

ENVIRONMENTAL ASSESSMENT

Duralie Extension Project

APPENDIX 0 VISUAL ASSESSMENT



APPENDIX O
DURALIE EXTENSION PROJECT
VISUAL ASSESSMENT

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01 INTRODUCTION

This report provides an assessment of the potential visual impacts associated with the Duralie Extension Project (the Project) and has been prepared for inclusion in the Environmental Assessment (EA) in accordance with the Director General's Environmental Assessment Requirements (EARs) for the Project. In relation to the assessment of key issues (which includes visual), the EARs relevantly state:

Visual – with particular emphasis on the measures that would be implemented to minimise the visual impacts of the project on The Bucketts Way.

Approval for the Project is being sought under Part 3A of the New South Wales (NSW) *Environmental Planning and Assessment Act, 1979* (EP&A Act).

The Project would be located approximately 10 kilometres (km) north of the village of Stroud and 20 km south of Stratford in the Gloucester Valley in NSW (Figure O-1). The Project is a proposed extension of the existing Duralie Coal Mine (DCM). The DCM is owned by Duralie Coal Pty Ltd (DCPL).

The following components were included as part of this visual assessment:

- Review of the previous visual assessments undertaken for the DCM viz. *Visual Impact Assessment Report* (EDAW Australia – Appendix K of the *Duralie Coal Environmental Impact Statement* [the Duralie Coal EIS] (DCPL, 1996); *Duralie Extended Modification Statement of Environmental Effects* (Duralie Extended SEE) (DCPL, 2006); and *Duralie June 2009 Modification Environmental Assessment* (DCPL, 2009a).
- A site inspection to identify the viewshed for the Project and potentially sensitive viewing locations within the vicinity of the Project.
- Characterisation of the existing visual landscape in terms of topography, existing land use and vegetation.
- Consultation with potentially affected local residents to discuss the objectives and proposed methodology of this visual assessment.
- Characterisation of the main aspects of the Project with respect to potential visual impacts.
- Recommendations for the management of potential visual impacts.



O2 METHODOLOGY

The following provides a description of the methodology adopted for the visual assessment.

The methodology employed for this visual assessment was developed on analysis of the visual setting and assessment of the anticipated impacts of the Project. The key factors considered include:

- sensitive land use (e.g. privately owned residential areas and public roads and natural/recreation areas); and
- the visual form, scale and colour of the proposed development.

The methodology employed during the preparation of this visual assessment was as follows:

- Review previous visual assessment reports undertaken for the DCM (Section O3).
- Characterise the existing landscape and visual setting (Section O4).
- Examine the main aspects of the Project (Section O4).
- Determine the Zone of Visual Influence (ZVI) (Section O5).
- Qualitatively assess (Section O5):
 - Visual modification at key viewpoints – *How would the Project contrast with the existing landscape character of the surrounding setting?*
 - Visual sensitivity at key viewpoints – *How sensitive would viewers be to the Project?*
- Consideration of the Australian Standard (AS) 4282 *Control of Obtrusive Effects of Outdoor Lighting*.
- Propose mitigation and management measures (Section O6).

The methodology employed by this visual assessment is based on the United States Forestry Service (USDA-FS) (1974) methodology. The potential visual impact was assessed by evaluating the level of visual modification of the development in the context of the visual sensitivity of relevant surrounding land use areas (i.e. those areas from which the proposed development may be visible) (EDAW Australia, 2006). Levels of visual impact resulting from visual modification and sensitivity are illustrated in Table O-1.

**Table O-1
Visual Impact Matrix**

		Viewer Sensitivity			
		H	M	L	
Visual Modification	H	H	H	M	VL = Very Low L = Low M = Moderate H = High
	M	H	M	L	
	L	M	L	L	
	VL	L	VL	VL	

Source: EDAW Australia (2006).

O2.1 VISUAL MODIFICATION

The degree of visual modification of a proposed development can be measured as a function of the contrast between the development and the existing visual landscape (including the approved mine landforms of the DCM). Throughout the visual catchment, the level of visual modification generally decreases as the distance from the development to various viewpoint locations increases, and is categorised as follows (EDAW Australia, 2006):

- Negligible (or very low) level of visual modification – where the development is distant and/or relates to a small proportion of the overall viewscape.
- Low level of visual modification - where there is minimal visual contrast and a high level of integration of form, line, shape, pattern, colour or texture values between the development and the landscape. In this situation the development may be noticeable, but does not markedly contrast with the existing modified landscape.
- Moderate level of visual modification - where a component of the development is visible and contrasts with the landscape, while at the same time achieving a level of integration. This occurs where surrounding topography, vegetation or existing modified landscape provide some measure of visual integration or screening.
- High level of visual modification - where the major components of the development contrast strongly with the existing landscape.

O2.2 VISUAL SENSITIVITY

Visual (viewer) sensitivity is a measure of how critically a change to the existing landscape would be viewed from various use areas, where different activities are considered to have different sensitivity levels. Visual sensitivity can therefore be described as a function of both land use and duration of exposure (EDAW Australia, 2006). For example, individuals would generally view changes to the visual setting of their residence more critically than changes to the visual setting of the broader setting in which they travel or work (EDAW Australia, 2006). Another factor to consider is the extent to which the viewer has become accustomed to significant modifications to the landscape and existing industrialisation in the region (EDAW Australia, 2006).

The visual sensitivity of the development depends on a range of viewer characteristics. The primary characteristics used in this visual assessment are land use, the distance to the Project and the Project landforms. These characteristics were assessed from the perspective of the viewer and visibility from critical viewpoints.

The extent to which the viewer has become accustomed to the DCM which is an existing modification to the landscape has also been considered.

Typical visual (viewer) sensitivity levels are defined in Table O-2.

**Table O-2
Typical Visual (Viewer) Sensitivity Levels**

Use Area	Foreground (Local Setting)		Middleground (Sub-Regional Setting)		Background (Regional Setting)
	0 - 0.5 km	0.5 - 1 km	1 - 2.5 km	2.5 - 5 km	> 5 km
Natural Area - Recreation	H	H	H	M	L
Residential - Rural	H	H	H	M	L
Residential - Township	H	H	H	M	L
Tourist Roads	H	M	M	L	L
Other Main Roads	M	L	L	L	L
Local Roads	L	L	L	L	L
Industrial Areas	L	L	L	L	L

Source: EDAW Gillespies (2005), EDAW Australia (2006).

H - High, M – Moderate, L – Low.

For the purposes of this visual assessment, land use areas in the vicinity of the Project were characterised in terms of low, moderate or high visual sensitivity, as follows:

- Low visual sensitivity – areas of rural, industrial and mining land use (e.g. agricultural land and coal mines) and minor roads (e.g. Johnsons Creek Road).
- Moderate visual sensitivity – major or arterial roads (e.g. The Bucketts Way).
- High visual sensitivity – rural residential dwellings (e.g. “Hattam Pty Ltd” dwelling [herein referred to as “Hattam”] located approximately 0.5 km east of the Project).

O2.3 ZONE OF VISUAL INFLUENCE ANALYSIS

The ZVI is the area from which views of a particular development may be possible. Its primary purpose is to identify locations from which a development may be visible (EDAW Australia, 2008).

The ZVI does not take into account the screening effect of vegetation and aspects of the built environment (e.g. sheds) and therefore identifies a greater extent of viewshed than would actually exist.

O3 REVIEW OF PREVIOUS VISUAL ASSESSMENTS

Three visual assessments have previously been conducted for the DCM. A visual impact assessment was conducted for the Duralie Coal EIS, prior to the commencement of construction of the DCM. Additional minor visual assessments have been conducted for subsequent modifications to the DCM. A review of each assessment is provided below.

