

Taroborah Coal Project

Appendix 9 – Visual Amenity Assessment




aarc
AustralAsian Resource Consultants

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Author: Mitch Gregory
Project Manager: Paul Jackson
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LIST OF ABBREVIATIONS

AARC	-	AustralAsian Resource Consultants Pty Ltd
BIBO	-	Bus In Bus Out
CGI	-	Computer Generated Image
CHPP	-	Coal Handling and Preparation Plant
EIS	-	Environmental Impact Statement
EP Act	-	*Environmental Protection Act 1994*
ha	-	Hectare
km	-	Kilometre
MDL	-	Mineral Development Licence
MIA	-	Mine Infrastructure Area
Mt	-	Million Tonnes
Mtpa	-	Million Tonnes per annum
PFS	-	Pre-Feasibility Study
QLD	-	Queensland
QR	-	Queensland Rail
ROM	-	Run of mine
Shenhuo	-	Shenhuo International Group Pty Ltd
TOR	-	Terms of Reference
VMUs	-	Visual Management Units

1.0 INTRODUCTION

1.1 BACKGROUND

AustralAsian Resource Consultants (AARC) Pty Ltd was commissioned by Shenhuo International Group Pty Ltd (Shenhuo – the "Proponent") to undertake a Visual Amenity assessment for the Taroborah Coal Project site (the "Project"). Both open-cut and underground mining of thermal coal deposits are currently being considered for the Project, with transport of product coal to the port of Gladstone via the Central Queensland (QLD) Rail Network.

Overburden and coal from the open cut operation will be mined via hydraulic excavators and transported to the Coal Handling and Preparation Plant (CHPP) or spoil dumps via rear dump trucks. Underground mining will employ the full-extraction, longwall mining method.

The Project site is located entirely within Mineral Development Licence (MDL) 467, currently held by the Proponent. A Terms of Reference (TOR) has been developed for the Taroborah Project (August 2012) and a variety of Project baseline studies developed in order to produce the Environmental Impact Statement (EIS).

1.2 PROJECT LOCATION

The Project site is located within the Bowen Basin, approximately 22 kilometres (km) west of Emerald and 295 km due south-west of Mackay (refer to Figure 1 for regional Project location details). The Project is wholly located in the Central Highlands Regional Council area.

The EIS study area (as assessed via the *Environmental Protection Act 1994* (EP Act)) is approximately 5,195 hectares (ha) and lies entirely within MDL467 (approximately 7,966 ha in area).

Both the Capricorn Highway and Queensland Rail Ltd's (QR) Central West rail system run through the Project site in an east-west direction, dissecting the Project site latitudinally (refer to Figure 2 for local Project location details). Access to the Project site is currently via the Capricorn Highway, however during both construction and operations, Project site access will be enhanced via additional connections with both the Capricorn Highway and Central West rail system.

Figure 1 Regional Project Location

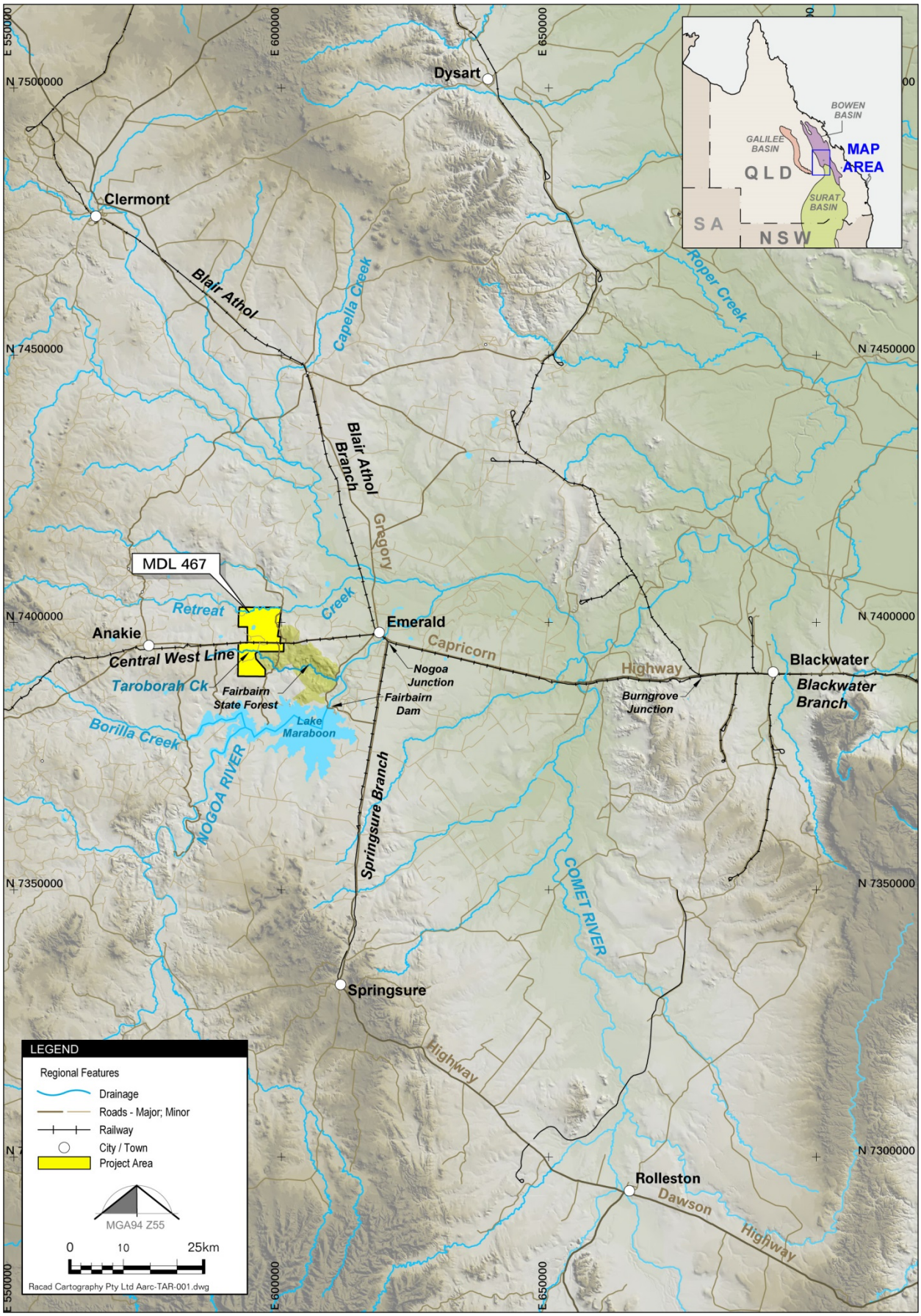


Figure 2 Local Project Location

2.0 PROJECT DESCRIPTION

This Project is based upon the development of a 202.1 million tonnes (Mt) thermal coal resource in the Bowen Basin, Queensland, Australia. The Project is currently considering both open-cut pit and underground mining activities with the following associated mine infrastructure: haul roads, CHPP, rail load-out facility, rail loop and spoil dumps.

2.1 MINING OPERATIONS

Both open-cut and underground mining methods are currently being considered for the Taroborah resource. Open-cut mining is planned to extract up to 2.28million tonnes per annum (Mtpa) of run of mine (ROM) coal and 2.02 Mtpa of product coal, after production steadily ramps up over the first 3 years of operation. Approximately 11.11 Mt of ROM coal is planned to be produced via open-cut methods for the proposed 7 year life of the open-cut mine, resulting in a total yield of 9.63 Mt of product coal.

Underground mining is expected to begin in Year 5 of the open-cut mining operation. The highwall developed in association with the open-cut operation is proposed to be utilised to provide access to the underground operation by constructing a tunnel underneath the Capricorn Highway in the northwest corner of the pit.

Two methods of underground mining have been assessed; Bord and Pillar and Longwall. The preferred option for the underground operations of the Taroborah Project is Longwall mining and will be the assumed underground mining method for the purposes of this assessment.

The underground operations are expected to produce a total of approximately 68.65 Mt of ROM coal and 68.14 Mt of product coal over an expected operational life of 17 years, steadily ramping up to a maximum annual production of 5.75 Mt of ROM and 5.73 Mt of product coal.

Topsoil that is stripped prior to mining will be segregated for later use in rehabilitation, with overburden disposed of both in-pit and via out-of-pit spoil dumps located on site and contiguous with the pit excavation.

The mass of waste produced from the pit increases over a period of 4 years to approximately 32.7 million loose cubic meters per annum. The following spoil dump design details were obtained from the most recent mine infrastructure design:

- Overall Slope Angle: 30°; and
- Dump Heights: between 67 m to 90 m (based upon the lowest ground level elevation adjacent to the spoil dumps).

Spoil dumps have been located as close as possible to the open-cut pit, in order to minimise truck haul distances. During open-cut mining Year one and Year two, nearly all spoil will be dumped externally. However, by Year three in-pit dumping will commence once the open-cut void is large enough.

Coal processing will involve sizing, handling and washing at the CHPP, although the majority of coal from the underground mine will bypass directly to the train loading facility after sizing.

The Project is predicted to commence mining operations in 2018, produce thermal coal over a period of 21 years and conclude mining operations in 2038. These operations include open-cut mining from production Year 1 to Year 7 and underground operations from production Year 5 to Year 21.

Mine construction will commence with site clearing and earthworks in order to prepare the site for infrastructure development.

The Project site will be progressively rehabilitated where appropriate.

Product coal will be transported via a train load-out facility to the QR Central West rail system, which connects (east of Emerald) to the Aurizon Blackwater rail system. This coal will then be exported via the Port of Gladstone.

Upon mine decommissioning, the remaining disturbed sectors of the Project site will be rehabilitated over a two year period, in accordance with best practices and via consultation with various government authorities and post mining land-owners.

The Project's major infrastructure includes the following elements:

- Open-cut pit - mining of the MDL467coal resource;
- Surface infrastructure and facilities - required to service the open-cut pit;
- Open-cut and underground MIAs - including workshops, offices and a laboratory;
- Site transport - mine site access and haul roads;
- Underground longwall mining - via continuous mining units which feed a mobile conveyor system for transfer of materials and waste;
- Processing of coal –CHPP sizing, handling and washing of ROM coal, with coarse and fine rejects disposed of in both ex-pit and in-pit spoil dumps;
- Conveyors – transport of ROM and product coal across the MIA;
- Radial stacker and product stockpile;
- Spoil dumps - ex-pit and in-pit spoil dumps;
- Open-cut and underground ROM stockpiles;
- Mine wastewater and CHPP Water recycle dams;
- Water storage and treatment - water storage tanks and potable water treatment system; and
- Train load-out facilities and rail loop - for transport of processed coal via the QR Central West and Aurizon Blackwater rail systems to the Port of Gladstone.

The following items of major infrastructure will pose a visual impact:

- Spoil dumps;
- CHPP, product stockpiles and Train Loadout Facility; and
- Visual amenity bund.

The proposed mine infrastructure layout is illustrated in Figure 3.

