ULAN COAL

GLENCORE

Annual Review

2019

Name of operation	Ulan Coal Mines Limited
Name of operator	Ulan Coal Mines Limited
Development consent / project approval #	PA 08_0184
Name of holder of development consent / project approval	Ulan Coal Mines Limited
Mining lease #	CCL 741, MPL 315, ML 1341, ML1365, ML 1366, ML 1467, ML 1468, ML 1511, ML 1554, ML 1656, ML1754, EL 5573, EL 7542, & EL 8687
Name of holder of mining lease	Ulan Coal Mines Limited
Water licence #	WAL41492, WAL19047, WAL27887, WAL37192, WAL36667, WAL41906 & WAL 34921 (only allocation Licences listed).
Name of holder of water licence	Ulan Coal Mines Limited
MOP/RMP start date	01/12/2017
MOP/RMP end date	01/12/2024
Annual Review start date	01/01/2019
Annual Review end date	31/12/2019

I, Robyn Stoney, certify that this audit report is a true and accurate record of the compliance status of Ulan Coal Mines Limited for the period 2019 and that I am authorised to make this statement on behalf of Ulan Coal Mines Limited.

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 acknowledges 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	Robyn Stoney
Title of authorised reporting officer	Environment and Community Manager
Signature of authorised reporting officer	
Date	31 March 2020

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ELECTRONIC COPY

Electronic copy of the 2019 AR emailed to stakeholders, attachments available electronically online via the website: *http://www.ulancoal.com.au/en/publications/Pages/annual-reports.aspx*

1. Statement of Compliance

Compliance Table 1 Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	Yes / No*
PA 08_0184	No
ML's	Yes
EL's	No
EPL 394	No
Water Licences	Yes

Notes:* Refer to Table B (Non Compliances), Section 3 (Approvals) Section 11 (Incidence and Non-Compliances) for details

Compliance Table 1 Compliance Status Key

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	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)
Compliant	Compliant	Criteria met

Compliance Table 2 Non- Compliances

Relevant Approval	Condition	Compliance Issue	Compliance Status	Comment	Section in AR
PA08_0184	S3, c19, Table 9	Non-compliance with PM10 24 hour criterion due to regional dust events on 88 of 365 days	Non-compliant	Measured exceedances are investigated and reported to DPI&E at the time of the event	**6.4**
EPL394	M2.2	HVAS did not operate at required runtime due to incorrect programming on 30 August 2019; and an unplanned power outage on 10 November 2019	Non-compliant	The TEOM measured PM10 concentrations of 7.8 and 19.5 µg/m3 for the 24 hour periods of 30 Aug and 10 Nov, respectively. An unplanned outage occurred from 22:05 to 23:47 on 10 November, confirmed in writing.	**6.4**
EPL394	M2.3	Continuous monitoring of pH and EC upstream of the operations, which was required when discharge was occurring, did not occur on 17 November 2019 due to water loss upstream	Non-compliant	Access to the area where the flow gauge is installed controlled. Alarm installed for operational failures. EPL varied - allows for management of the monitoring, if continuous monitoring is not possible, in consultation with EPA.	**6.4**
EL8687	C3	Penalty Notice received 15/4/2019: Failure to conduct community consultation strictly consistent with the community consultation strategy	Non-compliant	Actions taken include tracking of document commitments in the action tracking system and procedural revisions.	**9**

2. Introduction

2.1 Report Scope

This consolidated Annual Review[1] (AR) was prepared to satisfy consent conditions and reporting obligations as specified by NSW Department of Planning, Industry and Environment (DPI&E). The reporting period for this AR is from 01 January 2019 to 31 December 2019, with the AR due by 31 March 2020[2]. In accordance with Condition 3, Schedule 5 of PA08_0184, a copy of this report will be distributed to:

- DPI&E;
- NSW Department of Planning, Industry and Environment – Division of Resources and Geosciences (DRG);
- NSW Department of Planning, Industry and Environment- Biodiversity and Conservation Division (BCD);
- NSW Department of Planning, Industry and Environment–Water (DPI&E - Water);
- Mid-Western Regional Council (MWRC); and
- Ulan Coal Mine Community Consultative Committee (the CCC).

Upon approval, this document will be uploaded to the Ulan Coal website for public viewing at www.ulancoal.com.au

2.2 Mine Ownership and Location

Ulan Coal Mines Propriety Limited (UCMPL) is owned by Glencore Coal Assets Australia Pty Limited. The Ulan Underground Mine, the Ulan West Underground mine, the Open Cut mine and land holdings including the Bobadeen Irrigation Scheme, as a collective, are referred to as the Ulan Coal Complex (UCC).

The UCC is located in New South Wales approximately 1.5 kilometres from Ulan Village, within the Mid-Western Regional Council (MWRC) Local Government Area (LGA). The project area is approximately 38 kilometres north-north-east of Mudgee and 19 kilometres north-east of Gulgong. The 13000 hectare (ha) landholding, straddles the Great Dividing Range and is located at the headwaters of the Goulburn and Talbragar River Catchments. Underground and open cut mining and associated infrastructure are approved under PA08_0184[3] (Figure 2.2) for:

- Operations to 2033;
- Longwall mining of the Ulan Underground Mine (Ulan Underground);
- Longwall mining of the Ulan West Underground Mine (Ulan West Operations);
- Open cut mining over a 239 ha area;
- Coal Handling and Preparation Plant (CHPP) and rail loadout facilities with total coal production capacity of up to 20 million tonnes per annum (Mtpa) product coal; and
- Surface facilities and ancillary activities to support the above mentioned operations.

[1] The AR was prepared in accordance with the DPI&EDPI&E Annual Review Guideline October 2015 and the AR reporting requirements contained in Condition 3, Schedule 5 and Statement of Commitments in Appendix 9 of the PA08_0184.
[2] In accordance with Condition 3, Schedule 5 of Project Approval 08_0184 (PA08_0184).
[3] UCMPL was granted PA08_0184 under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) on 15 November 2010 for the Ulan Coal – Continued Operations Project. Prior to PA08_0184, UCMPL operated under four major Development Consents, 18 modifications and 16 other minor development approvals.

2.3 Mine Contacts

Table 2.1 outlines the contact details for site personnel responsible for mining, coal preparation, rehabilitation, environmental and community management at the end of the reporting period.

Table 2.1- Ulan Coal Mine Contacts

Name	Position	Contact Details
Charlie Allan	General Manager	Work: 02 6372 5300 Email: charlie.allan@glencore.com.au
Sam Wiseman	Operations Manager – Ulan Surface Operations	Work: 02 6372 5400 Email: sam.wiseman@glencore.com.au
Elliot Baume	Operations Manager – Ulan Underground Operations	Work: 02 6372 5300 Email: elliot.baume@glencore.com.au
David Ribaux	Operations Manager – Ulan West Underground Operations	Work: 02 6370 9200 Email: david.ribaux@glencore.com.au
Robyn Stoney	Environment & Community Manager	Work: 02 6372 5368 Email: robyn.stoney@glencore.com.au

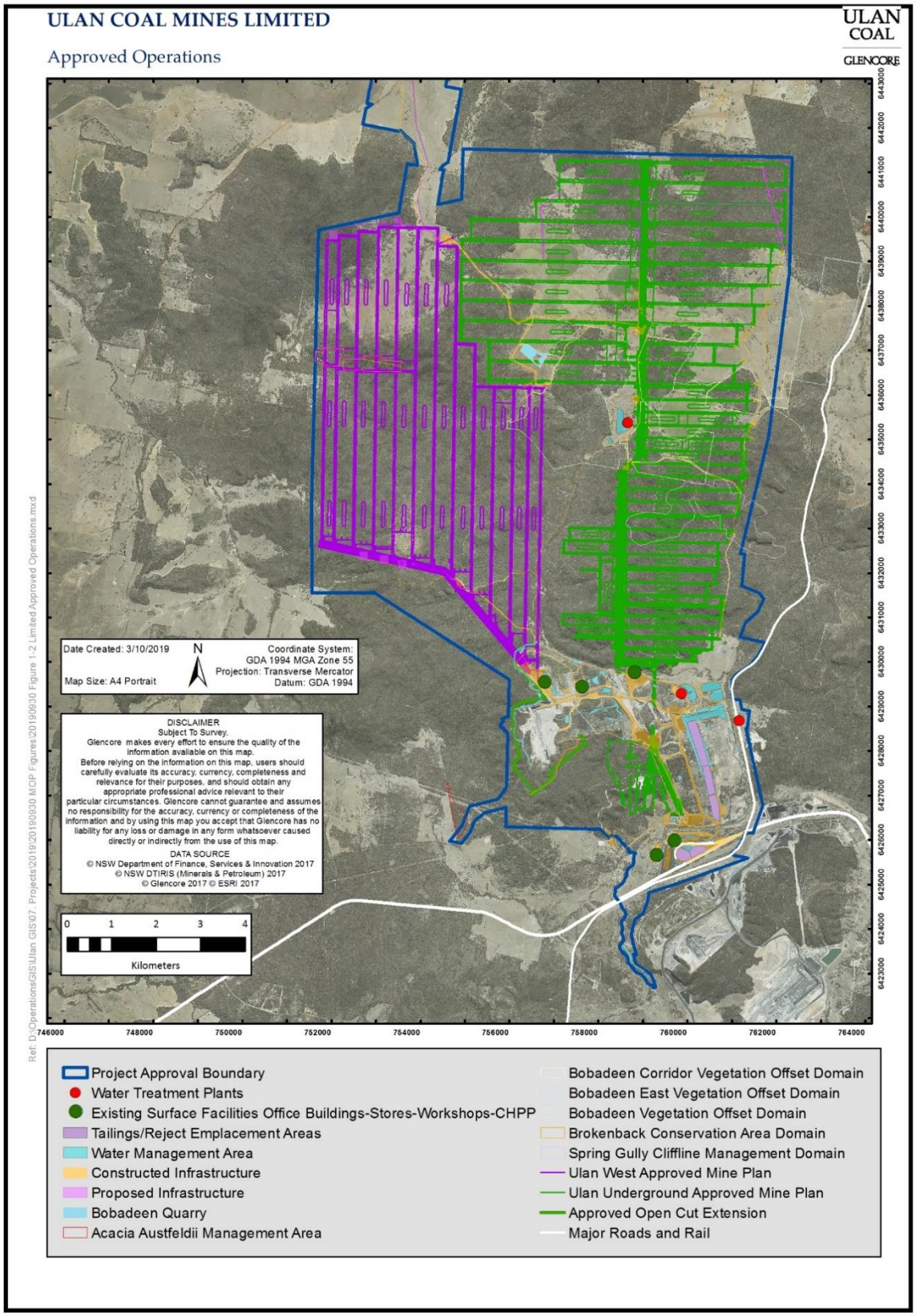


Figure 2.1 Approved Ulan Complex Operations

3. Approvals

3.1 Detailed Approvals Compliance

3.1.1 Project Approval

Table 3.1 - Current Project Approval [4]

Approval	Modifications	Description	Approval Authority	Approval Date	Were all conditions of the approval complied with?
PA 08_0184	PA 08_0184	Ulan Coal –Continued Operations Project	DPI&E	November 2010	No[5]
	PA 08_0184 MOD 1	Longwall extraction of the North 1 mining area Modify Ulan Underground & Ulan West mine plans Concrete Batching Plant	DPI&E	December 2011	Yes
	PA 08_0184 Court Orders	Land & Environment Court Judgement	DPI&E	April 2012	Yes
	PA 08_0184 MOD 2	Modify Ulan West mine plan LW1-5 Remove restrictions on construction blasts Minor amendments to European and natural heritage sites where blasting measures are applicable	DPI&E	May 2012	Yes
	PA 08_0184 MOD 3	Modify Ulan West Mine Plan- realignment of main headings further to the south.	DPI&E	14 March 2016	Yes
	PA 08_0184 Mod 4	Modify Ulan West and Ulan Underground Mine Plan - extend the approved longwalls Ulan Underground LW30 - LW33 and LW W7-8 and Ulan West LW07 and LW08.	DPI&E	17 July 2019	Yes

[4] DA 113-12-98 was surrendered to DPI&E 20/10/17 in accordance with Schedule 2 Condition 9, within 3 months of the completion of longwalls 26, West 2, and West 3. Resubmission was requested by DPI&EDPI&E, this occurred 23/11/17. Finalisation is pending the remaining landowners providing their consent for the surrender of DA 113-12-98.

[5] Technical non-compliance with PM10 24 hour criterion due to regional dust events.

3.1.2 Mining Leases & Exploration Licences

Mining and exploration authorisations are issued in accordance with the *Mining Act 1992* and regulated by DRG. UCMPL's Mining Tenure is detailed in **Table 3.2** and displayed in **Figure 3.1**. A look up table (Attachment I) provides section references for compliance with specific ML reporting conditions.

Table 3.2 - Mining & Exploration Titles

Instrument	Authority	Date of Grant	Duration of Approval	Mine Area Applicability	Were all conditions of the approval complied with?
Consolidation Coal Lease (CCL) 741	DRG	2/01/1990	15/05/2027	All operations	Yes
Mining Purpose Lease 315	DRG	3/08/1993	3/08/2035	No. 3 Underground (Surface Lease)	Yes
Mining Lease 1341	DRG	25/01/1994	25/01/2036	No. 3 Underground	Yes
Mining Lease 1365	DRG	9/03/1995	9/12/2032	No. 3 Underground (Surface Lease)	Yes
Mining Lease 1366	DRG	9/03/1995	9/12/2032	No. 3 Underground (Surface Lease)	Yes
Mining Lease 1467	DRG	17/04/2000	16/04/2021	No. 3 Underground (Surface Lease)	Yes
Mining Lease 1468	DRG	16/05/2000	15/05/2021	No. 3 Underground	Yes
Mining Lease 1511	DRG	24/04/2002	23/04/2023	No. 3 Underground (Surface Lease)	Yes
Mining Lease 1554	DRG	1/09/2004	31/08/2025	No. 3 Underground (Surface Lease)	Yes
Mining Lease 1656	DRG	03/03/2011	03/03/2032	No. 3 Underground (Surface Lease)	Yes
Mining Lease 1697	DRG	22/05/2014	22/05/2035	Ulan Open Cut	Yes
Exploration Licence 5573	DRG	28/04/1999	27/02/2018*	Ulan Underground	Yes
Exploration Licence 7542	DRG	6/05/2010	06/05/2020	Ulan West	Yes
Exploration Licence 8687	DRG	31/01/2018	31/1/2024	Ulan West	No[6]
Mining Lease Application 470	DRG	Submitted 13/02/2014	Application Pending	Ulan Open Cut	NA
Mining Lease Application 475	DRG	Submitted 01/05/2014	Application Pending	Ulan Open Cut	NA
Mining Lease Application 507	DRG	Submitted 19/08/2015	Application Pending	Ulan Surface Operations	NA

[6] Penalty Notice received 15/4/2016: Failure to conduct community consultation strictly in accordance with the community consultation strategy.

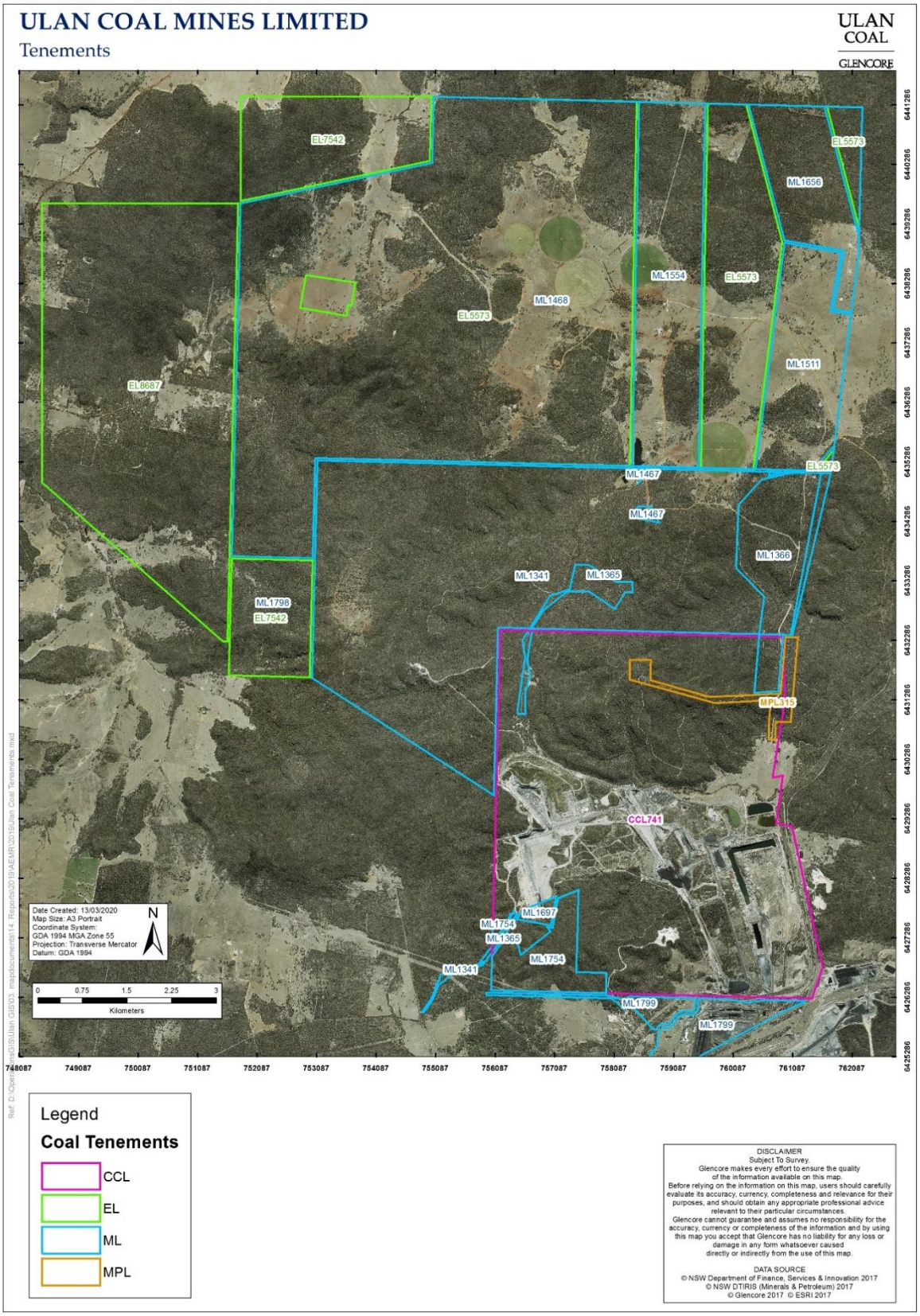


Figure 3.1 Ulan Coal Tenements

3.1.3 Water Licences

Water licences dewatering bores, dams, monitoring bores and wells are listed in Table 3.3 and Table 3.4.

Table 3.3 - Groundwater Licences held under Part 5 of Water Management Act 1912

Licence No.	Description	Works Type	Extraction Limit (ML)	Expiry Date	Were all conditions of the approval complied with?	
					Water Financial Year	Calendar year
80WA706111	Cavanders Flat	Stock/Domestic Bore	NA	Perpetuity	Yes	Yes
20BL168100	Monitoring Bores	Monitoring Bore	NA	Perpetuity	Yes	Yes
20BL172841	Bobadeen Monitoring Network	Monitoring Bore	NA	Perpetuity	Yes	Yes
20BL172845	Goulburn River Diversion Monitoring Network	Monitoring Bore	NA	Perpetuity	Yes	Yes
20BL172846	Alluvium Monitoring Network	Monitoring Bore	NA	Perpetuity	Yes	Yes
20BL172847	Hydrocarbon Monitoring Network	Monitoring Bore	NA	Perpetuity	Yes	Yes
20BL172850	North Monitoring Network	Monitoring Bore	NA	Perpetuity	Yes	Yes
20BL172851	Intermittent Monitoring Network	Monitoring Bore	NA	Perpetuity	Yes	Yes
20WA216193	1977 Cope Road	Stock/Domestic Bore	NA	Perpetuity	Yes	Yes
80WA706111	2450 Blue Springs Road	Stock/Domestic Bore	NA	Perpetuity	Yes	Yes

Table 3.4 - Water Approvals held under Division 2 of the Water Management Act 2000

Licence No.	Description	Works Type	Extraction Limit (Shares)	Water Source	Expiry Date	Were all conditions of the approval complied with?[7]	
						Water Financial Year	Calendar year
WAL41492 (20AL214787)	Aquifer (Extraction)	Water Allocation Licence	7060	Oxley Basin Coast Groundwater Source	Perpetuity	Yes	Yes
20AL723743 (WAL37192)	Aquifer (Extraction)	Water Allocation Licence	704	Sydney Basin Murray Darling Basin Groundwater Source	Perpetuity	Yes	Yes
80AL724736 (WAL 41906)	Aquifer (Extraction)	Water Allocation Licence	2215	Sydney Basin Murray Darling Basin Groundwater Source	Perpetuity	Yes	Yes
20AL220117 (WAL42900)	Aquifer (Extraction)	Water Allocation Licence	4031	Sydney Basin Murray Darling Basin Groundwater Source	Perpetuity	Yes	Yes
WAL36667	Aquifer (Extraction)	Water Allocation Licence	0	Sydney Basin Murray Darling Basin Groundwater Source	Surrendered	Yes	Yes
20FW213272	Goulburn River Flood Gates	Levy Licence	NA	NA	21/09/2027	Yes	Yes
20WA209953 (WAL19047)	Moolarben Creek Dam/Pump & Baseflow loss	Water Allocation Licence	600	Upper Goulburn River Water source	29/09/2027 WAL allocation Perpetuity	Yes	Yes
WAL41817	Aquifer (Baseflow loss)	Water Allocation Licence	50	Upper Talbragar River Water Source	Perpetuity	Yes	Yes
80AL716931 (WAL 34921)	Aquifer (Baseflow loss)	Water Allocation Licence	30	Talbragar Alluvial Groundwater Source	Perpetuity	Yes	Yes

[7] Extraction against licences provided in Section 5.3 of this report.

3.1.4 Other Approvals

Table 3.5 - Other Approvals and Licences

Licence/Approval	Licence/ Approval No.	Authority	Approval/Expires	Were all conditions of the approval complied with?
Environment Protection Licence (EPL)	394	EPA	Anniversary Date 18 November	No[8]
Ulan Mining Operations Plan (MOP)	2017-2024	DRG DPI&E	Expires 1/12/2024	Yes
Ulan Underground SMP/EP approval LW27-29 & W4-5	OUT11/23905 SO4/01722	DRG DPI&E	Approval (LW27-29 & W4-W5) 23/05/2013, SMP Expiry 31/05/2020	Yes
Ulan West Extraction Plan approval LW1 to LW6	NA	DPI&E	Approval 1/02/2019	Yes
Ulan Underground Extraction Plan LW30 & W6-W8	NA	DPI&E	Approval 19/08/2019	Yes
Radiation Licence	5023004	EPA	Expires 4/06/2021	Yes
Dangerous Goods Notification	NDG023149	WorkCover NSW	Perpetuity	Yes
EPBC Approval	2009/5252	Federal DE&E	Expires Sept 2031	Yes
EPBC Approval (MOD 4 extension area)	2015/7511	Federal DE&E	Expires 1 March 2036	Yes
Bobadeen Grinding Groove Conservation Agreement	NA	OEH	22 December 2015 to Perpetuity	Yes
Conservation Agreement for Brokenback Conservation Area-Area 1 (UCMPL owned land)	NA	OEH	Final signed copy received 11 December 2019	Yes
Conservation Agreement for Bobadeen Vegetation Offset Area (UCMPL owned land)	NA	OEH	Final signed copy received 11 December 2019	Yes

[8] Annual Return submitted to the NSW EPA on 13 January 2020 details three technical non-compliances in the reporting period 18/11/18-17/11/2019: HVAS did not operate during required runtime due to incorrect programming on 30 August 2019; Failure of HVAS to complete standard runtime, 24:00:00 hours ∓ 1:00:00 hour, on 10 November 2019 due to an unplanned power outage; continuous monitoring of pH and EC upstream of the operations, which was required when discharge was occurring, did not occur on 17 November 2019 due to a loss of water upstream that resulted from the activities of others.

Licence/Approval	Licence/ Approval No.	Authority	Approval/Expires	Were all conditions of the approval complied with?
Conservation Agreement for Highett Road Offset Area (UCMPL owned land)	NA	OEH	Final signed copy received 11 December 2019	Yes
Conservation Reservation for Spring Gully Offset Area (Crown owned land)	NSW Government Gazettal No 165	DPI&E- Crown Land	Gazetted 6 December 2019[9]	Yes
Conservation Reservation for Brokenback Conservation Area-Area 2 (Crown owned land)	NSW Government Gazettal No 165	DPI&E- Crown Land	Gazetted 6 December 2019	Yes
Conservation Reservation for Valley Way Grinding Grove Conservation Area (Crown owned land)	NSW Government Gazettal No 165	DPI&E- Crown Land	Gazetted 6 December 2019	Yes

[9] Crown Reserves Gazetted on 6 December 2019 are awaiting registration on Title

3.2 Changes to Approvals in 2019

3.2.1 Subsidence Management & Extraction Plans

An Extraction Plan (EP) for Ulan Underground Longwalls LW30 and W6-W8[10] was submitted to DPI&E on 2 November 2016. Feedback received from agencies and responses were provided in 2017. On 3 October 2018 further agency feedback was received. The Plan was finalised and submitted on 29 May 2019 and approved by DPI&E on 19 August 2019.

An Extraction Plan for Ulan West Longwalls LW05 and LW06 was submitted to DPI&E on 13 April 2018 and approved by DPI&E on 1 February 2019.

3.2.2 Ulan Modification 4

The Ulan Coal Longwall Optimisation Project (MOD 4) was approved by the Independent Planning Commission on 17 July 2019. This approves the extension of longwalls LW30 - LW33 and LWW7 and LWW8 at Ulan Underground, the extension of LW07 and LW08 at Ulan West and the extraction of an additional 6.4 million tonnes of coal. MOD 4 also approved associated surface infrastructure consisting of three (3) dewatering bores at Ulan Underground (this includes conceptual changes to one previously approved dewatering bore) and associated infrastructure.

3.2.3 Mining Operations Plan Amendments

Changes to the Ulan Coal Mining Operations Plan 2017-2024 (MOP)[11] to incorporate MOD 4 and minor administrative changes such as updates to Departmental names, were approved on 29 November 2019. Details of mining activities are provided in **Section 4.3**

3.2.4 First Workings

No requests to modify first workings[12] other than the modifications within Mod 4 were made in 2019.

3.2.5 Security of Offsets

The Conservation Agreements (CA) located on UCMPL owned land including the Brokenback Area 1, Bobadeen Vegetation Offset Area and Highetts Road were registered on title and received on 11 December 2019. The Conservation Reservations[13] for Spring Gully, Brokenback Area 2 and Valley Way Grinding Groove Conservation Areas were Gazetted on 6 December 2019. Less than 0.01% of the offset areas remains to be secured in perpetuity at the time of writing. The requirement to make suitable arrangements for the long term security of biodiversity offset areas[14] was extended by approval of DPI&E until 31 June 2020.[15]

[10] PA08_0184 Schedule 3, Condition 26. The Extraction Plan was prepared in accordance with the *Draft Guidelines for the Preparation of Extraction Plans version 5* (as issued by the Department of Planning & Environment (DPI&EDPI&E)

[11] MOP 2018-2024 Amendment A, V2 prepared generally in accordance with the requirements of NSW Department of Trade & Investment guidelines for the preparation of a MOP, entitled "ESG3: Mining Operations Plan (MOP) Guidelines" (September, 2013). DRG letter of approval 16 November 2017 (*Mining Act 1992*). This document constitutes the Rehabilitation Management Plan required by PA08_0184, at Schedule 3, Condition 57 and is available at *www.ulancoal.com.au* .

[12] PA08_0184 Schedule 3, condition 25

[13] reservation of the Crown land for conservation purposes in accordance with Part 2, Division 2.3 of the *Crown Land Management Act 2016*

[14] PA08_0184 Schedule 3, condition 43

[15] Letter of extension DPI&EDPI&E, 16 December 2019

4. Operations Summary

4.1 Exploration

Surface exploration included drilling[16] of 1 partly-cored borehole at Ulan Underground 11 partly-cored boreholes at Ulan West and 1 partly-cored borehole and 1 chipped borehole at Bungaba (EL8687) (**Table 4.1**) for mine design characterisation (geotechnical, coal quality).

