

GLADSTONE – FITZROY **PIPELINE PROJECT** Environmental Impact Statement

Landscape and Visual
Impact Assessment



Gladstone Area
Water Board



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This information has been prepared by, or on behalf of, the Gladstone Area Water Board (GAWB) regarding the Gladstone-Fitzroy Pipeline project. Care has been taken to ensure that the information is accurate and up to date at the time of publishing.





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17. Landscape and Visual Impact Assessment

17.1 Introduction

The purpose of this chapter is to assess the potential landscape and visual effects associated with the proposed Gladstone–Fitzroy Pipeline (the project).

This chapter addresses some of the requirements of the Terms of Reference (ToR) for the project. Items within the ToR specifically relating to landscape and visual amenity and addressed within this chapter are:

- Discussion of significant features of the landscape, including topographical features
- A description of any special landscape values of any natural vegetation communities
- A description of the environmental values of any nature conservation areas that may be impacted in terms of conservation of resources and integrity of landscapes and places including wilderness and similar natural places
- Discussion within the context of major topographic features and any measures taken to avoid or minimise impact to such (if required)
- Objectives for re-contouring and *landscaping*, including consideration for the use of Threatened plant species during any landscaping and re-vegetation
- Discussion of potential impacts to scenic amenity
- Provision for the protection and reasonable restoration of the visual amenity of the locale prior to the pipeline implementation, should the pipeline or any associated infrastructure be situated above ground.

The chapter is structured to include the following:

- A description of the methodology adopted for the assessment of effects upon landscape and visual amenity
- A description of the assumptions and limitations of this method
- A description of the relevant consultation, legislation, policies and guidelines that have been used to inform the assessment
- An evaluation of the baseline landscape and visual context
- Discussion of visual receptor sensitivity within the project area through the use of representative publicly accessible viewpoints
- An assessment of the significance of effects upon landscape and visual amenity as a direct result of the proposal based upon an evaluation of publicly accessible viewpoints
- Proposed mitigation strategies
- Discussion of residual impacts
- Discussion of cumulative and interactive effects
- A summary of the results of the assessment.

The assessment process aims to be objective and describe the changes factually. Potential changes as a result of the project have been defined however the significance of these changes requires qualitative (subjective) judgements to be made. The conclusions of this assessment therefore combine objective measurement and subjective professional interpretation. As with other chapters in the EIS, the baseline and impact assessment are described for the project area in two sections: Fitzroy to Bajool; and Bajool to Gladstone.

Generally, the pipeline will follow a narrow linear corridor - the right-of-way (ROW) and remain largely underground. Views of the project will be limited to close receptors, and users crossing the pipeline corridor on roads and/or railways. Landscape and visual impacts will be prevalent in a few key areas (intake site, water treatment plant, pump stations and storage facilities) where structures will be above ground and/or vegetation clearance will be required. There are also likely to be temporary visual impacts during construction as a result of storage yards, site facilities and construction works.

The project area for this chapter includes all areas directly within the project footprint and any surrounding lands within the zone of visual influence (ZVI, defined in Section 17.2.1.1).

17.2 Methodology

This section describes the methodology adopted to establish the baseline environment in the project area and then to assess the potential landscape or visual impacts that could result from the project during the construction and operational phases.

17.2.1 Establishment of Baseline

17.2.1.1 Zone of Visual Influence (ZVI)

An indicative ZVI, defined as the area from which the project may be viewed, was initially determined through a desktop study examining aerial photographs and topographic maps where landform and land cover (screening) were considered in tandem.

17.2.1.2 Site Survey

A site survey was undertaken by two landscape planners in order to build consensus and thus limit subjectivity. The site visit was conducted in August 2007 during conditions of good visibility. A further site visit was conducted in June 2008 at the site of the Alton Downs Water Treatment Plant (WTP).

The survey verified the desktop study, and provided more detailed information about the site and likely impacts.

17.2.1.3 Selection of Representative Viewpoints

Representative publicly accessible viewpoints have been identified in a range of locations. These have been recorded, photographed and included in the appraisal of significance. Photographs of viewpoints within Section 17.6 represent a range of typical views possible from that locality to the project (e.g. Viewpoint one from the Rockhampton Waterskiing and Powerboat Club describes views from the water, recreational grounds and jetty). These viewing situations reflect particular landscape and/or visual features of importance within the visual environment. Generally, they represent views from key visual receptors (residents and road users) where potentially significant changes in view may occur.

17.2.1.4 Description of Existing Conditions

The description of existing landscape and visual environment establishes a baseline situation against which the project has been assessed. This has been based upon a desktop study of relevant published documents and site surveys. The principal data sources used are set out in the bibliography, referenced within relevant sections of the text, and include:

- Survey mapping
- Aerial photographs
- Information from local planning authorities
- Site survey, comprising a photographic record of landscape features, key views and receptors
- Observations on the way in which the public realm (open space, roads etc.) is used.

17.2.2 Impact Assessment

A qualitative assessment of landscape and visual impacts has been undertaken. The effect of the proposal has been evaluated on the basis of a combination of two factors that inform the significance of the impact: *visual modification*; and *visual sensitivity*. Their definitions and use in identifying severity of the impacts are outlined in Sections 17.2.2.1 and 17.2.2.2.

17.2.2.1 Visual Modification

Visual modification refers to the extent of change to the landscape and visual amenity that would occur as a direct result of the project from a given viewpoint. Assessment of these changes includes identification of:

- The nature of the change (i.e. degree of contrast, or integration of, any new features with existing features)
- Context and quality of the views including the extent to which the proposals will be visible in the wider landscape (with consideration of the presence of intervening vegetation or features)
- The scale or degree of change i.e. obvious/imperceptible with respect to loss or addition of features
- The nature of the impact (adverse or beneficial).

For the purposes of this assessment the definitions in Table 17.1 are used to describe visual modification.

Table 17.1 Visual Modification Definitions

Visual Modification Level	Definition
Large Reduction or Improvement	A substantial/obvious change to the view due to total loss of, or change to, elements, features or characteristics of the landscape.
Moderate Reduction or Improvement	Discernible changes in the view due to partial loss of, or change to the elements, features or characteristics of the landscape so that alteration to the view is clearly visible.
Small Reduction or Improvement	Minor changes in the view due to minor loss of, or change to the elements, features or characteristics of the landscape. The proposals are either not visible, or the change in the view is not clearly visible.
No Perceivable Reduction or Improvement	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.

17.2.2.2 Visual Sensitivity

Visual sensitivity refers to visual receptors (e.g. residents, users of transport routes) and their sensitivity to their visual environment. Generally, this is dependent upon:

- Receptors' interest in the visual environment (i.e. high, medium or low interest in their everyday visual environment)
- Receptors' duration and viewing opportunity (i.e. prolonged, regular viewing opportunities)
- Number of viewers and their distance from the source of the effect, where relevant.

For the purposes of this assessment, the terminology set out in Table 17.2 has been used to describe visual sensitivity.

Table 17.2 Visual Sensitivity

Sensitivity	Definition
High	Large number of viewers with a passing interest in their surroundings and momentary viewing periods.
Medium	Medium number of viewers with moderate interest in their environment, and/or discontinuous and/or irregular viewing periods. or Small number of viewers with proprietary/high interest in their everyday visual environment and/or with prolonged and regular viewing opportunities.
Low	Small number of viewers with a passing interest in their surroundings and momentary viewing periods.
Neutral	Few viewers with minimal or no interest/awareness in their environment.

17.2.2.3 Impact Assessment

Representative viewpoints are described qualitatively, with the severity of residual impacts (following mitigation) assessed in accordance with the impact significance criteria applied across this EIS but made specific to this Chapter (described in Table 17.3).

Table 17.3 Impact Significance Criteria for Landscape and Visual Assessment

Impact Significance Level	Description
Major Adverse	Large reduction (modification) in the amenity of a view of high visual sensitivity.
High Adverse	Large reduction (modification) in the amenity of a view of medium visual sensitivity.
Moderate Adverse	Moderate reduction (modification) in the amenity of a view of a medium level visual sensitivity. or Large reduction (modification) in the amenity of a view of a low visual sensitivity.
Minor Adverse	Moderate reduction (modification) in the amenity of a view of low sensitivity. or Small reduction (modification) in the amenity of a view of moderate sensitivity.
Negligible	Small reduction (modification) in the amenity of a view of low sensitivity.

17.3 Assumptions and Limitations

This chapter is based upon the following assumptions:

- As the pipeline component of the project would be primarily located underground, most landscape and visual impacts relate to the visual appearance of the construction works that would be phased, temporary, and restricted to the construction period, and would be either direct or indirect. This type of impact would generally be consistent across the site and are therefore assessed on a site-wide basis.
- The impact of the WTP is based on the detailed design for costing prepared in June 2008.
- Some areas along the pipeline route would be required on a temporary basis to provide storage areas (stockpiles and equipment) to support construction.
- The intake, water treatment plant and pump stations will have some security lighting at night.
- During operation, maintenance and repair works will only occur on small sections of the pipeline at any one time, and will occur predominately during daylight hours.
- Design of the infrastructure is ongoing. Assumptions regarding the design of the intake site, water treatment plant, pump stations, storage areas and associated infrastructure are based on the best available information at the time of reporting, and likely outcomes of good design principles.
- The pipeline corridor will be kept free of trees during operation.

There are also a number of limitations associated with the assessment. These include:

- There is no guidance on the assessment of landscape and visual effects specific to Australia. Therefore, United Kingdom (UK) publications have been referenced where relevant for Landscape and Visual Impact Assessment (LVIA).
- This chapter responds directly to the requirements of the ToR specifically relating to landscape and visual amenity and as such utilises relevant sections of UK LVIA assessment guidelines (Landscape Institute 2002).
- The exact method of construction and range of equipment that will be used is still to be determined. Informed assumptions have been made based on the best available information in order to appraise the impact of the construction works upon landscape resources and visual amenity (see Chapter 2, Project Description).

