



Integra Underground 2020 Annual Review

1 January to 31 December

Title Block

Name of operation	Integra Underground Mine
Name of operator	HV Coking Coal Pty Limited
Development consent/ project approval	PA 08_0101
Name of holder of development consent/ project approval	Integra Underground Project
Mining lease and Exploration Lease #	CL 382, ML 1551, ML 1525, ML 1518, ML 1437, ML 1676, ML 1786, ML1740 and ML1742
Name of holder of mining lease	HV Coking Coal Pty Limited
Water licence #	WAL 484, WAL 485, WAL 960, WAL 961, WAL 1172, WAL 1173, WAL 1242, WAL41562, WAL41563, 20BL167917, 20BL169571, 20BL169573, 20BL169574, 20BL171707, 20BL171708, 20BL171710, 20BL171813, 20BL171870, 20BL172277, 20BL172278, 20BL172279
Name of holder of water licences	HV Coking Coal Pty Limited
MOP/ RMP start date	1 November 2018
MOP/ RMP end date	31 December 2023
Annual Review start date	1 January 2020
Annual review end date	31 December 2020
I, Chloe Piggford, certify that this audit report is a true and accurate record of the compliance status of Integra Underground for the period 01/01/2020 to 31/12/2020 and that I am authorised to make this statement on behalf of Integra Underground. <i>Note.</i> <i>a) The Annual Review is an 'environmental audit' for the purposes of section 122B (2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, \$1 million and for an individual, \$250,000.</i> <i>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).</i>	
Name of authorised reporting officer	Chloe Piggford
Title of authorised reporting officer	Environment and Community Manager
Signature of authorised reporting officer	
Date	29/03/2021

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1. Statement of Compliance

Integra Underground Mine (Integra Underground) operates in accordance with Project Approval (PA) 08_0101, Environment Protection Licence (EPL) 3390 and several mining tenements. A summary of compliance with these major approvals during 2020 is provided in **Table 1-1**.

Where non-compliances have been recognised, they are listed in **Table 1-2** and detailed in later sections of this Annual Review. **Table 1-3** presents the categories used to define the status of each non-compliance.

Table 1-1 – Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	Yes/No
PA 08_0101	No
EPL 3390	No
CL 382	Yes
ML 1437	Yes
ML 1518	Yes
ML 1525	Yes
ML 1551	Yes
ML 1676	Yes
ML 1694 Sublease*	Yes
ML 1740	Yes
ML 1742	Yes
ML 1786	Yes

* ML1694 Sublease was replaced with ML1742 on 6 April 2020.

Table 1-2 – Non-Compliances During 2020

Relevant Approval/Licence	Condition	Condition Summary	Compliance Status	Comment	Where Addressed
PA 08_0101	Sch 3 Cond 15	Air Quality & Greenhouse Gas Management Plan The Proponent must prepare an Air Quality & Greenhouse Gas Management Plan for the project to the satisfaction of the Secretary. The Proponent must implement the approved management plan as approved from time to time by the Secretary.	Non-Compliant	The AQGGMP was implemented during 2020 with the exception of collection of deposited dust samples not occurring in accordance with AS/NZS 3580.10.1:2016, as stipulated in Table 4-1 of the AQGGMP. One round of depositional dust monitoring samples (collected 06/01/2020) was not collected within the specified 30 days +/- 2 days.	Section 10 Section 11

Relevant Approval/ Licence	Condition	Condition Summary	Compliance Status	Comment	Where Addressed
EPL 3390	M1.3	The following records must be kept in respect of any samples required to be collected for the purposes of this licence: a) the date(s) on which the sample was taken; b) the time(s) at which the sample was collected; c) the point at which the sample was taken; and d) the name of the person who collected the sample.	Non-Compliant	Noise monitoring reports provided by Umwelt provide the following information: - Time in which monitoring occurred - Date in which monitoring occurred - Location in which monitoring occurred The name of the person who collected the sample is not referenced in the monitoring report.	Section 10 Section 11

Table 1-3 – Compliance Status Categories

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

2. Introduction

2.1 Background

Integra Underground is an underground coal mine located approximately 12 km north-west of Singleton, in the Singleton Local Government Area (LGA) of the Hunter Region of New South Wales (NSW) (refer **Figure 2-1**).

Integra Underground mining operations are approved at a maximum extraction rate of 4.5 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal until 31 December 2035 under Project Approval (PA) 08_0101. This approval allows longwall mining of the Hebden, Barrett and Middle Liddell seams to produce high quality, semi-hard coking coal for export. The approved underground mine layout in the Middle Liddell Seam is shown in **Figure 2-2**.

This Annual Review covers the period of 1 January to 31 December 2020 (herein referred to as the reporting period). During the reporting period Integra Underground completed the mining of Longwall 15 and commenced the mining of Longwall 16. Surface activities at Integra Underground during the reporting period included the construction of gas drainage wells, pipelines and access roads for Longwall 16. Rehabilitation was undertaken at one gas well location and surrounding areas of Ventilation Shaft 3.

2.2 History of Operations

Development Consent for underground mining at the site (then known as Glennies Creek Colliery) was first granted on 1 November 1991 (DA 105/90) and was modified on six occasions to allow further surface facility development and increased production. An environmental assessment for mining within the Middle Liddell Seam beyond 2012 and in the Hebden and Barrett seams was submitted in July 2009 with the application (PA 08_0101) being approved in late 2010 by the (then) Department of Planning (now Department of Planning, Industry and Environment [DPIE]). To date, coal has been mined from the Middle Liddell Seam with approval also covering the Hebden and Barrett seams. This includes a drift to the Hebden Seam that has not progressed to development.

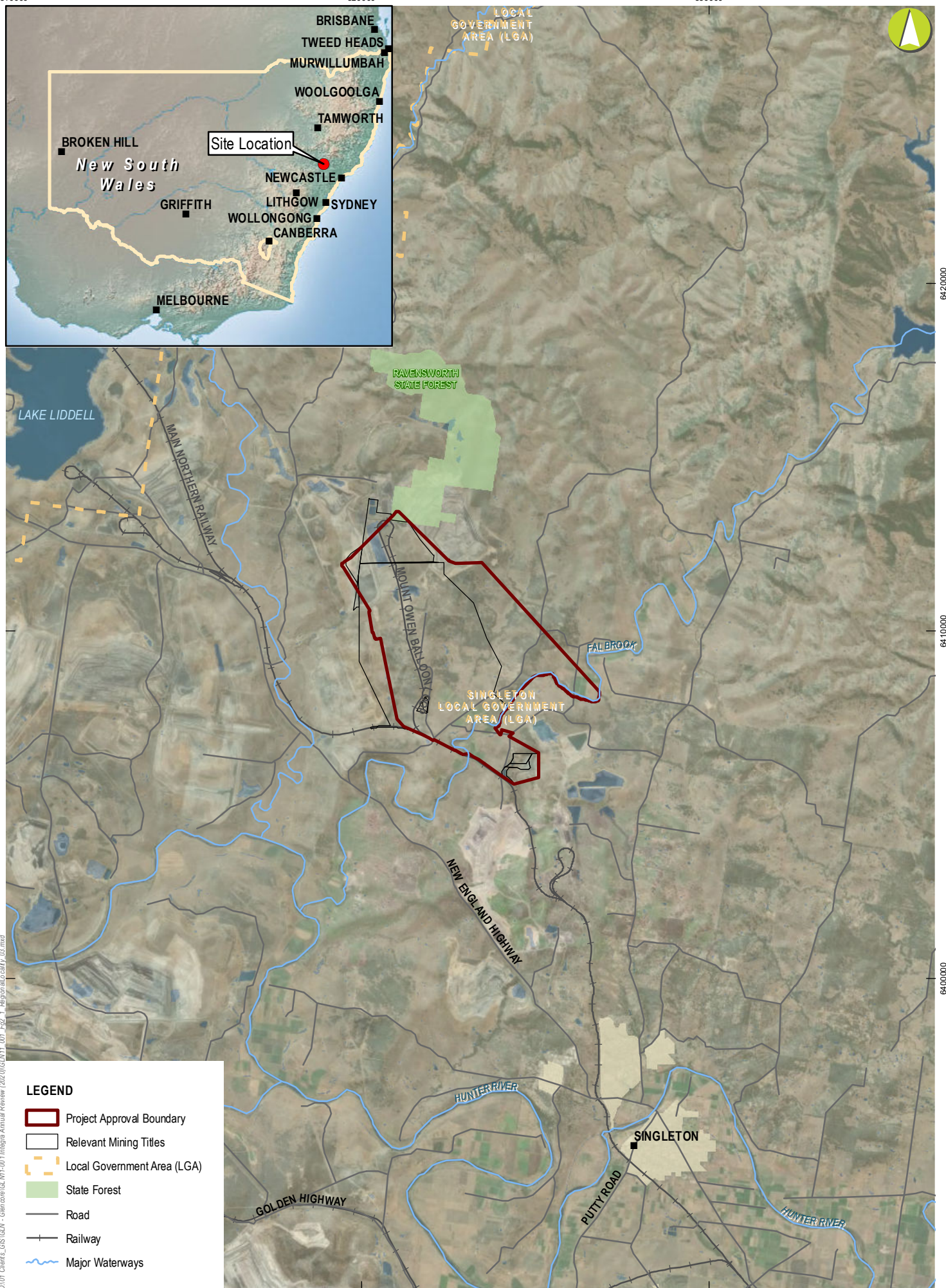
The Camberwell Coal Joint Venture (CCJV) was granted Development Consent (DA 86/2889) for mining operations on 21 March 1990. Development commenced with the construction of the Coal Handling and Preparation Plan (CHPP) and rail loop facilities and the first coal was mined in the area known as the North Pit on 1 March 1991. Ten modifications were granted, which related to matters such as increased production, and surface infrastructure changes and upgrades. An application (PA 08_0102) for open cut mining operations within the Northern and Western Extension mining areas was approved in late 2010 by the former Department of Planning (now DPIE).

The CCJV and Glennies Creek Joint Venture (GCJV) were integrated on 4 August 2006 to form the Integra Coal Joint Venture (ICJV). AMCI Holdings Australia, part owner of ICJV, was bought by Brazil's Companhia Vale do Rio Doce (CVRD) on the 20 April 2007. CVRD changed the company name to Vale on 29 November 2007 and on 11 February 2008 renamed CVRD Australia Pty Ltd as Vale Australia Pty Ltd. In December 2014, Vale Australia (GC) Pty Ltd, a subsidiary of Vale Australia Pty Ltd, acquired 3.6% from POS-GC Pty Ltd, increasing its stake to 36%.

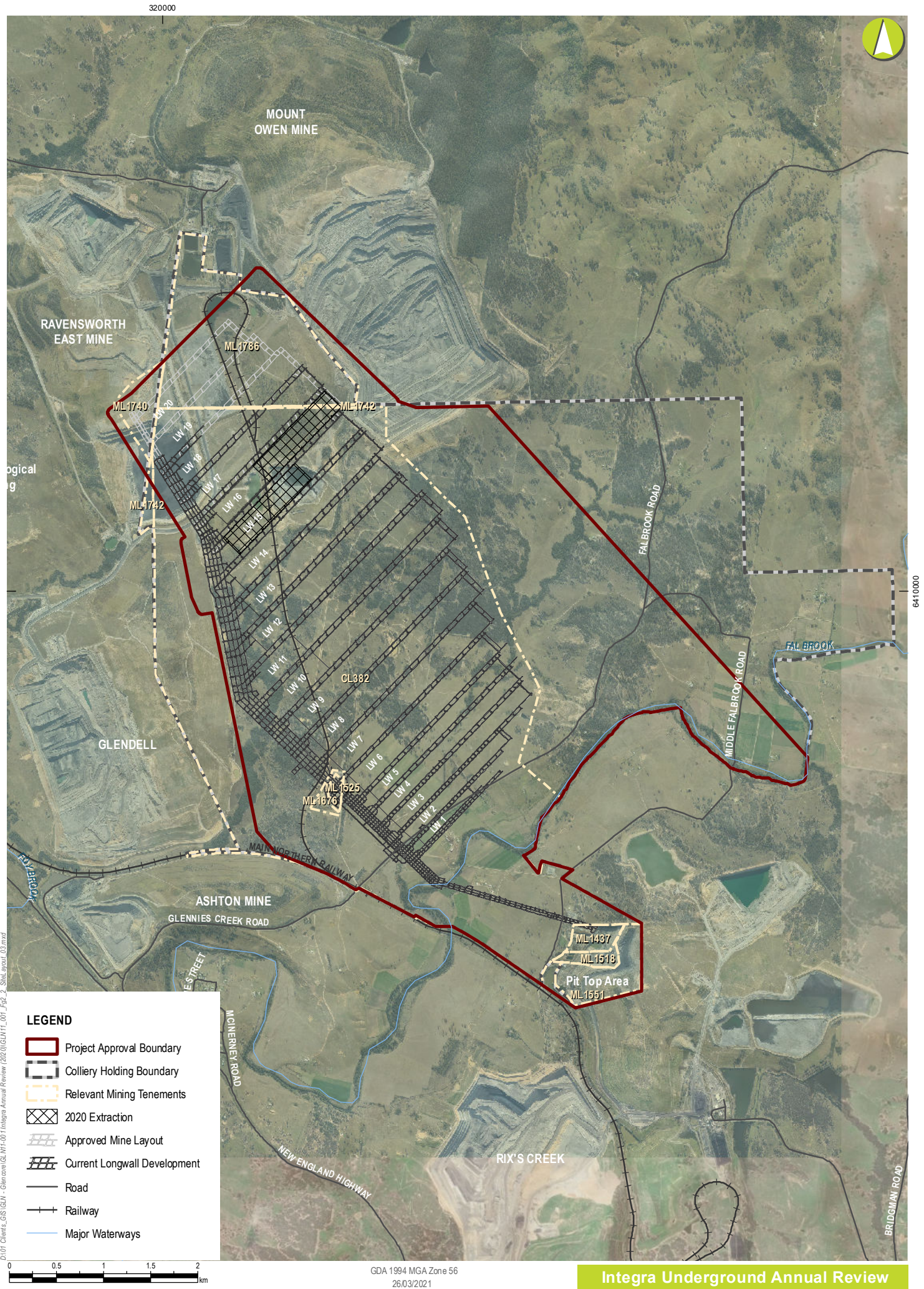
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Site Layout
FIGURE 2-2

The Integra Complex was operated as an unincorporated joint venture, with Integra Coal Operations Pty Limited being the management company responsible for all operations at both sites on behalf of the joint venture owners. Due to falling coal prices and increased operational costs at the Integra Complex, a decision was made by the Joint Ventures to place the Integra Complex under care and maintenance. Integra Underground and Integra Open Cut (IOC) were placed under care and maintenance on 28 July 2014 and 15 August 2014, respectively.

On 18 December 2015, HV Coking Coal Pty Limited (HVCC) (a 100% Glencore-owned company) purchased the Integra Complex. Bloomfield Collieries Pty Limited (Bloomfield) subsequently purchased from Glencore the IOC, coal handling preparation plant (CHPP), train loading infrastructure and the rail loop. EPL 3390 was applicable to the Integra Complex until 21 December 2015. At this time the EPL was varied to cover Integra Underground only, with the existing Rix's Creek EPL (3391) varied to also cover Rix's Creek North (previously IOC).

Prior to HVCC's purchase of Integra Underground, the Integra Complex operated under a single project approval which combined PA 08_0101 (Integra Underground) and PA 08_0102 (IOC). Following the respective sales of the underground and open cut mines in December 2015, approval was sought to separate the combined project approval. This separation of the combined project approval was granted through Modification (Mod) 5 on 23 August 2016. Until this modification was approved, an agreement between Bloomfield and HVCC outlined the separation of responsibilities under the Project Approval and EPL.

HVCC recommenced underground operations in 2017, with infrastructure development and early workings resuming in February 2017 and longwall extraction resuming in May 2017 in accordance with the Extraction Plan as required under Condition 20 of Schedule 3 of PA 08_0101.

An application for Modification 8 (Mod 8) to PA 08_0101 and accompanying EA was lodged with the DPIE in November 2017. The purpose of Mod 8 was to seek approval to continue longwall mining of the Middle Liddell Seam further to the north of the previously approved longwall panels, and construction and operation of ancillary surface infrastructure required to support the proposed mining activities. Subsequently, approval was granted by DPIE on 16 April 2018. The construction of these ancillary surface infrastructure commenced in February 2019 and was completed in June 2020. Longwalls 15 to 20 were included in the approved mine plan for Mod 8.

2.3 Purpose

This Annual Review has been prepared to provide a summary of the performance of the operation over the reporting period in accordance with:

- The DPIE publication *Post Approval Requirements for State Significant Mining Developments – Annual Review Guideline* (NSW Government 2015);
- The environmental management and compliance reporting requirements contained in relevant mining tenements (CL 382, ML 1551, ML 1525, ML 1518, ML 1437, ML 1676, ML 1786, ML1740 and ML1742);
- Schedule 5, Condition 11 of PA 08_0101;
- Commitments in the 2018-2023 Mining Operations Plan (MOP);
- Commitments contained within the Integra Underground Environmental Management System (EMS);
- Summary of progress against actions in the latest Independent Audit of the site; and
- Outcomes of and feedback from regulators following the 2019 Annual Review.

A summary of relevant requirements relating to this Annual Review is provided in **Table 2-1**.

Table 2-1 – Annual Review Requirements

Condition	Section Addressed
PA08_0101	
Schedule 5, Condition 11 By the end of March each year, or other timing as may be agreed by the Secretary, the Proponent must submit a report to the Department reviewing the environmental performance of the project to the satisfaction of the Secretary. This review must: a) describe the works (including any rehabilitation) that were carried out during the previous calendar year, and the works that are proposed to be carried out over the current calendar year;	Sections 4, 8 and 12
b) include a comprehensive review of the monitoring results and complaints records of the project over the previous calendar year, which includes a comparison of these results against the: • relevant statutory requirements, limits or performance measures/criteria; • monitoring results of previous years; and • relevant predictions in the documents referred to in condition 2 of Schedule 2;	Sections 6, 7, 8 and 9.4
c) identify any non-compliance over the previous calendar year, and describe what actions were (or are being) taken to ensure compliance;	Sections 1 and 11
d) identify any trends in the monitoring data over the life of the project;	Sections 7.5.4 and 7.6.4
e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and	Sections 6 and 7
f) describe what measures will be implemented over the current calendar year to improve the environmental performance of the project.	Sections 6, 7 and 8
Schedule 3, Condition 36: The proponent must: (d) Report on waste management and minimisation in the Annual Review, to the satisfaction of the Secretary.	Section 6.7
Statement of Commitments	
The current groundwater monitoring program will continue with ongoing review and possible modification of the program as further data is obtained and interpreted. Annual reports documenting and interpreting the collected data will be prepared	Section 7.6
Emissions and abatement strategies will be reported annually as part of the internal environmental reporting and National Greenhouse and Energy Reporting obligations and in the Annual Review. Statement of Commitments Surface Water - Monitoring results will be reported in the Annual Review and distributed to the relevant Government agencies, CCC members and other relevant stakeholders.	Section 6.10
Greenhouse gas emissions will be estimated and reported annually.	Section 6.10
Following the completion of extraction of each longwall panel, a report will be prepared that summarises relevant monitoring data. Relevant monitoring and management activities for each year will also be reported in the Annual Review.	Section 6

Condition	Section Addressed
Mining Leases	
ML1437, ML1518, ML1525, ML1551, ML1676, Sublease ML1694, ML1786, ML1740, ML1742 Coal Lease: CL382 Environmental Management Report/Rehabilitation Report a) The lease holder must lodge Environmental Management reports (EMR) with the Director-General annually or at dates otherwise directed by the Director-General. b) The EMR must; (i) report against compliance with the MOP; (ii) report on progress in respect of rehabilitation completion criteria; (iii) report on the extent of compliance with regulatory requirements; and (iv) have regard to any relevant guidelines adopted by the Director-General; Mining Leases:	Section 8
4. Compliance Report a) The lease holder must submit a Compliance Report to the satisfaction of the Minister. The report must be prepared in accordance with any relevant guidelines or requirements published by the Minister for compliance reporting. b) The Compliance Report must include: i. the extent to which the conditions of this mining lease or any provisions of the Act or the regulations applicable to activities under this mining lease, have or have not been complied with; ii. particulars of any non-compliance with any such conditions or provisions, iii. the reasons for any such non-compliance; iv. any action taken, or to be taken, to prevent any recurrence, or to mitigate the effects, of that non-compliance. c) The Compliance Report must be lodged with the Department annually on the grant anniversary date for the life of this mining lease. d) In addition to annual lodgement under condition 4(c) above, a Compliance Report: i. must accompany any application to renew this mining lease under the Act; ii. must accompany any application to transfer this mining lease under the Act; and iii. must accompany any application to cancel, or to partially cancel, this mining lease under the Act. e) Despite the submission of any Compliance Report under (c) or (d) above, the titleholder must lodge a Compliance Report with the Department at any date or dates otherwise required by the Minister. f) A Compliance Report must be submitted one month prior to the expiry of this mining lease, where the licence holder is not seeking to renew or cancel this mining lease.	This Annual Review
Mining Operations Plan 2018-2023	
All exploration within a mining lease will be reported in the Integra Underground Annual Review.	Section 4.2
HVCC will provide details about completed gas drainage rehabilitation and proposed gas drainage construction and rehabilitation as part of the Annual Review	Section 8 and 4.4.2
The results of air quality monitoring will be assessed against the relevant criteria from PA 08_0101 and EPL3390. Results will be provided in the Annual Review and EPL Annual Return.	Section 6.2
Disturbance and rehabilitation to be confirmed in the Annual Review includes:	Section 8.3
End 2020 Includes additional gas wells and goaf drainage area.	Section 8.3
Includes 2021 Includes additional gas wells and tracks.	Section 8.3
Includes 2022 Includes additional gas wells and tracks.	Section 8.3

Condition	Section Addressed
Includes 2023 Indicative only at this point. Rehabilitation based on approximately 18.5 ha of rehabilitated gas wells and 7.2ha of Domain 4 (Current Rehabilitation Area). Estimated disturbance summary includes: • 66.7ha of pit top; • 51.1ha of ventilation area and gas drainage as active; and • 4.5ha of water management.	Section 8.3
The rehabilitation monitoring results, along with any remedial works required, will be summarised in the Annual Review. Annual reviews will be conducted of rehabilitation monitoring data to assess trends and monitoring programme effectiveness.	Section 8
The Annual Review includes a summary of rehabilitation monitoring and reporting (including subsidence remediation) and is sent to the Resources Regulator, DPE, OEH and other relevant stakeholders. The Annual Review is also publicly available on the Integra Underground website. The Annual Review will contain additional details regarding the mine layout, exploration and gas drainage during each calendar year, as well as planning for the next calendar year's activities	Section 4, 8 and 12
Non-compliances and incidents will be reported within the Annual Review and EPL Annual Return	Section 11
Reporting required by the approved Extraction Plan will be undertaken. This is described in the Subsidence Monitoring Program within the Extraction Plan. This includes Annual Review reporting and incident reporting consistent with Section 10.1 and Section 10.2 of the Extraction Plan. Further, reporting required by the approved Extraction Plan may include bi-monthly subsidence reporting (if new impacts are identified), and six-monthly subsidence reporting, to the Resources Regulator and DPIE.	Section 6.13
Report the progress of any rehabilitation and monitoring of biodiversity in the Annual Review	Section 6.4 and Section 8.6

2.4 Mine Contacts

Contact details for key personnel responsible for the environmental management at Integra Underground are provided in **Table 2-2**.

Table 2-2 – Mine Contacts

Name	Position	Contact
Peter Ostermann	Operations Manager	(02) 6577 4200
Chloe Piggford	Environment and Community Manager	(02) 6577 4200
Evert Smit	Technical Services Manager	(02) 6577 4200

3. Approvals

Operations at Integra Underground are regulated by a range of leases, licences and approvals, which are summarised in the following sections.

3.1 Project Approval

PA 08_0101 (as modified) allows for the extraction, processing and transportation of up to 4.5 Mtpa until 31 December 2035. Eight modifications to PA 08_0101 have been approved. Details of the approval and subsequent modifications are provided in **Table 3-1**.

Table 3-1 – PA 08_0101 and Modifications

Approval	Date Granted	Expiry
PA 08_0101 Original approval	26 November 2010	31 December 2035
Mod 1 - Extend the open cut dump and increase emplacements height	18 March 2012	
Mod 2 - Amendments to consent wording	1 February 2013	
Mod 3 - Extend timeframes for conditions	5 October 2012	
Mod 4 - Modify biodiversity offset areas	24 February 2016	
Mod 5 - Separate into two project approvals for IOC and Integra Underground	23 August 2016	
Mod 6 - Approved to correct an administrative error which unintentionally altered the previously approved mine plan for the project	21 December 2016	
Mod 7 - Construct a water pipeline from Integra Underground to the Mount Owen Complex	15 September 2017	
Mod 8 - Realignment of main headings, extension of approved longwalls, development of up to three additional longwalls to the northwest in the Middle Liddell Seam and changes to ancillary surface infrastructure and water management	16 April 2018	

3.2 Leases

The leases outlined in **Table 3-2** are applicable to the operations at Integra Underground. During the reporting period two new mining leases were granted to HV Coking Coal Pty Ltd - ML 1740 and ML 1742. These were partial transfers of mining tenements to Integra Underground from Liddell and Mount Owen mines respectively. Once these new mining leases were granted in April 2020, the ML1694 sub-lease was no longer required.

Table 3-2 – Integra Underground Mining Leases

Title	Date Granted	Expiry
ML 1437	28 April 1999	27 March 2032
ML 1518	14 June 2004	27 March 2032
ML 1525 (shaft)	18 November 2002	17 November 2023
ML 1551	10 January 2006	27 March 2032
ML 1676	5 June 2013	4 January 2026
CL 382	12 November 1991	11 November 2033
ML1740	6 April 2020	30 December 2023
ML1742	6 April 2020	22 October 2034

Title	Date Granted	Expiry
ML 1786	28 May 2019	31 December 2031
ML 1694* (part)	22 October 2013	22 October 2034

* Sub-lease only. Full details to be reported by the Lease Holder (Mount Owen Pty Limited).

3.3 Licences

3.3.1 Environment Protection Licence

Integra Underground operates under EPL 3390, with an anniversary date of 31 August. EPL 3390 was varied once during the reporting period (26 May 2020). The variation involved updating the Licence with contemporary conditions consistent with other mining industry sector licences in the Hunter Region and the EPA's legislation, policy and guidelines.

3.3.2 Surface Water Licences

Integra Underground currently holds the surface water licences detailed in **Table 3-3**.

Table 3-3 – Integra Underground Surface Water Licences

Licence No	Work Approval	Date Granted	Expiry	Share	Water Source
WAL 484	20CA200060	1 July 2004	Perpetuity	3	Hunter Regulated River - any part of Glennies Creek
WAL 485				99	Hunter Regulated River - Zone 3A of Glennies Creek
WAL 960	20WA201234			50	
WAL 961	20WA201236			150	
WAL 1172	20CA201763			3	
WAL 1173				303	
WAL 1242				13	

3.3.3 Groundwater Licences

Integra Underground currently holds the groundwater licences outlined in **Table 3-4**. Previous licences 20BL172505 and 20BL172506 were converted to WAL41563, and licences 20BL169862 and 20BL169864 were converted to WAL41562.