Of 2272m drilled, 91m was open hole drilling and 2183m was core drilling. Cored holes were chipped down to approximately 20m above the Ulan Seam, and then cored to total depth. Core is logged in the field and stored in the Ulan core shed. Exploration holes were geophysically logged, surveyed by site surveyors and then sealed and rehabilitated consistent with the requirements of the Exploration Code of Practice: Rehabilitation.[17] Two vibrating wire piezometers (VWPs) were installed to boreholes. Coal quality testing results are positive to mining and the geological model was updated. No prospecting operations were undertaken in environmentally sensitive areas of state significance or exempted areas as defined by the *Mining Act 1992*.

Table 4.1 - Summary of 2019 Exploration Drilling

Project	Tenement	Core Boreholes	Meters Drilled	Non-Core Boreholes	Meters Drilled	Total Meters Drilled	Boreholes Grouted	Boreholes Rehabilitated
Ulan Underground	EL7542	1 x Partially cored	159m	Nil	0	159m	1 borehole grouted	1 x VWP installed
Ulan West	ML1468 (3) ML1341 (2) EL7542 (6)	11 x Partially cored	1827m	Nil	0	1827m	10 boreholes grouted	10
Bungaba	EL8687	1 x Partially cored	195m	1 x Chipped hole	91m	286m	2 boreholes grouted	1 x VWP installed 1 borehole rehabilitated
Total		13	2181m	1	91m	2272m	**13**	**13**

The 2020 exploration program is outlined in **Figure 4.1**; this program is subject to change based on operational requirements. There are 79 boreholes planned to be drilled within the next reporting period. These boreholes will be drilled to characterise areas of geological and geotechnical concern.

[16] Authorised Surface Disturbance Notification (SDN) is required from the DPI&EDPI&E-DRG for drilling in exploration licence areas outside of the mining lease.

[17] NSW Department of Planning and Environment, Division of Resources and Geoscience (2015) *Exploration Code of Practice: Rehabilitation*

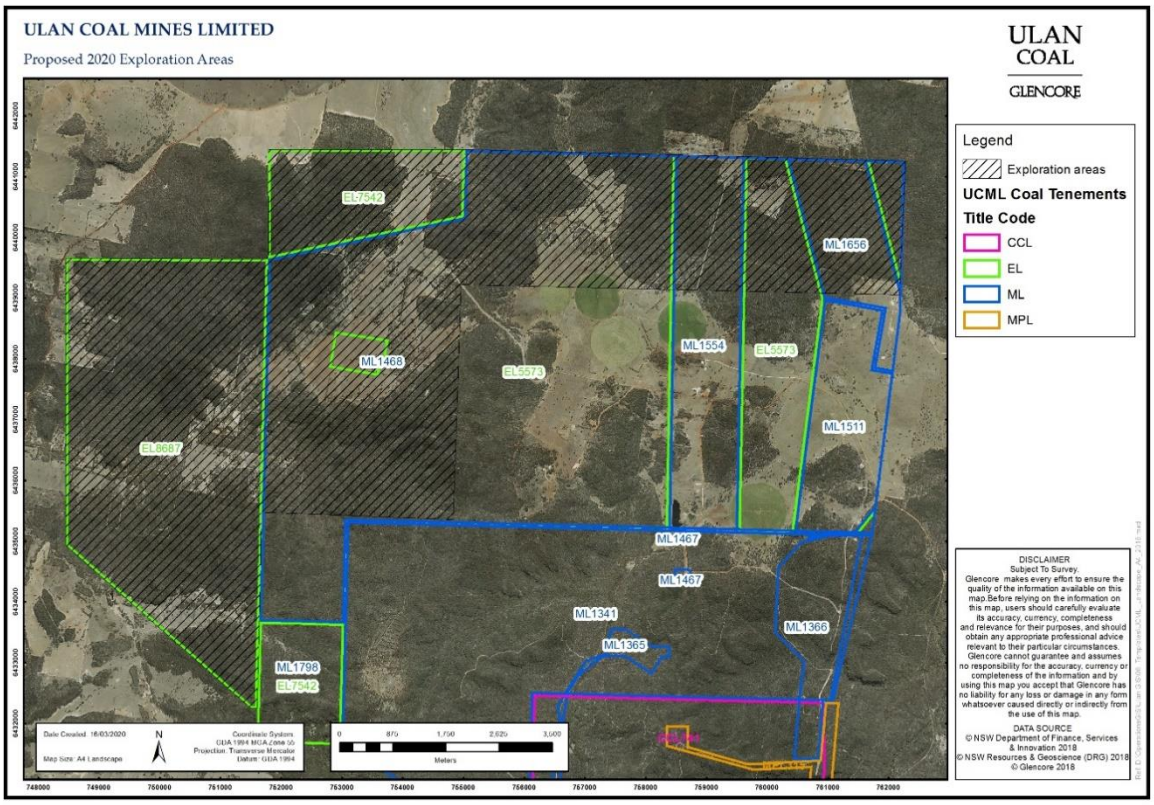


Figure 4.1 Proposed 2020 exploration program

4.2 Land Preparation

Land preparation activities, during the reporting period were carried out in accordance with the MOP. Land preparation ahead of mining operations involves the construction of appropriate erosion and sediment control structures, the clearing of vegetation and stripping and stockpiling of topsoil. This applies to major surface disturbance works[18] and is not limited to open cut mining operations.

The Ulan Open Cut did not operate during the reporting period; hence 0 ha of land within the Open Cut extension was cleared in 2019. Approximately 16.58 ha of land was cleared for infrastructure projects within the UCC during the 2019 reporting period.

4.3 Mining activities

4.3.1 Ulan Underground

Ulan Underground mining operations[19] included development of roadways for LWW06 and LWW07, in accordance with first workings approvals. Extraction of Ulan Underground LWW05 was in accordance with the SMP/EP[20] for Longwalls LW27 to LW29 and W4 to W5[21]. LWW05 commenced extraction on 18 December 2018[22] and had retreated 3,548m by 31 December 2019. Ulan Underground produced 6.128 million Tonnes of ROM coal during the reporting period (**Table 4.2**).

[18] G*CAA Ground Disturbance Permit (GDP) (CAA HSEC PER 0004)* is signed off by Senior Environment personnel and the Mine Surveyor.
[19] Standard longwall mining methods to mine D Working Section (DWS), the lower 3m of the Ulan seam, thermal coal. Development is undertaken using continuous miners and shuttle cars to drive roadways to access to the mine. The longwall is approximately 400m wide.
[20] PA08_0184 Schedule 3, condition 26.
[21] Approved by DPI&EDPI&E 25 May 2013.
[22] Approved SMP/EP for Longwalls LW27 to LW29 and W4 to W5

4.3.2 Ulan West Underground

Underground mining operations[23] included development of roadways for LW06, LW07 and the main headings consistent with first workings approvals. Secondary extraction of LW05[24] commenced 1 March 2019 and is forecast to finish 9 June 2020. Ulan West produced 6,496,341 million tonnes of ROM coal during the reporting period (**Table 4.2**). Infrastructure construction continued in 2019 commissioning is expected to be completed in 2020.

4.3.3 Open Cut

The Open cut mining area[25] has been in care and maintenance since 10 October 2016.

4.3.4 Saleable Production

Total product coal for the reporting period was 12,623,841 tonnes. **Table 4.2** provides an overview of the production schedule for 2019 against the previous reporting year and the forecast for the 2020 reporting period.

4.3.5 Bobadeen Basalt Quarry

The Bobadeen Basalt Quarry[26] produced no Basalt Road Base in 2019 for road works or infrastructure construction.

Table 4.2 - 2019 Cumulative Production

	Unit	Approved limit (specify source)	2018 Reporting Period	2019 Reporting Period	2020 Reporting Period **(Forecast)**
Topsoil Stripped	m^3	NA	0	3,884	7000
Topsoil Used/Spread	m^3	NA	0	0	0
Overburden Moved	m^3	NA	0	0	0
Open Cut	m^3	NA	0	0	0
ROM Coal Mined					
Ulan West	tonnes	NA	7,307,735	6,496,341	6,151,042
Open Cut	tonnes	4,100,000[27]	0	0	0
Ulan Underground	tonnes	NA	4,871,158	6,127,499	5,638,215
Total ROM	tonnes	NA	12,178,894	12,623,841	11,789,257
Product	tonnes	20,000,000[28]	11,537,048	12,623,841	11,720,949
Process Waste Course Rejects	tonnes	NA	381,888	239,149	237,225
Process Waste Tailings	tonnes	NA	259,957	180,999	320,000

[23] Ulan West uses longwall methods to mine the DWS. Longwall 01: 250m wide, LW2: 303m wide, remaining blocks are 400m wide.
[24] The EP, required by PA08_0184, Schedule 3, Condition 26, was approved for LW01-LW02 25 March 2014 and LW03 to LW04 30 May 2016.
[25] When operating, the Open Cut utilises a dragline to strip mine overburden and trucks, excavators and loaders for coal mining.
[26] Annual production limit of 100,000 tonnes (EPL394, A1.2).
[27] PA08_0184,S2,6(a)
[28] PA08_0184,S2,6(b)

4.4 Coal Handling and Processing

4.4.1 Mining Waste

The CHPP, located at the USO, washed 26% of Ulan West ROM and 22% of Ulan Underground ROM. The reject waste produced represents approximately 14% of the ROM coal processed in the plant; classified as either coarse reject (239,509 tonnes) and emplaced in the Barrier Pit or tailings (181,000 tonnes) emplaced in East Pit tailings dam number 2.[29]

4.4.2 Coal Loaded and Rail Movements

Product coal transported via rail[30] on the Sandy Hollow rail corridor to the Port of Newcastle[31] during the reporting period was 12,377,429 tonnes.[32] No movements occurred on the Tallawang to Wallerawang rail corridor in the 2019 reporting period.[33] Coal movements are summarised below.

Table 4.3- Coal Loaded and Train Movements in 2019

Month	Average and Maximum Trains Leaving Site per Day (Maximum allowed 10[34])	Total Movements for the Month	Coal Loaded for the Month
January 2019	3 - 5	108	984,252
February 2019	3 - 5	73	650,220
March 2019	3 - 5	86	797,686
April 2019	4 - 5	120	1,087,449
May 2019	3 - 5	88	1,398,555
June 2019	4 - 6	106	1,065,981
July 2019	4 - 6	132	1,227,771
August 2019	3 - 5	106	976,649
September 2019	4 - 6	111	1,026,206
October 2019	4 - 5	122	1,116,950
November 2019	3 - 5	96	886,600
December 2019	4 - 6	126	1,159,110

[29] High Risk Activity (HRA) Notification 25 March 2018.
[30] PA08_0184 Schedule 2 Condition 7(a)
[31] Product coal is stacked onto product stockpiles and reclaimed by a rail mounted bucket wheel reclaimer to the rail load out bin.
[32] PA08_0184 Schedule 2 Condition 6 (b)
[33] PA08_0184 Schedule 2 Condition 7(b)
[34] PA08_0184 Schedule 2 Condition 7(c)

5. 2018 Annual Review Feedback

The 2018 AR was submitted on 31 March 2019.[35]. The 2018 AR was accepted by DPI&E, in a letter dated 22 May 2019. A joint government agency meeting was held on the 13 June 2018 to complete a site inspection of the operation.

6. Environmental Performance

6.1 Meteorological Monitoring

6.1.1 Meteorological Overview

The weather station (WS1), located adjacent to the USO administration office, continuously records meteorological data [36] using multiple sensors and a data-logging system on a 30 metre tall mast. Logged meteorological parameters are listed in **Table 6.1**. WS1 is linked directly to the Sentinex[37] repository database providing access to real time weather conditions and rainfall events.

Table 6.1 - EPL 394 Meteorological Monitoring Parameters

Parameter	Unit of Measure	Frequency	Averaging period	Sampling Method
Wind Direction	Degrees	Continuous	15 minute	AM-2 & AM-4
Wind Speed	Metres per second	Continuous	15 minute	AM-2 & AM-4
Sigma Theta	Degrees	Continuous	15 minute	AM-2 & AM-4
Rainfall	Millimetres	Continuous	15 minute	AM-4
Air Temperature	Degrees Celsius	Continuous	1 hour	AM-4
Relative Humidity	Percent	Continuous	1 hour	AM-4

Notes: wind speed at 10, 20 and 30 metres above ground, wind direction at 10, 20 and 30 metres above ground sigma-theta from sampled wind direction measurements, temperature at 2 metres and 10 metres above ground. WS1 was maintained and operated in accordance with the OEH's 'Approved methods for the sampling and analysis of air pollutants in NSW' (EPA, 2006) which refers to Australian Standard AS2923 -1987 (Guide for measurement of horizontal wind for air quality applications).

[35] PA08_0184 Schedule 5, Condition 3
[36] Condition 23, Schedule 3 of PA08_0184 and EPL394
[37] Sentinex is a web-based platform to communicate from monitoring locations

6.1.2 Rainfall Summary

The rainfall recorded at WS1 for the 2019 reporting period was 352.6 mm, 187.9 mm less rainfall than 2018 (**Figure 6.1**) and 319.4 mm below the long term average of 672mm for the region (2009 EA). The majority of rain received was during the first quarter of 2019, with 70 per cent of the annual total falling within this quarter. The wettest month was January with 145.2mm of rainfall recorded. The driest month was April with 0mm of rainfall recorded.

Table 6.2 - Summary of Meteorological Conditions

Date	Rainfall (mm)	Rainfall Cumulative (mm)	Temperature Min (°C)^	Temperature Max (°C)^	Prevailing Wind Directions
Jan-19	145.2	145.2	17.2	41.9	East
Feb-19	5.3	150.5	7.3	37.9	East
Mar-19	98.4	248.9	5.9	35.3	West and East
Apr-19	0	248.9	-0.9	30.3	East
May-19	20.2	269.1	-3.3	24.1	South West
Jun-19	9.7	278.8	-7.9	22.0	South West
Jul-19	5	283.8	-5.8	21.7	West
Aug-19	7.4	291.2	-8.1	25.0	West
Sep-19	28.5	319.7	-5.1	30.0	South West
Oct-19	9.7	329.4	-0.7	34.5	West
Nov-19	19.6	349	3.0	37.0	West
Dec-19	3.6	352.6	5.2	42.2	West

Notes: ^15 minute capture period for data used.

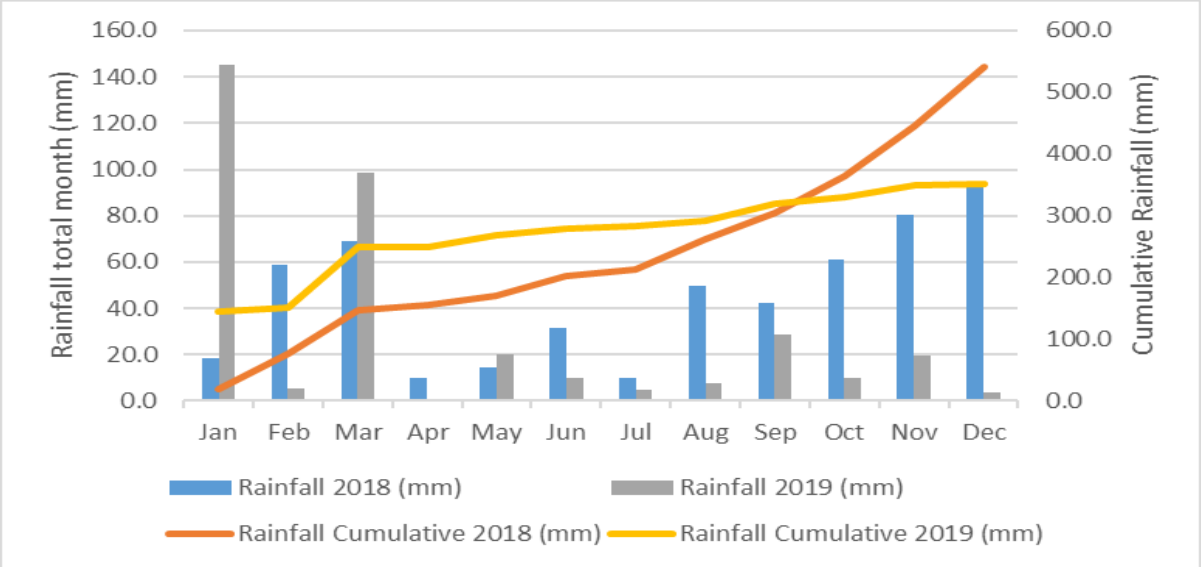


Figure 6.1 Rainfall comparison to previous reporting period

6.1.3 Temperature

Monthly minimum and maximum 15-minute temperatures recorded at WS1 are provided in **Figure 6.2** and **Figure 6.3**. The highest temperature over a 15-minute period of 42.2°C was recorded on 21 December 2019 and the lowest temperature over a 15 minute period of -8.1°C was recorded on 14 August 2019. The maximum and minimum were comparable to previous reporting periods.

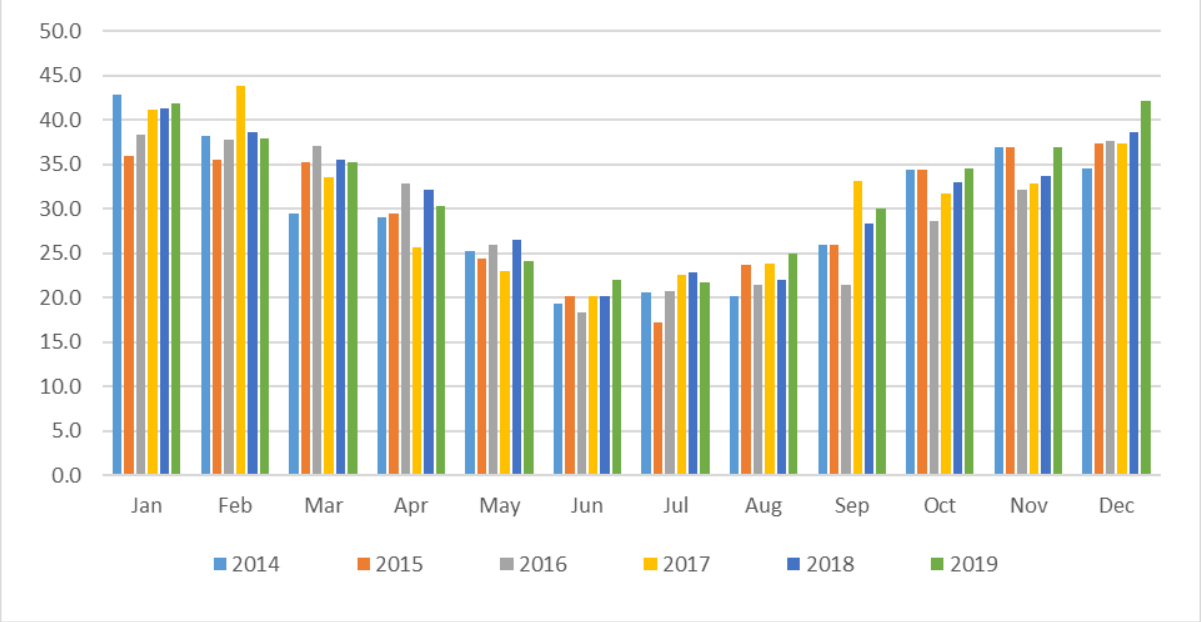


Figure 6.2 Six Year Maximum Temperature Trends

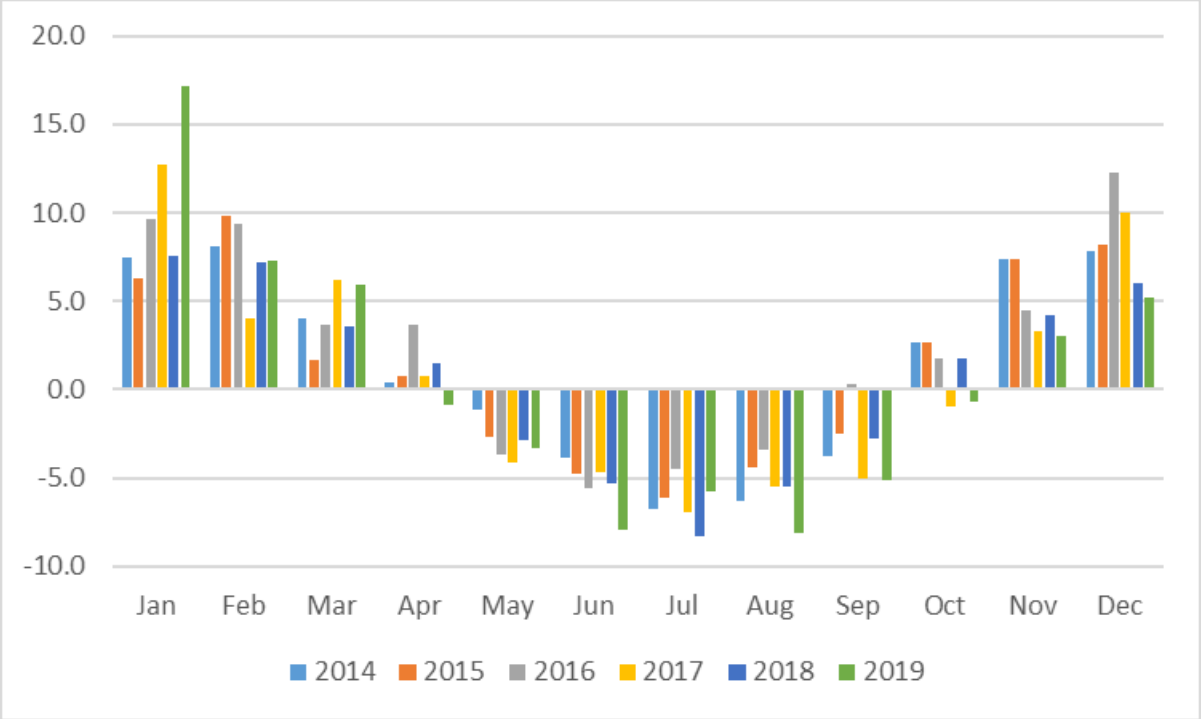


Figure 6.3 Six Year Minimum Temperature Trends

6.1.4 Wind Speed and Direction

Prevailing winds were generally from the West during winter and from the East during summer, consistent with the historical data presented in the EA. A westerly wind pattern is more common during winter through to early spring, in contrast to an easterly wind pattern during summer and autumn. Monthly wind roses for 2019 are presented in **Figure 6.4** on the following page.

6.2 Operational Noise

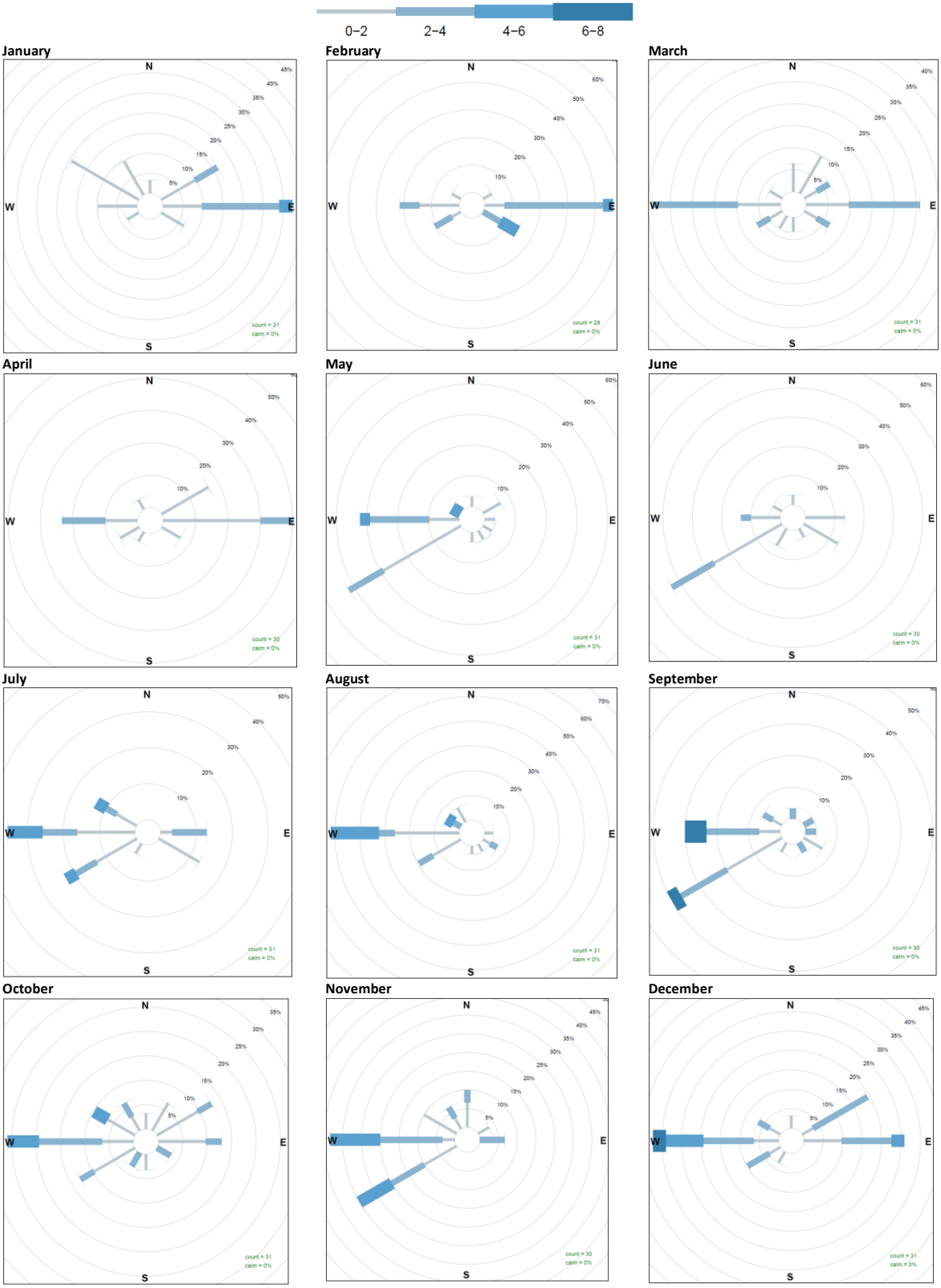
The Noise Management Plan (NMP) (ULNCX-111515275-232)[38] describes the attended noise monitoring, primarily used for determining compliance against the noise criteria, and unattended or real-time monitoring, which is used for proactive noise management. **Figure 6.5** displays the locations of the real time noise monitors (which may be relocated as required) and attended noise monitoring. Attended noise monitoring[39] results are provided below in **Table 6.3**, with attended noise monitoring reports provided at **Attachment A**.

6.3 Blasting

No blasts[40] were undertaken at the Bobadeen Quarry in 2019. Hence there were no exceedances of overpressure and vibration criteria[41] or the predicted impacts, as modelled in the 2009 EA, including the 100mm/s for Aboriginal Heritage sites or 10mm/s criterion for European heritage sites.

