CADIA VALLEY OPERATIONS
MOLYBDENUM RECOVERY PLANT RELOCATION MODIFICATION
ENVIRONMENTAL ASSESSMENT

PREPARED BY
CADIA HOLDINGS PTY LIMITED

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1 INTRODUCTION

The Cadia Valley Operations (CVO) are located approximately 25 kilometres (km) south-west of Orange, in the Central Tablelands of New South Wales (NSW) (Figure 1). Cadia Holdings Pty Limited (CHPL) is the owner and operator of the CVO and is a wholly owned subsidiary of Newcrest Mining Limited.

Project Approval (PA) for the Cadia East Project was granted by the NSW Minister for Planning under Part 3A of the *Environmental Planning and Assessment Act, 1979* (EP&A Act) on 6 January 2010 (PA 06_0295). The approval includes all components of the mining operations at the CVO (as described in Schedule 1 of PA 06_0295) including the Cadia East underground mine, the Cadia Hill open cut mine, the Ridgeway underground mine, the CVO Concentrate Dewatering Facility, and ancillary infrastructure. These integrated operations are herein referred to as the CVO.

1.1 OVERVIEW OF THE EXISTING CADIA VALLEY OPERATIONS

The Cadia Hill open pit, Ridgeway underground mine and Cadia East underground mine are located in the Cadia Valley within Mining Lease (ML) 1405, ML 1472, ML 1481, ML 1449, ML 1689 and ML 1690 (Figure 2). The CVO Dewatering Facility is located approximately 25 km to the east of the Cadia Valley near the town of Blayney.

Mining at the CVO commenced at Cadia Hill in 1998 and was placed on care and maintenance in 2012.

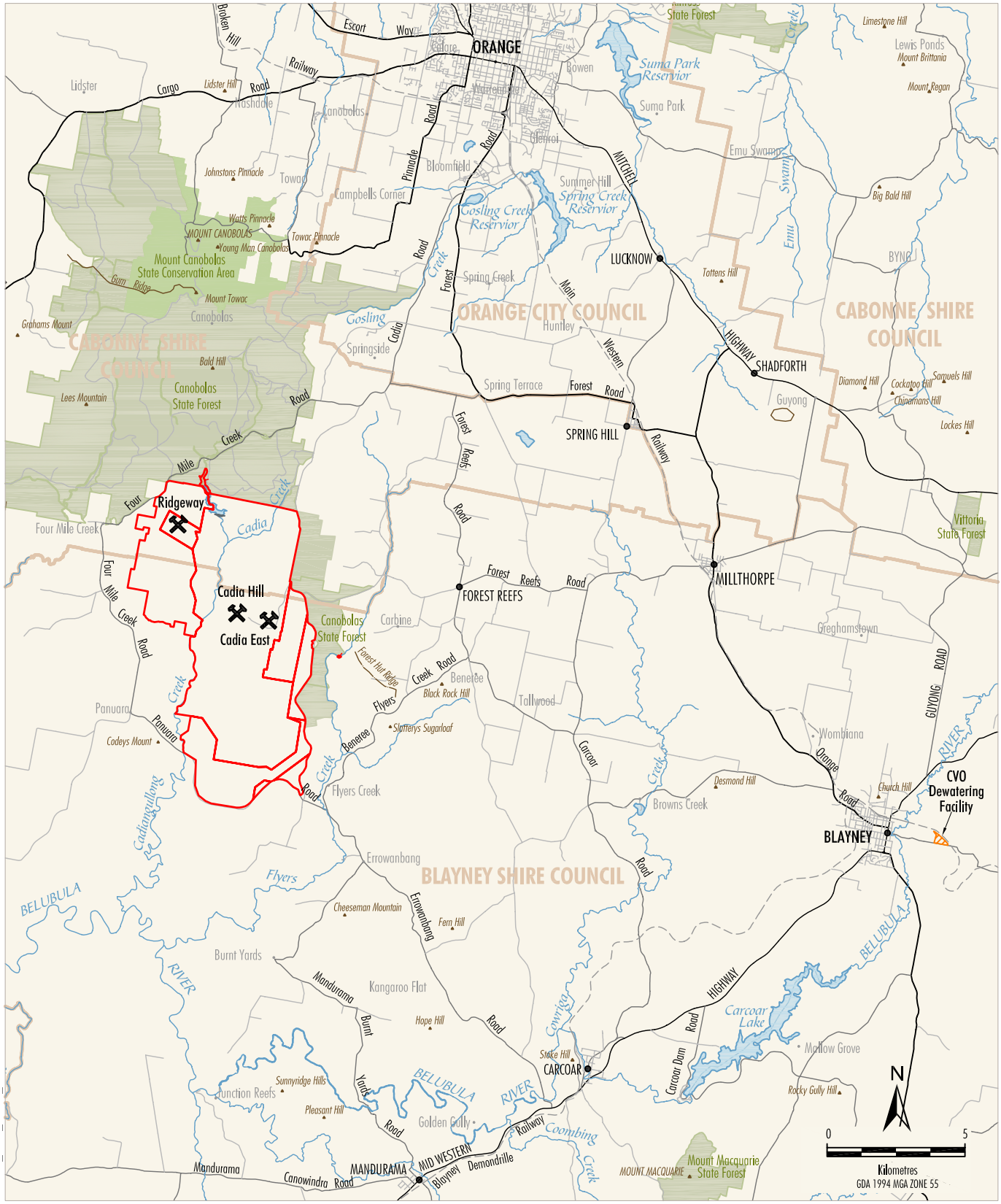
Ore production from the Ridgeway underground mine commenced in 2002 using block caving underground mining methods. The Ridgeway underground mine is currently on care and maintenance.

