



WHITEHAVEN GROUP



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WHC-PLN-OC-SUN- Rehabilitation Management Plan

WHITEHAVEN COAL

SUNNYSIDE COAL MINE

REHABILITATION MANAGEMENT PLAN

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Summary Table

Name of Mine	SCM
Rehabilitation Management Plan Commencement Date	July 2022
Mining Authorisations (Lease / Licence No.)	ML 1624 Expiry 5 November 2029
Name of Authorisation holder(s)	Namoi Mining Pty Ltd
Name of Mine Operator (if different)	Whitehaven Coal Mining Limited
Date	August 2022
Version	Version 1.0



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1 INTRODUCTION TO MINING PROJECT

The Sunnyside Coal Mine (SCM) was an open-cut coal mining operation, located within the Gunnedah Shire, approximately 15 kilometres (km) west of Gunnedah in northern New South Wales (NSW). The SCM is located within Mining Lease (ML) 1624 which is issued to Namoi Mining Pty Ltd (NMPL) (See **Figure 1**).

This Rehabilitation Management Plan (RMP, the Plan) has been prepared in accordance with the Mining Exploration and Geoscience – Resources Regulator's (RR) *Form and Way: Rehabilitation Management Plan for Large Mines* (RR, 2021) and associated guidelines (refer **Section 1.3**). The Plan has also been prepared to satisfy Condition 30, Schedule 3 of PA 06_0308 which requires NMPL to prepare and implement a Rehabilitation and Landscape Management Plan.

1.1 HISTORY OF OPERATIONS

Approval for Sunnyside was granted by the NSW Minister for Planning under Part 3A of the NSW Environment Planning and Assessment Act 1979 (EP&A Act) on 24 September 2008 under Project Approval 06-0308 (PA 06_0308). PA 06_0308 provided for the extraction of approximately 7 million tonnes (Mt) of run-of-mine (ROM) coal, with a maximum rate of 1 million tonnes per annum (Mtpa). The approval also allows for the crushing and screening of ROM coal at Sunnyside, prior to transport to the Whitehaven Coal Handling and Preparation Plant (CHPP) near Gunnedah.

ML 1624 was issued by the Minister for Mineral Resources on 5 November 2008. In addition, Environment Protection Licence (EPL) 12957 was granted on 15 December 2008. Operations at the SCM commenced in 2008.

Due to unfavourable economic conditions, Whitehaven discontinued mining operations at the SCM on 29 November 2012 and the mine was placed in care and maintenance. Stockpiled ROM coal continued to be transported to the CHPP on a campaign basis until May 2013. While the SCM was non-operational, environmental monitoring and rehabilitation continued.

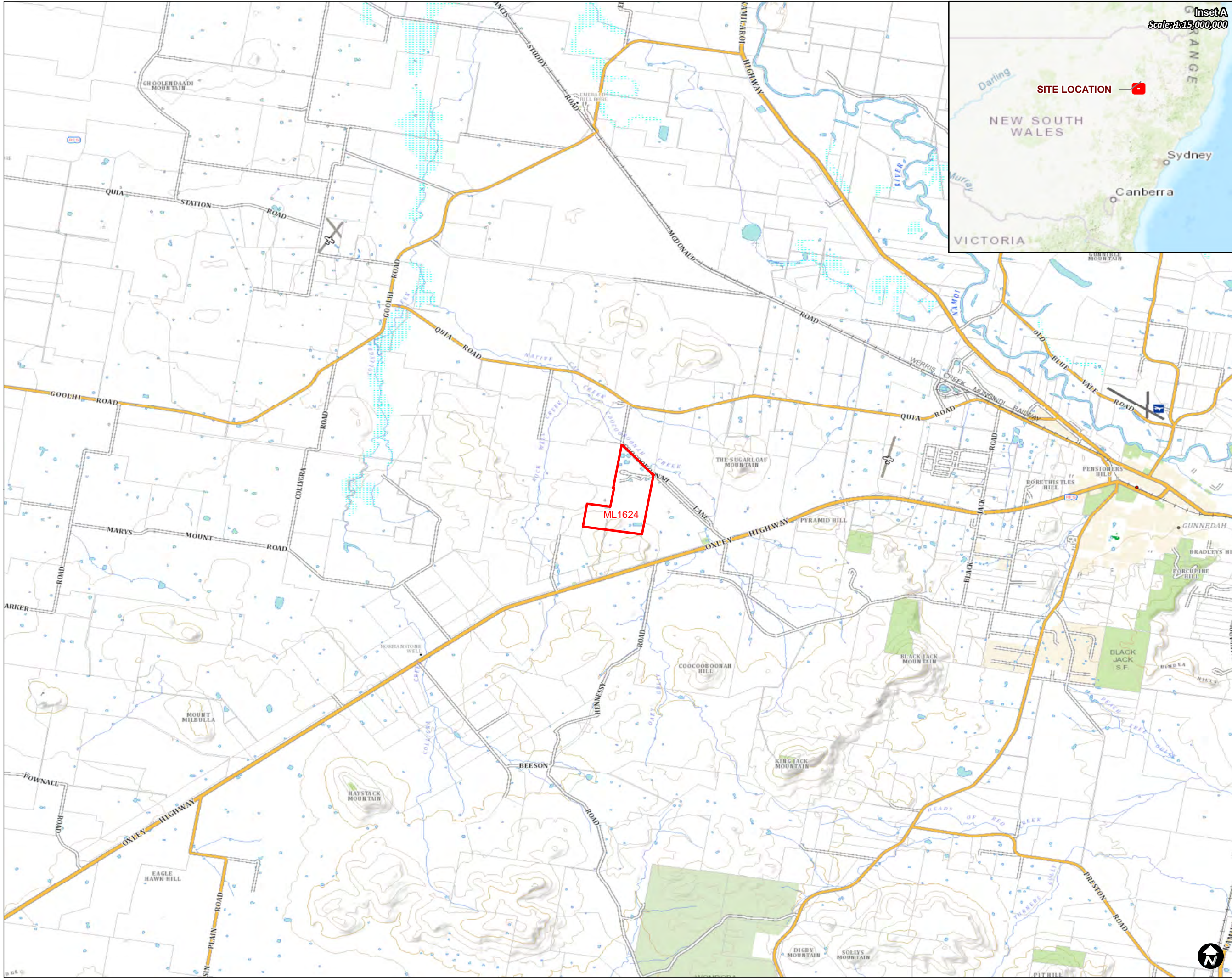
On 3 November 2015, a modification (MOD1) was granted for a five-year extension to mining operations to 5 November 2020. A subsequent modification (MOD2) was granted on 13 January 2017 for an administrative change to Annual Review requirements in Schedule 5 Condition 5 of PA 06_0308.

Following improvements in coal prices, mining recommenced in September 2017.

A third modification (MOD3) was lodged to the NSW Department of Planning and Environment (DP&E) in August 2018 which involved a modification to the post-mining backfilling strategy to create a final landform that includes a wholly free-draining final void depression (Whitehaven, 2018a). MOD 3 was granted in January 2019.

A fourth modification (MOD4) was lodged with DPE to amend the disturbance boundary to accommodate the requirement to install a highwall drain and safety bund. The modification was approved by DPE on the 22 June 2022.

Production ceased in August 2019, with coal crushing and transporting activities ceasing on the 27th of October 2019. Site activities are currently limited to aftercare, maintenance water management and rehabilitation. A Site Layout is shown in **Figure 2**.



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REHABILITATION
MANAGEMENT PLAN

SUNNYSIDE

FIGURE 1
REGIONAL LOCALITY

LEGEND
 Project Approval Boundary

Data Sources:
DoR NSW Exploration and Mining Leases
NSW LPI Base Map

0 1 2
Kilometres

Coordinate System: GDA2020

Scale: 1:100,000 at A3

Project Number: 630.30268

Date: 25-Jul-2022

Drawn by: LC

Annual Reporting Period: 2021





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FIGURE 2
SITE LAYOUT

LEGEND

Project Approval

Data Sources:
DoR NSW Exploration and Mining Leases
NSW LPI Base Map

0 150 300 Metres

Coordinate System: GDA2020

Scale: 1:10,142 at A3

Project Number: 630.30268

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1.2 CURRENT DEVELOPMENT CONSENTS, LEASES AND LICENCES

1.2.1 DEVELOPMENT CONSENTS

Table 1 below shows the Development Consent held by Sunnyside.

Table 1 Development Consents

Issuing / Responsible Authority	Development Consent*	Details	Date of Issue	Expiry
DP&E	PA 06_0308	Project Approval for Sunnyside Coal	24/9/2008	Mining operations until 5/11/2015
DP&E	PA 06_0308 (MOD1)	MOD1 (extend expiry of PA06_0308 and address revised final landform)	3/11/2015	Mining operations until 5/11/2020
DP&E	PA 06_0308 (MOD2)	MOD2 (administrative modification to Annual Review requirements in Schedule 5 Condition 5)	13/1/2017	Mining operations until 5/11/2020
DP&E	PA 06_0308 (MOD3)	MOD3 (modification to the approved post-mining backfilling strategy to create a final landform that is wholly free-draining and would no longer include a final void)	17/1/2019	Mining operations until 5/11/2020

1.2.2 AUTHORISATIONS

Sunnyside currently holds ML 1624 as outlined in **Table 2**.

Table 2 Authorisations

Issuing / Responsible Authority	Licence	Grant Date	Expiry Date	Status
RR	ML 1624	5/11/2008	5/11/2029	Current

1.2.3 OTHER APPROVALS

A summary of all licences held by Sunnyside for the mining operations are included in **Table 3**.

Table 3 Licences

Issuing / Responsible Authority	Licence	Licence Type	Grant Date	Expiry date
Environment Protection Authority (EPA)	EPL 12957	Environment Protection Licence	15/12/2008	Anniversary date 15 December
WaterNSW	90BL253767	Test bore	9/2/2007	Perpetuity



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Issuing / Responsible Authority	Licence	Licence Type	Grant Date	Expiry date
	90BL253768	Test bore	9/2/2007	Perpetuity
	90BL253769	Test bore	9/2/2007	Perpetuity
	90BL254686	Monitoring bore	26/3/2008	Perpetuity
	90BL254687	Monitoring bore	26/3/2008	Perpetuity
	90BL254688	Monitoring bore	26/3/2008	Perpetuity
	90BL254689	Monitoring bore	26/3/2008	Perpetuity
	90BL254690	Monitoring bore	26/3/2008	Perpetuity

1.3 APPLICABLE GUIDELINES

In addition to the regulatory requirements identified above, this Plan has been prepared with consideration for the following guidelines, standards, and policies:

- *Form and way: Rehabilitation Management Plan (large mines);*
- *Form and way: Rehabilitation objectives, rehabilitation completion criteria and final landform and rehabilitation plan for large mines;*
- *Guideline: Rehabilitation risk assessment;*
- *Guideline: Rehabilitation objectives and rehabilitation completion criteria;*
- *Planning for Integrated Mine Closure Toolkit (ICMM, 2008);*
- *Mining Amendment (Standard Condition of Mining Leases – Rehabilitation) Regulation 2021;*
- *Strategic Framework for Mine Closure (ANZMEC 2000);*
- *Leading Practice Sustainable Development Program for the Mining Industry – Mine Closure and Completion, Mine Rehabilitation (Commonwealth Department of Industry, Tourism and Resources);*
- *Best Practice Environmental Management in the Mining Industry Series;*
- *Enduring Value (Mineral Council of Australia 2015); and*
- *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (Mining SEPP).*

1.4 LAND OWNERSHIP AND LAND USE

1.4.1 LAND OWNERSHIP

Land ownership within and surrounding SCM is shown in **Figure 3**, **Figure 4** and **Figure 5**.

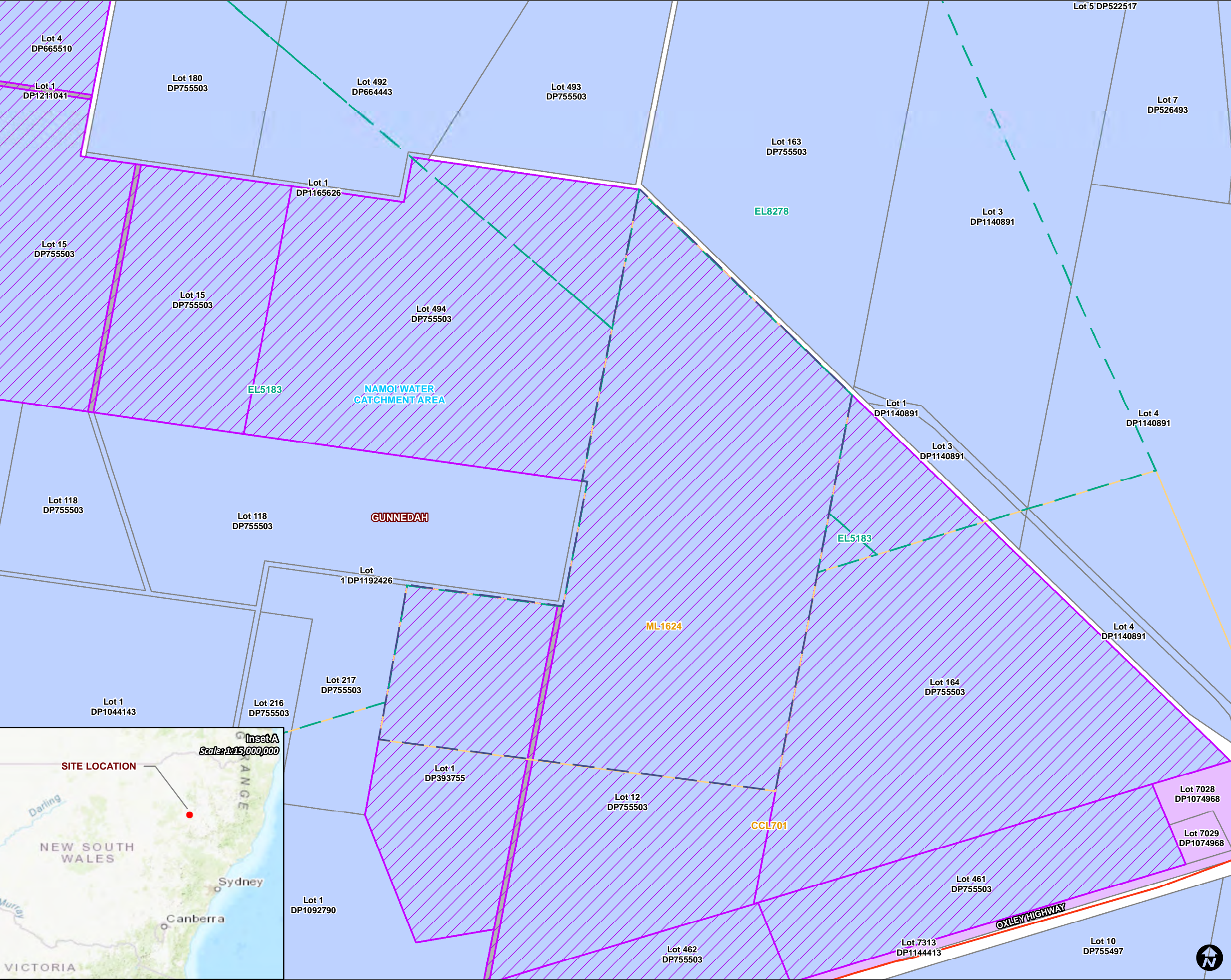
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The SCM is located on Lot 12 DP755503 and Lot 1 DP393755 which are within the Parish of Gill in the Gunnedah Shire. These parcels are held in freehold title by NMPL. The subject land is zoned RU1 (Primary Production) under the Gunnedah Local Environment Plan 2012. The schedule of Lands attached to PA 06_0308 is reproduced in **Appendix B**.

The Sunnyside Project Approval Area covers an area of approximately 234 hectares within the “Sunnyside” property which is owned by NMPL. The “Lilydale” property, located to the north-west and east of the SCM, is also owned by NMPL. The “Plain View” and “Werona” property, located to the north-east and north-west respectively, of the SCM are privately owned, however the “Plain View” property is related to the mine’s operations through leasing of the section of the property on which the coal transport route is located. The “Lilydale” property, located to the north-west and east of the SCM, is also owned by NMPL. The “Plain View” and “Werona” property, located to the north-east and north-west respectively, of the SCM are privately owned, however the “Plain View” property is related to the mine’s operations through leasing of the section of the property on which the coal transport route is located.

1.4.2 HISTORIC AND CURRENT LAND USE

Prior to mining, the SCM had predominantly been cleared for agricultural cultivation and grazing and was vegetated with open grassland. Land use immediately surrounding the SCM is also predominantly cropping and pastoral land use. A rocky escarpment with remnant vegetation and regrowth is located immediately south of the SCM. This southern area is considered a valuable area of local habitat given the historical landscape clearing within the region and is proposed to be managed as Koala habitat.



