



Appendix O

Visual impact assessment

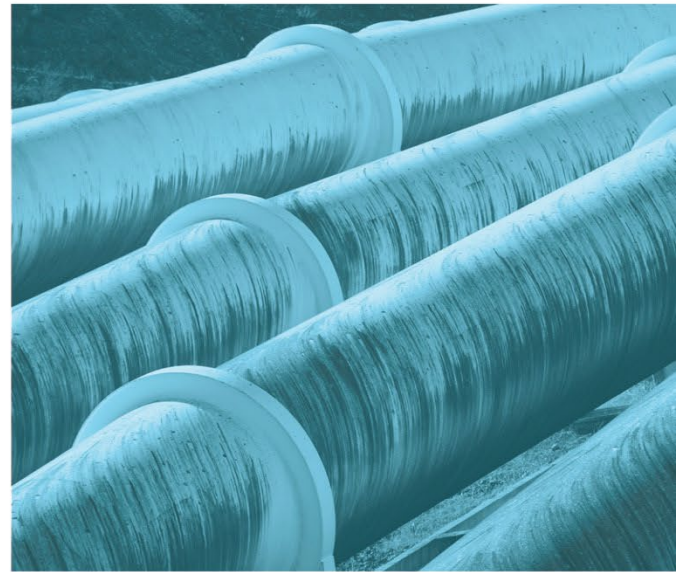




Balranald Mineral Sands Project - Modification of Consent (SSD-5285)

Visual impact assessment

Prepared for Iluka Resources Limited
April 2022





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Visual impact assessment

Report Number

S200529

Client

Iluka Resources Limited

Date

29 April 2022

Version

v3 Final

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1 Introduction

EMM was commissioned by Iluka Resources Limited (Iluka) to undertake a Visual Impact Assessment (VIA) of the proposed modification (MOD1) to the approved Balranald Mineral Sands Project (the Balranald Project) in south-western New South Wales (NSW).

The purpose of this VIA is to provide a comparison of predicted environmental impacts of the proposed modification against the predicted impacts of the approved project as follows:

- 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;
- the temporary and permanent modification of the landscape; and
- minimising the lighting impacts of the development.

