

Australia Pacific LNG Project

Volume 3: Gas Pipeline

Chapter 7: Landscape and Visual Amenity

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7. Landscape and visual amenity

7.1 Purpose

7.1.1 Introduction

The visual assessment outlined in this chapter considers the potential landscape and visual impacts associated with the proposed high pressure underground transmission gas pipeline (the gas pipeline) for the Australia Pacific LNG Project (the Project).

The gas pipeline is approximately 450km long and will connect the Walloons gas fields to the LNG facility on Curtis Island, Gladstone. The assessment evaluated the existing condition and values of the landscape within the gas pipeline study area and the potential visual effects of construction and operation.

Visual sensitivity was considered in terms of land use and distances of potential sensitive receptors, notably residences. An assessment of visual sensitivity and effect formed the basis for predicting levels of visual impact and developing suitable mitigation measures.

Australia Pacific LNG has a strong commitment to sustainability and has developed a set of 12 sustainability principles that will be applied across all phases of the Project. Sustainability principles in relation to landscape and visual amenity include:

- Minimising adverse environmental impacts and enhancing environmental benefits associated with Australia Pacific LNG's activities, products or services; conserving, protecting, and enhancing where the opportunity exists, the biodiversity values and water resources in its operational areas
- Respecting the rights, interests and diverse cultures of the communities in which Australia Pacific LNG operates
- Identifying, assessing, managing, monitoring and reviewing risks to Australia Pacific LNG's workforce, its property, the environment and the communities affected by its activities.

The landscape and visual assessment was conducted by Integral, landscape architecture and visual planning, and their full report is presented in Volume 5 Attachment 12.

7.1.2 Scope of work

The assessment of potential impacts on landscape character and the visual environment included:

- A baseline assessment of the study area and its local and regional context
- An examination of the proposed gas pipeline's potential impact on the landscape and visual amenity
- An assessment of its locality and sensitive receptors
- Development of measures considered necessary to mitigate potentially adverse visual impacts.

7.2 Methodology

To assess the visual significance and magnitude of the gas pipeline on the landscape, a baseline study was completed to record and analyse the existing character, quality and sensitivity of the

landscape and any significant visual features within the gas pipeline study area. The phased assessment approach included:

- **Stage 1:** A desktop review of relevant background reports, other data and mapped information to determine topography, vegetation types, land use, landscape and settlement patterns
- **Stage 2:** Classification of the landscape into 'landscape character zones' based on the gas pipeline study area and consideration of land use patterns, topography and vegetation types. The classification process was undertaken using topographic maps and aerial photographs which enabled the identification of the different landscape characteristics of each zone within the study area
- **Stage 3:** Analysis and evaluation. The visual assessment of the pipeline components was completed in two steps. The first step determined the visual impact of both the construction and operational phases, measuring both 'visual effect' and 'visual sensitivity' to determine the overall visual impact. The second step comprised the development of strategies to mitigate the identified impacts.

The visual character of the Project in relation to external views will also be created by a number of other facilities and associated infrastructure required for the operation of the gas pipeline, including service corridors, main line valves and intermediate scraper stations (launcher/receiver).

The 'visual effects' have been determined by measuring the contrast and integration of the pipeline components within the existing landscape. The colour, shape and form of gas pipeline (project) components and the topography, vegetation and surrounding landscape features all influence the degree of visual effect. The proportion of a view that includes project components will also influence the level of visual effect.

The visual sensitivity has been determined by assessing the views from which project components would be seen. There are three levels of sensitivity:

- Low visual sensitivity – project components are visible from rural lands and minor roads but may be partially obscured
- Moderate visual sensitivity – project components are visible from main roads and infrequently accessed state forests and national parks
- High visual sensitivity – project components are visible from urban and rural residences, recreational areas and highways.

The visual sensitivity of the Project, when viewed from individual residences, may also be affected by the following:

- Screening effects of any intervening topography, buildings or vegetation. Residences with well screened views of the project site will have a lower visual sensitivity than those with open views
- Viewing distance from the residence to visible areas of the project components. The longer the distance, the lower the visual sensitivity
- General orientation of residences to landscape areas potentially affected by the Project. Residences with strong visual orientation towards the project site (i.e. those with areas such as living rooms and/or verandas orientated towards the component) will have a higher visual sensitivity than those orientated away from the components and do not make use of the associated views.

Once the visual sensitivity and visual effect of each gas pipeline component has been identified, the overall visual impact of each component was determined using the matrix in Table 7.1.

