

Curtis Island Workforce Accommodation Queensland Curtis LNG

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1.0 INTRODUCTION

The Department of Infrastructure and Planning wrote to all LNG proponents on the 6 November 2009, requesting them to provide a justification for the establishment of temporary construction workforce accommodation facilities on Curtis Island. The justification was to clearly demonstrate the impacts of other accommodation options involving a mainland presence, in conjunction with, or as an alternative to, the proposed Curtis Island Construction Camp.

This report presents QGC's justification of the preferred option to house the majority of the non-local construction workforce on Curtis Island, in conjunction with temporary accommodation on the mainland to support early stages of construction and mainland-based construction activities such as pipeline installation.

The assessment has been carried out using a number of criteria covering the social, environmental and economic aspects of temporary workforce accommodation.

Following this introduction, the report is structured as follows:

- Chapter 2: Accommodation options
- Chapter 3: Option assessment
- Chapter 4: Conclusions.

1.1 Proposed QCLNG Workforce

For the construction of the LNG plant component of the QCLNG Project, the start-up workforce in Q2 2010 will comprise approximately 550 people, building to more than 1,500 workers by Q2 2011.

The workforce (including sub-contractors) will peak at more than 3,200 by mid-2012. Twenty per cent of non-local manual workers would be offsite at any one time, so the total onsite would be around 2,900.

Workforce numbers will decline from mid-2012, and construction is expected to be complete by mid-2015 (two trains).

Over the construction period of 50 months, the average number of jobs/month (manual and non-manual) is estimated at 1,560. Approximately 1,230 would be manual jobs, with an average of 330 non-manual jobs.

The Project estimate for the LNG Plant is based on analysis of required skills groups over time, with an estimated total local availability of 900-1,200 suitably skilled trade workers. In addition, 100 to 200 non-manual jobs are expected to be taken up by local people, depending on availability.

Local workers are expected to comprise around 42 per cent (up to 1,200 including 900 manual workers and over 200 non-manual) of the total workforce over the 50 months of construction.

At peak, the increased number of non-local workers would see the locally hired workforce percentage drop to around 32 per cent; this would include a peak of approximately 2,400 manual workers on site (900 local and more than 1,500 non-local), plus approximately 400 non-manual workers, up to 200 of whom will be local.

Cumulative case

With two LNG projects constructed concurrently, QCLNG may attract fewer local workers, and the local labour percentage is estimated to drop to 20-25 per cent. This may see approximately 1,800 manual and 400 non-manual workers from outside Gladstone employed during the construction phase of the QCLNG Project.

This estimate of the proportion of local and non-local staff working on the QCLNG Project may be influenced by the proportion of workers employed on the other project. However, since both projects are drawing workers from the same employment pool, the overall effect on Gladstone will be the same.

With the release of the draft GLNG EIS and subsequent sEIS, QGC has been able to take GLNG's worker housing strategy and social impact assessment into consideration in formulating QGC's response to DIP's concerns regarding workers being housed in one or more camps on Curtis Island.

GLNG's preferred option is to house 20 per cent of the non-local workforce in available housing in Gladstone with the remaining 80 per cent of the construction workforce being located in the GLNG Curtis Island camp. This would bring the number of workers potentially being housed in Gladstone should workers' camps on Curtis Island not be approved to approximately 4,700 workers between the two projects at peak construction. These workers would be required to be housed in rental accommodation or in a mainland camp.

2.0 ACCOMMODATION OPTIONS

The options assessed in this report are as follows:

Option 1: Construction workforce accommodation on both mainland and Curtis Island

Option 2: Construction workforce accommodation all on mainland.

2.1 Option 1: Construction workforce accommodation on both mainland and Curtis Island

Option 1 is the proposed accommodation strategy for the QCLNG Project.

Based on rental vacancy rate trends and housing production rates, QCLNG estimates approximately 250 rental dwellings will be available in the Gladstone Local Government Area (LGA) in 2011.

