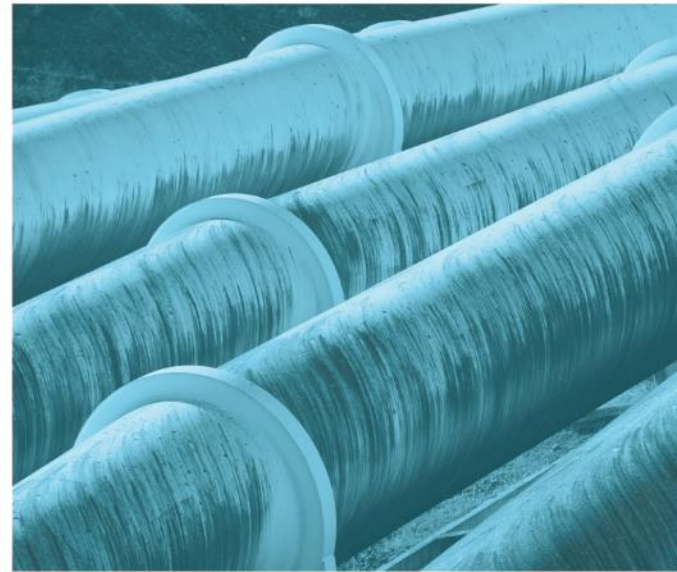




Hume Coal and Berrima Rail Project

Updated Visual Impact Assessment prepared in response to the
Independent Planning Assessment Report dated 27 May 2019

Prepared for Hume Coal Pty Limited
April 2020





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Hume Coal and Berrima Rail Project

Updated Visual Impact Assessment prepared in response to the Independent Planning Assessment Report dated 27 May 2019

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2 April 2020

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Executive Summary

ES1 Introduction

Hume Coal Pty Limited (Hume Coal) proposes to construct and operate an underground coal mine and associated mine infrastructure in the Southern Coalfield of New South Wales (NSW) (the Hume Coal Project). The mine will produce metallurgical coal with a secondary thermal coal product. Around 50 million tonnes (Mt) of run-of-mine coal will be extracted from the Wongawilli Seam via a non-caving mining system, resulting in approximately 39 Mt of saleable coal over a project life of about 23 years, including construction and rehabilitation. The Project area is located to the west of Moss Vale, in the Wingecarribee local government area (LGA).

Hume Coal is also seeking approval in a separate development application for the construction and operation of a new rail spur and loop, known as the Berrima Rail Project. Coal produced by the Hume Coal Project will be transported to port by rail for export or to domestic markets also by rail via this new rail spur and loop. The Hume Coal Project and the Berrima Rail Project together form 'the Project'.

The development application for the Hume Coal Project was publicly exhibited between March and June 2017. Submissions were received from government agencies, organisations and the public. A response to submissions report was submitted to the Department of Planning, Industry and Environment (DPIE) in June 2018, with their Preliminary Assessment Report provided in December 2018. The Project was referred to the Independent Planning Commission (IPC), to conduct a public hearing, to assess the merits of the Project, and to prepare a report outlining the Commission's findings on the Projects, including any recommendations.

The IPC findings and recommendations were published in their Independent Planning Assessment Report, released in May 2019. Specific to groundwater impacts on biodiversity and historic heritage, the IPC recommended that further visual impact assessment should be completed for assessment and should include at a minimum (recommendation R15 in the Independent Planning Assessment Report):

- dimensioned plans of the Project area and the railway extension. The plans should include a survey with contours and the location and size of all works as well as the relative heights above ground level of significant structures, including the coal stockpiles, the coal loader and primary water dam walls;
- views of the Project area and railway extension from sensitive properties within and in the vicinity of the Project area (including heritage items), from the Hume Motorway and Medway Road or any likely affected property. The distance and heights of the viewing points should be provided;
- views should be without mitigation measures (screen planting) and with mitigation measures in place after 5 years and 15 years;
- any findings in relation to groundwater impacts on gardens, plantings and landscape settings, and
- further assessment of the impacts of night-time lighting.

The IPC Report also noted that photomontages of the view impacts should be certified in accordance with the Land and Environment Court's Direction on use of photo montages http://www.lec.justice.nsw.gov.au/Pages/practice_procedure/directions.aspx.

This assessment addresses all of the above points. The assessment was conducted by a team comprising an environmental scientist, a GIS specialist, a photomontage specialist assisted by a registered surveyor, archaeologist, a cultural landscape expert and an ecologist. This interdisciplinary approach provides a robust impact assessment that addresses R15.

ES2 Methods

The study area for the visual impact assessment presented in the Hume Coal Project Environmental Impact Statement (EIS) (EMM 2017a) and Berrima Rail Project EIS (EMM 2017b), and Response to Submissions reports has been built upon resulting in the production of this Updated Visual Impact Assessment (UVIA).

At the request of the IPC (2019) the UVIA has:

- combined the visual assessment from the Hume Coal and Berrima Rail EISs (EMM 2017a,b) into a single uniform assessment
- presented further details on the various mine elements in the surface infrastructure area (SIA);
- provided additional viewpoints to demonstrate the landscape character and views of the project area and railway extension including:
 - views from sensitive properties within the project area
 - views in the vicinity of the project area;
 - views from Medway Road and the Hume Motorway;
 - views from within and around Mereworth in accordance with NSW Heritage Council (2017, 2018) letters;
- included specific details of viewpoint photography and photomontages in accordance with the Land and Environment Court's Practice Guidelines;
- included photomontages representing visibility of project elements within the SIA from a range of viewpoints, including Mereworth, representing views upon project completion, and with mitigation measures in place at year 5 and year 15;
- undertaken further assessment of night-time lighting; and
- incorporated findings in relation to groundwater impacts on gardens, plantings and landscape settings.

The methodology utilised for this UVIA was expanded upon from the assessments undertaken for the Hume Coal and Berrima Rail EISs (EMM 2017a,b), with the following methodological refinements:

- a visual catchment for the project was defined;
- the landscape character (physical, biological, cultural, historical and visual elements), and setting within which the project occurs was described and mapped (landscape character units);
- identification of landscape receptors and effects;
- visual effects of individual project elements and cumulatively were characterised formally and significance described in terms of scale / mass and magnitude of effect in terms of visual integration and visual contrast;
- the visual sensitivity to change was characterised formally in terms of landscape receptor sensitivity and distance of receptors from visible mine elements;

- overall significance (visual impact evaluation) utilised the matrix evaluation table of the Hume Coal and Berrima Rail EISs;
- visibility within the visual catchment was determined by analysis within a geographic information system (GIS) utilising LiDAR imagery specifically flown for the project;
 - visibility was mapped in terms of prominent individual mine elements and through composite assessment;
- following evaluation of initial visual impacts arising from the project, additional mitigation measures were proposed, tested and refined; and
- visual impacts were tabulated to show project effects to sensitive receptors within each landscape character unit, mitigation measures to be deployed and finally residual impacts.

In undertaking the UVIA, a visual catchment for the Project was established; being identified by the significant potential visibility zone. The significant potential visibility zone includes the most significant parts of the total visual catchment from which the above ground elements of the Project could potentially be seen.

These are areas visually connected to the proposal and determined by desk-top and field assessment to confirm extent and visibility. Not all parts of the landscape within the zone may have views of Project elements. Determination of this zone was based on a test of reasonableness which is proportional to the scale and nature of the proposed development; it does not encompass or enclose all potential viewpoints within the catchment, rather those which are most significant. It does not mean that views outside of this zone are not possible, rather it is the area containing the most critical locations with views to the Project, which is the focus of this UVIA. The significant potential view zone was developed through multi factorial spatial analysis conducted in ArcMap.

The evaluation of the existing setting was assessed through determination of the landscape character of the of the significant potential visibility zone. Character is determined by the determined by repeatable physical, biological and social elements of the landscape, the interaction of these elements resulting in similar patterns allowing landscape character units to be mapped.

Consideration of visual effect and sensitivity was undertaken to assess the interaction between the existing visual landscape and the Project facilitated the determination of potential impacts, from which additional mitigation measures were developed. The Project has been assessed on the basis of determining which visual elements are the most visible and significant in the context of the significant potential view zone. Elements were assessed in terms of contrast or integration with the existing visual environment (visual effects – Table 2.1), and visual sensitivity (how critically a change to the environment will be viewed) determined by visibility of elements to a hierarchical sensitivity listing of landscape receptors and land uses (Table 2.2). The visual impact of the Project has been determined by considering the interaction of visual effect and visual sensitivity as determined by Table 2.3.

Additional mitigation strategies and management measures, complimentary to existing measures already undertaken and proposed, and local government development controls relating to views and vistas were identified. Measures were developed to address and reduce visual effects or visibility in reasonable and appropriate timeframes.

To demonstrate visibility of the landscape from a variety of viewpoints representative of different landscape characters and sensitivity additional viewpoints have been added to the assessment from the cultural landscape and from Mereworth Garden. Precise photographic details of each image have been taken and are presented in the report. Computer generated photomontages for Project practical completion, Project year 5 and Project year 15 have been developed to illustrate what the Project together with proposed mitigations may look like from a specific viewpoint over the Project's lifetime.

A final analysis of Project visual and cumulative impacts including the effects of the groundwater drawdown assessment was undertaken.

ES3 Results

The results of this UVIA are broadly consistent with the findings of the original VIA presented in the EIS.

Visual impacts of the Hume Coal Project will be temporary during the life of the Project, and upon decommissioning, the landscape will be returned to its pre-disturbance agricultural landform/land use.

Visual effect is dependent upon the extent to which proposed elements visually contrast or integrate with elements of a view shed, and the proportion of the viewshed occupied by the new elements.

Additionally, the landscape context and location from which elements will be viewed is also important (eg if elements will be visible and present in the foreground, midground or background of a view). Visual effect must be considered on a case-by-case basis revised for each viewing location assessed. The assessment of visual effect has been described in terms of individual surface elements (or as groups of similar elements) and generally, the overall Project effect must be considered as a whole (the cumulative effects).

The following elements will generally have a moderate to high residual visual effect:

- train load out (TLO);
- run of mine (ROM) conveyor and conveyor tower;
- coal handling and processing plant (CHPP);
- coal stacker and reclaimer; and
- rejects stockpile.

The following elements will generally have a moderate visual effect:

- primary water dam;
- rail bridge; and
- rail maintenance facility.

All remaining elements were assessed as having moderate to low effects.

Visual sensitivity was determined by the landscape receptor type, functional land use and distance from the visible elements of the SIA, with sensitivity diminishing with distance as determined by the primary, secondary and tertiary view zones. Within the SPV zone, the highest visual sensitivity is assigned to the following receptors:

- Private properties and working farms which welcome tourists, such as the farm gate and cellar door activities of those ventures participating in the food and wine cluster ventures and other properties welcoming the public / tourism within 2.5 km of the Hume Coal SIA; and
- Identified tourist routes such as the Old Hume Highway, within 2.5 km of the Hume Coal SIA.

Within the SPV zone, a moderate visual sensitivity is assigned to the following receptors:

- State heritage listed house of Golden Vale as this property occasionally welcome the public for open days, between 2.5 km and 7.5 km of the Hume Coal SIA;

- Private properties and working farms which welcome tourists, such as the farm gate and cellar door activities of those ventures participating in the food and wine cluster ventures and other properties welcoming the public / tourism between 2.5 km and 7.5 km of the Hume Coal SIA;
- Identified tourist routes such as Old Hume Highway, between 2.5 km and 7.5 km of the Hume Coal SIA;
- The Hume Motorway less than 2.5 km from the Hume Coal SIA;
- Rural dwelling with views from living areas of the SIA less than 2.5 km from the Hume Coal SIA; and
- Subregional roads with views from living areas of the SIA less than 2.5 km from the Hume Coal SIA.

All other receptors / land uses within the various view zones have low sensitivity.

ES4 Impact assessment

The VIA conducted for the Hume Coal Project EIS (EMM 2017a) and the Berrima Rail Project (EMM 2017b) concluded that the project would not have any significant adverse visual impacts upon the locality. With a number of additional measures to assist with landscape integration, this finding is supported by the UVIA.

Visual impact varies according to the visual effect of the Project, its visibility in the landscape and the visual sensitivity of areas from which it is seen. The visual effect of the SIA is high where the visual elements contrast significantly with the existing landscape fabric and lack visual integration into the setting. Visually sensitive zones occur to the north (beyond Mereworth Road, and to the east of the Highway. These factors combined as identified within Table 2.3 to determine levels of impact.

Within the SPV zone the most substantial impacts will be experienced along the Old Hume Highway, a designated heritage route. Principal effects arise as a result of the Berrima Rail line bridge over the highway and the nearby rail construction camp (temporary) and maintenance facility. These will be direct views and there is little opportunity to mitigate the residual risk associated with the bridge. Transient and glimpsed partial views of some of the taller mine elements of the SIA and the primary water supply dam will be possible.

Overall, visual impacts taking into account proposed mitigation measures (Table 7.1), will be of a moderate level:

- SIA elements from the Hume Motorway. These will be glimpsed, transient views at speed of mine elements rising above the treeline;
- SIA elements from Old Hume Highway near intersection with Medway Road / Taylor Avenue. These will be transient and filtered views; and
- SIA elements from southern end of Old Hume Highway overlooking the primary water storage dam. These will be both static and transient views.

All other effects will be slight/moderate or lower.

Existing night-time lighting sources include rural residential properties, farm machinery and vehicles on roads. Motorists travelling north-south along the Hume Motorway provide a moderate source of lighting in the evening hours. Existing sources of night lighting in the immediate vicinity of the mines surface elements (west of the Hume Motorway) are less due to its rural setting and state forest to the west. Any new lighting, if unmitigated, would constitute an intensification of night-time lighting at the edge of more intense night lighting environment (a cumulative impact). Surface lighting effects could be experienced at locations identified by surface visibility analysis however visual impacts emanating from light sources will likely be low to moderate.

The drawdown on groundwater and mitigation strategies employed by Hume Coal are unlikely to result in significant vegetation effects affecting the visual environment.

The mine industrial elements would be experienced in the context of the pre-existing industrial area which extends from Moss Vale to the Old Hume Highway, and when viewed in the context of this existing development, would be experienced as a western extension of it. Elements of the mine are in keeping with the scale of existing industrial elements to the east.

Mine elements could create a focal point especially where there are long un-interrupted views and where they extend above the horizon, however there are few localities where this occurs as these elements occur in the lowest part of the landscape. With additional integration planting and sympathetic colour schemes the contrast of most mine and rail elements can be softened and the scale reduced. With the exception of some locations where mine elements can appear above the skyline, existing views and vistas can be preserved.

With respect to land use planning there are no other large-scale industrial developments with elements that will have a cumulative visual impact with Hume Coal. Therefore, there will be negligible cumulative impact.

ES5 Impact mitigation strategy

Hume Coal proposes a combination of mitigation methods to address potential impacts to the visual landscape. The visual mitigation measures presented in EIS and RtS (visual screen planting and sympathetic, non-reflective painting schemes for SIA elements) are supported and additional measures proposed are:

- Visual integration planting (over and above the screen planting undertaken by Hume Coal during 2015/2016) to assist in reducing the effect / visibility of elements.
- Potential offsite treatments for the Project will be assessed and acted upon post approval, where deemed necessary. Actions will be identified through ongoing liaison with landholders to identify and mitigate the visual effect of the Project on high sensitivity viewer locations through screen plantings, sympathetic with the landscape form (clumps / copses, specimen trees and belts).
- The proponent will commit to the development of a Visual Management Plan (VMP) in conjunction with stakeholders which will identify specific screening to be undertaken, suitable species and forms to be used, a register and mechanism for identifying, treating and reporting upon new locations.
- A detailed assessment of potential light spill from the Project will be undertaken as part of detailed design. It is not possible to undertake this assessment until a detailed design of the Project is complete with lighting protocols and assessment of effect and mitigation developed in the VMP.

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Glossary, acronyms and abbreviations

Term	Definition
Aesthetics	Refers to the sensory and perceptual experience. Aesthetic qualities can encompass tangible senses (visual and non-visual) and more intangible qualities such as feelings. Aesthetic appeal is often associated with the reinforcement of cultural or social values and identity.
Amenity	The pleasantness of a place as conveyed by desirable attributes including views, noise and odour.
Character (visual)	A distinct, recognisable and consistent pattern of elements in the landscape which makes one landscape different from another, and often conveys a distinctive sense of place. This term does not imply a level of value or importance.
Copse	Thicket, grove, small group of trees.
Development control plan (DCP)	Development control plans contain specific controls to guide certain types of development and achieve particular development outcomes within certain areas. A DCP is a supplementary development guideline that supports Council's primary planning instruments <i>viz.</i> Local Environmental Plans (LEPs).
Digital elevation model (DEM)	A digital elevation model is a three-dimensional computer-generated representation of a terrain's surface.
Digital surface model (DSM)	The DSM is derived from Airborne Light Detection and Ranging (LiDAR). The system collects point data on a grid basis giving varying elevation values representative of surface features; buildings, tree canopies, powerlines and other infrastructure. The output of a LiDAR collection is a point cloud filled with varying elevation values.
Effect (visual)	The landscape or visual outcome of a proposed change. It may be the combined result of sensitivity together with the magnitude of the change.
Field of view	The total open, observable area a person can see from a viewing location (viewpoint); in the case of (digital) photography it is a solid angle through which a detector is sensitive to electromagnetic radiation.
Ha ha	A recessed landscape design element that creates a vertical barrier while preserving an uninterrupted view of the landscape beyond. The design includes a turfed incline that slopes downward to a sharply vertical face (typically a masonry retaining wall). Ha-has are used in landscape design to prevent access to a garden, for example by grazing livestock, without obstructing views.
Impact	The characterisation of effects. Context should be considered in defining impacts and their significance.
Landscape	Landscape is an all-encompassing term that refers to areas of the earth's surface at various scales. It includes those landscapes that are: urban, peri-urban, rural, and natural; combining bio-physical elements with the cultural overlay of human use and values.
Local Environmental Plans (LEPs)	Local Environmental Plans guide planning decisions for local government areas. They do this through zoning and development controls, which provide a framework for the way land can be used.
LiDAR	Airborne Light Detection and Ranging (LiDAR). Using light, LiDAR measures reflected light that bounces off the ground and back to the sensor to obtain elevation of the Earth's surface.

Term	Definition
Magnitude of change	The extent of change that will be experienced by receptors. Change may be adverse or beneficial. Factors to be considered include: • Proportion of the view / landscape affected; Extent of the area over which the change occurs; • Size and scale of the change; • Rate and duration of change; and • Level of contrast and compatibility.
Mitigation	Measures to reduce and manage identified potential adverse impacts.
Photomontage	A visual representation of a proposal from a particular receptor viewpoint, on a photographic base.
Project area	The Project area covers the combined Hume Coal Project area (Mining Lease Application (MLA) areas for the Project that have been submitted under the NSW <i>Mining Act 1992</i> , (MLA 527, MLA 528 and MLA 529)), and the Berrima Rail Project area, as illustrated on Figure 1.3.
Receptor	A place, route, viewer audience or interest group which may experience an effect and require assessment; the people who will be affected by changes in views or visual amenity.
ROM	Run of mine
SHR	State Heritage Register
Scenic amenity	A measure of the relative contribution of each place to the collective appreciation of the landscape.
Surface Infrastructure Area (SIA)	The mining infrastructure area containing all elements of the mining operations which include the ROM, processing and product stockpiling functions, administration, workshop and bathhouse.
Significant Potential View Zone	Includes the most significant parts of the total visual catchment from which the above ground elements of the Project could potentially be seen. These are areas visually connected to the proposal and determined by desk-top and field assessment to confirm extent and visibility. Not all parts of the landscape within the zone may have views of Project elements. Determination of this zone is based on a test of reasonableness which is proportional to the scale and nature of the proposed development; it does not encompass or enclose all potential viewpoints within the catchment, rather those which will be most significant post development. It does not mean that views outside of this zone will not be possible, rather it is the area containing the most critical locations with views to the Project, which is the focus of this UVIA.
Sensitivity	Capacity of a landscape or view to accommodate change without losing valued attributes. Includes the value placed on a landscape or view by the community through planning scheme protection, and the type and number of receivers.
SIA	Surface infrastructure area. Area of the mine encompassing all above ground elements.
Silviculture	Silviculture is the practice of controlling the growth, composition/structure, and quality of forests to meet values and needs, specifically timber production
Spatial organisation	The arrangement of elements, people and places; in this sense, built elements and land use patterning on landscape. Urban development is considered to have a fine spatial patterning. In contrast agricultural landscapes have a broader arrangement of spatial organisation.
SPV Zone	Significant potential view zone.
Study area	The Project area and immediate surrounds; nominally the Project area buffered by 3 km.
Train Load Out (TLO)	Train Load Out. Area encompassing the rail loop and train loading infrastructure.
UVIA	Updated visual impact assessment.

Term	Definition
Values	Any aspect of landscape or views that people consider to be important. Landscape and visual values may be reflected in local, state or federal planning regulations, other published documents or be established through community consultation and engagement, or as professionally assessed.
View	Any sight, prospect or field of vision as seen from a place, and may be wide or narrow, partial or full, pleasant or unattractive, distinctive or nondescript, and may include background, mid ground and/or foreground elements or features.
Viewpoint	The specific location of a view, typically used for assessment purposes.
Viewshed	Areas visible from a particular location.
Vista	A distant view or a long, narrow view (as between rows of trees or buildings, especially one closed by a building or other structure).
Visual absorption capacity (VAC)	The potential for the physical attributes (landform, vegetation and built form) of a scene to absorb a particular change.
Visual amenity	The attractiveness of a scene or view.
Visual analysis map (VAM)	A map illustrating areas of land with views to a particular feature. It is a digitally modelled (GIS based) analysis incorporating a digital elevation model (terrain), and digital surface model (above surface elements) assessing the screening effect of terrain, vegetation and built form.
Visual catchment	Areas visible from a combination of locations within a defined setting (may be modelled or field-validated).

1 Introduction

1.1 Overview

Hume Coal Pty Limited (Hume Coal) proposes to construct and operate an underground coal mine and associated mine infrastructure in the Southern Coalfield of New South Wales (NSW) (the Hume Coal Project). The mine will produce metallurgical coal with a secondary thermal coal product. Around 50 million tonnes (Mt) of run-of-mine coal (3.5 million tonnes per annum (Mtpa)) will be extracted from the Wongawilli Seam via a non-caving mining system, resulting in approximately 39 Mt of saleable coal over a 23-year Project life which encompasses construction, mining and rehabilitation phases.

Hume Coal is also seeking approval in a separate development application for the construction and operation of a new rail spur and loop, known as the Berrima Rail Project. Coal produced by the Hume Coal Project will be transported to port by rail for export or to domestic markets also by rail via this new rail spur and loop. The Hume Coal Project and the Berrima Rail Project together form 'the Project'.

Approval for the Project is being sought under Part 4 Division 4.1 (State significant development) of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) and has been under assessment from 2015 to present. A detailed description of the environmental assessment process to date is provided in Hume Coal's response to the Independent Planning Commission (IPC) assessment report (EMM 2020a), to which this updated visual impact assessment (UVIA) is appended.

A full description of the Project, including the location at a regional scale, the Project areas and the indicative mine and surface infrastructure plans, is provided in the EIS report (EMM 2017a).

1.2 Scope and purpose of this updated visual impact assessment

1.2.1 Purpose

The IPC's report entitled *Independent Planning Assessment Report in relation to the Minister for Planning's request dated 4 December 2018 under Section 2.9(1)(d) of the Environmental Planning and Assessment Act 1979* (IPC 2019) was released on 27 May 2019. The report contained 485 comments and 30 detailed recommendations within 18 themes, of which visual impact (8.8) and historic heritage (8.9) were two. Many of those considerations, findings and recommendations, although grouped, are interrelated and need to be recognised and responded to in this UVIA report.

The purpose of this UVIA and statement of visual impact is to respond directly to the relevant IPC assessment, findings and recommendations. Specifically, it addresses parts of the IPC considerations, findings and recommendations for visual assessment that necessitated the completion of a revised historical archaeological assessment and statement of heritage impact. Where necessary, this study also addresses items presented in the IPC assessment report that the applicant feels are erroneous, unsubstantiated or are otherwise worthy of response.

1.2.2 Commission's finding and recommendations

The IPC findings and recommendations for visual impact included recommendations related to technical disciplines such as historic heritage, biodiversity and groundwater dependant ecosystems, groundwater modelling and cultural landscapes amongst others.

The scope of the visual assessment is to respond to the relevant requirements of recommendations R15, R17 and R18 from the IPC report. These include assessments of specific views, provision of additional information of visible components of the Project and revised impact assessments based on additional information from other technical studies.

The considerations, findings and recommendations specific to the Visual and Historic Heritage items are contained in Table 1.1.

Table 1.1 Response to IPC findings/recommendations – Visual Assessment

IPC's finding/recommendation	Hume Coal Response
8.8 Visual	
267. The Commission notes that a number of visual impact videos had been prepared by the Applicant and have been available on the Commission's website since 20 March 2019. The Applicant has confirmed that the videos were prepared independent of the Hume Coal EIS and before the Hume Coal RTS in support of the public exhibition process.	An excerpt still image has been used to prepare an oblique image (Figure 4.2) of the infrastructure area of the mine.
268. The Commission finds that that the Applicant and Department have not adequately assessed or considered the visual impacts of the Project. At this stage of its assessment the Commission finds that it is not satisfied with the information provided up to this point regarding visual impacts because the Commission considers that six viewpoints are not sufficient and that more information is needed to assess the visual impacts of the Project from private properties, particularly heritage items, and public roads.	Addressed in Sections 5.3.1, 5.4, 5.4.1 & 7.2. This UVIA included 26 viewpoint assessments (compared with 11 in the EIS). Of these 26 viewpoints, 11 have been subjected to photomontage analysis (compared with six in the EIS).
269. The VIA, based on expert studies, also assumes that the level of groundwater drawdown will not impact on the cultural landscape and scenic quality of the area. However, there are residual questions in relation to the level of water table draw down which may be relevant to the visual assessment.	Groundwater studies undertaken as a response to the IPC submission indicated that impacts to groundwater are unlikely to significantly affect terrestrial vegetation and the cultural landscape and scenic quality of the area. Effects of groundwater drawdown are discussed in the <i>Groundwater dependence assessment for cultural heritage landscapes and gardens prepared in response to recommendations R16 and E19 in the independent Planning Commission Assessment report dated 27 May 2019</i> (EMM 2020c).
270. The Commission makes the following recommendations that will require further information and/or assessment:	
R15: Further visual impact assessment should be completed for assessment and should include at a minimum:	
dimensioned plans of the Project area and the railway extension. The plans should include a survey with contours and the location and size of all works as well as the relative heights above ground level of significant structures, including the coal stockpiles, the coal loader and primary water dam walls;	Dimensions and details of the Project elements are dealt with in Section 4 – <i>Visual elements of the project</i> , Figure 4.1 and Figure 4.2.
views of the Project area and railway extension from sensitive properties within and in the vicinity of the Project area (including heritage items), from the Hume Motorway and Medway Road or any likely affected property. The distance and heights of the viewing points should be provided;	View shed and photomontage analysis from key locations in the public domain have been prepared and are presented in Section 5.4. Visual sensitivity is provided in Section 5.3.

Table 1.1 Response to IPC findings/recommendations – Visual Assessment

IPC's finding/recommendation	Hume Coal Response
views should be without mitigation measures (screen planting) and with mitigation measures in place after 5 years and 15 years;	Photomontages encompassing undisturbed, post construction, 5 year, 15 year with mitigation measures in place and end of mine timeframes is provided in Section 5.4.1 and Section 6.2.
any findings in relation to groundwater impacts on gardens, plantings and landscape settings, and	Effects of groundwater drawdown are discussed in EMM (2020c). The effects of the Project on the cultural landscape and the Mereworth garden are discussed in Brouwer (2020a,b).
further assessment of the impacts of night-time lighting.	Night-time lighting is discussed in Sections 7.2.2 and 7.3(vi).
Any photomontages of the view impacts should be certified in accordance with the Land and Environment Court's Direction on use of photo montages http://www.lec.justice.nsw.gov.au/Pages/practice_procedure_directions.aspx	The Land and Environment Court Direction is provided in Attachment B. Photomontages are provided in Section 5.4.1 and Section 6.2 with certification of images provided in Annexure C.
8.9. Historic Heritage	
286. At this stage of its assessment the Commission finds that it is not satisfied with the information provided up to this point regarding historic heritage impacts. The Commission considers that the magnitude of water table drawdown is not confirmed and thus there is a potential change to the aesthetic significance of the heritage items' settings (gardens, tree plantings) and cultural landscape. The SHIA relies on the VIA and further information provided with the Hume Coal RTS to assess the visual impacts of the surface infrastructure on Mereworth House, other heritage items and the cultural landscape. However, the visual impact assessment has shortcomings (that are addressed separately) and the impacts on heritage significance would need to be reassessed in accordance with an updated visual impact study.	Visual impacts related to groundwater and effects on gardens are further assessed in this report. These matters are also, in part, dealt with in the following reports: <i>Hume Coal and Berrima Road Project, Cultural Landscape Assessment</i> (Brouwer 2020a); <i>Sorensen Garden Analysis and the Garden at Mereworth</i> (Brouwer 2020b); <i>Hume coal project and Berrima rail project, historical archaeological assessment and statement of heritage intent: NIPC response</i> (EMM 2020b); and <i>Hume Coal and Berrima Rail Project – Groundwater dependence assessment for cultural heritage landscapes and gardens prepared in response to recommendations R16 and E19 in the independent Planning Commission Assessment report dated 27 May 2019</i> (EMM2020c).
270. The Commission makes the following recommendations that will require further information and or assessment:	

Table 1.1 Response to IPC findings/recommendations – Visual Assessment

IPC's finding/recommendation	Hume Coal Response
R17: The application should address the recommendations of the Heritage Council of NSW's correspondence to the Department dated 17 August 2018 as referenced in paragraph 283. Parts of that letter relevant to visual impact include: Despite additional visual impact assessment in the RTS, the visual impacts of the mine on views from the driveway of Mereworth, from points where Mereworth's garden, outer yards and surrounds have outward views, and views of the property from the Hume Highway, do not appear to have adequately addressed in the RTS. Therefore, existing photomontages should be amended to show the real outcome of the proposal before any decision is made. Choices of locations of photographs must avoid 'internal' areas of the garden where enclosure (by vegetation or structures) blocks outward views.	This recommendation is dealt with in Section 7.

1.2.3 Structure of this report

This report further investigates, in response to IPC findings (IPC 2019), potential impacts on visual amenity as a result of the Project. In this report:

- Chapter 2 - outlines the methodology employed for this UVIA;
- Chapter 3 – describes the environmental, visual and landscape character of the Project area;
- Chapter 4 – identifies the Project elements and their visual effects;
- Chapter 5 – presents an analysis of receptors and visual sensitivity, discussing selection of viewpoints, photomontage analysis and a viewshed analysis through the use of transects;
- Chapter 6 – conducts an analysis of the Mereworth property to assess visual sensitivity through the presentation of viewpoint photo-analysis and photomontages from key points identified by the Heritage Council, and the *Sorensen Garden Analysis and the Garden at Mereworth* (Brouwer 2020b);
- Chapter 7 – presents the landscape and visual impact assessment which investigates the visual effects, impacts and mitigation requirements of the Project; and
- Chapter 8 – is the conclusion.

1.3 Project and study areas

i Definition

The Project is located approximately 100 km south-west of Sydney (see Figure 1.1), 2.5 km south-west of Berrima and 4.5 km west of Moss Vale in the Wingecarribee local government area (Wingecarribee LGA) (see Figure 1.2).

Hume Coal is seeking development consent to construct and operate an underground coal mine and associated mine infrastructure in the Project area boundary illustrated in Figure 1.2. The proposed underground mining area is approximately 3,474 ha and includes Mining Lease Application (MLA) areas MLA 527, MLA 528 and MLA 529 as well as the parts of the Project that do not require a mining lease. Within the Project area, the surface infrastructure area (SIA) is limited to approximately 117 ha (see Figure 1.3).

The study area for the purpose of this assessment is defined as the Project area and immediate surrounds (nominally a 3 km buffer), from which Project components or infrastructure may be visible. The study area is further refined by this UVIA to describe the significant potential viewing (SPV) zone. The SPV zone includes the most significant parts of the total visual catchment from which the above ground elements of the Project could potentially be seen. The SPV zone is described in Section 3.2.2. These are areas visually connected to the Project and determined by desktop and field assessment to confirm extent and visibility. Not all parts of the landscape within the SPV zone may have views of Project elements.

ii Description

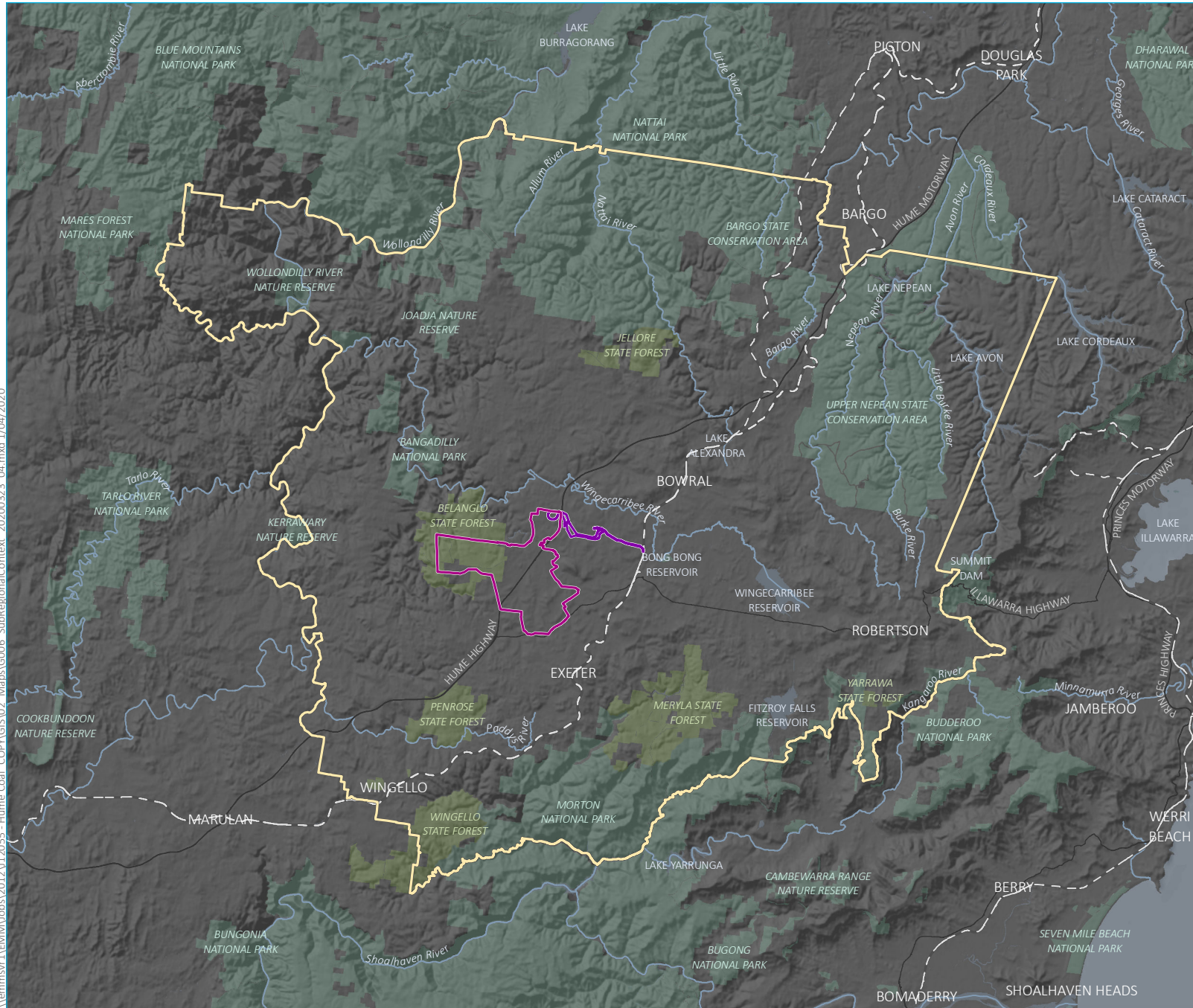
The Project is located in the Southern Highlands region of NSW, a scenic area containing many established rural enterprises and historic towns. The historic character of the Southern Highlands remains an important aspect of the place to residents and visitors and is recognised as such by statutory authorities and non-government organisations.

The Project area is in a semi-rural setting, with the wider region characterised by grazing properties, small-scale farm businesses, natural areas, forestry, scattered rural residences, villages and towns, industrial activities such as the Berrima Cement Works and Berrima Feed Mill, and some extractive industry and major transport infrastructure such as the Hume Motorway.

The Project area comprises cleared farmland, pine forest plantations associated with Belanglo State Forest and some native vegetation in Belanglo State Forest and in riparian corridors along watercourses. There are scattered rural residences and agricultural improvements such as outbuildings, dams and fences. The Project area is bisected by the Hume Motorway which runs from south-west to north-east.

Most of the central and eastern parts of the Project area have very low rolling hills with occasional elevated ridge lines. However, there are steeper slopes and deep gorges in the west in Belanglo State Forest.

\\lemmsvr1\EMM\Jobs\2012\112055 - Hume Coal - COPY\GIS\02 Maps\G006 SubRegionalContext 20200323 04.mxd 1/04/2020

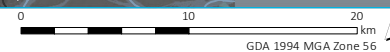


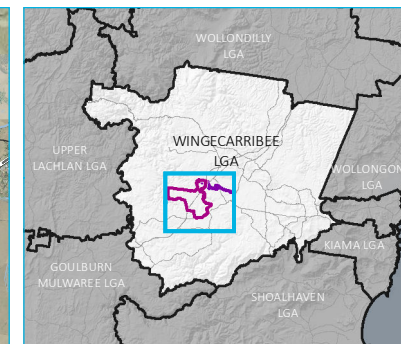
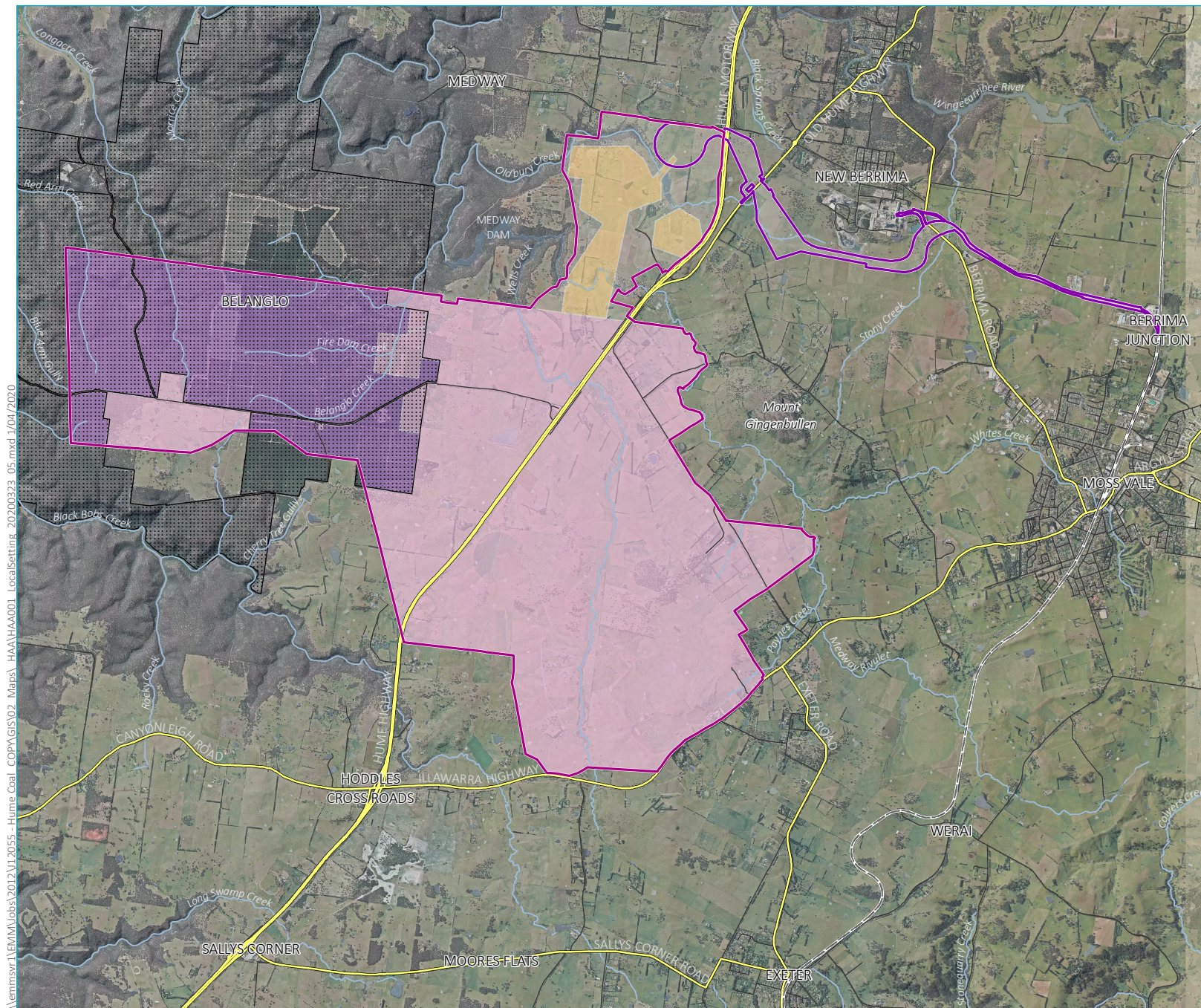
- KEY**
- Hume Coal Project area
 - Berrima Rail Project area
 - Wingecarribee Shire
 - local government area
 - Rail line
 - Motorways and primary roads
 - River
 - Named waterbody
 - NPWS reserve
 - State forest

Regional setting

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure 1.1

Source: EMM (2020); DFSI (2017); GA (2011); ASGC (2006)



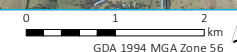


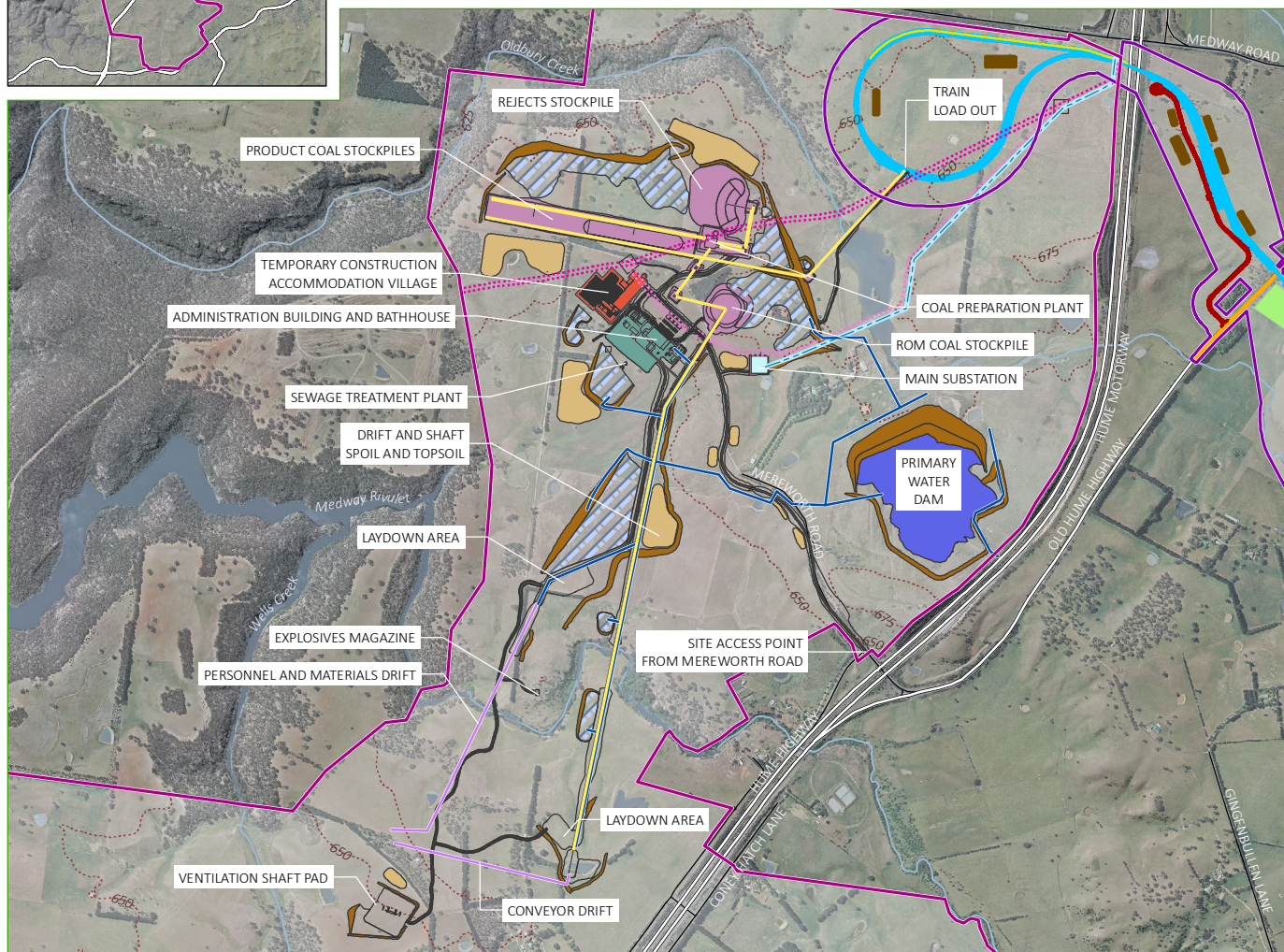
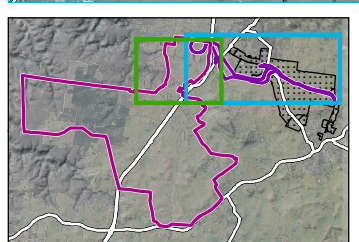
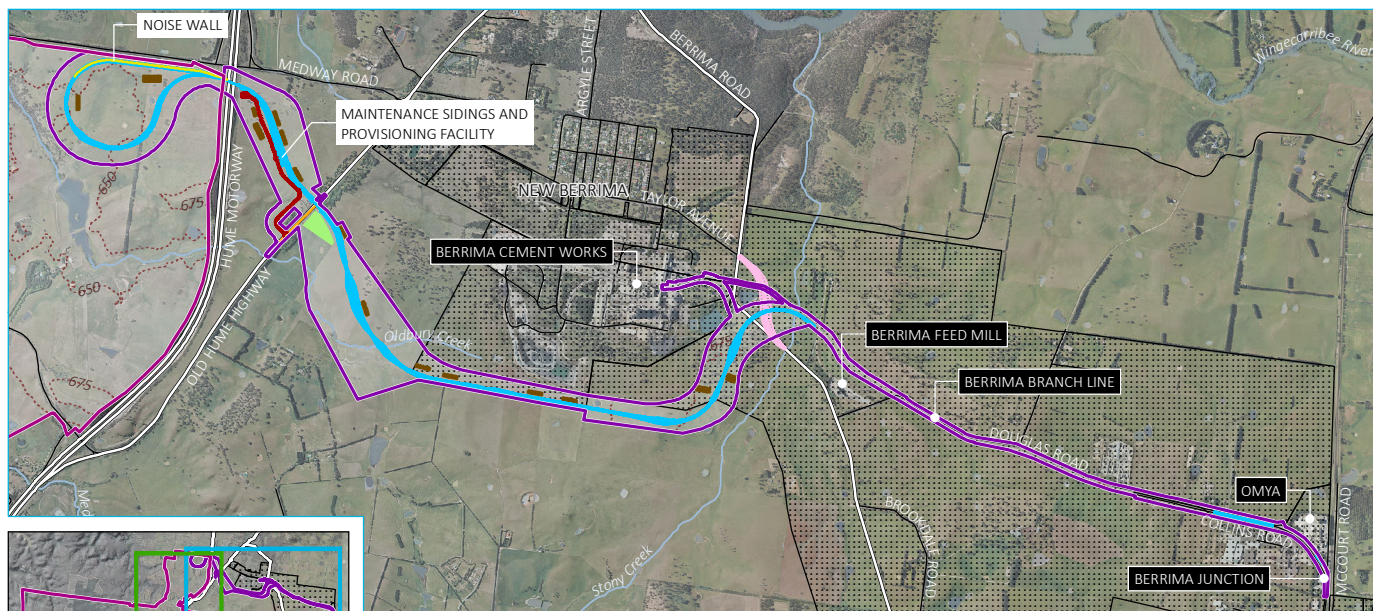
- KEY**
- Hume Coal Project area
(5,051 ha, 44,740 m perimeter)
 - Berrima Rail Project area
(181 ha, 23,201 m perimeter)
 - Mining lease application area**
 - MLA 527
 - MLA 528
 - MLA 529
 - Existing environment**
 - Rail line
 - Major road
 - Minor road
 - Named watercourse
 - Waterbody
 - Belanglo State Forest

Local setting

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure 1.2

Source: EMM (2020); Hume Coal (2016); DFSI (2017); DPE (2019)





Source: EMM (2020); DFSI (2017); DPE (2017)

KEY

- | | | |
|---------------------------------------|--|--|
| Major road | Berrima Road relocation (works by Wingecarribee Shire Council) | Existing WSC easement |
| Minor road | Topsoil stockpiles | Temporary construction accommodation village |
| Contour (25 m increments) | Rail temporary construction facility | Administration/bathhouse/workshop |
| Named watercourse | Turning lane/shoulder | Main substation |
| Waterbody | Hume Coal Project area | Internal road |
| Industrial enterprise area | Hume Coal Project elements | CPP and stockpiles |
| Berrima Rail Project area | Conveyor | Topsoil stockpiles |
| Berrima Rail Project elements | Drift (underground) | Stormwater management earthworks |
| Noise wall | Powerline route | Water management area |
| New rail line | Water pipeline | Top water level |
| Rail maintenance facility access road | Proposed powerline and pipeline easement | |

Mine infrastructure area layout plan

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure 1.3

2 Assessment methodology

2.1 Assessment guidelines

There are no Australian Federal, NSW State Government or Local Government Authority planning policies, guidelines or standards applicable to this assessment. The UVIA was therefore assessed with regard to industry standards included within the UK document *Guidelines for Landscape and Visual Impact Assessment* (GLVIA) Third Edition (Landscape Institute 2013) prepared by the Landscape Institute and Institute of Environmental Management and Assessment, and *Guidance Note for Landscape and Visual Assessment* (AILA 2018). The UVIA was also prepared with regard to Standards Australia (AS4282) *Control of Obtrusive Effects of Outdoor Lighting* and photomontages developed in accordance with the Land and Environment Court's 2013 direction on the use of photomontages (http://www.lec.justice.nsw.gov.au/Pages/practice_procedure/directions.aspx). The GLVIA (Landscape Institute 2013) and AS4282 were also utilised in the preparation of the VIA for the Hume Coal Project EIS (EMM 2017a) (Appendix N) and the Berrima Rail Project EIS (EMM 2017b) (Appendix M).

Viewpoint analysis was further guided by Landscape Institute technical guidance notes (Landscape Institute 2018 and 2019).

2.2 Assessment overview

Visual impact assessments essentially 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 magnitude of visual change.

The methodology, which was employed in the visual assessment for the EIS's (EMM 2017a, 2017b), 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 an adaption of 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 or both. This establishes the locations where views of the Project may be possible. Fieldwork is used to establish the types and locations of receptors within this theoretical zone;
- **Stage 3: View-point and photo montage 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.

2.3 Stages in the assessment method

2.3.1 Stage 1 - View and type of 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 considered are topography (Section 3.1.6), vegetation (Section 3.1.7), water features (Section 3.1.5) and built elements (Section 3.1.7). Other factors that are important are the consistency of these elements and whether they have developed progressively over time and become well integrated into the landscape. In addition, the presence of change and whether the landscape is or will experience large scale development such as residential growth on the urban fringe or industry needs to be considered. These aspects are dealt with in Section 3.3.

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

2.3.2 Stage 2 - Visibility baseline assessment

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

2.3.3 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 are identified through GIS mapping, fieldwork and desktop analysis.

2.3.4 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 the GLVIA, this visual assessment considered the following criteria in determining the magnitude of change on a receptor:

- whether the impact is temporary or permanent – impacts that are for a limited duration are considered less significant;
- 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, midground 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.

2.3.5 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 the 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.

2.3.6 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.

The overall visual impact of a new development is a subjective, quantitative assessment from predetermined criteria assessing the interaction between:

- visual effect – the effect individual Project elements have in relation to the level of contrast, mass and scale and integration with existing elements of the immediately surrounding landscape and the magnitude of that change (Table 2.1); and
- visual sensitivity - the visual sensitivity that is a measure of how significant the change may be to receptors (people) in the different land uses surrounding the development (Table 2.2).

The interaction of visual effect and sensitivity results in an assessment of visual impact. Table 2.3 illustrates how change in the landscape is assessed, and significance rated against the sensitivity of a receptor.

The primary assessment tools for determining the significance of impact were the site inspections, and photographs of the views from 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.

Table 2.1 Visual effects matrix

Contrast	Integration			Additional mitigating considerations
	Lacking visual integration with setting	Some visual integration with setting	Integration with setting is high	
Do not borrow from features in the visual setting	High	High/Moderate	Moderate	Extent to which a specific Project element occupies the immediate surrounding view landscape from a viewpoint – the magnitude of change
Some features of the setting have been borrowed	High/Moderate	Moderate	Low	
Extensive borrowing of elements	Moderate	Low	Negligible	

Table 2.2 Visual sensitivity determination

Landscape receptor and / or land use	Visual sensitivity levels			
	Primary	Secondary	Tertiary	Quaternary
	<i>Visible mine elements less than 2.5km from receptor</i>	<i>Visible mine elements 2.5-7.5 km from receptor</i>	<i>Visible mine elements >7.5 <12.5 km from receptor</i>	<i>Visible mine elements > than 12.5km from receptor</i>
Camping grounds, scenic outlooks, picnic areas and walking trails in public reserves	High	High/Moderate	Moderate	Low
State Heritage rural residences	High	High/Moderate	Moderate	Low

Table 2.2 Visual sensitivity determination

Landscape receptor and / or land use	Visual sensitivity levels			
	Primary	Secondary	Tertiary	Quaternary
	<i>Visible mine elements less than 2.5km from receptor</i>	<i>Visible mine elements 2.5-7.5 km from receptor</i>	<i>Visible mine elements >7.5 <12.5 km from receptor</i>	<i>Visible mine elements > than 12.5km from receptor</i>
Other tourism areas – eg food and wine clusters, Berrima village, State Heritage Registered Places	High	Moderate	Low	Low
Identified tourist roads – Old Hume Highway	High	Moderate	Low	Low
Highways and Main Roads – Hume Motorway	Moderate	Low	Low	Low
Rural residences (non state heritage listed)	Moderate	Low	Low	Low
State heritage gardens	Moderate	Low	Low	Low
Urban areas e.g. eg Medway and New Berrima	Moderate	Low	Low	Low
Sub regional roads	Moderate	Low	Low	Low
Local roads	Low	Low	Low	Low
Rural lands	Low	Low	Low	Low
Industrial	Low	Low	Low	Low

Table 2.3 Evaluation of significance matrix (visual impact)

Visual effect	Visual sensitivity		
	High	Moderate	Low
High	Substantial	Moderate/Substantial	Moderate
Moderate	Moderate/Substantial	Moderate	Slight/Moderate
Low	Moderate	Slight/Moderate	Slight
Negligible	Slight	Slight	Negligible
Key		Significant	Not significant

2.3.7 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:

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

Both avoidance and relocation of infrastructure have been utilised in early stages of the Project and therefore are not further considered. The updated UVIA considers the last three points in Section 7 of this report.

2.3.8 Visibility analysis

Visibility of the Project infrastructure within the landscape (ie the total visual catchment) was assessed through field assessment, evaluation of aerial photography and mapping and computer analysis in Geographic Information System (GIS), leading to the determination of the primary visual catchment.

A preliminary visual analysis was undertaken by GIS using a number of data sets; specifically the Project digital elevation model (DEM), the digital surface model (DSM)¹ and the surface elements 3D model (used also for the development of photomontages) to develop maps showing theoretical visibility.

The DEM shows only land from which the Project may theoretically be visible. It assesses the zone of interest in a 'bare-earth' state and excludes above-ground features. While the DEM is a terrain analysis that recognises the physical surface landform only, the DSM takes into account other surface components above the 'bare-ground' that may affect visibility, for example vegetation, buildings and surface infrastructure.

Superimposed into the model are the heights and location of key Project infrastructure, usually those of prominent height and or mass (see Section 4) and visibility within the landscape calculated along lines radiating outwards from the elements to potential observers. Observer height was assessed at 1.6 m above natural ground.

The DEM model was run as a 'first-cut' to identify zones of potential visibility where terrain did not constrain views. In this regard, it can be considered a worst-case scenario. The DSM analysis was then undertaken to further refine potential visibility so that a more realistic understanding of visibility could be determined. In the model-space, features within the landscape identified by the DSM are considered totally opaque; that is, all views will be blocked. To this end, a number of iterations of the DSM model were run to remove the known effects of powerlines.

Although the DSM could be considered to be a reasonable approximation of visibility, in reality actual visibility is difficult to model for large areas. Furthermore temporal, seasonal and climatic considerations all play a part in the accuracy of the model. In this instance, LiDAR (point cloud data) of the Project area and surrounds was obtained in October 2013 and was flown to support baseline assessments for the EIS. This LiDAR data can therefore be considered to be a 'snap-shot' or moment-in-time assessment of visibility.

In the six-year period since this data was acquired, the extent of vegetation growth, loss, effect of drought, and seasonal effects (flown mid spring in a landscape with a number of deciduous and semi-deciduous species are present), cannot be factored into the model. Further, Hume Coal undertook visual screen planting at key locations in 2015/2016, and this post-dates the LiDAR surface data capture. The effect of the vegetation in screening views therefore cannot, at least from this computer modelling exercise, be determined. For this reason, DSM 'visibility' can only be considered indicative of potential views.