17.4 Relevant Legislation and Policy

This section outlines the legislation and policy relevant to the project.

17.4.1 Queensland Legislation

Coastal Protection and Management Act 1995 (Qld)

The main objectives of the *Coastal Protection and Management Act 1995* are to:

- Provide for the protection, conservation, rehabilitation and management of the coast, including its resources and biological diversity
- Have regard to the goal, core objectives and guiding principles of the National Strategy for Ecologically Sustainable Development in the use of the coastal zone
- Provide, in conjunction with other legislation, a coordinated and integrated management and administrative framework for the ecologically sustainable development of the coastal zone
- Encourage the enhancement of knowledge of coastal resources and the effect of human activities on the coastal zone.

Coastal management is to be achieved by coordinated and integrated planning and decision-making, involving, among other things, the following: Coastal Management Plans; Coastal Management Districts; and through use of other legislation. This project falls within the Curtis Coast Coastal Management District, which under the *Coastal Protection and Management Act 1995* requires special controls and management practices.

State Coastal Plan

The State Coastal Plan (EPA and QPWS 2006) describes how the coastal zone will be managed as required by the *Coastal Protection and Management Act 1995*. The State Coastal Plan provides State-wide direction and guidance through policies for coastal management which are detailed under several topic areas. Of relevance to this chapter are coastal landscapes and conserving nature. The State Coastal Plan provides coastal management policy direction and defines how these directions should be implemented by government, industry and the community.

Development Scheme for the Gladstone State Development Area (GSDA)

The GSDA Development Scheme sets out the objectives and guidelines for future land use in the area as well as establishing procedures for assessment of applications. There is no specific policy within the Scheme that relates to the visual impact of development within the GSDA; however, the policy identifies that there are visual amenity benefits from having a dedicated heavy industry estate as opposed to having industry located at various sites throughout the region.

Development Scheme for the Stanwell – Gladstone Infrastructure Corridor (SGIC) State Development Area

A SGIC Development Scheme sets out the objectives and guidelines for future land use in the area as well as establishing procedures for assessment of applications (see Chapter 1, section 1.9). Among the outcomes that are sought to be achieved, the scheme states that infrastructure should not be visually intrusive. It also states a potential solution is that infrastructure should be located underground, with the exception of limited locations where it is either impractical or operationally necessary for the proper functioning of the infrastructure (for example pump station and balance tank locations) (Policy 1 of the Scheme). In this regard, the project is consistent with the Scheme.

Curtis Coast Regional Coastal Management Plan

The Curtis Coast Regional Coastal Management Plan (EPA and QPWS 2005) (Curtis Coastal Plan) is an area requiring special development controls and management practices (s. 4 and schedule 2) and has been developed under the *Coastal Protection and Management Act 1995*. Implementation of the Curtis Coastal Plan is also a key mechanism for achieving the State Coastal Plan's coastal management outcomes, principles and policies. The plan describes how the coastal zone of the Curtis Coast region is to be managed. Key initiatives within the plan developed in response to the key challenges of relevance to this chapter include: identification and protection of significant scenic coastal landscapes in the region; and identification and protection of habitat for significant species.

Rockhampton City Plan

The Rockhampton City Plan (Rockhampton City Council 2005) is a planning scheme prepared under the *Integrated Planning Act 1997* and aims to advance the purpose of the Act. The Rockhampton City Plan states a number of Desired Environmental Outcomes (DEOs) parts of which are of relevance to this study. DEOs considered within this chapter include: DEO 3 Nature Conservation; DEO 4 Environmental Management; DEO 8 Cultural and Urban Heritage; and DEO 14 Open Space and Recreation.

Fitzroy Shire Council Planning Scheme

The Fitzroy Shire Council Planning Scheme (Fitzroy Shire Council 2005) is a planning scheme prepared under the *Integrated Planning Act 1997* and aims to advance the purpose of the Act. The Planning Scheme states a number of DEOs, parts of which are of relevance to this study. DEOs considered within this chapter include Social Elements and Environmental Elements.

Calliope Shire Council Planning Scheme

The Calliope Shire Council Planning Scheme (Calliope Shire Council 2007) is a planning scheme prepared under the *Integrated Planning Act 1997* and aims to advance the purpose of the Act. This Planning Scheme under Part 3 Desired Environmental Outcomes Division 1 Preliminary states that development should not adversely affect the Shire's natural environment. This desired environmental outcome is to be achieved, amongst other means, via the protection, maintenance and enhancement of a number of items of relevance to this study detailed under: Environment and Conservation; Community Development; and Development Patterns and Infrastructure.

17.4.2 Standards and Guidance

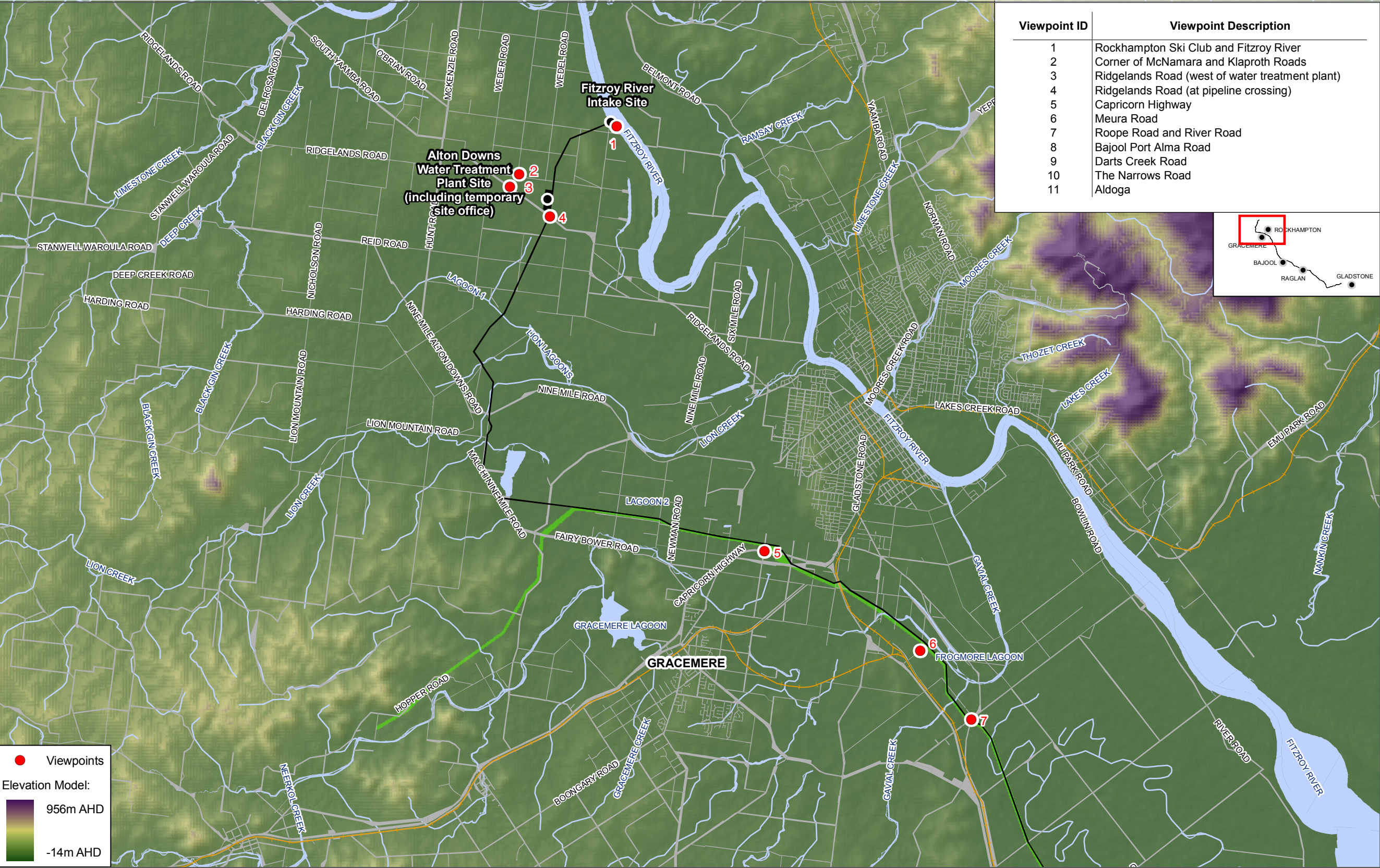
There is no guidance on the assessment of landscape and visual effects specific to Australia. However, the industry typically refers to guidance offered by the British Institute of Landscape Architects in the United Kingdom (UK). This assessment has been conducted in response to the ToR and in accordance to the LVIA published by The Landscape Institute and the Institute for Environmental Management and Assessment in the UK.

17.5 Baseline (Existing Conditions)

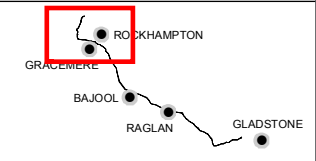
17.5.1 Regional Landscape Character

The project traverses approximately 115 km of landscape between Rockhampton and Gladstone. Creeks dissect the landscape which is primarily rural in character and utilised as an agricultural resource, with a predominance of beef cattle grazing. The topography is generally gently undulating landform of low hills and flat plains, rising to the northeast of the project area to coastal ranges providing a prominent and scenic green backdrop to the project area (see Figure 17.1).

Major urban centres occur at Rockhampton to the north of the project, and Gladstone to the south, with small settlements and individual rural residential properties scattered throughout.