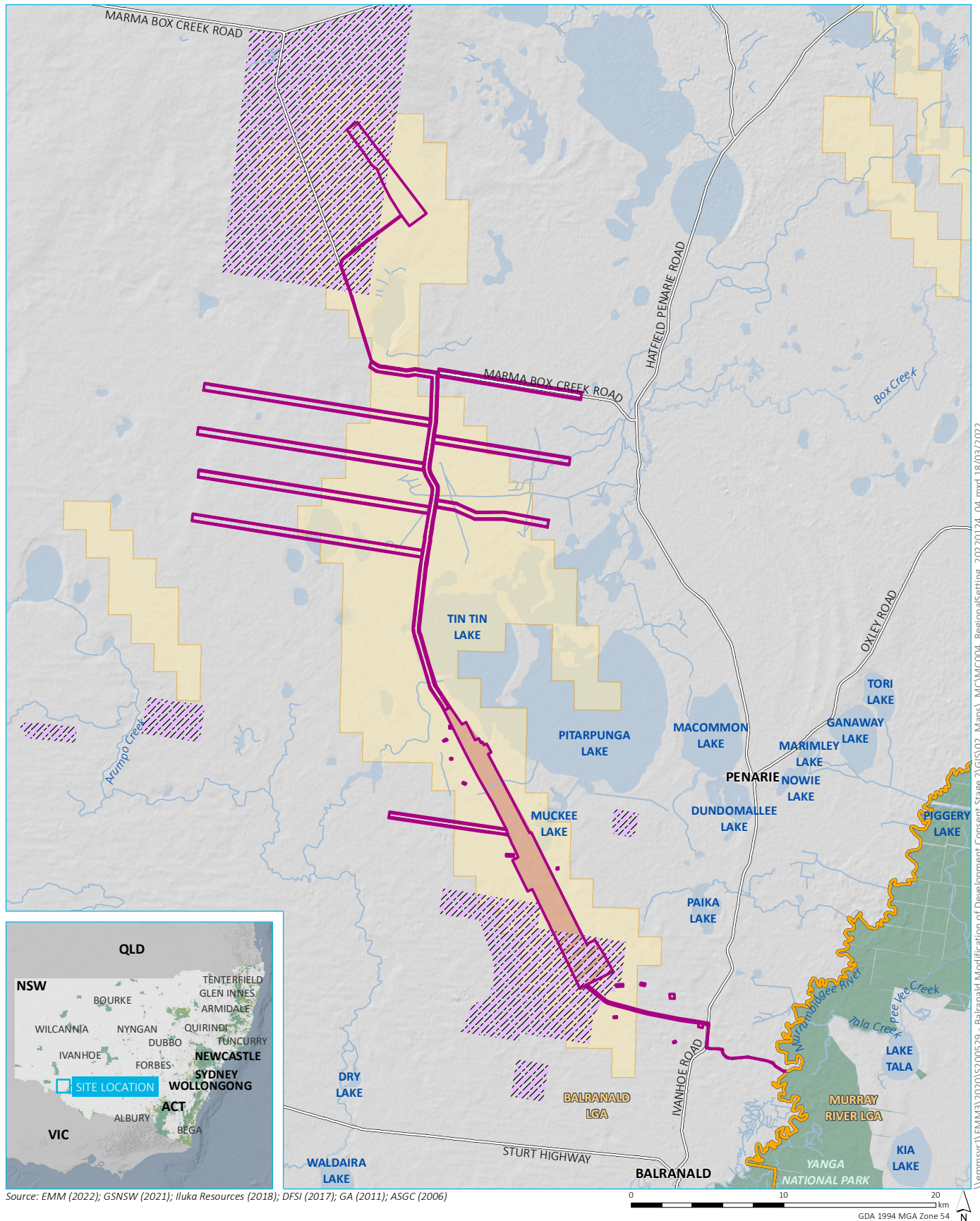
This report will support a modification report which will be submitted to the NSW Department of Planning and Environment (DPE) under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

1.1 Background

Iluka has approval to develop a mineral sands mine in south-western New South Wales (NSW), known as the Balranald Mineral Sands Mine (the Project). The Project includes construction, mining, primary processing and rehabilitation of two linear mineral sand deposits, known as the West Balranald and Nepean deposits, located approximately 12 kilometres (km) and 66 km north-west of the town of Balranald (Balranald town), respectively.

An environmental impact statement (EIS) was prepared and submitted in 2015 to accompany a State significant development (SSD-5285) application under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) for an open cut, truck and shovel mining method. Development consent under Part 4 of the EP&A Act was granted on 5 April 2016.

The Project included undertaking a bulk sampling activity (the activity) at the West Balranald deposit to test the removal of ore using underground mining methods.



KEY

- EIS Approved Balranald Project Area (SSD-5285)
- Exploration Licence (EL7450)
- Mining Lease (ML1736)
- Southern Mallee Conservation Area (2015)
- Major road
- Watercourse/drainage line
- Waterbody
- NPWS reserve

Local government area

INSET KEY

- NPWS reserve
- State forest

Regional setting and EIS approved Balranald project area (SSD-5285)

Balranald Mineral Sands Project
Visual impact assessment
Figure 1.1

1.2 Description of modification

The proposed MOD1 would involve:

- continuing underground mining within a portion of the approved disturbance footprint of the West Balranald deposit pursuant to the consent (ie mining area); and
- development of approved mineral processing infrastructure within a proposed new area of disturbance (ie surface infrastructure).

The construction of infrastructure would be undertaken to support the construction and operation for proposed underground mining, including mineral processing infrastructure, access roads, upgrade of external roads and intersections, gravel extraction, monitoring infrastructure, accommodation facility, road transport of ore offsite for downstream processing and other infrastructure as required.