¹ The digital surface model was developed from LiDAR data collected in 25 October 2013

3 Existing environment

3.1 Regional context

3.1.1 Settlements

The Hume Coal Project is situated within the Wingecarribee LGA within the Southern Highlands region of NSW. The Hume Coal and Berrima Rail Project areas are adjacent to the villages Medway, New Berrima, Sutton Forest and the towns of Exeter, Berrima, Moss Vale, Burradoo, Bowral and Mittagong (refer Figure 1.2). The mine infrastructure is approximately 2.5 km to the south-west of Berrima and 7.2 km to the north-west of Moss Vale. Each of these towns has a significant urban component surrounded by peri-urban and rural residential settlement with residential dwellings decreasing in number, and lot size increasing with distance from urban centres.

3.1.2 Transport Routes

i Road

The road network in the study area consists of a range of roadways, from State Highways through to minor, unsealed rural property access roads. The Hume Motorway is the major road traffic transport route through the Southern highlands, connecting Sydney with Canberra and Melbourne. It is a limited access, grade separated four-lane, dual-carriageway motorway with a posted speed limit of 110 km/h. The Berrima bypass on the Hume Motorway was completed in 1989, to divert highway traffic around the town of Berrima.

The bypassed section of the Hume Motorway is now known as the Old Hume Highway and this overlays parts of the earlier Great Southern Road, constructed in the early days of settlement. The road is a regional single lane dual carriageway road with a posted speed of 80 km/h outside of the town centre of Berrima. The road is promoted as a tourist drive linking with Mittagong, Bowral, Moss Vale, Exeter and Sutton Forest. South of Berrima, the Old Hume Highway forms part of the Remembrance Driveway, established in 1956.

Both the Hume Motorway and the Old Hume Highway traverse the study area in a north-east to south-west direction. Hume Motorway is a state road (TfNSW managed). Old Hume Highway south of the intersection with Taylor Avenue to the intersection with Hume Motorway is a regional road which is CSC managed and partially funded by the state). Moss Vale Road is another regional road to the east of the Hume Motorway that provides a transport route between Mittagong, Bowral, Moss Vale and Sutton Forest. Taylor Avenue and Berrima Road between the Hume Motorway and Mossvale are regional roads.

Local (collector) roads of Oxley Hill Road, Berrima Road and Golden Vale Road provide south-east to north-west connections between Moss Vale Road and the Old Hume Highway. These tend to be minor connector roads with posted speed limits of between 60-80 km/h. Mereworth Road and Medway Roads are local access roads, constructed as part of the Hume Motorway development, which provides access into the Project area.

The study area is also traversed by a number of unsealed farm and forestry tracks.

The Main Southern Rail Line between Sydney and Melbourne passes through Moss Vale. The Unanderra-Moss Vale railway line traverses the Illawarra Escarpment linking the Illawarra Line to Moss Vale. Both lines have been used for freight and passengers. A line from Moss Vale heading westwards services the Berrima Cement works. It is this line which would be extended to the Hume Coal Project area.

Figure 3.1 shows these features.

3.1.3 Industry and Mining

The Wingecarribee Enterprise Zone is a designated industrial development corridor under the *Wingecarribee Local Environmental Plan (LEP) 2010*. The industrial area extends from the Old Hume Highway to the west of the cement works and extends eastward centred along Moss Vale Road, extending to the outskirts of Moss Vale. It is zoned industrial (IN1 Light Industrial and IN3 Heavy Industrial). A number of key industrial and manufacturing facilities, including the cement works, brick works, metal fabrication, mining equipment manufacturing and quarries are present:

- Berrima Cement Works – located in New Berrima, the Boral Cement Limited (Boral) Berrima cement works have been operating since 1929 and produce cement products (cement and clinker) for sale in NSW, the ACT and for export. The cement works have approval to produce up to 1.56 Mtpa of cement products, which are dispatched by rail and road transport to domestic customers and to international customers via Port Kembla.
- Berrima Feed Mill – the Ingham poultry feed mill is also located on Berrima Road on the fringe of New Berrima and has been operating for approximately 15 years.
- Omya – Omya's Moss Vale plant was originally established in 1961. In recent years the incorporation of technology and high levels of automation have resulted in the plant being a high-volume producer of bulk products for glass, agriculture, mining and manufacturing industries.
- Dux – The Dux hot water plant is located on Collins Road in Moss Vale.
- Resource recovery centre–The Wingecarribee Shire Council resource recovery centre is off Berrima Road, Moss Vale and comprises a waste recycling, collection and transfer facility.
- Southern Regional Livestock exchange and abattoir.

Wingecarribee Shire Council has recently approved the development of the Austral masonry manufacturing facility at 416-524 Berrima Road. An area to the north-east of the approved Austral facility within the E3 Environmental Management Zone has been identified as the area of the proposed New Berrima Shale Quarry Project. This will involve development on the site for extraction, surplus overburden, access roads, site office, amenities and storage/maintenance buildings.

Berrima Colliery, an underground mine to the west of the township of Medway operated more or less continuously from 1880 to 2013. The mine and railway line were opened by James John Atkinson (the son of James Atkinson the original recipient of the land grant for Mereworth). James John built a private rail line from the mine head to a junction with the main southern line near Moss Vale and ballasted it with small coal. The above ground mine infrastructure of the Berrima Colliery remains intact to this day and the mine is in care and maintenance.

Figure 3.1 shows these features.

3.1.4 Night lighting

Existing sources of night lighting in the immediate vicinity of the proposed SIA (west of the Hume Motorway) are minimal due to its rural setting. The main sources are rural residential properties, farm machinery and vehicles on roads. Motorists travelling north-south along the Hume Motorway provide a moderate source of lighting in the evening hours.

In the wider context, the Berrima Cement Works, which is approximately 2.5 km east of the SIA, at New Berrima, is a source of significant direct and diffuse light in the evening hours, as is the Ingham's Berrima Feed Mill, located further east on Berrima Road, and the Southern Regional Livestock Exchange and Abattoir, off Berrima Road, Moss Vale.

The towns and urban areas of the locality, particularly Moss Vale, Mittagong, Bowral, New Berrima, Burradoo, contribute discernible diffuse light sources, illuminating the night sky.

3.1.5 Surface water features

i Waterways

Watercourses with the Project area include the Medway Rivulet and its tributaries; Belanglo and Wells Creeks, which traverse the Project area in a south to north-easterly direction, Oldbury Creek which traverses the northern part of the Project area in an east to west direction, and Stony Creek which flows into the Wingecarribee River to the east of Berrima.

Black Bob's creek traverses the southern part of the locality in a south-east to north-west direction before turning north to the west of Belanglo State Forest and joining the Wingecarribee River some 6 km to the west of Medway.

Whereas the river valleys tend to be contained in deeply incised channels, the smaller tributaries forming their upstream reaches tend to be shallow and therefore are less contained with broader alluvial depositional plains.

ii Dams

The study area contains many small farm dams which have been constructed on overland flow paths. Impoundments created by damming watercourses include the Mereworth farm dam on Oldbury Creek, Medway Dam which lies to the immediately to the west of the Project area downstream of the confluence of the Medway Rivulet and Wells Creek, and an area of impoundment created by a weir on the Wingecarribee River, upstream of Berrima. Figure 3.1 shows these features.

The Project area lies almost exclusively within the catchment of the Wingecarribee River, a tributary of the Wollondilly River, which in turn is part of the Warragamba River. Waters of the Wingecarribee discharge into Lake Burragarang, the impoundment created by the Warragamba Dam and the Hawkesbury-Nepean catchments.

3.1.6 Topography

The terrain of the study area generally consists of deeply incised river channels, flat to undulating plains with low rounded rolling hills and elevated ridgelines. A significant feature of the landscape is Mount Gingenbullen (801 m AHD) which is the highest point in the landscape. The low hills and ridgelines of the locality in proximity to the Project area seldom exceed 750 m AHD. The most elevated land occurs to the west within Belanglo State forest (725 - 750 m AHD) and adjacent to and north-east of Berrima (750 - 800 m AHD). A series of low rounded hills (725-750 m AHD) encircle the Project area to the south and east. These hills yield to undulating and rolling terrain at around 650-750 m AHD.

The rolling terrain is incised by the upper tributaries of a number of significant waterways. Whereas the river incision occurs at around 600-650 m AHD, their tributaries formed flattened floodplains at 600-650 m AHD.

3.1.7 Land use and vegetation

Much of the Project area is, as is the surrounding region, utilised for pastoral activities, mainly horse and cattle grazing on improved pasture and cultivation of fodder. Grazing of beef cattle predominates, with both working farms and the use of 'hobby' properties for agistment. Paddock and woody vegetation (remnant/regrowth and cultivated tree and shrub form) patterning in the agricultural lands contributes to the character of a distinctive, working landscape (EMM 2017a). This use of the land can be traced back to the earliest days of non-aboriginal settlement when the land was separated into a number of large parcel land-grants, some of which are substantially intact today.

Paddocks cleared during early settlement occurred on flat fertile soils around the Wingecarribee River and the Medway Rivulet, and these remain more-or-less productive today. Undulating pastoral land types are generally sloping land with less fertile soils and contain pockets of remnant/regrowth vegetation. They are used for grazing beneath canopies of endemic woodland canopy species.

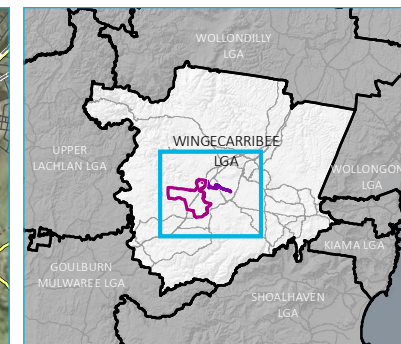
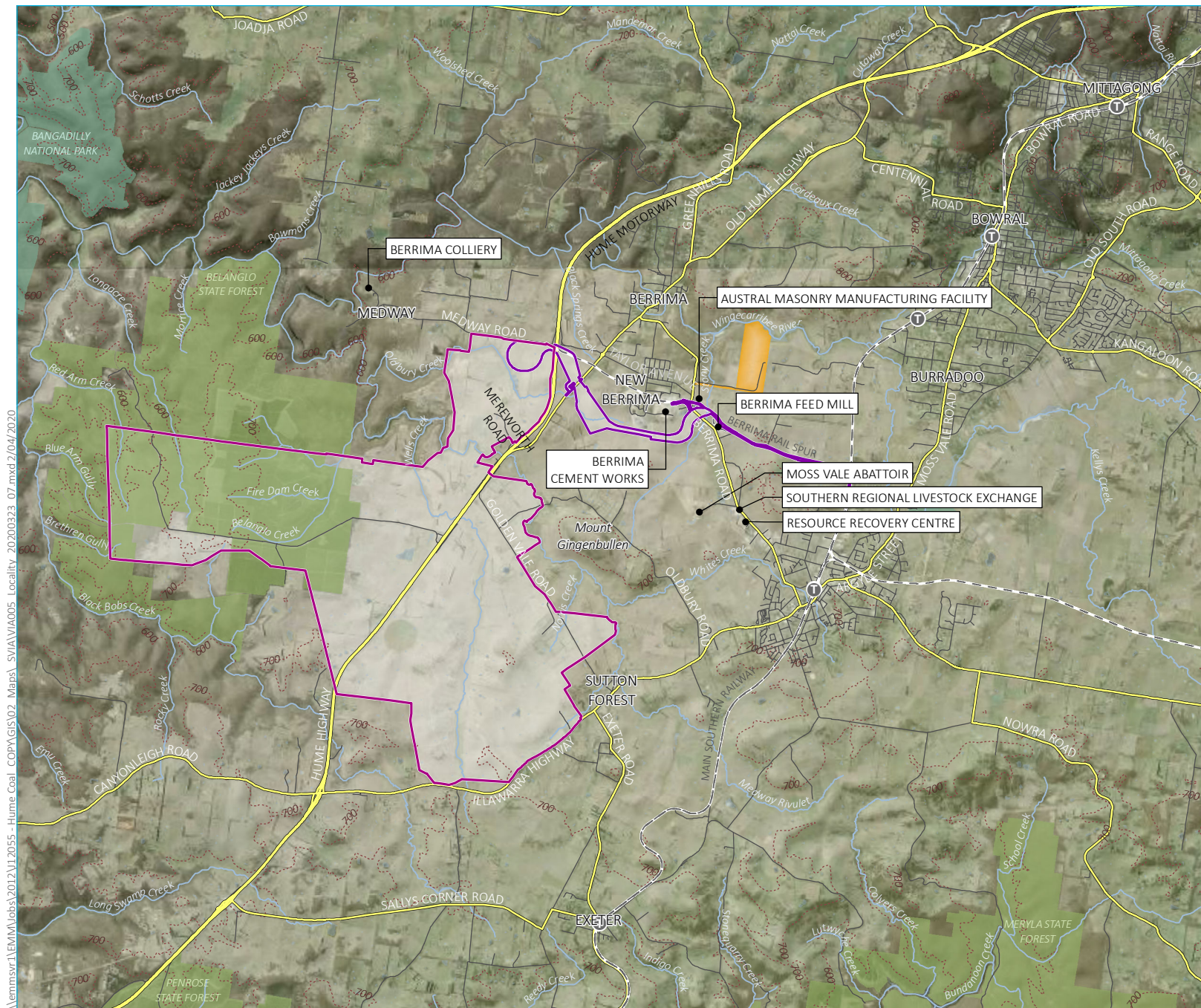
A distinctive feature of the pastoral setting of the Southern Highlands is the use and cultivation of exotic hawthorn hedges and windbreak plantings (usually exotic trees), to provide protection to properties, farm buildings and as shelter belts along paddocks. In many places, the hawthorn hedges have escaped cultivation and grow wild in the pastoral landscape. Character tree species include Monterey pines (*Pinus radiata*) and Himalayan cedar (*Cedrus deodara*), which were planted as windbreaks in the 19/20th centuries, and windbreak hedgerows of hawthorn (*Crataegus monogyna*), also used in the 19th century. These windbreak plantings are strongly linear landscape elements. In more recent times Leyland cypress (*Cupressus × leylandii*) hedges have been used in the landscape to replace the older Monterey pines. Hawthorn is an invasive species and if not well tended can become a weedy element of pastoral landscapes, and the study area is no exception.

Pastoral properties are extensive with distinctive groups of exotic plantings around homestead sites and 'avenues' that lead to them (EMM 2017a) with pines, elms and deciduous trees predominating. From the 1970s and 1980s there has been a contraction of land under agricultural production, especially on the drier margins of the region and subsequent subdivision of larger holdings and conversion to smaller rural residential lifestyle and pastoral properties. These occur within and adjacent to the northern part of the Project area, around the urban centres of Medway village, New Berrima village and Berrima.

Elevated country to the west and north of the Project area and lands bordering the steeply incised waterways retain native open forest vegetation cover. The native vegetation cover is predominantly in the outer parts of the shire and it has been estimated that over 60% of the shire's natural vegetation has been 'modified' (Bowie, 2006). This suggests pre-European vegetation remains essentially undisturbed in less than forty percent of the Wingecarribee LGA. This occurs mostly in less accessible areas in national parks, reserves and state forest. Dominant native vegetation types throughout the area includes Southern Highlands Shale Woodland, which is the predominant pre-settlement vegetation type, and minor representations of Wingecarribee Woodland to the north-east of the Project area and Mittagong Sandstone Woodland to the south-east.

Within the Wingecarribee LGA, early land clearing was associated with the development of the forestry industry, with a focus on native timbers. However, since 1919 when a softwood plantation of Monterey pine (*Pinus radiata*) was established in the Belanglo State Forest, forestry practice has focused on plantation timber and this continues to support a small industry.

Other land uses in the region include viticulture and wine production, olive production and mining. Mining has a long history in the Southern Highlands and this is discussed in Section 3.1.3. The former Berrima Colliery at Medway is described in Section 3.1.1.

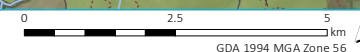


- KEY**
- Hume Coal Project area
 - Berrima Rail Project area
 - Berrima Shale Quarry Project
 - T Train station
 - Rail line
 - Major road
 - Minor road
 - ... Contour (100 m)
 - Named watercourse
 - Waterbody
 - NPWS reserve
 - State forest

Existing environment and locality

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure 3.1

Source: EMM (2020); Hume Coal (2016); DFSI (2017)



3.1.8 Cultural aspects

i Heritage places

a State

The Project was designed to avoid mining beneath items listed on the State Heritage Register (SHR). The following four SHR properties are located outside of the Project area, to the east:

- *Oldbury* (SHR 0048), Moss Vale (house, grounds and outbuildings);
- *Golden Vale* (SHR 0048), Moss Vale (house, grounds, outbuildings);
- *Whitley* (SHR 0058), Moss Vale (house, grounds, outbuildings and entry gate); and
- *Hillview* (SHR 00422), Sutton Forest (house, grounds and outbuildings).

These are shown on Figure 3.2, together with eight other SHR places also located outside of the Project area, and to the north-east within Berrima village.

b Wingecarribee LEP – listed properties

Eight properties that are listed on the Wingecarribee LEP are situated either wholly or partially within the Project area; none are listed on the SHR (Table 3.1). An additional 113 listed properties occur within the vicinity of the Project area.

Table 3.1 Listed heritage items in and surrounding the project area (5 km buffer)

Register	Presence	Location
National Heritage Listing	No	n/a
State Heritage Register	Yes	Surrounding the Project area
Wingecarribee Local Environmental Plan	Yes	Within and surrounding the Project area
S170 Register	One	Moss Vale Railway Precinct
National Trust	Yes	Surrounding the Project area
Register of National Estate	Yes	Surrounding the Project area

Note:

n/a – not applicable

Four items that are listed on the WLEP heritage schedule have all, or a substantial part, of their curtilage in the Project area and are of *local* heritage significance. These items are listed below (the identifying number in brackets is their LEP item number).

- *The Harp* (I027);
- *Mereworth House and Garden* (I351);
- *The Pines* (I029); and
- *Sutton Farm House* (I035).

Another four heritage items of *local* heritage significance are partially located in the Project area but outside of the SIA. These items have only their respective paddocks over areas that will be mined. The items with part of their lots above the Project area are:

- *Newbury* (I202);
- *Bunya Hill House, grounds and outbuildings* (I018);
- *Comfort Hill* (I021, I356, I357); and
- *Elling Forest Winery* (I004, I009, I010).

See Figure 3.2 for a plan showing the location of these features.

Historical elements are detailed in the Hume Coal and Berrima Rail EIS's (EMM 2017a,b) and further elaborated upon in the Hume Coal and Berrima Rail Projects Historical archaeological assessment and statement of heritage impact IPC response (EMM 2020b).

c Wingecarribee LEP heritage conservation area - general

The Berrima Heritage Conservation Area – General is one of 16 within the Wingecarribee LGA, but the only one in the study area. The area is located to the north-east of the SIA, within Berrima village and no mining is proposed beneath this area. A heritage conservation area is an area that displays unifying attributes or elements of heritage significance and can include whole sections of towns and villages. They are listed under Part 2, Schedule 5 of the Wingecarribee LEP. The Berrima heritage conservation area overlays the historic built urban centre of Berrima village. This area is shown in Figure 3.2.

ii Landscapes

a Wingecarribee LEP heritage conservation area - landscape

The Berrima Landscape Conservation Area which occurs in the study area is also listed under Part 2 of Schedule 5 of the Wingecarribee LEP. The area is located to the north-east of the SIA, buffering Berrima village and no mining is proposed beneath this area. The landscape area is a buffer area around the village of Berrima and comprises a rural landscape encompassing larger scale rural residential property holdings and contrasts with the urban small lot properties of Berrima. This area is shown in Figure 3.2.

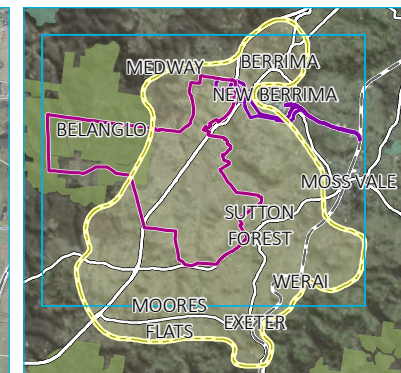
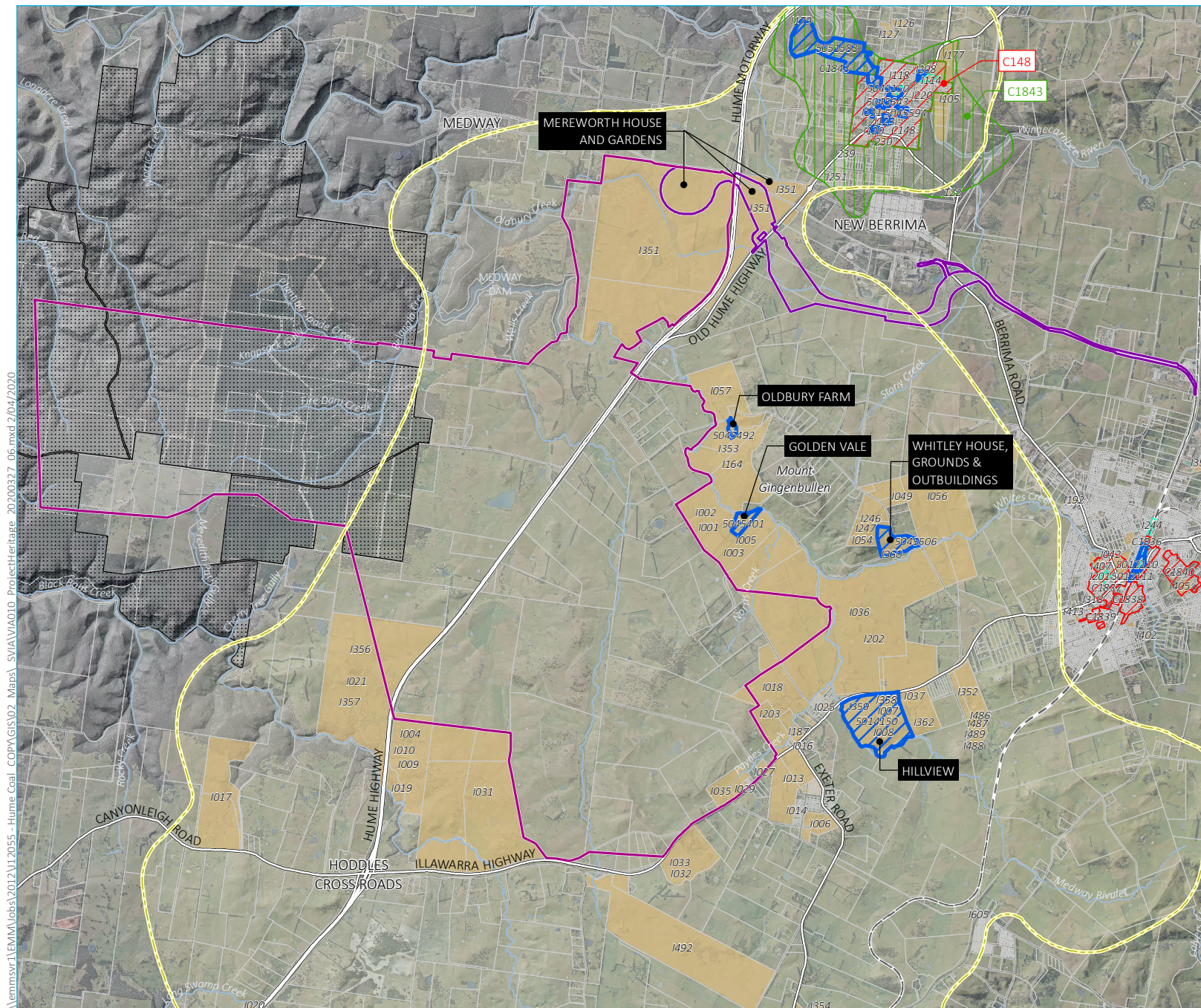
b Cultural landscape

A study of heritage in Wingecarribee Shire was commissioned in 1990 by the Heritage Council of NSW, the Department of Planning and Wingecarribee Shire Council was published in 1993 by JRC Planning Services. This study identified historically significant landscapes, 'Cultural Landscape Units', in the Southern Highlands region. Informed by that study, there were two cultural landscapes identified. These are:

- Key Historic Unit 6 -Sutton Forest Landscape Area - listed as zone 7(b) in the WSC LEP until 2010; and
- Exeter/Sutton Forest Landscape Conservation Area - a 1998 National Trust (NSW) listing.

A cultural landscape designation was also proposed in the Cultural Landscape Assessment of the Berrima, Sutton Forest and Exeter Area, a report prepared by Colleen Morris, May 2017 for the Berrima Residents Association, with support of WSC (Morris 2017). The landscape proposed in that study includes part of the Project area.

Further commentary and analysis of the Morris et al (2017), with respect to significance of the cultural landscape and applicability to the Project can be found in the *Hume Coal and Berrima Road Project, Cultural Landscape Assessment* (Brouwer 2020a).



- KEY**
- Hume Coal Project area
 - Berrima Rail Project area
 - Berrima, Sutton Forest and Exeter Cultural Landscape Area (Morris et al. 2017)
 - Heritage Act 1977
 - State Heritage Register
 - s170 Register
 - Wingecarribee LEP 2010 heritage
 - Conservation Area - General
 - Conservation Area - Landscape
 - Item - General
 - Existing environment
 - Rail line
 - Major road
 - Named watercourse
 - Waterbody
 - Cadastral boundary
 - Belanglo State Forest
 - NPWS reserve (refer to inset)
 - State forest (refer to inset)

Heritage items within and in the vicinity of the project area

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure 3.2

Source: EMM (2020); Hume Coal (2016); DFSI (2017); DPE (2017)

0 1 2 km
GDA 1994 MGA Zone 56



3.2 Visual catchment

Visibility analysis mapping is presented as Figure 3.3. Visibility analysis for each of the significant mine infrastructure elements is provided in Annexure A.

i Interpretation of the visibility layers

The visibility analysis map (Figure 3.3) developed by the digital analysis and represents the total visual catchment from which the various elements could be theoretically seen. The location of Project elements analysed are indicated on the plan, and their corresponding heights identified. Visibility based on terrain only (DEM) is represented by the light brown shading. The more refined visibility mapping relates to the DSM data and this is the dark brown colour. In interpreting the 'visibility' the following rules apply:

- large blocks of dark brown shading represent long uninterrupted views;
- long streaks are representative of views framed by structures or vegetation;
- mottling is representative of views filtered by (mostly vegetation); and
- stippling is representative of the tops of trees.

In the case of stippling this generally does not imply visibility to a person of average height at this location and is in fact several metres above the ground (i.e. treetops, which in the case of native forest vegetation could be 15-25 m in height).

3.2.2 Significant potential visibility zone

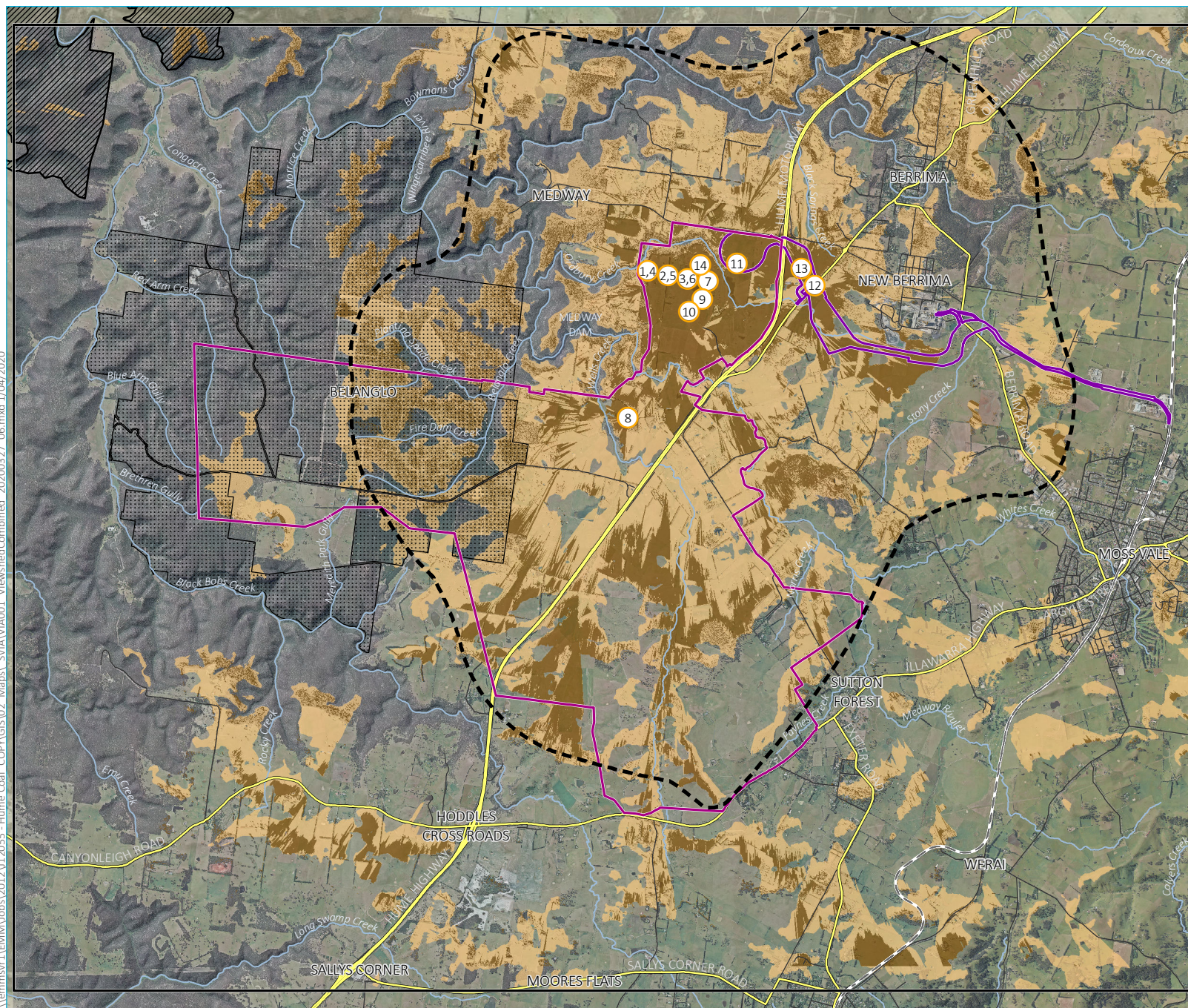
The total visual catchment does not take into consideration the mitigating effects of distance of a receptor from a visual element. In contrast the significant potential visibility zone (SPV zone) consists of the most significant parts of the total visual catchment from which the various Project elements may be seen.

These are areas visually connected to the Project and have been determined by desktop and field assessment to confirm extent and visibility. Not all parts of the landscape within the zone may have views of Project elements. Determination of this zone is also based on a test of reasonableness which is proportional to the scale and nature of the proposed development; it does not encompass or enclose all potential viewpoints within the catchment, rather those which are most significant. It does not mean that views outside of this zone are not possible, rather it is the area containing the most critical locations with views to the Project. The zone is illustrated on Figure 3.3. It is largely contained by the elevated terrain to the north and west, and the low rounded hills and higher undulating terrain to the south and east.

The SPV zone considers visibility of Project elements to receptors in the landscape as a result of terrain, vegetation, distance and nature (scale and massing of structure) and spatial arrangement of the Projects elements. For this reason, the SPV zone has a different area of investigation than does the cultural landscape assessments (CLA) of Brouwer (2020a) and Morris et al (2017).

The SIA will be mostly developed on the flattened pastoral lands surrounding the Medway Rivulet. Vegetation on this terrain is limited, though there are clusters of trees, windbreaks and native vegetation along creek lines which screen or filter near views. For this reason, the most significant concentration of (dark brown) visible land shown on Figure 3.3 is concentrated between the Hume Motorway, Medway Road, Oldbury Creek / Wells Creek, and Belanglo Road. This does not diminish any potential significance of views beyond this location, rather, beyond this, based upon the digital analysis, the opportunity to do so is far reduced.

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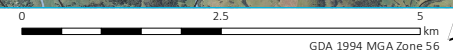


- KEY**
- Hume Coal Project area
 - Berrima Rail Project area
 - Existing environment
 - Rail line
 - Major road
 - Minor road
 - Named watercourse
 - Belanglo State Forest
 - Bangadilly National Park
 - Viewshed model boundary
 - Significant potential view zone
 - Viewshed assessment location
 - 1,4 Product coal stockpile - west
 - 2,5 Product coal stockpile - centre
 - 3,6 Product coal stockpile - east
 - 1,4 Reclaimer (product coal) - west
 - 2,5 Reclaimer (product coal) - centre
 - 3,6 Reclaimer (product coal) - east
 - 7 Coal handling and preparation plant
 - 8 Ventilation shaft pad structures
 - 9 ROM coal stockpile
 - 10 ROM conveyor tower
 - 11 Train load out (TLO)
 - 12 Rail bridge
 - 13 Rail rolling stock maintenance facility
 - 14 Rejects stockpile
 - Combined viewshed results
 - Viewshed based on DEM
 - Viewshed based on DSM

Visibility analysis

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure 3.3

Source: EMM (2020); Hume Coal (2016); DFSI (2017)



3.3 Landscape character units

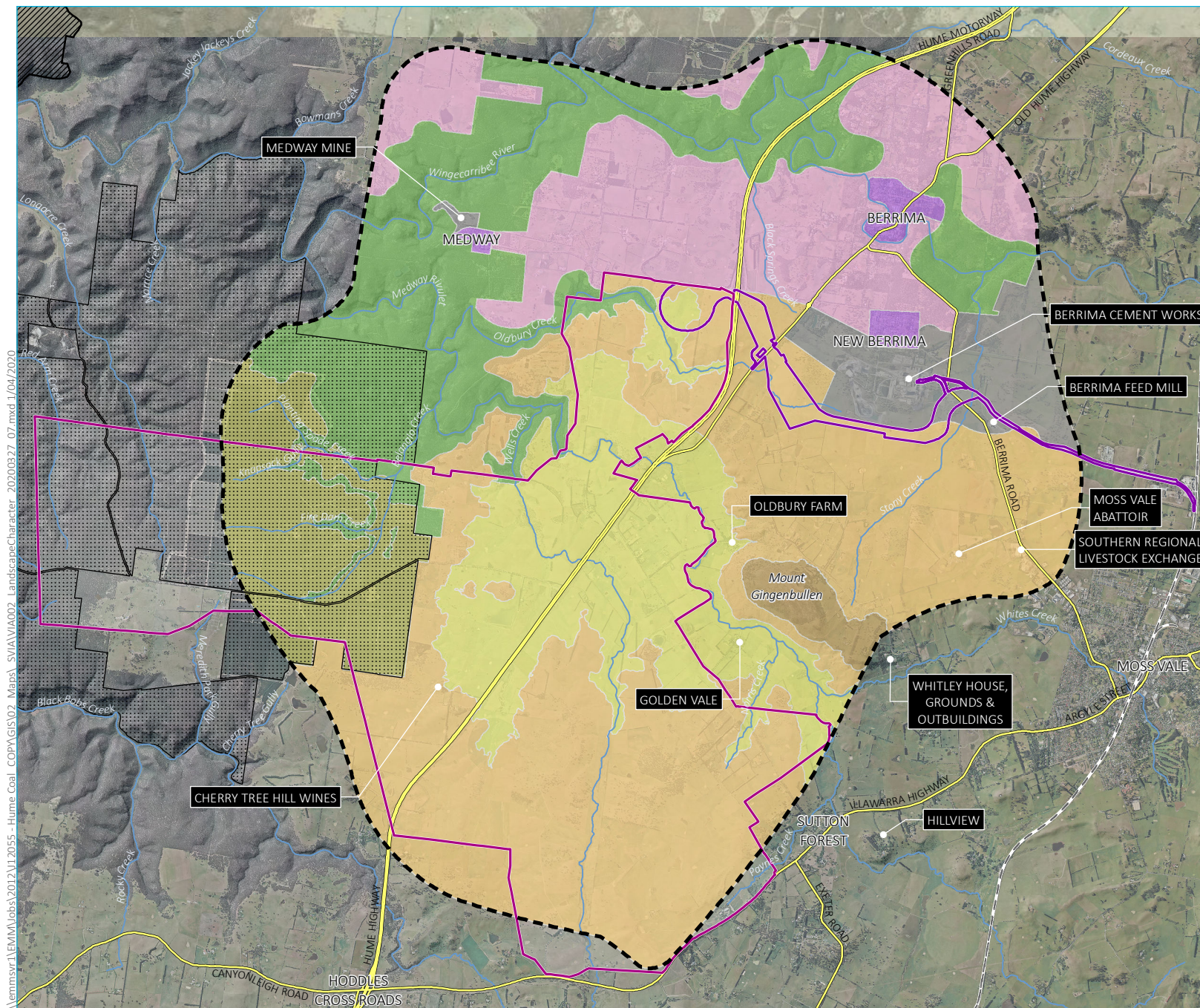
The landscape features of the locality are determined by physical, biological and social elements². In combination they create distinct, recognisable and consistent patterns of elements that make one landscape different from another and often, conveys a distinctive 'sense of place'.

This relative visual consistency or uniformity can be defined as Landscape Character Units (LCUs). LCUs do not imply a level of value or importance. The LCUs are experienced by viewing them from locations such as residences and public locations or traversing through the landscape, such as along roadways or rail lines.

LCUs present within the SPV zone of the Project are spatially represented in Figure 3.4.

1. Forested hills and rises – comparatively more elevated and forested lands to the east and north;
2. Plantation pine on hills - softwood pine plantations first established in the area in the early 1900's;
3. Undulating pastoral land - rolling agricultural lands used for grazing, strong historical landscape linkages and broad spatial organisation;
4. Flat pastoral land – flat alluvial depositional plains around the Medway Rivulet and Oldbury Creek and broader spatial organisation;
5. Creeks and river watercourses with varying degrees of riparian vegetation coverage;
6. Industrial - lands characterised by visually significant industrial elements;
7. Peri-urban - formerly undulating pastoral landscape converted to smaller lots with finer (more dense) spatial organisation;
8. Urban areas - containing the villages of Medway and Berrima and the strongly residential New Berrima; and
9. Mt Gingenbullen – visually prominent and the highest point in the landscape.

² physical elements – include terrain, topography and waterways; biological elements include vegetation and vegetation cover; social elements include land use and cultural significance.

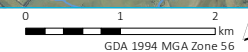


- KEY**
- Hume Coal Project area
 - Berrima Rail Project area
 - Significant potential view zone
 - Landscape character unit**
 - Forested hills and ridges
 - Plantation pine on hills
 - Undulating pastoral land
 - Flat pastoral land
 - Industrial and mine
 - Peri-urban
 - Urban areas
 - Mt Gingenbullen
 - Existing environment**
 - Rail line
 - Major road
 - Named watercourse
 - Belanglo State Forest
 - Bangadilly National Park

Landscape character units

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure 3.4

Source: EMM (2020); Hume Coal (2016); DFSI (2017)



3.3.1 Forested hills and rises

The forested hills and ridges frame the north-western, northern and north-eastern portions of the primary visual catchment. Typically, the forested hills and rises comprise native forest on steeper and less agriculturally fertile land between 650 and >700m AHD. Land ownership is both public (Belanglo State Forest, Berrima Reserve, Makin Reserve) and private. Vegetation of the forested hills and ridges LCU (refer Plate 3.1) consists of open forest and woodlands whether intact, thinned or regrown and are associated with the Wingecarribee River, Medway Rivulet and their tributaries.

The forested hills and ridges typically surround the undulating, modified grasslands that have been historically cleared of native forest for pastoral pursuits (Undulating Pastoral Land LCU), and those that have more recently been converted to lifestyle farming (rural residential) blocks (Peri-urban LCU). There is a strong visual contrast between the grazing land and the surrounding forested hills and ridgelines. Lands within Belanglo State Forest, Berrima Reserve and Makin Reserve are public lands used for recreation. Longer views outwards are generally blocked by foreground vegetation.

This LCU provides a backdrop to the visual elements in the foreground and screening elements in the middle distance and long distance.

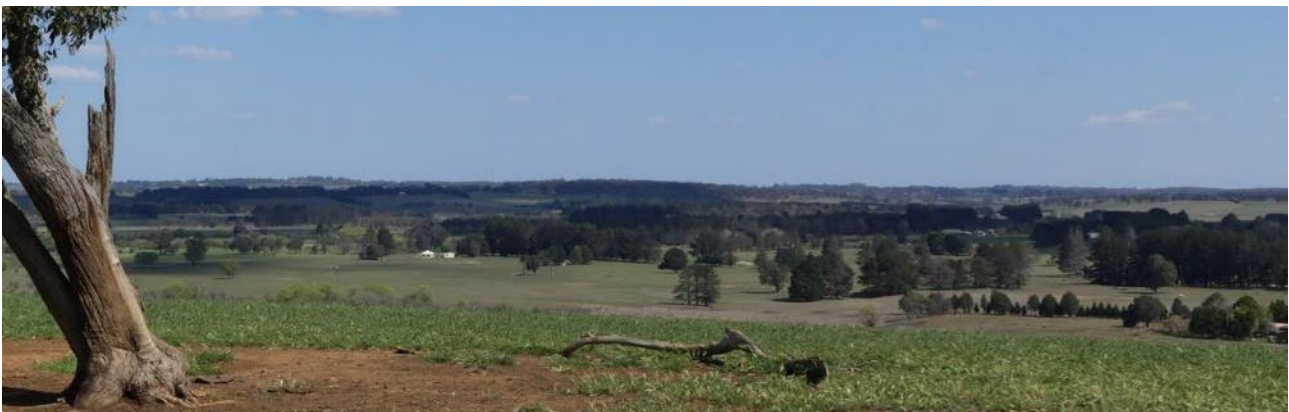


Plate 3.1 Forested hills and rises LCU

This LCU includes moderate rounded to flattened hills and rises that form the boundary of the SPV zone to the north and north – west (treeline on horizon). The combination of ridges and vegetation limit views beyond (Photo source – Brouwer 2020a).

3.3.2 Plantation pine on hills and rises

The plantation pine on hills LCU (refer Plate 3.2) frames the western portion of the primary visual catchment. Typically, it consists of silvicultural practices within the publicly owned Belanglo State Forest, where Forestry Corporation of NSW has established Monterey pine (*Pinus radiata*) plantations. These plantations have been established on steeper and less agriculturally fertile land between 650 and >700m AHD where native forest has been removed. Land ownership is public (Belanglo State Forest).

The plantation pine stands adjoin the undulating, modified grasslands that have been historically cleared of native forest for pastoral pursuits (Undulating Pastoral Land LCU). There is a strong and distinct visual contrast between the open grazing land consisting of parure grasses and the surrounding pine plantation consisting of exotic softwood timber species (of mainly Monterey pine *Pinus radiata*).

This LCU provides a backdrop to the visual elements in the foreground and screening elements in the middle ground and distance.



Plate 3.2 **Plantation pine on hills LCU**

This Plantation pine on hills LCU includes moderate rounded to flattened hills and rises that form the boundary of the SPV zone to the west. The combination of rises above 725 m AHD restrict views to the west (Photo source – Brouwer 2020a).

3.3.3 Undulating pastoral land

The undulating pastoral lands LCU (refer to Plate 3.3) occupies land historically cleared for pastoral purposes and presently used for broad paddock cattle grazing and fodder production. Other agricultural pursuits include agistment, breeding and spelling of horses, viticulture and wine production and orcharding (olives). It generally occurs between 650 m and 700 m AHD. The land has been cleared of most of the trees to develop a grassland of mainly exotic grasses for cattle and horses. However, in contrast with the less elevated, fertile soiled, flat pastoral land LCU, the undulating land LCU pastures are less fertile and contain pockets of remnant/regrowth vegetation especially around the more elevated dryer margins.

A strongly linear, visual characteristic of this landscape are the prominent planting and hedges of exotic species which have been developed to provide windbreaks and inter-paddock breaks. The landscape includes scattered rural residences and farm improvements such as outbuildings, dams, access tracks, fences, yards and gardens, as well as infrastructure and utilities including roads.

The landform is undulating occupying more elevated land adjacent to the Flat pastoral land LCU to which it is similar. There is significant contrast with the Forested hills and ridges LCU and the Pine plantation on hills LCU. The undulating pastoral lands LCU occupies the southern and eastern parts of the primary visual catchment and both land use types extend well beyond the visual catchment in those directions.

The undulating pastoral land LCU is a core component of the cultural landscapes identified by the National Trust (National Trust 1998), and Morris et al (2017). Superimposed on the LCU is the State listed Heritage properties of Oldbury (SHR 0048) and a number of properties listed by Schedule 5 of the Wingecarribee LEP (see **Error! Reference source not found.**), including Mereworth (I351) and Oldbury Farm (I353, I057 and I164).

Views within this LCU are long constrained by elevated and forested ridges to the west and north, and the undulating and rolling hills cleared for grazing to the east and south. Within the LCU and beyond, views are significantly interrupted and limited by undulating topography and tree cover, although some longer views are facilitated by areas with more elevated vantages. Road and roadside viewing opportunities are also contained within this LCU. Many of the roads contain treed corridors which screen foreground views. Roads within this LCU include the Hume Motorway, Old Hume Highway, Medway Road, Golden Vale Road, Oldbury Road and Belanglo Road. The Illawarra Highway fringes this LCU in the south-east of the significant potential view zone in the vicinity of Sutton Forest.

The Hume Motorway, constructed in the late 1980s as a high-speed bypass of the town of Berrima within the LCU and the major centres of Bowral and Mittagong, is a strong linear element running north-south and bisects northern portions of this LCU. The Hume Motorway is a dual lane median separated motorway lined either side by screening vegetation for parts of the alignment. It is the most significant arterial carriageway in the country, a link between Sydney and Melbourne/Canberra. There are in excess of 25,000 movements each day, everyday in both directions.

The Hume Motorway re-joins the highway at the southern extent (intersection with) Old Hume Highway, and continues southwards. It has been upgraded in recent years and it too has received screen planting along much of its length within the LCU. The Hume Motorway / Old Hume Highway intersection (occurs in the flat pastoral land LCU) allows vehicle access to Berrima, and the Old Hume Highway contains Remembrance Driveway plantings that are promoted as a tourist drive by the Council and the National Trust. Golden Vale Road and Oldbury Road valued for their visual quality on account of the framed tree lined rural vistas, occur within the LCU. Other local roads include Mereworth Road and Berrima Road.

The Undulating pastoral land LCU contains few trees and where present include paddock trees and exotic windbreaks. Views outwards from the SIA tend to be blocked in the foreground by vegetation and topography, with only longer views (2-3 km distance) more common, where terrain and elevation allow views to the flat pastoral lands of the Medway Rivulet.

The Undulating pastoral land LCU contains some tree copses, paddock trees and exotic windbreaks. Shorter views tend to be blocked by vegetation and longer views across the SPV zone are possible but only from more elevated parts of the LCU where higher vantage points allow longer vistas. Roadside vegetation along some of the smaller rural roads may screen or filter lower landscape features.

This LCU is a common landscape in the area which provides visual variety in the context of other non-pastoral landscape units. However, it is similar to the Flat pastoral land LCU, both of which are strongly associated with the non-indigenous cultural history extending back to early land grant settlement of the early 1800s.



Plate 3.3 **Undulating pastoral land LCU**

The Undulating pastoral land LCU contains few trees and where present, include paddock trees and exotic windbreaks. Shorter views tend to be blocked by vegetation and longer views across the SPV zone are possible but only from more elevated parts of the LCU where higher vantage points allow longer vistas (Photo source – Brouwer 2020a).

3.3.4 Flat pastoral land

The Flat pastoral land LCU (refer Plate 3.4) historically was the most highly prized landscape within the locality on account of its productivity. It represents the lowest parts of the landscape with lowest points at the confluence of the Medway Rivulet and the Wingecarribee River. It is characterised by flat land within the valley of the Medway. It is a working landscape that has been extensively cleared of native vegetation to develop a grassland of mainly exotic grasses for cattle and horses. As with the Undulating pastoral lands LCU, the distinctive feature of this pastoral setting is the use and cultivation of hawthorn hedges and wind break plantings (usually trees), mainly of exotic species, to provide protection to properties, farm buildings and as shelter belts along paddocks. Character species include Monterey pines (*Pinus radiata*) and Himalayan cedar (*Cedrus deodara*) used as windbreaks in the 19/20th centuries, and windbreak hedgerows of hawthorn (*Crataegus monogyna*) used in the 19th century. These planned windbreaks are linear elements in the landscape. In more recent times Leylandi cypress (*Cupressus × leylandii*) hedges have been used in the landscape to replace the older Monterey pines.

The landform is generally flat occupying less elevated land, 625 m – 650 m AHD, adjacent to the Undulating pastoral lands LCU, which mostly encircles it. It adjoins parts of the Forested hills and ridges LCU. There is significant contrast with the Forested hills and ridges LCU and the Pine plantation on hills LCU. The Flat pastoral lands LCU occupies the central parts of the primary visual catchment.

The Flat pastoral land LCU is a core component of the cultural landscapes identified by the National Trust's (National Trust 1998), and Morris et al (2017). Superimposed on the LCU in Figure 3.4 is the State Heritage listed property of Golden Vale (SHR 0049) and a number of properties locally listed under Schedule 5 of the Wingecarribee LEP (see EMM 2020b)

The Hume Motorway is a strongly linear, north-south running state highway bisecting the LCU. It is a dual lane median separated motorway lined either side by screening vegetation for the most part. The motorway is a high speed bypass of the towns of Berrima, Bowral and Mittagong, and re-joins the highway at the southern extent of the Old Hume Highway, immediately north of the crossing over the Medway Rivulet. The motorway southwards of the intersection has been upgraded in recent years and it too has received screen planting treatments along much of its length within the LCU.

Golden Vale Road, a cross regional access road between the highway and Sutton Forest is valued for its visual quality on account of the framed tree lined rural vistas afforded whilst driving along it.

The views within this LCU are constrained by elevated and forested ridges to the west and north, and the undulating and rolling hills cleared for grazing to the east and south. Within the LCU and beyond, vistas are long and uninterrupted generally only interrupted by tree cover.

Owing to the flat terrain, the low open flat pastoral grasslands of the Medway Rivulet facilitate distant views. The Flat pastoral land LCU contains few trees and where present mainly consist of paddock trees and exotic windbreaks. Views outwards from the mine surface area tend to be blocked in the foreground by vegetation and topography and longer views of 2-3 km are more common. Roadside trees, windbreaks and other native vegetation may screen lower features in the landscape. This vegetation also restricts nearby views inwards.

The Flat pastoral land LCU is a common landscape in the study area which provides visual variety in the context of other non-pastoral landscape units. It is similar to the Undulating pastoral land LCU which it complements.



Plate 3.4 Flat pastoral land LCU

The Flat pastoral land LCU contains few trees and where present include paddock trees and exotic windbreaks. Image is of the Oldbury Creek alluvial surface looking southwest from above the Hume Motorway. Views outwards from the mine surface area tend to be blocked in the foreground by vegetation and topography and Longer views of 2-3 km to more elevated country are more common.

3.3.5 Rivers and creeks

Rivers and creeks are narrow linear visual character elements that traverse the entire primary visual catchment. The Rivers and creeks LCU (refer Plate 3.5) is a topographically varied landscape. Watercourses below 625 m AHD are typically well defined waterways occupying moderately to deeply incised major channels which have cut into the Hawkesbury Sandstone, and possibly the Wianamatta Shales, Coal Seams and Claystones such as the Wianamatta shale bedrocks, Burratorang and Farmborough, as well as other geological units. Examples are the Wingecarribee River, Medway Rivulet, Belanglo Creek and the lower reaches of Oldbury Creek and Wells Creek. On account of the steep terrain, riparian vegetation is well developed and typically integrates into the Forested hills and rises LCU. Medway Dam and the Berrima Weir are integrated into these landscapes.

Above 625 m AHD the watercourses are integrated into the surrounding landscapes and are usually evident by a thin linear band of exotic and native riparian trees and shrubs that denote the watercourse. Examples of these are the upper reaches of the tributaries of the Medway Rivulet (eg Wells Creek, Norris Creek), Oldbury Creek, Black Springs Creek, Black Bob's Creek and Stony Creek.

The waterways are a common and strong element of the landscape and contribute to the rural character where they traverse the pastoral landscapes.



Plate 3.5 Creeks and rivers LCU

This LCU includes the watercourses which traverse the SPV zone and intersect with the Forested hills LCU where tributaries converge, and incised river channels are formed. Image (looking south) shows Oldbury Creek with incised channel and riparian vegetation centre to bottom right, and open watercourse containing farm dam and open channel centre left of the centre of the drone image.

3.3.6 Industrial and mine

The industrial and mine LCU occurs on land between 650 m and 700 m AHD. The industrial area is situated to the south of New Berrima village, extends west to the Old Hume Highway and east to Berrima Road. Distinctive features of the LCU (refer Plate 3.6) are the Berrima Cement Works and the Ingham Feed Mill. It also contains the site of the recently approved Austral masonry manufacturing facility at 416-524 Berrima Road, Moss Vale.

Coal mining was established in the area around Medway in 1880, with coal production more or less continuous between that time and the mine being placed into 'care and maintenance' in 2013. Mining infrastructure remains intact.

Although the industrial and mining LCU adds visual diversity to the landscape, the appearance of taller industrial elements in this landscape, rising above foreground screening vegetation, are a defining visual character of this unit. The Berrima Cement Works, the feed mill, the saleyards and abattoir are particularly visually distinctive within the landscape setting. However, they are not considered to be sensitive receptors.



Plate 3.6 Industrial and mining LCU

The Wingecarribee Shire Council industrial enterprise corridor (industrial precinct) forms a distinctive land use type that is prominent within the landscape and consists of land still retaining a pastoral form and land already converted to industry (Photo source – Brouwer 2020a).

3.3.7 Peri-urban

Occupying land between 650 m and 700 m that was formerly part of the historically large land holdings, the Peri-urban LCU (refer Plate 3.7) is characterised by larger lot rural residential and lifestyle farm blocks on varied size holdings. This LCU has expanded since the 1970's as agriculture within the region has shifted away from the drier (less productive) margins (Bowie 2006). It occurs in and around the urban areas of Medway to the west and Berrima and New Berrima to the east, to the north of Medway Road and mainly south of the Wingecarribee River.

The peri-urban LCU provides a transitional landscape between the pastoral landscapes and the urban centres.

Vistas within the peri-urban LCU are often interrupted by stands of vegetation, roadside trees and undulating topography at varying distances. The residences and farm buildings in this landscape because of their number quite strongly, create a visual character. The peri-urban LCU contains a number of potentially sensitive residential and recreational receptors.



Plate 3.7 **Peri-urban LCU**

The peri-urban LCU provides a transitional landscape between the pastoral landscapes and the urban centres. Views outwards from the LCU and roadside vegetation can screen or filter lower features in the landscape (drone image).

3.3.8 Urban areas

There are three urban areas within the SPV zone, these being Medway village, New Berrima village and Berrima Township. Although all are different in character, they all contribute to the urban visual character of the landscape (refer Plate 3.8).

Medway village is a small rural village laid out on a broad grid and has a strong historic association with the nearby former Berrima Colliery and was developed as the dormitory village for mine workers.

New Berrima was developed as a dormitory village for the adjacent Berrima Cement Works (formerly Southern Portland Cement Ltd) when it was constructed in 1929.

Berrima town retains a strong colonial character dating back to 1832 when the first lot was marked out. The town is recognized as one of the best conserved towns from the colonial period of Australia. It has a significant collection of state heritage register-listed properties concentrated in a small area. Berrima's original town layout and town limits are remarkably intact and legible, which is reinforced by the surrounding landscape; mature exotic gardens, streetscape features, and enclosure with surrounding natural vegetation (EMM 2017a). There are 64 buildings recognised in the Wingecarribee LEP, 16 of which are state listed. In contrast to New Berrima and Medway, Berrima is a significant tourist destination valued for its strong historic links and architecture.



Plate 3.8 **Urban areas LCU**

The towns and villages create points of interest and local focus points. These urban elements although each possessing unique qualities and values, each contribute to an urban character. Image of Berrima Village looking south (Photo source – Google Street View).

3.3.9 Mount Gingenbullen

This LCU (refer Plate 3.9) comprises Mount Gingenbullen (801 m AHD), a dolerite capped topographic feature which is a visually prominent, forms a topographic boundary on the eastern edge of the SPV zone. Mount Gingenbullen has a north-west to south-east alignment with a flattened top, being 1 km at its widest. A second peak, Judges Hill (735 m AHD), lies nearly 2.5 km to the south-east.

Mount Gingenbullen rises steeply from the Undulating pastoral land LCU which surrounds it, with side slopes steepest to the north and south and south-west. The top of Mount Gingenbullen and its encircling talus foot slope are sparsely vegetated with native regrowth woodland.

Owing to its prominence, Mount Gingenbullen is readily seen from much of the SPV zone, except where foreground vegetation screens views. Views from atop Mount Gingenbullen provide generally uninterrupted vistas across the SPV zone; however, Mount Gingenbullen is not in public ownership and views afforded from the summit are not available to the public.

The Mount Gingenbullen LCU is a unique landscape feature and its character provides strong visual variety from other landscape units.



Plate 3.9 Mount Gingenbullen LCU

Mount Gingenbullen is the most prominent LCU and is visible throughout much of the SPV zone where long views are afforded. View towards Mt Gingenbullen from Golden Vale Road within the Undulating lands LCU Photo source – Brouwer 2020a).

3.3.10 Overall landscape character of the potential view zone

Spatial organisation³ is finer within the northern parts of the SPV zone, especially within the more urban and industrial elements in and around Berrima and New Berrima. To the south, south-east and south-west, spatial organisation within the landscape is large scale. This area, mostly to the south of Medway Road, Taylor Avenue and Berrima Road, represents the parts of the landscape with tangible links to early land grants and landuses. Noting that this is a working landscape and one which is evolving with time (Brouwer p23, 2020a); parcel sizes and pastoral uses have not substantially changed.

The SPV zone is framed to the north and west by forested hills and steeper forested lands along the Wingecarribee River, and to the east and south by steeper ridges, some of which contain remnant and regrowth vegetation. Focal points in the landscape are formed by Mount Gingenbullen, some of the steeper ridgelines and patches of native vegetation, and land-use elements such as Berrima, rural homesteads, windbreaks and hedgerows.

The SPV zone contains a number of LCUs which combine to create a rich and varied visual and landscape character with strong historical and cultural links. The variations in scale and spatial arrangement create a variety of views and visual integrity is greatest within the natural and pastoral landscapes and less so in the peri-urban. With the exception of the town of Berrima, visual integrity within the urban and industrial elements is of lesser quality.

The significance in the landscape also lies in its visual integrity and the part it plays in the regional experience of landscapes of Berrima, Sutton Park and Moss Vale.