Viewpoint ID	Viewpoint Description
1	Rockhampton Ski Club and Fitzroy River
2	Corner of McNamara and Klaproth Roads
3	Ridgelands Road (west of water treatment plant)
4	Ridgelands Road (at pipeline crossing)
5	Capricorn Highway
6	Meura Road
7	Rooke Road and River Road
8	Bajool Port Alma Road
9	Darts Creek Road
10	The Narrows Road
11	Aldoga



Gladstone - Fitzroy Pipeline Project

Figure 17.1 - Topography and Visual Viewpoints Assessment of the Project Area

Sheet 1 of 4

The Right of Way

Project Infrastructure

Railway Line

Road Reserve

Waterways

LGA Boundary

SGIC

GSDA

0 2 4 6 8 km

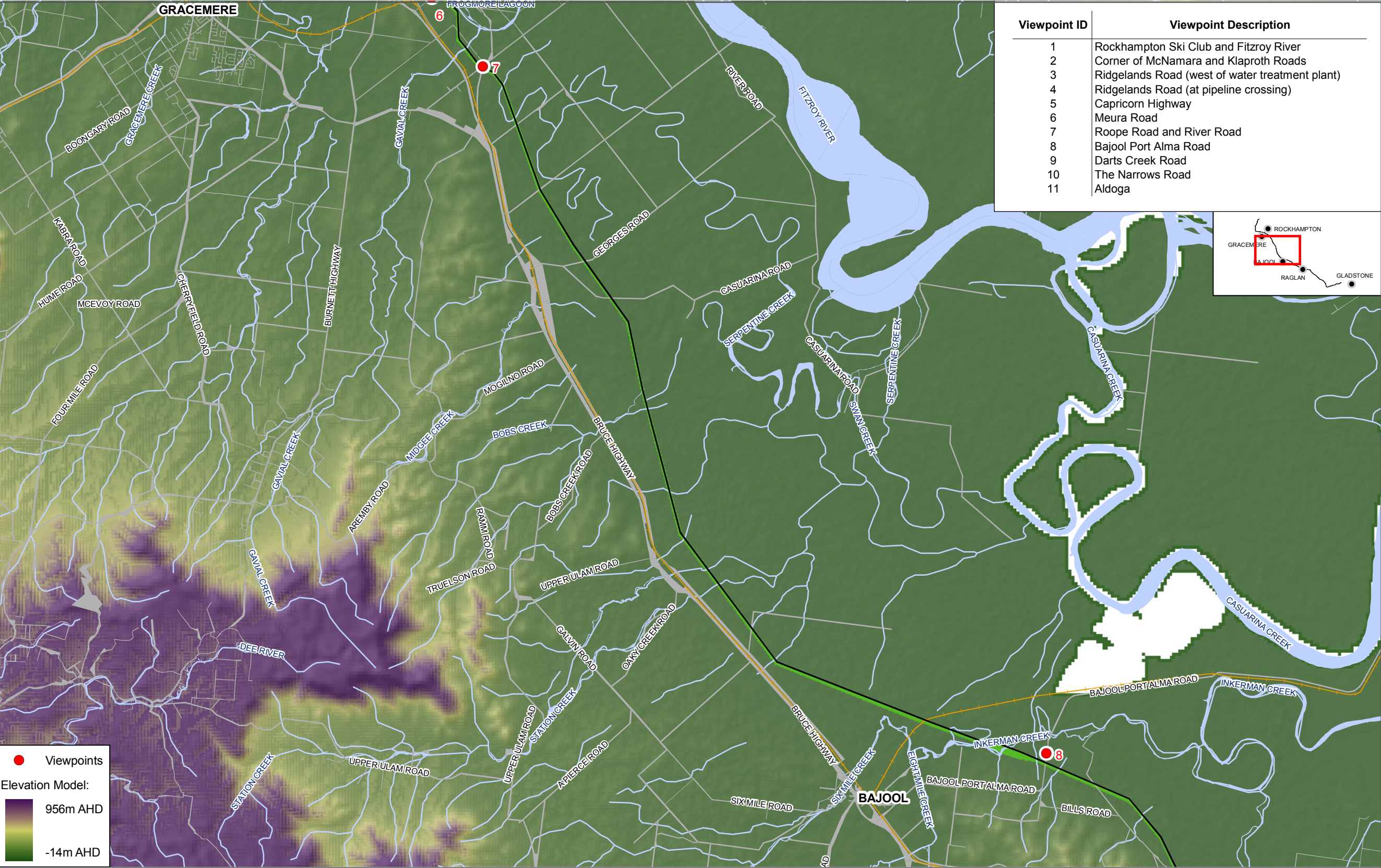
1:100,000 at A3

N

ARUP

Gladstone Area Water Board

While every care is taken to ensure the accuracy of this data, the Gladstone Area Water Board (GAWB) makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which might be incurred as a result of the plan being inaccurate or incomplete in any way and for any reason. It should also be noted that final survey of the pipeline alignment and SGIC boundary are yet to occur and may result in changes to the alignments depicted here.



● Viewpoints

Elevation Model:

956m AHD

-14m AHD

Gladstone - Fitzroy Pipeline Project

Figure 17.1 - Topography and Visual Viewpoints Assessment of the Project Area

Sheet 2 of 4

— The Right of Way

● Project Infrastructure

— Railway Line

— Road Reserve

— Waterways

— LGA Boundary

— SGIC

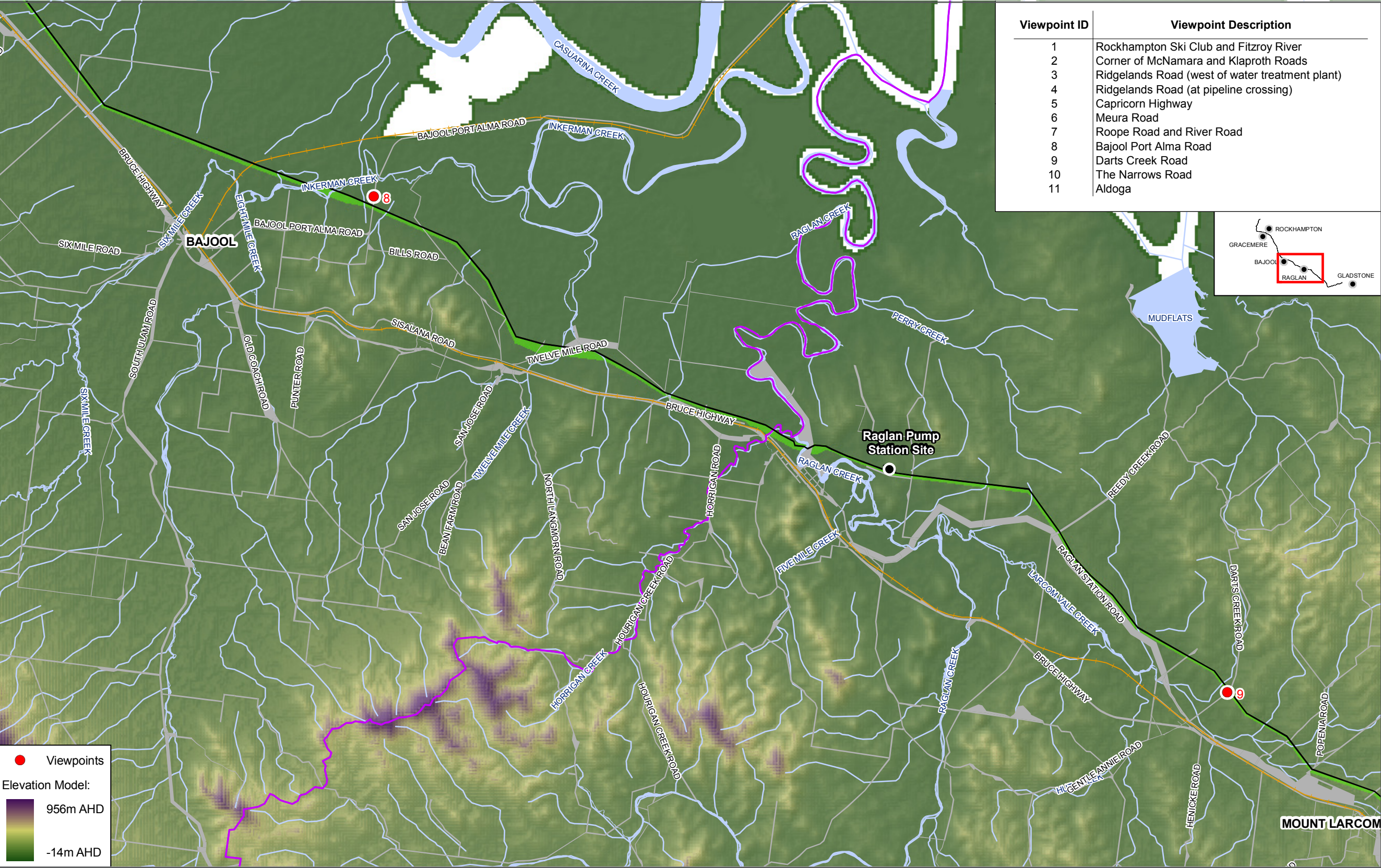
— GSDA

0 2 4 6 8 km

1:100,000 at A3

N

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● Viewpoints

Elevation Model:

956m AHD

-14m AHD

Gladstone - Fitzroy Pipeline Project

Figure 17.1 - Topography and Visual Viewpoints Assessment of the Project Area

Sheet 3 of 4

— The Right of Way

● Project Infrastructure

— Railway Line

— Road Reserve

— Waterways

— LGA Boundary

— SGIC

— GSDA

0 2 4 6 8 km

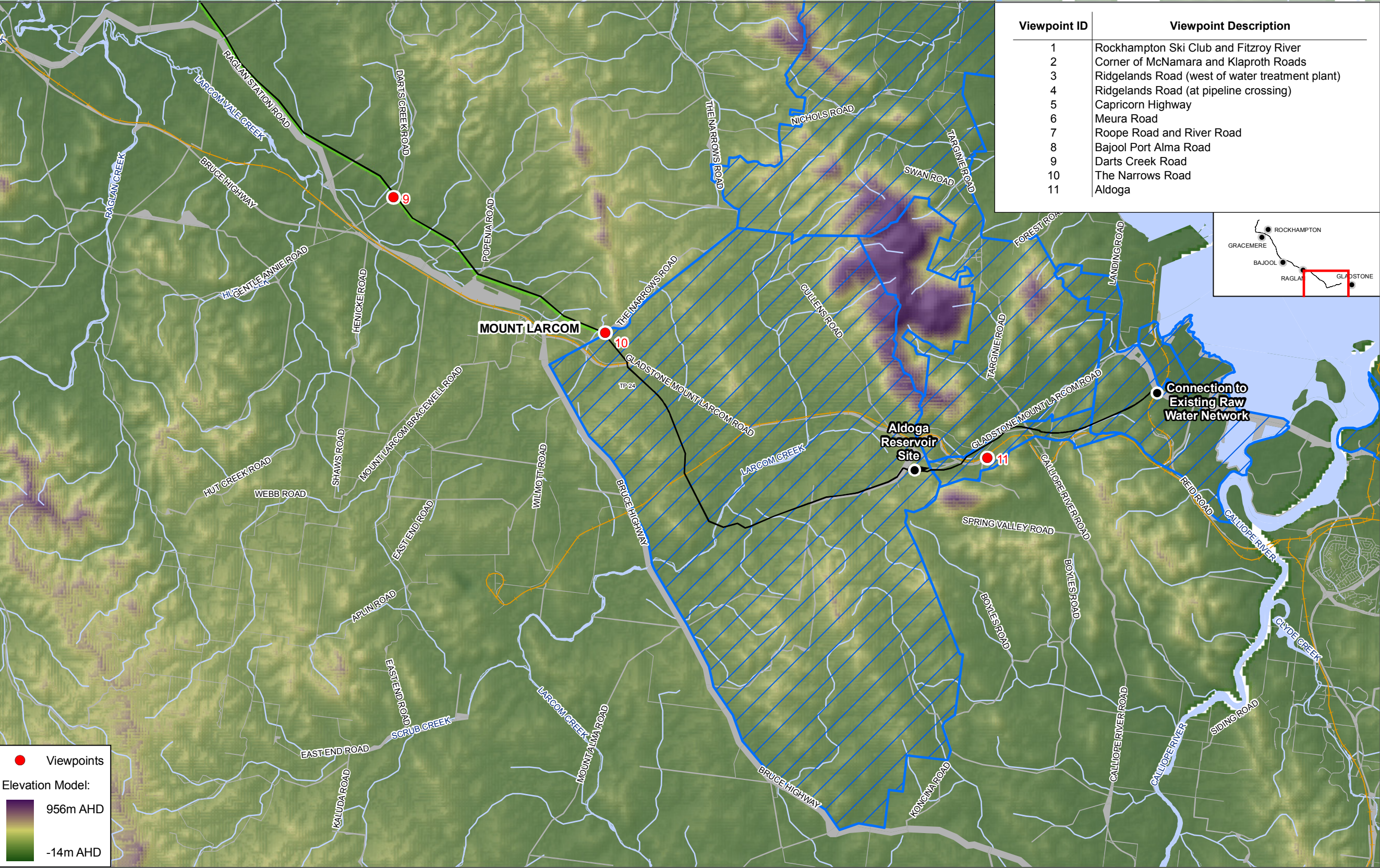
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Gladstone - Fitzroy Pipeline Project

Figure 17.1 - Topography and Visual Viewpoints Assessment of the Project Area

Sheet 4 of 4

The Right of Way

Project Infrastructure

Railway Line

Road Reserve

Waterways

LGA Boundary

SGIC

GSDA

0 2 4 6 8 km

1:100,000 at A3

N

ARUP

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Grazing land is sparsely vegetated throughout the region, with individual trees, some scrub and grazing fodder. The agricultural weed *Parthenium* is prevalent across the majority of the project area. Coastal foothills and ranges tend to be densely vegetated with native bushland.

The southern area of the pipeline route falls within the Curtis Coastal Plan from Raglan Creek to Gladstone. It also forms part of the Calliope and Fitzroy River coastal catchments and the GSDA. The Curtis Coastal Plan states that elements of the Curtis Coast landscape have been identified as contributing to the scenic coastal landscape values of the region and are identified as the 'areas of State significance (scenic coastal landscapes)' and include: riverine corridors and creeks; coastal mountain ranges; urban/industrial settings and edges.

The GSDA to the south of the project is composed of major industrial development and associated infrastructure. It is used for urban development, primary industries, mining, heavy and light manufacturing industries, port activities, residential and public facilities, tourism and recreation (EPA and QPWS 2005).

The area from which the various elements of the project are likely to be seen, while not including large numbers of residential areas, is sensitive in parts due to the route's visibility within a predominantly sparse, flat landscape. Visual impacts resulting from the project will be derived primarily from non-pipeline infrastructure (potentially including the WTP, pumping stations, intake point and storage reservoirs) as the pipeline itself will be mainly underground. Construction activities including the clearing of vegetation, earthworks and construction vehicles use and movement are likely to cause the most significant visual intrusion.

17.5.2 Local Landscape Context

17.5.2.1 Fitzroy to Bajool

The project commences at the intake point on the Fitzroy River, approximately 15.5 km upstream of Rockhampton Bridge, northwest of the major urban centre of Rockhampton.

The Fitzroy River is one of Queensland's largest river systems. Its catchment area includes natural assets such as waterways, wetlands, and natural reserves which contribute to local biodiversity, recreational, landscape and scenic quality. The area local to the Fitzroy River forms part of a unique local recreation, landscape and viewing experience. It is characterised by expansive, long views northwest and southeast along the river which are generally framed by riparian vegetation, including native trees and scattered scrub. Aquatic plants line parts of the river margins. The area adjacent to the intake point is the most significant area of recreational land identified within the project area and is associated with leisure facilities comprising of informal open space, a water sports club, a jetty, and walking tracks and well managed naturalistic native planting.

Due to its close proximity to Rockhampton, the area provides an important leisure facility and open space resource for the local community. It is recognised as a key resource within the Fitzroy Planning Scheme and is valued due to its attractive features, distinctiveness and recreational function.


Also within the Rockhampton City limits are the Berserker Ranges and Mt Archer National Park which provide a prominent and scenic green backdrop to the local area.

Small rural settlements occur along and/or adjacent to this section of the route including Alton Downs, Gracemere, Midgee, and Bajool. This region is generally broadacre grazing land, with scattered vegetation on gently undulating topography and rural properties/residences scattered throughout. Creeks (or dry creek beds) lined with riparian vegetation, dams, fences and irregular bush blocks dissect the landscape in parts. A number of minor roads connecting isolated properties and small communities to larger urban centres also cross the landscape. There is also an important rail freight corridor and the Bruce Highway. The gently undulating topography and scattered vegetation provides a variety of framed and/or open views from distant, middle distance and close locations. The vegetation structure, height and form are valuable, contributing to landscape character (local and regional) and sense of place.

17.5.2.2 Bajool to Gladstone

South of Bajool, small settlements along the pipeline route include Marmor, Raglan, Epala, Ambrose, Mt Larcom and Yarwun.

From Bajool to Mt Larcom the landscape is sparsely vegetated, gently undulating, with rural residential properties scattered throughout. The agricultural landscape is divided by creeks/dry creek beds lined with riparian vegetation, dams and irregular bush blocks. Primarily, the agricultural land is broadacre grazing land, with expansive paddock structures. The area is crossed by a number of minor roads connecting isolated properties and small communities to larger urban centres. There is also an important freight rail corridor and the Bruce Highway that traverse the landscape. The gently undulating topography and sparse vegetation provides a variety of framed and/or open views from distant, middle distance and close locations. The vegetation structure, height, form and composition are valuable, as they contribute to the character (local and regional) of the landscape, and to a sense of place.



Surrounding Yarwun, the landform provides a transition between the foothills and steep escarpments of Mt Larcom and the lower lying grazing land to the northwest. Ridge slopes of Mt Larcom give way to dense native bushland, restricting and enclosing views. This change in topography provides a buffer to the broader agricultural landscape from the Gladstone industrial area edge. It aids in increased levels of tranquillity and quiet enjoyment of the landscape and may be a respected resource for the local community.

The project terminates adjacent to Yarwun, northwest of the Gladstone major urban centre, inland of Fisherman's Landing. In this area, large industrial developments become predominant. However, the Gladstone area is identified as a coastal resource with values of coastal landscape, scenic amenity, recreational amenity, habitat for plants and animals.

The Curtis Coastal Plan states that coastal mountain ranges including the landscapes of the Rundle Range and Mt Larcom Range to the northeast contribute to scenic coastal landscape values by providing a prominent and scenic green backdrop to the local (and project) area. Rundle Range and Mt Larcom form State owned land, with Rundle Range also being a National Park and part of the Rundle Range Resources Reserve Management Plan. Mt Larcom is a distinctive focal point in the landscape. Mt Stowe is recognised within the Calliope Planning Scheme as a State Forest. The vegetated escarpments are highly significant in the landscape and form prominent backdrops to all views. Their landform contrast and naturalness are major contributors to scenic quality.

