

VICKERY EXTENSION PROJECT

ENVIRONMENTAL IMPACT STATEMENT

APPENDIX L

VISUAL ASSESSMENT

TABLE OF CONTENTS

1	INTRODUCTION	1
2	EXISTING LANDSCAPE AND VISUAL SETTING	5
2.1	LANDSCAPE CHARACTER AND SCENIC QUALITY	5
2.2	LANDSCAPE CHARACTER SIGNIFICANCE	8
3	REVIEW OF PREVIOUS VISUAL ASSESSMENT	9
4	PROJECT DESCRIPTION – VISUAL CHARACTER	10
4.1	OVERVIEW	10
4.1.1	Project Landforms	10
4.1.2	Project Infrastructure	16
4.1.3	Project Road Changes	20
4.1.4	Vegetation Clearance	20
4.1.5	Landform Profiling and Rehabilitation	20
4.1.6	Night-lighting	21
5	ASSESSMENT OF POTENTIAL VISUAL IMPACTS	22
5.1	METHODOLOGY	22
5.1.1	Visual Modification	22
5.1.2	Visual Sensitivity	23
5.2	IDENTIFICATION OF SENSITIVE VISUAL SETTINGS	23
5.3	PROJECT MINING AREA	24
5.3.1	Regional Setting (> 5 km)	24
5.3.2	Sub-Regional Setting (1 to 5 km)	37
5.3.3	Local Setting (< 1 km)	43
5.4	RAIL SPUR AND RAIL OVERPASS	44
5.5	PRIVATE HAUL ROAD AND KAMILAROI HIGHWAY OVERPASS	49
5.6	OTHER VISUAL IMPACT CONSIDERATIONS	49
5.7	SUMMARY OF IMPACTS	51
5.8	CUMULATIVE IMPACTS	53
6	MITIGATION MEASURES AND MANAGEMENT	54
6.1	PROGRESSIVE REHABILITATION AND REVEGETATION	54
6.2	VISUAL SCREENING	54
6.3	NIGHT-LIGHTING CONTROLS	54
7	REFERENCES	56

LIST OF TABLES

Table 1	Visual Impact Matrix
Table 2	Typical Visual (Viewer) Sensitivity Levels
Table 3	Locations of Viewpoints

LIST OF TABLES (Continued)

Table 4	Distances from Viewpoints to Project Rail Spur
Table 5	Distances from Viewpoints to Rail Overpass
Table 6	Summary of Visual Assessment

LIST OF FIGURES

Figure 1	Project Location
Figure 2	Project General Arrangement – Project Mining Area
Figure 3	Indicative Rail Spur Alignment and Groundwater Bore Locations
Figure 4	Land Ownership - Visual Simulation Locations and Viewpoint Locations
Figure 5	Project General Arrangement – Year 3
Figure 6	Project General Arrangement – Year 7
Figure 7	Project General Arrangement – Year 13
Figure 8	Project General Arrangement – Year 21
Figure 9	Project General Arrangement – Post-Mining Landform
Figure 10	Viewpoints and Visual Simulation Locations
Figure 11a	Existing View and Visual Simulation Outline (Year 21) – Brolga Residence (VP4)
Figure 11b	Visual Simulation (Year 21 and Post-Mining) – Brolga Residence (VP4)
Figure 12a	Existing View and Visual Simulation Outline (Year 21) – Blue Vale Road (VP6)
Figure 12b	Visual Simulations (Year 21 and Post-Mining) – Blue Vale Road (VP6)
Figure 13a	Existing View and Visual Simulation Outline (Year 7) – Braymont Road (VP7)
Figure 13b	Visual Simulation (Year 7 and Post-Mining) – Braymont Road (VP7)
Figure 14a	Existing View and Visual Simulation Outline (Year 7) – Kamilaroi Highway (VP8)
Figure 14b	Visual Simulation (Year 7 and Post-Mining) – Kamilaroi Highway (VP8)
Figure 15	Visual Simulation – Kamilaroi Highway Rail Overpass (VP14)
Figure 16	Indicative Namoi River Crossing Design
Figure 17	Indicative Kamilaroi Highway Rail Overpass Design
Figure 18	Existing View and Visual Simulation – Private Haul Road Overpass

LIST OF PLATES

Plate 1	View of the Maules Creek and Boggabri Coal Mines Rail Spur (Viewpoint 400 m from Rail Spur)
Plate 2	View of the Maules Creek and Boggabri Coal Mines Rail Spur (Viewpoint 800 m from Rail Spur)

1 INTRODUCTION

The former Vickery Coal Mine and the former Canyon Coal Mine are located approximately 25 kilometres (km) north of Gunnedah, in New South Wales (NSW) (Figure 1). Open cut and underground mining activities were conducted at the former Vickery Coal Mine between 1986 and 1998. Open cut mining activities at the former Canyon Coal Mine ceased in 2009. The former Vickery and Canyon Coal Mines have been rehabilitated following closure.

The Vickery Coal Project (herein referred to as the Approved Mine) is an approved, but yet to be constructed, project involving the development of an open cut coal mine and associated infrastructure, and would facilitate a run-of-mine (ROM) coal production rate of up to approximately 4.5 million tonnes per annum (Mtpa) for a period of 30 years.

Whitehaven Coal Limited (Whitehaven) is seeking a new Development Consent for extension of open cut mining operations at the Approved Mine (herein referred to as the Vickery Extension Project [the Project]). This would include a physical extension to the Approved Mine footprint to gain access to additional ROM coal reserves, an increase in the footprint of waste rock emplacement areas, an increase in the approved ROM coal mining rate and construction and operation of a Project Coal Handling and Preparation Plant (CHPP), train load-out facility and rail spur (Figures 2 and 3). This infrastructure would be used for the handling, processing and transport of coal from the Project, as well as from other Whitehaven mines.

This Visual Assessment forms part of an Environmental Impact Statement (EIS) which has been prepared to accompany a Development Application made for the Project in accordance with Part 4 of the NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act).

This Visual Assessment has been prepared to assist with addressing the following components of the Secretary's Environmental Assessment Requirements for the Project:

In particular the EIS must include:

...

- **Visual and Light** – including an assessment of the likely visual impacts of the development on private landowners in the vicinity of the development and key vantage points in the public domain, paying particular attention to the creation of any new landforms and minimising the lighting impacts of the development, with particular consideration of impacts on the Siding Springs Observatory;

...

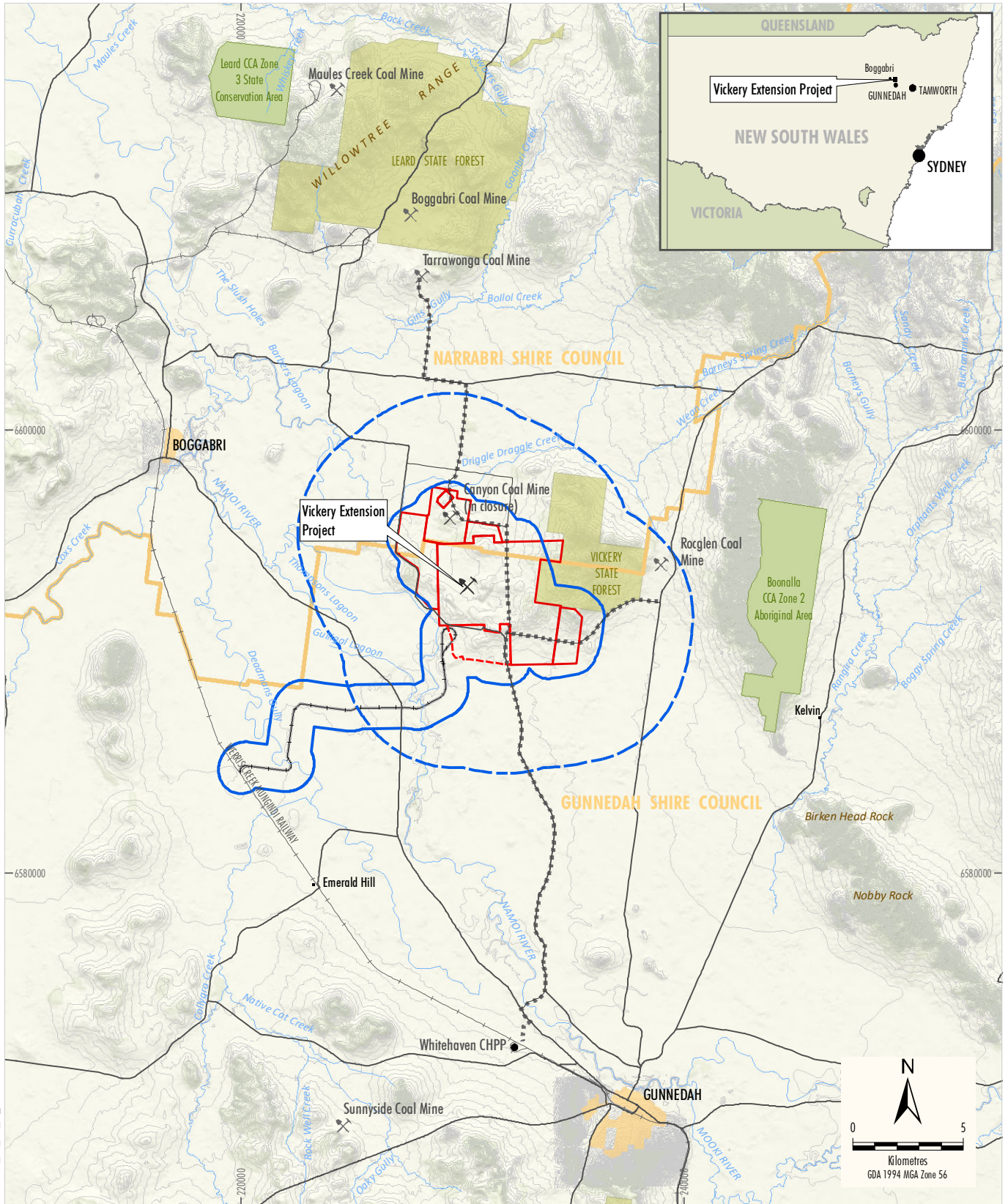
This Visual Assessment considers the *Dark Sky Planning Guideline* (NSW Department of Planning & Environment [DP&E], 2016) in relation to potential night-lighting impacts.

The following components are included as part of this Visual Assessment:

- Characterisation of the existing landscape and visual setting (Section 2).
- Review of previous visual assessments undertaken for the Approved Mine (Section 3).
- Description of the Project components that could have potential visual impacts (Section 4).

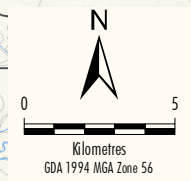
Assessment of potential impacts (Section 5).

- Proposed visual impact mitigation and management measures (Section 6).
- Documents referenced in Sections 1 to 6 of this Visual Assessment (Section 7).



WHC15-39_EIS_App_Vol_201H

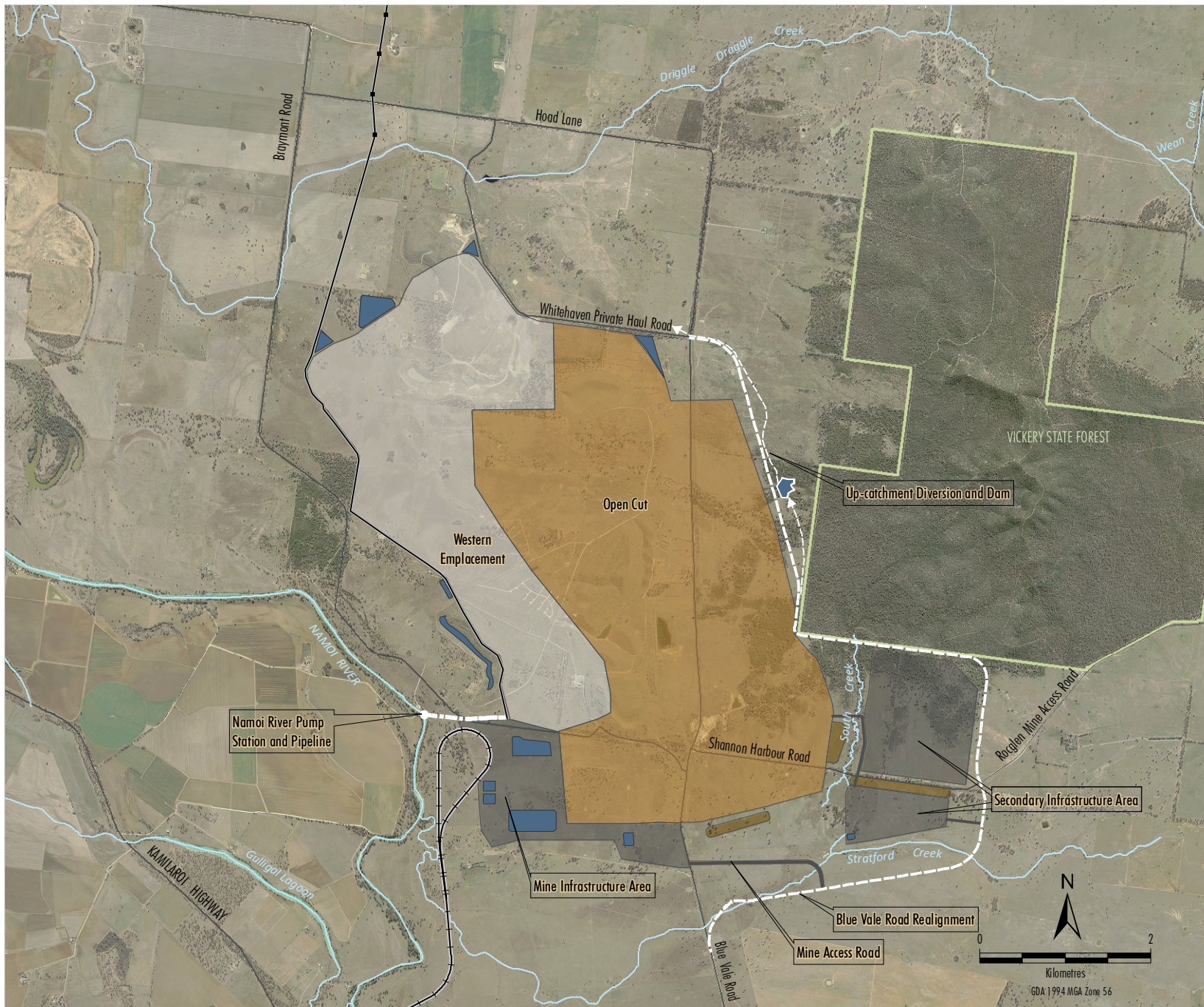
LEGEND			
	Mining Tenement Boundary (ML and CL)		Project Mining Area Local Setting Boundary (1 km from Project Mining Area)
	Mining Lease Application (MLA)		Project Mining Area Sub-Regional Setting Boundary (5 km from Project Mining Area)
	Local Government Boundary		
	NSW State Forest		
	State Conservation Area, Aboriginal Area		
	Major Roads		
	Railway		
	Approved Road Transport Route		
	Indicative Rail Spur Alignment		



WHITEHAVEN COAL
VICKERY EXTENSION PROJECT
Project Location

Source: LPMA - Topographic Base (2010); Department of Industry (2015)

Figure 1



- LEGEND**
- State Forest
 - Project Components**
 - Indicative Extent of Open Cut
 - Indicative Extent of Out of Pit Waste Rock Emplacement
 - Indicative Extent of Infrastructure Area
 - Indicative Extent of Soil Stockpile
 - Indicative Extent of Water Storage
 - Indicative Mine Access Road Alignment
 - Indicative Namoi River Pump Station and Pipeline
 - Indicative Road Realignment
 - Indicative Up-catchment Diversion and Dam Location
 - Indicative Rail Spur Alignment
 - Indicative Location of Groundwater Bores and Pipeline

