

APPENDIX I

COWAL GOLD MINE E42 MODIFICATION

VISUAL ASSESSMENT



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I1 INTRODUCTION

The Cowal Gold Mine (CGM) is located approximately 38 kilometres (km) north-east of West Wyalong, New South Wales (NSW) (Figure I-1). The CGM is owned by Barrick Australia Limited (Barrick).

This visual assessment assesses the potential visual impact of the proposed modification to the approved CGM. Changes implemented to the approved CGM by the E42 Modification would result in the modified CGM. This assessment has been prepared for inclusion in the Environmental Assessment (EA) in accordance with the environmental assessment requirements of the Director-General of the Department of Planning.

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

- Review of the previous visual assessment undertaken for the approved CGM viz. *Visual Assessment Report for the Cowal Gold Project* (EDAW Australia [EDAW], 1997) – Appendix M of the *Cowal Gold Project Environmental Impact Statement* (North Limited, 1998).
- A site inspection to identify the viewshed for the modified CGM and potentially sensitive viewing locations within the vicinity of the modified CGM.
- Characterisation of the existing visual landscape in terms of topography, existing landuse 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 modified CGM with respect to potential visual impacts.
- Recommendations for the management of potential visual impacts.

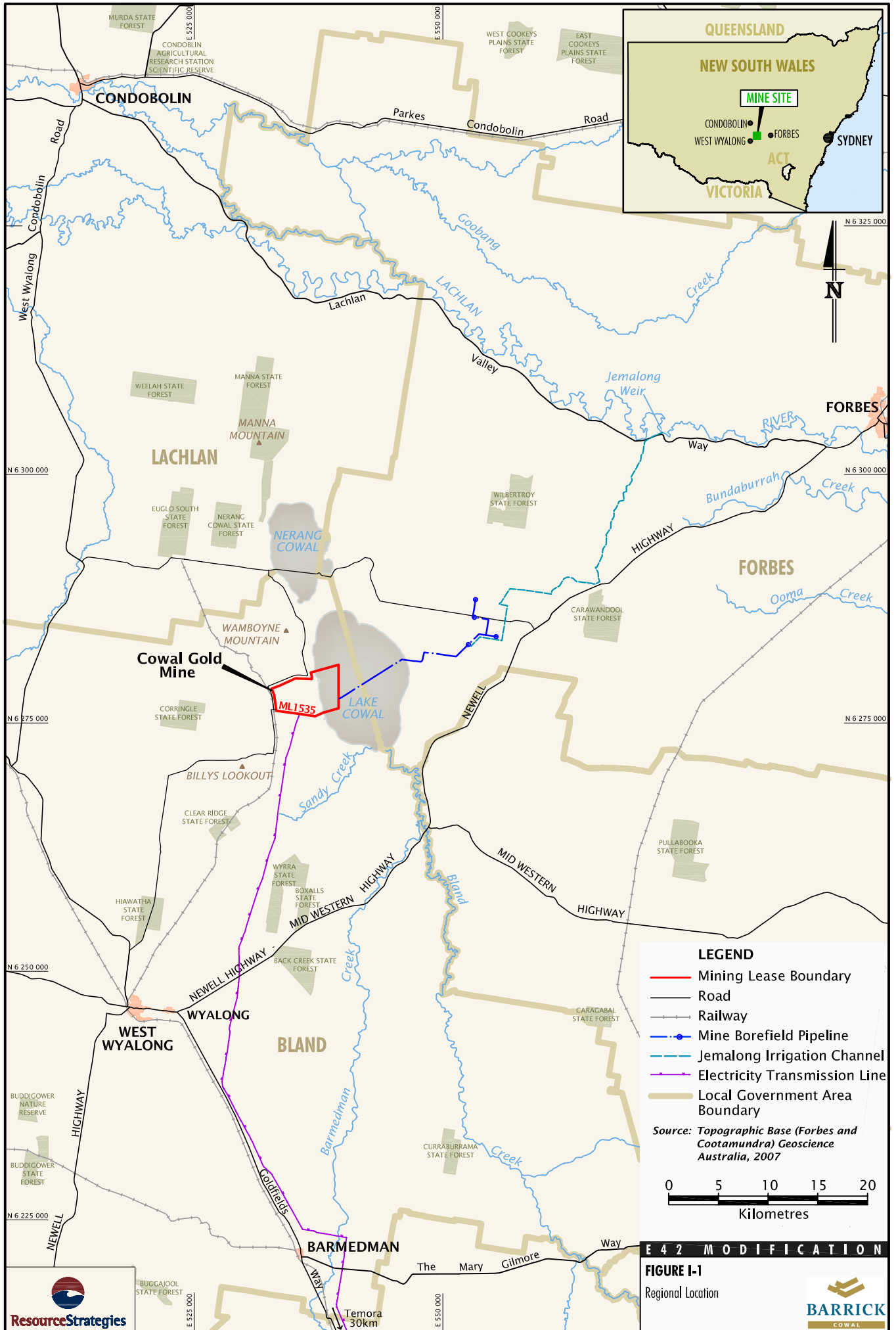
I1.1 METHODOLOGY

The methodology employed for this visual assessment has been based on analysis of the setting and assessment of the potential impacts of the modified CGM. The key factors considered include:

- Sensitive landuses (e.g. residential areas, public roads and natural/recreation areas) (note: dwellings owned by Barrick have not been assessed as part of this visual assessment).
- The visual form, scale and colour of the development.

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

- Review previous visual assessment reports undertaken for the approved CGM (Section I2).
- Characterise the existing landscape and visual setting (Section I3).
- Examine the main aspects of the modified CGM (Section I4).



- Qualitatively assess (Section I5):
 - Visual modification at key viewpoints – *How would the modified CGM contrast with the landscape character of the surrounding setting?*
 - Visual sensitivity at key viewpoints – *How sensitive would viewers be to the modified CGM?*
 - Potential night-lighting impacts.
- Propose mitigation and management measures (Section I6).

The methodology employed by this visual assessment is based on the United State Department of Agriculture – Forestry Service (1974) methodology. The potential visual impact was assessed by evaluating the level of visual modification of the modified CGM in the context of the visual sensitivity of relevant surrounding landuse areas (i.e. those areas from which the modified CGM may be visible) (EDAW, 2006). Levels of visual impact resulting from visual modification and sensitivity are illustrated in Table I-1.

**Table I-1
Visual Impact Matrix**

		Viewer Sensitivity			
		H	M	L	
Visual Modification	H	H	H	M	
	M	H	M	L	
	L	M	L	L	
	VL	L	VL	VL	

Source: EDAW (2006)

VL = Very Low
L = Low
M = Moderate
H = High

I1.1.1 Visual Modification

The level of visual modification of a proposed development can be measured as an expression of the visual interaction, or the level of visual contrast between the development and the existing visual environment. Throughout the visual catchment (or zone of visual influence) the level of visual modification generally decreases as the distance from the development to various viewpoint locations increases, and is categorised as follows (EDAW, 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.

11.1.2 Visual Sensitivity

Visual (viewer) sensitivity is a measure of how critically a change to the existing landscape is viewed from various use areas, and is a function of both landuse and duration of exposure (i.e. individuals 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, 2006).

The visual sensitivity of the development depends on a range of viewer characteristics. The major components of the E42 Modification would be contained within the approved CGM Mining Lease (ML) 1535. The primary characteristics used in this visual assessment are landuse, the distance to the ML and modified CGM landforms from viewers and its visibility from critical viewpoints.

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

Typical visual sensitivity levels are defined in Table I-2.

Table I-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
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, 2006

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

- Low visual sensitivity – local roads (e.g. Lake Cowal Road).
- Moderate visual sensitivity – major roads (e.g. Newell Highway).
- High visual sensitivity – rural residences and natural/recreation areas (e.g. Game Reserve).

I2 REVIEW OF PREVIOUS VISUAL ASSESSMENTS

A review of EDAW's (1997) visual assessment for the *Cowal Gold Project Environmental Impact Statement* (North Limited, 1998) is summarised below:

The visual assessment was conducted by EDAW, and three visual simulation points surrounding the ML were used to assess potential visual impact. These simulation points were all within the local setting (i.e. less than 1 km radius of the mine). The assessment concluded that the overall long-term potential visual impact of the mine development on the surrounding areas would generally be low because (EDAW, 1997):

- The open cut mining operations would be screened from view by existing stands of trees throughout the surrounding landscape.
- Only a very low number of people would potentially see the mining operations from the sparsely populated surrounding rural landscape.
- The very long distance of most potential views and the relative ease of screening potential views from the public road around the site.
- Long-term rehabilitation of the new landforms created by disposal of waste material would create tree covered hills similar to existing landforms in the region.