Table 7.1 Visual impact matrix

Visual effect	Visual sensitivity		
	High	Moderate	Low
High	High visual impact	High/moderate visual impact	Moderate/low visual impact
Moderate	High/moderate visual impact	Moderate visual impact	Moderate/low visual impact
Low	Moderate/low visual impact	Moderate/low visual impact	Low visual impact

Mitigation strategies have subsequently been developed to reduce the visual sensitivity and/or visual effect to reduce the overall visual impact of project components.

7.3 Existing visual environment

7.3.1 Regional context

The proposed gas pipeline will traverse the landscape from the Walloons Gas Fields near Miles to the proposed LNG facility on Curtis Island, near Gladstone on the central Queensland coast.

The broader region provides a range of visual landscapes – from rural hinterland, national parks and state forests with the gently undulating rural lands, to forest-covered mountain ranges and valleys. Outside of the state forests and national parks, vegetation cover is predominantly remnant woodlands with frequent tree cover along drainage lines and road reserves.

A combination of agricultural cropland and grazing pastures are scattered throughout the region with an overlay of sealed and unsealed rural roads. Gladstone, a regional urban centre, is well known for its strong industrial base. To the west of Gladstone is the hinterland of Banana Shire, with 11 towns in the Callide and Dawson Valleys. The Banana Shire has significant coal mining activity with extensive grazing and farming land. Townships and rural settlements are dispersed throughout the non-urban landscape.

7.3.2 Local context

The terrain along the proposed gas pipeline corridor ranges from moderately flat with gently sloping hills, to forest-covered mountain ranges with elevations up to 400m as the pipeline corridor traverses the Callide Ranges. There is a high proportion of open exposed landscapes throughout the study area, as well as areas of enclosed and semi-enclosed forest. Areas of flat terrain have low visual absorption capacity, but remnant vegetation provides some limited screening.

Land use is typical of central and south-eastern Queensland, comprising cultivated land including grazing and crop land, with limited housing and transport infrastructure. Agriculture is the predominant activity with grazing on native and improved pastures. Historical land use patterns within the gas pipeline study area have resulted in significant clearing of native vegetation. As a result, some rural residences within these agricultural lands may have views to the pipeline corridor and project components across crop and grazing lands, as well as open grasslands.

There are networks of major and minor public roads that pass through the gas pipeline corridor, from which some project components may be viewed. There are six major public roads which the gas pipeline route will cross, including:

- Warrego Highway, which provides the main east-west route from Brisbane to Charleville
- Leichhardt Highway, which runs north-south through central and southern Queensland
- Burnett Highway, generally running north-south from just south of Rockhampton to Nanango
- Dawson Highway, an east-west route which commences at Gladstone and runs to Springsure
- Bruce Highway providing a north-south coastal highway from Brisbane to Cairns
- Mount Larcom-Gladstone Road, which runs east-west from South Gladstone to Mount Larcom.

The gas pipeline corridor does not cross any nationally designated areas of landscape importance such as World Heritage Areas or national parks.

7.3.3 Landscape character zones

The landscape character of the proposed gas pipeline corridor has been assessed in terms of 14 landscape character zones determined by topography, vegetation type and land use pattern. These are illustrated in Figure 7.1.

Key visual characteristics within each zone are as follows:

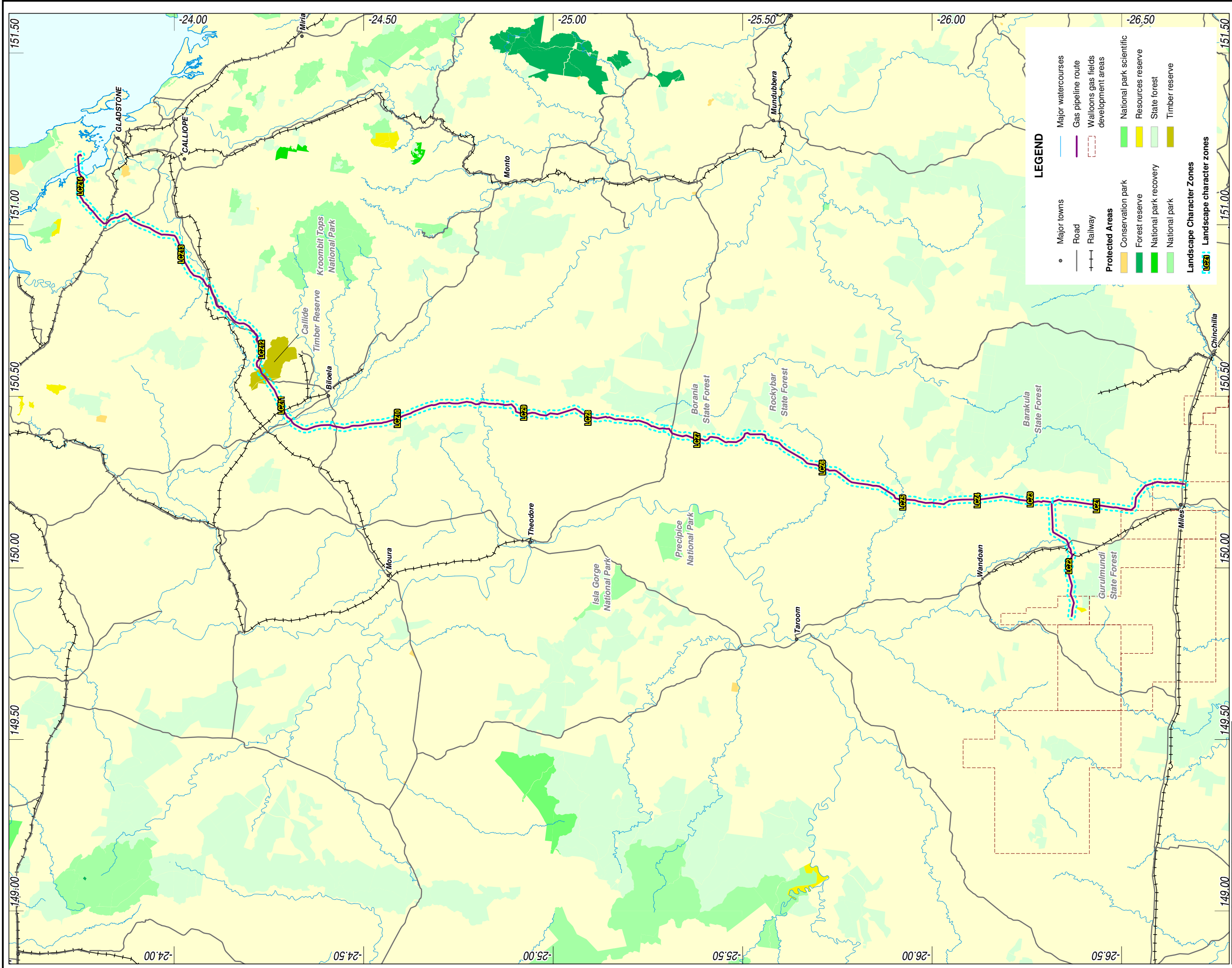
- **Landscape character zone 1** – Condabri gas field to pipeline intersection. The gas pipeline route begins at the gas field and traverses north-west for approximately 44km. This zone is moderately undulating dominated by enclosed forest with portions of open grassland and scattered trees. The gas pipeline crosses Dogwood Creek immediately north of the Condabri gas field.

The exceptions are the Warrego Highway and the Western Railway. These would have high sensitivity in the foreground up to 1km, but the speed of travel and linear nature of the gas pipeline may severely limit views from these two travel routes
- **Landscape character zone 2** – Woleebee gas field to pipeline intersection. The gas pipeline commences at the gas field near Mount Horrible and traverses east for approximately 38km. This zone is moderately undulating open grassland scattered with trees and some grazing. Approximately 4km of the gas pipeline route traverses a small patch of enclosed forest, with Juandah Creek running parallel to the pipeline for 12km
- **Landscape character zone 3** – Pipeline intersection to Old Chinchilla Road. The gas pipeline runs approximately 10km north of the junction of the Condabri and Woleebee laterals. This zone is moderately undulating, predominantly enclosed forest with portions of agricultural land scattered with trees along the drainage lines
- **Landscape character zone 4** – Old Chinchilla Road to Glendoan Road. This zone consists of open grassland grazing with some cultivated areas, scattered trees and remnant patches of enclosed vegetation. The gas pipeline crosses Roche Creek and is within viewing distance of several residences
- **Landscape character zone 5** – Glendoan Road to Big Valley Road. The gas pipeline progresses in a northerly direction, traversing a mix of semi-enclosed forest and enclosed

forest. This zone is flat to undulating dominated by a network of tracks. The gas pipeline crosses Bungaban Creek and its associated tributaries