Some non-local manual workers with families and most non-manual workers will settle in Gladstone during construction, and this could mount to around 100 households by early 2011.

Reliance on local housing for unattached non-local workers would cause unacceptable housing stress. This would particularly impact on lower-income groups and other vulnerable people who are understood to already find it difficult to find suitable and affordable housing.

Following consultation on the draft EIS and review of workforce numbers, QGC has developed an accommodation and housing strategy as follows.

Camp Accommodation

QGC plans to carry out the following regarding temporary workforce accommodation:

- request proposals from Maroon Group and MAC Services for development of their approved workers' accommodation facilities, for QCLNG take-up from Q3 2010 to Q2 2011 (up to approximately 400 workers). Camp places may also be required for QCLNG pipeline crews from Q2 2011 (approximately 400 additional workers)
- provide accommodation, recreation and health facilities for a construction workforce of 1,700-2,000 in the LNG precinct by Q2 2011 which will remain in place until Train 2 has been commissioned (2014-2015).

Housing Stock

For housing in the Gladstone area QGC proposes to:

- initiate joint ventures or investment for construction of dwellings in approved residential subdivisions or multi-unit dwelling proposals for Project families (including operational staff)
- secure rental dwellings with consideration to managing impacts on dwelling supply and rental costs
- support development of affordable housing for low-income households in Gladstone.

QGC has also initiated development of a housing strategy which includes consideration of cumulative impacts, and will seek Queensland Government co-operation in its development.

The likely workforce numbers associated with this strategy and the LNG plant construction are as follows:

1. Workforce numbers – Curtis Island - at peak, up to 2,900 onsite, comprising:
 - 900-plus local manual and 100-200 local non-manual (five-day week, returning home at nights)
 - 1,500 non-local manual (in accommodation camp)
 - up to 300 non-manual from other regions, including singles in accommodation camp.
2. Workforce numbers – mainland
 - approximately 100 working on the mainland
 - approximately 1,200 living on the mainland (including approximately 900 existing locals), of whom about 1,000 in total would travel to Curtis Island by car and then ferry.

For other components of the QCLNG Project such as pipeline installation, there will be a construction workforce on the mainland requiring temporary accommodation for 12 to 18 months in the Gladstone area. This includes one Export Pipeline construction “spread” of around 260 workers, and the Narrows pipeline crossing workforce of approximately 150. The feasibility of using existing approved accommodation camps for pipeline crews is being investigated.

2.2 Option 2: Construction workforce accommodation all on mainland

The option that has been assessed with regard to the entire QCLNG construction workforce being accommodated in the Gladstone area is based on the following:

- uptake of existing planned and approved (yet to be constructed) temporary workforce accommodation facilities in the Gladstone area, namely one near Calliope and one close to the Bruce Highway and Calliope River Road intersection in the vicinity of the Aldoga precinct of the Gladstone State Development Area (GSDA)
- expansion of these facilities and construction of as-yet unidentified new facilities in the Gladstone area required to absorb the non-local peak workforce requirements.

The numbers of construction workforce required to work on Curtis Island for this scenario will be significantly more than the 2,900 described in Option 1. For the proportion of the workforce currently intended to be accommodated on Curtis Island (up to 1,800), commuting from a mainland camp to the island will add some two to three hours to their workday, which will lead to increased remuneration and a significantly increased workforce to deal with the reduced efficiency of the onsite shifts. This increase in personnel is estimated to be between 10-20 per cent of the non-local workforce (180-360 people).

A range of options would be required to meet accommodation needs on the mainland. It is likely that the lack of a central camp for all workers would increase the number of workers accessing rental housing, causing serious stress on housing supply.

