



Visual Impact Assessment Report

Appendix M



Appendix M — Visual Impact Assessment Report



Berrima Rail Project

Visual Impact Assessment Report

Prepared for Hume Coal Pty Limited | 1 March 2017



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Berrima Rail Project

Final

Report J12055RP1 | Prepared for Hume Coal Pty Limited | 1 March 2017

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Date 1 March 2017

Date 1 March 2017

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Document Control

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1 Introduction

1.1 Overview

Hume Coal Pty Limited (Hume Coal) is seeking approval for the construction and operation of a new rail spur and loop. The Berrima Rail Project is in the Southern Highlands region of New South Wales (NSW). Hume Coal is seeking approval in a separate State significant development application to develop and operate the Hume Coal Project; an underground coal mine and associated mine infrastructure in the NSW Southern Coalfield. Coal produced by the Hume Coal Project will be transported to port for export or to domestic markets by rail via the new rail spur and loop, constructed as part of the Berrima Rail Project.

Approval for the Berrima Rail Project (the project) is being sought under Part 4, Division 4.1 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). An environmental impact statement (EIS) is a requirement of the approval processes. This visual impact assessment (VIA) forms part of the EIS. It documents the methodology and results of the assessment, the measures taken to avoid and minimise impacts and the additional mitigation and management measures proposed.

The location of the project is shown in Figure 1.1, and the local context around the project area is illustrated in Figure 1.2.

1.2 Project description

The Berrima Rail Project will enable the transportation of coal produced by the Hume Coal Project to various customers. The new rail spur and loop will be connected to the western end of the existing Berrima Branch Line; a privately owned line branching off the Main Southern Rail Line at the Berrima Junction approximately 2.5 km north of Moss Vale. The Berrima Branch Line is owned and used by Boral Cement Ltd (Boral) for the transportation of cement, limestone, coal and clinker to and from the Berrima Cement Works. It is also used by Inghams Enterprises Pty Limited (Inghams) for the transportation of grain to its feed mill east of the cement works, and by Omya (Australia) Pty Ltd (Omya) for the transportation of limestone to their Moss Vale plant at the Berrima Junction.

In addition to the construction of the new rail spur and loop, the project also involves upgrades to the Berrima Branch Line and the use of the rail infrastructure by Hume Coal and Boral. The rail project and the Hume Coal Project are subject of separate development applications as the rail project involves rail infrastructure used by existing users other than Hume Coal, as noted above.

Hume Coal will transport product coal by rail, primarily to Port Kembla for export, and possibly to the domestic market depending on demand. Hume Coal will transport up to 3.5 Million tonnes per annum (Mtpa) of product coal which will require up to eight train paths per day (four in each direction), with a typical day involving four to six paths (two to three in each direction).

In summary the project involves:

- upgrades to Berrima Junction (at the eastern end of the Berrima Branch Line) to improve the operational functionality of the junction, including extending the number 1 siding, installation of new turnouts and associated signalling;
- construction of a new rail line connected to the western end of the existing Berrima Branch Line approximately 700 m east of the Berrima Cement Works;

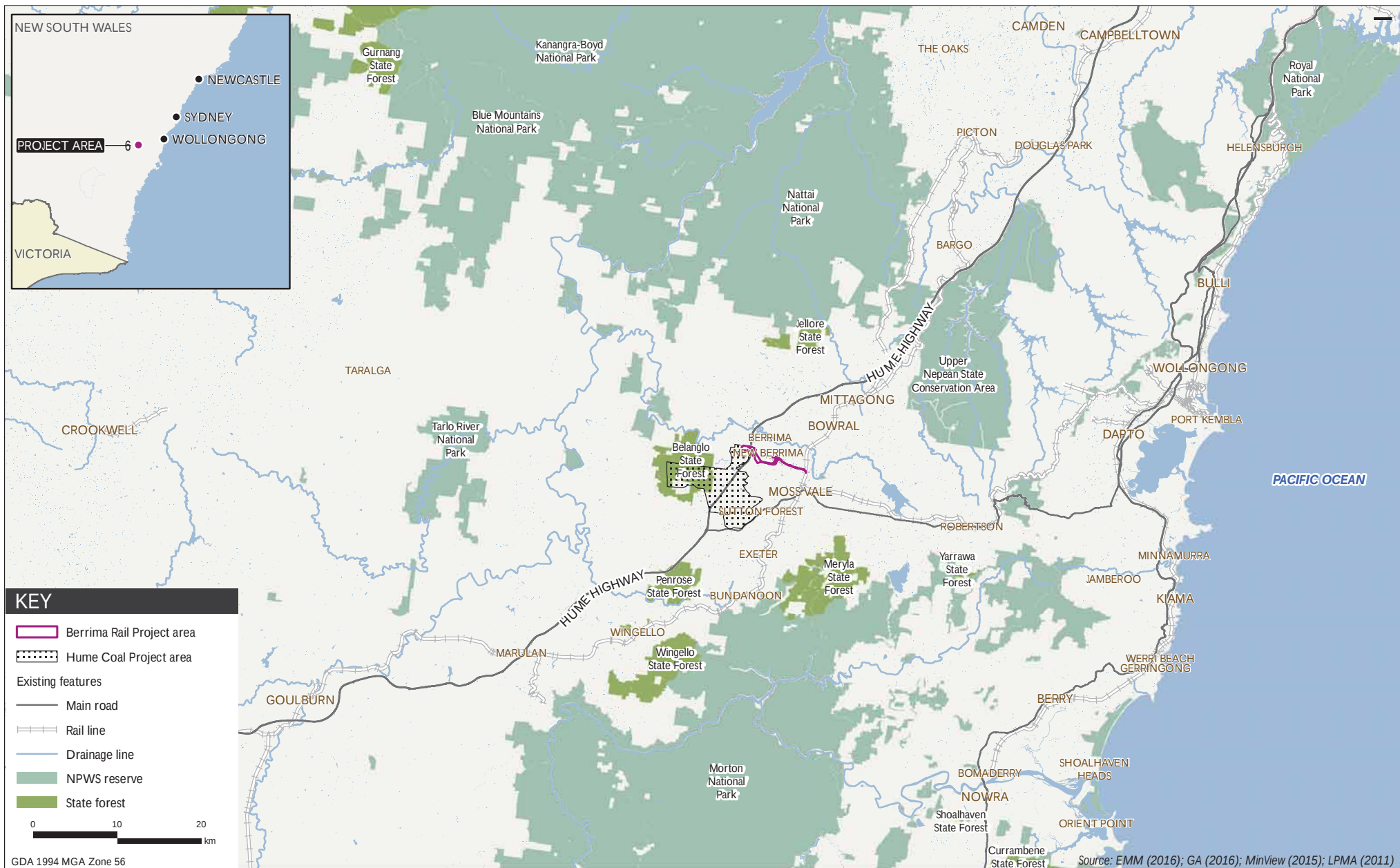
- construction of a railway bridge over Berrima Road;
- construction of a new rail connection into the Berrima Cement Works from the railway bridge;
- decommissioning of the existing rail connection into the Berrima Cement Works including the Berrima Road level rail crossing;
- construction of a new rail spur line from the Berrima Branch Line connection to the Hume Coal Project coal loading facility;
- construction of a grade separated crossing (railway bridge) over the Old Hume Highway;
- construction and operation of a maintenance siding and basic provisioning facility on the western side of the Old Hume Highway, including an associated access road, car parking and buildings; and
- construction of the Hume Coal rail loop with the Hume Coal Project Area, adjacent to Medway Road.

