information was to enable the CG's office to ensure that matters of interest to the public were adequately taken account of in its decision-making processes.

The following information has been compiled to respond to the RFI based on the outcomes of the 30 April 2018 meeting.

2.0 CONTEXT

In 2016/17 Origin identified a need to evaluate the potential impacts associated with the closure of Condabri and Talinga camps due to the timeframe for maximum duration of use – as stipulated in the EA – rapidly approaching. This issue was further supported by Western Downs Regional Council (WDRC), the Miles Chamber of Commerce, and a few concerned locals who had an interest in the closure of the camps. Part of this issue was fostered by an inaccurate public perception that the camps were constructed to bypass opportunities for local communities; however, the camps were proposed and committed to limit negative socioeconomic impacts associated with the boom and bust nature of the construction phase (Phase 1) of the Project.

As part of the transition of workers from Condabri and Talinga camps, Origin developed a set of criteria listed in order of importance for workers and a breakdown of accommodation requirements as outlined in Figure 1 below. For Origin, the safety and welfare of their workforce is paramount, with camps required to have adequate sports and recreation facilities including gyms, courts, exercise programs and organised sports, as well as mental health services. Additionally, workers are to provided individual rooms with air conditioning, their own ensuite, cable TV with movies, readily accessible telephone and/or mobile reception, and high-speed internet. These provisions are designed to maximise the comfort of workers while at the camps, and ensure they have access to a healthy lifestyle, including healthy options for meals.

Figure 1 *Origin Living in Community Guiding Principles and Accommodation Principles*

Living in Community the principles, our strategy



Guiding Accommodation Principles:

1. Our people should be accommodated as close as practical to their primary worksite
2. Travel to worksite will be no longer than 45 minutes* (one way) in normal conditions between their accommodation and usual place of work (*30 minutes for D&C)
3. Accommodation types (housing, hotel, bulk accommodation) will match our workforce types (permanent, short-term projects, longer-term transient)
4. Existing third-party accommodation is to be used in preference to establishing temporary accommodation facilities
5. Accommodation, where possible, should also include the provision of adequate office and shared facilities (meeting rooms etc.) to reduce travel requirements for office based workers
6. Accommodation for short term and transient workforce will be centrally coordinated through Origin's Non-Production Facilities team
7. Quality WiFi communications must be available at accommodation facilities.

*Drilling and Completions are the exception where 24 hour operations reduces this maximum travel time to 30 minutes



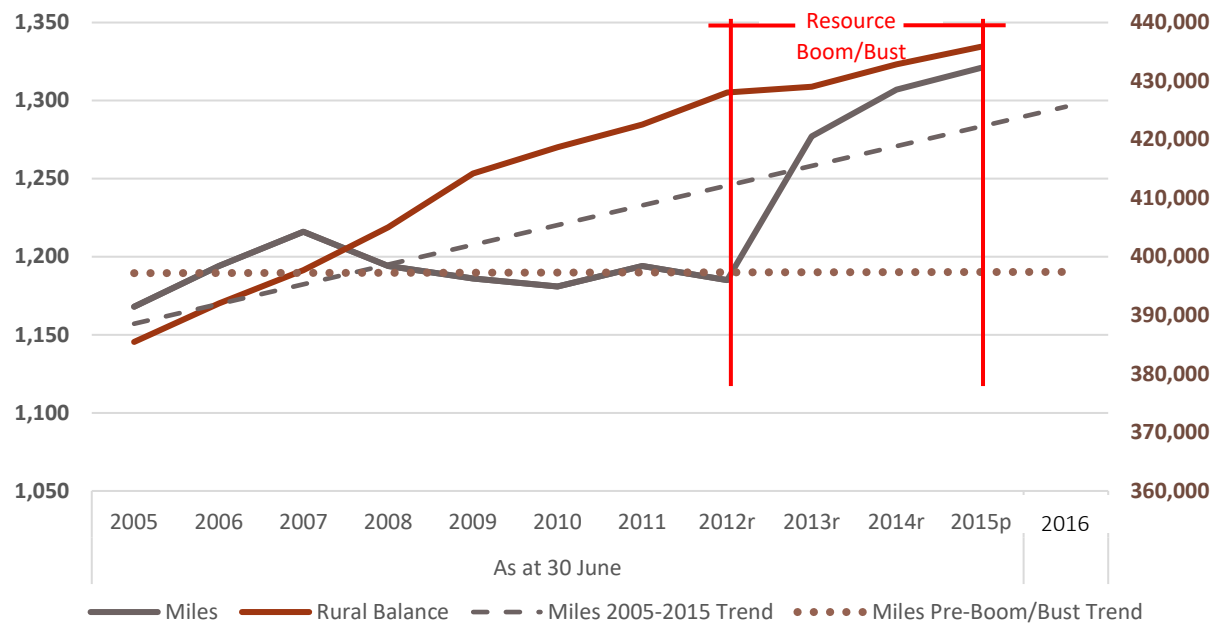
Source: (Origin Energy, 2017c)

Additionally, Origin has a Living Local policy designed to encourage the Operations workforce to be sourced from local communities or relocate, either while on shift or permanently, through an incentivisation package (see Operating Model section below for more details). This policy has been implemented with great success in the Western Downs Regional Council area, particularly in Miles and Chinchilla where 100.0% of the Talinga, Condabri and Orana Operations workforce (n=64) either stays locally while on-shift or live locally permanently. This was achievable due to the proximity of the local communities to CPFs and work fronts, and because of the amount of suitable housing available in the communities of Miles and Chinchilla. However, this quantity of suitable housing was the result of considerable oversupply by speculative investors looking to maximise economic benefits leading up to peak construction (circa 2011-2013). The unintended consequence however was considerable socioeconomic impacts in the form of a housing crash and significant loss of investment capital by most investors (see Case Study - Over Capitalisation of Housing Developments in Miles below).

Case Study – Over Capitalisation of Housing Developments in Miles

Miles is a small agriculture-based town situated on the cross-roads of the Warrego and Leichhardt highways in Queensland's Surat Basin. The town had one of the most stable populations in Queensland up to the introduction of the Coal Seam Gas (CSG) industry around 2008 (exploration – construction commenced in 2012). Figure CS1 outlines the Miles population changes from 2005 to 2015 (preliminary) as compared to the rural balance, which is the aggregate of all rural communities, to show the trend.

Figure CS1 *Miles and the Rural Balance Population Trends 2005-2015p*



Notes: p = preliminary r = revised (a) Estimates for 2005 to 2011 are final, 2012 to 2014 figures are revised, and 2015 figures are preliminary.

Source: (QGSO, 1861 to 2008); (ABS, 2005 to 2015); (Origin Energy, 2017a)

The rural balance increased fairly steadily over the timeframe with a minor uptake from 2009 to 2012 which coincided with the lifting of the drought across most of rural Queensland, and the start of the mining boom driven by coal mine developments (and coal prices). However, Miles effectively peaked in 2007 (during the drought which lifted in 2008) and then declined to relative equilibrium to 2012 through a series of back to back floods in 2010-2011.

The Miles pre-boom / bust trend line is calculated from 2005 to 2012 and is effectively flat, with the 2012 Miles population only slightly below trend. From 2012 to 2013/14 there was a dramatic increase up to the CSG industry construction peak, after which time the increase dropped. The Miles trend for 2005-2015 is below the 2015 value; however, the 2016 values from the census show Miles population at 1,133, well below the pre-boom / bust trend. This change occurred for several reasons including reduced workforce, Origin policy towards TWAFs, other project completions or cancellations in the area, and some residents taking advantage of high house prices to sell and relocate elsewhere.

Property speculation has been a common occurrence for resource projects in rural areas since the 1990s. This scenario was amplified by the mining boom of 2008-2012, which resulted in an accommodation crisis in some communities, particularly in Queensland's Bowen Basin. There was rapid, significant growth in housing sales in these resource communities based on extremely high

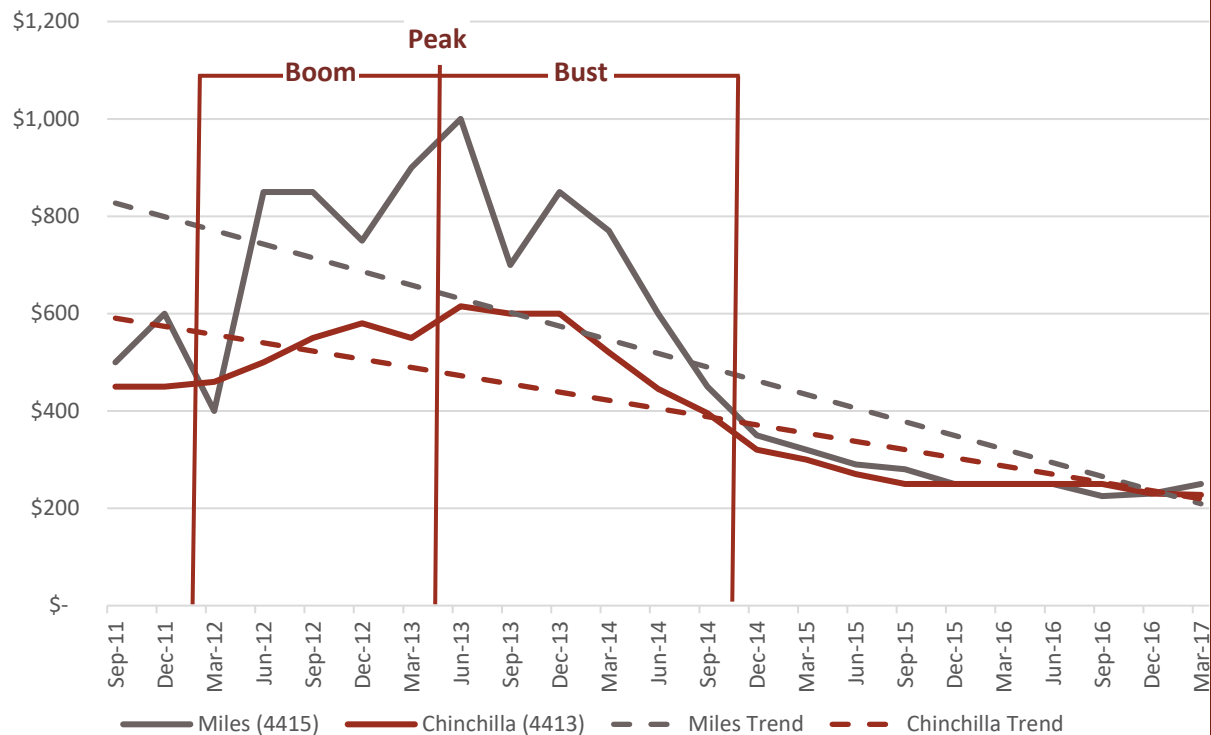
rental returns as demand outstripped supply. Multiple factors drove this scenario including housing demand, housing availability, a lack of appropriate housing stock (diversity of housing) and land availability; however, high-risk speculative investors tended to view all subsequent proposed resource projects as potential investment windfalls regardless of the pre-existing market conditions or proponent policies and strategies.

In Miles, the current (2018) housing situation (oversupplied) can be attributed to a series of Government and proponent policies, approvals and associated assessment reports and inferences that viewed collectively pointed to a significant increase in housing demand; however, when examined individually never committed to long-term housing demand for Miles. Chinchilla experienced similar impacts to Miles; however, Chinchilla's size and therefore abundance of other economic opportunities and shops, resulted in the impact being reduced in size, scale, and duration. However, the result too was oversupply of housing, followed by a dramatic drop in house prices as supply significantly outstripped demand.

The resultant downturn in the Miles real estate market since Q3 2015 has seen housing prices and rental returns drop to or below their pre-boom levels (prior to Q1 2012). This indicates an overall net loss to the community as the housing market is effectively worse off than it was before the perceived opportunity from the resource boom, and significantly below trend. There are large numbers of locals and outside investors losing money on investment properties, going into receivership, declaring bankruptcy and/or losing their homes (Hub Realty, 2016) (Properties Realty, 2016) (Ruralco Property, 2016). This is the result of high-risk speculative investment in an unbound housing market. Furthermore, since the housing crash, small numbers of people and families from outside the area have relocated to take advantage of the low housing rents. These migrants are generally from a lower socioeconomic background or on some form of welfare dependency, have limited to no connections within Miles, and remain outsiders from the rest of the community. There have been incidences reported of disruption to community cohesion from community members, social services providers, police, hospital and schools associated with these migrants.

In addition to the change in population and community dynamics, the effects of the construction boom also resulted in significant volatility in the housing market. Figure CS2 illustrates this volatility as well as the effects of significant over-supply of newly constructed houses in a small market with a stagnant to minor growth population environment. This outcome was achieved not by design, or company policy, but rather by uncontrolled speculative housing investment resulting in a significant over-supply and no measurable increase in demand. What this also shows is a looking glass into what could occur in small communities (< 1,500) where relatively short-term projects (<25 years) rapidly increase the population resulting in significant new housing construction, and then depart after the project ends, leaving significant oversupply, and a community unable to cope with the excess housing.

Figure CS2 Miles and Chinchilla Median Rent for Four Bedroom House Q3 2011 to Q1 2017 (weekly)



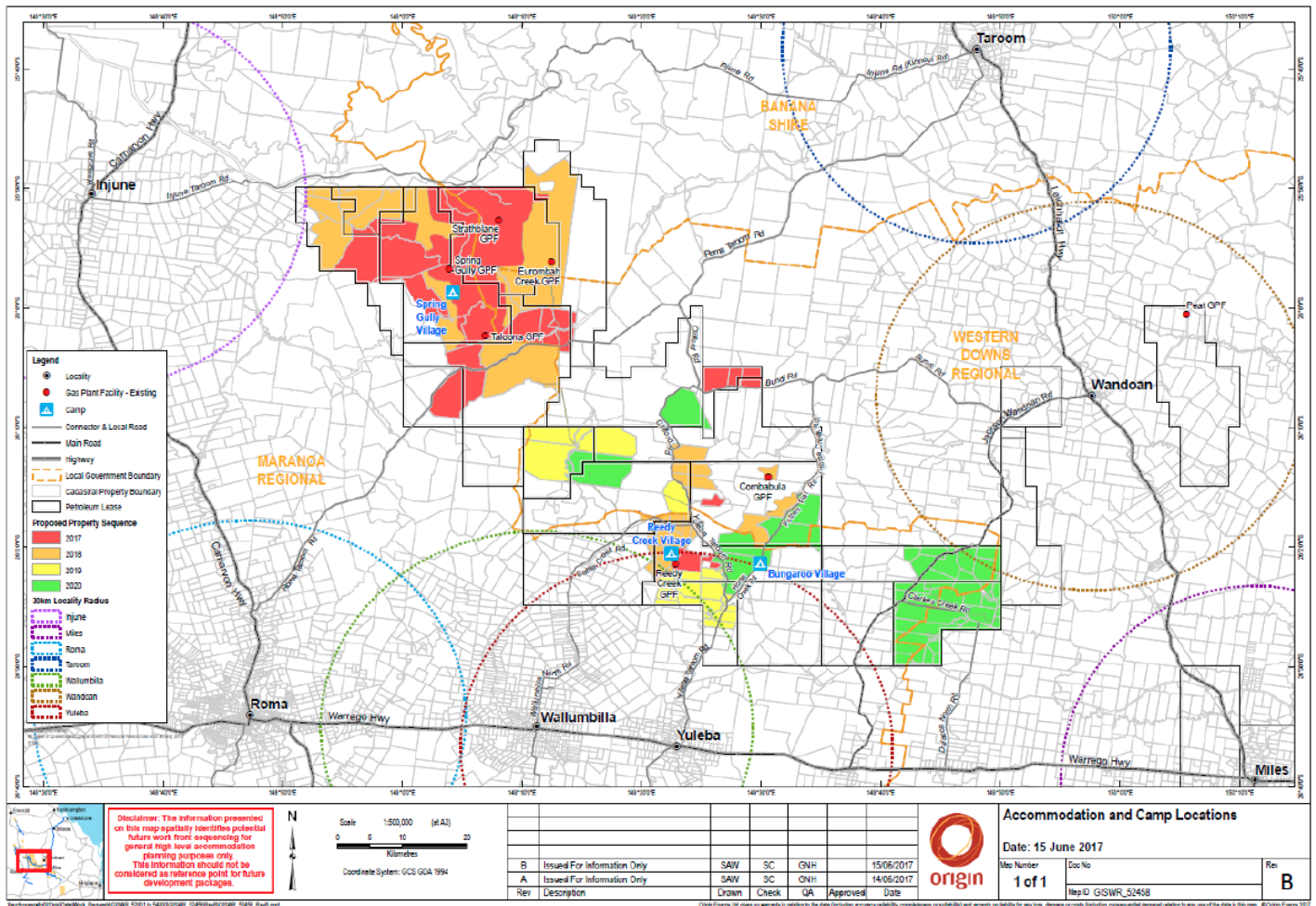
Source: (RTA, 2016)

The cautionary tale from the lessons learned in Miles is housing investment needs to be proportional to demand requirements, there needs to be a better understanding of the scale and duration of the project workforce(s) by investors, and there needs to be a clear understanding of the sustainability of project induced growth beyond the life of the project when the project life is relatively short in duration (3-5 years for construction, 17-20 years for operations and well development).

In MRC there are challenges implementing the Living Local policy around transportation safety, suitable accommodation options, workforce requirements, and a desire to minimise socioeconomic impacts. There are three TWAFs situated in the area: Spring Gully Village, Reedy Creek Village and Bungaroo Village. The relevant project condition to which the change request relates does not apply to Spring Gully Village, and it is too geographically isolated in any event to warrant exploration of alternative accommodation strategies. It is therefore not included in this application. Bungaroo Village is temporarily closed but may be used in the future. The focus of this assessment is on Reedy Creek, with reference to other camps (current and previous) for context and comparison as necessary. The objective is to enable Reedy Creek Village, and potentially Bungaroo Village, to remain operational for the duration of the Project (estimated at 20 years).

As Figure 2 outlines, the distances to regional communities from the western gas fields exceeds Origin's maximum daily commutable distance (45 min / 30 km direct line) to work except for Wallumbilla and Yuleba which are 45 minutes (50 km) (GoogleMaps, 2018a) and 40 min (40 km) (GoogleMaps, 2018b) to Reedy Creek respectively in ideal driving conditions.

Figure 2 30 km Radius Driving Distances Around Regional Communities



Source: Origin, 2017

Origin does have additional staff in regional communities including field offices in Miles, Chinchilla, Roma, Condamine, and Biloela staffed with workers from those communities who are receiving various forms of Living Local benefits. The majority of those workers reside permanently in or near those towns.

3.0 WORKFORCE PROFILE

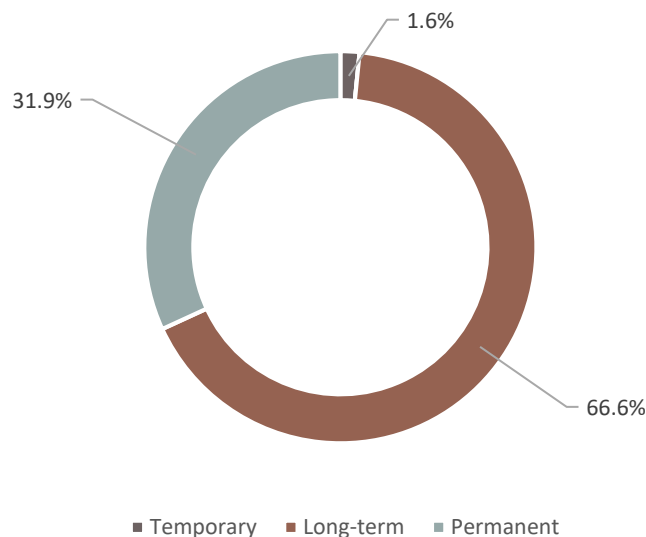
The workforce profile across the gas-fields can vary significantly depending on the phase of work, the drill programs in place, activities in other areas, seasonality, weather, and other internal and external factors. In 2016/17 Origin conducted an in-depth survey of the workforce at Condabri Camp to develop a more comprehensive understanding of the workforce and determine proportional breakdowns of the workforce composition for future studies. This proportional breakdown has been applied to the Reedy Creek and Spring Gully camps' accommodation numbers to provide a general understanding of what a typical workforce composition would look like at any given time in the year.

Figure 3 outlines the breakdown of the typical workforce in terms of duration of stay as follows:

- Temporary – less than one month;
- Short-term – 1-6 months (none identified);
- Long-term – greater than 6 months; and
- Permanent – salaried employee / permanent position.

Typically, the majority (66.6%) of the workforce at Reedy Creek Village (n=108) is engaged in long-term contracts, while nearly 1/3 (31.9%) are permanent employees / positions. This suggests accommodation options for workers will need to be almost entirely long-term in duration.

Figure 3 *Reedy Creek Village Workforce Employment Duration*

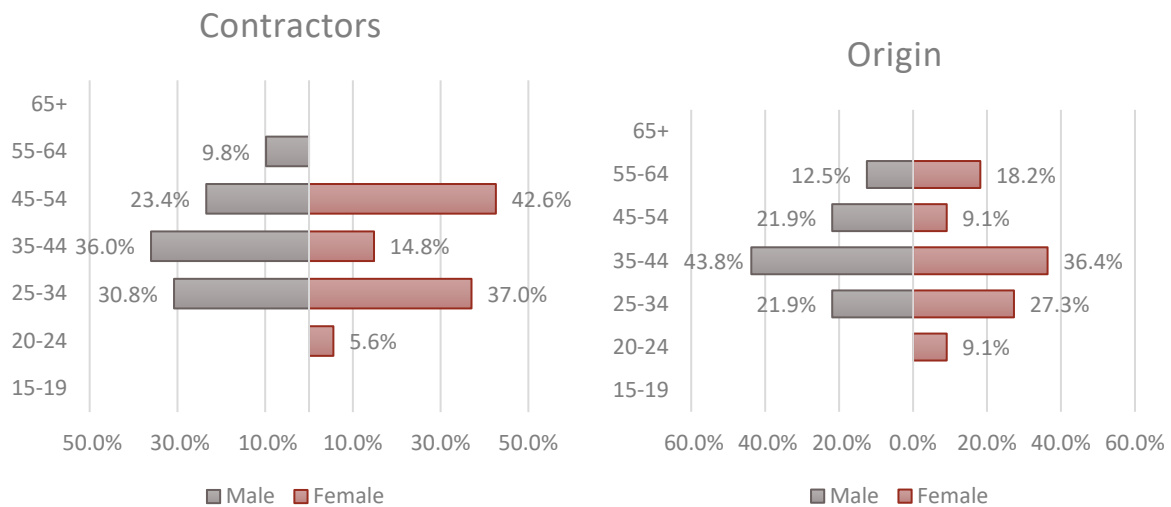


Note: Based on the proportions derived from the Condabri Camp Workforce Survey.
Source: (Origin Energy, 2017b)

Figure 4 outlines the typical proportional breakdown of the contractor and Origin workforces by gender and age cohort. The data shows the majority are males (83.0%), with most aged between 25 and 54 years old. Approximately 88.8% of the workforce are contractors. These ratios can fluctuate depending on the type of works being undertaken

throughout the year. Typically, contractors have a higher proportion of male workers (84.4%) than Origin (74.4%).