3.0 OPTION ASSESSMENT

3.1 Assessment Criteria

The criteria used in assessing the relative benefits or impacts of the two options are:

Criteria	To be considered
Economic benefits to local community	Local business, goods and services
Traffic impacts on mainland	Transporting mainland workforce and materials to and from Auckland Point Logistics Facility
Boat traffic on the harbour	Transporting workforce and materials to and from Curtis Island
Cost to industry	Costs related to transporting workforce, relative accommodation numbers, remuneration
Local government and community perception	Views of Gladstone Regional Council and local community on Curtis Island and in the Gladstone and Calliope areas
Potential land-use conflicts	Compatibility with LNG development and associated infrastructure on Curtis Island and other relevant land uses on the mainland
Project delivery risk	Schedule and construction efficiency
Environmental impact	Air, water, land, flora and fauna, climate change,
Social and cultural impact	On workers as well as local community
Opportunities for shared infrastructure	Shared construction and operation of infrastructure for use by other LNG proponents or other industries
Community legacies	Facilities remaining after construction which may be of use to local community
Health and safety issues	Workforce in the vicinity of a major hazard facility and separation distances

A discussion of each of these criteria follows.

3.2 Economic Benefits to Local Community

For Option 1 the economical benefits related to the LNG plant workforce will ensue as follows:

- The initial LNG workforce will live in mainland camps for the first nine to 12 months of the construction period and will contribute to the local economy on a daily basis during that period, (with further benefits from pipeline workers' use of camps for the following 12 to 18 months).

- Workers flowing through Gladstone between shifts will access businesses (such as hotels and accommodation places) and services on a weekly basis.
- The Local Content Strategy will ensure economic benefits for local businesses such as development of supply capacity, regardless of the location of the camp.

Businesses will also benefit through:

- building and servicing of onshore camps used by QCLNG
- inputs to and servicing of the camp in the LNG precinct
- servicing camps and workers for Pipeline and Narrows Crossing camps
- workers accessing businesses and services on the way in and out of Gladstone.

QGC has developed a Local Content Strategy to maximise local economic benefits, including:

- prioritising recruitment opportunities for locals (within competition and anti-discrimination rules)
- providing pathways from construction to operational employment
- working with local suppliers to increase their capacity to supply QCLNG and like projects
- providing capable suppliers with full, fair and reasonable opportunity to supply equipment, materials and services
- facilitating suppliers to competitively replace imports and access global supply chains
- increasing employment and economic development for indigenous people through direct employment, hiring and training, and support for business development.

The economic costs of time lost to transporting workers to and from the mainland on a daily basis would severely compromise the Project and the benefits it would bring to Gladstone.

The above benefits are also valid for Option 2. However some differences would likely be:

- increased daily usage of businesses, shops and services in Gladstone
- increased presence and increased numbers of workers would likely raise living costs
- excessive labour draw on the local and regional labour supply
- potential to exclude key workers (service and business employees) from the local economy due to lack of affordable housing.

QGC considers that the Curtis Island camp offers significant economic benefits to the community, notwithstanding the fact that it is also an important component of the case for a financially viable Project.

3.3 Traffic Impacts on the Mainland

For Option 1 and a temporary camp on the island there will be local personnel transiting Auckland Point daily from and to homes on the mainland. This implies between 820 and 1,050 cars per day arriving to and departing from Auckland Point at peak construction (depending on local labour availability). Once departed from Auckland Point this traffic would disperse throughout the Gladstone transport network, as demonstrated by QCLNG traffic modelling for the EIS and sEIS undertaken by Halcrow.

For Option 2 there will be these same movements of local personnel, with the addition of 1,800 non-local workforce personnel to be bussed from the temporary accommodation camps. With an assumed fleet of 10 buses, an additional impact of 160 bus movements per day (assuming 45 passengers per bus = 4 x 20 movements in the morning, plus 4 x 20 movements in the evening) would be required at peak construction. This would not be dispersed but follow the most direct route from Auckland Point to a camp, most likely via the Dawson Highway. These movements would occur on the shoulders of peak morning and evening traffic peaks, with morning transfers occurring leading into the morning peak and evening transfers commencing in and extending the evening peak.