O3.1 VISUAL IMPACT

A visual assessment was conducted for the Duralie Coal EIS in 1996 (EDAW Australia, 1996). Two simulation points were used to assess visual impact surrounding the extent of the DCM visual catchment. Four simulations were also considered as part of the assessment. The assessment concluded:

- The overall impact of the mining operations would generally be low as open pit mining operations would be screened by the Tombstone Hill landform and stands of trees throughout the landscape.
- The visual impact of the new landform would be limited to a period of eight to 10 years during which time the visible portion of the slope would be rehabilitated with a cover of grass and native trees similar to the areas of woodland in the surrounding landscape.
- The visual impacts of the new landform in the long-term would be very low as the overburden landform would form an extension of Tombstone Hill landform and following successful revegetation would appear to be a part of the natural landscape.
- Only two residences located on one DCPL-owned property would have significant potential views of the new landform, however, the visual impact was assessed to be low to moderate because of the acute angle that the landform would be viewed and the adjoining Tombstone Hill landform.
- Visual effects of lighting during the night-time operations would be similar to that of existing towns and villages in the region. Uni-directional lighting fixtures and screens were proposed to be used if necessary.

O3.2 DURALIE EXTENDED

A visual assessment was undertaken as a component of the Duralie Extended SEE (DCPL, 2006). The assessment concluded that the potential visual impact of the proposed modification at privately owned residences that had views of the DCM would be substantially the same as the originally approved DCM, due to the distances involved and screening effects of the existing waste rock emplacement and local topography.

O3.3 DURALIE JUNE 2009 MODIFICATION

A visual assessment was undertaken as a component of the *Duralie June 2009 Modification Environmental Assessment* (DCPL, 2009a). The assessment concluded that for privately owned residences which had views of the DCM, the proposed modification would not significantly increase the potential visual impacts of the then currently approved DCM, due to the distances involved and the implementation of mitigation measures such as tree planting.

04 EXISTING LANDSCAPE AND VISUAL SETTING

04.1 LANDSCAPE CHARACTER AND SCENIC QUALITY

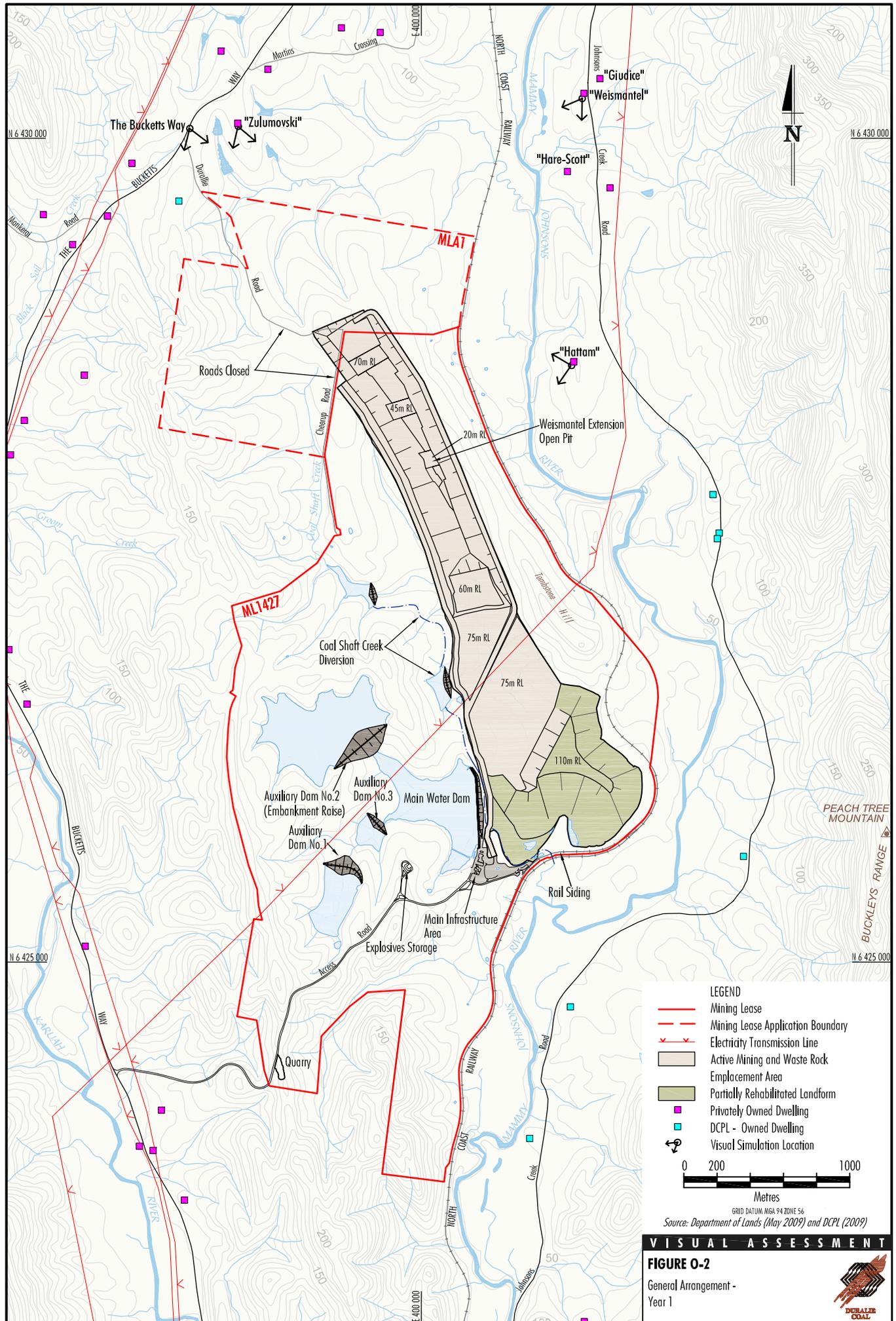
It has been established through previous studies that scenic quality increases as topographic ruggedness and relative relief increase (Burns and Rundell, 1969; Leonard and Hammond, 1984; Anderson *et al.*, 1976 in EDAW Australia, 2006). EDAW Australia (2006) also found that scenic quality can increase as the patterning of vegetation increases.

The Project area and surrounds are comprised of a number of distinct land use types and landscape units of varying levels of landscape quality. These have been defined as follows:

- Agricultural Areas – the Project area is located in a rural area characterised by cattle grazing on native and improved pastures, along with some poultry farming and other agricultural production.
- Existing Mine Developments - within the current Mining Lease (ML) 1427, the predominant land use is the operation of the DCM.
- Residential Dwellings – detached dwellings surrounding the Project, mostly to the north, north-west and east of the Project (Figure O-2).
- Peach Tree Mountain – approximate Relative Level (RL) 305 m. Peach Tree Mountain is located off Johnsons Creek Road approximately 1.5 km to the east of the Project.
- Peppers Mountain – approximate RL 350 metres (m). Peppers Mountain is located approximately 4 km south-east of the Project.
- Buckley's Range – approximate RL 350 m. Buckley's Range is located approximately 1.5 km east of the Project. The vegetated ridgeline, the dominant landscape feature, runs approximately north-south and separates largely cleared agricultural land in the Gloucester valley to the west and the Mill Creek Valley to the east.
- Ridgeline to the west of ML 1427 – runs generally north/south and is located approximately 2 km to the west of the Project. The Bucketts Way and Karuah River run parallel between the ridgeline and the western boundary of ML 1427. The ridgeline system reaches a maximum elevation of approximately RL 300 m.
- Smaller ridgeline to the west of ML 1427 – runs generally north/south and is located approximately 0.5 km to the west/south-west of the Project. The ridgeline runs parallel to and east of The Bucketts Way and along the western boundary of ML 1427, screening views from the majority of The Bucketts Way towards the Project. The ridgeline system reaches a maximum elevation of approximately RL 170 m.
- Tributaries – Mammy Johnsons River is the major watercourse in the valley that extends in an approximately north-south direction to the east of the Project, before it joins the Karuah River at a confluence located approximately 4 km south of ML 1427. Coal Shaft Creek, a tributary of the Mammy Johnsons River, is located within ML 1427.

The visual settings (e.g. local, sub-regional and regional) are based on distance from the Project landforms as follows:

- regional setting – greater than approximately 5 km from the Project landforms;
- sub-regional setting – approximately 1 to 5 km from the Project landforms; and
- local setting – up to approximately 1 km from the Project landforms.