The Curtis Coastal Plan also addresses riverine corridors and creeks. It recognises the landscape values of riverine creeks and corridors from elevated lookouts and from recreational use on the water (e.g. fishing, boating etc.). Creek systems and riparian vegetation cross the coastal plain and provide a visual contrast in an otherwise largely modified rural landscape. These areas often form the visual edge and link to local views (EPA and QPWS 2005).

In addition, the Curtis Coast Plan discusses the value of the urban/industrial setting and edge – “The settings and edges of all coastal towns and major developments are important to the character and identity of the Curtis Coast Region”. The edges of the places often have distinct character as seen from approach roads, lookouts and other viewpoints. It states that the city of Gladstone itself is unique as an industrial landscape providing a strong visual contrast to the adjacent natural areas, such as Mt Larcom.

However, it must be noted that the landscape character of the coastline has also been greatly modified through vegetation disturbance for residential and industrial development.

17.5.3 Visual Character of the Project

The majority of viewers will be motorists travelling along roads that cross the proposed pipeline corridor. Other receptors may include residents, rail users, agricultural workers, industrial workers and users of recreational open space.

During operation, the pipeline will generally be an underground linear feature within a largely rural environment. Landform surrounding the project and elevation of structures are the key determinants of visibility of the project. Vegetation, built form and environment have a localised influence. Views of the project will generally be limited to close receptors, and those crossing the pipeline corridor from roads and/or rail. Aboveground elements or processes that will be visible from a limited number of locations will include:

- Intake structure, pump station and associated security fencing and access road
- Water treatment plant and security fencing
- Storage reservoirs
- Valve and valve pits
- Storage facilities and associated infrastructure at Raglan and Aldoga
- The treeless pipeline corridor width – during operations, some of the ROW will be maintained to keep it clear of vegetation and to provide access for maintenance
- Access by maintenance vehicles and workers (vegetation, weed and pest management and repair works) and by deliveries and workers at the WTP
- Replacement planting and any landscape mitigation works (including earthworks).

During construction, areas that will be affected are likely to be viewed from a distance, as prescribed by the gently undulating topography defining the route corridor. However, at Yarwun the steeper topography and dense bushland of the Mt Larcom Ranges will restrict and screen scope of views to the site. The main visual impacts during construction are likely to include:

- Stockpiles (pipe, vegetation, soil)
- Construction vehicles and workers
- Vegetation clearance
- Fencing removal and construction
- Lighting during night time construction activities (if required)
- Additional vehicular traffic generated by construction workers, materials delivery and disposal along adjacent transport routes.

17.6 Assessment of Impacts

The following sections describe the assessment of landscape and visual impacts for the construction and operation of the project.

Due to their short-term duration and similarity of impacts across the project area, construction impacts are assessed for the entire route and are not split into two sections (Fitzroy to Bajool and Bajool to Gladstone) as with the assessment of operational impacts.

Impacts during operation are assessed from individual representative viewpoints.

17.6.1 Construction Phase

The construction of the project would create short-term impacts. These impacts would primarily relate to the visual appearance of the construction works that would be temporary, restricted to the construction period. Some areas would be used on a temporary basis for storage areas to support the construction.

General assumptions (Section 17.3) have been made in order to make a site-wide assessment of the impact of the construction works. Generally during construction the project is likely to impact the same areas as those affected by the operational phase, however construction impacts will be short-term in nature.

17.6.1.1 Visual Modification

Activities that would constitute the greatest intrusion into receptors' views as a result of changes within the landscape during construction would include:

Site clearance works

- Removal of vegetation
- Demolition of existing structures (e.g. structures at road and rail crossings)
- Earthworks

General construction activities

- Temporary traffic management
- Movement of construction machinery and large scale construction equipment
- Presence of construction workers
- Presence of equipment storage compounds
- Presence of hoarding and protective fencing
- Presence of temporary signage
- Excavations; earthworks
- Site preparation
- Construction of the pipeline
- Construction and fit out of concrete structures and reservoirs
- Soil stripping
- Installation of new pipeline infrastructure and landscaping elements

- The presence of major and minor site facilities
- Temporary offices and washrooms
- Laydown areas
- Pipe stockpiles and associated hard standing

Off-route impacts on landscape may also arise from physical changes to surrounding road network utilised during construction (e.g. traffic calming measures, road upgrades). Additional vehicles using these roads could potentially have a visual impact to normal users, including:

- Vehicles moving materials to/from site, and between construction sites
- Workers travelling to/from work, and moving between different areas of the site.

Impacts to traffic in the project area are assessed in Chapter 13, Transport and Access Arrangements.

The prominence of the site wide construction works and loss of some landscape elements suggests that there would be a Moderate Reduction in visual amenity during this phase.

17.6.1.2 Visual Sensitivity

The construction site will generally be experienced by a range of viewers including:

- Small numbers of residents with a high interest in their visual environment
- Large numbers of motorists with a passing interest in their visual environment
- Small numbers of outdoor workers (including farmers and maintenance workers) with a moderate interest in their environment
- Small numbers of recreation-site or activity-focused users (i.e. fishing, nature conservation, water-based activities, social clubs) with a high interest in their visual environment.

Although the site is not of particularly high scenic quality, the variety and number of people experiencing it suggests that it contains views of medium sensitivity.

17.6.1.3 Significance of Impact

The significance of the landscape and visual impact during construction and without mitigation measures has therefore been assessed as moderate adverse in accordance with the significance criteria in Table 17.3.

17.6.2 Operational Phase – Fitzroy to Bajool

Impacts are described below in terms of an assessment of each of the identified representative viewpoints. The process of selecting representative viewpoints is described in Section 17.2.1.3. The location of the viewpoints is shown in Figure 17.1.

17.6.2.1 Viewpoint - 1 Rockhampton Ski Club and Fitzroy River



Location	<p>Photo direction northwest along Fitzroy River approximately 300 m upstream from the intake point at the Rockhampton Water Ski and Power Boat Club approximately 15.5 km upstream from Rockhampton Bridge.</p> <p>GIS coordinates Lat -23.297045 Long 150.438516.</p>
Modification	<p>This view is of an attractive, semi-natural landscape with distinctive landscape elements that contribute to high degrees of amenity and tranquillity. The nature of this view is unique to the local and regional area, and is characterised by expansive, long views northwest and southeast along the river. Views are generally framed by riparian vegetation (approximately 15 m buffer zone to the river) including native trees and scattered scrub. Aquatic plants line parts of the river margins.</p> <p>This view has a strong sense of place as a managed, green recreational 'oasis' within a surrounding sparsely vegetated, dry, flat landscape. The scenic amenity forms part of the recreational experience as the Fitzroy River and adjacent open space is used for outdoor recreational pursuits (boating, water skiing, fishing, picnics etc.).</p> <p>The project will not be a prominent feature in this view, but will cause localised change to the existing landscape. Project elements would be visible within the landscape, but would be seen within the context of the existing SunWater pump station. The intake and pump station will consist of a combined single structure located in the river bank, with a separate plant room adjacent to the existing SunWater pump station and at the same level. Although the intake point is submerged, associated pipeline infrastructure (pipe, pumping station, etc.) are likely to be visible from the water and from the bank opposite. The ultimate form, material and colour of the infrastructure would play some role in determining its influence on visual amenity. Vegetation removal would also constitute an obvious change in view.</p> <p>The project would cause change through minor loss of landscape elements (trees), inclusion of infrastructure and maintenance activities. However, there is scope for mitigation, in the short- to medium-term</p> <p>It is anticipated that the project would result in a small reduction in visual amenity from this viewpoint.</p>
Sensitivity	<p>This view is experienced by:</p> <ul style="list-style-type: none"> • Small number of residents with a high interest in their visual environment and prolonged viewing opportunities. However, and views that do occur would be filtered through scattered vegetation and are located approximately 150–200 m in distance away from the pipeline, intake point and pump station • Small numbers of recreational users both on the water and within recreation facilities at the ski club with a high interest in their visual environment on a regular basis • Small numbers of outdoor workers (maintenance workers, gardening) with a medium interest in their visual environment on a regular basis. <p>This view is of locally high scenic quality, and although a small number of people experience it, it is for prolonged periods, and is rare in the local and regional area suggesting that this is a view of minor sensitivity.</p>
Significance of Impact	<p>Minor adverse</p>

17.6.2.2 Viewpoint 2 - Corner of McNamara and Klaproth Roads



Photographic simulation of the view to the proposed water treatment plant

Location	View southeast to the proposed water treatment plant from near the corner of Corner of McNamara and Klaproth Roads. GIS coordinates -23.309226° Long 150.410268°.
Modification	<p>This view is of flat grazing country with scattered trees, rural residences and other rural structures such as sheds and fences. The corridor of semi-mature and mature Eucalypts along Ridgeland Road provides an immediate backdrop, while the Berserker Range to the east of Rockhampton forms much of the horizon and adds to the overall variety and quality of the view.</p> <p>The water treatment plant would be approximately 1 km from this viewpoint. It would be prominent in the view because of its scale and the openness of the landscape. Most components of the water treatment plant would be clearly visible, including the control building, clarifier, sludge dewatering building, sludge balance tanks, and reservoir. Other features such as fencing and parked vehicles are not likely to be prominent because of the distance from the viewpoint.</p> <p>It is not anticipated that the pipeline would create a discernable change in the view from this location, other than the removal of several trees on the side of Ridgeland Road.</p> <p>There are opportunities to integrate the plant into the landscape to some degree with strategic planting. Planting of native tree species, once mature would potentially screen a large proportion of the visible elements of the water treatment plant.</p> <p>The ultimate choice of materials and colour for each structure would play some role in determining its influence on visual amenity. Darker, less reflective tones would be more likely to recede into the landscape.</p> <p>It is anticipated that the project would result in a moderate reduction in visual amenity from this viewpoint.</p>
Sensitivity	<p>This view is experienced by residences of several rural properties on McNamara and Klaproth Roads. It could be expected that these residents place a high value on their rural outlook.</p> <p>It is also experienced for short durations by vehicle users travelling on these two roads. The vehicle users are predominantly residents of rural properties to the north.</p> <p>Although a small number of people experience this view, the presence of residential views and the associated importance placed on the view suggests that this viewpoint is of medium sensitivity.</p>
Significance of Impact	Moderate Adverse