Table 3-4 – Integra Underground Groundwater Licences

Licence No.	Date Granted	Expiry	Allocation (ML)	Type of Works
WAL41562	7 June 2018	Perpetuity	450	Bore - Groundwater extraction for dewatering purpose
WAL41563	7 June 2018	Perpetuity	500	
20BL167917	15 August 2000	Perpetuity	-	Monitoring Bore
20BL169571	7 March 2005			
20BL169573				
20BL169574				
20BL171707	17 August 2007			
20BL171708				
20BL171710				

Licence No.	Date Granted	Expiry	Allocation (ML)	Type of Works
20BL171813	3 April 2008			
20BL171870	15 May 2008			
20BL172277	15 September 2009		-	
20BL172278				
20BL172279				

3.3.4 Sewage Management

Integra Underground has approval to operate a system of sewage management under On-site Sewerage Management (OSSM) Approval Number 3969/2008. This approval was granted 25 January 2012. The approval was renewed on 1 July 2020 through to 30 June 2021.

3.4 Other Approvals

3.4.1 Mining Operations Plan

The Integra Underground MOP was submitted to the Resources Regulator in November 2018 following the approval of Mod 8 to PA 08_0101 with a completion date of 31 December 2023 (SLR, 2018). This MOP was approved 19 November 2018. An amendment (known as Amendment A) was submitted in late 2018, which was revised in mid-2019. Subsequently, MOP Amendment A (Version 2) was approved on 22 July 2019. A further MOP amendment (Amendment B) was approved during the reporting period, on 28 July 2020. The MOP amendment related to:

- Amendment to the project approval boundary and boundary of CL 382 in MOP plans;
- Addition of ML 1786, ML 1740, ML 1742 to the MOP document and plans;
- Small change to Plan 3B to include five additional gas wells in place in 2020 (LW17); and
- Additional detail regarding subsidence monitoring, remediation and reporting.

The preparation of a new MOP is anticipated to commence in 2021, to reflect future mine closure (refer **Section 4.5.4**).

3.4.2 Extraction Plan

The Integra Underground Longwalls 15 and 16 Extraction Plan (EP 15-16) was prepared to seek approval for secondary extraction within these panels. The EP 15-16 was prepared in accordance with Schedule 3, Condition 20 of PA 08_0101 and was submitted to DPIE on 3 June 2019. Approval was received from DPIE on the 16 August 2019.

An Extraction Plan for Longwalls 17 to 20 was submitted to DPIE in 2020 and was recently approved in 2021.

4. Operations During the Reporting Period

4.1 Mining Operations

Integra Underground completed secondary extraction of Longwall 15 in May 2020 and commenced mining Longwall 16 in June 2020. Development of first workings in 2020 continued in Longwall 16, Longwall 17 and Longwall 18. Coal extraction during 2020 is shown in **Figure 4-1**.

All ROM coal is sent to Rix's Creek North (owned by Bloomfield) for processing, therefore tailings/rejects are not relevant to Integra Underground. The 2020 production summary is presented in **Table 4-1**.

Table 4-1 – Production Summary 2020

Material	Approved Limit (PA 08_0101)	2019 reporting period (actual)	2020 MOP Prediction	2020 reporting period (actual)	2021 MOP Prediction	2021 reporting period (forecast)
Waste Rock/ Overburden (bcm)	N/A	N/A	N/A	N/A	N/A	N/A
ROM Coal (t)	4,500,000	2,629,615	2,785,413	2,758,160	3,169,328	2,665,000
Reject Material (Tailings) (t)	N/A	N/A	N/A	N/A	N/A	N/A
Saleable product (t)	N/A	1,637,317	1,889,379	2,142,899	2,238,594	2,020,000

4.2 Exploration

Three exploration holes were drilled in 2020.

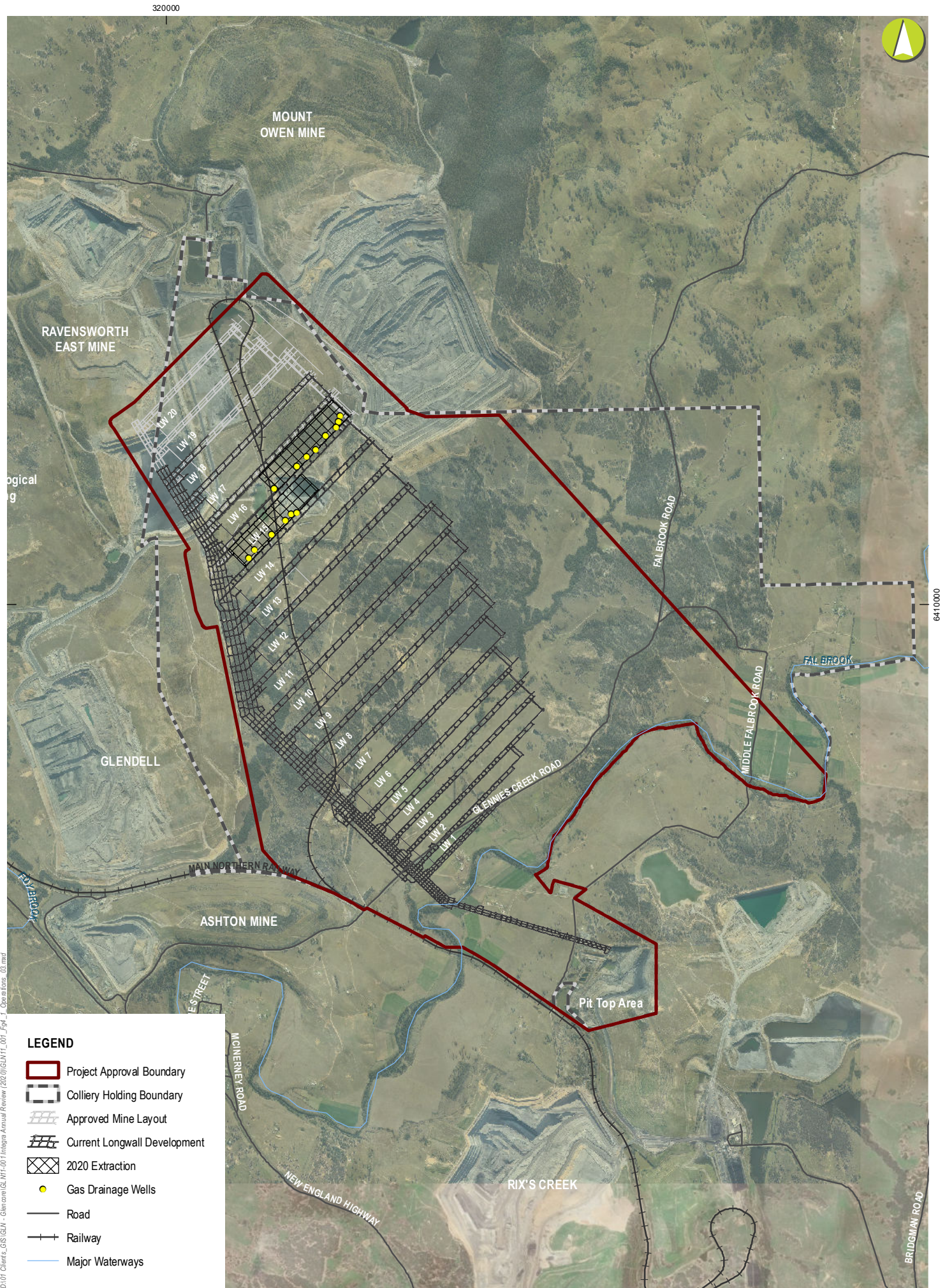
4.3 Rehabilitation

Rehabilitation was undertaken at one gas well location and surrounding areas of Ventilation Shaft 3. This is further detailed in **Section 8**. Six exploration holes were rehabilitated in 2020.

4.4 Other Operations

4.4.1 Coal Processing

All ROM coal was stockpiled by Integra Underground before being hauled by Bloomfield operations along their internal haul roads to Rix's Creek North (owned by Bloomfield) CHPP for processing.



D:\01 Clients_GIS\GLN - Glendon\GLN-01\Integra Annual Review (2020)\GLN1_001_Fy4_1_Operations_03.mxd

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4.4.2 Construction

Surface activities at Integra Underground included the construction of gas drainage wells, pipelines and access roads for Longwall 16. The gas wells constructed during 2020 are listed in **Table 4-2**.

Table 4-2 – Gas wells constructed 2020

Gas well	Dates	Turned on/commissioned	Drill Depth (m)
GW15/6	23/01/2020	10/02/2020	452
GW15/7	12/02/2020	14/02/2020	448
GW15/8	18/02/2020	24/02/2020	441
GW15/9	19/02/2020	4/03/2020	430
GW15/11	23/03/2020	30/03/2020	441
GW15/12	4/04/2020	6/04/2020	427
GW16/1	28/05/2020	29/05/2020	551
GW16/2	12/06/2020	4/07/2020	550
GW16/3	30/06/2020	19/07/2020	551
GW16/4	27/07/2020	4/08/2020	536
GW16/5	13/08/2020	14/08/2020	508
GW16/6	28/08/2020	1/09/2020	498
GW16/7	22/09/2020	30/09/2020	484
GW16/8	29/10/2020	8/12/2020	455

Ventilation Shaft 3 construction works were completed in 2020. Located above the main headings and near Longwall 16, this shaft is required to provide adequate ventilation and services to the underground mining operation. The following construction works were undertaken at Ventilation Shaft 3:

- Installation of HV switchgear and diesel generator (including foundations);
- Installation of diesel dam pump (including foundation);
- Installation of two potable water tanks and infrastructure;
- Installation of two emulsion tanks and infrastructure;
- Installation of shedding for transformers, HV switchgear, diesel generator and compressor facility;
- Installation of two ventilation fans, and associated gas monitoring infrastructure;
- Installation of concrete drophole foundation and facilities;
- Installation of ballast drophole foundation and facilities;
- Installation of ballast storage facility; and
- Installation of surface to seam emulsion and compressed air.

The ventilation shaft was commissioned on 8 April 2020.

4.4.3 Mobile Plant and Equipment

The equipment used in 2020 was mostly consistent with previous years and approved operations, with the majority of equipment used underground. **Table 4-3** details the type, quantity and function of vehicles used for operations at Integra Underground.

Table 4-3 – Integra Underground Mobile Plant and Equipment

Equipment Type	Number Routinely in Operation	Function
Personnel transporters	14	Personnel movement
Load haul dump (LHD/FBL)	14	Materials movement
Grader	1	Underground road maintenance
Continuous miner	2	Mine development
Shuttle car	4	Mine development
Bobcat	2	Underground belt cleaning
Surface forklift	2	Surface and stores
Longwall unit	1	Coal production
Light Vehicles	8	Surface transportation
Telehandlers	2	Surface and stores

4.4.4 Construction Traffic Management

A *Construction Traffic Management Plan* (CTMP) was developed to satisfy Schedule 3 Conditions 42 of PA 08_0101 for the construction activities included in Mod 8 to PA 08_0101 and was effective as of 10 September 2018.

During the reporting period, all traffic management was undertaken as outlined in the CTMP. Records of contractors assisting with the construction phase were retained, including start and finish times. Construction areas were inspected during the construction phase monthly by the Environment and Community Department with no construction traffic related issues observed. Access to construction areas was mainly via Glennies Creek Road, which was accessed using the New England Highway or Middle Falbrook Road. Integra Underground minimised traffic impacts during construction of surface infrastructure and traffic impacts did not exceed predictions. No traffic complaints were received regarding construction traffic.

The construction traffic management measures set out in the CTMP are deemed effective. There were no construction traffic related incidents.

4.4.5 Land Subdivision & Ownership Transfers

HV Coking Coal Pty Ltd acquired a property (Lot 2, DP600372) on 15 June 2020, on the acquisition basis of subsidence and air quality as per Schedule 3, Condition 1 of PA 08_0101.

4.5 Next Reporting Period

4.5.1 Mining

Integra Underground will undertake the following mining activities during 2021:

- Longwall development within the Middle Liddell Seam using continuous miners;
- Longwall mining within the Middle Liddell seam, in Longwalls 16 and 17. Longwall mining is projected to commence within Longwall 18 during 2021 subject to mine planning and production;
- Extraction of a maximum 4.5 Mtpa of ROM coal;
- Subsidence monitoring and remediation as per the approved Integra Underground Extraction Plan;
- Storage of ROM coal at the pit top;
- Hauling and processing of coal from Integra Underground to be undertaken by Bloomfield Collieries and its Rix's Creek North CHPP;
- Operation of workshop and administration areas; and
- Installation, commission and operation of gas management infrastructure for Longwalls 16, 17 and 18, including pads, access tracks and pipelines.

4.5.2 Exploration

No exploration is planned for 2021.

4.5.3 Construction

No construction is planned for 2021. Notwithstanding, Integra Underground holds approval to undertake construction activities if required.

4.5.4 Rehabilitation and Mine Closure

During 2021, Integra Underground plans to undertake progressive rehabilitation of one gas drainage well and associated infrastructure.

Integra Underground will commence planning for activities associated with mine closure, including the preparation of a new MOP to reflect mine closure.

5. Actions Required from Previous Annual Review

Following the submission of the 2018 Annual Review, the DPIE responded on 1 July 2019 requesting additional information. The revised Annual Review was then submitted to the DPIE on 30 July 2019. A letter was received from the DPIE on 15 August 2019 confirming acceptance of the amended 2018 Annual Review. The Resources Regulator did not provide any feedback in response to the 2018 Annual Review. While all comments received from DPIE were addressed and the revised 2018 Annual Review approved, the feedback has also been addressed within this Annual Review, as outlined in **Table 5-1**.

Table 5-1 - 2018 Annual Review Feedback

Comment	Section Addressed
Analysis of monitoring results – in accordance with Schedule 5, Condition 11 (b), and Section 6 of the Department's <i>Annual Review Guideline</i> (2015), analysis of the current Annual Review period monitoring results should be extended to include comparison to previous years' results for trend analysis (where appropriate and not already provided).	Section 6
24 Hour PM₁₀ exceedances – Table 19 details multiple exceedances of the 24hr PM ₁₀ criterion at all monitoring points. Please provide additional detail regarding calculation methodology for determining Integra Underground Mine's contribution to the overall level for each exceedance instance.	Appendix A
TSP annual average exceedances – Table 20 details an exceedance of the annual TSP criterion at TSP 1. Please provide additional detail regarding calculation methodology for determining Integra Underground Mine's contribution to the overall level.	Appendix B

Following the submission of the 2019 Annual Review, the DPIE responded with the following comments requesting additional information, in a letter dated 15 May 2020. The feedback was addressed in a revised version of the Annual Review, which was submitted in June 2020, and was approved by DPIE on 10 June 2020. For completeness, this feedback, and where it has been addressed in this document, is provided in **Table 5-2**. The Resources Regulator did not provide any feedback in response to the 2019 Annual Review.

Table 5-2 – 2019 Annual Review Feedback

Comment	Section Addressed
Waste Management – please include a comparison of waste generated by the development in previous years to assist the identification of trends in waste generated, and report on waste minimisation measures implemented during the reporting period.	Section 6.7
Surface Water – please amend Figure 11 to identify all monitoring locations in the legend of the graph. (Note Figure 7-3 in this Report)	Section 7.5.4
Community Complaints – please include a comparison of complaints received in the previous reporting periods, including an assessment of any trends in the subject, timing or location of complaints.	Section 9.4
Independent Audit – please include a brief discussion of progress made in implementing the Action Plan which was developed in the most recent audit. Where all actions have been addressed in previous reporting years, please include a brief statement indicating that this is the case.	Section 10

6. Environmental Performance

This chapter provides a summary of environmental monitoring and management undertaken during the 2020 reporting period. In accordance with the *Post Approval Requirements for State Significant Mining Developments – Annual Review Guideline* (NSW Government 2015) this report contains a summary of environmental monitoring data where it is required to explain trends or environmental performance during the report period.

6.1 Meteorology

The Glendell Meteorological Station was operated in accordance with Schedule 3, Condition 16 of PA 08_0101. The weather station records rainfall, relative humidity, wind speed, wind direction and sigma theta at 10 minute intervals and temperature at two minute intervals. The data is transferred by a telemetry link to the weather display and is used to evaluate weather conditions. The weather station achieved good data recovery during the reporting period with no extended malfunctions for the measured parameters. A summary of conditions recorded in 2020 is provided in **Table 6-1**.

Table 6-1 – Summary of 2020 Data from Glendell Meteorological Station

Date	2m Temperature (°C)			Wind Speed (m/s)		Humidity (%)	Rainfall (mm)
	Min	Ave.	Max	Ave.	Max	Ave.	Total
January	16.3	26.5	44.9	3.0	15.5	66.7	68.2
February	14.4	23.5	43.6	3.1	12.8	75.4	153.4
March	10.4	20.2	36.1	2.5	11.0	78.4	107.0
April	6.1	18.2	28.5	2.7	15.2	72.5	87.8
May	1.5	13.1	26.1	2.5	15.5	78.4	32.4
June	2.1	11.9	21.9	2.6	13.8	79.5	60.0
July	1.2	11.6	22.9	2.2	11.0	78.6	128.0
August	0.5	12.0	24.3	3.9	15.9	70.1	54.2
September	3.4	15.9	29.6	2.8	16.5	71.1	50.2
October	3.8	18.7	32.7	2.4	13.9	70.7	120.6
November	8.4	21.5	41.6	2.6	16.8	67.6	42.2
December	9.0	21.8	41.4	3.0	12.9	74.0	226.0

6.1.1 Rainfall

A total of 1,130 mm of rainfall was recorded during 2020. This is a significant increase from the 396.4 mm recorded during 2019 and the 505.2 mm recorded in 2018. **Figure 6-1** provides a comparison of monthly rainfall between 2018, 2019, and 2020.

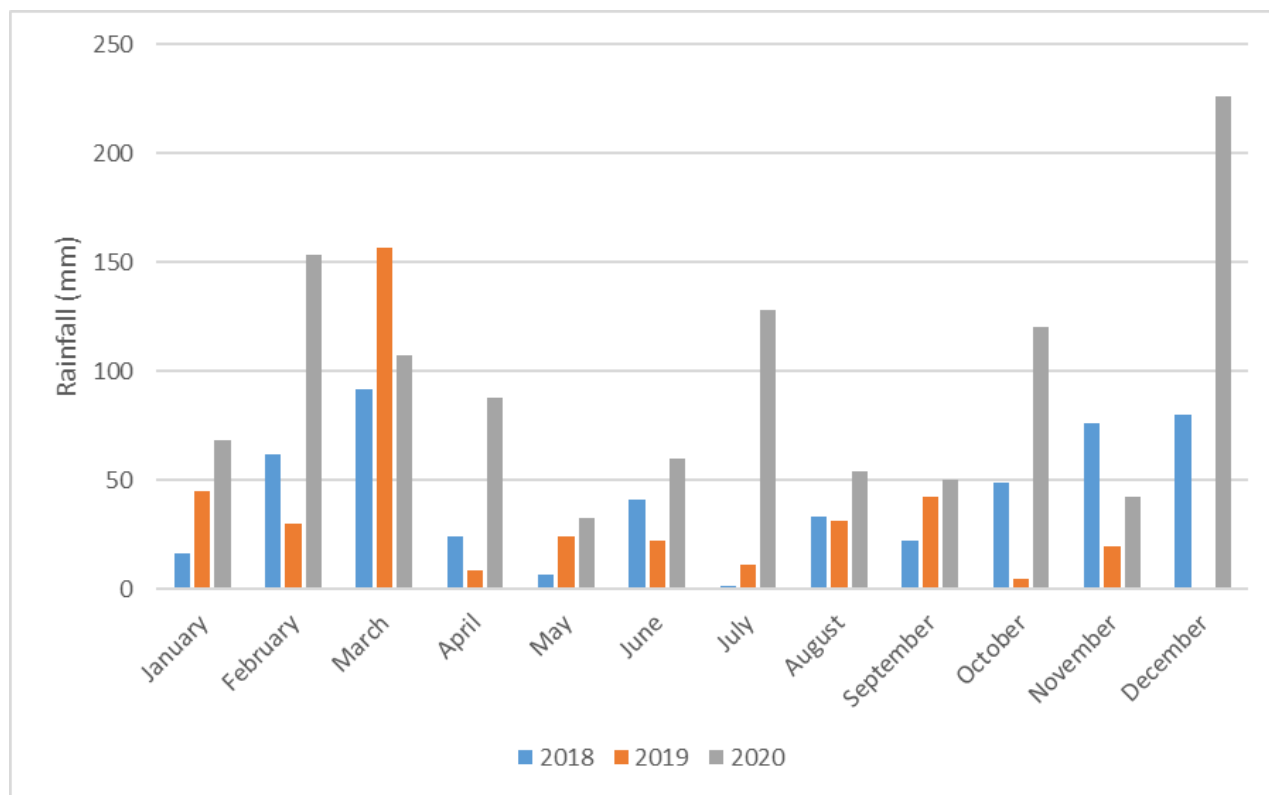


Figure 6-1 – 2018-2020 Monthly Rainfall

6.1.2 Temperature

Figure 6-2 illustrates the monthly minimum and maximum temperatures for 2018 to 2020. Results show similar trends across the three-year period. The maximum temperature in 2020 was 44.9°C, observed in January. This is comparable to the last reporting period, which had a maximum observed temperature of 43.2°C in January 2019. The minimum temperature in 2020 was 0.5°C, observed in August. This minimum temperature was comparable to the 2019 minimum temperature, where a low of -1.0°C was recorded in June.

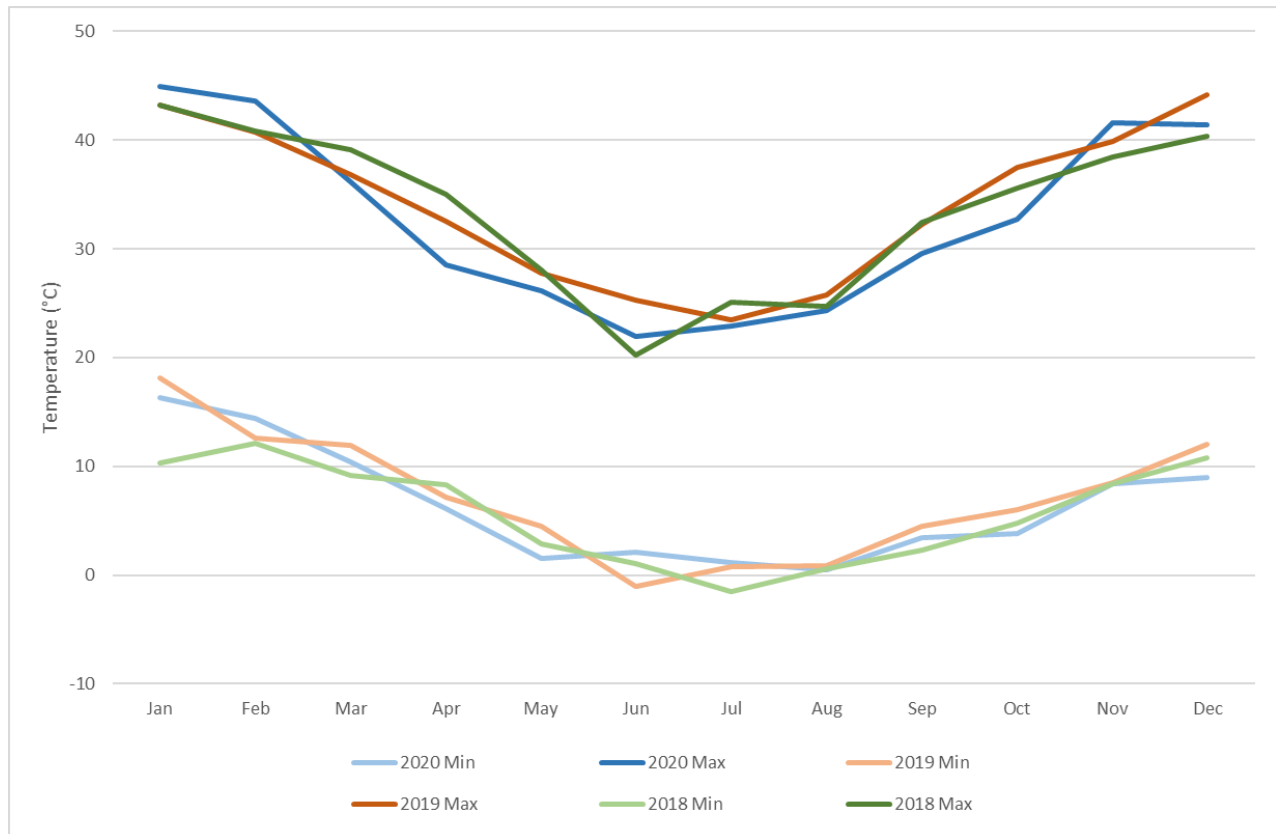


Figure 6-2 – 2018-2020 Monthly Temperature

6.1.3 Wind Speed and Direction

The wind distribution pattern during the reporting period shows winds generally follow a north-west to south-east axis. Maximum wind speed in 2020 was 16.8m/s, recorded in November. The annual average wind speed for the year was 2.8 m/s. These wind distribution patterns are consistent with observations in 2018 and 2019 and are typical of the Hunter Valley region. Annual wind rose data is shown in **Figure 6-3**.

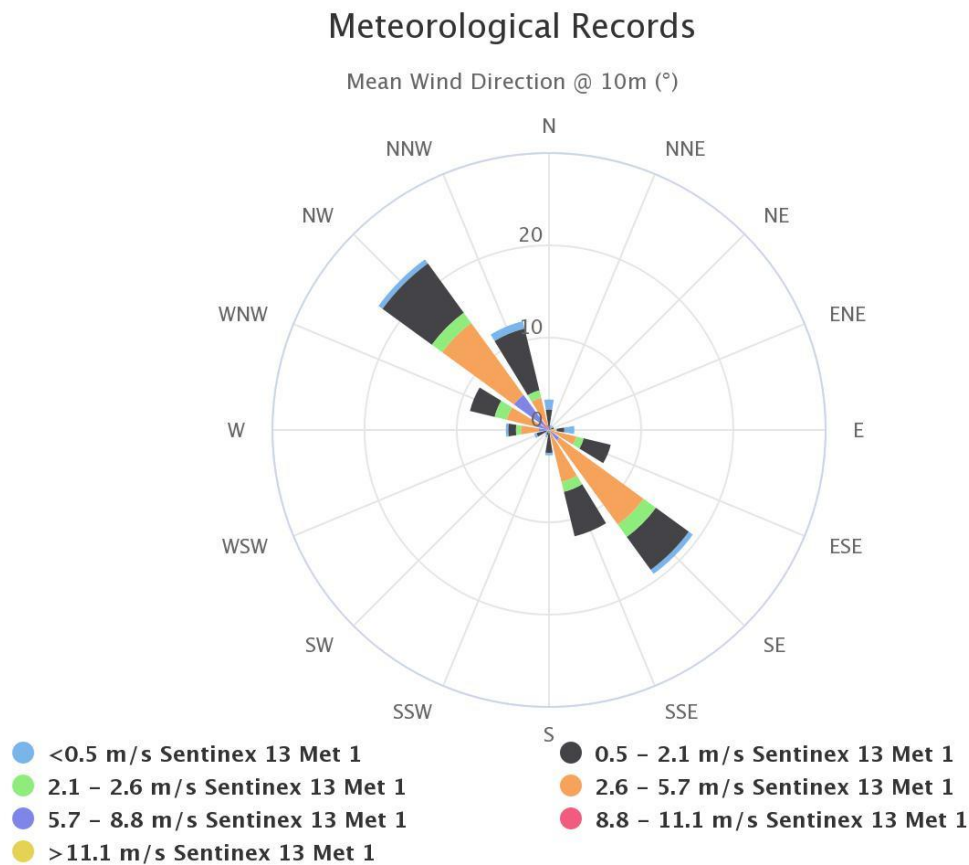


Figure 6-3 – 2020 Annual Wind Rose

6.2 Air Quality

The *Air Quality and Greenhouse Gas Management Plan* (2019) is one of a series of environmental management plans that together form the EMS for Integra Underground.