LEGEND

- Mining Lease
- - - Mining Lease Application Boundary
- x x Electricity Transmission Line
- Active Mining and Waste Rock
Emplacement Area
- Partially Rehabilitated Landform
- Privately Owned Dwelling
- DCPL - Owned Dwelling
- ↖ Visual Simulation Location

0 200 1000
Metres

GRID DATUM: MGA PAZDNE 56
Source: Department of Lands (May 2009) and DCPL (2009)

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FIGURE O-2
General Arrangement -
Year 1



Regional Setting (> 5 km)

The regional setting of the Project has attributes of moderate to high scenic quality due to the presence of the geographical features within the region such as Monkerai Mountain (RL 350 m), Brogden's Pinnacles (RL 200 m) and Lawlers Range (RL 626 m), as well as the Gloucester Basin. The Gloucester Basin is a linear valley which extends approximately 37 km in length and is 10 km in width (DCPL, 1998). The Bucketts Range (RL 546 m) and Mograni Range (RL 480 m) flank the western and eastern sides, respectively, of the township of Gloucester. The majority of the valley is rural in nature and has been cleared as a result of historic land use practices. The valley is a strongly defined landform that is visually enclosed and displays an attractive landscape resulting from a combination of natural features and rural land uses. Remnant vegetation generally occurs along ridgelines that define the valley, along watercourses and in isolated patches within the cleared landscape.

A number of reserved areas are also located in the vicinity of the Project, including the Myall River State Forest (located approximately 5 km to the south-east), Monkerai Nature Reserve (located approximately 7 km to the south-west), The Glen Nature Reserve (located approximately 11 km to the north-east), Ghin-doo-ee National Park (located approximately 11 km to the east) and Barrington Tops National Park (located approximately 20 km to the west) (Appendix E of the EA).

Townships within the Project regional setting include Craven, Stratford, Stroud and Gloucester.

Sub-regional Setting (1 - 5 km)

The sub-regional setting comprises similar features to that found within the regional and local settings. These features include elements of low to high scenic quality such as cleared pastoral land, undulating topography and scattered remnant vegetation. Peach Tree Mountain and Peppers Mountain occupy elevated topographic positions.

To the east and south-east of the Mammy Johnsons River, Buckley's Range is the highest topographical feature in close proximity to the DCM. To the north-west of the DCM is the Linger and Die Ridge (located approximately 4 km to the north-west), which extends to the south of Lawler's Range.

The small villages of Wards River and Stroud Road are located within the sub-regional setting approximately 4.5 km north and 2.5 km south of the DCM, respectively.

Local Setting (<1 km)

The Project is situated mostly within the Coal Shaft Creek valley floor, originally ranging from elevation of approximately RL 90 m to RL 50 m. The valley of Coal Shaft Creek is characterised by undulating hills, cleared open grassland and scattered native vegetation remnants. Coal Shaft Creek originally traversed a large proportion of the DCM deposit, but has since been diverted around the open pit workings.

The Mammy Johnsons River is located to the east of the Project and runs in an approximately north-south direction.

Elevations within the Project area and surrounds generally range from approximately RL 50 m along the river flats of the Mammy Johnsons River to RL 150 m on the ridgetops to the west of the Project.

O4.2 SITE TOPOGRAPHY AND VEGETATION

The local topography is dominated by the valley of Coal Shaft Creek and the Tombstone Hill landform, a locally elevated elongated feature in the north-eastern part of the ML 1427 that screens the current mining area from the north-east. The hill rises to an elevation of approximately RL 130 m and forms a part of the approved waste rock emplacement. A second ridgeline to the west of the DCM effectively screens the DCM from The Bucketts Way.

The development of the DCM and its associated open pits and waste rock emplacement has resulted in alteration to the site's pre-mining topography.

In general, views of the DCM from the surrounding area are effectively screened by topography and vegetation, except for some areas to the east and south-east. In these areas, the number of privately owned dwellings with potential views of the DCM mine landforms and infrastructure is restricted by DCPL ownership of the majority of land. DCPL has also planted vegetation screens at strategic locations to assist with the screening of mine landforms and infrastructure.

The majority of the Project area has been cleared as part of past rural land use practices. The remnant vegetation communities which exist within the Project area include *Spotted Gum–Red Ironbark–Thick-leaved Mahogany Forest*, *Spotted Gum–Grey Ironbark–Thick-leaved Mahogany Forest*, *Red Gum Grassy Woodland* and *Grey Gum–Red Gum–Apple Riparian Forest* (Appendix E of the EA).

O4.3 LANDSCAPE CHARACTER SIGNIFICANCE

A review of the significance of the landscape character proximal to the Project was undertaken based on searches for heritage listings on the NSW Heritage Branch website (i.e. NSW Heritage Council) database and the Commonwealth National Heritage Database. No listings of heritage significance were identified.

The Project is located within the Vale of Gloucester Landscape Conservation Area which was registered on the National Trust of Australia (NSW) in 1976 for its historical and scenic values. The listing was revised and extended by the Landscape Conservation Committee of the National Trust of Australia (NSW) in 1981. The original listing proposal recommended that the Vale of Gloucester “*be the subject of a detailed Rural Lands Environmental Study, with a view to protection under a Regional or local Environmental Plan*”. Despite the recommendation, the Vale of Gloucester Landscape Conservation Area has not been listed in either the Gloucester or Great Lakes Local Environmental Plans or any other regional plan.

A smaller portion of the Vale of Gloucester Landscape Conservation Area was later nominated to the Register of the National Estate (RNE). The RNE nomination for the Vale of Gloucester has a southern boundary which extends only as far as Craven (approximately 20 km north of the DCM), and as such, does not encompass the Project area. Further details in regard to the listing are provided in the non-Aboriginal heritage assessment (Appendix K of the EA).

This visual assessment has included consideration of the potential visual impacts of the Project on the Vale of Gloucester Landscape Conservation Area (Section O5.3).

O4.4 PROJECT DESCRIPTION – VISUAL CHARACTER

The Project has a number of components that would have varying impacts on the existing landscape. These impacts range from a modification of drainage lines and the generally undulating topography, to major earthworks which have a greater impact on the landscape character. A description of the visual character of the Project follows.

O4.4.1 Overview

A detailed description of the Project is provided in Section 2 in the Main Report of the EA. The general arrangement of the Project during Year 1 and Year 8 of the Project and post-mining is shown on Figures O-2 to O-4.

The major aspects of the Project considered to have the potential to impact on the visual landscape include:

- additional clearance or disturbance of vegetation within the Project area;
- modification of topographic features including an extension of the waste rock emplacement (the approved maximum elevation would remain unchanged at RL 110 m);
- an extension of the existing Weismantel open pit and development of the new Clareval North West open pit;
- progressive rehabilitation of completed landforms; and
- extension of lighting associated with night-time mining operations.

The following sub-sections provide a more detailed description of the major aspects of the Project that could potentially impact the visual landscape.

Vegetation

Approximately 88 ha of vegetation (including forest and woodland) would be disturbed within the Project area, and as a result, would potentially increase the views available from nearby public roads (e.g. The Bucketts Way) and dwellings to the north of the Project.

