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MAXWELL UNDERGROUND MINE PROJECT

APPENDIX F

Landscape and Visual Assessment

Maxwell Modification

visual impact assessment

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1. INTRODUCTION

1.1 Background and Modification Description

The Maxwell Underground Mine Project (the Project) is an approved underground coal mining operation owned by Maxwell Ventures (Management) Pty Ltd, a wholly owned subsidiary of Malabar Resources Limited (Malabar). The Project is in the Upper Hunter Valley of New South Wales (NSW), east-southeast of Denman and south-southwest of Muswellbrook (Figure 1.1).

Development Consent SSD 9526 for the Project was granted by the Independent Planning Commission (IPC) on 22 December 2020. The Project was subsequently approved under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 10 March 2021 (EPBC 2018/8287).

Malabar previously sought to modify Development Consent SSD 9526 under section 4.55(1A) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for a minor extension to the mine entry area (MEA) (Modification 1). Modification 1 was subsequently approved on 19 November 2021 and EPBC 2018/8287 was varied on 14 December 2021.

A proposed Modification is being sought under section 4.55(2) of the EP&A Act (the Modification). The Modification is located wholly within the approved Development Application Area and would comprise the following components:

- re-orientation of the longwall panels in the Woodlands Hill, Arrowfield and Bowfield Seams resulting in a minor increase in the approved underground mining extent;
- reduction in the width of some of the longwall panels in the Woodlands Hill Seam, which facilitates earlier commencement of longwall mining;
- repositioning of the upcast ventilation shaft site and associated infrastructure; and
- other minor works and ancillary infrastructure components (e.g. access road and ancillary water management infrastructure for the repositioned ventilation shaft site).

VPA (2019) completed the Landscape and Visual Impact Assessment for the Project Environmental Impact Statement (EIS). VPA has been engaged to prepare a Visual Impact Assessment for the Modification.

1.2 Visual Assessment Objectives

This assessment focusses on the potential incremental visual impacts associated with the repositioned ventilation shaft site on the existing landscape and visual amenity values of the surrounding area. This area notably includes the approved Project, other neighbouring large scale mining operations and neighbouring large scale power generation facilities.

The assessment methodology, existing environment and visual setting (including sensitivity) are described in detail in the approved EIS Landscape and Visual Impact Assessment (not reproduced in this report for brevity). Refer also to the EIS Landscape and Visual Impact Assessment (VPA 2019) for a comprehensive assessment of the approved Project in the following visual assessment sections:

- Visibility and Visual Sensitivity

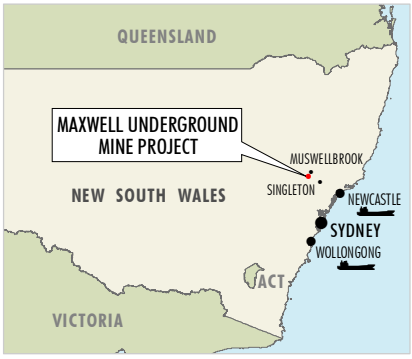
- Visual Effects
- Visual Impacts
- Cumulative Impacts
- Dynamic Impacts
- Mitigation

Three viewpoints considered to be potentially impacted by views of the Modification have been used in this assessment. Viewpoint locations are consistent with the previous assessment to evaluate any variations to visibility of the Project and associated impacts to visual amenity values.

The report also considers cumulative visual impacts in the locality, including with the approved Project.

SHA-20-04 MOD LW_Report_Visual_203A

Source: NSW Spatial Services (2022)



LEGEND

- Mining Operation
- Proposed Mining Operation
- Railway
- Local Government Boundary
- State Forest
- National Parks and Wildlife Service Estate
- Mining and Coal Lease Boundary
- Indicative Extent of Underground Development

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Regional Location

Figure 1.1

1.3 Malabar Commitments

Malabar integrated a range of visual mitigation measures into the design of the approved Project, including:

- locating the mine underground and committing that any future mining projects related to the Project would also be underground operations;
- utilising existing infrastructure at the Maxwell Infrastructure;
- positioning the MEA in a natural depression, which encloses most operational components within natural topography;
- ongoing rehabilitation at the Maxwell Infrastructure, in particular, substantive rehabilitation of the prior open cut has been undertaken with over 200 hectares of rehabilitation undertaken since Malabar acquired the tenements in 2018;
- use of compatible tones for building and cladding colours (such colours would include tonal variations of existing colours in the surrounding landscape); and
- landscaping at the MEA to create tonal variations when viewed from the air.

Consistent with the above and in accordance with condition B60 (a) and (f) of Development Consent SSD 9526, Malabar has designed and positioned the Modification components to reduce vertical profile and visibility at outside viewpoints and to blend as far as possible with the surrounding landscape.

Malabar has developed a Visual Impact Management Plan in accordance with Condition B61 of Development Consent SSD 9526, which identifies measures to "minimise the visual and off-site lighting impacts of the development":

(b) include a landscaping strategy to minimise views of the development from key vantage points in the public and/or private domain, which includes:

  i. the establishment and maintenance of tree screens to shield views of the MEA from Edderton Road to the greatest extent practicable; and
  ii. the establishment of tree screens along the eastern and/or southern boundaries of Edderton Homestead, upon request by the landowner or tenant, and subject to the agreement of both the landowner and tenant; and

(c) include a program to monitor, maintain and report on the effectiveness of visual impact mitigation measures, to the satisfaction of the Planning Secretary.

VPA (2019) included a recommendation for tree screening to be established along ridge line contours west of the MEA to mitigate views from Edderton Road. Malabar planted the screening vegetation in July 2019. In accordance with the Visual Impact Management Plan, Malabar undertakes annual monitoring of the tree screen to confirm the trees establish and become self-sustaining. This includes assessing the tree survival rate, tree height, tree width and any potential impacts from weeds, feral animals and/or grazing. The 2021 Annual Review (Malabar, 2022) describes that overall tree growth was good with several trees being recorded at a height above 2 metres (m) (aided by infill planting of approximately 520 additional trees in 2021).

The Modification would be developed in accordance with the approved Visual Impact Management Plan.

2. THE MODIFICATION

This section evaluates the various components of the Modification and defines their visual effects in terms of how these components may contrast with the existing landscapes.

2.1 Modification components

The Modification involves some limited additional surface development outside of the approved surface development area (Figure 2.1).

From a visual perspective, the major component of the Modification is the repositioning of the upcast ventilation shaft site and its associated infrastructure (Figure 2.2).