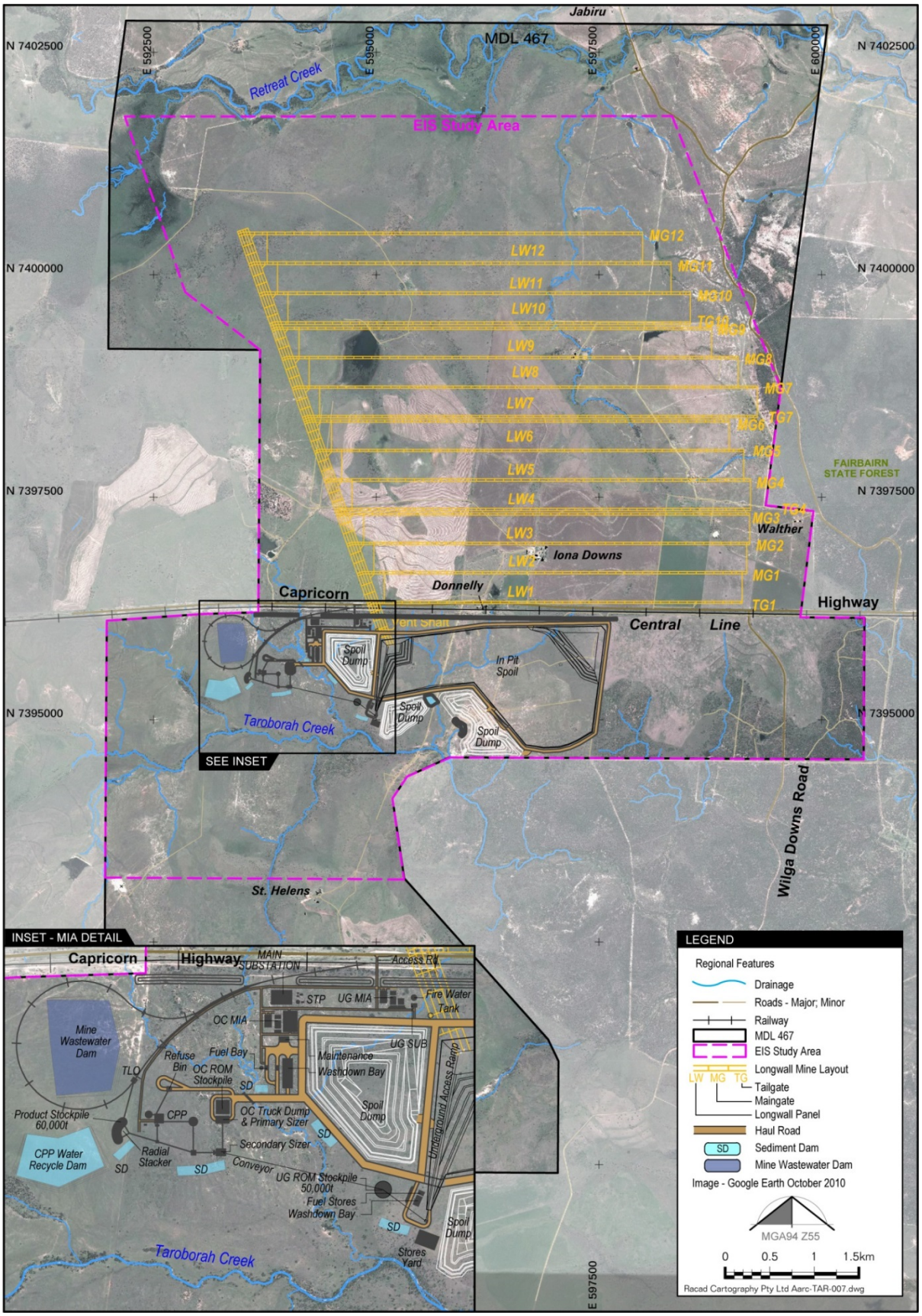


Figure 3 Proposed Mine Infrastructure Layout

2.2 ROADS

Development of the proposed mine may result in the temporary closure or disruption of traffic on the Capricorn Highway, in order to facilitate the construction of road access ramps to the Project site. It is not expected that any other gazetted public road will be disrupted by the Project. Local roads within and surrounding the Project site are presented in Figure 4.

2.3 DESCRIPTION OF EXISTING LANDSCAPE FEATURES

The region's undulating slopes were formed from the Permian sediments of the Bowen Basin and the dominant local land uses are low-intensity cattle grazing and dryland cropping.

The topography of the site is generally flat with gentle hills and undulations, variations in land elevation have been recorded up to 50 m. There are no distinctive viewpoints, landmarks, large perennial waterways, gateways or focal points surrounding the Project site, few ridgelines exist and no specific features which contribute to the visual amenity of the local area. Most of the major views assessed in this particular study are associated with local homesteads and local roads, since these locations represent the most significant sensitive receptors.

In terms of built form, homesteads and farm buildings are the predominant man-made structures that have been developed in the local area. Traditional designs have been employed to construct these buildings and therefore, none of these structures pose a significant visual impact upon the local landscape.

The number and size of directional signage which has been installed along both constructed and non-constructed roads are limited and typical of the signage density found in rural areas.

Areas of the Project landscape which possess the capacity to absorb land-use changes are mainly associated with dense stands of vegetation, no significant ridge lines or hills exist locally that could fulfil this function.

Although the majority of vegetation is sparse (due to historic land uses), visual buffers or screens do exist, which surround various sectors of the Project site. Topography and vegetation provide the main buffers for residents and visitors who are located in the north and east of the Project site and look to the south and west. The visual amenity of other residences that are located near the northern extents of the Project site and outside the MDL boundary is buffered by both topography and distance.

The observation points that were selected for this visual amenity assessment are presented in Figure 5, whilst the photographs taken from these observation points during the visual amenity fieldworks and converted into panoramas, are presented in Photo Plate 1 to Photo Plate 12. These panoramic photographs provide a record of the visual amenity from particular view points for the existing landscape, before mining activities commence.

Since the Project site is located approximately 22 km west of the town of Emerald, any visual amenity impacts caused by the Project will not be experienced in Emerald. Therefore, the town's image, local government strategic plan or townscape objectives have not been included in this visual amenity assessment.