The majority of this infrastructure would be required regardless of the mining method (ie open cut as approved under the development consent, or underground). For all other land located outside of the proposed modification area, ie other areas of the West Balranald mine and the Nepean mine, Iluka proposes no change to the currently approved open cut mining method at this stage.

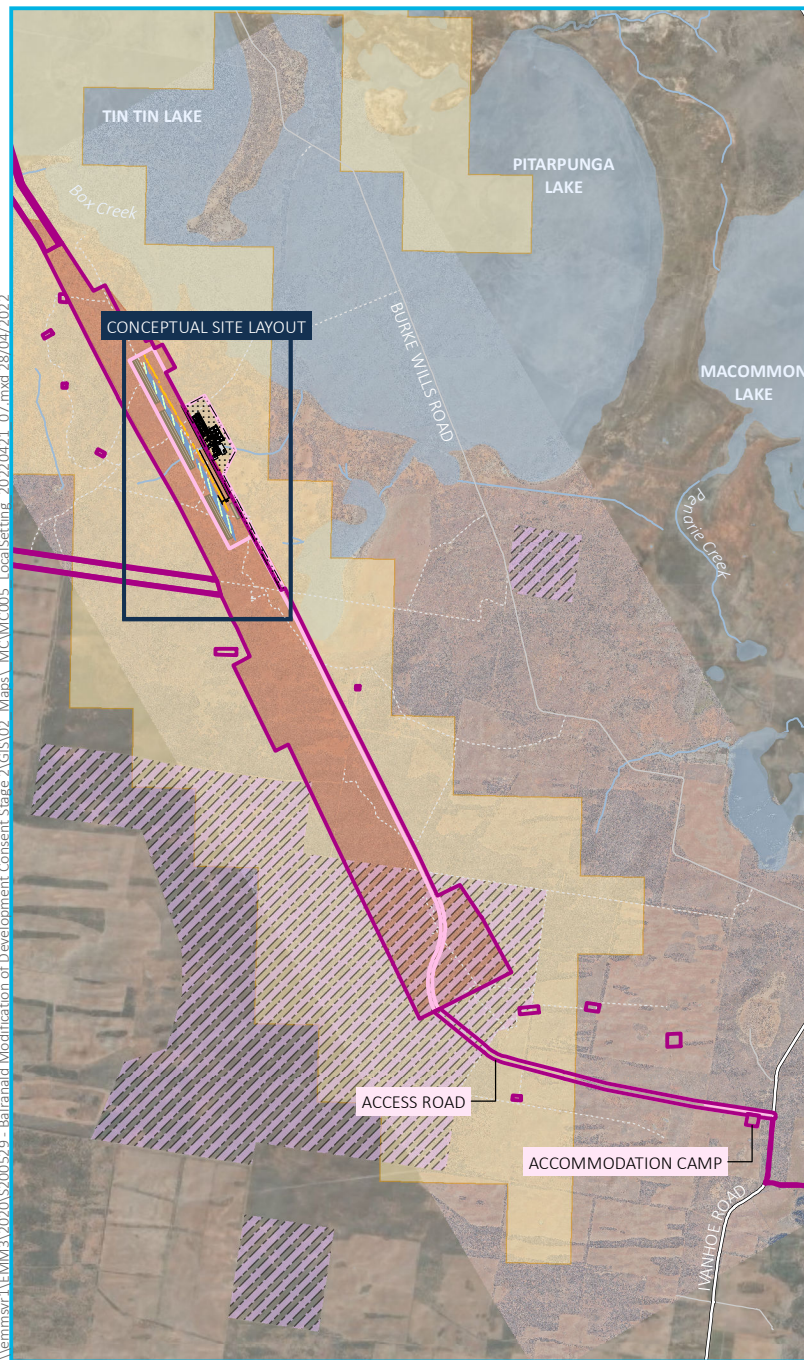
The underground mining process would involve:

- clearing the footprint directly above the mining area – the area will be stripped of topsoil, subsoil and non-saline overburden to a nominal depth of 2 metres (m);
- surface placement of treated sand tails and overburden/subsoil ahead of mining into the space created by the above stripping;
- underground mining of the ore;
- processing of the mined ore to separate the heavy mineral concentrate (HMC) from sand tails, sand fines and oversize;
- stockpiling of the HMC;
- backfilling of sand fines underground;
- replacement of subsoil and topsoil for rehabilitation and final landform; and
- environmental monitoring activities (including groundwater, geochemistry, subsidence, air quality and noise).

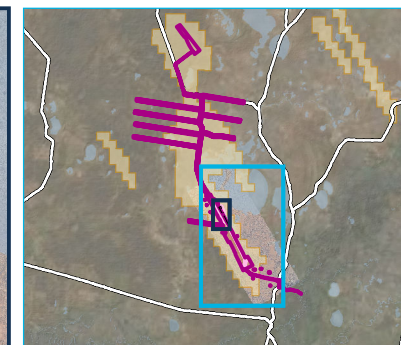
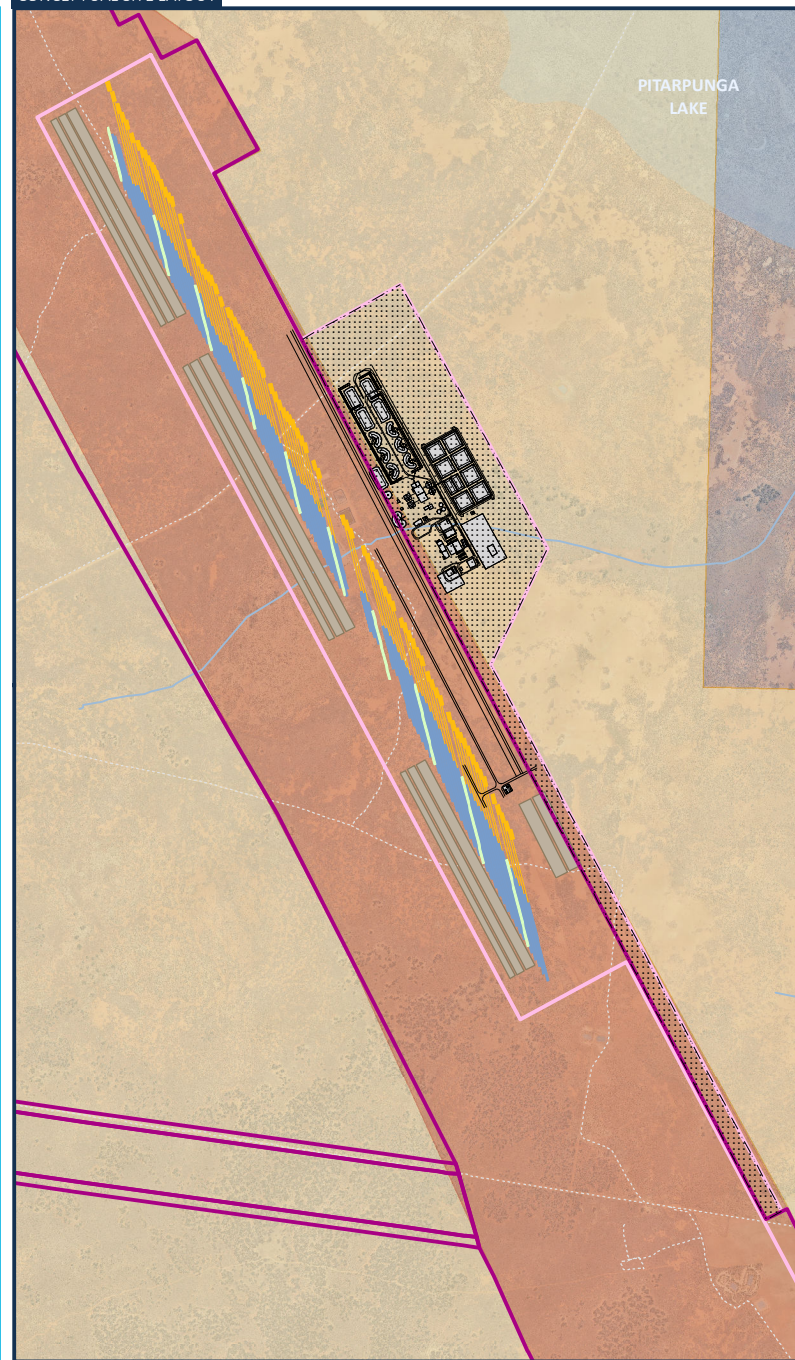
Ore is expected to be produced and processed at a rate no greater than approved under the development consent. The processing plant on site will produce a HMC to generate two primary product streams; magnetic HMC and non-magnetic HMC.

