

RAVENSWORTH OPERATIONS

GLENCORE



Ravensthworth Complex Annual Review 2024

Name of Operation	Ravensworth Operations
Name of Operator	Ravensworth Operations Pty Limited
Development Consent/ Project Approval #	PA 09_0176 and DA 104/96
Holder of Development Consent/ Project Approval	Ravensworth Operations Pty Limited
Ravensworth Operations Titles/ Mining Leases	ML1325, ML1357, ML1393, ML1484, ML1485, ML1502, ML1576, ML1669, ML1683, - ML1879, CL378, CL380, CL580, CCL723, CCL739, A385
Ravensworth Underground Mine Titles/ Mining Leases	ML1348, ML1349, ML1398, ML1416, ML1477, ML1495, ML1506, ML1564, ML1580, ML1581, ML1591, ML1595, ML1625, ML1667, ML1668, ML1669, ML1868, EL7799
Name of holder of Mining Lease	Ravensworth Operations Pty Ltd (primary authorisation holder), Cumnock No.1 Colliery Pty Limited, Resource Pacific Pty Limited, AGL Macquarie Pty Limited, Glencore Newpac Pty Limited, Cumnock Management Pty Limited.
Water Licence #	WAL #: 9049; 9050; 41496; 41505; 41554; 1046; 1325; 8964; 13102; 10771; 816; 41507; 41530; 41531
Name of holder of Water Licence #	Ravensworth Operations Pty Ltd / Cumnock Management Pty Ltd / Resource Pacific Pty Ltd
RMP previous revision date:	26 July 2024 (Ravensworth Operations) and 19 September 2024 (Ravensworth Underground Mine)
Annual Review start date	1 January 2024
Annual Review end date	31 December 2024
I, Klay Marchant, certify that this audit report is a true and accurate record of the compliance status of Ravensworth Operations for the period 1 January 2024 to 31 December 2024 and that I am authorised to make this statement on behalf of Ravensworth Operations. <i>Notes.</i> a) <i>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> b) <i>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 authorise reporting officer	Klay Marchant
Title of authorise reporting officer	Environment and Community Manager
Signature of authorised reporting officer	
Date	31 March 2025

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Electronic Copy

An electronic copy of the 2024 Annual Review submitted via the NSW Planning Portal to government stakeholders is available electronically online via the Ravensworth Operations website: <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/reporting-documents>

1. Statement of Compliance

A summary of compliance at Ravensworth Complex is provided in **Table 1-1**.

Table 1-1 – Statement of Compliance

Document	Compliant
Approvals	
PA 09_0176 (as modified)	NO
DA 104/96 (as modified)	YES
EPBC 2010_5839	YES
Licences	
EPL 2652	NO
Water Licences	YES
Mining Authorisations	
ML# 1325	YES
ML# 1348	YES
ML# 1349	YES
ML# 1357	YES
ML# 1393	YES
ML# 1398	YES
ML# 1416	YES
ML# 1477	YES
ML# 1484	YES
ML# 1485	YES
ML# 1495	YES
ML# 1502	YES
ML# 1506	YES
ML# 1564	YES
ML# 1576	YES
ML# 1580	YES
ML# 1581	YES
ML# 1591	YES
ML# 1595	YES
ML# 1625	YES
ML# 1667	YES
ML# 1668	YES
ML# 1669	YES
ML# 1683	YES
ML# 1868	NO
ML# 1879	YES

Document	Compliant
CL# 378	YES
CL# 380	YES
CL# 580	YES
CCL# 723	YES
CCL# 739	YES
AUTH385	YES
EL7799	YES

The non-compliances categories are described in **Table 1-2**. A summary of the non-compliances during the reporting period is provided in **Table 1-3** (below). The non-compliances during the reporting period are discussed further in **Section 11**.

Table 1-2 – Statement of Compliance Key

Risk Level	Colour code	Description
High	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless for the likelihood of occurrence
Medium	Non-compliant	Non-compliance with: Potential for serious environmental consequences, but it 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 it is unlikely to occur; or Potential for low environmental consequences, but is likely to occur
Administrative non-compliance	Non-compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)

Table 1-3 – Summary of Non-Compliances

Relevant approval	Condition #	Condition description	Compliance Status	Comment	Where addressed in the Annual Review
PA 09_0176	Schedule 3, Condition 20	Air Quality Criteria: All reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the Ravensworth mine complex do not exceed the criteria listed in Table 10 (short term PM ₁₀ criterion) at any residence on privately-owned land or on more than 25 percent of any privately-owned land.	Low Non-Compliant	PM ₁₀ 24-hour criterion of 50 µg/m ³ was exceeded on three occasions at TEOM SX45-G1 on 26/01/2024, 5/02/2024 and 25/09/2024. PM ₁₀ 24-hour criterion of 50 µg/m ³ was exceeded on two occasions at HVA519 on 2/09/2024 and 7/11/2024. On all occasions the third-party review estimated the contribution from the Ravensworth Complex to be less than the EIS prediction for the monitoring location, indicating that dust mitigation measures were effective in minimising site-related dust emissions.	Section 6.3.2, Section 11 and Appendix E - (Table D.1)
ML1868	s.378D Mining Act 1992	Contravention of condition of authorisation	Administrative Non-Compliant	Clause 19 in Schedule 8A requires the lease holder to Nominate a Contact Person (NCP) with whom the Resources Regulator can communicate with in relation to the mining lease(s) for the purposes of the <i>Mining Act 1992</i> . Resources Pacific Pty Ltd NCP was due 21 December 2023. Recourses Pacific Pty Ltd submitted the NCP on 31 May 2024 which was after the due date.	Section 11
EPL2652	M2.2	Air Monitoring Requirements Continuously monitor PM ₁₀ at Point 9 and 10 (TEOM G1 and G2)	Administrative Non-Compliant	Continuous PM ₁₀ data was not acquired. Invalid or missed samples were caused by routine, non-routine maintenance, and monitoring unit faults.	Section 6.3 and Section 11

2. Introduction

The Ravensworth Complex is located between the townships of Singleton and Muswellbrook, in the Upper Hunter Valley region of New South Wales (NSW) (refer to **Figure 2-1**). The Ravensworth Complex refers to the combined operations and activities of Ravensworth Operations (refer to **Section 2.1**) and Ravensworth Underground Mine (RUM) (refer to **Section 2.1.2**).

This Annual Review covers the reporting period 1 January 2024 to 31 December 2024, encompassing:

- PA 09_0176 (Ravensworth Operations);
- DA 104/96 (RUM);
- Environment Protection Licence (EPL) 2652;
- Various mining leases;
- Associated environmental management plans applicable to the Ravensworth Complex.

The layout of the Ravensworth Complex is shown on

Figure ..., while the Project Approval and mining lease boundaries are shown on

Figure The Annual Review was prepared in accordance with the NSW Department of Planning, Housing and Infrastructure (DPHI) *Annual Review Guideline October 2015*.

2.1 Ravensworth Complex

2.1.1 Ravensworth Operations

Ravensworth Operations is owned and operated by Ravensworth Operations Pty Limited, a wholly owned subsidiary of Glencore Coal Assets Australia (GCAA).

Ravensworth Operations is managed in accordance with the Project Approval (PA 09_0176) for the Ravensworth Operations Project (the Project), which was granted under the former Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) on 11 February 2011. The original development application was supported by the *Ravensworth Operations Project Environmental Assessment* (2010 EA), dated February 2010 (Umwelt, 2010). PA 09_0176 has been modified on four occasions, with the most recent (MOD 4) approved on 15 May 2023. Details of these modifications are outlined in **Section 3.1**.

Ravensworth Open Cut (ROC)

The Project consolidated a number of active and former open cut mines including Ravensworth West, Narama, Cumnock, Ravensworth South and Ravensworth No. 2. The Project also facilitated the expansion of open cut mining activities through the development of the Ravensworth North mining area. The single project approval streamlined operational integration, promoting a consistent and cohesive approach to both environmental management and mine planning.

Ravensworth Coal Handling and Preparation Plant (RCHPP)

Coal extracted from Ravensworth Operations is stored at the Run of Mine (ROM) coal stockpile and managed by the RCHPP. The RCHPP includes a coal handling and preparation plant and a coal terminal. Coal is fed into one of the three modules at a rate of up to 3,600 tonnes per hour (up to 20 Mt/year) prior to being loaded onto trains.

2.1.2 Ravensworth Underground Mine

RUM is owned by Resource Pacific Pty Limited and managed by GCAA. The land within the approved RUM development consent boundaries is owned by a combination of stakeholders, including RUM, AGL Macquarie, Ravensworth Operations Pty Limited, Glendell, and I. Bowman Pty Ltd.

RUM formally operated under Development Consent DA 104/96 dated 20 November 1996¹ (File No. N95/00395/001). Through subsequent modifications of DA 104/96, the most recent being modification 10 (MOD 10) approved on the 6 July 2022 by the DPHI, RUM had an approved maximum production of 7 Mtpa of ROM coal. Details of these modifications are outlined in **Section 3.1**. Continued operations in the current climate have proven to be uneconomical and RUM was placed in care and maintenance in October 2014 and commenced closure activities during 2022.

DA 104/96 approved operations until 31 July 2024. However, RUM was placed in Care and Maintenance in October 2014, with closure and decommissioning activities commencing in 2022. The majority of infrastructure demolition occurred during 2023, and rehabilitation of the disturbance footprint is ongoing.

RUM shares a common mining lease boundary with the Ashton Underground Mine, with both operations approved to extract coal from similar coal seams. In 2021, a tenth modification (DA 104/96 MOD10) was submitted and approved by the former Department of Planning and Environment (DPE) now DPHI on 6 July 2022. This modification allows Ashton Coal Operations Limited (ACOL), the operator of Ashton Underground Mine, to access and extract approved but unmined coal resources at RUM and integrate part of the approved RUM area with the Ashton Coal Project.

2.2 Mine Contacts

Mine contact details for Ravensworth Operations and RUM are shown in **Table 2-1**.

Table 2-1 - Mine Contacts

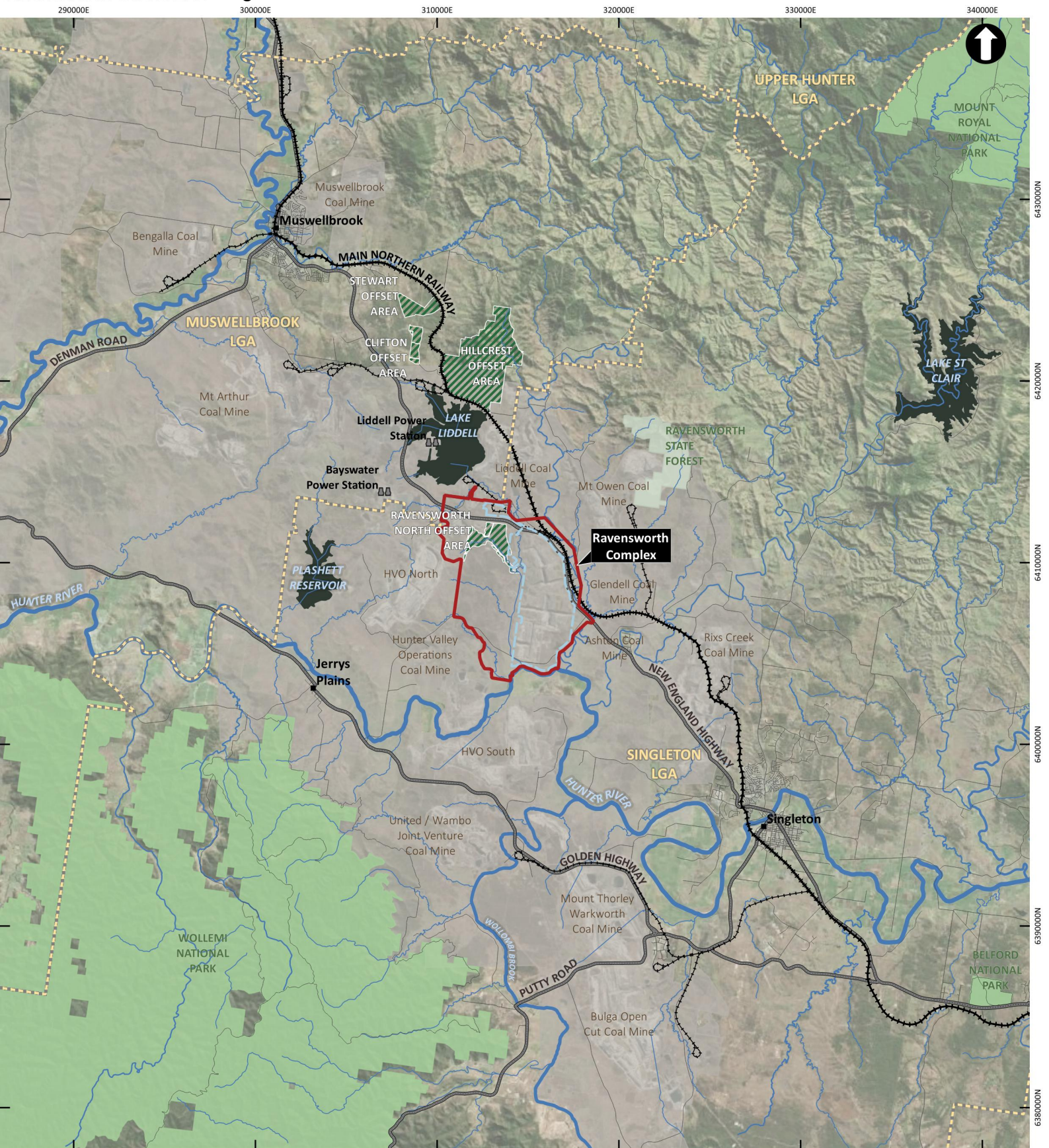
Name	Title	Contact Details
Ravensworth Operations	General Enquiries	Phone: 1800 620 553 Phone: (02) 6570 0700 Address: Lemington Road, Off New England Highway Ravensworth, via Singleton, NSW 2330 Postal: PO Box 294, Muswellbrook, NSW 2333 https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations
Ravensworth Underground Mine	General Enquiries	Phone: 1800 620 553 Address: Liddell Station Rd, Ravensworth NSW 2330 Postal: PO Box 528 Singleton 2330 https://www.glencore.com.au/operations-and-projects/coal/past-operations/ravensworth-underground
Thomas Hubert	Operations Manager	Phone : (02) 6570 0700 E-mail : thomas.hubert@glencore.com.au
Klay Marchant	Environment and Community Manager	Phone : (02) 6570 0700 Email : Klay.Marchant@glencore.com.au

Figure 2-1 – Regional Context

Figure 2-2 – Ravensworth Complex Layout

Figure 2-3 – Mining Lease Boundaries

¹ The original 1996 development application was supported by an Environmental Assessment (EA) for the construction and operation of an underground coal mine (HLA Envirosiences, 1996).



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Ravensworth Operations Project Boundary (PA09_0176)

Ravensworth Underground Mine Project Boundary (DA104/96)

Ravensworth Biodiversity Offset Areas

Other Mining Authorisation Areas

Local Government Area

Towns / Places

Main Road

Local Road

Rail Line

Watercourse

National Park

State Forest

GDA2020

0

4

8

12 km

Date Created: 18/03/2025

Map Size: A4 Portrait

Scale: 1:275,000

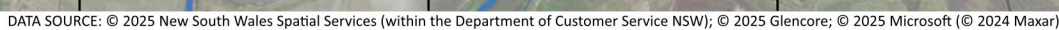
Map Created By: Pacific Environmental Pty Ltd (on behalf of Ravensworth Operations Pty Ltd)

Coordinate System: GDA2020 (MGA Zone 56)

Projection: Transverse Mercator Datum GDA2020

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- Date Created: 18/03/2025
Map Size: A4 Portrait
Scale: 1:65,000
Map Created By: Pacific Environmental Pty Ltd (on behalf of Ravensworth Operations Pty Ltd)
Coordinate System: GDA2020 (MGA Zone 56)
Projection: Transverse Mercator Datum GDA2020

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LEGEND

- Ravensworth Operations Project Boundary (PA09_0176)
- Ravensworth Underground Mine Project Boundary (DA104/96)
- Relevant Mining Titles
- Main Road
- Local Road
- Rail Line
- Watercourse



0 0.5 1 1.5 2 km

Date Created: 18/03/2025
Map Size: A4 Portrait
Scale: 1:50,000
Map Created By: Pacific Environmental Pty Ltd (on behalf of Ravensworth Operations Pty Ltd)
Coordinate System: GDA2020 (MGA Zone 56)
Projection: Transverse Mercator Datum GDA2020

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3. Approvals

Operations at the Ravensworth Complex are regulated by a range of State and Federal approvals, licences and leases which are summarised below. Further information and other statutory requirements applicable to the Ravensworth Complex under both State and Federal legislation is provided in the *Ravensworth Operations Environmental Management Strategy (EMS)*.

3.1 Project Approval

Ravensworth Operations is managed under Project Approval PA 09_0176 (MOD 4, granted on 15 May 2023). PA09_0176 permits mining operations until 31 December 2039.

A separate approval applies to RUM DA 104/96 (MOD 10, granted 6 July 2022). DA 104/96 permits mining operations until 31 July 2024 except for mining operations undertaken generally in accordance with MOD 10 which may take place until 31 December 2032.

This Annual Review has been completed to fulfil the requirements of Schedule 5, Condition 3 of PA 09_0176 and Schedule 4, Condition 2 of DA 104/96. **Table 3-1** below outlines the project approvals relevant to the Ravensworth Complex.

Table 3-1 – Ravensworth Complex Approvals & Modifications

Approval	Title	Date Granted
Ravensworth Operations		
09_0176	Original Approval	11 February 2011
09_0176 Mod 1	Extraction of approximately 2.7 million tonnes of coal in the Narama West mining area.	16 August 2013
09_0176 Mod 2	Allow for an increase in final landform heights to accommodate a more stable free flowing natural landform.	19 December 2014
09_0176 Mod 3	Construction and operation of a tailings pipeline from the RCHPP at Ravensworth Operations to the Mount Owen West Pit Void.	16 February 2016
09_0176 Mod 4	Construction and operation of a tailings pipeline from the RCHPP at Ravensworth Operations to Liddell Mine	15 May 2023
RUM		
104/96	Original Approval	20 November 1999
104/96 Mod 1	Modification to road haulage conditions	6 January 1998
104/96 Mod 2	Reject emplacement and water management system changes	5 March 2001
104/96 Mod 3	Installation of Substation	11 February 2007
104/96 Mod 4	Solcenic Borehole and Storage Tanks	11 February 2007
104/96 Mod 5	Ventilation Shaft, electricity supply and underground workings	4 July 2007
104/96 Mod 6	Tailings Water Recovery Dam	21 May 2008
104/96 Mod 7	Mining method, water, and waste management	3 July 2009
104/96 Mod 8	Extension to LWs 6 to 10 and additional gas management infrastructure	5 January 2011
104/96 Mod 9	Liddell Seam Project	20 June 2013
104/96 Mod 10	Ravensworth Ashton Integration	6 July 2022

3.2 Mining Authorisations

Operations at the Ravensworth Complex are regulated by various Mining Leases (MLs) and Authorisations. **Table 1-1** provides a list of the MLs and Authorisations relevant to the Ravensworth Complex. Recent changes to MLs are summarised as follows:

- **Mining Lease 1868** was granted to Resource Pacific Pty Limited on 23 November 2023 over an area of about 21.7 hectares which is located approximately 22 kilometres northwest of the town of Singleton, in the Parish of Liddell, County of Durham, NSW. The lease Embraces the surface and soil below thereof to a depth of 15.24 metres.
- **Mining Lease 1879** was granted to Cumnock Management Pty Limited on 3 July 2024 over an area of about 1.64 hectares which is located approximately 22 kilometres northwest of the town of Singleton, in the Parish of Liddell, County of Durham, NSW. The lease Embraces the surface and soil below thereof to a depth of 15.24 metres.

3.3 EPBC Act Approval

Under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC), approval from the Commonwealth Minister for the Environment is required for any action that may have a significant impact on Matters of National Environmental Significance (MNES). Four EPBC listed fauna species were identified as being potentially impacted by the Ravensworth Operations Project through the loss of habitat. The EPBC Act Approval (EPBC 2010/5839) was issued on 8 April 2011, and places 17 conditions on the Project and expires on the 31 March 2041.

Annual reports addressing compliance with each of the conditions of the EPBC approval are prepared in accordance with Condition 6 of EPBC 2010/5389 and are available on the Ravensworth Operations website².

3.4 Licences

The following sections discuss key Licences relevant to this Annual Review.

3.4.1 Environment Protection Licence

Aspects of environmental monitoring and reporting at Ravensworth Complex is managed under Environment Protection Licence (EPL) 2652 (anniversary date 12 January), issued under the *Protection of the Environment Operations Act 1997* (POEO). Monitoring results relevant to the EPL are reported via Annual Returns submitted to the Environment Protection Authority (EPA) as well as forming part of this Annual Review. Monitoring data is also available on the Ravensworth Operations website.

During the reporting period, an application for the variation to EPL 2652 was submitted to request a variation of the premises boundary to be consistent with the approved RUM Ashton Coal Project (104/96 MOD 10) development consent which allows ACOL to access and mine coal resources at RUM. ACOL need access to place infrastructure on Ravensworth Surface Operations above ground land for gas drainage and water management. On 28 March 2024 the EPA approved the variation as requested by the application (Notice Number 1636625).

Environmental monitoring and reporting activities undertaken at Ravensworth Operations as required under EPL 2652, are discussed in **Section 6**.

² <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/approvals-documents#environment-protection-and-biodiversity-conservation-epbc-approvals>

3.4.2 Surface and Groundwater Licences

The Ravensworth Complex currently holds water access licences (WALs) under the *Water Management Act 2000* for water extraction under Water Sharing Plans. The WALs held by the Ravensworth Complex permit the extraction of water from Management Zone 1B of the Hunter Regulated River (i.e. between the Goulburn River Junction and Glennies Creek Junction). Each WAL is linked to a works approval. The works approval allows for the installation of a pump station, at a defined location, to extract water as permitted by the WAL. Further details regarding these licences are provided in **Section 7.2**.

3.5 Other Approvals

3.5.1 Management Plans

Management plans and monitoring programs have been prepared in accordance with PA 09_0176 and DA 104/96. The status of relevant management plans as of 31 December 2024 are summarised in **Table 3-2**. In accordance with Schedule 5, Condition 4 of PA 09_0176 and Schedule 4, Condition 3 of DA 104/96, Ravensworth Operations and RUM will review, and if necessary, revise, the strategies, plans, and programs required under the consent within three months of this Annual Review, to the satisfaction of the Planning Secretary.

During the reporting period, several environmental management plans were submitted and approved by DPHI, including:

- Plans updated and submitted in 2023, following MOD 4 determination:
 - Water Management Plan, approved by DPHI 9 February 2024 (DPHI ref: MP09_0176-PA-128); and
 - Environmental Management Strategy, approved by DPHI 13 February 2024 (DPHI ref: MP09_0176-PA-129).
- Plans updated following the submission of the 2023 Annual Review, approved by DPHI 20 November 2024 (DPHI ref: MP09_0176-PA-145):
 - Blast Management Plan;
 - Heritage Management Plan;
 - Air Quality and Greenhouse Gas Management Plan; and
 - Noise Management Plan.

Table 3-2 – Ravensworth Complex Management Plan Status

Document	Reference	Revision Date
Ravensworth Operations Environmental Management Strategy (EMS)	PA 09_0176 Schedule 5, Condition 1	13 February 2024
Pollution Incident Response Management Plan (PIRMP)	EPL 2652, Condition O4 <i>Protection of the Environment Operations (POEO) Act 1997</i> .	28 September 2024
Ravensworth Operations Noise Management Plan (NMP)	PA 09_0176 Schedule 3 Condition 9 DA 104/96 Schedule 3 Condition 14	20 November 2024
Ravensworth Operations Blast Management Plan (BMP)	PA 09_0176 Schedule 3 Condition 17	20 November 2024
Ravensworth Operations Air Quality and Greenhouse Gas Management Plan (AQGGMP)	PA 09_0176 Schedule 3 Condition 24 DA 104/96 Schedule 2 Condition 18	20 November 2024

Document	Reference	Revision Date
Ravensworth Operations Water Management Plan (WMP)	PA 09_0176 Schedule 3 Condition 31 DA 104/96 Schedule 3 Condition 23	9 February 2024
Ravensworth Operations Biodiversity Offset Management Plan (BOMP)	PA 09_0176 Schedule 3 Condition 31	1 October 2023
Ravensworth Operations Heritage Management Plan (HMP)	PA 09_0176 Schedule 3 Condition 42	20 November 2024
Ravensworth Operations Aboriginal Cultural Heritage Management Plan (ACHMP)	PA 09_0176 Schedule 3 Condition 42 DA 104/96 Schedule 3 Condition 26	17 November 2022

3.5.2 Rehabilitation Management Plan

As of 1 July 2022, Ravensworth Operations and RUM each operate under a Rehabilitation Management Plan (RMP) in accordance with the Resources Regulator guidelines. The RMP covers aspects including mine closure planning and execution, stakeholder consultation, environmental management, post mining land use, status of closure, performance indicators and rehabilitation objectives, criteria, and implementation. The status of relevant Rehabilitation Management Plan as of 31 December 2024 is summarised in **Table 3-3**.

Table 3-3 – Rehabilitation Management Plan Status

Document	Reference	Revision Date
Ravensworth Operations		
Ravensworth Operations Rehabilitation Management Plan	PA 09_0176 Schedule 3 Condition 41 Mining Leases and <i>Mining Act 1992</i>	26 July 2024
RUM		
Ravensworth Underground Mine Rehabilitation Management Plan	DA 104/96 Schedule 3 Condition 27 Mining Leases and <i>Mining Act 1992</i>	16 September 2024

4. Operations During the Reporting Period

4.1 Mining Operations

Schedule 2, Condition 6 of PA 09_0176 stipulates that no more than 16 Mt of ROM coal will be produced through open cut mining in a calendar year and a combined maximum of 21 Mt of ROM coal produced by Ravensworth Operations and RUM in a calendar year.

ROC continued its progressive southward mining during the reporting period. Mining in Strip 14 was completed, and operations commenced in Strip 15, with pre-clearance surveys, erosion and sediment controls and topsoil salvage finalised in Q3 2024.

The majority of Strip 15 consists of previously disturbed land, including areas of the former Ravensworth West rehabilitation.

During the reporting period, approximately 60,484 kbcm of overburden was mined in Ravensworth North Pit to allow the extraction of 12.8 Mt ROM coal which is within the ROM annual limits.

There are no relevant reporting requirements for RUM, which commenced closure activities in 2022.

A summary of coal production is outlined in **Table 4-1**.

Table 4-1 – Coal Production & Waste Summary

Material	Approval Limit	Previous Reporting Period (2023)	This reporting period (2024)	Next reporting period (2025 budget)
Ravensworth Open Cut				
Prime Overburden (kbcm)	n/a	64,737	60,484	63,077
ROM coal (Mt)	16 ¹	13.5	12.8	13.3
Saleable Product (Mt)	20 ²	8.7	8.4	8.5
RUM				
ROM Coal (Mt)	7 ³	0	0	0
Product Coal (Mt)	n/a	0	0	0
RCHPP				
Coarse Waste Reject (Mt)	n/a	3.08	2.6	3.1
Fine Waste Reject (Mt) (dry)	n/a	1.7	1.8	1.6

Notes: ¹ Approval limit of 16 Mt applies to ROC mining operations. Note, a combined limit of 21 Mt applies to ROC and RUM (Schedule 2, Condition 6 of PA 09_0176). ² Restricted product coal transport to/from RCHPP/RCT to a maximum of 20 Mt (Schedule 2, Condition 7(b) of PA 09_0176). ³ Approval limit of 7 Mt applies to RUM mining operations (Schedule 2, Condition 6 of DA 104/96).

4.2 Exploration

No exploration activities were carried out at the Ravensworth Complex during the reporting period.

4.3 Construction

In late 2023, bulk earth works commenced to resize the office dam, a sediment and pollution control dam located at the RCHPP. The construction of the resized office dam was completed in Q2 2024.

No construction activities were carried out at RUM during the reporting period.

4.4 Land Preparation

Land preparation ahead of mining at Ravensworth Operations is undertaken in accordance with the RMP and the EMS. Areas are assessed prior to clearing to minimise potential ecological, water management, sediment and erosion and cultural heritage impacts in accordance with the pre-clearing requirements. Disturbed land in preparation for rehabilitation is discussed in **Section 8**. No land preparation activities were carried out at RUM in the reporting period.

4.5 Mineral Processing

The following subsections discuss mineral processing activities at Ravensworth Operations. No processing activities were undertaken at RUM in the reporting period.

4.5.1 Rejects Emplacement and Tailings

Coarse Rejects

Rejects are conveyed from the RCHPP to a reject bin, where they are collected by haul trucks. The haul trucks transport rejects via internal haul roads for co-disposing in the overburden emplacement areas in accordance with regulatory approvals. During this reporting period approximately 3.1Mt of coarse rejects was produced by the RCHPP (refer to **Table 4-1**).

Tailings

During 2024, tailings were emplaced into both the Mount Owen West Pit Void through the Greater Ravensworth Area Water and Tailings Strategy (GRAWTS) and the Ravensworth Cumnock Tailings storage facility. During this reporting period approximately 1.6Mt of fine tailings reject was produced by the RCHPP (refer to **Table 4-1**).

4.5.2 Train and Conveyor Movements

Product coal is transported to the Port of Newcastle by rail only. RCHPP train movements are summarised in **Table 4-2** below. All totals are compliant with the conditions set out in Schedule 2, Condition 7 of PA 09_0176, which specify that no more than 18 train movements (average) will occur each day, and no more than 20 million tonnes of product coal will be transported to/from the RCHPP/RCT in a calendar year. In accordance with Schedule 3, Condition 43 of PA 09_0176, records of all train movements are provided in **Appendix A - Train Movements**.

Table 4-2 - RCHPP Train Movements 2024

Train Movements	Total
Annual Average Daily Train Movements	2.6 movements per day
Max Daily Train Movements	7 max movements per day
Total Train Movements	963 total train movements
Average Train Tonnage	8,989 tonnes
Total product coal loaded from RCHPP	8,656,111 tonnes

4.6 Waste Management

Waste is managed in accordance with the EMS, Schedule 3, Condition 51 of PA 09_0176 and EPL 2652. The EMS has been developed in accordance with the requirements of the POEO Act and includes measures to minimise and monitor the waste generated, ensuring waste is appropriately stored, handled and disposed of and reporting on waste minimisation and management measures in the Annual Review.

4.6.1 Waste Management and Reporting

The disposal of waste generated on the site is undertaken in accordance with existing regulatory guidelines and established site procedures. Waste minimisation strategies for the Ravensworth Complex are reviewed on an as needs basis. **Table 4-3** provides waste generation for the Ravensworth Complex since 2020.

Table 4-3 – Waste Disposal & Recycling at the Ravensworth Complex

Waste Generation	Annual Review Reporting Period				
	2020	2021	2022	2023	2024
Ravensworth Operations					
Waste disposed offsite (t)	716	523	458	588	543
Waste recycled (t)	3,246	3,083	2,762	2,240	2,477
Total waste produced (t)	3,962	3,604	3,221	2,828	3,020
Waste recycled (%)	82%	86%	86%	79%	82%
RUM					
Waste disposed offsite (t)	5	4	6	2	N/A – RUM now closed and no longer generating waste
Waste recycled (t)	39	10	1	10,298	
Total waste produced (t)	44	13	7	10,300	
Waste recycled (%)	89%	73%	15%	99%	
TOTAL Waste disposed offsite (t)	721	527	464	590	543
TOTAL Waste recycled (t)	3,285	3,093	2,763	12,538	2,477
TOTAL Waste produced (t)	4,006	3,617	3,228	13,128	3,020
TOTAL Waste recycled (%)	82%	86%	86%	96%	82%

4.7 Product Coal

A total of 8.4 Mt of product coal was transported to the Port of Newcastle from the RCHPP in 2024.

4.8 Decommissioning

No decommissioning was undertaken at Ravensworth Operations in during the reporting period.

Mine closure activities at RUM commenced in 2022, with most demolition completed in 2023. However, final site clean-up of the RUM infrastructure areas was completed in Q2 2024.

Landform design for the RUM pit top and ROM was progressed during the reporting period, with rehabilitation of approximately 12 ha planned for commencement in 2025 (refer to **Section 8**).

4.9 Next Reporting Period

4.9.1 Mining

In 2025, coal extraction will continue in the ROC, with forecast production of 13.3Mt of ROM coal and 8.5Mt of product coal.

Dragline mining equipment is scheduled for demolition in 2025. Aside from this, mining operations will remain consistent with 2024, utilising the same in-pit mining equipment, personnel, and mining techniques. New fleet was acquired in 2024 with replacement of two excavators, and in 2025 additional fleet replacements will occur. These replacements will be equivalent in function to the existing fleet.

Mining in the Ravensworth North Pit will continue progressing southward in strips, in accordance with the mine plan, RMP and Annual Forward Program.

4.9.2 Exploration

In 2025, an exploration program is scheduled to commence at the Ravensworth Complex. The exploration program will take place in ML1669, and involve three 'chip' explorations holes and installation of vibration wire piezometers (VWPs). This will be undertaken in accordance with Ravensworth Operations Environmental Management System.

4.9.3 Construction

Infrastructure construction associated with Stage 2 of the Greater Ravensworth Area Water and Tailings Scheme (GRAWTS) is proposed for 2025. As part of these activities, a water pipeline will be installed between Highway Dam and Mt Owen / Glendell (MGO) to enable bidirectional water transfer. This pipeline will enhance water management capabilities at the Ravensworth Complex, supporting broader water supply needs beyond the dewatering of Narama Void. Updates of the GRAWTS will be provided in the 2025 Annual Review.

4.9.4 Coarse Rejects and Tailings Disposal

During 2025 coarse rejects will continue to be co-disposed of in overburden emplacement waste areas in accordance with current statutory approval. Tailings will be disposed of in onsite tailings storage facilities or disposed of via the GRAWTS network.

5. Actions Required from Previous Annual Review

A letter was received from the DPHI dated 3 July 2024 stating the Annual Review for the period 1 January 2023 to 31 December 2023 generally satisfied the reporting requirements of PA 09_0176.

Table 5-1 summarises the actions and requirements identified by the DPHI for the previous Annual Review (Reporting Period 1 January 2023 to 31 December 2023) submitted for the Ravensworth Complex.

Table 5-1 – Summary of Actions from the Previous Annual Review

Action Required from Previous Annual Review	Requested By	Action Taken	Where Addressed
Refer to the Annual Review Guideline (2015)	DPHI	The Annual Review has considered the requirements of the relevant reporting guidelines, including the ' <i>Annual Review Guideline</i> ' (DPiE, 2015) and satisfies the Annual Review requirements of Schedule 5, Condition 3 of PA 09_0176 and Schedule 4, Condition 2 of DA 104/96. CLOSED	This document
Section 6.4.3 refers to Appendix E in error.	DPHI	References for this Annual Review have been checked and updated. CLOSED	This document
Ensure all figures are of reasonable quality. Some of the included figures in the 2023 AEMR are of low quality and legends cannot be read.	DPHI	Figures for this Annual Review have been updated and supplied in higher resolution. CLOSED	Figures throughout this document

6. Environmental Management and Performance

6.1 Noise

6.1.1 Environmental Management

Noise emissions from the Ravensworth Complex are managed and monitored in accordance with the approved *Ravensworth Operations Noise Management Plan* (NMP)³, which has been developed in accordance with Schedule 3, Condition 9 of PA 09_0176 and Schedule 3, Condition 14 of DA 104/96 to minimise the potential noise impact on surrounding sensitive receivers and meet the noise impact assessment criteria.

The NMP specifies the noise monitoring to demonstrate the compliance with impact assessment criteria and effectiveness of the mitigation measures, including:

- Attended noise monitoring at four locations (collected monthly) for comparison with the noise criteria to assess compliance;
- Continuous (unattended) directional noise monitoring at one location to supplement the attended noise monitoring data; and
- One on-site Weather Station to record meteorological data in real-time (continuous).

Quarterly attended noise monitoring was also conducted at Site 7/R7 for RUM. During the reporting period, the NMP was updated to reflect the commencement of closure activities at RUM, resulting in the removal of the monitoring requirement for Site 7/R7. The revised NMP was approved by the DPHI on 20 November 2024 (ref: MP09_0176-PA-145). Noise monitoring locations are shown on **Figure 6-1**.

6.1.2 Environmental Monitoring Results

Results from the Reporting Period

All reasonable and feasible measures are implemented to ensure that the noise generated by the Ravensworth Complex, combined with the noise generated by other mines, does not exceed the criteria. An overview of environmental performance against the noise impact assessment criteria is provided in **Table 6-1** and **Table 6-2**. The relevant noise criteria and notes can be found in Schedule 3, Conditions 2, 3 and 4 of PA 09_0176⁴, Schedule 3, Condition 12 of DA 104/96 and Condition L5 of EPL 2652.

The 2024 attended noise monitoring program was conducted monthly; there were no exceedances (non-compliances) of noise impact assessment criteria at any location during the reporting period. Site 7/R7 is monitored on a quarterly basis for RUM and there were no exceedances during 2024 monitoring.

Noise monitoring results for the reporting period are provided in **Appendix B - Noise Monitoring Results**, with detailed analysis provided in **Appendix C - Annual Noise Monitoring Summary Report**.

Figure 6-1 – Noise Monitoring Locations

³ available on the Ravensworth Operations website <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/management-plans>

⁴ Note, noise criteria outlined in Schedule 3, Conditions 5, 6 and 7 of PA 09_0176 were not relevant for the reporting period, as no written requests were received from any landowners.



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LEGEND

Ravensworth Operations Project Boundary (PA09_0176)

Ravensworth Underground Mine Project Boundary (DA104/96)

Ravensworth Complex EPL Boundary (EPL2652)

Noise Monitoring

Attended Noise Monitoring Location

Continuous (unattended) Directional Noise Monitoring Location

Meterological Station

Main Road

Local Road

Rail Line

Watercourse

0123 km

Date Created: 18/03/2025

Map Size: A4 Portrait

Scale: 1:75,000

Map Created By: Pacific Environmental Pty Ltd (on behalf of Ravensworth Operations Pty Ltd)

Coordinate System: GDA2020 (MGA Zone 56)

Projection: Transverse Mercator Datum GDA2020

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Table 6-1 - Noise Criteria dB(A) & Performance for 2024 Reporting Period

Monitoring Location	Receiver Location	Receiver	Day ($L_{Aeq(15min)}$)	Evening ($L_{Aeq(15min)}$)	Night ($L_{Aeq(15min)}$)	Night ($L_{A1(1min)}$)	Performance during Reporting Period
-	R1	34 – Stapleton	48	48	48	49	Not applicable ¹
Site 2	R2	3 – A Bowman	35	35	35	45	Compliant
		13 – A Bowman	38	38	38	45	Compliant
Site 3	R3	Camberwell Village Central 12 – Yates, 21 – Miller, 27 Chisholm	37	37	37	45	Compliant
Site 5		38 - Ninness	36	36	36	45	Compliant
Site 6	R4	Camberwell Village North	35	35	35	45	Compliant
Site 7	R7	Spiteri	35	35	35	45	Compliant
-	-	All other privately-owned land	35	35	35	45	Compliant

Notes: ¹ Property owned by Ravensworth Operations

Table 6-2 - Cumulative Noise Criteria dB(A) $L_{Aeq(1hr)}$ from PA 09_0176 & Performance for 2024 Reporting Period

Receiver Location	Day	Evening	Night	Performance during Reporting Period
R3 and R4 – Camberwell Village	55	45	40	Compliant
All other privately owned land	50	45	40	Compliant

Comparison with Predictions

Spectrum Acoustics (2025) advised that a direct comparison between the measured noise levels from the Ravensworth Complex and the modelled EA predictions was not possible for any measurement throughout the 2024 reporting period. This was due to:

- Meteorological conditions during measurement periods not corresponding to any of the modelled conditions; or
- When meteorological conditions did correspond, noise from the Ravensworth Complex was not quantifiable, preventing a valid comparison.

This limitation also applied to the $L_{1(1min)}$ modelled predictions throughout the reporting period.

However, all noise monitoring results complied with the noise impact assessment criteria, confirming that noise emissions remained within predicted levels for the reporting period.

Long Term Trend Analysis

The results are generally consistent and comparable with prior years. There have been no recorded exceedances in the annual noise compliance assessments for the last 7 years (i.e. 2018 to 2024).

6.1.3 Key Performance and Management Issues

There were no performance or management issues in relation to operational noise during the reporting period. There were no community complaints regarding noise during the reporting period. Noise emission controls have been assessed as effective, based on compliance with noise predictions and performance criteria during the reporting period.

6.1.4 Proposed Improvements

Established site procedures, processes, and systems will continue to be implemented to manage noise at the Ravensworth Complex. As current controls are meeting performance requirements, no additional noise emission mitigation measures are proposed for 2025.

6.2 Blasting and Vibration

6.2.1 Environmental Management

Blasting at the Ravensworth Complex is undertaken in accordance with the *Ravensworth Operations Blast Management Plan* (BMP)⁵, which was developed in accordance with Schedule 3, Condition 17 of PA 09_0176. The BMP is supported by detailed procedures to manage potential blasting impacts, including overpressure, vibration, fume, and dust.

The BMP outlines real-time blast monitoring and modelling requirements to ensure compliance with impact assessment criteria. Monitoring is conducted at all key locations that have criteria specified in Schedule 3, Condition 10 of PA 09_0176 to verify compliance with regulatory limits. Blast monitoring locations are shown on

Figure 6-2.

Monitoring data collected from each blast are used to inform and refine blast designs, allowing for modifications as needed to minimise environmental impacts. To enhance blast management, the Ravensworth Complex utilises a Trigger Early Warning Unit (EWU) (refer to

Figure 6-2) for the management of blasting, this monitor is relocated from time to time as the open cut pit shell progresses.

6.2.2 Environmental Monitoring Results

Results from the Reporting Period

A summary of blasting results obtained during the reporting period is provided as **Table 6-3**, with detailed results provided in **Appendix D – Blast Monitoring Results**.

During the reporting period there were 214 blasts. No blasts exceeded the approval criteria for overpressure or vibration outlined in:

⁵ Available on the Ravensworth Operations website <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/management-plans>

- Schedule 3, Condition 10 of PA 09_0176;
- Condition L6 of EPL 2625; or
- The Blast Management Plan.

Figure 6-2 – Blast Monitoring Locations



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LEGEND

- Ravensworth Operations Project Boundary (PA09_0176)
- Ravensworth Underground Mine Project Boundary (DA104/96)
- Ravensworth Complex EPL Boundary (EPL2652)
- Main Road
- Local Road
- Rail Line
- Watercourse

Blast Monitoring

- Trigger Early Warning Unit (EWU)
- Infrastructure
- Aboriginal Heritage Site
- Heritage Site (uninhabited)
- Residence



Date Created: 18/03/2025
Map Size: A4 Portrait
Scale: 1:60,000
Map Created By: Pacific Environmental Pty Ltd (on behalf of Ravensworth Operations Pty Ltd)
Coordinate System: GDA2020 (MGA Zone 56)
Projection: Transverse Mercator Datum GDA2020

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Table 6-3 – Blasting Criteria and Performance for 2024 Reporting Period

Location	Approval Criteria			Performance during Reporting Period
	Airblast overpressure (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance	
Residence ^a on privately owned land and Camberwell church	120	10	0%	Compliant
	115	5	5% of the total number of blasts over a period of 12 months	Compliant
Ravensworth Public School and Chain of Ponds Hotel	133	10	0%	Compliant
Ravensworth Homestead	126	10	0%	Compliant
Aboriginal axe grinding groove site (REA86)	-	^c 175	0%	Compliant
1,000ML dam wall and proposed dam wall	-	^b 25	0%	N/A ^d
Conveyors, including the Hunter Valley Operations conveyor	-	^b 100	0%	Compliant
Main Northern Railway culverts and bridges	-	^b 25	0%	N/A ^d
Transmission lines	-	^b 50	0%	N/A ^d
Ashton underground mine	-	^b 6	0%	N/A ^d

Notes: ^a Unless otherwise agreed with the relevant owner/s of the residence, and the Applicant has advised the Department in writing of the terms of this agreement. ^b Unless otherwise agreed with relevant infrastructure provider, owner, or the regulator (in relation to the dams), and the Applicant has advised the Department in writing of the terms of this agreement. ^c Subject to meeting incremental limits under condition 10A (PA 09_0176). ^d A private agreement has been obtained in consultation with the relevant infrastructure owner regarding this specific Ground Vibration Criterion for this infrastructure and the Department has been advised in writing of the agreements.

Comparison with Predictions

The *Ravensworth Operations Project Environmental Assessment* (Umwelt, 2010) assessed the impacts of blasting, establishing vibration and airblast (overpressure) criteria for infrastructure and heritage sites that may be affected by the operations. These criteria are detailed in **Appendix D**. During the reporting period both blast vibration and overpressure remained consistent with Environmental Assessment predictions, with no exceedances recorded.

Long Term Trend Analysis

Since 2014, there have been no blast exceedances of the blasting criteria.

6.2.3 Key Performance and Management Issues

There were no performance or management issues in relation to blasting activities during the reporting period. There were no community complaint regarding blasting during the reporting period. Blasting and vibration controls have been assessed as effective, based on compliance with predictions and performance criteria during the reporting period.

6.2.4 Proposed Improvements

Established site procedures, processes, and systems will continue to be implemented to manage potential impacts from blasting at the Ravensworth Complex. As current controls are meeting performance requirements, no additional blasting mitigation measures are proposed for 2025.

6.3 Air Quality

6.3.1 Environmental Management

Air quality at Ravensworth Complex is managed and monitored in accordance with the approved *Ravensworth Operations Air Quality and Greenhouse Gas Management Plan* (AQGGMP)⁶ which has been developed in accordance with Schedule 3, Condition 24 of PA 09_0176 and Schedule 3, Condition 18 of DA 104/96 to minimise the potential air quality impacts, including odour from the continued operations at Ravensworth Complex on the local community and the environment.

The AQGGMP specifies the air quality monitoring program to demonstrate the compliance with impact assessment criteria and effectiveness of the mitigation measures including:

- Deposited dust monitoring at four locations (collected monthly);
- Three High Volume Air Samplers (HVAS) to measure dust concentrations (every six days), with one measuring Particulate Matter <10µm (PM₁₀) and two measuring Total Suspended Particulates (TSP);
- Two Tapered Element Oscillating Microbalances (TEOMs) for monitoring particulate matter PM₁₀ and Particulate Matter <2.5µm (PM_{2.5}) concentrations in real-time (continuous); and
- One on-site Weather Station to record meteorological data in real-time (continuous).

Air quality monitoring locations are shown on **Figure 6-3**.

Figure 6-3 – Air Quality Monitoring Locations

⁶ Available on the Ravensworth Operations website <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/management-plans>



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LEGEND

- Ravensworth Operations Project Boundary (PA09_0176)
- Ravensworth Underground Mine Project Boundary (DA104/96)
- Ravensworth Complex EPL Boundary (EPL2652)
- Main Road
- Local Road
- Rail Line
- Watercourse

Air Quality Monitoring Type

- Dust Depositional Gauge
- High Volume Air Sampler (PM10)
- High Volume Air Sampler (TSP)
- TEOM
- Meteorological Station



0 1 2 3 km

Date Created: 18/03/2025
Map Size: A4 Portrait
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6.3.2 Environmental Monitoring Results

Results from the Reporting Period

Overview

An overview of environmental performance against the air quality criteria based on TSP, PM₁₀, and depositional dust monitoring data is provided in **Table 6-4**, **Table 6-5** and **Table 6-6**. The air quality criteria and notes can be found in Schedule 3, Condition 20 of PA 09_0176.

Further detail on results for particulate matter, dust deposition and exceedance dates is provided below and **Appendix E – Air Quality Monitoring Results**. Note that no dates within 2024 were declared as extraordinary events, however a regional dust event on 4 February likely influenced 6 air quality monitoring stations in the Upper Hunter Air Quality Monitoring Network exceeding the PM₁₀ benchmark⁷.

Table 6-4 – Long Term Criteria for Particulate Matter

Pollutant	Averaging period	Approval Criteria ^d	Environmental Performance this Reporting Period
Total suspended particulate (TSP) matter	Annual	^a 90 µg/m ³	Compliant
Particulate matter < 10 µm (PM ₁₀)	Annual	^a 30 µg/m ³	Compliant

Note: Annual TSP performance based on HVAS data and PM₁₀ performance based on TEOM and HVAS data

Table 6-5 – Short Term Criterion for Particulate Matter

Pollutant	Averaging period	Approval Criteria	Environmental Performance this Reporting Period
Particulate matter < 10 µm (PM ₁₀)	24-hour	^b 50 µg/m ³	Non-Compliant ¹

Note: 24hr PM₁₀ performance based on TEOM and HVAS data. ¹ On all occasions the third-party review estimated the contribution from the Ravensworth Complex to be less than the EIS prediction for the monitoring location – see **Table 6-8**

Table 6-6 – Long Term Criteria for Deposited Dust

Pollutant	Averaging period	Approval Criteria		Environmental Performance this Reporting Period
		Maximum increase in deposited dust level	Maximum total deposited dust level	
^c Deposited dust	Annual	^b 2 g/m ² /month	^a 4 g/m ² /month	Compliant

Notes to Tables 6-4 to 6-6: ^a Total impact (i.e., incremental increase in concentrations due to the Ravensworth mine complex plus background concentrations due to all other sources); ^b Incremental impact (i.e., incremental increase in concentrations due to the Ravensworth mine complex on its own); ^c Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: *Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method*; ^d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog.

Particulate Matter (TSP and PM₁₀)

Three HVAS and two TEOM are operated at the Ravensworth Complex to monitor particulate matter. A summary of the recorded results for particulate matter (HVAS and TEOM) air sampling is presented in **Table 6-7**. The number of days that exceeded the consent criterion is also shown.

The results obtained in the reporting period demonstrates compliance with the long-term air quality impact assessment criteria (i.e. annual averages) for all monitoring locations. Rolling annual average

⁷ Source: <https://www2.environment.nsw.gov.au/topics/air/nsw-air-quality-statements/annual-air-quality-statement-2024/hunter-valley-focus-area>

and 24-hour results at the HVAS and TEOM locations are provided in **Appendix E – Air Quality Monitoring Results**.

Table 6-7: Summary of Particulate Matter Monitoring Results for 2024 Reporting Period

Monitoring Location	Data Availability (%)	Averaging Period	Approval Criteria ($\mu\text{g}/\text{m}^3$)	Maximum ($\mu\text{g}/\text{m}^3$)	Mean ($\mu\text{g}/\text{m}^3$)	Number of days exceeding criterion
HVAS19 (PM_{10})	100%	24-hour	50	140	N/A	2 ¹
		Annual	30	N/A	18.7	0
SX45-G1 / EPL9 (PM_{10})	91%	24-hour	50	57.4	N/A	3 ¹
		Annual	30	N/A	20.1	0
SX45-G2 / EPL10 (PM_{10}) ^a	80%	24-hour	N/A	61.2	N/A	N/A
		Annual	N/A	N/A	15.8	N/A
HVAS2 (TSP)	100%	Annual	90	N/A	46.3	0
HVAS5 (TSP) ^b	100%	Annual	90	N/A	56.3	0

Notes: ^a The TEOM SX45-G2 is maintained on mine owned land and used for management purposes and to assess compliance with EPL requirements of continuous monitoring only. ^b Property owned by Ravensworth Operations. ¹ On all occasions the third-party review estimated the contribution from the Ravensworth Complex to be less than the EIS prediction for the monitoring location – see **Table 6-8**

PM₁₀ 24-hour Criterion Exceedances

The PM_{10} 24-hour criterion of $50 \mu\text{g}/\text{m}^3$ was exceeded during the 2024 reporting period, twice at HVAS19 and on three occasions at SX45-G1. All exceedances were investigated and reported. Investigations included third-party review of each exceedance, using data from the Ravensworth Complex TEOMs, on-site weather station, Air Quality Control System (AQCS) model outputs and NSW Upper Hunter Air Quality Monitoring Network.

On all occasions the third-party review estimated the contribution from the Ravensworth Complex to be less than the EIS prediction for the monitoring location, indicating that dust mitigation measures were effective in minimising site-related dust emissions.

The exceedances during the reporting period are summarised in **Table 6-8**, and discussed further in **Section 11** and **Appendix E – Air Quality Monitoring Results**.

Table 6-8: Summary of Particulate Matter Exceedances During the 2024 Reporting Period

Date	Monitoring Location	Result ($\mu\text{g}/\text{m}^3$)	Ravensworth Complex estimated contribution ($\mu\text{g}/\text{m}^3$)
26/01/2024	SX45-G1 / EPL9	53.1	4.5
05/02/2024	SX45-G1 / EPL9	55.7	16.1
2/09/2024	HVAS19	140	7.9
25/09/2024	SX45-G1 / EPL9	57.4	19.6
7/11/2024	HVAS19	59	0.8

Dust Deposition

Table 6.9 presents the deposited dust monitoring data for the reporting period. Annual average deposited dust results were below 4 g/m²/month at every offsite monitoring location during 2024 and generally infers that compliance with the approved criteria is achieved.