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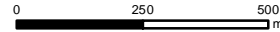
SUNNYSIDE

FIGURE 3
LAND OWNERSHIP

LEGEND

- Major Road
- Project Approval Boundary
- Exploration Licence
- Mining Lease
- Local Government Area
- Property Boundaries
- Whitehaven Owned Land
- Land Ownership**
 - Crown
 - Freehold
 - Unknown

Data Sources:
NSW Spatial Information Exchange
DoR NSW Exploration and Mining Leases
NSW LPI Land Status Cadastre & Ownership



Coordinate System:	GDA2020
Scale:	1:15,000 at A3
Project Number:	630.30268
Date:	25-Jul-2022
Drawn by:	JG
Annual Reporting Period:	2021





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FIGURE 4
LAND USE AND CONTOURS

LEGEND

- Major Road
- Current Landform Contour (5 mAHd)
- Project Approval Boundary
- Exploration Licence
- Mining Lease
- Local Government Area
- Property Boundaries

Land Use

- 2.1.0 Grazing native vegetation
- 3.2.0 Grazing modified pastures
- 3.3.0 Cropping
- 3.4.0 Perennial horticulture
- 5.4.0 Residential and farm infrastructure
- 5.7.0 Transport and communication
- 5.8.0 Mining
- 6.2.0 Reservoir/dam

Data Sources:
NSW Spatial Information Exchange
DoR NSW Exploration and Mining Leases
ESRI Basemap world imagery 2022
NSW LPI Land Status Cadastre & Ownership
NSW DPE Landuse 2017

0 250 500 m

Coordinate System: GDA2020

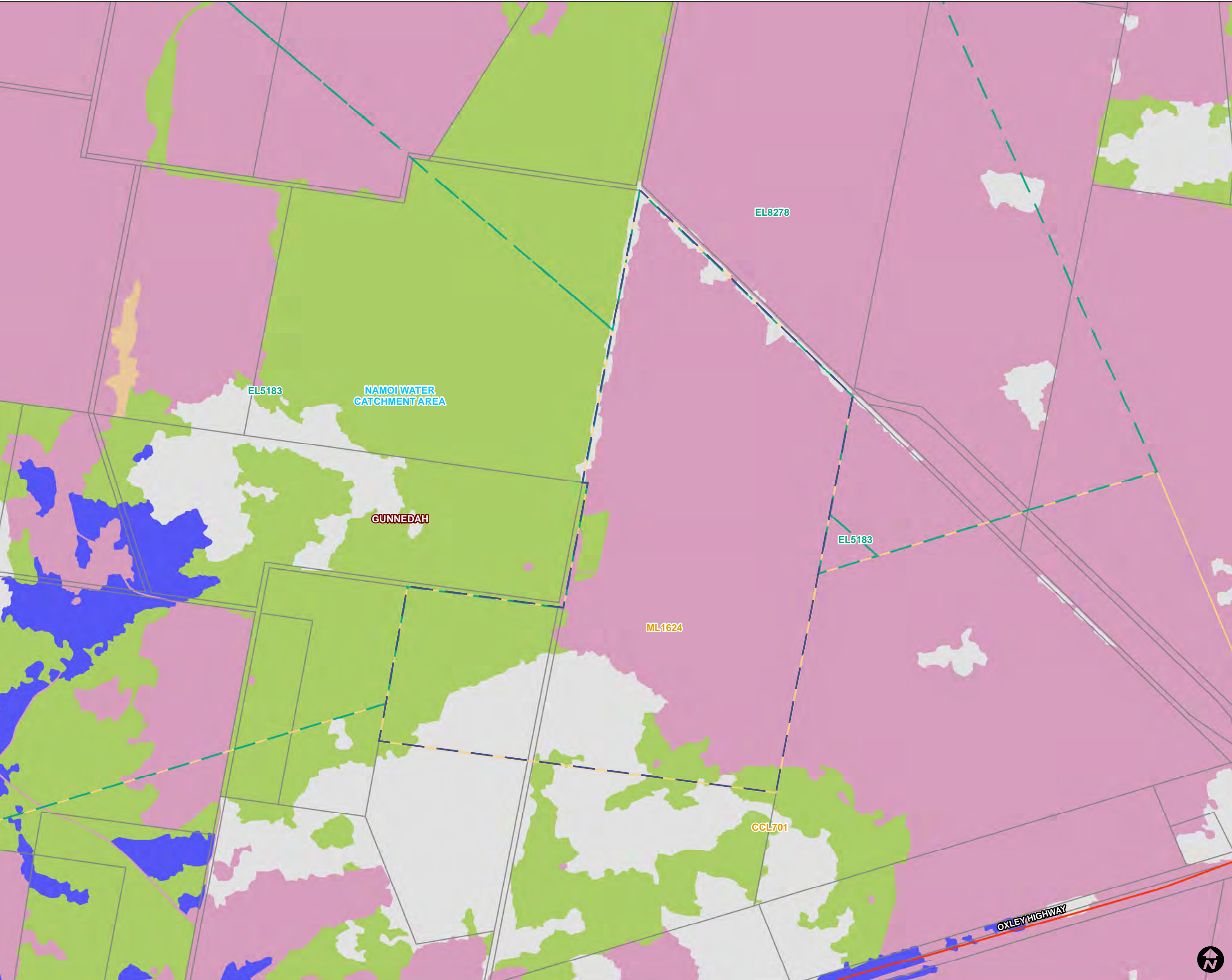
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Annual Reporting Period: 2021



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FIGURE 5
VEGETATION COMMUNITIES

LEGEND

- Major Road
- Project Approval Boundary
- Exploration Licence
- Mining Lease
- Local Government Area
- Property Boundaries
- Plant Community Type**
 - No Data
 - 0 - Non-Native
 - 1 - Candidate Native Grasslands
 - 27 - Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
 - 433 - White Box grassy woodland to open woodland on basalt flats and rises in the Liverpool Plains sub-region, BBS Bioregion

Data Sources:
NSW Spatial Information Exchange
DoR NSW Exploration and Mining Leases
NSW LPI Land Status Cadastre & Ownership
NSW Seed OEH Board Rivers Gwydir/Namoi regional native vegetation map v2 2015

0 250 500 m

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1.4.3 FUTURE LAND USE

The post-mining landform (including areas of the out-of-pit emplacement and final depression) will include approximately 85 ha of land rehabilitated with a mix of native and exotic pasture species and 17.7 ha of woodland species. Pasture rehabilitation areas will be created with a mix of land capability classes that is generally in accordance with the pre-mining environment to restore the potential for some grazing areas with characteristics similar to pasture areas in the general locality. It is expected that this area will be used for grazing purposes following closure of the SCM by future landowner/s. NMPL may alternatively elect to retain ownership of the land and lease the area for ongoing agricultural use.

Following cessation of mining the open cut has been partially backfilled, resulting in a minimum elevation of approximately 330 m AHD in the free-draining final depression. A portion of the open cut highwall to the south of the open cut (which would have a maximum elevation of approximately 372 m AHD) would be retained as part of the final landform. To ensure the ongoing stability of slopes retained in the final landform, geotechnical assessment and survey of all key areas will be undertaken to assess the stability of the landform and to verify that it has been constructed in accordance with the final landform shown in **Figure 6**. Survey or remote sensing of the rehabilitated landforms would be undertaken to identify any evidence of slumping or weathering that could compromise the stability of the highwall or end wall.

The post-mining landform includes approximately 17.7 ha of land rehabilitated with woodland species to enhance biodiversity values of the area. The rehabilitation of disturbed areas with woodland species targets the enhancement of Koala habitat and movement corridors and includes the batters of the regraded out-of-pit waste emplacement. The elevated areas (undisturbed by mining activities) on the southern end of the property will remain as Koala habitat. Additionally, approximately 18.3 ha of additional tree planting on areas undisturbed by mining activities along the eastern, northern, and western boundaries of the property will enhance wildlife corridors. It is expected that this area will continue to serve as a biodiversity enhancement area following closure of the SCM, subject to consultation with future landowner/s and any other relevant stakeholders.

Following mine closure, it is intended to retain some additional clean water dams and some access tracks (**Figure 6**). It is expected that any retained water infrastructure would be used for ongoing agricultural purposes (e.g., stock watering) following closure of the SCM.



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2 FINAL LAND USE

2.1 REGULATORY REQUIREMENTS FOR REHABILITATION

The regulatory requirements specific to post mining land use, rehabilitation, and closure at Sunnyside are summarised in **Table 4**.

Table 4 Regulatory Requirements Rehabilitation

.	Requirement	Domain	Timing	Section Addressed
Mining Lease 1624				
Part 2 Standard Conditions Division 1 Condition 4	Prevent or minimise harm to the environment.	All	Ongoing	Section 3
Part 2 Standard Conditions Division 1 Condition 5	Rehabilitate land and water as soon as reasonably practicable after disturbance occurs.	All	Ongoing	Section 6.1
Part 2 Standard Conditions Division 1 Condition 6	Achieve the approved final land use for the mining area as set out in the: <ul style="list-style-type: none"> rehabilitation objectives statement; rehabilitation completion criteria statement; and final landform and rehabilitation spatial plan (large mines only). 	All	Prior to relinquishment	Section 2.3
Part 2 Standard Conditions Division 2 Condition 7	Undertake a rehabilitation risk assessment and implement measures to eliminate, minimise or mitigate risks to achieving the final land use.	All	Complete/ Ongoing	Section 3
Part 2 Standard Conditions Division 3 Condition 10	Prepare and implement a rehabilitation management plan (large mines only).	All	Complete	This document
Part 2 Standard Conditions Division 3	Prepare an annual rehabilitation report which describes the progress of rehabilitation over	All	Ongoing	Section 6



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Condition 13	the annual reporting period.									
Part 2 Standard Conditions Division 3 Condition 13	Prepare a forward program which includes the schedule of mining and rehabilitation activities for the next three years demonstrating how rehabilitation will occur as soon as reasonably practicable after disturbance.	All	Ongoing	Section 6						
Project Approval PA 06_0308										
Schedule 3, Condition 29	<p>The Applicant must rehabilitate the site to the satisfaction of the Resources Regulator. This rehabilitation must comply with the objectives in Table 10.</p> <p>Table 10: Rehabilitation Objectives</p> <table><tr><th>Feature</th><th>Objective</th></tr><tr><td>Mine site (as a whole)</td><td><p>Safe, stable, and non-polluting</p><p>Final landforms maximise geotechnical performance, stability, and hydrological function</p><p>Constructed landforms maximise surface water drainage to the natural environment</p><p>Minimise long term groundwater seepage from the site to ensure negligible environmental consequences beyond those predicted for the project</p><p>Minimise visual impact of final landforms as far as is reasonable and feasible</p></td></tr><tr><td>Surface infrastructure</td><td>To be decommissioned and removed,</td></tr></table>	Feature	Objective	Mine site (as a whole)	<p>Safe, stable, and non-polluting</p> <p>Final landforms maximise geotechnical performance, stability, and hydrological function</p> <p>Constructed landforms maximise surface water drainage to the natural environment</p> <p>Minimise long term groundwater seepage from the site to ensure negligible environmental consequences beyond those predicted for the project</p> <p>Minimise visual impact of final landforms as far as is reasonable and feasible</p>	Surface infrastructure	To be decommissioned and removed,	All	Life of Mine	Section 4 and 6
Feature	Objective									
Mine site (as a whole)	<p>Safe, stable, and non-polluting</p> <p>Final landforms maximise geotechnical performance, stability, and hydrological function</p> <p>Constructed landforms maximise surface water drainage to the natural environment</p> <p>Minimise long term groundwater seepage from the site to ensure negligible environmental consequences beyond those predicted for the project</p> <p>Minimise visual impact of final landforms as far as is reasonable and feasible</p>									
Surface infrastructure	To be decommissioned and removed,									



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		unless the Resources Regulator agrees otherwise			
	Final Voids	No final void and free draining to the natural drainage system			
Schedule 3, Condition 30	<p>The Proponent shall prepare and implement a detailed Rehabilitation and Landscape Management Plan for the site to the satisfaction of the Secretary and the Resources Regulator. This plan must:</p> <ul style="list-style-type: none"> (a) be prepared in consultation with OEH, DPI Water and Council by suitably qualified expert/s whose appointment/s have been approved by the Secretary; and (b) be submitted to the Secretary and the Resources Regulator for approval by 1 March 2009; (c) include: <ul style="list-style-type: none"> ▪ the rehabilitation objectives for the site; ▪ a description of how the rehabilitation of the site would be integrated with the landscape of the surrounding area; ▪ detailed performance and completion criteria for the rehabilitation of the site; ▪ a detailed description of the measures that would be implemented to achieve the performance and completion criteria for each site, including the procedures to be implemented for: <ul style="list-style-type: none"> - managing impacts to water quality and flows; - protection and enhancement of koala habitat; - progressively rehabilitating the areas disturbed by mining operations; - restoration of agricultural land suitability; - revegetating the site; 		All	Life of Mine	<p>This Document</p> <p>4.1 6.3.1</p> <p>4.3 4.4</p> <p>6.3.1 6.3.2</p>



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	<ul style="list-style-type: none"> - protecting and/or enhancing areas in the vicinity of the disturbance area; - conserving and re-using any topsoil; - controlling weeds and feral pests; - controlling access; and - bushfire management. <ul style="list-style-type: none"> ▪ a program to monitor the performance of the rehabilitation against the stated objectives, performance and completion criteria; ▪ a description of the potential risks to successful rehabilitation, and a description of the contingency measures that would be implemented to minimise these risks; and <p>details of who is responsible for monitoring, reviewing, and implementing the plan.</p>			7,8 3.2 8
Statement of Commitments				
1. General Project Development	<p>1.1 All activities will be subject to the Mining, Rehabilitation and Environmental Management Process managed by the Department of Primary Industries – Mineral Resources.</p> <p>1.6 Undertake all rehabilitation and site decommissioning within 12 months of the end of mining. This would include re-instating Coocooboonah Lane to its pre-mining alignment</p> <p>1.10 Direct surface runoff water around the final void.</p>	All All	Ongoing Within 12 months of the end of mining Ongoing	4.5.2, 6.3.1 4.2.2, 6.3.1, 6.3.2 6.3.3
9. Flora and Fauna	9.6 Re-establish a small area of the Endangered ecological community Native Vegetation on Cracking Clay Soils of the Liverpool Plains.		After Coocooboonah Lane is re-established in	6.3.1, 1.4.3



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			pre-mining location.	N/A
	9.9 Transfer soil material and biomass removed beyond the first 18 to 24 months of mining directly to an active rehabilitation area, where practicable.		Active Mining (Completed)	6
	9.10 Undertake progressive rehabilitation of all disturbed areas.		Ongoing	6.3.5, 4.3
	9.11 Control noxious weeds at all times.		Ongoing	4.4, 6.3.1
	9.12 Adopt a strategy to rehabilitate specific areas of the Project Site to native vegetation, create and / or improve habitat corridors on and adjacent to the Project Site, and protect areas of native vegetation from agricultural activities on NMPL land external to the Project Site.		Ongoing	4.2.2, 6.3.1, 6.3.5
	9.13 Maintain, expand and / or create several Koala habitat corridors to promote the linkage of remnant vegetation in the local area.		Ongoing	
	9.14 Conserve the existing native vegetation on the Project Site during the life of the proposal and in the final landform		Ongoing	6.3, 6.3.1
	9.18 Bury all stumps, branches, and tree trunks from felled timber within the overburden emplacements.		Not Contemporary Practice	6.3
	9.19 Commence post-mining rehabilitation of the Box Cut area as soon as possible. Re-establish the connectivity of habitat corridor along Coocooboonah		Ongoing	4, 6.3.1



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	Lane. Commence postmining establishment of the Koala habitat corridors between Coocooboonah Lane and the remnant woodlands south of the Project Site as soon as practicable to re-establish and enhance the connectivity of local Koala habitat corridors			
11. Air Quality	<p>11.1 Fence off all land which is not to be disturbed to encourage natural regeneration.</p> <p>11.2 Establish ground cover on disturbed areas and emplacement areas as soon as possible.</p> <p>11.21 Progressively rehabilitate areas of disturbance including topsoil and subsoil stockpiles.</p>		<p>At start of mining</p> <p>Ongoing</p> <p>Ongoing</p>	<p>6.3.2</p> <p>6.3.5</p> <p>6.3.1</p>
13. Visibility	<p>13.1 Minimise cleared or non-vegetated areas by progressively rehabilitating the Project Site.</p> <p>13.2 Design the overburden emplacements to as much as possible, replicate existing topographic features.</p>		<p>Ongoing</p> <p>During planning and design</p>	<p>6.3.1</p> <p>6.3.1</p>
14. Soil, Land Capability and Agricultural Suitability	<p>14.1 Strip topsoil from each SMU to a depth of 15cm. Stockpile topsoil for later retrieval and spreading over specific areas during the first 18 to 24 months of mine operations. Beyond this period, Project Site topsoil would be typically directly transferred onto sections of the final landform.</p> <p>14.2 Strip subsoil from each SMU to a depth of 50cm below the topsoil. Stockpiles would be available for re-spreading as areas become available for rehabilitation</p>		<p>Active Mining (Completed)</p> <p>Active Mining (Completed)</p>	<p>N/A</p> <p>N/A</p>