Air quality in the vicinity of Integra Underground's operation is managed via a combination of:

- Ambient air quality monitoring;
- Meteorological monitoring; and
- Site management measures.

Air quality monitoring is conducted at the locations identified in **Figure 6-4** and includes:

- Three Tapered Element Oscillating Microbalance (TEOM) continuous air quality monitors that measure the concentration of particulate matter less than ten microns in diameter (PM₁₀);
- Seven Depositional Dust Gauges used for monitoring of larger dust particles (typically >50µm) collected every 30 +/- 2 days; and
- One High Volume Air Sampler (HVAS) that monitors Total Suspended Particulates (TSP) over a 24 hour period every sixth day.

The following days were declared as extraordinary events during 2020 as a result of extreme weather conditions which impact air quality, as confirmed by DPIE:

- 1-12, 15, 20, 21, and 23-25 January 2020;
- 1, 2, 4 and 19 February 2020;
- 19 August 2020; and
- 29 November 2020.

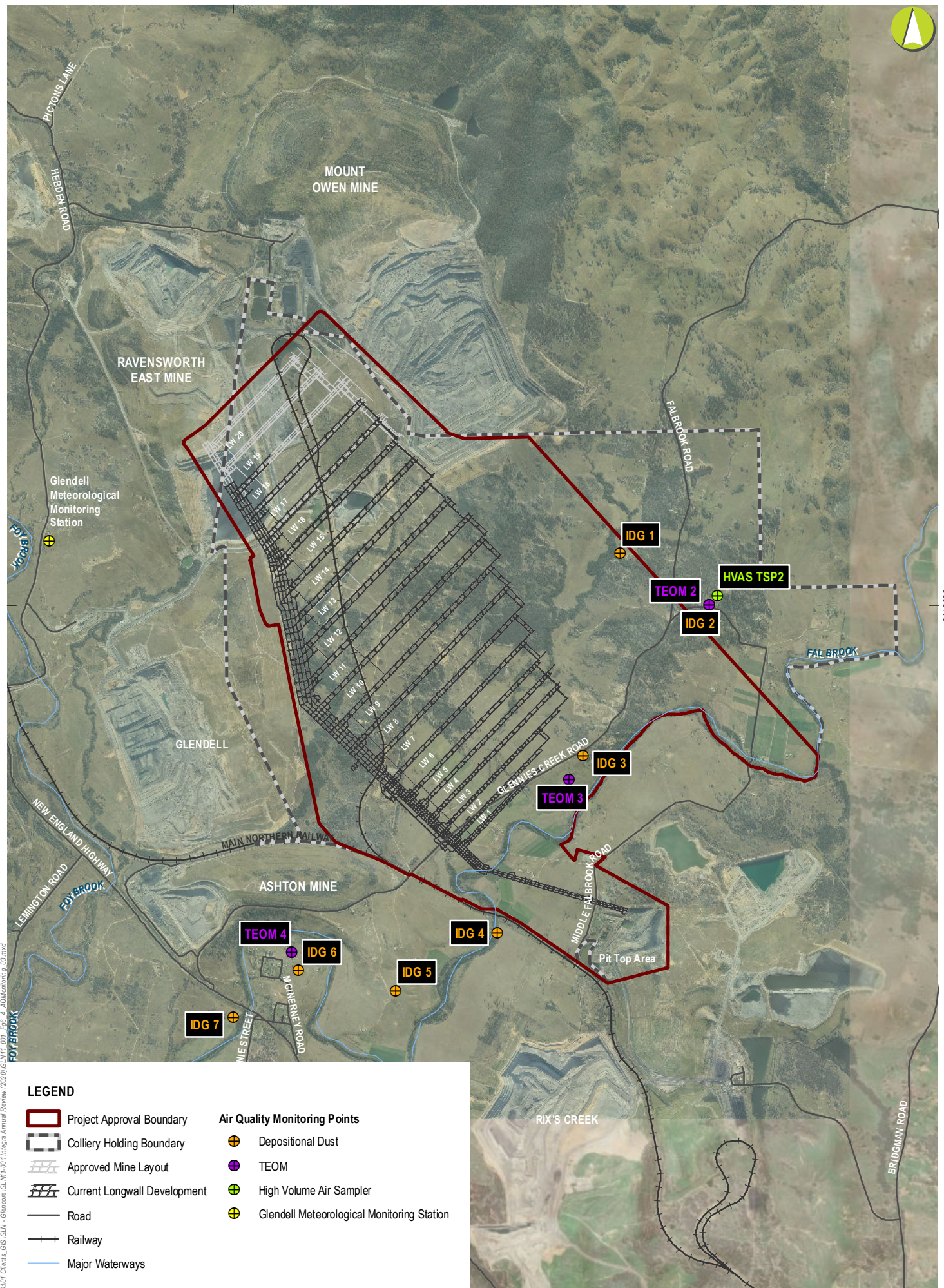
These extraordinary events have been removed from the PM₁₀ and TSP results for the reporting period.

Schedule 3 Condition 12 of PA 08_0101 stipulates the criteria for PM₁₀, TSP and deposited dust as presented in **Table 6-2**.

Table 6-2 – PA 08_0101 Air Quality Criteria

Pollutant	Criterion *	Averaging Period
TSP	90 µg/m ³ (Cumulative impact - increase in concentrations due to the project plus background concentrations due to all other sources)	Annual
PM ₁₀	50 µg/m ³ (Incremental impact - incremental increase in concentrations due to the project on its own)	24-hour
	30 µg/m ³ (Cumulative impact - increase in concentrations due to the project plus background concentrations due to all other sources)	Annual
Deposited Dust	4 g/m ² /month (Cumulative impact - increase in concentrations due to the project plus background concentrations due to all other sources)	Annual
	2 g/m ² /month (Incremental impact - incremental increase in concentrations due to the project on its own)	Annual

*Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity which has been endorsed by the EPA and then agreed to by the Secretary.



LEGEND

- Project Approval Boundary
- Colliery Holding Boundary
- Approved Mine Layout
- Current Longwall Development
- Road
- Railway
- Major Waterways

Air Quality Monitoring Points

- ⊕ Depositional Dust
- ⊕ TEOM
- ⊕ High Volume Air Sampler
- ⊕ Glendell Meteorological Monitoring Station

0 0.55 1.1 1.65 2.2
km

GDA 1994 MGA Zone 56
26/03/2021

Scale: 1:57,000

Management and Mitigation Measures

Air quality management and mitigation measures include:

- Coal handling areas, stockpiles, roads and trafficked area will be maintained in a moist condition using water carts and/or water sprays to minimise wind-blown and traffic-generated dust;
- Restricting vehicle speeds on unsealed roads that have not been treated with water or chemical stabilisers;
- Minimisation of disturbance areas;
- Obsolete roads are ripped and re-vegetated;
- Development of minor roads is limited and the locations of these is clearly defined;
- Minimise double handling of material; and
- Dust generated underground will be minimised by the application of water and/or use of dust suppressants.

6.2.1 Environmental Monitoring Results

Depositional Dust Gauges

Depositional dust gauge data collected during the reporting period is available on the Integra Underground website. The depositional dust results presented in **Table 6-3** do not exclude the extraordinary events, however has been corrected for contamination of samples (by bird droppings or insects). The annual average deposition rate and estimated Integra Underground contribution of insoluble solids is presented as g/m²/month.

Table 6-3 – Depositional Dust Data (Jacobs, 2021)

Statistic	g/m ² /month							Criterion
	IDG1	IDG2	IDG3	IDG4	IDG5	IDG6	IDG7	
Annual average	4.2	2.8	2.5	2.3	2.0	2.4	2.9*	4
Estimated Integra Underground contribution to annual average (g/m ² /month)	0.4	0.1	0.4	0.1	0.1	0.1	0.2	2

* Only 4 months of data available. The target for air quality monitoring programs is 90% complete.

During 2020, the annual average depositional dust results were slightly above the 4 g/m²/month criteria at monitoring location IDG1, which is located between Mount Owen Mine and Falbrook Road. Further investigation of these results were carried out by Jacobs (2021). Integra Underground was estimated to have contributed up to 0.4g/m²/month of the measured 4.2g/m²/month at IDG1. The investigation also noted that Integra Underground did not exceed the “incremental impact” criteria from PA 08_0101 (that is, 2g/m²/month). Given the distance to the monitor, limited data, drought influences, and calculated maximum contribution less than the “incremental impact”, Integra Underground was determined to not be the cause of the deposited dust level above 4g/m²/month at IDG1 (Jacobs, 2021).

A comparison of the last three years of depositional dust monitoring data is provided in **Table 6-4**.

Table 6-4 – Depositional Dust Gauges Trends (2018-2020)

Gauge	Insoluble Matter Deposited (g/m ² /month)			Consent Criteria (g/m ² /month)
	2018	2019	2020	
IDG1	3.9	5.6	4.2	4.0
IDG2	3.1	3.3	2.8	
IDG3	2.1	1.7	2.5	
IDG4	2.4	3.1	2.3	
IDG5	1.9	2.2	2.0	
IDG6	2.6	2.7	2.4	
IDG7	3.9	4.7	2.9	

As shown in **Table 6-4**, the 2018 data was within the consent criteria, the 2019 data exceeded the criteria at IDG1 and IDG7 and the 2020 data exceeded the criteria at IDG1, however specialist review concluded that these exceedances were not attributable to Integra Underground operations. There are no discernible trends in the monitoring data, however it is noted that most of the depositional dust gauge locations showed reduced dust levels in 2020, when compared to 2019. This is likely to be associated with increased rainfall during 2020 (refer **Section 6.1.1**).

TEOM (PM₁₀)

TEOM results for PM₁₀ concentrations are available in the Environmental Monitoring Reports on the Integra Underground website. **Table 6-5** summarises the 24-hour average and annual average for PM₁₀ concentrations without extraordinary events declared by DPIE and the contribution from Integra Underground.

Table 6-5 – TEOM Monitoring Results (Jacobs, 2021)

Statistic	TEOM 2	TEOM 3	TEOM 4	Criterion
Maximum 24-hour average in µg/m³				
Measurement (without extraordinary events)	41	45	58	NA
Calculated contribution from direction of Integra Underground (without extraordinary events)	2	4	9	50
Annual average in µg/m³				
Measurement (without extraordinary events)	14	17	21	30
Calculated contribution from direction of Integra Underground (without extraordinary events)	0	0	0.5	NA

As shown in **Table 6-5**, the investigation by Jacobs (2021) determined that without extraordinary events, the PM₁₀ concentrations at all three monitors were below the 24-hour and annual average criteria. The 2020 TEOM investigation results are detailed in **Appendix A**. A comparison of the 2020 TEOM data, against the 2018 and 2019 data, is presented in **Table 6-6**.

Table 6-6 – TEOM Monitoring Trends – 2018-2020

Gauge	Annual Average (µg/m ³)			Annual Ave Criteria (µg/m ³)	No. of days above 24h criteria			24h Criteria (µg/m ³)
	2018	2019	2020		2018	2019	2020	
TEOM 2	26	26	14	30	27	20	1	50
TEOM 3	22	23	17		12	11	9	
TEOM 4	29	27	21		37	23	17	

As shown in **Table 6-6**, the annual average PM₁₀ recorded at the TEOMs has been within the 30 µg/m³ annual average criteria for the last three years. During 2020, the number of days that the 24h PM₁₀ reached the daily limit of 50 µg/m³ was lower than previous years, with the number of daily occurrences generally decreasing at all monitors since 2018. Drought conditions during 2018 and 2019 caused drier conditions at Integra Underground, which saw an increase in the air quality monitoring results recorded at the three PM₁₀ monitors. In comparison, there was a reduction of the annual average of the PM₁₀ monitoring results in 2020 due to increased rainfall.

HVAS (TSP)

HVAS results for TSP concentrations are available on the Integra Underground website. The 2020 annual average for TSP2 calculated without extraordinary events is detailed in **Table 6-7**. The results show that the annual average TSP concentrations was well below the 90 µg/m³ criteria.

Table 6-7 – TSP Monitoring Results (Jacobs, 2021)

Statistic	TSP2	Criterion
Annual average in µg/m ³		
Measurement (without extraordinary events)	62	90

A comparison of the 2020 HVAS results for TSP concentrations against the 2018 and 2019 results are shown in **Table 6-8**.

Table 6-8 – HVAS Monitoring Trends 2018-2020

Monitoring Point	Annual Average (µg/m ³)			Annual Average Criteria (µg/m ³)
	2018	2019	2020	
HVAS - TSP2	77.9	75.7	62.0	90

A number of individual TSP readings were above the annual average criteria of 90 µg/m³. Investigations determined that these exceedances were not attributable to Integra Underground Operations (refer **Appendix B**).

Additionally, a full review of the 2020 Air Quality monitoring data was completed by an external specialist, which in summary concluded that Integra Underground was in compliance with its Project Approval in terms of total TSP impacts at all monitoring sites for data collected in 2020 (Jacobs, 2021).

6.2.2 Comparison with Predictions

Integra Underground operates in close proximity to a number of mining operations including: Ashton Coal, Rix's Creek North, Rix's Creek and the Mount Owen Glendell Operations which are potential sources of additional atmospheric emissions. Other potential sources of emissions in the locality include road and rail vehicle movements, vehicle exhaust emissions, windblown dust from exposed soils, bushfires and agricultural activities.

The predictions made in the 2009 Air Quality Assessment (AQA) (ERM), Mod 2 Air Quality Impact Assessment (AQIA) (PAE Holmes 2012) and the 2017 Air Quality and Greenhouse Gas Assessment (AQGGA) prepared by Jacobs (2017) as part of Mod 8 to PA 08_0101, have been assessed against air quality monitoring results for the reporting period. It should also be noted that the predictions made in the AQA and the AQIA were based on operations occurring at the Integra Complex at the time (i.e. both open cut and underground operations).

The 2009 AQA predicts the concentrations of depositional dust, PM₁₀ and TSP for multiple scenarios. Scenario 4 was chosen as it represents Year 8 of operations i.e. 2017, which was the most representative scenario for 2020 operations. **Table 6-9** outlines the predictions made in the AQA (ERM 2009) and the results for the 2020 reporting period.

Table 6-9 – Comparison of 2020 Air Quality Data Against 2009 Predictions

Sites	2009 Predictions (Scenario 4)	2020 Actual
Depositional Dust (g/m ² /month)		
IDG1	5	4.2
IDG2		2.8
IDG3		2.5
IDG4		2.3
IDG5		2.0
IDG6		2.4
IDG7		2.9
PM ₁₀ (µg/m ³) 24h Average		
TEOM 2	58	14
TEOM 3		17
TEOM 4		21
TSP (µg/m ³)		
HVAS – TSP2	119	62

As shown in **Table 6-9**, during 2020 the particulate emission predictions made in the AQA (ERM 2009) for depositional dust, PM₁₀ and TSP were higher than results recorded during the reporting period. The AQIA (PAE Holmes 2012) was prepared to support the application for PA 08_0101 Mod 2. This assessed the impact of the Western Extension (approved and commenced under PA 08_0102 for IOC) and the Integra Complex. The AQIA predicted the impacts of dust deposition, TSP and PM₁₀ on 171 sensitive receptors during years 3, 4 and 6 of operations. During 2020 depositional dust recordings at monitoring sites were lower than predicted.

The 2017 AQGGA (Jacobs, 2017) predicts the total mass of emissions based on assumed emission rates from different operational activities, such as transport of coal via conveyor and operation of dozers. These predictions were made to identify key operational activities that contribute to particulate emissions and whether Mod 8 was likely to increase the mine's air quality impacts. Jacobs (2017) state that historical and current monitoring data shows that air quality concentrations are at acceptable levels. The AQGGA concluded that "the modification would not cause any adverse air quality impacts".

Air quality impacts for the mine are measured in terms of particulate concentrations rather than total mass. A direct comparison between the annual particulate emissions predicted in the AQGGA and air quality results recorded during the reporting period is not considered feasible.

6.2.3 Comparison with Long Term Data

As outlined in **Section 2.2**, in November 2016 Glencore made a decision to recommence operations at Integra Underground with first workings recommencing in February 2017. Therefore site data prior to 2017 can assist in showing the difference in environmental performance between when the site was in care and maintenance and Glencore operational.

Site TSP2 – Middle Fallbrook was sampled for PM₁₀ concentrations between April 2006 and January 2018, with the results shown in **Table 6-10**. Sampling of TSP commenced at site TSP2 from December 2017 (until present), whereas sampling of PM₁₀ ceased January 2018. The 2018-2020 annual average data for TSP is presented in **Table 6-8**.

Annual averages for PM₁₀ concentrations at TSP2 – Middle Fallbrook ranged from 17.8µg/m³ in 2016 to 24.9µg/m³ in 2017. 2007 and 2008 saw similar results to 2018, recording 24.2 and 24.0 annual averages respectively. With the exception of 2015 and 2016, most annual results ranged from 20.1 µg/m³ to 24.9µg/m³.

High maximum results can be the outcome of external sources including long periods of drought or bushfires. 2018 data included January samples only and being a summer month, external causes such as heat, dry weather and bushfires increased dust levels.

Table 6-10 – Long term annual PM₁₀ concentrations recorded at TSP2 – Middle Fallbrook 2006-2018

Year	Minimum annual PM ₁₀ (µg/m ³)	Maximum annual PM ₁₀ (µg/m ³)	Average annual PM ₁₀ (µg/m ³)	Current Consent Criteria (µg/m ³)
2006*	4.0	63.0	20.1	30
2007	2.0	103.0	24.2	
2008	1.0	79.0	24.0	
2009	2.0	61.0	22.4	
2010	2.0	68.0	21.0	
2011	4.0	65.0	20.2	
2012	3.0	94.0	23.0	
2013	3.0	68.0	21.7	
2014	4.0	49.0	20.5	
2015	1.0	55.0	19.3	
2016	1.0	48.0	17.8	
2017	1.0	90.0	24.9	
January 2018 only*	18.0	46.0	35.8	

* Monitoring of PM₁₀ at TSP2 occurred between April 2006 and January 2018. Compliance monitoring of TSP at TSP2 commenced from December 2017 (until present).

The 2020 PM₁₀ results sites TEOM 2 (former site TSP2), 3 and 4 of 15 µg/m³, 19 µg/m³ and 24 µg/m³ are generally lower than the historical PM₁₀ data provided in **Table 6-10**.

6.2.4 Key Performance and/or Management Issues

One administrative non-compliance relating to air quality was identified during the reporting period. One round of depositional dust monitoring samples (collected 6 January 2020) was not collected within the specified timeframe (30 days +/- 2 days) as required under Schedule 3, Condition 15 of PA 08_0101. All other samples were collected within the required timeframe.

There were no key performance issues, management issues or community complaints relating to air quality in 2020.

6.2.5 Proposed Actions for 2021

Integra Underground will continue to manage air quality in accordance with the *Air Quality and Greenhouse Gas Management Plan*.

6.3 Noise

The *Noise Management Plan* (2019) details the controls implemented at Integra Underground to minimise noise emissions and establishes a noise monitoring program to assess noise impacts on surrounding sensitive receivers.

Noise monitoring consists of both attended and unattended monitoring to meet the requirements of PA 08_0101 and EPL 3390. Monitoring includes:

- Quarterly night-time attended monitoring to assess compliance with regulatory limits, with frequency increased to monthly when construction is undertaken during night time periods; and
- Where required real-time monitoring stations at the nearby Mount Owen Glendell Operations (which surrounds the Integra Underground operations) data is accessed to supplement the attended noise monitoring program.

The noise monitoring locations are illustrated in **Figure 6-5**.

Noise Assessment Group Criteria

The noise assessment group (NAG) criteria are provided in Table 2 of PA 08_0101. In accordance with the *Noise Management Plan*, attended noise monitoring undertaken on a quarterly basis at representative noise monitoring locations Noise emissions from Integra Underground must not exceed the project specific noise criteria at any residence on privately owned land or on more than 25 percent of any privately owned land.

Construction Noise Criteria

PA 08_0101 (Schedule 3, Condition 2A) requires Integra Underground to manage noise from construction activities associated with the water pipeline infrastructure and Modification 8, in accordance with the noise management levels defined in Table 2 of the *Interim Construction Noise Guideline*. During this construction, Integra Underground must ensure that combined operational and construction noise from the development does not exceed a level of 5 dB(A) above the daytime operational LAeq(15min) noise criteria in Table 3 of PA 08_0101 during Standard Construction Hours (7 am to 6 pm, Monday to Friday; and 8 am to 1 pm on Saturdays) and does not exceed the evening or night time operational LAeq(15min) noise criteria in Table 2 of PA 08_0101.

Noise Acquisition Criteria

Schedule 3, Condition 3, Table 3 of PA 08_0101 details the acquisition noise criteria for Integra Underground. This is in accordance with the *Noise Management Plan*. Noise emissions (except construction noise) from Integra Underground must not exceed the project specific noise criteria at any residence on privately owned land or on more than 25 percent of any privately owned land.

Cumulative Noise Criteria

Integra Underground must implement all reasonable and feasible mitigation measures to ensure that noise generated by the project combined with the noise generated from surrounding mines does not exceed the criteria provided in Table 4 PA 08_0101 (Schedule 3, Condition 4) at any residence on privately owned-land or on more of 25 percent of any privately owned-land.

Cumulative Noise Acquisition Criteria

If the noise generated by the project combined with the noise generated by other mines in the vicinity exceeds the criteria in Table 5 PA_08_0101 (Schedule 3, Condition 5) at any residence on privately-owned land or on more than 25 percent of privately-owned land (except for the residential receivers in Table 1 for which the acquisition basis is noise), then upon receiving a written request for acquisition from the landowner, acquisition may be triggered

Integra Underground implements all reasonable and feasible mitigation measures to manage noise emissions from its operations and other surrounding mines and prevent exceedances of the criteria at any residence on privately owned-land or on more than 25 percent of any privately owned-land.

Management and Mitigation Measures

In addition to conducting noise monitoring, Integra Underground implements a number of mitigation measures to minimise potential noise impact on nearby receivers, and to comply with the conditions of consent. Mitigation measures are completed as per the *Noise Management Plan* and include:

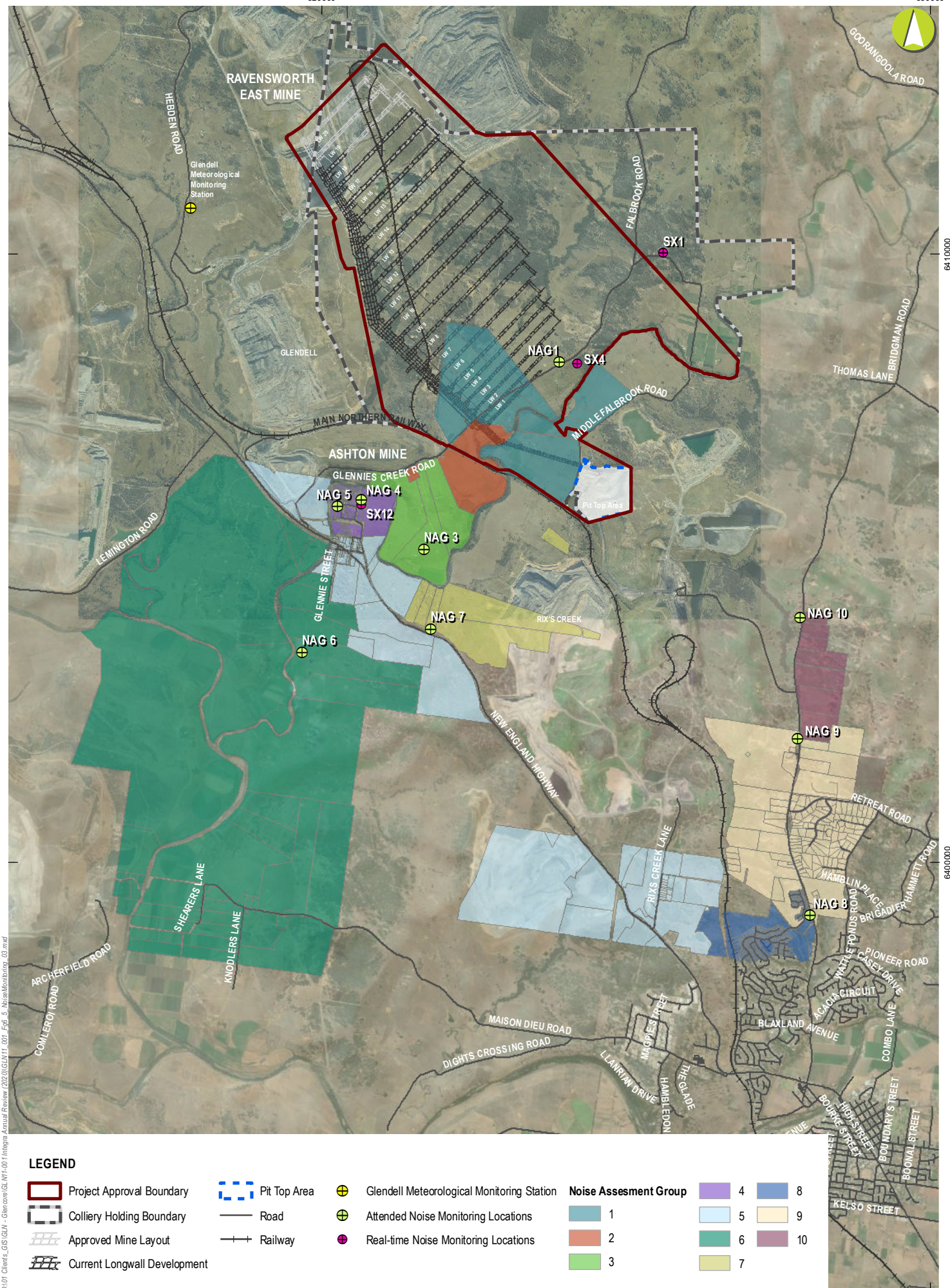
- Most operations are below the ground surface or in the portal;
- Significant distance between residences and ventilation fan sites;
- Controlling mine noise at the source through the use of equipment with appropriate sound attenuation fitted, where practical;
- Sound power level testing upon procurement of relevant plant and equipment, and annual sound power level testing to ensure ongoing compliance with relevant sound power level specifications;
- Restricting operations where possible in elevated/out of portal areas, especially during the night time and adverse meteorological conditions;
- Where practicable, evening and night-time surface operations will be restricted to areas that support a minimisation of mine contributed noise at privately owned residences surrounding Integra Underground; and
- Using broadband reversing alarms on mine equipment, light vehicles and contract vehicles.

6.3.1 Environmental Monitoring Results

Attended noise monitoring was undertaken on a quarterly basis in accordance with PA 08_0101. The quarterly monitoring results are shown in **Table 6-11** and **Table 6-12**. The Integra Underground contribution results were similar as the previous two reporting periods

Attended monitoring is also required to be undertaken at monthly intervals during construction when activities are undertaken during evening or night periods. During this monitoring, the actual measured levels will be assessed against the “noise affected level” of 40 LAeq,15min, as prescribed by the *Interim Construction Noise Guideline* (DECC, 2009), rather than against the predicted noise levels. Monthly construction noise monitoring were undertaken in January and April 2020, and the results are presented in **Table 6-13**. April attended noise monitoring is also considered the second quarterly monitoring event. All night-time construction was completed in January and April, therefore no further monthly monitoring was required.