Cadia East was approved in 2010 and the panel caving underground mine extraction method is used to extract approximately 456 million tonnes (Mt) of ore over a period of 21 years. The ore contains gold, copper and some molybdenum.

Cadia East is described in full in the *Cadia East Project Environmental Assessment* (the Cadia East EA) (CHPL, 2009).

At peak operations, approximately 32 million tonnes per annum (Mtpa) of ore will be processed at the CVO. Mineral concentrate containing gold and copper is pumped approximately 25 km from the CVO to the CVO Dewatering Facility, where it is dewatered and loaded onto trains for transport to Port Kembla on the eastern seaboard.

As a component of the Cadia East Project, the ore processing facilities (Figure 2) incorporated the construction and operation of a molybdenum recovery plant, with a concentrate feed design capacity of approximately 460,000 tonnes per annum (tpa). The molybdenum recovery plant is a facility to process the product concentrate to enable molybdenum contained in this concentrate to be extracted and sold as a separate product. The molybdenum recovery plant has not yet been constructed.



LEGEND

- Mining Lease/Mining Lease Application Boundary
- Local Government Area
- Road
- Railway
- NSW State Forest - Forest Commission Land
- NPWS Reserve

Source: Department of Lands NSW (2006); Department of Industry (2017)

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CADIA VALLEY OPERATIONS MODIFICATION 10