The arrangement of elements, people and places; in this sense, built elements and land use patterning on landscape. Urban development is considered to have a fine spatial patterning. In contrast, agricultural landscapes have a broader arrangement of spatial organisation.

4 Visual elements of the project

4.1 Preliminary

The Project is described in Section 1 (introduction) and has been described in detail in the Hume Coal and Berrima Rail EIS's (EMM 2017a,b). This chapter describes the various elements of the Project that may be visible in the Primary Visual Catchment. The Project is anticipated to have an operational phase of 21 years and a rehabilitation phase of around 2 years.

4.2 Physical elements

4.2.1 Mine surface infrastructure area

Surface infrastructure required to service the mine will be constructed in the northern portion of the Project area, on land owned by Hume Coal and its subsidiaries. The surface arrangement of aboveground infrastructure are shown in Figure 1.3. The CHPP, stockpiles and coal handling infrastructure will include:

- Run of mine (ROM) coal stockpile, with a capacity of approximately 60,000 t;
- coal sizing and screening plant;
- coal preparation plant with a nominal capacity of 450 tonnes per hour (tph);
- conveyors, breaker station, transfer points and surge bin;
- coal washery reject crushing, screening and pumping plant;
- coal washery reject stockpile and associated plant and equipment, including reject storage facilities;
- product stockpiles with a capacity of approximately 300,000 t;
- product coal reclaim system;
- water management infrastructure;
- dust suppression and firefighting systems;
- services including compressed air, power and water;
- offices, car parking, ablutions facilities, storage for spare parts; and
- other minor buildings, plant and equipment associated with, or ancillary to, the coal handling and processing operation.

The main mine office area will include:

- administration offices, bathhouse and carpark;
- control rooms;
- workshop facilities;
- warehouse/store and laydown area;
- fuel and lubrication storage and refuelling facilities;

- washdown facilities;
- security fencing;
- internal access roads;
- sewage treatment facility;
- water supply, storage and management infrastructure;
- electricity supply and communications infrastructure;
- air compressor and back-up generators;
- firefighting systems;
- emergency response facilities;
- minor plant, equipment and facilities required to service the mine; and
- environmental management and monitoring equipment.

A surface facility will be required at the main ventilation shaft site, at the southern end of the SIA and directly above the mine workings, including the following infrastructure:

- one personnel and materials drift access and one conveyor drift access from the surface to the coal seam;
- main ventilation fans and associated motor control room(s), power supply, transformers and switchgear;
- hardstand area around the shaft and fans, and vehicle parking for around five to 10 vehicles;
- borehole compound to allow the supply of services such as power and water and bulk materials such as concrete and ballast between the surface and underground;
- surface water management infrastructure; and
- access roads/tracks, security fencing, lighting, and other ancillary plant and equipment.

Relative heights of the significant surface elements are presented in Table 4.1 and illustrated Figure 4.1.

Table 4.1 Heights of significant infrastructure elements and constructed features

Element / feature	Structure height (m)	Reduced level (m)	Natural ground level (m AHD)	Dimensions (LxB) (m)
Mine				
Stacker / Reclaimer (Product coal)	30	655-658	654-658	66 x 22
Product coal stockpiles	20	655-658	654-658	700 x 50
Coal Handling and Preparation Plant (CHPP)	24	655	649-657	53 x 43
Rejects conveyor	12-15	654	651-656	-
Rejects stockpile	17-19	654	651-656	42 x 22
Administrative building, bathhouse and workshop	5	649	646-649	80 x 70
Temporary accommodation construction village	4	652	648-656	150 x 150

Table 4.1 Heights of significant infrastructure elements and constructed features

Element / feature	Structure height (m)	Reduced level (m)	Natural ground level (m AHD)	Dimensions (LxB) (m)
Personnel and materials drift/portal	6.5	642	636-642	93 x 8
Ventilation shaft pad structures	8	649	645-652	67 x 19
Conveyor drift / portal	6.5	643	643-646	34 x 8
Primary water dam wall	19*	645**	645**	500 x 260
Main substation	4	650	650-651	60 x 60
ROM Coal Stockpile	21	655	647-651	110 x 90
ROM Conveyor tower	31	655	647-651	20 x 10
Topsoil stockpiles	1-5	varies	varies	varies
Stormwater detention dam walls	4-10	varies	varies	varies
Rail				
Train load out (TLO) at rail loop	37	652	648-649	30 x 10
Rail loop at the TLO	4.7	652	648	-
Rail Bridge (Old Hume Highway)	8	664	656 ⁺	70 x 10
Rail rolling stock maintenance facility	7	661.5	662	25 x 7
Acoustic barrier – Medway road	4	varies	varies	-
Rail loop at Medway Road	1	651-6660	650-659	500 x 10

Nb.: Emboldened elements have been used to conduct the digital visibility analysis (Figure 3.3)

Notes:

- * - highest point
- ** - lowest point
- ⁺ - rail surface below bridge

For comparison purposes, prominent elements of the industrial LCU are identified in Table 4.2 and illustrated in relation to tallest SIA elements in Figure 4.2.

Table 4.2 Heights of surface elements in the Industrial LCU

Element / feature	Height above ground level (m)	Ground level (m AHD)
Berrima Cement Works		
Number 6 kiln	87	675
Clinker store and conveyor	35	674
Clinker silos	47	671
Berrima feed mill		
Mill building	50	666

4.2.2 Berrima rail (rail loop and loading out facilities)

i Structures

The new rail spur line will connect the Berrima Branch Line which runs between Moss Vale and the Berrima Cement Works, to the Hume Coal Project coal loading facility. It involves the construction of a rail loop and acoustic wall adjacent to Medway Road in the north-eastern corner of the Project area. The key components of the Berrima Rail Project area are shown in Figure 1.3.

The rail line will be constructed mostly at grade with areas of fill imported to create a landform suitable for rail grade requirements. Visibility analysis was conducted utilising elements on the rail loop; rail embankment north (0 m above ground level), rail embankment south (4.61 m above ground level), and a train on the rail loop north (4.25 m above ground level).

The Project elements that will be visible and are relevant to this UVIA are:

- construction of 7.6 km of new railway track; within an easement and generally in the same location as the train that historically ran to Berrima Colliery in Medway;
- construction of a number of road and creek crossings, including:
 - a grade separated crossing under Berrima Road
 - 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 Motorway and the Old Hume Highway. This will include a 25 m long, 7 m high maintenance shed to be used for all weather driver change over, 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 Motorway to approximately halfway around the rail loop, being approximately 950 m in length; and
- topsoil stockpiles adjoining the railway line approximately 3 m in height.

Relative heights of the significant surface elements are presented in Table 4.1.

ii Train movements

The transport of product coal from Hume Coal will require approximately seven (7) movements per day or four (4) round trips per day on average 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 operational movements along the Berrima Branch Line will be approximately 170.

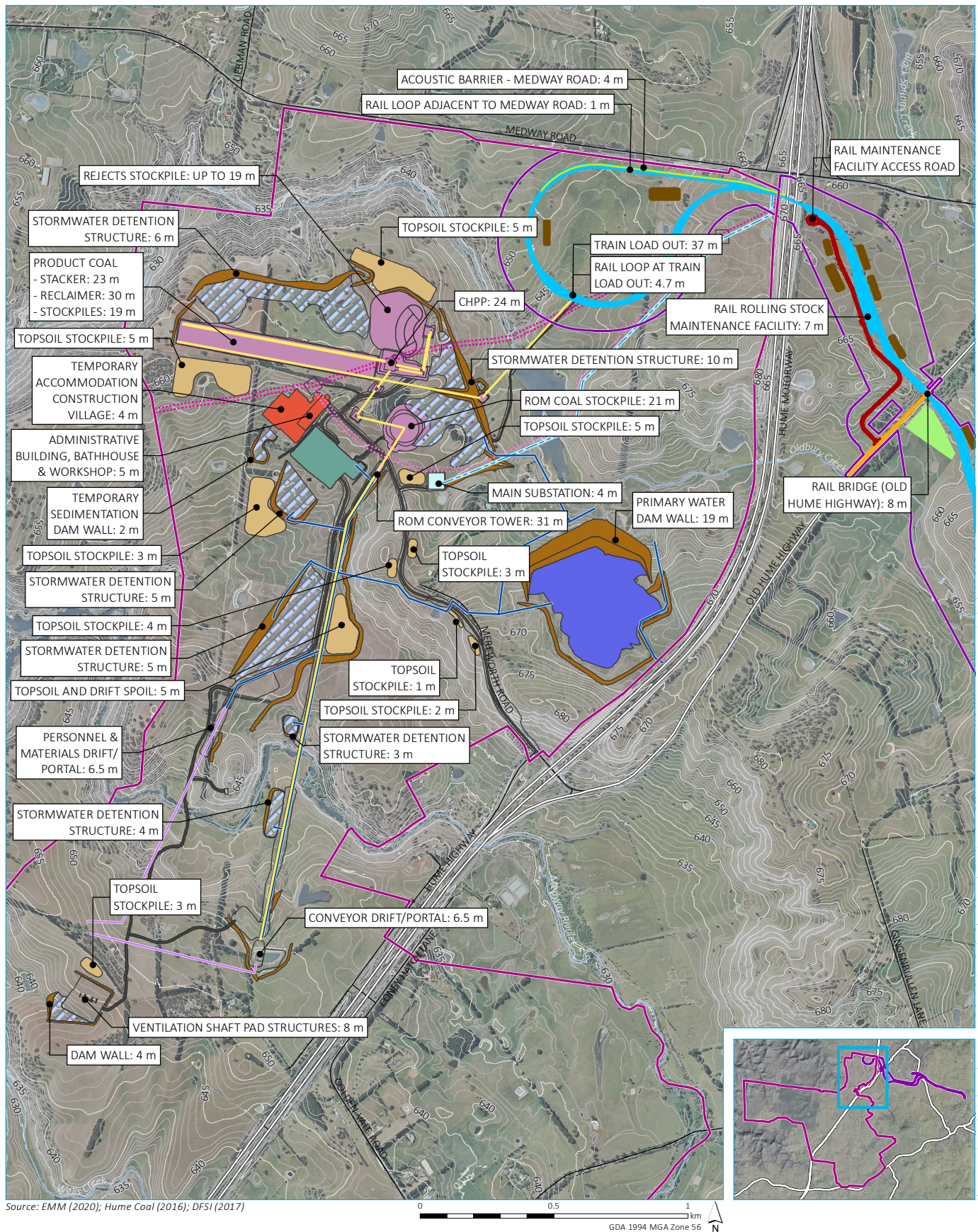
The visual effect of trains is a temporary change to a view, with trains not generally being stationary in one location along the track, except during coal loading activities idling awaiting section clearance, refuelling, train inspections, crew change overs and at the maintenance facility.

4.3 Visual mitigation commitments in the EIS

4.3.1 Overview

Hume Coal has already completed an extensive tree planting program, to establish a series of tree screens around the Project area. This program, conducted late 2015/ early 2016, is described below. The location of visual screening already undertaken to date is represented in Figure 4.1. Screen planting is an effective visual treatment limiting views of objects, especially when planting occurs in the foreground of viewing opportunities, for example in roadside plantings situations. The planting program undertaken by Hume Coal occurred on Hume Coal Owned Land where views from the public realm into the location of the proposed mine infrastructure was possible. Along the Hume Motorway planting occurred on Hume Coal owned land, generally where screen planting associated with the construction of the motorway had failed to screen the view, or at the top of cutting batters to afford additional screening.

Hume Coal has also committed to ensuring mine elements will be painted with a colour palette which is sympathetic with the colours of the surrounding landscape and especially those of the landscape backgrounding elements from particular viewsheds. Surfaces will be non-reflective.



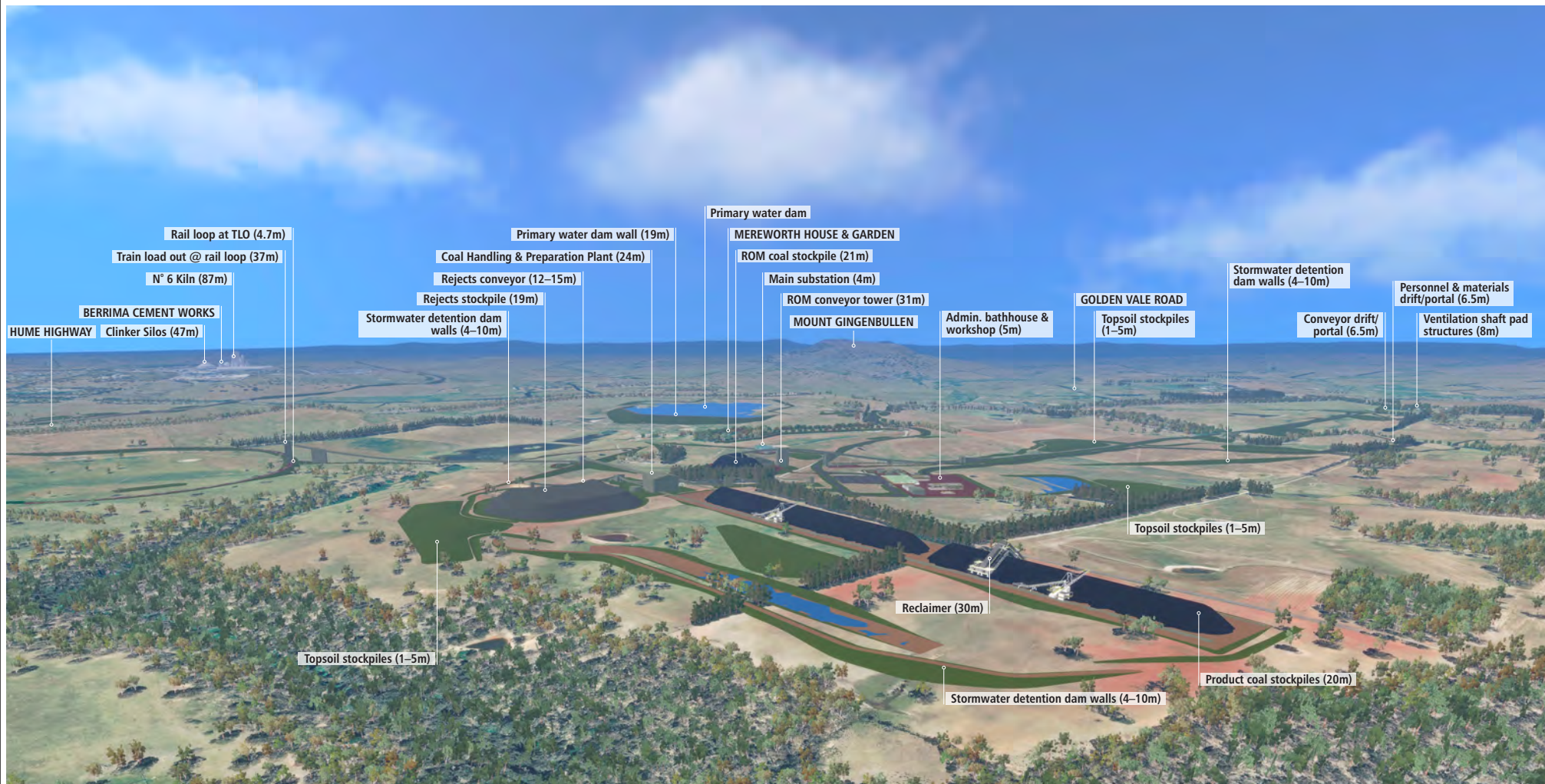
KEY

- Major road
- Minor road
- Contour (5 m)
- Contour (1 m)
- Named watercourse
- Waterbody
- Berrima Rail Project area
- Berrima Rail Project elements
- Noise wall
- Rail maintenance facility access road
- New rail line
- Topsoil stockpiles
- Rail temporary construction facility
- Turning lane/shoulder
- Hume Coal Project area
- Hume Coal Project elements
- Conveyor
- Drift (underground)
- Powerline route
- Water pipeline
- Proposed powerline and pipeline easement
- Existing WSC easement
- Temporary construction accommodation village
- Administration/bathhouse/workshop
- Main substation
- Internal road
- CPP and stockpiles
- Topsoil stockpiles
- Stormwater management earthworks
- Water management area
- Top water level

Relative heights of significant infrastructure and constructed features

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure 4.1





Oblique rendering with heights of mine elements relative to other built forms in the SPV Zone

4.3.2 Screen planting

Screening in the form of foreground and mid-ground tree and shrub planting is a very effective way of reducing exposure of a receptor to various aspects of the surface infrastructure in the SIA. Once established, such planting provides a natural screen to the various element of the mine from either roadways or private landholdings.

As described above, Hume Coal has already planted visual screens around the Project area. The location and extent of these tree screens were chosen to mitigate potential views from Medway Road and the Hume Motorway. A list of the type of species, form, age to maturity and maximum growth height is presented in Table 4.3. The species chosen include those common to the ecological community into which they have been planted.

With planting already complete, there will be sufficient time for some species to reach maturity, or be well progressed towards maturity, by the time construction commences. Screen plantings were installed by Hume Coal on Hume Coal land in late 2015 / early 2016, and much of the understorey vegetation (shrubs and small trees) will have reached maturity by next year (2021). Some trees, taking 10 years to mature will do so by 2026; and other taking 15 years to mature will do so by 2031. If the Project was approved and commenced in 2021, all trees within existing plantings will have matured by year 10 of the Project. The location of this planting is represented in Figure 4.3.

Assuming a determination in mid-2021, much of the understory vegetation (shrubs and small trees) will have reached maturity, being 5 years of age by then. At Project year 5, the vegetation will be 10 years of age and at Project year 15, 20 years of age. On this basis, vegetation maturity is anticipated between Project year 10 and Project year 15, and therefore, the designed vegetation screening effectiveness will be in place around halfway through the Project life. The location of this planting is represented in Figure 4.3.

Table 4.3 Screen planting species selection

Binomial name	Habit	Age to maturity (years) ¹	Height (m)	Project Year			
				1	5	10	15
<i>Acacia decurrens</i>	small tree	5-7	12	semi	mature	mature	mature
<i>Acacia floribunda</i>	small tree	5-7	4	semi	mature	mature	mature
<i>Acacia implexa</i>	small tree	10	6-12	semi	semi	mature	mature
<i>Acacia melanoxylon</i>	small tree	10	6-12	semi	semi	mature	mature
<i>Acacia rubida</i>	small tree	5	3-4	mature	mature	mature	mature
<i>Allocasuarina littoralis</i>	tree	10	10	semi	mature	mature	mature
<i>Banksia marginata</i>	small tree	5	5-6	mature	mature	mature	mature
<i>Casuarina cunninghamiana</i>	tree	15	20	juvenile	semi	mature	mature
<i>Eucalyptus amplifolia</i>	tree	15	8-15	juvenile	semi	mature	mature
<i>Eucalyptus elata</i>	tree	15	10-12	juvenile	semi	mature	mature
<i>Eucalyptus ovata</i>	tree	15	12-20	juvenile	semi	mature	mature
<i>Eucalyptus pauciflora</i>	tree	15	7-12	Juvenile	semi	mature	mature
<i>Eucalyptus radiata</i>	tree	15	15-30	Juvenile	semi	mature	mature
<i>Eucalyptus rubida</i>	tree	15	15-20	Juvenile	semi	mature	mature
<i>Eucalyptus stellulata</i>	small tree	15	5-7	Juvenile	semi	mature	mature
<i>Eucalyptus viminalis</i>	tree	15	20	juvenile	semi	mature	mature

Table 4.3 Screen planting species selection

Binomial name	Habit	Age to maturity (years) ¹	Height (m)	Project Year			
				1	5	10	15
<i>Hakea dactyloides</i>	tree	5	2-3	mature	mature	mature	mature
<i>Hakea salicifolia</i>	shrub	5	3-8	mature	mature	mature	mature
<i>Leptospermum morrisonii</i>	shrub	5	4	mature	mature	mature	mature
<i>Leptospermum obovatum</i>	shrub	5	2-4	mature	mature	mature	mature
<i>Leptospermum polygalifolium</i>	shrub	5	2-4	mature	mature	mature	mature
<i>Melaleuca linariifolia</i>	small tree	10	6-8	semi	mature	mature	mature

Note:

1. – based on a Project commencement of 2021 and a planting date of 2015/2016

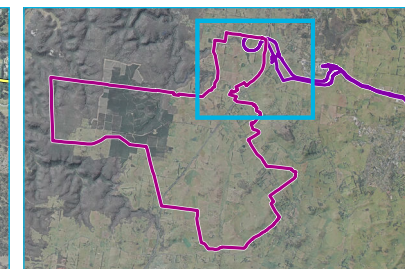
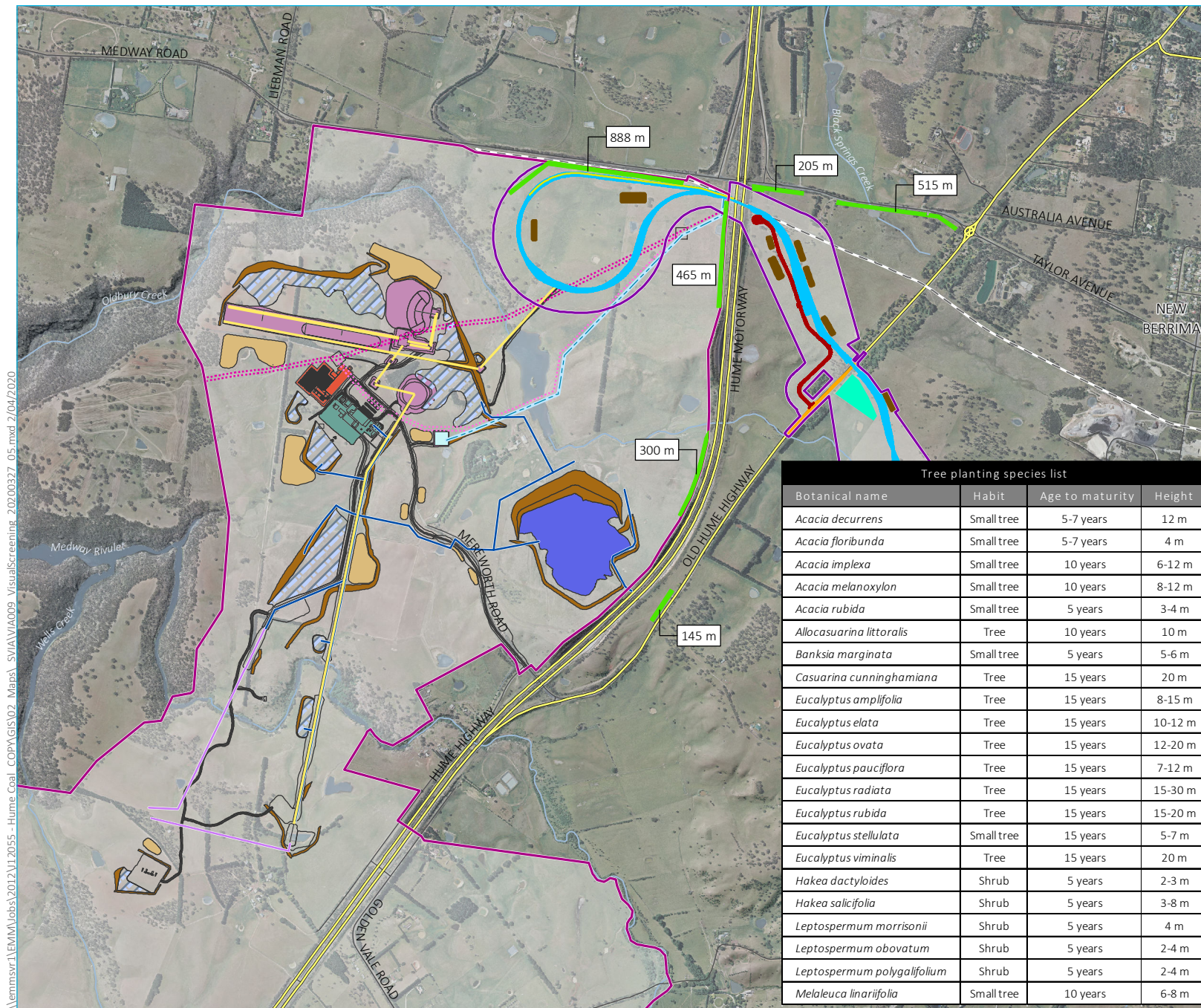
4.4 Major project elements

Surface infrastructure of the SIA is mostly aggregated within the generally flatter lands to the north of the Medway Rivulet and south of Oldbury Creek, west of the Hume Motorway, east of Medway Dam.

On account of the environmental, social and cultural sensitivities assigned to the location, Hume Coal determined that underground mining methods were preferable to reduce surface effects. The surface infrastructure was sited to optimise screening of more intrusive elements.

The method selected to extract coal from the deposit will not result in the permanent surface expression of any spoil. Spoil generated from the construction of the personnel and materials drift and the coal product drift will be used to backfill the declines upon mine decommissioning. Decommissioning will also result in the removal of all surface infrastructure, and topsoil stripped from mine areas during construction and stored on site for the life of the Project. As there will be no overburden emplacement areas generated by the mining operation, the post mining landform will be largely indistinguishable from the pre-mining landform.

The effects of the mine infrastructure will be experienced for the 21 years of the mine's operation. After this point, all constructed elements will be removed, and the landform graded and recontoured to be close as possible to the original landscape form. Topsoil stripped as part of the mine's development will be reinstated over disturbed areas and the area revegetated with pasture grasses. Elements described herein are shown in Figure 4.1.



- KEY**
- Tree planting
 - Existing environment
 - Rail line
 - Major road
 - Minor road
 - Named watercourse
 - Waterbody
 - Hume Coal Project area
 - Indicative surface infrastructure features
 - Conveyor
 - Drift (underground)
 - Powerline route
 - Water pipeline
 - Proposed powerline and pipeline easement
 - Existing WSC easement
 - Temporary construction accommodation village
 - Administration/bathhouse/workshop
 - Main substation
 - Internal road
 - CPP and stockpiles
 - Topsoil stockpiles
 - Stormwater management earthworks
 - Water management area
 - Top water level
 - Berrima Rail Project area
 - Berrima Rail Project elements
 - Noise wall
 - New rail line
 - Rail maintenance facility access road
 - Topsoil stockpiles
 - Rail temporary construction facility
 - Turning lane/shoulder

Visual screen planting

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure 4.3

4.4.1 Mining infrastructure

i Physical Character

The underground mining elements of the Project will be situated towards the southern end of the surface infrastructure in the SIA (north of the intersection of Belanglo Road and the Hume Motorway). The main elements that will be visible from locations outside the SIA will be the personnel and material drift, the conveyer drift and the ventilation shaft.

a Personnel and materials drift and Conveyor drift

Underground operations will commence with the excavation of two box cuts, one north – south for personnel and materials and one tending west to east for the coal conveyor. The box cuts will be developed below the ground surface and covered portals will be constructed and then for the most part covered. The drift entries will be visible to external views.

b Ventilation shaft pad

The ventilation shaft pad and buildings will be the southern-most element in the SIA. The purpose of this infrastructure is to ventilate the underground workings to required safety standards. The ventilation stacks that will be constructed will be visible to external views.

ii Visual effect

Underground mining will be undertaken using a modified first workings mining method which will have no subsidence effects to the surface landform. Subsidence impact is described in the EIS (EMM 2017a). Therefore, the visual effects of underground operations will be indistinguishable.

The visual effect of the underground mining will be limited to the initial excavation for the drift and ventilation shafts which will create localised landform and colour contrasts. The materials and forms will not necessarily be in keeping with existing landscape features. However, integration is considered to be achieved by their small form (comparative with other Project elements and relative to existing landscape element).

Owing to the location of the infrastructure, viewing point opportunities in the landscape, the small scale of the infrastructure particularly set well away from potential public viewing locations, and the integration into the landscape on account of vegetation, these elements will range from a low to moderate effect. This is dependent upon the distance of the receiver and the relative proportion of the viewshed that Project elements occupy (which is a function of mass and distance of the view; whether the element occupies the foreground, midground or background) and the extent to which vegetation or other surface features screen and afford integration of Project elements into the landscape.

4.4.2 Surface infrastructure – coal handling

i Physical Character

The coal handling and processing facilities form the SIA and consist of:

- conveyors, breaker station, transfer points and surge bin;
- run of mine (ROM) conveyor and tower;
- ROM stockpile;
- coal handling and preparation plant (CHPP);

- coal sizing and screening plant;
- product coal stockpiles;
- stacker / reclaimers;
- coal washery reject crushing, screening and pumping plant;
- rejects stockpile; and
- overland conveyor.

These elements will take on an industrial character. Their scale, mass and form, when combined with all other elements will create an industrial setting. Such character settings and scales are not absent within the locality (SPV zone) and are exhibited by the Berrima Cement Works and Berrima Feed Mill. Indeed, the mass and height of the cement works structures are prominent even, from Mereworth House (see Section 6).

ii Visual effect

The coal handling infrastructure will have varying degrees of contrast and integration on account of the physical form and mass of various elements, screening by vegetation and topography, and distance of viewing opportunities affecting occupancy of viewshed.

Overall, an intrusive effect will be created where elements will be visible within the landscape as they will be of strongly contrasting form, mass and colour (unmitigated) to the rural setting in which they occur. The presence of industrial elements rising above the surrounding vegetation is already a feature of the landscape, and seen in conjunction, there is some integration with surrounding land use. The diversity of form and spatial spread is of a scale similar to the nearby cement works which have been a feature of the landscape for ca. 90 years. At the end of mine phase, all constructed elements will be removed, and the landform rehabilitated.

The coal product conveyor from the conveyor drift to the ROM stockpile is a strongly linear element of approximately 2 km in length. The CHPP, product and reject stockpile, and stacker / reclaimers will be large rectilinear elements. The ROM stockpile, breaker station, surge bins and transfer points all contribute to a strongly industrial, contrasting effect. Although there is, in places, foreground vegetation which screens much of the structures, or breaks up its apparent mass, these elements would be prominent where terrain is conducive, and vegetation does not screen views. Individual mine elements will be of a smaller mass and smaller height to the Berrima Cement Works situated 2-2.5 km to the east, and of a similar scale though lesser height to the Berrima Feed Mill.

Views of the coal handling infrastructure will be afforded from the public domain of Medway Road, Hume Motorway, Old Hume Highway, and elevated, undulating private lands to the south, east and north.

Ensuring coal handling infrastructure elements will be painted with a colour palette which is sympathetic with the colours of the surrounding landscape and surface finishes will be non-reflective will further assist in landscape integration.

Owing to the effects of visual screening by vegetation, views from within Belanglo State Forest (west) will not be possible. The mine infrastructure is clustered to the south of mature native vegetation along Oldbury Creek. At this location the creek is slightly incised. Despite the maturity of this vegetation, owing to heights and massing of the coal handling infrastructure, they may appear rising above vegetation. This affects views from along Medway Road west of the Hume Motorway and rural residential properties to the north.

Glimpses of coal handling infrastructure will be possible from along the Hume Motorway; however, owing to the vegetation present along the road verge (within the road reserve and adjacent), impact to views are unlikely to be significant. An exception would be full, unimpeded views of the infrastructure from the Medway Road overpass on the Hume Motorway. Views of coal handling infrastructure rising above intervening vegetation will be possible from the Old Hume Highway (overlooking) the Hume Motorway, near the intersection with Mereworth Road (Viewpoint 7 and Cultural Landscape viewpoint CL VP16).

Local topography and vegetation screen views to the coal handling infrastructure from the nearby urban areas of Medway, New Berrima and Berrima. The mine will not be seen from Sutton Park or Exeter (see Figure 3.3).

The overall visual effect is affected by the distance from which the elements will be viewed, the proportion of the development seen, the nature of the view and the type of view opportunity (viewing or static). The overall visual effect therefore could range from moderate to high.

4.4.3 Surface infrastructure – site facilities

i Physical Character

Support facilities which relate to the operation of the mine include:

- administration offices (8 m high), bathhouse and carpark;
- control rooms;
- workshop facilities;
- warehouse/store and laydown area;
- fuel and lubrication storage and refuelling facilities;
- washdown facilities;
- security fencing;
- internal access roads;
- sewage treatment facility;
- water supply, storage and management infrastructure;
- electricity supply and communications infrastructure;
- air compressor and back-up generators;
- fire-fighting systems;
- emergency response facilities;
- minor plant, equipment and facilities required to service the mine; and
- environmental management and monitoring equipment.

These elements will take on a light industrial character.

ii Visual effect

The many buildings and facilities that will be established throughout the SIA; sheds offices workshops and equipment contrast in character with much of the rural landscape in which they will be situated. Despite this contrast, their size, dispersed nature throughout the SIA, scale and form will be in keeping with the rural sheds and outbuilding found within the regional rural and semi-rural landscape.

These elements will be visible from within flat undulating land to the south of the SIA. However, much of this land is privately owned by Hume Coal and public access is not possible. Where public views of the SIA will be possible, such as from Mereworth Road and the Hume Motorway, these elements will be typically screened by vegetation within the landscape and or cuttings along the highway.

Views of these elements will be possible from elevated private land to the south-east and east at distances of 2 km or greater. Owing to their scale and form, at such distances site facilities will likely be integrated visually and have a low to moderate visual effect.

4.4.4 Non product stockpiles

i Physical Character

A number of stockpiles will be established within the SIA during the life of the mine. Some of these will contain topsoil stripped from disturbance areas of the SIA, and others will be reject stockpile operating for the life of the mine which will also contain decline shaft spoil. These stockpiles will be established during the initial (12 months) mine development, during infrastructure set out and construction and mine drift excavation. Topsoil stockpiles (1-5 m in height) will be limited in vertical height by soil quality management constraints. These stockpiles will be visible to external views. Post mining, spoil will be returned underground to seal the shaft and soil will be used to rehabilitate the site.

ii Visual effect

Owing to low heights and the screening effect of vegetation from most views, topsoil stockpiles will be virtually indistinguishable. If they were visible, they would virtually be indistinguishable from the surrounding infrastructure.

These stockpiles will create, at least initially, localised landform and colour contrasts, which appear as bare earth until vegetation cover establishes on them. These elements will have a low to moderate visual effect because of their small scale and visual colour integration into the landscape following establishment of grasses where possible.

The reject stockpile (17-19 m in height) will be positioned between the coal product stockpile and remnant native vegetation along Oldbury Creek. Glimpses of the stockpile may be possible from along the Hume Motorway in the vicinity of the Medway Road overpass; however, on account of its lower stature and being backgrounded by more expansive elements of the SIA, it would be indistinguishable. Owing to the vegetation present along the motorway, and the short transient viewing opportunity, views will unlikely be significant. Local topography and vegetation will screen views to the coal handling infrastructure from the nearby urban areas of Medway, New Berrima and Berrima and from along Medway Road.

4.4.5 Load out facility and rail

i Physical Character

Coal will be transported to Port Kembla by train for export and sale to local markets. An extension of the existing Berrima rail spur from Moss Vale servicing the cement works will be constructed. Trains will run on the existing underutilised line between Moss Vale and Port Kembla. The alignment between the cement works and the Hume Coal Project area in part follows the alignment of the former rail line to the Berrima Colliery.

A rail loop and coal loadout will be constructed on the southern side of Medway Road to the east of the Hume Motorway and north of Oldbury Creek.

ii Visual effect

The Train Load Out (TLO) facility, with a height of 41.7 m above natural ground (37 m in height and located on top of the 4.1 m rail loop), will have varying degrees of contrast and integration on account of the physical form and mass of various elements, screening by vegetation, topography and distance of viewing opportunities affecting occupancy of viewshed. Overall, an intrusive effect will be created where it will be visible within the landscape as it will be of strongly contrasting form, mass and colour (unmitigated) to the rural setting in which it will occur. The presence of industrial elements rising above the surrounding vegetation is already a feature of the landscape, and seen in conjunction, there is a degree of integration with surrounding industrial land uses. The form and scale of this element is smaller than the nearby cement works which have been a feature of the landscape for ca. 90 years. At the end of mine operational phase, all constructed elements will be removed and the landform rehabilitated.

The overall visual effect is therefore affected by the distance from which the elements will be viewed, the proportion of the development seen, the nature of the view and the type of view opportunity (viewing or static). The overall visual effect therefore could range from moderate to high.

The Berrima rail bridge will be constructed over the Old Hume Highway to allow crossing of the rail line over the road. The bridge will be in keeping with other bridge structures in the locality. A high visual effect will be experienced during construction. However, as bridges are an existing visual element in the locality, and the Project can be integrated into the setting adjacent to industrially zoned land, once established the visual effect will be moderate.

Construction of a rail rolling stock maintenance and provisioning facility between the Hume Motorway and the Old Hume Highway will have a moderate degree of contrast with its immediate surrounds and a moderate to low integration. The elements of the proposed maintenance and provisioning facility structure are already present in the locality. A high visual effect will be experienced during construction; however, as sheds of this nature are an existing visual element in the locality, once established the visual effect will be moderate.

The visual effect of the rail construction will be temporary in nature with a number of laydown areas and construction compounds established. Development of the line will require cut and fill. Although cuts will be necessary in the area to the south and west of the of the cement works, fill will be required in lower parts of the landscape especially to the south of the cement works and at the rail loop to create a usable, at grade all-weather track.

During the early parts of the construction, localised landform and colour contrasts, which appear as bare earth will occur until vegetation cover establishes on them. A moderate visual affect is anticipated initially, but once the exposed embankments will be revegetated, the effect will be low.

4.4.6 Surface water management infrastructure

i Physical Character

Water infrastructure to be deployed includes construction and operation of a primary water storage dam adjacent to the Hume Motorway, surface and groundwater management and reticulation infrastructure and construction of sedimentation (environmental dams), diversion drains and bunds, culverts and other infrastructure.

Environmental management (erosion and sediment controls), will be sized appropriately and located in accordance with spatial requirements for these structures.

ii Visual effect

a Primary water dam

Development of the water storage dam will require removal of pasture grasses, topsoil stripping, excavation and construction of a 19 m high earthen dam wall. This dam will initially have a high visual effect during construction due to the colour contrast caused by the exposed soil and vegetation removal set against the grassy pastures of the undulating lands LCU. Dams are a feature of the landscape in the form of water storages (e.g. Medway Dam) and farm dams. However, the scale (surface area) of this dam is larger than many dams within the locality.

The most significant public viewing points (Hume Motorway and Old Hume Highway) would place the dam in the foreground of views. The visual effect will reduce after groundcover is re-established on disturbed areas of the dam wall. However, the scale of the dam will retain a moderate visual effect.

b Environmental management

Surface environmental dams will not be maintained with permanent standing water, and instead will only be used to collect surface runoff during rainfall. Water will be used for dust suppression or allowed to evaporate. A high visual effect will result during construction. Once revegetated they will be almost indistinguishable at distance and therefore a moderate to low visual effect within the SIA and very little effect outside of it (SIA).

Surface drains will be constructed by removing pasture, topsoil stripping and excavation of drains and deposition of the material downslope of the earthworks or deposition of bund material directly onto a cleared and prepared surface. Such works would have a high effect during construction. Once revegetated they will be almost indistinguishable at distance and therefore a moderate to low visual effect within the SIA and very little effect outside of it (SIA).

Elements of the water management infrastructure may include long horizontal pipelines bunds which generally follow (parallel to) contours. They will have a plain linear form. Pipelines will contrast in colour and texture to the landscape. Given their low height profile, they would have little visual effect (low to negligible) outside of the SIA.

4.4.7 Access

i Physical Character

Access to the mine will be from the existing Mereworth Road, from the Hume Motorway. There will be no upgrading of the roads or intersections required. Internal access roads within Mereworth (property) (to the mine administration area) will follow existing tracks within the property. This will be upgraded and sealed to accommodate the volume of traffic and heavy vehicles required for construction.

Internal mine access roads will be constructed alongside conveyor lines where possible to allow access to the ROM and product stockpiles, rail load out, underground personnel and conveyor drifts, ventilation shaft pad, magazine and laydowns.

ii Visual effect

The visual effect of internal mine roads will be high during construction owing to the extent of surface disturbance and the colour and contrast caused by exposed soils and the loss of vegetation. Post construction these roads will have dust suppression treatment a 'chip-seal' or similar and therefore will contrast with the surrounding vegetation. Sealed roads of this type are not common elements in the rural framework and therefore the effect, even with revegetation of road edges would be high. However, with distance from the roads and screening (by local topographic considerations), they would have little visual effect outside of the SIA (moderate to low visual effect). Further landscape integration could be achieved through implementation of tree planting.

Construction traffic will increase traffic volumes on the Hume Motorway and Mereworth Road during construction. Increased traffic volumes could create a low to moderate visual effect. The increases in traffic on the highway would be virtually indistinguishable against the background of existing high traffic numbers. Mereworth Road has very little traffic and is generally only used for access to Mereworth and one property to the south. The intersection of Mereworth Road and Hume Motorway also accommodates access to the motorway from Old Hume Highway / Access to Berrima from Hume Motorway.

4.4.8 Power infrastructure and substation

i Physical Character

The Project requires the construction of an electrical supply to power mining activities. The indicative 66 kV transmission supply alignment will run from approximately the intersection of the Hume Motorway and Medway Road, and extend in a south-easterly direction to a substation located near the mine administration / ROM stockpiles (refer Figure 4.1).

ii Visual effect

The power distribution lines that will be used in the SIA will be similar to elements already present within the landscape. However, the powerline and substation will be new elements within an otherwise rural landscape setting within the property and the visual effect will be moderate to low.

4.4.9 Temporary construction accommodation village

i Physical Character

A temporary accommodation village will be developed on the Mereworth property, in the vicinity of the mine administration building (Figure 4.1) for a 4 year period. The village will be a series of modular and demountable buildings comprising sleeping accommodation, mess hall, kitchen, ablution and showering facilities and carparking. It will be located 1.5 km from the nearest public road. These will be new temporary elements within an otherwise rural landscape setting.

ii Visual effect

The visual effect of this village will be moderate given the location of the village in relation to viewing areas. Existing vegetation along Oldbury creek will assist in screening this village especially from views along Medway Road, existing landscape screening vegetation planted along the Old Hume Highway / Motorway will screen view from highway users and local topography will screen some views from the east. The village would not be visible to from the Mereworth house or garden, unless standing on the ha-ha wall.

4.5 Summary

Visual effects of the Hume Coal Project will be temporary during the life of the Project, and upon decommissioning, the landscape will be returned as close as practical to its pre-disturbance agricultural landform/land use.

Visual effect is dependent upon the extent to which proposed elements visually contrast or integrate with elements of a view shed, and the proportion of the viewshed occupied by the new elements.

Additionally, the landscape context and location from which elements will be viewed is also important (eg if elements will be visible present in the foreground, midground or background of a view). Visual effect must be considered on a case-by-case basis revised for each viewing location assessed. The assessment of visual effect has been described in terms of individual surface elements (or as groups of similar elements) and generally, the overall Project effect must be considered as a whole (the cumulative effects). The effects will only be experienced for the life of the mine and once ended, the landform will be reinstated to functioning agricultural landscape, as close as practical to the pre-disturbance landform. The effects will be therefore reversable and temporary.

The following elements will generally have a moderate to high residual visual effect:

- TLO;
- ROM conveyor and conveyor tower;
- CHPP; and
- coal stacker / reclaimers.

The following elements will generally have a moderate visual effect:

- primary water dam;
- rail bridge; and
- rail maintenance facility.

All remaining elements have moderate to low effects.

5 Visual analysis

5.1 Overview

This chapter evaluates visibility of the Project to external viewing locations within the landscape.

Visual sensitivity is determined by the visibility of one or more mine elements within the SPV zone. Sensitivity is a function of: visibility; landuse and landscape character (defined by the LCUs) from where mine elements will be viewed; and the distance of viewing opportunities from the mine elements.

Section 5.2 identifies the parts of the SPV zone from which the Project may be seen (visibility). Section 5.3 identifies the visual sensitivity of receptors as a function of their distance from visible structures. Section 5.4 characterises the types of viewing opportunities in relation to landuse and ownership (sensitive receptors). Section 5.5 analyses viewpoints relating to the locally heritage listed Mereworth house and gardens, owned by Hume Coal.

5.2 Visibility within the significant potential view (SPV) zone

As identified in Section 4.2, the Project's visibility within the landscape and the SPV zone, being the parts of the catchment where the most significant views will be experienced, were assessed by a number of means. The total visibility area and the SPV zone are represented in Figure 3.3 and Figure 3.4. Features of the SPV zone are described in Section 4.3.

It is understood that an assessment of the views and vistas of the Wingecarribee LGA was the prepared for the Wingecarribee Shire Council in 2009. The report entitled *Views and Vistas Scenic Landscape Review* (DEM Consulting 2009), was proposed to an agenda item for the 11 November 2009 Ordinary General Meeting of Wingecarribee Shire Council. The purpose of the report was to support an application to amend the LEP to include a scenic protection clause. A copy of this report has not been obtained and the document does not appear to be publicly available. However, the mapping associated with the report has been adopted into the significant and highly significant views and vista's mapping of the Wingecarribee Rural Lands Development Control Plan (DCP).

The visibility of elements assessed for the visibility analysis (Figure 3.3) are presented individually in Attachment A:

- Figure A.1 – Product coal stockpile, stacker / reclaimers;
- Figure A.2 – Coal handling and processing plant;
- Figure A.3 – Vent shaft;
- Figure A.4 – ROM stockpile;
- Figure A.5 – ROM Conveyor and tower;
- Figure A.6 – Train load out facility;
- Figure A.7 – Old Hume Highway rail bridge;
- Figure A.8 – Train maintenance and provisioning shed; and
- Figure A.9 – Rejects stockpile.

5.2.1 Visibility of mine elements in the landscape

In the context of visibility within the SPV zone, the following elements have been identified as having moderate to high visibility:

- Product coal stockpile stacker / reclaimer - views of this infrastructure will be possible from the north-west, through the east to the south-west (refer Figure A.1 (Annexure A) for a map showing the visibility of this element). Most extensive views will be within the lowland pastoral LCU within the Hume Coal properties (including Mereworth). Outside of the Hume Coal properties static views will be possible from the north (Peri-urban LCU) and to the south-east in the Undulating pastoral land LCU. Within the secondary and tertiary sensitivity zones, filtered and framed views will be possible from the south-west through to the south-east.
- Coal Handling Preparation Plant – visibility of this large building in the landscape has a similar profile to the coal stockpile, stacker / reclaimer. To the south, views of the structure will be blocked by vegetation between approximately 2.5 km and 4.5 km such that distant views, of 5 km and beyond, would see the structure rising above the vegetation in the landscape (refer Figure A.2 (Attachment A) for a map showing the visibility of this element).
- ROM conveyor, conveyor tower and ROM stockpile – views with primary sensitivity occur in the Peri-urban LCU to the north of Medway Road and to the north-west, to the east in the Industrial LCU and to the south-east and south in the Undulating and Flat land LCUs. Beyond this primary sensitivity zone, distant filtered and framed views will be afforded to the south-west through to the south-east in the Undulating and Flat land LCUs, and the Mount Gingenbullen LCU. Theoretical mapping does identify some visibility to the north and north-east of Berrima; however, the nature of the mapping patterning suggests that vegetation in these locations will screen views (refer Figure A.4 and A.5 (Annexure A) for a maps of visibility within the SPV zone).
- Train load out – The train load out (TLO) is set 37 m above the height of the rail loop, itself 4.1 m above natural ground level. At 41.7 m above natural ground (located in the Flat pastoral land LCU, within the lowest parts of the SPV zone), this structure is the tallest element in the SIA. This is a 30 m x 10 m structure with a covered coal conveyor ramping upwards to near the top of the structure from a south to north alignment. Views with primary sensitivity within the SPV zone mainly occur within Hume Coal owned land. Outside of Hume Coal land, within the primary sensitivity zone, filtered and at time framed static views will be afforded in the Peri-urban LCU to the north-west, north and north-east, Industrial LCU to the east, and Undulating and Flat LCUs to the south-east and south-west. Views from the south-west and south occur in the Undulating and Flat LCUs between 5 km and 9 km from the TLO. Refer to Figure A.6 (Annexure A) for a map showing the visibility of this element.
- Primary water dam – The primary water dam is a 13 ha (at full capacity) water storage (500 m x 260 m) with a dam wall height of approximately 19 m. Visibility of this dam within the landscape is limited, with views mostly occurring within the primary sensitivity zone (ie within 2.5 km of the infrastructure – refer to visual sensitivity levels in Table 2.2) of the Undulating and Flat lands LCU.
- Rail bridge – This structure, which has a maximum height of 8 m above the Old Hume Highway, has a restricted visibility in the landscape. Outside of Hume Coal owned land, framed and filtered views occur within the primary sensitivity zone within the Peri-urban LCU (north), Industrial LCU (east) and Undulating pastoral land LCU (south-east). Refer to Figure A.7 (Annexure A) for a map showing the visibility of this element.
- Rail maintenance facility – Visibility of this 25 m x 7 m structure within the SPV is similar to the rail bridge visibility, though views will be more filtered and over a much-reduced spatial area. Refer to Figure A.8 (Annexure A) for a map showing the visibility of this element.

- Rejects stockpile – Visibility of this ephemerally 19 m high stockpile will vary dependent upon production and demand for reject material (backfilling) within the mine. Therefore the 19 m height is a worst-case (maximum) and would represent its greatest visibility in the landscape. Visibility has been assessed on this maximum height scenario. Refer to Figure A.9 (Appendix A) for a map showing the visibility of this element.

Generally, only the taller elements of the surface infrastructure will be visible with foreground and midground views blocked by vegetation / topography. These elements will appear above the tree line, and dependent upon the viewpoint of the viewer (distance and elevation), the infrastructure may be backgrounded by vegetation and appear in part, or in full, below the skyline.

Modelling in this section has been undertaken using theoretical visibility, which does not take into account the nature of the view (e.g. glimpsed, sequential or full) or the situation of the viewer (static or moving). Therefore, even glimpsed views filtered by vegetation and those distant are, by theoretical mapping, given the same 'weighting' as distant and full or uninterrupted views. This is irrespective of apparent mass of the element, even if small portions of a much larger element will be visible.

5.3 Visual sensitivity

Sensitivity is a function of land use and distance from a particular new landscape element or elements. Generally, views from accessible public spaces are valued more than views available only from private residences; water and natural elements are preferred to urban scenes; undulating, hilly and mountainous views are preferred to flat land; views with midground and background elements are preferred; views with skyline features and focal points are preferred and views from minor country roads are preferred to views from major highways. Diversity is generally preferred over uniformity, and heritage over modernity, but these need to be balanced with preferences for consistency and coherence of built form, which are also valued.

The value held for particular views from specific viewpoints can be related to their visual sensitivity to change by the introduction of discordant elements.

5.3.1 Receptors

The range of sensitive receptor types is identified and discussed below, firstly in relation to visibility and then, if visible, the sensitivity of the view. Sensitive receptors include publicly accessible sites / lands; national parks, state forests and environmental reserves, roads, public vantage points and scenic outlooks, heritage sites, recreation reserves, and private lands; urban, rural residential and rural lands. Tourism oriented facilities and areas are also sensitive receptors and sites may be in private or public ownership.

i National Parks, State Forests and reserves

Figure 5.1 presents a visibility analysis for the Project to National Parks, State Forest and public reserves. Although there are a number of National Parks in the broader regions surrounding the Project, none are within the Project area or the SPV zone and lie greater than 7.5 km from the SIA. Views of the SIA from national parks are blocked by a combination of topographic features and vegetation.

Belanglo State Forest is situated immediately to the west of the SIA and is partially situated within the SPV zone. The state forest is promoted as a passive and active recreation destination, containing walking trails and camping ground. The state forest boundary is >2.5 km to the west in the secondary sensitivity zone. However, there will be no opportunities to view the SIA once in the forest, on account of vegetation and topography which block views.

Medway Dam is situated on the Medway Rivulet and is not publicly accessible.

Three Wingecarribee Shire Council reserves are located within the SPV zone; Makin Reserve, Berrima Reserve and Berrima Camping Ground (Berrima River Reserve), as shown in Figure 5.1.

Makin Reserve is a natural area reserve on the Wingecarribee River between the Hume Motorway and Berrima. There are no public trails or camping facilities within Makin Reserve, and no opportunities to view the SIA once in the forest on account of vegetation and topographic constraints which block views.

Berrima Reserve is situated on the banks of the Wingecarribee River upstream of the Wingecarribee Weir. There are no opportunities to view the SIA once in the forest on account of vegetation and topography (river incision) which block views.

Berrima Camping Ground (Berrima River Reserve) is situated within Berrima on the banks of the Wingecarribee River. There are no opportunities to view the SIA once in the campground or from the river.

ii Vantage points and scenic lookouts and picnic areas

There are no known, designated public viewing points, within the SPV zone. The Old Hume Highway is a recognised heritage tourism route, and visual significance is considered in the roads section.

iii Urban area

Figure 5.2 presents a visibility analysis for the Project to the villages (urban areas) of Medway, New Berrima and Berrima; urban areas in the north-western, northern and north-eastern parts of the SPV zone respectively.

Medway Village is in the primary visual sensitivity zone being less than 2.5 km from the SIA and is deemed to have a moderate sensitivity rating (refer to visual sensitivity levels in Table 2.2).

New Berrima is also situated in the primary sensitivity zone, being less than 2.5 km from the Berrima Rail infrastructure (bridge and rail maintenance facility) and is deemed to moderate visual sensitivity.

Berrima Village is situated in the secondary visual sensitivity levels in Table 2.2) of both the SIA and Berrima rail facilities (both are greater than 3.5 km and 2.5 km from the village, respectively) and therefore has a low visual sensitivity.

Despite their proximity to the SIA and rail, on account of topographic and vegetation constraints, none of these urban areas have views of the Project, as verified by field inspection. Although DSM analysis does show some theoretical visibility within Medway, New Berrima and Berrima, these are representative of views from the tops of mature canopy trees.

iv Roads

Figure 5.3 presents a visibility analysis for the Project to the following roads.

a Hume Motorway

The Hume Motorway is the major road traffic transport route through the Southern highlands, connecting Sydney with Canberra and Melbourne. It is a limited access, grade separated four-lane, dual-carriageway motorway with a posted speed limit of 110 km/h. The Berrima bypass on the Hume Motorway was completed in 1989 to divert highway traffic around the town of Berrima.

Mapping (Figure 5.3) shows that Project elements will be visible in the following locations:

- Section 1:

- Northbound traffic – transient, uninterrupted, midground views of full SIA infrastructure (Product coal stockpile, stacker / reclaimer, CHPP, ROM coal stockpile, ROM conveyor tower, TLO, rejects stockpile) heading towards the Medway Road Overpass northwards of this point for approximately 150 m. These views will only be available to passengers as they appear to the left and behind the viewer. Views to the south of the Medway Road overpass will be screened by existing planting undertaken in late 2015.
- Southbound traffic - transient filtered, partial views of the rail siding and rail bridge between the Medway Road interchange and 500 m to the south. These views will only be momentarily available to drivers at Medway Road and rail corridor crossings. Longer opportunities will be available to passengers. Views of the SIA will not possible owing to landscaping on the median strip.
- Section 2:
 - Northbound traffic - transient filtered, views of the CHPP, ROM conveyor tower, TLO and rejects stockpile) from the southern extent of section 2. In the vicinity of Oldbury Creek uninterrupted partial views of the product coal stockpile, the stacker reclaimers, CHPP, ROM conveyor tower and stockpile and reject stockpile would appear in the midground for 300 m south of the Oldbury Creek crossing ca. 570 m (19 seconds at 110 km/hr). This will be reduced to ca. 300 m (10 seconds at 110 km/hr) when screen planting undertaken in 2015 reaches semi-maturity. Glimpses of the rail provisioning facility will be possible to the east of the motorway. Also long partial views of the primary water storage dam for 150 m (5 seconds at 110 km/hr) at a point ca. 820 m to the north of the Mereworth Road intersection where the motorway emerges from cutting.
 - Southbound traffic - west of the motorway - transient filtered, and in places uninterrupted full views of the primary water storage dam for ca. 300 m (10 seconds at 110 km/hr) immediately north of the Oldbury Creek crossing. This viewing length will be reduced to ca. 230 m (8 seconds at 110 km/hr) when the planting undertaken in 2015 matures.
- Section 3, northbound, north-west of the motorway - very limited transient filtered views of the stacker / reclaimers and ROM conveyor tower, to the north-west.
- Section 4, northbound – very limited transient filtered glimpses of the ventilation shaft pad structures in the area south of the Belanglo Road intersection.
- Section 5, distant views northbound to the north-west of the motorway on the section of the motorway between Belanglo Road and Black Bob’s Creek - filtered long-view glimpses of distant elements (stacker / reclaimers, ROM conveyor tower and TLO partially rising above intervening vegetation).

Sensitivity

Sections 1 – 4 (refer Figure 5.3) will be within the primary sensitivity zone. Immediately to the north of the Medway Road interchange, when approaching from the north, there will be potential views of the SIA (coal handling and rail load out) to the south-west of the highway and rail maintenance facility to the south-east for both southbound and northbound traffic (Section 1). Screen planting by Hume Coal in 2015/2016 (refer Figure 4.3), will eventually block / filter some views here to the SIA (views of the rail would still be possible). However, extensive uninterrupted views overlooking the rail loop, TLO and the SIA will still be possible from the crossing over Medway Road. Views of the various larger mine elements would be sequential in nature with flickering views possible between trees alongside the road. Partial views of vegetation will be possible and in most cases the mass of the elements would be broken up by intervening vegetation.

Section 2 to the south of Oldbury Creek allow views of the SIA to the west from the north and southbound lane (300 m long). Screen planting by Hume Coal in 2015 will eventually filter / block views (shorten the length of time these will be visible) to the SIA and the storage dam. Views of the rail would still be possible from the southern bound lane; however they would only be visible to passengers in vehicles as the infrastructure would be oriented over the left shoulder and behind the vehicle and views would be transient glimpses of rail infrastructure in the distance.

Sections 1 and 2 represent the most significant views from the highway.

Sections 3 and 4 afford very filtered views of the infrastructure for vehicles travelling both south and north. Owing to the orientation of the road, views from the southbound lane would not be as great as those to northbound traffic on account of the infrastructure appearing over the right shoulder (to the west) and behind the vehicle.

Sections 1-4 being in the primary sensitivity zone have a moderate sensitivity.

Section 5 is situated in the secondary sensitivity zone and affords glimpsed, filtered views from northbound. Section 5 has a low sensitivity.

Although the tallest elements of the screen planting associated with sections 1 and 2 will take 15 years to reach maturity, partial screening is expected from both sections in 5-7 years.