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	<p>14.4 Place higher alkalinity soils over the surface of the overburden emplacement to provide neutralising capacity in the event pockets of acid forming rock are encountered.</p> <p>14.5 Install erosion protection around stockpiles of this material with direct transfer from source to sink commenced as soon as practicable.</p> <p>14.6 Topsoil stockpiles not exceed 2m in height and where practicable, be maintained as windrows in preference to larger structures.</p> <p>14.7 Seed any stockpiles with a non-persistent cover crop as soon as possible after they have been established to reduce erosion potential and assist in the maintenance of the biological viability of the soil.</p> <p>14.8 Subsoil stockpiles to generally not exceed 3m in height and typically be placed in larger stockpiles than the topsoil.</p> <p>14.9 Maintain and regularly reconcile with rehabilitation requirements an inventory of soil resources present on the Project Site, ie. both in stockpiles and awaiting stripping.</p> <p>14.10 Utilise water management structures to divert surface water flow away from soil stockpile areas to reduce the potential for erosion.</p> <p>14.11 Place silt-stop fencing or similar immediately downslope of stockpiles where required, until stable vegetation cover is established.</p>		<p>Completed</p> <p>Active Mining (Completed)</p> <p>Active Mining (Completed)</p> <p>Active Mining (Completed)</p> <p>Active Mining (Completed)</p> <p>Ongoing</p> <p>Active Mining (Completed)</p> <p>Active Mining (Completed)</p>	<p>N/A</p> <p>N/A</p> <p>N/A</p> <p>N/A</p> <p>N/A</p> <p>6.3.1</p> <p>N/A</p> <p>N/A</p> <p>12, 8, 6.3.1</p>
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	14.12 Monitor erosion from soil stockpiles or rehabilitated surfaces throughout the life of the Project with remedial works undertaken should erosion be observed.		Ongoing	
17. Rehabilitation	<p>17.1 Stabilise earthworks, drainage lines and disturbed areas no longer required for mine related activities in order to minimise erosion and the associated generation of sediment laden water, and to reduce the visibility of activities from adjacent properties and the local road network.</p> <p>17.2 Provide a low maintenance, geotechnically and safe landform which is commensurate with a variety of agricultural land uses and / or nature conservation.</p> <p>17.3 Blend the created landforms with the surrounding land fabric as far as practicable.</p> <p>17.4 Utilise native tree, shrub and grass species and / or pasture species comparable with either the existing vegetation communities or those which occurred in the area prior to mining and agriculture-related disturbance.</p> <p>17.5 Rehabilitate out-of-pit emplacement with agricultural pasture species and incorporate random tree plantings.</p>		<p>Ongoing</p> <p>Ongoing</p> <p>Ongoing</p> <p>Ongoing</p> <p>Ongoing</p>	<p>4.2.1, 6.3.1,6</p> <p>4.4, 6, 6.3.3</p> <p>4.2.2</p> <p>6.3.5</p> <p>6.1.2</p>
Mining Lease 1624				
Condition 7	Disturbed land must be rehabilitated to a sustainable/agreed end land use to the satisfaction of the Director-General			4.1, 4.3, 4.4

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2.2 FINAL LAND USE OPTIONS ASSESSMENT

This section is not applicable to the Sunnyside RMP as the final land use is specified under Project Approval PA 0308 (refer to **Section 2.1**).

2.3 FINAL LAND USE STATEMENT

The overall closure goal for the SCM is to establish a stable and safe landform that is commensurate with the surrounding topography, and which maximises the return to an appropriate agricultural land use comparable to the pre-mining land use but is considerate of the fact that the landform is a backfilled mining area. The post-mining backfilling strategy is to create a final void that is wholly free-draining and no longer includes a final void. Assessments will demonstrate the stability of the final landform into perpetuity. The rehabilitation strategy also includes the enhancement of habitat value and ecosystem connectivity.

2.4 FINAL LAND USE AND MINING DOMAINS

2.4.1 FINAL LAND USE DOMAINS

Final land use domains are defined as land management units characterised by similar final land use objectives. Each final land use domain will require specific rehabilitation methods.

The final land use domains for this Plan are presented in Table 5 and shown on the Final Landform and Rehabilitation Plan (refer **Figure 6**).

Table 5 Final Land Use Domains

Code	Final Land Use Domain	Description
A	Native Ecosystem	Areas rehabilitated with native vegetation species analogous to adjacent remnant vegetation communities in the areas surrounding the SCM. Native vegetation areas will have characteristics like existing analogue sites to provide suitable habitat and movement corridors for native fauna.
B	Agricultural - Grazing	Areas rehabilitated with A mixture of native and pasture species to a rural land capability of (at least) Class VI, suitable for grazing land use.
F	Water management areas	The network of dams and water management structures retained in the final landform. Dams will provide water resources for grazing areas and native fauna.
I	Infrastructure	Infrastructure to be retained following relinquishment including some clean water dams and access tracks.

2.4.2 MINING DOMAINS

Mining domains identify the footprint of areas disturbed for mining related activities. For the purpose of this Plan, mining domains have been defined as the set of discrete areas that have a particular operational or functional purpose, therefore having similar geophysical and geochemical characteristics that will have similar rehabilitation requirements.

Mining domains are presented in **Table 6**.

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Table 6 Mining Domains

Code	Final Land Use Domain	Description
1	Infrastructure Area	Footprint of areas disturbed for existing and decommissioned infrastructure including; amenity facilities, sealed and unsealed roads and carparks, stockpiled material, ROM Pad and maintenance areas Material stockpiled for future management, (e.g., soil resources).
3	Water Management Area	The network of clean water and dirty water dams and associated infrastructure used for operational and rehabilitation water management.
4	Overburden Emplacement Area	Footprint of out-of-pit overburden waste dumps.
5	Active Mining Area (Open cut void)	Remaining Open cut footprint

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3 **REHABILITATION RISK ASSESSMENT**

3.1 **SUMMARY OF RISK ASSESSMENTS**

Multiple risk assessments have been completed historically for the rehabilitation works associated with Sunnyside. Based on review of historic documentation, **Table 7** summarises the identified risk assessments.

Table 7 Summary of Risk Assessments

Date	Risk Assessment	Details
November 2018	Closure MOP Risk Assessment	The Whitehaven Risk Register was used to calculate the consequence and likelihood of an event at the SCM during the Closure MOP term, to evaluate the subsequent risk.
October 2020	Gunnedah Open Cut Qualitative Risk Assessment	Determine the environmental aspects of the Gunnedah Open Cut Operations, rehabilitation and closure activities, products, and services that it can control and those that it can influence and their associated environmental impacts.
2021	Gunnedah Open Cut Broad Brush Risk Assessment (BBRA)	BBRA review to review material risks and controls.
2021	Gunnedah Open Cut Bowtie Risk Assessment	Bow Tie risk assessment for closed mine environmental risks
December 2021	RMP Risk Assessment	A risk assessment was conducted to identify the key issues that presented a risk to achieving satisfactory rehabilitation at Sunnyside and inform the preparation of the RMP. This risk assessment was conducted in accordance with Resources Regulator's Guideline: Rehabilitation Risk Assessment to satisfy the standard rehabilitation conditions introduced on Mining Leases in July 2021.

3.2 **REHABILITATION RISK ASSESSMENT**

Conditions of a mining lease granted under the Mining Act 1992 require the lease holder to conduct a rehabilitation risk assessment and implement measures to eliminate, minimise or mitigate the risks in accordance with the Resources Regulator's Guideline: Rehabilitation risk assessment.

A risk assessment workshop was undertaken on 16 December 2021. The workshop was used to identify the key issues that presented a risk to achieving satisfactory rehabilitation at Sunnyside.

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The risk assessment included key Whitehaven and SLR personnel and was undertaken in accordance with AS/NZS ISO 31000:2018 Risk Management – Guidelines, the Risk Management Handbook for the Mining Industry (MDG1010). Whitehaven's Risk Matrix was used to calculate the consequence and likelihood of an event and to evaluate the subsequent risk level (risk rank).

The risk assessment has been used to inform the preparation of this Plan. The objectives of the risk assessment were to:

- Identify the risks associated with rehabilitation and closure of Sunnyside to achieve the approved post mining land uses;
- Identify knowledge gaps in Whitehaven's current understanding of the risks to rehabilitation;
- Identify the investigations/controls/action plans necessary to effectively mitigate risks and/or realise opportunities and to close any identified knowledge gaps;
- Inform the development of this RMP, to provide a basis to determine additional investigations and/or project works to be undertaken; and
- Provide the framework to satisfy relevant internal and government guidelines, requiring implementation of a risk-based approach to closure.

The risk workshop assessed a total of 52 key rehabilitation risks, which are summarised as:

- 14 risks were ranked as not applicable;
- 28 risks were ranked as low;
- 9 risks were ranked as moderate;
- 1 risk was ranked as high; and
- 0 risks were ranked as critical.

Rehabilitation risks, controls and proposed controls will regularly be reviewed and revised (as required)

3.2.1 **SPECIFIC RISKS RELATING TO REHABILITATION**

The key risks (high and critical risks) to successful rehabilitation and associated risk controls identified within the December 2021 workshop have been summarised in Table 8. The outcomes of the risk assessment workshop have been used to inform the preparation of this Plan.

Table 8 Key Rehabilitation Risks and Identified Controls

Risk Rating	Key Risk	Key Controls	Sections Addressed
High	Weed infestation	TARP to drive rehabilitation success through responses where actions are required	Section 10
		Weed and Pest Management Plans	Section 6.3.1
		Study on control of pasture species in rehabilitation	Section 9.1
		Annual Rehab Plan	Section 8.3.3
		Rehabilitation standard includes weeds and pests	Section 6.3.1
		Annual rehabilitation monitoring	Section 8

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		Agronomist provides recommendations for priority weeds	Section 6.3.5
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3.2.2 FURTHER STUDIES / ACTION PLAN

Proposed controls and further studies were identified during the risk assessment workshop. Table 9 presents an action plan for implementation of the additional risk controls (including high and extreme risks).

Table 9 Further Studies / Action Plan

Risk Rating	Risk	Proposed Control / Study	Timeframe
High	Weed infestation	Develop weed and seed checklist for new vehicle entering site	Dec 2022

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4 **REHABILITATION OBJECTIVES AND REHABILITATION COMPLETION CRITERIA**

4.1 **PA 06_0308 REQUIREMENTS**

In accordance with Schedule 3 Condition 29 of PA 06_0308 (as modified), Whitehaven will:

- Rehabilitate the site to the satisfaction of the Resources Regulator as soon as practicable; and
- rehabilitate all parts of the site to comply with the rehabilitation objectives in **Table 10**.

Table 10 Rehabilitation Objectives

Feature	Objective
Mine site (as a whole)	<ul style="list-style-type: none"> Safe, stable, and non-polluting Final landforms maximise geotechnical performance, stability, and hydrological function Constructed landforms maximise surface water drainage to the natural environment Minimise long term groundwater seepage from the site to ensure negligible environmental consequences beyond those predicted for the project Minimise visual impact of final landforms as far as is reasonable and feasible
Surface infrastructure	To be decommissioned and removed, unless the Resources Regulator agrees otherwise
Final Voids	No final void and free draining to the natural drainage system

4.2 **SPECIFIC REHABILITATION OBJECTIVES**

In order to achieve the broad rehabilitation objectives presented in PA 06_0308, the following short-term and long-term rehabilitation objectives have been adopted at Sunnyside.

4.2.1 **SHORT-TERM REHABILITATION AND CLOSURE OBJECTIVES**

Short-term rehabilitation and closure objectives at the SCM include:

- Infill planting where required to achieve required plant density
- to stabilise all earthworks, drainage lines and disturbed areas in order to minimise erosion and sedimentation; and
- to control vermin, feral animals and noxious weeds.

4.2.2 **LONG-TERM REHABILITATION AND CLOSURE OBJECTIVES**

Long-term rehabilitation and closure objectives at the SCM include:

- continuation and/or restoration of biodiversity and ecological integrity of areas affected by mining or agriculture within the mining lease;
- to provide habitat for fauna and corridors for fauna movement within the final landform;
- to enhance Koala habitat in accordance with the Koala Management Plan;
- to monitor rehabilitation success in terms of physical and biological parameters; and
- to achieve relinquishment status of rehabilitated and decommissioned areas.

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4.3 DOMAIN REHABILITATION OBJECTIVES

In order to achieve the broad rehabilitation objectives presented in PA 06_0308, Whitehaven have developed specific domain rehabilitation objectives.

The key rehabilitation objectives for each of the domains are defined in **Table 11**.

Table 11 Rehabilitation Domain Objectives

Mining Domain	Final Land Use Domain	Rehabilitation Objective
A	Native Ecosystem	Native vegetation with characteristics comparable with analogue sites will be established on selected areas disturbed by mining (e.g., overburden emplacement slopes) Local provenance seed will be used for woodland rehabilitation areas. Woodland rehabilitation areas will contribute to habitat resources for local fauna (including the Koala) and provide linkages with adjacent native vegetation.
B	Agricultural – Grazing	Pasture areas with characteristics comparable with analogue sites will be established on selected areas disturbed by mining (e.g., former infrastructure areas, final depression) Grazing rehabilitation areas will comply with (at least) a Rural Land Capability of Class VI. Management inputs required to sustain grazing will be in the range of analogue sites.
F	Water management areas	The final landform drainage will be designed and constructed to integrate with surrounding catchments. Some clean water dams will be retained Final landform drainage will be designed and constructed to minimise erosion and enhance geomorphic stability. The final landform water management will not adversely impact downstream water users.
I	Infrastructure	Retained infrastructure. Some access tracks will be retained in the final landform for use by post-mining landholders.

4.4 REHABILITATION COMPLETION CRITERIA

Completion criteria are objective target levels or values assigned to a variety of indicators (e.g., slope, species diversity, percent groundcover), which can be measured to demonstrate progress and ultimate success of rehabilitation. As such, they provide a defined end point, at which point in time rehabilitation can be deemed successful and the lease relinquishment process can proceed. The rehabilitation completion criteria for all areas of Sunnyside are listed in **Table 12**.

These completion criteria will be utilised to demonstrate achievement of rehabilitation objectives. It is noted that the completion criteria may be subject to refinement as rehabilitation progresses,

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including as a result of ongoing consultation with the relevant stakeholders, studies yet to be completed and continuous improvement process informed by rehabilitation monitoring results. The achievement (or otherwise) of the completion criteria will be monitored and reported as required.

Completion criteria have been informed by the following information:

- Relevant conditions of PA 06_0308;
- The Department of Regional NSW – Mining, Exploration & Geosciences (DRNSW – MEG) rehabilitation guideline documents including:
- Form and way: Rehabilitation objectives, rehabilitation completion criteria and final landform and rehabilitation plan for large mines;
- Guideline: Rehabilitation objectives and rehabilitation completion criteria;
- Completion criteria from the previously approved Sunnyside MOP;
- Similar rehabilitation projects; and
- Specific information collected to date during detailed planning investigations.

