SARAJI EAST MINING LEASE PROJECT

Environmental Impact Statement

Chapter 13
Scenic Amenity and Lighting

BHP

Contents

Saraji East Mining Lease Project

13 Scenic Amenity and Lighting

13.1 Introduction

This chapter provides an assessment of the anticipated landscape and visual effects, including lighting effects, of the Saraji East Mining Lease Project (the Project). Visual impacts associated with coal mines can be a concern for nearby property owners and the wider community. This Landscape and Visual Impact Assessment (LVIA) undertaken for the Project considers the likely nature and extent of potential scenic amenity and lighting impacts and identifies, where appropriate, safeguards to help mitigate, manage, or avoid adverse impacts over the life of the Project.

Landscape and visual impacts typically extend beyond the immediate Project Site. Therefore, the LVIA assesses a wider LVIA Assessment Area, comprising land forming the landscape context and within the potential viewshed of the Project, extending up to 15 kilometres (km) from the Project Site, as shown in Figure 13-1. The purpose of the LVIA is to determine the significance of the Project's impacts on landscape and visual amenity values. The objectives of the LVIA are to:

- describe the existing landscape (landscape receptors) and identify those people who experience and value views of the landscape (visual receptors)
- undertake a baseline assessment describing existing environmental values of the LVIA Assessment Area with respect to landscape character, visual amenity and lighting
- identify key Project impacts on landscape and/or visual values during day and/or night
- evaluate the significance of the potential impacts of the Project activities on landscape, views and visual receptors during construction, operation and decommissioning/closure during day and night
- describe any Project modifications or management techniques that can mitigate identified landscape and visual impacts.

13.2 Legislation and policy

13.2.1 Queensland legislation

Environmental Protection Act 1994

The *Environmental Protection Act 1994* (EP Act) is the key piece of Queensland's environmental legislative system. The EP Act introduces fundamental definitions and provisions promoting the principles of ecologically sustainable development and environmental management. The EP Act describes and references a wide range of policies, processes, legislation and audit procedures applicable to mining activities and development in general. Regarding landscape and visual amenity management in particular, the application of the EP Act's 'general environmental duty' to minimise and prevent 'environmental harm' underwrites many of the objectives found in the Terms of Reference (ToR) for this Project.

No specific Commonwealth or Queensland legislation applies to the landscape of the Project Site or wider area adjacent to the Project Site.

The Project is not assessable against the Broadsound and Belyando Planning Schemes. However, consideration was made of any landscape and scenic amenity provisions within the applicable regional and local plans as described in Section 13.2.2.

13.2.2 Regional planning schemes

The *Mackay, Isaac and Whitsunday Regional Plan (2012)* is the regional plan which guides future planning decisions across the region. The plan includes general guidance on the protection of landscape values in the region as described in Table 13.1.

Table 13.1 Regional landscape planning policy context

Mackay, Isaac and Whitsunday Regional Plan (2012)	
The Mackay, Isaac and Whitsunday Regional Plan applies across the region. The Strategic Direction acknowledges the diversity of landscapes across the region including 'the western coalfields around Moranbah, Dysart and Nebo' and states that 'these landscapes are the basis of the social, economic, tourism and cultural values of the region'.	
Policy objective	**Purpose/intent**
Regional Landscapes	
Desired Regional Outcome (DRO) 2 Regional Landscapes: Environmental, economic, social and cultural values of the regional landscape are identified and secured to meet community needs and achieve ecological sustainability.	The purpose of this policy is to protect regional landscape values. The plan states that 'to remain attractive and functional, the regional landscape must be responsibly planned and well managed to continue to support values including biodiversity, rural production, scenic amenity, landscape heritage and outdoor recreation'. The notes associated with DRO2 2.2 identify that each component of the regional landscape has its own specific value and significance to the environment and residents of the region including: natural economic resource areas – sections of the landscape that support agricultural production, extractive industry, forestry, tourism and rural industries.

13.2.3 Local planning schemes

At the local level, the Project Site is located within the Isaac Regional Council (IRC) Local Government Area (LGA), as shown on Figure 13-1. IRC was formed in 2008 from the Belyando, Nebo and Broadsound Shire Councils. A new planning scheme for the region is being prepared that has been released for community feedback. The Project Site is located across both the Broadsound Shire LGA and a small part of the Belyando Shire LGA, therefore is subject to provisions of both the Broadsound Shire Planning Scheme (2005) and the Belyando Shire Planning Scheme (2009). These are described in Table 13.2. For reference, the relevant provisions of the proposed Isaac Regional Planning scheme are also described below.

Table 13.2 Local landscape planning policy context

Broadsound Shire Planning Scheme (2005)	
The Broadsound Shire Planning Scheme applies to the majority of the Project Site and most of the southern part of the LVIA Assessment Area. It does not include any landscape or scenic amenity overlays. The Project Site falls within the general Rural Preferred Use Area but is denoted as falling within an area of mining leases, potential key resource area and mineral development licences (Map 4 of the Planning Scheme). Part 2 of the Planning Scheme identifies Desired Environmental Outcomes (DEOs) for the region. The DEOs include provisions relevant to landscape and visual amenity, as outlined below.	
Policy objective	**Purpose/intent**
Maintenance of cultural, economic, physical and social well-being of people and communities	
This DEO seeks: (l) areas and places of special aesthetic, architectural, cultural, historic, scientific, social or spiritual significance and their values are conserved or enhanced (n) adverse effects for scenic values in coastal areas, bushland and the rural countryside are minimised.	The specific outcomes and probable solutions for amenity, community harmony and the sense of community are set out in the Planning Scheme. The Planning Scheme seeks to avoid adverse impacts on the countryside by ensuring that buildings and works are attractive and consistent with the scale and design of buildings and works in the rural neighbourhood. This includes: • a proposed 8.5 metre (m) maximum height of a building structure or object above natural ground surface • screening of outdoor storage areas for waste, machinery and other materials from view from the street by fencing and/or landscape • not placing ‘transportable buildings of a kind used at construction and mining sites, usually called ‘dongas’ within a rural preferred use area where they are visible from a road, neighbouring property or vantage point • avoiding impacts on associated, adjoining or nearby residential uses through the location and design of facilities (no probable solution is suggested) • maintaining rural amenity (no probable solution is suggested) • screening extensive open ponds and buildings with vegetation, topography or through sufficient setback distance from roads (no probable solution is suggested).

Belyando Shire Planning Scheme (2009)	
The Belyando Shire Planning Scheme (2009) applies to a small area in the north of the Project Site and the wider landscape of the LVIA Assessment Area to the north and west, within the potential viewshed of the Project. Part 3 Strategic Direction requires that, *"The areas of high scenic amenity, remnant vegetation, wetlands, fauna habitats and wildlife corridors and regionally significant open space in the Shire are protected*".	
Policy objective	**Purpose/intent**
The natural environment and cultural heritage	
There are no scenic amenity overlays or landscape overlays in the scheme. DEO 1 seeks to protect the natural environment and cultural heritage.	In Belyando Shire, ecological systems, the natural environment (including natural features and unique habitats), and items and places of cultural and heritage significance are protected such that biodiversity, cultural heritage values and existing or intended landscape character are maintained.
Rural zone code	
Features Map 1 of the Belyando Shire Planning Scheme shows that the immediate context of the site falls within Mining Lease and Mineral Development Licence areas. The wider area falls largely within the Rural Zone (Zoning Map 1).	The Rural Zone Code seeks to ensure that development within the rural zone does not adversely impact on areas and sites of conservation importance, including cultural and high landscape values.

Proposed Isaac Regional Planning Scheme (2019)	
The Proposed Isaac Regional Planning Scheme was released for community feedback. The consultation period extended from 16 July to 7 September 2018. Part 3 Strategic framework, 3.2 Strategic intent states that, *"Rural areas support mining activities, renewable energy facilities, infrastructure and hazardous activities that cannot be located within urban areas in locations that do not impact upon surrounding sensitive land use.*" and "*Development and infrastructure mitigates impacts on cultural heritage, water quality and natural environmental values*".	
Policy objective	**Purpose/intent**
3.3. Liveable communities	
Non-residential workforce accommodation (3.3.1.3)	The plan seeks to ensure that "*Non-resident workforce accommodation is provided … in areas that do not result in unacceptable impacts, including cumulative impacts on established towns and communities including visual amenity…*"
3.5. Protecting natural resources and the environment	
Extractive, mineral, gas and petroleum resources (3.5.1.2)	The plan seeks to ensure that "*(4) Extractive resource operations only occur where compatible with the intentions of the relevant zone and overlays applying to the site, and where impacts on visual amenity, the natural environment … or the safety and amenity of the surrounding area can be mitigated to an acceptable standard."*
6.2.6.5 Rural zone code	
Panning Scheme Zoning Map ZM-1.3 of the Draft Isaac Regional Council Planning Scheme Zoning	The Rural Zone Code seeks to provide for rural uses and activities and other uses and activities that are compatible with

Proposed Isaac Regional Planning Scheme (2019)	
Map shows that the site and its immediate context falls within the Rural Zone.	existing and future rural uses and activities and "*(ii) the character and environmental features of the zone*".
8.2 Use codes	
8.2.1 Extractive Industry Code	The purpose of the extractive industry code is to facilitate the optimum use of extractive resources in identified areas in the region; ensure extractive industry operations occur in a manner that "*minimises impacts on amenity and the natural environment; and ensure rehabilitation occurs following extraction*'" The code requires that "*extractive industry activities are designed and managed to mitigate as far as possible, impacts on the site and surrounding area's environmental value*." And "*land disturbed by extractive industry activities is progressively rehabilitated to ensure the site is environmentally stable and capable of reuse*."

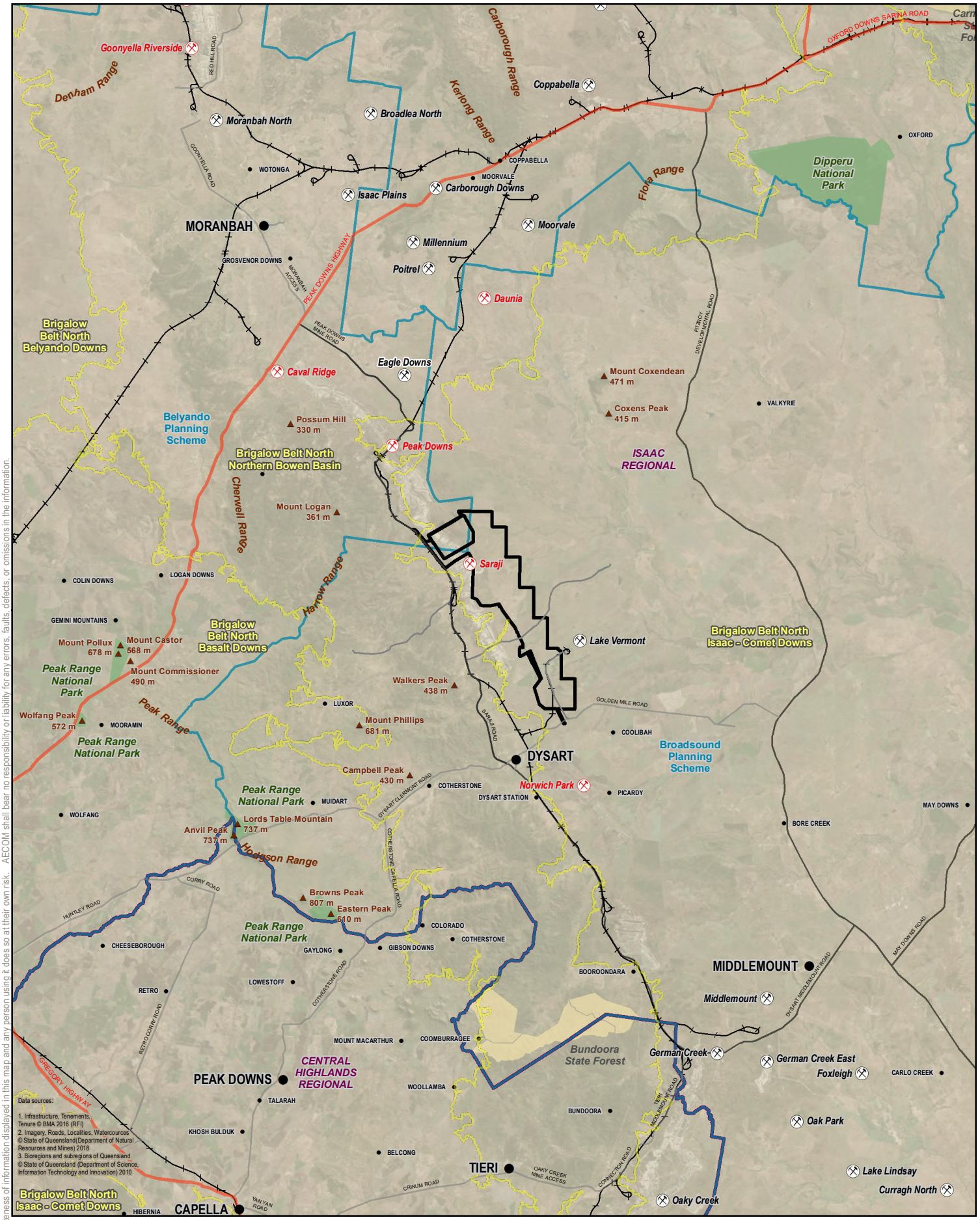
13.2.4 Guidelines and standards

There are currently no mandated Commonwealth or State requirements for landscape and visual impact assessment. Therefore, the approach to the LVIA was developed with reference to concepts in accepted guidelines and standards, including:

- '*The Guidelines for Landscape and Visual Impact Assessment*, Third Edition' (The Landscape Institute and the Institute of Environmental Management and Assessment, UK, 2013)
- '*The Guidelines for Landscape and Visual Impact Assessment*, Second Edition' (The Landscape Institute and the Institute of Environmental Management and Assessment, UK, 2002)
- Australian Standard (AS) 4282 (1997) Control of Obtrusive Effects of Outdoor Lighting
- 'Visual Landscape Planning in Western Australia: a manual for evaluation, assessment, siting and design' (Western Australian Planning Commission and Department for Planning and Infrastructure, 2007).

Other relevant guidance notes and documentation include:

- Australian Institute of Landscape Architects (AILA) Queensland (2018) - Guidance Note for Landscape and Visual Assessment (June 2018)
- 'Landscape Institute Advice Note 01/11: Use of photography and photomontage in landscape and visual assessment' (The Landscape Institute, UK, 2011)
- 'Topic Paper 6: Techniques and Criteria for Judging Capacity and Sensitivity' (Scottish Natural Heritage and The Countryside Agency, UK, 2006).



LEGEND

- Project Site
- Regional Locality
- Other Minor Locality
- Mountain peaks and Capes
- Highway
- Major Road
- Other Road
- Rail Network
- Planning Scheme Boundary
- Local Government Areas
- IBRA* Subregion
- National Park
- State Forest
- BMA Mine
- Other Mine

NOTE
* Interim Biogeographic Regionalisation for Australia (IBRA).

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Figure 13-1
Regional Landscape Context

Environmental Impact Statement
Saraji East Mining Lease Project

0 2.5 5 10
Kilometres

Scale: 1:600,000 (when printed at A4)
Projection: Map Grid of Australia - Zone 55 (GDA94)

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DATE: 8/03/2019 VERSION: 2

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13.3 Methodology

13.3.1 Desktop assessment

As shown on Figure 13-1, a preliminary desktop analysis of existing landscape character and visual amenity within the Project Site, as well as within the wider landscape, was undertaken to inform this LVIA. This included analysis of the underlying topography, land cover and high-level landscape values.

Key information sources were identified and reviewed as a component of the desktop analysis. These sources included cadastral data, aerial photography, relevant planning schemes, policies and guidelines, and publicly available information on recreation spaces and public visitor areas.

13.3.2 Field survey

Field visits were carried out between 25 August 2016 and 30 August 2016, and between 6 October 2016 and 10 October 2016, during which time photographs were obtained for the purposes of the assessment. The field surveys were used to ground truth the findings of the desktop assessment and to undertake an on-site assessment of landscape character and visual amenity. Photographs were taken to portray landscape character and inform the viewpoint assessment from representative viewpoints.

The field visits focused on those aspects of the landscape with potential to be of the greatest sensitivity to the Project and to gain an appreciation of those aspects of the Project most likely to affect landscape character and visual amenity.

13.3.3 Landscape assessment

Landscape character assessment is a tool for identifying what makes one place different from another. It identifies what makes a place distinctive, without necessarily assigning a value to it. This approach was used to establish the existing character of the landscape and to provide a framework for measuring the impact of the Project on landscape character. A number of ‘landscape character types’ were defined that provide a framework for describing these areas methodically. The general character of the landscape is described in Section 13.4, while the identified landscape character types are described in Section 13.5.2.