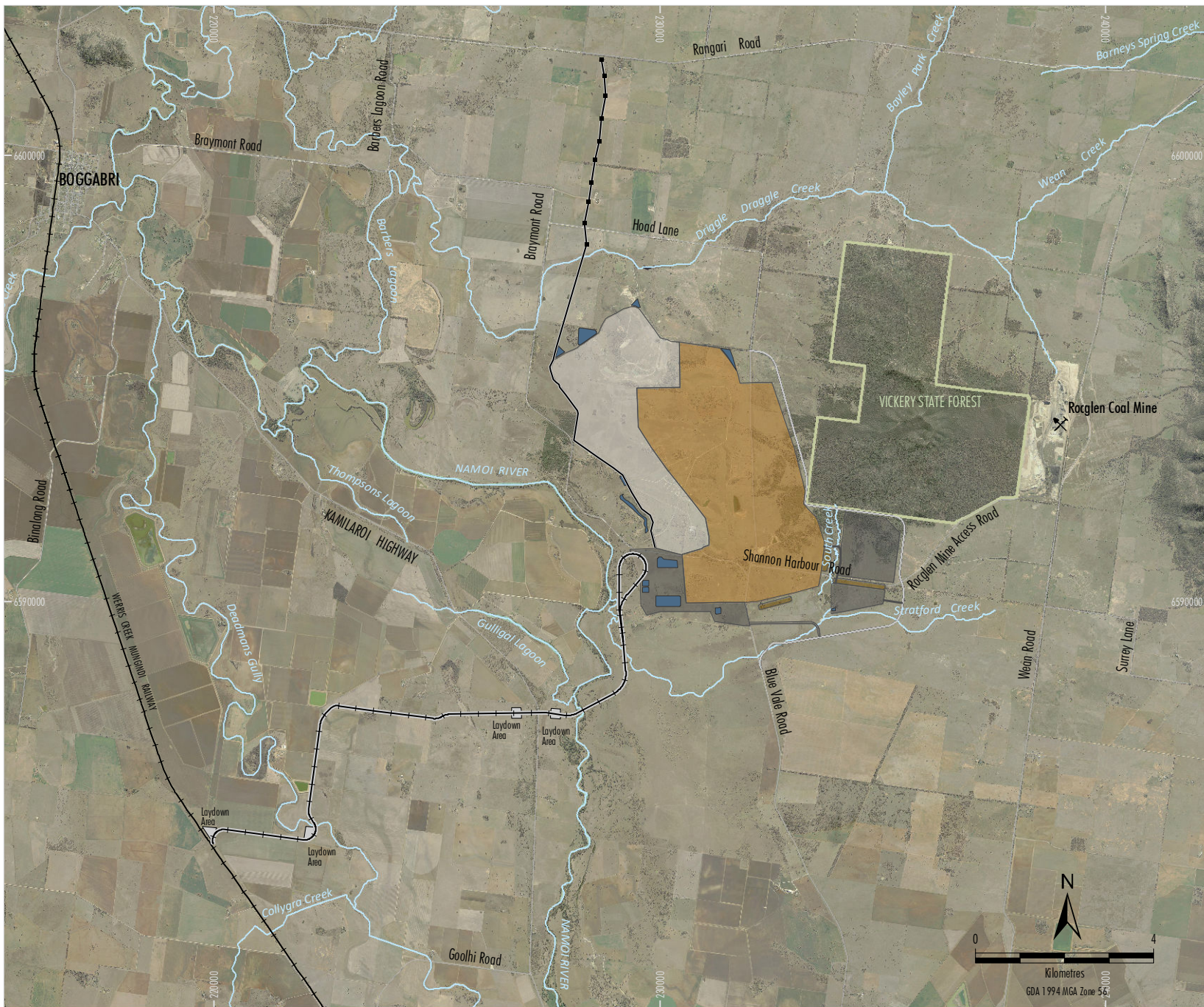
Source: Orthophoto - Department of Land and Property Information, Aerial Photography (July 2011); Department of Industry (2015); Essential Energy (2015)



VICKERY EXTENSION PROJECT
Project General Arrangement -
Project Mining Area



Figure 2



- LEGEND**
- State Forest
 - Railway
- Project Components**
- Indicative Extent of Open Cut
 - Indicative Extent of Out of Pit Waste Rock Emplacement
 - Indicative Extent of Infrastructure Area
 - Indicative Extent of Soil Stockpile
 - Indicative Extent of Water Storage
 - Indicative Mine Access Road Alignment
 - Indicative Rail Spur Alignment
 - Indicative Location of Groundwater Bores and Pipeline
 - Indicative Road Realignment

Source: Orthophoto - Department of Land and Property Information, Aerial Photography (July 2011); Department of Industry (2015)



VICKERY EXTENSION PROJECT
Indicative Rail Spur Alignment and
Groundwater Bore Locations

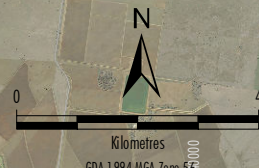


Figure 3

2 EXISTING LANDSCAPE AND VISUAL SETTING

2.1 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.

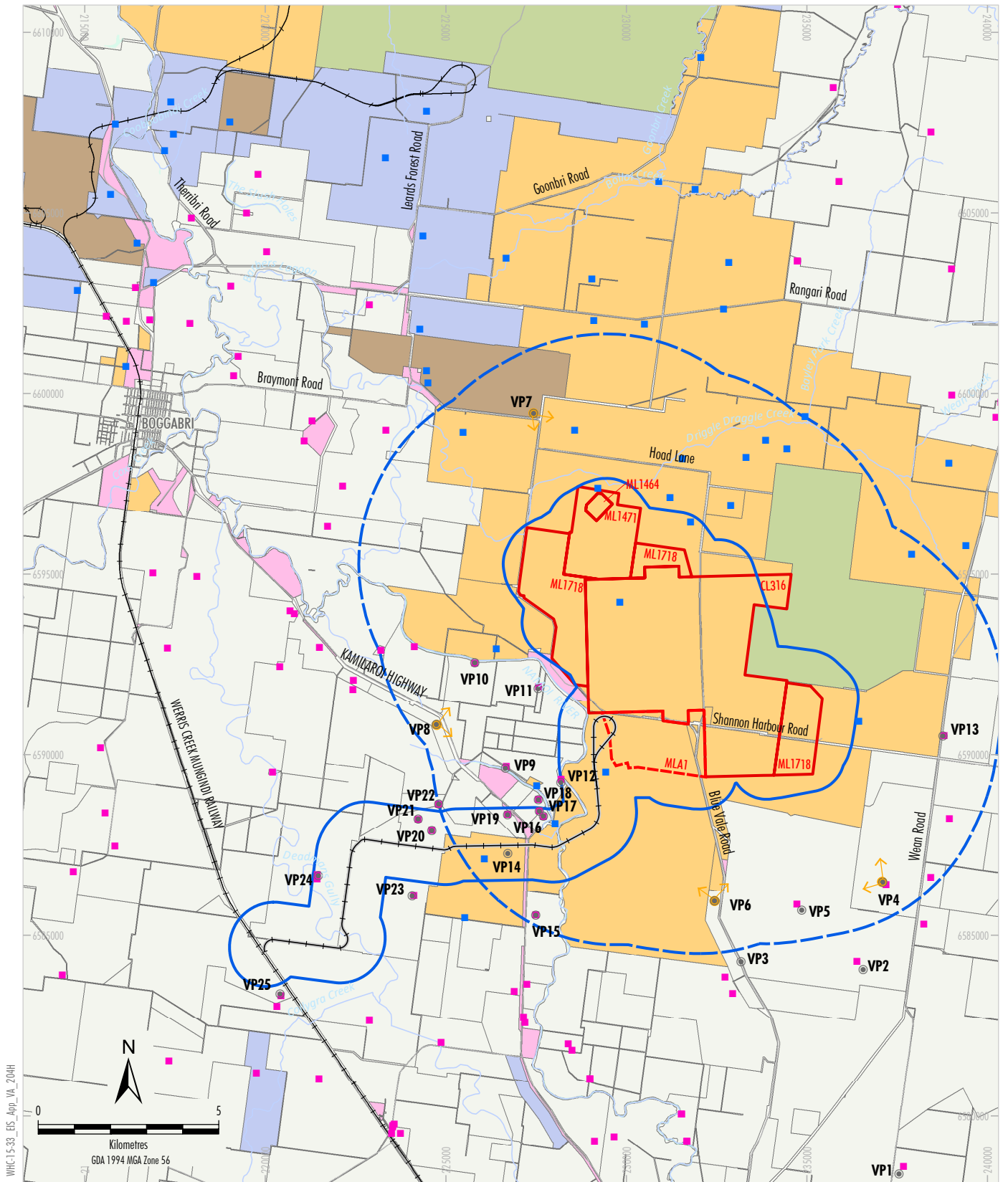
The natural topography at the Project mining area consists of undulating hills and slopes, with the elevation ranging from approximately 255 metres (m) Australian Height Datum (AHD) to approximately 325 m AHD. The topography is more dissected and steeper within the Vickery State Forest to the east of the Project, where it rises to approximately 479 m AHD. To the north, south and west of the Project mining area the topography is gently sloping to almost flat, and generally drains towards the Namoi River. These floodplains typically have elevations of between 250 to 260 m AHD. The proposed rail spur (Figure 3) crosses gently sloping terrain, with elevations typically ranging between 220 m AHD and 260 m AHD.

Visual settings (e.g. local, sub-regional and regional) are based on distance from the Project mining area as follows (Figure 1):

- 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.

The area surrounding the Project comprises 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 is abutted to the north and south by heavily cleared dryland agriculture areas (Figure 3). The irrigated crop production area of the Namoi Valley is located to the south and west.
- Existing Coal Mines – the Rocglen Coal Mine, located in the sub-regional setting to the east of the Project, and the Tarrawonga, Boggabri and Maules Creek Coal Mines, located in the regional setting to the north, are open cut coal mining operations (Figure 1).
- Former Coal Mines – the final void of the Canyon Coal Mine forms part of the Project area in the north, and mining landforms associated with the former Vickery Coal Mine (e.g. rehabilitated waste rock emplacements and the Blue Vale, Greenwood, Shannon Hill and Red Hill Final Voids) form part of the existing landscape within the Project area (Figures 1 and 2).
- Vickery State Forest – located to the immediate east of the Project, is a wooded area of higher elevation in the local area (Figure 1).
- Residential Dwellings – detached private dwellings located to the north, south, east and west of the Project (Figure 4).
- An unnamed wooded range (incorporating the Boonalla CCA Zone 2 Aboriginal Area) – running north to south, approximately 9 kilometres (km) to the east of the Project, containing a number of peaks to a maximum elevation of 823 m AHD (Figure 1).
- Namoi River – a major regional river that is located south-west of the Project (Figure 1).



WVC-15-83_ES_Appt_VA_204H

LEGEND

- | | | | |
|--|---|--|--------------------------------|
| | Mining Tenement Boundary (ML and CL) | | Railway |
| | Mining Lease Application (MLA) | | Mine-owned Dwelling |
| | State Forest | | Private Dwelling |
| | Crown Land | | Indicative Rail Spur Alignment |
| | Whitehaven Owned Land | | Viewpoint |
| | Whitehaven/Idemitsu Boggabri Coal Joint Owned Land | | Visual Simulation Location |
| | Idemitsu Boggabri Coal Owned Land | | |
| | Privately Owned Land and Other Land | | |
| | Project Mining Area Local Setting Boundary (1 km from Project Mining Area) | | |
| | Project Mining Area Sub-Regional Setting Boundary (5 km from Project Mining Area) | | |

Source: Department of Land and Property Information - Land Tenure (2016); Department of Industry (2016); Whitehaven (2016)



VICKERY EXTENSION PROJECT
Land Ownership - Visual Simulation Locations and Viewpoint Locations

Figure 4

The majority of the Project mining area comprises previously cleared agricultural areas and rehabilitated landforms from prior mining activities. Similarly, the proposed rail spur area comprises cleared agricultural areas.

Regional Setting (> 5 km)

The regional setting is primarily comprised of broad scale agriculture, predominantly grazing and crop production.

An unnamed wooded range (incorporating the Boonalla CCA Zone 2 Aboriginal Area) running north to south is located approximately 9 km to the east of the Project (Figure 1).

The town of Boggabri is located approximately 10 km to the north-west of the Project, and the town of Gunnedah, the major regional centre, is located approximately 25 km to the south of the Project. The infrastructure associated with the region includes roads (the most significant being the Kamilaroi Highway), rail lines and power-lines of varying voltages and scales.

The closest section of the Kamilaroi Highway to the Project is located in the sub-regional setting.

A number of coal mines exist within the regional setting, including the Tarrawonga, Boggabri and Maules Creek Coal Mines, which are located 10 km, 12.5 km and 16 km to the north, respectively (Figure 1).

The regional setting has attributes of moderate scenic quality due to the contrast between the vegetation and topography of the ranges (e.g. the unnamed wooded range 9 km to the east of the Project) and agricultural areas of the valley that add to visual interest. The regional setting also has many attributes of low scenic quality due to the presence of coal mines and the generally flat, cleared dryland agricultural areas that dominate the landscape (Urbis, 2012).

Sub-regional Setting (1 to 5 km)

Within the sub-regional setting, the eastern section of the Vickery State Forest is a heavily vegetated elevated area. However, the remainder of the sub-regional setting is generally free of vegetation, apart from remnants along waterways and road reserves.

Areas of cleared agricultural land are interspersed with vegetation generally associated with local roads and dwellings and other farm buildings. The rural residences in the sub-regional setting are generally surrounded by a band of vegetation associated with the residences' gardens.

The Rocglen Coal Mine is the only coal mine in the sub-regional setting, and is located approximately 4.5 km to the east of the Project.

The sub-regional setting has attributes of low scenic quality due to the presence of flat, cleared dryland agricultural areas, but has attributes of moderate scenic quality due to the presence of the Vickery State Forest and the meandering form of the Namoi River with associated riparian remnant vegetation (Urbis, 2012).

There are no villages or towns in the sub-regional setting. There are a number of privately-owned dwellings in the sub-regional setting, predominantly to the south and west of the Project (Figure 4).

Local Setting (< 1 km)

Within the local setting, the western section of the Vickery State Forest is a heavily vegetated elevated area, attaining a maximum elevation of approximately 479 m AHD, abutting the eastern edge of the Project mining area. Scattered vegetation extends from the Vickery State Forest into the Project mining area. However, the remainder of the local setting is generally free of vegetation apart from remnants along waterways and road reserves.

The local setting, apart from the Vickery State Forest, has been heavily modified over time with the majority of vegetation disturbed by historic agricultural clearing and previous mining operations. The visual character of the local setting is considered to be of low scenic quality with the exception of the Vickery State Forest, which is considered to be of moderate scenic quality (Urbis, 2012).

There are no villages, towns or privately-owned dwellings in the local setting of the Project mining area (Figure 4).

2.2 LANDSCAPE CHARACTER SIGNIFICANCE

A review of designations or classifications of the broader landscape setting from a cultural perspective was undertaken.

There were no citations in the NSW State Heritage Inventory, NSW State Heritage Register, Narrabri Local Environmental Plan (LEP), Gunnedah LEP or Australian Heritage Database for the Project mining area or surrounds (Extent Heritage Advisors, 2018).

3 REVIEW OF PREVIOUS VISUAL ASSESSMENT

Urbis (2012) undertook a visual assessment for the Approved Mine (including the approved private haul road and Kamilaroi Highway overpass) as a component of the Vickery Coal Project EIS in October 2012. The assessment assumed that disturbance visible during the mining process primarily related to waste rock emplacements and the open cut.

Urbis (2012) reported that sensitive viewpoints in the vicinity of the Approved Mine included rural residences and settlements, and transport and tourist routes (e.g. Kamilaroi Highway).

It was concluded that the Approved Mine would have a low visual impact on private dwellings and roads, based on a qualitative assessment of each sensitive viewpoint and a number of visual simulations prepared to approximate the extent of potential visual impact (Urbis, 2012). The presence of vegetation screening and other features was analysed in the assessment of potential visual impacts at sensitive viewpoints.

Similarly, Urbis (2012) concluded that the combined disturbance areas of the Approved Mine and the Rocglen Coal Mine represented a very small proportion of the Namoi Valley and, cumulatively, would not detract from the region's essentially rural nature.

With regard to night-lighting, Urbis (2012) concluded that the nature and degree of night-lighting would be similar to the existing night-lighting at the Tarrawonga and Rocglen Coal Mines.

4 PROJECT DESCRIPTION – VISUAL CHARACTER

4.1 OVERVIEW

The Project involves mining the coal reserves associated with the Approved Mine, as well as accessing additional coal reserves within the Project area. ROM coal would be mined by open cut methods at an average rate of 7.2 Mtpa over 25 years, with a peak production of up to approximately 10 Mtpa.

As described in Section 1, the Project would include a physical extension to the Approved Mine footprint to gain access to additional ROM coal reserves, an increase in the footprint of waste rock emplacement areas, an increase in the approved ROM coal mining rate and construction and operation of the Project CHPP, train load-out facility and rail spur (Figures 2 and 3). This infrastructure would be used for the handling, processing and transport of coal from the Project, as well as other Whitehaven mining operations.

