18 KEY FINDINGS AND CONCLUSION

18.1 INTRODUCTION

This chapter identifies the key findings and conclusions from the environmental impact assessment for the Pipeline Component (comprising the Export Pipeline, Lateral and Collection Header) of the Queensland Curtis LNG (QCLNG) Project as described in *Volume 4*.

18.2 CLIMATE AND CLIMATE CHANGE

The proposed pipeline routes are located in a subtropical climate zone of Australia. The coastal area is characterised by hot summers and mild-to-warm winters, while the inland areas are characterised by hot summers and dry-to-moderately dry winters. The most significant potential impact of climate and climate change associated with the Pipeline Component is the risk of exposing pipelines as a result of major storm and flooding events.

This will be considered during the Pipeline Component design to ensure that pipelines are buried deep enough, and potentially weighted, to prevent exposure during flood events. Other measures that will be implemented include monitoring of both the short-term and long-term weather predictions to ensure contingency measures can be put into place in a timely manner and ensuring that the Emergency Response Plan addresses measures for handling flood, fire and cyclones.

Project infrastructure will be designed and constructed to cope with the existing climate and future potential climate change.

Climate change impacts within the lifespan of the Project are not anticipated to significantly affect construction, operation and decommissioning of the Pipeline Component.

18.3 TOPOGRAPHY AND GEOMORPHOLOGY

The pipeline routes have been selected to avoid or minimise impacts associated with land and terrain constraints. The pipeline routes generally pass through predominantly level or gently sloping country, however some areas of steep topography need to be traversed around the Callide Range on the Export Pipeline and the western boundary of the Lateral Pipeline. Control measures such as erosion control, slope management and revegetation have been identified for the construction phase of the Project to ensure that impacts are temporary and limited to the immediate construction area.

18.4 GEOLOGY AND SOILS

The geology and soil characteristics of the pipeline routes have been identified from the western slopes of the Great Dividing Range in south–central Queensland to the coastal plains of Gladstone. The most significant potential soil issue for the Pipeline is erosion and the management of topsoil to ensure successful rehabilitation of the routes. Some areas of saline subsoil have been identified, the exposure of which can lead to further erosion and impact on the success of rehabilitation measures.

It has also been identified that approximately 252 km of the combined pipeline routes is considered to be Good Quality Agricultural Land. This equates to approximately 1,260 ha.

Specific mitigation measures have been proposed with the primary objective of:

- preserving topsoil quantity and quality
- limiting area of disturbance
- controlling overland water flows around disturbed areas
- minimising the potential for erosion and sedimentation, particularly associated with sodic subsoil
- maintaining the cropping productivity of the area.

Pipelines are anticipated to have a minor impact on soils and geology in the short term and negligible impact in the long term based on the successful implementation of the proposed mitigation measures. In coastal areas around Gladstone and on Curtis Island where acid sulphate soils (ASS) could be disturbed during construction of the Export Pipeline, some localised impacts may occur. This is being mitigated through geotechnical studies and, if required, the implementation of an ASS Management Plan.

18.5 LAND USE AND INFRASTRUCTURE

The Pipeline Component occurs within predominantly freehold rural lands, with grazing the primary land use. Pipelines will be buried with an appropriate level of cover as determined through the key pipeline standard; Australian Standard (AS) 2885 *Pipelines – Gas and Liquid Petroleum.* The minimum level of cover will be 900 mm but in cropping land this can be increased. Above-ground structures will be limited with the predominant item being marker posts. These posts are installed for safety reasons to allow for the easy identification of the pipeline location. As such agricultural activities can continue over the pipeline and the Project should have no long-term impact on these land uses.

The preferred Export Pipeline route (Option 2) also intersects two small areas of state forest, primarily within existing cleared areas. Preliminary negotiations have been entered into with the Department of Environment and Resource

Management (DERM) and finalisation of this section of the route will be subject to further negotiation DERM.