Table 6.9: Monthly Depositional Dust Monitoring Data (g/m²/month) – 2024 Reporting Period

Monitoring Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Ave ^a
D9	1.2	1.8	1.7	1.1	1.2	1.8	1.1	1.6	2.7	1.8	12.1 ^c	1.9	1.6
D12 ^b	0.6	4.1	2.4	0.8	1.2	5.6	0.8	3.7	2.8 ^c	7.1	2.3	1.5	2.7
D13	1.2	1.8	1.5	0.7	0.9	2.1	2.1	3.3 ^c	2.1	1.8	1.7	1.8	1.6
D27	1.4	0.9	0.9	0.9	4.2 ^c	1.4	2.1 ^c	1.2	1.2	2.7	4.1	2.1	1.7

Notes: ^a Calculated as the average of all non-contaminated monthly insoluble matter deposition rates during the annual monitoring period.

^b Property owned by Ravensworth Operations. ^c - Sample contaminated, not included in annual average calculations.

Comparison with Predictions

PAE Holmes (2010) *Air Quality Impact Assessment Ravensworth Operations Project* provided the following modelling predictions for the air quality criteria for the project:

- Five private residences (3, 6A, 6B, 6C and 13) are predicted to experience maximum 24-hour average PM₁₀ concentrations above the 50 µg/m³ criterion in Year 3 and Year 10, with residences 6A, 6B and 6C also predicted to experience exceedances in Year 15. Residence 34 is also predicted to experience exceedances during all scenarios, with 24-hour average PM₁₀ concentrations levels up to 131 µg/m³ during the Year 15 scenario (and up to 54 days per annum). There is a private agreement in place with this landholder that covers impacts from current approved operations;
- No private residences are predicted to experience annual average PM₁₀ concentrations above the 30 µg/m³ criterion for any of the modelled years;
- No private or mine owned residences are predicted to experience annual average TSP concentrations above the 90 µg/m³ criterion for any of the modelled years; and
- No private or mine owned residences are predicted to experience annual average dust deposition above the 2 g/m²/month (project only) criterion for any of the modelled years.

Table 6-10 provides a comparison of predicted particulate matter concentrations and deposition rates (TSP, PM₁₀ and dust deposition) from the 2010 EA (Umwelt, 2010) for the Year 15 modelled scenario and the 2024 measured averages for privately owned and mine owned offsite residences. Cumulative predictions consider the contribution of other mines in the area as well as other local sources of dust.

All 2024 annual results are greater than the EA predicted values but the annual average TSP, PM₁₀ and dust deposition monitoring data is generally consistent with the model predictions that the long-term air quality criteria for project (**Table 6-4** and **Table 6-6**) would not be exceeded.

Furthermore, it is noted that there are far fewer exceedances of the 24-hour average PM₁₀ concentrations then were predicted in the 2010 EA.

Table 6-10: Air Quality Comparison with EA Predictions

Pollutant	Monitor	ID ^a	Averaging Period	EA Year 15 Predictions ^a		Environmental Performance this Reporting Period
				Ravensworth Contribution	Cumulative	
TSP (µg/m ³)	HVAS2	45	Annual	6	35	Annual rolling average ranged from 41.8 to 49.8 µg/m ³

Pollutant	Monitor	ID ^a	Averaging Period	EA Year 15 Predictions ^a		Environmental Performance this Reporting Period
				Ravensworth Contribution	Cumulative	
	HVAS5 ^b	34	Annual	26	56	Annual rolling average ranged from 54.4 to 64.3 µg/m ³ and below 56µg/m ³ for approx. 20% of samples
PM ₁₀ (µg/m ³)	HVAS19	45	24-hour	37	N/A	The 24hr average was below 37µg/m ³ for more than 93% of samples
			Annual	5	11	Annual rolling average ranged from 17 to 19.8 µg/m ³
	SX45-G1	3	24-hour	47	N/A	The 24hr average was below 47µg/m ³ for more than 98% of samples
			Annual	9	15	Annual rolling average ranged from 19.7 to 22.6 µg/m ³
Deposited Dust (g/m ² /month)	D9	40B	Annual	0.2	0.7	Annual averages ranged from 1.5 to 1.6 g/m ² /month
	D12 ^b	34	Annual	0.5	1.0	Annual averages ranged from 1.5 to 2.8 g/m ² /month
	D13	3	Annual	0.4	0.8	Annual averages ranged from 1.6 to 2.2 g/m ² /month
	D27	5Z / 12	Annual	0.2	0.7	Annual averages ranged from 1.1 to 1.7 g/m ² /month

Notes: ^a Source: Air Quality Impact Assessment Ravensworth Operations Project (PAE Holmes, 2010). ^b Property owned by Ravensworth Operations.

Long Term Trend Analysis

Table 6-11 provides a summary of air quality monitoring results for the previous five years from 2020 to 2024, including the annual averages for deposition dust (insoluble solids), PM₁₀ and TSP.

Trends in historic data in relation to the Ravensworth Complex identify all air quality monitoring results are below annual criteria and consistent with predicted results. There is a slight correlation between depositional dust results and seasonal variability, with depositional dust monitoring results for January-March and September-December typically slightly higher than April-August.

Table 6-11 - Long Term Air Quality Monitoring Summary

Monitoring Location		Annual Averages				Approval Criteria (Annual Average)
	2020	2021	2022	2023	2024	
Insoluble Solids (g/m²/month)						
D9	3.5	2.4	1.9	1.5	1.6	4 g/m²/month
D12 ^a	2.5	2.0	2.5	1.5	2.7	
D13	3.1	2.3	1.9	2.2	1.6	
D27	3.1	2.1	4.4	1.3	1.7	
PM ₁₀ (µg/m³)						
HVAS19	21.9*	18.2	13.8	17.5	18.7	30 µg/m³
SX45-G1	19.1	17.9	13.2	21.4	20.1	

Monitoring Location	Annual Averages					Approval Criteria (Annual Average)
	2020	2021	2022	2023	2024	
SX45-G2 ^b	17.4	15.8	13.3	20.1 [#]	15.8	N/A
TSP (µg/m ³)						
HVAS2	66.8*	54.3	38.7	47.6	46.3	90 µg/m ³
HVAS5 ^a	61.6*	48.8	48.8	60.6	56.3	

Notes: ^a Property owned by Ravensworth Operations. ^b The TEOM SX45-G2 is maintained on mine owned land and used for management purposes and to assess compliance with EPL requirements of continuous monitoring only. * Excluding extraordinary events (as determined by the former DPIE) [#] Invalid due to less than 75% data availability

6.3.3 Key Performance and Management Issues

SX45-G2 was replaced in February 2024 improving availability of continuous dust monitoring data and proactive dust emission management measures. There were no community complaints related to air quality in the 2024 reporting period.

6.3.4 Proposed Improvements

Dust emission controls have been assessed as generally effective during the reporting period, with compliance achieved for annual average criteria for TSP, PM₁₀ and dust deposition. There were five exceedances of the PM₁₀ 24-hour average criterion, however third-party review of each exceedance estimated the Ravensworth Complex's contribution to be less than the EIS prediction for the particular monitoring location, indicating that dust mitigation measures were effective in minimising site-related dust emissions.

Established site procedures, processes, and systems will continue to be implemented to manage dust emissions at the Ravensworth Complex. As current controls are generally meeting performance requirements, no additional air quality mitigation measures are proposed for 2025.

6.4 Biodiversity

6.4.1 Environmental Management

Biodiversity Management

Biodiversity at the Ravensworth Complex is managed in accordance with the *Ravensworth Operations Biodiversity Offset Management Plan* (BOMP) ⁸ which has been developed in accordance with Schedule 3, Condition 38 of PA 09_0176. The BOMP outlines biodiversity management, monitoring and rehabilitation requirements, providing a framework for the implementation of ecological management actions, regeneration and revegetation strategies, controls and monitoring programs that are to be implemented for the management of flora and fauna at the Ravensworth Complex.

Biodiversity Offset Areas

The BOMP also defines the management, monitoring and rehabilitation requirements for the Biodiversity Offset Areas (BOAs). The primary objective of the establishment of the BOAs is to protect and enhance the extent and condition of Endangered Ecological Communities (EECs) and threatened species habitat values. Key management measures, including active and passive regeneration and

⁸ Available on the Ravensworth Operations website <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/management-plans>

revegetation initiatives, are detailed in the *Ravensworth Open Cut Offset Area Management Programme* (OAMP), which has been developed in accordance with Condition 4 of EPBC 2010/5389.

The Ravensworth Complex owns and manages four BOAs, as required under NSW Project Approval (PA 09_0176) and the Federal EPBC Approval (2010/5389). The BOAs are described in **Table 6-12** and shown in **Figure 6-4**.

Table 6-12 - Location and size of Ravensworth Operations Offset Areas

Name	Size (ha)	Location Description
Ravensworth North Offset Area (RNOA)	288	Immediately North of Ravensworth North Open Cut Disturbance Area
Hillcrest Offset Area (HOA)	1,376.4	Approx. 6km North of the Ravensworth Complex
Clifton Offset Area (COA)	105.4	Approx. 7.5km North of the Ravensworth Complex
Stewart Offset Area (SOA)	164.6	Approx. 10km North of the Ravensworth Complex

Monitoring Measures

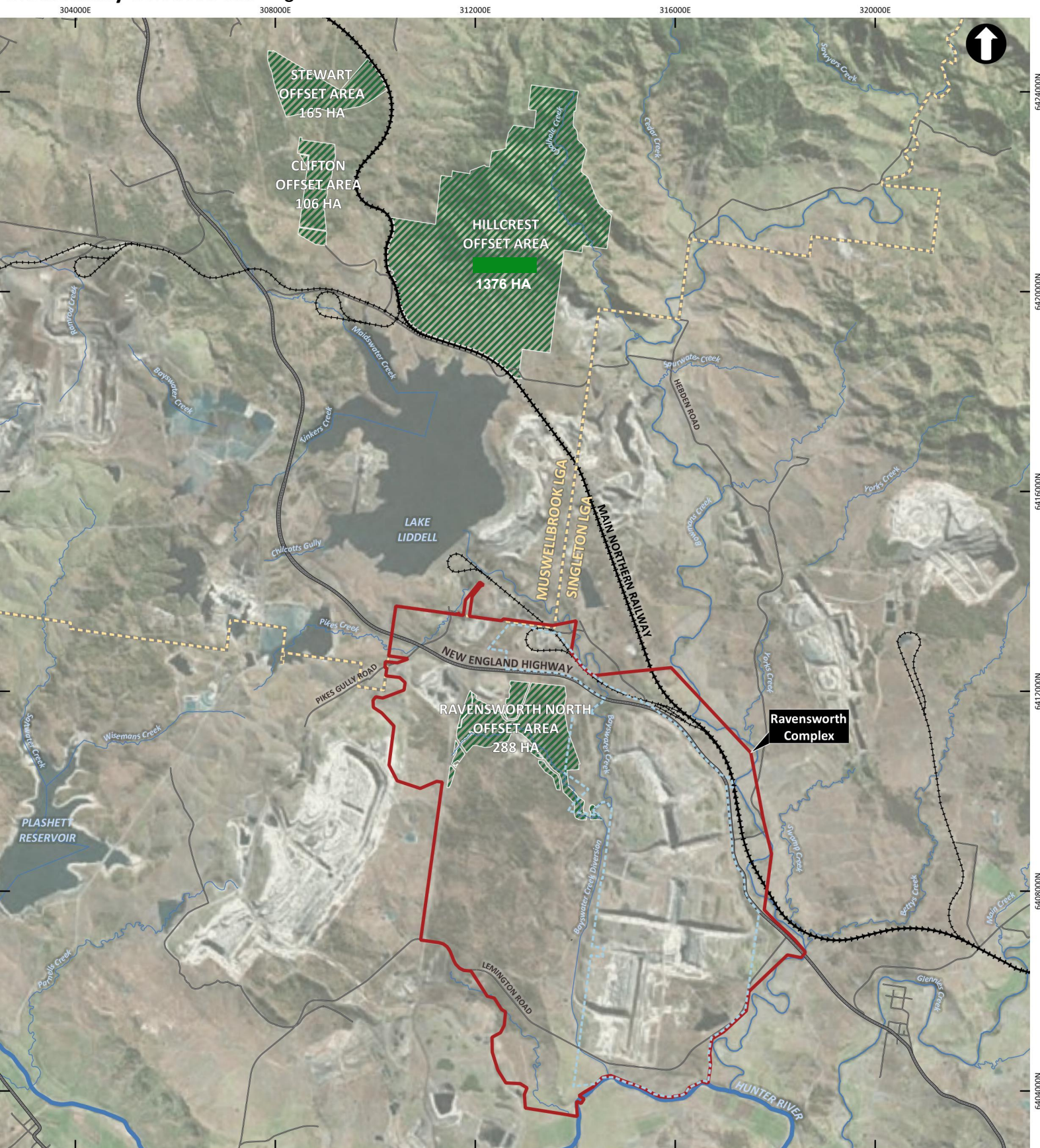
The BOMP specifies the ecological and rehabilitation monitoring program for the site, which includes monitoring of residual vegetation (annually), long-term rehabilitation and revegetation monitoring (annually), rehabilitation inspections (annually), and fauna monitoring (at least once every three years).

The OAMP includes a detailed biodiversity monitoring program to assess the effectiveness of conservation measures in achieving the management objectives of the BOAs. The biodiversity monitoring program for the BOAs includes:

- Vegetation condition assessment – conducted annually at 28 permanent monitoring locations across all BOAs;
- Bird census – conducted annually, in conjunction with the vegetation condition assessments, at the same 28 locations;
- Targeted threatened bird surveys - diurnal surveys conducted annually (winter) to target the Swift Parrot (*Lathamus discolor*) and Regent Honeyeater (*Anthochaera phrygia*) at a minimum of two locations per BOA;
- Microbat surveys – conducted bi-annually at each BOA using ultrasonic call detection;
- Green and Golden Bell Frog (*Litoria aurea*) surveys – conducted annually at target dams and moderate/high-quality habitats within RNOA and HOA; and
- Fauna monitoring – conducted bi-annually at permanent RNOA monitoring locations, including diurnal and nocturnal bird surveys, spotlighting, herpetological surveys, and hair funnels to detect terrestrial and arboreal mammals.

All biodiversity monitoring across BOAs is conducted by suitably qualified and accredited ecologists. The 2024 monitoring program results are discussed in the following sections. Rehabilitation and revegetation monitoring required under the BOMP and Conservation Agreement (CA) is covered in **Section 6.4.2**.

Figure 6-4 – Biodiversity Offset Areas



DATA SOURCE: © 2025 New South Wales Spatial Services (within the Department of Customer Service NSW); © 2025 Glencore; © 2025 Microsoft (© 2024 Maxar)

LEGEND

- Ravensworth Operations Project Boundary (PA09_0176)
- Ravensworth Underground Mine Project Boundary (DA104/96)
- Ravensworth Biodiversity Offset Areas
- Local Government Area
- Main Road
- Local Road
- Rail Line
- Watercourse



0 1 2 3 4 km

Date Created: 18/03/2025
Map Size: A4 Portrait
Scale: 1:100,000
Map Created By: Pacific Environmental Pty Ltd (on behalf of Ravensworth Operations Pty Ltd)
Coordinate System: GDA2020 (MGA Zone 56)
Projection: Transverse Mercator Datum GDA2020

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6.4.2 Environmental Monitoring Results

Biodiversity Offset Area Monitoring

Biodiversity Australia Pty Ltd conducted the 2024 BOA monitoring, fulfilling annual monitoring requirements and comparing results to previous years. The full report *Ravensworth Biodiversity Offset Area Monitoring 2024* (Biodiversity Australia, 2025) is available on the Ravensworth Operations website⁹, with a summary provided below.

To maintain data consistency, monitoring is conducted at similar times each year. In 2024, monitoring was conducted as follows:

- Winter (29–31 July 2024): Targeted threatened bird surveys;
- Spring (29 October – 1 November 2024): Flora surveys and bird census monitoring; and
- Summer (9–12 December 2024): Fauna surveys, including Green and Golden Bell Frog surveys, spotlighting and hair tube surveys.

In accordance with the Conservation Agreements, a separate annual monitoring event must be conducted, and report submitted to the NSW Biodiversity Conservation Trust (BCT) by the 30 December of that year. There were no limitations to completing the conservation agreement monitoring during 2024.

Vegetation condition assessment

In 2024, vegetation condition assessments were conducted for the first time using the Biodiversity Assessment Method (BAM). Biodiversity Australia (2025) reported that the data obtained through BAM was highly comparable to previous methodologies, with the primary difference being the addition of comments on canopy species regeneration.

Findings of vegetation condition assessments included:

- Increase species diversity across BOAs, though exotic species increased considerably and are at similar levels to 2016-2019;
- Species richness remained below 2016 peak levels but showed no decline compared with 2023;
- Above average rainfall early in 2024 may have contributed to seed germination and an increase in diversity;
- Natural regeneration was apparent in many of the surveyed grassland plots, though some areas within COA and HOA lacked evidence of regeneration;
- Planned revegetation was delayed due to supply issues and climatic conditions; and
- Grazing pressure from kangaroos and rabbits remains a challenge for regeneration success.

Bird census

Bird census monitoring showed increased species richness in grassland plots across all BOAs. Bird richness in grassland plots was slightly higher when compared with woodland.

One threatened bird species, the Grey-crowned Babbler (*Pomatostomus temporalis*), was recorded in 2024.

⁹ <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/reporting-documents#biodiversity-offset-area-monitoring>

Targeted threatened bird surveys

Targeted surveys were unsuccessful for the Regent Honeyeater and Swift Parrot were unsuccessful, possibly due to limited flowering of *Corymbia* at the time monitoring was conducted.

Microbat surveys

Microchiropteran bat call detection was undertaken using two Anabat Chorus units (Titley Scientific) deployed in each BOA. Analysis of anabat data found 10 species of Microchiroptera across the HCOA and RNOA. Review of logs from anabat device showed that there were no microbats recorded on COA or SOA, however on device showed that it had a firmware failure during deployment. Similarly one device deployed on HCOA and RNOA did not record microbats though logs show devices were on for the recording period.

Green and Golden Bell Frog (*Litoria aurea*) surveys

Surveys for the Green and Golden Bell Frog were unsuccessful in 2024, likely due to unsuitable dam conditions and low rainfall since July 2024.

Fauna

Findings of fauna surveys included:

- 44 fauna species were recorded at RNOA, with no new species identified.
- Overall fauna species counts declined, reaching the lowest levels since monitoring began; however, species richness remained stable over the past seven years, indicating the decline observed in 2024 is likely due to natural variation rather than habitat decline.
- Hair tube surveys did not detect any threatened fauna in 2024, nor did they collect any hair to be able to be analysed.
- Spotlighting detected two (2) fauna species in 2024, eastern grey kangaroo (*Macropus giganteus*) and rabbit (*Oryctolagus cuniculus*).
- No reptiles or amphibians were detected during spotlighting.

Erosion monitoring

In 2024, 18 erosion monitoring points were established in the HOA in areas where erosion remediation works have been completed. Baseline flora observations were recorded to provide an initial assessment of vegetation conditions; however, plot bearings were not recorded as formal surveys were not conducted.

Biodiversity Offset Area Monitoring – Conservation Agreement

Biodiversity Australia Pty Ltd conducted the 2024 BOA Conservation Agreement monitoring, fulfilling annual monitoring requirements and comparing results to previous years. Field surveys involved vegetation assessments and photo monitoring at a total of 25 monitoring sites across the four BOAs. These were conducted in line with previous assessments with additional data collected to be in line with the Biodiversity Assessment Method.

Overall, natural canopy regeneration was noted across the vast majority of plots (HC7 and ST1), a likely result of the improved environmental conditions following continued above average rainfall throughout 2024. Plots that have been historically cleared and not shown signs of regeneration, have this year, recorded signs of canopy species regeneration. Despite an overall improvement in canopy regeneration, shrub cover select sites continue to remain low. Many of these sites are *Allocasuarina* dominant woodlands where it can be difficult for shrubs to form (RN3 and RN4). This may also be attributed to competition with other strata i.e. plots where canopy cover is largely intact or open plots

where grass cover out competes germinating shrubs. These areas may benefit from direct intervention across all BOAs. Species richness has improved across all sites, again likely owing to the increased rainfall increasing the detectability of certain species. Weed cover is typically low across all BOAs however there are areas where exotic species are abundant and would benefit from targeted treatment.

Photo monitoring shows changes in vegetation cover since monitoring inception. Photo monitoring conducted during the 2024 monitoring period displayed a general increase in ground cover condition due to dry conditions. Of the sites showing improvement of regeneration, HC2, HC5, HC7, HC9, RN2, ST1, ST2 and CL4 show some degree of improvement in natural regeneration in comparison with baseline photos. Most of the disturbed grassland sites have remained stagnant throughout the years.

Vertebrate pest and vegetation management was carried out with some success across the BOAs. Exotic plants in general have increased likely due to the wetter conditions throughout the year, pest fauna species are evidently present throughout the offsets with scat of pigs/foxes/cats being observed.

6.4.3 Key Performance and Management Issues

Weeds and pests continue to be a focus of management within the BOAs (see **Section 6.9**).

No incidents occurred in the BOAs during the reporting period. Biodiversity Australia (2025) provides an assessment of the compliance of the 2024 monitoring results with the biodiversity objectives and target criteria outlined within the OAMP. Additional corrective actions are recommended for any targets not yet achieved.

6.4.4 Proposed Improvements

Established site procedures, processes, and systems will continue to be implemented to manage biodiversity, including BOAs, at the Ravensworth Complex. Revegetation efforts will continue, in consideration of the BOA monitoring recommendations, including:

- Continued weed and pest management (see **Section 6.9**);
- Continuation of revegetation works

6.5 Erosion and Sediment Control

6.5.1 Environmental Management

Erosion and sediment control at the Ravensworth Complex is managed in accordance with the approved *Erosion and Sediment Control Plan* (ESCP), which has been developed in accordance with Schedule 3, Condition 23(b) of PA 09_0176 and Schedule 3, Condition 31(c) of DA 104/76, and is included in the *Ravensworth Complex Water Management Plan* (WMP)¹⁰.

6.5.2 Environmental Monitoring Results and Works Undertaken

During the reporting period there were minor upgrades to erosion and sediment controls at site and maintenance of existing erosion and sediment control measures (e.g. desilting of dams).

¹⁰ available on the Ravensworth Operations website <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/management-plans>

6.5.3 Key Performance and Management Issues

Erosion is actively managed with appropriate controls. Erosion maintenance works are undertaken on an annual basis or otherwise as required. Erosion and sediment controls have been assessed as effective, based on the performance of existing measures during the reporting period.

6.5.4 Proposed Improvements

Established site procedures, processes, and systems will continue to be implemented to manage erosion and sediment controls at the Ravensworth Complex; including necessary monitoring, along with maintenance and upgrades, as required.

6.6 Aboriginal Heritage

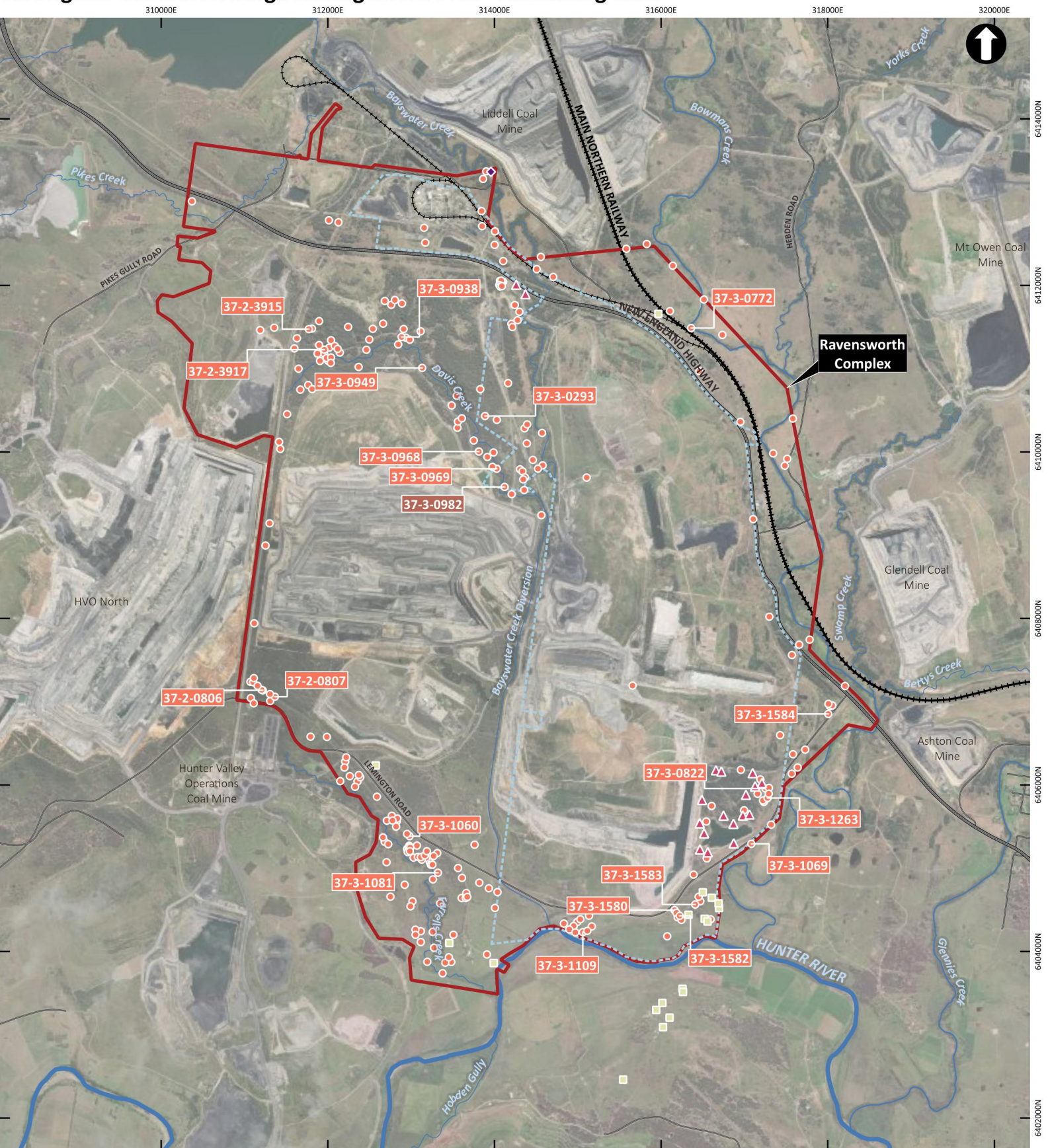
6.6.1 Environmental Management

Aboriginal and Cultural Heritage at Ravensworth Operations is managed in accordance with the *Ravensworth Complex Aboriginal Cultural Heritage Management Plan* (ACHMP). Remaining archaeological (Aboriginal heritage) sites within the Ravensworth Complex are shown on

Figure 6-5.

A monitoring program is undertaken for Aboriginal heritage sites that are not directly impacted by approved mining activities, in accordance with the ACHMP. Monitoring is conducted annually. Results from the monitoring program are discussed below.

Figure 6-5 – Archaeological (Aboriginal Heritage) Sites



DATA SOURCE: © 2025 New South Wales Spatial Services (within the Department of Customer Service NSW); © 2025 Glencore; © 2025 Microsoft (© 2024 Maxar)

LEGEND

- Ravensworth Operations Project Boundary (PA09_0176)
 - Ravensworth Underground Mine Project Boundary (DA104/96)
 - Main Road
 - Local Road
 - Rail Line
 - Watercourse
- Aboriginal Heritage Site Status**
- Extant
 - ▲ Partially extinct
 - ◆ Partially valid
 - Unknown
- 2024 Archaeological Monitoring (Sites Labelled)**
- ID Site Condition Monitoring Sites
 - ID REA86 Grinding Grooves



0 1 2 3 km

Date Created: 18/03/2025
Map Size: A4 Portrait
Scale: 1:60,000
Map Created By: Pacific Environmental Pty Ltd (on behalf of Ravensworth Operations Pty Ltd)
Coordinate System: GDA2020 (MGA Zone 56)
Projection: Transverse Mercator Datum GDA2020

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6.6.2 Environmental Monitoring Results

The Annual Site Monitoring program was conducted from 28 to 29 November 2024, and was attended by Registered Aboriginal Parties (RAPs).

The 2024 program involved a visual inspection of 21 monitoring sites to assess site conditions, evaluate the effectiveness of land management measures, particularly in mitigating erosion, and document Aboriginal site conditions over time.

Photographic monitoring was last completed in 2023 and is not required again until 2026.

Key Findings:

- **No Non-Natural Disturbances:** No impacts from non-natural activities were observed at any of the monitored sites.
- **Erosion Impacts:** Most sites at Ravensworth have been affected by sheet wash erosion, with a small number experiencing ongoing gully erosion.
- **Revegetation Progress:** Natural revegetation is occurring across many sites, helping to slow or halt sheet wash erosion. However, due to limited topsoil in eroded areas, full vegetation recovery will take time.
- **Erosion Control Measures:** At sites where hay bales have been installed, there is clear evidence of sediment accumulation upslope, which supports vegetation growth. This confirms that hay bales are an effective, non-invasive erosion control measure, although periodic replacement is required.
- **Protection of Aboriginal Sites:** All Aboriginal sites within the Ravensworth Complex are fenced and signposted. No impacts beyond natural deterioration were observed, and the fencing program has been effective in preventing inadvertent disturbances.

The 2024 monitoring program confirms that erosion control measures are functioning effectively and that land management strategies are supporting long-term site stability and the preservation of Aboriginal heritage sites.

6.6.3 Key Performance and Management Issues

There were no complaints or incidents involving Aboriginal heritage sites.

The Annual Site Monitoring program recommended:

- Replacing hay bales at three (3) sites to further mitigate erosion, by reducing water flow and promoting vegetation growth
- Installing fencing and signage at one (1) site to enhance site protection and visibility.

Aboriginal and Cultural Heritage controls have been assessed as effective, based on performance during the reporting period.

6.6.4 Proposed Improvements

Established site procedures, processes, and systems will continue to be implemented to manage Aboriginal and Cultural Heritage at the Ravensworth Complex. As current controls are meeting performance requirements, no additional Aboriginal and Cultural Heritage mitigation measures are proposed for 2025, beyond the implementation of the recommendations from the Annual Site Monitoring Program.

6.7 European Heritage

6.7.1 Environmental Management

Management of European heritage sites at the Ravensworth Complex is undertaken in accordance with the approved Heritage Management Plan (HMP)¹¹, which has been developed in accordance with Schedule 3, Condition 42(c) of PA 09_0176 to manage potential impacts on, and heritage values of, other historic heritage on, and surrounding, site including the Ravensworth homestead, Chain of Ponds Hotel and Ravensworth Public School.

Aside from the management of blasting practices to meet relevant blast impact assessment criteria at listed heritage sites / items¹², there are no ongoing management requirements for identified European heritage sites, except for the Oaklands homestead, which is located to the south of the ROC. The HMP outlines the following heritage management measures for the Oaklands homestead:

- Any actions undertaken as part of management will be recorded and maintained and compared to the baseline dilapidation survey to track the interventions made;
- An annual inspection of the homestead for pests and the ingress of pests will be undertaken and if required treatment will be undertaken; and
- Biannual inspections will be undertaken utilising the dilapidation survey as a reference. The aim of the inspection will be to identify any deterioration and required maintenance work necessary to ensure the ongoing protective care of the site.

6.7.2 Environmental Monitoring Results

An annual inspection for pests within the Oaklands homestead site was undertaken.

Biannual inspections were conducted in April and October 2024. These inspections did not identify any further deterioration requiring immediate repair.

6.7.3 Key Performance and Management Issues

There were no management issues related to European heritage at the Ravensworth Complex during the reporting period.

6.7.4 Proposed Improvements

The HMP will continue to be implemented to manage European heritage at the Ravensworth Complex. As current controls are meeting performance requirements, no additional mitigation measures are proposed for 2025.

6.8 Meteorological Monitoring

Meteorological monitoring at the Ravensworth Complex is undertaken in compliance with:

- PA 09_0176 (Schedule 3, Condition 25);
- DA 104/96 (Schedule 3, Condition 25); and
- EPL 2652 (Condition M4).

¹¹ Available on the Ravensworth Operations website <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/management-plans>

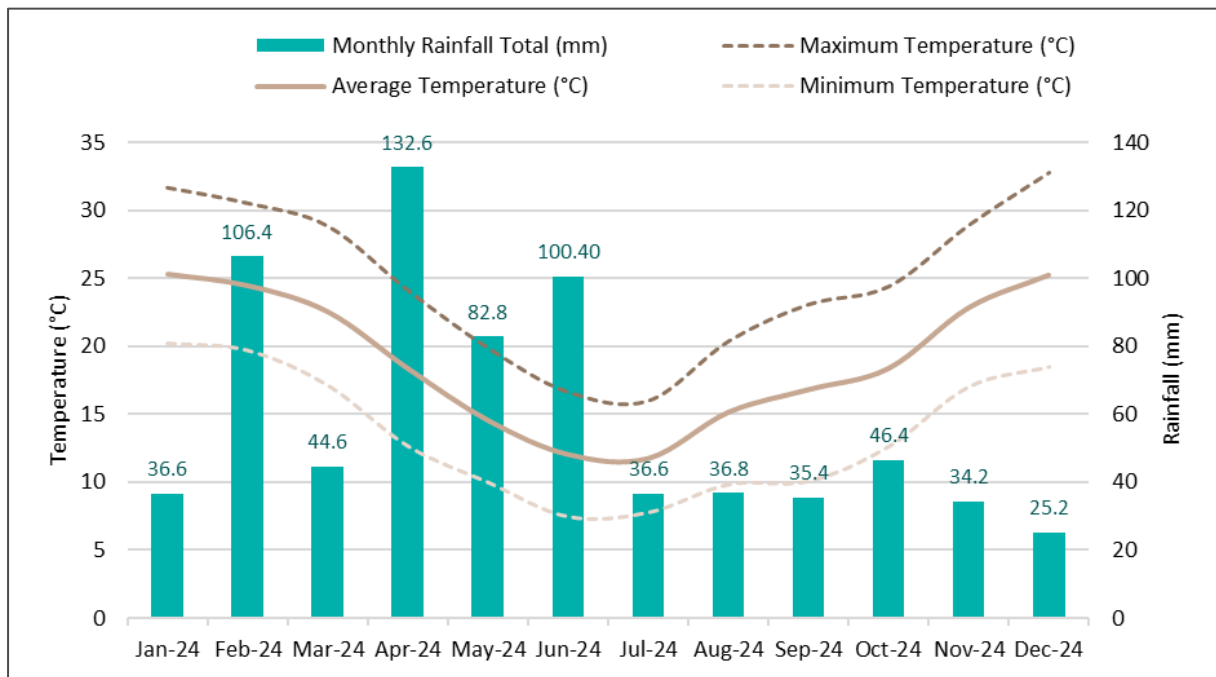
¹² The potential effects of blasting on heritage items is managed and monitored in accordance with the BMP (Section 6.2).

The meteorological station is required to measure atmospheric conditions, including wind speed, wind direction, sigma-theta, humidity, rainfall, and temperature in accordance with EPL 2652. This allows up to date predictions to be made on the impact of weather conditions on mining operations.

During the reporting period the meteorological station operated and recorded data for 100% of the time during the reporting period.

A summary of meteorological conditions is presented in **Figure 6-6**, with daily records presented in **Appendix F – Meteorological Monitoring Results**.

Figure 6-6 – Summary of Meteorological Conditions during 2024 Reporting Period



6.8.1 Average Temperature and Wind Speed

Throughout the reporting period the average mean wind speed was 1.92 m/s.

Temperature ranged from 1.9°C to 41.4°C. The mean air temperature (at 10m) was 19.0°C.

6.8.2 Rainfall

During the reporting period, a total of 718 mm of rainfall was recorded at the Ravensworth Complex. This was higher than 2023 (524 mm) but remained lower than 2022 (1,153 mm) and 2021 (1,042.4 mm). Rainfall was highest in the first half of the year, with February, April and June all recording over 100 mm.

- April was the wettest month, with 132.6 mm of rainfall recorded.
- December was the driest month, with just 25.2 mm of rainfall recorded.

Similar rainfall trends were observed at the nearest Bureau of Meteorology (BoM) monitoring station, Bowmans Creek (Station no. 61270). Rainfall over 2024 was typical average to below average, with slightly higher totals compared to 2023 but notably lower than the 2020-2023 La Nina event (BOM, 2024). Between 1994 and 2024, the average rainfall at this BoM monitoring station has been 873 mm.

6.9 Weed and Pest Management

6.9.1 Environmental Management

Weed and pest management at the Ravensworth Complex is undertaken in accordance with the approved *Ravensworth Open Cut Biodiversity Offset Management Plan (BOMP)*¹³, which has been developed in accordance with Schedule 3, Condition 38 of PA 09_0176 to describe the ecological management strategies, procedures, controls and monitoring programs that are to be implemented for the management of flora and fauna at the Ravensworth Complex. This includes the management of potential impacts from weeds and feral pests.

6.9.2 Environmental Monitoring Results

Weed Management Activities

Annual inspections at the Ravensworth Complex are used to identify areas of weed infestations as well as review the success of previous weed control programs. Weed infestations are recorded in the sites GIS database.

A summary of weed control activities undertaken at the Ravensworth Complex and BOAs in 2024 is presented in **Table 6-13**. Weed control was predominantly conducted in rehabilitation pasture areas, buffer lands and BOA's. Methods included:

- Application of herbicides via spraying;
- Cut and paste;
- Selective culling; and
- Mechanical removal.

Table 6-13 - Weed Control at the Ravensworth Complex and in BOAs during the Reporting Period

Location	Target Species
Ravensworth Rehabilitation	• Galenia • Pampas Grass • South African Pigeon Grass • Acacia salinga • African Boxthorn • Coolatai Grass • Rhodes Grass • Seteria • Common Pear
Ravensworth Offset Areas	• Common Prickly Pear • Fireweed • Galenia • Trailing Lantana • Blackberry • Mother of millions • Blue Heliotrope • St Johns Wort • Coolatai grass • Saffron thistle

¹³ available on the Ravensworth Operations website <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/management-plans>

Feral and Pest Animal Management

Feral species were recorded in the RNOA, HOA, COA and SOA during the monitoring program; however, targeted surveys were not undertaken and therefore there are no measured densities. The observed feral species include:

- Dog (*Canis lupus familiaris*)
- European rabbit (*Oryctolagus cuniculus*)
- Wild pig (*Sus scrofa*)

Observations suggest that pest species abundances were slightly lower in 2024. This was particularly evident with feral pigs, with a notably decreased extent of their impact.

Wild Dogs and Foxes

The management strategy for feral animals continued with baiting programs conducted during the reporting period. The programs were carried out by an experienced consultant and adhered to all best practice guidelines set by NSW Environment, Energy and Science and the Local Land Service.

Feral animal control continued to focus on fox and wild dog eradication across all the BOAs. During the Autumn baiting program, 20 baits were taken, with 5 baits taken by wild dogs, and 3 baits taken by foxes.

Feral animal control onsite (including RNOA) was undertaken in Autumn 2024. During the program 45 baits were taken, including 12 baits were taken by wild dogs, 5 baits were taken by foxes, and 10 baits taken by pigs.

Other Animals

A pig trapping program was implemented during 2024 which trapped 11 pigs.

A Pindone Rabbit Control Program was conducted seeing a considerable reduction in rabbit numbers recorded during post program monitoring.

6.9.3 Key Performance and Management Issues

No reportable incidents, performance or management issues regarding weeds and feral animal management occurred during the reporting period. Weed and feral pest management has been assessed as effective, based on the performance of existing measures during the reporting period.

6.9.4 Proposed Improvements

Established site procedures, processes, and systems will continue to be implemented to manage weeds and feral pests at the Ravensworth Complex; including necessary weed monitoring, as well as weed and pest management as required.

6.10 Visual and Lighting

6.10.1 Environmental Management

Ravensworth Complex employs various management strategies for mitigating and minimising its impacts on the visual amenity from community locations and public roads. These management

strategies ensure compliance with the requirements of Schedule 3, Condition 49 of PA 09_0176 and are documented in the BOMP¹⁴.

6.10.2 Environmental Monitoring Results

No lighting surveys were undertaken during the reporting period as there was no change to visual impacts at the Ravensworth Complex.

6.10.3 Key Performance and Management Issues

There were no performance or management issues regarding visual mitigation or lighting during the reporting period. Existing controls have been assessed as effective, based on performance during the reporting period.

6.10.4 Proposed Improvements

Established management strategies will continue to be implemented to manage potential impacts on the visual amenity at the Ravensworth Complex. As current controls are meeting performance requirements, no additional visual and lighting improvements are proposed for 2025.

6.11 Spontaneous Combustion, Methane Drainage and Ventilation

6.11.1 Environmental Management

Management of spontaneous combustion at the Ravensworth Complex is undertaken in accordance with the AQGGMP and *Ravensworth Complex Spontaneous Combustion Principal Hazard Management Plan* (SCPMHMP). The SCPMHMP has been developed to meet the requirements of the NSW work health and safety legislation and relevant guidance material issued by the NSW Resource Regulator.

The SCPMHMP addresses the placement of carbonaceous materials to minimise the potential for spontaneous combustion. It also identifies potential sources of carbonaceous material at the mine and details the procedures for their safe handling and disposal. To support effective implementation, a specific training module has been developed to communicate the requirements of this plan to appropriate personnel. Note, there are currently no methane drainage or ventilation activities taking place at RUM.

6.11.2 Environmental Monitoring Results

Monitoring is conducted in accordance with the *Spontaneous Combustion Principal Hazard Management Plan*.

6.11.3 Key Performance and Management Issues

There were no performance or management issues regarding spontaneous combustion, methane drainage and ventilation during the reporting period. There were no community complaints in relation

¹⁴ Available on the Ravensworth Operations website <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/management-plans>

to odour during the reporting period. Existing controls have been assessed as effective, based on performance during the reporting period.

6.11.4 Proposed Improvements

Established management strategies will continue to be implemented to manage spontaneous combustion, methane drainage and ventilation at the Ravensworth Complex. As current controls are meeting performance requirements, no additional spontaneous combustion, methane drainage and ventilation mitigation measures are proposed for 2025.

6.12 Bushfire Management

6.12.1 Environmental Management

Bushfire management at the Ravensworth Complex is undertaken in accordance with the approved *Ravensworth Operations Biodiversity Offset Management Plan (BOMP)*¹⁵, which has been developed in accordance with Schedule 3, Condition 38 of PA 09_0176. This plan outlines the bushfire management measures to be implemented.

The *Ravensworth Operations Offset Area Bushfire Management Plan* has been developed to meet statutory land management requirements, assess bushfire hazards through fuel load and terrain assessment, and outline management approaches including the development and ongoing maintenance of Strategic Fire Advantage Zones and Land Management Zones.

The reduction of fuel loads by mechanical means and through the use of fire are also considered in the plan as prevention measures to reduce the likelihood of uncontrollable wildfire. The utilisation of a mosaic of prescribed burns may provide some temporal benefit in fuel reduction in the BOAs. Any fuel reduction burns will be conducted at a time when it is likely to cause minimal impact to threatened species or endangered ecological communities. The best time will be decided after careful consideration of the fire ecology of the threatened species or vegetation community and consultation with the rural fire service for controlled burning.

In addition, Schedule 3, Condition 52 of PA 09_0176 requires that the Ravensworth Complex is suitably equipped to respond to fires on site and must assist the Rural Fire Service and emergency services as much as possible if there is a fire in the vicinity of the site. The Ravensworth Complex relies on site emergency response procedures, including the *Bushfire Emergency Response Plan* to fulfil these requirements.

6.12.2 Environmental Monitoring Results

There were no bushfire events onsite or within the BOAs during the reporting period.

The annual review of bushfire management in the offset areas was conducted in June by BEMC (2024), including:

- Visual inspections to confirm that fuel levels, including within designated Strategic Fire Advantage Zones (SFAZs), remain at or below recommended levels.
- Inspection of roads and trails to ensure adequate access is maintained for firefighting operations.

¹⁵ Available on the Ravensworth Operations website <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/management-plans>

- Identification of additional bushfire hazards or other factors affecting site-specific bushfire management.

BEMC (2024) concluded that:

- Recent weather conditions have resulted in an increase in fire fuel loads in consideration of previous drought years. The fuel load increase is consistent across all offsets resulting in an increased the bushfire risk especially within grassland environments.
- There has been significant improvement in the condition and standard of the existing trails network throughout the off-sets over the past 4 years.
- Trail works can move into a responsive maintenance program.

6.12.3 Key Performance and Management Issues

The *Ravensworth Complex Offset Area Bushfire Management Plan* is periodically revised to incorporate the findings of the annual reviews. There were no incidents of bushfire within the BOAs during the reporting period. Bushfire management controls have been assessed as effective, based on performance during the reporting period.

6.12.4 Proposed Improvements

Established site procedures, processes, and systems will continue to be implemented to manage bushfire at the Ravensworth Complex. As current controls are meeting performance requirements, no additional bushfire management measures are proposed for 2025.

6.13 Mine Subsidence

6.13.1 Environmental Management

RUM holds Subsidence Management Plan (SMP) approval for Longwalls (LW) 1 to 15 in the Pikes Gully Seam, approved in August 2013. The SMP was established manage potential subsidence impacts, including surface cracking, erosion, slope instability, land degradation and spontaneous combustion associated with longwall mining.

Although underground mining ceased in 2014, visual subsidence monitoring continues, and subsidence repairs are undertaken as required in accordance with the SMP. Key ongoing subsidence management measures include:

- Six-monthly visual subsidence inspections;
- Repair of subsidence damage and filling of subsidence cracks, if required; and
- Subsidence reporting to the Resource Regulator, if new subsidence impacts are identified during inspections.

6.13.2 Environmental Monitoring Results

In 2024, visual subsidence inspections were undertaken as part of the ongoing Environmental Monitoring Inspections. No subsidence-related issues were identified, and no remedial repair works were required during the reporting period.

Table 6-14 provides a summary of compliance with the subsidence performance measures required by Schedule 3, Condition 1 (Natural and Heritage Features) and Condition 3 (Built Features) of DA 104/96.

Table 6-14 - Summary of Compliance with Subsidence Impact Performance Measures

Aspect / Features	Performance Measure	Performance During Reporting Period
Watercourses		
Bowmans Creek and Bayswater Creek	No greater subsidence impact or environmental consequences than predicted in the EAs	Compliant
Bowmans Creek and Bayswater Creek alluvium	No greater subsidence impact or environmental consequences than predicted in the EAs	Compliant
Hunter River and its alluvium	Negligible environmental consequences	Compliant
Biodiversity		
Threatened species, threatened populations, or endangered ecological communities	Negligible environmental consequences	Compliant
Heritage		
Aboriginal heritage sites	No greater subsidence impact or environmental consequences than approved under a permit issued under section 90 of the <i>National Parks and Wildlife Act 1974</i>	Compliant
Built features		
Key public infrastructure: • New England Highway; • Main Northern Railway	Always safe and serviceable. Any damage that does not affect safety or serviceability must be fully repairable and must be fully repaired.	Compliant
Lemington Road/ Brunkers Lane	Always safe. Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated. Damage must be fully repaired or replaced, or else fully compensated.	Compliant
Other public infrastructure (including dams and voids; roads and tracks; active mining areas and infrastructure; electricity transmission lines; gas pipelines; telecommunications networks and fibre optic cables; water supply pipelines, etc.) Houses, industrial premises, swimming pools, farm dams and other built features or improvements	Always safe. Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated. Damage must be fully repaired or replaced, or else fully compensated.	Compliant
Public safety		
Public safety	Negligible additional risk	Compliant

6.13.3 Key Performance and Management Issues

Subsidence controls have been assessed as effective, based on monitoring and management performance during the reporting period.

6.13.4 Proposed Improvements

Six-monthly inspections will continue in 2025, with any required maintenance of subsidence related impacts completed in accordance with the RMP.

6.14 Hydrocarbon and Chemical Management

6.14.1 Environmental Management

Hydrocarbon and waste management is undertaken in accordance with EMS. Bulk fuel facilities comply with *AS1940-2017 The Storage and Handling of Flammable and Combustible liquids*, with all permanent fuel facilities bunded and equipped with spill management measures.

The Ravensworth Complex is designed to prevent contamination, with chemical storage and handling undertaken in compliance with Australian Standards and relevant guidelines.

Management of hydrocarbon-contaminated waste materials includes:

- Bioremediation and onsite disposal of materials from pit areas, hardstands, and truck wash areas.
- Treatment of hydrocarbon contaminated water via industrial oil-water separators, with treated water recycled for reuse and separated oil disposed of offsite by a licensed waste contractor.
- Containment and offsite treatment, by a licensed waste contractor, of contaminated water in the event of accidental onsite dam contamination.

The bioremediation area is tested when cells are full and dry or inspections indicate testing is necessary.

6.14.2 Environmental Monitoring Results

No reportable spills occurred during the reporting period.

Contaminated material was managed in accordance with the *Ravensworth Operations Environmental Management Strategy*, either sent to the onsite bioremediation area or disposed of appropriately.

The bioremediation area was tested in April and October 2024, based on cell capacity and inspection outcomes.

6.14.3 Key Performance and Management Issues

There were no significant issues regarding hydrocarbon and chemical management throughout the reporting period.

Hydrocarbon and chemical management controls have been assessed as effective, based on compliance with regulatory requirements and site procedures during the reporting period.

6.14.4 Proposed Improvements

Hydrocarbon spills will continue to be managed in accordance with AS1940-2017, with prompt clean-up and contaminated material sent to the bioremediation area or disposed of appropriately.

Established site procedures, processes, and systems will continue to be implemented to manage hydrocarbons and chemicals at the Ravensworth Complex. As current controls are meeting performance requirements, no additional hydrocarbon and chemical mitigation measures are proposed for 2025.

6.15 Greenhouse Gas and Energy

6.15.1 GHG Environmental Management

Greenhouse gas (GHG) emissions at Ravensworth Complex are managed, monitored and reported in accordance with the AQGGMP¹⁶.

Scope 1 (direct) and Scope 2 (indirect) GHG emissions are reported annually under the Commonwealth Government National Greenhouse and Energy Reporting Scheme (NGERS), as mandated by the *National Greenhouse and Energy Reporting Act 2007* (Cth) (NGER Act).

The Ravensworth Complex is part of the Glencore Coal Assets Australia (GCAA), with GHG reporting roles shared between GCAA and the Ravensworth Complex. Emissions, energy use and energy production are monitored through direct energy use measurement and emission modelling based on activity data, in accordance with the *National Greenhouse and Energy Reporting (Measurement) Determination 2008* (Cth).

To reduce GHG emissions from diesel and electricity consumption, the Ravensworth Complex is committed to:

- Optimising mining practices (e.g., haulage planning, blast design, conveying arrangements);
- Enhancing engine performance through studies with Original Equipment Manufacturers (OEMs) to improve fuel efficiency and emissions reduction;
- Purchasing new fleet vehicles with the most fuel-efficient engines available;
- Exploring biofuel and fuel additive opportunities through ongoing monitoring; and
- Assessing emerging technologies for potential implementation.

6.15.2 GHG Environmental Monitoring Results

Results from the Reporting Period

Table 6-15 presents the Scope 1 (direct) and Scope 2 (indirect) GHG emissions for the past five reporting periods, including comparisons to Environmental Assessment predictions¹⁷. During the reporting period, total GHG emissions for the Ravensworth Complex were 558,123 tonnes CO₂-e.

Table 6-15 - GHG Emissions Summary 2024

Emission Source	NGERS Reported Emissions (tonnes CO ₂ -e)					Predicted Emissions
	FY20*	FY21*	FY22*	FY23*	FY24*	
Ravensworth Open Cut						
Scope 1	291,655	324,204	268,698	327,434	326,604	324,204
Scope 2	11,218	10,690	10,017	10,317	10,875	11,218

¹⁶ Available on the Ravensworth Operations website <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/management-plans>

¹⁷ The NGERS reporting year follows a financial year cycle, rather than the calendar year used in this Annual Review. To ensure consistency and prevent discrepancies in public reporting, the values presented in this report also align with the financial year.

Emission Source	NGERS Reported Emissions (tonnes CO ₂ -e)					Predicted Emissions
	FY20*	FY21*	FY22*	FY23*	FY24*	
Total Scope 1 + Scope 2	302,873	334,894	278,715	337,751	337,479	302,873
RUM						
Scope 1	155,307	155,993	126,640	92,239	71,692	155,307
Scope 2	4,758	4,911	3,966	1,419	67	4,758
Total Scope 1 + Scope 2	160,065	160,904	130,606	93,658	71,759	160,065
RCHPP (including Cumnock)						
Scope 1	15,826	17,401	13,420	13,632	3,663	15,826
Scope 2	79,359	72,565	70,348	74,594	70,748	79,359
Total Scope 1 + Scope 2	95,185	89,966	83,768	88,226	74,411	95,185
Total Greenhouse Gas Emissions						
Scope 1 and 2 Emissions	558,123	585,764	493,089	519,635	483,649	558,123

Notes: ^a Source: *Air Quality and Greenhouse Gas Impact Assessment Narama West Modification Environmental Assessment* (Pacific Environment, 2013) – Table 4: Scope 1 and 2 Emissions (Ravensworth Operations - Average per Year (Over 29 years)) ^b Source: *Air Quality Assessment Ravensworth Underground Mine – Liddell Seam Project (MOD 9) Environmental Assessment* (PAEHolmes 2012) – Table 9.4: Summary of GHG Emissions for RUM Mod 9 (t CO₂-e / annum) ^c included in the estimates for Ravensworth Open Cut. *Previously reported values for 2020 -2024 were incorrectly reported in previous Annual Reviews. Values presented above align with actual NGERS submission for FY20-FY24.