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Table 12 Draft Rehabilitation completion criteria

Final Land Use Domain	Mining Domain	Rehabilitation Objective (describe the desired feature and/or characteristics of the final land use domain)	Indicator (specific attribute associated with the objective)	Rehabilitation Completion Criteria (benchmark for the indicator, based on analogue data where appropriate)	Example Justification Validation Method (evidence that the benchmark has been achieved)
Phase 1 - Decommissioning					
Infrastructure Areas					
Native ecosystem (Rehabilitation areas – Woodland) or Agricultural – Grazing (Rehabilitation Area – Pasture)	Infrastructure	All surface infrastructure has been decommissioned and removed, unless approved otherwise by the Secretary	Removal of all services (power, water, communications) that have been connected on the site as part of the operation.	All utility infrastructure removed.	Statement provided, utility service disconnection record / notification
			Demolition and removal of all surface infrastructure that is not required for the final land use.	Infrastructure removed.	Statement provided Demolition records As-constructed final landform
			Removal of all concrete footings, foundations, and pavements	All concrete footings, foundations and pavements have been removed to avoid exposure pathways to subsequent final land use.	Statement provided Demolition records Surveyed and marked on the as-constructed final landform plan.
			Surveying and sealing of all drill holes and exploration boreholes in accordance with departmental guidelines and relevant standards.	Sealing completed and verified.	Engineering report/statement, plug and abandonment log, photos, as-constructed drawings, records of fill materials and concrete plugs, filling methods etc.
Infrastructure	Infrastructure	Retention of infrastructure (if applicable): All infrastructure that is to remain as part of the final land use is safe and does not pose any hazard to the community and is approved by the Secretary for retention.	Potential hazards (e.g., electrical, mechanical) have been effectively isolated and secured	Hazards isolated and secured.	Statement provided by suitably qualified engineer.
			Damage to access tracks has been repaired and stabilised.	Repairs complete.	As-constructed final landform plan, photos etc.
			Appropriate approvals have been sought and granted for retained infrastructure	Approval in place	Approval from the Secretary
Native ecosystem (Rehabilitation areas – Woodland) or Agricultural – Grazing (Rehabilitation Area – Pasture)	Infrastructure	All hazardous and contaminated materials are appropriately removed or remediated in accordance with the recommendations of a contamination site assessment.	Waste material and/or visible contamination areas on site surface.	There are no visible signs of contamination following the removal of plant, equipment, and materials. All rubbish/ waste materials have been removed from site.	Statement provided and before/after photos. Waste disposal records
			Soil testing for contaminants of concern as listed by Health Investigation Level of the National Environment Protection (Assessment of Site Contamination) Measure (1999) (NEPM) applicable to land use type.	Contamination has been appropriately remediated, removed or managed so that appropriate guidelines for land use are met, e.g., Health Investigation Level (HIL) or Ecological Investigation Level (EIL) of the NEPM (1999).	Contamination Remediation Report prepared by suitable qualified person Site Contamination Audit Report and Site Audit Statement prepared by EPA Accredited Auditor (where required).
			Carbonaceous material is removed from the footprint of the infrastructure areas	Any carbonaceous material has been removed from the footprint of the infrastructure areas and disposed of in the void, with at least 5m cover.	Photographs, Rehabilitation monitoring reports, as-constructed surveys,

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Final Land Use Domain	Mining Domain	Rehabilitation Objective (describe the desired feature and/or characteristics of the final land use domain)	Indicator (specific attribute associated with the objective)	Rehabilitation Completion Criteria (benchmark for the indicator, based on analogue data where appropriate)	Example Justification Validation Method (evidence that the benchmark has been achieved)
					quality assurance records Test pits
Water Management Area					
Water management	Water management	All water management infrastructure has been decommissioned and removed, unless approved otherwise by the Secretary	Removal of all water management infrastructure (including pumps, pipes and power).	Infrastructure removed.	Statement provided and before/after photos.
Water management Native ecosystem (Rehabilitation areas – Woodland) or Agricultural – Grazing (Rehabilitation Area – Pasture)	Water management	Domain stable, limited groundwater seepage and non-polluting	Mine water dams and sediment dams are desilted and decontaminated prior to conversion to clean water dams or backfilling and regrading into in the final landform.	Sediment accumulated in mine water and sediment dams is removed and emplaced in the final depression with adequate inert cover, supported by records.	Statement provided and before/after photos. Monitoring Rehabilitation records
All other mining domains					
All domains	All domains	All surface infrastructure, plant and equipment has been decommissioned and removed, unless approved otherwise by the Secretary	Removal of all plant, equipment and associated equipment from the footprint of mining areas	Infrastructure and equipment (including mobile equipment) removed	Statement provided Demolition /decommissioning records As-constructed final landform
Phase 2 – Landform Establishment					
All domains					
All domains	All domains	Stable and permanent landform established	Landforms are surveyed and demonstrated to be constructed in accordance with the Final Landform Plan.	Survey verifies final landform construction in accordance with the Approved Final Landform plan	As constructed surveys Comparison to Final Landform Plan(s) prepared by surveyor
			Rehabilitated slopes are generally less than 10 degrees for overburden emplacement, 15 degrees for the end wall in the final depression, and up to 47 degrees for the retained section of the highwall	Survey verifies slopes as per indicator	As constructed surveys
			Landform stability and erosion	Survey or remote sensing of the rehabilitated landforms shows an absence of slumping that could compromise stability.	Survey or remote sensing monitoring
		Final Landform non-polluting	No polluted or contaminated runoff from the landform	Water quality measured at discharge points and downstream monitoring locations meets the EPL criteria	Observation post rainfall Water quality sampling and analyses as per the approved <i>Water Management Plan</i>

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Final Land Use Domain	Mining Domain	Rehabilitation Objective (describe the desired feature and/or characteristics of the final land use domain)	Indicator (specific attribute associated with the objective)	Rehabilitation Completion Criteria (benchmark for the indicator, based on analogue data where appropriate)	Example Justification Validation Method (evidence that the benchmark has been achieved)
		Final landform blends with the surrounding topography	Visual assessment and as constructed survey	Visual assessments and as constructed survey verifies the regraded landform blends with the surrounding topography	Before / after photographs As constructed survey
Water Management Areas					
Water Management Area	Water Management Area	Domain stable and non-polluting	Redundant water management structures backfilled	No pooling of water over site following rainfall	Observation/Photographs Rehabilitation monitoring reports
			Remaining water management structures non-polluting	Monitoring indicated that surface water complies with the Water Quality Guidelines (2018) trigger value for livestock (cattle) or analogue monitoring site	Water quality testing as per the approved <i>Site Water Management Plan</i>
		Water Approvals Structures that take or divert water such as final voids, dams, levees etc. are appropriately licensed (e.g., under the Water Management Act 2000) and where required ensure sufficient licence shares are held in the water source(s) to account for water take.	Water approvals	Site water capture of runoff water is less than 10% of total runoff	Site water catchment plan demonstrates that total water capture on site is within in legal requirements.
Overburden emplacement areas					
Native ecosystem (Rehabilitation areas – Woodland) or Agricultural – Grazing (Rehabilitation Area – Pasture)	Overburden Emplacements	Stable and permanent landform established, maximising geotechnical performance, stability, and hydrological function	Landforms are surveyed and demonstrated to be constructed in accordance with the Final Landform Plan.	Survey verifies final landform construction in accordance with the Approved Final Landform plan	As constructed survey plans
			Rehabilitated slopes are generally less than 10 degrees	Survey verifies slopes are generally less than 10 degrees	As constructed surveys
			Suitable surface water controls installed and operating effectively	Monitoring of water discharged from the Mine complies with EPL limits No identifiable erosion or sedimentation	Water quality testing as per the approved <i>Site Water Management Plan</i> Photographs Rehabilitation monitoring reports
			Overburden emplacement areas to an approximate height of 345 m AHD	Survey verifies that overburden emplacement areas to an approximate height of 345 m AHD	As constructed survey plans
All domains	Overburden Emplacements	Runoff and/or leachate from the landform is maximised and is non-polluting	Water quality of runoff is non-polluting	pH of 6.5 to 8.5 Electrical conductivity < 1,100 µS/cm	Sampling and analyses of runoff
Active Mining Area (Open Cut Void)					
Native ecosystem	Active Mining Area (Open Cut void);		Landforms are surveyed and demonstrated to be constructed in accordance with the final landform Plan.	Survey verifies final landform construction in accordance with the Approved Final Landform plan	As constructed survey plans

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Final Land Use Domain	Mining Domain	Rehabilitation Objective (describe the desired feature and/or characteristics of the final land use domain)	Indicator (specific attribute associated with the objective)	Rehabilitation Completion Criteria (benchmark for the indicator, based on analogue data where appropriate)	Example Justification Validation Method (evidence that the benchmark has been achieved)
(Rehabilitation areas – Woodland) or Agricultural – Grazing (Rehabilitation Area – Pasture)		The size, depth and slopes of the final void have been minimised and are in accordance with the approved final landform	Rehabilitated slopes are generally less than 15 degrees	Survey verifies slopes are generally less than 15 degrees	As constructed survey plans
			The final depression is backfilled to between 336 m AHD and 330 m AHD	Survey verifies depth of the final depression is between 336 m AHD and 330 m AHD	As constructed survey plans
		Final depression is safe and stable	Final depression geotechnically stable	Geotechnical report indicating no unacceptable risk of instability	Independent engineers report
			There is no evidence of slumping or uncontrolled erosion that could compromise stability prior to commencement of growth medium development phase.	Survey or remote sensing of the rehabilitated landforms shows an absence of slumping that could compromise stability.	Survey or remote sensing monitoring
			Erosion is assessed to be not compromising landform stability prior to commencement of growth medium development phase.	Survey or remote sensing of the rehabilitated landforms shows an absence of erosion that could compromise stability.	Survey or remote sensing monitoring
			Suitable surface water controls installed and operating effectively	Monitoring of water discharged from the Mine complies with EPL limits No identifiable erosion or sedimentation.	Water quality testing as per the approved <i>Site Water Management Plan</i> Photographs
		There is no evidence of spontaneous combustion which may present a risk to the final landform or final land use	There is no evidence of spontaneous combustion prior to commencement of growth medium development phase.	Heat monitoring verifies no evidence of spontaneous combustion or heating in the final depression	Heat monitoring results.
		Carbonaceous material is appropriately covered and capped	All coal and carbonaceous material are covered and capped with inert material	All coal and carbonaceous material are capped with a minimum of 5m of inert overburden, subsoil and topsoil.	Photos, rehabilitation monitoring reports, as-constructed surveys, quality assurance records for construction,
Phase 3 – Growth Medium Development					
All Domains					
Native ecosystem (Rehabilitation areas – Woodland) or Agricultural – Grazing (Rehabilitation Area – Pasture)	All domains	Growth media is appropriate to support the final land use	Soil thickness on shaped landform	Rehabilitation records verify that rehabilitation areas topsoiled with a nominal depth of 150 mm, where available.	Rehabilitation records Test pits As constructed survey
				Rehabilitation records verify that rehabilitation areas include subsoil with a nominal depth of 400 mm, where available.	Rehabilitation records Test pits As constructed survey
			Soil characteristics in the range of pre-mining soil characteristics	Monitoring verifies soil characteristics such as pH, Electrical Conductivity, Exchangeable sodium percentage, nitrogen and phosphorous are in the range of analogue sites or do not appear to be limiting plant performance.	Soil monitoring report outlining the results of physical and laboratory soil tests
			Ameliorant application.	Soil ameliorants (e.g., gypsum, mulch, biosolids, composts) are applied where necessary (supported by records).	Rehabilitation records

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Final Land Use Domain	Mining Domain	Rehabilitation Objective (describe the desired feature and/or characteristics of the final land use domain)	Indicator (specific attribute associated with the objective)	Rehabilitation Completion Criteria (benchmark for the indicator, based on analogue data where appropriate)	Example Justification Validation Method (evidence that the benchmark has been achieved)
		The rehabilitated area does not represent an erosion hazard	Suitable surface watercontrols installed and operating effectively	Monitoring of water discharged fromthe Mine complies with EPL limits No identifiable erosion orsedimentation	Water quality testing as perthe approved <i>Site Water Management Plan</i> Photographs
Phase 4 – Ecosystem and Land Use Establishment					
All domains					
Native ecosystem (Rehabilitation areas – Woodland) or Agricultural – Grazing (Rehabilitation Area – Pasture)	All domains	Weeds and feral animals do not present a risk to rehabilitation.	Weed presence	Number of weed species and abundance average no greater than20% more than that of analogue sites	Rehabilitation monitoring reports
			Feral animal density	Monitoring records indicate that feral and pest animal species abundance is nogreater than surrounding lands.	Rehabilitation monitoring reports
		Grazing stock is excluded from rehabilitation areas and enrichment zones prior to relinquishment.	Stock exclusion fencing	Rehabilitation areas and enrichment zones are fenced to exclude grazing stock (until stable and grazing will not impact upon its establishment).	Rehabilitation records Photographs
		Erosion does not present a safety hazard or compromise the post-mining land capability.	Erosion control	Visual monitoring indicates there is no significant erosion that compromises land capability or the intended final land use.	Rehabilitation monitoring reports
				Monitoring verifies there are no gully or tunnel erosion features, or rills >300 mm deep or wide.	Rehabilitation monitoring reports
Native ecosystem (Rehabilitation areas – Woodland) or Agricultural – Grazing (Rehabilitation Area – Pasture)	All domains	Bushfire: The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.	Appropriate bushfire hazard controls (where required) have been implemented on the advice from the NSW Rural Fire Service.	Bushfire controls implemented.	Statement provided and before/after photos.
Water Management Area					
Water Management Area	Water Management Area	Domain stable and non-polluting	Water management structuresstabilised and capable of retaining and conveying water without causing pollution	No identifiable erosion orsedimentation	Visual inspection Photographs
			Water discharged from sitewithin relevant criteria	Monitoring of water discharged fromthe Mine complies with EPL limits	Water quality testing as perthe approved <i>Water Management Plan</i>
Native ecosystem (Rehabilitation areas – Woodland)					
Native ecosystem (Rehabilitation areas – Woodland)	All domains	At least 43.6 ha of woodland has been established	Area of woodland rehabilitation	Rehabilitation records and landform survey verifies that at least 17.7 ha of rehabilitation areas have been reseeded with native woodland species at the nominated seeding rate.	Rehabilitation records
			Native species richness		Rehabilitation monitoring records.
			Native overstorey cover		

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Final Land Use Domain	Mining Domain	Rehabilitation Objective (describe the desired feature and/or characteristics of the final land use domain)	Indicator (specific attribute associated with the objective)	Rehabilitation Completion Criteria (benchmark for the indicator, based on analogue data where appropriate)	Example Justification Validation Method (evidence that the benchmark has been achieved)
		Woodland rehabilitation revegetation for White Box grassy woodland	Native mid storey cover Native ground cover (grasses)	Rehabilitation monitoring verifies that native ecosystem indicators have achieved the completion criteria targets listed in Table 13 .	
Agricultural – Grazing (Rehabilitation Area – Pasture)					
Agricultural – Grazing (Rehabilitation Area – Pasture)	All domains	Re-establishing 85.43 ha agricultural land over the areas disturbed by the mine. Pasture areas will be capable of sustaining grazing with land capability that reflects the pre-mining environment.	Area of pasture rehabilitation	Rehabilitated pasture areas have been sown with a mixture of pasture species including fast growing, short- lived species and perennial grasses and legumes.	Rehabilitation records
			Species selection	Rehabilitation areas comprise a mixture of grasses representative of regionally occurring vegetation where possible. Grasses sown will be selected from those listed in the RMP.	Rehabilitation records Rehabilitation monitoring reports
			Vegetation establishment	Rehabilitation monitoring records verify that ground cover (vegetation, leaf litter, and mulch) is at least 85%. The first monitoring program will be completed within 12 to 18 months of rehabilitation to quantify pasture crop establishment.	Rehabilitation monitoring reports
				No bare surfaces >20 m² in area or >10 m in length down slope as indicated by rehabilitation monitoring at Year 5 following establishment.	Rehabilitation monitoring reports Remote sensing (LiDAR)
			Vegetation health	Rehabilitation monitoring shows that pasture health is comparable to analogue sites.	Rehabilitation monitoring reports
Phase 5 – Ecosystem and Land Use Development					
All domains					
All domains	All domains	Weeds are controlled.	Weed presence	Number of weed species and abundance average no greater than20% more than that of analogue sites	Rehabilitation monitoring reports
All domains	All domains	Feral animal pests are controlled	Feral animal density	Monitoring records indicate that feral and pest animal species abundance is nogreater than surrounding lands.	Rehabilitation monitoring reports
All domains	All domains	Erosion does not present a safety hazard or compromise the post-mining land capability.	Erosion and sediment control	There are no gully or tunnel erosion features and there is an absence of rilling (> 300 mm deep) within each domain.	Rehabilitation monitoring reports
		Monitoring demonstrates soil profile development in rehabilitated areas (e.g., development of organic layer, litter layer).	Soil quality	Soil testing indicates that topsoil soil characteristics (pH, EC [electrical conductivity], ESP) generally meet the following criteria: - pH – between 4.5 and 8.5, or is comparable to relevant analogue sites; - EC - < 1 dS/m, or is comparable to relevant analogue sites; and	Soil monitoring and testing reports Rehabilitation monitoring reports

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Final Land Use Domain	Mining Domain	Rehabilitation Objective (describe the desired feature and/or characteristics of the final land use domain)	Indicator (specific attribute associated with the objective)	Rehabilitation Completion Criteria (benchmark for the indicator, based on analogue data where appropriate)	Example Justification Validation Method (evidence that the benchmark has been achieved)
				- ESP – that is comparable to the analogue sites. Where soil testing results indicate values outside the above criteria, rehabilitation monitoring at the relevant area verifies that the soil quality is not inhibiting plant growth.	
			Surface cover	Rehabilitation monitoring records verify that ground cover (vegetation, leaf litter, and mulch) is greater than 85 %.	Rehabilitation monitoring reports
Water Management Area					
Water management areas	Water management areas	Final landform drainage will integrate with surrounding catchments, achieve long-term geomorphic stability and minimise erosion.	Discharge water quality	Discharge water quality meets EPL requirements.	Rehabilitation monitoring reports
			Geomorphic stability	Water management structures are assessed to be stable	Geotechnical reports
Native ecosystem (Rehabilitation areas – Woodland)					
Native ecosystem (Rehabilitation areas – Woodland)	All domains	Woodland rehabilitation revegetation for White Box grassy woodland to minimise visual impacts.	Native species richness	Rehabilitation monitoring verifies that native ecosystem indicators have achieved the completion criteria targets listed in Table 14	Rehabilitation monitoring records.
			Native overstorey cover		
			Native mid storey cover		
			Native ground cover (grasses)		
Agricultural – Grazing (Rehabilitation Area – Pasture)					
Agricultural – Grazing (Rehabilitation Area – Pasture)	All domains	Pasture areas will be capable of sustaining grazing with land capability that reflects the pre-mining environment and to minimise visual impacts	Species composition	Rehabilitation monitoring verifies that species in pasture rehabilitation areas comprise a mixture of grasses representative of pasture vegetation.	Rehabilitation monitoring records.
			Regeneration	Established species survive and/or regenerate after disturbance	Rehabilitation monitoring records.
				Species are capable of setting viable seed, flowering or otherwise reproducing.	Rehabilitation monitoring records.
			Vegetation health	Rehabilitation monitoring verifies that vegetation health is comparable to reference sites.	Rehabilitation monitoring records.
			Land capability	Pasture areas are assessed to have a Rural Land Class VI or better (capable of sustaining grazing), consistent with the final landform.	Rehabilitation monitoring records.

