Mt Piper Power Station Extension

ENVIRONMENTAL ASSESSMENT

CHAPTER 11 – VISUAL IMPACTS

- September 2009

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11. Visual Impacts

The Director-General's requirements:

The Environmental Assessment must include an assessment of the visual impact of the project from representative viewing points including residential receivers, settlements and significant public view points and include a framework for the mitigation and management of visual amenity impacts on affected receivers. An overview of the effectiveness and reliability of the measures and any residual impacts after the implementation of such measures must be included.

11.1 Methodology

The visual impact assessment included a desktop analysis of existing photographs, maps and drawings, a field survey of sensitive locations, graphical simulation of the proposed new plant in the context of the existing landscape, assessment of the visual impact, and development of mitigation measures which would minimise the visual impact of the proposed new plant. The purpose of the visual assessment was to establish the visual impact of the proposed new plant by considering the degree of visual modification and the visual sensitivity of the surrounding areas.

11.1.1 Visual Modification

The degree of visual modification resulting from the proposed development is the level of visual contrast between the new plant and the existing visual setting in which it is located. The different levels of visual modification are described in **Table 11-1**.

The degree of visual modification generally decreases as the distance between the proposed development and the viewer increases.

Table 11-1 Levels of Visual Modification

Level of Visual Modification	Description
High	Proposed development is a major element that contrasts strongly with the existing environment. Little or no natural screening or integration with existing environment.
Medium	Proposed development is visible and contrasts with the surrounding environment but is integrated to some degree. Surrounding vegetation / topography provides some visual screening.
Low	Proposed development may be noticeable but does not markedly contrast with the existing environment. High level of integration in terms of form, shape, colour or texture.

11.1.2 Visual Sensitivity

Visual sensitivity is a measure of how critically a change to the existing landscape would be viewed from various areas. The visual sensitivity depends on a range of characteristics such as land use, the number of viewers, the viewing time and the distance between the proposed development and the viewer. These characteristics were all considered in developing the different levels of visual sensitivity from land uses surrounding the Mt Piper Power Station (refer to **Table 11-2**).

Table 11-2 Levels of Visual Sensitivity

Land Use	Foreground		Middle ground		Background
	0 – 0.5 km	0.5 – 1 km	1-2 km	2-3 km	>3 km
Rural residential	H	H	H	M	L
Main roads	H	M	L	L	L
Local roads	M	L	L	L	L
Agricultural areas	L	L	L	L	L
Mines	L	L	L	L	L

Typically, residential areas are more sensitive to changes in the visual environment than roads or productive land. This is primarily due to the different lifestyle contexts associated with these land uses. Hence, rural residential areas have been rated quite highly in terms of their visual sensitivity. Main roads have also been given a relatively high visual sensitivity rating due to the large number of people that could view the development whilst travelling on these roads.

11.1.3 Visual impact

The visual impact of the proposed development is determined by considering both the degree of visual modification and the visual sensitivity. A matrix has been developed to identify the level of impact for each combination of visual modification and visual sensitivity (refer to **Table 11-3**).

Table 11-3 Visual Impact Matrix

		Visual Sensitivity		
		High	Medium	Low
Visual Modification	High	H	H	M
	Medium	H	M	L
	Low	M	L	L

11.2 Existing Environment

The Mt Piper Power Station is predominantly surrounded by rural and extractive industries (mining). The Wallerawang Power Station is located approximately 6 km to the south-east, the Ivanhoe Colliery is located directly to the north, Springvale Mine is located immediately to the south-east of the existing ash disposal area and numerous other mines are located in close proximity.

The nearest townships are Portland, which is approximately 4 km to the west of the site, and Wallerawang, which is approximately 6 km to the south-east of the site. There are also several communities in the vicinity of the power station, including Blackmans Flat, which is approximately 3 km to the south-east, Lidsdale, which is approximately 6 km to the south-east, Cullen Bullen, which is approximately 6 km to the north of the site and rural residential properties in Back Cullen Road, which are approximately 3 km to the west of the site.