[38] PA08_0184 schedule 3, condition 9
[39] Reference methods: NSW Environment Protection Authority, Noise Policy for Industry, 2017. (NPfI,2017) and Australian Standards: AS 1055.1, AS 1055.2 and 1055.3 Acoustics - Description and measurement of environmental noise; AS 2659.1 - Guide to the use of sound measuring equipment; and AS 2659 - Sound level meters.
[40] If blasting was undertaken it would need to be within the hours 9:00am to 5:00pm Monday – Saturday as per EPL394, condition L6.2. No blasting activities may be undertaken on Sundays or Public Holidays.
[41] PA 08_0184, Schedule 3, Condition 10A

Figure 6.4 Monthly Wind Roses



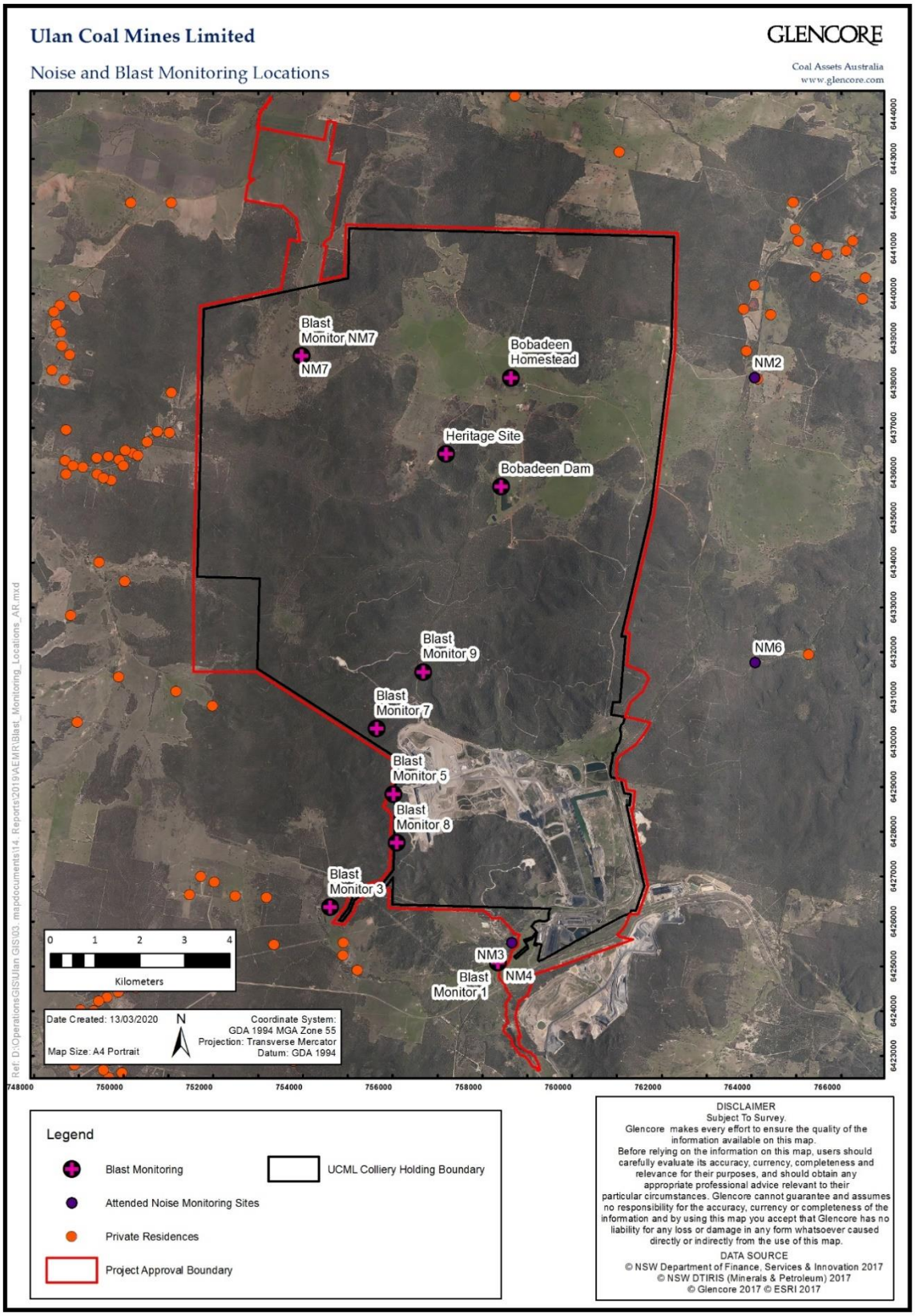


Figure 6.5 Noise and Blast Monitoring Locations

Table 6.3 - Attended Noise Monitoring Summary LAeq (15-min) and Maximums (dB) 2019

Criteria/prediction*

Ulan Monitoring ID/ Licenced EPL394 Monitoring Point	Property Number	DayLAeq,15minute	Evening[1] LAeq,15minute	Night[1] LAeq,15minute	Night[1] LA1,1minute[3]
NM2/ 38	60	35	35	35	45
NM3/ -	274	NA	NA	NA	NA
NM4[2]/26	Ulan School	35	NA	NA	NA
NM6/ 38	1	35	35	35	45
NM7/ 24	254	38	38	37	45

Notes:
1. NA indicates criteria is not applicable at this location during this time.
2. Criteria for Ulan Public School (internal) 'when in use'
3 All LA_{max} results are interchangeable with LA1(1min) for assessment purposes

The updated noise assessments for Mod 3 and Mod 4, combined with the *Environmental Assessment (2009)* indicate that:

- Three private residences are predicted to exceed 35dBA LAeq (15 min) at some stage of the project and have higher criteria limits to allow for short term elevated noise as indicated in the table above. Other residences have since been acquired and are no longer subject to the specified noise criteria;

Performance during reporting period

Attended Noise Monitoring – June Results

Monitoring Locations	Property Number	Maximum Result LAeq 15min dB	Complies	Maximum Result LA1(1min) dB	Exceedance
NM2	60	IA	Yes	IA	Nil
NM3	274	44	Yes	47	Nil
NM4[2]	Ulan School	IA	Yes	NA	Nil
NM6	1	IA	Yes	IA	Nil
NM7	254	<27	Yes	30	Nil

IA = Inaudible refers to the noise measured that is attributable to Ulan Coal operations 2. Criteria for Ulan Public School apply 'when in use'

Attended Noise Monitoring – December Results

Monitoring Locations	Property Number	Maximum Result LAeq 15min dB	Complies	Maximum Result LA1(1min) dB	Exceedance
NM2	60	IA	Yes	IA	Nil
NM3	274	42	NA	46	Nil
NM4[2]	Ulan School	IA	Yes	NA	Nil
NM6	1	<20	Yes	<20	Nil
NM7	254	38	Yes	26	Nil

IA = Inaudible NA = noise criteria does not apply 2. Criteria for Ulan Public School apply 'when in use'

Trends/Key Management Implications

- Attended noise monitoring occurred on two consecutive days, during June and December, in 2019[42] as follows:
  - During the evening and night periods of 24, 25 & 26 June, and the day periods of 24 and 25 June 2019; and
  - During the evening and night periods of 17,18 and 19 December, and the day periods of 17 and 18 December 2019;
- Noise from Ulan Coal was inaudible during 55% of measurements in June and 55% in December;
- The measured LAeq 15-min and LAmax (assessing LA1(1-min)) noise emission levels from Ulan Coal complied with applicable noise limits;
- Stability class data (atmospheric data for wind speed and direction) rendered criteria not applicable on occasion (as documented in the consultants reports);
- Four noise complaints were received in 2019, less than the twenty six complaints in 2018. Noise complaints and responses to the complaints are available on the Ulan Coal Website *www.ulancoal.com.au* .
- Current attended noise monitoring results are within or below levels predicted for year 8 of the project (Section 5.9.1.4 and Appendix 12) in the EA. The trend for attended noise monitoring results over time is stable (**Table 6.4)**.

[42] NMP, Section 4.1

Table 6.4 – Attended Noise Monitoring LAeq Maximums (dB) 2011 – 2019

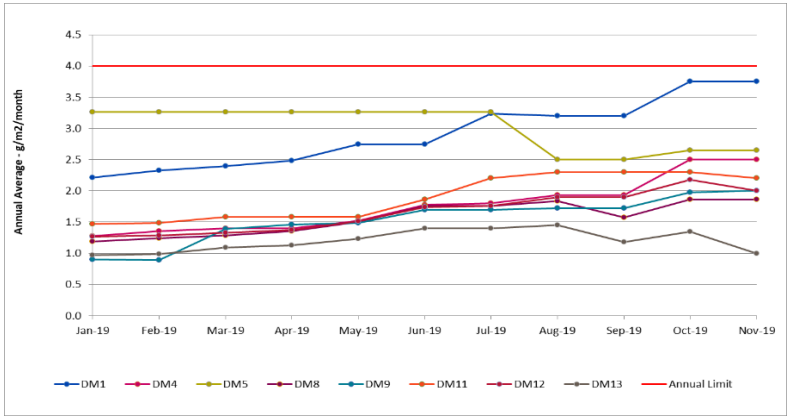
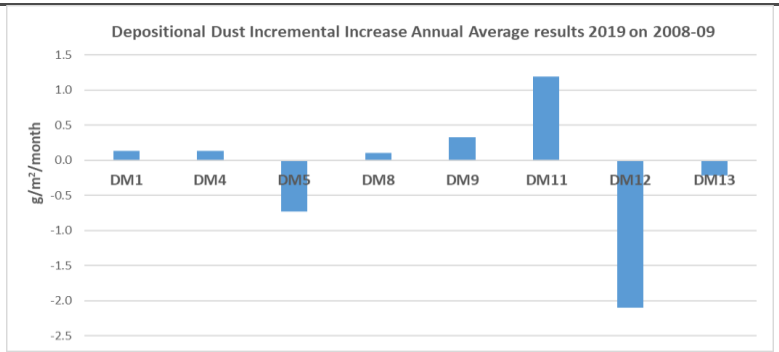
Location	NM2	NM3	NM4	NM6	NM7
Noise Criteria	35	n/a*	35	35	38
2011	48	50	52	42	-
2012	IA	43	30	IA	29
2013	29	50	<20	31	37
2014	20	49	IA	26	<20
2015	20	46	IA	27	IA
2016	<23	53	IA	<25	<27
2017	<25	47	<35	28	25
2018	IA	45	IA	IA	26
2019	IA	44	IA	<20	38
General Trend (Stable, Increasing, Decreasing)	Decreasing	Relatively Stable	Decreasing	Decreasing	Increasing

Notes: IA – inaudible. *NM3 must be acquired on request noise criteria do not apply (n/a).

6.5 Air Quality

The following summary table compares the 2019 monitoring results with impact assessment criteria, predictions in the EA and monitored dust levels in previous reporting periods. Air quality monitoring locations are shown in **Figure 6.6**. Detailed results are provided in **Attachment B**.

Table 6.5 - Compliance Summary Air Quality Monitoring

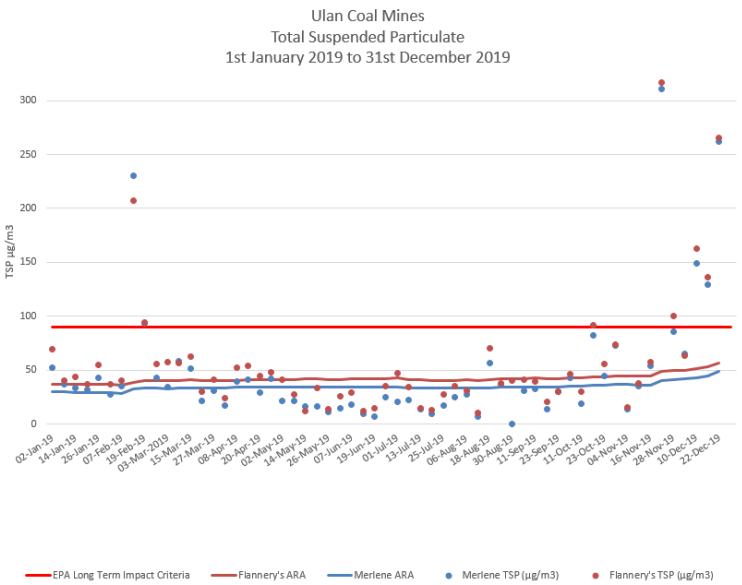
Criteria/ prediction*	Performance during reporting period	Assessment of Performance	Data capture/ sample comments	Compliant
PA criteria Deposited Dust Annual Maximum total 4 g/m²/month		The 2019 average annual results indicate that depositional dust concentrations were generally consistent with the historical average (**Attachment B**). The 2019 results are generally consistent with EA predictions.	A number of Monthly deposited matter samples for all sites were contaminated from insects, vegetation/ seeds and farming activity. Dust deposition monitoring ceased in November 2019 with variation of EPL394.	Yes
PA criteria: Deposited dust Annual Max increase 2 g/m²/month **EA predictions Y7:** no residences affected by > 2 g/m²/month increase		There were no incremental increases of greater than 2 g/m²/month when compared to the annual average dust deposition levels from the 2008-09 reporting period. A review of the historical dust depositional averages generally indicates a stable trend in deposition dust concentrations.	As above. Contaminated results removed from the 2019 annual average	Yes

<table>
<tr><th>Criteria/ prediction*</th><th>Performance during reporting period</th><th>Assessment of Performance</th><th>Data capture/ sample comments</th><th>Compliant</th></tr>
<tr>
<td>Total Suspended Particulate (TSP)

PA criteria

Annual Criterion 90 µg/m³

EA predictions Y7

No residences to be affected by annual average of >90 µg/m³</td>
<td>
<table>
<tr><th></th><th>Flannery's (HV1) µg/m³</th><th>Merlene (HV3) µg/m³</th></tr>
<tr><td>Capture rate</td><td>99..2%</td><td>98.4%</td></tr>
<tr><td>Annual Average</td><td>57.07</td><td>49.47</td></tr>
<tr><td>Maximum result</td><td>317</td><td>311</td></tr>
</table>


Notes: ARA – Annual Running Average
</td>
<td>The annual average TSP concentrations recorded at HV1 and HV3 were below the project specific criteria of 90 µg/m³ in 2019.

The TSP results for 2019 were in line with predictions provided in the air quality assessment from the 2009 Environmental Assessment.

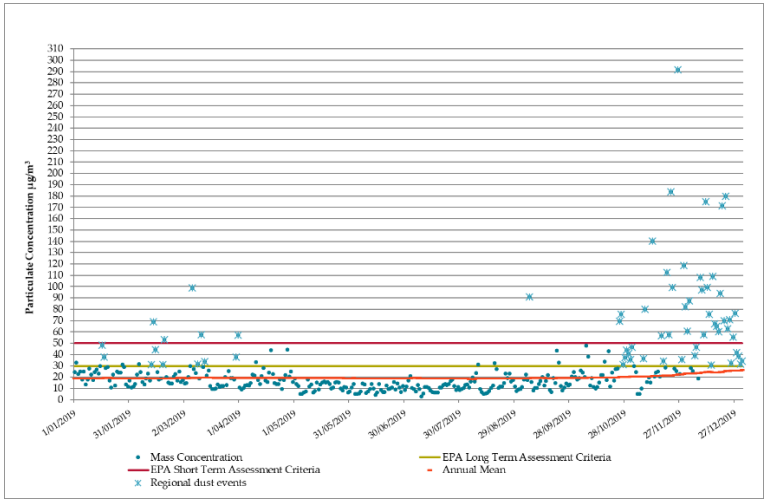
The TSP annual averages for 2019 where higher than those recorded 2014 to 2017.</td>
<td>9 HV1 and 6 HV3 samples exceeded 90 µg/m3. Regional air quality events were occurring at the time of elevated readings.

Elevated readings due to regional dust events are excluded from the Annual Average to provide representative results. (Attachment B).</td>
<td>Yes</td>
</tr>
</table>

<table>
<tr><th>Criteria/ prediction*</th><th>Performance during reporting period</th><th>Assessment of Performance</th><th>Data capture/ sample comments</th><th>Compliant</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Tapered Element Oscillating Microbalance (TEOM) Particulate matter <10µm (PM_{10})

PA Criteria: Annual average 30 µg/m³

EA predictions Y7

30 – 50 µg/m³</td><td> 

<table>
<tr><th>Reporting Period</th><th colspan="2">TEOM PM_{10} Results</th></tr>
<tr><td rowspan="3">2019</td><td>Capture Rate</td><td>100%</td></tr>
<tr><td>Annual Average</td><td>26.1 µg/m³</td></tr>
<tr><td>Maximum (24hr)</td><td>291.4 µg/m³</td></tr>
</table></td><td>The annual average PM_{10} was 26.1 µg/m³ (16.5 µg/m³ if regional dust events are excluded), below the annual average criteria of 30µg/m³.

Measured annual average PM10 in 2019 was lower than predicted in the EA.

Measured annual average PM10 in 2019 was higher in comparison to previous monitoring periods.

The 24 hour average PM_{10} concentration exceeded the 50µg/m³ impact assessment criteria a total of 88 times in 2019. All of these exceedances coincided with regional dust events. These results were omitted from the calculation of the annual average and the graph presented (Attachment B).</td><td>Regional dust events occurred in Jan, Feb, Mar, Sept, Oct, Nov and Dec, with the December event occurring on 28 of 31days. Air quality monitoring results from other monitors in close proximity to these monitors recorded similar results during these time periods.

One hundred percent (100%) of 1 hour average PM_{10} results were captured during the 2019 monitoring period. On each occasion an exceedance occurs, investigation is undertaken and the results provided to DPI&E and EPA.</td><td>Yes

No</td></tr>
</table>

Notes: *Refer to Condition 19 of Project Approval PA 08_0184 for notes and further details on Criteria

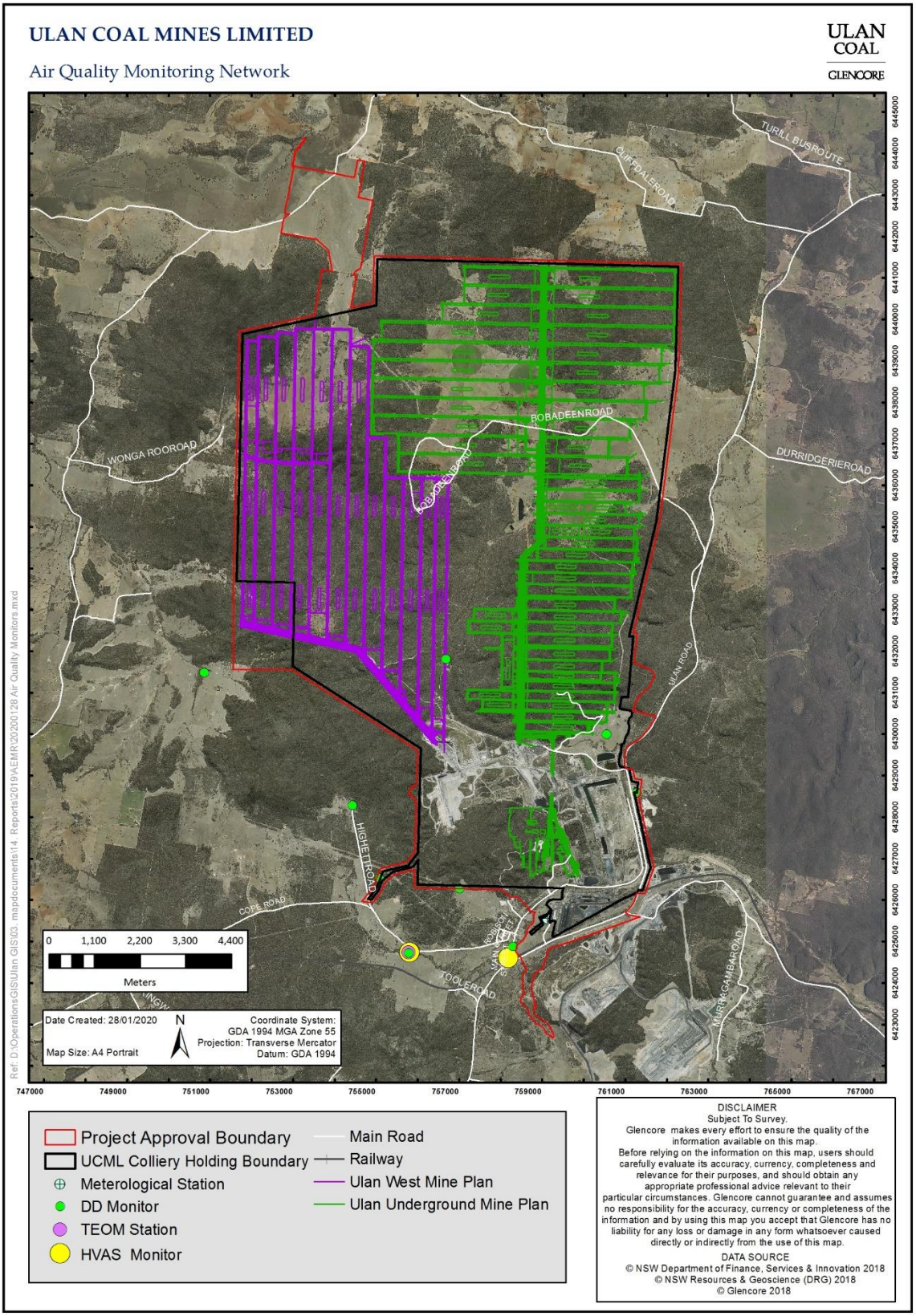


Figure 6.6 Air Quality Monitoring Network

6.6 Heritage

6.6.1 Aboriginal Heritage

Aboriginal heritage activities undertaken in accordance with the Heritage Management Plan (HMP) (ULNCX-111515275-95)[43] in 2019 included:

- Survey fieldwork and assessment as per Section 3.7.4 of the HMP for the Ulan Underground, EL8687 and EL7542 exploration programs;
- Ulan West Infrastructure corridor survey;
- Completion of works on the Hands On Rock Board Walk;
- Inspections of Grinding Grooves at Bobadeen and Valley Way;
- The Brokenback Conservation Area Agreement was signed by the parties on 17 May and registered on title on 11 December 2019;
- The Valley Way Grinding Grooves was gazetted as a Crown Land Reservation in December;
- Laser scanning of selected rock shelters above UWO longwall 5; and
- Monitoring of aboriginal rock shelter sites in accordance with the Extraction Plans (results provided in Attachment J).

Aboriginal Heritage Meetings were held in July and December 2019. Items discussed included:

- Operational update;
- Feedback about the Independent Audit;
- Management Plan updates;
- Outcomes of the Residue Analysis workshop;
- Laser Scanning of Brokenback Rock Shelters;
- Outcomes of the Hands on Rock work;
- Update on the Bushfoods Handbook; and
- The upcoming program of heritage works.

6.6.1.1 Bobadeen and Valley Way Grinding Groove Conservation Areas

Inspections of the Bobadeen and Valley Way Grinding Grooves Conservation Areas were undertaken on the 30 March and 17 December 2019. Both areas are in good condition and no management issues were identified.

6.6.2 European and Natural Heritage

Minor maintenance of the Bobadeen Homestead, fences and gardens was undertaken in accordance with the Bobadeen Homestead Management Plan.[44] Slashing around the homestead was undertaken in the spring/summer months to reduce the risk of a bushfire damaging the homestead.

The buildings of the Bobadeen Homestead are located approximately 100m from where Ulan Underground Longwall W4 finished. No subsidence impacts were observed in an inspection conducted on 9 January 2019 after longwall W4 was completed. The Bobadeen Homestead is directly above the eastern end of Ulan Underground Longwall W5. Inspection on 11 June 2019 when the longwall face was approximately 2km to the west, did not identify any subsidence impacts.

Restoration works around the remaining chimneys at the Old Ulan Conservation Area commenced and will be completed in 2020.

[43] PA 08_0184, Schedule 3 condition 47
[44] PA08_0184, Schedule 3, Condition 47 (d) and ULN SD EXT 0094 April 2011, revised scope of works ULN SD EXT 0135 January 2014

6.7 Biodiversity

Flora, terrestrial and aquatic fauna/stream health monitoring was completed consistent with the Biodiversity Management Plan (BMP) (ULNCX-111515275-225), which includes the Offset Management Plan (OMP).Reports of monitoring prepared by Eco Logical Australia (ELA) and Fly By Night Bat Surveys (FBN) are provided in **Attachment E**. Locations of monitoring sites are indicated in **Figure 6.7**. The 2019 monitoring consisted of:

- **Flora** – Assessment of 43 floristic sites, consisting of 31 full floristic and 12 rapid assessment sites and 60 floristic based subsidence sites;
- **Fauna** (excluding microbats) – Feral animal monitoring was conducted using 10 infra-red motion cameras set up along two monitoring transects (Trig Road – Transect 1 and Apple Road – Transect 2), capturing high resolution images of passing fauna over fourteen consecutive days Targeted *Tyto novaehollandiae* (Masked Owl) surveys were conducted at two sites. Nest Box monitoring of 100 pre-selected nest boxes was conducted to assess their condition and signs of use;
- **Microbats** –24 sites within past, current and future mine subsidence areas located over Ulan West LW01-LW07 and Ulan Underground LWW3-LWW5 were monitored. An additional eight control sites were sampled that have not been undermined by longwalls.
- **Aquatic fauna and riparian habitat** – within creek and river systems internal to, upstream and downstream of the project approval area.

6.7.1 Floristic Monitoring

The floristic performance of each Management Zone (MZ),[45] shown on **Figure 6.8**, is assessed in the Floristic Monitoring 2019 Annual Report (**Attachment E).** Conclusions of the assessment are summarised below.

6.7.1.1 Management Zone 1 – Benchmark Vegetation

Twenty-two (22) monitoring sites located within MZ1 were surveyed in 2019. This comprised of nine (9) full floristic plots and 13 rapid assessment plots.

Attaining benchmarks is not required for areas in MZ1, but Biometric Vegetation Type (BVT) benchmarks provide a useful yardstick. Each BVT in MZ1 has achieved its respective benchmark for native species richness when averaged across the years except for HU551. Failure to reach benchmark levels on a year to year basis particularly across 2013, 2016, 2018 and 2019 correlate to low rainfall years.

Exotic groundcover has also shown a noticeable decrease since 2016 which may be attributed to below average rainfall and subsequent dry conditions experienced during the monitoring periods on average, all BVTs are currently meeting the Year 9 Completion Criteria of <15% cover of weeds.

