# 2024 Annual Review





A GLENCORE MANAGED OPERATION

### **ANNUAL REVIEW**

1 January – 31 December 2024

### **FINAL**

Prepared by Umwelt (Australia) Pty Limited on behalf of Bulga Coal Pty Ltd

Project Director: Adam Williams Project Manager: Eva Tew Report No. 31902/R01 Date: March 2025





This report was prepared using Umwelt's ISO 9001 certified Quality Management System.



#### Acknowledgement of Country

Umwelt would like to acknowledge the traditional custodians of the country on which we work and pay respect to their cultural heritage, beliefs, and continuing relationship with the land. We pay our respect to the Elders – past, present, and future.

**Cover Photo:** An aerial view of the Eastern Emplacement Rehabilitation Area taken in February 2025. 32 hectares was shaped into a natural landform throughout 2024 and seeded by helicopter in December. Another 32 hectares of this area will be rehabilitated by the end of 2025.

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Rev No.	Revi	ewer	Approved for Issue		
	Name	Date	Name	Date	
Draft	Adam Williams	19 March 2025	Adam Williams	19 March 2025	
Final	Adam Williams	26 March 2025	Adam Williams	26 March 2025	



# **Compliance Declaration**

Name of Operation	Bulga Coal
Name of Operator	Bulga Coal Management Pty Ltd
Development consent / project approval #	Bulga Underground Operations DA 376-8-2003
Name of holder of development consent / project approval	Bulga Open Cut SSD-4960
Mining lease #	Bulga Coal Management Pty Ltd
Name of holder of mining lease	ML 1494, ML 1547, ML 1674, ML 1717, ML 1788, CL 224, sublease within Mount Thorley Operations (CL 219), AUTH 447, AUTH 450, EL 5277, EL 5461, EL 8315, ML 1547 AMA.
Water licence #	Saxonvale Coal Pty Ltd; Saxonvale Coal Pty Ltd and Nippon Steel Australia Pty Ltd; and Bulga Coal Management Pty Ltd
Name of holder of water licences	WAL36221, WAL41543, WAL41544, WAL41545, WAL41546, WAL41687
RMP start date	5 March 2024
Annual Review start date	1 January 2024
Annual Review end date	31 December 2024

I, Ralph Northey,

certify that this audit report is a true and accurate record of the compliance status of Bulga Coal for the period 1 January 2024 to 31 December 2024 and that I am authorised to make this statement on behalf of Bulga Coal Management Pty Ltd.

Note.

a) The Annual Review is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, \$1 million and for an individual, \$250,000.

b) The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents—maximum penalty 2 years imprisonment or \$22,000, or both).

Name of authorised reporting officer	Ralph Northey
Title of authorised reporting officer	Environment and Community Manager
Signature of authorised reporting officer	RMonthey
Date	28 March 2025



# **Table of Contents**

Comp	pliance Declaration			i
1.0	State	ement of	f Compliance	1
2.0	Intro	duction		4
	2.1	Mine C	Operations	4
	2.2	Mine C	Contacts	4
		2.2.1	Mining Personnel	4
3.0	Appr	ovals		6
	3.1	Develo	pment Consents and Commonwealth Approvals	6
	3.2	Mining	Tenements	7
		3.2.1	Rehabilitation Management Plan and Outcome Documents Status	7
	3.3	Licence	25	8
4.0	Oper	ations S	Summary	10
	4.1	Explora	ation	10
	4.2	Land Preparation		
	4.3	Mining	Operations	12
	4.4	Other (	Operations	13
		4.4.1	Coal Handling and Preparation Plant	13
		4.4.2	Tailings Management	14
		4.4.3	Construction	14
		4.4.4	Demolition	14
		4.4.5	Waste Management	14
		4.4.6	Hazardous Materials Management	16
	4.5	Next Re	eporting Period	17
		4.5.1	Bulga Underground Operations	17
		4.5.2	Bulga Open Cut	17
5.0	Actio	ons Requ	uired from Previous Annual Review	19
6.0	Envir	onment	al Management Performance	20
	6.1	Meteo	rology	24
	6.2	Noise		41
		6.2.1	Environmental Management	41
		6.2.2	Environmental Performance	41
		6.2.3	Comparison Against Predictions	43

ii



	6.2.4	Long Term Analysis		43
	6.2.5	Implemented/Proposed Improve	ments	45
6.3	Blasting			45
	6.3.1	Environmental Management		45
	6.3.2	Environmental Performance		46
	6.3.3	Comparison Against Predictions		47
	6.3.4	Implemented/Proposed Improve	ments	47
6.4	Air Qua	lity		47
	6.4.1	Environmental Management		47
	6.4.2	Environmental Performance		48
	6.4.3	Comparison Against Predictions		54
	6.4.4	Long Term Analysis		54
	6.4.5	Implemented/Proposed Improve	ments	54
6.5	Mine Su	ıbsidence		54
	6.5.1	Environmental Management		54
	6.5.2	Comparison Against Predictions		55
	6.5.3	Implemented/Proposed Improve	ments	55
6.6	Biodive	rsity and Offsets		55
	6.6.1	Remnant Vegetation		55
	6.6.2	Biodiversity Offsets		60
6.7	Weeds	and Pests		80
	6.7.1	Environmental Management		80
	6.7.2	Environmental Performance		80
	6.7.3	Implemented/Proposed Improve	ments	80
6.8	Archaed	ology and Heritage		80
	6.8.1	Environmental Management		80
	6.8.2	Environmental Performance		81
	6.8.3	Implemented/Proposed Improve	ments	85
6.9	Visual a	nd Lighting		85
	6.9.1	Environmental Management		85
	6.9.2	Environmental Performance		85
6.10	Spontar	neous Combustion		85
	6.10.1	Environmental Management		85
	6.10.2	Environmental Performance		86
6.11	Bushfire	2		86
	6.11.1	Environmental Management		86
	6.11.2	Environmental Performance		86



		6.11.3	Implemented/Proposed Improvements	86
	6.12	Greenh	ouse Gas Emissions	86
		6.12.1	Environmental Management	86
		6.12.2	Environmental Performance	87
		6.12.3	Implemented/Proposed Improvements	88
	6.13	Hydroc	arbon Management	89
		6.13.1	Environmental Management	89
		6.13.2	Environmental Performance	91
		6.13.3	Implemented/Proposed Improvements	92
	6.14	Public S	Safety	92
		6.14.1	Environmental Management	92
		6.14.2	Environmental Performance	92
7.0	Wate	r Mana	gement	93
	7.1	Water I	Management	93
		7.1.1	Water Balance	93
		7.1.2	Licensed Water Take	94
		7.1.3	Long Term Trend Analysis	95
	7.2	Surface	Water	95
		7.2.1	Environmental Management	95
		7.2.2	Environmental Performance	95
		7.2.3	Comparison Against Predictions	103
		7.2.4	Long Term Trend Analysis	104
	7.3	Erosion	and Sedimentation	105
		7.3.1	Environmental Management	105
		7.3.2	Environmental Performance	106
	7.4	Ground	lwater	106
		7.4.1	Environmental Management	106
		7.4.2	Environmental Performance	106
		7.4.3	Comparison Against Predictions	111
		7.4.4	Long Term Trend Analysis	111
8.0	Rehat	oilitatio	n	113
	8.1	Post M	ining Land Use	113
	8.2	Rehabil	litation Performance During the Reporting Period	113
		8.2.1	Rehabilitation Summary	113
		8.2.2	2024 Rehabilitation – Bulga Open Cut	114
		8.2.3	2024 Rehabilitation – Bulga Underground Operations	118



	8.3	Decom	missioning of Infrastructure	118
	8.4	Depart	ment of Regional NSW – RR Rehabilitation Sign-off	119
	8.5	Variatio	ons from Proposed Forward Work Program Activities	119
	8.6	Rehabi	litation Monitoring, Trials and Research	119
		8.6.1	Annual Rehabilitation Monitoring Program	120
		8.6.2	Rehabilitation Trials and Research	122
	8.7	Key Issu	ues that may Affect Rehabilitation	122
		8.7.1	Bulga Open Cut	123
		8.7.2	Bulga Underground Operations	125
	8.8	Actions	s for the Next Reporting Period	125
		8.8.1	Rehabilitation Outcomes	125
		8.8.2	Proposed Rehabilitation Trials, Projects and Initiatives	125
		8.8.3	Rehabilitation Activities Proposed for 2025	125
9.0	Community			
	9.1	Commu	unity Engagement	126
		9.1.1	Community Barbeques	126
		9.1.2	Newsletters	126
		9.1.3	Community Consultative Committee	127
		9.1.4	Voluntary Planning Agreement	127
		9.1.5	Broke to Bulga Discovery Trail Feasibility Study	127
		9.1.6	Mine Tours	127
	9.2	Commu	unity Sponsorship and Donations	129
		9.2.1	Broke and Bulga Bicentennial Celebrations	129
		9.2.2	Broke School	129
		9.2.3	Broke Bulga Landcare	130
		9.2.4	Community Yoga Classes	130
		9.2.5	Broke Village Fair	130
		9.2.6	Broke Fordwich Wine and Tourism Association	131
		9.2.7	Sponsorships	131
		9.2.8	Donations	132
	9.3	Commu	unity Complaints	133
	9.4	Commu	unity Feedback	133
10.0	Indep	endent	Audit	134
	10.1	2024 In	ndependent Environmental Audit	134
11.0	Incide	ents and	d Non-Compliances During the Reporting Period	137
	11.1	Admini	strative Non-Compliance	137

v



		11.1.1 Failure to Continuously Monitor Air Quality	137
12.0	Activities to Be Completed in the Next Reporting Period		138
	12.1	Proposed Activities	138

# **Figures**

Figure 2.1	Bulga Coal Locality and Licences 2024	5
Figure 4.1	Bulga Open Cut Summary of Operations 2024	11
Figure 4.2	2017–2024 Waste Streams Generated	16
Figure 4.3	Bulga Open Cut Proposed Operations 2025	18
Figure 6.1	Bulga Coal Air and Meteorological Monitoring Locations 2024	21
Figure 6.2	Bulga Coal Noise and Blast Monitoring Locations 2024	22
Figure 6.3	Bulga Open Cut Water Monitoring Locations 2024	23
Figure 6.4	Distribution of Monthly Rainfall at Representative Monitoring Stations	26
Figure 6.5	2024 Monthly Temperature 2 m (Degrees Celsius) at Representative Monitoring S	tations
		29
Figure 6.6	2024 Monthly Temperature 10 m/30 m (Degrees Celsius) at Representative Monit	oring
	Stations	30
Figure 6.7	2024 Relative Humidity (%) at Representative Monitoring Stations	32
Figure 6.8	2024 Wind Speed at Representative Monitoring Stations	34
Figure 6.9	Wind Speed and Direction Quarter 1	37
Figure 6.10	Wind Speed and Direction Quarter 2	38
Figure 6.11	Wind Speed and Direction Quarter 3	39
Figure 6.12	Wind Speed and Direction Quarter 4	40
Figure 6.13	2024 Pollution-Rose for EPA Point 10, $PM_{10}$ Data (Todoroski Air Sciences, 2025)	51
Figure 6.14	2024 Pollution Rose for EPA Point 9, $PM_{10}$ Data (Todoroski Air Sciences, 2025)	52
Figure 6.15	Mushroom Composting Facility (D4 Sampling Results 2024 – 13-hour PM <sub>10</sub> Averag	es) 53
Figure 6.16	Bulga Coal Ecological and Rehabilitation Monitoring Locations 2024	57
Figure 6.17	Bulga Coal Biodiversity Offsets and Management Areas – Regional Context	62
Figure 6.18	Bulga Coal Biodiversity Offsets and Management Areas	63
Figure 6.19	Bulga Coal Hydrocarbon Surface and Groundwater Monitoring Locations 2024	90
Figure 7.1	Wollombi Brook Brickmans Bridge Gauging Station (210135)	98
Figure 7.2	Wollombi Brook – Bulga Gauging Station 210028 (Downstream)	98
Figure 7.3	Long Term Surface Water EC Results	104
Figure 7.4	Long Term Surface Water pH Results	104
Figure 7.5	Long Term Surface Water TSS Results	105



# Photos

Photo 6.1	Bushtucker garden work with RAPs at Minimbah Teaching Place 2024	82
Photo 6.2	Bushtucker garden work with RAPs at Minimbah Teaching Place 2024	83
Photo 6.3	Pathways Program Launch at Minimbah Teaching Place 2024	84
Photo 8.1	Rehabilitation landform shaping at the Eastern Emplacement Area 2024	115
Photo 8.2	Topsoil loading at the Eastern Emplacement in 2024	116
Photo 9.1	Community Barbeque at the Starline Alpaca Farm in December, 2024	126
Photo 9.2	St Catherine's College Year 9 Mine Tour	128
Photo 9.3	Post Mining Land Use Ideas from Students during Rehabilitation and Mine Tour 202	4128
Photo 9.4	Receiving Recognition from the Broke Residents Association for Contributions to th	e
	Bicentennial Celebration	129
Photo 9.5	Apprentice Working Bee at Broke Public School	130
Photo 9.6	Bulga Coal Marquee at the Broke Village Fair	131
Photo 9.7	Historical Broke vs Bulga Cricket match at the Broke Bicentennial Celebrations	132

# Tables

Table 1.1	Summary Statement of Compliance for Major Approvals	1
Table 1.2	Summary of Non-Compliances	2
Table 1.3	Compliance Status Categories	3
Table 2.1	Contacts for Bulga Coal	4
Table 3.1	Development Consents and Commonwealth Approvals	6
Table 3.2	Mining Tenements	7
Table 3.3	Bulga Coal Licences	8
Table 4.1	Equipment Fleet	12
Table 4.2	Production and Waste Summary for the Bulga Open Cut	13
Table 5.1	DPHI 2023 Annual Review additional information requested	19
Table 6.1	Distribution of Monthly Rainfall at Representative Monitoring Stations	25
Table 6.2	2024 Temperature 2 m (Degrees Celsius) at Representative Monitoring Stations	27
Table 6.3	2024 Temperature 10 m/30 m (Degrees Celsius) at Representative Monitoring Static	ons
		28
Table 6.4	2024 Relative Humidity (%) at Representative Monitoring Stations	31
Table 6.5	2024 Wind Speed at Representative Monitoring Stations	33
Table 6.6	2024 Wind Direction at Representative Monitoring Stations	35
Table 6.7	2024 Sigma Theta at Representative Monitoring Stations	36
Table 6.8	Summary of Attended Noise Monitoring Data – 2024	42
Table 6.9	Summary of Exceedances by Noise Monitoring Location 2012-2024	44
Table 6.10	Private Property Amenity Impact Assessment Criteria	45
Table 6.11	Infrastructure Impact Assessment Criteria	45
Table 6.12	Heritage Impact Assessment Criteria	46
Table 6.13	2024 Private Property Overpressure and Vibration Monitoring Results	46
Table 6.14	2024 Infrastructure Vibration Monitoring Results	46



Table 6.15	2024 Declared Dam (Northern Tailings Facility) Vibration Monitoring Results	46
Table 6.16	Air Quality Criteria SSD-4960 Mod 3	48
Table 6.17	Summary of Dust Deposition Monitoring Results – 2024 Annual Average	48
Table 6.18	Summary of 2024 HVAS Annual Average Results	49
Table 6.19	Summary of TEOM 2024 Monitoring Results	49
Table 6.20	Summary of BAM 2024 Monitoring Results	50
Table 6.21	Observed Subsidence Impacts	54
Table 6.22	Bulga Coal Biodiversity Offset Areas	60
Table 6.23	Bulga Coal Greenhouse Gas Emissions (Scope 1 and 2 Direct Emissions) FY 2023/2	024 87
Table 6.24	Hydrocarbon Monitoring Sites	91
Table 6.25	Ecological Investigation Levels (ANZECC) Adopted for Natural Waters (Surface and	
	Groundwater) at Bulga Open Cut	91
Table 7.1	Bulga Coal 2024 Water Balance	93
Table 7.2	Water Take 2023–2024	94
Table 7.3	Summary of Surface Water Monitoring Results – 2024 Annual Averages	95
Table 7.4	Comparison of Surface Water Monitoring Results (2024) against Background (201	3
	Bulga Optimisation Project EIS)	103
Table 7.5	Summary of Groundwater Monitoring Results – 2024 Annual Averages	107
Table 8.1	Rehabilitation Status at Bulga Coal	114
Table 8.2	Maintenance Activities on Rehabilitated Land for Bulga Open Cut	117
Table 8.3	Maintenance Activities on Rehabilitated Land for Bulga Underground Operations	118
Table 8.4	Bulga Coal Rehabilitation Performance against Forecast	119
Table 9.1	Summary of Complaints by Issue 2019–2024	133
Table 10.1	Non-Compliance Findings and Action Status from 2024 IEA	135
Table 12.1	Bulga Coal Proposed Activities 2025	138

# Appendices

Appendix A	EPBC Approvals Compliance Reports
Appendix B	Air Quality Monitoring Data Review and Analysis at Bulga Complex 2024 (Todoroski,
	2025)
Appendix C	Progress Against 2024 Performance Indicators – Offset Areas
Appendix D	Bulga Coal 2024 Groundwater and Surface Water Annual Review (Umwelt, 2025)
Appendix E	Annual Photographic Monitoring of Loders Creek Grinding Grooves Relocation Area



# **1.0 Statement of Compliance**

The Bulga Coal Complex (Bulga Coal) includes the Bulga Open Cut and the Bulga Underground Operations. During the reporting period Bulga Open Cut operated under development consent SSD-4960, while Bulga Underground Operations operated under DA 376-8-2003. Both sites operate under Environment Protection Licence (EPL) 563 and several mining and exploration leases.

**Table 1.1** outlines compliance against major approvals. Where non-compliances have been identified, they are listed in **Table 1.2** and detailed in later sections of this report. **Table 1.3** describes the status categories of non-compliance.

Licence	Were all conditions of the Licence complied with?		
SSD-4960	No		
DA 376-8-2003	No		
EPBC 2002/773	Yes		
EPBC 2012/6637	Yes		
EPBC 2018/8300	Yes		
EPL 563	No		
ML 1494	Yes		
ML 1547	Yes		
ML 1674	Yes		
ML 1717	Yes		
ML 1788	Yes		
EL 5277	Yes		
EL 5461	Yes		
EL 8315	Yes		
AUTH 447	Yes		
AUTH 450	Yes		
CL 224	Yes		

#### Table 1.1 Summary Statement of Compliance for Major Approvals



#### Table 1.2Summary of Non-Compliances

Approval/ Licence	Condition / Legislative Reference	Condition Summary	Compliance Status	Date	Details of the Non-compliance	Corrective Action/s	Section of this Annual Review
SSD-4960	Schedule 3, Condition 16	Air Quality Monitoring	Non-Compliant	Various	Failure to continuously monitor $PM_{10}$ at air quality monitors D1, D3, D5 and D11.	Causes of the failures were investigated and issues	Section 11.1.1
DA 376-8-2003	Schedule 4, Condition 22				Yearly valid data for all four monitors was above 96.8%.	fixed, or power restored.	
SSD-4960	Schedule 3, Condition 16	Air Quality Monitoring	Non-Compliant	Various	Failure to continuously monitor PM <sub>2.5</sub> at air quality monitors D2 and D10.	Causes of the failures were investigated and issues	Section 11.1.1
DA 376-8-2003	Schedule 4, Condition 22				Yearly valid data for both monitors was above 82.7%.	fixed, or power restored.	
EPL 563	Condition M2.2	Air Quality Monitoring	Non-Compliant	Various	Failure to continuously monitor PM <sub>10</sub> at air quality monitors EPA Point 9 and EPA Point 10. Yearly valid data for both monitors was above 97.7%.	Causes of the failures were investigated and issues fixed, or power restored.	Section 11.1.1



### Table 1.3 Compliance Status Categories

Risk Level	Colour Code	Description		
High	Non-Compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence		
Medium	Non-Compliant	Non-compliance with potential for serious environmental consequences, but is unlikely to occur; or potential for moderate environmental consequences, but is likely to occur		
Low	Non-Compliant	Non-compliance with potential for moderate environmental consequences, but is unlikely to occur; or potential for low environmental consequences, but is likely to occur		
Administrative non-compliance	Non-Compliant	Non-compliance which does not result in any risk of environmental harm		

**Section 6.0** and **Section 7.0** of this report detail the environmental management and water management performance of Bulga Coal, respectively. Non-compliances are discussed in **Section 11.0**.



# 2.0 Introduction

# 2.1 Mine Operations

Bulga Coal is located approximately 12 kilometres (km) southwest of Singleton, and 2 km from the townships of Broke and Bulga in the Upper Hunter Valley of New South Wales (NSW) (refer **Figure 2.1**). Bulga Coal comprises two coal mining operations, being Bulga Open Cut and Bulga Underground Operations. The Coal Handling and Processing Plant (CHPP) and rail loading facility are on the eastern side of the site. In May 2018, Bulga Underground Operations ceased mining and the mine was sealed in July 2018.

Bulga Coal is managed by Bulga Coal Management Pty Ltd on behalf of the Bulga Joint Venture. Bulga Coal Management Pty Ltd is owned by Oakbridge Pty Ltd, which is the majority shareholder (87.5%) of the Bulga Joint Venture. Glencore is the majority shareholder of Oakbridge Pty Ltd.

This report details the environmental management performance of Bulga Coal over the period 1 January 2024 to 31 December 2024. It has been prepared in accordance with the *Annual Review Guideline* (DPE, 2015) and satisfies:

- Schedule 6, Condition 4 of Bulga Underground Operations Development Consent DA 376-8-2003.
- Schedule 5, Condition 4 of Bulga Optimisation Project Development Consent SSD-4960.

### 2.2 Mine Contacts

The contact details for the personnel responsible for environmental management and community relations at Bulga Coal are provided in **Table 2.1**.

Contact	Position	Contact Details
Ralph Northey	alph NortheyBulga Coal Environment and CommunityT: 02 6570 2539	
	Manager	E: Ralph.Northey@glencore.com.au
Murray Gregson	Bulga Coal Operations Manager	T: 02 6570 2400
		E: Murray.Gregson@glencore.com.au

Table 2.1Contacts for Bulga Coal

### 2.2.1 Mining Personnel

As at the end of the reporting period, Bulga Coal employed approximately 932 direct employees and fulltime equivalent personnel.

#### **Bulga** Coal FIGURE 2.1 - Bulga Coal Locality and Licences 2024



File Path Ref: Q:\03\_MapDocuments\18\_Reporting\Annual\_Review\2024\AR FIGURES\20250210\_Figure\_2\_1\_AR\_Locality\_A4\_GDA2020.mxd

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# 3.0 Approvals

# **3.1** Development Consents and Commonwealth Approvals

Bulga Coal operates under two development consents: the Bulga Underground Operations DA 376-8-2003 and Bulga Open Cut SSD-4960.

In December 2024 the decision was made to put Mod 5 on hold to consider a revised mine design and other potential inclusions. The final void modification is not required until 2031.

Bulga Coal also operates in accordance with three Commonwealth approvals issued by the Australian Government Department of Climate Change, Energy, the Environment and Water (Commonwealth DCCEEW) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). For more information regarding compliance with Commonwealth approval conditions refer to **Appendix A**.

Details of the current State development consents and Commonwealth approvals are provided in Table 3.1.

	evelopment consents and commonwealth Approvais	
Consent	Details	Expiry Date
DA 376-8-2003	Bulga Coal Continued Underground Operations	23 February 2031
	Mod 1 – Drift relocation (11 April 2006)	
	Mod 2 – Increase CHPP throughput (25 October 2006)	
	Mod 3 – Longwall realignment (1 October 2007)	
	Mod 4 – Methane Abatement and Gas-fired Power Plant (14 July 2010)	
	Mod 5 – Blakefield North Longwall Modification and Gas Fired Power Plant (18 October 2013)	
	Mod 6 – Modification to noise criteria, flora and fauna criteria, and independent auditing (8 December 2016)	
	Mod 7 – Relocation of the 9 MW power station and associated flares (16 July 2020)	
	Mod 8 – Change to Annual Review reporting period and change to sigma theta method for meteorological monitoring (24 February 2022)	
SSD-4960	Bulga Optimisation Project (1 December 2014)	31 December 2039
	Mod 1 – Eastern Emplacement Area and Tailings Storage (17 January 2017)	
	Mod 2 – Extend the period for construction of the outer face of the Noise and Visual Bund (30 August 2018)	
	Mod 3 – Extend approval to extract additional 64 Mt from beneath tailings storage (16 July 2020)	
	Mod 4 – Change to Annual Review reporting period and change to sigma theta method for meteorological monitoring (24 February 2022)	
EPBC 2002/773	Commonwealth Land Consent (as varied 25 October 2015)	31 December 2034
	Mod 2002/773 – Commonwealth Land Subsidence Management Plan (SMP) Submission Schedule	
EPBC 2012/6637	Bulga Open Cut (as varied 5 January 2016)	31 December 2036
EPBC 2018/8300	Bulga Open Cut (as varied 9 September 2021)	31 December 2049

#### Table 3.1 Development Consents and Commonwealth Approvals



# 3.2 Mining Tenements

Mining operations at Bulga Coal are undertaken within Mining Lease (ML) 1494, ML 1547, ML 1674, ML 1717, ML 1788, Coal Lease (CL) 224 and a sublease within Mount Thorley Operations (CL 219). Bulga Coal also has land area AMA1004 for ancillary mining activities annexed to ML1547. Exploration activities are undertaken in accordance with Exploration Lease (EL) 5277, EL 5461, EL 8315, Authorisation (AUTH) 447 and AUTH 450.

In December 2024 the decision was made to relinquish AUTH 450 considering:

- The Department of Regional NSW, Mining, Exploration and Geosciences (MEG) is no longer renewing veneer licences that cannot be demonstrably linked to an Open Cut exploration program or mining study, and veneer licences are no longer being renewed for the sole purpose of completing rehabilitation; and
- AUTH 450 is located outside the Bulga Open Cut operations Noise and Visual Bund which acts as an established boundary to the current extent of active open cut mining operations within the Bulga Complex.

Tenement	Details Expiry Date	
ML 1494	Saxonvale Coal Pty Ltd and Nippon Steel and Sumitomo Metal Australia Pty Ltd	20 September 2027
ML 1547 & AMA 1004	Bulga Coal Management Pty Ltd	4 April 2025 <sup>1</sup>
ML 1674	Bulga Coal Management Pty Ltd	22 March 2033
ML 1717	Bulga Coal Management Pty Ltd	15 September 2036
ML 1788	Bulga Coal Management Pty Ltd	19 June 2040
Sublease within CL 219	Sublease to Bulga Coal within the Mount Thorley Operations CL 219	1 June 2025
CL 224 Saxonvale Coal Pty Ltd		23 December 2044
EL 5277	L 5277 Saxonvale Coal Pty Ltd 7 April 2026 <sup>2</sup>	
EL 5461	Saxonvale Coal Pty Ltd and Nippon Steel and Sumitomo Metal Australia Pty Ltd	3 April 2026
EL 8315	Saxonvale Coal Pty Ltd 13 October 2027	
AUTH 447	Saxonvale Coal Pty Ltd 2 September 2025	
AUTH 450 Saxonvale Coal Pty Ltd 30 December		30 December 2024 <sup>3</sup>

Mining tenements are summarised in Table 3.2 and are shown on Figure 2.1.

**Mining Tenements** 

<sup>1</sup> Renewal application submitted to the Department of Regional NSW – Mining, Exploration and Geoscience (MEG) in April 2024.

<sup>2</sup> Renewal approved in 2024 with a reduced area (from 2054 ha to 879.5 ha).

<sup>3</sup> AUTH 450 was relinquished in December 2024.

Table 3.2

### 3.2.1 Rehabilitation Management Plan and Outcome Documents Status

The Mining Amendment (Standard Conditions of Mining Leases – Rehabilitation) Regulation 2021 (the Regulation) introduced new standard rehabilitation and reporting conditions on mining leases.



To meet the requirements of the Regulation, Bulga Coal developed and implemented a Rehabilitation Management Plan, Forward Program and Rehabilitation Outcome Documents. The Bulga Coal Rehabilitation Objectives Statement and Final Landform and Rehabilitation Plan were approved by the NSW Resource Regulator (NSW RR) on 18 October 2023.

### 3.3 Licences

The licences held by Bulga Coal are detailed in **Table 3.3**. Bulga Coal does not hold any surface water licences for mining purposes. Surface water drawn for mining purposes is supplied from the Mount Thorley Water Supply Joint Venture, operated by Singleton Council. It is also supplied by Yancoal's Mount Thorley Mine through an agreement with Bulga Coal.

Licence	Details					
Environmental Protection Licence (EPL)						
EPL 563	For scheduled activities:					
	Coal works > 5,000,000 t annual handling capacity;					
	Crushing, grinding or separating >100,000–500,000 t annual processing capacity; and					
	Mining for coal >5,000,000 t annual production capacity.					
Mater Linences	Anniversary Date: 20 July.					
water Licences						
WAL41687	Mining: Volume licence limit 500 ML. Sydney Basin-North Coast Groundwater Source.					
WAL41546	Mining: Volume licence limit 365 ML. Sydney Basin-North Coast Groundwater Source.					
WAL41543	Mining: Volume licence limit 500 ML. Sydney Basin-North Coast Groundwater Source.					
WAL41544	Mining: Volume licence limit 500 ML. Sydney Basin-North Coast Groundwater Source.					
WAL41545	Mining: Volume licence limit 500 ML. Sydney Basin-North Coast Groundwater Source.					
WAL36221	Mining: Wollombi Brook Aquifer leakage to Permian coal measures 300 ML.					
20BL166867	Monitoring (mining bore): GW1 – GW10. Total of 16 bores for monitoring purposes.					
20BL167776	Monitoring: P1 – P3, P4A, P4B, P5 – P8 and V3. Licence for total of 9 bores for monitoring purposes.					
20BL167777	Monitoring: V1, V2, F1 and F2.					
20BL169204	Monitoring: Bore – ACARP Project.					
20BL169246	Monitoring: Bore – ACARP Project.					
20BL172659	Monitoring: WBR180 and WBR181.					
20BL172660	Monitoring: WBR182 and WBR183.					
20BL173014	Monitoring: SBD194, SBD196.					
20BL173617	Monitoring: Lot 61/755264.					
20BL173618	Monitoring: Lot 34/755264.					
20BL173619	Monitoring: Lot 33/755264.					
20BL173620	Monitoring: Lot 23/755264.					
20BL173621	Monitoring: Lot 24/755264.					
20BL173640	Monitoring Bore – 25//755264.					
20BL173657	Monitoring Bore – 22//755264.					
20BL173708	Monitoring Bore – 11//730762.					