It must also be recognised that a fleet of 10 buses would transfer only 450 persons per one-hour round trip. It would thus take a four-hour period to transfer the 1,800 workforce in each direction. This volume and cycle rate would thereby require the construction effort to operate under a daily roster involving a four-hour ramp-up, and a four-hour ramp-down of the workforce, twice per day. This is not a workable arrangement. Alternatively, with an assumed fleet of 40 buses, the shift roster would be nominally workable, transferring the workforce in one hour. However, it would require a major capital investment in the fleet, costs and redundancy in the operation of the fleet, plus the requirement to create a major new bus storage and maintenance facility.

Other material movements related to workforce accommodation locations are assumed to be of a similar nature between the options, as deliveries of supplies to the mainland camps from various locations around Gladstone would need to occur just as the delivery of supplies to the island camp (for Option 1) would need to occur through Auckland Point.

The likely increase in non-local workforce numbers for Option 2 compared to Option 1 will exacerbate the mainland traffic issues.

3.4 Boat Traffic on the Harbour

For the Option 1 case of temporary workforce accommodation on Curtis Island and assuming local personnel are accommodated in Gladstone, the number of personnel ferry movements amounts to approximately 16 movements per day at peak construction periods.

For Option 2 with all personnel accommodated in mainland camps the estimated number of personnel ferry movements rises by approximately 32 movements per day at peak. In addition it has been concluded that two extra ferries will be required. It will not be possible to anchor these ferries at Auckland Point, thus additional anchorages will be required in the harbour. However, there would be some offsetting reduction in ferry movements from the island, as consumables and waste for a camp on the island would no longer require transfer via water. At peak this would be in the order of three barge loads per day (six barge movements per day) that would not be required if the camp was not located on Curtis Island, leaving a net increase of 26 vessel movements per day.

3.5 Cost to Industry

The CSG-LNG industry proposed for Queensland is a world first; CSG has never been used to feed an LNG plant before.

All the proposed projects will face very significant challenges in managing project costs so that Australian projects can compete in what is a highly competitive Asia-Pacific LNG market. These challenges should not be underestimated.

An analysis of the relative costs to the Project of temporary accommodation on the island for part of the workforce against all workforce accommodation on the mainland was carried out during engineering studies during late 2008. The conclusion was that there would be a very significant additional cost to the Project to locate all staff in mainland camps based on:

- increased working-day hours (remuneration)
- increase in workforce numbers to compensate for loss of effective working hours
- daily transportation of thousands of workers around peak construction period
- loss of economies of scale of one central camp
- housing and management of a fleet of buses, and additional ferries.

Based on the 2008 workforce figures (considerably smaller predicted workforce than the currently proposed numbers), the additional costs of establishing a construction camp or camps on the mainland (in the Gladstone area) was estimated to be in excess of \$200 million. The bulk of the additional costs arise from lost productive time and from the cost of ferrying workers, and hence with the increased workforce numbers now estimated to be required, this additional cost will increase significantly. In the case of no accommodation on the island, there is the added potential that the price of land on the mainland suitable for temporary workforce accommodation could suffer inflationary pressures. This would be an additional impost on the Project economics.

3.6 Local Government and Community Perception

The perceptions of the Gladstone Regional Council are that:

- the benefits from fly-in fly-out staff to local businesses will be very limited
- there will be no economic benefits or legacy from the island camp, e.g. small businesses are likely to be excluded from servicing an island camp
- there would be a lack of social infrastructure for camp residents developed by the Proponent.

These perceptions are addressed in the separate criteria of “Economic Benefits to Community”, “Health and Safety Issues” and “Community legacies”.

The concerns of the broader community, established through the Project consultation process, and QCLNG’s responses are:

- How a large workforce could be accommodated in the LNG industry precinct, particularly in relation to issues such as:
 - Waste – transport of wastes to mainland will be as described in other sections of the draft EIS and sEIS. Wastes will not be stored indefinitely on Curtis Island. Sewage treatment discharges, will be to a level acceptable to the Department of Environment and Resources Management and aligned with quality criteria based on Great Barrier Reef Marine Park guidelines.
 - Water – significant quantities of water will need to be provided on the island and for accommodation camps, with or without a temporary accommodation facility.