Topographic Features

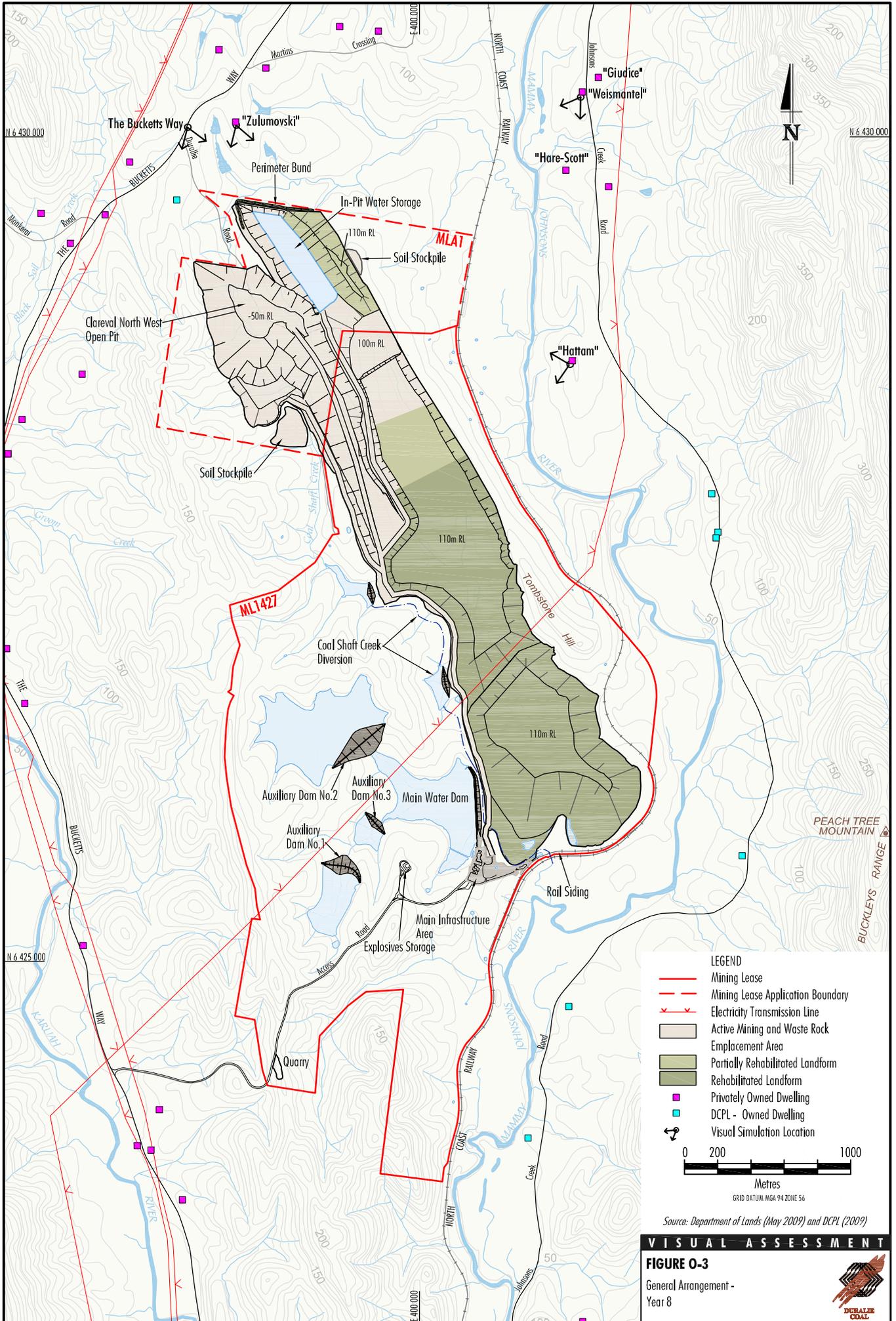
Up to approximately 114 million tonnes (Mt) of waste rock would be produced over the life of the Project. The Project would involve progressive backfilling of the open pits with waste rock as mining develops. The backfilled waste rock emplacement would be shaped by dozer prior to commencement of rehabilitation activities (i.e. re-contouring, topsoiling and revegetation).

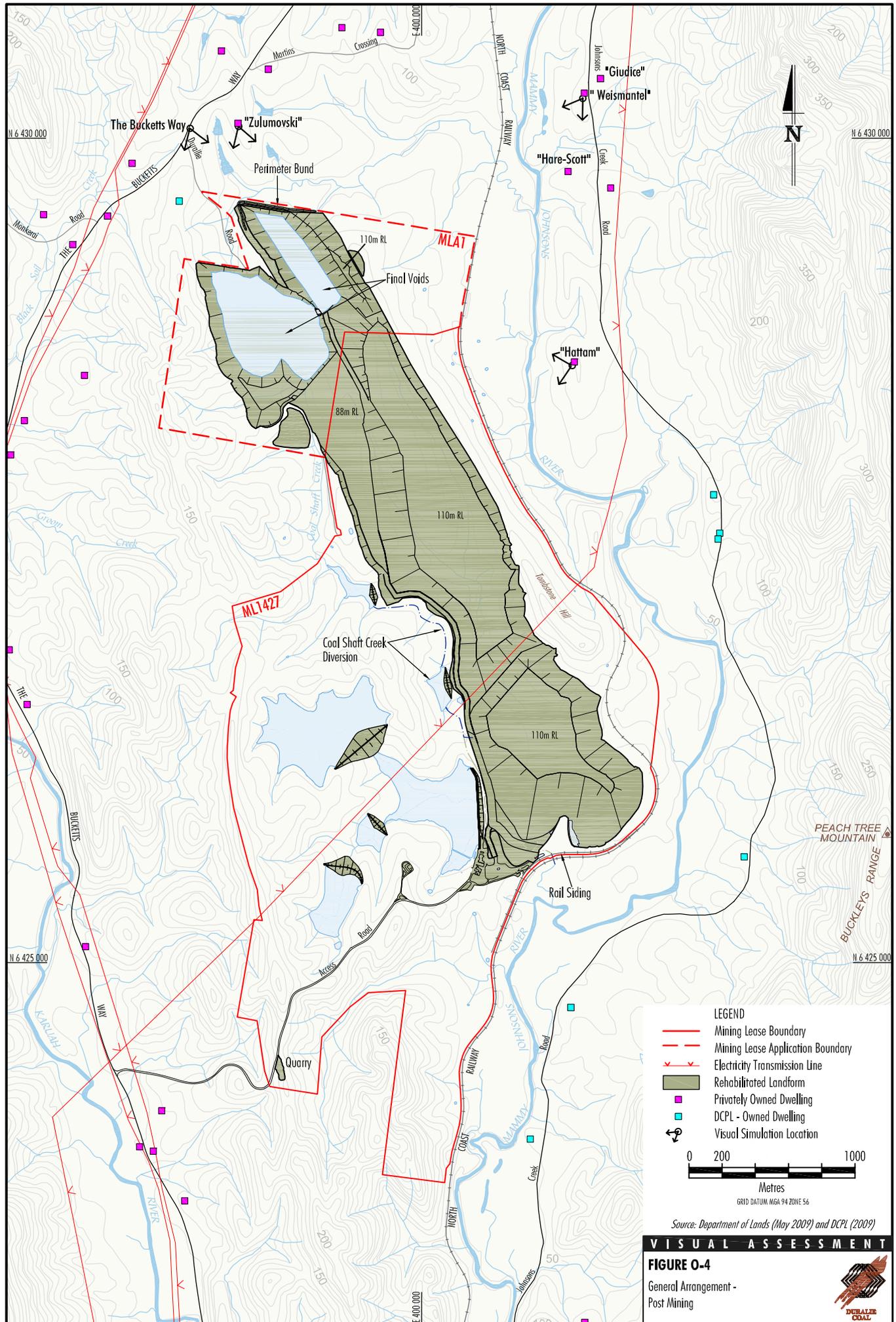
The Project would result in a northern extension of the existing waste rock emplacement. No change is proposed to the maximum height of the waste rock emplacement (i.e. RL 110 m).

The final landform would abut and exceed (in northern extent) the existing Tombstone Hill landform to the east of the currently approved open pit.

Open Pit

The Project would involve a northern extension of the existing Weismantel open pit, as well as development of the Clareval North West open pit. This would result in an increase in the total disturbance area and visibility of the open pit workings to viewpoints in close proximity to the Project. The area of the final void (which would partially fill with water post-mining) would also increase.





VISUAL ASSESSMENT
FIGURE O-4
 General Arrangement -
 Post Mining



Rehabilitation

The rehabilitation of the waste rock emplacement would be undertaken on a progressive basis in order to improve integration of the Project landforms with the surrounding environment and mitigate potential visual impacts.

The backfilled areas of the open pits would, over time, vary in appearance from freshly placed waste rock to rehabilitated landforms, complete with topsoil and vegetation (i.e. either pasture or woodland). As such, the level of visual modification created by the waste rock emplacement would change, reducing as vegetation becomes established and matures.

The post-mining landforms would be topsoiled and revegetated in accordance with the Rehabilitation and Landscape Management Strategy presented in Section 5 in the Main Report of the EA.