Comparison with Predictions

Total GHG emissions in FY24 remained significantly below Environmental Assessment predictions, with actual emissions less than 25% of predicted levels.

Long Term Trend Analysis

Table 6-15 summarises GHG emissions over the past five financial years, showing:

- Emissions consistently significantly below Environmental Assessment estimates; and
- A general downward trend in total GHG emissions.

6.15.3 Key Performance and Management Issues

There were no significant issues regarding GHG emissions or management measures throughout the reporting period. GHG emission management has been assessed as effective, based on compliance with predictions and NGERS during the reporting period.

6.15.4 Proposed Improvements

Established site procedures, processes, and systems will continue to be implemented to manage GHG emissions at the Ravensworth Complex.

As part of Glencore Coal Assets Australia (GCAA) and the global Glencore mining portfolio, the Ravensworth Complex aligns with Glencore's corporate emissions reduction targets, which include:

- A 15% emissions reduction by 2026.
- A 50% reduction in total (Scope 1, 2, and 3) emissions by 2035, based on 2019 levels.
- A net-zero ambition by 2050, contingent on a supportive policy environment.

Glencore integrates energy costs and carbon footprint considerations into its annual planning process, requiring all commodity departments, including GCAA, to:

- Forecast energy use and GHG emissions for each asset.
- Identify emissions reduction projects for potential implementation.

At Ravensworth Complex, this includes:

- Engagement with GCAA on GHG abatement technologies.
- Mine planning optimisation to improve efficiency and fuel consumption reduction.

7. Water Management

7.1 Water Balance

The overall water balance for the Ravensworth Complex in 2024 is presented below in **Table 7-1**.

The Ravensworth Complex water balance assessment for 2024 produced a net inventory change over the year of 6,162 ML, which is lower compared to the recorded change in inventory of 7,925 ML. This resulted in a water balance error of approximately 9.7%, which suggests that all inflow and outflows of the mine water system have been accounted for. The minor balance error is well within the acceptable limit for reporting and likely attributed to estimated or calculated water streams where exact monitoring is impracticable (e.g. groundwater inflow calculations, runoff estimates, etc.).

Table 7-1 – Ravensworth Complex 2024 Water Balance

Item	Volume (ML)
Inflows	
Rainfall Runoff	3,335
Groundwater Inflow	833
ROM Coal Moisture	1,007
From Mount Owen Complex (MOC)	0
From Liddell Coal Operations (LOC)	0
From Hunter Valley Operations (HVO)	691
Potable Supply	6
From Hunter River	113
Total Inflows	5,985
Outflows	
Evaporation	897
Dust Suppression / Wash bay	1,385
CHPP Supply	2
Product Coal Moisture	754
Coarse Rejects Moisture	361
Tailings Water	0
To MOC	8,489
To LOC	0
Other Third-party supply (to HVO, Oaklands Property)	0
HRSTS Discharges to the Hunter River	0
Uncontrolled Release	259
Total Outflows	12,147
Inflow – Outflow	-6,162
Recorded Stored on Site at Start of Annual Review Period	19,716
Recorded Stored on Site and End of Annual Review Period	11,791
Change in Storage	-7,925
Error	-9.7%

7.2 Water Take

7.2.1 Surface Water Usage

The Ravensworth Complex holds water access licences (WALs) issued under the *Water Management Act 2000* including WAL 9049, WAL 10771, WAL 1046, WAL 13102, WAL 9050, WAL 8964, WAL 816, and WAL 1325 that allow for extraction of water from the Hunter River.

The Ravensworth Complex 2024 (2023-2024) water year surface water extraction and licence entitlement is recorded in **Table 7-2**. A total of 86.8 ML was extracted from the Hunter River in the 2023-2024 Water Year (i.e. 01 July 2023 to 30 June 2024) in compliance with the conditions of the relevant licences.

Table 7-2 – Licenced Surface Water Usage for the 2023-2024 Water Year

WAL / Reference Number	Water Source / Management Zone	Category	Entitlement (ML) ¹	Extracted Volume (ML)	Linked to
WAL 9049 / 20AL200743	Hunter River Regulated / Zone 1b (Hunter River from Goulburn River Junction to Glennies Creek Junction)	High Security	0	0	20WA200745
WAL 10771 / 20AL200462	Hunter River Regulated / Zone 1b (Hunter River from Goulburn River Junction to Glennies Creek Junction)	High Security	25	12.4	20WA200463
WAL 1046 / 20AL201444	Hunter River Regulated / Zone 1b (Hunter River from Goulburn River Junction to Glennies Creek Junction)	High Security	3	0	20CA203133
WAL 13102 / 20AL203412	Hunter River Regulated / Zone 1a (Hunter River from Glenbawn Dam to Goulburn River Junction)	High Security	15	0	20CA203133
WAL 9050 / 20AL200744	Hunter River Regulated / Zone 1b (Hunter River from Goulburn River Junction to Glennies Creek Junction)	General Security	500	74.4	20WA200745 20WA200463
WAL 8964 / 20AL203224	Hunter River Regulated / Zone 1b (Hunter River from Goulburn River Junction to Glennies Creek Junction)	General Security	1,590	0	20CA203133
WAL 816 / 20AL200890	Hunter River Regulated / Management Zone 3a (Glennies Creek)	General Security	20	0	20WA200891
WAL 1325 / 20AL203042	Hunter River Regulated / Zone 1b (Hunter River from Goulburn River Junction to Glennies Creek Junction)	Supplementary	13	0	20CA203133

Notes: ¹ Excluding any potential carry over

7.2.2 Groundwater Usage

The Ravensworth Complex currently holds six water licences issued under the *Water Management Act 2000* that allow the extraction of groundwater including WAL 41496, WAL 41505, WAL 41554, WAL 41507, WAL 41530, and WAL 41531.

The Ravensworth Complex groundwater extraction and licence entitlements are recorded in **Table 7-3**. A total of 1447 ML of groundwater was extracted in the 2024 water year in accordance with the conditions of all relevant licences.

Table 7-3 - Licenced Groundwater Usage for the 2023-2024 water year

WAL / Reference Number	Water Source	Entitlement ¹	Reported Usage (ML) ²	Linked to
WAL 41496 20AL216920	Sydney Basin-North Coast Groundwater Source	2520	988	20MW065021
WAL 41505 20AL217052	Sydney Basin-North Coast Groundwater Source	500	0	20MW065021
WAL 41554 20AL219016	Sydney Basin-North Coast Groundwater Source	50	0	20MW065021
WAL 41507 20AL217068	Sydney Basin-North Coast Groundwater Source	576	313	20MW065021
WAL 41530 20AL218992	Sydney Basin-North Coast Groundwater Source	100	0	20MW065014
WAL 41531 20AL218993	Sydney Basin-North Coast Groundwater Source	150	146	20MW065014

Notes: ¹ Excluding any potential carry over. ² Reported usage based on water year

7.3 Water Supply, Use and Discharges

The ROC water management system comprises a range of infrastructure including water storages, pipes, and pumps for water transfers (within the mine complex and between external water sources and sinks) and instrumentation for flow and level measurement.

Surplus surface water at ROC is managed through:

- Transfer to the RCHPP for operational use;
- Discharge from the Narama Dam to the Hunter River via Bowmans Creek under the conditions of EPL 2652 and the Hunter River Salinity Trading Scheme (HRSTS); or
- Transfers to other Glencore mine sites under the Greater Ravensworth Water and Tailings Scheme (GRAWTS).

In accordance with EPL 2652, a maximum discharge of 400 ML/day from the Narama In-pit Storage Dam is permitted under the HRSTS Regulations.

During 2024, Ravensworth Operations:

- Held a maximum of 134 HRSTS salt credits.
- Did not undertaken any HRSTS discharges.
- Had HRSTS salt credit holdings reduced from 134 to 99.

7.4 Surface Water Monitoring

The following sections discuss surface water monitoring for the reporting period with results presented in **Appendix G - Annual Review Water Summary Report**.

7.4.1 Environmental Management

Surface water management across the Ravensworth Complex is undertaken in accordance with the *Ravensworth Operations Water Management Plan* (WMP)¹⁸. The WMP has been developed in accordance with Schedule 3, Condition 31 of PA 09_0176 and Schedule 3, Condition 23 of DA 104/96 and describes the measures and procedures to manage potential surface and groundwater impacts from operations at the Ravensworth Complex. The WMP was last updated in November 2023 following the determination of Mod 4 and was approved by DPHI on 9 February 2024 (DPHI ref: MP09_0176-PA-128).

Surface water monitoring is conducted in accordance with the requirements of the WMP, PA 09_0176, DA 104/96 and EPL 2652 requirements. Surface water monitoring includes:

- Surface water quality and flows in upstream and downstream watercourses;
- Channel stability in upstream and downstream watercourses;
- Stream health conditions in upstream and downstream watercourses;
- Onsite water and wastewater management; and
- Discharges to Bowmans Creek under the HRSTS¹⁹.

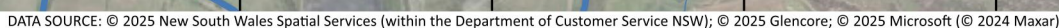
Surface water monitoring locations are shown on **Figure 7-1**.

Figure 7-1- Surface Water Monitoring Locations

¹⁸ Available on the Ravensworth Operations website <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/management-plans>

¹⁹ No HRSTS discharge occurred during the 2024 reporting period – see **Section 7.3**.

GLENCORE



 Main Road
 Local Road
 Rail Line
 Watercourse

- ▲ Hunter River Salinity Trading Scheme
- Watercourse Quality and Flow
- 🪟 Onsite Water Storage Management
- 🌿 Stream Stability



Date Created: 18/03/2025
Map Size: A4 Portrait
Scale: 1:60,000
Map Created By: Pacific Environmental Pty Ltd (on behalf of Ravensworth Operations Pty Ltd)
Coordinate System: GDA2020 (MGA Zone 56)
Projection: Transverse Mercator Datum GDA2020

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7.4.2 Environmental Monitoring Results

Surface Water Quality Monitoring Results

Surface water quality monitoring in upstream and downstream watercourses was conducted monthly in Bowmans Creek and Bayswater Creek, and bi-monthly in Davis Creek and Pikes Gully Creek.

Impact assessment criteria (IAC), also referred to as 'trigger values,' for pH, Electrical Conductivity (EC), Total Suspended Solids (TSS), and Total Dissolved Solids (TDS) have been determined for specific receiving water monitoring locations as part of the WMP. The IAC are used to identify deviations from the baseline water quality conditions.

Water quality results (pH, EC, TDS and TSS) for the reporting period have been assessed by Engeny (2025) and are presented in **Appendix G – Annual Review Water Summary Report (Tables B-1-B-6 and Figures B.1 – B.44)**. The assessment included:

- Statistical analysis (mean and standard deviation).
- Time-series charts illustrating historical trends and IAC trigger values for each watercourse.

Exceedances of IAC values were investigated in accordance with the WMP. The findings from the internal investigations for each creek (Engeny, 2024) indicate that most exceedances were influenced by natural factors, including:

- Low flow conditions and pooling, which can affect water quality variability.
- Sediment disturbance, particularly following rainfall events.

However, continued monitoring and analysis are recommended for Bowmans Creek and Bayswater Creek to assess potential recurring trends and nutrient contamination sources.

Flow Monitoring and Channel Stability

AECOM Australia Pty Ltd (AECOM) prepared the *Annual Stream Flow Report Ravensworth Open Cut - 2024 Report* (AECOM, 2025) on stream flow events and stream stability in upstream and downstream watercourses. The assessment included:

- Stream height and theoretical flow monitoring at two primary stations: Davis Creek and Bayswater Creek²⁰; and
- Stream stability analysis, based on comparative review of photographs taken at monitoring stations on Davis Creek, Bayswater Creek, Bowmans Creek and Pikes Gully Creek.

Key findings:

- Total recorded rainfall for 2024 was 718 mm, higher than the 524 mm recorded in 2023.
- The volume and frequency of rainfall events influenced the size and number of flow events recorded in each creek.
- Davis Creek recorded more flow events than Bayswater Creek, likely due to:
 - Differences in catchment size and potential external influences beyond Ravensworth Open Cut's control.
 - Localised rainfall variability, with storms possibly affecting Davis Creek without being fully recorded at the Ravensworth Open Cut Compliance Weather Station.

²⁰ Initially, stream flow event monitoring included three flow monitoring stations; however, the Emu Creek station was decommissioned in March 2022 following the installation of a flood levee as part of ongoing mining activities.

- Silt accumulation in Davis Creek's lower reaches, prolonging water retention and allowing small rainfall inputs to generate additional flow events.
- Photographic records suggest that monitored streams have remained relatively stable throughout 2024, comparable to 2022 conditions.
- Previous flow events (2021 and 2022) along Bayswater Creek had caused degradation to the drop structure downstream, which has been monitored through photographic records since 2015.
- Minor bank erosion was observed upstream of the drop structure, consistent with previous seasons, though partial recovery was evident due to natural vegetation regeneration.
- Photographic review of the Bayswater Creek drop structure confirmed no new damage from recent flow events.

Stream Health Monitoring

Biosis Pty Ltd (Biosis) prepared the *Annual Report Ravensworth Stream Health Monitoring Program 2024* (Biosis, 2025) based on biannual stream health assessments in upstream and downstream watercourses. The assessment included:

- Five potential monitoring sites within the Ravensworth Complex, across Bayswater Creek and Davis Creek; and
- Eight control sites within the BOAs; Cuan Creek, Wybong Creek, Unnamed Creek 1 and Unnamed Creek 2.

The monitoring program assesses macroinvertebrate community assemblages, water quality and overall catchment-riparian health using New South Wales (NSW) Australian River Assessment System (AUSRIVAS) and Stream Invertebrate Grade Number Average Level version 2 (SIGNAL 2) sampling and analyses, HABSCORE assessments, and physicochemical surface water quality testing.

Key findings:

- HABSCORE assessments in 2024 indicated slight improvements in habitat conditions compared to previous assessments (Biosis, 2023). Results fell within the marginal to sub-optimal range.
- Autumn monitoring showed higher water retention, leading to improved HABSCORE results compared to spring. This is uncommon in the program due to the ephemeral nature of the creeks and prior drought-like conditions.
- Minor variations in HABSCORE results were consistent with control sites, suggesting no significant habitat changes attributable to mining activities.
- AUSRIVAS and SIGNAL 2 analyses indicated that macroinvertebrate community structures remained in poor condition, as observed since baseline monitoring began.
- Slight improvements in macroinvertebrate structures were recorded in 2024, likely due to sustained rainfall in 2021 and 2022 and average rainfall in 2024.
- Fluctuations in stream health metrics were observed across both monitoring and control sites, largely influenced by water availability and environmental conditions, particularly during the 2019 drought.
- All recorded Band and SIGNAL 2 scores in 2024 remained within the historical range.

Since the commencement of stream health monitoring in 2012, all sites have remained in a poor condition, with no significant changes observed. As such, no impacts on stream health associated with mining operations were detected in 2024.

Onsite Water and Wastewater Management

Monitoring of onsite water storages at the Ravensworth Complex, including water supply dams, mine voids, and sediment dams is undertaken to meet operational requirements. Monitoring was conducted in accordance with the WMP.

There were no performance or management issues regarding onsite water and wastewater management during the reporting period.

Long Term Trend Analysis

Despite environmental fluctuations in water availability, monitoring sites and control sites overall have remained in a relatively stable but poor condition since the stream health monitoring program incorporated control sites in autumn 2013.

- No significant difference has been observed between monitoring sites and the control sites regarding water quality or macroinvertebrate assemblage health.
- Based on the parameters recorded at monitoring and control sites, it appears that mining activities have minimal impact on stream health within the Ravensworth Complex area.

7.4.3 Key Performance and Management Issues

Independent assessments of surface water monitoring data in 2024 concluded the following:

- Engeny (2025) determined that exceedances of the surface water quality trigger values in upstream and downstream watercourses were most likely influenced by natural factors, such as low flow conditions, pooling, and sediment disturbance following rainfall events.
- AECOM (2025) concluded that the volume and frequency of rainfall during the monitoring period is reflected in the size, number and timing of recorded flow events. Photographic records indicate streams remained relatively stable over the monitored period.
- Biosis (2025) found that the 2024 stream health monitoring results are considered predominantly normal for the locality and no impacts to stream health as a result of mine operation have been detected.

Based on these findings, surface water controls have been assessed as effective, throughout the reporting period.

7.4.4 Proposed Improvements

Surface water monitoring in upstream and downstream watercourses, incorporating surface water quality, stream flow, channel stability and stream health monitoring will continue to be conducted during the next reporting period.

Established site procedures, processes, and systems will continue to be implemented to manage surface water at the Ravensworth Complex. As current controls are meeting performance requirements, no additional surface water mitigation measures are proposed for 2025.

7.5 Groundwater Management

The following sections discuss groundwater management, monitoring, and compliance for the 2024 reporting period with results presented in **Appendix G - Annual Review Water Summary Report**.

7.5.1 Environmental Management

Groundwater management across the Ravensworth Complex is undertaken in accordance with the *Ravensworth Complex Water Management Plan* (WMP)²¹. The WMP has been developed in accordance with Schedule 3, Condition 31 of PA 09_0176 and Schedule 3, Condition 23 of DA 104/96 and describes the measures and procedures to manage potential surface and groundwater impacts from operations at the Ravensworth Complex. The WMP was last updated in November 2023 following the determination of Mod 4 and was approved by DPHI on 9 February 2024 (DPHI ref: MP09_0176-PA-128).

Groundwater monitoring is conducted in accordance with the requirements of the WMP and includes monitoring of the following elements of the alluvial and hardrock/coal aquifers underlying the Ravensworth Complex:

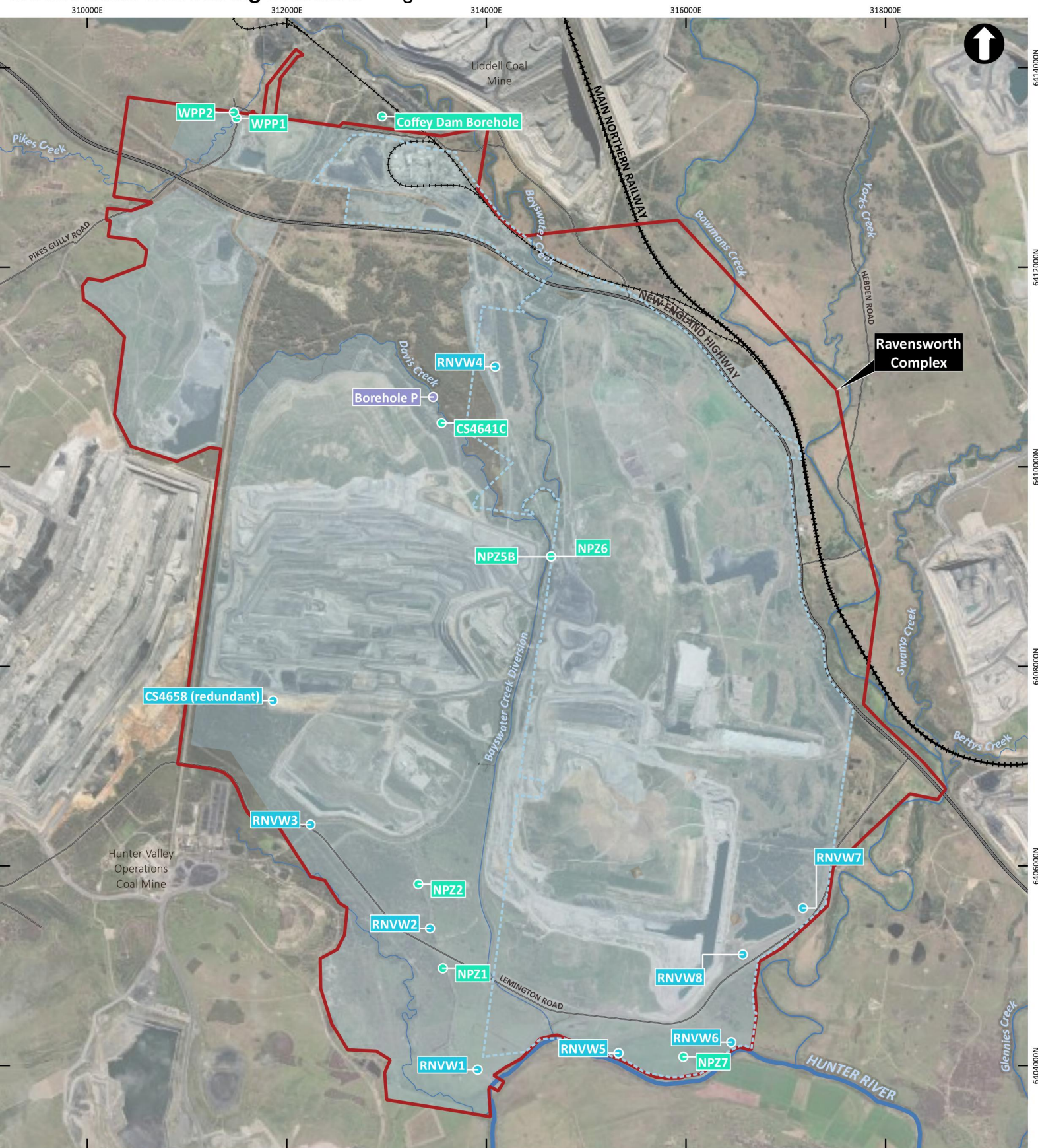
- Groundwater inflows/seepage into open cut pits and former underground workings;
- Groundwater quality monitoring, including:
 - pH;
 - Electrical Conductivity (EC); and
 - various trace elements (i.e. speciation);
- Groundwater levels/aquifer depressurisation; and
- Impacts on groundwater users and groundwater dependent ecosystems.

Groundwater monitoring locations are shown on **Figure 7-2**.

As required by *Condition 6.8.4* of PA 09_0176 Statement of Commitments, a formal review of the depressurisation of coal measures and comparison of responses with the aquifer model predictions is required biennially. A review of the model was completed in 2023 by AGE. The review concluded that the groundwater model continues to predict groundwater impacts with satisfactory accuracy, and that no further calibration of the model is required at this stage (AGE, 2023). A review of groundwater model predictions will be undertaken again in 2025.

Figure 7-2 – Groundwater Monitoring Locations

²¹ Available on the Ravensworth Operations website <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/management-plans>



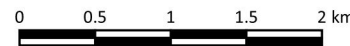
DATA SOURCE: © 2025 New South Wales Spatial Services (within the Department of Customer Service NSW); © 2025 Glencore; © 2025 Microsoft (© 2024 Maxar)

LEGEND

- Ravensworth Operations Project Boundary (PA09_0176)
- Ravensworth Underground Mine Project Boundary (DA104/96)
- Ravensworth Complex EPL Boundary (EPL2652)
- Main Road
- Local Road
- Rail Line
- Watercourse

Groundwater Monitoring Type

- Water Level and Quality (Standpipe)
- Water Level (Vibrating Wire Piezometer)
- Water Level (Standpipe)



Date Created: 18/03/2025
Map Size: A4 Portrait
Scale: 1:50,000
Map Created By: Pacific Environmental Pty Ltd (on behalf of Ravensworth Operations Pty Ltd)
Coordinate System: GDA2020 (MGA Zone 56)
Projection: Transverse Mercator Datum GDA2020

DISCLAIMER: Subject to survey, Glencore makes every effort to ensure the quality of the information available on this map. Before relying on the information on this map, users should carefully evaluate its accuracy, currency, completeness and relevance for their purposes, and should obtain appropriate professional advice relevant to their particular circumstances. Glencore cannot guarantee and assumes no responsibility for the accuracy, currency or completeness of the information and by using this map you accept that Glencore has no liability for any loss or damage in any form whatsoever caused directly or indirectly from the use of this map. Not for public distribution.

7.5.2 Environmental Monitoring Results

Results from the Reporting Period

The groundwater monitoring program included monthly monitoring of water levels, quarterly (minimum) monitoring of pH and EC, and annual monitoring of inorganic species (speciation data).

In 2024, some bores were blocked or inaccessible, preventing sampling at specific locations. However, most sites were monitored more frequently than required, ensuring robust data collection. Speciation sampling, typically conducted annually, was undertaken twice in April and October 2024.

All monitoring data collected as part of this program is assessed against established IAC to:

- Determine whether groundwater extraction volumes are within WAL limits and are comparable with modelled predictions;
- Identify deviations from the baseline water quality conditions; and
- Identify deviations from the baseline groundwater level trends.

Groundwater monitoring program results for the reporting period have been assessed by Engeny (2025) and are presented in **Appendix G - Annual Review Water Summary Report**. The assessment included:

- Statistical analysis (mean and standard deviation).
- Time-series charts illustrating historical trends and IAC trigger values for each monitoring location.

A summary of the findings are provided below.

Groundwater Quality

Results for pH, EC, and speciation 2024 data for all current and decommissioned monitoring bores are presented in **Appendix G - (Tables D-1-D-5 and Figures D.1 – D.32)** with the exceedances of IAC ranges identified in red text.

Key findings:

- No evidence of mining-related groundwater impacts was identified in exceedance investigations.
- Many exceedances were minor and consistent with historical trends.
- IAC trigger values should be updated at multiple sites to reflect natural variability and reduce unnecessary exceedance investigations.
- Site-specific triggers should be developed for key parameters (e.g., nitrate, sodium, chloride, iron, manganese) once sufficient data is available.
- Further assessment of local rainfall recharge influences is recommended at selected sites (e.g., NPZ7 Tall, NPZ5B P2).

Groundwater Levels

Results for groundwater level monitoring are presented in **Appendix G – Annual Review Water Summary Report (Tables E-1-E-2 and Figure E.1)**.

Key findings:

- Most groundwater monitoring sites showed increasing levels, aligning with climatic conditions and natural recharge processes.

- Localised declines were recorded at NPZ7 Small, NPZ7 Tall, and CS4641C, with trends largely consistent with historical data and linked to previous dewatering activities.
- No anomalies or unexpected trends were identified in groundwater level data that would indicate new mining-related impacts.

Groundwater Depressurisation

In addition to the above, groundwater pressure level is recorded at eight vibrating wire piezometers (RNW1-RNW8) at 6-hour or 12-hour intervals using. These monitoring locations are used to identify groundwater pressure responses to mining operations. Historical water level results are presented in **Appendix G – Annual Review Water Summary Report - (Figures E.2 – E.9).**

Key findings:

- Most groundwater monitoring sites showed increasing levels, aligning with climatic conditions and natural recharge processes.
- Localised declines were recorded at NPZ7 Small, NPZ7 Tall, and CS4641C, with trends largely consistent with historical data and linked to previous dewatering activities.
- No anomalies or unexpected trends were identified in groundwater level data that would indicate new mining-related impacts.

7.5.3 Key Performance and Management Issues

Independent assessment of groundwater monitoring data in 2024 concluded the following (Engeny, 2025):

- Exceedances of the groundwater quality trigger values were minor and consistent with historical trends.
- No evidence of mining-related groundwater impacts was identified in exceedance investigations.
- No anomalies or unexpected trends were identified in groundwater level data that would indicate new mining-related impacts.

Based on these findings, groundwater controls have been assessed as effective, throughout the reporting period.

7.5.4 Proposed Improvements

Established site procedures, processes, and systems will continue to be implemented to manage groundwater at the Ravensworth Complex. As current controls are meeting performance requirements, no additional groundwater mitigation measures are proposed for 2025.

8. Rehabilitation

8.1 Rehabilitation Performance

8.1.1 Rehabilitation Status at the End of the Reporting Period

Rehabilitation and disturbance areas at the Ravensworth Complex are summarised in **Table 8-1**. A total of 43.06 Ha of new disturbance associated with the progression of the Ravensworth North pit occurred during the reporting period. A total of 55 ha was prepared for rehabilitation in 2024 and 13 Ha of previously rehabilitated land was re-disturbed at Ravensworth Operations.

Figure 8-1 includes a map of areas disturbed and rehabilitated during 2024. Photographs of rehabilitation are also provided.

Table 8-1 - Ravensworth Complex 2024 Rehabilitation & Disturbance

Mine Area Type	Previous Reporting Period (Actual) - 2023	This Reporting Period (Actual) - 2024	Next Reporting Period (Forecast) - 2025
Total Mine Footprint (Ha)	2720.1	2656.02	2699.08
Disturbance (Ha)	1689.9	1580.42	1564.08
Land Being Prepared for Rehabilitation (Ha)	55.0	55.0	55.0
Land under Active Rehabilitation (Ha)	1075.1	1075.6	1135
Completed Rehabilitation (Ha) ¹	0	0	0

Notes: ¹ Completed Rehabilitation is classified as being signed off

Photo 1 – Rehabilitation Progress 2024. Western Emplacement Area



Photo 2 – Rehabilitation Progress 2024. Eastern Emplacement Area



Photo 3 – Rehabilitation Progress 2024. 7 South Rehabilitation Area



Photo 4 – Rehabilitation Progress 2024. 7 South Rehabilitation Area bulk shaping



Figure 8-1 – 2024 Rehabilitation and Disturbance (Ravensworth Operations)

Figure 8-2 – 2024 Rehabilitation and Disturbance (RUM)

Figure 8-1 - 2024 Rehabilitation and Disturbance (Ravensworth Operations)

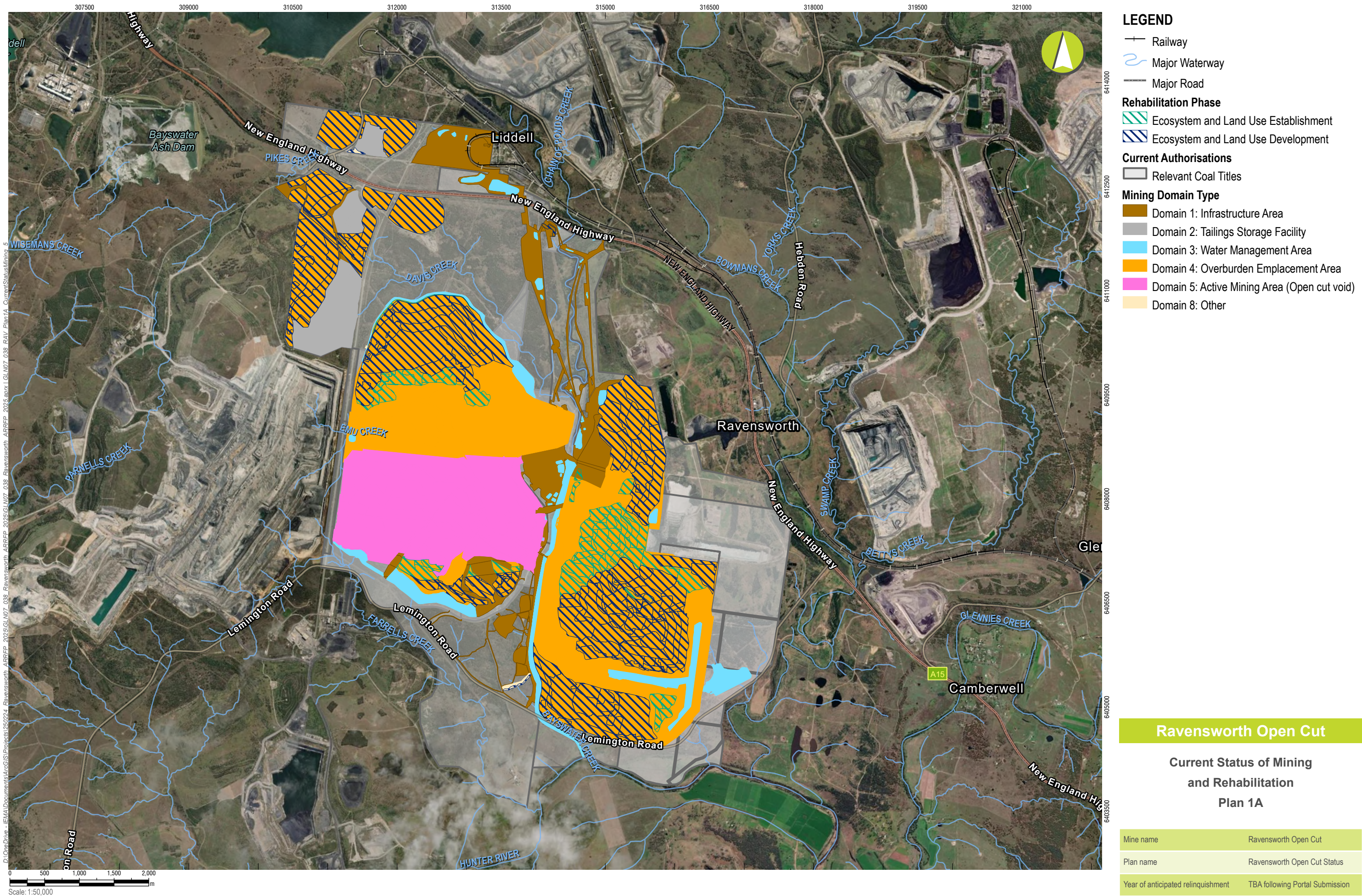
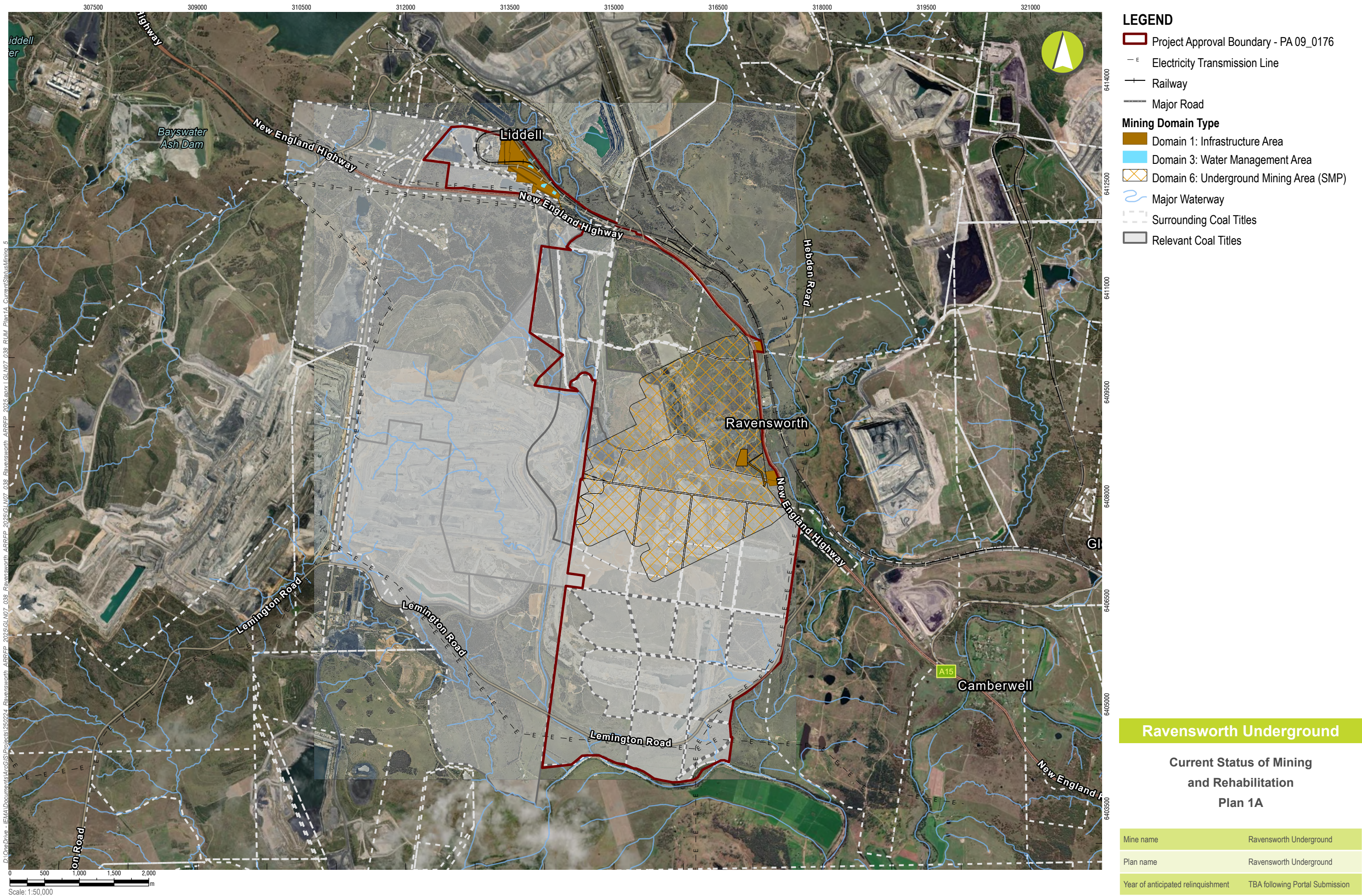


Figure 8-2 - 2024 Rehabilitation and Disturbance (Ravensworth Underground)



8.1.2 Summary of Rehabilitation Monitoring

During the reporting period long-term rehabilitation monitoring and a rehabilitation walkover assessment was conducted to compare current conditions of the rehabilitation with closure criteria outlined in the RMP. This information developed management recommendations to guide the rehabilitation towards targeted Ecological Communities and final landform criteria.

Rehabilitation Monitoring

The Annual Rehabilitation Monitoring Program was completed by a specialist consultant during Spring 2024 and assessed 17 rehabilitation blocks, which accounts for an area of approximately 330.3 ha of rehabilitation. This included:

- 176.0 ha assessed for Initial Establishment Monitoring (IEM) across eight blocks.
- 154.3 ha assessed for Long-Term Monitoring (LTM) across nine blocks.
- A total of 57 rehabilitation monitoring sites were assessed within the selected blocks:
 - 27 IEM sites; and
 - 30 LTM sites.
- Of these, 48 sites were within native ecosystem rehabilitation areas targeting Central Hunter Grey Box-Ironbark Woodland (GBIW), while nine sites were within pasture rehabilitation areas.
- Additionally, two native reference sites were monitored under the GCAA Reference Sites Sharing Program, with one located in each of the GBIW and Central Hunter Swamp Oak Forest (SOF) communities.
- A walkover visual inspection was conducted across all 17 blocks, covering an estimated 70 km of meandering traverses.

Fauna Monitoring

Fauna monitoring in rehabilitation is required every three years. Fauna monitoring was previously completed in 2014, 2017, 2020 and 2023. Fauna monitoring surveys were not required or conducted during the reporting period.

Rehabilitation Maintenance

Ongoing maintenance of rehabilitation areas focused on weed management of previously completed rehabilitation.

In addition, approximately 40 ha of rehabilitation maintenance was completed. Work included removing established stands of acacia saligna, with follow up work to be completed in 2025.

8.2 Rehabilitation Trials and Research

8.2.1 Rehabilitation Trial Results

No rehabilitation trials were undertaken at the Ravensworth Complex in during the reporting period.

8.3 Next Reporting Period

Rehabilitation activities proposed in 2025 include:

- Rehabilitation of 55 Ha, including scheduled commencement of rehabilitation of the RUM pit top and ROM;
- Maintenance works as outlined in **Section 8.3.1**;
- Crash grazing using cattle at Cumnock;
- Ongoing inspections and long-term rehabilitation monitoring; and
- Continued pest and weed management across the Ravensworth Complex and in offset areas.

8.3.1 2025 Rehabilitation Maintenance and Repairs

During the next reporting period, the Ravensworth Complex will continue to develop and implement a rehabilitation maintenance strategy to support the progression of rehabilitated areas toward the final landform, consistent with final land use objectives.

In 2025 the Ravensworth Complex will carry out ongoing maintenance in previously rehabilitated areas, with a focus on the following priority actions:

- Erosion repairs on the Western Emplacement Area;
- Control of priority weed species as identified during rehabilitation monitoring and inspections;
- Increasing lower-storey species richness in areas where priority weed grasses are absent (or following weed suppression) through hand seeding or tubestock planting;
- Increasing tree densities of rehabilitated areas (e.g Narama and Bridge Dump) through supplementary seeding and or tube stock planting; and
- Increasing habitat potential through adding rocks, logs, woody debris, and nest boxes to rehabilitation areas for fauna.
- A Rehabilitation Maintenance Strategy is currently being developed to address priority areas including management of *Acacia Saligna* and investigation into healing of overburden emplacement areas (EEA).

9. Community Relations

9.1 Employment Status

At the end of the reporting period, the Ravensworth Operations and RUM had approximately 576 full time employees and contractors.

9.2 Complaints

A complaints register is maintained and publicly available on the Ravensworth Operations website²².

No community complaints were received during the reporting period. The absence of complaints in 2024, along with consistent compliance and performance, indicates Ravensworth Complex's management and mitigation measures have been successfully implemented and that no further action, beyond the current management and mitigation measures are necessary at this stage. Ongoing monitoring and community engagement will continue to ensure early detection of any potential emerging issues.

9.2.1 Complaint Trend Analysis

Table 9-1 shows the community complaints record for the period 2012 to 2024. Community Complaints have decreased significantly, peaking at 10 in 2012 (during construction activities) and reaching zero in 2024. Since 2019, complaints have remained consistently low, indicating that current environmental management practices are effective in minimising community concerns.

Table 9-1 - Record of Annual Community Complaints from 2012 to 2024

Aspect	Community Complaints by Reporting Period												
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Blasting (Overpressure)	-	3	3	-	1	-	-	1	2	2	-	-	-
Blasting (dust)	-	-	1	-	-	2	2	1	-	-	2	1	-
Noise	1	-	-	-	-	-	-	-	-	-	-	-	-
Air Quality	8	-	1	-	1	-	-	-	-	-	-	-	-
Other	1	-	-	-	1	-	-	-	-	-	-	-	-
Total	10	3	5	0	3	2	2	2	2	2	2	1	0

9.3 Community Engagement

The Stakeholder Engagement Plan contains a *Community Investment Plan* which outlines key projects to be undertaken by the Ravensworth Complex throughout the year.

Community/stakeholder related activities undertaken during the reporting period include:

- Community Consultative Committee Meetings;
- Distribution of community newsletters;

²² <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/community-documents#community-complaints-register>

- Mine tour/career talks with local primary schools and apprentices;
- Active participation in Wild Dog Groups and the LLS; and
- Direct engagement with nearby landholders.

During 2024, the Ravensworth Operations continued to foster positive relationships with the local community through engagement and ongoing financial support provided to a range of community groups and events, including, but not limited to:

- Preschool visit to Hillcrest;
- St Catherines Catholic College – Film and Cracker Night;
- Singleton High School – Cooking Program for Special education students;
- Singleton Primary School P&C;
- Upper Hunter Primary School Sports Assoc – Shade cloths/First Aid equipment;
- Hunter River Community School;
- Carries Place;
- Singleton Scouts;
- Singleton Triathlon Club;
- Singleton Roosters AFL;
- Movember;
- Great Escape – Cystic Fibrosis;
- Variety NSW – NSW Variety bash;
- Domestic Violence NSW; and
- Family Connections Program.

9.4 Community Consultative Committee

The Ravensworth Complex maintains a close partnership with the local community. The Community Consultative Committee (CCC), which includes Glencore representatives, local community members and relevant government stakeholders. The CCC serves as a formal forum for community engagement, facilitating dialogue between the community and mine management.

In 2024, the CCC held meetings in February, May, August, November 2024. Community representatives are encouraged to share meeting outcomes with the broader community and raise any concerns or discussion items at future meetings.

Minutes from the CCC meetings are publicly available on the Ravensworth Operations website²³. The following key topics were discussed at the CCC meetings:

- Discussion of previous meeting minutes;
- Update on mining and processing activities at the Ravensworth Operations;
- Update on closure activities at RUM;
- Update on key environment and community aspects, including monitoring results and incidents;

²³ <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/community-documents#community-consultative-committee-ccc-meeting-minutes>

- Update on safety performance; and
- Update on community support programs.

9.5 Community Newsletter

Ravensworth Complex contributes to the *Greater Ravensworth community newsletter* circulated by Glencore approximately every six months to neighbouring residents, its employees, CCC members and other stakeholders.

The newsletter provides information about the operational progress of the Ravensworth Operations, decommissioning of RUM, environmental and safety performance, plus other news of community interest.

The *Greater Ravensworth community newsletters* are publicly available on the Ravensworth Operations website²⁴.

²⁴ <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/community-documents#community-newsletters>

10. Independent Audit

In accordance with Schedule 5, Condition 8 of PA 09_0176 and Schedule 4, Condition 7 of DA 104/96, an Independent Environmental Audit (IEA) is required every 3 years, unless the Planning Secretary directs otherwise.

The most recent audit was completed by EMM Consulting Pty Limited (EMM) (Lead Auditor) and Minesoils Pty Ltd (Rehabilitation Specialist), consisting of a site inspection, as well as document reviews and interviews with personnel. The IEA covered the period 18 June 2021 to 26 June 2024. The findings of the audit were reported in the Ravensworth Coal Complex Independent Environmental Audit 2024, dated 1 October 2024.

In accordance with Schedule 5, Condition 9 of PA 09_0176 and Schedule 4, Condition 8 of DA 104/96, a copy of the audit report, together with responses to the recommendations contained in the audit report were provided to DPHI.²⁵

Table 10-1 provides an update on the status of responses to the audit recommendations remaining.

The next Independent Environmental Audit will be undertaken in 2027.

²⁵ The Audit Report and Responses to the Recommendations are also available on the Ravensworth Operations website <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/reporting-documents#independent-audits>

Table 10-1 – Summary of Responses to Remaining Audit Recommendations Identified During the 2024 IEA

Finding Ref.	Condition Ref.	Requirement	Auditor Recommendation	Status Update
NC3	PA 09_0176 Schedule 3, Condition 20	Air Quality Criteria Except for the air quality-affected land referred to in Table 1, the Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the Ravensworth mine complex do not exceed the criteria listed in Tables 9, 10 or 11 at any residence on privately-owned land or on more than 25 percent of any privately-owned land.	Undertake a review and update of the Air Quality and Greenhouse Gas Management Plan. Review measures in the AQGHGMP for effectiveness. Where changes are made this should be incorporated into training for dispatch, operators and other relevant personnel to ensure awareness.	A comprehensive review and update of the AQGHGMP has been completed, with approval of the revised management plan received in November 2024. Changes have been incorporated into training programs for dispatch, operators, and other relevant personnel to ensure ongoing awareness and compliance. COMPLETE
NC5	EPL 2652 Condition L5.5	For the purposes of condition L5.4: a) Data recorded by the meteorological station on the premises at EPA Point 13 must be used to determine meteorological conditions; and b) Stability category temperature inversion conditions are to be determined by the sigma-theta method referred to in Part E4 of Appendix E of the NSW Industrial Noise Policy.	Ensure monthly attended noise monitoring is carried out in accordance with the INP.	The scope of work for noise monitoring was reviewed in consultation with the noise monitoring contractor, ensuring alignment with regulatory requirements and best practices. Monthly attended noise monitoring is now conducted in full compliance with the NSW Industrial Noise Policy (INP). COMPLETE
NC9 NC10	EPL 2652 Condition M10.1, M10.2	To assess compliance with the noise limits specified within this licence, the licensee must undertake operator attended noise monitoring at each specified noise monitoring point in accordance with the table below. To assess compliance with condition L5.1, attended noise monitoring must be undertaken in accordance with Conditions L5.2 to L5.6: a) at the EPA points 14, 15 and 16 identified in P1.4; and b) occur every calendar month in a reporting period; and c) occur during one night time period as defined in the Noise Policy for Industry 2017 for a minimum of 15 minutes at each location from a), and when relevant b) during the night.	Update the Noise Management Plan to be in line with the period definitions outlined in Condition 5.3 of EPL 2652.	The NMP has been reviewed and updated to align with the period definitions outlined in Condition L5.3 of EPL 2652, ensuring consistency with regulatory requirements. The revised NMP received approval in November 2024. COMPLETE

11. Environmental Incidents and Non-Compliances

All incidents, non-compliances and exceedances related to PA 09_0176, DA 104/96 and EPL 2652 during the reporting period are summarised **Table 11-1**.

Table 11-1 – Incidents, Non-compliances & Exceedances

Incident/non-compliance ¹	Overview of incident/non-compliance	Description of incident/non-compliance	Actions	Status of Actions
Non - Compliance 1 ²	Exceedance of short-term air quality criteria in Schedule 3, Condition 20 of PA 09_0176	Air Quality Criteria – Schedule 3, Condition 20 Exceedance of the PM ₁₀ 24-hour criterion of 50 µg/m ³ was recorded on five occasions during the reporting period.	Each exceedance was treated as a reportable incident, with notifications provided to the DPHI via the DPHI Portal in accordance with Schedule 5, Condition 6 and 6A of PA 09_0176. Investigation reports were prepared for each exceedance and provided to DPHI. The particulars of each exceedance are detailed below.	Complete

Incident/non-compliance ¹	Overview of incident/non-compliance	Description of incident/non-compliance	Actions	Status of Actions
Incident 1	Reported Exceedance of Short-term PM ₁₀ Criterion	Incident Notification: 29 January 2024 On 26 January 2024, SX45-G1 recorded a PM₁₀ 24-hour average concentration of 53.1 µg/m³, exceeding the 50 µg/m³ short-term criterion. During the event, the Ravensworth Complex was operating in accordance with the <i>Air Quality and Greenhouse Gas Management Plan</i> (AQGGMP) and <i>Production Environmental Trigger Action Response Plan</i> (TARP). A third-party review investigated the exceedance, using data from the Ravensworth Complex TEOMs, on-site weather station, Air Quality Control System (AQCS) model outputs and NSW Upper Hunter Air Quality Monitoring Network. The review estimated the Ravensworth Complex's contribution at 4.5 µg/m³, which is less than the EIS prediction of 47 µg/m³ at this location, indicating that dust mitigation measures were effective in minimising site-related dust emissions.	In accordance with Condition 4(b), Schedule 5 of PA 09_0176, management plans were reviewed, with no updates or changes required. The DPHI reviewed the incident notification and investigation report and advised that no further information was required.	Complete
Incident 2	Reported Exceedance of Short-term PM ₁₀ Criterion	Incident Notification: 6 February 2024 On 5 February 2024, SX45-G1 recorded a PM₁₀ 24-hour average concentration of 55.9 µg/m³, exceeding the 50 µg/m³ short-term criterion. During the event, the Ravensworth Complex was operating in accordance with the <i>AQGGMP</i> and <i>Production Environmental TARP</i>. A third-party review investigated the exceedance, using data from the Ravensworth Complex TEOMs, on-site weather station, Air Quality Control System (AQCS) model outputs and NSW Upper Hunter Air Quality Monitoring Network. The review estimated the Ravensworth Complex's contribution at 16.1 µg/m³, which is less than the EIS prediction of 47 µg/m³ at this location, indicating that dust mitigation measures were effective in minimising site-related dust emissions.	In accordance with Condition 4(b), Schedule 5 of PA 09_0176, management plans were reviewed, with no updates or changes required. The DPHI reviewed the incident notification and investigation report and advised that no further information was required.	Complete

Incident/non-compliance ¹	Overview of incident/non-compliance	Description of incident/non-compliance	Actions	Status of Actions
Incident 3	Reported Exceedance of Short-term PM ₁₀ Criterion	Incident Notification: 11 October 2024 On 2 September 2024, HVAS19 recorded a PM₁₀ 24-hour average concentration of 140 µg/m³, exceeding the 50 µg/m³ short-term criterion. However, real-time monitoring units (TEOMs) at the Ravensworth Complex did not record any exceedances of the 24-hour average PM₁₀ criterion during the same period. During the event, the Ravensworth Complex was operating in accordance with the <i>AQGGMP</i> and <i>Production Environmental TARP</i>. A third-party review investigated the exceedance, using data from the Ravensworth Complex TEOMs, on-site weather station, Air Quality Control System (AQCS) model outputs and NSW Upper Hunter Air Quality Monitoring Network. The review estimated the Ravensworth Complex's contribution at 7.9 µg/m³, which is less than the EIS prediction of 37 µg/m³ at this location, indicating that dust mitigation measures were effective in minimising site-related dust emissions.	In accordance with Condition 4(b), Schedule 5 of PA 09_0176, management plans were reviewed, with no updates or changes required. The DPHI reviewed the incident notification and investigation report and advised that no further information was required.	Complete
Incident 4	Reported Exceedance of Short-term PM ₁₀ Criterion	Incident Notification: 26 September 2024 On 25 September 2024, SX45-G1 recorded a PM₁₀ 24-hour average concentration of 57.4 µg/m³, exceeding the 50 µg/m³ short-term criterion. During the event, the Ravensworth Complex was operating in accordance with the <i>AQGGMP</i> and <i>Production Environmental TARP</i>. A third-party review investigated the exceedance, using data from the Ravensworth Complex TEOMs, on-site weather station, Air Quality Control System (AQCS) model outputs and NSW Upper Hunter Air Quality Monitoring Network. The review estimated the Ravensworth Complex's contribution at 19.6 µg/m³, which is less than the EIS prediction of 47 µg/m³ at this location, indicating that dust mitigation measures were effective in minimising site-related dust emissions.	In accordance with Condition 4(b), Schedule 5 of PA 09_0176, management plans were reviewed, with no updates or changes required. The DPHI reviewed the incident notification and investigation report and advised that no further information was required.	Complete.

