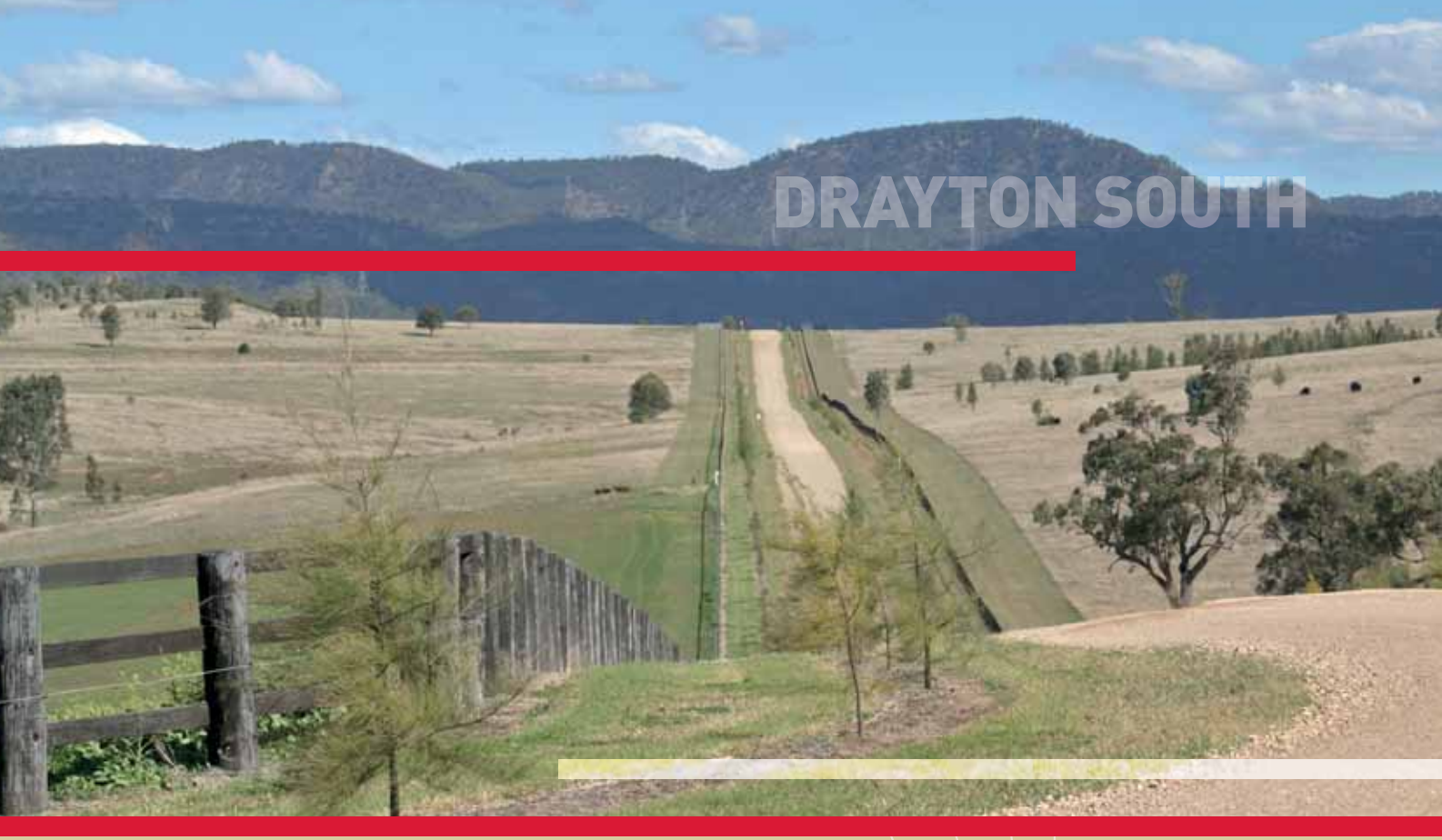

Visual Impact Assessment

Drayton South Coal Project

visual impact assessment

October 2012

a report prepared by

VP&d visual planning + design

Drayton South Coal Project
visual impact assessment

October 2012

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Date:	29th October 2012
Reference:	Data/dropbox/projects/2011/Drayton South/Report
Status:	Final - Rev A 29/10/2012

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Glossary

Areas of Primary Visual Concern	Areas that have potential views of the Project based on a consideration of topography alone as a screening
Contrast	The degree to which a development component differs visually from its landscape setting.
Field of View	This area includes the total view, consisting of the primary view zones above and the secondary or peripheral view zones around the primary view zone, out to about 70^0 either side of the central view line in both vertical and horizontal plain.
Integration	The degree to which a development component can be blended into the existing landscape without necessarily being screened from view.
Overburden Emplacement Area (OEA)	Refers to the placement of waste material (mostly dirt and rock) excavated as part of the coal mining process into a predefined area.
Photomontage	Photomontage is the process and result of making a composite photograph by cutting and joining a number of other photographs or graphic images for illustrative effect. The composite picture or image aims to give a visualisation of a projected visual effect.
Primary View Zone (PVZ)	This zone is the central most critical part of a view that is seen with the greatest clarity. It is that part of a view that is within a horizontal arc of 30^0 either side of the centre line of a view and a vertical arc of 30^0 above the horizontal
Project	Drayton South Coal Project
Screen	The degree to which a development element is unseen due to intervening landscape elements such as topography or vegetation
Visual Character Unit (VCU)	Areas of landscape that have similar topographic, vegetation and land use features that create areas of similar visual character
Visual Effect	A measure of the visual interaction between the Project and the landscape setting within which it is located
Visual Impact	A measure of a joint consideration of both visual sensitivity and visual effect that considered together determine the visual impact of a development
Visual Sensitivity	Degree to which a change to the landscape will be perceived in an adverse way
Visual Study Area	The visual study area includes the most significant parts of the total visual catchment from which the Project Area potentially could be seen. This is the area containing the most critical locations with potential views to the Project, which will be the focus of visual impact assessment.

1. INTRODUCTION

JVP Visual Planning and Design has been engaged by Hansen Bailey Environmental Consultants (Hansen Bailey) on behalf of Anglo American Metallurgical Coal Pty Ltd (Anglo American) to complete a visual impact assessment for the Drayton South Coal Project (the Project). The purpose of the assessment is to form part of an Environmental Assessment (EA) being prepared by Hansen Bailey to support an application for a contemporary Project Approval under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to facilitate the continuation of the existing Drayton Mine by the development of an open cut and highwall coal mining operation and associated infrastructure within the Drayton South area.

The primary objective of the assessment is to provide a comprehensive visual impact assessment for submission as part of the EA. This includes:

- An assessment of the existing visual settings created by various landscapes in and around the Project;
- Establishing the visual character and visual effect created by the Project;
- A consideration of the visibility of the Project from sensitive receptors;
- The likely visual impacts created by the Project (including both short term and long term) having regard to visual effect and sensitivity;
- An assessment of potential night light effects;
- Consideration of cumulative visual impacts in the locality; and
- The development of mitigation strategies to ameliorate adverse visual impacts.

1.1 Project Description

Drayton Mine is managed by Anglo Coal (Drayton Management) Pty Ltd which is owned by Anglo American. Drayton Mine commenced production in 1983 and currently holds Project Approval 06_0202 (dated 1 February 2008), which expires in 2017 at which time the operation will have to close.

The Project will allow for the continuation of mining at Drayton Mine by the development of open cut and highwall mining operations within the Drayton South mining area while continuing to utilise the existing infrastructure and equipment from Drayton Mine.

The Project is located approximately 10km north west of the village of Jerrys Plains and approximately 13km south of the township of Muswellbrook in the Upper Hunter Valley of NSW. The Project is predominately situated within the Muswellbrook Shire Local Government Area (LGA), with the south west portion falling within the Singleton LGA. Figure 1.1 illustrates the location of the Project. The Project is located adjacent to two thoroughbred horse studs, two power stations and several existing coal mines.

The Project will extend the life of Drayton Mine by a further 27 years ensuring the continuity of employment for its workforce, the ongoing utilisation of its infrastructure and the orderly rehabilitation of Drayton Mine's completed mining areas.

The Project generally comprises the:

- Continuation of operations at Drayton Mine as presently approved with minor additional mining areas within the East, North, and South Pits;
- Development of an open cut and highwall mining operation extracting up to 7 Mtpa of ROM coal over a period of 27 years;

- Utilisation of the existing Drayton Mine workforce and equipment fleet (with an addition of a highwall miner and coal haulage fleet);
- Drayton Mine fleet consists of at least a dragline, excavators, fleet of haul trucks, dozers, graders, water carts and associated supporting equipment;
- Use of the Drayton Mine existing voids for rejects and tailings disposal and water storage to allow for the optimisation of the Drayton Mine final landform;
- Utilisation of the existing Drayton Mine infrastructure including the Coal Handling and Preparation Plant (CHPP), rail loop and associated loadout infrastructure, workshops, bath houses and administration offices;
- Construction of a transport corridor between Drayton South and the existing Drayton Mine;
- Utilisation of the Antiene Rail Spur off the Main Northern Railway to transport product coal to the Port of Newcastle for export;
- Realignment of a section of Edderton Road; and
- Installation of water management and power reticulation infrastructure at Drayton South.

The conceptual layout of the Project is shown in Figure 1.2.

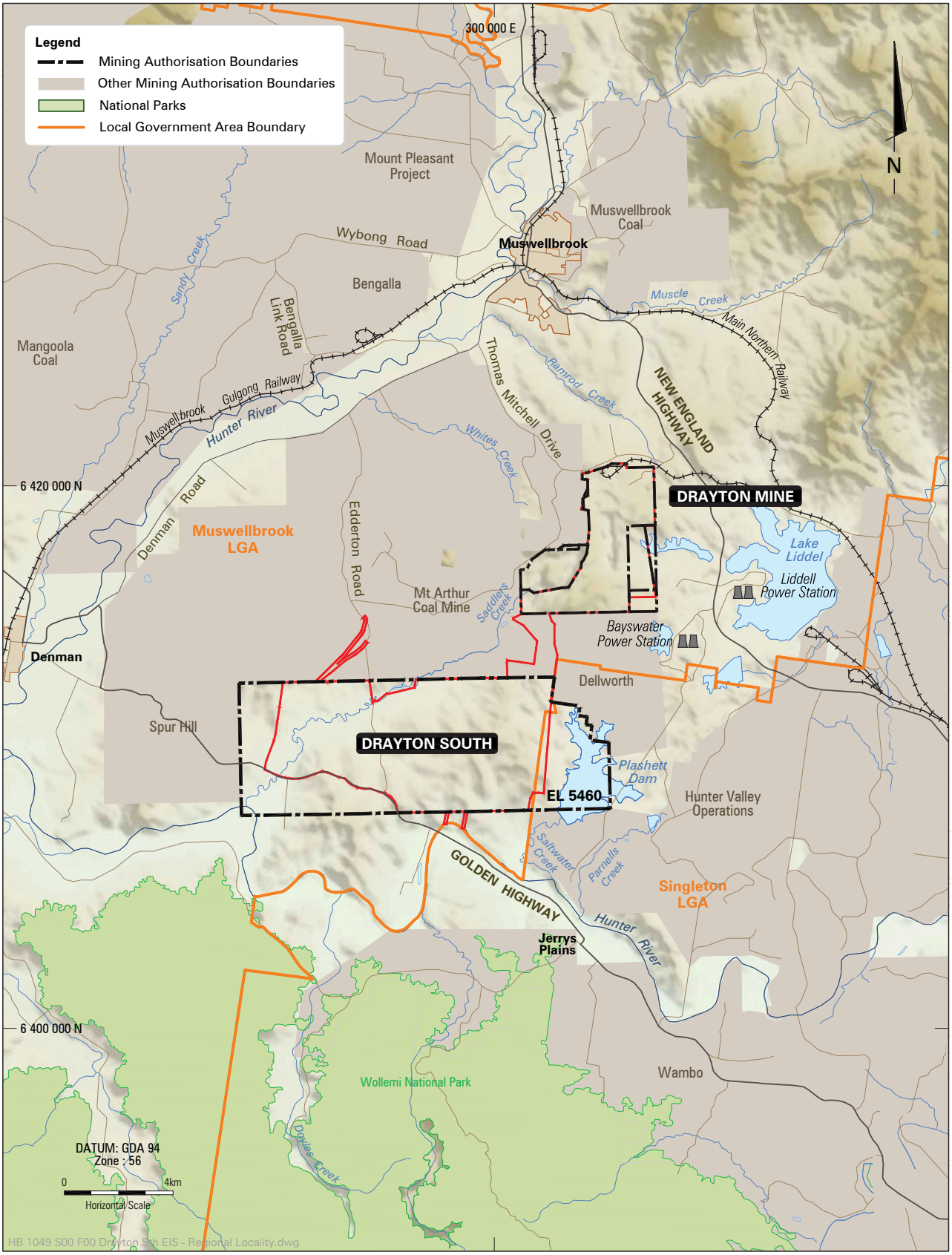

Figure 1.1 | ***Drayton South Coal Project Locality***

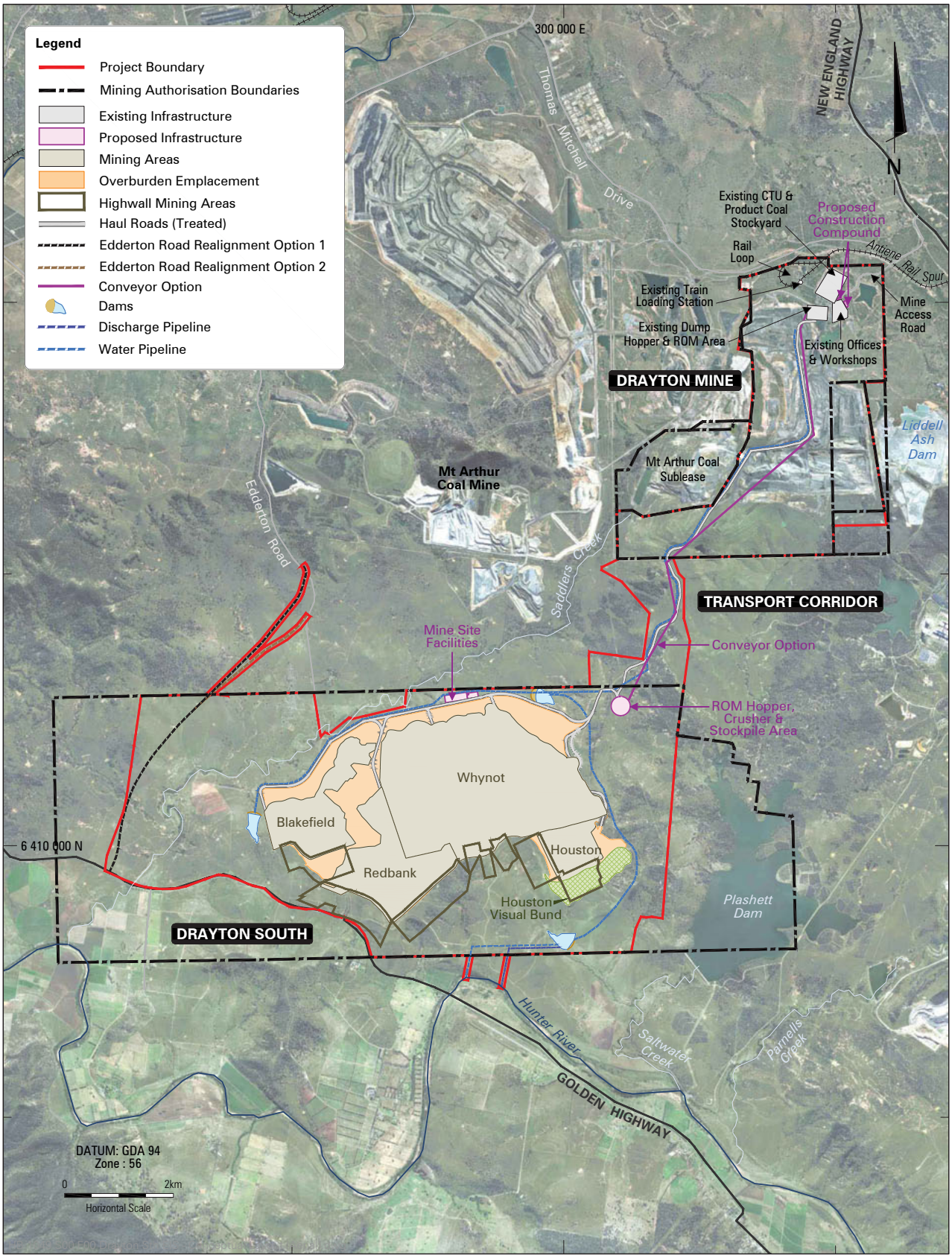

Figure 1.2 | ***Conceptual Project Layout***

2. ASSESSMENT METHODOLOGY

2.1 Introduction

The methodology used to determine the level of visual impact of the Project involves, in the first instance, a consideration of the existing visual environment. This includes a consideration of existing landscape settings, and how they are seen from various viewing locations. In this way the visual character of the landscape as well as visual sensitivity of the various viewing locations can be determined.

Secondly, the visual effect of the Project is determined by considering the visual characteristics of the Project in the context of the landscape within which it is seen.

A combined consideration of both visual sensitivity and visual effect identifies impacts and directs whether any mitigation strategies are required. The overall method of visual assessment of the existing landscape and the Project in the context of the landscape is outlined in Figure 2.1.

2.2 Evaluation of the existing visual environment

The evaluation of the existing visual environment consists of the assessment of both the landscape and viewing locations within it. It also includes consideration of the statutory framework within which any development must be considered.

Landscape Setting

The landscape setting can be defined in terms of topography, vegetation, hydrological and land use features. These elements define the existing visual character of the landscape that the Project interacts with. Within any landscape there are areas of similar visual features that are defined as a Visual Character Unit (VCU). Defining the landscape in terms of these units assists in understanding the visual character of the landscape as a whole.

Viewing Locations

Viewing locations are those areas where people are likely to obtain a view of the Project. These viewing locations have different significance based on numerous factors, collectively evaluated through land use and distance.

There are numerous locations within the vicinity of the Project that would potentially be visually impacted by the Project to various levels. For the purpose of the visual impact assessment a number of sites within key sectors of the visual study area were selected as representative viewing locations. These representative viewing locations were selected as part of an extensive consultation process with key stakeholders. This included a field assessment and detailed analysis of aerial photography and topographic plans to determine the likely visibility of the Project. Whilst there would be some variation in the impacts on specific viewing locations, an overall assessment of the visual impact on the selected locations would be representative for the majority of views experienced. The representative viewing locations selected were evaluated using photomontage simulations of the Project.

The Project

The Project is evaluated to define the visual elements that are most significant from a visual perspective. The Project elements are defined as being major or minor and are considered in terms of how they contrast with the existing environment.

2.3 Statutory Framework

Environmental Planning and Assessment Act 1979

The EP&A Act is the overarching planning legislation in NSW. This act provides for the creation of planning instruments that guide land use.

Part 3A of the EP&A Act provides an approvals regime for all 'major projects'. Major projects are defined under Schedule 1 of *State Environmental Planning Policy* (Major Development) 2005 (SEPP (Major Development)) and are identified by way of declaration as a listed project in the SEPP (Major Development) or by notice in the NSW Government Gazette. The Minister is the consent authority for all projects to which Part 3A applies. Under Part 3A, the Minister was able to issue a project approval or a concept approval following consultation with the community and relevant State Government agencies. The requirement for certain other permits and licenses is removed under Part 3A.

In October 2011, Part 3A of the EP&A Act was repealed. However, the Project has been granted the benefit of transitional provisions and as such, is a development to which Part 3A applies.

This impact assessment has been prepared in accordance with Part 3A of the EP&A Act. The EP&A Act requires that environmental impacts including visual impacts are assessed and mitigated where necessary.

Strategic Regional Land Use Plan – Upper Hunter

The NSW government released the Strategic Regional Land Use Plan (SRLUP) for the Upper Hunter region in September 2012. The Plan represents a component of the government's broader Strategic Regional Land Use Policy which comprises initiatives to address land use conflicts in areas such as the Upper Hunter and with a particular focus on managing coal and coal seam gas issues.

The plan defines areas of biophysical strategic agricultural land and critical industry clusters, including clusters for the equine and viticulture industries. In accordance with the SRLUP, coal mining and coal seam gas projects that are located in areas of defined biophysical strategic agricultural land or critical industry clusters must consider the potential for impacts in accordance with the prescribed 'Gateway Criteria' listed within the plan. The Project is not situated on biophysical strategic agricultural land or land operated by the thoroughbred breeding operations or viticulture industry; however, it does fall within areas of mapped equine and viticulture critical industry clusters. As such, an assessment has been conducted against the gateway criteria for these mapped clusters as provided in the SRLUP to determine whether the Project would lead to a significant impact on either the equine or viticulture critical industry cluster.

The gateway criteria with regard to critical industry clusters require the following to be considered:

Whether the proposal would lead to significant impacts on the critical industry cluster through:

(a) surface area disturbance,

(b) subsidence,

(c) reduced access to agricultural resources,

(d) reduced access to support services and infrastructure,

(e) reduced access to transport routes, or

(f) loss of scenic and landscape values.

This visual impact assessment has considered the potential for the Project to lead to significant impacts on the equine and viticulture critical industry clusters through loss of scenic and landscape values.

2.4 Impact Analysis

The analysis of the interaction between the existing visual environment and the Project provides the basis for determining impacts and mitigation strategies. This is achieved by defining the visual effect of the Project and visual sensitivity of viewing locations to determine impact.

Visual Sensitivity

Visual sensitivity is a measure of how critically a change to the existing landscape is viewed by people from different land use areas in the vicinity of a project.

In this regard, residential, tourist and recreation areas, and in the case of the Project neighbouring horse studs and winery generally have a higher visual sensitivity than other land use areas including industrial, agricultural or transport corridors. This is because land uses, such as horse studs and wineries use the scenic amenity values of the surrounding landscape as part of their business image. Figure 2.2 indicates the levels of visual sensitivity associated with the Project.

However, the visual sensitivity of individual residences may range from high to low, depending on the following additional factors:

- Screening effects of any intervening topography, buildings or vegetation. Residences with well screened views of the Project will have a lower visual sensitivity than those with open views;
- Viewing distance from the residence, or other sensitive receptor, to visible areas of the Project. The longer the viewing distances, the lower the visual sensitivity; and
- General orientation of residences, or sensitive receptor, to landscape areas affected by the Project. Residences with strong visual orientation towards the Project, i.e. those with areas such as living rooms and/or verandas orientated towards it, will have a higher visual sensitivity than those not orientated towards the Project, and which do not make use of the views toward the Project.

For any area to be given a sensitivity score, it must have visibility to the Project. This visibility was determined based on field assessment, map and aerial photo evaluation and/or computer assessment of topographic and vegetation data.

Visual Effect

Visual effect is a measure of the level of visual contrast and integration of the Project with the existing landscape.

The degree to which the visual characteristics of the Project contrast with the existing landscape will determine the level of visual effect. The development of a new mine in an area where mining is not a current land use will have a higher visual effect due to strong contrast. The development of a mine or an extension in an existing mining area will have a lesser visual effect. A successfully rehabilitated Project will have a low visual effect due to limited contrast with the existing landscape.

A Project can be integrated with the existing landscape depending on its scale, position in the landscape and contrast. High visual integration is achieved if a development is dominated by

the existing landscape, is of small scale and / or of limited contrast.

The magnitude of the visual effect as outlined in Figure 2.3 is determined by a balanced consideration of the following:

Contrast and integration

The level of contrast and integration of the Project with its surrounding landscape determine visual effect. Project elements as expressed through the visual expression elements (i.e. form, shape, pattern, line and colour with minor consideration in relation to texture) contrast to varying degrees with the surrounding landscape and will also to varying degrees integrate with it.

The proportion of a view that includes elements of the Project

For any given type of contrast and integration the lower the proportion of the view that is occupied by the Project, the lower the level of visual effect. This is determined by defining the proportion of the total field of view occupied by the Project, or more appropriately determined by defining what percentage of the Primary View Zone (PVZ) it occupies (see Figure 2.4).

The PVZ is the most critical and central part of a view. It is not the total view, but the most important part. It is that area that is occupied by an arc created by sight lines from the eye radiating out: horizontally at angles of 30^0, around a centre view line; and vertically at an angle of 30^0 above the horizontal around a centre view line. Measuring the percentage of the PVZ occupied by a development will provide a more critical measure than a measure of the development in the context of the whole view zone which would include both primary and secondary view areas, representing a view arc of 120 - $160^{0.}$ of which the PVZ is only 60^0.

Generally, a high visual effect category will result if a visible area of the Project has a high visual contrast and low integration to the surrounding landscape.

A low or very low visual effect level will occur if there is minimal contrast between the visible area of the Project and the existing landscape setting and or the areas occupied by the Project are only small parts of a total view.

The higher the visual effect level, the lower the permissible percentage of the primary view that may be affected, before a high visual effect is scored. For a high visual effect category I, the percentage of view that can be affected is 2.5% before a high visual effect is scored, (see Figures 2.2 & 2.3).

Photomontage Development

The visual effect of the Project on external viewpoints was determined by the development of a number of photomontages taken from the selected representative locations within the visual study area. The assessment of visual effect from these locations takes into account the significant views of the project expected to be seen from these areas.

Photographs of the Project were taken at standing eye level from the selected viewing locations. The precise location of each of these photograph positions was recorded by a registered surveyor using a GPS. The photography provides a realistic representation of the site landscape and how it is seen from each viewing location in response to light and atmospheric conditions.

Three dimensional computer models of the Project at representative stages of the mines progression were created from digital surface topography and Project development plans. The 3D model has been aligned to photograph using from surveyed viewpoint and then lined up with multiple ground points and landform features and draped aerial photograph, including

bumps, roads, tracks, fencelines, trees, buildings. The surveyed viewpoint position lines up with multiple ground features from the DTM and orthorectified aerial photograph, both of which were created with their own survey control.

The models enable accurate views of the Project to be generated from any specified viewing location and account for screening of views by natural topography. The photographs of the Project and its landscape setting were overlain on the model view from the same viewing location. The locations of future visible components of the Project were determined taking into account any foreground screening from topography or vegetation in the photograph. Realistic colours and textures were applied to the visible project components taking into account viewing distances to the visible components. The end result is an accurate and realistic photomontage of the likely future view of the Project from the selected representative viewing locations.

The photomontages were used to assist in determining the level of visual effect of the Project from each of the representative viewing locations. To further assist in evaluating visual effects as illustrated by photomontage it is useful to use 60mm (camera focal length) or greater to illustrate how the eye perceives the actual size of objects. Lower focal lengths are often used to enable a larger part of the primary view zone to be captured. In such photomontages the scale of the Project elements is in scale with other features including those of the landscape. However such focal lengths such as 30-35mm digital camera focal length creates an actual 50mm focal length with a conversion factor of approximately 1.3. This photomontage will accurately portray the Project elements and their scale to other elements, however will appear 'smaller' and 'more distant' than the human eye perceives. The larger focal length while foreshortening views a little, thereby visually exaggerating them does give a better concept of the 'size' of Project elements. Hence the use of 70mm generally is likely to make things look a little bigger and is not an undersized representation of Project elements.

Visual Impact

The visual impact of a Project is determined by considering both visual effect and visual sensitivity, which together determine impact level. The way in which the parameters of visual sensitivity and visual effect are cross referenced to determine visual impact is illustrated in Figure 2.5.

Visual Impact

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2.5 Visual Impact Mitigation

Where neccessary, visual impacts are reduced by mitigation measures designed to reduce visual effects and/or visual sensitivity. Depending on the situation, effective impact mitigation strategies may be implemented either on the Project site or off-site.

Reduce Visual Effects

Rehabilitation of disturbed areas associated with the Project will decrease the visual contrast created by mining operations to the existing landscape. The rehabilitation strategies that emulate patterns, shapes, line and colour of the existing landscape will reduce the contrast between the Project and the existing landscape, reducing visual effect levels.

Reduce Visual Sensitivity

Visual sensitivity is reduced by carrying out treatments to minimise visibility of the Project. Due to the scale of open cut coal mining components, such as the Overburden Emplacement Areas (OEAs), screening is often most effective at or close to the point of viewing. Such screening treatments can also be used to redirect views to areas not affected by mining activities as well as generally enhancing the landscape at the viewing point.

New Visual Setting

On completion of mining operations and following rehabilitation, a new local landscape will be created. This new landscape will reflect post mining land.