The conceptual project layout is illustrated in Figure 1.3. As shown, approval is sought for two alignments of the new rail line where it will cross Berrima Road. The preferred option is the blue rail alignment shown in Figure 1.3, which includes construction of a railway bridge over Berrima Road as described in the points above. This preferred project design has been developed in consultation with Boral as the owner of the Berrima Branch Line.

The alternative option (orange alignment in Figure 1.3) accounts for a proposal by Wingecarribee Shire Council (WSC) to realign approximately 700 m of Berrima Road between Taylor Avenue and Stony Creek to replace the T-intersection at Berrima Road and Taylor Avenue with a roundabout, and to replace the existing rail level crossing into the Berrima Cement Works with a rail overbridge. If WSC relocates Berrima Road to the alignment shown in Figure 1.3, then the following project components would vary:

- the turnout for the new spur line to service the Hume Coal Project would be installed on the existing Berrima Branch Line approximately 1000 m east of the cement works. A short section of the existing Berrima Branch Line would be shifted north, within the rail corridor on Boral-owned land, to accommodate the spur line;
- the construction of a railway bridge over Berrima Road would be replaced by a railway underpass beneath the realigned Berrima Road, constructed through the elevated embankment for the road;
- the construction of a new rail connection into the Berrima Cement Works from the railway bridge would no longer be required, and the cement works access would remain unchanged; and
- the existing rail connection into the Berrima Cement Works and the Berrima Road level rail crossing would not be decommissioned, since the road would be realigned to pass over the existing rail alignment using a bridge.

This VIA has considered the impacts of both options shown in Figure 1.3.

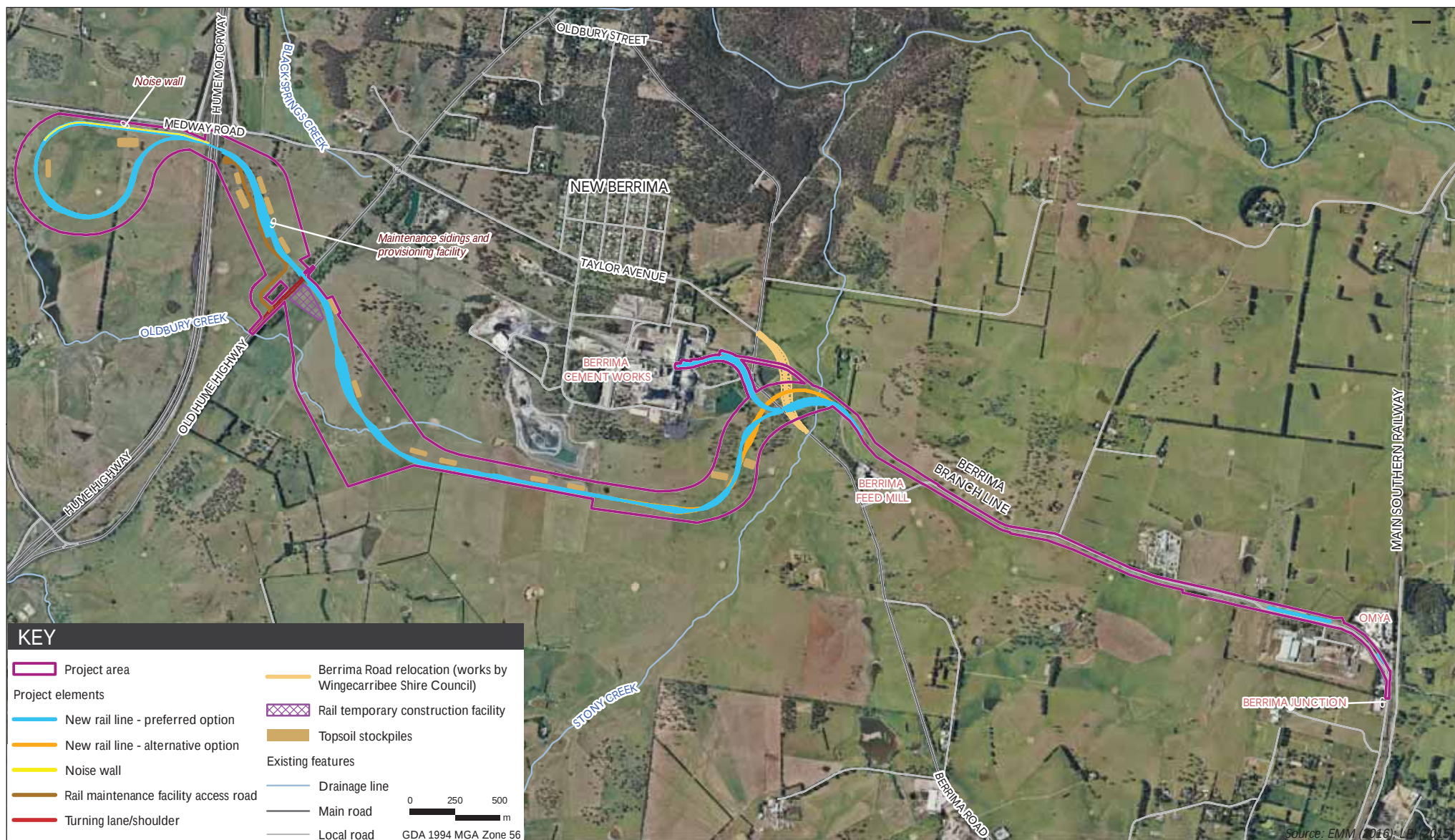


Locality plan
Berrima Rail Project
Visual amenity assessment
Figure 1.1



Source: EMM (2016); Hume Coal (2016); LPI (2015)

Local context
Berrima Rail Project
Visual amenity assessment
Figure 1.2



Conceptual project components

Berrima Rail Project
Visual amenity assessment

Figure 1.3

1.3 Project area

The project area is located in the Southern Highlands region of NSW, within the Wingecarribee local government area, approximately 100 km south-west of Sydney. It occupies a corridor that is approximately 8 km in length, stretching from the Berrima Junction on the outskirts of Moss Vale, heading west in parallel with Douglas Road past the Berrima Feed Mill, around the southern side of the Berrima Cement Works, across the Old Hume Highway and under the Hume Highway through an existing underpass into the Hume Coal Project area, south of Medway Road.

The project area is in a semi-rural setting. It is surrounded by grazing properties, small-scale farm businesses, and scattered rural residences, large and small industries and is traversed by the Hume Highway. The project area contains predominately cleared agricultural land consisting of improved pasture for grazing, and over a third of the area comprises the existing Berrima Branch Line.

The villages of New Berrima, Berrima and Moss Vale are located in the general area. Medway is also located nearby while Bowral and Mittagong are located between 6 and 10 km north-east of the eastern end of the project area, respectively. There are also scattered homesteads, dwellings and other built structures associated with agricultural production surrounding the project area.

1.4 Assessment guidelines and requirements

This VIA has been prepared in accordance with the relevant governmental assessment requirements, guidelines and policies, and in consultation with the relevant government agencies.