The general area through which the pipeline routes traverse is overlain with mining and mineral exploration permits but the routes have avoided any mining leases. There are no major industrial developments along the route except for the northern end of the Export Pipeline which traverses the Gladstone State Development Area (GSDA). Installation of the pipeline in this area should be compatible with the intended use of the GSDA and QGC has been liaising with the government in relation to the pipeline route in this area.

The Pipeline Component will intersect a number of road, rail and power line easements. Works will be carried out in accordance with the requirements of the infrastructure manager to ensure no long-term impacts on their infrastructure. ‘‘Dial before you Dig’’ searches and consultation with infrastructure providers will ensure no long-term impacts to existing infrastructure.

The Pipeline Component traverses land subject to a number of native title claims. Consultation is underway, and will continue, with all identified claimants to ensure the pipeline routes minimise impacts to the land and that native title claimants can actively participate in the Project.

18.6 LAND CONTAMINATION

A risk-based approach to land contamination has been adopted that considers the most likely contaminants and their likely locations. At this stage no potentially contaminated areas have been located although road and rail crossings are known to be high-risk areas. Management plans have been proposed for identifying potential contaminated sites, for managing construction to minimise the potential to disturb any such sites and for handling any accidental discovery of contaminated sites during construction. Management measures include consultation with landholders to ensure the pipeline routes do not intercept any past cattle dips or waste disposal sites.

There is minor potential for Project activities to cause land contamination, through release of chemicals, waste, fuel and effluent. Management strategies have been proposed to minimise the potential for such incidents to occur. These include ensuring that:

- all refuelling will be carried out away from watercourses and using containment devices such as drips trays to avoid surface water contamination
- spill management and containment materials is provided at any refuelling location.
- all chemicals and fuels are stored either in lined bunds or on self-bunded pallets.

QGC anticipates that with the implementation of these management measures no long-term land contamination will occur as a result of the installation and

operation of the pipelines.

18.7 TERRESTRIAL ECOLOGY

The proposed Pipeline routes have been selected to traverse predominantly cleared areas. Based on the Queensland Herbarium regional ecosystem (RE) mapping, the approximate length of remnant vegetation that is expected to be impacted by the 780 km of Pipelines is 215 km (110 km Export Pipeline, 25 km Lateral Pipeline and 80 km Collection Header).

Pipeline corridors transect small areas of communities and species habitat listed under the *Environment Protection and Biodiversity Conservation Act* (*EPBC Act*) (Cth) and the *Vegetation Management Act 1999 (VMA*) (Qld). However, the locations have been selected to minimise impacts and detailed field studies will be conducted prior to construction to ensure the final route has the least impact on these species.

Pipeline routes do not directly impact any Category A environmentally sensitive areas (as defined in the *Environmental Protection Act 1994*). However works to cross the The Narrows will be within one kilometre of the Great Barrier Reef Coastal Marine Park. Impacts on this area are addressed in *Volume 5 Chapter 8*.

The Pipeline routes will transect some Category B and Category C environmentally sensitive areas including:

- Category B:
  - Endangered REs (*VMA*) (incorporated within BAMM)
  - Marine Plants Area
  - Seaward side of Highest Astronomical Tide
  - World Heritage Area
- Category C:
  - state forests
  - Other environmentally sensitive areas include:
  - threatened species and ecological communities (EPBC Act)
  - Of Concern REs (VMA)
  - woodlands fringing drainage lines (RE 11.3.25)
  - wetlands (RE 11.3.27)
  - habitats of endangered, vulnerable and rare (EVR) and regionally significant species
  - large intact tracts of vegetation.

Key issues for Pipeline Component construction are the clearing of vegetation, management of fauna entrapment in trenches and the potential to introduce or spread weed species.

Mitigation measures have been proposed to minimise the impacts on terrestrial ecology including:

- detailed field studies prior to construction to minimise impacts on EVR species
- utilising existing tracks and cleared areas as far as practicable to minimise the total clearing required
- employment of qualified fauna handlers to remove trapped fauna and maintain records of all species rescued
- continuation of weed management practices implemented for all pre-construction works
- implementation of construction weed management practices that will include:
  - ensuring all plant and equipment brought to site is free of organic matter
  - providing washdown facilities at key locations
  - monitoring of disturbed areas for outbreaks of weeds
  - pre and post construction weed control management
- provision of offsets where impacts to Endangered and Of Concern Ecological Communities/REs are unavoidable.