The attended noise monitoring results show that Integra Underground operations were inaudible throughout most monitoring periods and below criteria when audible, demonstrating compliance with all noise criteria including acquisition, cumulative and cumulative acquisition detailed in **Section 6.3**.



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0 0.8 1.6 2.4 3.2
km

GDA 1994 MGA Zone 56
26/03/2021

Scale: 1:80,000

Table 6-11 – Quarterly Attended Noise Monitoring Results - LAeq (15minute)

Location	Criteria	Total Site Noise Monitoring Results				Integra Underground Contribution ¹			
		Q1	Q2	Q3	Q4	Q1 ¹	Q2 ¹	Q3 ¹	Q4 ¹
NAG 3	39	42	41	42	39	<35	IA	<35	IA
NAG 4	35	41	44	44	40	<30	IA	IA	IA
NAG 5	35	45	50	53	47	IA	IA	IA	IA
NAG 6	35	49	40	39	39	IA	IA	IA	IA
NAG 7	38	52	45	46	46	IA	IA	IA	IA
NAG 8	35	42	50	37	45	IA	IA	IA	IA
NAG 9	35	32	60	54	52	IA	IA	IA	IA
NAG 10	35	35	55	43	41	IA	IA	IA	IA

¹ Estimated Integra Underground contribution, as assessed by the operator during the monitoring session

IA = Not audible

Table 6-12 – Quarterly Attended Noise Monitoring Results - LAeq (1minute)

Location	Criteria	Total Site Noise Monitoring Results				Integra Underground Contribution ¹			
		Q1	Q2	Q3	Q4	Q1 ¹	Q2 ¹	Q3 ¹	Q4 ¹
NAG 3	49	62	49	51	48	43	IA	40	IA
NAG 4	47	55	61	59	49	43	IA	IA	IA
NAG 5	52	58	63	67	60	IA	IA	IA	IA
NAG 6	48	58	59	46	45	IA	IA	IA	IA
NAG 7	48	67	58	58	59	IA	IA	IA	IA
NAG 8	45	62	68	50	63	IA	IA	IA	IA
NAG 9	48	37	83	77	73	IA	IA	IA	IA
NAG 10	47	46	74	52	50	IA	IA	IA	IA

¹Estimated Integra Underground contribution, as assessed by the operator during the monitoring session

IA = Not audible

Table 6-13 – Monthly Attended Noise Monitoring Results During Construction (January 2020)

Location	LAeq (15minute)		LAeq (1minute)			
	Criteria	Integra Underground Contribution ¹	Criteria	Integra Underground Contribution ¹	Met Exclusion (Y/N) ²	Compliant (Y/N) ³
NAG 3	39	IA	49	<30	Yes	Yes
NAG 4	35	IA	47	IA	No	Yes
NAG 5	35	IA	52	IA	No	Yes
NAG 6	35	IA	48	IA	No	Yes
NAG 7	38	IA	49	IA	Yes	Yes
NAG 8	35	IA	45	IA	No	Yes
NAG 9	35	IA	48	IA	No	Yes
NAG 10	35	IA	47	IA	No	Yes

¹ Estimated Integra Underground contribution, as assessed by the operator during the monitoring session

² Meteorological conditions were measured at Glendell Mine's meteorological station (SentinelX 13).

³ Measurement cannot be non-compliant if meteorological conditions exclude the measurement.

IA = Inaudible

6.3.2 Comparison with Predictions

A comprehensive review of background noise levels in the region was undertaken as part of the Noise Impact Assessment (EMM 2012) prepared to support the application for PA 08_0101 Mod 2. This review was undertaken to assess cumulative noise from neighbouring operations including Rix's Creek, Glennies Creek, Glendell, Mount Owen, Camberwell and Ravensworth East Mines, and the influence of the Main Northern Rail Line and the New England Highway on the ambient noise environment. The Noise Impact Assessment also assessed the impact of the operational changes associated with the approved Western Extension and the Integra Complex. Further to this, an acoustics report was prepared to support the Integra Underground Mod 8 Environmental Assessment (Bridges, 2017).

During 2020, Integra Underground contributions to noise were below all criteria across all locations for both quarterly (including cumulative, acquisition and cumulative acquisition) and monthly construction noise emissions (January and April). Approved criteria for the site was developed using past noise impact assessments, therefore Integra Underground being below criteria (or inaudible) suggests that the site is below noise predictions.

These results are consistent with the previous reporting period where all quarterly noise monitoring recorded inaudible results.

6.3.3 Key Performance and/or Management Issues

One administrative non-compliance relating to noise was identified during the reporting period. The noise monitoring reports provided by Umwelt did not include the name of the person who collected the sample, as required by condition M1.3 of EPL 3390. Future monitoring reports will now include this information.

There were no key performance issues, management issues or community complaints relating to noise during 2020.

6.3.4 Proposed Actions for 2021

There are no proposed actions for 2021 regarding noise management. Integra Underground will continue to manage noise in accordance with the *Noise Management Plan*.

6.4 Biodiversity

Biodiversity is managed in accordance with the *Biodiversity Management Plan* (2019).

6.4.1 Environmental Monitoring Results

The *Biodiversity Management Plan* (BMP) commits to the collection of baseline ecological data within the surface area of Longwalls 13 to 20 to statistically test for impacts from subsidence.

In 2017 SLR Consulting (SLR) established two monitoring sites within the predicted subsidence zone of Longwalls 13 and 14, and three control sites within equivalent vegetation communities inside the study area, but outside of the predicted subsidence zone. Baseline monitoring was completed in 2017 using plot and transect surveys across all five sites in accordance with the BioBanking Assessment Methodology (BBAM) (OEH, 2014). The data collected at both monitoring and control sites allowed the vegetation condition, species composition and evidence of subsidence within the predicted subsidence zone to be effectively monitored as mining progressed.

Since 2017, monitoring has been repeated on the 22 October 2018 (monitoring event 1) and 23 and 29 July 2019 (monitoring event 2), and 10 October 2019 (plot relocation exercise for sites SG01 to SG01B due to predicted clearing impacts on the original site by Mount Owen Glendell Complex).

In late 2019 SLR also provided a Biodiversity Review of Longwalls 15 to 20 advising management that whilst the area may provide some (albeit limited) foraging habitat for more mobile threatened species and that biobanking monitoring of the area is achievable, there was limited biodiversity values within the area and there was no strict requirement to monitor these areas as part of the BMP. SLR (2019) explained historic mapping undertaken by Greater Hunter Vegetation Mapping (OEH 2013) and Cumberland Ecology (2017) of LW15 to 20 was proven to be out dated. Predominately due to the progress of open cut mining and rehabilitation, recent mapping indicates vegetation types disturbed land, rehabilitation and derived native grassland remain. These habitats generally lack a tree canopy or shrub layer, contain a low diversity of plant species and do not contain resources or features of value to native fauna, such as tree hollows, fallen logs, leaf litter, and fruits, nectar and flowers (of flowering plants). Accordingly, these areas are assessed as of low biodiversity value. The BMP notes that: *“The conditions of the Project Approval do not require IUG to conduct ecological monitoring. Notwithstanding, to demonstrate commitment to biodiversity management, IUG will implement a program to monitor the potential impacts of subsidence on sensitive ecological features. The monitoring program will be targeted to areas predicted to be affected by subsidence impacts and is primarily designed to detect changes in vegetation and/or habitat condition”*. The areas of vegetation within LW15 to 20 are not considered to be “sensitive ecological features”, as defined in the BMP.

In August 2020, monitoring event four was completed at sites SG01B, SG02, B01, B02, and G01. Field data from the latest monitoring event is summarised below.

Vegetation Types

The study area has been considerably disturbed prior to mining activities due to land clearing and grazing activities and as such, most of the study area is cleared of native vegetation. Notwithstanding this fact, a total of seven native plant communities were identified within the study area during the baseline field survey in 2017.

These communities are as follows:

- Central Hunter Ironbark-Spotted Gum-Grey Box Forest;
- Central Hunter Bulloak Forest;
- Central Hunter Swamp Oak Forest;
- Hunter Valley River Oak Forest;

- Grassland;
- Regenerating Native Woodland/Shrubland; and
- Revegetation.

The identified vegetation communities and their conservation status under the *Biodiversity Conservation Act 2016* (BC Act) and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) are listed in **Table 6-14**.

Table 6-14 – Vegetation Types Recorded at Monitoring Sites

Vegetation Type	Regional Significance	BC Act Status	EPBC Act Status	Plot No.
Central Hunter Bulloak Forest	None	Not listed	Not listed	B01, B02
Central Hunter Ironbark-Spotted Gum-Grey Box Forest	High	Endangered	Critically Endangered	SG01, SG01B, SG02
Modified Grassland	None	Not listed	Not listed	G01

A summary of the results of the 2020 biodiversity monitoring (SLR, 2020) is provided below:

- Results of the past monitoring indicate a general decline in species richness across all sites (i.e. both impact and control sites), but there has been a slight increase in species richness since the 2019 survey. Similarly, this is reflected in the values for native ground cover (grasses and other), which were generally declining but have experienced increases since the 2019 survey.
- Results of the past monitoring indicate a general incline in native over-storey cover, such that some sites were exceeding the benchmark range for their respective PCT. Results of this monitoring event, however, indicate a slight decline, such that all sites are currently within benchmark. The total length of fallen logs have experience a slight decline since the last monitoring event but remain well above benchmark values.
- Midstorey, shrub layers and tree hollows are largely absent, and this is consistent with previous results. The grassland monitoring site (G01) has generally improved in condition showing a noticeable increased cover of native grasses and a decreased cover of exotics.
- The BioBanking plot results indicate scores that are below benchmark for most variables across all sites, but this has been consistent across the monitoring period. This reflects the general regrowth nature of vegetation within the Integra Underground Project Area and general locality. Much of this part of the Hunter Valley has been cleared and disturbed historically for grazing and mining land use.
- Climatic variability is likely the key factor contributing to the decline in BBAM plot scores, as well as the recent incline in species richness and cover within ground layers. The region experienced below average rainfall and generally hotter conditions between 2017 and 2019 but has experienced lower temperatures and higher rainfall during 2020.

Modification 8 Biodiversity Impacts

The majority of works associated with Mod 8 were completed during the previous reporting period. Compensatory tree planting activities associated with Mod 8 are planned to commence during the 2021 reporting period.

Management Controls

A number of short, medium and long term measures have been identified within the *Biodiversity Management Plan* including:

Short term measures:

- establish baseline subsidence monitoring plots over longwall panels LW13, LW14, and appropriate reference sites (complete);
- establish baseline subsidence monitoring plots over longwall panels LW 15 – LW 20 (complete);
- implement weed and pest management controls where required in the project area, such as along the diverted channel of Bettys Creek and adjacent vegetation (ongoing); and
- continue to adopt management strategies to ensure cattle and other livestock are excluded from the diverted Bettys Creek riparian zone (complete).

Medium term measures:

- continue to undertake ongoing rehabilitation of completed exploration borehole sites and minor surface disturbance, and implement maintenance works as required along the riparian zone of the diverted channel of Bettys Creek;
- undertake subsidence monitoring as mining progresses (in accordance with the Integra Underground Extraction Plan);
- implement weed control to manage new weed incursions;
- undertake annual monitoring of revegetation success;
- for the Integra Underground Mod 8 construction, plant and maintain, until established, 10 like-for-like trees for every established tree removed during construction of the water pipeline infrastructure that is associated with the following flora communities:
 - Central Hunter Ironbark — Spotted Gum — Grey Box Forest EEC;
 - Central Hunter Swamp Oak Forest;
 - Hunter Valley River Oak Forest;
 - Central Hunter Bulloak Forest; and
- planting of like-for-like trees will be undertaken to compensate for the removal of established trees due to construction of surface facilities approved by Mod 8 only (i.e. not including areas that are approved to be disturbed by the Mount Owen Complex).

Long term measures:

- rehabilitate disturbed exploration, minor surface disturbance areas and the Integra Underground to Mount Owen Complex pipeline areas in accordance with final landform/land use design; and
- long term ongoing monitoring of revegetated areas along the Bettys Creek diversion to inform revisions to the management plans and any required alterations to management practices.

6.4.2 Key Performance and/or Management Issues

There were no key performance issues, management issues or community complaints relating to biodiversity during 2020.

6.4.3 Proposed Actions for 2021

Integra Underground will continue to manage biodiversity in accordance with the *BMP*. Additional proposed actions for 2021 regarding biodiversity include continued monitoring of Mod 7 tree planting, and undertaking Mod 8 compensatory tree planting.

6.5 Aboriginal Heritage

The management of Aboriginal heritage during the reporting period was undertaken in accordance with the *Aboriginal Heritage Management Plan* (2018).

6.5.1 Environmental Monitoring Results

An Aboriginal and Historic Heritage Impact Assessment was undertaken by OzArk in November 2017 to support the application for PA 08_0101 Mod 8, which sought approval to continue longwall mining of the Middle Liddell Seam further to the north of the previously approved longwall panels, as well as the construction and operation of ancillary surface infrastructure required to support the proposed mining activities. The impact assessment discovered five valid sites are located within the Assessment Boundary. The locations of all five sites were visited during the assessment and while surface artefacts were not visible at any of the site locations, all sites are regarded as remaining extant within the landscape (OzArk, 2017).

In efforts to preserve these sites, Integra Underground manage these areas in accordance with the *Aboriginal Heritage Management Plan* (AHMP). The protection measures implemented included:

- Fencing;
- Land management;
- Recording;
- Interpretation; and
- Monitoring.

An Aboriginal Due Diligence Archaeological Assessment was undertaken by OzArk in November 2018 to assess the additional disturbance areas for 66kV power line and access road construction at Integra (OzArk, 2018). This due diligence concluded that although the proposal will have an impact on the ground surface, no Aboriginal objects or intact archaeological deposits will be harmed by the proposed works.

In February 2019, a Due Diligence Archaeological Assessment was undertaken by OzArk to assess the potential impacts associated with coal extraction from Integra Underground's Longwall 15 (OzArk, 2019). This due diligence concluded that although works will have an impact on the ground surface, with appropriate management no Aboriginal objects or intact archaeological deposits will be harmed by the proposed works. No significant archaeological features were impacted throughout the operations of Longwall 15 during 2020.

LW16 and LW17 Due Diligence Archaeological Assessments were undertaken in 2020 by OzArk. As all proposed works are occurring in landforms that have been previously mined, it is considered that the works are occurring in 'disturbed lands' as defined by the Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW (DECCW 2010). It was concluded that an Aboriginal Heritage Impact Permit application was not necessary.

Aboriginal Cultural Heritage Monitoring is undertaken annually by Ozark. In May 2020, monitoring was undertaken at 12 sites and was assisted by Aboriginal community members. All sites inspected were found to be valid during the 2020 monitoring. There were management recommendations as part of the monitoring which included erecting a sign to identify the location of IF2 heritage site. This recommendation was completed in 2020.

Additionally, 3 Yearly Photographic Monitoring was undertaken in August and November 2020 with Mount Owen Glendell Operations, this includes AHIMS 37-3-0683 Main Creek 14 which falls within the Integra Underground Statutory boundary. Main Creek 14 is an artefact scatter along the banks of Main Creek. There were no further management measures required as a result of the monitoring.



Photo 6-1 - Site 37-3-0683 - Main Creek 14

6.5.2 Key Performance and/or Management Issues

Two Aboriginal Cultural Heritage Working Group meetings were held in 2020, on 4 June and 12 November. Representatives were present from Integra Underground, Mount Owen Glendell Operations and Wanaruah Local Aboriginal Lands Council on 4 June 2020, where an overview of Integra Underground operations was provided during the meeting. There were no community members in attendance at the meeting on 12 November 2020.

There were no key performance issues, management issues or community complaints relating to Aboriginal Heritage during the reporting period.

6.5.3 Proposed Actions for 2021

Integra Underground will continue to manage Aboriginal heritage as per the AHMP.

A further Due Diligence Archaeological Assessment was undertaken in 2021 by OzArk to assess the potential impacts associated with coal extraction from Integra Underground's Longwall 18. This will be reported on in the 2021 Annual Review.

6.6 Historical Heritage

Historical heritage is managed at Integra Underground in accordance with the *Historical Heritage Management Plan* (2018). The *Historical Heritage Management Plan* (HHMP) states that no additional historical heritage sites/items have been identified within the Integra Underground project approval area during the heritage assessment completed for Mod 8. It is not anticipated that Integra Underground's mining operations will have any impact on the remaining historical heritage sites identified within the Integra Underground project area, and the potential for historical archaeological items to be present is considered to be very low, therefore, no specific monitoring measures are required.

In November 2018, Umwelt completed a Heritage Assessment of the two buildings proposed for removal in the Integra Underground Pit Top Area. The heritage assessment of the 'Oak Park School House' and 'Residence' was required to assess potential heritage significance and to determine whether or not they can be demolished in accordance with PA 08_0101. It was concluded that both of the buildings can be removed without further assessment or investigation, in accordance with PA 08_0101, *Historic Heritage Management Plan* and *Mining Operations Plan*.

6.6.1 Key Performance and/or Management Issues

There were no issues or unexpected finds relating to historical heritage during 2020.

There were no key performance issues, management issues or community complaints relating to historical heritage during the reporting period.

6.6.2 Proposed Actions for 2021

Integra Underground will continue to manage historic heritage as per the HHMP.

6.7 Waste

The current waste management program utilises licensed waste contractors to incorporate recycling, in addition to the disposal of wastes in accordance with the waste provisions of the *Protection of the Environment Operations (Waste) Regulation 2014*.

6.7.1 Environmental Monitoring Results

There were no changes to the waste management system at Integra Underground during the reporting period. In accordance with Schedule 3, Condition 36 of PA 08_0101, Integra Underground are required to minimise and monitor waste generated by the operation and ensure that waste generated by Integra Underground is appropriately stored, handled and disposed. **Table 6-15** outlines the volumes of waste disposed of or recycled during the report period.

Table 6-15 – Summary of Waste 2020

Waste	Tonnes	Percentage (%)
Total waste disposed offsite to landfill	867.5	60.5%
Total waste recycled	565.5	39.5%
Total waste generated onsite	1,432.9	100%

Table 6-16 compares the volumes of waste disposed of or recycled across the last three years. During 2020 there was an increase in the volume of waste disposed of in landfill, and a decrease in the volume of waste recycled, however the overall total volume of waste generated in 2020 was less than that generated in 2019. The reduction in overall waste generated is due to a reduction in operations as a result of coal market conditions. Construction completed for Mod 8 caused higher volumes of waste generation in 2019.

Table 6-16 – Waste Trends (2018-2020)

Waste	Tonnes & Percentage (%)		
	2018	2019	2020
Total waste disposed offsite to landfill	398.9 (36.8%)	769.9 (40.7%)	867.5 (60.5%)
Total waste recycled	683.9 (63.2%)	1,122.2* (59.3%)	565.5 (39.5%)
Total waste generated onsite	1,082.8 (100%)	1,892.1 (100%)	1,432.9 (100%)

*Scrap steel recycling campaign undertaken in 2019

Waste minimisation measures that occurred at Integra Underground during the reporting period included:

- Increased waste segregation;
 - separating timber waste out from general waste for both recycling & cost reduction purposes;
 - reclamation of usable materials; and
 - removal of steel from general waste for recycling and cost reduction.
- Increased scrutiny of sump (solid waste) material being disposed of, particular emphasis of correct classification of the material; and
- Improved signage at bins to improve waste segregation.

6.7.2 Sewage Treatment

Integra Underground has an on-site sewage treatment system (OSSM Approval Number 3969/2008), which includes a primary aeration tank with a secondary maturation pond and a package sewage treatment plant. Wastewater from the system is dispersed by irrigation sprays on dedicated irrigation areas.

As required by Condition M2.2 of EPL 3390, monitoring was undertaken of the sewage effluent for pH and faecal coliforms. Sewage monitoring and maintenance has been undertaken on quarterly basis and relevant approvals have been retained.

6.7.3 Key Performance and/or Management Issues

There were no key performance issues, management issues or community complaints relating to waste during 2020.

6.7.4 Proposed Actions for 2021

Integra Underground will continue to monitor waste parameters throughout 2021.

6.8 Weed and Pests

6.8.1 Environmental Monitoring Results

During 2020, Integra Underground conducted weed control works across Project Approval and mining lease areas, targeting biosecurity priority weeds and environmental weeds. A 2020 Completed Weed Works Report (Enright Land Management, 2020) was prepared to provide information on the weed works carried out on site, the locations of the works and an indication of the weed areas treated.

Weed treatment locations included the Mount Owen Western out of Pit (WOOP) dump, Bettys Creek, Main Creek, Glennies Creek, rehabilitation areas and Middle Falbrook Road. Key species targeted included:

Biosecurity Priority Weeds:

- African Boxthorn (*Lycium ferocissimum*)
- African Olive (*Olea europaea* ssp *Africana*)
- Castor Oil (*Ricinus communis*)
- Fireweed (*Senecio madagascariensis*)
- Green Cestrum (*Cestrum parquai*)
- Mother of Millions (*Chrysanthemoides monilifera*)
- Lantana (*Lantana species*)
- Pampas Grass (*Cortaderia species*)
- Prickly Pear (*Cylindropuntia species*)
- Spear Thistle (*Cirsium vulgare*)

Serious Environmental Weeds:

- Golden Wreath Wattle (*Acacia saligna*)
- Galenia (*Galenia pubescens*)

Environmental Weeds:

- Cotton Bush (*Gomphocarpus fruticosus*)
- Mimosa Bush (*Vachellia farnesiana*)
- Saffron Thistle (*Carthamus lanatus*)
- Scotch Thistle (*Onopordum acanthium*)
- Tree Tobacco (*Nicotiana glauca*)

Of particular note, observation was made on *Acacia saligna* (also known as Golden Wreath Wattle) infestation which is classed as a Serious Environmental Weed and falls under General Biosecurity Duty regulations in all of NSW. The approximate infestation area treated was 5 ha (plus isolated trees) on Integra Underground rehabilitation areas.

The main method of treatment was cut and paint. Basal bark spraying was carried out on some young active growth. Monitoring and follow up may be required for regrowth or seed germination.

6.8.2 Key Performance and/or Management Issues

There were no key performance issues, management issues or community complaints relating to weeds and pests during 2020.

6.8.3 Proposed Actions for 2021

Weed and pests will be monitored and managed during 2021 as per the management strategies in the BMP and MOP.

6.9 Bushfire

6.9.1 Environmental Management

Bushfire management is undertaken in accordance with the *Bushfire Management Plan (2020)* which has been prepared to assess and manage bushfire risks on site. The *Bushfire Management Plan* details prevention and management measures to reduce the impact of bushfire at Integra Underground. These include:

Ignition Management

- Smoking onsite, no smoking is permitted at Integra Underground;
- Procedures for hot works and other higher risk activities;
- Procedures for management of the gas flare site and other gas management infrastructure;
- Works with ignition potential (i.e. Hot-works, slashing or clearing of vegetation, track works, drilling etc) are not permitted during total fire bans days, unless in hard stand (i.e. workshop areas);
- Limit high risk activities (i.e. works with ignition potential) in areas proximal to hazards (fuel, vegetation) during very high/severe/extreme/catastrophic fire danger days or accompany with a suppression resource;
- Maintenance of housekeeping by mine management;
- All workshops and offices are required to have appropriate firefighting equipment and with their location indicated by signs compliant with Australian Standards;
- Equipment will not be stored on uncleared ground; and
- Vehicular access will be maintained around all areas of mining-related activities which will aid in observation and response.

Fuel Management

- Vegetative fuels:
 - Maintain Asset Protection Zones (APZs) around vulnerable assets to minimise the potential impact of bushfire; and
 - Maintain Strategic Fire Advantage Zones (SFAZs).
- Anthropogenic fuels:
 - All fuel and oil is stored within defined storages which meet the relevant Australian Standards and are regularly maintained;
 - All fuel tanks on-site will be fully or self-bunded so that in the event of a leak or rupture, fuel is restricted from escaping. Each bunded area will have the capacity of at least 110% of the largest tank. Bunds may be integrated, (i.e. form part of the tank structure) or be external;
 - Undertake refuelling within designated fuel bays or within cleared areas of the mine site where possible; and
 - Manage explosives materials according to the relevant Australian Standards.

Other management strategies include maintaining widely available access across the site, availability of water supply in the event of a bushfire, communication and availability of the *Bushfire Management Plan* to all relevant persons and protection of life strategies such as postponing non-essential works within bushfire prone areas on days of declared Total Fire Ban.

6.9.2 Key Performance and/or Management Issues

Quarterly bushfire inspections were undertaken in 2020 to monitor bushfire risk to Asset Protection Zones and Strategic Fire Advantage Zones. An action was raised and subsequently completed in the Quarter 1 inspection to slash grass were required around fan sites and the pit top. Vegetation under powerlines were also maintained in accordance with the *Bushfire Management Plan*. There were no fires onsite during 2020.

There were no key performance issues, management issues or community complaints relating to bushfires during the reporting period.

6.9.3 Proposed Actions for 2021

The controls and mitigation measures within the *Bushfire Management Plan* will be implemented in 2021.

6.10 Greenhouse Gas

Greenhouse gas management is undertaken in accordance with the *Air Quality and Greenhouse Gas Management Plan* (2019). Annual emissions and abatement strategies are reported as part of National Greenhouse and Energy Reporting (NGER) obligations.

The methane emitted from Integra Underground is discharged via goaf gas drainage boreholes to either the Glennies Creek Power Station, the flare site on Forest Road or through mine ventilation. A number of goaf gas drainage boreholes are connected to the Glennies Creek Power Station, which utilises the gas to generate electricity for distribution in the NSW power grid. Integra Underground records the gas sent to the EDL Power Station and the annual total reported in **Table 6-17**.

Additionally, energy efficiency opportunities and greenhouse gas management strategies are implemented at Integra Underground in accordance with the *Air Quality and Greenhouse Gas Management Plan*.

6.10.1 Environmental Monitoring Results

Greenhouse gas emissions for Integra Underground during the reporting period, as well as the previous two reporting periods (for comparison), are shown in **Table 6-17**. The emissions have been estimated using the methods specified in the former Department of the Environment, Water, Heritage and the Arts (DEWHA) (now Department of the Environment and Energy) *National Greenhouse and Energy Reporting (Measurement) Determination 2008* and the publication, *National Greenhouse Accounts Factors July 2018*.

Table 6-17 – Greenhouse Gas Data

Emission Source	Unit	2017/ 2018	2018/ 2019	2019/ 2020
Fossil Fuel – Diesel	t CO ₂ -e	2,012	5,126	3,205
Fugitive Emission - Flaring	t CO ₂ -e	40,471	67,120	74,013
Fugitive Emission - Vented	t CO ₂ -e	542,831	490,105	476,459
Fugitive Emission - Extraction of Coal (Flaring and venting)	t CO ₂ -e	583,302	557,225	550,472
Fugitive Emission - ROM Coal	t CO ₂ -e	41,226	39,250	47,567
Total Scope 1 Emissions	t CO ₂ -e	626,540	601,601	601,244
Electricity from Grid	t CO ₂ -e	33,444	38,673	44,038
Total Scope 2 Emissions	t CO ₂ -e	33,444	38,673	44,038
Total Scope 1 and Scope 2 Emissions	t CO ₂ -e	659,984	640,274	645,282
Gas sent off site (not an Integra Underground emission)	m ³	22,933,261	24,073,177	29,136,749

Note: Greenhouse gas data for 2020 is reported in financial year as compared to calendar years in previous Annual Reviews. This change has been made to improve data accuracy by aligning with the National Greenhouse Gas and Energy Reporting.

