



PORT of TOWNSVILLE
Nexus North Queensland

Appendix N Landscape and Visual Amenity

Townsville Marine Precinct Project
Environmental Impact Statement



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Glossary of Terms and Abbreviations

Term	Definition
Background	6km – 16km - Textures are no longer visible, but mountain and valley forms, skylines and ridgelines are important (Forest Practice Board Tasmania, 2006)
Cumulative impact	The interaction of impacts arising from a development in conjunction with other past, present and reasonably foreseeable future actions
Foreground	0-1 km – Is the visual zone where colour contrast and textural detail are most clearly perceived (Forest Practice Board Tasmania, 2006)
GIS	Geographical Information Systems
Indirect impact	Impact on the environment that is not a direct result of the development but is often produced away from it or as a result of a complex association, such as off-site traffic movements
Landscape feature	A component, part or feature of the landscape that is prominent or eye-catching, e.g. hills, buildings, vegetation
Landscape quality	Largely subjective judgement based on particular characteristics that influence the way in which the environment is experienced, including special interests such as cultural associations or heritage interests, the presence and/or type of elements and condition
Landscape sensitivity	The extent to which landscape can accept a change of a particular type and scale without unacceptable adverse impacts on its character
Landscape value	Areas of formally designated landscape that through national or local consensus, reflect the value placed by society on particular environments and/or their features
Middleground	1km-6km – Different elements in the landscape are visually apparent (Forest Practice Board Tasmania, 2006)
Mitigation	Measures, including any process, activity or design to avoid, reduce, remedy or compensate for adverse landscape and visual impacts of a development project
Residual impact	An impact that occurs/persists after mitigation measures have been implemented
Sensitive visual receptor	Person and/or viewer group that will experience an impact
Visual amenity	The value of a particular area or view in terms of what is seen
Visual impact	Changes in the appearance of the landscape or in the composition of available views as a result of development, to people's responses to these changes, and to the overall impacts in regard to visual amenity. This can be or negative.
Visual catchment	Extent of potential visibility to or from a specific area, feature or proposal
VIA	Visual Impact Assessment

Executive Summary

The visual impact assessment (VIA) describes the existing landscape and visual character within the visual catchment of the proposed port works, identifies and assesses the existing visual context and viewpoints, undertakes an assessment of the significance of the impacts on the visual landscape and identifies the extent to which mitigation of impacts is required.

The Townsville area is characterised by a low-lying coastal landform bounded by Cleveland Bay and the Paluma and Hervey mountain ranges (Queensland Government, 2007). Castle Hill and Mt Stuart are key landform elements within the wider landscape. Magnetic Island located off the coast of Townsville, has steep topography with numerous bays and inlets, and provides a visual backdrop to the east of the city.

The visual catchment for the proposed port works extends over the ridges and high points of the city and incorporates both residential and commercial development, recreation areas and lookouts. The topography of the region means that areas distant from the site, such as Mt Stuart, are part of the visual catchment. While these areas are within the visual catchment, due to the distance from the project area they are not considered to be viewpoints.

The project site is located within an area that has existing industrial development including both port and land based activities. While individual developments may have a minimal impact on the visual landscape, the cumulative impact is a continuing industrialised landscape within this area. This is particularly the case with the additional land reclamation which will extend land beyond the current boundaries and that which has been designated for industrial development.

While the ongoing industrial and port development diminishes the quality of the visual outlook the proposed development creates a unique landscape which combines the background of the mountains with the inter-tidal zone of Cleveland Bay and the Ross River.

Some visual impacts resulting from the project are unavoidable and cannot be mitigated for during operation. The project will alter the surrounding landscape and the visual experience of the visual receptors. However, these changes must be seen within the context of the existing local environment.

Foremost is the creation of a new land area within Ross River adding to the existing port facilities, and the construction of the associated breakwater. In addition the construction of industrial and port related infrastructure will increase the extent of this type of use in the visual landscape. The new works are co-located with existing port and industrial development therefore it is not considered to be a new element in the visual outlook.

The change in view will be permanent from all viewpoints with increased prominence when viewed from viewpoints 1, 4 and 5 as these either provide extensive, uninterrupted outlooks over the site, or are located within close proximity and therefore not visually or physically separated from the impacts.

Site wide, in terms of the assessment criteria this equates to a moderate adverse residual landscape impact, with medium visual sensitivity due to proximity of the receptors to the site. Therefore, the assessment of significance of residual impacts is considered to be of moderate significance.

1. Introduction

This section describes the landscape and visual character of the area surrounding the proposed Townsville Marine Precinct, assesses the potential impacts that the project may have on these values and recommends mitigation measures where appropriate.

The proposed Townsville Marine Precinct has a total area of 34 ha and will be situated at the mouth of the Ross River in Cleveland Bay. The site area extends to the west of the existing land reclamation that has occurred at the mouth of the river. All proposed works are located within the declared Port Limits of the Townsville Port Authority. Construction is proposed to begin in 2010, with an operational life of the project expected to be more than 25 years.

This report assesses the landscape, visual values, and impacts of the project. The assessment of the potential landscape impacts of a project is carried out as an impact on an environmental resource (i.e. the landscape) whereas visual impacts are assessed as one of the interrelated impacts of a project on the viewing population.

Landscape features and elements are determined and/or influenced by physical, biological and cultural factors and may include soils, vegetation, and land uses. As such, landscape effects occur from changes in the physical landscape, which may give rise to changes in its visual character and how this is experienced. This may in turn affect the perceived value of the landscape.

This visual impact assessment (VIA) describes the existing landscape and visual character within the visual catchment of the project, identifies and assesses the existing visual context and viewpoints, undertakes an assessment of the significance of the impacts on the visual landscape and identifies the extent to which mitigation of impacts is required.

2. Scope and Methodology

2.1 Introduction

The methodology for this study, including impacts and proposed mitigation measures, has been derived from the *Guidelines for Landscape and Visual Impact Assessment, Second Edition*, published by The Landscape Institute and Institute of Environmental Management and Assessment (2002) and the Forest Practice Board of Tasmania's *A Manual for Forest Landscape Management*.

2.2 Visual Impact Assessment Scope

This visual impact assessment addresses the potential landscape and visual impacts associated with the project, including:

- ▶ Review of existing information including planning and statutory requirements;
- ▶ A description of the project and its visual components;
- ▶ Identifying the limitations and assumptions of this method;
- ▶ An evaluation of the existing landscape and visual environment;
- ▶ Discussion of visual receptor sensitivity within the study area through the use of viewpoints;
- ▶ Assessment of the significance of impacts on landscape character and visual amenity at the viewpoints as a direct result of the project;
- ▶ Identification of residual and cumulative impacts;
- ▶ Proposed mitigation strategies; and
- ▶ A summary of the findings of the assessment.