Figures 2 and 3 illustrate the general arrangement of the Project. A detailed description of the Project is provided in Section 2 in the Main Report of the EIS.

The general arrangement of the Project during Years 3, 7, 13, 21 and post-mining are shown on Figures 5 to 9.

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

4.1.1 Project Landforms

Open Cut Pit

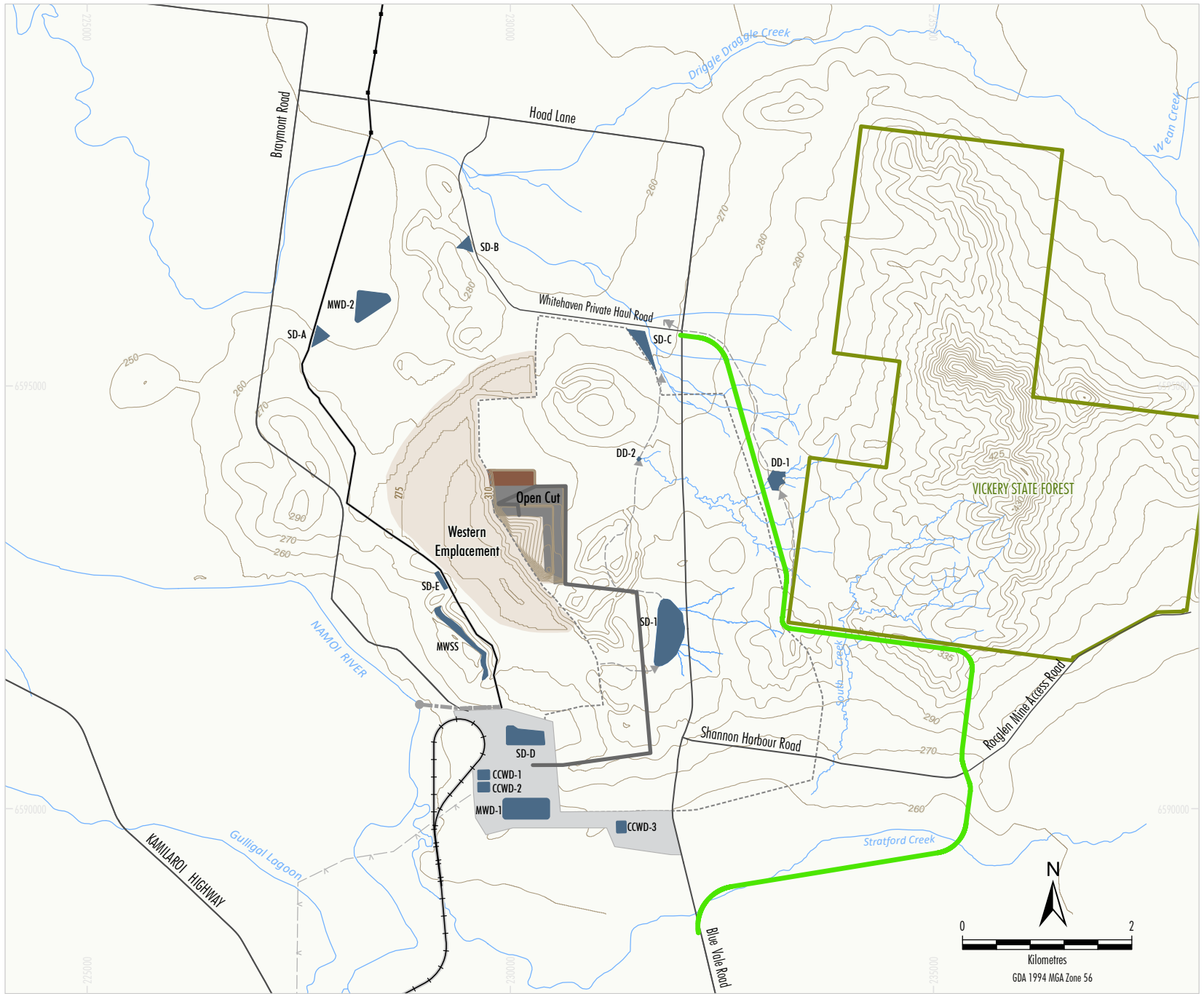
The Project would involve open cut mining within the Maules Creek Formation (Figure 2).

Development of the open cut would commence in the north-west and progress to the east, before progressing towards the south over the life of the Project (Figures 5 to 9). Depth from the existing ground level to the base of the open cut would vary from approximately 100 m in the west to 250 m in the east. The open cut would be progressively rehabilitated so that the total area disturbed at any one time is minimised.

Waste rock would be progressively placed within the footprint of the open cut as part of development of the waste rock emplacement (Figures 5 to 9).


The mining layout and sequence may vary to take into account localised geological features, coal market quality and volume requirements, mining economics and Project detailed engineering design. The detailed mining sequence for any given period would be detailed in the Mining Operations Plan.

Large areas of open cuts are typically not visible as they are excavated into the earth and, therefore, below view (Urbis, 2012). Notwithstanding the above, sections of the open cut workings (e.g. high walls, haul roads) would be visible from elevated sections of Blue Vale Road and Braymont Road depending on the presence of intervening topography and vegetation.



- LEGEND**
- State Forest
 - Existing 66kV Powerline
 - Indicative Up-catchment Diversion
 - Indicative Namoi River Pump Station and Pipeline
 - Potential Extent of Visual Screening Along Blue Vale Road Realignment
 - Indicative Active Mining
 - Indicative Active Waste Rock Emplacement
 - Indicative Soil Stripped
 - Indicative Infrastructure Area
 - Indicative Extent of Water Storage
 - Indicative Mine Access Road
 - Indicative Main ROM Coal Haul Road
 - Indicative Rail Spur Alignment
 - Indicative Location of Groundwater Bores and Pipeline
 - Indicative Maximum Extent of Open Cut

Source: Department of Land and Property Information (2014);
Department of Industry (2015)


VICKERY EXTENSION PROJECT
 Project General Arrangement -
 Year 3

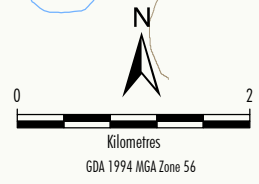
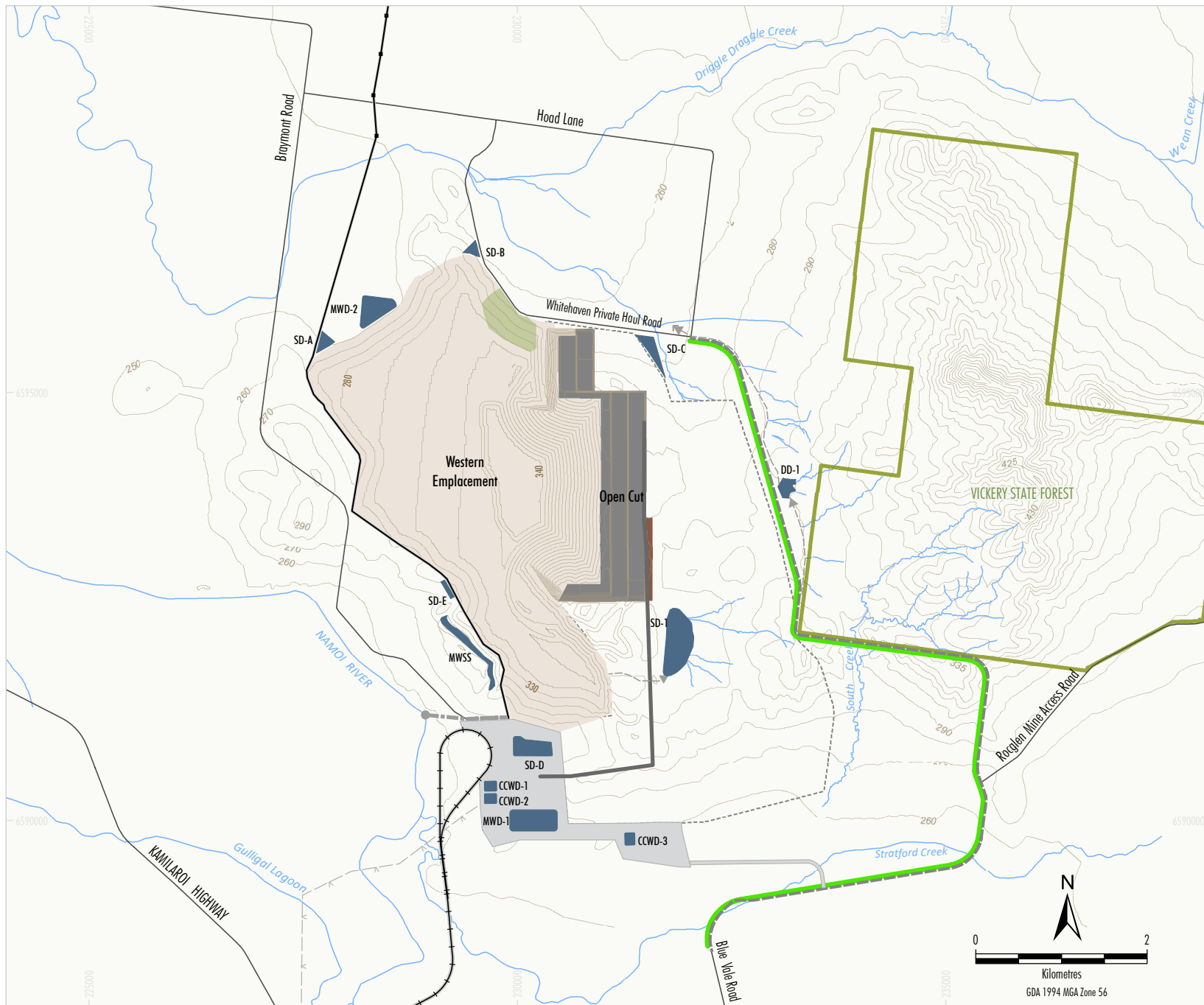


Figure 5



- LEGEND**
- State Forest
 - Existing 66kV Powerline
 - Indicative Road Realignment
 - Indicative Namoi River Pump Station and Pipeline
 - Indicative Up-catchment Diversion
 - Potential Extent of Visual Screening Along Blue Vale Road Realignment
 - Indicative Active Mining
 - Indicative Active Waste Rock Emplacement
 - Indicative Soil Stripped
 - Indicative Initial Rehabilitation
 - Indicative Established Rehabilitation
 - Indicative Infrastructure Area
 - Indicative Extent of Water Storage
 - Indicative Mine Access Road
 - Indicative Main ROM Coal Haul Road
 - Indicative Rail Spur Alignment
 - Indicative Location of Groundwater Bores and Pipeline
 - Indicative Maximum Extent of Open Cut

Source: Department of Land and Property Information (2014);
Department of Industry (2015)


VICKERY EXTENSION PROJECT
Project General Arrangement -
Year 7

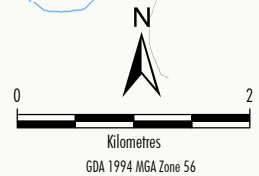
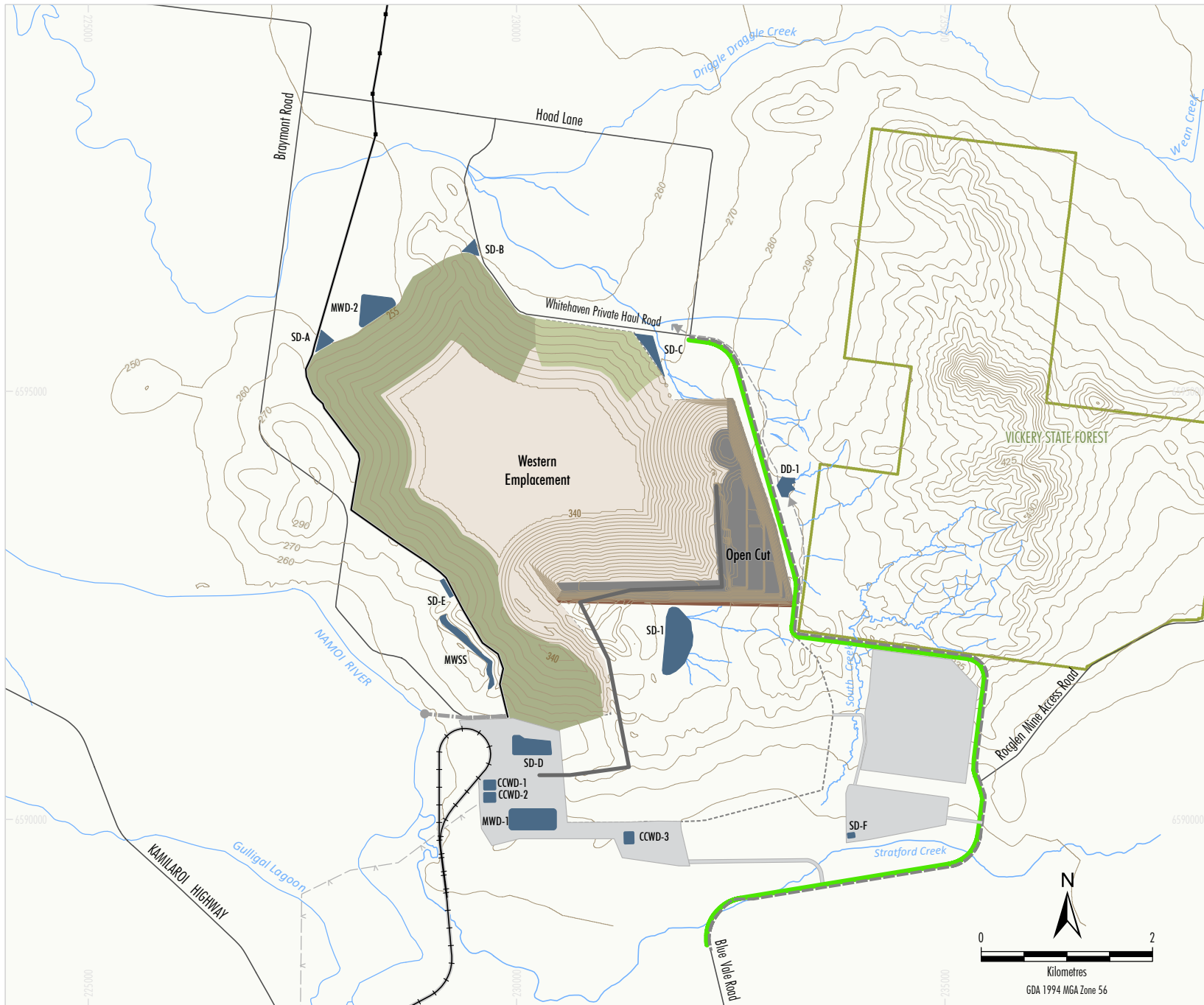


Figure 6



- LEGEND**
- State Forest
 - Existing 66kV Powerline
 - Indicative Road Realignment
 - Indicative Namoio River Pump Station and Pipeline
 - Indicative Up-catchment Diversion
 - Potential Extent of Visual Screening Along Blue Vale Road Realignment
 - Indicative Active Mining
 - Indicative Active Waste Rock Emplacement
 - Indicative Soil Stripped
 - Indicative Initial Rehabilitation
 - Indicative Established Rehabilitation
 - Indicative Infrastructure Area
 - Indicative Extent of Water Storage
 - Indicative Mine Access Road
 - Indicative Main ROM Coal Haul Road
 - Indicative Rail Spur Alignment
 - Indicative Location of Groundwater Bores and Pipeline
 - Indicative Maximum Extent of Open Cut

Source: Department of Land and Property Information (2014);
Department of Industry (2015)