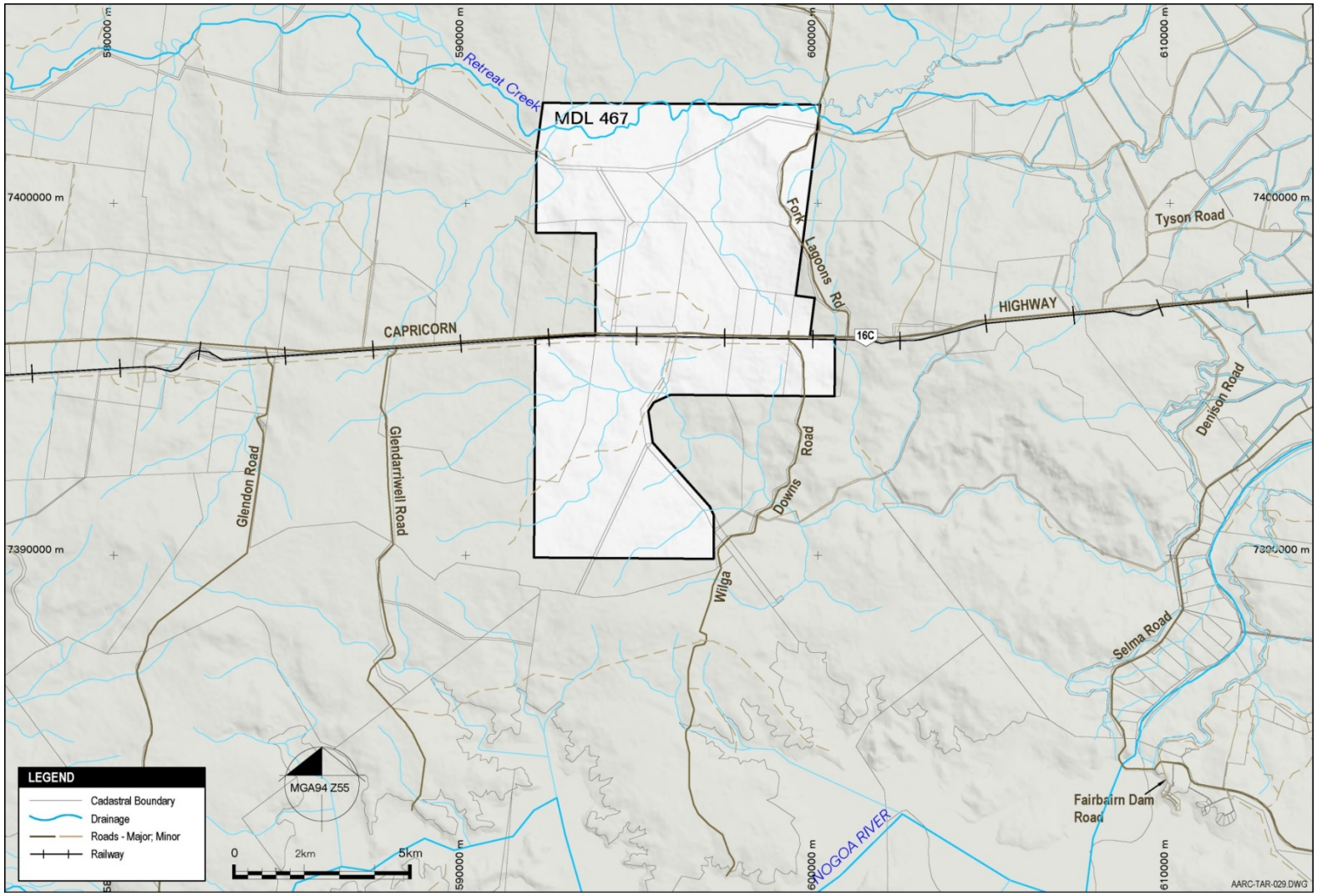


Figure 4 Roads Surrounding the Project Site

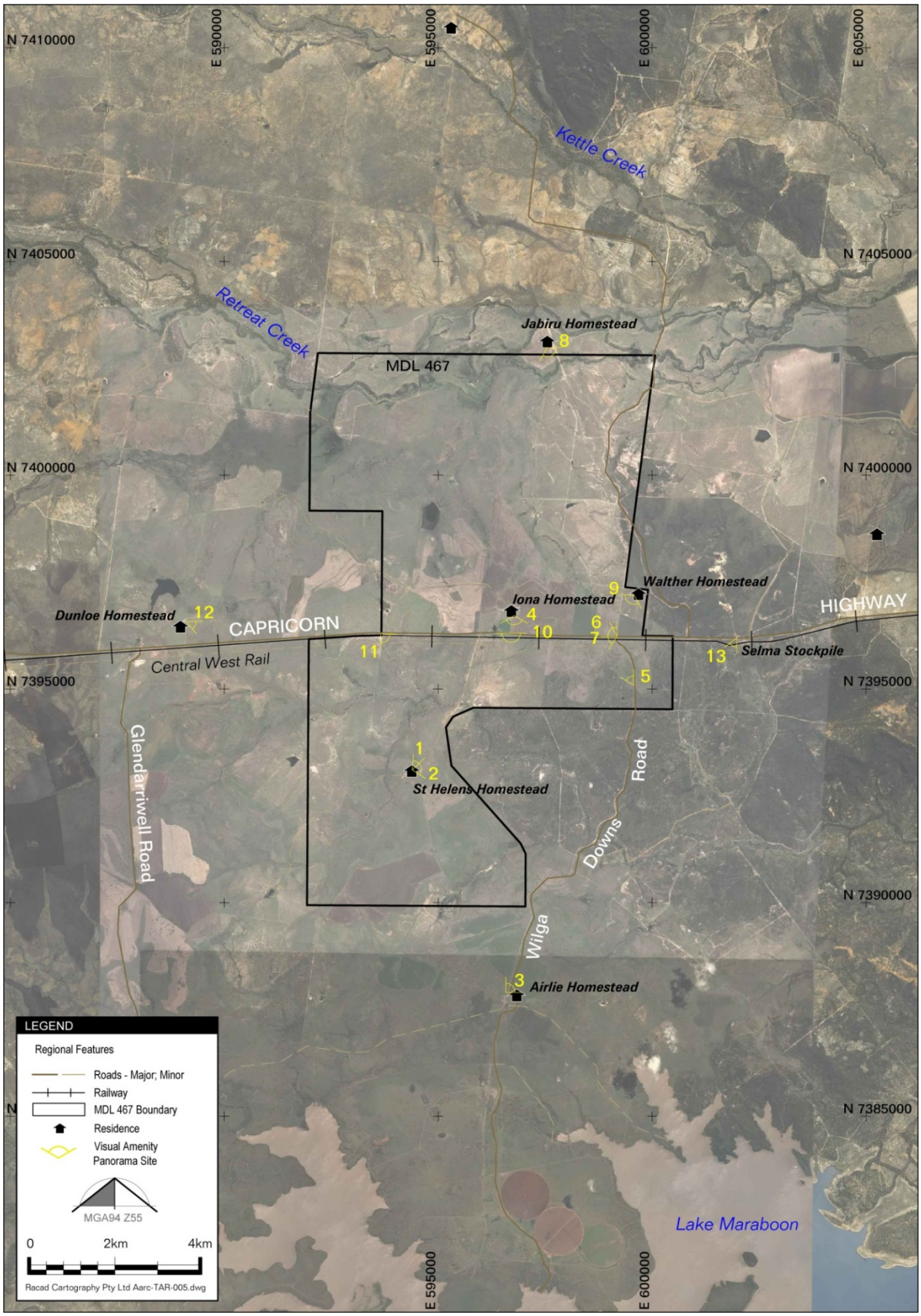


Figure 5 Panoramic Photograph Site Locations and Directions

Photo Plate 1 **Visual Assessment Site 6: View from Capricorn Highway at the Wilga Downs intersection, looking westward and panning north.**

Photo Plate 2 **Visual Assessment Site 4: Iona homestead facing south panning south-east to south-west, directly in front of homestead by 50 meters.**

Photo Plate 3 **Visual Assessment Site 10: Capricorn Highway from Iona property gate facing south. Encompasses view of mine infrastructure area from the road.**

Photo Plate 4 **Visual Assessment Site 8: Photo taken in front of Jabiru Homestead looking south.**

Photo Plate 5 **Visual Assessment Site 13: Capricorn Highway near Selma Stockpile outside of MDL467, on the eastern edge, two photos panning south west to south.**

Photo Plate 6 **Visual Assessment Site 9: Walther Property on the eastern margin of the MDL467 panning south-east to west from the western side of the homestead.**

Photo Plate 7 **Visual Assessment Site 7: Southern side of the Capricorn Highway at intersection with Wilga Downs panning south-west to west.**

Photo Plate 8 **Visual Assessment Site 5: Wilga Downs Road on eastern side of MDL467, panning north-west to north.**

Photo Plate 9 **Visual Assessment Site 1: St Helens property, view panning north to northeast.**

Photo Plate 10 **Visual Assessment Site 3: Airlie property taken 50 meters in front of the homestead, panning from north to east.**

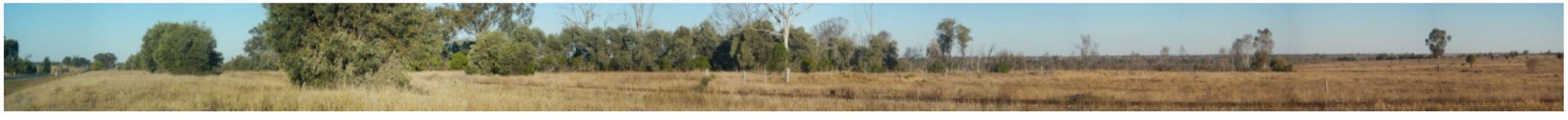


Photo Plate 11 **Visual Assessment Site 11: Capricorn Highway from western edge of MDL467, panning east to south from the south side of the road.**

Photo Plate 12 **Visual Assessment Site 12: Dunloe property on the western edge of MDL467. Taken from the south eastern corner of the homestead facing east.**

2.4 PROGRESSIVE REHABILITATION

The Project's main rehabilitation strategy is to return areas that have been appreciably disturbed by surface-mining activities to a stable landform with a self-sustaining vegetation cover. Rehabilitation will be undertaken progressively on areas that cease to be used for mining or mine-related activities, in order to minimise the area of disturbed land at any one time.

The current pre-mining land-use is low-intensity grazing and dryland cropping of wheat and sorghum. Upon commencement of mine construction, local topsoil will be stripped from infrastructure areas and stockpiled for re-use in the rehabilitation programme. Such topsoil will also provide a seed bank and growth media for the revegetation process. The proposed rehabilitation process will include selection of appropriate drainage measures / structures and plant species for vegetation re-establishment. The rehabilitation process will be continually refined, as rehabilitation results become available.

The aim of the rehabilitation process is to return a stable landform whose appearance, visual amenity value and land use potential is similar to those of the pre-mining landscape. In order to achieve this aim, the nominated post-mine land use will utilise remnant native vegetation where practical and return some of the pre-existing conservation values.

It is intended that, where practical, most mine infrastructure will be removed from the Project site, unless formal written agreements are obtained with post-mining landowners to retain particular items of infrastructure for ongoing use. Potential long-term visual amenity impacts will be reduced, following the removal of particular items of mine infrastructure.

Progressive rehabilitation of disturbed land on the Project site will be conducted so that:

- Suitable species of vegetation are planted and established to achieve the nominated post-mine land uses;
- The potential for water and wind induced erosion of rehabilitated land is minimised, including environmental impacts caused by dust release;
- The release of surface water and seepage from the Project site is unlikely to cause environmental harm to the local receiving environment;
- The quality of water residing in local post-mining water bodies meets criteria for subsequent uses and does not have the potential to cause environmental harm; and
- The final landform is stable and not subject to any slumping or erosion, which could result in the agreed post-mining landform not being achieved.

This rehabilitation strategy will return the land to similar or identical visual amenity values to that of the current land condition, whilst constricting major disturbances to a fixed timeframe.

In addition, ongoing revegetation and erosion monitoring of rehabilitation works will be conducted on an annual basis, in order to ensure that rehabilitated areas are progressing towards completion criteria for rehabilitated landforms and the land use of low-intensity grazing and cropping.

2.5 SENSITIVE RECEIVERS

The location and proximity of sensitive receivers to the Project site are presented in Figure 5 and summarised in Table 1. Sensitive receivers that are closer to mine infrastructure will generally be subject to greater visual amenity impacts.

For sensitive receivers located outside the Project site, the number of receivers located within buffer distances from the Project boundary has been assessed. In reality, these distances will be greater, since the majority of above-ground operations will be confined to a mine infrastructure area (MIA) south of the Capricorn Highway (refer to Figure 6 for location details of these sensitive receivers).

Table 1 Number of Residencies and Distance to the Project Boundary

MDL467	
Buffer Distance from Project Boundary	**Number of Residences**
Less than 1 km	1
1 km – 3 km	3
3 km – 5 km	2
5 km – 10 km	4
Total	**10**

Note that this table excludes the four properties which exist within MDL467

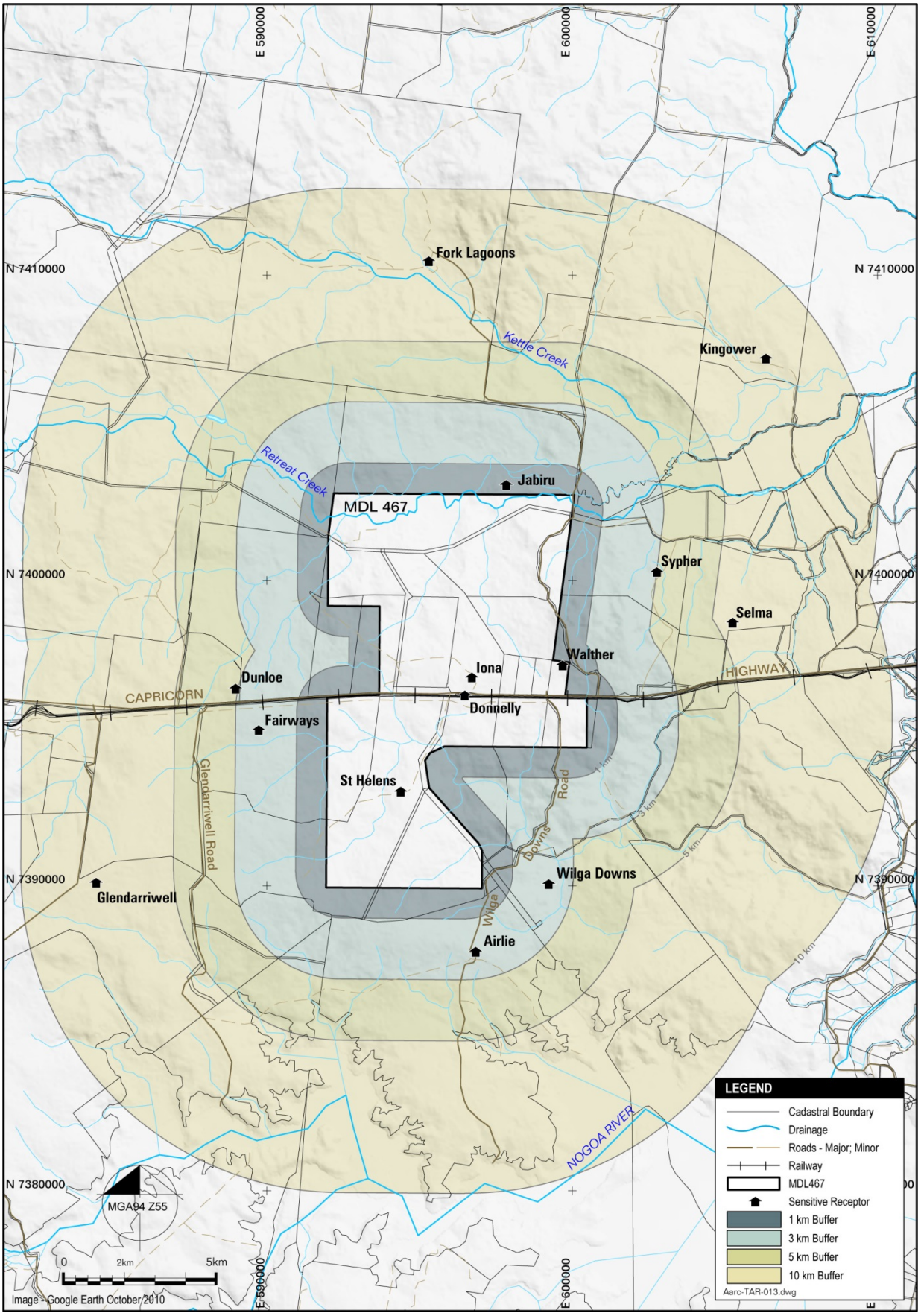


Figure 6 Location of Sensitive Receivers and Buffers

3.0 METHODOLOGY

3.1 OBJECTIVES OF THE VISUAL AMENITY ASSESSMENT

The objectives of this visual amenity assessment were as follows:

- Identify current landscape features, landmarks (built form or topography), panoramas, views, and other focal points adding to the visual amenity of the area that have or could be expected to have potential value to the community at a local, regional, State-wide, national or international level;
- Summarise elements of the mine infrastructure which could have an impact upon visual amenity;
- Identify areas of the Project site that have the ability to absorb land use changes without detriment to the existing visual value and landscape character, including the importance of present vegetation as a visual screen;
- Ascertain potential Project impacts upon local sensitive receivers (private residences) in terms of their major vistas, view sheds, existing outlooks, ridgelines and other features which add to the local visual amenity of the area; and
- Develop appropriate visual amenity impact-mitigation measures where feasible.

