]	ENVIRONMENTAL ASSESSMENT
Appendix J	Visual



South East Fibre Exports 5MW Biomass Power Plant

Visual Impact Assessment

Prepared for:



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Introduction

1.1 Introduction

The South East Fibre Exports (SEFE) Biomass Power Plant visual assessment has been prepared by Green Bean Design Landscape Architects on behalf of URS Australia Pty Ltd.

The visual assessment involved an evaluation of the visual character of the landscape in which the Power Plant would be located and an assessment of the potential visual impacts that could result from the construction and operation of the Power Plant.

The primary objective of the visual assessment was to determine the likely visual impact of the Power Plant on people living and working in, or travelling through the landscape surrounding the Power Plant site, including the waters in and around Twofold Bay.

1.2 Methodology

The Power Plant visual assessment adopted a methodology that has been applied to a number of visual assessments for similar Power Plant projects undertaken by Green Bean Design.

A desktop study was undertaken by reference to 1:25,000 topographic maps as well as aerial photographs of the site and surrounding area. The topographic maps and aerial photographs were also used to identify potential view locations that could be assessed and verified during the fieldwork component of the visual assessment.

The field inspection involved:

- a detailed inspection to determine the potential extent of visibility of the Power Plant site;
- determination of the view locations from which the Power Plant site could potentially be visible;
- assessment of visual impact using:
 - potential visibility of the Power Plant site;
 - identification and mapping of potential view locations;
 - analysis of visibility; and
- identification of mitigation measures to minimise potential visual impacts.

1.3 Assessment of Visual Impact

The potential visual impact of the Power Plant would result primarily from a combination of the potential visibility of the Power Plant structures and the landscape characteristics between, and surrounding the viewer and the Power Plant. The potential degree of visibility and potential visual impact may be partly determined by a combination of factors including:

- The category of situation from which people may view the Power Plant (examples of view categories include residents and motorists);
- The visual sensitivity of view categories surrounding the Power Plant;
- The potential number of people with a view toward the Power Plant from any one view location;
- The distance between the view location and the Power Plant; and
- The duration of time a person may view the Power Plant from any static or dynamic view location.

Location and Environmental Factors

2.1 Location and Context

The SEFE site is situated on the far south coast of New South Wales around 380km south of Sydney and 40km from the New South Wales and Victorian State border. The SEFE site is located at Munganno Point on the south side of Twofold Bay around 3km south east of Eden and is accessed via Edrom Road extending off the Princes Highway. The proposed Power Plant would be located in a general central location within the SEFE site, to the east of the main woodchip stockpiles and on the site of the existing waste burner. The existing waste burner would be demolished and removed. The location of the SEFE site and proposed Power Plant is illustrated in **Figure 1**. The landscape immediately surrounding the proposed Power Plant is largely characterised and defined by the industrial nature of the SEFE site, which includes large scale elements associated with SEFE main operations. The large scale elements that contribute to the local visual character and includes:

- Woodchip stockpiles;
- Mill facilities and machinery;
- Storage structures;
- Loading wharf and gantry structures; and
- Lighting.

Urban development south of Eden is generally low density and not visually prominent due to screening by surrounding undulating landform or the presence of trees around developed areas and individual dwellings. Beyond the immediate vicinity of the SEFE site built development is generally limited to the Australian Defence Force wharf and Edrom Lodge.

2.2 Topography

Topography is a key influence on the extent to which the Power Plant may be visible from surrounding areas. Topography surrounding the SEFE site, as well as the broader area surrounding Twofold Bay, is illustrated in **Figure 2** and the key aspects summarised below:

- The SEFE site slopes gently east to west from the Power Plant location toward and beyond the woodchip stockpiles. The Power Plant would be constructed on a platform at around 40m AHD, with the top of the exhaust stack at around 75m AHD. From the SEFE site boundary the landform falls steeply over rocky outcrops to the surrounding waters of Twofold Bay.
- The landform to the south and south east of the SEFE site falls to the east and west of a ridgeline (along Edrom Road) across a portion of Ben Boyd National Park and the East Boyd State Forest. The ridgeline is generally located above the 100m AHD contour and reaches a highpoint around 142m AHD 2km south of the SEFE site. This ridgeline would tend to form the skyline and backdrop for a number of the view locations to the north of the SEFE site.
- Beyond the SEFE site the landform that extends to the west of Twofold Bay follows a complex series of hills, ridgelines and drainage lines.