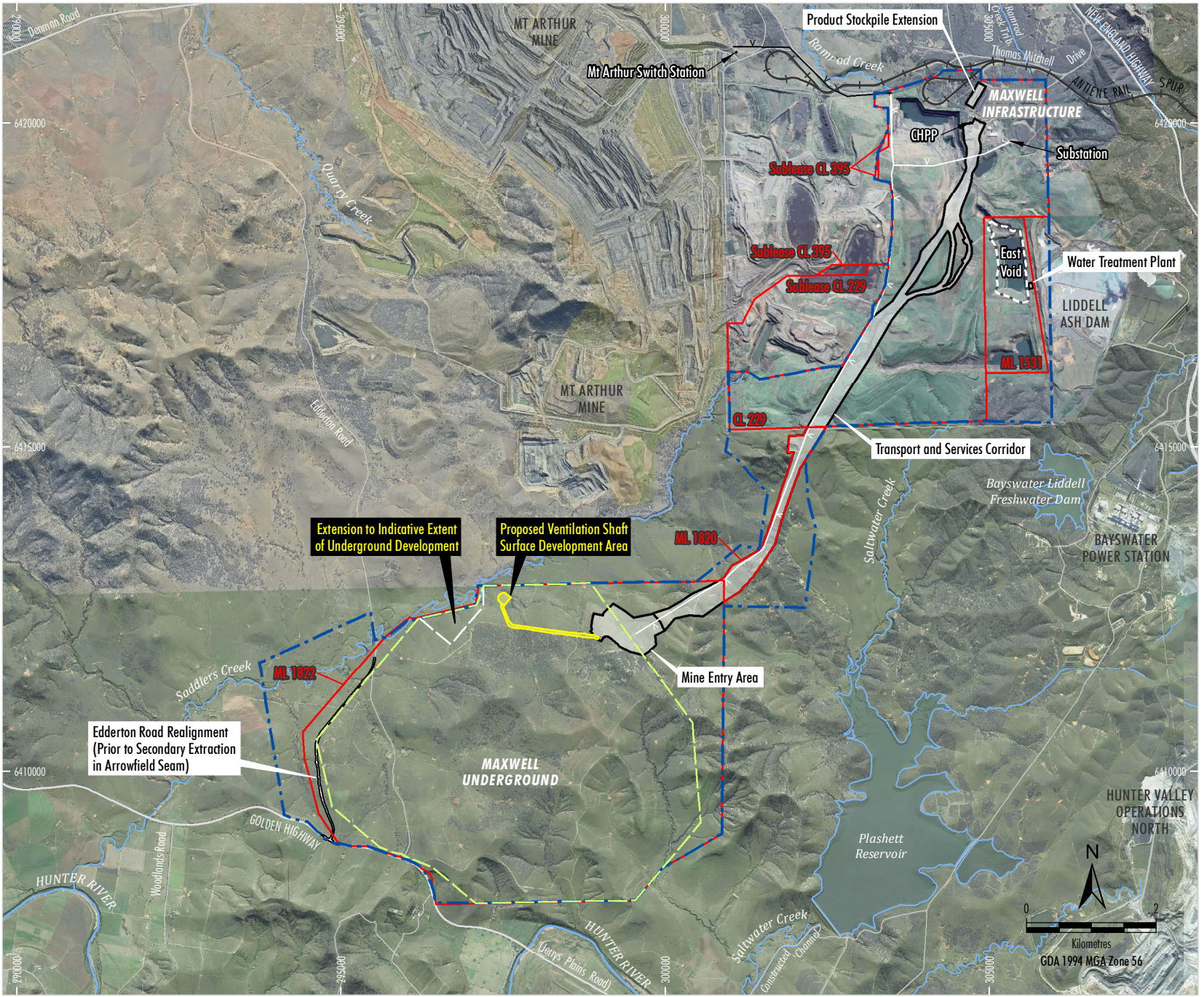
The Modification does not change the following approved Project components:

- total resource extraction and maximum annual production;
- the life of the mine;
- coal handling, processing and stockpiling, including management of reject material (i.e. stone-derived material);
- product coal transport;
- workforce; and
- hours of operation.

The Modification would provide the following benefits:

- improved mine safety due to aligning the underground mine plan more favourably with the geotechnical environment;
- improved management of subsidence impacts on Edderton Road;
- less development drivage required to achieve first longwall coal, resulting in earlier commencement of longwall production (and associated economic and community benefits);
- reduction in initial capital expenditure required to achieve steady-state production and future capital costs associated with modifications to longwall equipment;
- extraction of initial longwall panels in an area with lower gas content, which provides additional time to develop gas management strategies; and
- improved ventilation efficiency.

A description of the key visual elements of the Modification is provided in Table 2.1.



LEGEND

- Railway
- Mining and Coal Lease Boundary
- Proposed Ausgrid 66 kV Power Supply Extension #

Approved Maxwell Underground Mine

- Development Application Area
- Indicative Extent of Underground Development
- Indicative Surface Development Area
- CHPP Reject Emplacement Area
- 66 kV Power Supply

Proposed Modification

- Modified Indicative Extent of Underground Development
- Indicative Modification Surface Development Area

Subject to separate assessment and approval.

Source: NSW Spatial Services (2022); MSEC (2021)
Orthophoto Mosaic: 2020, 2019

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Modification General Arrangement