I3 EXISTING LANDSCAPE AND VISUAL SETTING

I3.1 LOCAL LANDSCAPE CHARACTER AND SCENIC QUALITY

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

The ML and surrounding area are comprised of a number of distinct landuse types and landscape units of varying levels of landscape quality. These have been defined as follows:

- Agricultural Areas – the ML is predominantly surrounded by heavily cleared dryland agriculture areas with opportunistic irrigation farming in the Jemalong/Wyldes Plains Irrigation Districts adjoining the north-east edge of Lake Cowal. These areas include Lake Cowal, approximately 8 km wide by 13 km long, located immediately to the east of the ML. Lake Cowal is ephemeral, generally flat and shallow.
- Residential Dwellings - detached dwellings to the north, east, west and south-west of the ML.
- Game Reserve – located approximately 3 km south-east of the ML.
- Billys Lookout and Associated Ridgeline System – runs generally north/south approximately 5 km to the ML. The ridgeline system reaches a maximum elevation of relative level (RL) 368 metres (m) Australian Height Datum (AHD) at Billys Lookout located approximately 7 km south-west of the ML.
- Wamboyne Mountain – approximately RL 412 m AHD. Wamboyne Mountain is a major tree-covered landform of regional significance located about 5 km north of the ML and visible from surrounding areas.

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

- Regional Setting – greater than 5 km from the ML;
- Sub-regional Setting – 1 to 5 km from the ML; and
- Local Setting – up to 1 km from the ML.

Regional Setting (>5 km)

The regional setting has attributes of moderate to high scenic quality due to the presence of a wooded north-south oriented ridgeline system running approximately 5 km west of the CGM. The contrast between the vegetation and topography of the ridgelines and adjacent agricultural areas adds to the visual interest. The ridgeline system has an average elevation level of approximately RL 205 m AHD, reaching a maximum elevation of RL 368 m AHD at Billys Lookout (located approximately 7 km south-west of the ML). The other major topographic feature in the regional setting is Wamboyne Mountain, located approximately 5 km north of the ML (RL 412 m AHD). The regional setting also has attributes of low scenic quality due to the generally flat, cleared dryland agricultural areas that dominate the landscape.

Sub-regional Setting (1-5 km)

Lake Cowal is listed on the Register of National Estate, however no aspects relating to visual amenity are described (Department of the Environment, Water, Heritage and the Arts, 2008).

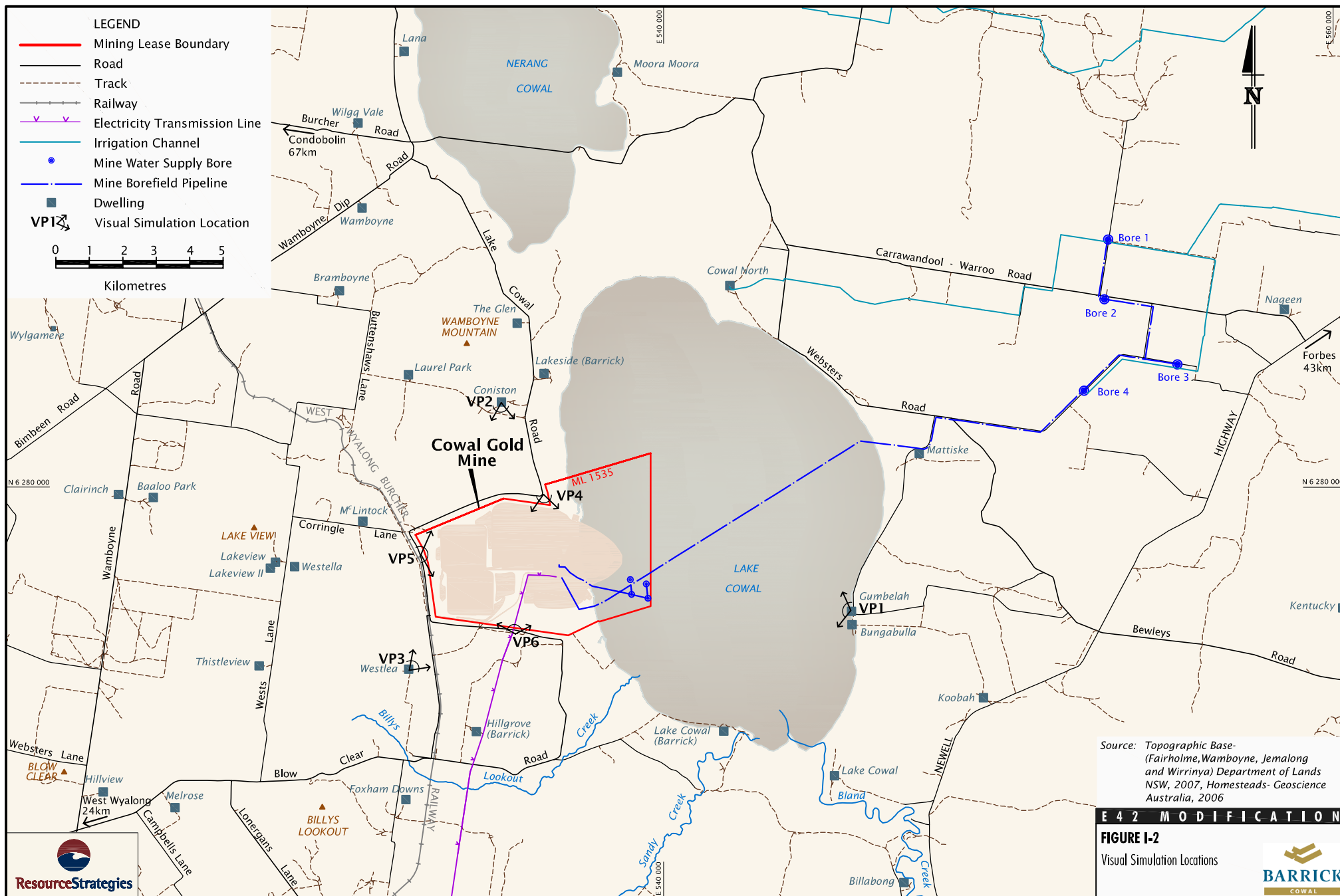
Most of the Lake Cowal area, including the Lake itself, has been cleared for grazing and/or cultivation which results in a low to moderate scenic quality, with remnant tree and shrub vegetation (e.g. lignum) occurring primarily on rocky elevated ground, areas of impeded drainage, patches of sandy soils, the shoreline of Lake Cowal and road verges (North Limited, 1998). Lake Cowal was historically substantially inundated seven years out of ten (North Limited, 1998), however there has been no substantial water in Lake Cowal since 1995.

Local Setting (<1 km)

The local setting has been heavily modified over time with the majority of vegetation disturbed by historic agricultural clearing and the approved CGM, which includes a number of modifying elements including active tailings storage facilities and waste emplacements, process plant and infrastructure areas and a mine access road. Cowal West Hill is a small tree-covered hill generally oriented north/south (approximately RL 223 m AHD), located west of the existing northern waste emplacement. A small tree-covered hill of low relief (approximately 260 m AHD) is also located immediately to the south of the ML. Due to their highly disturbed nature, these areas are considered to be of low scenic quality.

Other features of the local setting include the local road network (including Lake Cowal Road), the electricity transmission line and Burcher-West Wyalong Railway (Figure I-2).

The overall visual character of the local setting is considered to be of low scenic quality.



I3.2 SITE TOPOGRAPHY AND VEGETATION

The ML is located on the flat plains associated with the western side of Lake Cowal (Figure I-1). The site is generally flat and falls to the east at a slope of approximately 1% (North Limited, 1998).

As discussed in Section I3.1, the ML has been heavily modified over time with the majority of vegetation disturbed as a result of both historic agricultural clearing and the approved CGM. Vegetation within the ML is predominantly cleared agricultural land with scattered trees, with remnant patches of other woody species located to the north and south of the ML. Cowal West Hill is located west of the existing northern waste emplacement.

I4 E42 MODIFICATION DESCRIPTION – VISUAL CHARACTER

I4.1 OVERVIEW

A detailed description of the changes proposed by the E42 Modification is provided in Section 2 of the EA. The major aspects of the E42 Modification considered to have the potential to impact on the visual landscape include:

- additional clearance of vegetation (approximately 290 hectares) within the ML;
- modification of topographic features, including increased height of waste emplacements up to RL 275 m AHD and tailings storage facilities up to RL 256 m AHD;
- progressive rehabilitation of completed landforms; and
- lighting associated with night-time mining operations.