The product would be stockpiled and transported off-site for downstream processing with underground mining operations to be undertaken for a period of 6 years.

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CONCEPTUAL SITE LAYOUT



KEY

- EIS Approved Balranald Project Area (SSD-5285)
- Proposed modification study area
- Proposed modification extension to Balranald Project Area boundary
- Processing area infrastructure
- Subsoil stockpile
- Drill pad and string to underground stope
- Underground stope
- Underground pillar
- Major road
- Minor road
- Existing track
- Watercourse/drainage line
- Waterbody
- Southern Mallee Conservation Area (2015)
- Exploration Licence (EL7450)
- Mining Lease (ML1736)

Proposed modification study area and conceptual site layout

Balranald Mineral Sands Project
Visual impact assessment
Figure 1.2

2 Existing environment

2.1 Existing environment description

The landscape of the MOD1 project area is generally flat. There are regional areas surrounding the project area with high scenic view quality, including areas with natural features such as the Yanga National Park and the Murrumbidgee River which are located about 20 km south-east of the proposed disturbance footprint.

Visual features in the project area include mallee dunes in the south of the West Balranald deposit and relatively flat areas comprising dry relic lake beds to the north where the proposed MOD1 processing infrastructure is proposed to be established.

Land uses in the immediate vicinity of the MOD1 project area are primarily agricultural and include sheep and cattle grazing on saltbush plains and broadacre grain crops. Other land uses which are located to the south of the project area are tourist accommodation (at Paika Station), the Southern Mallee Conservation Area, gypsum mining, and charcoal production (using cleared mallee scrub). These land uses are interspersed with areas of native vegetation which consist primarily of mallee.

The only township or settlement in proximity to the proposed MOD1 project area is Balranald which is located about 12 km south-east of the proposed accommodation facility.

As previously stated, three bulk sampling activities have been undertaken within the proposed MOD1 project disturbance footprint since the EIS was approved with development comprising mining infrastructure, ore pads, water storage dams and establishment of soil stockpiles.

3 Summary of the 2015 VIA

The 2015 VIA (EMM 2015a) examined predicted visual impacts of the approved Balranald Project (SSD-5285) as summarised below.

3.1 Approved activities

Current site approvals for development at the site include:

- open cut mining areas (ie pit/mine void) to extract the ore;
- soil and overburden stockpiles;
- ore stockpiles and mining unit plant (MUP) locations;
- a processing area, including a mineral processing plant, tailings storage facility (TSF), maintenance areas and workshops, product stockpiles, truck load-out area, administration offices and amenities;
- groundwater management infrastructure, including dewatering, injection and monitoring bores and associated pumps and pipelines;
- surface water management infrastructure;
- services and utilities infrastructure (eg electricity infrastructure);
- haul roads for heavy machinery and service roads for light vehicles;
- accommodation facility; and
- other ancillary equipment and infrastructure.