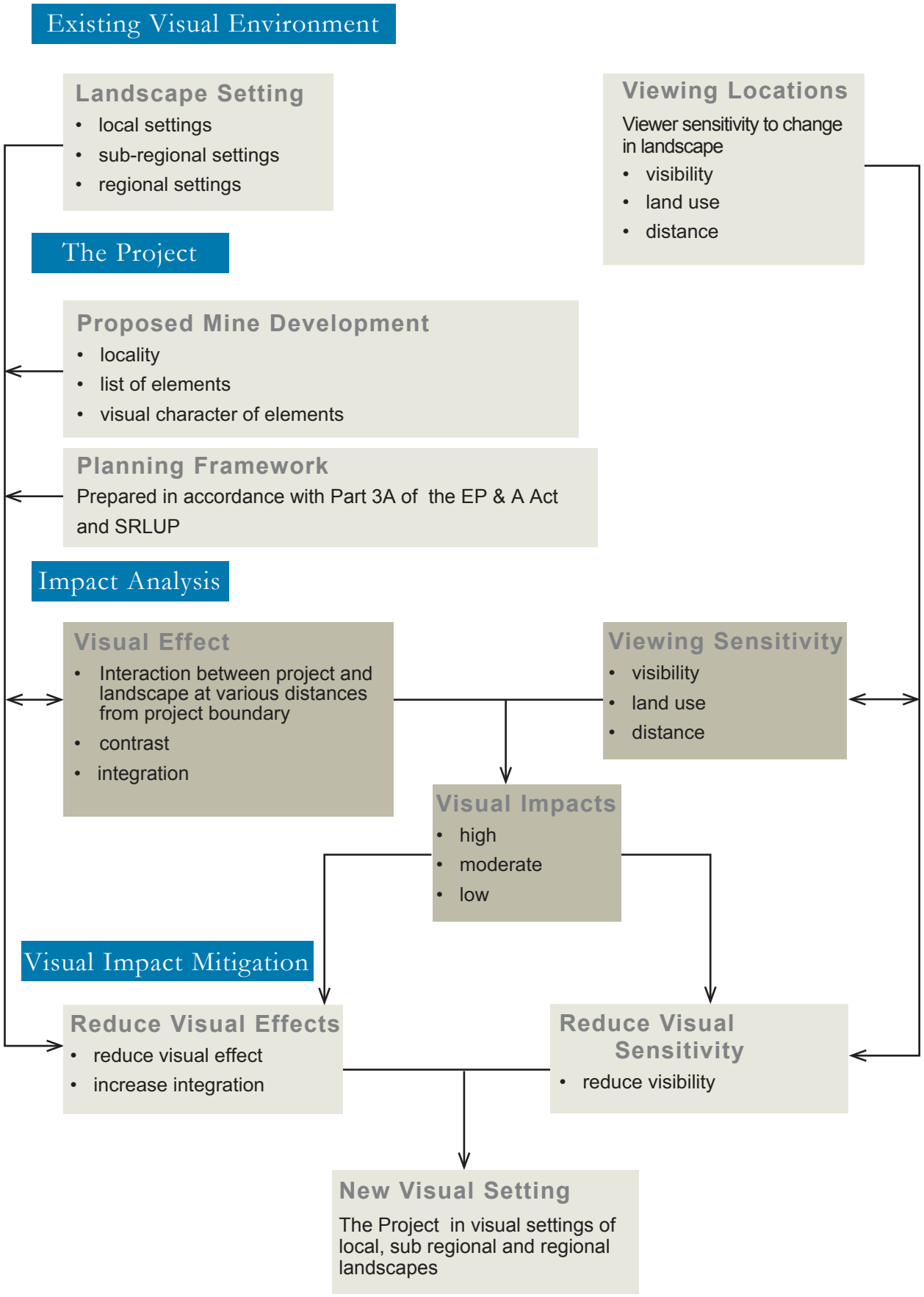

Figure 2.1 | *Visual Assessment Methodology*

JVP visual planning and design

Land Use	Visual Sensitivity Levels			
	Nearest visible mine area less than 2.5kms away	Nearest visible mine area between 500m - 2.5kms - 7.5kms	Nearest visible mine area between 7.5kms - 12.5kms away	Nearest visible area more than 12.5km away
Urban and rural houses	High Sensitivity	High Sensitivity	Moderate Sensitivity	Low Sensitivity
Destinations of visually high sensitive land uses eg. Horse Studs, vineyards	High Sensitivity	Moderate Sensitivity	Low Sensitivity	Low Sensitivity
Designated tourist roads eg Golden Highways	High Sensitivity	Moderate Sensitivity	Low Sensitivity	Low Sensitivity
Commercial Facilities	High Sensitivity	Moderate Sensitivity	Low Sensitivity	Low Sensitivity
Other main roads eg Edderton Road	Moderate Sensitivity	Low Sensitivity	Low Sensitivity	Low Sensitivity
Minor local roads in rural zone eg Bureen Rd.	Moderate/Low Sensitivty	Low Sensitivity	Very Low Sensitivity	Very Low Sensitivity
Broad acre rural lands	Low Sensitivity	Low Sensitivity	Very Low Sensitivity	Very Low Sensitivity

Figure 2.2 | *Visual Sensitivity*

Visual Properties			Visual Effect Levels		
Contrast Levels with elements in primary view zone	Visual Integration with elements in primary view zone	Visual Effect Levels	High Visual Effect	Moderate Visual Effect	Low Visual Effect
High Development elements do not borrow, form, shape, line, colour or texture or scale from existing features of the visual setting and contrast levels are high with existing landscape .	Low The development lacks integration with visual setting because of scale totally dominating the ability of site or surrounding features, vegetation and or topographic features to integrate the development	Level 1	It occupies more than 2.5% of the primary view zone	It occupies between 1 - 2.5% of the primary view zone	It occupies less than 1% of the primary view zone
Moderate Development elements borrow from some features of the visual setting in terms of form, shape, line pattern and or colour and scale, reducing visual contrast with existing setting and or…..	Moderate The development has some degree of visual integration with setting from other features, vegetation and or topography achieve some level of integration	Level 2	It occupies more than 20% of the primary view zone generally when in a foreground location	It occupies between 20-10% of the primary view zone	It occupies less than 10%
Low Development elements borrow extensively from features in visual setting in terms of form, shape, line, pattern colour and scale minimizing contrast with the existing setting.	High Visual integration is high due to other features, vegetation and or topography achieving dominance and screening or filtering	Level 3	The development occupies more than 40% of the primary view zone	The development occupies 40-30% of the primary view zone	The development occupies less than 30% of the primary view zone

Figure 2.3 | *Visual Effect Levels*

Area of Primary View Zone at various distances from project area

Distance from Project Site	Area of Primary View Zone
1 km	0.60 km²
2 km	2.4 km²
3 km	5.43 km²
4 km	9.66 km²
5 km	15.09 km²
6 km	21.73 km²
7 km	29.57 km²
8 km	38.62 km²
9 km	48.88 km²
10 km	60.35 km²
11 km	73.02 km²
12 km	86.9 km²
13 km	101.99 km²
14 km	118.29 km²
15 km	135.79 km²

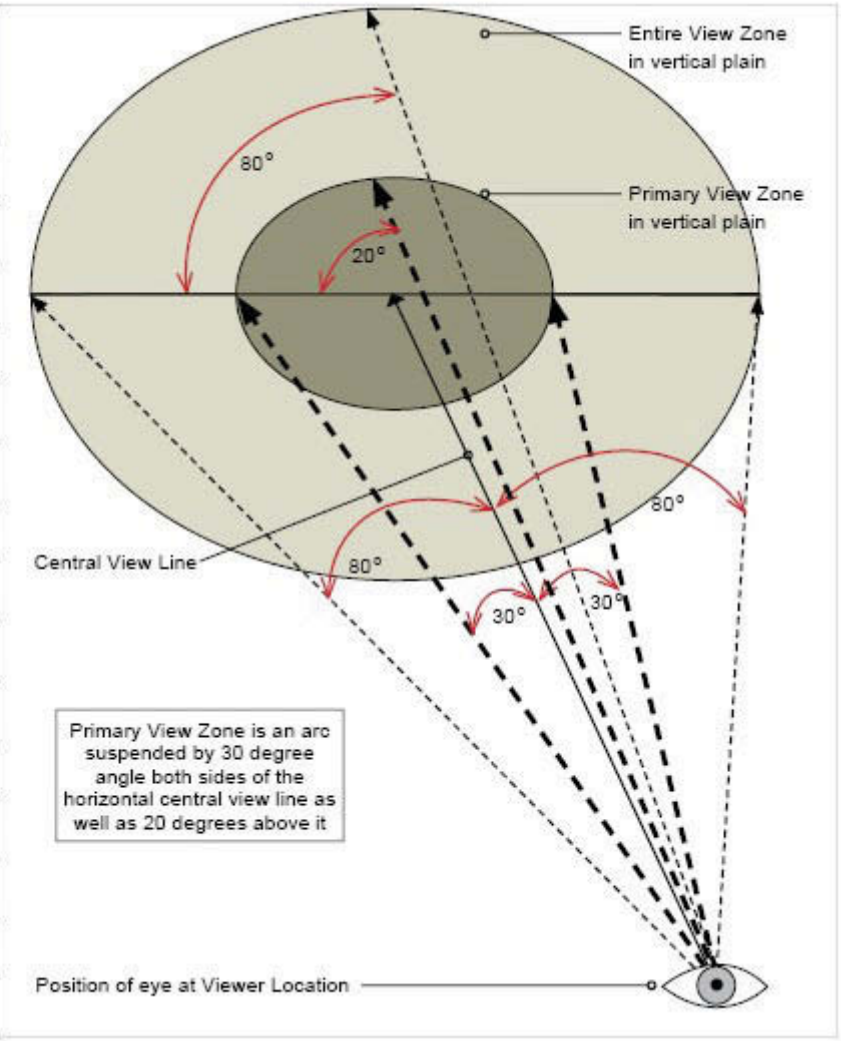

Figure 2.4 | ***Area of Primary View Zone at Various Distances from the Project.***
The Primary View Zone being the most critical and central part of any view.

Visual Effect	Visual Sensitivity		
	High	Moderate	Low
High	High visual Impact	High/Moderate Visual Impact	Moderate/Low Visual Impact
Moderate	High /Moderate Visual Impact	Moderate Visual Impact	Moderate/Low Visual Impact
Low	Moderate/Low visual Impact	Moderate/Low Visual Impact	Low Visual Impact

Figure 2.5 | *Visual Impact*
Visual Impact is dependant on the interaction between visual effect and sensitivity

3. EXISTING ENVIRONMENT

3.1 Introduction

This section of the report establishes the visual character of the Project and the surrounding landscapes that make up its visual settings. The existing visual settings of the Project are created by a range of different landscapes, which vary as a result of topography, vegetation cover and land use types. Based on visual differences created by these landscape elements, ten visual character units (VCU) were established.

These VCU were analysed in terms of their visual character within the primary view zone of the Project.

3.2 Regional Setting of the Project

The Project is located approximately 10km north west of the village of Jerrys Plains and approximately 13km south of the township of Muswellbrook in the Upper Hunter Valley of NSW. The Golden Highway is located south of the Project Boundary and provides access throughout the region from Jerrys Plains to Denman and then on to Merriwa and Dubbo. Edderton Road, a minor rural road that currently runs through EL 5460, links the Golden Highway with Denman Road to the north.

The Wollemi National Park is situated approximately 10km south of the Project Boundary. This park forms the largest wilderness area in NSW and is part of the recently declared Greater Blue Mountains World Heritage Area (DECCW, 2009).

There are numerous small creeks which drain the area and feed into the larger creeks (see Figure 1.1). The main water courses are Saddlers Creek a low flow creek and the Hunter River, which is a regulated river and flows constantly providing water to the majority of the agricultural and industrial (Power Stations, Mining Operations, etc.) pursuits in the area. All of the other smaller creeks are ephemeral. The Hunter River is located to the south of the Project Boundary and meanders from north west to south east.

The Drayton South area comprises the central reaches of the Saddlers Creek catchment area. Saddlers Creek flows in a south easterly direction, eventually discharging into the Hunter River to the south west of the Project Boundary. Plashett Dam, located to the south east of the Project Boundary, was specifically built to supply water to the nearby Bayswater Power Station. It is situated on Saltwater Creek which only flows during times of dam discharge into the Hunter River.

The topography of the Drayton South area consists of moderate undulating foothills to steeply sloping hills over open paddock grazing land. The topographic elevation ranges from approximately RL 100 m near the Hunter River to RL 200 m where a distinct ridgeline dissects the Drayton South area in a north east to south west trend. The land surface within the Drayton South area is primarily cleared, open paddock grazing land, with minimal tree cover and good grass cover.

The ground adjacent to Saddlers Creek is flat; however, away from the creek bed, the land is undulating to hilly, with slopes between 20% and 30%.

3.3 Visual Study Area

The project components associated with the existing Drayton Mine will not be changed from what is currently approved. As such views of the existing Drayton Mine have not been included

in this visual impact assessment.

The visual study area for this assessment includes the most significant parts of the total visual catchment from which the new mine elements associated with Drayton South and the transport corridor could potentially be seen. It covers an area of approximately 190km^2. At a regional scale, the visual study area is defined by the north facing escarpment of Wollemi National Park to the south. To the north west are Ogilvies Hill and associated ridges, spurs and foothills. To the north the visual study area is defined by the ridges, spurs and foothills rising to the distinctive peak of Mt Arthur. The distant low ridgeline that runs north south from Plashett Knob defines the eastern boundary of the visual study area.

The visual study area represents the area within which the majority of critical views of the Project are located. It is the critical part of the visual catchment. The visual study area does not enclose all view points, but a consideration of those within it will achieve proper visual assessment of the Project. The visual study area is illustrated in Figure 3.1.

Wollemi National Park is a regionally significant landscape at the edge of the visual study area. Its steep heavily wooded escarpment and plateau contrast significantly with the predominantly cleared lowland at its base within the visual study area to the north. This elevated conservation area with its folded steep topography and isolated knolls and ridges creates landscape of high visual interest.

Local landscape features include Saddlers Creek that flows in a south westerly direction, eventually discharging into the regionally significant Hunter River to the south west of the Project Boundary. This creek line flows across the Project area in a north east to south west direction through gently rolling grassed grazing land.

Saltwater Creek further to the south east is the outlet to Plashett Dam, a purpose built reservoir to servicing Bayswater Power Station. Bayswater Power Station is located within the Saltwater Creek catchment to the east of the Project. This creek flows into the Hunter River during times of dam discharge.

These meandering creek lines and the adjoining riparian vegetation bands are landscape features that contrast with the gently rolling grassed hills interspersed with wooded hills that dominate the visual study area.

3.4 Visual Character of the Landscape

The visual character of the regional and local landscape in the vicinity of the Project is created by the mosaic of topographic form, vegetation and land cover, the Hunter River, Saddlers Creek and various land use patterns. These landscape features combine in various ways to create areas of relative visual uniformity that can be defined as visual character units (VCUs). The VCUs combine in various vistas that are obtained from viewing locations such as residences and roadways.

Figure 3.1 illustrate the VCUs within the visual study area and include the:

- Creek Lines VCU;
- Hunter River Flood Plain VCU;
- Slopes and Hills VCU;
- Forested Hills VCU;
- Southern Escarpment VCU;
- Coolmore Thoroughbred Horse Stud VCU;

- Thoroughbred Horse Stud - Darley VCU;
- Vineyard VCU;
- Village VCU; and
- Mine and Infrastructure Area VCU.

Each is discussed further below.

3.5 Creek Lines VCU

This VCU contains two main creeks within the visual study area; Saddlers Creek and Saltwater Creek. The central reaches of Saddlers Creek, which flows in a south westerly direction, eventually discharges into the Hunter River to the south west of the Project Boundary.

Saltwater Creek, which drains much of the mine site area, flows into Plashett Dam, located to the south east of the Project Boundary. The lower landscape along the original creek lines and flood plain are now within the dam extent. Saltwater Creek only flows during times of dam discharge into the Hunter River.

There are also numerous creeks draining the mine area to the west of Plashett Knob that feed Saltwater Creek.

The water elements of these creeks have only ephemeral or localised foreground effects. More significant visually are the remnant riparian River She Oak / eucalypt woodlands that adjoin these meandering creek alignments.

The VCU create minor visual features in the landscape and visual backdrops to many of the adjoining open fields and grazing croplands. Their visual effect in the landscape is limited, with the potential exception of Plashett Dam.

3.6 Hunter River Flood Plain VCU

Rural cropping lands for the greater part adjoin the river flood plains of the Hunter River. Visually the VCU is dominated by the expansive flats that by virtue of soils and irrigation, support cropland. This croplands results in vivid rectilinear patterns, (Figure 3.3) between the riparian woodlands along creeks and the river and the dry-land grass and woodlands on adjoining slopes and hills

The Hunter River generally runs west to east in the visual study area but meanders significantly along the southern edge of the site. The river is fed by two creek systems, Saltwater Creek and Saddlers Creek.

The VCU is relatively flat and the grass / crop cover allows for long views from the cleared rural lands to the surrounding ranges.

There are a number of scattered rural residences within and at the edges of the VCU. However most of these residences are within the thoroughbred studs of Darley and Coolmore.

The significance of the unit is the open views it gives to more distant locations. In addition the rectilinear character of the verdant green improved pastures and crops create focal interest as a contrasting centre piece of many landscape settings enclosed by the drier grassland slopes and forests of surrounding slopes, hills and mountains.

3.7 Slopes and Hills VCU

The slopes and hills generally occur between the cropping lands and forested hills, rocky hills and / or surrounding ranges. The gentle to moderate slopes are generally cleared and maintained as grazing land. The dry-land grass areas generally have some degree of tree cover. This cover can vary from scattered trees to scattered clumps of trees, but grassland is the dominant land cover.

This unit is the most common in views of the rural landscapes, including views towards the project boundary.

3.8 Forested Hills VCU

These hills include Ogilvies Hill to the north west and Plashett Knob to the east. To the north is a range associated with Mt Arthur. Foothills rise from 200m to the distinctive peak of Mt Arthur at an elevation of 483m, enclosing landscapes to the south. The range comprises a series of lesser knolls and ridges in the range of 300 – 350m running east to west of Mt Arthur.

The forested hills are mainly around the perimeter of the site but areas of open woodland are scattered throughout the VSA. Many of these hills lie close to the Golden Highway, which runs along the southern boundary of the site. The topography has gentle to moderate slopes that rise from the surrounding slopes and hills with elevations in the vicinity of 150m to 240m along the Plashett Knob ridge.

The forest is highly contrasting in colour and texture to that of the surrounding paler grasslands accentuating its visibility as a landscape element.

The forest cover creates a highly contrasting colour texture backdrop against which mine operations will be viewed. The limited elevation of the forested hills limits their visibility to surrounding locations. The forested slopes adjacent the to Golden Highway boundary near the thoroughbred horse studs within the visual study area creates a visual boundary to view sheds to the north.

3.9 Southern Escarpment VCU

The southern escarpment defines the southern and south western edge of the visual study area. It consists of very steep escarpment, plateaus, ridges and knolls of the northern extent of the Wollemi National Park, that rise from 100m at the Hunter River floodplain to 640-700m. The steep slopes support open eucalypt and cypress forests. The ranges contrast with and enclose the landscapes to the north and create dramatic visual backdrops to them.

The visual significance of the escarpment is that it often creates the background to valley views from a full range of view locations and as discussed frequently acts as visual barriers to long distance views.

3.10 Thoroughbred Studs VCU

The Upper Hunter region has a long history of rural land use. One of the current dominant land uses adjacent to the Project Boundary is thoroughbred horse breeding and associated rural residential areas.

The site is in close proximity to two of the premier thoroughbred horse studs in NSW – Coolmore Stud and Woodlands Stud. Coolmore Stud is located immediately south of the Project (see Figure 3.1). Darley Australia owns and operates Woodlands Stud, which is located immediately to the west of Coolmore and south west to the Project.

Thoroughbred Stud - Coolmore VCU

This thoroughbred horse stud presents irrigated grazing lands of lush green and distinctive timber post and rail fences and stock yards which from the Golden Highway creates an attractive rural landscape with high visual appeal. This river flat landscape is contrasted by gentle enclosing hills with dryland grass and scattered tree cover that exist on the property on the northern edge of Apple Tree Creek (see Figure 3.7). There are mature exotic tree plantings associated with roadside landscapes along stud property perimeters and entrances as well as along internal roads. Trees are also planted along many horse paddocks reinforcing the rectilinear pattern of the horse stud landscapes and differentiating it from other Flood Plain VCU areas. Again these contrast with the more random pattern of the native remnant trees on the rolling hills.

Associated with the stud are a number of residential properties and administration infrastructure as well as numerous cottages for staff management and workers. These also have maturing tree cover around the houses. Such locations include heritage residences such as Ellerslie and Strowan. Some of these houses are located on hill slopes with a northerly aspect and with views towards the Project.

The internal roads also give access to a number of lookouts.

Coolmore creates distinctive landscape settings that add to the visual quality of the region and locality. The area as a whole is likely to have high sensitivity particularly major use areas, roads and residences and administration buildings.

Thoroughbred Stud – Darley VCU

The Darley owned Woodlands Stud, presents as lush, green grazing land. Its entrance is announced with quality post and rail rural fencing and gateway signage, creating an attractive rural landscape from the Golden Highway.

This stud has a more varied topography than that of Coolmore, with local and regional ridge lines within the property perimeter. Internal roads provide access to rocky outcrops which provide higher vantage points and lookouts to surrounding landscape views. (See Figure 3.8)

The lush undulating irrigated grazing land character of this stud contrasts with surrounding dryland grass associated with the Slopes and Hills VCU.

There are mature tree plantings along the Golden Highway roadside and along several internal roads. Trees are also planted along many horse paddocks reinforcing the rectilinear pattern of the horse stud. Again these contrast with the more random pattern of the native remnant trees on the rolling hills. Scattered remnant trees cover the hills near Trig Hill and its associated ridge line.

An extensive rural residential complex is located south of the Hunter River, along with stockyards, staff cottages and administration infrastructure. A manager's residence is located further north and at a higher elevation, closer to the northern entrance to the stud. Both residences either have views away from the Project or have views interrupted by internal ridgelines.

Darley creates distinctive landscape settings that add to the visual quality of the region and locality. The area as a whole is likely to have high sensitivity, particularly major use areas roads, lookouts, residences and administration buildings.

3.11 Vineyards VCU

Surrounded by the grazing lands of Darley and Coolmore Studs is the Arrowfield Estate Vineyards, a commercial enterprise that in the past has operated a small scale winery and restaurant. The vineyard consists of a knoll covered by the tiers of vine rows generally following the hillside contours and local topography. These vineyards create a textured patchwork visual appearance on the landscape interspersed with mature remnant vegetation. (See Figure 3.9)

The winery cellar door and administration and function facilities are located at the top of the hill with a north easterly outlook towards the Project. Mature planted trees surround the buildings and scattered trees cover a portion of the undeveloped area of the estate.

Arrowfield Estate is a distinctive landscape setting that adds to the visual quality of the region and locality. It has previously been a tourist destination and commercial operation that is likely to have high sensitivity values due to its close proximity to the Project Boundary.

3.12 Village VCU

The historic village of Jerrys Plain occurs in the south eastern corner of the visual study area. The village is set in the Slopes and Hills VCU immediately adjacent to the Hunter River Flood Plain VCU (see Figure 3.1). The village streets are set out in a grid pattern off the Golden Highway that passes through the village. The village typically consists of the main street along the highway and streets with large residential blocks supporting houses and out buildings and scattered tree growth (see Figure 3.10).

The village is a visual feature of the region and for the greater part retains its village integrity. It represents an area of high sensitivity.

3.13 Mine and Infrastructure VCU

There are existing coal mines and power stations in close proximity to the Project and in partially within the visual study area. They include Mt Arthur Coal Mine, Hunter Valley Operations Mine, Drayton Mine and Bayswater Power Station. The visual character and scale of the existing Drayton Mine, the adjacent Mt Arthur Coal Mine and the Bayswater power station are strong enough to create a VCU based on the visual character of the mines (see Figure 3.11).

The VCU contains: active mine areas, overburden emplacement and mine infrastructure facilities including Coal Handling Facilities, truck loading facilities and haul roads. It also contains significant infrastructure elements associated with Bayswater Power Station including cooling towers and emissions stacks. The mine and infrastructure areas create a large scale industrial landscape that contrasts with the surrounding forested hills and the agricultural landscapes of the foot slopes and flood plains.

To a degree the existing mine and infrastructure areas creates a visual context for the Project being visible from some south western locations. Other nearby mining areas are outside the visual study area and therefore do not contribute directly to the visual settings of the Project. However, they are part of the seen continuum of a number of journeys along roads in the locality.

3.14 Summary

The various VCUs within the visual study area create a diverse range of visual settings and views. The forested hills create minor visual features within the landscape, contrasting

strongly with the pale coloured gentle slopes of cleared grazing land. They also often create visual screens to and within the Project Boundary. In this regard the forested hills within the Project Boundary are especially significant.

Coolmore and Darley Thoroughbred Horse Studs both have visually appealing rural landscape settings with high vantage points on ridge lines and hills within their perimeters that have a broader range of viewpoints than the lower, flatter and more undulating slopes and hills.

The Southern escarpment is a very significant visual landscape feature creating a highly appealing and strong visual backdrop to the south and defines the visual catchment in that location.

The slopes and hills within which the Project Boundary is situated is a gentle landscape that has restricted broader views due to its limited topographic relief. The surrounding topographic features as well as riparian vegetation along various creek fronts obscure views to the Project Boundary.

All the VCUs interact visually to create various landscape settings as seen from a range of viewpoints. They create the total view as well as screening or providing view corridors to the Project.

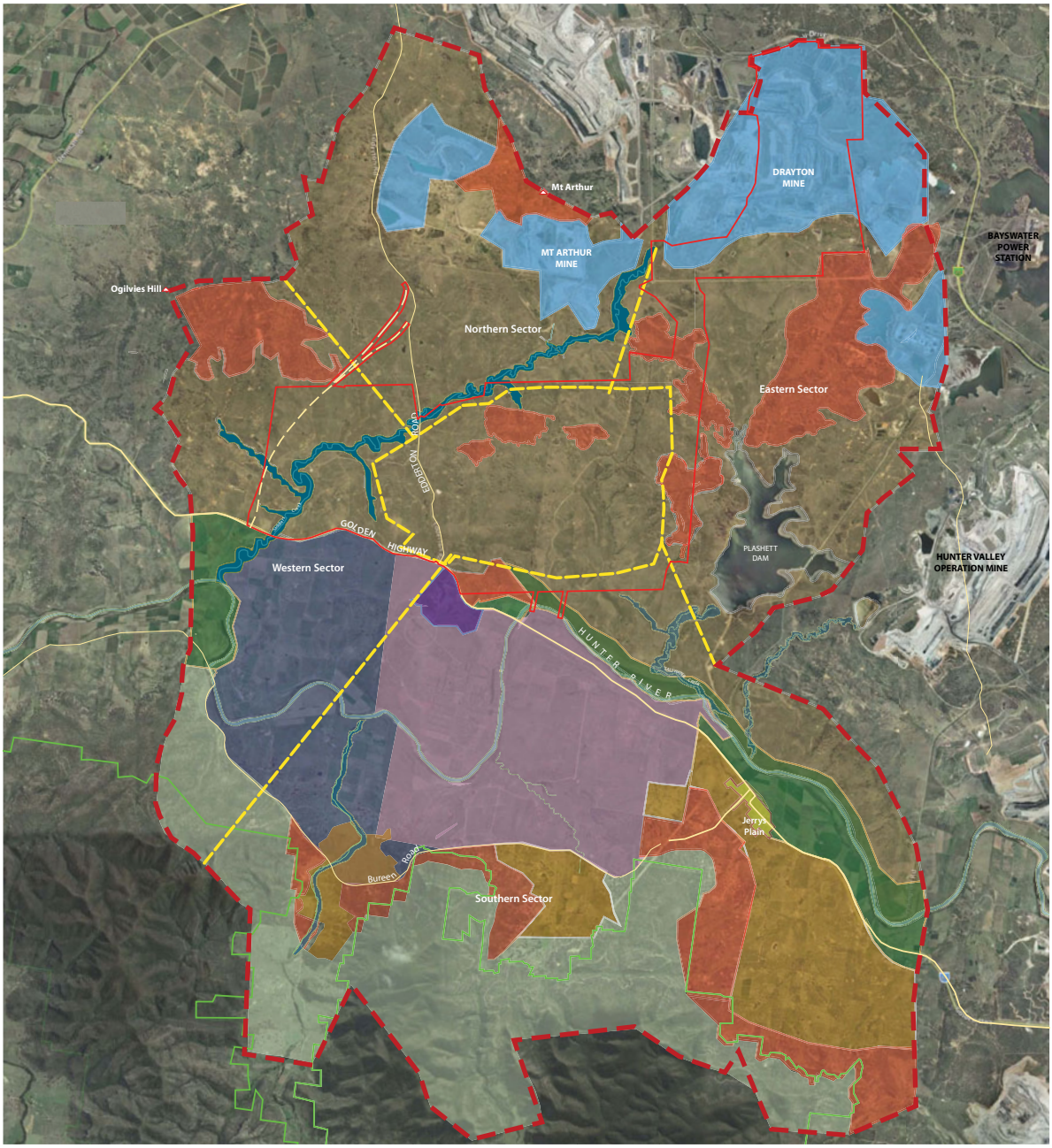

Figure 3.1 | *Visual Study Area*

The visual settings of the Project Site are created by a range of landscapes with different topography, vegetation, and land use features. Considered together, these create a number of distinctive visual character units (VCU). Many VCUs are naturally seen in any one view.

