16 VISUAL AMENITY

16.1 INTRODUCTION

This chapter provides an assessment of impacts that have changed as a result of amendments to the Queensland Curtis LNG (QCLNG) Project's LNG Component. It also provides additional information on visual amenity which has been gathered since the submission of the draft environmental impact statement (EIS).

Key Project amendments which are of relevance to visual amenity for the LNG Component, and form the basis of this assessment include:

- changes to the LNG Facility layout (for more details see Project description in *Volume 2, Chapter 9* and *Chapter 13*, and *Section 16.4.1* below)
- discontinued consideration of the option of the mainland road bridge from the Project scope.

The assessment also considers lighting impacts associated with alternative marine transport routes during construction of the LNG Facility, and proposed night-time construction activities.

16.2 RESPONSES TO SUBMISSIONS

No submissions were received specifically relating to potential landscape and visual amenity impacts from the construction and operation of the LNG Facility (as detailed in *Volume 5, Chapter 16* of the draft EIS).

16.3 AMENDMENTS TO VISUAL AMENITY BASELINE

Amendments to the Visual Amenity Baseline were not required as the study area remains consistent with the draft EIS.

16.4 UPDATE OF VISUAL AMENITY IMPACTS

This section provides a summary of the updated assessment of the potential visual and landscape impacts arising from amendments to the LNG Component project description. The complete updated assessment is provided as *Appendix 5.9*[1] to this sEIS. It also assesses potential impacts

1 ERM, 2010. Queensland Curtis LNG Project: LNG Facility and Associated Infrastructure Supplementary Landscape and Visual Impact Assessment. Unpublished report for Queensland Gas Company Limited

associated with night-time construction activities and alternative marine transport routes for construction of the LNG Facility.

16.4.1 Changes to LNG Facility Layout

16.4.1.1 Removal of LPG Storage Tank

The removal of the 100,000 m³ LPG storage tank will result in an improvement to the visual amenity of the LNG Facility.

16.4.1.2 Reduction of LNG Facility Footprint

Refinement of the engineering design for the LNG Facility has resulted in some consolidation of the construction lay-down areas along the north eastern boundary.

16.4.1.3 Shoreline Configuration and Relocation of the LNG Loading Berth and Jetty

The configuration of the LNG Facility has been developed such that the core plant area has been relocated inland from the shoreline (up to approximately 150 m), with a relocation of the LNG loading berth and jetty to the south.

Outcomes of the reconfiguration include:

- retention of a larger area of the intertidal zone along the shoreline immediately adjoining the LNG Facility
- opportunity to increase vegetation screening behind the intertidal zone.

16.4.1.4 Proposed Revisions to Site Grading and Benching

Further refinement of the proposed site grading and benching for the LNG Facility has been undertaken. The main plant areas remain at the same level, however, areas identified for construction lay-down in the north-eastern and eastern sections of the site have increased in height.

A comparative assessment with the draft EIS indicates the following changes to visual impacts:

- Benching for the construction camp areas along the northern boundary has increased in height from relative level (RL) 20 to RL 31, with an additional benching area at RL 17. This increase in bench height will have the visual effect of reducing the extent of cut face to adjoining hill slopes, but will also increase the height of retaining walls on the downward slope. Retention of the cut face above the benched areas will be undertaken using pitched rock retaining walls. Stepping of the retaining walls will enable vegetation screening to be provided.

  - The alteration in landform, extensive areas of cut, and large retaining structures, will impact on surrounding visual amenity when viewed from adjoining waterways. However, the location of the retaining structures towards the back of the LNG Facility will limit the extent of visibility and this, combined with the terracing and landscape treatment, will reduce visual impacts on views from the adjoining waterway.

- The proposed construction camp area to the north-east of the site will result in a cut face of approximately 36.5 m in height. Retention of this cut face will require pitched rock terraces.
  - As with other retaining structures, each terraced section will be planted with vegetation to reduce the visual impacts of the retaining walls when viewed from adjoining waterways.

- A series of smaller platforms in the south-eastern corner of the site have been included to support various buildings and infrastructure elements.
  - Cut faces and retaining walls in this area are less extensive than the northern section of the site and their location behind the main LNG Plant results in some screening of views from adjoining waterways.