3.2 Predicted impacts

EMM conducted an assessment of potential visual impacts of the Balranald Project which considered potential visual impacts associated with:

- temporary changes to the landscape as a result of vegetation removal, overburden stockpiling, landform modification, modification to natural drainage patterns and the placement of artificial elements into the landscape (ie buildings or structures); and
- permanent changes to the landscape as a result of the development of the final landforms that would remain post mining, including removal of mallee vegetation and a final void.

The VIA considered potential visual impacts of the project on surrounding sensitive receivers, including Balranald town, rural residences, conservation areas (Willandra Lakes Region World Heritage Site, Mungo National Park and Yanga National Park) and road users.

The 2015 EIS assessed eight representative viewpoints (ie assessment locations) surrounding both the West Balranald and Nepean sites. The VIA utilised a viewshed analysis using Geographic Information System (GIS) to calculate the visibility of features in the Balranald Project for three conceptual mine layout plans, year 1, year 4 and year 8, at any point in surrounding the project area.

Visual and lighting impacts were considered to be negligible to low based on the distances between viewpoints and mining operations, and screening provided by existing vegetation.

An assessment of two proposed steel lattice telecommunication towers proposed as part of the Balranald Project was also undertaken based on the results of a study determining visibility distance of towers in the United States. The VIA concluded that the telecommunications towers at the West Balranald and Nepean mines would not be visible from any sensitive receptors.

3.3 Approved mitigation measures

The approved mitigation measures outlined in the EIS were based on the prediction that the visual impacts were predominantly negligible to low, largely due to the visual absorption capacity (VAC) of the existing landscape, the distance from which the visible elements would be observed, and the presence of existing vegetation that would provide screening and partial obstruction of views from observer locations. Lighting from plant and equipment on overburden stockpiles and at the processing plant were identified to be visible at night from some viewpoints which could result in moderate impacts.

The mitigation measures included in the EIS included:

- installing directional light fittings in the processing area to minimise light spill;
- usage of low wattage lighting;
- limiting placement of lighting at the top of overburden stockpiles (at night), where safe and practical, to provide screening and limit light spill on top of overburden stockpiles; and
- progressive rehabilitation of disturbed areas to minimise the extent of, and views to, the most visually obtrusive elements in the project area.

3.4 Existing SSD-5285 conditions of consent

Condition 28 of the 2015 EIS approval provided the following conditions of consent in relation to addressing the visual impact of the proposed West Balranald mine site on the surrounding landscape and receptors:

- a) implement all reasonable and feasible measures to minimise the visual and off-site lighting impacts of the development;
- b) ensure that all external lighting associated with the development complies with Australian Standard AS4282 (INT) 1995 - *Control of Obtrusive Effects of Outdoor Lighting*; and
- c) take all practical measures to shield views of mining operations from users of public roads and privately-owned residences.

4 Proposed modification

The following sections provide a comparison of the potential visual impacts related to the proposed MOD1 against the predicted impacts of the approved Balranald Project.

4.1 Assessment methodology

An updated viewshed analysis was developed for MOD1 using spatial analysis in GIS for comparison against the viewshed analysis developed for the approved EIS.

In accordance with the original EIS, visual impacts were considered in terms of the view type/context and the VAC of a view. VAC is a measure of the landscapes ability to absorb development without a significant change in the character and is measured as either low, moderate or high.

A high VAC would represent a modification/addition to the landscape area which would result in high visual contrast and a low level of visual integration with the surrounding landscape. A low VAC would represent a modification/addition to the landscape area which would result in minimal visual contrast and a high level of visual integration with the surrounding landscape.

The updated comparative viewshed analysis compared the MOD1 layout against the analysis undertaken for the EIS and identified areas of change between what has been approved and what is proposed for modification. Using a digital elevation model (DEM) within the area of interest, along with other parameters such as the curvature of the earth and the height of the built structure or object, it is possible to predict whether the structure or object has a line of sight with sensitive receptors.

Viewpoints identified from the 2015 EIS were used to provide comparative assessment of the approved project site layout against the proposed MOD1 site layout.