SEFE Biomass Power Plant - Visual Assessment





SEFE Biomass Power Plant - Location Plan



Source: Copyright Department of Lands Panorama Avenue Bathurst 2795 (www.lands.nsw.gov.au)

Fig 1 - Location Plan

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• The Towamba and Nullica Rivers create relatively flat inlets adjoining Twofold Bay, which extend north and south of Boydtown.

2.3 Vegetation

The SEFE site is generally clear of vegetation across operational, laydown and stockpile areas although internal tree planting extends along internal roads and around buildings or offices within the SEFE site. There is a buffer of coastal tree and shrub planting between the SEFE site and the rocky outcrop defining the headland location. The wider landscape contains extensive and relatively dense timbered areas immediately to the south of the SEFE site, as well other areas extending west, and north of Eden, which are generally associated with Ben Boyd National Park and surrounding State Forests.

2.4 Landscape Characteristics

The landscape surrounding Twofold Bay is characterised by a high level of visual diversity and a generally 'naturalistic' appearance that is contrasted by the urban character of Eden and low density development fringing the Bay together with the industrial character of the SEFE facility. The high level of visual diversity results from a combination of:

- Visually prominent headlands which are generally covered by forest vegetation;
- Exposed rock faces formed by erosion of a series of major ridgelines extending to the edge of the Bay;
- Strong variation in landform adjoining the Bay, comprising a series of ridgelines extending from the Bay edge to connect with the mountain range to the west and alternating with a series of valleys formed by rivers and creeks draining into the Bay;
- Light coloured sandy beaches alternating with the headlands and contrasting in colour with the dark tones of vegetation on the adjoining slopes and ridges;
- Visually prominent residential development confined to the township of Eden located on the north side of the Bay; and
- Generally low density residential development adjoining the southern and western edges of the Bay, with a small number of tourist facilities associated with sandy beaches.

This high level of visual diversity results in a relatively high level of scenic quality which is associated with the far south coast of New South Wales and the landscape within, and surrounding Twofold Bay. Overall the physical characteristics of the landscape surrounding the Power Plant site are generally robust and consistent, and the degree to which the existing landscape may accommodate the Power Plant is likely to be relatively high given the existing industrial nature of the SEFE site and potential influence of dense timbered areas that form the backdrop to a number of the surrounding view locations.

SEFE Biomass Power Plant - Visual Assessment

LEGEND





HIGH POINT



SEFE Biomass Power Plant - Topography

Source: Copyright Department of Lands Panorama Avenue Bathurst 2795 (www.lands.nsw.gov.au)





Fig 2 - Topography

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Project Description

SECTION 3

3.1 Project description

Details of the various components of the Power Plant development are described in detail in the Environmental Assessment. The key visual elements associated with the Power Plant include:

- an existing uncovered area for the storage of biomass fuel;
- weatherproof fuel storage bunker with 1000m3 capacity;
- fuel storage bin;
- flue gas exhaust stack;
- 5 MW multi-stage steam turbine;
- generator set connected to SEFE's existing high voltage switch room; and
- seawater intake and return pipelines.

The overall dimensions of the Power Plant structures would include:

- A boiler house around 30m in length, 16m in width and 23m in height;
- A turbine house around 40m in length, 20m in width and 8m in height; and
- An exhaust stack around 35m high and 1.6m in width.

A number of the ancillary structures would be located within the proximity of the main turbine and generator housing, but are unlikely to form visually prominent elements within the existing landscape. The proposed exhaust stack is likely to be cylindrical in form and visually narrower than the existing burner.

The detailed cross section illustrated in **Figure 3** provides an indicative comparison between the bulk and form of the existing burner and the main structures associated with the proposed Power Plant. The cross section demonstrates that there is likely to be no overall difference in physical height between the existing and proposed structures, although the length of the proposed Power Plant is likely to exceed the dimensions of the existing burner. The proposed exhaust stack will be around 6m higher than the existing burner but, at around 1.6m in width, is unlikely to be prominent visual component of the Power Plant.