Given the location of the proposed routes, clearing for Pipeline Component construction will involve a relatively small portion of the existing vegetation in the local area.

With the implementation of the proposed mitigation and rehabilitation measures, it has been assessed that the pipelines would have a moderate impact on terrestrial ecology in the short-term due to loss of mature vegetation. However, the long-term impact is anticipated to be minor due to the potential for regrowth and the use of offsets to compensate for losses of native vegetation.

18.8 AQUATIC ECOLOGY

The Collection Header traverses the Condamine River downstream of which several nationally significant wetlands occur. However, the closest of these is the Ramsar-listed Narran Lake Nature Reserve which lies approximately 450 km to the south-west of the intended crossing point. The Export and Lateral Pipelines traverse a number of significant watercourse catchments including the Auburn, Dawson, Nogoa and Calliope.

A number of significant wetlands occur in the vicinity of the marine crossing to Curtis Island. The Export Pipeline also transects a few small areas mapped by

the Queensland Herbarium mapping as wetlands.

Potential impacts that have been identified in association with aquatic ecology relate to the construction of the Pipelines and include:

- direct clearance and disturbance by machinery
- indirect impacts – altered water and sediment and nutrient flows if watercourse disturbance is not effectively managed
- release of contaminants, nutrients and/or silt
- introduction or spread of weed species.

To minimise impacts on watercourses and their aquatic ecology it is proposed that:

- the pipeline will, as far as practicable, traverse the watercourse at 90 degrees to the watercourse
- crossings will, where practicable, be in no or low-flow conditions with reinstatement completed as soon as possible after works are finalised
- implementation of effective weed hygiene practices
- monitoring of rehabilitation measures six months after works are completed and then bi-annually for two years.

QGC has endorsed the proposed mitigation measures to ensure aquatic (freshwater) ecology is protected during the construction, operation and decommission of the Pipeline Component. It is anticipated that with the implementation of these mitigation measures the Pipeline Component will not have a significant impact on aquatic ecology values in, or downstream of, the proposed activities.

18.9 SURFACE WATER RESOURCES

Pipeline Component routes will traverse the river catchments of the Condamine–Balonne, Dawson–Fitzroy, and the Burnett–Calliope. Numerous water courses will be intersected and range in width from 120 m (the Condamine River) to 10 m (Larcom Creek) with depths varying between 11 m (Condamine River) and 1 m (e.g. Rainbow Creek). The majority of the watercourses are expected to be dry at the time of construction.

A number of wetlands have been identified within the region as discussed in *Section 18.8: Aquatic Ecology*.

Construction activities, which will include open cutting of the watercourses, can potentially increase or create soil erosion and scouring, temporarily interrupt drainage patterns and create turbidity through the mobilisation of sediments.

Watercourse crossings have been selected to minimise impacts on riparian vegetation and to ensure that, as far as practicable, crossings points are located at stable bank locations.

Management measures to minimise impacts on watercourses and surface water quality will include:

- scheduling construction of watercourse crossings where possible primarily during dry periods, particularly crossings of larger watercourses
- crossing streams perpendicular to flow to minimise the area of impact
- using erosion control measures (e.g. silt fences, berms) between the watercourse and the construction area to minimise sediment releases
- returning banks to a slope no steeper than existing site conditions and to a grade compatible with the strength of the site's soil type
- installing trench plugs on approaches to stream crossings to reduce subsurface flow potential in the backfilled trench
- discharge of hydrotest water so as not to create environmental harm
- implementing ASS measures in coastal areas around Gladstone if required.

With the implementation of the proposed mitigation measures long-term adverse impacts on any watercourses are not expected and the overall impact of the construction and operation of the Pipeline Component has been assessed as minor.