17.6.2.3 Viewpoint 3 - Ridgeland Road (west of WTP)



Photographic simulation of proposed water treatment plant

Location	<p>View east to the proposed water treatment plant from Ridgeland Road.</p> <p>GIS coordinates -23.312482° Long 150.407546°.</p>
Modification	<p>This view is from Ridgeland Road heading east. It is dominated by the informal avenue of semi-mature and mature native trees that have established within the road reserve. It also includes expanses of flat grazing country with scattered trees and rural structures such as sheds and fences. The view is backdropped by the Berserker Ranges which adds to the overall variety and quality of the view.</p> <p>The WTP would be approximately 1 km from this viewpoint. Despite its scale, the plant would be partially screened by foreground trees.</p> <p>This view represents one of the more likely locations on Ridgeland Road from where the plant would be able to be clearly seen. For the most part closer views on Ridgeland Road are subject to greater levels of screening from the roadside vegetation.</p> <p>It is not anticipated that the pipeline would create a discernible change in the view from this location. The removal of trees at the Ridgeland Road crossing point would be obscured by intervening roadside vegetation.</p> <p>There are opportunities to integrate the plant into the landscape to some degree with strategic planting. Planting of native tree species, once mature would potentially screen the water treatment plant to the point where it would be difficult to discern from this viewpoint for viewers that were not specifically focusing on the plant.</p> <p>The ultimate choice of materials and colour for each structure would play some role in determining its influence on visual amenity. Darker, less reflective tones would be more likely to recede into the landscape.</p> <p>It is anticipated that the project would result in a small reduction in visual amenity from this viewpoint.</p>
Sensitivity	<p>This view is primarily experienced by a moderate number of road users with a passing interest in their visual environment.</p> <p>This moderate numbers and short duration of views suggests that this is a view of low sensitivity.</p>
Significance of Impact	<p>Negligible</p>

17.6.2.4 Viewpoint 4 - Ridgелands Road (at pipeline crossing)



Location	<p>View east on Ridgелands Road pipeline intersection.</p> <p>GIS coordinates Lat -23.320563 Long 150.418904.</p>
Modification	<p>This view is of flat to gently undulating agricultural grazing country with scattered trees, rows of trees along fence lines and road sides, and bushland blocks. The landscape is intersected by minor gravel roads, main roads and fence lines. Occasional houses and sheds are scattered throughout. The nature of this view is unique to the local and regional area, and is characterised by expansive, open views across the landscape with some topographical features (Berserker Ranges/Mt Archer National Park) in the distance.</p> <p>The pipeline will not be a prominent feature in this view, as it will be underground. The project would impact upon the composition of this view through permanent loss of trees within the route corridor, and through implementation of a linear maintenance route. Infrequent movement along this route by maintenance vehicles and worker access would form a visual modification.</p> <p>There would be an overall local reduction in the quantity of trees, grassland and dense scrub within the pipeline corridor as a result of the project. Grass would naturally regenerate to earthworks areas over time.</p> <p>It is anticipated that the project in this location would result in a small reduction in visual amenity from this viewpoint.</p>
Sensitivity	<p>This view is primarily experienced by a moderate number of road users with a passing interest in their visual environment.</p> <p>This moderate numbers and short duration of views suggests that this is a view of low sensitivity.</p>
Significance of Impact	<p>Negligible</p>

17.6.2.5 Viewpoint 5 - Capricorn Highway



Location	<p>View northeast on the Capricorn Highway pipeline intersection.</p> <p>GIS coordinates Lat -23.410513 Long 150.478942.</p>
Modification	<p>This view is of flat to gently undulating agricultural grazing country with scattered trees, rows of trees along fence lines and road sides, and bushland blocks. The landscape is intersected by minor gravel roads, main roads and fence lines. Occasional houses and sheds are scattered throughout. The nature of this view is unique to the local and regional area, and is characterised by expansive, open views across the landscape with some topographical features (Berserker Ranges/Mt Archer coastal ranges) in the distance.</p> <p>The pipeline will not be a prominent feature in this view, as it will be underground. The project would impact upon the composition of this view through permanent loss of trees within the pipeline corridor, and through implementation of a linear maintenance route. Infrequent movement along this route by maintenance vehicles and worker access would form a visual modification.</p> <p>There would be an overall local reduction in the quantity of trees, grassland and dense scrub within the pipeline corridor as a result of the project. Grass would naturally regenerate to earthworks areas over time.</p> <p>It is anticipated that the project would result in a small reduction in visual amenity from this viewpoint.</p>
Sensitivity	<p>This view is experienced by:</p> <ul style="list-style-type: none">• Large number of road users with a passing interest in their visual environment• Small numbers of outdoor workers (farmers, maintenance workers) with a medium interest in their visual environment on a regular basis. <p>The interest and distance from the pipeline of the viewers, and the project's nature from this viewpoint within the landscape suggests that this is a view of medium sensitivity.</p>
Significance of Impact	<p>Minor adverse</p>

17.6.2.6 Viewpoint 6 - Meura Road



Location	<p>View north along Meura Road easement to pipeline intersection.</p> <p>GIS coordinates Lat -23.437614 Long 150.523167.</p>
Modification	<p>This view comprises flat to gently undulating agricultural grazing, low scattered scrub and tussocks. The landscape is intersected by minor gravel roads and fence lines. Occasional houses and sheds are scattered throughout. The nature of this view is unique to the local area, and is characterised by filtered views through open bushland. In this location, views are restricted by vegetative cover.</p> <p>The pipeline will not be a prominent feature in this view, as it will be underground. The project would impact upon the composition of this view through permanent loss of trees from the bushland within the pipeline corridor, and through implementation of a linear maintenance route. Infrequent movement along this route by maintenance vehicles and worker access would form a visual modification.</p> <p>There would be an overall local reduction in the quantity of trees, grassland and dense scrub within the pipeline corridor as a result of the project. Grass would naturally regenerate to earthworks areas over time.</p> <p>It is anticipated that the project in this location would result in a small reduction in visual amenity from this viewpoint.</p>
Sensitivity	<p>This view is experienced by:</p> <ul style="list-style-type: none"> • Small numbers of residents with a high interest in their visual environment and prolonged viewing opportunities. However, views would be heavily filtered through vegetation and approximately 350 m in distance away from the pipeline route • Small numbers of road users with a passing interest in their visual environment • Small numbers of outdoor workers (farmers, maintenance workers) with a medium interest in their visual environment on a regular basis. <p>The interest, distance and filtered views of the pipeline from this viewpoint, and the project's nature within the landscape suggests that this is a view of low sensitivity.</p>
Significance of Impact	Negligible

17.6.2.7 Viewpoint 7 - Roope Road and River Road



Location	View north along Roope Road (at intersection of River Road) and pipeline intersection. GIS coordinates Lat -23.456068 Long 150.537543.
Modification	<p>This view comprises flat to gently undulating agricultural grazing land, scattered trees, low scattered scrub and tussocks. The landscape is intersected by minor roads and fence lines. Occasional houses and sheds are scattered throughout. The nature of this view is unique to the local area, and is characterised by filtered views across grazing land through scattered trees and bushland blocks. Distant topographical features (Berseker Ranges/Mt Archer coastal ranges) form a backdrop to the view.</p> <p>The pipeline will not be a prominent feature in this view, as it will be underground. The project would impact upon the composition of this view through permanent loss of trees from the bushland and scattered trees within the pipeline corridor, and through implementation of a linear maintenance route. Infrequent movement along this route by maintenance vehicles and worker access would form a visual modification.</p> <p>There would be an overall local reduction in the quantity of trees, grassland and dense scrub within the pipeline corridor as a result of the project. Grass would naturally regenerate to earthworks areas over time.</p> <p>It is anticipated that the project in this location would result in a small reduction in visual amenity from this viewpoint.</p>
Sensitivity	<p>This view is experienced by:</p> <ul style="list-style-type: none"> • Small numbers of residents with a high interest in their visual environment and prolonged viewing opportunities. However, views would be filtered through vegetation and range from approximately 400 m distance away from the pipeline route • Small numbers of road users with a passing interest in their visual environment • Small numbers of outdoor workers (farmers, maintenance workers) with a medium interest in their visual environment on a regular basis. <p>The interest, distance and filtered views of the pipeline from this viewpoint, and the project's nature within the landscape suggests that this is a view of low sensitivity.</p>
Significance of Impact	Negligible