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Table 13 Draft Rehabilitation Completion Criteria for Sunnyside - Phase – Ecosystem and land use Establishment

Phase – Ecosystem and land use Establishment (Rehabilitation areas Woodland)*		Methodology	Benchmark	Initial establishment monitoring (12 to 18 months)	2 to 10 years	Justification Validation Method (evidence that the benchmark has been achieved)	Comment
Woodland rehabilitation of approximately 26 ha revegetation for White Box grassy woodland (BVT 226 and PCT 1383) as consulted with OEH September 2018	Native Species Richness	Measured following BBAM methodology will target between the Benchmark and Analogue Site values.	Minimum Target	At least 10 individuals per 20x20 plots	At least 13 individuals per 20x20 plots	Rehabilitation monitoring records.	Targets are set to allow for ecosystem and land use establishment phase to achieved the minimum value recorded in the Analogue sites in the first 2 years and achieving analogue site targets within 10 years.
	Abundance of Species that will Contribute to Native Overstorey Cover	Measured following the BBAM methodology will target between the Benchmark and Analogue Site values.	Minimum Target	At least 4 individuals per 20x20 plots	At least 8 individuals per 20x20 plots	Rehabilitation monitoring records.	
	Abundance of Species that will contribute to Native Mid-storey Cover	Measured following BBAM methodology will target between the Benchmark and Analogue Site values.	Minimum Target	At least 1 species present per 20x20 plots	At least 3 species present per 20x20 plots	Rehabilitation monitoring records.	
	Native Groundcover (Grasses)	Measured following BBAM methodology will target between the Benchmark and Analogue Site values.	Minimum Target	24%	50%	Rehabilitation monitoring records.	
	Vegetation Surface Cover	Measured following BBAM methodology will target between the Benchmark and Analogue Site values.	Minimum Target	60%	80%*	Rehabilitation monitoring records.	

Table 14 Draft Rehabilitation Completion Criteria for Sunnyside - Phase – Ecosystem and land use Development

Phase – Ecosystem and land use Development		Methodology	Benchmark	PCT 589	Local Reference (Analogue) (80%)	Justification Validation Method (evidence that the benchmark has been achieved).
Woodland rehabilitation of approximately 26 ha revegetation for White Box grassy woodland (BVT BR388 and PCT 589)*589	Native Species Richness	Measured following BBAM methodology will target between the Benchmark and Analogue Site values.	Mean Target	23	35	Rehabilitation monitoring records.
			Minimum Target	18	30	Rehabilitation monitoring records.
	Native Overstorey Cover	Measured following the BBAM methodology will target between the Benchmark and Analogue Site values.	Mean Target	25%	12%	Rehabilitation monitoring records.
			Minimum Target	6%	5%	Rehabilitation monitoring records.
	Native Mid-storey Cover	Measured following BBAM methodology will target between the Benchmark and Analogue Site values.	Mean Target	6%	11.7%*	Rehabilitation monitoring records.
			Minimum Target	0%	2.5	Rehabilitation monitoring records.

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Phase – Ecosystem and land use Development		Methodology	Benchmark	PCT 589	Local Reference (Analogue) (80%)	Justification Validation Method (evidence that the benchmark has been achieved).
	Native Groundcover (Grasses)	Measured following BBAM methodology will target between the Benchmark and Analogue Site values.	Mean Target	40%	38 %*	Rehabilitation monitoring records.
			Minimum Target	30 %	Not Available	Rehabilitation monitoring records.
	Vegetation Surface Cover	Measured following BBAM methodology will target between the Benchmark and Analogue Site values.	Target	>80%	>90%*	Rehabilitation monitoring records.

*as consulted with OEH September 2018 with local community vegetation type correction as per Aspect Ecology 2020 recommendations

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4.5 REHABILITATION OBJECTIVES AND REHABILITATION COMPLETION CRITERIA – STAKEHOLDER CONSULTATION

4.5.1 STAKEHOLDER ENGAGEMENT PLAN

Sunnyside has prepared a Stakeholder Engagement Plan (SEP) to facilitate stakeholder consultation for Sunnyside's rehabilitation objectives and completion criteria. This document details Sunnyside's stakeholders and the strategies used to communicate with them and provide the foundation for working with stakeholders prior to and during the closure process. The SEP will be regularly revised to reflect the outcomes of technical investigations, the ongoing development and execution of this RMP and the outcomes of ongoing engagement.

Since the commencement of rehabilitation and closure planning for Sunnyside, Whitehaven has consulted with regulatory authorities including RR as well as relevant landholders as summarised in Table 15.

Relevant Statutory Authorities

Whitehaven has consulted with and will continue to consult with the following regulatory bodies in relation to the Sunnyside operations, rehabilitation and completion criteria:

- Department of Primary Industries - Mineral Resources (now Resource Regulator).
- Department of Environment and Climate Change (now Environment and Heritage Group in the Department of Planning and Environment);
- Department of Water and Energy (now Department of Planning and Environment - Water).
- Department of Planning (DoP) (now Department of Planning and Environment)
- Department of Natural Resources (DNR) now Department of Water and Energy (now Environment and Heritage Group in the Department of Planning and Environment);
- Department of Primary Industries - Mineral Resources (DPI-MR) (now NSW Department of Industry);
- NSW Roads and Traffic Authority (RTA) (now Transport for NSW);
- Division of Resources and Energy (DRE) (part of the NSW Department of Trade and Investment) (now NSW Department of Industry);
- Roads and Maritime Services (RMS) (now Transport for NSW);
- Gunnedah Shire Council
- NSW Office of Environment and Heritage (now Environment and Heritage Group in the Department of Planning and Environment)

Other Key Stakeholders

Sunnyside has consulted with and will continue to consult with a number of community groups and landholders in relation to the Rocglen operations and rehabilitation, including:

- Red Chief Local Aboriginal Land Council
- Bigundi Biame Gunnedarr Traditional People
- Gunida Gunyah Aboriginal Corporation
- Min Min Corporation

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- Surrounding residents

Community Consultative Committee

A Community Consultative Committee (CCC) operates in accordance with Schedule 5, Condition 9 of PA 06_0308.

4.5.2 SUMMARY OF STAKEHOLDER ENGAGEMENT COMPLETED TO DATE

Consultation regarding the rehabilitation of the SCM was primarily undertaken during the preparation of the Sunnyside Coal Project Environmental Assessment (EA) (Olsen Environmental Consulting Pty Limited [Olsen Environmental] and R.W. Corkery & Co. Pty Ltd [R.W. Corkery], 2008).

Further consultation has occurred with relevant stakeholders during preparation of the SCM Modification Environmental Assessment (Whitehaven, 2015) and the SCM Final Landform Modification (Whitehaven, 2018a).

Whitehaven also consulted with the now DPE and Resource Regulator during preparation of MOP Amendments A, B and C, the Care and Maintenance MOP, and the 2017 MOP (i.e., following recommencement of mining). Whitehaven consulted with DPE and Resources Regulator regarding the Closure MOP (and the related MOD3) in April 2018 and October 2018.

Table 15 presents a high-level summary of the key consultation undertaken for the project to date.

Table 15 Consultation Summary to Date

Stakeholder	Date	Issues Raised
DoP	17 th October 2006	Planning Focus Meeting convened and co-ordinated by DoP in Gunnedah with the GSC, Department of Environmental and Climate Change, Department of Water and Energy and DPI-MR. The Planning Focus Meeting provided each agency with an opportunity to gain an understanding of the Project and to inspect the Project Site prior to formally providing their written requirements for the Environmental Assessment. A tabulated summary of the Director General's requirements and all government agency requirements is included in the Environmental Assessment (EA) Appendix 2, together with a reference to where each requirement is addressed in the EA.
Landowners	January 2007	NMPL produced and distributed a Community Consultation Newsletter to landowners in the area and to all potentially affected property owners along the coal transport route. Multiple discussions were also held with landowners regarding the Project and the effects it may have on the area.
DPE	9 April 2014	Whitehaven provided an overview of the proposed Modification 1 to the NSW Department of Planning and Infrastructure



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Stakeholder	Date	Issues Raised
RMS Transport for NSW GSC EPA	September/ October 2014	Whitehaven provided briefing letters to the Roads and Maritime Services (RMS), Transport for NSW, GSC and the NSW Environment Protection Authority (EPA) in September/October 2014 outlining the key aspects of the proposed PA 06_0308 Modification 1.
DRE	September 2014 October 2014	Whitehaven provided a briefing letter to the Division of Resources and Energy (DRE) outlining the key aspects of the proposed PA 06_0308 Modification 1. Further, Whitehaven met with DRE representatives in October 2014 to discuss the proposed Modification and suitable approvals pathway.
DP&E	February 2018	Whitehaven provided an overview of the proposed PA 06_0308 Modification 3 to the DP&E in February 2018 requesting confirmation of the suitable approvals pathway. The DP&E subsequently confirmed the Modification could be assessed under Section 75W of the EP&A Act. The MOD3 EA was prepared consistent with this correspondence.
NSW DRG Gunnedah Shire Council (GSC)	3 August 2018	Whitehaven provided a briefing letter to the NSW Division of Resources and Geoscience (DRG) (within the DP&E) and the General Manager of the GSC outlining the key aspects of PA 06_0308 Modification 3.
CCC	3 August 2018	Consultation regarding the PA 06_0308 Modification 3 was conducted via a briefing letter sent to the CCC Chairperson. The EA was also made available to all SCM CCC members following submission to the DP&E.
RR	18 April 2019	SCM received a Section 240 Notice from the Resource Regulator on 18 th of April. Consultation was undertaken with the RR as part of preparing and submitting a Final SCM Rehabilitation Report on 29 th November 2019.
RR	December 2021	Submission of Rehabilitation report and RCE for reduction of RCE. Approved 3 Feb2022
DPE	February 2022	Whitehaven provided an overview of PA 06_0308 Modification 4, scope of environmental assessments, proposed assessment pathway, and proposed consultation to the DPE in February 2022. Whitehaven sent a scoping letter to DPE in March 2022 which was progressed through the NSW Major Projects Portal.



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Stakeholder	Date	Issues Raised
Biodiversity Conservation & Science Division of DPE	March 2022	Whitehaven provided an overview of PA 06_0308 Modification 4 and scope of the biodiversity assessment by AMBS in March 2022. BCS representatives requested the following information to be provide with the Modification Application (Appendix A and Section 6): <ul style="list-style-type: none"> the Modification Application is to demonstrate that no loss in biodiversity will occur; and a like-for-like comparison is required for the additional disturbance area and relinquishment area.
CCC	March 2022	Whitehaven provided an overview of PA 06_0308 Modification 4 to the members of the CCC in March 2022.
RR, GSC	April 2022	Whitehaven provided an overview of PA 06_0308 Modification 4 to the NSW Resource Regulator and GSC in April 2022.

4.5.3 PROPOSED FUTURE CONSULTATION

Consultation will continue with stakeholders during the life of mine, in accordance with the SEP. **Table 16** presents a summary of the proposed future consultation activities key stakeholders.

Table 16 Summary of proposed future stakeholder engagement activities

Stakeholder	Activities
RR	Ongoing revisions of the RMP Submission of the Annual Review and Annual Rehabilitation Report Rehabilitation and Mine Closure Progress
DPE	Annual Reviews Ongoing revisions of the RMP Submission of the Annual Review and Annual Rehabilitation Report Rehabilitation and Mine Closure Progress
CCC	Annual Reviews Ongoing revisions of the RMP Yearly CCC Meetings Rehabilitation and Mine Closure Progress Results of environmental monitoring
Agencies	Annual Reviews Ongoing revisions of the RMP Submission of the Annual Review and Annual Rehabilitation Report Rehabilitation and Mine Closure Progress

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Stakeholder	Activities
Stakeholder and Community Interest Groups	Ongoing revisions of the RMP Rehabilitation and Mine Closure Progress
Registered Aboriginal Parties	Rehabilitation and Mine Closure Progress

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5 **FINAL LANDFORM AND REHABILITATION PLAN**

5.1 **FINAL LANDFORM AND REHABILITATION PLAN – ELECTRONIC COPY**

In accordance with the requirements of the *Form and Way: Rehabilitation Management Plan for Large Mines* (RR, 2021a) a *Final Landform and Rehabilitation Plan* has been prepared to show the proposed final land use and final landform for SCM (refer **Figure 6** Final Landform and Rehabilitation Plan 1 and **Figure 7** Final Landform and Rehabilitation Plan 2).



WHITEHAVEN REHABILITATION
MANAGEMENT PLAN

SUNNYSIDE

FLRP PLAN 1: FINAL
LANDFORM FEATURES

- LEGEND
- Rehabilitation Monitoring Sites
 - Project Approval Boundary
 - Final Landform Feature**
 - Dump decant structure
 - Highwall
 - Highwall Drain
 - Storage Dam
 - Storage Dam, Discharge Dam
 - Final Landuse Domain**
 - Agricultural – Grazing
 - Final Void
 - Native Ecosystem
 - Water Storage (Excluding Final Void)

0	150	300
Metres		
Coordinate System:	GDA2020	
Scale:	1:10,000 at A3	
Project Number:	630.30268	
Date:	26-Jul-2022	
Drawn by:	LC	



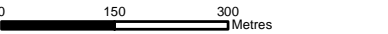


**WHITEHAVEN REHABILITATION
MANAGEMENT PLAN**

SUNNYSIDE

**FLRP PLAN 2: FINAL
LANDFORM CONTOURS**

- LEGEND**
- Final Landform Contour (2m AHD)
 - Project Approval Boundary



Coordinate System:	GDA2020
Scale:	1:10,000 at A3
Project Number:	630.30268
Date:	26-Jul-2022
Drawn by:	LC



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6 **REHABILITATION IMPLEMENTATION**

6.1 **LIFE OF MINE REHABILITATION SCHEDULE**

Whitehaven has adopted a progressive approach to the rehabilitation of disturbed areas within the Project Site to ensure that, remaining mining disturbance areas are promptly shaped, top-dressed and vegetated to provide a stable landform.

The life of mine rehabilitation schedule associated with rehabilitation activities has been presented in **Figure 8**. The figure the projected rehabilitation status at closure (within next five-yearly interval) with the completion of decommissioning activities and achievement of the final land use.

6.1.1 **INFRASTRUCTURE**

There are no further construction activities planned for key infrastructure at Sunnyside.

Key infrastructure has been decommissioned to prepare land for rehabilitation including removal of built infrastructure, foundation and hardstand materials, services, equipment and materials including wastes and contamination.

The indicative timeline of rehabilitation and decommissioning activities are shown in **Table 17** and further details are provided in **Section 6.3**.

Table 17 Indicative Timeline of Rehabilitation and Decommissioning Activities

2021	2025
<ul style="list-style-type: none"> • Disconnection and termination of services (e.g., water and electricity). Complete • Decommissioning of internal access roads/tracks that are no longer required. Complete 	<ul style="list-style-type: none"> • Final landform is geotechnically stable, safe and non-polluting. • Rehabilitation to Ecosystem and land use Establishment established across all relevant areas of the mining lease. • Decommissioning of any residual infrastructure not being retained, and on-site remediation of any remaining contaminated areas. • Ongoing rehabilitation, monitoring and management. • Decommissioning and rehabilitation of water dams that are not being retained as part of the final landform

6.1.2 **MINING ACTIVITIES**

Coal extraction at the SCM ceased in September 2019, with coal crushing and transport to the Gunnedah Coal Handling and Processing Plant (CHPP) concluding on the 27 October 2019. Rehabilitation, aftercare and maintenance will be undertaken to November 2025.