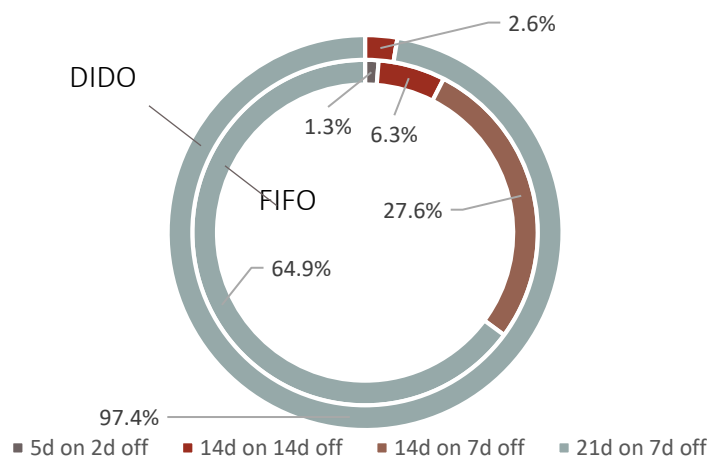
Figure 4 *Condabri Camp Workforce Proportional Composition*



Note: Based on the proportions derived from the Condabri Camp Workforce Survey.
Source: (Origin Energy, 2017b)

Figure 5 outlines the various rosters used at present based on FIFO or DIDO work arrangements based on 2017 data. The FIFO workforce is considerably larger (88.6%) to the DIDO workforce (10.6%) though this can fluctuate throughout the year based on works undertaken from Reedy Creek and the location of the contractors (from Roma as an example where DIDO is possible). Both are mostly 21 days on, 7 days off, though that represents 97.4% of DIDO rosters and 64.9% of FIFO, while 27.6% of FIFO are 14 days on, 7 days off. There is no differentiation of rosters for local and non-local workers at present, though Origin is currently progressively transitioning some roles to a five day on, two days off schedule and is exploring options to transition more positions to this rotation for locals.

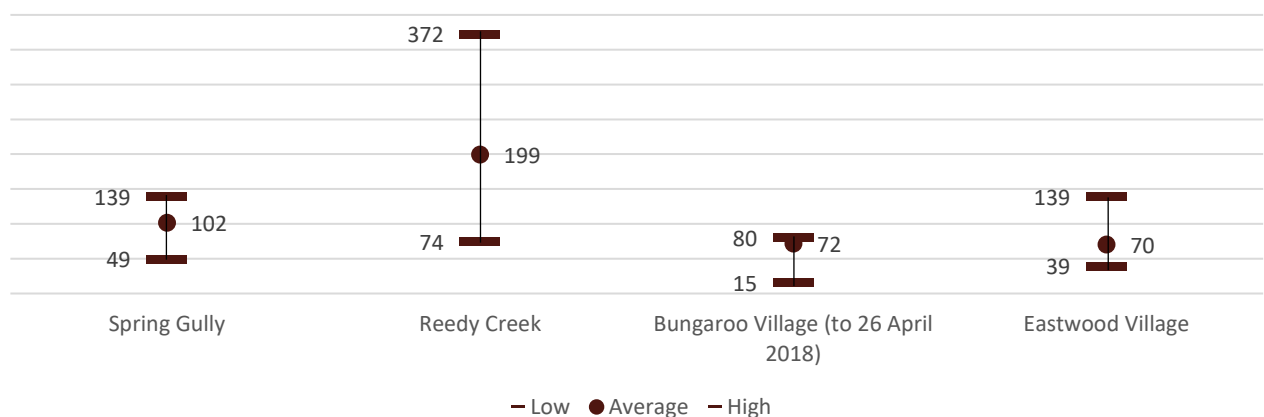
Figure 5 *Reedy Creek Camp Workforce Rosters*



Note: Based on the proportions derived from the Condabri Camp Workforce Survey.
Source: (Origin Energy, 2017b)

Figure 6 outlines the utilisation (through bookings) to date and the forecast utilisation of the various camps from 2/3 January to 31 December 2018. The data shows considerable variability in the camps, particularly Reedy Creek, which has a maximum capacity of 451 beds meaning the high (which occurred on 26 April 2018) resulted in an 82.5% vacancy rate, and the average has a 44.1% vacancy rate. During the high there was room at Reedy Creek for 79 additional workers before alternative arrangements would need to be considered. There is relative stability in Spring Gully with moderate variability throughout the next six months. Bungaroo Village is temporarily closed due to no current workforce utilisation requirements. Eastwood Village is a 3rd party accommodation camp in Miles owned by Oswalt Bros and operated by Morris Corporation on behalf of Origin. There is considerable variation in the workforce requirements at Eastwood (Miles) and Base Camp (Chinchilla) dependent on drilling programs and other activities throughout the year – the Operations workforce is predominantly accommodated in Miles town or Chinchilla utilising local housing.

Figure 6 *Forecast Utilisation of Camps to 31 December 2018*



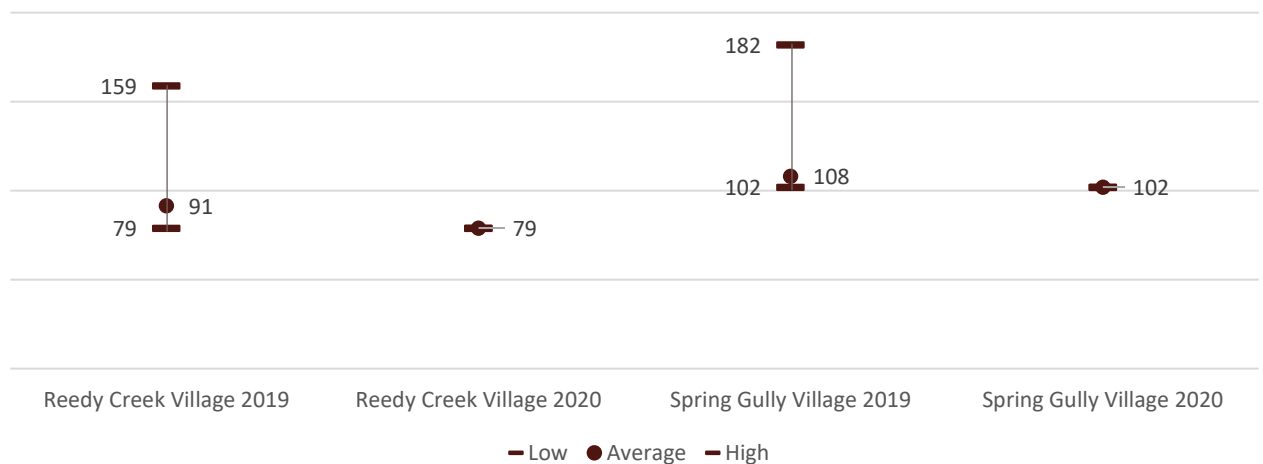
Source: Origin, 2018

The variation in workforce numbers in Reedy Creek is such that utilisation of alternative accommodation options is not an option. The forecast high (n=372) is 502.7% of the low (n=74), while the high is 234.0% of the average. To secure suitable 3rd party (external) accommodation for the workforce Origin would need to cater for at least 372 workers and operate at as low as 19.0% occupancy (n=74) and average 42.7% occupancy. Furthermore, there is no certainty a contract with a 3rd party camp operator would continue at these levels, which does not provide certainty in a long-term investment model. To accommodate this workforce in new built housing would require ~93 four-bedroom, two-bathroom brick houses, with as many as 74 vacant during forecast lows. This is assuming all beds are used at the same time. In Miles, the Origin Operations workforce generally has an arrangement where four people share a four-bedroom house, with only two bedrooms used at any time (i.e. a two and two cross-shift arrangement). This enables workers to have their own room and not have to 'hot bed'. As such, the new build approach is not a viable option both in terms of the scale of new built homes required, and the impact on owners having extended

periods with no tenants, assuming all new builds would be built by 3rd parties and rented to Origin workers and contractors.

Figure 7 outlines the forecast utilisation of the Reedy Creek and Spring Gully camps for 2019 and 2020 based on the current long-term plans for field development in the Western Gas Fields. This is based on known operational requirements and will be updated when drilling programs, maintenance schedules, and other activities are known. The data shows sustained levels of workforce accommodation requirements well within the parameters of the existing camps.

Figure 7 Forecast Utilisation for Reedy Creek and Spring Gully 2019 and 2020



Source: Origin, 2018

It is important to note that Morris Corporation (the current camp operator) requires onsite staff to manage the camps. Table 1 outlines the number of Morris staff required for high, medium, and low utilisation values based on the current contractual arrangement with Origin.

Table 1 Morris Staff Requirements Based on Utilisation of Reedy Creek and Spring Gully

Facility	High	Medium	Low
Reedy Creek Village	451	338	220
Morris Staff Required	55	53	46
Spring Gully Village	248	186	120
Morris Staff Required	46	45	39

Source: Origin, 2018

To accommodate the Reedy Creek Village high in local suitable accommodation would require the construction of at least 113 four-bedroom, two-bathroom brick homes.

4.0 OPERATING MODEL

The Reedy Creek CPF is well into the operations phase of the Project, with no scheduled major projects to be constructed in the area in the future. As such, it is assumed the workforce requirements will remain consistent with those outlined in the previous section, with fluctuations in workforce numbers on-site dependent on numerous factors including maintenance shut-downs, drilling programs, quality of wells and gas output, weather and climatic conditions, contractor availability, etc. These are normal considerations when planning future gas field activities in this operations phase, with Origin generally planning approvals for well developments one year in advance, and then conducting a series of assessments and reviews prior to commencement to determine constraints and timing. Any issues regarding accommodation requirements are captured as part of this process and flagged as a constraint if such a scenario occurs.

4.1 LIVING LOCAL POLICY

To limit the need for a FIFO / DIDO workforce, Origin has a Living Local policy which incentivises workers to live regionally / locally. This is an ongoing strategy to move as many positions to the local and regional communities as possible throughout the life of the Project. To date Origin has hired locally or transitioned positions locally for some of the operations workforce and will continue to explore opportunities to increase local and regional positions.

Origin undertook a workforce survey at Condabri Village in 2017 to identify the opportunities and barriers to workers relocating to regional communities. Variables that workers identified as contributing to where they reside included experience, family commitments, education (partner or children, generally completing high school), and partner employment (tied to current job or limited to no opportunities in their field / industry in the local area), which limit relocation by some workers. However, Origin is committed to finding solutions to living local including the Living Local Guide (updated 2018), Condabri Workforce Relocation Assessment (2017), and Maranoa Liveability Study (underway), to identify opportunities to expand the workforce living local.

There are three types of allowances available to workers permanently living locally / regionally or utilising long-term accommodation locally while on-roster (FIFO / DIDO workers) (Origin Energy, 2018b):

- **Regional Living Allowance** – Regional Living is defined as living within a 150 km radius of an existing Origin asset or work site within regional Queensland.
- **Living Local Allowance** - Living Locally is defined as permanently living within a 45-minute commute of their usual place of work (an existing Origin asset or work site) within regional Queensland.
- **Fly In, Fly Out (FIFO) / Drive In, Drive Out (DIDO) Allowance** - FIFO or DIDO employees are those who source their own local accommodation while working on shift but normally reside beyond a 45-minute commute of an existing Origin asset.

This is only applicable for those on a formal roster arrangement as documented in their employment terms and conditions (for example 14 days on/14 days off, a standard five day working week and weekend is not considered a roster arrangement as per the ATO guidelines).

Origin's Regional Living Allowance consists of 10% of the worker's Total Cost (less pay as you go (PAYG) tax and superannuation). This allowance replaced the Surat Basin Allowance which ceased 3 November 2017. The Living Local Allowance consists of an additional \$15,000 per annum (less PAYG and superannuation) on top of the Regional Living Allowance (Origin Energy, 2018b).

In addition to one of the following allowance options, all employees that are classified as a FIFO/DIDO will also be eligible to receive a Living Local One-Off Payment of \$5,000 (less PAYG and superannuation) to cover incidental costs incurred. Please note that this does not include any support for uplift and removal of goods, temporary accommodation, or spouse/partner assistance. There are two allowance options that fall into this category. FIFO or DIDO employees who source their own local accommodation whilst working on shift but normally reside beyond a 45-minute commute of an existing Origin asset or work site within regional Queensland are eligible for a FIFO/DIDO Local Allowance of \$15,000 per annum (less PAYG and superannuation) prorated for hours worked. This is to assist the employee in covering reasonable costs associated with items such as food, accommodation, water, electricity, internet and fortnightly cleaning. Rather than receiving the FIFO/DIDO Local Allowance (less PAYG and superannuation), an employee may be eligible to receive a combined allowance that includes a Food LAFHA (Living Away From Home Allowance), if they meet the conditions for being classified as a FIFO/DIDO according to the ATO. This policy clearly outlines the incentives for workers to seek permanent or long-term accommodation (while on-roster) and the efforts of Origin to persuade workers to live in the regions and local communities around the gas fields. This is based on a series of options to enable workers to choose which one best suits their needs. In the Eastern Gas Fields this approach was successful because of the proximity of the gas fields to local and regional communities, and direct access via suitable road networks and airports. In the Western Gas Fields this is more of a challenge due to travel distances, most of which is on unsealed roads (Origin Energy, 2018b).

As part of the transition of the workforce from the Eastern Gas fields TWAFs (Condabri and Talinga), Origin developed a set of criteria to determine the best strategy. The following list is structured in order of importance:

- Origin people should be accommodated as close as practical to their primary worksite;
- Travel to worksite will be no longer than 45 minutes (one way) in normal conditions between their accommodation and usual place of work (30 minutes for D&C);

- Accommodation types (housing, hotel, bulk accommodation) will match the workforce types (permanent, short-term projects, longer-term transient respectively);
- Existing third-party accommodation is to be used in preference to establishing temporary accommodation facilities;
- Accommodation, where possible, should also include the provision of adequate office and shared facilities (meeting rooms etc.) to reduce travel requirements for office-based workers;
- Accommodation for short term and transient workforce will be centrally coordinated through Origin's Non-Production Facilities team; and
- Quality WiFi communications must be available at accommodation facilities.

A review of the neighbouring communities to the processing facilities as outlined in Figure 2 shows only Yuleba captures the Reedy Creek and Bungaroo Villages, and these are on the edge of the 30 km diameter limit. Reedy Creek is just outside the Wallumbilla limit, and ~85%+ of the gas fields are outside these community limits.

A review of suitable housing is addressed in detail in the next section. The housing stock in Wallumbilla and Yuleba is insufficient to house workers on a long-term or permanent basis based on the criteria developed by realtors in Miles (Miles Realtors, 2017). There is a mothballed accommodation village south of Wallumbilla, which is beyond the 30 km limit; however, this facility is currently non-operational and there are no current plans to reinstate it. A limited review of the effects of the workers in Eastwood Village outside Miles suggests there is limited socioeconomic benefits to the community from the transition of workers from Condabri and Talinga camps to Eastwood Village. No studies have been undertaken to explore this in more detail, or to determine if there were any differences to when the workers were accommodated at Condabri and Talinga camps. Short-term accommodation options are also limited, with the hotels in Wallumbilla and Yuleba having a limited number of rooms as discussed in more detail in the next section.

A review of the National Broadband Network website indicates Wallumbilla is slated for NBN rollout in April - June 2019 (NBN Co, 2018a) while Yuleba is not scheduled for a rollout, and instead will use the Sky Muster satellite service (NBN Co, 2018b). Most of Roma has NBN already installed either to the node or curb (NBN Co, 2018c).

4.2 CURRENT STATE OF THE LOCAL HOUSING MARKET

A review of the local housing market was conducted examining data from 2001 to present (April/May 2018) including relevant context from previous Origin studies for the Eastern Gas Fields.

4.2.1 CONTEXT

Comprehensive assessments of accommodation suitability and availability was undertaken for Miles and Chinchilla in 2017 by Origin as part of the Condabri Operations workforce

transition into local communities and the closure of Condabri and Talinga camps. These assessments were conducted in collaboration with three realty businesses in Miles to identify suitable accommodation options for Operations workers based on their requirements, as identified by the realtors, as follows (Miles Realtors, 2017):

- Modern brick-built home;
- Three to four bedrooms;
- Two plus bathrooms;
- Air-conditioning; and
- Lock up double garage.

Furthermore, the assessments determined the Operations workforce's transition into Miles had effectively exhausted suitable accommodation opportunities in the community and use of existing 3rd party camps and short-term accommodation was required to accommodate the remainder of the workforce previously accommodated at Condabri and Talinga camps. Chinchilla was further from work fronts in the present and near future, and therefore became an overflow community for workers unable to be accommodated in Miles, for some workers dependent on their role / employer (contractors tended to accommodate all workers together where possible), or as a matter of choice by workers seeking a larger community with more amenities.

A scoping assessment of the opportunities and barriers to integration of the Operations workforce from Reedy Creek and Spring Gully into local communities was conducted in 2017. This assessment concluded that the travel distances from these communities to the Central Processing Facility (CPF) exceeded the allowable daily commutable distance for workers due to their shift length, quality of roads, prevalence of fauna at peak driving times (mainly kangaroos), and the requirement to further commute to work fronts from the CPF after daily meetings (safety and work plan). Furthermore, the two communities closest to the work fronts – Wallumbilla (and surrounds population 388) and Yuleba (and surrounds population 207) – did not have suitable housing stock, amenities, or large enough population sizes to effectively absorb the workforce without significant socioeconomic impacts as witnessed in larger regional communities like Miles (pop 1,746). Wallumbilla has a hospital (Wallumbilla Community Clinic) with basic health services consisting of a registered nurse on site Monday to Friday and visiting and outreach services. A significant upgrade would be required to accommodate Origin's workforce, including extra staff to enable 24 hour, 7 days a week staffing, mental health services, etc. The main referring hospital is Roma (42 km) followed by Toowoomba (320 km) and Princess Alexandra Hospital (411 km) (Queensland Health, 2014).

A more detailed assessment of the suitability of accommodation in communities near the AP LNG Western Gas Fields in Maranoa Regional Council (MRC) was conducted based on the information gathered from the 2017 accommodation studies in Western Downs Regional Council (MRC) – mainly focussed on Miles. Interviews with realtors in Roma and Miles, and field observations noted no new housing stock in either community, with most houses more

than 20 years old and not matching the criteria outlined by Miles realtors in 2017 (Miles Realtors, 2017) (Roma Realtors, 2018) (field research, 2018). Photo 1 shows a streetscape with typical houses in Wallumbilla.

Photo 1 *Typical Streetscape in Wallumbilla*



Source: RSLC, 2018

Photo 2 illustrates a typical streetscape in Yuleba showing the types of housing a lot sizes, which are large (+2,000m²) due to the requirement to have a septic field.

Photo 2 *Typical Streetscape in Yuleba*

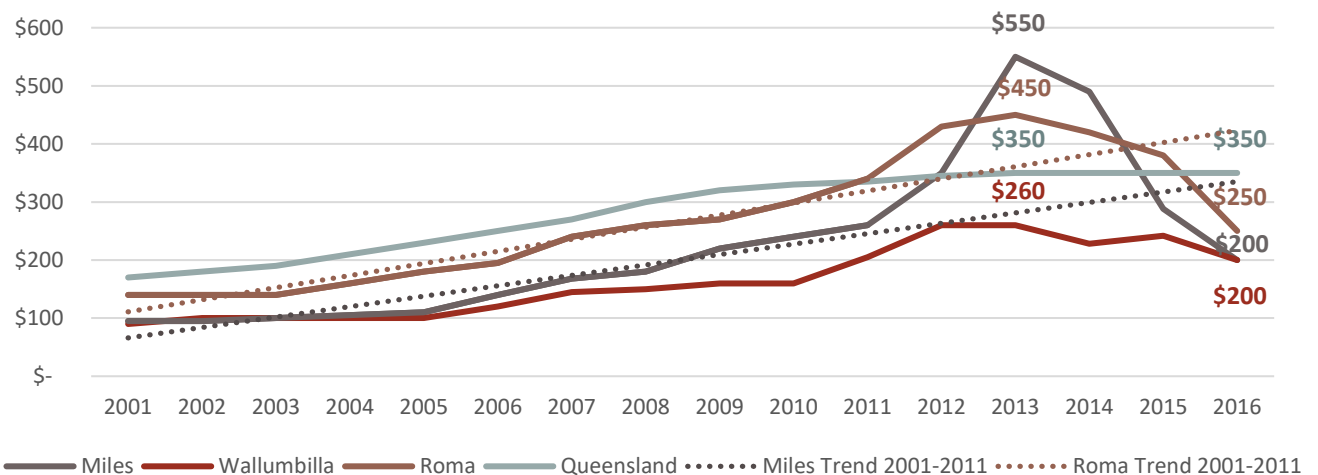


Source: RSLC, 2018

4.2.2 HISTORICAL REAL ESTATE DATA

A review of median rent for three-bedroom houses was conducted using available literature and discussions with select realtors active in the communities of Miles, Wallumbilla and Roma – there was no historical data for Yuleba due to its small size and low volume of houses for rent. Figure 8 outlines the longitudinal median data from 2001 to 2016 compared to Queensland. The data shows a consistent trend for Miles and Roma from 2001 to 2011 (prior to the CSG boom), before a sharp increase to 2013 and then a decline to 2016.

Figure 8 *Median Rent for Three-Bedroom Houses, 2001 to 2016*



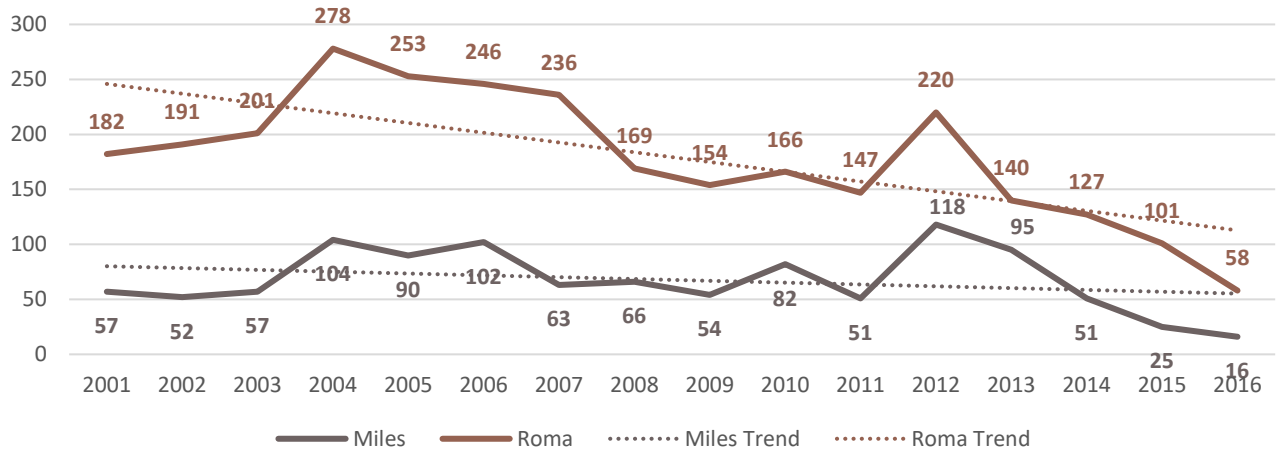
Source: (Boomtown-indicators, 2018)

The effects of the speculation of high rental yields drove rents upwards during the construction boom from 2011 to its peak in 2013; however, the policy of housing the majority of construction workers in camps by CSG companies wanting to limit negative socioeconomic impacts to communities as experienced in the coal mining boom happening concurrently resulted in a significant drop in median rent as it became clear supply outstripped demand. In Miles, where a substantial over-supply occurred due to speculative housing investors, the effects were most pronounced. Rents are now significantly below trend (2001-2011, projected to 2016) and many investors have lost large amounts of money or gone bankrupt as a result.