There are no Australian Federal, NSW State Government or Local Government Authority planning policies, guidelines or standards applicable to this assessment. The VIA was therefore assessed with regard to industry standards included within the UK document *Guidelines for Landscape and Visual Impact Assessment (GLVIA) Third Edition* (2013), prepared by the Landscape Institute and Institute of Environmental Management and Assessment. The VIA was also prepared with regard to Standards Australia (AS4282) Control of Obtrusive Effects of Outdoor Lighting.

The VIA was prepared to address the requirements of the NSW Department of Planning and Environment (DP&E) as set out in the Secretary's Environmental Assessment Requirements (SEARs) for the project, issued on 20 August 2015. A copy of the SEARs is attached to the EIS as Appendix B.

To inform preparation of the SEARs, DP&E invited other government agencies to recommend matters for consideration in the EIS. These matters were taken into account by the Secretary when preparing the SEARs. A copy of each of the government agencies' advice to DP&E is attached to the SEARs.

One agency, the NSW Roads and Maritime Services (RMS), raised a matter relevant to the visual assessment, as listed in Table 1.2. Although this requirement is worded as being relevant to the mine, the visual impacts of the rail have also been assessed to take this issue into account.

Table 1.1 RMS's comments: assessment recommendations

Requirement	Section addressed
The visual amenity impact of the mine works with regard to driver behaviour	Chapter 5

1.5 Structure of the report

This report investigates the potential impacts on visual amenity as a result of the project. In the assessment:

- Chapter 2 describes the visual impact methodology used in the visual assessment;
- Chapter 3 describes the existing landscape within which the project will be sited;
- Chapter 4 describes the character of the visual components of the project;
- Chapter 5 describes the impacts of the project from representative viewpoints in and around the project area;
- Chapter 6 provides cumulative assessment of impacts with other developments in the area;
- Chapter 7 provides measures to mitigate visual impacts of the project; and
- Chapter 8 provides conclusions.

2 Visual impact method

2.1 Overview

In essence visual impact assessments simply compare an existing landscape to that which will eventuate as a project develops and matures. It is also an interactive process involving modifications to the locations, design, size and colour of the various project components so as to reduce the extent and significance of visual change.

The assessment involves review of information, consultation, fieldwork observations and photography, computer-based data processing and analysis, and subjective professional judgement.

The assessment method used in this report is that contained within the GLVIA. The assessment involved the following seven stages:

- Stage 1:** View type and context – the existing landscape baseline is described noting its character and complexity;
- Stage 2:** Visibility baseline assessment – the zone of visual influence of the project is established, where appropriate, the use of computer generated zones of theoretical visibility, based on topographical data, or through fieldwork analysis. This establishes the locations where views of the project may be possible. Fieldwork to establish the types and locations of receptors within this theoretical zone;
- Stage 3:** Viewpoint and photomontage selection – key public and private viewpoints of the project area are selected and the project's level of exposure to them is determined;
- Stage 4:** Magnitude of change – the magnitude of visual change and the changes arising from the project are assessed and the need for project modifications or other mitigation measures evaluated;
- Stage 5:** Visual sensitivity – the capacity of the landscape to absorb change without a loss of quality (its visual sensitivity) is determined;
- Stage 6:** Evaluation of significance – the significance of change in the landscape is a function of the magnitude of change when considered against the view type/context and the sensitivity of a receptor; and
- Stage 7:** Mitigation – the modified and mitigated project (if applicable) is assessed and final visual impacts are described and illustrated and their significance documented.

Details of each of the above stages are outlined below.

2.2 Stages in the assessment methodology

2.2.1 Stage 1 - View type and context

The purpose of this stage is to record and analyse the existing landscape features, characteristics, the way in which the landscape is experienced and the value or importance of the landscape and visual resource in the project area. The landscape character is determined by the number, size, type and contrast of elements present. Typically the key elements are topography, vegetation, water features and built elements. Other factors that are important are the consistency of these elements and whether they have developed progressively over time and become well integrated into a harmonious landscape. In addition, the presence of change and whether the landscape is experiencing large scale development such as residential growth on the urban fringe needs to be considered.

The context is a primary factor in the visual sensitivity of the view. Generally sites within higher contrasting landscapes have greater ability to absorb change, whereas sites within a uniform or highly ordered landscape have higher sensitivity.

The GLVIA sets out guidance in relation to landscape baseline at paragraph 5.3:

“Baseline studies for assessing landscape effects require a mix of desk study and field work to identify and record the character of the landscape and the elements, features and aesthetic and perceptual factors which contribute to it. They should also deal with the value attached to the landscape (see paragraph 5.19). The methods used should be appropriate to the context into which the development proposal will be introduced and in line with current guidance and terminology.”

2.2.2 Stage 2 - Visibility baseline assessment

Baseline studies for visual effects should establish the area in which the development may be visible, who will see the development, the viewpoints that will be affected and the nature of the views at those points.

2.2.3 Stage 3 - Viewpoint selection

Viewpoints are selected to provide a representative sample of the likely impacts on the different users of the areas surrounding the project and their visual exposure to various project elements. Viewpoints that are considered to have potential exposure to various project elements, and/or areas that are available to public access such as main roadways and other unsealed rural roads, are selected for detailed assessment.

It may also be appropriate to consider private viewpoints, mainly from residential properties surrounding the project. These properties will be identified through GIS mapping, fieldwork and desktop analysis.

2.2.4 Stage 4 - Magnitude of change

The magnitude of change on the visual landscape is one factor in determining the significance of visual impacts of the project. In accordance with GLVIA, this visual assessment considered the following criteria in determining the magnitude of change on a receptor:

- whether the impact is temporal or permanent – impacts that are for a limited duration are considered less significant than those which occur for an extended period or are permanent;

- scale of change – the loss or addition of features in the view and changes in the proportion of the view affected by the proposal;
- degree of contrast – level of integration of new features with existing or remaining landscape elements, having regard to form, scale, height, colour, and texture;
- distance of the viewer from the altered elements in the landscape – close proximity to an altered landscape will increase the significance for private residences. In the case of motorists, mid ground changes can be greater than foreground elements as they can result in longer viewing times;
- viewing direction – whether the change is to the primary view from the receptor;
- extent of view affected – impacts that are visible over a greater portion of a view are more significant than those where only a part of the view is impacted. Intervening topography and vegetation will also affect the magnitude of change; and
- length of viewing time – views from a residence are constant whereas some views from roadways as experienced by motorists may be brief dependent upon speed and viewing direction.

2.2.5 Stage 5 - Visual sensitivity

Visual sensitivity is a measure of the landscape's ability to absorb development without a significant change in the character. It is a function of the view type and context. In this assessment, the major factor influencing visual sensitivity is the level of contrast between the mining activities, associated infrastructure and the rural landscape setting in which they will sit.

Visual sensitivity is rated on a scale of high to low (refer to Table 2.1 below). The physical characteristics of the landscape, including existing development features, are integral components in determining the visual sensitivity. For example, a low visual sensitivity would enable a modification or addition to be made to the landscape which would only cause minimal contrast and result in a high level of integration with the surrounding landscape. Similarly, a high visual sensitivity would mean the same modification or addition to the surrounding landscape which would cause high contrast to the surrounding landscape.

In accordance with GLVIA, the visual sensitivity of a receptor was assessed based on the following criteria:

- importance of the view – changes to views from private residences or main tourist roads are considered more sensitive than from secondary roads;
- length of view – transient nature of a view by motorists from roads is considered less sensitive compared to a long term view from a private residence;
- receptor viewer expectation – communities where development results in changes in the landscape setting or valued views; and
- location and context of the viewpoint – natural and modified elements that make up the visual landscape and contribute to the composition, and hence sensitivity of a viewscape.