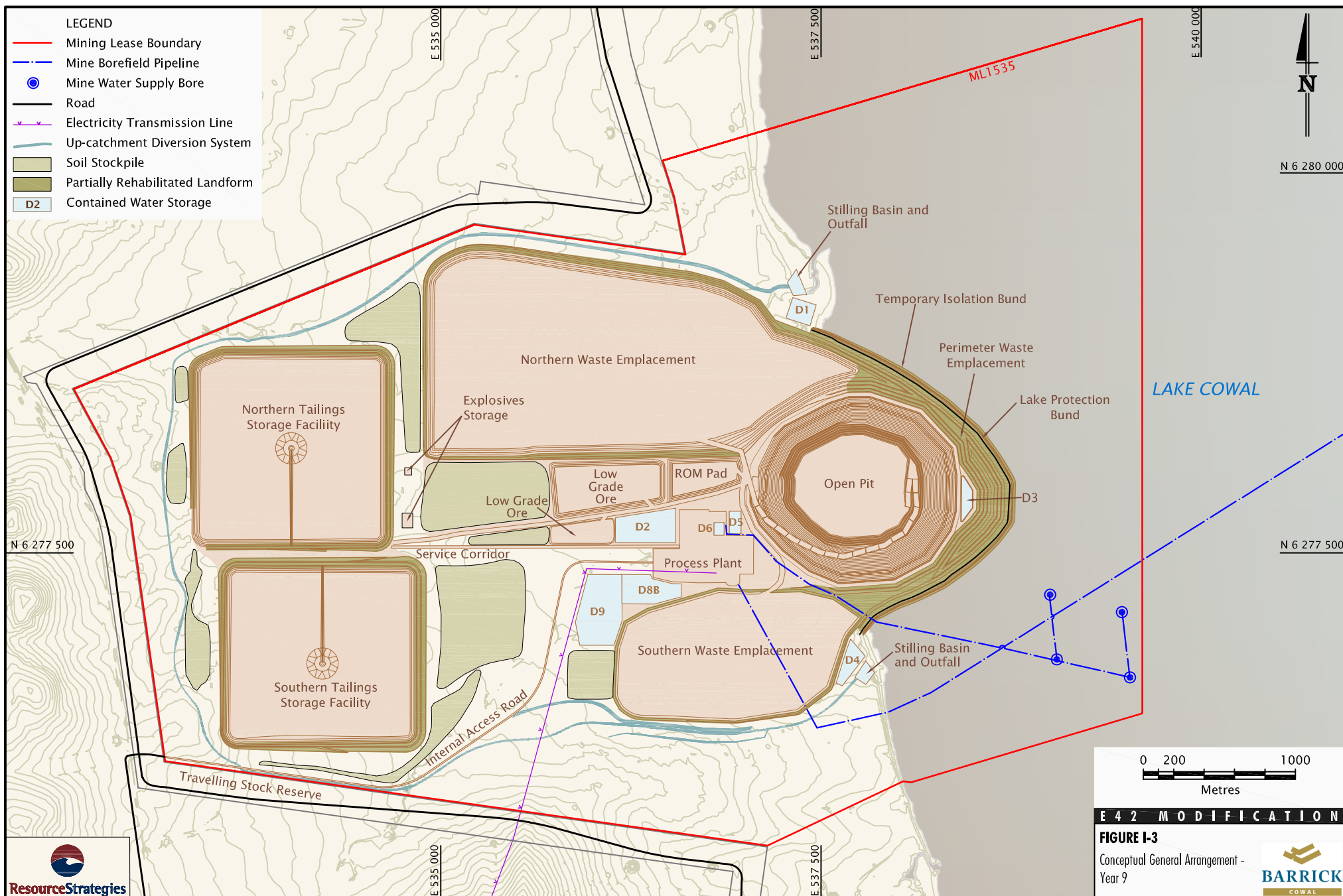
I4.2 MINING LANDFORMS

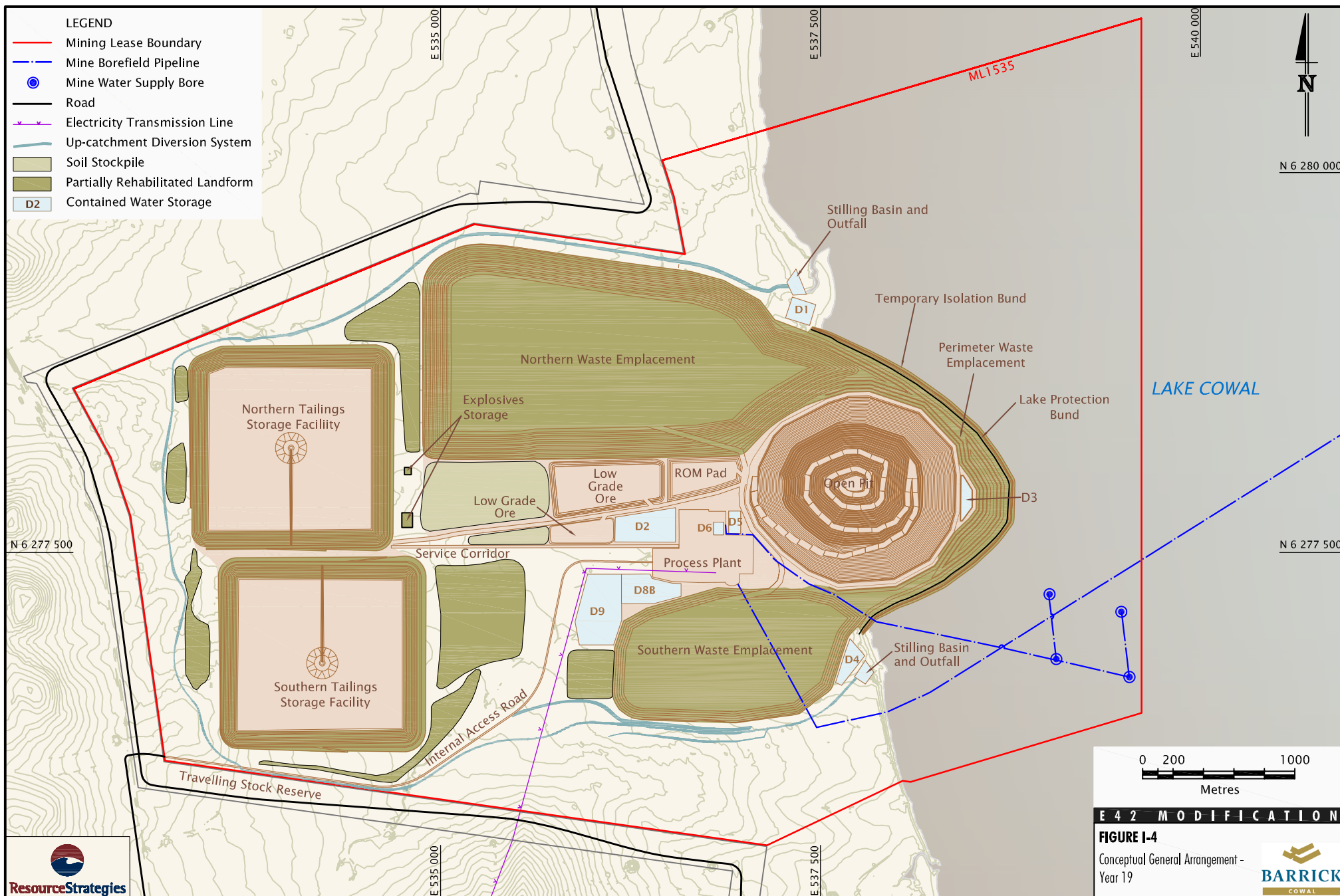
The general arrangement of the modified CGM during Years 9, 19 and post-mining is shown on Figures I-3 to I-5.