- There is an increase in the bench height supporting the LNG trains to RL 13.75, with a corresponding increase in LNG train stack heights.
  - This will not have any noticeable increase in the visual impact of the Project as the tanks and flares remain the highest and visually dominant elements of the LNG Plant area. It should be noted that the flare design is under review and flare height is likely to increase prior to finalisation of design, but that these changes have not been finalised and have therefore not assessed at this time.

16.4.1.5 Addition of Construction Dock

The low profile of the Construction Dock moderates the visual impacts of this element in comparison to other elements of the LNG Facility.

16.4.1.6 MOF Reconfiguration

Reconfiguration of the Material Off-loading Facility (MOF) will result in no major changes to the visual impact of this element.

16.4.2 Changes to Visual Impacts from Publicly Accessible Viewpoints

An assessment of visual impacts from publicly accessible viewpoints in Gladstone and surrounding areas which may be affected by changes to the LNG Facility is provided below as an update to those presented in the draft EIS.

Removal of the proposed Curtis Island bridge and mainland road from the Project scope eliminates visual impacts from all viewpoints affected by these elements in the draft EIS.

16.4.2.1 Viewpoint 5 – Port Curtis Way

Proposed amendments to the LNG Facility will not be visible from this viewpoint, therefore there is no alteration to the impact presented in the draft EIS.

16.4.2.2 Viewpoint 8 – Unnamed track Targinie Foreshore

Proposed amendments to the LNG Facility will be visible from this location due to its close proximity, however, these changes will not change the significance rating established in the draft EIS. The reconfiguration of the Facility layout will have a positive outcome when viewed from this location as it encourages continuity of the natural shoreline, as summarised in *Table 5.16.1* below.

Table 5.16.1 Visual Impacts from Viewpoint 8 – Unnamed Track along Targinie Foreshore

Item	Description	Evaluation (Construction)	Evaluation (Operation)
Landscape sensitivity	High with some intrusive industry	High	High
Viewer numbers	Low	Low	Low
Distance to nearest Project structures	Approx. 4 km	Moderate to High	Moderate to High
Visibility of the Project structure (LNG Facility)	High	High	High
Magnitude of change (LNG Facility)	Medium	Medium	Medium
Overall significance of the visual impact		**LNG Facility – Moderate to Major**	**LNG Facility – Moderate to Major**

Figure 5.16.1 Photomontage of Visual Impacts from Viewpoint 8 – Unnamed Track along Targinie Foreshore

16.4.3 Changes to Visual Impacts from Surrounding Waterways

Reassessment of the visual impacts of the Project from adjoining waterways relating to the LNG Facility is discussed below. A summary of updated impacts is provided in *Table 5.16.2* to *Table 5.16.4*.

Removal of the proposed Curtis Island bridge and mainland road from the Project scope eliminates visual impacts from all viewpoints previously affected by these elements in the draft EIS.

16.4.3.1 Viewpoint 9 – Port Curtis adjoining North Passage Island

The close proximity of the proposed LNG Facility to this viewpoint will result in the Project being visually dominant in the landscape, however the proposed amendments to the Project will have the benefit of reducing the visual impacts as they reduce the visual bulk of the LNG tanks.

16.4.3.2 Viewpoint 10

Views south from this viewpoint will include the LNG Facility, however, the relocation of the LNG Facility further inland will reduce the level of visual impact due to the screening effect of intervening topography and vegetation.

16.4.3.3 Viewpoint 11

The relocation of the main visual components of the LNG Facility inland from the shoreline will result in these elements being screened by intervening topography and vegetation. The overall significance of visual impacts for the amended LNG Facility layout is subsequently reduced to a minor to moderate impact.

16.4.3.4 Viewpoint 12

Amendments to the LNG Facility will not alter the significance of impacts from this location.