Figure 2.1

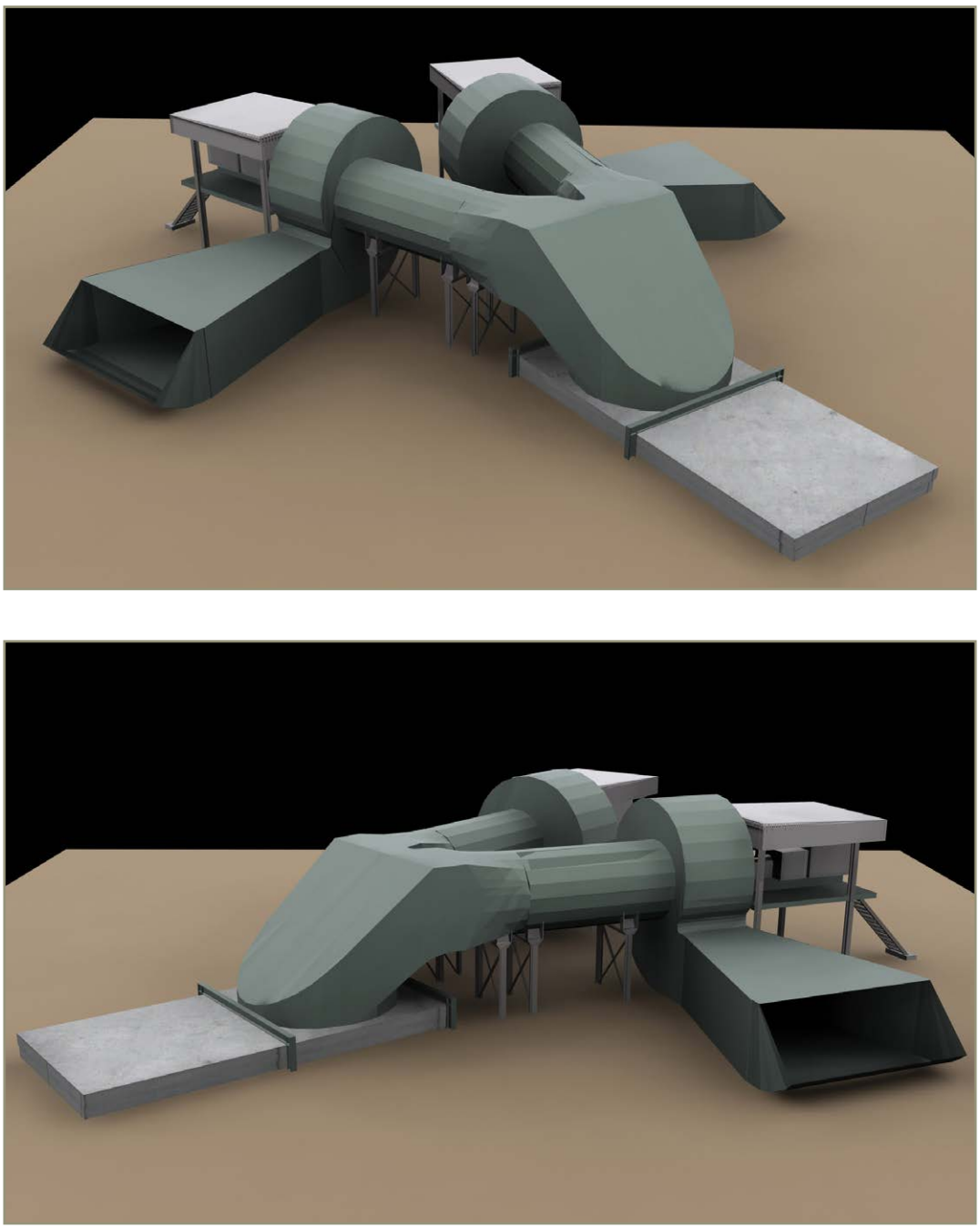


Figure 2.2 | *Indicative Modification ventilation shaft arrangement*

Oblique views of 3D modelling illustrating the general form, shape, colour, texture and visual character of ventilation shaft.

Table 2.1 Modification description

Visual Components	Mine ventilation and gas management structures and above ground linear infrastructure linking the MEA to the ventilation shaft.	
Physical Character	Assemblage of cylindrical pipes, shaft, ventilation fan ductwork, horizontal fan diffusers, work platforms and access points, and supporting framework of small-scale industrial character. Maximum height: approximately 9.5 m (determined based on avoiding visibility from thoroughbred horse studs) Maximum length/width: approximately 33.3 m. The infrastructure at the ventilation shaft surface has been purposely designed so that it would not be visible from the Godolphin Woodlands Stud nor the Coolmore Stud to the south of the Project. The shafts are aligned horizontally to minimise visible vertical components and mitigate potential noise impacts. Modest earthworks would modify the local surface to establish a construction pad. Generally, structures would be painted in neutral colours borrowed from the surrounding landscape except where safety requirements dictate otherwise. An access road from the MEA would be formed along an existing track. Electrical transmission infrastructure would be established in the same corridor as the access road. At night, lighting from work areas, mobile equipment and head lamps would potentially affect the ambient darkness that characterises the surrounding rural landscape. Lighting would be designed to minimise "spill" and is expected to be small relative to some of the existing industrial developments in the region.	
Visual effect	During construction	Operation
	Level 2 visual effect: During the initial period of the Modification construction, clearing and earthworks would create areas of colour and texture that contrast with the surrounding landscapes but are consistent with the approved Project visual effects. These works would generally be below the surrounding ridge lines that would provide screening to views from the south.	**Level 3 visual effect** Following construction, the Modification components have achieved a good level of integration due predominantly to the screening provided by surrounding ridge lines to the north, south and east. If visible, the collection of industrial buildings would establish a texture of low profile geometric shapes in contrast with surrounding landscape setting.

2.2 Visual Effect Summary

The visual effects of the repositioned ventilation shaft are typically moderate during construction reducing to low during operations. The undulating topography and the low vertical profile of ventilation fans mitigate the visual effects of this Project component. In many instances the visual components of the Modification are screened from view and would not be visible from most external view locations.

3. VISIBILITY AND VISUAL SENSITIVITY

The degree of visibility is subject to the effects of topography and vegetation. The degree of visibility would be diminished where the topographic features or vegetation are close to the viewer.

Assessed sensitive view locations (Figure 3.1):

- Elevated view locations within the thoroughbred horse studs south of the Project*
  - Coolmore Stud – Batty Hill (VP3)
  - Godolphin Woodlands Stud – Randwick Park Hill (VP4)

  *Field assessment for the approved Project (2019), defined these elevated locations as having the highest potential for views of Project infrastructure.
- Views from Edderton Road to the west of the Modification (VP11).

Areas that do not have a view of the Modification would not be directly impacted.

3.1 Significant topographic features

Several local topographic features limit the visibility of the Modification area; a series of low ridges and spurs to the east, south and south-west of the Modification that define localised view sheds.