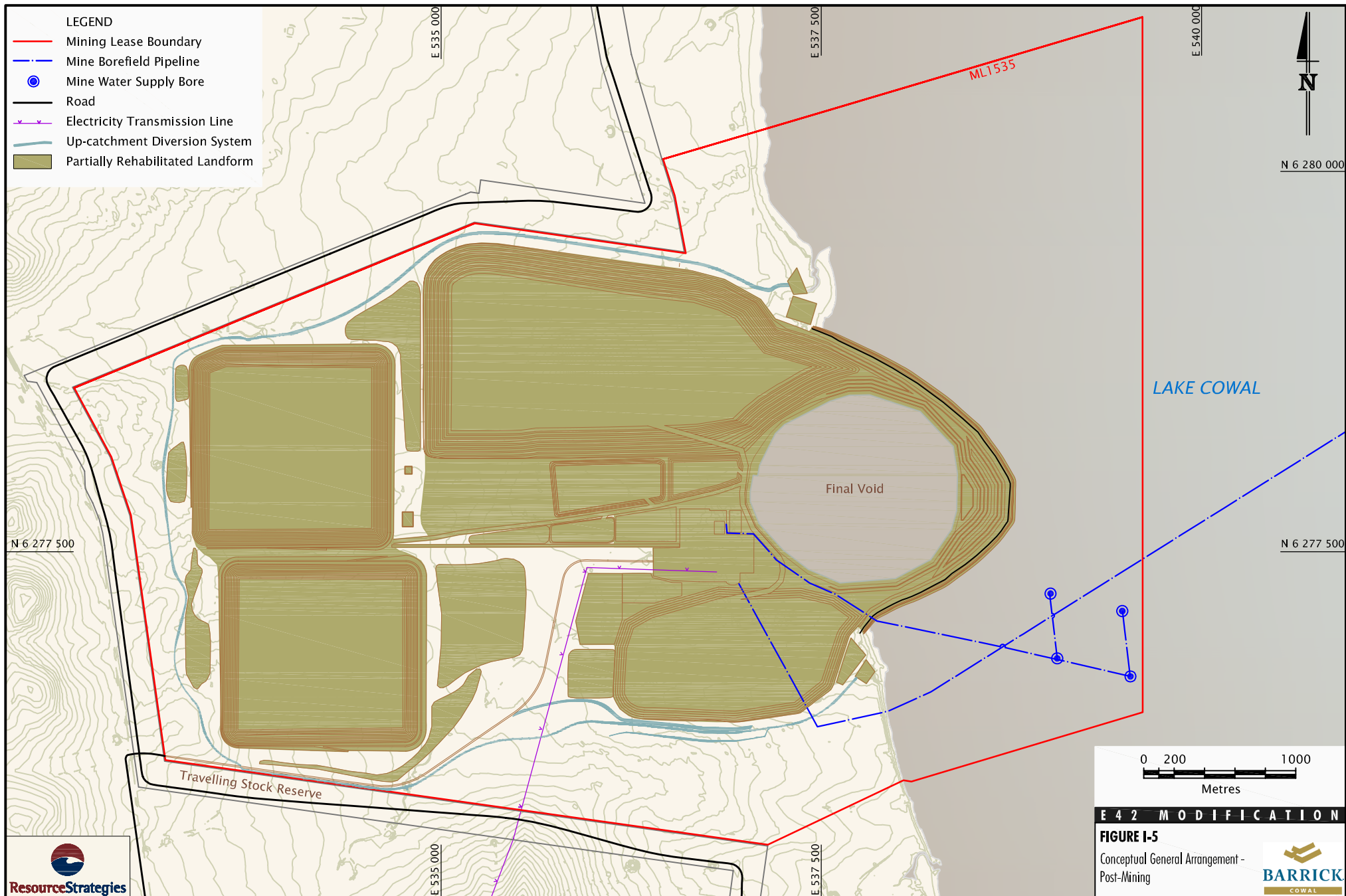
The rehabilitation of waste emplacements and tailings storage facilities would be undertaken on a progressive basis in order to improve integration of the modified CGM landforms with the surrounding environment and mitigate potential visual impacts.

Mine waste emplacements would, over time, vary in appearance from freshly placed waste rock to rehabilitated landforms, complete with topsoil and vegetation. As such, the level of visual modification created by these emplacements would change, reducing as vegetation becomes established and matures.

Post-mining landforms shown on Figure I-5 are conceptual and would range in elevation from approximately RL 252 m AHD to RL 275 m AHD. The post-mining landforms would be topsoiled and revegetated in accordance with the Rehabilitation and Landscape Management Strategy presented in Section 5 of the EA.







I4.3 NIGHT-LIGHTING

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

- overhead lighting of the process plant area and administration area;
- fixed lights on top of waste emplacements; and
- mobile vehicle-mounted lights (e.g. work vehicles in various locations on the ML).

The E42 Modification would vary the potential effects of existing night-lighting (i.e. visible at additional locations due to increased elevations of some light sources) over the life of the mine. The scale and nature of night-lighting for the modified CGM would be similar in intensity to the existing night-lighting at the approved CGM. The potential impacts of night-lighting associated with the modified CGM are discussed in Section I5.3.

I5 ASSESSMENT OF POTENTIAL VISUAL IMPACTS

This visual assessment has been conducted to identify areas where potential visual impacts are most likely to occur as a result of the E42 Modification and to assist in the mitigation of those potential impacts from sensitive viewpoints. The assessment process has focussed on the potential visual impact that may result on views for the most sensitive visual settings/landuses where routinely accessed or readily accessible viewpoints exist.

I5.1 SENSITIVE VISUAL SETTINGS

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

- the number of sensitive viewing locations; and
- the level to which the proposed works are visible - if they are not seen, then there is no impact.

Locations with potential views of the modified CGM landforms include those that already have views of the approved CGM. Potential views of the modified CGM landforms would be available from the following locations:

- rural residences to the north, east, west and south-west of the ML;
- Lake Cowal Road looking south, east and north towards the ML;
- Newell Highway located to the east of the ML;
- Billys Lookout looking north-east over the ML;
- Wamboyne Mountain looking south over the ML;
- Lake Cowal looking west towards the ML;
- Game Reserve looking north-west towards the ML; and
- Burcher-West Wyalong Railway looking east towards the ML.

Whilst it is acknowledged that Billys Lookout, the associated ridgeline system and Wamboyne Mountain overlook the ML, the potential views from these locations are considered to be negligible given the relatively low topography, wooded vegetation coverage and the fact these areas are not routinely accessed by the public nor are these areas readily accessible to the public. As such, no further assessment for these locations has been undertaken.

Limited views of the approved CGM are currently available from viewpoints along the Newell Highway, where roadside vegetation and topography permit. However, given the distance to the ML, the small proportion of the overall viewscape that the modified CGM landforms would contribute to, and the obscured view of these landforms from viewpoints along the majority of the road, no further assessment for this location has been undertaken.

The modified tailings storage facilities and waste emplacements would be visible from the Burcher-West Wyalong Railway and given its close proximity to the ML, the level of visual modification at this location is considered moderate. However, given the railway is used intermittently and exclusively for grain transport during the harvest period, no further assessment for this location has been undertaken.

The Game Reserve was originally established to allow public access to the Lake for recreational use (including fishing) and duck hunting (historically) (Office of the Commissioners of Inquiry for Environment and Planning, 1999). It has been assumed that this recreational use continues. Potential views of the ML from the Game Reserve are restricted by intervening screening vegetation (particularly along the south-western fringe of Lake Cowal) and flat topography. Potential north-westerly views of the modified CGM landforms would be available due to the flat lake-bed topography and absence of screening foreground vegetation on Lake Cowal. These views would mostly be restricted to portions of the active waste emplacements and relate to a small extent of the overall viewscape. The potential visual impact at the Game Reserve would occur during the latter years of the modified CGM, when the heights of the waste emplacements increase beyond their currently-approved elevations. Given the distance of the Game Reserve from the ML and that the modified CGM landforms would comprise a small proportion of the viewscape (remaining also below the vegetated ridgeline to the north-west), the level of visual modification would be low. The distance of the Game Reserve from the ML together with the nature of its use (i.e. recreational use including fishing) means the visual sensitivity of this location would be moderate. The low level of visual modification coupled with the moderate level of visual sensitivity means the level of potential visual impact on users of the Game Reserve would be moderate to low. This level of potential visual impact would progressively reduce once vegetation cover begins to establish on the rehabilitated waste emplacements.

A visual simulation was not prepared for this location on the basis that potential visual impacts for the Game Reserve would be lower than those assessed for closer viewpoints with a similar directional view (i.e. Lake Cowal Road looking north towards the ML).

Visual simulations were therefore created for the locations identified in Table I-3 and shown on Figure 1-2.