The anticipated impact on landscape character was based on the scale and layout of the Project and how this relates to the characteristics of the receiving landscape. Unlike other technical disciplines (such as noise) there are no established, measurable thresholds of significance that exist for landscape impacts. The significance of impact is therefore determined by considering the sensitivity of the landscape receptor and the magnitude of change expected due to the proposed development.

Judgement of landscape sensitivity

The sensitivity of a landscape is judged on the extent to which it can accept change of a particular type and scale without adverse effects on existing landscape character. Levels of sensitivity, as shown in Table 13.3, vary according to the type of development and the nature of the landscape. Key aspects that have been considered when identifying the level of sensitivity associated with each landscape character type include:

- the landscape’s inherent values (e.g. perceptual qualities, cultural importance and any specific values that may apply such as landscape planning designations, as described in Table 13.2)
- the landscape’s ability to absorb changes associated with the Project (e.g. the extent to which the Project may fit or be absorbed into the landform, land use, pattern, scale or texture of the existing landscape).

Table 13.3 Defining landscape sensitivity

Sensitivity of landscape	Attributes of landscape sensitivity categories
High	A landscape protected by national designation and/or widely acknowledged for its quality and value; a landscape with distinctive character and low capacity to accommodate the type of change envisaged.
Medium	A moderately valued landscape, perhaps a regionally important landscape and/or protected by regional or state designations, or where its character, land use, pattern and scale may have some capacity to accommodate a degree of the type of change envisaged.
Low	A landscape valued to a limited extent, perhaps a locally important landscape or where its character, land use, pattern and scale is likely to have the capacity to accommodate the type of change envisaged.
Negligible	A landscape, which is not valued for its scenic quality or where its character, existing land use, pattern and scale are tolerant of the type of change envisaged and the landscape has capacity to accommodate change.

Magnitude of change to landscape character

The magnitude of change to landscape character depends on the nature, scale and duration of the change that is expected to occur. The magnitude of change also depends on the loss, change or addition of any feature to the existing landscape and is based upon that part of the landscape character type which is likely to be impacted to the greatest extent by the Project before the application of any mitigation.

Magnitude of change is described as being ‘Negligible’ (barely perceptible change), ‘Low’ (noticeable change), ‘Medium’ (considerable change) or ‘High’ (dominant change), as described in Table 13.4. The descriptions of magnitude and sensitivity are illustrative as there is no defined boundary between levels of impacts.

Table 13.4 Defining magnitude of change to landscape character

Magnitude of change	Typical examples
High	Dominant change: a clearly evident and frequent/continuous change in landscape characteristics affecting an extensive area, which is likely to fundamentally change the character of the landscape.
Medium	Considerable change: a considerable change in landscape characteristics, frequent or continuous and over a wide area or a clearly evident change, but over a restricted area.
Low	Noticeable change: a noticeable change in landscape characteristics over a wide area or a considerable change over a restricted area but will not fundamentally change the character of the landscape.
Negligible	Barely perceptible change: an imperceptible, barely or rarely perceptible change in landscape characteristics.

Level of effect on landscape character

An evaluation of overall potential effects on landscape character is based on the sensitivity of the existing landscape to change and the magnitude of change that is likely to occur. No prescribed methods for assessment of significance of landscape impacts exist; therefore, professional judgement and experience are applied in order to identify the level of significance. Each landscape character type is assessed on its own merits, as factors unique to each circumstance need to be considered. There are general principles which can be used as a guide to this process that provide transparency about how judgements have been made. The overall significance of change to landscape character is determined using Table 13.5.

Table 13.5 Significance of effect

Level of effect		Magnitude of change			
		High (dominant change)	Medium (considerable change)	Low (noticeable change)	Negligible (barely perceptible change)
Sensitivity	High	Major	Moderate to major	Moderate	Minor to moderate
	Medium	Moderate to major	Moderate	Minor to moderate	Minor
	Low	Moderate	Minor to moderate	Minor	Minor to negligible
	Negligible	Minor to moderate	Minor	Minor to negligible	Negligible

Denotes a 'Significant' impact.

Denotes a 'Not Significant' impact.

13.3.4 Visual amenity assessment

Visual receptor audiences are assessed and described in terms of the views that can be obtained from selected representative viewpoints within the LVIA Assessment Area. Representative viewpoints were identified and described as part of the assessment. Visual receptors have been identified based on parameters, including:

- proximity of the receptor, i.e. that the most affected visual receptors are anticipated to be located within a 5 km radius of the Project unless located at an elevated vantage point
- type of visual receptor, i.e. that the visual receptor is a permanent resident of a residential dwelling or homestead
- drivers or passengers of vehicles passing through or alongside the LVIA Assessment Area
- a member of the public accessing noted recreational areas (e.g. national parks, cycle ways and footpaths)
- an industrial or commercial worker (excluding those employed as part of the Project).

These visual receptor audiences and representative viewpoints are discussed further in Section 13.5.

No Zone of Theoretical Visibility (ZTV) mapping was undertaken for this assessment. It is considered that ZTV mapping would not be particularly informative in this context because there are relatively few

sensitive receptors around the Project Site, many of the Project components are underground and visibility is strongly influenced by the presence of vegetation which is not typically modelled within a ZTV model. Similarly, no visualisations or artist's impressions have been prepared because, as described in the following section, the existing context of the landscape is already strongly influenced by mining, therefore the affected receptors are likely to be familiar with the Project components proposed.

Judgement of visual sensitivity to changes to the view

The sensitivity of each viewpoint and the visual receptor audiences, which it represents, is considered to be dependent upon:

- the importance of the view, its existing scenic qualities and the presence of other existing man-made elements in the view
- the type of the visual receptor audience and their likely interest in the view (e.g. residents, visitors to important/valued landscapes or visitors to non-designated areas, motorists)
- the volume of visual receptors and the duration of time that receptors spend experiencing the view.

The second edition of '*Guidelines for Landscape and Visual Impact Assessment*' (2002) states "changes affecting large numbers of people are generally more significant than those affecting a relatively small group of users. However, in wilderness landscapes the sensitivity of the people who use these areas may be very high and this will be reflected in the significance of the change."

Similarly, the third edition of '*Guidelines for Landscape and Visual Impact Assessment*' (2013) states the visual receptors most susceptible to change include "… residents at home…people, whether residents or visitors who are engaged in outdoor recreation, including users of public rights of way whose attention or interest is likely to be focused on the landscape and on particular views; …communities where views contribute to the landscape setting enjoyed by residents in the area".

The above guidance is reflected in the method used to assess the sensitivity of the viewpoints to the Project. For instance, views from a regionally important location whose interest is specifically focussed on the landscape (such as views from national parks) have been judged as having a high sensitivity to change as have large numbers of residential viewers. Levels of sensitivity, shown in Table 13.6, vary according to the type of development and the visual receptor audience.

Table 13.6 Defining viewpoint sensitivity

Sensitivity of landscape	Attributes of viewpoint sensitivity categories
High	Large numbers of viewers or those with proprietary interest and prolonged viewing opportunities such as residents and users of attractive and/or well-used recreational facilities. Views from a regionally important location whose interest is specifically focussed on the landscape, such as national park users (e.g. Peak Range National Park).
Medium	Medium numbers of residents (e.g. rural communities and townships) and moderate numbers of visitors with an interest in their environment. For example, visitors to State Forests, including bush walkers, horse riders, trail bikers, as well as groups of travellers with an interest in designated scenic routes.
Low	Small numbers of visitors and/or those with a passing interest in their surroundings, for example those travelling along principal roads. Viewers whose interest is not specifically focussed on the landscape, for example workers and commuters.
Negligible	Very occasional numbers of viewers with a passing interest in their surroundings, for example those travelling along minor roads and views from the air.

Magnitude of change to visual amenity from representative viewpoints

The magnitude of change to views and visual amenity depends on the nature, scale and duration of the change that is expected to occur. The magnitude of change also depends on the loss, change or addition of any feature in the field of view of the receptor, or any change to the backdrop to, or outlook from, a viewpoint. The assessment assumes a worst case scenario without mitigation. The level of effects on a view depend on the extent of visibility, degree of obstruction of existing features, degree of contrast with the existing view, angle of view, duration of view and distance from the Project.

Magnitude of change is described as being Negligible (barely perceptible change), Low (noticeable change), Medium (considerable change) or High (dominant change), as illustrated in Table 13.7.

Table 13.7 Defining magnitude of change to visual amenity

Magnitude of change	Typical examples
High	Dominant change: major changes in view at close distances, affecting a substantial part of the view, continuously visible for a long duration, or obstructing a substantial part or important elements of view.
Medium	Considerable change: clearly perceptible changes in views at intermediate distances, resulting in either a distinct new element in a significant part of the view, or a more wide-ranging, less concentrated change across a wider area.
Low	Noticeable change: minor changes in views at long distances or visible for a short duration, and/or are expected to blend in with the existing view to a moderate extent.
Negligible	Barely perceptible change: change which is barely visible at a very long distance, or visible for a very short duration, and/or is expected to blend with the existing view.

Overall significance of impact on visual amenity from representative viewpoints

The evaluation of overall potential impacts on visual amenity is based on the sensitivity of existing views to change and the magnitude of change that is likely to occur. The overall significance of change to visual amenity and individual viewpoints is determined by using Table 13.5.

Impacts on the visual resource have been described by representative views in the LVIA Assessment Area. Impacts can be short term (i.e. those occurring during installation/construction of a development) or medium/long term (i.e. those lasting for several years or the lifetime of the Project). In addition, they can be widespread (i.e. taking up a large proportional change in the view) or localised. Some impacts can be static (such as the presence of a building) whereas other changes are more dynamic changing over time (including stockpiles). These factors are considered in determining the significance of change.

13.3.5 Lighting assessment

A qualitative assessment of the impacts of lighting on visual amenity was undertaken based upon the determination of the current level of lighting within the LVIA Assessment Area and any potential changes to lighting levels that may be associated with the Project. As there is no prescribed assessment method for the impacts of lighting on visual amenity, guidance and terminology was taken from the *Guidance Notes for Reduction of Obstructive Lighting* (2005), prepared by The Institution of Lighting Engineers UK, and AS 4282 – Control of Obtrusive Effects of Outdoor Lighting (1997). This information was combined with the standard method of assessment for impacts on visual amenity.

Visual receptor audiences are assumed to be the same as those identified in the assessment of visual amenity. The assessment is qualitative, and these locations have not been visited at night to measure existing light levels.

The lighting assessment does not consider the impacts of lighting on terrestrial fauna, but rather on the visual amenity of any visual receptor audiences that may be exposed to this lighting.

Judgement of visual sensitivity to lighting

The sensitivity of each representative viewpoint to changes in after-dark lighting conditions due to the Project was based upon elements illustrated in Table 13.8, including:

- the proximity of the viewpoint to the greatest lighting source that is associated with the Project
- the public and private accessibility of the representative viewpoint location and the likely number of viewers who will visit the viewpoint.

Full descriptions on the judgements of visual sensitivity from each representative viewpoint are discussed in Section 0.

Table 13.8 Defining viewpoint sensitivity to lighting

Sensitivity of landscape	Attributes of viewpoint sensitivity categories
High	Easily accessible at night with large numbers of viewers or those with proprietary interest and prolonged viewing opportunities located at very close distances (typically less than 200 m) to the light source.
Medium	Relatively accessible at night with medium numbers of viewers and close to the site or easily accessible with propriety interest but located some distance (typically up to 500 m) from the light source.
Low	Typically, location not accessed at night, with small numbers of visitors with a passing interest in their surroundings, e.g. those travelling along principal roads or greater numbers of viewers but located at considerable distance from the light source (less than one km)
Negligible	Rarely accessed at night. Rural locations with very occasional numbers of viewers with a passing interest in their surroundings, e.g. those travelling along minor roads and views from the air or located at greater than one km from the light source.

Magnitude of change to lighting from representative viewpoints

The magnitude of change to views and visual amenity, as a result of lighting conditions, depends on the nature, scale and duration of the change to lighting that is expected to occur. The magnitude of change also considers any change to the backdrop to, or outlook from, the representative viewpoint. The assessment assumes a worst-case scenario without mitigation. The level of effect on a view depends on the extent of visibility, degree of obstruction of existing features, degree of contrast with the existing view and angle of view.

To enable the judgement of the magnitude of changes in lighting, Table 13.9 considers the existing condition against the potential condition. These conditions include very dark, predominantly dark, predominantly lit, or brightly lit landscapes as a measure of change in visual conditions. The outcome of this judgement will result in either a dominant, considerable, noticeable or imperceptible change to lighting conditions from the representative viewpoint. Full descriptions on the magnitude of change from each representative viewpoint are discussed in Section 0 and comprise:

- intrinsically dark– inherently remote rural landscapes with minimal artificial lighting other than that which is localised lighting of a dwelling. typically, no street lighting and no industrial lighting
- predominantly dark – commonly rural residential landscapes where dwellings are still largely isolated from one another, creating a relatively dark atmosphere with intermittent sources of lighting (such as street lighting). industrial lighting may occur in predominantly dark landscapes; however, lengthy distances between these sites and residential dwellings result in minimal lighting spill onto private property

- predominantly lit – commonly small towns with standard elements of lighting such as street lighting and lighting from residential dwellings, commercial businesses and some industrial lighting
- brightly lit – town/city centres or large scale industrial landscapes with high levels of lighting.

Table 13.9 Defining magnitude of change to lighting amenity

Magnitude of change	Typical examples
High	Dominant change: occurs when an intrinsically dark landscape becomes brightly lit.
Medium	Considerable change: occurs when an intrinsically dark landscape becomes predominantly lit or a predominantly dark landscape becomes brightly lit.
Low	Noticeable change: occurs when an intrinsically dark landscape becomes predominantly dark, a predominantly dark landscape becomes predominantly lit or a predominantly lit landscape becomes brightly lit.
Negligible	Barely perceptible change: occurs when a landscape experiences negligible changes from the existing lighting conditions to the proposed lighting conditions.

Overall significance of impact on lighting amenity

This evaluation considers sensitivity of each representative night time viewpoint and the magnitude of change that is likely to occur. The overall significance of change to lighting amenity from individual viewpoints is determined using Table 13.5 and outlined in Section 13.4.4.

13.4 Description of environmental values

This section provides an overview of the landscape and visual character of the existing regional and local context of the Project.

13.4.1 Regional landscape context

The Project is located approximately 30 km north of Dysart, 40 km south-east of Moranbah and 170 km south-west of Mackay in the Bowen Basin of Central Queensland. The Project Site and the LVIA Assessment Area that forms its wider landscape context are illustrated in Figure 13-1.

Landform and hydrology

As illustrated in Figure 13-1, the main hydrological feature of the landscape is the Isaac River, which is located approximately 20 km east of the Project Site and flows in a north to south direction. The natural landform around the Project Site, between the Isaac River and Dysart-Moranbah Road is associated with the river floodplain and so is fairly flat. This terrain gently undulates between around 200 m above Australian Height Datum (AHD) to 250 m AHD associated with the river and its tributaries, including Cherwell Creek, JB Gully, Ripstone Creek, Plumtree Creek, Boomerang Creek and One Mile Creek and Phillips Creek. West of the Dysart-Moranbah Road, the landform becomes more undulating and elevated, rising to around 400 m AHD within the Harrow and Denham Ranges, including local peaks such as Possum Hill (330 m) 23 km to the north west, Mount Logan 12 km to the east and Walkers Peak (438 m AHD) 15 km to the south.

Settlement and infrastructure

The Project Site lies in an area dominated by rural land uses interspersed with large mines. The nearby towns of Dysart and Moranbah were largely established to support the mining community (DILGP, 2012). The surrounding landscape comprises isolated farmsteads and rangelands used largely for cattle grazing, including associated agricultural infrastructure such as sheds and barns.

These settlements are connected by the Dysart-Moranbah Road which is located to the west of the Project Site and runs in an approximately north-westerly direction to connect to the Peak Downs Highway around 30 km north.

Other roads around the Project Site are typically unsealed private roads accessing private properties such as Luxor Quarry Road and various farmsteads.

A freight rail track runs approximately parallel to the Dysart-Moranbah Road. This is part of the Goonyella System which forms part of the Central Queensland Coal Network operated by Aurizon, servicing the existing adjacent Saraji Mine and other surrounding coal mines.

There is considerable evidence of mining activity including the existing Saraji Mine, Lake Vermont Mine and Peak Downs Mine. Surface infrastructure and spoil dumps are visible components of mining landscapes. Electricity transmission lines are associated with the mining areas.

Vegetation character and recreational land use

There are no protected landscapes close to the Project Site or other areas that are likely to be used for recreation. The nearest State Forest is Bundoora State Forest which is located over 50 km south of the Project Site.