2.2.6 Stage 6 - Evaluation of significance

The significance of a change in the landscape is a function of the magnitude of that change when considered against the view type/context and the sensitivity of a receptor. Typically, a noticeable change in the landscape in an unmodified rural or natural setting would be considered to be significant, whereas a change in an already heavily modified landscape could be considered slight or moderate.

Table 2.1 illustrates how the magnitude of a change in the landscape is assessed, and its significance rated against the sensitivity of a receptor.

Table 2.1 Evaluation of significance matrix

Magnitude of change	Visual sensitivity		
	High	Moderate	Low
High	Substantial	Moderate/ Substantial	Moderate
Medium	Moderate/ Substantial	Moderate	Slight/ Moderate
Low	Moderate	Slight/ Moderate	Slight
Negligible	Slight	Slight	Negligible
Key:  Significant  Not significant			

The primary assessment tools for determining the significance of impact were the site inspections, and photographs of the views from the selected viewpoints. These were used to determine the level of change to assess visual impacts, taking into consideration the nature of the landscape, topography, the distance between the viewpoint and the proposed installation, as well as the type of view experienced.

2.2.7 Stage 7 - Mitigation

The final step in the assessment process is to determine measures that can be incorporated into the design of the project to ameliorate, or, where possible, eliminate the visual impact of the proposed activity.

Mitigation measures can be in several forms including:

- design of infrastructure to reduce the contrast with the surrounding environment;
- use of visual buffers and screening by planting vegetation; and
- designing infrastructure to screen surface operations and lighting.

Proposed mitigation measures are provided in Chapter 7.

3 Site description

3.1 Overview

The land use within the project area where the rail loop and new rail line will be constructed is improved pasture for grazing, with a number of roads traversing the area. The wider region surrounding the project area corridor is set in an area of mixed character, consisting of grazing properties, small-scale farm businesses, natural areas, forestry, scattered rural residences, villages and towns, and some extractive, as well as other industries and major infrastructure.

Photographs 3.1 to 3.3 illustrate the project area and surrounds. The locations from where the photographs were taken are shown in Figure 5.1.



Photograph 3.1 View from Medway Road looking south-east across the northern portion of the proposed rail loop location

Tree planting undertaken by Hume Coal to establish a visual screen can be seen in the foreground in Photograph 3.1. The trees have been planted on Hume Coal land between the northern side of the proposed rail loop location and the old Berrima Colliery train easement.

Photograph 3.2 below shows approximately where the rail loop will commence on the western side of the Hume Motorway (bottom left hand corner of photograph) after passing under the highway in the existing old Berrima Colliery underpass.



Photograph 3.2 **View from the embankment on the western side of the Hume Highway looking south-west across the location of the northern half of the rail loop**

The corflute tubes associated with the tree planting undertaken by Hume Coal can again be seen in the foreground of Photographs 3.2 and 3.3.



Photograph 3.3 **View on the eastern side of the Hume Highway from Medway Road looking south-west towards the location of the new rail line and maintenance facility**

With the exception of the Berrima Branch Line, the main land uses adjacent to the project corridor are currently agricultural, industrial and rural residential.

The proposed rail line will be alongside the operational Berrima Cement Works, which includes a quarry. Other industrial businesses (such as the feed mill, pipe manufacturer and hot water heater manufacturer) are also adjacent to the rail line.

The road network in and around the project area consists of a range of roadways from State Highways through to minor unsealed rural property access roads. The Hume Highway, which is a four lane dual carriageway, runs north-south through the project area. It is known as the Hume Motorway north of its intersection with Mereworth Road, and forms part of the main inland arterial route between Sydney, Canberra and Melbourne.

On the western side of the Hume Highway, the project area has frontage to Medway Road along its northern boundary. On the eastern side of the Hume Highway the new rail line crosses the Old Hume Highway and joins the existing rail line to the north-east of Berrima Road.

4 Visual elements of the project

The project is described in detail in Chapter 2 of the EIS. The project elements that will be visible and are relevant to the VIA are as follows:

- construction of a 8.2 km of new railway track, or 7.6 km if the alternative option is constructed;
- construction of a number of road and creek crossings, including:
 - a grade separated crossing over Berrima Road and a new rail siding into the Berrima Cement Works, with the rail line passing over the road (the preferred option) or;
 - if Berrima Road is relocated by WSC, the road will be constructed so that the rail line passes under the road (alternative option);
 - the existing rail bridge over Stony Creek will be decommissioned and a new bridge and culvert will be constructed to accommodate the new rail line; and
 - a bridge will be constructed over the Old Hume Highway to allow crossing of the rail line over the highway.
- construction of a new intersection on the Old Hume Highway to enable safe access to the Rail Maintenance Facility;
- construction of a rail rolling stock maintenance and provisioning facility adjacent to the new rail line, between the Hume Highway and the Old Hume Highway. This will include a maintenance shed 6-8 m high, as well as a shed at the northern provisioning point;
- construction of a noise wall of appropriate materials to mitigate potential noise impacts to residents north of the rail loop along Medway road. The wall will be 4 m high relative to the height of the railway track, and will extend from adjacent to the western side of the Hume Highway to approximately half way around the rail loop, being approximately 950 m in length; and
- topsoil stockpiles adjoining the railway line approximately 3 m in height.

4.1 Train movements

When undertaking a VIA of the project, it is important to consider the number of train movements per day. The visual impact of trains is a temporary change to a view, with trains not generally being stationary in one location along the track, except during coal loading activities idling awaiting section clearance, refuelling, train inspections, crew changeovers and at the maintenance facility.

The transport of product coal from Hume Coal will require approximately 50 train movements per week along the new rail spur. Currently there are approximately 120 weekly train movements (60 trains each way) associated with the existing users of the Berrima Branch Line, and therefore with the Berrima Rail Project in operation the total weekly movements along the Berrima Branch Line will be approximately 170.

5 Viewpoint assessment

5.1 Viewpoint selection

There are a number of areas within the vicinity of the project area that would potentially be visually impacted by the project to varying degrees. Specifically, these areas are representative of likely visual impact to surrounding private residential landowners or potential exposure to motorists travelling on public roads in the vicinity of the project corridor.

Following the desktop analysis, a site survey was undertaken on 26 May 2016 to confirm potentially affected areas. Representative viewing locations or 'viewpoints' were selected as part of the field assessment and detailed analysis of aerial photography and topographic plans were undertaken to determine the likely visibility of the project components.

Whilst there will be some variation in the impacts on chosen viewing locations, an overall assessment of the visual impacts on the selected viewpoints is representative for the majority of views experienced from the surrounding locality. The viewpoints were primarily selected to represent the 'worst case' where clear views of the project could potentially be obtained.