Night-Lighting

Night-lighting at the DCM is currently emitted from the following sources:

- overhead lighting of the process plant area and administration area;
- uni-directional lighting on active open pit mining areas; and
- mobile equipment and work vehicle-mounted lights working within ML 1427.

Night-lighting has not previously been raised by the community as a concern at the DCM (DCPL, 2009b). The scale and intensity of night-lighting for the Project would be similar in intensity to the existing night-lighting at the DCM. The potential impacts of night-lighting associated with the Project are discussed in Section O5.5.

O5 ASSESSMENT OF POTENTIAL VISUAL IMPACTS

The main issues to consider in the assessment of visual impacts are (EDAW Australia, 2006):

- the number of sensitive viewing locations; and
- the level to which the proposed works are visible.

O5.1 SENSITIVE VISUAL SETTINGS

Locations with potential views of the Project landforms primarily include those that already have views of the DCM. Potential views of the Project landforms would be available from the following locations:

- privately owned rural residences to the east, north-east and north of the Project;
- sections of Johnsons Creek Road located to the east of the Project and Mammy Johnsons River;
- a portion of The Bucketts Way (i.e. between the intersections of Martins Crossing and Durallie Roads) with views to the south towards the Project; and
- sections of the North Coast Railway looking west towards the Project.

Whilst it is acknowledged that the ridgelines located to the west and east of the Project area overlook the Project, the potential views available from these locations are considered to be negligible given they are:

- heavily wooded with potential views restricted by vegetation; and
- not readily accessible to the public and not routinely assessed by the public.

As such, no further assessment for these locations has been undertaken.

Views of the Project waste rock emplacement would be available from some sections of the North Coast Railway (Figure O-2), where vegetation and topography permit. The potential views available from the North Coast Railway are considered to be negligible however, given that:

- the railway line is situated at a relatively low elevation with intervening vegetation screening potential views of the waste rock emplacement;
- the railway line is used only intermittently by passenger trains; and
- a low degree of visual modification would be experienced by train users given the existing views of the DCM waste rock emplacement available from the North Coast Railway.

As such, no further assessment for this location has been undertaken.

Views of the current DCM waste rock emplacement are available from one private residence to the east (i.e. "Hattam" dwelling) (Figure O-2).

Very limited views of the current DCM irrigation areas are available from the “Hare-Scott” dwelling, located north-east of the Project. Views of the current DCM irrigation areas are also available from the “Weismantel” dwelling, which is situated approximately 0.4 km north-east of the “Hare-Scott” dwelling. The relatively low elevation of the “Hare-Scott” dwelling and its close proximity to the Mammy Johnsons River mean that views towards the Project would be almost entirely screened by intervening riparian vegetation. A visual simulation was not prepared for the “Hare-Scott” dwelling on the basis that potential visual impacts for this location would be similar to or lower than those assessed for the “Weismantel” dwelling, which has similar (and less interrupted) directional views available towards the Project (Figure O-2).

Views of the existing DCM from privately owned residences to the west and south-west are screened by the ridgeline that separates the DCM from The Bucketts Way (EDAW Australia, 1996) as well as intervening vegetation.

Views of the Project would not be available from the villages of Wards River, Stroud or Stroud Road, and as such, no further assessment for these locations has been undertaken.

The Project would result in the closure of Cheerup Road and the last 1 km of Durallie Road. These roads currently provide no through traffic function. The remaining open section of Durallie Road would continue to provide access to a limited number of private properties. Views towards the Project from Durallie Road would be screened by existing vegetation that would be retained along the MLA 1 boundary. As such, no further assessment of potential visual impacts was undertaken for Durallie Road.

Visual simulations have been created for the locations identified in Table O-3 (Figures O-5 to O-8).

Table O-3
Locations of Visual Simulations

Visual Simulation Location	Potential View of Project Landforms	Simulation Figure
Dwelling – Weismantel	South-west over partially cleared agricultural land and riparian vegetation towards the waste rock emplacement.	Figure O-5
Dwelling – Hattam	West over partially cleared agricultural land and riparian vegetation to the waste rock emplacement.	Figure O-6
Dwelling – Zulumovski	South over cleared agricultural land to the open pit and waste rock emplacement.	Figure O-7
Road - The Bucketts Way	South-east over cleared agricultural land to the open pit and waste rock emplacement.	Figure O-8

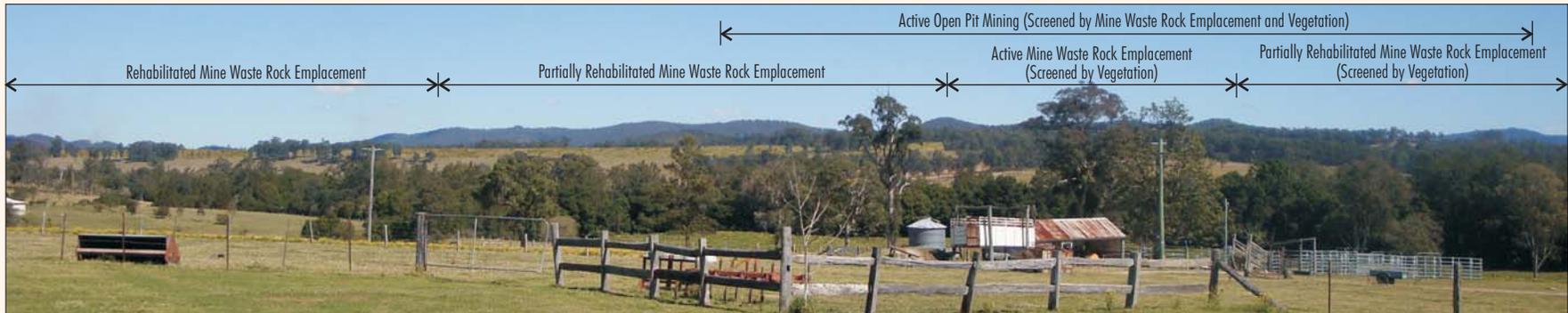
Visual simulations (Figures O-5 to O-8) were prepared to show the existing views as well as simulations of the modified Project landforms during Year 8 of operations. This is when the landforms would be at their maximum heights with the greatest area of disturbance, representing the greatest potential for visual impact. A post-mining simulation was also developed to illustrate the conceptual landform following completion of mining and rehabilitation activities. The post-mining simulations have been prepared with consideration of the Rehabilitation and Landscape Management Strategy presented in Section 5 in the Main Report of the EA.

O5.2 ZONE OF VISUAL INFLUENCE

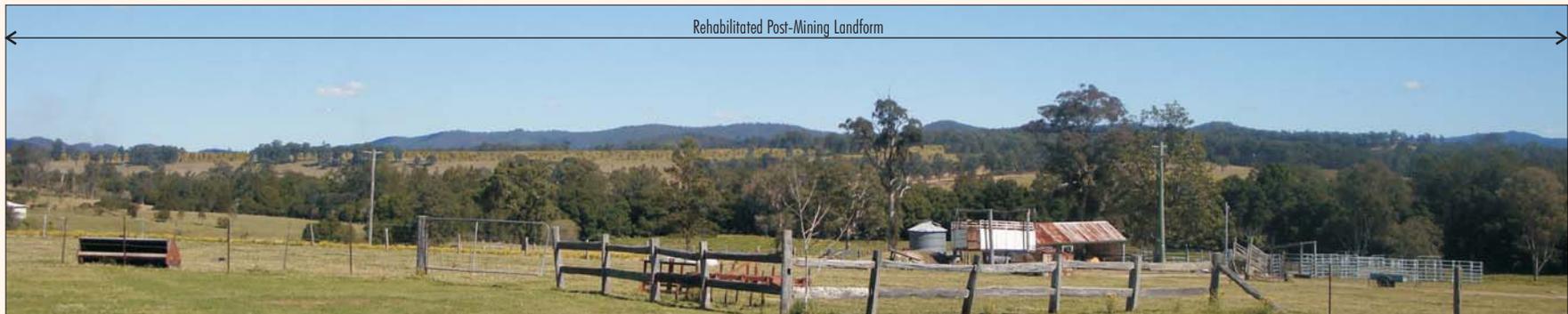
The ZVI for the existing DCM is primarily from the east and south-east of the DCM and ridgelines to the east and west. The ZVI for the Project shows that areas with potential views available of the Project landforms would be primarily those with existing views of the DCM, with some new areas to the north and north-east.