Figure 9 outlines the number of house sales from 2001 to 2016 for Miles, Wallumbilla and Roma. This data shows variability in the market, predominantly associated with climatic conditions and its influence on agriculture. Up to 2004 there was fairly good agricultural returns in the region prior to a prolonged drought which eventually broke in 2010 in most areas.

The CSG industry influence occurred briefly from 2011 to 2012 before the bust from 2013 once major construction was completed. Like median rents, the boom and bust of the CSG industries' construction period had an overall effect of contributing to declines; however, as the trends suggest in the number of house sales, this decline would have occurred without CSG activity. This is more a reflection of the de-ruralisation of regional Queensland whereas median rents are more a reflection of over-capitalisation of speculative investors as outlined in the case study on Miles.

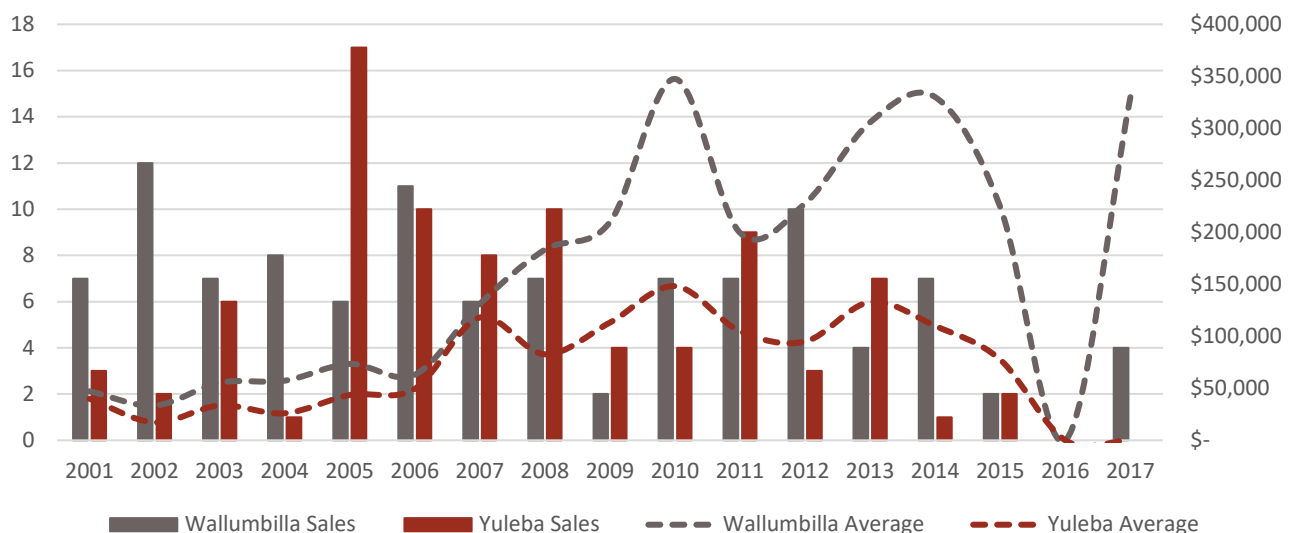
Figure 9 Miles and Roma Number of House Sales, 2001 to 2016



Source: (Boomtown-indicators, 2018)

Figure 10 outlines the historical sales data for Wallumbilla and Yuleba based on data provided by realtors in Roma with current listings in these communities. Number of sales is measured as columns and referenced to the scale on the left of the graph, while average sale price is measured as a smoothed line and referenced to the scale on the right of the graph. The data shows Wallumbilla experienced more effects of speculation from the resource boom than Yuleba, largely due to location, quality of housing and other socioeconomic considerations; however, this was considerably smaller than other communities like Miles and Roma (Roma Realtors, 2018). Wallumbilla had no sales in 2016 and four in 2017. Yuleba did not have any sales in 2016 and 2017, and three since 2014. Historical sales prior to 2011 reflect the effects of drought and floods on communities almost exclusively tied economically to agriculture in Wallumbilla and agriculture and social assistance in Yuleba (Roma Realtors, 2018).

Figure 10 Wallumbilla and Yuleba Housing Sales - Number and Average Sales, 2001 to 2017



Source: (PriceFinder, 2018a) (PriceFinder, 2018b)

Based on the last nine sales in Wallumbilla the average house sold for \$228,333 after being listed for 88 days. In Yuleba the average was \$104,864 after 147 days.

Based on the last nine listings in Wallumbilla the average house is listed at \$301,556 and has been on the market for 402 days. The longest houses and lots have been on the market for over 1,000 days (highest timeframe reported). In Yuleba the average is \$220,111 and has been on the market for 623 days. Two properties have been on the market for over 1,000 days. The long duration on the market reflects properties being listed above market value, generally due to people trying to retain previous prices in a depressing market, and due to speculative investors (largely outside the community) trying to recoup losses from purchases during the boom (Roma Realtors, 2018).

4.2.3 CURRENT REAL ESTATE DATA

A search of all real estate for sale in Wallumbilla revealed twelve results in town and four outside town within a few kilometres. Of these the following breakdown was ascertained (Realestate.com.au, 2018a):

- Outside town there were:
 - 2 lots – no housing for workers;
 - 1 x 84-acre property with two old donger style units – not suitable for workers without a 3rd party developer; and
 - 1 x 80-acre property with a four-bedroom house south of town – potential for four workers.
- Inside town there were:
 - 1 two-bedroom house – not suitable for workers due to age and condition;
 - 5 three-bedroom houses – not suitable for workers due to age and condition;
 - 2 four-bedroom houses – not suitable for workers due to age and condition;
 - 1 five-bedroom house – not suitable for workers due to age and condition; and
 - 4 lots – no housing for workers.

There were no properties for rent in Wallumbilla (Realestate.com.au, 2018b).

A search of real estate for sale in Yuleba revealed 14 results in town and one further south. Of these the following breakdown was ascertained (Realestate.com.au, 2018c):

- Outside town there was 1 three-bedroom house on 85-acres
- Inside town there were:
 - 2 two-bedroom house – not suitable for workers due to age and condition;
 - 6 three-bedroom houses – not suitable for workers due to age and condition;
 - 3 four-bedroom houses – not suitable for workers due to age and condition;
 - 1 five-bedroom house – not suitable for workers due to age and condition; and
 - 2 lots – no housing for workers.

There was one rental property in Yuleba which did not meet the criteria identified by Miles realtors as suitable for workers' accommodation (Realestate.com.au, 2018d).

Both Wallumbilla and Yuleba have small populations, insufficient housing stock (quality and quantity) for housing operations workers, insufficient services and amenities, and are situated at the maximum safe daily travel distance to the CPF where they would conduct daily safety briefings prior to travelling to their work front. Furthermore, as was learned from the lessons of Miles' unsustainable housing boom, construction of new housing to sustain the workforce would require a near doubling of housing in the towns. There would need to be considerable over-supply developed to accommodate the variability in the workforce requiring accommodation throughout the year depending on the activities undertaken in the area. Furthermore, once the workforce departed at the end of the Project, there would be insufficient population, economic opportunities, or secondary industries to enable population growth to occupy the now vacant houses. The result would be significant over-supply in housing like the bust in Miles from 2015, resulting in older houses being almost worthless, and most houses being unoccupied. The owners of all houses in these communities would experience significant financial loss, and the communities' identities and aesthetics would be completely altered. The only recourse would be the complete removal of all Origin workforce occupied housing, which would be cost prohibitive and would only partially mitigate the socioeconomic impacts.

A review of the Roma rental market for three-bedroom plus houses and units yielded 60 results of which nine matched the criteria for suitable accommodation identified by realtors in Miles. Of these, five were ideally suited (four-bedroom, 2 bathroom) to enable four workers to share (two at a time), with an average rent of \$314 per week (Realestate.com.au, 2018e). These ideally suited houses could accommodate 20 workers or 10 workers per shift, while the nine houses could accommodate 38 workers. It is possible that more suitable housing could be made available in Roma if owners were aware of an increase in demand; however, it is unlikely a sufficient amount of housing could be made available to accommodate the entire workforce accommodated at Reedy Creek and/or Spring Gully villages. Compound this absence of supply with the extremely long commutes and the opportunity to utilise housing in Roma becomes untenable. The potential small-scale economic rewards to limited property owners does not justify the economic, physical and emotional costs on workers forced to commute and live – be it subsidised – outside of the camps.

4.2.4 SHORT-STAY ACCOMMODATION

Wallumbilla has two short-stay accommodation options, the Wallumbilla Cabin Park and the Federal Hotel. The Wallumbilla Cabin Park has ten resort style cabins suitable for Origin workforce short-stays (Wallumbilla Cabin Park, 2018) where driving distances to the work front are in line with the maximum one-way commutable distance, which is 30 minutes (~45 km). The Federal Hotel is a typical small country town hotel with modest rooms with basic provisions. It is not suitable for Origin workforce short-stays without TV, internet, and décor upgrades including soundproofing from the pub noises.

There is a hotel motel in Yuleba with twelve air-conditioned cabins, four motel rooms, and four single bunkhouse rooms with shared facilities (Yuleba Hotel Motel, 2018). This is acceptable for some short-term stays where driving distances to the work front are in line with the maximum one-way commutable distance, which is 30 minutes (~45 km).

4.2.5 CUMULATIVE ACCOMMODATION IMPACTS

There is periodic use of local short-term accommodation in Wallumbilla and to a much lesser extent Yuleba by contractors from various companies though this is not a common occurrence (i.e. not policy). As evidenced in a recent field assessment of Wallumbilla, drill rigs for field development north of Wallumbilla utilise mobile camps as is common practice (see Photo 3). On 7 May 2018 there were signs for six separate drill rigs observed in and around these communities from three separate companies (not including Origin). Exploration and field development drilling appear to be the only activities being undertaken by other CSG companies in the area. As these activities are being catered for with temporary camps at the rig site there does not appear to be a reason for cumulative use of accommodation within these communities.

Photo 3 Dongers in Wallumbilla Awaiting Transport to Drill Rigs North of Town



Source: RSLC, 2018

4.2.6 PLANNED HOUSING DEVELOPMENTS

There was no evidence of planned housing developments for Wallumbilla and Yuleba and any consideration of such an endeavour would be undertaken in wilful ignorance of historical and current housing trends in these communities, and lessons learned from such endeavours in regional communities like Miles, Roma, and Chinchilla (Roma Realtors, 2018). A search of the MRC Development Applications site found once application in Wallumbilla to install a telecommunications facility associated with the NBN which was approved in August 2017 (MRC, 2018).

5.0 CONCLUSION

The communities in the Western Gas Fields have several limiting factors that also need to be considered in determining the viability of sustainably housing workers for the duration of the Project. Wallumbilla is an almost exclusively agriculture-based economy (and culture) with a strong

civic pride. An influx of workers constituting a ~75-150% increase in the population of Wallumbilla (pop 311, (ABS, 2005 to 2015)) would significantly alter the community dynamic and balance of power within the community and put significant pressure on the population from the large proportion of males within the workforce. This can manifest in real and perceived impacts on the male population in terms of a sense of helplessness from the incursion of other males (i.e. marginalization in society which may lead to antisocial behaviour and violence, particularly at pubs and other functions serving alcohol (Miles Police, 2017)), and in the female population in terms of security and societal stability.

In Wallumbilla, the housing stock is older Queenslanders and wood houses not deemed suitable for workers (Miles Realtors, 2017). This would require construction of new housing for an extremely variable-sized workforce, some of whom are permanent and many who are temporary contractors requiring accommodation for extended periods of time intermittently throughout the year. This would put upward pressure on housing in the short-term by speculators who would benefit from new house construction allocated to the workforce but not benefit from purchasing unsuitable older houses, and in the long-term this is likely to devalue older housing stock due to the prevalence of newer housing stock, particularly at the end of the Project life in ~20 years, when supply outstrips demand (Origin Energy, 2017a). There would also be periods of time where large numbers of new-built houses for the workers would be vacant, due to a lack of demand associated with the absence of contractor activities as is common in field development phases of oil and gas projects. Wallumbilla also does not have adequate recreational facilities to cater for the workforce, or health (physical and mental) services and staff, and the NBN roll out is not scheduled until April to June 2019 (NBN Co, 2018a). The alternative is to move a 3rd party camp to the area (or activate the mothballed camp south of town) which would likely result in little to no change to the community in terms of positive economic opportunities for local businesses but would impact on worker health and safety due to the extended commute. If the camp remained south of Wallumbilla this would require workers to cross the Warrego Highway without a traffic light or adequately marked crossing.

In Yuleba, the housing stock is also older Queenslanders and wood houses with the same requirement for new builds and the subsequent effects as Wallumbilla. Yuleba also does not have a sewage system which means lots cannot be subdivided due to the requirement for a septic field (Roma Realtors, 2018). The town has fewer businesses and services than Wallumbilla, no NBN roll out plan (NBN Co, 2018b), and a large portion of the population is on some form of welfare or a pension (Roma Realtors, 2018). An increase in housing prices, even short-term could result in evictions of low income renters and mass selling by some residents looking to profit.

In both communities there is a high likelihood an increase in housing prices from speculators could see a sizeable portion of the population sell, either to recoup losses from over-capitalisation if they purchased during the CSG construction boom (generally out of town speculators), or locals moving out to gain financially from the high prices (Origin Energy, 2017a). This is an unacceptable risk that would inevitably occur in some form based on the experiences of Miles and Chinchilla, and the requirement to build new houses to accommodate the workforce. Furthermore, it would take years to construct the 90+ four-bedroom, two-bathroom brick houses required to meet the peak demands for workers currently housed in Reedy Creek Village alone. If the workforce was instead moved into 3rd party camps the result would be little to no economic gain for the communities but would impact on worker health and safety due to the extended commute.

Origin views worker choice of where they live as a barometer for the attractiveness and liveability of communities near the gas fields, and particularly the Central Processing Facilities (CPFs). In the Eastern Gas Fields, twenty-one (32.8%) Operations workers lived local in 2016, many moving prior to

the Living Local Policy applied to them, or in a much more limited fashion than exists now. This showed the positive perception many workers had towards local communities, generally because of the travel distance to work, the desire to move out of the camp environment and into a community, and the availability of services and amenities in these communities. For contractors the numbers were lower, generally because of the transitory nature as they move around various gas fields depending on where their work fronts are and how the fields ultimately develop (Origin Energy, 2017a). The commute to work and the liveability of communities (real or perceived) within a commutable distance are major factors in decisions to live in the Western Gas Field.

It is therefore not likely to result in a community benefit, would likely result in a net financial loss to Origin, and would increase health and safety risks for workers if the Western Gas Field camps were to be mothballed or closed, and their workforce moved to neighbouring communities based on the issues outlined above, the lessons from the housing speculation in the Eastern Gas Fields, and the move in the Eastern Gas Fields to suitably situated and resourced communities (Origin Energy, 2017a). A more satisfactory outcome would be for Origin and Maranoa Regional Council (MRC) to explore regional development opportunities and explore opportunities and barriers for more workers to move locally through alternative measures, strategies, and policies. Part of the collaboration with MRC on determining manageable, sustainable solutions for living local could include discussions with Wallumbilla and Yuleba community members and groups to determine their desire for change, and in what form, in order to identify opportunities and barriers to living local, and realistic expectations for community investment and development.

References

- ABS, 2005 to 2015. *3218.0 - Regional Population Growth, Australia, 2014-15*. [Online]
Available at: [ABS 3218.0, Regional Population Growth, Australia, 2014-15, unpublished data](#)
[Accessed 26 January 2015].
- Boomtown-indicators, 2018. *Boomtown Indicators Compare*. [Online]
Available at: <https://boomtown-indicators.org/compare>
- GoogleMaps, 2018a. *Navigate Wallumbilla to Reedy Creek CPF*. [Online]
Available at: <https://www.google.com.au/maps/dir/Wallumbilla+QLD/-26.3475513,149.3837517/@-26.4518793,149.1792928,58378m/data=!3m2!1e3!4b1!4m9!4m8!1m5!1m1!1s0x6bbbd14cc1b342e9:0x400eef17f20a410!2m2!1d149.1881542!2d-26.5801535!1m0!3e0>
- GoogleMaps, 2018b. *Navigate Yuleba to Reedy Creek CPF*. [Online]
Available at: <https://www.google.com.au/maps/dir/Yuleba+QLD/-26.3475513,149.3837517/@-26.466071,149.2772941,58371m/data=!3m2!1e3!4b1!4m9!4m8!1m5!1m1!1s0x6bbbf319fec03c9:0x400eef17f20a420!2m2!1d149.3841005!2d-26.6167554!1m0!3e0>
- Hub Realty, 2016. *Miles Real Estate Changes 2008 to present* [Interview] (08 September 2016).
- Miles Police, 2017. *Antisocial behaviour and other issues experienced in Miles during the CSG construction boom* [Interview] 2017.
- Miles Realtors, 2017. *Suitable Housing Requirements for Origin workers* [Interview] 2017.
- MRC, 2018. *Development Applications*. [Online]
Available at:
<http://pdonline.maranoa.qld.gov.au/Application/ApplicationDetails/030.2017.00019659.001/>
[Accessed 25 May 2018].
- NBN Co, 2018a. *Rollout Map*. [Online]
Available at: <https://www.nbnco.com.au/learn-about-the-nbn/rollout-map.html?lat=-26.5801535&lng=149.1881542&addressString=Wallumbilla QLD 4428, Australia&addressCategory=HOME&zoom=15>
[Accessed May 2018].
- NBN Co, 2018b. *Rollout Map*. [Online]
Available at: <https://www.nbnco.com.au/learn-about-the-nbn/rollout-map.html?lat=-26.5801535&lng=149.1881542&addressString=Wallumbilla QLD 4428, Australia&addressCategory=HOME&zoom=15>
[Accessed May 2018].
- NBN Co, 2018c. *Rollout Map*. [Online]
Available at: <https://www.nbnco.com.au/learn-about-the-nbn/rollout-map.html?lat=-26.5801535&lng=149.1881542&addressString=Wallumbilla QLD 4428, Australia&addressCategory=HOME&zoom=15>
[Accessed May 2018].
- Origin Energy, 2017a. *Condabri Camp Closure Social Impact Assessment*, Brisbane: Red Sun Land Consulting.
- Origin Energy, 2017b. *Condabri Camp Accommodated Workforce Profile*, Brisbane: Red Sun Land Consulting.

- Origin Energy, 2017c. *APLNG Accommodation Principles*, Brisbane: Origin Energy.
- Origin Energy, 2018a. *Six Month Utilization Forecast - APLNG Camps*, Brisbane: Origin Energy.
- Origin Energy, 2018b. *Living Local Guide*, s.l.: Origin Energy.
- PriceFinder, 2018a. *Comparative Market Analysis - Wallumbilla*, s.l.: Property Data Solutions Pty Ltd.
- PriceFinder, 2018b. *Comparative Market Analysis Yuleba*, s.l.: Property Data Solutions Pty Ltd.
- Properties Realty, 2016. *Miles Real Estate Changes 2008 to present* [Interview] (08 September 2016).
- QGSO, 1861 to 2008. *Queensland Government Statisticians Office Historical Tables*. [Online]
Available at: <http://www.qgso.qld.gov.au/products/tables/historical-tables-demography/index.php>
[Accessed 21 January 2015].
- Queensland Health, 2014. *Wallumbilla Community Clinic*. [Online]
Available at: https://www.health.qld.gov.au/services/southwest/swest_wallum_hosp
[Accessed 25 May 2018].
- Realestate.com.au, 2018a. *Houses for Sale - Wallumbilla*. [Online]
Available at: <https://www.realestate.com.au/buy/in-wallumbilla%2c+qld+4428%3b+/map-1?channel=buy&source=location-search>
[Accessed 26 April 2018].
- Realestate.com.au, 2018b. *Houses for Rent - Wallumbilla*. [Online]
Available at: <https://www.realestate.com.au/rent/in-wallumbilla%2c+qld+4428%3b+/map-1?channel=rent&source=location-search>
[Accessed 26 April 2018].
- Realestate.com.au, 2018c. *Houses for Sale - Yuleba*. [Online]
Available at: <https://www.realestate.com.au/buy/in-yuleba,+qld+4427/map-1?includeSurrounding=false>
[Accessed 26 April 2018].
- Realestate.com.au, 2018d. *Houses for Rent - Yuleba*. [Online]
Available at: <https://www.realestate.com.au/rent/in-yuleba,+qld+4427/map-1?includeSurrounding=false>
[Accessed 26 April 2018].
- Realestate.com.au, 2018e. *Houses for Rent - Roma*. [Online]
Available at: <https://www.realestate.com.au/rent/property-unitblock-townhouse-unit+apartment-house-with-3-bedrooms-in-roma,+qld+4455/map-1?includeSurrounding=false>
[Accessed 26 April 2018].
- Roma Realtors, 2018. *Discussions of current and historical real estate trends in Wallumbilla and Yuleba 2001 to present* [Interview] (07 May 2018).
- RTA, 2016. *Median rents quarterly data*. [Online]
Available at: <https://www.rta.qld.gov.au/Resources/Median-rents/Median-rents-quarterly-data>
- Ruralco Property, 2016. *Miles Real Estate Changes 2008 to present* [Interview] (09 September 2016).

Wallumbilla Cabin Park, 2018. *Accommodation*. [Online]

Available at: <http://www.wallumbillacabins.com.au/index.php/accommodation>
[Accessed 20 May 2018].

Yuleba Hotel Motel, 2018. *Accommodation*. [Online]

Available at: <http://yulebahotelmotel.com.au/accommodation/>
[Accessed 20 May 2018].

Page Intentionally Left Blank

28 September 2018



Attention: [REDACTED]

Mr. Barry Broe
Coordinator-General
Department of State Development, Manufacturing
Industry & Planning
PO Box 15009
City East QLD 4002

Dear Mr. Broe,

Application to change Australia Pacific LNG Project conditions – retention of 2 accommodation facilities – response to Request for Information dated 14 August 2018

Thank you for your email of 14 August 2018 requesting additional information relating to our application to change the Australia Pacific LNG Project conditions to enable the retention of the Reedy Creek and Bungaroo villages.

Description of our activities and workforce

As discussed in our meeting on 31 July 2018, the nature of the upstream project activities has changed since the completion of Phase 1¹. You will recall that Phase 1 of the Project was comprised principally of construction activities. During Phase 1, we drilled and connected some 978 wells to our gas processing facilities (GPFs). Connecting the wells involved constructing thousands of kilometres of buried HDPE gathering pipelines to connect the wells to the GPFs. We retained some existing GPFs (at Spring Gully, Talinga and Peat), and then constructed an additional 6 GPFs and expanded our Talinga facilities. We also retained some existing water treatment facilities (WTFs), and then constructed an additional 2 WTFs. We also constructed the major steel pipeline connecting the gasfields to the LNG facility on Curtis Island, and electrified and established telecommunications across the gasfields. Ancillary activities included major road upgrades. Phase 1 was, in essence, the coordinated completion of a number of related major construction projects (drilling, gathering, gas and water facilities, pipeline, electrification and telecommunication).

The future “sustain” or “operations” phase of the project is quite different to Phase 1 and was described in the EIS (albeit at a maximum development case, which was larger than our actual development case). Nonetheless there seems to be a misapprehension amongst stakeholders that there would be (or has been) a straight cutover at the end of Phase 1 from “construction” to ongoing “operations”, and that the workforce would transition from being largely a transient FIFO construction workforce to a permanent operations workforce. That is not the case, and this seems to give rise to some contention about our workforce and resultant accommodation needs.