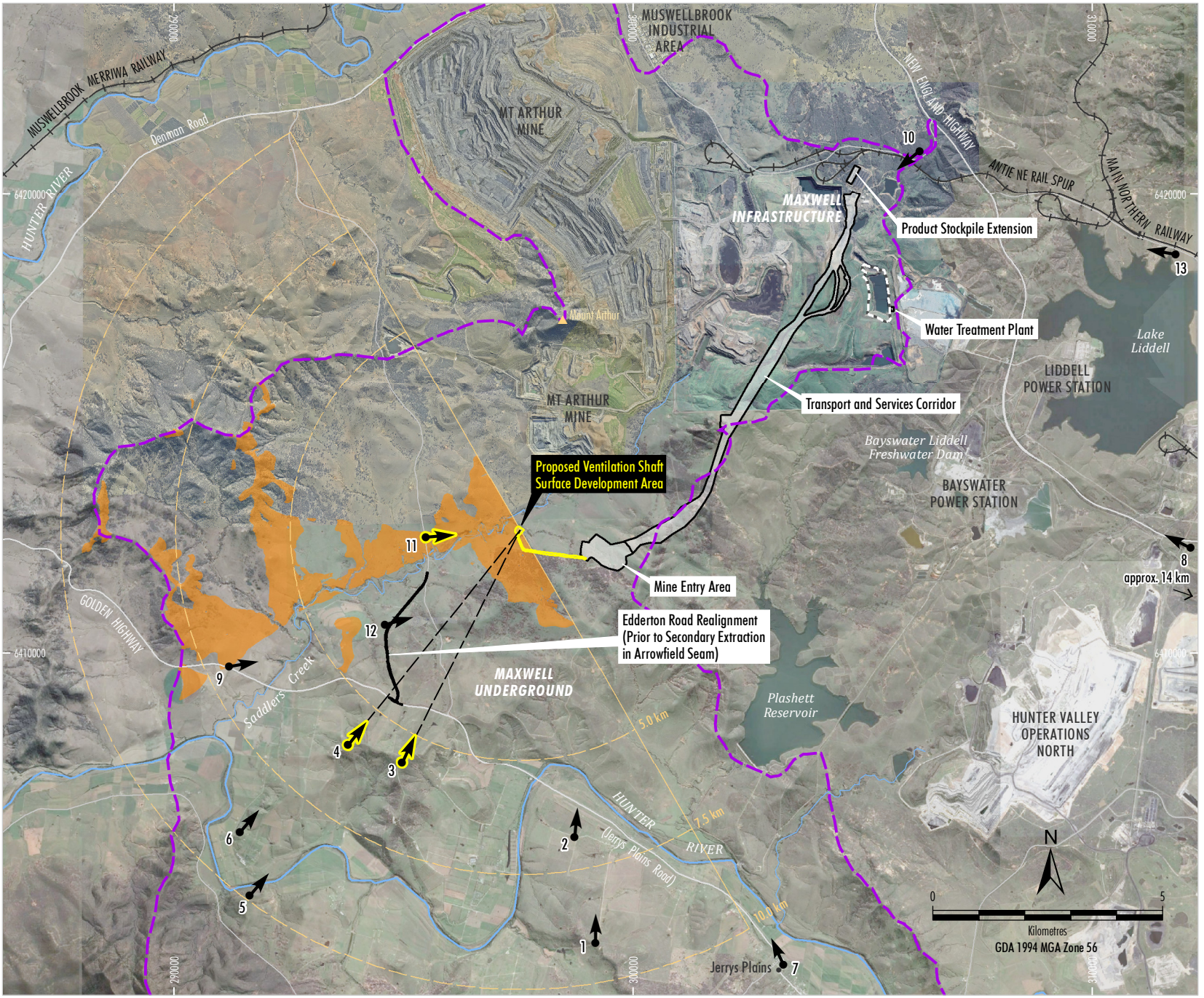
Saddlers Creek is a low area in the local view shed. Edderton Road passes to the west of the Modification, located adjacent to the creek line; there may be potential views of the repositioned ventilation infrastructure along Saddlers Creek looking east from some view angles.

3.2 Significant vegetation areas

Tree cover is important in providing potential screening of the Modification, especially when it is close to the viewing location such as along Edderton Road.

Plantings and remnant trees in rural residential areas limit views to the Modification, particularly when the vegetation is close to the viewer. Native woodland and the vegetation along the creeks and drainage lines can also provide effective screening.

As described in Section 1.3, Malabar has established a tree screen along Edderton Road to mitigate potential views of the MEA infrastructure.



LEGEND

- Railway
- Approved Project Visual Catchment
- Assessed Potential Viewing Location (EIS)
- Assessed Potential Viewing Location (Modification)
- Line of Sight Section-line
- Modification Viewshed (excluding intervening vegetation) - Area Visible from Ventilation Surface Infrastructure at 9.5 m Above Ground Level

Approved Maxwell Underground Mine

- Indicative Surface Development Area
- CHPP Reject Emplacement Area

Proposed Modification

- Indicative Modification Surface Development Area

Refer Figures 4.2 and 4.3 for Line of Sight Cross Sections.

Source: NSW Spatial Services (2022); VPA (2019)
Orthophoto Mosaic: 2020, 2019; Google Digital Globe (2017)

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Project Visual Catchment and Assessed Potential Viewing Locations

Figure 3.1

3.3 Visual sensitivity

3.3.1 *Equine industry – Coolmore Stud and Godolphin Woodlands Stud*

Both the Coolmore Stud and the Godolphin Woodlands Stud contain several sensitive receptor locations.

The operations and activities associated with thoroughbred horse breeding are considered highly sensitive to mine operations as referred to by the NSW Planning Assessment Commission (2017) due to the *'particular nature of, operations and requirements*' of them as existing land uses and potential impacts on the sustainability of the Equine Critical Industry Cluster.

Coolmore Stud

The Coolmore Stud is located to south of the Modification. The elevated parts of the estate have views to more distant locations beyond the immediate Hunter Valley landscapes. Existing mining and infrastructure activity of the neighbouring mine to the north-east can be seen from elevated positions within the Coolmore Stud property and are an integral part of the existing visual landscape.

The elevated areas within the property are associated with the Randwick Park Hill ridge system on the western end of the Coolmore Stud property. This ridge supports lower sensitivity activities such as the property quarry, however it is used on some occasions for viewing over the property to the east. On occasions, Coolmore Australia take commercial visitors to these elevated ridge viewpoints.

The highest vantage point on the Coolmore Stud property is approximately 5.7 kilometres (km) from the Modification area.

Coolmore Stud's land use sensitivity is high but would be classed as having moderate visual sensitivity due to the distance to the Modification area.

Godolphin Woodlands Stud

Lower elevations on the Godolphin Woodlands Stud property are screened from the Modification area either by intervening topography within the Godolphin Woodlands Stud property or by ridges to the north of the Golden Highway.

The ridgeline associated with Randwick Park Hill screens many of the Godolphin Woodlands Stud property views to the north but provides distant views north across the Hunter Valley. The views from these elevated locations include existing mining and power generation infrastructure.