18.10 GROUNDWATER RESOURCES

Desktop studies have identified 196 relevant DERM registered bores within the Pipeline Component study area. The relevance was based on the depth of water and entry points with reference to the potential depth of the pipeline. As the pipeline will not generally require a trench depth greater than 2.5 m, all bores with a depth greater than 5 m were eliminated, as it is highly unlikely these bores will be impacted by the construction or operation of the Pipeline Component.

Excavation and burial of pipelines is expected to occur above the top of any aquifer and existing groundwater resources will not therefore be affected. The key areas for potential interaction between the Pipeline Component and groundwater are shallow aquifers which would mainly occur in alluviums associated with watercourses.

Management measures that will be implemented during construction to ensure no adverse impacts to groundwater resources are predominantly those required for the protection of surface waters and soils. They include:

- discharge of hydrotest water so as not to create environmental harm
- implementing ASS measures in coastal area around Gladstone if required
- ensuring refuelling is away from watercourses where practicable, and using lined and bunded areas for refuelling equipment in close proximity to watercourses (e.g. equipment used for trenchless crossings).

As there is a low probability of intercepting groundwater during pipeline construction due to the shallow depth of the trench, QGC does not anticipate any adverse impacts to groundwater. The overall significance of impacts on groundwater has been assessed as negligible.

18.11 AIR

The main source of air emissions for pipelines is dust during construction and emissions from compressor stations during operation.

Dust generated during the construction will be managed through measures described in the Environmental Management Plan which will include speed limits on unsealed areas in windy conditions and the use of water to damp down travel routes.

Emissions from compressor stations include oxides of nitrogen, carbon monoxide and hydrocarbons. A conservative approach has been adopted in modelling impacts on air quality, as the exact location and time of installation of an in-line compressor station is not known. Modelling results indicate that there will be no exceedences of air quality objectives, as set out by DERM, for compressor emissions.

QGC will liaise with landholders during construction to ensure the effective management of dust. It is anticipated that neither construction of pipelines nor the later operation of an in-line compressor on the Export Pipeline will create any adverse air quality conditions. The overall significance of air impacts has been assessed as negligible.

18.12 NOISE AND VIBRATION

The primary source of noise associated with the Pipeline Component will be construction machinery used in earth-moving activities. Existing ambient noise levels are rural and the DERM recommended background levels have been adopted as the baseline for the pipelines.

Noise limits have been proposed based on background plus 10 dB(A) during daylight hours and sleep-awakening criteria for night-time hours.

Generic noise modelling has been carried out which has identified buffer distances between the construction Right-of-Way (RoW) and any noise sensitive receptor (e.g. residence). The modelling has shown that noise impacts should not create any nuisance at distances greater than 1.5 km from the pipelines.

Night-time construction is not anticipated however some activities once commenced must continue to completion. These include:

- filling of the pipe with water to test its integrity – continuous filling is required to ensure no air is trapped in the pipe that would interfere with the

testing process

- trenchless crossing techniques that require the continuous operation of drilling equipment – if drilling is halted the hole may collapse resulting in longer and more difficult construction work
- transport of pipe which may need to be carried out at night to avoid interference with daytime road users.

Impacts would be mitigated by the relatively short period of intensive construction activity at any one point along a route. The construction contractor would liaise with the community to advise the likely duration of noisy activities and, in certain circumstances, undertake particularly noisy activities (e.g. rock hammering) at periods less likely to cause nuisance to nearby residents.

Given the rural location of the pipeline routes, which endeavour to avoid residences, noise is not expected to create any long-term impacts and the overall significance of noise impacts to sensitive receptors has been assessed as minor in the short term and negligible in the long term.

18.13 TRANSPORT

At this early stage of the Project transport logistics have not been completed. Pipeline materials are expected to be imported due to the large diameter required. Transportation of the pipe from the port of entry to the pipeline RoW will require road transport either directly from the port or from a rail line. The preliminary transport impact assessment has assumed that all transport will be by road as this would create the worst-case impacts.