6.10.2 Comparison with Predictions

An Air Quality and Greenhouse Gas Assessment was prepared by Jacobs (2017) as a component of the Mod 8 Environmental Assessment. Jacobs (2017) predicted that total greenhouse gas emissions from Integra Underground would be 820,125 (2017) and 878,493 (2018) t CO₂-e. As outlined in **Table 6-17**, total emissions during 2020 were 645,282 tCO₂-e which is an improvement upon the predicted emissions.

6.10.3 Key Performance and/or Management Issues

There were no key performance issues, management issues or community complaints relating to greenhouse gas emissions during 2020.

6.10.4 Proposed Actions for 2021

Greenhouse Gas management during 2021 will be undertaken in accordance with the *Air Quality and Greenhouse Gas Management Plan*.

6.11 Hydrocarbon Management

Bulk fuel facilities are managed in accordance with *AS1940-2004 The Storage and Handling of Flammable and Combustible Liquids*. All permanent fuel facilities are bunded, with emergency measures in place to manage any spills.

Hydrocarbon spills which occur are reported via the site's incident reporting system and investigations carried out as required. When spills occur they are managed with spill kits available onsite or treated through oil-water separators.

6.11.1 Environmental Monitoring Results

During the reporting period two minor hydrocarbon spills occurred and were reported internally.

All spill incidents were managed in accordance with the Spill Response Procedure in the *Emergency Response Manual* and *Pollution Incident Response Management Plan*

6.11.2 Key Performance and/or Management Issues

There were no key performance issues, management issues or community complaints relating to hydrocarbon management in 2020.

6.11.3 Proposed Actions for 2021

Integra Underground will continue to prevent hydrocarbon spills in 2021 as well as respond to and investigate any spills which may occur to prevent recurrence.

6.12 Public Safety

Public safety is managed in accordance with the *Longwalls 15 and 16 Extraction Plan Public Safety Management Plan*.

Integra Underground is committed to preventing risks to public safety resulting from operations at the mine. Ongoing reviews of potential public safety issues are undertaken on a regular basis around the mine area and associated public roads.

Integra Underground's general approach to public safety management is outlined below:

- Baseline Monitoring and Inspections – Establishing baseline data for the Extraction Plan area by completing inspections and subsidence monitoring. Liaison with key stakeholders;
- Mitigation Measures Prior to Mining – Fences and gates have been used to minimise the potential for public access to the Extraction Plan Area. Mitigation measures where appropriate for the rail line and engineering modifications to the Bettys Creek bridge;
- Monitoring and Inspections During Mining – Continue inspections and monitoring as mining progresses. Liaison with key stakeholders;
- Assessment and Interpretation of Impacts – Monitoring and inspection data is analysed to identify variations from subsidence predictions. Assessment of impacts/risks to public safety. Liaison with key stakeholders;
- Implement Remediation Measures – Implement actions to effectively manage any risks to public safety. Liaison with key stakeholders; and
- Re-assessing Impacts and Review of Effectiveness of Remediation Measures – Re-assessment of impacts through inspection and monitoring. Review of the effectiveness of remedial measures. Liaison with key stakeholders.

Day-to-day monitoring of public safety at Integra Underground is undertaken through the use of a variety of methods, including:

- All site visitors are directed to the main office and are required to report and log on to an electronic visitors system;
- Implementation of a security system to ensure public and employee safety is maintained in accordance with the relevant requirements under the , *Work Health and Safety (Mines and Petroleum Sites) Act 2013*, *Work Health and Safety (Mines and Petroleum Sites) Regulation 2014*, *Mining Act 1992* and the mining tenements;
- Signage advising of subsidence areas;
- Security fencing surround the perimeter of the pit top and surface infrastructure;
- Security patrols; and
- Employee and contractor inductions regarding mine safety and environmental management issues prior to commencement of work at the site.

6.12.1 Environmental Monitoring Results

Public safety monitoring is undertaken as part of the weekly subsidence inspections. Minor subsidence cracking was identified during 2020 above Longwalls 15 and 16 however this did not cause any potential impacts to public safety as these areas are inaccessible to the public.

6.12.2 Key Performance and/or Management Issues

A new Extraction Plan was submitted to DPIE in 2020 for secondary extraction within Longwalls 17-20. This Extraction Plan included a Longwall 17-20 *Public Safety Management Plan*. The plan is currently being assessed for approval.

There were no key performance issues, management issues or community complaints relating to public safety during 2020.

6.12.3 Proposed Actions for 2021

It is anticipated that the Longwall 17-20 Extraction Plan (including the *Public Safety Management Plan*) will be approved and implemented during 2021.

6.13 Subsidence

During the reporting period mining was undertaken in Longwalls 15 and 16. Subsidence is managed in accordance with the Longwalls 15 and 16 Extraction Plan, which is available on the Integra Underground website. The Longwalls 15 and 16 Subsidence Monitoring Program was prepared as a component of the Extraction Plan and details the ongoing monitoring program to manage subsidence. This includes:

- Weekly visual inspections within the subsidence impact zone;
- Bi-monthly subsidence impact reporting; and
- Six-monthly reporting with a comprehensive summary of all impacts and environmental monitoring results.

A Longwalls 17-20 Extraction Plan, including a Subsidence Impact Assessment, was prepared and submitted for approval in 2020. It is anticipated that the Extraction plan will be approved during the following reporting period.

6.13.1 Environmental Monitoring Results

SCT Operations (SCT) was engaged to review and analyse the Longwalls 15 and 16 subsidence monitoring data (undertaken bimonthly during the 2020 reporting period), as well as six monthly reviews (December 2019 to May 2020 and June to November 2020) for Longwall 15. An End of Panel report was also completed for Longwall 15. The results of this monitoring are summarised below:

In the six-monthly review and the Longwall 15 End of Panel Report, SCT concluded that:

- Subsidence effects are consistent with expectation and much less than the relevant performance indicators for Longwalls 15 and 16;
- Subsidence impacts observed at the completion of Longwall 15 are considered compliant with the subsidence performance measures of PA 08_0101 (Mod 8);
- Subsidence effects and impacts observed are likely to be compliant with the performance indicators within the various management plans developed for the Extraction Plan as required under PA 08_0101.
- No incidents relating to an increased risk to public safety from subsidence in the mining area have been reported.

The bi-monthly monitoring reports also concluded the following:

- No significant subsidence impacts to natural or built features were observed;
- Subsidence impacts to the Mount Owen Railway Line/Bettys Creek Bridges and associated infrastructure have been minor and have been effectively managed by the technical committee to maintain this infrastructure in a safe and serviceable condition;
- No subsidence impacts to the Mount Owen North Pit open cut mining operations have been recorded.

6.13.2 Comparison with Predictions

A Subsidence Impact Assessment was undertaken by SCT (2018) to support the Longwalls 15 and 16 Extraction Plan. The assessment predicted the proposed extraction would be compliant with the subsidence performance measures in Schedule 3, Condition 17 of PA 08_0101.

Table 6-18 shows that measured values of the primary subsidence parameters – vertical subsidence, tilt and strains – are less than the predictions made in the Longwalls 15 and 16 Extraction Plan. The lower than forecast subsidence applies to natural ground surfaces and areas of disturbed ground with waste rock fill material.

Table 6-18 – Comparison of Subsidence Parameters: Forecast and Measured for Longwall 15 and 16

Data Set	Subsidence (m)	Tilt (mm/m)	Tensile Strain (mm/m)	Compressive Strain (mm/m)
Natural/ Undisturbed Ground (e.g. Rail Corridor and LOOP)				
Forecast Maximum LW 15	2.0	14	7	10
Forecast Maximum LW 16	1.5	14	7	10
Areas of Waste Rock Emplacement (e.g. TP2, ERP, West Dump)				
Forecast Maximum LW 15	2.5	14	14	20
Forecast Maximum LW 16	2.0	14	14	20
End of Panel Report Findings				
Measured Maximum LW 15	0.73	~10	3	7

Subsidence behaviour and impacts observed in the vicinity of Longwall 15 and 16 are consistent with expectations outlined in the Longwalls 15 and 16 Extraction Plan. End of panel report findings for Longwall 15 indicate subsidence impacts well below forecast impacts (refer **Table 6-18**). SCT (2020) states the main subsidence impact observed was minor cracking of the surface, and minor changes to the landform. Minor impacts to built features such as the Mount Owen Railway Line, Bettys Creek Bridges and associated infrastructure was expected and has been recorded. All impacts are consistent with predictions and expectations, and are less than the maxima forecast (SCT, 2020).

6.13.3 Key Performance and/or Management Issues

Minor subsidence cracking was identified during 2020 across Longwalls 15 and 16, however this did not cause any potential impacts to public safety or the environment.

There were no key performance issues, management issues or community complaints relating to subsidence during the reporting period.

6.13.4 Proposed Actions for 2021

Integra Underground will continue to rehabilitate cracks, as per the *Mine Operations Plan* and *Extraction Plan*, identified during 2021.

A Longwalls 17-20 Extraction Plan, including a Subsidence Impact Assessment, was prepared and submitted for approval in 2020. It is anticipated that this Extraction Plan will be approved in 2021.

6.14 Lighting and Visual Impacts

6.14.1 Environmental Management

The following management measures are implemented at Integra Underground to reduce the impact of visual amenity and lighting:

- Lighting impacts are considered during the Annual Environment and Community Risk Assessment process. The Annual Environment and Community Risk Assessment is reviewed to manage all associated risks to the surrounding environment and community;
- Site lighting locations are inspected during Surface Environmental Inspections to manage compliance with siting and positioning of lights;
- Outdoor lights are angled to shine below the horizon, or have shields;
- All external lighting associated with the project comply with *Australian Standard AS/NZS 4282:2019 - Control of Obtrusive Effects of Outdoor Lighting*, or its latest version; and
- The locations of private land and residences (i.e. sensitive receptors who may be impacted by outdoor lighting) are considered prior to undertaking an activity that may create intrusive lighting.

6.14.2 Key Performance and/or Management Issues

There were no key performance issues, management issues or community complaints relating to lighting or visual impacts during the reporting period.

6.14.3 Proposed Actions for 2021

During 2021 lighting and visual impacts at Integra Underground will continue to be managed in accordance with site procedures.

7. Water Management

Integra Underground operates under a *Water Management Plan* (2019). The *Water Management Plan* (WMP) includes surface water, groundwater, creek diversions, erosion and sediment control.

Integra Underground is situated within the catchments of Glennies Creek, Main Creek and Bettys Creek. Water monitoring sites and extent of alluvium at Integra Underground are shown on **Figure 7-1**.

The Integra Underground water management system adopts a water management approach categorising water into three classes and managing each via a segregated system. The three categories of water are:

- **Clean water:** Runoff from areas undisturbed by mining activities, established rehabilitation or local water sources (creeks, rivers or alluvial aquifers).
- **Dirty water:** Runoff from unestablished rehabilitation and disturbed areas (hardstand, laydown areas and unsealed roads).
- **Mine water:** Runoff from haul roads, rehabilitated overburden dumps, workshop areas, vehicle wash-down bays and storage yards. Also includes dewatering of underground workings.

The Integra Underground water management system considers water sharing agreement in place with Bloomfield (operators of Rix's Creek North) and Mount Owen Glendell Operations. A water transfer pipeline has been constructed which transfers mine water from Integra Underground to the Mount Owen Glendell Operations.

7.1 Water Balance

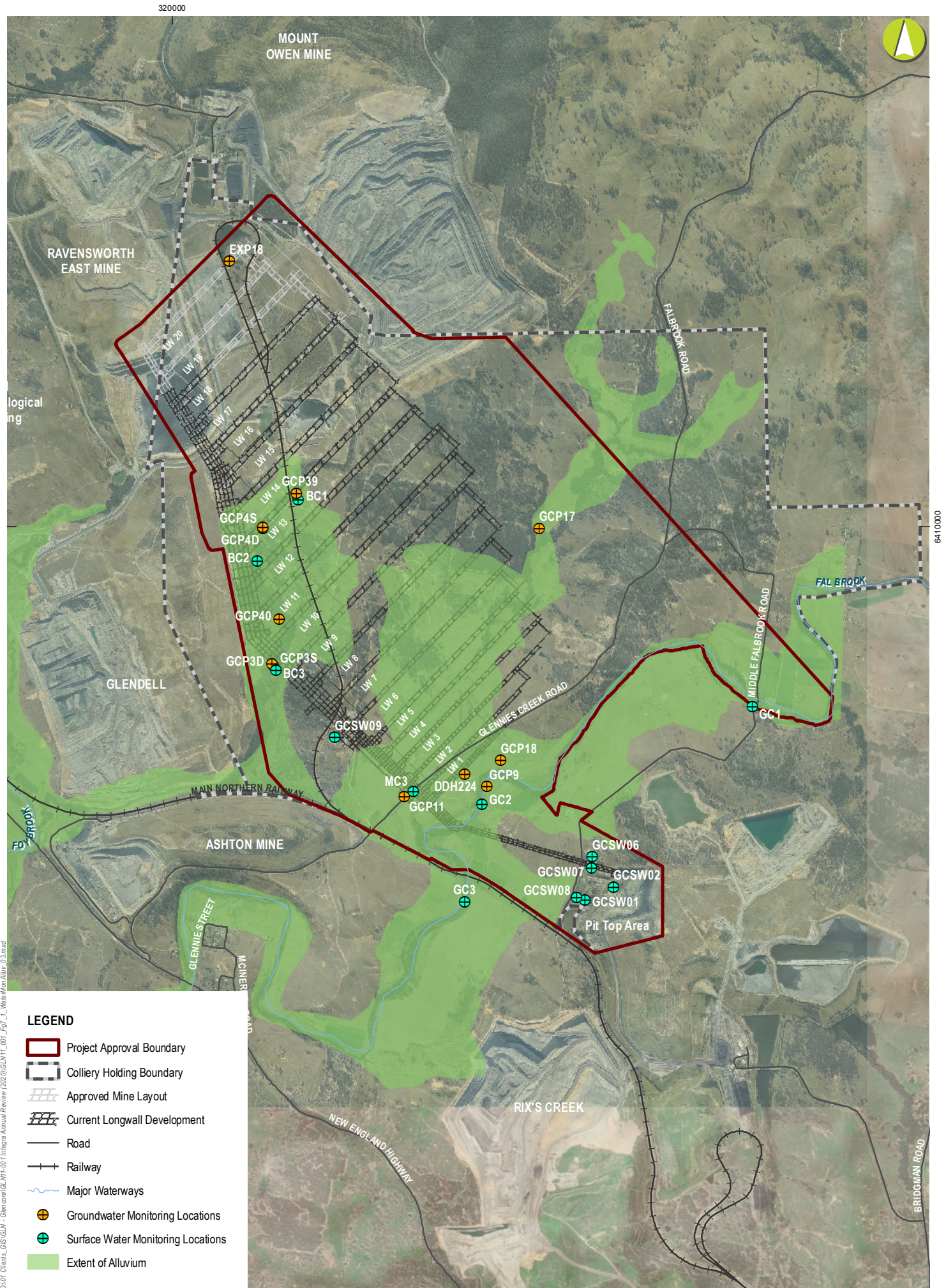
The mine water management system at Integra Underground achieves a net neutral water balance through integrated water management practices with the neighbouring open cut mining operation at Rix's Creek North, and the Integra Underground to Mount Owen Glendell Complex mine water pipeline which operates under the Greater Ravensworth Area Water Sharing Scheme.

Mine water associated with Integra Underground is generated from:

- Dewatering of underground workings;
- Rainfall runoff from the Portal Sump, administration and laydown areas (via overflows from Process Dams); and
- Seepage from overburden dump (Rix's Creek North).

Integra Underground engaged Engeny Water Management (Engeny) to review the site water balance for the reporting period (1 January 2020 – 31 December 2020), using the existing GoldSim model. The 2020 water balance, along with the previous 2019 and 2018 balances for comparison, is presented in **Table 7-1**.

In summary, there has been a decrease in inputs/outputs from 2019, this is largely due to lower volume of seepage into the Portal Sump from Rix's Creek, and a decrease in the volume pumped to the Mount Owen Glendell Operations.



D:\01 Clients\GIS\GLN - Glendell\GLN1-001 Integra Annual Review (2020)\GLN1_001_Fig_1_WebMapAlluv_03.mxd

0 0.5 1 1.5 2 km

Scale: 1:50,000

Table 7-1 – 2018-2020 Water Balance

Aspect	2018 Volume (ML)	2019 Volume (ML)	2020 Volume (ML)
Inputs			
Imported clean water for operational use	341.2	496.8	391.8
Imported portable water	11.8	15.2	14.8
Groundwater ingress	148.0	131.9	114.9
Seepage into Portal Sump from Rix's Creek North overburden emplacement	539.0	636.6	306.0
Transfers from Rix's Creek into Integra Underground Portal Sump	0.0	496.4	234.9
Rainfall-runoff	64.6	65.3	321.8
Water intake	108.0	100.1	149.9
Total Inputs	1,212.6	1,942.3	1,534.1
Outputs			
Operational uses (e.g. dust suppression)	27.8	34.0	22.3
Evaporation	23.8	35.0	30.0
Potable water use	11.8	15.2	14.8
Transfers to Rix's Creek Mine	14.0	0.0	0.0
Transfers to Mount Owen Glendell Operations	957.1	1,685.3	1,246.9
Moisture loss to Vented Air	176.0	158.5	221.6
Recorded Volume Stored on Site at start of Annual Review period	40.2	28.2	24.8
Recorded Volume Stored on Site at end of Annual Review period	39.3	30.4	30.1
Recorded Change in Storage	0.9	2.2	5.4
Error	<1%	<1%	<1%

7.2 Water Take

Water taken by Integra Underground during the previous water year (1 July 2019 to 30 June 2020) has been summarised in **Table 7-2**. Water sourced from WAL 484, WAL 485, WAL 960 and WAL 961 was directly transferred to Mount Owen Glendell Operations WAL7814.

Table 7-2 – 2019-2020 Water Take

Water Licence #	Water sharing plan, source and management zone (as applicable)	Entitlement (ML)	Allocation Used (ML)
Waterways			
WAL 484	Hunter Regulated River - any part of Glennies Creek	3	2.5
WAL 485	Hunter Regulated River - Zone 3A of Glennies Creek	99	74.2
WAL 960	Hunter Regulated River - Zone 3A of Glennies Creek	50	42.5
WAL 961	Hunter Regulated River - Zone 3A of Glennies Creek	150	127.5
WAL 1172	Hunter Regulated River - Zone 3A of Glennies Creek	3	0.0
WAL 1173	Hunter Regulated River - Zone 3A of Glennies Creek	303	170.3
WAL 1242	Hunter Regulated River - Zone 3A of Glennies Creek	13	0.0

Water Licence #	Water sharing plan, source and management zone (as applicable)	Entitlement (ML)	Allocation Used (ML)
Groundwater			
WAL 41562	Bore: Sydney Basin - Hunter Porous Rock Aquifer	450	116.6
WAL 41563	Bore: Sydney Basin - Hunter Porous Rock Aquifer	500	

During the reporting period Integra Underground used 417 ML (67%) of its 621 ML surface water allocation, and 116.6 ML (12%) of its 950 ML groundwater allocation. The Mod 8 Groundwater Impact Assessment (AGE, 2017) predicted that in Year 3 of the operation, Integra Underground would intercept 602 ML of groundwater, therefore Integra Underground used less than this prediction.

7.3 Changes to Licences

There were no changes to water licences during the reporting period.

7.4 Discharges

Integra Underground is a closed system with transfers between neighbouring mines. There are no discharges of water offsite to the natural environment.

7.5 Surface Water

7.5.1 Environmental Monitoring Results

Surface water quality was monitored onsite at Integra Underground and in the surrounding waterways during the reporting period. Surface water monitoring locations are shown on **Figure 7-1** and comprise nine sites which are sampled monthly for pH, Electrical Conductivity (EC), total suspended solids (TSS) and total dissolved solids (TDS). Sampling of Bettys Creek and Main Creek is also completed on a quarterly basis.

The pH and EC monitoring results for the reporting period have been summarised in **Table 7-3**.

Table 7-3 – Surface Water Monitoring Results – pH and EC

Monitoring Location	pH Results					EC Results (µS/cm)			
	Min	Ave	Max	Lower Criteria	Upper Criteria	Min	Ave	Max	Criteria
Monthly Monitoring Sites									
GCSW01 Process Dam	8.0	8.4	9.2	-	-	312	511	658	-
GCSW02 Portal Sump	7.5	8.2	8.7	-	-	4,360	6,855	8,950	-
GCSW06 Sewerage Pond	7.3	8.5	10.8	-	-	431	512	612	-
GCSW07 Potable Water Supply	7.6	7.9	8.1	-	-	276	300	328	-
GCSW08 Runoff Pond	7.6	8.2	9.5	-	-	413	589	894	-
GCSW09 Ventilation Shaft Dam ^	7.6	8.2	8.5	-	-	606	1,431	2,800	-
GC1 Glennies Creek	7.7	7.9	8.1	7.6	7.9	318	472	808	555
GC2/W4 Nobles Crossing	7.7	7.8	7.9	7.5	7.9	318	478	792	466
GC3 Glennies Creek	7.7	7.8	7.9	7.6	7.9	328	474	771	519
Quarterly Monitoring Sites									
BC1 Bettys Creek	7.2	7.2	7.2	6.9 - 7.8 (flow) 6.9 - 8.1 (no flow)		231	231	231	540 (flow)
BC2 Bettys Creek	7.0	7.1	7.1			211	262	314	6,350 (no flow)
BC3 Bettys Creek	7.1	7.2	7.3			254	310	366	
MC3 Main Creek	7.0	7.2	7.4			154	204	236	680 (flow) 1,220 (no flow)

Average pH results were above the upper criteria levels at GC1, GC2/W4, and GC3 Glennies Creek. Average EC results were also above the upper criteria at GC2/W4 and GC3. In accordance with the WMP, investigations were undertaken in response to these pH and EC triggers. The investigations determined that monitoring results at the locations were not attributable to Integra Underground (refer **Section 7.5.5**). The monitoring results were within historic ranges which have been observed since 2009. Additionally, the locations of these monitoring points are outside the predicted subsidence impact zone.

Total dissolved solids (TDS) and total suspended solids (TSS) were sampled at the locations summarised in **Table 7-4**. In accordance with the WMP, GCSW01, GCSW02 and GCSW08 are monitored for TDS only, while the remaining sites are monitored for both TDS and TSS.

Table 7-4 – Surface Water Monitoring Results – TSS and TDS

Monitoring Location	TSS Results (mg/L)				TDS Results (mg/L)			
	Min	Ave	Max	Criteria	Min	Ave	Max	Criteria
Monthly Monitoring Sites								
GCSW01 Process Dam	NR	NR	NR	NR	203	291	407	-
GCSW02 Portal Sump	NR	NR	NR	NR	2,450	4,091	5,390	-
GCSW06 Sewerage Pond	10	69	164	50*	248	286	340	-
GCSW08 Runoff Pond	NR	NR	NR	NR	228	381	642	-
GC1 Glennies Creek	7	8	10	50*	204	342	439	-
GC2/W4 Nobles Crossing	<5	10	10		198	324	402	-
GC3 Glennies Creek	<5	10	17		165	262	414	-
Quarterly Monitoring Sites								
BC1 Bettys Creek*	<5	<5	<5	50*	154	154	154	-
BC2 Bettys Creek*	<5	<5	<5		204	240	276	-
BC3 Bettys Creek*	<5	<5	<5		264	284	304	-
MC3 Main Creek^	<5	14	14	50*	103	148	183	-

*ANZECC (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality

NR: Not required

TSS levels during the reporting period ranged from <5 mg/L to 164 mg/L, with an average of 37 mg/L. Results above the TSS criteria at GCSW06 Sewerage Pond were recorded in January, February, March, July, August and October 2020. Elevated TSS levels appear to correlate to months with high rainfall, as increased runoff can result in increased sediment in the water.

7.5.2 Stream Health and Channel Stability

The results of the June 2020 Bettys Creek Diversion Channel Stability and Stream Health Monitoring (SLR, 2020) indicated that the majority of monitoring points experienced no apparent change from what was observed during the October 2019 assessment. A decrease in conditions occurred at two monitoring points (MBD2 and MBD3) with an increase in stabilisation score observed at BC2, however this was attributed to a change of assessor for this round of monitoring (SLR, 2020).

SLR (2020) identified that some sections of the diversion were eroding and were considered vulnerable to further erosion, with areas of significant erosion observed (generally associated with exposed dispersive sub-soils). The diversion was considered generally stable in most areas but some rill/gully erosion was observed at some locations where the banks were bare (points MBD04 and MBD05). No evidence was observed to indicate that impacts to the diversion had occurred as a result of Integra Underground operations.

SLR (2020) noted that significant tunnel erosion had occurred within the cracks at several locations (sites E7 and E15) which were not observed during the previous monitoring in October 2019. This tunnel erosion was likely due to several large storm events. This erosion was not deemed to be a result of Integra Underground operations.

The condition of riparian vegetation remained stable amongst the majority of monitoring sites however, most continued to record 'poor' to 'very poor' condition classes. These sites had reduced riparian vegetation width, canopy cover and low levels of native species cover in the mid-storey and groundcover. Many sites had a high abundance of exotic species, including a number of priority weed species. Finally, comparison of recent and historical aerial photographs indicated that no significant lateral shifts of the diversion occurred in the 6.5 months between when the photographs were taken (SLR, 2020).

SLR (2020) recommended that measures be put in place to prevent vehicle access to E9 to reduce further erosion (completed in 2020) and the stream health and channel stability monitoring be conducted annually, or following completion of future longwall panels for which the Bettys Creek Diversions are in the subsidence zones.

7.5.3 Comparison with Predictions

A Surface Water Assessment was undertaken by WRM Water and Environment (2009) as part of the Integra Underground Coal Project EIS. The assessment concluded that “Impacts from the current proposal will be limited to Bettys Creek, Main Creek and their local drainage network. Mine planning has ensured that Glennies Creek and its associated alluvium lie outside the subsidence footprint from the proposed underground mining and hence no surface water impacts are expected” (WRM, 2009). A Surface Water Assessment was undertaken by Hansen Bailey (2017) to support the Mod 8 Environmental Assessment. This assessment stated that:

- The existing monitoring program will be expanded to include the Modification Underground Extraction Area and ancillary infrastructure;
- The proponent will undertake routine inspections as necessary to monitor the potential impacts of the Modification;
- Additional annual inspection sites will be established in response to any erosion or sediment control issues identified through the routine monitoring program; and
- The monitoring program will continue to be reviewed on an annual basis.

Bettys Creek quarterly monitoring results presented in **Table 7-3** and **Table 7-4** support that Integra Underground is not impacting upon surface water quality.

7.5.4 Long Term Trend Analysis

Figures 7-2 and 7-3 show long-term (2012 to 2020) results for pH and EC, respectively. Although pH and EC levels resulted in some attributes outside of trigger criteria, these levels are within the historic pH and EC levels observed at the site. The location of all monitoring sites is below the limit of predicted subsidence and therefore operations at Integra Underground are not considered a contributing factor to these triggers.