As shown on Figure 13-2, Peak Range National Park is located around 40 km west of the Project Site and is the closest protected landscape to the site. It includes four sections: Wolfgang Peak, Eastern Peak, Lord's Table Mountain and Gemini Mountains. The Peak Range National Park may attract some visitors for scenic drives and picnic facilities at the base of some of the peaks, but has no motorised vehicle access, facilities or defined walking tracks (Isaac Regional Council, 2017). Bush walking is via unmarked fire control lines; therefore, it is anticipated that relatively few people would visit these areas. Dipperu National Park also falls within the wider landscape context of the area as shown on Figure 13-1, but it is not anticipated that many visitors would travel pass the Project Site to visit this area.

For the most part, vegetation has largely been cleared from the LVIA Assessment Area to facilitate rural land uses. Remnant vegetation comprises small woodlands (typically on locally elevated areas), tree belts associated with edge of local and state roads and scattered riparian vegetation associated with creeks.

The Interim Biogeographic Regionalisation for Australia (IBRA) is a biogeographic regionalisation of Australia developed by the Australian Government department formerly known as Department of Sustainability, Environment, Water, Population and Communities (now Department of the Environment and Energy (DoEE)). IBRA represents a landscape-based approach to classifying the land surface of Australia. The IBRA data consists of two datasets: IBRA bioregions, which are a larger scale regional classification of homogenous ecosystems; and sub regions, which are more localised.

Whilst bioregions have been defined mainly for the purposes of ecosystem planning and monitoring, the nominal attributes that make up IBRA are: climate, lithology/geology, landform, vegetation, flora and fauna and land use which are themes typically used to define landscape character at a high level. On 5th July 2012, IBRA version 7.0 (IBRA7) was released, which delineates 89 biogeographic regions and 419 sub regions, each reflecting a unifying set of major environmental influences which shape the occurrence of flora and fauna and their interaction with the physical environment across Australia. The bioregion information enables a high-level desktop understanding of the different landscape settings of the LVIA Assessment Area. The descriptions for the sub-regions that accompany IBRA7 are not currently published. However, upon request, the Queensland Government Environmental Resources Information Network (ERIN) supplied descriptions of each of the sub-bioregions in the LVIA Assessment Area for the IBRA5.1 dataset (which follows similar boundaries) (Australian Government Department of Sustainability, Environment, Water, Population and Communities, 2012).

The Project Site falls within the Brigalow Belt North Bioregion. Most of the Project Site falls within the Northern Bowen Basin Subregion. The area west of Dysart-Moranbah Road with some small incursions into the Site falls within Isaac-Comet Downs Subregion. The area around Peak Range

National Park falls within the Basalt Downs Subregion. These are described in Table 13.10 (ERIN, 2012).

Table 13.10 IBRA sub bioregion descriptions

IBRA subregion name, code and total area (ha)	Description
Northern Bowen Basin 1,338,049 hectares (ha)	Northern Bowen Basin contains the major areas of outcrop of the Triassic and Permian sediments of the Bowen Basin. There are also areas of basalt and Tertiary sediments. The landscape is predominantly undulating with Brigalow (*Acacia harpophylla*) and Dawson Gum (*Eucalyptus cambageana*) — brigalow communities dominant on the clay soils, and an open woodland of Narrow–leaved Ironbark (*E. crebra*) or Poplar Box (*E. populnea*) often with a shrubby understorey, on the shallower texture contrast soils. There are also areas of Blue Grass (*Dichanthium sericeum*) downs. The range areas of sandstone are dominated by narrow–leaved ironbark and bloodwood (*Corymbia* spp.). Streams in the east of the subregion are often fringed by Black Ironbox (*Eucalyptus raveretiana*).
Basalt Downs 1,238,537 ha	Basalt Downs is formed almost entirely on Tertiary basalts. It occurs as two separate parts: a northern section, which is dominantly undulating and contains areas of lower Tertiary sediments; and a southern section which is predominantly hilly and contains areas of outcrop of Permian sediments. The more undulating areas carry a Blue Grass (*Dichanthium sericeum*) grassland with Mountain Coolibah (*Eucalyptus orgadophila*) on hillier areas, often with Silver–leaved Ironbark (*E. melanophloia*) and Red Bloodwood (*Corymbia erythrophloia*). Coolibah (*Eucalyptus coolabah*) occurs on flood plains. In the north, on Tertiary weathered basalts, Gidgee (*Acacia cambagei*) scrub and Brigalow (*A. harpophylla*) scrub are common, Belah (*Casuarina cristata*) often occurring with the latter. Narrow–leaved Ironbark (*Eucalyptus crebra*) forms woodlands with Silver–leaved Ironbark (*E. melanophloia)* and Red Bloodwood (*C. erythrophloia*) on rugged basalt areas. On the Permian sediments Narrow–leaved ironbark or Poplar Box (*Eucalyptus populnea*) form open or shrub woodlands.
Isaac-Comet Downs 2,701,119 ha	Isaac - Comet Downs is an extensive but diverse subregion that does not readily lend itself to further subdivision. It is a largely undulating subregion dominated by Tertiary and other Cainozoic deposits, with mid–catena deposits being slightly more prominent. Tablelands and dissected remnants of the upper Tertiary surface are widespread, carrying a Narrow–leaved (*Eucalyptus crebra*) woodland on the earths of undulating plateaus, and Bendee (*Acacia catenulata*) or Lancewood (*A. shirleyi*) on the rocky hills and mesas. The lower parts of the Tertiary surface are dominated by Brigalow (*Acacia harpophylla*) and Dawson Gum (*Eucalyptus cambageana*) — brigalow communities on undulating clay or tenure contrast soils. These communities dominate the subregion. Alluvium is also prominent, and the predominantly fine textured soils carry brigalow or open woodland of Coolibah (*Eucalyptus coolabah*). Fine grained Permian sediments are exposed in some areas, giving rise to grasslands, open woodland and areas of brigalow.

13.4.2 Project Site

The eastern part of the Project Site lies within Mining Lease Application (MLA) 70383. This area comprises flat grazing lands associated with the Isaac River and its tributaries, typically between around 180 m AHD and up to 200 m AHD. This area includes the properties known as Meadowbrook and Lake Vermont, which is owned by BMA.

The central part of the Project Site is already considerably fragmented by open cut mining activities. Mining Lease (ML) 1775 comprises Jacaranda Pit, Bauhinia Pit, Acacia Pit, Coolibah Pit and Dogwood Pit. ML 1782 comprises Ebony Pit, Grevillea Pit, and Hakea Pit. All of the pits have out of pit spoil located along their boundaries, creating a distinct landform at up to 250 m AHD, visible in the wider environment. Parts of this landscape have been progressively rehabilitated. The northern section of the Project Site consists of MLA 70459, in which part of the infrastructure and transport corridor is proposed.

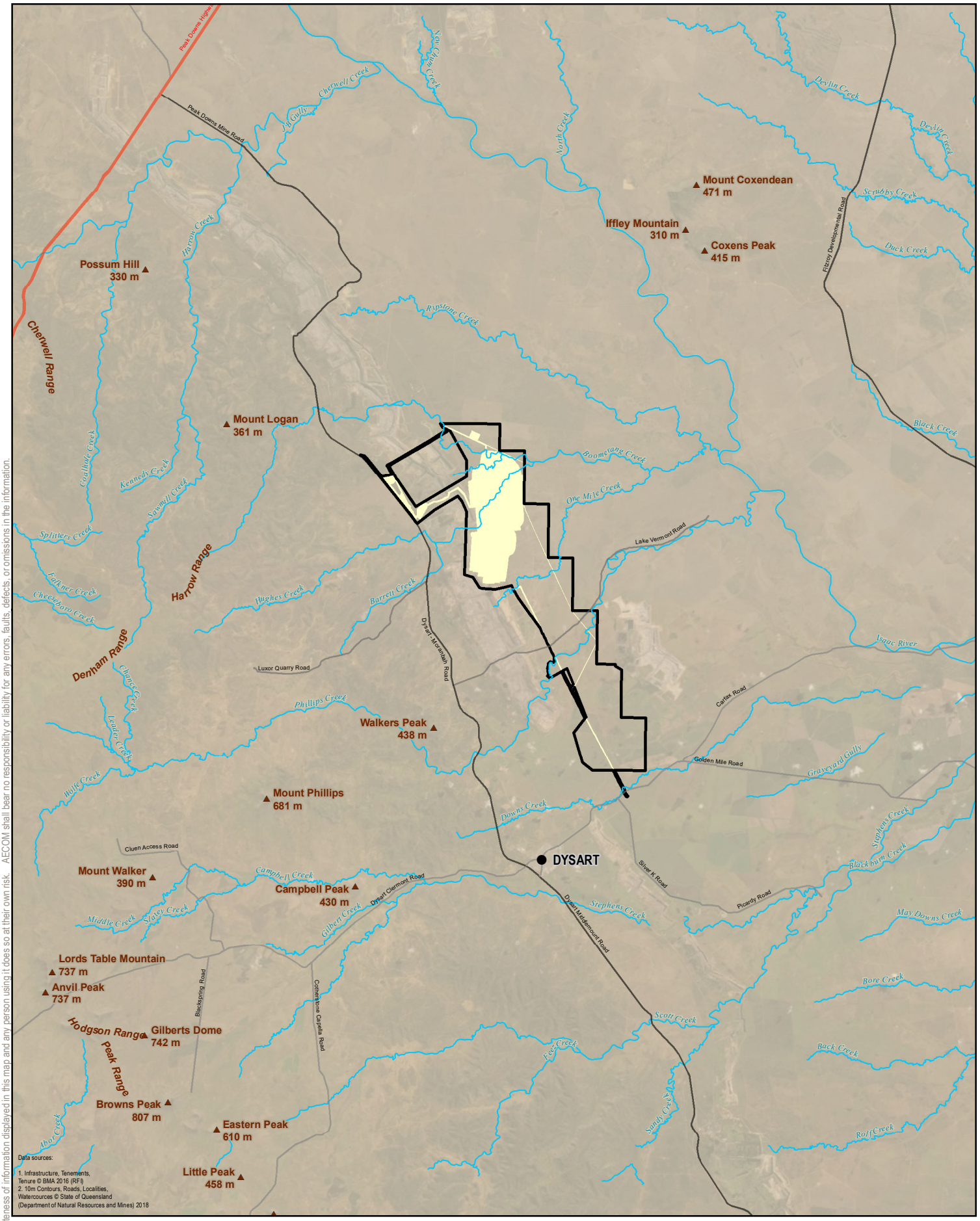
To the west of the pits, the landscape associated with ML 70142 and ML 1784 is already influenced by the presence of the Norwich Park Rail Line (including existing balloon loop) and the adjoining Dysart-Moranbah Road. This area comprises a mixture of roadside shelterbelts, fencing, cleared areas beside the rail tracks, mine dams, undisturbed and rehabilitated mining land; all affected by the presence of adjacent open cut pits. This land is largely flat and low-lying up to around 230 m AHD.

13.4.3 Landscape character

Four landscape character types have been identified within the LVIA Assessment Area. These are identified in Figure 13-3. They are described and evaluated in Table 13.14 to Table 13.17.

These landscape types are:

- Landscape Type A: mined and transitional lands
- Landscape Type B: lowland rural plains
- Landscape Type C: undulating hills with open forest
- Landscape Type D: rural ranges and peaks (located 15 km from Project Site and therefore not considered in detail).



LEGEND

- Project Site
- Project Footprint
- Regional Locality
- Mountain Peak
- Highway
- Major Road
- Other Road
- Watercourse

N

Figure 13-2
Project Site and Local Landscape Context

Environmental Impact Statement
Saraji East Mining Lease Project

0 1.5 3 6
Kilometres

Scale: 1:341,187 (when printed at A4)

Projection: Map Grid of Australia - Zone 55 (GDA94)

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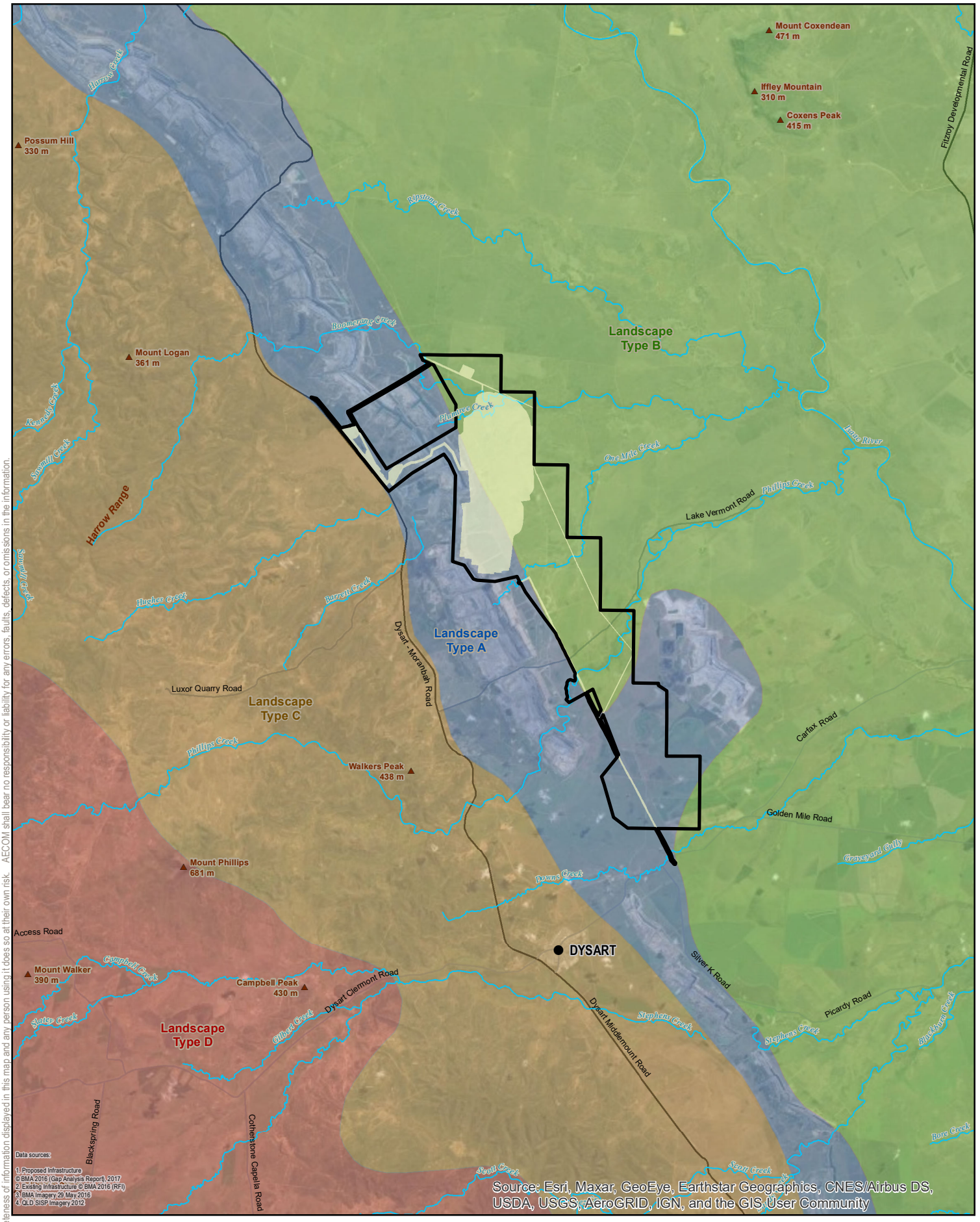
DATE: 4/08/2020 VERSION: 2

Filename: P:\605X\605070311\4. Tech Work Area\4.99 GIS\02_MXDs\06 Environmental Impact Statement\13 Scenic Amenity and Lighting\60507031_G113_v2_A4P.mxd



Data sources:
1. Proposed Infrastructure © BMA 2016 (Gap Analysis Report), 2017
2. Existing Infrastructure © BMA 2016 (RFI)
3. BMA Imagery, 29 May 2016
4. QLD SISP Imagery 2012

LEGEND

- Project Site
- Project Footprint
- Regional Locality
- Mountain Peak
- Watercourse
- Major Road
- Other Road

Landscape Character Area

- Landscape Type A: Mined and Transitional Lands
- Landscape Type B: Lowland Rural Plains
- Landscape Type C: Undulating Hills with Open Forest
- Landscape Type D: Rural Ranges and Peaks

N

Figure 13-3
Landscape Character Context

Environmental Impact Statement
Saraji East Mining Lease Project

0 1 2 4
Kilometres

Scale: 1:250,000 (when printed at A4)
Projection: Map Grid of Australia - Zone 55 (GDA94)

BHP

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13.4.4 Scenic amenity and lighting

The visual baseline was assessed and described in terms of views from selected representative viewpoints within the LVIA Assessment Area. Since lighting is experienced by the same sensitive receptors, it is considered together with visual amenity for each representative viewpoint identified.