VICKERY EXTENSION PROJECT
Project General Arrangement -
Year 13

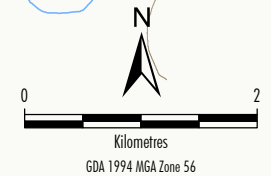
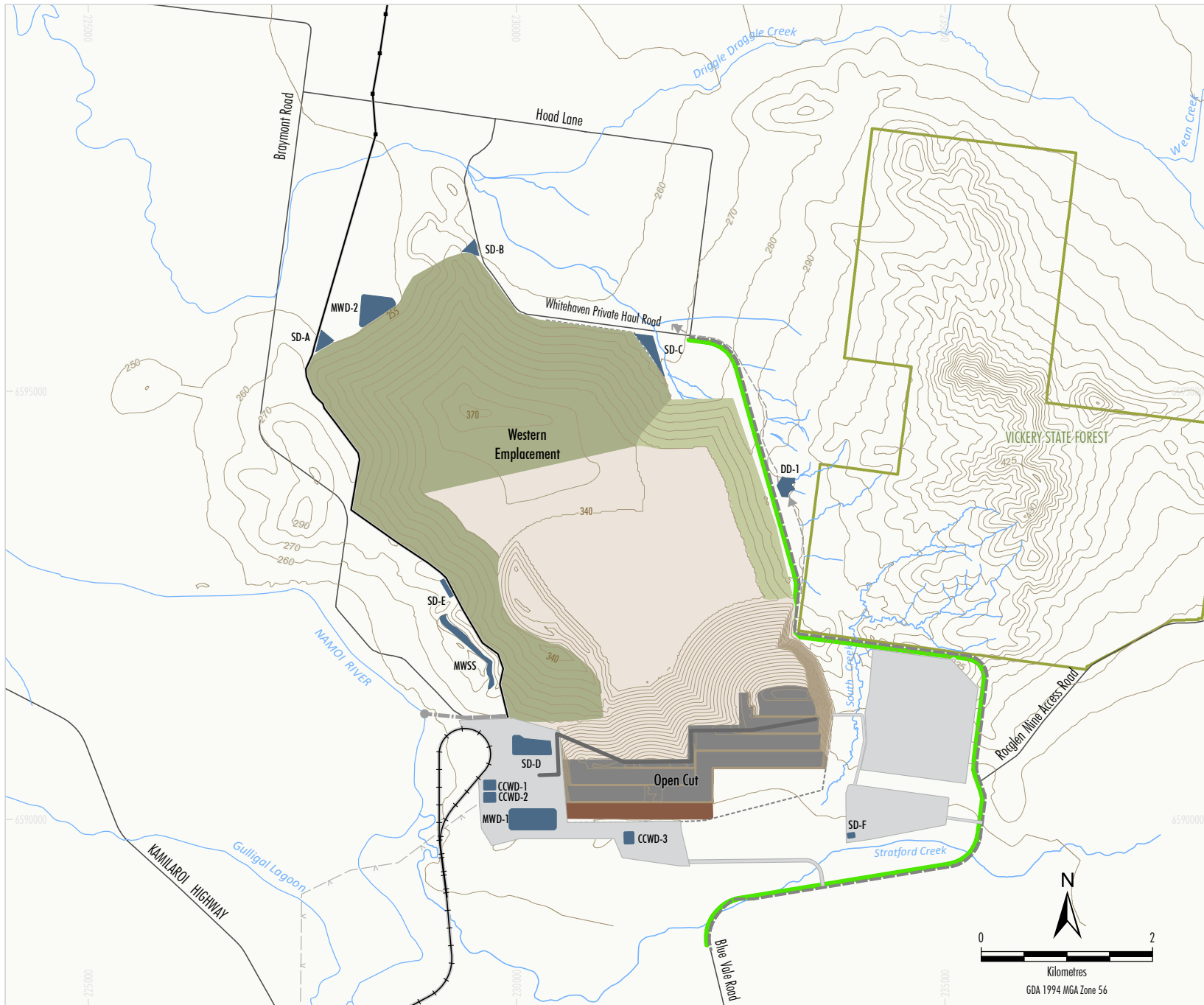


Figure 7



- LEGEND**
- State Forest
 - Existing 66kV Powerline
 - Indicative Road Realignment
 - Indicative Namoi River Pump Station and Pipeline
 - Indicative Up-catchment Diversion
 - Potential Extent of Visual Screening Along Blue Vale Road Realignment
 - Indicative Active Mining
 - Indicative Active Waste Rock Emplacement
 - Indicative Soil Stripped
 - Indicative Initial Rehabilitation
 - Indicative Established Rehabilitation
 - Indicative Infrastructure Area
 - Indicative Extent of Water Storage
 - Indicative Mine Access Road
 - Indicative Main ROM Coal Haul Road
 - Indicative Rail Spur Alignment
 - Indicative Location of Groundwater Bores and Pipeline
 - Indicative Maximum Extent of Open Cut

Source: Department of Land and Property Information (2014);
Department of Industry (2015)



VICKERY EXTENSION PROJECT
Project General Arrangement -
Year 21

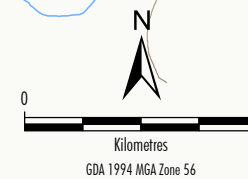
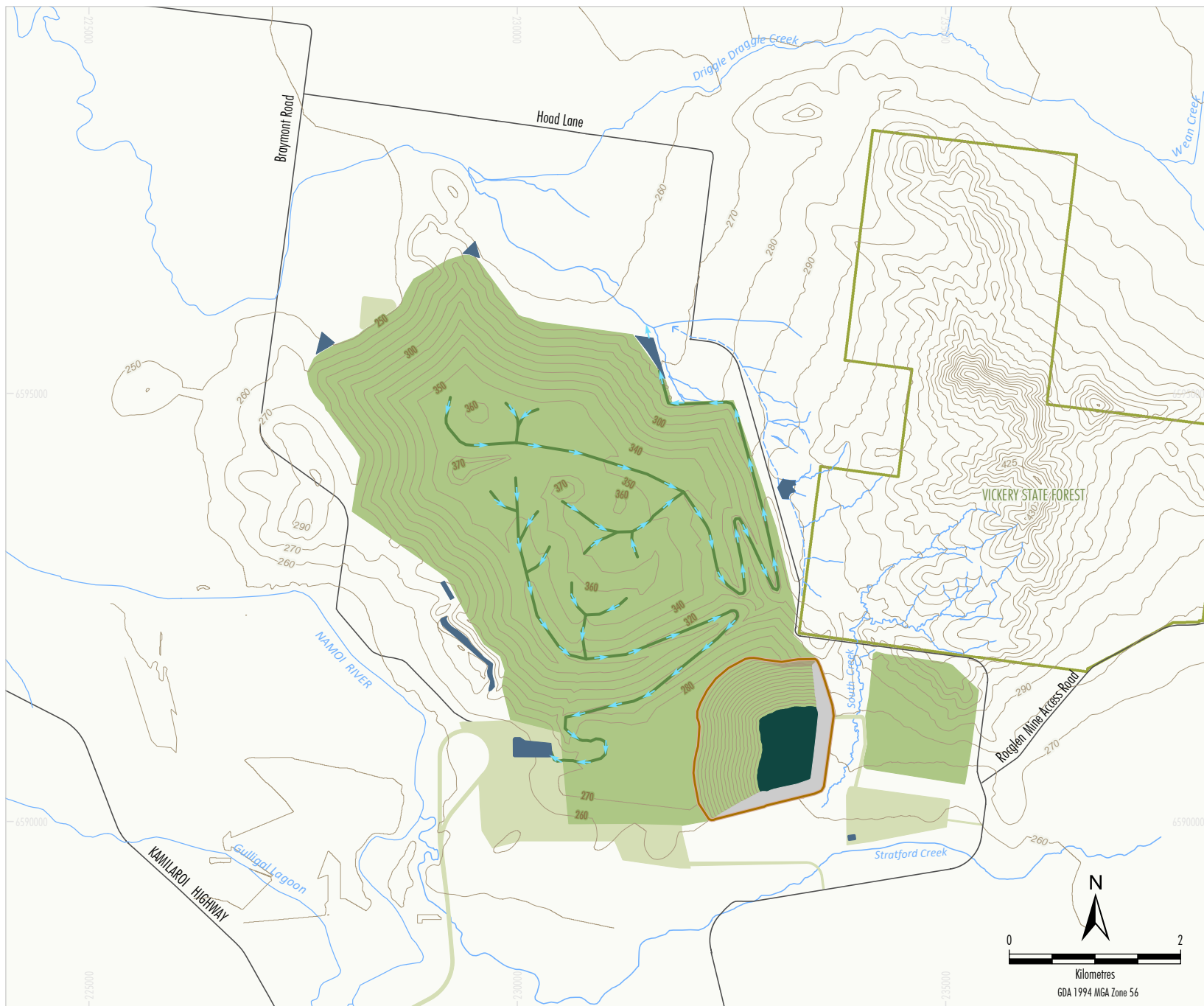


Figure 8



- LEGEND**
- State Forest
 - Indicative Up-catchment Diversion
 - Indicative Sediment Dams
 - Indicative Constructed Channels
 - Indicative Pasture Area
 - Indicative Woodland/Forest Area
 - Indicative Final Void
 - Indicative Final Void Highwall
 - Final Void Perimeter Bund

Source: Department of Land and Property Information (2014);
Department of Industry (2015)



VICKERY EXTENSION PROJECT
Project General Arrangement -
Post Mining Landform

Figure 9

Waste Rock Emplacement

Waste rock would be used to develop the Western Emplacement (Figures 5 to 9) to a maximum height of up to approximately 370 m AHD (approximately 110 m above the nearby Namoi River floodplain and approximately 110 m lower than the peak of the ridge in the Vickery State Forest) (Figures 5 to 9) and to progressively fill the open cut void. The maximum height of the waste rock emplacement would be similar to that of the maximum height of the Approved Mine. The waste rock emplacement would be the most visible component of the Project.

The waste rock emplacement would be progressively shaped for rehabilitation activities (i.e. final re-contouring, topsoiling and revegetation). The waste rock emplacement is located in proximity to existing elevated areas in the Vickery State Forest so it would effectively form an extension to these elevated areas. The final landform design of the waste rock emplacement incorporates elements of macro- and micro-relief (Figure 9). This would improve the integration of the landform with the surrounding environment and mitigate potential visual impacts.

Final Voids

A final void is a depression below the natural ground level at the completion of open cut mining and closure. Currently, five final voids from previous mining operations remain in the Project area.

Waste rock would be progressively placed within the footprint of the open cut void (and existing voids associated with former mining activities at the Vickery and Canyon Coal Mines) over the life of the Project to reduce the surface area of the final void as far as is reasonable and feasible.

At the cessation of mining, one final void would remain in the south-eastern corner of the open cut (in addition to the existing Blue Vale void). The Project would, therefore, reduce the number of final voids in comparison to the five final voids in the current landscape and three final voids for the Approved Mine.

Potential views of the final voids would be limited by surrounding Project landforms (e.g. waste rock emplacement) and the perimeter bunds and/or vegetation screens (over time) that would be developed around them. There may be some views from elevated areas (e.g. Vickery State Forest).

4.1.2 Project Infrastructure

The Project would include the development of the following additional supporting infrastructure:

- mine infrastructure areas (including the Project CHPP) and associated access road;
- Project rail spur (including Kamilaroi Highway rail overpass) and rail loop;
- site up-catchment water management infrastructure; and
- water and electricity supply infrastructure.

Until the Project CHPP, train load-out facility and rail spur reach full operational capacity, ROM coal transport from the Project by road to the Whitehaven CHPP would be along the Approved Road Transport Route, consistent with the Development Consent conditions for coal haulage for the Approved Mine (i.e. up to a total of 3.5 Mtpa, or up to 4.5 Mtpa ROM coal transport subject to the construction of the approved private haul road and Kamilaroi Highway overpass).

Both the Approved Mine and the Project include provision for construction of the approved private haul road and Kamlaroi Highway overpass for coal transport to the Whitehaven CHPP.

Once the Project CHPP, train load-out facility and rail spur reach full operational capacity, ROM coal from the Project would be processed at the Project CHPP.

Development of Mine Infrastructure Area and Associated Access Road

The mine infrastructure area would be constructed to the south of the Western Emplacement (Figure 2). Of relevance to this assessment, the mine infrastructure area would include (among other things):

- ROM coal and product coal pads and stockpiles, ROM handling and dumping facilities, product coal stacking and reclaim facilities;
- CHPP incorporating coal handling, reject handling, crushing, screening and washing infrastructure;
- rail spur, rail loop and train load-out facilities;
- water and flood management infrastructure;
- administration, crib room, ablution and first aid facilities;
- light and heavy vehicle parking and delivery facilities;
- bulk fuel, liquid petroleum gas, lubrication and other hazardous goods storage and handling facilities;
- stores, light vehicle and heavy vehicle workshop facilities;
- soil stockpiles; and
- a range of service facilities.

The access road to the mine infrastructure area would connect to the Approved Road Transport Route (Figure 2).

An existing infrastructure area associated with previous mining activities at the Vickery Coal Mine may be developed into a temporary infrastructure area during the initial stage of the Project. The temporary infrastructure area would no longer be used once the footprint is required for waste rock emplacement.

Secondary infrastructure areas would be constructed to the east of the open cut during the latter stages of the Project as the open cut progresses to the south and east.

The secondary infrastructure areas would be used as laydown and storage areas, vehicle parking areas, waste management areas and/or soil storage areas. If required, mine water surge storage dams, mine water dams and water supply dams would also be constructed within the secondary infrastructure areas (Figure 2).

Development of the Project Rail Spur and Rail Loop

The Project would include construction of a rail spur and rail loop connecting to the Werris Creek Mungindi Railway with an approximate total rail length of 14 km (Figure 3).

The Project rail spur would include the construction of the following key infrastructure:

- Namoi River bridge;
- Deadmans Gully bridge;
- Stratford Creek bridge; and
- Kamilaroi Highway rail overpass.

The Project rail spur would generally be an elevated structure with some in-filled embankment sections where conditions permit, and would be designed to minimise afflux upstream, changes to flood velocities and diversion of flood flows.

The Project rail spur would be similar to the rail spur constructed to transport coal from the Maules Creek and Boggabri coal mines (located approximately 20 km north-west of the Project rail spur) (Plates 1 and 2). It is noted that the rail spur shown in Plate 1 is approximately 6 m above ground level, while the Project rail spur would be generally 1 to 2 m above ground level in the vicinity of the closest privately-owned rural residences.

The closest privately-owned rural residence would be located approximately 500 m from the Project rail spur at its closest point.



Source: Google Earth (2018).

Plate 1 View of the Maules Creek and Boggabri Coal Mines Rail Spur (Viewpoint 400 m from Rail Spur)



Source: Google Earth (2018).

Plate 2 View of the Maules Creek and Boggabri Coal Mines Rail Spur (Viewpoint 800 m from Rail Spur)

A viaduct structure would be constructed where the rail spur crosses the Namoi River and Kamilaroi Highway. The Project rail spur's Kamilaroi Highway overpass would be similar to the existing Kamilaroi Highway overpass of the Maules Creek and Boggabri coal mines rail spur and have an elevation of approximately 6.5 m above ground level. The closest privately-owned rural residence would be more than 800 m from the Namoi River bridge or Kamilaroi Highway rail overpass.

An unsealed rail service road would also be constructed adjacent to the Project rail spur.

Site Up-Catchment Water Management Infrastructure

A permanent up-catchment diversion system would be constructed to divert up-catchment runoff around the advancing open cut (Figure 2).

Water and Electricity Supply Infrastructure

A pump station and associated infrastructure would be constructed near the mine infrastructure area on the eastern bank and within the Namoi River, at the same location as the pump station for the Approved Mine (Figure 2). The pump station and associated pipeline would be used to provide make-up water at the Project when required during dry periods, in accordance with Whitehaven's water licences.

Water supply bores would be constructed for the Project on Whitehaven-owned land along a corridor to the north of the Project (Figure 3). It is expected that up to 10 bores would be constructed, along with associated piping and power supply infrastructure. The volume of groundwater pumped from the bores would be within Whitehaven's licensed entitlements.

A new 66 kV/11 kV substation would be constructed in the mine infrastructure area. An existing 66 kV overhead powerline (i.e. comprising poles, insulators and electrical conductors) would be realigned to service the Project.

4.1.3 Project Road Changes

Blue Vale Road Realignment

The approved Blue Vale Road realignment would be constructed for the Project adjacent to the western and southern boundaries of the Vickery State Forest, and around the secondary infrastructure areas to allow continued public access around the Project (Figure 2).

The Blue Vale Road realignment would generally follow the existing topography of the section to the south of the open cut and to the west of the Vickery State Forest. Appropriately-sized culverts would be installed where the road realignment crosses drainage lines and suitable drainage would be established, as required, adjacent to the realigned road.

Public Road Closures

Extension of the open cut to the south requires the closure of approximately 3 km of Braymont Road, from its intersection with Blue Vale Road to the western boundary of the Project area. There is no privately-owned land along the section of Braymont Road proposed to be closed.

The section of Shannon Harbour Road west of its intersection with the Blue Vale Road Realignment would be closed. There is no privately-owned land on this section of road and the existing Blue Vale Road would remain accessible via the Blue Vale Road realignment.