Figure 3.2 | *Creek Lines VCU*

This VCU defines the lower lying drainage catchment within the surrounding undulating grazing lands. The River She Oak woodlands define the creeks and water ways in the landscape and often act as visual barriers to more distant views.

Figure 3.3 | *Hunter River Flood Plain VCU*
Cropping lands dominate this VCU creating a strong open large scale and small scale rectilinear pattern of great visual diversity.The VCU is generally backdropped by the Slopes and Foothills VCU that adds visual interest to the views of the valley.

Figure 3.4 | *Slopes and Hills VCU*
The undulating country is generally cleared with scattered tree cover.

Figure 3.5 | *Forested Hills VCU*
Forested hills include gentle to moderate slopes with topographic features that often create visual screens to the Project.

Figure 3.6 | *Southern Escarpment VCU*
The Southern Escarpment VCU dominates the southern horizon and creates spectacular backdrops to local landscape settings within the visual study area.

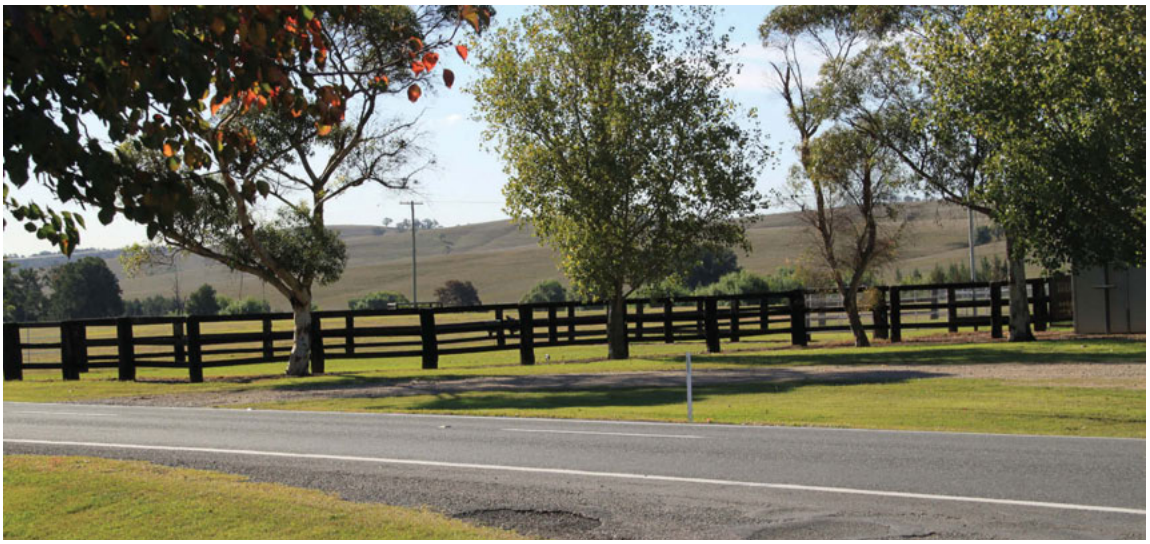

Figure 3.7 | *Coolmore Thoroughbred Horse Stud VCU*

The horse studs and residences within the visual study area are limited mostly to the southern side of Golden Highway with numerous rural properties and houses adjacent the highway.

Darley front gate on Golden Highway

Views north towards Mt Arthur and east from Darley Estate lookout

Figure 3.8 | *Darley Thoroughbred Horse Stud VCU*
Darley Estate has several higher vantage points with views of high visual appeal.

Figure 3.9 | *Vineyards VCU*
This VCU is limited to a small area adjacent the Golden Highway and is surrounded by Coolmore and Darley Horse Studs. It is a commercial enterprise and tourist destination.

Figure 3.10 | *Village VCU*
Towns and villages create focal points in the landscape as well as local settings with built elements contributing to the foreground of a view.

The main visual elements of mines to external view are the overburden emplacement areas. The visual effect of rehabilitated OEA is similar to the existing landscape while pre-rehabilitated OEAs contrasts strongly with it.

Regional infrastructure such as power stations are highly visible elements in the landscape. The visual effect of these type of facilities contrast strongly with surrounding rural character.

Figure 3.11 | *Mining and Infrastructure VCU*

4. THE PROJECT

4.1 General

This section of the report considers the various components of the Project in relation to their potential visual effect. Each of the components will have varied visual effects on the surrounding landscapes based on their visual character, scale and their interaction with the adjoining landscape.

Components of mining operations are generally large scale. However there are differing levels of visual effect on external viewing locations. It is significant that the Project is generally contained behind a prominent ridgeline that runs along the southern boundary of the Project. This is an advantage as it shields the majority of views of the Project from the more sensitive receptors located to the south.

The Project will be constructed and operated over a period of 27 years. To be able to evaluate the visual effects of the Project over time, conceptual staged development plans have been established at Year 3A, 3B, 5, 10, 15, 20 and 27 (See Figures 4.2- 4.9).

4.2 Project Components

The Project is described in this section in the context of its visual implications. In relation to the visual effects of the Project, development elements can be divided into major and minor elements. Major elements have the potential for higher visual effect in relation to external view. Minor elements, although not insignificant in horizontal scale, have a less significant visual effect due to lack of vertical scale and visual projection outside the Project Boundary.

Both the major and minor components already occur within the existing environment because of the already established Drayton Mine, Mt Arthur Coal Mine and Hunter Valley Operations.

Major mine components include:

- Active mine areas;
- OEAs; and
- The Houston visual bund.

Minor mine components include:

- ROM hopper, crusher and stockpile area
- Mine site facilities;
- Transport corridor and related infrastructure;
- Water infrastructure; and
- Realignment of Edderton Road.

Both the major and minor mine components associated with Project are shown on Figure 4.1.

4.3 Major Mine Components

The major visual components of the Project and their progressive development over the life of the mine are discussed in the following sections.

Active Mine Areas

Physical Character

By year 3 mining will be established and progressing on three fronts within the Whynot, Blakefield and Redbank mining areas (see Figure 4.2). Mining operations generally commence in the north and progress in a southerly direction. At the start of year 3 works will also commence on the construction of the Houston visual bund in the south of the Houston mining area. By the end of year 3, a significant portion of the bund (approximately 75%) will be established (see Figure 4.3).

By year 5, mining has progressed within the Whynot, Blakefield, Redbank and Houston mining areas. During this stage, Whynot remains the largest of the mining areas with an active face of approximately 3km in length. The Blakefield mining area consists of a series of smaller active mining areas with the largest being approximately 1.5km wide. Redbank consists of a two sided mining area with each of the faces measuring approximately 1km. The box cut at Houston (which was established to build the Houston visual bund) will have been completed by Year 5.

By year 10 the mining footprints of Blakefield and Redbank will be nearing their extraction limits with the Redbank mining area joining Whynot in the north. Highwall mining has also commenced in Redbank and Houston (See Figure 4.5).

By year 15, further highwall mining will have been undertaken within Blakefield and open cut operations have finished. Further highwall mining is also undertaken in Redbank and open cut operations have reached the limits of the proposed footprint.

By year 20, open cut mining is only undertaken in Whynot and Houston. Whynot remains the largest of the mining areas with an active face of approximately 3.5km. At this stage the active face in Houston has reduced in length to less than 1km.

During year 27, which is the final year of the mine life, all open cut operations have ceased and the only extraction is via highwall mining in Whynot (See Figure 4.8).

All mining operations remain behind the natural ridgeline that runs north and south from Plashett Knob in the east of the Project site and a series of low ridgelines that run north west from close to the Golden Highway.

Visual Effect

The active mining areas consist of two significant components. These include the 'highwall' (active mining area) and the 'low wall' which forms part of the OEA. The highwall is generally below natural ground level and therefore only visible to view points with higher elevations. The low wall is also often shielded by other mining elements and is not widely visible to surrounding areas unless they are elevated looking into the mining area.

The visual effect of the mining void is created by the colour of the raw earth and exposed rock contrasting with the surrounding landscape. The open mining face also creates strong form, shape and line characteristics that differ from the existing landscape. These effects decrease over distance and by atmospheric conditions such as cloud cover, backlight and heat haze.

Views into the mine are limited by:

- the location of the void and its enclosure within the low surrounding ridges to the east, south and west,
- the proposed visual bund located in the valley to the south east of the Project Boundary; and

- the location of the OEA in the north of the Drayton South area.

To some extent the mine areas could be visible to elevated views from Mt Arthur and Ogilvies Hill, however both these locations have limited visual sensitivity due to either their existing land use; existing mining in the case of Mt Arthur; and limited access and viewing points from Ogilvies Hill. Views may also be possible from the Wollemi Plateau. However, the visual effect is minimised by the significant distance to these viewing locations, with remote lookouts over 15km away.

The mine void creates a high visual effect (Visual Effect Type 1, Figure 2.3). This effect cannot be reduced until the final landform is created at the end of all mining activity. However as stated above, these voids are visible to limited receptors in the foreground and middle-ground so the visual effect has limited significance. The visual effects and impacts to surrounding receptors as a result of active mining areas are discussed in Section 6.

Overburden Emplacement Areas

Physical Character

Sequential mining will commence in three separate and distinctive areas with each causing the establishment of a separate OEA. Ultimately, over the life of mining operations these three OEA's will combine to form a constant and continuous final landform. All three initially developed OEAs are located to the north of active mining faces and generally are developed from north to south following mining operations for the life of the Project. During Year 3, the OEAs associated with the Whynot and Blakefield mining areas will have elevations of approximately 230m and 180m respectively. They increase in elevation by 10m by year 5 of operations (see Figure 4.4). During Year 3, construction also commences on the Houston visual bund. Material is excavated from a box cut and used to develop the bund within the valley immediately to the south of the Houston mining area.

By year 10, the three original OEAs associated with the Whynot, Blakefield and Redbank mining areas will have merged into one larger configuration that winds around the extent of the active mining fronts. The faces of this are steep. The highest point is approximately 260m at this stage. Rehabilitation has been completed on the lower northern faces of the OEAs and tree screening along the ridges at the southern extent of mines has been established. It is worth noting that the tree screens along the ridgeline and in all other areas will be planted by the start of construction to ensure that they become established prior to mining advancing to the south.

The Houston mining area has positioned its overburden to the east and west end of its operations, and to the north of the constructed visual bund.

By year 15, the main OEA associated with Whynot, Blakefield and Redbank has moved south along its main south facing front; its western most arm and much of the northern and western slopes have been rehabilitated with a grass and tree cover. The overall elevation has remained unchanged. The Houston mining area OEA to the south east has expanded further into the area behind the natural feature of Plashett Knob and adjacent ridges. It reaches its maximum elevation of 220-240m.

By year 20, rehabilitation work to the main OEA is for the greater part completed. There remain narrow bands of future rehabilitation works running parallel to the active OEA areas. In the Houston mine, placement of overburden within existing mining areas continues as active mine face moves east. No rehabilitation has commenced on the slope faces.

By year 27, the two OEA areas have consolidated into one area with overburden being placed within existing mine voids. Rehabilitation works to most of the OEAs have been completed.

Table 4.1 | Visual Bund Construction Program				
Stage	Construction Activity	Volume (Mlcm)	Time (Months)*	Visibilty (Months)
1.	Lift to 175RL.	2.2	2.1	2.1
2.	Backfill to 170 RL	2.5	1.5	-
3.	Lift to 200 RL and 4% grade to 225 RL (East End)	4.5	4.3	4.3
4.	Backfill to 195 RL.	1.6	1.5	-
5.	Backfill to 4% grade (East End)	1.1	1.0	-
6.	Lift to 225 RL and crest line (West End)	2.2	2.1	2.1
7.	Backfill to 220 RL.	0.7	0.6	-
8.	Lift crest line and final shaping.	2.8	2.7	2.7
TOTAL		16.6	16	11.3

The remaining central "T" like section of OEA (in the area of the main ramp into Whynot) will not be rehabilitated until mining activities cease. Such reshaping and rehabilitation of these slopes would spill over the mine internal haul roads that will be required throughout the working life of the mine.

All at grade areas such as haul roads, water pipelines and infrastructure sites are proposed to have full rehabilitation by the time final conceptual landform is achieved following completion of mining in Year 27 (see Figure 4.9)

Visual Effect

The OEAs will create strong contrasting form in the landscape, and will initially also have a strong colour contrast. This contrast and high visual effect (Visual Effect Type 1, Figure 2.3) will be reduced as grass cover is established lowering visual effects to moderate to low, (Visual Effect Type 2). Following the establishment of tree cover, the visual effect will be low as visual integration is achieved (Visual Effect Type 3).

Some high visual effect levels may be experienced at sites of high visual sensitivity for 1-2 years due to visual exposure to a pre-rehabilitated condition of the OEA. However these effects can be minimised by optimising rehabilitation timetables for the outer faces.

Houston Visual Bund

Physical Character

One of Anglo American's key objectives when developing the mine plan for the Project was to reduce as far as practical the visual impacts of the mine on sensitive receptors located to the immediate south including Coolmore, Darley, the existing Arrowfield Estate and the village of Jerrys Plains. This was largely achieved through careful mine planning and design to ensure that the existing ridgeline to the south of the Project was maintained and that overburden emplacement areas remained shielded behind it in order to protect views of the Project over the mine life from the sensitive receptors. The existing ridgeline is able to shield the majority of views from the Project particularly from the Redbank and Blakefield mining areas. However, there is a valley located immediately to the south of the Houston mining area where views would be possible. In order to alleviate potential long term views of the Project, a visual bund will be constructed within this valley to shield views of operations in the Houston and Whynot mining areas (see Figures 4.3 to 4.9). The Houston visual bund has been designed in consultation with neighbouring stakeholders, particularly Coolmore Australia as part of a series of working

group meetings that have been ongoing throughout the planning phase of the Project.

The Houston visual bund will undergo an eight staged construction program (see Table 1 and Figure 4.10a & 4.10b) from Year 3 for a period of approximately 16 months. The visual bund will be situated approximately 2.8km from the nearest receptor in the south. Approximately 16.6 Million loose cubic metres (Mlcm) of overburden material from mining activities will be required during its construction. The design allows for a maximum batter height of 77 m and a crest length of 1,750 m, and aligns with the existing topography once fully constructed. Throughout stage 1, 3, 6 and 8, a dozer (D11) and trucks (CAT 789's) will be supporting construction activities, which will be visible on the face of the visual bund. All other stages of the construction of the visual bund have been designed to remain shielded behind the previous lifts (see Table 4.1).

*Excludes wet weather and other unforeseen production delays

Each main stage lift of the Houston visual bund will be progressively covered with available topsoil and rehabilitated with a crop of pasture grass to minimise exposed areas. Tree screens, composed of native species, will be established on the visual bund to restore visual amenity (see Figure 4.4 & 4.5 and Figure 4.10b Stage 8).

Tree screens have also been established on the Golden Highway and will be planted along the ridgeline adjoining the Houston visual bund and the Edderton Road realignment to minimise views of the Project from various vantage points (see Figure 4.2 & 4.5). These tree screens will be planted prior to the construction phase to allow for substantial growth prior to the commencement of work and to maximise survival rates.

Visual Effect

The Houston visual bund will create a new form in the landscape that to some extent emulates existing hill forms. It will initially have a strong colour contrast. This contrast and high visual effect (Visual Effect Type 1, Figure 2.3 & 4.10a Stage 1) will be reduced as grass cover establishes during the progressive stage builds lowering visual effects to moderate to low, (Visual Effect Type 2, Figure 4.10b Stage 8). Following the establishment of tree cover the visual effect will be low as visual integration is achieved (Visual Effect Type 3, Figure 4.10b Stage 8, Year 10 & 27).

Some high visual effect levels may be experienced at sites of high visual sensitivity for short periods during the construction of the bund due to visual exposure to a pre-rehabilitated condition of the visual bund. However these effects will be minimised by optimising rehabilitation timetables for the southernmost face of the bund.

Alternative Visual Bunds Considered

Considerable engineering and design works have been undertaken on various visual bund options (Figure 4.11) as part of the consultation process and ongoing working group participation with neighbouring stakeholders. The preferred location and design of the visual bund (as described in Section 4.3.3) was then developed with consideration of the feedback received from key stakeholders.

Option One

The visual bund design for Option One is located approximately 2.4km to the nearest receptor to the south. Approximately 18.8 Mlcm of overburden material from mining activities would be required during a staged construction over 18 months. The design allows for a maximum batter height of 100 m and crest length of 1,500 m, and aligns with the existing topography

once fully constructed (See Figure 4.2-4.9).

The advantages of Option One is greater efficiency of mining in Houston because it provides an optimal strike length for the dragline which improves operability and scheduling of operations in the later years of the Project. It also provides greater access for machinery to operate in behind the bund (particularly during construction) and provides additional room behind the bund for overburden storage when mining in Houston ramps up post Year 10.

Option One was initially proposed by Anglo American for consideration in the Project mine plan. This was then presented to neighbouring stakeholders, in particular Coolmore Australia, for discussion. The response from Coolmore was that the size and the position of the visual bund so low down in the valley was a key concern. Following this response, Anglo American commissioned the investigation of alternative visual bund locations and design specifications.

Option Two

The visual bund design for Option Two is located approximately 4.5km to the nearest receptor to the south. Approximately 8.1 Mlcm of overburden material from mining activities would be required during a staged construction over 10 months. The design allows for a maximum batter height of 70 m and crest length of 1,600 m, and aligns with the existing topography once fully constructed (see Figure 4.11).

The location of Option Two was initially proposed by Coolmore Australia for consideration in the Project mine plan. A conceptual design was then developed by Anglo American so that mine planning and bund construction issues could be fully understood in order to make a decision on the practicality and feasibility of the option.

Option Two causes impacts to the operability of the Houston mining area due to a significant reduction in the mine strike length that is available. As a result it is not deemed viable to operate the dragline within the Houston mining area under this option. This change would thereby reduce the productivity of the overall Project mining schedule and thereby have implications for costs and equipment utilisation. This then would render the lower seams within the Houston mining area uneconomical and lead to further resource sterilisation over and above the mining areas that have already been removed from the Project mine plans.

Option 3

In order to minimise operational impacts to the Project and visual impacts to neighbouring stakeholders, Anglo American investigated a third visual bund option located w between Option One and Option Two. Under Option 3, the bund is located further away from nearby receptors in the south whilst still providing a sufficient strike length to allow for the efficient operation of a dragline. Option Three was deemed by Anglo American to be the preferred compromise option for the Project and is described in detail in this Section. Subsequently, Option 3 is the visual bund that is assessed in detail by this assessment (Figure 4.11).

Comparison of Bund Option Visual Outcomes

To ascertain the effectiveness of the preferred design option (Option 3), earlier montages of Option 1 and 2 were compared with the preferred design for the Project. The montages or views are taken from three critical viewpoints from Coolmore Stud (see Figure 4.11).

- DS08 Batty Hill
- DS05 Ellerslie Residence
- DS06 Oak Range Road (top of hill)

The various bund options are illustrated with different coloured lenses:

- Option 1 is illustrated by a pink lens;
- Option 2 is illustrated by a blue lens; and
- Option 3 is illustrated by a brown lens.

DS08 Batty Hill

This is a viewpoint of high sensitivity being a lookout point on the Coolmore Stud where visitors are taken for an overview of the property.

Figure 4.12 comparatively illustrates the extents of the three options against the existing view from Batty Hill. The pink lens correlates with the design of the Option 1 visual bund as initially shown to Coolmore during the 2009 modelling work. Options 2 and 3 are alternative designs investigated following feedback from Coolmore in quarter 4 of 2011.

Option 2 has the least visual effect being the furthest distance from the sensitive receptor on Batty Hill.

Option 3 is slightly more visible as its profile crest is higher and is closer to Coolmore Stud than Option 2.

Both Options 2 and 3 would have high to moderate visual effect during the construction stage of the bund before any rehabilitation work is undertaken. By Year 10, trees will further soften the bund and screen the ridge line profile reducing the visual effects significantly.

Both of these options have a smaller Area of Primary View zone (PVZ) visible than the broader face of Option 1 as was originally proposed.

DS05 Ellerslie Residence

This is a viewpoint of high sensitivity being a residential property on the Coolmore Stud less than 7.5km from the Project.

Figure 4.13 compares the three design options in terms of seen area from the viewing point. Option 2 has the least visual effect as the area of primary view is the smallest. Option 3 has a wider face and spills over some of the nearer slopes. Option 1 has the highest visual effect with the greatest area in PVZ with a ridgeline crest higher than other options.

All options will have high to moderate visual effect during the construction stage of the bund before any rehabilitation work is undertaken. By Year 5 rehabilitation will have been completed and trees planted. Over time the development of these trees will further soften the bund and

allow for integration with the existing ridge line profile reducing the visual effect significantly.

DS06 Oak Range Road (top of hill)

This is a view point of high sensitivity being a road frequently used on the Coolmore Stud. The view to the north along Oak Range Road looks directly towards the Houston visual bund (See Figure 4.14).

Figure 4.14 comparatively illustrates the extents of the three options against the existing view from the top of the hill on Oak Range Road.

From this viewing point, Options 2 and 3 have little variation in their visual effect, Option 3 being slightly wider in the eastern sector. Height difference between the two options at this

distance would be indistinguishable to the eye.

Option 1 is very similar in area of PVZ, but its closer proximity would heighten the visual effect marginally.

All options will have high to moderate visual effect during the construction stage of the bund before any rehabilitation work is undertaken. By Year 5 rehabilitation will have been completed and trees planted. Over time the development of these trees will further soften the bund and allow for integration with the existing ridge line profile reducing the visual effect significantly.

4.4 Minor Mine Development Components

The Project will utilise much of the existing Drayton Mine infrastructure. Coal from Drayton South will be transported to the Drayton Mine CHPP facilities along the transport corridor. The minor mine development components considered as part of this assessment include:

- ROM hopper, crusher and stockpile area;
- Mine site facilities;
- Transport corridor;
- Water infrastructure; and
- Realignment of Edderton Road.

These components are considered minor because they generally do not visually project beyond the project boundary in relation to significant external viewing locations.

ROM Hopper, Crusher and Stockpile Area.

The ROM hopper, crusher and stockpile area is proposed to be located to the north-east of the Whynot mining area adjacent to the proposed haul road to the existing Drayton Mine, Figure 4.1. This site would only be developed if the conveyor option for transporting coal back to Drayton Mine CHPP is determined to be an economically viable option. As the Project currently stands the use of the haul road is the preferred option for coal haulage.

All of the infrastructure elements proposed have a distinct industrial character however the height of most of these items would be generally less than 12 m.

These infrastructure elements will create a high visual effect (Type 1) contrasting strongly with the surrounding rural landscape. However given the positioning of this infrastructure it will be well shielded by the existing topography to the south and mining areas associated with the Project.

Mine Site Facilities

As the Project is intended to replace the current mining operations at Drayton Mine, minimal changes are required to the existing surface facilities at Drayton Mine. The current administration office, bath house and workshops will be utilised for the Project. The only new facilities requiring development are the Drayton South mine site facilities.

The proposed location of the Drayton South mine site facilities is shown on Figure 4.1.

The mine site facilities area includes numerous built elements such as a workshop, offices, parking areas and storage areas. Most of these are generally small in scale and it is more the combination of the various infrastructure items contained in this area that must be considered.

The visual effect of these elements when considered collectively will be moderate to high and

will create a type 2 visual effect. The mine site facilities will only be partially visible to select areas in the northern sector.

Transport Corridor

The Project includes two options for the transport of coal from Drayton South to Drayton Mine CHPP. The first is road transport along a dedicated haul road from the Mine Site facilities. The second is an overland conveyor from the ROM pad and crushing station located at the Drayton South Mine.

The road is a flat linear element at grade within the existing landscape. The cleared wide bare dirt road corridor will contrast in colour and texture with the surrounding rural landscape. However, it will be similar in visual character to many rural access roads in the surrounding rural landscape and will create a low type 1 visual effect.

The overland conveyor is an elevated linear construction, the elevation dependent upon topographical features along the transport corridor. It would contrast highly with the surrounding rural landscape in form but its route may follow the undulations of the corridor topography.

The visual effect of this element will be moderate to high and will create a type 2 visual effect.

Water Infrastructure

The water infrastructure consists of three onsite drainage and water retention basins as well as overland water pipelines around the site and through the transport corridor connecting to the Drayton Mine infrastructure area. There is also a water extraction and discharge pipeline to the Hunter River. All of these elements are at or below ground level (with the exception of dam walls) and therefore would have very little visual effect outside of the Project Boundary.

Edderton Road Realignment

The existing alignment of Edderton Road runs in a north south direction through the Project boundary. The proposed Edderton Road realignment proposes a route to the west of the existing Edderton Road along the relatively lower lying areas following the path of Saddlers Creek to the south west (see Figure 4.1). The new two lane, two way sealed road will transverse existing grassed grazing lands and will be of similar character to the existing Edderton Road and will therefore not add a new and highly contrasting visual element to this landscape. It will have a type 2 visual effect and will result in low visual effect levels in most instances.

4.5 Summary

The development of the Project and more specifically the major mine components associated with it in a landscape of open grass lands and remnant vegetation has the potential to create high visual effects.

However before the level of this effect from various viewing locations can be determined the visibility of the various project components from external areas must first be defined (Section 5). Once the visibility is confirmed, the visual effect of the Project on these external viewing locations can be determined (Section 6).