Incident/non-compliance ¹	Overview of incident/non-compliance	Description of incident/non-compliance	Actions	Status of Actions
Incident 5	Reported Exceedance of Short-term PM ₁₀ Criterion	Incident Notification: 9 December 2024 On 7 November 2024, HVAS19 recorded a PM₁₀ 24-hour average concentration of 58.6 µg/m³, exceeding the 50 µg/m³ short-term criterion. However, real-time monitoring units (TEOMs) at the Ravensworth Complex did not record any exceedances of the 24-hour average PM₁₀ criterion during the same period. During the event, the Ravensworth Complex was operating in accordance with the <i>AQGGM</i>P and <i>Production Environmental TARP</i>. A third-party review investigated the exceedance, using data from the Ravensworth Complex TEOMs, on-site weather station, Air Quality Control System (AQCS) model outputs and NSW Upper Hunter Air Quality Monitoring Network. The review estimated the Ravensworth Complex's contribution at 0.8 µg/m³, which is less than the EIS prediction of 37 µg/m³ at this location, indicating that dust mitigation measures were effective in minimising site-related dust emissions.	In accordance with Condition 4(b), Schedule 5 of PA 09_0176, management plans were reviewed, with no updates or changes required. The DPHI reviewed the incident notification and investigation report and advised that no further information was required.	Complete.
Non-Compliance 2	Contravention condition of authorisation	Clause 19 in Schedule 8A requires the lease holder to Nominate a Contact Person (NCP) with whom the Resources Regulator can communicate with in relation to the mining lease(s) for the purposes of the <i>Mining Act 1992</i>. Resources Pacific Pty Ltd NCP was due 21 December 2023. Recourses Pacific Pty Ltd submitted the NCP on 31 May 2024 which was after the due date	Following notification by the NSW Resources Regulator on the 29 May 2024 that that the NCP had not been lodged, Resource Pacific Pty Ltd (RUM) took immediate steps to review its records and, on the 31 May 2024, after confirming that no record had been made, Resource Pacific Pty Ltd lodged the NCP for ML1868	Complete.

Notes: ¹ See Statement of Compliance Key in **Table 1-2** for risk level, colour code and description. ² As reported in **Section 1**. On all occasions the third-party review estimated the contribution from the Ravensworth Complex to be less than the EIS prediction for the monitoring location, indicating that dust mitigation measures were effective in minimising site-related dust emissions (refer to **Section 6.3**).

12. Document Information

12.1 Related Documents

Table 12-1 – Related Documents

Number	Title
<u>Management plans (glencore.com.au)</u>	Ravensworth Underground Mine Rehabilitation Management Plan (September 2024)
<u>Management plans (glencore.com.au)</u>	Ravensworth Operations Rehabilitation Management Plan (26 July 2024)

12.2 Reference Information

Table 12-2 – Reference Information

Reference	Title
AECOM (2025)	Annual Stream Flow Report – Ravensworth Open Cut - 2024 Report
AGE (2023)	Ravensworth Operations – Review of Groundwater Model Predictions
Biodiversity Australia (2025)	Ravensworth Biodiversity Offset Area Monitoring 2024, Glencore - Ravensworth Coal Mine
Biosis Pty Ltd (Biosis) (2025)	Annual Report Ravensworth Stream Health Monitoring Program 2024
BEMC (2024)	Annual Bushfire Audit 2024 – Ravensworth Off-sets
Engeny Australia Pty Ltd (Engeny) (2024)	Ravensworth Operations – 2024 Exceedance Report – Surface Water and Groundwater Exceedance Investigation.
Engeny Australia Pty Ltd (Engeny) (2025)	Ravensworth Operations 2024 Annual Review Water Summary Report
GSS Environmental (2012)	Ravensworth Underground Mine Liddell Seam Project (MOD 9) Environmental Assessment
Hansen Bailey (2013)	Narama West Modification Environmental Assessment (Ravensworth Operations Project Modification 1)
HLA Envirosiences (1996)	Environmental Impact Statement – Proposed Nardell Underground Mine – Ravensworth, New South Wales
Koru Environmental (2025)	Rehabilitation Monitoring 2024 – Ravensworth Operations
NSW Government (2015)	Post-approval requirements for State significant mining developments – Annual Review Guideline
OzArk Environment and Heritage (2025)	2024 Archaeological Monitoring Report, Ravensworth Operations
Pacific Environment (2013)	Narama West Modification – Air Quality and Greenhouse Gas Impact Assessment
PAEHolmes (2012)	Ravensworth Underground Mine – Liddell Seam Project Air Quality Assessment
Spectrum Acoustics (2025)	Annual Attended Noise Monitoring Summary (January 2024 – December 2024) – Ravensworth Mining Complex
Umwelt (2010)	The Ravensworth Operations Project Environmental Assessment

Appendix A - Train Movements

Table A.1 Records of all Train Movements, Ravensworth 2024

Train Index	Load Finish Date	Load Time Complete	Net Weight (t)
1	1/01/2024	1:19:00 AM	9083.96
2	1/01/2024	5:15:04 AM	8993.84
3	1/01/2024	8:55:40 AM	9138.38
4	1/01/2024	12:41:25 PM	9129.07
5	1/01/2024	4:37:54 PM	8972.51
6	1/01/2024	8:54:45 PM	9041.55
7	2/01/2024	12:35:40 AM	8873.38
8	2/01/2024	3:32:15 AM	9204.3
9	2/01/2024	7:14:14 AM	9106.55
10	2/01/2024	1:11:39 PM	8964.3
11	2/01/2024	4:47:31 PM	8998.11
12	3/01/2024	12:28:31 AM	8988.16
13	3/01/2024	3:35:13 AM	9228.47
14	3/01/2024	8:05:49 AM	9124.6
15	3/01/2024	11:14:32 AM	9078.31
16	3/01/2024	3:49:20 PM	8873.67
17	3/01/2024	7:26:29 PM	8990.1
18	3/01/2024	10:47:52 PM	8922.25
19	4/01/2024	3:56:30 AM	9077.69
20	4/01/2024	8:23:52 AM	9057.75
21	4/01/2024	1:29:23 PM	9047.69
22	4/01/2024	7:51:45 PM	9108.32
23	4/01/2024	11:47:03 PM	9136.65
24	5/01/2024	4:39:48 AM	9035.1
25	5/01/2024	2:04:27 PM	9036.84
26	5/01/2024	8:30:04 PM	9366.76
27	5/01/2024	11:57:53 PM	9088.27
28	6/01/2024	2:45:19 AM	9085.49
29	6/01/2024	5:49:00 AM	8978.31
30	6/01/2024	9:29:17 AM	8973.16
31	6/01/2024	3:43:06 PM	9579.3
32	6/01/2024	8:18:00 PM	9264.95
33	6/01/2024	11:35:50 PM	8963.07
34	7/01/2024	4:37:59 AM	8928.29
35	7/01/2024	9:00:20 AM	9276.52
36	7/01/2024	2:07:00 PM	8905.99
37	7/01/2024	5:26:36 PM	9131.69
38	8/01/2024	12:54:49 AM	8865.24
39	8/01/2024	4:22:44 AM	9146.51
40	8/01/2024	8:27:30 AM	8850.69
41	8/01/2024	12:41:00 PM	8922.79
42	9/01/2024	10:27:53 AM	9465.91
43	9/01/2024	1:49:34 PM	8975.29
44	9/01/2024	7:56:29 PM	9180.24
45	10/01/2024	2:27:56 AM	9081.92

Train Index	Load Finish Date	Load Time Complete	Net Weight (t)
46	10/01/2024	2:04:03 PM	9068.32
47	10/01/2024	8:27:11 PM	9000.1
48	11/01/2024	1:55:08 AM	8926.09
49	11/01/2024	5:25:51 AM	8924.76
50	11/01/2024	1:36:27 PM	9262.1
51	11/01/2024	5:42:37 PM	8920.76
52	12/01/2024	7:13:39 AM	9050.92
53	12/01/2024	11:59:18 AM	8974.84
54	12/01/2024	6:57:02 PM	9009.51
55	12/01/2024	9:49:14 PM	8976.84
56	13/01/2024	1:23:22 AM	9086.49
57	13/01/2024	9:43:08 AM	9064.26
58	13/01/2024	1:19:10 PM	9016.44
59	13/01/2024	4:55:33 PM	9081.64
60	14/01/2024	3:55:23 AM	8885.65
61	14/01/2024	7:26:33 AM	8891.45
62	14/01/2024	12:32:13 PM	9080.29
63	14/01/2024	10:38:13 PM	8915.29
64	15/01/2024	2:16:12 AM	9014.37
65	15/01/2024	6:09:54 AM	9015.87
66	16/01/2024	12:37:00 AM	9242.65
67	16/01/2024	4:46:00 AM	8903.96
68	16/01/2024	8:37:00 AM	8892.64
69	16/01/2024	11:40:00 AM	9191.49
70	16/01/2024	11:02:00 PM	9265.49
71	17/01/2024	6:28:59 AM	9070.72
72	17/01/2024	2:44:00 PM	9262.11
73	18/01/2024	2:40:00 AM	9024.11
74	18/01/2024	7:06:36 AM	8838.46
75	18/01/2024	5:17:12 PM	9018.32
76	19/01/2024	4:44:00 AM	9073.29
77	19/01/2024	9:05:00 AM	9232.9
78	19/01/2024	2:39:00 PM	9140.45
79	19/01/2024	5:23:00 PM	9123.32
80	19/01/2024	8:52:44 PM	8917.7
81	20/01/2024	5:20:22 AM	9051.11
82	20/01/2024	10:00:00 AM	9135.65
83	20/01/2024	5:24:42 PM	9036.51
84	21/01/2024	2:34:32 AM	9175.66
85	21/01/2024	5:59:00 AM	9131.07
86	21/01/2024	9:02:57 AM	9101.45
87	21/01/2024	1:11:52 PM	9112.09
88	21/01/2024	4:42:00 PM	9092.5
89	22/01/2024	3:37:25 AM	9127.86
90	22/01/2024	11:51:00 AM	8962.27
91	22/01/2024	3:18:26 PM	9066.86
92	22/01/2024	11:34:11 PM	9088.67
93	23/01/2024	5:53:00 AM	9076.29
94	24/01/2024	5:18:20 AM	9126.3
95	24/01/2024	11:01:00 PM	9105.61

Train Index	Load Finish Date	Load Time Complete	Net Weight (t)
96	25/01/2024	1:00:06 PM	9299.6
97	25/01/2024	10:40:27 PM	8967.36
98	26/01/2024	1:22:41 PM	9174.86
99	26/01/2024	5:30:26 PM	9109.31
100	26/01/2024	9:31:20 PM	9003.92
101	27/01/2024	12:53:13 AM	8779.97
102	27/01/2024	4:03:00 AM	8871.71
103	27/01/2024	12:56:29 PM	8933.71
104	27/01/2024	9:58:00 PM	8834.91
105	28/01/2024	4:25:56 AM	8939.7
106	28/01/2024	8:35:23 AM	9087.76
107	28/01/2024	12:25:10 PM	8839.09
108	28/01/2024	3:54:47 PM	9362.11
109	29/01/2024	3:24:29 AM	9268.66
110	29/01/2024	6:31:00 AM	8983.02
111	29/01/2024	9:43:43 AM	9151.32
112	29/01/2024	2:04:00 PM	8995.66
113	30/01/2024	3:52:30 AM	9376.51
114	30/01/2024	7:10:00 AM	8994.24
115	30/01/2024	10:03:00 AM	8879.02
116	30/01/2024	2:31:00 PM	8692.26
117	30/01/2024	6:18:33 PM	8988.76
118	31/01/2024	12:33:40 AM	8666.3
119	31/01/2024	3:55:30 AM	8928.32
120	31/01/2024	8:02:19 AM	8981.69
121	31/01/2024	2:40:19 PM	8889.72
122	31/01/2024	7:20:33 PM	9513.69
123	1/02/2024	4:08:00 AM	9120.41
124	1/02/2024	10:06:59 AM	9303.75
125	1/02/2024	2:04:06 PM	9017.32
126	2/02/2024	12:02:00 AM	9072.66
127	2/02/2024	4:27:23 AM	8802.91
128	2/02/2024	2:40:43 PM	9227.96
129	2/02/2024	5:59:00 PM	9085.55
130	2/02/2024	10:20:00 PM	9010.35
131	3/02/2024	2:47:36 AM	9269.96
132	3/02/2024	9:43:00 AM	8655
133	3/02/2024	5:51:00 PM	9245.5
134	4/02/2024	3:01:00 AM	8849.55
135	4/02/2024	5:02:00 PM	9100
136	4/02/2024	9:38:00 PM	9000
137	5/02/2024	1:12:23 AM	0
138	5/02/2024	2:57:00 PM	0
139	9/02/2024	3:36:40 AM	9031.35
140	9/02/2024	7:46:16 AM	8847.94
141	9/02/2024	4:29:18 PM	8629.86
142	10/02/2024	12:41:53 AM	8878.24
143	10/02/2024	6:18:12 AM	9082.76
144	10/02/2024	3:03:29 PM	8984.92
145	11/02/2024	12:31:53 AM	9074.35

Train Index	Load Finish Date	Load Time Complete	Net Weight (t)
146	11/02/2024	6:06:30 AM	8754.9
147	11/02/2024	10:17:51 AM	8884.74
148	11/02/2024	9:31:42 PM	9047.5
149	12/02/2024	3:44:22 AM	8918.15
150	13/02/2024	2:05:18 AM	9245.6
151	13/02/2024	9:50:00 AM	9234.4
152	13/02/2024	6:58:08 PM	9052.12
153	14/02/2024	12:12:04 AM	8986.3
154	14/02/2024	3:27:03 AM	8777
155	14/02/2024	7:32:55 PM	8974.15
156	15/02/2024	8:43:00 AM	9078.22
157	15/02/2024	6:20:01 PM	9098.74
158	15/02/2024	9:24:28 PM	9073.12
159	16/02/2024	4:31:11 AM	9086.15
160	16/02/2024	9:27:44 AM	9100
161	16/02/2024	1:12:55 PM	8910.32
162	16/02/2024	5:49:45 PM	9241.95
163	16/02/2024	10:33:48 PM	9025
164	17/02/2024	1:46:15 AM	8864.01
165	17/02/2024	6:02:06 AM	8916.92
166	17/02/2024	9:12:52 AM	9066.95
167	17/02/2024	12:37:46 PM	9078
168	17/02/2024	6:17:22 PM	9018.12
169	19/02/2024	2:47:09 AM	9026.55
170	19/02/2024	6:52:38 PM	9266.07
171	20/02/2024	12:43:19 AM	8974.8
172	20/02/2024	3:35:35 AM	9167.62
173	20/02/2024	8:28:27 AM	8864.81
174	20/02/2024	12:00:19 PM	9111.6
175	20/02/2024	8:07:21 PM	9179.55
176	21/02/2024	5:50:52 AM	9125.7
177	21/02/2024	9:41:59 AM	9094.75
178	21/02/2024	1:51:04 PM	8944.79
179	21/02/2024	6:48:41 PM	8706.41
180	22/02/2024	10:40:15 AM	8760.47
181	22/02/2024	8:55:56 PM	9033.59
182	23/02/2024	12:33:09 AM	8823.55
183	23/02/2024	6:37:57 AM	8969
184	23/02/2024	2:24:24 PM	8852.61
185	23/02/2024	6:38:40 PM	8926.49
186	23/02/2024	11:19:00 PM	8990.28
187	24/02/2024	5:14:13 AM	8891.07
188	24/02/2024	8:56:50 AM	9030.01
189	25/02/2024	2:34:36 AM	8890.87
190	25/02/2024	2:42:34 PM	8888.4
191	25/02/2024	6:19:00 PM	9221.3
192	25/02/2024	9:38:00 PM	9077.34
193	26/02/2024	11:53:54 AM	8872.95
194	27/02/2024	12:10:14 PM	9115.09
195	27/02/2024	9:00:14 PM	8948.41

Train Index	Load Finish Date	Load Time Complete	Net Weight (t)
196	28/02/2024	4:52:15 AM	9214.9
197	29/02/2024	8:22:10 PM	8963.9
198	1/03/2024	9:30:00 AM	9041.4
199	1/03/2024	5:31:52 PM	9081.8
200	2/03/2024	9:12:26 AM	9042
201	2/03/2024	1:36:45 PM	9124.7
202	3/03/2024	5:35:21 AM	9081.1
203	3/03/2024	11:33:48 AM	8958
204	3/03/2024	6:20:03 PM	9045.04
205	4/03/2024	9:59:14 AM	9097.88
206	4/03/2024	2:02:18 PM	8937.07
207	4/03/2024	6:00:00 PM	9297.6
208	5/03/2024	9:06:41 AM	9009.04
209	5/03/2024	1:52:59 PM	9236.72
210	5/03/2024	5:59:00 PM	8800.81
211	6/03/2024	4:01:12 AM	9153.49
212	6/03/2024	10:58:09 PM	9126.92
213	7/03/2024	2:43:06 AM	9111.87
214	7/03/2024	6:16:07 AM	9248.9
215	7/03/2024	9:43:34 AM	9112.61
216	7/03/2024	1:11:56 PM	9332.72
217	7/03/2024	4:38:13 PM	9127.9
218	7/03/2024	8:53:48 PM	9237.61
219	8/03/2024	12:44:12 AM	9214.49
220	8/03/2024	4:13:20 AM	9089.67
221	8/03/2024	12:03:00 PM	9103.69
222	8/03/2024	5:09:00 PM	9395.52
223	9/03/2024	12:24:41 AM	9231.67
224	9/03/2024	4:08:13 AM	9332.21
225	9/03/2024	7:28:45 AM	9279.24
226	9/03/2024	12:16:05 PM	9444.67
227	9/03/2024	5:11:28 PM	9188.28
228	9/03/2024	10:24:20 PM	8994.64
229	10/03/2024	4:08:24 AM	9205.47
230	10/03/2024	8:11:03 AM	9365.72
231	10/03/2024	11:56:49 AM	9072.48
232	10/03/2024	6:21:26 PM	9222.07
233	10/03/2024	10:59:46 PM	9471.49
234	11/03/2024	4:04:27 AM	9187.08
235	11/03/2024	2:20:55 PM	9245.47
236	11/03/2024	10:15:08 PM	9263.04
237	12/03/2024	8:25:31 AM	9335.28
238	12/03/2024	8:41:34 PM	9239.53
239	13/03/2024	8:39:04 AM	9260.28
240	14/03/2024	9:11:42 AM	9438.88
241	14/03/2024	10:02:28 PM	9312.68
242	15/03/2024	1:46:09 AM	9466.5
243	15/03/2024	9:37:29 PM	9423.3
244	16/03/2024	9:35:34 AM	9231.3
245	17/03/2024	5:00:41 AM	9544.14

Train Index	Load Finish Date	Load Time Complete	Net Weight (t)
246	18/03/2024	10:35:48 AM	9214.9
247	19/03/2024	5:12:33 AM	9458.27
248	19/03/2024	9:21:33 AM	9609.7
249	19/03/2024	1:12:54 PM	9505.08
250	20/03/2024	3:22:12 AM	9662.61
251	20/03/2024	2:03:21 PM	9783.7
252	20/03/2024	8:36:13 PM	9445.2
253	21/03/2024	2:33:37 AM	9709.09
254	21/03/2024	6:04:46 AM	9591.3
255	21/03/2024	7:45:01 PM	9416.04
256	22/03/2024	6:13:27 AM	9561.46
257	22/03/2024	11:39:07 AM	9608.8
258	22/03/2024	11:51:20 PM	9618.24
259	23/03/2024	6:48:32 PM	9574.43
260	24/03/2024	5:34:36 AM	9021.3
261	24/03/2024	4:22:25 PM	9715.84
262	24/03/2024	8:25:42 PM	8921
263	25/03/2024	4:39:23 AM	9666.04
264	25/03/2024	8:18:00 AM	9724.4
265	25/03/2024	2:09:01 PM	9736.1
266	25/03/2024	7:09:56 PM	9520.21
267	25/03/2024	10:16:35 PM	9602.44
268	26/03/2024	6:29:44 AM	9729.63
269	26/03/2024	9:38:07 AM	9663.44
270	26/03/2024	4:17:00 PM	9706.43
271	26/03/2024	7:57:03 PM	9273.84
272	27/03/2024	12:43:57 AM	9203.21
273	27/03/2024	4:40:19 AM	9313.42
274	27/03/2024	9:52:00 AM	9129.73
275	27/03/2024	1:46:51 PM	9228.41
276	27/03/2024	6:04:12 PM	8943.9
277	27/03/2024	8:38:54 PM	8974.28
278	28/03/2024	4:22:59 AM	9205.41
279	28/03/2024	12:18:37 PM	8948.68
280	28/03/2024	4:38:38 PM	8888
281	28/03/2024	9:35:56 PM	8863.44
282	29/03/2024	1:32:22 AM	9266.52
283	29/03/2024	6:55:27 AM	9297.7
284	29/03/2024	11:35:00 AM	8795.92
285	29/03/2024	7:49:05 PM	8877.41
286	30/03/2024	6:38:49 AM	8920.24
287	30/03/2024	11:31:40 AM	9178.61
288	30/03/2024	2:50:05 PM	8987.52
289	30/03/2024	5:59:53 PM	9222.76
290	30/03/2024	11:55:35 PM	9202.92
291	31/03/2024	9:57:29 AM	9197.41
292	31/03/2024	1:18:00 PM	8923.4
293	31/03/2024	9:44:06 PM	8832.48
294	1/04/2024	1:24:59 AM	8964.92
295	1/04/2024	10:14:30 AM	8908.43

Train Index	Load Finish Date	Load Time Complete	Net Weight (t)
296	1/04/2024	3:00:54 PM	8957.64
297	1/04/2024	5:42:21 PM	8804.34
298	2/04/2024	12:07:38 AM	8911.84
299	2/04/2024	5:34:13 AM	9195
300	2/04/2024	9:36:13 AM	8896.44
301	2/04/2024	3:04:33 PM	8899
302	3/04/2024	6:51:00 AM	9027.92
303	6/04/2024	12:44:00 PM	8952.7
304	6/04/2024	12:45:00 PM	9200
305	6/04/2024	9:21:47 PM	8908.2
306	7/04/2024	1:39:00 PM	8851.41
307	7/04/2024	8:26:00 PM	8850.8
308	8/04/2024	5:23:00 AM	8842.64
309	8/04/2024	9:05:00 AM	9067.72
310	8/04/2024	3:22:00 PM	9149.57
311	8/04/2024	9:16:00 PM	9197.52
312	9/04/2024	2:40:00 PM	9129.5
313	10/04/2024	4:39:00 AM	8889.92
314	10/04/2024	8:16:00 PM	9176.84
315	11/04/2024	4:33:00 AM	8923.37
316	11/04/2024	8:01:00 PM	9253.23
317	11/04/2024	11:37:00 PM	9042.01
318	12/04/2024	5:11:00 PM	8895
319	12/04/2024	10:46:00 PM	8863.25
320	13/04/2024	9:39:00 AM	8919.37
321	13/04/2024	11:20:00 PM	9071.04
322	14/04/2024	8:43:00 AM	9133.4
323	14/04/2024	11:50:00 AM	8868.44
324	14/04/2024	5:29:00 PM	8877.72
325	15/04/2024	5:07:46 AM	8984.69
326	15/04/2024	8:21:00 AM	9149.52
327	15/04/2024	10:26:00 AM	9150.6
328	15/04/2024	9:34:00 PM	8875.37
329	16/04/2024	8:17:00 PM	8937.32
330	17/04/2024	8:39:00 PM	9120.01
331	18/04/2024	6:04:00 PM	9073.64
332	19/04/2024	7:07:00 AM	9073.24
333	19/04/2024	10:10:32 PM	9218.2
334	20/04/2024	2:55:18 AM	8899.05
335	20/04/2024	6:24:04 AM	9088.21
336	20/04/2024	9:22:54 AM	9393.81
337	20/04/2024	1:17:00 PM	8949.2
338	20/04/2024	6:42:40 PM	9112.21
339	21/04/2024	12:29:18 PM	9402.65
340	21/04/2024	10:09:50 PM	9054.85
341	22/04/2024	4:25:42 AM	9094.9
342	22/04/2024	8:14:07 AM	9034.25
343	22/04/2024	1:17:48 PM	8934.37
344	22/04/2024	8:52:23 PM	9111.2
345	23/04/2024	12:06:02 AM	8941.97

Train Index	Load Finish Date	Load Time Complete	Net Weight (t)
346	23/04/2024	6:15:19 AM	8905.5
347	23/04/2024	9:42:51 AM	8836.17
348	23/04/2024	5:13:07 PM	8855.05
349	23/04/2024	10:12:20 PM	8920.57
350	24/04/2024	1:41:30 AM	8998.24
351	24/04/2024	5:18:57 AM	8773.85
352	24/04/2024	10:14:23 PM	9131.01
353	25/04/2024	2:15:08 AM	8906.17
354	25/04/2024	6:45:35 AM	9145
355	25/04/2024	10:22:55 AM	9028.9
356	25/04/2024	1:36:24 PM	9047.97
357	25/04/2024	10:29:02 PM	9141.37
358	26/04/2024	6:27:55 AM	9143.8
359	26/04/2024	7:30:00 PM	9265.01
360	26/04/2024	11:27:33 PM	9055.4
361	27/04/2024	2:13:53 AM	0
362	27/04/2024	3:54:05 PM	9270
363	27/04/2024	8:19:18 PM	9129.9
364	28/04/2024	2:32:28 AM	9156.77
365	28/04/2024	10:26:15 AM	8825.77
366	28/04/2024	1:35:00 PM	9073.41
367	28/04/2024	5:44:43 PM	8893.78
368	28/04/2024	9:45:58 PM	9005.25
369	29/04/2024	1:04:54 AM	9078.9
370	29/04/2024	5:17:53 AM	9020.18
371	29/04/2024	1:36:47 PM	8922.96
372	29/04/2024	11:46:00 PM	8870.77
373	30/04/2024	8:32:27 AM	8976.81
374	30/04/2024	9:42:34 PM	9240.8
375	3/05/2024	4:46:10 AM	9164.84
376	3/05/2024	8:52:18 AM	8994.79
377	3/05/2024	12:23:27 PM	8925.31
378	3/05/2024	4:11:19 PM	9117.01
379	4/05/2024	1:25:25 AM	9130.5
380	4/05/2024	6:20:00 AM	9109.04
381	4/05/2024	7:35:00 PM	8742.39
382	5/05/2024	10:09:45 AM	8936.17
383	7/05/2024	3:32:01 AM	9233.57
384	7/05/2024	7:18:33 PM	9231.24
385	8/05/2024	2:14:48 AM	8908.85
386	8/05/2024	10:15:48 AM	8856.55
387	8/05/2024	2:38:11 PM	9031.05
388	8/05/2024	6:35:00 PM	9021
389	11/05/2024	10:18:53 AM	8904.3
390	12/05/2024	7:59:07 PM	9035.24
391	12/05/2024	10:49:09 PM	8915.25
392	13/05/2024	4:33:47 AM	9165.71
393	13/05/2024	8:11:49 AM	9080.69
394	13/05/2024	12:17:21 PM	9112.5
395	14/05/2024	12:44:42 AM	8947.56

Train Index	Load Finish Date	Load Time Complete	Net Weight (t)
396	14/05/2024	4:40:11 AM	9068.15
397	14/05/2024	3:23:13 PM	9007.45
398	14/05/2024	7:06:59 PM	8978.95
399	15/05/2024	1:43:06 AM	9269.44
400	15/05/2024	1:55:28 PM	9077.04
401	15/05/2024	8:46:00 PM	8753.3
402	16/05/2024	5:12:54 AM	9399.43
403	16/05/2024	8:46:18 AM	9069.24
404	16/05/2024	11:56:34 AM	8794.19
405	16/05/2024	6:13:09 PM	9020.64
406	16/05/2024	9:58:49 PM	8950.83
407	17/05/2024	6:17:25 PM	9091.92
408	17/05/2024	10:16:27 PM	8901.04
409	18/05/2024	8:36:15 PM	8797.92
410	18/05/2024	11:47:00 PM	9053.22
411	19/05/2024	11:20:00 AM	9066.15
412	19/05/2024	11:19:43 AM	9221.1
413	19/05/2024	2:35:10 PM	8036.08
414	19/05/2024	6:15:50 PM	9034.18
415	19/05/2024	11:26:00 PM	9124.15
416	20/05/2024	2:49:59 AM	9062.29
417	20/05/2024	8:40:34 AM	8985.18
418	20/05/2024	9:26:34 PM	9198.38
419	24/05/2024	11:37:29 AM	8808.1
420	24/05/2024	7:31:48 PM	8962.82
421	24/05/2024	10:44:36 PM	8932.85
422	25/05/2024	4:51:21 AM	9026.68
423	25/05/2024	2:36:21 PM	8893.09
424	26/05/2024	12:28:00 AM	9108.64
425	26/05/2024	12:24:29 AM	9239.4
426	26/05/2024	4:15:11 AM	8739.1
427	26/05/2024	1:39:29 PM	8941.49
428	26/05/2024	11:39:36 PM	8944.24
429	27/05/2024	10:30:26 AM	9077.24
430	28/05/2024	8:16:00 AM	9003.9
431	28/05/2024	12:08:34 PM	9113.1
432	28/05/2024	12:09:00 PM	8947.44
433	28/05/2024	3:31:10 PM	9034.78
434	29/05/2024	4:12:49 AM	9221.7
435	29/05/2024	8:37:57 AM	9064.58
436	29/05/2024	1:27:09 PM	9092.71
437	29/05/2024	7:19:32 PM	8981.92
438	31/05/2024	3:57:19 AM	9237.51
439	1/06/2024	3:21:00 PM	9161.95
440	1/06/2024	3:20:39 PM	9314.8
441	1/06/2024	6:38:39 PM	9248.12
442	2/06/2024	9:00:23 AM	9243.44
443	2/06/2024	10:50:16 PM	9062.84
444	3/06/2024	10:50:49 AM	9130.15
445	3/06/2024	10:02:23 PM	9166.84

Train Index	Load Finish Date	Load Time Complete	Net Weight (t)
446	4/06/2024	4:46:59 PM	9096.52
447	6/06/2024	1:22:54 AM	8944.23
448	6/06/2024	6:41:22 AM	9155.31
449	6/06/2024	12:17:00 PM	9117.76
450	6/06/2024	4:12:08 PM	9225.8
451	6/06/2024	7:48:06 PM	9009
452	7/06/2024	2:32:00 AM	9023
453	7/06/2024	8:32:28 AM	9160.08
454	7/06/2024	7:45:59 PM	9043.84
455	8/06/2024	2:11:45 AM	9014.51
456	8/06/2024	10:07:54 AM	9255.2
457	8/06/2024	8:40:31 PM	9116.68
458	9/06/2024	12:14:18 AM	9247.2
459	9/06/2024	3:39:18 AM	9224.1
460	9/06/2024	7:14:08 AM	9202.64
461	9/06/2024	9:33:15 PM	8881.98
462	10/06/2024	12:52:46 AM	9202.3
463	10/06/2024	6:14:47 AM	9182.2
464	10/06/2024	11:55:30 AM	9154.1
465	10/06/2024	11:53:30 PM	9105.71
466	12/06/2024	3:03:52 AM	9109.04
467	13/06/2024	2:41:20 AM	9210.9
468	13/06/2024	6:15:03 AM	9073.4
469	13/06/2024	10:04:03 AM	9073.4
470	13/06/2024	4:13:01 PM	9073.4
471	13/06/2024	9:02:15 PM	9073.4
472	14/06/2024	3:27:40 AM	9073.4
473	14/06/2024	3:11:27 PM	9073.4
474	15/06/2024	12:42:00 AM	9073.4
475	15/06/2024	8:43:02 AM	9116.52
476	15/06/2024	3:45:34 PM	9233.4
477	16/06/2024	7:19:47 AM	9090.63
478	16/06/2024	6:46:22 PM	9090.63
479	17/06/2024	6:56:15 AM	9243.4
480	18/06/2024	2:18:17 PM	9090.63
481	18/06/2024	5:22:10 PM	9090.63
482	19/06/2024	2:35:32 AM	9090.63
483	19/06/2024	7:49:20 AM	9090.63
484	19/06/2024	2:34:41 PM	9090.63
485	20/06/2024	2:22:00 AM	9103.11
486	20/06/2024	5:32:02 AM	8997.92
487	20/06/2024	9:20:52 PM	9024.53
488	21/06/2024	1:45:54 AM	9067.27
489	21/06/2024	4:41:36 AM	9067.27
490	21/06/2024	10:59:28 AM	9067.27
491	21/06/2024	4:49:45 PM	8762.27
492	22/06/2024	1:56:54 AM	9146.9
493	22/06/2024	4:05:18 PM	9096.29
494	22/06/2024	8:24:56 PM	9216.3
495	22/06/2024	11:55:26 PM	9083.71

Train Index	Load Finish Date	Load Time Complete	Net Weight (t)
496	23/06/2024	3:58:19 AM	9082.71
497	23/06/2024	3:07:21 PM	9035.33
498	24/06/2024	12:56:17 AM	9131.51
499	24/06/2024	4:34:00 AM	9044.92
500	24/06/2024	8:33:55 AM	9062.68
501	26/06/2024	6:58:47 PM	9102.12
502	28/06/2024	9:26:53 PM	9070.55
503	30/06/2024	10:13:23 AM	9068.27
504	1/07/2024	9:06:00 PM	9144.04
505	2/07/2024	12:29:00 AM	9080.32
506	2/07/2024	7:33:20 AM	9055.91
507	2/07/2024	9:00:00 PM	9245
508	3/07/2024	12:48:03 AM	8999.72
509	4/07/2024	4:48:11 AM	9075.05
510	5/07/2024	1:15:00 AM	8997.1
511	5/07/2024	8:35:35 PM	9166.7
512	7/07/2024	12:12:43 AM	9056.52
513	7/07/2024	3:20:50 AM	9041.97
514	7/07/2024	6:21:20 AM	9004.52
515	7/07/2024	1:25:00 PM	9087.25
516	7/07/2024	5:30:40 PM	9063.4
517	8/07/2024	3:53:20 PM	9112.08
518	8/07/2024	7:14:33 PM	9094.25
519	9/07/2024	1:52:46 AM	9148.11
520	9/07/2024	5:03:55 AM	9049.82
521	9/07/2024	9:33:34 PM	9025.7
522	10/07/2024	12:52:18 AM	9161.52
523	10/07/2024	10:05:49 PM	9199.52
524	11/07/2024	9:25:27 PM	9092.47
525	12/07/2024	9:09:32 AM	9092.47
526	12/07/2024	4:34:16 PM	9092.47
527	12/07/2024	11:11:22 PM	9092.47
528	13/07/2024	4:04:00 AM	9092.47
529	13/07/2024	7:52:45 AM	9092.47
530	14/07/2024	5:39:04 AM	9092.47
531	14/07/2024	9:24:02 AM	9092.47
532	14/07/2024	10:05:29 PM	9092.47
533	15/07/2024	10:06:33 PM	9092.47
534	16/07/2024	1:05:30 PM	9063.32
535	16/07/2024	6:13:32 PM	9093.5
536	17/07/2024	5:54:55 AM	9097.81
537	17/07/2024	10:40:00 AM	9249.65
538	17/07/2024	3:25:21 PM	9058.81
539	17/07/2024	6:26:00 PM	9114.96
540	17/07/2024	9:56:25 PM	9066.13
541	18/07/2024	1:54:14 AM	9111.46
542	18/07/2024	5:22:04 AM	9223.83
543	18/07/2024	8:48:32 AM	9116.72
544	18/07/2024	11:40:07 PM	9128.42
545	19/07/2024	7:09:37 AM	9155.7

Train Index	Load Finish Date	Load Time Complete	Net Weight (t)
546	19/07/2024	10:49:57 AM	9124.04
547	20/07/2024	1:57:00 AM	9124.04
548	20/07/2024	9:36:50 AM	9124.04
549	20/07/2024	3:32:41 PM	9124.04
550	20/07/2024	10:25:43 PM	9124.04
551	21/07/2024	1:59:02 AM	9124.04
552	21/07/2024	6:33:44 AM	9124.04
553	21/07/2024	10:10:05 AM	9124.04
554	21/07/2024	1:15:23 PM	9124.04
555	21/07/2024	10:13:42 PM	9124.04
556	22/07/2024	12:50:43 AM	9124.04
557	22/07/2024	5:31:49 AM	9124.04
558	22/07/2024	10:11:00 AM	9054.71
559	22/07/2024	1:01:29 PM	9124.04
560	23/07/2024	4:20:34 AM	9123.18
561	23/07/2024	5:29:56 PM	9038.51
562	23/07/2024	10:53:00 PM	9091.72
563	24/07/2024	3:55:49 AM	9069.9
564	24/07/2024	10:28:40 AM	9134.54
565	24/07/2024	9:02:00 PM	9236.8
566	25/07/2024	2:40:39 AM	9096.65
567	25/07/2024	5:32:43 PM	9169.9
568	25/07/2024	9:19:38 PM	8997.72
569	26/07/2024	12:00:20 AM	9066
570	26/07/2024	5:06:45 AM	9053.02
571	26/07/2024	9:27:28 AM	9053.72
572	26/07/2024	2:32:00 PM	9066.61
573	26/07/2024	10:29:59 PM	9064.53
574	27/07/2024	2:04:47 AM	9078.56
575	27/07/2024	12:04:27 PM	9053.67
576	27/07/2024	4:46:14 PM	9053.67
577	28/07/2024	2:18:23 AM	9136.19
578	28/07/2024	5:50:25 AM	9116.51
579	28/07/2024	1:29:35 PM	9086.43
580	28/07/2024	5:25:22 PM	9069.09
581	28/07/2024	9:07:08 PM	9201.71
582	29/07/2024	3:54:18 AM	9082.27
583	29/07/2024	8:41:00 AM	9124.2
584	30/07/2024	6:24:40 AM	9091.26
585	30/07/2024	4:10:28 PM	9091.26
586	31/07/2024	10:49:50 AM	9136.2
587	31/07/2024	10:31:08 PM	9105.74
588	1/08/2024	2:13:38 PM	9102.06
589	2/08/2024	3:48:55 AM	9320.1
590	2/08/2024	3:27:00 PM	9242.37
591	6/08/2024	12:53:33 AM	9051.17
592	6/08/2024	7:22:37 PM	9006.93
593	6/08/2024	10:44:02 PM	9104.17
594	7/08/2024	9:32:47 AM	9109.12
595	7/08/2024	8:27:06 PM	9094.75

Train Index	Load Finish Date	Load Time Complete	Net Weight (t)
596	8/08/2024	12:08:07 AM	9112.66
597	8/08/2024	2:52:11 AM	9133.57
598	8/08/2024	8:18:18 AM	9006.95
599	8/08/2024	7:27:03 PM	9088.76
600	8/08/2024	11:05:07 PM	9234
601	9/08/2024	10:48:08 AM	9094.36
602	9/08/2024	9:03:42 PM	9094.36
603	10/08/2024	11:34:03 AM	9206.8
604	10/08/2024	7:39:18 PM	8737.49
605	11/08/2024	10:05:41 AM	8959.93
606	11/08/2024	2:12:51 PM	8754.1
607	12/08/2024	6:40:36 AM	9078.96
608	13/08/2024	6:00:17 AM	9105.48
609	13/08/2024	10:23:16 AM	9052.7
610	13/08/2024	1:03:23 PM	9103.97
611	14/08/2024	11:50:00 AM	9074.37
612	14/08/2024	3:46:54 PM	9074.37
613	14/08/2024	7:17:05 PM	9063.77
614	15/08/2024	12:54:28 AM	9163.4
615	15/08/2024	7:03:16 AM	9083.04
616	15/08/2024	11:04:00 PM	9204.97
617	16/08/2024	3:20:00 AM	9008.72
618	16/08/2024	6:56:00 AM	9139.97
619	16/08/2024	11:17:03 PM	9183.4
620	17/08/2024	8:42:39 PM	9294.4
621	18/08/2024	12:06:40 AM	9282
622	20/08/2024	1:30:21 PM	9110.02
623	20/08/2024	6:50:28 PM	9110.02
624	21/08/2024	9:15:01 AM	9110.02
625	21/08/2024	5:33:12 PM	9110.02
626	22/08/2024	12:35:34 AM	9110.02
627	22/08/2024	4:14:52 AM	9110.02
628	22/08/2024	9:47:00 AM	9110.02
629	23/08/2024	3:06:03 AM	9110.02
630	23/08/2024	9:05:47 AM	9110.02
631	23/08/2024	12:59:00 PM	9110.02
632	23/08/2024	5:09:00 PM	9110.02
633	23/08/2024	8:39:41 PM	9110.02
634	24/08/2024	10:30:42 AM	9110.02
635	24/08/2024	1:53:35 PM	9110.02
636	25/08/2024	9:37:37 AM	9110.02
637	25/08/2024	1:55:59 PM	9110.02
638	25/08/2024	7:06:42 PM	9110.02
639	26/08/2024	12:13:27 AM	9110.02
640	26/08/2024	5:58:10 PM	9110.02
641	29/08/2024	9:39:49 AM	9110.02
642	29/08/2024	11:34:42 PM	9110.02
643	2/09/2024	1:55:00 AM	8151
644	2/09/2024	5:15:00 AM	9170
645	2/09/2024	9:25:00 AM	8597

Train Index	Load Finish Date	Load Time Complete	Net Weight (t)
646	3/09/2024	8:06:00 PM	8955
647	4/09/2024	1:54:00 AM	9041
648	4/09/2024	3:41:00 PM	9131
649	4/09/2024	7:23:00 PM	8975
650	5/09/2024	2:17:00 AM	8935
651	5/09/2024	1:16:00 PM	9140
652	5/09/2024	4:28:00 PM	9033
653	5/09/2024	8:38:00 PM	8725
654	6/09/2024	12:22:00 PM	8745
655	6/09/2024	5:32:00 PM	8933
656	7/09/2024	3:46:00 AM	8926
657	7/09/2024	9:04:00 AM	8608
658	7/09/2024	1:45:00 PM	8833
659	7/09/2024	6:58:00 PM	8754
660	8/09/2024	12:22:00 AM	8781
661	8/09/2024	3:33:00 AM	8795
662	8/09/2024	6:55:00 AM	8976
663	8/09/2024	10:31:00 AM	8819
664	8/09/2024	1:47:00 PM	9076
665	9/09/2024	5:23:00 AM	9059
666	10/09/2024	2:19:00 AM	8752
667	11/09/2024	1:28:00 AM	9051
668	11/09/2024	5:17:00 AM	8869
669	11/09/2024	10:26:00 PM	8879
670	12/09/2024	8:12:00 AM	9160
671	13/09/2024	12:32:00 AM	8925
672	14/09/2024	5:20:00 PM	8867
673	15/09/2024	4:40:00 AM	8873
674	16/09/2024	2:04:00 AM	8885
675	16/09/2024	9:31:00 PM	8811
676	17/09/2024	10:58:00 PM	8610
677	18/09/2024	2:16:00 AM	8902
678	18/09/2024	7:32:00 PM	8623
679	19/09/2024	2:57:00 AM	8641
680	19/09/2024	6:07:00 AM	8656
681	19/09/2024	1:02:00 PM	8548
682	19/09/2024	10:23:00 PM	8891
683	20/09/2024	4:44:00 AM	8384
684	21/09/2024	8:06:00 AM	8438
685	21/09/2024	11:40:00 AM	8525
686	22/09/2024	12:50:00 AM	8537
687	22/09/2024	10:14:00 AM	8452
688	22/09/2024	3:59:00 PM	8283
689	23/09/2024	4:26:00 AM	8196
690	23/09/2024	12:35:00 PM	8130
691	23/09/2024	4:11:00 PM	8142
692	23/09/2024	8:43:00 PM	7465
693	24/09/2024	12:29:00 AM	7916
694	24/09/2024	3:49:00 AM	7315
695	25/09/2024	10:25:00 AM	8816

Train Index	Load Finish Date	Load Time Complete	Net Weight (t)
696	25/09/2024	10:04:00 PM	7697
697	26/09/2024	4:03:00 AM	9218
698	26/09/2024	10:00:00 AM	8694
699	26/09/2024	10:40:00 PM	9216
700	28/09/2024	4:46:00 AM	8776
701	28/09/2024	8:12:00 AM	8234
702	29/09/2024	1:55:00 AM	8584
703	29/09/2024	5:22:00 AM	8962
704	29/09/2024	9:01:00 AM	8918
705	29/09/2024	1:25:00 PM	8850
706	29/09/2024	5:54:00 PM	8570
707	29/09/2024	10:54:00 PM	9025
708	30/09/2024	5:31:00 AM	9000.29
709	30/09/2024	10:06:00 AM	8774.94
710	1/10/2024	4:46:00 AM	9018.42
711	4/10/2024	7:02:00 PM	8814.57
712	4/10/2024	10:21:00 PM	8800.7
713	5/10/2024	1:35:44 AM	8865.48
714	5/10/2024	5:25:00 AM	8865.48
715	5/10/2024	3:28:00 PM	8865.48
716	6/10/2024	1:30:00 AM	8865.48
717	6/10/2024	4:54:04 AM	8865.48
718	6/10/2024	6:22:33 PM	8865.48
719	7/10/2024	9:02:10 AM	8865.48
720	7/10/2024	12:24:20 PM	8865.48
721	7/10/2024	3:27:16 PM	8865.48
722	7/10/2024	10:02:10 PM	8999.18
723	8/10/2024	12:53:01 AM	8865.48
724	8/10/2024	8:36:00 PM	8978
725	9/10/2024	4:56:00 AM	9056.88
726	9/10/2024	8:49:00 AM	8511.78
727	10/10/2024	1:21:00 AM	9284.42
728	10/10/2024	7:27:00 AM	8940
729	10/10/2024	11:57:57 AM	9312.87
730	10/10/2024	4:03:00 PM	8970.01
731	10/10/2024	7:19:52 PM	9207.49
732	11/10/2024	2:46:10 AM	9222.02
733	11/10/2024	2:47:00 PM	9041.41
734	11/10/2024	6:12:05 PM	8553.32
735	11/10/2024	10:31:52 PM	8939.48
736	12/10/2024	1:56:00 AM	9286.96
737	12/10/2024	5:53:00 AM	9491.58
738	12/10/2024	1:54:00 PM	9324.58
739	13/10/2024	1:46:11 AM	9327.79
740	13/10/2024	5:14:38 AM	9030
741	13/10/2024	11:37:00 AM	8933
742	13/10/2024	11:59:00 PM	9271.78
743	14/10/2024	4:57:00 AM	9044.91
744	14/10/2024	9:32:19 AM	9149.24
745	15/10/2024	12:58:00 AM	8811.38

Train Index	Load Finish Date	Load Time Complete	Net Weight (t)
746	15/10/2024	2:31:05 AM	9149.24
747	15/10/2024	11:35:24 PM	9108.18
748	16/10/2024	2:23:40 AM	9108.18
749	16/10/2024	6:06:20 AM	8503.9
750	17/10/2024	12:04:06 AM	9103.24
751	17/10/2024	3:04:20 AM	9103.24
752	17/10/2024	8:00:50 AM	9103.24
753	17/10/2024	6:49:32 PM	9103.24
754	18/10/2024	1:05:20 AM	9199.4
755	18/10/2024	6:40:33 AM	9103.24
756	18/10/2024	10:17:46 AM	9103.24
757	19/10/2024	2:52:45 AM	9103.24
758	19/10/2024	6:42:42 AM	9051.88
759	19/10/2024	8:06:31 PM	9114.48
760	19/10/2024	11:16:19 PM	9114.48
761	20/10/2024	4:32:32 AM	9142.06
762	20/10/2024	10:45:28 AM	9011.32
763	20/10/2024	2:49:15 PM	9026.23
764	20/10/2024	5:50:25 PM	9005.22
765	20/10/2024	9:17:26 PM	9050.5
766	21/10/2024	12:18:59 AM	8989.87
767	22/10/2024	9:20:52 PM	8991.92
768	23/10/2024	7:09:33 AM	8991.92
769	24/10/2024	10:05:30 PM	8936.78
770	25/10/2024	4:17:56 AM	8958.42
771	25/10/2024	8:48:14 AM	8958.42
772	26/10/2024	5:46:52 AM	8958.42
773	26/10/2024	10:16:23 AM	8958.42
774	26/10/2024	2:23:46 PM	8958.42
775	26/10/2024	8:54:04 PM	8958.42
776	27/10/2024	4:19:58 AM	8958.42
777	27/10/2024	8:03:28 AM	8958.42
778	27/10/2024	11:05:06 AM	8958.42
779	27/10/2024	7:11:24 PM	8958.42
780	28/10/2024	3:52:46 AM	8958.42
781	28/10/2024	8:20:25 AM	8958.42
782	28/10/2024	5:04:59 PM	8887.3
783	29/10/2024	5:49:19 AM	8806.63
784	30/10/2024	5:25:45 AM	8721.98
785	30/10/2024	8:55:39 PM	8721.17
786	31/10/2024	3:17:00 AM	8930.92
787	31/10/2024	8:37:36 AM	8930.92
788	31/10/2024	11:17:27 PM	9021.63
789	1/11/2024	5:39:12 AM	8918.88
790	1/11/2024	8:52:00 AM	8992.9
791	1/11/2024	5:21:08 PM	8925.62
792	1/11/2024	10:37:44 PM	8906.97
793	2/11/2024	12:17:46 PM	8942.99
794	2/11/2024	4:33:26 PM	8955.82
795	3/11/2024	5:16:20 AM	8854.6

Train Index	Load Finish Date	Load Time Complete	Net Weight (t)
796	3/11/2024	8:39:15 AM	8883.06
797	3/11/2024	4:47:53 PM	8641.83
798	3/11/2024	11:19:12 PM	8938.88
799	4/11/2024	3:08:37 AM	8993.48
800	4/11/2024	8:09:58 AM	8769.06
801	4/11/2024	12:10:54 PM	8903.68
802	5/11/2024	4:46:28 AM	8934.39
803	5/11/2024	10:58:06 AM	8894.96
804	5/11/2024	5:30:58 PM	9072.03
805	5/11/2024	8:38:33 PM	8907.87
806	5/11/2024	11:21:20 PM	8975.58
807	6/11/2024	8:05:00 AM	8952.86
808	6/11/2024	2:35:00 PM	8705.48
809	6/11/2024	11:19:00 PM	8839.66
810	7/11/2024	9:08:47 AM	8941.48
811	7/11/2024	11:01:24 PM	8912.29
812	8/11/2024	10:50:02 AM	8912.29
813	9/11/2024	5:16:43 AM	8994.82
814	9/11/2024	1:22:47 PM	8917.88
815	9/11/2024	5:31:42 PM	8934.01
816	10/11/2024	1:50:01 AM	8913.38
817	10/11/2024	11:02:18 AM	8911.79
818	10/11/2024	2:25:37 PM	9009.26
819	10/11/2024	7:23:38 PM	8969.2
820	10/11/2024	10:42:38 PM	8952.18
821	11/11/2024	2:25:20 AM	8987.46
822	11/11/2024	8:27:58 AM	9182.9
823	11/11/2024	1:41:41 PM	8893.84
824	11/11/2024	9:55:02 PM	8978.88
825	12/11/2024	4:11:54 AM	9009.79
826	12/11/2024	1:45:35 PM	8890.23
827	12/11/2024	4:49:58 PM	8951.6
828	12/11/2024	10:44:28 PM	8951.6
829	13/11/2024	2:57:30 AM	9028.58
830	13/11/2024	11:57:07 AM	8963.12
831	13/11/2024	10:42:07 PM	8963.12
832	14/11/2024	5:18:38 AM	8963.12
833	14/11/2024	9:53:03 AM	8963.12
834	14/11/2024	1:21:30 PM	8963.12
835	14/11/2024	4:44:31 PM	8963.12
836	14/11/2024	7:23:25 PM	8963.12
837	15/11/2024	12:11:26 AM	8963.12
838	15/11/2024	6:59:32 AM	8963.12
839	16/11/2024	3:48:03 AM	8963.12
840	16/11/2024	10:52:18 PM	8963.12
841	17/11/2024	11:43:34 AM	8963.12
842	17/11/2024	2:58:39 PM	8963.12
843	17/11/2024	11:12:48 PM	8963.12
844	19/11/2024	5:37:16 AM	8842.22
845	22/11/2024	9:45:00 AM	8736.25

Train Index	Load Finish Date	Load Time Complete	Net Weight (t)
846	22/11/2024	11:15:00 PM	8810.24
847	24/11/2024	1:03:00 PM	8807.68
848	24/11/2024	8:24:36 PM	8912.18
849	25/11/2024	12:22:46 AM	8904.16
850	25/11/2024	2:58:00 AM	8892.02
851	25/11/2024	2:56:00 PM	8892.02
852	25/11/2024	11:32:10 PM	8801.58
853	26/11/2024	6:17:53 AM	8920.29
854	26/11/2024	10:06:00 AM	9172.8
855	27/11/2024	1:10:00 AM	8865.34
856	27/11/2024	4:31:47 AM	8865.34
857	27/11/2024	4:04:00 PM	8882.72
858	28/11/2024	12:16:00 AM	8875.08
859	28/11/2024	3:45:00 AM	8808.24
860	28/11/2024	8:35:00 PM	8845.84
861	29/11/2024	1:30:00 AM	8888.8
862	29/11/2024	7:54:23 AM	8883.44
863	29/11/2024	12:36:11 PM	8918.86
864	29/11/2024	4:19:10 PM	8830.52
865	30/11/2024	3:31:00 AM	8723.96
866	30/11/2024	1:53:59 PM	8949.06
867	30/11/2024	8:07:37 PM	9087.27
868	1/12/2024	2:05:00 AM	8955.25
869	1/12/2024	11:17:00 AM	8923.48
870	1/12/2024	2:27:00 PM	8815.78
871	1/12/2024	6:47:47 PM	8721.06
872	1/12/2024	10:55:00 PM	8952.09
873	2/12/2024	2:19:40 AM	8907.12
874	2/12/2024	3:56:00 PM	8863.18
875	3/12/2024	12:45:00 AM	8962.76
876	3/12/2024	5:43:42 PM	8860.64
877	4/12/2024	3:16:18 AM	8838.64
878	4/12/2024	5:53:00 PM	8852.26
879	6/12/2024	1:51:51 AM	8923.98
880	6/12/2024	9:48:00 AM	8837.64
881	6/12/2024	5:43:34 PM	8695.33
882	6/12/2024	9:55:00 PM	8862.12
883	7/12/2024	1:51:00 AM	8879.69
884	7/12/2024	5:14:00 AM	8769.96
885	7/12/2024	12:47:00 PM	8848.41
886	7/12/2024	5:46:00 PM	8848.41
887	7/12/2024	9:24:00 PM	8852.98
888	8/12/2024	12:58:00 AM	8856.13
889	8/12/2024	3:48:00 AM	8912.56
890	8/12/2024	7:17:00 AM	8758.73
891	8/12/2024	12:54:00 PM	8619.16
892	8/12/2024	8:23:00 PM	8872.25
893	9/12/2024	2:10:00 AM	8913.36
894	9/12/2024	9:30:33 AM	8850.65
895	9/12/2024	1:41:00 PM	8828.55