4.1.4 Vegetation Clearance

The Project would require the progressive removal of native woodland/forest, derived native grassland and previously cleared land associated with the historic Canyon Coal Mine.

4.1.5 Landform Profiling and Rehabilitation

Landform profiling and rehabilitation of the waste rock emplacement would be undertaken progressively over the life of the Project.

The waste rock emplacement would, over time, vary in appearance from freshly placed waste rock to a rehabilitated landform, 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.

Occasionally, temporary rehabilitation would be undertaken to stabilise landforms, until further mining operations are carried out in the future.

A detailed description of the rehabilitation strategy and proposed post-mine landform and land use for the Project is provided in Section 5 of the EIS.

4.1.6 Night-lighting

Night-lighting at the Project would be emitted from the following sources:

- stationary work lights;
- fixed/permanent lights; and
- vehicle and train-mounted lights.

Direct views of night-lighting sources associated with the Project would occur from public roads and elsewhere in the local and sub-regional setting, where intervening topography and vegetation permit. Lighting on taller infrastructure, such as the Project CHPP, would also be visible.

The scale and intensity of night-lighting for the Project would be similar in intensity to the existing night-lighting at other nearby coal mining operations (i.e. Tarrawonga and Rocglen Coal Mines) and the intensity assessed for the Approved Mine.

The potential impacts of night-lighting associated with the Project are discussed in Section 5.6.

5 ASSESSMENT OF POTENTIAL VISUAL IMPACTS

The following sub-sections present an assessment of the potential visual impacts associated with the Project.

5.1 METHODOLOGY

The potential visual impacts were assessed by evaluating the level of visual modification of the Project 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 1.

Table 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).

5.1.1 Visual Modification

The degree of visual modification of a proposed development is the contrast between the development and the existing visual landscape (including consideration of the landforms of the Approved Mine). 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):

- 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 the 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.

5.1.2 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. For example, a viewer would generally be more sensitive to visual modifications at their dwelling than at a road they travel along. 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 dwelling more critically than changes to the visual setting of the broader landscape in which they travel or work (EDAW Australia, 2006). An additional factor 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 and the distance to the Project (i.e. visual sensitivity decreases as the distance from the Project increases). These characteristics were assessed from the perspective of the viewer and visibility from critical viewpoints.

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

Table 2
Typical Visual (Viewer) Sensitivity Levels

Land Use	Foreground (Local Setting)		Middle Ground (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: After EDAW Australia (2006).

Note: H – High, M – Moderate, L – Low.

For the purposes of this visual assessment, visual sensitivity was classified using the relevant land use and distance from the nearest Project landform, in accordance with Table 2.

5.2 IDENTIFICATION OF SENSITIVE VISUAL SETTINGS

Potential views of the Project may be available from locations including:

- private dwellings located to the west of the Project;
- private dwellings located to the south of the Project;
- private dwellings located to the east of the Project;
- sections of the Kamlaroi Highway looking east towards the Project;
- sections of Blue Vale Road (and the Blue Vale Road realignment) located to the south and east of the Project; and
- sections of Braymont Road located to the west of the Project.

Agricultural production land has been considered to have low visual sensitivity and, therefore, has not been considered further.

The Vickery State Forest is not routinely accessed by the public, and any views of the Project from parts of the Vickery State Forest that are accessible are obstructed by dense vegetation. Therefore, visual impacts from the Vickery State Forest due to the Project are expected to be very low and are not considered further in this assessment.

Viewpoints representative of the locations with potential views of the Project are shown on Figure 10 and summarised in Table 3. Whitehaven-owned land has not been considered in this assessment.

Visual simulations (Figures 11a to 15) have been created for the locations identified in Table 3 and shown on Figure 10. Visual simulations were prepared to show the existing views, as well as simulations of the Project landforms and infrastructure during the stage of the Project when the greatest potential visual impact would occur at that viewpoint. Post-rehabilitation simulations were also developed to illustrate the conceptual landform following completion of mining and rehabilitation activities.

5.3 PROJECT MINING AREA

This section assesses potential visual impacts that are expected to arise as a result of the Project mining area based on the methodology described in Section 5.1.

5.3.1 Regional Setting (> 5 km)

A number of viewpoints are located within the regional setting. The potential visual impacts of the Project mining area on the regional setting are described below.

Rural Residences (VP1 and VP2)

Views from the Bengalala residence (VP1) and Coulston (1) residence (VP2) would be representative of the potential visual impacts from other rural residences in the regional setting.

Level of Visual Modification

Distant views of the Project landforms (i.e. waste rock emplacement) may be available from the Bengalala residence (VP1) and the Coulston (1) residence (VP2), where vegetation and topography permit.

Both of these rural residences are screened by vegetation surrounding the residences (Urbis, 2012).

Given the distance from the Project mining area, the relatively minimal topographic variation that prevents overlooking and the presence of vegetation immediately around the residences, views of the Project may be possible but the Project would not be visible in its entirety.

Table 3
Locations of Viewpoints

Viewpoint	Land Use	Viewshed ¹	Potential View of Project Landforms	Simulation	
				Years	Figure
VP1 (Property ID 340; Bengalala)	Residential – Rural	Regional	Potential distant views of the waste rock emplacement, where vegetation and topography permit.		
VP2 (Property ID 108b; Coulston [1])	Residential – Rural	Regional			
VP3 (Blue Vale Road)	Local Road	Regional	Views of the waste rock emplacement and limited views of mine infrastructure from sections of Blue Vale Road, where vegetation and topography permit.		
VP4 (Property ID 310; Broлга)	Residential – Rural	Sub-regional	Distant views of the waste rock emplacement and mine infrastructure, where vegetation and topography permit. Potential distant views of secondary infrastructure area.	Year 21 and Post-mining	Figures 11a and 11b
VP5 (Property ID 108a; Coulston [2])	Residential – Rural	Sub-regional			
VP6 (Blue Vale Road)	Local Road	Sub-regional	Distant views of the waste rock emplacement and mine infrastructure area, where roadside vegetation and topography permit. Potential distant views of secondary infrastructure area.	Year 21 and Post-mining	Figures 12a and 12b
VP7 (Braymont Road)	Local Road	Sub-regional	Distant views of the waste rock emplacement from sections of Braymont Road, where roadside vegetation and topography permit.	Year 7 and Post-mining	Figures 13a and 13b
VP8 (Kamilaroi Highway)	Other Main Road	Sub-regional	Distant views of the waste rock emplacement on sections of the Kamilaroi Highway, where vegetation and topography permit.	Year 7 and Post-mining	Figures 14a and 14b
VP9 (Property ID 133a; Clinton)	Residential – Rural	Sub-regional	Potential distant views of the waste rock emplacement and mine infrastructure area, where vegetation and topography permit.		
VP10 (Property ID 127a; Mirrabinda [1])	Residential – Rural	Sub-regional	Potential distant views of the waste rock emplacement and mine infrastructure, where vegetation and topography permit.		
VP11 (Property ID 127b; Mirrabinda [2])	Residential – Rural	Sub-regional	Potential distant views of the waste rock emplacement and mine infrastructure, where vegetation and topography permit.		

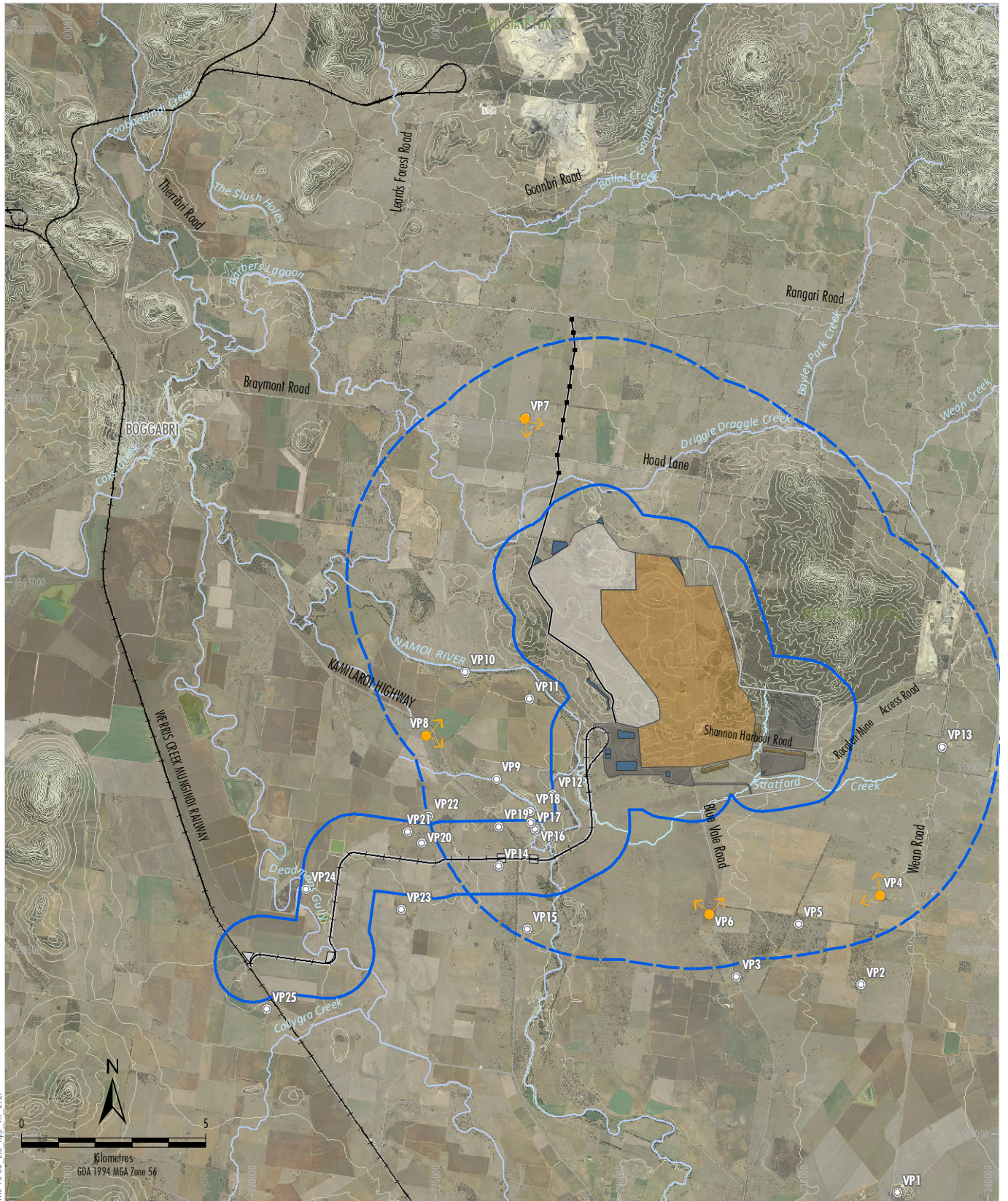
Table 3 (continued)
Locations of Viewpoints

Viewpoint	Land Use	Viewshed	Potential View of Project Landforms	Simulation	
				Years	Figure
VP12 (Property ID 127c; Mirrabinda [3])	Residential – Rural	Sub-regional	Potential distant views of the waste rock emplacement, mine infrastructure area and rail spur, where vegetation and topography permit.		
VP13 (Property ID 98; Roseberry)	Residential – Rural	Sub-regional	Potential distant views of the secondary infrastructure area, where vegetation and topography permit.		
VP14 (Kamilaroi Highway – Rail Overpass)	Other Main Road	Local ²	Dynamic views of the rail overpass by passing traffic. Potential views of the waste rock emplacement and mine infrastructure, where vegetation and topography permit.	If Constructed	Figure 15
VP15 (Property ID 153; Avona)	Residential - Rural	Sub-regional ³	Potential views of the rail spur, where vegetation and topography permit.		
VP16 (Property ID 132; Lanreef)	Residential – Rural	Local ³			
VP17 (Property ID 131a; Dennison)	Residential – Rural	Local ³			
VP18 (Property ID 131b)	Residential – Rural	Sub-regional ³			
VP19 (Property ID 141)	Residential – Rural	Local ³			
VP20 (Property ID 144b)	Residential – Rural	Local ³			
VP21 (Property ID 144a)	Residential – Rural	Local ³			
VP22 (Property ID 143)	Residential – Rural	Sub-regional ³			
VP23 (Property ID 147; Killara)	Residential – Rural	Sub-regional ³			
VP24 (Property IDs 146a and 146b)	Residential – Rural	Local ³			
VP25 (Property ID 322)	Residential – Rural	Sub-regional ³			

¹ Based on distance from viewpoint to the Project mining area.

² Based on distance from VP14 to the Kamilaroi Highway rail overpass.

³ Based on distance from viewpoint to the Project rail spur.



WRC-15-33 ES App VA 2121

LEGEND

- | | |
|---|---|
|  Railway |  Project Mining Area Local Setting Boundary (1 km from Project Mining Area) |
| Project Components |  Project Mining Area Sub-Regional Setting Boundary (5 km from Project Mining Area) |
|  Indicative Extent of Open Cut |  Viewpoint |
|  Indicative Extent of Out of Pit Waste Rock Employment |  Visual Simulation Location |
|  Indicative Extent of Infrastructure Area | |
|  Indicative Extent of Soil Stockpile | |
|  Indicative Extent of Water Storage | |
|  Indicative Rail Spur Alignment | |
|  Indicative Location of Groundwater Bores and Pipeline | |

Source: Orthophoto - Department of Land and Property Information, Aerial Photo (July 2011); Department of Industry (2016); Whitehaven (2016)



VICKERY EXTENSION PROJECT
Viewpoints and
Visual Simulation Locations

Figure 10



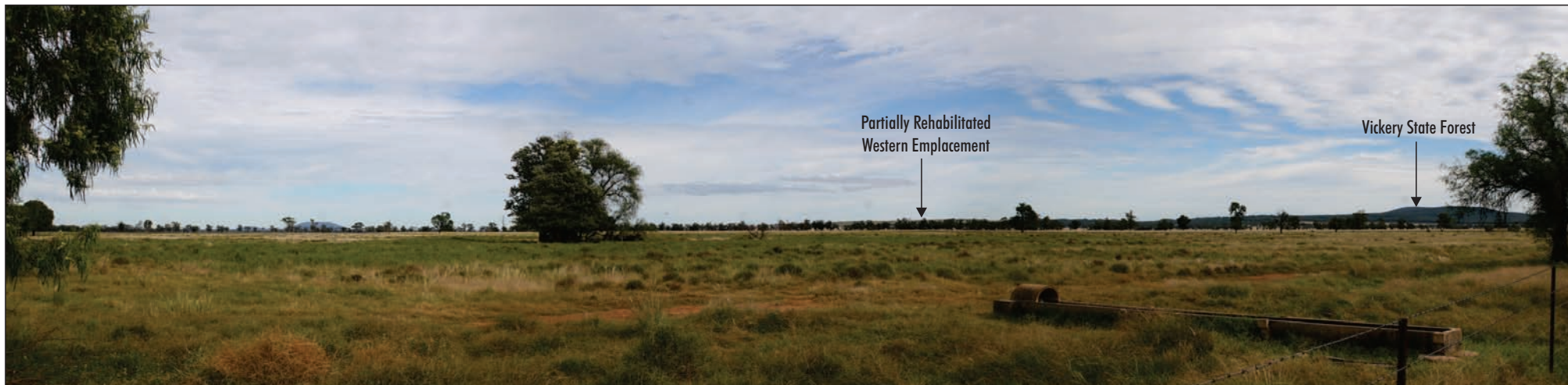
Existing View



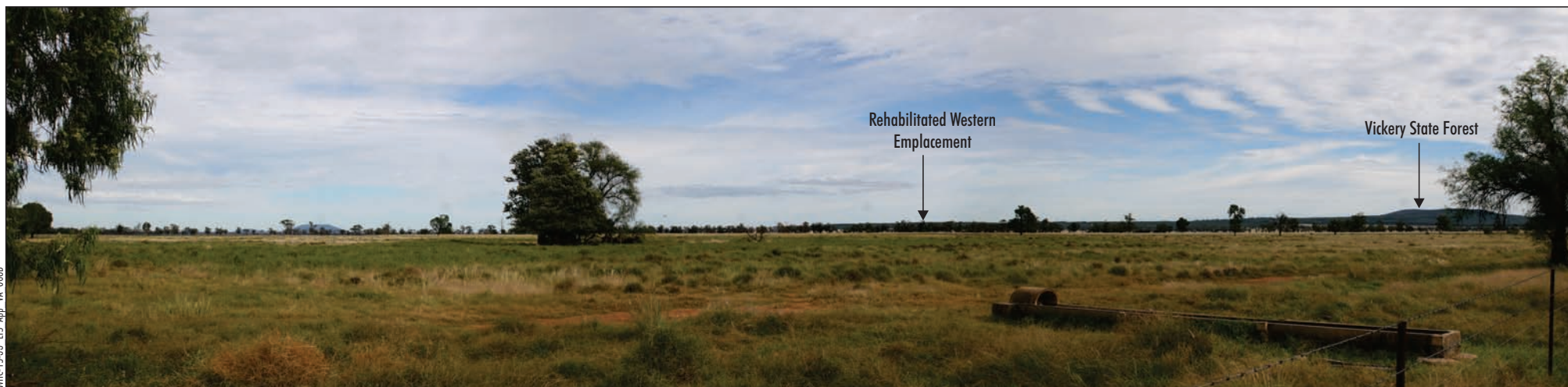
Existing View with Simulation Outline - Year 21