2.3 Visual Impact Assessment Methodology

2.3.5 Existing Environmental Values

The methodology for the identification of the existing environmental values of the area surrounding the site and the identification of the viewpoints is detailed below:

- ▶ Review of existing information including planning and statutory requirements. Documents reviewed include:
 - The Queensland State Coastal Management Plan (note: a Regional Coastal Management Plan has not yet been prepared for the dry tropics region within which the project is located);
 - The World Heritage Area gazettal for the Great Barrier Reef WHA;
 - The Townsville-Thuringowa Strategy Plan;
 - The Townsville Port Authority Land Use Plan 1996; and
 - The Port of Townsville Statement of Authority 2006;
- ▶ Use of Geographical Information Systems (GIS) datasets (including topography, land use, zoning and infrastructure layers) and aerial photography to generate a visual catchment map. This identifies the area from which the proposed project can potentially be seen;

- ▶ Identification of viewpoints which are accessible to the public or are a place of residence using aerial photography and topographic maps;
- ▶ Identification and grouping of potentially affected receptors (residents, road users, recreation users, etc) from aerial photography and verification of this information through site visits;
- ▶ Review of existing information and collation of relevant background information including planning and statutory requirements; and
- ▶ Publicly accessible and representative viewpoints were confirmed, recorded and photographed to provide a representation of typical views possible from that locality to the project. These viewing situations reflect particular landscape and /or visual features of importance within the visual environment and local landscape character. Generally, they represent views from key visual receptors (residents and recreation users) where a potentially significant change in view may occur.

2.3.6 Assessment of Impacts

A qualitative assessment of landscape and visual impacts has been undertaken. The significance of impacts has been evaluated using a combination of two factors; *landscape impacts*; and *visual impacts*, as defined below.

2.3.7 Landscape Impact

Landscape impacts refer to the relative capacity of the landscape to accommodate changes of the type and scale that would occur as a direct result of the proposed project, through the introduction of new features or loss/modification of existing features. Impacts have been assessed from identified vantage points and consider (through professional judgement) the scale of change including:

- ▶ The extent to which the change (modification, removal and / or addition) of landscape features alters the existing landscape character;
- ▶ The extent of area from which the effect is evident;
- ▶ The duration of the effect (short, medium, long term, or permanent);
- ▶ The physical state (or condition) of the landscape and its intactness from a visual, functional and ecological perspective. This includes consideration of the condition of landscape elements (eg. groups of features within the soft landscape including open space, recreational facilities, creek lines, etc) or features (eg. prominent eye-catching elements such as a distinctive building, a lookout point, etc) and their contribution to landscape character. Individual features and elements make up the character of a place and influence how the landscape is experienced; and
- ▶ The effectiveness of any proposed mitigation.

The levels of landscape impact used in this assessment are detailed in Table 2-1.

Table 2-1 Magnitude of Landscape Impact

Landscape Impact	Definition
Large	<p>A substantial / obvious change to the landscape due to total loss of, or change to, elements, features or characteristics of the landscape. Would cause a landscape to be permanently changed and its quality diminished.</p> <p>Change is likely to cause a direct adverse permanent or long term (more than 10 years) impact on the value of the receptor.</p>
Moderate	<p>Discernible changes in the landscape due to partial loss of, or change to the elements, features or characteristics of the landscape. May be partly mitigated. The change would be out of scale with the landscape, and at odds with the local pattern and landform and will leave an adverse impact on a landscape of recognised quality.</p> <p>Change is likely to impact adversely the integrity/value of the receptor but recovery is predicted in the medium term (5-10 years).</p>
Small	<p>Minor loss or alteration to one or more key landscape elements, features, or characteristics, or the introduction of elements that may be visible but may not be uncharacteristic within the existing landscape.</p> <p>Change is likely to adversely impact the integrity/value of the receptor but recovery is expected in the short term (0-4 years).</p>
Negligible	<p>Almost imperceptible or no change in the view as there is little or no loss of / or change to the elements, features or characteristics of the landscape.</p> <p>The existing landscape quality is maintained but be slightly at odds to the scale, landform and pattern of the landscape.</p>

(Landscape Institute and Institute for Environmental Management and Assessment, 2002)

2.3.8 Visual Impact

Visual impacts arise from changes in available views of the landscape that occur as a result of the project. Visual impact is determined through the subjective assessment of sensitivity of the visual receptors (i.e. residents, outdoor recreational users) and the magnitude (scale) of the change in view. Sensitivity is dependent upon receptors': location; the importance of their view; their activity (i.e. working, recreational, traveling through), expectations; available view; and the extent of screening of this view.

Factors that have been considered in assessing the response of receptors to changes in the visual amenity include:

- ▶ Interest in the visual environment and their distance/angle of view to the source of the impact;
- ▶ The extent of screening / filtering of the view;
- ▶ Magnitude of change in the view (i.e. loss/addition of features that change the view's composition);
- ▶ Integration of changes within the existing view (form, mass, height, colour and texture);
- ▶ Duration of the effect (temporary/ permanent, intermittent/ continuous); and
- ▶ Effectiveness of the proposed mitigation.

Receptor sensitivity levels that have been used in this assessment are outlined in **Table 2-2**.

Table 2-2 Visual Receptor Sensitivity

Sensitivity	Examples
High	<ul style="list-style-type: none"> ▶ Occupiers of residential properties with long viewing periods, within close proximity to the proposed development ▶ Users of outdoor recreational area including nature reserves, and nature recreation (walking, horse riding trails, water based activities such as swimming and fishing) where their attention is focussed, in part, on the landscape and its amenity ▶ Communities that place value upon the landscape and enjoyment of views of their landscape setting
Medium	<ul style="list-style-type: none"> ▶ Outdoor workers who have a key focus on their work who may also have intermittent views of the project area ▶ Outdoor recreation users (i.e. sporting activities) where their attention is focussed predominately on the activity being undertaken ▶ Occupiers of residential properties with long viewing periods, at a distance from or screened from the project area
Low	<ul style="list-style-type: none"> ▶ Road users in motor vehicles, trains or on transport routes that are passing through/adjacent to the study area and therefore have short term views ▶ Viewers indoor at their place of work
Negligible	<ul style="list-style-type: none"> ▶ Viewers from locations where there is screening by vegetation or structures where only occasional screened views are available and viewing times are short ▶ Road users in motor vehicles, trains or on transport routes that are passing through/adjacent to the study area and have partially screened views and short viewing times

(Landscape Institute and Institute for Environmental Management and Assessment, 2002)

2.3.9 Significance of Impact

For the purposes of this assessment, predicted impacts as a direct result of the project have been described according to their significance, which is a function of the magnitude of the impact and the sensitivity of the receptor as detailed in Table 2-3 below. Only impacts considered to be of Major Significance or of High Significance are considered as significant for the purposes of this assessment.