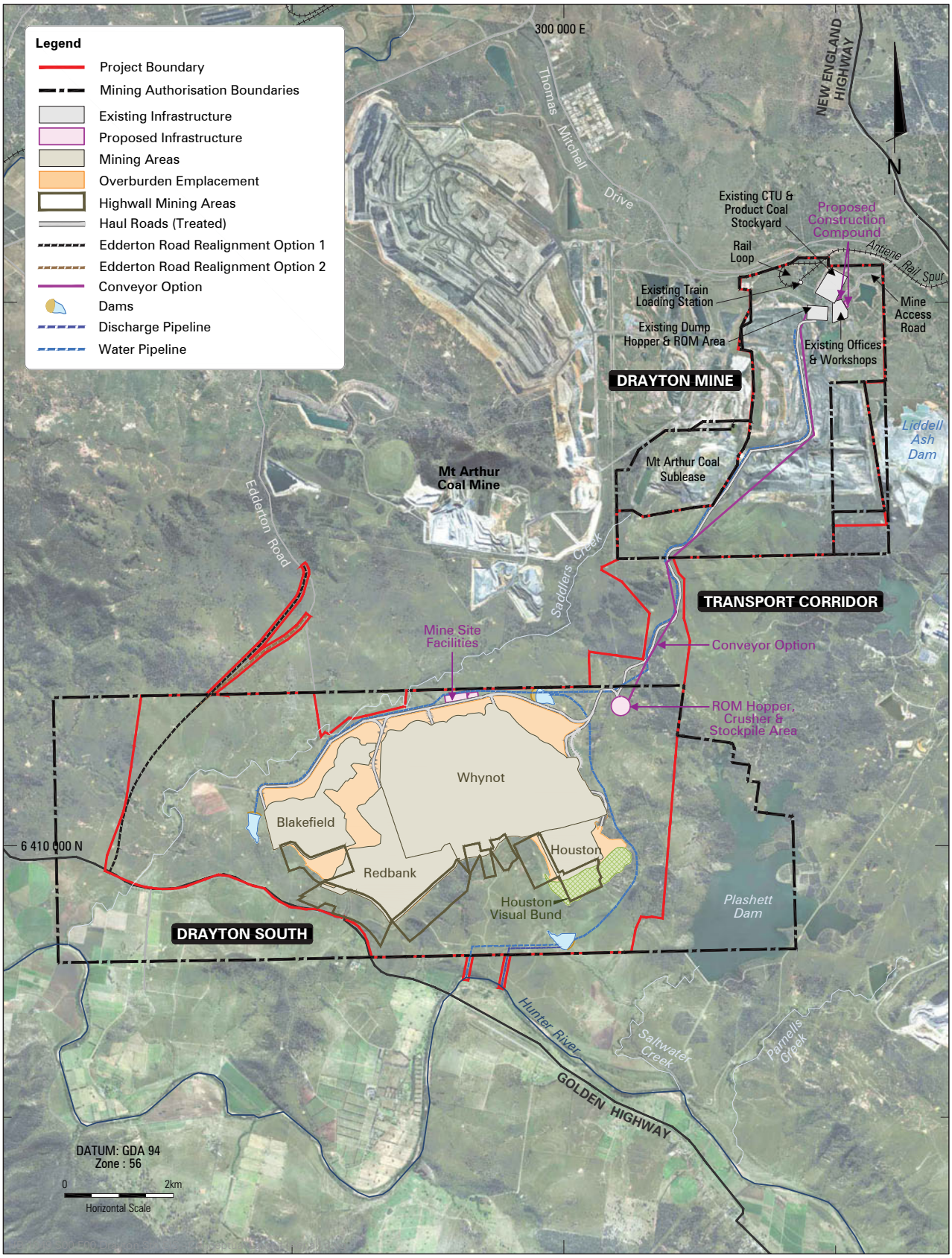

Figure 4.1 | *Conceptual Project Layout*

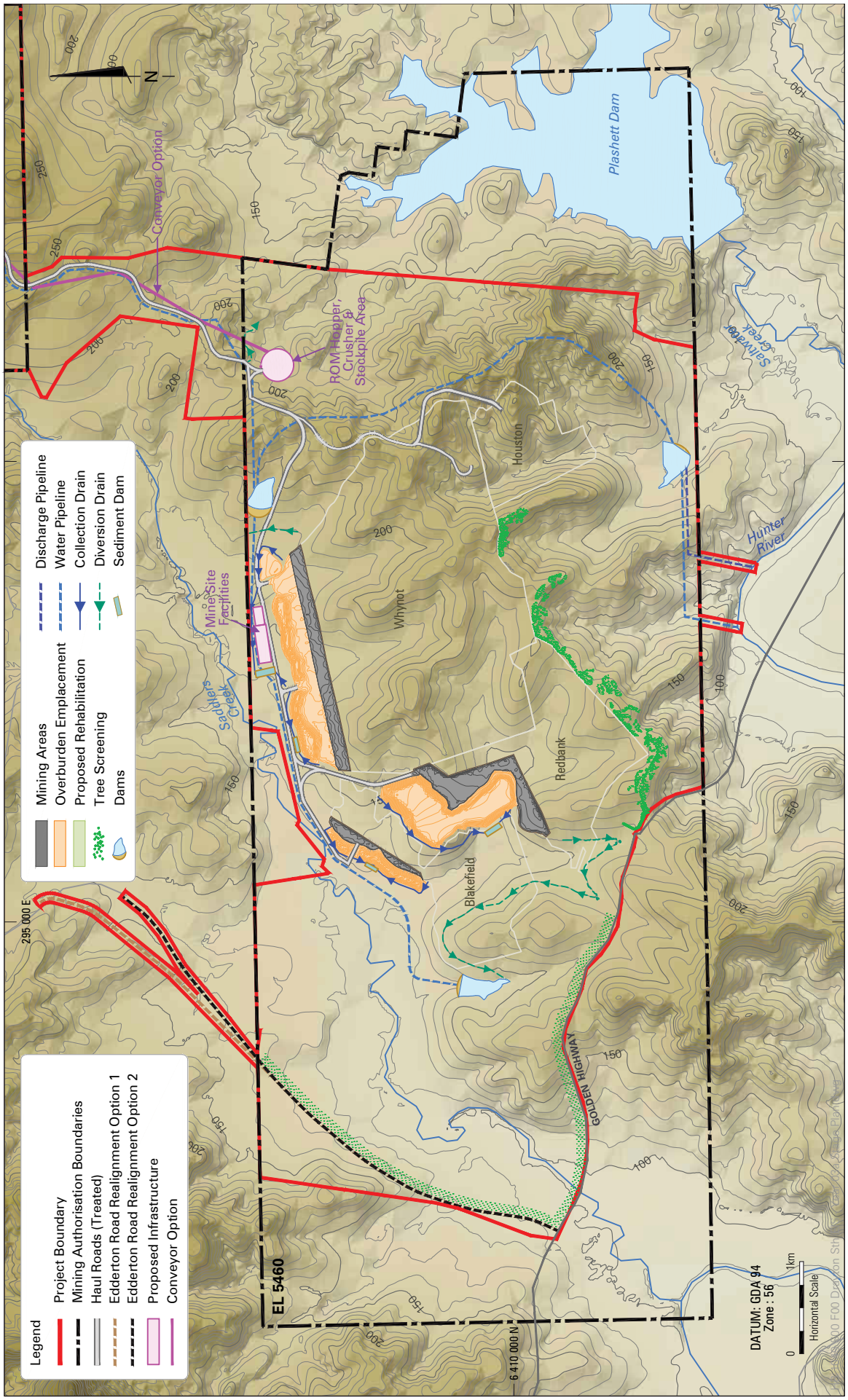

Figure 4.2 | *Conceptual Year 3a Mine Plan*

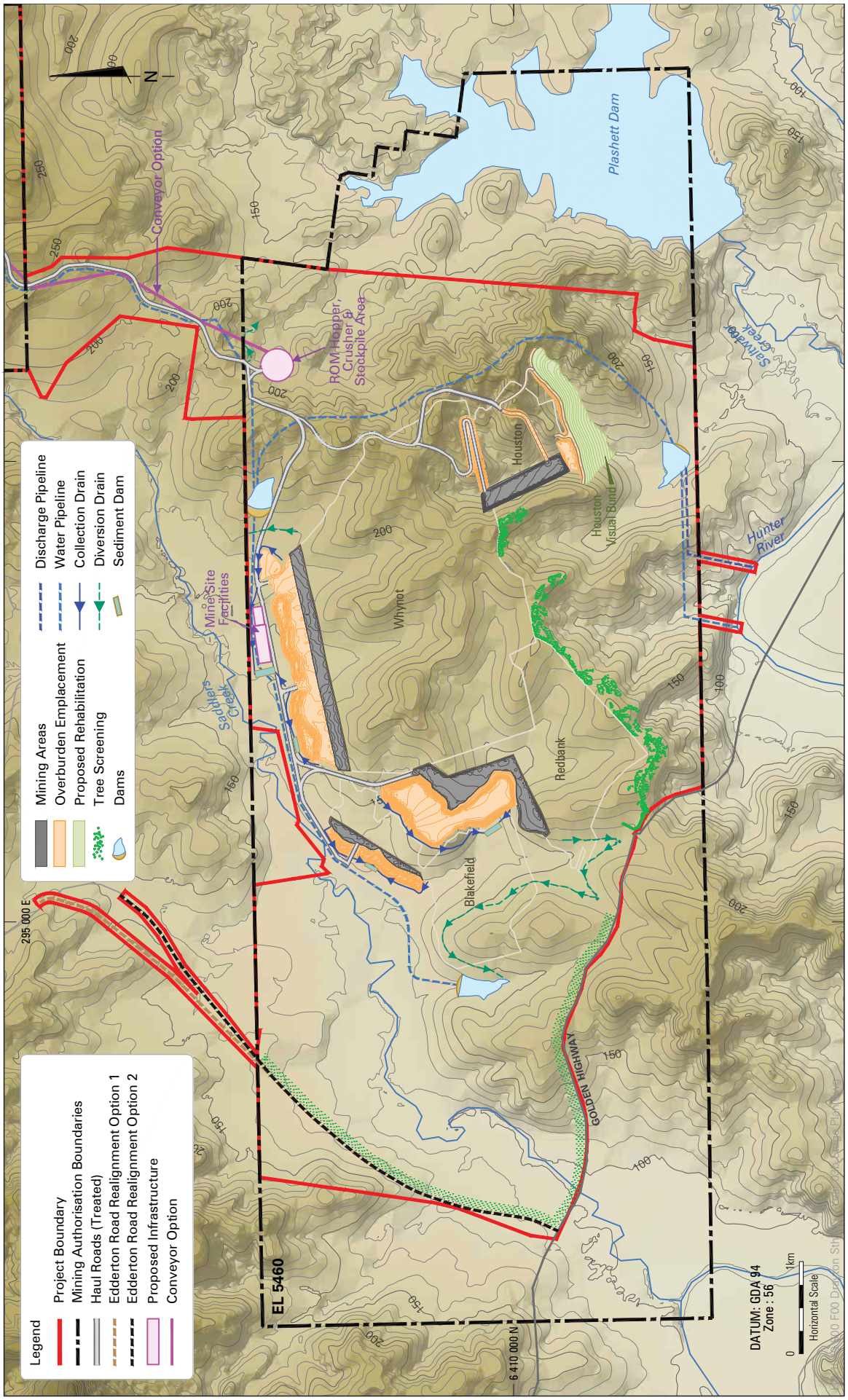

Figure 4.3 | *Conceptual Year 3b Mine Plan*

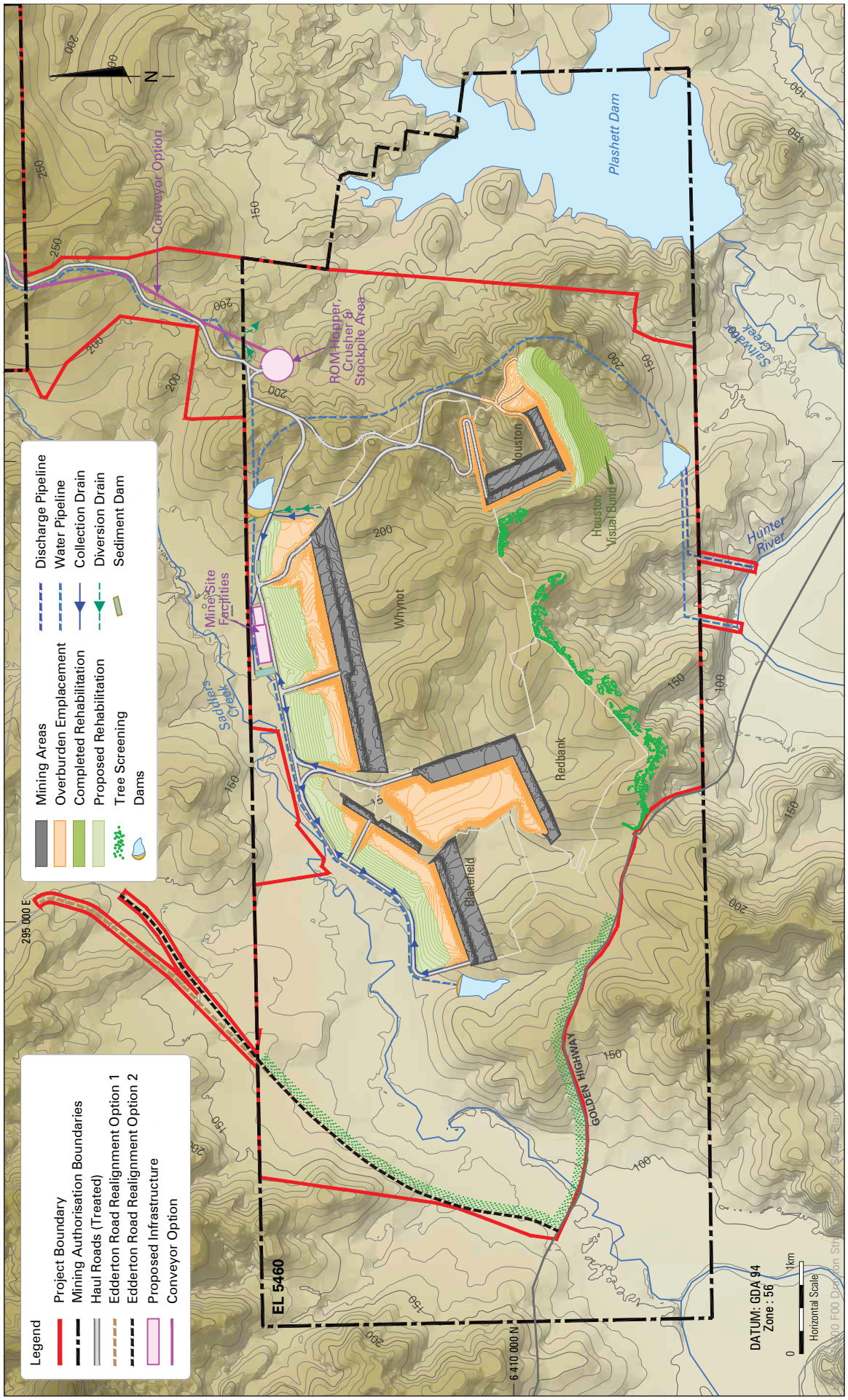

Figure 4.4 | *Conceptual Year 5 Mine Plan*

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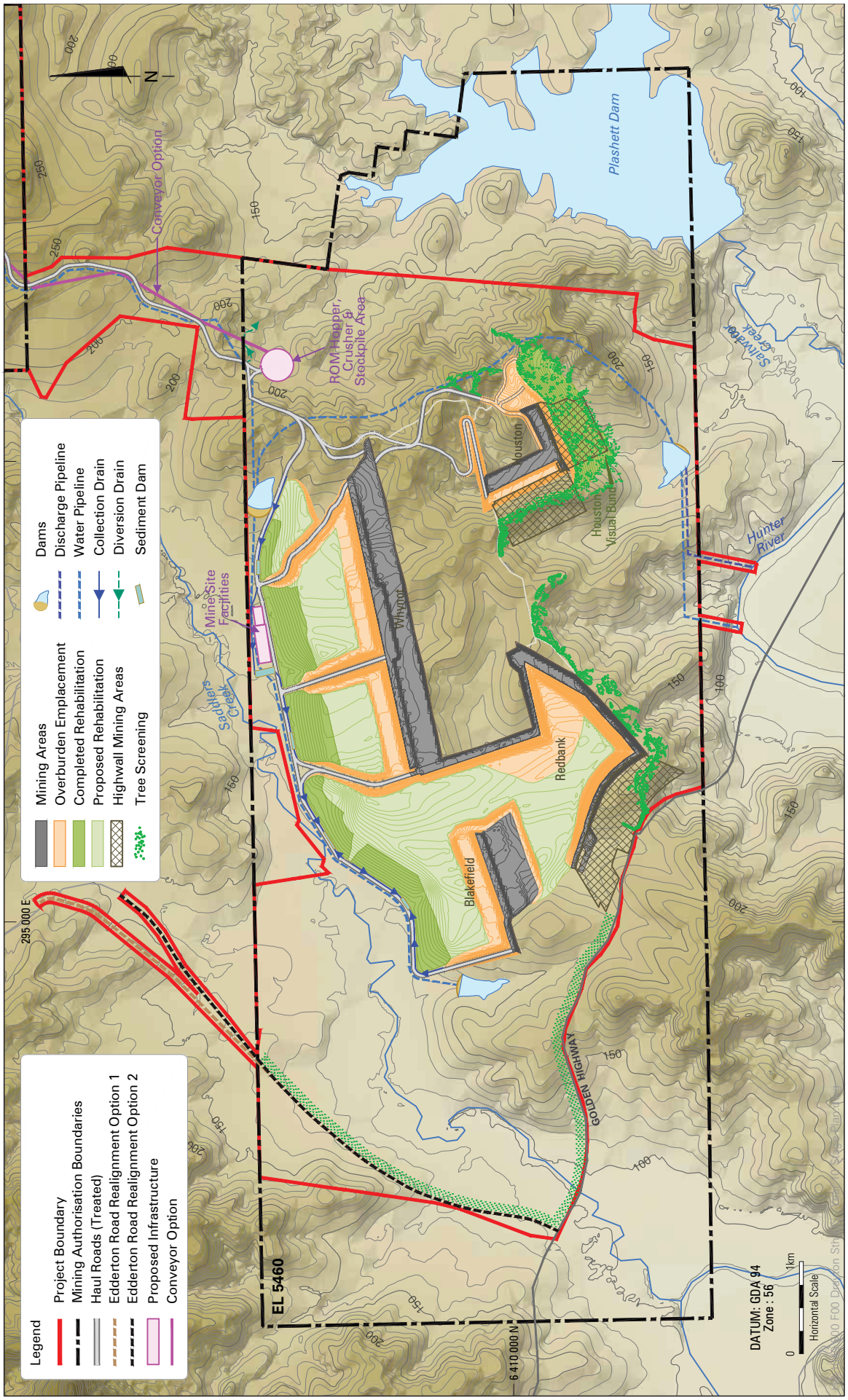