WMC-15-33 EIS App VA 002F

Figure 11a



Simulation - Year 21



Simulation - Post-Mining

WHC-15-33 EIS App. VA. 008B



Existing View



WHC15-33 ES App VA 0036

Existing View with Simulation Outline - Year 21

Figure 12a



Simulation - Year 21



Simulation - Post-Mining

WHC-15-33 EIS App VA 009A

Figure 12b



Existing View



Existing View with Simulation Outline - Year 7

WHC-15-33 EIS App. VA. 0046

Figure 13a



Simulation - Year 7



Simulation - Post-Mining

WHC15-33 EIS App. VA. 010A



Existing View



Existing View with Simulation Outline - Year 7

WHIC-15-33-EIS-App. VA. 005F



VICKERY EXTENSION PROJECT

Existing View and
Visual Simulation Outline (Year 7) -
Kamilaroi Highway (VP8)

Figure 14a



Simulation - Year 7



Simulation - Post-Mining

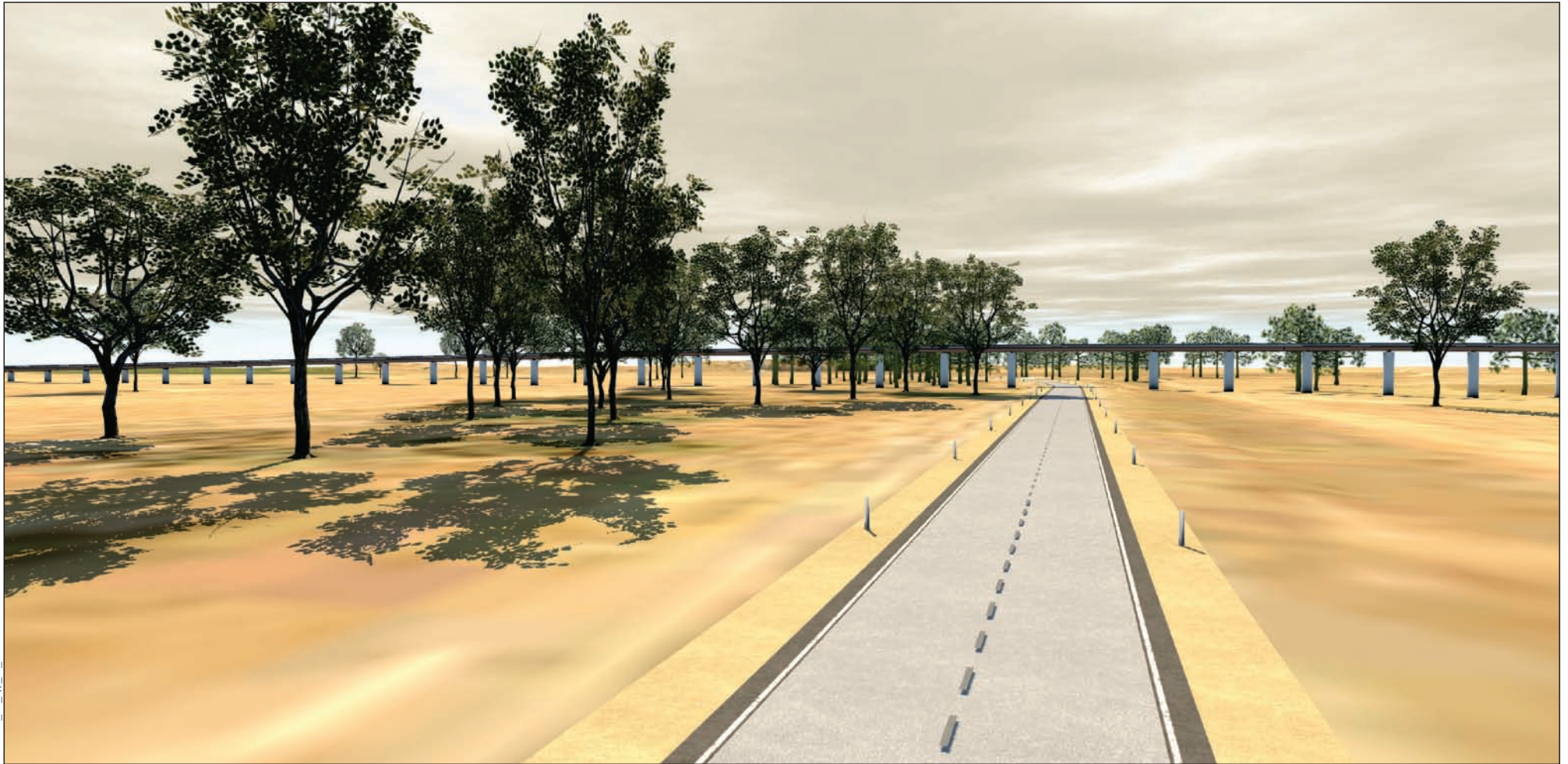
WHIC-15-33-ES-App-VA-011A



VICKERY EXTENSION PROJECT

Visual Simulation
(Year 7 and Post-Mining) -
Kamilaroi Highway (VP8)

Figure 14b



WHC-15-33_EIS_App_V4_0078

Simulation - Looking Northbound

Source: Whitehaven (2018)

Visual Sensitivity

Within the regional setting, the visual sensitivity of the rural residences would be low.

Visual Impact

For the two rural residences, 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 during operations. Following final rehabilitation, the level of potential visual impact associated with the Project would reduce to very low.

Blue Vale Road (VP3)

Blue Vale Road runs generally north-south through the Project area to the Kamilaroi Highway (Figure 10). VP3 would be representative of potential visual impacts from Blue Vale Road in the regional setting.

Level of Visual Modification

Views of the Project landforms would be available from sections of Blue Vale Road in the regional setting, where roadside vegetation and topography permit.

The potential visual impact on users of Blue Vale Road in the regional setting would result from distant views of the waste rock emplacement. The waste rock emplacement would change local topography and create contrast in colour and texture between the surrounding undisturbed areas and the emplaced waste rock.

Limited views of mine infrastructure are expected from sections of Blue Vale Road in the regional setting; however, due to intervening topography and vegetation, these would generally be intermittent or partial views.

The Project would contribute to a low to moderate level of visual modification along Blue Vale Road in the regional setting.

Visual Sensitivity

Within the regional setting, the visual sensitivity of users of Blue Vale Road (a local road [GTA Consultants, 2018]) would be low. It is also noted that the majority of traffic on Blue Vale Road would be Project-related traffic (GTA Consultants, 2018) and, therefore, it is anticipated that the usage of Blue Vale Road by non-mining vehicles in this area would be relatively low.

Visual Impact

For users of Blue Vale Road in the regional setting, the low to moderate level of visual modification, coupled with the low level of visual sensitivity, indicates a low level of potential visual impact would be expected during operations. Following final rehabilitation, the level of potential visual impact associated with the Project at Blue Vale Road in the regional setting would reduce to very low.

5.3.2 Sub-Regional Setting (1 to 5 km)

A number of viewpoints are located within the sub-regional setting. The potential visual impacts of the Project on the sub-regional setting are described below.

Southern Rural Residences (VP4 and VP5)

Views from the Brolga (VP4) and Coulston (2) (VP5) residences, located approximately 4.1 km and 3.8 km from the Project mining area, respectively (Figure 10), would be representative of the potential visual impacts from other rural residences in the sub-regional setting to the south of the Project.

Level of Visual Modification

Distant views of the Project landforms (particularly the waste rock emplacement) and mine infrastructure may be available from these residences to the south of the Project, where vegetation and topography permit. Views from these residences are generally screened by vegetation surrounding the residences (Urbis, 2012).

The greatest potential visual impact at these residences would occur while the waste rock emplacement is active. The main source of visual modification associated with the Project would be the contrasting colour and texture of the existing landscape and the newly placed and unvegetated material on the waste rock emplacement before a cover is established as part of the rehabilitation process, as well as lighting impacts during night-time operations.

Potential views of the secondary infrastructure area may also be available from these residences. Vegetative screens and, in some cases, bunds would be installed along the Blue Vale Road realignment (Section 6.2) that would limit views of the secondary infrastructure area over time.

Visual simulations from the Brolga (VP4) residence have been developed (Figures 11a and 11b). The simulations show that the Project landforms would only comprise a small proportion of the overall viewscape from the Brolga (VP4) residence.

The Project would contribute to a moderate level of visual modification at the rural residences to the south of the Project during operations. Following final rehabilitation, the level of visual modification associated with the Project would reduce to low or very low.

Visual Sensitivity

Within the sub-regional setting, the visual sensitivity of these rural residences would be moderate (Table 2).

Visual Impact

For the rural residences to the south of the Project, the moderate level of visual modification coupled with the moderate level of visual sensitivity indicates a moderate level of potential visual impact would be expected during operations. Following final rehabilitation, the level of potential visual impact associated with the Project would reduce to low or very low.

Northern Rural Residences

Rural residences within the sub-regional setting to the north of the Project mining area are owned by Whitehaven (e.g. Bungalow, Braymont and Silkdale) (Figure 4). On this basis, visual impacts on these residences are not assessed further.

Western Rural Residences (VP9, VP10, VP11 and VP12)

Views from the Clinton (VP9), Mirrabinda (1) (VP10), Mirrabinda (2) (VP11) and Mirrabinda (3) (VP12) residences, located approximately 2.9 km, 2.5 km, 1.8 km and 1.6 km from the Project mining area, respectively (Figure 10), would be representative of the potential visual impacts from other rural residences in the sub-regional setting to the west of the Project.

Level of Visual Modification

Distant views of the Project landforms (particularly the waste rock emplacement) and mine infrastructure may be available from these residences to the west of the Project, where vegetation and topography permit. Views from these residences are generally screened by vegetation surrounding the residences (Urbis, 2012).

The greatest potential visual impact at rural residences to the west of the Project would occur while the waste rock emplacement is active. By Year 7 of the Project, the waste rock emplacement would be at its approximate maximum height and not yet fully rehabilitated (therefore representing the greatest potential for visual impact from the west). The main source of visual modification associated with the Project would be the contrasting colour and texture of the existing landscape and the newly placed and unvegetated material on the waste rock emplacement before a cover is established as part of the rehabilitation process.

Potential views of the mine infrastructure area would be partially obscured by the existing vegetation surrounding the residences, as well as by the Project rail spur that would be constructed between the mine infrastructure area and western rural residences (Section 5.4).

The Project would contribute to a moderate level of visual modification at rural residences to the west of the Project during operations. Following final rehabilitation, the level of visual modification associated with the Project would reduce to low or very low.

Visual Sensitivity

Within the sub-regional setting, the visual sensitivity of the Clinton (VP9) rural residence would be moderate (Table 2). The visual sensitivity of the Mirrabinda (1) (VP10), Mirrabinda (2) (VP11) and Mirrabinda (3) (VP12) rural residences would be high (Table 2).

Visual Impact

For the Clinton (VP9) rural residence, the moderate level of visual modification coupled with the moderate level of visual sensitivity, indicates that a moderate level of potential visual impact would be expected during operations. For the Mirrabinda (1) (VP10), Mirrabinda (2) (VP11) and Mirrabinda (3) (VP12) rural residences, the moderate level of visual modification, coupled with the high level of visual sensitivity, indicates that a high level of potential visual impact would be expected during operations. Following final rehabilitation, the level of potential visual impact associated with the Project for rural residences to the west of the Project would reduce to low.

Eastern Rural Residences (VP13)

Views from the Roseberry residence (VP13), located approximately 3.5 km from the Project mining area (Figure 10), would be representative of the potential visual impacts from other rural residences in the sub-regional setting to the east of the Project.

Level of Visual Modification

Distant views of the Project landforms and mine infrastructure may be available from this residence to the east of the Project, where vegetation and topography permit. Views from this residence are generally screened by vegetation surrounding the residence.

The greatest potential visual impact at rural residences to the east of the Project would occur while the southern section of the waste rock emplacement is active. The southern section of the waste rock emplacement would not be fully rehabilitated (therefore representing the greatest potential for visual impact from the east) until the later years of the Project.

Potential views of the secondary infrastructure area would generally be obscured by an existing small ridgeline and vegetative screens (over time) (Section 6.2) located to the east of the secondary infrastructure area.

The elevated sections of the Vickery State Forest would generally obscure views of the waste rock emplacement and the open cut from rural residences to the east of the Project.

The Project would contribute to a moderate level of visual modification at rural residences to the east of the Project during operations. Following final rehabilitation, the level of visual modification associated with the Project would reduce to low or very low.

Visual Sensitivity

Within the sub-regional setting, the visual sensitivity of the rural residences to the east of the Project would be moderate (Table 2).

Visual Impact

For the rural residences to the east of the Project, the moderate level of visual modification during operations coupled with the moderate level of visual sensitivity indicates a moderate level of potential visual impact would be expected. Following final rehabilitation, the level of potential visual impact associated with the Project would reduce to low or very low.

Blue Vale Road (VP6)

Blue Vale Road runs generally north-south within the Project area to the Kamilaroi Highway (Figure 10). VP6 would be representative of potential visual impacts from Blue Vale Road in the sub-regional setting.

Level of Visual Modification

Views of the Project landforms (particularly the waste rock emplacement) and mine infrastructure would be available from sections of Blue Vale Road in the sub-regional setting, where roadside vegetation and topography permit.

The greatest potential visual impact at Blue Vale Road in the sub-regional setting would occur while the waste rock emplacement is active. The main source of visual modification associated with the Project would be the contrasting colour and texture of the existing landscape and the newly placed and unvegetated material on the waste rock emplacement before a cover is established as part of the rehabilitation process.

Views of the mine infrastructure area (particularly the elevated components such as materials-handling infrastructure) would also be available from sections of Blue Vale Road.

Potential views of the secondary infrastructure area may also be available from Blue Vale Road (VP6). Vegetative screens and in some cases bunds, would be installed along the Blue Vale Road realignment (Section 6.2) that would limit views of the secondary infrastructure area over time.

Views of the open cut from Blue Vale Road in the sub-regional setting would be generally screened by intervening roadside and paddock boundary vegetation.

Visual simulations from Blue Vale Road 3.5 km south of the Project (VP6) have been developed (Figures 12a and 12b).

The Project would contribute to a moderate to high level of visual modification at Blue Vale Road in the sub-regional setting during operations. Following final rehabilitation, the level of visual modification associated with the Project would reduce to low.

Visual Sensitivity

Within the sub-regional setting, the visual sensitivity of users of Blue Vale Road (a local road [GTA Consultants, 2018]) would be low. It is also noted that the majority of traffic on Blue Vale Road would be Project-related traffic (GTA Consultants, 2018) and therefore it is anticipated that the usage of Blue Vale Road by non-mining vehicles in this area would be relatively low.

Visual Impact

For users of Blue Vale Road in the sub-regional setting, the moderate to high level of visual modification during operations, coupled with the low level of visual sensitivity, indicates that a low to moderate level of potential visual impact would be expected during operations. Following final rehabilitation, the level of potential visual impact associated with the Project would reduce to low or very low.

Braymont Road (VP7)

Braymont Road provides a generally east-west connection between the Project area and Boggabri (Figure 10). VP7 would be representative of potential visual impacts from Braymont Road in the sub-regional setting.

Level of Visual Modification

Distant views of the Project landforms (particularly the waste rock emplacement) would be available from sections of Braymont Road on the northern approach to the Project, where vegetation and topography permit.

The greatest potential visual impact at Braymont Road in the sub-regional setting would occur while the waste rock emplacement is active. By Year 7 of the Project, the waste rock emplacement would be at its approximate maximum height and not yet fully rehabilitated (therefore representing the greatest potential for visual impact from the north). The main source of visual modification associated with the Project would be the contrasting colour and texture of the existing landscape and the newly placed and unvegetated material on the waste rock emplacement before a cover is established as part of the rehabilitation process.