Table 2-3 Assessment of Significance of Impacts

		Landscape Impact			
		Large	Moderate	Small	Negligible
Visual Sensitivity	High	Major Significance	High Significance	Moderate Significance	Minor Significance
	Medium	High Significance	Moderate Significance	Minor Significance	Not Significant
	Low	Moderate Significance	Minor Significance	Not Significant	Not Significant
	Negligible	Minor Significance	Not Significant	Not Significant	Not Significant

(Landscape Institute and Institute for Environmental Management and Assessment, 2002)

2.3.10 Limitations of the VIA

There are the following limitations associated with this assessment:

- ▶ There is no guidance on the assessment of landscape and visual impacts specific to Australia. Therefore the *Guidance for Landscape and Visual Impact Assessment* prepared by the United Kingdom Landscape Institute, the Tasmanian Forest Practice Board's Manual for *Forest Landscape Management*, and the United States Forest Service *National Forest Landscape Management Agriculture Handbook*. and the has been as a basis for the methodology for this assessment.
- ▶ The VIA process aims to be objective and describe any changes factually. Potential impacts as a result of the project have been defined, however, the significance of these changes requires qualitative (subjective) judgements to be made. The conclusion to this assessment therefore combines objective measurement and subjective professional interpretation. This assessment has attempted to be objective, however it is recognised that visual assessment can be highly subjective and individuals are likely to associate different visual experiences to the study area.

3. Existing Environmental Values

3.1 Introduction

This section provides an overview of the existing landform, land uses and vegetation of the Townsville region and in particular in the vicinity of the project site. These features all contribute to the landscape and visual character of the area.

3.2 Landscape Character

3.2.5 Landform

The Townsville area is characterised by a low-lying coastal landform bounded by Cleveland Bay and the Paluma and Hervey mountain ranges (Queensland Government, 2007). Castle Hill and Mt Stuart are key landform elements within the wider landscape rising above the urban areas of the city.

Magnetic Island located off the coast of Townsville, has steep landform with numerous bays and inlets, and provides a visual backdrop to the east of the city.



Castle Hill is a dominant landscape feature in Townsville, being visible from most urban locations



Mt Stuart located on the south-west edge of Townsville is another dominant landscape feature and provides a visual backdrop to the city

3.2.6 Land Use and Statutory Requirements

Townsville is a major regional Queensland centre providing a range of services and facilities to the city and surrounding communities. The project site is located within the Port of Townsville which incorporates large scale industrial development, port facilities, and areas undergoing reclamation. The site is also located within close proximity to the South Townsville residential area and the commercial and residential development in the city centre area. The area on the eastern bank of Ross River is largely an undeveloped inter-tidal coastal area.

3.2.7 Townsville – Thuringowa Strategy Plan

The 2007 Townsville – Thuringowa Strategy Plan is the framework for managing growth and development in the region and while it is not a statutory document it provides a guiding framework for population growth. This plan states that “the region’s dominant features including its mountainous and hilly areas, coastline, rivers and creeks combine to present a strong physical image. The landscape and seascape values should be protected for the long-term benefit and enjoyment of the region and its visitors”.

The Townsville Port area is identified as Major Industry while the area on the eastern bank of Ross River is identified as Critical Conservation Area outside Reserves, and Special Uses.

3.2.8 State Coastal Management Plan

No regional coast plan has been developed for this area therefore for this site the provisions of the State Coastal Management Plan have been assessed in relation to landscape value. The plan incorporates three principles relating to coastal landscapes:

- ▶ The values of coastal landscapes are conserved and recognised for their importance to the quality of life of both residents and visitors, as well as to the economic development and growth of Queensland;
- ▶ The dominance of the natural character of the coast (excluding developed urban areas) is retained, including elements of landscape and vegetation; and
- ▶ The cultural and spiritual values of coastal landscapes are recognised and conserved through the involvement of the relevant Indigenous Traditional Owner communities.

3.2.9 Townsville Port Authority Statement of Proposal 2006

Townsville Port Authority Statement of Proposal 2006 identifies the following features within Port limits which are considered to have high scenic value:

- ▶ Port of Townsville port facilities including active berths;
- ▶ Ross River (sandy beaches, boat ramps and recreational fishing areas);
- ▶ Ross Creek;
- ▶ Tracts of vegetation along the coast;
- ▶ The Strand;
- ▶ Magnetic Island coastline;
- ▶ Townsville Maritime Museum;
- ▶ Port Environmental Park; and
- ▶ Cape Cleveland Coastline.

Port facilities and operations at the Port of Townsville are visible from many points in Townsville, including Castle Hill, Townsville City and built structures.

3.2.10 Vegetation

Three State bioregions meet in the Townsville region, the Brigalow Belt North, the Einasleigh Uplands, and the Wet Tropics. This is representative of the diversity in the natural characteristics, such as landform and vegetation, of the region.

The Townsville – Thuringowa Strategy Plan identifies that the main vegetation type in the region is Eucalypt dominated savannah woodland and grasslands. However, the region also includes significant examples of other vegetation communities such as beach ridge vine thickets, riparian forests along creeks and rivers, mangrove forests in estuarine areas, and samphire communities associated with salt pans (Queensland Government, 2007).

On the eastern bank of Ross River, mangroves dominate while the area between the mangroves and the areas above the tidal influence contains saline mudflat including salt couch (*Sporobolus virginicus*). The most abundant vegetation community in the vicinity of the site is located above the tidal reach and includes sclerophyll woodland dominated by Moreton Bay ash (*Corymbia tessellaris*) or grey paperbark (*Melaleuca dealbata*) (primarily in the swales).

Of the project site on the western bank of the river there is approximately 1.5 hectares of vegetation characterised by a low shrub layer dominated by grey mangrove and club mangrove (*Aegialitis annulata*) and a ground layer of predominately typical saline system plants.

3.3 Visual Catchment

The topography in the vicinity of the site limits the viewpoints from which the site will be visible, thereby limiting the visual exposure of the project. The identification of the visual catchment of the project provides an assessment tool used to define the area from which the project may be visible. Site assessment further defines the location from which the project site is visible within the identified visual catchment and the viewpoints from which detailed assessment will be undertaken.

The visual catchment for the proposed port works extends over the ridges and high points of the city and incorporates both residential and commercial development, recreation areas and lookouts. The topography of the region means that areas distant from the site, such as Mt Stuart, are part of the visual catchment. While these areas are within the visual catchment, due to the distance from the project area they are not considered to be viewpoints.

The visual catchment for the project includes:

- ▶ South West to Mount Stuart;
- ▶ Castle Hill to the north;
- ▶ Residential areas to the north and west; and
- ▶ Cleveland Bay and Ross River.

The extent of the visual catchment of the project is shown on Figure 3-1.