Train Index	Load Finish Date	Load Time Complete	Net Weight (t)
896	10/12/2024	12:40:00 AM	8880.65
897	10/12/2024	5:06:00 AM	8953.34
898	10/12/2024	6:38:00 PM	8849.98
899	11/12/2024	10:21:58 PM	8688.43
900	12/12/2024	1:57:14 AM	8812.69
901	12/12/2024	11:32:00 PM	8828.37
902	13/12/2024	1:10:00 PM	8825.38
903	13/12/2024	8:24:00 PM	8836.54
904	14/12/2024	7:31:00 AM	8780.69
905	14/12/2024	11:04:00 AM	8889.27
906	14/12/2024	2:43:00 PM	8845.29
907	14/12/2024	6:14:00 PM	8927.96
908	14/12/2024	9:24:42 PM	8845.29
909	15/12/2024	1:22:27 AM	8885.07
910	15/12/2024	4:01:37 AM	8898.3
911	15/12/2024	7:23:00 AM	8861.95
912	15/12/2024	3:59:00 PM	8847.5
913	15/12/2024	7:45:00 PM	8794.75
914	16/12/2024	12:47:55 AM	8860.33
915	16/12/2024	7:19:00 AM	8939.44
916	16/12/2024	12:31:00 PM	9315.2
917	16/12/2024	3:52:00 PM	8875.43
918	16/12/2024	11:32:00 PM	8877.95
919	17/12/2024	4:34:00 AM	8955.28
920	17/12/2024	10:26:00 AM	8784.04
921	17/12/2024	4:07:00 PM	8837.29
922	17/12/2024	10:43:00 PM	8897.81
923	18/12/2024	1:51:00 AM	8887.28
924	18/12/2024	5:03:00 AM	8864.78
925	18/12/2024	6:14:00 PM	8821.92
926	18/12/2024	8:51:50 PM	8870.94
927	19/12/2024	1:03:31 AM	8855.41
928	19/12/2024	4:28:00 AM	8802.94
929	19/12/2024	6:25:00 PM	8865.22
930	20/12/2024	12:16:01 AM	8865.22
931	20/12/2024	3:39:00 AM	8812.13
932	20/12/2024	3:02:00 PM	9027.18
933	20/12/2024	11:36:00 PM	8865.53
934	21/12/2024	2:11:18 AM	8865.53
935	21/12/2024	5:50:21 AM	8960.93
936	21/12/2024	9:25:00 AM	8914.74
937	21/12/2024	1:20:00 PM	8879.17
938	21/12/2024	5:10:00 PM	8879.17
939	22/12/2024	1:59:28 AM	8879.17
940	22/12/2024	5:07:00 AM	8832.01
941	22/12/2024	8:22:00 PM	8876.32
942	23/12/2024	2:26:00 AM	8806.75
943	23/12/2024	9:54:00 AM	8893.73
944	23/12/2024	2:27:00 PM	8911.74
945	23/12/2024	5:05:00 PM	8881.76

Train Index	Load Finish Date	Load Time Complete	Net Weight (t)
946	26/12/2024	10:28:00 PM	8881.76
947	27/12/2024	1:45:00 AM	8910.67
948	27/12/2024	4:37:00 AM	8884.33
949	27/12/2024	3:21:00 PM	8723.3
950	27/12/2024	10:11:43 PM	8960.19
951	28/12/2024	1:39:48 AM	9000.3
952	28/12/2024	5:30:00 AM	8823.21
953	28/12/2024	9:42:00 AM	8772.13
954	28/12/2024	8:26:52 PM	8819.34
955	28/12/2024	11:37:14 PM	8835.49
956	29/12/2024	4:30:04 AM	8866.58
957	29/12/2024	8:32:00 AM	8690.87
958	29/12/2024	2:45:00 PM	8676.21
959	29/12/2024	8:28:52 PM	8827.33
960	29/12/2024	11:51:17 PM	8686.29
961	30/12/2024	4:15:00 AM	8700.01
962	30/12/2024	10:26:04 AM	8811.71
963	30/12/2024	6:55:46 PM	8713.83

Appendix B - Noise Monitoring Results

Table B.1 Noise Monitoring Results January 2024

Site / Receiver	Time	L _{Aeq} (15min) Ravensworth Contribution (dB)	L _{Aeq} (15min) Criteria (dB)	Compliant	EA Predicted Operational Noise Levels ^a	Within Predicted Levels	L _{A1} (1 min) Ravensworth Contribution (dB)	L _{A1} (1 min) Criteria (dB)	Compliant	L _{Aeq} (15min) Cumulative Noise Ravensworth Contribution (dB)	L _{Aeq} (15min) Cumulative Noise Criteria (dB)	Compliant
Site 2 / R2 (EPL16 / NM3) A. Bowman	10:06pm	<20	35	Yes	<30-35	Yes	<20	45	Yes	<20	40	Yes
Site 3 / R3 W. Bowman	11:06pm	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes
Site 5 / R3 (EPL15 / NM2) Camberwell South	11:29pm	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes
Site 6 / R4 (EPL14 / NM1) Camberwell North	11:50pm	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes

Notes: ^a Source: *Noise Impact Assessment Ravensworth Operations Project* (Umwelt, 2010) – Table 5.1 - Predicted Operational Noise Levels, dB(A) (Year 15)

Further detailed monthly noise monitoring reports are available on the Ravensworth Operations website: <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/monitoring-documents#noise-monitoring>

Table B.2 Noise Monitoring Results February 2024

Site / Receiver	Time	L _{Aeq} (15min) Ravensworth Contribution (dB)	L _{Aeq} (15min) Criteria (dB)	Compliant	EA Predicted Operational Noise Levels ^a	Within Predicted Levels	L _{A1} (1 min) Ravensworth Contribution (dB)	L _{A1} (1 min) Criteria (dB)	Compliant	L _{Aeq} (15min) Cumulative Noise Ravensworth Contribution (dB)	L _{Aeq} (15min) Cumulative Noise Criteria (dB)	Compliant
Site 2 / R2 (EPL16 / NM3) A. Bowman	10:40pm	27	35	Yes	<30-35	Yes	31	45	Yes	27	40	Yes
Site 3 / R3 W. Bowman	11:32pm	21	35	Yes	<30-36	Yes	29	45	Yes	21	40	Yes
Site 5 / R3 (EPL15 / NM2) Camberwell South	11:55pm	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes
Site 6 / R4 (EPL14 / NM1) Camberwell North	12:15am	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes
Site 7 / R7 Spiteri	10:00pm	<20	35	Yes	26 ^b	Yes	<20	45	Yes	<20	N/A	N/A

Notes:^a Source: *Noise Impact Assessment Ravensworth Operations Project* (Umwelt, 2010) – Table 5.1 - Predicted Operational Noise Levels, dB(A) (Year 15)

^b Source: *Environmental Noise Impact Assessment Ravensworth Underground Mine Proposed Modification 8 of DA104/96* (Global Acoustics Pty Ltd, 2010) – Table 4.2 - Operational Noise Results - Worst Case Atmosphere
- L_{Aeq} dB

Further detailed monthly noise monitoring reports are available on the Ravensworth Operations website: <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/monitoring-documents#noise-monitoring>

Table B.3 Noise Monitoring Results March 2024

Site / Receiver	Time	L _{Aeq} (15min) Ravensworth Contribution (dB)	L _{Aeq} (15min) Criteria (dB)	Compliant	EA Predicted Operational Noise Levels ^a	Within Predicted Levels	L _{A1} (1 min) Ravensworth Contribution (dB)	L _{A1} (1 min) Criteria (dB)	Compliant	L _{Aeq} (15min) Cumulative Noise Ravensworth Contribution (dB)	L _{Aeq} (15min) Cumulative Noise Criteria (dB)	Compliant
Site 2 / R2 (EPL16 / NM3) A. Bowman	10:10pm	21	35	Yes	<30-35	Yes	29	45	Yes	21	40	Yes
Site 3 / R3 W. Bowman	11:01pm	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes
Site 5 / R3 (EPL15 / NM2) Camberwell South	11:23pm	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes
Site 6 / R4 (EPL14 / NM1) Camberwell North	11:43pm	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes

Notes: ^a Source: *Noise Impact Assessment Ravensworth Operations Project* (Umwelt, 2010) – Table 5.1 - Predicted Operational Noise Levels, dB(A) (Year 15)

Further detailed monthly noise monitoring reports are available on the Ravensworth Operations website: <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/monitoring-documents#noise-monitoring>

Table B.4 Noise Monitoring Results April 2024

Site / Receiver	Time	L _{Aeq} (15min) Ravensworth Contribution (dB)	L _{Aeq} (15min) Criteria (dB)	Compliant	EA Predicted Operational Noise Levels ^a	Within Predicted Levels	L _{A1} (1 min) Ravensworth Contribution (dB)	L _{A1} (1 min) Criteria (dB)	Compliant	L _{Aeq} (15min) Cumulative Noise Ravensworth Contribution (dB)	L _{Aeq} (15min) Cumulative Noise Criteria (dB)	Compliant
Site 2 / R2 (EPL16 / NM3) A. Bowman	10:08pm	<20	35	Yes	<30-35	Yes	<20	45	Yes	<20	40	Yes
Site 3 / R3 W. Bowman	10:58pm	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes
Site 5 / R3 (EPL15 / NM2) Camberwell South	11:19pm	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes
Site 6 / R4 (EPL14 / NM1) Camberwell North	11:40pm	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes

Notes: ^a Source: *Noise Impact Assessment Ravensworth Operations Project* (Umwelt, 2010) – Table 5.1 - Predicted Operational Noise Levels, dB(A) (Year 15)

Further detailed monthly noise monitoring reports are available on the Ravensworth Operations website: <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/monitoring-documents#noise-monitoring>

Table B.5 Noise Monitoring Results May 2024

Site / Receiver	Time	L _{Aeq} (15min) Ravensworth Contribution (dB)	L _{Aeq} (15min) Criteria (dB)	Compliant	EA Predicted Operational Noise Levels ^a	Within Predicted Levels	L _{A1} (1 min) Ravensworth Contribution (dB)	L _{A1} (1 min) Criteria (dB)	Compliant	L _{Aeq} (15min) Cumulative Noise Ravensworth Contribution (dB)	L _{Aeq} (15min) Cumulative Noise Criteria (dB)	Compliant
Site 2 / R2 (EPL16 / NM3) A. Bowman	10:39pm	<20	35	Yes	<30-35	Yes	<20	45	Yes	<20	40	Yes
Site 3 / R3 W. Bowman	11:20pm	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes
Site 5 / R3 (EPL15 / NM2) Camberwell South	11:51pm	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes
Site 6 / R4 (EPL14 / NM1) Camberwell North	12:11am	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes
Site 7 / R7 Spiteri	10:00pm	<20	35	Yes	26 ^b	Yes	<20	45	Yes	<20	N/A	N/A

Notes: ^a Source: *Noise Impact Assessment Ravensworth Operations Project* (Umwelt, 2010) – Table 5.1 - Predicted Operational Noise Levels, dB(A) (Year 15)

^b Source: *Environmental Noise Impact Assessment Ravensworth Underground Mine Proposed Modification 8 of DA104/96* (Global Acoustics Pty Ltd, 2010) – Table 4.2 - Operational Noise Results - Worst Case Atmosphere
- L_{Aeq} dB

Further detailed monthly noise monitoring reports are available on the Ravensworth Operations website: <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/monitoring-documents#noise-monitoring>

Table B.6 Noise Monitoring Results June 2024

Site / Receiver	Time	L _{Aeq} (15min) Ravensworth Contribution (dB)	L _{Aeq} (15min) Criteria (dB)	Compliant	EA Predicted Operational Noise Levels ^a	Within Predicted Levels	L _{A1} (1 min) Ravensworth Contribution (dB)	L _{A1} (1 min) Criteria (dB)	Compliant	L _{Aeq} (15min) Cumulative Noise Ravensworth Contribution (dB)	L _{Aeq} (15min) Cumulative Noise Criteria (dB)	Compliant
Site 2 / R2 (EPL16 / NM3) A. Bowman	10:07pm	<20	35	Yes	<30-35	Yes	<20	45	Yes	<20	40	Yes
Site 3 / R3 W. Bowman	11:00pm	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes
Site 5 / R3 (EPL15 / NM2) Camberwell South	11:22pm	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes
Site 6 / R4 (EPL14 / NM1) Camberwell North	11:43pm	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes

Notes: ^a Source: *Noise Impact Assessment Ravensworth Operations Project* (Umwelt, 2010) – Table 5.1 - Predicted Operational Noise Levels, dB(A) (Year 15)

Further detailed monthly noise monitoring reports are available on the Ravensworth Operations website: <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/monitoring-documents#noise-monitoring>

Table B.7 Noise Monitoring Results July 2024

Site / Receiver	Time	L _{Aeq} (15min) Ravensworth Contribution (dB)	L _{Aeq} (15min) Criteria (dB)	Compliant	EA Predicted Operational Noise Levels ^a	Within Predicted Levels	L _{A1} (1 min) Ravensworth Contribution (dB)	L _{A1} (1 min) Criteria (dB)	Compliant	L _{Aeq} (15min) Cumulative Noise Ravensworth Contribution (dB)	L _{Aeq} (15min) Cumulative Noise Criteria (dB)	Compliant
Site 2 / R2 (EPL16 / NM3) A. Bowman	10:04pm	<20	35	Yes	<30-35	Yes	<20	45	Yes	<20	40	Yes
Site 3 / R3 W. Bowman	10:58pm	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes
Site 5 / R3 (EPL15 / NM2) Camberwell South	11:19pm	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes
Site 6 / R4 (EPL14 / NM1) Camberwell North	11:41pm	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes

Notes: ^a Source: *Noise Impact Assessment Ravensworth Operations Project* (Umwelt, 2010) – Table 5.1 - Predicted Operational Noise Levels, dB(A) (Year 15)

Further detailed monthly noise monitoring reports are available on the Ravensworth Operations website: <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/monitoring-documents#noise-monitoring>

Table B.8 Noise Monitoring Results August 2024

Site / Receiver	Time	L _{Aeq} (15min) Ravensworth Contribution (dB)	L _{Aeq} (15min) Criteria (dB)	Compliant	EA Predicted Operational Noise Levels ^a	Within Predicted Levels	L _{A1} (1 min) Ravensworth Contribution (dB)	L _{A1} (1 min) Criteria (dB)	Compliant	L _{Aeq} (15min) Cumulative Noise Ravensworth Contribution (dB)	L _{Aeq} (15min) Cumulative Noise Criteria (dB)	Compliant
Site 2 / R2 (EPL16 / NM3) A. Bowman	10:42pm	<20	35	Yes	<30-35	Yes	<20	45	Yes	<20	40	Yes
Site 3 / R3 W. Bowman	11:37pm	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes
Site 5 / R3 (EPL15 / NM2) Camberwell South	11:57pm	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes
Site 6 / R4 (EPL14 / NM1) Camberwell North	12:17am	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes
Site 7 / R7 Spiteri	10:01pm	<20	35	Yes	26 ^b	Yes	<20	45	Yes	<20	N/A	N/A

Notes: ^a Source: *Noise Impact Assessment Ravensworth Operations Project* (Umwelt, 2010) – Table 5.1 - Predicted Operational Noise Levels, dB(A) (Year 15)

^b Source: *Environmental Noise Impact Assessment Ravensworth Underground Mine Proposed Modification 8 of DA104/96* (Global Acoustics Pty Ltd, 2010) – Table 4.2 - Operational Noise Results - Worst Case Atmosphere

- L_{Aeq} dB

Further detailed monthly noise monitoring reports are available on the Ravensworth Operations website: <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/monitoring-documents#noise-monitoring>

Table B.9 Noise Monitoring Results September 2024

Site / Receiver	Time	L _{Aeq} (15min) Ravensworth Contribution (dB)	L _{Aeq} (15min) Criteria (dB)	Compliant	EA Predicted Operational Noise Levels ^a	Within Predicted Levels	L _{A1} (1 min) Ravensworth Contribution (dB)	L _{A1} (1 min) Criteria (dB)	Compliant	L _{Aeq} (15min) Cumulative Noise Ravensworth Contribution (dB)	L _{Aeq} (15min) Cumulative Noise Criteria (dB)	Compliant
Site 2 / R2 (EPL16 / NM3) A. Bowman	10:00pm	<20	35	Yes	<30-35	Yes	<20	45	Yes	<20	40	Yes
Site 3 / R3 W. Bowman	10:50pm	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes
Site 5 / R3 (EPL15 / NM2) Camberwell South	11:12pm	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes
Site 6 / R4 (EPL14 / NM1) Camberwell North	11:31pm	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes

Notes: ^a Source: *Noise Impact Assessment Ravensworth Operations Project* (Umwelt, 2010) – Table 5.1 - Predicted Operational Noise Levels, dB(A) (Year 15)

Further detailed monthly noise monitoring reports are available on the Ravensworth Operations website: <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/monitoring-documents#noise-monitoring>

Table B.10 Noise Monitoring Results October 2024

Site / Receiver	Time	L _{Aeq} (15min) Ravensworth Contribution (dB)	L _{Aeq} (15min) Criteria (dB)	Compliant	EA Predicted Operational Noise Levels ^a	Within Predicted Levels	L _{A1} (1 min) Ravensworth Contribution (dB)	L _{A1} (1 min) Criteria (dB)	Compliant	L _{Aeq} (15min) Cumulative Noise Ravensworth Contribution (dB)	L _{Aeq} (15min) Cumulative Noise Criteria (dB)	Compliant
Site 2 / R2 (EPL16 / NM3) A. Bowman	10:07pm	<20	35	Yes	<30-35	Yes	<20	45	Yes	<20	40	Yes
Site 3 / R3 W. Bowman	10:57pm	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes
Site 5 / R3 (EPL15 / NM2) Camberwell South	11:18pm	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes
Site 6 / R4 (EPL14 / NM1) Camberwell North	11:37pm	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes

Notes: ^a Source: *Noise Impact Assessment Ravensworth Operations Project* (Umwelt, 2010) – Table 5.1 - Predicted Operational Noise Levels, dB(A) (Year 15)

Further detailed monthly noise monitoring reports are available on the Ravensworth Operations website: <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/monitoring-documents#noise-monitoring>

Table B.11 Noise Monitoring Results November 2024

Site / Receiver	Time	L _{Aeq} (15min) Ravensworth Contribution (dB)	L _{Aeq} (15min) Criteria (dB)	Compliant	EA Predicted Operational Noise Levels ^a	Within Predicted Levels	L _{A1} (1 min) Ravensworth Contribution (dB)	L _{A1} (1 min) Criteria (dB)	Compliant	L _{Aeq} (15min) Cumulative Noise Ravensworth Contribution (dB)	L _{Aeq} (15min) Cumulative Noise Criteria (dB)	Compliant
Site 2 / R2 (EPL16 / NM3) A. Bowman	10:40pm	<20	35	Yes	<30-35	Yes	<20	45	Yes	<20	40	Yes
Site 3 / R3 W. Bowman	11:29pm	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes
Site 5 / R3 (EPL15 / NM2) Camberwell South	11:51pm	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes
Site 6 / R4 (EPL14 / NM1) Camberwell North	12:10am	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes
Site 7 / R7 Spiteri	10:01pm	<20	35	Yes	26 ^b	Yes	<20	45	Yes	<20	N/A	N/A

Notes: ^a Source: *Noise Impact Assessment Ravensworth Operations Project* (Umwelt, 2010) – Table 5.1 - Predicted Operational Noise Levels, dB(A) (Year 15)

^b Source: *Environmental Noise Impact Assessment Ravensworth Underground Mine Proposed Modification 8 of DA104/96* (Global Acoustics Pty Ltd, 2010) – Table 4.2 - Operational Noise Results - Worst Case Atmosphere
- L_{Aeq} dB

Further detailed monthly noise monitoring reports are available on the Ravensworth Operations website: <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/monitoring-documents#noise-monitoring>

Table B.12 Noise Monitoring Results December 2024

Site / Receiver	Time	L _{Aeq} (15min) Ravensworth Contribution (dB)	L _{Aeq} (15min) Criteria (dB)	Compliant	EA Predicted Operational Noise Levels ^a	Within Predicted Levels	L _{A1} (1 min) Ravensworth Contribution (dB)	L _{A1} (1 min) Criteria (dB)	Compliant	L _{Aeq} (15min) Cumulative Noise Ravensworth Contribution (dB)	L _{Aeq} (15min) Cumulative Noise Criteria (dB)	Compliant
Site 2 / R2 (EPL16 / NM3) A. Bowman	12:40am	<20	35	Yes	<30-35	Yes	<20	45	Yes	<20	40	Yes
Site 3 / R3 W. Bowman	1:31am	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes
Site 5 / R3 (EPL15 / NM2) Camberwell South	1:53am	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes
Site 6 / R4 (EPL14 / NM1) Camberwell North	2:13am	<20	35	Yes	<30-36	Yes	<20	45	Yes	<20	40	Yes

Notes: ^a Source: *Noise Impact Assessment Ravensworth Operations Project* (Umwelt, 2010) – Table 5.1 - Predicted Operational Noise Levels, dB(A) (Year 15)

Further detailed monthly noise monitoring reports are available on the Ravensworth Operations website: <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ravensworth-operations/monitoring-documents#noise-monitoring>

Appendix C - Annual Noise Monitoring Summary Report



Document No: 13835/10733

ANNUAL ATTENDED NOISE MONITORING SUMMARY

January 2024 – December 2024

Ravensworth Mining Complex

Ravensworth, NSW

Prepared for:
Ravensworth Operations Pty Limited
Lemington Road
Ravensworth NSW 2330

.....
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February 2025

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APPENDIX A Description of Acoustical Terms

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1.0 INTRODUCTION

This report presents the results of attended noise compliance monitoring and measurements conducted for the Ravensworth Mining Complex (RMC) during the 2024 calendar year, as required under Condition R5.3 of EPL 2652, and Schedule 5 Condition 3 of the Project Approval (PA 09_0176). Monitoring was undertaken in accordance with requirements of Ravensworth Mine Complex Noise Management Plan (NMP) dated November 2024. The noise monitoring programme and procedures in the NMP have been developed in accordance with the RMC Environmental Protection Licence (EPL) no 2652, the Ravensworth Operations Project Approval (PA 09_0176) and Ravensworth Underground Development Approval (DA 104/96). To aid in the understanding of this report a description of acoustical terms is attached as **Appendix A**.

1.1 Noise Monitoring Locations

The NMP (Section 6) contains a table (Table 6.1) detailing the locations for attended noise monitoring and corresponding identification numbers which are generally in keeping with EPL 2652, PA 09_0176 and DA 104/96. The relevant sections of Table 6.1 from the NMP are reproduced below in **Table 1**. The monitoring locations are also shown on **Figures 1** and **2**.

Table 1 RMC Noise Monitoring Locations		
Monitoring Location	EPL Point	Description
Site 2	NM3	A. Bowman
Site 3	-	W. Bowman
Site 5	NM2	Camberwell South
Site 6	NM1	Camberwell North
Site 7	-	Spiteri
SX46	-	Sentinex (Bowman)
SX12	-	Camberwell Village

The NMP for the RMC states attended noise monitoring must be carried out at Sites 2, 3, 5 and 6 (per Table 1). Monitoring at Site 7 was a requirement of the NMP for RUM prior to November 2024. The Ravensworth Complex has a directional noise monitoring unit (SX46) installed at Site 2 and has access to data from a unit operated by a neighbouring GCAA site (SX12), which is located in Camberwell Village. The data from SX12 is used on an as needs basis, whereas the data from SX46 is used to supplement the attended noise monitoring data. The “monitoring location” nomenclature detailed in Table 1 will be used throughout this report.

1.2 Monitoring Frequency and Duration

EPL 2652 indicates that the attended noise monitoring must be conducted monthly at EPL Point 14, 15 and 16 for one night time period. The RMC NMP indicates that attended monitoring is to be conducted monthly at each location during the night period. Each monthly survey is to consist of one 15 minute measurement at each location. Site 7 was a requirement for RUM prior to November 2024 and was required to be monitored on a quarterly basis and was required to be monitored for a minimum 15 minutes. For the purposes of attended noise monitoring night is defined in the NMP as being between 2200 and 0700 hours. Monitoring is conducted as required in Condition M11.1 of the EPL.

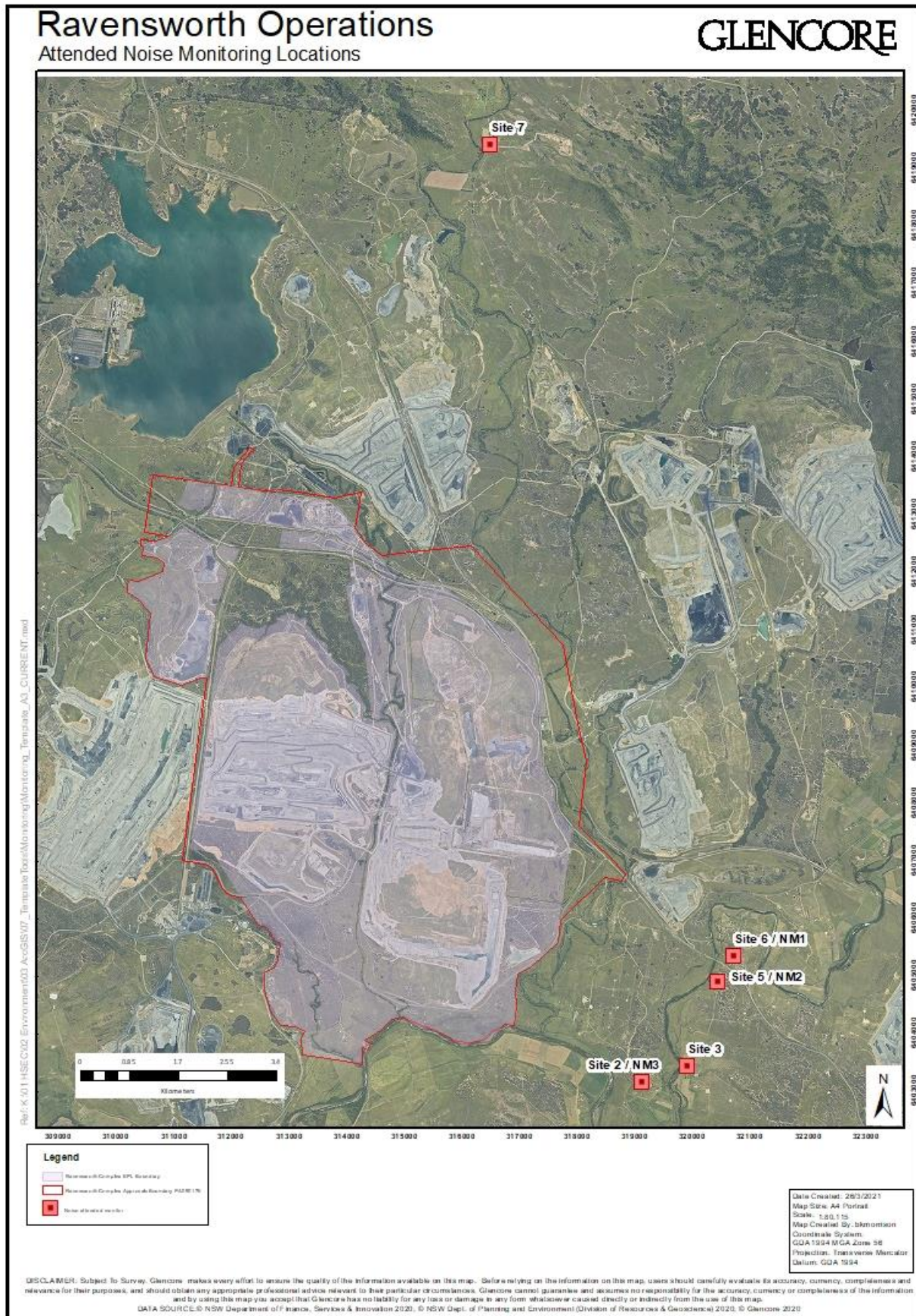


Figure 1: Noise Monitoring Locations

2.0 CRITERIA AND CONDITIONS

2.1 Noise Assessment Criteria

The noise assessment criteria are detailed in Condition L5.1 of the EPL and Table 2, 3, 4, 5, 6 and 7 of PA 09_0176. The criteria may vary for each receiver monitoring location. The applicable night time criterion for each location is shown in the tables of results (**Tables 4 to 27 in Section 4.1**). Noise criteria for all residences listed in the EPL and PA 09_0176 are shown in **Appendix B**. The above noise criteria include the requirement that noise levels at night must not exceed **45 dB(A) L1 (1 min)** (sleep disturbance criterion) at any residence.

In relation to cumulative noise impacts the NMP states that Ravensworth Operations shall implement all reasonable and feasible measures to ensure that the noise generated by the RMC combined with the noise generated by other mines does not exceed the criteria shown in **Table 2**, at any residence on privately-owned land or on more than 25 per cent of any privately-owned land.

Table 2 Cumulative Noise Criteria, dB(A), Leq(period)			
Location	Day	Evening	Night
R3 and R4 Camberwell Village	55	45	40
All other privately owned land	50	45	40

2.2 Monitoring Location Definition

The EPA requires that to determine compliance with the Leq (15 min) and L1(1minute) operational noise limits the noise measurement equipment must be located at the most affected point on or within the residential boundary, or at the most affected point within 30m of the dwelling where the dwelling is more than 30m from the boundary.

2.3 Applicable Meteorological Conditions

The noise limits apply under all meteorological conditions except for any one of the following;

1. Wind speeds greater than 3m/s at 10m above ground level; or
2. Stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level; or
3. Stability category G temperature inversion conditions.

2.4 Other Conditions

To determine compliance with the Leq (15 min) operational noise criteria the modification factors detailed in Fact Sheet C of the NSW Noise Policy for Industry must be applied, as appropriate, to the measured noise levels.

2.5 RMC EA Model Predictions

The night-time operational noise predictions for Year 15 are detailed in Table 5.1 of the Umwelt Australia Pty Ltd 'Ravensworth Operations Project' Noise Impact Assessment. Relevant predictions are summarised below in **Table 3** for the purpose of comparison between measured noise levels and their respective modelled predicted levels for RMC operations. The modelled predictions are indicative of noise conditions throughout specific operational scenarios, time periods, and weather conditions.

Table 3 EA Predictions – Year 15							
Location	Nearest Property ID	Night LAeq, 15min (Scenario 1)	Night LAeq, 15min (Scenario 2)	Night LAeq, 15min (Scenario 3)	Night LAeq, 15min (Scenario 4)	Night LAeq, 15min (Scenario 5)	Night LA1, 1min ³
Site 2 / NM3	3	<30	<30	<30	<30	<30	<35
Site 3	47	<30	31	31	32	<30	36
Site 5 / NM2	8B	<30	31	30	n/a ²	<30	36
Site 6 / NM1	40B	<30	32	<30	n/a ²	<30	37
Site 7 ¹	NA	NA	NA	NA	NA	NA	NA

1. NA – no Property ID found.
2. n/a – reproduced from NIA report.
3. Predicted level for 'worst case meteorological conditions', NW Wind at 3m/s.

Comparisons with these predicted noise levels will be made with the attended noise monitoring results where the relevant meteorological conditions apply. Table 4.6 of the Umwelt NIA report (**Ref: 2383/R12**) summarises these meteorological scenarios, which are shown below.

Table 4.6 – Meteorological Scenarios for Noise Modelling

Scenario	Temperature (°C)	Relative Humidity (%)	Wind Speed (m/s)	Wind Direction, ° from North	Temperature Gradient, °C/100 m
1. Calm	20	65	-	-	-
2. Winter Evening, Night (NW Wind)	10	90	3	315	-
3. Winter Night (Inversion and gradient wind)	10	90	0.6	270	3
4. Winter Night (Inversion and drainage flow)	10	90	2	315	3
5. Summer Night (SSE Wind)	18	65	3	135	-

3.0 NOISE MONITORING PROCEDURE

3.1 Monitoring Equipment

Attended noise monitoring was conducted with a Brüel & Kjær Type 2250 Precision Sound Analyser. This instrument has Class 1 characteristics as defined in AS IEC61672.1-2019 and has current NATA calibration. Calibration certificates are included in Appendix C. Field calibration is carried out at the start and end of each monitoring period.

A-weighted noise levels were measured over the 15-minute monitoring periods with data acquired at 1 or 2 second statistical intervals and the meter set to “fast” response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing NPI ‘modifying factors’. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.

3.2 Measurement Analysis

The 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from RMC was audible, Bruel & Kjaer “Evaluator” analysis software was used to quantify the contributions of RMC and other significant noise sources to the overall noise level. Mine noise from RMC is shown in the tables in bold type.

Due to the close proximity, relative to some receivers, of the entire RMC and other nearby coal mines, it is sometimes not always possible to determine the partial contributions of emissions from each mine to the overall measured noise level. Where this is the case the total measured mine noise is shown in the tables as “mine noise”. Where the total measured mine noise is equal to, or greater than, the noise criterion for RMC, an estimate of the relative contributions of each mine has been made based on the field observations and data analysis.

3.3 Meteorological Data

Meteorological data used in this report were taken from the weather station at Ravensworth Open Cut.

4.0 RESULTS AND DISCUSSION

4.1 RMC Operations & EA Comparison

Measured Leq(15 min) and L1(1 min) noise levels for each monitoring location for the reporting period, and a comparison against the applicable EA predicted values, are summarised in **Tables 4 to 27**.

4.1.1 RMC Operations – January 2024

Table 4
RMC Operational Noise Monitoring Results Leq(15min) – 18th January 2024

Location	Time	dB(A), Leq	RMC Contribution dB(A),Leq	Criterion dB(A),Leq	Stability Class, Wind speed (m/s),dir°	Exceedance (Yes/No) ¹	Applicable Meteorological Condition ^{2,3}	EA Predicted Level ⁴	Difference ^{3,5}
Site 2 / NM3	10:06pm	44	<20	35	D / 3.1 / 262	NA	NA	-	NA
Site 3	11:06pm	42	<20	35	F / 1.1 / 049	No	NA	-	NA
Site 5 / NM2	11:29pm	51	<20	35	F / 0.3 / 327	No	Scenario 1	<30	NC
Site 6 / NM1	11:50pm	51	<20	35	E / 2.1 / 298	No	Scenario 4	n/a	NC

1. NA in this column means applicable meteorological conditions not met, therefore criterion is not applicable.
2. Refer to Table 4.6 of NIA for applicable meteorological conditions.
3. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison.
4. '-' in column means no applicable meteorological conditions were met, therefore there is no applicable predicted noise level.
5. NC indicates measured RMC noise levels were not audible or quantifiable, or expressed as a "less than" quantity (e.g. less than 20 dB), therefore measured and predicted noise levels were not comparable.

Table 5
RMC Operational Noise Monitoring Results L1(1 min) Sleep Disturbance – 18th January 2024

Location	Time	RMC Contribution dB(A),L1(1min)	Criterion dB(A),L1	Stability Class, Wind speed (m/s),dir°	Exceedance (Yes/No) ¹	Applicable Meteorological Condition ^{2,3}	EA Predicted Level ⁴	Difference ^{3,5}
Site 2 / NM3	10:06pm	<20	45	D / 3.1 / 262	NA	NA	-	NA
Site 3	11:06pm	<20	45	F / 1.1 / 049	No	NA	-	NA
Site 5 / NM2	11:29pm	<20	45	F / 0.3 / 327	No	NA	-	NA
Site 6 / NM1	11:50pm	<20	45	E / 2.1 / 298	No	NA	-	NA

1. NA in this column means applicable meteorological conditions not met, therefore criterion is not applicable.
2. Refer to Table 5.3 of NIA for applicable meteorological conditions, NW wind at 3 m/s.
3. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison.
4. '-' in column means no applicable meteorological conditions were met, therefore there is no applicable predicted noise level.
5. NC indicates measured RMC noise levels were not audible or quantifiable, or expressed as a "less than" quantity (e.g. less than 20 dB), therefore measured and predicted noise levels were not comparable.

The results show that, under the operating and meteorological conditions at the times, for the 15 minute compliance measurement periods, the mine noise from RMC did not exceed the applicable operational noise criterion at any time or location during January 2024. Comparison with the EA predicted noise levels was not possible.

4.1.2 RMC Operations – February 2024

Table 6
RMC Operational Noise Monitoring Results Leq(15min) – 22nd & 23rd February 2024

Location	Time	dB(A), Leq	RMC Contribution dB(A),Leq	Criterion dB(A),Leq	Stability Class, Wind speed (m/s),dir°	Exceedance (Yes/No) ¹	Applicable Meteorological Condition ^{2,3}	EA Predicted Level ⁴	Difference ^{3,5}
Site 2 / NM3	10:40pm	41	27	35	F / 0.9 / 166	No	NA	-	NA
Site 3	11:32pm	40	21	35	E / 1.4 / 020	No	NA	-	NA
Site 5 / NM2	11:55pm	44	<20	35	F / 0.7 / 181	No	NA	-	NA
Site 6 / NM1	12:15am	54	<20	35	F / 0.6 / 171	No	NA	-	NA
Site 7	10:00pm	39	<20	35	F / 1.2 / 172	No	NA	-	NA

1. NA in this column means applicable meteorological conditions not met, therefore criterion is not applicable.
2. Refer to Table 4.6 of NIA for applicable meteorological conditions.
3. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison.
4. '-' in column means no applicable meteorological conditions were met, therefore there is no applicable predicted noise level.
5. NC indicates measured RMC noise levels were not audible or quantifiable, or expressed as a "less than" quantity (e.g. less than 20 dB), therefore measured and predicted noise levels were not comparable.

Table 7
RMC Operational Noise Monitoring Results L1(1 min) Sleep Disturbance – 22nd & 23rd February 2024

Location	Time	RMC Contribution dB(A),L1(1min)	Criterion dB(A),L1	Stability Class, Wind speed (m/s),dir°	Exceedance (Yes/No) ¹	Applicable Meteorological Condition ^{2,3}	EA Predicted Level ⁴	Difference ^{3,5}
Site 2 / NM3	10:40pm	31	45	F / 0.9 / 166	No	NA	-	NA
Site 3	11:32pm	29	45	E / 1.4 / 020	No	NA	-	NA
Site 5 / NM2	11:55pm	<20	45	F / 0.7 / 181	No	NA	-	NA
Site 6 / NM1	12:15am	<20	45	F / 0.6 / 171	No	NA	-	NA
Site 7	10:00pm	<20	45	F / 1.2 / 172	No	NA	-	NA

1. NA in this column means applicable meteorological conditions not met, therefore criterion is not applicable.
2. Refer to Table 5.3 of NIA for applicable meteorological conditions, NW wind at 3 m/s.
3. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison.
4. '-' in column means no applicable meteorological conditions were met, therefore there is no applicable predicted noise level.
5. NC indicates measured RMC noise levels were not audible or quantifiable, or expressed as a "less than" quantity (e.g. less than 20 dB), therefore measured and predicted noise levels were not comparable.

The results show that, under the operating and meteorological conditions at the times, for the 15 minute compliance measurement periods, the mine noise from RMC did not exceed the applicable operational noise criterion at any time or location during February 2024. Comparison with the EA predicted noise levels was not possible.

4.1.3 RMC Operations – March 2024

Table 8
RMC Operational Noise Monitoring Results Leq(15min) – 25th March 2024

Location	Time	dB(A), Leq	RMC Contribution dB(A),Leq	Criterion dB(A),Leq	Stability Class, Wind speed (m/s),dir°	Exceedance (Yes/No) ¹	Applicable Meteorological Condition ^{2,3}	EA Predicted Level ⁴	Difference ^{3,5}
Site 2 / NM3	10:10pm	41	21	35	F / 1.4 / 238	No	NA	-	NA
Site 3	11:01pm	42	<20	35	F / 0.7 / 343	No	NA	-	NA
Site 5 / NM2	11:23pm	47	<20	35	F / 1.4 / 000	No	NA	-	NA
Site 6 / NM1	11:43pm	46	<20	35	E / 1.5 / 000	No	NA	-	NA

1. NA in this column means applicable meteorological conditions not met, therefore criterion is not applicable.
2. Refer to Table 4.6 of NIA for applicable meteorological conditions.
3. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison.
4. '-' in column means no applicable meteorological conditions were met, therefore there is no applicable predicted noise level.
5. NC indicates measured RMC noise levels were not audible or quantifiable, or expressed as a "less than" quantity (e.g. less than 20 dB), therefore measured and predicted noise levels were not comparable.

Table 9
RMC Operational Noise Monitoring Results L1(1 min) Sleep Disturbance – 25th March 2024

Location	Time	RMC Contribution dB(A),L1(1min)	Criterion dB(A),L1	Stability Class, Wind speed (m/s),dir°	Exceedance (Yes/No) ¹	Applicable Meteorological Condition ^{2,3}	EA Predicted Level ⁴	Difference ^{3,5}
Site 2 / NM3	10:06pm	29	45	F / 1.4 / 238	No	NA	-	NA
Site 3	11:06pm	<20	45	F / 0.7 / 343	No	NA	-	NA
Site 5 / NM2	11:29pm	<20	45	F / 1.4 / 000	No	NA	-	NA
Site 6 / NM1	11:50pm	<20	45	E / 1.5 / 000	No	NA	-	NA

1. NA in this column means applicable meteorological conditions not met, therefore criterion is not applicable.
2. Refer to Table 5.3 of NIA for applicable meteorological conditions, NW wind at 3 m/s.
3. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison.
4. '-' in column means no applicable meteorological conditions were met, therefore there is no applicable predicted noise level.
5. NC indicates measured RMC noise levels were not audible or quantifiable, or expressed as a "less than" quantity (e.g. less than 20 dB), therefore measured and predicted noise levels were not comparable

The results show that, under the operating and meteorological conditions at the times, for the 15 minute compliance measurement periods, the mine noise from RMC did not exceed the applicable operational noise criterion at any time or location during March 2024. Comparison with the EA predicted noise levels was not possible.

4.1.4 RMC Operations – April 2024

Table 10
RMC Operational Noise Monitoring Results Leq(15min) – 23rd April 2024

Location	Time	dB(A), Leq	RMC Contribution dB(A),Leq	Criterion dB(A),Leq	Stability Class, Wind speed (m/s),dir°	Exceedance (Yes/No) ¹	Applicable Meteorological Condition ^{2,3}	EA Predicted Level ⁴	Difference ^{3,5}
Site 2 / NM3	10:08pm	38	<20	35	F / 1.6 / 351	No	NA	-	NA
Site 3	10:58pm	38	<20	35	F / 0.9 / 017	No	NA	-	NA
Site 5 / NM2	11:19pm	50	<20	35	F / 0.7 / 033	No	NA	-	NA
Site 6 / NM1	11:40pm	51	<20	35	F / 1.6 / 000	No	NA	-	NA

1. NA in this column means applicable meteorological conditions not met, therefore criterion is not applicable.
2. Refer to Table 4.6 of NIA for applicable meteorological conditions.
3. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison.
4. '-' in column means no applicable meteorological conditions were met, therefore there is no applicable predicted noise level.
5. NC indicates measured RMC noise levels were not audible or quantifiable, or expressed as a "less than" quantity (e.g. less than 20 dB), therefore measured and predicted noise levels were not comparable.

Table 11
RMC Operational Noise Monitoring Results L1(1 min) Sleep Disturbance – 23rd April 2024

Location	Time	RMC Contribution dB(A),L1(1min)	Criterion dB(A),L1	Stability Class, Wind speed (m/s),dir°	Exceedance (Yes/No) ¹	Applicable Meteorological Condition ^{2,3}	EA Predicted Level ⁴	Difference ^{3,5}
Site 2 / NM3	10:08pm	<20	45	F / 1.6 / 351	No	NA	-	NA
Site 3	10:58pm	<20	45	F / 0.9 / 017	No	NA	-	NA
Site 5 / NM2	11:19pm	<20	45	F / 0.7 / 033	No	NA	-	NA
Site 6 / NM1	11:40pm	<20	45	F / 1.6 / 000	No	NA	-	NA

1. NA in this column means applicable meteorological conditions not met, therefore criterion is not applicable.
2. Refer to Table 5.3 of NIA for applicable meteorological conditions, NW wind at 3 m/s.
3. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison.
4. '-' in column means no applicable meteorological conditions were met, therefore there is no applicable predicted noise level.
5. NC indicates measured RMC noise levels were not audible or quantifiable, or expressed as a "less than" quantity (e.g. less than 20 dB), therefore measured and predicted noise levels were not comparable

The results show that, under the operating and meteorological conditions at the times, for the 15 minute compliance measurement periods, the mine noise from RMC did not exceed the applicable operational noise criterion at any time or location during April 2024. Comparison with the EA predicted noise levels was not possible.

4.1.5 RMC Operations – May 2024

Table 12
RMC Operational Noise Monitoring Results Leq(15min) – 30th & 31st May 2024

Location	Time	dB(A), Leq	RMC Contribution dB(A),Leq	Criterion dB(A),Leq	Stability Class, Wind speed (m/s),dir°	Exceedance (Yes/No) ¹	Applicable Meteorological Condition ^{2,3}	EA Predicted Level ⁴	Difference _{3,5}
Site 2 / NM3	10:39pm	36	<20	35	F / 1.5 / 010	No	NA	-	NA
Site 3	11:20pm	39	<20	35	F / 1.7 / 002	No	NA	-	NA
Site 5 / NM2	11:51pm	47	<20	35	F / 1.9 / 347	No	Scenario 4	n/a	NC
Site 6 / NM1	12:11am	52	<20	35	F / 1.0 / 001	No	NA	-	NA
Site 7	10:00pm	46	<20	35	F / 0.9 / 003	No	NA	-	NA

1. NA in this column means applicable meteorological conditions not met, therefore criterion is not applicable.
2. Refer to Table 4.6 of NIA for applicable meteorological conditions.
3. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison.
4. '-' in column means no applicable meteorological conditions were met, therefore there is no applicable predicted noise level.
5. NC indicates measured RMC noise levels were not audible or quantifiable, or expressed as a "less than" quantity (e.g. less than 20 dB), therefore measured and predicted noise levels were not comparable.

Table 13
RMC Operational Noise Monitoring Results L1(1 min) Sleep Disturbance – 30th & 31st May 2024

Location	Time	RMC Contribution dB(A),L1(1min)	Criterion dB(A),L1	Stability Class, Wind speed (m/s),dir°	Exceedance (Yes/No) ¹	Applicable Meteorological Condition ^{2,3}	EA Predicted Level ⁴	Difference _{3,5}
Site 2 / NM3	10:39pm	<20	45	F / 1.5 / 010	No	NA	-	NA
Site 3	11:20pm	<20	45	F / 1.7 / 002	No	NA	-	NA
Site 5 / NM2	11:51pm	<20	45	F / 1.9 / 347	No	NA	-	NA
Site 6 / NM1	12:11am	<20	45	F / 1.0 / 001	No	NA	-	NA
Site 7	10:00pm	<20	45	F / 0.9 / 003	No	NA	-	NA

1. NA in this column means applicable meteorological conditions not met, therefore criterion is not applicable.
2. Refer to Table 5.3 of NIA for applicable meteorological conditions, NW wind at 3 m/s.

3. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison.
4. '-' in column means no applicable meteorological conditions were met, therefore there is no applicable predicted noise level.
5. NC indicates measured RMC noise levels were not audible or quantifiable, or expressed as a "less than" quantity (e.g. less than 20 dB), therefore measured and predicted noise levels were not comparable.

The results show that, under the operating and meteorological conditions at the times, for the 15 minute compliance measurement periods, the mine noise from RMC did not exceed the applicable operational noise criterion at any time or location during May 2024. Comparison with the EA predicted noise levels was not possible.

4.1.6 RMC Operations – June 2024

Table 14
RMC Operational Noise Monitoring Results Leq(15min) – 25th June 2024

Location	Time	dB(A), Leq	RMC Contribution dB(A),Leq	Criterion dB(A),Leq	Stability Class, Wind speed (m/s),dir°	Exceedance (Yes/No) ¹	Applicable Meteorological Condition ^{2,3}	EA Predicted Level ⁴	Difference _{3,5}
Site 2 / NM3	10:07pm	36	<20	35	E / 1.9 / 009	No	NA	-	NA
Site 3	11:00pm	40	<20	35	F / 1.3 / 353	No	NA	-	NA
Site 5 / NM2	11:22pm	50	<20	35	E / 1.4 / 348	No	NA	-	NA
Site 6 / NM1	11:43pm	48	<20	35	F / 1.5 / 348	No	NA	-	NA

1. NA in this column means applicable meteorological conditions not met, therefore criterion is not applicable.
2. Refer to Table 4.6 of NIA for applicable meteorological conditions.
3. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison.
4. '-' in column means no applicable meteorological conditions were met, therefore there is no applicable predicted noise level.
5. NC indicates measured RMC noise levels were not audible or quantifiable, or expressed as a "less than" quantity (e.g. less than 20 dB), therefore measured and predicted noise levels were not comparable.

Table 15
RMC Operational Noise Monitoring Results L1(1 min) Sleep Disturbance – 25th June 2024

Location	Time	RMC Contribution dB(A),L1(1min)	Criterion dB(A),L1	Stability Class, Wind speed (m/s),dir°	Exceedance (Yes/No) ¹	Applicable Meteorological Condition ^{2,3}	EA Predicted Level ⁴	Difference _{3,5}
Site 2 / NM3	10:07pm	<20	45	E / 1.9 / 009	No	NA	-	NA
Site 3	11:00pm	<20	45	F / 1.3 / 353	No	NA	-	NA
Site 5 / NM2	11:22pm	<20	45	E / 1.4 / 348	No	NA	-	NA
Site 6 / NM1	11:43pm	<20	45	F / 1.5 / 348	No	NA	-	NA

1. NA in this column means applicable meteorological conditions not met, therefore criterion is not applicable.

2. Refer to Table 5.3 of NIA for applicable meteorological conditions, NW wind at 3 m/s.
3. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison.
4. '-' in column means no applicable meteorological conditions were met, therefore there is no applicable predicted noise level.
5. NC indicates measured RMC noise levels were not audible or quantifiable, or expressed as a "less than" quantity (e.g. less than 20 dB), therefore measured and predicted noise levels were not comparable

The results show that, under the operating and meteorological conditions at the times, for the 15 minute compliance measurement periods, the mine noise from RMC did not exceed the applicable operational noise criterion at any time or location during June 2024. Comparison with the EA predicted noise levels was not possible.

4.1.7 RMC Operations – July 2024

Table 16
RMC Operational Noise Monitoring Results Leq(15min) – 29th July 2024

Location	Time	dB(A), Leq	RMC Contribution dB(A),Leq	Criterion dB(A),Leq	Stability Class, Wind speed (m/s),dir°	Exceedance (Yes/No) ¹	Applicable Meteorological Condition ^{2,3}	EA Predicted Level ⁴	Difference ^{3,5}
Site 2 / NM3	10:04pm	39	<20	35	F / 1.1 / 001	No	NA	-	NA
Site 3	10:58pm	42	<20	35	F / 1.4 / 003	No	NA	-	NA
Site 5 / NM2	11:19pm	49	<20	35	F / 1.2 / 351	No	NA	-	NA
Site 6 / NM1	11:41pm	51	<20	35	F / 1.9 / 351	No	NA	-	NA

1. NA in this column means applicable meteorological conditions not met, therefore criterion is not applicable.
2. Refer to Table 4.6 of NIA for applicable meteorological conditions.
3. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison.
4. '-' in column means no applicable meteorological conditions were met, therefore there is no applicable predicted noise level.
5. NC indicates measured RMC noise levels were not audible or quantifiable, or expressed as a "less than" quantity (e.g. less than 20 dB), therefore measured and predicted noise levels were not comparable.

Table 17
RMC Operational Noise Monitoring Results L1(1 min) Sleep Disturbance – 29th July 2024

Location	Time	RMC Contribution dB(A),L1(1min)	Criterion dB(A),L1	Stability Class, Wind speed (m/s),dir°	Exceedance (Yes/No) ¹	Applicable Meteorological Condition ^{2,3}	EA Predicted Level ⁴	Difference ^{3,5}
Site 2 / NM3	10:04pm	<20	45	F / 1.1 / 001	No	NA	-	NA
Site 3	10:58pm	<20	45	F / 1.4 / 003	No	NA	-	NA
Site 5 / NM2	11:19pm	<20	45	F / 1.2 / 351	No	NA	-	NA
Site 6 / NM1	11:41pm	<20	45	F / 1.9 / 351	No	NA	-	NA

1. NA in this column means applicable meteorological conditions not met, therefore criterion is not applicable.

2. Refer to Table 5.3 of NIA for applicable meteorological conditions, NW wind at 3 m/s.
3. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison.
4. '-' in column means no applicable meteorological conditions were met, therefore there is no applicable predicted noise level.
5. NC indicates measured RMC noise levels were not audible or quantifiable, or expressed as a "less than" quantity (e.g. less than 20 dB), therefore measured and predicted noise levels were not comparable

The results show that, under the operating and meteorological conditions at the times, for the 15 minute compliance measurement periods, the mine noise from RMC did not exceed the applicable operational noise criterion at any time or location during July 2024. Comparison with the EA predicted noise levels was not possible.