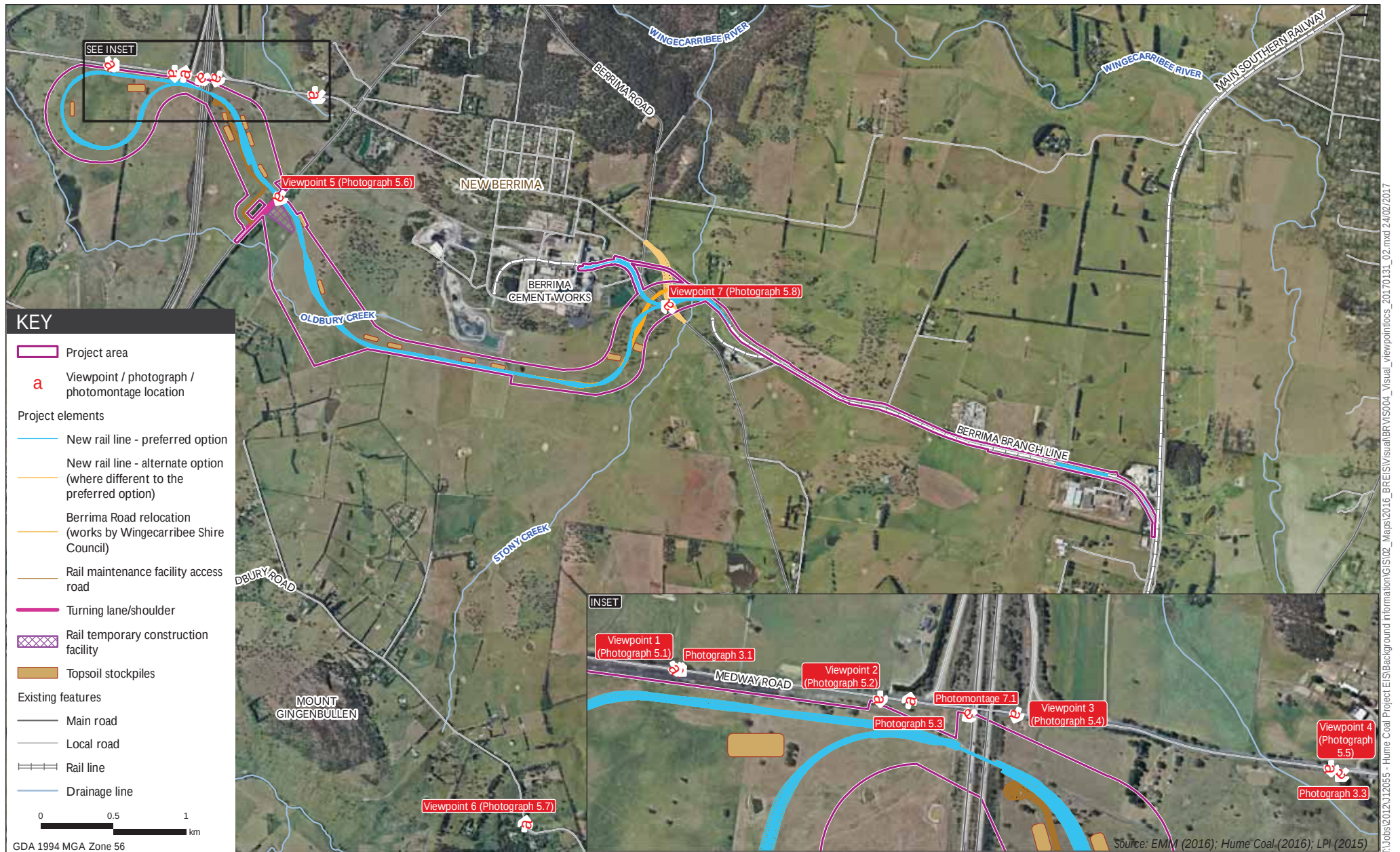
The viewpoints assessed are as follows:

- viewpoint 1 – from Medway road, looking south-east towards the location of the rail loop;
- viewpoint 2 – from Medway road (further east than viewpoint 1, closer to the Hume Highway), looking south towards the location of the rail loop;
- viewpoint 3 – northern side of Medway Road (east of Hume Highway) looking south west towards the Hume Highway underpass;
- viewpoint 4 – view from Medway Road (east of Highway) looking south towards rail maintenance facility and railway line;
- viewpoint 5 – view looking south-west along the Old Hume Highway towards proposed rail crossing location;
- viewpoint 6 – view looking north from Oldbury Road; and
- viewpoint 7 – view looking along Berrima Road north-west towards the Berrima Road bridge crossing associated with the preferred option.

The location of each of the seven viewpoints is illustrated in Figure 5.1.

5.2 Viewpoint analysis

The following photographs and tables provide an overview of the seven selected viewpoints and include an assessment of these viewpoints in accordance with the methodology outlined in Chapter 2.



Viewpoint, photograph and photomontage locations

Berrima Rail Project
Visual amenity assessment

Figure 5.1



Photograph 5.1 **Viewpoint 1 - view looking south-east from Medway Road towards the rail loop**



Photograph 5.2 **Viewpoint 2 – view looking south from Medway Road towards the rail loop**

Table 5.1 Viewpoints 1 and 2 – views looking south-east and south towards the rail loop from Medway Road (photographs 5.1 and 5.2)

Viewpoint details	These viewpoints are located on the northern side of Medway Road, west of the Hume Highway. The relevant viewing direction is facing south towards the rail loop and coal loading facility.
View type and context	The landscape is predominantly dominated by flat open paddocks and presents a rural character. Mature tree planting exists in the background with a lesser amount in the foreground towards Medway Road. This allows wide and unobstructed views across this part of the project area. There are a few examples of visual detractors such as overhead power lines, fencing and street signage.
Viewpoint selection	These views are typical of the view from Medway Road and from the street frontage of private residences on Medway Road opposite the rail loop. There are three houses situated on the northern side of Medway Road which overlook the rail loop (Lot 1 on DP 738446, Lot 3 on DP 793839 and Lot 2 on DP 793839, the Zen Oasis Restaurant) and the noise wall. These viewpoints were selected on the basis that they represent the 'worst case' scenario, with unobstructed views from the nearest public roadway towards the rail loop and the noise wall.
Magnitude of change	The rail loop will be at grade. However, the 4 m high noise wall with tree screening will be seen from this viewpoint and along the entire length of the project's frontage to Medway Road. There will be a change in the view due to the fact that no railway or built structures currently exist in these views and no tree screening exists, apart from a road, fence, powerline and small embankment from the Berrima Colliery in the near foreground. It is considered that viewers from this location will experience a medium magnitude of change. Motorists travelling along Medway Road will experience loss of views across the rural landscape. Although being the closest residential property to the project, views from Lot 1 on DP 738446 will experience the least impact as existing mature vegetation provides a substantial landscaped buffer to views outside the property in a southerly direction. Refer to photograph 5.3 below. Private residences and the Zen Oasis property further to the west on the northern side of Medway Road are on higher land. The impact on views from these properties will not alter as much as those properties on lower ground fronting Medway Road. This is because land use within the rail loop will continue to be agricultural as it is now and will contrast well with the surrounding landscape. Grazing of livestock will continue inside the rail loop. As these properties are at a higher elevation they will experience views above the noise wall towards a relatively familiar agricultural setting, except during train loading. Closer to the Hume Motorway, the private property on the southern side of Medway Road is unkempt with large clumps of brambles growing, and stockpiles of soil and other materials as well as general refuse.
Visual sensitivity	The sensitivity of motorists travelling along Medway Road is considered to be moderate. Although the change in view is temporary, the view is unobstructed across flat open rural grazing land. Residences are considered to have a moderate to high sensitivity as the change in view is permanent. The higher sensitivity is also due to the elevated positioning of a majority of the private residences and lack of mature vegetation to obscure the views towards the project area.
Evaluation of significance	Based on a combination of the magnitude of change and visual sensitivity, the significance is moderate to high in varying degrees to motorists and private residences on the northern side of Medway Road.
Mitigation	Native tree planting along Medway Road has already been implemented. This planting will visually enhance the noise wall from the public roadway and the view from private residences situated on the northern side of Medway Road. The time to maturity of the tree species planted varies from 5-15 years (refer Chapter 7). Therefore, by the time construction commences some of the species will be close to maturity, reducing the magnitude of change from high to moderate. The noise wall will also reflect the character of the rural surroundings through the use of appropriate colours, materials and surface treatments.