The assessment has shown that if all the transport of pipe materials is by road adverse impacts potentially arise on the road pavement for the Leichhardt, Burnett and Dawson highways and the Surat Developmental, Dalby–Kogan, Eidsvold–Theodore, Kogan–Condamine, Jackson–Wandoan and Roma–Taroom roads. The transport impacts are not expected to reduce the ‘‘level of service’’ on any of these roads. Pavement impacts are also expected on regional council roads, the majority of which are unsealed.

QGC is seeking confirmation of its assessment approach and will work with the relevant road authorities to agree on mitigation and management measures that ensure:

- no long-term adverse impacts on the road pavement
- safe management of transport during construction.

Depending on transport strategies to be implemented and the final transport corridors selected, the preliminary assessment suggests a moderate impact on the road network. However, once transport options are better defined during the detailed design phase and roads identified in consultation with relevant government departments and agencies, it is expected that the impact from transport on roads will be minor to negligible.

18.14 VISUAL AMENITY

It is expected that visual amenity will not be impacted by construction or operation of the Pipeline Component as these works will be of short duration. Pipelines will be buried with only limited infrastructure installed above ground. This will include mainline valve actuators, scrapper stations used for the cleaning of the pipelines and marker posts. An in-line compressor station is also proposed for the Export Pipeline. While, visually, this will be quite large, a flexible approach to locating the station will ensure that there are no adverse visual impacts to communities.

The primary visual impact will be construction activity, however the RoW will revert to existing land use post-construction, thereby minimising any potential for long-term visual impacts.

Landscape techniques cannot mitigate the visual impacts associated with the construction phase of the Pipeline Component. However, management practices will maintain construction areas to the minimum required and the pipeline routes have been located away from residential areas as far as practical. Landscaping could be used to minimise the visual impact of the in-line compressor station if the location warrants this approach. However, the preferred approach is to maintain a cleared buffer around these facilities to minimise impacts from bushfires.

As Pipeline Component infrastructure is generally low in height and scattered widely across a vegetated landscape, visual amenity is not expected to be impacted significantly. The overall significance of impact to visual amenity has been assessed as minor in the short term and negligible in the medium-to-long term.

18.15 WASTE

Waste will be managed appropriately, within Queensland waste management laws and in accordance with BG Group policy. Pipeline construction and operation generate only small volumes of waste and in the case of construction this is for a limited time.

The main sources of waste are hydrotest water from testing of pipelines and sewage effluent from the camps. The testing process does not normally affect hydrotest water which, with minimal management measures, can be safely released back into the environment.

Sewage will be treated on site and effluent irrigated to land in accordance with requirements made in agreement with DERM. Provision will be made for wet weather management of effluent.

All other wastes will be removed and disposed of by a licensed waste contractor.

The overall significance of impact to the environment from waste has been

assessed as minor.

18.16 HAZARD AND RISK

A quantitative risk assessment has been undertaken for the unplanned release of gas from the Collection Header and Export Pipelines and associated infrastructure. All other hazards were identified and assessed using a qualitative risk assessment process.

For hazards assessed qualitatively, those with the greatest residual risk were related to transport incidents. Further control measures have been proposed to minimise these risks including:

- identifying routes, drivers and times of driving that present the greatest risk
- compulsory driver training and repeated safety message for all high risks
- upgrading of existing high risk roads in consultation with relevant authorities
- increasing number of water trucks to keep dust levels low, especially where multiple unsealed roads and multiple projects are in the same area.

A number of scenarios were considered for the unplanned release of gas, relating to the type of equipment and the size of the hole from which gas is released. For each scenario there are five potential consequences: toxic effects, potential vapour-cloud flash fire, blast overpressure, thermal radiation from ignition of gas, and downwind toxic effects of a fire.

The only consequence that presented a fatality risk greater than negligible, or an injury risk greater than minor, was thermal radiation from ignition of gas released from a pipeline. Modelling of this scenario used the most conservative assumptions about consequence and likelihood. The most conservative fatality risk criterion of 0.5×10^{-6} per annum was not exceeded for distances greater than 126 m. This is likely to be less distance than the minimum separation distances under AS 2885. Moderate injury risk criteria (50×10^{-6} p.a.) are unlikely to be exceeded at distances greater than 94 m.