SEFE Biomass Power Plant - Visual Assessment

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Panoramic Photographs

SECTION 4

4.1 Panoramic Photographs

A series of photographs were taken during the course of the fieldwork to illustrate views from a number of indicative view locations surrounding and beyond the SEFE site, which were inspected and assessed as part of the visual assessment process.

Individual photographs were digitally stitched together to form a segmented panoramic image to provide a visual illustration of the existing view from each photographic location.

The panoramic images presented in this report have been annotated to identify key existing features located within the view.

The panoramic photographs are illustrated in Figures 4 to 7.



Fig 4 - Photosheet 1

Detail 2 - View south east from Murrumbulga Point



SEFE Biomass Power Plant - Visual Assessment













Existing burner – (below tree line)

Stockpiles

Murrumbulga Point car park

Prominent ridgeline south of Boydtown Beach

Existing burner (below tree line)

Boyds Tower --

- Stockpiles

Refer Detail 2

Photo Location A - Boydtown Beach

Navy wharf

SEFE wharf

Photo Location B - Murrumbulga Point car park

Boydtown beach -- Existing waste burner Refer Detail 1 Eagles Claw Eden -Murrumbulga Point



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Fig 5 - Photosheet 2

Detail 4 - View south to south east from Aslings Beach







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Source: Copyright Department of Lands Panorama Avenue Bathurst 2795 (www.lands.nsw.gov.au)

Photo Locations C & D

Existing burner – viewed below skyline

Eden

— Stockpiles

Existing burner -viewed below skyline

Stockpiles

Photo Location D - Aslings Beach, Eden

-Eagles Claw

- Existing burner viewed below skyline

Boyds Tower

Worang Point --

Photo Location C - Lookout Point, Eden

Stockpiles

SEFE wharf

-Refer Detail 4

Boydtown Beach

Torarago Point

Whale Beach -

Brierly Point -

Existing burner — (below tree line) Refer Detail 3 -

Boyds Tower

Navy wharf

SEFE



Photo Location E - Snug Cove, Eden



Photo Location F - Legges Beach, Quarantine Bay





Detail 5 - View south east from Legges Beach

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Fig 6 - Photosheet 3



Photo Location G - SEFE, view north to north west



Photo Location H - SEFE Wharf, view south east



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Fig 7 - Photosheet 4

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Visual Impact

SECTION 5

5.1 Introduction

The potential visual impact of the proposed Power Plant would result primarily from the combination of two factors:

- The level of visibility or extent to which the proposed Power Plant structures would be visible from surrounding areas; and
- The degree of visual contrast between the proposed Power Plant structures and the capability of the surrounding landscape to visually accommodate them.

The potential visual impact from particular view locations is strongly dependant on the level of visibility from that location, which in turn is dependent on a number of criteria which are defined in **Table 1**.

5.2 Visual Impact

Visual impact is a measure of the extent to which particular structures of the Power Plant would be visible from surrounding areas and considers the relative number and type of viewers, the period of the view, view distance and context of the view.

The distance between the proposed Power Plant and the potential viewers has been illustrated as a series of concentric band widths extending out from the proposed site across the landscape. Individual view locations can be identified and assessed in relation to their distance and the degree of potential visual impact.

The influence of distance on visibility results primarily from two factors:

- With increasing distance the proportion of the horizontal and vertical view cone occupied by the Power Plant would decline.
- As the view distance increases so does the atmospheric effects resulting from dust and moisture in the atmosphere which tends to make elements of the Power Plant appear grey, thus reducing the contrast between the Power Plant and the background against which they are viewed.

Visual Assessment Criteria and Matrix

6.1 Introduction

A visual impact rating for each view location has been assessed and determined against the criteria outlined in **Table 1** below:

Criteria	Definition
Number of Viewers	
High	>1000 people per day
Moderate	500 - 1000 people per day
Low	250 - 500 people per day
Very Low	<250 people per day
View Distance	
Distant	>4km
Long	2km – 4km
Medium	1km – 2km
Short	500m – 1km
Very short	<500m
Period of View	
Long term	> 2 hours
Moderate term	30 - 120 minutes
Short term	10 – 30 minutes
Very Short Term	< 10 minutes