Figure 4.5 | *Conceptual Year 10 Mine Plan*

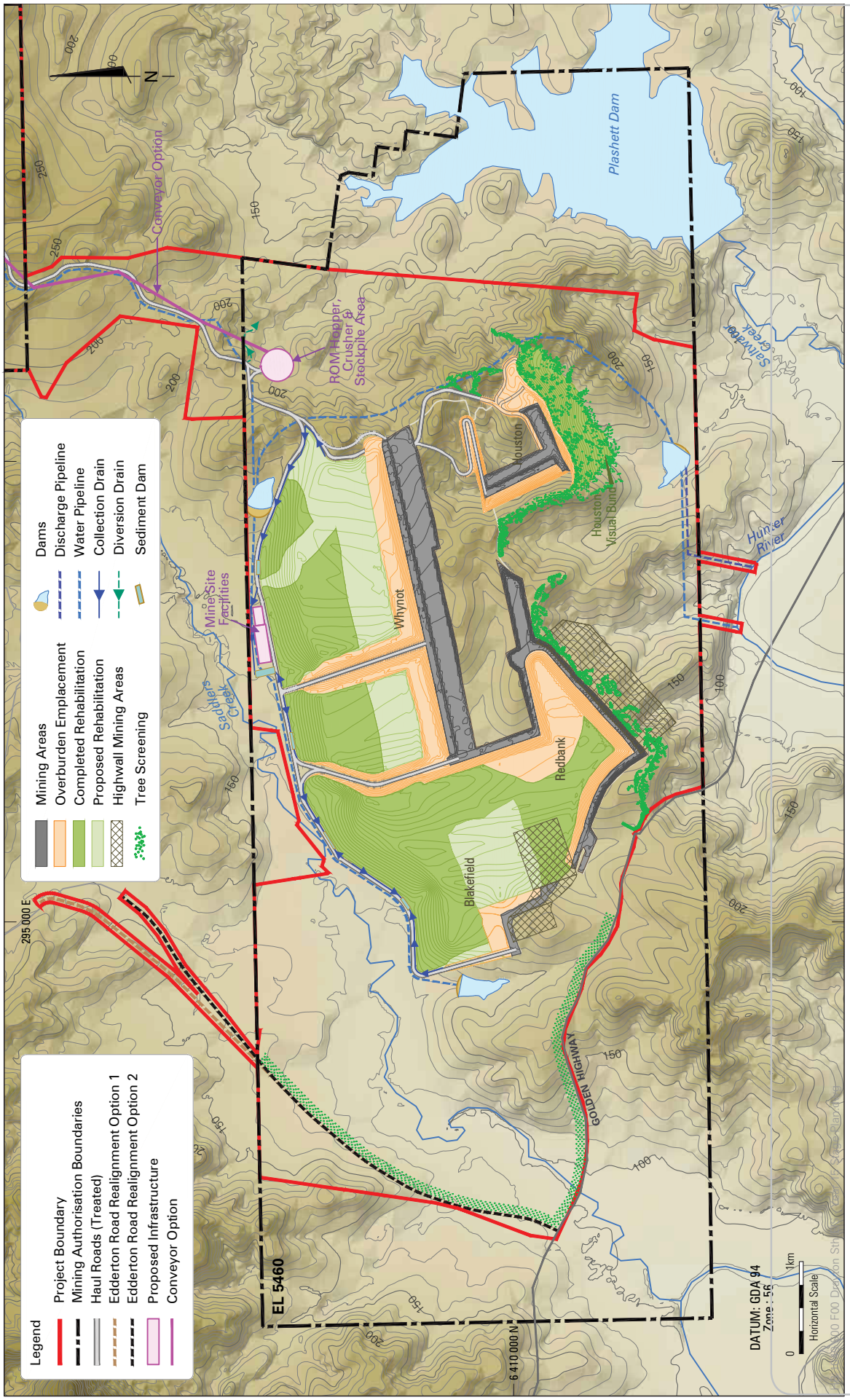

Figure 4.6 | *Conceptual Year 15 Mine Plan*

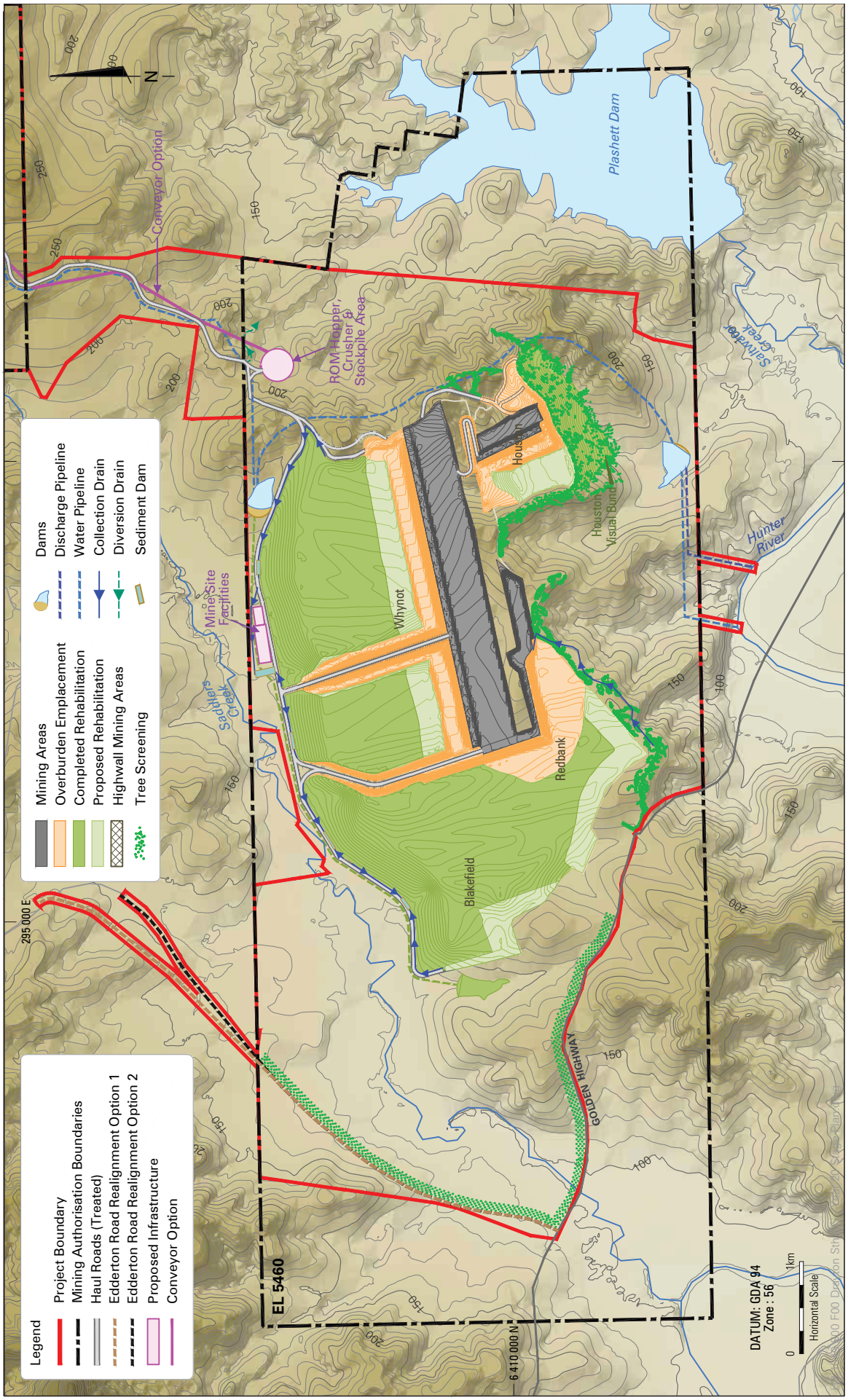

Figure 4.7 | *Conceptual Year 20 Mine Plan*

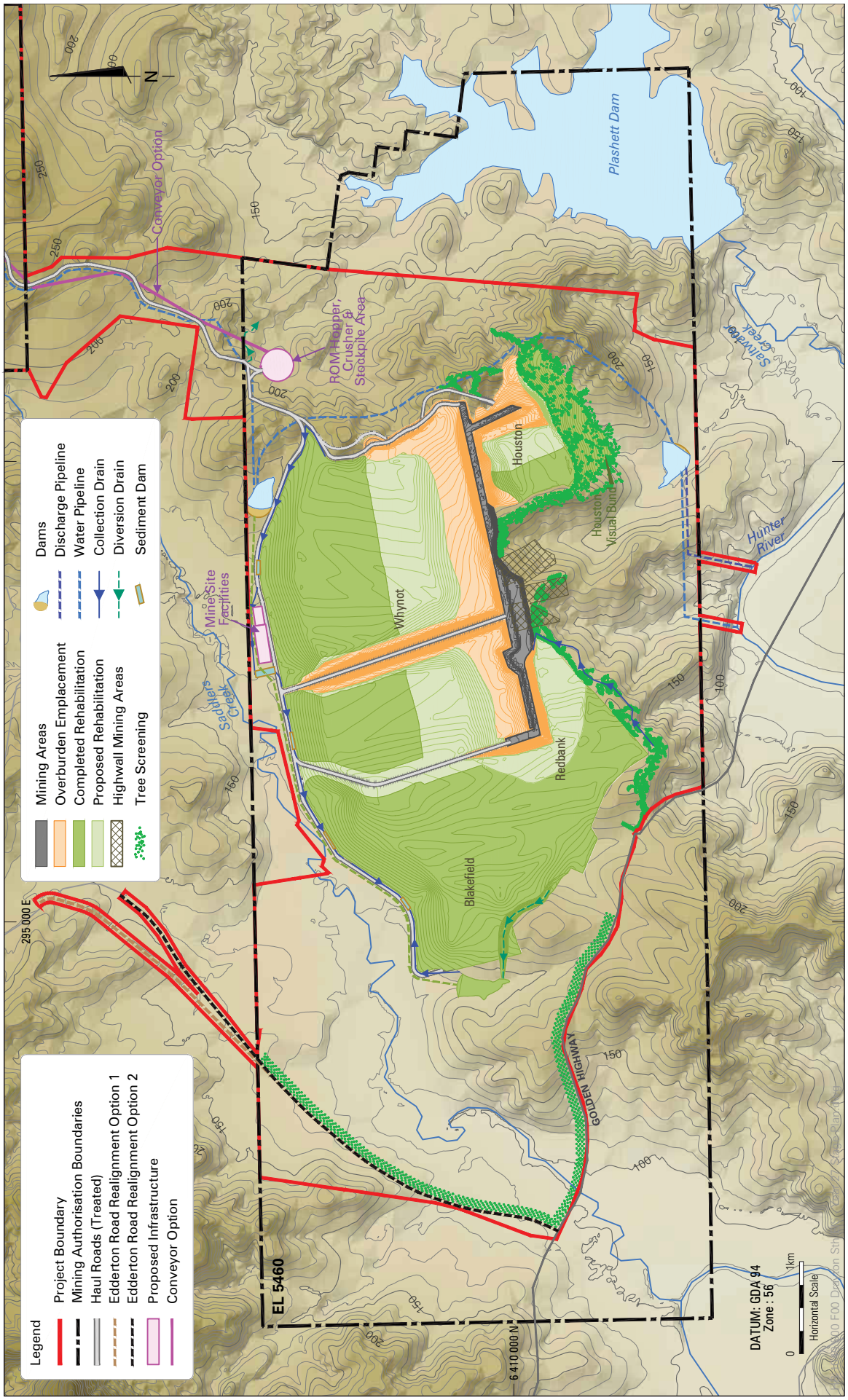

Figure 4.8 | *Conceptual Year 27 Mine Plan*

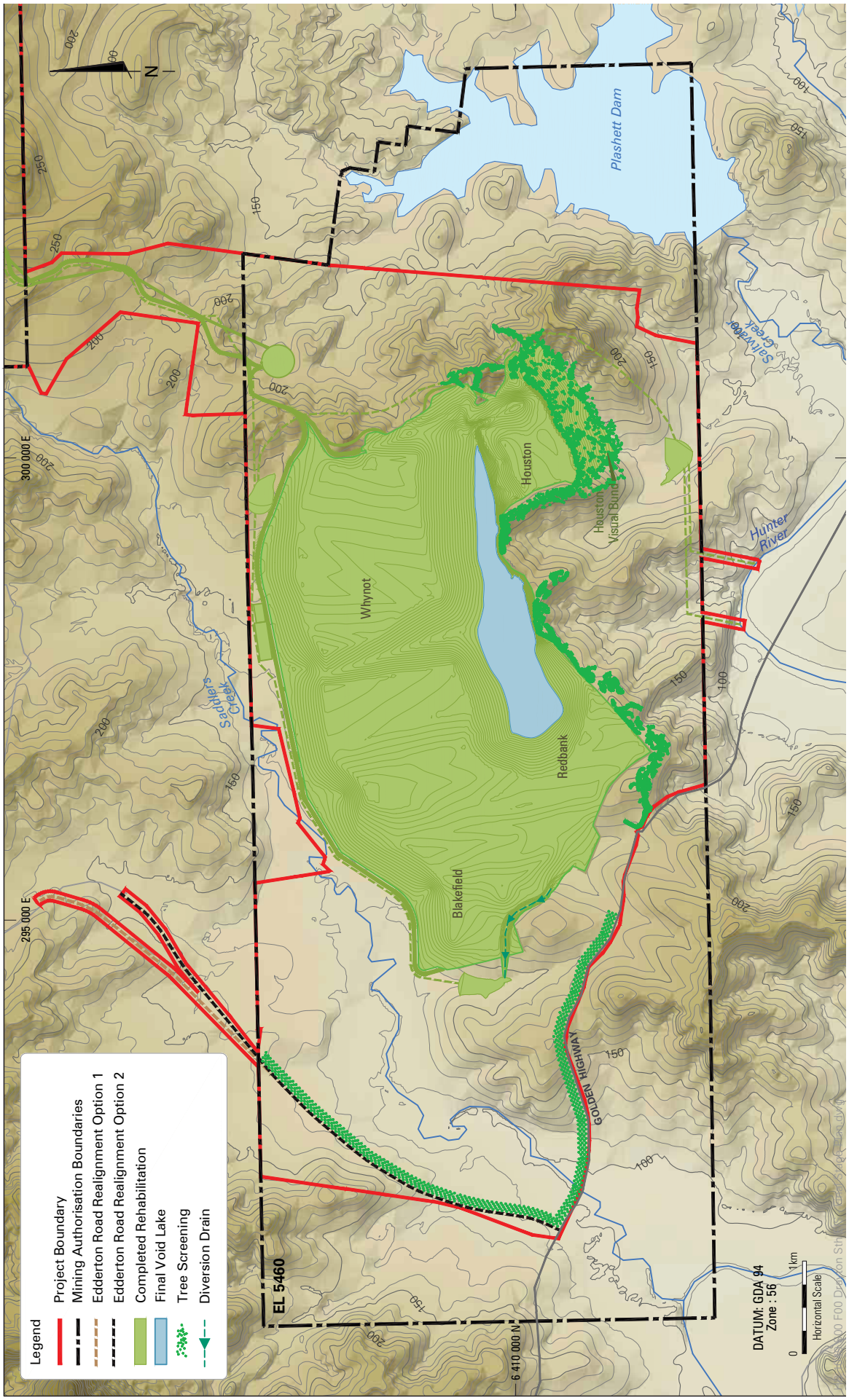

Figure 4.9 | *Conceptual Final Landform*

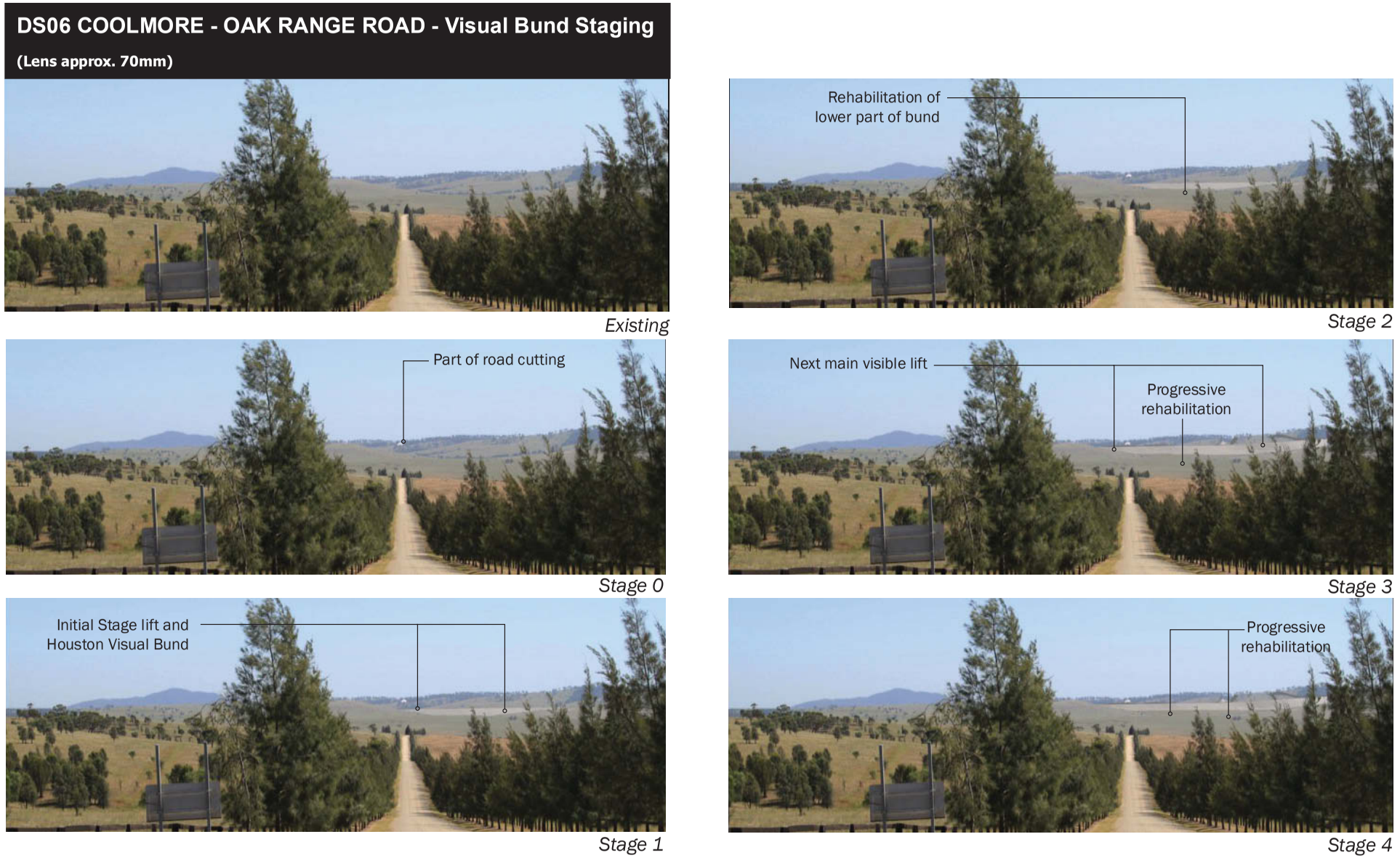

Figure 4.10a | ***Photomontage DS06 - Coolmore - Oak Range Road - Visual Bund Construction Staging***

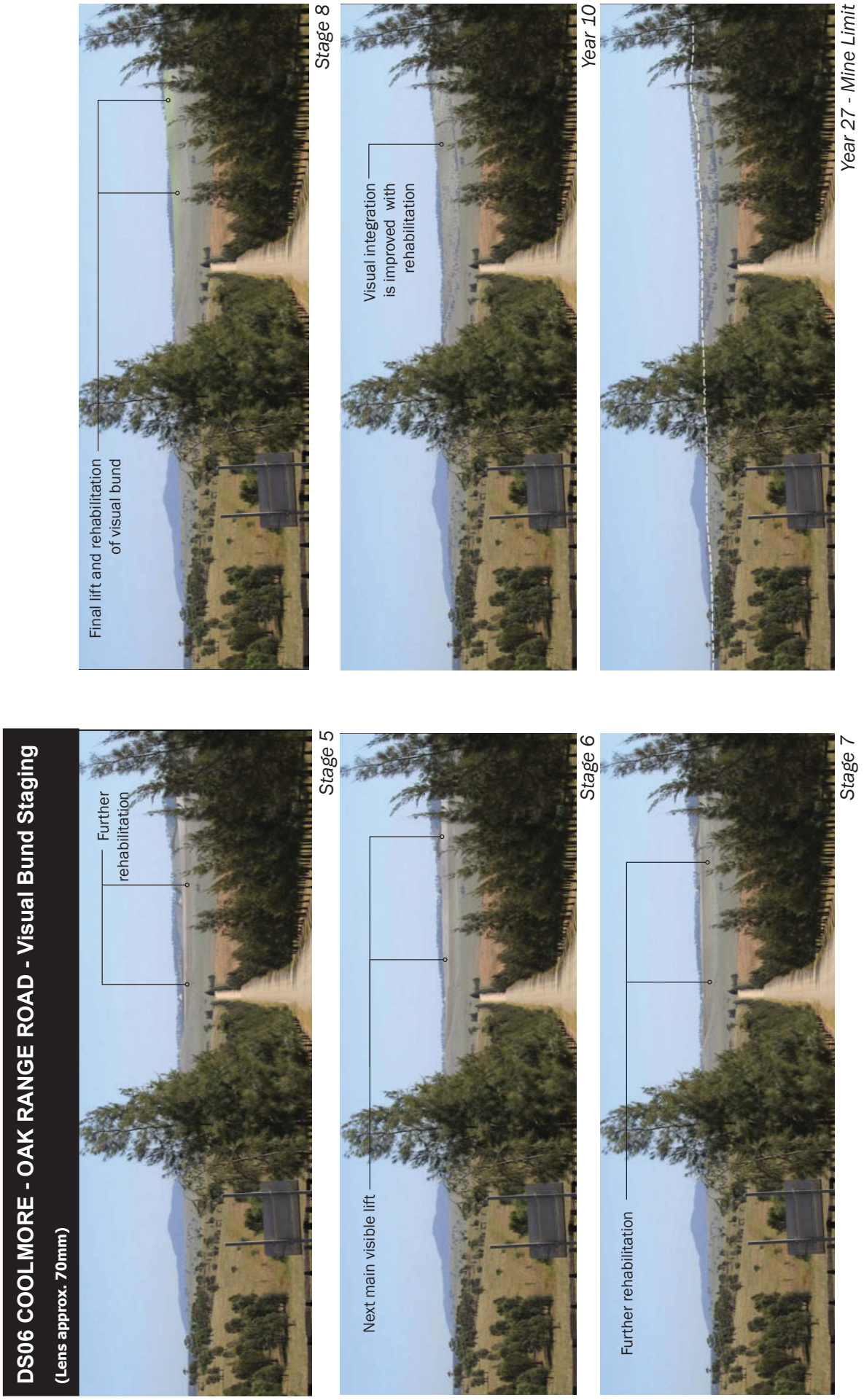

Figure 4.10b| *Photomontage DS06 - Coolmore - Oak Range Road - Visual Bund Construction Staging*

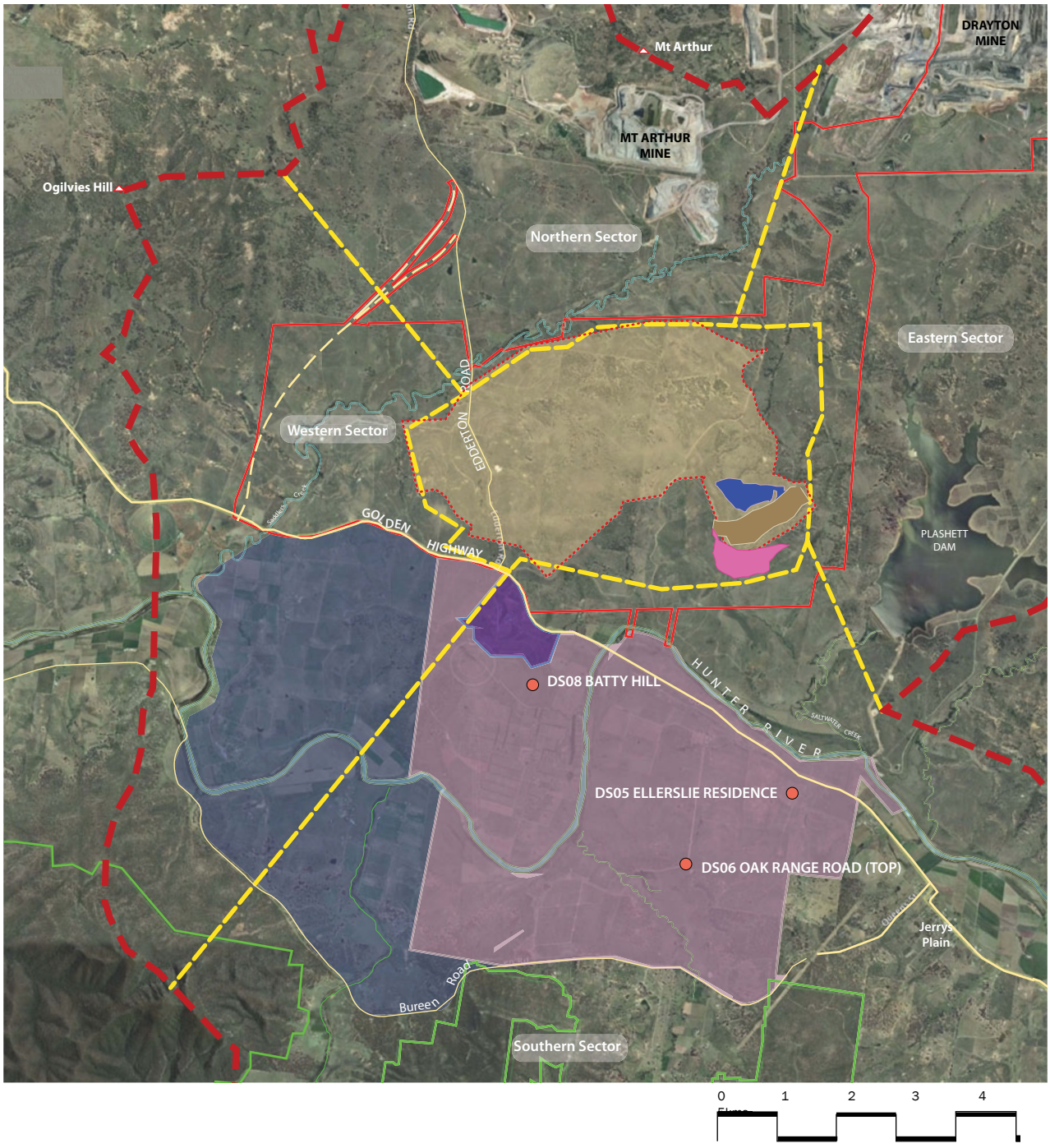

Figure 4.11 | *Visual Bund Options*

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Figure 4.12 | *DS08 BATTY HILL - Visual Bund Comparison*

Visual Bund - Option 1

Visual Bund - Option 2

Visual Bund - Option 3 - Project

Figure 4.13 | *DS05 ELLERSLIE Residence - Visual Bund Comparison*

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Figure 4.14 | *DS06 OAK RANGE ROAD - Visual Bund Comparison*

5. VISIBILITY AND VISUAL SENSITIVITY

5.1 General

This section of the report evaluates the visibility of the various elements of the Project from locations surrounding the Project Boundary. Visibility will vary depending on a combination of topography and vegetation; especially foreground vegetation close to points of viewing.

The sensitivity of the various areas that have views of the project will depend on the land use. Land use areas or activities that utilise the view, such as thoroughbred horse studs or private residences, will have a high sensitivity. Conversely, areas such as rural lands and back country will have a low sensitivity. A consideration of sensitivity must be responsive to local conditions and current perceptions about the visual amenity aspects of a landscape, as illustrated through current land use practices.

The determination of visibility and sensitivity give direction to potential mitigation strategies (Section 7) for any areas with high visual impact.

Field assessment and evaluation of mapping and aerial photography as well as computer analysis assisted in defining the Visual Study Area as shown on Figure 5.1. This area contains the most critical locations with potential views to the Project. To assist in an evaluation of this visibility the visual study area has been divided into the Northern, Eastern, Southern and Western Sectors. The visibility from each of these sectors is described in Sections 5.4, 5.5, 5.6 and 5.7 below.

There needs to be visibility of the various mine components for a visual sensitivity and a visual impact to be incurred. Areas that do not have a view of the Project will not be visually impacted by the Project.

5.2 Visibility Considerations

Significant Topographic Features

There are a number of topographic features that greatly assist in limiting the visibility of mine areas, (see Figure 5.1). These features limit views to the north, east, south and west in different ways.

To the north and north west of the Project, the hills and low ranges associated with Ogilvie Hill and Mt Arthur define the visual study area between the Hunter River and Saddlers Creek. These features screen views from further afield in those directions.

To the east, the distant low ridgeline that runs north-south from Plashett Knob assists in interrupting views from east of that ridgeline.

To the south and south-west of the Project there are a series of low ridges and spurs adjacent to the Golden Highway and Hunter River that define view sheds to varying degrees (see Figure 5.2). Views of the Project from the Golden Highway are limited to the western and eastern extremities of the Project.

To the south the Wollemi National Park escarpment and associated national park wilderness areas limit views from areas outside the southern sector. The only potential exception would be any wilderness walkers that trek on to the extreme northern end of the Wollemi National Park plateau. However there are no accessible designated lookout points on any marked trail that would enable wilderness walkers to obtain distant views of the Project.

To the west, there is extensive rural land with limited sensitive receptors in that sector. A high ridge to the north west which divides the Hunter River and Saddlers Creek catchments limits views into the Project. Views are also limited by the numerous low ridges and spurs in this sector on both sides of the Golden Highway in the vicinity of Darley Stud.

Significant vegetation areas

Tree cover is important in providing potential screening of the Project components. It is especially significant when it is close to the viewing locations as shown in Figure 5.3.

In addition to the screening effect of native woodland, especially that associated with the casuarinas and eucalypts along the creeks and drainage lines, cultural plantings around rural residences and villages also create screening effects. Cultural plantings and residual tree areas in the foreground or near middle ground can be significant in reducing views to the Project. Similarly, vegetation around residences or village streets can greatly assist in screening views to the Project (see Figure 5.4).

5.3 Sensitive Receptors

There are a range of potentially sensitive viewing locations around the Project Boundary. These include the village of Jerrys Plains, the thoroughbred horse studs of Darley and Coolmore, Arrowfield Estate, rural residences, roads and Wollemi National Park (see Figure 5.1).

Jerrys Plains Village

This village and houses close to the Golden Highway are the only cluster of residences and community facilities within the visual study area.

Thoroughbred Horse Studs

Coolmore and Darley horse studs have a number of sensitive receptor areas within them. This is due to the visitation to the studs by existing and potential horse breeding customers. The high quality cultural landscapes created within the stud properties is testament to the value placed on the visual amenity of the horse breeding environments. In addition these areas have numerous residential nodes for managers and workers.

Arrowfield Estate

The Arrowfield Estate is situated in close proximity to the Project on the southern side of the Golden Highway. A small vineyard exists on the property. Although also containing a restaurant, winery and cellar door infrastructure none of these facilities were being utilised for their intended purpose at the time of writing of this report.

Rural Residences

There are a limited number of rural residences spread throughout the locality. Most significant are those located to the south and south-west of the Project Boundary.

Roads

The major road in the locality is the Golden Highway to the south of the Project Boundary. The other roads within the locality are generally minor rural roads.

These roads include Bureen Road that runs east-west from Jerrys Plains to Denman, and

Edderton Road which intersects Denman Road approximately 10km south west of Muswellbrook and runs in a north to south direction to the Golden Highway.

Wollemi National Park

Wollemi National Park to the south of the visual study area is a recreation area of regional recreational significance. There are no marked bushwalking trails in the northern parts of the park, but "wilderness walkers" sometimes venture to the northern parts of the forested plateau. There would also be bush fire control trails through the park and within the southern extents of the visual study area.

5.4 Visibility and Visual Sensitivity of the Northern Sector

The view sector is more clearly illustrated in Figure 5.1. This sector is dominated by low sensitivity rural lands, Mt Arthur and the telecommunications tower and existing mining operations of the Mt Arthur Coal Mine. Creek line vegetation associated with Saddlers Creek also influences this sector.

Mt Arthur

Mt Arthur's distinctive single peak and communications tower dominates the northern skyline of the visual study area. Surrounding this peak are several existing open cut mining operations. From this view point at the communication tower there will be views into the Drayton South mine approximately 5km to the south, however the visual effect will be diminished due to existing operations already in place as part of the view south.

The Mt Arthur lookout would have a low sensitivity due to the lack of public access to the site.

Rural Residences

There are two rural residences located within this sector. The first property, Edderton Homestead, is located approximately 0.6km to the north of the Project Boundary and east of Edderton Road. The second is further north adjacent the Mt Arthur mine water catchment dams to the west of Edderton Road. It is approximately 6.6km from the Project Boundary and 8.3km from the minig areas at Drayton South.

Edderton Homestead is owned by Mt Arthur Coal Mine but is leased to a local farmer. The residence is occupied. On the basis of topography alone, Edderton Homestead would have views to the northern OEA and the Mine Site Facilities. However homestead landscapes as well as trees in adjoining fields will limit such views.

Local topography will screen views to the second residence "Bobbagullion": therefore that location will have very low visual sensitivity.

Views from residences closer than 7.5km would have a high sensitivity with a moderate sensitivity being ascribed up to 12.5km and a low sensitivity beyond 12.5km. In this context, Edderton Homestead has a high sensitivity.

Local Roads

There are local views to the Project from sections of Edderton Road. The proposed realignment will increase the distance of those views. The road alignment transverses lower areas roughly parallel to Saddlers Creek and will be approximately 2.5 to 5km from the Project and will have moderate sensitivity at that distance. Rolling topography and creek line vegetation will screen

some of the western face of OEAs as will the tree screens that are proposed to be planted along this realignment as part of the construction process. However the final elevations of OEAs will be visible from some parts of the road.

Edderton Road would have a moderate to low sensitivity.

5.5 Visibility and Visual Sensitivity of the Eastern Sector

There are no rural residences to the east; however there are elevated locations at, Plashett Knob, and the ridgelines north and south. Plashett Dam is also within the eastern sector. Macquarie Generations holds the majority of land ownership in this sector.

Plashett Knob and Ridgelines

These areas are not accessible to the public and are generally used for grazing activities. As a result, these areas have a very low sensitivity.

Rural Residences

The eastern sector contains no rural residential properties.

Local Roads

The roads within this sector are on private property within grazing properties or Macquarie Generation's land and are minor rural or industrial site roads. A single road crosses Plashett Dam in a north-south direction, linking the Bayswater Power Station to power generation infrastructure to the south on the banks of the Hunter River.

A minor rural road runs in a north-south direction on the east face of the Plashett Knob ridgeline. It accesses pastures in this sector and to the north. As it is on the east slope it has limited views of the mine site.

These roads would have very low sensitivity.

Plashett Dam

Plashett Dam supplies water to the Bayswater Power Station to the north-east. Water is pumped from the Hunter River via a pumping station on the Hunter River. It is situated to the east of Plashett Knob and ridges to north and south, which screen views of the Project site.

There is no recreational or tourist activity at Plashett Dam and no public access roads.

Plashett Dam would have very low sensitivity.

5.6 Visibility and Visual Sensitivity of the Southern Sector

This sector is dominated by the village of Jerrys Plains, rural lands associated with the Hunter River Valley including Coolmore Stud, Arrowfield Estate, scattered rural residences and local tourist roads as well as a significant section of the Golden Highway.

Jerrys Plains

The village of Jerrys Plains is located approximately 7.5km to the south-east of the mining areas at Drayton South.

Vegetation and other buildings within the village will screen many views from the village area.

There will be views to the Houston visual bund as it is constructed and rehabilitated during years 3 to 5. Many of the properties have existing trees in the foreground views which reduce the impact of views to the Project.

The village would have a high sensitivity for any areas that would have views to the construction of the Houston visual bund and are within 7.5km of the Project. However the majority of receptors within the village of Jerrys Plains are outside of this range and would result in a moderate sensitivity being ascribed during the period when the bund is being constructed. Once the bund is completed and rehabilitated no views are anticipated for Jerrys Plains and at this time the sensitivity would reduce to low.

Hunter River Valley

The flood plain of the river is dominated by improved pastures and croplands. These are contained within a range of private properties with a significant area of this land within the Coolmore and Darley Studs.

Visibility from these areas is limited, but will have views to the eastern extent of the Project boundary, namely the Houston Visual Bund.

Coolmore Stud

Coolmore is located directly to the south of the Project. It contains a number of landscape areas that have different view characteristics and visibility to parts of the Project.

With the exception of a narrow strip of river flat lands between the Hunter River to the north and the Golden Highway to the south the majority of the property is to the south of the Golden Highway. Most of the Coolmore land is located on the alluvial flats associated with the Hunter River. Adjoining these flats are rolling hills with increased elevation.

Most of the intensive stud use areas and the most sensitive receptors are on the low flat lands. This includes the Coolmore office and reception building, many stud facilities and paddocks. Adjacent to this on the lower parts of the adjoining low lying hills are many of the residences occupied by managers and workers families. These residences include many historic buildings such as Strowan Homestead.

There are some exceptions to the location of sensitive facilities at the lower elevations, including the stud managers house on the back of Oak Range and the workers accommodation buildings adjacent to Bureen Road, adjacent to the 'back gate' to Coolmore. In addition there are roads that cross this higher terrain, specifically the Oak Range Road to the south of Strowan. Generally less significant dry land paddocks occur on these parts of the property as do other functional elements such as storage areas and the Coolmore quarry.

The rolling hills also support some lookouts, specifically at Batty Hill, as well as high points on roads such as Oak Range Road. The highest locations on the property are associated with the ridgeline on the western end of the Coolmore property. This ridge supports low sensitivity activities such as the Coolmore quarry and loading of cattle from the established cattle yards in this part of the property. Given its broad acre rural area value it has been assigned a low sensitivity.

Most of the deemed sensitive locations on Coolmore Stud are within 7.5km of the Project, specifically the Houston visual bund. This would mean that locations that obtain a view to the construction of the Houston visual bund would have a high sensitivity.

There will be open views to all mining areas from the maintenance road in the vicinity of the

Coolmore quarry and cattle yards. This area is considered to be of low sensitivity.

Arrowfield Estate

Arrowfield contains a small vineyard and houses an unused winery, cellar door and restaurant infrastructure. In addition the property also supports a number of residences.

The facilities and residences associated with Arrowfield have no views to the Project due to the screening effects of the southern ridgeline between Arrowfield and the Project.

Views would be available from select high points on the back of this property. Given that these high points on the top of the ridgeline do not form part of the previous commercial areas associated with the winery or restaurant, they have been considered as broad acre rural areas and assigned a low sensitivity.

As such Arrowfield will have a low sensitivity due to lack of visibility to the Project.

Residences

Excluding the numerous rural residences on Coolmore and Darley, rural residences in the remainder of the sector are limited. These residences are generally adjoining minor rural roads to the south of Bureen Road and are further than 7.5km away.

Micro-topographic elements, existing vegetation and tree planting around many of the rural residences as well as their orientation reduce the visibility to the Project.

These residences would have a moderate to low visual sensitivity with views generally limited to the construction of the Houston visual bund.

Roads

The Golden Highway traverses the southern sector from the south east corner to north west (see Figure 5.2). In the south east corner, construction of the Houston visual bund will be visible from the Golden Highway. The southern ridgeline lies roughly parallel to the highway, obstructing direct views into the area of mining operations in this sector.

From the north west views of the Project are limited by existing ridgelines and a tree screen that has been planted along the Golden Highway (see Figure 5.7). Some limited views or glimpses of the Project may be possible in this area of the Golden highway

Other local roads in the southern sector include Bureen Road and the minor Doyles Creek Road and Redmondvale Road. Bureen Road runs from Jerrys Plains west along the base of the Wollemi escarpment to Denman and is a minor tourist route. The visibility from these roads in the southern sector to the Project is generally limited to the Houston Visual Bund.

The highway in this sector has high visual sensitivity due to its proximity to the mine. Other roads would have a low sensitivity based on distance and usage patterns.

5.7 Visibility and Visual Sensitivity of the Western Sector

This sector has a limited extent between the Project's western boundary and the Ogilvie Hill range some 7km to the west. Rural grazing lands dominate the zone with some improved pastures along the Hunter River in the vicinity of Bureen Road and steep forested hills in the vicinity of Ogilvie Hill and the foothills of Wollemi National Park.