Regional Location

Figure 1

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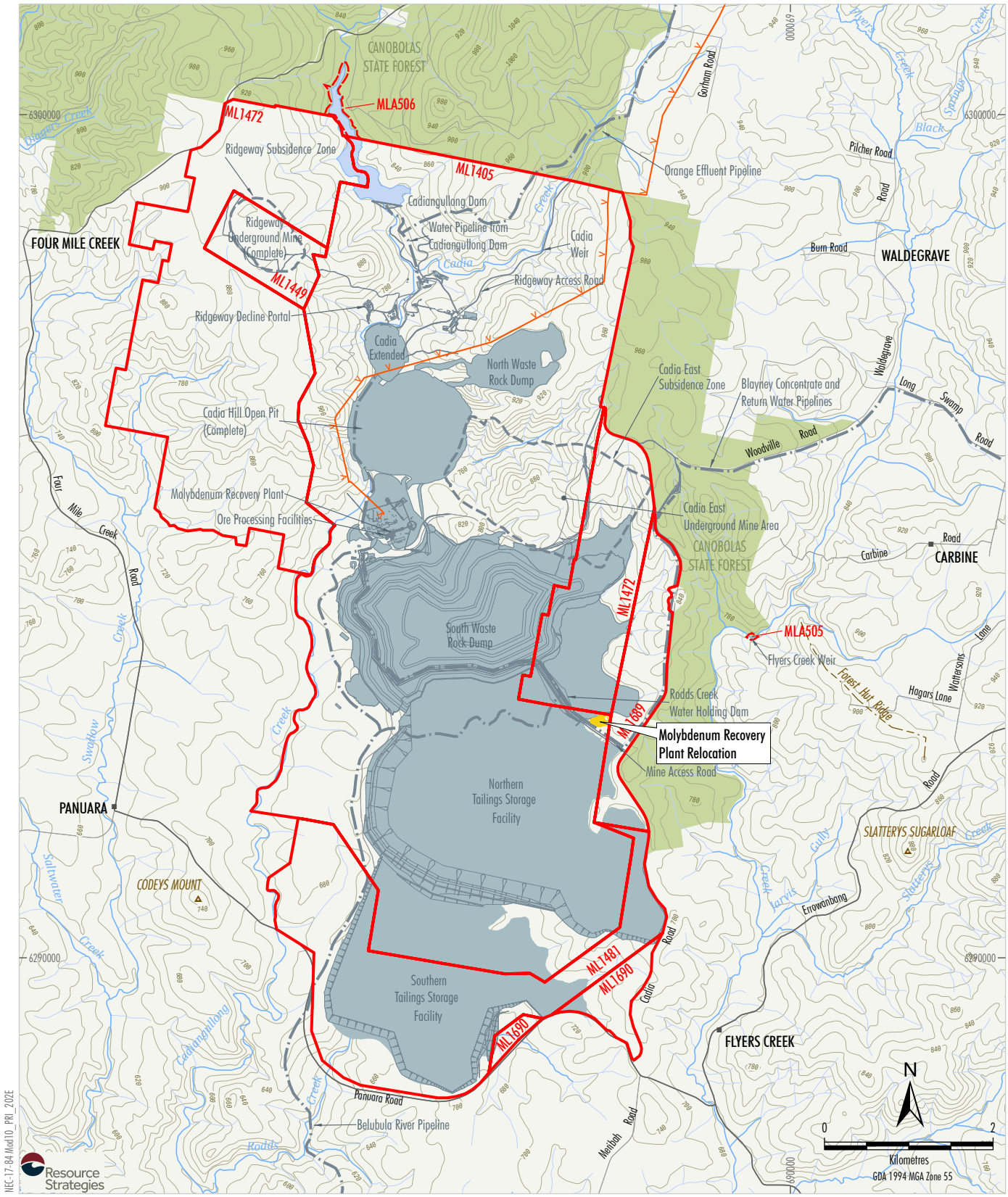

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LEGEND

- Mining Lease Boundary
- Mining Lease Application Boundary
- State Forest
- Powerline
- Existing/Approved Mine Infrastructure and Landforms
- Proposed Modifciation Infrastructure

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CADIA VALLEY OPERATIONS MODIFICATION 10

Modification Location

Source: Land and Property Infromation (2017);
NSW Planning & Environment Resource & Energy (2017)
CHPL (2018)

Figure 2

1.2 OVERVIEW OF THE MODIFICATION

The CVO Molybdenum Recovery Plant Relocation Modification (Modification 10 - the Modification) would involve relocation of the molybdenum recovery plant from its approved location at the CVO ore processing facilities to the eastern side of the CVO complex (near Rodds Creek Water Holding Dam) (Figure 2) and associated minor alterations to infrastructure.

A description of the Modification is provided in Section 2.

1.3 LEGISLATIVE FRAMEWORK

The CVO is approved as a 'transitional Part 3A project' under clause 2 of Schedule 6A of the EP&A Act and therefore section 75W of the EP&A Act continues to apply to modifications to PA 06_0295, notwithstanding its repeal.[1] Section 75W of the EP&A Act relevantly provides:

> ***75W Modification of Minister's approval***
>
> *(1) In this section:*
>
> ***Minister's approval** means an approval to carry out a project under this Part, and includes an approval of a concept plan.*
>
> ***modification of approval** means changing the terms of a Minister's approval, including:*
>
> *a) revoking or varying a condition of the approval or imposing an additional condition of the approval, and*
>
> *b) changing the terms of any determination made by the Minister under Division 3 in connection with the approval.*
>
> *(2) The proponent may request the Minister to modify the Minister's approval for a project. The Minister's approval for a modification is not required if the project as modified will be consistent with the existing approval under this Part.*
>
> *(3) The request for the Minister's approval is to be lodged with the Director-General. The Director-General may notify the proponent of environmental assessment requirements with respect to the proposed modification that the proponent must comply with before the matter will be considered by the Minister.*
>
> *(4) The Minister may modify the approval (with or without conditions) or disapprove of the modification.*
>
> *…*

1.4 CONSULTATION FOR THE MODIFICATION

CHPL provided an overview of the Modification to the Department of Planning and Environment (DP&E) on 5 December 2017. Following this, DP&E responded on 11 January 2018 confirming that the Modification application could be submitted under section 75W of the EP&A Act.