Despite their proximity to the SIA on account of topographic (cuttings on the Motorway and adjoining rolling rises) and vegetation constraints, views of the SIA will mostly be blocked. In places screen planting by the former RTA adjoining the highway between Medway Road and the Old Hume Highway has failed, and recently (2015/2016), Hume Coal has undertaken screen planting on the Mereworth property adjoining the Motorway. This planting and topography now functionally screens or filters previously uninterrupted views into the SIA although some glimpsed, filtered views between vegetation may be possible. This is especially the case near the crossing of the Medway Rivulet for vehicles travelling north.

b Old Hume Highway

The Old Hume Highway is a two lane, 80 km/h sealed road, which is lined with trees forming part of the Remembrance Driveway. From the south, it links the Hume Motorway with the towns of Berrima, Bowral and Mittagong, before re-joining the Hume Motorway to the north of that town. The road intersects with Medway Road and Taylor Avenue, New Berrima. North of this intersection lies the peri-urban LCU. To the south of the intersection, the Industrial land LCU lies to the east and Hume Coal land within the Undulating lands LCU lies to the west. Prominent views of the Berrima Cement works will be afforded along this road.

As a tourism route, unmitigated, the Old Hume Highway is within the primary sensitivity zone (views will be <2.5 km to Project infrastructure) and therefore has a high visual sensitivity.

Visible Project elements would include long uninterrupted views of the rail bridge, framed and filtered views of the rail maintenance shed, and filtered partial views of major elements in the SIA (ROM conveyor tower and TLO) rising above intervening vegetation in the vicinity of the proposed rail crossing.

Users of the Old Hume Highway will have extended views of the rail infrastructure associated with the maintenance facility and the rail bridge across it. Between the Medway Road / Taylor Avenue intersection and the Berrima Rail line, travellers will have glimpsed views of the rail load out facility and the coal processing area within the SIA and filtered views will be afforded to the west between the Remembrance Drive tree plantings on the roadway shoulders.

Between 0.5 km and 1.5 km from the intersection of the Old Hume Highway and Hume Motorway, unmitigated, filtered views of the SIA (ROM conveyor tower) and the primary water storage dam will be possible. This area also presents a location for vehicles to stop for static views. Hume Coal undertook screen planting between the Old Hume Highway and the Hume Motorway in 2015/2016. Screen planting will eventually block views here to the SIA, with most trees semi-matured by 2021 and reaching full maturity by 2026 (year 5 of the Project, if commenced in 2021).

c Golden Vale Road

Golden Vale Road is a subregional road which connects the Hume Motorway with Sutton Forest, traversing both primary (<2.5 km) and secondary (2.5-7.5 km) visual sensitivity zones. Golden Vale Road is a dual lane country road, valued for its rural character, comprising a tree lined vista. There will be no potential views from this road to the SIA or rail facilities, due to terrain and existing vegetation.

d Oldbury Road

Oldbury Road is a local road that traverses the north-western, northern and eastern flanks of Mount Gingenbullen. At the western extent it intersects with Golden Vale Road, and at the eastern extent the Illawarra Highway between Sutton Vale and Moss Vale. It is a scenic single lane, unsealed and sealed, with a tree lined 'country-lane' quality to the north-west of Mount Gingenbullen. Parts of Oldbury Road are considered by the Wingecarribee Rural Lands DCP to have of significant views and vistas. The visual sensitivity for the users of Oldbury Road is deemed as high. To the east Oldbury Road is sealed and can accommodate passing traffic, but there will be no views of the proposed SIA area. The route could be considered a heritage route (on account of the publicly accessible heritage places accessed from the road).

Parts of the road in the secondary (2.5-7.5 km) sensitivity zone may have potential filtered, partial views to the stacker / reclaimers, product stockpile, ROM conveyor tower and TLO of the SIA through the roadside vegetation in the vicinity of Oldbury House. Visual sensitivity for the users of Oldbury Road in this location is deemed as moderate.

e Medway Road

Medway Road is a local road with low sensitivity (refer Table 2.2). It provides access westward of the motorway to Medway Village and the peri-urban properties to the north and urban, peri-urban, agricultural and industry to the east of the motorway. Views to the SIA will be possible and the acoustic barrier to be constructed at the intersection of the highway and Medway Road would be visible.

Views will be effectively screened by planting undertaken by Hume Coal in late 2015 (refer Figure 4.3). Notwithstanding, Hume Coal has conducted screen planting, along the northern boundary of the Mereworth property to screen near-field views of the facility from the roadside (refer Figure 4.3). This planting is in keeping with the character of the landscape and local road character in this locality. Screen planting will eventually block views, with most trees semi-matured by 2021 and reaching full maturity by 2026 (year 5 of the Project, if commenced in 2021).

f Mereworth Road

Mereworth Road is a local road created to facilitate access to Mereworth and another property to the south, following construction of the Hume Motorway. Views of the SIA will be afforded to the south-west and west. The road will be the primary access route for vehicle accessing the mine. Local roads with views of Project elements are deemed to have a low sensitivity at any distance from the Project.

g Belanglo Road

Belanglo Road is a local road providing access to Belanglo State Forest from the Hume Motorway. Belanglo State Forest is a recognised recreational and tourist location. Although there will possibly be transient glimpsed views of the southernmost SIA elements within 2.5 km of the road; these are small, would not be viewed in full and the viewers eyeline would likely be attracted to the larger Project elements in the distance (eg TLO, CHPP, conveyor). The visual sensitivity would be moderate. low.

v Heritage sites

a State

Figure 5.4 presents a visibility analysis for the Project to publicly accessible heritage sites. A number of SHR properties are situated within the urban area of Berrima. However visual analysis clearly shows they will not be affected and therefore have not been further considered.

Two state heritage sites which are sporadically visited by the public occur in the SPV zone. These are; Oldbury and Golden Vale which are 2.2 km and 3.5 km from the closest SIA elements; primary water storage dam and ventilation shaft pad buildings, respectively. GIS analysis shows that views of the SIA from the houses at Oldbury (Residence 58) and Golden Vale will not possible owing to terrain and screening vegetation (refer Figure 5.5).

Further assessment of the visibility of the gardens of these properties (refer Table 5.1), showed that mine elements may be visible from Golden Vale. Static and partial views of the SIA will be filtered by intervening vegetation and only from a small portion of the garden near the road. Visual sensitivity is low owing to the gardens being situated between 2.5 and 7.5 km from the surface infrastructure.

Table 5.1 Visibility of mine elements from state heritage properties within the SPV Zone

Property	1. Product Coal Stockpile (west)*	2. Product Coal Stockpile (centre)	3. Product Coal Stockpile (east)	4. Product coal reclaim (west)	5. Product coal reclaim (centre)	6. Product coal reclaim (east)	7. CHPP	8. Ventilation shaft pad structure	9. ROM coal stockpiles	10. ROM conveyor tower	11. Train load out	12. Rail bridge	13. Rail rolling stock maintenance
Golden Vale gardens only	YES	YES	No	YES	YES	YES	No	No	No	YES	No	No	No
Oldbury gardens only	No	No	No	No	No	No	No	No	No	No	No	No	No

Note:

For locations of properties refer to Figure 5.4

* number correspond to Project elements identified in Figure 3.3.

b Local

None of the LEP listed heritage places are publicly accessible. Therefore, visual sensitivity is assessed as it would be for 'other rural houses' (moderate sensitivity).

There are a number of rural houses spread across the SPV zone and Figure 5.5 presents a visibility analysis of rural residential properties. These properties are associated with rural residential (smaller lot) peri-urban development (Peri-urban LCU) and the various properties associated with agricultural pursuits which occur on the flat pastoral land and the Undulating pastoral land LCUs. The same rural residential properties identified in the acoustic analysis for the EIS (EMM 2017a) were used.

Visual analysis shows that of the 69 rural houses assessed for visibility (Figure 5.5), only 10 were potentially affected. Table 5.2 shows which SIA elements would be visible from these rural houses. In many instances, the views would only be partial static views of the taller Project elements, with landscape vegetation screening lower elements in the SIA and masking the scale and mass of the visible structures.

Residents within the primary sensitivity zone (<2.5 km) have a moderate visual sensitivity, where views to SIA will be available. Beyond 2.5 km to visible elements, sensitivity is low. Table 5.3 identifies the visual sensitivity of residential properties.

Table 5.2 Visibility of mine elements from private rural residence receptors

Property	1. Product Coal Stockpile (west)*	2. Product Coal Stockpile (centre)	3. Product Coal Stockpile (east)	4. Product coal reclaim (west)	5. Product coal reclaim (centre)	6. Product coal reclaim (east)	7. Coal Handling and Preparation Plant	8. Ventilation shaft pad structure	9. ROM coal stockpiles	10. ROM conveyor tower	11. Train load out	12. Rail bridge	13. Rail rolling stock maintenance	Sensitivity**
10	YES	No	No	YES	No	No	No	No	No	No	YES	No	No	Moderate
16	No	No	No	No	No	No	YES	No	YES	YES	YES	No	No	Moderate
17	YES	YES	No	YES	YES	No	No	No	No	No	No	No	No	Moderate
19	YES	YES	YES	YES	YES	YES	YES	No	YES	YES	YES	YES	YES	Moderate
37	No	No	No	No	No	No	No	YES	YES	YES	No	No	No	Moderate
38	No	No	YES	No	No	YES	YES	No	YES	YES	YES	No	No	Low
41	No	No	No	YES	YES	YES	No	No	No	YES	YES	No	No	Low
52	No	No	No	No	No	No	No	No	No	YES	No	No	No	Moderate
55	No	No	No	No	No	No	No	No	No	YES	No	No	No	Moderate
59	No	No	No	No	No	YES	No	No	No	No	No	No	No	Moderate***

Note:

For locations of properties refer to Figure 5.5

* number correspond to Project elements identified in Figure 3.3.

** Sensitivity based on distance to nearest visible element

*** Distance to nearest assessed element greater than 2.5 km and would be assessed as low sensitivity (Table 2,2), however visibility of other mine elements <2.5 km from the residence is expected and therefore property has been assessed as having moderate sensitivity

vii Rural lands

Cattle grazing and fodder production are the main agricultural activities in the agricultural lands LCUs (Flat pastoral land and Undulating pastoral land). Figure 5.6 presents a visibility analysis for the Project from rural lands. View from much of the undulating pastoral lands are blocked by vegetation and topography. Views from the Flat pastoral lands LCU afford longer views, however much of these areas where views are possible, are in Hume Coal Ownership (Mereworth). Pastoral and agricultural (rural broadacre) receptors would have a low sensitivity.

viii Industrial zones

The Wingecarribee industrial enterprise zone represents an expanding industrial area framed by the Old Hume Highway to the west, Moss Vale to the east, New Berrima and the Wingecarribee River to the north and rural land to the south. Owing to the strong industrial forms of the present, recently approved and future industrial forms within this zone, as receptors they would have a low sensitivity to types of structures within the SIA or rail.

ix Southern tablelands food and wine cluster

The Southern tablelands food and wine cluster is a non-statutory, self-declared tourism / local producer venture of the Southern Highlands Food and Wine Association to promote the region's economic development and tourism potential. Although not well defined spatially, the Berrima Cluster and parts of the Joadja and Moss Vale Clusters potentially occur within the SPV zone.

There are several farm-to-gate producer ventures within the area providing tourism opportunities. These include wine and olive production which encourages tourists 'to the door'. The nearest winery, Cherry Tree Hill Wines is situated off Belanglo Road in the southern part of the SPV zone, 3.5 km to the south of the nearest infrastructure within the SIA and greater than 5 km from the largest Project elements (e.g. product coal stockpiles). From this distance elements of the SIA would occupy a small component of the broader panoramic view shed, with taller elements appearing clustered closely together and rising above the foreground vegetation. Potentially the eastern portion of the product coal stockpile, stackers / reclaimers, the CHPP, TLO, the ROM Conveyor tower and stockpiles could be visible. These elements would be backgrounded by elevated and well vegetated terrain to the north of the Wingecarribee River which forms the northern boundary of the SPV zone. Farm tourism operations within 2.5 km of the mine (primary sensitivity zone), with views of the SIA would have a high sensitivity. Those beyond 2.5 km, if present, would have a moderate sensitivity.

The Zen Oasis Restaurant (Residence 15 of Table 5.3) has been assessed as not having visibility of mine infrastructure from the main building.

5.3.2 Summary

Visual sensitivity is determined by the landscape receptor type, functional landuse and distance from the visible elements of the SIA, with sensitivity diminishing with distance as determined by the primary, secondary and tertiary view zones. Within the SPV zone, the highest visual sensitivity is assigned to the following receptors:

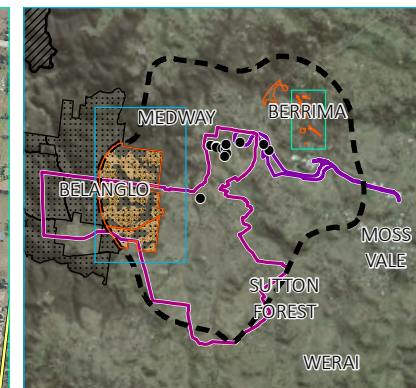
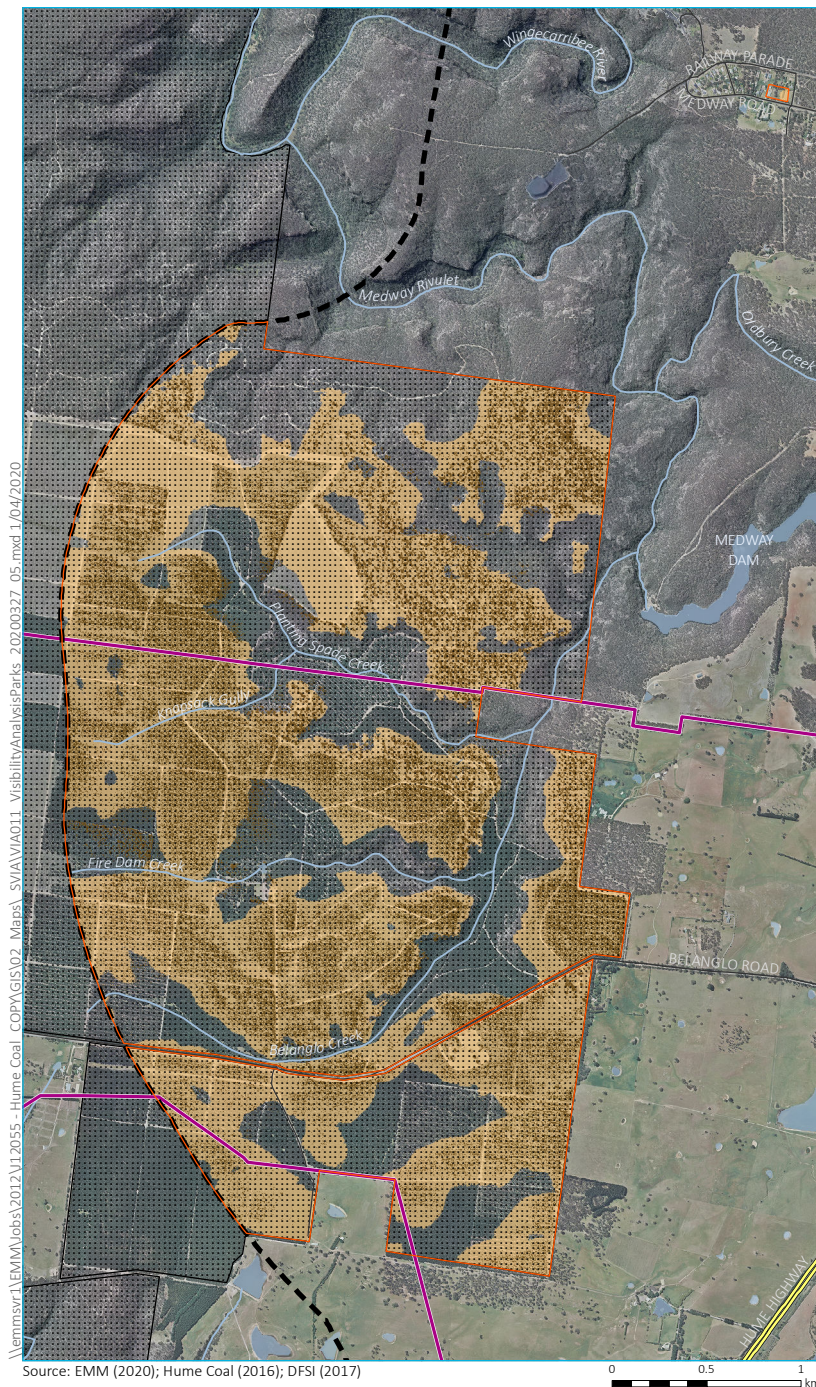
- Private properties and working farms which welcome tourists, such as the farm gate and cellar door activities of those ventures participating in the food and wine cluster ventures and other properties welcoming the public / tourism within 2.5 km of the Hume Coal SIA; and
- Identified tourist routes such as the Old Hume Highway, within 2.5 km of the Hume Coal SIA.

Within the SPV zone, a moderate visual sensitivity is assigned to the following receptors:

- State heritage listed house of Golden Vale as this property occasionally welcome the public for open days, between 2.5 km and 7.5 km of the Hume Coal SIA;

- Private properties and working farms which welcome tourists, such as the farm gate and cellar door activities of those ventures participating in the food and wine cluster ventures and other properties welcoming the public / tourism between 2.5 km and 7.5 km of the Hume Coal SIA; and
- Identified tourist routes such as Old Hume Highway, between 2.5 km and 7.5 km of the Hume Coal SIA;
- The Hume Motorway less than 2.5 km from the Hume Coal SIA;
- Rural dwelling with views from living areas of the SIA less than 2.5 km from the Hume Coal SIA; and
- Subregional roads with views from living areas of the SIA less than 2.5 km from the Hume Coal SIA.

All other receptors / land uses within the various view zones have low sensitivity.

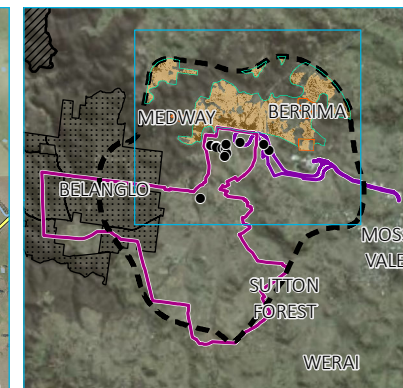
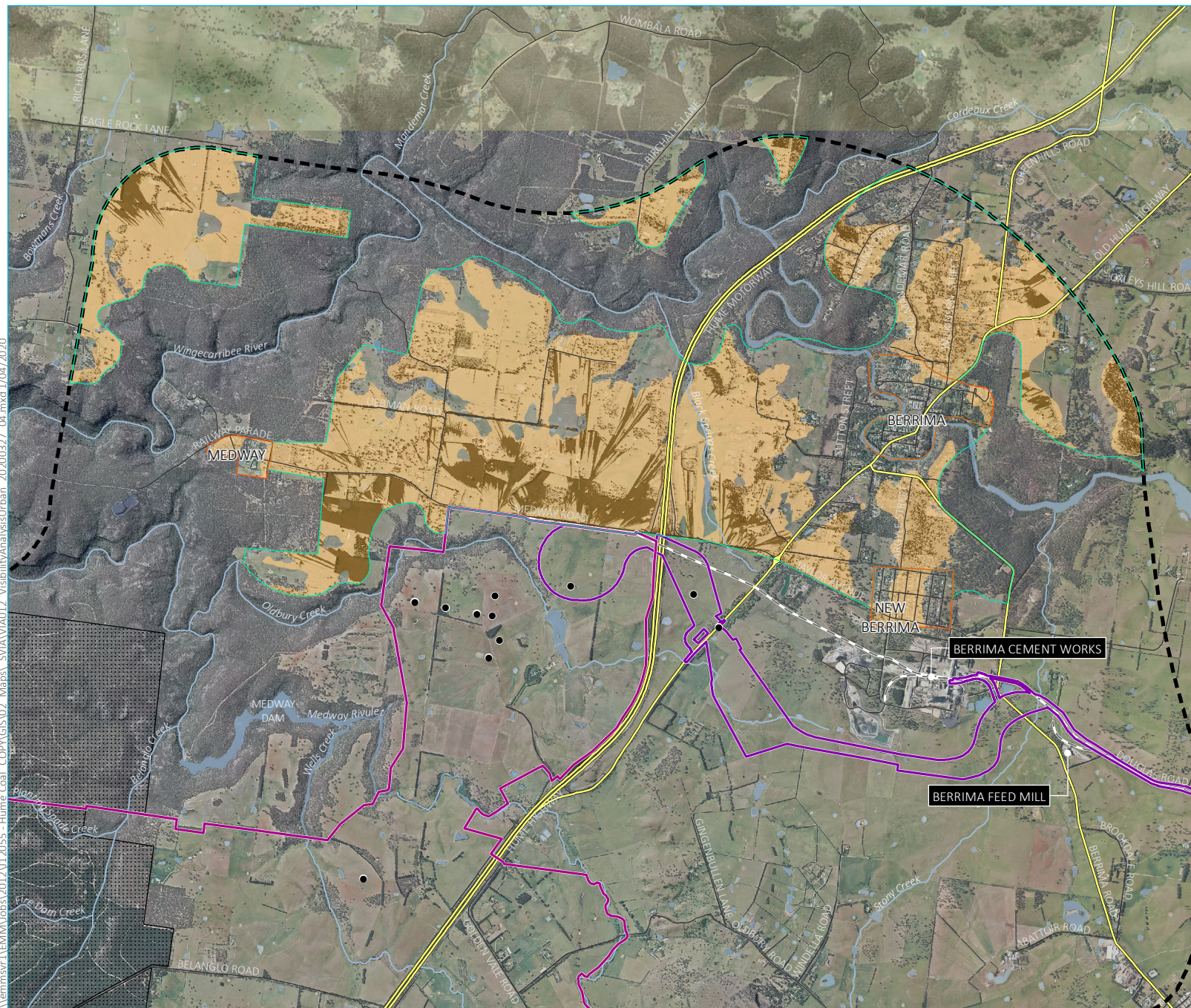


- KEY**
- Hume Coal Project area
 - Berrima Rail Project area
 - Significant potential view zone
 - State forest and public reserve boundary
 - Viewshed assessment location
- Viewshed results**
- Viewshed based on DEM
 - Viewshed based on DSM
- Existing environment**
- Major road
 - Minor road
 - Named watercourse
 - Waterbody
 - Belanglo State Forest
 - Bangadilly National Park (refer to inset)

Visibility analysis from National Parks, State Forests and reserves

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure 5.1

\\lemmsvr1\EMM\Jobs\2012\112055 - Hume Coal - COPY\GIS\02 Maps\SVIA\IA012 VisibilityAnalysis\Urban 20200327 04.mxd 1/04/2020

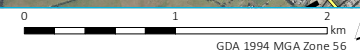


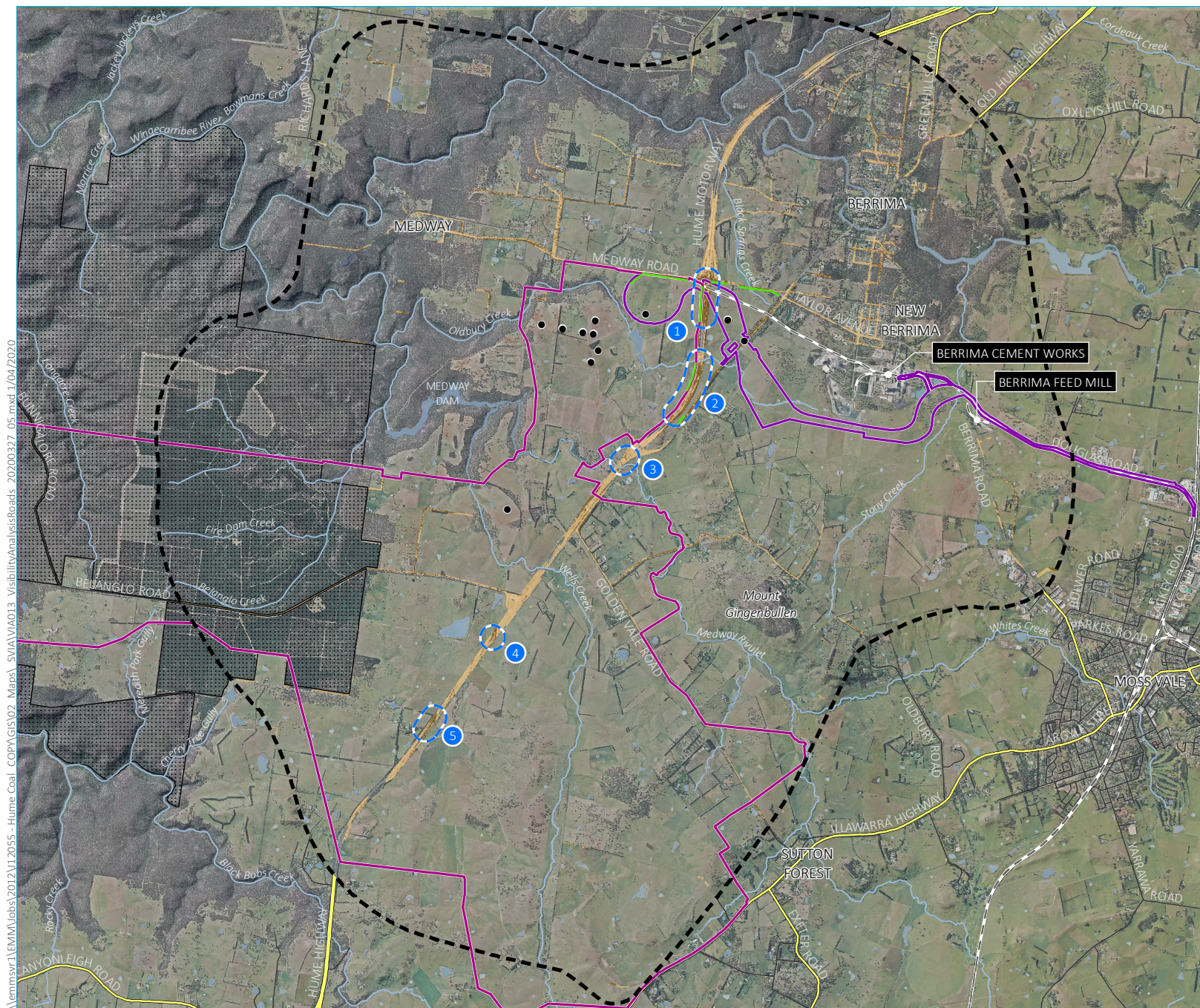
- KEY**
- Hume Coal Project area
 - Berrima Rail Project area
 - Significant potential view zone
 - Viewshed assessment location
 - Landscape character unit**
 - Urban area
 - Peri-urban
 - Viewshed results**
 - Viewshed based on DEM
 - Viewshed based on DSM
 - Existing environment**
 - Rail line
 - Major road
 - Minor road
 - Named watercourse
 - Waterbody
 - Belanglo State Forest
 - Bangadilly National Park (refer to inset)

Visibility analysis – urban and peri-urban areas

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure 5.2

Source: EMM (2020); Hume Coal (2016); DFSI (2017)



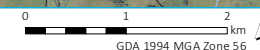


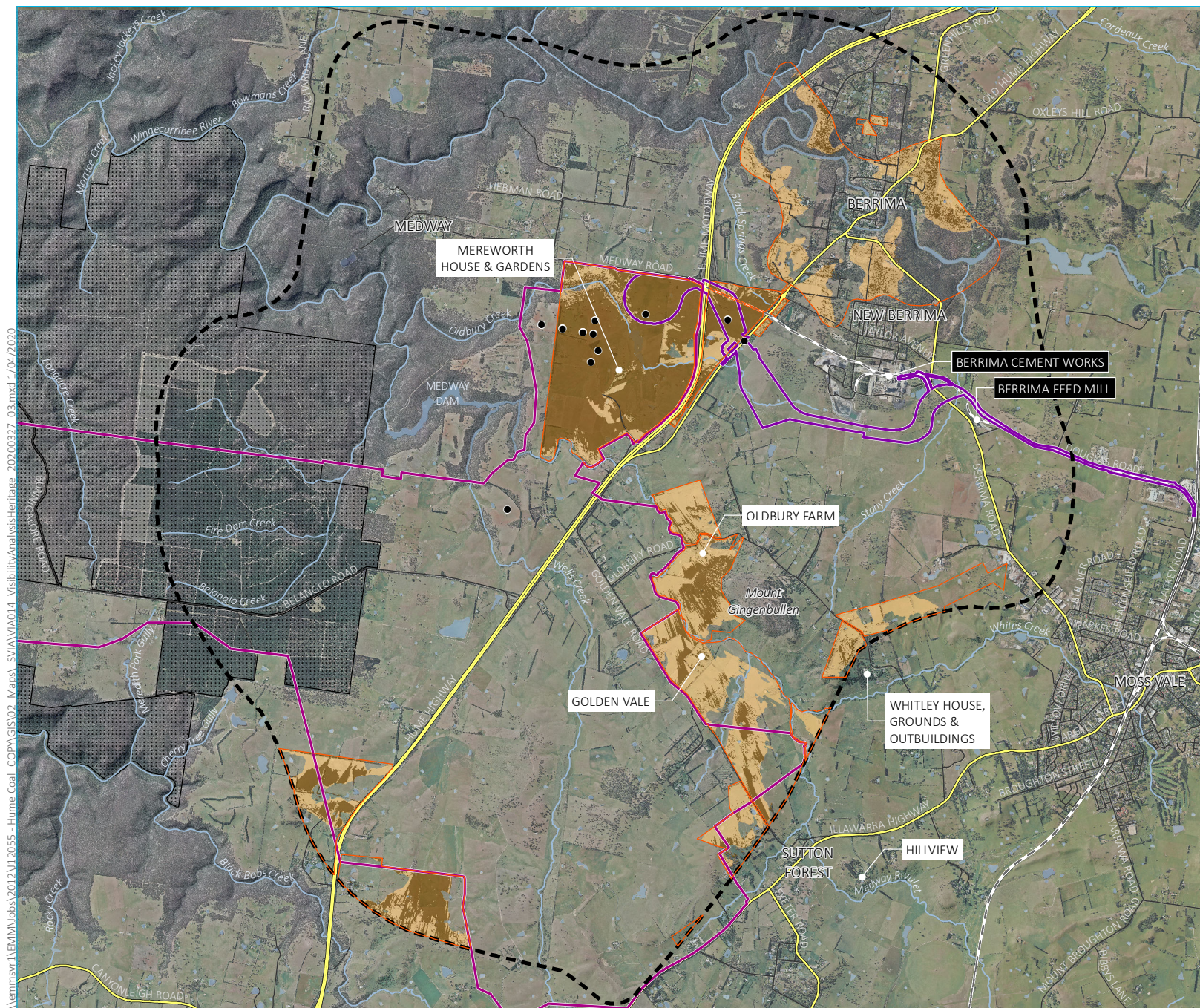
- KEY**
- Hume Coal Project area
 - Berrima Rail Project area
 - Proposed tree planting
 - Significant potential view zone
 - Viewshed assessment location
- Viewshed results**
- Viewshed based on DEM
 - Viewshed based on DSM
 - Section along the Hume Highway that may be visible to assessed project surface infrastructure (refer to Report Section 5.3.1 IVa)
- Existing environment**
- Rail line
 - Major road
 - Minor road
 - Named watercourse
 - Waterbody
 - Belanglo State Forest

Visibility analysis – road corridors

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure 5.3

Source: EMM (2020); Hume Coal (2016); DFSI (2017)



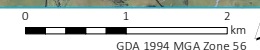


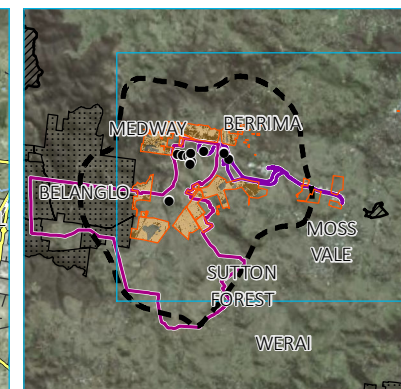
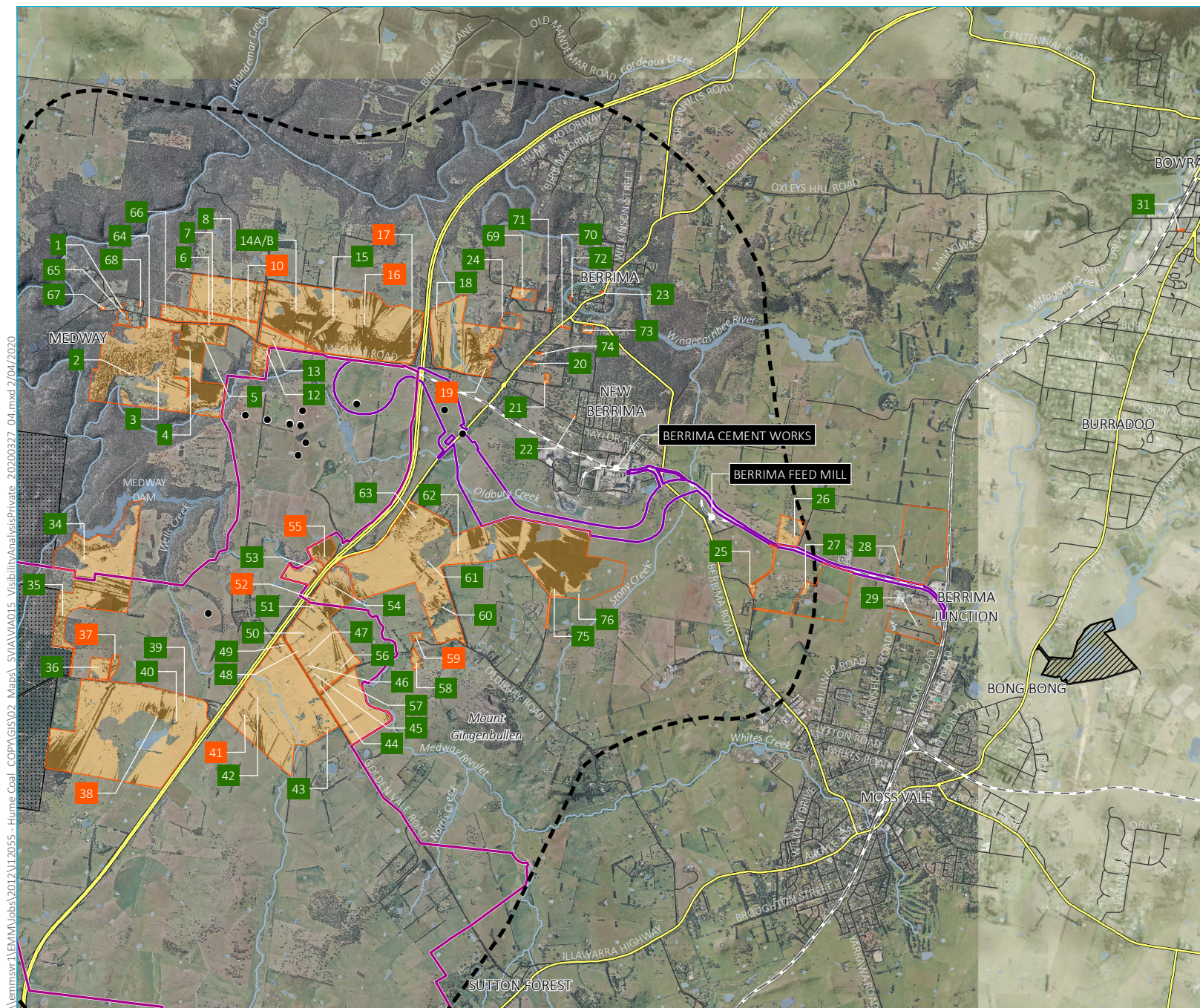
- KEY**
- Hume Coal Project area
 - Berrima Rail Project area
 - Significant potential view zone
 - Heritage area boundary (merged)
 - Viewshed assessment location
- Viewshed results**
- Viewshed based on DEM
 - Viewshed based on DSM
- Existing environment**
- Rail line
 - Major road
 - Minor road
 - Named watercourse
 - Waterbody
 - Belanglo State Forest

Visibility analysis – publicly accessible heritage sites

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure 5.4

Source: EMM (2020); Hume Coal (2016); DFSI (2017)



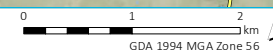


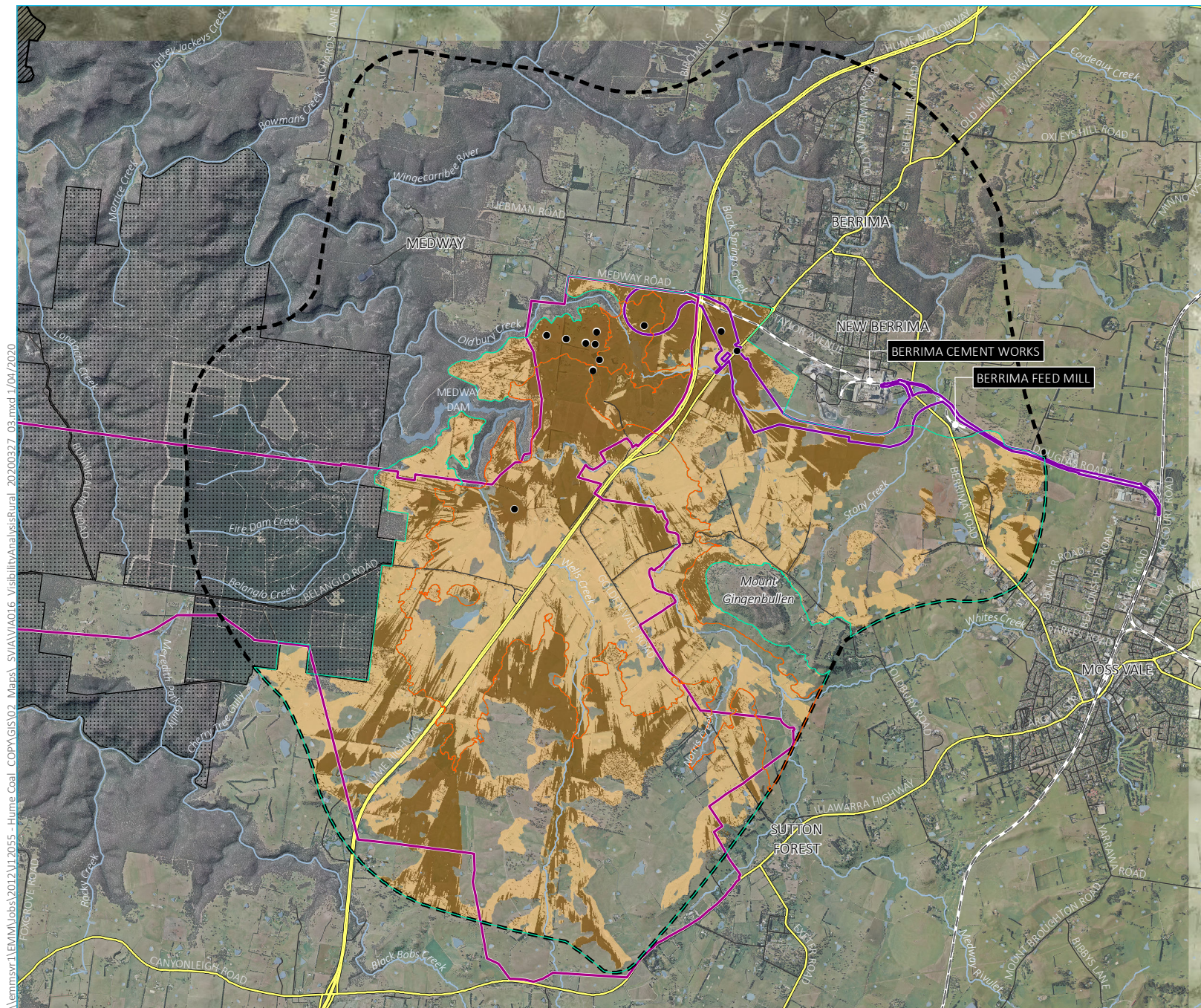
- KEY**
- Hume Coal Project area
 - Berrima Rail Project area
 - Significant potential view zone
 - Private rural residential receptor boundary (merged)
 - Viewshed assessment location
 - Viewshed results**
 - Viewshed based on DEM
 - Viewshed based on DSM
 - Private freehold residence (ID number)**
 - XX No views of assessed surface infrastructure elements (based on DSM)
 - XX Views to one or more assessed surface infrastructure elements (based on DSM)
 - Existing environment**
 - Rail line
 - Major road
 - Minor road
 - Named watercourse
 - Waterbody
 - ▨ State forest
 - ▨ Bangadilly National Park (refer to inset)

Visibility analysis – private rural residential receptors

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure 5.5

Source: EMM (2020); Hume Coal (2016); DFSI (2017)



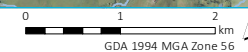


- KEY**
- Hume Coal Project area
 - Berrima Rail Project area
 - Significant potential view zone
 - Viewshed assessment location
 - Landscape character unit**
 - Flat pastoral land
 - Undulating pastoral land
 - Viewshed results**
 - Viewshed based on DEM
 - Viewshed based on DSM
 - Existing environment**
 - Rail line
 - Major road
 - Minor road
 - Named watercourse
 - Waterbody
 - Bangadilly National Park
 - Belanglo State Forest

Visibility analysis – rural lands

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure 5.6

Source: EMM (2020); Hume Coal (2016); DFSI (2017)



5.4 Visual Effect

The analysis of visual effects has been conducted by selecting several representative viewing locations (viewpoints) principally in the primary visual sensitivity zone. Viewpoints were selected:

- on the basis of being public accessible;
- in response to items raised by the IPC assessment (e.g. Heritage Council letters) to provide a more fulsome assessment of visual conditions; and
- and to select appropriate photomontage point to address the IPCs request for additional montages to assist their assessment of the Project.

This has been a collation of photographs from the EIS, RTS and submitter documentation. The viewpoints and their specific characteristics are described in Table 5.3 and represented in Figure 5.7.

A subset of these viewpoints, considered to be the key viewpoints within the SPV zone, have been further assessed through the development of photomontages and cross-section analysis to represent the changes to the landform arising from the Project (these key viewpoints are shown in bold in Table 5.3. Photographic exposure details for each viewpoint are presented as Annexure D.

Table 5.3 SPV zone viewpoints analysed

Viewshed	Source	LCU	Reason for assessment
Viewpoint 1	EIS Appendix N, Visual Amenity Assessment Report	3	This is representative of views to the Project for motorists travelling north along the Hume Motorway. It is the closest position on the Motorway, south of the SIA, that a motorist travelling north could safely stop to view the SIA in a forward-facing manner. These views would be static views if stopped, however most motorists would experience this transient view at speed. It is representative of Section 4 of the Hume Motorway as identified by Figure 5.3 and section 5.3.1 iv. a. See Plate 5.1.
Viewpoint 2	EIS Appendix N, Visual Amenity Assessment Report	3	The view from this location is typical of the view for motorists travelling along Belanglo Road to access the recreational and tourist opportunities within Belanglo State Forest and for residents accessing private dwellings to the north and south of the road. These dwellings (34, 35, 36, 37, 38, 39 and 40) are identified in Figure 5.5 and visibility to mine elements of the SIA described in Section 5.3.1 v. b. This viewpoint was selected on the basis that Belanglo Road is the nearest public road to the south of the SIA. See Plate 5.2.
Viewpoint 4* (Photomontage 2)	EIS Appendix N, Visual Amenity Assessment Report	8/3	The view from this receptor is typical of the view for motorists travelling along Medway Road to access the village of Medway and the rural residential properties located on the northern and southern side of Medway Road. This viewpoint overlooks the northern boundary of the SIA, the train load out and rail loop. Residential properties accessed from Medway Road, in Viewpoint 4 include dwellings 14A/B, 15, 16 and 17 and visibility to mine elements of the SIA identified in Figure 5.3.1 and described in Section 5.3.1 v. b. See Plate 5.3. See Photomontage Plates 5.22 – 5.25.

Table 5.3 **SPV zone viewpoints analysed**

Viewshed	Source	LCU	Reason for assessment
Viewpoint 5* (Photomontage 3)	EIS Appendix N, Visual Amenity Assessment Report	3	This viewpoint is an elevated position looking towards the surface infrastructure. The view is typical of the view from the western side of the Hume Motorway travelling north (being the main transport corridor which runs through the Project area) in closest proximity to the SIA and the proposed rail loop and noise barrier. Most of the industrial elements will be visible from this viewpoint. Generally it is not safe to stop at this location and transient views would be experienced by passengers to the left (west) and behind the moving vehicle. This location is identified in the description of visibility from the Hume Motorway (Section 1 northbound – Figure 5.3) and identified in Section 5.3.1 iv. a. of this report. See Plate 5.4. See Photomontages Plates 5.26 – 5.29.
Viewpoint 6* (Photomontage 4)	EIS Appendix N, Visual Amenity Assessment Report	8	This view is experienced from the edge of Medway Road immediately to the west of the SIA. The viewshed overlooks the vicinity of the SIA containing the Product Coal Stockpile. It is intended to be typical of the static views of private rural residential properties in the locality, particularly to the south of the road. The building in the foreground is a shed, and the dwelling (dwelling 5 of Figure 5.5) which is framed by the break in the Leyland cypress windbreak to the left of the shed, is one of the nearest properties to the north-west of the SIA. Visibility analysis shows that dwelling 5 does not have visibility of mine elements and of the 16 dwelling in this locality assessed, only one (dwelling 10) has visibility of the mine elements. See Plate 5.5. See Photomontage Plates 5.30 – 5.33.
Viewpoint 7* (Photomontage 5)	EIS Appendix N, Visual Amenity Assessment Report	3/4	This view is typical of the view of Mereworth house and gardens from the edge of Old Hume Highway. The viewpoint represents a point where motorists could safely stop to view the SIA. Such views would be static, however most motorists would experience transient view from moving vehicles when travelling either north or southwards. Vegetation planting undertaken in 2015/2016 on Hume land, between Old Hume Highway and the Hume Motorway will eventually screen views. See Plate 5.6. See Photomontage Plates 5.34 – 5.37.
Photograph 5.2	EIS Appendix N, Visual Amenity Assessment Report	3	This viewpoint overlooks the SIA from the edge of the Hume Highway. Views from the motorway at this location will not be possible on account of screen planting on the western side of the motorway and the motorway being within a cutting at this point. See Plate 5.7.
Photograph 5.3	EIS Appendix N, Visual Amenity Assessment Report	3	This viewpoint overlooks the SIA from the edge of the Hume Highway in the vicinity of the crossing of Oldbury Creek. This view overlooks parts of the SIA. It is not safe to stop at this location and therefore represents transient views when travelling north. This location is identified in the description of visibility from the Hume Motorway (Section 2 northbound – Figure 5.3) and identified in Section 5.3.1 iv. a. of this report. See Plate 5.8.
CL VP1	Viewpoint identified by Morris (2017)	3	View from Oldbury Road over the western parts of Mount Gingenbullen and southwest towards the Wells Creek floodplain and shows the indicative character of the landscape at this location. See Plate 5.9.
CL VP2*	Viewpoint identified by Morris (2017)	3/2	Panoramic image and image of view looking to the north-west from Oldbury Road overlooking Oldbury Farm. Static views with a wide vista will be afforded at this location and overlooks the Hume Motorway, Medway Rivulet and the southern parts of the SIA. See Plate 5.10. See Photomontage Plates 5.38 – 5.41.

Table 5.3 **SPV zone viewpoints analysed**

Viewshed	Source	LCU	Reason for assessment
CL VP11*	Viewpoint identified by Morris (2017)	4	Looking north from the approach to 11972 Hume Motorway toward Medway Rivulet and Mereworth. The location of this photograph is from a service road providing access to a private property adjoining the Motorway. It looks northwards to the southern parts of the SIA (portals and conveyors) in the foreground and the industrial elements of the SIA in the background of the image. See Plate 5.11. See Photomontage Plates 5.42 – 5.45.
CL VP13*	Viewpoint identified by Morris (2017)	8/3	Looking south-west from Medway Road between the Old Hume Highway and the Hume Motorway towards the Berrima Rail Project (midground behind tree) and industrial elements of the SIA. Note new boundary screen planting to undertaken by Hume Coal in 2015/2016. See Plate 5.12. See Photomontage Plates 5.46 – 5.49.
CL VP14*	Viewpoint identified by Morris (2017)	3	Panoramic image and image of view from elevated viewpoint on the Hume Motorway looking towards the Berrima rail Project provisioning/maintenance shed and the rail bridge over the Old Hume Highway. The Berrima Cement Works is located to the left of the panoramic image and is screened by vegetation. The view is typical of the view from the western side of the Hume Motorway travelling south (being the main transport corridor which runs through the Project area). Generally it is not safe to stop at this location and transient views would be experienced by passengers to the left (east) the moving vehicle. This location is identified in the description of visibility from the Hume Motorway (Section 1 southbound – Figure 5.3) and identified in Section 5.3.1 iv. a. of this report. See Plate 5.13. See Photomontage Plates 5.50 – 5.53.
CL VP14a	Viewpoint identified by Morris (2017)	8	View from elevated viewpoint on the Hume Motorway (Medway Road overpass) looking south-east towards the Berrima rail Project provisioning/maintenance area. View overlooks Medway Road. Generally it is not safe to stop at this location and transient views would be experienced by passengers to the left (east) the moving vehicle. This location is identified in the description of visibility from the Hume Motorway (Section 1 southbound – Figure 5.3) and identified in Section 5.3.1 iv. a. of this report. Note new boundary screen planting to undertaken by Hume Coal in 2015/2016. See Plate 5.14.
CL VP16*	Viewpoint identified by Morris (2017)	3	This view is typical of the view of Mereworth house and gardens from the edge of Old Hume Highway. It is a similar location to Viewpoint 7. This viewpoint is in the vicinity of the former Merworth property access road (prior to construction of the motorway). The viewpoint represents a point where motorists could safely stop to view the SIA. Such views would be static, however most motorists would experience transient view from moving vehicles when travelling either north or southwards. Vegetation planting undertaken in 2015/2016 on Hume land, between Old Hume Highway and the Hume Motorway will eventually screen views, however from this location view of the primary water storage dam will still be possible. See Plate 5.15. See Photomontage Plates 5.54 – 5.57.
CLVP17	Viewpoint identified by Morris (2017)	4	Medway Rivulet valley from Old Hume Highway looking south-east toward Golden Vale Road. Oldbury is in this view catchment and is backgrounded by Mount Gingenbullen. Photo shows the indicative character of the landscape at this location. See Plate 5.16

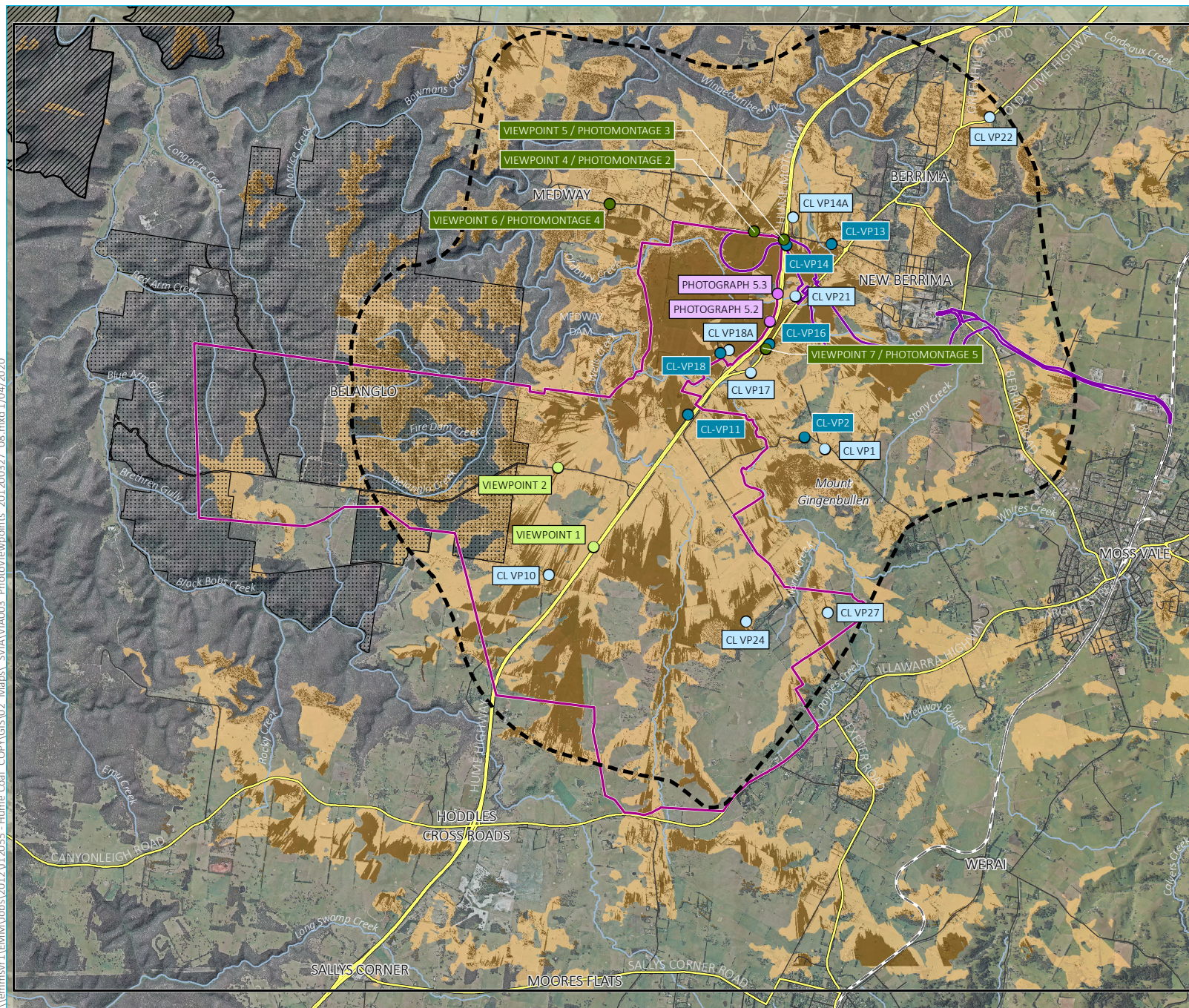
Table 5.3 **SPV zone viewpoints analysed**

Viewshed	Source	LCU	Reason for assessment
CL VP18*	Viewpoint identified by Morris (2017)	3/4	Panoramic views from Mereworth Road to the south and west. This represents static viewing opportunities from public land of the southern portions of the SIA. Views of the larger coal handling industrial elements to the north (behind the photographer), will be hidden by elevated terrain to the north. The Medway Rivulet is located in the midground, left of photo, just below the tree line. The main photograph shows the character of the southern part of the SIA in the vicinity of the coal and personnel portals, conveyor and ventilation shaft pad. See Plate 5. 17. See Photomontage Plates 5.58 – 5.61.
CL VP18a	Viewpoint identified by Morris (2017)	4/3	View from the same point at CL VP18 looking south-east to Mount Gingenbullen. The Hume Motorway can be seen in the midground, below the footslopes of the mount, where it crosses over Mereworth Road (intersection with the Old Hume Highway). See Plate 5.18.
CL VP21	Viewpoint identified by Morris (2017)	3	This view is on approach along Old Hume Highway toward Berrima from the south (travelling north). The old highway at this point is flanked by Remembrance Driveway planting which focus views along the road. This is representative of views for motorists travelling north at a point where they could safely stop and view the rail bridge. See Plate 5.19.
CL VP22	Viewpoint identified by Morris (2017)	8	The view from the ridgeline from the Old Hume Highway to the north of Greenhills Road, Berrima. This ridge contributes to the sense of enclosure that Berrima has. Views of the elements of the VIA will generally not be possible from this point. It is representative of the character of the elevated landscape north of Berrima and the south and west of the Motorway (background). See Plate 5.20.
CL VP24/27	Viewpoint identified by Morris (2017)	3	This is representative of views to the Project for motorists travelling north-west along Golden Vale Road. These views would be static views if stopped, however most motorists would experience this transient view at moderate speed (80 km/h). It is representative the rolling pastoral landscape of the area. See Plate 5.21.

Notes:

* Viewpoints subjected to further photomontage analysis are emboldened.