- **Landscape character zone 6** – Big Valley Road to Dearne Road. The gas pipeline traverses north through open grassland with scattered trees and remnant patches of vegetation. It crosses Cockatoo Creek and several smaller creeks including Nine Mile, Kennedy and Rocky Creek. It also crosses Pine Creek and runs parallel to it for approximately 6km
- **Landscape character zone 7** – Dearne Road to JP Gully. The gas pipeline traverses in a north-westerly direction between valleys and mountain ranges on the west and several state forests on the east. In this zone, the valleys and mountain ranges are covered in remnant forests on the slopes and along drainage lines, while the state forests are dominated by enclosed forests with patches of open grassland. The gas pipeline crosses several gullies and creeks and Eidsvold-Theodore Road
- **Landscape character zone 8** – JP Gully to Oxtrack Creek. The gas the pipeline traverses open landscape (grassland and grazing land), several creeks, small areas of semi-enclosed forest and remnant vegetation on slopes and along drainage lines
- **Landscape character zone 9** – Oxtrack Creek to Keen Creek. The gas pipeline continues in a north-westerly direction through enclosed forest and patches of semi-enclosed woodland. It intersects several unsealed tracks, and South Creek and Keen Creek
- **Landscape character zone 10** – Keen Creek to Dawson Highway (south). This zone is predominantly open grassland with scattered trees and patches of remnant semi-enclosed woodland. The gas pipeline crosses several creeks which run from the Banana Ranges to the west of the pipeline
- **Landscape character zone 11** – Dawson Highway (south) to Dawson Highway (north). The gas pipeline traverses predominantly agricultural land with few patches of remnant vegetation along creek lines and road reserves. The gas pipeline crosses the Dawson Highway, the Burnett Highway and several creeks including Back Creek, Kroombit Creek and Callide Creek
- **Landscape character zone 12** – Dawson Highway (north) to Coal Road. The gas pipeline crosses the Callide Ranges which consists of enclosed forest. It runs adjacent to the Dawson Highway and crosses Collards Creek in several locations. Elevations increase through this zone, ranging from 350m to 400m
- **Landscape character zone 13** – Coal Road to Sneaker Gully. This zone is undulating grassland with scattered trees and patches of remnant vegetation. The gas pipeline crosses several roads including Mount Larcom Gladstone Road and the Bruce Highway, as well as the Calliope River and several creeks
- **Landscape character zone 14** – Sneaker Gully to Curtis Island. The gas pipeline traverses through the Mount Larcom Ranges between Scrubby Mountain and Mount Larcom. This zone has several vegetation types – forest (including remnant), grassland, scattered woodlands and crop land. The gas pipeline traverses Kangaroo Island, which is low swamps coastal plains and mangrove flat, across The Narrows to Curtis Island. Curtis Island is characterised by undulating forested hills and valleys.

The Callide Infrastructure Corridor State Development Area and the Department of Infrastructure and Planning's proposed infrastructure corridor within the Gladstone State Development Area are located in landscape character zones 13 (Coal Road to Sneakers Gully) and 14 (Sneaker Gully to Curtis Island). Both zones are on the coastal plain, east of the Callide Range.



LEGEND

- Major towns
- Road
- +— Railway
- Major watercourses
- Gas pipeline route
- - - Walloons gas fields development areas
- Conservation park
- Forest reserve
- National park recovery
- National park
- National park scientific
- Resources reserve
- State forest
- Timber reserve

Protected Areas

- Conservation park
- Forest reserve
- National park recovery
- National park
- National park scientific
- Resources reserve
- State forest
- Timber reserve

Landscape Character Zones

- LCZ1 - Landscape character zones

AUSTRALIA PACIFIC LNG PROJECT

Volume 3 Chapter 7
Figure 7.1 Landscape character zones - pipeline

0 25 50km

SCALE - 1 : 1,000,000 (at A3)

Latitude / Longitude
 Geocentric Datum of Australia 1994



Source Information

Cadastral and Easements
 Department of Natural Resources and Water, Queensland 2009

Protected Areas (Queensland Estates)
 Environmental Protection Agency 2009

Landscape Character Zones
 Integral Landscape Architecture and Visual Planning (12/01/2010)



7.4 Potential impacts

The gas pipeline will be approximately 450km long and will be located underground and constructed using a trench and backfill method. Construction works will operate seven days a week, during daylight hours only, over approximately 18 months. The right of way width of the pipeline corridor will typically be 40m to 50m wide. It is expected that most of the pipeline will be constructed within a 40m wide right of way, which will be reduced to about 10m post commissioning.

Some additional area may be required at larger crossings, while the width may be reduced for limited distances through sensitive areas. The length of open trench at any one time will be minimised and will vary depending upon number of construction teams and progress. Expected time between commencement of clear and grade, and completion of restoration works, will be approximately three to five months.