**Table I-3
Locations of Visual Simulations**

Visual Simulation Point No.	Visual Simulation Location*	Potential View of E42 Modification Landforms	Simulation Figure
1	Adjacent to the "Gumbelah" Dwelling	West over Lake Cowal towards southern, perimeter and northern waste emplacements.	Figure I-6
2	Adjacent to the "Coniston" Dwelling	South over partially cleared agricultural land towards perimeter and northern waste emplacements and northern tailings storage facility.	Figure I-7
3	Adjacent to the "Westlea" Dwelling	North-east over partially cleared agricultural land towards southern tailings storage facility and southern waste emplacement.	Figure I-8
4	Lake Cowal Road	South towards perimeter and northern waste emplacements.	Figure I-9
5	Lake Cowal Road	East towards northern and southern tailings storage facilities.	Figure I-10
6	Lake Cowal Road	North towards southern tailings storage facility and waste emplacements.	Figure I-11

* Refer to Figure I-2

Visual simulations (Figure I-6 to Figure I-11) were prepared to show the existing views as well as simulations of the modified CGM landforms during Year 19 of operations, when the landforms would be at their maximum heights, 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 simulation takes into account the Rehabilitation and Landscape Management Strategy presented in Section 5 of the EA.

I5.2 QUALITATIVE ASSESSMENT

This section assesses potential visual impacts that are expected to arise as a result of the E42 Modification based on the methodology described in Section I1.1. The level of potential visual impact is assessed for the modified CGM prior to any amelioration being undertaken (i.e. vegetation screening). The final category considers some maturation of vegetation/tree planting works (i.e. 5 to 10 years).

A summary of the visual assessment locations analysed in the following subsections is provided in Table I-4.



Existing View



Year 19 Simulation



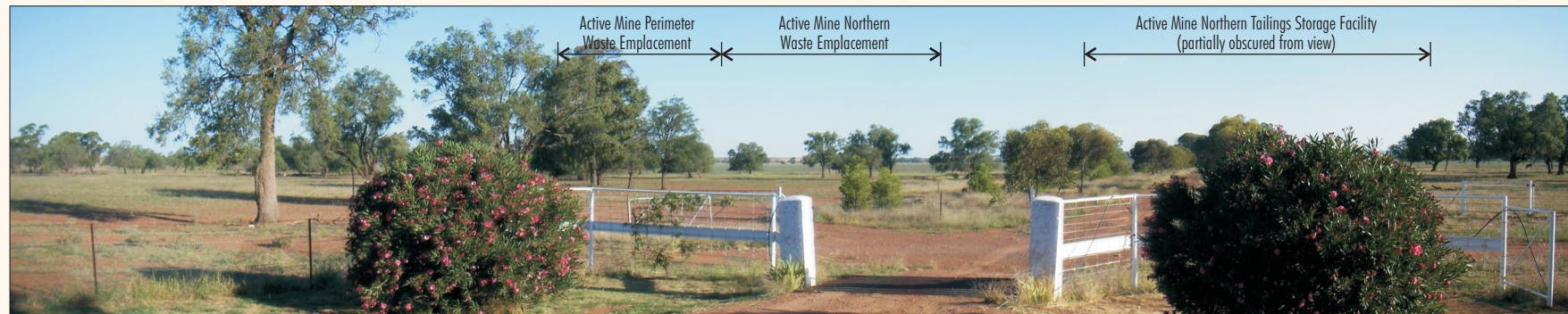
Post-Mining Simulation

E 4 2 M O D I F I C A T I O N

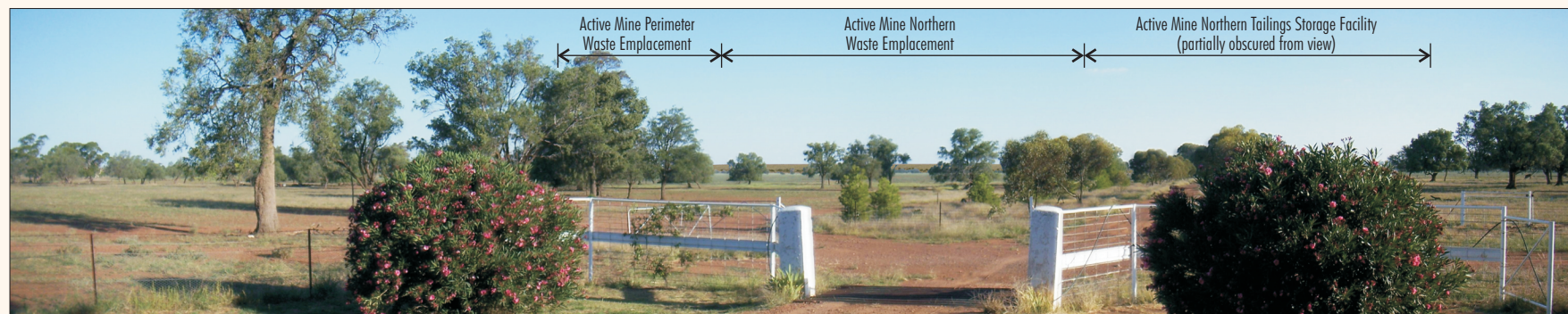
FIGURE I-6

Existing View and
Visual Simulations -
"Gumbelah" Dwelling (1)





Existing View



Year 19 Simulation



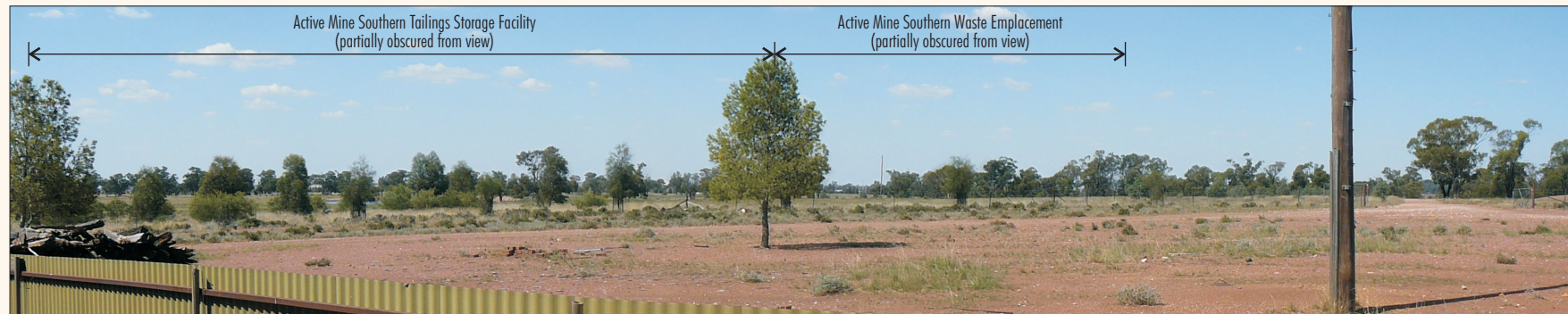
Post-Mining Simulation

E 4 2 M O D I F I C A T I O N

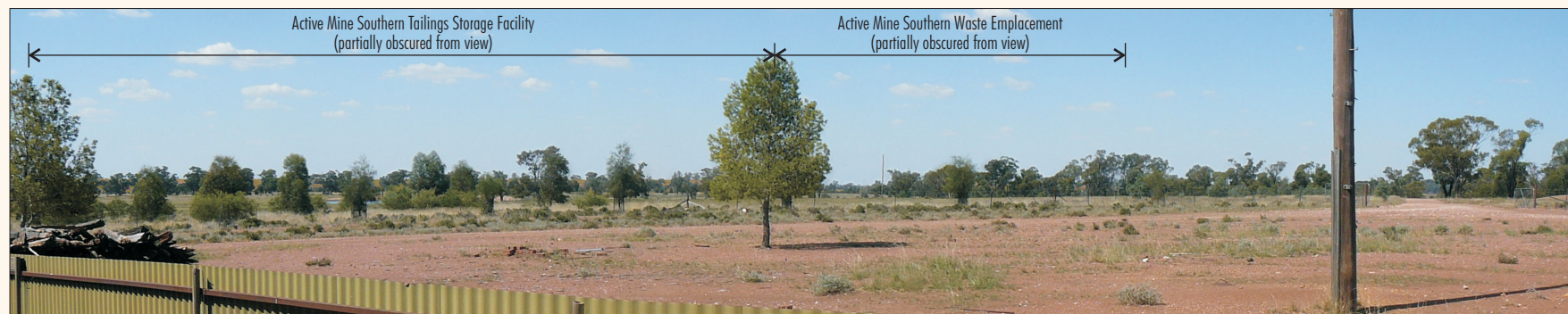
FIGURE I-7

Existing View and
Visual Simulations -
"Coniston" Dwelling (2)