17.6.3 Operational Phase – Bajool to Gladstone

17.6.3.1 Viewpoint 8 - Bajool Port Alma Road



Location	<p>View south along Bajool Port Alma Road to pipeline intersection.</p> <p>GIS coordinates Lat -23.640647 Long 150.696287.</p>
Modification	<p>This view comprises flat to gently undulating agricultural grazing, low scattered scrub and tussocks. The landscape is intersected by minor roads, rows of trees along road edges and fence lines. Occasional houses and sheds are scattered throughout, with a steel works adjacent to the pipeline route. The nature of this view is unique to the local area, and is characterised by open views across grazing land.</p> <p>The pipeline will not be a prominent feature in this view, as it will be underground. The project would impact upon the composition of this view through permanent loss of trees from the road side within the pipeline corridor, and through implementation of a linear maintenance route. Infrequent movement along this route by maintenance vehicles and worker access would form a visual modification.</p> <p>There would be an overall local reduction in the quantity of trees, grassland and dense scrub within the pipeline corridor as a result of the project. Grass would naturally regenerate to earthworks areas over time.</p> <p>It is anticipated that the project would result in a small reduction in visual amenity from this viewpoint.</p>
Sensitivity	<p>This view is experienced by:</p> <ul style="list-style-type: none">• Small numbers of residents with a high interest in their visual environment and prolonged viewing opportunities. However, views would be filtered through scattered vegetation. The closest residence is approximately 500 m in distance away from the pipeline route• Small numbers of road users with a passing interest in their visual environment• Small numbers of outdoor workers (farmers, maintenance workers) with a medium interest in their visual environment on a regular basis. <p>The interest, distance and filtered views of the pipeline from this viewpoint, and the project's nature within the landscape suggests that this is a view of low sensitivity.</p>
Significance of Impact	<p>Negligible</p>

17.6.3.2 Viewpoint 9 - Darts Creek Road



Location	<p>View northeast along Darts Creek Road to pipeline route intersection.</p> <p>GIS coordinates Lat -23.775616 Long 150.939982.</p>
Modification	<p>This view comprises flat to gently undulating bushland, low scrub and tussocks with some areas cleared for agricultural grazing land. The landscape is intersected by minor roads, rows of trees along road edges and fence lines. A small residential subdivision exists to the northeast of the pipeline route. This view would be seen within the context of an existing easement along which the pipeline route will follow that is already clear of vegetation. The nature of this view is unique to the local area, and is characterised by views filtered and enclosed by vegetation.</p> <p>The pipeline will not be a prominent feature in this view, as it will be underground. The project would impact upon the composition of this view through permanent loss of trees from the road side, bushland, and from within the pipeline corridor, and through implementation of a linear maintenance route. Infrequent movement along this route by maintenance vehicles and worker access would form a visual modification.</p> <p>Natural vegetation regeneration may be encouraged locally along the pipeline corridor margins to screen adjacent residents. Initially, regeneration would be immature. However, over time planting would mature, and vegetation would re-establish (including self-seeded growth) aiding in screening of the project from residents. However, there would still be an overall local reduction in the quantity of trees, grassland and dense scrub within the pipeline corridor as a result of the project.</p> <p>It is anticipated that the project in this location would result in a small reduction in visual amenity from this viewpoint.</p>
Sensitivity	<p>This view is experienced by:</p> <ul style="list-style-type: none">• Small numbers of residents with a high interest in their visual environment and prolonged viewing opportunities. However, views would be filtered through vegetation. One residence is located approximately 100 m from the route, with others 250 m or greater distance away• Small numbers of road users with a passing interest in their visual environment• Small numbers of outdoor workers (farmers, maintenance workers) with a medium interest in their visual environment on a regular basis. <p>The interest, distance and filtered views of the pipeline from this viewpoint, and the project's nature within the landscape suggests that this is a view of medium sensitivity.</p>
Significance of Impact	<p>Minor adverse</p>

17.6.3.3 Viewpoint 10 - The Narrows Road



Location	<p>View southwest along The Narrows Road to pipeline intersection.</p> <p>GIS coordinates Lat -23.812308 Long 151.000514.</p>
Modification	<p>This view comprises undulating bushland, low scrub and tussocks and is unique to the local area character. In parts, areas have been cleared for agricultural grazing land. A billabong in the valley floor is directly north of the route. The landscape is intersected by minor gravel roads, bushland, rows of trees along road edges and fence lines. The nature of this view is unique to the local area, and is characterised by views filtered and enclosed by vegetation.</p> <p>The pipeline will not be a prominent feature in this view, as it will be underground. The project would impact upon the composition of this view through permanent loss of trees from the road side, bushland, and from within the pipeline corridor, and through implementation of a linear maintenance route. Infrequent movement along this route by maintenance vehicles and worker access would form a visual modification.</p> <p>Natural vegetation regeneration may be encouraged locally along the pipeline corridor margins to screen adjacent residents and maintain the local landscape character. Initially, regeneration would be immature. However, over time planting would mature, and vegetation would re-establish (including self-seeded growth) aiding in screening of the project from residents. However, there would still be an overall local reduction in the quantity of trees, grassland and dense scrub within the pipeline corridor as a result of the project.</p> <p>It is anticipated that the project in this location would result in a small reduction in visual amenity from this viewpoint.</p>
Sensitivity	<p>This view is experienced by:</p> <ul style="list-style-type: none"> • Small numbers of residents on hilltops with clear views southwest over the route with a high interest in their visual environment and prolonged viewing opportunities. However, views would be filtered vegetation and local undulating topography. One residence is located approximately 150 m from the route, with others 300 m, or greater, distance away • Small numbers of road users with a passing interest in their visual environment • Small numbers of outdoor workers (farmers, maintenance workers) with a medium interest in their visual environment on a regular basis. <p>The interest, distance and filtered views of the pipeline from this viewpoint, and the project's nature within the landscape suggests that this is a view of medium sensitivity.</p>
Significance of Impact	<p>Minor adverse</p>

17.6.3.4 Viewpoint 11 - Aldoga



Location	<p>View northeast across proposed Aldoga Reservoir.</p> <p>GIS coordinates Lat -23.846962 Long 151.110313.</p>
Modification	<p>This view comprises undulating to steep slopes covered with bushland, low scrub and tussocks. A large quarry site is adjacent. The landscape is intersected by major roads, railways, above ground pipelines, overhead power lines and fence lines. The nature of this view is unique to the local area, on the industrial outskirts of Gladstone and is characterised by views filtered and enclosed by vegetation and topography.</p> <p>The storage facility and associated infrastructure will form a prominent component of this view due to its hill top location. It will cause localised change due to: the removal of trees and vegetation; new site access; earthworks; and inclusion of new infrastructure (it is expected that the detailed design for construction shall be two circular shaped structures, approximately 90 m diameter.). The project in this location would be seen within the context of the existing industrial facilities in close proximity to the site and large infrastructure (road, rail, etc.). The ultimate form, material, colour and layout of the proposed infrastructure would play some role in determining its influence on visual amenity.</p> <p>There is some scope for mitigation through orientation, form, location and various forms of screening (vegetation/earthworks), but the proposal cannot be completely mitigated for because of its nature and location within the landscape.</p> <p>It is anticipated that this part of the project would be seen within the existing context of an industrial zone, but due to its hill top location would result in a moderate reduction in visual amenity.</p>
Sensitivity	<p>This view is experienced by:</p> <ul style="list-style-type: none">• Small numbers of road users with a passing interest in their visual environment• Small numbers of outdoor workers (quarry workers, maintenance workers) with a low interest in their visual environment on a regular basis. <p>The interest and filtered/enclosed views of the storage facility from this viewpoint, and that the project would be viewed within the context of an existing industrial environment suggests that this view is of low sensitivity.</p>
Significance of Impact	<p>Minor adverse</p>

17.7 Mitigation

17.7.1 General

The pipeline will be buried for the majority of its length. Generally, the project will have a minor impact upon landscape character and visual amenity altering parts of the local environment. Impacts vary according to local context, and construction and operational phases. The aim of this section is to highlight project wide, general mitigation measures that would reduce and/or manage adverse impacts of construction work and operation upon landscape and visual amenity.

Specific measures for key areas, including the WTP, Raglan Pump Station and Reservoir and the Aldoga Reservoir will be considered once detailed design for construction is completed and are likely to include the measures outlined below for the construction and operational phases. Any mitigation measures for the WTP would be discussed with the landowner and adjacent landowners and may include:

- Screening of the site with vegetation
- Design of the WTP to sit within existing topography
- Use of appropriate colours and finishings to minimise the visual impact.

17.7.2 Construction Phase

The construction of the pipeline would create short-term impacts. These impacts would primarily relate to the visual appearance of the construction works that would be phased, temporary, and restricted to the construction period. Some areas along the project (and within the project boundary) would be required on a temporary basis to provide compounds and storage areas to support the construction.

Specific objectives and methodologies for mitigation during construction will be further developed within the construction strategy and Environmental Management Plan (EMP) developed prior to construction. Mitigation measures are also proposed in Chapter 20, Planning Environmental Management Plan which forms the precursor to the Construction EMP.

For the purpose of this chapter, general assumptions (Section 17.3) have been made in order to appraise the impact of the construction works upon landscape resources and visual amenity. Essentially, the construction of the project would impact upon the same areas as those affected by the operational phase of the project. However the landscape and visual impacts from construction activities are likely to be similar across the project and occur on a temporary basis.

For the purposes of this assessment, construction phase mitigation strategies will include:

- Existing trees and vegetation to the pipeline corridor margins, or trees identified as important to retain, would be protected prior to construction
- Vegetation clearance at sensitive sites would be minimised
- Temporary hoardings, barriers, traffic management and signage would be removed when no longer required
- Work on site would be restricted to agreed working hours
- Lighting of compounds and works sites would be restricted to low impact lighting for security purposes, where and when required
- Storage facilities would be located away from residential areas
- Materials and machinery would be stored tidily during the works, and where possible behind solid hoardings
- Roads providing access to site compounds and works areas would be maintained free of dust and mud as far as reasonably practicable
- Upon completion of construction, all construction materials would be removed to a suitable location.