Night lighting is required for security and night-time operation of the mine. It is used to illuminate mine infrastructure such as mine entrances, access roads, coal stockpile areas and major plant and equipment. The current night lighting at the existing Saraji Mine and the adjoining Peak Downs Mine is typically unshielded and can be seen from around the mine site. The presence of vegetation and landform between the light sources and viewing locations, including homesteads and roads, can reduce the overall visibility of night lighting. Table 13.13 includes a photograph illustrating an example of night lighting at the existing Saraji Mine as viewed from the Dysart-Moranbah Road at night.

The locations of indicative visual receptors are shown on Figure 13-6, including residents and other key roads around the Project Site.

It is considered that the viewers (visual receptors) who may experience views of the Project and potentially experience lighting impacts include:

- residents living on rural properties (including homesteads) near to the Project
- people working in the rural landscape around the Project
- people working (during day and night) at Saraji Mine, Peak Downs Mine and Rankin Quarry
- recreational users and tourists passing through the LVIA Assessment Area by vehicle, particularly along the Dysart-Moranbah Road, including motorists travelling to access Peak Range National Park
- other travellers using major and minor roads within the LVIA Assessment Area, including motorists on the Dysart-Moranbah Road.

It is noted that residents living in the major settlements of Dysart and Moranbah are anticipated to be too far away to be affected by the Project.

No other sensitive receivers, such as recreational parks, reserves or other key viewing areas are located within 10 km of the Project Site.

As shown on Figure 13-6, seven residential homesteads have been identified as located within 10 km of the Project Site, with two properties (both owned by BMA) lying within the Project Site. These are:

- Saraji Homestead 1: 4.4 km at closest point to Project Site
- Saraji Homestead 2: 1.4 km at closest point to Project Site
- Saraji Homestead 3: 1.9 km south of Project Site
- Tay Glen Homestead: 5.8 km west-southwest of Project Site
- Meadowbrook Homestead: within Project Site
- Lake Vermont Homestead: within Project Site
- Kyewong Homestead: 1 km south-east of Project Site.

Homesteads typically consist of one and two storey buildings including a primary residence, occasionally additional smaller residential dwellings and barns and other buildings that support the rural use. Sometimes small gardens are associated with the prime residence. Homesteads provide a range of functions for the operation of the rural property. An example of a homestead is provided in Table 13.11.

Table 13.11 Typical homesteads

Images of typical homesteads in the LVIA assessment area


Roads close to the Project Site, as described in Section 13.4.1, are primarily used to access the existing mining operations, connect Moranbah and Dysart and allow access to rural properties. The closest highway is Peak Downs Highway; as this is over 30 km away from the Project Site it is not considered material to this assessment.

The Project Site is not located close to any designated tourist drives; the closest are the Great Inland Way (Charters Towers to Emerald) and Pacific Coast Way (Townsville to Rockhampton). Potentially some road users may be accessing Peak Range National Park. The Dysart-Moranbah Road travels parallel to the west of the Saraji Mine. Due to its proximity to the proposed mine infrastructure area (MIA) and rail loop, views of these facilities from passing motorists have been considered.

Based on an understanding of the Project components in relation to the key views and viewers with potential to be affected, six viewpoints were selected for detailed assessment through the LVIA process. These views are not exhaustive but are intended to be representative of the range of views likely to be experienced and the range of receptor groups likely to be affected by views of the Project assessed, wherever possible, from publicly-accessible vantage points. The selected viewpoints are summarised in Table 13.12 and shown on Figure 13-6, and are described together with the impact assessment in Section 0 below.

Table 13.12 Selected viewpoints

Viewpoint	Description
Viewpoint 1	View from Dysart-Moranbah Road looking south-east
Viewpoint 2	View from Dysart-Moranbah Road looking north
Viewpoint 3	View from Dysart-Moranbah Road near Saraji Homesteads 2 and 3 looking north-east
Viewpoint 4	View from Luxor Quarry Road near Saraji Homestead 1 looking north-east
Viewpoint 5	View from near Meadowbrook Homestead looking north-west
Viewpoint 6	View from Lake Vermont Homestead looking north-west

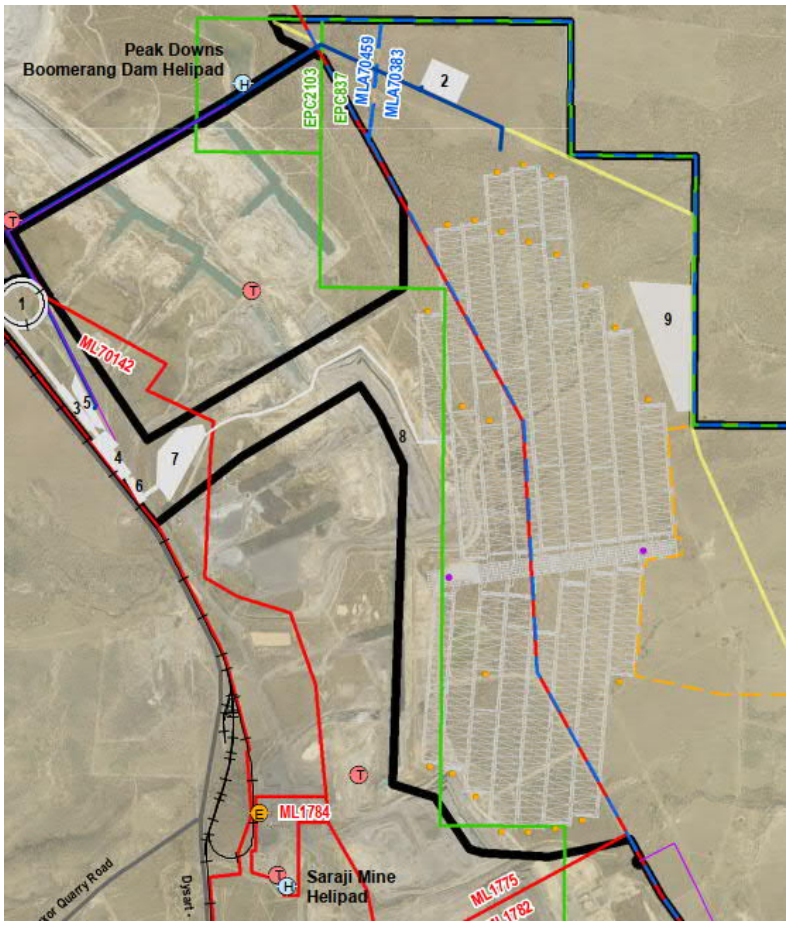
13.5 Potential impacts

This section describes the key components of the Project that are relevant to this assessment. Key components of the development activities anticipated for the Project which are relevant to the assessment of landscape and visual impacts are set out in this section. For further details on the description of the Project, refer to **Chapter 3 Project Description.** The components are shown on Figure 13-4 and described in more detail in Table 13.13 below.

Table 13.13 Potential Project impacts on landscape and visual values

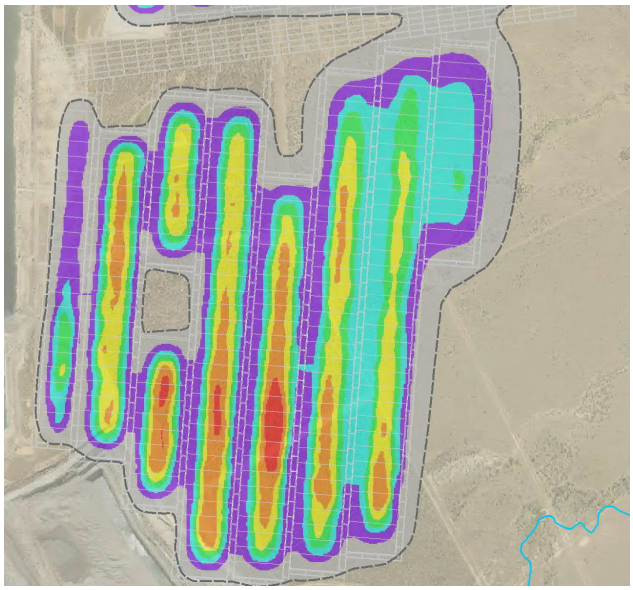
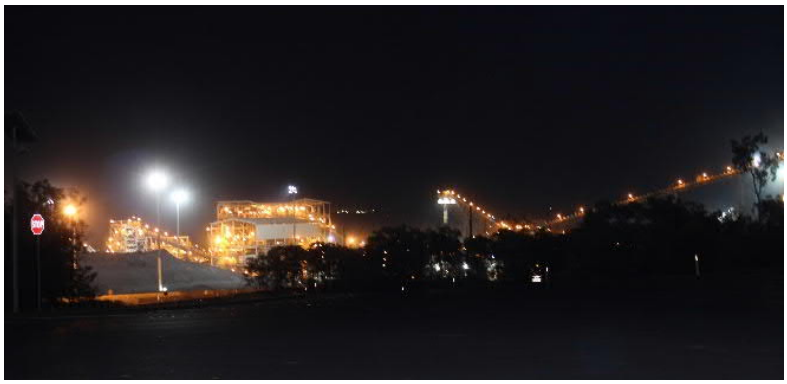
Development activities and infrastructure	Indicative imagery (not actual site)
Removal of vegetation within the MLA Site preparation activities, which will be undertaken for the construction of associated mine infrastructure are commonly conducted during daylight working hours. It is likely that there will be a presence of construction staff and large-scale machinery to assist in vegetation clearance or trimming activities. Temporary stockpiles of cleared vegetation may also be present.	
Construction and operation of new haul roads The construction of new haul roads within the Project Site would entail the presence of construction within the mining leases resulting in shorter term impacts on landscape and visual values. Once operating, the roads would generate longer term impacts on landscape and visual values, particularly associated with the presence of intermittent vehicular traffic, although are within the site so may not be visible in wider views.	
Construction and operation of powerlines Likely sources of impact associated with powerlines include the clearance of vegetation, presence of construction traffic to and within the mining lease areas as well as increased numbers of construction staff. The Project includes relocation and re-connection of the existing 132 kilovolt (kV) powerline to the eastern boundary of MLA 70383 and northern boundary of MLA 70459. Two new 66 kV powerlines will be constructed, comprising a co-aligned 66 kV powerline and connection extending off lease and	

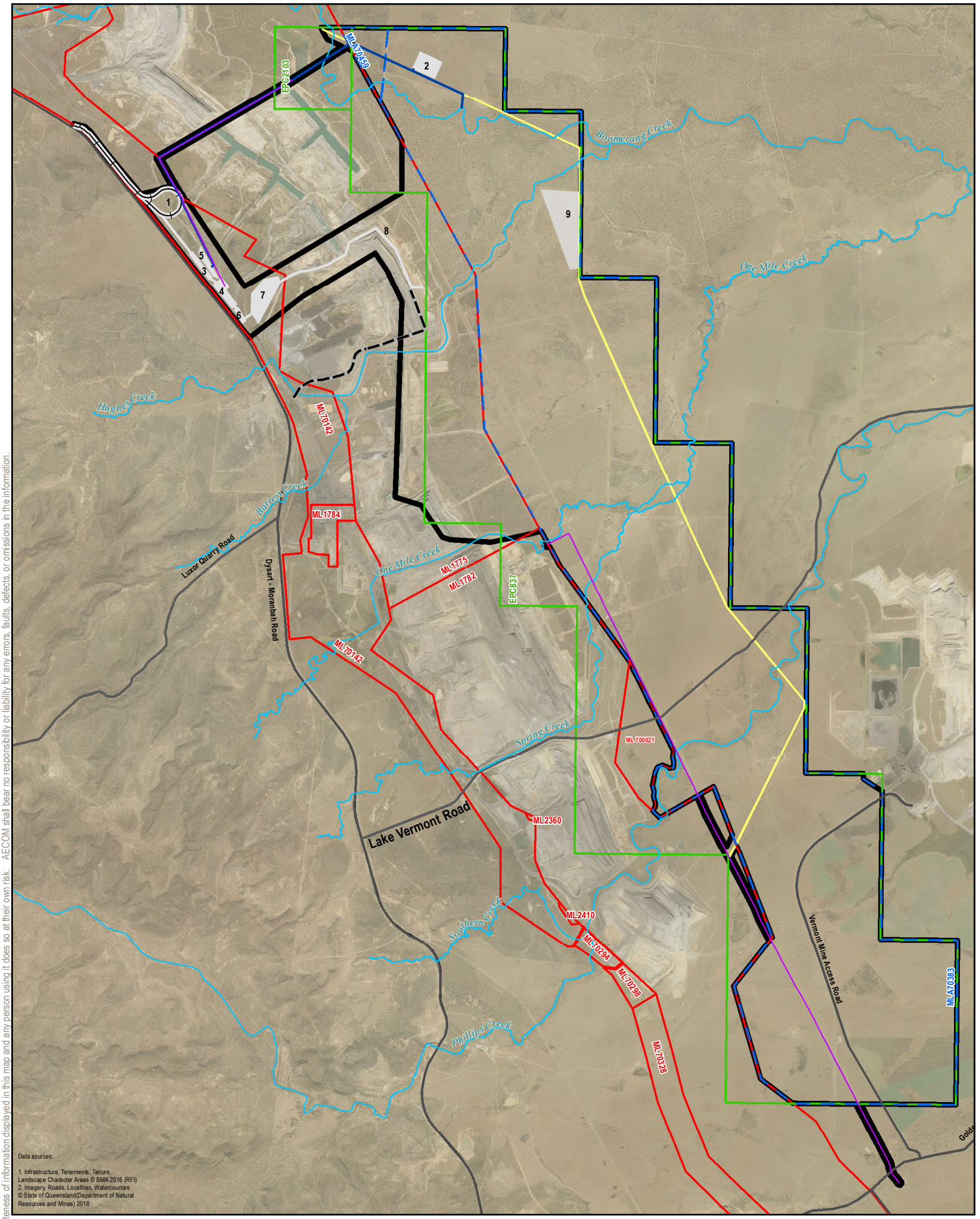
Development activities and infrastructure	Indicative imagery (not actual site)
connecting to the Dysart Substation and a northern extension connecting the Project to the proposed transport and infrastructure corridor.	
Construction and operation of new balloon rail loop A new rail spur, balloon loop and signalling system will be required to connect to the existing rail network. A new balloon rail loop and spur and signalling system will be required on the mainline adjacent to the Norwich Park rail line within ML 70142, adjacent to the Dysart-Moranbah Road. The balloon rail loop will be approximately 4.4 km in length. The balloon rail loop will be a narrow gauge electrified line.	 

Development activities and infrastructure	Indicative imagery (not actual site)
Mine gas pre-drainage vents and flares Mine gas pre-draining wells/vents will be constructed over the area of the proposed underground coal mine within MLA 70459. These are typically less than 5 m high and spaced along collection lines (refer **Chapter 3 Project Description**) and indicated in the illustration. There will be two flares structures which are anticipated to be located near the mine entry. The flares associated with these structures may be visible, particularly at night.	
Construction and operation of support buildings – construction accommodation village An increased number of buildings is proposed, comprising temporary single-storey buildings to house the construction and operation staff. The construction village is approximately 80 ha and would include kitchens and sports fields as well as accommodation. Construction would bring additional traffic, staff and machinery to the mining lease areas. Following consideration of Social Impact Assessment (SIA) related consultation with the Office of the Coordinator-General (OCG) and Isaac Regional Council (IRC) during the development of the EIS, it become evident to BMA	

Development activities and infrastructure	Indicative imagery (not actual site)
that these key stakeholders did not agree that the proposed village was warranted. As a result, BMA is no longer pursuing approval of the operational accommodation village as part of the EIS process.	
Construction and operation of support buildings – MIA An MIA is proposed located on ML 1775. Buildings including administration, operations, communications, workshop and warehouse buildings and car parks as well as construction laydown and storage areas.	
Construction and operation of support buildings – Coal Handling and Processing Plant (CHPP) The CHPP is proposed to be located in ML 70142. It is anticipated to be 25 m high and will be associated with overland conveyors, and coal stockpiles as described below.	
Run of Mine (ROM) product stockpiles and conveyors Non-static coal stockpiles located adjacent to the proposed rail balloon loop will be up to 20 m high and will continuously change in form as mining progresses.	