Table 3.3 Bulga Coal Licences



Licence	Details					
Radiation/Dangerous	Radiation/Dangerous Goods Licences					
Radiation	Radiation regulated material ID 8929 – Serial Numbers: 054 / 6230GK					
Management	Radiation regulated material ID 8934 – Serial Numbers: 055 / 4421GK					
Licence 5061333	Radiation regulated material ID 8935 – Serial Numbers: 057 / 4412GK					
	Radiation regulated material ID 8938 – Serial Numbers: 056 / 4376GK					
	Radiation regulated material ID 8939 – Serial Numbers: 053 / 6218GK					
	Radiation regulated material ID 9581 – Serial Numbers: 436-03-07 / OCS519					
	Radiation regulated material ID 9582 – Serial Numbers: 2173 / 0532/06					
	Radiation regulated material ID 9583 – Serial Numbers: 2190 / 0528/07					
	Radiation regulated material ID 9584 – Serial Number: 2187					
	Radiation regulated material ID 9585 – Serial Numbers: 2188 / 0539/07					
	Radiation regulated material ID 20634 – Serial Numbers: S500160113F / BC-1754					
	Radiation regulated material ID 20635 – Serial Numbers: S500170113F / BC-1755					
	Radiation regulated material ID 20636 – Serial Numbers: S500180113 / BC-1756					
	Radiation regulated material ID 20637 – Serial Numbers: S500190113/ BC-1757					
	Radiation regulated material ID 20638 – Serial Numbers: S5001A0113F/ BC-1758					
	Radiation regulated material ID 20639 – Serial Numbers: S5001B0113F/ BC-1759					
HAZNOT0001098	Hazardous Chemicals Notification					
XSTR100095	Licence to Store Explosives					



# 4.0 **Operations Summary**

Bulga Open Cut mining activities undertaken in 2024 are displayed on **Figure 4.1**. There were no underground mining activities undertaken in 2024 other than operation of existing gas drainage infrastructure.

# 4.1 Exploration

No exploration holes were drilled during 2024.

No Bulga Underground prospecting exploration activities occurred in 2024.

# 4.2 Land Preparation

Land preparation ahead of open cut mining operations involves the construction of erosion and sediment control measures, clearing vegetation, stripping and stockpiling topsoil. These activities were undertaken in accordance with the *Bulga Coal Biodiversity Management Plan* (BMP) and the *Bulga Coal Rehabilitation Management Plan* (RMP).

Grassland, fragmented woodland communities and previously rehabilitated land is cleared with topsoil stripped ahead of mining. Vegetation and vegetative matter is either mulched and incorporated into topsoil or stockpiled for future use in rehabilitation.

During 2024, 1.7 ha was disturbed to allow mining, overburden dumping and construction activities (roads, drains, dams). There was also 90.54 ha of existing rehabilitation cleared to facilitate overburden dumping across the East Pit and West Pit emplacements.

Approximately 20,689 m<sup>3</sup> of topsoil was stripped and 3 habitat trees were salvaged from clearing areas in advance of mining.

Clearing and disturbance areas are shown in Figure 4.1.



#### GLENCORE Legend Development Consent Boundary Dehabilitation Coal - Current Titles Mining Lease AMA Biodiversity Offset Areas 2024 Rehabilitation Redisturbance 2024 Rehabilitation 2024 Disturbance Main Roads Local Roads BULGA ML1717 . Railway CL219 Watercourse Mining Domain Type Infrastructure Area Overburden Emplacement Area Tailings Storage Facility Active Mining Area (Open cut void) Water Management Area Rehabilitation Phase Ecosystem and Land Use Establishment Ecosystem and Land Use Development ML1547 ML1 **GDA2020** BROKE ML1674 Date Created: 27/03/2025 Map Size: A4 Landscape Scale: 1:80,376 2.7 3.6 0.9 1.8 0 Map Created By: rabbott Coordinate System: GDA2020 MGA Zone 56 Kilometers Projection: Transverse Mercator Datum: GDA2020 325000 330000 315000 320000

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# 4.3 Mining Operations

#### **Bulga Underground Operations**

Bulga Underground Operations finished producing coal in May 2018 with all workings sealed in July 2018. There were no underground mining activities conducted in 2024 other than the operation of gas drainage infrastructure in support of the Bulga Open Cut.

#### Bulga Open Cut

Bulga Open Cut continued mining coal reserves from the East Pit and West Pit in 2024. Mining is progressing in a southerly direction.

Bulga Open Cut placed overburden on the Eastern Emplacement Area and Southern Extension Dump. In-pit dumping occurred in the West Pit and East Pit. Overburden was stripped using truck/shovel and excavator fleets. Coal was mined by a fleet of hydraulic excavators and trucks. Run of Mine (ROM) coal was transported by dump truck via an overpass on Broke Road to the ROM coal hopper.

Bulga Open Cut commenced Surface to Inseam (SIS) drilling operations in the open cut in November 2024, with the purpose of facilitating ongoing safe mining operations within the West Pit. This includes measures to depressurise the seam due to higher in-situ gas pressure in the areas.

Six (6) new Komatsu 930E-5 haulage trucks were acquired in 2024. The total mining fleet as of 31 December 2024 is listed in **Table 4.1**. It is noted that a review of the existing fleet was undertaken in 2024, with minor corrections to previous units presented.

Туре	Model	Units
Shovels – Electric	P&H4100	1
Excavators – Hydraulic	Hitachi EX8000	1
	Hitachi EX5500	1
	Liebherr EX9400	1
	Liebherr EX9250	1
	Liebherr EX9100	2
	Cat 6040	2
	Cat 6060	2
Haulage Trucks	Cat 793C XQ	6
	Cat 793D XQ	33
	Cat 789C XQ	9
	Cat 797F XQ	7
	Komatsu 930E-5	19
Water Carts	Cat 777F Hire Water Cart	1 (hire)
	Cat 789C XQ Water Trucks	4
	Cat 777 Water Cart	1
Front End Loaders	LeTourneau L1850	2
	Cat 980M Wheel Loader	2 (hire)

#### Table 4.1 Equipment Fleet



Туре	Model	Units
Dozers	Cat D11T	3
	Cat D11R	1
	Cat D10T	3
	Cat D10T2	5
	Cat D10R	1
	Cat 854K	2
	Cat D11	9
Graders	Cat 24 series	2
	Cat 24M	2
	Cat 16M	1
	Cat 18 Series	1
Fuel Trucks	Cat 773E	1
	Cat 775G	2
Drills	Sandvik D75K	1
	Terex SKS-W	2
	Terex SKF	2
Tractors	John Deer 6155M	1
	John Deer 6630	1

A summary of coal production and waste material (overburden and reject) production for the Bulga Open Cut is provided in **Table 4.2**.

			• •		
Aspect	Approved Limit SSD-4960	2023 Reporting Period (Actual)	2024 Reporting Period (Actual)	2024 Predictions (Forecast)	2025 Predictions (Forecast)
Waste Rock/ Overburden (bcm)	N/A	66,356,721	68,886,148	67,460,000	58,331,091
ROM Coal (t)	12,200,000	10,195,451	10,046,377	10,038,851	10,125,467
Coarse reject (t)	N/A	3,191,842	3,459,172		
Fine Reject (tailings) (t)	N/A	636,777	752,399	3,541,141	3,448,015
Saleable Product (t)	N/A	6,444,555	6,752,866	6,654,771	7,053,742

Table 4.2Production and Waste Summary for the Bulga Open Cut

Note – Forecast total waste volume predictions do not split the volumes of fine and coarse reject produced per year.

# 4.4 Other Operations

### 4.4.1 Coal Handling and Preparation Plant

10.3 million tonnes (Mt) of ROM coal was washed, producing 6.75 Mt of saleable product coal. The CHPP has approval to wash up to 20 Mt of ROM coal per year. 5.5 Mt of coal was railed to the Port of Newcastle for export and 1.19 Mt of coal was railed for domestic use.



### 4.4.2 Tailings Management

Deposition of tailings to the Northern Tailings Storage Facility (NTSF) continued for the duration of 2024. No tailings were pumped to underground workings during 2024.

The dredging of tailings for relocation from the Deep Pit TSF to the NTSF continued in 2024, where the storage facility split into Deep Pit North and Deep Pit South following the exposure of the centre embankment. A total of 6,621 kbcm of tailings was relocated to the NTSF during 2024.

### 4.4.3 Construction

Bulga Coal construction works included:

- construction of CHPP external crib room facilities;
- relocation of the second temporary shelter structure (Igloo) at the Mine Infrastructure Area (MIA);
- commenced construction of the light vehicle wash bay at the East Pit;
- commenced construction of a new four bay maintenance workshop in MIA;
- commissioning of mine dewatering pump station, associated pipelines and power supply;
- construction of a new bulk fuel and lubricate facility; and
- continuation of works associated with S53 Dam.

The CHPP was upgraded to improve coal throughput and recovery, and to reduce water usage. The upgrades included:

- replacement of Dense Medium Cyclone magnetic separators to improve magnetite recovery; and
- continuation of site fire water storage and systems upgrade.

### 4.4.4 Demolition

Following the cessation of underground mining, Bulga Underground Operations infrastructure has continued to be demolished/decommissioned including:

- demolition of underground bulk fuel storage area;
- demolition of concrete transformer bay associated with Raw Coal 1 breaker station system; and
- continued scrapping and offsite disposal of decommissioned equipment in the laydown area.

Demolition works were carried out by a licensed demolition contractor in accordance with *Australian Standard AS 2601-2001.* 

### 4.4.5 Waste Management

Waste management is undertaken in accordance with the *Bulga Complex Waste Management Plan* and EPL 563. Waste is removed by a licenced contractor and is recycled where possible. Waste removed from site



includes batteries, light vehicle tyres, scrap metal, domestic waste, fuel and oil filters, solvent, radiator coolant, wooden pallets, oily rags and hydrocarbon contaminated material from maintenance workshops.

Bulga Coal produced 3,829 t of waste during 2024, which represents a slight decrease from previous years (4,211 t in 2023). The main cause of this variation has been the completion of the dragline demolition and recycling of Bulga Underground Operations equipment (8,949 t in 2022, 686 t in 2023). 75.25 % of the waste produced by Bulga Coal (2,881 t) in 2024 was recycled. Bulga generated 44.7 t of hazardous waste which included oily rags/absorbents, contaminated soil and medical/sanitary waste. Bulga produced 902.9 t of non-hazardous waste (including mixed solid waste) that was disposed to landfill.

Waste oil and grease removed from equipment is stored in bunded tanks. Wastewater generated from the workshop areas is treated through hydrocyclone oily water separators. Waste oil, grease and oily water from oil water separators are then removed by an authorised waste contractor for recycling.

The treatment and disposal of sewage at Bulga Open Cut is through an extended aeration Sewage Treatment Plant (STP). Effluent from this plant goes to two maturation ponds before it is returned to the CHPP circuit water.

Sewage from the East Pit Muster is treated by an extended aeration STP. Effluent is also treated with ultraviolet (UV) light. Treated water is transferred to a mine water dam for reuse. Deactivated sludge is transported to the Singleton Council Treatment Works Depot.

#### 4.4.5.1 Comparison Against Predictions

The *Bulga Optimisation Project – Environmental Impact Statement* (Umwelt, 2013) predicted waste to be generally consistent with the current operations at the time. Operations in 2012 disposed of 507 t of waste to landfill, 1,978 t of waste (or approximately 80 per cent of waste generated by the Bulga Surface Operations) was recycled or reused.

Waste disposed to landfill was 903 t during 2024 which was above the 507 t outlined/predicted. Bulga Coal recycled 2,881 t of waste (75.25 % of all waste produced at Bulga Coal). While the total volume of recycled waste was higher than predictions, the percentage of waste recycled was slightly below predictions, this was due to several clean-up campaigns at the underground laydown areas in preparation for mining activities.

#### 4.4.5.2 Long Term Analysis

A summary of waste disposal from 2017 to 2024 is presented in **Figure 4.2**. The figure shows non-hazardous waste recycling has fluctuated significantly between 2021 to 2024. The changes in volumes and recycled material reflect the staged decommissioning of the underground laydown areas and dragline decommissioning (8,949 t) during 2022.





Figure 4.2 2017–2024 Waste Streams Generated

### 4.4.6 Hazardous Materials Management

Hazardous and dangerous goods are stored and labelled according to the relevant Australian Standard.

Hazardous materials stored at Bulga Open Cut have been notified to SafeWork NSW (Acknowledgement HAZNOT0001098).

Hazardous waste stored at Bulga Open Cut is tracked and transported by a licenced waste transporter and disposed of at a licenced facility.

Explosives are stored in a licenced explosive magazine as per SafeWork NSW requirements. Bulga Coal hold Licence No. XSTR100095 for the storage of explosives at Bulga Open Cut.



## 4.5 Next Reporting Period

### 4.5.1 Bulga Underground Operations

Activities proposed in 2025 are generally consistent with DA 376-8-2003. Underground mining activities will include:

- continued operation of the Blakefield South goaf drainage system;
- continued decommissioning and demolition of Bulga Underground Operations infrastructure, including the site Power Station;
- rehabilitation of redundant gas drainage infrastructure, access tracks and pipelines; and
- installation of nitrogen deposition and monitoring holes at South Bulga to assist in controlling the underground atmosphere while open cut works are carried out near the power station.

### 4.5.2 Bulga Open Cut

Activities proposed in 2025 are generally consistent with SSD-4960. **Figure 4.3** illustrates the proposed operations.

Mining operations will continue in the West Pit and East Pit with overburden emplacement continuing in the Eastern Emplacement Area, Noise and Visual Bund and in-pit dumping. Dredging (relocation) of tailings from Deep Pit to the in-pit NTSF will continue. This will enable mining of the underlying coal.

Construction and decommissioning activities will include:

- continued Bulga Underground sealing projects to manage the underground atmosphere;
- commissioning Dam S53 and associated pump station, pipelines and drainage;
- commissioning of a new sewerage treatment plant at the East Pit muster to replace the existing system;
- upgrade to carpark facilities at the East Pit;
- modification and upgrades to offices and bath house at the East Pit Offices;
- construction of a light vehicle workshop at the East Pit Offices;
- commissioning of the light vehicle wash bay facility;
- commissioning of a bulk fuel facility;
- commissioning of the four bay maintenance workshop at the MIA;
- demolition of Underground reclaim tunnel structure and associated footings;
- demolition of overland and stacking conveyor systems; and
- decommissioning of Area Station bulk fuel and hydrocarbon storage facilities.

#### **Bulga** Coal FIGURE 4.3 - Bulga Open Cut Proposed Operations 2025



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# 5.0 Actions Required from Previous Annual Review

The 2023 Annual Review was provided to the Department of Planning, Housing and Infrastructure (DPHI) on 28 March 2024. DPHI considered the Annual Review to generally meet the requirements of the approval in relation to reporting and the *Annual Review Guideline* (DPE, 2015). No additional actions were required from the 2023 Annual review, however the DPHI requested additional information to be included in future Annual Review. Refer to **Table 5.1** for the details.

Table 5.1	DPHI 2023 Annual Review additional information requested
-----------	--

Information requested from DPHI	Section addressed
Please include the development consent boundary (as shown in Figure 1 of Appendix 2 of SSD4960) in the figures.	All figures have been updated to include the development consent boundary, as shown in Figure 1 of Appendix 2 of the SSD4960.
Please include a figure that shows the regional context for the biodiversity offset and management areas (similar to Figure 1 of Appendix 9 of SSD-4960)	Figure 6.17 and Figure 6.18 included in Section 6.6.2



# 6.0 Environmental Management Performance

Bulga Coal implements a comprehensive *Environmental Management Strategy* (EMS) that provides a framework for managing environmental and community impacts. It includes management plans, procedures and standards to minimise the risks of impact to the environment and continually improve the environmental management. The *Bulga Coal Complex Environmental Management Strategy* was revised in March 2024 and was approved by DPHI on 12 August 2024. The revisions were administrative in nature and included updates to figures, removal of references to the *Mining Operations Plan* and improvements to the description of the Risk Assessment process.

An extensive environmental monitoring network is in place to monitor the environmental management performance of the site. The environmental monitoring network is shown in **Figure 6.1**, **Figure 6.2** and **Figure 6.3**.

# Bulga Coal

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# **Bulga** Coal

315000



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# **Bulga Coal FIGURE 6.3** - Bulga Open Cut Water Monitoring 2024

# GLENCORE





# 6.1 Meteorology

Bulga Coal has three meteorological monitoring sites as shown in **Figure 6.1**. Meteorological data from the Bulga Complex Meteorological Station is reported in the quarterly environmental monitoring reports available on the <u>Bulga Coal website</u>.

In accordance with Schedule 3, Condition 23 of SSD-4960, and Condition M4 of EPL 563, Bulga continued to operate the Bulga Complex Weather Station, Southern Extension Weather Station and the Flares Weather Station.

2024 saw slightly higher than average rainfall with total annual rainfall at the Bulga Complex Weather Station being 677.5 mm in comparison to the 524 mm recorded in 2023. The average annual rainfall at Bulga is approximately 670 mm.

In November 2024 the Bulga Complex Met Station was relocated to allow for dumping progression on the Northern Dumps, the new location is shown in **Figure 6.1**.

A summary of the annual meteorological monitoring is shown in **Table 6.1** to **Table 6.7** and **Figure 6.4** to **Figure 6.8**.



	January	February	March	April	May	June	July	August	September	October	November	December	Annual Total
Bulga Complex Weather Station													
Total	39	105	39	154	81	55.5	28	37	37.5	52	38	11.5	677.5
Southern Extension Weather Station													
Total	33.5	106.5	24	173.5	80	56	29.5	34	31.5	43.5	47	23.5	682.5
Flares Weather Station													
Total	35.8	115.6	23.2	164.2	75	52.4	27.2	32.8	34.2	34.4	40.8	20.6	656.2

#### Table 6.1 Distribution of Monthly Rainfall at Representative Monitoring Stations




Figure 6.4 Distribution of Monthly Rainfall at Representative Monitoring Stations

As shown in **Table 6.2** and **Table 6.3**, the daily minimum and maximum surface level temperatures ranged across Bulga's three monitoring stations at 2 metres and 10 metres above surface level from  $-1.32^{\circ}$ C to 46.1°C respectively. Refer to **Table 6.4** for humidity recorded over the reporting period.



Temperature 2 m (degrees Celsius)	В	ulga Complex		Flares			Southern Extension		
Month	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum
January	15.88	27.87	46.10	11.10	25.46	43.86	15.10	24.85	40.88
February	17.61	26.94	44.89	14.88	24.55	42.61	15.76	23.96	40.51
March	16.28	25.30	42.36	10.75	22.46	39.23	13.40	22.25	36.06
April	11.78	21.07	35.61	7.58	17.72	33.43	9.76	17.99	29.60
Мау	6.35	16.88	26.65	0.73	13.82	25.29	3.62	14.44	22.20
June	4.64	13.26	23.71	-1.32	10.16	22.21	2.01	11.18	20.92
July	5.13	13.45	23.54	-1.08	10.33	22.63	2.89	11.34	21.45
August	5.71	16.52	30.01	-0.20	13.48	27.92	2.71	14.86	28.25
September	8.83	20.26	33.55	0.07	14.36	29.78	4.20	16.41	29.85
October	13.13	21.91	35.12	5.56	17.21	31.28	8.26	18.14	31.83
November	18.15	25.57	42.54	11.33	21.90	37.92	13.63	22.57	39.30
December	16.43	28.08	43.55	8.61	24.35	40.47	13.06	24.88	41.13

### Table 6.2 2024 Temperature 2 m (Degrees Celsius) at Representative Monitoring Stations



Temperature 10 m/30 m (degrees Celsius)	Bul	lga Complex (10 m) Flares (1				Southern Extension (30 m)			(30 m)
Month	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum
January	16.19	25.73	43.63	12.22	24.62	40.21	16.59	24.49	39.39
February	16.49	24.86	42.25	15.61	23.79	40.41	15.58	23.69	38.92
March	15.20	23.33	38.99	11.62	21.90	35.69	13.62	22.13	34.51
April	11.41	19.37	31.60	8.44	17.42	29.98	10.96	18.25	28.64
May	5.21	15.34	24.47	2.02	13.77	22.30	4.67	14.90	22.25
June	3.33	11.71	21.22	-0.74	10.30	20.81	3.68	11.77	20.24
July	4.29	11.80	21.10	0.02	10.61	21.05	4.49	11.65	20.45
August	4.36	14.88	28.06	0.81	13.74	28.22	4.47	15.25	27.78
September	7.15	18.43	31.23	0.97	14.97	29.73	5.31	16.56	28.97
October	11.41	19.96	32.19	6.46	17.55	30.57	9.21	17.88	29.75
November	16.19	23.49	39.73	12.19	22.16	37.51	14.72	22.09	36.82
December	15.68	25.93	41.10	9.52	24.42	39.78	14.14	24.22	38.77

### Table 6.32024 Temperature 10 m/30 m (Degrees Celsius) at Representative Monitoring Stations

Note: Temperature at Bulga Complex and Flares stations is at 10 m. Temperature at 30 m is recorded at Southern Extension.





Figure 6.5 2024 Monthly Temperature 2 m (Degrees Celsius) at Representative Monitoring Stations





#### Figure 6.6 2024 Monthly Temperature 10 m/30 m (Degrees Celsius) at Representative Monitoring Stations



Relative humidity (%)		Bulga Complex		Flares			Southern Extension		
Month	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum
January	16.8	69.4	99.4	15.2	68.3	98.6	12.3	63.6	95.7
February	17.8	74.3	98.0	17.0	73.7	98.7	12.5	68.2	93.6
March	24.2	71.8	98.8	23.5	72.2	99.0	19.8	65.6	94.4
April	31.9	76.2	100.1	28.1	78.6	99.2	26.4	70.4	94.3
Мау	40.1	81.6	98.9	33.8	84.8	99.3	32.1	76.7	93.9
June	35.6	77.5	99.6	33.7	82.8	99.3	28.9	73.5	93.8
July	27.8	73.4	100.0	25.2	78.2	99.4	21.2	68.7	94.0
August	19.1	70.8	99.9	23.5	78.6	99.3	19.2	68.8	96.7
September	13.9	58.3	100.1	11.8	65.3	99.0	9.0	55.6	97.4
October	20.3	69.1	102.1	17.0	70.1	99.0	14.1	64.2	97.3
November	18.2	72.5	102.8	16.8	70.2	98.6	13.6	65.0	97.2
December	9.0	63.2	100.8	7.0	63.8	98.9	3.2	58.5	95.1

### Table 6.4 2024 Relative Humidity (%) at Representative Monitoring Stations





Figure 6.7 2024 Relative Humidity (%) at Representative Monitoring Stations



Wind speed (m/s)		Bulga Complex	:	Flares			Southern Extension		
Month	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum
January	0.0	2.5	9.4	0.0	1.7	7.7	0.0	4.3	12.4
February	0.0	2.6	14.7	0.0	1.6	9.9	0.0	4.2	15.9
March	0.0	2.1	9.3	0.0	1.3	5.5	0.0	3.8	12.4
April	0.0	2.3	9.9	0.0	1.2	6.5	0.0	3.9	12.4
Мау	0.0	2.2	8.5	0.0	0.9	6.1	0.0	3.6	11.3
June	0.0	2.8	10.4	0.0	1.1	5.6	0.0	3.5	12.6
July	0.0	3.5	13.5	0.0	1.5	9.3	0.0	4.4	14.4
August	0.0	2.8	11.5	0.0	1.2	7.9	0.0	3.7	14.1
September	0.0	3.9	11.9	0.0	1.7	9.5	0.0	4.7	13.7
October	0.0	3.1	9.3	0.0	1.4	6.9	0.0	3.9	11.6
November	0.0	3.2	16.5	0.0	1.6	8.1	0.0	3.9	12.0
December	0.0	2.7	10.9	0.0	1.7	9.0	0.0	4.1	15.7

### Table 6.52024 Wind Speed at Representative Monitoring Stations









Wind direction (degrees)		Bulga Complex		Flares			Southern Extension		
Month	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum
January	0	158.2	360.0	0	155.1	359.5	0	164.0	359.7
February	0	171.9	360.0	0	166.7	359.9	0	177.8	359.9
March	0	153.3	360.0	0	150.1	359.8	0	156.3	359.8
April	0	197.7	359.8	0	178.3	359.9	0	195.2	359.8
Мау	0	201.0	359.8	0	168.6	359.9	0	200.0	359.8
June	0	257.5	359.9	0	204.0	359.9	0	249.5	359.8
July	0	246.5	358.9	0	204.8	359.7	0	244.8	359.9
August	0	223.5	358.4	0	183.6	359.9	0	217.2	360.0
September	0	246.7	359.4	0	195.7	359.7	0	241.0	360.0
October	0	198.1	359.8	0	172.8	359.9	0	193.2	359.8
November	0	163.3	360.0	0	158.9	359.9	0	171.7	360.0
December	0	157.3	359.4	0	161.1	359.5	0	179.2	360.0

### Table 6.62024 Wind Direction at Representative Monitoring Stations



Sigma theta (degrees)	Bulga Complex Flares						Southern Extension			
Month	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	
January	0.0	20.1	89.5	0.0	27.5	96.5	1.3	15.0	99.7	
February	0.0	17.1	96.8	0.0	28.1	101.9	0.0	14.5	96.8	
March	0.0	18.3	90.0	0.0	26.1	96.3	1.1	14.4	93.7	
April	0.0	15.5	87.1	0.0	25.1	96.0	0.7	13.6	97.9	
May	0.0	13.1	75.1	0.0	21.6	92.3	1.0	12.4	92.6	
June	0.0	11.1	96.3	0.0	22.1	89.9	0.0	12.8	100.5	
July	0.0	10.8	83.4	0.0	21.7	91.8	1.5	11.7	89.6	
August	0.0	11.1	73.5	0.0	19.8	90.0	1.0	13.5	93.8	
September	0.0	11.7	88.8	0.0	21.1	93.6	1.2	12.5	94.6	
October	0.0	13.6	92.6	0.0	24.5	96.1	1.2	14.6	100.0	
November	0.0	13.6	85.4	0.0	26.1	96.3	1.7	15.2	94.5	
December	0.0	15.2	91.4	0.0	26.7	93.7	1.2	16.0	101.9	

### Table 6.7 2024 Sigma Theta at Representative Monitoring Stations



### Wind Speed and Direction

Wind speed and direction at Bulga during 2024 has been summarised in Figure 6.9 to Figure 6.12.



Figure 6.9 Wind Speed and Direction Quarter 1

The Bulga Complex Station, Southern Extension Station and Flares Station predominantly recorded winds originating from the south and southeast in Q1 2024. The calms recorded at the Flares Station were most likely due to sheltering from vegetation.





Figure 6.10 Wind Speed and Direction Quarter 2

The Bulga Complex Station, Southern Extension Station and Flares Station recorded variable wind directions with the highest proportions being from the south in Q2 2024. The calms recorded at the Flares Meteorological Station were most likely due to sheltering from vegetation.





Figure 6.11 Wind Speed and Direction Quarter 3

The Bulga Complex Station, Southern Extension Station and Flares Station recorded variable wind directions, with the highest proportions being from the south quadrant and northwest quadrants in Q3 2024. The calms recorded at the Flares Station were most likely due to sheltering from vegetation.





### Figure 6.12 Wind Speed and Direction Quarter 4

The Bulga Complex Station, Southern Extension Station and Flares Station recorded variable wind directions with the highest proportions being from the south in Q4 2024. It is noted that the Bulga Complex Station was temporarily offline from 25 November 2024 to 28 November 2024 to allow the system to be relocated prior to dump progression. The calms recorded at the Flares Station were most likely due to sheltering from vegetation.



# 6.2 Noise

## 6.2.1 Environmental Management

Noise monitoring is undertaken in accordance with the Bulga Coal Noise Management Plan.

The location of noise monitoring sites is shown on Figure 6.2. The monitoring program includes:

- monthly attended night-time monitoring at nine locations
- real-time monitoring at four locations
- sound power testing of a representative sample of the open cut fleet
- additional monitoring as initiated by alarms or in response to community concerns.

The real-time monitoring network assists with the management of noise impacts from mining operations. Monitors are operated at locations representative of Broke, Fordwich, Milbrodale and Bulga. Data is recorded continuously and reported real-time to the Bulga Open Cut control room via an internal website. Dispatch is notified of noise levels that are approaching or exceeding the Development Consent noise criteria. Return to work alarms are implemented to alert Dispatch to a change to non-noise enhancing weather conditions. Dispatch and Open Cut Examiners (OCE) investigate noise sources and make changes to reduce noise, where required. The noise criteria is found in Appendix 6 of SSD-4960 and shown in **Table 6.8**. Compliance with these criteria was assessed in attended monitoring during 2024.

Sound power testing is undertaken for a representative sample of the open cut fleet annually. Every item of mobile equipment is tested at least once every three years. Measured sound power levels are compared to levels included in the *Bulga Surface Operations Eastern Emplacement Area Modification Statement of Environmental Effects* (SEE) dated July 2016, including the *Bulga Surface Operations Eastern Emplacement Area Modification Response to Submissions* (RTS) dated December 2016. Individual items that exceed specified levels by 3 dB or more are investigated to assess the cause of the exceedance. Defects are rectified as soon as practicable.

The total measured fleet-wide (logarithmic) averages of mobile plant for the current sound power testing campaign are calculated annually. The total measured fleet averages should remain equal to or less than 2 dB of the relevant modelled fleet averages.