[45] Refer to BMP section 6 for MZ descriptions and objectives

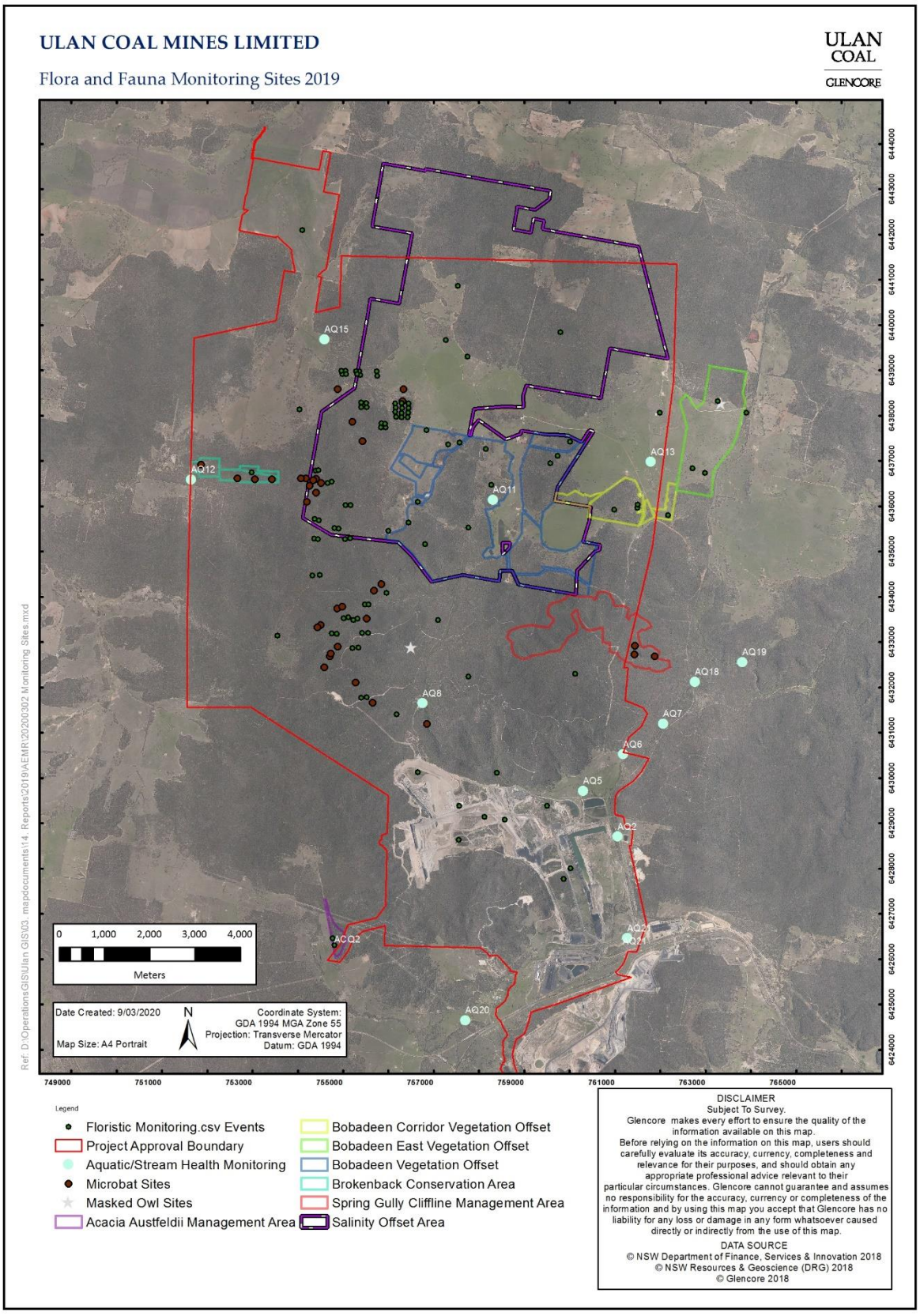


Figure 6.7 2019 Flora and Fauna Monitoring Sites

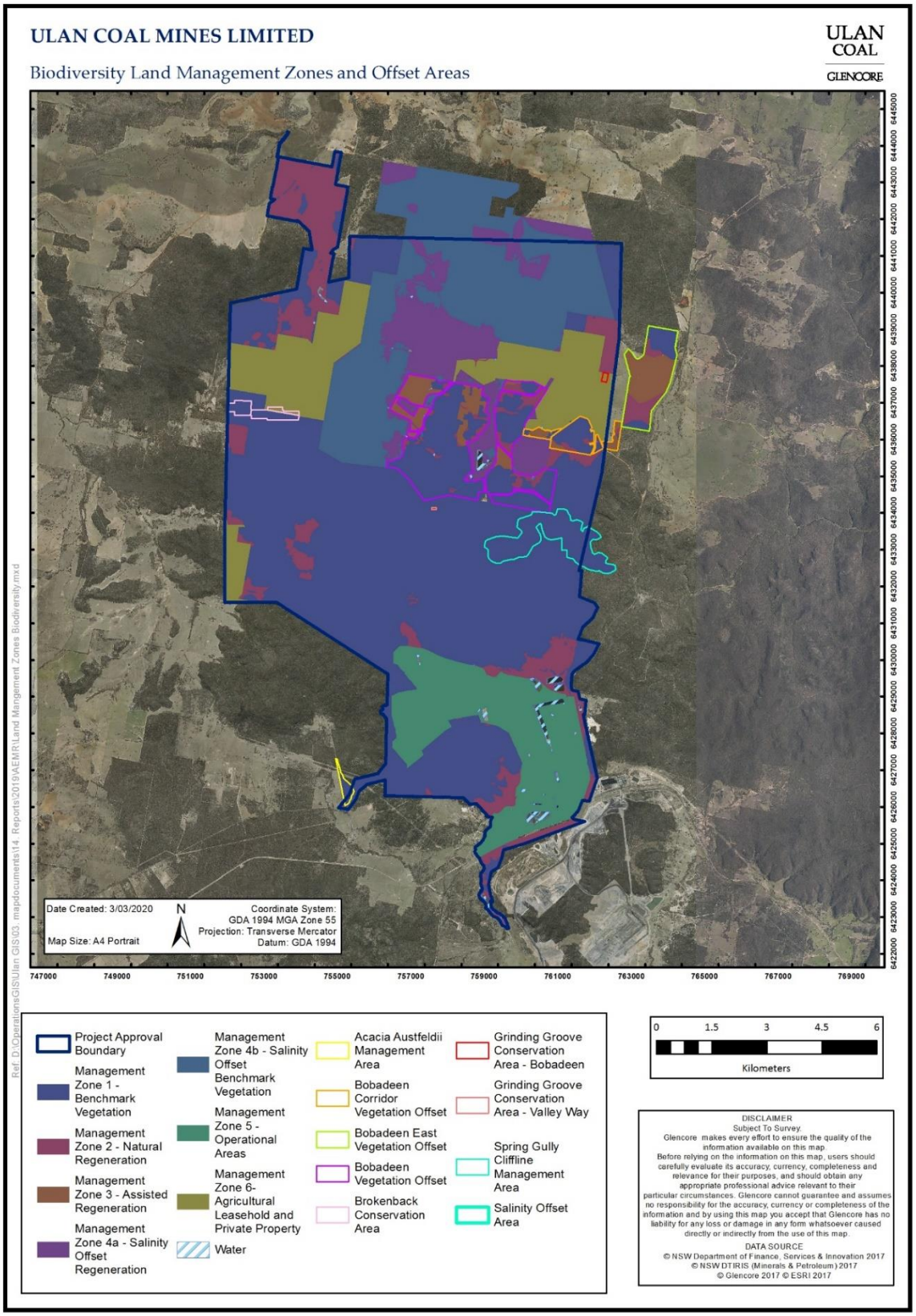


Figure 6.8 Management Zones

6.7.1.2 Floristic Based Subsidence Monitoring within MZ1

Twenty (20) new Floristics Based Subsidence (FBS) sites located at longwall panels UW LW6 and UG LWW6 were established in autumn 2019. A total of 40 previously established sites along UW LW4, UG LWW4, UW LW5 and UG LWW5 also underwent monitoring in 2019.

Native species richness data collected from seven FBS monitoring sites shows no clear trends and does not indicate subsidence-related impacts on plant biodiversity for any site. Variation between years is consistent with observations at other BioMetric plots at the site and most likely explained by seasonal variation.

6.7.1.3 Management Zone 2 - Natural regeneration

Five (5) full floristic sites were monitored in MZ2 during 2019. Two (2) out of three (3) BVTs monitored in 2019 recorded native species richness above that of the benchmark for each respective vegetation type for 2019 and on average across all years of monitoring.

Exotic groundcover has fluctuated over the years, and no increase or decline can be observed with fluctuation in exotic ground cover attributed to rainfall timing across years, however two BVTs within MZ2 recorded considerably higher exotic ground cover. Previous monitoring periods have recorded exotic ground cover in all years. High exotic ground cover is likely caused by higher soil fertility present. On average, all MZ2 BVTs are meeting the 20-year completion criteria for exotic ground cover (<15%).

Field observations have been that natural regeneration is occurring in the Ulan Project Area, with windrows of felled trees now under a relatively mature woodland/open forest canopy and extensive areas of young trees.

6.7.1.4 Management Zone 3 – Assisted Revegetation

Approximately 225 ha in MZ3 (revegetation MZ) has been planted or directed seeded to create either gum-box grassy woodland or ironbark woodland/open forest vegetation communities. Monitoring shows that tree planting/direct seeding has achieved 90% success spatially. This is a significant contribution to meeting the mining approval requiring establishment or improvement of gum-box grassy woodland and fauna habitat across 413 ha of the Biodiversity Offset Area (BOA).

Three (3) full floristic sites were monitored in MZ3 during 2019. When averaged across years, one (1) BVT, HU552: Grey Gum – Narrow-leaved Stringybark – Ironbark Woodland is currently meeting the benchmark value for native species richness. All remaining BVTs recorded average native species richness across years of between 30 to 99 % of the benchmark value.

Two BVTs, HU515 Blakely's Red Gum – Yellow Box grassy open forest and HU654 White Box – Yellow Box grassy woodland are within the limits of the 9-year benchmark for <15% exotic groundcover.

All BVTs continue to be below benchmark values for both Large Woody Debris (LWD) and Hollow Bearing Trees (HBTs). The LWD and HBTs present within MZ3 are in very low densities and are not picked up by the series of established monitoring plots. MZ3 is typified by isolated large paddock trees with hollows and may provide LWD in the form of dropped limbs at the base of paddock trees.

6.7.1.5 Management Zone 4 – Salinity Offset Area (SOA)

Natural regeneration and some planted areas are present in MZ4a around the irrigation pivots. MZ4a overlaps MZ3 and BOAs. Of 24 floristic monitoring sites, 17 are located in BOAs. Six rapid assessment sites (SOA 1-6) are located solely within MZ4a. Three natural regeneration transects (SOA1, SOA2, and SOA3) identified natural regeneration of multiple overstorey species, with all transects recording natural regeneration in both seedling (<5 cm DBH) and sapling (5-15 cm DBH) forms. Three sites

(SOA4, SOA5 and SOA6) within MZ4a underwent both natural regeneration and rapid floristic assessment monitoring during autumn 2019

Average exotic ground cover across all monitoring years is below the benchmark limit. Ground cover (including native groundcover, litter, rocks and cryptogam) has decreased over 2018 and 2019 across MZ4a sites. This is likely attributable with below average rainfall conditions experienced within these years and it is anticipated that ground cover will increase when average annual rainfall is received.

An area in the SOA was examined for changes in area of tree cover over nearly 3 decades. When comparing the extent of cleared land in 1990 with that in 2019 that there has been an increase of 50 ha of treed area in an area of 150 ha of previously cleared land. The extent of tree cover was delineated as the limit of young trees that occur in fringe areas extending out from remnant woodland and isolated trees. A caveat for this work is that this limit of young trees could not be detected in the aerial photography of 1990, so the treed area in 1990 could have been greater than that mapped. However, examination of the 1990 aerial photography and that flown in 2019 shows there has certainly been an increase in tree cover both in terms of extent and percentage cover over this period. The current presence of very small trees in the form of seedlings and saplings indicates that natural regeneration is ongoing in the SOA.

6.7.1.6 Management Zone 5 – Operational Area – Open Cut Rehabilitation Area

Eight (8) MZ5 sites underwent floristic monitoring, landform stability and habitat value assessments MZ5 during 2019.

The areas currently monitored achieve the management aim for Secondary Domain B of a woodland in many parts. However, the density of stems means many of the rehabilitation areas would be classified as open forest. If a woodland structure is desired there will need to be thinning. In these woodland and open forest areas the mix of species is not reflective of any particular BVT.

There is no benchmark requirement for woodland in MZ5, however the use of BVT benchmarks provide a valuable yardstick for considering success. The average of all years (28.4 native species) exceeds the native species richness benchmark for HU574 Narrow-leaved Ironbark – Grey Gum shrubby woodland of 26 native species and is under the native species benchmark for HU551 Grey Box – Narrow-leaved Ironbark shrubby woodland of 35 native species. This is consistent with average native species richness from 2015 onwards. Cover and abundance of herbs are low, possibly due to a high litter load and bare soil / rock covers, which are typical of post-mining rehabilitation soils in combination with the dry climatic conditions.

Table 6.6 Native Species Richness for each BVT in MZ2 monitoring sites (2011-2019)

BVT	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average	BVT Benchmark	No of Sites	Area (ha)
HU515					30	31	38		37	33	25	1	74.6
HU552					26	21	27	23	NA	24	23	1	151.6
HU605	24	28	20	20	23	31	27	22	30	25	24	9	188.5
HU654	25	27	13	19	22	24	28	18	18.5	23	23	6	253.8

Table 6.7 Native Species Richness for each BVT in MZ3 monitoring sites (2011-2019)

BVT	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average	BVT Benchmark	No. of sites	Area (ha)
HU515	14.5	16.5	13.3	18.25	23.3	21	N/A		24	18.7	25	7	56.9
HU552					38		N/A		19	28.5	23	1	32.5
HU605	28	26	20	13	20		N/A		NA	21.4	29	2	15.4
HU654	15.3	16	13.5	13.1	19.1	22.7	N/A	27	9	17.0	23	9	184.2

6.7.2 Nest Box Monitoring

Fifty (50) out of the 100 nest boxes monitored during 2019 demonstrated signs of use; with 37 of these nest boxes containing nests or nesting material. Thirty (30) nest boxes were determined to have been used recently, based upon the apparent freshness of nesting material (e.g. leaves) and scats present. Of the 100 nest boxes monitored, 96 were deemed fit for use and only four (4) were in need of repair or re-attachment. None were unserviceable and in need of replacement.

Resident fauna was observed in one (1) nest box, with *Varanus varius* (Lace Monitor) recorded in nest box BOA23-5 (Hollow Log Homes Treecreeper nest box), whilst a single white egg, likely belonging to a native parrot species, was recorded in nest box BOA20-10.

6.7.3 Fauna

Call playback and spotlighting surveys were conducted during the evenings of 22 and 23 October 2019 at monitoring sites BE2 and RES2. No Masked Owls were recorded at either monitoring site, however, *Ninox connivens* (Barking Owl), listed as Vulnerable under the BC Act, was recorded at site BE2 on both survey evenings. The absence of Masked Owl during 2019 surveys does not indicate that the habitat contained within the UCMPL complex is unsuitable for this species. As the species is mobile and rare throughout its range, there is potential for it to utilise this area.

Grantiella picta (Painted Honeyeater) which is listed as Vulnerable under the BC Act and EPBC Act, and *Calyptorhynchus lathami* (Glossy Black-Cockatoo) which is listed as Vulnerable under the BC Act were observed opportunistically within the UCMPL project area during 2019. The presence of these species, demonstrates that the UCMPL project area continues to provide habitat for these two specialists feeding species.

6.7.4 Microbat Monitoring

Microbat monitoring was undertaken at 20 general monitoring sites, eight control sites that have not been undermined by longwalls, twenty-four sites above the first seven panels of Ulan West and three sites above three panels of Ulan Underground.

Fifteen microbat species were recorded in total at the general fauna sites during the 2019 surveys. This is similar to that recorded during previous monitoring. The number of species recorded at each site varied from five to eleven.

Six species were captured in harp traps, the Large-eared Pied Bat *(Chalinolobus dwyeri),* Chocolate Wattled Bat *(Chalinolobus morio),* Lesser Long-eared Bat *(Nyctophilus geoffroyi),* Gould's Long-eared Bat (*Nyctophilus gouldi),* Southern Freetail Bat *(Mormopterus planiceps)* and Little Forest Bat *(Vespadelus vulturnus).*

Monitoring at the targeted microbat sites during 2019 has provided information on the continued presence and abundance of the three target bat species within these areas. The Large-eared Pied Bat was captured at one and recorded from call at fifteen impact sites and captured at one and recorded from echolocation call at seven of the eight control sites. Capture of lactating females at UGLWW3, UG1 and SG7 confirmed continued breeding in these areas. In the case of SG7 this represented the first evidence of breeding at the Spring Gully Domain since 2004.

Additional data is available for target species: the Large-eared Pied Bat; Eastern Horseshoe Bat; and Large Bent-winged Bat longwall panels within the application area for the Ulan West Extraction Plan for LW1 to 6. Analysis of the data showed six examples of both decreased and increased activity of target microbat species at monitoring sites over previously mined longwall panels compared with activity prior to mining and control sites. The decreased results trigger an investigation consistent

with the requirements of the Ulan West LW1 to LW6 BMP. The investigation will be undertaken in 2020.

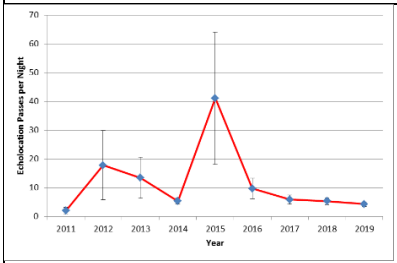
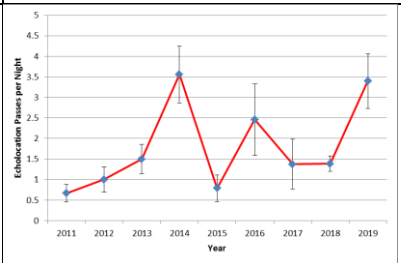
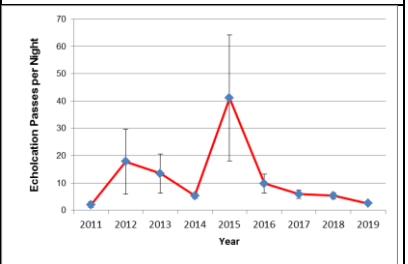
Large-eared Pied Bat	Eastern Horseshoe Bat	Large Bent-winged Bat
		

Figure 6.9 Mean Activity Levels of Target Microbat Species 2019

6.7.5 Aquatic Monitoring

The 2019 monitoring event occurred during prolonged drought conditions. Therefore, only nine of fourteen sites had enough water for the full suite of ecological samples to be collected. Due to the low rainfall in the lead up to sampling, flow at most sites was dominated by discharged mine water.

6.7.5.1 Macroinvertebrates

Aquatic Macro invertebrate taxonomic richness recorded in the 2019 field study ranged from 12 to 17 taxa identified at sites upstream of UCC operations and ranged from 14 to 20 taxa identified in sites downstream of the operations. SIGNAL scores were generally lower than earlier years with ranges from 3.29 to 3.6 in upstream sites and 3.0 to 4.41 in downstream sites. Average SIGNAL scores of each site from 2011 to 2019 are shown in **Figure 6.10.** The 2019 results likely indicate the impact of prolonged drought conditions on macroinvertebrate communities, through reduced water inundation and flow, resulting in decreased habitat.

6.7.5.2 Riparian Habitat

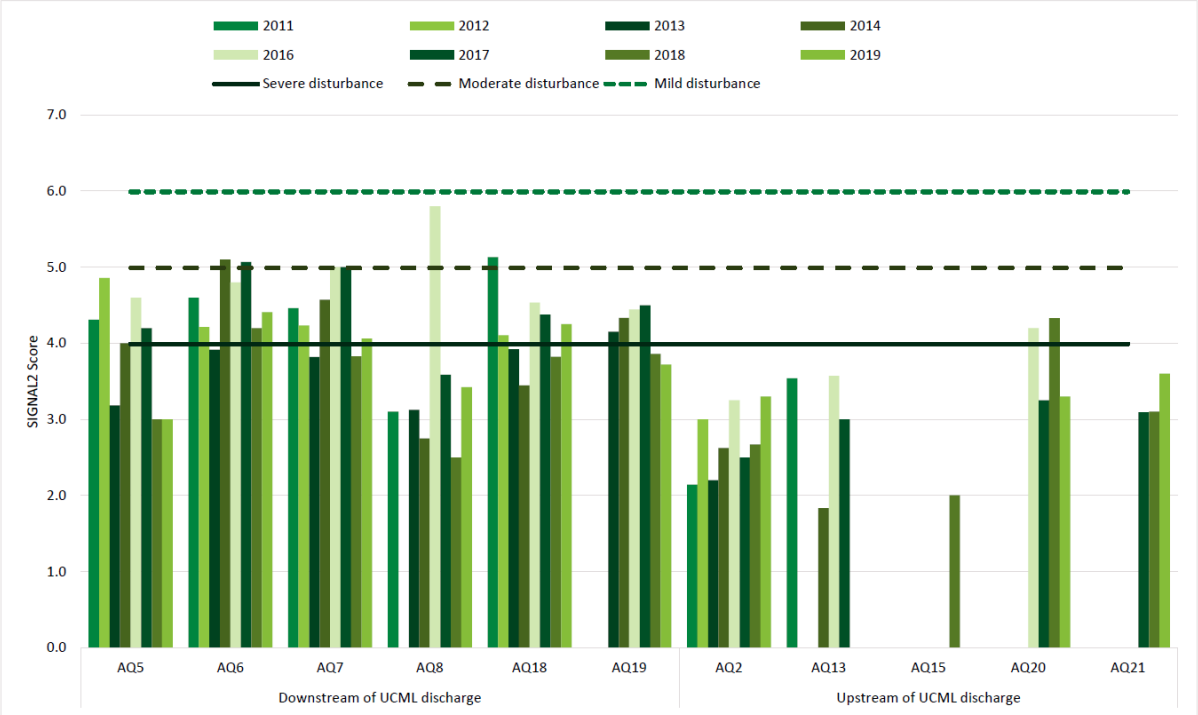
A comparison of RCE results from 2011 to 2019 (where available due to varied site establishment) reveals highly consistent results. Eleven sites were classified as 'Good' and 3 sites ranked as 'Excellent'. Photographic comparisons of each site further demonstrate the relative stability observed at each site across monitoring years. RCE results for individual sites reflect the nature of the riparian habitat present. Both Goulburn River Diversion sites AQ2 and AQ20 experienced an increase in their RCE scores since 2016, in line with remediation works undertaken during this period. Overall, the RCE results indicate that the riparian environment is not subject to any ongoing adverse effects resulting from mining operations and are reflective of historical regional land use practices in the catchment. Results are outlined in **Figure 6.11** below.

6.7.5.3 Water Quality

With low flow in the period prior to the aquatic ecology field work, much of the sampling was undertaken from discrete pools. The lack of flow is considered to have influenced the SIGNAL scores and water quality. The water quality measurements collected at the time of sampling provided the following results:

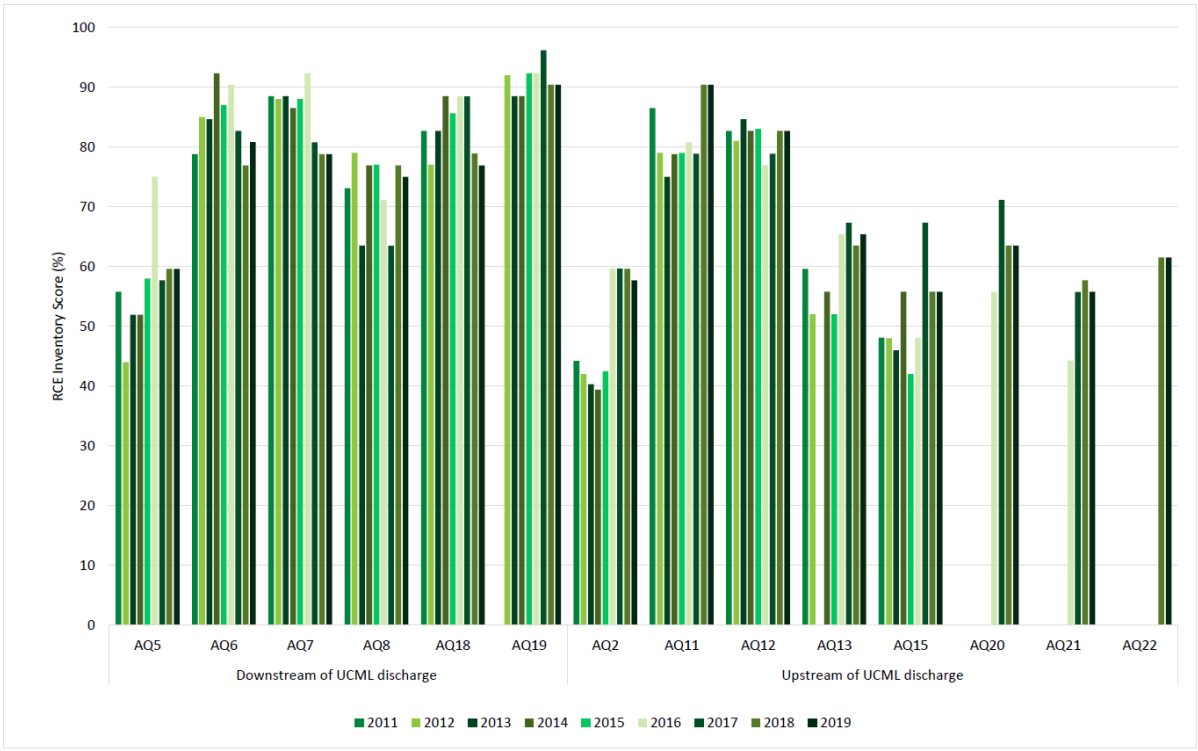
- DO concentrations recorded in 2019 were largely consistent with 2016 and 2018 results, although notably lower than 2017 results. DO variability was evident upstream and downstream of Ulan Coal discharge points and operational boundaries;

- All sites except for AQ5 and AQ19 demonstrated an increase in EC from 2018 monitoring. Higher EC values were observed upstream and downstream of Ulan Coal discharge points and operations



Source: *2019 Aquatic Monitoring Report (ELA, 2019)*

Figure 6.10 Average SIGNAL2 Scores per site 2011 to 2019



Source: *2019 Aquatic Monitoring Report (ELA, 2019)*

Figure 6.11 Comparison of RCE Inventory Percentage Scores across sites over time

6.7.6 Pest and Weed Monitoring

Six (6) feral animal species were recorded across both remote camera monitoring transects, five (5) of which are listed as priority pest species under Section 5 of the Central Tablelands Regional Strategic Pest Management Plan 2018-2023 (Local Land Services, 2018). Red Fox (Vulpes vulpes) was the most commonly recorded feral pest species and was recorded at both transect locations (Appendix A). All feral pest species identified through this monitoring have been previously recorded within the UCMPL complex.

The local Land Authority conducted an aerial dog baiting program in June and ground baiting conducted within the Open Cut area. Large numbers of pigs were entering onto the Bobadeen pivots and a baiting program was conducted with an estimated 240 pigs baited

A targeted shooting program for pest species was also undertaken by a licenced shooter and pastoral leaseholders to address overgrazing and feral pest issues targeting Pigs, Foxes, Deer and Kangaroos.

There has been little weed growth in 2019 due to drought conditions. Weed management focussed on *Heliotropium amplexicaule* (Blue Heliotrope), *Opuntia* sp. (Prickly Pear), *Xanthium spinosa* (Bathurst burr), *Juncus acutus* (Spiny Rush), *Cenchrus sp*. (spiny burr grass) and *Hypericum perforatum* (St John's Wort).

6.8 Energy and Greenhouse Gas

Greenhouse Gas (GHG) and energy consumption is reported[46] for Ulan Coal Mine which triggers the individual facility threshold.[47] GHG emissions and energy consumption are reported under the parent company, AZSA Holding Pty Ltd. Estimated GHG emissions (Scope 1 and 2) for the reporting period was 201,825 tCO2-e, which is lower than the EA (Umwelt 2009) prediction for year 8 to 11 of the project of 230,934 tCO2-e. The total energy consumed for Scope 1 and Scope 2 was 632,779.08 GJ, which is lower than the EA prediction of 799,814 GJ. Importantly, energy and GHG intensity remain lower than predicted in the EA with energy intensity 21% lower than predicted and GHG intensity approximately 13% lower than predicted.[48]

6.9 Mine Subsidence

Underground Mining activities undertaken during the reporting period are outlined in **Section 4.3.**

Subsidence monitoring compares survey of monitoring lines and the monitoring of heritage sites, infrastructure, cliff lines, flora, fauna, groundwater, drainage lines and surface waters to subsidence predictions.[49] In 2019 subsidence monitoring focussed on;

- Ulan Underground LWW5 (SMP/EP), which requires the submission of 4 monthly subsidence status reports and end of panel reports; [50] and
- Ulan West Operations LW05 (EP) which requires submission of an Annual Report (incorporated into this Annual Review, **Attachment J**) by 31 March.

Subsidence effects as follows, were within predictions:

[46] PA 08_0184 Schedule 3, Condition 22, Air Quality and Greenhouse Gas (GHG) Management Plan (ULNCX-111515275-1653) and *National Greenhouse and Energy Reporting Act (NGER) 2007* (Cth)

[47] > 25,000 tonnes of carbon dioxide equivalent (t CO2-e) generated and/or > 100 terajoules (TJ) of energy consumed *NGER 2007* (Cth)

[48] Energy intensity of 0.051 GJ/ tonne of ROM coal produced, predicted 0.081 GJ/tonne. GHG intensity 0.017 tCO2e/ tonne of ROM coal produced, compared with predicted rate 0.029 tCO2e /tonne.

[49] PA08_0184 Schedule 3, Condition 24

[50] Status reports submitted to DRG, DPI-Water and OEH (15 August 2018 and 2 January 2019). End of Panel report for LWW4 due 10 April 2019.

- Minor cracking of land including internal roads;
- Rock falls and perceptible cracking in clifflines, including a number identified rockshelters;
- No obvious signs of subsidence impact to major drainage lines or creek lines;
- No evidence of subsidence impact upon flora or fauna including endangered species and communities; and
- No public safety concerns raised.

An assessment of subsidence performance during the reporting period against the performance measures[51] are provided in **Table 6.8**.

6.10 Waste Management

Disposal and tracking protocols for waste, processes for identifying and minimising waste generation, controls to mitigate waste impacts and responsibilities for waste management are described in the Waste Management Plan (WMP) (ULNCX-111515275-98).[52] A licensed waste contractor provides off-site waste disposal and recycling. A summary of waste performance is provided in **Table 6.** below.[53] Approximately 62% of waste was recycled including oil filters, waste grease, scrap metal, timber, paper and cardboard, and empty drums. Waste contained onsite for disposal (in accordance with EPL 394), included 5 tonnes of Concrete (in accordance with Condition L4.1 which specifies a limit of 400 tonnes per year).

Table 6.9 – Summary of Monthly Waste Statistics for 2019

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Totals
USO	**Total Offsite Waste (T)**	90.2	18.5	14.5	30.4	31.1	19.8	19.4	21	17.0	17.3	22.0	18.1	319.5
	Recycled Waste	85.9	14.7	8.5	23.2	27.3	14.6	15.8	12.6	11.8	9.9	19.2	10.2	253.75
	Recycling %	**95.3**	**79.7**	**58.4**	**76.0**	**87.7**	**73.9**	**81.2**	**59.8**	**69.4**	**57.1**	**87.4**	**56.3**	**79.4**
UUG	**Total Offsite Waste (T)**	70.9	70.7	91.7	92.6	62.8	96.9	92.6	70.6	88.7	77.5	91.3	66	972.3
	Recycled Waste	35.2	37	27.6	54.7	36.5	68.2	73.5	40.1	37.2	52.1	74.3	46.7	583.2
	Recycling %	**49.6**	**52.4**	**55.5**	**59.1**	**58.2**	**70.4**	**79.4**	**60.4**	**41.9**	**67.2**	**81.4**	**70.8**	**63**
UWO	**Total Offsite Waste (T)**	98.6	75.8	81.9	136.1	112.9	141.4	150.3	119.9	83.8	93.1	117.1	128.8	98.6
	Recycled Waste	34.9	24.4	24.5	80	45.8	69.1	77.7	49.1	25.6	31.1	55.2	77.8	590.3
	Recycling %	**35.4**	**32.2**	**29.9**	**58.8**	**40.6**	**48.9**	**51.7**	**41**	**30.5**	**33.4**	**47.1**	**56.5**	**44.1**

[51] PA08_0184 Schedule 3 Condition 24
[52] PA 08_0184 Schedule 3, Condition 54,and SoC 6.15.1 and EPL 394.
[53] PA 08_0184 Schedule 5, Condition 3.