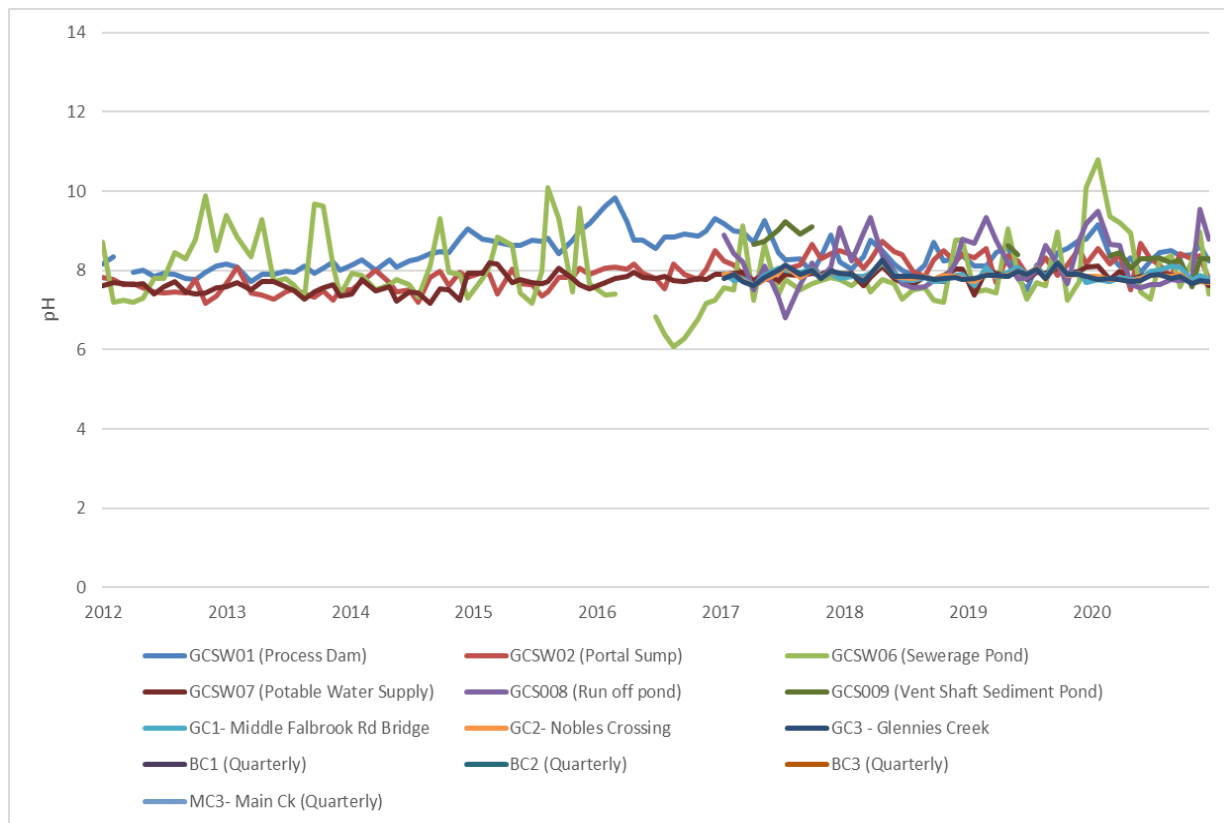


Figure 7-2 – Long Term Surface Water pH Results

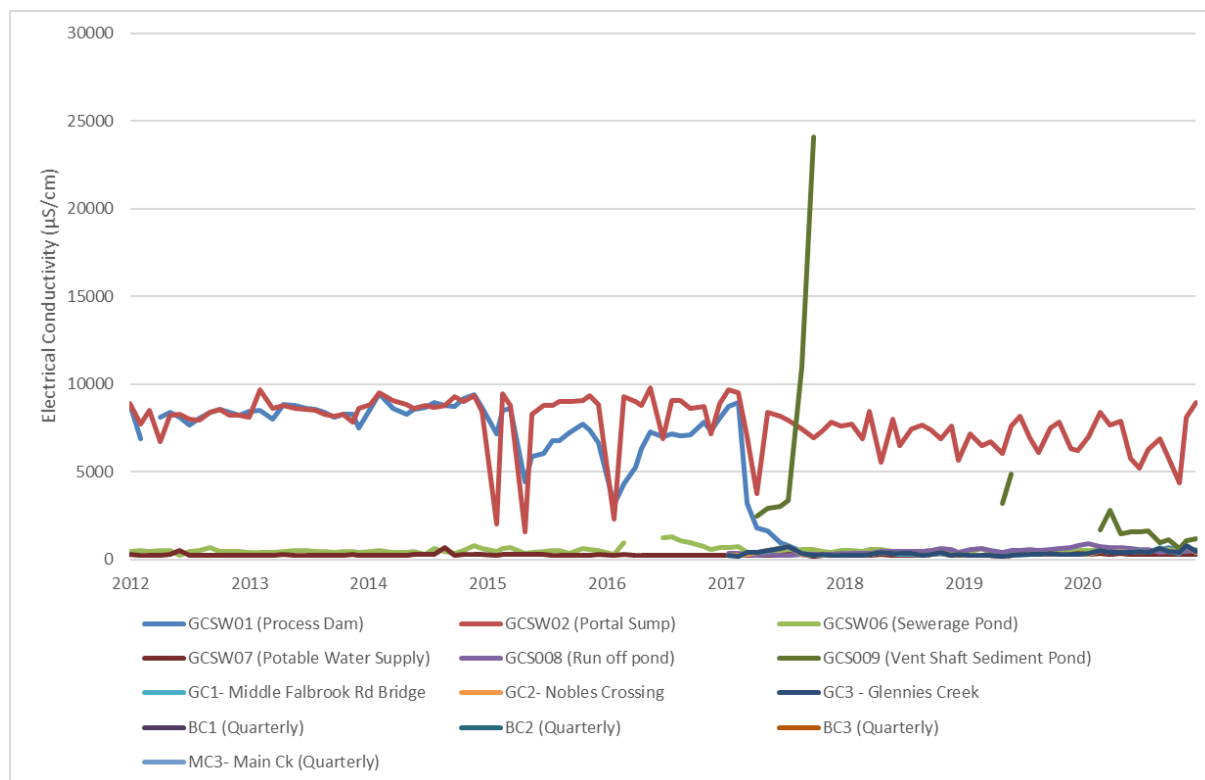


Figure 7-3 – Long Term Surface Water EC Results

7.5.5 Key Performance and/or Management Issues

During the reporting period there were a number of elevated results at Glennies, Bettys and Main Creeks which triggered the surface water TARP (refer **Section 7.5.1**). Investigations were undertaken by GeoTerra for each of these occasions, which concluded the following:

- **Stream pH** – The pH levels recorded for Glennies Creek during the reporting period were found to be within the historic pH range that has been observed in the creek since September 2002. Insufficient data is available for a long term assessment / plotting of Main Creek or Bettys Creek stream pH. It was noted that factors that may contribute to the pH being outside the specified TARP range are principally the introduction of buffering species, such as bicarbonate, and the interaction between these influences and stream flow changes. The results are only just above (more alkaline) than the outlined trigger value and within their historic range. In summary, GeoTerra determined that none of the pH results which triggered the TARP were considered significant, and they were not directly due to influences from activities or operations within the Integra Underground.
- **Stream Salinity and Total Suspended Solids** - The stream salinity has been gradually rising since late April 2019, however the elevated results which triggered the TARP during the 2020 reporting period were considered to be within the historical range of salinities recorded since September 2002.

Consequently, there were no key performance issues, management issues or community complaints relating to surface water during the reporting period.

7.5.6 Proposed Actions for 2021

Integra Underground will continue to manage surface water in accordance with the *Water Management Plan*.

7.6 Groundwater

7.6.1 Environmental Monitoring Results

Groundwater was monitored onsite at Integra Underground during the reporting period. Groundwater monitoring locations are shown on **Figure 7-1** and comprises of ten sites which are sampled bimonthly for pH, EC and depth (m) and another two vibrating wire piezometers sites that monitor pressure. **Table 7-5** summarises the pH, EC and depth monitoring results for the reporting period.

7.6.2 Alluvium Interception

Figure 7-1 shows the extent of mining activities and the unconsolidated alluvium associated with Glennies Creek, Bettys Creek and Main Creek.

7.6.3 Comparison with Predictions

A Groundwater Impact Assessment was undertaken by AGE Consultants (2017) to support the 2017 modification to PA 08_0101 (Mod 8).

The assessment determined that there would be no impact to groundwater quality as a result of the proposed operations. The 2020 groundwater quality monitoring results align with these predictions, as there have been no impacts to groundwater quality (pH or EC) attributable to Integra Underground Operations (GeoTerra, 2021) (refer **Section 7.6.5**).

The Groundwater Impact Assessment (AGE, 2017) predicted that the Modification would generate a zone of drawdown within the Permian coal measures focussed around the Modification footprint. It also concluded that the maximum net loss of groundwater from the Quaternary alluvium and from connected stream baseflow due to the Modification was predicted to be negligible at less than 1 ML/year, and therefore undetectable. The 2020 groundwater depth monitoring align with these predictions, as there have been no impacts to groundwater depth attributable to Integra Underground Operations (GeoTerra, 2021) (refer **Section 7.6.5**).

Table 7-5 – Groundwater Monitoring Results

Monitoring Location	pH Results					EC Results (µS/cm)					Groundwater Level (mbgl)				
	Min	Ave	Max	Lower Criteria	Upper Criteria	Min	Ave	Max	Lower Criteria	Upper Criteria	Min	Ave	Max	Lower Criteria	Upper Criteria
GCP3S	-	-	-	6.9	7.2				14,900	16,200	5.9	5.9	5.9	3.6	4.5
GCP3D	7.3	7.4	7.5	7.3	7.5	10,570	11,280	12,100	5,140	10,700	44.2	44.6	44.9	-	92.14 [#]
GCP4S	-	-	-	7.3	7.8				7,230	10,200	5.9	5.9	6.0	3.5	4.6
GCP4D	6.8	7.0	7.1	7.0	7.7	15,050	16,408	18,700	4,570	12,900	14.5	15.0	15.3	-	73.69 [#]
GCP9	6.9	6.9	7.0	6.8	7.1	429	453	477	395	475	5.8	6.1	6.2	4.5	4.2
GCP11	7.1	7.2	7.3	7.1	7.5	3,400	3,545	3,750	1,740	4,510	9.0	9.3	9.7	8.4	9.3
GCP17	-	-	-	6.8	7.0				17,100	18,000	8.3	8.4	8.5	7.3	7.5
GCP18	6.9	7.0	7.0	6.8	7.3	668	694	718	760	1,180	7.7	8.0	8.1	-	-68.73 [#]
GCP39	6.9	6.9	6.9	6.0	6.9	1,820	1,820	1,820	210	4,310	4.5	5.2	5.7	3.3	4.4
GCP40	-	-	-	6.6	6.9	-	-	-	33,000	40,800	6.5	6.5	6.5	4.6	5.2
DDH224*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DH316*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Coal Measure Maximum Drawdown Level Triggers

Bolded results represent those which trigger TARP criteria.

* vibrating wire piezometer does not measure analytes in Table 7-5

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Version: 1.0

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7.6.4 Long Term Trend Analysis

Figures 7-4 to 7-6 show long-term results for pH, EC and depth, respectively. Although there were elevated results which triggered the TARP during 2020 (refer **Section 7.6.1**), these levels were within the historic ranges of the piezometers (GeoTerra 2021).

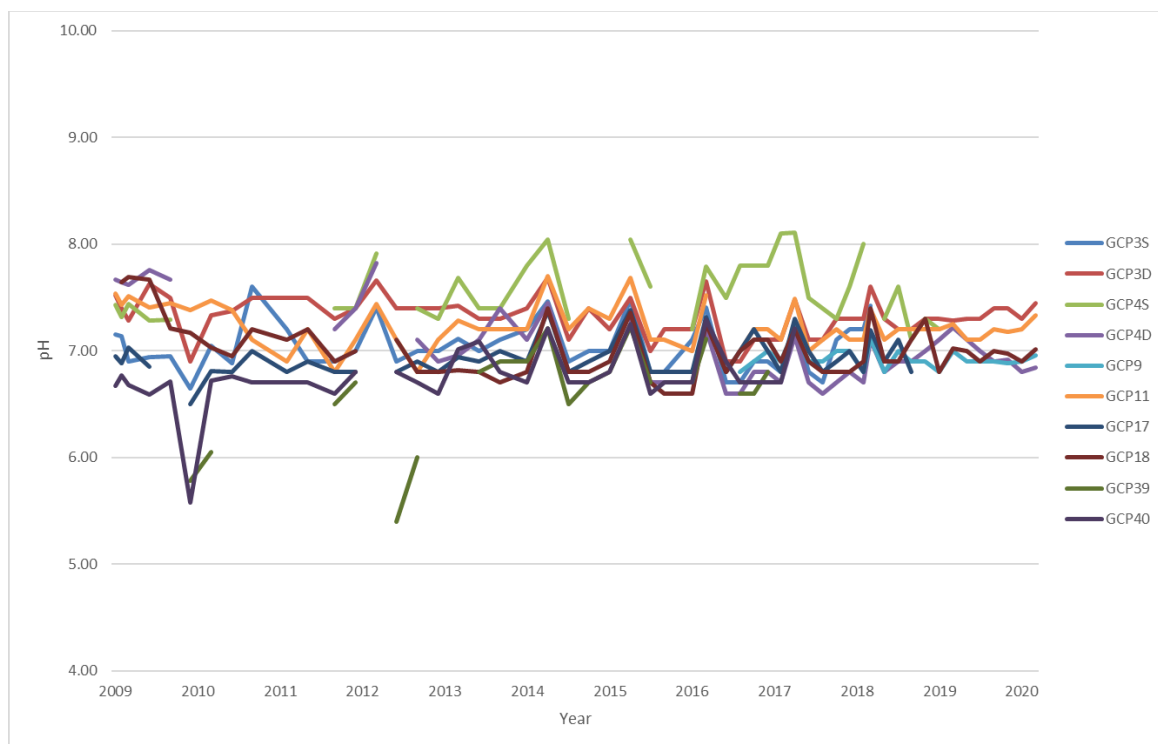


Figure 7-4 – Long Term Groundwater pH Results

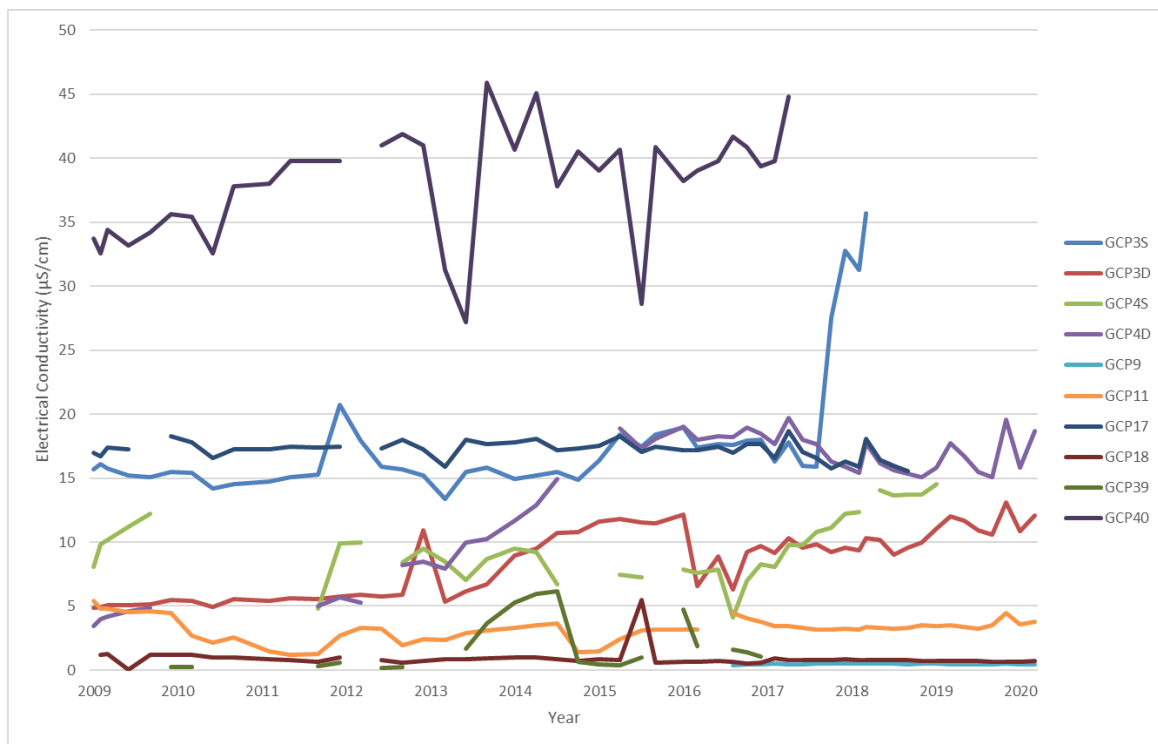


Figure 7-5 – Long Term Groundwater EC Results

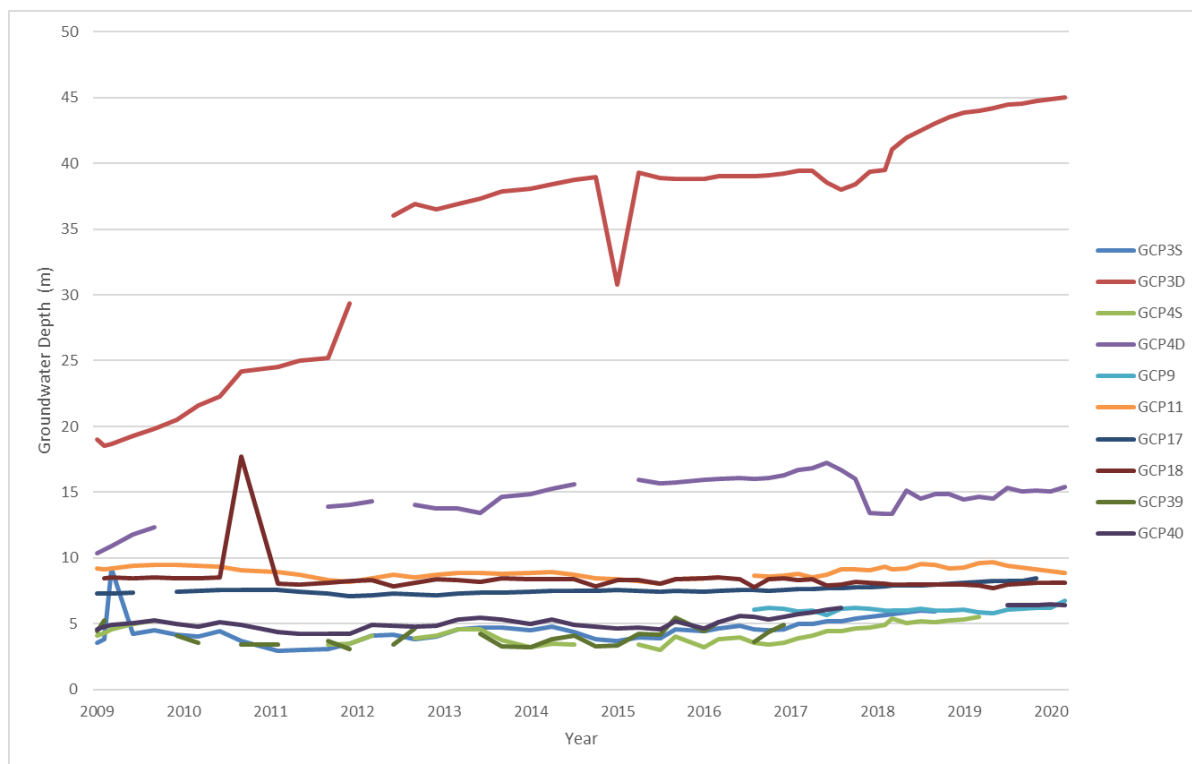


Figure 7-6 – Long Term Groundwater Level Results

7.6.5 Key Performance and/or Management Issues

During 2020, groundwater monitoring limits were triggered. In response to this, Integra Underground engaged GeoTerra to undertake an investigation of these results during the reporting period. The results of these investigations are summarised below:

Groundwater pH

GeoTerra determined that the TARP pH levels recorded in GCP4D during the reporting period are within the historic pH range, and gradual acidification trend observed since late 2015. GeoTerra noted that factors that may contribute to the pH being outside the specified TARP range are principally the degree of oxidation of primary sulfide species, such as pyrite, and the introduction of buffering species, such as bicarbonate, and the interaction between these influences and water level changes that expose (oxidise) or submerge (de-oxygenate) the minerals that may be dissolved within the aquifer. In summary, GeoTerra concluded that the pH results which triggered the TARP were not considered significant, and they were not attributed to influences from activities or operations within Integra Underground.

Groundwater Salinity

GeoTerra determined that the TARP EC levels recorded during the reporting period were within the historic range of EC observed since April 2005 for GCP4D, and November 2009 for GCP18. It was noted that the elevated results recorded at:

- GCP4D is within a long term salinisation trend that started around May 2009, this is within its overall historic range since monitoring began; and
- GCP18 is within a long term moderately freshening trend, also within its overall historic range since monitoring began.

The elevated results were only marginally outside the outlined trigger value and were within the historic range of the piezometers since April 2005. In summary, none of the EC results which triggered the TARP were considered significant, and were not directly due to influences from activities or operations of Integra Underground, however, GeoTerra noted that ongoing monitoring results should be observed to assess if the salinisation trend continues.

Groundwater Levels

GeoTerra noted that groundwater levels have been outside the TARP criteria at GCP4S and GCP9 for periods in that they were deeper than the lower criteria range. GCP17 has also been beneath (lower than) the criteria since 2019. Piezometer GCP11 was outside the criteria, however did not trigger the TARP as it was higher than the upper criteria, (i.e. it had shallower groundwater levels). GeoTerra (2021) noted that the factor that influences groundwater levels to be outside the specified TARP range, outside of subsidence impacts, is principally rainfall recharge into the aquifer, with more recharge generating “shallower” and less recharge generating deeper water levels. The elevated results were within the historic range of the basement piezometers since January 2002, however the alluvial piezometers GCP3S, GCP39 and GCP40 are all now lower.

In summary, GeoTerra confirmed that none of the groundwater level results which triggered the TARP were considered significant, and were not currently due to influences from recent activities or operations of Integra Underground, however, it was recommended that ongoing monitoring results be observed to assess the long term water level trends in association with rainfall.

Consequently, there were no further performance issues, management issues or community complaints relating to groundwater during the reporting period.

7.6.6 Proposed Actions for 2021

Integra Underground will continue to monitor and manage groundwater in accordance with the *Water Management Plan*.

8. Rehabilitation

Rehabilitation objectives at Integra Underground are in accordance with the approved MOP. Rehabilitation is undertaken progressively as outlined in the Environmental Assessments, PA 08_0101, the approved MOP and the *Biodiversity Management Plan*. The rehabilitation of the final landform features will be integrated across the underground and surrounding natural landforms.

8.1 Rehabilitation Outcomes and Objectives

Integra Underground is committed to achieving a post mining land use outcome which is safe, stable and sustainable and meets the requirements of key stakeholders. In general and where practicable the final landscape will be returned to as close as possible to the pre-mining land use configuration. Regular monitoring of rehabilitated areas is undertaken during the initial vegetation establishment period and beyond to demonstrate that the objectives of the rehabilitation strategy are being achieved, and that a sustainable, stable landform has been created. Depending on the outcomes of the monitoring, rehabilitation maintenance to repair any areas may be undertaken where required. This may include, but not be limited to, the repair of diversion drains and banks, and the reseeding or fertilising of areas that may have failed to establish.

The monitoring results of rehabilitated areas will be compared to the reference sites established as part of the baseline monitoring program to allow a comparison of the development and success of the rehabilitation against remnant vegetation. Reference sites indicate the condition of surrounding undisturbed areas and allow comparisons to be made between the rehabilitated sites and the undisturbed areas. Additionally, Schedule 3, Condition 38 of PA 08_0101 sets out the rehabilitation objectives for Integra Underground.

8.2 Status of Mining and Rehabilitation

During 2020 rehabilitation was undertaken at one gas well, six exploration holes and surrounding areas of Ventilation Shaft 3. Photographs taken during the annual rehabilitation monitoring program in 2020 are provided in **Photos 8-1 to 8-3**.



Photo 8-1 – Longwall 4 GW01 Rehabilitation



Photo 8-2 – Longwall 12 GW10 Rehabilitation



Photo 8-3 – Longwall 13 GW11 Rehabilitation

The operational status of mining and rehabilitation is shown in **Figure 8-1**. Total active disturbance (cumulative) for 2020 increased by 2.29 ha from 2019, and was predominantly associated with the construction of gas drainage infrastructure. Total rehabilitation has increased by 1.74 ha from 2019 and was associated with the rehabilitation of decommissioned gas drainage infrastructure. A summary of rehabilitation and disturbance is provided in **Table 8-1**.

Table 8-1 – Rehabilitation Status

Mine Area Type	Previous Reporting Period (Actual) (ha)	This Reporting Period (Actual) (ha)	Next Reporting Period (Forecast) (ha)
A. Total mine footprint	114.37	118.40	123.70
B. Total active disturbance (cumulative)	103.43	105.72	110.86
C. Land being prepared for rehabilitation	0.00	0.00	0.00
D. Land under active rehabilitation	10.94	12.68	12.84*
E. Completed rehabilitation	0.00	0.00	0.00

* Integra Underground review the gas wells each quarter to determine the operational need for each gas well. When a gas well is deemed to be no longer required for future operations where possible it will be rehabilitated. This quarterly review process is used to schedule rehabilitation of wells through the year.

The previous reporting period actual hectares were adjusted to account for discrepancies identified from a review of the rehabilitation and disturbance areas at Integra Underground.

8.3 Comparison against MOP Predictions

During 2020 Integra Underground generally operated in accordance with the approved 2018-2023 MOP. A comparison of how the 2020 rehabilitation is tracking against the end of MOP (2023) predictions have been presented in **Table 8-2**. Annual predictions for rehabilitation and disturbance are not provided in the MOP.