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6.1.3 MINE PRODUCTION SCHEDULES

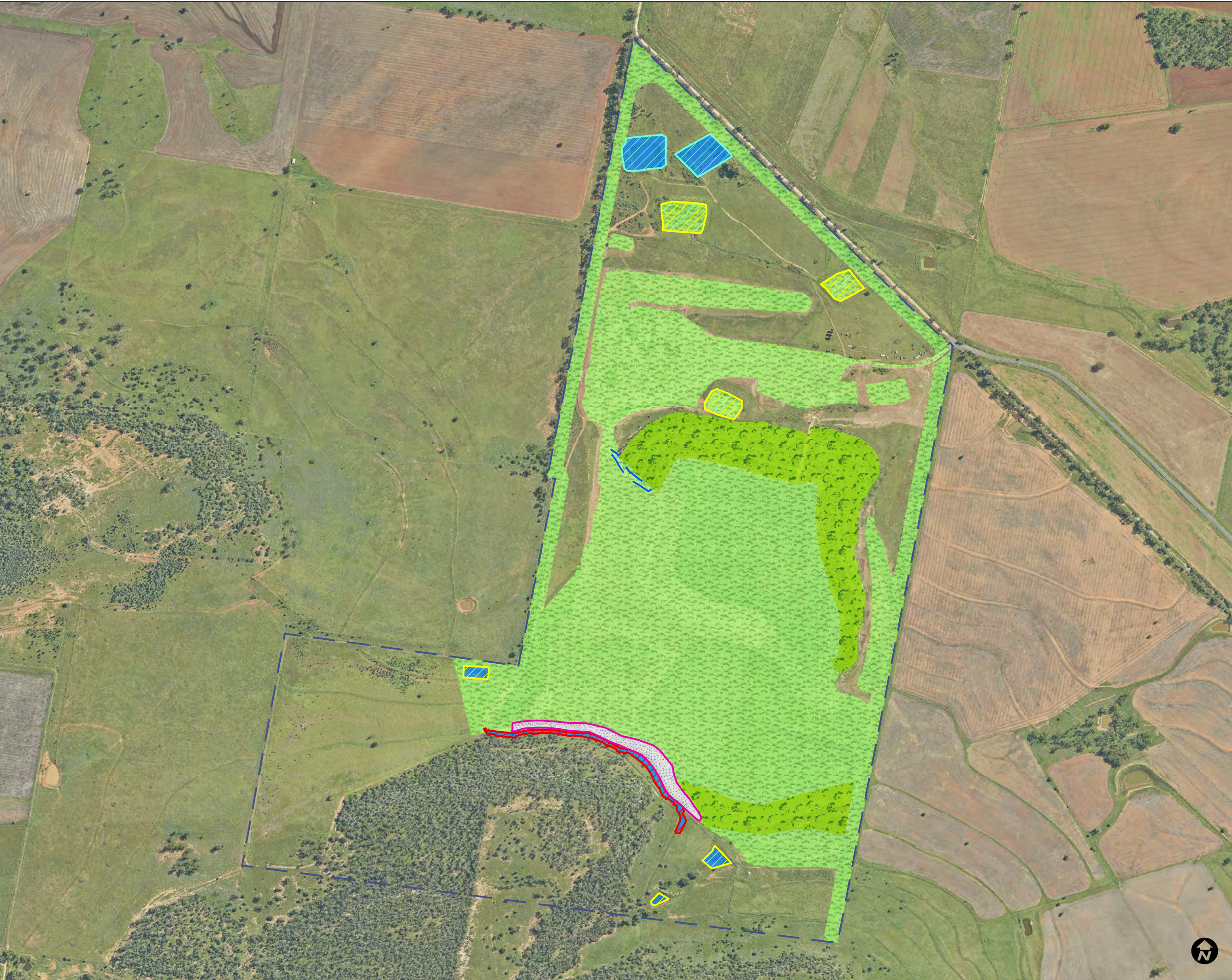
Coal extraction at the SCM ceased in September 2019. There is no production or overburden dumping scheduled.

6.1.4 REHABILITATION ACTIVITIES

Only temporary water infrastructure (1.08ha) remains for rehabilitation, which will be kept operational for up to five years. Outstanding rehabilitation works include:

- Two remaining exploration drill holes require sealing
- Two water dams (1.08ha) to be removed and filled after vegetation has successfully established and rehabilitation is safe and stable.
- Highwall drain to divert rainfall run-on water away from the highwall batters
- Aftercare and maintenance of rehabilitated areas and infill planting where required.

6.2 LIFE OF MINE REHABILITATION PLANS



WHITEHAVEN REHABILITATION
MANAGEMENT PLAN

SUNNYSIDE

LOM PLAN 1

- LEGEND
- Project Approval Boundary
 - Final Landform Feature**
 - Dump decant structure
 - Highwall
 - Highwall Drain
 - Storage Dam
 - Storage Dam, Discharge Dam
 - Final Landuse Domain**
 - Agricultural – Grazing
 - Final Void
 - Native Ecosystem
 - Water Storage (Excluding Final Void)

Coordinate System: GDA2020
Scale: 1:10,000 at A3
Project Number: 630.30268
Date: 28-Jul-2022
Drawn by: LC



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6.3 PHASES OF REHABILITATION AND GENERAL METHODOLOGIES

Achievement of a safe and stable landform that is commensurate with the surrounding topography will be demonstrated through the implementation of a series of conceptual rehabilitation phases. As defined by the *Form and way: Rehabilitation Management Plan (large mines)* the rehabilitation phases are presented in **Table 18**.

Table 18 Rehabilitation Phases

Rehabilitation Phase	Description
Phase 1: Active Mining	This phase is associated with active mining operations across the domains.
Phase 2: Decommissioning	This phase of rehabilitation includes activities associated with the removal of mining infrastructure, unless agreed to be retained, and the removal, remediation or management of contaminated and hazardous materials.
Phase 3: Landform Establishment	<p>This phase of rehabilitation consists of the processes and activities required to construct the approved final landform.</p> <p>In addition to profiling the surface of rehabilitation areas to the approved final landform profile this phase may include works to construct surface water drainage features, encapsulate problematic materials such as tailings, and prepare a substrate with the desired physical and chemical characteristics (that is, rock raking or ameliorating sodic materials).</p>
Phase 4: Growth Medium Development	<p>This phase of rehabilitation consists of activities required to establish the physical, chemical and biological components of the substrate required to establish the desired vegetation community (including short-lived pioneer species) to ensure achievement of the approved or, if not yet approved, the proposed:</p> <ul style="list-style-type: none"> - rehabilitation objectives - rehabilitation completion criteria - final landform and rehabilitation plan. <p>This phase may include spreading the prepared landform with topsoil and/or subsoil and/or soil substitutes, applying soil ameliorants to enhance the physical, chemical and biological characteristics of the growth media, and actions to minimise loss of growth media due to erosion.</p>
Phase 5: Ecosystem and Land Use Establishment	<p>This phase of rehabilitation consists of the processes to establish the final land use following construction of the final landform.</p> <p>For vegetated land uses this rehabilitation phase includes establishing the desired vegetation community and implementing land management activities such as weed control.</p>
Phase 6: Ecosystem and Land Use Development	<p>This phase of rehabilitation consists of the activities to manage maturing rehabilitation areas on a trajectory to achieving the approved or, if not yet approved, the proposed:</p> <ul style="list-style-type: none"> - rehabilitation objectives - rehabilitation completion criteria - final landform and rehabilitation plan. <p>For vegetated land uses this phase may include processes to develop characteristics of functional self-sustaining ecosystems, such as nutrient recycling, vegetation flowering and reproduction, and increasing habitat complexity, and development of a productive, self-sustaining soil profile. This phase of rehabilitation may include specific vegetation management</p>

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Rehabilitation Phase	Description
	strategies and maintenance such as tree thinning, supplementary plantings and weed management.
Phase 7: Rehabilitation Completion (sign-off)	<p>The final phase of rehabilitation when a rehabilitation area has achieved the final land use for the mining area:</p> <ul style="list-style-type: none"> - as stated in the approved rehabilitation objectives and the approved rehabilitation completion criteria - as spatially depicted in the approved final landform and rehabilitation plan. <p>Rehabilitation areas may be classified as complete when the RR has determined in writing that rehabilitation has achieved the final land use following submission of the relevant application by the lease holder.</p>

6.3.1 **ACTIVE MINING PHASE**

Coal extraction at the SCM ceased in September 2019, with coal crushing and transport to the Gunnedah CHPP concluding on the 27 October 2019.

Appropriate measures and strategies were implemented during the active phase of mining to enhance rehabilitation outcomes. Works in this phase are summarised below.

a. **Flora**

Management

The SCM is located in an area which had previously (prior to mining) been extensively cleared for agriculture. Subsequently no major areas of native vegetation have, or will be, cleared within the footprint of the operation. Notwithstanding this, Whitehaven has implemented flora and fauna management aspects including:

- ongoing implementation of the Koala Management Plan (including establishment of corridors and supplementary plantings); and
- control of priority weeds via weed management plans/standard.

These management aspects will continue as required.

Resources

Native seed is collected within Gunnedah region, and from WHC mining tenements and offset areas where practicable. Seed collection is generally undertaken by suitable experienced or qualified contractors throughout the year as required by the seeding times of target species.

Native seed utilised in rehabilitation is generally supported by seed viability testing and quality control processes to help guide application rates.

b. **Fauna Management**

The area surrounding the mine site supports a viable koala population. NMPL has undertaken a number of measures to minimise the impacts on this population as detailed in the Koala Management Plan. Key measures relevant for the RMP include:

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- Habitat Protection - The remnant woodland in particular areas will be protected from degrading activities such as clearing, grazing, storing and dumping materials and vehicle incursion not related to management.
- Improving and expanding habitat – enhancement planting to improve their value as Koala habitat as well as their functioning as movement corridors for the Koala and other native fauna
- Minimising likelihood of roadkill – maintaining and decommissioning signage, site procedures and inductions
- Fencing and restricted access – maintaining and decommissioning a koala-proof fence around the active mine area
- control of pest species via pest management plans/standard.

c. **Rock/Overburden Emplacement**

Active mining at the SCM ceased in September 2019. Rock and overburden emplacement is not applicable for this RMP.

d. **Waste Management**

All waste from SCM has been removed. There are no further waste generating activities on the mine site.

e. **Geology and Geochemistry**

Regionally, the Sunnyside Project Site lies in the Mullaley sub-basin of the central Gunnedah Coalfield, with the proposed extraction of the Hoskissons Seam from the Late Permian Hoskissons Coal Member of the Black Jack Formation. Two major coal seams occur beneath the Project Site, namely the Hoskissons Seam and the underlying Upper and Lower Melville Seam, which sub-crop to the east of the Project Site. The Lower Melville Seam subcrops beneath Quaternary alluvium in the Coocooboonah Creek valley floor, whilst the Hoskissons Seam sub-crops under primarily transported colluvial cover on the eastern flanks of Coocooboonah Creek. The strata have an average dip of 2° to 3° to the southwest. The depth of weathering extends approximately 30m below surface, with the depth to the top of the Hoskissons Seam extending up to approximately 65m below surface in the open cut pit area. Any sulfides that may have been present in the overburden above the fresh overburden/weathered overburden interface have been weathered out to depths of up to 36m below surface and would no longer be a potential source of acidic drainage.

The Hoskissons Coal Seam sub-crops on the north-eastern side of the open cut area. The seam dips to the southwest, away from the sub-crop and beneath the rising topography associated with remnant sandstone hills on the “Sunnyside” property. This stratigraphy determines the overburden to coal stripping ratios.

f. **Material Prone to Spontaneous Combustion**

The Hoskissons Coal Seam (the resource mined at the SCM) has the potential for spontaneous combustion. Testing completed on representative core samples during the preparation of the EA classified the intrinsic spontaneous combustion propensity as high (Olsen Environmental and R.W. Corkery, 2008).

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Spontaneous combustion has occurred at the SCM within coal stockpiles. In response to this risk, NMPL have implemented a comprehensive Spontaneous Combustion Monitoring Plan (SCMP) since 2013.

Measures implemented during active mining to minimise spontaneous combustion included:

- earthworks to ensure that no coal seams remain exposed in the final landform highwall or end wall (i.e., due to partial backfilling of the open cut);
- selective handling of carbonaceous material;
- minimising the length of time coal is held in stockpiles;
- routine shift inspections of coal stockpiles and emplacement areas for signs of spontaneous combustion;

Measures implemented during rehabilitation and decommissioning to minimise spontaneous combustion included:

- All coal stockpile removed
- All carbonaceous material placed at least 5m below final landform surface

g. Material Prone to Generating Acid Mine Drainage

A material characterisation assessment completed in the Sunnyside Coal Project EA indicated that waste rock is not potentially acid-producing and that the leachate from the overburden would be moderately saline with a neutral to slightly alkaline pH. Laboratory testing did identify a small volume coal seam located approximately 36 m below the surface which demonstrated some acid-producing potential. However, this coal seam is only 18 centimetres (cm) thick and represents approximately 1% of the total overburden volume. As such, its acid-producing potential will be dominated by the non-acid producing rock.

h. Ore Beneficiation Waste Management (Reject and Tailings Disposal)

No processing residues or reject / tailings were emplaced at the SCM.

i. Erosion and Sediment Control

Key sources of erosion and sedimentation are generally related to surface water runoff from exposed surfaces, including cleared areas, stockpiles (coal, soil and waste rock) and unsealed roads, and to a lesser degree caused by wind erosion from emplacement areas and stockpiles.

Erosion and sediment control (ESC) at Sunnyside is managed in accordance with the Sunnyside Water Management Plan (including an Erosion and Sediment Control Plan), relevant regulatory requirements and the guideline document.

j. Ongoing Management of Biological Resources for Use in Rehabilitation

Biological resources are managed as detailed throughout this Section (6.4.1) including completed and ongoing resource recovery and soil management.

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k. Mine Subsidence

Sunnyside is located to the north of the now closed Gunnedah No. 5 Coal Mine subsidence district. Subsequently, no specific management controls or monitoring programs are necessary. For the open cut area, a barrier pillar of 40 m has been maintained as an offset from the old underground workings.

l. Management of Potential Cultural and Heritage Issues

Aboriginal heritage is managed in accordance with the Aboriginal Cultural Heritage Management Plan which was developed in consultation with the local Aboriginal community and OEH (now Heritage NSW).

Engagement with RAPs and Heritage NSW will be undertaken as part of detailed mine closure planning. Advice will be sought as to the management of heritage sites post closure.

m. Exploration Activities

No exploration activities are expected to be undertaken during the RMP term.

Disturbance from previous exploration activities will be rehabilitated prior to mine closure. All exploration drill holes will be sealed in accordance with relevant RR DRG guidelines at the time.

6.3.2 DECOMMISSIONING

Decommissioning and demolition activities have been appropriately planned and documented to ensure that appropriate approvals are in place for the works.

Remaining decommissioning activities will be reported in the Forward Program.

a. Site Security

Site security measures will be implemented during and following the decommissioning process to prevent access by members of the public and secure rehabilitation areas, including any heritage places or objects and any retained infrastructure items. Site security measures include:

- Locked gates
- Maintenance of existing security fences and signage; and
- Restricted offroad access to rehabilitated areas.

Public safety measures following closure of the SCM would be developed during the detailed mine closure planning. Measures include the establishment of a highwall drain associated to prevent inadvertent access to the final southern highwall. It is expected that relevant signage, fencing and bunding for safety would be retained, subject to consultation with future landowner(s) and stakeholders.

b. Infrastructure to be Removed or Demolished

The final remaining site features, services and structures are to be decommissioned and demolished to achieve the final land use are described in **Table 19** unless the Resource Regulator agrees otherwise.

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All demolition work was carried out in accordance with Australian Standard AS 2601-2001: The Demolition of Structures (or its latest version) and Exploration and Petroleum Drilling and Well Servicing Competencies (DISRD,2015), as applicable.

Table 19 Infrastructure to be Decommissioned

Code	Mining Domain	Description	Indicative Timing
1	Infrastructure Area	Car Park, Administration Building, Ablutions Building, Workshop Building, ROM Hopper and Conveyor, Load Out Bin, Weigh Bridge	Completed (2020)
		Stockpile Sediment Fencing, Signage	Completed (2021)
		Underground Telstra Line	Disconnected 2022
		Signage	2025
		Mining infrastructure on buffer lands (Koala Fence, Boreholes, signage)	2025 ⁽²⁾
3	Water Management Area	Pumps/Suction Pipe/Foot Valves, Pipeline, Standpipe	Completed (2020)
		Groundwater Piezometers (P3, P7-8, refer Water Management Plan Figure 3), Signage, Sediment Basins (SB2-5, refer Water Management Plan Figure 3), Storage Dams (SD2, refer Water Management Plan Figure 3), Storage Dams (SD1, SD3-4, refer Water Management Plan Figure 3), Pit Water Storage (Turkeys Nest, refer Water Management Plan Figure 3)	2025
4	Overburden Emplacement Area	Signage	Completed (2021)
5	Active Mining Area (Open cut void)	Two-way communication tower, <u>Bore</u> pump and power box (Production No.5)	Completed (2020)

⁽²⁾ some piezometers/boreholes may be retained beyond 2025 for ongoing monitoring or agricultural use and will require licensing under the Water Management Act

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c. Buildings, structures and fixed plant to be retained

Following mine closure, it is intended to retain some additional clean water dams and some access tracks. It is expected that any retained water infrastructure would be used for ongoing agricultural purposes (e.g., stock watering) following closure of the SCM.

Site features, services and structures to be retained for future use as part of the final land use are described in **Table 20**.