Table 6.8 - PA08_0184 Subsidence Performance Measures

Subsidence Performance Measures		Assessment of Performance[54] 2019 (Ulan Underground LWW4 & LWW5, Ulan West LW04)
Water		
Ulan, Mona & Cockabutta Creeks	No greater environmental consequences than predicted in the EA *EA 2009 predictions:* *Ulan Creek is considered unlikely to be significantly impacted by the proposed mining. Some small horizontal movements may occur toward the goaf, but the character and capacity of the creek to maintain flow is unlikely to be affected by these movements.* *Mining below ephemeral creeks is considered to have the potential to reduce surface flows and the duration that pools retain water following a rainfall event.*	Assessment by Pacific Environmental indicates compliance for Ulan Creek. Other creeks are too remote to be impacted. (Pacific Environmental 2019 **Attachment G**).
Biodiversity		
Threatened species, populations, habitat or ecological communities	Negligible impact	Floristic-based subsidence (FBS) monitoring showed a 1-7% decrease in projected foliage cover across longwall and transition sites. This decrease sites may be associated within ongoing drought conditions resulting in dieback in the canopy. There is no clear trend of canopy decline over-time that would indicate an adverse impact of subsidence on tree health (Eco Logical 2019 Flora report **Attachment E**). Compliance expected because there were no greater subsidence effects than those expected in EAs and EPs. (SCT 2019 **Attachment J**). Analysis of the microbat data showed examples of both decreased and increased activity of target microbat species at monitoring sites over previously mined longwall panels compared with activity prior to mining and control sites. The decreased results trigger an investigation which will be undertaken in 2020.
Land		
Cliffs in the Brokenback Conservation Area	Nil environmental consequences	Longwall mining in 2019 did not occur near the Brokenback Conservation Area. No perceptible subsidence impacts were observed at any of the sandstone cliff formations inspected by SCT and PE. (SCT 2019 **Attachment J**).
Other cliffs	Minor environmental consequences *EA 2009 predictions:* *Mining subsidence is expected to cause rock falls on 10-20% of the sandstone cliff formations directly above the mining area.*	Surface inspections over Ulan West LW05 and Ulan Underground LWW5 indicate observed subsidence impacts to cliff lines is generally consistent with predictions. (SCT 2019 **Attachment J**).
Heritage		

[54] Assessment made through performance indicators detailed in the component management plans of the SMP/EP Approvals.

Subsidence Performance Measures		Assessment of Performance[54] 2019 (Ulan Underground LWW4 & LWW5, Ulan West LW04)
Aboriginal sites	Nil impact in the Brokenback Conservation Area, Grinding Groove Conservation Areas; and on Mona Creek Rock Shelter Sites	Aboriginal sites listed in this performance measure were not located within the potential subsidence zone for mining in 2019. There have been no recordable changes to these sites as a result of mining. The edge of the Brokenback conservation area is located approximately 2km from UUG LWW5 and 1.2km from UWO LW05. The Mona Creek rock shelters are located approximately 1.1km from UUG LWW5 and 2.5km from UWO LW05. The grinding groove offset areas are located approximately 3.2km from UUG LWW5 and 2.4km from UWO LW05
Talbragar Fish Fossil Reserve	Negligible impact	Longwall mining in 2019 did not occur near the Talbragar Fish Fossil Reserve. UUG LWW4 is located approximately 1.7km to the east of the Reserve and UWO LW5 is located approximately 1.8km south east of the Reserve.
Other Heritage Sites	No greater impact than predicted in the EA EA 2009 predictions: Subsidence movements are not expected to have any practical effect on artefact scatters and isolated finds in open terrain Mine subsidence is not expected to cause any acceleration or change in the degradation that is occurring naturally over time at Old Ulan Village Mine subsidence is not expected to significantly impact any of the European Heritage sites within the Project Area.	Old Ulan Village is located adjacent to UWO LW1. Inspections of the area found no visible impacts of subsidence. Cracking and minor rock falls observed at Aboriginal heritage rock shelter sites Ulan ID 1148, 1149, 1151, 1153, 1154, 1155, 1157 and 1158 were within the range predicted in SCT (2007) for the SMP (SCT, 2019). (SCT 2019 **Attachment J**).
Built Features		
All built features	Safe, serviceable and repairable unless the owner agrees otherwise in writing	No privately owned built features were affected by mining in 2019. Minor cracking of an access tracks located over the longwall panels being mined were observed for Ulan Underground and Ulan West. These observations were consistent with predictions and access tracks were repaired. Road repairs were undertaken to address cracking that posed a potential safety risk to mine employees and contractors. There were no perceptible impact to stock fences located over LWW5. It is noted that fences have been damaged in storm events during 2019.
Public Safety		
Public Safety	No additional risk due to mining	The areas mined in 2019 are not accessible to the public and there is not considered to have been any increase in risk to public safety as a result of longwall mining. No incidents of public safety in relation to mining were recorded in the reporting period.

7. Water Management

The Water Management Plan (WMP ULNCA-111515275-99)[55] includes a number of sub plans and systems including:

- Site Water Balance;
- Erosion and Sediment Control Plan (ESCP) (ULNCX-111515275-224
- Surface Water Monitoring Program (SWMP) (ULNCX-111515275-1642);
- Groundwater Monitoring Program (GWMP) (ULNCX-111515275-1643); and
- Surface Water and Groundwater Response Plan (SWGWRP) (ULNCX-111515275-1644);
- Goulburn River Diversion Remediation Plan (GRDRP) (ULN SD PLN 0054);
- Goulburn River Diversion Erosion & Sediment Control Plan (ULN SD PLN 0104).

7.1 Overview of Mine Water Management System

The mine water management system includes mine dewatering systems, water storages, the Bobadeen Irrigation Scheme (BIS), water treatment facilities, sedimentation and retention basins, settling and tailings ponds, clean water diversion drains and dirty water catch drains, levee banks and earth bunding around stockpiles, hardstand areas and refuelling areas. The key objectives of the water management system include:

- preventing the contamination of clean water by mining and related activities;
- reducing the discharge of pollutants from the mine to the environment;
- minimising adverse effects on the Goulburn River and Ulan Creek;
- managing approved water discharges to meet EPL394 licence conditions;
- segregating mine impacted water from better quality water to minimise the volume of impacted water that requires recycling and treatment; and
- managing the inventory of water on-site in order to meet the requirements of the mining operation.

Open cut mine surface runoff and pit water is directed to the mine water management system to control and treat runoff from site.

7.2 Water Balance

The water balance[56] consists of micro water balances for discrete operational areas of the water circuit (detailed in **Attachment F**). The micro balances are summed to provide the overall water inputs and outputs (**Table 7.1**). Water sources are rainfall on dams and disturbed areas, groundwater inflows to underground mines and the potable water supply. Water is lost through product coal, the Bobadeen irrigation scheme, dust suppression, evaporation, supply to external parties and potable water use. Water in excess of operational needs is discharged from licenced discharge points.

During the 2019 calendar year inflow to the Ulan Underground workings averaged 16.6 ML/day, whilst inflow to the Ulan West Underground workings averaged 2.7ML/day.

11.99ML of potable water was supplied to site through an external party in 2019. Additional potable water—approximately 50.5ML—was sourced from the PB1C bore and treated at the Millers Water Treatment Facility, reducing the need for third party imports.

[55] PA08_0184 Schedule 3, condition 34, EA 2009, EPL394.
[56] In accordance with Condition 34, Schedule 3 of the PA08_0184

Table 7.1 - Water Balance Calculation 2019 Water Year

Water Balance Period[57]	Total Inputs[58]	Total Outputs[59]	Net Water Balance[60]
2019	8156 ML (22.3ML/day)	8504 ML (23.3ML/day)	-348ML (0.95 ML/day)

7.3 Salt Balance

The GoldSIM water model estimates a Net Salt loss of 999 tonnes for the 2019 reporting year.

Table 7.2 – Salt Balance Calculations for 2019

Site	Salt tonnes (1 Jan 2019)	Salt tonnes (31 Dec 2019)	Net Salt Balance 2019 tonnes
Water Management System	16027	15028	-999

7.4 Baseflow Offsets

Baseflow loss to the Goulburn River catchment is estimated by groundwater modelling at 0.037 ML/day, equivalent to 13.5 ML per year.[61] Baseflow loss is offset from Water Access Licence (WAL) 19047[62] for (**Section 5.4**). An average 10.1ML/day of treated water was discharged to the Goulburn River in 2019. Flow at the downstream gauging station (SW02) ranged between 0.35 ML/day and 37.5 ML/day. [63]

Baseflow losses from the Talbragar River catchment have not occurred based on observed levels in VWPs, TAL1 and TAL2, which were installed for the purpose of assessing baseflow impacts in that area. A decreasing pressure trend in the Ulan Seam(approximately 1 m) at TAL1 first noted in 2018, has continued during 2019 consistent with ground water modelling. All sensors in TAL2 identified stable porewater pressures throughout 2019. The groundwater model estimates baseflow losses in the Talbragar catchment will commence at 0.135 ML/day, rising to 0.2 ML/day. UCMPL has secured WALs to offset the Talbragar Baseflow losses as follows:

- WAL 41817 provides 50 units in the Upper Talbragar River Water Source[64]*;* and
- WAL 34921 provides 30 units in the Talbragar Alluvium Water Source.[65]

7.5 Water Extraction Licence Compliance

Water Balance indicates total groundwater extraction of 5259 ML (**Table 7.3**) for the 2019 water year (1 July 2018 to 30 June 2019), of which;

[57] 1 January 2018 to 31 December 2018.
[58] Includes rainfall, seepage from groundwater, coal and spoil, groundwater and water from dewatering bores and runoff/drainage from tailings.
[59] Includes water used in the CHPP, dust suppression, irrigation, licensed discharge, evaporation, moisture bound to coal, rejects and tailings, onsite potable water use and seepage to spoil.
[60] Total inputs less total outputs.
[61] PA08_0184, Schedule 3, condition 29, note
[62] WAL19047 for Upper Goulburn River Water Source within *Water Sharing Plan for the Hunter Unregulated & Alluvial Water Sources 2009*.
[63] Flow at SW02 augmented by licenced water discharge.
[64] *Water Sharing Plan for the Macquarie Bogan Unregulated and Alluvial Water Sources 2012*
[65] *Water Sharing Plan for the Macquarie Bogan Unregulated and Alluvial Water Sources 2012*

- 3226.6 ML of groundwater was extracted from the WSP North Coast Fractured and Porous Rock Groundwater Sources [66] (WAL41492 provides 7060 units of allocation). This was withdrawn under work approval 20AL214787 including various dewatering locations (**Figure 7.1**) throughout the Ulan Complex, none of which are in alluvial sediments;
- 2032.7 ML of groundwater was extracted from the Sydney Basin and Sydney Basin Macquarie - Oxley of the Murray Darling Basin (MDB) Groundwater Source[67] (WAL41906 and WAL37192 provide 2215and 704 units of allocation respectively).
- 309.37 ML of entitlement under water access licence WAL19047 was used during the reporting period (extraction limit 600ML). 0.49ML was extracted from Moolarben Creek Dam/Pump and 18.25 ML of entitlement used to offset the maximum expected base flow losses[68] to the Upper Goulburn River Water Source during the reporting period. 248.61 ML of water was released as flow through the dam wall as per the conditions of the licence and 42.02 ML was evaporated during the reporting period

Table 7.3 – Water Extraction

Water Licence	Water sharing plan, source and management zone (as applicable)	Entitlement (Unit Shares)	Shares in ML for 2019 Water Year	Passive take / outflows	Active pumping	TOTAL
WAL 34921	Talbragar Alluvial Groundwater Source *Macquarie Bogan Unregulated and Alluvial Water Sources 2012*	30	30			
WAL 37192	Sydney Basin Groundwater Source *Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources 2011*	704	704ML			
WAL 41492 (20AL214787, Dewatering / Water Supply Groundwater Goulburn River Catchment of	*Water Sharing Plan for the North Coast Fractured and Porous Rock Groundwater Sources 2016*	7060	7060ML	0	3226[69]	3226

[66] *Water Sharing Plan for the North Coast Fractured and Porous Rock Groundwater Sources 2016*
[67] *Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources 2011*
[68] *Extracted from Sydney Basin Groundwater Source*

Water Licence	Water sharing plan, source and management zone (as applicable)	Entitlement (Unit Shares)	Shares in ML for 2019 Water Year	Passive take / outflows	Active pumping	TOTAL
Hunter Catchment)						
WAL 41817	Upper Talbragar River Water Source *Macquarie Bogan Unregulated and Alluvial Water Sources 2012*	0	0			
WAL 41906	Sydney Basin Groundwater Source *Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources 2011*	2215	2215ML		2005.9	2005.9
WAL 42900	Sydney Basin Groundwater Source *Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources 2011*	4031	4031			
WAL19047 **(20WA209953, Moolarben Creek Dam / Pump / Water Supply)**[70]	Upper Goulburn River Water Source *Water Sharing Plan for the Hunter Unregulated & Alluvial Water Sources 2009*.	600	600ML	248.61	0.49	309.37

Notes: *Includes 0.49 ML water extraction via small pump, 18.25 ML offset baseflows to Goulburn River, 42.02 ML annual evaporation from Moolarben Dam, 248.61 ML to maintain riparian flow.

[70] Works approval 20WA209953 requires riparian flow of 7 L/second. 144.92 ML was released to Moolarben Creek in 2018.

7.6 Licenced Water Discharge

Water treatment and discharge facilities were operated in accordance with EPL 394 during the reporting period. Discharges were made from:

- The Bobadeen Irrigation Scheme (BIS)[71;]
- The Bobadeen Water Treatment Facility (LDP6) [72;] and
- The North West Sediment Dam Water Treatment Facility (LDP19). [73]

Approximately 1889ML of water with an average EC of 1042µS/cm was applied to the BIS in 2019, with modelled offset capacity 80% utilised to the end of 2019. Ecological performance of the offset is described in **section 6.6.1** and groundwater monitoring results are provided in **section 7.11.6**.

Discharge of blended product water from the Bobadeen Water Treatment Facility to Ulan Creek at Bobadeen (LDP6) occurred on 295 days with an average daily discharge volume of 3,680 KL/day. Measured pH, EC and TSS concentrations were within EPL394 limits (**Table 7.7**). The maximum discharge volume on any day was 14,053 KL (EPL394 volume limit 15,000 KL/day) (**Table 7.4**).

Discharge of blended product water from the Northwest Sediment Dam Water Treatment Facility to Ulan Creek near the Goulburn River (LDP19) occurred on 349 days with an average daily discharge volume of 6,420 KL/day and a maximum discharge on any day of 14,041 KL (**Table 7.4**) (EPL394 volume limit 30,000 KL/day). Measured pH, EC and TSS concentrations were within EPL 394 limits (**Table 7.7**).

The maximum combined discharge of 22,756 KL, on 22 April 2019, was below the 30,000 KL limit. Monitoring summaries are provided in **Table 7.4.** No discharges from LDP1 (Millers Dam), LDP2 (Effluent Dams) LDP3 (V-notch weir plate at the end of the discharge channel at Rowans Dam) or LDP4 (Truckfill Dam) occurred. Monitoring was conducted at the Goulburn River Gauging Station Downstream (LMP18), the Goulburn River Gauging Station Upstream (LMP33) and Ulan West Box Cut clean water drain (LDP23) (**Section 7.8** and **Attachment C).**

Table 7.4 - 2019 Calendar Year Discharge Volumes

Location	Licence Limit (ML/year)	Discharged Volume (ML/year)	2019 Discharge Compliance with Annual Discharge Limits
Effluent Storage Dam (LDP1)	31	0	No discharge
Millers Dam (LDP2)	219	0	No discharge
Rowans Dam (LDP3)	3,650	0	No discharge
Truckfill Dam (LDP4)	730	0	No discharge
Discharge to Ulan Creek (LDP 6)	5,475	1928.3	Yes
Discharge to Ulan Creek (LDP 19)	10,950	1187.4	Yes
Discharge to Ulan Creek (LDP3, LDP6, and LDP19)	10,950	3115.7	Yes

[71] The BIS (operating since 2004) utilises five central irrigating pivots to irrigate approximately 242ha of pasture.
[72] The BWTF (commissioned 2006) uses microfiltration and reverse osmosis water treatment and discharges to EPL 394 LDP 6.
[73] The North West Sediment Dam WTF (initially commissioned April 2011) uses a reverse osmosis water treatment process and discharges to EPL394 LDP19. Commissioning of the expanded NWSDWTF occurred on the 28 October 2014.

Location	Licence Limit (ML/year)	Discharged Volume (ML/year)	2019 Discharge Compliance with Annual Discharge Limits
Discharge through irrigation scheme (BIS)	No applicable volume limit[74]	1889	Yes

7.7 Compensatory Water Supply

Compensatory water was supplied to one landholder in response to dry conditions and poor performance of their bore. Groundwater modelling indicates the bore is potentially impacted by drawdown of up to 5m. Drawdown has not been in observed in observation piezometers in the area to date. An Alternative Water Supply Agreement[75] has been agreed with the landholder.

[74] Salinity offset requirement EPL394 E 1.1 b) The Salinity Offset Program must offset the residual salinity loads generated by the Bobadeen Irrigation Area over the life of the Bobadeen Irrigation Program, and its associated salinity load impacts, and when fully implemented, must achieve an offset ratio of 1:1.5.

[75] As required by Condition 30, Schedule 3 of the Project Approval PA08_0184

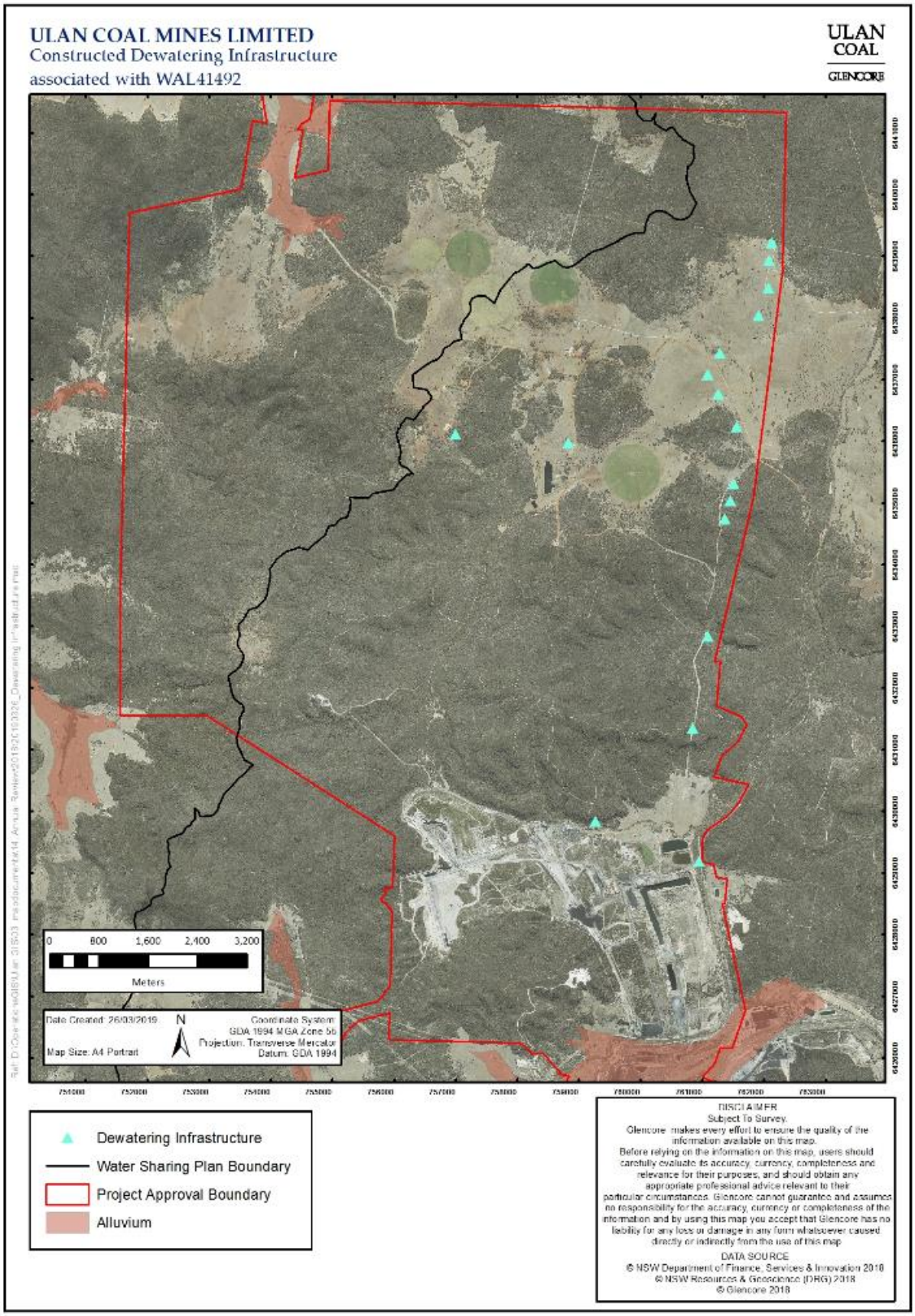


Figure 7.1 Dewatering Infrastructure

7.8 Surface Water Monitoring Results

The Surface Water Monitoring Program (ULNCX-111515275-1642) (SWMP)[76] details surface water monitoring to measure and assess changes in stream health (including base flows) and channel stability that could be attributable to mining activities. The locations of surface water (SW) monitoring and Licenced Discharge Point (LDP) sites are shown in **Figure 7.2**. For details on parameters sampled, sampling method and sampling frequency of each monitoring site see **Attachment C**.

SW01 and SW02 are monitored for pH and EC (µS/cm) via a continuous monitor and TSS collected via monthly grab sample. **Figure 7.3 to 7.8** show the daily average real time water quality results for SW01 and SW02 for 2019 and historical results since 2012. **Figure 7.9** shows flow at SW02 during the reporting period.

The Creeks in the vicinity of the operation are ephemeral. Surface monitoring sites SW03 to SW11 are sampled monthly if flow is present and following any rainfall event greater than 30 mm. Automatic sampling stations are installed at SW06, SW07, SW10 and SW11. Samples are collected and sent to the laboratory for analysis of pH, EC (µS/cm), TSS (mg/L), TDS (mg/L) and Turbidity (NTU). **Figure 7.10 to 7.12** provide water quality results for SW03 to SW11 within the reporting period compared with the historical average (2011-2019). The 2019 average, maximum and minimum sampling result for each surface water sampling site are compared against the adopted trigger values (detailed in the SWMP) in **Table 7.5**. **Table 7.6** provides a summary of investigations undertaken where results exceeded trigger values in 2019. Results of monitoring for EPL 394 licence discharge points are reported in the annual return.

Table 7.5 - Adopted Trigger Values for Key Water Quality Parameters

Water Quality Variable	Goulburn River Upstream (SW01)	Goulburn River Downstream (SW02)	Ulan Creek Upstream of LDP6 (SW03)[9]	Ulan Creek at Old Ulan (SW04)[10]	Ulan Creek at Pleuger Road (SW05)[11]	Talbragar River[3] (SW09)	Watercourses flowing to Goulburn River[4]	Watercourses flowing to Talbragar River[6]
pH	6.5 – 8.01	6.4 – 8.13	6.5 – 7.98	6.5 – 8.58	6.5 – 8.58	6.5 – 8.55	6.5 – 8.06	6.5 – 8.05
EC (µS/cm)	680[2]	854[2]	1126[8]	900[8]	900[8]	125 – 2200[5]	30 – 350[6]	30 – 350[5]
TSS (mg/L)	50[2]	50[2]	64[9]	83.2[10]	50[7]	50[7]	50[7]	50[7]

Notes:
[1] ANZECC (2000) default trigger value range for lowland east flowing coastal rivers in NSW
[2] 80th percentile based on historical data for the Goulburn River
[3] Range within Historical data for Goulburn River Downstream
[4] SW02 is downstream of the Ulan Mine Complex and as such water quality at this location can be influenced by other developments in the catchment outside of UCMPL influence.
[5] Interim trigger values based on ANZECC (2000) default trigger values for lowland rivers in NSW. Site-specific trigger values will be developed as monitoring data becomes available.
[6] Interim trigger values based on ANZECC (2000) default trigger values for upland rivers in NSW. Site-specific trigger values will be developed as monitoring data becomes available.
[7] Interim trigger values based on Volume 1 of Managing Urban Stormwater: Soils and Construction (Landcom, 2004).
[8] Trigger level reflects upstream discharge limit approved under EPL394
[9] 80th percentile of SW03 baseline (31 samples taken between February 2012 and September 2017)
[10] 80th percentile of SW04 baseline (24 samples taken between February 2012 and November 2017)

[76] Condition 34, Schedule 3 of the PA08_0184 and EPL 394, plan approved by DPI&EDPI&E on 29 September 2011, a component of the WMP (ULN SD PLN 0017).