## 6.2.2 Environmental Performance

#### **Attended Noise Monitoring**

A summary of attended noise monitoring data for each monitoring location (**Figure 6.2**) is shown in **Table 6.8**. Results are presented as the maximum noise levels from Bulga Coal at each location during 2024. A detailed discussion of monitoring results is provided in monthly noise monitoring reports available on the <u>Bulga Coal website</u>. Bulga Coal were generally compliant with the *Noise Management Plan;* details of exceedances have been presented below and in **Section 11.1**.



Location	Bulga Coal Noise – dB4	Monitoring Results A (Max)	Bulga Coal Project Specific Noise Criteria – dBA		
	LAeq(15minute)	LA1(1minute)	LAeq(15minute)	LA1(1minute)	
BCC1 (Bulga Village)	32	35	35	45	
BCC2 (2241 Putty Road)	32	38	35		
BCC3 (803 Milbrodale Road)	32	43	35		
BCC4 (115 Hill Street)	31	51	35		
BCC5 (Broke Cemetery)	35	42	35		
BCC7 (179 Cobcroft Road)	33	42	36		
BCC8 (154 Cobcroft Road)	40 <sup>1</sup>	48	36		
BCC9 (Mitchell Line Road)	32	42	35		

#### Table 6.8 Summary of Attended Noise Monitoring Data – 2024

<sup>1</sup> In August 2024 a LAeq (15min) reading of 40 dB was recorded at BCC8 during 'very noise-enhancing meteorological conditions'. In accordance with the Noise Policy for Industry (EPA, 2017) the sites noise limits increased by 5 dB on this occasion, BCC noise levels were within the adjusted limits. All other LAeq (15 minute) readings at this location during the 2024 reporting period were below the criteria.

Noise affected nights recorded during the attended noise monitoring included:

- BCC4 115 Hill Street
  - A 6 dB exceedance of the LA1 (1 minute) noise criterion was recorded on 4 June 2024. This was mainly caused by horn noise. Dispatch was notified and a follow up noise measurement was undertaken within 75 minutes. Noise levels were compliant during the follow up measurement.
- BCC8 154 Cobcroft Road
  - A 3 dB exceedance of the LA1 (1 minute) noise criterion was recorded on 22 April 2024. This was mainly caused by horn noise. Dispatch was notified and a follow up noise measurement was undertaken within 75 minutes. Noise levels were compliant during the follow up measurement.

#### **Mobile Plant Sound Power Testing**

In 2022, 2023 and 2024 sound power testing was undertaken by EMM Consulting Pty Ltd (EMM, 2025). During 2024, measurements were taken for 47 items of mobile plant giving a total of 122 items measured over the three-year period which is 100% of the mobile plant fleet.

Average sound power levels across the make/model of mobile plant tested during the three-year testing cycle was within 2 dB of the noise targets, except for the larger Hitachi and Caterpillar excavators, Caterpillar 789C XQ rear dump trucks and Caterpillar 854K rubber tyred dozer.

- The larger excavator fleet was +3 dB (L<sub>w</sub>) above modelled levels and +1 dB (L<sub>wA</sub>) above modelled levels.
- The CAT 789C XQ rear dump trucks were +2 dB (L<sub>W</sub>) above modelled levels and +2 dB (L<sub>WA</sub>) above modelled levels.
- The CAT 854H rubber tyred dozers were +7 dB (L<sub>W</sub>) above modelled levels and +1 dB (L<sub>WA</sub>) above modelled levels



The exceedance from the larger Hitachi/CAT excavators was caused by the Hitachi EX5600, which was removed from operations in 2023. Sound attenuation packages on trucks are inspected every three to four weeks and replaced every four years. Some variation across the fleet is expected as individual units will be at different stages of their build cycle.

Sound attenuation packages on trucks are inspected every three to four weeks and replaced every four years. Some variation across the fleet is expected as individual units will be at different stages of their build cycle.

Individual items of plant that did not meet the targets by more than 3 dB will be inspected and defects fixed, where required. Corrective actions for plant that exceeded the sound power targets by 3 dB or more during 2024 include:

- The D11T and D10T will be inspected and defects fixed, if required.
- A number of components on the 793D haul trucks will be inspected and replaced.
- A number of components on the 789C haul trucks will be inspected and replaced.
- A number of components on the CAT 854K Rubber tyred dozer will be inspected and replaced.

# 6.2.3 Comparison Against Predictions

The Noise Impact Assessment for the Bulga Optimisation Project – Eastern Emplacement Area Development Consent Modification (Global Acoustics, 2016) predicted Bulga Coal only noise levels from reasonable worst-case operating conditions throughout the life of the open cut mine. Modelling was done for Year 4 of the Bulga Optimisation Project. The Bulga Extension Project Noise Impact Assessment (Global Acoustics, 2019) and the Bulga Extension Project Noise Impact Assessment (Global Acoustics, 2019b) (for Modification 3) stated the modification would comply with approved noise limits at all receptor locations throughout the mining progression with an appropriate level of noise mitigation applied during periods of adverse meteorological conditions. Therefore, the existing predictions remain the same.

As noted in **Section 6.2.2**, attended monitoring results in 2024 were compliant with the SSD-4960 noise criteria. Two noise affected nights occurred during 2024, which were deemed to be within the criteria after follow-up measurements had been taken (refer **Section 6.2.2**). This shows that measured noise levels were managed in accordance with the *Noise Management Plan* and generally below reasonable worst-case night-time predictions made for the Bulga Optimisation Project.

# 6.2.4 Long Term Analysis

**Table 6.9** shows the number of noise criteria exceedances recorded by Bulga Coal during the period from 2011 to 2024.



Location	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
BCC1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
BCC2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BCC3	0	0	0	0	0	0	0	1	0	0	0	0	1	0	2
BCC4	0	0	0	0	0	0	0	1	0	0	0	0	0	1	2
BCC5	0	0	0	0	1	0	1	2	0	0	2	0	0	0	6
BCC6	0	0	0	0	0	1	0	_1	_1	_1	_1	_1	_1	_1	1
BCC7	0	1	0	0	0	4	0	1	0	0	0	0	2	0	8
BCC8	0	0	0	0	0	0	0	0	0	0	0	4	2	1	7
BCC9	_1	_1	_1	_1	_1	_1	0	0	0	0	0	1	0	0	1
BCC10	_1	_1	_1	_1	_1	_1	_1	1	0	0	0	0	0	0	1
Total	0	2	0	0	1	5	1	6	0	0	2	5	5	2	29

#### Table 6.9Summary of Exceedances by Noise Monitoring Location 2012–2024

<sup>1</sup>Noise levels no longer monitored at this location.

As indicated in **Table 6.9**, occasional exceedances of the Bulga Coal noise criteria have been recorded during the period from 2011 to 2024.



# 6.2.5 Implemented/Proposed Improvements

The Noise Management Plan was revised in February 2022 and was approved on 9 March 2022 by DPHI.

#### **Changes to Noise Monitoring or Management**

No changes to the noise monitoring network were carried out during 2024.

#### **Continuous Improvement**

Continuous improvement to noise management during 2024 included:

- Individual items of plant that did not meet the targets by more than 3 dB in 2024 will be inspected and defects fixed, if required in 2025.
- Introduction to site of 6 Komatsu 930E haul trucks which have sound power levels of approximately 113 dBA which is approximately 2 dB less than the Cat 793 trucks they are replacing.

# 6.3 Blasting

## 6.3.1 Environmental Management

Blasting is undertaken in accordance with the *Blast Management Plan*. Monitoring is carried out to assess air blast overpressure and ground vibration impacts to the nearest privately owned residents.

Private property blast impact assessment criteria are provided in **Table 6.10**. The criteria compliance monitoring locations (Dawtrey, Bulga, Charlton and Hedley) are shown in **Figure 6.2**.

Table 6.10	Private Property Amenity Impact Assessment Criteria
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Air blast Overpressure Level (Db(Lin Peak))	Ground Vibration Peak Particle Velocity (ppv)	Allowable Exceedance
115	5 mm/s	5% of the total number of blasts over a period of 12 months
120	10 mm/s	0%

Blasting is managed to minimise ground vibration at public infrastructure. Infrastructure impact assessment criteria are provided in **Table 6.11**. Vibration monitoring is undertaken when the predictions from the scaled distance model are greater than or equal to 80% of the criteria. During the year, monitoring was undertaken at Pole 29 and Pole 26 of the 330 kV powerline as shown in **Figure 6.2**.

#### Table 6.11 Infrastructure Impact Assessment Criteria

Infrastructure	Ground Vibration peak particle velocity (ppv)	Allowable Exceedance
330 kV Suspension Towers, Private Irrigation District (PID) Pipeline and public roads	100 mm/s	0%
Declared dams	50 mm/s	0%
All other public infrastructure	50 mm/s	0%



Heritage blast vibration impact assessment criteria are listed in **Table 6.12**. The Bulga, Charlton and Dawtrey blast monitors shown in **Figure 6.2** are used to assess compliance.

 Table 6.12
 Heritage Impact Assessment Criteria

Heritage Site	Ground vibration ppv	Allowable Exceedance
'Mt Leonard Homestead',	5 mm/s	0%
BH14 – 'Charlton',		
B13 – Stone Wall alongside Monkey Place Creek,		
St Andrews Anglican Church,		
BH6 – Broke Cemetery,		
Murinbin House Group.		

# 6.3.2 Environmental Performance

142 blasts from Bulga Open Cut were recorded during 2024. Monitoring data is available on the Bulga Coal website, with a summary provided in **Table 6.13** to **Table 6.15**. During 2024 no blast exceeded the overpressure or ground vibration exceedance criteria.

Monitoring	Airblast Overpressure Level dBL (Lin Peak)			Ground Vibration ppv (mm/s)				
Location	Average	Max	Results >115 dBL	Results >120 dBL	Average	Мах	Results >10 mm/s	Results >5 mm/s
Bulga	93.2	112.2	0 (0%)	0 (0%)	0.1	0.73	0 (0%)	0 (0%)
Charlton	91.4	106.4	0 (0%)	0 (0%)	0.26	1.15	0 (0%)	0 (0%)
Dawtrey	91.4	106.4	0 (0%)	0 (0%)	0.21	2.17	0 (0%)	0 (0%)
Hedley	91.1	109.9	0 (0%)	0 (0%)	0.05	0.43	0 (0%)	0 (0%)

 Table 6.13
 2024 Private Property Overpressure and Vibration Monitoring Results

### Table 6.14 2024 Infrastructure Vibration Monitoring Results

Monitoring Location	Ground Vibration ppv (mm/s)				
	Average	Results > 100 mm/s			
330 kV Pole 29	0.85	6.23	0 (0%)		
330 kV Pole 26	0.88	3.00	0 (0%)		

It is noted that the 330 kV Pole 29 monitor was disconnected and relocated to 330kV Pole 26 on 11 November 2024. This was to continue to monitor blasting impacts on the 330 kV transmission line as mine progression continued south and east.

Table 6.15	2024 Declared Dam (Northern T	ailings Facility) Vibration	<b>Monitoring Results</b>
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Monitoring Location	Ground Vibration ppv (mm/s)				
	Average	Max	Results > 50 mm/s		
Portable Blast NTSF B	0.16	1.55	0 (0%)		
Surge Dam	0.48	2.08	0 (0%)		



# 6.3.3 Comparison Against Predictions

A *Blasting Noise and Vibration Impact Assessment* (Wilkinson Murray, 2012) was undertaken as part of the *Bulga Optimisation Project Environmental Impact Statement* (EIS). The assessment noted that blasting would be managed to meet the amenity air blast and vibration criteria identified for inclusion in the Development Consent and EPL. The results are consistent with predictions.

# 6.3.4 Implemented/Proposed Improvements

In 2024 Bulga Open Cut commenced works for the implementation of an SMS verification system to replace the blast authorisation spreadsheet. The SMS system will assess the blast details (size, location, design) together with current meteorological data from site; this information will feed the blast model and provide a Yes/No output to approve or delay the blast.

Changes to monitoring included the relocation of the 330kV Pole 29 monitor to 330kV Pole 26 from 11 November 2024.

# 6.4 Air Quality

# 6.4.1 Environmental Management

Bulga Coal implements controls to mitigate air quality impacts in accordance with the *Eastern Emplacement Area Management Framework* (EEAMF) and the *Air Quality and Greenhouse Gas Management Plan* (AQGGMP).

A revised version of the AQGGMP was submitted to the DPHI in June 2024 to address comments from the Katestone Environmental Pty Ltd (Katestone) review and to include minor amendments across several sections. At the time of preparing this Annual Review, the revised AQGGMP had not been approved.

Bulga Coal operates a monitoring network to assess air quality impacts on surrounding communities. The monitoring network (refer **Figure 6.1**) consists of:

- Air quality monitors required by the relevant consents:
  - Eleven Dust Deposition Gauges (DDGs) (four of which are directional) used for monitoring of larger dust particles (typically >50 micrometres [μm]). DDGs are sampled monthly (+/- 2 days) and results include the insoluble (mineralogical) matter (IM) and ash residue (organic).
  - Three High Volume Air Samplers (HVAS) that monitor Total Suspended Particulates (TSP) over a 24-hour period every sixth day, known as D10, Dawtrey and Hill Street monitors.
  - Five Tapered Element Oscillating Microbalance (TEOM) continuous air quality monitors that measure the concentration of PM<sub>10</sub>, located at Putty Road (D3), Dawtrey (D5), Hill Street (D1), Mitchell Line Road (D11) and the Mushroom Composting Facility (D4).
  - Two Beta Attenuation Monitors (BAM) located at Hill Street (D2) and Putty Road (D10) that measure the concentration of particulate matter less than 2.5µm in diameter (PM<sub>2.5</sub>).



- Air quality monitors required by EPL 563:
  - Two E-BAM monitors continuously measuring PM<sub>10</sub>, at EPL Point 9 and EPL Point 10 at the northwest and south-east of the EPL premises, respectively.

### 6.4.2 Environmental Performance

The environmental performance presented below includes the data from the Bulga Coal monitors including DDGs, HVAS, TEOMs, BAMs and E-BAMs.

Table 6.16 presents the SSD-4960 Mod 3 air quality criteria.

 Table 6.16
 Air Quality Criteria SSD-4960 Mod 3

Pollutant	Averaging Period	Criterion		
Particulate Matter <10 μm (PM <sub>10</sub> )	Annual	<sup>a,c</sup> 25 μg/m <sup>3</sup>		
	24-hour	<sup>b</sup> 50 μg/m <sup>3</sup>		
Particulate Matter <2.5 μm (PM <sub>2.5</sub> )	Annual	<sup>a,c</sup> 8 μg/m <sup>3</sup>		
	24-hour	<sup>b</sup> 25 μg/m <sup>3</sup>		
Total Suspended Particulates (TSP)	Annual	<sup>a,c</sup> 90 μg/m <sup>3</sup>		
<sup>d</sup> Deposited Dust	Annual	<sup>b</sup> 2 g/m <sup>2</sup> /month	<sup>a</sup> 4 g/m <sup>2</sup> /month	

<sup>a</sup> Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources).

<sup>b</sup> Incremental impact (i.e. incremental increase in concentrations due to the development on its own).

<sup>c</sup> Excludes extraordinary events such as bushfires, prescribed burning, dust storms, fire incidents or any other activity agreed to by the Planning Secretary.

<sup>d</sup> Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air – Determination of Particulate Matter – Deposited Matter – Gravimetric Method.

In 2024, there were no days declared as "extraordinary air quality events" by DPHI.

#### **Depositional Dust Monitoring**

Depositional dust monitoring results are summarised in **Table 6.17**. Quarterly and Annual Monitoring Reports are available on the Bulga Coal website.

	• •	0		0
Offsite Gauge		IM Deposited	Ash Residue	Adopted Criteria
Code	General Location	(g/m²/mth)	(g/m²/mth)	(g/m²/mth)
A3	Inlet Road	1.1	0.7	4.0
C5 (DR <sup>1</sup> )	Mount Eyre Vineyard	0.9	0.5	
D6	Howe Street	1.3	0.8	
D9	Inlet Road	1.2	0.7	
D10	Putty Road	2.2 <sup>2</sup>	1.0	
F3 (DR <sup>1</sup> )	Fordwich	1.2	0.8	
N5 (DR <sup>1</sup> )	Putty Road	1.2	0.7	]
Redibar	Redibar	1.1	0.5	

 Table 6.17
 Summary of Dust Deposition Monitoring Results – 2024 Annual Average



Offsite Gauge		IM Deposited	Ash Residue	Adopted Criteria
Code	General Location	(g/m²/mth)	(g/m²/mth)	(g/m²/mth)
Sharrock 1	Sharrock	0.6	0.3	
Hedley	Mitchell Line Road	1.1	0.8	
F2 (DR <sup>1</sup> )	Cobcroft Rd	1.0	0.6	

<sup>1</sup> Indicates Directional Depositional Dust Monitor.

<sup>2</sup> Two monthly samples deemed to be contaminated from excessive bird droppings.

There were no exceedances of the depositional dust criteria during 2024. There was a decrease in the monthly deposited dust levels across most sites during 2024 compared with previous years.

#### **High Volume Air Sampling**

**Table 6.18** presents a summary of monitoring results and compares annual averages for TSP againstconsent criteria. Results include dust from mine (including neighbouring operations) and non-mine sourcesand are not attributable to Bulga Coal only.

Annual averages were below the relevant criteria at all locations in 2024.

#### Table 6.18 Summary of 2024 HVAS Annual Average Results

Gauge	Annual Average (μg/ m <sup>3</sup> ) (excluding extraordinary events)			
	<b>TSP (μg/</b> m³)			
Consent Criteria	90			
Dawtrey	32.6			
Putty Road (D10)	31.7			
Hill Street (D2)	23.5			

#### Continuous Monitoring – PM<sub>10</sub>

A summary of the recorded PM<sub>10</sub> levels at the TEOM units is presented in Table 6.19.

The annual  $PM_{10}$  averages were below the criterion of 25  $\mu$ g/m<sup>3</sup> at all monitoring locations, Hill St (D1), Putty Rd (D3), Dawtrey (D5) and Mitchell Line Road (D11).

The 24-hour average  $PM_{10}$  levels recorded in 2024 were broadly consistent with the levels recorded during recent years and the levels prior to the end of 2019. During 2024 there was one recorded exceedance of the 24-hour average criterion. The exceedance recorded during September 2024 was investigated and results indicated that Bulga contributed to less than 50 µg/m<sup>3</sup>.

Gauge	Annual Average PM <sub>10</sub> (μg/m³)		Maximum 24-hour A	werage PM10 (µg/m³)		
	PM10 (μg/m³) <sup>1</sup>	Number of days exceeding criterion	PM10 (μg/m³)	Number of days exceeding criterion		
Consent Criteria	25	-	50	-		
Hill Street (D1)	13.4	-	40.1	-		
Putty Road (D3)	15.2	-	52.0	1		

#### Table 6.19 Summary of TEOM 2024 Monitoring Results



Gauge	Annual Average PM₁₀ (µg/m³)		Maximum 24-hour Average PM10 (μg/r	
	PM10 (μg/m <sup>3</sup> ) <sup>1</sup>	Number of days exceeding criterion	PM10 (μg/m³)	Number of days exceeding criterion
Dawtrey (D5)	15.7	-	43.0	-
Mitchell Line Road (D11)	16.7	-	49.1	-

#### Continuous Monitoring – PM<sub>2.5</sub>

Table 6.20 presents a summary of the recorded PM<sub>2.5</sub> levels at the BAM monitors.

The annual  $PM_{2.5}$  averages were below the relevant criterion of 8  $\mu$ g/m<sup>3</sup> at D2 (Hill St) and D10 (Putty Road).

The maximum 24-hour  $PM_{2.5}$  averages were below the relevant criterion of 25  $\mu$ g/m<sup>3</sup> during 2024. The annual average  $PM_{2.5}$  recorded in 2024 were slightly lower than the previous year.

Table 6.20	Summary	of BAM 2024	<b>Monitoring Results</b>
	••••••		

Gauge	Annual average PM <sub>2.5</sub> (μg/m³)		Maximum 24 hour a	verage PM <sub>2.5</sub> (µg/m³)
	PM2.5 (μg/m³)	Number of days exceeding criterion	PM2.5 (μg/m³)	Number of days exceeding criterion
Consent Criteria	8	-	25	-
Putty Road (D10)	4.8	-	16.6	-
Hill Street (D2)	4.2	-	14.6	-

### **Onsite EPL Monitors**

In accordance with the requirements of EPL 563, Bulga Coal operated two E-BAM type continuous air quality (PM<sub>10</sub>) monitors close to the EPL premises boundary.

The data is analysed with wind speed and wind direction data to estimate the Bulga Coal  $PM_{10}$  contribution at each location. The monitors are not used to assess compliance with the air quality criteria in the Development Consent; they inform the *Bulga Open Cut Air Quality Trigger Action Response Plan* (TARP). Alarms are generated in the control room when elevated  $PM_{10}$  levels occur. Actions to minimise dust are taken in response to alarms, where required.

**Figure 6.13** and **Figure 6.14** present the pollution roses for EPA Point 9 and EPA Point 10 monitors, respectively. The figures show that there is a slight effect on dust levels from the direction of Bulga Coal. Some high levels occur in the direction of Bulga Coal at the EPA Point 9 (D9) monitor given the location is close to mining activities, however the monitor recorded a greater proportion of high levels when winds were from the northwest quadrant which is upwind of Bulga Coal.





Figure 6.13 2024 Pollution-Rose<sup>1</sup> for EPA Point 10, PM<sub>10</sub> Data (Todoroski Air Sciences, 2025)

<sup>&</sup>lt;sup>1</sup> How to read a pollution rose:

<sup>•</sup> The colour indicates the pollutant concentration measured at the monitor.

<sup>•</sup> The position of pollutant concentration markings along the 360° axis indicates the corresponding direction from which pollutants arise from.

The position of pollutant concentration markings relative to the banded rings indicates the wind speed for the corresponding hourly concentration.

<sup>•</sup> The arc labelled "Bulga" indicates the relative direction of Bulga Complex from the monitor.





Figure 6.14 2024 Pollution Rose<sup>2</sup> for EPA Point 9, PM<sub>10</sub> Data (Todoroski Air Sciences, 2025)

<sup>&</sup>lt;sup>2</sup> How to read a pollution rose:

<sup>•</sup> The colour indicates the pollutant concentration measured at the monitor.

The position of pollutant concentration markings along the 360° axis indicates the corresponding direction from which pollutants arise from.
 The position of pollutant concentration markings relative to the banded rings indicates the wind speed for the corresponding hourly

The position of political concentration markings relative to the banded rings indicates the wind speed for the corresponding nouny concentration.

<sup>•</sup> The arc labelled "Bulga" indicates the relative direction of Bulga Complex from the monitor.



### **Mushroom Composting Facility**

**Figure 6.15** presents the  $PM_{10}$  13-hour average measured at the Mushroom Composting Facility (D4 TEOM monitor) against the 13-hour average Assessment Level of 91 µg/m<sup>3</sup>. The Assessment Level only applies during the approved operating hours of the Mushroom Composting Facility. These are between 6:00 am and 7:00 pm Monday to Friday, and any additional operating hours of the Mushroom Composting Facility, provided that:

- Such operating hours do not exceed 6:00 am to 12:00 pm on weekends.
- The Mushroom Composting Facility has given Bulga Coal at least one month advance notice of the intention to operate during those additional operating hours.

As shown in **Figure 6.15**, there was one occasion where levels were above the assessment level of  $91\mu g/m^3$ . This was investigated in accordance with the *Eastern Emplacement Area Air Quality Management Framework* (EEAAQMF). In accordance with the investigation and incident reporting process in the EEAAQMF, Bulga Coal and the Mushroom Composters agreed that Bulga Coal was not the main cause of the exceedance; no dumping or loading activities were undertaken at the Eastern Emplacement Area (EEA) during the day. Only rehabilitation activities were carried out and they were not upwind of the Mushroom Composting Facility. Therefore, this was not classified as an incident or non-compliance and no notification to DPHI was required.



Figure 6.15 Mushroom Composting Facility (D4 Sampling Results 2024 – 13-hour PM<sub>10</sub> Averages)



# 6.4.3 Comparison Against Predictions

A comparison of 2024 dust monitoring data with the modelled predictions made in the *Bulga Coal Complex Modification 3 Air Quality Impact Assessment* (Jacobs, 2019) (Year 2022) was undertaken by Todoroski Air Sciences (2025) (attached as **Appendix B**). The analysis shows that the annual average measured levels in 2024 were generally lower than the predictions for the representative modelling scenarios.

# 6.4.4 Long Term Analysis

An assessment of long-term trends over the life of Bulga Coal operations was undertaken by Todoroski Air Sciences (2025) (**Appendix B**). Annual average levels were generally consistent with pre-2022 levels. The trends in air quality reflect the prevailing meteorological conditions and not the mining activity.

# 6.4.5 Implemented/Proposed Improvements

In November 2024 Bulga Coal upgraded two continuous real-time PM<sub>2.5</sub> air quality monitors.

The *Air Quality Management Procedure* (BULOC-1104430715-5602) was reviewed and updated in January 2024. The revisions included updates to the dust and weather triggers, responses to include precedence of safety in relation to TARP implementation, and minor figure updates.

# 6.5 Mine Subsidence

# 6.5.1 Environmental Management

The last underground coal was mined in May 2018 and the relevant Subsidence Management Plan expired in December 2019. Subsidence impact monitoring and mitigation works are now completed in accordance with the *Bulga Underground Operations Post Mining Subsidence Management Plan*.

## 6.5.1.1 Monitoring Results

Repairs to surface subsidence cracking identified during monitoring activities for previously mined areas continued to be undertaken during the reporting period. The observed impacts caused by subsidence are summarised in **Table 6.21**.

Feature	Impact Performance Measures	Observed Impacts
Surface Cracking	Always safe. Stable, non-polluting post mining landform.	No adverse impacts reported. Continue to monitor and repair as required
Telecommunications and powerlines	Always safe. Serviceability should be maintained wherever practicable.	No adverse impacts identified to public or internal infrastructure
Pipelines and tanks	Always safe. Serviceability should be maintained wherever practicable.	No adverse impacts identified to public or internal infrastructure.
Roads and gates	Always safe. Serviceability should be maintained wherever practicable.	No adverse impacts identified to public or internal infrastructure.

### Table 6.21 Observed Subsidence Impacts



Feature	Impact Performance Measures	Observed Impacts
Fences	Always safe. Serviceability should be maintained wherever practicable.	No adverse impacts identified to public or internal infrastructure.
Buildings	Always safe. Serviceability should be maintained wherever practicable.	No adverse impacts identified to public or internal infrastructure.
Archaeology sites and vegetation	Stable, non-polluting post mining Landform.	No adverse impacts reported.

# 6.5.2 Comparison Against Predictions

A comparison against predictions was not applicable considering underground mining did not occur during 2024.

# 6.5.3 Implemented/Proposed Improvements

As noted above, Bulga Underground Operations have continued to progressively complete repairs to surface subsidence cracking identified from monitoring. Monitoring of previously mined areas will continue in 2025. Any required mitigation works will be completed in accordance with the *Bulga Underground Operations Subsidence Mapping and Repair Procedure* and the *Bulga Underground Operations Post Mining Subsidence Management Plan.* 

# 6.6 Biodiversity and Offsets

Bulga Coal implements management activities and conducts annual ecological monitoring in remnant vegetation areas located within the mine site, Biodiversity Offset Areas (BOAs) and mine rehabilitation areas. The activities and monitoring programs implemented during 2024 can be found in the following sections:

- Remnant vegetation around the mine site (Section 6.6.1).
- Offset areas (Section 6.6.2).
- Mine rehabilitation (Section 8.6).
- During 2024, the biodiversity and offset monitoring programs were completed successfully. In general monitoring results showed a constant to slightly increasing trend in both flora and fauna, and species diversity and abundance.

# 6.6.1 Remnant Vegetation

### 6.6.1.1 Environmental Management

Flora and fauna monitoring is conducted around the mining operations in accordance with the *Biodiversity Management Plan* (BMP). The locations of ecological monitoring sites are shown in **Figure 6.16**.



#### Annual Ecological Monitoring Program – Flora

The annual ecological monitoring program for remnant vegetation was undertaken in 2024 with a summary of the results presented in **Section 6.6.1.2**.

The long-term remnant vegetation monitoring program utilises the Biodiversity Assessment Methodology (BAM) to compare rehabilitation areas with biometric scores from the targeted vegetation communities.

The primary objective of the monitoring program is to assess the health and condition of remnant vegetation at Bulga Coal. The BAM was adopted during 2018 to be consistent with the Biodiversity Conservation Division (BCD) (formerly the Office of Environment and Heritage (OEH)) requirements and to match the methodology used at rehabilitation sites. The BAM involves assessing vegetation condition based on the compositional, structural and functional attributes of a site (OEH 2018).



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#### Annual Ecological Monitoring Program – Fauna

Ecological monitoring for fauna was completed by Forest Fauna Surveys (2024) and results provided in the 2024 Annual Fauna Monitoring Report which is available on the <u>Bulga Coal website</u>. A summary of results is provided in **Section 6.6.1.2**. The methodology includes targeted surveys of birds, bats, reptiles and amphibians, owl call-playback, fauna spotlighting and opportunistic fauna surveying.

The program is designed to check if there have been any impacts on the surrounding terrestrial and aquatic habitats (outside of approved disturbance areas) because of mining operations and to monitor the habitat condition of rehabilitation areas.

#### 6.6.1.2 Environmental Performance

#### **Flora Monitoring**

In accordance with the *Bulga Complex Biodiversity Management Plan*, ecological and photographic monitoring of remnant flora was conducted at three monitoring sites in 2024 located within the following vegetation communities:

- PCT 3431 Central Hunter Grey Box Ironbark Woodland (two sites).
- PCT 4015 Central Hunter Swamp Oak Forest.

Overall, the 2024 monitoring results highlighted the ongoing good vegetation condition at one of the grassy woodland ecological monitoring sites. At the riparian Swamp Oak Forest site and at one of the native grassy woodland monitoring sites, weed incursion remained the main issue impacting vegetation quality, with Lantana and/or exotic grasses being problematic and requiring management if vegetation condition and integrity scores are to be maintained or improved.