Moving forward, in the field, we will have a “construction workforce” (most of whom will not be directly employed by Origin) that is involved in work more in the nature of “construction”, and others (most of whom who will be directly employed by Origin) involved in work more in the nature of “operations and maintenance”. We’ve described the various activities in detail below, and identified them as generally being either more in the nature of “construction activity” or “operations and maintenance activity”.

For the purposes of the change request, we have detailed activity carried out in the gasfields (as distinct from work carried out by people in our Brisbane office). A large proportion of our workforce that lives and works in Brisbane travel to and from the gasfields at varying frequencies. When they do, that creates an accommodation demand in the gasfields. Our policy is for such people to stay in motel accommodation where that is practicable, although there is some utilisation of the Reedy Creek and Spring Gully villages when they travel to those areas.

¹ Note that the Phase 1 downstream project activity was principally the construction of the LNG facility on Curtis Island. The operation of that facility has no relevance to the change request.

To assist you further in understanding our workforce at a high level, at present our workforce can be broken down as follows:

Table 1: High level workforce breakdown

Employees that work in Brisbane	525
Employees that work in the field	433
Contractors (employed by our service providers) that work in the field	605 – 2018 average NB. These numbers are highly variable. The individuals are employed by more than 50 service provider/ supplier organisations across varying scopes of work that is highly variable in terms of location and volume.
Total ²	1563

We expect that each year we will drill and connect approximately 275-300 new wells across the Project area. The addition of new wells does not represent additional production each year; rather production will be relatively stable as the new wells “replace” older wells as they reach end of life and are decommissioned. What that means is that our current activity (leaving aside our field development planning, commercial and other functional support activities) can be broken down as follows:

Construction Activity

- The drilling and completion of the 275-300 wells (which involves the operation of separate rigs for the drilling and completion activities) including cultural heritage and environmental field surveys, preparation of lease pads and completion of other pre-drill field activities;
- The installation of the HDPE gathering lines to connect those wells;
- The decommissioning of exploration, appraisal and production wells and associated infrastructure that is no longer required;
- The rehabilitation of other infrastructure such as old evaporation ponds that are no longer suitable for use;
- The completion of “new” projects such as the imminent construction of a new pipeline to connect our Reedy Creek facilities to our Spring Gully facilities, and the planned addition of compression facilities near Talinga in 2019; and
- The drilling of water monitoring bores, decommissioning of landholder bores and occasional drilling of new water bores for landholders.

Operations & Maintenance Activity

- The operation of our exploration, appraisal and production wells and the associated gathering systems;
- The operation of our GPFs and WTFs, including the operation of our Integrated Operations Centres in Spring Gully, Reedy Creek and Condabri, and the Brisbane Central Control Room in Brisbane;
- Workovers of our production wells to enhance gas production and extend the life of the wells;
- Undertaking major maintenance shutdowns of the GPFs and WTFs, which occur for each facility approximately once every four years (scheduled on a rolling basis);
- The operation of warehousing facilities and accommodation villages; and
- Engagement with landholders, Traditional Owners and community stakeholders, including negotiating landholder agreements.

The typical workforce for each of those activities is set out in Table 2 below.

Table 2 - Typical Workforce Description by Activity

Activity Type	Typical Workforce Description
Construction Activity	
Drilling, completion and associated pre-drill activity	• The location of field surveying, drilling and gathering activities is highly variable (refer also Table 3 below). • Preparation of lease pads is typically performed by gathering contractors (refer next row for details).

² The number of people that don't fit into one of those 3 categories is immaterial for the purpose of the change request. For example, where we engage a professional service firm to assist us with a commercial activity, their employees are not included in these numbers.

	• Drilling each well requires the operation of a drilling rig followed by a completions rig. Rigs and rig crews are provided by service providers, and Origin typically has a small number of employees present on each rig whilst it is operating. There is a team of 20-22 people per drilling work front; they work on 12-hour shifts and follow the rigs as they go. These teams typically stay in mobile rig camps to support safe 24-hour operations and ensure that personnel do not travel further than 25km or 30 minutes to and from the rig. • Drilling personnel typically stay in mobile rig camps regardless of where they reside when working, including if they reside permanently in Maranoa Regional Council (MRC) or Western Downs Regional Council (WDRC) areas. That is, a person involved in drilling activity needs camp accommodation (typically mobile rig camp) even if they live in the gasfields. When drilling activity is proximate to an existing Origin village, these workers stay in a village. • We estimate that this contractor workforce size is between 0 and 130 in each month, with an average of 90. • Cultural heritage scouting is predominantly undertaken by members of Traditional Owner groups who typically live across the gasfields area. Origin retains 2 Chinchilla-based roles (permanent employees) to work with scouting teams. • Environmental/ ecology field work is predominantly undertaken by service providers with offices generally located in Roma or Brisbane. Origin retains 2 Chinchilla-based roles (permanent employees) to work with service providers and undertake environmental field work as required. • The individuals involved in cultural heritage scouting and environmental field work utilise camp accommodation when their work fronts are not proximate to their place of residence. For example, it is common for a cultural heritage employee living in Chinchilla to stay in the Reedy Creek or Spring Gully village when undertaking field work in areas located west of Miles. • A level of accommodation demand exists for people that live in Chinchilla, Miles, Roma and other regional towns.
Gathering	• Gathering activity is associated with the drilling activity, and therefore the location is also highly variable. • Origin typically engages civil construction companies to undertake gathering activities. Most people that undertake the work are contractors. • Whilst we seek to level activity across the year, it typically ebbs and flows. We estimate that this contractor workforce size is between 0 and 220 in each month, with an average of 175 • When working in the Condabri/ Talinga/ Orana fields, this workforce most typically FIFOs in and out, and stays in camps in Chinchilla or Miles operated by non-Origin parties. • When working in other areas (west of Miles), this workforce most typically FIFOs in and out, and stays in Reedy Creek or Spring Gully village. • Some of this contractor workforce resides permanently in the gasfields, however we are unable to provide an accurate number due to the lack of complete contractor data.
Decommissioning of wells and associated infrastructure	• This work is spasmodic and usually happens as a program/ project when there is an appropriately sized package of work. Therefore, the number of people engaged in this activity is highly variable. • Decommissioning a well requires a rig and rig crew, along with other people to remove infrastructure. • Drilling rig crew information is as set out above.

	• Origin typically engages service providers on a project or scope basis for this type of work. • When working in the Condabri/ Talinga/ Orana fields, this workforce most typically FIFOs in and out, and stays in camps in Chinchilla or Miles operated by non-Origin parties. • When working in other areas (west of Miles), this workforce most typically FIFOs in and out, and stays in Reedy Creek or Spring Gully village.
Rehabilitation of legacy infrastructure e.g. ponds	• This work is spasmodic and usually happens as a program/ project when there is an appropriately sized package of work. • This work is spasmodic and usually happens as a program/ project when there is an appropriately sized package of work. • Origin typically engaged service providers on a project or scope basis for this type of work. • When working in the Condabri/ Talinga/ Orana fields, this workforce most typically FIFOs in and out, and stays in camps in Chinchilla or Miles operated by non-Origin parties. • When working in other areas (west of Miles), this workforce most typically FIFOs in and out, and stays in Reedy Creek or Spring Gully village.
New projects such as pipelines and compression facilities	• Origin typically engages civil construction companies to undertake these new project activities. Most people that undertake the work are contractors. • There are times when none of these projects are occurring, and times when multiple projects are occurring at the same time. • These projects are typically carried out continuously until they are completed, and typically take 3-12 months of field activity to complete (although can be longer). • When working in the Condabri/ Talinga/ Orana fields, this workforce most typically FIFOs in and out, and stays in camps in Chinchilla or Miles operated by non-Origin parties. • When working in other areas (west of Miles), this workforce most typically FIFOs in and out, and stays in Reedy Creek or Spring Gully village. • For example, the commencement of construction of a pipeline connecting Reedy Creek and Spring Gully facilities is imminent. We have engaged service providers to construct the pipeline, and therefore most people are contractors and typically FIFO (although some will live in the gasfields). Given the location of the pipeline, this workforce will typically stay in the Reedy Creek or Spring Gully village. This activity will take approximately 6 months with 100 MPC Contractors.
Drilling and decommissioning of water bores	• This work is spasmodic and usually happens as a program/ project when there is an appropriately sized package of work. Therefore, the number of people engaged in this activity is highly variable. A likely scenario is one program of work per year that would take about a month to complete. • Decommissioning a well requires a rig and rig crew, along with other people to remove surface infrastructure (such as windmills). • Drilling rig crew information is as set out above. • Origin typically engages service providers on a project or scope basis for this type of work. • When working in the Condabri/ Talinga/ Orana fields, this workforce most typically FIFOs in and out, and stays in camps in Chinchilla or Miles operated by non-Origin parties. • When working in other areas (west of Miles), this workforce most typically FIFOs in and out, and stays in Reedy Creek or Spring Gully village.
Operations & Maintenance Activity	

Operation of wells and gathering	This is the workforce generally described as the “operational workforce” in the EIS.
Operation of GPFs, WTFs, IOCs and BCCR	- Most people that undertake this activity are Origin employees. - Further information about this workforce is set out below. - Those who work in the Condabri/ Talinga/ Orana fields do not utilise Origin village accommodation. The Condabri and Talinga villages were closed in 2017. - Those who work in other areas (Combabula, Reedy Creek, , Spring Gully and Denison) do utilise Origin village accommodation. That is the case even for those people that reside permanently in MRC, WDRC or elsewhere in the gasfields or regional Queensland.
Workovers	This activity is akin to drilling activity. The description of the workforce above applies here.
Major shutdowns	- The gas processing and water treatment facilities are shut down for major planned maintenance activities approximately once every four years on a rolling basis. - This activity is undertaken by a combination of Origin employees (represented in the operations workforce detailed above) as well as service providers/ contractors. It is highly specialised work that requires disciplined planning and execution. - Depending on the scope of maintenance activity, the duration of each campaign is approximately 2-4 weeks and we will typically have 2-4 campaigns each year. - For the contractor workforce: - When working in the Condabri/ Talinga/ Orana fields, this workforce most typically FIFOs in and out, and stays in camps in Chinchilla or Miles operated by non-Origin parties. - When working in other areas (west of Miles), this workforce most typically FIFOs in and out, and stays in Reedy Creek or Spring Gully village.
Operation of warehousing and accommodation villages	- For warehousing, this workforce is included in the operations workforce described above. - We engage a service provider to manage the Origin villages on our behalf, and therefore most people involved in this activity are contractors. - These people typically stay in the village when they are working, even if they reside permanently in MRC, WDRC, or elsewhere in the gasfields or regional Queensland.
Landholder and stakeholder engagement	- There are approximately 20 people involved in this activity. - All the people involved in this activity are Origin employees. - The majority of people live and work in or near Chinchilla or Roma. - These employees sometimes travel elsewhere in the gasfields for work, which creates an accommodation demand met typically through motel accommodation and occasional usage of Reedy Creek or Spring Gully village.

In summary:

- Only a small proportion of our activities are level in terms of location and volume, and this is essentially the operation and maintenance of existing infrastructure and engagement with landholders and other stakeholders.
- Whilst we forecast drilling and gathering an additional 275-300 wells each year, that activity is highly variable in terms of location, and the number of wells drilled changes from month to month due to a complex array of constraints. Drilling rigs and crews are also utilised for workover and decommissioning activities.

- Drilling: These are continuous 24-hour operations, with workers working back-to-back 12-hour shifts. Safety – including through strict management of travel distances/ durations – is paramount. Typically, approximately 14 contractors and 16 employees are involved in that activity per rig.
- Gathering: Typically, approximately 175 contractors and 170 employees are involved in gathering activity.
- We foresee that we will always have a level of the other construction activity described above. That activity is highly variable in terms of location and volume. However, it will typically be undertaken in the field by contractors, with an immaterial number of Origin employees.

Variability in location and volume of activity

Whilst the location of existing wells, GPFs, WTFs and associated infrastructure is fixed, the location of new wells and projects is highly variable and influenced by a combination of factors. For example, ideally we would be drilling new wells right across the Project area at present. However, there are constraints in the Spring Gully and Condabri/ Talinga/ Orana areas that mean nearly all drilling is currently centred on our Combabula/ Reedy Creek area.³

Similarly, the nature and volume of activity is highly variable from one period to the next. An indicative forecast of wells by location is shown in Table 3 below. These constraints and resultant planning and logistics challenges drive the need for some flexibility with our accommodation.

Table 3: Indicative Well Count by Field

Field	2018	2019	2020	2021	2022
Talinga/ Orana	49	60	97	87	
Condabri	3	72	39		
Kainama			63		48
Reedy Creek/Combabula	203	115	118	148	148
Peat			24	6	
Ramyard		10	48		
Spring Gully	4	29	9		
Total	259	286	398	241	196

Employee Field workers: where they live and stay

As set out above, the Origin employee component of our 433 field workers is relatively stable.

At present, approximately 85 (20%) of those workers reside permanently in MRC or WDRC.

An additional 4 employees live in the Central Highlands Regional Council (CHRC) area, and work in Biloela.

Further information about the 85 people that reside in MRC or WDRC is provided in Table 4.

Table 4: Breakdown of MRC and WDRC resident field workers

Employees that live in MRC, WDRC or CHRC – and live at home when on shift	52
Employees that live in MRC or WDRC – and stay in other local housing when on shift ⁴	14
Employees that live in MRC or WDRC – and stay in camp when on shift	23
Total	89

At present, approximately 344 (80%) of those workers reside outside of MRC, WDRC and CHRC and fly or drive in and out of the gasfields when they are working. Further information about those people is provided in Table 5.

³ The constraint in Spring Gully is a federal environmental approval that is illustrative of external factors that impact our field development planning.

⁴ Mostly people that work in the Peat field.

Table 5: Breakdown of other field workers

Stay in motels	5
Stay in local housing	136
Stay in camp	203
Total	344⁵

Most of the workers that stay in local housing when they are on shift work in the Condabri, Talinga and Orana fields because of the deliberate decision to close the Origin villages at Condabri and Talinga. As set out in the change request, this is possible and safe due to the proximity of the towns of Miles and Chinchilla to those fields.

Most of the workers that stay in camp when they are on shift work in the Reedy Creek, Combabula or Spring Gully fields (although some are workers that stay in non-Origin camps in Miles and Chinchilla). As set out in the change request, this is a result of the distance between those fields and local towns.

As can be seen in the above tables, 202 (46%) of our field workers are currently utilising local housing.

Contractor Field workers: where they live and stay

The size of our contractor workforce is highly variable, however the 2018 average to date is estimated to be 605.

The majority of these workers fly in and out of the gasfields and stay in mobile drilling camps, third party camps or Origin villages when working.

As is the case with our employees, a proportion of these individuals permanently reside in regional and rural locations elsewhere in Queensland. This workforce is constantly changing. The individuals are employed by more than 50 supplier organisations and we do not have data in relation to where they permanently reside.

Demand for Reedy Creek and Bungaroo

In the request for information, you have indicated that there appears to be a limited need for the retention of the Reedy Creek and Bungaroo villages. The basis of that contention is unclear.

Origin requires the long-term ability to utilise Reedy Creek, Bungaroo and Spring Gully villages:

- Reedy Creek is our preferred accommodation for people working in the Combabula and Reedy Creek fields;
- Spring Gully is our preferred accommodation for people working in the Spring Gully field;
- Our intent is to retain Bungaroo village for use only when demand requires;
- The 2017-18 project activity illustrates why both Reedy Creek and Bungaroo are required;
- Approximately 55 Origin employees that undertake operations and maintenance activities in the Reedy Creek and/ or Combabula fields utilise Reedy Creek village on an ongoing basis;
- In 2018 (as shown in Table 3), 80% of our drilling and gathering activity was in the Reedy Creek and/ or Combabula fields. That meant another a minimum of 350 workers (sometimes more) required accommodation proximate to those fields;
- That demand exceeded the capacity of the Reedy Creek village (460 beds) during October to December 2017 which was managed by temporarily utilising the Bungaroo village;
- Whilst the drilling and gathering activity in that area will decrease to about 40% of the total activity, we will be undertaking the construction of the pipeline to connect Reedy Creek and Spring Gully resulting in the temporary addition of approximately 100 workers; and
- It is likely that the demand in that area will exceed the capacity of the Reedy Creek camp from time to time.

Other

In the information request, you queried the number of people that would utilise fly camps. On the assumption that we have a fleet of 5 rigs for drilling, workover and decommissioning activities, we anticipate that up to 100 people (mostly contractors) will be accommodated in mobile rig or "fly" camps.

⁵ A proportion of these individuals permanently reside in regional and rural locations in Queensland.

We have previously advised you of steps we have taken to increase the proportion of our field workers that live permanently in MRC and WDRC. We are advertising vacant roles locally, with a policy of hiring suitable local candidates before considering other candidates. We anticipate that the proportion of our field workers that live locally will continue to increase over time. Additionally, a large number of field workers that travel into the gasfields to work utilise local housing when they are working. It is worth noting that when camps utilised by workers working in the Condabri/ Talinga/ Orana area, they use existing camps owned and operated by third parties.

Our typical rosters are as follows:

- Most of our operations workforce work a 2 weeks on/ 2 weeks off roster, with a small number of individuals that work a standard working week (5 days on/ 2 days off);
- Most of our drilling workforce work a 2 weeks on/ 2 weeks off roster;
- Most of our gathering and projects workforce work a 19 days on/ 9 days off roster (with a small number of individuals working 5/2)
- All of our landholder and stakeholder engagement workforce works a 5/2 pattern.

Conclusion

We hope that this additional information meets your needs, and demonstrates why the retention of the camps is required on the basis of demand, but also (as detailed in the change request) safety, housing supply and other socio-economic factors.

Should you have any further queries in relation to the change request, please contact Wade Micke (Tenures and Native Title Lead) by email Wade.Micke@originenergy.com.au.

Yours faithfully



Natasha Patterson
Strategic Approvals Manager
Integrated Gas
0459 826 553 – Natasha.Patterson@originenergy.com.au

Australia Pacific LNG Project Supplemental information to the EIS Project Description Improvements

Disclaimer

This report has been prepared on behalf of and for the exclusive use of Australia Pacific LNG Pty Limited, and is subject to and issued in accordance with the agreement between Australia Pacific LNG Pty Limited and WorleyParsons Services Pty Ltd. WorleyParsons Services Pty Ltd accepts no liability or responsibility whatsoever for it in respect of any use of or reliance upon this report by any third party.

Copying this report without the permission of Australia Pacific LNG Pty Limited or WorleyParsons is not permitted.

Contents

1.	Introduction	1
2.	Purpose	2
3.	Gas fields	3
3.1	Field development plan	3
3.2	Electrification of the Gas Fields	9
3.3	High pressure gas pipelines	13
3.4	Temporary and permanent accommodation facilities	14
4.	Main Gas Pipeline	17
4.1	Pipe transportation	17
4.2	Biloela support base	17
4.3	Accommodation facilities and laydown areas	17
4.4	The Narrows crossing	21
5.	LNG Facility	23
5.1	LNG Facility Layout/Design	23
5.2	Construction Marine Infrastructure	31
5.3	Dredging	33
5.4	Mainland Facilities	35
5.5	Stormwater drainage	35
5.6	Brine and Treated Wastewater Discharges	36
5.7	Construction Workforce and Accommodation	37
5.8	Interim Construction Access	38
5.9	Traffic and Transport	39

Figures

Figure 3-1 Existing Development 2010	5
Figure 3-2 Existing and proposed development 2012	6
Figure 3-3 Existing and proposed development 2013	7
Figure 3-4 Existing and proposed development 2014	8
Figure 3-5 Siting of infrastructure and landowner engagement process	9
Figure 3-6 Typical input/output streams for a gas processing facility	11

Figure 3-7 Single and double circuit powerlines	12
Figure 3-8 Electric driven GPF – Combabula (excluding temporary power plant)	13
Figure 3-9 Optimised high pressure gas pipelines	16
Figure 4-1 Main gas pipeline laydown and temporary accommodation facilities	19
Figure 4-2 Typical temporary accommodation facility layout	20
Figure 4-3 Typical layout of laydown areas	20
Figure 4-4 Crossing of The Narrows route	22
Figure 5-1 Cadastral boundaries and proposed lease areas	25
Figure 5-2 LNG facility development area	26
Figure 5-3 LNG facility indicative layout	27
Figure 5-4 Artist's impression of LNG facility – indicative view from north	28
Figure 5-5 Artist's impression of LNG facility – indicative view from west (aerial)	28
Figure 5-6 Artist's impression of LNG facility – indicative view from west	29
Figure 5-7 Artist's impression of LNG facility – indicative view from east	29
Figure 5-8 Fatality risk contours	31
Figure 5-9 Construction marine infrastructure	32
Figure 5-10 Indicative dredge options	34
Figure 5-11 Indicative drainage plan	36
Figure 5-12 Indicative temporary accommodation facility conceptual layout	37

Tables

Table 3-1 GPF configuration	10
-----------------------------------	----

1. Introduction

Australia Pacific LNG, a 50:50 joint venture between Origin Energy Limited (Origin) and ConocoPhillips, proposes to develop a world-scale, long-term coal seam gas (CSG) to liquefied natural gas (LNG) project (the Project) in Queensland. The Project is anticipated to spend approximately A\$35 billion through to 2020. The Project has a life of at least 30 years, and is made up of three primary elements:

- The further development of Australia Pacific LNG's gas fields in south central Queensland
- A high pressure gas pipeline from the gas fields to Gladstone in central Queensland
- An LNG facility on Curtis Island at Gladstone

On 9 April 2009, The Queensland Coordinator-General declared the Australia Pacific LNG Project to be a 'significant project for which an Environmental Impact Statement (EIS) is required' under the *State Development Public Works Organisation Act 1971* (SDPWO Act). The EIS process under this Act includes the relationship to the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and other relevant approvals processes.

On 29 March 2010, the Project's EIS was released for public comment for a period of five weeks. Since the publication of the EIS, further improvements and optimisation of the Project's infrastructure has occurred. A summary of the changes are discussed below.

The EIS is still publicly available and can be found at <http://www.aplng.com.au/>.

2. Purpose

The purpose of this document is to inform stakeholders of the project description improvements to the Australia Pacific LNG Project since the submission of the EIS. Project improvements which have reduced impacts described in the EIS have been developed through the consideration of potential environmental and social impacts and project economics, advancement of engineering solutions, and improved clarity around reserves in the gas field tenements.

3. Gas fields

3.1 Field development plan

The Walloons gas fields cover an area of approximately 570,000ha within petroleum tenures held by Australia Pacific LNG. To supply the required quantity of CSG to support the LNG facility at Gladstone, a series of gas fields will need to be progressively developed during a 30-year timeframe.

Infrastructure associated with the development of the gas fields includes gas compression and processing, power generation, water treatment facilities, feed and brine ponds, coal seam gas wells, low pressure gas and water pipelines as well as high pressure gas pipelines. Other infrastructure required will consist of road and access tracks, communications infrastructure, warehousing, temporary and permanent accommodation facilities, communications and logistics-related infrastructure.