\\lemmsvr1\EMM\Jobs\2012\112055 - Hume Coal - COPY\GIS\02 Maps\SVIA\IA003 PhotoViewpoints 201_200327 08.mxd 1/04/2020



- KEY**
- Hume Coal Project area
 - Berrima Rail Project area
 - Existing environment
 - Rail line
 - Major road
 - Minor road
 - Named watercourse
 - Belanglo State Forest
 - Bangadilly National Park
 - Viewshed model boundary
 - Significant potential view zone
 - Viewpoint (photo/montage)
 - Viewpoint (photo only)
 - EIS viewpoint (photo/montage)
 - EIS viewpoint (photo only)
 - EIS photograph location
 - Combined viewshed results
 - Viewshed based on DEM
 - Viewshed based on DSM

Viewpoint locations

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure 5.7

Source: EMM (2020); Hume Coal (2016); DFSI (2017)

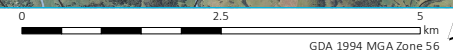




Plate 5.1 Viewpoint 1



Plate 5.2 Viewpoint 2



Plate 5.3 Viewpoint 4

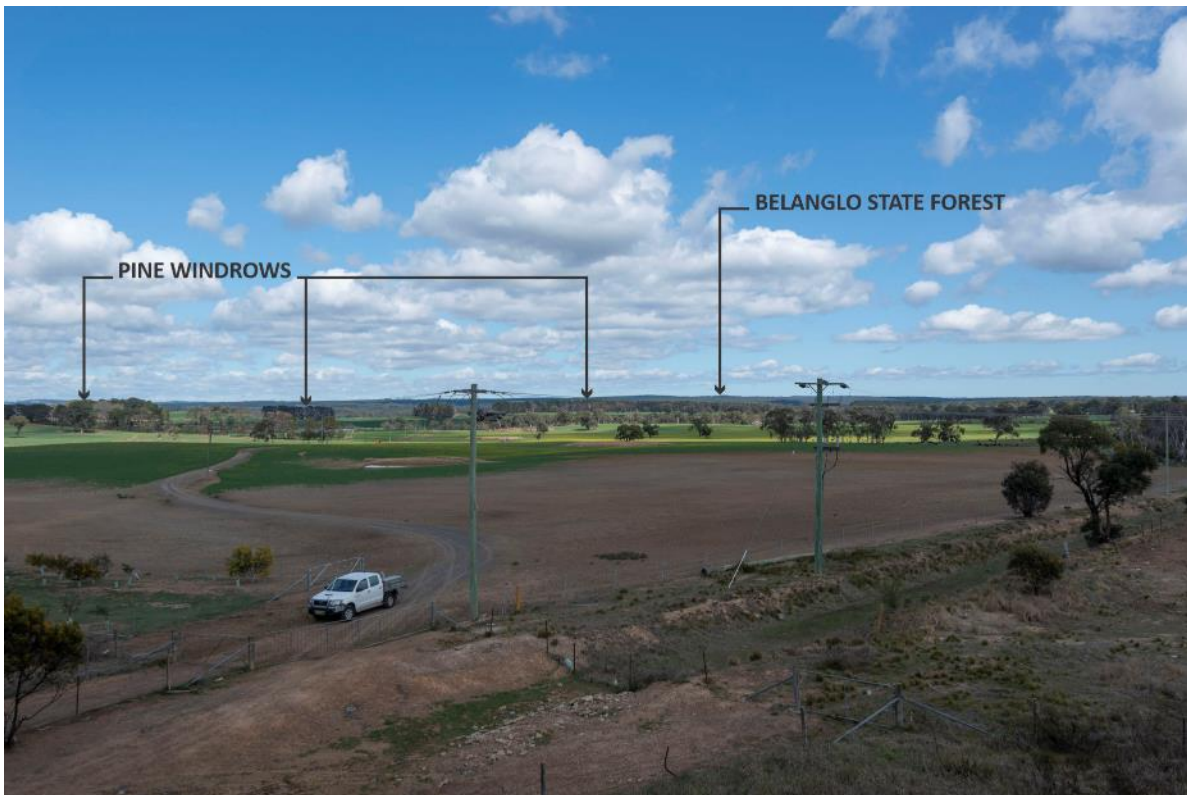


Plate 5.4 Viewpoint 5

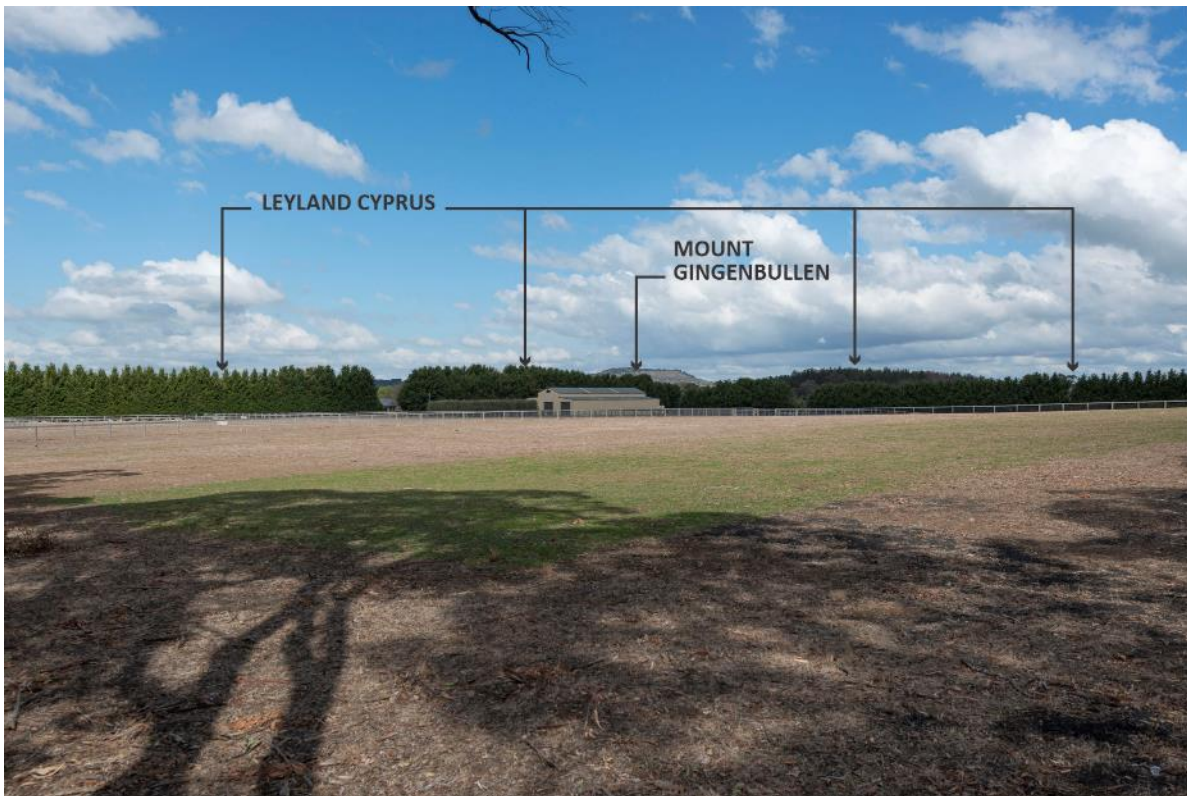


Plate 5.5 Viewpoint 6



Plate 5.6 Viewpoint 7



Plate 5.7 Photograph 5.2



Plate 5.8 Photograph 5.3



Plate 5.9 Viewpoint CL VP1

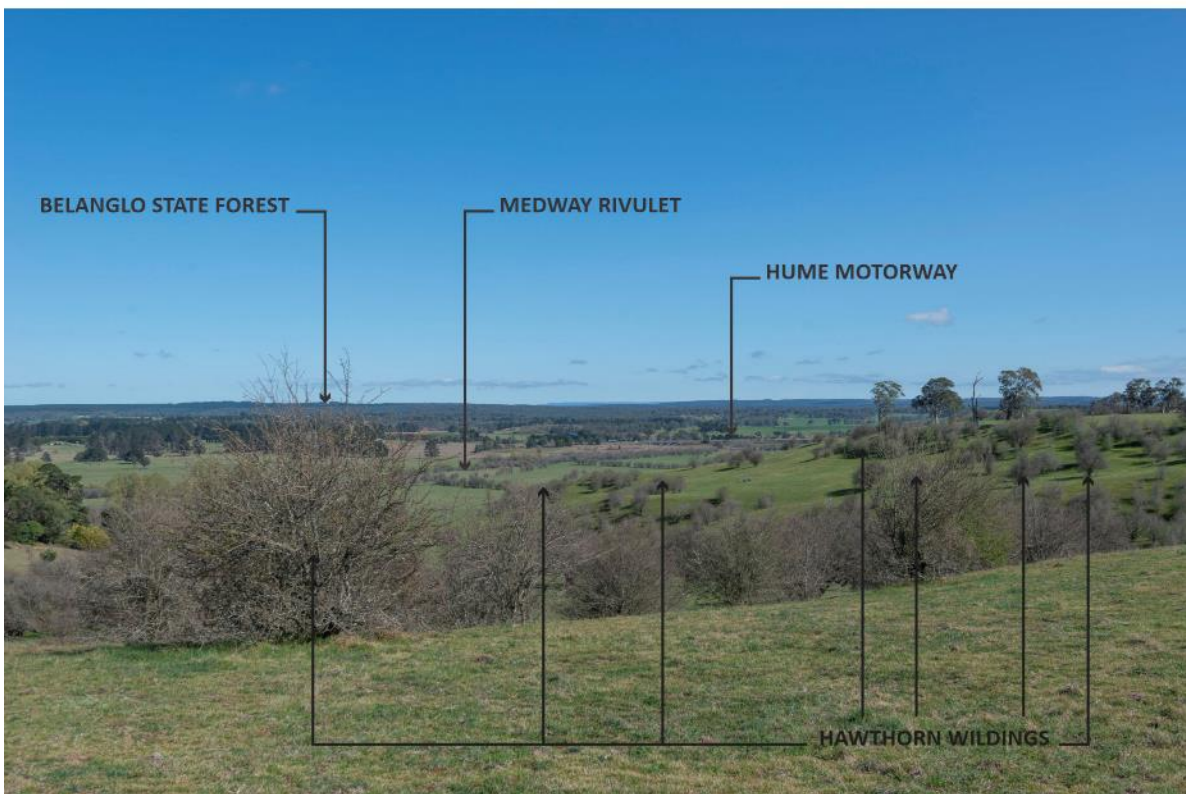


Plate 5.10 Viewpoint CL VP2



Plate 5.11 Viewpoint CL VP11



Plate 5.12 Viewpoint CL VP13



Plate 5.13 **Viewpoint CL VP14**



Plate 5.14 Viewpoint CL VP14a

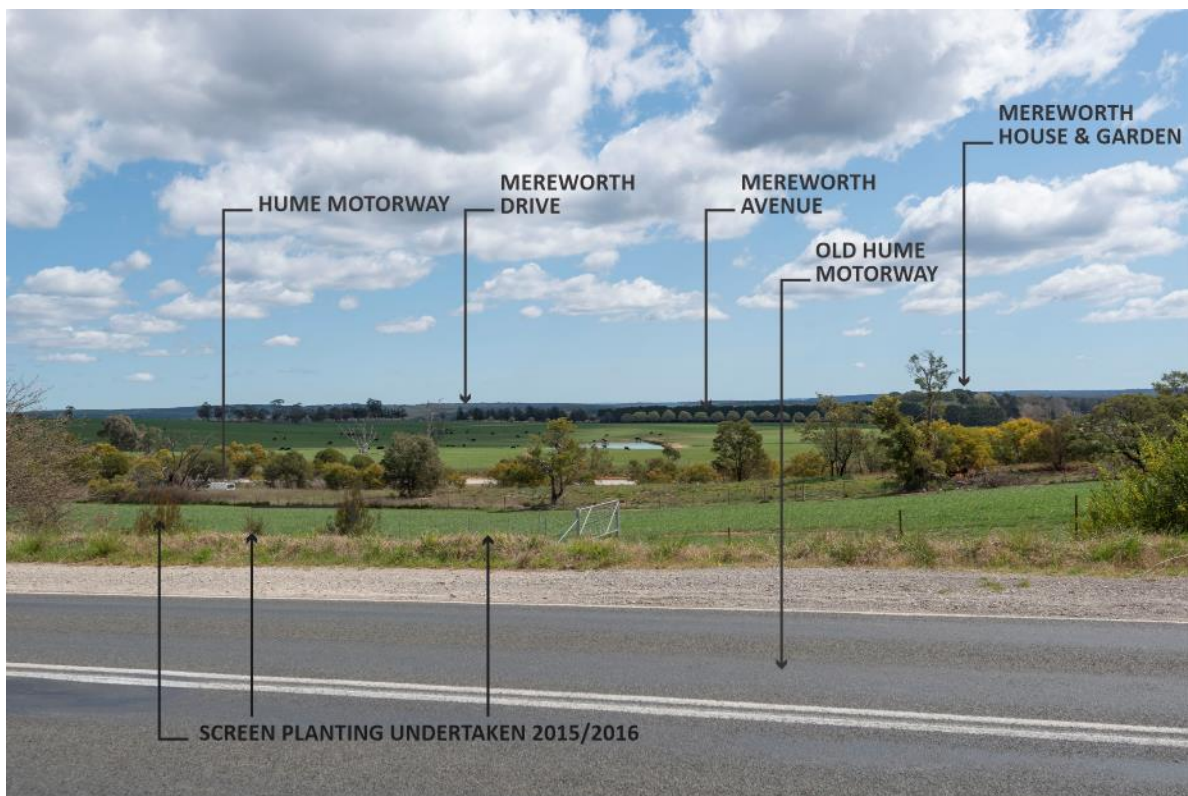


Plate 5.15 Viewpoint CL VP16



Plate 5.16 Viewpoint CL VP17

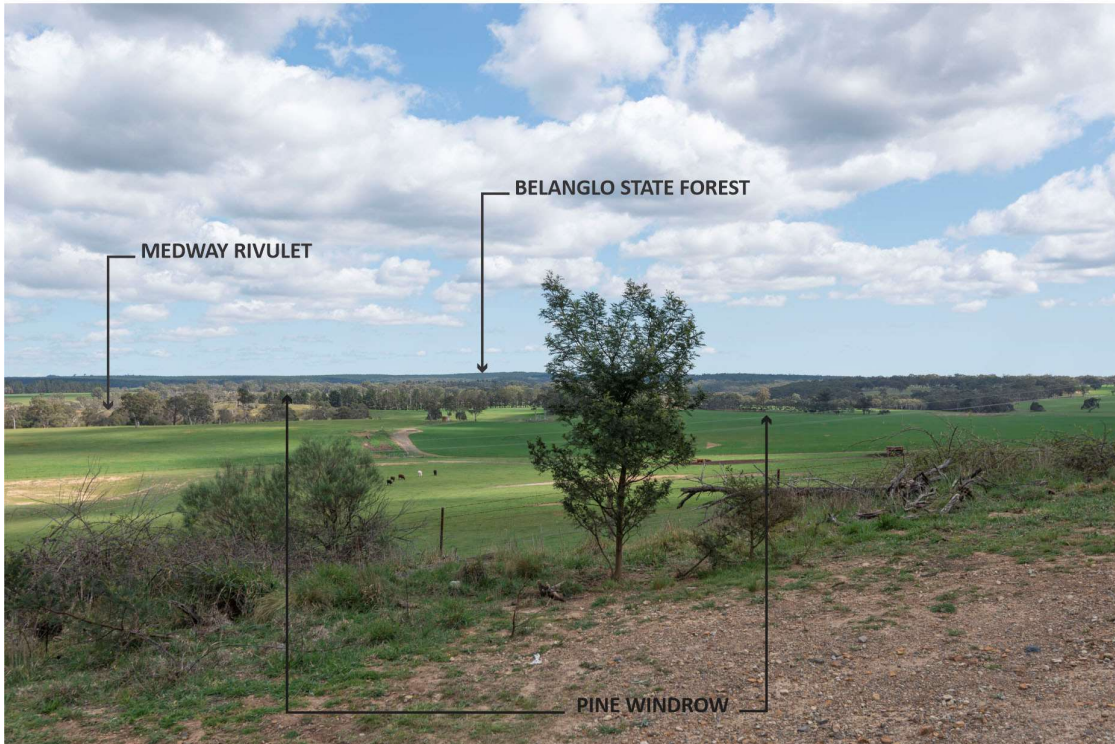


Plate 5.17 Viewpoint CL VP18



Plate 5.18 **Viewpoint CLVP18a**



Plate 5.19 **Viewpoint CL VP21**



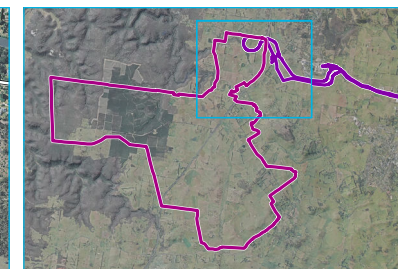
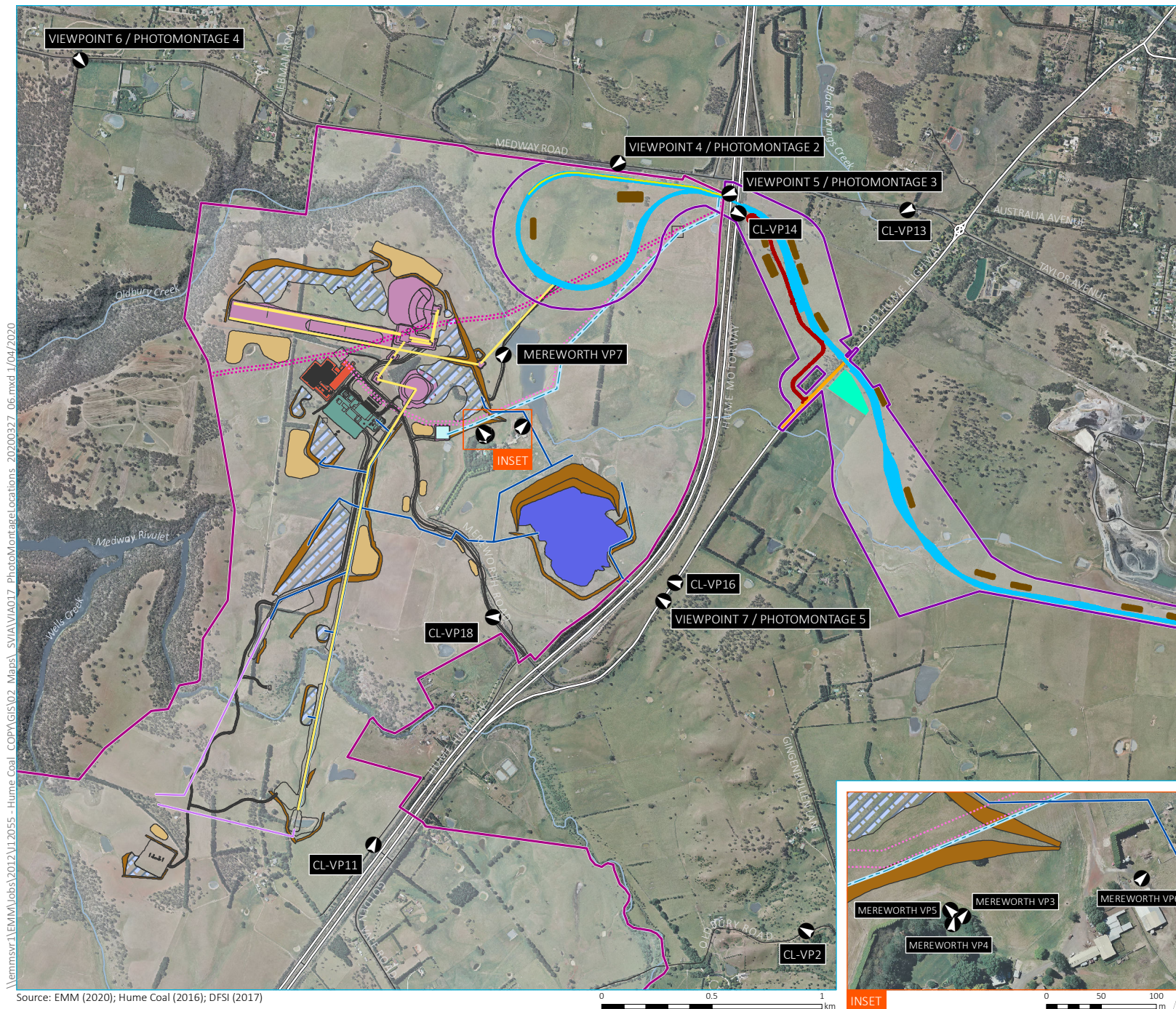
Plate 5.20 Viewpoint CL VP22



Plate 5.21 Viewpoint CL VP24/27

5.4.1 Photomontages

The visual effect of the Project has been represented by a number of photomontages prepared for 12 of the 21 locations described in Table 5.2 within the primary sensitivity zone of the SPV zone and are representative of the visual effects; what can be seen in the existing landscape setting and the proposed visual character of the of the Project elements. These are emboldened in Table 5.1. The location of the photomontage views are identified in Figure 5.8. Photographic technical details of each of the photographs, in accordance with Land and Environment Court’s direction on the use of photomontages (Annexure B) is presented in Annexure C. Photographic exposure details for each viewpoint are presented as Annexure D.



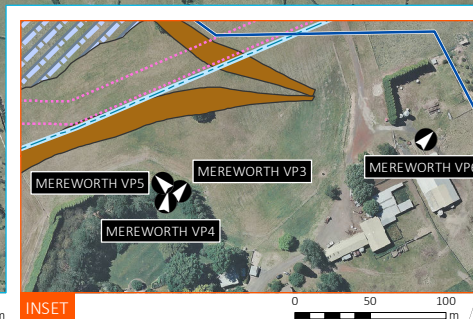
- KEY**
- Photomontage location and view direction
 - Major road
 - Minor road
 - Named watercourse
 - Waterbody
 - Hume Coal Project area
 - Berrima Rail Project area
 - Berrima Rail Project elements
 - Noise wall
 - New rail line
 - Rail maintenance facility access road
 - Topsoil stockpiles
 - Rail temporary construction facility
 - Turning lane/shoulder
 - Hume Coal Project elements
 - Conveyor
 - Drift (underground)
 - Powerline route
 - Water pipeline
 - Proposed powerline and pipeline easement
 - Existing WSC easement
 - Temporary construction accommodation village
 - Administration/bathhouse/workshop
 - Main substation
 - Internal road
 - CPP and stockpiles
 - Topsoil stockpiles
 - Stormwater management earthworks
 - Water management area
 - Top water level

Photomontage locations and field of view

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure 5.8

Source: EMM (2020); Hume Coal (2016); DFSI (2017)

0 0.5 1
km



0 50 100
m
GDA 1994 MGA Zone 56



i Viewpoint 4 – Photomontage 2 – Medway Road

View of the northern part of the SIA overlooking the rail loop, the noise barrier and the TLO. Screen planting along the road in 2015/2016 will significantly mitigate views by Project year 5.



Plate 5.22 Viewpoint 4 – Photomontage – existing



Plate 5.23 **Viewpoint 4 – Photomontage 2 – post construction year 1**



Plate 5.24 **Viewpoint 4 – Photomontage 2 – year 5**



Plate 5.25 **Viewpoint 4 – Photomontage 2 – year 15**

ii **Viewpoint 5 – Photomontage 3 – Hume Motorway**

Views of the northern part of the SIA, with visibility of the major mine industrial elements. The bottom left of the image shows the location of screen plantings undertaken in 2015/2016 by Hume Coal. Additional measures to improve visual integration into the landscape and retain character and form of existing vegetation are proposed. These measures also seek to preserve viewlines and vistas. Measures used include sympathetic colour schemes for all mine elements, planted Monterey pine windbreaks and planted copses of trees and shrubs. The measures are further outlined in Section 6.



Plate 5.26 Viewpoint 5 – Photomontage – existing



Plate 5.27 Viewpoint 5 – Photomontage 3 – post construction year 1

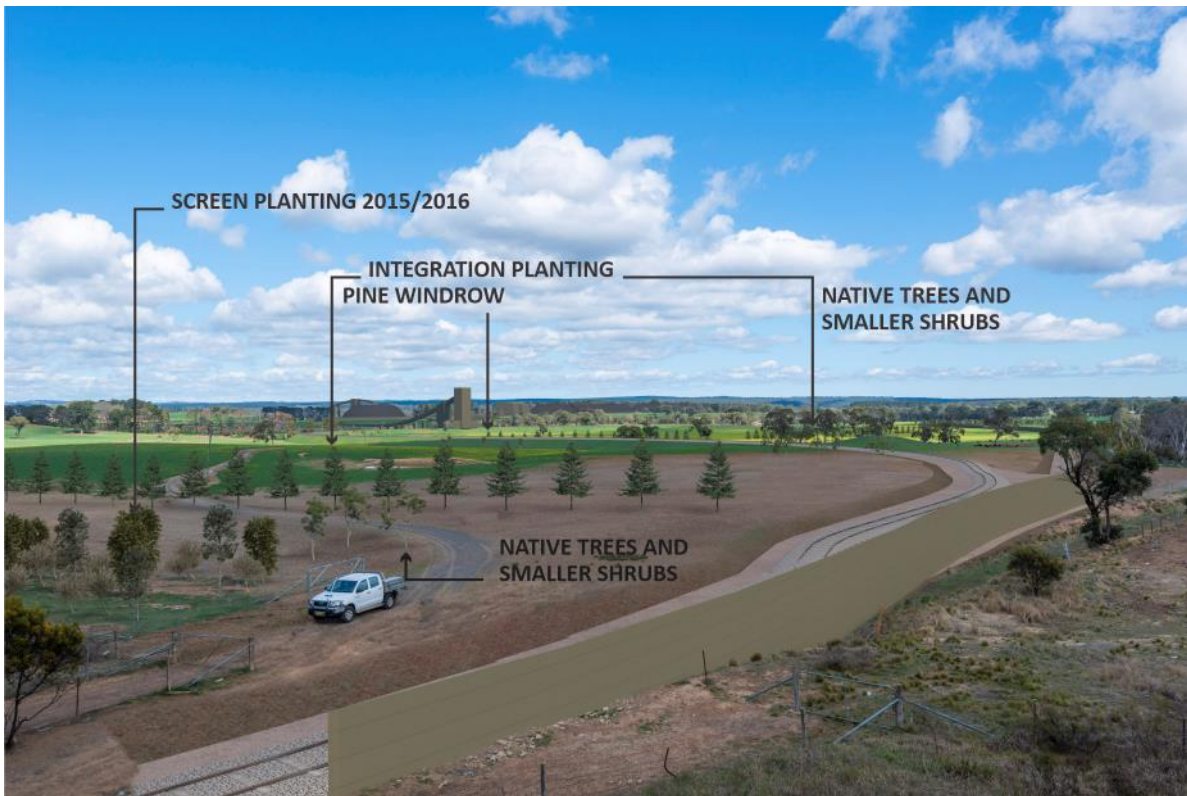


Plate 5.28 **Viewpoint 5 – Photomontage 3 – year 5**



Plate 5.29 **Viewpoint 5 – Photomontage 3 – year 15**

iii Viewpoint 6 – Photomontage 4 – Medway Road

This photomontage set shows the product coal stockpile, stackers / reclaimer will be partially visible above the treeline. Additional integration measure include complimentary paint scheme on mine elements and informal mass plantings with native trees and shrubs. The measures are further outlined in Section 6.



Plate 5.30 Viewpoint 6 – Photomontage – existing



Plate 5.31 **Viewpoint 6 – Photomontage 4 – Post construction year 1**



Plate 5.32 **Viewpoint 6 – Photomontage 4 – year 5**



Plate 5.33 **Viewpoint 6 – Photomontage 4 – year 15**

iv **Viewpoint 7 – Photomontage 5 – Old Hume Highway**

The primary water storage dam will be the most visible mine element at this location. Planting undertaken by Hume Coal in 2015/2016 will screen this view by Project year 5.



Plate 5.34 **Viewpoint 7 – Photomontage – existing**



Plate 5.35 **Viewpoint 7 – Photomontage 5 – post construction year 1**



Plate 5.36 **Viewpoint 7 – Photomontage 5 – year 5**



Plate 5.37 **Viewpoint 7 – Photomontage 5 – year 15**

v CL VP2 – Oldbury Road

Views of the southern part of the SIA, with visibility of the internal roads, conveyor and mine portals afforded by this view.

Additional measures to improve visual integration into the landscape and retain character and form of existing vegetation are proposed. These measures also seek to preserve view lines and vistas. Measures used include planted formal Monterey pine windbreaks, infill planting within relict canopy along the Medway Rivulet, planted copses of trees and shrubs and informal mass plantings with native trees and shrubs. The measures are further outlined in Section 6.



Plate 5.38 CL VP2 – Photomontage – existing



Plate 5.39 CL VP2 Photomontage – post construction year 1



Plate 5.40 CL VP2 Photomontage – year 5



Plate 5.41 **CL VP2 Photomontage – year 15**

vi **CL VP11 – Driveway entry to 11972 Hume Motorway**

Views of the southern part of the SIA midground and taller industrial element and the product coal stockpile will be possible from this location.

Additional measures to improve visual integration into the landscape and retain character and form of existing vegetation are proposed. These measures also seek to preserve viewlines and vistas. Measures used include planted formal Monterey pine windbreaks, infill planting within relict canopy along the Medway Rivulet, planted copses of trees and shrubs and informal mass plantings with native trees and shrubs. The measures are further outlined in Section 6.

By year 5 it will be difficult to discern mine element from this location and by year 10, elements will generally not be possible.



Plate 5.42 **CL VP11 – Photomontage – existing**



Plate 5.43 **CL VP11 Photomontage – post construction year 1**



Plate 5.44 CL VP11 Photomontage – year 5



Plate 5.45 CL VP11 Photomontage – year 15

View looking south-west from Medway Road between the Old Hume Highway and the Hume Motorway towards the Berrima Rail line (midground behind tree) and industrial elements of the SIA. Note new boundary screen planting to undertaken by Hume Coal in 2015/2016. Screen planting along the road in 2015/2016 will significantly mitigate views by Project year 5.



Plate 5.46 CL VP13 – Photomontage – existing



Plate 5.47 **CL VP13 Photomontage – post construction year 1**



Plate 5.48 **CL VP13 Photomontage – year 5**



Plate 5.49 **CL VP13 Photomontage – year 15**

viii **CL VP14 – Hume Motorway**

View of the rail provisioning/maintenance shed and the rail bridge over the Old Hume Highway. Additional measures to improve visual integration into the landscape and retain character and form of existing vegetation are proposed. These measures also seek to preserve view lines and vistas. Measures used planted copses of trees and shrubs and informal mass plantings with native trees and shrubs. The measures are further outlined in Section 6.

By year 5 it will be difficult to discern mine element from this location and by year 10, elements will generally not be possible.



Plate 5.50 **CL VP14 – Photomontage – existing**



Plate 5.51 **CL VP14 Photomontage – post construction year 1**

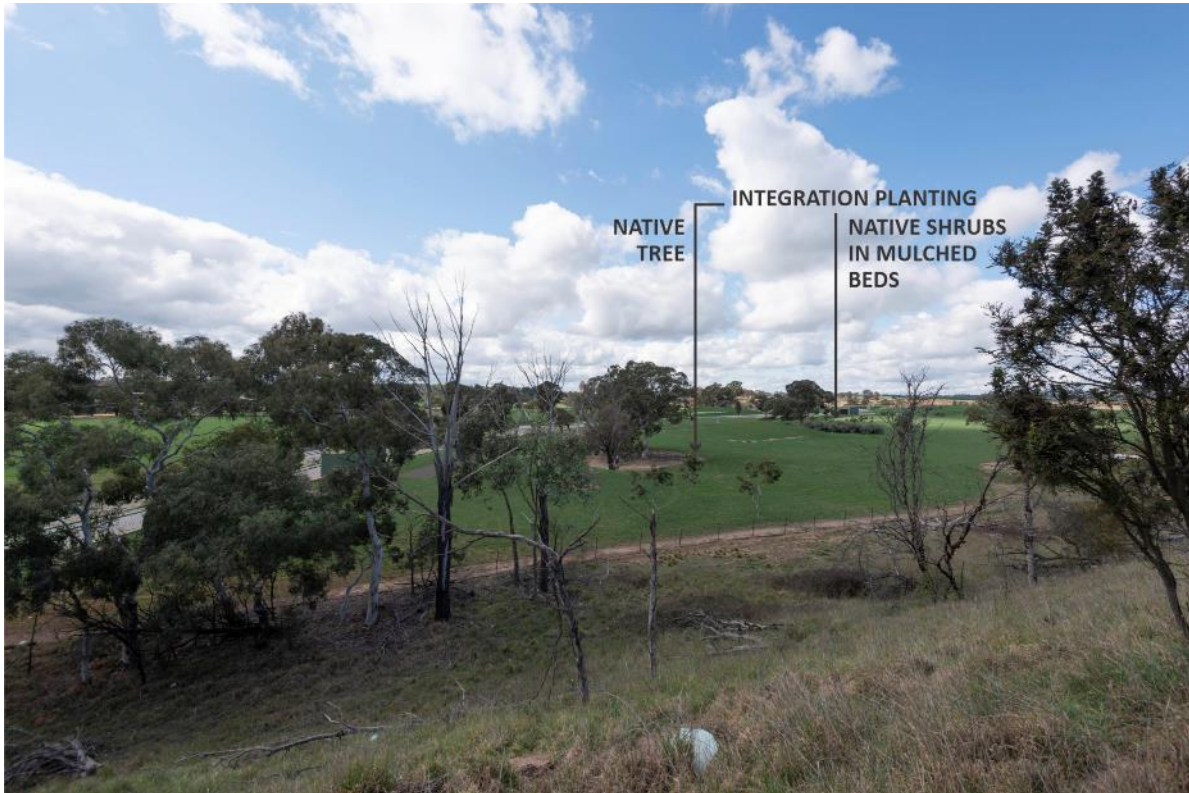


Plate 5.52 **CL VP14 Photomontage – year 5**



Plate 5.53 **CL VP14 Photomontage – year 15**

ix CL VP16 – Old Hume Highway

The primary water storage dam will be the most visible mine element at this location. Planting undertaken by Hume Coal in 2015/2016 will partially screen this view by Project year 5. Careful consideration of integration plantings around the water storage has been undertaken to ensure that plantings assist in breaking the surface mass of dam through integration planting with native trees and shrubs. Planting locations and form have been selected to ensure sight lines to the Mereworth gardens and planted avenue will not be interrupted.



Plate 5.54 CL VP16 – Photomontage – existing



Plate 5.55 CL VP16 Photomontage – post construction year 1



Plate 5.56 CL VP16 Photomontage – year 5



Plate 5.57 **CL VP16 Photomontage – year 15**

x **CL VP18 – Mereworth Road**

Views of the southern part of the SIA, with visibility of the internal roads, conveyor and mine portals afforded by this view.

Additional measures to improve visual integration into the landscape and retain character and form of existing vegetation are proposed. These measures also seek to preserve viewlines and vistas. Measures used include planted formal Monterey pine windbreaks, infill planting within relict canopy along the Medway Rivulet, planted copses of trees and shrubs and informal mass plantings with native trees and shrubs. The measures are further outlined in Section 6.



Plate 5.58 CL VP18 – Photomontage – existing

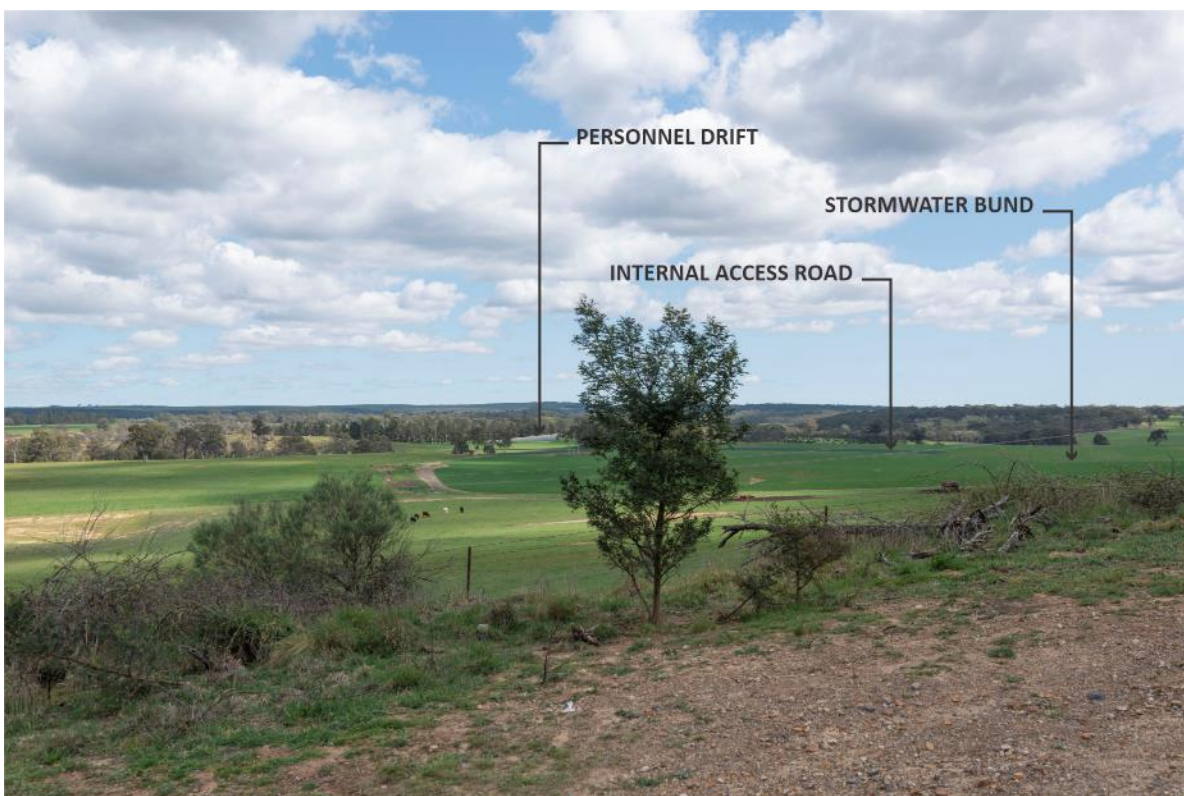


Plate 5.59 CL VP18 Photomontage – post construction year 1

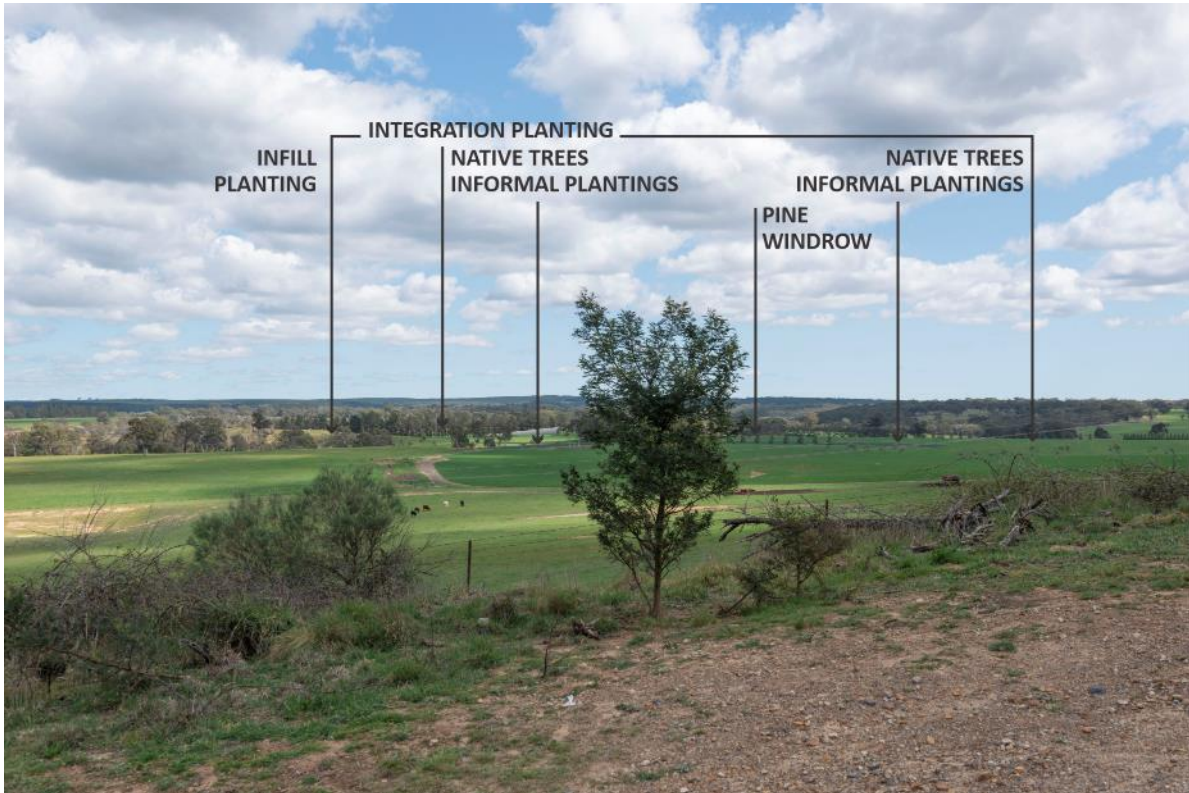


Plate 5.60 CL VP18 Photomontage – year 5



Plate 5.61 CL VP18 Photomontage – year 15

5.5 Mereworth House and Gardens

5.5.1 Viewpoints

The analysis of viewpoints and visual effects on the locally heritage listed Mereworth house and Paul Sorensen garden has been conducted by selecting a number of representative viewing locations (viewpoints) within the garden and in the yards around the garden.

Viewpoint and photomontage locations were determined on the basis of NSW Heritage Council (2018) correspondence to the IPC and National Trust (2017) correspondence to the DPIE. The significance of Sorensen's garden design in the body of his work is the subject of a comparative assessment by Brouwer (2020b). Viewpoints were also determined through discussion with and instruction by Brouwer (2020b).

The viewpoints and their specific characteristics are described in Table 5.4 and represented in Figure 5.9. Viewpoints representative of external public views are represented in Figure 5.8.

A number of key viewpoints have been further assessed through development of photomontages to represent the changes to the landform arising from the Project, these key viewpoints are shown in bold in Table 5.4. Viewpoints 1-13 represent private views from within the property that the public would not have access to. VP 7, CL VP16 and CL CP18 are views from public lands (road corridors), photographs of these are presented in the Section 5.4. Photographic exposure details for each viewpoint are presented as Annexure D.

Table 5.4 Mereworth viewpoint summary

Viewshed	Source	LCU	Reason for assessment
Internal private views			
Mereworth 1*	new	3	This viewpoint is the outlook from the terrace adjacent to Mereworth house from under the pear tree. The view looks out beyond the garden between the conifers / evergreens which frame the lawn, however views beyond will only be glimpsed between the foliage of the outer trees of the lawn. See Plate 5.62. See Photomontage Plates 5.75-5.78.
Mereworth 2*	new	3/4	The viewpoint is situated by two flowering cherry trees within the garden (to the left of the image), looking northwest along Sorensen's constructed vista. The vista looks beyond the mid-point of the elms curving around the edge of the lawn, inside of the ha-ha (four elms to the left of view centre, and four to right) towards the existing farm dam, focusing the view upon the two ornamental tree plantings (focal points) on the far side of the farm dam / island (midground of image). The planted trees fill the space between the fourth and fifth elm. See Plate 5.63. See Photomontage Plates 5.79-5.82.
Mereworth 3*	new	3/4	This is a panoramic view of the rolling pastoral landscape taken from the lawn edge close to the ha-ha. The image is taken from close to the convex curve of the ha-ha (between elm 4 and 5), with the view centered on the two ornamental trees on the far side of the farm dam. The view is Projected on a 90° tangent outwards of the arc created by the tree line. At this point, beyond the elms, longer rural vistas to the broader landscape and especially the distant hills to the north-east become apparent. See Plate 5.64. See Photomontage Plates 5.83-5.86.
Mereworth 4	new	3	Viewpoint 4 presents a view sitting on top of the ha-ha wall looking north over the rural landscape of the Mereworth property. See Plate 5.65.
Mereworth 5	new	3/4	Viewpoint 5 presents a view sitting on top of the ha-ha wall looking to the north-west over the rural landscape of the Mereworth property. This view is a typical view across the northern part of the Mereworth property, when standing outside of the Sorenson garden. See Plate 5.66.

Table 5.4 Mereworth viewpoint summary

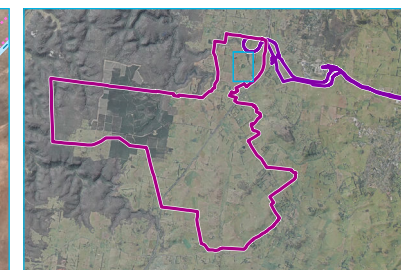
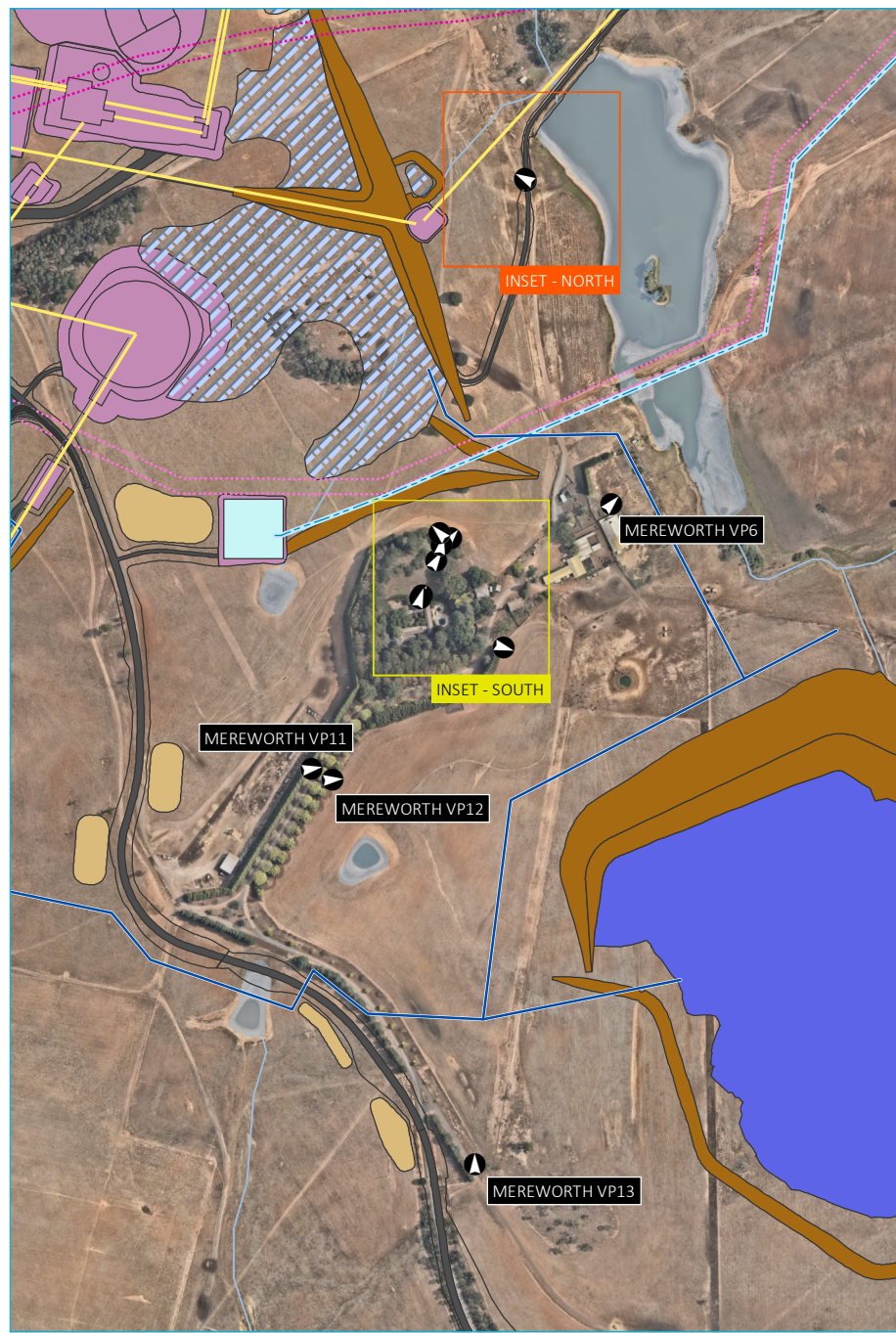
Viewshed	Source	LCU	Reason for assessment
Mereworth 6	new	3	This view presents a typical view of the eastern landscape, from the outer sheds/yards. The foreground and midground are dominated by the farm dam and pastoral land, longer views are generally blocked by a low forested rise. See Plate 5.67.
Mereworth 7*	new	3	This view is taken from within the pastoral land to the north of the Mereworth garden from an intersection of farm tracks. This is another outward view from Mereworth's surrounds, to the east as required by NSW Heritage Council and takes in longer views associated with the plains adjoining Oldbury Creek. See Plate 5.68. See Photomontage Plates 5.87-5.90.
Mereworth 8	new	3/4	This view is from the same viewpoint as Mereworth 7, however towards the north-west, from the intersection of farm tracks. This is another outward view from Mereworth's surrounds to the north-west, as required by NSW Heritage Council. See Plate 5.69.
Mereworth 9	new	3	Viewpoint from a gap in the vegetation east of the house and gardens, looking to the east. The Berrima Cement Works is prominent above the treeline. See See Plate 5.70.
Mereworth 10	new	3	View from a balcony of the house looking towards the north-east encompassing the location where the surface infrastructure would be. Views will be mostly blocked by canopy vegetation of the garden. See Plate 5.71.
Mereworth 11	new	3	Viewpoint 11 (and 12) are views out towards the east, half way along the tree lined driveway. This represents what the driver, or passenger on leaving, would see when looking out beneath the trees which protect the driveway (filtered views). See Plate 5.72.
Mereworth 12*	new	3	Viewpoint 12 is located under the outer line of trees to the east of Viewpoint 11. This represents what may possibly be done by a visitor arriving at the property for the first time, or the owner. In this image the cement works is completely obscured by one tree which highlights the benefit of screening. See Plate 5.73. See Photomontage Plates 5.91-5.94.
Mereworth 13*	new	3	This viewpoint is situated on the old disused driveway with a view from the eastern side of the ridge (high point on the driveway). The viewpoint is situated at the point where, as the owner driving along the old driveway would emerge from beneath the copse of eucalypts to the north of the track and the windbreak to the south. This is a point where views of Mereworth house, garden and rolling country would have first become apparent after cresting the highpoint on the driveway. Views to the west are blocked and the hedge which serves to direct views to the house and garden. Opportunities to appreciate this view in a contemporary sense are limited as the driveway is no longer in use, following the destruction of the driveway entry for completion of the Hume Motorway (Berrima bypass). As a working property, visitors (nor the public) would not have access to this point, and similar views from Mereworth Road (public), do not afford the same views owing to the screening effects of topography and windbreaks. See Plate 5.74. See Photomontage Plates 5.95-5.98.
External public views			
VP7 / Montage 5*	EIS Appendix N, Visual Amenity Assessment Report	3	This view is typical of the view of the house and gardens from the edge of Old Hume Highway. The viewpoint was selected as this represents an approximation of views from a vehicle at the intersection of Golden Vale Road and Old Hume Highway. This represents a view of the house and gardens from the Old Hume Highway parallel to the entry point to the Mereworth property, as required by the Heritage Council. See Plate 5.6. See Photomontage Plates 5.34 – 5.37.

Table 5.4 **Mereworth viewpoint summary**

Viewshed	Source	LCU	Reason for assessment
CL VP16*	Morris et al (2017)	3	This Morris et al (2017) viewpoint is in a similar location to Viewpoint (VP)7. Panoramic views are afforded to the west from this elevated location. This photo looking to the west takes in Mereworth estate, pine plantations and the Blue Mountains in the distance. See Plate 5.15. See Photomontage Plates 5.54 – 5.57.
CL VP18*	Morris et al (2017)	3/4	This Morris et al (2017) viewpoint takes in panoramic views from Mereworth Road to the south and west. Views to the north, behind the photographer, are enclosed by the road cutting. The view from this viewpoint approximates the view afforded from the break in the windbreaks along the former driveway. See Plate 5.18. See Photomontage Plates 5.58 – 5.61.

Notes:

*Viewpoints subjected to further photomontage analysis are emboldened.



- KEY**
- Photograph location and view direction
 - Hume Coal Project area (refer to inset)
 - Berrima Rail Project area (refer to inset)
 - Watercourse/drainage line
 - Waterbody
- Hume Coal Project elements**
- Conveyor
 - Powerline route
 - Water pipeline
 - Proposed powerline & pipeline easement
 - Existing WSC easement
 - Main substation
 - Internal road
 - CPP and stockpiles
 - Topsoil stockpiles
 - Stormwater management earthworks
 - Water management area
 - Top water level

Mereworth viewpoint and photomontage locations

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure 5.9

Source: EMM (2020); Hume Coal (2016); NearMap (2020); DFSI (2017)

INSET - SOUTH

0 100 200
m
GDA 1994 MGA Zone 56





Plate 5.62 Mereworth viewpoint 1



Plate 5.63 Mereworth viewpoint 2



Plate 5.64 **Mereworth viewpoint 3**



Plate 5.65 Mereworth viewpoint 4



Plate 5.66 Mereworth viewpoint 5



Plate 5.67 **Mereworth viewpoint 6**

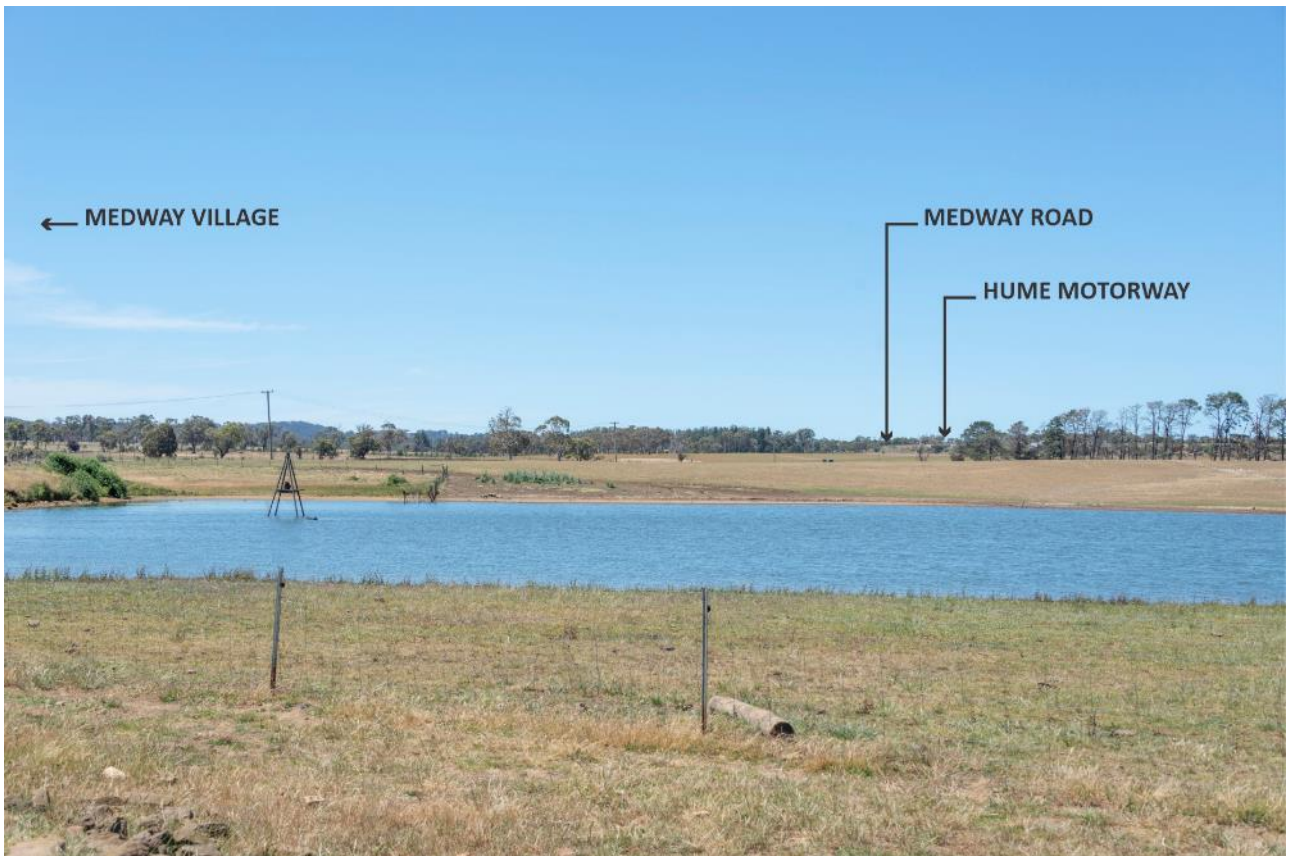


Plate 5.68 Mereworth viewpoint 7



Plate 5.69 **Mereworth viewpoint 8**



Plate 5.70 **Mereworth viewpoint 9**



Plate 5.71 **Mereworth viewpoint 10**



Plate 5.72 Mereworth viewpoint 11



Plate 5.73 **Mereworth viewpoint 12**



Plate 5.74 **Mereworth viewpoint 13**

5.6 Photomontages

5.6.1 Assessment

The visual effect on the Sorensen garden at Mereworth has been represented by a number of photomontages prepared for 11 locations within the primary sensitivity zone of the SPV zone and are representative of the visual effects (i.e. what can be seen in the existing landscape setting and the proposed visual character of the of the Project elements). These are emboldened in Table 6.1. The location of the photomontage views are the same as those identified in Table 7.1. Photographic technical details of each of the photograph, in accordance with the Land and Environment Court's direction on the use of photo-montages (Annexure B) is presented in Annexure C. Photomontage viewpoints and directions are identified in Figure 5.9.

i Mereworth 1

Views of mine infrastructure will generally be screened by the existing garden planting.



Plate 5.75 Mereworth 1 – Photomontage – existing



Plate 5.76 Mereworth 1 – Photomontage – post construction year 1



Plate 5.77 Mereworth 1 – Photomontage – year 5



Plate 5.78 **Mereworth 1– Photomontage – year 15**

ii **Mereworth 2**

Views of the northern part of the SIA, with visibility of the TLO and the rail loop (Berrima Rail Project) will be visible between the trees on the outer edge of the Sorensen garden. Views through the trees to integration planting beyond are discussed below (Mereworth 3). The mine surface infrastructure will have a sympathetic colour scheme to aid in visual integration.



Plate 5.79 Mereworth 2 – Photomontage – existing



Plate 5.80 Mereworth 2 – Photomontage – post construction year 1



Plate 5.81 Mereworth 2 – Photomontage – year 5



Plate 5.82 Mereworth 2– Photomontage – year 15

iii Mereworth 3

Views of the northern part of the SIA, with visibility of the TLO and rail loop is possible. Additional measures to improve visual integration into the landscape and retain character and form of existing vegetation are proposed. These measures also seek to preserve viewlines and vistas. Measures used include planted Monterey pine windbreaks, planted copses of trees and shrubs. An informal line of specimen trees (six of) believed to have been planted by Paul Sorensen (see Brouwer 2020b) heads in a north-westerly direction from this location. The first tree, represented by the canopy shadow can be seen in the foreground, left of image. Two trees of the same species will be planted at this location to aid in integration. Year 5 montages show good integration, with vegetation near maturity by year 15. The measures are further outlined in Section 6.



Plate 5.83 Mereworth 3 – Photomontage – existing



Plate 5.84 Mereworth 3 – Photomontage – post construction year 1



Plate 5.85 Mereworth 3 – Photomontage – year 5



Plate 5.86 **Mereworth 3– Photomontage – year 15**

iv **Mereworth 7**

This image represents views from the farm, at the intersection of two farm track, overlooking the northern part of the dam formed on Oldbury Creek. This view is representative of the TLO, the product coal conveyor and the associated rail loop on embankment. Measures to integrate the elements include sympathetic colour schemes for all mine elements. Integration planting to soften the contrast between the mine elements and the landscape include, planted Monterey pine windbreaks, planted copses of trees and shrubs and an informal row of River Oak (*Casuarina cunninghamiana*) at the dam edge. Year 5 montages show the beginning of good integration of the lower mine element, with vegetation near maturity by year 15. The measures are further outlined in Section 6.