The Mt Piper Power Station is surrounded by undulating terrain. Due to the topography and vegetation screening around the existing plant, the existing Mt Piper Power Station is not a dominant visual feature in the landscape. The majority of the plant is hidden from view, although the top of the exhaust stack and the water vapour from the cooling towers are visible from the surrounding areas.

The plant itself is visible from the northbound carriageway of the Castlereagh Highway for approximately 1 km, although vegetation screening adjacent to the highway minimises its visual obtrusiveness. Whilst the top of the stack and the water vapour from the existing cooling towers are visible from the surrounding areas, the visual impacts are not considered to be significant due to the distance between the plant and sensitive viewpoints.

11.2.1 Visual Management Units

The site for the new plant can be divided into two visual management units (VMUs), which reflect areas where the landform, vegetation and land use are relatively consistent throughout the unit.

The area between the entrance road and the western edge of the existing plant comprises flat, cleared land, which is approximately 100 – 200m wide. This site was cleared and filled when the power station was originally constructed, to accommodate future expansion of the plant. The main power block (the boilers, turbines, generators etc) would be constructed in this area.

To the west of the power station entrance road, the topography is gently undulating and vegetation cover increases. The new coal live storage area would extend approximately 200m beyond the entrance road into this VMU.

11.2.2 Visual Absorptive Capability

The visual absorptive capability (VAC) of an environment is a measure of the relative ability of a landscape to absorb visual modification. A landscape with a high VAC is able to incorporate more visual modification without significant impact to the viewer than one with a low VAC.

The degree of absorptive capability is influenced by topography and vegetation. In general, there are more opportunities to minimise the visual impact of a development in varied and undulating landscapes than areas of flat terrain.

In areas where the topography does not conceal the development from surrounding areas, vegetation can be used to screen the development from sensitive viewpoints. The height, density, colour and seasonal change of the vegetation can all affect the VAC of the environment to conceal the development. In general, smaller trees with low canopies can be used effectively on gentle slopes or flat areas to screen developments, and taller trees with high canopies are more effective on steeper slopes.

The VAC of the natural environment to absorb the new plant would be relatively low. However, the VAC of the existing built environment to absorb the extension would be high, given the disturbed nature of the site and the similarities between the existing plant and the extension.

11.3 Visual Characteristics of the Proposed Development

11.3.1 Physical Appearance of the Plant

The new coal plant would have a similar appearance to the existing plant as several components (the boilers, turbines, generators, fly ash collection plant and coal live storage area) would essentially be duplicated to the west of the existing plant (refer to Chapter 3). The new exhaust stack would be up to 250m high and it would have a similar appearance to the existing stack. The gas plant would be similar in bulk, although it is likely to have up to six stacks, each 60-80m high.

The main difference in the visual appearance of the new plant would result from the presence of ACCs rather than cooling towers. The two ACC units would be approximately 30m high. Due to the relatively low height of the ACCs, they would not be visible from the surrounding sensitive viewpoints.

11.4 Visual Impact Assessment

11.4.1 Visual Modification

Whilst the new plant would contrast with the surrounding natural environment, the visual modification of the existing built environment would be relatively low, given the size, scale and appearance of the new plant compared with the existing plant. Furthermore, the site has already

been cleared to accommodate the new units and only a small area of revegetated land on the western side of the entrance road would be required for the new works.

11.4.2 Visual Sensitivity

The nearest residences are located at Blackmans Flat and Back Cullen Road, approximately 3km from the power station. Other sensitive viewpoints include the townships of Portland, Lidsdale and Cullen Bullen, which are approximately 4-6km from the site.

Whilst the existing exhaust stack and water vapour from the existing cooling towers are visible from sensitive locations such as the nearby townships/communities, the majority of the plant is hidden from view. Given the distance between the sensitive viewpoints and the power station, the visual sensitivity from these locations would be low.

The power station is also visible from the Castlereagh Highway and Boulder Road. However, mounding and vegetation adjacent to these roads minimise the visual intrusiveness. As these roads are located in close proximity to the power station, the visual sensitivity is regarded as moderate.