Establishment and maintenance of adequate safety zones for all Pipeline Component infrastructure will ensure that the risk to human health is as low as reasonably practical.

It is probable that both fatality and injury risk will be an order of magnitude less than predicted by the model. Pipelines will be constructed to Australian Standards, which data show results in a lower likelihood of release of gas than the likelihood used in the model.

Comprehensive emergency management plans will be developed to further mitigate potential hazards and manage any hazards should they occur. It is considered that the overall level of significance will be negligible.

18.17 CUMULATIVE IMPACT

The cumulative contribution of other projects in the region was assessed at a high level based on best-available information.

The other projects with the greatest potential for cumulative impacts are those that:

- overlap or are adjacent to, the pipeline routes
- are geographically separated, but have potentially significant impacts on certain environmental values (e.g. transport routes) within the Project boundary
- are geographically separated but will have impacts beyond the boundaries of their project.

The environmental values with the greatest potential for cumulative impacts are:

- terrestrial ecology
- aquatic ecology
- air, particularly dust
- noise
- road transport.

QGC has proposed mitigation measures to minimise the Project's impact on the above environmental values.

18.18 CONCLUSION

All environmental values have been identified and addressed in relation to the impacts of construction and operation of the Pipeline Component of the Queensland Curtis LNG (QCLNG) Project. Environmental values have been assessed for land use, climate, water resources, nature conservation, air, noise, waste, traffic, visual amenity, transport and hazard and risk.

Potential adverse impacts of the Pipeline Component of the Project include increased erosion, spread of pest species (e.g. weeds), exposure of contaminated areas, disturbance of acid sulfate soils, deterioration of water quality, clearing of vegetation, habitat destruction, endangerment of fauna, endangerment of nationally endangered ecological communities, endangerment of listed threatened species and major impacts on the road network.

However, with an iterative route selection process carried out with the assistance of specialist ecologists, the most critical environmental areas have been avoided. QGC will continue to involve ecologists as route refinement is finalised. This involvement, combined with the mitigation measures set out in this Environmental Impact Statement (EIS) and the Draft Environmental Management Plan (refer to *Volume 10*), should ensure there are no impacts of

major or critical significance. This approach should also mean identified impacts will not result in long-term changes to the environment, public amenity or public safety.

QGC believes the assessment process has demonstrated that the overall impact of the proposed Pipeline Component will be not significant when assessed in a regional context and that the Pipeline Component will not result in any long-term adverse effects on the physical, built or social environment.

Table 4.18.1 provides a high-level risk assessment for the Pipeline Component and summarises these impacts. With all necessary mitigation strategies, none of the environmental factors assessed was identified as being critical, major or moderate.

The overall environmental impact of construction and operation of the Pipeline Component is of minor-to-negligible significance.

Table 4.18.1 QCLNG Project EIS Summary - Pipelines Component and Associated Ancillary Activities and Infrastructure