- Worker behaviour - workplace rules, behavioural standards, fishing and hunting prohibitions are part of QGC's planning
- Biting insects – a specific biting insect management plan will be developed prior to construction.
- The legacy that QGC would leave – See *Section 3.12* below.
- Concerns expressed in consultation about the impacts of large non-local workforces living in or near town. Safety and housing were more frequently expressed in general consultation than concerns about economic benefits, which arose from only a couple of submissions. (See *Section 3.10* below).

BG Group, QGC's parent company and our EPC contractors have constructed and developed a number of LNG facilities around the world. BG Group and in particular EPC contractors for the LNG Facility have practical experience in managing non-local workers housed in communities, in construction camps and on islands and camps on gas and oil platforms.

Many of the concerns raised by the general public and regional councils regarding the location of camps in remote areas with issues such as worker stress, isolation and family stress do not apply to the QCLNG constructors. Non-local construction workers tend to move from one isolated construction site to another where camps are located many hours from their home, and involve logistically challenging travel arrangements. For example: workers involved in construction of the Gorgon LNG Facility in Western Australia are located approximately 70 km from the foreshore of Western Australia, whereas, the QCLNG workers will be 40 minutes from Gladstone Airport, and in the case of a domestic emergency, QGC can get workers from camp to Gladstone easily. Telecommunications including internet access will be available within the room of each worker, allowing daily contact with family members and friends.

The camp to be constructed for the QCLNG Project will be a state-of-the-art camp both in design and facilities.

3.7 Potential Land use Conflicts

While QGC understands that the Government currently has a policy of no temporary workforce accommodation within the Gladstone State Development Area (GSDA), QGC argues that this policy was based on a different set of circumstances to those that apply today to the proposed LNG projects on Curtis Island.

The initial policy position was, in QGC's understanding, targeted at ensuring there was no permanent residential population within the GSDA that might sterilise parts or all of the GSDA. The proposal being put by QGC is for a temporary camp that is fundamentally a workplace not a residential precinct. The camp would be constructed within the fenceline of the LNG Facility, and will only be used during the construction of the plant. Therefore there will be no future conflict between the State Development Area and a resident population.

Further, this policy position was developed in the circumstance whereby the GSDA was limited to the mainland and therefore did not present the same suite of workforce transport problems as that from the location of projects on Curtis Island.

It is also noted that the total capacity of the two approved workers' accommodation camps in the Gladstone Local Government Area is currently 540 places. An additional six camps of a similar capacity to the two approved camps would be required for QCLNG, potentially giving rise to land use conflicts in relation to these camps and a heightened level of community concern.

3.8 Project Delivery Risk

The risks to delivery of the Project related to workforce accommodation are:

- workforce recruitment
- schedule of availability of the temporary accommodation
- economic cost.

QCLNG is competing for a skilled construction workforce with other LNG projects and other resources projects. The use of a mainland camp will make the employment conditions less attractive in the context of a nationally competitive environment for skilled workers. The significant reduction in worker recreational and recuperation time is crucial to this and to health and safety implications.

Although there are some preliminary planning approvals in place for temporary workforce accommodation sites for approximately 540 people, the use of these sites will respond to the initial QCLNG construction workforce needs as early as mid-2010. The immediate development or expansion progressively afterwards of an additional 1,500 capacity with related infrastructure is considered by QGC to be far more achievable on Curtis Island on GSDA land than on rural-residential land in the Gladstone area. Potential land-use conflicts and the time required to process Material Change of Use applications, and then construct the camps, constitute a significant delivery risk.

The economic costs of time lost to transporting workers to and from the mainland on a daily basis would severely compromise the Project and the benefits it would bring to Gladstone (see *Section 3.5*).