Development activities and infrastructure	Indicative imagery (not actual site)
Installation of security fencing where required The introduction of chain link security fencing (anticipated to be approximately 1.8 m high) would result in the introduction of industrial type fencing into a rural landscape, east of the existing Saraji Mine. The construction of the fence would require construction crew and plant which could generate short term adverse impacts.	
Construction and operation of water management infrastructure – raw water dam and process water dam A small raw water dam is proposed in the vicinity of the CHPP. A process water dam is proposed in the far north of the Site connected by a water pipeline. As these features are at ground level, they are not anticipated to be prominent features in views.	
Topsoil and out of pit spoil disposal Waste material including removed topsoil, tailings and CHPP rejects will be placed in existing open cut spoil dumps. While these are likely to cause some of the most visually prominent sources of impacts within the Project Site, they are already necessitated by existing open-cut activities. From a landscape character perspective, this is due to the contrast between the mine's footprint and the surrounding rural landscape.	

Development activities and infrastructure	Indicative imagery (not actual site)
Subsidence Due to the unsupported strata (goaf) collapsing into the mined void, areas will subside resulting in a pitted and rolling surface up to around 3.5 m deep above the underground mine. This may be visually differentiated from the surrounding flat floodplain landscape.	
Rehabilitation As rehabilitation is undertaken it is likely that machinery and staff will be present in these sections of the mine site. This is likely to be the result of re-grading, planting and maintenance. Rehabilitated landscapes will typically blend more consistently into their wider landscape setting than they would if left in a disturbed state. However, the colours may be noticeably different to that currently existing, at least in the early years, due to the new growth of grass seed and juvenile trees, which may stand out as being somewhat greener than surrounding pastures.	
Project lighting Lighting of the Project Site will be required for safety, security and for the operation of the MIA, CHPP and conveyors, as well as within the construction accommodation village which will result in night time impacts. The image shows the current night time lighting as experienced from Dysart-Moranbah Road which is typical of the type of lighting anticipated.	



Data sources:

1. Infrastructure, Tenements, Tenure, Landscape Character Areas © BMA 2016 (RFI)
2. Imagery, Roads, Localities, Watercourses © State of Queensland(Department of Natural Resources and Mines) 2018

LEGEND

- Project Site
- Watercourse
- Public Road
- Surface Infrastructure
- Transport and/or Infrastructure Corridor
- Watercourse
- Pipeline
- 66kV Powerline
- Rail Loop
- Haul Road
- Exploration Permit Coal (EPC)
- Mining Lease (ML)
- Mining Lease Application (MLA)

1 Rail Loading Balloon Loop
2 Process Water Dam
3 Product Stockpiles
4 CHPP
5 Raw Water Dam
6 ROM Pad
7 Future MIA
8 Conveyor
9 Construction Village

N

Figure 13-4
Visible Project Components

Environmental Impact Statement
Saraji East Mining Lease Project

0 0.5 1 2
Kilometres

Scale: 1:110,000 (when printed at A4)

Projection: Map Grid of Australia - Zone 55 (GDA94)

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13.5.1 Lighting

Project lighting is proposed as follows and as shown on Figure 13-5.

Accommodation village and internal roads: The construction accommodation village will be made up of small pre-made living units which may have some outdoor lighting for a patio. The village will have street lighting similar to a residential suburb and will be lit in accordance with the AS 1158 series. Poles will be between 8 m to 12 m high with lights between 150 watts (W) and 250 W.

MIA: The MIA will operate 24 hours a day, 365 days a year and will be lit using flood lights. Each building in the MIA will be lit according to its function. The lighting for each building will be contained within it and spill lighting will be minimal. All pedestrian walkways between buildings will be lit to a minimum average of 40 lux which will be done using small poles and low wattage fittings (approximately 2 m to 5 m pole, 100 W to 250 W). As there will be no large mast pole lighting the effective spill area will be limited to the area outside the boundary of the MIA.

CHPP: The CHPP will operate 24 hours a day, 365 days a year (excluding maintenance shut down periods) and will be lit using flood lights. Each level of the CHPP will be well lit to various lux levels using flood lights. The structure will use lights between 250 W for walkways and the lower levels to 1,000 W lights which could be mounted on the roof to light up large areas. As there will be lights facing all directions there will be a considerable amount of spill lighting leading away from the CHPP.

Conveyor: Low lights will be placed at regular intervals along the conveyer to maintain a 40 lux average. This will require lights between 50 W and 150 W depending on the spacing and height. As these poles will be quite low there will be very limited spill lighting.

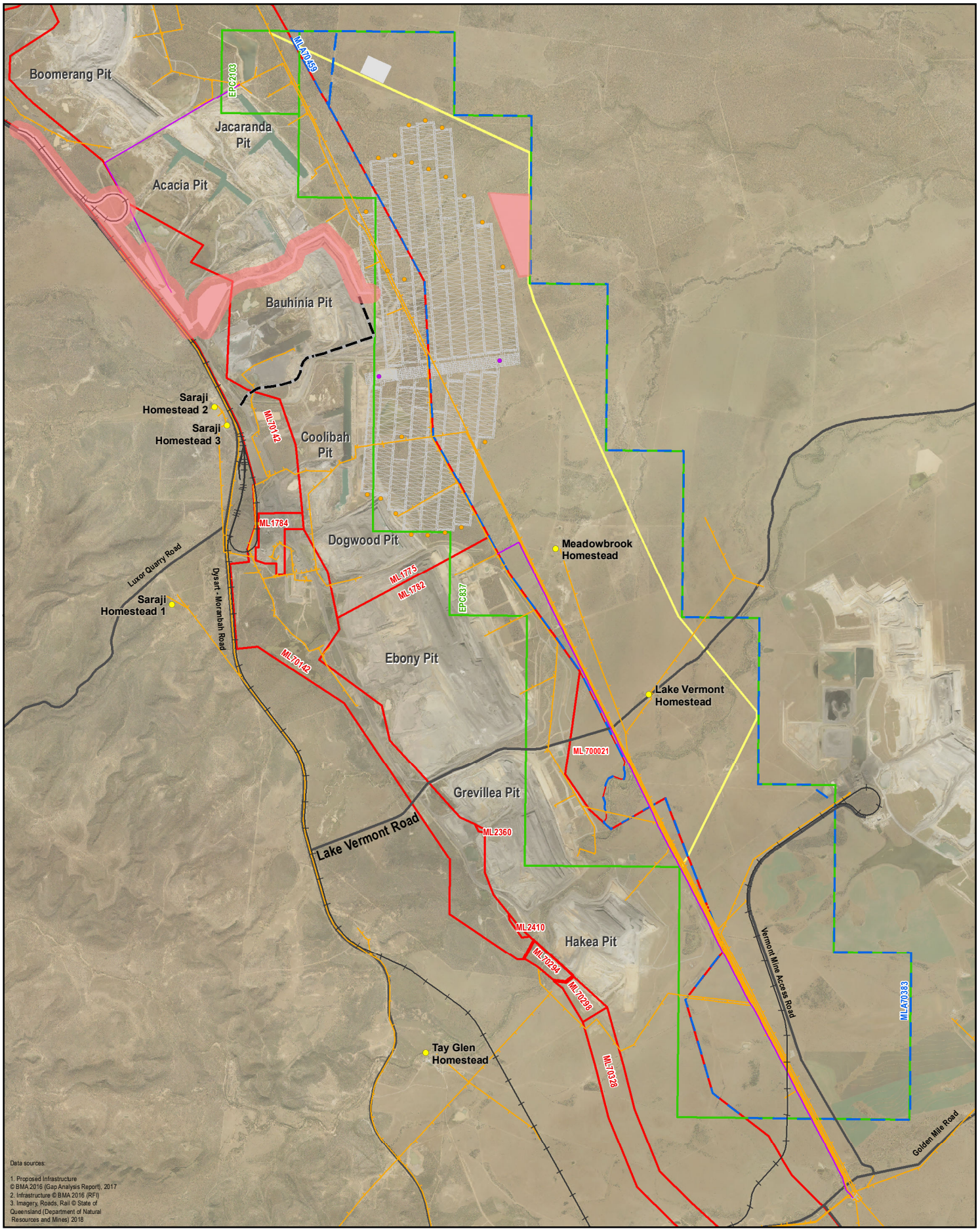
Pedestrian walkways and carparks: Pedestrian walkways will be lit using a similar method to the conveyors. As such, they will not produce any significant spill lighting. Some large carparks will be lit using tall poles and high wattage luminaires. If the carparks are lit in accordance with the AS 1158 series the amount of spill lighting will be minimised. The carparks would also be very far from any sensitive areas and the risk spill lighting is minimal.

ROM Pad: The ROM pad and the haul road leading to it are well lit using 15 m to 20 m poles and bright luminaires (2000 W to 4000 W). If orientated incorrectly, this could produce a significant amount of spill lighting.

Mobile plant: Mobile plant will require minimal extra lighting as in most cases the plant will be located in an already lit area. If this is not the case the plant will come with its only lighting if it is required. This lighting would provide the minimum amount of light required to operate the plant and will not have an effect on the surrounding area.

Gas drainage network and flares: There are no lighting requirements around gas drainage points. It was assumed that the two flare stacks would present and in continuous operation.

Other safety lighting: Other safety lighting may be required; particularly where heavy vehicles operate.



LEGEND

- Homestead
- Existing Powerline
- Existing Railway
- Public Road
- Potential Area Affected by Light
- Indicative Flare Location
- Indicative Vent Location
- Rail Loop
- 66kV Powerline
- Proposed Haul Road
- Surface Infrastructure
- Transport and/or Infrastructure Corridor
- Underground layout (optimised)
- Exploration Permit Coal (EPC)
- Mining Lease (ML)
- Mining Lease Application (MLA)

1 Rail Loading Balloon Loop
2 Process Water Dam
3 Product Stockpiles
4 CHPP
5 Raw Water Dam
6 ROM Pad
7 Future MIA
8 Conveyor
9 Construction Village

N

Figure 13-5
Lighting Plan

Environmental Impact Statement
Saraji East Mining Lease Project

0 0.5 1 2
Kilometres

Scale: 1:110,000 (when printed at A4)
Projection: Map Grid of Australia - Zone 55 (GDA94)

BHP

DATE: 6/08/2020 VERSION: 2

13.5.2 Landscape character impact assessment

The existing landscape character is described in Section 13.4.3 and shown in Figure 13-3. Table 13.14 to Table 13.17 provide an assessment of the landscape character sensitivities for each identified Landscape Character Type, the likely magnitude of change as a result of the identified potential impacts, an overall level of visual effect, and a resultant significance of that effect. Photographs provided in this assessment are actual photographs taken during the field work program.

Table 13.14 Landscape Character Type A (LCT A): mined and transitional lands

LCT A: Mined and transitional lands	
	
Character baseline assessment	
Location	This landscape type occupies a defined area approximately north-west to south-east through the Project Site, generally east of Dysart-Moranbah Road.
Key characteristics	• mining is a visually prominent landscape type • this landscape has been subjected to intensive mining activities that have significantly changed the visual character of the landscape • removal of vegetation, although remnant vegetation stands remain within and around site boundaries • significant modification to topography with large open cut pit areas bounded by large spoil dumps • presence of structures associated with mining including powerlines, freight railway lines (Norwich Park line) • generally, the most visible aspects of this landscape are the spoil dumps, the rehabilitated mounds and the associated infrastructure. • access into this landscape is generally restricted to mining personnel with security fencing around site boundaries • views within and into the mined areas are typically restricted by the boundary landform and vegetation.
Landscape evaluation	
Overall inherent sensitivity	The overall sensitivity of this landscape is considered to be negligible. This is because: • the landscape a highly modified and not valued for its scenic quality • the landscape largely falls within the area which falls within the zones allocated for mining leases, potential key resource area and mineral development licences/extractive resources within the Broadsound and Belyando planning schemes • modification within this area for mining is consistent with the character of the landscape and it can readily accommodate additional change.
Judgement of magnitude of change	The magnitude of change to LCT A is noticeable and, therefore, low, due to the following factors:

LCT A: Mined and transitional lands	
	• the main effect results from the introduction of new elements into the landscape (i.e. the introduction of new rail balloon loop, product stockpiles, raw water dam, conveyors, CHPP and MIAs) • other effects are associated with the removal of areas of vegetation • these elements are being added into previously disturbed and rehabilitated areas • the changes will be clearly evident but will not change the character of the landscape.
Judgement of potential effect	**Minor to negligible adverse,** due to the negligible degree of landscape sensitivity combined with a low magnitude of change.
Significance of effect	**Not significant**: the effect of the Project on LCT A is considered to be minor to negligible and, therefore, not significant.

Table 13.15 Landscape Character Type B (LCT B): lowland rural plains

LCT B: lowland rural plains	
	
Character baseline assessment	
Location	This landscape type occupies the area east of the existing Saraji Mine and Peak Downs Mine associated with the valley of the Isaac River.
Key characteristics	• flat to gently shelving rural farmland • landscape is used for grazing, predominantly by cattle, and associated rural infrastructure including barns and fenced areas is located across the landscape • predominantly open landscape due to vegetation clearance with expansive panoramic views to distant horizons • remnant stands of trees and shrubs remain within some grazing areas, particularly associated with the creeks (Phillips Creek, One Mile Creek, Boomerang Creek, Plumtree Creek and Ripstone Creek) that traverse this landscape typically in a west to east direction towards the Isaac River (around 20 km from Saraji Mine), which creates visual interest in the landscape and punctuates the horizons with vegetation • presence of structures supporting the adjacent mining areas including powerlines • access into this landscape is generally restricted to rural workers and residents of the isolated farmsteads that are located at low density across the area, typically accessed by private driveways • views of adjoining LCT A throughout much of this area - generally the most visible aspects of the adjoining landscape are the spoil dumps on the eastern edge of the existing Saraji Mine pits

LCT B: lowland rural plains	
	• few roads traverse the area - local roads such as Lake Vermont Road and adjoining private driveways allow expansive views across the landscape but larger public roads such as Fitzroy Developmental Road (some 30 km to the east) are bound by extensive tree-lined verges that restrict views.
Landscape evaluation	
Overall inherent sensitivity	The overall sensitivity of this landscape is considered to be medium. This is because: • the scenic character of the landscape is not protected in any planning scheme for its scenic quality, except for its rural character • the landscape is anticipated to be valued by local residents • open views make any changes in the landscape visible across a wide area • adjoining mining landscapes intrude on the natural and rural qualities of the landscape and give this landscape some capacity to accommodate additional change.
Judgement of magnitude of change	The magnitude of change to LCT B is considerable and, therefore, medium, due to the following factors: • the main effect on landscape results from the introduction of new elements into the landscape, however, within this landscape type they are predominantly underground, and the main impact will be long term subsidence • key changes in surface landscape elements relate to vegetation clearance and the introduction of the proposed accommodation village • the process water dam is also located within this landscape type, which is a small element at surface level • these changes will be clearly evident but will not fundamentally change the character of the landscape.
Judgement of potential effect	**Moderate adverse** due to the medium degree of landscape sensitivity combined with a medium magnitude of change.
Significance of effect	**Not significant**: the effect of the Project on LCT B is considered to be moderate adverse and, therefore, not significant.

Table 13.16 Landscape Character Type C (LCT C): undulating hills with open forest

LCT C: undulating hills with open forest	
 	
Character baseline assessment	
Location	This landscape type occupies the area west of the existing Saraji Mine, and Peak Downs Mine and Dysart-Moranbah Road associated with elevated and undulating landscape.

LCT C: undulating hills with open forest	
Key characteristics	• undulating and hilly landscape • landscape is a mosaic of forested areas and grazing properties predominantly cattle with associated rural infrastructure including barns and fenced areas • isolated clusters of farmsteads, typically adjacent to main roads or on areas permitting views across the landscape • few roads traverse the area, typically small local roads and private driveways • tree-lined verges exist along property boundaries and roads • traversed by small creek lines some of which are only seasonally wet (tributaries of the Isaac River, draining in a west to east direction) including Harrow Creek, Sawmill Creek, Kennedy Creek, and Boomerang Creek • access into this landscape is generally restricted to rural workers and residents of the isolated farmsteads • predominantly enclosed landscape due to combination of undulating landform and vegetation but with occasional expansive views out from more elevated and cleared areas • occasional views of adjoining LCT A in the east of this area - typically spoil dumps - and to LTC D in the west.
Landscape evaluation	
Overall inherent sensitivity	The overall sensitivity of this landscape is considered to be medium. This is because**:** • the scenic character of the landscape is not protected in any planning scheme for its scenic quality, except for its rural character • the landscape is anticipated to be valued by local residents • the landscape is relatively undeveloped with strong natural qualities and interesting topography • generally low capacity to accommodate change but adjoining mining landscapes intrude on the natural and rural qualities of the landscape in the east of the landscape character area and give this landscape some capacity to accommodate additional change.
Judgement of magnitude of change	The magnitude of change to LCT C is barely perceptible and, therefore, negligible due to the following factors: • there are no direct impacts on this landscape type • there are impacts on the adjacent LCT A which will result in changes to the visual setting along the eastern part of this area. However, these are localised and will not generally be perceived across most of this zone due to the undulated and vegetated character which restrict views • these changes will have minimal effect on the character of the landscape.
Judgement of potential effect	**Minor** (indirect) adverse due to the medium degree of visual sensitivity combined with a negligible magnitude of change.
Significance of effect	**Not significant**: the effect of the Project on LCT C is considered to be minor adverse and, therefore, not significant.