Table 1 - View Location Assessment Criteria

An indicative visual impact rating resulting from various combinations of the above criteria is listed in the following Table.

		nt and Distanc			Mediun Distanc		Sho	rt Dista	ance		ery Sho Distanc	
Period of View	L	м	s/vs	L	м	s/vs	L	м	s/vs	L	м	s/vs
High No. of Viewers	М	L	L	Н	М	М	Н	Н	М	Н	Н	Н
Moderate No. of Viewers	L	L	L	М	М	L	Н	М	М	Н	Н	М
Low No. of Viewers	L	L	L	М	L	L	М	М	L	Н	М	L
Very Low No. of Viewers	L	L	L	L	L	L	М	L	L	М	М	L

 Table 2 - Visibility Criteria Matrix

- Period of View L/M=Long to Moderate term, S=Short term , VS=Very Short term
- Levels of visibility L=low, M=medium and H=high

The visibility criteria matrix is used **as a guide** to determine a visual impact rating. The visual impact rating for each view location is also considered against other factors, which include

the sensitivity of the viewer. The general relationship between the viewer category and their potential level of sensitivity is outlined in **Table 3** below:

Viewer Category	Sensitivity
Residential Properties	Highest Sensitivity
Pedestrians (recreational)	\bigtriangledown
Public Recreational Space (incl. water bodies)	\bigtriangledown
Pedestrians (non-recreational)	\bigtriangledown
Motorists	\bigtriangledown
Business (commercial)	\bigtriangledown
Industry	Lower Sensitivity

6.2 Assessment Matrix

Table 4 presents the Assessment Matrix for the potential view locations together with the:

- Category of viewer;
- Context of view;
- Approximate distance between the view location and the Power Plant;
- Relative numbers of people;
- Viewer sensitivity; and
- Estimated period of view.

Potential view locations are illustrated in Figure 8.

SEFE Biomass Power Plant - Visual Assessment



SEFE Biomass Power Plant - View Locations

Source: Copyright Department of Lands Panorama Avenue Bathurst 2795 (www.lands.nsw.gov.au)

0m 500m 1Km



Fig 8 - View Locations

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Table 4 - Assessment Matrix – View Locations R1 to R14

View Location	Category of Viewer	View context	Approx. distance to the proposed Power Plant	Relative number of viewers	Estimated period of view	Viewer sensitivity	Visibility Rating
R1 Worang Point, Ben Boyd National Park	Visitor	Extensive and expansive views from Worang Point lookout across Twofold Bay toward Eden and coastline extending south. Distant views south toward the SEFE site, including the woodchip stockpiles. Views extend beyond the SEFE site toward dense timbered slopes and ridgelines. Views of the existing waste burner tend to occur below the skyline from this view location with a backdrop of dense forest vegetation providing a high degree of visual absorption.	5km	Very Low	Generally short term (potentially moderate)	High	Low
R2 Aslings Beach	Visitor	Extensive and expansive views from Aslings Beach toward Eden and the coastline extending south. Distant views south toward the SEFE site, including the woodchip stockpiles, extend toward dense timbered slopes and ridgelines. Views of the existing burner tend to occur below the skyline from this location with a backdrop of dense forested vegetation providing a high degree of visual absorption.	5.6km	Very Low	Generally moderate	High	Low
R3 Eden	Residents, pedestrians or motorists	Views toward the SEFE site from the commercial centre of Eden, including the majority of residential areas within Eden, are generally screened by topography, vegetation and built development. Photo location G (Figure 7), from the SEFE site	4 to 5km	Low	Varies up to long term	Varies High for resident, Iow for motorist	Low to Nil