Existing View



Full Development Simulation (Year 8)



Post-Mining Simulation

Source: Adapted from Urbis (2009)

V I S U A L A S S E S S M E N T

FIGURE O-5
Existing View and Visual Simulations -
"Weismantel" Dwelling

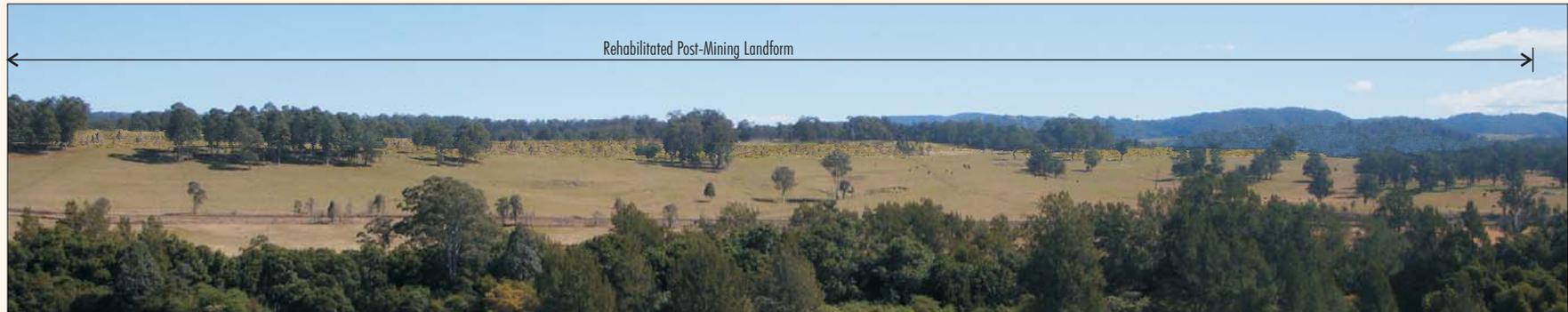




Existing View



Full Development Simulation (Year 8)



Post-Mining Simulation

Source: Adapted from Urbis (2009)

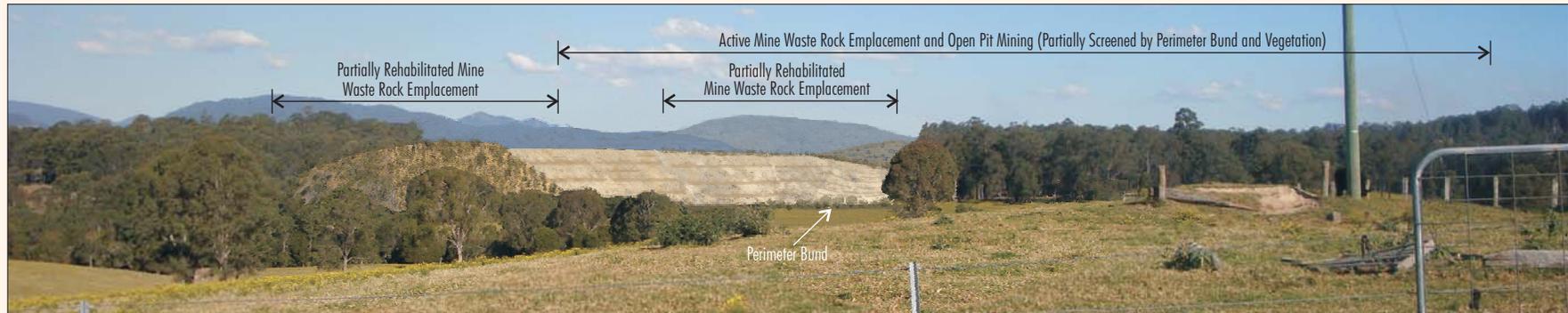
V I S U A L A S S E S S M E N T

FIGURE O-6
Existing View and Visual Simulations -
"Hattam" Dwelling

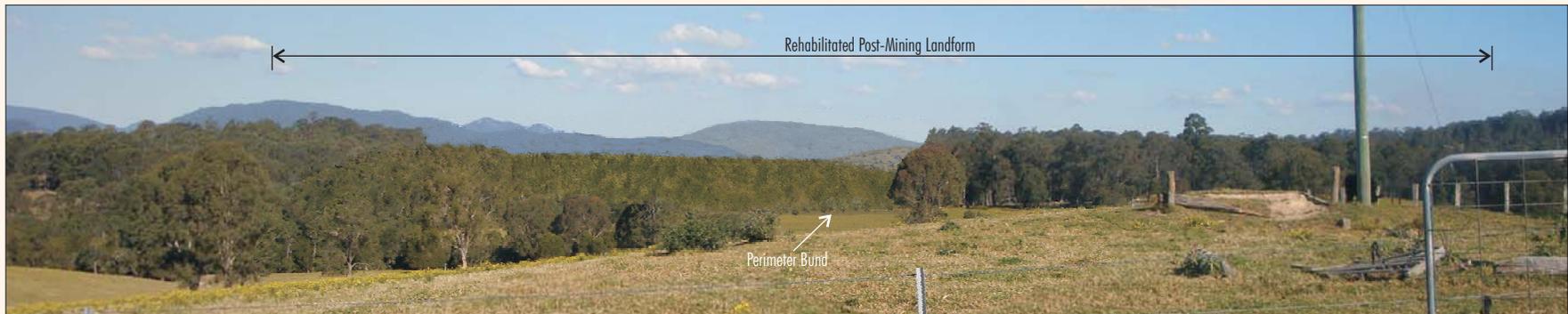




Existing View



Full Development Simulation (Year 8)



Post-Mining Simulation

Source: Adapted from Urbis (2009)

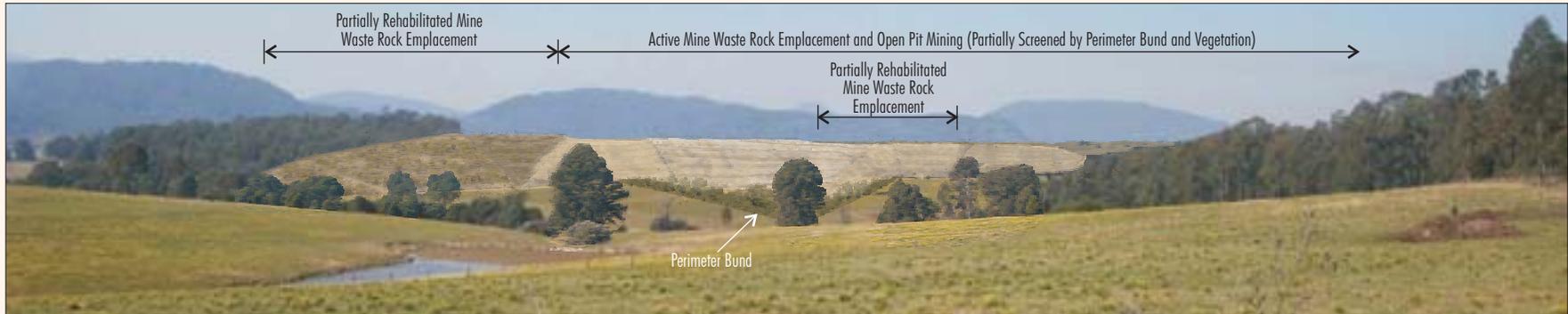
VISUAL ASSESSMENT

FIGURE O-7
Existing View and Visual Simulations -
"Zulomovski" Dwelling

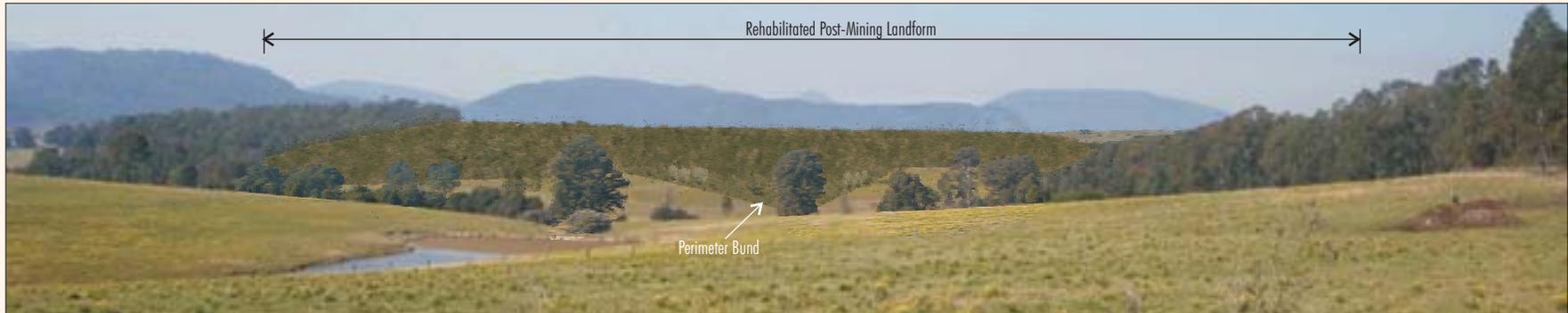




Existing View



Full Development Simulation (Year 8)