Table 20 Infrastructure to be Retained

Code	Mining Domain	Description
1	Infrastructure Area	Access Roads
3	Water Management Area	Clean water dams (SD1, SD3 and SD4)

The Detailed Mine Closure Planning process conducted over the life of mine, in consultation with DPE, RR, GSC and CCC will

- Identify the associated short-term and long-term risks to public safety and the environment from the structures remaining in place, which should identify potential modes of failure
- Address any potential residual risks such as potential for structures to fail
- Engage (where required) a suitably qualified engineer to verify that any risks have been satisfactorily addressed.

d. Management of Carbonaceous/Contaminated Material

Carbonaceous Material

During decommissioning, detailed inspections and audits were undertaken within the footprint of surface infrastructure including stockpiles, access roads and haul roads to identify and remove any remaining sources of carbonaceous material. All carbonaceous material was placed 5m below final landform surface

The minimum 5 m of inert material is considered sufficient to minimise the risk of the cap being compromised by water ingress, erosion and root penetration and is sufficient to reduce oxygen dispersion required to sustain combustion.

Contaminated Material

A final contamination assessment has been completed. No areas were found to be contaminated.

e. Hazardous Materials Management

There is no hazardous material remaining on site, as confirmed in the final contamination assessment.

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f. Underground Infrastructure

Sunnyside is an open cut mine and does not have any portals, decline entries, shafts, underground workings, underground equipment, or subsidence monitoring lines. Subsequently, underground infrastructure is not applicable to Sunnyside.

6.3.3 LANDFORM ESTABLISHMENT

Landform establishment has been completed at Sunnyside since prior to 2019. The final landform for the SCM is shown on the Final Landform Plan in Section 5.

a. Water Management Infrastructure

Elements such as drainage paths, contour drains, ridgelines, and emplacements are shaped, as much as practical, to implement the approved post mining land use. Water management structures are designed to collect surface runoff from rehabilitation or disturbed areas.

Water management structures that will remain following mine closure is detailed in Figure 6.

Surface runoff water will be redirected around and away from the final void.

Long term ground water seepage from the site will be minimised to ensure negligible environmental consequences beyond those predicted for the project.

b. Final Landform Construction: General Requirements

Final Landform construction has been completed at Sunnyside. The general characteristics of the final landform implemented during construction include:

- Rehandling waste rock from the out-of-pit waste emplacement.
- Rehandling of the out of pit emplacement including selective handling of vegetation, topsoil, and subsoil to minimise biota loss. Existing small trees were mulched and incorporated into topsoil
- Material removed from the top of the waste emplacement is used to partially backfill the open cut (i.e., to improve geotechnical stability of the open cut highwall)
- Rehabilitated slopes have been by survey to be generally less than 10 degrees (overburden emplacement) and an average of 47 degrees (retained highwall in the final depression).
- All coal and carbonaceous material is capped with a minimum of 5 m of inert overburden, subsoil and topsoil
- Water management and erosion control structures are installed as required and are consistent with Blue Book (Landcom, 2004) requirements.
- The final landform is rehabilitated to minimise visual impacts as far as is reasonable and feasible.

c. Final Landform Construction: Reject Emplacement Areas and Tailings Dams

There is no reject emplacement areas or tailings dams at Sunnyside. Subsequently the Final Landform construction of Reject Emplacement Area Active Mining Phase is not applicable for this RMP.

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d. Final Landform Construction: Final Voids, Highwalls and Low Walls

Construction of the final void, highwall and low walls has been completed at Sunnyside. The characteristics of these features include:

- The final depression is backfilled to have a minimum elevation of 330 m AHD and be free draining to the natural drainage system.
- The highwall in the south-western portion of the open cut.
- The slope of the backfilled final void is approximately 15 degrees or less, and the highwall is at an average of 47 degrees
- The final landform highwall and end wall are located below the surrounding ground level and therefore would generally only be visible at elevated viewpoints in the vicinity of the SCM.

e. Final Landform Construction: Overburden Emplacement

Construction of the overburden emplacement has been completed at Sunnyside. The characteristic of this feature includes:

- An out of pit waste rock emplacement with elevation of approximately 345 metres (m) Australian Height Datum (AHD)
- The final batter slopes for the Overburden Emplacement Area generally less than 10 degrees.

6.3.4 GROWTH MEDIUM DEVELOPMENT

In the context of this RMP, growth media development encompasses activities to reinstate soils with the initial physical, chemical and biological characteristics required to establish the desired vegetation community. As a mine in an advanced state of closure, activities associate with growth medium development have largely been completed.

Characterisation

Soils used for rehabilitation at Sunnyside was informed by soil characterisation studies completed in 2012 and 2018. Soil testing results indicated the following:

- Metals analysed (Boron, copper, Iron, Manganese and Zinc) were low and below contamination guidelines,
- Levels of iron were high ranging between 13,000 and 31,000 mg/kg,
- pH is high between 8 and 9.4,
- Electrical conductivity, exchangeable calcium and exchangeable sodium are slightly evaluated,
- Nutrient levels are good with around 400mg/kg of total nitrogen, and total phosphorus around 300mg/kg,
- There is very low organic matter in the soils mostly below 1%.

Based on these results, soil applied during rehabilitation was generally ameliorated with gypsum and if required organic matter.

Topsoil Respreading and Amelioration

Topsoil was respread in rehabilitation areas following a weed assessment and consideration of stockpile inventory (i.e., amount, age, type), climatic conditions, the location and distance of the stockpile from the area to be rehabilitated, the pre-mining vegetation communities (i.e., what

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communities were growing in the area prior to stripping), and the vegetation communities and final land use proposed for the rehabilitation area.

Over handing of soil was minimised through implementation of the following:

- Topsoil will be respread to a nominal depth of 150 millimetres (mm) and subsoil to a depth of 400mm;
- All soils will be lightly ripped prior to seeding. This will be conducted on the contour and will be managed to minimise the potential for unsuitable spoil material being ripped up to the surface;
- Fertiliser application will be considered prior to seeding (agricultural rehabilitation only) while the surface is being lightly scarified to create an optimal seed bed.

Seed Bed Preparation

Thorough seedbed preparation was undertaken to ensure optimum establishment and growth of vegetation. All top-dressed areas were ripped (after top-dressing) to create a “key” between the soil and the subsoil / capping.

For seedings areas ripping was undertaken along the contour, where possible and immediately prior to sowing. The spread top-dressed surface was scarified to incorporate any ameliorant applied and scarified after spreading seed to ensure soil contact with seed.

For tree planting / Hiko areas, deep ripping was scheduled well ahead of the target planting date to allow for sufficient rip line settlement, to capture rain and improve soil moisture and ongoing moisture retention.

6.3.5 ECOSYSTEM AND LAND USE ESTABLISHMENT

In the context of this RMP, ecosystem and land use establishment included activities to establish the desired floristic composition (species diversity and density) and habitat features.

The phase incorporated management actions such as weed and feral pest control to achieve species establishment and growth to juvenile communities, and habitat augmentation.

Revegetation activities were planned to occur after the completion of reshaping, topdressing with growth media and construction of drainage structures.

Domain B – Agricultural – Grazing

Following the re-creation of the final landform a pasture mix was sown by conventional agricultural methods i.e., preparation of surface to form seed bed, broadcast seeding and scarification. This sequence was implemented to stabilise the landform and return the land to agricultural productivity. The pasture species applied were appropriate for the season and generally included annual and perennial grass species and legumes as identified in Table 21.

Table 21 Recommended Pasture Species Seed Mix

Pasture Species	Rate (kg/ha)	Ameliorant
Warm Season Grasses		
Bombatsi Panic	1 – 2	Gypsum Composted Manure
Green Panic 1	2 – 4	
Purple Pigeon Grass	1 – 2	



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Pasture Species	Rate (kg/ha)	Ameliorant
Annual Legumes		
Subterranean Legume	4 - 5	-
Cool Season Legumes		
Barrel (Sephi) medic	2 – 4	-
Snail (sava) medic	3 – 5	-
Woolly Pod Vetch	4 – 6	-
Serradella (Elgara)	1 – 2	-
Lucerne	0.5	-
Cool Season Grasses		
Phalaris (Sirolan or Holdfast)	1 - 2	-
Wallaby Grass	0.3 - 1	-

Domain A – Native Ecosystem and Domain

Areas revegetated with woodland species were planted to establish and enhance Koala habitat at the SCM as described in the Koala Management Plan, which includes seed collection and propagation, multi-stage planting, seedling protection and ongoing maintenance.

The species utilise in woodland rehabilitation is shown in **Table 22** and includes a mix of Koala feed trees and non-Koala feed trees.

Cover crops (oats, millet) were used in conjunction with native seeds for revegetation, where necessary, to provide for an effective groundcover until the target seed species are established. This will minimise the likelihood for erosion and weed infestation during the initial establishment phase of the rehabilitation

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Table 22 Woodland Species for Koala Habitat

Common Name	Species Name
White Box*	<i>Eucalyptus albens</i>
Yellow Box*	<i>Eucalyptus melliodora</i>
Tumbledown Red Gum	<i>Eucalyptus dealbata</i>
Wilga	<i>Geijera parviflora</i>
White Cypress	<i>Callitris glaucophylla</i>
Red Ash	<i>Alphitonia excelsa</i>
Poplar Box*	<i>Eucalyptus populnea</i>
Kurrajong	<i>Brachychiton populneus</i>
Motherumbah	<i>Acacia cheelii</i>

*Indicates Koala feed trees (utilising those species endemic to the area as identified in the Koala Management Plan).

Weed and Vertebrate Pest Control

Ecosystem Establishment includes initial management actions to limit the introduction of weeds and vertebrate pest species in rehabilitation areas. Ongoing weed and pest management and monitoring is considered in the ecosystem and land use development phase (refer **Section 6.4.6**).

Management measures include:

- Treatment of weeds on topsoil stockpiles prior to re-spreading in rehabilitation areas;
- Ensuring all plant and equipment are weed free prior to mobilisation to rehabilitation areas;
- Maximising the retention of ground cover (cover crop stubble) when planting tubestock to minimise opportunities for weed activity; and
- Installation of fauna exclusion fencing and/or tree guards for newly planted tubestock where predation by grazing herbivores represents a risk to establishment.
- If required, an agronomist will be engaged to provide recommendations for priority weeds

6.3.6 ECOSYSTEM AND LAND USE DEVELOPMENT

For the purposes of this RMP the Ecosystem and Land Use Development phase represents those activities required to develop sustainable ecosystems that have characteristics comparable to similar undisturbed vegetation associations (analogue site) in the area.

All Domains

Activities associated with the ecosystem and land use development phase of rehabilitation are generally ongoing maintenance and land management activities and rehabilitation monitoring. Maintenance at rehabilitated areas will include, but not be limited to:

- ongoing environmental management to minimise risks to rehabilitation;
- ongoing visual observations of weeds and feral animal activity including inspections for all the nominated vertebrate pests

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- comparing specific ecosystem characteristics such as soil profile development, floristic composition and structure and faunal diversity and abundance with the characteristics of appropriate analogue sites; and
- undertaking adaptive management and remedial works where characteristics of the rehabilitation are not trending toward desired outcomes.

Rehabilitation monitoring will be undertaken throughout the ecosystem and land use development phase until it can be demonstrated that rehabilitation areas have met all conditions for relinquishment. Rehabilitation maintenance activities will be identified by rehabilitation monitoring and ongoing requirements will be reported annually in the Annual Rehabilitation Report and Forward Program.

6.3.7 REHABILITATION COMPLETION (SIGN-OFF)

Rehabilitated areas will be progressively signed-off by the Resources Regulator as they meet the rehabilitation criteria outlined in **Section 4**, in accordance with the Guideline: Achieving Rehabilitation Completion (Sign-off).

6.4 REHABILITATION OF AREAS AFFECTED BY SUBSIDENCE

The SCM is located to the north of the now closed Gunnedah No. 5 Coal Mine subsidence district. Subsequently, no specific management controls or monitoring programs are necessary. For the open cut area, a barrier pillar of 40 m has been maintained as an offset from the old underground workings.

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7 **REHABILITATION QUALITY ASSURANCE PROCESS**

A Rehabilitation Quality Assurance Process (RQAP) has been developed for Sunnyside. This will include details of inspections, monitoring and record keeping which will be required to ensure that:

- Rehabilitation was implemented in accordance with the nominated methodologies; and
- Identified risks to rehabilitation are being adequately addressed and closed out for relinquishment.

Whitehaven will implement the RQAP through the detailed closure process to confirm that the rehabilitation strategies outlined in this RMP have been completed in accordance with the nominated methodologies (see **Section 6.3**). The RQAP will also include inspections and documentation to verify that each phase of demolition and rehabilitation has been completed and has met the completion criteria detailed in **Section 4**. Documentation to be maintained would include (but not limited to):

Phase 1 – Active Mining (Where available 2008 to 2019)

- Documentation of pre-clearance surveys and LDPs;
- Resource salvage records (soil, rocks, habitat trees)
- Dumping plans and surveys
- Detailed Landform designs

Phase 2 – Decommissioning

- Documentation of boreholes sealing and sign off by RR;
- Inspection and demolition reports to confirm all infrastructure to be demolished has been removed; and
- Validation testing to ensure any contamination has been appropriately remediated and/or removed.

Phase 3 – Landform Establishment

- Survey and preparation of as constructed drawings of final constructed slopes, landforms and water drainage structures; and
- Verification reporting to confirm the specified depth of capping has been implemented (i.e., aerial surveys).

Phase 4 – Growth Medium Development

- Maintenance of a topsoil inventory to document stripped, stockpiled and re-spread resources;
- Site records of re-spread topsoil, ameliorants, fertiliser etc.; and
- Soil testing results to confirm appropriate soil geochemical parameters for plant establishment.

Phase 5 – Ecosystem and Land Use Establishment

- Documentation of reseeded or planting activities undertaken, such as date of planting, seeding rates and/or planting rates; and
- Site inspections and monitoring of rehabilitated areas to allow early identification of any emerging threats to rehabilitation.
- Inspections of temporary and permanent erosion and sediment controls;

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- Inspections to identify potential weed infestations;
- Documentation of Rehabilitation Monitoring

Phase 6 – Ecosystem and Land Use Development

- Inspections of temporary and permanent erosion and sediment controls;
- Inspections to identify potential weed infestations;
- Documentation of Rehabilitation Monitoring; and
- Documentation of weed and feral animal management and eradication programs and follow-up inspections.

Whitehaven have developed a Rehabilitation Quality Checklist to be signed off after each phase of rehabilitation prior to proceeding to the next phase (refer **Figure 9**).

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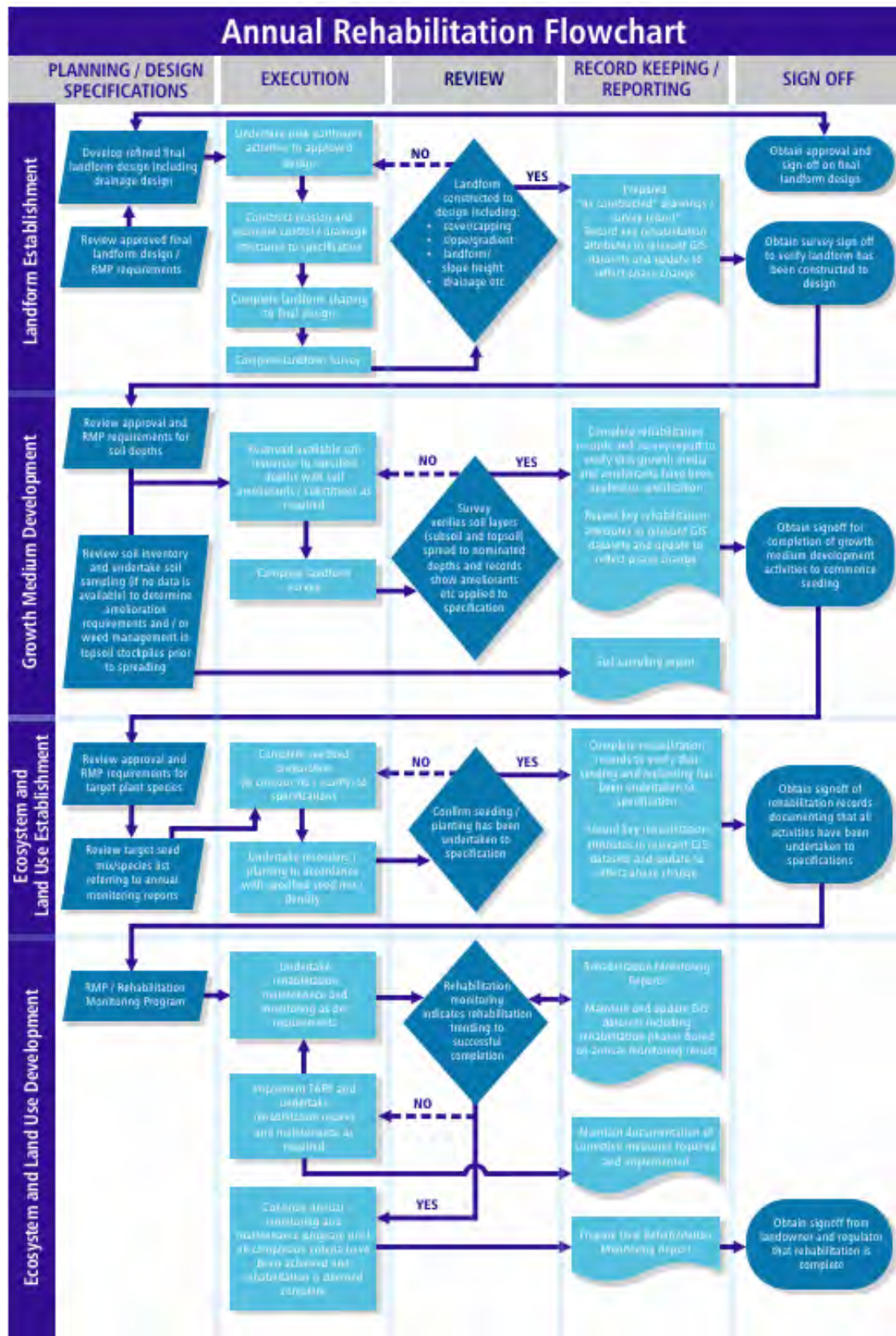


Figure 9 - Rehabilitation Quality Assurance Process

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8 **REHABILITATION MONITORING PROGRAM**

Rehabilitation monitoring is undertaken at Sunnyside to measure and assess rehabilitation performance against the stated rehabilitation and closure criteria outlined in this document. The monitoring results are also used to identify the need for corrective actions for rehabilitation performance. The monitoring program incorporates the most appropriate indicators and methods that:

- Provide a measure of completion criteria to be assessed in accordance with the defined rehabilitation objectives;
- Adequately track changes to rehabilitation phases;
- Are reproducible;
- Utilise scientific recognised techniques; and
- Are cost-effective.