View	Category of	View context	Approx. distance	Relative	Estimated	Viewer	Visibility
Location	Viewer		to the proposed	number of	period of	sensitivity	Rating
			Power Plant	viewers	view		
		toward Eden, illustrates that a small number of residential dwellings may have distant views toward the location of the proposed Power Plant. Views toward the existing burner will tend to occur below the skyline from this location with a backdrop of dense forested vegetation providing a high degree of visual absorption.	2.51				
R4 Eagles Claw Lookout	Residents, pedestrians, motorists or visitors	Views toward the SEFE site from Eagles Claw (south Eden), including the majority of residences, are generally screened by vegetation above the rocky coastal outcrops. Photo Location G (Figure 7), from the SEFE site toward Eden, illustrates that a small number of residential dwellings may have distant views toward the location of the proposed Power Plant. The panoramic view from the lookout illustrated in Photo Location C (Figure 5) extends across and beyond Twofold Bay, with direct views toward the SEFE site and Power Plant location. The existing burner is visible above and to the left of the visually prominent woodchip stockpiles. The existing burner is not a visually prominent feature from this view location and, situated below the skyline, tends to be visually absorbed by the dense timbered area forming a backdrop to the view.	3.5km	Low	Varies up to long term	Varies High for resident, low for motorist	Low

View Location	Category of Viewer	View context	Approx. distance to the proposed Power Plant	Relative number of viewers	Estimated period of view	Viewer sensitivity	Visibility Rating
R5 Snug Cove & Wharf	Visitors and commercial facilities	Views toward the SEFE site from the commercial fishing wharves are generally screened by a combination of landform and built development. There are no direct views toward the existing burner within the SEFE site.	4km	Low	Varies up to long term	High	Nil
R6	Residents	There is potential for intermittent and distant views toward the SEFE site from residential dwellings north and north east of Cocora Point and north of Snug Cove; however, the majority of views from residential dwellings are generally screened by vegetation above rocky shoreline areas.	4.5 to 5km	Low	Varies up to long term	High	Low
R7 Twofold Bay Yacht Club and Quarantin e Bay	Visitors	Distant views extend south east across Twofold Bay toward the SEFE site and existing waste burner from areas surrounding the Yacht Club and Murrumbulga Point boat ramp and breakwater.	5km	Very Low	Generally short term (potentially moderate)	High	Low
R8 Discovery Holiday Park	Visitors or campers	Views toward the SEFE site from within the holiday park are largely screened by accommodation structures and service facilities as well as vegetation surrounding and alongside the adjoining beach. Cabins situated along the eastern portion (beachside) of the holiday park may have views across the Bay extending toward the SEFE site and existing burner structure as illustrated in Photo Location F (Figure 6).	5.7km	Very Low	Varies up to long term	High	Low

View Location	Category of Viewer	View context	Approx. distance to the proposed Power Plant	Relative number of viewers	Estimated period of view	Viewer sensitivity	Visibility Rating
R9 Princes Highway	Motorists and visitors	There are opportunities for indirect views east toward the SEFE site and existing waste burner from a short section of the road bridge spanning the Nullica River. The short section of road (less the 400m) is generally the only opportunity to view the SEFE site from the Princes Highway.	5.9km	High	Generally short term	Varies High for resident, Iow for motorist	Low
R10 Twofold Bay Beach Resort	Visitors or campers	Views toward the SEFE site from areas within the resort are generally screened by a combination of landform, including the main ridgeline extending toward Torarago Point, and vegetation between the beach and the resort. There are distant and skyline views toward the SEFE site and existing waste burner from portions of Boydtown Beach to the east of the resort.	5 to 6km	Very Low	Varies up to long term	High	Low
R11 Seahorse Inn and Boydtown Beach	Visitors or resident staff	Views toward the SEFE site from the southern portion of Boydtown Beach are generally blocked by the timbered ridgeline extending toward Torarago Point south east of Nullica Bay.	4.7km	Very Low	Varies up to long term	High	Nil
R12 Davidson Whaling Station (Historic Site)	Visitors	Views east to north east toward the SEFE site from the Whaling Station are blocked by a combination of landform and vegetation. There are no views toward the existing burner from the whaling station or immediate cartilage surrounding the buildings.	1.8km	Very Low	Generally short term (potentially moderate)	High	Nil

View Location	Category of Viewer	View context	Approx. distance to the proposed Power Plant	Relative number of viewers	Estimated period of view	Viewer sensitivity	Visibility Rating
R13 Edrom Lodge	Visitors or resident staff	Views toward the SEFE site from Edrom Lodge are generally screened by a combination of landform and vegetation. There are no views toward the existing burner from this location.	Less than 1km	Very Low	Varies up to long term	High	Nil
R14 Twofold Bay	Commercial or recreational water activities	There are potential views toward the SEFE site and existing waste burner from a large area of water across Twofold Bay. The degree to which the existing waste burner may be visible is highly dependent upon the location of the viewer relative to the burner. As with the majority of land based views, the existing burner tends to be viewed below the skyline from distances of medium or greater.	Varies (from 1km to beyond 5km)	Low	Generally short term (potentially moderate)	High	Low

6.3 Summary of Visual Impact Ratings

A total of 14 indicative view locations were identified as part of the visual assessment process.