In addition, CHPL presented an overview of the Modification and key findings of this Environmental Assessment (EA) to the Community Consultative Committee (CCC) on 12 February 2018. No concerns were raised by the CCC in relation to the proposed Modification.

[1] Part 3A of the EP&A Act (as in force immediately before its repeal) continues to apply. The description and quotations of relevant references to clauses of Part 3A in this document are as if Part 3A of the EP&A Act is still in force.

1.5 DOCUMENT STRUCTURE

This EA is structured as follows:

Section 1 Provides an introduction to the existing/approved CVO and the Modification, describes the structure of this EA, presents the legislative framework and provides a summary of the consultation undertaken.

Section 2 Describes the approved molybdenum recovery plant and the Modification.

Section 3 Details the Environmental Assessment (EA) of the Modification.

Section 4 Provides a conclusion to this EA.

Section 5 Lists documents and reports referenced in this document.

2 PROJECT DESCRIPTION

2.1 OVERVIEW OF THE APPROVED MOLYBDENDUM RECOVERY PLANT

The approved CVO includes the construction and operation of a molybdenum recovery plant with a design concentrate feed capacity of up to 460,000 tpa. The molybdenum recovery plant is approved to be constructed at the ore processing facilities and has not yet been constructed.

Mineral concentrate from the ore processing facilities' flotation circuits will feed to the molybdenum recovery plant. The general molybdenum recovery plant process stages involve:

- a flotation circuit;
- an optional regrind circuit (i.e. would be included to increase molybdenum recovery if required);
- a molybdenum conditioning and thickening circuit; and
- a concentrate filtering, drying and bagging facility.

The molybdenum concentrate from the flotation circuit will report to a concentrate storage tank prior to being pumped to the molybdenum filtration and drying plant (CHPL, 2009).

Concentrate from the CVO ore processing facilities will feed the molybdenum recovery plant, where the molybdenum would be removed.

The molybdenum concentrate will be filter pressed to approximately 8% by weight (w/w) and the filter cake dried to approximately 3% w/w (CHPL, 2009). The dried molybdenum concentrate will be stored in a hopper prior to bagging and sealing. The bagged molybdenum concentrate will be stored on pallets for subsequent transport via road to market.

Molybdenum concentrate product would be transported on trucks (nominally to Sydney, subject to market requirements) at a rate of up to 1,500 tonnes per annum (tpa) (or approximately 6 trucks per week).

2.2 DESCRIPTION OF THE MODIFICATION

The molybdenum recovery plant would be constructed in a new location, located adjacent to Rodds Creek Water Holding Dam (Figure 3). The new location is considered to be superior to the approved because the approved location at the CVO ore processing facilities is spatially constrained. The relocated plant would have an increased design concentrate feed capacity of up to 500,000 tpa.

The general process stages would be consistent with the approved CVO molybdenum recovery plant, and would include a regrind circuit and a stack emissions scrubber included on the flotation circuit.

Consistent with the approved plant, the molybdenum concentrate would be filter pressed however dried to approximately 9% by w/w and the filter cake dried to approximately 1% w/w.

Consistent with the approved plant, molybdenum concentrate product would be transported in shipping containers on trucks (nominally to Sydney, subject to market requirements) at a rate of up to 6,500 tpa (or approximately four B-double trucks per week). The remaining copper/gold concentrate will continue via the concentrate pipeline to the CVO Dewatering Facility.

The Cadia East EA included approval of a new mine access road for the CVO off Cadia Road. Once commissioned, this road will replace the existing mine access road (also off Cadia Road). The approved mine access road will be constructed and commissioned as part of the molybdenum recovery plant construction phase, approximately 30 metres (m) north of the previously planned intersection location (Figure 3).