On the converging ridge line, Randwick Park Hill is near the highest point on the property. It is approximately 5.9 km from the Modification area. There are other lookouts on the stud that give views of the property but would not provide views of Modification.

Godolphin Woodlands Stud land use sensitivity is high but would be classed as having moderate visual sensitivity due to the distance to the Modification area.

3.3.2 *Edderton Road*

Edderton Road is a local rural road linking Denman Road to the Golden Highway and is signposted with distance markers to local winery destinations to the south, so is considered part of the regional tourism experience. Edderton Road also acts as a thoroughfare between the horse studs around Jerrys Plains and other horse studs and equine services near Aberdeen and Scone to the north.

There are local views towards the Modification area from a section of Edderton Road, the view location being approximately 2.1 km west of the nearest Modification infrastructure over a low-lying area of Saddlers Creek.

Rolling topography and creek line vegetation would screen views from this road.

As a tourist route, land use sensitivity for Edderton Road is moderate. Edderton Road would have a moderate to low visual sensitivity along its length depending on the viewing distance to the Modification.

3.3.3 *Edderton Homestead*

Edderton Homestead is a residence owned by BHP with views of the Project. It is approximately 3.3 km from the MEA. The elevated position of the property and residences gives it broader, but limited views to the MEA and infrastructure within the transport and services corridor.

The existing views to the east from some areas of the property include the Bayswater Power Station and some high voltage transmission line pylons along the horizon ridgeline.

Potential impacts on Edderton Homestead have been assessed via the Edderton Road viewpoint (i.e. potential impacts from the Edderton Road viewpoint are considered representative of impacts on the Edderton Homestead, albeit the elevated position of the homestead may increase visibility of the Modification infrastructure).

A visual sensitivity summary for the Modification is provided in Table 3.1.

Table 3.1 Visual sensitivity summary

Receptor	Sensitivity of Land Use	Distance	Visual sensitivity
Coolmore Stud	High	5.7 km	Moderate
Godolphin Woodlands Stud	High	5.9 km	Moderate
Edderton Road	Moderate	2.1 km	Moderate

4. VISUAL EFFECT OF THE MODIFICATION

4.1 General

The visual effects of the Modification have been assessed from specific viewpoints to determine any incremental change in visual contrast or reduction of visual integration from the approved Project. This is measured in the incremental change to the extent of any primary view that is occupied by Modification components. These viewpoints were analysed using either visualisations and/or line of sight cross-sections.

4.2 View locations for Modification visual effect analysis

The representative viewing locations used in this assessment are shown in Figure 3.1.

Viewshed analysis shown on Figure 4.1 indicates areas where the Modification may be visible. However, this viewshed analysis does not consider intervening topography and therefore more detailed assessment from key potential viewpoints has been undertaken (as described below).

4.2.1 *Elevated view points on horse studs south of the Golden Highway*

Potentially sensitive locations in the horse studs to the south were reviewed to determine whether Modification infrastructure would be visible. Line of sight cross-sections were prepared for the following viewpoints:

- Coolmore Stud – Highest Vantage Point
- Godolphin Woodlands Stud – Highest Vantage Point

4.2.2 *Edderton Road*

The viewpoint location on Edderton Road that was assessed in VPA (2019) was selected to illustrate the potential visibility of the Modification from this nearest publicly accessible location.

4.3 Modification visual effect analysis

VP 3 – Coolmore Stud – Highest Vantage Point

VP 3 is the highest vantage point at the Coolmore Stud providing visitors expansive views, extending beyond the local ridgelines to include views to Mt Arthur Mine to the north.

The line of sight cross section (Figure 4.2) identifies that views of the Modification from Coolmore Stud (at the highest vantage point) would be obstructed by an intervening ridgeline approximately 4.5 km from the view location with a minimum clearance of approximately 26.8 m between top of ridge and the line of sight to the highest point of the ventilation infrastructure.

Accordingly, the Modification would have no incremental visual impact on the Coolmore Stud (Table 4.1).

Table 4.1 VP 3 Visual effect

Distance from nearest Modification component	5.7 km
Area of Primary View Zone occupied by the Modification	Nil (not visible)
Visual effect:	Nil (not visible)

VP 4 – Godolphin Woodlands Stud – converging ridgelines

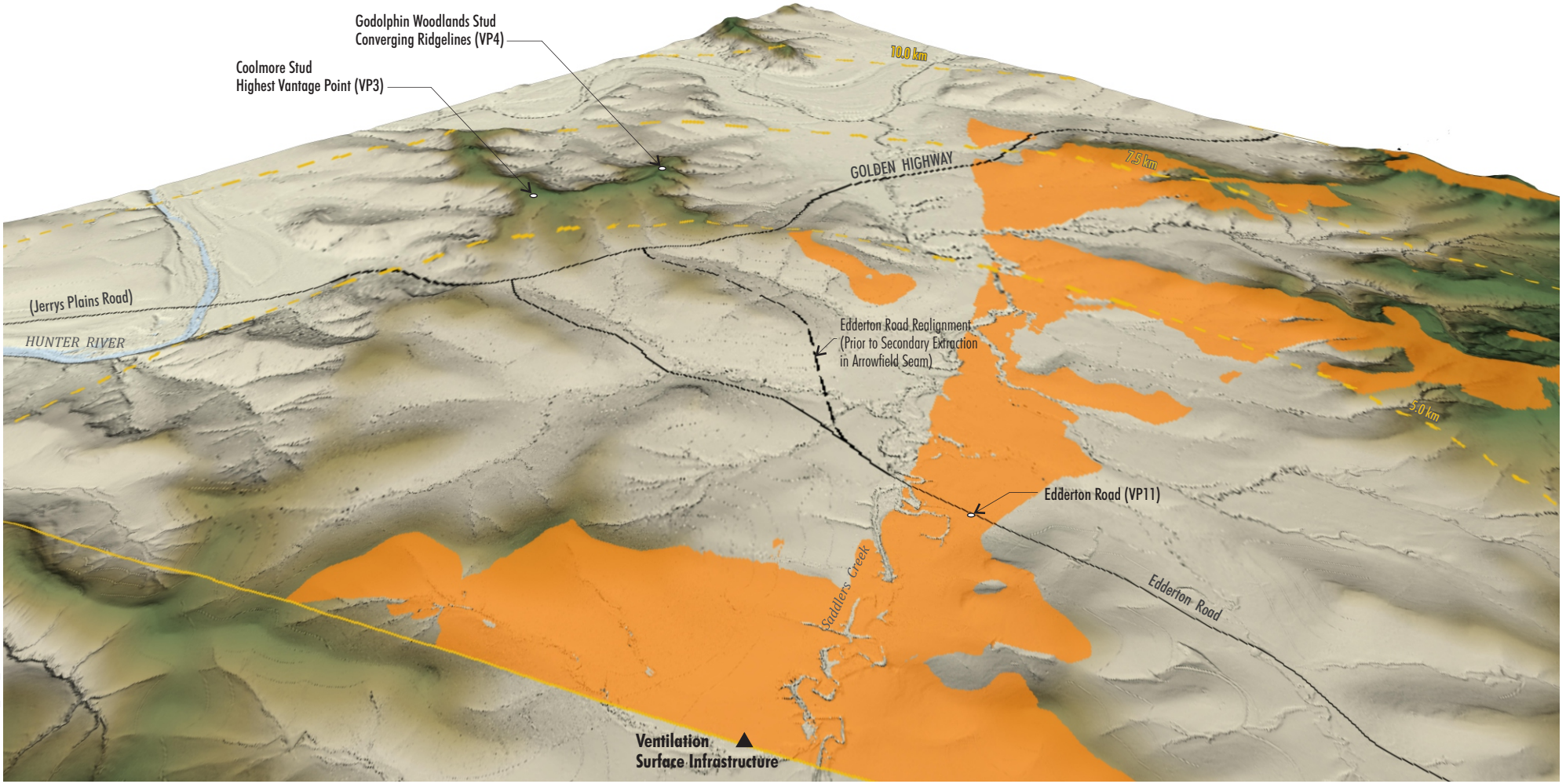
VP 4 is the highest vantage point at the Godolphin Woodlands Stud adjacent to the local trig survey marker. Locally, it has been known as Randwick Park Hill. Like Coolmore, visitors to Godolphin are taken to this location to experience the expansive views which extend beyond the local ridgelines to include views to Mt Arthur Mine to the north.