Table 8-2 – Rehabilitation Progress Compared to MOP Predictions

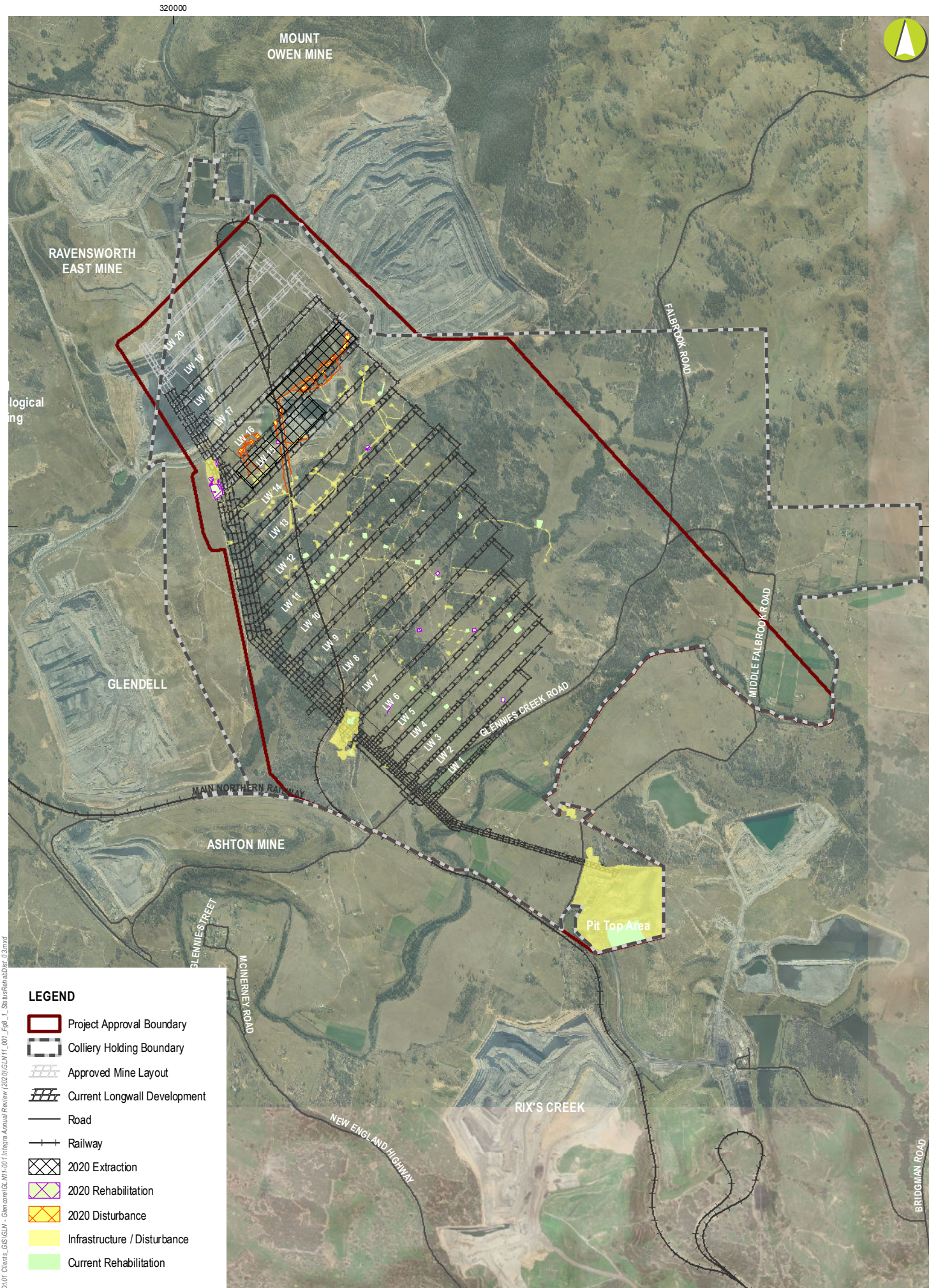
Predicted/Actual	Total Disturbance Area (ha)	Total Rehabilitation Area (ha)
2020 Data (actual)	105.72	12.68
End of MOP (2023) Prediction	140.60	7.20

As seen in **Table 8-2**, Integra Underground is trending towards the predicted end of MOP term disturbance area. Total rehabilitation completed at the end of 2020 (12.68 ha) was greater than the 2023 End of MOP prediction of 7.20 ha.

8.4 Post Rehabilitation Land Use

As outlined in the MOP, Integra Underground is committed to achieving a post mining land use outcome which is safe, stable and sustainable, and meets the requirements of key stakeholders. In general and where practicable the final landscape will be returned to as close as possible to the pre-mining land use configuration.

The majority of mining and pit top infrastructure will be removed, with the majority of the areas rehabilitated to pasture. Only 7.2 ha of rehabilitation will be woodland/pasture. All surface cracks due to subsidence will be identified and remediated appropriately.



D:\01 Clients_GIS\GLN - Glengarry Coal Mine Annual Review (2020)\GLN1_001_Fig_1_StatusRehabDist_03.mxd

0 0.5 1 1.5 2 km

Scale: 1:50,000

GDA 1994 MGA Zone 56
26/03/2021

8.5 Key Issues that May Affect Rehabilitation

Issues that cannot be predicted but may present risks to Integra Underground rehabilitation include:

- Climate variability;
- Bushfire;
- Drought;
- Flood;
- Dam failure;
- Major landform deformation due to geotechnical instability;
- Changes to regulatory requirements;
- Infestations of destructive species; and/or
- Malicious damage.

An event such as those listed above could have substantial consequences for rehabilitation value and are likely to require effective recovery practices to limit the harm, control the risks and to rebuild the rehabilitation to achieve satisfactory performance criteria within a reasonable timeframe to achieve relinquishment. The effect on rehabilitation could occur at any time during the life of mine, during care and maintenance and post closure.

The probability of any of the events listed above occurring are very low based on industry evidence throughout Australia and the exact geo-political location for Integra Underground. Some events may occur suddenly, such as an act of damage by a vandal whereas other such as the impacts of climate variability can be monitored through progressive changes against average weather patterns and the severity of those events. The likelihood of a bushfire affecting the site is cyclical with conditions such as higher risk seasons and increasing fuel loads of vegetation in areas that have dense undergrowth and no grazing or clearing.

8.6 Rehabilitation Monitoring

8.6.1 2020 Rehabilitation Monitoring Summary

A 2020 Annual Rehabilitation Monitoring Report was prepared by Umwelt (2020). Monitoring was undertaken by two ecologists over four days from 7 to 10 December 2020. The program included the assessment of 17 rehabilitated gas well sites, 3 pasture analogue sites, 2 woodland rehabilitation sites and 2 engineered creek-crossing sites. Three types of rehabilitation works have been completed across Integra Underground to date. These are:

- **Woodland rehabilitation areas** located in the rehabilitation overburden emplacement area (7.2 ha), which has been reshaped, topsoil applied and seeded/planted with native trees, shrubs and groundcover species.
- **Gas well rehabilitation sites:** These areas would have included a small drill hole, with the remaining area slashed for vehicle and equipment laydown areas. After cessation of the need for the gas well site, these locations were backfilled and left to naturally recover, with some follow-up weed management works. The rehabilitation of these sites aims for consistency with surrounding vegetation (predominantly cattle grazed grassland).

- **Creek Crossings:** these works cross existing natural creek lines (Main Creek and Bettys Creek) and were disturbed to allow for the Integra to Mount Owen Mine Water Pipeline.

The key findings of the 2020 rehabilitation monitoring program (Umwelt, 2021) were as follows:

- At the time of the survey, vegetation in the Hunter Valley was coming out of drought conditions and Plant Growth Index had moved above the recovery threshold (50th percentile) for the first time since September 2017 (DPI 2020). Subsequently groundcover and species diversity were considered to be a good representation of the sites under desirable conditions;
- Generally, gas well rehabilitation sites were considered to be on the correct trajectory for meeting completion criteria (expected to naturally improve with time with gradual plant colonisation from surrounding areas);
- Gas well rehabilitation sites were generally consistent with the surrounding landscape, though three sites were considered to require reworking (PTA_W02, LW11_GW09 and LW11_GW12). Many of the 2020 Walkover sites continued to require maintenance;
- Some minor areas of weed infestation were identified throughout. Particular areas of infestation warranting management were identified;
- The main threat to the success of the 7.2 ha of Woodland Rehabilitation was considered to be succession of golden wreath wattle (*Acacia saligna*). Although substantial work has been undertaken for management of this species, this process was recommended to be ongoing;
- The Woodland Rehabilitation was deemed successful in the south-east, however less so for the north and western areas. The better quality Woodland Rehabilitation in the south-east was expected to require supplementary groundcover plantings at a later date; and
- Plantings near Bettys Creek Crossing were progressing moderately well in consideration of the drought conditions experienced in 2019 and early 2020, however additional plantings were recommended to reach the requirements of Mod 7.

Monitoring results were an improvement on the previous years results, with only three gas well sites requiring rework in 2020 compared to the five in 2019, and four in 2018. This is likely due to the easing of drought conditions during 2020.

8.7 Proposed Actions for 2021

Integra Underground propose the following actions during 2021:

- Implement additional works in line with recommendations in the Rehabilitation Monitoring 2020 report (Umwelt 2021);
- Continue to rehabilitate subsidence cracks, as per the MOP and Extraction Plan, identified during 2020 (where necessary).
- Weeds will be monitored and managed during 2021 as per the management strategies in the BMP and MOP.

9. Community

9.1 Overview

A number of consultation tools are used at Integra Underground to consult with relevant stakeholders. These include:

- A 24-hour community response line: This service aims to promptly and effectively address community concerns;
- Community Consultative Committee (CCC): The Integra Underground CCC is held with the Mount Owen Glendell Complex CCC. This committee met twice during 2020 to discuss environmental management and any matters raised by members on behalf of the community;
- Integra Underground website: Includes updates on current and future operations, including approvals, environmental management plans and monitoring results; and
- Glencore Greater Ravensworth Area newsletters: These were prepared twice during 2020 and circulated to disseminate information on Glencore operations in the area, including Integra Underground.

9.2 Community Consultative Committee

The Integra Underground and Mount Owen Glendell Operations CCC comprise of:

- Community members;
- Representative of Singleton Council; and
- Representatives from Mount Owen Glendell Operations and Integra Underground.

Two CCC meetings were held during the reporting period:

- April 2020; and
- October 2020.

These meetings provided updates on operations, including subsidence management, environmental monitoring results, community complaints, environmental incidents, summaries of rehabilitation activities, and mine closure planning. CCC meeting minutes are available on the Integra Underground website.

9.3 Community Contributions, Donations and Sponsorship

Integra Underground is committed to supporting the local community in which it operates. To reflect this commitment, Integra Underground supported the following community initiatives, making donations to the total value of \$12,925 in 2020:

- NSW Fire and Rescue Singleton – community educational trailer (refer **Photo 9-1**); and
- Singleton neighbourhood centre – donation of food and drinks (refer **Photo 9-2**) and Christmas hams (refer **Photo 9-3**).



Photo 9-1 – Donation of Community Educational Trailer to NSW Fire and Rescue, Singleton



Photo 9-2 – Donation of Food and Drinks to Singleton Neighbourhood Centre



Photo 9-3 – Donation of Christmas Hams

9.4 Community Complaints

No community complaints were received during the 2020 reporting period. Historic community complaints related to PA 08_0101 underground operations for the past ten years are presented in **Table 9-1**.

Table 9-1 – Community Complaints History

Year	Nature of Complaint					Total
	Traffic	Noise	Lighting	Dust	Land Access	
2020	-	-	-	-	-	0
2019	1	-	-	-	-	1
2018	-	-	-	-	-	0
2017	-	-	-	-	-	0
2016	-	-	-	-	-	0
2015	-	-	-	-	-	0
2014	-	-	-	-	-	0
2013	-	-	-	-	-	0
2012	-	-	-	-	-	0
2011	-	1	-	1	-	2

As shown in **Table 9-1**, Integra Underground receives little to no complaints, with only three complaints being received in the past ten years. Therefore, no trends in the subject, timing or location of complaints are observable.

It should be noted that HVCC purchased Integra Underground in December 2015 and the mine was managed by other mine operators in the previous years.

10. Independent Audit

In accordance with Condition 12 of Schedule 5 of PA 08_0101, an Independent Environmental Audit was undertaken in 2020. The audit team was comprised of suitably qualified, experienced and independent experts from AECOM Australia Pty Ltd whose appointment had been endorsed by DPIE. The audit period was from 29 November 2017 to 3 December 2020 and a site inspection was undertaken from 1 to 3 December 2020.

The audit identified 9 non-compliances against PA 08_0101 and EPL 3390 (refer **Appendix C, Table C-1**) and 29 opportunities for improvement (refer **Appendix C, Table C-2**). Integra Underground will submit the audit report and a response to the recommendations (in the form of an action plan) to DPIE in 2021 in accordance with Condition 13 Schedule 5 of PA 08_0101. Integra Underground will discuss progress made in implementing the action plan in the 2021 Annual Review.

The next Independent Environmental Audit is scheduled for 2023 in accordance with Condition 12 of Schedule 5 of PA 08_0101.

11. Incidents and Non-Compliances

During the reporting period, two administrative non-compliances were identified, as listed below:

- One round of depositional dust monitoring samples (collected 6 January 2020) were not collected within the specified timeframe (30 days +/- 2 days) as required under Schedule 3 Condition 15 of PA01_0101 (refer **Section 6.2.4**); and
- The noise monitoring reports provided by Umwelt did not include the name of the person who collected the sample, as required by condition M1.3 of EPL 3390 (refer **Section 6.3.3**)

Additionally, Jacobs completed a full review of the 2020 Air Quality Monitoring Data (2021) which in summary concluded that HV Coking Coal Pty Limited was in compliance with its Project Approval in terms of total PM₁₀ and TSP impacts, and total and incremental dust deposition impacts at all reportable monitoring sites for data collected in 2020. Refer to **Section 6.2** for further details on Air Quality.

12. Activities to be Completed in the Next Reporting Period

The activities listed in **Table 12-1** will be completed in 2021.

Table 12-1 – Proposed Activities in 2021

Topic	Proposed Activities	By When
Longwall mining	Undertake longwall development within the Middle Liddell seam using continuous miners for future longwall panels, and longwall mining within the Middle Liddell seam in Longwalls 16, 17 and 18.	2021
Operational disturbance	Installation of gas well infrastructure for Longwalls 17 and 18.	2021
Rehabilitation	Progressive rehabilitation of gas drainage infrastructure.	2021
Management Plans	Extraction Plan approval by DPIE.	2021
	Preparation of new MOP to reflect mine closure.	2021

13. References

- AGE Consultants (2017) *Integra Underground Groundwater Impact Assessment*.
- ANZECC (2010) Australian and New Zealand Environment and Conservation Council Water Quality Guidelines.
- Bridges (2017) Integra Longwall Extension Modification – Acoustics.
- EMM (2012) Integra Mine Complex Modification 2 Environmental Assessment.
- Enright Land Management (2021) 2020 Completed Weed Works Report.
- Cumberland Ecology (2017) Integra Underground. Longwall Extension Modification Ecological Impact Assessment.
- Geoterra (2021a) Discussion on Surface Water TARP Trigger Exceedance at Integra Underground.
- Geoterra (2021b) Discussion on Groundwater TARP Trigger Exceedance at Integra Underground.
- Integra (2019) Longwalls 15 and 16 Public Safety Management Plan.
- Jacobs (2021) Review of 2020 Air Quality Monitoring Data
- NSW Government (2015) Post Approval Requirements for State Significant Mining Developments – Annual Review Guideline.
- OEH (2014) BioBanking Assessment Methodology 2014. State of NSW and Office of Environment and Heritage, Sydney.
- OzArk EHM (2017) Aboriginal and Historic Heritage Impact Assessment, Longwall Extension Modification, Integra Underground Mine, Singleton LGA.
- OzArk EHM (2018) Aboriginal Due Diligence Archaeological Assessment, Additional Disturbance Areas for 66 kV Power Line and Access Road Construction, Integra Underground Mine, Singleton LGA.
- OzArk EHM (2019) Aboriginal Due Diligence Archaeological Assessment, Potential Impacts Associated with Coal Extraction from Longwall 15, Integra Underground Mine, Singleton LGA.
- OzArk EHM (2020) Aboriginal Cultural Heritage Monitoring Report, Mount Owen Glendell Operations Integra Underground.
- SCT (2018) Integra Underground Mine: Subsidence Assessment for LW15 and LW16 Extraction Plan.
- SCT (2020) Integra Underground Mine: Six Monthly Subsidence Report for Longwall 15.
- SCT (2020) Integra Underground Mine: End of Panel Report for Longwall 15.
- SLR (2018) Mining Operations Plan, Integra Underground, November 2018 – December 2023.
- SLR (2019) Integra Underground Mine Biodiversity Review - LW 15 to 20.
- SLR (2020) Integra Underground Longwalls 13-14 Biodiversity Monitoring 2020
- Umwelt (2018) Heritage Assessment of Two Buildings Proposed for Removal, Integra Underground Pit Top Area, Glennies Creek.
- Umwelt (2021) Integra Underground 2020 Annual Rehabilitation Monitoring Report.

Appendix A - TEOM Exceedances

Date Sampled	Sample Site	PM ₁₀ Result (µg/m ³)	Exceedance Report Summary*
01/01/2020	TEOM 3	61.3	Not attributable to Integra Underground operations based on predominant wind direction (SE) and minimal operations being undertaken on the day.
	TEOM 4	83.2	
02/01/2020	TEOM 4	55.0	Not attributable to Integra Underground operations based on predominant wind direction (SE) and minimal operations being undertaken on the day.
04/01/2020	TEOM 4	52.6	Not attributable to Integra Underground operations based on predominant wind direction (SW) and minimal operations being undertaken on the day.
05/01/2020	TEOM 3	86.9	Not attributable to Integra Underground operations based on predominant wind direction (SSE) and minimal operations being undertaken on the day.
	TEOM 4	100.7	
08/01/2020	TEOM 3	60.8	Not attributable to Integra Underground operations based on predominant wind direction (SE) and minimal operations being undertaken on the day.
	TEOM 4	76.9	
11/01/2020	TEOM 3	59.0	Not attributable to Integra Underground operations based on predominant wind direction (SE) and minimal operations being undertaken on the day.
	TEOM 4	61.7	
12/01/2020	TEOM 4	54.5	Not attributable to Integra Underground operations based on predominant wind direction (SE) and minimal operations being undertaken on the day.
21/01/2020	TEOM 3	65.0	Not attributable to Integra Underground operations based on predominant wind direction (WSW) and minimal operations being undertaken on the day.
	TEOM 4	65.8	
23/01/2020	TEOM 2	58.5	Not attributable to Integra Underground operations based on predominant wind direction (NW) and minimal operations being undertaken on the day.
	TEOM 3	82.2	
	TEOM 4	93.2	
24/01/2020	TEOM 4	57.6	Not attributable to Integra Underground operations based on predominant wind direction (NW) and minimal operations being undertaken on the day.
01/02/2020	TEOM 4	53.8	Not attributable to Integra Underground operations based on predominant wind direction (NW) and minimal operations being undertaken on the day.
02/02/2020	TEOM 4	68.6	Not attributable to Integra Underground operations based on predominant wind direction (WSW) and minimal operations being undertaken on the day.
19/02/2020	TEOM 3	56.5	Not attributable to Integra Underground operations based on predominant wind direction (NW) and minimal operations being undertaken on the day.
	TEOM 4	53.9	
20/03/2020	TEOM 4	56.3	Not attributable to Integra Underground operations based on predominant wind direction (NNE) and minimal operations being undertaken on the day.

Date Sampled	Sample Site	PM ₁₀ Result (µg/m ³)	Exceedance Report Summary*
26/04/2020	TEOM 4	58.4	Not attributable to Integra Underground operations based on predominant wind direction (NNW) and minimal operations being undertaken on the day.
19/08/2020	TEOM 3	58.7	Not attributable to Integra Underground operations based on very minimal dust generating activities being undertaken on the day and the elevated PM ₁₀ result recorded by the UHAQMN.
	TEOM 4	75.0	
29/11/2020	TEOM 3	67.1	Not attributable to Integra Underground operations based on very minimal dust generating activities being undertaken on the day and the elevated PM ₁₀ result recorded by the UHAQMN.
	TEOM 4	95.9	

*PM₁₀ 24 criteria is 50 µg/m³

Appendix B - HVAS Exceedances

Date Sampled	Sample Site	TSP $\mu\text{g}/\text{m}^3$	Exceedance Report Summary *
21/01/2020	TSP2	145.0	Not attributable to Integra Underground due to predominant wind direction, and minimal operations being undertaken on the day.
02/02/2020	TSP2	175.0	Not attributable to Integra Underground due to predominant wind direction, and minimal operations being undertaken on the day.
20/04/2020	TSP2	154.0	Not attributable to Integra Underground due to minimal operations being undertaken on the day.
26/04/2020	TSP2	152.0	Not attributable to Integra Underground due to no surface operations being undertaken on the day.
01/06/2020	TSP2	101.0	Not attributable to Integra Underground due to minimal operations being undertaken on the day and elevated air quality result for the region.
07/06/2020	TSP2	118.0	Not attributable to Integra Underground due to minimal operations being undertaken on the day and the predominant wind direction (north-north-west).
25/06/2020	TSP2	119.0	Not attributable to Integra Underground due to minimal operations being undertaken on the day and elevated air quality result for the region.
01/07/2020	TSP2	127.0	Not attributable to Integra Underground due to minimal operations being undertaken on the day and the predominant wind direction (north-north-west).
19/07/2020	TSP2	132.0	Not attributable to Integra Underground due to minimal Integra Underground operations undertaken and predominant wind direction (east-north-east).
24/08/2020	TSP2	101.0	Not attributable to Integra Underground due to minimal operations being undertaken on the day, and elevated PM ₁₀ levels within the region.
30/08/2020	TSP2	101.0	Not attributable to Integra Underground due to minimal operations being undertaken on the day and elevated PM ₁₀ levels within the region.
23/09/2020	TSP2	123.0	Not attributable to Integra Underground due to minimal operations being undertaken on the day, predominant wind direction (south-west) and elevated PM ₁₀ levels within the region.
17/10/2020	TSP2	104.0	Not attributable to Integra Underground due to minimal operations being undertaken on the day and the predominant wind direction (south).
28/11/2020	TSP2	106.0	Not attributable to Integra Underground due to minimal operations being undertaken on the day and the predominant wind direction (west-south-west).

*TSP Criteria = 90 $\mu\text{g}/\text{m}^3$

Appendix C - Independent Environmental Audit

Table C1 – Non-Compliances

Approval and Condition	Requirement	Independent Audit Finding	Recommendation	Response, Action and Timeframe
PA 08_0101 SCH 3, C3	TERMS OF APPROVAL The Proponent must comply with the: (a) Statement of Commitments; and (b) conditions of this approval. <i>Notes to condition 2 and 3:</i> • Previous EAs for the project are listed in Appendix 2; • The project layout plans are shown in Appendix 3; • The Statement of Commitments is reproduced in Appendix 7; and • This project approval is intended to regulate all existing and approved development on site.	A detailed review of compliance was conducted against Integra UG's Project Approval (PA) 08_0101 and included Statement of Commitments. The results from that review are included in this checklist. Based on the results of the review the auditors concluded the following: • 7 non-compliances were identified against conditions of PA 08_0101. These were in relation to the following: ○ Consultation with Subsidence Advisory New South Wales (SANSW) before constructing a new building on site ○ Consultation with required agencies with regards to updates to management plans ○ Collection of depositional dust samples in accordance with monitoring methods specified in relevant Australian Standards ○ Evidence not provided to validate that ecological survey reports were provided to the Department within the required timeframes ○ Implementation of controls stipulated in Ground Disturbance Permits (GDPs). • No non-compliances were identified against the Statement of Commitments outlined in PA 08_0101.	Recommendation not required, refer to individual non-compliances in this checklist	Response: Specific responses included in other sections of this table. Action: No action required. Specific actions included in other sections of this table. Timeframe: Not applicable

Approval and Condition	Requirement	Independent Audit Finding	Recommendation	Response, Action and Timeframe
		While minimal non-compliances were noted during the 2020 IEA audit period, compliance with Schedule 2, Condition 3 cannot be stated as being compliant as non-compliances against the conditions of PA 08_0101 were identified. Therefore, this condition must be found not compliant.		
PA 08_0101 SCH2 C11	The Proponent must ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the BCA and SANSW. <i>Notes:</i> • Under Part 4A of the EP&A Act, the Proponent is required to obtain construction and occupation certificates for the proposed building works; • Part 8 of the EP&A Regulation sets out the requirements for the certification of the project; and • The project is located in the Patrick Plains Mine Subsidence District. Under Section 15 of the Mine Subsidence Compensation Act 1961, the Proponent is required to obtain the SANSW's approval before constructing or relocating any improvements on site.	During the audit period (29 November 2017 to 03 December 2020) one new building was constructed. The building is a transportable structure utilised in the administrative/office section of the mine. <u>Compliance with SANSW</u> The auditors sighted a letter from SANSW, dated 30 October 2020, advising that Integra UG's construction of the additional building was exempt from requiring approval from SANSW under Sections 21, 22 and 23 of Part 3 of the <i>Mine Subsidence Compensation Act 1961</i>. Integra UG commenced consultation with SANSW after construction of the new building was completed. Notes provided under Schedule 2, Condition 11 of PA 08_0101 requires that SANSW's approval be obtained before constructing or relocating any improvements on site. As exemption from the SANSW was received in 2020, post construction, this condition is not compliant.	Recommendation not required	Response: Noted Action: No action required Timeframe: Not applicable

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PA 08_0101 SCH3 C9a	Noise Management Plan This plan must: (a) be prepared in consultation with the EPA, and then submitted to the Secretary for approval;	While evidence of previous consultation requests being submitted to the EPA was provided to the auditors, no evidence of consultation with the EPA when the NMP was updated in 2019 was provided. This condition is therefore found to be not compliant.	IEA REC 01 – It is recommended that Integra UG confirm that a request for consultation was sent to the EPA with regards to the latest update of the NMP. Evidence of consultation should be provided in the NMP, as has been Integra UG's practice in the past.	Response: Integra UG is unable to confirm that consultation was undertaken with the EPA for the NMP in 2019. Action: Provide approved Noise Management Plan to EPA and seek any comments the EPA may have. In the event that comments are provided, consider these and review the NMP if necessary. Timeframe: 30 June 2021
PA 08_0101 SCH3 C15	Air Quality & Greenhouse Gas Management Plan The Proponent must prepare an Air Quality & Greenhouse Gas Management Plan for the project to the satisfaction of the Secretary. The Proponent must implement the approved management plan as approved from time to time by the Secretary.	Based on the evidence reviewed the AQGGMP was considered to have been adequately implemented at the time of the audit with the exception of collection of deposited dust samples not occurring in accordance with AS/NZS 3580.10.1:2016, as stipulated in Table 4-1 of the AQGGMP. Details of the incident are outlined below: CMO Incident Ref 2020011614.1, dated 16 January 2020: This incident was in relation to Carbon Based failing to pick up the deposited dust samples in December within the required 30days +/- 2days. The AQGGMP requires sampling of Deposited Dust to be in accordance with AS/NZS 3580.10.1:2016 Methods for Sampling and Analysis of	Recommendation not required	Response: Noted Action: No action required Timeframe: Not applicable

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		Ambient Air, Determination of Particulates—Deposited Matter—Gravimetric method. As monitoring of deposited dust was one day outside of the limits specified in AS/NZS 3580.10.1:2016 and this is the selected methodology specified in the AQGGMP this is found to be a non-compliance with regards to the implementation of the AQGGMP. No recommendation is required to be applied.		
PA 08_0101 SCH3 C15a	Air Quality Greenhouse Gas Management Plan (a) be prepared in consultation with EPA, and then submitted to the Secretary for approval;	While evidence of previous consultation requests being submitted to the EPA was provided to the auditors no evidence of consultation occurring with the EPA when the AQGGMP was updated in 2019 was provided. As such this condition is found to be not compliant. Evidence of submission to the Secretary is detailed against schedule 3, condition C9.	IEA REC 02 – It is recommended that Integra UG confirm that a request for consultation was sent to the EPA with regards to the latest update of the AQGGMP. Evidence of consultation should be provided in the AQGGMP, as has been Integra UG's practice in the past.	Response: Integra UG is unable to confirm that consultation was undertaken with the EPA for the AQGGMP in 2019. Action: Provide approved Air Quality & GHG Management Plan to EPA and seek any comments the EPA may have. In the event that comments are provided, consider these and review the AQGGMP if necessary. Timeframe: 30 June 2021
PA 08_0101 SCH3 C29	Mount Owen Bettys Creek Diversion The Proponent must: (a) commission a suitably qualified and independent	Requirements for this condition include the following: Survey to be conducted within 6 months of completing LW13 (by 10 February 2019). Survey was conducted in October 2018, however evidence of this being submitted to the Department within the required timeframe was not	IEA REC 03: Integra UG to ensure that survey reports are provided to the Department in accordance with Schedule 3, Condition	Response: Noted Action: No action required Timeframe:

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	expert, whose appointment has been approved by the Secretary, to carry out a detailed survey of geotechnical, geomorphic and ecological baseline condition of the Mount Owen Bettys Creek Diversions: • prior to carrying out any second workings under the creek diversions; and • within 6 months of completing the second workings under these creek diversions; and (b) provide a copy of these surveys to the Department within a month of the completion of each survey.	provided. • Survey to be completed prior to commencing LW14 on 07 September 2018. Survey completed prior to commencing LW14 on 07 September 2018. Survey was conducted in May 2018, however evidence of this survey being submitted to the Department within the required timeframe was not provided. • Survey conducted within 6 months of completing LW14 (by 17 February 2020); Survey conducted in June 2020. This survey was provided to the Department on 03 July 2020. On 01 May 2020 Integra UG sought endorsement for SLR to be appointed as experts to conduct the required stream surveys. The Department responded on 20 May 2020 and approved the appointment of the experts. On the basis that the evidence provided did not validate compliance with Schedule 3, Condition 29 this condition is found to be not compliant.	29.	Not applicable
PA 08_0101 SCH3 C41	Exploration Activities and Minor Surface Infrastructure Management Plan The Proponent must prepare an Exploration Activities and Minor Surface Infrastructure Management Plan for the project to the satisfaction of the Secretary. The Proponent must implement the approved management plan as approved from time to time by the Secretary.	A review of incidents recorded in Integra UG's internal database CMO during the audit period was conducted by the auditors. Four internal incidents were recorded which related to non-compliances with environmental management controls identified in relevant GDPs. It is noted that in all instances the disturbance occurred within the disturbance footprint of Integra UG but were outside the GDP boundary areas authorised by Integra UG's E&C department. It is also noted that a total number of 72 GDPs were processed during the audit period. While it has been found that the internal incidents resulted in vegetation clearing in excess of that approved under the authorised GDPs, the auditors note that Integra UG's GDP	Recommendation not required	Response: Noted Action: No action required Timeframe: Not applicable

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		process is a well-established management measure which allows identification of risks to the environment and ensures impacts to areas outside the mine disturbance footprint are avoided. In assessing compliance with the implementation of the EAMSIMP the auditors must review the management measures outlined in the plan and validate if they are being effectively implemented during the audit period. A primary control to ensure compliance with the objectives of the plan is the implementation of Integra UG's GDP process. While these incidents are not deemed to be reportable incidents under the definition of an incident in the PA 08_0101, they show a minor lack of implementation of controls outlined in the EAMSIMP. Therefore, a non-compliance has been identified. The auditors note that following each incident actions were made to address the root cause of each incident. This included improving communication with contractors regarding the GDP process. It is noted that reporting of internal non-conformances is an essential method of ensuring continual improvement. Therefore, while these incidents should be avoided, it is important that non-conformances of this nature continue to be reported in Integra UG's internal incident management system. While a non-compliance has been identified the auditors believe, based on evidence reviewed, that Integra UGs actions are adequate at addressing the cause and preventing reoccurrences of this nature. Therefore, no recommendation has been applied for this non-compliance.		