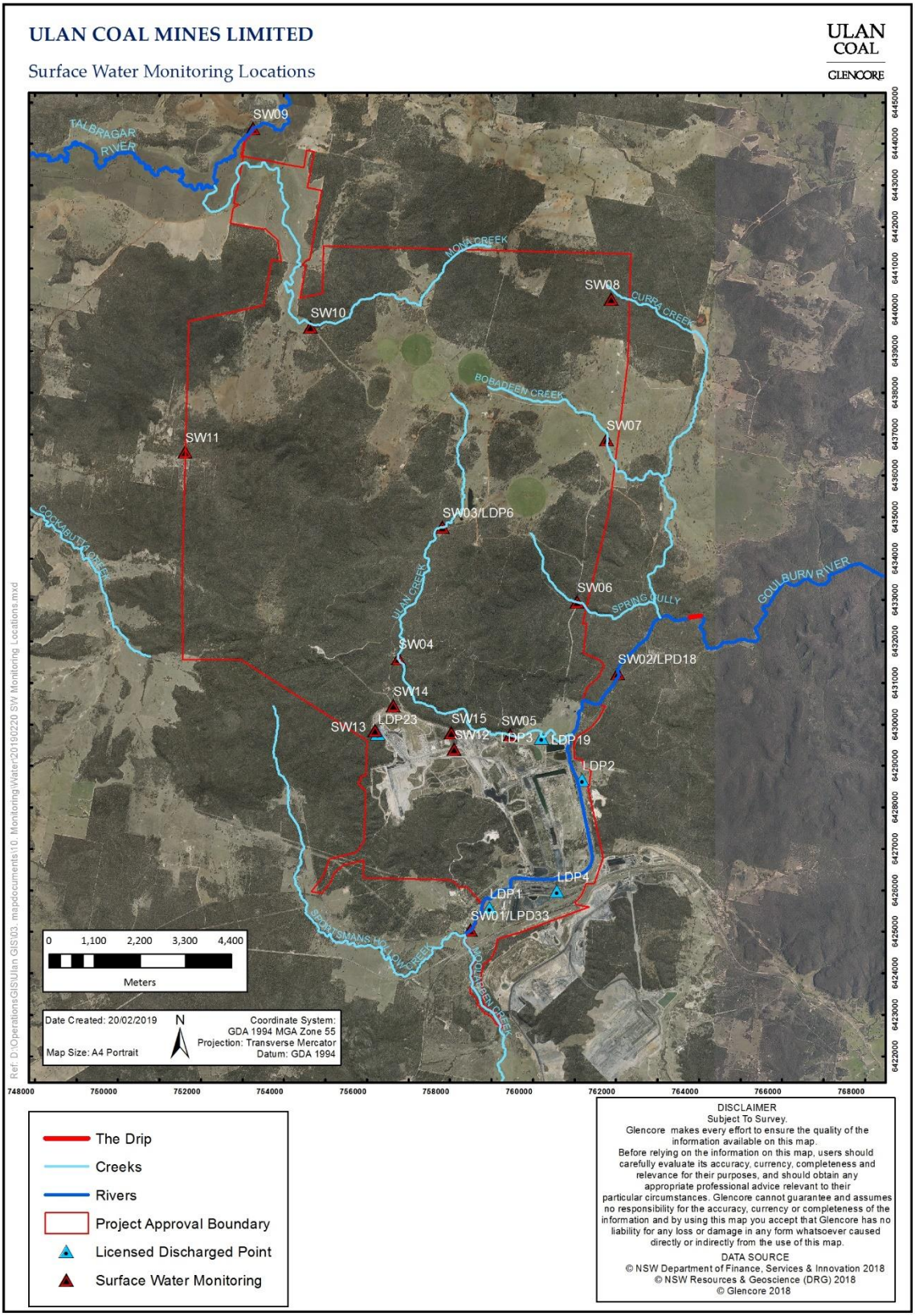


Figure 7.2 Surface Water Monitoring Network

Table 7.6 Surface Water Monitoring Result TARP Activation

Site	Date of sample	Trigger	Action	Result
SW01	17 November 2019	Loss of Continuous Monitoring	Inspection of site undertaken and result revealed that the water in which the probe is situated had been pumped out –	Reported to the EPA and the EPL varied until there was sufficient water to recommence monitoring.
SW03	24 June, 31 July and 28 August	Three consecutive results where the EC was greater than Trigger Value	Investigation revealed that the SW03 was a stagnant pool of water which was no longer flowing due to reduced rainfall. This resulted in increased evaporation, increasing the EC. No elevated results were recorded further downstream	Monitoring of SW03 should only occur when the water is flowing and not just a stagnated pool. Further training of operational staff and detailed recording of field sheets

Table 7.7 - EPL 394 Concentration Limits for Licensed Discharge Points

Location	(LDP)	Discharge Limits								2019 Discharge Compliance with Discharge Limits
		Iron (mg/L)	Conductivity (µS/cm)		Oil & Grease (mg/L)	pH	Zinc mg/L	TSS mg/L	Volume kL/ day	
			50th Percentile	100th Percentile						
Effluent Storage Dam	1	-	-	810	-	6.5-8.5	-	-	85	No discharge
Millers Dam	2	5	-	900	10	6.5-8.5	5	50	600	No discharge
Rowans Dam to Ulan Creek	3	5	800	900	10	6.5-8.5	5	50	10,000	No discharge
Truckfill Dam	4	5	-	900	10	6.5-8.5	5	50	2000	No discharge
Bobadeen WTF	6	-	800	900	-	6.5-8.5	-	50	15,000	Compliant
Goulburn River Gauging Station Downstream	18	-	-	-	-	-	-	-	-	Compliant
North West Sediment Dam WTF	19	-	800	900	-	6.5-8.5	-	50	30,000	Compliant

Location	(LDP)	Discharge Limits								2019 Discharge Compliance with Discharge Limits
		Iron (mg/L)	Conductivity (µS/cm)		Oil & Grease (mg/L)	pH	Zinc mg/L	TSS mg/L	Volume kL/ day	
			50th Percentile	100th Percentile						
Ulan West Box Cut clean water	23	-	-	-	-	-	-	-	-	Compliant
Goulburn River Gauging Station Upstream	33	-	-	-	-	-	-	-	-	Compliant
Ulan Creek Cumulative Discharge Limit^	3+6+19	-	-	-	-	-	-	-	30,000	Compliant

Note: ^ The combined daily discharge from LDP 3, 6 and 19 must not exceed 30,000 kL/day

Table 7.8 - 2019 Sampling result Summary

SW Sites	pH			EC (µS/cm)			TSS (mg/L)		
	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave
SW01	**6.4***	7.95	6.78	305	663	599.94	2	34	11
SW02	6.72	8.19	7.76	707	857	806.8	<1	12	2.4
SW03	7.4	**8.3***	7.86	737	**1680^^**	1153	<1	40	13.4
SW04	7.7	**8.5**	8.25	401	829	748.66	<1	66	13.4
SW05	7.1	8	7.6	551	937	781.7	<1	15	4.25
SW06	7.5			238			95		
SW07	6.5			60			91		
SW08	^								
SW09	7.6			266			1270		
SW10**	6.4	6.5	6.45	41	76	58.5	47	308	177.5
SW11	^								

Notes: Bold results are outside the adopted trigger values. SW01 and SW02 pH and EC from real time monitoring.* Trigger not reached as not three consecutive results ** Two samples only. ^ Indicates no results were obtained during the 2019 reporting period due to no flows in the creek at the time of sampling. *Average Daily Result for pH, EC at SW01, SW02 and SW03. ^^Investigation of trigger in Table 7.6*

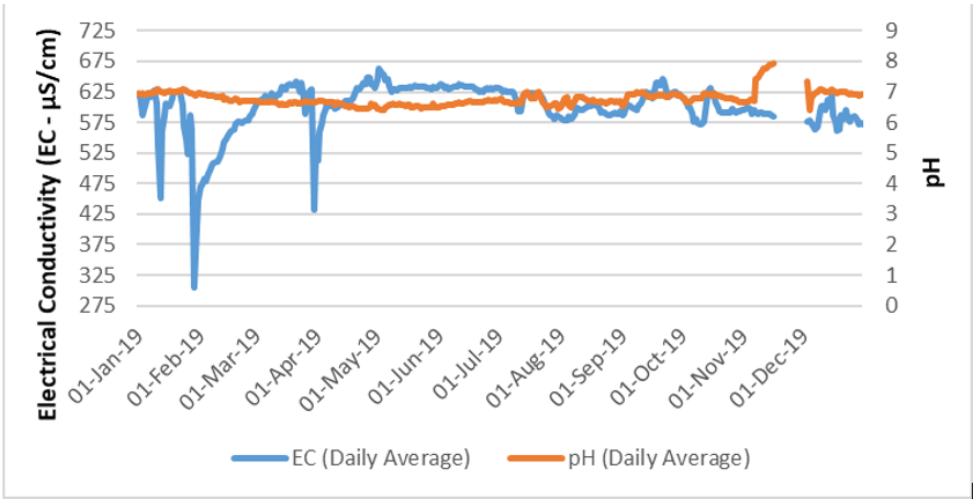


Figure 7.3 SW01 Upstream Goulburn River Monitoring Results 2019

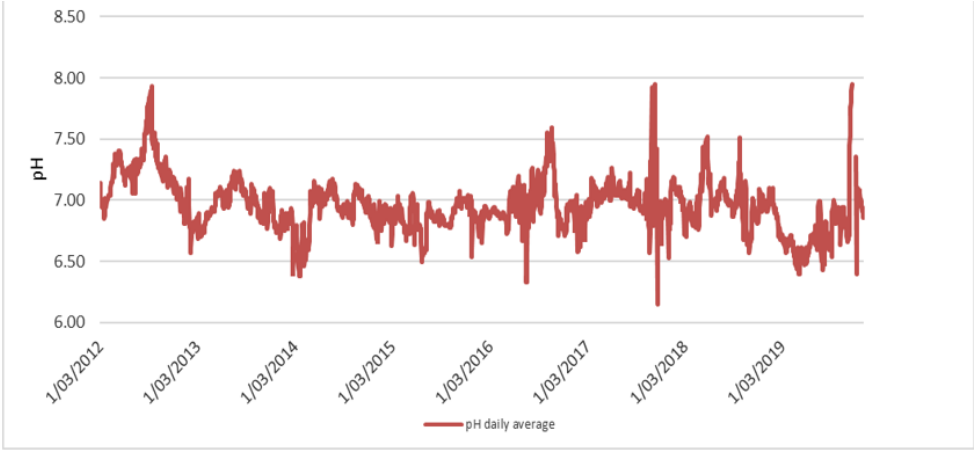


Figure 7.4 SW01 Upstream Goulburn River Historical pH (2012 - 2019)

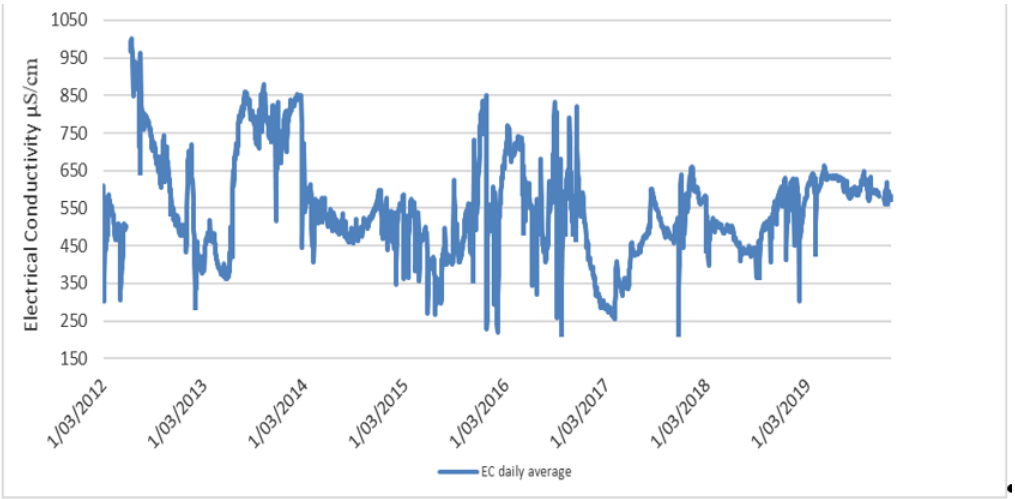


Figure 7.5 SW01 Upstream Goulburn River Historical EC (2012 - 2019)

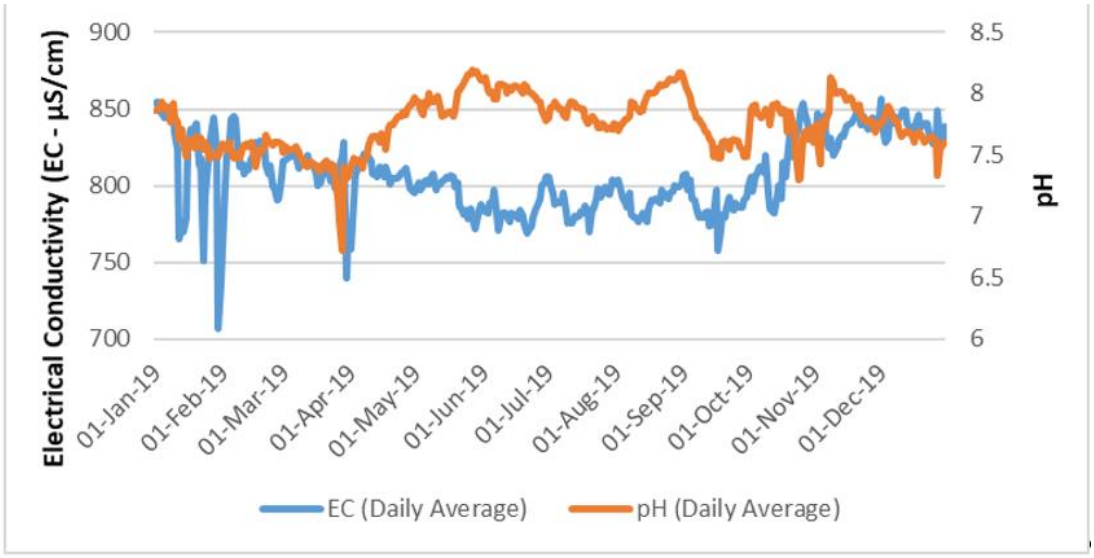


Figure 7.6 SW02 Goulburn River Downstream Monitoring Results 2019

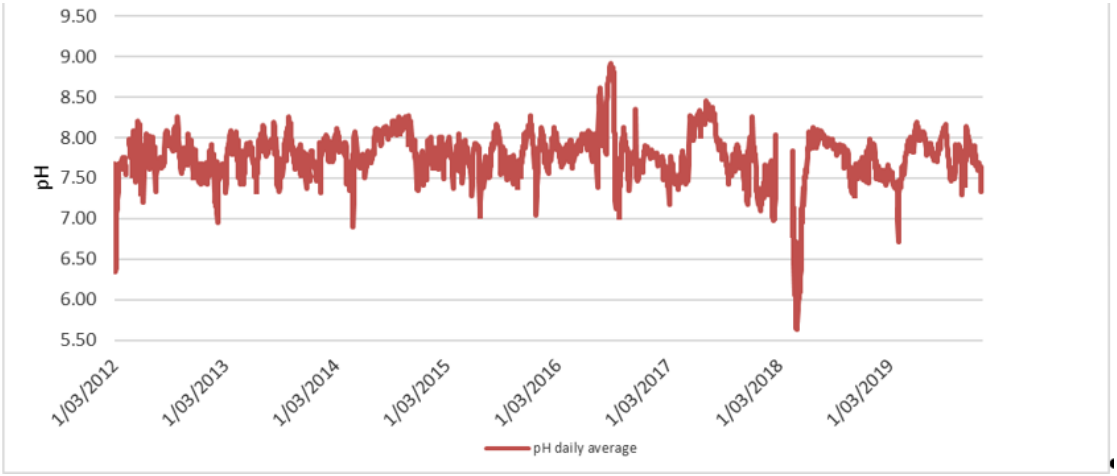


Figure 7.7 SW02 Goulburn River Downstream Historical pH (2012 - 2019)

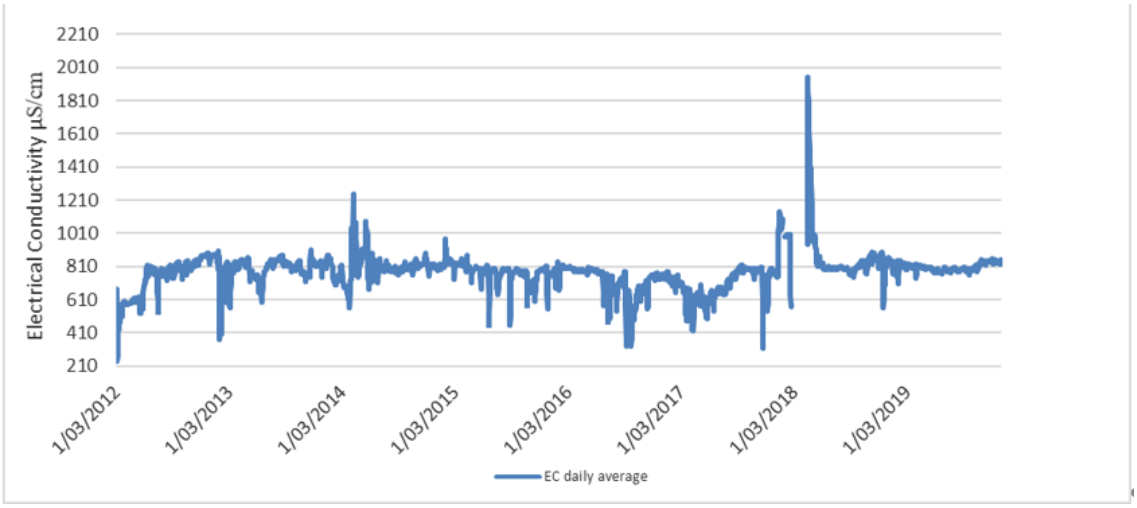


Figure 7.8 SW02 Goulburn River Downstream Historical EC (2012 - 2019)

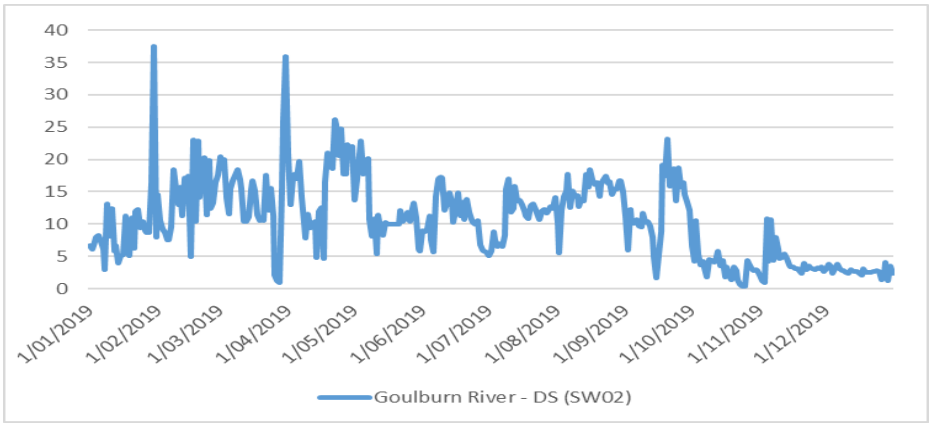


Figure 7.9 SW02 Goulburn River Downstream Flow 2019

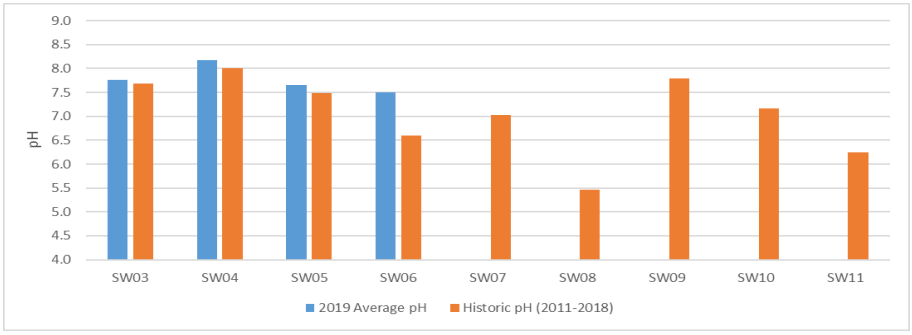


Figure 7.10: Comparison 2019 to Historic Average pH Monitoring Results

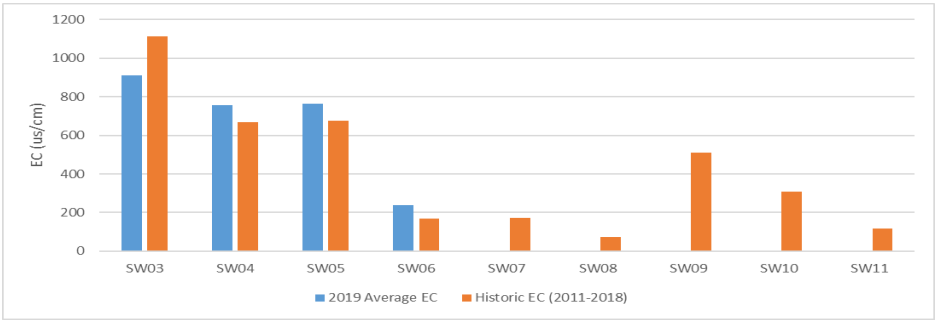


Figure 7.11 Comparison 2019 to Historic Average EC Monitoring Results

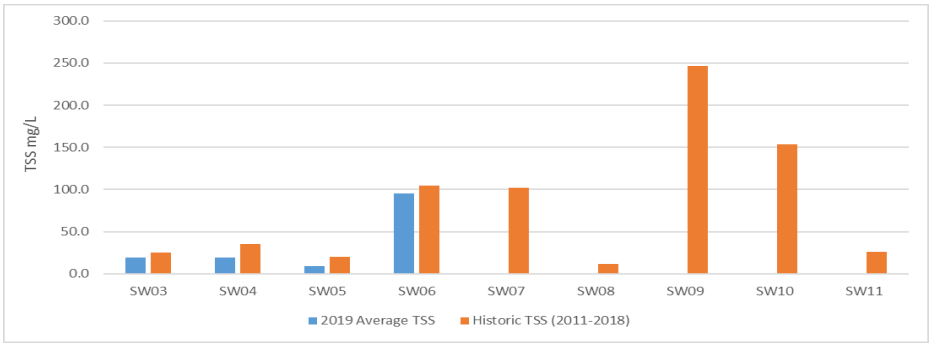


Figure 7.12 Comparison 2019 to Historic Average TSS Monitoring Results

7.9 Ulan Creek Stability Monitoring

Channel stability monitoring as required by the SWMP, subsidence monitoring programs and PA08_0184, is completed annually. Channel stability monitoring along the Ulan Creek, downstream of LDP6 was completed in October 2019 (**Attachment G**). The monitoring involves an observational survey of each stream which provides a description of locations and dimensions of significant erosive or depositional features and photographs recorded at monitoring points in representative locations.

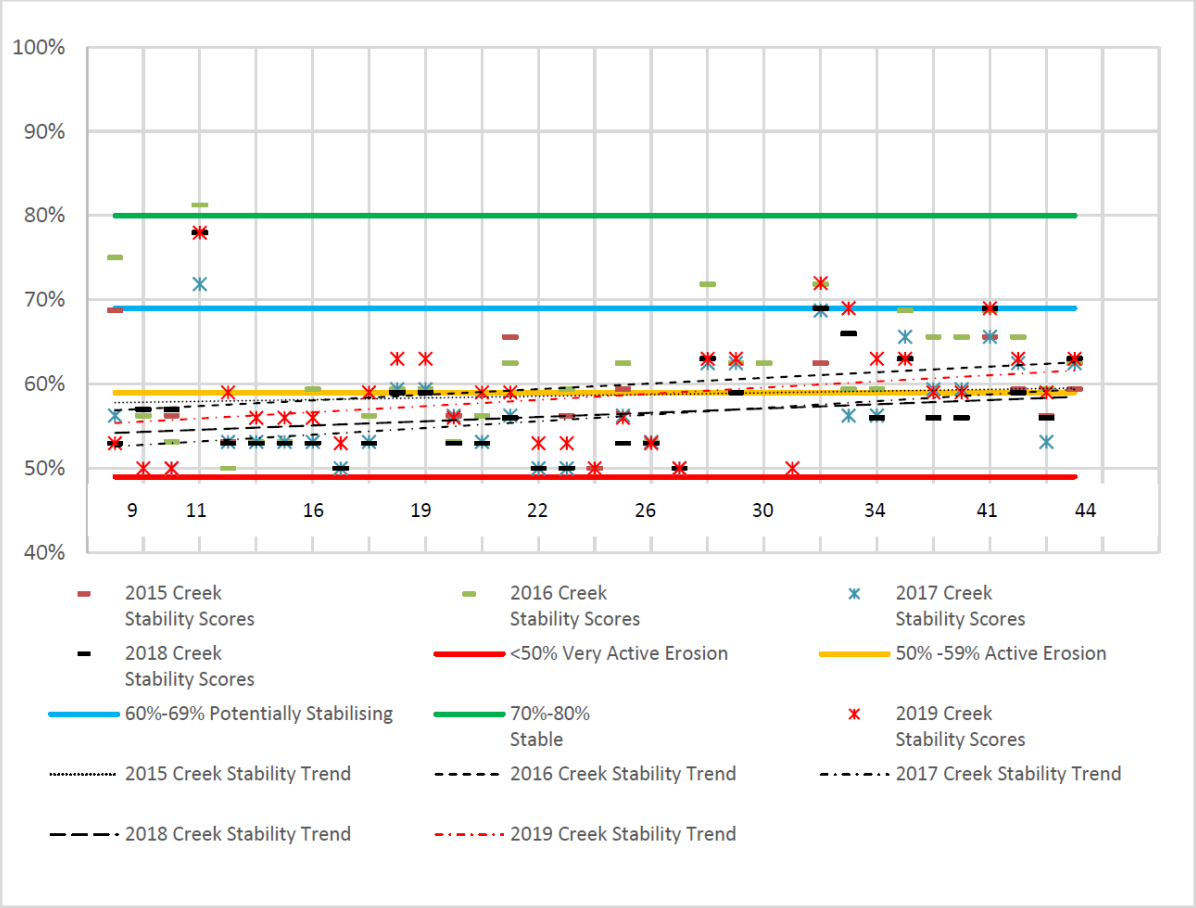
Targeted monitoring of creek lines above the longwall panels proposed to be undermined in the next 12 months and those undermined in the previous 24 months is also conducted pre, during and post mining. This monitoring is summarised in the subsidence section of this report.

The results from the Ulan Creek stability monitoring in 2019 concluded:

Ulan Creek is outside the immediate zone of subsidence from the first longwall panel (i.e. LW1) of the Ulan West underground mine, approximately 80m from the goaf edge of LW17. As with previous monitoring of Ulan Creek completed since 2015, there were no obvious signs of subsidence related impacts from the Ulan West underground mine. There was no clear evidence of surface cracking or subsidence related instabilities that could be identified in the Ulan Creek channel at the time of the 2019 creek stability assessment.

*In contrast to a declining creek stability trend noted in 2018, the 2019 creek stability results indicate a slight improving trend (***Figure 7.13***). The minor improvement in many of the scores noted in 2019 can be attributed to the establishment of vegetation on the channel floor, above the low flow section of the channel. These observations may relate to reduced flows from LDP6 during 2019 (as confirmed by UCMPL), allowing vegetation to establish in parts of the channel that are not regularly inundated. The other factor could be climatic and seasonal variations as the 2019 survey was completed in mid-spring, as opposed to previous surveys completed in hotter/drier conditions during December.*

Although the 2019 creek stability results indicate a slight overall improving trend, there are numerous sites displaying a continuation of very active erosion. The 2019 channel stability monitoring noted similar morphological processes, as identified from previous monitoring, which also attributed to lower scores at these respective sites.



Source: *2019 Channel Stability Monitoring Report (Pacific Environmental 2020)*

Figure 7.13 Ulan Creek Stability Monitoring Assessment Scores

7.10 Stream Health/Aquatic Monitoring

Results of stream health/aquatic monitoring for the Goulburn River, Talbragar River, Ulan Creek, Bobadeen Creek, Mona Creek and Cockabutta Creek (i.e. aquatic surveys) are summarised in **Section 6.7.5**.

7.11 Groundwater Monitoring results

The Groundwater Monitoring Program (GWMP) (ULNCX-111515275-1643)[77] describes the program to monitor trends in groundwater levels and assess groundwater depressurisation and associated groundwater inflows against modelled predictions and identify any potential impact on private licensed bores. Collected data is also used to calibrate and update the groundwater model. Monitoring focusses on the alluvial and hard rock/coal measures aquifers in the region:

- Alluvial, Triassic, coal seam and interburden aquifers;
- Base flows to the Goulburn and Talbragar Rivers and associated creeks;
- Groundwater bores, springs and seeps on privately owned land; and
- 'The Drip', a groundwater dependant natural site, east of the operations.

[77] Condition 34, Schedule 3 of PA08_0184, a component of the WMP (ULN SD PLN 0017)

7.11.1 Groundwater Sampling Procedure

Groundwater monitoring was undertaken in accordance with the following:

- ULNCX-111515275-1643 Groundwater Monitoring Program;
- Approved Methods for the Sampling and Analysis of Water pollutants in NSW (Department of Environment and Conservation, 2004);
- Groundwater Monitoring Guidelines for Mine Sites within the Hunter Region (Department of Infrastructure, Planning and Natural Resources, 2003);
- AS/NZS 5667.1:1998 Water Quality – Sampling – Guidance on the Design of Sampling Programs, Sampling Techniques and the Preservation and Handling of Samples; and
- AS/NZS 5667.10:1998 Water Quality – Sampling – Guidance on Sampling of Waste Waters.

7.11.2 Maintenance of Groundwater Monitoring Network

The groundwater monitoring network is reviewed annually. Additional VWP arrays were installed at two new locations; Mona Creek (DDH598) and at a private property (DDH601). Due to the installation in late 2019, data from these VWP were not included in the annual review.. Maintenance checks of the VWPs are undertaken quarterly when data is downloaded.

7.11.3 Groundwater monitoring results

Monitoring bores and VWPs, intersecting Jurassic sediments and Triassic units over 2 km from the mine, recorded relatively stable groundwater levels, indicating no mine related impacts. Monitoring bores intersecting the Triassic units within 1 km of the mine area recorded less than a 1 m decline in groundwater levels. These observed changes align with model predictions. Groundwater within the Permian coal measures generally declined over the monitoring period, in line with model predictions. Groundwater levels observed in monitored private bores have remained stable with no marked decline during 2019 monitoring period.