The main sensitive receptors within the zone are Darley Stud, a small section of the Golden Highway, the realigned Edderton Road and a limited number of rural residences.

Darley Stud

Darley Stud is entirely screened from the Project except for locations along its eastern boundary and other high points along the ridgeline associated with Trig Hill. Given that Trig Hill does not form part of the commercial areas associated with Darley's thoroughbred breeding operations, it has been considered as a broad acre rural area and has subsequently been assigned a low sensitivity.

It is in fact this ridge that screens Darleys main operational areas from views. Even the most easterly view points on the property, including the elevated location of Bowmans Hill, do not have views of the operational areas of the Project. Other sensitive areas within the property that are screened from view include the administration office, the main entrance gate and entrance road, the Darley lookout, residences and staff quarters as well as most field areas.

The visual sensitivity is limited by lack of visibility. The exception to this is Trig Hill, which would have views to the Project. However given that this site is not used for any commercial purposes associated with Darley's breeding operations, it is considered to be of low sensitivity.

Golden Highway

There are potential views from the highway when travelling east down from Denman Gap on the Ogilvie Hill Range. This roadway is screened from view by adjoining topography until approximately 1km from Saddlers Creek. From here views continue to be limited by spurs associated with Trig Hill immediately to the east of the Creek, but views are gained to a small part of elevated areas within the distant Whynot mining area. The view zone is limited to approximately 500m before elevation is lost and complete screening by existing topography is achieved (see Figure 5.10).

The highway at this distance will have a moderate sensitivity.

Rural Roads

The realigned portion of Edderton Road within the sector will have tree screens planted along it to screen views to the Project where possible. Bureen Road to the south is screened from views.

At distances closer than 2.5km Edderton Road will have a moderate sensitivity where views are available. Where locations are screened by trees and vegetation the sensitivity will be low.

Rural Residences

There are four rural residences in the western sector which are located on the easterly aspects of the footslopes of the Ogilvie Hill Range to the south of the Golden Highway. The most easterly two are too low on the slope to have views across the Trig Hill spur. The more elevated 'Mayland; and 'Luloma' properties would have views to the more elevated operational areas within Blakefield and Whynot mining areas. However views would be limited and are over 8km away.

The 'Glen Munro' property north of the highway is screened by adjoining topography.

The rural residences will have a moderate sensitivity to views of the Project.

Rural Lands

The majority of the rural land is rolling grassed grazing land alongside Saddlers Creek as it flows from the north, and some forested hills rising to Ogilvies Hill in the north west of the

sector.

The broad acre rural use has low visual sensitivity at distances over 2.5km from the Project.

Ogilvies Hill at 468m is one of the highest topographic features in the immediate area and would have unimpeded views into the active mine site. Access to this lookout point is limited as it is on private land.

At a distance of over 2.5km from the Project and very limited access, this vantage point has low visual sensitivity.

5.8 Summary

Visibility of the project is significantly restricted by topography and existing vegetation. The northern sector is dominated by Mount Arthur Coal Mine and topography associated with Mt Arthur itself restricts views. Edderton Homestead that does have views is owned by Hunter Valley Energy Coal (HVEC) and is leased to local land owners. There are limited views from Edderton Road in the sector and these will have moderate sensitivity.

Eastern sector areas are within Macquarie Generation lands and lack sensitive receptors.

The most sensitive sector is the southern sector. It contains the village of Jerrys Plains, the Coolmore and Darley Horse studs as well as the Golden Highway. Project planning has all but eliminated views to operational areas from these locations. Such limits were designed into the Project through the use of the existing southern ridgeline to screen the Project from this sector. Screening of the Whynot and Houston mining areas was achieved through the development of the Houston visual bund. This construction of the bund will be visible for a short period between year 3 and 5 before rehabilitation is totally completed.

The exception to this screening effect is from elevated areas on the ridge and spurs associated with Trig Hill. However the high points associated with this ridge are not greatly used as part of the thoroughbred breeding operations at Coolmore or Darley. The existing tourist and residential facilities of Arrowfield do not have views to the Project.

The Western Sector has the most open views to the operational areas within Blakefield and Whynot mining areas. However visual sensitivity of rural lands in this location are limited and there are no residences within 7.5km. Edderton Road itself has a moderate sensitivity due to its proximity and rural road status. However, most of Edderton Road will be screened as a result of the tree screens planned to be established as part of the Project.

The Golden Highway occurs in both the southern and western sectors. In the southern sector the mining operations are screened by ridgelines north of the Hunter River. The exception is the view to the Houston Visual Bund while it is being constructed. Minor glimpses on the western trip are visible to the distant elevated areas of the Whynot mining area. The highway generally has moderate to low sensitivity.

Rural residences have high potential sensitivity. However views of the Houston Visual Bund within the 7.5km distance zone are restricted in most cases.

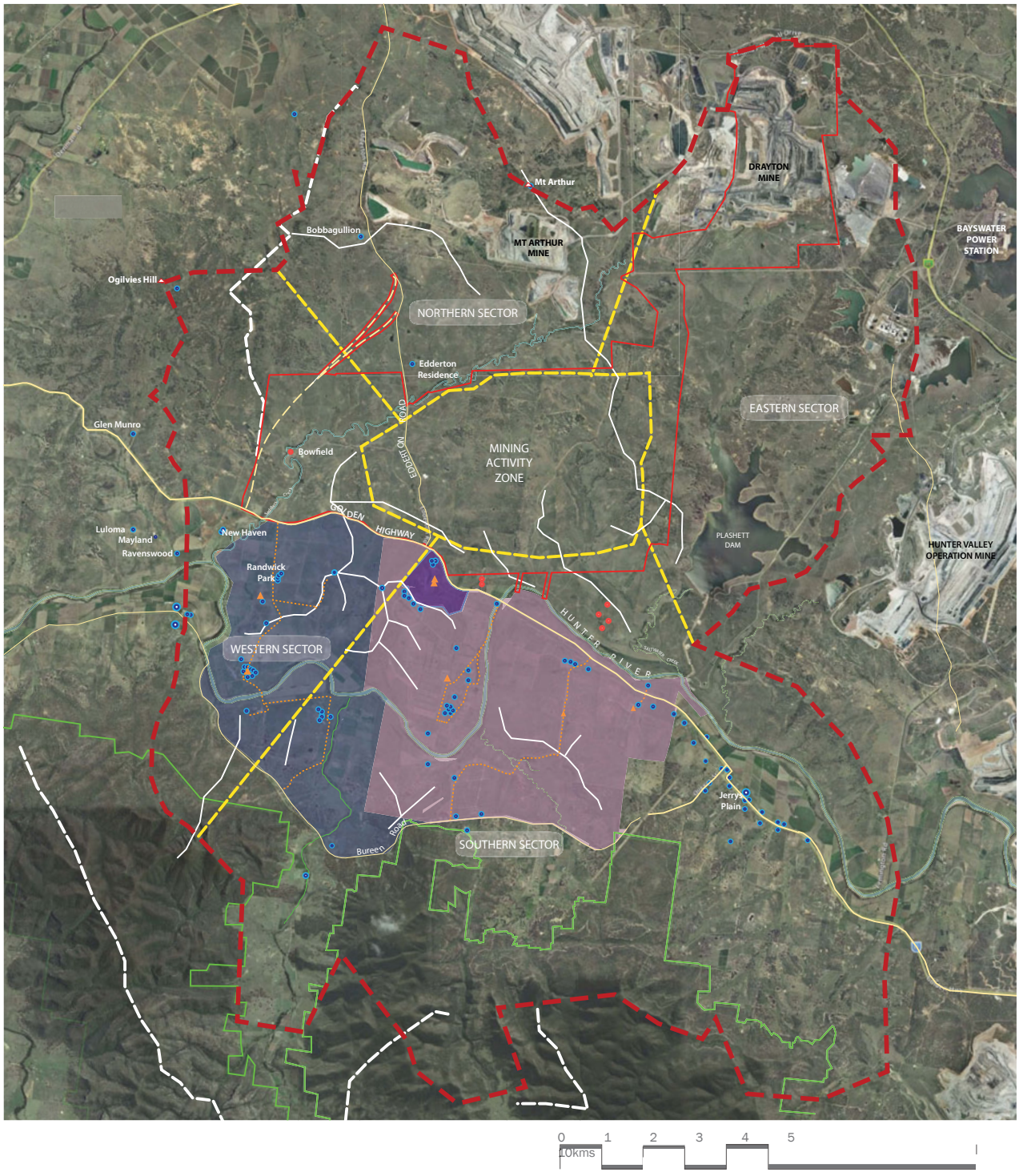


Figure 5.1 | *View Sectors and Sensitive Receptors*

Figure 5.2 | *Golden Highway from Coolmore Horse Stud - View to northwest*
Topographic features in foreground or near middleground of sensitive receptors are effective in screening views to Project areas.

Figure 5.3 | *Vegetation along Edderton Road*
Vegetation in the foreground such as a roadside is effective in screening views.

Gees Residence with screening vegetation between house and Project boundary.

Low ridgeline between Project and Golden Highway provides screening of distant views.

Figure 5.4 | *Foreground Elements Screen Views*
Trees, other vegetation and topography can screen distant views

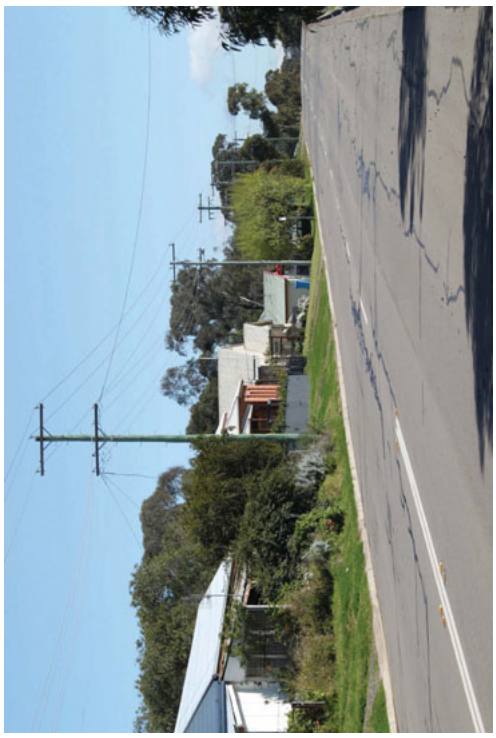


Figure 5.5 | *Villages & Towns*

Buildings and tree cover within streets and gardens often screen views beyond the town edge.

Ellerslie Residence

Figure 5.6 | *Rural Residences*
Rural residences are sensitive receptors with visibility often depending on foreground gardens and view orientation.

Views along Golden Highway looking east towards project site.

Views northeast from Bureen Road

Views from Edderton Road

Golden Highway near Coolmore Australia entrance

Figure 5.7 | *Roads*
Roads have varying status and sensitivity reflecting the type of use of the road. Visibility depends on roadside vegetation.

Edderton Road looking east towards Project site

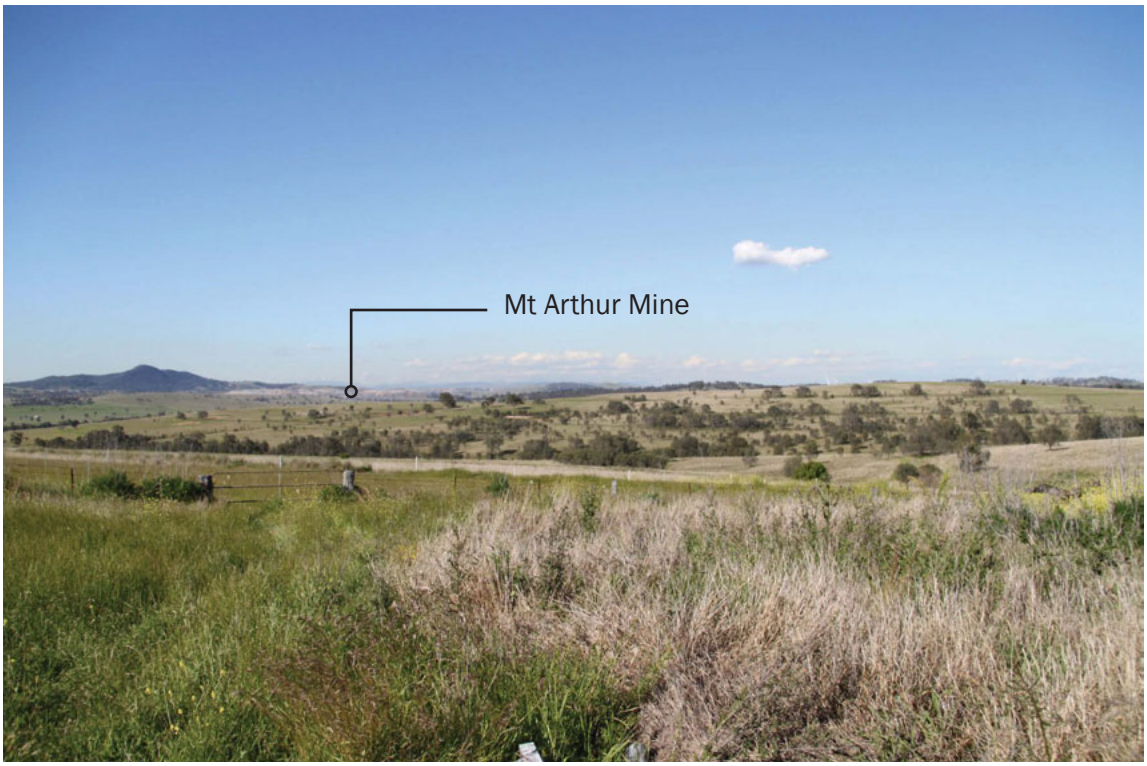
The sector is dominated by rural lands and existing mining operations. Edderton Road is within the sector.

Figure 5.8 | *Northern Sector*
View south from further north on Edderton Road

Looking north towards Project from Coolmore Estate on Golden Highway

Gateway to Coolmore Estate on Golden Highway.

Figure 5.9 | *Southern Sector*
The southern sector is dominated by sensitive land uses that include horse studs, the Golden Highway, village of Jerrys Plains and rural residences.



Looking east toward project from high point on Golden Highway

Figure 5.10 | *Western Sector*
The western sector also includes sensitive land uses in the form of horse studs, the Golden Highway and rural residences.

6. VISUAL EFFECT

6.1 General

The potential sensitive viewing locations (receptors) around the Project have been defined in detail in Section 5 of this report.

This section defines the visual effect of various project components on external view locations around the site. To assess the visual effects of project components on view locations around the Project, views were considered from the northern, southern and western sectors. As described in Section 5 no sensitive receptors or viewing locations are present in the eastern sector. The visual effects were considered from a number of representative viewing locations and have also been assessed through photomontage development. The representative viewing locations used in this assessment are shown in Figure 6.1.

The photomontage locations were selected to illustrate a range of typical views and worst case scenarios as seen from the various view sectors. The sites were selected from numerous sites where photography was taken along with GPS coordinates. Distances of these locations from nearest point of Project disturbance have been identified in Table 6.1.

The level of visual impact on receptors is discussed in Section 7 based on the consideration of receptor sensitivity (Section 5) and visual effect (Section 6).

6.2 Photomontage Illustration of Visual Effect

The visual effects of the Project were evaluated in part by completing a photomontage analysis from various critical viewpoints. These locations, as illustrated on Figure 6.1 included the following representative locations for each of the Sectors:

Northern Sector

- DS01 –Edderton Road

Southern Sector

- DS02– Jerrys Plains – Pagan Street
- DS03- Jerrys Plains – Golden Highway
- DS04– Gees Property – Residence
- DS05 – Coolmore – Ellerslie Residence
- DS06 – Coolmore – Oak Range Road (top)
- DS07 – Coolmore – Back Gate
- DS08– Coolmore – Batty Hill
- DS09 – Coolmore – Quarry/ Cattle Paddock

Western Sector

- DS10 - Darley – Front Gate
- DS11 - Darley – Managers House
- DS12 – Darley – Bowmans Hill
- DS13 - Darley – Lookout

- DS14 – Darley – Trig Hill
- DS15 – Darley – Randwick
- DS16 - Ogilvies Hill – Golden Highway
- DS17 –Realigned Edderton Road

As there is limited visibility and no sensitive receptors in the eastern sector, no locations for photomontages were selected in this sector.

Northern Sector

DS01 – Edderton Road

The view from this location on the existing Edderton Road to the north of the Project over looks broad acre rural lands with patches of open woodland (see Figure 6.1). This location is near where the realigned portion of Edderton Road will be connected to the existing. The anticipated visual effect levels for this location are described below for each of the representative years of the Project and are shown on Figure 6.2.

- Year 3:

From this location very small slithers of view maybe available for parts of the Drayton South OEAs. However with the existing vegetation shielding the majority of views these are not anticipated to occupy more than 1% of the PVZ and as such represent a low visual effect from this location.

- Year 5:

Similar to Year 3 some areas of small slithers of view maybe available for parts of the Drayton South OEAs. However with the existing vegetation shielding the majority of views, these are not anticipated to occupy more than 1% of the PVZ and as such represent a low visual effect from this location. Rehabilitation is also planned to have commenced in this year on the northern most extents of the OEAs which will allow them to become better integrated with the surrounding landscape.

- Year 10 - 27:

By year 10, the northern extents of the Whynot and Blakefield OEAs have been fully rehabilitated and have become more integrated with the surrounding landscape. Visual effects from this location from year 10 and for the remainder of the Project life will be low.

Southern Sector

DS02 – Jerrys Plains – Pagan Street

Pagan Street is on the south side of the Golden Highway and on the north side of the village of Jerrys Plains (see Figure 6.1). The view location is slightly elevated above the highway and village within a small residential area of approximately a dozen homes. It is orientated towards the north west in the direction of the Project.

The existing view is contained by a gently undulating ridgeline to the north of the Golden Highway. Scattered trees vegetate the slopes and ridgeline. The Hunter River lies between the viewpoint and the ridgeline. The anticipated visual effect levels for this location are described below for each of the representative years of the Project and are shown on Figure 6.3:

- Year 3A

With the exception of initial growth of tree screens planted on the existing ridgeline, there is no visible change to the view from this location.

- Year 3B:

This stage of the Project shows the Houston visual bund under construction, raising the profile of the existing ridgeline. The high visual contrast of the bund under construction and a distance of less than 7.5km results in high visual effect.

- Year 5:

The visual bund has achieved its maximum height and final profile and rehabilitation with grasses has been completed with trees planted. Visual effect is lower but due to the sizable area of PVZ occupied by the bund and the sensitivity of the location, the visual effect is still moderate to low.

The Project is now screened behind the bund.

- Year 10:

As the trees planted along the ridgeline and bund slopes grow they continue to improve visual integration of the visual bund and reduce its visual effects to low. No mining activity is visible from this location. The existing profile of the ridgeline has been altered but no views beyond the ridge were previously available so visual effect is low.

- Year 27:

The white line illustrates that the upper limit of OEAs beyond the ridgeline are shielded from view.

DS03 – Jerrys Plains – Golden Highway

This view point from the Golden Highway is located about 1km out of Jerrys Plains and looks towards the north west in the direction of the Project.

The existing view is contained by a gently undulating ridgeline to the north of the Golden Highway. Scattered trees vegetate the slopes and ridgeline. Trees and vegetation in the foreground break up the view to the slopes and ridgeline in the background. The anticipated visual effect levels for this location are described below for each of the representative years of the Project and are shown on Figure 6.4:

- Year 3A:

With the exception of initial growth of tree screens planted on the existing ridgeline, there is no visible change to the view from this location.

- Year 3B:

This stage of the Project shows the Houston visual bund under construction, raising the profile of the existing ridgeline. The high visual contrast of the construction of the bund and a distance of less than 7.5km, results in high visual effect.

- Year 5:

The visual bund has achieved its maximum height and final profile and rehabilitation with grasses has been completed with trees planted. Visual effect is lower but due to the sizable area of PVZ occupied by the bund and the sensitivity of the location, the visual effect is still

moderate.

The Project is now screened behind the bund.

- Year 10:

As the trees planted along the ridgeline and bund slopes grow they continue to improve visual integration of the visual bund and reduce its visual effects to low. No mining activity is visible from this location. The existing profile of the ridgeline has been altered but no views beyond the ridge were previously available so visual effect is low.

- Year 27:

The white line illustrates that the upper limit of OEAs beyond the ridgeline are shielded from view.

DS04 – Gees Property – Residence

The Gees dairy farm is located on the southern side of the Golden Highway on the northern side of the village of Jerrys Plains (see Figure 6.1). The view location is slightly elevated above the highway. The residence is orientated towards the north east and overlooks the alluvial lands of the Hunter River on the northern side of the Golden Highway. Existing vegetation and garden plantings block views from the residence itself; however the location has been assessed from the front yard of the property, which is also representative of views that would be experienced from the dairy sheds.

The anticipated visual effect levels for this location are described below for each of the representative years of the Project and are shown on Figure 6.5:

- Year 3A:

With the exception of initial growth of tree screens planted on the existing ridgeline there is no visible change to the view from this location.

- Year 3B:

This stage of the Project shows the Houston visual bund under construction, raising the profile of the existing ridgeline. The high visual contrast of the bund under construction and a distance of less than 7.5km result in high visual effect.

- Year 5:

The visual bund has achieved its maximum height and final profile and rehabilitation with grasses has been completed with trees planted. Visual effect is lower but due to the sizable area of PVZ occupied by the bund and the sensitivity of the location, the visual effect is still moderate to low.

The Project is now screened behind the bund.

- Year 10:

As the trees planted along the ridgeline and bund slopes grow they continue to improve visual integration of the visual bund and reduce its visual effects to low. No mining activity is visible from this location. The existing profile of the ridgeline has been altered but no views beyond the ridge were previously available so the visual effect is low.

- Year 27:

The white line illustrates that the upper limit of OEAs beyond the ridge are shielded from view.

DS05 – Coolmore – Ellerslie Residence

A comparison of the visual effects of the three visual bund options has previously been discussed for this location in Section 4.3.4.

Situated just off the Golden Highway and about 3km west of Jerrys Plains are the Ellerslie residences which are part of the Coolmore Stud (see Figure 6.1). These residences are generally orientated north in the direction of the Project. The existing views are contained by low undulating hills and ridgelines. The peak of Mt Arthur beyond the southern ridgeline is just visible over the ridgeline, adding to the broader view. In the foreground are the Coolmore Stud VCU and Slopes and Foothills VCU. The anticipated visual effect levels for this location are described below for each of the representative years of the Project and are shown on Figure 6.6:

- Year 3A:

With the exception of initial growth of tree screens planted on the existing ridgeline, there is no visible change to the view from this location.

- Year 3B:

This stage of the Project shows the Houston Visual Bund under construction, raising the profile of the existing ridgeline. The high visual contrast of the visual bund and a distance of less than 4.5km results in high visual effect.

- Year 5:

The visual bund has achieved its maximum height and final profile and rehabilitation with grasses has been completed with trees planted. Visual effect is lower but due to the sizable area of PVZ occupied by the bund and the sensitivity of the location, the visual effect is still moderate to low.

The Project is now screened behind the bund.

- Year 10:

As the trees planted along the ridgeline and bund slopes grow they continue to improve visual integration of the visual bund and reduce its visual effects to low. No mining activity is visible from this location. Existing profile of ridgeline has been altered but no views beyond the ridge were previously available so the visual effect is low.

- Year 27:

The white line illustrates that the upper limit of OEAs beyond the ridgeline are shielded from view.

DS06 – Coolmore – Oak Range Road (top)

A comparison of the visual effects of the three visual bund options has previously been discussed for this location in Section 4.3.4.

This is a viewpoint of high sensitivity being a main property road on the Coolmore Stud where visitors are taken (see Figure 6.1). The existing view is limited by a low ridgeline to the north of the Golden Highway between the location and the Project and existing tree plantings. The

valley below contains parts of the Coolmore Stud VCU and the Slopes and Foothills VCU. The anticipated visual effect levels for this location are described below for each of the representative years of the Project and are shown on Figure 6.7.

- Year 3A:

With the exception of initial growth of tree screens planted on the existing ridgeline there is no visible change to the view from this location.

- Year 3B:

This view illustrates the initial development of the Houston Visual Bund in the valley to the far east of the view, as well as tree planting as per year 3A. Associated cuttings and some of the OEAs are now visible in the distance occupying approximately 1% of the PVZ with moderate visual effect.

- Year 5:

The visual bund has achieved its maximum height and final profile and rehabilitation with grasses has been completed with trees planted. Visual effect is lowered by the grass establishment and the visual effect is moderate to low.

The Project is now screened behind the bund.

- Year 10:

As the trees planted along the ridgeline and bund slopes grow they continue to improve visual integration of the visual bund and reduce its visual effects to low. No mining activity is visible from this location. Existing profile of ridgeline has been altered but no views beyond the ridge were previously available so visual effect is low.

- Year 27:

The white line illustrates that the upper limit of OEAs beyond the ridgeline are shielded from view.

DS07 – Coolmore – Back Gate

This is a viewpoint of moderate sensitivity being a main property road and access point at the back of the Coolmore Stud off of Bureen Road where visitors are taken (see Figure 6.1). The existing view expands over the Coolmore Stud VCU to the main southern ridgeline. The peak of Mt Arthur can also been seen off in the distance. The anticipated visual effect levels for this location are described below for each of the representative years of the Project and are shown on Figure 6.8.

- Year 3A:

There is no visible change to the view from this location.

- Year 3B:

This view illustrates the initial development of the Houston visual bund in the valley to the far east of the view. Associated cuttings and some of the OEAs are now visible in the distance occupying less than 1% of the PVZ with a low visual effect at a distance of greater than 7km.

- Year 5:

The visual bund has achieved its maximum height and final profile and rehabilitation with grasses has been completed with trees planted. As a result, the visual effect at this location

would be further reduced.

The Project is now screened behind the bund.

- Year 10:

As the trees planted along the ridgeline and bund slopes grow they continue to improve visual integration of the visual bund. No mining activity is visible from this location. Existing profile of ridgeline has been altered but no views beyond the ridge were previously available so the visual effect is low.

- Year 27:

The white line illustrates that the upper limit of OEAs beyond the ridgeline are shielded from view.

DS08 – Coolmore – Batty Hill

This is a viewpoint of high sensitivity being a lookout on the Coolmore Stud where visitors are taken for an overview of the property. The existing view is limited by a low ridgeline to the north of the Golden Highway between the location and the Project (see Figure 6.1). The valley below contains the majority of the Coolmore Stud VCU. In the middle distance is the Golden Highway running left to right (east to west). The anticipated visual effect levels for this location are described below for each of the representative years of the Project and are shown on Figure 6.9.

- Year 3A:

With the exception of initial growth of tree screens planted on the existing ridgeline, there is no visible change to the view from this location.

- Year 3B:

In addition to the tree planting as per year 3A, the initial development of the Houston Visual Bund can be observed in the far east of the view. Associated cuttings and some of the OEAs are now visible in the distance occupying between 1 & 2.5% of the PVZ with moderate visual effect.

- Year 5:

Beyond the bund, small areas of contrasting tops of the active OEAs are seen. The visual bund has achieved its maximum height and final profile and rehabilitation with grasses has been completed with trees planted. Beyond the bund, a small part of an exposed cutting and OEA can be seen, but these occupy less than 1% of the PVZ. Visual effect is reduced to low.

- Year 10:

As the trees planted along the ridgeline and bund slopes grow they continue to improve visual integration of the visual bund and improve screening of the Project. The bund is now integrated with the surrounding visual landscape from this distance. Beyond the bund a small part of an exposed cutting can be seen but occupying less than 2.5% of the PVZ. Visual effect remains low. The overall visual effect is low due to low visual effect of the bund and Project.

- Year 27:

There is further visual integration with surrounding area following establishment of open forest on the bund slope and along the top of ridgelines. Beyond the bund a small part of an exposed cutting can be seen occupying less than 2.5% of the PVZ. Visual effect remains low.

DS09 – Coolmore – Quarry/ Cattle Paddock (top)

This viewpoint is located on the top of the ridgeline to the south-west of the Project (see Figure 6.1). It provides sweeping distant views to the north and north east across the Slopes and Hills VCU to the Forested Hills VCU in the distance. Views of the existing mining operations at Mt Arthur Coal Mine and Hunter Valley Operations are available from this location in the distant view as are the stacks of Bayswater and Liddell Power stations. Being located on broad acre rural lands this location has low visual sensitivity. The anticipated visual effect levels for this location are described below for each of the representative years of the Project and are shown on Figure 6.10.

- Year 3A:

Views will be available to the established OEAs in the Redbank mining area in the middle distance. Views of the Project occupy greater than 2.5% of PVZ. The OEAs at this distance have a high visual effect due to the pre-rehabilitated stage of the OEA.