4.1.8 RMC Operations – August 2024

Table 18
RMC Operational Noise Monitoring Results Leq(15min) – 26th & 27th August 2024

Location	Time	dB(A), Leq	RMC Contribution dB(A),Leq	Criterion dB(A),Leq	Stability Class, Wind speed (m/s),dir°	Exceedance (Yes/No) ¹	Applicable Meteorological Condition ^{2,3}	EA Predicted Level ⁴	Difference ^{3,5}
Site 2 / NM3	10:42pm	35	<20	35	F / 1.3 / 010	No	NA	-	NA
Site 3	11:37pm	43	<20	35	D / 3.2 / 306	NA	Scenario 2	31	NC
Site 5 / NM2	11:57pm	50	<20	35	F / 2.3 / 298	NA	Scenario 4	n/a	NC
Site 6 / NM1	12:17am	48	<20	35	F / 2.8 / 306	NA	Scenario 4	n/a	NC
Site 7	10:01pm	45	<20	35	F / 0.7 / 043	No	NA	-	NA

1. NA in this column means applicable meteorological conditions not met, therefore criterion is not applicable.
2. Refer to Table 4.6 of NIA for applicable meteorological conditions.
3. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison.
4. '-' in column means no applicable meteorological conditions were met, therefore there is no applicable predicted noise level.
5. NC indicates measured RMC noise levels were not audible or quantifiable, or expressed as a "less than" quantity (e.g. less than 20 dB), therefore measured and predicted noise levels were not comparable.

Table 19
RMC Operational Noise Monitoring Results L1(1 min) Sleep Disturbance – 26th & 27th August 2024

Location	Time	RMC Contribution dB(A),L1(1min)	Criterion dB(A),L1	Stability Class, Wind speed (m/s),dir°	Exceedance (Yes/No) ¹	Applicable Meteorological Condition ^{2,3}	EA Predicted Level ⁴	Difference ^{3,5}
Site 2 / NM3	10:42pm	<20	45	F / 1.3 / 010	No	NA	-	NA
Site 3	11:37pm	<20	45	D / 3.2 / 306	NA	Yes	36	NC
Site 5 / NM2	11:57pm	<20	45	F / 2.3 / 298	NA	NA	-	NA

Site 6 / NM1	12:17am	<20	45	F / 2.8 / 306	NA	Yes	37	NC
Site 7	10:01pm	<20	45	F / 0.7 / 043	No	NA	-	NA

1. NA in this column means applicable meteorological conditions not met, therefore criterion is not applicable.
2. Refer to Table 5.3 of NIA for applicable meteorological conditions, NW wind at 3 m/s.
3. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison.
4. '-' in column means no applicable meteorological conditions were met, therefore there is no applicable predicted noise level.
5. NC indicates measured RMC noise levels were not audible or quantifiable, or expressed as a "less than" quantity (e.g. less than 20 dB), therefore measured and predicted noise levels were not comparable.

The results show that, under the operating and meteorological conditions at the times, for the 15 minute compliance measurement periods, the mine noise from RMC did not exceed the applicable operational noise criterion at any time or location during August 2024. Comparison with the EA predicted noise levels was not possible.

4.1.9 RMC Operations – September 2024

Table 20 RMC Operational Noise Monitoring Results Leq(15min) – 23rd September 2024									
Location	Time	dB(A), Leq	RMC Contribution dB(A),Leq	Criterion dB(A),Leq	Stability Class, Wind speed (m/s),dir°	Exceedance (Yes/No) ¹	Applicable Meteorological Condition ^{2,3}	EA Predicted Level ⁴	Difference ^{3,5}
Site 2 / NM3	10:00pm	34	<20	35	F / 1.3 / 064	No	NA	-	NA
Site 3	10:50pm	35	<20	35	D / 2.2 / 014	No	NA	-	NA
Site 5 / NM2	11:12pm	52	<20	35	D / 1.7 / 031	No	NA	-	NA
Site 6 / NM1	11:31pm	47	<20	35	D / 1.5 / 028	No	NA	-	NA

1. NA in this column means applicable meteorological conditions not met, therefore criterion is not applicable.
2. Refer to Table 4.6 of NIA for applicable meteorological conditions.
3. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison.
4. '-' in column means no applicable meteorological conditions were met, therefore there is no applicable predicted noise level.
5. NC indicates measured RMC noise levels were not audible or quantifiable, or expressed as a "less than" quantity (e.g. less than 20 dB), therefore measured and predicted noise levels were not comparable.

Table 21 RMC Operational Noise Monitoring Results L1(1 min) Sleep Disturbance – 23rd September 2024								
Location	Time	RMC Contribution dB(A),L1(1min)	Criterion dB(A),L1	Stability Class, Wind speed (m/s),dir°	Exceedance (Yes/No) ¹	Applicable Meteorological Condition ^{2,3}	EA Predicted Level ⁴	Difference ^{3,5}
Site 2 / NM3	10:00pm	<20	45	F / 1.3 / 064	No	NA	-	NA

Site 3	10:50pm	<20	45	D / 2.2 / 014	No	NA	-	NA
Site 5 / NM2	11:12pm	<20	45	D / 1.7 / 031	No	NA	-	NA
Site 6 / NM1	11:31pm	<20	45	D / 1.5 / 028	No	NA	-	NA

1. NA in this column means applicable meteorological conditions not met, therefore criterion is not applicable.
2. Refer to Table 5.3 of NIA for applicable meteorological conditions, NW wind at 3 m/s.
3. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison.
4. '-' in column means no applicable meteorological conditions were met, therefore there is no applicable predicted noise level.
5. NC indicates measured RMC noise levels were not audible or quantifiable, or expressed as a "less than" quantity (e.g. less than 20 dB), therefore measured and predicted noise levels were not comparable

The results show that, under the operating and meteorological conditions at the times, for the 15 minute compliance measurement periods, the mine noise from RMC did not exceed the applicable operational noise criterion at any time or location during September 2024. Comparison with the EA predicted noise levels was not possible.

4.1.10 RMC Operations – October 2024

Table 22
RMC Operational Noise Monitoring Results Leq(15min) – 17th October 2024

Location	Time	dB(A), Leq	RMC Contribution dB(A),Leq	Criterion dB(A),Leq	Stability Class, Wind speed (m/s),dir°	Exceedance (Yes/No) ¹	Applicable Meteorological Condition ^{2,3}	EA Predicted Level ⁴	Difference ^{3,5}
Site 2 / NM3	10:07pm	35	<20	35	F / 1.1 / 181	No	NA	-	NA
Site 3	10:57pm	51	<20	35	F / 1.3 / 208	No	NA	-	NA
Site 5 / NM2	11:18pm	44	<20	35	F / 1.2 / 216	No	NA	-	NA
Site 6 / NM1	11:37pm	49	<20	35	E / 2.0 / 201	No	NA	-	NA

1. NA in this column means applicable meteorological conditions not met, therefore criterion is not applicable.
2. Refer to Table 4.6 of NIA for applicable meteorological conditions.
3. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison.
4. '-' in column means no applicable meteorological conditions were met, therefore there is no applicable predicted noise level.
5. NC indicates measured RMC noise levels were not audible or quantifiable, or expressed as a "less than" quantity (e.g. less than 20 dB), therefore measured and predicted noise levels were not comparable.

Table 23
RMC Operational Noise Monitoring Results L1(1 min) Sleep Disturbance – 17th October 2024

Location	Time	RMC Contribution dB(A),L1(1min)	Criterion dB(A),L1	Stability Class, Wind speed (m/s),dir°	Exceedance (Yes/No) ¹	Applicable Meteorological Condition ^{2,3}	EA Predicted Level ⁴	Difference ^{3,5}
Site 2 / NM3	10:07pm	<20	45	F / 1.1 / 181	No	NA	-	NA
Site 3	10:57pm	<20	45	F / 1.3 / 208	No	NA	-	NA
Site 5 / NM2	11:18pm	<20	45	F / 1.2 / 216	No	NA	-	NA
Site 6 / NM1	11:37pm	<20	45	E / 2.0 / 201	No	NA	-	NA

1. NA in this column means applicable meteorological conditions not met, therefore criterion is not applicable.
2. Refer to Table 5.3 of NIA for applicable meteorological conditions, NW wind at 3 m/s.
3. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison.
4. '-' in column means no applicable meteorological conditions were met, therefore there is no applicable predicted noise level.
5. NC indicates measured RMC noise levels were not audible or quantifiable, or expressed as a "less than" quantity (e.g. less than 20 dB), therefore measured and predicted noise levels were not comparable

The results show that, under the operating and meteorological conditions at the times, for the 15 minute compliance measurement periods, the mine noise from RMC did not exceed the applicable operational noise criterion at any time or location during October 2024. Comparison with the EA predicted noise levels was not possible.

4.1.11 RMC Operations – November 2024

Table 24
RMC Operational Noise Monitoring Results Leq(15min) – 25th & 26th November 2024

Location	Time	dB(A), Leq	RMC Contribution dB(A),Leq	Criterion dB(A),Leq	Stability Class, Wind speed (m/s),dir°	Exceedance (Yes/No) ¹	Applicable Meteorological Condition ^{2,3}	EA Predicted Level ⁴	Difference ^{3,5}
Site 2 / NM3	10:40pm	47	<20	35	F / 2.1 / 192	NA	NA	-	NA
Site 3	11:29pm	45	<20	35	F / 1.5 / 196	No	NA	-	NA
Site 5 / NM2	11:51pm	44	<20	35	F / 1.5 / 175	No	NA	-	NA
Site 6 / NM1	12:10am	51	<20	35	F / 1.3 / 179	No	NA	-	NA
Site 7	10:01pm	40	<20	35	F / 1.8 / 156	No	NA	-	NA

1. NA in this column means applicable meteorological conditions not met, therefore criterion is not applicable.
2. Refer to Table 4.6 of NIA for applicable meteorological conditions.
3. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison.
4. '-' in column means no applicable meteorological conditions were met, therefore there is no applicable predicted noise level.

5. NC indicates measured RMC noise levels were not audible or quantifiable, or expressed as a “less than” quantity (e.g. less than 20 dB), therefore measured and predicted noise levels were not comparable.

Table 25
RMC Operational Noise Monitoring Results L1(1 min) Sleep Disturbance – 25th & 26th November 2024

Location	Time	RMC Contribution dB(A),L1(1min)	Criterion dB(A),L1	Stability Class, Wind speed (m/s),dir°	Exceedance (Yes/No) ¹	Applicable Meteorological Condition ^{2,3}	EA Predicted Level ⁴	Difference _{3,5}
Site 2 / NM3	10:40pm	<20	45	F / 2.1 / 192	NA	NA	-	NA
Site 3	11:29pm	<20	45	F / 1.5 / 196	No	NA	-	NA
Site 5 / NM2	11:51pm	<20	45	F / 1.5 / 175	No	NA	-	NA
Site 6 / NM1	12:10am	<20	45	F / 1.3 / 179	No	NA	-	NA
Site 7	10:01pm	<20	45	F / 1.8 / 156	No	NA	-	NA

1. NA in this column means applicable meteorological conditions not met, therefore criterion is not applicable.
2. Refer to Table 5.3 of NIA for applicable meteorological conditions, NW wind at 3 m/s.
3. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison.
4. ‘-’ in column means no applicable meteorological conditions were met, therefore there is no applicable predicted noise level.
5. NC indicates measured RMC noise levels were not audible or quantifiable, or expressed as a “less than” quantity (e.g. less than 20 dB), therefore measured and predicted noise levels were not comparable.

The results show that, under the operating and meteorological conditions at the times, for the 15 minute compliance measurement periods, the mine noise from RMC did not exceed the applicable operational noise criterion at any time or location during November 2024. Comparison with the EA predicted noise levels was not possible.

4.1.12 RMC Operations – December 2024

Table 26
RMC Operational Noise Monitoring Results Leq(15min) – 20th December 2024

Location	Time	dB(A), Leq	RMC Contribution dB(A),Leq	Criterion dB(A),Leq	Stability Class, Wind speed (m/s),dir°	Exceedance (Yes/No) ¹	Applicable Meteorological Condition ^{2,3}	EA Predicted Level ⁴	Difference _{3,5}
Site 2 / NM3	12:40am	30	<20	35	E / 1.3 / 130	No	NA	-	NA
Site 3	1:31am	41	<20	35	D / 1.8 / 124	No	NA	-	NA
Site 5 / NM2	1:53am	48	<20	35	F / 1.5 / 349	No	NA	-	NA
Site 6 / NM1	2:13am	48	<20	35	F / 1.6 / 343	No	NA	-	NA

1. NA in this column means applicable meteorological conditions not met, therefore criterion is not applicable.
2. Refer to Table 4.6 of NIA for applicable meteorological conditions.

3. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison.
4. '-' in column means no applicable meteorological conditions were met, therefore there is no applicable predicted noise level.
5. NC indicates measured RMC noise levels were not audible or quantifiable, or expressed as a "less than" quantity (e.g. less than 20 dB), therefore measured and predicted noise levels were not comparable.

Table 27
RMC Operational Noise Monitoring Results L1(1 min) Sleep Disturbance – 20th December 2024

Location	Time	RMC Contribution dB(A),L1(1min)	Criterion dB(A),L1	Stability Class, Wind speed (m/s),dir°	Exceedance (Yes/No) ¹	Applicable Meteorological Condition ^{2,3}	EA Predicted Level ⁴	Difference ^{3,5}
Site 2 / NM3	12:40am	<20	45	E / 1.3 / 130	No	NA	-	NA
Site 3	1:31am	<20	45	D / 1.8 / 124	No	NA	-	NA
Site 5 / NM2	1:53am	<20	45	F / 1.5 / 349	No	NA	-	NA
Site 6 / NM1	2:13am	<20	45	F / 1.6 / 343	No	NA	-	NA

1. NA in this column means applicable meteorological conditions not met, therefore criterion is not applicable.
2. Refer to Table 5.3 of NIA for applicable meteorological conditions, NW wind at 3 m/s.
3. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison.
4. '-' in column means no applicable meteorological conditions were met, therefore there is no applicable predicted noise level.
5. NC indicates measured RMC noise levels were not audible or quantifiable, or expressed as a "less than" quantity (e.g. less than 20 dB), therefore measured and predicted noise levels were not comparable

The results show that, under the operating and meteorological conditions at the times, for the 15 minute compliance measurement periods, the mine noise from RMC did not exceed the applicable operational noise criterion at any time or location during December 2024. Comparison with the EA predicted noise levels was not possible.

Data from those times where RMC operations were audible were analysed using the "Evaluator" software. This analysis showed the noise did not contain any tonal or impulsive components as per definitions in the NPI. The methodology for analysing the low frequency noise modifying factor correction in the NPI is shown in extract below.

Low-frequency noise	Measurement of source contribution C-weighted and A-weighted level and one-third octave measurements in the range 10– 160 Hz	Measure/assess source contribution C- and A-weighted Leq,T levels over same time period. Correction to be applied where the C minus A level is 15 dB or more and: - where any of the one-third octave noise levels in Table C2 are exceeded by up to and including 5 dB and cannot be mitigated, a 2-dB(A) positive adjustment to measured/predicted A-weighted levels applies for the evening/night period - where any of the one-third octave noise levels in Table C2 are exceeded by more than 5 dB and cannot be mitigated, a 5-dB(A) positive adjustment to measured/predicted A-weighted levels applies for the evening/night period and a 2-dB(A) positive adjustment applies for the daytime period.	2 or 5 dB ²	A difference of 15 dB or more between C- and A-weighted measurements identifies the potential for an unbalance spectrum and potential increased annoyance. The values in Table C2 are derived from Moorhouse (2011) for DEFRA fluctuating low-frequency noise criteria with corrections to reflect external assessment locations.
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Table C2: One-third octave low-frequency noise thresholds.

Hz/dB(Z)	One-third octave L _{Zeq,15min} threshold level												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

The correction applies to the mine noise component only. There are many sources of low frequency noise in the acoustic environment of each receiver area (including noise from road and rail traffic). In many cases the C minus A level is greater than 15 due to these other noise sources. In most instances the screening criteria will be the one third octave analysis. The NPI quantitative assessment of noise from RMC can only be conducted where the noise was clearly definable, which is at a level typically greater than 30 dB(A) or when there are no other significant sources. This condition was not triggered throughout the 2024 reporting period.

4.2 Discussion of Results

4.2.1 RMC Operations

Mine noise from RMC was audible and quantifiable at Site 2 / NM3 during two measurement periods in February and March 2024, and at Site 3 during one measurement period during February 2024. The attended noise monitoring results show that, under the operating and meteorological conditions throughout 2024, for the 15 minute and L_{max} compliance measurement periods, the mine noise from RMC was inaudible or below all applicable noise criteria.

The results of the noise monitoring programme have shown that RMC is operating within approved noise limits. No actions are recommended with respect to noise compliance at the mine.

4.2.2 Comparison with EA Predictions

Comparison between the measured noise levels from RMC contributions and the modelled EA predictions was not possible for any measurement throughout the 2024 reporting period. This was due to either the meteorological conditions during the measurement periods not corresponding to any of the modelled meteorological conditions, or in instances where meteorological conditions did correspond with the modelled meteorological conditions, the mine noise from RMC was not quantifiable and therefore comparison was not possible. This also applies for the L1(1 min) modelled predictions throughout the 2024 reporting period.

APPENDIX A

DESCRIPTION OF ACOUSTICAL TERMS

Table A1
Definition of acoustical terms

Term	Description
dB(A)	The quantitative measure of sound heard by the human ear, measured by the A-Scale Weighting Network of a sound level meter expressed in decibels (dB).
SPL	Sound Pressure Level. The incremental variation of sound pressure above and below atmospheric pressure and expressed in decibels. The human ear responds to pressure fluctuations, resulting in sound being heard.
STL	Sound Transmission Loss. The ability of a partition to attenuate sound, in dB.
Lw	Sound Power Level radiated by a noise source per unit time re 1pW.
Leq	Equivalent Continuous Noise Level - taking into account the fluctuations of noise over time. The time-varying level is computed to give an equivalent dB(A) level that is equal to the energy content and time period.
L1	Average Peak Noise Level - the level exceeded for 1% of the monitoring period.
L90	"Background" Noise Level - the level exceeded for 90% of the monitoring period.
LA _{max}	The maximum sound pressure level of an event measured with a sound level meter satisfying AS IEC 61672.1-2004 set to 'A' frequency weighting and fast time weighting.

APPENDIX B

NOISE LIMITS

EPL 2652

L5 Noise limits

L5.1 Noise generated at the premises must not exceed the noise limits presented in the table below.

Location	Day LAeq(15 minute)	Evening LAeq(15 minute)	Night LAeq(15 minute)	Night LA1(1minute)
Residence 3 in NMG2	35	35	35	45
Residence 13 in NMG2	38	38	38	45
All other privately-owned land in NMG3	35	35	35	45
All privately-owned land in NMG4	35	35	35	45
EPA Point 14 in NMG1			35	45
EPA Point 15 in NMG2			35	45
EPA Point 16 in NMG3			38	45

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NOISE

Noise Criteria

2. The **Applicant must** ensure that the noise generated by mining operations at the Ravensworth mine complex does not exceed the criteria in Table 2 at any residence on privately-owned land or on more than 25 per cent of any privately-owned land.

Table 2: Noise Criteria dB(A)

Receiver Location	Receiver	Day (L_{Aeq} (15min))	Evening (L_{Aeq} (15min))	Night (L_{Aeq} (15min))	Night (L_{A1} (1 min))
R1	34 – Stapleton	48	48	48	49
R2	3 – A Bowman	35	35	35	45
	13 – A Bowman	38	38	38	45
R3	Camberwell Village Central: 12 – Yates, 21 – Miller, 27 – Chisholm	37	37	37	45
	38 – Ninness	36	36	36	45
	All other privately-owned land	35	35	35	45
R4	Camberwell Village North: All privately-owned land	35	35	35	45
-	All other privately-owned land	35	35	35	45

Notes:

- To interpret the locations referred to Table 2, see the applicable figure in Appendix 5.
- Noise generated by **the development** is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy.

However, these noise criteria do not apply if the **Applicant** has an agreement with the relevant owner/s of these residences/land to generate higher noise levels, and the **Applicant** has advised the Department in writing of the terms of this agreement.

Noise Acquisition Criteria

3. If the noise generated by the Ravensworth mine complex exceeds the criteria in Table 3 at any residence on privately-owned land or on more than 25 per cent of any privately-owned land, then upon receiving a written request for acquisition from the landowner, the **Applicant must** acquire the land in accordance with the procedures in conditions 6-7 of schedule 4.

Table 3: Noise acquisition criteria dB(A) $L_{Aeq}(15min)$

Receiver Location	Receiver	Day ($L_{Aeq}(15min)$)	Evening ($L_{Aeq}(15min)$)	Night ($L_{Aeq}(15min)$)
R2	All privately-owned land	40	40	40
R3	All privately-owned land	54	54	49
R4	All privately-owned land	47	47	47
-	All other privately-owned land	40	40	40

Notes:

- To interpret the locations referred to Table 3, see the applicable figure in Appendix 5.
- Noise generated by the development is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy.
- For this condition to apply, the exceedance of the criteria must be systemic.

Cumulative Noise Criteria

- Except for the noise-affected land in Table 1, the Applicant must implement all reasonable and feasible measures to ensure that the noise generated by the Ravensworth mine complex combined with the noise generated by other mines does not exceed the criteria in Table 4 at any residence on privately-owned land or on more than 25 per cent of any privately-owned land.

Table 4: Cumulative noise criteria dB(A) $L_{Aeq}(period)$

Location	Day	Evening	Night
R3 and R4 – Camberwell Village	55	45	40
All other privately-owned land	50	45	40

Notes:

- To interpret the locations referred to Table 4, see the applicable figure in Appendix 5.
- Cumulative noise is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy.

Cumulative Noise Acquisition Criteria

- If the cumulative noise generated by the Ravensworth mine complex combined with the noise generated by other mines exceeds the criteria in Table 5 at any residence on privately-owned land or on more than 25 per cent of any privately-owned land, then upon receiving a written request from the landowner, the Applicant must acquire the land on as equitable basis as possible with the relevant mines, in accordance with the procedures in conditions 6-7 of schedule 4.

Table 5: Cumulative noise acquisition criteria dB(A) $L_{Aeq}(period)$

Location	Day	Evening	Night
R3 and R4 – Camberwell Village	60	50	45
All other privately-owned land	55	50	45

Notes:

- To interpret the locations referred to Table 5, see the applicable figure in Appendix 5.
- Cumulative noise is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy.
- For this condition to apply, the exceedance of the criteria must be systemic.

Additional Noise Mitigation Measures

- Upon receiving a written request from the owner of:
 - Residence 34 – Stapleton;
 - Residence 13 – A Bowman; or
 - any other residence on privately-owned land where subsequent operational noise monitoring shows the noise generated by the Ravensworth mine complex exceeds the noise limits in Table 6,
 the Applicant must implement additional reasonable and feasible noise mitigation measures (such as double glazing, insulation, and/or air conditioning) at the residence in consultation with the owner.

If within 3 months of receiving this request from the landowner, the Applicant and the landowner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Planning Secretary for resolution.

Table 6: Additional noise mitigation criteria dB(A) $L_{Aeq}(15min)$

Receiver Location	Receiver	Day ($L_{Aeq}(15min)$)	Evening ($L_{Aeq}(15min)$)	Night ($L_{Aeq}(15min)$)
R2	All privately-owned land	37	37	37
R3	All privately-owned land	51	51	46
R4	All privately-owned land	44	44	44
-	All other privately-owned land	37	37	37

Notes:

- To interpret the locations referred to Table 6, see the applicable figure in Appendix 5.
- Noise generated by the development is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy.
- For this condition to apply, the exceedance of the criteria must be systemic.

- If the cumulative noise generated by the Ravensthorpe mine complex combined with the noise generated by other mines exceeds the criteria at any residence on the land referred to in Table 7, then upon receiving a written request from the owner, the Applicant must implement additional reasonable and feasible noise mitigation measures (such as double glazing, insulation, and/or air conditioning) at the residence in consultation with the owner. The Applicant must share the costs associated with implementing these measures on an equitable basis as possible with the relevant mines.

If within 3 months of receiving this request from the owner, the Applicant and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Planning Secretary for resolution.

Table 7: Cumulative noise mitigation criteria dB(A) $L_{Aeq}(period)$

Location	Day	Evening	Night
R3 and R4 – Camberwell Village	57	47	42
All other privately-owned land	52	47	42

Notes:

- To interpret the locations referred to Table 7, see the applicable figure in Appendix 5.
- Cumulative noise is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy.
- For this condition to apply, the exceedance of the criteria must be systemic.

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NOISE

Noise Criteria

12. The Applicant **must** ensure that the noise generated by the development does not exceed the criteria in Table 3 at any residence on privately-owned land or on more than 25 per cent of any privately-owned land.

Table 3: Noise Criteria dB(A)

Receiver	Day (<i>L_{Aeq}</i> (15min))	Evening (<i>L_{Aeq}</i> (15min))	Night (<i>L_{Aeq}</i> (15min))	Night (<i>L_{A1}</i> (1 min))
Any residence on any privately owned land	35	35	35	45

Note: Noise generated by the development is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy.

However, these noise criteria do not apply if the Applicant has an agreement with the relevant owner/s of these residences/land to generate higher noise levels, and the Applicant has advised the Department in writing of the terms of this agreement.

APPENDIX C

CALIBRATION CERTIFICATES



Australian Calibration Laboratory
Suite 4.03, Level 4, 3 Thomas Holt Drive, Macquarie Park NSW 2113, Australia
Accredited for compliance with ISO/IEC 17025 - Calibration. Laboratory No. 1301



CERTIFICATE OF CALIBRATION

Certificate No: CAU2300638

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CALIBRATION OF:

Sound Level Meter:	Brüel & Kjær	2250	No: 2653961
Microphone:	Brüel & Kjær	4966	No: 3343809
Preamplifier:	Brüel & Kjær	ZC-0032	No: 25104
Supplied Calibrator:	None		
Software version:	BZ7224 Version 4.7.6	Pattern Approval:	-
Instruction manual:	BE1897-11	Identification:	N/A

CUSTOMER:

Spectrum Acoustics Pty Ltd
8 Panylan St
Cardiff NSW 2285

CALIBRATION CONDITIONS:

Preconditioning:	4 hours at 23 °C
Environment conditions:	see actual values in Environmental conditions sections

SPECIFICATIONS:

The Sound Level Meter has been calibrated in accordance with the requirements as specified in IEC61672-1:2013 class 1. Procedures from IEC 61672-3:2013 were used to perform the periodic tests. The measurements included in this document are traceable to Australian/National standards.

PROCEDURE:

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System B&K 3630 with application software type 7763 (version 8.6 - DB: 8.60) and test procedure 2250-4966.

RESULTS:

☐	Initial calibration	☐	Calibration prior to repair/adjustment
☐	Calibration without repair/adjustment	☒	Calibration after repair/adjustment

The reported expanded uncertainty is based on the standard uncertainty multiplied by a coverage factor $k = 2$ providing a level of confidence of approximately 95 %. The uncertainty evaluation has been carried out in accordance with EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.

Date of Calibration: 12/09/2023

Certificate issued: 12/09/2023

Sajeeb Tharayil
Calibration Technician

Craig Patrick
Approved signatory

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Sydney Calibration Laboratory
Unit 21, 1 Talavera Road, Macquarie Park NSW 2113, Australia
Accredited for compliance with ISO/IEC 17025 - Calibration. Laboratory No. 1301



CERTIFICATE OF CALIBRATION

Certificate No: CAU2401038

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CALIBRATION OF:

Sound Level Meter:	Brüel & Kjær	2250	No: 3030460
Microphone:	Brüel & Kjær	4189	No: 3318407
Preamplifier:	Brüel & Kjær	ZC-0032	No: 31079
Supplied Calibrator:	Brüel & Kjær	4231	No: 2466354
Software version:	BZ7223 Version 4.7.6	Pattern Approval:	-
Instruction manual:	BE1712-22	Identification:	N/A

CUSTOMER:

Spectrum Acoustics Pty Ltd
8 Panylan St
Cardiff NSW 2285

CALIBRATION CONDITIONS:

Preconditioning:	4 hours at 23 °C
Environment conditions:	see actual values in <i>Environmental conditions</i> sections

SPECIFICATIONS:

The Sound Level Meter has been calibrated in accordance with the requirements as specified in IEC61672-1:2013 class 1. Procedures from IEC 61672-3:2013 were used to perform the periodic tests. The measurements included in this document are traceable to Australian / International standards through accredited calibration of all relevant reference equipment.

PROCEDURE:

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System B&K 3630 with application software type 7763 (version 8.6 - DB: 8.60) and test procedure 2250-4189.

RESULTS:

	Initial calibration	Calibration prior to repair/adjustment
X	Calibration without repair/adjustment	Calibration after repair/adjustment

The reported expanded uncertainty is based on the standard uncertainty multiplied by a coverage factor $k = 2$ providing a level of confidence of approximately 95 %. The uncertainty evaluation has been carried out in accordance with EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.

Date of Calibration: 04/11/2024

Certificate issued: 06/11/2024

Barath Chandar Rajendran

Calibration Technician

Sajeeb Tharayil

Approved signatory

Reproduction of the complete certificate is allowed. Parts of the certificate may only be reproduced after written permission.

Appendix D - Blast Monitoring Results

Table C.1 Annual Blast Overpressure Monitoring Results

	Bowmans	Camberwell Village	Camberwell Church	Chain of Ponds Hotel	Ravensworth Public School	Ravensworth Homestead
Limit	120	120	120	133	133	126
Limit 5% up to 120 dBL	115	115	115	N/A	N/A	N/A
EA Prediction	115	115	N/A	N/A	N/A	115
Min	72.6	76.5	76.4	80.4	83.9	83.9
Mean	94.0	92.4	93.1	96.6	97.6	95.3
Max	117.4	113.2	109.2	115.6	115.9	125.8
Blast Events Exceeding 120 dBL	0	0	0	N/A	N/A	N/A
Blast Events Exceeding 115dBL	2	0	0	N/A	N/A	N/A
% > 115 dBL up to 120 dBL	1%	-	-	N/A	N/A	N/A

Table C.2 Annual Vibration Monitoring Results

	Bowmans	Camberwell Village	Camberwell Church	Chain of Ponds Hotel	REA 86 Grinding Grooves	Rav West (HVO conveyor)	Powerline (Ravensworth owned)	Ravensworth Public School	Ravensworth Homestead
Limit	10	10	10	10	175	100	50	10	10
Limit 5% up to 10mm/s	5	5	5	N/A	N/A	N/A	N/A	N/A	N/A
EA Prediction	5	5	5	N/A	N/A	N/A	N/A	N/A	N/A
Min	0	0.01	0.01	0.03	0.01	0.12	0.01	0.02	0.01
Mean	0.1	0.1	0.1	0.2	0.4	4.6	3.8	0.2	0.1
Max	0.74	0.52	0.46	0.95	3.08	32.54	17.29	1.46	0.43
Blast events exceeding 10mm/s	0	0	0	0	N/A	N/A	N/A	0	0
Blast events exceeding 5mm/s	0	0	0	N/A	N/A	N/A	N/A	N/A	N/A
%> 5mm/s up to 10mm/s	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A

Appendix E - Air Quality Monitoring Results

Figure D.1 Total Suspended Particulates - HVAS2 2024 Results

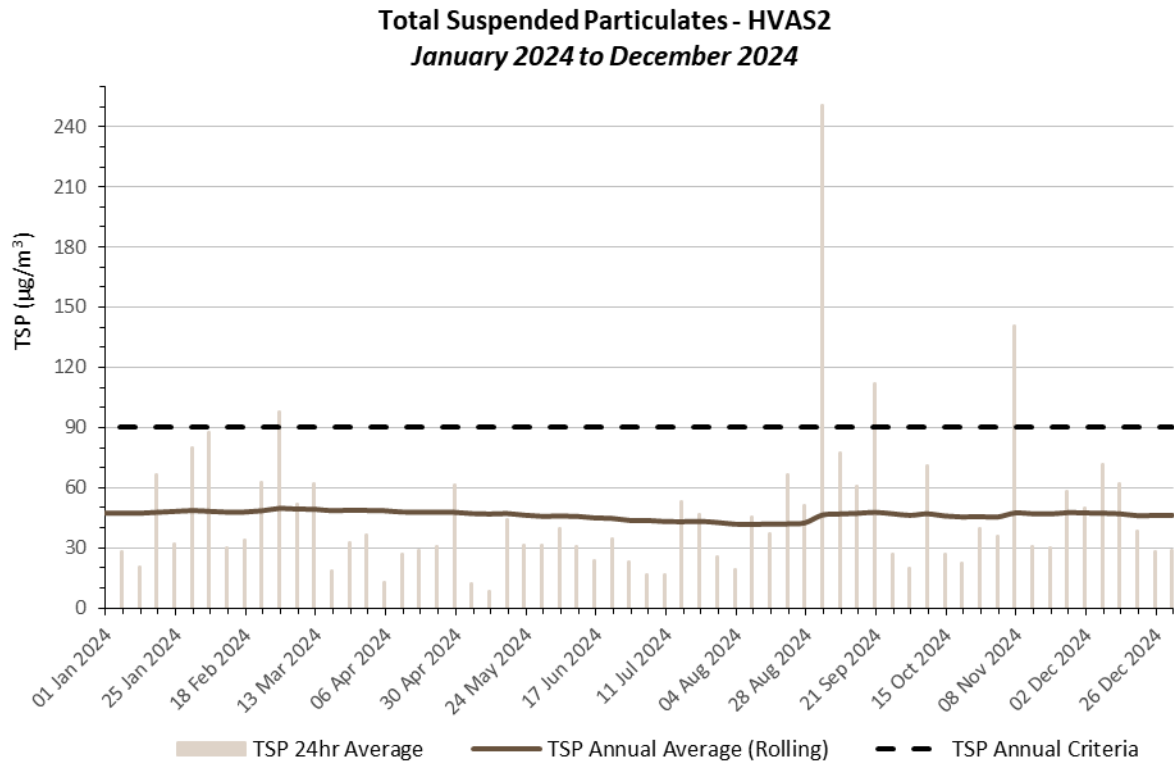


Figure D.2 Total Suspended Particulates - HVAS5 2024 Results

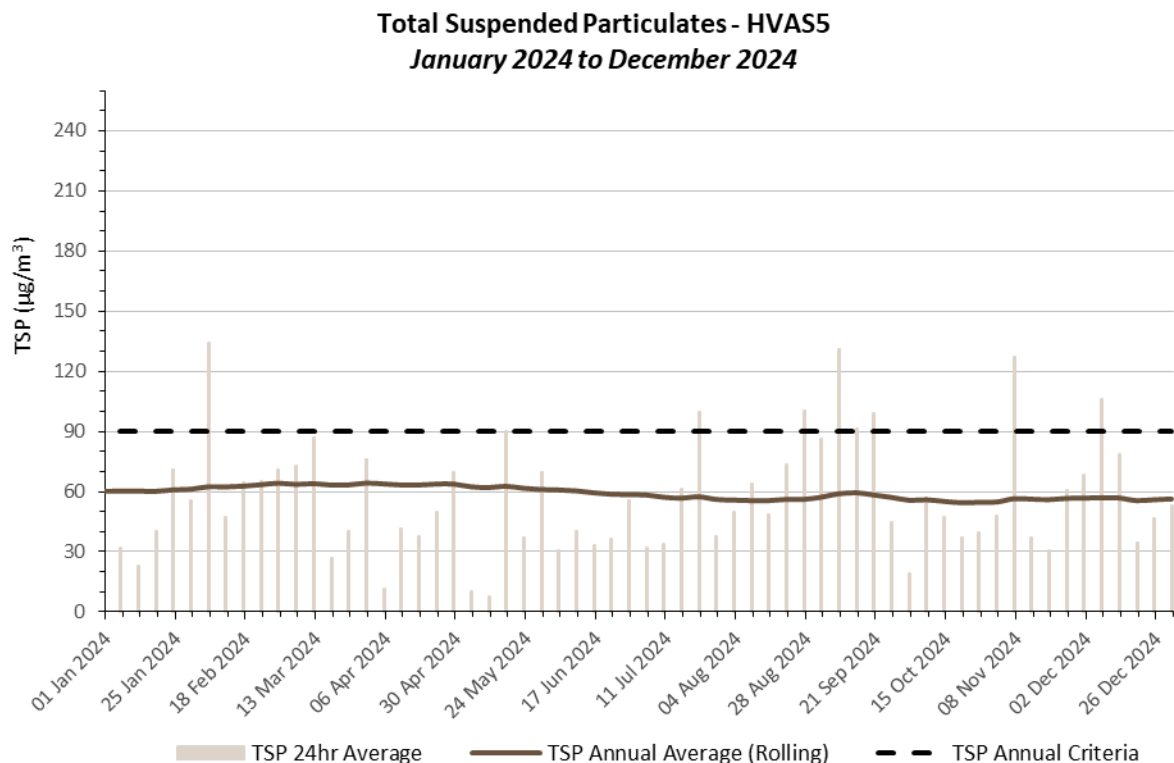


Figure D.3 PM₁₀ - HVAS19 2024 Results

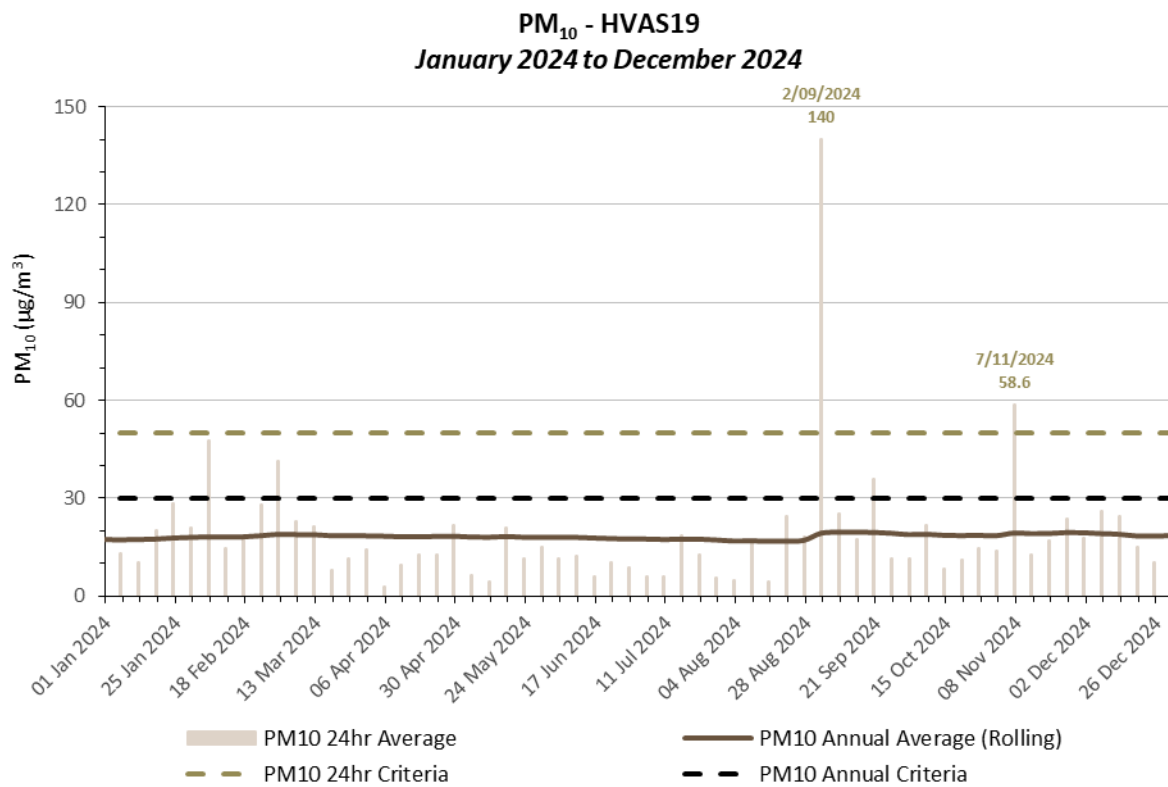


Figure D.4 PM₁₀ - TEOM SX45-G1 2024 Results

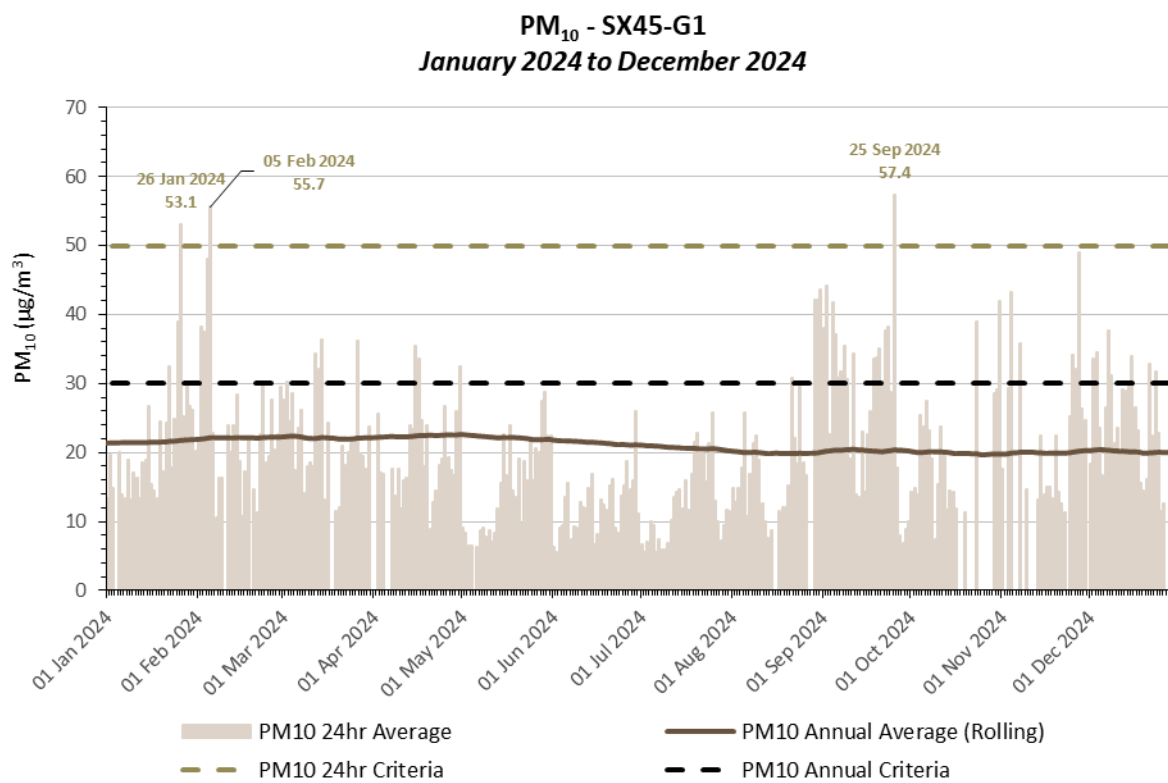


Figure D.5 PM₁₀ - TEOM SX45-G2 2024 Results

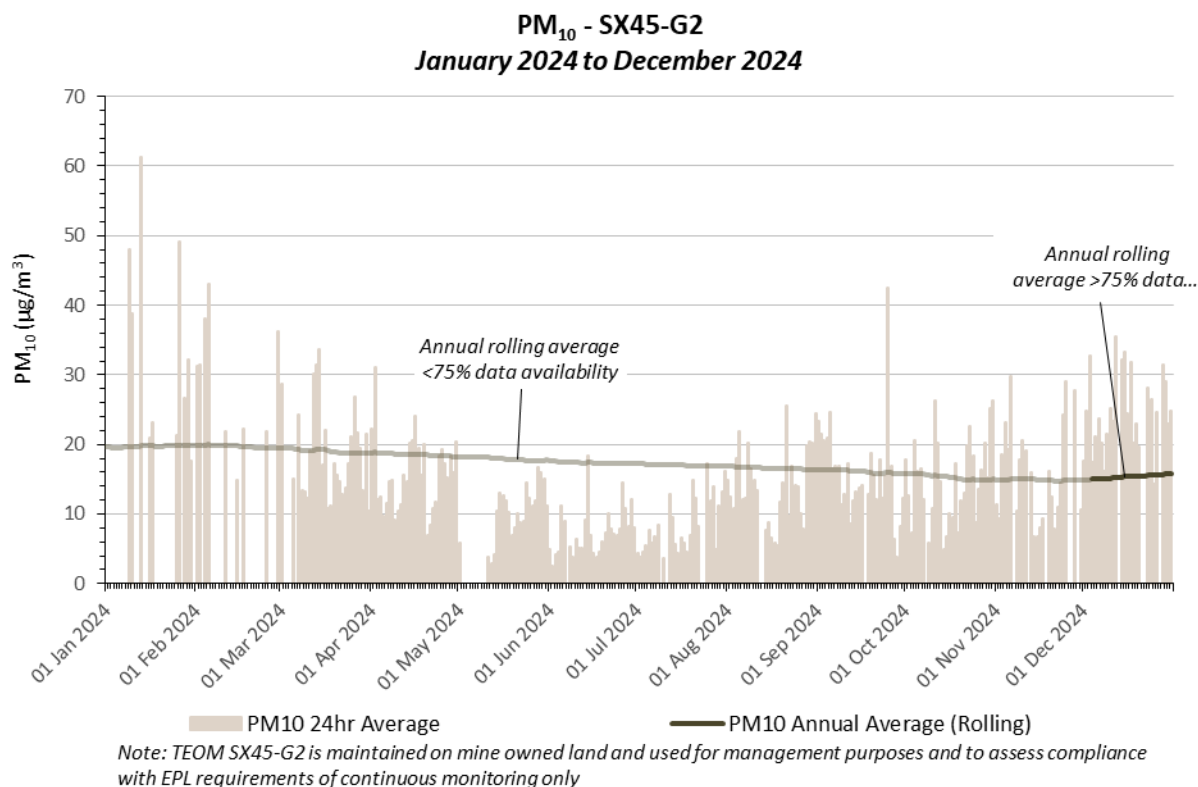


Table D.1 PM₁₀ 24 hr Exceedances above 50 µg/m³ during 2024

On all occasions the third-party review estimated the contribution from the Ravensworth Complex to be less than the EIS prediction for the monitoring location, indicating that dust mitigation measures were effective in minimising site-related dust emissions (refer to **Section 6.3**).