Table 5.16.2 Visual Impacts from Viewpoint 9 – Port Curtis adjoining North Passage Island

Item	Description	Evaluation (Construction)	Evaluation (Operation)
Landscape sensitivity	High	High	High
Viewer numbers	Low	Low	Low
Distance to nearest Project structures	Approx. 1 km	High	High
Visibility of the Project structure (LNG Facility)	High	High	High
Magnitude of change (LNG Facility)	Large	Large	Large
Overall significance of the visual impact		**LNG Facility – Major**	**LNG Facility – Major**

Figure 5.16.2 Photomontage from Viewpoint 9 – Port Curtis adjoining North Passage Island

Table 5.16.3 Visual Impacts from Viewpoint 10 – The Narrows (500 m north of LNG Facility)

Item	**Description**	**Evaluation (Construction)**	Evaluation (Operation)
Landscape sensitivity	Medium to High	Medium to High	Medium to High
Viewer numbers	Low	Low	Low
Distance to nearest Project structures	Approx. 500 m	High	High
Visibility of the Project structure (LNG Facility)	Moderate	Moderate	Moderate
Magnitude of change (LNG Facility)	Medium	Medium	Medium
Overall significance of the visual impact		**LNG Facility – Moderate**	**LNG Facility - Moderate**

Table 5.16.4 Visual impact from Viewpoint 11 – The Narrows (1 km north of LNG Facility)

Item	**Description**	**Evaluation (Construction)**	**Evaluation (Operation)**
Landscape sensitivity	Medium to High	Medium to High	Medium to High
Viewer numbers	Low	Low	Low
Distance to nearest Project structures	Approx. 4.2 km	Moderate	Moderate
Visibility of the Project structure (LNG Facility)	Low	Low	Low
Magnitude of change (LNG Facility)	Small	Small	Small
Overall significance of the visual impact		**LNG Facility – Minor to Moderate**	**LNG Facility – Minor to Moderate**

16.4.4 Night Lighting of the LNG Facility

Lighting impacts that required further assessment following changes to the Project description concern the following:

- proposed 24-hour bulk-earth works construction
- proposed marine-based transportation routes during construction and operation of the LNG Facility.

The proposed amendments to the LNG Facility layout are not expected to significantly alter the outcomes of the light impact assessment provided in the draft EIS.

16.4.4.1 Potential Impacts on Humans

The use of night lighting during construction is not expected to increase impacts identified in the draft EIS. There is limited visibility of the site from Gladstone and surrounding areas which combined with high levels of existing industrial lighting reduces the significance of this perceived impact.

16.4.4.2 Potential Impacts on Amphibians and Reptiles

Amphibians and reptiles may be impacted on to a moderate extent by night lighting within the local area as it will attract insects to the construction areas. This will result in short-term impacts but is not expected to alter populations of species detailed in the draft EIS.

The proposed amendments to the LNG Facility layout will not result in any additional impacts to those already assessed.

Marine turtle and/or hatchlings will not be impacted on by night lighting and the revised LNG layout due to the large distance of the site from known nesting areas.

16.4.4.3 Potential Impacts on Birds

Bird species that may be impacted on by the introduction of artificial light include the Beach Stone-Curlew, Eastern Curlew, Powerful Owl, Southern Boobook and Barking Owls.

The proposed amendments to the LNG Facility layout will not result in additional impacts to those already assessed. Twenty four-hour lighting during construction will occur in conjunction with the removal of site vegetation. The impacts of night lighting during the 24-hour bulk-earth works are therefore unlikely to increase the extent of any roosting and/or nesting displacement within the construction areas.

Foraging and roosting sites within adjacent habitat areas, particularly those located to the south and west of the LNG Facility site, are expected to be subjected to light spill. Potential impacts on these locations are expected to be low to moderate, and generally within natural fluctuations and trends.

16.4.4.4 Potential Impacts on Mammals

Potential impacts of night lighting on mammals are consistent with those discussed for birds (see above). It is unlikely impacts will significantly increase the extent of displacement arising from clearing activities.

16.4.5 Night Lighting Impacts of Alternative Marine-based Transportation Routes

Additional marine activity associated with the proposed construction and operational routes for the LNG Facility will result in an increased level of lighting associated with marine traffic between Curtis Island and the mainland. In the context of artificial lighting emanating from both the QCLNG Project and potentially other proposed developments on Curtis Island, increases in lighting associated with night-time marine traffic will not alter the conclusions presented in the draft EIS.

Removal of the Curtis Island bridge from the scope of the assessment will result in a reduction in the impact of night lighting on the sensitive waterways of the Narrows Passage.

Night-lighting impacts associated with vehicle traffic servicing the loading facilities at Auckland Point are not anticipated given there is no direct impact on light sensitive receptors, and these routes are currently lit by fixed and constant artificial lighting. Two sections of the route adjoin residential properties, however, in both cases these are not directly in line of sight of the road alignment and are therefore not subject to impacts resulting from vehicle headlights. Residential properties along the route are also generally set back from the road alignment with, in some cases, noise barriers, vehicle barriers and fencing providing light shielding from passing vehicles.