Views of the open cut from Braymont Road in the sub-regional setting would be generally screened by intervening roadside and paddock boundary vegetation.

Visual simulations from Braymont Road approximately 3.4 km north-west of the Project (VP7) have been developed (Figures 13a and 13b).

The Project would contribute to a moderate to high level of visual modification at Braymont Road in the sub-regional setting during operations. Following final rehabilitation, the level of visual modification associated with the Project would reduce to low.

Visual Sensitivity

Within the sub-regional setting, the visual sensitivity of users of Braymont Road (a local road [GTA Consultants, 2018]) would be low. It is also noted that the majority of traffic on Braymont Road would be Project-related traffic (GTA Consultants, 2018) and, therefore, it is anticipated that the usage of Braymont Road by non-mining vehicles in this area would be relatively low.

Visual Impact

For users of Braymont Road, the moderate to high level of visual modification during operations coupled with the low level of visual sensitivity, indicates that a low to moderate level of potential visual impact would be expected. Following final rehabilitation, the level of potential visual impact associated with the Project would reduce to low or very low.

Kamilaroi Highway (VP8)

The Kamilaroi Highway runs generally north-south, to the west of the Project area (Figure 10). VP8 would be representative of potential visual impacts from the Kamilaroi Highway in the sub-regional setting.

Level of Visual Modification

Distant views of the Project landforms (particularly the waste rock emplacement) and mine infrastructure would be available from sections of the Kamilaroi Highway, where vegetation and topography permit.

The greatest potential visual impact at the Kamilaroi Highway in the sub-regional setting would occur while the waste rock emplacement is active. By Year 7 of the Project, the waste rock emplacement would be at its approximate maximum height and not yet fully rehabilitated (therefore representing the greatest potential for visual impact from the north). The main source of visual modification associated with the Project would be the contrasting colour and texture of the existing landscape and the newly placed and unvegetated material on the waste rock emplacement before a cover is established as part of the rehabilitation process.

Views of the open cut and the mine infrastructure area from the Kamilaroi Highway in the sub-regional setting would be generally screened by intervening roadside and paddock boundary vegetation.

Visual simulations from the Kamilaroi Highway (VP8) approximately 4.5 km to the west of the Project have been developed (Figures 14a and 14b).

The Project would contribute to a moderate level of visual modification at the Kamilaroi Highway during operations. Following final rehabilitation, the level of visual modification associated with the Project would reduce to low or very low.

Visual Sensitivity

Within the sub-regional setting, the visual sensitivity of users of the Kamilaroi Highway (a State road [GTA Consultants, 2018]) would be low.

Visual Impact

For users of the Kamilaroi Highway, the moderate level of visual modification during operations, coupled with the low level of visual sensitivity, indicates that a low level of potential visual impact would be expected. Following final rehabilitation, the level of potential visual impact associated with the Project would reduce to low or very low.

5.3.3 Local Setting (< 1 km)

The potential visual impacts of the Project on the local setting are described below.

Rural Residences

There are no rural residences within the local setting of the the Project mining area. On this basis, visual impacts on rural residences within the local setting are not assessed further.

Public Roads

A number of locations along public roads (i.e. Blue Vale Road, Braymont Road, Hoad Lane and Shannon Harbour Road) exist in the local setting where views of the Project would be available.

Level of Visual Modification

The close proximity of public roads to Project landforms (particularly the waste rock emplacement) and mine infrastructure would result in prominent visual impacts, particularly at locations along the realigned section of Blue Vale Road that would be adjacent to the open cut and the waste rock emplacement, presenting views of the operational areas of the mine to vehicles travelling along the road.

These views would be screened in part, by existing vegetation and vegetative screens (over time), and in some cases bunds, proposed to be installed along sections of the Blue Vale Road realignment where views of the active mine operations would be available to road traffic (Figure 10). These vegetative screens and bunds would mitigate some of the visual impact along the Blue Vale Road realignment over time, although it is anticipated that residual visual impacts would be experienced by motorists due to the close proximity to the mining landforms.

Given the above, it is anticipated that a high level of visual modification would occur at a number of locations along public roads (particularly the realigned Blue Vale Road) in the local setting.

Visual Sensitivity

All these roads are local roads (GTA Consultants, 2018) and, therefore, have a low visual sensitivity (Table 2). The proportion of Project-related vehicles would be high and, therefore, it is anticipated that the usage of these local roads by non-mining vehicles in this area would be relatively low.

Visual Impact

For users of the public roads in the local setting, the high level of visual modification during operations, coupled with the low level of visual sensitivity, indicates that a moderate level of potential visual impact would be expected. Following final rehabilitation, the level of potential visual impact associated with the Project would reduce to low.

5.4 RAIL SPUR AND RAIL OVERPASS

The Project would include construction of a rail spur (including a rail overpass over the Kamilaroi Highway and crossing of the Namoi River) and loop connecting to the Werris Creek Mungindi Railway, with an approximate total rail length of 14 km (Figure 3). The eastern part of the Project rail spur would be located on land owned by Whitehaven. The western part of the Project rail spur would be located in a corridor owned by Whitehaven. The Project rail spur would cross the Kamilaroi Highway, Namoi River and a parcel of Crown Land (Figure 4).

Rail Spur

Rural residences located in the vicinity of the proposed rail spur alignment (Figure 4) may have views of the Project rail spur once constructed. Residences that may have views of the rail spur include Mirrabinda (3) (VP12), Avona (VP15), Lanreef (VP16), Dennison (VP17), Property ID 131b (VP18), Property ID 141 (VP19), Property ID 144b (VP20), Property ID 144a (VP21), Property ID 143 (VP22), Killara (VP23), Property IDs 146a and 146b (VP24) and Property ID 322 (VP25) (Figure 10). Rural residences in the region commonly have vegetative screening (either natural or planted) which generally limits views beyond the local setting.

The Project rail spur would be similar to the existing Maules Creek and Boggabri coal mines rail spur where it crosses the Namoi River and Kamilaroi Highway (Plates 1 and 2).

Intermittent views of the rail spur would also be available from the road network in the vicinity of the rail spur where vegetation and topography permit.

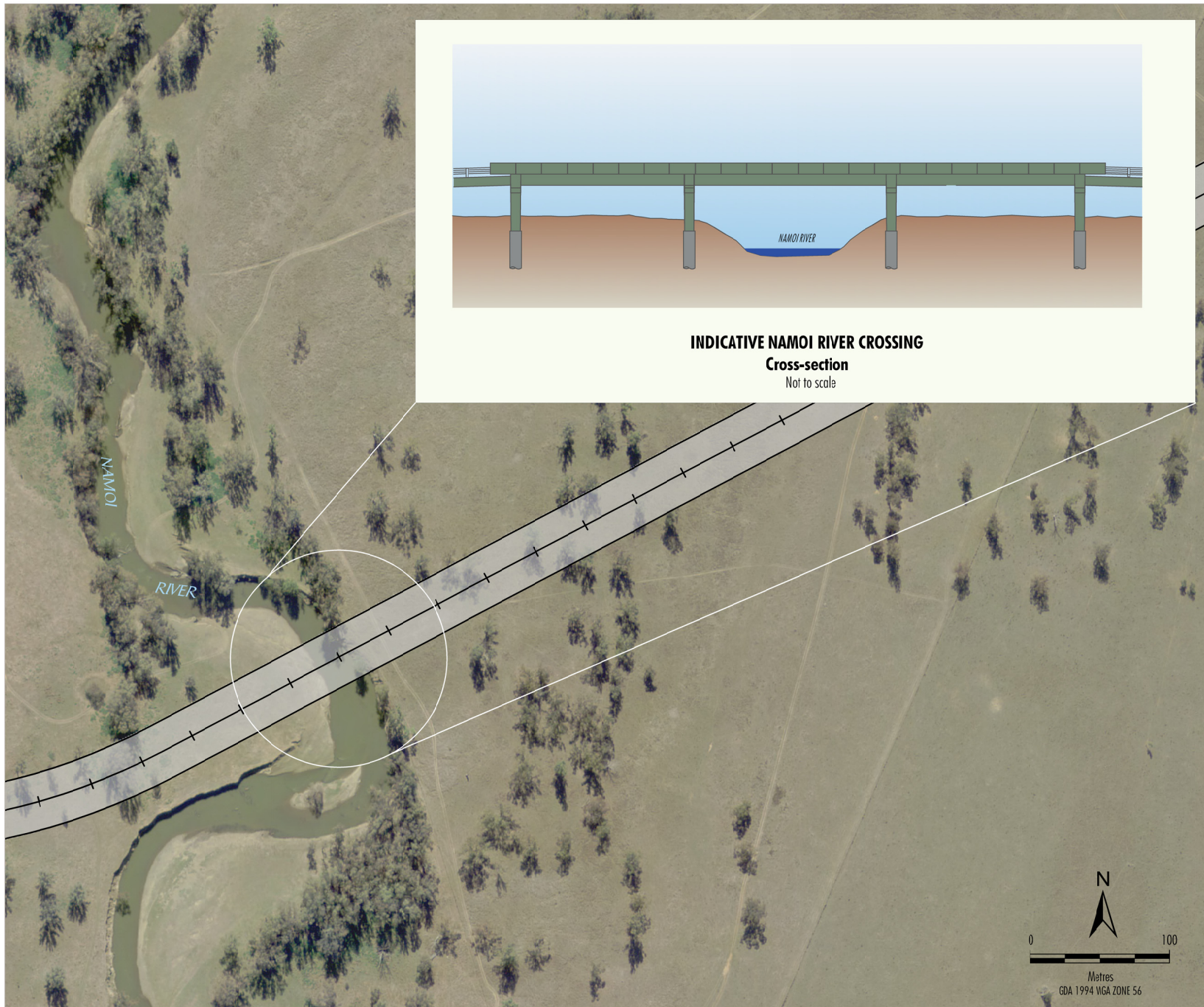
The Project rail spur would partially obscure views of the mining infrastructure area for western rural residences (including night-lighting sources located at the mining infrastructure area) (Section 5.6).

Level of Visual Modification

The Project rail spur would generally be an elevated structure with some infilled embankment sections. Where the Project rail spur crosses the Namoi River it would be elevated further on a viaduct structure to minimise impacts to the flooding regime.

The viaduct structure would consist of spans between piers supporting the rail track. An indicative cross section of the elevated crossing of the Namoi River is shown on Figure 16.

Plates 1 and 2 show the existing Maules Creek and Boggabri Rail Spur at distances of approximately 400 and 800 m, respectively. It is noted the section of the existing rail spur shown in Plates 1 and 2 is approximately 6 m, whereas the Project rail spur would be 1 to 2 m where it is closest to rural dwellings. Accordingly, visual modification could be less than what is indicated on Plates 1 and 2 for the Project rail spur, subject to the presence of intervening vegetation.



LEGEND
 +---+ Indicative Rail Spur Alignment

Source: Orthophoto - Department of Land and Property Information,
 Aerial Photography (July 2011)

INDICATIVE NAMOI RIVER CROSSING
Cross-section
 Not to scale



VICKERY EXTENSION PROJECT
 Indicative Namoi River
 Crossing Design



Figure 16

As the rail spur would only comprise a small proportion of the overall viewscape, it is anticipated that a low level of visual modification would occur at the closest privately-owned rural residences to the Project rail spur (within approximately 1.5 km). At all other privately-owned rural residences, it is anticipated that a very low level of visual modification would occur.

Visual Sensitivity

The visual sensitivity of the rural residences described above would be high as they are located within 2.5 km of the rail spur (Table 4).

Table 4
Distances from Viewpoints to Project Rail Spur

Viewpoint	Approximate Distance to Rail Spur	Visual Sensitivity*
VP12 (Property ID 127c; Mirrabinda [3])	950 m	H
VP15 (Property ID 153; Avona)	1.9 km	H
VP16 (Property ID 132; Lanreef)	800 m	H
VP17 (Property ID 131a; Dennison)	950 m	H
VP18 (Property ID 131b)	1.2 km	H
VP19 (Property ID 141)	850 m	H
VP20 (Property ID 144b)	500 m	H
VP21 (Property ID 144a)	750 m	H
VP22 (Property ID 143)	1.2 km	H
VP23 (Property ID 147; Killara)	1.5 km	H
VP24 (Property IDs 146a and 146b)	800 m	H
VP25 (Property ID 322)	1.3 km	H

* Refer to Table 2.
Note: H – High.

Visual Impact

At dwellings within approximately 1.5 km from the Project rail spur, the low level of visual modification during operations coupled with the high level of visual sensitivity indicates a moderate level of potential visual impact would be expected during operations (Table 1). For other rural residences, the very low level of visual modification during operations coupled with the high level of visual sensitivity indicates a low level of potential visual impact would be expected during operations (Table 1).

In addition, the owners of property 144 have approval to construct a dwelling approximately 300 m from the Project rail spur. If constructed, potential visual impacts from the approved dwelling location would likely be similar to those from VP20 (i.e. moderate level of potential visual impact).

Rail Overpass

The Project rail spur would include an overpass where it crosses the Kamilaroi Highway. The rail overpass would be elevated on a viaduct structure to provide sufficient clearance for vehicles travelling along the Kamilaroi Highway (Figure 3). An indicative cross-section of the rail overpass is shown on Figure 17. The Kamilaroi Highway rail overpass would be similar to the Maules Creek and Boggabri coal mines rail spur (Plates 1 and 2) Kamilaroi Highway overpass and have an elevation of approximately 6.5 m above ground level.

Level of Visual Modification

The Kamilaroi Highway is located within a landscape that is generally flat, with bands of vegetation present along the edge of the highway and along local roads and property or paddock boundaries. The highway landscape includes signage, road intersections, rail crossings and, occasionally, road and rail overpasses/grade separations.

The rail overpass is typical of infrastructure within a highway setting. In this regard it is considered to have a higher degree of visual compatibility or fit. As a result, the visual modification level is considered to be low from the highway itself and low to very low from the closest residences.

Visual Sensitivity

Table 5 indicates the distance from nearby viewpoints to the rail overpass.