Plate 5.87 Mereworth 7 – Photomontage – existing

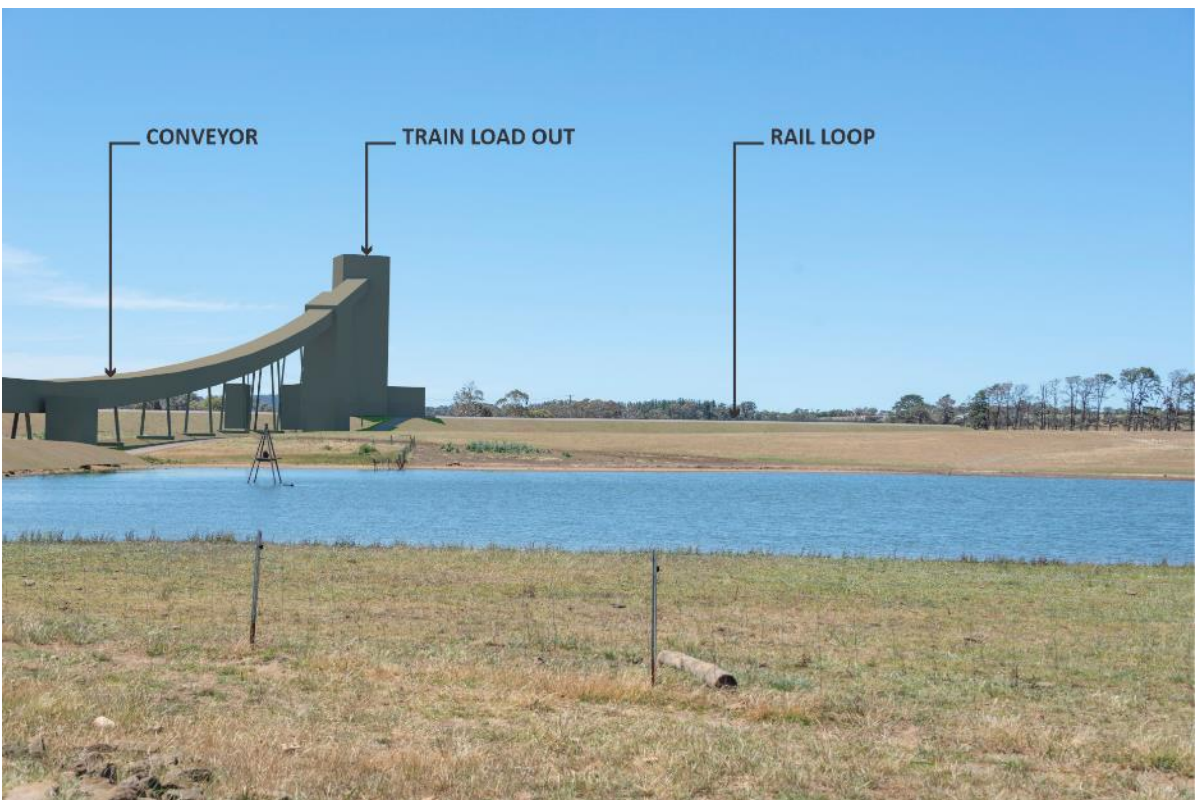


Plate 5.88 Mereworth 7 – Photomontage – post construction year 1

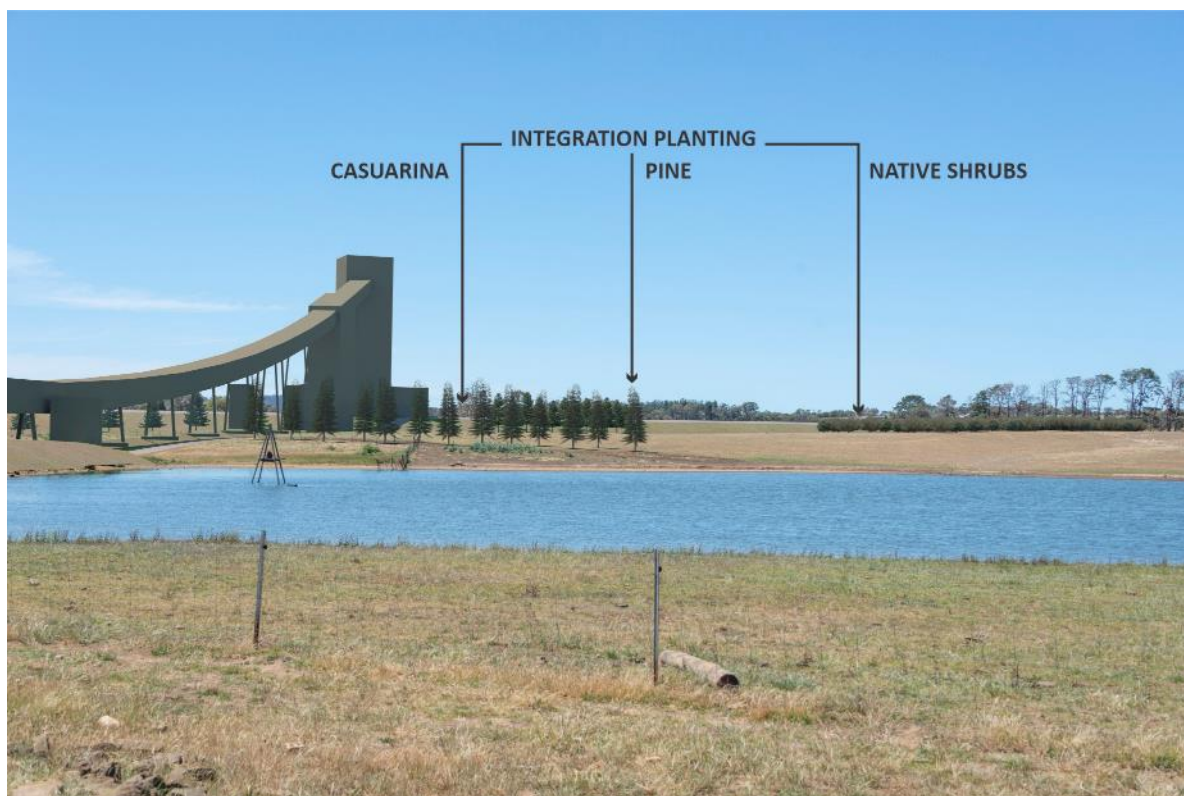


Plate 5.89 Mereworth 7 – Photomontage – year 5



Plate 5.90 Mereworth 7– Photomontage – year 15

This image represents views from the edge of the avenue approach to Mereworth house, looking east. The Berrima Cement Works can be clearly seen in this image, rising above the tree line to the right of the centre of the image. Note how the single mature tree at this location breaks up the apparent mass of the cement works. This view represents the Primary Water Storage dam wall. Upon completion the starkness of the contrast between the earth wall and the pasture will be reduced by seeding it with pasture grasses. Informal planting with native shrubs and smaller trees will occur and their selection and location has been made on the basis of preserving long vistas at this location and not interrupting the skyline. A windbreak of Monterey pines is proposed and this can be seen to the left of the dam wall at the base of the line of vegetation denoting the line of the Hume Motorway. The line of pines is a projection of a line of pines to the east of the dam and motorway (see Figure 6.1).

The planting at this location is intended to integrate the dam wall into views from both the avenue at Mereworth, and views south bound on the motorway, at the low point across Oldbury Creek (see Section 5.3.1 iv. b. highway section 2 southbound).

Year 5 montages show the beginning of good integration of the dam, with vegetation near maturity by year 15. The measures are further outlined in Section 6.



Plate 5.91 Mereworth 12 – Photomontage – existing



Plate 5.92 Mereworth 12 – Photomontage – post construction year 1

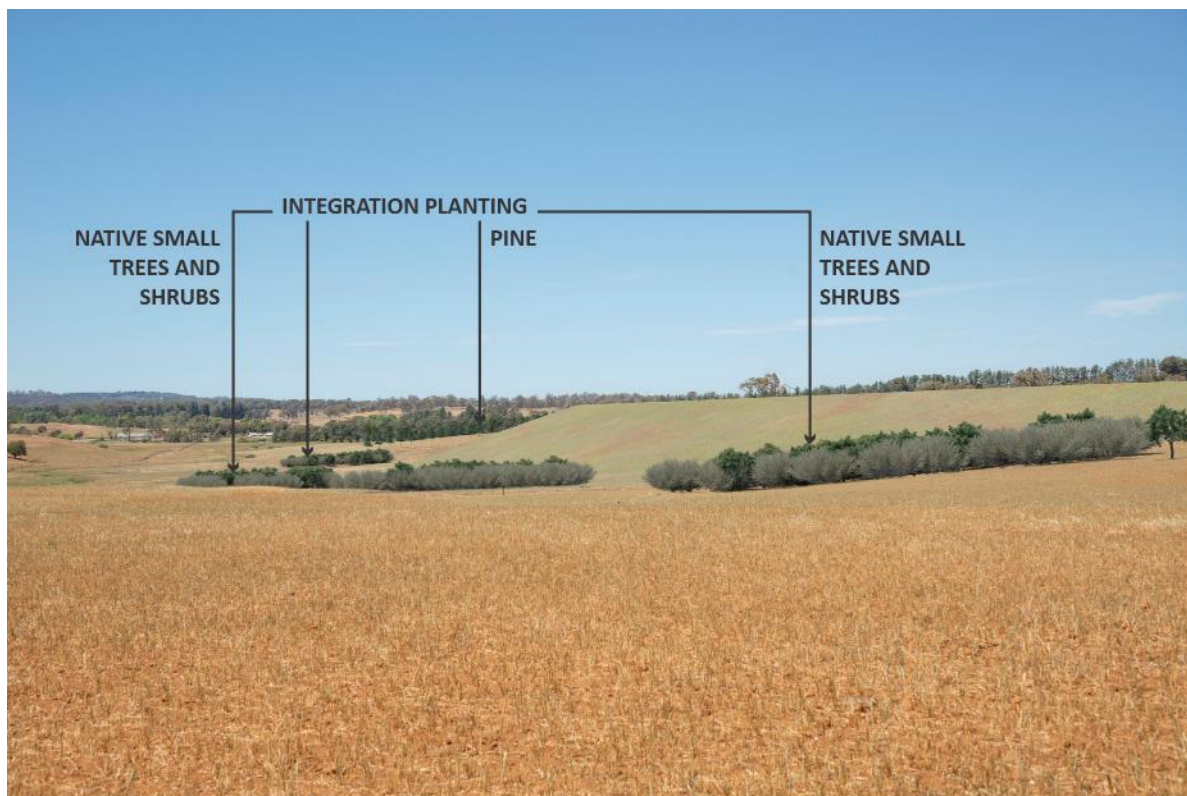


Plate 5.93 Mereworth 12 – Photomontage – year 5



Plate 5.94 **Mereworth 12– Photomontage – year 15**

vi **Mereworth 13**

This image represents views from the original Sorensen property track, as the viewer crested the highpoint on the drive and emerged from a copse of relict canopy trees allowing the view of the Mereworth garden to emerge into the visual experience. This is not a public view. The nearest public view id to the south at CL-VP18, which is on Mereworth Road. Owing to terrain, views to the north will not be possible. The view for year 1 shows the mine infrastructure. Year 5 shows the developing planting. The plantings in the midground to the right of the avenue of trees and in front of the outbuildings are associated with the primary water storage dam. Trees behind, in the vicinity of the TLO will be Monterey Pine windbreaks and the River Oak plantings discussed in the Mereworth 7 photomontage sequence.



Plate 5.95 **Mereworth 13 – Photomontage – existing**



Plate 5.96 **Mereworth 13 – Photomontage – post construction year 1**



Plate 5.97 **Mereworth 13 – Photomontage – year 5**



Plate 5.98 **Mereworth 13– Photomontage – year 15**

6 Mitigation

6.1 Summary

The visual mitigation measures presented in EIS and RtS are still supported. The mitigation measures identified herein have been developed based on the findings of the visual analysis. Impact assessment of residual effects is presented as Section 7 (Table 7.1). Mitigation measures proposed to lessen residual impacts are identified in Table 7.1. Proposed mitigation measures are outlined in this section and are discussed in terms of design elements, onsite and offsite treatments and post mining landform.

6.2 Design elements

There may be opportunities within the Project's post-approval and detailed design phase to incorporate some or all of the following:

- Undergrounding of power and other service / supply lines, where practicable.
- Vehicle circulation (ie roads) relocated away from heritage features and visibility from significant viewpoints and view routes (this option has been adopted by Hume Coal).
- Modification of the location or mass of buildings and ancillary structures, where practicable.
- Design detail:
 - selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape.
 - forms should be sympathetic to existing farm shed character forms and treatments (timber, tin, pitched roof lines and eaves to buildings) where practicable.
- Design drainage and storage structures to have forms more sympathetic to the landscape (be informal) to reduce visual contrast, e.g. maintaining the informal edges of the causeway across Mereworth property to the north-east of Mereworth House, should not be altered in form or altered in surface appearance to maintain the present view of this feature from the garden and its existing informal edge should be retained.

6.3 Visual integration planting

Brouwer (2020a and 2020b) identified that further landscape integration of the various Project elements can be achieved through implementation of tree planting around infrastructure areas and adjacent to roads and fence lines. All additional plantings proposed as mitigation measures, would be implemented post approval. Screen planting undertaken by Hume Coal in 2015/2016 and additional integration planting proposed are represented in Figure 6.1. Specific measures would include:

- Preparation of a Landscape Plan to address heritage and /or cultural landscape key viewpoints.

- Forming the primary water dam on Mereworth, as an attractive farm waterbody through the use of nearby vegetation plantings to break up the apparent scale of the structure. Buffer plantings do not necessarily need to be continuous screen planting, rather can be vegetated 'clumps' sympathetic to the existing landscape forms for remnant native vegetation, or windbreaks/hedgerows. Care needs to be taken so as to not obscure the view of the Mereworth driveway plantings from Old Hume Highway (representative of viewpoint CL-VP16). Planting need to be undertaken; and also cognisant of engineering constraints associated with the structure of the dam wall. Treatments are shown in the year 5 and year 15 photomontages at Mereworth viewpoint 12:
 - In conjunction with softening the starkness of the dam wall through a more organic form and revegetating it with pasture grasses, undertake planting of both groups of trees, specimen trees, and massed tree and shrub planting patches on the bank and into the field(s) to reduce the formalised structure of the bank form to better integrate with the existing grades. Treatments are shown in the year 5 and year 15 photomontages at Mereworth viewpoint 12.
 - A number of viewpoints and view-routes have views of mine elements. Planting which is cognisant of the rural cultural landscape and complimentary of the viewshed and vistas would be undertaken to break up the scale and mass of various mine elements. Planting with native (preferred) and non-weedy trees and shrubs to create clumps / copses, specimen trees and belts (akin to linear forms hedgerows, windbreaks and fenceline plantings) could be undertaken to semi-screen structures. This would allow better integration of Project elements into the pattern of this locality's rural paddocks. Planting should not just follow constructed element lines as this emphasises the change. Planting is to be angled to the line, have breaks, have different sizes and lengths of planted patches. Treatments shown in the Year 5 and year 15 photomontages show these.
- Onsite Consideration of onsite planting treatments to further mitigate night-time lighting effects from mobile equipment and surface lighting, where other mechanisms (sighting, directional treatments and timed and zonal illumination methods) do not mitigate effects.
- Timely rehabilitation of disturbed areas no longer required for construction or operational activities.

Additional proposed landscape integration planting measures are shown in Figure 6.1.

6.3.1 Planting themes and rationale

The purpose of this plantings is not to screen Project elements from view. Their purpose is to integrate into the existing landscape (species and patterning) to provide visual relief by softening / breaking up the apparent mass of mine elements (reduction in contrast) and preserve where possible existing views and vistas. General planting themes include the following:

- Native trees and shrubs – informal massed plantings with mulched planting beds:
 - These plantings aim to strengthen and/or compliment existing patches of vegetation in the landscape. Planting may be as stand along patches or as clusters along fencelines and tracks. Species selection will be based upon existing vegetation communities appropriate for the locality (see photomontages for CL-VP18 (Plates 5.59-5.61)). Suitable species, mature height and years to maturity for each species, is identified by Table 4.3.
- Native trees and shrubs – informal infill planting:

- Planting of this element in the vicinity of the Medway Rivulet will involve the planting of canopy trees and shrubs into the existing thinned canopy at this location. Planting will assist in integrating conveyor, topsoil stockpiles and portals into the landscape through reducing their size and contrast. Species selection will be based upon existing vegetation communities appropriate for the locality (see photomontages for CL-VP18 (Plates 5.59-5.61)). Suitable species, mature height and years to maturity for each species, is identified by Table 4.3.
- Native shrubs – informal mass plantings with mulched planting beds:
 - This planting treatment is used where planting is required to assist in the integration of the Project but sightlines mandate that lower forms will be used so that the skyline / existing vistas are not disrupted. These are used in the vicinity of the primary water storage dam and the rail facilities. Species selection will be based upon existing vegetation communities appropriate for the locality (see photomontages for Mereworth 7 (Plates 5.88-5.90)). Suitable species, mature height and years to maturity for each species, is identified by Table 4.3.
- River oak – informal linear stand:
 - River oak is a part of the riverine landscape of the region. This species is used in informal linear stands along Oldbury Creek (for additional bank stability / protection) and along other waterbodies locality (see photomontages for Mereworth 7 (Plates 5.88-5.90)). Mature height and years to maturity for this species is identified by Table 4.3.
- Monterey pine windbreak – formal planting:
 - Monterey pines have a long history of use in the landscape for windbreaks, feature tree plantings, demarcation of fencelines / property lines, avenue plantings and softwood pine plantation (eg Belanglo State Forest). Used as windbreaks, they will be strongly formal and linear in presentation. Their use for integration of the Hume Coal surface elements includes infill planting of existing windbreaks where trees have died out and not been replaced, along roads and fencelines, extensions of existing windbreaks so these will be integrated and from a landscape perspective will be legible, and as duplication of rows in the landscape. Their use has been determined where they can maximise provision of visual relief from Project elements, where their presence does not interrupt existing views and vistas, and where their presence does not disrupt ongoing farm operations at Mereworth. Within rows, gaps will be provided, and rows have been sited to broadly conform with the requirements of the Wingecarribee Shire Council Rural Lands Development Control Plan. Specific examples include Viewpoint 5 (refer Plates 5.28-5.30). Monterey pines have a similar height and age profile to river oak (refer Table 4.3).
- Native trees and tall shrubs – informal planting with mulched beds:
 - These consist of small copses of canopy trees and shrubs used in specific locations to assist with breaking the apparent mass (contrast) of Project elements. Species selection will be based upon existing vegetation communities appropriate for the locality (see photomontages for CL-VP14 (Plates 5.51-5.53)). Suitable species and years to maturity for each species is identified by Table 4.3.
- Individual feature tree planting:
 - Specifically this includes feature tree planting within the Mereworth property (see photomontages for Mereworth 3 (Plates 5.83-5.86)). Maturity is assumed in 15 years of planting

6.4 Potential off-site mitigation treatments

Potential offsite treatments for the Project will be assessed and acted upon post approval, where deemed necessary. Actions will be identified through ongoing liaison with landholders to identify and mitigate the visual effect of the Project on high sensitivity viewer locations through screen plantings, sympathetic with the landscape form (clumps / copses, specimen trees and belts).

6.5 Management plan

The proponent will commit to the development of a Visual Management Plan (VMP) in conjunction with stakeholders (RAP, Garden society, etc) which will identify specific screening to be undertaken, suitable species and forms to be used, a register and mechanism for identifying, treating and reporting upon new locations.

6.6 Post closure landform

The overriding objective of rehabilitation activities at the mine will be to return disturbed land to a condition that is stable, and supports the proposed post-mining land use, which is grazing on improved pasture. The SIA is on land currently used for agriculture, and it is therefore anticipated that the rehabilitated land will be incorporated back into the operating farm. Specifically, the rehabilitation will:

- remove all Project-related infrastructure not required by the final land use;
- restore a safe and stable landform;
- reinstate the soil profile and function using stockpiled topsoil, creating landforms that will be compatible with the surrounding topography and as close as possible to the pre-mining agricultural state; and
- establish a landscape that permits the land use of livestock grazing on improved pasture.

The final post closure landform is shown in Figure 6.2.

6.7 Lighting

Direct lighting has the potential to point source impacts as lighting can become a focal point in darker night skies. This has the potential to become a nuisance given the darker backdrop associated with state forest and more rural lands to the west of the mine.

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

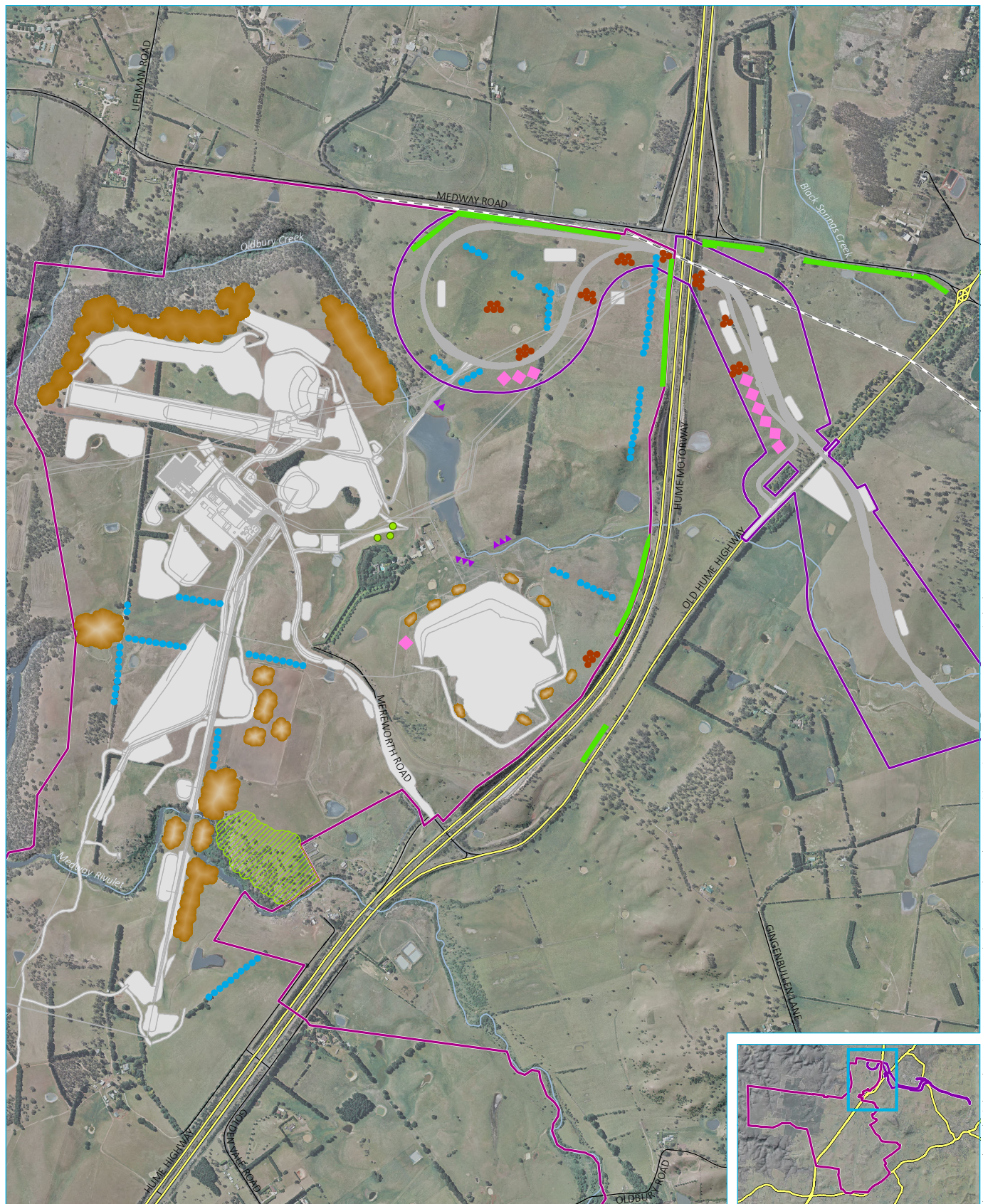
Lighting associated with the surface infrastructure will remain throughout the life of the Project and will be visible to residents surrounding the Project area and motorists travelling along roads in the immediate vicinity.

Diffuse lighting effects associated with 'night-glow' from operational machinery, mine infrastructure and associated lighting will be present throughout the life of the Project. The amount of nightglow will vary depending on factors such as cloud cover and the location of operational mining activities at a given time.

A detailed assessment of potential light spill from the Project will be undertaken as part of detailed design. It is not possible to undertake this assessment until a detailed design of the Project is complete.

However, lighting protocols will be developed and included in the VMP, which will also adopt the following principles:

- establish operational protocols for setting up of mobile lighting plant such that lighting is directed away from external private receptors (this may include altering the alignment of internal roads);
- establish design and operational protocols such that lighting sources will be hooded and directed (directional treatments) below the horizontal to minimise potential light spill;
- design light systems that minimise wastage;
- screening of lighting where possible for viewers external to the Project;
- avoiding lighting of light-coloured surfaces which have greater reflectivity;
- installation of and timed and zonal illumination methods whereby a structure or area is only illuminated when activity is occurring in that area;
- additional landscape treatments in the form of planting to screen views; and
- follow up with neighbours to ensure that any lighting impacts will be mitigated as far as is reasonably practical to do so, keeping in mind safety issues for the workforce.



Source: EMM (2020); Hume Coal (2016); DFSI (2017)

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GDA 1994 MGA Zone 56
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KEY

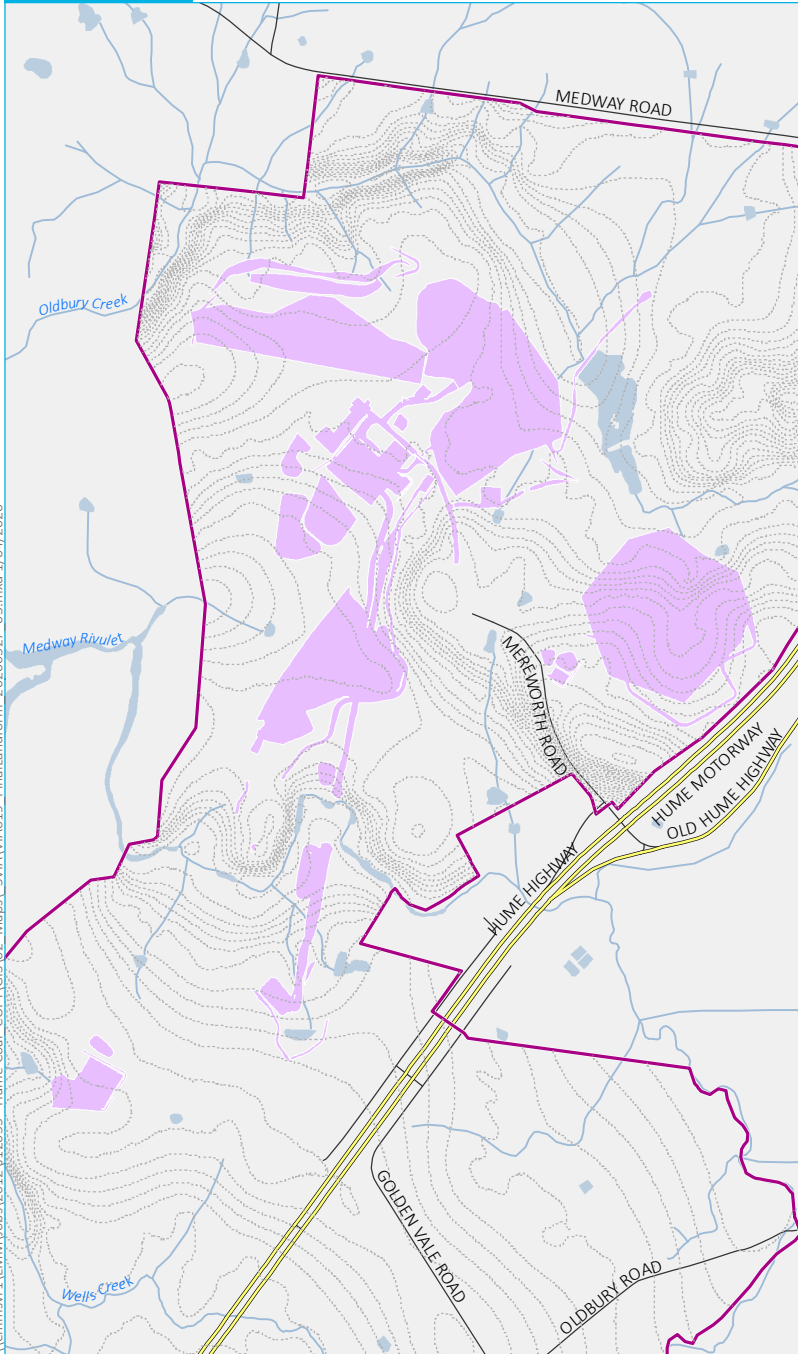
- Hume Coal Project area
- Berrima Rail Project area
- Indicative surface infrastructure features
- Tree planting (EIS)
- Existing environment
- Rail line
- Major road
- Minor road
- Named watercourse
- Waterbody

- Proposed additional plantings (RTS)
- Native trees and shrubs - informal mass plantings with mulched planting beds
- Native trees and shrubs - informal infill planting
- Native shrubs - informal mass plantings with mulched planting beds
- ▲ River Oak (*Casuarina cunninghamiana*) - informal linear stand
- Pine (*Pinus* sp.) windrow - formal planting
- Native trees and tall shrubs - informal planting (paddock tree/copse) with mulched beds
- Native/non-native tree - match existing

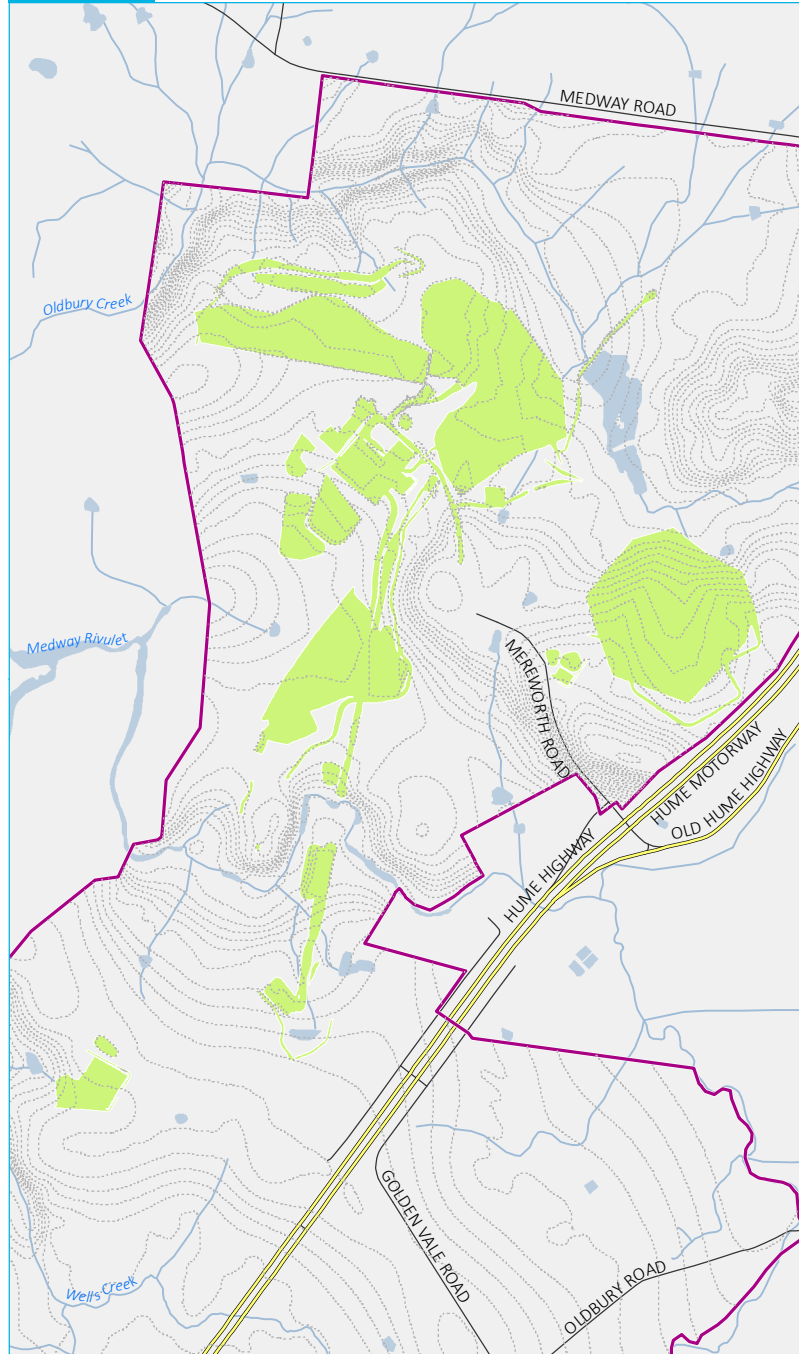
Visual integration planting locations

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure 6.1

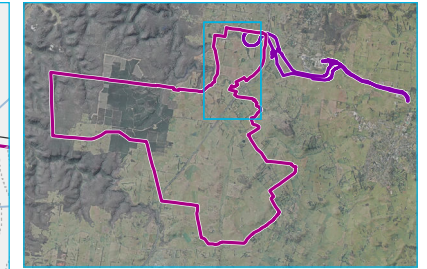
EXISTING TOPOGRAPHY



FINAL LANDFORM



- KEY**
- Hume Coal Project area
 - Berrima Rail Project area (refer to inset)
 - Surface infrastructure footprint
 - Rehabilitation areas/grazing
 - Contour (2 m)
 - Major road
 - Minor road
 - Watercourse/drainage line
 - Waterbody



Post closure landform

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure 6.2

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Source: EMM (2020); Hume Coal (2016); DFSI (2017)

0 0.5 1 km
GDA 1994 MGA Zone 56

7 Visual impact assessment

7.1 Overview

The overall landscape and visual impact analysis has been prepared using the methodology described in Section 2 with the visual effect described in Section 4 (refer Table 2.1) and visual sensitivity described in Section 5 (refer Table 2.2) being combined in the evaluation of significance matrix (Table 2.3) to determine overall impact.

The landscape and visual effects of the Project are described in Section 7.2 with discussion of the impacts arising to the broader potential view zone, potential light effects and Mereworth house and gardens. Additional mitigation measures required to achieve visual integration / reduce visual sensitivity are described (Section 6).

7.2 Visual impacts

7.2.1 Significant potential view zone

The SIA occurs in an area of broad landscape spatial arrangement, characterised by large tracts of pastoral grassland to the south and south-east. To the west occurs large tracts of native forest and plantation. To the north and east, the spatial arrangement is finer with rural residential activities occurring in close proximity to the SIA (north of Medway Road), the urban areas of Berrima to the north and New Berrima to the north-east and industry, dominated by the Berrima Cement Works a prominent feature of landscape since the 1930s.

The SIA generally occurs in the lowest parts of the landscape (Medway Rivulet floodplain), and is surrounded in all directions by comparatively, more elevated undulating land. Therefore, views of the SIA potentially occur throughout the SPV zone. Visual analysis has shown that foreground views of the various mine elements from within the Medway house localities are expansive owing to the nature of the property and the flat terrain. However, this area represents views that the public would not have access to. Across the SPV zone, views mostly occur within 2.5 km-3.0 km of the SIA and mainly in the north-west through east to south-western parts. Beyond this zone, on account of the flat terrain of the floodplain (represented by the Flat pastoral land LCU), and the degree of vegetation cover, nearfield views are blocked by vegetation in the landscape and terrain.

In the vicinity of Mereworth house and gardens, there are foreground views of the various mine elements, due to the cleared pastoral nature of the property and the flat terrain. However, this area represents views that the public would not have access to and the property is owned by Hume Coal.

Longer views of the SIA are afforded from more elevated positions greater than 5 km from various mine elements and they occur to the south-west to south-east.

Visual impact varies according to the visual effect of the Project (Section 2.3.6 and Table 2.1), its visibility in the landscape (Section 5) and the visual sensitivity (Section 2.3.6, Table 2.2) of areas from which it is seen. The visual effect of the SIA is high where the visual elements contrast significantly with the existing landscape fabric and lack visual integration into the setting. Visually sensitive zones occur to the north beyond Medway Road, and to the east of the Highway. These factors combined as identified within Table 2.3 to determine levels of impact. Visual impacts are outlined in Table 6.1.

Within the SPV zone the most substantial impacts will be experienced along the Old Hume Highway, a designated heritage route. Principal effects arise as a result of the Berrima Rail line bridge over the highway and the nearby rail construction camp (temporary) and maintenance facility. These will be direct views and there is little opportunity to mitigate the view associated with the bridge. Transient and glimpsed partial views of some of the taller mine elements of the SIA and the primary water supply dam will be possible. Opportunities to further improve visual integration of the Project are discussed in Section 6.3.

The Hume Motorway is exposed to moderate / substantial impacts (unmitigated) associated with views in the vicinity of Oldbury Creek. The effects of some of these views will diminish as the 2015/2016 screen tree planting by Hume Coal further establishes and matures. Presently this vegetation is 4-5 years old and evidence of establishment with views beginning to be screened (filtered) can be seen at many locations (see Plate 5.3, 5.6, 5.12, 5.14 and 5.16). The viewing experience occurs at speed (110 kph) and therefore over the distances that views will be possible (several hundred metres) transient partial views of mine infrastructure, filtered by vegetation would be possible for approximately 15 seconds, depending on speed. More extensive, longer transient views of rail infrastructure can be experienced to the east. Moderate impacts occur in the vicinity of the primary water dam. Opportunities to further improve visual integration of the Project are discussed in Section 6.3.

Portions of the garden of the state listed heritage property 'Golden Vale' will be potentially exposed to static, partial views of mine infrastructure. Views would be longer, in the order of 2.5 km and the elements would occupy only a small part of the viewshed. Opportunities to further improve visual integration of the Project are discussed in Section 6.3.

Table 7.1 provides a tabulated analysis of visual impacts arising for the project.

Table 7.1 Overall visual impact

Land use /receptor within zone	Project Elements	Visual effect	Visual sensitivity	Overall Effect	View type	Mitigation measures	Residual Overall Effect
LCU 1 – Forested hills and rises							
<i>No views of infrastructure from forested hills and rises</i>				n/a	n/a	n/a	n/a
LCU 2 – Plantation pine on hills							
<i>No views of infrastructure from Plantation pine on hills</i>				n/a	n/a	n/a	n/a
LCU 3 – Undulating pastoral lands							
Hume Motorway	Product coal stockpile and stacker / reclaimers, CHPP, ROM conveyor tower and stockpile, reject stockpile	High	Moderate	Moderate / Substantial	Transient and glimpsed views through trees of elements rising above tree line/ridgeline, but generally below the skyline. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Integration planting. Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape. Maturation of 2015/2016 screen planting.	Measures reduce the visual effect to Moderate. Overall effect will be Moderate.
	TLO	High	Moderate	Moderate / Substantial	Transient, full views with element rising above skyline. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Integration planting. Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape. Maturation of 2015/2016 screen planting.	Measures reduce the visual effect to Moderate. Overall effect will be Moderate.

Table 7.1 Overall visual impact

Land use /receptor within zone	Project Elements	Visual effect	Visual sensitivity	Overall Effect	View type	Mitigation measures	Residual Overall Effect
Tourist Road (Old Hume Highway)	Rail Bridge and train maintenance facility	Low	Moderate	Slight / Moderate	Transient, long view of facility when travelling south on the motorway. Element backgrounded by terrain and vegetation. However, Berrima cement works would present as a far more significant visual focus which is superimposed against the skyline and would be the focal point of views. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Integration planting Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape.	Measures reduce the visual effect to Slight. Overall effect will be Slight.
	Product Coal stockpile and stacker / reclaimers, CHPP (near rail bridge), and Product Coal stockpile and stacker / reclaimers, CHPP, ROM and rejects stockpile near CL VP16	Moderate	High	Moderate / Substantial	Transient and glimpsed views through trees of parts of the elements rising above tree line/ridgeline. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Integration planting Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape.	Measures reduce the visual effect to Low. Overall effect will be Slight / Moderate.
	TLO	High	High	Substantial	Transient, full long views with element rising above skyline created by ridges and motorway embankments. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Integration planting Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape.	Measures reduce the visual effect to Low. Overall effect will be Slight / Moderate.

Table 7.1 Overall visual impact

Land use /receptor within zone	Project Elements	Visual effect	Visual sensitivity	Overall Effect	View type	Mitigation measures	Residual Overall Effect
	Train maintenance / provisioning facility	Moderate	Moderate	Moderate	Transient, full long views with element rising above skyline created by ridges and motorway embankments. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Integration planting Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape.	Measures reduce the visual effect to Low. Overall effect will be Slight.
	Rail Bridge	Moderate	Moderate	Moderate	Transient full view of the bridge crossing the Old Hume Highway.	Integration planting Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape.	Measures reduce the visual effect to Low/moderate. Overall effect will be Slight/moderate.
	Primary water dam	Moderate	Moderate	Moderate	Transient glimpsed views from motorway of dam in foreground. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Integration planting around perimeter of dam. Maturation of 2015/2016 screen planting.	Measures reduce the visual effect to low. Overall effect will be Slight/Moderate.
Local road (Medway Road)	ROM and TLO	Moderate	Low	Slight to Moderate	Glimpsed views from primary sensitivity zone. Structures would appear above intervening vegetation. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape. Maturation of 2015/2016 screen planting.	Measures reduce the visual effect to Low. Overall effect is Slight.

Table 7.1 Overall visual impact

Land use /receptor within zone	Project Elements	Visual effect	Visual sensitivity	Overall Effect	View type	Mitigation measures	Residual Overall Effect
Other tourism areas – wine clusters (Cherry Tree Hill Wines)	TLO and ROM Conveyor	Moderate	Moderate	Moderate	Distant views (secondary sensitivity) of ROM Conveyor and TLO, appearing above intervening vegetation, backgrounded by elevated vegetated terrain to north. Minor effect occupying small component of the viewshed. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Integration planting Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape.	Measures reduce the visual effect to low. Overall effect will be Slight/Moderate.
Rural residences	Stacker / reclaimer, CHPP, ROM, TLO	Moderate	Moderate	Moderate	Primary sensitivity zone - static glimpsed view of surface elements between trees, with elements partially backgrounded by vegetated elevated terrain to west. Visual effect – moderate to low on account of screening vegetation and proportion of view shed occupied. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Integration planting Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape.	Measures reduce the visual effect to Low. Overall effect will be Slight / Moderate.
	Maintenance and provisioning facility	Low	Moderate	Low	Primary sensitivity zone - static glimpsed view of elements between trees, with elements backgrounded by vegetation and elevated. Visual effect – low on account of screening vegetation, low contrast and moderate integration and proportion of view shed occupied. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Integration planting Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape.	Measures reduce the visual effect to negligible. Overall effect will be Slight.

Table 7.1 Overall visual impact

Land use /receptor within zone	Project Elements	Visual effect	Visual sensitivity	Overall Effect	View type	Mitigation measures	Residual Overall Effect
	Rail bridge	Low	Moderate	Low	Primary sensitivity zone - static glimpsed view of elements between trees, with elements backgrounded by vegetation and elevated. Visual effect – low on account of screening vegetation. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Integration planting Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape.	Measures reduce the visual effect to negligible. Overall effect will be Slight.
Rural lands	Various Project elements	Moderate	Low	Slight / Moderate	Views include static glimpses and full views of a variety of surface elements.	Integration planting Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape.	Measures reduce the visual effect to Low. Overall effect will be slight to slight / moderate dependent upon viewing location.
LCU 4 – Flat pastoral lands							
Hume Motorway	Product Coal stockpile and stacker / reclaimers, CHPP, ROM	High	Moderate	Moderate / Substantial	Primary sensitivity zone - Transient and glimpsed views through trees of elements rising above tree line/ridgeline, but generally below the skyline. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Integration planting Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape. Maturation of 2015/2016 screen planting.	Measures reduce the visual effect to Low. Overall effect will be Slight / Moderate.

Table 7.1 Overall visual impact

Land use /receptor within zone	Project Elements	Visual effect	Visual sensitivity	Overall Effect	View type	Mitigation measures	Residual Overall Effect
Local roads (Belanglo Road and Mereworth Road)	TLO	High	Moderate	Moderate / Substantial	Transient, full views with element rising above skyline. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Integration planting Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape. Maturation of 2015/2016 screen planting.	Measures reduce the visual effect to Low. Overall effect will be Slight / Moderate.
	Primary water dam	Moderate	Moderate	Moderate	Transient glimpsed views from motorway of dam in foreground. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Integration planting around perimeter of dam. Maturation of 2015/2016 screen planting.	Measures reduce the visual effect to low. Overall effect will be Slight/Moderate.
	Product Coal stockpile, TLO and stacker / reclaimers, ROM	High to Moderate	Low	Moderate	Owing to topographic constraints and vegetation screening of many elements only the TLO and stacker / reclaimers would be visible above the treeline but backgrounded by the vegetated hills to the north and west. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Integration planting. Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape. Maturation of 2015/2016 screen planting.	Measures reduce the visual effect to Low. Overall effect will be Slight.
	Mining infrastructure	Moderate to Low	Low	Slight	Views of the portals and vent pad will be visible from Mereworth Road and Belanglo Road. Owing to smaller size and lower levels of contrast and higher integration, the effect is moderate to low. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Integration planting. Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape. Maturation of 2015/2016 screen planting.	Measures reduce the visual effect to Low. Overall effect will be Slight.

Table 7.1 Overall visual impact

Land use /receptor within zone	Project Elements	Visual effect	Visual sensitivity	Overall Effect	View type	Mitigation measures	Residual Overall Effect
State heritage place - Golden Vale garden only	Product Coal stockpile and stacker / reclaimer, ROM tower	Low	Moderate	Slight / Moderate	Partial views glimpsed between trees of Reclaimers appearing above the treeline; minor element in viewshed. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Integration planting. Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape.	Measures reduce the visual effect to Low. Overall effect will be Slight / Moderate
Rural residences	Stacker / reclaimer, ROM conveyor	Moderate	Moderate	Moderate	Primary sensitivity zone - static glimpsed view of surface elements between trees, with elements partially backgrounded by vegetated elevated terrain to west. Visual effect – moderate to low on account of screening vegetation and proportion of view shed occupied. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Integration planting Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape.	Measures reduce the visual effect to Low. Overall effect will be Slight / Moderate.
Rural lands	Various Project elements	Moderate to high	Low	Slight to moderate	Views include static glimpses and full views of a variety of surface elements. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Integration planting Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape.	Measures reduce the visual effect to Moderate. Overall effect will be Slight / Moderate.
LCU 5 – Industrial and mine							
Industry Zones	Product Coal stockpile and stacker / reclaimers, ROM Conveyor, TLO	Moderate	Low	Slight / Moderate	Static screened views, elements will appear above foreground treelines and ridgelines. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape.	Measures reduce the visual effect to Low. Overall effect will be Slight.

Table 7.1 Overall visual impact

Land use /receptor within zone	Project Elements	Visual effect	Visual sensitivity	Overall Effect	View type	Mitigation measures	Residual Overall Effect
	Rail bridge and maintenance facility	Low	Low	Slight	Static screened views elements will appear above foreground treelines and ridgelines. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Integration planting Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape.	Measures reduce the visual effect to Negligible. Overall effect will be Negligible.
Sub-regional and local Roads	Product Coal stockpile and stacker / reclaimers, ROM Conveyor, TLO	Moderate	Low	Slight / Moderate	Transient filtered views from Taylor Avenue. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape.	Measures reduce the visual effect to Low. Overall effect will be Slight.
	Rail bridge and maintenance facility	Moderate to Low	Low	Slight Moderate	Transient filtered views from Taylor Avenue. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Integration planting Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape.	Measures reduce the visual effect to Low. Overall effect will be Slight.
LCU 6 – Peri-urban							
Tourist road (Old Hume Highway)	ROM and stacker / reclaimer	Moderate	Moderate	Moderate	Glimpsed transient views from secondary visual sensitivity zone. Elements would appear at distance, backgrounded by vegetation and terrain. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Screen and Integration planting. Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape.	Measures reduce the visual effect to Low. Overall effect will be Slight / Moderate.

Table 7.1 Overall visual impact

Land use /receptor within zone	Project Elements	Visual effect	Visual sensitivity	Overall Effect	View type	Mitigation measures	Residual Overall Effect
Local road (Medway Road)	Product Coal stockpile and stacker / reclaimers, CHPP, ROM, TLO, rail loop	High to Moderate	Low	Moderate	Glimpsed views from primary sensitivity zone. Structures would appear above intervening vegetation. Vegetation screening undertaken in 2015/2016 will screen views of the infrastructure in the SIA. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Integration planting. Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape. Maturation of 2015/2016 screen planting.	Measures reduce the visual effect to moderate to Low. Overall effect will be Slight
Other tourist property	Product Coal stockpile and stacker / reclaimers, CHPP, ROM, TLO	Moderate	Moderate	Moderate	Primary sensitivity zone with static, screened views of these elements rising above intervening vegetation and appearing against the skyline. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Integration planting. Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape. Maturation of 2015/2016 screen planting.	Measures reduce the visual effect will drop to moderate and then low as screen planting matures. Overall effect will be Slight.
Rural residences	Product Coal stockpile and stacker / reclaimers, CHPP, ROM, TLO	Moderate	Moderate	Moderate	Primary sensitivity zone with static, screened views of these elements rising above intervening vegetation and appearing against the skyline. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Screen and Integration planting. Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape.	As vegetation matures, measures will reduce the visual effect to Low. Therefore the overall effect will be Slight / Moderate (moderate initially, reducing to slight as the vegetation matures).
Rural lands	Various Project elements	Moderate to High	Low	Slight to moderate	Views include static glimpses and full views of a variety of surface elements. <i>Additional mitigation strategies will be implemented to reduce overall impact. See Section 6.3.</i>	Integration planting Selection of colour tone and material finishes of structures and infrastructure that is sympathetic to the background vegetation or landscape.	Measures reduce the visual effect to Moderate. Overall effect will be Slight / Moderate.

Table 7.1 **Overall visual impact**

Land use /receptor within zone	Project Elements	Visual effect	Visual sensitivity	Overall Effect	View type	Mitigation measures	Residual Overall Effect
LCU 7 – Urban areas							
<i>No views of infrastructure from urban areas</i>		n/a	n/a	n/a	n/a	n/a	n/a
LCU 8 – Mt Gingenbullen							
Rural lands	Various Project elements	High	Low	n/a	Not publicly accessible – private views. Owing to elevation elements would be backgrounded by vegetated / elevated terrain.	n/a	n/a

7.2.2 Lighting

The effects of night light will be influenced by the location and relative heights of on-site operations, the relative level at which the viewing location is situated and the presence of any possible onsite barriers to lighting and off-site topographic and landform effects which may screen views and / or vegetation.

There are two types of lighting effects:

- Direct light effects; through from surface lighting and mobile plant which is experienced if there is a direct line of sight between the source and the viewing location; and
- Diffuse light effect; the night-glow or 'light-cloud' (light pollution) being atmospheric conditions (light reflected by low cloud, fog or dust) / light reflected off light-coloured surfaces.

Both are more prevalent impacts in darker environments – ie those environments without much lighting. Sensitivity is affected by number and proximity of the residence. Night glows can create strong focal points.

7.3 Cumulative impact

Figure 7.1 presents a cumulative visibility assessment of the Hume Coal and Berrima Rail Project, compared with the Berrima Cement Works and the Berrima Feed Mill. The cement works and feed mill represent some of the taller most visible elements within the landscape, which also contribute to the night-time lighting environment.

The figure overlays the visibility of coal (mine and rail) and industrial (cement works and feed mill) elements and has been assessed using the elevation (DEM) and surface (DSM) models. Individual comparisons of elements are presented in Attachment A (Figures A.1-A.8 for the Hume Coal and Berrima Rail Project elements and Figure A.8 and A.9 for the cement works and feed mill, respectively).

The analysis (refer Figure 7.1 and Figure A.10) shows that the feed mill contributes to the industrial character of the locality in a minor way; visibility in the landscape is largely confined to the east of the Old Hume Highway and Hume Motorway with visibility to the high country to the north-east of Berrima and south the Oldbury Road and Mt Gingenbullen. The cement works (Figure A.9) has a far greater visual footprint than the feed mill and is visible within the landscape in significantly the same areas as the Project (refer Figure 3.3).

As previously identified the cement works which have been a feature of the landscape for ca.90 years and are of a larger scale and mass. The tallest Hume coal elements are generally half the height as number 6 kiln, and approximately the same height as the clinker store and conveyor, and the clinker silos. They are dispersed over a greater area and will be of lesser mass.

The mine industrial elements would be experienced in the context of the pre-existing industrial area which extends from Moss Vale to the Old Hume Highway, and when viewed in the context of this existing development, would be experienced as a western extension of it. Elements of the mine will be in keeping with the scale existing industrial elements to the east.

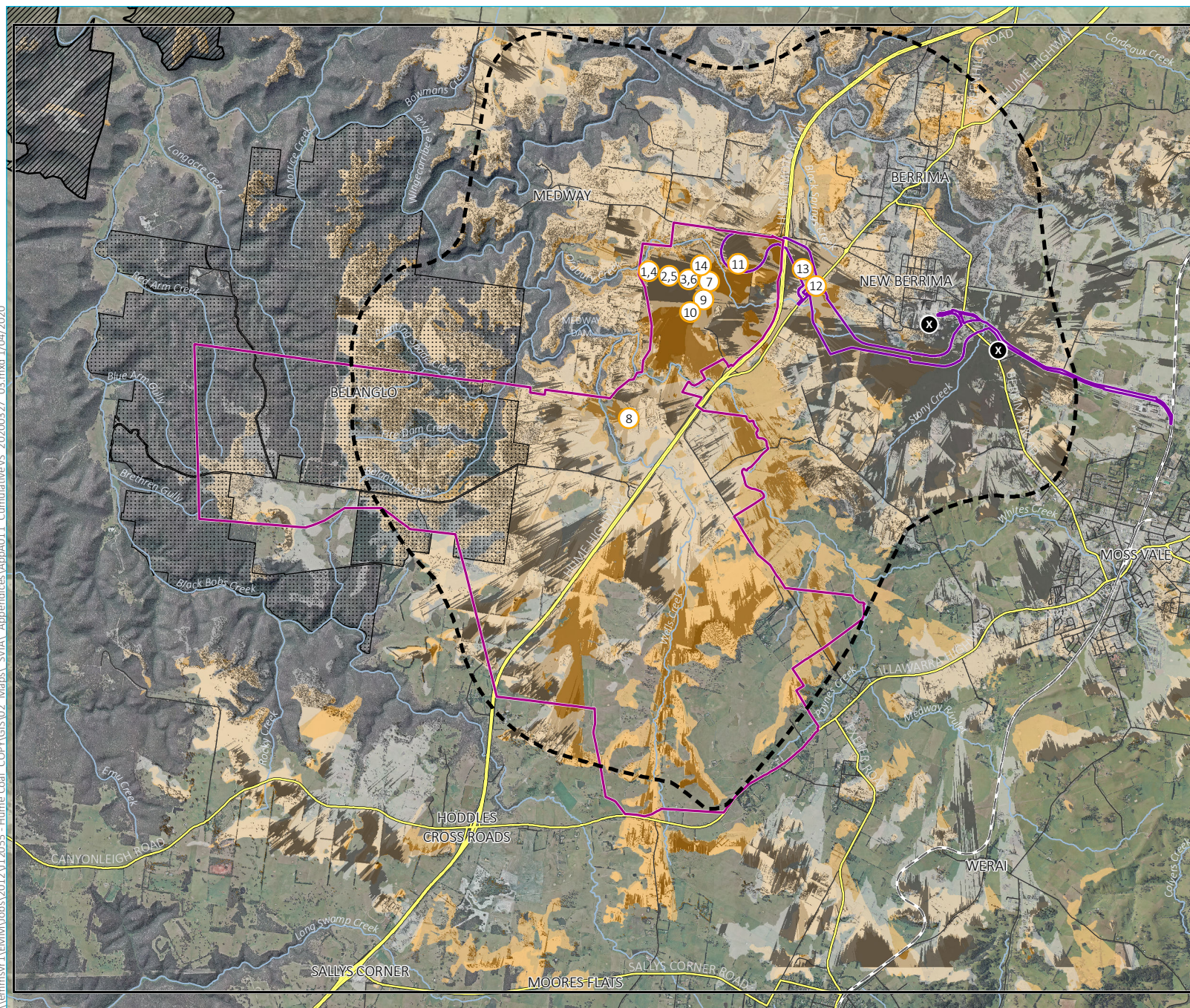
Groundwater drawdown and mitigation strategies employed by Hume Coal will be unlikely to result in vegetation effects.

Mine elements could create a focal point especially where long un-interrupted views will be possible and elements extend above the horizon. However there will be few localities where this occurs as these elements occur in the lowest part of the landscape. With additional integration planting and sympathetic colour schemes the contrast of most mine and rail elements can be softened and the scale reduced. With the exception of some locations where mine elements can appear above the skyline, existing views and vistas can be preserved.

With respect to land use planning there are no other large-scale industrial developments with elements that will have a cumulative visual impact with Hume Coal. Therefore, there will be negligible cumulative impact.

Existing night-time lighting sources include rural residential properties, farm machinery and vehicles on roads. Vehicles travelling north-south along the Hume Motorway provide a moderate source of lighting during times of darkness. Existing sources of night lighting in the immediate vicinity of the mines surface elements (west of the Hume Motorway) are less due to its rural setting and state forest to the west. Any new lighting, if unmitigated, would constitute an intensification of night-time lighting at the edge a night lighting environment (from the Berrima industrial enterprise area). Surface lighting effects could be experienced at locations identified by surface visibility analysis however visual impacts as a result of Project-related night-time lighting will likely be low to moderate.

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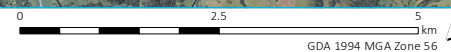


- KEY**
- Hume Coal Project area
 - Berrima Rail Project area
 - Existing environment
 - Rail line
 - Major road
 - Minor road
 - Named watercourse
 - Belanglo State Forest
 - Bangadilly National Park
 - Viewshed model boundary
 - Significant potential view zone
 - Viewshed assessment location
 - 1,4 Product coal stockpile - west
 - 2,5 Product coal stockpile - centre
 - 3,6 Product coal stockpile - east
 - 1,4 Reclaimer (product coal) - west
 - 2,5 Reclaimer (product coal) - centre
 - 3,6 Reclaimer (product coal) - east
 - 7 Coal handling and preparation plant
 - 8 Ventilation shaft pad structures
 - 9 ROM coal stockpile
 - 10 ROM conveyor tower
 - 11 Train load out (TLO)
 - 12 Rail bridge
 - 13 Rail rolling stock maintenance facility
 - 14 Rejects stockpile
 - Berrima Cement Works and Berrima Feed Mill
 - Combined viewshed - Project
 - Viewshed based on DEM (Project)
 - Viewshed based on DSM (Project)
 - Combined viewshed - Berrima industry
 - Viewshed based on DEM
 - Viewshed based on DSM

Cumulative visual effects

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure 7.1

Source: EMM (2020); Hume Coal (2016); DFSI (2017)



8 Conclusions

This assessment has been prepared to respond directly to the IPC findings and recommendations, as published in the IPC assessment report released in May 2019. An updated visual impact assessment has been prepared which presents images of additional viewpoints and photomontages from the surrounding cultural landscape and the Mereworth property.