#### **Fauna Monitoring**

Fauna monitoring was undertaken at nine sites in areas of remnant vegetation and rehabilitation across the project area:

- Remnant Woodland and Riparian Vegetation Sites BM04, BM10, BM18 and BM23.
- Mine Rehabilitation Sites BM07a, BM18a, BM19a, BM27a and BM28.

Diurnal bird census surveys in 2024 recorded 83 native and two introduced bird species, an increase to that recorded in 2022 and 2023. No new bird species were detected in 2024, however, the Australian Brushturkey was again recorded on camera at BM23. This species was previously detected at Bulga Coal monitoring surveys in 2022 and 2023. Four threatened bird species were recorded in 2024, including Speckled Warbler, Scarlet Robin, Grey-crowned Babbler and Varied Sitella. The Varied Sitella was located in riparian vegetation site (BM23), with no evidence of the species in newly established rehabilitation areas. The Speckled Warbler was recorded at two of nine monitoring sites in 2024, both in remnant woodland (BM10) and rehabilitation (BM19a) sites. The Scarlet Robin was recorded at one remnant woodland site (BM10), while the Grey-crowned Babbler was recorded at two remnant woodland and riparian vegetation sites (BM04 and BM23).



Infra-red motion detection digital cameras were installed at selected monitoring sites (BM04, BM10 and BM23) to photograph fauna. Bait stations were set up in the field of view of each camera and cameras were activated for 128 consecutive nights from 27 June to 2 December 2024. The cameras were removed, and photographs analysed for species identification. A total of six native and six pest species were detected, including the Short-Beaked Echidna, Bare-Nosed Wombat, Northern Brown Bandicoot, Common Ringtail Possum, Common Brushtail Possum, Red Necked Wallaby and the Eastern Grey Kangaroo.

Fourteen microchiropteran bat species were recorded in the Bulga Coal area in 2024 by echolocation call recordings. A total of 1,114 calls were recorded across nine sites and two sampling periods. This compares to 12 species and 231 calls recorded in 2023. The diversity of microbats in 2024 was significantly higher to previous monitoring years. All sites in 2024 recorded microbat activity, with higher activity recorded at rehabilitation site BM28. Previous monitoring years have determined rehabilitation sites recording lower microbat activity, but in 2024, site BM28 recorded 385 calls for two monitoring nights. Parts of this rehabilitation site were slashed and cleared of problem trees in 2023/2024, resulting in open areas adjoining residual trees, which may have improved access for flying microbats. Spotlight searches in 2024 did not detect the threatened Grey-headed Flying-fox within the Bulga Coal area. Foraging resources (nectar, pollen) were considered low in abundance for this bat group, which may have influenced their absence in 2024.

Reptile microhabitat is variable at the rehabilitation and revegetation sites. Terrestrial microhabitat for reptiles in rehabilitation areas contains both dense regrowth of trees, plus open grassy areas (contour drains) separating each stand. Several very large rock drains have been constructed in the rehabilitation areas, also providing ideal habitat for reptiles. The open areas create basking sites for reptiles, which can retreat to dense shaded areas to regulate their body temperature. Ground microhabitat includes placement of small to larger boulders from overburden areas, which provide ideal sheltering and basking sites for several reptile species. Five reptile species were recorded in the 2024 fauna monitoring period, including the Red-Bellied Black Snake, the Eastern Brown Snake, the Eastern Blue-Tongue, the Lace Monitor and the Bearded Dragon.

Five threatened mammal species were detected during 2024 surveys, which comprised five microbat species (the Eastern Freetail Bat, Little Bentwing-bat, Eastern Bentwing-bat, Large-eared Pied Bat and the Yellow-bellied Sheathtail-bat). No evidence of the threatened Spotted-tail Quoll was recorded in 2024, being recorded for the first time at Bulga Coal in 2022.

During surveys in 2024, overall abundance of pest species is variable, with high numbers of pigs at several sites. The local wild pig population has increased significantly since 2022 when above average rains were recorded within the Hunter Valley, resulting in expanded areas of habitat suitable for pigs. Ongoing control of pigs is regularly undertaken in Bulga Coal landholdings by trapping and poisoning, refer to **Section 6.6.2** and **Section 6.7** for a summary of pig control undertaken across Bulga Coal landholdings.

Several feral cats and foxes were observed across sites in 2024. Both species are likely to be widespread and in relatively low abundance, due to the limited number of images recorded by monitoring over an extended period (128 continuous nights in 2024). Control measures for pest species are undertaken annually to regulate numbers.

Nest box monitoring was also undertaken in areas of remnant vegetation, refer to Section 6.6.2.



## 6.6.1.3 Implemented/Proposed Improvements

Recommendations from monitoring reports, where appropriate, will be implemented in 2024. These recommendations focus on land management practices to improve the health of vegetation and quality of habitat in surrounding vegetation.

Land management activities to be implemented in 2024 across remnant vegetation areas include ongoing management of Lantana (*Lantana camara*) and priority weed grasses to minimise the risk of further spread.

As Bulga Coal continues to clear remnant vegetation to allow for the progression of mining activities, habitat resources (logs, rocks, and tree hollows) will be salvaged for re-use in rehabilitation and where feasible, remnant vegetation areas.

Due to mining progression some remnant vegetation monitoring sites will be disturbed, or will become part of the Vere Biodiversity Offset Area under a Biodiversity Stewardship Agreement. The Bulga Coal *Biodiversity Management Plan* is currently under review during the preparation of the Bulga 2024 Annual Review, as part of this revision, Bulga Coal will update the *Biodiversity Management Plan* to reflect changes to the ecological monitoring program.

# 6.6.2 Biodiversity Offsets

Schedule 3, Condition 29 of SSD-4960 requires Bulga Coal to establish and maintain five Biodiversity Offset Areas (BOAs). Condition 9 of EPBC 2012/6637 and Condition 12 of EPBC 2018/8300 requires an annual report including implementation of the associated management plans (see **Section 6.6.2.1** to **Section 6.6.2.4**) and detailing compliance with the conditions of the approval (see **Appendix A**). The BOAs were established in agreement with the BCD and its performance is currently overseen by the Biodiversity Conservation Trust (BCT). Bulga Coal currently manages the BOAs presented in **Table 6.22**.

Biodiversity Offset Area	Area (ha)	Conservation Agreement Date
Broke Road BOA	251	9 May 2019
Condran	50	7 May 2019
Reedy Valley	1,486	7 May 2019
Wollombi Brook Conservation Area	65 (BOA)	7 May 2019
(WBCA)	51 (Aboriginal heritage conservation)	
Vere Biodiversity Stewardship	154	4 December 2023
Agreement (BSA) Area		

### Table 6.22 Bulga Coal Biodiversity Offset Areas

The Broke Road BOA, and WBCA are located in the north-eastern and north-western corners of Bulga Coal, respectively. The Reedy Valley and Condran BOAs are located further from Bulga Coal and are approximately 30 km north-west and 10 km south-east of Muswellbrook, respectively. In addition, Bulga Coal committed to establishing two Weeping Myall Management Areas in the Bulga Optimisation Project EIS. These were established in 2015. **Figure 6.17** shows the general location of the Biodiversity Offsets and Management Areas.



In accordance with Schedule 3, Condition 33A of SSD-4960 Bulga Coal has committed to establishing and managing the Vere BSA Area located to the south-east of Bulga Coal (refer **Figure 6.17** and **Figure 6.18**) within two years of the commencement of development approved under SSD-4960 Mod 3. Development approved under Mod 3 commenced in September 2020. An extension of time for establishment of the Vere BSA was granted by the DPHI on 21 November 2022 to the 30 June 2023. Two additional extensions of time to secure the Vere BSA Area were approved by DPHI, to the 31 December 2023 and then to 29 February 2024. The Credits Supply Taskforce finalised and registered the BSA on 4 December 2023. First payment was received on 11 July 2024, triggering the management actions ongoing from First Payment Date as described in the Vere BSA.

At each BOA, monitoring is undertaken to assess performance against defined indicators as specified by the conservation agreements. Monitoring transects are 50 m in length, with each comprising ten quadrats 5 m x 5 m in size, positioned along alternate sides of the centreline. Within each quadrat, data on species diversity, age and structure of the canopy, and shrub strata are collected. For comparative purposes, replicated transects within adjacent regenerating grassland areas were also established to monitor the return of woodland to these areas. In effect, pairs of 50 m transects (i.e. 100 m transects of 20 quadrats) were positioned end-to-end across grassland-woodland boundaries so that restoration progress can be tracked over successive monitoring seasons. With the change to biometric monitoring in 2017, additional data on vegetation condition and habitat is also collected within a 20 m x 20 m quadrat positioned within these transects. In addition, fauna and habitat usage monitoring is conducted annually and every three years, respectively.

The monitoring program for the Weeping Myall Management Areas involves annual ecological monitoring by a qualified ecologist. The ecological monitoring survey records an updated count of individual plants of weeping myall, assesses their health and population, and includes permanent photographic point monitoring. Additionally, floristic data is collected to identify if native species (other than weeping myall) are also responding to management activities. Information regarding any weed or pest species requiring management, along with recommendations for suitable actions is also recorded.

At the Vere BSA Area, ecological monitoring is also undertaken to measure the success of management and restoration strategies in meeting the approval conditions and performance against defined indicators. The ecological monitoring program involves conducting permanent flora plots in remnant woodland, Derived Native Grassland (DNG) regeneration, and DNG revegetation areas. A minimum of three plots are surveyed in each area, focusing on floristics, structure, habitat features, and ecological condition. Monitoring also includes permanent photo point monitoring, stem count assessments, and site-based diurnal woodland bird surveys, with additional winter bird surveys undertaken annually for the first five years and then five monitoring periods over the next 15 years. Surveys undertaken in a separate monitoring event target threatened migratory species, including the Swift Parrot (*Lathamus discolorand*) and the Regent Honeyeater (*Anthochaera Phrygia*). As a minimum, 2 x 20-minute bird surveys are undertaken at six monitoring sites (consistent with flora monitoring sites where possible). Nocturnal microbat and megabat surveys are also undertaken, including spotlighting searches and Anabat recordings.

Progress against 2024 performance indicators for Broke Road, Condran, Reed Valley and Wollombi Brook BOA's, as detailed in *Biodiversity Offset Management Plan* (BOMP) is shown in **Appendix C**.


### Bulga Coal FIGURE 6.18 - Bulga Coal Biodiversity Offsets and Management Areas



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### 6.6.2.1 Broke Road BOA

### **Environmental Management**

Environmental management activities undertaken at the Broke Road BOA in 2024 included:

- Weed control works focussing in particular on African boxthorn (Lycium ferocissimum), African lovegrass (Eragrostis curvula), African olive (Olea europaea subsp. cuspidate), Bitou bush (Chrysanthemoides monilifera subsp. Rotundata), Blue heliotrope (Heliotropium amplexicaule), Coolatai grass (Hyparrhenia hirta), Galenia (Galenia pubescens), Golden wreath wattle (Acacia saligna), Green cestrum (Cestrum parqui), Kikuyu (Cenchrus clandestinus), Lantana (Lantana camara), Peppercorn tree (Schinus molle), Prickly pears (Opuntia spp.), Rhodes grass (Chloris Gayana), Sharp rush (Juncus acutus), Silky oak (Grevillea robusta), Sugar gum (Eucalyptus cladocalyx), Sweet briar (Rosa rubiginosa), Whisky grass (Andropogon virginicus) and Wild peach (Prunus persica).
- Bushfire firebreak slashing along tracks, fence lines and neighbouring properties (along the northwestern boundary), to reduce bushfire risk.
- Maintenance to internal tracks deteriorated during 2024 and creek crossing repairs to ensure safe access throughout the BOA.
- Wild dog and fox baiting program during autumn and spring months resulted in 10 wild dogs and 32 foxes.
- Development and implementation of the Broke Road Operational Weed Management Action Plan 2024-2028.
- Control actions undertaken by a qualified contractor.
- 36 feral pigs controlled.
- Planted 32 ha of Central Hunter Grey Box Ironbark Woodland EEC.
- Six-monthly inspections.
- Ongoing ecological monitoring program.
- Regeneration assessment.

### **Monitoring Results**

The annual monitoring program is generally completed during spring and autumn in the Broke Road BOA. The 2024 monitoring program included fauna, flora and nest boxes. Flora monitoring showed an increasing trend in native and weed species diversity across the various plots in 2024. Increases in plant species and structure diversity still provide a wider range of habitat for native fauna including threatened species.



### Flora

Below are key findings during the 2024 flora monitoring at Broke Road BOA:

- 166 native and 70 weed (236) species were detected in 2024.
- The three revegetation plots supported between 33 (19 natives, 14 weeds) species in plot BRO08R and 55 (24 native, 31 weeds) species in plot BRO08R.
- Forest and grassland transects of Native Ground Cover (Grass) largely meet or approach benchmark values for the single Plant Community Types (PCTs) present at Broke Road Voluntary Conservation Agreement (VCA): PCT 1605 (Narrow-leaved Ironbark – Native Olive shrubby open forest of the central and upper Hunter).
- No new records of threatened plant species were recorded.
- The existing individual clump of *Cymbidium canaliculatum* (endangered population in the Hunter Catchment) persisting adjacent to site BRO-RMN-1691-04 continues to flourish.
- Monitoring plots established within the vulnerable *Eucalyptus glaucina* population showed continuing evidence of new recruitment following a wet three years, a feature repeated throughout the whole population.
- African Olive (Olea europea subsp. cuspidata) appear to have been reduced considerably.

### <u>Fauna</u>

Below are key findings during the 2024 fauna monitoring at Broke Road BOA:

- Five threatened fauna species were recorded (one bird and four microbat species). The total bird species diversity, based on surveys for the 2024 monitoring year and previous monitoring years, is 119 native and two introduced bird species.
- The diurnal bird census recorded 56 native bird species across nine monitoring sites.
- One threatened bird species was recorded, the Grey-crowned Babbler.
- No new bird species were recorded for Broke Road BOA.
- Site BR008R recorded the highest bird species diversity overall.
- Twelve microchiropteran bat species were recorded by echolocation calls.
- One arboreal mammal species was recorded by spotlight searches and field camera, the Common Brushtail Possum.
- Four reptile species including the Eastern Brown Snake, Red-bellied Black Snake, Striped Skink and Lace Monitor were observed in Broke Road VCA.
- Due to the above average rainfall in winter 2024, frog species were abundant. Several dams recorded large chorus of frogs, with five frog species recorded; Common Eastern Froglet, Spotted Grass Frog, Eastern Dwarf Tree Frog, Peron's Tree Frog and Broad-palmed Frog.



• Four threatened microbats were recorded including the Eastern Freetail-bat (12 calls), Eastern Bentwing-bat (27 calls), Little Bentwing-bat (5 calls) and Large-eared Pied Bat (3 calls).

A detailed list and location of fauna species recorded can be found in the Biodiversity Offset Monitoring Report which is available on the <u>Bulga Coal website</u>.

### Performance Against Criteria

During 2024, 15 of the 17 performance indicators were met and two were below the specific criteria (**Appendix C**).

### Implemented/Proposed Improvements

### Weed Management

The 2025 weed management strategy for Broke Road BOA will focus on the management of highest and high priority species identified in the *Broke Road Operational Weed Management Action Plan 2024–2028*.

### Pest Management

Surveys and control activities undertaken in 2024 indicate that the change in weather conditions had slightly increased the feral pig numbers during 2024. Wild dog and fox take increased during the 2024 baiting programs.

Pest fauna present are contiguous with the wider landscape, and effective management for control requires a coordinated approach with neighbouring landholders (particularly the neighbouring Department of Defence) to ensure the wider source populations are controlled to reasonable levels. The monitoring to date indicates pest species do not require any additional control efforts over those already prescribed in the BOMP and current management practices.

In 2025 pest control activities will continue to be implemented with additional opportunistic management also undertaken in response to sightings or evidence of pest species presence. Planned pest management activities include wild dog and fox baiting in collaboration with Local Land Services to maximise the effectiveness of the program.

### Habitat Augmentation and Revegetation

Habitat augmentation features are prioritised for the following threatened fauna species, the Regent Honeyeater, Swift Parrot and Large-eared Pied Bat. The Large-eared Pied Bat is a cave roosting microbat that would forage on the Broke Road BOA site as part of its larger foraging range. No roosting habitat features occurred or could be constructed on the Broke Road BOA site for the species.

Habitat augmentation measures were observed throughout the BOA in 2024 as result of revegetating 32 ha of Central Hunter Grey Box Ironbark Woodland EEC.

In 2025 revegetation works will continue at the Broke Road BOA with planting of 19.6 ha (19,600 stems) of Central Hunter Grey Box Ironbark Woodland EEC.

### **General Management**

Slashing and annual weed management will be undertaken where feasible to minimise both bushfire risk and further spread of priority weeds.



Fence repairs and track maintenance will be undertaken on an as needs basis, as identified through inspection programs.

### 6.6.2.2 Condran BOA

### **Environmental Management**

Activities undertaken at the Condran BOA in 2024 included:

- Bushfire firebreak slashing along tracks and fence lines.
- Track maintenance across the offset area.
- Implementation of the Condran Operational Weed Management Action Plan 2024–2028.
- Weed controls works, focusing on Crofton weed (*Ageratina Adenophora*), Coolatai grass (*Hyparrhenia hirta*), Rhodes grass (*Chloris gayana*), Whisky grass (*Andropogon virginicus*), Pampas grass (*Cortaderia species*), Sweet briar (*Rosa rubiginosa*), Blue heliotrope (*Heliotropium amplexicaule*), Kikuyu (*Cenchrus clandestinus*), Lantana (*Lantana camara*), Prickly pear (*Opuntia spp*) and Wild peach (*Prunus persica*).
- Wild dog and fox baiting program during autumn and spring months resulted in two wild dog and nine fox takes.
- Rabbit baiting program during spring.
- Feral pig trapping and baiting program during autumn and spring.
- Six monthly inspections.
- Continuation of the ecological monitoring program established in 2013.

### **Monitoring Results**

The annual monitoring program is generally completed during spring and autumn in the Condran BOA. The 2024 monitoring program included fauna and flora. During the 2024 flora monitoring period, 111 native and 44 weed species were detected; showing an increasing trend in species diversity of native species and weeds compared to 2023. The fauna monitoring conducted in 2024 recorded an abundance in bird species diversity. Two threatened bird species and the threatened Spotted-tail Quoll were recorded during the 2024 program.

### <u>Flora</u>

Below are key findings during the 2024 flora monitoring at Condran BOA:

- Relative to 2023 data, there was an increase in diversity of native species and weeds in 2024. No threatened plant species were recorded within monitoring transects.
- The existing population of *Diuris tricolor* (vulnerable, and an endangered population in the Muswellbrook LGA) persists within the BOA despite only three capsules (4.8% of emerged individuals) ultimately dehiscing seed. No new colonies were found during the search of the entire BOA at peak flowering, however, an additional 27 unmarked *Diuris tricolor* emerged during the 2024 flowering season within the main population, the first new individuals since 2021.



- Comparative data with the common *Diuris sulphurea* showed no seed release in 2024, suggesting that environmental factors including dry conditions and grazing pressure govern emergence, flowering and seed release in the species. During 2024, an additional six *Diuris sulphurea* individuals emerged and were marked, tagged and added to the monitoring program.
- Biometric data from the eight monitoring plots have been compared against benchmark values for the relevant PCTs present at Condran BOA. The findings include:
  - For PCT 1605, Native Ground Cover (Grass) and Native Ground Cover (Other) for Ironbark approaches benchmark values, and Native Plant Species abundance approaches benchmark. Grassland data for PCT 1605 show a similar pattern with most attributes well below benchmark. Revegetation data for PCT 1605 exceeds benchmark for Native Ground Cover (Grass), but all others are below benchmark values.
  - For PCT 1607, all attributes lie below benchmark for the Forest Redgum (CON01F), except for Native Ground Cover (Grass), Native Ground Cover (Shrubs) and Native Ground Cover (Other) which exceed or approach benchmark.

#### <u>Fauna</u>

Below are key findings during the 2024 fauna monitoring at Condran BOA:

- Two threatened bird species were recorded, the Grey-crowned Babbler and Scarlet Robin.
- No evidence of the nationally endangered Swift Parrot or Regent Honeyeater were recorded.
- Overall diversity of native mammals was comparative across all mammal groups, although the use of remote field cameras to survey larger mammals is very short in duration.
- The threatened Spotted-tail Quoll was detected by field camera monitoring. The species was first recorded in 2023.
- Seven microbat species were recorded, which is a significant increase in diversity and abundance with only two microbat species observed in 2023. Over the period 2019 to 2023, very low abundance and diversity of microbats has been recorded due to factors unknown.
- There is no significant pest animal (or weed) infestation within the offset that adversely affects the quality of existing or regenerating vegetation.
- Evidence from the observed extent of dung suggests cattle were again present in 2024.

A detailed list and location of fauna species recorded can be found in the Biodiversity Offset Monitoring Report which is available on the <u>Bulga Coal website</u>.

### Nest Boxes

An additional 16 nest boxes were installed in the Condran BOA in October 2022. The monitoring program commenced in 2023 and will be conducted every three years. This monitoring program meets the Habitat Augmentation requirements outlined in the Condran BOMP.



### Performance Against Criteria

During 2024, 15 of the 16 performance indicators were met and one was below the specific criteria (**Appendix C**).

### Implemented/Proposed Improvements

### Weed Management

The 2025 weed management strategy for Condran BOA will focus on the management of highest and high priority species identified in the *Condran Operational Weed Management Action Plan 2024–2028*.

### Pest Management

Based on long-term monitoring of the Condran BOA by field cameras, the presence of introduced pest animals is considered low. Pest species that do occur at the Condran BOA are part of the wider surrounding landscape and will require a co-operative approach with input from several stakeholders to manage effectively. It is not considered that the pest species present are adversely affecting the quality of the existing or regenerating vegetation, or native fauna populations at the Condran BOA.

During 2025 Bulga will aim to align timing of wild dog and fox baiting programs at Condran with the Local Land Services aerial baiting program for neighbouring landholders to maximise the effectiveness of the program. Other pest species will be controlled on an as needed basis, based on inspection and monitoring outcomes.

### 6.6.2.3 Reedy Valley BOA

### **Environmental Management**

The activities undertaken at the Reedy Valley BOA in 2024 included:

- Maintenance to creek crossings to ensure safe access to the BOA.
- Fence line maintenance where required.
- Bushfire firebreak slashing along tracks and fence lines.
- Implementation of the Reedy Valley Operational Weed Management Action Plan 2024–2028.
- Weed control works focussing on African boxthorn (*Lycium ferocissimum*), Prickly pear (*Opuntia species*), African olive (*Olea europaea subsp. cuspidate*), Apple tree (*Malus sp.*), Moth vine (*Araujia sericifera*), Black locust (*Robinia pseudoacacia*), Bathurst burr (*Xanthium spinosum*), Blue heliotrope (*Heliotropium amplexicaule*), Broad-leaf privet (*Ligustrum lucidum*), Common olive (*Olea europaea*), Coolatai grass (*Hyparrhenia hirta*), Cotoneaster (*Cotoneaster glaucophyllus*), Date palm (*Phoenix sp.*), Fruit tree (indeterminate), Galenia (*Galenia pubescens*), Grape vine (*Vitis vinifera*), Khaki weed (*Alternanthera pungens*), Paterson's curse (*Echium plantagineum*), Peppercorn tree (*Schinus molle*), Sweet briar (*Rosa rubiginosa*) and St John's Wort (*Hypericum perforatum*).
- Feral animal control in conjunction with the wider program being completed by Local Land Services and surrounding property owners. In May 2024 Bulga Coal participated in the wild dog aerial baiting program.



- The wild dog and fox baiting program during autumn and spring resulted in four wild dogs, 43 fox and three feral pig takes.
- 67 feral pigs controlled.
- Revegetation planting of 25.5 ha (25,500 stems) of White Box Yellow Box Blakely's Red Gum Woodland critically endangered ecological community (CEEC).
- Six-monthly inspections were completed.
- Ongoing ecological monitoring program.
- Regeneration assessment.

### **Monitoring Results**

The annual monitoring program is generally completed during winter and spring in the Reedy Valley BOA. The 2024 ecological monitoring program included fauna, flora and revegetation assessment. During the 2024 flora monitoring period, 105 native and 67 weed species were detected. The fauna monitoring in 2024 recorded an increase in bird species diversity compared to previous years. Nine threatened fauna species (five birds, four microbats) were recorded at Reedy Valley BOA in 2024.

### <u>Flora</u>

Below are key findings during the 2024 flora monitoring at the Reedy Valley BOA:

- There was an increasing trend in diversity of native species and weeds in 2024, with 105 native and 67 weed species recorded.
- No threatened plant species were recorded within monitoring transects.
- Biometric data from all monitoring plots have been compared against benchmark values for the two PCTs present: PCT 483 (Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley) and PCT 623 (*Narrow-leaved Ironbark +/- Grey Box grassy woodland of the upper Hunter Valley, mainly Sydney Basin Bioregion*). The findings include:
  - For forest transects in PCT 483, benchmark values were attained in some transects for Native Overstorey Cover, Native Mid-storey Cover (shrubs), Native Ground Cover (Grass), Native Ground Cover (Other) and Fallen Logs. All other attributes remain below benchmark.
  - For grassland transects in PCT 483, only Native Ground Cover (Other) exceeds benchmark for some transects.
  - For forest transects in PCT 623, benchmark values were approached or exceeded in some transects for Native Ground Cover (Grass), Native Ground Cover (Other) and Fallen Logs.
  - For grassland transects in PCT 623, only Native Ground Cover (Grass) and Native Ground Cover (Other) exceeded benchmark for three transects, all others were below benchmark. Number of Trees with Hollows and Fallen Logs for both PCTs are well below benchmark.



### <u>Fauna</u>

Below are key findings during the 2024 fauna monitoring at the Reedy Valley BOA:

- The diurnal bird census recorded 88 native bird species across the twelve monitoring sites in 2024, which is an increasing trend to previous monitoring years.
- Four threatened bird species were recorded in 2024: the Brown Treecreeper, Grey-crowned Babbler, Varied Sittella and Diamond Firetail.
- Total bird species diversity, based on surveys from all monitoring years, is 132 bird species. No new bird species were detected in the BOA in 2024.
- No evidence of the critically endangered Regent Honeyeater or Swift Parrot were recorded in 2024. The last sighting of a Regent Honeyeater at Reedy Valley BOA was in 2009.
- For the DNG, bird species diversity was variable between sites in 2024. Site RV10 recorded a significant increase over the average score for this site, whilst other sites remained within the average variation. Across all the DNG sites, annual scores remain lower than the comparison remnant woodland sites.
- Seventeen microbat species were detected by echolocation call recordings in 2024, five of which are listed as threatened, the Eastern Bent-wing Bat (12 calls), Eastern Cave Bat (126 calls), Greater Broad-nosed Bat (1 call), Large-eared Pied Bat (49 calls) and Yellow-bellied Sheathtail-bat (2 calls).
- The Grey-headed Flying-fox was not observed feeding in Reedy Valley BOA.

A detailed list and location of fauna species recorded can be found in the Biodiversity Offset Monitoring Report which is available on the <u>Bulga Coal website</u>.

### Performance against Criteria

During 2024, 11 of the 16 performance indicators were met and 5 were below the specific criteria (**Appendix C**).

### Implemented/Proposed Improvements

### Weed Management

The 2025 weed management strategy for Reedy Valley BOA will focus on the management of highest and high priority species identified in the *Reedy Valley Operational Weed Management Action Plan 2024–2028*.

### Pest Management

Bulga Coal will aim to align timing of wild dog and fox baiting programs at Reedy Valley BOA with the Local Land Services aerial baiting program in 2025 to maximise the effectiveness of the program. Ongoing inspections and monitoring will determine if cattle and other pest species (feral pigs, deer, foxes and goats) persist.

Management of some pests, particularly in the rocky outcrop parts of the site will be difficult due to the terrain and abundance of source populations in adjoining properties.

### Habitat Augmentation and Revegetation

In 2025, infill planting of unsuccessful revegetation areas will continue at the Reedy Valley BOA.



### General Management

Slashing of boundary fence lines, tracks and priority weed infestations will be undertaken where feasible to minimise both bushfire risk and further spread of weeds. Additionally, fence repairs will be undertaken on an as needs basis, as identified through inspections.

### 6.6.2.4 Wollombi Brook Conservation Area

### **Environmental Management**

The activities undertaken at the WBCA in 2024 included:

- Develop the WBCA Operational Weed Management Action Plan 2024–2028.
- Weed control works focussing on: Turkey rhubarb (*Rumex sagittatus*), Green Cestrum (*Cestrum parqui*), Blue Heliotrope (*Heliotropium amplexicaule*), Balloon Vine (*Cardiospermum grandiflorum*), Moth Vine (*Araujia sericifera*), Passiflora caerulea (*Bluecrown Passionflower*), African Love Grass (*Eragrostis curvula*), Paterson's Curse (*Echium plantagineum*), Rhodes grass (*Chloris gayana*), Gelenia (*Galenia pubescens*), Prickly Pear (*Opuntia sp.*).
- Thinning targeting Bull-Oak (*Allocasuarina luehmanii*) to facilitate natural regeneration.
- Monitoring of trial plots to establish the effectiveness of thinning Bull-Oak (*Allocasuaina luehmannii*) and tea-tree (*Leptospermum polyanthum*) species.
- Wild dog and fox baiting program during autumn and spring resulted in two fox takes.
- Feral pig trapping program.
- Feral rabbit baiting program.
- Firebreak slashing along tracks and fence lines.
- Revegetation program of 6 ha (6,000 stems) of Central Hunter Grey Box Ironbark Woodland EEC.
- Infill planting of 1,160 Banksia integrifolia in Warkworth Sands EEC.
- Six-monthly inspections.
- Ongoing ecological monitoring.