**Table 5
Distances from Viewpoints to Rail Overpass**

Viewpoint	Approximate Distance to Kamilaroi Highway Rail Overpass	Visual Sensitivity*
VP9 (Property ID 133a; Clinton)	2.2 km	H
VP12 (Property ID 127c; Mirrabinda [3])	1.9 km	H
VP14 (Kamilaroi Highway – Rail Overpass)^	0.5 km	M
VP15 (Property ID 153; Avona)	1.9 km	H
VP16 (Property ID 132; Lanreef)	900 m	H
VP17 (Property ID 131a; Dennison)	950 m	H
VP18 (Property ID 131b)	1.3 km	H
VP19 (Property ID 141)	1 km	H

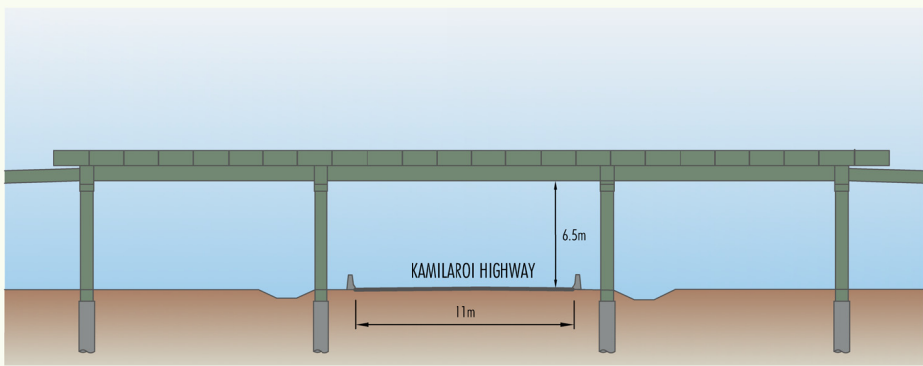
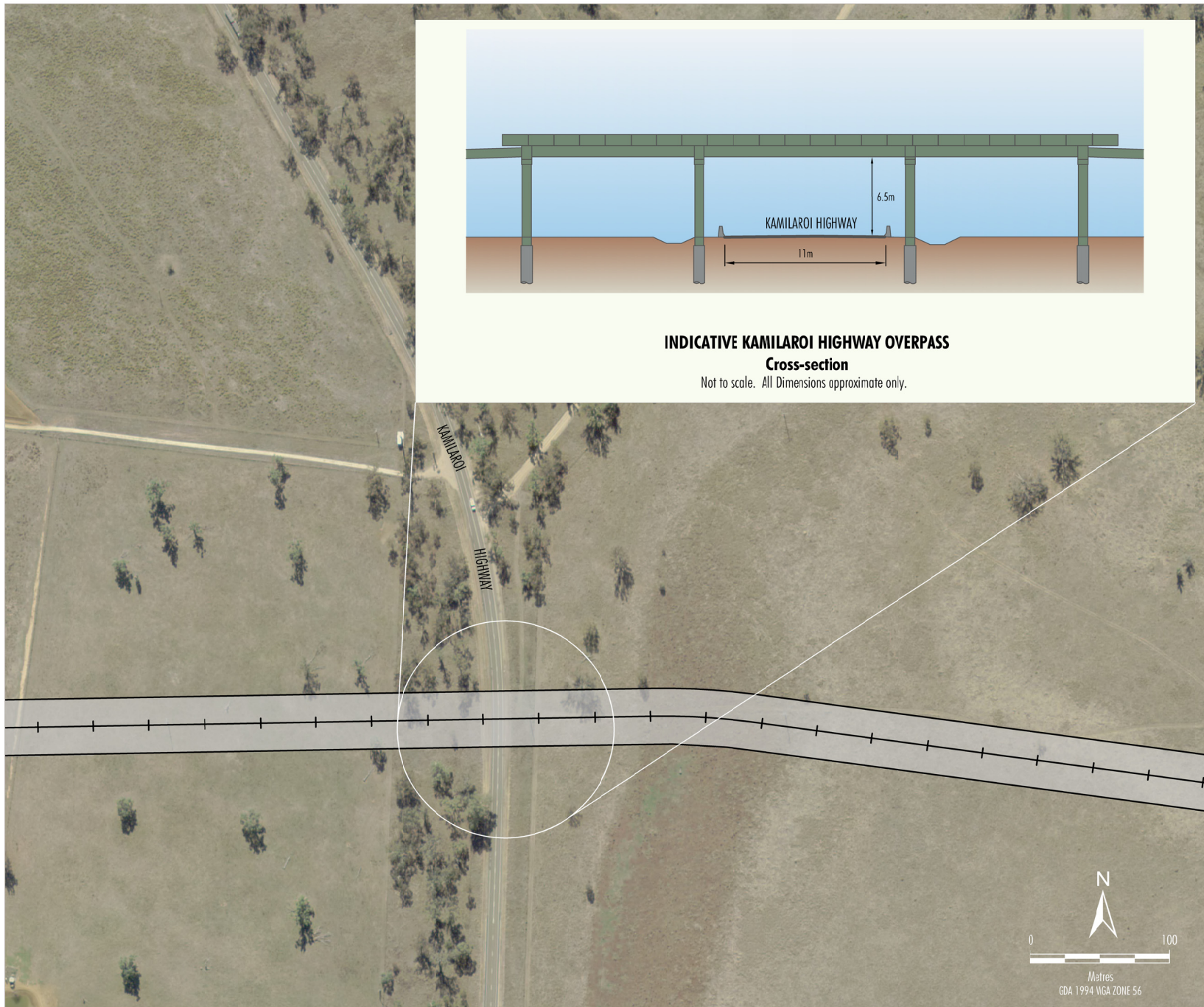
* Refer to Table 2.

^ The Kamilaroi Highway is a State road (GTA Consultants, 2018) and, therefore, would have a moderate visual sensitivity within 0.5 km of the rail overpass.

Note: H – High, M – Moderate.

Visual Impact – Rural Residences

Nearby residences that may have views of the rail overpass include Lanreef (VP16), Dennison (VP17), Property ID 131b (VP18) and Property ID 141 (VP19) (Table 5) (Figure 10). For these residences, the low level of visual modification associated with the rail overpass, coupled with the high level of visual sensitivity, indicates a moderate level of potential visual impact would be expected during operations (Table 1). For any other rural dwelling, the potential visual impact from the rail overpass would be expected to be low.



INDICATIVE KAMILAROI HIGHWAY OVERPASS
Cross-section

Not to scale. All Dimensions approximate only.

LEGEND
 +---+ Indicative Rail Spur Alignment

Source: Orthophoto - Department of Land and Property Information,
 Aerial Photography (July 2011)



VICKERY EXTENSION PROJECT
 Indicative Kamilaroi Highway
 Rail Overpass Design

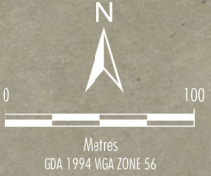


Figure 17

Visual Impact – Kamilaroi Highway

Visual simulations of the rail overpass from the Kamilaroi Highway (VP14) have been developed and are provided in Figure 15.

For users of the Kamilaroi Highway in the local setting, the low level of visual modification during operations coupled with the moderate level of visual sensitivity indicates a low level of potential visual impact would be expected (Table 1).

5.5 PRIVATE HAUL ROAD AND KAMILAROI HIGHWAY OVERPASS

The trigger for construction of the approved private haul road and Kamilaroi Highway overpass is described in Section 4.1.2.

The potential visual impacts of the approved private haul road and Kamilaroi Highway overpass were assessed by Urbis (2012) as part of the Approved Mine EIS. A visual simulation of the Kamilaroi Highway overpass was prepared as part of the Urbis (2012) report and it is reproduced on Figure 18.

The approved private haul road and Kamilaroi Highway overpass were concluded to have a very low potential visual modification and a high visual sensitivity (Urbis, 2012). The very low potential visual modification level, coupled with a high visual sensitivity, indicates that a low level of potential visual impact would be expected (Urbis, 2012).

In the event that the approved private haul road and Kamilaroi Highway overpass are constructed as part of the Project, it would be constructed as per the Approved Mine and, therefore, the conclusions of Urbis (2012) (i.e. low level of potential visual impact) would be relevant to the Project.

5.6 OTHER VISUAL IMPACT CONSIDERATIONS

Direct Night-lighting

Direct views of Project lighting sources would be possible from public roads and some residences. Lights associated with the Project that may be directly visible from some public roads and residences include stationary work lights, fixed/permanent lights and vehicle-mounted lights. Direct views to the lighting sources would be obscured from most residences by vegetation within the landscape and around residences. The headlights of trains using the Project rail spur would intermittently be visible from residences and sections of public roads.

Some western rural residences may have views of lighting sources from the mining infrastructure area, which would be partially obscured by the existing vegetation surrounding the residences, as well as by the Project rail spur that would be constructed between the mine infrastructure area and western rural residences.

The design of the Project is such that the outer edge of the Western Emplacement would be established and rehabilitated during the first 13 years of the mine life (Figure 7). This (and the natural topography of the Project mining area) would provide a barrier between the operating fleet in the open cut and the majority of the surrounding residences later in the Project life.

Measures to mitigate potential impacts from direct night-lighting are discussed in Section 6.3.



Existing View



Simulation

Source: URBIS (2012)

WH/C-15-33-ES-App-VA-006D



VICKERY EXTENSION PROJECT
Existing View and Visual Simulation -
Private Haul Road Overpass

Figure 18

Indirect Night-lighting

There is potential for the Project to spill a certain amount of light from vehicles and stationary work lights producing sky glow, and when there is cloud cover at night this may also result in some reflection off the cloud base.

Lighting of night-time works is essential for the safety of personnel operating at the Project. The intensity, nature and degree of night-lighting for the Project would be similar to, or slightly greater than, the existing night-lighting at the Tarrawonga and Rocglen Coal Mines and the intensity assessed for the Approved Mine.

Lighting of night-time works is essential for the safety of personnel operating at the Project. The intensity, nature and degree of night-lighting for the Project would be similar to, or slightly greater than, the existing night-lighting at the Tarrawonga and Rocglen Coal Mines and the intensity assessed for the Approved Mine. Measures to mitigate potential impacts from indirect night-lighting are discussed in Section 6.3.

Siding Springs Observatory

The Siding Springs Observatory is located approximately 115 km to the south-west of the Project. As such, the Project is within the Dark Sky Region as defined in the *Dark Sky Planning Guideline* (DP&E, 2016). There are a number of light sources and small towns (e.g. Coonabarabran) between the Project and the Siding Springs Observatory, which may contribute to sky glow at the Siding Springs Observatory.

Any potential impact associated with night-lighting required for the Project (i.e. for safety reasons) would be similar to those for the Approved Mine and would be minimised as far as possible through the mitigation measures described in Section 6.3, which include the implementation of ‘good lighting design principles’ provided in the *Dark Sky Planning Guideline* (DP&E, 2016) where practicable and without compromising operational safety.

Dust

Dust emissions (and any potential impacts associated with visible dust) would be mitigated through the implementation of dust management practices as a component of a relevant management plan.

5.7 SUMMARY OF IMPACTS

Overall, the Project is expected to result in moderate to very low levels of potential visual impacts at relevant sensitive receivers (Section 5).

A summary of the potential visual impacts discussed in Sections 5.3 to 5.5 is shown in Table 6.

**Table 6
Summary of Visual Assessment**

Location	Visual Modification Level	Visual Sensitivity	Potential Impact*	Potential Impact After Rehabilitation
Project Mining Area				
VP1 (Property ID 340; Bengalala)	L	L	L	VL
VP2 (Property ID 108b; Coulston [1])	L	L	L	VL
VP3 (Blue Vale Road)	L/M	L	L	VL
VP4 (Property ID 310; Brolga)	M	M	M	VL/L
VP5 (Property ID 108a; Coulston [2])	M	M	M	VL/L
VP6 (Blue Vale Road)	M/H	L	L/M	VL/L
VP7 (Braymont Road)	M/H	L	L/M	VL/L
VP8 (Kamilaroi Highway)	M	L	M	VL/L
VP9 (Property ID 133a; Clinton)	M	M	M	L
VP10 (Property ID 127a; Mirrabinda [1])	M	H	H	L
VP11 (Property ID 127b; Mirrabinda [2])	M	H	H	L
VP12 (Property ID 127c; Mirrabinda [3])	M	H	H	L
VP13 (Property ID 98; Roseberry)	M	M	M	VL/L
Rail Spur				
VP12 (Property ID 127c; Mirrabinda [3])	VL	H	L	N/A
VP15 (Property ID 153; Avona)	VL	H	L	N/A
VP16 (Property ID 132; Lanreef)	L	H	M	N/A
VP17 (Property ID 131a; Dennison)	L	H	M	N/A
VP18 (Property ID 131b)	L	H	M	N/A
VP19 (Property ID 141)	L	H	M	N/A
VP20 (Property ID 144b)	L	H	M	N/A
VP21 (Property ID 144a)	L	H	M	N/A
VP22 (Property ID 143)	L	H	M	N/A
VP23 (Property ID 147; Killara)	L	H	M	N/A
VP24 (Property IDs 146a and 146b)	L	H	M	N/A
VP25 (Property ID 322)	VL	H	L	N/A
Rail Overpass				
VP9 (Property ID 133a; Clinton)	VL	H	L	N/A
VP12 (Property ID 127c; Mirrabinda [3])	VL	H	L	N/A
VP14 (Kamilaroi Highway – Rail Overpass)	L	M	L	N/A
VP15 (Property ID 153; Avona)	VL	H	L	N/A
VP16 (Property ID 132; Lanreef)	L	H	M	N/A
VP17 (Property ID 131a; Dennison)	L	H	M	N/A
VP18 (Property ID 131b)	L	H	M	N/A
VP19 (Property ID 141)	L	H	M	N/A

* Methodology described in Section 5.1.

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

5.8 CUMULATIVE IMPACTS

The assessment of potential cumulative visual impacts considers the combined effects of the Project with the effects of the existing Rocglen Coal Mine.

Due to the elevated and hilly topography of the Vickery State Forest, views of both the Project and the Rocglen Coal Mine landforms would generally only be available from viewpoints to the south and south-east of the Project. As with views of the Project, these viewpoints would generally be limited to elevated areas and/or areas where no vegetation screening is present (e.g. from paddocks, private roads).

The Roseberry residence (VP13) would be potentially exposed to views of both the Project and the Rocglen Coal Mine landforms. However, given the intervening topography and the presence of screening vegetation around the dwelling, these would generally be intermittent or partial views. The cumulative views would also be similar to the cumulative visual impacts associated with the Approved Mine and the Rocglen Coal Mine.

The night-time setting is currently subject to the effects of lighting from the Rocglen Coal Mine. However, the Rocglen Coal Mine is contained to some extent between the rising topography of the Vickery State Forest and the unnamed range to the east.

Cumulative visual impacts as a result of the Project and the Rocglen Coal Mine are considered to be low to moderate and confined to viewpoints to the south and south-east of the Project. These impacts would reduce to low once final rehabilitation has been completed.

6 MITIGATION MEASURES AND MANAGEMENT

The mitigation and management measures that would be implemented for the maintenance of visual amenity at the Project are described below.

6.1 PROGRESSIVE REHABILITATION AND REVEGETATION

Progressive rehabilitation of the Project landforms would be undertaken and would assist in reducing the contrast between them and the surrounding environment. The design of the waste rock emplacement would assist with the visual shielding of the active open cut operations from viewpoints to the north, west and south-west of the Project. The level of visual modification by the waste rock emplacement itself would vary over time, reducing as vegetation becomes established and mature. Rehabilitation would be conducted in accordance with the rehabilitation and landscape management strategy presented in Section 5 in the Main Report of the EIS.

6.2 VISUAL SCREENING

Vegetative screens, and in some cases bunds, would be installed along sections of the Blue Vale Road realignment where prominent views of the active mine operations would be available to road traffic (Figure 2). Vegetative screens would take some years to develop and, once developed, would only provide partial screening. The vegetative screens and bunds, over time, would mitigate some of the visual impact along the Blue Vale Road realignment, although it is anticipated that residual visual impacts would be experienced by motorists due to the close proximity to the Project landforms.

In addition, upon receiving a request from an owner of any privately-owned dwelling within direct views of the Project, Whitehaven would assess whether there is a high visual impact. In the event the Project is concluded to be resulting in a high visual impact at a dwelling, Whitehaven would implement reasonable and feasible visual mitigation measures in consultation with the owner to minimise the visibility of the Project from the dwelling.

6.3 NIGHT-LIGHTING CONTROLS

Measures to mitigate potential impacts from night-lighting (including sky glow) could include one or more of the following, where practicable and without compromising operational safety:

- All external lighting associated with the Project would comply with AS 4282:1997 – *Control of the Obtrusive Effects of Outdoor Lighting*, including the minimisation of light spill through the following:
 - Adequate aiming of lights (including consideration of mounting heights).
 - Use of shielded fittings where practicable.
- Implementation of ‘good lighting design principles’ provided by the *Dark Sky Planning Guideline* (DP&E, 2016), such as:
 - Use of warm white coloured bulbs on fixed lighting, with an objective of maintaining colour temperature below 3,500 Kelvin, where appropriate.
 - Use of asymmetric beams on fixed lighting, where appropriate.
 - Night-lighting would be restricted to the minimum required for operations and safety requirements so as to avoid over-lighting.

- Appropriate positioning and orientation of lights.
- Screens would be installed along sections of the Project rail spur to mitigate potential train lighting impacts to neighbouring residents and users of the Kamlaroi Highway.
- Mitigation measures at private residences, where warranted and if requested by the landholder (e.g. curtains, cladding, screens and tree planting).

7 REFERENCES

- Anderson, J.R., Hardy, E.E. and Roach, J.T. (1976) *Land Use and Land Cover Classification System for Use with Remote Sensing Data*. Geological Survey Professional Paper 964. A revision of the land use classification system as presented in US. Geological Circular 671. U.S. Government Printing Office, Washington, D.C.
- Burns, W.T. and Rundell, D.D. (1969) *A Test of Visual Preferences in a Rural New England Landscape*.
- Department of Planning & Environment (2016) *Dark Sky Planning Guideline*.
- EDAW Australia (2006) *NCIG Coal Export Terminal Visual Assessment*. Appendix N in Newcastle Coal Infrastructure Group (2006) *Newcastle Coal Infrastructure Group Coal Export Terminal Environmental Assessment*.
- Google Earth (2018) *Google Earth Street View*. Imagery date August 2015.
- GTA Consultants (2018) *Vickery Extension Project Environmental Impact Statement – Road Transport Assessment*.
- Leonard, M. and Hammond, R. (1984) *Landscape Character Types of Victoria*.
- Extent Heritage Advisors (2018) *Vickery Extension Project Environmental Impact Statement – Historic Heritage Assessment*.
- Urbis (2012) *Vickery Coal Project Environmental Impact Statement – Visual Assessment*.