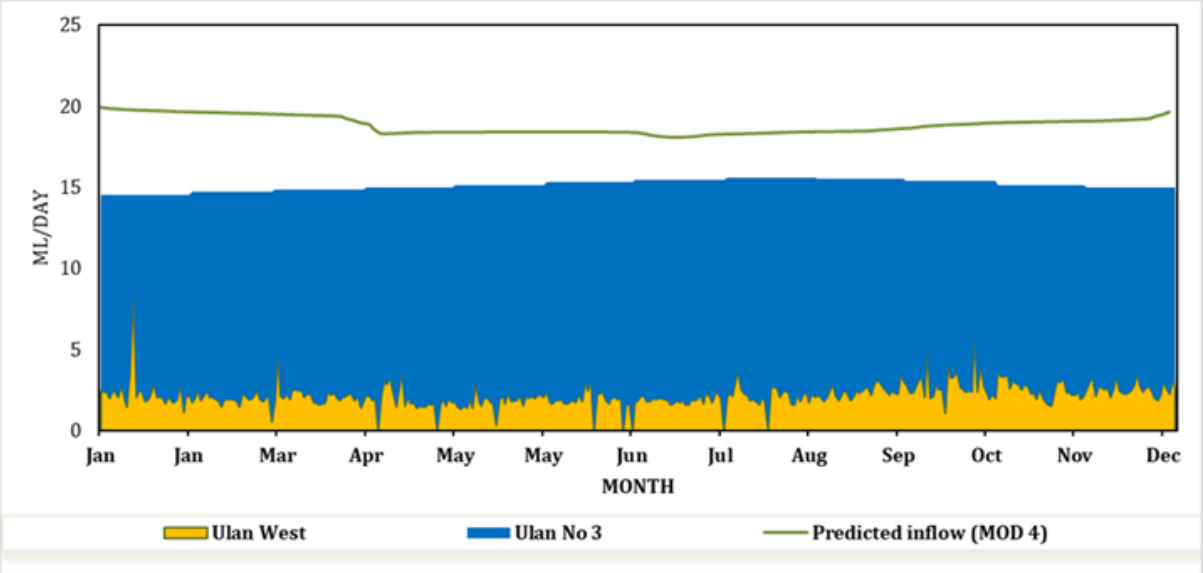
Groundwater monitoring results are summarised in Sections **7.12.4** to **7.12.9** and detailed in the 'Annual Groundwater Monitoring Review – 2019' by AGE in **Attachment D**.

7.11.4 Observed and Predicted Groundwater Inflows and Levels

Extracted water from pit inflows ranged between 14.53 ML/day and 15.55ML/day in 2019 and was 15.12ML/day on average. **Figure 7.14** shows the modelled inflow combined for the two mine areas and indicates that actual inflows are less than the modelled inflows throughout the year and that modelled groundwater inflows diverge from the observed inflows towards the end of 2019.

7.11.5 North Monitoring Network

North Monitoring Network (NMN) is the largest network of environmental monitoring bores and consists of 38 monitoring standpipes (SPs) at 18 locations, and 11 VWPs with a total of 46 sensors (**Figure 7.15**). Groundwater levels in SPs are monitored quarterly (March, June, September, and December), field water quality was sampled bi-annually and a full suite of chemical parameters was collected annually. Due to access restrictions, monitoring bores PZ13A, PZ25A, PZ25B, PZ26A, PZ26B, PZ26C and PZ26D were not sampled during 2019. Access restrictions at monitoring bores PZ14A, PZ14B and PZ14C limited data collection to only the second half of 2019.



Source: *2019 Groundwater Monitoring Report (AGE 2019)*

Figure 7.14 Comparison of Modelled and Calculated Groundwater Inflows to the Underground

Tertiary Basalt

Monitoring bore R752 intersects Tertiary basalt. This monitoring bore was dry during the second half of 2018 and through all 2019 monitoring rounds. It is expected that the absence of groundwater levels at R752 is the result of low rainfall.

Jurassic Sediments

Monitoring bores PZ09D, PZ14C, and PZ28B were stable throughout the year while PZ10B increased between quarter 2 and quarter 3 and was dry in quarter 4. **Figure 7.16** shows the interpolated groundwater contours, which indicate groundwater flow in the Jurassic sediments is south-easterly, away from the mine towards the Goulburn River.

Triassic Sediments

Groundwater levels for PZ01A, PZ06C, PZ09C, PZ11B, PZ12C, PZ14B, PZ24B, PZ28A and R755A were generally stable. A continual decline which has not exceed predicted drawdown was observed in PZ10A, which is directly above the northern section of the underground mine. **Figure 7.17** shows the interpolated groundwater contours from monitoring bores in the Triassic sediments. The contours show that groundwater within the Triassic sediments is lowest in an area directly above the mine (PZ10).

Permian Coal Measures

Monitoring bores intersecting the Ulan Seam and Permian coal measures underlying the Ulan Seam were observed to be in decline. Declining groundwater levels in this stratigraphic unit is not unexpected as the process of underground mining reduces groundwater pressures within the target coal seam (Ulan seam) and hydraulically connected aquifers (Permian coal measures).**Figure 7.18** shows the interpolated groundwater contours from monitoring bores in the Permian Coal Measures, indicating drawdown is towards the active mine area, as predicted within the EA.

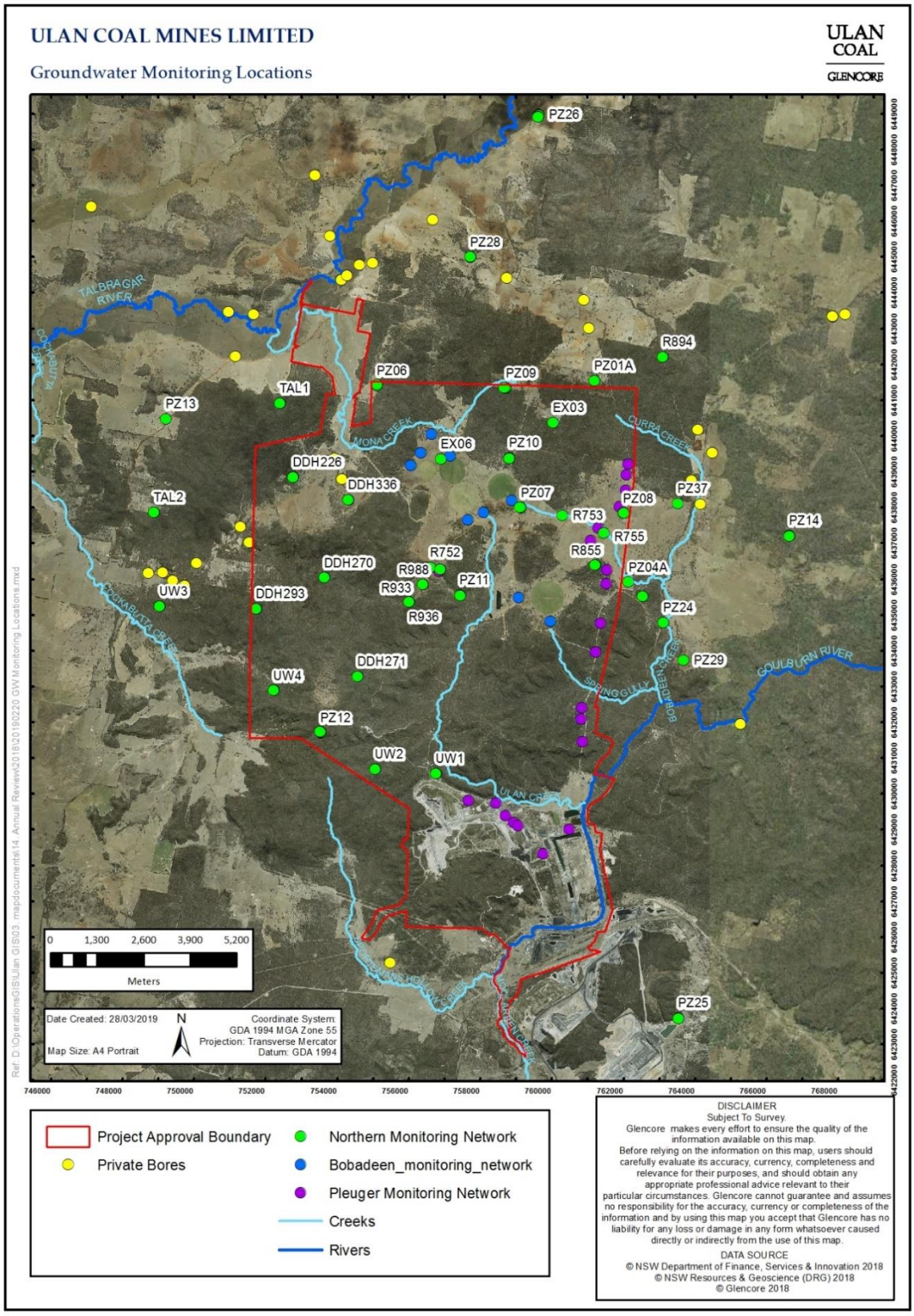
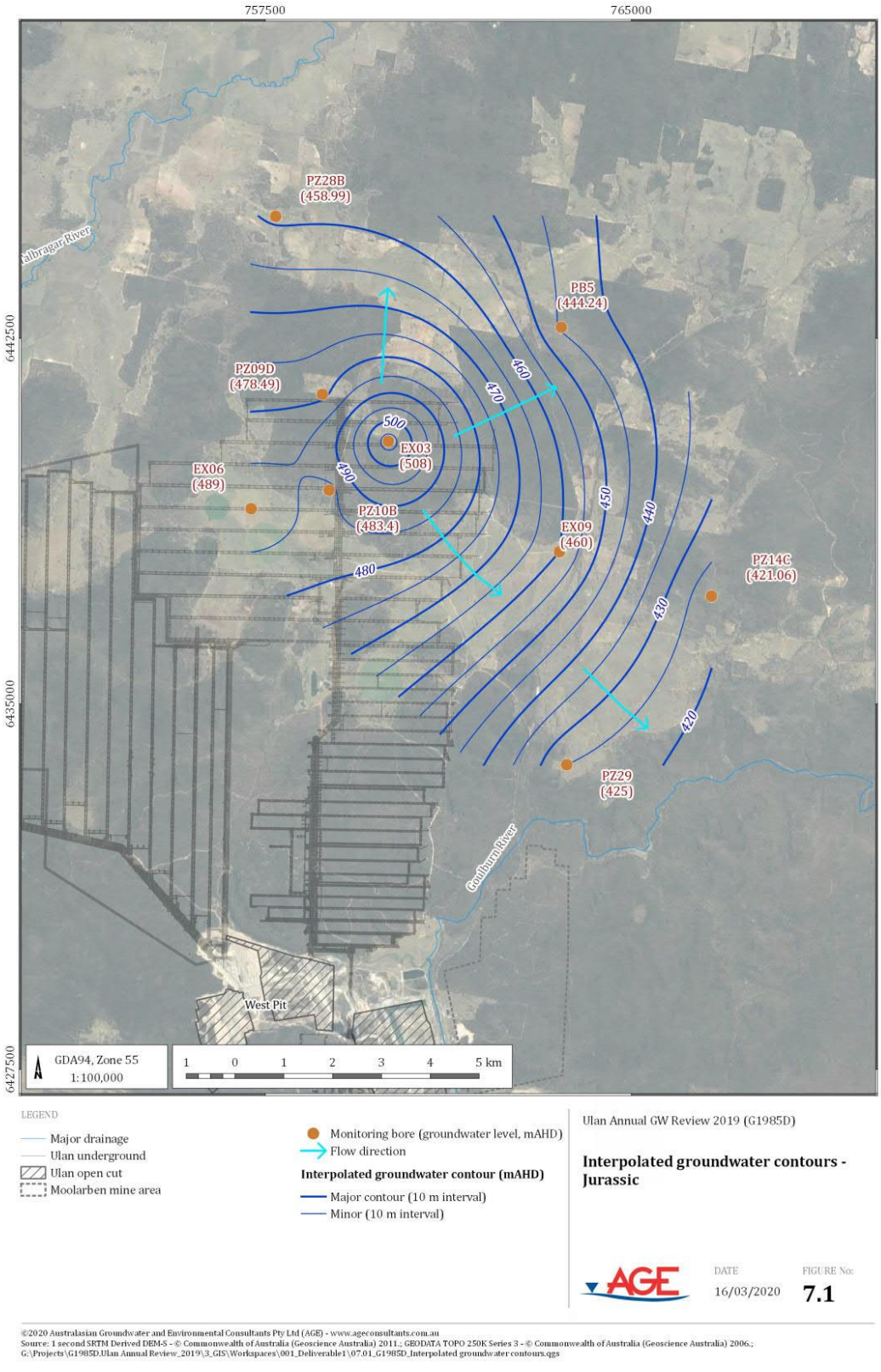
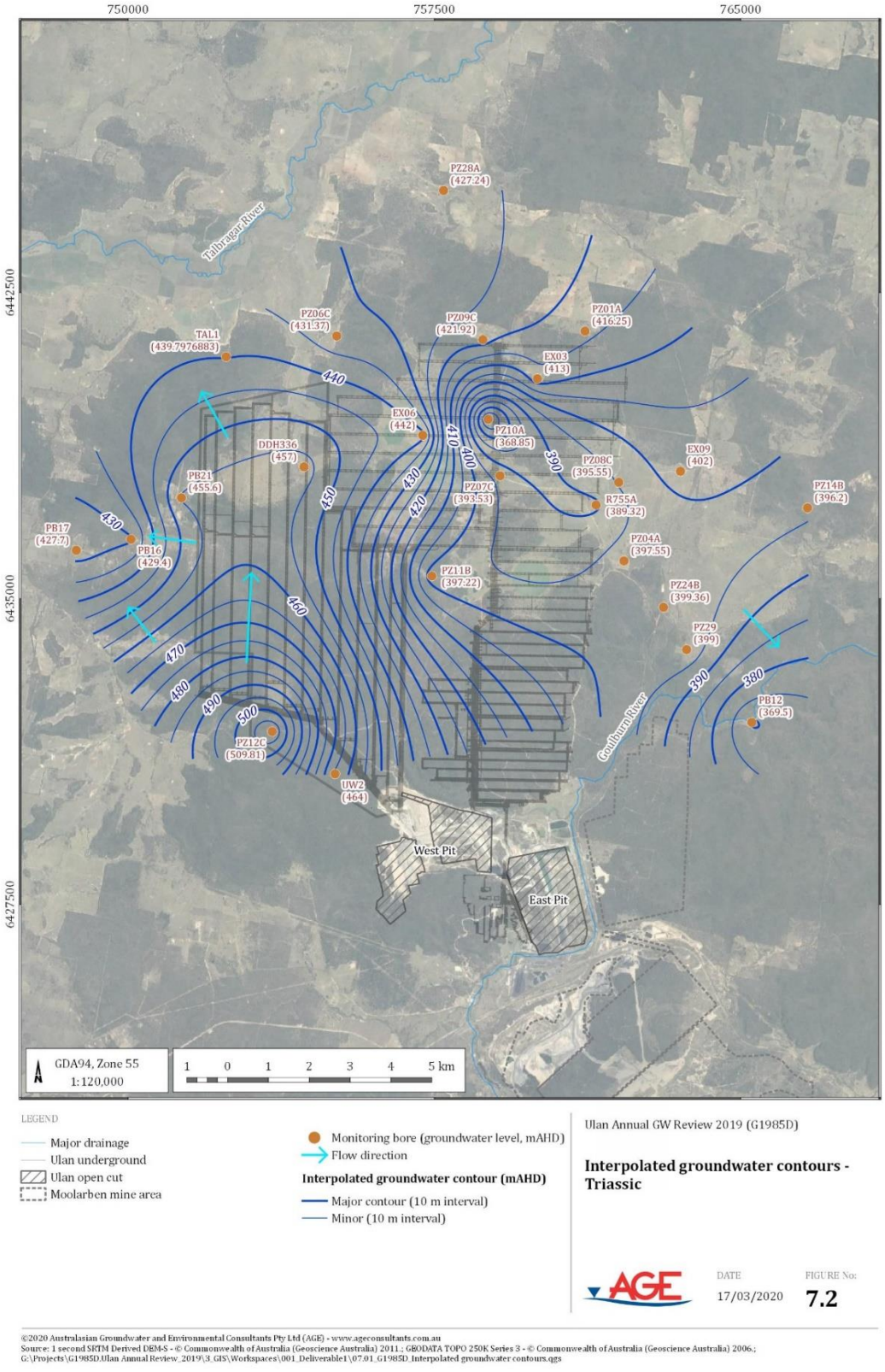


Figure 7.15 Groundwater Monitoring Network



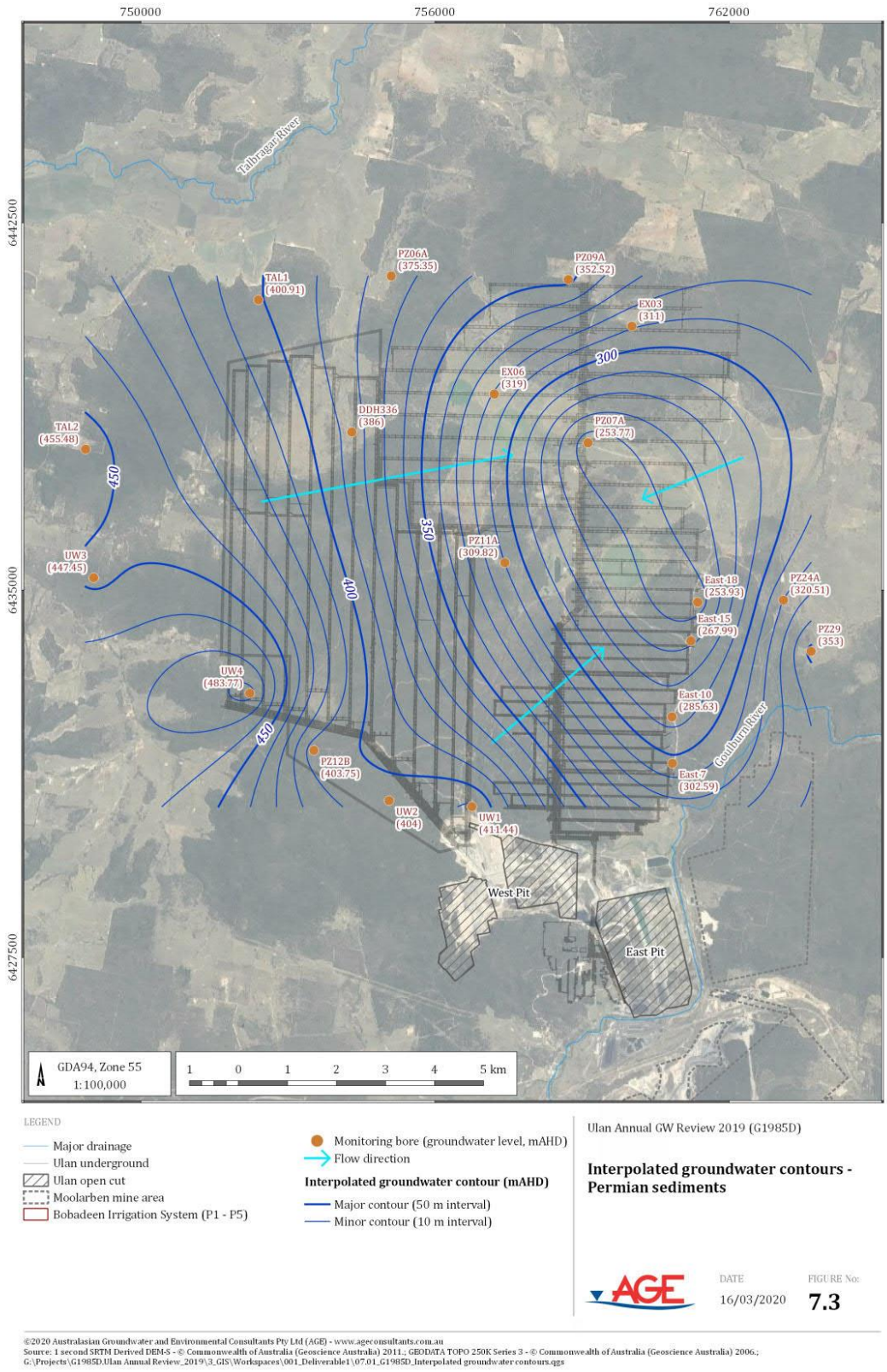
Source: *2019 Groundwater Monitoring Report (AGE 2019)*

Figure 7.16 Interpolated Groundwater Contours - Jurassic Sediments December 2019



Source: *2017 Groundwater Monitoring Report (AGE 2019)*

Figure 7.17 Interpolated Groundwater Contours - Triassic Sediments December 2019



Source: *2017 Groundwater Monitoring Report (AGE 2019)*

Figure 7.18 Interpolated Groundwater Contours – Ulan Seam for December 2019

7.11.6 Bobadeen Monitoring Network

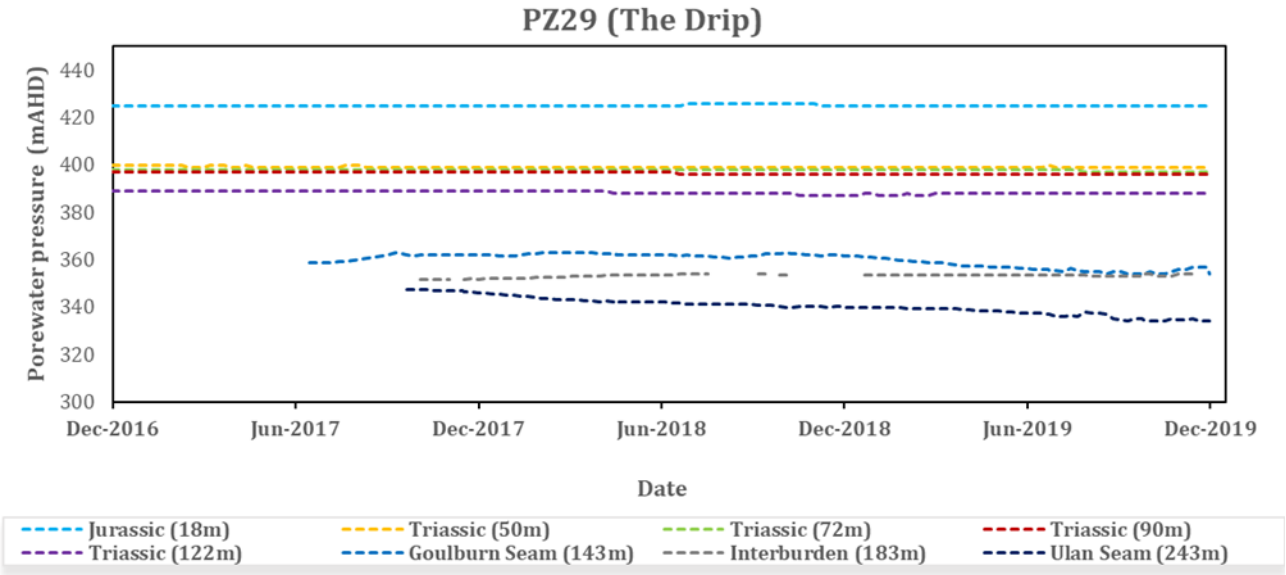
Land above Ulan Underground is irrigated with recycled mine water as part of the Bobadeen Irrigation Scheme (BIS). Assessment of groundwater level and quality in standpipes IMW01 to IMW09 is undertaken quarterly, however no groundwater quality samples were able to be collected from BMN monitoring bores during the year as all were recorded as dry. The standpipes range between 1 and 11.5 meters below ground level (mbgl) and intersect unconsolidated sediments within the upper catchments of Mona Creek, Ulan Creek, and Spring Gully Creek.

7.11.7 Private Bore Monitoring

Monitoring of the private bores is conducted annually, where owners have requested it and bore is accessible. Where obtained, water quality and level results were within the range of previously recorded data, including the bores that are predicted to be impacted by groundwater drawdown. No complaints related to groundwater quality were received in 2019

7.11.8 The Drip Monitoring Program

Analysis of water samples collected from the drip continues to exhibit proportions of major ions that are different to those collected from other Triassic sediments in the rest of the monitoring program. This difference in major ion composition suggests the influence of a different recharge source for The Drip. The porewater pressure trends (**Figure 7.19**) have been stable for 3 years, indicating that there is no drawdown in the Triassic sediments . Consistent with the groundwater model, there is minor drawdown in the Ulan seam (PCM 243 in Figure 7.19) due the active mining and dewatering of that seam.



Source: *2019 Groundwater Monitoring Report (AGE 2019)*

Figure 7.19 PZ29 Porewater Pressure

7.11.9 Pleuger Monitoring Network

The PMN in 2019 comprised eight active dewatering bores (East 20, MG23, MG26, MG27, MG28, MG29, LW A+B, UW TG1) and six decommissioned dewatering bores (East 7, East 9, East 10, East 15, East 18 and MG21). Groundwater levels were stable throughout 2019 although East 7, East 9 and MG21 slightly declined from minor groundwater level increases in 2018.

As groundwater abstracted for dewatering is subjected to treatment prior to site use, irrigation or discharge, there is a trigger in the SWGWRP. It is noted that whilst some SWGWRP triggers have been exceeded, for the dissolved metals analysed, with the exception of iron, all bores recorded concentrations within acceptable limits under the ANZECC (2000) short term irrigation and stock water guidelines.

8. Rehabilitation

8.1 Status of Rehabilitation

The Ulan Coal Mining Operations Plan 2017 to 2024 (MOP)[78] details the proposed mining, processing and rehabilitation of disturbed areas. Section 7 of the MOP provides the rehabilitation plan[79] for the MOP period. The primary objective of rehabilitation is to create a stable final landform, with self-sustaining native vegetation communities characteristic of the pre-mining composition, with a post mining land use capability Class VI landscape. **Table 8.1** presents a summary of current rehabilitation and disturbance areas. The Open Cut remained in care and maintenance in 2019 and no further areas are currently available for rehabilitation.

Table 8.1 - Rehabilitation and Disturbance Summary

	2018 (ha)	2019 (ha)	2020 Forecast (ha)
A. Total mine footprint[80]	1263	1296	1299
B. Total Active disturbance[81]	667	695	698
C. Land being prepared for rehabilitation[82]	5	0	0
D. Land under active rehabilitation[83]	596	601	601
E. completed rehabilitation[84]	5	0	50

Notes: Figures from MOP 2017-2024 Table 7-1

[78] Required by mining lease conditions under the *Mining Act 1992*
[79] PA08_0184, Schedule 3, Condition 57 - Rehabilitation Management Plan (RMP)
[80] Mine footprint comprises areas that are subject to active disturbance, decommissioning, landform establishment, growth medium development, ecosystem establishment, ecosystem development and relinquished lands (as defined in DRG MOP/RMP Guidelines) and excludes subsidence remediation areas.
[81] Active disturbance is areas not already rehabilitated including exploration, active mining areas, infrastructure areas, water and sewage infrastructure, topsoil stockpiles, access tracks and haul roads, waste emplacements (active/unshaped/in or out-of-pit), and tailings dams (active/unshaped/uncapped).
[82] Rehabilitation preparation – describes land where decommissioning, landform establishment and growth medium development (as defined in DRG MOP/RMP Guidelines) are in progress.
[83] Active rehabilitation includes "ecosystem and land use establishment" (area seeded or surface developed in accordance with final land use) and "ecosystem and land use sustainability" (revegetation assessed as showing signs of trending towards relinquishment or infrastructure development)
[84] Completed rehabilitation has successfully met the rehabilitation land use objectives and completion criteria and is signed off by DRG.

The site is divided into a number of conceptual units or 'rehabilitation domains' that focus on the treatment of like areas. Domains are assigned based on location, type of land disturbance and remedial aspects. (**Figure 8.2**). The status of mining and rehabilitation at the end of the reporting period are shown on the plans in **Attachment H**. These Figures are currently being amended and will be the subject of a Mining Operations Plan amendment submission, following the grant of Mining Lease Applications 475 (now known as Mining Lease 1798) and 507 (now known as Mining Lease 1799. Rehabilitation Areas 1 to 11 (**Figure 8.2**) were created to facilitate tracking of rehabilitation performance. The areas were formed by grouping rehabilitation areas with a similar age, structure and species composition. Formal sign off of 50 ha of established rehabilitated area was submitted In January 2020.

Figure 8.1 Rehabilitation Aerial Image May 2019

Key issues that would affect the successful rehabilitation of the areas as identified through the ecological monitoring programs and the annual site walkover inspections are summarised in **Table 8.2** with proposed management actions. Based on the results of the annual inspection and long term rehabilitation monitoring rehabilitation area performance is classified into one of the following categories[85];

- Rework- Does not meet completion criteria. Extensive rework required that would not typically form part of a rehabilitation maintenance program (e.g. slopes do not comply with approval requirements, bare areas >0.1ha, large erosion gullies).
- Maintenance- Does not meet completion criteria. Routine rehabilitation maintenance works required (e.g. weed control, infill seeding/plantings, repair of minor erosion, fertiliser application).
- Monitor- Trajecting towards completion criteria but does not meet all criteria. No intervention required but continue to monitor (e.g. ecologically young areas, variable soil results).
- Acceptable- Meets completion criteria and ready for sign off by stakeholders. Continue to manage and monitor to maintain status until sign off is sought.