The scope of work involved with installing the gas pipeline will include:

- Temporary pipe laydown areas
- Temporary accommodation facilities
- Detailed survey
- Clear and grade
- Stringing
- Welding
- Trenching
- Bedding and padding
- Lowering-in and backfill
- Restoration and rehabilitation
- Signage.

7.4.1 Visual analysis

The long term visual impacts of the completed underground gas pipeline will be largely negligible; but the short term construction impacts could create strong visual effects on the landscape. Generally visual impact will be greater in locations that look down over the construction works, as elevated locations provide longer views of the pipeline easement than when viewed from flatter locations.

The pipeline construction process will alter the local landscape character. This change will be created through stripping ground cover (grass or shrub cover), excavating the pipeline trench and the temporarily stockpiling soil material. The resultant exposure and excavation of the trench is likely to create strong colour contrast with the adjoining landscape. The linear character of this component could also create a strong line contrast in the landscape.

In areas where woodland or forest occurs, clearing trees will also increase the level of contrast between the existing landscape and the pipeline easement, creating a strong visual effect. The timing between clearing and restoration works along individual sections of the gas pipeline corridor will typically be within a three to five month period.

Earthmoving equipment, excavators and other machinery used for construction will also be visible for a short period during the installation of the pipeline. However, the visual impact will be relatively short term.

7.4.2 Visual effect and visual sensitivity

The visual changes in the landscape will primarily be experienced during the construction period, as Figure 7.2 and Figure 7.3 show. The form and colour contrast will be removed when restoration of ground cover is complete. Upon completion of the gas pipeline and following reinstatement of the corridor close to pre-existing conditions, the overall visual impact will be negligible. The visual effects from the gas pipeline are set out below:

- There would be a residual visual impact in areas where vegetation is removed and cannot be reinstated, but in most areas the route alignment diverts around woodland and forest
- Aboveground markers will have the most significant long term visual impact on the existing landscape, and these are shown in Figure 7.4. However, due to the scale of the markers, the visual impact of this component will be negligible in most situations, except in the immediate foreground of approximately 50 to 100m
- The visual effect of gas pipeline construction, including pipe laydown areas and temporary accommodation facilities, will be high in all 'visual character units' with some screening occurring in forest areas
- The long term visual effect through grassland will be low once rehabilitation is complete
- The long term visual effect in woodland areas would be moderate to low depending on the density of tree cover in a location
- The long term visual effect of the gas pipeline in forest country, especially steep country, will be high. This is because there is a need to keep a narrow strip (approximately 6m) of the gas pipeline easement clear of forest cover. Whilst the gas pipeline infrastructure is limited in elevation, components such as the inlet station and scraper stations may have a moderate sized footprint. The visual effect of the minor components will be localised and is generally not significant beyond its immediate setting of approximately 100m.

A summary of the visual impacts for each landscape character zone is provided in Table 7.2.



Figure 7.2 Typical pipeline construction – lowering pipes



Figure 7.3 Typical pipeline construction – mainline valve



Figure 7.4 Typical aboveground marker

Table 7.2 Summary of visual sensitivity and potential visual impact along gas pipeline route

Landscape character zone	Visual/landscape sensitivity	Visual impact
1 Condabri CSG field to pipeline intersection.	Low sensitivity along the most of the landscape character zone. The exceptions are the Warrego Highway and the Western Railway that would have high sensitivity in the foreground up to 1km, but speed of travel and the linear nature of the gas pipeline may severely limit views from these two travel routes.	Moderate visual impact with the exception of the Warrego Highway during the construction period (high).
2 Woleebee CSG field to pipeline intersection:	High sensitivity where the gas pipeline crosses the Leichardt Highway south of Guluguba. High sensitivity at two residences located 1.5 to 2.5km away which are located approximately 19km from the start of the Woleebee lateral.	High visual impact during construction at both residences and at the Leichardt Highway crossing. Low visual impact following construction.
3 Pipeline intersection to Old Chinchilla Road	The visual sensitivity of the landscape character zone is low The gas pipeline section within the forest adjacent to Barakula State Forest will not be viewed at the two houses on Upper Downfall Creek Road, but there may be views to the gas pipeline in the open fields.	High visual impact during construction due to views from the houses. The impact would be reduced to low following rehabilitation. Moderate/low visual impacts of the pipeline in Barakula State Forest.
4 Old Chinchilla Road to Glendoan Road	Open grassland grazing with some cultivated areas and scattered trees. There are few remnant patches of enclosed vegetation. Low sensitivity of the southern section of the landscape character zone with a high sensitivity in the northern section due to the close proximity of residences.	Moderate/low impacts of the temporary accommodation facilities due to natural screening from sensitive receptors. Moderate visual impact in the southern section and high impact in the northern section during the construction phase. Following construction, the visual impact will be low.
5 Glendoan Road to Big Valley Road	The visual sensitivity of the landscape character zone is low.	Moderate visual impacts during the construction phase reduced to low in the operational phase.