Table 13.17 Landscape Character Type D (LCT D): rural ranges and peaks

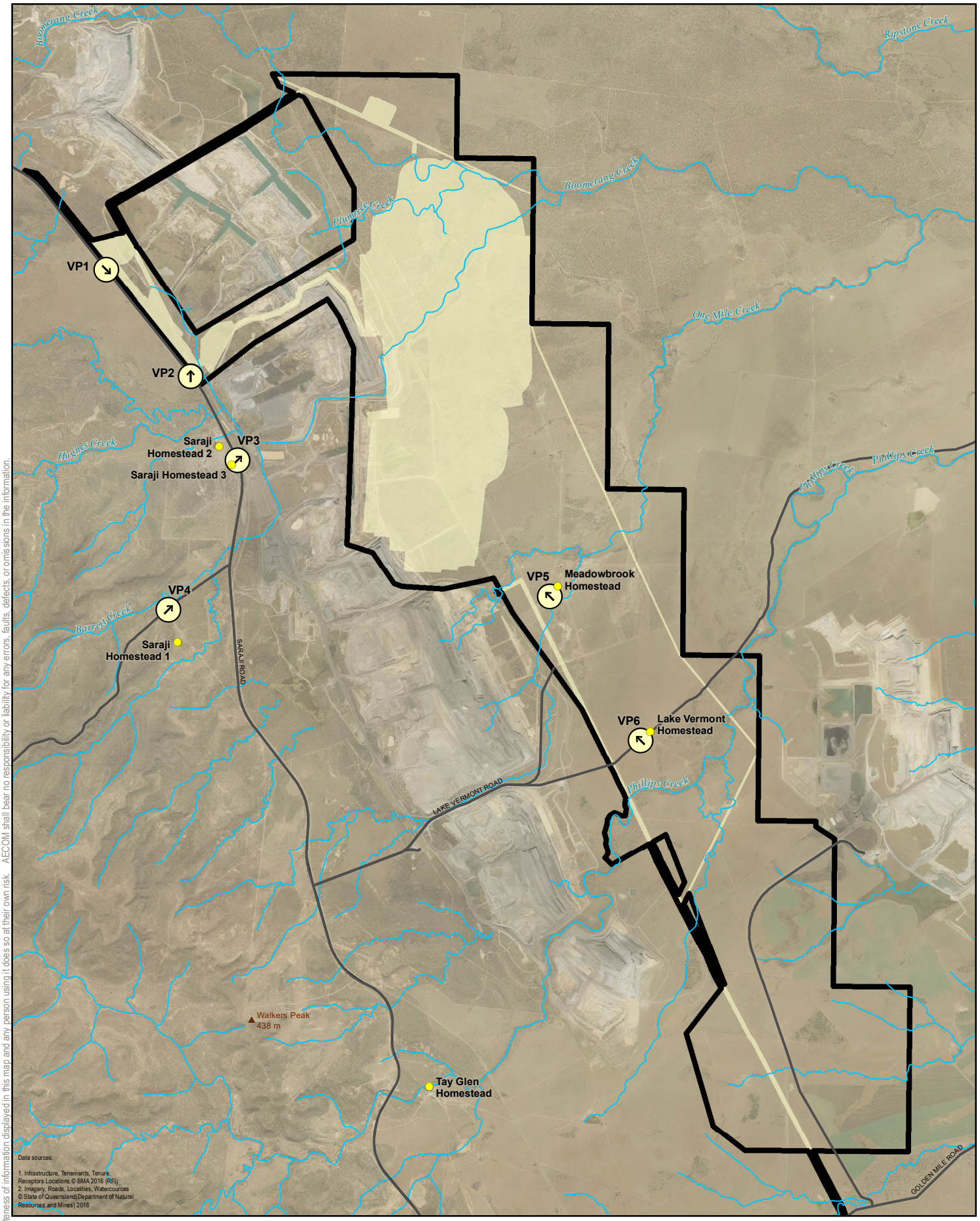
LCT D: rural ranges and peaks	
Due to the distance of this area from the Project Site, images have not been obtained	
Character baseline assessment	
Location	This landscape type occupies the area west of LCT C. It is therefore located over 15 km from the Project Site with limited potential to be affected by the Project.
Key characteristics	• rural landscape interspersed with national parks • distinctive national park features created by volcanic landform including Gemini Peaks, Wolfgang Peak, Lord's Table Mountain and Eastern Peak • includes areas of dense vegetation • few roads traverse the area, typically small local roads and Peak Downs Highway • traversed by small creek lines typically draining towards Diamond Creek and Logan Creek that are tributaries of the Suttor River • separated from the Project Site by distance (over 15 km) and intervening hilly and vegetated landscape of LCT C • recreational visitors may pass through other areas travelling to Peak Downs National Park.
Landscape evaluation	
Overall inherent sensitivity	The overall sensitivity of this landscape is considered to be high. This is because: • the scenic character of parts of this landscape is protected in planning schemes at a national level (Peak Downs National Park) and the surrounding rural landscape provides an important setting for the landform features of the Peak Downs National Park • the landscape is anticipated to be valued by residents and visitors to the area • the landscape has strong natural and rural qualities with particularly interesting topographic features • overall, this area has a low capacity to accommodate change.
Judgement of magnitude of change	The magnitude of change to LCT D is not perceptible and, therefore, no impacts are anticipated due to the following factors: • distance of LCT D from the Project Site • separation of this landscape type from the Project Site by intervening landform and vegetation of LCT B • weak visual relationship between this landscape type and the Project Site except as experienced by people travelling through the landscape.
Judgement of potential effect	No impact: due to the high degree of visual sensitivity combined with no measurable magnitude of change.
Significance of effect	Not significant: The Project is considered to have no impact on LCT D and is therefore, not significant.

13.5.3 Scenic amenity and lighting impact assessment

A visual impact assessment of the Project was undertaken by providing an assessment of the potential impact on the existing viewshed from selected key locations around the Project Site identified on Figure 13-6.

The assessment considers the amenity of the view as well as the potential impacts of lighting upon each viewpoint identified. The assessment describes the existing lighting conditions from the representative viewpoints along with the location and proximity of the viewpoint to the lighting source to provide a baseline against which the impacts of the Project can be extrapolated.

As the mining activities will be primarily undertaken underground, night lighting impacts on nearby receptors will principally be associated with aboveground activities comprising the MIA, the CHPP, product stockpiles and rail loading balloon loop. There would also be potential lighting impacts associated with the gas flare from the two gas vent stacks; albeit the two proposed flares are located over four km from the closest receptor.



LEGEND

- Project Site
- Project Footprint
- Homestead
- Mountain Peak
- Public Road
- Watercourse
- Representative Viewpoint Location

N

Figure 13-6
Visual Receptors and Representative Viewpoint Locations

Environmental Impact Statement
Saraji East Mining Lease Project

0 0.5 1 2
Kilometres

Scale: 1:110,000 (when printed at A4)

Projection: Map Grid of Australia - Zone 55 (GDA94)

BHP

DATE: 4/08/2020 VERSION: 2

Filename: P:\605X\605070311\4. Tech Work Area\4.99 GIS\02_MXDs\06 Environmental Impact Statement\13 Scenic Amenity and Lighting\60507031_G116_v1_A4P.mxd

The scenic amenity and lighting assessment for each viewpoint is described in Table 13.18 to Table 13.22.

Table 13.18 Likely visual effect of the Project on Viewpoint 1

Viewpoint 1 – view from Dysart-Moranbah Road looking south-east	
 Refer to Figure 13-7 for full scale image	
Visual baseline assessment	
Location and description	• GPS Location: -22.355, 148.2419 • the Project Site is 70 m at its closest point (to the north-east) and Project footprint is located 144 m away • represents typical publicly accessible views of people travelling south along Dysart-Moranbah Road • key viewer groups likely to comprise mine and quarry workers, residents travelling between Moranbah and Dysart, residents accessing rural residential properties around the Project Site and occasionally tourists/visitors passing through this area to access other recreational areas • the landscape in this view comprises largely LCT A, with glimpses to LCT C and LCT D • infrastructure components are an existing element of the view including the road and the Norwich Park railway line and rail infrastructure which run parallel to the road • disturbed land associated with mining activities can also be seen in the distance • landscape appears fairly flat and is punctuated by vegetation including scattered vegetation beside the road and railway line.
Visual evaluation	
Sensitivity	The overall sensitivity of receptors from this point is considered to be low. This is due to medium numbers of travellers who are travelling at speed and likely to have only a passing interest in their surrounds. Sensitivity is also lessened due to the prominence of mine infrastructure as viewed from other parts of the Dysart-Moranbah Road.
Judgement of magnitude of change	The magnitude of change to this viewpoint is considered to be considerable and, therefore, medium, due to the following factors: • the proximity to the Project - the nearest component is less than 200 m of this viewpoint) • vegetation removal will be necessary to accommodate the mine infrastructure that will decrease the sense of naturalness of the view • in this view, the product stockpiles will be visible (located around one km away) as well as the train using the rail loading balloon loop, the conveyor and infrastructure associated with the CHPP • the 66 kV powerline will be visible beyond the rail line

Viewpoint 1 – view from Dysart-Moranbah Road looking south-east	
	• the presence of existing rail infrastructure and mine spoil in the view lessens the degree of contrast associated with the introduction of the new elements.
Judgement of potential effect	**Moderate adverse**: due to the low degree of visual sensitivity combined with a high magnitude of change.
Significance of effect	**Not significant** The effect of the Project on Viewpoint 1 is considered to be minor to moderate adverse and therefore not significant.
Lighting evaluation	
Sensitivity	The overall sensitivity of receptors from this point is considered to be low. Low numbers of travellers are anticipated at night and these will be travelling at speed and likely to have only a passing interest in their surrounds. Most will be workers at Saraji or nearby mines. Sensitivity is also lessened due to the prominence of mine infrastructure as viewed from other parts of the Dysart-Moranbah Road.
Judgement of magnitude of change	The existing landscape in this location is predominantly dark, although there is light spill from the nearby Acacia and Bauhinia Pit. The lighting associated with the stockpiles and nearby balloon loop/loading facility will change this to predominantly lit. This represents a low magnitude of change.
Judgement of potential effect	**Minor adverse** due to the low degree of lighting sensitivity combined with a low magnitude of change.
Significance of effect	**Not significant**: the effect of the Project lighting on Viewpoint 1 is considered to be minor adverse and therefore not significant.

Table 13.19 Likely visual effect of the Project on Viewpoint 2

Viewpoint 2 – view from Dysart-Moranbah Road looking north	
 Refer to Figure 13-8 for a full-scale image	
Visual baseline assessment	
Location and description	• GPS Location: -22.3764, 148.2605. • the Project Site is less than 70 m at its closest point and Project footprint is around 90 m away • represents typical publicly accessible views of people travelling northwards along Dysart-Moranbah Road • key viewer groups likely to comprise mine and quarry workforce, residents travelling between Moranbah and Dysart, residents accessing rural residential properties around the Project Site and occasionally tourists/visitors passing through this area to access other recreational areas

Viewpoint 2 – view from Dysart-Moranbah Road looking north	
	• the landscape in this view comprises largely LCT A • infrastructure components are an existing element of the view including the road and the Norwich Park railway line catenary and rail infrastructure which run parallel to the road • the landscape appears fairly flat and is punctuated by scattered roadside vegetation and vegetation belts adjoining the railway line and within the mine site.
Visual evaluation	
Overall inherent sensitivity	The overall sensitivity of receptors from this point is considered to be low. This is due to medium numbers of travellers who are travelling at speed and likely to have only a passing interest in their surrounds. Sensitivity is also lessened due to the prominence of mine infrastructure as viewed from other parts of the Dysart-Moranbah Road.
Judgement of magnitude of change	The magnitude of change to this viewpoint is considered to be considerable and therefore medium, due to the following factors: • the proximity to the Project - in this view, the MIA which is approximately 420 m away, the conveyor and infrastructure associated with the ROM Pad, with the CHPP located beyond, are all likely to be visible • the proposed conveyor is located less than 1.4 km to the east-northeast of this viewpoint • vegetation removal will be necessary to accommodate the conveyor and other mine infrastructure that will decrease the sense of naturalness of the view • the presence of existing rail infrastructure in the view and, generally the presence of existing mining infrastructure visible travelling along Dysart-Moranbah Road lessens the degree of contrast associated with the introduction of the new elements.
Judgement of potential effect	**Minor to moderate adverse** due to the low degree of visual sensitivity combined with a medium magnitude of change.
Significance of effect	**Not significant** the effect of the Project on Viewpoint 2 is considered to be minor to moderate adverse and therefore not significant.
Lighting evaluation	
Sensitivity	The overall sensitivity of receptors from this point is considered to be low. Low numbers of travellers are anticipated at night and these will be travelling at speed and likely to have only a passing interest in their surrounds. Most will be workers at Saraji or nearby mines. Sensitivity is also lessened due to the prominence of mine infrastructure as experienced in transient sequential views from other parts of the Dysart-Moranbah Road.
Judgement of magnitude of change	The existing landscape in this location is predominantly dark, although there is light spill from the nearby Acacia and Bauhinia Pit. The lighting associated with the MIA, ROM, CHPP and conveyor will change this to predominantly lit. This represents a low magnitude of change.
Judgement of potential effect	**Minor adverse** due to the low degree of lighting sensitivity combined with a low magnitude of change.
Significance of effect	**Not significant** the effect of the Project lighting on Viewpoint 2 is considered to be minor adverse and therefore not significant.

Table 13.20 Likely visual effect of the Project on Viewpoint 3

Viewpoint 3 – view from Dysart-Moranbah Road near Saraji Homesteads 2 and 3 looking north-east	
 Refer to Figure 13-9 for a full-scale image	
Visual baseline assessment	
Location and description	• GPS Location: -22.3933, 148.2708 • the Project Site is 1.9 km at its closest point, with the Project Footprint lying around 2 km away • represents typical publicly accessible views of people travelling north along Dysart-Moranbah Road • viewpoint also representative of views from Homesteads. Saraji Homestead 3 is located 166 m from this viewpoint and is set back from the site boundary behind scattered roadside vegetation. Saraji Homestead 2 is located around 510 m from this viewpoint and is set back from the site boundary behind roadside vegetation • key viewer groups likely to comprise mine and quarry workforce, residents travelling between Moranbah and Dysart, residents accessing rural residential properties around the Project Site and, occasionally tourists/visitors passing through this area to access other recreational areas. • the landscape in this view comprises largely LCT A • infrastructure components are an existing element of the view including the road and the Norwich Park railway line catenary and rail infrastructure which run parallel to the road • the landscape appears fairly flat and is punctuated by scattered roadside vegetation and vegetation belts adjoining the railway line.
Visual evaluation	
Overall inherent sensitivity	The overall sensitivity of receptors from this point is considered to be medium. This is due to the presence of a very small number of residents who are anticipated to have proprietary interest in their surrounds and a medium number of travellers who are travelling at speed along Dysart-Moranbah Road who are likely to have only a passing interest in their surrounds.
Judgement of magnitude of change	The magnitude of change to this viewpoint is considered to be noticeable and, therefore, low, due to the following factors: • the proximity to the Project - the nearest new surface component is the MIA which is located approximately 2.0 km from this viewpoint • in this view, the main impact will be the perception of vegetation removal in the distance, which is necessary to accommodate the mine infrastructure but may decrease the sense of naturalness of the view • views from homesteads will be substantially buffered by the presence of retained vegetation to the east of the road as well as any vegetation within the existing Saraji Mine site that can be retained • the presence of existing rail infrastructure in the view lessens the degree of contrast associated with the introduction of the new elements.

Viewpoint 3 – view from Dysart-Moranbah Road near Saraji Homesteads 2 and 3 looking north-east	
Judgement of potential effect	**Minor to moderate adverse** due to the medium degree of visual sensitivity combined with a low magnitude of change.
Significance of effect	**Not significant** the effect of the Project on Viewpoint 3 is considered to be minor to moderate adverse and, therefore, not significant.
Lighting evaluation	
Sensitivity	The overall sensitivity of receptors from this point is considered to be medium. Low numbers of travellers are anticipated at night and these will be travelling at speed and likely to have only a passing interest in their surrounds. Most will be workers at Saraji or nearby mines. However, viewers at Saraji Homestead 2 and 3 will have prolonged viewing opportunities, albeit some screening of lighting will be provided by the existing mature roadside vegetation between the site and the properties.
Judgement of magnitude of change	The existing landscape in this location is predominantly dark, although there is light spill from the nearby Acacia and Bauhinia Pit. The lighting associated with distant spill from the CHPP and MIA will potentially be visible from this location changing the lighting level to predominantly lit. This represents a low magnitude of change.
Judgement of potential effect	**Minor to moderate adverse** due to the medium degree of lighting sensitivity combined with a low magnitude of change.
Significance of effect	**Not significant** the effect of the Project lighting on Viewpoint 3 is considered to be minor to moderate adverse and therefore not significant.