Visual Impact

A zone of visual influence has also been developed to identify the locations from which the new stack (for the coal option) would be visible (refer to **Figure 11-1**). The zone of influence was generated using a 250m high stack for a radius of 10 km from the power station and represents the worst case for the two options.

The model assumes there is no vegetation coverage or screening from other objects or structures. Hence, the zone of influence is also the worst case and the stack may not actually be visible from all locations shown on **Figure 11-1**. Furthermore, the zone of visual influence does not provide an indication as to the length of stack that would be visible from the different viewpoints.

The extent of visual modification can be more easily identified from the photomontages in **Figure 11-2** to **Figure 11-6**, in which the new coal plant has been super-imposed on photographs of existing viewsheds. These photomontages show that only the top of the new stack would be visible from the surrounding townships/communities. It follows that the stacks from the gas fired plant used would not be visible from these parts.

Figure 11-7 and **Figure 11-8** show diagrammatically views of the existing and extended power station (again assuming a coal plant) from a 'bird's eye-view'. **Figure 11-7** shows the view from the south west, looking north east. The ash storage area and existing open cut mining adjacent to Castlereagh Highway are shown, with Blackmans Flat in the top right (refer also to

Figure 11-5). **Figure 11-8** shows the view from the south east to the north west. The rural residential areas near Back Cullen Road are shown to the north west (refer also to the view in **Figure 11-3**).

For both figures it is clear that the extended power station is well concealed from these viewing areas and visual impacts would be limited.

Given the VAC of the existing built environment to absorb the visual changes and the distance between sensitive viewing locations and the power station, the visual impact of the new plant would be low.

11.5 Mitigation of Visual Impacts

The visual impacts of the new plant have been mitigated through its location and design.

11.5.1 Location

The Mt Piper Power Station is already well screened from sensitive viewpoints by topography and vegetation. The new plant would be located adjacent to the existing plant and as such, the existing environment has a much higher VAC to absorb the visual modification than an undisturbed site. Furthermore, the new plant would predominantly be located in a cleared area, to minimise the extent of vegetation clearing required.

11.5.2 Design

As the new plant would essentially be a duplication of the existing plant, it would have a similar appearance to the existing plant. Whilst the new components would be clearly visible to those familiar with the plant's appearance, the modifications would be consistent with the overall appearance of the plant. At present, the exhaust stack and water vapour plumes from the cooling towers are visible from the surrounding townships/communities.

The new exhaust stack for the coal option would be the same height as the existing stack and as such, would not be any more obtrusive, while the exhaust stack for the gas option would not be visible. The new ACCs would use a direct dry cooling process to cool the spent steam and as such, would not generate water vapour plumes. Hence, the visual obtrusiveness of the new plant would be minimised.

11.5.3 Landscaping

Some additional landscaping treatments would be required to improve the overall aesthetic appearance of the power station following the disturbance of construction works.