Landscape character zone	Visual/landscape sensitivity	Visual impact
6 Big Valley Road to Deearne Road	Low visual sensitivity due to rural land use. This zone would also support a temporary accommodation facility in the vicinity of Cockatoo Creek.	Moderate visual impacts during the construction phase reduced to low in the operational phase. Low visual impact of the temporary accommodation facility as there are no sensitive receptors nearby.
7 Deearne Road to JP Gully	Elevations are much higher through this zone ranging from 300m to 480m. However, there are no sensitive receptors within this landscape character zone, so a low sensitivity rating has been assigned.	The visual effects of construction may be high in both forest and grassland/woodland areas during construction, but visual impacts would reduce to moderate/low in the operational phase.
8 JP Gully to Oxtrack Creek	There are approximately five residences that would have limited views of the pipeline. The remaining sensitivity of the landscape character zone is classified as low.	High visual impacts at the residences during the construction phase and low following rehabilitation.
9 Oxtrack Creek to Keen Creek	The visual sensitivity of the landscape character zone is low with the exception of one homestead north of Camboon.	High visual impacts will be experienced at the homestead during the construction. Following rehabilitation, the impact would be low. Visual impacts will be moderate for the remaining section of the pipeline and low following rehabilitation.
10 Keen Creek to Dawson Highway (south)	The visual sensitivity is low with a moderate rating for 200m along Crowsdale Camboon Road and a high sensitivity around the residences adjacent to Prospect Creek.	Moderate visual impacts during construction and low following rehabilitation.
11 Dawson Highway (south) to Dawson Highway (north)	The zone is dominated by agricultural activity. However, the improved quality of the land, results in an increased number of residences with high sensitivities to 1km and highway zones with high sensitivity. The visual sensitivity is high surrounding the residences and where the pipeline crossed the Dawson Highway and the Burnett Highway north of	High visual impact during the construction phase reduced to low following rehabilitation.



Landscape character zone	Visual/landscape sensitivity	Visual impact
Biloela.		
12 Dawson Highway (north) to Coal Road	The visual sensitivity is low with a high sensitivity in the immediate foreground of the Dawson Highway	The visual impacts will be high during construction in the immediate foreground of the highway and moderate in other areas. The gas pipeline crosses the Callide Ranges and may be visible from some residences in the valley, creating a high visual impact up to 5km. This would remain high in the operational phase where the right of way is visible from the highway and residences.
13 Coal Road to Sneaker Gully	The majority of the landscape character zone has a low visual sensitivity due to grazing. The gas pipeline runs adjacent to the Dawson Highway for 18km. This section of pipeline and the crossing of the Bruce Highway are classified as high. The crossing of the Gladstone- Mount Larcom Road would have a moderate sensitivity. A limited number of residences are located on Mt Alma Road and Narrows Road. These would have a high sensitivity.	Low visual impact for the majority of the landscape character zone. The section of pipeline adjacent to the Dawson Highway will have a high impact during construction and revert to low following rehabilitation as proposed planting will screen views of the cleared easement. The exception to this will be at the Bruce Highway, where the route alignment passes through remnant open forest. Here the visual effect following restoration works will remain high to moderate.
14 Sneaker Gully to Curtis Island	Low sensitivity for most of the gas pipeline. High visual sensitivity towards the eastern portion of the section as the pipeline crosses salt flats, mangroves and The Narrows to Curtis Island, and the ridgeline to the east of the LNG facility.	High visual impacts during the construction phase, particularly as the gas pipeline passes through the wetlands to the west of The Narrows, mangroves, and on Curtis Island. Moderate to low following operations for most of the landscape character zone.

Common infrastructure corridor (cumulative impacts)

The Department of Infrastructure and Planning's proposed common infrastructure corridor is located in landscape character zone 13 – Coal Road to Sneakers Gully, and zone 14 – Sneaker Gully to Curtis Island.

Construction phase

It is likely that the higher impact construction phases of up to four pipelines will vary so that, at any one time, construction impacts will be similar as for one pipeline (refer to Section 7.4).