3.9 Environmental Impact

The key environmental issues that may differentiate between temporary accommodation facilities on Curtis Island when compared to the mainland option are:

- travel-related greenhouse gas emissions
- sewage treatment and disposal
- vegetation loss.
- noise

Greenhouse Gas: A preliminary comparison of greenhouse gas emissions associated with personnel travel (bus and ferry) has been undertaken, based on total 2,000-person workforce including 900 local workers (this will now be higher given increased personnel numbers):

- mainland camp (locals transit to homes in Gladstone via Auckland Point daily, non-local by bus to camp): approximately 2,040 CO₂-e/annum at peak construction
- camp on island (locals transit to homes in Gladstone via car from Auckland Point daily): approximately 480 CO₂-e/annum.

Sewage Treatment and Disposal: The sewage generated on Curtis Island will either be treated and reused on site for construction or irrigation purposes or treated to a quality that conforms with discharge criteria set by the Great Barrier Reef Marine Park 2005 guidelines. In particular nutrients (nitrogen and phosphorous compounds) will be discharged at low levels. At best, assuming onsite treatment, any mainland camp will discharge water of a similar quality. Alternatively, wastes may be directed to the existing Gladstone Regional Council sewage system, which may have an impact on this infrastructure and which may not have the same discharged water quality performance criteria.

Vegetation loss: The removal of vegetation on Curtis Island has been assessed as part of the draft EIS and the vegetation in the area of the proposed temporary accommodation facility within the LNG Facility boundary is classified as “not of concern” or “of concern sub-dominant” Regional Ecosystem under the Vegetation Management Act (primarily RE 12.11.6 and RE 12.11.14), based on field survey. The total area of construction camp proposed on the island for Option 1 is estimated at 115 ha. This camp is to be contained within the LNG Facility footprint on a plot to be partially cleared for bulk cut to fill earthworks.

Although some land on the mainland has been proposed for development of temporary workforce accommodation, the sensitivity of these land areas and required additional land for the predicted peak workforce requirements is unknown.

Noise: There is a community perception that camps are noisy. Camps increase traffic for both personal vehicles and Project vehicles which transport non-local workers to and from sites. As camps require water and sewage treatment systems, commercial kitchens and air-conditioning, noise from camps could impact on neighbouring rural properties. The location of the proposed camp on Curtis Island, will have no such impact on existing residents.

3.10 Social and Cultural Impact

3.10.1 Social

The mitigation of potential social impacts of the proposed large-scale non-local workforce is a key focus for the QCLNG Project. Accommodating workers in the LNG precinct on Curtis Island mitigates most of the social issues which may arise from large non-local workforces living in or near towns. These include:

- anti-social behaviour and poor role modelling
- sexual health issues
- local perceptions of safety
- demands on social, health, recreational and traffic infrastructure
- worker fatigue, if driving home to other regional centres.

QCLNG is developing its worker code of conduct (town and camp rules) to ensure workers moving through town between shifts are respectful of local values. Workers will be required to sign in and out of the camp (for emergency management purposes) which will assist in behavioural management.

Although QCLNG will be employing temporary accommodation facilities on the mainland in the Gladstone area for early construction phases and for other land-based components of the Project (such as pipeline construction) the construction of the LNG Plant on Curtis Island offers the opportunity of reducing potential conflicts of large numbers of workforce near longstanding population centres.

The strong social impact assessment performed by QGC for its draft EIS and the subsequent updating of this work conclude that on social grounds alone a temporary workforce accommodation facility on Curtis Island for non-local personnel is in the best interests of the community. Given an established, high-quality camp, with good primary healthcare and recreational services provided, workers would be less likely to take up rental dwellings or shared housing in Gladstone, making less demand on housing and social infrastructure.

3.10.2 Cultural

Providing the camp within the LNG precinct will prevent any further land use requirement or disturbance to cultural heritage places.

QGC has committed to constraining on-site workers from fishing and crabbing from the Project areas to protect indigenous cultural fishing values.