3.2 ASSESSMENT PROCESS

Assessing visual amenity values, or defining the effects of visual modification, is a largely subjective process. Individuals usually place unique and diverse insights on the worth of a view or landscape. Usually, the higher the proportion of man-made features, the less alluring the view. Different vegetation types can also add considerable visual value and the more varied or 'green' the landscape, the greater its appeal.

Local visual amenities are often impacted by coal mine development, when large items of coal infrastructure modify the local horizon and block or reduce clear lines of sight. Such impacts have been considered from residential, work and recreational locations, transport routes, and other known vantage points during both day and night and across all phases of the Project.

To address the subjectivity normally associated with visual amenity assessments, the visual impacts of coal mine structures and associated infrastructure utilised visual simulation methods, photographs, maps, sections, and elevations. Particular consideration has been given to public roads, public thoroughfares and places of residence or work, which are within the line-of-sight of the Project.

People mainly assess visual impacts from their places of residence, work or leisure. Such visual impacts can be absorbed to varying degrees by the local landscape.

Landscape and visual impacts can arise from the following Project activities:

- Construction of mine infrastructure, including effects associated with construction activities such as vegetation clearance, construction lighting and fugitive dust; and
- Mine operations, including permanent loss of existing landscape features, permanent structures, visible dust emissions and lighting.

In order to assess the potential visual impacts that the Project may have upon the local landscape and population, the following activities were conducted:

- Field survey to determine the visual values of the Project site;
- Acquire panoramic and line-of-sight photographs from significant vantage points (local residences and the MDL boundary), in order to capture current and local viewsheds, landforms, topography and vegetation;
- Assessment of the proposed mine infrastructure layout, topographical maps and aerial photographs; and
- Analysis of diagrams, visual simulations, aerial photographs, GIS as well as foreground and background photos.

3.3 VISUAL MANAGEMENT UNITS FOR THE PROJECT

The Project site incorporates a variety of different landscapes and visual amenity values. In order to assess these values in a consistent manner, at a manageable / accurate scale and obtain more detailed assessment outcomes, a Visual Management Unit (VMU) approach has been adopted. VMUs were created by grouping landscapes with the same broad characteristics (vegetation, land use, properties, transport infrastructure etc.) within the Project site.

Two different categories of VMUs were employed for the Project site as follows:

- Landscape VMUs – landscape features that are viewed by people and potentially impacted by Project activities. Refer to Table 2 for details of landscape VMU characteristics; and
- Receiver VMUs – locations from which people are viewing a landscape, refer to Table 3 for details of receiver VMU characteristics.

Distinctive landscapes and landscapes that can absorb Project impacts were categorised into VMUs. The diversity of landscape features and patterns present on the Project site influences their ability to accommodate and absorb different types of development impacts. Some landscapes are particularly sensitive to development, whilst others are more resilient. Such landscape sensitivity has a bearing upon the overall impact of visual amenity values.

The extent to which Project activities impact upon sensitive receiver VMUs depends upon the receiver's location and the duration of exposure to Project activities. A crucial aspect of assessing a VMU's sensitivity is their distance to disturbances and variation in local topography. The level of receiver sensitivity and magnitude of impact was determined in order to assess the overall level of significance of potential impacts.

The criteria set out in the following sections will be used to assess VMUs to determine the significance of impacts.

Table 2 Landscape VMU Characteristics

VMU	Project Characteristics
Rural / Grazing	Predominantly cleared areas of improved pasture. Scattered trees or clumps of trees present, many fences and unformed roads/tracks.
Remnant Vegetation	Patches of forest/woodland with relatively large or mature trees and a characteristically intact appearance. Grazed understorey typical.
Main Roads / Highways	The Capricorn highway which provides a route from east central Queensland to the western areas of Queensland.
Major Railways	The Queensland Rail Central West rail system runs parallel with the Capricorn highway and connects western Queensland with the eastern areas of central Queensland.
Residential Roads	Constructed and unconstructed roads that provide access to residences surrounding the Project.
Residences	Existing residences close to the MDL that are within 10km.

Table 3 Receiver VMU Characteristics

VMU	Project Characteristics
Homesteads and places of work	Few receivers with propriety interest and prolonged exposure durations
Main public roads or highways	Many receivers with intermittent or short term exposure durations and momentary interest
Major Railways	Very few receivers with intermittent or short term exposure durations and momentary interest
Lookouts and scenic routes	Few receivers and moderate exposure durations with moderate interest
Constructed roads	Few receivers and intermittent or short term exposure durations with momentary interest
Non-constructed roads	Very few receivers and intermittent or short term exposure durations with momentary interest
Broad-scale rural land uses	Very few receivers with moderate exposure durations with moderate interest

3.4 PHOTOGRAPHIC LOCATION POINTS

Panoramic and line-of-sight photographs were taken from key vantage points around and adjacent to the Project site. Images of certain items of Project infrastructure were superimposed upon particular panoramic photographs, in order to assess the visual impact that this infrastructure will have upon a number of viewsheds.

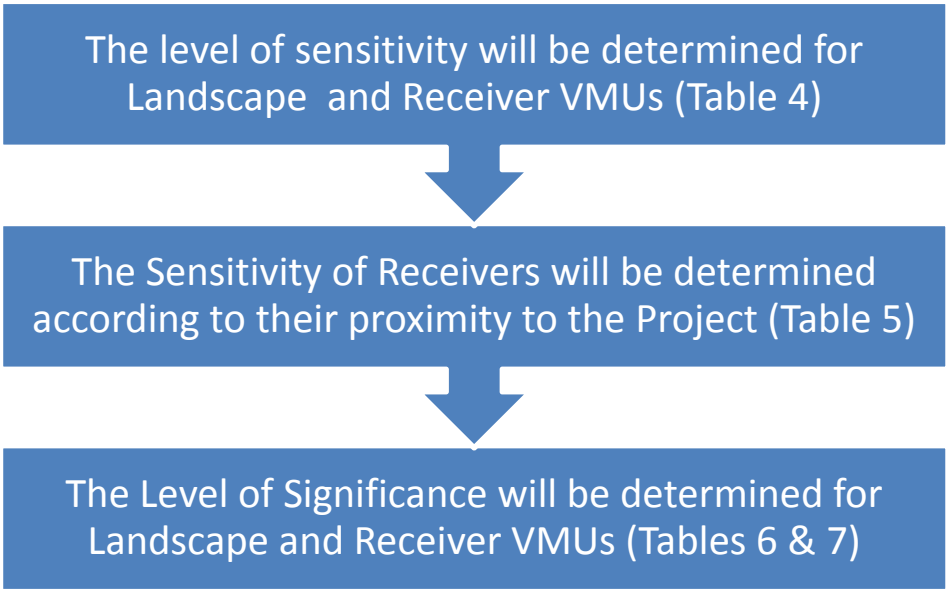
Additional sites were also selected to provide north / east / south / west views and areas of interest from sites surrounding the Project. Refer to Figure 5 for details of these photograph locations.

3.5 ASSESSMENT OF SIGNIFICANCE LEVELS

Visual amenity impacts potentially caused by Project activities were classified according to their severity - substantial, moderate, slight or no significant impact upon associated receivers or landscapes. In the absence of any QLD guidance on the subject of visual amenity assessment, the EIAO Guidance Note No. 8/2010 was employed to describe and assess the local visual amenity (Environmental Protection Department 2010).

The severity or significance of a visual amenity impact is related to the magnitude of changes in the landscape (which is a function of the nature, scale and visibility of the proposed mine infrastructure) and the sensitivity of the landscape and / or observer to such changes. When a VMU rating fell between two classes, the more significant VMU value was used in the assessment. Refer to Table 4 for a summary of the magnitude and sensitivity descriptions for both Landscape and Receiver VMUs and Table 5 for a précis of sensitivity assessment classes for Receiver VMUs.

The following flow chart has been used to conduct the visual amenity assessment process for this Project:



Source: EPD 2010

Figure 7 Assessment Process for Determining Level of Significance

The level of sensitivity for both Landscape and Receiver VMUs, sensitivity of Receivers and level of significance for receiver impacts (as presented in the above flow chart) have been summarised in the following tables:

Table 4 Magnitude and Sensitivity Descriptions for Landscape and Receiver VMUs

Level of Sensitivity	VMU	Magnitude	Sensitivity
Low Sensitivity	Landscape	Almost imperceptible change in components or character of the landscape.	A landscape which is not valued for its scenic quality and tolerant of substantial change.
	Receiver	Few viewers affected by minor changes in view.	A viewer with passing or momentary interest in its surroundings, e.g. motorists.
Moderate Sensitivity	Landscape	Moderate change in landscape components and character.	A moderately valued landscape, perhaps a locally important landscape, tolerant of some change.
	Receiver	Many viewers affected by moderate changes in views.	A viewer with moderate interest in their environment, e.g. users of recreational facilities.
High Sensitivity	Landscape	An obvious change in landscape components over an extensive area.	A landscape of particularly distinctive character or nationally valued for its scenic quality.
	Receiver	Many viewers affected by obvious changes in view.	A viewer with proprietary interest and prolonged viewing opportunities, e.g. residents.

Source: EPD 2010

Table 5 Sensitivity Assessment Classes for Receiver VMUs

VMU	Visual Sensitivity Assessment Classes			
	Visible from less than 1 km	**Visible from 1 – 3 km**	**Visible from 3 – 5 km**	**Visible from more than 5 km +**
Homesteads and Places Work	High Sensitivity	High Sensitivity	Moderate Sensitivity	Low Sensitivity
Lookouts and Scenic Routes	High Sensitivity	Moderate Sensitivity	Moderate Sensitivity	Low Sensitivity
Main Public Roads or Highways	Moderate Sensitivity	Moderate Sensitivity	Low Sensitivity	Low Sensitivity
Major Railways	Moderate Sensitivity	Moderate Sensitivity	Low Sensitivity	Low Sensitivity
Constructed Roads	Moderate Sensitivity	Moderate Sensitivity	Low Sensitivity	Low Sensitivity
Non-Constructed Roads	Moderate Sensitivity	Low Sensitivity	Low Sensitivity	Low Sensitivity
Open-scale Rural Land Uses	Low Sensitivity	Low Sensitivity	Low Sensitivity	Low Sensitivity

Source: EPD 2010

The significance of Project impacts upon visual amenity values varies depending upon the extent to which the landscape has been changed; a summary of the various levels of significance is presented in Table 6. The assessment of impact significance is based upon a combination of the number of receivers potentially affected, the distance of receivers to a disturbance location and magnitude or extent of change in the local landscape. Levels of significance are used throughout this document in order to standardise the results of the assessment.

Table 6 Summary of Impact Significance for Receiver VMUs

Magnitude of Visual Change	High Visual Sensitivity	Moderate Visual Sensitivity	Low Visual Sensitivity
Dominant landscape component (adverse or beneficial)	Significant impact	Moderate impact	Slight impact
Clearly discernible landscape component (adverse or beneficial)	Moderate impact	Slight impact	No significant impact
Small or negligible landscape component (adverse or beneficial)	Slight impact	No significant impact	No significant impact

Source: EPD 2010

Table 7 Summary of Impact Significance for Landscape VMUs

Loss of existing beneficial components or introduction of new inappropriate components	High Landscape Sensitivity	Moderate Landscape Sensitivity	Low Landscape Sensitivity
Dominant landscape component (adverse or beneficial)	Significant Impact	Moderate Impact	Slight Impact
Clearly discernible landscape component (adverse or beneficial)	Moderate Impact	Slight Impact	No significant impact
Small or negligible landscape component (adverse or beneficial)	Slight Impact	No significant impact	No significant impact

Source: EPD 2010

As previously stated, the assessment of impact significance incorporates the number of receivers affected, the magnitude or extent of landscape change and the sensitivity of receivers and landscapes. If multiple receivers are impacted, then the level of significance for a particular location will be higher, than if fewer receivers are affected. The same concept applies to landscapes, if the scale of landscape change is higher, then the impact will be higher.