The field development plan is regularly reviewed with the assessment of exploration results and gas reserves and refinements of engineering design. The indicative development program detailed in Volume 2 Chapter 3 Table 3.4 of the EIS has been refined for the first five years. The current development from 2011 to 2015 is scheduled to involve the construction and operation of the following infrastructure:

- Eight gas processing facilities (GPF)
- Two water treatment facilities (WTF)
- Two brine ponds (BP)
- Water transfer stations (WTS) and water gathering stations (WGS)
- High pressure gas pipelines
- Water pipelines
- 150 to 400 coal seam gas wells per year
- Wash down facilities
- Agricultural areas
- Laydown and storage areas
- Temporary and permanent accommodation facilities
- Administration offices

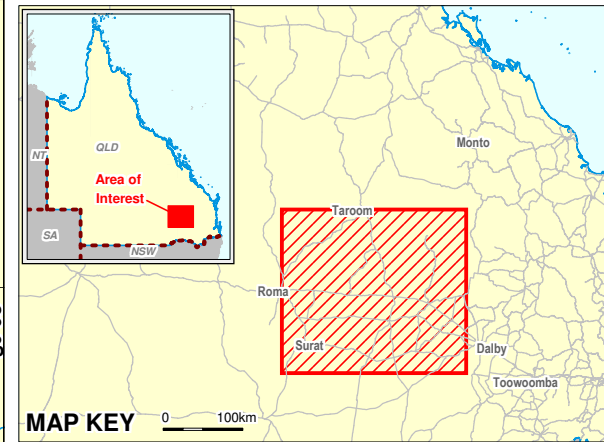
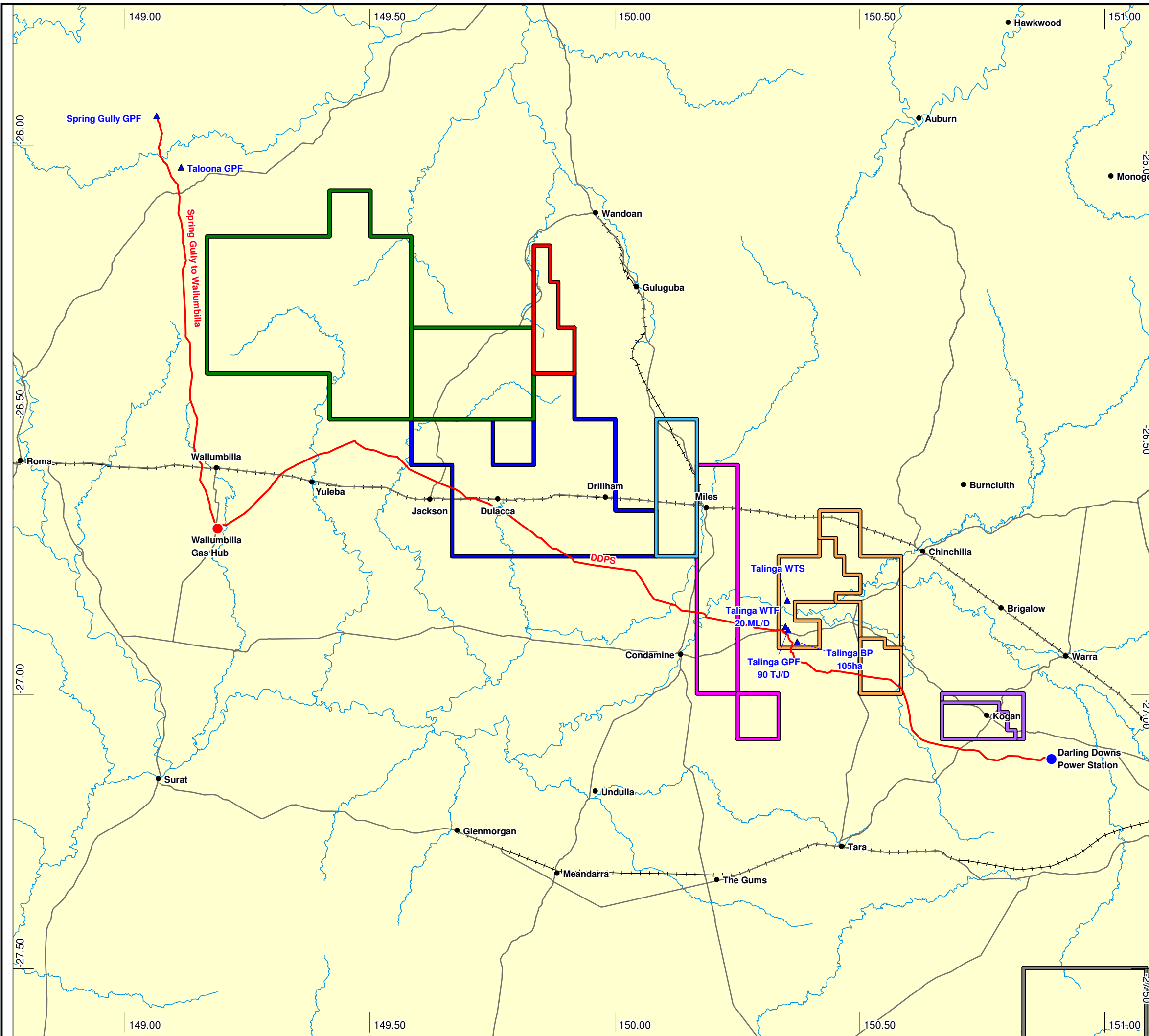
The development plan will be further detailed in a five-year operational plan, which will be updated when any significant changes to the development plan occur. Figure 3-1 to Figure 3-4 presents the major infrastructure (GPFs, WTF, BP, high pressure pipelines) to be constructed within the gas fields for the first five years. Major infrastructure will continue to be built in 2011, however it will not be brought online until 2012. Therefore no map for 2011 has been produced.

Refinements to the five-year field development plan were completed using the following planning processes:

1. Preliminary siting of key Project infrastructure, such as GPFs and WTFs, based on reserves developed during seismic and exploration work
2. Multi-criteria analysis (MCA) to objectively evaluate technical, environmental, social and cultural heritage constraints using existing information and information obtained through the EIS process (refer to Volume 2 Chapter 3 Section 3.4 of the EIS)
3. Refinement of all infrastructure locations and identification of appropriate technologies based on constraints mapping developed during the EIS process
4. Ecological scouting and landowner engagement to further refine the location of infrastructure. Figure 3-5 is an example of the landowner engagement process, with wells and gathering network sited giving consideration to impacts on agricultural land and sensitive ecological areas
5. Identification of mitigation measures and monitoring requirements, based on a risk assessment process that considers legislative requirements and impacts on the natural environment, the community and cultural heritage

Post 2015, further optimisation of Project infrastructure will continue to take place with extended exploration and pilot studies within these development areas. It is important to note that across the life of the Project Australia Pacific LNG is committed to using the process described above to ensure that the company follows due process that minimises the impacts to the region. Australia Pacific LNG requires approval for the life of the Project and Volume 2 Chapter 3 of the EIS details the maximum development scenario for the full 30 years of development.

© Commonwealth of Australia Geoscience Australia 2009. © The State of Queensland Department of Natural Resources, Mines and Energy 2009. © Worleyparsons Services Pty Ltd hereof the information recorded in this document (the information) except all responsibility and risk associated with the use of this information for purposes other than those for which it was prepared. No warranty is made by the Commonwealth of Australia or the State of Queensland as to the accuracy, reliability, completeness or currency and all liability for any development and consequential costs, losses, damages and expenses incurred by any party relying on the information is excluded. No liability is accepted for any development and consequential costs, losses, damages and expenses incurred by any party relying on the information.



- LEGEND**
- Town
 - Wallumbilla gas hub
 - Road
 - +++ Railway
 - Existing pipeline
 - ▲ Existing infrastructure
 - Darling Downs power station
 - Major drainage

- Walloons Gas Fields Development Areas**
- | | |
|-----------------|---------------------|
| Talinga / Orana | Combabula / Ramyard |
| Dalwogan | Woleebee |
| Kainama | Carinya |
| Gilbert Gully | Condabri |

Source Information

Pipelines
Commonwealth of Australia (Geoscience Australia) 2009
Department of Mines and Energy, MERLIN Mining Tenures system and Database (MTDB) 2009

Gas pipelines
Supplied by Origin Energy 17/05/2010

Water treatment facility and brine pond location
Supplied by Origin Energy 25/05/2010

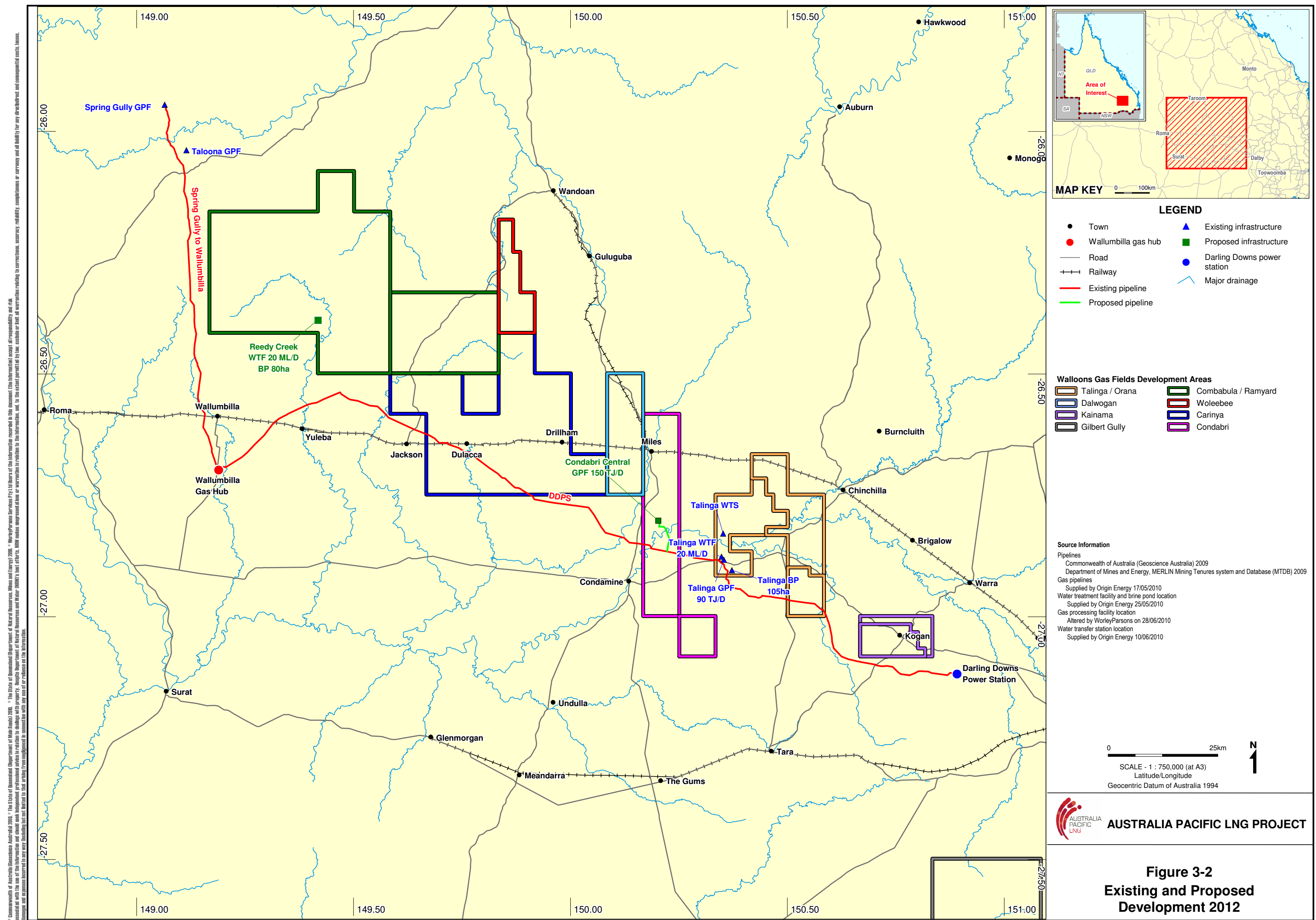
Gas processing facility location
Altered by WorleyParsons on 28/06/2010

Water transfer station location
Supplied by Origin Energy 10/06/2010

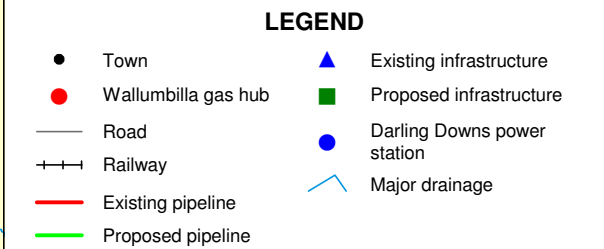
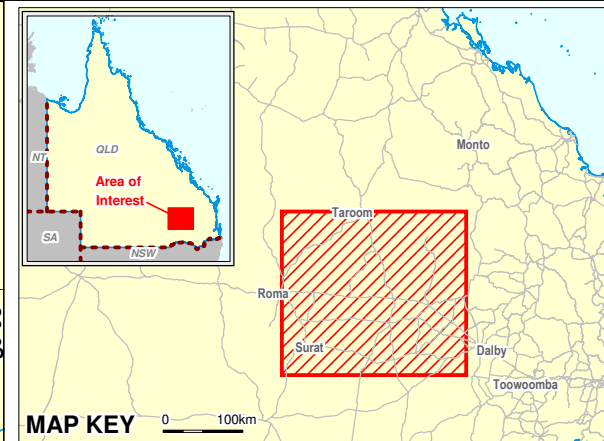
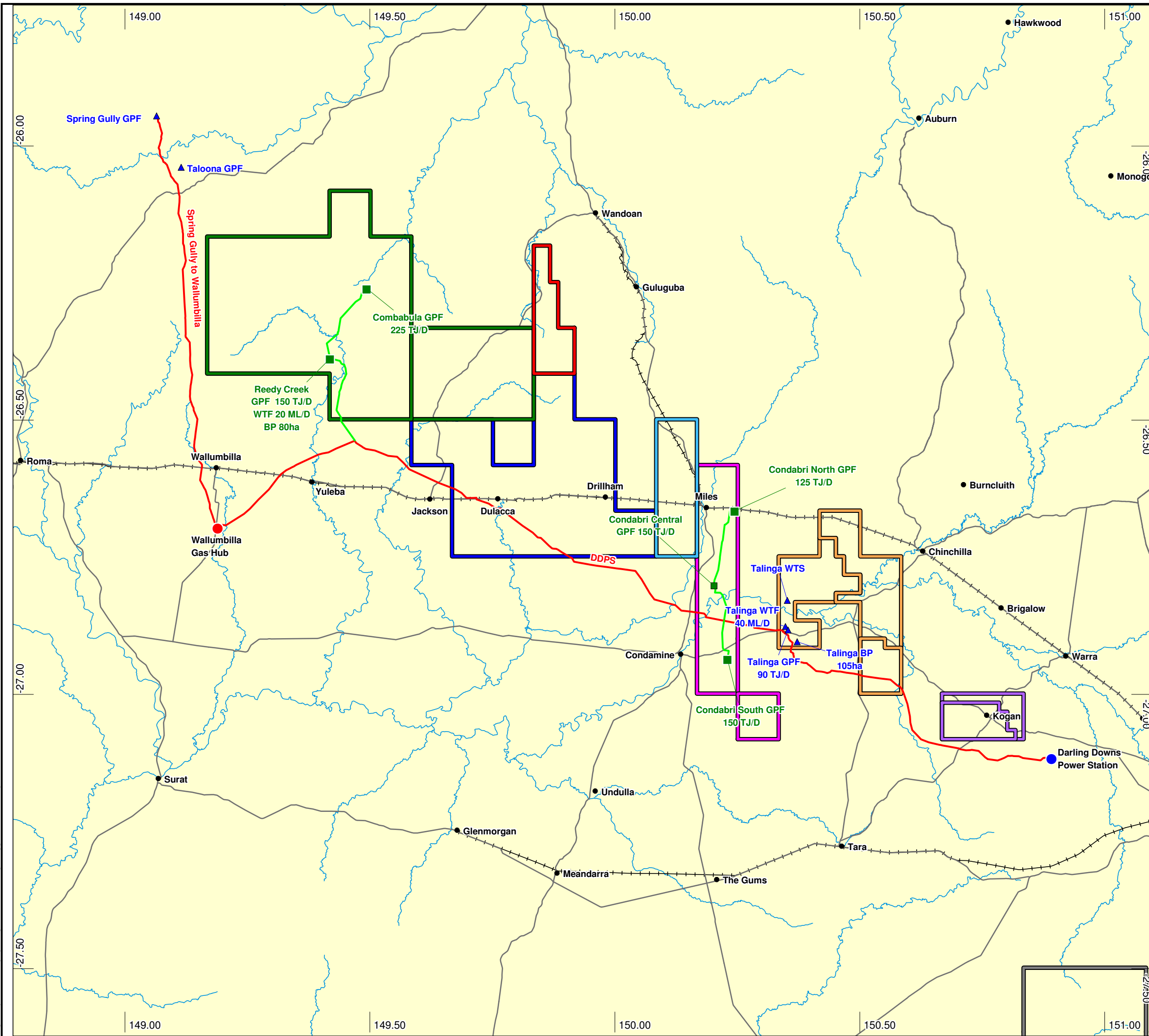
0 25km
SCALE - 1 : 750,000 (at A3)
Latitude/Longitude
Geocentric Datum of Australia 1994



Figure 3-1
Existing Development 2010



© Commonwealth of Australia Geoscience Australia 2009. © The State of Queensland Department of Natural Resources, Mines and Energy 2009. © WerbyParsons Services Pty Ltd. None of the information recorded in this document (the information) is to be used for any purpose other than that for which it was provided. The information is provided as a guide only and does not constitute a warranty or guarantee of any kind. The user of the information is advised to verify the accuracy and reliability of the information for any development and consequential costs. Issues, changes and updates recorded in any way. Nothing is to be construed as a warranty or guarantee of any kind. Any use of the information is at the user's risk.



Source Information

Pipelines
Commonwealth of Australia (Geoscience Australia) 2009
Department of Mines and Energy, MERLIN Mining Tenures system and Database (MTDB) 2009

Gas pipelines
Supplied by Origin Energy 17/05/2010

Water treatment facility and brine pond location
Supplied by Origin Energy 25/05/2010

Gas processing facility location
Altered by WorleyParsons on 28/06/2010

Water transfer station location
Supplied by Origin Energy 10/06/2010

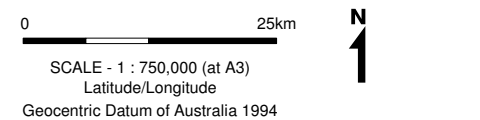


Figure 3-3
Existing and Proposed
Development 2013

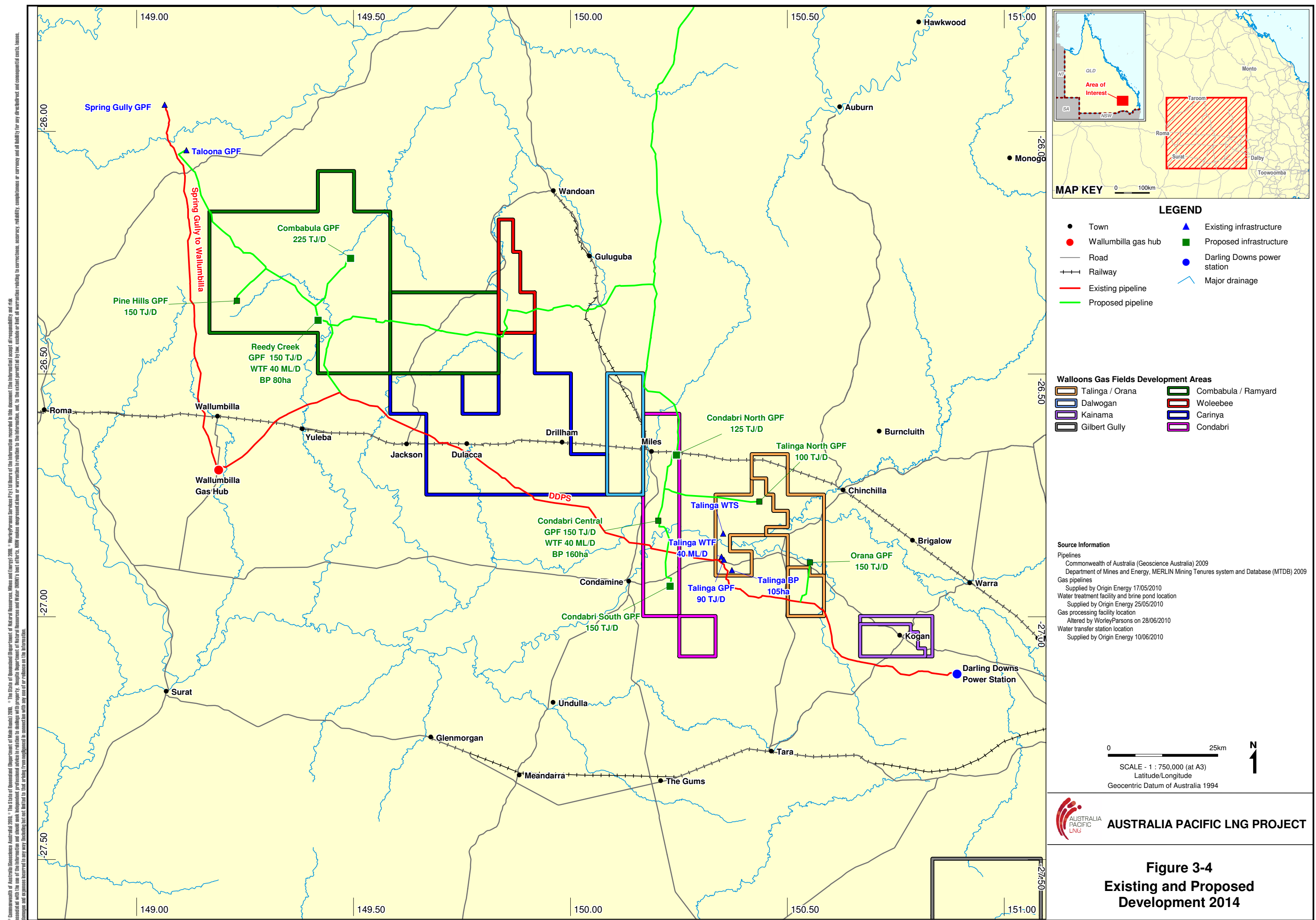




Figure 3-5 Siting of infrastructure and landowner engagement process

3.2 Electrification of the Gas Fields

GPFs compress and dehydrate the coal seam gas to remove any remaining water which may have been transferred with the gas through the gas gathering system. The compressed CSG is then sent to the high pressure gas pipeline system and the main gas transmission pipeline.

Volume 2 Chapter 3 Section 3.8 of the EIS presented the preferred energy source for compression in GPFs as being gas-fired engines with electric drive as an alternative. Further studies have identified grid electrical power as an attractive option due to the relative proximity of Powerlink's proposed 275kV powerlines, environmental benefits from reduced on site emissions (air and noise) and operational and maintenance efficiency advantages.

The development base case for the EIS assumed that the compression units would be a combination of rotary screw compressors for the initial pressure boost, followed by reciprocating units.

Electric driven GPFs in comparison will utilise two centrifugal compressors in a series to form a single compression train with intercooling utilised in between stages. The compressors will be operated by electric motors powered by grid electricity and utilising variable speed drives to control the speed (refer to Figure 3-6).

Table 3-1 provides the configurations of 100, 150 and 225TJ/d GPFs for both gas and electric drive.