Overall, visual impacts associated with the mine surface infrastructure, taking into account proposed mitigation measures (Table 7.1), will be of a moderate level for motorists travelling along the Hume Motorway. These will be glimpsed, transient views at speed of mine elements rising above the treeline. Visual impacts will also be moderate to low for residences along Medway Road, depending upon the location of the residence and the maturity of the screen and integration plantings.

All other effects will be slight/moderate or lower.

Existing night-time lighting sources include rural residential properties, farm machinery and vehicles on roads. Motorists travelling north-south along the Hume Motorway provide a moderate source of lighting in the evening hours. Existing sources of night lighting in the immediate vicinity of the mines surface elements (west of the Hume Motorway) are less due to its rural setting and state forest to the west. Any new lighting, if unmitigated, would constitute an intensification of night-time lighting at the edge of more intense night lighting environment (a cumulative impact). Surface lighting effects could be experienced at locations identified by surface visibility analysis however visual impacts emanating from light sources will likely be low to moderate.

Groundwater drawdown and mitigation strategies employed by Hume Coal are unlikely to result in vegetation effects largely due to significant amounts of the surrounding landscape being situated above Wianamatta Group shale.

The mine industrial elements would be experienced in the context of the pre-existing industrial area which extends from Moss Vale to the Old Hume Highway, and when viewed in the context of this existing development, would be experienced as a western extension of it. Elements of the mine will be in keeping with the scale existing industrial elements to the east.

Mine elements could create a focal point especially where there will be long un-interrupted views and where they extend above the horizon, however there will be few localities where this occurs as these elements occur in the lowest part of the landscape. With additional integration planting and sympathetic colour schemes the contrast of most mine and rail elements can be softened and the scale reduced. With the exception of some locations where mine elements will appear above the skyline, existing views and vistas can be preserved.

With respect to land use planning there are no other large-scale industrial developments with elements that will have a cumulative visual impact with Hume Coal. No new or proposed developments that will have a cumulative visual effect with Hume Coal are known. Therefore, there will be negligible cumulative impact.

Hume Coal proposes a combination of mitigation methods to address potential impacts to the visual landscape. The visual mitigation measures presented in EIS and RtS (visual screen planting and sympathetic, non-reflective painting schemes for SIA elements) are supported and additional measures proposed are:

- Additional visual integration planting (over and above the screen planting undertaken by Hume Coal during 2015/2016) to assist in reducing the effect / visibility of elements.
- Potential offsite treatments for the Project will be assessed and acted upon post approval, where deemed necessary. Actions will be identified through ongoing liaison with landholders to identify and mitigate the visual effect of the Project on high sensitivity viewer locations through screen plantings, sympathetic with the landscape form (clumps / copses, specimen trees and belts).

- The proponent will commit to the development of a Visual Management Plan (VMP) in conjunction with stakeholders (RAP, Garden society, etc) which will identify specific screening to be undertaken, suitable species and forms to be used, a register and mechanism for identifying, treating and reporting upon new locations.
- A detailed assessment of potential light spill from the Project will be undertaken as part of detailed design. It is not possible to undertake this assessment until a detailed design of the Project is complete with lighting protocols and assessment of effect and mitigation developed in the VMP.

The visual impacts associated with the project will be temporary. At the end of the life of the mine surface infrastructure will be removed, excess material stockpiled on the surface will be returned underground, the landform returned as close as practical to the pre-disturbance landform, stockpiled topsoil spread and topsoiled areas reseeded with pasture grasses and the land returned to agricultural production.

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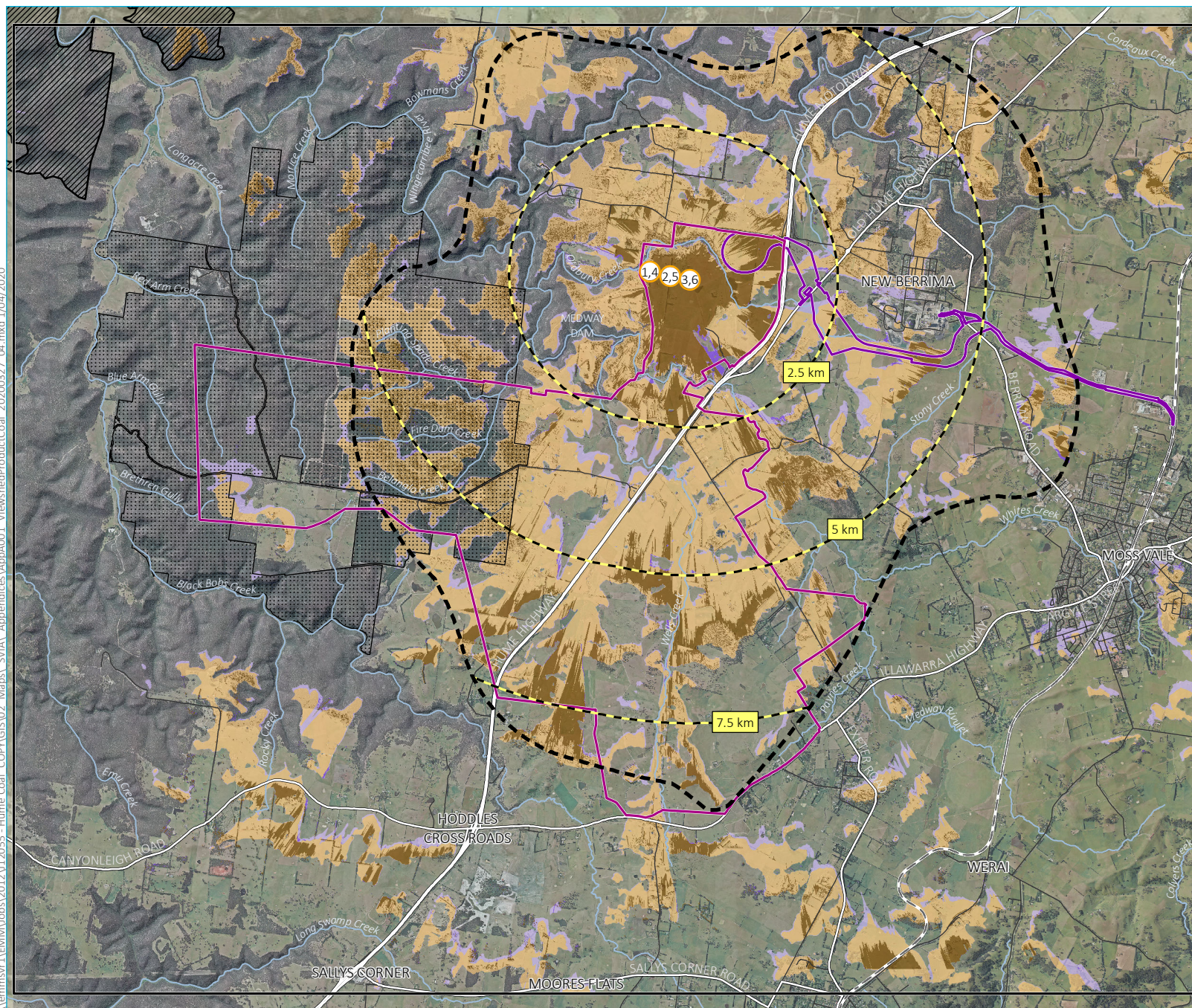
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Annexure A

Visibility analysis mapping

\\lemmsvr1\EMM\Jobs\2012\112055 - Hume Coal - COPY\GIS\02 Maps\ SVIA\ Appendices\MapA001 ViewshedProductCoal 20200327 04.mxd 1/04/2020



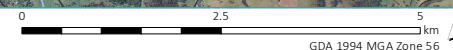
KEY

- Hume Coal Project area
- Berrima Rail Project area
- Existing environment
- - Rail line
- Major road
- Minor road
- Named watercourse
- Belanglo State Forest
- Bangadilly National Park
- Viewshed model boundary
- Significant potential view zone
- - Distance buffer (2.5 km, 5 km, 7.5 km)
- Viewshed assessment location
- 1,4 Product coal stockpile - west
- 2,5 Product coal stockpile - centre
- 3,6 Product coal stockpile - east
- 1,4 Reclaimer (product coal) - west
- 2,5 Reclaimer (product coal) - centre
- 3,6 Reclaimer (product coal) - east
- Combined viewshed results
- Viewshed based on DEM - product coal stockpiles
- Viewshed based on DSM - product coal stockpiles
- Additional viewshed based on DEM - reclaimer
- Additional viewshed based on DSM - reclaimer

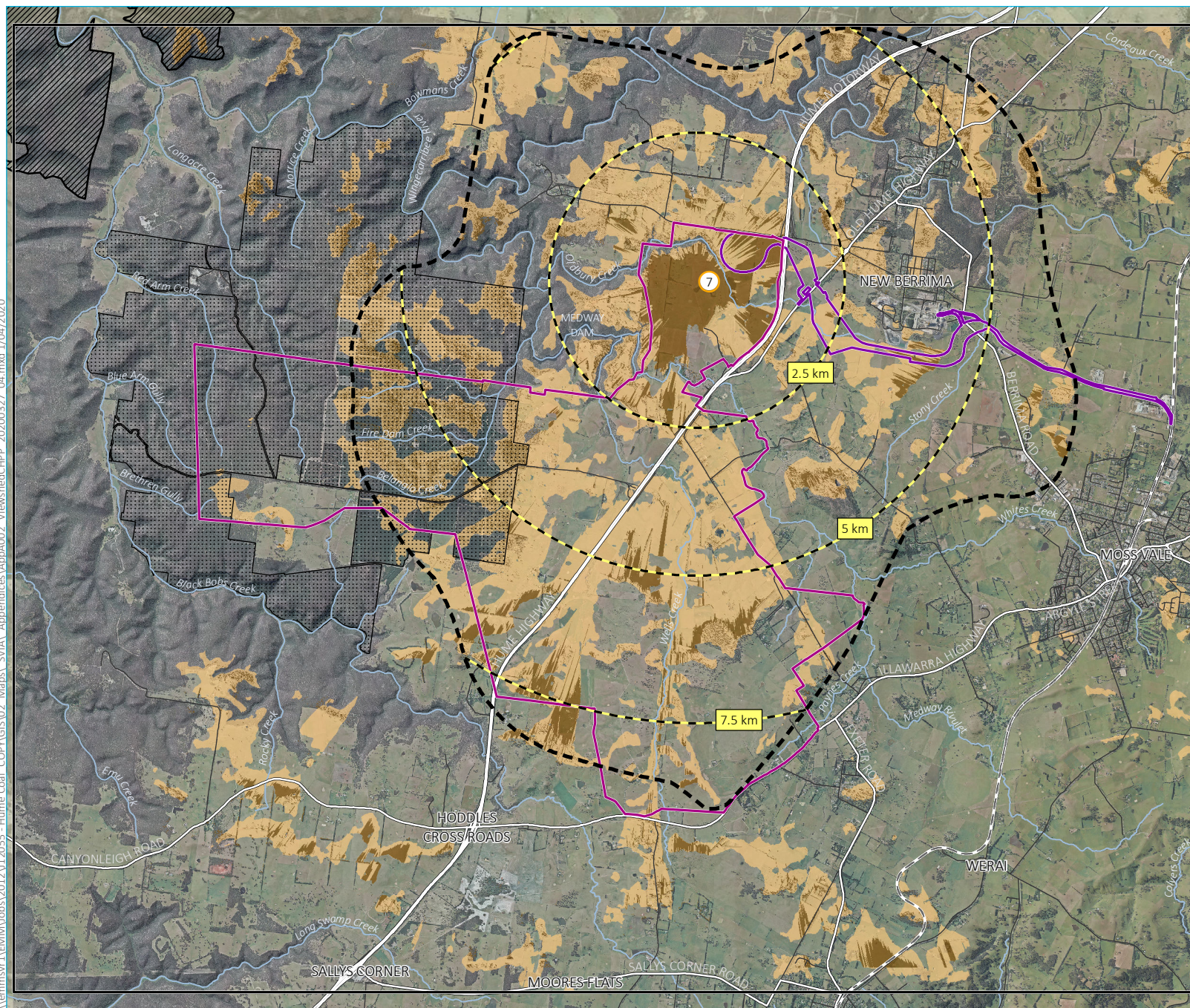
Visibility analysis – product coal stockpile and reclaimers

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure A.1

Source: EMM (2020); Hume Coal (2016); DFSI (2017)



\\lemmsvr1\EMM\Jobs\2012\112055 - Hume Coal - COPY\GIS\02 Maps\ SVIA\ Appendices\AhpA002 ViewshedCHPP 20200327 04.mxd 1/04/2020

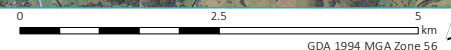


- KEY**
- Hume Coal Project area
 - Berrima Rail Project area
 - Existing environment
 - Rail line
 - Major road
 - Minor road
 - Named watercourse
 - Belanglo State Forest
 - Bangadilly National Park
 - Viewshed model boundary
 - Significant potential view zone
 - Distance buffer (2.5 km, 5 km, 7.5 km)
 - Viewshed assessment location
 - 7 Coal handling and preparation plant
 - Viewshed results
 - Viewshed based on DEM
 - Viewshed based on DSM

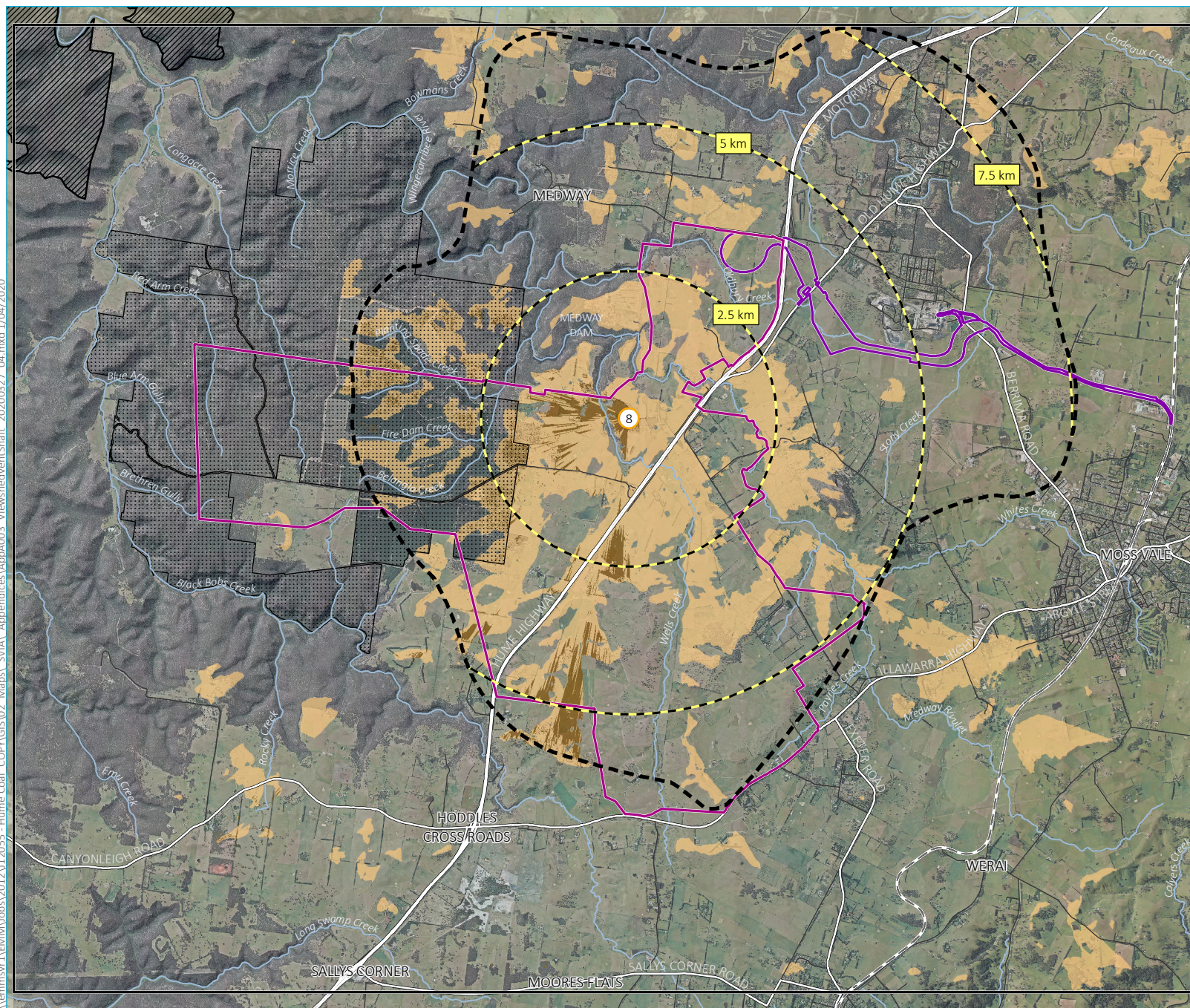
Visibility analysis – coal handling and preparation plant

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure A.2

Source: EMM (2020); Hume Coal (2016); DFSI (2017)



\\lemmsvr1\EMM\Jobs\2012\112055 - Hume Coal - COPY\GIS\02 Maps\ SVIA\ Appendices\MapA003 Views\shedVentShaft_20200327_04.mxd 1/04/2020

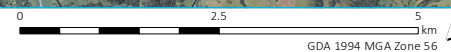


- KEY**
- Hume Coal Project area
 - Berrima Rail Project area
 - Existing environment
 - Rail line
 - Major road
 - Minor road
 - Named watercourse
 - Belanglo State Forest
 - Bangadilly National Park
 - Viewshed model boundary
 - Significant potential view zone
 - Distance buffer (2.5 km, 5 km, 7.5 km)
 - Viewshed assessment location
 - 8 Ventilation shaft pad structures
 - Viewshed results
 - Viewshed based on DEM
 - Viewshed based on DSM

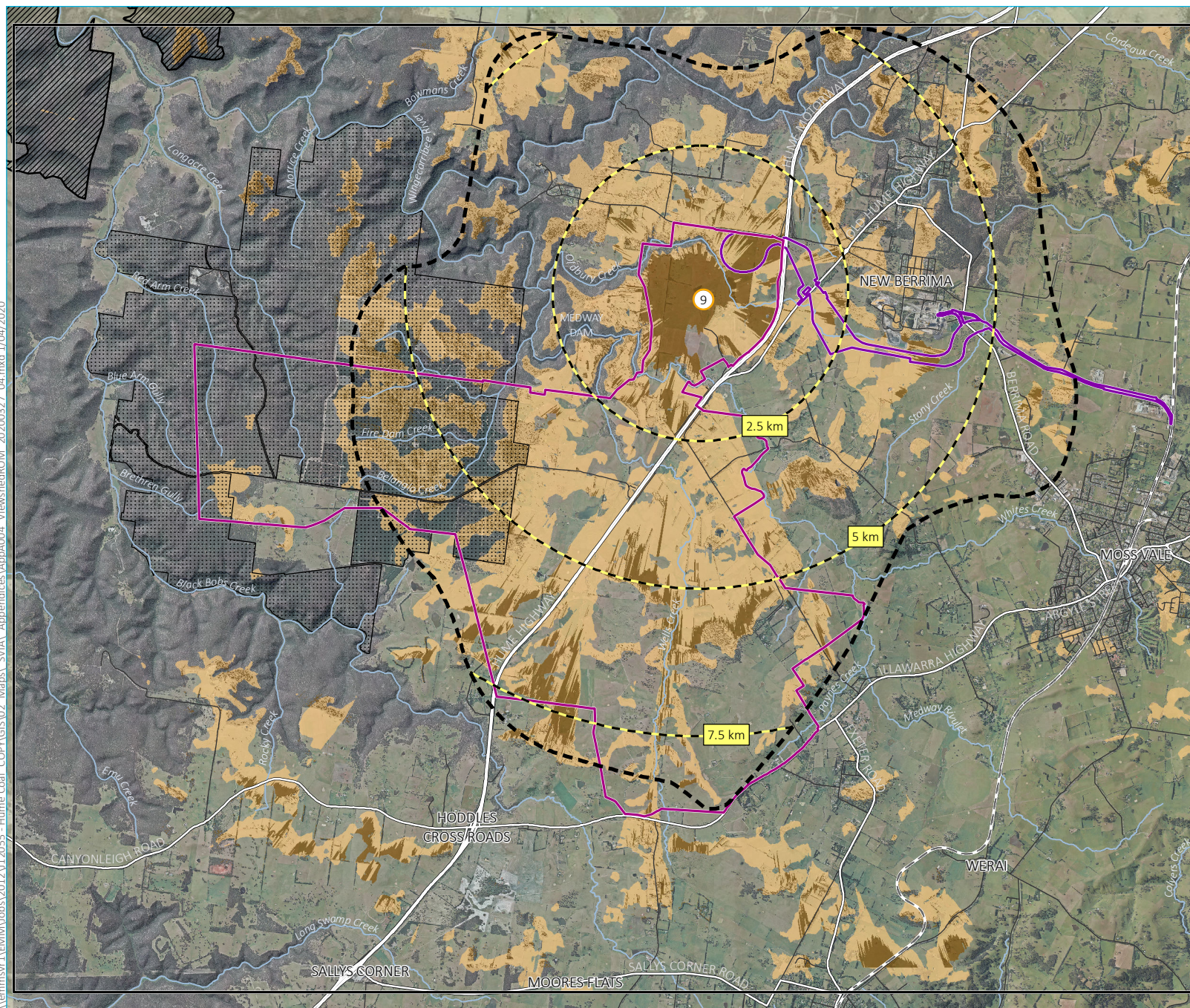
Visibility analysis – ventilation shaft pad structures

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure A.3

Source: EMM (2020); Hume Coal (2016); DFSI (2017)



\\lemmsvr1\EMM\Jobs\2012\112055 - Hume Coal - COPY\GIS\02 Maps\ SVIA\ Appendices\MapA004 ViewshedROM_20200327_04.mxd 1/04/2020

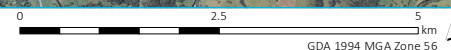


- KEY**
- Hume Coal Project area
 - Berrima Rail Project area
 - Existing environment
 - Rail line
 - Major road
 - Minor road
 - Named watercourse
 - Belanglo State Forest
 - Bangadilly National Park
 - Viewshed model boundary
 - Significant potential view zone
 - Distance buffer (2.5 km, 5 km, 7.5 km)
 - Viewshed assessment location
 - 9 ROM coal stockpile
 - Viewshed results
 - Viewshed based on DEM
 - Viewshed based on DSM

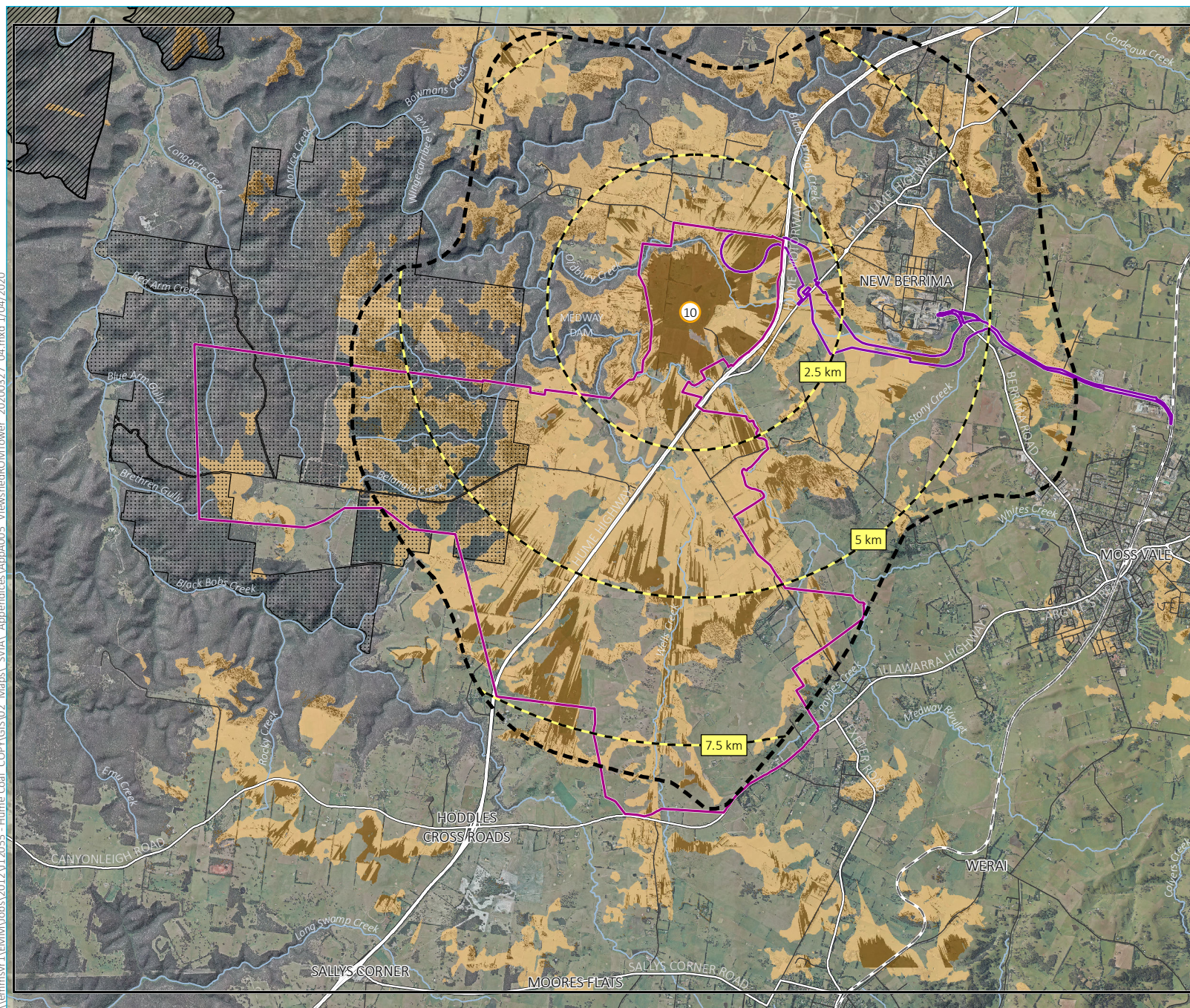
Visibility analysis – ROM coal stockpile

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure A.4

Source: EMM (2020); Hume Coal (2016); DFSI (2017)



\\lemmsvr1\EMM\Jobs\2012\112055 - Hume Coal - COP\GIS\02 Maps\SVIA\ Appendices\A05 Views\ROMTower 20200327 04.mxd 1/04/2020

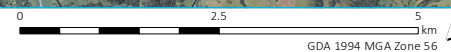


- KEY**
- Hume Coal Project area
 - Berrima Rail Project area
 - Existing environment**
 - Rail line
 - Major road
 - Minor road
 - Named watercourse
 - Belanglo State Forest
 - Bangadilly National Park
 - Viewshed model boundary
 - Significant potential view zone
 - Distance buffer (2.5 km, 5 km, 7.5 km)
 - Viewshed assessment location**
 - 10 ROM conveyor tower
 - Viewshed results**
 - Viewshed based on DEM
 - Viewshed based on DSM

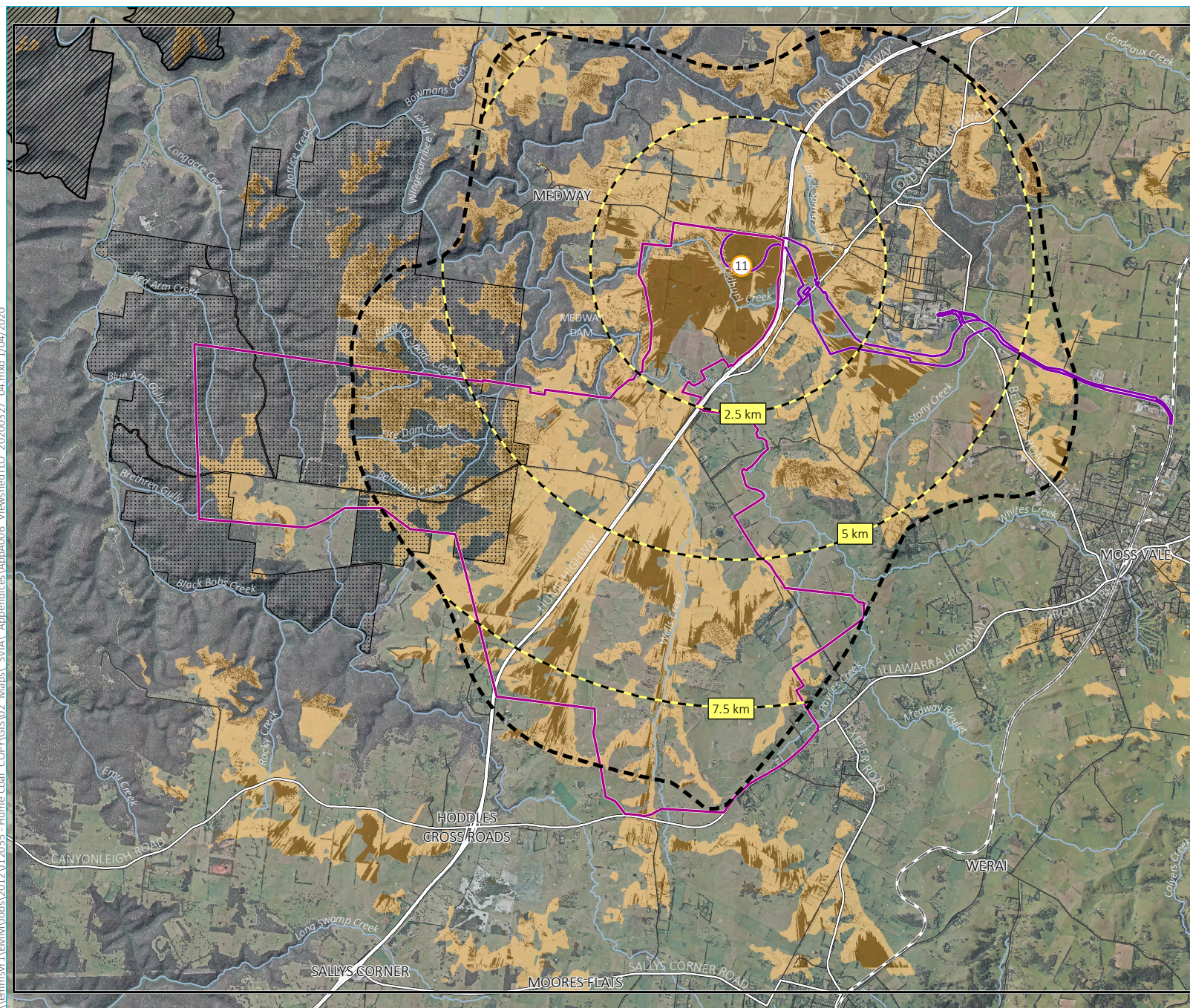
Visibility analysis – ROM conveyor tower

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure A.5

Source: EMM (2020); Hume Coal (2016); DFSI (2017)



\\lemmsvr1\EMM\Jobs\2012\112055 - Hume Coal - COPY\GIS\02 Maps\ SVIA\ Appendices\AhpA006 ViewshedTLO 20200327 04.mxd 1/04/2020

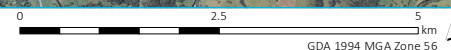


- KEY**
- Hume Coal Project area
 - Berrima Rail Project area
 - Existing environment
 - Rail line
 - Major road
 - Minor road
 - Named watercourse
 - Belanglo State Forest
 - Bangadilly National Park
 - Viewshed model boundary
 - Significant potential view zone
 - Distance buffer (2.5 km, 5 km, 7.5 km)
 - Viewshed assessment location
 - 11 Train load out (TLO)
 - Viewshed results
 - Viewshed based on DEM
 - Viewshed based on DSM

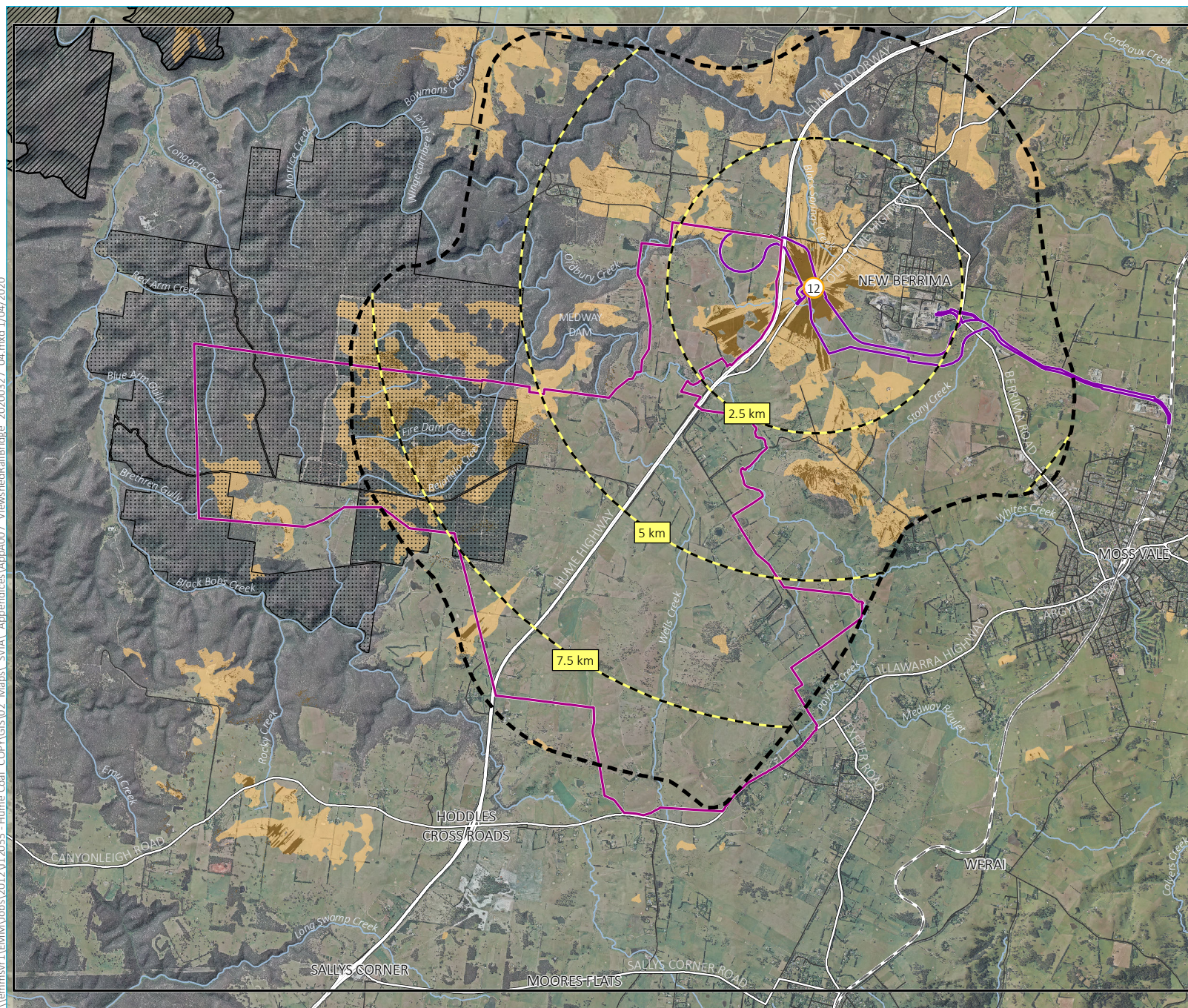
Visibility analysis – train load out (TLO)

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure A.6

Source: EMM (2020); Hume Coal (2016); DFSI (2017)



\\lemmsvr1\EMM\Jobs\2012\112055 - Hume Coal - COP\GIS\02 Maps\ SVA\ Appendices\A007 ViewshedRailBridge_20200327_04.mxd 1/04/2020

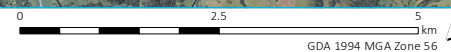


- KEY**
- Hume Coal Project area
 - Berrima Rail Project area
 - Existing environment**
 - Rail line
 - Major road
 - Minor road
 - Named watercourse
 - Belanglo State Forest
 - Bangadilly National Park
 - Viewshed model boundary
 - Significant potential view zone
 - Distance buffer (2.5 km, 5 km, 7.5 km)
 - Viewshed assessment location**
 - 12 Rail bridge
 - Viewshed results**
 - Viewshed based on DEM
 - Viewshed based on DSM

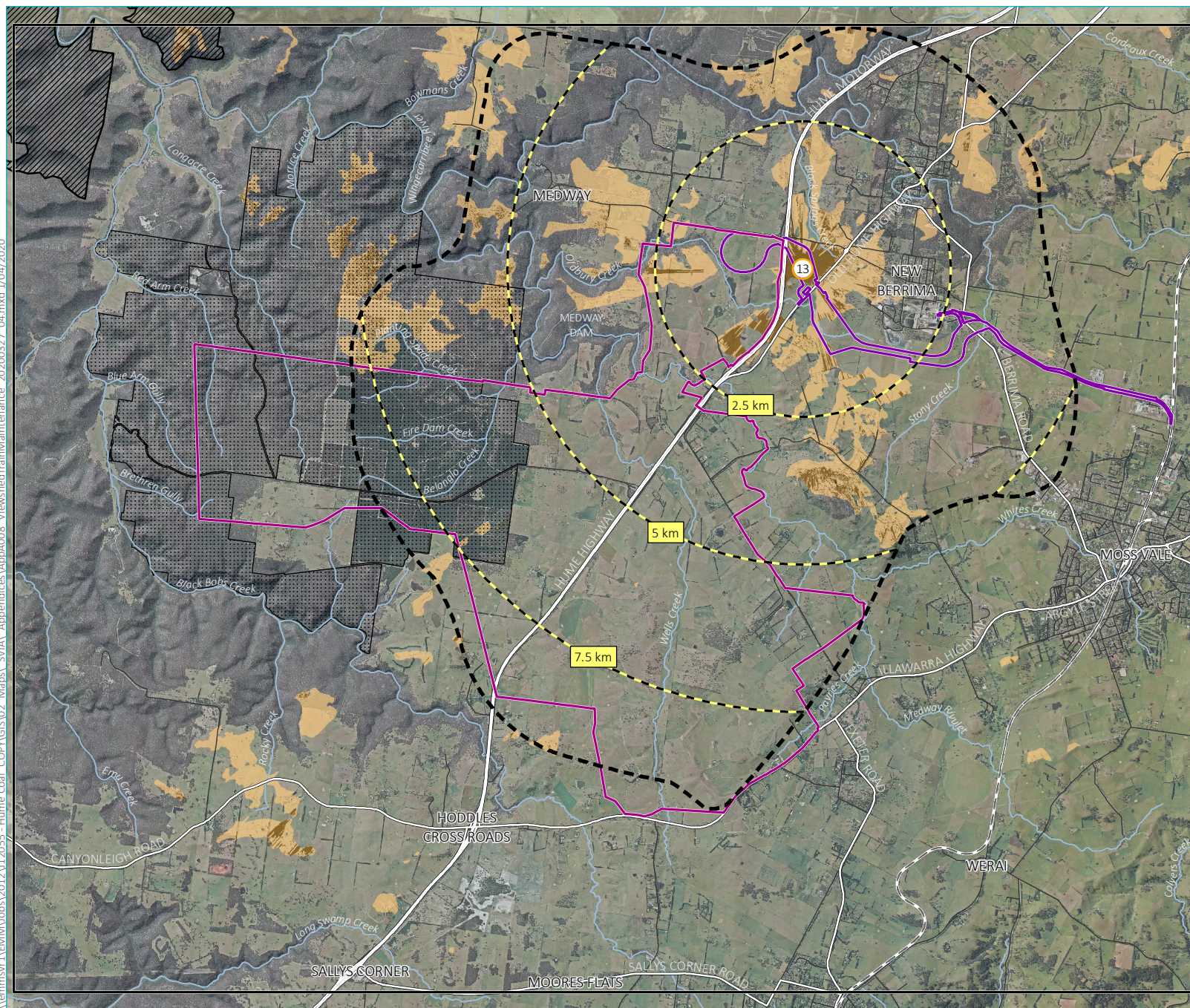
Visibility analysis – rail bridge

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure A.7

Source: EMM (2020); Hume Coal (2016); DFSI (2017)



\\lemmsvr1\EMM\Jobs\2012\112055 - Hume Coal - COPY\GIS\02 Maps\ SVIA\ Appendices\MapA008 ViewshedTrainMaintenance_20200327_04.mxd 1/04/2020

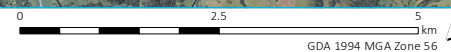


- KEY**
- Hume Coal Project area
 - Berrima Rail Project area
 - Existing environment**
 - Rail line
 - Major road
 - Minor road
 - Named watercourse
 - Belanglo State Forest
 - Bangadilly National Park
 - Viewshed model boundary
 - Significant potential view zone
 - Distance buffer (2.5 km, 5 km, 7.5 km)
 - Viewshed assessment location**
 - 13 Rail rolling stock maintenance facility
 - Viewshed results**
 - Viewshed based on DEM
 - Viewshed based on DSM

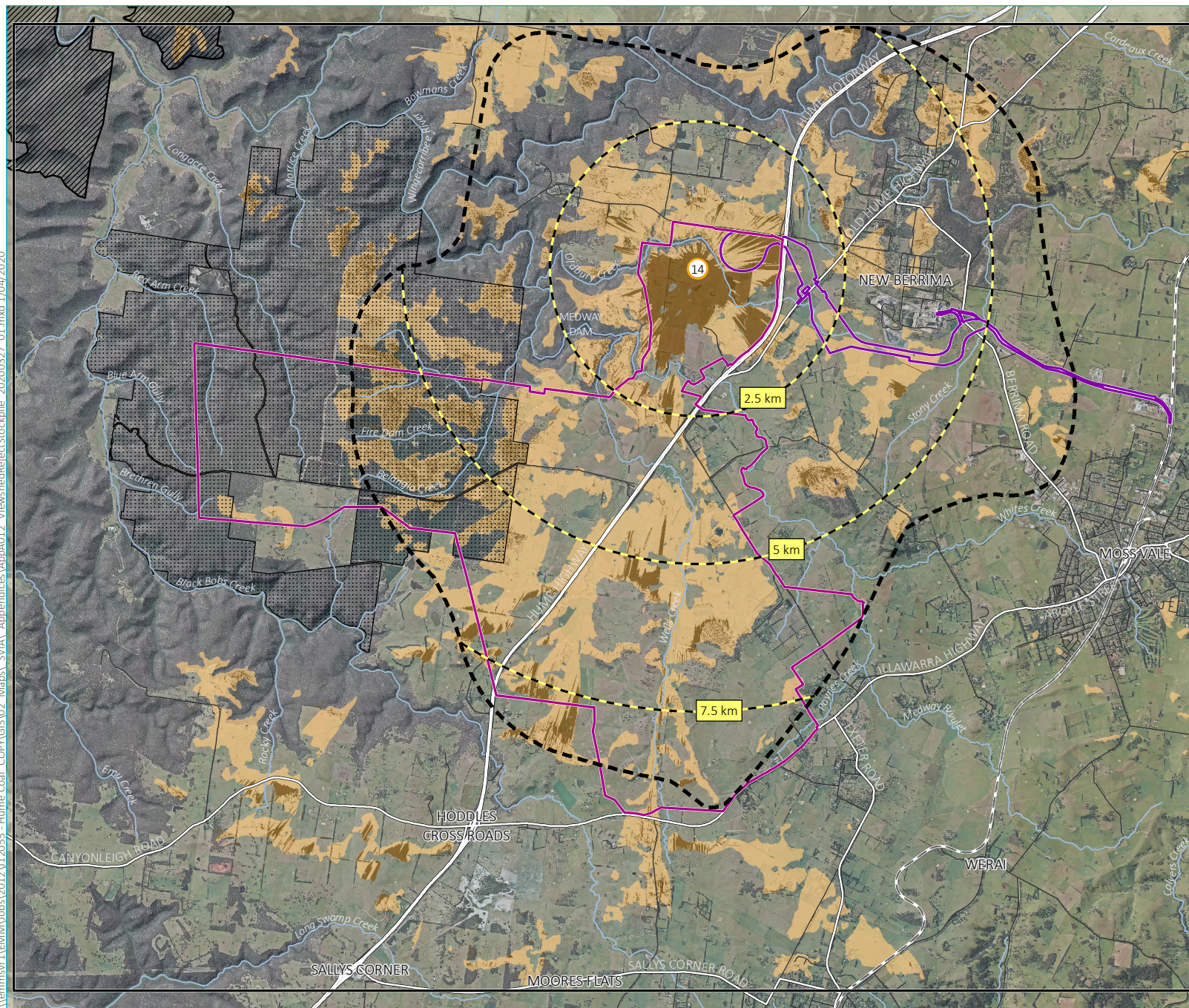
Visibility analysis – rail rolling stock maintenance facility

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure A.8

Source: EMM (2020); Hume Coal (2016); DFSI (2017)



\\lemmsvr1\EMM\Jobs\2012\112055 - Hume Coal - COPY\GIS\02 Maps\ SVIA\ Appendices\MapA01.2 ViewshedRejectStockpile 20200327 01.mxd 1/04/2020

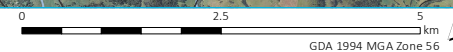


- KEY**
- Hume Coal Project area
 - Berrima Rail Project area
 - Existing environment
 - Rail line
 - Major road
 - Minor road
 - Named watercourse
 - Belanglo State Forest
 - Bangadilly National Park
 - Viewshed model boundary
 - Significant potential view zone
 - Distance buffer (2.5 km, 5 km, 7.5 km)
 - Viewshed assessment location
 - 14 Rejects stockpile
 - Viewshed results
 - Viewshed based on DEM
 - Viewshed based on DSM

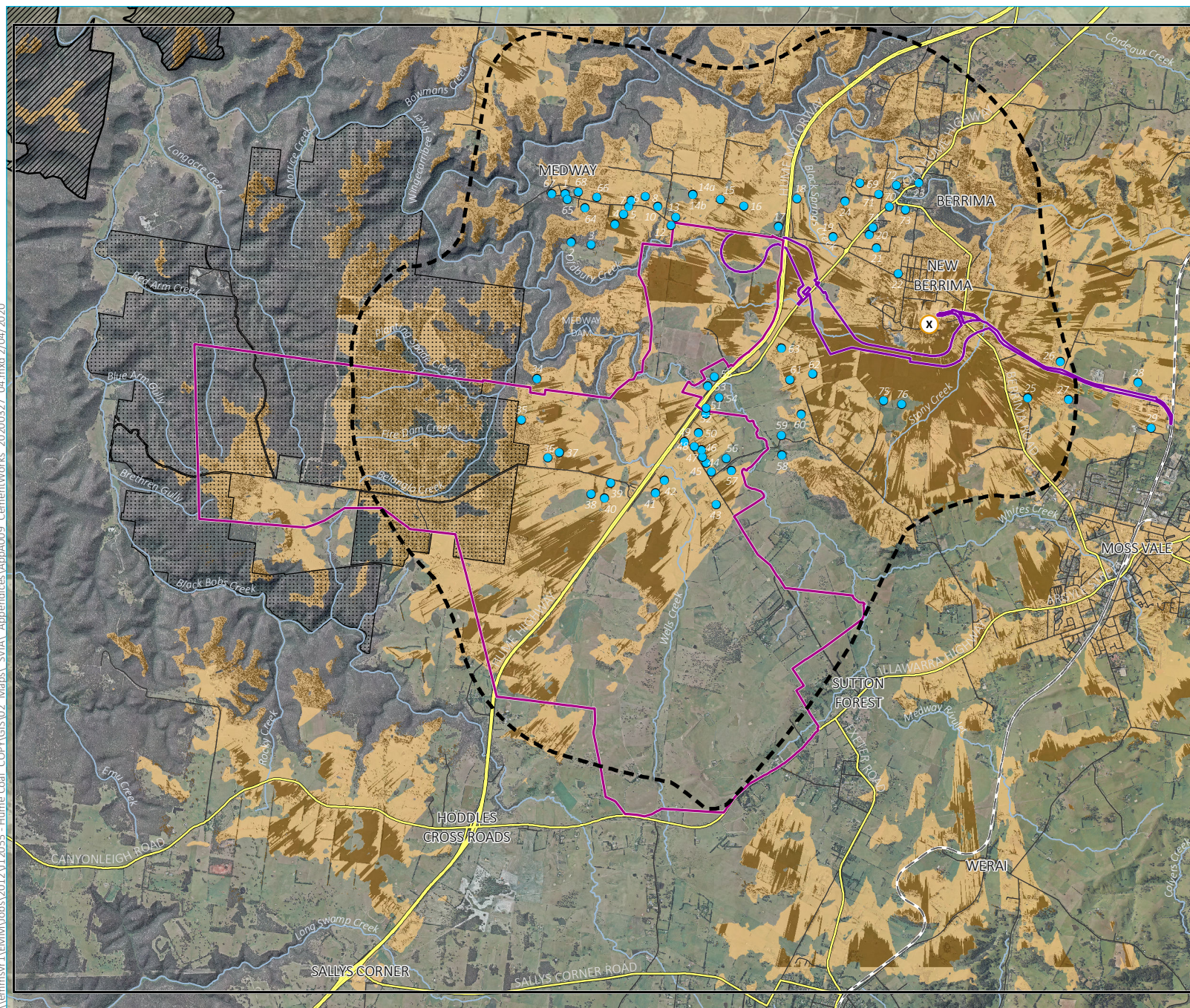
Visibility analysis – rejects stockpile

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure A.9

Source: EMM (2020); Hume Coal (2016); DFSI (2017)



\\lemmsvr1\EMM\Jobs\2012\112055 - Hume Coal - COPY\GIS\02 Maps\ SVIA\ Appendices\AhpA009 CementWorks 20200327 04.mxd 2/04/2020

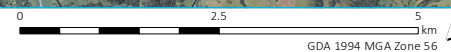


- KEY**
- Hume Coal Project area
 - Berrima Rail Project area
 - Private freehold residence
 - Existing environment
 - Rail line
 - Major road
 - Minor road
 - Named watercourse
 - Belanglo State Forest
 - Bangadilly National Park
 - Viewshed model boundary
 - Significant potential view zone
 - Viewshed assessment location
 - X Berrima Cement Works
 - Viewshed results
 - Viewshed based on DEM
 - Viewshed based on DSM

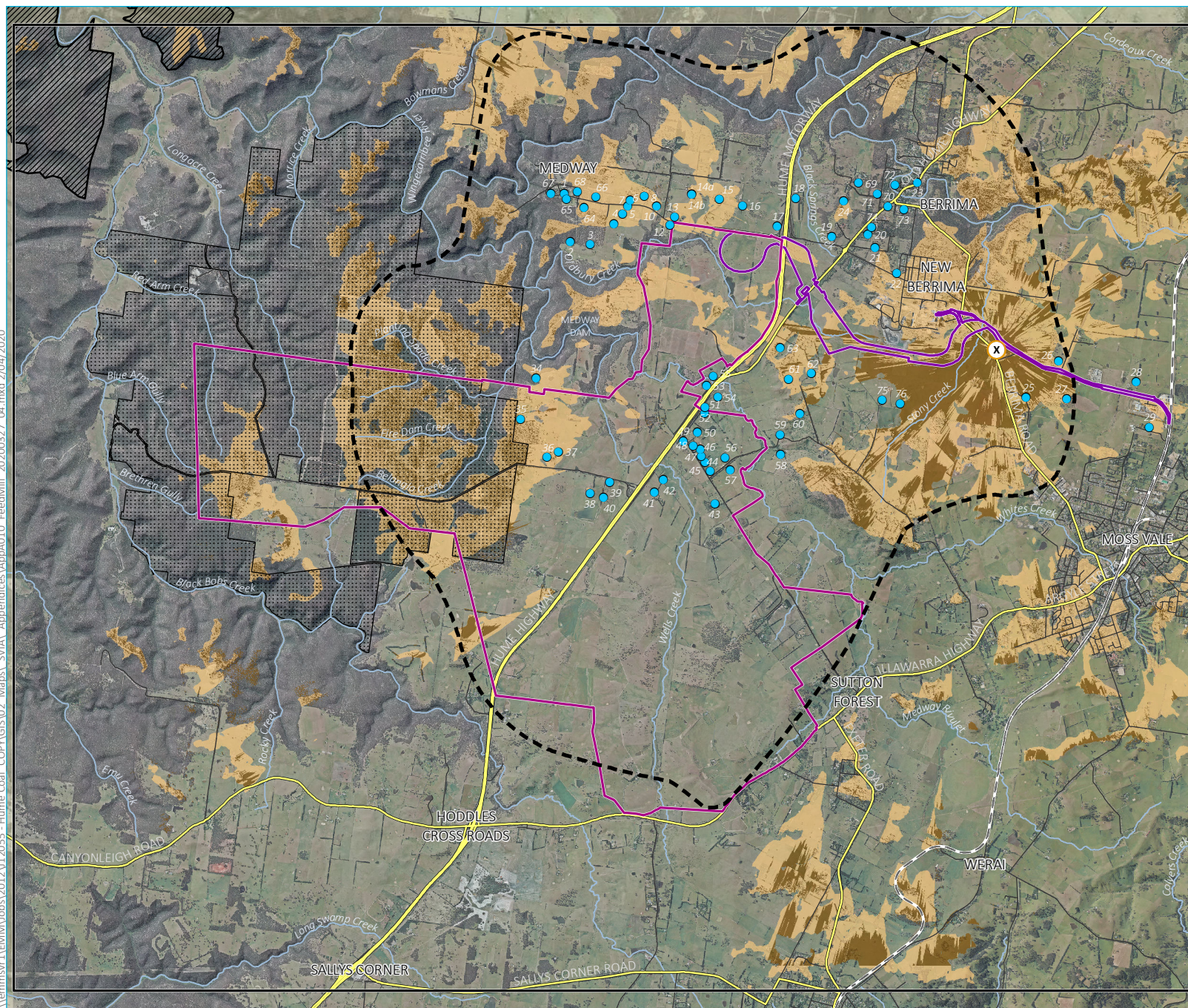
Visibility analysis – Berrima Cement Works

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure A.10

Source: EMM (2020); Hume Coal (2016); DFSI (2017)



\\lemmsvr1\EMM\Jobs\2012\112055 - Hume Coal - COPY\GIS\02 Maps\ SVIA\ Appendices\AhpA010 FeedMill 20200327 04.mxd 2/04/2020

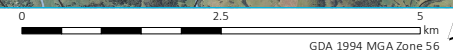


- KEY**
- Hume Coal Project area
 - Berrima Rail Project area
 - Private freehold residence
 - Existing environment
 - Rail line
 - Major road
 - Minor road
 - Named watercourse
 - Belanglo State Forest
 - Bangadilly National Park
 - Viewshed model boundary
 - Significant potential view zone
 - Viewshed assessment location
 - X Berrima Feed Mill
 - Viewshed results
 - Viewshed based on DEM
 - Viewshed based on DSM

Visibility analysis – Berrima Feed Mill

Hume Coal and Berrima Rail Project
Updated visual impact assessment
Figure A.11

Source: EMM (2020); Hume Coal (2016); DFSI (2017)



Annexure B

Land and Environment Court's Direction on use of photo montages

B.1 Land and Environment Court Direction

Use of photomontages

The following requirements for photomontages proposed to be relied on as or as part of expert evidence in Class 1 appeals will apply for proceedings commenced on or after 1 October 2013. The following directions will apply to photomontages from that date:

Requirements for photomontages

1. Any photomontage proposed to be relied on in an expert report or as demonstrating an expert opinion as an accurate depiction of some intended future change to the present physical position concerning an identified location is to be accompanied by:

Existing Photograph.

- a) A photograph showing the current, unchanged view of the location depicted in the photomontage from the same viewing point as that of the photomontage (the existing photograph);
- b) A copy of the existing photograph with the wire frame lines depicted so as to demonstrate the data from which the photomontage has been constructed. The wire frame overlay represents the existing surveyed elements which correspond with the same elements in the existing photograph; and
- c) A 2D plan showing the location of the camera and target point that corresponds to the same location the existing photograph was taken.

Survey data.

- d) Confirmation that accurate 2D/3D survey data has been used to prepare the Photomontages. This is to include confirmation that survey data was used:
 - i. for depiction of existing buildings or existing elements as shown in the wire frame; and
 - ii. to establish an accurate camera location and RL of the camera.
2. Any expert statement or other document demonstrating an expert opinion that proposes to rely on a photomontage is to include details of:
 - a) The name and qualifications of the surveyor who prepared the survey information from which the underlying data for the wire frame from which the photomontage was derived was obtained; and
 - b) The camera type and field of view of the lens used for the purpose of the photograph in (1)(a) from which the photomontage has been derived.

Source: Land and Environment Court's Direction on use of photo montages
http://www.lec.justice.nsw.gov.au/Pages/practice_procedure/directions.aspx

Accessed 23 January 2020

Annexure C

Photomontage Certification



Our Ref: 23982

7 February 2020

Rock Hunter Australia Pty Ltd
85 Monteith Street
WARRAWEE NSW 2074

Hume Coal Project
Photographic Control Survey

Dear David

In accordance with your instructions we advise that we have now completed the surveys to identify the camera positions for the sites as requested.

Co-ordinates for these points are listed in the table below:

Co-ordinates – Datum GDA94 MGA Zone 56.

Levels – AHD.

Camera positions for each photograph were indented from photography provided. Stakes & paint marks were found at site indicating the camera positions.

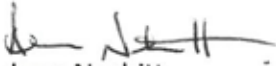
Survey values for these locations were determined using RTK GNSS observations from the CORS network. Where the sites were unsuitable for accurate GNSS observations; traditional survey traverse was employed connecting into GNSS control points.

Additional unique points (fence lines, power poles, buildings etc.), visible within each of the photographs have been co-ordinated to assist in the validation and preparation of photo montages.

Trimble GNSS R6 receivers and a Trimble S6 total station were used in the surveys.