The potential Project impacts upon the level of significance for both local visual amenity and landscape values are discussed in Section 6 of this report.

4.0 MAJOR MINE COMPONENTS

4.1 INFRASTRUCTURE

Since mine infrastructure is not homogenous in form, the potential visual amenity impacts associated with this infrastructure can vary considerably. However, the main visual amenity impact factors at the Project site will be vertical profile and the magnitude or extent of landscape change that is associated with mine construction and operations.

Visual amenity impacts associated with specific elements of mine infrastructure are discussed in this section of the report, whilst Section 4.3 demonstrates that since many of these infrastructure elements will change throughout the life of the mine, the associated visual impacts will also change. For example, spoil dumps will be highest at the end of mine life; however, their visual amenity impact will be reduced to some degree via the process of progressive rehabilitation.

The development of certain elements of mine infrastructure can also mask the initial visual amenity impacts created by other mine infrastructure components. For example, the initial visual impacts created by the central industrial area will be masked by spoil waste dumps as they are developed.

Mining Areas, Final Voids and Extraction

The proposed final voids will exhibit a relatively small disturbance area. Although the open-cut pit and final voids are in close proximity to the Capricorn Highway with a potential for visual amenity impact, the visual amenity bund constructed parallel to the highway will minimise such impacts.

The total projected disturbance area for the Project has been estimated to be 2,676 ha (2,203 ha associated with underground operations and 473 ha associated with the open cut void, haul roads, out-of-pit dumps, dams, rail loop, MIA and visual amenity bunds). Visual amenity impacts will be dynamic as the Project develops, with the process of progressive land rehabilitation sequentially reducing the visual impacts created by the Project, until the end of mine life.

A vegetated visual-amenity bund will be developed along the southern side of the rail line and Capricorn Highway within the first year of open-cut mining, this bund will help to reduce the visual impacts of mine infrastructure upon users of both the rail line and highway (refer to Figure 8 for location details of this visual amenity bund).

In addition, bunds will be constructed around all final voids, consistent with the *Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland* (Department of Mines and Energy 1995). For safety reasons, the guidelines stipulate that the bund wall should be a minimum of 2 m in height. However, as rehabilitation progresses, the bund walls will also provide a buffer and reduce potential visual impacts.

The heavy machinery that is required for overburden, interburden and coal extraction may be visible from particular vantages around the Project site. Sharp contrasts will arise when the dark coloured coal is viewed against the existing, natural colours of the environment, thereby generating additional visual amenity impacts.

The extraction of material and development of the open-cut void in particular will not have significant impacts upon line-of-sight sensitive receivers, since the visual amenity bund will limit these impacts. Any minor visual amenity impacts will ultimately be resolved via progressive rehabilitation and the bunds that will be constructed around the final voids.

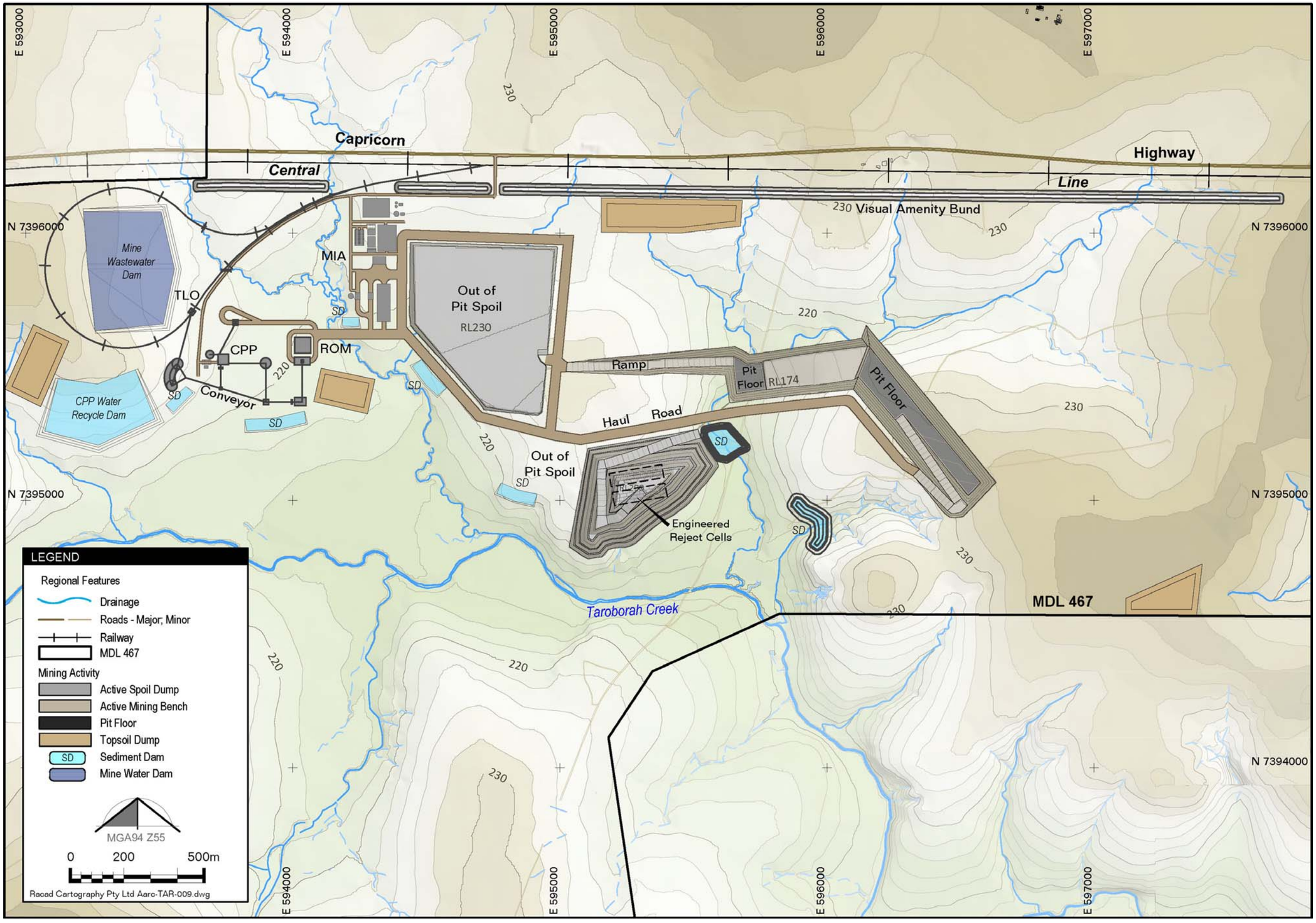


Figure 8 Visual Amenity Bund Location

Spoil Dumps

Spoil dumps and the open cut voids will become the most prominent and permanent features of the Project site. As the mine progresses, the development of these elements will be dynamic. The greatest visual amenity impacts from spoil dumps will arise at the end of mine life, however, the process of progressive rehabilitation will help to limit these impacts. The final rehabilitation plan for overburden dumps is detailed in the EIS.

The sequential development of out-of-pit spoil dumps will have a cumulative effect in terms of visual amenity impacts. During the first three years of mine operations, spoil will be stored in three out-of-pit dumps located in close proximity to the open-cut void. These spoil dumps will run west to east over a distance of 2.2 km. In-pit dumping will begin during the second year of operations when the open-pit void becomes large enough, such dumping will also help to minimise the total area of the Project site that is disturbed.

Out-of-pit spoil dumps have been designed with an overall slope angle of 30 ^{o} and dump heights expected to reach up to 90 m above the original topography.

Mine Infrastructure Area

The MIA (which includes a range of structures) is located approximately 22 km west of Emerald Township and therefore, due to the distance involved and vegetation present (providing efficient buffering against any visual impacts), the MIA should not conflict with regional outlooks from the Emerald Township. The MIA will be generally screened by the visual amenity bund and therefore not visible from the majority of Capricorn Highway. Because of its distance from the St Helens homestead, the MIA is not anticipated to have a significant visual amenity impact upon this sensitive receiver.

The final building design specifications, particularly the colours chosen for the exterior of the buildings, can help to reduce the impacts of buildings upon visual amenity. It is recommended that building exteriors should be painted with earthy / natural colours, in order to blend with the surrounding natural environment.

Since mining operations will occur 24 hours a day; artificial lighting will be employed throughout the night to facilitate these operations; such nigh-time lighting may cause visual impacts upon local homesteads.

Haul Roads

The main haul roads associated with the Project site have been designed to run in close proximity to the open-cut pit, thereby reducing truck haul distances and areas of disturbance. Activity on the haul roads and site access roads will not be visible due to the presence of the visual amenity bund and their lack of vertical profile, although haul trucks may be visible on the highest level of the out-of-pit spoil dumps during Year 2 and Year 3 of operations. Therefore, this infrastructure will not have a significant impact on local visual amenity values.

Fugitive lighting from haul trucks can potentially cause visual impacts; however such lighting will only occur during night time hours for limited periods of time. The following factors will control the magnitude of these visual impacts; homestead orientation, presence of tall / thick vegetation and local topography.

A general increase in traffic associated with the Project can also create visual amenity impacts; however such impacts are expected to be minimal for this Project, due to the use of the local rail line

for product transport and a Bus In Bus Out (BIBO) system for conveying workforce to and from the Project site.

Train Load-Out Facilities

The train load-out facility is located adjacent to the CHPP area and supplies product coal to the proposed 4 km rail loop, which connects to the QR Central West rail system. Although train load-out facilities exhibit a low vertical profile, they will be visible from portions of the Capricorn Highway. The existing vegetation, proposed visual amenity bund and spoil dumps are likely to reduce visual amenity impacts from the train load-out facility. The existing QR Central West rail system is not generally used by other mining operations in the region and since the increase in Project-related rail traffic is predicted to be negligible, low visual amenity impacts are anticipated from the rail line.

Vegetation Clearance

Vegetation clearance will incur both primary and secondary visual amenity impacts. Primary impacts (which arise during both Project construction and operations) are associated with a change in landscape due to vegetation removal and subsequent reduction in visual amenity values. Secondary impacts occur because less vegetation is available to shield sensitive receivers from visual impacts. Vegetation clearance will also change the colour of surface structures, thereby creating a colour contrast in the landscape.

Many sectors of the Project site that are cleared (particularly open-cut voids and spoil dumps), will be progressively rehabilitated. This approach helps to reduce the contrast between existing mined landscapes and unmined areas, and returns the colours and tones of the environment to a similar pre-mining state.

It should be noted that vegetation plays a major role in mitigating the visual amenity impacts caused by Project activities.

4.2 LIGHTING FROM THE PROJECT

Artificial lighting will be used at night on the Project site, particularly around the MIA, haul roads, CHPP, train load out facilities, power generating sites and by both light and heavy vehicles. The majority of these light sources will not be directly visible from either the Capricorn Highway or the surrounding residences once the mine is constructed and operating due to the presence of the visual amenity bund. However, potential visual amenity impacts will also be influenced by the prevailing climatic conditions, such as the intensity of moonlight and presence of fog or haze, such that a lit up sky will be prevalent at times. It is likely that such a lit up sky will be visible from surrounding residences and the Capricorn Highway and therefore, while not a risk of causing glare, will impose some visual amenity impacts.