Table 3-1 GPF configuration

GPF size	EIS base case	Electric drive
100TJ/d	Seven screw compressors driven by internal combustion engines, with compressed gas cooling carried out using air coolers with engine-driven fans. Four reciprocating compressors, with internal combustion engine drives with engine-driven cooling fans. One TEG dehydration unit, including gas fired boilers.	Two centrifugal compressors driven by electrical motors using grid power. Air coolers using electric fans will be used to cool gas following each compressor casing. A tri-ethylene glycol (TEG) dehydration unit using electric heaters.
150TJ/d	13 screw compressors driven by internal combustion engines, with compressed gas cooling carried out using air coolers with engine-driven fans. Seven reciprocating compressors, with internal combustion engine drives with engine-driven cooling fans. Two TEG dehydration units, including gas fired boilers.	Four centrifugal compressors (as described above).
225TJ/d	20 screw compressors driven by internal combustion engines, with compressed gas cooling carried out using air coolers with engine-driven fans. 10 reciprocating compressors, with internal combustion engine drives with engine-driven cooling fans. Three TEG dehydration units, including gas fired boilers.	Six centrifugal compressors (as described above).

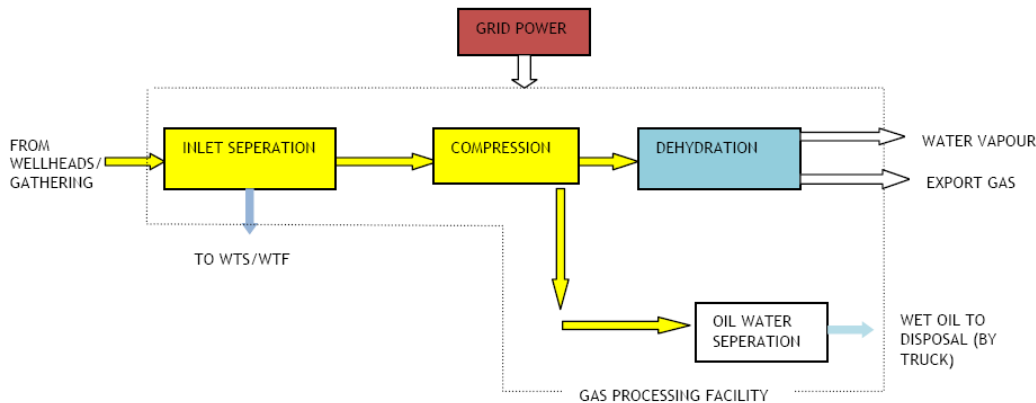


Figure 3-6 Typical input/output streams for a gas processing facility

A number of 132kV transmission lines will be required to provide the necessary power to the GPFs. The 132kV lines will be constructed and operated by a third party, including management of obtaining the relevant approvals. Within each of the gas field development areas, the proposed 132kV transmission lines would extend from the 132kV switchyards associated with Powerlink's 275kV network to the substations associated with the respective GPF.

Three indicative transmission line networks have been identified in the five-year development plan:

- Northern network – approximately 77km long and will connect Combabula, Reedy Creek and Pine Hills GPFs within the Combabula development area to the proposed Wandoan South Switchyard.
- Central network – approximately 92km long and is located in the Condabri and Talinga development areas. It will connect Condabri North, Central and South GPFs and Talinga North GPF with the proposed Columboola Switchyard.
- South eastern network – approximately 20km long and will connect the Orana GPF to the proposed Western Downs Switchyard.

Typical infrastructure associated with the electrification of the gas fields will include:

- A 132kV sub-transmission network of either single or double circuit aerial lines (refer to Figure 3-7);
- Tubular galvanised steel or spun reinforced concrete poles, ranging from 27- 32m high, with a separation distance of over 300m
- Phase conductors in either a single or twin bundle configuration
- Insulators of either glazed porcelain or toughened glass
- Aerial earthwire with fibre optic cable

It is anticipated that construction of the transmission lines will require a Right-of-Way of no more than 50m. The entire Right-of-Way will not be disturbed, as the work areas will be concentrated around the construction of the poles which are constructed approximately every 280m. A 4m-wide track will be required during construction between each pole and for operational access and maintenance requirements.

The infrastructure to provide power to the Project will not be fully developed within the first five years of the Project. As a short-term solution, it is proposed that power will be provided by portable gas-fired power plant (engine or turbine driven ~35MW) which do not require connection to the 132kV lines. The power plants will be situated at the various GPF locations that are planned for the first five years.

These portable power plants will most likely be removed once the power from the main transmission system is available through the proposed Powerlink 275kV powerline. Alternatively the portable power plants could be used during peak power loads. The assessment and approval of the future Powerlink infrastructure will be undertaken by Powerlink within its standard development program.

There are a number of benefits to electrification which are outlined in Volume 2 Chapter 3 Table 3.8 of the EIS. Some of the benefits are outlined below.

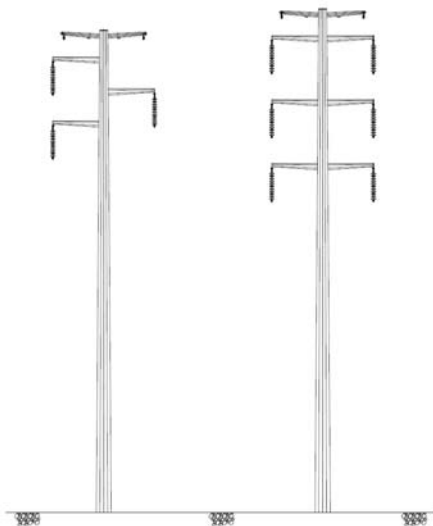


Figure 3-7 Single and double circuit powerlines

Noise

Electric driven GPFs produce less noise than gas-driven reciprocating GPFs as a result of the absence of combustion exhaust noise, smaller possible acoustic enclosure surface area, and reduced requirement for ventilation through the acoustic enclosure. Noise modelling undertaken for the EIS indicated that a 150TJ gas driven GPF using existing (Spring Gully) technology produces approximately 28dBA $L_{Aeq,adj}$ at 6km from GPF. Enclosure of the gas drivers and use of low noise fans reduces the noise footprint to approximately 28dBA at 2.1km. Recent modelling indicates that a 150TJ electric driven GPF with enclosed compressors and low-noise fans can reduce the noise footprint further to approximately 28dBA at 1km from the GPF. The reduction compared to an existing technology GPF is approximately 23dBA (from comparable predictions at 1km).

Figure 3-8 provides the noise contours for an electric driven GPF.

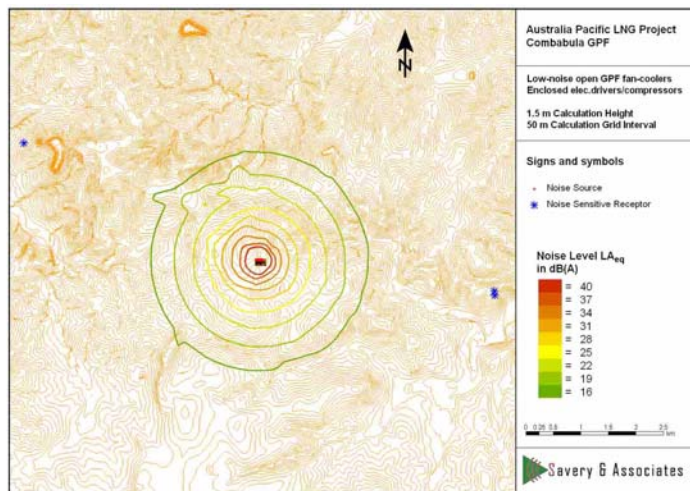


Figure 3-8 Electric driven GPF – Combabula (excluding temporary power plant)

Results from the updated noise modelling for electrification of the gas fields will be used for engineering design to meet the Department of Environment and Resource Management model conditions for level 1 environmental authorities for coal seam gas activities.

Air

The change from gas to electric driven compression will significantly reduce the rate and number of emission sources as electric drivers do not produce exhaust emissions.

Gas resource

Gas driven GPFs utilise gas at an approximate rate of 30PJ/yr at a compression flow of 1,380TJ/day. Using electric drive, it is estimated that there will be a gas fuel use saving of 6%, thereby making more gas available for LNG production.

Labour

Electric driven GPFs are less labour intensive which will reduce the size of temporary and permanent accommodation facilities.

Disturbance footprint

A smaller disturbance footprint is anticipated for electric driven GPFs as less compression units are required to generate the required compression power. Electric drivers produce more power which allow larger and therefore fewer compressors to be used in each GPF. A disturbance footprint for an electric driven GPF will only require half the disturbance footprint of a gas driven GPF.

3.3 High pressure gas pipelines

Following the publication of the EIS, the alignment of the high pressure gas network has been optimised for the first five years as shown in Figure 3-9.

Realignment of the high pressure gas network will enable optimising the capacity of the two major lateral pipelines (Woleebee and Condabri) and the addition of the Talinga North Lateral. This high pressure pipeline feeds directly into the Condabri Lateral, thereby eliminating the need to loop a section of the Darling Downs Power Station Pipeline. Re-alignment of the pipeline to Spring Gully has eliminated the need to loop a section of the Spring Gully to Wallumbilla Pipeline.

These changes in the alignments result in an overall reduction of total pipeline length, reduce the number of impacted landowners and decrease the environmental impacts associated with multiple high pressure pipelines by reducing the disturbance footprint. A portion of this re-alignment is consistent with the alignment that was described in the Australia Pacific LNG Infrastructure Facility of Significance (IFS) application which was published on 10 March 2010 (refer to Figure 3-9). The IFS document was available for public consultation and each landowner was directly contacted by Australia Pacific LNG to discuss the high pressure gas network.

3.4 Temporary and permanent accommodation facilities

Temporary and permanent accommodation facilities will be required to house the large workforce required to construct and operate the gas fields. As described in the EIS, the gas fields will require a peak construction workforce of up to 2,100 people and an operational workforce of more than 700.

The accommodation strategy presented in the EIS was to locate temporary accommodation facilities (TAF) near each GPF, which equates to a maximum 23 TAFs during the construction phase. During the operational phase, personnel would be encouraged to reside within communities in close proximity to where GPFs are located. GPFs located in more remote areas would be provided with permanent accommodation facilities (PAF).

Further assessment and optimisation of the accommodation strategy has occurred since the EIS was completed. Accommodation facilities are proposed to be located and designed taking into consideration:

- The impacts to local communities (locating facilities with consideration of reducing possible impact upon neighbouring properties, but where possible create opportunity for personnel to interact with the community and contribute/utilise local businesses)
- Health and safety with respect to travel times
- The standard of facilities in attracting and retaining personnel

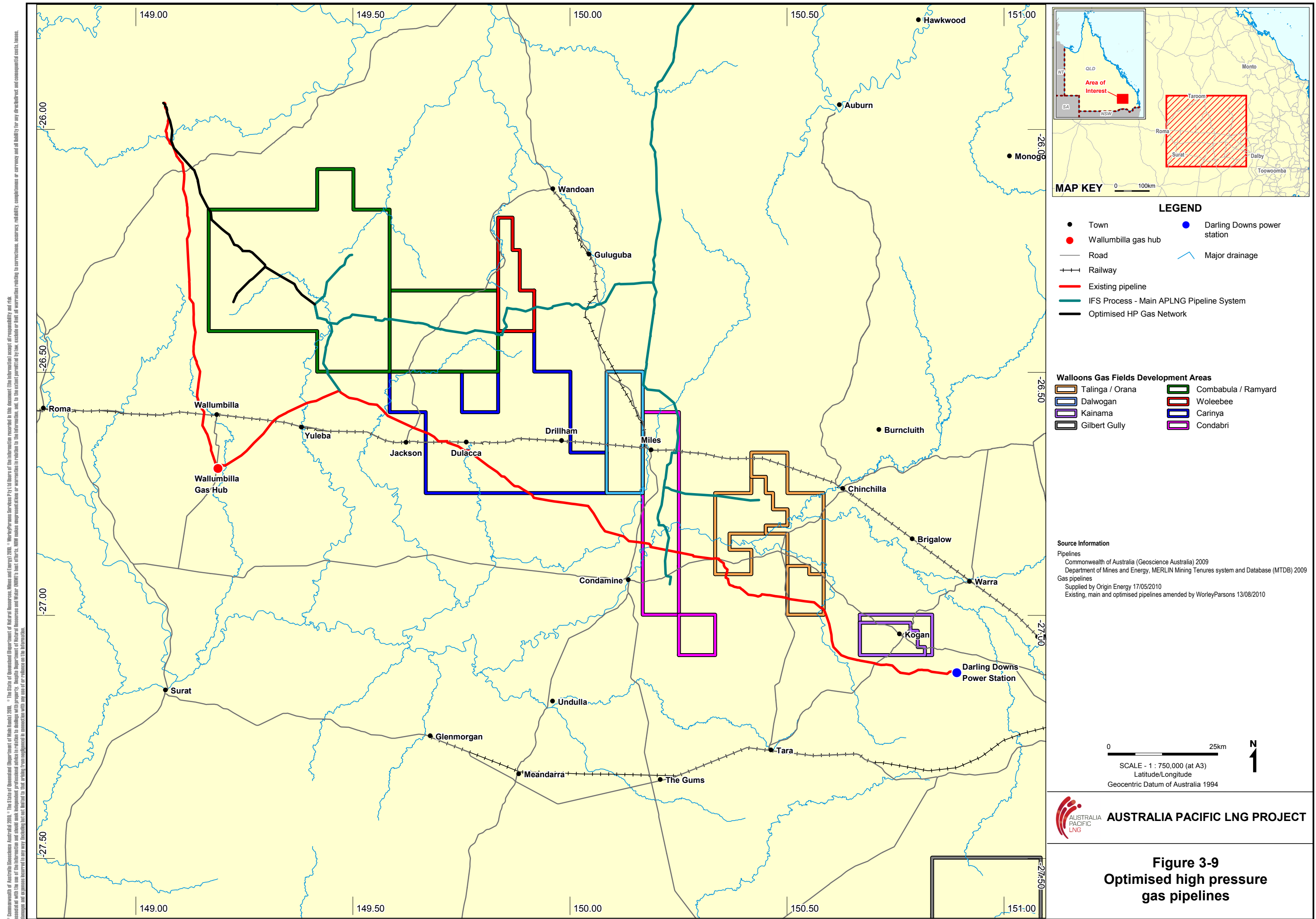
The following accommodation facilities will be required in the first five years:

- Accommodation for GPF and WTF construction activities
 - 450 bed accommodation facility at Talinga (existing site) to service Talinga North and Orana GPF construction
 - 500 bed accommodation facility at Condabri North to service Condabri North, Condabri Central and Condabri South GPF and WTF construction
 - 500 bed accommodation facility at Reedy Creek to service Reedy Creek, Combabula and Pine Hills GPF and WTF construction
- Accommodation for gathering and infrastructure:
 - 300 bed accommodation facility in Condabri Central
 - 300 bed accommodation facility in Combabula
- Accommodation for drilling:
 - Centralised 60 bed accommodation facility in Combabula
 - Highly mobile 10-15 bed accommodation facility for each rig

All accommodation facilities will be located within Australia Pacific LNG petroleum leases and on land owned by Australia Pacific LNG.

Condabri Central and Reedy Creek will become the central bases for operational personnel with 130 and 230 person accommodation facilities respectively. These sites have been selected due to the centralised locations and the infrastructure and equipment, including GPFs, WTFs, ponds, workshop, stores, (I&E) testing facilities, administration complex and an Integrated Operations Centre (IOC) which will oversee the control of the smaller satellite GPFs. The Reedy Creek operational accommodation facility is larger as there are no communities in close proximity for employees to live.

The reduced number of accommodation facilities decreases the environmental footprint and associated impacts and allows for greater efficiencies and economy of scale including catering, cleaning and optimum use of utility services (electricity, sewage treatment, water supply and use, etc).



4. Main Gas Pipeline

4.1 Pipe transportation

The main gas pipeline shown in Figure 4-1 will transport dehydrated and compressed CSG from the Walloons gas fields to the LNG facility on Curtis Island. Further investigations regarding the transportation of pipe have been completed following the results of the EIS modelling.

Volume 3 Chapter 17 of the EIS presented road transport as the base case for the movement of pipe with the option to use rail being under investigation. Further discussion with Queensland Rail, along with investigations into engineering and feasibility, indicates that rail is feasible and is Australia Pacific LNG's preferred option as it will reduce the potential for traffic impacts in Gladstone.

The gas pipeline will be delivered to Gladstone Port from late 2011 at a rate of one shipment per month. It is estimated that the pipeline will comprise of:

- 380km at 42 inch diameter
- 81km at 36 inch diameter
- 96km at 30 inch diameter

Approximately 50km of 42 inch pipe will be transported by road to a laydown area near Mount Larcom while the remainder will be loaded onto trains and delivered to the proposed Biloela support base via a railhead at Biloela. It is anticipated that one train per day for 12 months will be required. The pipe will then be transported from the Biloela support base to pipe stockpiles at approximately 100km intervals along the pipeline using extendable semi trailers. The pipe will then be transported to the Right of Way.

Australia Pacific LNG has completed an updated traffic and transport assessment incorporating the rail option to assess the sensitivity from the model output. Australia Pacific LNG is committed to working with DIP and DTMR on the cumulative model which has been commissioned.

4.2 Biloela support base

A project support base is planned at Biloela which will provide a range of services including project management, administration, training and logistics support (receiving and dispatching materials and equipment). It is anticipated that the support base will be required for approximately three years from 2011 to support the construction and commissioning of the pipeline.

A peak workforce of 70 personnel will be required at the Biloela support base and will be accommodated in motels, commercial camps or rented houses.

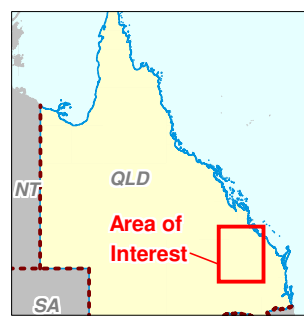
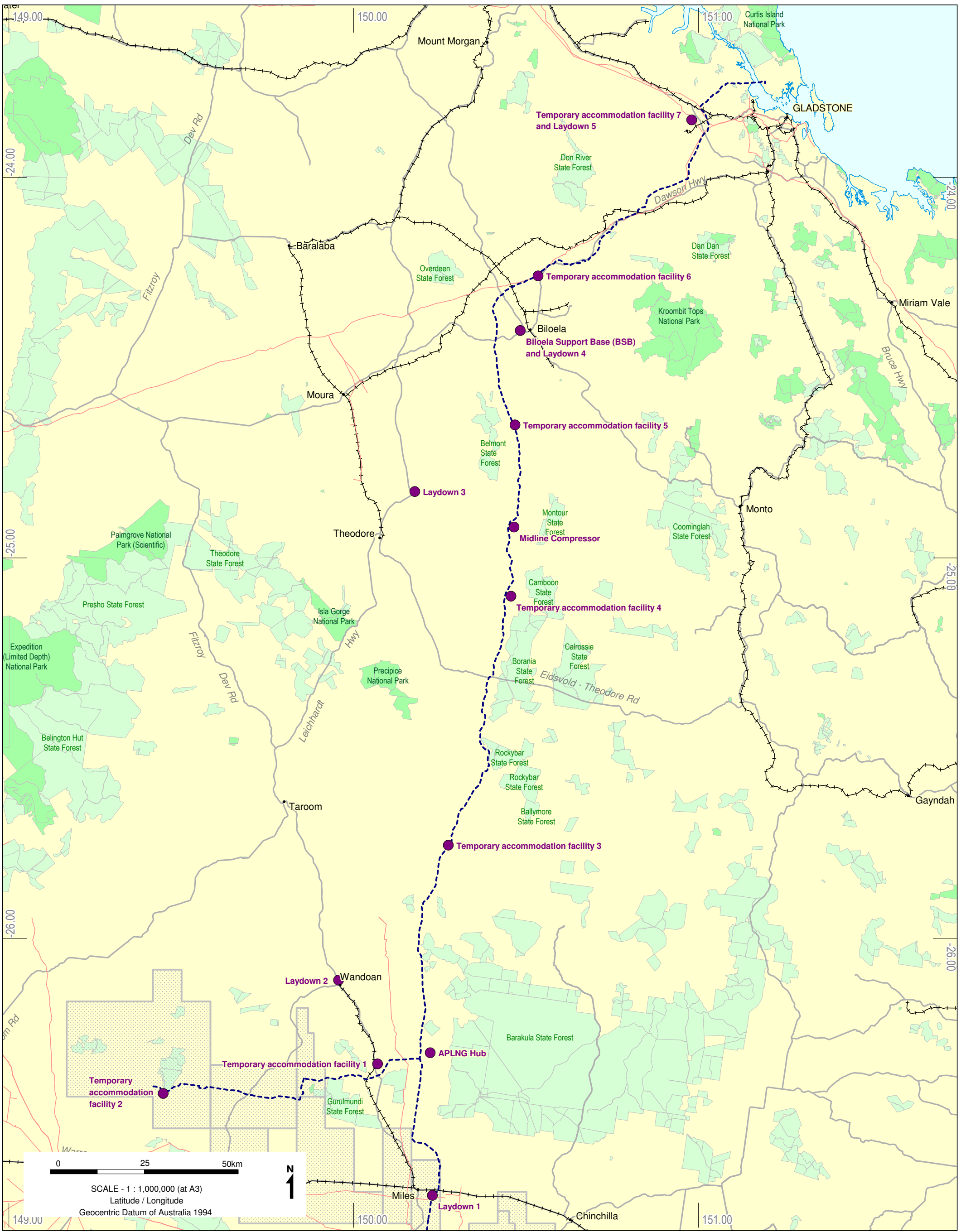
4.3 Accommodation facilities and laydown areas

Volume 3 Chapter 3 Section 3.10.2 of the EIS describes the accommodation facilities required during the construction of the pipeline. Further assessment has refined the locations to ensure travel times to and from the Right of Way is a maximum of one hour each way. The proposed locations are provided in Figure 4-1. It is anticipated that each accommodation facility will be required for approximately four months, which is an additional two months from what was presented in the EIS.

A total of seven TAFs will be required from early 2012 to late 2013. A lead (fly) TAF will be established followed by the main and then the trail TAF. These will use common core facilities, with accommodation units transferring forward as required by the construction progress.

The TAFs will accommodate approximately 600 personnel and will include one unit per person (with ensuite), catering and recreational facilities (refer to Figure 4-2). The recreational facilities will typically include a gymnasium, television and DVD room, reading room and open sports areas for activities.

The locations of laydown areas have also been refined since the publication of the EIS to ensure distances to and from the Right of Way are manageable. The proposed locations are provided in Figure 4-1. The laydown areas will store line pipe, bends and other material, as required (refer to for a typical layout).



SOURCE INFORMATION

Main APLNG gas pipeline alignment
Provided by Origin Energy 17/05/2010

Gas pipeline laydown areas and temporary accommodation facility locations
Provided by Origin 12/06/2010

Main Roads
Department of Main Roads, Queensland 2009

Protected Areas
Department of Environment and Resource Management (DERM) 2009

Existing Pipelines
Department of Mines and Energy, MERLIN Mining Tenures system and Database (MTDB) 2009
Commonwealth of Australia (Geoscience Australia) 2009

LEGEND

● Town	■ National Park
— Road	■ State Forest
—+— Railway	■ Wallroons gas fields development areas
— Existing pipeline	

Proposed Infrastructure

--- Gas pipeline route
● Gas pipeline laydown area and temporary accommodation facility location



AUSTRALIA PACIFIC LNG PROJECT

Figure 4-1
Main gas pipeline
laydown areas and temporary
accommodation facilities



4.4 The Narrows crossing

An integral component of the gas pipeline is the marine crossing of The Narrows from the mainland near Friend Point to Curtis Island. The Narrows crossing has two distinct sections; the mud flats on the mainland foreshore and an open water section, which is The Narrows itself.