Date	Monitoring Location	Result (µg/m ³)
26/01/2024	SX45-G1 / EPL9	53.1
05/02/2024	SX45-G1 / EPL9	55.7
2/09/2024	HVAS19	140
25/09/2024	SX45-G1 / EPL9	57.4
7/11/2024	HVAS19	59

Appendix F - Meteorological Monitoring Results

Table F.1 Meteorological Results 2024

Date Sampled	Mean Relative Humidity (%)	Mean Air Temperature @ 10m (°C)	Mean Wind Speed @ 10m (m/s)	Mean Wind Direction @ 10m (°)	Total Rainfall (mm)	Stability Class
01/01/2024	68	23.5	3.5	130	0	17.7
02/01/2024	64.4	25	2.7	121	0	22.0
03/01/2024	62.1	25.3	1.9	136	0	26.3
04/01/2024	77.4	24	1.5	119	18.4	25.1
05/01/2024	77	21.5	3.4	124	0.6	15.8
06/01/2024	61.4	22.2	3.8	122	0	17.4
07/01/2024	60.6	23.8	1.7	123	0	26.1
08/01/2024	73.7	23.8	1.3	290	0.8	25.7
09/01/2024	71.8	25.2	0.9	130	0.2	18.9
10/01/2024	72.8	25.7	2.3	121	0.6	24.7
11/01/2024	75.2	26.1	3	110	0	18.5
12/01/2024	67.8	25.9	3.9	115	0	16.4
13/01/2024	62.9	26.2	1.8	124	0	27.4
14/01/2024	76.6	23.6	3.6	131	0	16.2
15/01/2024	80.8	21.6	4.2	110	2.2	16.3
16/01/2024	76.1	22.6	3.3	126	0	17.1
17/01/2024	78	24.5	0.5	236	13.8	27.5
18/01/2024	62.5	27.1	3.1	263	0	19.0
19/01/2024	41.4	25.1	1	194	0	24.6
20/01/2024	63.1	25.1	2.9	137	0	23.3
21/01/2024	51.8	29.9	1.7	245	0	22.2
22/01/2024	56.6	24.7	4.3	106	0	17.3
23/01/2024	61.9	23.2	3.8	104	0	17.0
24/01/2024	54	26.5	0.7	254	0	27.7
25/01/2024	43.1	32.2	0.8	269	0	26.1
26/01/2024	44.4	32.6	2	257	0	18.0
27/01/2024	74.2	23.1	3.8	111	0	15.8
28/01/2024	71.9	23.8	3.2	108	0	17.5
29/01/2024	59.8	28.3	2.4	143	0	25.0
30/01/2024	68.8	27.4	3.6	121	0	18.8
31/01/2024	69.5	26	3.2	117	0	19.9
01/02/2024	67.4	26.1	1.3	110	0.4	28.0
02/02/2024	57.3	28.3	1.5	112	0	27.0
03/02/2024	59.2	25.3	4.1	123	0	17.8

Date Sampled	Mean Relative Humidity (%)	Mean Air Temperature @ 10m (°C)	Mean Wind Speed @ 10m (m/s)	Mean Wind Direction @ 10m (°)	Total Rainfall (mm)	Stability Class
04/02/2024	52.8	30	0.7	299	0	28.5
05/02/2024	50.1	32.2	0.5	210	0	22.0
06/02/2024	85	24.2	1.9	132	20.80	19.8
07/02/2024	93.3	17.8	2	119	12.2	17.0
08/02/2024	74.8	20.5	2.9	124	0.6	15.2
09/02/2024	65.5	22.1	2.1	113	0	22.6
10/02/2024	77	21.2	3.7	140	3.4	15.3
11/02/2024	77.7	21.3	3.2	130	0.2	15.2
12/02/2024	67.9	24	1.2	93	0	29.5
13/02/2024	63.7	26.2	0.4	352	0	33.1
14/02/2024	65.3	26.1	0.7	294	8	21.4
15/02/2024	85.6	21.4	3	136	0.4	16.3
16/02/2024	72.4	24.4	2.5	115	0	21.1
17/02/2024	70.2	25.6	1.2	133	0	29.4
18/02/2024	70.1	25.6	0.4	140	2.2	28.4
19/02/2024	82.4	21.2	2	130	44.80	25.7
20/02/2024	87.4	20.5	1.7	123	6.8	20.8
21/02/2024	77.2	23.1	2.2	120	0.2	21.9
22/02/2024	70.4	26.3	0.7	116	0	28.2
23/02/2024	62	28.7	1.9	284	5.2	23.0
24/02/2024	86.8	21.2	3.1	139	0.8	15.5
25/02/2024	70.7	22.5	1.9	119	0.2	21.7
26/02/2024	68.3	24.7	1.3	84	0	26.8
27/02/2024	78.9	23.1	3.6	133	0.2	16.6
28/02/2024	70.6	26.3	1.8	115	0	26.2
29/02/2024	57.3	30.3	1.5	247	0	9.0
01/03/2024	64.6	28.2	0.5	194	0.4	31.2
02/03/2024	74.5	26.6	0.1	1	20.80	21.0
03/03/2024	67.4	25.5	1.1	187	0.2	26.2
04/03/2024	70	21.7	3.7	105	0	15.7
05/03/2024	64	21.3	2.4	105	0	17.8
06/03/2024	65.2	23.9	0.5	85	0	32.9
07/03/2024	65.1	25.3	1.9	105	0	23.9
08/03/2024	68	24.4	2.9	100	0	18.3
09/03/2024	64.3	23.7	2.3	89	0	23.2
10/03/2024	65	24.1	2.9	94	0	18.5
11/03/2024	62.4	24.1	2.7	107	0	20.8

Date Sampled	Mean Relative Humidity (%)	Mean Air Temperature @ 10m (°C)	Mean Wind Speed @ 10m (m/s)	Mean Wind Direction @ 10m (°)	Total Rainfall (mm)	Stability Class
12/03/2024	57.9	24.7	0.8	66	0	29.4
13/03/2024	64.4	22.6	1.6	94	0	23.2
14/03/2024	62.4	25.4	0.1	290	0	21.8
15/03/2024	70.6	20.6	3.7	125	0.4	15.9
16/03/2024	67.8	20	2.6	118	0.6	17.1
17/03/2024	79.9	20.3	2	135	6.2	22.8
18/03/2024	85.7	20.7	1.7	128	14	20.6
19/03/2024	75.6	23.6	0.8	109	0	27.1
20/03/2024	84.3	22	0.5	291	1.8	20.7
21/03/2024	60.8	18.7	3.4	111	0.2	16.4
22/03/2024	71	19.1	1.8	124	0	21.1
23/03/2024	74.6	19	1	92	0	24.7
24/03/2024	67.6	21.8	0.6	69	0	36.2
25/03/2024	60.7	22.5	0.6	302	0	29.0
26/03/2024	64.8	22	1	92	0	25.9
27/03/2024	73.3	21.8	2.4	95	0	19.9
28/03/2024	72.7	22.2	2.9	127	0	18.4
29/03/2024	73.7	21.6	2.6	113	0	16.8
30/03/2024	69.8	20.8	0.9	55	0	27.9
31/03/2024	73.7	21.2	1.8	97	0	20.2
01/04/2024	66	22.6	0.9	89	0	31.1
02/04/2024	76.5	20.6	2.1	293	9	21.3
03/04/2024	61.6	20	0.4	129	0	28.1
04/04/2024	91.8	18.5	2.8	136	16.8	16.4
05/04/2024	96.9	18.3	3	131	68.80	16.1
06/04/2024	76	20.9	2.2	291	1.8	22.5
07/04/2024	67.5	20.9	1.5	282	0	24.5
08/04/2024	66.8	20.8	1.5	273	0	26.3
09/04/2024	67.7	17.6	1.6	228	4.4	24.4
10/04/2024	58.8	16.3	1.6	171	0	22.0
11/04/2024	65.2	16.7	0.7	69	0	27.4
12/04/2024	71.6	17.5	0.5	86	0	27.8
13/04/2024	73.7	19.1	0.4	134	0	31.0
14/04/2024	76	18.9	0.5	342	0	32.6
15/04/2024	69.6	20.1	0.4	296	0	28.3
16/04/2024	75.8	20.4	1	100	0	25.7
17/04/2024	78.1	19.5	0.8	102	16	28.9

Date Sampled	Mean Relative Humidity (%)	Mean Air Temperature @ 10m (°C)	Mean Wind Speed @ 10m (m/s)	Mean Wind Direction @ 10m (°)	Total Rainfall (mm)	Stability Class
18/04/2024	78	18.6	1.9	315	0.4	23.8
19/04/2024	61.8	16.7	0.7	140	0	25.6
20/04/2024	87.7	16	2.4	149	10.8	18.9
21/04/2024	78.6	17.5	3.2	139	1.2	16.2
22/04/2024	78	17.6	1.7	96	0	21.7
23/04/2024	76	17.3	0.5	332	0	27.1
24/04/2024	70.5	19.4	0.4	259	0	24.8
25/04/2024	66.1	17.5	2	127	0	17.8
26/04/2024	70.3	15.1	1.3	75	0	24.0
27/04/2024	75.9	15.7	1	94	0	25.7
28/04/2024	80.8	16.3	0.9	14	0	30.7
29/04/2024	69.5	18.1	0.7	311	0	26.6
30/04/2024	78.8	17.2	1.9	150	3.4	21.5
01/05/2024	87.9	14.6	2.7	147	8.2	16.3
02/05/2024	79.3	15.8	2.6	124	0.2	15.0
03/05/2024	80.9	15.1	1.8	106	0	22.2
04/05/2024	88.4	15.3	2.2	103	10.2	16.6
05/05/2024	86.8	15.4	1.8	154	3.4	21.1
06/05/2024	93.1	15.2	2.6	137	33.80	19.2
07/05/2024	81.5	15	1.6	104	0	22.0
08/05/2024	82.6	15.7	1.6	110	0	21.7
09/05/2024	86.7	15.8	1.7	108	0.6	22.2
10/05/2024	82.4	16.5	2.5	125	0.2	15.0
11/05/2024	93.4	16	2.6	128	17	16.5
12/05/2024	86.7	16	0.3	342	0.6	30.6
13/05/2024	83.3	16.2	1.4	315	0	24.0
14/05/2024	80.8	16.2	0.8	311	0.4	26.5
15/05/2024	80.1	15.1	0.9	341	0	25.8
16/05/2024	83.9	15.4	0.8	105	0	26.0
17/05/2024	82.3	15.8	1.4	320	0	25.0
18/05/2024	73.7	12.6	1.3	157	0.6	26.5
19/05/2024	65.9	12.8	0.7	299	0.2	32.1
20/05/2024	62.4	12.9	0.2	306	0	36.0
21/05/2024	79.1	14.1	0.9	57	0	24.5
22/05/2024	81.4	11.8	1.1	349	0.2	28.5
23/05/2024	79.7	11.8	0.6	6	0	26.7
24/05/2024	81.6	12.6	0.4	20	0.2	30.7

Date Sampled	Mean Relative Humidity (%)	Mean Air Temperature @ 10m (°C)	Mean Wind Speed @ 10m (m/s)	Mean Wind Direction @ 10m (°)	Total Rainfall (mm)	Stability Class
25/05/2024	86.6	12.7	0.5	61	0	26.6
26/05/2024	85.3	13.7	1.6	329	0	23.9
27/05/2024	77.1	14	0.5	305	0.2	30.5
28/05/2024	81.6	12.3	0.8	0	0	28.2
29/05/2024	78.8	12.7	0.7	357	0	28.3
30/05/2024	76.9	14.5	0.8	338	0	24.6
31/05/2024	75.2	18.1	1.9	301	6.8	23.8
01/06/2024	95.9	13.9	0		46.60	12.7
02/06/2024	87.7	12.4	2	262	14.4	18.2
03/06/2024	66.9	12.2	3.7	271	0.2	14.1
04/06/2024	65.1	11.6	3	254	0	15.4
05/06/2024	78.8	11.6	0.4	342	0	39.0
06/06/2024	73.5	13.7	1.1	284	4.2	32.5
07/06/2024	86.8	11.8	3	292	5.6	18.1
08/06/2024	75.7	13.7	3.5	272	0	14.6
09/06/2024	71.4	13.8	3.3	275	0	16.2
10/06/2024	73.5	11.8	1.4	284	0	28.5
11/06/2024	71	12.7	2.2	290	0	25.3
12/06/2024	54.3	15.2	3.7	253	0	16.3
13/06/2024	76.6	9.2	1.1	349	0	31.7
14/06/2024	76.9	12.6	1	130	0	22.4
15/06/2024	84.5	12.1	1.4	157	5.6	19.4
16/06/2024	69.9	11.7	1.2	293	0	23.3
17/06/2024	66	11.1	2	296	0	37.2
18/06/2024	66.7	11.8	1.9	286	0	23.1
19/06/2024	64.6	10.5	2.5	276	0	22.1
20/06/2024	67.9	11.3	1.2	288	0	20.9
21/06/2024	68.5	13.2	1.8	270	0.2	24.4
22/06/2024	76.3	11	0.5	306	0.2	28.2
23/06/2024	87.1	11.4	0.6	22	0.2	24.6
24/06/2024	87	10.1	1.1	304	0	24.2
25/06/2024	82.9	10	0.7	358	0.2	26.0
26/06/2024	73.2	13.8	1.7	311	0.2	22.7
27/06/2024	67.2	12.1	1.1	295	0	26.0
28/06/2024	74.7	9.3	0.8	17	0	27.2
29/06/2024	73.9	12.5	1.8	298	0	23.5
30/06/2024	92.2	13.8	0.3	159	22.80	23.0

Date Sampled	Mean Relative Humidity (%)	Mean Air Temperature @ 10m (°C)	Mean Wind Speed @ 10m (m/s)	Mean Wind Direction @ 10m (°)	Total Rainfall (mm)	Stability Class
01/07/2024	76.9	11.5	1.5	114	0	18.7
02/07/2024	88	11.1	2.2	132	2.8	18.8
03/07/2024	80.1	12.2	2.6	134	0	15.4
04/07/2024	78.9	12.1	2	125	0.6	19.0
05/07/2024	86.5	11	1.3	120	1.8	18.9
06/07/2024	80.5	12.4	2.4	126	1	16.0
07/07/2024	87.7	11.2	1	83	0.4	25.7
08/07/2024	91.9	12.9	0.6	88	1	28.2
09/07/2024	87	13.5	1.3	308	10.2	25.5
10/07/2024	73.3	12.8	2.7	293	0	19.6
11/07/2024	82.4	11.1	0.6	320	0	27.4
12/07/2024	78.1	12.1	1.2	291	0	30.9
13/07/2024	70.9	12.5	2	292	0	23.8
14/07/2024	66.2	10.7	3.7	276	0	15.4
15/07/2024	63.5	9.8	4.4	268	0	15.9
16/07/2024	66.6	10.3	6.3	265	0	13.5
17/07/2024	69.6	12.2	4.1	278	0	16.2
18/07/2024	67.5	12.2	3.7	272	0	19.2
19/07/2024	54.7	11.5	4.6	265	0	14.5
20/07/2024	51.2	13.4	6.6	263	0	14.9
21/07/2024	52.8	12.2	4.1	280	0	16.5
22/07/2024	63.9	12.1	1.5	306	0	32.6
23/07/2024	68.3	11.9	1.3	294	0	26.1
24/07/2024	64.4	12.2	1.8	303	0	25.5
25/07/2024	63.2	15.1	2.3	309	0	23.1
26/07/2024	78.2	15	1.6	294	3.8	26.0
27/07/2024	91.7	12.4	1	288	14.8	26.1
28/07/2024	60.5	11.1	4.7	279	0.2	13.8
29/07/2024	65.5	9	1.9	291	0	23.5
30/07/2024	77.1	7.9	0.9	350	0	26.8
31/07/2024	75.1	9.5	0.6	79	0	25.1
01/08/2024	77.6	10.2	0.6	52	0	25.3
02/08/2024	83.3	10.2	1	20	0.2	28.7
03/08/2024	79.1	9	0.8	346	0	28.5
04/08/2024	76.2	10	0.3	6	0.2	30.1
05/08/2024	86.7	11.1	0.3	12	14.6	27.8
06/08/2024	81.3	12.6	0.5	304	0.2	29.5

Date Sampled	Mean Relative Humidity (%)	Mean Air Temperature @ 10m (°C)	Mean Wind Speed @ 10m (m/s)	Mean Wind Direction @ 10m (°)	Total Rainfall (mm)	Stability Class
07/08/2024	76.1	11.4	0.4	244	0.2	24.2
08/08/2024	82.6	10.8	0.6	10	0	28.8
09/08/2024	78.2	13	0.7	320	0	24.1
10/08/2024	81.8	13.4	1.1	95	0	22.0
11/08/2024	86.3	13.5	1.3	103	0.2	21.2
12/08/2024	92.4	13.8	2.5	121	2.6	14.3
13/08/2024	87.7	16.2	1.7	149	1.2	17.1
14/08/2024	96.3	15.5	1	140	6.8	19.0
15/08/2024	91.1	16.1	1.2	137	0.4	16.9
16/08/2024	81.9	17.1	0.8	295	0	24.0
17/08/2024	66.3	15.7	3.7	273	2.4	17.7
18/08/2024	69.7	14.8	1.1	292	0	19.6
19/08/2024	75.5	14.5	1.8	111	0.2	18.5
20/08/2024	85.2	13.9	0.5	358	0	32.4
21/08/2024	61.9	18.7	3.6	289	0	17.7
22/08/2024	58.8	17.1	1.9	286	0	23.5
23/08/2024	70.8	14.5	0.4	39	0	31.3
24/08/2024	62.5	18.1	2.8	283	0.2	23.1
25/08/2024	74.6	18.9	2.6	281	6.6	19.0
26/08/2024	55.6	19.4	3.3	275	0.8	20.4
27/08/2024	50.7	17.5	2.1	281	0	23.0
28/08/2024	36.6	21.9	6.4	255	0	12.6
29/08/2024	40.9	18.9	3.4	282	0	18.2
30/08/2024	43	21.4	3.6	292	0	16.7
31/08/2024	35.6	21.2	5.7	267	0	12.9
01/09/2024	42.6	20.7	4.5	267	0	12.8
02/09/2024	34.8	19.5	5.7	267	0	13.6
03/09/2024	42.5	13.6	0.3	103	0	32.0
04/09/2024	63.8	12.3	0.8	330	0	29.1
05/09/2024	51.1	17.9	3.6	308	0	19.7
06/09/2024	51.4	20.5	4.3	303	0	16.9
07/09/2024	50.6	22.5	2.2	278	0	19.8
08/09/2024	66.2	17	2.1	283	0	22.1
09/09/2024	51.2	16.7	2.3	291	0	25.9
10/09/2024	60.3	16.2	1	96	0	25.8
11/09/2024	69.2	17.7	1.4	311	0	25.1
12/09/2024	74.7	16.8	1.2	139	3.8	21.2

Date Sampled	Mean Relative Humidity (%)	Mean Air Temperature @ 10m (°C)	Mean Wind Speed @ 10m (m/s)	Mean Wind Direction @ 10m (°)	Total Rainfall (mm)	Stability Class
13/09/2024	68.3	14	2.1	104	0	17.8
14/09/2024	61.9	15	1.9	299	0	25.2
15/09/2024	52.1	12.3	2.6	135	0	18.3
16/09/2024	56.5	12.2	1.7	292	0	22.5
17/09/2024	58.4	13.7	1.3	311	0	31.9
18/09/2024	42.8	17.4	3.8	279	0	17.4
19/09/2024	29.9	19.7	3.2	258	0	19.3
20/09/2024	36	17.3	2.6	278	0	23.8
21/09/2024	38.5	17.7	3.9	275	0	16.9
22/09/2024	39.8	18.3	2.7	277	0	22.4
23/09/2024	42.7	19.6	1.9	286	0	21.9
24/09/2024	57.4	18.3	0.9	356	0	35.5
25/09/2024	49.7	21.7	2.7	312	0	23.3
26/09/2024	85.6	14.4	2.7	151	17.4	18.1
27/09/2024	77.4	13.2	3.8	132	5.6	15.4
28/09/2024	80.4	14.1	2.8	121	0.6	17.2
29/09/2024	84.9	17.3	2.4	143	0.2	18.5
30/09/2024	76.2	17.7	1.5	96	7.8	21.5
01/10/2024	68.1	16.5	0.5	104	0	27.9
02/10/2024	78.6	16.2	2.4	109	2	17.9
03/10/2024	68.8	16.4	2.8	111	0	17.1
04/10/2024	63.8	17.5	1.5	296	0	26.4
05/10/2024	51.4	21.8	4	265	0	16.5
06/10/2024	40.8	22.5	4	264	0	15.2
07/10/2024	42.5	22.5	2.1	260	0	23.5
08/10/2024	73.6	16.6	3	121	0	18.2
09/10/2024	86.2	13.3	3	130	2.2	16.2
10/10/2024	71.4	16.8	0.4	7	0.2	32.9
11/10/2024	67.8	19	0.7	11	0	34.3
12/10/2024	73	16.4	3.2	125	0	17.9
13/10/2024	69.1	16.4	2.6	121	0.8	17.9
14/10/2024	81.1	15.7	1.4	292	20.20	23.8
15/10/2024	88.3	15.2	1.3	127	1.8	21.9
16/10/2024	84.4	14.2	1.7	130	3.2	15.8
17/10/2024	80.7	16.8	0.5	156	0	29.8
18/10/2024	81.5	20.9	1.2	274	8.8	29.8
19/10/2024	73.2	21.1	2.3	266	0.8	17.0

Date Sampled	Mean Relative Humidity (%)	Mean Air Temperature @ 10m (°C)	Mean Wind Speed @ 10m (m/s)	Mean Wind Direction @ 10m (°)	Total Rainfall (mm)	Stability Class
20/10/2024	75.3	19	2	95	0.2	23.7
21/10/2024	61.5	17.8	2.5	127	0	17.0
22/10/2024	62.3	18.4	0.5	25	0	35.8
23/10/2024	55.9	21.9	1.6	292	0	23.7
24/10/2024	62.2	21.4	1.4	114	6	30.5
25/10/2024	59.4	17.1	0.8	174	0.2	25.0
26/10/2024	51.1	16.6	2.5	120	0	22.1
27/10/2024	57.2	18.2	0.7	247	0	28.0
28/10/2024	58.6	20.4	0.2	53	0	24.3
29/10/2024	64.8	19.2	2.4	115	0	23.4
30/10/2024	58.9	21.3	0.3	245	0	32.0
31/10/2024	47.3	23.3	0.5	184	0	30.6
01/11/2024	68.2	20.2	3.2	119	0.2	18.7
02/11/2024	66.3	20.4	3.5	131	0	18.4
03/11/2024	56	24.2	2.4	305	0	25.6
04/11/2024	49.4	27	1.8	262	0	21.8
05/11/2024	75.8	20.6	3.3	113	0	16.5
06/11/2024	61.8	25.4	0.2	357	0	35.6
07/11/2024	54.1	28.4	1	270	5.4	29.0
08/11/2024	50.1	24.2	2.8	254	0.4	23.1
09/11/2024	56.4	22.2	1.9	106	0	27.5
10/11/2024	65.8	22.6	2.1	111	0	27.8
11/11/2024	78.4	19.2	2.5	133	6.8	17.6
12/11/2024	85.3	19.2	2.6	127	1.6	16.7
13/11/2024	80	19.8	0.4	127	2.8	29.4
14/11/2024	77.8	19.7	2.2	99	0	23.3
15/11/2024	79.4	19.5	3.3	124	0	16.8
16/11/2024	74.5	22	3.1	129	0	18.1
17/11/2024	64.5	24.9	1.9	302	5.4	26.3
18/11/2024	75	22	1.5	265	2.8	21.6
19/11/2024	68.3	20.3	3.6	113	0	16.9
20/11/2024	66.2	20	2.4	105	0	24.7
21/11/2024	61.3	20.1	3	107	0	20.9
22/11/2024	63.5	21.7	1.3	110	0	32.1
23/11/2024	55.5	24	1.1	94	0	28.6
24/11/2024	51	25.5	1.1	81	0	31.2
25/11/2024	57.1	26.2	0.5	104	0	32.2

Date Sampled	Mean Relative Humidity (%)	Mean Air Temperature @ 10m (°C)	Mean Wind Speed @ 10m (m/s)	Mean Wind Direction @ 10m (°)	Total Rainfall (mm)	Stability Class
26/11/2024	50.5	28.3	1.4	297	0	29.7
27/11/2024	46.4	29	2.7	287	0	23.6
28/11/2024	76.6	24.3	1.2	242	3	22.6
29/11/2024	87	22.8	2.1	117	2.6	18.8
30/11/2024	91.5	22.3	1	138	3.2	20.3
01/12/2024	74.3	24.5	1.6	288	3.2	25.8
02/12/2024	58.4	26.7	1.3	311	0	28.9
03/12/2024	72.7	24.8	1.9	280	0	22.5
04/12/2024	70	25.3	1.8	100	0	21.7
05/12/2024	72.5	24.5	2.7	116	0	21.9
06/12/2024	68.2	27.3	0.6	270	0	30.5
07/12/2024	59.5	29.5	2.3	264	2	22.4
08/12/2024	66.2	27	0.6	224	0.4	21.2
09/12/2024	82.4	21.9	2.8	134	0	18.3
10/12/2024	64.5	24.4	2.1	105	0	26.1
11/12/2024	58	23.7	1.6	111	0	27.9
12/12/2024	49.3	26.2	1	244	0	28.4
13/12/2024	46.5	28.3	1	242	0	24.3
14/12/2024	57.1	27.9	2.3	121	0	24.7
15/12/2024	63.4	27.7	2	110	0	27.5
16/12/2024	56.2	28.8	2.9	107	0	21.1
17/12/2024	52.6	29.9	1.1	236	6.2	27.4
18/12/2024	79.2	19.3	3.7	126	3.2	16.1
19/12/2024	59.6	20.1	3.1	104	0.2	17.2
20/12/2024	58.1	21	1.4	104	0	32.3
21/12/2024	53.4	25.2	0.6	120	0	27.6
22/12/2024	61.7	26.1	2.5	122	0	24.2
23/12/2024	43.1	25.9	3.3	246	0	21.4
24/12/2024	44.7	21.2	1.9	109	0	30.7
25/12/2024	51.5	23	1.4	109	0	37.3
26/12/2024	49.9	26.9	0.5	289	0	33.6
27/12/2024	51.4	28.1	2.4	277	9.6	24.2
28/12/2024	58.8	24.5	1.8	136	0.4	26.5
29/12/2024	48.7	24.2	1.5	105	0	30.7
30/12/2024	60.8	24.8	3.9	119	0	17.9
31/12/2024	61.5	24.7	1.7	123	0	23.4

Appendix G - Annual Review Water Summary Report



RAVENSWORTH OPERATIONS

2024 Annual Review

Water Summary Report

NTL00236_0184-REP-001-1

26 MARCH 2025



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1. OVERVIEW

1.1 Scope

Ravensworth Operations (RO) comprises of the following operations:

- Ravensworth Open Cut (ROC).
- Ravensworth Underground Mine (RUM).
- Ravensworth Coal Handling and Preparation Plant (RCHPP).

This 2024 Annual Review Water Summary Report has been prepared for RO in accordance with the requirements of Schedule 5, Condition 3 of PA 09_0176 (NSW DPE, 2023) and the monitoring program detailed in the RO Water Management Plan (WMP) (ROC, 2024). The scope of this report includes:

- Identify all water reporting requirements identified in PA 09_0176, DA 104/96 and the RO WMP and where each is addressed within the Annual Review Water Summary Report.
- Summarise all water monitoring results. This involves:
 - An overview of surface water and groundwater monitoring and impact assessment criteria (IAC), in accordance with the monitoring program detailed in the RO WMP;
 - Preparation of updated surface water quality charts, groundwater quality charts and groundwater level contours for inclusion in the Annual Review appendices and,
 - Preparation of summary tables of all recorded data, including identification of any exceedances of the IAC.
- Review the monitoring results and complaints records of the development over the past 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 EA.
- Identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance.
- Compare surface water quality results against adopted trigger values/IAC documented in the latest version of the RO WMP, including a long-term trend analysis.
- Summarise the potential causes for any exceedances of the IAC and provide recommendations / corrective actions.
- Compare surface water and groundwater extraction volumes with the relevant water access licence entitlement.
- Summarise the mine complex water balance results and compare against the predictions in the EA.
 - This includes commentary regarding any volume error in the water balance results.
- Report on any additional significant finding regarding the implementation of the WMP, including the effectiveness of erosion and sediment controls.
- Recommend environmental management targets for the next year, including any changes to IAC, monitoring regimes or further investigations.

The 2024 Annual Review Water Summary Report covers the period from 1 January 2024 to 31 December 2024.

1.2 Water Management

Water management for RO is detailed in the RO WMP. The WMP has been developed in order to satisfy the conditions of development consents and water access licenses (WALs) for the operations managed by RO. The WMP:

- Details the water management strategies required by the development consent conditions in order to manage the quality and quantity of water on site and report on water quality in the area surrounding the mine; and
- Outlines the management commitments and monitoring programs in place to address the specific requirements of the development consents relating to surface water and groundwater at RO.

2. SURFACE WATER MONITORING

2.1 Surface Water Monitoring Program

The surface water monitoring program comprehensively oversees various facets of the RO water management system (WMS) and the surrounding creeks. This includes the examination of:

- Surface water quality and flows in upstream and downstream watercourses.
- Channel stability on upstream and downstream watercourses (addressed separately).
- Stream health conditions in upstream and downstream watercourses (addressed separately).
- On-site water management.
- Discharge to the Hunter River via Bowmans Creek under the Hunter River Salinity Trading Scheme (HRSTS).

The specific surface water monitoring locations for watercourses can be found in Appendix A. Additionally, the monitoring program, as outlined in the WMP (ROC, 2024), incorporates the following elements:

- Daily Rainfall: Recorded from an on-site weather station.
- Water Level Monitoring: Regular monitoring of the main water storage dams.
- Water Level Monitoring of Other Dams: Conducted pre, during, and post rainfall events exceeding 20 mm in 24 hours.
- Monthly Volume of Imported Water: Compliance with relevant WAL requirements.
- Monthly Monitoring of Dams: Assessing water quality parameters such as pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), and Total Suspended Solids (TSS).
- Six-Monthly Speciation Monitoring: Focused assessment of the Narama In-pit Storage Dam for metals, nutrients, and hydrocarbons.
- Dams in key locations including the infrastructure area are tested monthly for other analytes including:
 - BOD.
 - Oil and grease.
 - Phosphorus.
- Regular Inspections: Scheduled inspections of all sediment and erosion control structures, particularly during and after storm events (i.e., rainfall events exceeding 20 mm in 24 hours), in accordance with RO Erosion and Sediment Control Plan.
- Hydrocarbon Monitoring if hydrocarbon contamination is suspected (visible sheen), prompt monitoring will be initiated. In case of confirmed contamination, appropriate remediation actions will be promptly undertaken.

2.2 Impact Assessment Criteria

Impact assessment criteria (IAC), also referred to as 'trigger values,' for pH, EC, TSS and TDS have been determined for specific receiving water monitoring locations as part of the WMP (ROC, 2024). The IAC are used to identify deviations from the baseline water quality conditions. Surface water quality IAC are presented in Appendix A.

2.3 Surface Water Quality Monitoring Results

Water quality sampling is undertaken monthly at upstream and downstream locations along Bowmans Creek and Bayswater Creek and every two months in Davis Creek and Pikes Creek, shown in Table A.1 (in accordance with Table 6.1 and 6.2 from the RO WMP). Samples that were not collected according to this schedule was due to the site being too dry or inaccessible.

Statistical analyses of the 2024 water quality monitoring data for pH, EC, TDS and TSS and time-series charts (including all historical data) are presented in Appendix B. The IAC triggers are shown on the graphs for each watercourse.

2.3.1 Bowmans Creek

Five samples were gathered from the upstream site of Bowmans Creek (EPL3) and ten at the downstream monitoring location (EPL4).

The water quality analysis at the Bowmans Creek monitoring locations identified:

- Two pH results at EPL3 and three at EPL4 were outside of the IAC range.
- Four EC results at EPL4 exceeded the IAC value.
- One TSS result at EPL3 and two at EPL4 were outside of the IAC range, however all results were well below the historically recorded maximum value of 176 mg/L.
- Three TDS results at EPL4 exceeded the IAC range.

The exceeding readings for EPL3 (pH and TSS) are within the historical ranges for the site and have not varied significantly from values recorded in 2023. Throughout 2024, EC and TDS readings at EPL4 observe a typically positive trend; however, values remain within the sites historical range and have not varied outside of the range observed during 2023. A similar positive trend in EC and TDS values was observed throughout 2022 and 2023, with the 2023 readings remaining higher than those recorded in 2022 and 2024. The pH exceedances at EPL4 were all below the lower IAC trigger limit, similar to the 2023 exceedances. pH values remained within the historical range throughout 2024.

No immediate actions are recommended for EPL3, as elevated results are likely due to low flow conditions. The exceedance investigation (Engeny, 2025) also found that the elevated EC and TDS readings at EPL4 are likely due to low flow and pooling conditions at the sample site. However, further investigation is recommended to rule out other possible sources given the recurring trend.

2.3.2 Bayswater Creek

Nine water quality samples were collected from the Bayswater Creek upstream of ROC (W114) and five water quality samples were collected from the Bayswater Creek downstream of ROC (W115) in 2024.

Eleven water quality samples were collected from the Bayswater Creek upstream of RUM (W10) and six water quality samples were collected from the Bayswater Creek downstream of RUM (W11) in 2024. It is noted that W10 and W11 do not have site specific IAC defined in the RO WMP (2024) and the Bayswater IAC defined for W114 and W115 have therefore been adopted as interim IAC.

The water quality analysis at the Bayswater Creek monitoring locations identified:

- Three pH samples at W114 and W115 exceeded the IAC range.
- Three EC and TDS samples at W114 exceeded the IAC range.
- One TSS sample at W114 and two at W115 exceeded the IAC range.
- One pH and TSS sample at W11 exceeded the IAC range.
- Two pH samples at W10 exceeded the IAC range.
- Eight EC and TDS samples at W10 exceeded the IAC range.

None of the Bayswater Creek exceedances deviated considerably from historical site trends however, new minimum values were recorded for TDS and EC. When comparing the 2024 readings to the 2023 readings the following was observed for each of the sites:

- **W114:** the 2024 recorded parameters (TDS, TSS, EC, and pH) have all been lower than typically observed throughout 2023. Recorded values are not considered to vary significantly, as they remain within historical ranges for the site.
- **W115:** the 2024 recorded parameters (TDS, TSS, EC, and pH) have all been lower than typically observed throughout 2023. Three of five TSS values were below the minimum recorded in 2023, and pH sat low within the historical range throughout 2024.
- **W10:** 2024 values were typically lower than those recorded in 2023 for recorded parameters (TDS, TSS, EC, and pH). The range of values observed during 2024 was higher than typical for all analytes, but lower than the range seen in 2023 for TSS. The lowest historical value of 7.5 was recorded for the 3rd time at the site during March, and the lowest historical value for EC (758 µS/cm) and TDS (410 mg/L) were recorded in January.
- **W11:** the 2024 recorded parameters (TDS, TSS, EC, and pH) have all been lower than typically observed throughout 2023. No trends were seen in 2024 data for any analyte, with values appearing to return to a more “normal” range after the increasing trend observed for all parameters during 2023.

The exceedance investigation (Engeny, 2025) identified that no immediate actions are required for each of the Bayswater Creek monitoring locations, as exceedances are likely related to sediment disturbance in the creek bed due to recent rainfall, which is consistent with climatic conditions observed during 2024. However, it is noted that mirrored increases in EC and TDS for both W114 and W10 in addition to elevated nitrate concentrations at groundwater monitoring site NPZ5B P1, located in the catchment between W114 and W10 indicate possible nutrient contamination at these sites. As a result, the area between W11 and W114 and the upstream catchment for W10 should be investigated for possible pollution from diffuse or point sources.

2.3.3 Davis Creek

Six water quality samples were collected at the Davis Creek upstream monitoring location (W152) and one at the Davis Creek Downstream monitoring location (W164).

The water quality analysis at the Davis Creek monitoring locations identified:

- One EC and TDS sample at W152 exceeded the IAC range.
- Two TSS samples at W152 exceeded the IAC range.
- One pH and TSS sample at W164 exceeded the IAC range.

Some exceedances were observed at Davis Creek during 2024 however, most did not deviate considerably from historical site trends. When comparing the 2024 readings to the 2023 readings the following was observed for each of the sites:

- **W152:** all recorded parameters (TDS, TSS, EC, and pH) demonstrated greater range in 2024 than those observed during 2023. The second highest value (462 mg/L) for TSS was recorded during December 2024. This is consistent with notes taken on the date of the sample (16 December) listing suspended fines, vegetation and algae in the waterway at the time of sampling. All other exceedances were within the typical historical range. While increasing trends can be seen primarily from May to December for EC and TDS, no distinct trends are present in TSS and pH data.
- **W164:** all recorded parameters excluding TSS were recorded within the historical range. No values were recorded for this site during 2023 due to dry conditions. Only one sample was collected in 2024 (February), which recorded a TSS value of 5,020 mg/L. On the day of sampling, it was noted that the water level was low, with every other sample date noting that the sample site was dry. This reading was taken following approximately 54 mm of rainfall in the week preceding the sample (between 16 and 22 February). With consideration to these factors and the increased probability of sediment disturbance during sampling, this TSS value is considered an outlier caused by environmental stochasticity and sampling error.

With exception of the results described above, all parameters for W152 and W164 have remained consistent with or typically lower than readings recorded throughout 2023 and have not deviated from historical trends. Field sheets for both sites stated that samples were taken from pooled or no flow conditions throughout 2024, and this is the likely cause of IAC exceedances. The Davis Creek water quality results did not trigger any further exceedance investigations in 2024.

2.3.4 Pikes Gully Creek

Five water quality samples were collected at the Pikes Creek Upstream monitoring location (W135) and six at the Pikes Creek Road at New England Highway monitoring location (W136).

The water quality analysis at the Pikes Creek monitoring locations identified:

- One TSS sample at W136 and W135 exceeded the IAC range.
- Four pH samples at W135 and two at W136 exceeded the IAC range.

Some high TSS values were observed at Pikes Creek during 2024 however, most exceeding samples did not deviate considerably from historical site trends.

When comparing the 2024 readings to the 2023 readings the following was observed for each of the sites:

- **W135:** EC and TDS values typically maintained the increasing trend observed in 2023 until October, when both analytes at the site dropped. It is noted that only one value for pH was observed at W135 during 2023 however, pH during 2024 did not deviate from

historical trends but saw all exceedances below the lower IAC limit, similarly to the sample taken during 2023. All TSS values remained below the sites historical average.

- **W136:** it is noted that comments for W136 noted that the site was dry throughout the majority of 2023, with one sample taken during that year. Values for TDS and EC were both typically higher than the value observed during 2023 however, fell within or below the range observed for 2022. TSS samples for 2024 were typically higher than those observed during both 2022 and 2023, with the first exceedance of current IAC values since 2018 recorded in February. pH values were overall increasing with 2024 exceedances being the lowest values recorded since early 2020. All data for 2024 at W136 fell within the historical range.

No water quality samples were collected at the downstream monitoring location Pikes Creek at CHPP Culvert (W137), with comments noting the site to be dry throughout the entirety of 2024. All parameters for W135 and W136 remained typically consistent with historical data and data recorded during 2022/23 throughout 2024. As such, the exceedance investigation (Engeny, 2025) indicated that no immediate actions are required for each of the Pikes Creek monitoring locations. In the investigation, exceeding values of pH and TSS were determined to be likely related to samples being taken from low flow and pooling water conditions in addition to rainfall events prior to sampling, which is consistent with climatic conditions observed during 2024.

3. GROUNDWATER MONITORING

3.1 Groundwater Monitoring Program

The groundwater monitoring program includes assessment of the following elements of the alluvial and hard rock/coal measure aquifers underlying RO:

- Groundwater inflows / seepage into open cut pits and former underground workings.
- Groundwater quality monitoring, including:
 - pH.
 - EC.
 - Various trace elements (i.e., speciation).
- Groundwater levels and aquifer depressurisation.
- Impacts on groundwater dependent ecosystems and riparian vegetation.

Further details on the groundwater monitoring program are included in the WMP (ROC, 2024).

Data from the monitoring program is also used to estimate the groundwater seepage into former underground workings and open cut voids.

Details of the groundwater monitoring locations are provided in Appendix C.

During the 2024 monitoring period, the groundwater monitoring program included monthly monitoring of water levels, quarterly (minimum) monitoring of pH and EC, and annual monitoring of inorganic species (speciation data).

3.2 Impact Assessment Criteria

All monitoring data collected as part of this program is assessed against established IAC in order to:

- Determine whether groundwater extraction volumes are within WAL limits and are comparable with modelled predictions.
- Identify deviations from the baseline water quality conditions.
- Identify deviations from the baseline groundwater level trends.

3.2.1 pH and EC

Site-specific IAC values for pH and EC have been determined for each monitoring location as part of the WMP (ROC, 2024). These values are presented in Appendix C.

3.2.2 Speciation Data

Where site-specific values are not defined at any location, interim and site specific (sodium and chloride) water quality IAC are based on the ANZECC (2000) guidelines as per WMP (ROC, 2024), using values from *Table 5.2.3 - Summary of water quality guidelines for recreational purposes* in the ANZECC (2000) guidelines.

The interim and site-specific IAC values for speciation data are presented in Appendix C.

3.3 Groundwater Quality Results

3.3.1 Overview

Groundwater quality sampling is listed in the WMP to be undertaken quarterly at all groundwater sampling locations as listed in Table C.1. Samples that were not collected according to this schedule was due to the bore being blocked or sampling being inaccessible. It is noted that

samples were generally conducted more frequently than requires, with deviations from the planned intervals described in the WMP as follows:

- NPZ1 Mid monitoring Bayswater Creek was noted as blocked during 2024, with no significant groundwater level data collected since 2014.
- NPZ7 Mid monitoring the Broonies Seam was noted as blocked during 2024, with no significant groundwater level data collected since 2018.
- Attempted pH and EC sampling at CS4641C every other month (bi-monthly) rather than quarterly. Field notes indicate insufficient water to obtain a sample at CS4641C throughout 2024.
- EC and pH sampling at Coffee Dam, NPZ1 Tall, NPZ2 Tall, NPZ7 Small, NPZ7 Tall, WPP1, and WPP2 was undertaken every other month (bi-monthly) rather than quarterly.
- Sampling at NPZ5B P1, NPZ5B P2, and NPZ6 Tall was undertaken monthly between February and October rather than quarterly.
- Speciation sampling was undertaken twice in 2024 (April and October), however is only required annually.

Groundwater quality data for pH, EC, and trace elements (speciation) are provided in Appendix D. Average historical pH and EC results for all current and decommissioned monitoring bores are presented in Figure D.1 to Figure D.6.

3.3.2 Alluvium and Underlying Weather Coal Measures

Quarterly monitoring of groundwater from the alluvium has been undertaken since 2009 at the monitoring location NPZ5B P2 and near Bayswater Creek upstream of the confluence with Emu Creek.

It is noted that NPZ7 Small, located near the Hunter River, is listed as a monitoring bore for the Hunter River alluvium in the site WMP (ROC, 2024), however, an investigation of groundwater trigger exceedances undertaken by Umwelt in 2021 confirmed that the bore is monitoring weathered Permian coal measures underlying the Hunter River alluvium. This corresponds with the water quality results for the bore that are more saline than what would be expected for the Hunter River alluvium.

The ranges in water quality for NPZ7 Small and NPZ5B P2 is shown in Appendix D (Table D.1 to Table D.5).

NPZ5B P2

All of the ten pH results for NPZ5B P2 (Bayswater Creek alluvium) were outside of the IAC range. An investigation of the trigger exceedances (Engeny, 2025) indicates that the exceedances are minor, consistent with historical trends and recommends the trigger value for pH be reviewed.

Water quality results for NPZ5B P2 (Bayswater Creek alluvium) have exhibited higher salinity levels than the Hunter River alluvium (NPZ7 (Small)) throughout 2024, with all ten of the EC reading being above the IAC trigger level.

Analysis of specification results at NPZ5B P2 monitoring bore showed that:

- Both sodium readings were above the interim IAC of 300 mg/L, with values of 845 and 918 mg/L.
- Both sulphate readings above the interim IAC of 400 mg/L, with values of 588 and 533 mg/L.
- Both chloride readings were above the interim IAC limit of 400 mg/L, with values of 1570 and 1,370 mg/L.
- Both iron readings above the interim IAC of 0.3 mg/L, with readings of 0.78 and 0.79 mg/L.
- Both manganese trigger exceedances of the interim IAC of 0.1 mg/L, with readings of 1.23 and 1.46 mg/L.

All other speciation results for NPZ5B P2 were below interim IAC values. When comparing 2024 results to what was recorded in 2023, the following is observed:

- pH values increased throughout 2024 but typically remained within the range observed during both 2022 and 2023.
- EC plateaued in 2024, dipping slightly through the middle of the year after increasing from 2021 throughout 2023. As a result, all EC values recorded in 2024 are higher than those recorded in preceding years, with a historical maximum of 7,030 $\mu\text{S}/\text{cm}$ recorded in February.
- Chloride and sulphate values continued the 2023 increase at the start of 2024 to new historical maximums of 1,570 mg/L and 588 mg/L, respectively, before dropping in the second half of the year. Manganese dropped from its 2023 maximum and decreased throughout the year in 2024.

- Sodium values continued the increasing trend seen through 2023, peaking in October at 918 mg/L. Although dropping after a peak in 2023, iron concentrations also increased in the second half of 2024.

The investigation of trigger exceedances (Engeny, 2025) indicated that there is no evidence that the elevated groundwater results at NPZ5B P2 are mining related. No immediate actions were required for this site; however, it was recommended that IAC trigger values be reviewed for all analytes.

NPZ7 Small

The six pH results for NPZ7 Small show that samples throughout 2024 were consistent with historical data, despite two minor exceedances of 7.2 below the IAC trigger. The pH values ranged from 7.2 to 7.3 throughout 2024, this is consistent with the 2022 and 2023 pH range (7.1 to 7.3). All EC readings were below the IAC limit of 5,259 $\mu\text{S}/\text{cm}$ in 2024. All values since 2022 were also below the EC IAC limit.

Analysis of specification results at NPZ7 (Small) monitoring bore showed that:

- Both sodium results were below the trigger range of 1,300 – 1496 mg/L, with values of 749 and 326 mg/L.
- Both chloride results were below the IAC trigger range of 1,990 – 2,492 mg/L, with values of 433 and 1050 mg/L.
- Both manganese results were above the IAC trigger value of 0.1 mg/L, with values of 0.114 and 0.21 mg/L.

All other speciation results for NPZ7 (Small) were below interim IAC values. When comparing 2024 results to what was recorded in 2023, the following is observed:

- pH and EC values were consistent with those recorded in 2023.
- Sodium and chloride values were both consistent with or lower than those observed throughout 2023.
- Manganese values increased throughout 2024, continuing from a positive trend seen during 2023. Values remained within the historical range.

The exceedance investigation (Engeny, 2025) identified that no immediate actions are required for the site. However, a review of the lower IAC trigger levels for chloride and sodium is recommended and once 25 values have been recorded for manganese, updated trigger levels should be established.

3.3.3 Bayswater Seam

Monitoring of groundwater quality in the Bayswater Seam occurs at NPZ7 Tall. Water quality results for NPZ7 Tall monitoring bore are shown in Appendix D (Table D.1 to Table D.5).

NPZ7 Tall

Six pH samples were obtained at NPZ7 Tall throughout 2024, which were all consistent with historical data. Values in 2024 remained within the same range as those seen in 2023, with a lower annual maximum of 7.5 as opposed to 7.6 seen in 2023. The six recorded EC values, while demonstrating a greater range during 2024, continued the period of plateau seen in 2023, and were consistent with results despite the new historical minimum of 5,190 $\mu\text{S}/\text{cm}$ recorded in August.

Analysis of specification results at NPZ7 Tall monitoring bore showed that:

- Both sodium results were below the 20th percentile IAC trigger value of 1,320 mg/L, with values of 974 and 999 mg/L.
- Both chloride results were below the 20th percentile IAC trigger value of 2,099 mg/L, with readings at 1,270 and 1,360 mg/L.

All other speciation results for NPZ7 Tall were below interim IAC values. When comparing 2024 results to what was recorded in 2023, the following is observed:

- pH values and EC trends were consistent with those recorded in 2023.
- Sodium and chloride values were consistent with those recorded in 2023, forming the continuation of a plateau forming in late 2022 for sodium and in early 2023 for chloride.

The exceedance investigation (Engeny, 2025) recommended that the condition of NPZ7 Tall be assessed for the potential influence of local rainfall recharge on water quality results. It is also recommended that the IAC trigger values be updated to reflect typical site conditions once an appropriate sample count has been attained.

3.3.4 Broonies Seam

Monitoring of groundwater quality in the Broonies Seam is undertaken at NPZ5B P1 and NPZ6 (Tall). Water quality results for NPZ5B P1 and NPZ6 Tall are presented in Appendix D (Table D.1 to Table D.5).

Nine samples of pH and EC and two samples of specification data were analysed from the Broonies Seam monitoring sites in 2024.

NPZ5B P1

The groundwater quality readings for 2024 at NPZ5B P1 borehole exceeded the IAC limit for the following:

- Eight (8) of ten (10) pH readings were above the IAC range of 7.2 – 7.44, ranging between 7.5 and 8.0.
- Two sodium readings below the IAC trigger range of 820 – 939 mg/L, with values of 45 and 41 mg/L.
- Two chloride readings below the 20th percentile trigger level of 830 mg/L, with values of 32 and 33 mg/L.
- Two nitrate as N values exceeded the interim IAC of 10 mg/L, with values of 14.1 and 19.8 mg/L.

All other speciation results for NPZ5B P1 were below interim IAC values. When comparing 2024 results to what was recorded in 2023, the following is observed:

- pH values demonstrated a higher range in 2024 than what was seen in 2023, however, values remained within the limits of historical data.
- EC values were generally lower than those observed during 2023, recording a new minimum historical value of 933 $\mu\text{S}/\text{cm}$.
- Sodium and chloride during 2024 demonstrated much lower values than those observed during 2023.
- Nitrate values were higher in 2024 than those observed during 2023 (1 and 4 mg/L).

The exceedance investigation (Engeny, 2025) stated that no specific actions are required for pH at the site as they remain relative, and likely subject to groundwater levels. It is recommended that IAC trigger values be updated for pH, sodium, and chloride to better capture natural variation and reduce unnecessary exceedance investigations. Now that 25 samples have been collected for nitrate, it is also recommended that development of a site-specific IAC for nitrate be established. It is suggested the 20th and 80th percentile values of historical nitrate data be implemented to provide conservative triggers until more data is gathered.

Additionally, it is recommended the condition of NPZ5B P2 bore be assessed for the potential influence of local runoff recharge on water quality results. Potential sources of nitrate contamination impacting surface water sources that serve to recharge groundwater at NPZ5B P2 should also be investigated.

NPZ6 Tall

The groundwater quality readings for 2024 at NPZ6 Tall borehole exceeded the IAC limit for the following:

- Five (5) of ten (10) pH results were outside of the IAC trigger range of 7.5 – 7.7, ranging from 7.8 to 8.2.
- Two EC value exceeded the IAC trigger level of 7,120 $\mu\text{S}/\text{cm}$ with a value of 7,180 $\mu\text{S}/\text{cm}$ in both September and December.
- Both sodium results were above the interim IAC trigger level of 300 mg/L with readings of 1,500 and 1,620 mg/L.
- Both chloride results were above the interim IAC trigger value of 400 mg/L with readings of 1,670 and 1,690 mg/L.
- Both iron results are above the interim IAC trigger limit of 300 mg/L with values of 0.78 and 0.79 mg/L.

All other speciation results for NPZ6 Tall were below interim IAC values. When comparing 2024 results to what was recorded in 2023, the following is observed:

- pH values demonstrated a higher range in 2024 than what was seen in 2023, however, values remained within the limits of historical data.
- EC values were consistent with those recorded in 2023.
- Sodium, chloride, and iron values were all lower than or consistent with those recorded in 2023.

The exceedance investigation (Engeny, 2025) recommended revaluation of IAC trigger values for pH and EC to better reflect the expected natural variation at the site. It is recommended that once 24 values have been recorded for sodium, chloride and iron, that site-specific IAC values should be established in accordance with the ANZECC 2000 Guidelines.

3.3.5 Lemington Seam

Monitoring of groundwater quality in the Lemington Seam occurs at NPZ1 Tall and NPZ2 Tall. The ranges in water quality for each monitoring bore are shown in Appendix D (Table D.1 to Table D.5).

Six samples of pH and EC and two samples of specification data were analysed from the Lemington Seam monitoring sites in 2024.

NPZ1 Tall

The groundwater quality readings for 2024 at NPZ1 Tall borehole exceeded the IAC limit for the following:

- Two (2) of six (6) pH readings were above the IAC trigger range of 7 – 7.3, both with a reading of 7.4.
- Two (2) sodium results below site specific lower IAC range of 1,820 – 2,048 mg/L, with readings at 1,740 and 1,760 mg/L.
- Two (2) chloride results were below the lower IAC limit of 2,225 mg/L, with values of 1,790 and 1,710 mg/L.
- Two (2) iron results exceeded the interim IAC trigger limit of 0.3 mg/L, with readings of 1.3 mg/L and 0.59 mg/L. The former value is suggested to be an outlier in the exceedance investigation (Engeny, 2025).
- Both manganese readings exceeding the interim IAC trigger limit of 0.1 mg/L, with readings of 0.131 and 0.132 mg/L.

All other specification results for NPZ1 Tall were within the IAC trigger limits. When comparing exceeding 2024 results to what was recorded in 2023, the following is observed:

- pH values were consistent with those recorded in 2023.
- Iron values were typically higher than those observed in 2023.
- Sodium, chloride, and manganese values were consistent with those recorded in 2023.

The exceedance investigation (Engeny, 2025) recommended the adoption of 5th and 95th percentile values of all historical data for pH, sodium, and chloride. Once 24 historical values are recorded for manganese and iron, it is recommended that the 20th and 80th percentiles be adopted for the IAC trigger levels to provide more accurate trigger limits for these analytes.

NPZ2 Tall

The groundwater readings for 2024 at NPZ2 Tall borehole exceeded the IAC limit for the following:

- Three (3) of seven (7) EC results exceeding the IAC trigger value of 9,765 $\mu\text{S}/\text{cm}$, with values ranging from 9,790 to 9,870 $\mu\text{S}/\text{cm}$.
- Two (2) sodium results above the upper IAC limit of 2,178 mg/L, with readings of 2,270 mg/L and 2,240 mg/L.
- Two (2) barium values above the interim IAC of 1 mg/L, with values of 1.28 and 1.34 mg/L.

All other specification values were within the IAC trigger limits. When comparing 2024 results to what was recorded in 2023, the following is observed:

- EC values were typically consistent with those recorded in 2023.
- Sodium and barium values were consistent with those recorded in 2023.

The trigger exceedance investigation (Engeny, 2025) found that the exceeding specification results do not deviate from the historical trends for the site. All 2024 readings are consistent with the values recorded throughout 2023. It is recommended that trigger limits for sodium and chloride continue to be revised, and that site-specific triggers for barium be implemented once 24 samples have been recorded for the site (as per ANZECC guideline recommendations).

3.3.6 Pikes Gully Seam

Monitoring of groundwater quality in the Pikes Gully Seam is undertaken at CS4641C which lies within the Lower Pikes Gully Seam. Depth to water was observed in monthly samples from February to December in the Environmental Monitoring Database for RO however, no water quality samples were taken in 2024. Observations during sampling in 2024 noted “unable to obtain sample”.

Historical pH and EC for the sample site is presented in Figure D.9 and Figure D.10, respectively.

3.3.7 Liddell Seam

Monitoring of groundwater within the Liddell Seam is undertaken at the Coffey Dam Borehole. The range in water quality for Coffey's Dam Borehole is presented in Appendix D (Table D.1 to Table D.5).

Coffey Dam Borehole

Six samples of pH and EC and two samples of specification data were analysed from the Coffey Dam Borehole in 2024. The groundwater readings for 2023 at this borehole exceeded the IAC limit for the following:

- All six (6) pH results were below the lower IAC trigger of 9.2, with values ranging from 7.1 -7.4.
- All six (6) EC results exceeded the IAC trigger of 3,160 $\mu\text{S}/\text{cm}$, with values ranging from 6,290 to 6 530 $\mu\text{S}/\text{cm}$.
- The two sodium results exceeded the interim IAC trigger of 300 mg/L, with values ranging from 1,740 and 1,760 mg/L.
- The two (2) sulphate results exceeded the interim IAC trigger of 400 mg/L, with values ranging from 734 and 1,150 mg/L.
- The two (2) chloride results exceeding the interim IAC trigger of 400 mg/L, with values of 974 and 1,030 mg/L in October and April, respectively.
- Both iron results are above the Interim IAC of 0.3 mg/L, with readings of 0.69 mg/L and 0.77 mg/L in October and April, respectively.
- Both manganese results above the IAC trigger of 0.01 mg/L, with readings of 0.101 mg/L and 0.181 mg/L.

All other specification values remained within the IAC trigger range. When comparing 2024 results to what was recorded in 2023, the following is observed:

- pH and EC values were consistent with those recorded in 2023.
- Sodium, chloride, manganese and iron values were consistent with those recorded in 2023.
- Sulphate values increased throughout the year, similarly to 2023 however, covered a greater range. A new maximum historical value of 1,150 mg/L recorded in October.

The exceedance investigation (Engeny, 2025) recommended the revision of groundwater trigger values to account for site variability at the Coffee Dam Borehole. Once 25 values have been recorded for iron and manganese, site-specific trigger levels are recommended for these analytes to account for typical site conditions. It is noted that results are considered typical of groundwater extracted from a coal seam and the IACs which are based on ANZECC 2000 guidelines for recreational water use are not considered applicable.

3.3.8 Other Groundwater Monitoring Locations

Monitoring of groundwater quality in the vicinity of the former Cumnock Wash Plant Pit is undertaken at WPP1 and WPP2. The ranges in water quality within each monitoring bore are shown in Appendix D (Table D.1 to Table D.5).

WPP1

The groundwater readings for 2024 for WPP1 borehole exceeded the IAC limit for the following:

- Three (3) of six (6) pH results were above the adopted IAC range of 7 -7.1, with values ranging from 7.3 to 7.5.
- Both sodium results are above the Interim IAC trigger of 300 mg/L, with readings of 1,220 and 1,180 mg/L.
- Both sulphate results are above the Interim IAC trigger of 400 mg/L, with readings of 3,260 and 3,130 mg/L.
- Both chloride results exceeded the IAC trigger of 400 mg/L, with readings of 844 and 767 mg/L.
- One (1) manganese result were above the Interim IAC trigger of 0.01 mg/L, with a reading of 0.211 mg/L.
- Both iron results were above the Interim IAC trigger of 0.03 mg/L, with readings of 0.830 and 0.05 mg/L. The former value is suggested to be an outlier in the exceedance investigation (Engeny, 2025).

All other specification values were within IAC trigger ranges. When comparing 2024 results to what was recorded in 2023, the following is observed:

- pH values were consistent between 7.1 and 7.2 during 2023 but increased from 7 to 7.5 throughout 2024, observing two new historical maximums during the year.
- Manganese and iron (excluding outlier) values were consistent with or lower than those observed during 2023.
- Sodium, chloride, and sulphate values were consistent with those recorded in 2023.

The exceedance investigation (Engeny, 2025) recommends that since sodium, sulphate, and chloride now each have 25 values recorded in their respective historical datasets for this site, that the 20th to 80th percentile results be adopted as an IAC trigger range, or the 80th percentile be adopted as an upper limit.

WPP2

The groundwater readings for 2024 at WPP2 Tall borehole exceeded the IAC limit for the following:

- Three (3) of six (6) pH values were above the IAC range of 7 – 7.3, with two readings of 7.4 and one of 7.5.
- All six (6) EC values were above the IAC limit of 9352 $\mu\text{S}/\text{cm}$, with readings ranging from 9,510 to 10,130 $\mu\text{S}/\text{cm}$.
- Both sodium values exceeding the interim IAC trigger of 300 mg/L, with readings of 1,860 and 1,730 mg/L.
- Both sulphate readings above the interim IAC trigger of 400 mg/L, with readings of 4,060 and 3,628 mg/L.
- Both chloride readings above the interim IAC trigger of 400 mg/L, with readings of 1,028 and 918 mg/L.
- One (1) of two (2) manganese readings exceeded the interim IAC of 0.1 mg/L, with a reading of 0.186 mg/L.