17.7.3 Operational Phase

Mitigation of landscape and visual impacts as a result of the project would strive to achieve a balance between all other design disciplines including engineering, ecology, hydrology/hydrogeology and noise to achieve an optimum design outcome. The mitigation strategy for this project would primarily focus on screening the various elements from view, and designing the pipeline components in a way that minimises detrimental effects on visual amenity. Measures will include:

- The design of above ground structures (i.e. WTP, Aldoga Reservoir) to be considered to achieve the best fit with the existing contours, vegetation and earthworks features (mounding) to assist in screening and integration
- Optimise visual protection of residential properties and rural settlements
- Seek to achieve a cut and fill balance of material on site, with reuse of excess material on site as part of the landscape mitigation proposals where appropriate
- Avoid loss or damage to landscape features, including minimisation of the width of vegetation clearance in bushland areas. Where possible, trim trees to avoid total removal, particularly in environmentally sensitive areas and at creek crossings
- Screen planting and encouragement of natural regeneration around the pipeline corridor, particularly where structures are above ground and where the pipeline corridor is in close proximity to residences
- Screen planting and/or encouragement of natural vegetation regeneration at key locations outside the pipeline corridor, particularly where the alignment is in close proximity to residences and trees have been removed for construction (i.e. Viewpoint 8 and Viewpoint 9 described in Section 17.6.3)
- Careful consideration of the form and finish of structures, including minimisation of the bulk of the WTP and supply structures, including use of darker colours for the structures and less reflective materials
- Consideration of the appearance of other features such as signs and fencing
- Careful consideration of any lighting requirements and any potential increase in light pollution.

17.8 Residual Impacts

17.8.1 General

Some impacts resulting from the project are unavoidable and cannot be mitigated. The project would alter the surrounding landscape and the visual experience of receptors. However, these changes would be seen within the context of the existing local environment. Foremost amongst residual impacts is the addition of non-pipeline infrastructure (intake point, WTP, pumping stations, storage facilities), permanent removal of trees along the pipeline corridor, and new planting primarily impacting upon visual amenity.

This assessment of residual impacts assumes that mitigation measures described in the section above would be implemented. Impacts are outlined in Section 17.8.2 and 17.8.3, with significance of residual impacts at specific viewpoints outlined within Table 17.4 and Table 17.5.

17.8.2 Construction Phase

With the implementation of suitable mitigation measures as described in Section 17.7, the construction of the proposed development is considered to have a low environmental risk with regard to landscape and visual effects. However, although the significance of impacts would be reduced, they would still occur and elements that would still be visible include:

- Tree and vegetation removal
- Temporary hoardings, barriers, traffic management and signage
- Onsite works and workers, stored facilities, materials, and machinery
- Mud and dust resulting from works
- Spoil and construction materials storage.

Contractors would be required to 'make good' all work sites prior to/at the end of the construction period. The extent of landscape and visual impacts arising from 'making good' would be dependent upon the level of disturbance required for construction of the project.

In terms of the significance criteria described in Section 17.2.2, residual landscape and visual impacts arising from the construction phase have been assessed as negligible to minor adverse.

17.8.3 Operational Phase

Initially, the new pipeline elements, access roads and landscaping at key sites (WTP and Aldoga Reservoir) would have an impact upon the viewing experience of visual receptors. The visual amenity of the area would be, in parts, affected by the project intruding into views. As the pipeline itself will be largely underground the visual impact of this aspect of the project will be limited to the loss of vegetation in the ROW. Residential receptors near the WTP site would experience the most significant changes due to their respective viewing opportunities and proximity to the project. The change in view would be permanent and initially prominent, but would become less dominant over time as the project would become part of the existing view as vegetation naturally regenerates, or screening matures. In terms of the significance criteria this equates to a minor adverse to negligible impact, with the exception of the WTP which, based on the current understanding of its design, may have a moderate adverse impact even after mitigation.

17.9 Cumulative and Interactive Impacts

There is potential for cumulative effects, with regard operational effects. It is known that there may be other pipeline projects implemented within the same corridor as this project. However, operationally, this is not likely to be significant (depending on the number of vehicle movements anticipated during operation along the corridor, the width of clearance, and earthworks required). It is also known that there are no significant aboveground structures proposed by other projects (in planning at present) within the project area, except for the Powerlink-proposed high voltage powerlines in the Alton Downs area. As far as reasonable, the pipeline and other infrastructure has been located in the vicinity of this infrastructure. Significant adverse effects may be avoided through the implementation of mitigation measures as outlined in Section 17.7.

17.10 Summary and Conclusions

The construction effects of the project on landscape and visual amenity will primarily be related to site clearance and general construction activities that would occur during the limited duration of the construction activities. These will be controlled through mitigation measures set out within the Construction EMP to ensure that most adverse effects resulting from the construction of the project on landscape and visual amenity are minimised or avoided.

The landscape and visual impacts once the project becomes operational are generally likely to be minor, with the exception of the WTP. This is considered to have a moderate impact. Mitigation measures in relation to operation are proposed in order to minimise these impacts, as set out above, and would be further detailed following the completion of detailed design for construction.

Table 17.4 Summary of Impacts – Construction Phase

EIS Area: Landscape and Visual Impact Feature/Description/ Viewpoint	Current value + Substitutable Y:N	Description of Impact		
		Description in Words	Mitigation Inherent in Design/Standard Practice Amelioration Who?/Why?/Scale?	Residual Impact using Significance Criteria
All Viewpoints (site-wide)	Locally and regionally valued views with capacity to accept some change.	Site clearance and general construction activities.	Retain and protect vegetation; hoardings; restricted work hours; tidy storage; dust free access routes; removal of spoil and construction materials upon completion; compounds off-site.	Minor, -ve, D, T, ST

Table 17.5 Summary of Impacts – Operational Phase

EIS Area: Landscape and Visual Impact Feature/Description/ Viewpoint	Current Value + Substitutable Y:N	Description of Impact		
		Description in Words	Mitigation Inherent in Design/Standard Practice Amelioration Who?/Why?/Scale?	Residual Impact using Significance Criteria
1. Rockhampton Ski Club	Regionally and locally valued. In parts substitutable.	Clearing of vegetation and introduction of built elements into the landscape.	Avoid significant vegetation; screen planting; built form to sit within existing topography; built element designed to reduce visibility within landscape.	Minor; –ve; D; P; LT.
2. Corner of McNamara and Klaproth Roads	Locally valued with capacity for the landscape to accept limited change.	Introduction of built elements and associated infrastructure into open landscape. Minor clearing of vegetation and earth works. Movement of workers.	Screening; built form to sit within existing topography; built elements form and design to reduce visibility within landscape.	Moderate; –ve; D; P; LT.
3. Ridgeland Road (west of WTP)	Locally valued with capacity for the landscape to accept limited change.	Introduction of built elements and associated infrastructure into landscape. Partial screening by existing vegetation. Minor clearing of vegetation and earth works. Movement of workers.	Screening; built form to sit within existing topography; built elements form and design to reduce visibility within landscape.	Minor; –ve; D; P; LT.
4. Ridgeland Road (at pipeline crossing point)	Locally valued with capacity for the landscape to accept some change.	Clearing of vegetation. New access road and movement of vehicles and workers.	Encourage natural regeneration of grass and vegetation to pipeline corridor margin.	Negligible
5. Capricorn Highway	Locally valued with capacity for the landscape to accept some change.	Clearing of vegetation. New access road and movement of vehicles and workers.	Encourage natural regeneration of grass and vegetation to pipeline corridor margin.	Negligible
6. Meura Road	Locally valued with capacity for the landscape to accept some change.	Clearing of vegetation. New access road and movement of vehicles and workers.	Encourage natural regeneration of grass and vegetation to pipeline corridor margin.	Negligible
7. Roope Road	Locally valued with capacity for the landscape to accept some change.	Clearing of vegetation. New access road and movement of vehicles and workers.	Encourage natural regeneration of grass and vegetation to pipeline corridor margin.	Negligible
8. Bajool Port Alma Road	Locally valued with capacity for the landscape to accept some change.	Clearing of vegetation. New access road and movement of vehicles and workers.	Encourage natural regeneration of grass and vegetation to pipeline corridor margin.	Negligible

EIS Area: Landscape and Visual Impact Feature/Description/ Viewpoint	Current Value + Substitutable Y:N	Description of Impact		
		Description in Words	Mitigation Inherent in Design/Standard Practice Amelioration Who?/Why?/Scale?	Residual Impact using Significance Criteria
9. Darts Creek Road	Locally valued with capacity for the landscape to accept some change.	Clearing of vegetation. New access road and movement of vehicles and workers.	Encourage natural regeneration of grass within corridor, and vegetation and trees adjacent to corridor to form a screen to properties.	Minor; -ve; D; P; LT.
10. The Narrows Road	Locally valued with capacity for the landscape to accept some change.	Clearing of vegetation. New access road and movement of vehicles and workers.	Encourage natural regeneration of grass within corridor, and vegetation and trees adjacent to corridor to form a screen to properties and maintain local character.	Minor; -ve; D; P; LT.
11. Aldoga Reservoir	Locally valued with capacity for the landscape to accept some change.	Introduction of built elements and associated infrastructure into the landscape. Minor clearing of vegetation and earth works. Movement of workers.	Reduce visual intrusion through; vegetation screening and earthworks; sensitive built form to sit within existing topography; built elements form and design to reduce visibility within landscape.	Minor; -ve; D; P; LT.
KEY: Significance criteria: Major, High, Moderate, Minor, Negligible +ve = positive; -ve = negative impacts D = direct; I = indirect C = cumulative; P = permanent; T = temporary ST = short-term; MT = medium-term; LT = long-term		Relative Duration of Environmental Effects Temporary: Up to one year Short-term: From one to seven years Medium-term: From seven to 20 years Long-term: From 20 to 50 years Permanent: Period in excess of 50 years		



17.11 References

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