For a single pipeline, the EIS presented two construction methodologies to cross The Narrows; open cut excavation across the mud flats and horizontal directional drilling (HDD) for The Narrows, with open cut trench as an alternative. As indicated in the EIS Volume 3 Chapter 3 Section 3.8.5, Australia Pacific LNG is continuing to engage in technical and commercial negotiations with other proponents to enable a joint pipeline crossing of The Narrows.

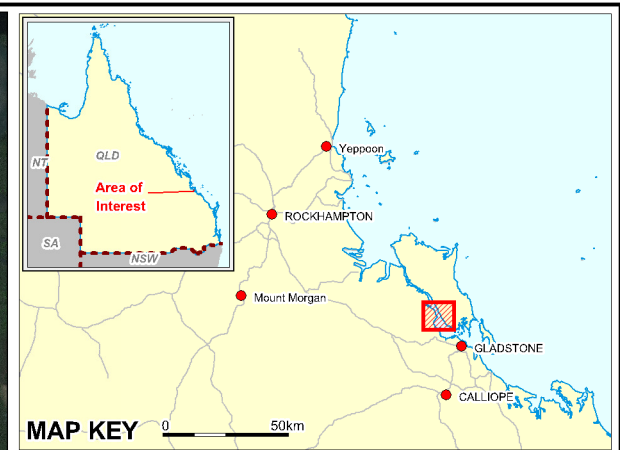
Further investigations have determined that for the single crossing methodology, HDD across The Narrows is not feasible due to engineering constraints. Open cut trench using a cutter suction dredge, which was presented as an alternative method in the EIS, has been identified as a technically sound option. The pipe string would be pre-fabricated and tested on the mudflats at Friend Point in preparation for a 'bottom tow' pull towards Laird Point at Curtis Island. Once the pipeline is in place, rock armour would be used to protect the pipeline and the sediment would be allowed to refill the trench over the pipe and rock armour.

The mud flats will be trenched with sections sheetpiled or drilled as presented in Volume 3 Chapter 3 Section 3.8.3 of the EIS.

The alignment of the pipeline across The Narrows has been refined since the release of the EIS to align with the preferred corridor advised by Department of Infrastructure and Planning (DIP) and following submissions to avoid impacts on the Queensland Energy Resources Ltd (QERL) shale oil resources. The revised alignment is shown in Figure 4-4

Australia Pacific LNG has undertaken further environmental assessments of the alignment within the Callide Infrastructure Corridor (CIC) and Gladstone State Development Area (GSDA) which were not investigated prior to completion of the EIS due to access issues. These updated assessments are based on Australia Pacific LNG's construction methodology for a single stand alone crossing of the mudflats and the Narrows and have been completed to feed into the detailed design of Australia Pacific LNG's single crossing and for subsequent approvals.

© Commonwealth of Australia (Geoscience Australia) 2008. © The State of Queensland (Department of Main Roads) 2008.
© VerityParsons Service Pty Ltd While every care is taken to ensure the accuracy of this data, VerityParsons makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including interest or consequential damage) and costs which might be incurred as a result of the data being inaccurate or incomplete in any way and for any reason.



- LEGEND**
- Gas pipeline route
 - EIS gas pipeline route
 - GSDA - Proposed Narrows pipeline corridor

Source Information

Satellite imagery
captured by GeoEye-1 on 24 March 2009

Gas pipeline route
supplied by Origin Energy on 17/05/2010

GSDA - Proposed Narrows Pipeline Corridor
Supplied by Origin Energy on 10/06/2010



Figure 4-4
Gas Pipeline Route
Crossing of the Narrows

5. LNG Facility

5.1 LNG Facility Layout/Design

Since the submission of the EIS, the LNG facility's design has been further optimised to improve operability and reduce environmental impacts. Such changes were discussed as alternatives in Section 3.3.1, Volume 4 of the EIS. The optimisation has resulted in the following key layout and/or design modifications:

- **Material Offloading Facility (MOF)** - the revised MOF location and footprint will enhance marine accessibility as it is orientated in a manner that is more in line with the direction of the marine currents. This has also resulted in improvements to safety and navigation for marine access. The alternate configuration of the MOF is also reduced in size, resulting in less reclaimed seabed and associated environmental impacts. An operational ferry terminal has been included in the design of the MOF
- **Ground Flares** - the design of the flare system has been modified from two wet/dry ground flares with a stack marine flare, to a five ground flare system that includes wet/dry and marine flaring. Three of the five ground flares will be constructed during the development of trains 1 and 2, with one of three being a spare. At ultimate development two additional flares will be incorporated in the flare system. The spare unit allows maintenance to occur on the flares without impacting the operation of the plant, thereby increasing plant availability. The revised configuration has the same duty as described in the Australia Pacific LNG Project's EIS, but allows splitting of the flare to multiple smaller units to increase efficiency. The optimised configuration (five ground flare system and the inclusion of the marine flare) has reduced visual impacts to sensitive receptors. It has also reduced heat turbulence at altitude, which reduces potential impacts to aviation safety
- **LNG Storage Tanks** – the revised location of the LNG storage tanks to the south west area within the LNG facility site will result in less generation of boil-off gas during the loading operations and reduced construction effort. This is due to improved foundation suitability and the shorter loading line to the loading berths from the storage tanks
- **Stormwater and Discharges** – stormwater management improvements and revised discharge point locations have been incorporated into the updated LNG facility layout. Improvements to stormwater management include:
 - Increased diversion drains around entire land-based site boundary to reduce ingress of stormwater onto the development area
 - Increased number of sedimentation ponds for retention of stormwater and management of water quality across various levels of the site
 - Clean stormwater within the site will be directed by surface drains to sedimentation ponds for reuse or release via outfalls
 - Potentially contaminated stormwater collected in the north area will be sent to the CPI separator and in the south area will be sent to an oil skimmer and the oil to the CPI separator

Further information on stormwater drainage and brine and wastewater discharges is provided in Section 5.5 and Section 5.6 respectively

- Acid Gas Incinerators – acid gas incinerators have been included on the acid gas removal units to allow for any changes in sulphur content of CSG across the life of the Project. Australia Pacific LNG has undertaken air dispersion modelling associated with emissions from the acid gas incinerators. Modelling has indicated that air quality objectives for sulphur dioxide are met for normal and non-normal operation of the LNG facility (inclusive of background levels) at sensitive receptors
- Utility Infrastructure – Utility infrastructure has been revised in response to progression of LNG facility design, including:
 - Feasibility study underway on a potential water supply line from the mainland to Curtis Island. This is being undertaken by the Gladstone Area Water Board
 - The estimated demand for water during the construction phase of trains 1 and 2 includes 850,000 m³ potable water, 574,000 m³ for site preparation and dust control, 140,000 m³ for hydrotesting and 31,000 m³ for concrete work. Impounding ponds will be established as soon as practicable to capture surface water runoff water as part of the temporary site drainage system. This water will be used for dust control, firewater and for hydrotest purposes. The estimated demand for freshwater during operations is 1,550 m³/day (four trains)
 - Removal of the reuse of condensed water from the inlet air propane chilling process from the LNG facility design due to additional study work indicating that this is economically unsound
 - Refinement of the fire protection system to include a single firewater tank for the purposes of fighting a four hour duration fire in accordance with NFPA 59A
 - An additional back-up gas turbine power generator to support the 13 Solar Titan gas turbine generator sets for the four LNG trains
 - External telecommunications connectivity (primary and backup) to the LNG facility through a local communications carrier in Gladstone. Primary connectivity shall be through a terrestrial fibre optic cable entering the facility with the gas pipeline. Backup connectivity will be through a high speed, private point-to-point microwave link

The LNG facility site is shown in Figure 5-1. The indicative LNG facility development area and layout are depicted on Figure 5-2 and Figure 5-3 respectfully. Updated artist's impressions of the LNG facility are shown in Figure 5-4, Figure 5-5, Figure 5-6, and Figure 5-7.

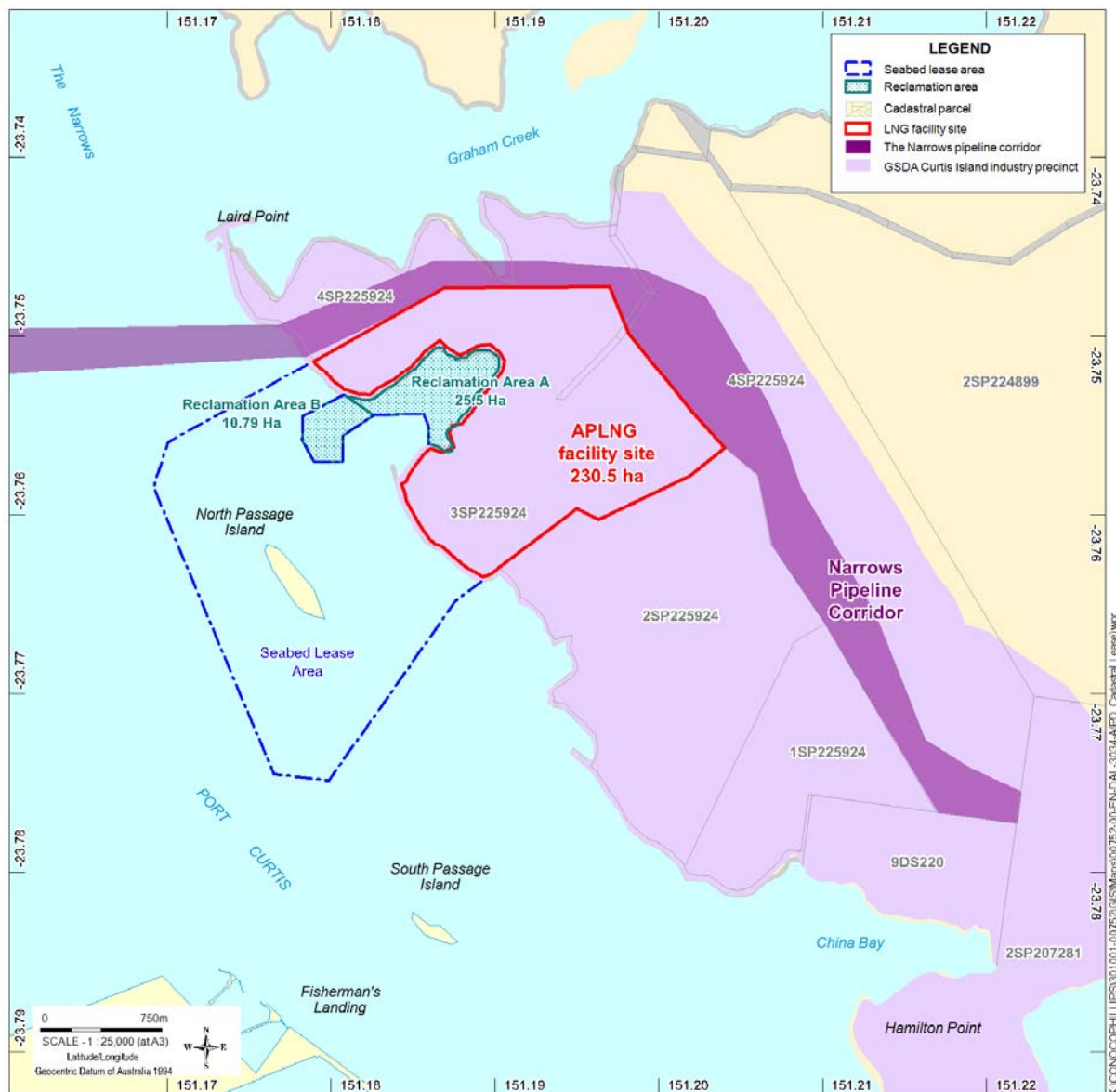


Figure 5-1 Cadastral boundaries and proposed lease areas



Figure 5-2 LNG facility development area

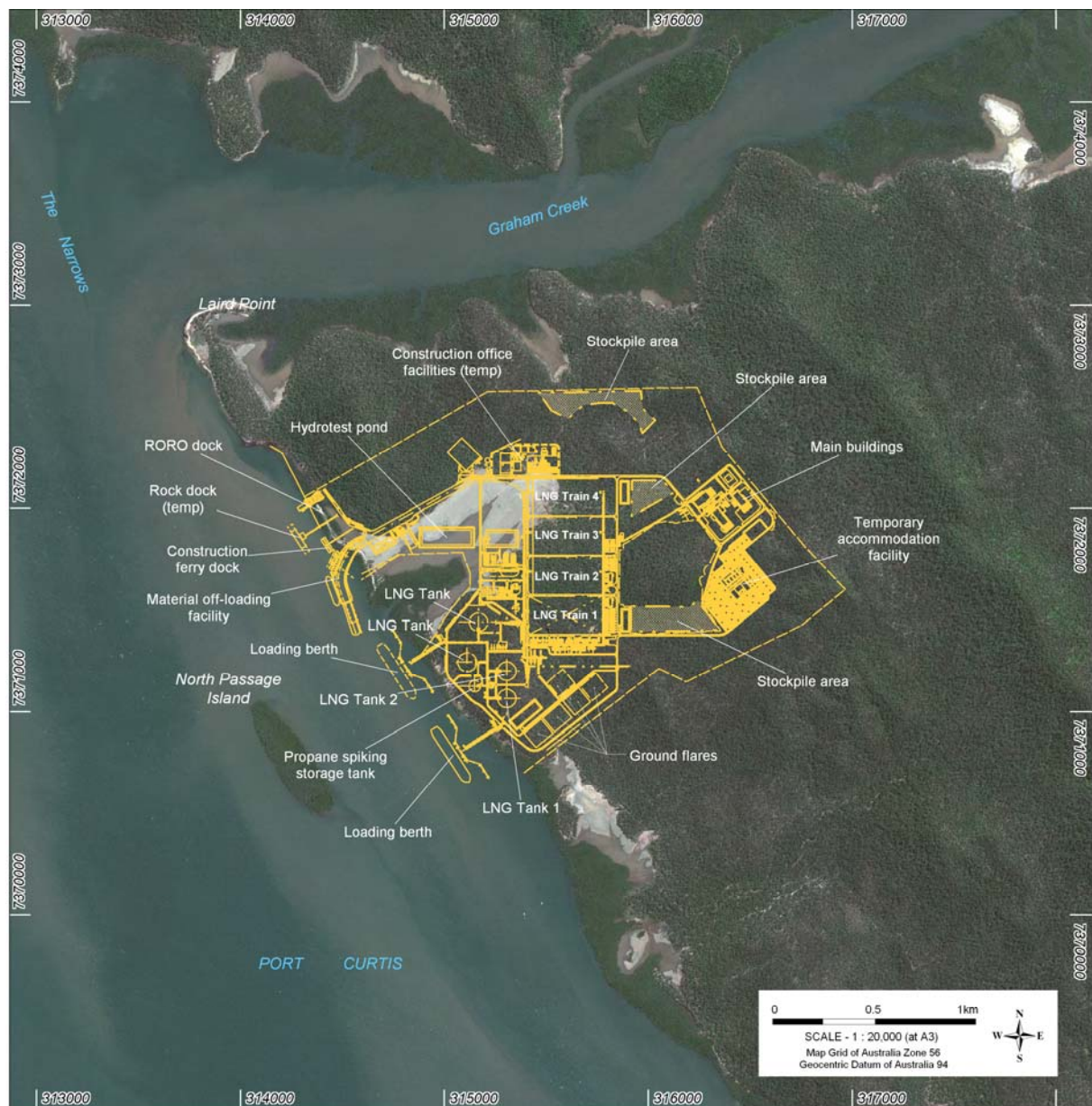


Figure 5-3 LNG facility indicative layout



Figure 5-4 Artist's impression of LNG facility – indicative view from north



Figure 5-5 Artist's impression of LNG facility – indicative view from west (aerial)



Figure 5-6 Artist's impression of LNG facility – indicative view from west



Figure 5-7 Artist's impression of LNG facility – indicative view from east

The hazard and risk assessment for the LNG facility has been updated using the revised layout and design. Modelling results showed that 30kW/m², 9kW/m², and 5kW/m² radiation exclusion distances from tank impoundment fires are completely contained within the site boundary. Thus, NFPA 59A siting requirements are met by the LNG facility site layout. Additionally, the site layout appears to meet all of NFPA 59A's spacing requirements, including the tank requirements that relate to tank-to-tank radiation during a tank-top fire.

Modelling also showed that with the exception of buildings within or near the liquefaction trains, the facility layout also provides adequate spacing for the permanent plant buildings. The locations designated for all buildings outside the liquefaction areas are outside of the 4.1kPa vulnerability zone.

Fatality risk contours for the updated layout were reviewed and are illustrated in Figure 5-1. These contours are based on a wide range of accident scenarios and combine the potential consequences with failure frequency and weather probability data to map the risk around the facility following potential release scenarios. The site with four LNG trains will most likely not pose a risk greater than 50×10^{-6} on offsite areas. Some adjacent offsite areas could be exposed to risk levels greater than 1.0×10^{-6} ; however, based on regulatory requirements, it is acceptable for the particular land use. Risk levels due to the facility are expected to be less than 1.0×10^{-8} at most boundaries.

Shipping was reviewed with regard to the revised LNG facility layout and the following were concluded:

- The layout has a substantial separation distance between ship berths and the LNG storage tanks and LNG trains. This ensures that LNG ships at berth are outside of the overpressure and fire radiation vulnerability zones created by the process and storage of LNG
- LNG/LPG ships at berth are protected from the existing shipping lanes in the Port of Gladstone by North Passage Island. Protection provided by the island and the physical separation from the shipping lanes greatly reduces the potential risk of a LNG/LPG ship at berth being struck by a wayward vessel

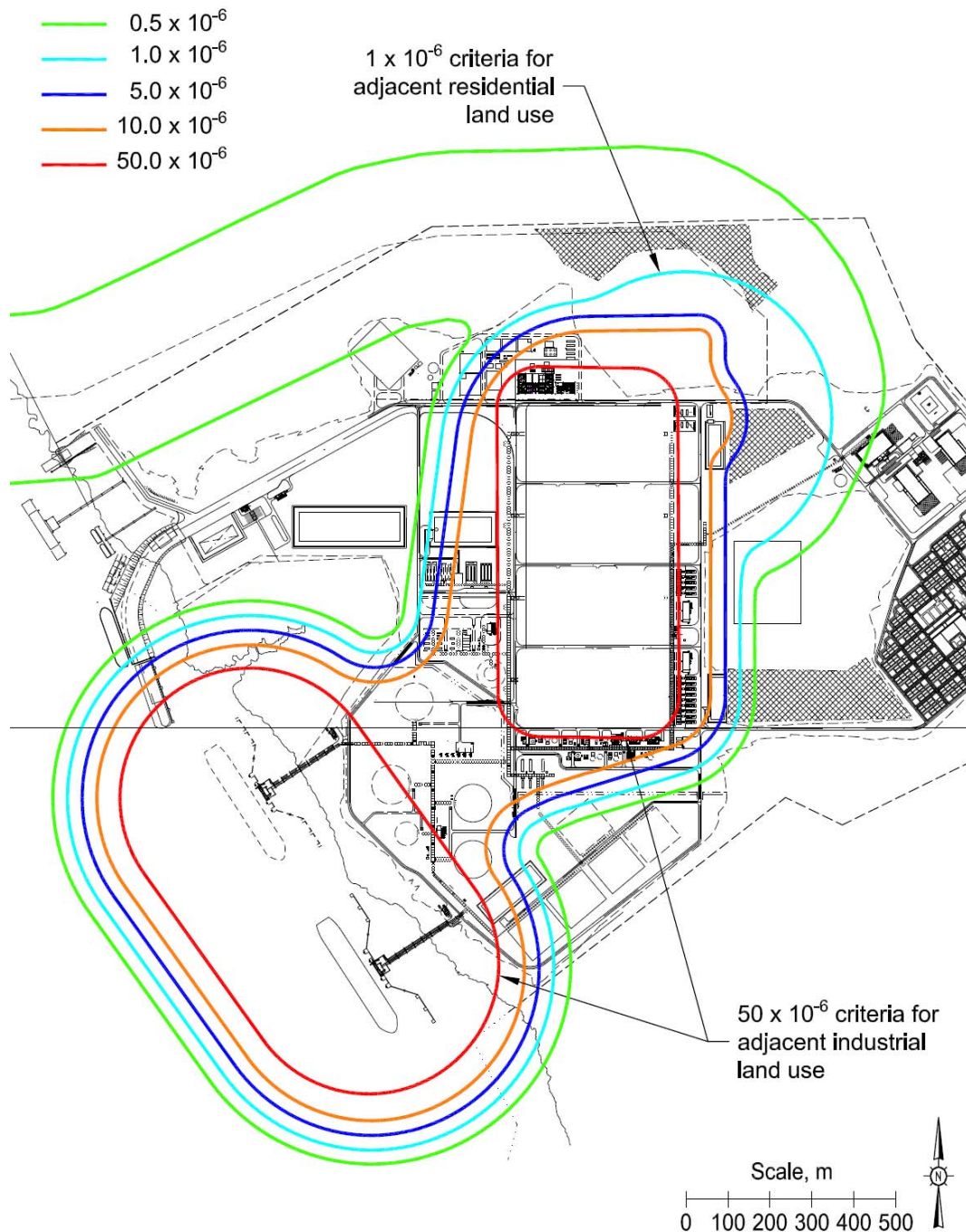


Figure 5-8 Fatality risk contours

5.2 Construction Marine Infrastructure

Aside from the changes to the MOF discussed in Section 4.1, marine infrastructure design that was described in Chapter 3, Volume 4 of the EIS, has been advanced since the EIS was submitted.

To facilitate the early transfer of materials, equipment and personnel to/from the site for construction and operational purposes, a temporary rock dock, a roll-on roll-off dock and a construction ferry dock are required (refer Figure 5-9). These marine facilities will be located to the north of the MOF with access from Fisherman's Landing to the Laird Pt site from around the north of North Passage Island. As a result, additional dredging to that described and assessed in the Gladstone Ports Corporation's (GPC) Western Basin Dredging and Disposal Project's EIS will be required (refer Section 5.3 of this document).