### **Monitoring Results**

Monitoring in 2024 at the WBCA continued within the eight transects, consisting of six permanent monitoring transects established in 2015 and two temporary revegetation plots established in 2019. The annual monitoring program was completed during spring and winter in the WBCA. The 2024 monitoring program included fauna and flora monitoring. In 2024, following the revised monitoring protocol an additional 9 transects were also established at Wollombi Brook, five positioned in Warkworth Sands Woodland and grasslands, two in Swamp Oak Forest, and two in Central Hunter Grey Box – Ironbark Woodland revegetation areas. Transect locations were selected independently by a third party using GIS, but field placement on the day may have adjusted these to suit conditions. At all transects, the collection of vegetation integrity plots consistent with the BAM was undertaken, in addition to Biometric monitoring at the existing transects.



### Flora

Below are key findings during the 2024 flora monitoring at the WBCA:

- 103 native and 59 weed species were detected. Coolatai Grass (*Hyparrhenia hirta*), previously present in some transects, was not recorded in 2024. Relative to 2023, there was an increasing trend in species diversity of native species and weeds in 2024.
- No threatened plant species were recorded within monitoring transects in 2024, however as in previous years the rare Hunter Valley endemics *Grevillea montana* and *Diuris sp. aff. dendrobioides* were detected.
- For PCT 1605, only Native Ground Cover (Other) exceeds benchmark values, although one transect for Native Ground Cover (Grass) also achieves this. All other attributes are yet to approach benchmark. For PCT 1658, Native Overstorey Cover, Native Ground Cover (Shrubs) and Native Ground Cover (Other) exceed benchmark values for some transects, but all others are below benchmark. Number of Tree Hollows and Fallen Logs for both PCTs are well below benchmark for almost all transects, but both will take considerable time to improve. For Revegetation transect WOL04R (also allocated to PCT 1658), only Native Ground Cover (Shrubs) and Native Ground Cover (Other) exceed benchmark values.
- In 2023, the mean floristic diversity of native species in thinned plots of both Bull-oak and tea-tree was higher than non-thinned and remnant plots, and significant changes over time in overall floristic composition within thinned plots can be demonstrated. 2024 monitoring results demonstrate a further increase in species diversity with native species diversity within Bulloak and Tea-tree plots remaining above pre-thinning baseline data. Good growing conditions over the past 2-3 years have facilitated germination and growth of Bulloak and Tea-tree, and manual removal of these from plots during annual monitoring events has maintained levels. However, ongoing thinning of remaining trees and new recruits within and outside of plots should be prioritised to aid recovery and colonisation by native species.
- Monitoring of survey plots comprising the trial cultural burning program, commencing in September 2023, found significant differences in floristic composition and abundance at three months post-fire within *Angophora floribunda* woodland and *Eragrostis curvula* grassland, and good recovery from several key understory species. In 2024 the two plots affected by the burn had rapidly returned to their pre-burn state at 12 months.

### <u>Fauna</u>

Below are key findings during the 2024 fauna monitoring at the WBCA:

- 54 bird species were recorded by census survey in 2024. No new bird species were detected.
- Two threatened bird species were recorded in 2024; the Grey-crowned Babbler and Speckled Warbler.
- Total bird species diversity for the WBCA is 129 species. The highest bird species diversity at WBCA in 2024 was observed at regeneration site WOL04.



- The performance target for WBCA, based on diversity index scores for birds, is for the regeneration site (WOL04) to achieve comparable mean scores to the remnant woodland sites (WB01, WB02 and WB03). This performance target was met at WBCA for the second time since commencement of monitoring in 2015. Echolocation call surveys for microbats recorded 13 species in 2024. The total numbers of calls dramatically increased from monitoring in 2023, with a total of 720 calls recorded in 2024. Four threatened microbats were recorded, the Eastern Bent-wing Bat (147 calls), Little Bent-winged Bat (9 calls), Eastern Coastal Freetail-bat (83 calls) and Large-eared Pied Bat (8 calls). The highest number of calls recorded at remnant woodland sites in comparison to the rehabilitation / regeneration was observed at site WOL04.
- No evidence of the threatened Regent Honeyeater, Swift Parrot or the Large-eared Pied Bat were recorded in 2024.
- A detailed list and location of fauna species recorded can be found in the Biodiversity Offset Monitoring Report which is available on the <u>Bulga Coal website</u>.

### **Performance Against Criteria**

During 2024, 15 of the 17 performance indicators were met and two were below the specific criteria (**Appendix C**).

### Implemented/Proposed Improvements

### Weed Management

The 2025 weed management strategy for WBCA will focus on the management of highest and high priority species identified in the WBCA Operational Weed Management Action Plan 2024–2028.

In 2025 weed management will be focused on locating and eradicating outbreaks of Coolatai Grass (*Hyparrhenia hirta*) and African Love Grass (*Eragrostis curvula*) as quickly as possible. This will include areas within the larger fenced archaeological sites, where dense infestations of African Love Grass have been identified. Additionally, proactive management strategies will be implemented to address the ongoing Salvinia (*Salvinia molesta*) outbreak in the farm dam. Given that this invasive species has been reported along Wollombi Brook, consideration will be given to the reclamation of the dam to prevent reinfestation, especially following flooding events.

### Pest Management

In 2025 pest control activities will continue to be implemented, with a focus on managing feral pig populations. Additional opportunistic management will also undertaken in response to sightings or evidence of pest species presence. In 2024, pest management activities included wild dog and fox baiting in collaboration with Local Land Services to maximise the effectiveness of the program. This program appears to have been effective, as only one wild dog was recorded by field cameras, on one night from 102 continuous nights, indicating a low density of wild dogs within the WBCA. Wild dog and fox baiting in collaboration with Local Land Services will continue in 2025.

### Habitat Augmentation and Revegetation

In 2025, Bulloak and Tea-tree will continue to be removed from the trial research area and surrounds to further encourage native species recovery. Revegetation works will continue at the WBCA with planting of 6 ha (6,000 stems) of Central Hunter Grey Box Ironbark Woodland EEC.



### General Management

Slashing of boundary fencing, tracks and annual weed infestations will be undertaken where feasible to minimise both bushfire risk and further spread of weeds.

Fence repairs will be undertaken on an as needs basis, as identified through inspection programs.

### 6.6.2.5 Weeping Myall Management Areas

The weeping myall (*Acacia pendula*) management areas are located on the western side of Bulga Coal, west of Charlton Road. These two stands are marked on and are referred to as Weeping Myall Management Areas 1 and 2. These areas will be protected and managed by Bulga Coal, however they do not form part of a formal biodiversity offset.

The weeping myall (*Acacia pendula*) is an endangered population within the Hunter catchment, listed under the *NSW Biodiversity Conservation Act 2016* (BC Act). Management areas contain mature and juvenile weeping myall trees, the northern stand (WMMA # 1) supported relatively young trees and the southern stand (WMMA # 2) comprised very mature trees with no young plants.

### **Environmental Management**

The activities that were undertaken within the two Weeping Myall Management Areas (WMMAs) during 2024 included:

- Six-monthly inspections.
- Ongoing ecological monitoring.
- Fence repair/maintenance.
- Weed control, largely focusing on Prickly Pear (Opuntia species).

### **Monitoring Results**

Monitoring within the two WMMAs during 2024 has revealed an increase in height of the tallest individuals of *Acacia pendula* across five of the six plots, although the number of stems detected fluctuates across the three treatment areas and between years. This is likely due to macropod grazing of young shoots affecting counts. Estimates of bare ground are increasing within *Acacia pendula* plots relative to control plots, inferring a loss of grass and herb growth in these areas due to shading from developing *Acacia pendula* thickets, and/or increasing macropod resting areas.

### <u>Flora</u>

Below are key findings from the 2024 flora monitoring:

- Overall, floristic diversity and abundance within the two management areas have increased.
- Numerical analysis of floristic compositions within these two management areas over ten seasons showed significant differences in the diversity and abundance of species relative to rainfall received, with observable differentiation of the dry years of 2017–2019 and 2023 compared to the wetter years of 2015–2016, 2020–2022 and 2024.



- Six years after establishment, there has been an increase of up to 17% in the number of *Acacia pendula* stems evident within the growth monitoring plots established in 2018, but reductions of up to 22% since 2018 are also evident in some plots. Reductions are likely due to macropod grazing of very young stems.
- The maximum height of Acacia within plots ranged from 2.5 to 3.7 m in 2024, showing a continuing increasing trend from baseline data in 2018 (1.0–1.6 m), with the tallest *Acacia pendula* individuals within experimental plots growing an average of 2.07 m over six years.
- Species diversity within all growth monitoring plots combined increased from 2023 data for both native and weed species, reflecting the better conditions in 2024. Following five years of monitoring, there are no significant differences in floristic composition between areas supporting developing stands of *Acacia pendula* and those where this species is absent (in either grassland, bare woodland or grassy woodland).

### Implemented/Proposed Improvements

Bulga Coal will continue to monitor the WMMAs to address the general health of Weeping Myall plants, together with annual survey of floristic composition within two management areas, and counts of *Acacia pendula* stems and floristic composition within the twelve growth monitoring plots. Additionally, the following recommendations will be implemented:

- Spot eradication of African Olive where it occurs in the Management Area.
- Continue to informally monitor for flowering on individual *Acacia pendula* trees.
- Continue to informally monitor the impact of mistletoes on older individuals of *Acacia pendula* within WMMA # 2.

### 6.6.2.6 Vere BSA Area

The Vere BSA Area currently supports the Central Hunter Valley Eucalypt Forest and Woodland CEEC, listed under the EPBC Act. Active restoration management actions are proposed that will result in a total of 153.7 ha of Central Hunter Valley Eucalypt Forest and Woodland CEEC within the Vere BSA Area . The Vere BSA Area also contains one recorded European heritage value site.

### **Environmental Management**

The activities that were undertaken within the Vere BSA Area during 2024 included:

- Development and implementation of the Vere Operational Weed Management Action Plan 2024–2028.
- Weed controls works, focusing on Golden Wreath Wattle (*Acacia Saligna*), Lantana (*Lantana camara*), Green Cestrum (*Cestrum parqui*), African boxthorn (*Lycium ferocissimum*), Queensland Silver Wattle (*Acacia podalyriifolia*), Blackberry (*Rubus spp*.), Moth Vine (*Araujia sericifera*), Silky Oak (*Grevillea robusta*), Setaria (*Setaria sphacelata*), African Love Grass (*Eragrostis curvula*), Galenia (*Galenia pubescens*), Spiny Rush (*Juncus actus*), Prickly Pear (*Opuntia species*), Rhodes Grass (*Chloris gayana*), Blue Heliotrope (*Heliotropium amplexicaule*) and Ink Weed (*Phytolacca octandra*).
- Installation of new boundary fencing on both the northern and southern boundaries.



- Repair of the Broke Road boundary fence and installation of new signage and gates.
- Replacement of previous barbed wire on boundary fences (top and bottom wires) with plain wire.
- Removal of internal redundant fencing.
- Wild dog and fox baiting program during autumn and spring months resulted in two wild dog and 12 fox takes.
- Feral rabbit baiting program.
- Track maintenance program and bushfire slashing.
- Specialist erosion repair investigation.
- Removal of rubbish.
- Native seed collection for tube stock development.
- 19 feral pigs controlled.
- Six-monthly inspections.
- Ongoing ecological monitoring.

#### **Monitoring Results**

Monitoring at the Vere BSA Area commenced in 2022. A large proportion of the Vere BSA Area comprises native vegetation and derived native grasslands of moderate to good condition, therefore the Vere BOMP focusses on regeneration and revegetation strategies to enhance existing communities and establish further native vegetation in degraded areas. These works will focus specifically on the Central Hunter Valley Eucalypt Forest and Woodland CEEC.

The monitoring program is outlined in the Vere BOMP, requiring annual systematic ecological monitoring for the first 10 years (2022–2031), then every three years for the following 15 years.

### <u>Flora</u>

Below are key findings from the 2024 flora monitoring:

- No new records of threatened plant species were recorded in 2024.
- From the 2024 monitoring, 250 plant species were recorded within the 18 transects at the Vere BSA Area.
- The Derived Native Grassland Revegetation and Remnant Woodland sites recorded comparable scores in 2024, although overall the sites recorded lower scores. However, this analysis is based on only three years of monitoring, which can limit the determination of ecological trends.



- Of the total plant species recorded, 80 species (32%) were weeds (none were high threat species), predominantly herbaceous or grassy species typical of former grazing lands. Woody species present include Lantana (*Lantana camara*) and the South Australia Sugar Gum (*Eucalyptus cladocalyx*). As noted previously. Sugar Gum has been formally planted out in disturbed areas and should be progressively removed and replaced with local endemic eucalypts. Other planted eucalypts including White Box (*Eucalyptus albens*) and Mugga Ironbark (Eucalyptus sideroxylon) should also be replaced.
- As previously reported, some of the pre-determined monitoring plot locations do not sample the intended vegetation zones as outlined in the Biodiversity Stewardship Site Assessment Report. At one location (plot VER\_RVG\_1601\_28\_01), the rehabilitation is dominated by Sugar Gum (*Eucalyptus cladocalyx*), however the monitoring plot is intended to monitor Spotted Gum Narrow-leaved Ironbark Red Ironbark shrub/grass open forest (PCT 1601), equivalent to Central Hunter Valley Eucalypt Forest and Woodland CEEC. This plot should be repositioned for ongoing monitoring, and some others reviewed closely.

### <u>Fauna</u>

Below are key findings during the 2024 fauna monitoring:

- One new species was identified in 2024 for the first time since the commencement of monitoring in 2013, the Feathertail Glider. This is an elusive species to detect due to its small size, cryptic nature and rapid movement through the canopy of trees.
- Bird census surveys were conducted at nine sites over four monitoring periods in 2024, two in winter and two in spring. A total of 58 bird species were detected by census surveys, with several additional bird species either observed indirectly or known to occur based on previous monitoring surveys of the BSA Area. Three threatened bird species were recorded in 2024, the Little Lorikeet, Grey-crowned Babbler and Speckled Warbler (all Vulnerable under the BC Act).
- Fourteen microchiropteran bat species were recorded at the Vere BSA Area in 2024. No evidence of the threatened Grey-headed Flying-fox was observed during spotlight searches. Several individual trees were in flower during the surveys in 2024, but overall abundance of flowers was considered low. A total of 898 calls of microchiropteran bats were identified from echolocation call recordings.
- Four threatened microbats were recorded, the Eastern Freetail Bat (640 calls), Eastern Bentwinged-bat (60 calls), Large-eared Pied Bat (2 calls) and Eastern Cave Bat (1 call).
- Nine native and seven exotic mammals were recorded by spotlight searches, nestbox inspection and field camera monitoring. Native mammals include the Short-beaked Echidna, Northern Brown Bandicoot, Bare-nosed Wombat, Common Brushtail Possum, Squirrel Glider, Feathertail Glider, Eastern Grey Kangaroo, Red-necked Wallaby, Swamp Wallaby and Common Wallaroo.
- Bird species diversity indices in 2024 between broad vegetation treatments reveal the derived native grassland sites, and revegetation sites recorded comparable scores to remnant woodland.



### Nest Boxes

Nest box inspections recorded two species in 2024, the Common Brushtail Possum and threatened Squirrel Glider. Evidence of nest box usage (leaf nests) was observed in many of the glider style boxes, indicating the species is widespread across the BSA Area. Several boxes were damaged, namely missing the lift-up lids. The damage is likely caused by the Common Brushtail Possum, with those boxes missing lids being occupied by the species.

### Implemented/Proposed Improvements

### Weed Management

The 2025 weed management strategy for Vere BSA Area will focus on the management of highest and high priority species identified in the *Vere BOA Operational Weed Management Action Plan 2024–2028*. Lantana (*Lantana camara*) is widespread on the north facing hillside of the BSA Area. Targeted management of Lantana (*Lantana camara*) will be undertaken at Vere BSA Area in 2025.

Sugar Gum, a South Australian species, should be progressively removed and replaced with local endemic eucalypts. Consideration should be given to relocating the existing transect within this area to better reflect the Central Hunter Valley Eucalypt Forest and Woodland CEEC it is intended to monitor.

Ongoing monitoring and control of introduced weed species, particularly in highly disturbed areas such as the former quarry, will minimise dispersal of weeds into the wider areas of the Vere BSA Area.

### Pest Management

During surveys in 2024, evidence of feral animals was detected across much of the Vere BSA Area. Due to above average rainfall over the winter period, and moist soils, extensive diggings by feral pigs were evident across much of the BSA Area. A large rock pile located near site Vere08 recorded activity by several introduced predators, including feral cats and foxes. A large red deer was also recorded in the BSA Area in 2024, with the species becoming more common and abundant in the mid to upper Hunter Region. In 2025, pest control activities will continue to be implemented with additional opportunistic management also undertaken in response to sightings or evidence of pest species presence. Planned pest management activities include wild dog and fox baiting in collaboration with Local Land Services to maximise the effectiveness of the program and pig trapping.

### **General Management**

Tunnel erosion identified on the north-facing hillside within the Vere BSA Area will be inspected and remediated, where feasible during 2025.

Slashing of boundary fence lines, tracks and annual weed infestations will be undertaken where feasible to minimise both bushfire risk and further spread of weeds.

The southern boundary fence for the Vere BSA Area was completed in 2024. Continued fence repairs and track maintenance will be undertaken on an as needs basis, as identified through inspection programs.



# 6.7 Weeds and Pests

# 6.7.1 Environmental Management

An ongoing weed control program was carried out by licenced contractors. Annual buffer land inspections monitor success of any previous weed control and identify areas which will require additional treatment. Major efforts were implemented in 2024 to conduct weed management by prioritising the significance, timing and treatment method.

Land management contractors were engaged by Bulga Coal to undertake vertebrate pest control programs in autumn, winter, spring and summer in conjunction with the coordinated program being organised by Local Land Services, where possible. As part of the program, 1080 baiting was conducted, targeting wild dog and fox populations within the landholdings. Pig trapping targeted populations travelling through buffer lands and BOAs. Pindone baiting targeting rabbits was performed in multiple BOA's and a BSA area (The Vere, Broke Road, Wollombi Brook and Condran).

# 6.7.2 Environmental Performance

Annual buffer land inspections generally indicate that weed management is successful, but ongoing monitoring and treatment is required to prevent further infestations.

The 1080 baiting program was undertaken in autumn and spring across Bulga Coal. The autumn program included a total of 192 baits laid with a total of 25 baits taken, which represented 13% of the available baits and a decrease on the 2023 results. The spring baiting program included a total of 192 baits laid with a total of 18 target species taken which represented 9% of the available. This was in general lower than the previous year's results.

# 6.7.3 Implemented/Proposed Improvements

Weed management in 2025 will be conducted as per prioritisation and the schedule defined in the *Buffer* Land and Biodiversity Offset Operational Weed Management Action Plan 2024–2028.

# 6.8 Archaeology and Heritage

# 6.8.1 Environmental Management

Bulga Coal continues to work with the Registered Aboriginal Parties (RAPs) regarding aspects of Aboriginal heritage and the implementation of the *Bulga Coal Aboriginal Cultural Heritage Management Plan* (ACHMP). A planned review of the ACHMP and appendices commenced in 2024 and will be submitted in 2025 for review and approval to the relevant agencies and stakeholders.

Bulga Coal manages European (historical) heritage through the implementation of the *Historic Heritage Management Plan* (HHMP).



# 6.8.2 Environmental Performance

### 6.8.2.1 2024 Quarterly Monitoring

A program for quarterly monitoring of Aboriginal heritage sites began in 2013 at Bulga Coal. Monitoring of Aboriginal heritage sites in conjunction with (up to) four RAPs and an OzArk archaeologist was continued in 2024. Quarterly monitoring reports are available on the <u>Bulga Coal website</u> and the results are summarised as:

- Quarter 1 monitoring was undertaken on 11 March 2024. The inspection included a review of sites at the Loders Creek Grinding Grooves Relocation Area (LCGGRA) and 4 sites at the WBCA.
- Quarter 2 monitoring was undertaken on 7 May 2024, this included a review primarily of sites to the west of Charlton Road.
- Quarter 3 monitoring was undertaken on 6 August 2024, which included a review of sites south of the operations, within the gas drainage areas and the Vere Offset, as well as sites located near the CHPP and rail loop. In addition, erosion controls (sandbags) were installed in the vicinity of a site west of Charlton Road.
- Quarter 4 monitoring occurred on 26 November 2024. This monitoring was focused on sites located within the Broke Road BOA and to the northeast of the operations near Loders Creek and the boundary with the Mount Thorley Mine.

### 6.8.2.2 New Aboriginal Heritage Sites

On 11 March 2024, during the Quarter 1 monitoring, an isolated mudstone flake was located in the WBCA. WBCAA IF-3 (37-6-4378) has been displaced from its primary depositional context and is representative of the background scatter of artefacts in landforms associated with the Wollombi Brook. The new site was registered in the AHIMS and included in Bulga Coals geodatabase. The site is located within the conservation area in a fenced location.

### 6.8.2.3 Salvages During 2024

No salvages occurred during 2024.

### 6.8.2.4 Wollombi Brook Conservation Area

The WBCA is both a BOA and an Aboriginal and Cultural Heritage Offset Area. Heritage is managed in accordance with the *Wollombi Brook Plan of Management* (Appendix J of the ACHMP). Land management is undertaken in accordance with the BOMP.

The Minimbah Teaching Place was built in December 2021 and is in the WBCA. The facilities were used throughout 2024 by various local Aboriginal organisations, schools and businesses for educational and cultural events. Glencore's First Nations Pathways Program, aimed at creating employment and career opportunities for Indigenous people was launched at Minimbah in April (**Photo 6.3**).

On 4 December 2024 the Annual Aboriginal Stakeholder meeting was also held at the Minimbah Teaching Place. Following the meeting there was a working bee to continue work on the bushtucker garden (**Photo 6.1**, **Photo 6.2**).





Photo 6.1 Bushtucker garden work with RAPs at Minimbah Teaching Place 2024





Photo 6.2 Bushtucker garden work with RAPs at Minimbah Teaching Place 2024





Photo 6.3 Pathways Program Launch at Minimbah Teaching Place 2024

### 6.8.2.5 Loders Creek Grinding Grooves Conservation Area

On 3 November 2022 the LCGGCA Agreement was executed by Heritage NSW. The LCGGCA is an Aboriginal and cultural heritage conservation area. Heritage is managed in accordance with the *LCGGCA Plan of Management* (Appendix K of the ACHMP). Land management is undertaken in accordance with the BOMP.

Photographic monitoring of the LCGGCA occurs annually, and the site is monitored once a year as part of the quarterly monitoring program. In March 2024, the four fixed points were photographed to monitor the condition of the Loders Creek Grinding Grooves. There are five main groups of grooves within the site (Groups A to E). The site was originally photographed in September 2015 following the relocation, and annually between 2017 and 2024. In summary, the 2024 monitoring showed that natural weathering is occurring to the Group A and Group D grooves. Group A has a layer of sandstone starting to exfoliate and Group D grooves are weathering and becoming less obvious. Despite weathering, the grooves remain in good condition and no further management is required. All results from the monitoring are presented in **Appendix E**.

### 6.8.2.6 Incidents

No heritage related incidents occurred during 2024.



# 6.8.3 Implemented/Proposed Improvements

Quarterly monitoring of Aboriginal sites in consultation with RAPs will continue in 2025. Bulga Coal will also continue to work with the Aboriginal community on Minimbah Teaching Place projects including the bushtucker garden, walking trails, signage and educational resources.

# 6.9 Visual and Lighting

# 6.9.1 Environmental Management

Control strategies are implemented to reduce potential visual and light related impacts associated with mining operations. Management is undertaken in accordance with the *Bulga Lighting Plant Procedure* and the *Visual Impact Management Plan* (VIMP) which was revised in 2023 and approved by DPHI on 10 August 2023. The revised VIMP includes additional visual screening along Broke Road.

Visual and lighting impacts are assessed through monitoring and inspection regimes. Onsite monitoring includes assessments of lighting impacts, compliance with development consent conditions and the angle at which light is emitted from lamps and luminaries, glare, spill and sky glow.

# 6.9.2 Environmental Performance

Potential lighting impacts are assessed as part of the overburden dump design process. Dumps are orientated, where practicable, and windrows or bunds are designed and constructed to mitigate lighting impacts.

A sensitive lighting receiver map is updated and communicated to mining personnel prior to commencing exposed dumps that have the potential to cause lighting impacts offsite.

An independent visual and lighting review of Bulga Coal was completed in 2024 to assess compliance against the lighting and visual amenity requirements. The assessment confirmed there were no non-compliances in the management of lighting and visual impacts by the mining operations and that operations are generally being undertaken to minimise external visual and lighting impacts, in accordance with the relevant obligations of SSD-4960 and DA 376-8-203. A recommendation was made to consider additional screening of a section along Broke Road to reduce direct views of underground infrastructure. Bulga Coal will implement this recommendation.

# 6.10 Spontaneous Combustion

# 6.10.1 Environmental Management

Spontaneous combustion is managed in accordance with the *Spontaneous Combustion Management Plan*. Inspections of potentially affected areas are conducted during each shift. Spontaneous combustion incidents at Bulga Coal are predominantly associated with coal stockpiles.

Portable gas monitoring units are used by units working in areas of spontaneous combustion or where toxic gases are suspected of being present. This is for the purpose of identifying the presence of spontaneous combustion and any potential increase in risk.



# 6.10.2 Environmental Performance

No incidences of spontaneous combustion occurred in 2024.

# 6.11 Bushfire

### 6.11.1 Environmental Management

Bushfire management strategies and monitoring are undertaken at Bulga Coal in accordance with the *Bushfire Management Plan* which was updated in November 2023. The revisions included updates to mining and operational areas, contact details for neighbours/lessees contact numbers were updated on the *Bushfire Operations Plan* and personnel details were updated on the Rural Fire Service (RFS) Communication Plan. The revised documents were provided to the RFS.

The following activities were undertaken during the reporting period:

- Consultation with RFS to provide the latest version of the Bushfire Management Plan.
- Annual fire season review completed including currency of contacts and refuge points, GIS database and works required prior to the bushfire season.
- Monitoring of fuel loads in areas that adjoin Charlton Road and the former Broke Road, private property boundaries, tenanted properties and mine owned assets.
- Monitoring of tracks and trails within the Bulga Coal colliery holding to ensure these remain accessible by checking for fallen logs, erosion or other signs of trail degradation.
- Monitoring of weather conditions.
- Hazard reduction measures were implemented including slashing powerline easements, access tracks and boundaries of adjoining land holdings.

# 6.11.2 Environmental Performance

No bushfires were recorded on the site.

### 6.11.3 Implemented/Proposed Improvements

Bulga Coal continued to maintain existing fire breaks and monitor fuel loads.

# 6.12 Greenhouse Gas Emissions

### 6.12.1 Environmental Management

Bulga Coal implements controls to mitigate air quality impacts in accordance with the *Air Quality and Greenhouse Gas Management Plan*. The *Air Quality and Greenhouse Gas Management Plan* was revised in 2020 to reflect SSD-4960 Modification 3 and DA 376-8-2003 Modification 7, and was approved by DPHI in May 2022. A revised version of the AQGHGMP was submitted to the DPHI in June 2024 to address comments from the DPHI review and to include minor amendments across several sections.



The underground goaf atmosphere is managed with post-mining gas drainage infrastructure. This helps reduce the potential for spontaneous combusting within the sealed underground workings and potential leakage of methane from the sealed workings intercepted by open cut mining.

Post-mining drainage methane and carbon dioxide is extracted from the mined-out goaf and is sent to the Post-drainage Flaring Facility for combustion of the methane. This conversion of coal seam methane gas to carbon dioxide gas and water substantially reduces greenhouse gas emissions from the Bulga Underground Operations.

Methane and carbon dioxide levels are measured in the gas drainage operations. The gas drainage operations have monitoring at the gas wells and the flaring facilities. The gas composition and flow rate are trended in the site's continuous monitoring system, and long-term data stored offsite in a database.

# 6.12.2 Environmental Performance

### 6.12.2.1 Reported Greenhouse Gas Emissions

Bulga Coal reports greenhouse gas emissions (GHG) in accordance with National Energy and Greenhouse Gases (NGER) legislation. Each financial year Bulga Coal is required to submit to the federal government the emissions from their NGERs registered facility. Also, because Bulga Coal emits over 100 kt of CO<sub>2-e</sub> each year, Bulga Coal is registered as a Safeguard facility and therefore also had a Safeguard baseline. Emissions above the baseline for that year need to be offset by retiring Australian Carbon Credit Units (ACCUs).

The NGERs reporting year is based on a financial year, not a calendar year such as this Annual Review. To prevent incompatible public reporting, the values in this report also cover a financial year. **Table 6.23** contains the Scope 1 (direct emissions from the mining activities during the year), and Scope 2 emissions (electricity consumption by the mine during the year).

### Table 6.23 Bulga Coal Greenhouse Gas Emissions (Scope 1 and 2 Direct Emissions) FY 2023/2024

Emissions	Bulga Coal (t CO <sub>2-e</sub> )					
	2021/2022	2022/2023	2023/2024	Predicted maximum annual totals		
Total Scope 1 Emissions	474,479	512,403	527,889	1,011,888		
Total Scope 2 Emissions	46,126	68,916	82,415	55,042		
Total Emissions (Scope 1 and 2)	520,605	581,319	610,304	1,066,930		

Note – The predicted maximum annual total includes 1,066,930 t CO<sub>2</sub>-e (1,011,888 t CO<sub>2</sub>-e Scope 1 and 55,042 t CO<sub>2</sub>-e Scope 2) from the Greenhouse Gas and Energy Assessment for the Bulga Optimisation Project EIS and excludes the Bulga Underground Operations and the additional emissions associate with SSD-4960 Modification 3. The annual emissions included in **Table 6.23** also include the emissions from the remnant underground gas drainage.

Overall, there was an increase in Bulga Coal emissions of approximately 5% when compared to the 2022/2023 reporting period. The increase is attributable to increased fugitive emissions from ROM coal. Over the 2023/2024 period Bulga mined coal in areas of the mine which have higher gas zones compared to the 2022/2023 period.