- Year 3B:

Views of the Redbank OEAs are consistent with Year 3A and a small linear extent of the top of Houston visual bund can be seen in the distance to the right of Bayswater Power station. The visual effect of this seen area of mine is low as it is a very small area of primary view zone. The OEAs associated with Redbank continue to cause a high visual effect.

- By Year 5:

The Redbank OEAs have progressed closer and are marginally higher than in Year 3B, obscuring views to forested slopes to the north of the OEAs and remains a visual element of high visual effect. Operations within Houston to the east have increased in height and visibility from this distance. However, the visual effect of operations in the Houston mining area remains low visual effect as it still occupies a very small area of PVZ.

- Year 10:

The Redbank and Blakefield OEAs have merged to form a larger mass of contrasting visual form and texture, though the visual effect in this rehabilitated state is moderate to low. Further screening of existing vegetation to the north of the OEAs has occurred. Active mine areas remain more visible against the greener rehabilitated OEAs and surrounding landscape however these occupy less than 1% of the PVZ and hence create a low visual effect.

Operations associated with Houston have not changed significantly since year 5. Its visual effect therefore remains low, resulting in a low visual impact.

- Year 27:

The extent of rehabilitated areas relating to Redbank and Blakefield occupies a significant percentage of the PVZ. However the visual effect remains moderate to low post final rehabilitation.

The overall view has altered since pre-mining, however this elevated site is located away from major tourist roads and is not a location that is accessed by Coolmore's staff or customers.

Western Sector

DS10 – Darley – Front Gate

This view from Darley front gate is on the Golden Highway looking north east towards the

Project (See Figure 6.1). It looks out across the Slopes and Foothills VCU towards parts of the Forested Hills VCU in the distance. A low ridgeline which is continuous with Trig Hill runs north from Trig Hill and across the PVZ. This low ridge limits views beyond the top of the ridge.

The 27 Year white line outlining the Projects upper limit indicates that there would be no views into the mine site for the life of the Project.

DS11 – Darley – Manager's House

This view from the Darley manager's house is orientated in a north easterly direction within the Darley Stud VCU (see Figure 6.1). A small knoll rises just to the north of this location, screening views of the Project. There are views beyond to the west of the knoll to the Slopes and Foothills VCU and Forested Hills VCU to the north.

The 27 Year white line outlining the Projects upper limit indicates that there would be no views into the mine site for the life of the Project.

DS12 – Darley – Bowmans Hill

Bowman's Hill lies between Darley Lookout to the south and the Darley Manager's house further north (see Figure 6.1). This view location sits on a slightly elevated rocky outcrop to the west of Darley's main access road. A low east west ridgeline interrupts distant views into the Project.

The 27 Year white line outlining the Project's upper limit indicates that there would be no views into the mine site for the life of the Project.

DS13 – Darley Lookout

The view from Darley Lookout is to the north east towards the Project (see Figure 6.1). The view is from an elevated location with a ridgeline lying between the lookout and the Project. This view is higher than typical views from this southern extent of the Darley Stud. Lower views south of the mid-ridgeline would not see the full extent of the view illustrated in this montage.

The 27 Year white line outlining the Project's upper limit indicates that there would be no views into the mine site for the life of the Project.

DS14 – Darley – Trig Hill

The Trig Hill view point is located at the highest point of three converging ridgelines (see Figure 6.1). Existing views look across the Slopes and Hills VCU towards Mt Arthur in the north (left of Figure 6.15). Views of the existing mining operations at Mt Arthur Coal Mine are available from this location. Being located on broad acre rural lands this location has low visual sensitivity. The anticipated visual effect levels for this location are described below for each of the representative years of the Project and are shown on Figure 6.15:

- Year 3A & B:

Views will be available to the established OEAs within the Blakefield and Redbank mining areas. Views of the Project occupy greater than 2.5% of PVZ. The OEAs at this distance have a high visual effect due to the pre-rehabilitated stage of the OEA.

- By Year 5:

The Blakefield and Redbank OEAs have progressed in a southerly direction and remain a visual element of high visual effect.

- Year 10:

The Redbank and Blakefield OEAs have merged to form a larger mass of contrasting visual form and texture, though the visual effect in this rehabilitated state is moderate.

- Year 27:

Final rehabilitation of the Blakefield and Redbank OEAs has been completed. More distant views of the pre-rehabilitated OEAs at Houston and Whynot may be available, but due to the distance and the small percentage of the PVZ occupied, this would represent a low visual effect.

The overall view has altered since pre-mining; however this elevated site is located away from major tourist roads and is not a location that is accessed by Darley's staff or customers.

DS15 – Darley – Randwick

This viewpoint is located on the southern extent of Darley Stud. From this location looking north east, there are limited views over the Darley Stud VCU. Low hills and ridges in the middle distance limit views beyond this southern part of the Stud.

The 27 Year white line outlining the Project's upper limit indicates that there would be no views into the mine site for the life of the Project.

DS16 – Ogilvies Hill – Golden Highway

This viewpoint is on an elevated portion of the Golden Highway as it passes over Ogilvies Hill. This represents a location of moderate visual sensitivity, looking north east towards the Project. It looks out across the Slopes and Foothills VCU and Saddlers Creek in the middle distance identified by the line of trees following the creek line. Beyond is a low ridge over which there are some views at its lower extent. The anticipated visual effect levels for this location are described below for each of the representative years of the Project and are shown on Figure 6.17.

- Year 3A – 5:

During this period, there will be views of the realigned Edderton Road and associated tree screen that has been planted. Beyond this, views are also available of parts of the Blakefield OEAs that appear over the lower lying ridgeline occupying less than 1% of the PVZ. As such, this visual effect is considered low.

- Year 10 - 27

By year 10 the small area of OEA from Blakefield has been shaped and rehabilitated. From this stage all operations associated with the Project are shielded behind the existing ridgeline. Visual effect in year 10 from this location and for the remaining life of the Project is low.

DS17 – Realigned Edderton Road

The view from this realigned portion of Edderton Road to the west of the Project would have clear views of the Whynot and Blakefield mining areas associated with the Project (see Figure 6.1). This was identified during the early planning stages of the Project and as such tree screens were designed to be planted along this realigned portion of road following its construction to reduce the visibility of the Project from this part of Edderton Road. The anticipated visual effect levels for this location are described below for each of the representative years of the Project and are shown on Figure 6.18.

- Year 3:

This view shows the effect of the tree screen in offering screening to the Project. Small slithers of view may be available for parts of the Project OEAs from this location; however with the tree screens shielding the majority of views these are not anticipated to occupy more than 1% of the PVZ, and as such, represent a low visual effect from this location.

- Year 5 - 27

As the tree screens become established they will effectively shield views from this location and along the realigned Edderton Road to its intersection with the Golden Highway.

6.3 View Loss Assessment

The visual effect of view loss due to the Project has been considered. Due to the strong enclosure of the project by existing topography, such potential is limited and localised to the area with views to the Houston visual bund and tree planting along the new alignment of the Edderton Road.

The Houston visual bund is located across a small valley in the south-east of the Drayton South area. Through this break in the southern ridge lines there is limited local view of a maximum of 2.5km of upper valley areas that is available to the southern view shed. This would include areas along the Golden Highway and a range of locations at Coolmore such as the Ellerslie Residences that would additionally loose the view of the upper most tip of Mt Arthur as shown on Figure 6.6. It is not considered that these localised views are significant and the rural character of the view is maintained by the rehabilitation plan for the visual bund.

At Edderton Road, foreground and near middle ground views of existing rural valleys would be screened by roadside plantings. The open view of this valley is typical of rural views and does not have any significant features. Loss of this view is not considered significant (see Figure 6.18).

Other sensitive receptors other than those defined above are screened or are within mine lease areas or land uses that have a low visual sensitivity to the Project.

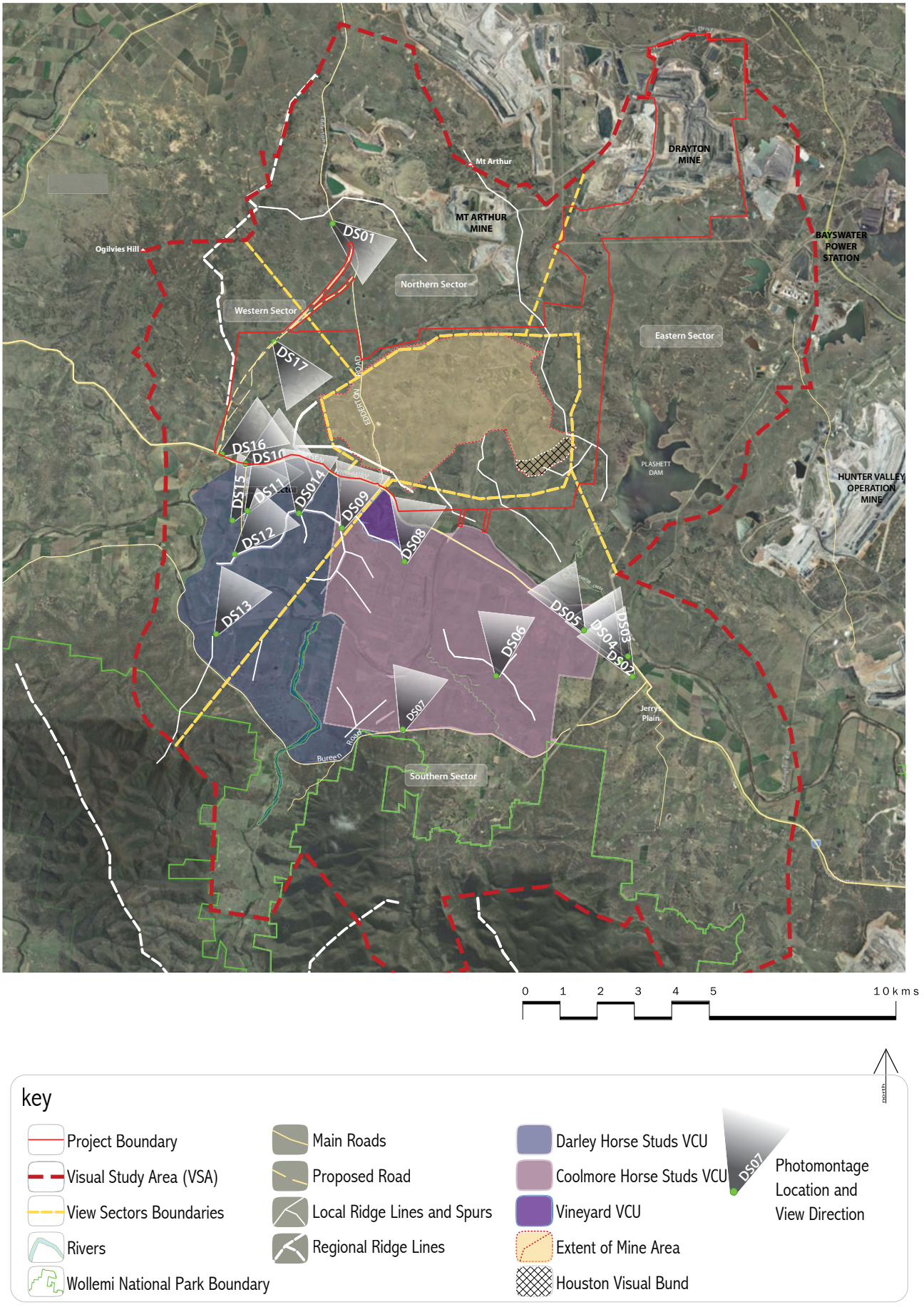


Figure 6.1 | *Photomontage Locations*

Table 6.1 | Distances from Photomontage Locations to nearest area of Project Disturbance

PHOTO MONTAGE LOCATION	DESCRIPTION	S°	E°	Distance from nearest point of Project disturbance.*
Northern Sector				
DS-01	Edderton Road	32°22'33.84"S	150°49'4.48"E	3.71kms
Southern Sector				
DS-02	Jerrys Plains - Pagan Street	32°29'9.76"S	150°53'54.60"E	5.95kms
DS-03	Jerrys Plains - Golden Highway	32°28'48.92"S	150°53'47.00"E	5.29kmas
DS-04	Gees Property - Residence	32°28'46.76"S	150°53'39.45"E	5.13kms
DS-05	Coolmore - Ellerslie Residence	32°28'24.73"S	150°53'5.56"E	4.22kms
DS-06	Coolmore - Oak Range Road (top)	32°29'11.85"S	150°51'45.88"E	5.51kms
DS-07	Coolmore - Back Gate	32°29'59.89"S	150°50'6.70"E	6.58kms
DS-08	Coolmore - Batty Hill	32°27'29.51"S	150°50'6.50"E	1.94kms/ 4.06kms to bund
DS-09	Coolmore - Quarry / Cattle Paddock	32°26'58.56"S	150°49'4.39"E	1.73kms
Western Sector				
DS-10	Darley - Front Gate	32°26'7.06"S	150°47'31.03"E	2.25kms
DS-11	Darley - Manager's House	32°26'48.18"S	150°47'30.33"E	2.93kms
DS-12	Darley - Bowmans Hill	32°27'28.24"S	150°47'16.82"E	4.10kms
DS-13	Darley - Lookout	32°28'32.11"S	150°46'59.07"E	5.95kms
DS-14	Darley - Trig Hill	32°26'46.40"S	150°48'23.72"E	2.08kms
DS-15	Darley - Randwick	32°26'50.39"S	150°47'18.03"E	3.23kms
DS-16	Ogilvies Hill - Golden Highway	32°25'52.14"S	150°46'51.18"E	3.15kms
DS-17	Realigned Edderton Road	32°24'12.30"S	150°48'4.67"E	1.97kms
* Distances are +/- 100m based on aerial photography mapping.				

Figure 6.1a | *Distance of Photomontage Locations to nearest point of Project disturbance*

Figure 6.2 | *Photomontage DS01 - Edderton Road*

Figure 6.3 | *Photomontage DS02 - Jerrys Plains - Pagan Street*

JVP visual planning and design

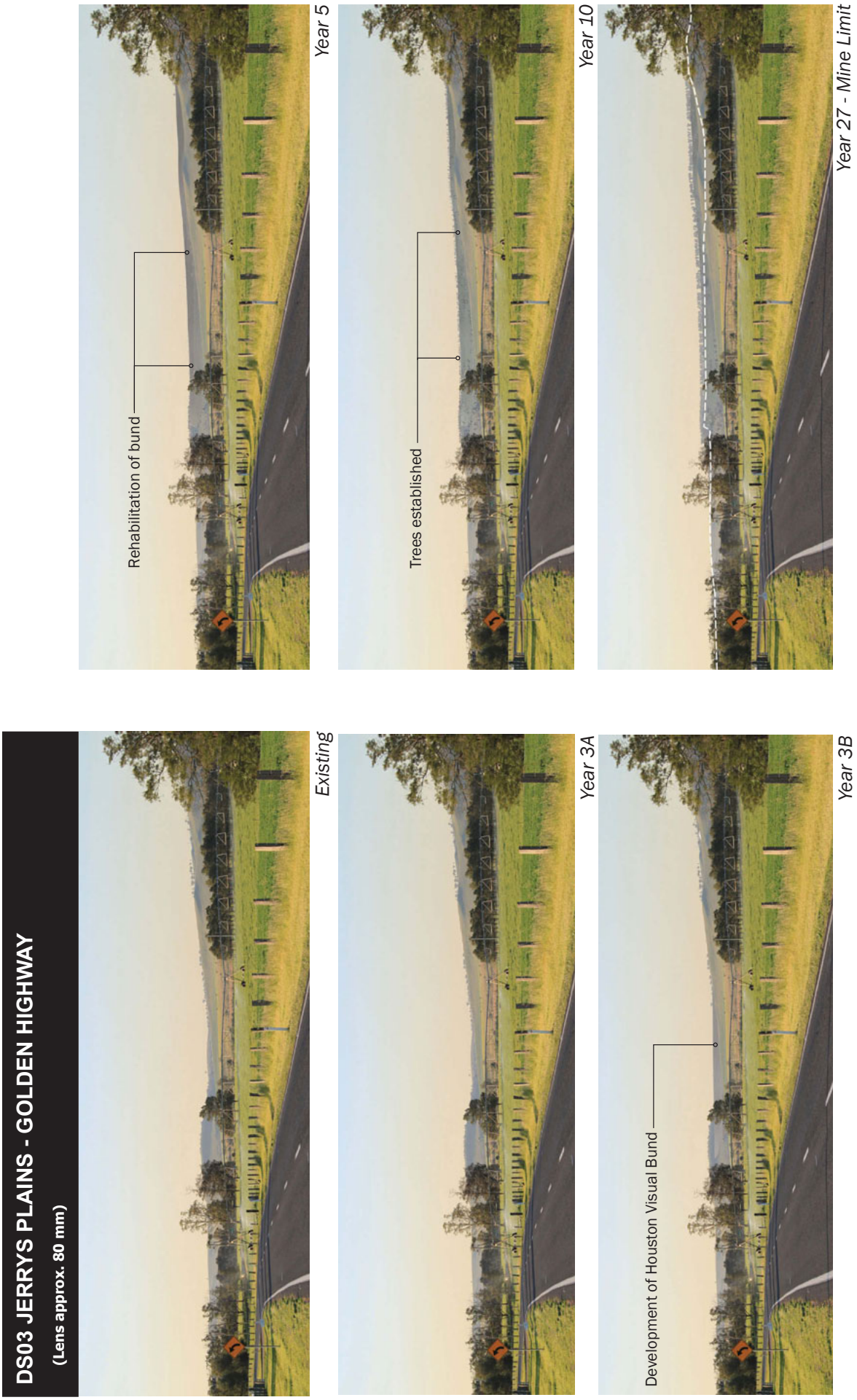


Figure 6.4 | *Photomontage DS03 - Jerrys Plains - Golden Highway*

JVP visual planning and design

Hansen Bailey

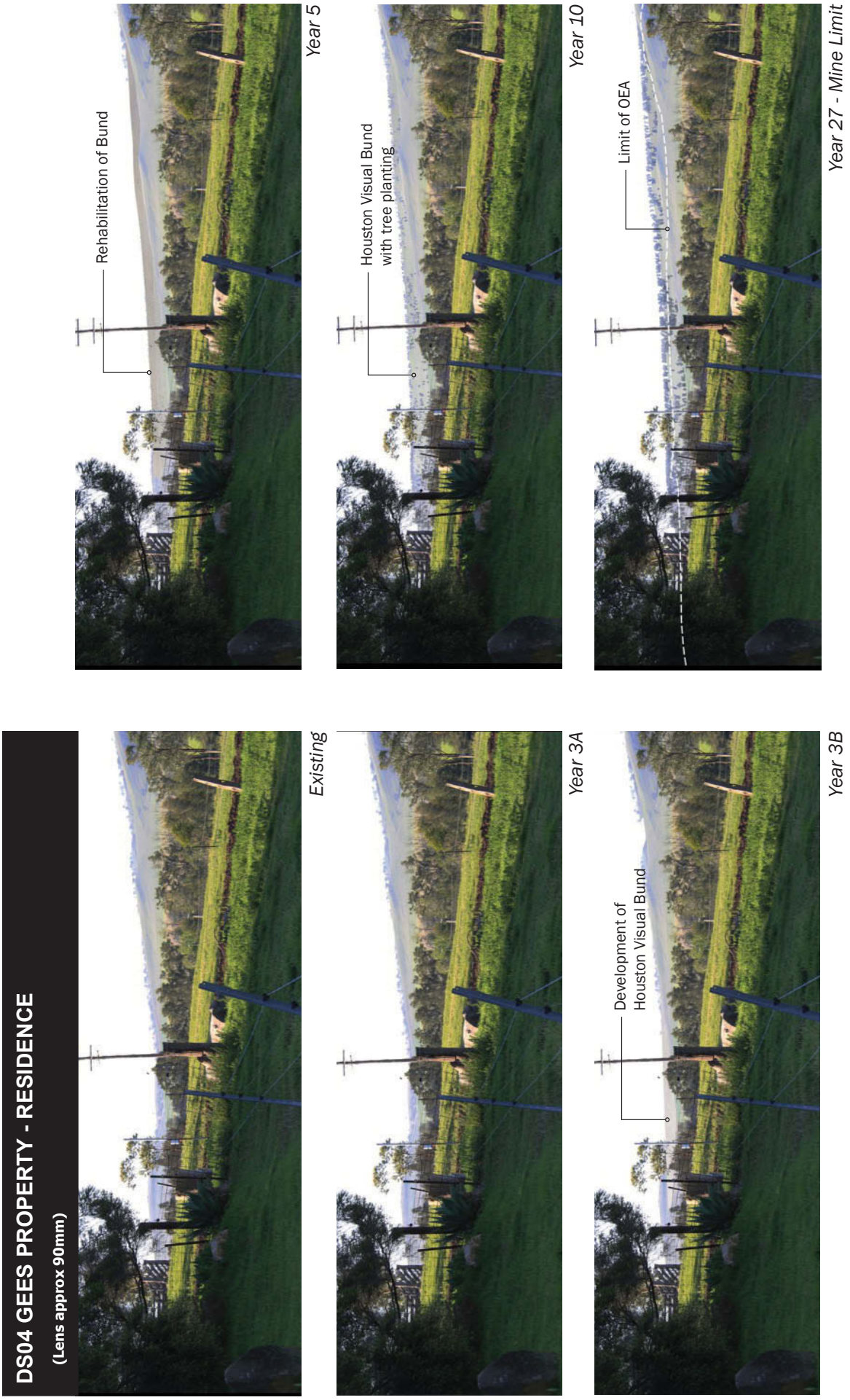


Figure 6.5 | *Photomontage DS04 - Gees Property - Residence*

JVP visual planning and design

DS05 COOLMORE - ELLERSLIE RESIDENCE

(Lens approx. 85mm)

Existing

Year 3A

Year 3B

Year 5

Year 10

Year 27 - Mine Limit

Figure 6.6 | *Photomontage DS05 - Coolmore- Ellerslie Residence*

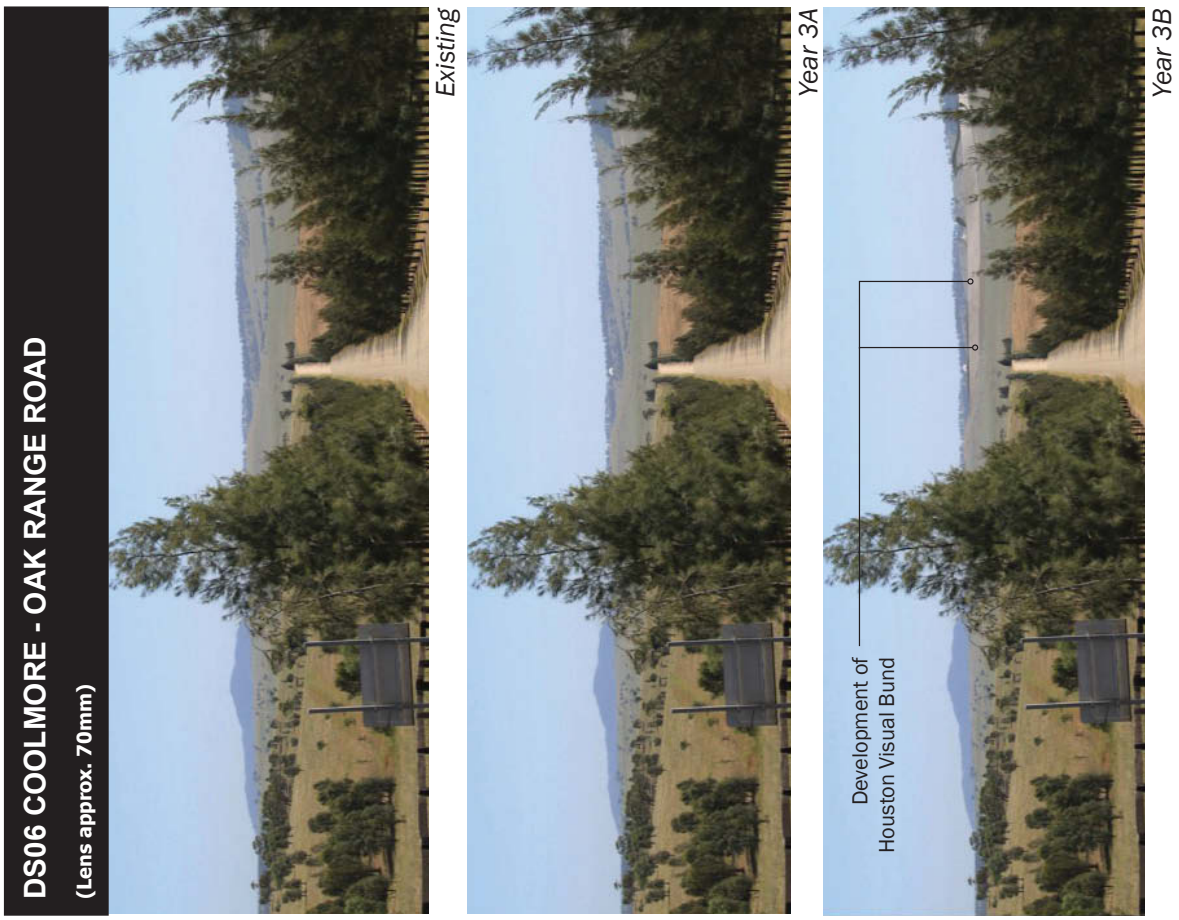


Figure 6.7 | *Photomontage DS06 - Coolmore - Oak Range Road*

DS07 COOLMORE - BACK GATE

Panorama (Lens approx. 80mm - 2 photos)

Existing

Year 3A

Year 3B

Year 5

Year 10

Year 27- Mine Limit

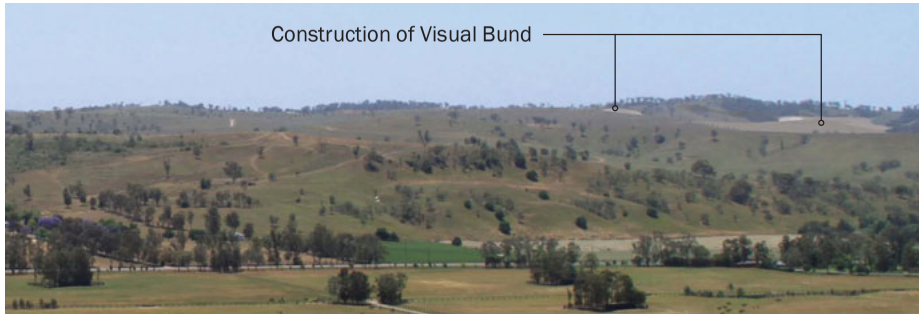
Figure 6.8 | *Photomontage DS07 - Coolmore - Back Gate*

DS08 COOLMORE - BATTY HILL

Right View (Lens approx. 70mm)