The presence of artificial lighting will be the main source of visual impacts at night time. While it is likely that most of the artificial lighting will be directed southward, since the Project's lighting layout plans have yet to be developed, night time images of the Project site and potential visual amenity impacts of the Project at night were not developed for this visual amenity assessment.

4.3 MINE STAGING

Mine staging will have a significant influence on the magnitude and extent of landscape change. Sectors of land disturbance, spoil dumps and the open-cut void will increase in both area and location as coal production rates increase. Figure 9 illustrates open-cut ROM coal and waste production rates

for the Project. Thermal coal production will be initiated via open-cut mining, with underground operations beginning in year 5 of the Project. During the first three years, open-cut production is planned to increase steadily before reaching a maximum ROM coal production rate of approximately 2.28 Mtpa. In contrast, the underground mining operation is expected to reach a maximum ROM coal production rate of 5.75 Mtpa.

The underground mining techniques that have been selected for this Project are not expected to generate large volumes of waste material. The vast majority of spoil produced will arise from seven years of open-cut operations.

Most of the land disturbance generated within MDL467 will occur south of the Capricorn Highway as a result of development of the open-cut void, spoil dumps, ROM coal haul roads, site access road, ROM stockpiles, CHPP, wastewater and recycling dams, train load-out facility and associated mine infrastructure. Project disturbance areas will become significant by year two, with out-of-pit waste dumping expected to reach up to 14 million loose cubic metres. The majority of land clearing will be undertaken during the construction period, in order to accommodate mine infrastructure.

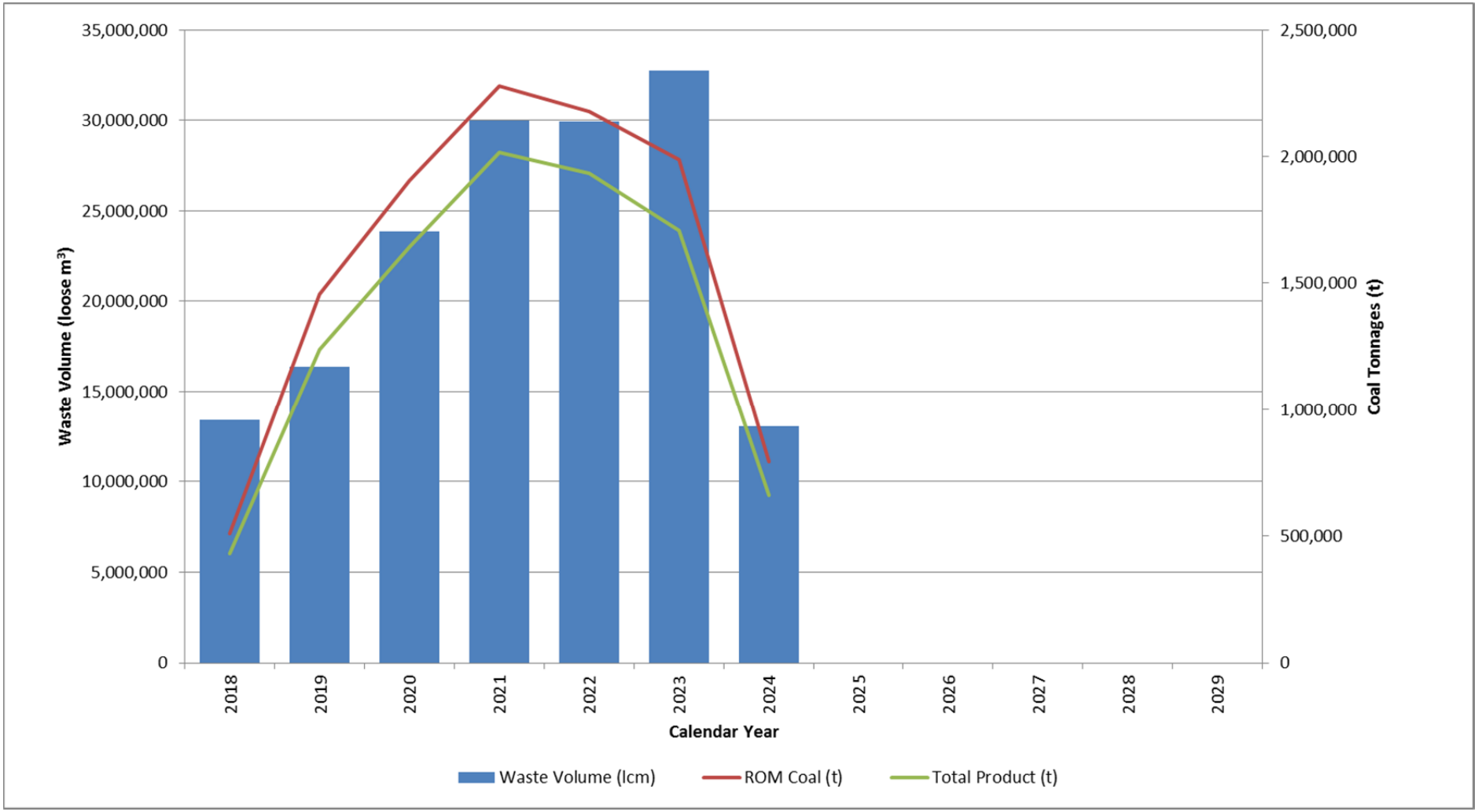


Figure 9 Open Cut Production Rates for ROM, Product Coal and Waste Volumes

5.0 POTENTIAL IMPACTS FROM THE PROJECT UPON VISUAL MANAGEMENT UNITS

5.1 COMPUTER GENERATED IMAGES OF VISUAL IMPACTS

This section of the report presents computer generated images (CGI) of the potential visual amenity impacts that Project activities will have upon the local landscape when observed from key viewpoints around the Project site. Aerial photographs, contour maps, road maps and vegetation maps were inspected in conjunction with the position of local sensitive receivers, in order to identify these key viewpoints for both the northern and southern sectors of the Project.

Panoramic photographs for each key viewpoint were generated from multiple images, in order to record the current landscape condition around each viewpoint. Computer generated images of significant items of mine infrastructure were then superimposed over each panoramic photograph, in order to portray potential Project impacts upon local visual amenities. These panoramic / CGI photo compilations are presented in Photo Plate 13, Photo Plate 14, Photo Plate 15 and Photo Plate 16 and compare local viewsheds before and after mining activities.

Spoil dumps will be most visible when they are earthy brown in colour, however, following progressive rehabilitation their colour will have changed to that of green vegetation. Since spoil dump regrading will begin in Year 3 and be complete by Year 5, one of the spoil dump CGIs has been rendered in green colour to reflect their post rehabilitation appearance.

Since no local recreation areas, places of work (apart from agricultural work), cycle or walkways exist on or near the Project site, these potential landscape VMUs have been excluded from this visual amenity assessment.

5.2 DESCRIPTION OF PANORAMIC PHOTOGRAPHS AND COMPUTER GENERATED IMAGES

Of the Project infrastructure developed on site, the spoil dumps will exert the greatest visual amenity impacts, being visible from the following homesteads; Iona (which shares similar visual amenity values with the Capricorn Highway, Walther, St Helens and from Visual Amenity Panorama Site 11 (toward the western extent of the MDL) (refer to Figure 5 for location details of these visual amenity locations). Limited views of the CHPP, train load-out facility, ROM and product stockpiles will also be possible from St Helens and the Capricorn Highway.

In locations were vegetation cover is sparse, visual amenity impacts will arise (refer to Photo Plate 13 for an example of these impacts). For other sectors of the Project site, it appears that many lines of sight and views will be blocked or fragmented by existing topography and vegetation (refer to Photo Plate 16 for an example of these limited views).

Potential visual amenity impacts can be minimised or negated by significant stands of existing vegetation (both located around the site and on existing properties) as well as dense wind breaks along roads, road reserves and property boundaries. The visual amenity bund that will be installed to the south of the Central West rail line will also help to minimise visual amenity impacts for people travelling along the Capricorn Highway and Central West rail line. Areas of disturbance (particularly spoil dumps) are likely to be visible from some homesteads, where visual amenity impacts can range from minor to significant.