An assessment of the visibility rating for each view location indicated that for the proposed Power Plant:

- 4 of the 14 view locations have been determined to have a NIL visual impact; and
- 10 of the 14 view locations have been determined to have a LOW visual impact.

Mitigation Measures

SECTION 7

7.1 Mitigation Measures

While the overall potential visual impact of the Power Plant has been assessed as low, the following mitigation measures would potentially help to minimise the level of visual impact.

The mitigation measures generally involve reducing the extent of visual contrast between the visible portions of the Power Plant structures and the surrounding landscape.

Structures

 The colour and texture of structures in the Power Plant should be dark in tone and utilise non-reflective materials. This would potentially minimise the visual contrast between the structures and forested areas that form a background to a number of views locations surrounding and beyond the SEFE site.

Lighting

- Lighting associated with the Power Plant would be designed to avoid direct line of sight from areas surrounding the site from which portions of the Power Plant stack may be visible at night.
- The top of the stack would not have lighting.
- Large floodlights would generally not be used, although it is likely that some lights may be required for lighting to allow emergency maintenance.
- Security lighting would be designed not to spill light.

A summary of the visual mitigation measures is presented in Table 5.

Mitigation Measures	Planning & Design	Operation
Materials utilised in the construction of the Power Plant would be generally dark in tone and where possible non reflective.	~	~
Lighting would avoid direct line of sight to distant view locations	\checkmark	~
Top of the stack would not have lighting.	√	\checkmark
Large floodlights not to be used other than for emergency lighting.	\checkmark	~
Security lighting would not spill onto neighbouring areas. This would be achieved through the use of down lights and motion sensor lighting.	~	~

Table 5 Summary of visual Mitigation Measures

Conclusions

SECTION 8

8.1 Summary

A total of 14 view locations were identified and assessed as part of the visual assessment process. An assessment of the visibility and resultant visual impact for each of the 14 view locations indicated that:

- 4 of the 14 view locations were determined to have a NIL visibility rating; and
- 10 of the 14 view locations were determined to have a LOW visibility rating.

The Green Bean Design visual assessment concludes that overall the construction and operation of the SEFE Biomass Power Plant would have a low visual impact on people in areas surrounding the site. The low visual impact would be due to a combination of the following factors:

- The Power Plant would replace the existing waste burner structure on the SEFE site, and would generally comprise structures at a built height lower than the existing waste burner (excluding the proposed exhaust stack). The proposed exhaust stack, at around 35m in height and 1.6m in diameter, would be unlikely to create a significant visual impact from the majority of surrounding view locations.
- The majority of land based views, including those from the north and north west of the SEFE site, tend to be distant (in excess of 3 to 4km), with the existing waste burner (and site of the Power Plant) occupying a relatively small portion of the overall available panorama.
- The existing waste burner (and site of the Power Plant) tends to be viewed below the skyline and against a background of dense timbered areas from a majority of surrounding view locations. The background provides a relatively high degree of visual absorption which reduces the visibility of the existing waste burner (and the proposed Power Plant).
- The majority of land based view locations from areas surrounding Twofold Bay are significantly influenced and screened by ridgelines and extensive areas of timber cover extending toward and surrounding the Bay. These physical characteristics also provide screening from view locations located within 2km of the SEFE site, including the historic Davidson's Whaling Station and Edrom Lodge.
- The ancillary structures associated with the Power Plant, including electrical infrastructure and water pipelines, are unlikely to result in any significant visual impacts.
- There are unlikely to be any significant views toward the proposed Power Plant from surrounding roads or access tracks, including the Princes Highway.
- There are no known existing developments of a similar nature within the local or surrounding area, therefore it is considered that no cumulative visual impacts are likely to occur.

• It is understood that during normal operation there is unlikely to be a visible emissions plume above the Power Plant exhaust stack.