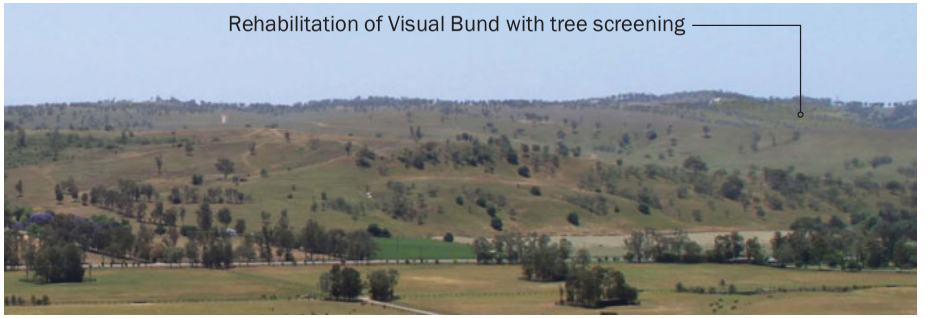
Existing

Year 3A



Year 3B

Year 5



Year 10

Year 27 - Mine Limit

Figure 6.9 | *Photomontage DS08 - Coolmore - Batty Hill*

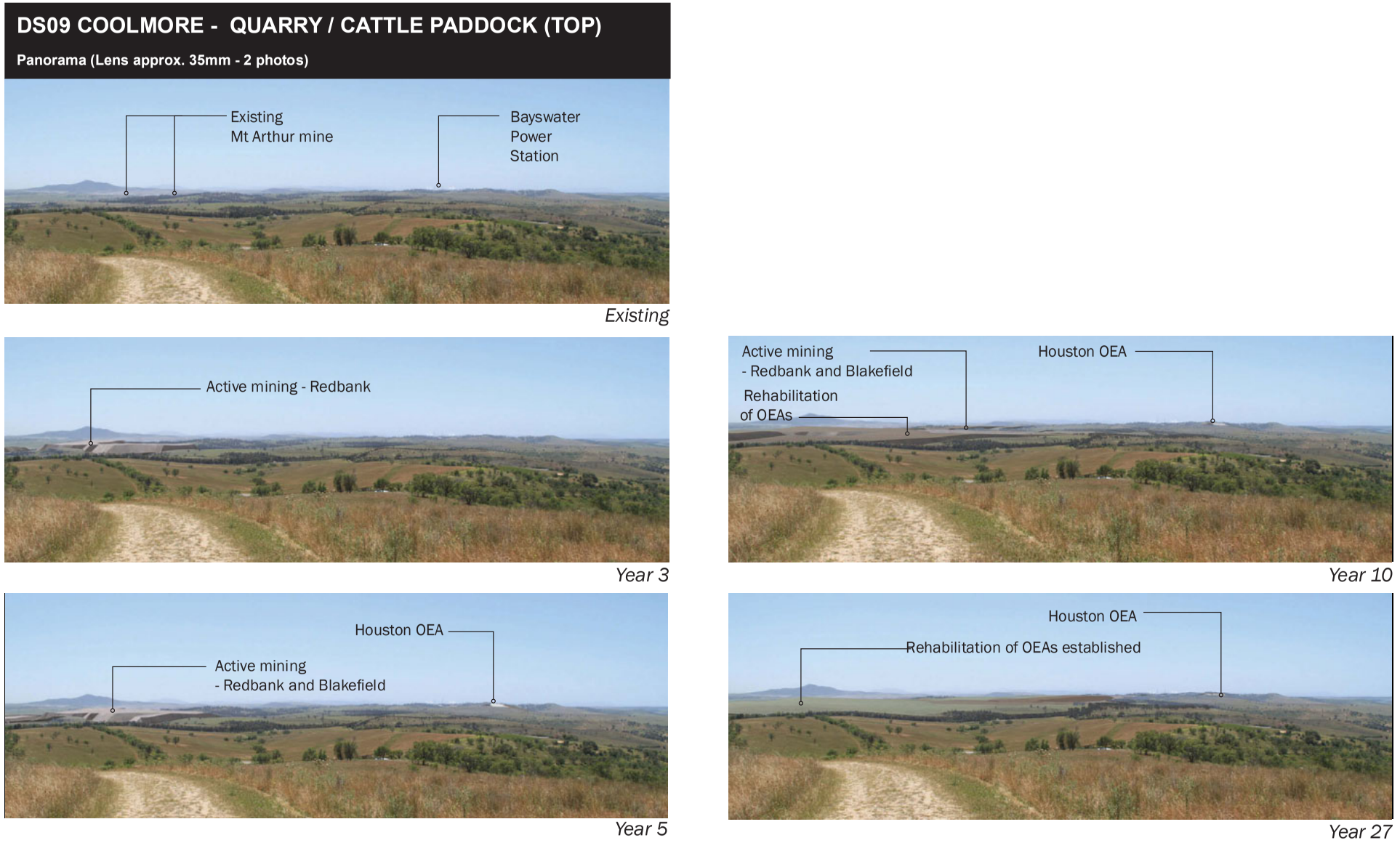


Figure 6.10 | *Photomontage DS09 - Coolmore - Quarry / Cattle Paddock (Top)*

DS10 DARLEY - FRONT GATE

(Lens approx. 30mm)

Existing

Year 3

Year 5

Year 10

Year 27 - Mine Limit

Figure 6.11 | *Photomontage DS10 - Darley - Front Gate*

DS11 DARLEY - MANAGER'S HOUSE

(Panorama 2 x approx. 30mm lens)

Existing

Year 27 - Mine Limit

Figure 6.12 | *Photomontage DS11 - Darley - Manager's House*

DS12 DARLEY - BOWMANS HILL

(Lens approx. 30mm)

Existing

Year 27 - Mine Limit

Figure 6.13 | *Photomontage DS12 - Darley - Bowmans Hill*

DS13 DARLEY LOOKOUT

(Lens approx. 40mm)

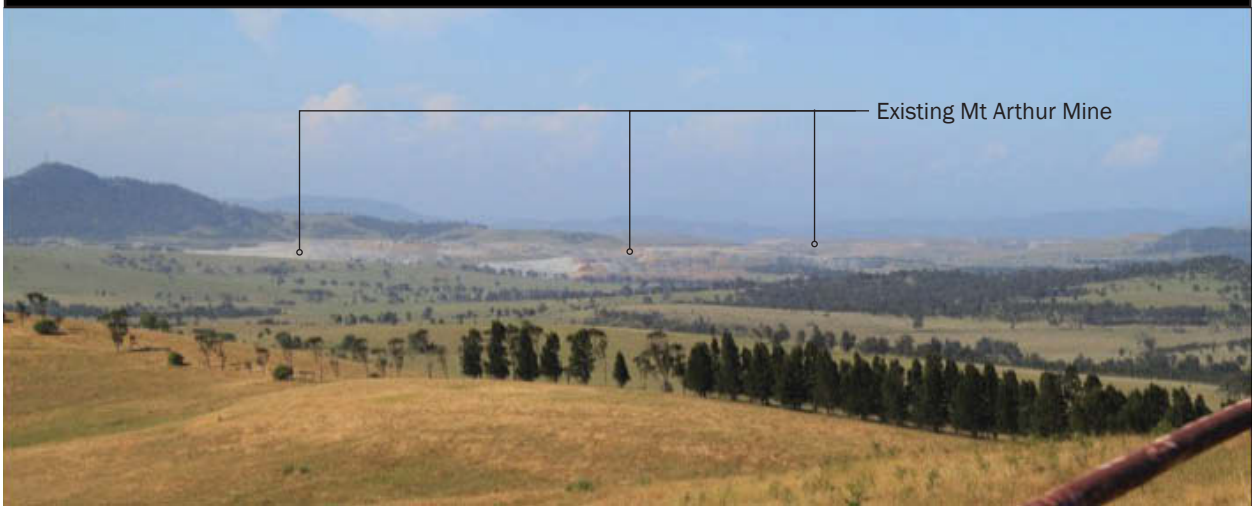
Existing

Year 27- Mine Limit

Figure 6.14 | *Photomontage DS13 - Darley Lookout*

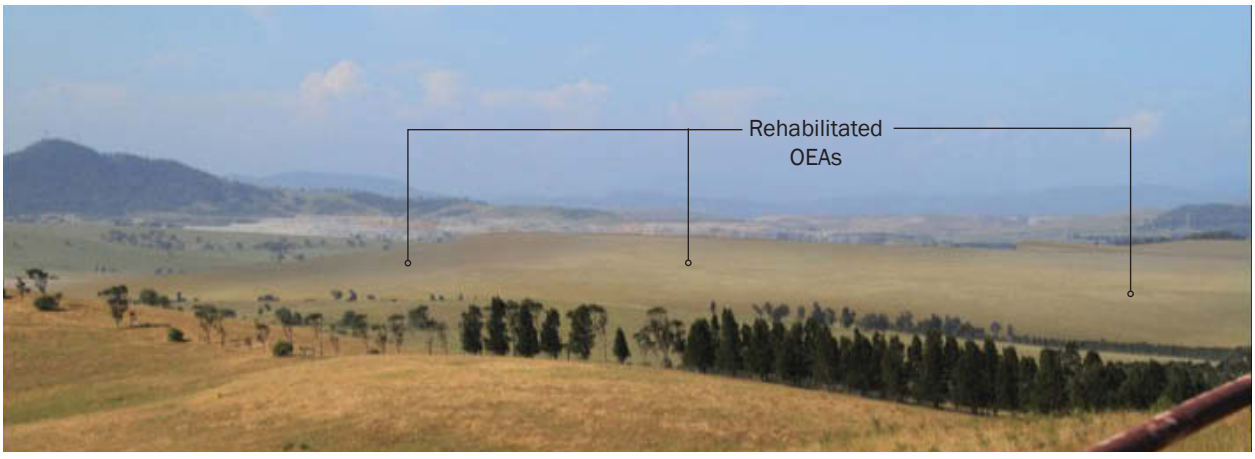
DS14 DARLEY - TRIG HILL

(Lens approx. 90mm)



Existing

Year 10



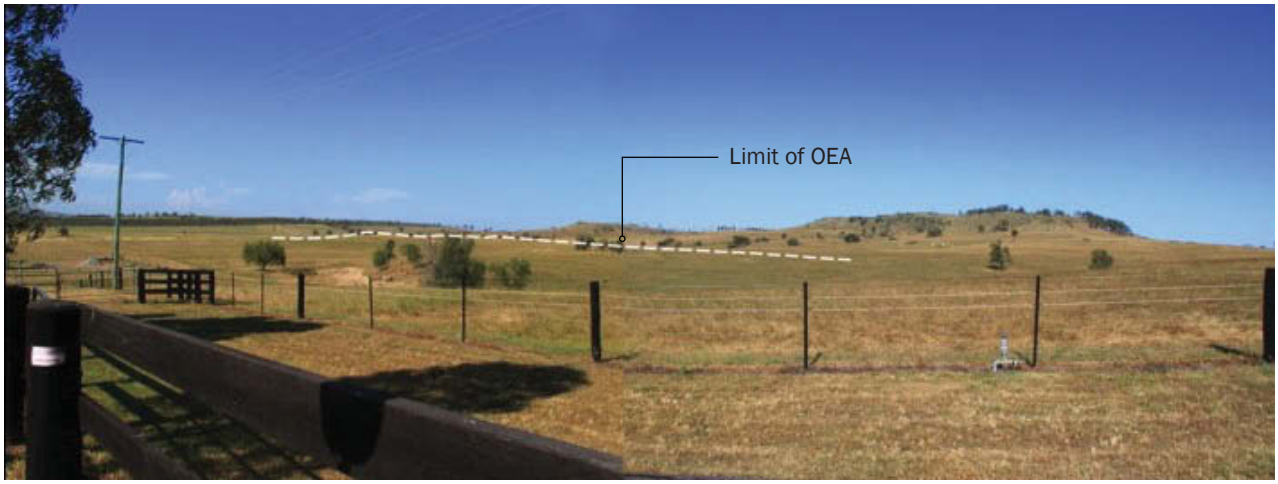
Year 27

Figure 6.15 | *Photomontage DS14 - Darley - Trig Hill*

DS15 DARLEY - RANDWICK

Panorama (2 x Lens approx. 30mm)

Existing



Year 27 - Mine Limit

Figure 6.16 | ***Photomontage DS15 - Darley - Randwick***

DS16 OGILVIES HILL - GOLDEN HIGHWAY

(Lens approx.55mm)

Existing

Year 10

Year 27 - Mine Limit

Figure 6.17 | *Photomontage DS16 - Ogilvie's Hill - Golden Highway*

Figure 6.18 | *Photomontage DS17- Realigned Edderton Road*

7. VISUAL IMPACT

The visual effects of the various elements of the Project were discussed in Section 6 of this report. The visual sensitivity levels of the Project were discussed in Section 5 of this report.

This section considers the visual impact of the Project based on visual effect and sensitivity values. The impact of the development will vary according to the visual effect of the Project, its visibility, and the visual sensitivity of areas from which it is seen. These two factors are considered together as indicated in Figure 2.5 to determine impact levels. The visual impacts are considered in relation to the various sectors.

7.1 Northern Sector

Edderton Homestead, which is owned by HVEC is the only residence in this sector and it will have close views (<2.5km) into the northern elements of the Project. As such it will likely experience high visual impacts during the early stages of the Project. This visual impact will be reduced to moderate and then low as the northern most extent of the OEAs are rehabilitated and mining advances further south.

Also within the northern sector are parts of Edderton Road which would have a moderate sensitivity (see Section 5.4). Due to the potential for some views towards the northern faces of the OEAs from sections of Edderton Road (particularly where tree screens are not able to be planted) this will result in a high/moderate visual impact. This visual impact will be reduced to moderate and then moderate to low as the Blakefield and Whynot OEAs are rehabilitated and mining advances further south. The majority of views from Edderton Road will be screened by existing foreground vegetation and the tree screens planned to be planted as part of the Project.

Finally, Mt Arthur which is also within the northern sector will experience high visual effects, however the low sensitivity of the restricted view location reduces impacts to moderate to low.

The impact levels on the sector as a whole will quickly be reduced as the outer faces of the OEAs are rehabilitated. This will change visual effect levels from high to moderate and eventually to low. The visual impact levels will be similarly reduced.

7.2 Eastern Sector

There will be no significant visual impacts from the Project on areas in the eastern sector as views will be screened by the existing topography and the sector is dominated by electricity generating infrastructure and subsequent buffer lands with no sensitive receptors.

7.3 Southern Sector

The southern sector contains most of the sensitive receptors. However mine planning has been carried out to minimise impacts on this sector. To achieve this, OEAs have been designed to ensure that they are effectively screened behind the ridgeline that runs west from Plashett Knob (277m). Such planning has achieved screening for all sensitive locations on the flats and adjoining hills. The exception to this is the Trig Hill on Darley Stud and the high point on Coolmore Stud adjacent to the existing quarry site and cattle yards. From these high points, views will be possible for most of the mine life into the operational areas of the Project.

The existing ridgeline is able to shield the majority of views of the Project, particularly into the Redbank and Blakefield mining areas. However, there is a valley located immediately to the south of the Houston mining area where views would be possible. In order, to alleviate potential

long term views of the Project, a visual bund will be constructed within this valley to shield views of operations in the Houston and Whynot mining areas. The sensitive receptors located in the southern sector include the village of Jerrys Plains, the Golden Highway, Coolmore Stud, the existing Arrowfield Estate, as well as some isolated rural residences.

Jerrys Plains

The visual impact on the village of Jerrys Plains is limited. The western edge of the village only has potential views of the construction of the Houston Visual Bund. Visual effects for the majority of Jerrys Plains would be moderate to low except for Pagan Street with its higher elevation and vantage point. The area around Pagan Street would experience views of the Houston visual bund while it is being constructed. During this time (estimated 16 months) the visual effects for this area would be high. When combined with the high sensitivity of these residences, this would create a high visual impact on sensitive receptors in this part of Jerrys Plains. These impacts would be reduced as rehabilitation is completed. This is likely to be no more than 3 – 5 months following completion of the final stage lift of construction. After this the visual impact will be reduced to low for the remainder of the Project reflecting decreasing visual effect levels.

Coolmore Stud

The visual impact on Coolmore stud is limited. The operational areas of Blakefield, Redbank and Whynot have been modified to conceal them from views at the most sensitive locations on the flood plain and the slopes of adjoining hills. This includes the main office, major stables and paddocks as well as the residences.

The more open views to the Houston mining area along an open gully line are screened from view by the Houston Visual Bund. The construction of the bund will create a high visual effect for a period of time until the bund is constructed over a 16 month period. To limit potential high impact periods, the construction of the bund has been designed in a series of lifts with progressive rehabilitation being undertaken as part of this process (refer Section 4.3.3). This limits the visible lifts of the bund to approximately 11 months. The visual impacts anticipated during the visible construction lifts of the Houston visual bund from Coolmore are likely to be high. These impacts would be further reduced as rehabilitation is completed. This is likely to be no more than 3 – 5 months following completion of the final stage lift of construction. After this, visual impact will reduce to moderate and then low reflecting decreasing visual effect levels.

Once constructed the Houston visual bund adds to the effect of the existing ridgeline in shielding views from all of the sensitive viewing locations on Coolmore Stud during the remaining years of the Project.

There will be open views to the operational areas of the Project from a ridge that supports a maintenance road and passes cattle yards and the Coolmore quarry. This ridge will experience high visibility and visual effects. However, as described in Section 5.6, this location has been considered as a broad acre rural area and assigned a low sensitivity as it is not utilised as part of the day to day operations of the thoroughbred breeding aspects of Coolmore's business. It also currently has views of the existing Mt Arthur Coal Mine, Hunter Valley Operations Mine and Bayswater Power Station. As such it is assessed as having moderate to low visual impacts.

Accordingly following due consideration of the gateway criteria as prescribed under the SRLUP (as outlined in Section 2.3) this visual impact assessment concludes that the Project will not lead to significant impacts on the equine critical industry cluster through a loss of scenic and landscape values.

Golden Highway

The highway will have views of the construction of the Houston Visual Bund in the south-east of the visual study area (see Figure 6.4). Potential views from the Golden Highway when approaching from the west to distant mining areas in Blakefield and Whynot will be reduced by proactive screen tree screen planting already underway along these sensitive sections of the Highway. (See Figures 4.2 to 4.6 for position of existing and proposed tree screens).

Visual impacts relating to views of the Houston Visual Bund could be high during its 16 month construction period until the bund face is completely rehabilitated. This is likely to be no more than 3 – 5 months following completion of the final stage lift of construction. After this, visual impact will reduce to moderate and then low, reflecting decreasing visual effect levels.

Views from the south-west are limited to glimpses as one travels east along a limited stretch of road (approximately 200m) on the approach to Saddlers Creek. These limited views would be to the more distant Whynot mining area creating moderate visual effects. This would create low to moderate visual impacts that would reduce once rehabilitation is completed.

Arrowfield

The facilities and residences associated with Arrowfield have no views of the Project due to the screening effects of the southern ridgeline between Arrowfield and the Project.

As such the facilities and residences associated with Arrowfield will have no visual impacts due to lack of visibility to the Project.

Views would be available from select high points on the back of this property. Given that these high points on the top of the ridgeline do not form part of the potential commercial areas associated with the winery or restaurant they have been considered as broad acre rural areas and assigned a low sensitivity and as such any visual impacts on these locations would be moderate to low.

Accordingly following due consideration of the gateway criteria as prescribed under the SRLUP (as outlined in Section 2.3) this visual impact assessment concludes that the Project will not lead to significant impacts on the viticulture critical industry cluster through a loss of scenic and landscape values.

Rural Residences

There are a limited number of rural residences within the southern sector to the east of Coolmore. These residences will have views to parts of the Houston Visual Bund while it is being constructed.

Visual impacts relating to views of the Houston Visual Bund could be high for limited periods of time during its 16 month construction until the bund face is completely rehabilitated. This is likely to be no more than 3 – 5 months following completion of the final stage lift of construction. After this, visual impact will reduce to moderate and low reflecting decreasing visual effect levels. .

7.4 Western Sector

Darley Stud

The visual impact on Darley Stud is very limited. Most of the property including the main entrance gate on the Golden Highway, manager's residence, the lookout, Randwick Park and

all residences and stables are screened by existing topography.

The only exception is the location on Trig Hill. However, as described in Section 5.7, this location has been considered as a broad acre rural area and assigned a low sensitivity as it is not utilised as part of the day to day operations of the thoroughbred breeding aspects of Darley's business. It also currently has views to the existing Mt Arthur Coal Mine. As such it is assessed as having moderate to low visual impacts.

Accordingly following due consideration of the gateway criteria as prescribed under the SRLUP (as outlined in Section 2.3) this visual impact assessment concludes that the Project will not lead to significant impacts on the equine critical industry cluster through a loss of scenic and landscape values.

Rural Residences

Two western residences, Mayland and the more elevated Luloma would have potential views of higher elevation areas of the Whynot OEA. However these receptors are over 7.5km away and only small portions of these operations would be seen over intervening ridges. The moderate sensitivity and low to moderate visual effects will create a moderate to low impact.

The residences of Ravenswood and New Haven are too low in elevation and are screened by the Trig Hill ridges. Similarly Glen Munro is screened by an adjoining ridge line associated with Ogilvies Hill and these residences will not experience impact.

Edderton Road

A small portion of this road (less than 1km) will have open views across open grasslands to the Blakefield and Redbank operational areas. This is because this portion of the road is not on Anglo American owned land and as a result, tree screens are not able to be planted. The road has a moderate sensitivity up to 2.5km. Visual effects will initially be high, so a high to moderate visual impact will be experienced along this portion of the road. These visual effects will last up to 5 years after which OEAs facing the road will be rehabilitated and impacts will be reduced.The southern 4km of this road will be completely shielded by tree screens which will be planted as part of the construction period (see Figure 6.18).

The greatest impacts on users of this road will affect predominantly those travelling in a south-west direction before reaching tree screening; catching views of the OEAs across the broad flat areas adjacent Saddlers creek. Those travelling north east on this road will not likely have any such views given the orientation of the road when travelling in this direction.

7.5 Consideration of Scenic and Landscape Values as part of Gateway Criteria for SRLUP

In view of the SRLUP the regions scenic and landscape values were considered. It is recognised that scenic and landscape diversity are a recognised resource base for tourism and associated agricultural pursuits such as viticulture and thoroughbred horse breeding. In this context the Project is considered.

In terms of scenic and landscape quality the various VCU's that make up the Project site combine to create a common but none the less intact landscape. That intactness is however adjoined and to a certain degree compromised by existing mining at Mt Arthur Coal Mine, Hunter Valley Operations and the existing Drayton Mine. These existing mining areas are visible from the Drayton South area and compromise the integrity of the Project site itself as it is seen as a scenic resource from outside locations. Even though the mix of VCUs that make up the Project site create some variety in the rural landscape they would be considered minimal/common in terms of landscape quality.

Given the open character of the Project site it would have a low visual absorption. However, surrounding topography screens it from significant tourist and agricultural/tourist locations. These locations include the Golden Highway, the village of Jerrys Plains, Coolmore, Darley and Arrowfield to the south, Denman to the west and Muswellbrook, Denman Road and Pakara Olive Orchard to the north.

To the north-east and west of the Project are significant ridges and spurs associated with Mt Arthur to the east and Spur Hill/Ogilvies Hill to the west. This screens Muswellbrook, Denman Road and the Olive Orchard from view. To the west it screens Denman and the Golden Highway.

The ridge adjacent to the southern boundary of the Project protects for the greater part the sensitive areas of Coolmore, Darley and Arrowfield. Parts of the Coolmore property to the south of the Golden Highway including a number of residences will be exposed to the construction of the Houston visual bund for a period of 16 months. However the staged construction of this visual bund and progressive rehabilitation will reduce the potential visual impact of this visual mitigation element even further. In a similar way the Golden Highway will be screened with exceptions to the east in the vicinity of Jerrys Plains.

The Project has been developed in consultation with Coolmore to minimise visual impacts from Batty Hill, a prominent lookout over the property and other areas of the stud. Higher working roads around the south western boundaries in the vicinity of the Coolmore quarry will have views over screening topography and will experience a high visual effect. This is also the case for the undeveloped ridge at the back of the Arrowfield property and for Trig Hill on Darley, with the main part of Darley being screened by Trig Hill and associated features.

The Project does not significantly compromise the scenic and landscape settings of the tourist and agricultural businesses around the Project with activities for the greater part screened by existing topography and the proposed Houston Visual Bund.

7.6 Lighting Impacts

Introduction

The visual effect of lighting surrounding the Project Boundary will vary. In addition, the locations of sensitive receptors are generally toward the south with some residences in the west. Edderton Homestead, which is owned by Mt Arthur Coal, is the exception to the north.

The majority of night lighting associated with mining projects is typically associated with CHPP infrastructure, workshops and load out infrastructure. This infrastructure is located at the existing Drayton Mine and won't hence will not be required at Drayton South. At Drayton South there will be limited fixed infrastructure with only mobile plant likely to produce lighting impacts.

The lighting impacts produced by infrastructure at the existing Drayton Mine were assessed as part of the Drayton Mine Extension EA. Since the lighting utilised at the existing Drayton Mine will not change as a result of the Project, the lighting impacts caused by the existing Drayton Mine have not been re-assessed in this EA.

The effect of night light will be influenced by the locality of operations on-site, the relative level at which the viewing location is situated and the presence of any off-site barriers such as topographic features and / or vegetation. The screening of light, especially to the south will be afforded by the screening ridgelines and vegetation that will be planted on it.

There are two types of lighting effects that could be experienced from the Project. The first effect is where the light source is directly visible (direct light), and will be experienced if there

is a direct line of sight between a viewing location and the light source.

The second effect relates to the general night-glow (diffuse light) that results from light of sufficient strength being reflected into the atmosphere. This type of effect will create a strong local focal point and the effect will vary with distance and atmospheric conditions such as fog, low cloud and / or dust particles which all reflect light.

Both of these light effects already exist in the locality and are discussed further below in relation to the Project.

Direct Light Effects

The potential for direct light effects are generally restricted to vehicles and equipment moving outside of the active mining areas and roadway lighting (as other operational lighting would be hooded).

Generally, Project vehicle and equipment lighting will be screened by topography, vegetation and eventually by the OEAs. During the first 5 years of the Project as the northern and western OEA at Blakefield and Redbank are constructed, night lighting from haul trucks and other machinery working on the outer faces of the OEA could project lighting effects outside the Project Boundary to the north and west. However with the exception of Edderton Homestead, which is owned by HVEC, there are no sensitive receptors in these locations. Areas to the south will be screened by existing topography. The exception may be during the construction of the Houston Visual Bund where some direct lighting impacts maybe experienced to the south.

Diffuse Light Effects

Mt Arthur Coal Mine, Hunter Valley Operations and the existing Drayton Mine already contribute diffuse light effects into the night sky in the broader locality. The influence of surrounding mining operations and associated lighting activities will reduce the visual impact of diffuse light associated with the Project. The diffuse night lighting effect of the Project at Drayton South would be far less than that which is currently emitted by the existing operations in the area given that the CHPP, workshops and other core infrastructure areas are located at the existing Drayton Mine.

Generally, this glow would not create a significant visual effect but would be apparent from time to time.

Night Light Impacts

The Project would result in night lighting impacts due to direct and diffuse light effects.

Direct lighting would create a higher impact but is more limited in extent to the northern and western sectors where there are no defined sensitive receptors. In the southern sector, direct light effects would likely be from intermittent lights associated with truck movements associated with the construction of the Houston Visual Bund. These impacts are only anticipated to be experienced for short periods during the visible staged lifts of the bund over a total period of approximately 11 months (see Table 1 in Section 4.3.3).

The diffuse lighting effects would have a lower impact although they would be more widely experienced, especially if moisture or particulate matter such as dust is present in the atmosphere. This would create a halo of light above the mine components that are the sources of the light. This halo of light would be seen from many locations around the Project Boundary. Although evident, this halo of light is not considered to be a significant visual impact, due to a combination of viewing distances, orientation of residences and screening effects of

topography and vegetation.

The visual effect of diffuse lighting associated with the Project would be at a similar level to that currently approved and experienced at the Drayton and Mt Arthur coal mines to the north and Hunter Valley Operations to the east.

The major mitigation elements against night light effects are topography, vegetation and distance to sensitive receptors. All light effects are mitigated to a level that will not create a significant visual impact.

8. MITIGATION

There are numerous mitigation measures incorporated in the design and operating plans for the Project that will reduce the visual effect and mitigate the visual impact of the Project on sensitive viewing locations. These include:

- Mine planning and design to ensure that the southern ridgeline was maintained and that all OEAs are developed and shaped so that they remain shielded behind this ridgeline from receptors in the southern sector;
- Development of the Houston Visual Bund to alleviate potential long term views of the Project. The Houston Visual Bund has been designed to be constructed as quickly as possible in a staged lift configuration so that each main stage lift is able to be progressively covered with available topsoil and rehabilitated with a crop of pasture grass to minimise exposed areas. Tree plantings, composed of native species, will be established on the visual bund to restore visual amenity and compatibility with surrounding woodland landscapes;
- Tree screens have been established along the Golden Highway and will be planted along the ridgeline adjoining the Houston visual bund and the Edderton Road realignment to minimise views of the Project from various vantage points. These tree screens will be planted prior to the construction phase to allow for substantial growth and to maximise survival rates;
- Detail planting plans are to be prepared to clearly illustrate areas and character of planting on all rehabilitation areas including the visual bunds, OEAs and tree screens;
- Progressive rehabilitation of OEAs and disturbed areas;
- Use of compatible tones for building and cladding colours. Such colours will include tonal variations of existing colours in the surrounding landscape;
- Use of low lux lamps and direction of fixed lights toward the ground, where practical; and
- Implementation of work procedures related to the use of mobile lighting plants to avoid adverse off site lighting impacts.

The mitigation measures listed above will reduce the visual effect of project components by reducing visibility for sensitive receptors and reducing the level of contrast with the surroundings.

Anglo American will also conduct ongoing consultation with stakeholders surrounding the site over the life of the Project. Should any issues arise in relation to visual impacts on surrounding sensitive viewing locations, these would be addressed through consultation with the relevant parties. If deemed necessary, additional visual impact mitigation maybe achieved at specific sensitive viewing locations via offsite visual treatments, such as establishing tree screens and / or plantings at the viewer's location to reduce visibility.

At completion of mining operations the Project will be fully rehabilitated and decommissioned. The final rehabilitation and decommissioning of the site will involve further revegetation of disturbed areas on the mine site with woodland communities.