The line of sight cross section (Figure 4.3) identifies that views of the Modification from Godolphin Woodlands Stud would be obstructed by an intervening ridgeline approximately 4.9 km from the view location with a minimum clearance of 7.1 m between top of ridge and the line of sight to the highest point of the ventilation infrastructure.

Accordingly, the Modification would have no incremental visual impact on the Godolphin Woodlands Stud (Table 4.2).

Table 4.2 VP 4 Visual effect

Distance from nearest Modification component	5.9 km
Area of Primary View Zone occupied by the Modification	Nil (not visible)
Visual effect:	Nil (not visible)



SHM-20-04 LW MOD_Visual_002A

Source: NSW Spatial Services (2022)

LEGEND

Area Visible from Ventilation Surface Infrastructure at Nominally 9.5 m Above Ground Level

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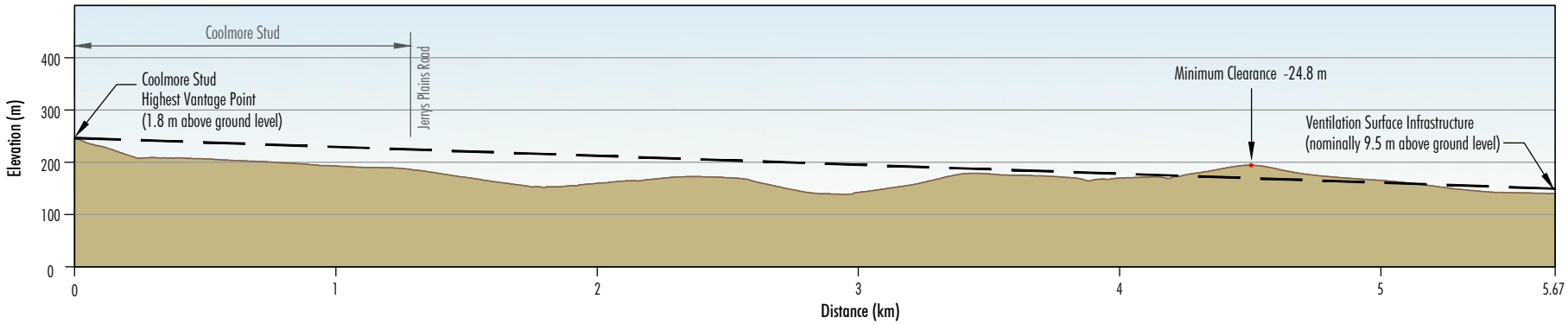
Oblique View of Ventilation Surface Infrastructure Viewshed

Figure 4.1

View Point 3 - Coolmore Stud E 150° 52' 32.5" / S 32° 24' 45.2"



Line of Sight Cross Section

Scale 1 Horiz : 2 Vertical

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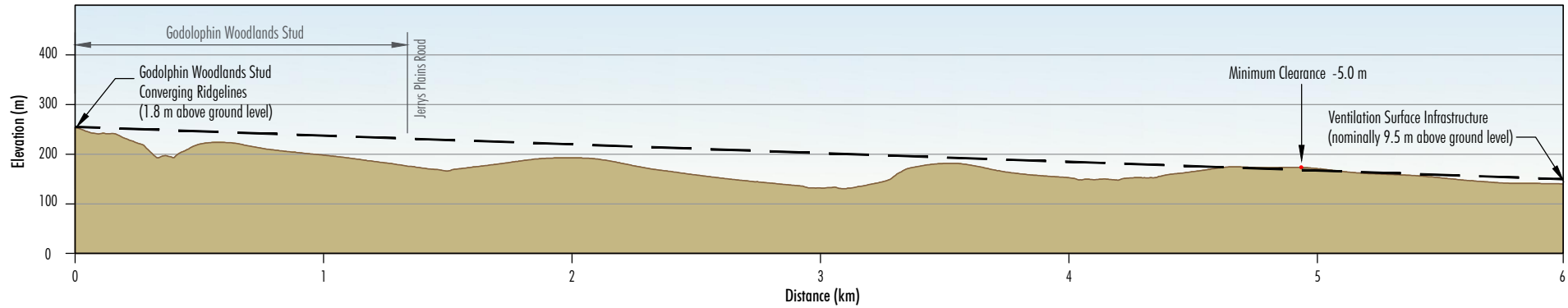
View Point 3 - Coolmore Stud - Highest Vantage Point
Line of Sight Cross Section to Modification

Figure 4.2

View Point 4 - Godolphin Woodlands Stud E 150° 48' 32.80" / S 32° 26' 45.13"



Line of Sight Cross Section

Scale 1 Horiz : 2 Vertical

LEGEND
Line of Sight
Line of Sight Obstruction Point
Natural Surface

Source: LiDAR (2019), ELVIS 2 m DEM (2017)

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View Point 4 - Godolphin Woodlands Stud - Converging Ridgelines
Line of Sight Cross Section to Modification

Figure 4.3

VP 11 – Edderton Road

The view from this location includes broad acre rural lands with patches of open woodland (refer Figure 4.4).