Monitoring is conducted by a suitably skilled and qualified person(s) at locations representative of the range of conditions on the rehabilitating areas and appropriate analogue sites. Monitoring results will inform refinements of rehabilitation methodology as required. Rehabilitation monitoring will be continued until it can be demonstrated that rehabilitation has satisfied all rehabilitation and closure criteria.

8.1 **ANALOGUE SITE BASELINE MONITORING**

Analogue sites in 'best-on-offer' vegetation are used to determine if the appropriate characteristics are developing or being achieved. For benchmarking purposes, there are replicate sites within each vegetation community target, and repeat monitoring to capture seasonal variation. Protocols have been established to ensure that sites are appropriately located and position, as detailed in the Whitehaven Standard Annual Rehabilitation Monitoring Methodology (WHC-STD-OC-Rehabilitation Monitoring Method).

8.2 **REHABILITATION ESTABLISHMENT MONITORING**

Annual Rehabilitation monitoring is undertaken each year as sites are established in rehabilitation that has been seeded since the previous monitoring event. Annual Rehabilitation Monitoring of the newly established sites will identify issues and success within developing rehab.

Annual Rehabilitation monitoring results will link with the TARP management system in **Section 10** if issues are identified during the monitoring period.

The data yielded from the monitoring program allows an adaptive management approach by providing information to inform the type and implementation of management activities and determining the status of rehabilitation performance in relation to completion criteria. This facilitates the continual improvement and refinement of rehabilitation techniques.

8.3 **MEASURING PERFORMANCE AGAINST REHABILITATION OBJECTIVES AND REHABILITATION COMPLETION CRITERIA**

8.3.1 **ANNUAL REHABILITATION WALK OVER INSPECTIONS**

Annual walk-through of all rehabilitated areas is undertaken internally by a suitably qualified person(s) in Spring to assess the general progress of completed rehabilitation and to identify areas where corrective action is necessary. This assessment has simple objectives relating to vegetation

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establishment, weeds, erosion presence, surface water management and erosion and sediment control structures.

Any issue identified during the walk over will be recorded and the *Annual Site Rehabilitation Plan* which is updated to include remediation or monitoring activities on the issues.

8.3.2 ANNUAL REHABILITATION MONITORING

Annual Rehabilitation Monitoring is undertaken during spring each year when species are generally flowering, and more species diversity can be identified. Monitoring is undertaken in accordance with the Whitehaven Standard Annual Rehabilitation Monitoring Methodology (WHC-STD-OC-Rehabilitation Monitoring Method).

The monitoring provides detailed (transect-based) scientific data and trends on vegetation community establishment and development and is based on the Biodiversity Assessment Methodology (BAM).

Additional monitoring sites are established as rehabilitation progress. Periodic or standalone monitoring projects are commissioned as required, and may include targeted fauna, soil, and trial studies.

Detailed analysis of the monitoring data generated by the annual rehabilitation monitoring program is undertaken to determine the trajectory rehabilitation is tracking towards to achieve the final land uses detailed above. The analysis and monitoring outcomes are documented in annual monitoring reports.

Regular visual inspections of all phases of rehabilitation are also undertaken by WHC personnel. These informal assessments facilitate early management intervention, and include:

- Success of initial germination after seeding;
- Success of tree and shrub plantings;
- Adequacy of drainage controls;
- Presence/absence of weeds; and
- General stability of the rehabilitation site.

Any issue identified during rehabilitation inspection and documented in the annual rehabilitation monitoring report is actioned in the *Annual Site Rehabilitation Plan*.

8.3.3 REHABILITATION PERFORMANCE

Outcomes of monitoring results as described in **Section 8.3.1 to 8.3.2** are incorporated within the *Annual Site Rehabilitation Plan* which is developed every year by the end of June to align with the budget period. The *Annual Site Rehabilitation Plan* provides additional specific detail, maps and data on planned rehabilitation/closure activities and schedules for the next 12-month period. Notwithstanding this, planned activities are consistent with those in the Forward Program/LOM Plans. The *Annual Site Rehabilitation Plan* will provision for rehabilitation activities depending on the phase of rehabilitation at a particular area. The *Annual Site Rehabilitation Plan* will be the key document for tracking the progress of rehabilitation through rehabilitation phases.

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9 **REHABILITATION RESEARCH, MODELLING AND TRIALS**

9.1 **CURRENT REHABILITATION RESEARCH, MODELLING AND TRIALS**

A trial to understand different seed coating and application methods, focused mainly on grass species was undertaken in 2021 and established at the site of the rehabilitated ROM pad.

Results from this trial will be reporting in the Annual review.

Rehabilitation monitoring and rehabilitation methodology records are, shared among Whitehaven operations to inform decision-making regarding rehabilitation campaigns.

9.2 **FUTURE REHABILITATION RESEARCH, MODELLING AND TRIALS**

Gunnedah opencut sites have engaged a consultant to complete a Ground Flora Rehabilitation Study that incorporates literature review and field trial phases to produce practical management outcomes that will improve the standard of rehabilitation. Sunnyside is included in this study due to the dominance of pasture grasses in some woodland areas.

The trial is focused on, and include:

- Success of initial germination after seeding; the eradication or removal of exotic pasture groundcover; and
- cost effective strategies and technologies to enhance ground flora diversity and cover/abundance.

Progress and outcomes of the trial will be included in the Annual review

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10 INTERVENTION AND ADAPTIVE MANAGEMENT

Where rehabilitation performance is not trending toward the nominated completion criteria this may indicate that there is a potential threat to long term rehabilitation success. Threats to rehabilitation may include events such as extended periods of drought, bushfire events, or pressures from weeds and feral/pest animals.

A Rehabilitation and Closure TARP has been developed to provide a framework to manage potential key risks to rehabilitation during the mine closure and has been developed based on rehabilitation and closure risks. The Rehabilitation and Closure TARP includes:

- Identification of the principal contributing factors and impacts for each major risk to rehabilitation;
- Identification of upper limits (trigger values) for causes and impacts that are considered to represent an unacceptable level of risk; and
- Identification of appropriate responses to mitigate or remediate the causes and impacts, including a notification protocol.

The Rehabilitation and Closure TARP provides management responses for lower (first tier) and upper (second tier) trigger values. First tier trigger values identify opportunities for closer monitoring or early intervention that may mitigate potential impacts before notable impact to rehabilitation occurs. Second tier trigger values identify when indicators have reached a threshold that requires more substantive or widespread remedial actions to remediate or mitigate rehabilitation failure.

Should any trigger conditions be met resulting in the requirement for intervention or adaptive management, actions will be reported in the Annual Review. Whitehaven will notify the Resource Regulator and other relevant stakeholders of any incident (such as bushfire or disease) that results in major impacts to rehabilitation that are likely to significantly impact the potential to achieve rehabilitation success.

The Rehabilitation and Closure TARP is provided in **Table 23** and will be revised as conditions at the SCM change or new risks to rehabilitation are identified.

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Table 23 Trigger Action Response Plan

Aspect/ Category	Key Element	Element Number	Trigger Response	1st Level Trigger	2nd Level Trigger
Landform stability	Slope gradient	1	Trigger	Monthly survey data indicates that the landform is not built to the final landform design.	<55% of the rehabilitation area has slopes within the limits stipulated in the final the RMP.
			Response	Check machinery guidance system on dozers and update if required Check site datum and update if required. Undertake regrading as required	Undertake a review of the landform design and make an assessment of the stability of the landform including material characterisation. Undertake stability enhancement works including revegetation if required. Consider regrading to achieve stability.
	Erosion control	2	Trigger	Minor gully or tunnel erosion present and/or minor rilling (rilling up to 200 mm in depth or width).	Slumping and / or active gully or tunnel erosion present and / or rilling >200mm, which is compromising landform stability.
			Response	An inspection of the site will be undertaken by a suitably experienced person. Investigate opportunities to install water management infrastructure to address erosion. Remediate as appropriate.	Engage suitably qualified person(s) to assist with the management of erosion and sedimentation at the site and provide recommendations to appropriately remediate the erosion. Remediate as soon as practicable.
	Water management Structures	3	Trigger	Water management structures (sediment dams, channels, contour banks) minor erosion and/or scouring as determined by monitoring.	Water management structures fail or display significant scouring / erosion as determined by monitoring.
			Response	An inspection of the site will be undertaken by a suitably trained person. Identify remedial actions such as amelioration, re-vegetation or alternative scour protection	Engage a suitably qualified person to develop a site-specific remediation plan and review water management structure design criteria. Provide for physical works on the basis of design review.
Soil/spoil Quality	Salinity	4	Trigger	Increasing trend in soil/water salinity levels	Presence of salt scalds
			Response	Undertake soil/spoil testing to verify EC and recommend further soil / spoil amelioration	Engage a specialist consultant suitably qualified person to develop a site-specific management report to be implemented to remediate salinity scalds. Undertake works as required.



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	Spoil surface layers chemical characteristics	5	Trigger	Increasing trend in soil dispersivity (EAT)	Soils are moderately to highly dispersive
			Response	Undertake testing to determine required amelioration and undertake amelioration as required.	Review material handling practices to confirm that non-dispersive spoil is selectively dumped at final RL where possible and /or dispersive spoils emplaced at surface are appropriately ameliorated. Ameliorate dispersive spoils (for example with coarse gypsum) to a depth of 300 mm. Re-vegetate if required.
	Soil biophysical and chemical characteristics	6	Trigger	Soil biophysical and chemical characteristics not able to sustain vegetation growth for required vegetation community	Soil physical, chemical and biological characteristics continues to illustrate signs of not able to sustain the desired final land use.
			Response	Engage a consultant to recommend appropriate soil/spoil amelioration. Undertake amelioration and re-vegetation in accordance with the consultant recommendations.	Engage a consultant to recommend appropriate soil/spoil amelioration. Undertake amelioration and re-vegetation in accordance with the consultant recommendations.
	Topsoil depth	7	Trigger	Topsoil is not reinstated to, at least, the minimum depth specified for the proposed final land use. As identified in the quality assurance process	Sufficient suitable topsoil cannot be identified for reinstatement at the minimum specified depth for the proposed final land use i.e., 150 mm to 200 mm (agriculture areas), 200 mm (other disturbance areas).
			Response	Spread additional topsoil to achieve required depth	Engage a consultant to recommend appropriate soil/spoil amelioration. Undertake amelioration and re-vegetation in accordance with the consultant recommendations.
Biodiversity (native vegetation areas)	Native Species Richness	8	Trigger	Less than 50% of species sown recorded.	Less than 25% of species sown recorded.
			Response	Undertake a field survey to identify which species do not present in revegetation areas. Re-seed or maintenance planting of revegetation areas with unsatisfactory species richness. Review viability results and modify seed species as required.	Undertake a field survey to identify which species do not present in revegetation areas. Engage an independent specialist to review seed viability and others causes for revegetation failure and recommend remedial actions.



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				Use annual rehabilitation monitoring data to track progress	Implement appropriate management actions including revising rehabilitation procedures if required.
	Native Groundcover	9	Trigger	Less than 50% of groundcover species sown recorded.	Less than 25% of groundcover species sown recorded.
			Response	Undertake a field survey to identify likely causes of unsatisfactory germination rates. Re-seed areas with unsatisfactory cover. Review seeding procedures incl. seasonal mixes, timing and seed rate per hectare.	Undertake a field survey to identify which species do not present in revegetation areas. Engage an independent specialist to review seed viability and others causes for revegetation failure and recommend remedial actions. Implement appropriate management actions including revising rehabilitation procedures if required.
	Exotic Plant Cover (Weeds)	10	Trigger	Increasing number and cover of exotic species and/or occurrence of newly identified exotic species.	More than 10% of domain area and/or significant weed invasions.
			Response	Engage weed management contractor to remove / spray introduced weed species.	Engage weed management contractor to remove introduced weed species. Investigate management measures to improve native plant establishment and weed suppression. Implement recommendations as appropriate.
Water Quality	Water quality	11	Trigger	Water quality exceeds baseline values	Long term trend the Water Quality Guidelines (2018) limits values
			Response	Review and investigation of water quality monitoring and management where appropriate. Implement relevant remedial measures where required.	Specialist to review sampling and climate data and review likely cause(s). If mine related, undertake assessment to identify sources of water quality degradation and recommend remedial actions Implement specialist recommendations
	Discharge water quality at licence discharge points	12	Trigger	Sediment basin discharge exceeds EPL criteria for pH, TSS and/or oil/grease	Long term trend outside the Water Quality Guidelines (2018) limits
			Response	Re-sampling will be undertaken during the next discharge event to confirm results exceed limits and investigate potential causes.	Review sediment basin maintenance and discharge procedures, and sediment basin capacity requirements. Undertake required corrective actions.

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			Response	Undertake a review of the landform design to assess risks to stability and free draining design.	Engage a specialist to assist with the management of settlement and slumping and provide recommendations to appropriately remediate. Consider rehandling material and/or regrading if required.
	Monitoring of final landform	14	Trigger	Survey or remote sensing of the rehabilitated landforms indicates settlement or slumping that could compromise stability.	Survey or remote sensing of the rehabilitated landforms indicates major settlement or slumping.
			Response	Undertake a review of the landform design to assess risks to stability and free draining design.	Engage a specialist to assist with the management of settlement and slumping and provide recommendations to appropriately remediate. Consider rehandling material and/or regrading if required.

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11 REVIEW, REVISION AND IMPLEMENTATION

11.1 REVIEW AND REVISION OF THE PLAN

The Plan will be reviewed and if required revised in the event of the following:

- An amendment to the rehabilitation objectives, completion criteria or proposed final land use;
- Changes to risks, risk control measures or rehabilitation strategies being identified during the completion of rehabilitation risk assessment or additional investigations;
- When directed to by the RR Secretary; and
- When triggered by consent conditions (Annual Reviews, Independent Environmental Audits, Incident Reports, Modifications).

11.2 IMPLEMENTATION

The process for ensuring that mining and rehabilitation are conducted in accordance with the RMP is the preparation and implementation of an Annual Rehabilitation Plan. The Annual Rehabilitation Plan is prepared and managed by the site Environmental superintendents and approved by the Mine Manager.



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ACCOUNTABILITIES

Role	Accountability
General Manager	Ensure adequate resources are available to the Operations Manager to complete required rehabilitation activities according to the forward plan; Ensure adequate resources are available to enable the Environment Manager/Supt to complete the required monitoring and quality control activities in this plan.
Manager	Complete rehabilitation activities according to the schedule put forward in the Forward Plan. Ensure adequate resources are made available to monitor and assure the quality during the rehabilitation process.
Technical Expert	Monitor the progress of the rehabilitation completed against completion criteria and objectives. Monitor and report on any risks to rehabilitation success and communicate those risks effectively. Provide advice to the Operations Manager on all rehabilitation matters.
All Workers	Complete any rehabilitation activities according to procedures and protocols. Advise the Environmental Supt or delegate of any issues or risks encountered during rehabilitation activities.

SUPPORTING DOCUMENTATION

The following supporting documentation which includes associated training materials may need to be consulted and, where appropriate, used when applying this Standard and/or any subordinate procedures:

- *WHC-PRO-GOC-Annual Rehabilitation Planning Process*

Revisions	Revision Description	Who Consulted	Date
1	Document Developed	Environmental Manager, Ops Mgr, Env Supt, Env Officer	29/7/22
2			

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APPENDIX A – LAND OWNERSHIP

Tenure Type	Lot Number	Deposited Plan Number
Freehold	1	393755
Freehold	12	755503
Freehold	16	7555031
Freehold	162	755503
Various Road Reserves		

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APPENDIX B – STANDARD MINING LEASE CONDITIONS

Refer to website: <https://legislation.nsw.gov.au/view/pdf/asmade/sl-2021-360>