16.4.6 Impact Summary

16.4.6.1 Amendments to LNG Facility

The potential impacts arising from the amended LNG Facility results in no major changes to the significance of impacts identified in the draft EIS.

16.4.6.2 Impact from Waterways and Publicly Accessible Viewpoints in Gladstone and Surrounding Areas

Changes to visual impacts during construction and operation of the LNG Facility are summarised in *Table 5.16.5* below.

In general, the significance of the landscape and visual impacts for the amended LNG Facility layout remain unchanged from the draft EIS. However, amendments to the LNG Facility provide improvements to views from the adjoining waterways and Targinie foreshore. Views from The Narrows south towards the Project have improved as a result of relocating the LNG Facility further inland from the shoreline.

Removal of the Curtis Island bridge from the Project scope has lowered the level of visual impact in some locations, particularly for Viewpoint 11 which is located 1 km north of The Narrows entrance. The bridge was previously identified as visually dominant structure at this location and distance from the LNG Facility. Following its removal the visual impact significance rating was lowered to minor to moderate (originally identified as moderate to major).

Table 5.16.5 Summary of Changes to Visual Amenity Impacts from Selected Viewpoints

Summary of Impacts in Draft EIS	Summary of Impact Change from the Revised LNG Facility Layout
• Visual impact of the LNG Facility on views from residential areas: negligible to minor adverse significance	No change
• Visual impact on views from the Targinie foreshore: moderate to major adverse significance	No change
• No locations on the mainland are expected to be affected to a major to critical level by the proposed LNG Facility	No change
• No significant difference in the visual impact of the LNG Facility during the construction and operational stages when viewed from the mainland	No change
• Views of the LNG Facility, within approximately 4.2 km of the site, are expected to have a level of visual impact which would be rated as moderate to major adverse significance	No change
• Views of the LNG Facility from the adjoining waterway, within approximately 1.4 km of the site, are expected to have the highest identified level of visual impact which would be rated as major adverse significance	No change

Summary of Impacts in Draft EIS	Summary of Impact Change from the Revised LNG Facility Layout
• Visual impact on views of the LNG Facility from within The Narrows and 1 km north of the entrance: moderate to major adverse significance	Decrease in visual impact to minor to moderate significance.
• Visual impact on views of the LNG Facility from 5 km north of The Narrows: negligible significance	No change
• Visual impact on views of the LNG Facility from the waterways adjoining Turtle, Witt and Tide islands: negligible significance during construction and negligible to moderate significance during operation.	No change

16.4.6.3 Night lighting of the LNG Facility

The potential impact of night lighting from 24-hour bulk-earth works has been assessed as follows:

- no significant increase in light impacts on human settlements, because of the limited visibility
- nocturnal fauna species identified on the site and/or potentially within the vicinity of the site may be impacted on by night lighting, predominantly from the effects of light spill and attraction of insects. However, the nature of the lighting fixtures and the fact that the construction site will already have been cleared of vegetation and fauna species, will result in existing levels of disturbance not being affected as a result of night-lighting
- there are no identifiable increases in risks of impact on turtles.

In summary, the introduction of artificial lighting for 24-hour bulk-earth works during construction will not result in significant increases to impacts already identified in the draft EIS.

16.4.6.4 Night lighting of Transportation Routes

Additional marine activity associated with the proposed construction and operational routes for the LNG Facility will not alter the findings presented in the draft EIS which identified fixed and constant lighting such as wharves and jetties, as these generally having a greater visual impact than that generated by marine traffic.

Additional night-time vehicle traffic associated with the proposed construction and operational routes servicing Auckland Point are unlikely to result in significant impacts on light-sensitive receptors as there is no direct line of sight

between vehicle lights and residential properties, and the proposed routes are currently lit by fixed and constant artificial lighting.

16.5 MITIGATION

Given that the significance of the landscape and visual impacts for the amended LNG Facility layout remain unchanged or reduced from that described in the draft EIS, mitigation measures as proposed in the draft EIS remain valid.