The photomontage (Figure 4.4) shows the location of the Modification components in the absence of existing screening vegetation. When the existing screening vegetation is taken into account, the Modification is not visible from this location.

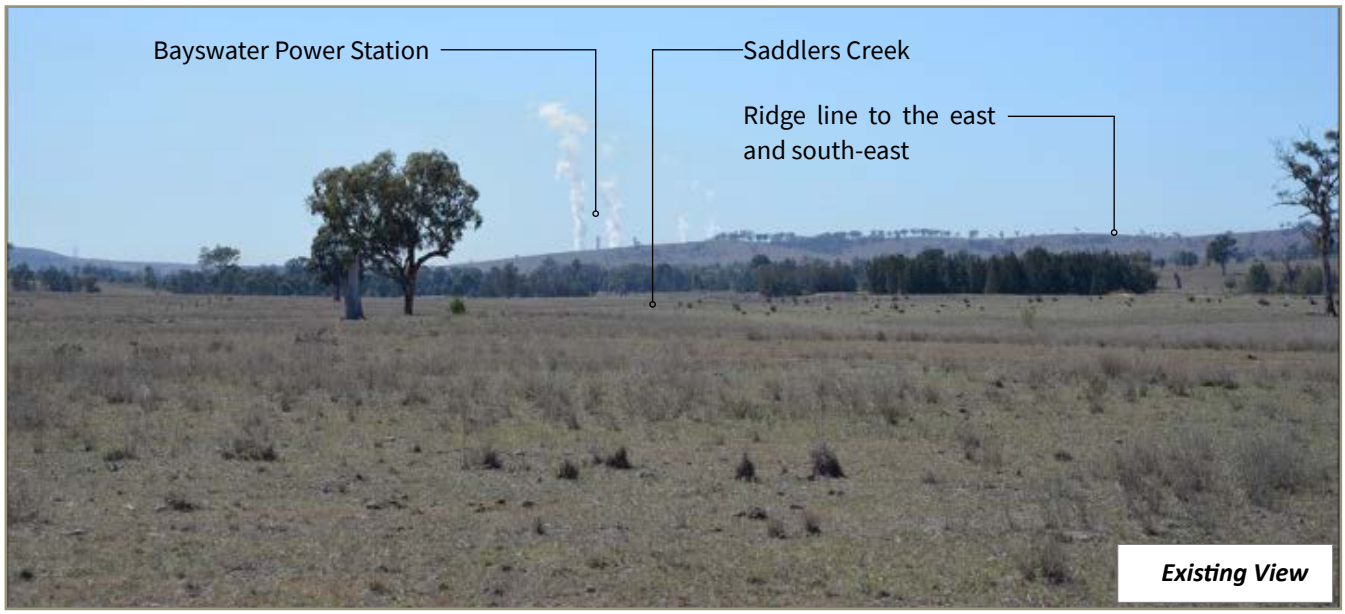
Some of the approved Project components and the stacks and steam from Bayswater Power Station and a high voltage power pylon can be seen in the background of this existing view.

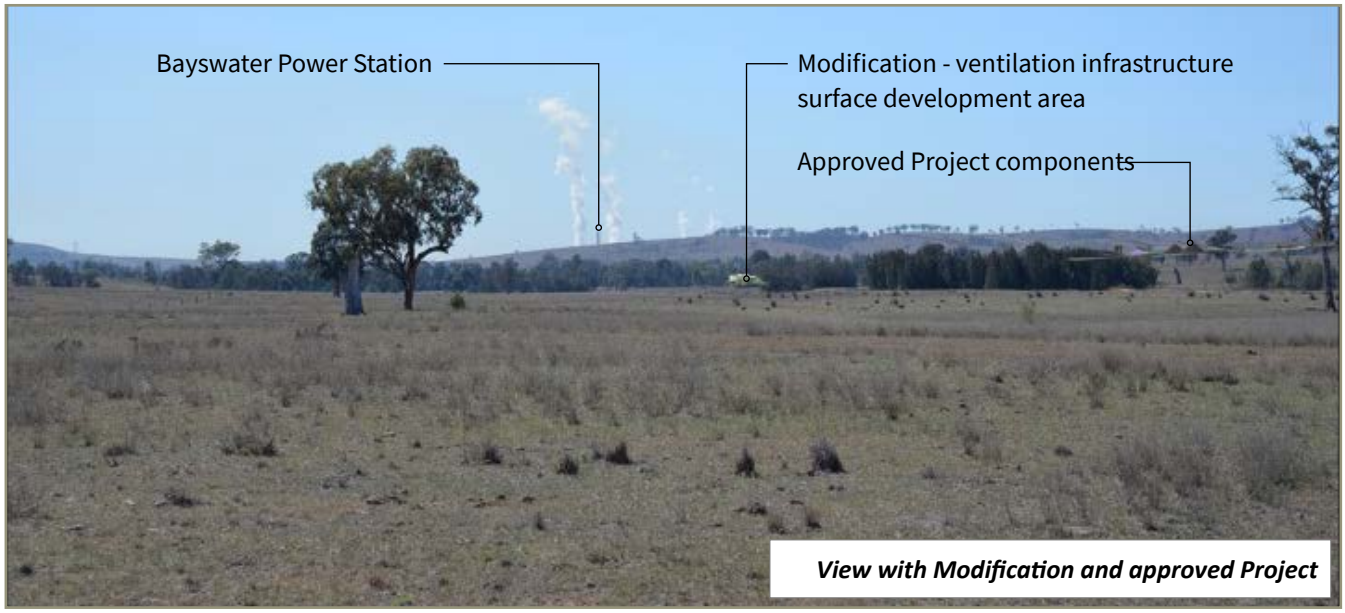
The visual effects of the Modification on the Edderton Road viewpoint are summarised in Table 4.3.