Photograph 5.3 Existing mature vegetation within Lot 1 on DP 738446 which will minimise visual impacts of the noise wall and rail loop (looking north from viewpoint 2)



Photograph 5.4 Viewpoint 3 - southern side of Medway Road looking south west towards the Hume Highway underpass

Table 5.2 Viewpoint 3 –Medway Road, to the east of the Hume Motorway looking south-west towards the existing Hume Highway underpass (photograph 5.4)

Viewpoint details	This viewpoint is located on the southern side of Medway Road and provides a direct view towards the new railway line, the sheds that will accommodate the rail maintenance facility and at the northern provision point, topsoil stockpiles and the existing Hume Highway underpass. The existing view is shown in photograph 5.4.
View type and context	The landscape is dominated by flat open paddocks to the south and south-east and the Hume Motorway to the south-west and presents a mostly rural character. Mature tree planting exists along the eastern embankment of the Hume Highway and there are some scattered trees throughout the landscape.
Viewpoint selection	This view is typical of the view from the nearest public roadway, being Medway Road on the eastern side of the Hume Highway. This viewpoint is the closest and most visible position to the new railway line, sheds and topsoil stockpiles on the eastern side of the Hume Highway.
Magnitude of change	Viewers, primarily motorists travelling along Medway Road, from this location will have transient views towards the new railway line, sheds and stockpiles. The magnitude of change is considered to be medium, although noting that by the time these project elements are constructed some of the trees already planted will be reaching maturity and will provide substantial screening (see mitigation below). Viewers may be generally aware of a physical presence in the landscape of the, sheds and topsoil stockpiles through the tree screen along Medway Road.
Visual sensitivity	This viewpoint is considered to have a moderate visual sensitivity due to its rural landscape character. The landscape is predominantly flat with existing vegetation providing limited capacity to absorb change. However, it is noted that the Hume Highway in the background already interferes with the scenic quality from this viewpoint and subsequently reduces the visual sensitivity.
Evaluation of significance	Unmitigated visual impacts from this viewpoint would be moderate. Although the railway line and sheds will introduce new built elements, the distance from the road will reduce its visual influence within the landscape. In addition, the tree planting along Medway Road will provide a substantial landscape buffer.
Mitigation	Tree planting has already been implemented in multiple rows (refer to Photograph 5.4) in the foreground of this viewpoint along Medway Road, which will enhance the scenic quality of this viewing direction. It will also provide a landscaped buffer to the railway line, sheds and topsoil stockpiles and reduce the magnitude of change from moderate to low. The shed will be appropriately designed and constructed of materials to reduce its visual impact.



Photograph 5.5 **Viewpoint 4 - view from Medway Road looking south towards rail maintenance facility and railway line**

Table 5.3 **Viewpoint 4 - view from Medway Road looking south towards rail maintenance facility and railway line (photograph 5.5)**

Viewpoint details	This viewpoint is located on the northern side of Medway Road and approximately 700 m to the east of the Hume Highway. The relevant viewing direction is facing south-west towards the shed housing the rail maintenance facility, the shed at the northern provisioning point, the railway line and topsoil stockpiles.
View type and context	The landscape is dominated by predominantly flat grazing land with scattered vegetation throughout. It provides a scenic rural view from Medway Road on the eastern side of the Hume Highway. Mature tree planting exists in the background, with a few isolated examples in the foreground. It also includes Telstra's Berrima telephone exchange to the east.
Viewpoint selection	This view is the typical for private residences on the northern side of Medway Road near to this location. Although the rail infrastructure will represent new built features in the landscape, it will be less visible in this location as compared to viewpoint 3 as the rail line travels away from Medway Road in a south-easterly direction to meet the Old Hume Highway.
Magnitude of change	Without considering the effect of the recent tree screen planting, viewers from this location would have partially obstructed views towards the rail line, the shed and topsoil stockpiles. Viewers would also experience views of the trains running along the rail line intermittently (up to a maximum of eight train movements per day) due to the flat topography. The existing vegetation would provide a limited capacity to absorb change. The magnitude of change is considered to be medium in this location.

Table 5.3 **Viewpoint 4 - view from Medway Road looking south towards rail maintenance facility and railway line (photograph 5.5)**

Visual sensitivity	The viewpoint for motorists and residents is considered to have a moderate visual sensitivity respectively in consideration of its rural landscape character and the distance from the rail infrastructure.
Evaluation of significance	Unmitigated visual impacts from this viewpoint are considered to be low to moderate. The passage of trains through an otherwise relatively static landscape will alter the visual amenity from this location. However, the visual impact of the trains will be a temporary change to the view, with trains not generally being stationary in one location along the track for lengthy periods of time, and will be limited to four trains (eight movements) per day. The primary changes at this viewpoint are the railway track which will follow the flat land surface. As the vertical projection of the railway track will be minimal there will be little interruption to the views. Given the distance to the railway line and that it will follow the existing flat topography the visual impacts will not be significant. The tree planting that has been carried out along Medway Road will also provide a substantial buffer to the rail infrastructure in the background.
Mitigation	Tree planting has already been introduced to minimise the visual impacts to low.



Photograph 5.6 **Viewpoint 5 - view looking south-west on the Old Hume Highway at the railway bridge location**

Table 5.4 Viewpoint 5 - view looking south-west along the Old Hume Highway towards the railway crossing (photograph 5.6)

Viewpoint details	This viewpoint is located on the Old Hume Highway looking south-west towards the proposed location of the rail line crossing.
View type and context	Views towards the rail line and bridge crossing will be predominantly screened by existing tree planting within the landscape. Views will be transient to motorists travelling along the Old Hume Highway.
Viewpoint selection	The view from this receptor is typical of the view for motorists travelling south-west along the Old Hume Highway and potentially from the frontages of a limited number of rural-residential properties located on the eastern side of the roadway. It is noted that the properties both sides of the road at this point are owned by Hume Coal and that the bridge will not be visible from the nearest privately owned residence. This viewpoint was selected on the basis that this part of the Old Hume Highway is the nearest public road to the south of the project.
Magnitude of change	Motorists at this location will experience a view of the bridge. The bridge crossing is positioned a considerable distance away from residential properties and within an existing vegetated area, therefore the magnitude of change will be low.
Visual sensitivity	The viewpoint for motorists is considered to have low visual sensitivity due the temporary nature of the view and existing dense vegetation in the foreground to soften the visual impact of new built structures in the landscape.
Evaluation of significance	Visual impacts of the bridge are considered to be low, given that the bridge will only be temporary viewed as motorist pass underneath it.
Mitigation	No mitigation measures will be necessary.