Approval and Condition	Requirement	Independent Audit Finding	Recommendation	Response, Action and Timeframe
EPL 3390 O2.4	The licensee must prepare a sewage treatment system maintenance program. The program must include: a) Certification from the system provider that the sewage treatment system is operating within its capacity; b) Date, time and results of all routine maintenance procedures undertaken to the sewage treatment system; and c) Provide written records of each quarterly inspection.	Integra UG submit the sewage treatment quarterly maintenance reports along with the Annual Returns to the EPA each year. The maintenance reports do not record the time that maintenance procedures were carried out. From November 2019 onwards, the time has been written onto the maintenance reports, however prior to this the date time was not recorded. This finding has triggered a non-compliance of Condition O2.4 of EPL 3390 however as Integra Underground were capturing the time on the maintenance records since November 2019 no recommendation is required.	Recommendation not required	Response: Noted Action: No action required Timeframe: Not applicable
EPL 3390 M1.3	The following records must be kept in respect of any samples required to be collected for the purposes of this licence: a) the date(s) on which the sample was taken; b) the time(s) at which the sample was collected; c) the point at which the sample was taken; and d) the name of the person who collected the sample.	Noise monitoring reports provided by Umwelt provide the following information: - Time in which monitoring occurred - Date in which monitoring occurred - Location in which monitoring occurred The name of the person who collected the sample is not referenced in the monitoring report.	IEA REC 04: Integra UG to ensure that the name of the person who undertook noise monitoring in accordance with the EPL is recorded and can be produced to validate compliance with Condition M1.3 of EPL 3390.	Response: Attended noise monitoring is undertaken and reported in accordance with EPL 3390. Action: Include the name of the person who undertook noise monitoring in attended noise monitoring reports by communicating this requirement to the noise consultant. Timeframe: March 2021

Table C-2: Opportunities for Improvement

Approval & Condition	Context	Opportunity for Improvement	Response, Action and Timeframe
PA 08_0101 SCH3 C9	Section 3.2.1 of the NMP indicates that sound power testing will be conducted on all plant and equipment.	It is suggested that Section 3.2.1 of the NMP be amended so that the commitment for sound power testing is applicable to surface equipment and infrastructure only	Response: The NMP will be reviewed, and if necessary revised, in accordance with Schedule 5 Condition 6 of PA 08_0101. Action: Revise the Noise Management Plan to clarify that the commitment for sound power testing is applicable to surface equipment and infrastructure only. Timeframe: December 2021
	The locations for NAG 1 and NAG 7 are not outlined on Figure 2 of the NMP, however these NAGs are monitored as part of the attended noise monitoring conducted by Umwelt during the audit period. Umwelt summarise the location of each attended noise monitoring location in the environmental noise monitoring reports. There is therefore a slight inconsistency between the monitoring locations specified in the NMP and those included in the attended noise monitoring. However, as there appear to be more monitoring locations than those outlined in the NMP, this does not constitute a non-compliance.	Ensure the attended noise monitoring locations outlined in the NMP are reflective of the locations being monitored and reported in the quarterly environmental noise monitoring reports. Appendix A, Figure 2.1 of the environmental noise monitoring reports should be consistent with Figure 2 of the NMP.	Response: Attended noise monitoring is undertaken at the locations in the approved Noise Management Plan. The additional locations are not required by PA 08_0101. Therefore, these locations are not required to be included in the NMP. Action: Review figures in the attended noise monitoring reports to clearly indicate which locations are required by PA 08_0101 and the approved NMP. Timeframe: June 2021

Approval & Condition	Context	Opportunity for Improvement	Response, Action and Timeframe
	The noise monitoring summary provided in Section 6.3 of the Integra UG Annual Review does not clearly outline that monitoring is conducted at representative locations only or that this approach had been approved by the Department.	It is suggested the annual review outline that the Department has approved Integra UG conduct attended monitoring at representative locations.	Response: Noise monitoring information and results has been included in previous Annual Reviews. This has been done in a manner consistent with the approved Noise Management Plan. Action: Include further description in the 2021 Annual Review that attended noise monitoring is conducted at representative locations. Timeframe: March 2021
PA 08_0101 SCH3 C9c-d	Table 1-1 of the NMP maps the project approval condition requirements with the relevant section of the NMP where this requirement is addressed. Some inconsistencies with the references made in the table and the information provided in the sections referenced was identified.	It is suggested that Table 1-1 of the NMP be updated to better reflect where the project approval requirements of the NMP are outlined in the plan.	Response: The Noise Management Plan was revised and submitted to DPIE in 2020 and approved by DPIE in 2021. This revision included amendments to Table 1-1 to accurately refer to relevant sections of this NMP. Action: Nil Timeframe: Complete

Approval & Condition	Context	Opportunity for Improvement	Response, Action and Timeframe
PA 08_0101 SCH3 C11	The auditors identified that Table 38 of the Annual Review presented much higher emissions figures being vented compared to those being flared. For example, in 2019 the Annual Review states that 485,972 t CO ₂ -e of vented emissions and only 79,739 t CO ₂ -e of flared emissions were recorded. Integra UG commented that this was an administrative error reported in the 2017, 2018 and 2019 Annual Reviews and will be rectified in the 2020 Annual Review.	It is recommended Integra UG review the greenhouse gas data presented in the Annual Reviews to ensure accurate quantities of flared and vented emissions are reported.	Response: Some greenhouse gas values reported in previous Annual Reviews are slightly different to those reported within NGERS due to calendar data being reported, rather than finalised financial year data. Action: Report greenhouse gas data in Annual Reviews using financial year data. Review data previously reported in Annual Reviews and, if errors are identified, amend any historical data in the 2020 Annual Review. Timeframe: March 2021
PA 08_0101 SCH3 C12	The data collected during days classified as extraordinary events was removed from Integra's annual data set resulting in the rolling annual averages being below the criteria specified in Table 9 of PA 08_0101. As a result, the rolling annual average total suspended particulates (TSP) reported in the in the air quality monitoring reports was higher than the rolling annual average for TSP reported in the 2019 Annual Review.	It is recommended that the Annual Reviews more clearly outline where data has been removed from the rolling annual averages presented in the Annual Reviews. This ensures a clear link between the air quality monitoring data and the summaries provided in the Annual Review.	Response: The air quality data reported in monitoring reports published to the public website during the year do not consider extraordinary events. This is due to the acceptance of extraordinary events only being sought from DPIE at the end of each year. In contrast, the Annual Reviews consider extraordinary events. Action: Include information about extraordinary events in Annual Reviews and clearly state where data has been removed as a result of these events. Timeframe: March 2021

Approval & Condition	Context	Opportunity for Improvement	Response, Action and Timeframe
PA 08_0101 SCH3 C14a	Management and contingency measures are triggered by visual monitoring and alerts from the real time operational monitoring and forecast systems as outlined in the Dust Management TARP. The AQGGMP does not make reference to the dust TARP.	It is suggested that the AQGGMP makes reference to the internal dust TARP.	Response: The approved Air Quality and Greenhouse Gas Management Plan includes management and contingency measures in accordance with the requirements of PA 08_0101. As part of Integra Underground's Environmental Management System, an Air Quality TARP is implemented in addition to the AQGGMP. Action: No action required Timeframe: Not applicable
PA 08_0101 SCH3 C15d-e	Table 1-1 of the AQGGMP maps the project approval condition requirements with the relevant section of the AQGGMP where this requirement is addressed. Some inconsistencies with the references made in the table and the information provided in the sections referenced was identified.	It is suggested that Table 1-1 of the AQGGMP be updated to better reflect where the project approval requirements of the AQGGMP are outlined in the plan.	Response: The Air Quality and Greenhouse Gas Management Plan was revised and submitted to DPIE in 2020. This revision included amendments to Table 1-1 to accurately refer to relevant sections of this AQGGMP. Action: Nil Timeframe: Complete

Approval & Condition	Context	Opportunity for Improvement	Response, Action and Timeframe
PA 08_0101 SCH3 C30	The workshop area contained an outside storage area for hydrocarbons including oils and greases. The bund was uncovered and had a considerable amount of sludge built up on the floor of the bund. The condition sighted at the time of the audit may impact the storage capacity of the bund. Outside the concrete kerb / bund containing spills and runoff to the sump is situated another grated inlet pit. Hydrocarbon staining was observed both outside the concrete bund and around the surface of the oil water separator. In close proximity to this system is a well vegetated and stable clean water channel, separated by a ~400mm high earth bund. Visually, no hydrocarbon staining or other evidence of spills / discharge to the clean water drain was evident.	Review the operation and capacity of the oil water separator at the workshop to manage rainfall and spill events in accordance with relevant EPA guidelines and standards. Implement any identified actions or controls accordingly.	Response: The oil water separator is maintained as part of the mine's maintenance, water and waste management systems. The bund capacity or operation is not compromised by the minor sludge present during the audit site inspection. This area is regularly inspected and maintained. Action: Review the operation and capacity of the oil water separator at the workshop to manage rainfall and spill events in accordance with relevant EPA guidelines and standards. Timeframe: December 2021
PA 08_0101 SCH3	hydrocarbon staining or other evidence of spills / discharge to the clean water drain was evident.	Update the WMP to specifically describe the operation, inspection and management regime of stormwater, chemical containment and oily water separators.	Response: The Water Management Plan meets the requirements of PA 08_0101. The more suitable system documents to include a description of the operation, inspection and management regime of storm water, chemical containment and oily water separators would be the Waste Management Plan and/or Hydrocarbon Management Plan. Action: Revise the Waste Management Plan and/or Hydrocarbon Management Plan to describe the operation, inspection and management regime of storm water, chemical containment and oily water separators. Timeframe: December 2021

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PA 08_0101 SCH3	Annual Reviews in 2018 and 2019 note poor condition of Mount Owen's Middle Bettys Creek diversion, including rill erosion and nearby cracking. Whilst the cracking and erosion issues noted have not been attributable to Integra UG operations, there is opportunity to update the WMP to remove ambiguity in how channel stability and erosion is identified in the WMP.	Update the WMP to remove ambiguity in how channel stability and erosion is identified in the WMP (for example, how is rill erosion or channel stability attributed to LW operations or otherwise). It is recommended the WMP include quantifiable triggers (i.e., define 'significant'), and details how actions are then communicated and jointly managed between Mount Owen and Integra UG.	Response: The second workings under the Bettys Creek diversion are complete. Integra Underground will provide a copy of the most recent monitoring report to Mount Owen Glendell Operations. Action: No action required Timeframe: Not applicable
PA 08_0101 SCH3 C31	The Pollution Incident Response Management Plan does not clearly outline the handling, storage and incident response for storage of chemicals at Ventilation Shaft 3	Update Pollution Incident Response Management Plan to document the handling, storage and incident response for storage of chemicals at Ventilation Shaft 3 (i.e. Solcenic Emulsion).	Response: The Pollution Incident Response Management Plan was revised in 2020. The PIRMP includes environmental hazards related to spills resulting in land contamination. Solcenic emulsion is stored in bunded areas onsite and is a solution comprised of approximately 98% water and 2% hydrocarbon. In the event of a spill, this substance would be contained onsite. Action: No action required Timeframe: Not applicable

Approval & Condition	Context	Opportunity for Improvement	Response, Action and Timeframe
PA 08_0101 SCH3 C32B	A summary of rehabilitation status for gas well rehabilitation sites is provided in the Annual Review, however the Annual Review does not include a summary of the status of rehabilitation in the woodland rehabilitation areas or the creek crossings which relate specifically to the construction conducted as part of modification 7.	It is suggested that the Annual Review report on the status of all rehabilitation conducted across Integra Underground in particular rehabilitation of woodland rehabilitation areas and creek crossing rehabilitation.	Response: The 2019 Annual Review included a description of rehabilitation areas, which included woodland rehabilitation areas and creek crossing rehabilitation. However, the monitoring results in these areas were not specifically included. These areas are included in the rehabilitation monitoring program and will be reported on in the Annual Review. Action: Report on the status of all rehabilitation areas in the Annual Review, in particular rehabilitation of woodland rehabilitation areas and creek crossing rehabilitation. Timeframe: March 2021
PA 08_0101 SCH3 C33	Section 4.2 of the AHMP indicates that the management of fencing and signage in the Bettys Creek habitat Management Area may fall to Integra UG when in fact this is the responsibility of Mount Owen.	It is suggested that during the plans next revision the wording in paragraph 1 of Section 4.2 of the Aboriginal Heritage Management Plan be updated to reflect that management of fencing and signage in the Bettys Creek Habitat Management Area is the responsibility of Mount Owen.	Response: The Bettys Creek Habitat Management Area is fenced and sign posted by Mount Owen Glendell Operations. This amendment will be made to the AHMP as part of a future scheduled revision. Action: Revise the Aboriginal Heritage Management Plan to clarify that the management of fencing and signage in the Bettys Creek Habitat Management Area is the responsibility of Mount Owen. Timeframe: June 2022

Approval & Condition	Context	Opportunity for Improvement	Response, Action and Timeframe
PA 08_0101 SCH3 C33	The status of archaeological sites which were destroyed in the 2017 audit period by the previous mine operator has not been updated in the AHMP	It is suggested that: a) AHIMS is reviewed to confirm the status of these sites has been updated; and, b) The status of the archaeological sites which were destroyed by the previous operator be updated in the AHMP	Response: Integra UG previously notified OEH of the status of the two AHIMS sites and updated the AHMP to include the requirement to notify the OEH with respect to incidents relating to Aboriginal heritage. These status of these sites in the AHIMS register may have been updated since the Aboriginal Heritage Management Plan was last revised. Action: Confirm the status of two site have been updated on the AHIMS register. If the statuses are not consistent with the AHMP, revise the AHMP to reflect the AHIMS register. Timeframe: June 2022
PA 08_0101 SCH3 C34	Evidence was not provided to verify if visual amenity and lighting on site was to the satisfaction of the Secretary, as required by Schedule 3, Condition 34.	It is recommended a summary of lighting and visual impacts is made in the annual review each year. To ensure visual amenity and lighting on site at Integra UG is to the satisfaction of the Department	Response: The Annual Review could include information about the management of lighting and visual amenity. It already considers any community complaints related to lighting. Action: Include information about the management of lighting and visual amenity in the Annual Review. Timeframe: March 2021

Approval & Condition	Context	Opportunity for Improvement	Response, Action and Timeframe
PA 08_0101 SCH3 C40	A summary of rehabilitation monitoring and reporting is provided in the Annual Reviews. The auditors reviewed the data presented in the 2017, 2018 and 2019 Annual Reviews and notes the following: - In 2017 Table 36 of the Annual Review stated the total disturbance area as 3.2 (ha) indicating that this was the total disturbance area for the year and not the cumulative disturbance area of the site (which was reported in Table 35). - In 2018 and 2019 the same table (now Table 38 of the Annual Review reported the total disturbance area to be 95.66 ha and 109.1 ha respectively. Discussion with Integra UG indicated that these figures were reporting the cumulative disturbance area opposed to the disturbance area for the year. The 2018 and 2019 Annual Reviews do not specify the annual disturbance area. It is noted that the cumulative disturbance area is already being reporting in Table 46 of the Annual Reviews and the current presentation of data makes it difficult to compare annual disturbance predictions made in the MOP (which are provided in Table 47) to actual annual figures.	It is recommended the Annual Review clearly outlines the total land disturbed each year. Alternatively, Table 38 of the Annual Reviews should clearly outline that the Total Disturbance Area is a cumulative figure.	Response: The Annual Reviews include land disturbance information and data. Notwithstanding, this information and data could be presented more clearly. Action: Include information in Table 38 of the Annual Review to clearly outline that the Total Disturbance Area is a cumulative figure. Timeframe: March 2021

Approval & Condition	Context	Opportunity for Improvement	Response, Action and Timeframe
PA 08_0101 SCH3 C41d	Table 1-1- of the EAMSIMP outlines the project approval conditions and where they addressed in the plan. The table states that rehabilitation of disturbed areas is covered in section 4.3 of the EAMSIMP however this section related to the objectives and performance indicators for the plan. Instead rehabilitation management is outlined in Section 4.2 of the EAMSIMP.	It is suggested that Table 1-1 be updated in the next revision of the plan to accurately reflect where rehabilitation management is covered in the plan.	Response: This amendment will be made to the EAMSIMP as part of a future scheduled revision. Action: Revise the Exploration Activities and Minor Surface Infrastructure Management Plan to amend Table 1-1 to accurately reflect where rehabilitation management is covered in this Plan. Timeframe: June 2022
PA 08_0101 SOC 209	The Surface Water Impact Assessment for Integra Underground Mine Longwall Extension Modification (Modification 8) identified that Subsidence may lead to indirect impacts on Bettys Creek channel and floodplain. It is noted that the rainfall inspection form prompts monitoring of any notable changes to Glennies Creek Flood Plain and Channel and to Mains Creek Flood Plain and Channel. The form does not include prompts to monitor changes to Bettys Creek Flood Plain and Channel.	It is recommended that the rainfall inspection form be updated to prompt monitoring of any notable changes to Bettys Creek Flood Plain and Channel	Response: The Bettys Creek floodplain and channel is monitored in accordance with the Water Management Plan (e.g. stream health and channel stability monitoring). Action: Nil Timeframe: Not applicable
EPL M2.2	The requirement for Ambient water quality monitoring was added to EPL 3390 in May 2020 following a licence variation issued by the EPA on 26 May 2020. Quarterly monitoring records show monitoring of pollutants is conducted in accordance with Condition M2.2. The sampling method is not outlined on the water quality monitoring results summary.	It is recommended the sampling method is documented on the effluent and water monitoring results summary	Response: The sampling method is not required to be documented in the online reporting of EPL monitoring data. Action: No action required Timeframe: Not applicable

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	It is noted that water quality results are summarised in the Integra UG Quarterly Environmental Monitoring Reports. Ambient water quality monitoring results at all required EPL points is not summarised in these reports. Reference is made to Monitoring Points 8, 9 and 10 only (GC1, GC2 and GC3 respectively) despite all EPL monitoring points being referenced in the WMP. Discussion with Integra UG E&C Manager outlined that the monitoring points not outlined in the Integra UG quarterly environmental monitoring reports were excluded as these monitoring point locations were dry or too low to allow samples to be taken. Integra UG noted that the environmental monitoring reports could be updated to reflect sampling points where samples could not be taken.	It is recommended that the Integra UG Quarterly Environmental Monitoring Reports include a summary of all EPL monitoring points. Where samples cannot be taken due to low water levels this should be outlined in the reports.	Response: During 2020, the monitoring reports published to the public website did not include monitoring locations that were dry and therefore unable to be sampled for water quality. These monitoring reports have been amended to include a note that these monitoring locations were dry at time of sampling. Action: Amended monitoring reports on public website to include a note that water quality monitoring points were dry at time of sampling. Timeframe: Complete
Extraction Plan LW 13-14	The names and location of Subsidence monitoring lines referenced in the plan is not consistent with those referenced in monitoring reports. This includes reference to the PH line and R line.	It is suggested that the survey lines referenced in the Integra UG EP LW13-14 Subsidence Monitoring Program be consistent with those being monitored. Reference should be made to the R Line and PH Line in the Subsidence Monitoring Program.	Response: Longwall mining in LW13-14 has been completed. Therefore, a revision of this document is not necessary. Action: No action required Timeframe: Not applicable

Approval & Condition	Context	Opportunity for Improvement	Response, Action and Timeframe
	The Integra UG LW13-14 EP document was last reviewed on 11 August 2017 and was due for review on 11 August 2020.	Ensure the Integra UG LW13-14 EP is reviewed in accordance with the specified review date on the plan.	Response: The review date on the Extraction Plan for LW13-14 is a date automatically generated by an internal system. The Extraction Plan is reviewed in accordance with PA 08_0101 and commitments made within the Extraction Plan. Action: No action required Timeframe: Not applicable
Extraction Plan LWs 15-16	The names and location of Subsidence monitoring line MB15 and R Line are not referenced in the plan however they are referenced in subsidence monitoring reports.	It is suggested that the survey lines referenced in the IUG EP LW15-16 Subsidence Monitoring Program be consistent with those being monitored. Reference should be made to the R Line and MB15 Line in the Subsidence Monitoring Program.	Response: Longwall mining in in LW15-16 is nearing completion. Therefore, a revision of this document is not necessary. Action: No action required Timeframe: Not applicable
Groundwater specialist	The auditor notes that Section 8.1.1 of the WMP states that an investigation into the high salinity observed in the alluvial aquifers (particularly Bettys Creek) will be undertaken in 2017. The WMP should be updated to reflect the results from this assessment, namely the identification of any impacts on surrounding groundwater dependant ecosystems, private groundwater extractors and the salinity values of the Hunter salinity trading scheme.	The WMP should be updated to reflect the results from the investigation into the high salinity observed in the alluvial aquifers conducted in 2017.	Response: This amendment will be made to the Water Management Plan as part of a future scheduled revision. Action: Revise the Water Management Plan to reflect the results from the investigation into the high salinity observed in the alluvial aquifers conducted in 2017. Timeframe: June 2022

Approval & Condition	Context	Opportunity for Improvement	Response, Action and Timeframe
Biodiversity Specialist	It is noted that the BMP does not specify the monitoring sites (including reference sites) which are referenced in the monitoring reports.	It is recommended the BMP makes specific reference to the monitoring sites including reference sites. Locations of sites should be outlined including the monitoring site which was added in 2019 (SG03) and monitoring sites which were relocated (SB01).	Response: This amendment will be made to the Biodiversity Management Plan as part of a future scheduled revision. Action: Revise the Biodiversity Management Plan to make specific reference to the monitoring sites including reference sites. Timeframe: June 2022

Biodiversity Specialist	Integra UG engaged Enright Land Management to conduct weed and pest management services during the audit period. An annual completed weed works report is prepared by Enright which summarises the weed and pest work conducted as part of the ongoing weed control program. While the annual completed weed works reports are considered adequate at detailing the progress of weed management, a number of improvements could be made to the reporting.	While the annual completed weed works reports are considered adequate at detailing the progress of weed management, the following improvements could be made to the reporting: • The location of weed control activities could be better noted within Table 1 for each weed • The months in which weeds were treated should be noted to allow consideration of the effectiveness of weed control effort • For each weed, the report should if the same location(s) have been treated for the same weed species within the past five years. This will allow the effectiveness of control methods to be evaluated and for future control strategies to be better targeted • The success of weed control works for each species, both within the current year and previous years, could be outlined in Table 1 • Mapping: some colours shown on maps are not included in legends, or are difficult to discern. Indication of the month of treatment in the legend would be helpful. • Mapping: A separate map indicating weed treatment priority areas in the coming year would allow better tracking of progress. This should also outline and discuss any areas of new infestations recorded, and their reasons e.g.	Response: Improvements to the annual completed weed works reports can be made. Integra UG has engaged a weed management contractor and will seek for these items to be included in the annual reports. Action: Update Weed Action Plan to include annual completed weed works report and its requirements. Timeframe: June 2021.
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Approval & Condition	Context	Opportunity for Improvement	Response, Action and Timeframe
		disturbance due to specific construction.	
Subsidence Specialist	The extent of LiDAR surveying is not outlined in the Extraction Plans.	It is suggested that the extent of LiDAR is identified on monitoring figures within the extraction plans.	Response: The extent of the LiDAR survey is inclusive of the potential subsidence affectation area. Action: Include the extent of the LiDAR survey in future reporting under the Extraction Plan to clarify monitoring area. Timeframe: June 2021
Subsidence Specialist	Table 4-1 of the IUG EP LW15-16 Subsidence Monitoring Program references Longwall 15 but not Longwall 16.	Update Table 4-1 of the IUG EP LW15-16 Subsidence Monitoring Program to ensure it refers to both Longwall 15 and Longwall 16.	Response: The Subsidence Monitoring Program with the Extraction Plan for LW15-16 is being implemented and LW16 nearing completion. The information relevant to both LW15 and LW16 is included in Table 4-1; however, there are two instances where LW16 has been mistyped as LW15. This has not affected the management of subsidence during LW16. Action: No action required Timeframe: Not applicable

Approval & Condition	Context	Opportunity for Improvement	Response, Action and Timeframe
Previous IEA Recommendation SCH3 C32D		It is recommended that AHIMS is reviewed to confirm the status of these sites has been updated	Response: Integra UG previously notified OEH of the status of the two AHIMS sites and updated the AHMP to include the requirement to notify the OEH with respect to incidents relating to Aboriginal heritage. Action: Confirm the status of two site have been updated on the AHIMS register. If the statuses are not consistent with the AHMP, revise the AHMP to reflect the AHIMS register. Timeframe: June 2022

GLENCORE