The major alteration to the visual landscape would occur due to construction in forested areas, where each pipeline will require separate clearing to create a cleared potentially four times the size of a single easement. This may result in major visual effects. Whilst this effect is limited to small sections of steep forested country, there are sensitive viewing locations on the Dawson and Bruce Highways.

Therefore, the visual impact in these locations is potentially high due to the major visual effects close to the sensitive receptors.

Operational phase

In the operational phase the visual effect will be significantly reduced, except where the pipelines pass through forested areas. Again, the major areas of concern remain the forested locations close to the Dawson and Bruce Highways.

Also of visual concern is the potential proliferation of pipeline signage, especially as seen from the sensitive viewing locations on the highways.

7.5 Proposed mitigation and management measures

The proposed gas pipeline from the Walloons gas fields to Curtis Island will have high visual effects during the construction period. However, long term effects are predicted to be low, with moderate effects limited to some forest areas. From a visual amenity perspective, the short and long term landscape management strategies will achieve acceptable levels of visual impact reduction, while creating enhanced landscapes in and around a number of sensitive landscape locations.

The proposed visual and landscape mitigation strategies developed for the Project aim to reduce the short and long term impacts. Short term strategies will be carried out close to sensitive receptor points for impact reduction and to achieve landscape improvements. Longer term strategies relate to landscape management of areas in which project infrastructure is located, to restore and enhance visual amenity values as close to pre-development conditions as practicable.

Rehabilitation of disturbed areas will decrease the visual contrast created by project components to the existing landscape. The rehabilitation strategies that emulate patterns, shapes, line and colours of the existing landscape will reduce the contrast between the project components and the existing landscape, reducing visual effect.

Where practicable, the following mitigation measures will be implemented:

- Minimise construction time close to sensitive receptors, notably residences and highways
- Minimise clearing of forest and woodland cover

- Establish pipe laydown locations away from sensitive receptors, and minimise cut and fill requirements
- Vehicle access is via existing tracks and new tracks, where required, would follow the contours in the landscape
- Investigate minor re-alignment options in locations where the gas pipeline route passes through forest areas within the viewshed of sensitive receptors. This will avoid long views along cleared easements
- Seek to locate pipeline infrastructure and temporary accommodation facilities outside the viewsheds of sensitive receptors
- Detailed analysis of the visual catchment of each accommodation facility will be undertaken to establish if there are any sensitive receptors within 800m of the facility. Where required, strategies will be implemented to minimise impacts, in consultation with the landholder
- Following the laying of pipes, ground levels will be rehabilitated consistent with surrounding terrain
- Create appropriate drainage structures and undertake rehabilitation works to avoid erosion where possible (see Volume 3 Chapter 11 – Surface Water and Volume 3 Chapter 5 – Soils, topography and geology)
- Properly fell trees and clear easements so as not to damage adjoining vegetation
- Mulch felled material for re-use in easement rehabilitation works
- Store topsoil to enable re-use in rehabilitation works
- Rehabilitate disturbed areas to be consistent with surrounding vegetation types
- Where sight lines are important in forest areas, re-establish scrub cover to diminish the contrast between the adjoining forest and the easement.

In addition to implementing these general mitigation strategies for pipelines, the following landscape character zones have specific mitigation measures due to their location in relation to sensitive receptors:

- Zone 1 – Condabri CSG field to Pipeline Intersection – establish a visual screen of low trees to avoid views along the gas pipeline at this location
- Zone 3 – Pipeline Intersection to Old Chinchilla Road – rehabilitate steep forest ridges
- Zone 12 – Dawson Highway (north) to Coal Road – complete a detailed visual assessment of potential views to the western portion of the gas pipeline route from adjoining rural lands. As needed plant tall shrubs/small trees to screen views onto cleared easement and restore roadside landscape amenity
- Zone 14 – Sneaker Gully to Curtis Island – where possible retain mangrove and other waterside vegetation to prevent views along the pipeline easement. Revegetate the easement on Curtis Island with scrub and small tree species that will restore values. This rehabilitation program would be undertaken in collaboration with the other operators within the Common Infrastructure Corridor.

7.6 Conclusion

7.6.1 Assessment outcomes

The gas pipeline covers a distance of approximately 450km across a wide range of landscape settings, from the tablelands of south central Queensland, through mountain ranges onto the coastal river systems and along various coastal valleys and plains to subtropical areas on the central Queensland coast.

The dominant land use along the pipeline corridor is agriculture, which has a low visual sensitivity. However, there are sensitive receptors (i.e. residences) along the gas pipeline route and highway crossings, although the areas of increased visual sensitivity are limited.