Label
1 Castle Hill
2 Townsville City Residential East
3 Townsville City Residential and Commercial West
4a Benwell Road
4b Archer Street
5 Ross River and Cleveland Bay

LEGEND

- View Points and View Direction
- View Catchment
- Proposed Marine Precinct
- Proposed Breakwater

1:30,000 (at A4)

Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid of Australia, Zone 55

Port of Townsville
Marine Precinct EIS

Visual catchment
and viewpoints

Job Number | 42-15399
Revision | A
Date | 23 March 2009

Figure 3-1

G:\4215399\GIS\Projects\42-15399_905_rev_a.mxd 2 / 100 Goondoon Street Gladstone QLD 4680 Australia T 61 7 4972 6377 F 61 7 4972 6236 E gtlmail@ghd.com.au W www.ghd.com.au
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3.4 Viewpoints and Sensitive Receptors

The visual catchment provides the basis upon which viewpoints and sensitive visual receptors can be identified and further assessment undertaken. The viewpoints are areas where full or screened views of the site are possible and there is human activity being undertaken. This activity may include residential, business, recreation. In addition, viewpoints also include areas where the only views are transient such as vehicles using a road or views from trains.

The identification of viewpoints for this assessment excluded views from Mount Stuart and the surrounding area due to the separation distance from the site and therefore the background nature of the view.

The viewpoints that have been identified and assessed in this report are:

- ▶ Castle Hill;
- ▶ Townsville City Residential East;
- ▶ Townsville City Residential and Commercial West;
- ▶ Boundary Street, Archer Street and Benwell Road; and
- ▶ Ross River and Cleveland Bay.

The viewpoints are shown on Figure 3-1.

3.4.5 Viewpoint 1 –Castle Hill

Castle Hill is a dominant landscape feature of Townsville rising above the city centre and surrounding suburbs. This location is frequently visited by both residents and visitors and provides extensive views of Townsville, Cleveland Bay, and Magnetic Island. A description of this viewpoint is contained in Table 3-1.

Table 3-1 Viewpoint 1 – Castle Hill

Typical local landscape character




View of the city centre and south east proposed reclamation site from Castle Hill

Landform	Castle Hill is a granite monolith that is located close to the Townsville CBD and the eastern suburbs of the city. The hill rises steeply from the largely flat landform of the city.
Vegetation	The vegetation of Castle Hill is dominated by indigenous species in particular mixed Eucalyptus species. There are small areas of notophyll vine thickets, and grassed slopes with kangaroo grass and girant spear grass. Specialised flora also occur on the cliffs and rocky outcrops (EPA, 2009)
Land Use	Residential and commercial development is located on the lower slopes of the hill with the upper parts used primarily as a lookout with associated facilities, including car parking, lookouts, interpretative material, and walking tracks.
Visual Context	<p>Visually dominant landscape feature providing extensive views of Townville urban area, Cleveland Bay and Magnetic Island. Views from this location are experienced by:</p> <ul style="list-style-type: none"> ▶ Visitors ▶ Recreation users accessing the walking tracks and road for recreation activities ▶ Road uses

3.4.6 Viewpoint 2 – Townsville City Residential East

This residential area located in the north-east suburbs of the city provides elevated house site and the opportunities for views of the surrounding urban development and over Cleveland Bay to Magnetic Island. This is predominately an area of single detached houses. This viewpoint is described in Table 3-2.

Table 3-2 Viewpoint 2 – Townsville City Residential East

Typical local landscape character	
View towards the site from an elevated residential area in the eastern part of the Townsville	
Landform	These residential areas rise to an elevation of approximately 55 m AHD providing views of the surrounding built and natural environment.
Vegetation	Urban landscape and residential planting
Land Use	Primarily residential development comprised of detached housing
Visual Context	<p>This location provides one of the few elevated residential locations in Townsville, therefore providing residents with views of the surrounding urban environment and of Cleveland Bay and Magnetic Island.</p> <p>The mature vegetation and buildings in this location provides screening of some views and limits outlooks from some locations within this area.</p> <p>Views from this location are experienced by:</p> <ul style="list-style-type: none"> ▶ Residential properties with both screened and unscreened views. These residents have long viewing periods ▶ Road uses travelling through the area

3.4.7 Viewpoint 3 – Townsville City Residential and Commercial West

The development that has occurred on the southern slopes of Castle Hill, including both residential development and commercial development associated with the city centre has views that encompass the

southern and eastern suburbs of Townsville. The characteristics of this viewpoint are detailed in Table 3-3.

Table 3-3 Viewpoint 3 – Townsville City Residential and Commercial West

Typical local landscape character



Residential and commercial development located on the south-east slopes of Castle Hill. Views from this viewpoint are generally to the south-east.

Landform	Sloping land that forms the lower slopes of Castle Hill.
Vegetation	Urban landscape and residential planting
Land Use	Residential and commercial land uses
Visual Context	<p>The commercial and residential development located within this viewpoint. Due to the landform the views from this location are focused to the south-east. The mature vegetation and buildings in this location provides screening of some views and limits outlooks from some locations within this area.</p> <p>Views from this location are experienced by:</p> <ul style="list-style-type: none"> ▶ Residential properties with both screened and unscreened views ▶ Activity focused workers in commercial buildings ▶ Road users visiting or passing through the area

3.4.8 Viewpoint 4 – Boundary Street, Archer Street and Benwell Road

This South Townsville location is immediately adjacent to the reclamation area. The roads in this location provide access to industrial development with the main Townsville Port access on Benwell Road. This area is described in Table 3-4.

Table 3-4 Viewpoint 4 – Boundary Street, Archer Street and Benwell Road

Typical local landscape character



Existing Ross River foreshore and Benwell Road



View of Ross River and reclamation site from Archer Street (intersection with Benwell Road)


Landform	The landform at this viewpoint is largely flat with some small rises in elevation.
Vegetation	Urban and industrial landscaping, and intertidal vegetation including mangroves

Land Use	The area is comprised of industrial development and vacant industrial land. The industrial development includes activities in large buildings and storage tanks.
Visual Context	<p>The landform of this viewpoint is flat with the visual outlook dominated by the existing industrial development and the waterfront fringing vegetation.</p> <p>Views from this location are experienced by:</p> <ul style="list-style-type: none"> ▶ Activity focused workers on industrial sites; and ▶ Local road users accessing the port and other industrial developments and visiting the foreshore

3.4.9 Viewpoint 5 – Ross River and Cleveland Bay

Ross River and Cleveland Bay near the mouth of the river provide water access and water based recreation use for commercial craft, recreation boats and other water based activities. Water craft travelling through this area have extensive views of the site and the surrounding built and natural environment. The characteristics of this viewpoint are described in Table 3-5.