Visual Amenity Site 4 - Iona Homestead

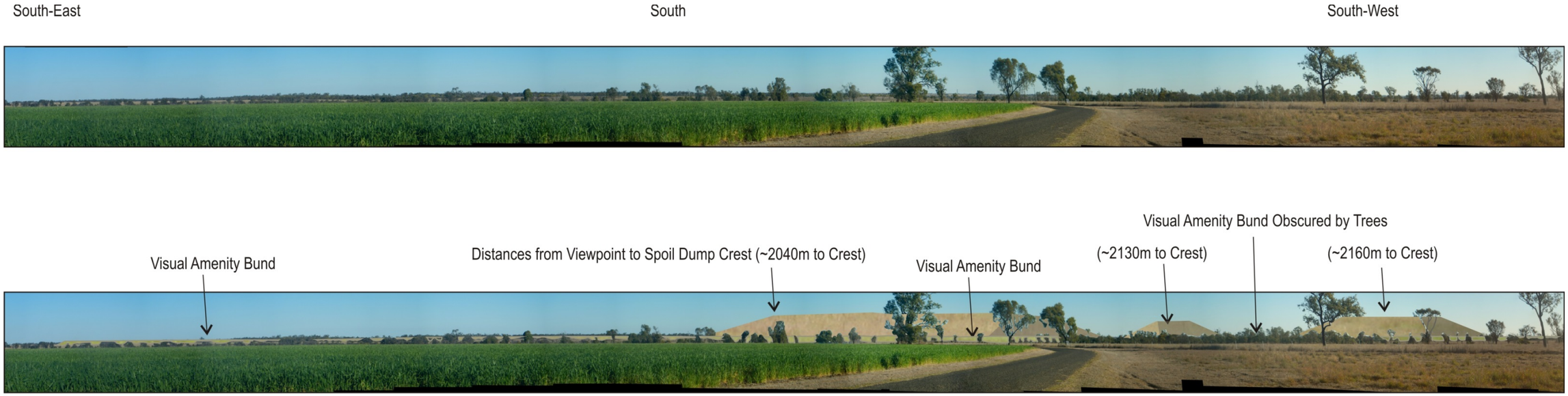


Photo Plate 13 Pre and Post-Mining Visual Amenity Impacts from Iona Homestead

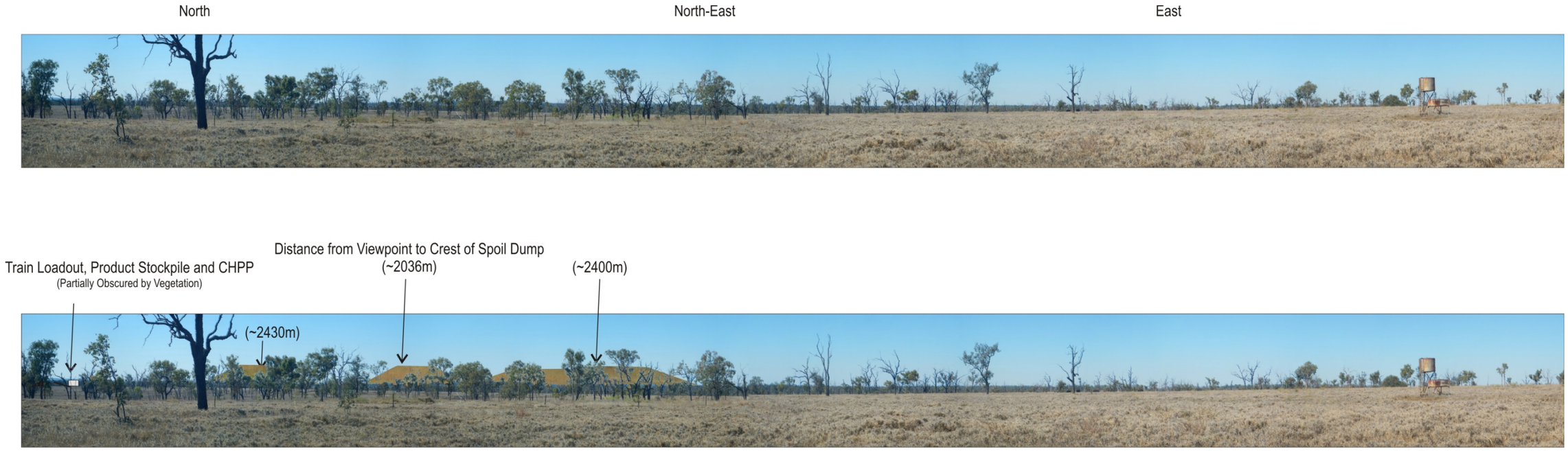
The Iona homestead will be particularly impacted by the Project, due to its close proximity to open cut operations and sparse vegetation (low-lying agricultural crops) between it and the proposed spoil dumps. The Iona homestead visual amenity impacts will be similar to those experienced from certain sectors of the Capricorn Highway, which is located between the Iona homestead and spoil dumps, running east to west through the above image. A view from Iona homestead of the rehabilitated spoil dumps is also presented.

Visual Amenity Site 11- Western Extent of MDL467

Photo Plate 14 Pre and Post Mining Visual Amenity Impacts from the Western Side of MDL467 on Capricorn Highway

Visual amenity impacts from the western extent of MDL467 will be alleviated by the presence of vegetation and the visual amenity bund, which obscures views of the Project's main infrastructure area and spoil dumps. The Capricorn Highway can be seen to the left of the image, indicating that along parts of the highway, vegetation also helps to obscure the Projects visual amenity impacts. The post mining visual presents both a rehabilitated spoil dump and visual amenity bund.

Visual Amenity Site 1 – St Helens Homestead

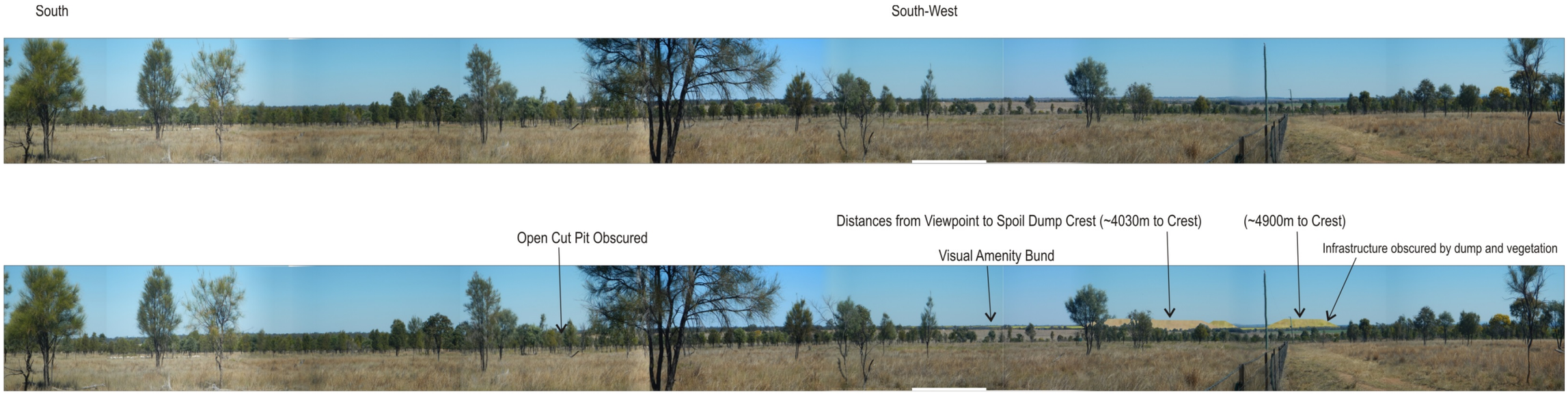


Note: All dumps and Bunds shown as landforms prior to final rehab grade and vegetation.

Photo Plate 15 Pre and Post Mining Visual Amenity Impacts from St Helens homestead

The Project's visual amenity impacts upon the St Helens homestead (located to the south of the MIA), will be partly minimised by local vegetation and the distance to the spoil dumps. Although the spoil dumps will be the most prominent visible item of mine infrastructure, during the mine's operational phase, the train load out, product stockpiles and CHPP will also be visible from this homestead.

Visual Amenity Site 9 – Walther Homestead



Note: All dumps and Bunds shown as landforms prior to final rehab grade and vegetation.

Photo Plate 16 Pre and Post Mining Visual Amenity Impacts from the Walther Homestead

The spoil dumps will pose a visual amenity impact when viewed from the Walther homestead. Although the spoil dumps are partly obscured by vegetation, the visual amenity impacts will be observable on the horizon. Visual amenity impacts predicted at the Walther homestead are similar to those encountered at the Iona homestead, albeit to a lesser degree.

5.3 LEVEL OF SIGNIFICANCE FOR RECEIVER VMUS

Compared with other categories, residential receivers are deemed to be the most sensitive to visual amenity impacts, as a result of their proprietary interest and prolonged exposure to visual impacts. Although recreational receivers have a shorter exposure to visual impacts than local residents, they are also considered to be sensitive due to the aesthetic value they place in the landscape. Transient users (users of trains or roads) are considered to have moderate sensitivity because they only pass through the Project area intermittently. The least sensitive groups are rural land users, where a limited number of receivers exist, receiver sensitivity is low and moderate exposure durations occur. The level of significance for each Receiver VMU is summarised in Table 8.

For this particular project, local homesteads that are located relatively close to mine infrastructure and not shielded by vegetation will be significantly impacted. Receivers using main roads and in particular the Capricorn Highway, have the potential to be moderately impacted, as well as those receivers using the QR Central West rail system. Receivers who travel along minor roads and tracks in close proximity to the Project site will have an intermittent exposure to landscape disturbances, but since the number of receivers in this category is anticipated to be low, the overall visual amenity impact is judged to be moderate. Other roads users and rural graziers have a slight potential to be impacted by the Project.

Table 8 Level of Project Impact Significance upon Receiver VMUs

Visual Management Unit	Project Characteristics	No of Viewers	Distance to Disturbance	Magnitude of Change	Receiver Sensitivity	Level of Significance
Homesteads and Places Work	Few receivers with propriety interest and prolonged exposure durations	Few	High (< 1 km)	Dominant	High	Significant Impact
Main Public Roads or Highways	Many receivers with intermittent or short term exposure durations and momentary interest	Many	High (< 1 km)	Dominant	Moderate	Moderate Impact
Major Railways	Very few receivers with intermittent or short term exposure durations and momentary interest	Very few	High(< 1 km)	Dominant	Moderate	Moderate Impact
Lookouts and Scenic Routes	Few receivers and moderate exposure durations with moderate interest	N/A	N/A	N/A	N/A	N/A
Constructed Roads	Few receivers and intermittent or short term exposure durations with momentary interest	Few	High (< 1 km)	Dominant	Moderate	Moderate Impact
Non-Constructed Roads	Very few receivers and intermittent or short term exposure durations with momentary interest	Very few	High (< 1 km)	Dominant	Moderate	Moderate Impact
Open-scale Rural Land Users	Very few receivers with moderate exposure durations with moderate interest	Very few	Low (< 2 km)	Dominant	Low	Slight Impact

N/A = not applicable

5.4 LEVEL OF SIGNIFICANCE FOR LANDSCAPE VMUS

In terms of the Project's visual amenity impacts upon local landscapes, Table 7 was assessed to determine levels of significance for such impacts. The assessment was based upon combinations of landscape sensitivity (the nature and value of any landscape resources likely to be affected and the character of the landscape and its ability to accommodate change) and impact magnitude (extent of loss of beneficial components or addition of inappropriate components). The results of this assessment are presented in Table 9 below.

Table 9 Level of Project Impact Significance upon Landscapes VMUs

Visual Management Unit	Project Landscape Characteristics	Landscape Magnitude	Landscape Sensitivity	Level of Significance
Rural / Grazing	Predominantly cleared areas of improved pasture. Scattered trees or clumps of trees present, many fences and unformed roads / tracks.	High	Low	Slight Impact
Remnant Vegetation	Patches of forest / woodland with relatively large or mature trees and a characteristically intact appearance. Grazed understorey typical.	High	Moderate	Moderate Impact
Riverine / Aquatic Ecosystems	Immediate Riparian Zone	High	Moderate	Moderate Impact
Residential	Existing residences close to the MDL.	High	Moderate	Moderate Impact
Roads and Public View Points	Existing roads and public viewpoints close to the MDL	High	Low	Slight Impact

5.5 SUMMARY OF VISUAL AMENITY IMPACTS

Since the Project's spoil dumps will be the most substantial component of mine infrastructure, they will probably create the most significant visual amenity impacts. Homesteads that are located in close proximity to the Project area, such as Iona, Donnelly, St Helens and Walther, are those most likely to be exposed to significant impacts. Areas of the Project site which lack vegetation buffering will also be subject to intermittent impacts.

Receivers that use the Capricorn Highway will be intermittently exposed to a moderate level of visual amenity disturbances associated with the Project. A CGI Project infrastructure overlay was not produced for Visual Amenity Panorama Site 5 (Wilga Downs Road); however, since this road runs a few kilometres to the east of the proposed spoil dumps and receiver exposure will be intermittent along this road, it is anticipated that only a low visual amenity impact will arise.

Receivers that are located more than 5 km from the Project site are likely to experience only slight visual amenity impacts, if any.

Although the MIA will be visible from one of the receiver locations (St Helens), the infrastructure is unlikely to produce a significant visual impact because of its vertical scale, the amount of vegetation present and the distance. For residential receivers who live to the north and receivers that use main roads adjacent to the Project area, the MIA will be screened by the visual amenity bund.

Artificial lighting will be used during both Project construction and operations. Light will be visible from certain vantage points, but it is expected that potentially affected receivers are generally likely to be indoors when artificial lighting is employed and therefore, the visual amenity impacts are anticipated to be limited. The density / distribution of local vegetation, visual amenity bund and positioning of the spoil dumps between the closest receivers will also limit the potential visual impacts from artificial lighting.

6.0 MITIGATION OF POTENTIAL VISUAL AMENITY IMPACTS

The assessment of visual amenity impacts for this Project has indicated that, for certain homesteads which lie in close proximity to the Project, visual amenity impacts are likely to be significant. However, the gently undulating local topography does not provide any viewpoints that would overlook the Project, therefore, mine infrastructure components will appear on the horizon and will be predominantly limited to the spoil dumps (refer to Section 5.1 for details of these impacts).

For some receivers, the existing vegetation provides a visual screen which can mitigate particular visual impacts. It is therefore recommended that as much vegetation as possible should be left intact along important buffer zones, in order to alleviate any potential visual impacts.

This section of the report identifies local receivers that will potentially be impacted from a visual amenity perspective by Project development and provides impact mitigation options.