Existing View



Year 19 Simulation



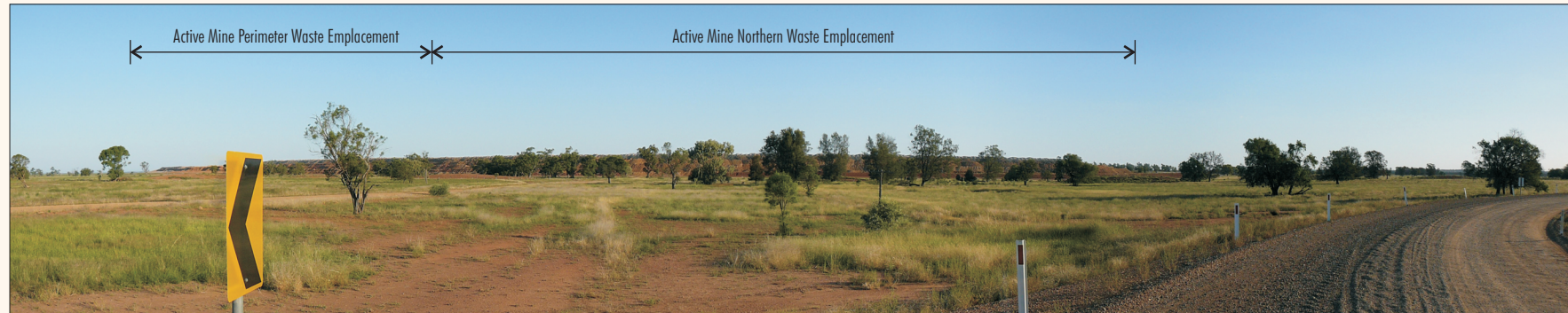
Post-Mining Simulation

E 4 2 M O D I F I C A T I O N

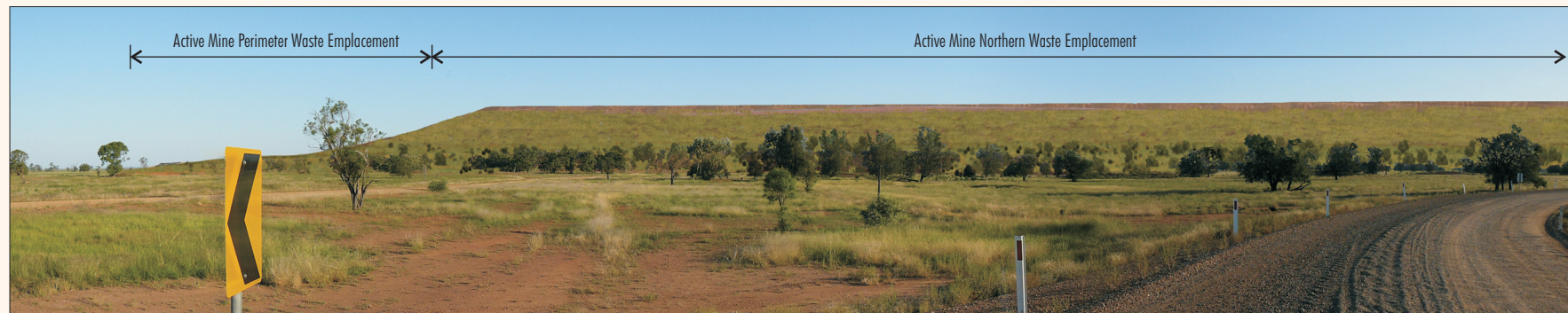
FIGURE I-8

Existing View and
Visual Simulations -
"Westlea" Dwelling (3)

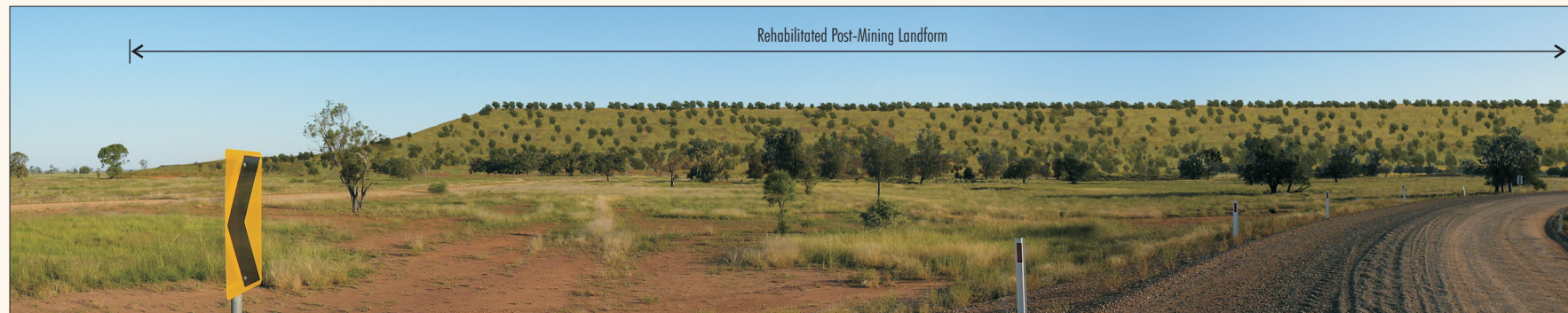




Existing View



Year 19 Simulation



Post-Mining Simulation

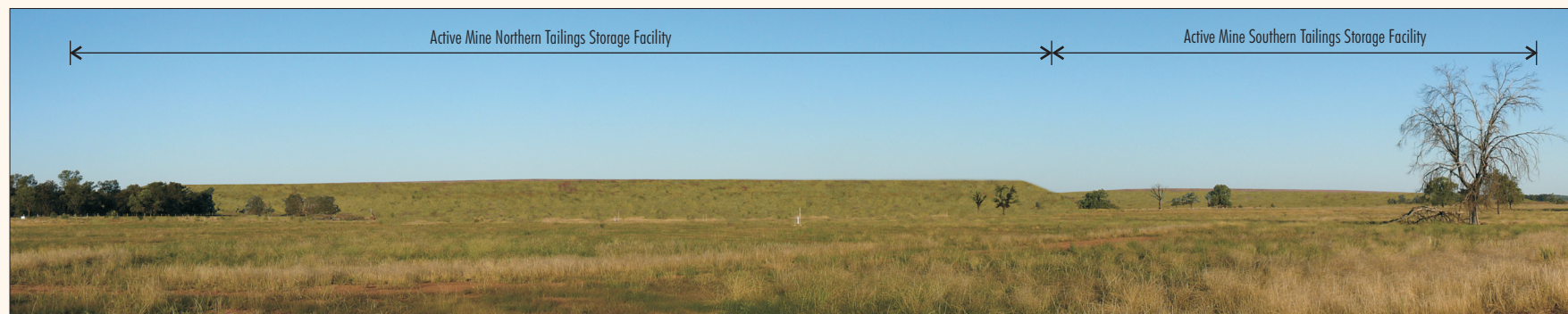
E 4 2 M O D I F I C A T I O N

FIGURE I-9
Existing View and
Visual Simulations -
Lake Cowal Road (4)