Photograph 5.7 Viewpoint 6 - view looking north from Oldbury Road

Table 5.5 Viewpoint 6 - view looking north from Oldbury Road (photograph 5.7)

Viewpoint details	This viewpoint provides a view in a northerly direction towards the project area on the eastern side of the Hume Highway.
View type and context	Views towards the project will be screened by intervening topography and tree planting within the landscape.
Viewpoint selection	The view from this receptor is typical of the view for motorists travelling along Oldbury Road and from a number of rural-residential properties that are located on the northern and southern side of the roadway. This viewpoint was selected on the basis that it is representative of views from the south-east of the project.
Magnitude of change	Viewers at this location will not have views of the project due to distance, intervening topography and existing tree planting within the landscape. Therefore viewers are unlikely to experience a change to the view from this location.
Visual sensitivity	The viewpoint for motorists and residents is considered to have low to moderate visual sensitivity to visual change respectively in consideration of its rural landscape character.
Evaluation of significance	Visual impacts from this viewpoint will be negligible as the project will not be seen due to intervening topography and vegetation.
Mitigation	No mitigation measures will be necessary.



Photograph 5.8 Viewpoint 7 - view looking north-west towards the proposed location of the Berrima Road bridge crossing associated with the preferred option

Table 5.6 Viewpoint 7 - view looking along Berrima Road towards the Berrima Road bridge crossing (photograph 5.8)

Viewpoint details	This viewpoint is located on Berrima Road looking north-west towards the bridge crossing.
View type and context	The landscape visible from this viewpoint is dominated by predominantly flat grazing land with scattered vegetation throughout. There are few intervening built elements in the landscape that would reduce the visual prominence of the bridge crossing. Although, further to the west is the Berrima Cement Works which provides a substantial industrial backdrop to viewers from Berrima Road, as well as the Berrima feedmill to the south-east. Due to its significant bulk, the cement works would dwarf any new development in scale and proximity to the viewer.
Viewpoint selection	The view from this receptor is typical of the view for motorists travelling along Berrima Road, near the project area's eastern boundary.
Magnitude of change	Viewers from this location will have direct views to the bridge crossing, therefore the magnitude of change will be medium to high.
Visual sensitivity	The viewpoint for motorists and residents is considered to have a low visual sensitivity in consideration of its existing rural landscape/semi-industrial character. Viewers will not be highly sensitive to the change in the view due to the close proximity of large built structures associated with existing industrial uses within the locality.
Evaluation of significance	The visual impact from this viewpoint is considered to be low as whilst the bridge crossing will be a new built element in the landscape, viewers will not be highly sensitive to the change in this semi-industrial area.
Mitigation	No mitigation is considered necessary, although the visual effects could be further reduced through bridge and native foreground vegetation.

The results of the visual analysis are summarised in Table 5.7.

Table 5.7 Visual analysis results

Location	Visual Sensitivity
V1	Mod
V2	Mod
V3	Mod
V4	Mod
V5	Low
V6	Low to Mod
V7	Low

6 Cumulative impact assessment

6.1 Overview

The 2002 edition of the GLVIA defines cumulative landscape and visual effects as those that:

‘Result from additional changes to the landscape or visual amenity caused by the proposed development in conjunction with other developments (associated or separate to it), or actions that occurred in the past, present or are likely to occur in the foreseeable future.’

As described above in Chapter 6, a number of agricultural, industrial, extractive and manufacturing facilities occur in the locality. Of these, it is the Berrima Cement Works, Omya, the Berrima Feed Mill and the Hume Highway that have a visual significance in the immediate locality due to their height. Given that the visual impacts arising from the proposed rail project are generally moderate (as outlined in Chapter 5), it is considered that the cumulative impact of the project and the existing development within the locality will be minimal.

6.2 Current development applications

The environmental assessment of the project has also considered proposed or recently approved developments in the region with respect to cumulative impacts. In the vicinity of the project is the Zen Oasis Restaurant, which is the subject of a current development application for a two-storey function centre. The Statement of Environmental Effects prepared by Bureaucracy Busters Town Planning Consultants accompanying the development application for the proposal states that ‘the proposed location of the new structure is central on the subject site, being screened by a substantial landscaping scheme.’ The function centre maintains the existing floor area of 4,495 m².

The project will not be located within close proximity (the rail loop will be located approximately 1.2 km to the south) to the proposed Zen Oasis development. Therefore, the visual influence of the proposed function centre within the landscape is considered negligible given the distance from the rail loop and coal loading facility, its isolated positioning within the landscape (on the northern side of Medway Road) and the proposed landscaping scheme (refer to Figure 7.1 – tree planting). In addition, the existing building footprint of the Zen Oasis will not be increased and it is therefore unlikely that cumulative visual effects would arise if both projects were to proceed as the Zen Oasis will not become more visually prominent.

The visual impacts of the project on the function centre are also considered (by Hume Coal) to be low. The railway line will be intermittently visible from the ground level of the function centre due to existing tree planting and topography to the south of the property. The function centre includes small window openings on the second floor level of the southern elevation, facing the project area, which would only allow partial views of the railway line.

6.3 Night lighting

In the immediate vicinity of the project area, the Boral Cement Works is a source of significant lighting in the evening hours, as well as the Berrima Feedmill to a lesser degree, which is located east of the cement works at the intersection of Berrima Road and Douglas Road.

Other sources of night lighting in the immediate vicinity of the project area are minimal due to its predominantly rural setting, including rural residential properties, farm machinery and vehicles on roads. Motorists travelling north-south along the Hume Highway will provide a moderate source of lighting in the evening hours.

Lighting used at the maintenance facility will be in accordance with all relevant Australian Standards for outdoor lighting, such as *Australian Standard (AS) 4282:1997 - Control of obtrusive effects of outdoor lighting*. Lighting protocols that will be implemented for the project, and which reflect the principles contained within (AS) 4282:1997, are outlined in Chapter 7 below.

Lights from locomotives will shine towards the Old Hume Highway and the Hume Motorway at night. However, trains will pass over the Old Hume Highway via a bridge and under the Hume Motorway via an existing underpass. Therefore, the trains will not be at the same level as the roads and lights will not shine directly onto vehicles.

7 Management and mitigation measures

Screening in the form of foreground, mid-ground tree and shrub planting is a very effective way of reducing exposure of a receptor to various aspects of built elements. Once established, such planting provides a permanent and natural screen to the various element of the mine from either roadways or private landholdings. A tree planting schedule which outlines the type of species, age to maturity and maximum growth height is provided in Table 7.1 below.