6.1 ROADS

Although the proposed mine site lies in close proximity to the Capricorn Highway, only moderate visual amenity impacts are anticipated since a large number of short-term, or intermittent, highway users will encounter the Project infrastructure. In addition, a visual amenity bund will be built along and to the south of the Central West rail line within the first year of mining, in order to reduce visual amenity impacts upon both road users and residents who live close to the mine.

Although no dense vegetation buffers were consistently observed along the highway, where possible, existing vegetation buffers will be retained throughout the life of the Project in order to reduce potential visual impacts for intermittent highway users.

Wilga Downs Road is located 2 km from the nearest edge of the pit and 3 km from the nearest spoil dump and thus will not be significantly visually impacted by the proposed spoil dumps. Due to the relatively low number of receivers that use Wilga Downs Road, the visual impacts for this location were assessed as low. The vegetation along this road, which remains untouched during Project development, will help to mitigate local visual impacts, as well as the progressive revegetation of the spoil dumps.

6.2 MINE COMPONENTS

Spoil dumps are one of the major items of Project infrastructure that will create visual amenity impacts. As discussed previously, it is likely that during the early years of operations the out-of-pit spoil dumps will reach a height of approximately 67 m to 90 m above original ground level, with a slope of up to 30 ^{o}. The close proximity of the Project to the Iona, Walther and St Helens homesteads, means that visual impacts for these locations are unavoidable, since the spoil dumps have been located as close to the open-cut pit as possible, in order to minimise haul distances.

The spoil dumps will be re-contoured during rehabilitation and both the angles of repose and dump heights slightly reduced, helping these structures to blend into the surrounding topography. The process of progressive ripping, seeding and planting of the dumps with suitable native plants will also help to reduce the visual impacts associated with these structures by Year 5 of the Project. The quantity of material that is delivered to out-of-pit spoil dumps will also be minimised, by utilising in-pit spoil disposal methods.

The in-pit dumping of spoil will also decrease the maximum potential height of the out-of-pit spoil dumps. Both in-pit and out-of-pit spoil dumps are to be progressively rehabilitated as mine operations advance. The in-pit spoil dumps should reach no higher than 5 m above the existing topography following rehabilitation. Such re-vegetation will visually help the dumps to merge into the surrounding landscape relatively quickly and reduce the time frames that receivers are exposed to potential visual impacts from spoil dumps.

Although the Capricorn Highway will be in close proximity to the final voids, the visual amenity bund (constructed within the first year of mining) and sporadic stands of vegetation located on the highway will obscure the final voids from the highway. In addition, as part of the site rehabilitation process, the final voids will be surrounded with small-scale bunds of approximately two meters, which will help to screen the voids from view.

The MIA is not expected to have significant visual impacts on any of the local homesteads, since it will be obscured to the north by the spoil dumps and the visual amenity bund and by existing vegetation to the south, as presented in Photo Plate 15.

There are no existing public viewing locations associated with the Project area. The primary land use of the surrounding environment is low-intensity cattle grazing and cropping, whose visual amenity values are unlikely to be significantly disrupted by the Project. The topography of the site varies in elevation by approximately 50m from the highest rises to lower-lying flat ground and is mainly comprised of gentle undulations. The majority of the raised land forms are on private land, inaccessible to the general public and therefore unlikely to be used for scenic viewing purposes.

6.3 WATERWAYS

The visual amenity values of local creeks are likely to be altered and impacted to a limited extent by the land subsidence which will occur as a result of underground mining.

6.4 EXISTING RESIDENCIES

Photographic panoramas and infrastructure CGIs were constructed for three residences (Iona, St Helen's and Walther) that are located within 3 km of the proposed open-cut operations, spoil dumps and MIA area (south of the Capricorn Highway), in order to assess potential visual amenity impacts generated by the Project. The residences likely to experience the highest impacts are those located within 3 km of the Project, due to the lack of existing vegetation and topography.

Visual sensitivity assessments were conducted for four homesteads as follows:

- Iona - located less than 1 km from the Project's open-cut area and therefore considered to be a highly sensitive receiver;
- Donnelly - located less than 1 km from the Project's open-cut area and therefore considered to be a highly sensitive receiver. However note that the visual amenity bund protects this homestead from visual amenity impacts from the spoil dump;
- St Helen's – also considered to be highly sensitive, due to their proximity to the MIA (between 1 km to 3 km from the open-cut area); and
- Walther - located 1 km to 3 km from the open-cut area and also considered to be highly sensitive.

Six additional homesteads are also located more than 3 km from the Project's MIA and have therefore been assigned moderate to low sensitivity to the Project.

6.5 PLACES OF WORK

No places of work in the region are predicted to be visually impacted by the Project (except for local farmers), since Emerald (the nearest town or centre) is located approximately 22 km to the east of the Project site.

6.6 EXISTING FEATURES ABILITY TO ABSORB COMPONENTS OF THE PROJECT

The existing character of the Project site is open-scale pasture and cropping land, with occasional stands of vegetation occurring along roads and sporadic patches in grazing areas. Since the Project site is not densely vegetated, the existing site is limited in terms of its ability to absorb the Project's visual impacts. Post-mining land forms will be elevated above existing ground levels, but will be returned to a similar pre-mining condition once the Project enters the decommissioning and rehabilitation phases. Vegetation buffers that currently surround the Project site will help the existing environment to absorb some of the Projects visual amenity impacts.

A number of exploration and mining leases exist in the Project area. These leases will help to desensitise certain viewers to the Project's visual amenity impacts, since coal operations are common in the region and provide a valuable economic input into the community.

Post rehabilitation, the modified landscapes should blend into the surrounding environment and have a similar final appearance, albeit at a slightly raised level to the surrounding topography. Vegetative cover should also help to alleviate the visual impacts of the spoil dumps post mining. For operational reasons, much of the mine infrastructure has been located in low points around the Project site. Such a layout will also help to alleviate their visual impact.

6.7 BUFFER ZONES SURROUNDING THE PROJECT

Planting of vegetation buffer zones along Lot boundaries, especially those on the visual amenity bund located along the Capricorn Highway, north of the open-cut area, will help to alleviate potential visual amenity impacts. Allowing existing vegetation buffers to increase in density will enhance their ability to interrupt views or fully screen receivers from Project visual impacts. Although the process of revegetation can take up to 20 years, after 10 years of growth, local vegetation will begin to block views of the MIA. Since the Project has a proposed life span of approximately 22 years, a revegetation strategy could prove beneficial for the later stages of the Project.

6.8 LIGHTING

If sources of artificial light are located within 1 km of direct line-of-sight of sensitive receivers, it is recommended that directional lighting be employed, in order to deflect the light from these sources and limit visual impacts upon local receivers. Note that lighting hoods can also be used for this purpose. Further light-mitigation analysis will also be required, in order to determine appropriate mitigation strategies for individual residences.

The potential for lighting to cause a risk of glare to motorists on the Capricorn highway is considered very low due to the visual amenity bund, which will screen all but the highest portions of the northwest spoil dump from direct line of site to light sources.

7.0 SUMMARY

Local visual amenity values have been described and assessed for land which lies within MDL467 and the surrounding landscape.

The local landscape and associated views have not been assigned significant national, state, regional or local value and are reasonably uniform within the wider region. The local topography is mainly comprised of gently-rolling hills (which are typical of the surrounding, rural, grazing landscapes) which vary in elevation by less than 50m. Land-use is mainly low-intensity cattle grazing and dryland cropping.

Panoramic photographs have been developed for particular sectors of the landscape where mine infrastructure could potentially impact the visual amenity of local homesteads (sensitive receivers). Significant components of the Project's mine infrastructure have been superimposed over these panoramic photographs, in order to identify which items of mine infrastructure would create visual amenity impacts.

The majority of sensitive-receivers are located far enough from the Project site to ensure that visual amenity impacts upon them are minimal. The mature local vegetation which surrounds these receivers also helps to mitigate any visual amenity impacts associated with the Project.

However, for a limited number of viewing locations, proposed Project impacts upon local visual amenity values have been identified. The level of significance for these particular visual impacts was also assessed, using the VMU assessment methodology that is presented in Section 3.0 of this report. Spoil dumps were found to generate the most significant impacts upon visual amenity values.

The main components of mine infrastructure that have the potential of a negative impact upon the visual amenity values of local homesteads include the spoil dumps, CHPP, train load-out facilities, ROM and product stockpiles and visual amenity bund.

Three homesteads (Iona, Walther and St Helens) will be subject to significant visual impacts due to their close proximity to the Project's spoil dumps (refer to Section 5.0 of this report for details). It is anticipated that the visual amenity impacts at these homesteads will be unavoidable.

The topography and existing vegetation of the site will help to shield most sensitive receivers from Project impacts, where thick vegetation cover exists. However, in sparsely vegetated areas, local receivers will be subject to increased visual impacts.

No workplaces or public lookout points are located in close proximity to the Project site; therefore, these VMUs will not be visually impacted by the Project. The only gentle ridgelines and hills that occur locally are situated on private land and thus, since only a few receivers exist at these locations, their level of visual amenity impact will not be significant.

Progressive rehabilitation of the Project site will also help to blend mine-infrastructure features into the surrounding environment, thereby significantly reducing visual amenity impacts. Suitable vegetation species will be planted, in order to achieve the nominated post mining land use, water and wind-induced soil erosion will be reduced by this new vegetation, surface water and seepage run-off will be managed and the final landform stabilised.

It is recommended that all vegetation located on the perimeter of the MIA should be preserved and maintained throughout the life of the Project. Managing vegetation effectively will also help to

preserve and improve the existing remnant vegetation communities. The ability of the current landscape (open-scale pasture with occasional stands of vegetation) to absorb visual amenity impacts created by the Project is limited, due to the fact that the local topography does not include very many hilly regions or ridgelines and the local vegetation in the Project area is sparse. However, re-vegetation of the spoil dumps will help to reduce their long-term visual amenity impacts post mining.

Receivers that travel along both constructed (Capricorn Highway) and non-constructed local roads are predicted to be moderately impacted by the Project. Although these receivers are in close proximity to the Project area, only a limited number of such receivers exist and therefore, the level of visual amenity impact upon these receivers will not be significant.

Spoil dumps pose the greatest impacts upon local visual amenity values, however, as part of the rehabilitation process, these dumps will be flattened, their angle of repose reduced and the surface ripped, seeded and planted in order to reduce such impacts. The use of in-pit dumping will also help to reduce the volume of material that is deposited in the higher profile out-of-pit spoil dumps.

The artificial lighting employed for specific locations on the Project site (MIA, CHPP, train load out facility, power generating sites and mine vehicles) will have an impact upon the visual amenity of local sensitive receivers. Directional lighting and vegetation screens could be employed to reduce these visual amenity impacts.

People travelling along the Capricorn Highway will experience moderate visual impacts, due to the fact that the highway is in close proximity to the Project site and that in some locations along the highway, vegetation cover is sparse. Despite the obvious visual impacts of the spoil dumps, road users are not considered to be highly sensitive receivers, since they only have a passing or momentary visual interest in their surroundings.

The existing vegetation which surrounds the Project site helps to significantly reduce potential Project impacts upon local visual amenity values. Therefore, it is highly recommended that existing vegetation located within MDL467 be left intact where possible, as it will provide a visual buffer for large sectors of the Project site. This visual buffer could also be extended by vegetation planting along further sectors of the Project boundary. Even if the buffer zone at particular Project site locations proves to be minimal, it will still help to break up potential views of Project infrastructure. Established vegetation should be preserved wherever possible.

8.0 REFERENCES

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