4.2 Proposed activities

As previously stated, the proposed MOD1 would involve continuing underground mining trial wholly within a portion of the approved disturbance footprint of the West Balranald mine pursuant to the development consent (SSD-5285) and development of mineral processing infrastructure and a portion of the access road within a proposed new area of disturbance under Part 4 of the EP&A Act.

The construction of infrastructure would be undertaken to support the construction and operation for proposed underground mining, including mineral processing infrastructure, access roads, upgrade of external roads and intersections, gravel extraction, monitoring infrastructure, accommodation facility, road transport of ore off-site for downstream processing and other infrastructure as required.

4.3 Predicted impacts

The VIA to support the proposed MOD1 assessed six representative viewpoints (ie assessment locations, excluding the Nepean site to the north) surrounding the West Balranald site (Figure 4.1). The visual assessment utilised the 2015 EIS viewshed analysis using GIS to calculate the visibility of the proposed MOD1 surface infrastructure features at any point in surrounding the project area.

The proposed MOD1 underground mining requires significantly less land disturbance, processing plant infrastructure and soil stockpiles than the project area approved under the EIS, while the accommodation facility is proposed to be sited within the approved EIS boundary location.

No additional impacts to the surrounding rural homesteads were identified with limited plant and equipment lighting on overburden stockpiles potentially able to be viewed on the horizon.

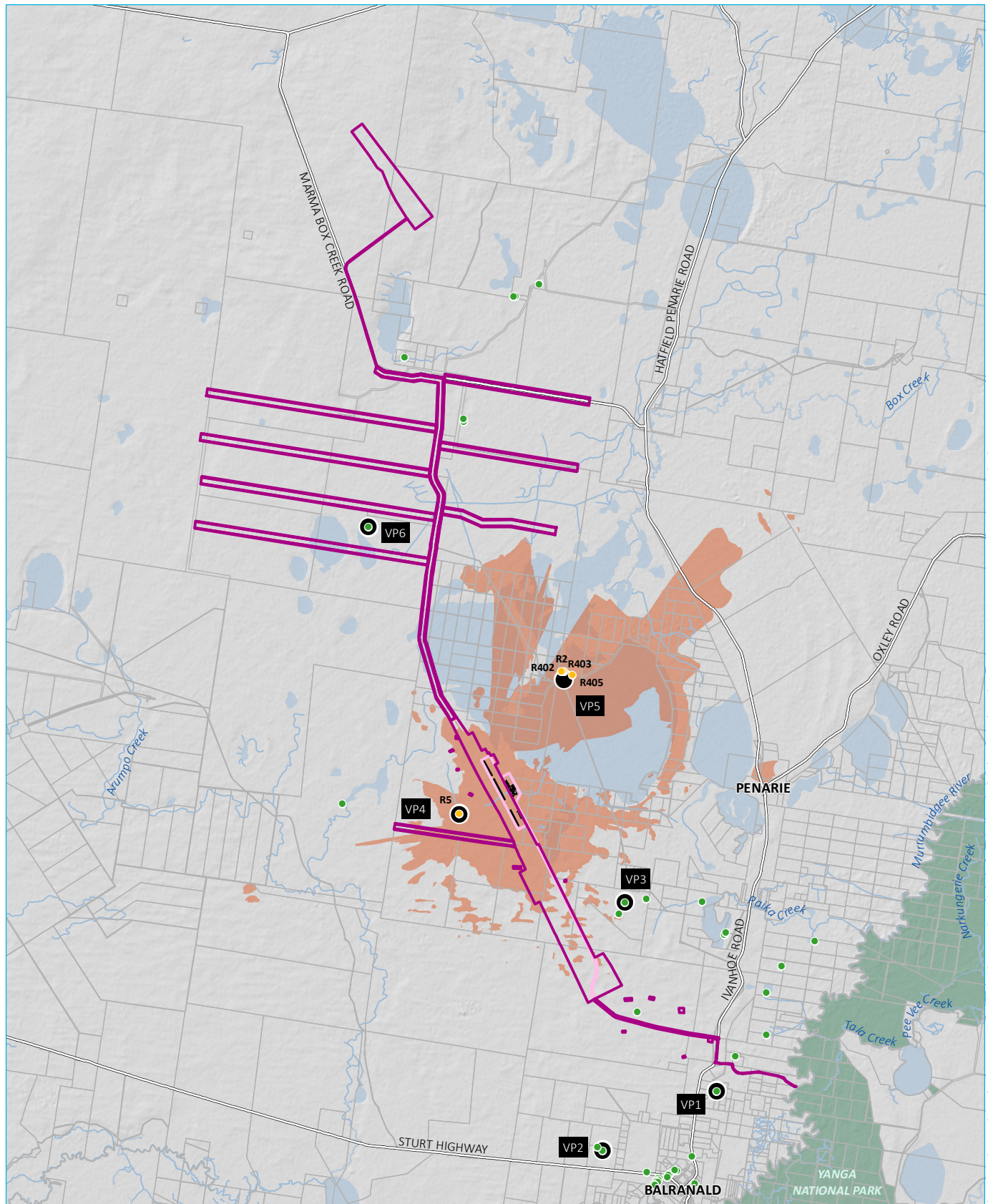
No additional impacts were identified for the Balranald-Ivanhoe Road and Sturt Highway.