The gas pipeline corridor traverses predominately gentle to moderate slopes, although steep areas are encountered in small sections of mountain forest. The vegetation cover was considered a more significant environmental parameter, determining the long term visual impact of pipeline construction. Following construction in grassland or woodland areas the visual effect is, with the exception of immediate foreground, of low visual significance. However, in forest areas where there is a need to maintain easement areas free of trees, the visual effect is long lasting and is part of the operational effect of the gas pipeline. Such effects in highly sensitive locations create a high visual impact.

It is inevitable, given the level of activity associated with pipeline construction, that the visual effects will be high. In low sensitivity locations, such as agricultural areas, the visual impact is likely to be low, reflecting the low sensitivity of that land use. However, where such areas occur within the viewshed of a residence or a highway, a high impact may result.

Following completion of rehabilitation work, visual effects and impacts can be reduced to low, even for high sensitivity areas. The exception to this is in forest areas where a 40m wide easement will be cleared for construction. Following rehabilitation, regrowth will be encouraged over the easement except for a narrow track (approximately 6m) to be maintained in a cleared state for access during gas pipeline operation.

The mitigation strategies recommend that in sensitive locations there is re-establishment of suitable species to remove sight lines into the easement.

The most sensitive location along the gas pipeline route is at the pipeline crossing of The Narrows to Curtis Island. This area is significant in terms of recreation and tourist values. Visual treatment in this location is important to reduce visual impacts.

A summary of the environmental values, sustainability principles, potential impacts and mitigation measures in relation to landscape and visual amenity associated with the LNG facility is presented in Table 7.3. Additionally, Table 7.1 includes the residual risk levels for landscape and visual amenity. Further details on the risk assessment process are presented in Volume 2 Chapter 4.



Table 7.3 Summary of environmental values, sustainability principles, potential impacts and mitigation measures

Environmental values	Sustainability principles	Potential impacts	Possible causes	Mitigation and management measures	Residual risk level
Rural and coastal landscape values	Minimising adverse environmental impacts and enhancing environmental benefits associated with Australia Pacific LNG's activities, products or services; conserving, protecting, and enhancing where the opportunity exists, the biodiversity values and water resources in its operational areas	Creation of an adverse visual impact on areas surrounding the gas pipeline and associated infrastructure, especially on sensitive visual receptors	Inappropriate design and construction methods that are not sensitive to the exiting environment Uncontrolled clearing activities	Avoid, view sheds of sensitive receptors such as residences, highways and towns as far as practicable Locate temporary accommodation facilities and above ground pipeline infrastructure at appropriate minimum separation distances from existing residences	Low
Cultural heritage values	Respecting the rights, interests and diverse cultures of the communities in which Australia Pacific LNG operates	Impacts to culturally significant vistas or areas	Implementation of design which is not culturally sensitive	Reduce, as far as practical, the cleared areas needed to support the construction of the gas pipeline Where practicable, retain vegetation	Low
Outdoor recreation values	Respecting the rights, interests and diverse cultures of the communities in which Australia Pacific LNG operates	Impacts to outdoor recreational areas	Implementation of design which is not sensitive to areas used for outdoor recreation	Utilise access via existing roads and farm tracks as far as possible and rehabilitate if not required for operational access Minimise night-time activities that require lighting	Negligible
Biodiversity values and fauna habitat	Identifying, assessing, managing, monitoring and reviewing risks to Australia Pacific LNG's workforce, its property, the environment and the communities affected by its activities	Habitat impact to fauna species	Introduction of night lighting into a fauna habitat	Rehabilitate pipeline routes, access tracks and other infrastructure as soon as practicable with appropriate vegetation	Negligible

7.6.2 Commitments

To manage the potential visual impacts associated with the construction and operation of the gas pipeline, Australia Pacific LNG will, where practicable:

- Minimise the construction time within the visible areas of sensitive receptors
- Minimise clearing of forest and woodland cover particularly in the vicinity of sensitive receptors
- Undertake detailed analysis of the visual catchment of each temporary accommodation facility to establish if there are any sensitive receptors within 800m of the facility. Where required, strategies will be implemented to minimise impacts, in consultation with the land holder
- Rehabilitate disturbed areas to be consistent with surrounding area
- Where sight lines are important in forest areas, re-establish cover (within operational and safety bounds) to diminish the contrast between the adjoining forest and the easement
- Properly fell trees and clear easements to minimise impact on adjoining vegetation.