Table 13.21 Likely visual effect of the Project on Viewpoint 4

Viewpoint 4 – view from Luxor Quarry Road near Saraji Homestead 1 looking north-east	
 Refer to Figure 13-10 for a full-scale image	
Visual baseline assessment	
Location and description	• GPS Location: -22.4236, 148.256 • located approximately 600 m from Saraji Homestead 1 • the Project Site is 4.3 km at its closest point with surface infrastructure around 5.4 km away • represents views obtained travelling northeast along Luxor Quarry Road • key viewer groups include road users, comprising quarry workers and a small number of residents, as well as being representative of private views obtained from the Saraji Homestead 1 (closest available public views) • the landscape in this view comprises largely LCT C with more distant views to LCT A • disturbed land associated with mining activities can also be seen in the distance comprising the spoil mounds associated with Coolibah Pit • landscape is gently undulating comprising cattle grazing and rolling forested hills.
Visual evaluation	
Overall inherent sensitivity	The overall sensitivity of receptors from this point is considered to be low. This is due to the very low numbers of travellers likely to be travelling along Luxor Quarry Road.
Judgement of magnitude of change	The magnitude of change to this viewpoint is considered to be noticeable and, therefore, low, due to the following factors: • the proximity to the Project - the nearest significant new elements are the MIA and the underground mine area which are both located over 5 km from this vantage point • the views are likely to be curtailed by intervening vegetation and landform, including the existing spoil associated with Coolibah Pit.
Judgement of potential effect	**Minor adverse** due to the low degree of visual sensitivity combined with a low magnitude of change.
Significance of effect	**Not significant** the effect of the Project on Viewpoint 4 is considered to be minor adverse and, therefore, not significant.
Lighting evaluation	
Sensitivity	The overall sensitivity of receptors from this point is considered to be low. Low numbers of travellers are anticipated at night and

Viewpoint 4 – view from Luxor Quarry Road near Saraji Homestead 1 looking north-east	
	there are few residents located at long distances from new mine Project components.
Judgement of magnitude of change	The existing landscape in this location is predominantly dark, although there is anticipated to be light spill from the nearby Saraji Mine. It is anticipated that light levels will remain similar during the Project due to the distance of this vantage point from potential light sources. This represents a negligible magnitude of change.
Judgement of potential effect	**Minor to negligible adverse** due to the low degree of lighting sensitivity combined with a negligible magnitude of change.
Significance of effect	**Not significant** the effect of the Project on Viewpoint 4 is considered to be minor to negligible adverse and therefore not significant

Table 13.22 Likely visual effect of the Project on Viewpoint 5

Viewpoint 5 – view from near Meadowbrook Homestead looking north-west	
 Refer to Figure 13-11 for a full-scale image	
Visual baseline assessment	
Location and description	• GPS Location: -22.4185, 148.3404 • expansive panoramic view looking north-west from private area within Meadowbrook Homestead accessed from Lake Vermont Road • located within the Project Site, approximately 365 m south-east of Project Footprint, around 1.8 km from proposed underground mine area and over 4.5 km from the nearest surface infrastructure components • represents views obtained from residents of Meadowbrook Homestead • BMA has purchased Meadowbrook Homestead and the tenants will be vacated when impacted by mining activities • dwellings and barns associated with Meadowbrook are visible to the east of this view (just beyond the right side of the selected photograph) • the landscape in this view comprises foreground views of LCT B with views of LCT A beyond • disturbed land associated with mining activities can be seen in the distance comprising the spoil mounds associated with Coolibah and Bauhinia Pit (visible to the south, just beyond the left side of the photograph) • landscape is largely flat, comprising cattle grazing and rough pasture with scattered vegetation and tree belts

Viewpoint 5 – view from near Meadowbrook Homestead looking north-west	
	• the landscape is punctuated by a line of electricity transmission towers.
Visual evaluation	
Overall inherent sensitivity	The overall sensitivity of receptors at this vantage point is considered to be low. This is because this vantage point can only be accessed by residents of Meadowbrook which is an isolated rural homestead. While residents have proprietary interest in the view, these views are already affected by mining infrastructure and the viewpoint is located at distance from proposed elements within the Project Site. When required for mining or subject to mining impacts the homestead will be vacated.
Judgement of magnitude of change	The magnitude of change to this viewpoint is considered to be considerable and, therefore, medium, due to the following factors: • the proximity to the Project - the nearest significant new elements are the underground mine area, which is located beyond a vegetated creek line over 1.8 km from this vantage point. other infrastructure includes the construction village located around 6 km away and the gas flares at beyond 4.5 km • the views are likely to be curtailed by intervening vegetation including associated with One Mile Creek and other retained vegetation.
Judgement of potential effect	**Minor to moderate adverse** due to the low degree of visual sensitivity combined with a medium magnitude of change.
Significance of effect	**Not significant** the effect of the Project on Viewpoint 5 is considered to be minor to moderate adverse and, therefore, not significant.
Lighting evaluation	
Sensitivity	The overall sensitivity of receptors from this point is considered to be low. Low numbers of residents are anticipated to be present at night, particularly as the residence will be vacated once mining activities impact the property.
Judgement of magnitude of change	The existing landscape in this location is predominantly dark, although there is anticipated to be light spill from the nearby Saraji Mine pits. It is anticipated that light levels will remain similar during the Project due to the distance of this vantage point from potential new light sources including the proposed construction village and components associated with the underground mine. There may also be views of the gas flare. This represents a negligible magnitude of change.
Judgement of potential effect	**Minor to negligible adverse** due to the low degree of lighting sensitivity combined with a negligible magnitude of change.
Significance of effect	**Not significant** the effect of the Project on Viewpoint 5 is considered to be minor to negligible adverse and therefore not significant.

Table 13.23 Likely visual effect of the Project on Viewpoint 6

Viewpoint 6 – view from Lake Vermont Homestead looking north-west	
 Refer to Figure 13-12 for a full-scale image	
Visual baseline assessment	
Location and description	• GPS Location: -22.4473, 148.3611 • located within Project Site, approximately 760 m from the Project Footprint, around 5.5 km south-east of the proposed underground mine area and over 8 km from the nearest surface infrastructure components • represents views obtained from residents of Lake Vermont Homestead as well as workers driving along the access road • the landscape in this view comprises foreground views of LCT B with views of LCT A beyond • disturbed land associated with mining activities can be seen in the distance: the out of pit spoil mounds associated with Ebony Pit and Fiddlewood Pit are particularly noticeable towards the west (beyond the left-hand side of the photograph) with mounds associated with Ebony, Dogwood, Coolibah and Bauhinia Pit forming a noticeable element on the horizon of the view • landscape is largely flat comprising cattle grazing and rough pasture with scattered vegetation and tree belts associated with One Mile Creek • the landscape is also punctuated by a line of electricity transmission towers.
Visual evaluation	
Overall inherent sensitivity	The overall sensitivity of receptors at this vantage point is considered to be low. This is because this vantage point can only be accessed by residents of Lake Vermont which is an isolated rural homestead. It is noted that the Lake Vermont property is owned by BMA. While any residents have proprietary interest in the view, they are tenants of the proponent so unlikely to object. Furthermore, these views are already affected by mining infrastructure and landform modification and the viewpoint is located at a considerable distance from proposed elements within the Project Site. When required for mining or subject to mining impacts the homestead will be vacated.
Judgement of magnitude of change	The magnitude of change to this viewpoint is considered to be noticeable and, therefore, low, due to the following factors: • the proximity of the viewpoint to the Project - the nearest significant new elements are the underground mine area, which is located beyond a vegetated creek line around 5.5 km from this vantage point. • the views are likely to be curtailed by intervening vegetation associated with various creeks and other retained vegetation.

Viewpoint 6 – view from Lake Vermont Homestead looking north-west	
Judgement of potential effect	**Minor adverse** due to the low degree of visual sensitivity combined with a low magnitude of change.
Significance of effect	**Not significant**: the effect of the Project on Viewpoint 6 is considered to be minor adverse and therefore not significant.
Lighting evaluation	
Sensitivity	The overall sensitivity of receptors from this point is considered to be low. Low numbers of residents are anticipated to be present at night.
Judgement of magnitude of change	The existing landscape in this location is predominantly dark, although there is anticipated to be light spill from the existing Saraji Mine pits. It is anticipated that light levels will remain similar during the Project due to the long distance of this vantage point from potential new light sources including the proposed construction village and components associated with the underground mine. There may also be distant views of the gas flares, both located over 8 km away. This represents a negligible magnitude of change.
Judgement of potential effect	**Minor to negligible adverse** due to the low degree of lighting sensitivity combined with a negligible magnitude of change.
Significance of effect	**Not significant** the effect of the Project on Viewpoint 6 is considered to be minor to negligible adverse and therefore not significant.

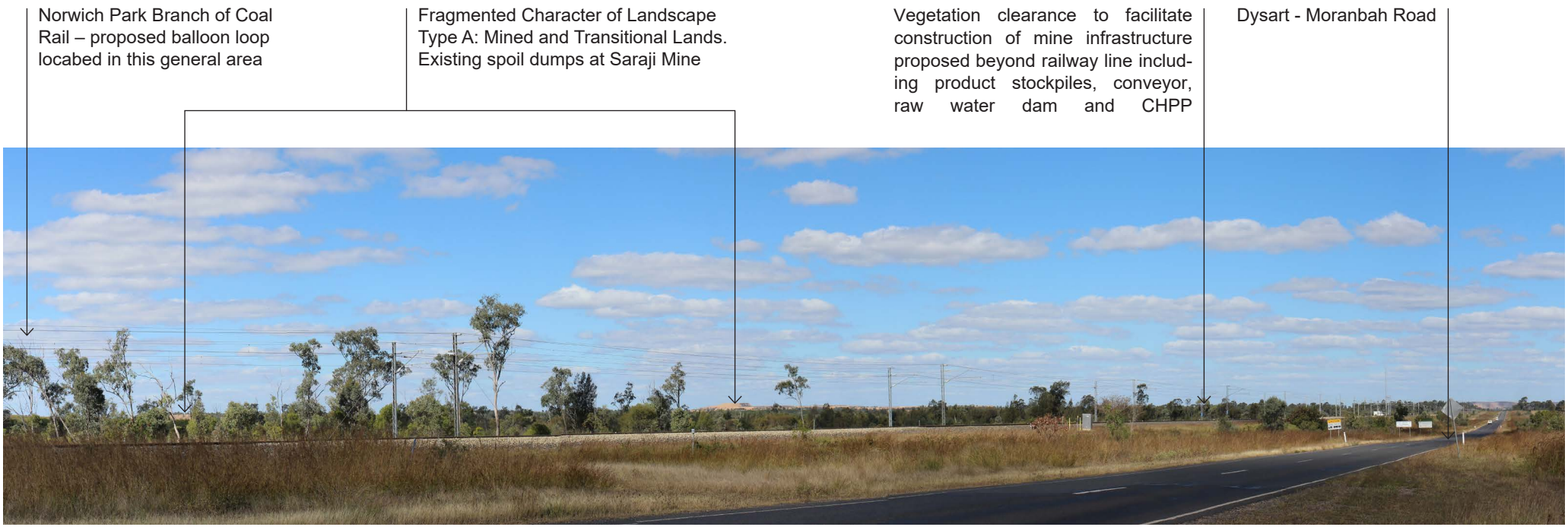


Figure 13-7 Viewpoint 1: View from Dysart-Moranbah Road looking south-east

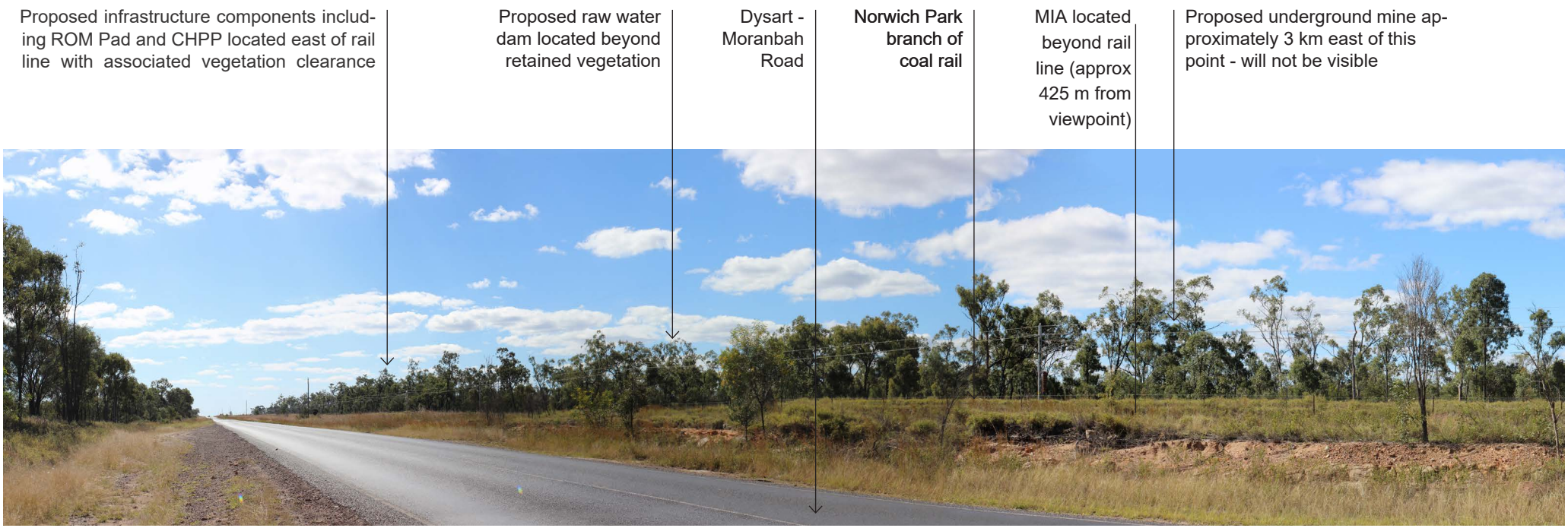


Figure 13-8 Viewpoint 2: View from Dysart-Moranbah Road looking north

Figure 13-9 Viewpoint 3: View from Dysart-Moranbah Road near Saraji Homesteads 2 and 3 looking north-east

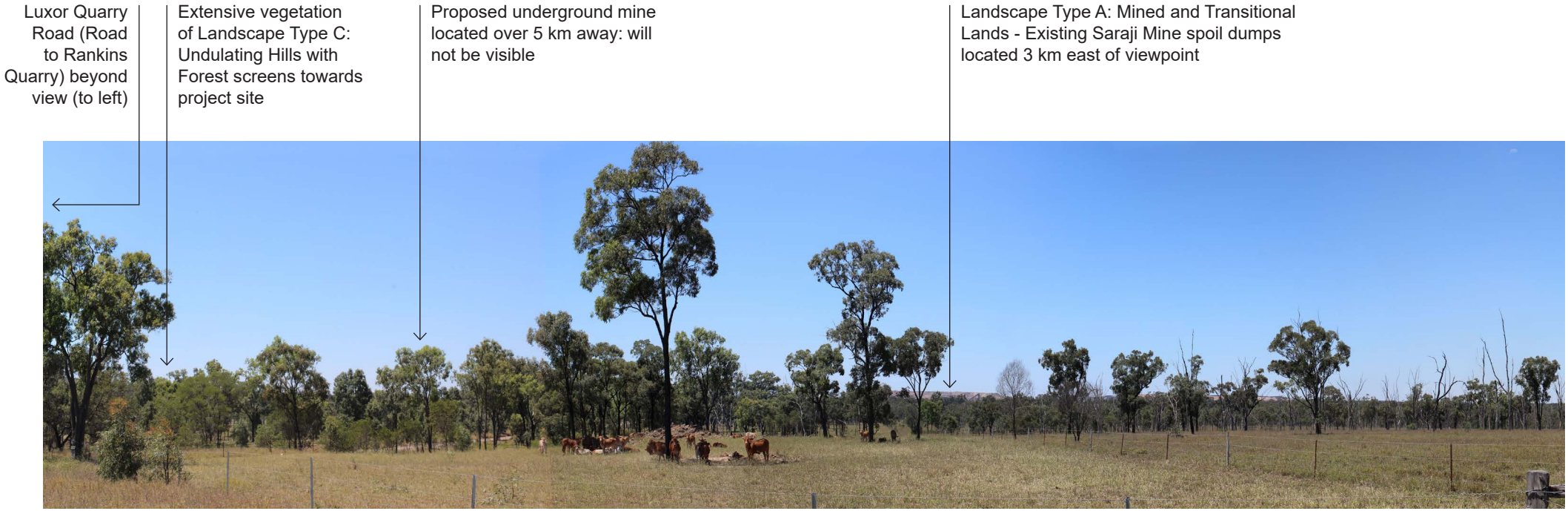


Figure 13-10 Viewpoint 4: View from Luxor Quarry Road near Saraji Homestead 1 looking north-east