PHOTO	EAST	NORTH	RL
CL-VP 2	253395.62	6175989.51	687.20
CL-VP 11	251426.30	6176379.23	643.11
CL-VP 13	253856.43	6179268.57	663.44
CL-VP 14	253086.80	6179249.87	670.75
CL-VP 16	252799.78	6177570.26	676.31
CL-VP 18	251973.74	6177416.18	661.25
EIS-VP 4	252540.11	6179481.85	653.90
EIS-VP 5	253048.38	6179342.10	670.46
EIS-VP 6	250094.58	6179949.03	664.78
EIS-VP 7	252745.82	6177489.13	674.05
Heritage-VP1	251911.12	6178187.97	657.95
Heritage-VP2	251925.89	6178222.03	655.48
Heritage-VP3	251941.15	6178245.89	654.89
Heritage-VP 7	252017.09	6178608.39	645.02
Heritage-VP 12	251820.73	6178001.27	661.18
Heritage-VP 13	251965.56	6177610.95	672.36

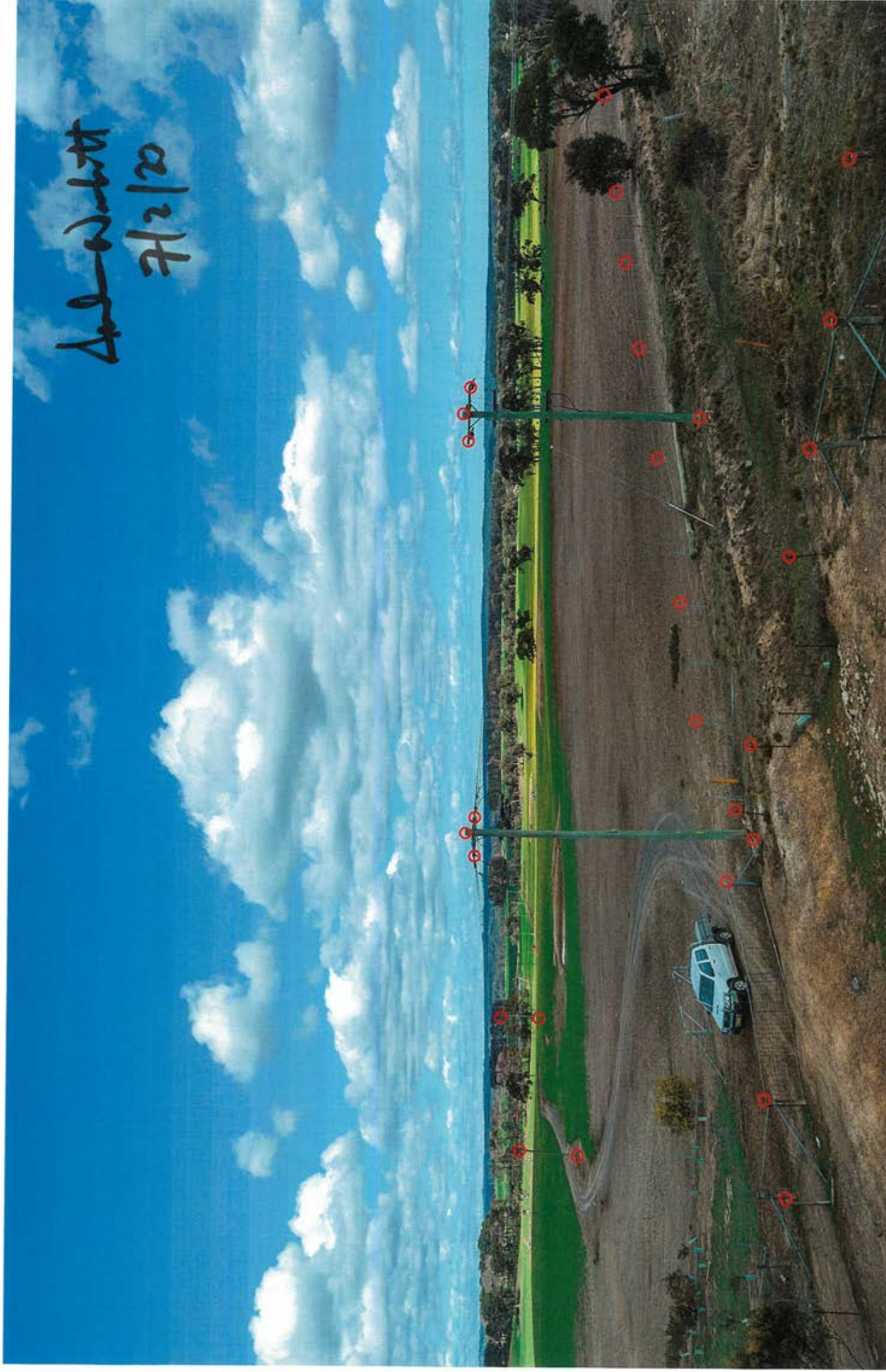
Please contact our office 4822 1366, should you have any queries regarding this matter.



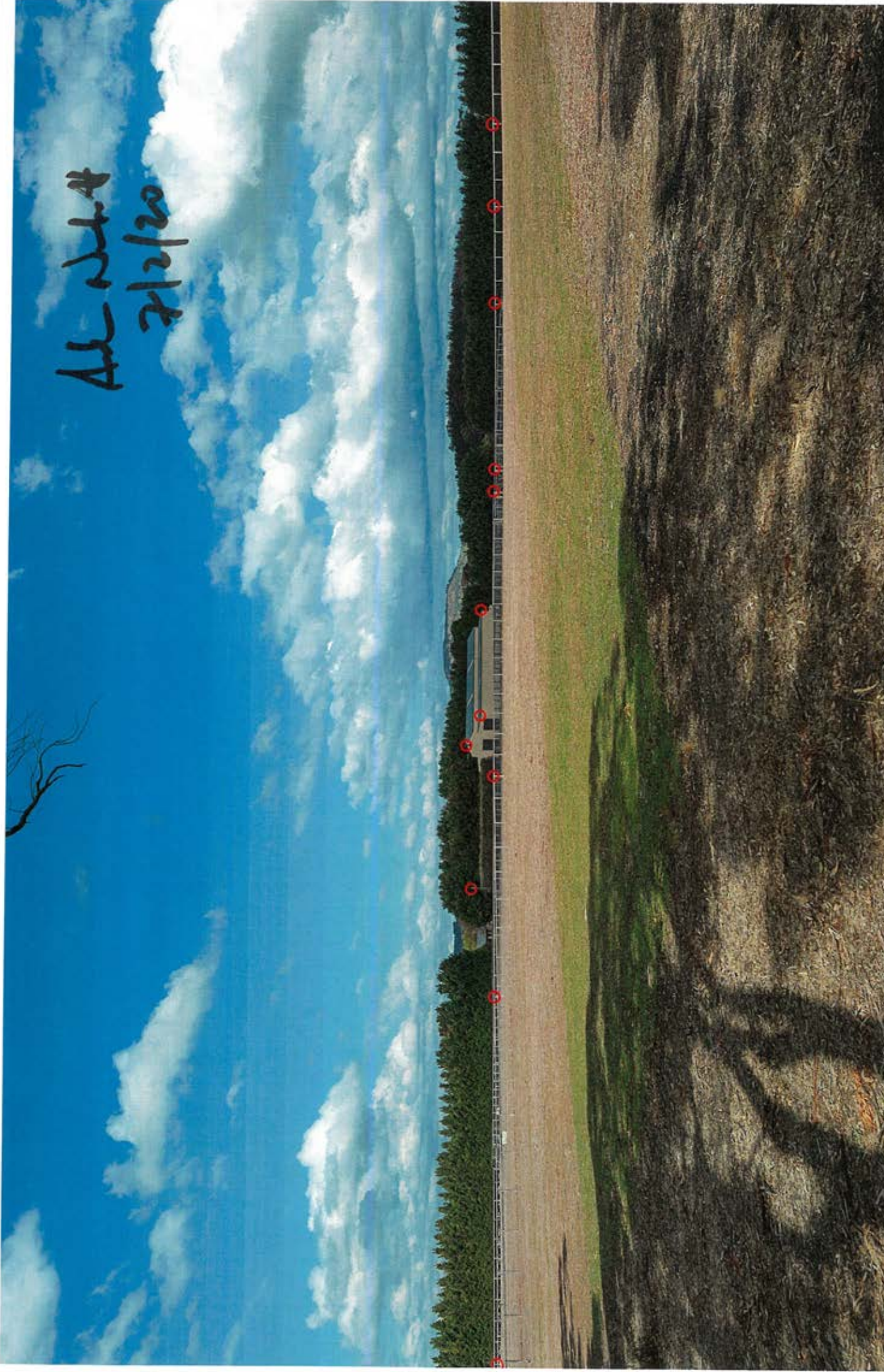
Andrew Nesbitt

Registered Land & Mining Surveyor

Del Webb
7/2/20

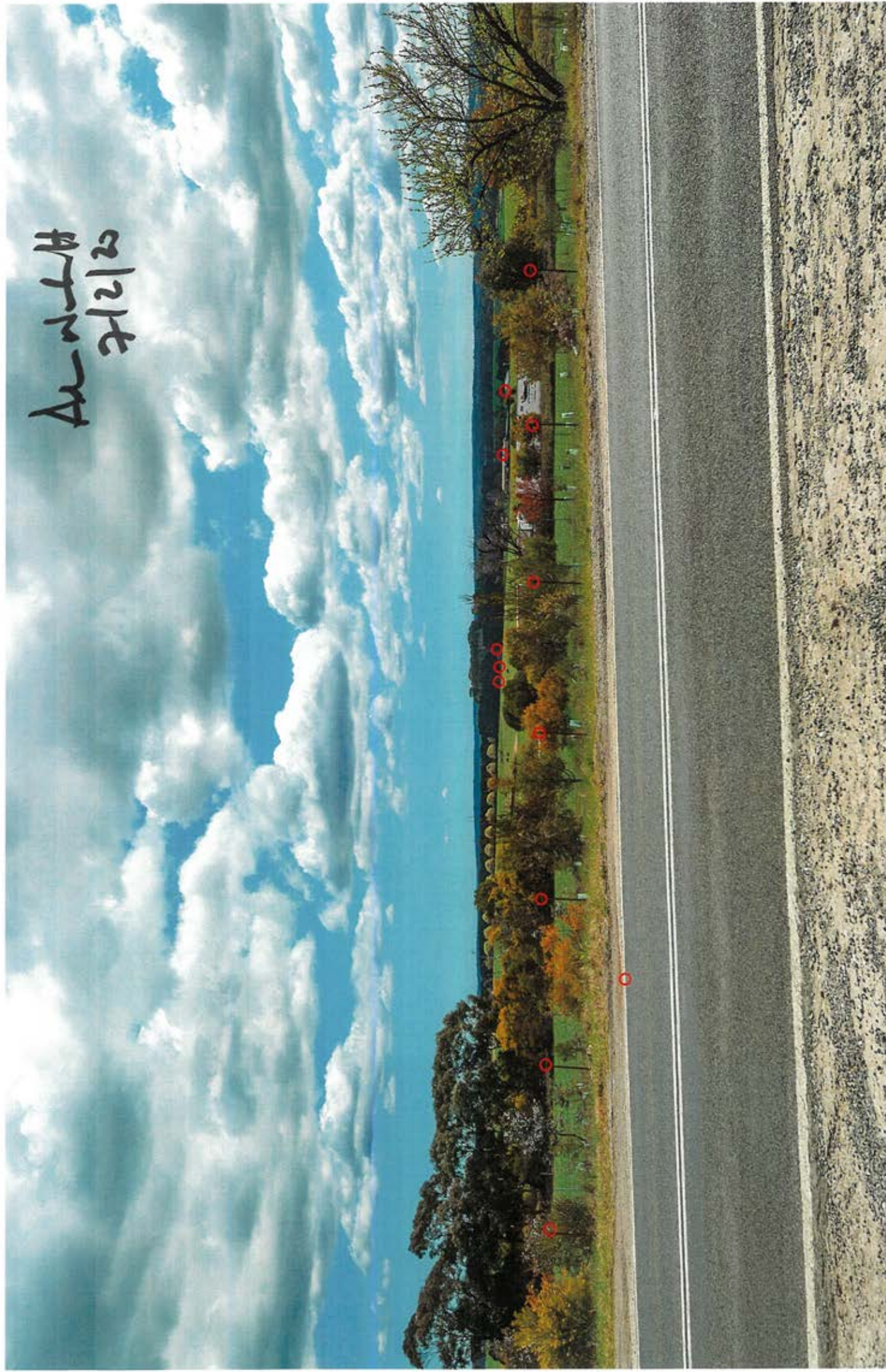


EIS VP5 - MONTAGE 3

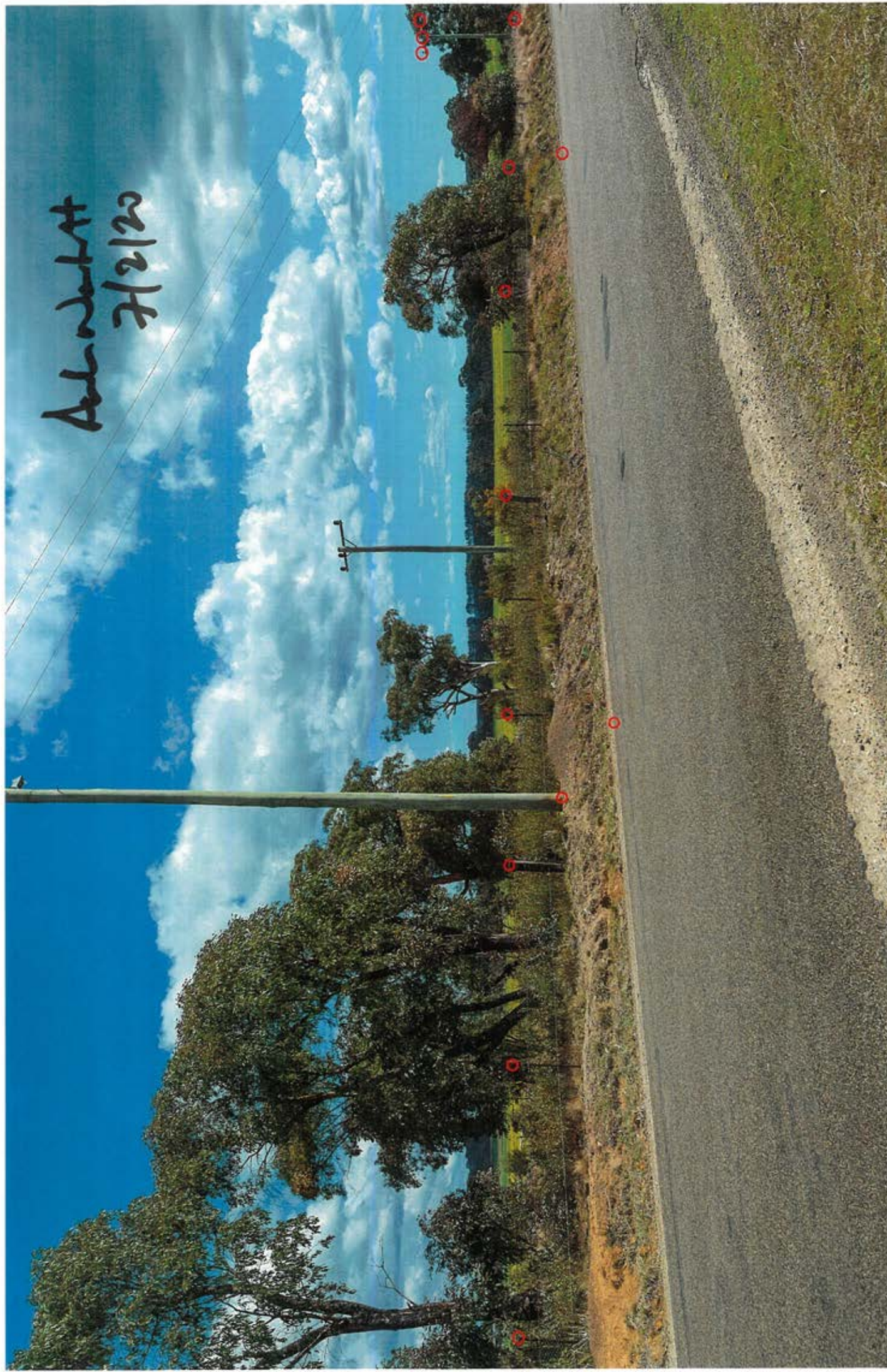


EIS VP6 - MONTAGE 4

Ar-2114
7/2/20



EIS VP7 - MONTAGE 5



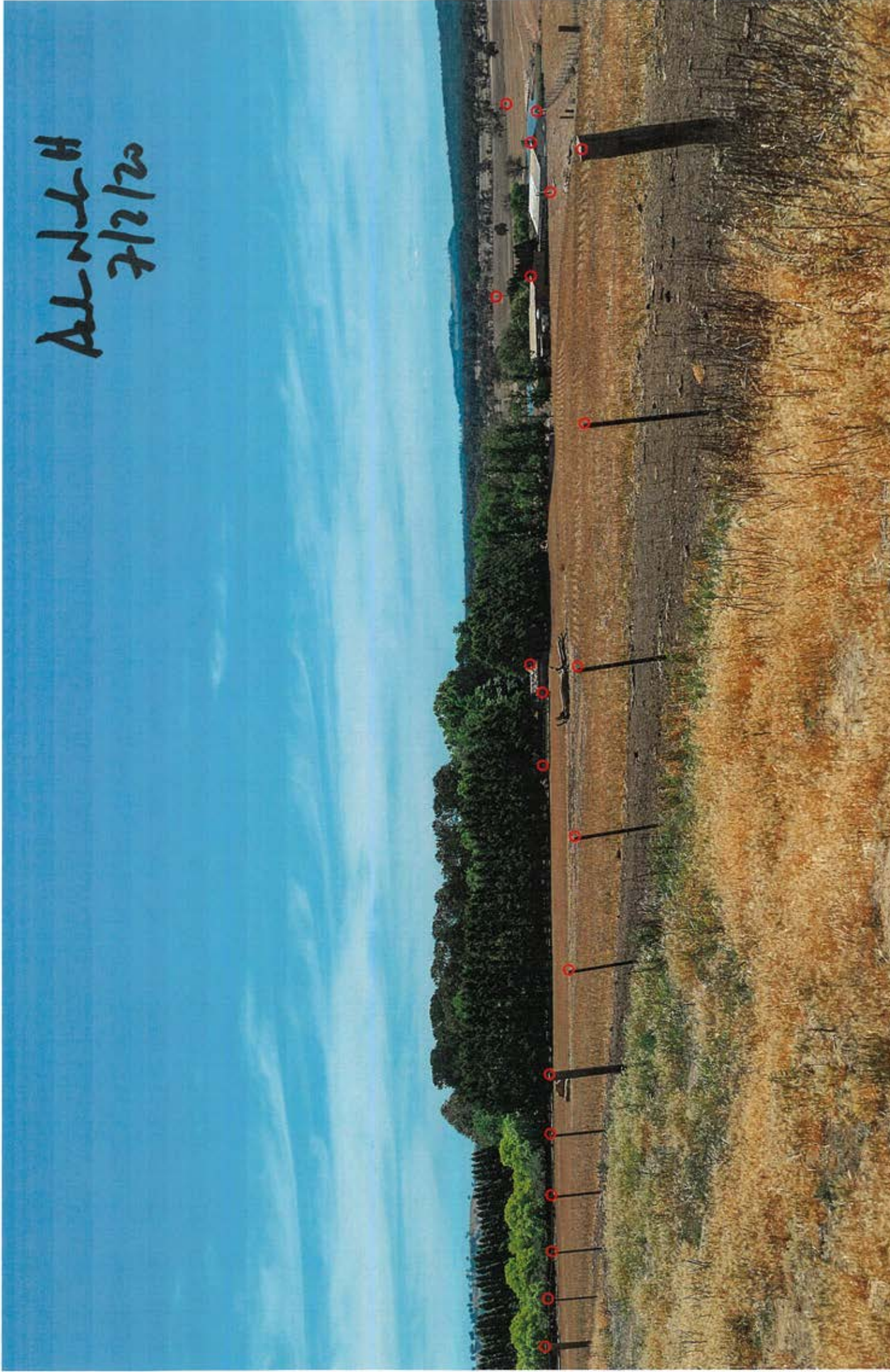
EIS VP4 - MONTAGE 2

De Worth
7/2/20



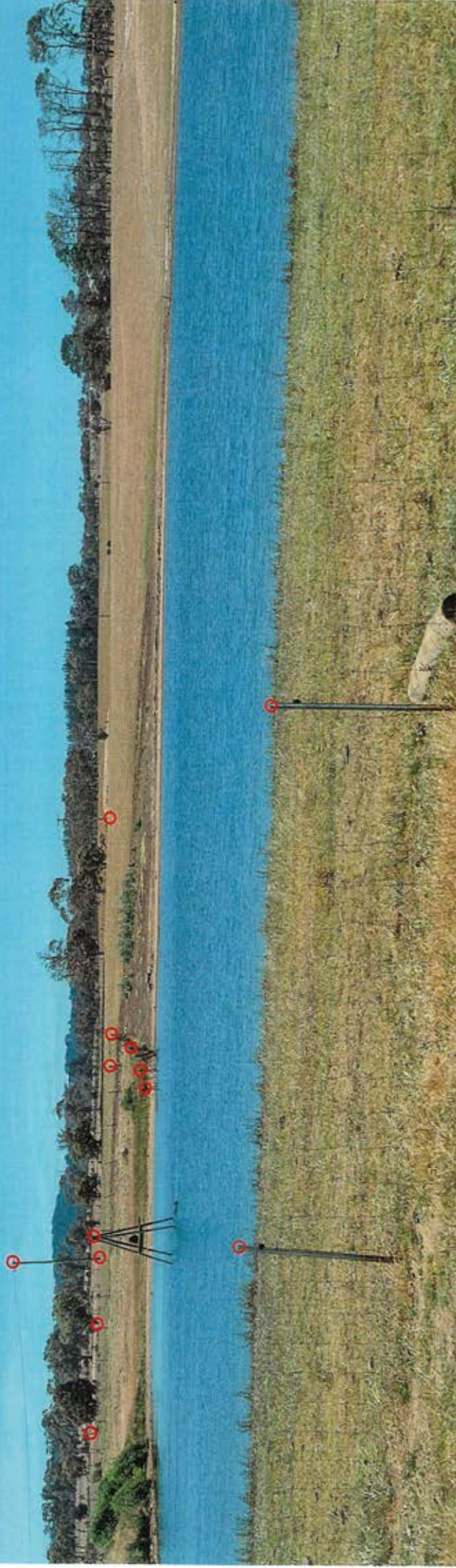
MEREWORTH 12

ALL L L H
7/2/20



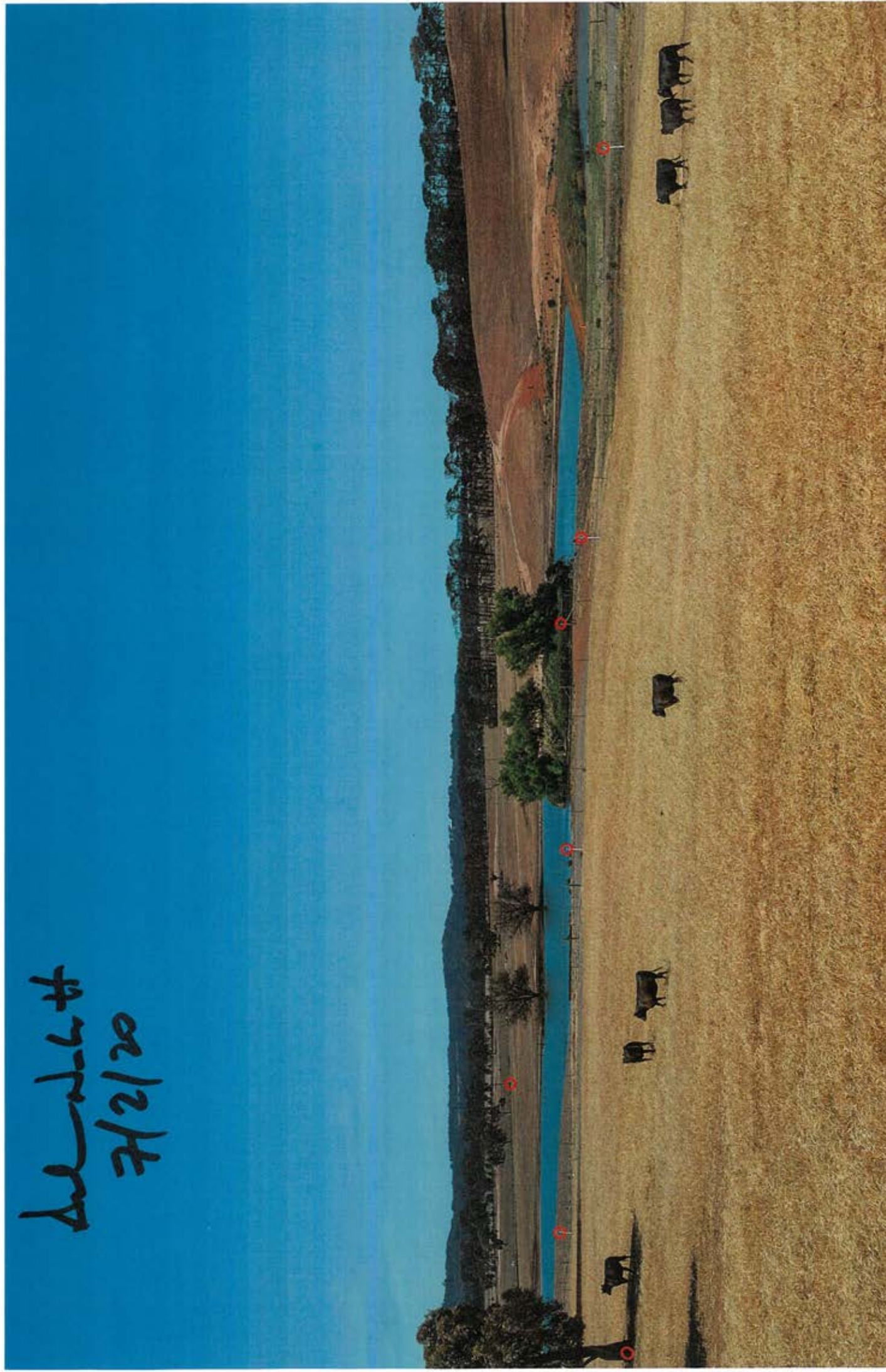
MEREWORTH 13

DeWalt
7/2/20



MEREWORTH 7

Del Norte
7/2/20

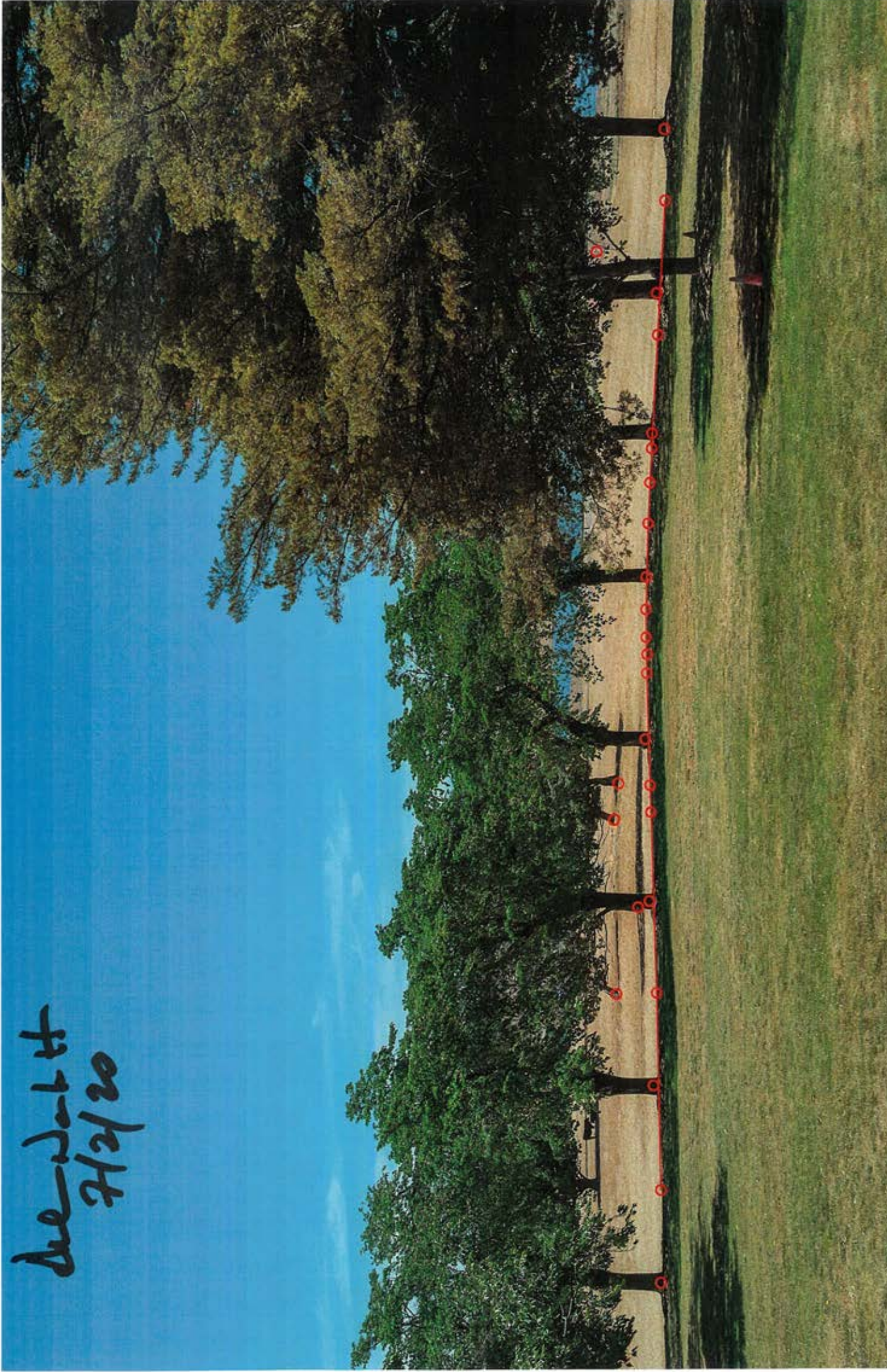


MEREWORTH 3



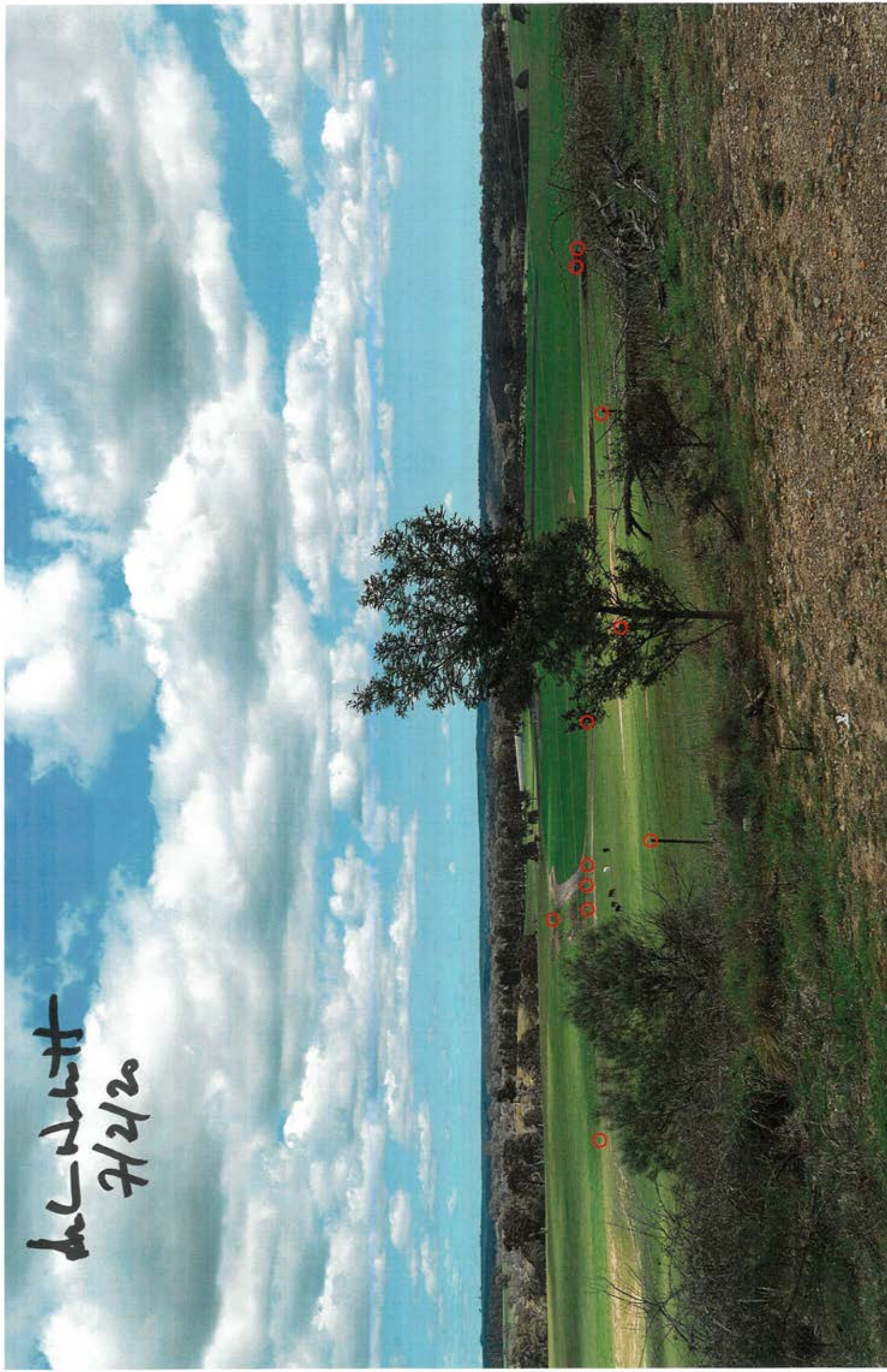
MEREWORTH 2

Due North
7/24/20



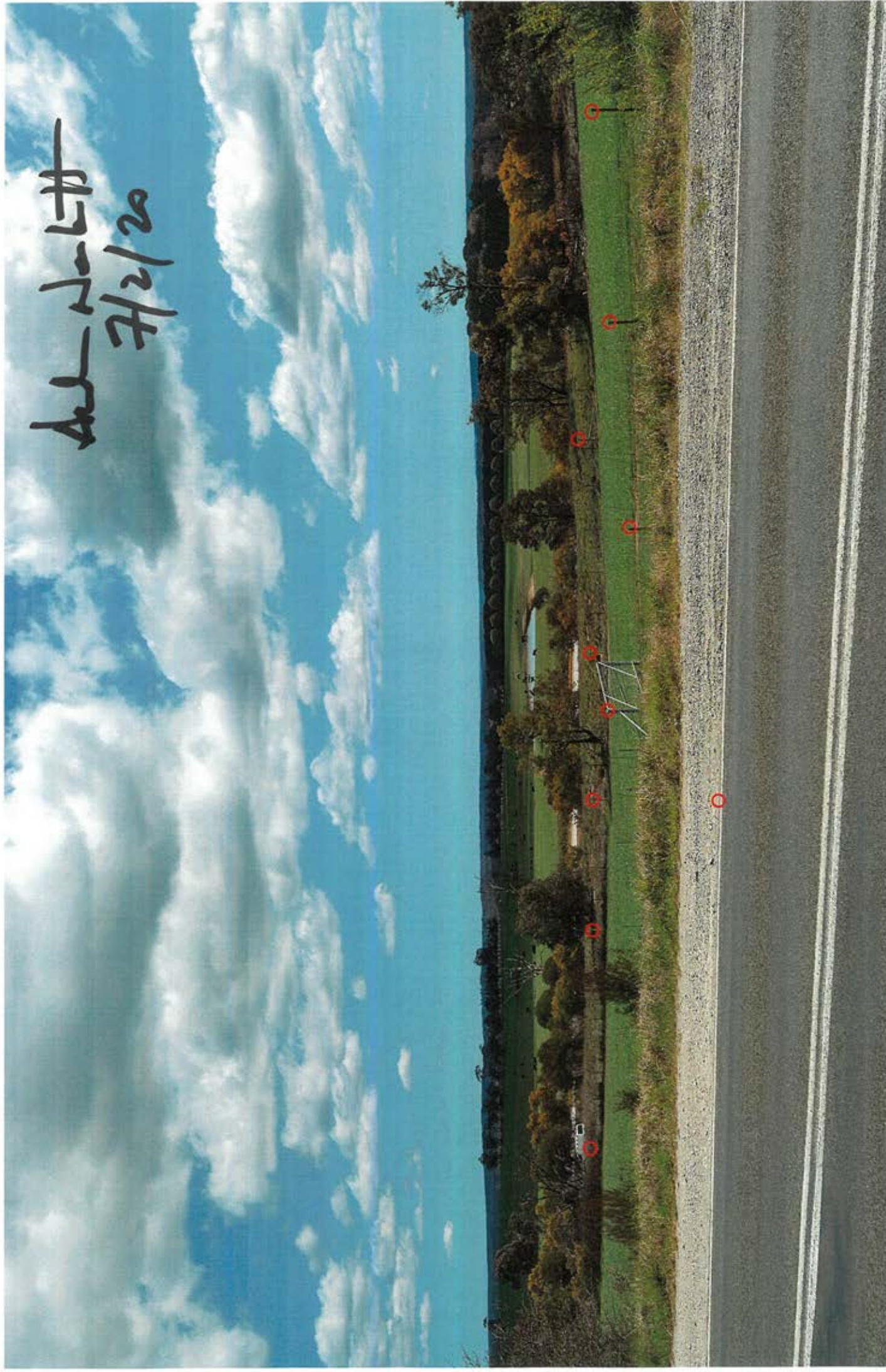
MEREWORTH 1

del-Valle
7/24/20



CL VP18

Jul-Nov-18
7/2/20



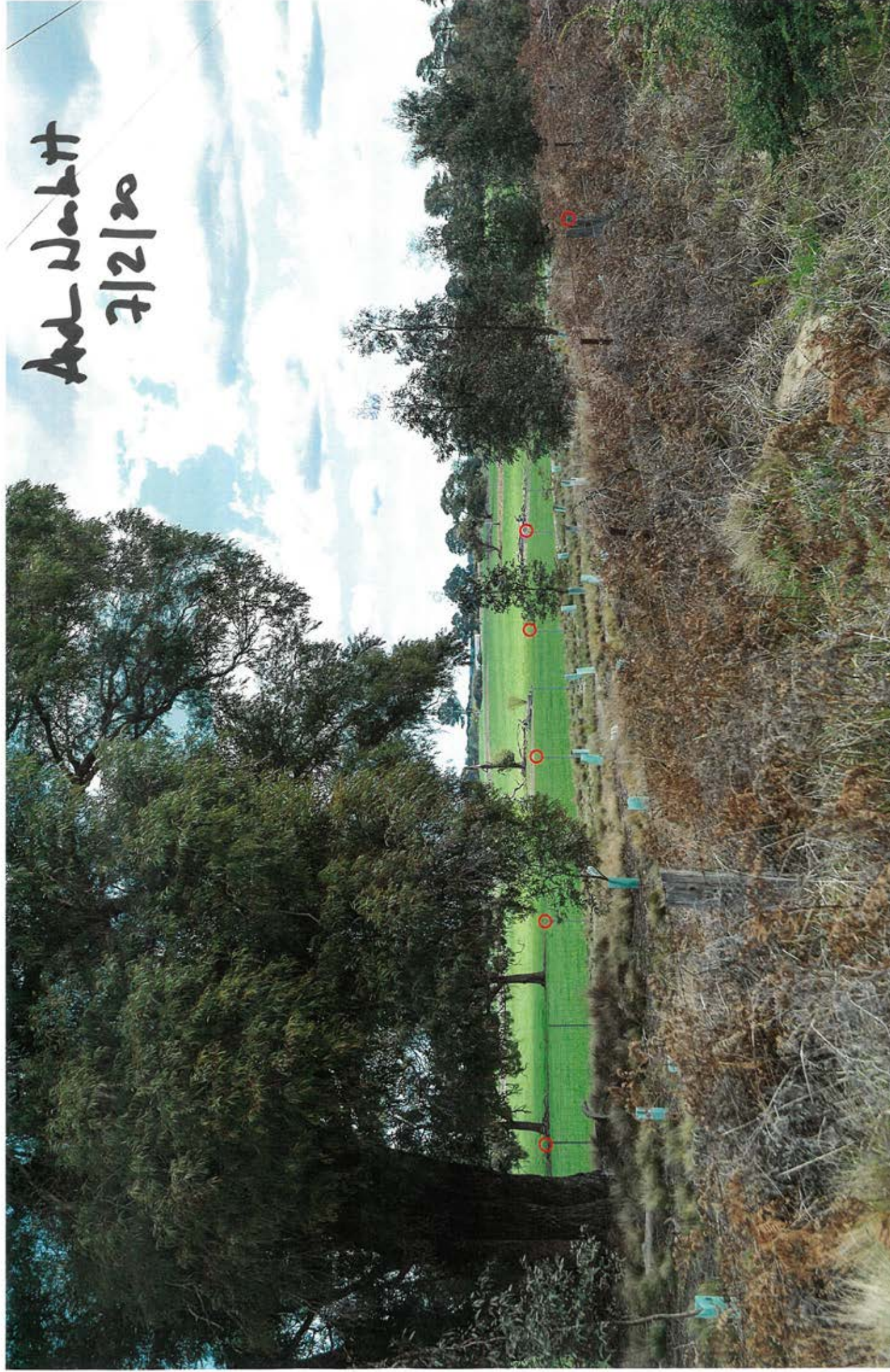
CL VP16

Alt. 1414
7/2/20



CL VP14

And Warbitt
7/2/20



CL VP13

As-Adaltt
7/24/20



CL VP11

De N-64

7/2/20



CL VP2

Annexure D

Photographic exposure details

Annexure D - Photograph and exposure details

Plate Number	Viewpoint (VP)	Type	Date	Time	Compass bearing (direction of photo) (deg)	Easting	Northing	Datum	RL (m)	Height of camera lens above ground	Nearest key SIA feature	Distance (km)	Camera	Lens	Focal Length (mm)	F-stop	Exposure	ISO	Max aperture	Metering	HfOV	VfOV	Contrast	Saturation	Sharpness	White balance	Visualisation type	Projection	Software	Copyright	Author
5.1'	Viewpoint 1	Photo viewpoint	25/09/2019	12:16	18	249821.00	6174131.00	GDA94 MGA Zone 56	644.4	1.6	Vent shaft pad	2.5	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	28	f/9	1/320 sec	100	4	pattern	65.47	46.4	normal	normal	normal	auto	Landscape	Planar	Adobe Photoshop	Rock Hunter	David Murgatroyd
5.2'	Viewpoint 2	Photo viewpoint	25/09/2019	12:29	48	249225.00	6175488.00	GDA94 MGA Zone 56	648.4	1.6	tower	3.2	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	35	f/9	1/320 sec	100	4	pattern	54.43	37.85	normal	normal	normal	auto	Landscape	Planar	Adobe Photoshop	Rock Hunter	David Murgatroyd
5.3'	Viewpoint 4	Photo viewpoint	25/09/2019	13:58	231	252540.11	6179481.85	GDA94 MGA Zone 56	653.9	1.6	TLO	0.5	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	35	f/8	1/250 sec	100	4	pattern	54.43	37.85	normal	normal	normal	auto	Landscape	Planar	Adobe Photoshop	Rock Hunter	David Murgatroyd
5.4'	Viewpoint 5	Photo viewpoint	25/09/2019	10:11	251	253048.38	6179342.1	GDA94 MGA Zone 56	670.46	1.6	TLO	0.8	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	28	f/9	1/320 sec	100	4	pattern	65.47	46.4	normal	normal	normal	auto	Landscape	Planar	Adobe Photosotsh	Rock Hunter	David Murgatroyd
5.5'	Viewpoint 6	Photo viewpoint	25/09/2019	14:06	140	250094.58	6179949.03	GDA94 MGA Zone 56	664.78	1.6	s/pile	1.3	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	27	f/9	1/320 sec	100	4	pattern	67.38	47.92	normal	normal	normal	auto	Landscape	Planar	Adobe Photoshop	Rock Hunter	David Murgatroyd
5.6'	Viewpoint 7	Photo viewpoint	25/09/2019	11:42	305	252745.82	6177489.13	GDA94 MGA Zone 56	674.05	1.6	dam	0.4	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	28	f/9	1/320 sec	100	4	pattern	65.47	46.4	normal	normal	normal	auto	Landscape	Planar	Adobe Photoshop	Rock Hunter	David Murgatroyd
5.7'	Photograph 5.2	Photo viewpoint	25/09/2019	11:00	302	252788	6177900	GDA94 MGA Zone 56	670.4	1.6	ROM	1.3	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	35	f/9	1/320 sec	100	4	pattern	54.43	37.85	normal	normal	normal	auto	Landscape	Planar	Adobe Photoshop	Rock Hunter	David Murgatroyd
5.8'	Photograph 5.3	Photo viewpoint	25/09/2019	10:33	258	252926	6178414	GDA94 MGA Zone 56	651.48	1.6	ROM	1.3	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	35	f/9	1/320 sec	100	4	pattern	54.43	37.85	normal	normal	normal	auto	Landscape	Planar	Adobe Photoshop	Rock Hunter	David Murgatroyd
5.9'	CL-VP1	Photo viewpoint	25/09/2019	9:03	247	253544.00	6175947.00	GDA94 MGA Zone 56	687.4	1.6	no view to SIA	n/a	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	16	f/9	1/320 sec	100	4	pattern	96.73	73.74	normal	normal	normal	auto	Landscape	Planar	Adobe Photoshop	Rock Hunter	David Murgatroyd
5.10'	CL-VP2	Photo viewpoint	25/09/2019	9:12	298	253395.62	6175989.51	GDA94 MGA Zone 56	687.2	1.6	and portal	2.5	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	16	f/9	1/320 sec	100	4	pattern	100	27	normal	normal	normal	auto	Panorama	Spherical	Autopano pro 4.42	Rock Hunter	David Murgatroyd
5.11'	CL-VP11	Photo viewpoint	25/09/2019	9:40	24	251426.3	6176379.23	GDA94 MGA Zone 56	643.11	1.6	product stockpile	2.7	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	16	f/9	1/320 sec	100	4	pattern	96.73	73.74	normal	normal	normal	auto	Landscape	Planar	Adobe Photoshop	Rock Hunter	David Murgatroyd
5.12'	CL-VP13	Photo viewpoint	25/09/2019	13:38	244	253856.43	6179288.57	GDA94 MGA Zone 56	663.44	1.6	ROM conveyor tower	2.4	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	35	f/6.3	1/160 sec	100	4	pattern	54.43	37.85	normal	normal	normal	auto	Landscape	Planar	Adobe Photoshop	Rock Hunter	David Murgatroyd
5.13	CL-VP14	Photo viewpoint	25/09/2019	10:17	120	253086.8	6179249.87	GDA94 MGA Zone 56	670.75	1.6	rail provisioning facility	0.3	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	16	f/7.1	1/200 sec	100	4	pattern	120	27	normal	normal	normal	auto	Panorama	Spherical	Autopano pro 4.42	Rock Hunter	David Murgatroyd
5.14'	CL-VP14a	Photo viewpoint	25/09/2019	13:48	114	253103	6179420	GDA94 MGA Zone 56	670.4	1.6	rail line	0.4	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	16	f/9	1/320 sec	100	4	pattern	96.73	73.74	normal	normal	normal	auto	Landscape	Planar	Adobe Photoshoo	Rock Hunter	David Murgatroyd
5.15'	CL-VP16	Photo viewpoint	25/09/2019	11:51	285	252799.78	6177570.26	GDA94 MGA Zone 56	676.31	1.6	primary storage dam	0.5	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	35	f/9	1/320 sec	100	4	pattern	54.43	37.85	normal	normal	normal	auto	Landscape	Planar	Adobe Photoshop	Rock Hunter	David Murgatroyd
5.16'	CL-VP17	Photo viewpoint	25/09/2019	11:28	186	252407	6177113	GDA94 MGA Zone 56	645.5	1.6	no view to SIA	n/a	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	16	f/9	1/320 sec	100	4	pattern	96.73	73.74	normal	normal	normal	auto	Landscape	Planar	Adobe Photoshoo	Rock Hunter	David Murgatroyd
5.17'	CL-VP18	Photo viewpoint	25/06/2019	11:18	272	251973.74	6177416.18	GDA94 MGA Zone 56	661.25	1.6	product conveyor	0.8	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	16	f/9	1/320 sec	100	4	pattern	120	27	normal	normal	normal	auto	Panorama	Spherical	Autopano pro 4.42	Rock Hunter	David Murgatroyd
5.18'	CL-VP18a	Photo viewpoint	25/06/2019	11:19	157	251973.74	6177416.18	GDA94 MGA Zone 56	661.25	1.6	no view to SIA	n/a	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	35	f/8	1/250 sec	100	4	pattern	54.43	37.85	normal	normal	normal	auto	Landscape	Planar	Adobe Photoshoo	Rock Hunter	David Murgatroyd
5.19'	CL-VP21	Photo viewpoint	25/06/2019	12:43	20	253644	6178654	GDA94 MGA Zone 56	661.4	1.6	rail bridge	0.4	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	16	f/9	1/320 sec	100	4	pattern	96.73	73.74	normal	normal	normal	auto	Landscape	Planar	Adobe Photoshop	Rock Hunter	David Murgatroyd
5.20'	CL-VP22	Photo viewpoint	25/06/2019	8:18	280	256553	6181460	GDA94 MGA Zone 56	737.4	1.6	TLO	4.9	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	35	f/9	1/320 sec	100	4	pattern	54.43	37.85	normal	normal	normal	auto	Landscape	Planar	Adobe Photoshoo	Rock Hunter	David Murgatroyd
5.21'	CL-VP24+27	Photo viewpoint	25/06/2019	8:44	348	253679	6172452	GDA94 MGA Zone 56	669.4	1.6	no view of SIA	n/a	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	16	f/9	1/320 sec	100	4	pattern	96.73	73.74	normal	normal	normal	auto	Landscape	Planar	Adobe Photoshop	Rock Hunter	David Murgatroyd
5.22-5.25'	Viewpoint 4 - Montage 2	Photomontage	25/09/2019	13:58	231	250094.58	6179949.03	GDA94 MGA Zone 56	664.78	1.6	TLO	0.5	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	26	f/9	1/320 sec	100	4	pattern	69.39	49.55	normal	normal	normal	auto	Photomontage	Planar	Adobe Photoshop cc 2019	Rock Hunter	David Murgatroyd
5.26-5.29'	Viewpoint 5 - Montage 3	Photomontage	25/09/2019	10:11	251	252745.82	6177489.13	GDA94 MGA Zone 56	674.05	1.6	TLO	0.8	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	28	f/9	1/320 sec	100	4	pattern	65.47	46.4	normal	normal	normal	auto	Photomontage	Planar	Adobe Photoshop cc 2019	Rock Hunter	David Murgatroyd
5.30-5.33'	Viewpoint 6 - Montage 4	Photomontage	25/09/2019	14:06	140	252540.11	6179481.85	GDA94 MGA Zone 56	653.9	1.6	western product s/pile	1.3	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	27	f/9	1/320 sec	100	4	pattern	67.38	47.92	normal	normal	normal	auto	Photomontage	Planar	Adobe Photoshop cc 2019	Rock Hunter	David Murgatroyd
5.34-5.37'	Viewpoint 7 - Montage 5	Photomontage	25/09/2019	11:42	305	253048.38	6179342.1	GDA94 MGA Zone 56	670.46	1.6	primary storage dam	0.4	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	28	f/9	1/320 sec	100	4	pattern	65.47	46.4	normal	normal	normal	auto	Photomontage	Planar	Adobe Photoshop cc 2019	Rock Hunter	David Murgatroyd
5.38-5.41'	Montage CL-VP2	Photomontage	25/09/2019	9:12	298	253395.62	6175989.51	GDA94 MGA Zone 56	687.2	1.6	and portal	2.5	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	35	f/9	1/320 sec	100	4	pattern	54.43	37.85	normal	normal	normal	auto	Photomontage	Planar	Adobe Photoshop cc 2019	Rock Hunter	David Murgatroyd
5.42'-5.45'	Montage CL-VP11	Photomontage	25/09/2019	9:40	24	251426.3	6176379.23	GDA94 MGA Zone 56	643.11	1.6	product stockpile	2.7	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	16	f/9	1/320 sec	100	4	pattern	96.73	73.74	normal	normal	normal	auto	Photomontage	Planar	Adobe Photoshop cc 2019	Rock Hunter	David Murgatroyd
5.46-5.49'	Montage CL-VP13	Photomontage	25/09/2019	13:38	244	253856.43	6179288.57	GDA94 MGA Zone 56	663.44	1.6	ROM conveyor tower	2.4	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	35	f/6.3	1/160 sec	100	4	pattern	54.43	37.85	normal	normal	normal	auto	Photomontage	Planar	Adobe Photoshop cc 2019	Rock Hunter	David Murgatroyd
5.50-5.53'	Montage CL-VP14	Photomontage	25/09/2019	10:17	120	253086.8	6179249.87	GDA94 MGA Zone 56	670.75	1.6	Rail provisioning facility	0.3	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	16	f/8	1/250 sec	100	4	pattern	96.73	73.74	normal	normal	normal	auto	Photomontage	Planar	Adobe Photoshop cc 2019	Rock Hunter	David Murgatroyd
5.54-5.57'	Montage CL-VP16	Photomontage	25/09/2019	11:51	285	252799.78	6177570.26	GDA94 MGA Zone 56	676.31	1.6	primary storage dam	0.5	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	35	f/9	1/320 sec	100	4	pattern	54.43	37.85	normal	normal	normal	auto	Photomontage	Planar	Adobe Photoshop cc 2019	Rock Hunter	David Murgatroyd
5.58-5.61'	Montage CL-VP18	Photomontage	25/09/2019	11:18	272	251973.74	6177416.18	GDA94 MGA Zone 56	661.25	1.6	product conveyor	0.8	Nikon D800	AF-S Nikkor 16-35mm f/4G ED VR	35	f/8	1/250 sec	100	4	pattern	54.43	37.85	normal	normal	normal	auto	Photomontage	Planar	Adobe Photoshoo cc 2019	Rock Hunter	David Murgatroyd
5.62'	Mereworth 1	Photo viewpoint	11/11/2019	13:00	26	251911.12	6178187.97	GDA94 MGA Zone 56	657.95	1.6	rail loop	1.1	Nikon D800	AF-S Nikkor 28-300mm f/3.5-5.6G ED VR	28	f/10	1/250 sec	100	3.6	pattern	120	27	normal	normal	normal	auto	Panorama	Spherical	Autopano pro 4.42	Rock Hunter	David Murgatroyd
5.63'	Mereworth 2	Photo viewpoint	11/11/2019	13:08	32	251925.89	6178222.03	GDA94 MGA Zone 56	655.48	1.6	rail loop	1.0'	Nikon D800	AF-S Nikkor 28-300mm f/3.5-5.6G ED VR	28	f/10	1/250 sec	100	3.6	pattern	120	27	normal	normal	normal	auto	Panorama	Spherical	Autopano pro 4.42	Rock Hunter	David Murgatroyd
5.64'	Mereworth 3	Photo viewpoint	11/11/2019	13:12	39	251941.15	6178245.89	GDA94 MGA Zone 56	654.89	1.6	rail loop	0.9	Nikon D800	AF-S Nikkor 28-300mm f/3.5-5.6G ED VR	28	f/10	1/250 sec	100	3.6	pattern	120	27	normal	normal	normal	auto	Panorama	Spherical	Autopano pro 4.42	Rock Hunter	David Murgatroyd
5.65'	Mereworth 4	Photo viewpoint	11/11/2019	13:17	12	251931.686	6178238.98	GDA94 MGA Zone 56	656.4	1.6	TLO	0.8	Nikon D800	AF-S Nikkor 28-300mm f/3.5-5.6G ED VR	28	f/10	1/250 sec	100	3.6	pattern	120	27	normal	normal	normal	auto	Panorama	Spherical	Autopano pro 4.42	Rock Hunter	David Murgatroyd
5.66'	Mereworth 5	Photo viewpoint	11/11/2019	13:23	315	251929.6	6178251.69	GDA94 MGA Zone 56	656.4	1.6	CHPP	0.5	Nikon D800	AF-S Nikkor 28-300mm f/3.5-5.6G ED VR	28	f/10	1/250 sec	100	3.6	pattern	120	27	normal	normal	normal	auto	Panorama	Spherical	Autopano pro 4.42	Rock Hunter	David Murgatroyd
5.67'	Mereworth 6	Photo viewpoint	11/11/2019	12:45	43	252103.627	6178280.21	GDA94 MGA Zone 56	648.4	1.6	infrastructure	n/a	Nikon D800	AF-S Nikkor 28-300mm f/3.5-5.6G ED VR	28	f/10	1/250 sec	100	3.6	pattern	120	27	normal	normal	normal	auto	Panorama	Spherical	Autopano pro 4.42	Rock Hunter	David Murgatroyd
5.68'	Mereworth 7	Photo viewpoint	11/11/2019	12:37	44	252017.09	6178608.39	GDA94 MGA Zone 56	645.02	1.6	TLO	0.4	Nikon D800	AF-S Nikkor 28-300mm f/3.5-5.6G ED VR	28	f/8	1/250 sec	100	3.6	pattern	120	27	normal	normal	normal	auto	Panorama	Spherical	Autopano pro 4.42	Rock Hunter	David Murgatroyd
5.69'	Mereworth 8	Photo viewpoint	11/11/2019	12:37	297	252017.132	6178611.05	GDA94 MGA Zone 56	644.4	1.6	CHPP	0.4	Nikon D800	AF-S Nikkor 28-300mm f/3.5-5.6G ED VR	28	f/8	1/250 sec	100	3.6	pattern	120	27	normal	normal	normal	auto	Panorama	Spherical	Autopano pro 4.42	Rock Hunter	David Murgatroyd
5.70'	Mereworth 9	Photo viewpoint	11/11/2019	13:31	107	251993.72	6178135.74	GDA94 MGA Zone 56	656.4	1.6	Primary storage dam	0.3	Nikon D800	AF-S Nikkor 28-300mm f/3.5-5.6G ED VR	28	f/10	1/250 sec	100	3.6	pattern	120</										