Table 4.3 VP 11 Visual effect

Distance from nearest visible Modification component	2.1 km
Area of Primary View Zone occupied by the Modification	> 2.0% but screened by intervening vegetation
Visual effect: • During construction • During operations	 Level 2 - Low Level 3 - Low

View Point 11 - Edderton Road | E 150° 49'31.35"/ S 32° 24'20.52





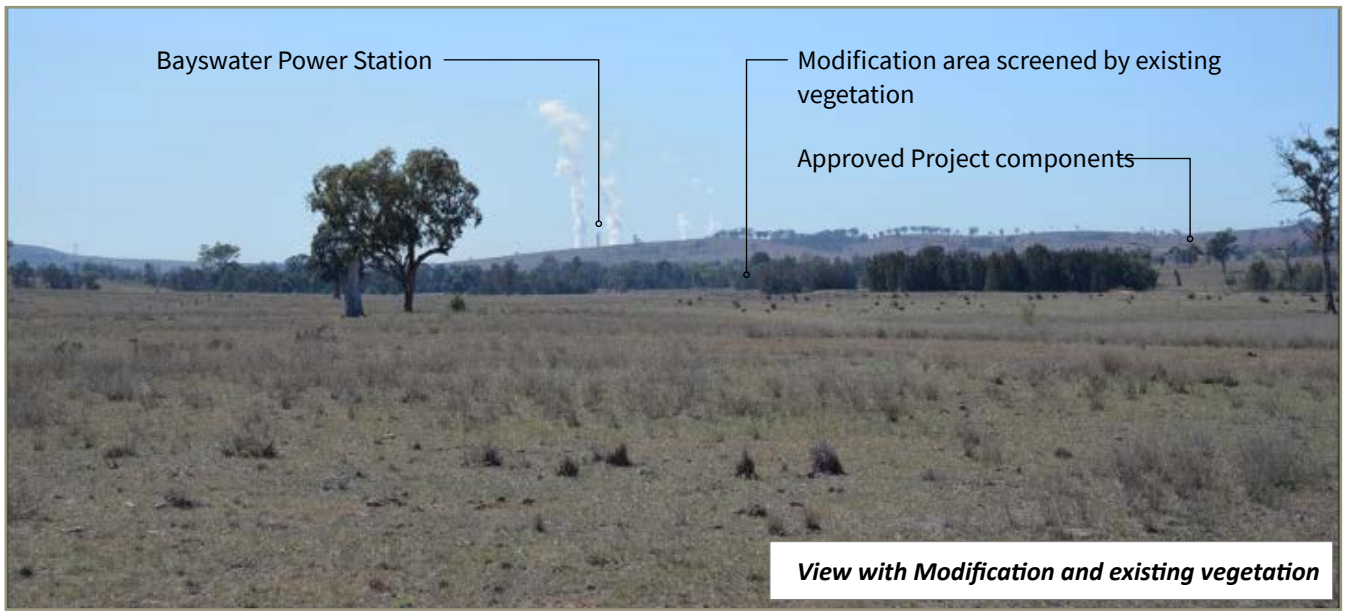


Figure 4.4 | *VP11 - Edderton Road - Photomontage*

5. VISUAL IMPACT

5.1 Modification Visual impacts

5.1.1 *Direct Visual Impacts*

There would be no views of the Modification from the Coolmore Stud and Godolphin Woodlands Stud properties.

Existing vegetation would screen views of the Modification components from a low-lying section of Edderton Road near Saddlers Creek. Accordingly, visual impacts to Edderton Road are considered low.

5.1.2 *Direct Light Effects and Impacts*

Most of the lighting associated with Modification is typically associated with necessary safety and operational lighting around the ventilation pad. However, due to the location of the Modification, most of the direct lighting would be screened to sensitive receptors by local topography and existing vegetation.

The screened, intermittent and isolated direct lighting would not be significantly greater than the approved lighting impacts in the context of the surrounding mining operations and power stations.

5.1.3 *Diffuse Light Effects and Impacts*

Several mining operations and power stations in the vicinity of the Modification already contribute to diffuse light effects into the night sky (sky glow). The Modification will spread the localised lighting effects of the approved Project but will not significantly increase the level of diffuse lighting.

5.2 Cumulative impacts

The existing mining and power generation operations in the vicinity of the Maxwell Underground (i.e. Mt Arthur Mine, existing Maxwell Infrastructure, Hunter Valley Operations, Bayswater Power Station and Liddell Power Station) would remain visually dominant, in comparison to the surface infrastructure required for the Project (as modified).

As the visual impacts of the Modification are considered low to none, there would be negligible increase in cumulative visual impacts from the Project (as modified).

5.3 Viewpoint visual impact summary

A summary of the visual impacts of the assessed viewpoints is provided in Table 5.1.

Table 5.1 **Visual impact summary**

Receptor	Land Use Sensitivity	Visual Sensitivity	Approved Visual Impact	Modification Incremental change
Coolmore Stud	High	High to Moderate	No impact to majority of the property. Low at highest vantage point.	No visibility No change
Godolphin Woodlands Stud	High	High to Moderate	No impact to majority of the property. Low at highest vantage point.	No visibility No change
Edderton Road	Moderate	Moderate	Low	Low – No change

6. MITIGATION

There are numerous visual mitigation measures pro-actively incorporated into the design of the Modification. These include:

- locating the ventilation shaft and associated surface infrastructure in a natural depression which encloses most operational components within natural topography and associated remnant vegetation;
- reducing the vertical profile of the ventilation infrastructure;
- use of compatible tones for building and cladding colours (such colours would include tonal variations of existing colours in the surrounding landscape).

The mitigation measures outlined in the approved Visual Impact Management Plan should continue to be implemented for the Modification (including the ongoing monitoring and maintenance of the existing tree screen).

7. REFERENCES

Landscape Institute and Institute of Environmental Management & Assessment (2013)	Guidelines for Landscape and Visual Impact Assessment 3rd Edition
Malabar (2022)	Visual Impact Management Plan https://malabarresources.com.au/images/docs/2020/220210_Maxwell_UG_Project_-_Visual_Impact_Management_Plan_FINAL.pdf
Malabar Coal (2018)	Maxwell Project Scoping Report - In support of a request for Secretary's Environmental Assessment Requirements (August 2018)
NSW Planning Assessment Commission (2017)	Final Assessment Report – Drayton South Coal Project (SSD 6875).
VPA (2019)	Maxwell Project - Landscape and Visual Impact Assessment