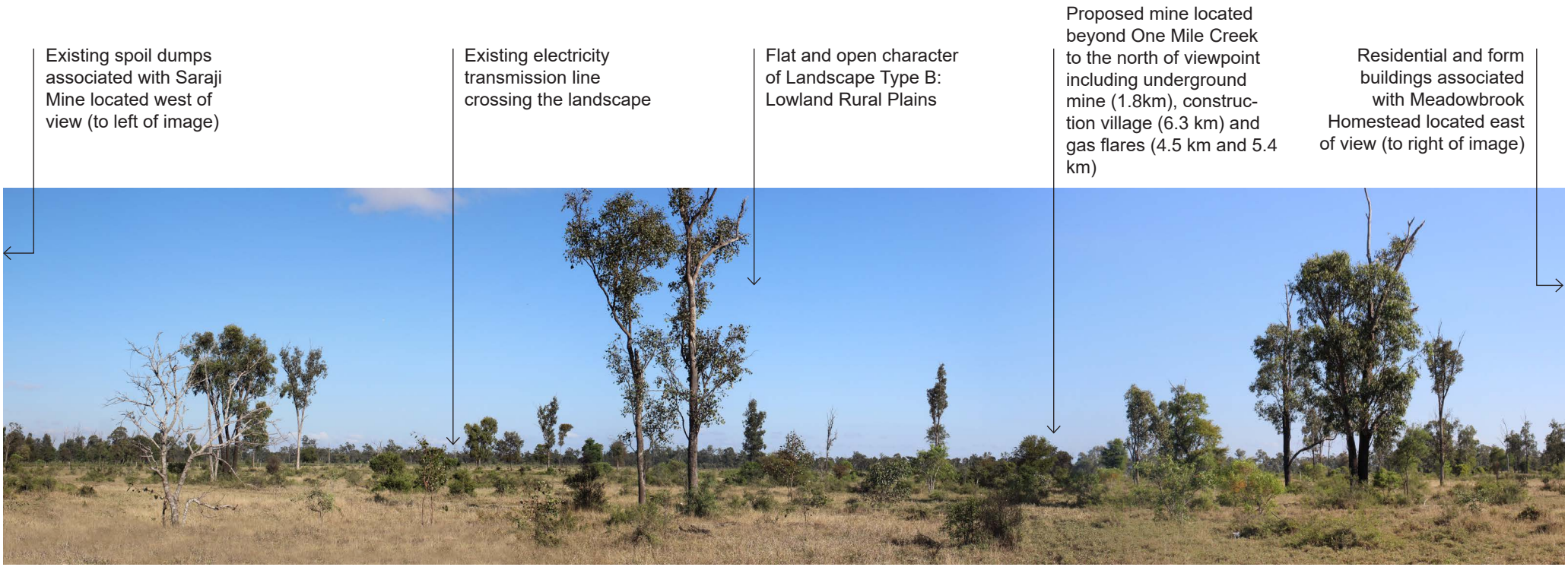


Figure 13-11 Viewpoint 5: View from near Meadowbrook Homestead looking north-west

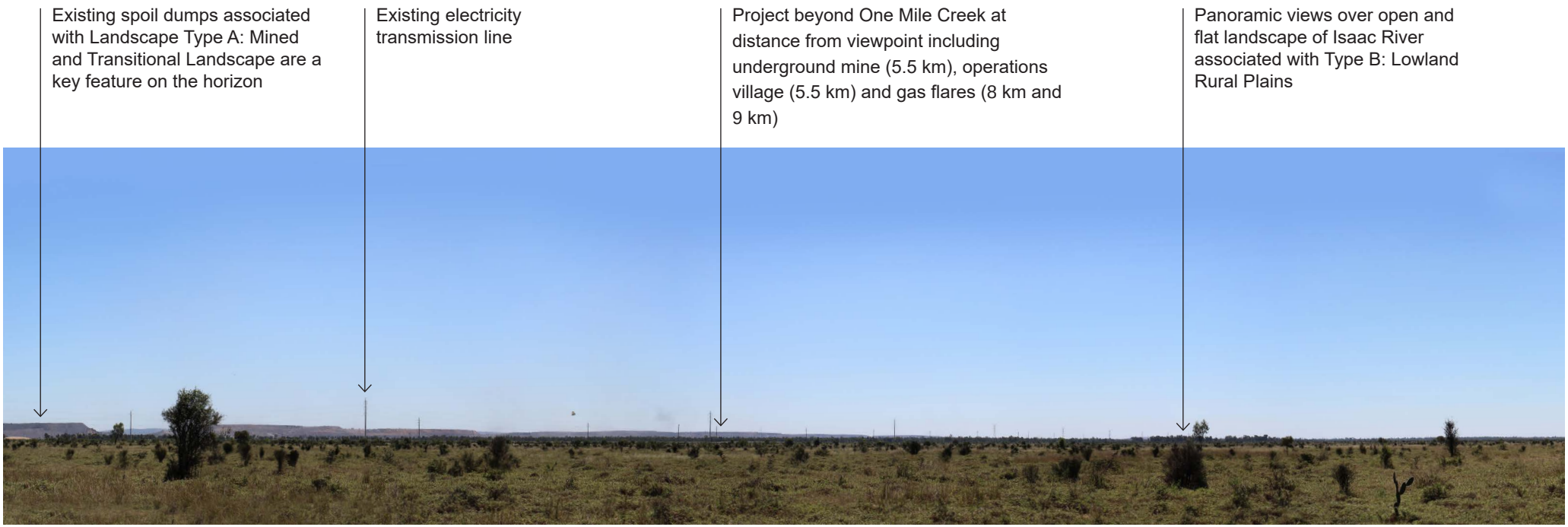


Figure 13-12 Viewpoint 6: View from Lake Vermont Homestead looking north-west

13.5.4 Decommissioning and rehabilitation

BMA has prepared a Rehabilitation Management Plan (**Appendix K-1**) in line with the *Mined Land Rehabilitation Policy* (DES, 2018a) and BHP's *Queensland Coal Rehabilitation Completion Criteria* (BHP, 2018c).

The proposed post mining land use will be an undulating landscape that could be used as grazing land, consistent with the surrounding pastoral land use that dominates the region. The exception to this is where remnant native bushland is disturbed. Where practicable, the post mining land use for these areas is woodlands habitat as this is compatible with the pre-existing land use for biodiversity values. There may be instances in which a mix of native and non-native species will be implemented.

Impacts during this phase would be positive and would be less significant than those experienced during construction and operation.

13.6 Mitigation measures

This section provides a description of the mitigation measures proposed to minimise the visual impacts of the Project. Table 13.24 lists the mitigation measures that would be undertaken to reduce the likely visibility or visual impact of the Project from key locations around the Project Site.

Table 13.24 Mitigation measures

Mine element or issue	Primary mitigation	Supplementary mitigation
Vegetation removal or retention of existing vegetation	Vegetation clearance in accordance with applicable State and Federal Laws	Vegetation will remain in-situ for the greatest length of time possible prior to removal. This will ensure that the screening effects of existing vegetation are maintained for as long as possible. Where practical, retention of existing roadside and fence line vegetation would assist in partially screening the mine expansion areas and may assist in limiting expansive views of the Project Site from sensitive receivers. This action will particularly be considered at the following locations: • Dysart Moranbah Road (near to the MIA) • near to residential dwellings, including Meadowbrook and Lake Vermont homesteads.
Stripping of topsoil	Collection of topsoil and placement in a rehabilitation area or designated stockpile	A Topsoil Management Plan will be developed prior to construction. The plan will consider: • Facilitating the re-use of topsoil as soon as practical • Where topsoil stockpiles are required, the height of topsoil stockpiles will be minimised to the greatest extent possible.
Lighting associated with permanent facilities and plant (including flares)	No specific commitments	Locate night lights as required for safety and security. The number of lights will be kept to a minimum, insofar as is consistent with maintaining operations and health and safety requirements. Ensure lights are focussed on the areas required, with shields around the globes to limit extraneous light. Light spill will be contained to the greatest extent possible by using directional lighting wherever possible, orientating lighting inwards and screening from the outside. Specific considerations include: • Use of aersocreen luminaires to reduce glare and spill lighting associated with the construction village, internal roads and pedestrian walkways. • Managing light spill from CHPP by ensuring that the lights facing the sensitive areas are not tilted to keep the most amount of light possible inside the CHPP area. Alternative lower wattage lights could be placed lower down to reduce the spill light. • Reduce the potential spill of light from the ROM pad by positioned luminaires such that they shine away from the homesteads or the lights orientated to have the least amount of tilt possible so that the light is concentrated in the correct area. Alternatively, LED luminaires with specified optics could be used to limit the amount of spill lighting.
General site landscape	No specific commitments	The Project Site will be maintained in good condition, particularly adjacent to neighbouring properties. Fences and signage will remain in good repair and litter will be regularly removed.

Mine element or issue	Primary mitigation	Supplementary mitigation
Rehabilitation Management Plan	Requirement to develop a Rehabilitation Management Plan	BMA has prepared a Rehabilitation Management Plan (**Appendix K-1**) in line with the *Mined Land Rehabilitation Policy* (DES, 2018a) and BHP's *Queensland Coal Rehabilitation Completion Criteria* (BHP, 2018c). The proposed post mining land use will be an undulating landscape that could be used as grazing land, consistent with the surrounding pastoral land use that dominates the region. The exception to this is where remnant native bushland is disturbed. Where practicable, the post mining land use for these areas is woodlands habitat as this is compatible with the pre-existing land use for biodiversity values. There may be instances in which a mix of native and non-native species will be implemented.
Further identification of impacts	No specific commitments	The Project is committed to ongoing consultation within impacted landholders. As required, residences will be consulted to determine if future perceived impacts require mitigation and if so, discuss what form of mitigation is appropriate.

13.7 Residual impacts

Residual impacts relate to any changes in the overall level of effect for potential impacts after the implementation of mitigation. Although a number of mitigation measures have been described in Table 13.24, such measures are considered unlikely to meaningfully alter the significance of effect as assessed in Section 13.5.2 and 0. Subsequently, the significance of the residual impact is described in Section 13.8 below.

13.8 Summary and conclusions

The Project is located in a landscape that is already considerably influenced by the presence of mining activities affecting both the perception of character and quality of views. None of the landscape in or around the Project Site is the subject of any overlay code or zone intended to protect valued landscape or scenic values and there are no important recreational areas lying adjacent to the Project Site.

The Project Site and surrounding area is dominated by vegetated landscapes and existing mining activities. The landscape assessment identified four landscape types in the landscape around the site. The assessment of impacts of the Project on their respective character is summarised in Table 13.25 below.

Table 13.25 Summary of effect on landscape character

Landscape character type	Description	Sensitivity	Magnitude of change	Level of effect	Significance
LCT A	Mined and transitional lands	Negligible	Noticeable: Low	Minor to Negligible	Not significant
LCT B	Lowland rural plains	Medium	Considerable: Medium	Moderate	Not significant
LCT C	Undulating hills with open forest	Medium	Barely perceptible: Negligible	Minor (indirect)	Not significant
LCT D	Rural ranges and peaks	High	No impact	No impact	Not significant

Only LCT A and LCT B would be directly affected. The character of LCT A is strongly influenced by the existing Saraji Mine and nearby Peak Downs Mine. The existing mines are prominent features within the landscape, particularly the spoil dumps, comprising both rehabilitated and active areas. Infrastructure associated with the mining activities, including road traffic, powerlines and rail lines, are also key features. Consequently, the construction of mining infrastructure, including key components such as the MIA and CHPP, will not contrast strongly with or result in the removal of valued landscape elements, resulting in an impact of minor to negligible significance.

Impacts of up to moderate significance will be related to the influence of the Project on LCT B. This is associated with the removal of vegetation for the construction accommodation village, the presence of mine infrastructure including gas wells, as well as longer-term subsidence associated with the underground mine which will contrast with the character of this rural area associated with the Isaac River.

The low-lying nature of the Project Site and surrounding area enables extensive views of a mix of rural and mining landscapes. The main road through the area is the Dysart-Moranbah Road that passes adjacent to the west of the Project Site. There are few other roads in the local area; most of these being local and private drives to farms or quarries and mines.

The area around the Project Site is sparsely settled comprising isolated clusters of rural farmsteads. Therefore, there are very few publicly accessible views towards the mine except for the main road. No scenic viewpoints used for recreational purposes were identified. Typically, viewer sensitivity is low. Six viewpoints were identified for the purposes of the scenic amenity assessment. These are summarised in Table 13.26 below.

Table 13.26 Summary of effect on visual amenity

Viewpoint	Description	Sensitivity	Magnitude of change	Level of effect	Significance
Viewpoint 1	View from Dysart-Moranbah Road looking south-east	Low (road travellers)	Considerable: Medium	Minor to Moderate	Not significant
Viewpoint 2	View from Dysart-Moranbah Road looking north	Low (road travellers)	Considerable: Medium	Minor to Moderate	Not significant
Viewpoint 3	View from Dysart-Moranbah Road near Saraji Homesteads 2 and 3 looking north-east	Medium (Saraji Homestead 2 and 3)	Noticeable: Low	Minor to Moderate	Not significant
Viewpoint 4	View from Luxor Quarry Road near Saraji Homestead 1 looking north-east	Low	Noticeable: Low	Minor	Not significant
Viewpoint 5	View from near Meadowbrook Homestead looking north-west	Low	Considerable: Medium	Minor to moderate	Not significant
Viewpoint 6	View from Lake Vermont Homestead looking north-west	Low	Noticeable: Low	Minor	Not significant

Much of the Project is located underground which limits potential visual impacts. Generally, views of the Project's above-ground facilities and activities would be congruent with the existing mining activities, which are dominant elements of the visual environment. Above-ground facilities associated with the Project, including the MIA, CHPP, product stockpile, conveyors and balloon rail loop and spur will be accommodated within the footprint of the Saraji Mine. Whilst this will result in an intensification of the presence of mining infrastructure within the visible environment this will not result in a significant change and would mostly be experienced by road users on the Dysart-Moranbah Road who would be travelling at speed with limited interest in their visual environment. Temporary views of construction traffic, particularly along the Dysart-Moranbah Road, accessing the Project Site, will be experienced by other road users and from residential properties near to road ways.

Changes to the visual environment will also be experienced in the rural landscape because of the underground mining activities and the associated subsidence. The subsidence will result in changes to landform and requires the relocation of aboveground infrastructure, including electricity transmission lines and access roads. However, due to the location of the proposed underground mining area, opportunities for these changes to be experienced by sensitive receivers are limited, with only two homesteads directly affected (Lake Vermont and Meadowbrook), both of which are owned by BMA. The impacts on these receptors are, conservatively considered, minor to moderate.

Night lighting impacts from the Project will be minor and are unlikely to have a significant adverse effect on sensitive receivers. The qualitative impact assessment of lighting on receptors is summarised in Table 13.27 below.

Table 13.27 Summary of effect on lighting amenity

Viewpoint	Description	Sensitivity	Magnitude of change	Level of effect	Significance
Viewpoint 1	View from Dysart-Moranbah Road looking south-east	Low	Low	Minor	Not significant
Viewpoint 2	View from Dysart-Moranbah Road looking north	Low	Low	Minor	Not significant
Viewpoint 3	View from Dysart-Moranbah Road near Saraji Homesteads 2 and 3 looking north-east	Medium	Low	Minor to moderate	Not significant
Viewpoint 4	View from Luxor Quarry Road near Saraji Homestead 1 looking north-east	Low	Negligible	Minor to negligible	Not significant
Viewpoint 5	View from near Meadowbrook Homestead looking north-west	Low	Negligible	Minor to Negligible	Not significant
Viewpoint 6	View from Lake Vermont Homestead looking north-west	Low	Negligible	Minor to Negligible	Not significant

In conclusion, the Project occurs in an area with few sensitive visual receptors and generally low landscape sensitivity due to the presence of extensive mine activities in the wider landscape. Much of the Project is underground but associated above-ground mine infrastructure will result in localised changes to views during both operation and construction and during both day and night. Affected views will primarily be experienced by travellers on the Dysart-Moranbah Road and a small number of rural homesteads. The assessment has described impacts of up to moderate significance. No significant impacts on landscape character, scenic amenity or lighting were identified.