ENVIRONMENTAL FACTORS	PIPELINES				MITIGATION						RESIDUAL		EMERGENCY CONDITIONS	
	Export Pipeline [1]	Lateral	Upstream Infrastructure Corridor	Accommodation Camps [4]	Avoid at Source	Abate at Source	Attenuate	Abate at the Receptor	Remedy	Compensate / Offset	Residual Impact Significance	Gas Release [3]		
Climate and Climate Change (Design Implications)	N (-)	N (-)	N (-)	N (-)	√	√					N (-)	Mi (-)		
Topography & Geomorphology (Changes in landform)	N (-)	N (-)	N (-)	N (-)	√	√					N (-)	n/a		
Geology and Soils (Erosion) [2]	Mo (-)	Mo (-)	Mo (-)	N (-)		√	√		√		N (-)	n/a		
Geology and Soils (GQAL)	Mi (-)	Mi (-)	Mi (-)	N (-)		√	√		√		N (-)	n/a		
Land Use	Mi (-)	Mi (-)	Mi (-)	N (-)		√	√		√	√	N (-)	Mo (-)		
Infrastructure (Power, water, wastewater, waste)	N (-)	N (-)	N (-)	N (-)	√	√					N (-)	Mo (-)		
Land Contamination	N (-)	N (-)	N (-)	N (-)	√	√			√		N (-)	n/a		
Terrestrial Ecology	Ma (-)	Ma (-)	Ma (-)	N (-)	√	√			√	√	Mo (-)	Mi (-)		
Aquatic Ecology	Mo (-)	Mo (-)	Mo (-)	N (-)	√	√	√			√	Mi (-)	Mi (-)		
Surface Water Resources	Mi (-)	Mi (-)	Mi (-)	N (-)	√	√	√		√		Mi (-)	n/a		
Groundwater Resources	N (-)	N (-)	N (-)	N (-)	√	√					N (-)	n/a		
Air (Air Quality) [5]	Mi (-)	N (-)	N (-)	N (-)	√	√	√				N (-)	Mi (-)		
Noise	Mi (-)	Mi (-)	Mi (-)	N (-)	√	√		√			Mi (-)	Mi (-)		
Vibration	Mi (-)	Mi (-)	Mi (-)	N (-)		√					N (-)	n/a		
Transport	Mo (-)	Mi (-)	Mo (-)	Mi (-)	√	√				√	Mo (-)	n/a		
Visual Amenity	N (-)	N (-)	N (-)	N (-)		√	√				N (-)	n/a		
Waste Management	N (-)	N (-)	N (-)	N (-)	√	√					N (-)	n/a		

Potential impact significance ratings	
N	**Negligible:** Magnitude of change comprarable to natural variation. Not significant to the decision to be made on the project.
Mi	**Minor:** Detectable but not significant. Impact warrants being brought to the attention of the decision-maker but does not require special conditions to be attached to the approval. Negative impacts can be controlled through the adoption of normal good practice. Monitoring is required to ensure mitigation for negative impacts is working properly, that benefits are realised and that the impact is not worse than predicted.
Mo	**Moderate:** Significant. Positive and negative impacts warrant being brought to the attention of the decision-maker and deserve careful attention in the decision. Negative impacts are amenable to mitigation. Monitoring is required to ensure mitigation for negative impacts is working properly, that benefits are realised and that the impact is not worse than predicted.
Ma	**Major:** Significant. Impact mitigation measures must be found to reduce negative impacts. Positive and negative impacts warrant being given considerable weight in the decision. Residual impacts must be compensated for if possible. Monitoring is required to ensure mitigation for negative impacts is working properly, that benefits are realised and that the impact is not worse than predicted.
C	**Critical:** Applies to negative impacts only. Intolerable and not amenable to mitigation. Alternatives must be found.
n/a	Not applicable (no impact)
+	Positive impact
-	Negative impact

Mitigation types
Avoid at source: Remove the source of the impact through route selection or by designing the project so that a feature causing an impact is designed out or altered.
Abate at source: Reduce the source of the impact by adding something to the basic design to abate the impact (e.g. pollution control).
Attenuate: Reduce the impact between the source and the receptor.
Abate at the receptor: Reduce the impact at the receptor.
Remedy: Repair the damage after it has occurred.
Compensate / Offset: Replace in kind or with a different resource of equal value.

Other definitions
Residual impacts: Significance of impacts if feasible mitigation measures are integrated into design, construction and operation of the project.
Emergency conditions: Conditions that occur infrequently as a result of an accident or unplanned/extreme event. They represent non-normal operating conditions.

Notes
(1) From Miles to Targinnie Road. The section from Targinnie Road to the LNG Facility is covered under the LNG Facility
(2) Acid Sulfate Soils are within the section from Targinnie Road to the LNG Facility
(3) Limited to the immediate area of the incident. Temporary duration.
(4) Limited to immediate area and duration of the camp.
(5) Minor impacts would be associated with a compressor station. Impacts from pipeline construction would be negligible and short term.