Post-Mining Simulation

Source: Adapted from Urbis (2009)

VISUAL ASSESSMENT

FIGURE O-8
Existing View and Visual Simulations -
The Buckets Way



Areas with views available of the new Project components are limited to the higher ridges surrounding the site and parts of the valley floor to the north and north-east. The ridges are primarily vegetated and not readily accessible to the public. Views available from areas of the valley floor to the north and north-east of the new Project components would be distant (i.e. the Project would comprise a low proportion of the viewscape) or be partly screened by intervening vegetation.

05.3 VALE OF GLOUCESTER LANDSCAPE CONSERVATION AREA

The Vale of Gloucester Landscape Conservation Area covers an area of approximately 46,300 ha. The disturbance area associated with the Project is approximately 206 ha, which is 0.5 per cent of the total Vale of Gloucester Landscape Conservation Area. As a result, the Project is not considered to have any significant impact on the scenic values described in the National Heritage Trust of Australia (NSW) registration and would not detract from the essentially rural nature of the Vale of Gloucester Landscape Conservation Area.

05.4 QUALITATIVE ASSESSMENT

This section assesses potential visual impacts that are expected to arise as a result of the Project based on the methodology described in Section O2. The level of potential visual impact is assessed for the Project prior to any amelioration being undertaken (i.e. vegetation screening). The final category considers some maturation of vegetation/tree planting works (i.e. five to 10 years).

A summary of the visual assessment locations analysed in the following sub-sections is provided in Table O-4.

**Table O-4
Summary of Visual Assessment**

Location	Visual Sensitivity	Visual Modification Level	Potential Impact*	Potential Impact After Final Amelioration
Regional Setting (Greater than 5 km)	-	-	-	-
Sub-Regional Setting (1 to 5 km)				
Weismantel Dwelling	H	M - L	M	L
Local Setting (Up to 1 km)				
Hattam Dwelling	H	M	M - H	M - L
Zulumovski Dwelling	H	H	H	M
The Bucketts Way	M	H	H	M - L
Johnsons Creek Road	L	L	L	VL

* Methodology described in Section O2.

H – High, M – Moderate, L – Low, VL – Very Low.

05.4.1 Visual Impacts – Regional Setting (> 5km)

Due to undulating topography and vegetation, no viewpoints identified in the regional setting would have views available of the Project. The potential visual impact of the Project on the regional setting is considered to be low.

O5.4.2 Visual Impacts – Sub-Regional Setting (1 to 5 km)

A number of isolated viewing locations are located within the sub-regional setting (Figure O-2). The potential visual impacts of the Project on the sub-regional setting are described below and visual simulations are shown on Figure O-5.

“Weismantel” Dwelling

Level of Visual Modification

The “Weismantel” dwelling is located approximately 1.6 km north-east of the closest Project landform (Figure O-2). Partial south-westerly views of the Project area would be available from the residence due to its elevation and the absence of any screening foreground vegetation and topography. The existing view shows that the Tombstone Hill landform running adjacent to existing DCM screens views of the open pit, with a portion of the current northern irrigation area visible in the middle ground. In the foreground is the Mammy Johnsons River (distinguished by the dense riparian vegetation) with the major ridgeline to the east of The Bucketts Way visible on the horizon.

The potential visual impact at the “Weismantel” dwelling would occur during the latter years of the Project, when the waste rock emplacement is at its maximum height and the Project disturbance area is greatest. The waste rock emplacement would remain below the vegetated ridgeline to the west of the Project area which defines the horizon.

The potential visual impact of the waste rock emplacement would also result from the contrasting colour and texture of the undisturbed natural areas and the newly placed and unvegetated material before a grass cover is established as part of the rehabilitation process. The potential visual impact of the open pit would result from the removal of vegetation from a section of the viewscape.

The level of visual modification would be moderate to low.

Viewer Sensitivity

Within the sub-regional setting, visual sensitivity at the rural residence is considered high, given the distance to the Project (i.e. approximately 1.6 km).

Visual Impact

Given the moderate to low level of visual modification coupled with the high visual sensitivity at the “Weismantel” dwelling, a moderate level of potential visual impact would be expected. The batters of the embankments of the waste rock emplacement would be progressively rehabilitated with grasses, trees and/or shrubs reducing the bare soil appearance in the long-term as the vegetation establishes (Figure O-5). With progressive and final rehabilitation the level of visual impact would be reduced to low.

“Giudice” Dwelling

The same level of potential visual impact would be expected at the “Giudice” dwelling located north-east from the “Weismantel” dwelling, given the proximity of these two dwellings (Figure O-2).

O5.4.3 Visual Impacts – Local Setting (< 1 km)

A number of isolated viewing locations are located within the local setting (Table O-4). The potential visual impacts of the Project on the local setting are described below and visual simulations are shown on Figures O-6 to O-8.

“Hattam” Dwelling

Level of Visual Modification

The “Hattam” dwelling is located approximately 0.9 km east of the Project (Figure O-2). Westerly views are available from the residence due to its elevated position and the absence of any screening foreground vegetation (Figure O-6). The existing view shows the existing DCM irrigation areas in the middle ground, with the Mammy Johnsons River (distinguished by the dense riparian vegetation) in the foreground and the major ridgeline to the east of The Bucketts Way visible on the horizon, with the Linger and Die Ridge forming the horizon to the north-west.

The potential visual impact at the “Hattam” dwelling would occur during the latter years of the Project, when the waste rock emplacement is at its maximum height and the Project disturbance area is greatest.

Considering the extent to which the viewer has become accustomed to the existing views of the DCM (which is an existing modification to the landscape), the level of potential visual impact would be moderate.

Viewer Sensitivity

Within the local setting, visual sensitivity at the rural residence would be high, given the distance to the Project (i.e. less than approximately 1 km).

Visual Impact

For the “Hattam” dwelling, the moderate level of visual modification coupled with the high visual sensitivity indicates a moderate to high level of potential visual impact would be expected.

The waste rock emplacement would be progressively rehabilitated with grasses, trees and/or shrubs reducing the bare soil appearance in the long-term as the vegetation establishes (Figure O-6). Following progressive and final rehabilitation, the level of visual impact associated with the Project at the “Hattam” dwelling would be moderate to low.

“Zulumovski” Dwelling

Level of Visual Modification

The “Zulumovski” dwelling is the closest residence to the Project (i.e. approximately 0.4 km north). Views from this residence are available due to its elevated position and the absence of intervening vegetation. The existing view shows the current DCM is not visible, with thick treed vegetation forming the middle ground of the viewscape (Figure O-7). The tree-line of the vegetation forms the horizon in the centre of the viewscape, with distant views towards Buckley’s Range also visible. Cleared pastoral land on the “Zulumovski” property appears in the foreground, and marks the boundary between the Project Mining Lease Application area (MLA 1) and the “Zulumovski” property.