LEGEND

Proposed Modifciation Infrastructure

Source: CHPL - Orthophoto (Nov 2016); CHPL (2018)

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CADIA VALLEY OPERATIONS MODIFICATION 10

Conceptual General Arrangement - Relocated Molybdenum Recovery Plant

Figure 3

NEC-17-84 Mod10_PRI App ADDA_203C

3 ENVIRONMENTAL REVIEW

3.1 NOISE

A noise assessment for the Cadia East Project was undertaken by Wilkinson Murray (2009) as part of the Cadia East EA. As part of this assessment, an acoustic model was developed and used to simulate the CVO components and noise source information (i.e. sound levels and locations). The model also considered meteorological effects, surrounding terrain, distance from source to receiver and noise attenuation. The predicted operational and construction noise levels were generally lower than the Project-specific criteria at each assessed receiver location during daytime, evening and night-time operations for all modelled scenarios.

In accordance with Condition 9 of Schedule 3 of PA 06_0295, CHPL has prepared a detailed *CVO Noise Monitoring Program* for the CVO (CHPL, 2014a). The Noise Monitoring Program describes the unattended and attended monitoring measures that are used, as well as the noise monitoring protocol that has been adopted to evaluate compliance with the noise impact assessment and land acquisition criteria specified in PA 06_0295.

3.1.1 Operational Noise

The Modification could potentially affect the local acoustic amenity through the construction and operation of the relocated molybdenum recovery plant. Wilkinson Murray (2018) (Appendix A) has conducted a review of the potential noise impacts of the Modification (Attachment A). The review used the existing noise model to evaluate potential noise emission changes and concluded that the predicted operational noise levels would not change due to the Modification, and that there would be no exceedance of the impact assessment or land acquisition noise criteria specified in PA 06_0295.

3.1.2 Construction Noise

Wilkinson Murray (2018) also considered noise associated with construction of the molybdenum recovery plant, which would be undertaken during the daytime (7:00 am to 6:00 pm). Noise levels were predicted by simulating noise associated with the indicative construction fleet list provided by CHPL using the existing environmental noise model.

The resulting noise levels were assessed against the operational noise criteria in PA 06_0295. The review concluded that the predicted construction noise levels would generally result in no cumulative noise level increases and a minor 0-2 “A” weighted decibels increase at a limited number of receivers. Predicted daytime noise levels would continue to be well below the impact assessment and land acquisition criteria specified in PA 06_0295.

3.2 AIR QUALITY

An air quality review of the Modification was undertaken by Ramboll (2018) (Appendix B). Ramboll’s review identified that the main potential air quality impact would be limited to particulate matter emissions during construction of the plant.

Construction of the molybdenum recovery plant would include dust emission controls, such as watering of exposed areas during construction activities, in accordance with the *CVO Air Quality Monitoring Program* (CHPL, 2014b). These controls would adequately control potential dust emissions during construction activities (Appendix B).

3.3 BIODIVERSITY

Flora Search (2018) (Dr Colin Bower) undertook an ecological review of the Modification area. This assessment is included as Appendix C.

Dr Bower concluded that the Modification would include the clearing of 6.6 hectares of exotic pine plantation, which is not native vegetation.

The Modification would not result in the loss of any native vegetation and is highly unlikely to affect any threatened flora and fauna species listed under State or Commonwealth legislation. No threatened populations or Critical Habitat listed under either jurisdiction would be affected.

Flora Search (2018) also assessed potential impacts on the Scarlett Robin (*Petroica boondang*) and Flame Robin (*Petroica phonicea*), for which the pine plantation constitutes potential poor-quality seasonal foraging habitat. Potential impacts due to the small reduction of this available habitat would not significantly affect populations of either fauna species, should they occur in the Modification area (Appendix C).

3.4 ABORIGINAL CULTURAL HERITAGE ASSESSMENT

Landskape (2018) (Dr Matt Cupper) undertook an Aboriginal Cultural Heritage Assessment of the Modification area. This assessment is included as Appendix D. The assessment was undertaken in consideration of:

- *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (Department of Environment, Climate Change and Water, 2010a).
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (Department of Environment, Climate Change and Water, 2010b).

The assessment found that the Modification area would be located in an area extensively disturbed by previous forestry operations, including felling of the original vegetation, deep ripping and replanting with pine trees (Appendix D). No Aboriginal cultural heritage places, objects or values were found, or are considered likely, in the Modification area. Based on the results of this Aboriginal cultural heritage assessment (including consultation with members of the Orange Local Aboriginal Land Council), Dr Cupper concludes that construction of the molybdenum recovery plant is unlikely to harm Aboriginal cultural heritage places or objects.