Table 3-5 Viewpoint 5 – Ross River and Cleveland Bay

Typical local landscape character	 <p>View of reclamation site from Cleveland Bay at the entrance to Ross River. Castle Hill is the dominant landscape feature from this location.</p>
Landform	The land immediately surrounding the entrance to the Ross River and this part of Cleveland Bay is generally low-lying with Castle Hill being the only significant landscape feature when viewing to the north and north-west.
Vegetation	The vegetation of this view point is characterised by mangroves and saline mudflats
Land Use	The land uses in the vicinity of this viewpoint are characterised by large industrial development and low-lying undeveloped foreshore areas.
Visual Context	<p>The site is located at the entrance to the Ross River with this viewpoint providing the closest views of the bunds and reclamation works. The existing port reclamation area is visible from this location with the existing fringing mangroves providing a narrow vegetated strip along the western bank of the river. The view from this location to the north and north-west is dominated by Castle Hill while Mt Stuart provides the background view to the south-west.</p> <p>Views from this viewpoint are experienced by:</p>

-
- ▶ Water based recreation users including people fishing and using recreational water craft
 - ▶ Commercial water based users largely activity focused
-

4. Assessment of Visual Impacts

4.1 Introduction

The potential visual impacts have been considered in the context of the sensitivity of the surrounding visual environment and the potential for viewing of the areas that have had changes to their visual outlook due to site works.

4.2 Construction Stage

4.2.5 Construction Works

The construction stage of the project will be undertaken in as pre-construction activities and 3 stages:

- ▶ Pre-construction activities
 - removal of sediments in the reclamation area prior to reclamation to assist in establishing the site for the construction facilities
 - Temporary works including the upgrade, relocation, realignment of roads and other infrastructure
- ▶ Stage 1
 - Construction of up to 50 trawler/commercial berths
 - barge berthing with vehicular ramp access
 - provisioning and refuelling facilities
 - temporary travel lifts of 75t and 200t capacity and the associated vessel servicing hardstand area of approximately 1 hectare on lands already reclaimed by the Port of Townsville
- ▶ Stage 2
 - reclamation of approximately 12 hectares of land to cater for further marine industries surrounding a 7 hectare inner harbour and the progressive development of vessel maintenance & industrial buildings and inwater work berths. It is anticipated that the reclamation area will be constructed using the dredge spoil from the construction of the breakwater and navigational channel for the Project. Where greater amounts of fill are required they will be sourced from a licensed contractor. Quarry material required for the breakwater and the reclamation will be transported to site by trucks.
 - development method being by way of a 'cut-to-fill' balance to eliminate the need for exported fill, but this may be required if dredged material is unsuitable for reclamation works
 - undertaken over a 10 year timeframe
- ▶ Stage 3
 - Further reclamation work beyond the area developed in Stages 1 and 2. The extent of this work will depend upon market demand and utilisation rates of existing developed areas.

The proposed structures to be built as part of the project include:

- ▶ an inner harbour basin;
- ▶ a stage 1 trawler basin;

- ▶ an inner rock revetment wall for the harbour basin;
- ▶ an inner berthing configuration;
- ▶ a navigation channel;
- ▶ an outer rock revetment wall for Precinct;
- ▶ stage 3 land reclamation with no harbour configuration;
- ▶ moorings, work berths, and other structures;
- ▶ a swing basin 150m outside of inner harbour located offshore of sand spit protected by breakwater;
- ▶ ship lift 350t; and
- ▶ a breakwater.

4.2.6 Impacts during Construction Stage

The visual impacts that will occur during the construction stage include:

- ▶ Construction of the breakwater resulting in a new linear element in the visual landscape;
- ▶ Creation of the new land area through the reclamation process. This will incorporate heavy machinery with the possibility of dust during the construction state. The full extent of these activities will be clearly visible from some viewpoints;
- ▶ Construction and security lighting. The extent of lighting during construction will result in some increased sky glow in this part of the city; and
- ▶ Building construction and other associated site development works. The extent of visibility of these activities depends on the viewing location.

These impacts are addressed in more detail for each of the viewpoints.

4.3 Operation Stage

4.3.5 Operational Activities

The proposed operational activities to be undertaken on the site include:

- ▶ marine industry land uses including a commercial slipway, barge ramp, ship-lift, docking facility and associated marine facilities. These uses may be accompanied by industrial buildings up to a maximum of 20 metres in height;
- ▶ approximately 40 trawler berths and two trawler maintenance berths;
- ▶ potential relocation of the Volunteer Coastguard office and mooring;
- ▶ potential for private pile moorings; and
- ▶ a public boat ramp and car/trailer parking areas.

Operating times will reflect the existing businesses hours, and some proposed uses will require 24 hour, 7 day a week operation, as required (e.g. police and emergency vessels).

A future access route to the site will be via the Stuart Bypass and proposed Port Access Road. The proposed Port Access Road Corridor will provide a direct transport connection along part of Benwell Road and across Ross River to the State Development Area.

4.3.6 Impacts during Operation Stage

At the completion of construction operations the site will be used for industrial and port related development. Additional activities that will occur as a result of the operation of the port facilities include:

- ▶ Security and night lighting;
- ▶ Increased vehicle movements, including both cars and heavy vehicles;
- ▶ On-going building construction and site development works;
- ▶ Increased possibility of reflection from the large industrial buildings; and
- ▶ Outside storage areas and loading and unloading areas.

These impacts are addressed in more detail for each of the viewpoints.

4.4 Visual Impact and Viewpoints

The visual impact on the viewpoints have been assessed both the construction and operational phases of the project. These impacts are addressed in the following sections.

4.4.5 Viewpoint 1 – Castle Hill

Table 4-1 Viewpoint 1 – Castle Hill

Project Elements	Construction
	<ul style="list-style-type: none"> ▶ All construction operations will be visible from the Castle Hill lookout that provide views to the south-east
	<p>Operation</p> <ul style="list-style-type: none"> ▶ All buildings and other structures on the site ▶ Vessels and port related activities ▶ Most outdoor industrial and storage related activities

Visualisation



Existing view of the project area from Castle Hill



Visualisation of the view from Castle Hill incorporating the land reclamation area and constructed buildings. The major components of the project will be clearly visible from this location.



Location of viewpoint and direction of view

Landscape Impact
Construction and
Operation

The reclamation area will be a prominent landscape feature when viewed from Castle Hill. The proximity of this viewpoint to the site (approximately 3.5 km) along with the addition of the new linear elements in the reclamation area and breakwater will have an impact on the landscape amenity.

The project will result in the following changes to the landscape character from this viewpoint:

- ▶ Introduction of an additional linear element into the landscape particularly when viewed in association with the existing port facility;
- ▶ Creation of a new constructed landscape feature in the breakwater. This element will be situated in a position where the background is largely natural adding to the landscape impact;
- ▶ Creation of additional features that will alter the appearance of the entrance to the Ross River. This will reduce the naturalness of the current landscape in this location and create an area having an engineered appearance;
- ▶ Introduction of additional industrial elements into the landscape decreasing the degree of naturalness when viewing to the south-east from this location.

The landscape character visible from this view point will also be impacted on the proposed construction of the road and rail crossing of Ross Creek adjacent to the reclamation area. While the bridge is not part of this project, this new constructed feature of the visual landscape will visually be closely linked with the port development and will add to the perceived loss of naturalness of the landscape from this viewpoint. The bridge has been added to the above visualisation to enable a full understanding of the cumulative impact of the works proposed to occur in this area.

It is assessed that the project will have a **moderate adverse landscape impact** from this viewpoint.