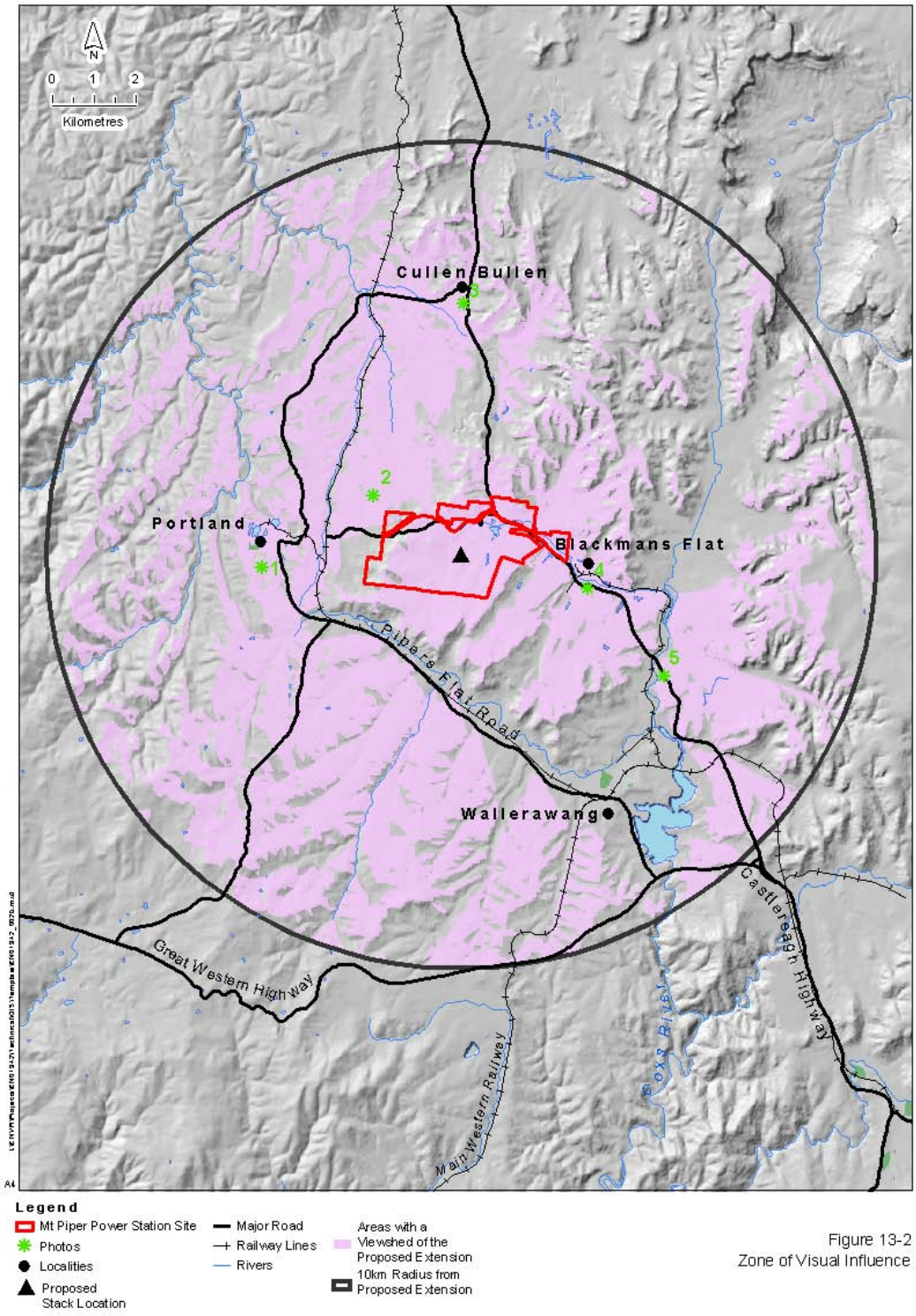

Figure 13-2
Zone of Visual Influence

- **Figure 11-1 Zone of Visual Influence**

- **Figure 11-2 Viewshed from Portland**

- **Figure 11-3 Viewshed from Back Cullen Road**

- **Figure 11-4 Viewshed from Cullen Bullen**

- **Figure 11-5 Viewshed from Blackmans Flat**

- **Figure 11-6 Viewshed from Lidsdale**

- **Figure 11-7 View of Power Station Extension (USC coal) to the north east**

- **Figure 11-8 View of Power Station Extension (USC coal) to the north west**

11.5.4 Residual Impacts

Given the low level of visual impact, and the limited mitigation measures required, residual impacts would be low.

11.6 Conclusions

The visual impact of the Mt Piper Power Station Extension would generally be quite low due to the following factors:

- The distance between the power station and sensitive viewing locations;
- The low number of vantage points;
- The surrounding topography and vegetation;
- The similarities in appearance between the existing plant and new plant; and
- The design modifications such as the reduced stack height (gas only) and use of ACCs rather than cooling towers.

Whilst it is proposed that appropriate landscaping treatments be provided, no further mitigation measures are required.