The potential visual impact at the “Zulumovski” dwelling would occur during the latter years of the Project, when the Project disturbance area (primarily the extent of the open pit) is greatest. However a degree of visual impact would occur during the initial years of the Project, when pre-stripping of vegetation is first undertaken and mobile equipment may be visible in the open pit workings.

The level of potential visual impact would be high.

Viewer Sensitivity

Within the local setting, visual sensitivity at the rural residence is considered high, given the close proximity to the Project (i.e. approximately 0.4 km) and the existing undisturbed views.

Visual Impact

For the “Zulumovski” dwelling, the high level of visual modification coupled with the high visual sensitivity indicates a high level of potential visual impact would be expected.

It is proposed that a vegetation screen (to be established with advanced native tree species) would be planted to screen views from the “Zulumovski” dwelling (subject to landholder consent). The vegetation screen is described in further detail in O6.1.2. Until consent for the vegetation screen is received, however, it is assumed that views of the Project would be available from the “Zulumovski” dwelling and visual simulations have been prepared accordingly (Figure O-7). A perimeter bund would also be constructed at the north-west extent of the open pit and progressively vegetated with shrubs and trees to further screen views of the open pit. The simulation shown on Figure O-7 shows that following progressive and final rehabilitation, the level of potential visual impact associated with the Project at the “Zulumovski” dwelling would be moderate.

With the vegetation screen, however, the level of potential visual impact associated with the Project at the “Zulumovski” dwelling would be reduced to low.

The Bucketts Way

Level of Visual Modification

Limited views would be available from a portion (approximately 500 m) of The Bucketts Way, looking south-east towards the Project. This is due to the elevation of the road along this section and the absence of screening vegetation (Figure O-8).

The potential visual impact on users of The Bucketts Way would result from the clearance of vegetation and the contrast in colour and texture between the surrounding undisturbed natural areas and the disturbed open pit. The potential visual impact at this location of The Bucketts Way would occur during the latter years of the Project, when the Project disturbance area (primarily the extent of the open pit) is greatest. However a degree of visual impact would occur during the initial years of the Project, when pre-stripping clearance of vegetation is first undertaken and mobile equipment may be visible in the open pit workings.

There would be a high level of visual modification along this section of The Bucketts Way.

Viewer Sensitivity

Within the local setting, the visual sensitivity of users on The Bucketts Way would be moderate. This is largely due to the changing temporal and directional views experienced by users of The Bucketts Way, in which the exposure to the modified views is confined to a relatively short period of time.

Visual Impact

For users of The Bucketts Way, the high level of visual modification coupled with the moderate level of visual sensitivity indicates a high level of potential visual impact would be expected.

A vegetation screen (to be established with advanced native tree species) would be planted (subject to landholder consent) to screen views from the portion of The Bucketts Way where the Project would be visible (i.e. between the intersections of The Bucketts Way with Martins Crossing and Durallie Roads). The vegetation screen is described in further detail in O6.1.2. Until consent for the vegetation screen is received, however, it is assumed that views of the Project would be available from The Bucketts Way and visual simulations have been prepared accordingly (Figure O-8). A perimeter bund would also be constructed at the north-west extent of the open pit and progressively vegetated with shrubs and trees to further screen views of the open pit. The simulations shown on Figure O-8 shows that following progressive and final rehabilitation, the level of visual impact associated with the Project at The Bucketts Way would be moderate.

With the vegetation screen, the level of potential visual impact would be reduced to low.

Johnsons Creek Road

Level of Visual Modification

Views of the Project waste rock emplacement would be available from limited sections of Johnsons Creek Road (Figure O-2), where roadside vegetation and topography permit. The potential visual impact on users of Johnsons Creek Road would result from the contrast in colour and texture between the surrounding undisturbed natural areas and the disturbed waste rock emplacement. Given the low proportion of the overall viewscape that the Project landforms would contribute to (due largely to the screening effects of the Tombstone Hill landform), the level of visual modification would be low.

Viewer Sensitivity

Within the local setting, the visual sensitivity of users of Johnsons Creek Road would also be low. This is largely due to the changing temporal and directional views experienced by users of Johnsons Creek Road, in which the exposure to the modified views is confined to a relatively short period of time and a limited number of users.

Visual Impact

For users of Johnsons Creek Road, the low level of visual modification coupled with the low level of visual sensitivity indicates a low level of potential visual impact would be expected. Following progressive and final rehabilitation, the level of potential visual impact associated with the Project at Johnsons Creek Road would reduce to very low.

O5.5 POTENTIAL IMPACTS OF NIGHT-LIGHTING

The glow produced by night-lighting at the current DCM is visible at nearby residences and along transport routes. The night-glow is similar to that associated with existing towns and villages in the region.

As discussed in Section O4.4.1, the scale and intensity of night-lighting for the Project would be of a similar intensity when compared to the existing night-lighting at the approved DCM. However, there is potential for direct views of mobile machinery lights and operational lighting to be available from some exposed viewpoints to the north of the Project and along The Bucketts Way, due to the extension of the open pit and waste rock emplacement areas and associated vegetation clearance. Mitigation measures to reduce the potential impacts of night-lighting from the Project are described in Section O6.2.

O5.6 CUMULATIVE IMPACTS

The assessment of cumulative visual impacts has considered the combined effects of the Project with the effects of other existing or approved developments in the region. The primary development activity in the visual catchment of the Project is agriculture. The combined disturbance areas of the Stratford Coal Mine (located approximately 20 km to the north of the Project) and the Project represent a very small proportion of the Gloucester Valley and cumulatively would not detract from the region's essentially rural nature. The ZVI analysis also shows that areas with potential views available of the Project landforms would be primarily those with existing views of the DCM (Section O5.2), therefore cumulative visual impacts as a result of the Project and DCM are considered to be negligible. On a regional scale, the scale and intensity of night-lighting for the Project would be of a similar intensity when compared to the existing night-lighting at the approved DCM and as such, would not result in significant cumulative night-lighting impacts.

O6 VISUAL/LANDSCAPE MITIGATION MEASURES AND MANAGEMENT

O6.1 LANDSCAPE DESIGN AND REHABILITATION STRATEGIES

O6.1.1 Progressive Rehabilitation

Progressive rehabilitation of the waste rock emplacement would be undertaken in order to reduce the contrast between the Project landforms and the surrounding environment. This would include progressive rehabilitation with selected tree and pasture species (endemic where practicable) (Section 5 in the Main Report of the EA). Trees would be planted to achieve maximum aesthetic and screening effects as well as providing windbreaks, woodlots, stock shelter and habitat enhancement. Local endemic native species would be used wherever possible based on trialling of various species in the existing rehabilitation areas. Pasture seed utilised would consist of a mix based on previous sowings, seasonal availability and external advice.

The waste rock emplacement has been designed to integrate where practicable with the adjoining natural landforms (i.e. the Tombstone Hill landform).

The Rehabilitation and Landscape Management Strategy for the Project is presented in Section 5 in the Main Report of the EA.

O6.1.2 Foreground Visual Screening/Vegetation Screens

Existing remnant vegetation along the Tombstone Hill landform would continue to be maintained for the Project to screen views from the North Coast Railway, with additional plantings along the ridgeline to screen views from dwellings situated to the east of the Project.

A perimeter bund would be constructed at the north-west extent of the open pit to restrict access and screen views of the active open pit development areas (and ultimately the final void) from The Bucketts Way and the "Zulumovski" dwelling. The bund would be approximately 3 to 5 m in height and would be progressively vegetated with shrubs and trees to further screen views of the open pit. A vegetation screen (to be established with advanced native tree species) would also be planted on the "Zulumovski" property to screen views, subject to landholder consent.

Similarly, a vegetation screen (to be established with advanced native tree species) would be planted (subject to landholder consent) to screen views from the portion of The Bucketts Way where the Project would be most visible.

Further details of the proposed revegetation activities are provided in the Rehabilitation and Landscape Management Strategy presented in Section 5 in the Main Report of the EA.

O6.2 NIGHT- LIGHTING

The placement, configuration and direction of lighting would be designed so as to reduce off-site nuisance effects where practicable. Unidirectional lights would be used and directed away from sensitive viewpoints (i.e. The Bucketts Way and "Zulumovski" dwelling) to the north of the Project.

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