Visual Impact
Construction and
Operation

The view from this location will be experienced by visitors to Castle Hill. This view point has a high level of visual impact due to the extensive views offered from this location. As it is a landscape feature and a popular attraction for both visitors and residents the visual impact will be experienced by a large number of people. Viewing times vary depending on the nature of the activity, but would largely be of short duration

The project will result in some changes to the visual outlook during both construction and operation.

Visual impacts during construction include:

- ▶ Gradual loss of naturalness of the landscape in this area with the creation of the breakwater and associated dredging and reclamation activities;
- ▶ Construction lighting; and
- ▶ Increase in the activity occurring in this location with the operation of large machinery and the construction work site operations.

Visual impacts during operation include:

- ▶ Introduction of new linear elements, in the reclamation area and the breakwater that provide a new edge to the Ross River and extend into the mangrove and inter-tidal area on the western side of the river;
-

-
- ▶ Visual extension of the South Townsville industrial development with the appearance of this development extending into Cleveland Bay;
 - ▶ Security and other operational lighting; and
 - ▶ Creation of a new development edge to the city in this location.

The change in view will be experienced by:

- ▶ Visitors to Castle Hill at lookout points that have views to the south-east will have unscreened views of both the construction operations and the future use of the site for port and industrial uses;
- ▶ Residents undertaking recreation and fitness activities on the parts of Castle Hill with views to the south-east will also experience unscreened views as well as some vegetation screened views of all the construction and operation activities on the site; and
- ▶ Road users travelling to and from the top of Castle Hill will have views to the construction site. These views are of short duration due to the transient nature of the viewing opportunity.

It is assessed that the project will have a **medium adverse visual impact** from this viewpoint.

Significance of
Visual Impact

Moderate Significance

4.4.6 Viewpoint 2 – Townsville City Residential East

Table 4-2 Viewpoint 2 – Townsville City Residential East

Project Elements

Construction

- ▶ Breakwater and parts of the reclamation area
- ▶ Site equipment, particularly elevated structures such as cranes
- ▶ Construction lighting

Operation

- ▶ Buildings and other structures on the site with the extent of the visibility of the building depending on viewing location and surrounding vegetation. The height of the proposed buildings is such that a large proportion will be screened by foreground buildings
 - ▶ Vessels and elevated port related activities
 - ▶ Operational lighting
-

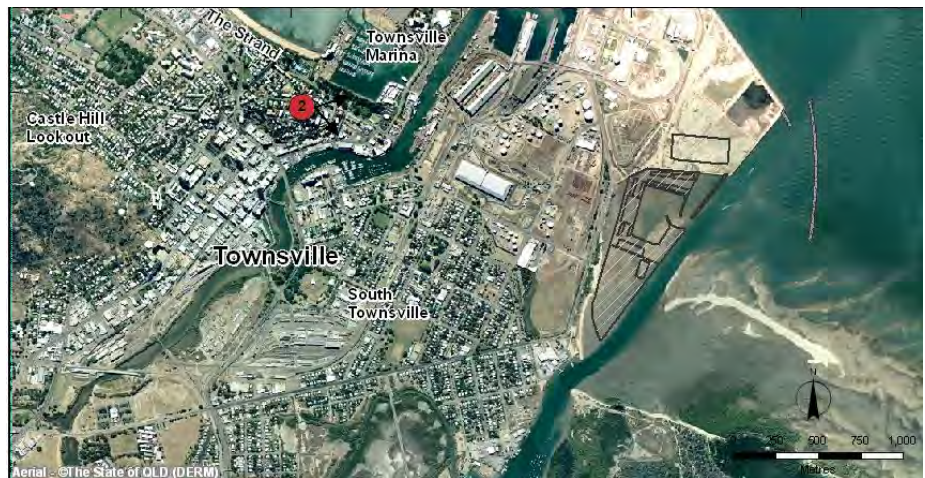
Visualisation



An example of the existing views from this viewpoint



The residential properties in this location will have screened views of the project area as shown from this visualisation. The project location is within the red area with the extent of available view dependant on the specific viewing location, surrounding vegetation and buildings.



Location of viewpoint and direction of view



Landscape Impact Construction and

The residences in this location are elevated above the level of the site with this ranging from about 20-55m AHD providing views from some properties. The proposed construction works will not be a prominent landscape feature

<p>Operation</p>	<p>from the residences in this location as:</p> <ul style="list-style-type: none"> ▶ Screening by vegetation and other buildings limit the view from many of the residential locations; ▶ The site works and completed reclamation area does not incorporate any elevated structures which would be a feature of the landscape when viewed from this location; ▶ The distance from this viewpoint to the site of approximately 2 km places it in the middleground view. Between this viewpoint and the site there is both commercial and industrial development, incorporating both buildings and tanks, which are evident in the landscape from this location; and ▶ Background views, including the distant landscape features are visible from this location and draw the visual interest away from the middleground. <p>It is assessed that the project will have a small adverse landscape impact from this viewpoint.</p>
<p>Visual Impact Construction and Operation</p>	<p>The view from this location is experienced by some residents and visitors to the area. Residents with screened or unscreened views are sensitive receptors that have long viewing periods and therefore a higher sensitivity to the visual environment. The project will result in some changes to the visual outlook during both construction and operation.</p> <p>Visual impacts during construction include:</p> <ul style="list-style-type: none"> ▶ Increased visible activity through machinery (particularly tall equipment); ▶ Breakwater construction and the increase in vessels at the entrance to the Ross River; and ▶ Additional lighting. <p>Visual impacts during operation include:</p> <ul style="list-style-type: none"> ▶ Additional buildings in the landscape that provide a visual extension to the industrial nature of this view although the extent of visibility of the buildings is dependent on viewing location and the foreground buildings and structures; ▶ Reduction in the view of Cleveland Bay due to extension of the land area through reclamation and the buildings and other activities on the site; and ▶ Increased lighting. <p>The change in view will be experienced by:</p> <ul style="list-style-type: none"> ▶ The residents located at elevation with either partially screened or unscreened views will have views of completed buildings located and other structures located on the site. The views of reclamation and site will works will be limited due to level at which these works will be undertaken. ▶ Road users travelling in a southerly direction will have some views of both construction operations and completed site development. The extent of these views and the impact depend on location and extent of visual screening offered by building and vegetation. <p>For this viewpoint is therefore assessed as having low visual sensitivity</p>
<p>Significance of Visual Impact</p>	<p>Not Significant</p>

4.4.7 Viewpoint 3 – Townsville City Residential and Commercial West

Table 4-3 Viewpoint 3 – Townsville City Residential and Commercial West

Project Elements	<p>Construction</p> <ul style="list-style-type: none"> ▶ Breakwater and parts of the reclamation area ▶ Site equipment, particularly elevated structures such as cranes ▶ Construction lighting <p>Operation</p> <ul style="list-style-type: none"> ▶ Buildings and other structures on the site with the extent of the view of increasing with height of the building from which it is viewed ▶ Vessels and elevated port related activities ▶ Operational lighting
Visualisation	 <p>Visualisation of the view from the city residential and commercial development. The project location is within the red area with the extent of available view dependant on the specific viewing location, surrounding vegetation and buildings.</p>  <p>Location of viewpoint and direction of view</p>
Landscape Impact Construction and	The residences and commercial buildings in this location are elevated above the level of the site up to approximately 60m AHD providing views to the