### 6.12.2.2 Comparison Against Predictions

A Greenhouse Gas and Energy Assessment was prepared for Bulga Coal by Umwelt (2012) as a component of the Bulga Optimisation Project EIS. The assessment does not include the emissions associated with the Bulga Underground Operations or the additional emissions associate with SSD-4960 Modification 3 which includes the relocation of approximately 30M m<sup>3</sup> of tailings with electric pumps which generate considerable additional Scope 2 emissions. A comparison against the predictions of the Greenhouse Gas and Energy Assessments is included in **Table 6.23**.

Predictions represent the maximum annual greenhouse gas emissions for Bulga Coal during operations. The Total Emissions (Scope 1 and 2) are approximately half (57%) of the predicted maximum total included in the Bulga Optimisation Project EIS prediction for the Open Cut operations. The lower than predicted emissions is primarily due to the deeper coal (which is higher in emissions) not being mined yet. The Scope 2 emissions have increased largely due to the additional electricity consumed to relocate tailings from the Deep Pit to the NTSF, and the limited use of the power station on site.

# 6.12.3 Implemented/Proposed Improvements

Bulga Coal is a part of the wider coal assets held by Glencore across Australia. Glencore Coal Assets Australia (GCAA) are themselves a part of the global Glencore mining portfolio. In line with the ambitions of the 1.5°C scenarios set out by the Intergovernmental Panel on Climate Change (IPCC), Glencore target a short-term reduction of 15% by 2026 and a medium-term 50% reduction of our total (Scope 1, 2 and 3) emissions by 2035 on 2019 levels. Post 2035, Glencore's ambition is to achieve, with a supportive policy environment, net zero total emissions by 2050.

Glencore incorporates energy costs and our carbon footprint into our annual planning process. Commodity departments, such as GCAA, are required to provide energy and GHG emissions forecasts for each asset over the forward planning period and provide details of emissions reduction projects. In the case of Bulga Coal this includes involvement with GCAA when considering available GHG abatement technology and mine planning to optimise efficiency (which usually translates into reduced fuel consumption).

Glencore open cut and underground sites minimise emissions from diesel and electricity consumption by:

- Optimisation of mining practices e.g. haulage planning, blast design, conveying arrangements.
- Optimisation of engine performance e.g. studies undertaken in collaboration with OEMs to enhance fuel efficiency and emissions reduction.
- New fleet is purchased with the most fuel-efficient engines available.
- Ongoing monitoring of potential biofuel and fuel additive opportunities.
- Ongoing monitoring and assessment of emerging technologies.



# 6.13 Hydrocarbon Management

# 6.13.1 Environmental Management

Controls implemented to manage the risk of hydrocarbon related impacts are conducted under the:

- *Bulga Coal Hydrocarbon Management Plan,* incorporating spill response procedure and Bulga Open Cut Hydrocarbon TARP.
- Bioremediation Area Management Plan.
- Bulga Coal Pollution Incident Response Management Plan.

Hydrocarbon storage facilities have been designed generally in accordance with AS 1940-2004 – *'The Storage and Handling of Flammable and Combustible Liquids'*. The storage system includes computerised controls for the purpose of monitoring and identification of faults.

Bulga Coal monitor for petroleum hydrocarbons at dirty water dams, EPL discharge points and groundwater bores surrounding hydrocarbon storage and natural watercourses, in accordance with *the Bulga Open Cut Remediation Action Plan* and the *Bulga Coal Hydrocarbon Management Plan*. The monitoring program involves:

- Regular inspections of hydrocarbon infrastructure to identify losses or leakages.
- Monthly oil and grease analysis at the surface water monitoring sites shown on Figure 6.19.
- Hydrocarbon monitoring at the locations listed in **Table 6.24**. Surface water sites are monitored quarterly, following rain. Groundwater sites are monitored six-monthly (refer **Figure 6.19**).

### Bulga Coal

FIGURE 6.19 - Bulga Coal Hydrocarbon Surface and Groundwater Monitoring 2024

# GLENCORE



<sup>325000</sup> 

File Path Ref: Q:\03\_MapDocuments\18\_Reporting\Annual\_Review\2024\AR FIGURES\20250210\_Figure\_6\_19\_AR\_Hydrocarbon\_Surface\_Groundwater\_Monitoring\_A4\_GDA2020.mxd

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# 6.13.2 Environmental Performance

Surface water and groundwater monitoring was conducted at the locations listed in Table 6.24 and shown on **Figure 6.19**. Results were assessed against the *Hydrocarbon Trigger Action Response Plan* (TARP) triggers in **Table 6.25**.

Туре	Monitoring Location
Groundwater	ASMW02
	ASMW06 <sup>1</sup>
	ASMW07
	C2MW03
	C3MW01
Surface Water	NMC4
	NMC5
	NMC6
	NMC Culvert
Licenced Discharge Point (LDP)	Northern Dam (ND1)
Onsite Dirty/Mine Water Dam	AS Dam 2
	AS Dam 3
	C2 Dam
	C3 Dam

 Table 6.24
 Hydrocarbon Monitoring Sites

<sup>1</sup>ASMW06 was decommissioned in September 2024 due to the site being flooded during the previous three years of sampling events.

# Table 6.25Ecological Investigation Levels (ANZECC) Adopted for Natural Waters (Surface and<br/>Groundwater) at Bulga Open Cut

Sampling Location	Contaminant	Trigger (μg/L)	
Surface Water	TRH C6-C10	20 (LOR)	
NMC4, NMC5, NMC6, Nine Mile Creek Culvert, ND1.	TRH >C10-C16	100 (LOR)	
Groundwater	TRH >C16-C34	100 (LOR)	
ASMW02, ASMW06, C2MW03, C2MW04, C3MW01.	TRH >C34-C40	100 (LOR)	
	TRH >C10-C40	300 (LOR)	
	Naphthalene	16	
	Phenanthrene	0.6	
	Anthracene	0.01	
	Fluoranthene	1	
	Benzo(a) pyrene	0.1	

Groundwater monitoring results in 2024 were below the ecological investigation levels.



Surface water monitoring results from the Nine Mile Creek monitoring sites and the Northern Dam were also below the ecological investigation levels.

Hydrocarbon spills were contained, cleaned-up and bioremediated or transported offsite as hazardous waste by a licensed waste contractor.

# 6.13.3 Implemented/Proposed Improvements

A new bulk fuel facility and a new light vehicle workshop will be commissioned in the East Pit to replace the existing infrastructure in the Area Station.

A new ultra-class workshop is being constructed and is being commissioned in 2025 within the maintenance workshop area.

Decommissioning of the Area Station Light Vehicle Workshop and associated infrastructure to allow for mining progression.

# 6.14 Public Safety

# 6.14.1 Environmental Management

Controls implemented to minimise the potential for public safety incidents include:

- Implementation of a security system. These systems and procedures have been established in accordance with the relevant requirements under the *Work Health and Safety Act 2011, Mining Act 1992* and conditions stipulated in the relevant mining tenements.
- Using sentries to prevent unauthorised entry into the blast exclusion zone.
- Using traffic control when working near public roads.
- Maintaining a fence around the perimeter of mining operations.

# 6.14.2 Environmental Performance

There were no public safety incidents recorded at Bulga Coal during the reporting period. Management measures and control strategies implemented at Bulga Coal have been effective in the prevention of incidents regarding public safety during the reporting period.

There were no changes to public safety management in 2024.



# 7.0 Water Management

# 7.1 Water Management

During the 2024 reporting period the Bulga Complex Weather Station recorded a total of 677.5 mm of rain which is close to the yearly average rainfall at Bulga, this is slightly higher than what was recorded during 2023 which was 524 mm. The surface and groundwater monitoring data reflects the natural response to an average rainfall year.

# 7.1.1 Water Balance

Bulga Coal uses a water balance model to assist in the management of water onsite. The model is used to review performance and undertake short term projections (12 months) of water requirements. The model is also used to predict water needs for the life of the mine. Major water transfers are monitored via flow meters. Water storage volumes are monitored with level sensors or measured fortnightly.

The water balance for Bulga Coal is presented in **Table 7.1**. The discrepancy between inflows, outflows and change in storage is due to the limitations of the accuracy of the surface and groundwater storage measurements, and water balance model predictions.

Bulga Coal 2024 Water Balance	Volume (ML)
Water Inventory and Capacity	
Total estimated water stored on site 1 January 2024 (8,933 ML predicted to be in the underground goaf)	20,315
Total estimated water stored on site 31 December 2024 (8,625 ML predicted to be in the underground goaf)	16,685
Change in water inventory (ML)	-3,631
Inflows (ML)	
Water extracted from Hunter River (monitored)	2,484
Rainfall and runoff intercepted from mine areas	5,330
Groundwater inflow (Groundwater model prediction)	1,219
Pumped from dewatering bores (drawing on water stored in the underground goaf)	1,214
Water entrained in CHPP feed material	516
Water entrained in dredged tailings	2,687
Potable supply	13
Mt Thorley Mine water supply	195
Total Inflows	13,658
Outflows	
Evaporation	3,547
Discharge to Hunter River under Hunter River Salinity Trading Scheme	0

### Table 7.1Bulga Coal 2024 Water Balance



Bulga Coal 2024 Water Balance	Volume (ML)
Discharge via spill	0
Water entrained in product coal, coarse rejects and tailings (including Deep Pit tailings relocation)	11,321
Open Cut Dust suppression	1,166
Bulga Underground Operations Water Consumption	0
Potable water consumption	13
Other losses	5
Total Outflows	16,039

# 7.1.2 Licensed Water Take

Water taken by Bulga Coal during the previous water year (1 July 2023 to 30 June 2024) is summarised in **Table 7.2**.

Water Licence #	Water Sharing Plan, Source and Management Zone	Entitlement (ML)	Total entitlement under Source	Passive take/ inflows	Active Pumping	Total
Groundwater						
WAL41687	Mining: Sydney Basin-North Coast Groundwater Source	500	2,365	1,737²	66 <sup>3</sup>	1,757
WAL41546	Mining: Sydney Basin-North Coast Groundwater Source	365				
WAL41543	Mining: Sydney Basin-North Coast Groundwater Source	500				
WAL41544	Mining: Sydney Basin-North Coast Groundwater Source	500				
WAL41545	Mining: Sydney Basin-North Coast Groundwater Source	500				
WAL36221	Mining: Wollombi Brook Aquifer leakage to Permian coal measures	300	300	0	0	0
Surface Water						
Singleton Council Agreement	Hunter River	2,367 <sup>1</sup>	-	0	2,053	2,053

#### Table 7.2Water Take 2023–2024

<sup>1</sup>This is the annual Singleton Council agreement allocation (867 ML) along with an additional 1,500 ML temporary transfer from Resource Pacific Pty Ltd (Ravensworth Mine) under licence 20AL203244. Bulga did not transfer water to other mines in 2023/2024.

<sup>2</sup>Passive inflow for each individual licence is not metered individually as they are passive inflow into the Open Cut and Underground from the Sydney Basin North Coast Groundwater Source.

<sup>3</sup> Drawn from a detention basin immediately downstream of the Northern Dam. This water leaks from the dam impoundment though the Permian strata that the dam has been cut into. This water is pumped back into the Northern Dam. This take is also allocated to the site Sydney Basin WALs.



# 7.1.3 Long Term Trend Analysis

In 2024 there was a reduction in the total site water inventory, driven by the continuation of the Deep Pit dredging operations. Overall total site water storage remained slightly higher than the EIS modelled estimates due to the dredging operational demand.

# 7.2 Surface Water

Bulga Coal implements surface water management measures in accordance with the *Water Management Plan* (WMP). This Plan outlines procedures for the detection of significant offsite impacts. The Plan also outlines trigger levels to identify and manage potentially adverse impacts. Trigger levels are included in the site Environmental Monitoring Database (EMD), which generates an alarm if a trigger level is reached. The WMP further outlines the methods for monitoring the quantities of water extracted, imported or discharged under groundwater extraction licences, surface water extraction licences and the EPL.

Monthly surface water quality monitoring is undertaken at dams, streams and creeks in and around Bulga Coal mining operations. Monitoring locations were selected to obtain representative samples. Water quality parameters including temperature and depth are tested onsite, whilst pH, electrical conductivity (EC), and total suspended solids (TSS) are undertaken by a National Association of Testing Authorities (NATA) accredited laboratory.

Surface water quality monitoring is conducted in accordance with:

- AS 5667.4 1998 Water Quality Sampling Guidance on Sampling from Lakes, Natural and Man-made.
- AS 5667.6 1998 Water Quality Sampling-Guidance on Sampling of Rivers and Streams.
- The Bulga Coal Water Management Plan.

The WMP was approved by DPHI in 2021.

# 7.2.1 Environmental Management

A summary of surface water monitoring results against relevant criteria from the WMP is provided in **Table 7.3**. The location of surface water monitoring sites is shown on **Figure 6.3**. Monitoring data is available on the <u>Bulga Coal website</u>. Umwelt have produced the *Bulga Coal Complex 2024 Groundwater and Surface Water Annual Review* (Umwelt, 2025) which is attached as **Appendix D**.

# 7.2.2 Environmental Performance

### Table 7.3 Summary of Surface Water Monitoring Results – 2024 Annual Averages

Sample Point	pH (range Min-Max)	pH Criteria		EC (μS/cm)	EC Criteria (μS/cm)	TSS (mg/L)	TSS Criteria (mg/L)
		Lower 20 <sup>th</sup> percentiles	Upper 80 <sup>th</sup> percentile		80 <sup>th</sup> percentile		80 <sup>th</sup> percentile
LR1 <sup>1</sup>	6.57–7.36	7.12	7.81	644.2	944	5.5	12
LR2	6.94–8.11	7.39	7.91	3,530.1	4,924	22.67	40
LR5	6.94–8.03	7.41	7.98	1,081.0	1,350	7.25	12
W2	6.72–7.78	7.13	7.67	775.6	836	5.82	12



Sample Point	pH (range Min-Max)	pH Criteria		EC (μS/cm)	EC Criteria (μS/cm)	TSS (mg/L)	TSS Criteria (mg/L)
		Lower 20 <sup>th</sup> percentiles	Upper 80 <sup>th</sup> percentile		80 <sup>th</sup> percentile		80 <sup>th</sup> percentile
W4	6.71–8.39	7.33	7.87	748.7	947	5.83	10
SDL1	6.79–7.49	6.70	7.24	259.0	285	13.67	39
NDL1	7.06–8.28	7.14	7.26	2,335.8	399	18.00	70
W9 <sup>3</sup>	7.4–8.39	7.36	7.92	8,110.0	1,970	14.33	157
W10	7.4–8.39	7.00	7.64	18,433.3	691	16.67	102
NMC1 <sup>2</sup>	7.62-8.21	-	-	469.0	-	12.60	-

 $^{\scriptscriptstyle 1}$  Site is upstream of the operations and is used as a reference site.

<sup>2</sup> Insufficient data to establish criteria.

<sup>3</sup> W9 replaced W8 as it was mined through.

### 7.2.2.1 Surface Water pH

In 2024, pH tended to follow historical trends across the watercourses. Measured pH ranged from a minimum of 6.57 at LR1 in Wollombi Brook upstream of the village of Broke in April and maximum of 8.39 at W10 in December on Loder Creek upstream of confluence with Nine Mile Creek and just upstream of Mining Lease boundary.

Many of the monitored watercourses were dry or unable to be sampled throughout 2024. Watercourses were more likely to be able to be sampled during the autumn to spring months when the cumulative rainfall departure was average to above average.

Surface water pH was compared to trigger values from the adopted WMP (Bulga Coal, 2021). Trigger values for pH have been determined using the 20<sup>th</sup> and 80<sup>th</sup> percentile of previously recorded values and are summarised in **Table 7.3**. Eight of the nine sample locations recorded values outside of respective surface water pH trigger levels throughout the year. Surface water pH in all waterways varied slightly from acceptable ranges at some point during 2024. Most sites exceeded trigger levels for the majority of 2024; however, they are within historical ranges. Deviance from the trigger ranges are attributed to natural variations in watercourse conditions throughout the year, many of which were dry at a time in 2024.

### 7.2.2.2 Surface Water EC

Historic surface water EC trends mostly continued into 2024 with all sites showing significant variability in EC over the 2024 monitoring period. Measured EC ranged from a minimum of 208 μS/cm at SDL1 on the Southern Drainage line west of Bulga Open Cut to a maximum of W10 at Loder Creek upstream of confluence with Nine Mile Creek and just upstream of Mining Lease boundary. Graphs of EC trends to the end of the reporting period are included in the *Bulga Coal Complex 2024 Groundwater and Surface Water Annual Review* (Umwelt, 2025) (**Appendix D**).

Many of the monitored watercourses were dry or too low to sample throughout 2024. Rainfall was below average in the first few months of 2024, then tended to increase to above average to average rainfall throughout autumn to spring before falling below average for the last two months of the year. EC for Wollombi Brook tended to match this trend, with EC increased during the drier months when salts concentrate in water due to evaporation and then dropping again during wetter months.



Surface water EC has been compared to trigger values from the adopted WMP (refer **Table 7.3**). Nine of the ten monitored sites exceeded the adopted trigger level during sampling events in 2024.

EC of most sites tended to peak in January to March, then decrease across the autumn and winter months with minor increases towards November to December. This likely reflects increased salt concentrations through evaporation at the start of the year due to drier than average conditions. The drier than average conditions resulted in all six of the waterways drying up or being too low to sample for at least one monitoring event in the first half of the year.

Generally, the surface water locations with exceedances are interpreted to be attributed to the climate and the elevated values are unlikely to be due to mining impacts. Notwithstanding this, the EC results for W10, particularly from August to December are elevated and correspond with relatively high TSS for the same period.

### 7.2.2.3 Surface Water TSS

In 2024, Total Suspended Solids (TSS) typically followed historical trends with all sites showing similar variability in TSS values.

TSS in Wollombi Brook was typically low. TSS tended to be lower in the autumn-spring months when rainfall was average to above average and higher during the first three months of the year and November when rainfall tended to be below average. Many of the monitored watercourses were dry or unable to be sampled throughout 2024. In following with historic trends, TSS at most other sites was higher than Wollombi Brook, which likely corresponds with lower flow depths relating to their ephemeral nature as evidenced by them only being able to be sampled during periods of average to higher than average rainfall.

TSS tended to range from below the limit of reading (<5 mg/L) along Wollombi Brook, Loders Creek, Nine Mile Creek and Monkey Place Creek to a maximum of 67 mg/L at LR2 on Monkey Place Creek at Broke Road during July in 2024.

Surface water TSS has been compared to trigger values from the adopted WMP (refer **Table 7.3**). All monitoring locations remained within trigger ranges and historical ranges during the year, with the exception of Monkey Place Creek during July. The field data sheets for this sample indicated that the flow rate was very slow (a "trickle") and the exceedance could reflect disturbance during sampling given the TSS returned below the trigger value in the following month. It is noted that the TSS reduced in subsequent months, below the assigned trigger level.

### 7.2.2.4 Stream Flow in Wollombi Brook

Stream flow impacts in Wollombi Brook from Bulga Coal are determined by comparing the Water NSW gauging station records, upstream and downstream of the site. The upstream site is the Wollombi Brook – Brickmans Bridge (Paynes Crossing) gauging station (210135), which is located approximately 20 km upstream of Bulga Coal. The downstream site is the Wollombi Brook – Bulga gauging station (210028), located approximately 5 km downstream of Bulga Coal. **Figure 7.1** and **Figure 7.2** show the gauging station records for 2020 to 2024 for the upstream and downstream sites, respectively.








Figure 7.2 Wollombi Brook – Bulga Gauging Station 210028 (Downstream)



The data presented in **Figure 7.1** and **Figure 7.2** indicates that the water level in Wollombi Brook increased over the 2020–2022 period due to consistent rain. During 2024 flow and levels remained very low compared to previous years.

#### 7.2.2.5 Hunter River Salinity Trading Scheme

The site has one Hunter River Salinity Trading Scheme (HRSTS) discharge point, EPL ID 11 – Northern Dam.

EPL 563 requires the discharge volume, pH, TSS and turbidity to be monitored during discharge events. There were no discharges from the licenced discharge points during 2024.

#### 7.2.2.6 Channel Stability Monitoring Results

The Commonwealth Scientific and Industrial Research Organisation (CSIRO) Ephemeral Stream Assessment Methodology was used to assess the channel stability of Nine Mile Creek, Loders Creek and Wollombi Brook. The assessment uses indicators (vegetation presence, shape and profile, type of materials, nature of walls etc.) to produce a rating which ranges from 'Very Stable' to 'Very Active'.

There were only three changes recorded for individual category scores in 2024, owing to increases in vegetation occurring along the drainage line floor (LC12) or walls (BM22), or increases in the presence of fine sediments within the channel floor (LC3), and each of the sites have recorded fluctuations for these respective categories over the past two to four years. While the change in scores was not sufficient to change the overall CSIRO rating at BM22, Loders Creek site LC3 experienced a reduction in rating from Active to Very Active and LC12 increased from Active to Potentially Stabilising. The changes in scores at BM22 and LC12 are attributable to vegetation responses to climatic conditions, whereas the changes at LC3 are attributable to natural fluvial processes (i.e., the downstream transport of catchment sourced sediments). Although some of the existing erosion scars, rills and gullies are considered active (unconsolidated in parts, and contributing sediments during wet weather events), there were no significant changes to the extent or prevalence of new erosion features at any of the sites, and where losses of fine sediments have been observed, there has usually been an associated response by vegetation (e.g. colonisation of settled colluvial sediments before entering the drainage channel at LC5 and LC6).

#### 7.2.2.7 Stream Health

The Rapid Appraisal of Riparian Condition (RARC) is an assessment method incorporating indicators of geophysical, and biological properties and processes which are likely to provide reliable estimate of ecological condition in riverine ecosystems (Jansen et al, 2005). Each indicator is given a score which combine to provide an overall creek health score, ranging from Very Poor (<25) to Excellent (40–50).



The Stream Health Monitoring RARC results have been consistent over the consecutive post-drought surveys (since 2021), and the trend was continued in 2024. There were no changes to the RARC classification ratings which ranged between Average (Loders Creek site BM35 and Wollombi Brook site BM36) and Good (Nine Mile Creek site BM22 and Loder Creek site BM34). Whilst each of the Stream Health Monitoring sites contain generally continuous riparian corridors dominated by swamp-oak (BM22, BM34 and BM35) or river-oak (BM36) canopy forming species, associated site-specific riparian and habitat features contribute to the observed variation in category scores and overall ratings. Localised erosion features are, for the most part, restricted to the upper margins of the drainage channel in Loder Creek, where active bank erosion, slumped trees, and animal tracks (from livestock and wild pigs) contribute fine sediment to the creek line. Colonisation of the deposited colluvial sediments by vegetation (mostly grasses, swamp-oak saplings and weeds) has been observed in some areas, and although there has been some sparse colonisation of the erosion scars at the source (by swamp-oak saplings and weeds), the soil properties appear to be generally inhibitive to seed propagation, comprising a firm crust of clayey sand. Recent exclusion of livestock from pasturelands adjacent to sites BM34 and BM36 has supported gradual riparian recovery, and although site conditions remain influenced by competition from invasive species and animal disturbance, remediation actions such as targeted weed spraying appear to be effective in mitigating seasonal outbreaks of weeds.

#### 7.2.2.8 Aquatic Ecology

Bi-annual Aquatic Ecology monitoring was undertaken in autumn (June) and spring (November-December) 2024. The Aquatic Ecology monitoring included sampling of the aquatic macroinvertebrate fauna using the AusRivAS sampling, sorting and identification protocols, field water quality metering and baited fish trapping. Following on from the previous dry weather survey undertaken in spring (December) 2023, weather patterns in 2024 were characterised by wet conditions in autumn and intensification of dry weather systems in spring, with creek water levels and river flows being generally stable and gradually receding over the latter half of the year. The creek and river drainage channels appeared to have been subjected to recent high flow events prior to the autumn survey, and the spring survey conditions were indicative of prolonged stability (and lack of scouring events), with most sites having accumulated detrital material and increases in macrophyte growth among wetted channel areas. A total of 10 sites were sampled for both surveys however, there were only very small quantities of surface water, in the form of isolated shallow pools, at Nine Mile Creek site NMDn, Loders Creek tributary site Pt11 and Southern Drainage Line site SDL1 in spring.

#### **Aquatic Habitat Condition**

The macrophyte (aquatic plant) diversity within study sites has increased over successive seasonal surveys, with 15 macrophyte taxa recorded in spring 2021, 16 taxa in autumn 2022, 17 taxa in both spring 2022 and autumn 2023 and 21 taxa in spring 2023. The current survey year saw consistent macrophyte diversity with 20 taxa recorded in autumn and 19 taxa in spring. Nine Mile Creek site NMDn supported relatively sparse macrophyte occupation in 2024 with only small quantities of water ribbons (*Cycnogeton sp*) present in autumn and no macrophytes observed for the dry weather survey in spring. In Loders Creek the distribution and coverage of submerged macrophytes sago pondweed (*Stuckenia pectinata*) had increased for autumn 2024 at sites LCM1 and LCM2, and the distribution of sago pondweed and curly pondweed (*Potamogeton crispus*) beds at LCDn had showed continued growth since their decline during former dry weather surveys. The conditions experienced over the months leading into the spring 2024 survey were favourable for macrophyte growth, and sites LCM1 and LCM2 contained very dense macrophyte coverage for the spring 2024 survey, notably sago pondweed, common reed (Phragmites australis) and spiny rush (*Juncus acutus*).



Seasonal die-back of common reed stands were noted in all Wollombi Brook sites for the autumn 2024 survey, however there were significant increases in its distribution for the spring 2024 survey, and marsh clubrush (*Bolboschoenus fluviatilis*) had also showed signs of increased occupation for the spring survey at WBDn. The invasive noxious species Salvinia molesta occurred in variable quantities in Wollombi Brook site WBDn.

The aquatic habitat availability was mostly unchanged from former sample occasions. The aquatic habitat availability at site NMDn was generally limited, containing very limited quantities of detrital material in autumn 2024 (indicative of flow event scouring) with higher quantities among the refuge pools in spring. Loders Creek provided a greater complexity of aquatic habitat, in the form of macrophytes and detritus, however filamentous green alga was smothering most submerged surfaces for both surveys. As previously noted for successive surveys in 2023, the complexity of aquatic habitats at the Wollombi Brook sites provided by submerged edge bank vegetation and detrital reservoirs declined as water levels receded over consecutive surveys in 2024. The southern drainage line site SDL1 contained adequate quantities of edge habitat to sample in autumn 2024 and only very poor aquatic habitats owing to the very small quantities of surface water available to sample in spring 2024, which comprised limited submerged grasses but mostly bare muddy sediments. The levels of filamentous green alga was present in varying quantities during seasonal surveys in 2024, being abundant in Loders Creek sites LCM2, LCDn and Pt11, and being absent or in small amounts in Wollombi Brook plus the Southern and Northern Drainage Line sites for both surveys.

The Riparian, Channel and Environment (RCE) Inventory is a standardised description of site condition which is used to compile a stream site condition index based on physical and biological attributes, with higher scores indicating better overall condition of the riparian and channel environments. The RCE category scores remained relatively stable across the 2024 seasonal surveys, with minor fluctuations due to seasonal changes in category scores for 'stream detritus' or 'aquatic vegetation'. The reduction in 'stream detritus' category scores were owing to depletions of in stream detrital levels following flow event scouring among sites in Nine Mile and Loders Creek, and relative increases in Wollombi Brook site WBMd and Northern Drainage Line site NDL1 in autumn 2024 (after replenishment of water levels). The variations in 'aquatic vegetation' category scores between surveys resulted mostly from increases in the relative levels of filamentous green algae and macrophyte growth in Loder Creek sites and Southern Drainage Line sites SDL1. Overall, the changes in the 2024 RCE results were generally minor (<2%) compared to recent monitoring rounds.

#### **Aquatic Ecology Site Water Quality**

The water quality results are provided in seasonal monitoring reports, providing a snapshot of conditions encountered during each survey. Water quality results were only available for the spring 2024 survey as there were no water quality readings recorded in autumn 2024 due to probe malfunction. Surface water quality results were influenced by weather conditions in spring 2024, conditional upon flow status with the drier sites containing surface water in isolated refuge pools and therefore subjected to more variable water quality condition owing to in-situ processes (e.g. oxygen fluctuation due to photosynthesis and consumption). There were no indications of layering between surface and bottom water quality readings for the spring 2024 survey.



Water temperatures were very warm for the Wollombi Brook sites ( $26.6^{\circ}C$  to  $29.8^{\circ}C$ ) and SDL1 ( $35.9^{\circ}C$ ), with variable temperatures recorded throughout the length of Loders Creek, which ranged between  $20.3^{\circ}C$  at LCM2 and  $29.4^{\circ}C$  at LC12. For the Nine Mile and Loders Creek sites, dissolved oxygen (DO) levels were saturated at LCM1 ( $109.5^{\circ}$  saturation) and LC12 ( $112.4^{\circ}$  sat), and very low at NMDn ( $23.6^{\circ}$  sat) and Pt11 ( $22.3^{\circ}$  sat). DO concentrations for the remainder of Loder Creek sites and NDL1 were low to moderate (34.0 to  $68.2^{\circ}$  sat), and similar between the Wollombi Brook sites (68.1 to  $70.2^{\circ}$  sat), displaying lesser variation owing to the volume of water passing through the sites on a daily basis. The overall highest water conductivity levels were recorded in Nine Mile Creek and Loders Creek catchment sites, with salinity readings generally decreasing with distance downstream to LCDn. As water of variable salinity passes through these creeks during flowing conditions, the effect of water level lowering (and pool contraction) during dry periods would result in increases in conductivity (salinity) through concentrations of salts. Conductivity levels in Wollombi Brook for the spring 2024 survey were low compared to the dry weather survey in spring 2023 (range of 1126 to 2326  $\mu$ S/cm), and increased with distance downstream from WBUp ( $603 \ \mu$ S/cm) to WBMd ( $818 \ \mu$ S/cm) and WBDn ( $885 \ \mu$ S/cm).