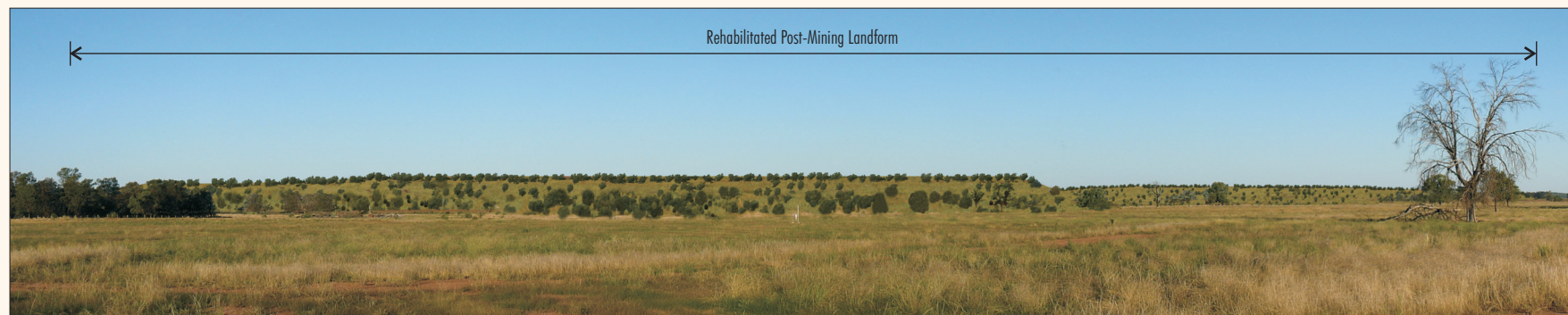




Existing View



Year 19 Simulation

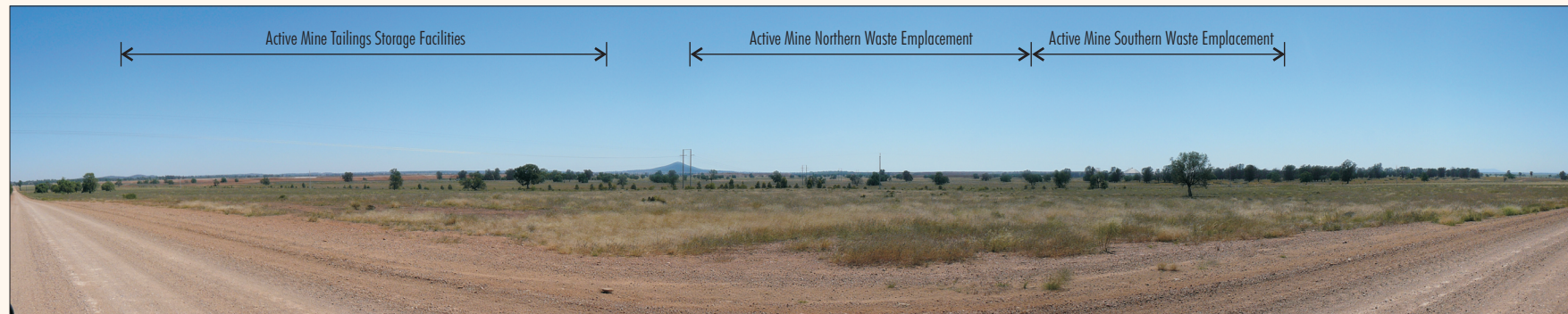


Post-Mining Simulation

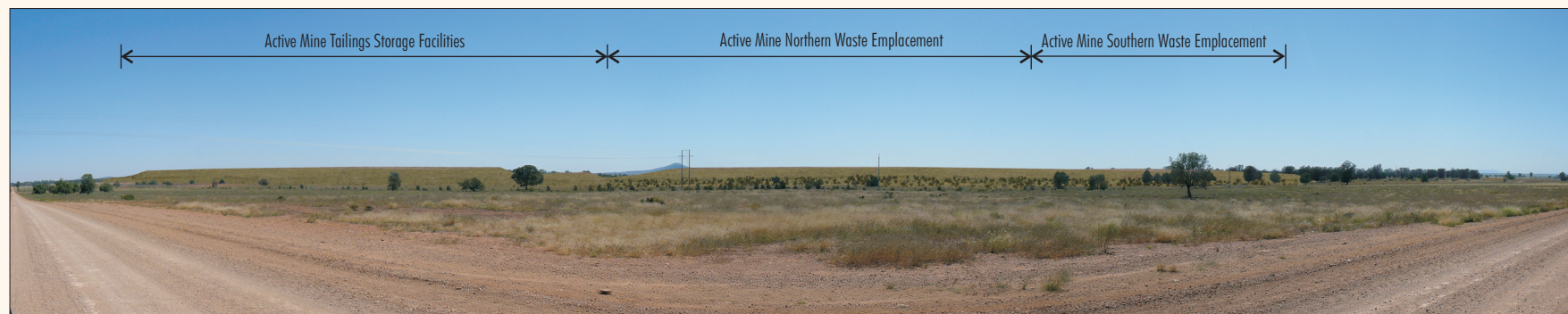
E 4 2 M O D I F I C A T I O N

FIGURE I-10
Existing View and
Visual Simulations -
Lake Cowal Road (5)

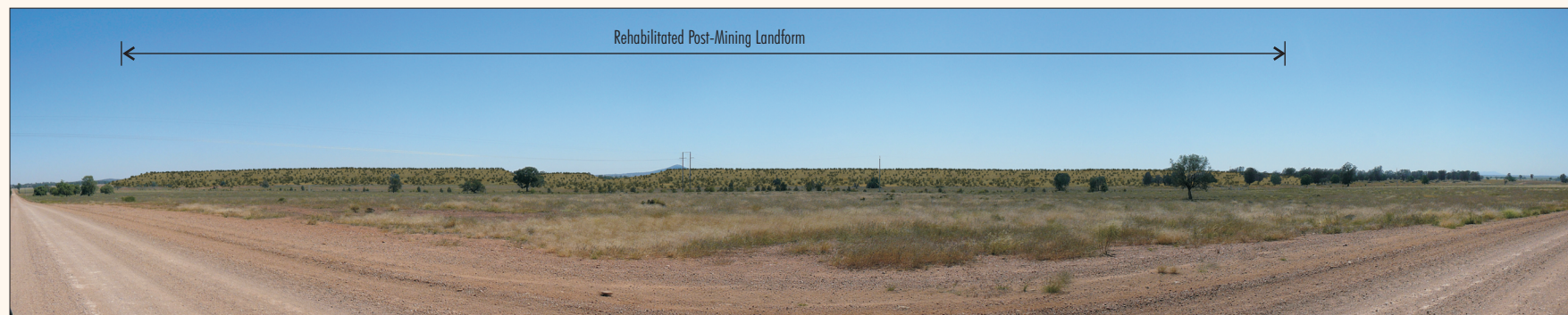




Existing View



Year 19 Simulation



Post-Mining Simulation

E 4 2 M O D I F I C A T I O N

FIGURE I-11
Existing View and
Visual Simulations -
Lake Cowal Road (6)



Table I-4
Summary of Visual Assessment

Location	Sensitivity	Visual Modification Level	Potential Impact	Potential Impact After Final Amelioration
Regional Setting (Greater than 5 km)				
“Gumbelah” Dwelling (Visual Simulation Location 1)	L	L	L	L
Sub-Regional Setting (1 – 5 km)				
“Coniston” (Visual Simulation Location 2)	M	M-L	M-L	L
“Westlea” (Visual Simulation Location 3)	M-H	L	M-L	L
Local Setting (Up to 1 km)				
Lake Cowal Road (Visual Simulation Location 4)	L	M-H	M	M-L
Lake Cowal Road (Visual Simulation Location 5)	L	M-H	M	M-L
Lake Cowal Road (Visual Simulation Location 6)	L	M-H	M	M-L

* Minimal visibility
H – High, M – Moderate, L – Low

15.2.1 Visual Impacts – Regional Setting

“Gumbelah” Dwelling (Visual Simulation Location 1)

Level of Visual Modification

The “Gumbelah” dwelling is located more than 5 km from the eastern boundary of the ML. Direct westerly views are available from the residence due to the flat topography and the absence of any screening foreground vegetation across Lake Cowal (Figure I-6). The existing view shows that the elevated north-south trending ridgeline is visible on the horizon with the approved CGM in the background and Lake Cowal in the middle and foreground.

The potential visual impact at the “Gumbelah” dwelling would occur during the latter years of the modified CGM when the heights of the landforms increase beyond their currently-approved elevations.

The simulation on Figure I-6 shows that following progressive and final rehabilitation, the level of visual modification would be low. Further, the heights of the modified CGM landforms would remain below the vegetated ridgeline to the west. Further details of the Rehabilitation and Landscape Management Strategy are provided in Section 5 of the EA.

Viewer Sensitivity

Within the sub-regional setting, visual sensitivity at the rural residence is considered low given the distance to the ML (i.e. greater than 5 km).

Visual Impact

Given the low level of modification coupled with the low visual sensitivity at the “Gumbelah” dwelling, a low level of potential visual impact is expected.

Duration of Impact

The level of potential visual impact would progressively reduce once vegetation cover begins to establish on the rehabilitated waste emplacements.

“Bungabulla” Dwelling

The same level of potential visual impact would be expected at the “Bungabulla” dwelling (Figure I-2) located adjacent to the “Gumbelah” dwelling, given the proximity of these two dwellings.

I5.2.2 Visual Impacts – Sub-Regional Setting

A number of isolated viewing locations are located within the sub-regional setting (Table I-4). The potential visual impacts of the E42 Modification for the “Coniston” and “Westlea” dwellings are described below and visual simulations are shown on Figures I-7 and I-8.