<p>Operation</p>	<p>south-east from some of the properties. The distance from this viewpoint to the site is approximately 2 km which places it in the middleground view. Between this viewpoint and the site there is both commercial and industrial development, incorporating both buildings and tanks, which are evident in the landscape from this location. Background views, including the distant landscape features are visible from this location and draw the visual interest away from the middleground.</p> <p>The landscape impact of the proposed construction and operation works will vary from site to site with this being largely dependant on the viewing elevation and existing vegetation.</p> <p>The proposed development will generally not be a prominent feature in the visual landscape, however the project will cause some change in the landscape character through:</p> <ul style="list-style-type: none"> ▶ Introduction of an additional linear element into the landscape particularly when viewed in association with the existing port facility; ▶ Create a new constructed landscape feature in the breakwater. This element will be situated in a position where the background is largely natural adding to the landscape impact; ▶ Creation of additional features that will alter the appearance of the entrance to the Ross River. This will reduce the naturalness of the current landscape in this location and create an area having an engineered appearance; and ▶ Introduction of additional industrial elements into the landscape decreasing the degree of naturalness when viewing to the south-east from elevated positions in this viewpoint. <p>It is assessed that the project will have a moderate landscape impact from this viewpoint.</p>
<p>Visual Impact Construction and Operation</p>	<p>The view from this location is experienced by some residents and visitors to the area, and workers in commercial buildings. Residents with screened or unscreened views are sensitive receptors that have long viewing periods and therefore a higher sensitivity to the visual environment. Activity focused workers will also have views over the site.</p> <p>The project will result in some changes to the visual outlook during both construction and operation.</p> <p>Visual impacts during construction include:</p> <ul style="list-style-type: none"> ▶ Increased visible activity through machinery (particularly tall equipment) and site construction buildings; ▶ Breakwater construction and the increase in vessels at the entrance to the Ross River; and ▶ Additional lighting. <p>Visual impacts during operation include:</p> <ul style="list-style-type: none"> ▶ Additional buildings in the landscape that provide a visual extension to the industrial nature of this view; ▶ Reduction in the view of Cleveland Bay due to extension of the land area through reclamation and the buildings and other activities on the site; ▶ The buildings constructed on the site will be visible although the extent of visibility will depend on viewing height and the nature of the foreground

structures. The buildings are unlikely to impact on the appearance of the mountains in the background view although it is expected that there will be increased focus on the middleground view with the increased development; and

- ▶ Increased lighting.

The change in view will be experienced by:

- ▶ The residents located at elevation with either partially screened or unscreened views will have views of completed buildings located and other structures located on the site. The views of reclamation and site will works will be limited due to level at which these works will be undertaken;
- ▶ Activity focused workers in commercial buildings; and
- ▶ Road users travelling through the area will have some views of both construction operations and completed site development. The extent of these views depend on location and extent of visual screening offered by building and vegetation and are only experienced for very short duration due to the transient nature of the viewing opportunity.

For this viewpoint is therefore assessed as having **medium visual sensitivity**

Significance of Visual Impact

Moderate Significance

4.4.8 Viewpoint 4 – Boundary Street, Archer Street and Benwell Road

Table 4-4 Viewpoint 4 – Boundary Street, Archer Street and Benwell Road

Project Elements

Construction

- ▶ Most of the construction operations

Operation

- ▶ All buildings and other structures on the site
- ▶ Vessels and port related activities
- ▶ Most outdoor industrial and storage related activities

Visualisation



Existing Ross River foreshore and Benwell Road



Visualisation of the site from near the intersection of Benwell Road – The land reclamation and buildings will be clearly visible from this location. There will also be loss of the existing vegetation adjacent to the water.





Location of viewpoint and direction of view

<p>Landscape Impact Construction and Operation</p>	<p>During both construction and operation the project will have a permanent impact on the visual landscape from this viewpoint. This impact needs to be assessed in the context of the existing landscape of the viewpoint. The existing and approved industrial and port related development of which these roads form part of which is changing the nature of the landscape and visual environment.</p> <p>It is assessed that the project will have a large adverse landscape impact from this viewpoint.</p>
<p>Visual Impact Construction and Operation</p>	<p>The project will result in permanent changes to the visual outlook during both construction and operation.</p> <p>Visual impacts during construction include:</p> <ul style="list-style-type: none"> ▶ Gradual loss of naturalness of the landscape in this area with the creation of the breakwater and associated dredging and reclamation activities; ▶ Construction lighting; and ▶ Increase in the activity occurring in this location with the operation of large machinery and the construction work site operations. <p>Visual impacts during operation include:</p> <ul style="list-style-type: none"> ▶ Introduction of new linear elements, in the reclamation area and the breakwater that provide a new edge to the Ross River and extend into the mangrove and inter-tidal area on the western side of the river; ▶ The construction of new buildings on the reclaimed site will permanently alter the outlook from this viewpoint and block some of the views that are currently available of the water and background mountains; ▶ Security and other operational lighting; and ▶ Creation of a new development edge to the city in this location. <p>The landscape character visible from this view point will also be impacted on the proposed construction of the road and rail crossing of Ross Creek adjacent to the reclamation area. While the bridge is not part of this project, this new constructed feature of the visual landscape will visually be closely linked with the port development and will add to the perceived loss of naturalness of the landscape from this viewpoint. The bridge has been added to the above visualisation to enable a full understanding of the cumulative impact of the works proposed to occur in this area.</p> <p>For this project this viewpoint is therefore assessed as having medium visual sensitivity.</p>
<p>Significance of Visual Impact</p>	<p>High Significance</p>

4.4.9 Viewpoint 5 – Ross River and Cleveland Bay

Table 4-5 Viewpoint 5 – Ross River and Cleveland Bay

Project Elements	<p>Construction</p> <ul style="list-style-type: none">▶ All construction activities occurring seaward of the existing western foreshore of the Ross River▶ Storage and land based construction related activities, in particular, activities that higher than the foreshore vegetation <p>Operation</p> <ul style="list-style-type: none">▶ Breakwater▶ Dredging▶ Land reclamation area, industrial and port activities and buildings located on the site
Visualisation	 <p>Existing view of the site from Cleveland Bay</p>  <p>Visualisation of the view of the site from Cleveland Bay – building bulk and scale is in context with the adjacent industrial and port development</p>



Location of viewpoint and direction of view

Landscape Impact
Construction and
Operation

During both construction and operation the project will have a permanent impact on the visual landscape from this viewpoint. This impact needs to be assessed in the context of the existing landscape of the viewpoint. The existing and approved industrial and port related development of which these roads form part of which is changing the nature of the landscape and visual environment.