#### **Aquatic Macroinvertebrate Results**

There were 50 macroinvertebrate taxa recorded from the ten aquatic ecology monitoring sites in autumn 2024 and 55 taxa recorded from the ten sites sampled in spring 2024, from a total pool of 81 macroinvertebrate taxa recorded from the study area since the commencement of bi-annual aquatic ecology monitoring in spring 2021. Over the seven surveys to date, there have been 43 taxa recorded from the Nine Mile Creek site NMDn (6 samples), 56 taxa recorded from the Loders Creek sites (20 samples) and 66 taxa recorded from Wollombi Brook sites (21 samples).

Generally, the macroinvertebrate community results reflect the quality of freshwater aquatic ecosystems available in each system, and the variability of aquatic features which are dependent on water levels and flows. As pools dry up, the aquatic habitat availability usually declines as does water quality. Wollombi Brook is the most permanent watercourse within the study area and while the river does experience fluctuating water quality (as indicated by conductivity results) and habitat availability from time to time, the Wollombi Brook monitoring sites continue to record the most stable macroinvertebrate community results on a survey-to-survey basis, according to the macroinvertebrate indices results (taxa diversity (richness), SIGNAL and EPT index). Nine Mile and Loders Creek sites support relatively high diversity of macroinvertebrate taxa from time to time, for example, NMDn recorded the overall highest diversity in autumn 2024 and LCDn recorded the second highest diversity in spring 2024, however these types of results are usually preceded or followed by much lower values (17 taxa at NMDn in spring 2024 and 19 taxa at LCDn in autumn 2024). Taking this into consideration, the SIGNAL and EPT results show that the macroinvertebrate community in these ephemeral creeks are dominated by tolerant taxa with relatively few sensitive macroinvertebrates such as caddis-flies, stoneflies or mayflies (EPT taxa). This is to be expected given the ephemerality and background creek conductivity values throughout the Nine Mile and Loders Creek study area.



Each of the tributary sites (Pt11, SDL1 and NDL1) continue to support viable macroinvertebrate communities during wet periods and variable results during extended dry periods. For the first time since monitoring began in 2021, there was no flow at site Pt11 in spring 2024, and the channel area was mostly dry (with aquatic habitats contained in isolated refuge pools). There has been an associated response (decline) in overall taxa diversity and EPT diversity at Pt11 over consecutive surveys since spring 2023. The Southern Drainage Line site SDL1 showed an improvement in macroinvertebrate indices results in 2024 despite being restricted to isolated pools for (likely) much of the year. During wet conditions, SDL1 can sustain diversity and SIGNAL values consistent with the other more permanent sites, including mayfly (family Baetidae and Leptophlebiidae) and caddis-fly (Hydroptilidae and Leptoceridae) EPT taxa, however when pools dry up, habitat quality declines due to exposure and livestock access.

#### **Fish Sample Results**

To date there have been nine confirmed species of fish recorded from the Bulga Coal aquatic ecology monitoring sites, seven of which were recorded from the study area sites in 2024. Species representation among study sites appears to be higher for wet years (2022) when fish passage among habitats in the ephemeral creeks would be continuous. The invasive pest species plague minnow (Gambusia holbrooki) remains the most widespread species occurring in the study area, being recorded from 13 of 20 site samples collected in 2024 (all sites except WBUp and NDL1), with the small native firetail gudgeon being recorded from 9 of 20 samples (all Wollombi Brook sites, LCDn and NDL1). Carp (Cyprinus carpio) remain restricted to Wollombi Brook. It is likely that the more permanent water bodies within the Southern and Northern Drainage Lines (e.g., farm dams) act as a source for fish at SDL1 and NDL1 following complete drying, however both of these sites provide suitable habitat for small natives when inundated.

# 7.2.3 Comparison Against Predictions

A Surface Water Assessment was undertaken by Umwelt (2013) as part of the Bulga Optimisation Project EIS. The assessment concluded that with the implementation of the water management system and the proposed controls there was only a low risk of impacting on the water quality of the downstream watercourses, and that results would be comparable to background levels. A comparison of the background water quality against the 2024 data has been made in **Table 7.4**. *The Bulga Coal Complex 2024 Groundwater and Surface Water Annual Review* (Umwelt, 2025) (refer to **Appendix D**) reviews surface water performance against criteria.

Sample Point	рН		EC (μ	6/cm)	TSS (mg/L)		
	2024 Range	EIS Range	2024 Average	EIS Range	2024 Average	EIS Range	
LR1	6.57–7.36	6.6–8.8	644.2	4–9,470	5.5	1–72	
LR2	6.94–8.11	6.3–8.8	3,530.1	130–6,230	22.67	3–440	
LR5	6.94–8.03	6.7–8.4	1,081.0	196–3,470	7.25	2–144	
W2	6.72–7.78	6.6–8.2	775.6	195–1,470	5.82	1–114	
W4	6.71–8.39	6.5–8.2	748.7	200–1,760	5.83	2–42	

# Table 7.4Comparison of Surface Water Monitoring Results (2024) against Background (2013 BulgaOptimisation Project EIS)



## 7.2.4 Long Term Trend Analysis



Figure 7.3 Long Term Surface Water EC Results









Figure 7.5 Long Term Surface Water TSS Results

# 7.3 Erosion and Sedimentation

### 7.3.1 Environmental Management

A variety of controls are implemented at Bulga Coal to mitigate operational risks associated with erosion and sedimentation. During and following ground disturbance, structures such as sediment ponds, sediment fences, spoon drains, sediment catches and site catch sumps are used where appropriate to manage runoff and minimise erosion and sedimentation. Inspections are undertaken following more than 20 mm of rain in 24-hours to evaluate the effectiveness of erosion and sediment control structures and any maintenance or dewatering requirements. Additional stabilisation works for these areas may include reshaping, amelioration of dispersive soil, revegetation, fencing and weed control.

High risk sediment dams have been incorporated into an automatic management system which continuously monitors dam water levels and commences dewatering when the water level reaches set trigger levels. Other sediment dams are monitored weekly and following rainfall events to determine pumping requirements.

Monitoring and inspections at Bulga Coal are completed in accordance with the *Bulga Coal Erosion and Sediment Control Plan* approved in 2021. This monitoring system is designed to comply with EPL 563 and the erosion and sediment control conditions stipulated within the Bulga Underground Operations and Bulga Open Cut Development Consents.



# 7.3.2 Environmental Performance

There were no erosion and sediment related incidents recorded at Bulga Coal during the reporting period.

# 7.4 Groundwater

### 7.4.1 Environmental Management

Groundwater is managed in accordance with the approved WMP.

Mapping of the deep and shallow depressurisation of the hard rock (coal measures) strata is undertaken. This identifies the potential for any adverse impacts on the shallow alluvial aquifer systems associated with Wollombi Brook and Monkey Place Creek. Depressurisation is predicted within the coal measures on a regional scale; however, it is not expected to produce any measurable impact in the overlying alluvial aquifer.

The monitoring program provides early warning for potential changes in groundwater levels and quality.

Bulga has a comprehensive groundwater monitoring network within and outside of the mine footprint area with groundwater monitoring points shown in **Figure 6.3**. The monitoring network comprises both standpipe piezometers and multilevel vibrating wire piezometers installed in all hydrostratigraphic units.

As part of the EPBC Act approval EPBC 2018/8300 (as varied on the 9 September 2021), an ecohydrological conceptual model was submitted to the Commonwealth Department of Climate Change, Energy, the Environment and Water (Commonwealth DCCEEW) 20 December 2021.

### 7.4.2 Environmental Performance

A summary of groundwater monitoring results and relevant criteria from the WMP is provided in **Table 7.5**, with detailed groundwater monitoring results available on the <u>Bulga Coal website</u>.



Piezometer	Water Elevation	Baseline Water Level (mAHD)	Lab pH	Lal	рН	Lab EC (µS/cm)	Lab EC (μS/cm)
	(mAHD)			20th Percentile Trigger Value	80th Percentile Trigger Value		80th Percentile Trigger Value
Broke Area Alluvials							
GW1	89.19	84.37	7.2	6.7	7.3	1,174	3,634
GW2	85.07	NA <sup>1</sup>	6.6	NA <sup>1</sup>	NA <sup>1</sup>	3,689	NA <sup>1</sup>
GW3	_2	74.48	_2	6.7	7.2	_2	6,010
GW4	79.46	NA <sup>1</sup>	4.8	NA <sup>1</sup>	NA <sup>1</sup>	1,191	NA <sup>1</sup>
GW5	81.00	NA <sup>1</sup>	7.1	NA <sup>1</sup>	NA <sup>1</sup>	5,257	NA <sup>1</sup>
GW6	75.07	72.21	7.4	7.3	7.8	6,723	7,900
GW7	74.37	63.21	7.0	6.7	7.4	3,470	3,946
GW8	72.38	66.86	7.4	6.6	7	2,427	5,936
GW9	72.69	70.83	7.1	6.7	7.2	1,398	4,458
GW10	72.52	69.76	7.2	7.1	7.6	5,315	10,252
V3	69.72	65.49	7.1	7.1	7.6	1,959	1,744
Broke Area Wollom	oi Seam						
P2	69.07	67.1	7.1	7.4	8	8,419	12,834
P5A	69.46	67.84	7.0	7.5	8.2	293	6,242
P6A	68.51	63.4	7.0	7	8.1	1,138	2,740
Northern Area Shall	ow Alluvials						
F1	65.84	61.26	7.3	7.2	7.6	1,193	1,025
F2	66.00	63.3	7.3	7.1	7.4	1,469	1,720
V1	65.90	63.14	7.7	7.3	7.7	1,074	1,570
V2	60.74	58.56	6.8	6.4	7.1	126	922
WBR50A	59.76	56.98	7.7	7.1	7.7	2,777	14,000

#### Table 7.5 Summary of Groundwater Monitoring Results – 2024 Annual Averages



Piezometer	Water Elevation	Baseline Water	Lab pH	Lab pH		Lab EC (µS/cm)	Lab EC (µS/cm)	
	(mAHD)	Level (mAHD)		20th Percentile Trigger Value	80th Percentile Trigger Value		80th Percentile Trigger Value	
SBC/Broke Area Low	ver Whybrow Seam							
P6B	-25.26	-24.84	8.5	6.7	7.3	6,472	1,353	
P8	75.78	63.3	7.1	7.3	9.3	474	5,076	
Northern Area Lower Whybrow Seam								
WBR50	28.63	24.3	6.6	6.7	8	560	8,382	
Northern Alcheringa Seam								
WBD62A	68.41	NA <sup>1</sup>	6.9	NA <sup>1</sup>	NA <sup>1</sup>	366	NA <sup>1</sup>	
Beltana Area Miscel	laneous Bores and We	ells						
WBR15	66.42	59.32	7.4	6.8	7.3	786	924	
Dwyers	63.90	60.9	7.4	7.3	7.6	1,724	1,476	
Fernance	65.71	59.74	8.0	7.3	8	1,657	1,473	
McG1	92.53	89.86	7.6	7.5	8	1,907	918	
White 1	66.52	63.36	7.4	7	7.4	786	2,444	
Beltana Area NPZ								
NPZ3-A	_3	56.01	_3	6.5	8.1	_3	1,362	
NPZ3-B	66.60	59.63	7.5	7.3	7.5	801	921	
NPZ4-A	66.88	56.01	7.2	6.9	7.3	668	729	
NPZ4-B	54.75	45.32	6.9	7.3	7.8	1,431	1,342	
NPZ5-A	65.61	60.9	6.7	6.9	7.3	792	886	
NPZ5-B	52.01	41.16	7.3	7.1	7.6	2,650	2,760	
NPZ7-1	65.14	53.47	7.8	6.7	7.7	1,152	1,240	
NP27-2A	65.63	62.04	7.3	7.1	7.6	1,912	2,250	
NPZ7-2B	62.77	45.36	7.7	6.8	7.8	1,276	1,307	
NPZ7-3A	65.98	62	7.4	7	7.5	1,474	2,540	



Piezometer	Water Elevation	Baseline Water	Lab pH	Lab	рН	Lab EC (µS/cm)	Lab EC (μS/cm)	
	(mAHD)	Level (mAHD)		20th Percentile Trigger Value	80th Percentile Trigger Value		80th Percentile Trigger Value	
NPZ7-3B	66.00	53.7	7.6	7.4	7.8	1,238	1,316	
Wollombi Alluvials a	nd Shallow Coal Mea	sures <sup>1</sup>						
SBD196	68.94	NA <sup>1</sup>	6.9	NA <sup>1</sup>	NA <sup>1</sup>	4,177	NA <sup>1</sup>	
WBD160	66.82	63.83	6.9	6.9	7.3	212	1,310	
WBR180	37.29	34.3	7.2	7.1	7.5	1,6498	20,850	
WBR181	61.22	59.41	7.2	7.2	7.5	2,759	2,670	
WBR182	63.94	61.7	7.2	7.3	8.3	1,370	1,512	
WBR183	62.40	NA <sup>1</sup>	7.0	7.0	7.4	3,089	3,484	
WBR240	60.43	58.36	7.4	7	7.5	6,599	26,800	
WBR241	61.36	59.63	6.8	6.4	6.9	666	435	
Loders Creek Alluvials								
LC1	Dry	NA <sup>1</sup>	Dry	NA <sup>1</sup>	NA <sup>1</sup>	Dry	NA <sup>1</sup>	
LC2	43.12	NA <sup>1</sup>	7.3	NA <sup>1</sup>	NA <sup>1</sup>	3,395	NA <sup>1</sup>	
Northern Tailings en	nplacement facility pi	ezometers <sup>4</sup>						
MB1a	60.6	NA <sup>1</sup>	_4	NA <sup>1</sup>	NA <sup>1</sup>	_4	NA <sup>1</sup>	
MB1b	-13.48	NA <sup>1</sup>	_4	NA <sup>1</sup>	NA <sup>1</sup>	_4	NA <sup>1</sup>	
MB2	66.73	NA <sup>1</sup>	_4	NA <sup>1</sup>	NA <sup>1</sup>	_4	NA <sup>1</sup>	
MB3a	53.45	NA <sup>1</sup>	_4	NA <sup>1</sup>	NA <sup>1</sup>	_4	NA <sup>1</sup>	
MB3b	-11.41	NA <sup>1</sup>	_4	NA <sup>1</sup>	NA <sup>1</sup>	_4	NA <sup>1</sup>	
Warkworth Sands m	onitoring bores							
WWS1	Dry	NA <sup>1</sup>	Dry	NA <sup>1</sup>	NA <sup>1</sup>	Dry	NA <sup>1</sup>	
WWS2a	Dry	NA <sup>1</sup>	Dry	NA <sup>1</sup>	NA <sup>1</sup>	Dry	NA <sup>1</sup>	
WWS2b	94.08	NA <sup>1</sup>	6.1	NA <sup>1</sup>	NA <sup>1</sup>	130	NA <sup>1</sup>	
WWS3a	Dry	NA <sup>1</sup>	Dry	NA <sup>1</sup>	NA <sup>1</sup>	Dry	NA <sup>1</sup>	



Piezometer	Water Elevation	Baseline Water	Lab pH	Lai	р рН	Lab EC (µS/cm)	Lab EC (µS/cm)
	(mAHD)	Level (mAHD)		20th Percentile Trigger Value	80th Percentile Trigger Value		80th Percentile Trigger Value
WWS3b	Dry	NA <sup>1</sup>	Dry	NA <sup>1</sup>	NA <sup>1</sup>	Dry	NA <sup>1</sup>

<sup>1</sup> No trigger values have been established.

<sup>2</sup> No results available for 2024. SWL at GW3 was unable to be measured due to a deformed bore.

<sup>3</sup>NPZ3-A no longer monitored since 2015.

<sup>4</sup> The Northern Tailings emplacement facility piezometers sites are grouted vibrating wire piezometers and do not have access to water quality.



Umwelt have produced the *Bulga Coal Complex 2024 Groundwater and Surface Water Annual Review* (Umwelt, 2025) which is attached as **Appendix D**. The following is a summary of the groundwater monitoring review.

The groundwater monitoring network covers the area along the Wollombi Brook and Monkey Place Creek to the west and south and extends 5 km to the north and northwest of the Blakefield South footprint. The current groundwater monitoring network is comprehensive and includes 50 monitoring locations in the alluvium, overburden strata (sandstone and coal seams), Whybrow Seam, Blakefield Seam and underlying and overlying strata.

Over 2024, groundwater within the alluvium recorded a declining trend similar to 2023 in response to below average rainfall at the start of the year. Most bores recorded an increase in groundwater levels in the alluvium by June following the significant rainfall recorded by the site rainfall gauge in April and May 2024 of 151 mm and 81 mm, respectively. Groundwater levels declined again slightly from August to December 2024. Groundwater levels within the alluvium generally shows a response to rainfall and streamflow over the same period.

Groundwater levels in paired bores and VWPs monitoring the interburden (sandstone), shallow Permian coal measures and coal seams indicated that there is generally a downward vertical hydraulic gradient present. Groundwater levels in the Alcheringa Seam are recovering following the cessation of underground mining in 2018 and above average rainfall from 2020 to 2022. There were no groundwater level exceedances recorded over 2024.

Review of water quality results and comparison to trigger levels for EC and pH identified that several bores exceeded triggers for EC and nearly all bores had a pH exceedance. However, the 2024 readings were generally in line with historical trends for all bores.

A comparison of major ion data (water type) for December 2024 with all data collected since monitoring began indicated that the water type for all bores with available data has generally remained the same over 2024.

# 7.4.3 Comparison Against Predictions

Two successive years (2021 and 2022) of above average rainfall and flooding have resulted in substantial volumes of rainfall runoff reporting to the open cut (approximately 13.5 GL) and increased groundwater recharge; during 2023 rainfall recorded was below average, which resulted in approximately 3.7 GL of rainfall runoff reporting to the open cut.

Both the alluvial and Permian aquifers continued recovering through 2022; and saw a slight reduction during 2023, due to lower rainfall. During 2024 rainfall recorded was slightly above the historic yearly average, which resulted in approximately 5.3 GL of rainfall runoff to the open cut.

# 7.4.4 Long Term Trend Analysis

Bulga Coal has an extensive groundwater monitoring network which covers Wollombi Brook and Monkey Place Creek alluvium, overburden, sandstone, and deep coal seam hydrostratigraphic units. A long-term monitoring record (over 20 years) now exists and it enables interpretation of groundwater trends.



Review of water quality results and comparison to trigger levels for EC and pH identified that several bores exceeded triggers for EC and nearly all bores had a pH exceedance. However, the 2024 readings were generally in line with historical trends for all bores. Detailed historic groundwater monitoring trend graphs are presented in Appendix C of the *Bulga Coal Complex 2024 Groundwater and Surface Water Annual Review* (Umwelt, 2025) (refer **Appendix D**).

It is interpreted that there was no measurable impact on the alluvial aquifers in response to mining activities.



# 8.0 Rehabilitation

Progressive rehabilitation of disturbed areas is an important aspect of the mining operations at Bulga Coal. The objective of rehabilitation is to restore the land to a condition that is equal or greater than that prior to disturbance. Ongoing rehabilitation of areas disturbed by operations has continued throughout the reporting period. Annual rehabilitation inspections and scientific plot-based monitoring is undertaken by experienced rehabilitation consultants to monitor the success of rehabilitation works.

# 8.1 Post Mining Land Use

In accordance with SSD-4960 and the *Biodiversity Management Plan*, rehabilitation has continued to focus on the goal of establishing EECs.

The post-mining land use goal is the combination of objectives contained in the Bulga Optimisation Project approval (for the Bulga Open Cut), the Bulga Underground Operations 2003 EIS and *Bulga Optimisation Project Modification 3 and Bulga Underground Modification 7 – Statement of Environmental Effects* (Umwelt, 2019). Following closure of Bulga Coal and the subsequent rehabilitation activities, the areas disturbed by mining activities will be predominantly native vegetation (woodlands on spoil dumps and riparian communities along established drainage lines) with a minimum of 260 ha being returned to land suitable for agricultural uses. In summary, the land associated with Bulga Underground Operations to the east of Charlton Road is either contained within the footprint of the Bulga Open Cut final land use or is regenerating woodland above underground workings; whilst the land to the west of Charlton Road is principally agricultural land used for grazing, viticulture or olive groves. Apart from an ecological and archaeological conservation area in the north-west of the colliery holding, the goal is to retain the agricultural productivity of the land to the west of Charlton Road and above the underground mine.

The areas disturbed by mining will be predominantly returned to land and soil capability Classes 6 and 7. Existing areas currently mapped as being land and soil capability Class 3 and Class 4 will remain generally consistent post-closure, with a small reduction in Class 5 areas expected. Based upon current approvals, mining operations at Bulga Coal will cease mining in 2039.

The *Final Landform and Rehabilitation Plan* depicting the post-mining land use outlined within this section was approved by the Resources Regulator on 18 October 2023.

# 8.2 Rehabilitation Performance During the Reporting Period

# 8.2.1 Rehabilitation Summary

Rehabilitation activities have been completed in accordance with the approved *Forward Work Program* and *Bulga Coal Rehabilitation Management Plan* (RMP). Rehabilitation activities undertaken in 2024 included:

- shaping of overburden dumps
- installation of geomorphic drainage structures
- deep ripping



- rock raking
- installation of habitat features (e.g. stag trees, woody debris, rock piles)
- spreading of topsoil/suitable growth medium
- application of ameliorants
- re-ripping of prepared surface
- seeding with target ecological communities.

Further details regarding these steps are provided in the RMP which is available on the **<u>Bulga Coal website</u>**. A summary of rehabilitation at Bulga Coal as at the end of 2024 is presented in **Table 8.1**.

Mine Area Type	Previous Reporting Period (Actual) 2023 <sup>1</sup>	This Reporting Period (Actual) 2024 <sup>2</sup>	Next Reporting Period (Forecast) 2025				
Total mine footprint	3,497.97	3,507.07	3,510.57				
Total active disturbance	2,432.48	2,507.97	2,395.17				
Land being prepared for rehabilitation	0	0	120.06				
Land under active rehabilitation	1,065.48	999.25	1,115.4				
Completed rehabilitation*	0	0	0				

#### Table 8.1 Rehabilitation Status at Bulga Coal

<sup>1</sup>Note: 2023 values align with the submitted 2023 Annual Rehabilitation Report.

<sup>2</sup> A review of Bulga disturbance and rehabilitation data was completed during the preparation of this Annual Review. The review resulted in the removal of some areas not associated with Bulga Coal disturbance (e.g. visual screening activities, areas associated with the new Broke Road), additionally some remedial works above the Bulga Underground Operations have been captured as rehabilitation.

\* Denotes land that has been signed off by RR as completed rehabilitation.

# 8.2.2 2024 Rehabilitation – Bulga Open Cut

During 2024, Bulga Coal completed 31.56 ha of rehabilitation at the Eastern Emplacement Area, with maintenance of previously established rehabilitation also occurring throughout the year. The rehabilitation establishment methodology is outlined in the RMP.

#### 8.2.2.1 Landform Details

During 2024, Bulga Open Cut continued to implement a geomorphic natural landform design, as shown in **Photo 8.1**. Bulga Open Cut continued to progressively rehabilitate all available overburden emplacement areas which have reached final landform extents.







#### 8.2.2.2 Topsoil

Stockpiled topsoil was spread at a nominal thickness of 100 mm on the slope of the shaped landform, with approximately 50 mm applied on the flatter areas (refer **Section 8.6.2**). Topsoil was sourced directly from topsoil stripping activities and topsoil stockpiles stored onsite. Gypsum was applied immediately after topsoil application at a rate of 8 t/ha and then deep ripped to a depth of 450 mm to incorporate the topsoil into overburden material to create a suitable seed bed, as shown in **Photo 8.2**.





Photo 8.2 Topsoil loading at the Eastern Emplacement in 2024

### 8.2.2.3 Physical and Chemical Characteristics

Bulga Open Cut has identified some coal seams and interburdens which are potentially acid forming and contain elevated sulphur levels and or contain carbonaceous materials. These seams and interburdens have been analysed and are separated and handled/dumped to reduce the long-term potential to form acids and or generate heating. Further detail on this material and its management is provided in the RMP.

#### 8.2.2.4 Vegetation Species

Revegetation activities in 2024 focused on the establishment of the Central Hunter Grey Box – Ironbark Woodland EEC. The seed mix for these areas included the key canopy, understory and groundcover species for the community (as outlined in the RMP and *Biodiversity Management Plan*). Outcomes from the Hunter Ironbark Research Program were used to guide the species selected to establish the target ecological communities.

#### 8.2.2.5 Habitat Resources and Potential

The *Biodiversity Management Plan* outlines the requirement for incorporating habitat features into rehabilitated landscapes.



In 2024 several methods were used to increase the habitat potential of rehabilitated areas, including the incorporation of:

- woody debris
- drains and water structures
- rock piles
- stag trees.

As rehabilitation matures, other habitat enhancement methods such as installing nest boxes may be utilised, if required.

#### 8.2.2.6 Temporary Rehabilitation and Visual Mitigation

No temporary rehabilitation was carried out during 2024.

#### 8.2.2.7 Rehabilitation Maintenance

Rehabilitated areas at Bulga Open Cut are subject to an ongoing monitoring and maintenance program to ensure that rehabilitation objectives and completion criteria are achieved or are on trajectory to be achieved. Inspections are conducted annually by an external consulting rehabilitation specialist. A summary of care and maintenance activities undertaken during 2024 is provided in the following sections and in **Table 8.2**.

Nature of Treatment	Area Treated (ha)		Comment/control Strategies/Treatment Details		
	2024 (actual)	2025 (planned)			
Additional erosion control works (drains, recontouring, rock protection, erosion repairs)	<1	<1	A landform stability inspection has been conducted annually by an engineering consultant since 2021 to identify all erosion features across rehabilitated areas. During 2024 repairs were undertaken on localised erosion features identified across the Noise and Visual Bund, East Pit emplacement area and the Eastern Emplacement Area. In 2025 a follow up landform stability inspection will be undertaken with continued erosion remediation works undertaken on rehabilitation areas, as required.		
Re-seeding/replanting (species density, season etc.)	0	1.4	Bare areas lacking vegetation growth or topsoil cover will be remediated in 2025.		
Adversely affected by weeds (type and treatment)	~54.6	~80	Weed control works in 2024 were carried out across all rehabilitation areas. Weed control works will continue in 2025 with new rehabilitation areas being added to the program as they are completed. The main weeds being controlled are Lantana, Galenia, Blue Heliotrope, Acacia Saligna and various exotic grass species.		
Feral animal control (additional fencing, trapping, baiting etc.)	N/A	N/A	Feral animal control will concentrate on wild dog, kangaroo and pig control within rehabilitation areas as required.		

#### Table 8.2 Maintenance Activities on Rehabilitated Land for Bulga Open Cut



# 8.2.3 2024 Rehabilitation – Bulga Underground Operations

No rehabilitation of Bulga Underground Operations infrastructure was undertaken during 2024, however work continued on decommissioning redundant infrastructure to allow for the progression of open cut mining as described in **Section 4.4.4**.

No maintenance or rehabilitation activities were required at the Flood Exclusion Levee.

#### 8.2.3.1 Rehabilitation Maintenance

Rehabilitated areas at Bulga Underground Operations are subject to an ongoing monitoring and maintenance program to ensure that the rehabilitation objectives and completion criteria are achieved or on trajectory to be achieved. A summary of rehabilitation maintenance activities undertaken during 2024 are outlined in **Table 8.3**.

Nature of Treatment	Area Treated (ha)		Comment/control Strategies/Treatment Details
	2024 (actual)	2025 (planned)	
Additional erosion control works (drains re contouring, rock protection)	0	As required	Maintaining temporary controls around active rehabilitation areas as identified in routine and scheduled inspections.
Subsidence Repairs	As required	As required	Subsidence inspections are undertaken on an annual basis or after high rainfall events. Repairs are undertaken on an as needs basis as described in Section 6.5.
Soil treatment (fertiliser, lime, gypsum etc.)	0	0	Ameliorants applied to rehabilitation areas as required.
Re-seeding/replanting (species density, season etc.)	0	0	Supplementary seeding of rehabilitation maintenance and repairs identified in annual rehabilitation inspection.
Adversely affected by weeds (type and treatment)	As required	As required	Weed management activities were ongoing in 2024 and focused mainly on the Vere and Bulga Underground rehabilitation areas. Target areas are identified during monthly inspections, annual rehabilitation inspections and buffer land inspections.
Feral animal control (additional fencing, trapping, baiting etc.)	As required	As required	Feral animal control concentrating on wild dog, fox and pig control, as required.

#### Table 8.3 Maintenance Activities on Rehabilitated Land for Bulga Underground Operations

# 8.3 Decommissioning of Infrastructure

There was no decommissioning of infrastructure in 2024 that required rehabilitation. Refer to **Section 4.4.4** for a summary of other demolition and decommissioning of infrastructure that occurred in 2024.



# 8.4 Department of Regional NSW – RR Rehabilitation Sign-off

In 2024, no areas of rehabilitation received formal sign-off from RR that land use objectives and completion criteria had been met.

# 8.5 Variations from Proposed Forward Work Program Activities

**Table 8.4** summarises the rehabilitation progress at Bulga Coal (including Bulga Open Cut and BulgaUnderground Operations) during 2024 against the Forward Work Program (FWP) forecast.

A copy of the 2024 Annual Rehabilitation Report and 2025 FWP is provided on the Bulga Coal website.

	0			
Mine Area Type	2024 Actual Data	2024 FWP Forecast	2025 FWP Forecast	
Rehabilitation (ha)	31.56	31.77	120.06	
Disturbance (ha)	1.87	5.13	3.45	
Rehabilitation Re-disturbance (ha)	90.54	80.47	3.91	

Table 8.4 Bulga Coal Rehabilitation Performance against Forecast

Rehabilitation in 2024 was generally as per the FWP forecast. An additional 10.07 ha of historic rehabilitation was re-disturbed in 2024 to allow for overburden emplacement. New disturbance was 3.26 ha less than forecast.