The proposed MOD1 relocation of the West Balranald access road and 22kV power line would have low visual impact as it would not be visible from any sensitive receptors or roads given the distance and the established vegetation is sufficient to negate any impacts.

No additional impacts were identified for the establishment of a telecommunications tower for the proposed MOD1 project as it would not be visible from any sensitive receptors.

Visual impacts for the proposed MOD1 project are predicted to remain negligible to low when compared to the approved EIS (Figure 4.1). As detailed in the 2015 EIS, this is largely due to the VAC of the existing landscape, the distance from which the visible elements would be observed, and the presence of existing vegetation that would provide screening and partial obstruction of views from observer locations. Lighting from processing plant, plant and equipment could be visible at night from some viewpoints which are proposed to be managed and mitigated in accordance with the EIS conditions of consent (refer Section 3.4).

The proposed MOD1 project infrastructure would not be visible from Balranald town and have no greater impact on the surrounding amenity than what has already been identified and approved.



KEY

- | | |
|--|---|
| EIS Approved Balranald Project Area (SSD-5285) | Modelled viewshed |
| Proposed modification study area | Viewshed analysis |
| Site layout | ● Viewpoint |
| Major road | Assessment location |
| Watercourse/drainage line | ● Visible |
| Cadastral boundary | ● Not visible |
| Waterbody | |
| NPWS reserve | |

Viewshed analysis – proposed MOD1

Balranald Mineral Sands Project
Visual impact assessment
Figure 4.1

4.4 Proposed mitigation measures

The following 2015 EIS approved mitigation measures would be implemented to further mitigate any potential visual impact caused as a result of the proposed MOD1 project:

- Implement all reasonable and feasible measures to minimise the visual and off-site lighting impacts of the development.
- Ensure that all external lighting associated with the development complies with Australian Standard AS4282 (INT) 1995 - *Control of Obtrusive Effects of Outdoor Lighting*.
- Take all practical measures to shield views of mining operations from users of public roads and privately-owned residences.

5 Conclusion

The VIA for the proposed MOD1 project area considered potential visual impacts of the modification against the predicted impacts of the approved project.

Visual impacts for the proposed MOD1 project are predicted to remain negligible to low when compared to the approved EIS and would have no greater impact on the surrounding amenity than what has already been identified and approved.

6 References

EMM (2015), Visual impact assessment for the Balranald Mineral Sands Project. In EMM, *Balranald Mineral Sands Project Environmental Impact Statement*. Chapter 25 prepared for Iluka Resources Limited.