Castle Hill is a significant landscape feature from this viewpoint and will continue to be the dominant visual element in the landscape.

It is assessed that the project will have a **moderate adverse landscape impact** from this viewpoint.

Visual Impact
Construction and
Operation

The visual environment from this viewpoint will be impacted on both during construction and operation stages. The change in the view will be experienced by water based recreation users including people fishing and using recreational water craft and commercial water based users and will be a permanent visual change.

The middleground views to Castle Hill will still be available, but the foreground view from water level will be modified with the introduction of the breakwater, the new landform and industrial and port related development. Views to the east and south will not be substantially different during construction or at the completion of the works when vessels are located outside the breakwater.

As this project represents an extension of the existing port facility there are existing impacts on the visual amenity of this location due to land reclamation activities and the construction of industrial development. When viewed from water level there will be a visual intensification of these uses and an increase in the night lighting.

The project will result in some changes to the visual outlook during both construction and operation.

Visual impacts during construction include:

- ▶ Gradual loss of naturalness of the landscape in this area with the creation of the breakwater and associated dredging and reclamation activities;
- ▶ Construction lighting; and
- ▶ Increase in the activity occurring in this location with the operation of large

machinery and the construction work site operations.

Visual impacts during operation include:

- ▶ Introduction of new linear elements, in the reclamation area and the breakwater that provide a new edge to the Ross River and extend into the mangrove and inter-tidal area on the western side of the river;
- ▶ Security and other operational lighting; and
- ▶ Creation of a new development edge to the city in this location.

The landscape character visible from this view point will also be impacted on the proposed construction of the road and rail crossing of Ross Creek adjacent to the reclamation area. While the bridge is not part of this project, this new constructed feature of the visual landscape will visually be closely linked with the port development and will add to the perceived loss of naturalness of the view from this location. The bridge has been added to the above visualisation to enable a full understanding of the cumulative impact of the works proposed to occur in this area.

For the project this viewpoint is therefore assessed as having **medium visual sensitivity**.

Significance of
Visual Impact

Moderate Significance

5. Cumulative and Residual Impacts

5.1 Cumulative Impacts

The project site is located within an area that has existing industrial development including both port and land based activities. While individual developments may have a minimal impact on the visual landscape the cumulative impact is a continuing industrialisation of the visual environment of this area. This is particularly the case with the land reclamation which will create additional land beyond which is currently available or has been intended for industrial development.

In addition to the changes proposed as part of this development the visual landscape in the vicinity of the site will also be impacted on by the proposed construction of the road and rail crossing of Ross Creek. This new constructed feature of the visual landscape will visually be closely linked with the port development and will add to the perceived loss of naturalness of this area.

While the ongoing industrial and port development diminishes the naturalness of the visual outlook in this sector of the visual landscape, this development also provides a unique landscape which combines the background of the mountains with the inter-tidal zone of Cleveland Bay and the Ross River.

5.2 Residual Impacts

5.2.5 Construction

It is not anticipated that there will be any residual landscape or visual impacts arising from the construction phase of the project.

5.2.6 Operation

Some impacts resulting from the project are unavoidable and cannot be mitigated for during operation. The project will alter the surrounding landscape and the visual experience of the visual receptors. However, these changes must be seen within the context of the existing local environment.

Foremost amongst residual visual impacts is the creation of a new land area within Ross River adding to the existing port facilities, and the creation of the breakwater facilities. In addition the construction of industrial and port related development will increase the extent of this type of use in the visual landscape. As industrial and port development is located immediately adjacent to the site it is not considered to be a new element in the visual outlook.

The change in view will be permanent from all viewpoints with increased prominence when viewed from viewpoints 1, 4 and 5 as these either provide extensive uninterrupted outlooks over the site, or are located within close proximity and therefore not visually or physically separated from the impacts.

Site wide, in terms of the assessment criteria this equates to a moderate adverse residual landscape impact, with medium visual sensitivity due to proximity of the receptors to the site. Therefore, the assessment of significance of residual impacts is considered to be of moderate significance.

6. Mitigation Measures

6.1 Introduction

The intent of this section of the VIA is to identify mitigation measures that will reduce and/or manage adverse visual impacts of construction and operation on landscape and visual amenity.

6.2 Construction Phase

The project would aim to achieve construction without causing undue visual disruption to existing receptors. The following mitigation measures are recommended for this project:

- ▶ Avoid loss or damage to landscape features. Where possible, protect trees prior to construction and/or trim vegetation to avoid total removal. This includes vegetation that makes a significant and positive contribution to landscape character and/or has significant value in terms of biodiversity;
- ▶ Temporary hoardings, barriers, traffic management and signage to be removed when no longer required;
- ▶ Materials and machinery to be stored tidily during the works;
- ▶ Lighting of work sites is restricted to approved working hours and those which are necessary for security;
- ▶ Roads providing access to the site and work areas to be maintained free of dust and mud as far as reasonably practicable, and dust management techniques to be used; and
- ▶ Use of appropriate soil erosion prevention techniques.

6.3 Operation Phase

Mitigation of landscape and visual impacts as a result of the project seeks to achieve a balance between the site design and use requirements and achieving an optimal visual outcome. The mitigation strategy for the project is to minimise the detrimental effects on the landscape and visual character. Operation phase mitigation measures are:

- ▶ Building and structure design should respond to the surrounding environment with consideration to viewpoints through consideration of:
 - Building form and style;
 - Finish, including use of less reflective materials, appropriate colours, textures, and roofing; and
 - Building bulk and location.
- ▶ Establishment of landscaping works as soon as possible after the completion of construction operations, or if appropriate, during the construction stage;
- ▶ Mitigation of pollution from lighting through:
 - Appropriate lighting design to ensure the site is not over-lit;
 - Use of specifically design lighting that minimises the spread of light and glare towards visual receptors;
 - Specify appropriate luminaries to reduce light spill, sky glow and glare;

- Consider the potential for solar power for lighting; and
- Sensitive placement and specification of lighting to minimise any potential increase in light pollution within the natural environment.

7. Conclusion and Summary of Impacts

Landscape and visual impacts of the project both during construction and when the site is available for industrial and port related development are assessed as being of moderate adverse significance. Due to the nature of the project there will be a permanent impact on the visual landscape and amenity of the area, particularly when viewed from the identified view points.

The construction effects of the project on landscape and visual amenity will be moderate due to the nature of the proposed works, the proximity of the site to residential areas and Castle Hill which provides extensive views over this location. The assessment of a moderate impact on the landscape and visual amenity, and not higher considers the natural of the surrounding industrial development in this location, the duration of viewing opportunities, and the nature of the proposed works.

The management of the construction process through the site EMP and the requirements of the environmental approval will help ensure that any adverse impacts resulting from the construction of the project on landscape and visual amenity are minimised or mitigated.

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