# 8.6 Rehabilitation Monitoring, Trials and Research

Bulga Coal has an extensive rehabilitation monitoring program to track the establishment and progress of rehabilitated areas towards the completion criteria. The objectives of the rehabilitation monitoring program are to:

- assess the long-term stability and functioning of re-established ecosystems on mine affected land
- assess rehabilitation performance against the completion criteria
- facilitate continuous improvement in rehabilitation practices.

The monitoring program will continue within rehabilitated and non-mined areas (reference sites) until it can be demonstrated that rehabilitation has satisfied the closure criteria. The rehabilitation monitoring criteria for each domain have been developed to demonstrate that select indicators (or criteria) have been reached or that a satisfactory successional trajectory has been established that will result in a self-sustainable ecosystem.

Based on the outcomes of the rehabilitation monitoring program, a care and maintenance program is implemented. The scope of the care and maintenance program may include weed and feral animal control, fertilising, re-seeding or planting (where required), and erosion and sediment control works.



# 8.6.1 Annual Rehabilitation Monitoring Program

The annual rehabilitation monitoring program includes Initial Establishment Monitoring (IEM) and Long-Term Monitoring (LTM). In summary, the IEM is a rapid style assessment of young (<3 years old) rehabilitated areas, principally to determine germination success, landform stability and other management issues such as establishment of weeds. The LTM procedure is applied to rehabilitation that is a minimum of four years since establishment. The objective of the LTM program (areas >3 years old) is to evaluate progress of rehabilitation towards fulfilling completion criteria, including additional statutory requirements that may apply to the operation and ultimately the targeted post-mining land use.

The methods described for LTM apply to both rehabilitation and reference monitoring sites. For further details on methodology and timing refer to the *GCAA Completion Criteria and Rehabilitation Monitoring Procedure*.

#### 8.6.1.1 General Observations

A total of 17 rehabilitation blocks and 40 transects/plots were assessed across the Noise and Visual Bund (NVB), EEA, East Pit Dump (EPD) and northern dams and drains rehabilitation areas; including nine (9) blocks monitored for IEM, and eight (8) blocks monitored for LTM. All rehabilitation blocks assessed were being returned to a native woodland/forest land use, and covered a cumulative area of approximately 225.4 ha.

Ecological monitoring included the assessment of three of the seven permanent monitoring plots established in areas of remnant native vegetation within the buffer zones surrounding Bulga Coal. This monitoring is implemented to identify potential deterioration (or lack thereof) in vegetation health or habitat quality as a result of mining operations.

Field surveys were undertaken during May 2024. The locality received average annual rainfall in 2024. Despite a relatively dry month in March, the three-month period directly preceding the 2024 field surveys (i.e. from mid-February to early May 2024) was particularly wet and received much higher cumulative rainfall.

Based on collected monitoring results and observations, management recommendations have been suggested to improve the condition of rehabilitation areas and ensure they are on a trajectory towards the approved rehabilitation objectives.

#### **Rehabilitation IEM Blocks Summary Findings**

Surface drainage was assessed as satisfactory across all 2024 IEM blocks, with no issues of ponding or settlement detected that could threaten to cause rehabilitation failure.

Five of the nine IEM blocks monitored were identified as requiring erosion repair works to remediate gully channels of moderate to high severity.

Ground cover protection was satisfactory in all IEM blocks and on average comprised between ~79%–91%, which is well above the 70% minimum target benchmark.



A high total of 93 native species were recorded across all IEM blocks, but average native richness was variable between the blocks and ranged from a low ~15.7 species/site to a very high ~39.3 species/site. Native species assemblages were excellent in all blocks, with on average more than 85% of the total native richness comprised of species representative of the target communities. Average tree stems densities were highly variable and ranged from a low 50 stems/ha to a high 1,065 stems/ha. Two blocks displayed tree densities well short of indicative targets and will need assisted plantings if further seed germination fails to occur. Establishing tree densities were acceptable in all other IEM blocks.

Average cumulative priority weed cover was highly variable and ranged between 1.1%–60.2%, with two blocks returning weed cover exceeding levels defined as allowable in the RMP. Both were located on the NVB emplacement and had a ground layer largely comprised of the invasive grasses South-African Pigeon Grass and Kikuyu. Invasive perennial grasses remained widespread and a common issue across much the NVB emplacement, and will require significant management inputs and long timeframes to successfully manage. In addition, four blocks reporting moderately low weed levels at the time of monitoring (including all blocks in the EEA) were affected by widespread infestations of Lantana emerging from topsoil-borne seeds, which will rapidly become problematic if left untreated. Control of the species has been ongoing across the EEA in the past two years (with locally positive outcomes), and will need to be sustained until the seedbank is depleted and population levels reach acceptably low levels.

#### **Rehabilitation LTM Blocks Summary Findings**

Landforms, soil profiles and vegetation were generally well-established across all LTM blocks monitored in 2024, with very limited active erosion processes recorded across the slopes. Few residual and localised erosion features were recorded but all were assessed as stabilising, and none posed a threat to rehabilitation success or overall landform integrity (i.e. repairs unlikely to be justified).

A total of 119 native species were recorded across all LTM blocks, but average native species richness was highly variable between the blocks and ranged from a very low ~8.5 species/site to a high ~34.5 species/site. Average total native species richness was greater than 50% of the average native richness at the corresponding reference sites (i.e. the completion criteria for Bulga Coal) in five of the eight blocks monitored, but insufficient to greatly insufficient in the other three blocks (~16%–43% of the reference sites average). Irrespective of richness levels, native species recorded in the rehabilitation were generally well-representative of the species found in the targeted native communities.

Overall, the floristics monitoring results highlighted that improvements in native species richness and/or composition will be required in at least four of the eight blocks assessed in 2024. Most blocks were deemed in a 'manageable' condition for possible progression towards the target native communities (i.e. assuming sufficient management inputs and commitments), however one block will likely require a full rework having regards to its highly deficient condition.

Average tree stem densities were highly variable and ranged from a very low ~45 stems/ha to a very high ~2,400 stems/ha, with an additional one (small) block showing a near-complete lack of trees. Overall, three of the LTM blocks were assessed as having adequate tree stem densities, while two blocks had greatly insufficient tree densities and three blocks had excessive tree densities. Tree thinning was however not yet recommended for immediate implementation in two of the three blocks showing excessive stem densities having regard to the still early successional stage of the rehabilitation. Tree thinning was recommended for one block, especially as the block contains a population of the exotic Sugar Gum which needs to be removed.



In terms of vegetation structure, four of the eight blocks showed an acceptable performance, i.e. meeting the BAM structure score completion criteria or deemed satisfactory relative to the age of the rehabilitation (and expected to progressively improve over time). The other four blocks will require various management inputs to rectify deficiencies in existing native vegetation performance, the main (and most problematic) issue being an insufficient native grass layer.

Vegetation function scores (BAM scores) consistently remained below defined targets, however the function score is mainly a reflection of the maturity of the vegetation and should progressively increase in most blocks where sufficient mid and canopy layers occurred.

Average cumulative priority weed cover exceeded allowable levels in two of the eight LTM blocks; whilst an additional three blocks had an average cover below triggers but displayed variance levels exceeding triggers, i.e. indicating locally high weed levels within the blocks. Priority weed grasses by far represented the biggest issue across the monitored LTM blocks, and the greatest threat to rehabilitation success. Other problematic species of concern consisted of woody weeds including Lantana, Golden Wreath Wattle and/or Sugar Gum.

#### 8.6.1.2 Reference Site Monitoring

Monitoring was conducted at three reference sites in 2024 located within each of the following vegetation communities:

- PCT 3431 Central Hunter Grey Box Ironbark Woodland (two sites).
- PCT 4015 Central Hunter Swamp Oak Forest.

Overall, the 2024 monitoring results highlighted the ongoing good vegetation condition at one of the grassy woodland ecological monitoring sites. At the riparian Swamp Oak Forest site and at one of the native grassy woodland monitoring sites, weed incursion remained the main issue impacting vegetation quality, with Lantana and/or exotic grasses being problematic and requiring management if vegetation condition and integrity scores are to be maintained or improved.

### 8.6.2 Rehabilitation Trials and Research

#### 8.6.2.1 Growth Medium Trial

A growth medium trial commenced in 2024 on a section of the Eastern Emplacement Area rehabilitation. Topsoil was spread to a depth of 50 mm on the flatter areas of the 2024 rehabilitation as opposed to the typical depth of 100 mm. This trial is a part of the life of mine topsoil strategy and will help inform future methodologies for maximising re-use of growth medium.

Further topsoil trials are planned in 2025. These may include areas in which alternative growth mediums are used or topsoil depths are adjusted. Future monitoring events will assess the performance of these areas.

# 8.7 Key Issues that may Affect Rehabilitation

A review of the rehabilitation risk assessment was undertaken in 2022 in accordance with *RR Guideline*: *Rehabilitation Risk Assessment*. Risks and controls identified through this process have been incorporated in the RMP.



The key risks to rehabilitation at Bulga Coal are:

- potential contamination of disturbance areas
- spontaneous combustion of exposed coal seams in highwalls
- spontaneous combustion impeding rehabilitation
- tailings does not consolidate sufficiently to allow capping to progress as planned
- adverse surface and groundwater quality and quantity
- lack of habitat structures for colonisation or use
- softwall instability
- erosion within rehabilitation areas
- extended water ponding or redirection of creek and river flows.

Key risks to rehabilitation are included in a rehabilitation TARP within the RMP and to identify required management actions in the event of impacts to rehabilitation, or where rehabilitation outcomes are not achieved in an acceptable timeframe.

Ongoing works will be undertaken throughout the life of the operation to ensure rehabilitation areas meet completion criteria and rehabilitation objectives. These works will mostly include weed control, erosion repairs and planting/seeding to meet the requirements of target vegetation communities. Identification of these works will be through the rehabilitation monitoring program and annual walkover inspections.

### 8.7.1 Bulga Open Cut

#### 8.7.1.1 Weed and Pest Species

Weed management in rehabilitation areas is an ongoing challenge for all mining operations. Considerable planning is undertaken at Bulga Open Cut to prevent weeds entering rehabilitation areas in the first instance, primarily through topsoil management. Despite this, several weed species are present throughout most historical rehabilitation areas and significant resources are dedicated to their removal. The methods employed at Bulga Open Cut include:

- Appropriate topsoil management, including scalping of topsoil stockpiles prior to spreading and weed control in areas prior to stripping.
- Seeding with quick establishing cover crops and acacia species to out-compete weed species.
- Ongoing weed spraying and removal.
- Seeding with a eucalypt and acacia heavy native woodland seed mix to shade-out introduced weed species such as Rhodes grass (*Chloris gayana*) and Galenia (*Galenia pubescens*).



The key weed species targeted in 2024 were Lantana (Lantana camara), Rhodes Grass (*Chloris Gayana*), Pampas Grass (*Cortaderia selloana*), Galenia (*Galenia pubescens*), African Boxthorn (*Lycium ferocissimum*), Golden Wreath Wattle (*Acacia Saligna*), Blue Heliotrope (*Heliotropium arboescens/amplexicaule*), Spiny Rush (*Juncus acutus*), Setaria Grass (*Setaria species*), Coolatai Grass (*Hyparrhenia hirta*), African Love Grass (*Eragrostis curvula*), St John's Wort (*Hypericum perforatum*), Purpletop (*Verbena bonariensis*), Firewood (*Senecio madagascariensis*), Narrow-leaf Cotton Bush (*Gomphocarpus fruticosus*) and Castor Oil (*Ricinus communis*).

The 2025 rehabilitation weed management program will continue to implement controls for the abovementioned weed species plus any additional weeds identified during inspections and previous monitoring programs. Control of weeds will be undertaken in order of priority according to biosecurity duties and actions required to achieve target vegetation communities.

As part of the dog baiting program, 1080 baits were placed in rehabilitation areas where the presence of wild dogs has previously been identified.

#### 8.7.1.2 Erosion and Water Quality

Drainage structures such as contour banks and drop structures at Bulga Open Cut are largely functioning as designed and require little to no maintenance.

During 2024 Bulga continued to implement the annual landform stability and drainage inspections across all rehabilitation areas and associated drainage structures. The inspection was undertaken by a consulting engineer to identify erosion features such as rills, tunnelling, silt accumulation and overtopping drains. Spatial data was collected for all erosion and drainage maintenance features identified across rehabilitation areas. The inspection noted a marked improvement in landform stability from previous inspections with a reduced number of erosion and maintenance issues identified.

Spatial data from previous inspections was used to develop a maintenance program which was implemented in 2024. Maintenance works undertaken included contour banks, repairing rilling and gully erosion and tunnelling. Coir logs were also successfully used to prevent and stabilise minor rill erosion across natural landform areas.

In 2025 a subsequent landform stability and drainage inspection will be conducted to identify any new erosion features or maintenance issues and assess the success of the 2024 maintenance program. Budget has been allocated to rehabilitation maintenance to allow for works to be conducted throughout the year and in response to new erosion identified following high rainfall events.

Monthly water quality sampling is undertaken on all sediment dams downstream of rehabilitated areas. Biannual water quality analysis is also undertaken on the sediment dams. This monitoring will be used to assess when surface water runoff can be diverted back into clean water catchments.

#### 8.7.1.3 Safety Risks

There are currently no rehabilitation areas that present safety risks to the public or employees. At the time of mine closure (in year 2039 based upon current approvals), the proposed final void and highwalls will be rehabilitated in accordance with the Bulga Coal RMP and appropriate safety controls will be implemented.



# 8.7.2 Bulga Underground Operations

#### 8.7.2.1 Weed and Pest Species

Due to the small and isolated nature of rehabilitation and the maintenance of buffer land at Bulga Underground Operations, weed and pest management activities are not isolated to rehabilitation areas. Weed and pest management, inclusive of rehabilitation was undertaken throughout 2024 as outlined in **Section 6.7**.

#### 8.7.2.2 Erosion and Water Quality

Maintenance of erosion controls identified during scheduled and routine inspections was undertaken during 2024.

#### 8.7.2.3 Safety Risks

There are currently no Bulga Underground rehabilitation areas that present safety risks to the public or employees.

# 8.8 Actions for the Next Reporting Period

### 8.8.1 Rehabilitation Outcomes

The rehabilitation outcomes have been agreed with stakeholders and documented in the RMP which is available on the <u>Bulga Coal website</u>. The Bulga Coal RMP and associated works include rehabilitation outcomes.

The *Bulga Coal Rehabilitation Objectives Statement* (ROBJs) and *Final Landform Rehabilitation Plan* (FLRP) were approved by the NSW RR on 18 October 2023. Completion criteria are currently being reviewed and will be submitted to the NSW RR in 2025.

### 8.8.2 Proposed Rehabilitation Trials, Projects and Initiatives

Bulga plans to continue and expand on a topsoil trial in 2025 to help assess the best strategy to manage the topsoil deficit whilst meeting our rehabilitation objectives.

### 8.8.3 Rehabilitation Activities Proposed for 2025

Bulga Coal plans to undertake the following rehabilitation and disturbance works during 2025:

- 3.45 ha of disturbance
- 120 ha of rehabilitation (levelled/re-contoured, topsoiled and seeded)
- 3.91 ha of rehabilitation disturbance
- maintenance works as required on existing rehabilitation areas
- subsidence repairs as required.

The proposed 2025 operations for Bulga Open Cut have been presented in Figure 4.3.



# 9.0 Community

# 9.1 Community Engagement

Bulga Coal engaged with the community through meetings, newsletters, local event participation and community barbeques in 2024.

# 9.1.1 Community Barbeques

Community barbecues were held in May and November 2024 at Broke and Bulga. In May, approximately 50 community members attended each barbecue, and there were over 80 attendees for both the November cocktail style events. In May, the community was presented with the proposed change to the final landform and our new Community Consultative Committee (CCC) members, while November served as an end of year celebration and informal get together where community members could get to know the Bulga Coal Environment and Community team in a more casual setting (**Photo 9.1**).



Photo 9.1 Community Barbeque at the Starline Alpaca Farm in December, 2024

### 9.1.2 Newsletters

Community newsletters were distributed in May and December 2024, detailing the proposal to change the final landform and providing an update to the community regarding rehabilitation progress.



# 9.1.3 Community Consultative Committee

Bulga Coal enjoys an open and honest dialogue with community representatives and Singleton Council through our CCC. Two new community representatives joined the CCC in 2024; Jody Derrick and Mick McCardle. Two meetings were held, in May and December, the minutes from these CCC meetings available on the Bulga Coal website.

## 9.1.4 Voluntary Planning Agreement

Bulga Coal completed the last payment of VPA Part C: contributions to local education in 2024, with an investment in technology and infrastructure at the Broke Public School. VPA Part C: contributions to local events, continued throughout 2024, with extra funds going towards the Broke and Bulga Bicentennial celebrations.

Bulga Coal made payments for VPA Part B: Broke Road Maintenance in 2024 and continued to monitor progress of outstanding VPA Part A projects, including Bulga community hall upgrades and Bulga cemetery headstone repairs.

# 9.1.5 Broke to Bulga Discovery Trail Feasibility Study

Common Ground was contracted to complete a *Concept Trail Plan* in 2024, submitting the draft concept plan in November 2024. 2025 will see finalisation of the plan and continuation of liaising with the Broke Residents Association in regard to securing funding for the next stages.

### 9.1.6 Mine Tours

In November 2024, Bulga Coal hosted approximately 60 students from year 9 St Catherine's Science class for an excursion focused on rehabilitation and final land use options (**Photo 9.2**, **Photo 9.3**). Bulga Coal also hosted mine tours as part of the Broke Village Fair in September.





Photo 9.2 St Catherine's College Year 9 Mine Tour



Photo 9.3 Post Mining Land Use Ideas from Students during Rehabilitation and Mine Tour 2024



# 9.2 Community Sponsorship and Donations

Bulga Coal contributed approximately \$125,000 in sponsorships and donations in 2024 and supported several projects throughout the year.

# 9.2.1 Broke and Bulga Bicentennial Celebrations

2024 marked 200 years since European settlement of the villages of Broke and Bulga, with events held in both locations, sponsored by Bulga Coal. The celebrations incorporated historical displays, a traditional bush dance, and games of cricket and tennis between the villages. Bulga Coal supported the planning of these events throughout the year and completed the Broke Village Heritage Trail, with signs erected around the village and an interactive walking guide now available to anyone wishing to do the self-guided walk. Yellow Rock was illuminated over three nights thanks to lighting supplied by Bulga Coal.

The Broke Residents Association officially recognised the efforts of Bulga Coal throughout the year with a presentation at the end of year community barbecue (**Photo 9.4**).



Photo 9.4 Receiving Recognition from the Broke Residents Association for Contributions to the Bicentennial Celebration

### 9.2.2 Broke School

Broke School was the focus of our Apprentice working bee this year, with a group helping to build an outdoor learning hub, complete with a raised gravel surface, garden beds and a large shed for storage of gardening equipment (**Photo 9.5**). The last VPA Part C (contribution to local education) contribution was made in 2024, marking the end of VPA payments to the school. Bulga will continue to support Broke Public School.





Photo 9.5 Apprentice Working Bee at Broke Public School

# 9.2.3 Broke Bulga Landcare

Bulga Coal continued to support Broke Bulga Landcare during 2024, funding slashing and weeding jobs at Fordwich crossing along the Wollombi Brook. eDNA testing for platypus and Rakali (native water rat) in the Wollombi Brook was completed in April, with encouraging results.

# 9.2.4 Community Yoga Classes

Bulga Coal funded weekly yoga classes in Broke during 2024. The classes were well attended and appreciated by the community.

# 9.2.5 Broke Village Fair

Bulga Coal is the major sponsor of the annual Broke Village Fair. Bulga Coal works in partnership with the Fair Committee, participating in committee meetings, planning and marketing the event. Around 1,250 native trees and shrubs were handed out in the Bulga Coal marquee and six bus tours to the mine were hosted throughout the day (**Photo 9.6**).





Photo 9.6 Bulga Coal Marquee at the Broke Village Fair

# 9.2.6 Broke Fordwich Wine and Tourism Association

Bulga Coal once again sponsored the flagship wine and tourism event of the Broke Fordwich area; A Little Bit of Broke, held in March 2024. The digital media campaign that was sponsored in 2023 made a big impact throughout 2024. Meetings were held to discuss ongoing support of the Association and how Bulga Coal can best help with economic and business growth in the local wine and tourism industry.

# 9.2.7 Sponsorships

Organisations and events sponsored by Bulga Coal during 2024 included:

- Broke Residents Association: Broke Village Bicentennial events (Photo 9.7)
- Bulga Milbrodale Progress Association: Bulga Village Bicentennial events
- Broke Public School: Working Bee and Outdoor learning Hub
- Singleton Tidy Towns Adopt a Spot Broke Road clean up
- Milbrodale Mountain Classic



- Soft Cogs MS Gong Ride
- Singleton Library: Summer Reading Program
- Community Yoga classes
- Broke Fordwich Wine and Tourism Association: A Little Bit of Broke
- Broke Bulga Landcare: slashing and weed removal at Fordwich Crossing.



Photo 9.7 Historical Broke vs Bulga Cricket match at the Broke Bicentennial Celebrations

### 9.2.8 Donations

Donations were made to these recipients in 2024:

- Movember Foundation
- Broke Public School: Vegetable garden
- Broke Village Heritage Trail.



# 9.3 Community Complaints

During 2024, Bulga Coal logged nine community complaints from six stakeholders, with one stakeholder logging four air quality complaints. Of the nine complaints, four were related to air quality, three were noise complaints, one lighting and one property complaint. **Table 9.1** shows a comparison of complaints received by Bulga Coal over the past six years.

All complaints were logged as per the Bulga Coal Community Complaint Procedure, and responses are made public in the complaints register on the <u>Bulga Coal website</u>.

Complaint Type	2019	2020	2021	2022	2023	2024
Blast vibration/ overpressure	1	2	1	1	0	0
Lighting	5	2	0	1	3	1
Dust	4	1	2	0	0	4
Noise	11	12	10	15	4	3
Traffic	0	0	0	0	0	0
Visual Amenity	2	0	0	0	0	0
Odour	0	0	0	0	0	0
Fume	0	0	0	0	0	0
Other	1	0	1	0	1	1
Total	24	17	14	17	8	9

Table 9.1Summary of Complaints by Issue 2019–2024

Each of these complaints followed the *Bulga Coal Community Complaint Procedure* and the response is available in the complaints register on the <u>Bulga Coal website</u>.

# 9.4 Community Feedback

Bulga Coal continued with community consultation throughout 2024, holding two community barbecues, CCC meetings in May and December, hosting the Bulga Coal Marquee at the Broke Village Fair, and producing two Newsletters. Further consultation was undertaken regarding the proposed changes to final landform modification (Mod 5), which has since been put on hold. No concerns were raised by the community throughout the consultation process.

Bulga Coal received positive feedback from the community regarding Minimbah Teaching Place, which was used for a large variety of events throughout 2024. The bushtucker garden project continued and will be implemented in 2025.


## **10.0 Independent Audit**

### 10.1 2024 Independent Environmental Audit

In accordance with the requirements of Schedule 5, Conditions 9 and 10 of SSD-4960, Condition 8.4 of DA 41-03-99 (now surrendered) and Schedule 6, Conditions 6 and 7 of DA 376-8-2003, an Independent Environmental Audit (IEA) was undertaken for Bulga Coal in 2024. The audit was conducted in November 2024 and was submitted to the DPHI on the 24 January 2025.

A summary of non-compliances and the status of the proposed actions is presented in **Table 10.1**. Actions that are ongoing, required no action or were completed prior to this Annual Review period have been excluded. The next IEA is planned for November 2027.



Condition Reference	Context	Recommended / Action from IEA	Action Proposed by Bulga Coal	By When
EPL 563 M9.3	The licensee must mark monitoring Point 11 with a sign which clearly indicates the name of the licensee, whether the monitoring point is up or down stream of the discharge point and that it is a monitoring point for the Hunter River Salinity Trading Scheme.	Licence Discharge Point 11 signage to indicate whether the monitoring point is up or downstream of the discharge point.	The Licence Discharge Point sign is immediately adjacent to the discharge monitoring point. Bulga Coal will review the signage requirement and replace signage, if required.	25 April 2025
DA 376-8-2003 Schedule 3, Condition 10	The End of Project report sighted in this audit does not specifically refer to AS2601.	The End of Project report should include details of relevant information and status updated.	All demolition completion reports will reference the adherence to AS2601. Bulga Coal will review the report and include the relevant information.	31 March 2025
DA376-8-2003 Schedule 4, Condition 11	No details of maintenance and rehabilitation of the levee is found in the approved Annual Review reports.	Update of details of maintenance and rehabilitation of the levee should be included in the Annual Review reports.	Bulga Coal will include maintenance and rehabilitation updates in the Annual Review. Action will be created in the HSEC system to ensure this is included in future Annual Reviews.	31 March 2025 Complete (refer Section 8.2.3)
SSD 4960 Schedule 3, Condition 8	Blast monitoring reports in general should identify criteria applicable to each location.	Blast Monitoring Compliance Reports (Attachments to annual returns) would benefit from identifying which criteria are applicable to each location, the type of each location (house, land, etc), highlighting results which exceed criteria and highlighting any blasts which occurred outside of the specified hours or on Sundays, if any.	Bulga Coal will include criteria in the Blast Monitoring Compliance Reports for each location in future reports.	15 September 2025
SSD 4960 Schedule 3, Condition 18 (a) (iv) EPL 563 O3.1 CL 224 – Condition 17	During the audit site walkover, large plumes of dust were seen to escape from the western sections of the development where parts of the Noise and Visual Bund was yet to be landscaped.	Make sure surfaces are covered or dust suppressed to avoid dust / particulate matter being disturbed and carried by wind.	Bulga Coal will continue to carry out progressive rehabilitation on site to ensure that exposed surfaces are covered in a timely manner.	Ongoing 29 August 2025

#### Table 10.1 Non-Compliance Findings and Action Status from 2024 IEA



Condition Reference	Context	Recommended / Action from IEA	Action Proposed by Bulga Coal	By When
			Bulga Coal will review exposed areas across site and assess the potential to implement temporary rehabilitation or dust suppression.	
SSD 4960 Schedule 3, Condition 18 (e)	Appendix A - Air Quality Statutory Requirements of the AQGGMP gives Section 7.4.3 of the Air Quality and Greenhouse Gas Management Plan as the relevant section of the Plan in response to this requirement. However, this section does not exist.	Review and update the Appendix A of AQGGMP with correct referencing for requirements and compliance.	Bulga Coal has submitted a revised version of the AQGHGMP. Bulga Coal will review the Appendix A table and ensure the sections referenced align with the sections of the document.	31 March 2025
SSD 4960 Schedule 3, Condition 39	Wollombi Brook Plan of Management is overdue for review (Jan 2021) as per the document version control details. The Bulga Coal website has the 2018 version.	The WBPM is due for review on 11 Jan 2021. The Bulga Coal website has the 2018 version. This need to be reviewed and updated on the website.	The WBPM is currently being reviewed. This plan is an appendix of the Aboriginal and Cultural Heritage Management Plan (ACHMP) which is also being reviewed. The revised ACHMP will be submitted for approval.	30 June 2025
SSD 4960 Schedule 3, Condition 56	Rehabilitation Strategy has not been prepared as required by the condition.	There is no rehabilitation strategy - request any evidence of an exemption from the department and that the RMP from the mining lease can be used, rather than the RMP from the SSD conditions. If this document is required by DPHI, seek a specific timeline to prepare it.	Bulga Coal will seek to remove these conditions in the next project modification as it duplicated the requirements of Schedule 3 condition 55. Rehabilitation Management Plan.	31 December 2025
EPL 563 R5.7	Water Quality Monitoring Report submitted with EPL annual return – qualification and experience of person who prepared the report is not evident.	Water Quality Monitoring Report submitted with EPL annual return – qualification and experience of person who prepared the report should be evident.	Action in place to include in future Water Quality Monitoring Reports details of the person who prepared the report.	Completed



# 11.0 Incidents and Non-Compliances During the Reporting Period

Incidents and non-compliances which are considered as low risk of environmental harm are detailed in this section.

### 11.1 Administrative Non-Compliance

#### 11.1.1 Failure to Continuously Monitor Air Quality

PM<sub>10</sub> air quality data was not monitored continuously at EPA Point 9 and Point 10 due to the equipment failure or planned maintenance at various times during 2024. For the reporting period 97.7% of valid data was captured for EPA Point 9, and 98.8% of valid data was captured for EPA Point 10.

The cause of the breakdowns were investigated promptly, and the monitors were fixed. Details were reported to the NSW Environment Protection Authority (EPA) in the 2023–2024 EPL 563 Annual Return, and are included in the *Annual Air Quality Report* in **Appendix B**.

PM<sub>2.5</sub> air quality data was not monitored continuously at air quality monitors D2 and D10 due to equipment failure, power outages and planned maintenance at various times during the reporting period. Valid data was recorded for 82.7% and 96.3% of 24-hour events during the reporting period respectively.

PM<sub>10</sub> air quality data was not monitored continuously at air quality monitors D1, D3, D5 and D11 due to equipment failure, power outages and planned maintenance at various times during the reporting period. Valid data was recorded for 98.8%, 96.8%, 98.9% and 99.5% of 24-hour events during the reporting period respectively.

The cause/s of the breakdowns were investigated promptly, and the monitors were fixed. Further details are included in the *Annual Air Quality Report* in **Appendix B**.



# 12.0 Activities to Be Completed in the Next Reporting Period

### **12.1** Proposed Activities

The works listed in **Table 12.1** will be completed in 2025 at Bulga Coal to improve the environmental and/or community performance of the operation.

Торіс	Proposed Activity	By When
Rehabilitation and decommissioning	Completion of 120 ha of Rehabilitation. Rehabilitation will be completed at the EEA, Noise and Visual Bund and Northern Extension areas.	December 2025
	Decommissioning and demolition of Bulga Underground Operations infrastructure, including the site Power Station.	
Noise	Upgrade of the equipment used in the real-time monitoring network.	December 2025
Offsets	Continue the active management actions at The Vere Offset for Year 1 and 2.	December 2025
Community	Continue engagement with RAPs and other community members to enhance and promote local projects.	December 2025

Table 12.1Bulga Coal Proposed Activities 2025