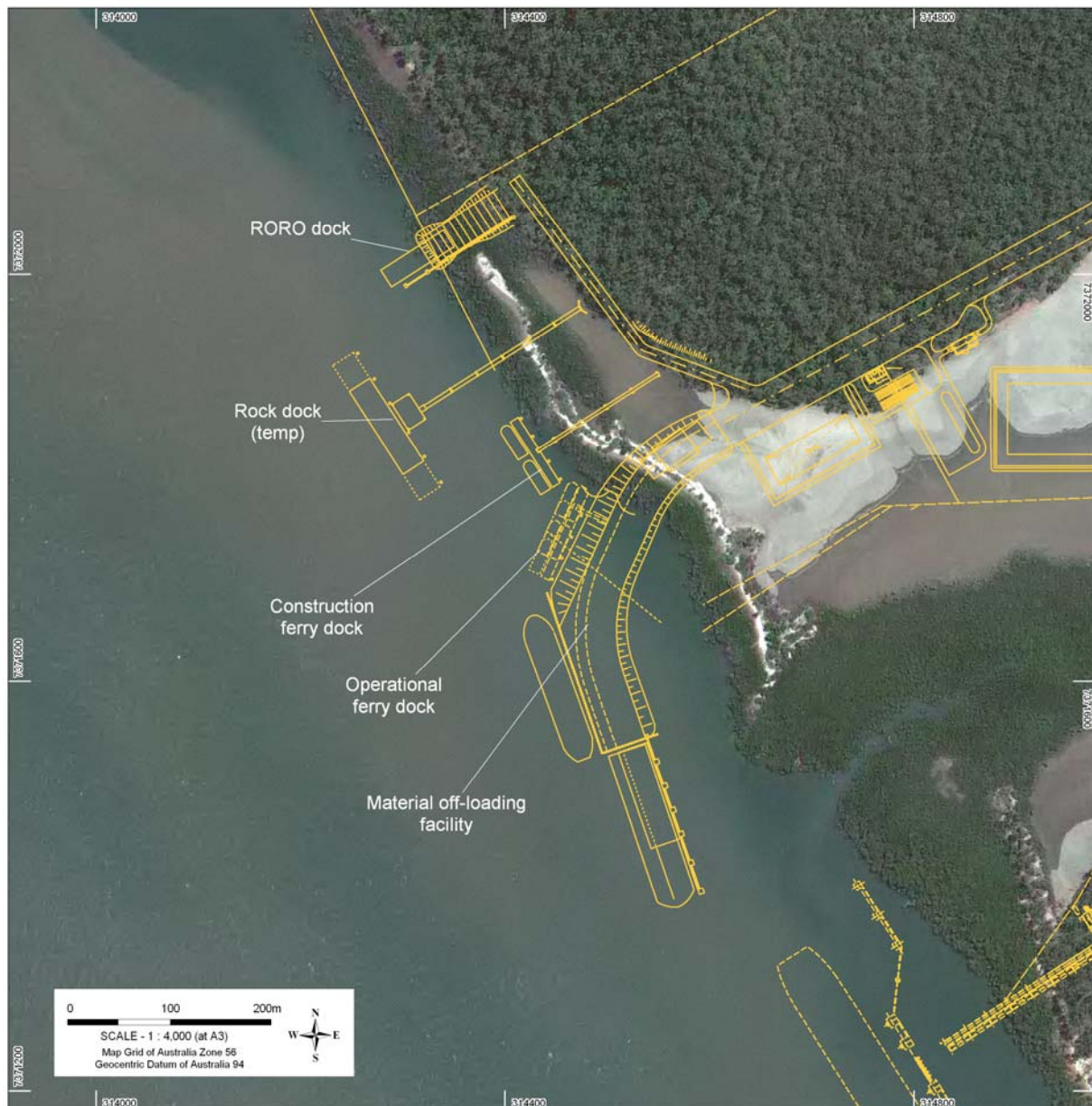


Figure 5-9 Construction marine infrastructure

5.3 Dredging

Dredging will be required for the construction of the revised marine infrastructure, including the rock dock, roll-on roll-off dock, construction ferry dock, MOF, jetty and wharfs, and access to the rock dock, roll-on roll-off dock and construction ferry dock. This dredging has been assessed by Australia Pacific LNG. Most of this dredging work is located to the north of the dredge option 2a footprint and has an estimated approximate volume of 900,000m³. Australia Pacific LNG is assessing options for minimising the dredging footprint and quantity of dredge material for disposal associated with these marine facilities. Dredging for vessel access to the marine terminal at Fisherman's Landing Northern Expansion will also be required. While these requirements have the effect of increasing dredging associated with the Australia Pacific LNG Project, it is noted that design optimisation activities associated with the main shipping channel and swing basins for the Project and access to the MOF (assessed in the Western Basin Dredging and Disposal Project's EIS) has reduced quantities of dredge material for the option 2a footprint subsequent to the release of the EIS for the Western Basin Dredging and Disposal Project.

Figure 5-10 illustrates the optimised dredging requirements required for the Australia Pacific LNG Project as well as dredging outlined in the Western Basin Dredging and Disposal Project EIS and includes expected timing.

As discussed in Section 3.1, Volume 4 of the Australia Pacific LNG Project's EIS, dredge material associated with the Australia Pacific LNG Project will be disposed of in a location approved under approval processes by Gladstone Port Corporation, such as that for the Western Basin Dredging and Disposal Project.

Australia Pacific LNG has undertaken sediment characterisation studies of the additional dredge sediment to identify any contamination potential. Sediment contaminant concentrations were assessed against the *National Assessment Guidelines for Dredging* (NAGD) (Commonwealth of Australia 2009) screening levels and Environmental Investigation Levels (EIL) and Health Investigation Levels for residential land use (HIL-A) as detailed in the *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland* (DEH 1998). Chemical analyses of sediments within the rock dock, roll-on roll-off dock, construction ferry dock, MOF, jetty and jetty berth dredge areas identified that contaminant substances, if present, are generally below NAGD Screening Levels.

In general, the results of this study are consistent with those of previous studies within the area. Based on the analyses undertaken, it is considered that the material to be dredged within these areas is suitable for unconfined placement at sea, according to the NAGD contaminant assessment framework. The material is also suitable for placement on land, according to the DEH (1998) guidelines.

It is anticipated that GPC will undertake this dredging on behalf of Australia Pacific LNG. The disposal of all dredge material within the scope of the Australia Pacific LNG's EIS will be at location(s) approved within GPC's approved projects such as the Western Basin Dredging and Disposal Project.

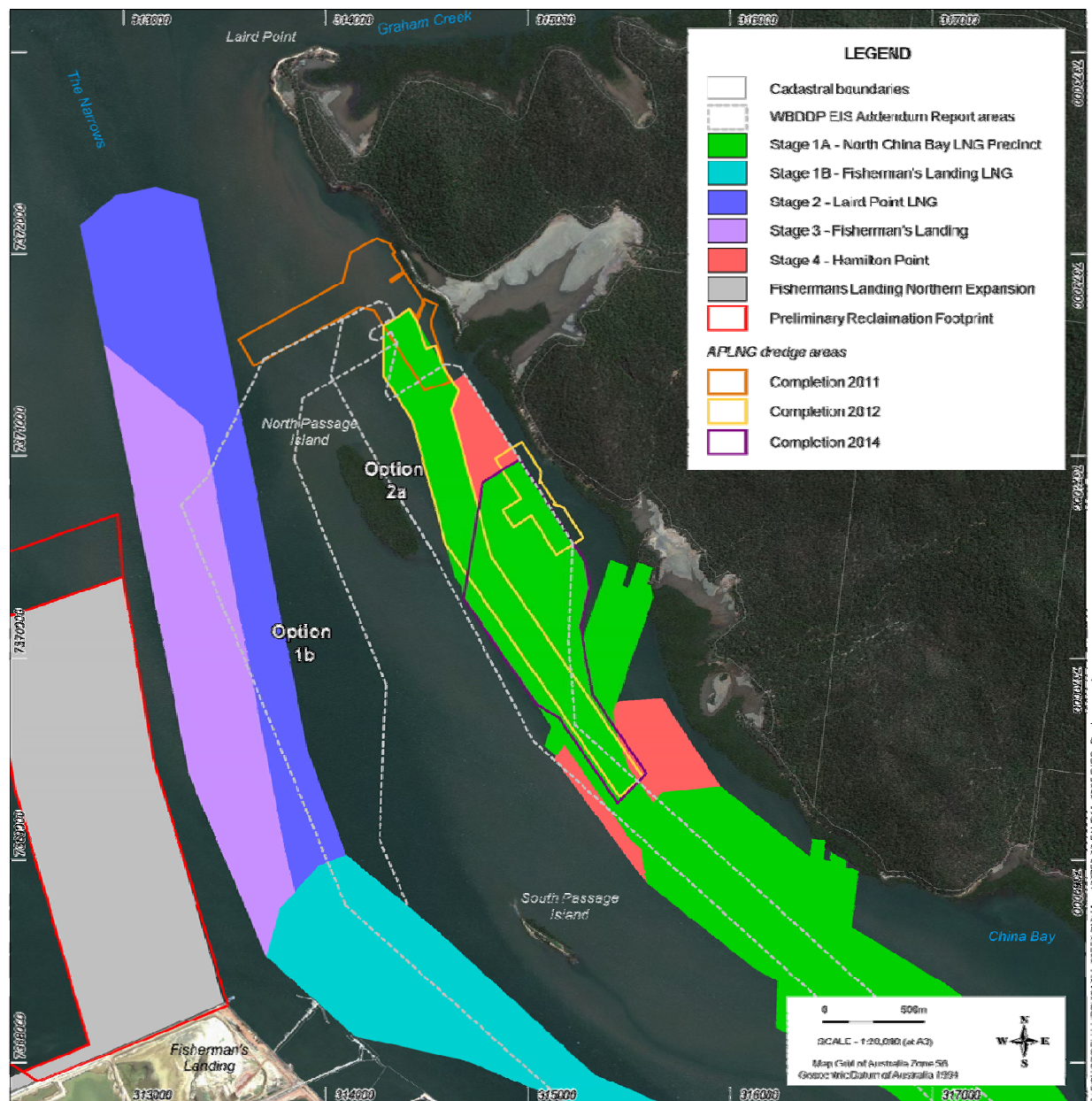


Figure 5-10 Indicative dredge options

Australia Pacific LNG has undertaken coastal modelling to identify the potential impacts from dredging plumes. Results indicate that Total Suspended Solids (TSS) concentrations associated with the dredging for the rock dock, roll-on roll-off dock, construction ferry dock and MOF are not significant. For this dredging, TSS concentrations are characterised by elevated levels on the eastern side of The Narrows' main channel for short durations at low tide. Statistical analysis of the modelled results was undertaken for selected locations at dredging locations and within sensitive seagrass areas. This analysis indicated that the 90th percentile TSS concentrations associated with this dredging would not exceed levels of normal background concentrations. Australia Pacific LNG and will develop mitigation measures in consultation with GPC to minimise potential impacts during dredging operations.

5.4 Mainland Facilities

Volume 4, Chapter 3 Section 3.3.4 of the EIS describes the mainland facilities required to support the construction and operation of the LNG facility and includes a discussion about alternatives. Since submission of the EIS, Australia Pacific LNG has progressed assessment of the mainland site required for temporary construction car parking and offices and selected an alternative to the site described in the EIS. It is proposed that a site on Bensted Road in Gladstone will be developed for car parking facilities, a bus terminal to transport personnel to the mainland marine facilities at Fisherman's Landing, operations' offices and training and hiring facilities.

The design of the marine facilities proposed for Fisherman's Landing (aggregate handling) and Fisherman's Landing Northern Expansion (roll-on roll-off dock, passenger ferry dock) has progressed since the EIS was completed. GPC is progressing the approvals for the construction of the aggregate load out facilities on Fisherman's Landing South (Cell 3).

5.5 Stormwater drainage

For construction of the LNG facility, a temporary stormwater drainage system will direct site runoff to sedimentation ponds. Outfall structures will enable high flows encountered during major storm events to be managed by discharging to Port Curtis after an initial 10 minute diversion.

The increased number of sedimentation ponds will impound most stormwater and be used to manage water quality. The main sedimentation pond will be used to store stormwater to enable its use for dust control, firewater and/or hydrotesting.

The proposed drainage plan for the fully developed LNG facility is provided in Figure 5-11.

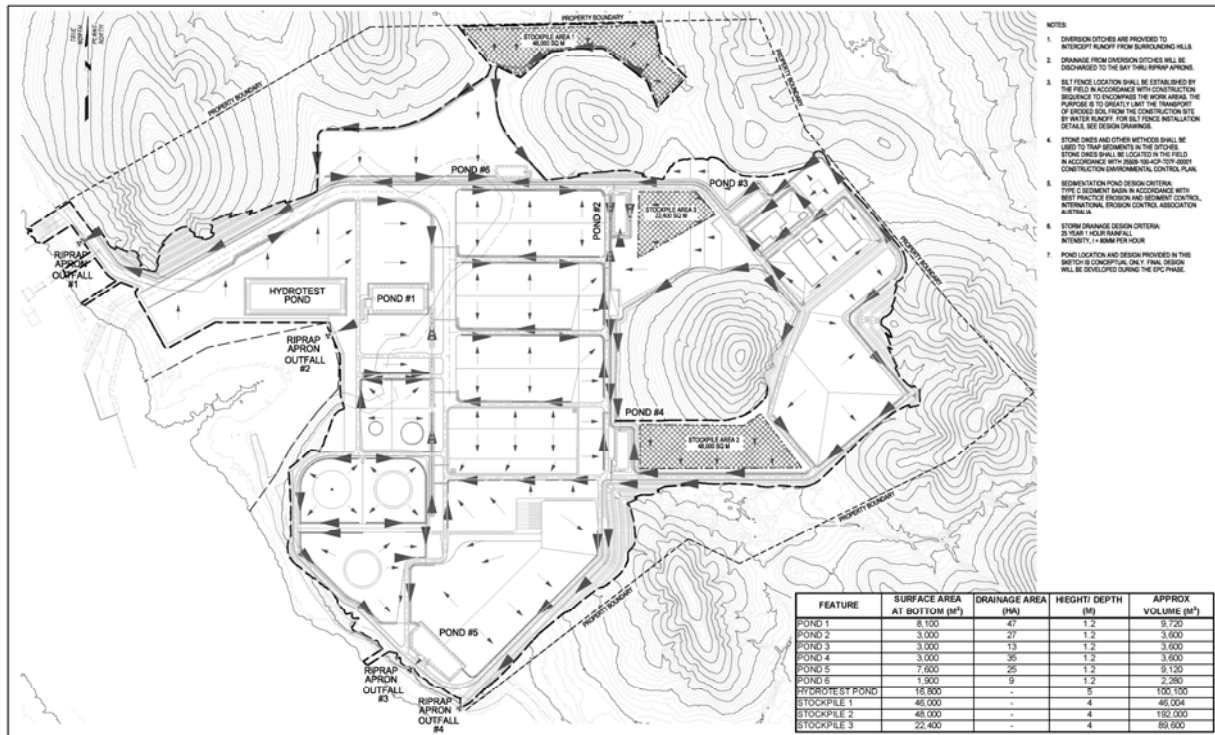


Figure 5-11 Indicative drainage plan

Stormwater from the undeveloped areas of the site will be diverted around the LNG facility's development area to reduce the quantity of stormwater entering the site. Diversion ditches will intercept stormwater near the LNG facility's site boundaries and carry it directly to the outfalls to Port Curtis.

All storm water entering or falling within the developed area of the site will be classified based on potential for contamination and directed to treatment accordingly.

5.6 Brine and Treated Wastewater Discharges

The revised locations for the discharge of desalination plant brine and treated wastewater are:

- Rock dock during the construction phase
- Product Loading Jetty during the operational phase

Near-field and far-field modelling of the combined discharge of desalination plant brine and treated wastewater has been undertaken for various discharge mixing and flow scenarios to achieve dilutions of discharge concentrations consistent with Water Quality Objectives for Port Curtis. The proportion of brine to wastewater in the discharge was important in determining the density of the discharge, which affects mixing with the receiving waters. A range of discharge scenarios, such as brine only, average brine with average wastewater flow, maximum brine and maximum wastewater flow, were considered so that a worst-case could be established.

Modelling for the construction phase using an appropriate diffuser (indicative design is 20m long with four port openings [diameter of 0.05 m] with the ports discharging in the offshore direction, horizontal

to the bed and perpendicular to the current direction) indicated that a dilution of 1 in 50 within 12.8m of the diffuser could be achieved.

For the operation phase, modelling with an appropriate diffuser (indicative design is 20m long with six port openings (diameter of 0.10m) with the ports discharging in the offshore direction, horizontal to the bed and perpendicular to the current direction) indicated a dilution of 1 in 50 within 7.20m of the diffuser could be achieved in all cases.

Modelling also indicated that dilution of brine in the near-field zone is aided by the addition of treated wastewater.

5.7 Construction Workforce and Accommodation

Through further project development, workforce requirements have been re-evaluated. It is anticipated that construction of the LNG facility will require a peak workforce of approximately 3,300. Australia Pacific LNG continues to work on optimising and refining the size of the workforce. The increased construction workforce will increase the economic and employment benefits of the Project.

In order to mitigate the potential impacts and enhance opportunities associated with this workforce increase, Australia Pacific LNG proposes a number of strategies. To reduce the impact to the housing market, and in acknowledgment of the limited availability of local labour, Australia Pacific LNG proposes to accommodate up to 2,600 workers in the temporary accommodation facility (TAF) on Curtis Island. Figure 5-12 illustrates the proposed layout of the TAF.

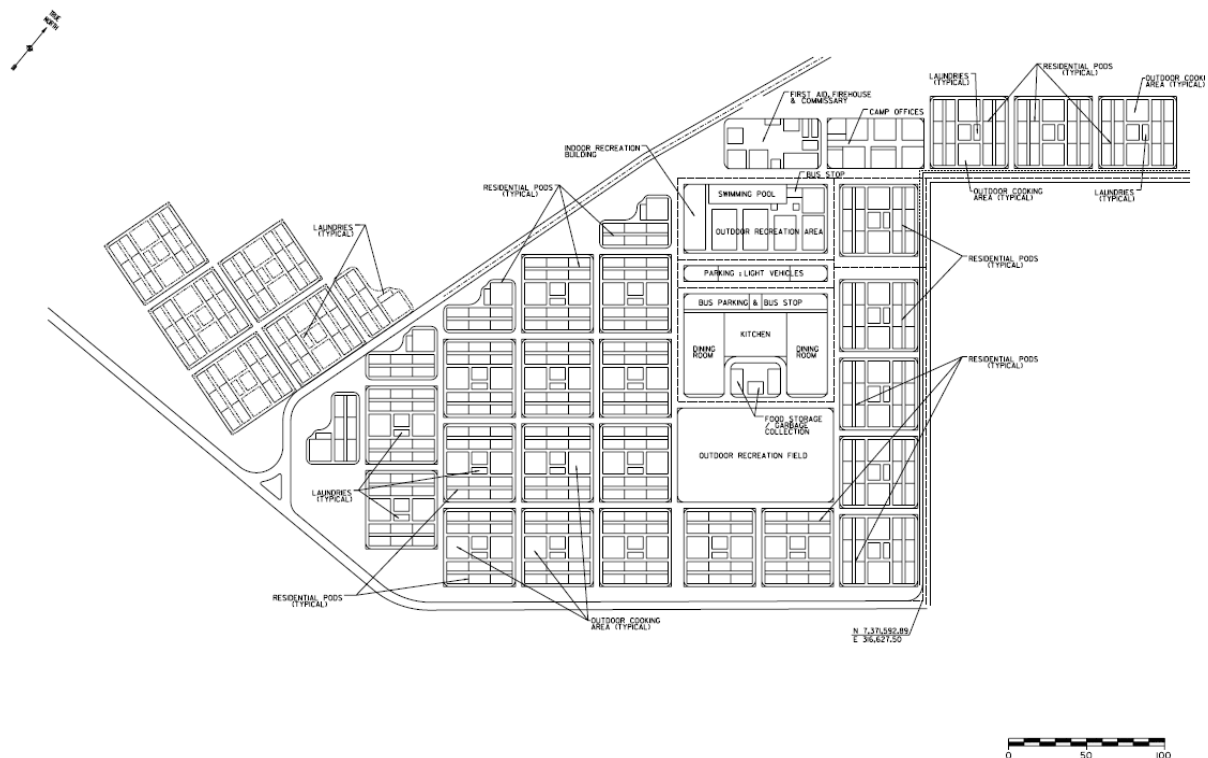


Figure 5-12 Indicative temporary accommodation facility conceptual layout

Australia Pacific LNG has commenced the development of a Housing and Accommodation Strategy to establish the most appropriate methods to accommodate this non-local workforce. The Strategy is designed to mitigate potential impacts on the local housing and rental market, focusing on four key areas: temporary accommodation, permanent accommodation, short-term accommodation and affordable housing.

Since the release of the EIS, Australia Pacific LNG has further developed its strategy for accommodating the non-local workforce prior to construction of the TAF on Curtis Island.

Australia Pacific LNG proposes to accommodate 325 workers in a temporary accommodation facility located on the mainland (for example the facility located in Calliope which has gained preliminary development approval). This will limit the impact to the short-term and permanent accommodation market in Gladstone and will ensure that there is a long-term solution for temporary accommodation for utilisation by other industries.

A permanent accommodation facility for approximately 110 people will also be incorporated into the design of the LNG facility on Curtis Island for emergency situations and will only be used as required.

5.8 Interim Construction Access

Interim access for equipment, material and personnel to the Curtis Island LNG facility site will be required while marine facilities (mainland and on Curtis Island) are being constructed. A multi-user facility in the Gladstone marina (assessment and approval by other parties) will be used as an interim mainland terminal for personnel and equipment transfer. Initial access to the LNG facility site from adjacent properties e.g. Laird Point, will be required because the construction of marine facilities on the Australia Pacific LNG site is contingent on timing of dredging. Interim access plans and construction management plans are being developed based on the following refined construction schedule:

- Dredging to support construction access to the LNG facility site at Laird Point will commence in early 2011
- Construction of LNG train 1 will commence in 2011. Construction of train 2 will commence approximately six months after the commencement of train 1 to take advantage of the workforce and construction equipment already mobilised. The baseline construction schedule for the construction of the first two trains is four years and nine months and it is expected that the trains will be operational after this time
- Dredging required for MOF construction will commence in 2011 with major capital dredging works (included in Western Basin Dredging and Disposal Project) closely following. MOF construction will commence soon after completion of the dredging and will be completed in approximately fifteen months
- Dredging required for construction of the LNG ship jetties will be completed in 2012. Construction of the ship berths will take approximately 28 months
- Construction of train 3 would commence in 2015 and train 4 would commence approximately six months after the commencement of train 3 (as for trains 1 and 2)

5.9 Traffic and Transport

Due to the increased construction workforce and location changes to the mainland facilities, traffic movements (road and marine) and routes may increase and change. Refinements to traffic movements assessed in the Australia Pacific LNG Project EIS include:

- Estimated number of truck movements to the Fisherman's Landing area over the duration of the construction of Train 1 and 2 includes 13,000 for aggregate, 19,000 for road base, 18,000 for structural fill, 7,000 for sand, 3,000 for cement, 1,700 for diesel, 3,700 for construction equipment, 13,000 for plant and 2,300 for waste
- Estimated number of barge movements from the Fisherman's Landing area to Curtis Island over the duration of the construction of Train 1 and 2 includes 83 for aggregate, 125 for road base, 130 for structural fill and 42 for sand
- Estimated number of roll-on roll-off passenger vessel movements from the Fisherman's Landing area to Curtis Island over the duration of the construction of Train 1 and 2 includes 501 for cement, 267 for diesel, 454 for construction equipment, 1236 for plant and 384 for waste
- 27 module barges and 12 ships carrying cargo for construction directly arriving at the LNG facility site on Curtis Island

In accordance to the Coordinator-General's report on the GLNG and QCLNG Projects in relation to traffic and transport cumulative impact study, Australia Pacific LNG will contribute to a Road Transport Infrastructure Cumulative Impacts Study – Proposed LNG Industry Impacts. The most current traffic and transport data will be provided to this cumulative impact study. Australia Pacific LNG will use the most current traffic data in its transport impact assessments necessary to inform road use management plans and infrastructure agreements.