“Coniston” Dwelling (Visual Simulation Location 2)

Level of Visual Modification

The “Coniston” dwelling is located approximately 3 km north of the northern boundary of the ML. Views from this residence towards the ML are mostly obscured by intervening vegetation and comprise a small proportion of the overall viewscape (Figure I-7).

The potential visual impact at the “Coniston” dwelling would occur during the latter years of the modified CGM, when the heights of the landforms increase beyond their currently-approved elevations.

The potential visual impact of the northern waste 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. This potential impact would be confined to the upper batters of the new landform during progressive construction and rehabilitation. There is also likely to be some contrast between the colour of the newly established grass and the adjoining grassland areas. However, this contrast is likely to be of a short duration following completion of rehabilitation works.

The level of visual modification would be moderate to low as a result of intervening vegetation and undulating topography.

Viewer Sensitivity

Within the sub-regional setting, visual sensitivity at the rural residence would be moderate.

Visual Impact

Given the moderate to low level of modification coupled with the moderate visual sensitivity of the “Coniston” dwelling, there would be a moderate to low level of potential visual impact at this location.

Duration of Impacts

As discussed above, the northern waste emplacement would be the most visually prominent component of the modified CGM from this location and would remain as a permanent landscape feature. The outer batters of the waste emplacements would be planted with grasses, shrubs and/or trees reducing the raw overburden appearance in the long-term as the vegetation establishes.

The simulation on Figure I-7 shows that following progressive and final rehabilitation, the level of potential visual impact would reduce to low. Further details of the Rehabilitation and Landscape Management Strategy are provided in Section 5 of the EA.

“Westlea” Dwelling (Visual Simulation Location 3)

Level of Visual Modification

The “Westlea” dwelling is the closest residence to the ML (i.e. approximately 2.5 km south-west). Views from this residence towards the ML are mostly obscured by intervening vegetation and undulating topography and relate to a small proportion of the overall viewscape (Figure I-8). The potential visual impact at the “Westlea” dwelling would occur during the latter years of the modified CGM, when the heights of the tailings storage facilities increase beyond their currently-approved elevations.

The potential visual impact of the tailings storage facilities would also result from the contrast in colour and texture between the undisturbed natural areas and the newly constructed outer batters before a grass cover is established during the rehabilitation process. This potential impact would be confined to the upper batters of the new landform during progressive construction and rehabilitation.

The level of visual modification would be low as a result of intervening vegetation and undulating topography and would be further reduced as a result of rehabilitation/plantings on the tailings storage facilities.

Viewer Sensitivity

Within the sub-regional setting, visual sensitivity of the rural residence within the sub-regional setting would be moderate to high.

Visual Impact

Given the low level of modification coupled with the moderate to high visual sensitivity of the “Westlea” dwelling, the potential visual impact would be moderate to low.

Duration of Impacts

As discussed above, the tailings storage facilities would be the most visually prominent components of the modified CGM from this location and would remain as permanent landscape features. The outer batters of the tailings storage facilities would be planted with grasses, shrubs and/or trees reducing the raw soil appearance in the long-term as the vegetation establishes.

The simulation on Figure I-8 shows that following progressive and final rehabilitation, the level of potential visual impact would reduce to low. Further details of the Rehabilitation and Landscape Management Strategy are provided in Section 5 of the EA.

I5.2.3 Visual Impacts – Local Setting

The potential visual impacts of the modified CGM on viewpoints within the local setting are described below. The assessment has focussed on the potential visual impact that may result on views from the most sensitive viewpoints where routinely accessed or are readily accessible (i.e. along Lake Cowal Road directly adjacent to the ML and the Burcher-West Wyalong Railway).

Lake Cowal Road (Visual Simulation Locations 4, 5 and 6)

Visual Modification

Figures I-9, I-10 and I-11 simulate views of the ML from the north (visual simulation location 4), east (visual simulation location 5) and south (visual simulation location 6) along Lake Cowal Road. These visual simulation locations are approximately 200 to 300 m from the ML.

The potential visual impact along Lake Cowal Road would occur during the latter years of the modified CGM when the heights of the landforms increase beyond their currently-approved elevations.

The potential visual impact of the waste emplacements and tailings storage facilities would result from the contrast in colour and texture between the undisturbed natural areas and the newly placed and unvegetated material before a grass cover is established as part of the rehabilitation process. This potential impact would be confined to the upper batters of the new landform during progressive construction and rehabilitation. There is also likely to be some contrast between the colour of the newly established grass and adjoining grassland areas. However, this contrast is likely to be of a short duration following completion of rehabilitation works.

Grasses, shrubs and/or trees would be planted on the outer batters of the waste emplacements and tailings storage facilities to integrate with the vegetation character of the surrounding landscape to reduce the level of visual modification on the visual setting. Maturation of existing roadside tree and shrub plantings as well as additional tree plantings would provide partial screening of the lower slopes of the landforms. The Rehabilitation and Landscape Management Strategy is discussed further in Section 5 of the EA.

There would be a moderate to high level of visual modification at the above locations on Lake Cowal Road.

Viewer Sensitivity

Although the modified CGM landforms would be visible from Lake Cowal Road, there are few users who would be exposed to the views along this local road. In addition, these users would be accustomed to the existing modified landscape that includes views of the approved CGM. Within the local setting, the visual sensitivity of users on Lake Cowal Road is therefore considered to be low.

Visual Impact

The low level of visual sensitivity coupled with the moderate to high level of modification means a moderate level of potential visual impact is expected on users of Lake Cowal Road.

Duration of Impact

The level of potential visual impact is expected to decrease from moderate to low following progressive rehabilitation of the modified landform components and maturation of existing and proposed future roadside tree plantings.

15.3 POTENTIAL IMPACTS OF NIGHT-LIGHTING

The glow produced by night-lighting at the approved CGM is visible at nearby residences and along transport routes, while direct views of mobile machinery lights and operational lighting are available from some exposed positions. The night-glow is similar to that associated with existing towns and villages in the region.

As discussed in Section 14.3, the nature of night-lighting for the modified CGM would be of a similar intensity when compared to the existing night-lighting at the approved CGM. However, there is potential for the fixed lights to be visible from a wider area surrounding the ML due to the increased elevations of the waste emplacements.

16 VISUAL/LANDSCAPE MITIGATION MEASURES AND MANAGEMENT

16.1 LANDSCAPE DESIGN AND REHABILITATION STRATEGIES

16.1.1 Progressive Rehabilitation

Progressive rehabilitation of waste emplacements and tailings storage facilities would be undertaken in order to reduce the contrast between the modified CGM landforms and the surrounding environment. This would include progressive rehabilitation with selected grass, shrub and tree species (Section 5 of the EA). Figure I-5 illustrates the proposed rehabilitated landforms, including the waste emplacements, tailings storage facilities and other areas of surface disturbance. The final void would be screened from public views on Lake Cowal Road by the tailings storage facilities and waste emplacements. The Rehabilitation and Landscape Management Strategy for the modified CGM disturbance areas is presented in Section 5 of the EA.

16.1.2 Foreground Visual Screening/Vegetation Screens

Earth mounds have been constructed on sections of the western and northern boundaries of the ML to break up continuous views from Lake Cowal Road. These earth mounds as well as vegetation screen areas surrounding the ML (including along Lake Cowal Road) have been planted with endemic plants that are compatible with the existing surrounding vegetation. Maintenance of the vegetation screens (e.g. addition and replacement of plants where required) would continue to be undertaken in these areas. An increase in screening effect over time as plants grow, would continue as a result. Further details of the proposed revegetation activities are provided in Section 5 of the EA.

I6.2 NIGHT-LIGHTING

Measures that would be employed to mitigate potential impacts from night-lighting would include one or more of the following, where practicable:

- Scheduling of mining operations, where practicable, so that evening and night-time operations on the waste emplacements would be located on the southern waste emplacement (i.e. the lower waste emplacement) to reduce the potential for direct lighting impacts to locations north of the ML.
- Restriction of night-lighting to the minimum required for operations and safety requirements where appropriate.
- Use of unidirectional lighting techniques, where practicable.
- Use of light shields to limit the spill of lighting, where practicable.
- Provision of curtains, cladding and/or screens at nearby dwellings to help screen any potential night-time lighting impacts, in consultation with the landholder.
- Planting of trees at nearby dwellings to help screen any potential night-time lighting impacts, in consultation with the landholder.

I7 REFERENCES

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