Indigenous people are one of the first groups affected by projects' housing demand and rental increases. A camp within the LNG precinct is required to reduce housing stress for indigenous households. QGC received a number of submissions from indigenous groups expressing concern regarding the potential for increases in rental rates to force existing occupants from rental properties.

Overseas workers may be required for the peak labour demand, and QCLNG is developing mitigation strategies with Gladstone stakeholders in relation to overseas workers' care and integration.

Overall, the assessment of the two options on cultural grounds does not highlight significant differences.

3.11 Opportunities for Shared Infrastructure

For Option 1, shared infrastructure for worker accommodation on the mainland would be likely as different third-party providers would respond to the need for temporary accommodation by increasing capacity to meet the demand for all construction projects in the Gladstone area. With the moderate requirement for mainland accommodation for each LNG project, assuming each project has significant island accommodation, the development of capacity would appear to be achievable in the timeframes available.

Sharing worker accommodation infrastructure on Curtis Island between the different proponents has the following critical constraining factors:

- **Schedule.** For QGC to deliver on its commercial arrangements, a rapid build-up of the construction workforce will occur between X and Y. In order for this to be achieved it is considered essential that QGC designs and constructs its own accommodation facility on its allocated land area on Curtis Island. The plans for this are in progress and construction schedules intrinsically linked to these plans. In addition although there are several LNG projects planned for Curtis Island all have different schedules and none have been endorsed with a financial investment decision by their respective executive levels. QGC cannot tie itself to the potential outcomes of other organisations' commercial decision processes.
- **Management.** No discussion has yet taken place between proponents and government as to how shared workforce accommodation would be designed, constructed and then managed

during the different projects' construction programs. These arrangements would take a considerable amount of time which does not align with the tight timeframes that QGC is working towards.

- Location. A shared accommodation facility on Curtis Island has yet to be discussed between the different interested parties. The location of any shared facility on the island would inevitably result in a new road network and large-scale bussing operation in order for the workforce to be moved between sites and the facility. The logistics of such a task detracts from the main benefit of QGC's proposed use of a workforce accommodation on the island, which is efficiency arising from the availability of an onsite workforce.

For Option 2, with no island worker accommodation there will be a necessity for the construction of several large-scale mainland camps within nine to 12 months of the initial construction phases of the different LNG projects. For QGC alone there would be a requirement for over 2,200 beds by 2012. Assuming one other LNG project of similar schedule and scale the requirement would rise to well over 4,500. If this scenario was considered at all to be feasible the likelihood is that, with this scale of workforce requiring temporary accommodation, separate mainland facilities for each proponent would be developed and shared infrastructure limited. However, if a subsequent major construction project was scheduled after the peak of QGC's construction program, use of spare accommodation capacity would clearly be a practical solution.

3.12 Community Legacies

Community legacies inherent in QCLNG's proposed approach (Option 1) include:

- facilitating the development of mainland camps which are approved but not yet constructed, with a commitment of 1-2 years' uptake
- facilitating development of housing stock for QCLNG families who will be Gladstone residents
- affordable housing, health and social infrastructure upgrades
- local skills enhancement, employment pathways and training for young people
- local labour force readiness for major projects
- development of local suppliers' capacity to benefit from local industry and export supply.

A mainland camp in the Calliope area may have a shared:

- 250 mm water pipeline to Mount Elizabeth reservoir
- sewerage pipeline to Calliope waste water treatment plant.

Depending on the location of any mainland temporary accommodation facility (or facilities), the legacy for the community could be an extension of the water and sewerage infrastructure to the intersection of Bruce Highway and Calliope River Road. From this point, it may be possible for a lateral to run towards Yarwun and facilitate residential subdivision and growth along Calliope River Road. However, as QCLNG would only use these services for a couple of years under Option 1 the community legacy may include a maintenance cost of \$50,000-\$100,000 per annum unless other camp users can be found. However, urban development of this kind occurring on the fringe of the Gladstone State Development Area is likely to create future conflict between industrial development in the mainland GSDA and neighbouring permanent residential development.