Performance indicators and completion/relinquishment criteria for the rehabilitation areas of the Ulan Complex are outlined in Section 6 of the MOP. Performance indicators are used to establish which rehabilitation phase each of the rehabilitation areas are in and highlight any areas where further remediation/improvement works may be required to progress rehabilitation areas to meet completion/relinquishment criteria (**Table 8.2** and **Figure 8.3**) .

[85] Categories taken from the Glencore Coal Assets Australia Guideline 11.6 Completion Criteria and Rehabilitation Monitoring

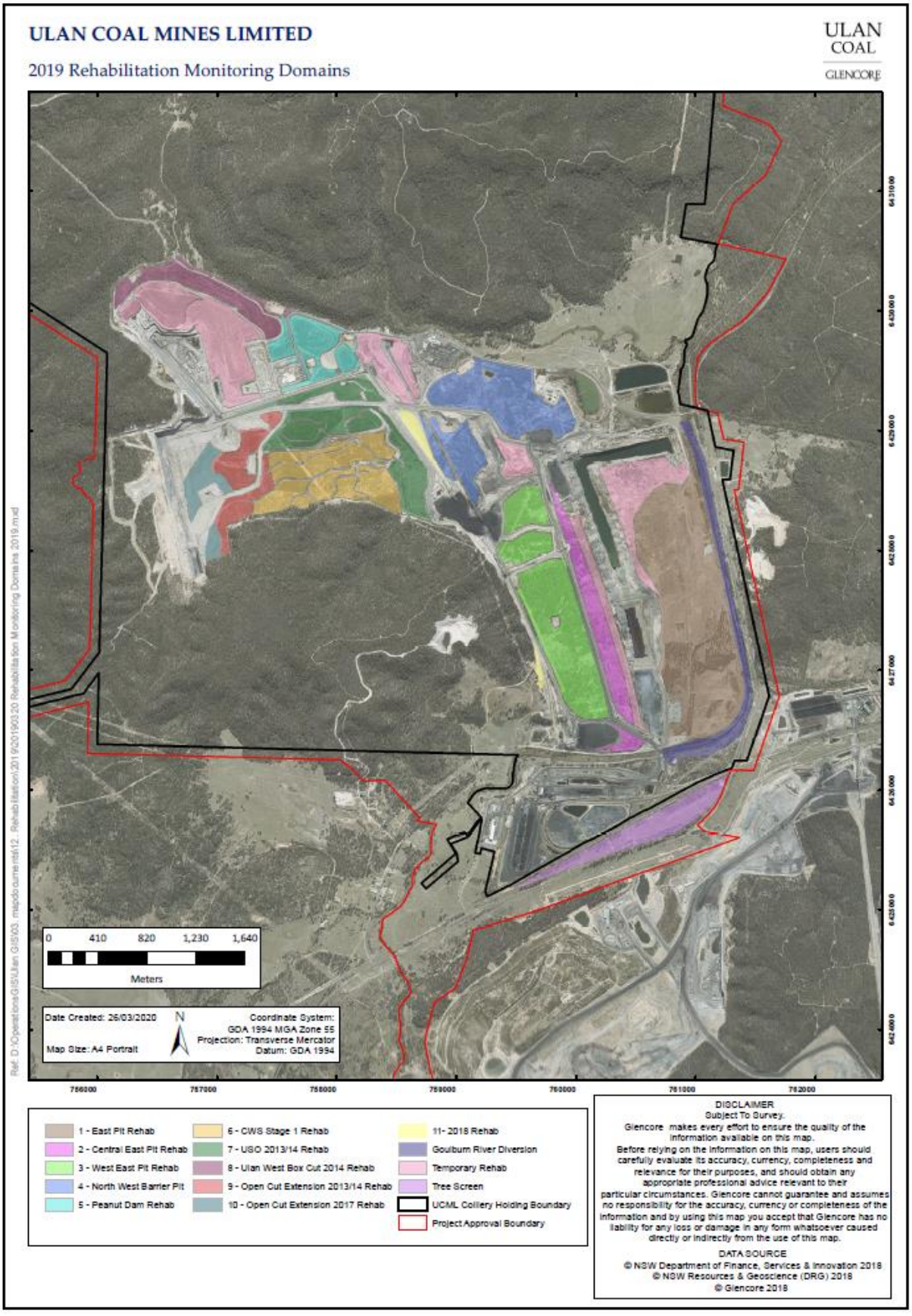


Figure 8.2 Mine Rehabilitated Areas

Table 8.2 – Rehabilitation Area Performance Category and Management Issues

Rehabilitation Area	Performance Category[86]	Anticipated Rehabilitation Phase [87]	Management Issues	Management Action Required[88]	Management Action Undertaken in the Reporting Period[89]
1	Rework required	2-5	Poor soil conditions poor plant establishment Weed colonising	Remediation and monitoring to be completed in accordance with the East Pit Rehabilitation 2017-2024 MOP commitments. This work commenced in 2017 -18, to be completed by 2024. Walk through spot spray	Spot spraying of weeds
2	Monitor	5	Weed colonising poor canopy species	Walk through spot spray planting of tube stock in areas without canopy spices	Spot spraying of weeds
3	Monitor	5	One broad area of erosion to be repaired.	Removal of rubbish repair of sinkholes soil sampling and tree thinning	Spot spraying of Prickly Pear tree thinning sink holes repaired soil sampling completed all rubbish removed
4	Rework	4-5	Minor erosion and the ingress of dirty water in one location. Poor species diversity predominately acacia species with little tree establishment - low presence of eucalypts in large areas in the northern region.	Repairs of minor erosion and correction to the drainage to Minor rework is required to increase the presence of eucalyptus tree species within the northern area. A trial of methods for eucalyptus tree species establishment is proposed.	
5	Rework required	5	Sink holes present within the peanut dam. Temporary dam wall present to prevent discharge from Clean Water Systems.	Works to be completed within the peanut dam to repair sink holes and remove the temporary dam wall will be undertaken in 2019.	
6	Monitor some rework required	5	Minor erosion in noted in two locations Some tree thinning may be required.	Minor erosion to continue to be monitored, access to repair area would require re-disturbance to rehabilitation area. Investigate if tree thinning is required	Monitoring of areas of erosion undertaken, area stable, will continue monitoring.
7	Monitor	4-5	Significant ponding in one location. Poor vegetation establishment at clean water dam in the west of the area.	Selective planting to occur in South 5 rehabilitated Tailings Dam at a clean water systems dam within the west of this area. Drainage realignment to be conducted in one area of significant ponding. Ongoing monitoring for any new erosion or sink holes around the Clean Water Systems.	Monitoring of areas of erosion undertaken.

[86] Categories taken from the Glencore Coal Assets Australia Guideline 11.6 Completion Criteria and Rehabilitation Monitoring
[87] As per Table 5-4 of the Ulan Coal Mining Operations Plan 2017-2024.
[88] The management of weeds and feral/pest animals is ongoing throughout the rehabilitation areas and only noted in management actions if there is a particular issue to be addressed.
[89] Weed and feral animal control is conducted throughout the rehabilitation areas.

Rehabilitation Area	Performance Category[86]	Anticipated Rehabilitation Phase [87]	Management Issues	Management Action Required[88]	Management Action Undertaken in the Reporting Period[89]
8	Monitor	4-5	Minor erosion noted in two locations.	Minor erosion to be repaired in one location and selective - 2020.	
9	Monitor	4-5	Potential species richness not acceptable	Monitor erosion complete study on species richness to determine management actions.	Erosion repairs.
10	Monitor and rework	2-3	Poor seed germination areas of erosion	Assess requirement to reseed monitor erosion	
11	Rework	2-3	Poor groundcover and vegetation growth	Assess the need to reseed area	
Goulburn River Remediation	Monitor	2-3	Minor erosion and bare areas require repair, weeds colonising	Works to be undertaken in accordance with the Goulburn River Remediation Plan, and walkover inspections	Inspections
Tree Screen	Monitor	5	Ulan road looking across East Pit	Plant bare areas	
Temporary Rehabilitation	Monitor	2		No Management actions required	

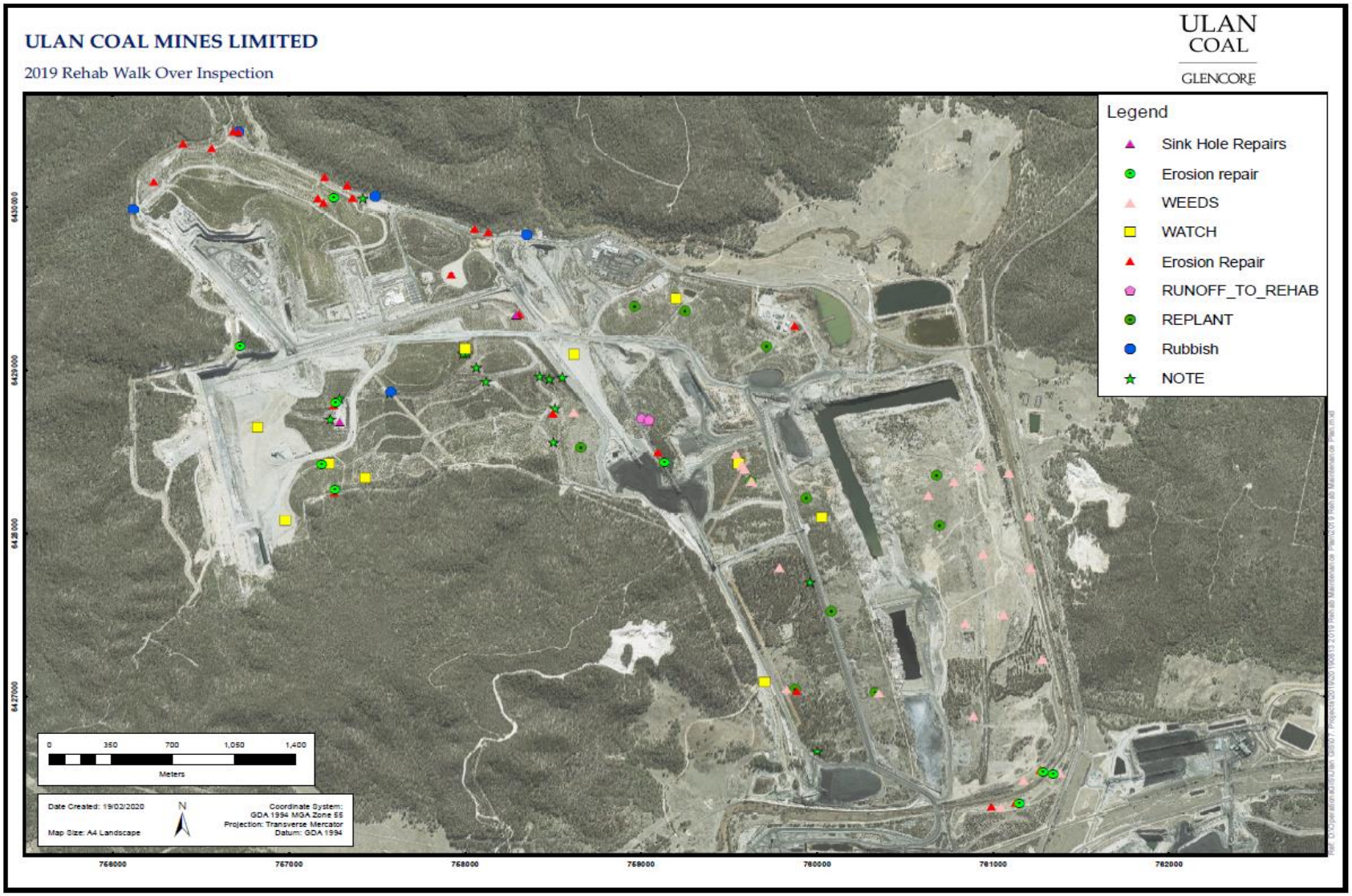


Figure 8.3 2019 Rehabilitation Inspection - Issues Identified

8.2 Rehabilitation Activities during the Reporting Period

8.2.1 Open Cut Rehabilitation

No areas were available and no rehabilitation was undertaken within the Open Cut.

8.2.2 Maintenance Activities Rehabilitation areas

Rehabilitation maintenance identified in the annual walk over inspection consisted of:

- Repairs to rill erosion;
- Construction of new drop structures;
- Repair of drop structures;
- Repairs to sink holes;
- Thinning of trees;
- Removal of rubbish; and
- Weed spraying conducted early in 2019 but not in Spring and Summer due to dry conditions.

No infill planting or seeding was completed due to extremely dry conditions.

Figure 8.4 Rehabilitation Repairs

8.2.3 Relinquishment of Rehabilitated areas

Glencore Coal Assets Australia (GCAA) aims to standardise monitoring and completion criteria based on Resource Regulator feedback. In 2019, QLD University reviewed the Ulan Coal rehabilitation monitoring program and provided recommendations. Implementation of monitoring recommendations will commence in 2020, this will trigger a review of the BMP. A 50 ha native Woodland area, rehabilitated from the mid-1980s through to 1997, has sufficient land stability, soil composition and richness of flora and fauna to meet completion criteria for a self-sustaining landform. Monitoring results within the area recorded;

- 55 flora species, 45 of which are from the surrounding area and
- 130 fauna spices including, 12 threatened spices.

A rehabilitation relinquishment form was submitted to the Resources Regulator In January 2020.

Figure 8.5 East Pit Rehabilitation Established Area

8.2.4 Offset Management Program

The planting of gum-box grassy woodland in the Biodiversity Offset Areas (BOA) is one of the largest single ecological restoration efforts for this community in NSW. An assessment (October 2019) found approximately 90% survival of planted trees (**see Figure 8.6**). Assisted revegetation and natural

regeneration areas within the Biodiversity Offset Areas[90] are referred to as MZ3 and MZ2 respectively in **Section 6.7.1** of this report. Offset area performance indicators for rehabilitation phases 3 to 4 are outlined in Section 6 of the MOP.

Figure 8.6 2019 Offset Area inspection findings

Figure 8.7 *2019 Offset Area Plantings 2019*

8.2.5 Other Environmental Management Areas

No building removal or decommissioning of infrastructure occurred during the reporting period. No material changes with respect to erosion and sediment, contaminated land, visual and landscape management, spontaneous combustion, bushfire, methane drainage/ventilation or waste management.

[90] Offset Management Program (OMP) for the MZ2 and MZ3, Appendix B of the BMP, completed 2016.

9. Community

9.1 CCC Meetings

Four meetings of the Ulan Coal Mine Community Consultative Committee (CCC) were held in 2019. Operational progress, community complaints, monitoring results and environmental performance were presented at each meeting. The 2019 meetings also presented and discussed Modification 4, the exploration program, results of the Annual Review and regulator site inspection, Environment and Community Risk Assessment and the community investment program.

9.2 Exploration Consultation

The exploration program for EL8687 and EL7542 in 2019 was announced in the local newspaper. Letters and exploration newsletters were delivered to landholders within 5km of the operations, indigenous stakeholder groups, Mudgee Local Aboriginal Land Council, CCC Members, Bungaba Progress Association, Mid Western Regional Council and the NSW government local Member of Parliament. Community BBQs were held at the Bungaba Progress Association Hall. Land access agreements were negotiated with landholders where drilling was undertaken on private property.

9.3 Community Sponsorship

Glencore invests in Health, Arts and Culture, Education and Enterprise, Environment and the Community, including, as an example, education grants to NSW Government Schools. Examples of local projects:

- Mudgee Show Society 2019;
- 2019 Max Potential Program;
- Gulgong Bowls Club – Defibrillator;
- The AUSIMM International Women's Day Breakfast;
- Dundeoo Lions Club - Art Unlimited;
- Camp Quality Limited 2019 Motorcycle tour;
- MWRC Putta Bucca Wetlands Infrastructure;
- Bungaba Community Hall Lighting upgrades;
- Mudgee Junior Rugby League New balls and training equipment;
- Gulgong Arts Council 2019 Gulgong Unearthed Competition;
- Can Assist Mudgee Branch 2019 Masquerade ball; and
- Wings4Kids Winner of Mudgee Running Festival Coal Miners Cup

Figure 9.1 Community Activities

9.4 Community Complaints

Of the six (6) complaints received during the 2019 reporting period, 4 were due to noise, one dust and one odour. A community complaint summary is available from the Ulan Coal Website *http://ulancoal.com.au/*.

Figure 9.2 Complaints by Year

9.5 Ulan Road Noise Mitigation Strategy

Eighteen (18) residences were identified within the noise mitigation strategy for the Ulan Road Upgrade. The mitigation strategy has been agreed and implemented at 13 residences. One (1) owner has an agreement in place and works have commenced, 1 owner has in principle agreement and 3 residence owners will not have any works conducted because either, they do not want to, or the buildings within the noise mitigation zone are not residences.

9.6 Ulan Road Traffic Management

Employees, including contractors, are trained and reminded (through site inductions, environmental management systems training, training day presentations and tool box talks) of each person's responsibility to maintain legal and considerate behaviour during passage to and from the mine site. Key messages communicated include considerate and legal behaviour, minimising road use where possible, litter avoidance and reporting unsafe behaviour.

10. Independent Compliance Audit

The Independent Compliance Audit [91] was conducted by EMM Consulting Pty Limited (EMM)[92] in May and June 2019. The audit term was 1 January 2016 to 31 December 2018 inclusive. The audit comprised a desktop analysis, site audit inspections and interviews and involved technical specialists for, noise, aboriginal cultural heritage, ecology, rehabilitation, subsidence, air quality and water. A copy of the most recent as well as previous audit reports, and responses to audit recommendations can be found on the Ulan Coal website at *www.ulancoal.com.au*. Audit findings are presented in the table below.

Table 10.1: 2019 Independent Audit Findings

Approval	Section	Finding	Issue	Ulan response	Status
PA 08_0184	Schd 3, C 19	Non-compliance	Regional dust events caused PM10 particulate concentrations to exceed the short-term criteria (50 µg/m3 PM10 24hr average) on seven occasions in 2018.	Instances of non-compliance reported to DPE and EPA and included in the 2018 Annual Return.	Complete
PA 08_0184	Schd 2, C 1 and Schd 3, C 53b)	Observation	Plans provided for older hydrocarbon facilities are not signed off by Certified Engineer	Suitably qualified engineer prepare documentation (plans or otherwise) confirming compliance with AS1940, for UUG diesel and USO oil storage	Complete
PA 08_0184	Schd 3, C 23 (b)	Observation	Meteorological monitoring station at the Ulan Mine Complex not capable of monitoring temperature lapse rate in accordance with the NSW Industrial Noise Policy	UCMPL again follow up with DPE to confirm the approach of using Wilpinjong's temperature lapse rate data is supported.	Complete
PA 08_0184	Schd 3, C43	Observation	Conservation agreements not signed off	No further recommendations.	No additional action
PA 08_0184	Schd 3, C46	Observation	Valley Way conservation agreement not signed off	No further recommendations.	No additional action
DA113-12-98 (surrendered 2017)	C 8(b)	Non-compliance	Surface and ground water sampling events have not included quality control samples ('Blanks') for quality control purposes.	Sampling Manual (ULNCX-111515275-3549) revised to include QA sampling - completed	Complete
DA113-12-98 (surrendered 2017)	C3.4 (b)	Observation	Native vegetation that is cleared to accommodate surface facilities shall not be burnt or disposed of. Condition not referenced in procedures at the time of Audit.	Recommendation: updates are made to the Land Clearing Procedure and Ground Disturbance Permit Review of Environmental Factors to include a requirement for maintaining cleared vegetation for reuse as part of rehabilitation.	Complete
DA113-12-98 (surrendered 2017)	C 3.5 (c)	Observation	Condition for Creek proximity not referenced in procedures at the time of audit. The consent has been surrendered and the condition is superseded by PA 08_0814, S3, c37.	Recommendation: updates are made to the ESCP which includes provisions to address proximity to creeks.	Complete
EPL 394	M2.2	Non-compliance	DM13 Highetts Road (Monitoring point 27) Dust depositional bottle - sample bottle was found smashed (28 February 2017 and 13 October 2018)	Install padding surrounding the glass sample between and the bottle and the metal stand to ensure that further damage cannot reoccur from wind and storm events. Update procedures accordingly.	Complete
EPL 394	M2.3	Non-compliance	Electrical failure of water monitoring equipment 27 December 2017	Fail to safe system implemented, this is noted in the report	Complete
EL8687	C3	Non-compliance	Failure to conduct community consultation strictly in accordance with the community consultation strategy	Ensuring commitments from the Community Consultation Strategy are entered and tracked in CMO; and Revising procedures and tracking processes within the Community Consultation Strategy.	Complete

[91] A requirement of PA 08_0184, Schedule 5, Condition 8
[92] Endorsed by DPIE Secretary per PA 08_0184, Schedule 5, Condition 8

11. Incidents & Non-compliances

Incidents are notified to the EPA, DPI&E and other relevant agencies immediately on becoming aware of a notifiable incident.[93]

11.1 Reportable Incidents

The following incidents were reported during the 2019 review period:

21 February 2019: Notification provided in accordance with Condition 15 of SMP Approval 04/1907. Subsidence within LWW3 of Ulan Underground had increased to 1.62m (predicted subsidence over LWW3 was 1.60m). The additional subsidence was investigated and found to have no practical consequence. No further investigation was undertaken.

11.2 Non-Compliances

There were a total of nine non-compliances reported to EPA and DPI&E, as identified in **Compliance Table 1** for the 2019 reporting period. Non-compliances were recorded against EPL 394 Clause M2.2 and M2.3 and PA08_0184, S3, C19 *Table 9*. A summary of non-compliances, the nature and cause of the non-compliances and actions to address the non-compliances is provided in **Table 11.1** below.

[93] PA 08_0184 Schedule 5, Condition 6 and *Protection of the Environment Operations Act 1997*, Section 153 - Pollution Incident Response Management Plan (PIRMP, ULNCX-111515275-2432, tested on 24/7/2019 and subsequently updated on 26/7/2019).

Table 11.1 Details of Non-Compliances

Relevant Approval	Date	Details of Non-Compliance	Cause of Non-Compliance	Action to Address Non-Compliance
EPL 394, M2.2 Point 29	30 August 2019	Non-compliance of the 6 day sampling schedule of the High Volume Air Sampler (HVAS) located at 331 Cope Road (EPL ID 29).	HVAS did not operate at required runtime due to incorrect programming on 30 August 2019	Measured PM10 concentrations were below compliance limits for the relevant period. Programming procedures were reviewed with operators.
EPL 394, M2.2 Point 29	10 November 2019	The High Volume Air Samplers (HVAS) Flannery and Merlene failed to complete standard runtime 24:00:00 hours ∓ 1:00:00 hour run time on 10 November 2019	Essential Energy records confirm that an unplanned supply interruption occurred affecting the supply to the HVAS from around 10:05 pm for a duration of approximately 1 hour and 42 mins, with supply being restored at 11:47 pm.	No mitigating actions are proposed as it is not considered that the Ulan operations could have exceeded air quality limits at the time of the monitoring failure, due to the TEOM recording 19.5 µg/m3 for the 24 hour period.
EPL 394, M2.2 Point 33	17 November 2019	Continuous monitoring of pH and EC upstream of the operations, which was required when discharge was occurring, did not occur on 17 November 2019	Water loss upstream, not Ulan Coal operations.	Access to the area where the flow gauge is installed controlled. Alarm installed for operational failures. EPL varied - if continuous monitoring is not possible, consult with EPA.
PA08_0184, S3,c19 Table 9	Feb 13 and 19 2019	24 hour PM10 measured at EPL394, M2.2 monitoring point 30 exceeds 50 µg/m3 criterion	Ulan mining activities are located to the East of the monitor. Similarly high PM10 concentrations recorded by dust monitors for in the Upper Hunter air quality network, North West Slopes and Upper Hunter region.	Technical non-compliance reported to DPI&E and EPA
PA08_0184, S3,c19 Table 9	March 6, 11 and 31	24 hour PM10 measured at EPL394, M2.2 monitoring point 30 exceeds 50 µg/m3 criterion	Ulan mining activities are located to the East of the monitor. Similarly high PM10 concentrations recorded by dust monitors for in the Upper Hunter air quality network at Merriwa and Bathurst	Technical non-compliance reported to DPI&E and EPA
PA08_0184, S3,c19 Table 9	October 26 and 29	24 hour PM10 measured at EPL394, M2.2 monitoring point 30 exceeds 50 µg/m3 criterion	Ulan mining activities are located to the East of the monitor. Similarly high PM10 concentrations recorded by dust monitors for in the Upper Hunter air quality network at Merriwa, Bathurst, Narrabri and Gunnedah	Technical non-compliance reported to DPI&E and EPA
PA08_0184, S3,c19 Table 9	November 8, 12, 17, 20-23, 26 and 29-3dec	24 hour PM10 measured at EPL394, M2.2 monitoring point 30 exceeds 50 µg/m3 criterion	Ulan mining activities are located to the East of the monitor. Similarly high PM10 concentrations recorded by dust monitors for in the Upper Hunter air quality network at Merriwa, Bathurst, Narrabri and Gunnedah	Technical non-compliance reported to DPI&E and EPA
PA08_0184, S3,c19 Table 9	Dec 8, 9, 16 and 27	24 hour PM10 measured at EPL394, M2.2 monitoring point 30 exceeds 50 µg/m3 criterion	Ulan mining activities are located to the East of the monitor. Similarly high PM10 concentrations recorded by dust monitors for in the Upper Hunter air quality network at Merriwa, Bathurst, Narrabri and Gunnedah	Technical non-compliance reported to DPI&E and EPA
EL8687 C3	15 April 2019	Penalty Notice received 15/4/2019: Failure to conduct community consultation strictly consistent with the community consultation strategy	Procedures inconsistent with approved strategy	Actions taken include tracking of document commitments in the action tracking system and procedural revisions

12. Activities Planned for 2020

Operational activities planned for 2020

- The Ulan Underground will continue to develop roadways for LWW07 and LW30 in 2020 as well as advancing the Main Headings. Longwall mining will continue in LWW06 for the remainder of 2020.
- Ulan West Operations will continue to develop the main headings and roadways for LW06 and LW07 in 2020. Longwall mining is expected to commence in LW06 in quarter three of 2020. The Ulan West Operations will continue installation of new infrastructure associated with the ventilation and dewatering of LW06 and LW07 and construction of surface infrastructure and ventilation shaft to the south west of Ulan West will continue commence
- The Ulan Open Cut is not expected to operate in 2020. Mining could occur in response to operational requirements
- Handling and processing of coal from the ROM stockpiles to the train load out
- Blasting and extraction of rock material from the Bobadeen Basalt Quarry, if required for operational projects
- Exploration at both Ulan West and Ulan Underground will continue with approximately 75 holes to be drilled in 2020

Groundwater management plan

- Response to recommendations from the 2019 Groundwater monitoring report
- Installation of groundwater monitoring wells to the North of Ulan West and near Mona Creek
- Finalisation of the groundwater model recalibration

Rehabilitation/Remediation/Offset Areas/Goulburn River

- Management actions as for identified issued within the rehabilitation/remediation and offset areas
- Progress DRG Rehabilitation relinquishment and identify other areas that meet completion criteria.
- Implement report card recommendations.

The following heritage works are planned for 2020:

- Heritage Survey of areas not previously surveyed within the Ulan West Extension Area and exploration activities
- Completion of outstanding reports
- Complete Old Ulan Conservation Area restoration works around the remaining chimneys
- Bobadeen Homestead will undergo yard maintenance, pest control and house maintenance as required

Ulan West Extraction Plan LW1-6 Biodiversity Management Plan

- Undertake investigation into reduced bat activity levels over mined panels in the Ulan West LW1 To 6 Extraction Plan area

Management Plan/Extraction Plan revisions planned for 2020 include

- Revision of the relevant Ulan Coal Management Plans following the submission of this Annual Review; including the incorporation of the implemented recommendations from the following reports:
    - Annual Groundwater Report
    - Ulan Creek Stability Report
    - Ulan West Annual Subsidence Report
    - Annual Biodiversity Reports
    - Biodiversity Management Plan

Approval Modifications

- No new modification applications are anticipated to be submitted in 2020

Community

- Two community BBQs Bungaba Progress Association Hall
- Consultation for the 2020 Exploration Program within EL8687 and EL7542 via newspaper ad, community newsletters, exploration newsletters, emails, letter drops, telephone calls and face to face meetings.
- Negotiate private property access agreements with landholders for exploration within ML1468, EL8687 and EL7542.
- Provide support to the local community through Community Investment Program via sponsorship support, community projects and in-kind donations.

GLENCORE