Notwithstanding, the *CVO Aboriginal Cultural Heritage Management Plan* (CHPL, 2014c) would be implemented should any previously unidentified Aboriginal cultural heritage places or objects be encountered during the course of the proposed works.

3.5 VISUAL

The molybdenum recovery plant would be in the order of 18 m high at its most elevated point, therefore, the potential for visual impacts has been considered. The Modification area is currently dominated by mature *Pinus radiata* plantation. Although the Modification would result in removal of some of this plantation, views of the molybdenum recovery plant from Cadia Road are expected to be limited by the remaining pine plantation trees and intervening topography. No views from private receivers further east of Cadia Road are expected, as Cadia Road generally follows the ridgeline and catchment divide between Cadiangullong/Rodds Creeks and Flyers Creek.

3.6 WATER RESOURCES

The molybdenum recovery plant would be located within the operational catchments of the adjacent Rodds Creek Water Holding Dam and Northern Tailings Storage Facility. Construction of the molybdenum recovery plant would include the controls described in the *CVO Water Management Plan* (CHPL, 2014d).

Accordingly, impacts on water resources are anticipated to be negligible.

3.7 OTHER ASPECTS

The *Cadia Valley Operations Surface Preconditioning and On-Site Warehouse Modification – Environmental Assessment* (CHPL, 2017) describes the estimated employee and delivery trips for the existing/approved CVO. As the molybdenum recovery plant is approved, the related trips were considered as part of the Cadia East Project EA (CHPL, 2009) and CHPL (2017).

Consistent with the existing CVO procedures, any dangerous goods required for the molybdenum recovery plant operations would be transported in accordance with the *Australian Code for the Transport of Dangerous Goods by Road and Rail* (ADG Code) (National Transport Commission, 2017).

4 CONCLUSION

The existing PA 06_0295 for the CVO authorises the construction and operation of a molybdenum recovery plant. This approved facility would be relocated to the eastern side of the CVO site, adjacent to Rodds Creek Water Holding Dam. The new location is considered to be superior to the approved because the approved location, at the CVO ore processing facilities, is spatially constrained (i.e. by existing infrastructure including the ore processing facilities, Cadia East surface facilities South Waste Rock Dump and the Cadia Hill open pit). The Modification proposes that the molybdenum recovery plant is instead constructed in a pine plantation within the existing mining leases. As no material environmental impacts have been identified, the Modification is considered to be justified.

5 REFERENCES

Cadia Holdings Pty Limited (2009) *Cadia East Project Environmental Assessment.*

Cadia Holdings Pty Limited (2014a) *Cadia Valley Operations Noise Monitoring Program.*

Cadia Holdings Pty Limited (2014b) *Cadia Valley Operations Air Quality Monitoring Program.*

Cadia Holdings Pty Limited (2014c) *Cadia Valley Operations Aboriginal Cultural Heritage Management Plan*.

Cadia Holdings Pty Limited (2014d) *Cadia Valley Operations Water Management Plan.*

Cadia Holdings Pty Limited (2017) *Cadia Valley Operations Surface Preconditioning and On-Site Warehouse Modification – Environmental Assessment*.

Department of Environment, Climate Change and Water (2010a) *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010.*

Department of Environment, Climate Change and Water (2010b) *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW.*

Flora Search (2018) *Molybdenum Recovery Plant Relocation Modification Ecological Assessment.*

Landskape (2018) *Aboriginal Cultural Heritage Assessment.*

National Transport Commission (2017) *Australian Code for the Transport of Dangerous Goods by Road and Rail*.

Ramboll (2018) *Cadia Valley Operations Mod 10 Air Quality Review.*

Wilkinson Murray Pty Ltd (2009) *Cadia East Project Noise and Blasting Impact Assessment*. Report prepared for Cadia Holdings Pty Limited.

Wilkinson Murray Pty Ltd (2018) *Molybdenum Recovery Plant Relocation Modification Noise Review*. Report prepared for Cadia Holdings Pty Limited.

APPENDIX A

NOISE REVIEW

APPENDIX B

AIR QUALITY REVIEW

APPENDIX C

ECOLOGICAL REVIEW

APPENDIX D

ABORIGINAL CULTURAL HERITAGE ASSESSMENT