There would be a far reduced likelihood of negative legacies such as significant housing impacts which would result from the inevitable movement of workers from mainland camps into rental housing as local relationships develop.

Option 2 would offer a similar prospect of community legacies with the additional potential for large-scale temporary accommodation infrastructure for future use for future projects.

3.13 Health and Safety Issues

3.13.1 Health

QGC is unaware of any evidence identifying increased health risks of remote accommodation facilities when compared to accommodation facilities in or near population centres.

For the proposed option of temporary accommodation on Curtis Island, the Project will provide for construction workforce health and safety within the LNG precinct camp through the provision of:

- a QCLNG doctor
- paramedic/nurse practitioner services
- a worker health facility within the camp
- occupational health and medi-vac services which will be co-ordinated through the QCLNG doctor and local services providers.

In the case of Option 2 similar services would be proposed, but dispersed between camps and other options.

QCLNG is also investing in local community capacity building which will expand community services and provide targeted initiatives to ensure residual impacts are offset and that community health and social infrastructure is improved as a result of the development of the QCLNG Project.

3.13.2 Safety

The potential safety issues related to the assessment of the options of an island or mainland temporary accommodation facility are:

- *hazard risk to a construction workforce in accommodation in the broad vicinity of a commissioning or operational LNG plant.* QGC has undertaken detailed quantitative risk assessments of the LNG Plant and its potentially hazardous operations. The conclusions of the QRAs include the finding that the proposed temporary accommodation facility on Curtis Island is sited outside of any fire or blast zones. It is also reiterated here that there are no hazards associated with the release of toxic gases

- *safety of large workforce numbers travelling daily from mainland to Curtis Island.* Without the camp on Curtis Island, QGC will be required to move up to 2000 workers in both directions across the Gladstone Harbour each day at peak periods of construction. This will require a minimum of an additional 16 boat trips per day. If other LNG projects proceed on Curtis Island the number of boat movements will increase accordingly.

QGC believes that the risks inherent in the constant movement of employees by ferry will increase the prospect of injuries from accidents to both its workers and users of the harbour. These risks arise from the general movement of vessels in the harbour and from embarkation and disembarkation and berthing (particularly at Auckland Point if there are multiple projects).

The use of ferries and buses will also add a minimum of two hours to the length of the working day with workers required to undertake two car or bus trips as well as the two ferry trips each day. Over time this is likely to add to worker fatigue.

4.0 SUMMARY AND CONCLUSION

An assessment of the options of temporary workforce accommodation on Curtis Island or in the area of Gladstone on the mainland has been carried out against the relevant criteria. The assessment leads to conclusions for each criterion depending on the level of differentiation between the options:

1. Comparable: No significant difference between the two options
2. Positive or negative: A positive or negative differentiation between the two options
3. Major positive or major negative: A major positive or major negative differentiation between the options.

This qualitative analysis of the criteria assessment identifying the differences between the two potential options is presented in the table below.

Criteria	Option 1 Camp on Island	Option 2 Camp(s) on Mainland
Economic benefits to local community	Comparable	Comparable
Traffic impacts on mainland	Positive	Negative
Boat traffic on the harbour	Comparable	Comparable
Cost to industry	Major positive	Major negative
Local Government and community perception	Negative	Positive
Potential land-use conflicts	Positive	Negative
Project delivery risk	Major positive	Major negative
Environmental impact	Comparable	Comparable
Cultural and social impacts including housing	Positive	Major negative
Opportunities for shared infrastructure	Comparable	Comparable
Community legacies	Comparable	Comparable
Health and safety issues	Positive	Negative

4.1 Conclusion

Overall QGC strongly believes that using mainland camps for the first year of construction for the LNG Facility and for up to 18 months for the Pipeline in the Gladstone area, coupled with accommodating the LNG non-local manual workforce on Curtis Island, will provide the optimum solution for the community and the Project.