16.6 UPDATED ASSESSMENT OF CUMULATIVE IMPACTS

Assessment of the cumulative impacts of potential industrial developments planned for the Gladstone State Development Area have been considered based on EIS developments and information recently made available from the Department of Infrastructure and Planning. Consideration has been given to all projects currently under investigation within the GSDA, however, the assessment was limited by the extent of available information.

A brief description of potential changes to landscape character arising from cumulative development within the GSDA is provided below.

16.6.1.1 Wiggins Island Coal Terminal

Impacts and major components of the Wiggins Island Coal Terminal Project remain consistent with the draft EIS.

16.6.1.2 Gladstone Pacific Nickel Project

In relation to the proposed development of the Western Basin and in particular the Curtis Island Industrial Precinct, the proposed refinery will not have a significant impact on the existing viewshed of these proposed developments and therefore cumulative impact is not expected to be significant.

16.6.1.3 Fisherman's Landing

The existing reclamation area at Fisherman's Landing allows the development of five shipping berths. A further six berths are under investigation on a proposed 153 ha reclamation project extending to the north of Fisherman's Landing. The extension of Fisherman's Landing, together with the Western Basin Reclamation project will substantially alter the natural landscape character of this section of Targinie foreshore extending to Friend Point. The creation of artificially constructed landings will be highly visible from The Narrows entrance, and entail removal and disruption of the mangrove vegetation along the shoreline. This artificial edge, associated infrastructure

and marine activities will extend the industrial, working port character of the existing Gladstone Port through the Targinie Passage to the entrance to The Narrows.

16.6.1.4 Gladstone LNG and Sun LNG Projects – Fisherman's Landing

Impacts and details of the major components of the Gladstone LNG and Sun LNG projects remain consistent with the draft EIS. The development of the Curtis Island Industrial Precinct together with development of industry and shipping berths associated with Fisherman's Landing will alter the character of the landscape from one of a predominantly undeveloped waterway to an industrial working port.

16.6.1.5 Gladstone Steel-Making Facility (Boulder Steel) – Aldoga Precinct

Boulder Steel is proposing to construct and operate an integrated steel-making plant at a site within the Aldoga Precinct of the GSDA. The plant will produce steel for export via a berth at Fisherman's Landing. The steel-making facility will be developed in conjunction with power generation facilities for reuse of waste gas and heat from the steel plant. The proposed project is located to the west of Mount Larcom and is not within the viewshed of the QCLNG and therefore does not contribute directly to cumulative visual impacts. Expansion of the export facilities at Fisherman's Landing has been addressed above.

16.6.1.6 Gladstone LNG Project (Santos) – Curtis Island

The visual impact assessment undertaken as part of the Gladstone LNG EIS report identified the key visual impacts as occurring from the adjoining waterway. The report also found views from publicly accessible locations were generally blocked by intervening hills and ridges which formed the valley within which the LNG Facility is located. Flaring, particularly at night, was identified as a key visual impact, due to the height of the flare, although it was acknowledged as an infrequent occurrence.

16.6.1.7 Australia Pacific LNG Project (Conoco Philips-Origin) – Curtis Island

The proposed Australia Pacific LNG project located to the north of the QCLNG Project is a three to four train LNG processing facility. The initial advice statement dated March 2009 provides an outline of the project, however, details regarding layout and potential visual impacts of the LNG Facility are not currently available and therefore no detailed assessment of potential cumulative impacts has been undertaken.

16.6.1.8 Shell Australia LNG Project – Curtis Island

Shell Australia LNG site is proposing to build a three-to-four train LNG facility to the north of Boatshed Point. An initial advice statement was released in May 2009, however, this does not provide details regarding layout and potential visual impacts of the LNG Facility and therefore no detailed assessment of potential cumulative impacts has been undertaken.

16.6.1.9 Summary of Cumulative Impacts

The most significant cumulative visual impact of the projects will be the combined visual impacts within the Curtis Island Industrial Precinct, together with the proposed expansion of the reclaimed land and industrial facilities at Fisherman's Landing. The positioning of the industrial/infrastructure elements on both sides of the Targinie Passage will substantially alter the landscape character of the area from a predominantly undeveloped waterway to a large industrial port precinct, dominated by man-modified elements, and visually linking with the industrial landscapes of the existing Gladstone waterfront port areas. Retention of sections of the natural shoreline will assist in reducing cumulative visual impacts.