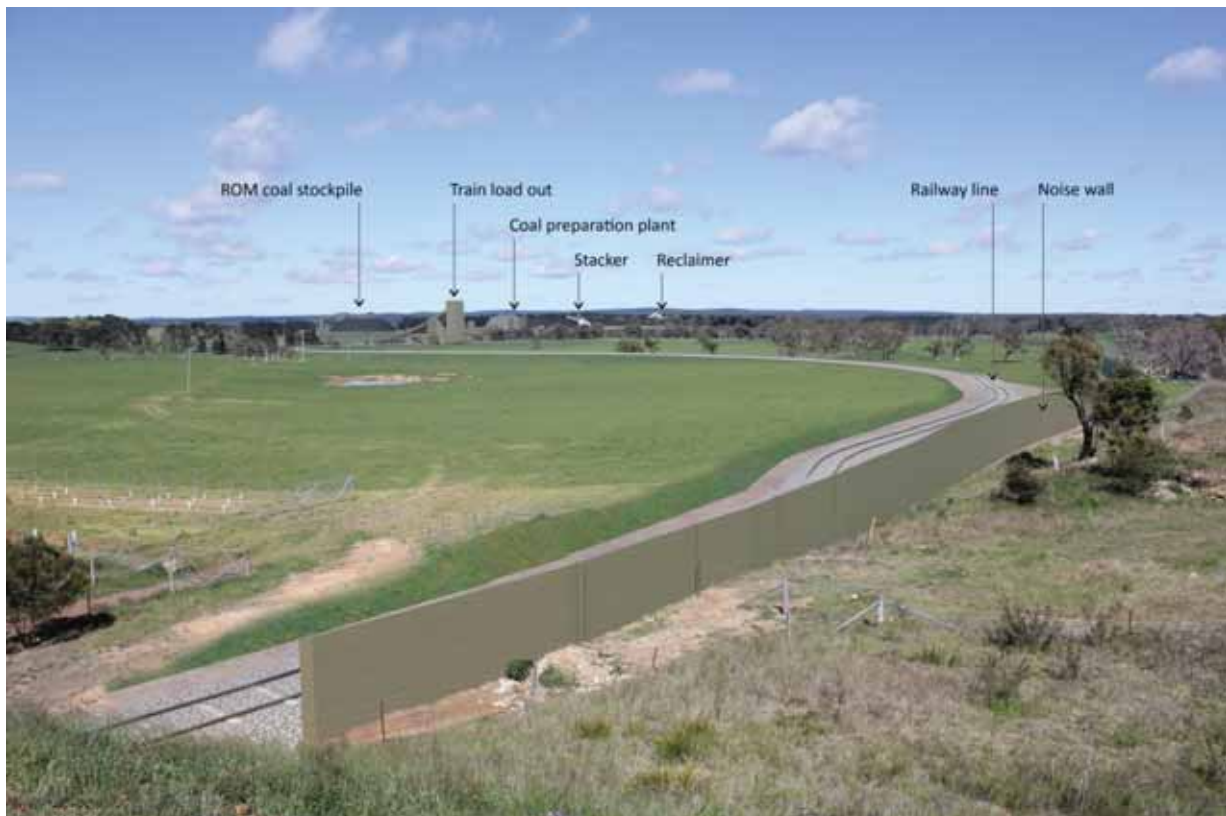
Table 7.1 Tree planting species

Botanical name	Habit	Age to maturity	Height
<i>Acacia decurrens</i>	Small tree	5-7 years	12m
<i>Acacia floribunda</i>	Small tree	5-7 years	4m
<i>Acacia implexa</i>	Small tree	10 years	6-12m
<i>Acacia melanoxylon</i>	Small tree	10 years	8-12m
<i>Acacia rubida</i>	Small tree	5 years	3-4m
<i>Allocasuarina littoralis</i>	Tree	10 years	10m
<i>Banksia marginate</i>	Small tree	5 years	5-6m
<i>Casuarina cunninghamiana</i>	Tree	15 years	20m
<i>Eucalyptus amplifolia</i>	Tree	15 years	8-15m
<i>Eucalyptus elata</i>	Tree	15 years	10-12m
<i>Eucalyptus ovata</i>	Tree	15 years	12-20m
<i>Eucalyptus pauciflora</i>	Tree	15 years	7-12m
<i>Eucalyptus radiata</i>	Tree	15 years	15-30m
<i>Eucalyptus rubida</i>	Tree	15 years	15-20m
<i>Eucalyptus stellulata</i>	Small tree	15 years	5-7m
<i>Eucalyptus viminalis</i>	Tree	15 years	20m
<i>Hakea dactyloides</i>	Shrub	5 years	2-3m
<i>Hakea salicifolia</i>	Shrub	5 years	3-8m
<i>Leptospermum morrisonii</i>	Shrub	5 years	4m
<i>Leptospermum obovatum</i>	Shrub	5 years	2-4m
<i>Leptospermum polygalifolium</i>	Shrub	5 years	2-4m
<i>Melaleuca linariifolia</i>	Small tree	10 years	6-8m

Photomontage 7.1 illustrates the tree screen planting undertaken by Hume Coal during Autumn 2016. It is anticipated that once construction starts on the project it will provide substantial screening to a majority of the project elements, thereby ensuring the effectiveness of the screening as early as possible.

Other mitigation measures include:

- appropriate colour selection for the noise wall (refer to photomontage 7.1), buildings and sheds; and
- minimisation of night lighting.



Photomontage 7.1 Proposed noise wall adjacent to rail line along Medway Road (represented as a photomontage). View from Hume Highway/Medway road intersection looking south-west.

Australian Standard 4282 (AS4282) *Control of Obtrusive Effects of Outdoor Lighting* sets out guidelines for the control of the obtrusive effects of outdoor lighting and gives recommended limits for relevant lighting levels to contain these effects within tolerable levels.

Lighting protocols will be developed which adopt the following principles:

- establish operational protocols for setting up of mobile lighting plant (if required) such that lighting is directed away from external private receptors;
- establish design and operational protocols such that lighting sources are directed below the horizontal to minimise potential light spill;
- design light systems that minimise wastage;
- screening of lighting where possible for viewers internal and external to the project; and
- avoid lighting of light coloured surfaces which have greater reflectivity.



Tree planting scheme
Berrima Rail Project
Visual amenity assessment
Figure 7.1

8 Conclusion

The visual assessment was conducted from a number of representative viewpoints and these viewpoints were selected to represent worst case scenarios, including views from private residential properties, a main transport route and local streets nearest to the project area. Due to tree screen planting along adjoining transport routes, and the rail line being predominantly at grade with the natural topography, the project will not result in any significant visual impacts for viewers across the project area. Further, due to the relatively intermittent frequency of trains travelling along the railway line the overall visual impact is minimised. It is also important to note that a rail line already exists within the landscape in the eastern extent of the project area at present so viewers will not experience significant alterations to existing views in the locality.

The project design has progressively evolved to reduce its attendant impacts, including visual impacts. Nonetheless, the development of the project will result in some changes to the existing landscape especially in the early stages prior to maturation of screen landscaping. Such changes will be noticeable to viewers and generally perceived as intruding into an attractive rural landscape from certain viewpoints surrounding the project area.

The viewpoints assessed are likely to experience varying degrees of visual change which is primarily due to the fact that no railway line currently exists in these views and existing views are characterised by open, flat and rural scenic landscapes. Some viewpoints will experience a higher magnitude of change, particularly those along Medway Road, due to the introduction of a noise wall and rail infrastructure, including the rail maintenance facility and bridge crossing.

However, the extensive tree planting scheme undertaken by Hume Coal will reduce exposure to project elements at viewer locations, and/or minimise the contrast between the element concerned and the surrounding landscape. Although the tree planting will take time to become established and fully effective, once established, it will assist to substantially mitigate visual impacts such that they will be generally acceptable to residents in the locality and motorists. Notably, the tree screens have already been planted to provide time for the trees to become established prior to construction commencing.

This VIA concludes that the project will not have significant adverse visual impacts on the locality.

References

Australian Standard 4282 (AS4282) *Control of Obtrusive Effects of Outdoor Lighting*.

EMM 2017 *Hume Coal Project Environmental Impact Statement*. Report prepared by EMM for Hume Coal Pty Limited.

Landscape Institute and Institute of Environmental Management and Assessment 2013, *Guidelines for Landscape and Visual Impact Assessment (GLVIA) Third Edition*.



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