All other specification values were within IAC trigger ranges. When comparing 2024 results to what was recorded in 2023, the following is observed:

- pH values were consistent between 7 and 7.3 during 2023 but ranged from 7 to 7.5 throughout 2024, observing the historical maximum of 7.5 in June.
- EC values typically increased during 2024, while showing no distinct trend in 2023. Overall, EC values were higher in 2024.
- Sulphate values in 2024 were lower than those observed in 2023 but remained consistent with historical data.
- Sodium, chloride and manganese values were consistent with those observed during 2023.

It is noted that the interim IAC values are based on ANZECC 2000 guidelines for recreational water use are not considered applicable. The exceedance investigation (Engeny, 2025) recommends that IAC values be updated for pH and EC, and site-specific IACs be established for sodium, chloride, magnesium, and sulphate once the sufficient number of samples (24) are taken.

3.4 Groundwater Level Results

In 2024, groundwater levels were measured at 12 out of 14 total locations, with monitoring results shown in Appendix E (Table E.1 and Chart E.1). Monitoring locations are shown on in Appendix B (Figure B.1). Most monitoring sites have observed a generally increasing water level over 2024, which is consistent with climatic conditions. Site specific groundwater level summaries are provided in the sections below.

Alluvium and Underlying Weathered Coal Measures

Water level monitoring occurs in the Bayswater Creek Alluvium at NP25B P2 and the Hunter River Alluvium at NP27 Small.

Recorded levels at NP27 Small (Hunter River Alluvium) showed a decrease over the 2024 monitoring period, dropping from 41.97 mAHD to 39.83 mAHD. The recorded level in NP25B P2 (Bayswater Creek Alluvium) was stable, increasing slightly throughout the 2024 monitoring period, climbing from 66.18 mAHD to 66.36 mAHD.

Bayswater Seam

Groundwater level monitoring in the Bayswater Seam is undertaken at NP21 Mid and NP27 Tall.

NP21 Mid is currently blocked and therefore not monitored during 2024. NP27 Tall decreased during 2024, dropping from 42.09 mAHD to 40.23 mAHD.

Broonies Seam

Monitoring of groundwater level monitoring in the Broonies Seam is undertaken at NP26 Tall and NP25B P1.

The recorded levels in NP26 Tall varied throughout the year but overall, increased slightly over the 2024 period, climbing from 64.24 to 64.40 mAHD. NP25B P1 observed a slight increase in water level over the 2024 period, dropping from 60.15 mAHD to 60.94 mAHD.

Lemington Seam

Monitoring of groundwater quality in the Lemington Seam occurs at NPZ1 Tall, NPZ2 Tall.

The recorded levels in NPZ1 Tall continued to increase during 2023, rising from 38.72 to 40.58 mAHD. NPZ2 Tall also saw an increase over 2023, from 34.76 to 35.30 mAHD.

Pikes Gully Seams

Monitoring of groundwater quality in the Pikes Gully Seam is undertaken at CS4641C which lies within the Lower Pikes Gully Seam.

Recorded water levels at CS4641C declined slightly during the 2024 period from -19.52 to -20.15 mAHD. This is consistent with recent trends, following a steady decline in level since 2015, which followed the sharp decline observed from 2013 to 2015 as a result of and dewatering of the former Cumnock underground workings to allow mining in the Ravensworth North Pit.

Liddell Seam

Monitoring of groundwater within the Liddell Seam is undertaken at the Coffey Dam Borehole. Recorded results at the Coffey Dam Borehole were relatively stable around 57 mAHD, with a minor peak of 59.57 mAHD in April. Overall, groundwater levels dropped throughout 2024, decreasing from 57.54 to 57.27 mAHD.

Other Groundwater Monitoring Locations

Monitoring of groundwater quality in the vicinity of the former Cumnock Wash Plant Pit is undertaken at WPP1 and WPP2. Both WPP1 and WPP2 saw an increasing trend over 2024. WPP1 rose from 105.69 to 106.25 mAHD, and WPP2 rose from 105.73 to 106.37 mAHD.

In addition to the above, groundwater level is recorded in 8 locations (RNVW1, RNVW2, RNVW3, RNVW4, RNVW5, RNVW6, RNVW7 and RNVW8 as shown on Figure C.1) at 6-hour or 12-hour intervals using vibrating wire piezometers. The purpose of these groundwater level monitoring locations is to identify the groundwater pressure response to mining operations. The water level and depressurisation results from the vibrating wire piezometers is discussed in Section 3.5.

3.5 Groundwater Pressure Response

The groundwater pressure response to mining operations for the 2024 reporting period was measured at 6-hour or 12-hourly intervals using vibrating wire piezometers. The vibrating wire piezometers were installed in 2007 at four locations (CS4655, CS4656, CS4657 and CS4658), in 2008 at four locations (RNVW1, RNVW2, RNVW3, RNVW4), in 2009 in two locations (RNVW5, RNVW6) and in 2010 at two locations (RNVW7, RNVW8). Monitoring results are presented graphically in Appendix E (Figure E.9).

Piezometers CS4655, CS2656, CS4545, CS4657 and CS4539A have been decommissioned as a result of the progression of the North Pit to the south. The locations of the vibrating wire piezometers are shown in Appendix C (Figure C.1).

RNVW1

The bore RNVW1 results at all depths (48 mbgl - 326 mbgl) have remained relatively stable since the 2023 readings. Slight depressurisation at depths of 270 mbgl, 150 mbgl, 109 mbgl, and 68 mbgl has been observed and slight recovery has been observed at depths of 240 mbgl and 190 mbgl (refer to Appendix E, Figure E.2).

Historically (since 2008) a depressurisation trend at depths of 109 mbgl, 150 mbgl, 190 mbgl, 240 mbgl and 270 mbgl have been observed. The historical depressurisation at a depth of 109 mbgl exceeds predictions presented in *Ravensworth Operations – Review of Groundwater Model Predictions* (AGE, 2023), while all other locations are depressurising to a lesser degree than predicted.

RNVW2

Results for bore RNVW2 (refer to Appendix E, Figure E.3) show continued depressurisation at all depths, except 43 mbgl, however depressurisation at depths 258 mbgl, 180 mbgl, and 140 mbgl has been minimal since 2023. Stabilisation is observed at depths of 43 mbgl.

Depressurisation at depths of 239 mbgl occurs to a lesser degree than predicted in the Ravensworth Project (RO Project) groundwater model results as presented in *Ravensworth Operations – Review of Groundwater Model Predictions* (AGE, 2023). The groundwater model for the RO Project also predicted depressurisation at a depth of 140 mbgl for RNVW2, however, results over recent years indicate pressure recovery at this depth.

RNVW3

Results for RNVW3 (refer to Appendix E, Figure E.4) indicate ongoing depressurisation at all depths (254 mbgl, 210 mbgl, 180 mbgl, 143 mbgl, 103 mbgl, and 62 mbgl), although the change at 143 mbgl has been minimal since 2023.

RNVW4

Results for RNVW4 (refer to Appendix E, Figure E.5) show ongoing depressurisation at depths of 225 mbgl, 201 mbgl, and 114 mbgl. The depressurisation observed is typically to a lesser degree than predicted in the RO Project groundwater model results as presented in *Ravensworth Operations – Review of Groundwater Model Predictions* (AGE, 2023). The results at depths of 163 mbgl and 102 mbgl indicate minimal recovery or stabilisation since 2023.

RNVW5

Results for RNVW5 (refer to Appendix E, Figure E.6), indicate minimal depressurisation for the 2024 monitoring period. It is noted that the RNVW5 instrument is currently outputting zero readings on channels 1 (depth of 19 mbgl), 6 (depth of 279 mbgl) and 7 (depth of 350 mbgl) and therefore no observations of depressurisation at these depths can be made. Results have only been captured at channel 3 (depth of 87 mbgl) since 2023 and therefore trend analysis cannot be made at this depth.

RNVW6

Results for RNVW6 (refer to Appendix E, Figure E.7) show continued depressurisation since 2023 at all depths, although this has been minimal at depths of 19 mbgl, 116 mbgl, and 330 mbgl. Historical results indicated depressurisation at depths of 19 mbgl and 66 mbgl exceeded predictions in the RO Project groundwater model results as presented in *Ravensworth Operations – Review of Groundwater Model Predictions* (AGE, 2023). However, pressures have now recovered at both depths and despite the depressurisation indicated since 2023, an overall recovery is still maintained compared to historical results.

RNVW7

Results for RNVW7 (refer to Appendix E, Figure E.8) show ongoing depressurisation since 2023 at all depths, ranging from 83 mbgl to 335 mbgl, which is consistent with groundwater model predictions for the RO Project. It is noted that channel 1 (depth of 83 mbgl) appeared to be outputting erroneous results for all years prior to 2023 and therefore no historical trends can be made.

RNVW8

Results since 2023 for RNVW8 show depressurisation at depths of 205 mbgl and 252 mbgl, and a continued pressure recovery at 300 mbgl. Although depressurisation has been observed at a depth of 205 mbgl, an overall recovery of historical pressure is observed. The depressurisation remains to a lesser degree than predicted in the RO Project groundwater model results as reported in *Ravensworth Operations – Review of Groundwater Model Predictions* (AGE, 2023).

3.6 Groundwater Model Review

Condition 6.8.4 of the PA 09_0176 requires biennial review of the groundwater model. A review of the model was completed in 2023 by AGE. The review concluded that the groundwater model continues to predict groundwater impacts with satisfactory accuracy, and that no further calibration of the model is required at this stage. A review of groundwater model predictions will be undertaken again in 2025.

4. WATER BALANCE

4.1 Water Sources and Demands

The water management system at RO consists of water storages, pumps, pipelines, and instrumentation for flow and level measurement. The existing RO water management system consists of three separate systems, including:

1. Clean (raw) water system.
2. Dirty water system (sediment).
3. Mine water system (saline).

These systems are further described in RO WMP (2024).

The WMS infrastructure is monitored and controlled via RO Citect supervisory control and data acquisition (SCADA) systems (separate systems are used by ROC and RCHPP). The Citect SCADA system incorporates a graphical user interface (GUI) that displays the status of WMS infrastructure (e.g. dam levels, pump on/off, flow rates, etc.) and operator access to operate equipment and adjust WMS infrastructure set points. Operational WMS data collected by the Citect SCADA system is utilised in site water accounting models to monitor RO water sources and demands.

Key water sources for the RO include:

- Rainfall/runoff within the ROC and RCHPP WMS.
- Groundwater seepage into operating open cut pits, voids, and underground mine pits (and spoils seepage to Narama Pit).
- Moisture in ROM coal.
- Groundwater extracted from the former Cumnock underground workings.
- Water imported from the Mount Owen Complex or Liddell Mine under the Greater Ravensworth Area Water and Tailings Scheme (GRAWTS).
- Water imported from the Hunter River.
- Potable water trucked to site.

Key water demands for the RO include:

- Evaporative losses from water storages.
- Dust suppression (haul roads, stockpiles, and handling) and vehicle wash bay losses.
- RCHPP losses: moisture bound with product coal and rejects (coarse and fine).
- Discharges under the Hunter River Salinity Trading Scheme (HRSTS).
- Transfers to the Mount Owen Complex or Liddell Mine under the GRAWTS.

4.2 Surface Water Discharge

Surplus surface water at ROC is transferred to RCHPP or discharged from the Narama Dam to the Hunter River via Bowmans Creek under the conditions of RO EPL 2652 and the HRSTS or transferred to other Glencore mine sites under the GRAWTS.

EPL 2652 permits a maximum discharge of 400 ML/day from the Narama In-pit Storage Dam under the HRSTS Regulations. Throughout 2024, RO held a maximum of 134 salt credits. No HRSTS discharge occurred during the 2024 period. RO's HRSTS salt credit holdings reduced from 134 to 99 during the 2024 period.

4.3 Surface Water Extraction

RO holds water access licences WAL 9050, WAL 1046, WAL 1325, WAL 8964, WAL 13102, WAL 10771, and WAL816 that allow RO to extract water from the Hunter River and Bayswater Creek. In the 2024 water year (1 July 2023 to 30 June 2024), RO extracted a total of 107.77 ML from the Hunter River, not exceeding extraction entitlements. Table 4.1 presents the surface water extraction for each RO WAL for the 2024 water year.

TABLE 4.1: 2024 WATER YEAR (JUL 23 – JUN 24) SURFACE WATER EXTRACTIONS

WAL / Reference Number	Water Source/ Management Zone	Category	Entitlement ¹	Extracted Volume (ML)
WAL 10771 (20WA200463)	Hunter River Regulated/Zone 1b (Hunter River from Goulburn River Junction to Glennies Creek Junction)	High Security	25	12.4
WAL 1046 (20AL201444)	Hunter River Regulated/Zone 1b (Hunter River from Goulburn River Junction to Glennies Creek Junction)	High Security	3	0
WAL 13102 (20AL203412)	Hunter River Regulated/Zone 1a (Hunter River from Glenbawn Dam to Goulburn River Junction)	High Security	15	0
WAL 9050 (20AL200744)	Hunter River Regulated/Zone 1b (Hunter River from Goulburn River Junction to Glennies Creek Junction)	General Security	500	74.7
WAL 8964 (20AL203224)	Hunter River Regulated/Zone 1b (Hunter River from Goulburn River Junction to Glennies Creek Junction)	General Security	1,590	0
WAL 1325 (20AL203042)	Hunter River Regulated/Zone 1b (Hunter River from Goulburn River Junction to Glennies Creek Junction)	Supplementary	13	0
WAL816	Hunter River Regulated /Zone 3a (Glennies Creek)	General security	20	0

1. Excluding any potential carry over.

4.4 Groundwater Extraction

During the 2024 water year, RO extracted a total of 3,715 ML of groundwater. The extraction was undertaken in compliance with the conditions of all relevant licences shown in Table 4.2.

TABLE 4.2: 2024 WATER YEARGROUNDWATER EXTRACTIONS

WAL / Reference Number	Extraction Limit (ML) ¹	Extracted Volume (ML)
WAL 41496	2520	988
WAL 41505	500	0
WAL 41554	50	0
WAL 41507	576	313
WAL 41530	100	0

WAL / Reference Number	Extraction Limit (ML) ¹	Extracted Volume (ML)
WAL 41531	150	146
TOTAL	3896	1447

1. Excluding any potential carry over.
2. Units from another WAL licence temporarily transferred during the 2024 water year.

4.5 2024 Water Balance Summary

4.5.1 Site Recorded Data

The site recorded data in RO 2024 Water Accounting Framework (WAF) was used to complete the 2024 water balance assessment. The site recorded rainfall for 2024 was 718 mm which does not exceed the long-term 90th percentile rainfall at the Jerry's Plains Bureau of Meteorology station (station number 61086) of 904 mm.

4.6 2024 Water Balance

The 2024 water balance summary for RO is provided in Table 4.3.

TABLE 4.3: RAVENSWORTH OPERATIONS 2024 SITE WATER BALANCE

Item	Volume (ML)
INFLOWS	
Rainfall Runoff	3,335
Groundwater Inflow	833
ROM Coal Moisture	1007
From Mount Owen Complex (MOC)	0
From Liddell Coal Operations (LOC)	0
From Hunter Valley Operations (HVO)	691
Potable Supply	6
From Hunter River	113
Total Inflows	5,985
OUTFLOWS	
Evaporation	897
Dust Suppression / Washbay	1,385
CHPP Supply	2

Item	Volume (ML)
Product Coal Moisture	754
Coarse Rejects Moisture	361
Tailings Water	0
To MOC	8,489
To LOC	0
Other third-party supply (to HVO, Oaklands Property)	0
HRSTS Discharges to the Hunter River	0
Uncontrolled Release	259
Total Outflows	12,147
Inflow – Outflow	-6,162
Recorded Stored on Site at Start of Annual Review Period	19,716
Recorded Stored on Site and End of Annual Review Period	11,791
Change in Storage	-7,925
Error	9.7%

The RO water balance assessment for 2024 produced a net inventory change over the year of 6,162 ML, which is lower compared to the recorded change in inventory of 7,925 ML. This resulted in a water balance error of approximately 9.7%, which is within the acceptable limit for Glencore WAF reporting (10%). This suggests that all inflow and outflows of the mine water system have been accounted for. The minor balance error is likely attributed to estimated or calculated water streams where exact monitoring is impracticable (e.g. groundwater inflow calculations, runoff estimates, etc.).

4.6.1 Comparison to EA Predictions

The *Ravensworth Operations Project Environmental Assessment (EA)* (Umwelt, 2010) included the development of a predictive water balance model to ensure there would be sufficient water available to meet the requirements of the RO Project. The predictive water balance indicated that RO would have a net water deficit for most years of mining operation, including during 2024 (refer to Figure 4.1). It is noted that the actual operational water balance will be dependent on rainfall and the quantity of water held in the Barret seam workings of the former Cumnock underground mine workings, however, a net water balance ranging from a minor deficit to a minor surplus is expected.

Similarly, an update by GHD (2017) also indicates that the site is expected to site within a minor deficit between Year 5 (2021) and Year 10 (2026) of operations, as presented in Section 4.4 of the WMP (ROC, 2024). This is consistent with the 2024 results, where the site outflows have been greater than site inflows, indicating a water deficit.

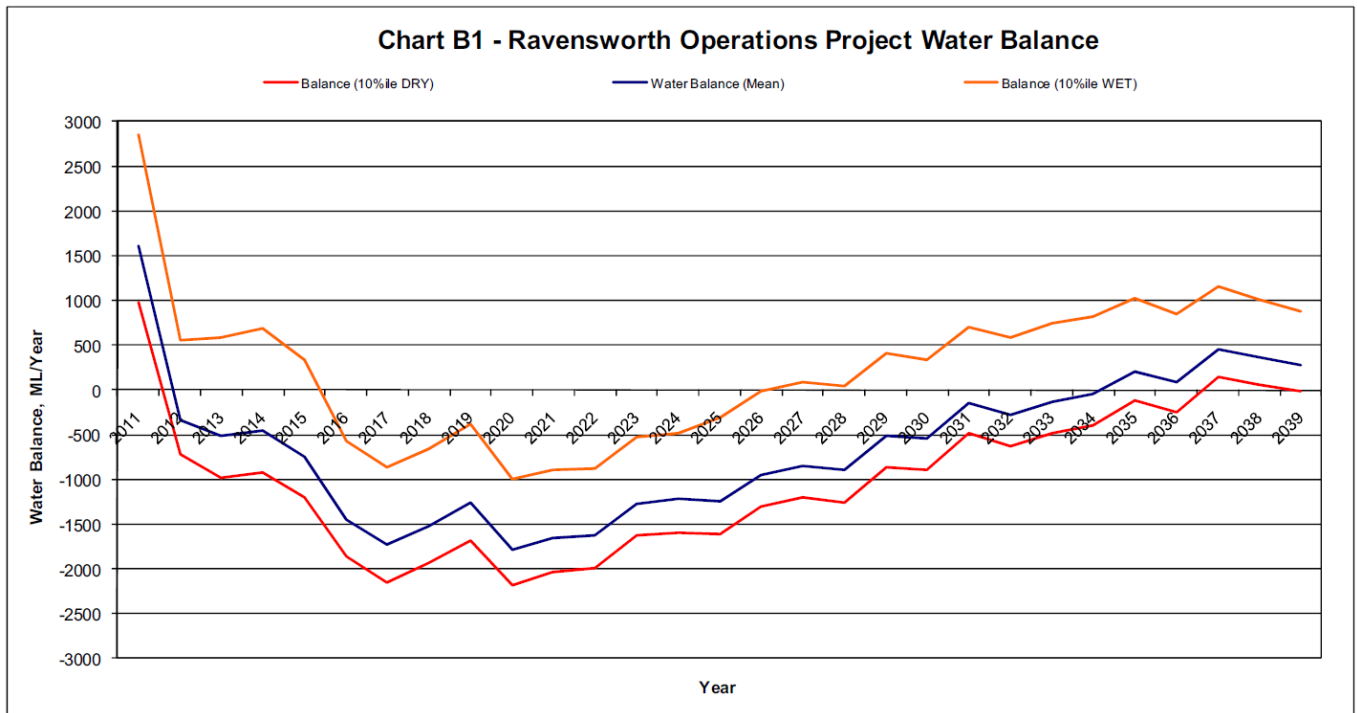


FIGURE 4.1: RAVENSWORTH OPERATIONS PROJECT WATER BALANCE (UMWELT, 2010)

5. QUALIFICATIONS

- (a) In preparing this document, including all relevant calculation and modelling, Engeny Australia Pty Ltd (Engeny) has exercised the degree of skill, care and diligence normally exercised by members of the engineering profession and has acted in accordance with accepted practices of engineering principles.
- (b) Engeny has used reasonable endeavours to inform itself of the parameters and requirements of the project and has taken reasonable steps to ensure that the works and document is as accurate and comprehensive as possible given the information upon which it has been based including information that may have been provided or obtained by any third party or external sources which has not been independently verified.
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- (g) This Report does not provide legal advice.

6. REFERENCES

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APPENDIX A: SURFACE WATER MONITORING LOCATIONS AND IMPACT ASSESSMENT CRITERIA



TABLE A.1: SURFACE WATER MONITORING LOCATION AND FREQUENCY

Watercourse	Monitoring Location	Location Code	Monitoring Frequency
Bowmans Creek	Bowmans Creek Upstream	EPL3	Monthly
	Bowmans Creek Downstream	EPL4	Monthly
Bayswater Creek (ROC)	Bayswater Creek Upstream	W114	Monthly
	Bayswater Creek Downstream	W115	Monthly
Bayswater Creek (RUM)	Bayswater Creek Upstream	W10 (EPL 25)	Monthly
	Bayswater Creek Downstream	W11 (EPL 24)	Monthly
Davis Creek	Davis Creek 2	W152 (EPL 23)	Bi-monthly
	Davis Creek Down	W164 (EPL 22)	Bi-monthly
Pikes Gully	Pikes Creek Upstream	W135	Bi-monthly
	Pikes Creek at New England Highway	W136	Bi-monthly
	Pikes Creek Road at CHPP Culvert	W137	Bi-monthly

TABLE A.2: ADOPTED SURFACE WATER IAC VALUES FOR KEY PARAMETERS

Watercourse	pH	EC (µS/cm)	TSS (mg/L)	TDS (mg/L)
Bowmans Creek	7.7 – 8.1	1,485	17	933
Bayswater Creek	7.7 – 8.5	4,570	33	2,955
Davis Creek	7.5 – 8.3	7,378	31	2,014
Pikes Gully	7.6 – 8.2	13,150	22	10,490

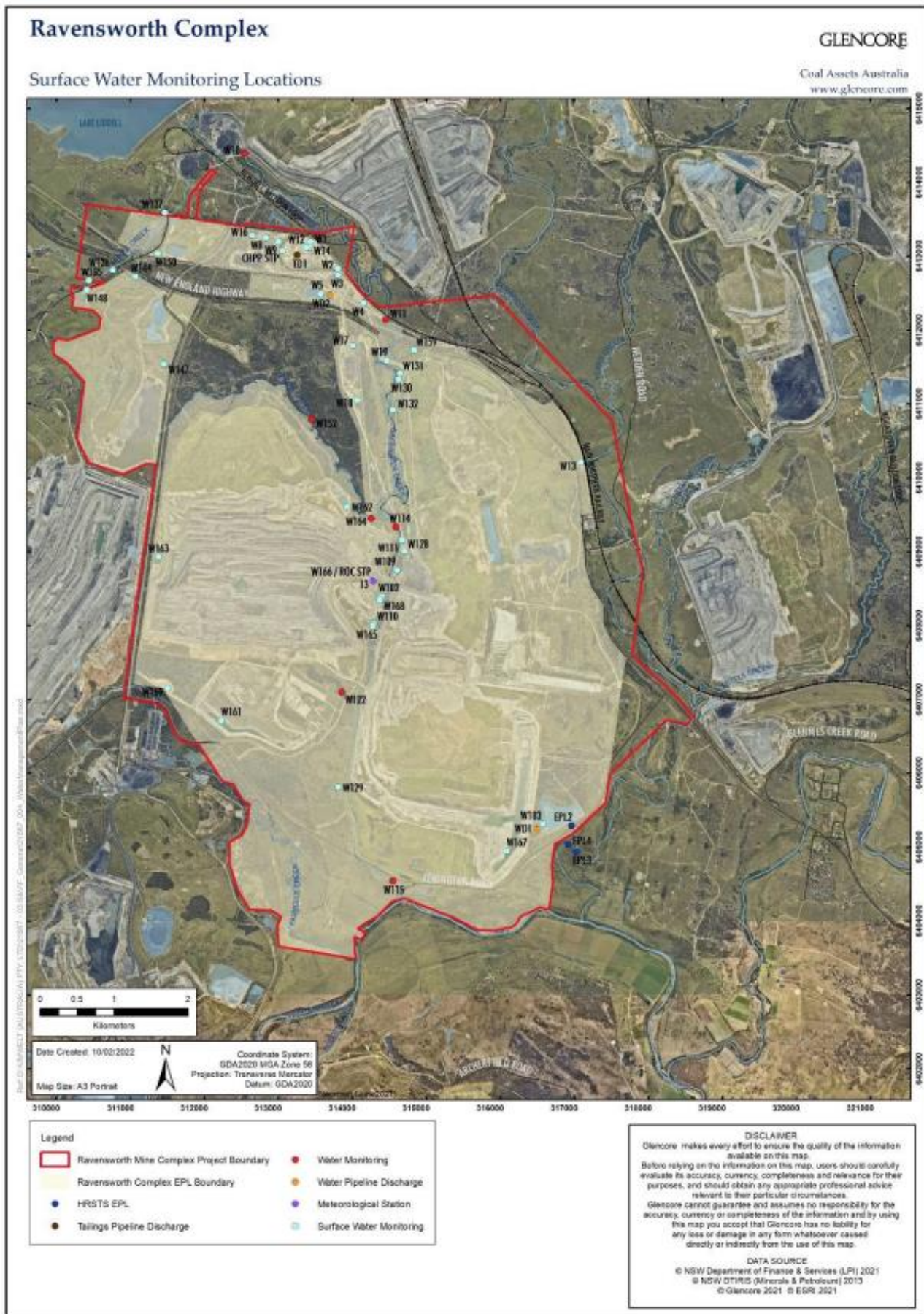


FIGURE A.1: SURFACE WATER MONITORING LOCATIONS

APPENDIX B: SURFACE WATER QUALITY MONITORING RESULTS



TABLE B.1: SUMMARY OF 2024 SURFACE WATER PH AND EC RESULTS

Water Course	Monitoring Location	pH			EC (µS/cm)			No. of samples
		Min	Max	Mean	Min	Max	Mean	
Bowmans Creek	EPL3	7.4	8.1	7.8	565	1,080	835	7
	EPL4	7.4	8.1	7.8	564	2,930	1,422	9
Bayswater Creek (ROC)	W114	7.5	8.4	7.9	699	5,580	3,516	9
	W115	7.3	7.9	7.7	1,160	2,860	1,818	5
Bayswater Creek (RUM)	W10	7.5	8.4	8	758	7,320	5,276	11
	W11	7.6	8.3	7.9	993	4,000	2,172	6
Davis Creek	W152	7.5	8.3	7.9	597	8,220	5,455	6
	W164	8.5	8.5	8.5	845	845	845	1
Pikes Gully Creek	W135	7.2	8	7.5	2,270	5,720	3,922	5
	W136	7.3	8.1	7.8	242	12,700	6,074	6
	W137	-	-	-	-	-	-	0

TABLE B.2: SUMMARY OF 2024 SURFACE WATER TSS ASND TDS RESULTS

Water Course	Monitoring Location	TSS (mg/L)			TDS (mg/L)			No. of samples
		Min	Max	Mean	Min	Max	Mean	
Bowmans Creek	EPL3	5	18	10	354	607	474	7
	EPL4	5	36	12	357	1,730	839	9
Bayswater Creek (ROC)	W114	5	50	15	505	3,520	2,244	9
	W115	7	64	25	703	1,860	1,117	5
Bayswater Creek (RUM)	W10	5	30	13	410	4,760	3,468	11
	W11	5	35	18	595	2,410	1,329	6
Davis Creek	W152	5	462	96	510	5,250	3,290	6
	W164	5,020	5,020	5,020	546	546	546	1
Pikes Gully Creek	W135	12	24	19	1,510	3,860	2,634	5
	W136	9	34	17	163	9,380	4,317	6
	W137	-	-	-	-	-	-	-

The 2024 monthly surface water quality monitoring results for pH, EC, TSS and TDS are presented in tables Table B.3 to Table B.6 respectively. The tables' identity when sampling was not achieved due to dry, inaccessible sites, or due to two monthly sampling regimes.

Table B.3 to C.6 contain the following formatting:

	Indicates monitoring location was dry or inaccessible.
	Indicates non-sampling month.
XXX	Indicates a value which exceeds the IAC range.
*	No site specific IAC for this site so Bayswater Creek triggers were applied.

TABLE B.3: 2024 WATERCOURSE PH MONITORING RESULTS

Site	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24
EPL3 - Bowmans Creek Upstream						7.69	7.91	7.93	7.89	8.08	7.44	7.9
EPL4 - Bowmans Creek Downstream				8.02	7.84	7.6	7.86	7.9	7.84	8.05	7.38	7.42
W114 - Bayswater Creek Upstream				7.46	7.52	7.83	7.62	7.83	7.9	8.14	8.18	8.43
W115 - Bayswater Creek Downstream				7.33	7.63	7.91		7.6			7.88	
W10 - Bayswater Creek Upstream*	7.9		7.5	7.8	8.1	8.2	8.1	7.9	7.6	8.1	7.9	8.4
W11 - Bayswater Creek Downstream*					7.8	8.3	7.8	7.6		7.9	7.9	
W152 - Davis Creek 2		7.5		8	8.2	7.74				7.9		8.3
W164 - Davis Creek Down		8.52										
W135 - Pikes Gully Upstream				7.29	7.24	7.57		7.98		7.25		
W136 - Pikes Gully @ New England Highway		7.26		7.81	7.5	7.95		8.07		8.14		
W137 - Pikes Gully Road @ CHPP Culvert												

NOTE: pH field results were used for sites W10 and W11 as no lab results were available.

TABLE B.4: 2024 WATERCOURSE EC MONITORING RESULTS

Site	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24
EPL3 - Bowmans Creek Upstream						5,656	621	762	919	900	1,000	1,080
EPL4 - Bowmans Creek Downstream				2,200	2,190	564	616	771	976	897	7,650	2,930
W114 - Bayswater Creek Upstream				741	699	2,840	3450	4,070	4,770	4,550	4,950	5,580
W115 - Bayswater Creek Downstream				1,160	1,660	2,860		1,290			2,120	
W10 - Bayswater Creek Upstream*	758		6,480	2,640	4,270	5,200	5,820	5,990	7,270	7,320	6,900	5,390
W11 - Bayswater Creek Downstream*					1,040	4,000	933	1,905		2,560	2530	
W152 - Davis Creek 2		597		6,210	5,090	5,680				6,930		8,220
W164 - Davis Creek Down		845										
W135 - Pikes Gully Upstream				2,560	5,720	2,270		4,990		4,070		
W136 - Pikes Gully @ New England Highway		242		3,420	4,380	8,710		6,990		12,700		
W137 - Pikes Gully Road @ CHPP Culvert												

TABLE B.5: 2024 WATERCOURSE TSS MONITORING RESULTS

Site	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24
EPL3 - Bowmans Creek Upstream						9	13	5	5	5	14	18
EPL4 - Bowmans Creek Downstream				21	36	10	11	5	6	5	5	8
W114 - Bayswater Creek Upstream				50	24	5	5	6	5	5	6	26
W115 - Bayswater Creek Downstream				64	37	8		11			7	
W10 - Bayswater Creek Upstream*	20		21	30	5	5	6	5	12	5	10	23
W11 - Bayswater Creek Downstream*					21	10	35	5		16	20	
W152 - Davis Creek 2		56		26	5	17				10		462
W164 - Davis Creek Down		5020										
W135 - Pikes Gully Upstream				21	18	24		21		12		
W136 - Pikes Gully @ New England Highway		34		18	9	12		17		13		
W137 - Pikes Gully Road @ CHPP Culvert												

TABLE B.6: 2024 WATERCOURSE TDS MONITORING RESULTS

Site	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24
EPL3 - Bowmans Creek Upstream						354	384	434	509	496	532	607
EPL4 - Bowmans Creek Downstream				1,290	1,340	357	395	451	545	542	903	1,730
W114 - Bayswater Creek Upstream				555	505	1,860	2,120	2,590	3,060	2,920	3,070	3,520
W115 - Bayswater Creek Downstream				703	948	1,860		836			1,240	
W10 - Bayswater Creek Upstream*	410		4,530	1,660	2,810	3,430	3,660	3,920	4,730	4,760	4,630	3,610
W11 - Bayswater Creek Downstream*					778	2,410	595	1,120		1,510	1,560	
W152 - Davis Creek 2		510		3,440	3,130	3,340				4,070		5,250
W164 - Davis Creek Down		546										
W135 - Pikes Gully Upstream				1,730	3,860	1,510		3,460		2,610		
W136 - Pikes Gully @ New England Highway		163		2,370	3,110	6,060		4,820		9,380		
W137 - Pikes Gully Road @ CHPP Culvert												

FIGURE B.1: BOWMAN'S CREEK PH – EPL3

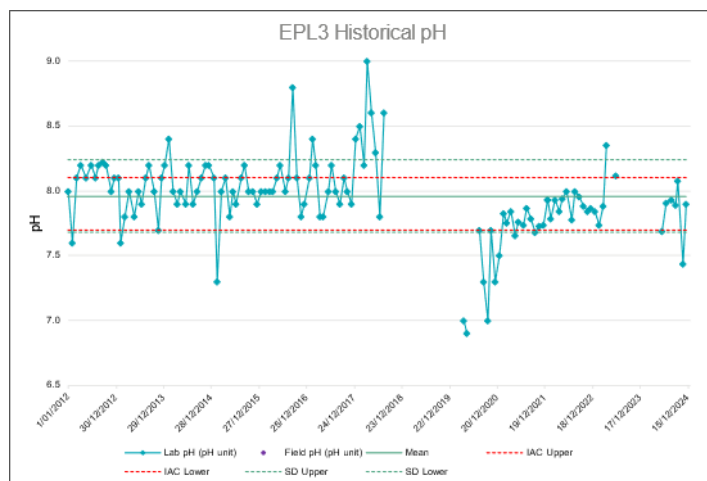


FIGURE B.2: BOWMAN'S CREEK EC – EPL3

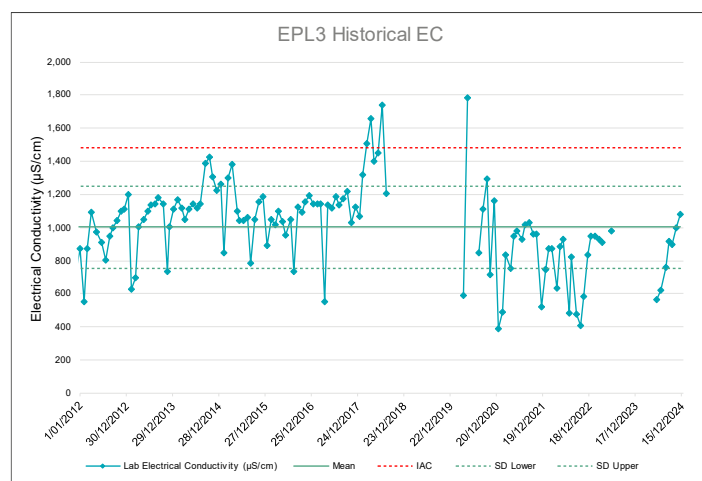


FIGURE B.3: BOWMAN'S CREEK TSS – EPL 3

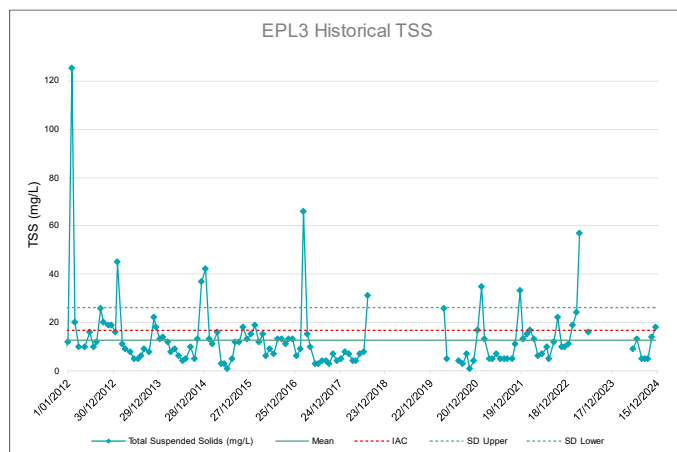


FIGURE B.4: BOWMAN'S CREEK TDS – EPL 3

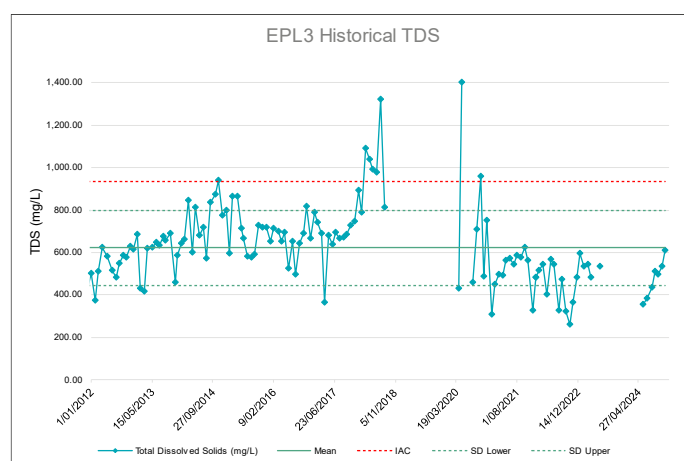


FIGURE B.5: BOWMAN'S CREEK PH – EPL4

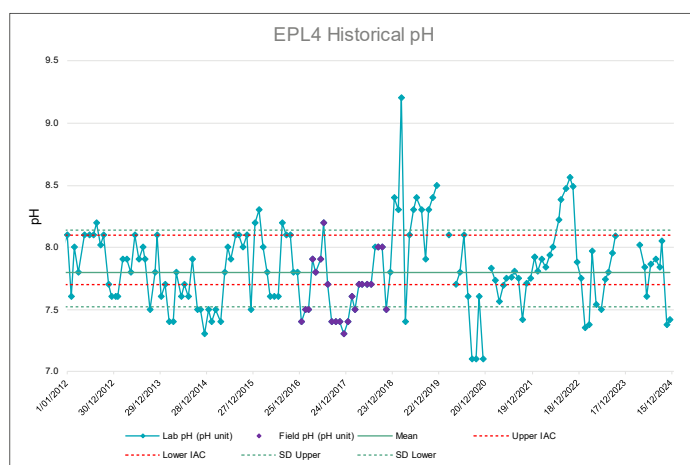


FIGURE B.6: BOWMAN'S CREEK EC – EPL4

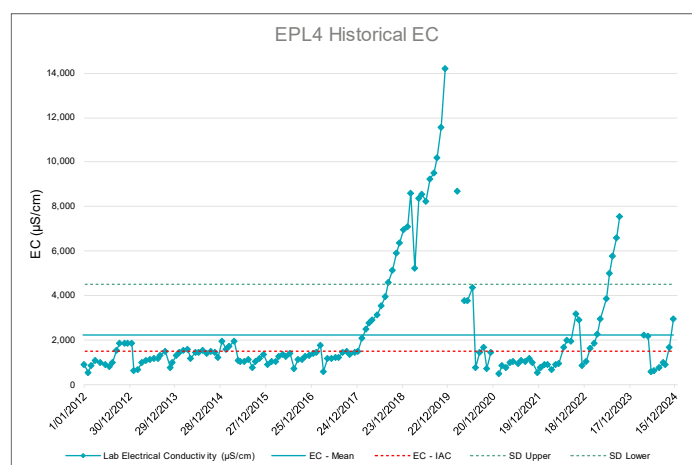


FIGURE B.7: BOWMAN'S CREEK TSS – EPL4

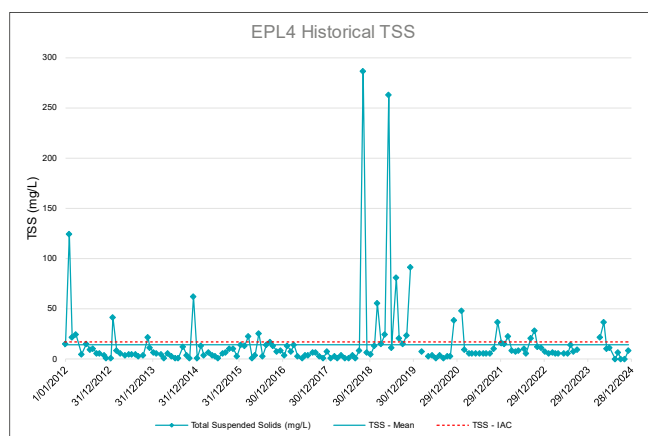


FIGURE B.8: BOWMAN'S CREEK TDS – EPL4

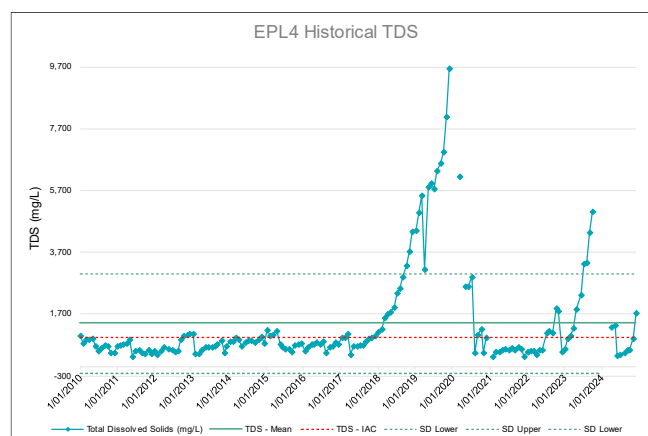


FIGURE B.9: BAYSWATER CREEK (ROC) PH -W114

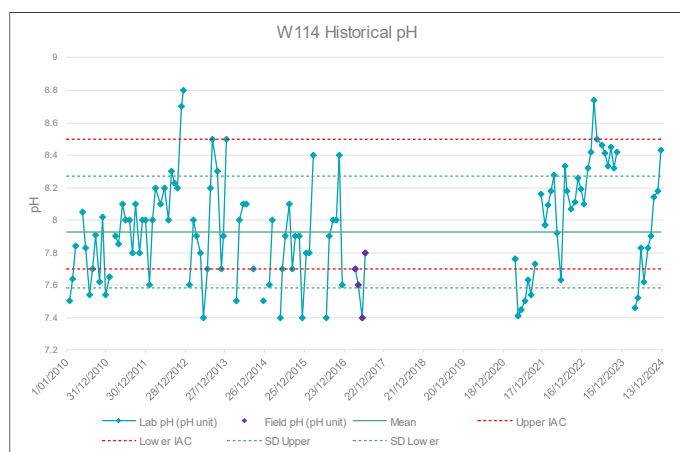


FIGURE B.10: BAYSWATER CREEK (ROC) EC – W114

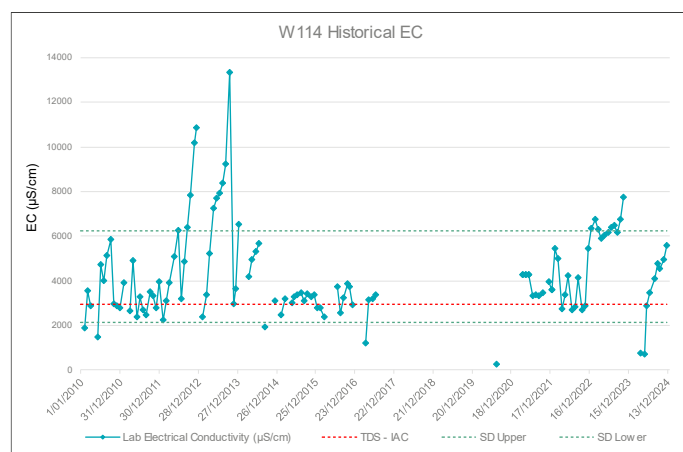


FIGURE B.11: BAYSWATER CREEK (ROC) TSS – W114

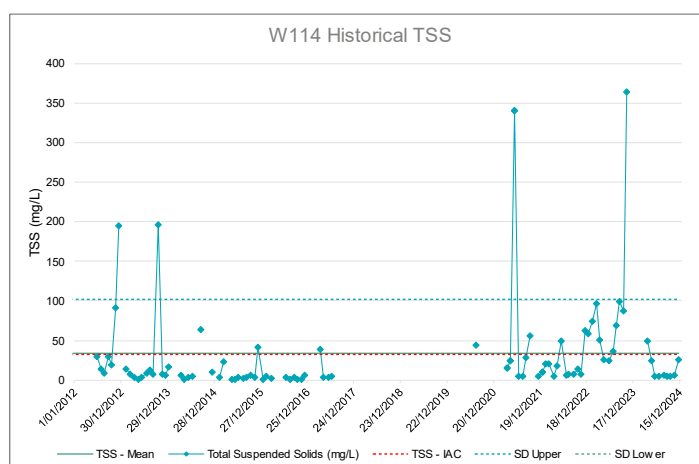


FIGURE B.12: BAYSWATER CREEK (ROC) TDS – W114

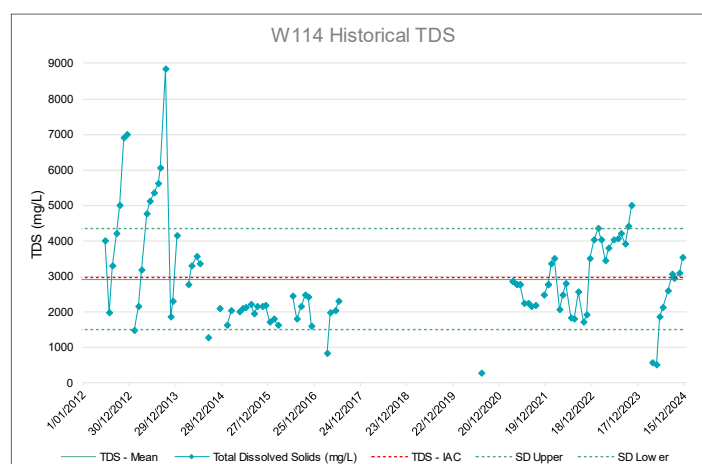


FIGURE B.13: BAYSWATER CREEK (ROC) PH -W115

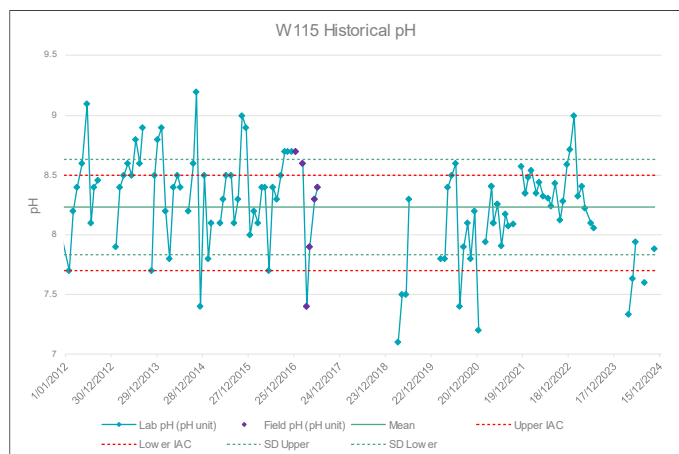


FIGURE B.14: BAYSWATER CREEK (ROC) EC – W115

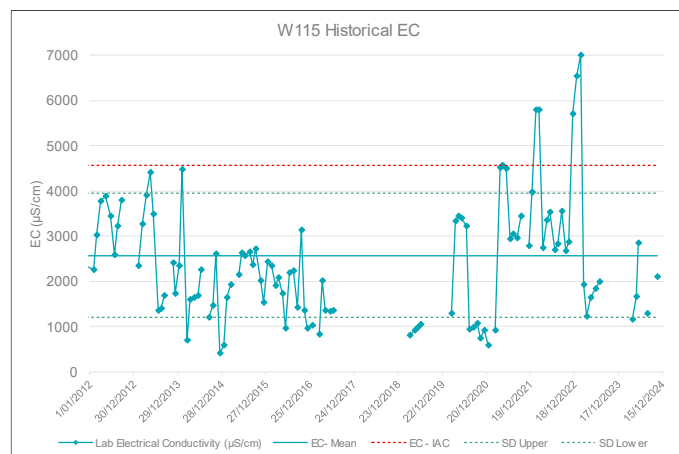


FIGURE B.15: BAYSWATER CREEK (ROC) TSS – W115

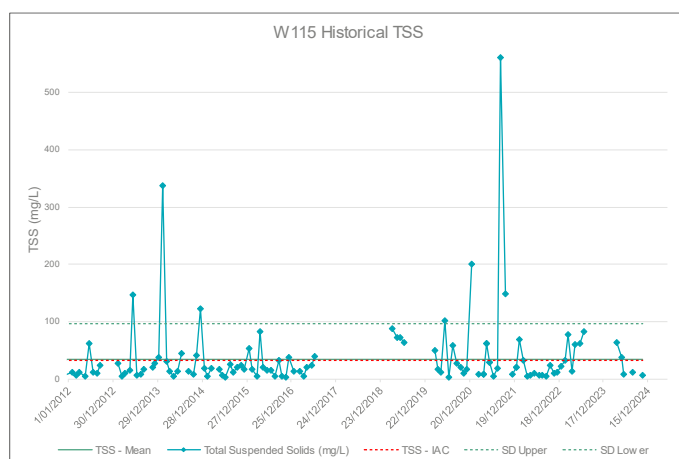


FIGURE B.16: BAYSWATER CREEK (ROC) TDS – W115

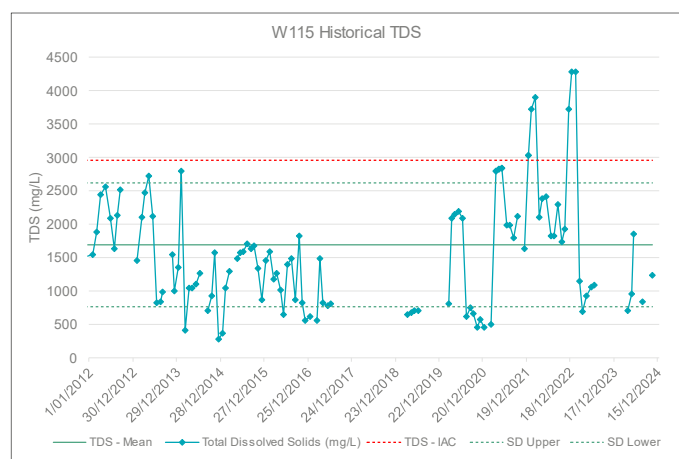


FIGURE B.17: BAYSWATER CREEK (RUM) PH – W10

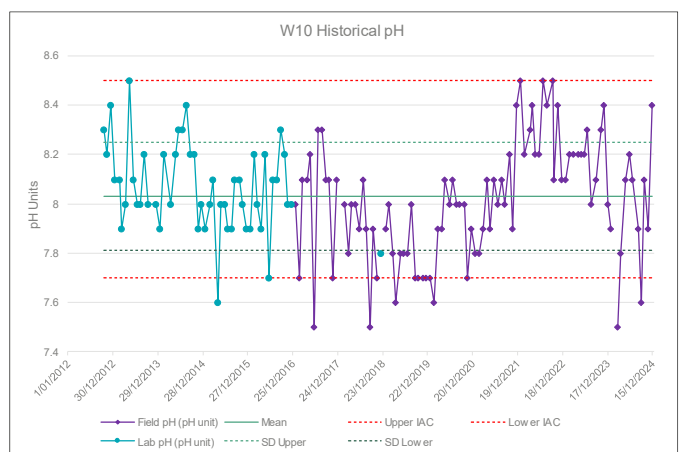


FIGURE B.18: BAYSWATER CREEK (RUM) EC – W10

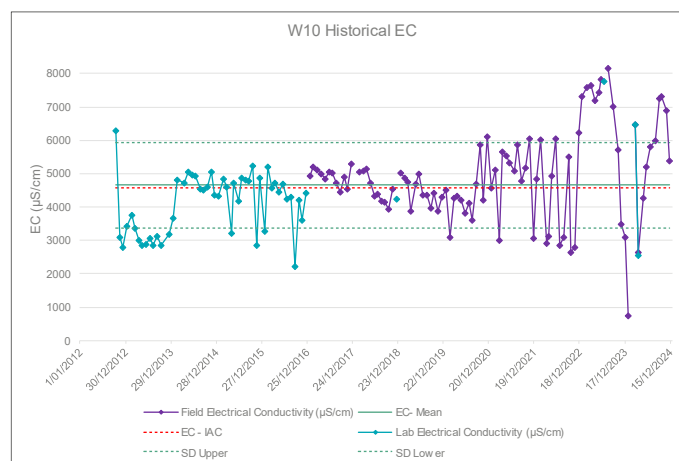


FIGURE B.19: BAYSWATER CREEK (RUM) TSS- W10

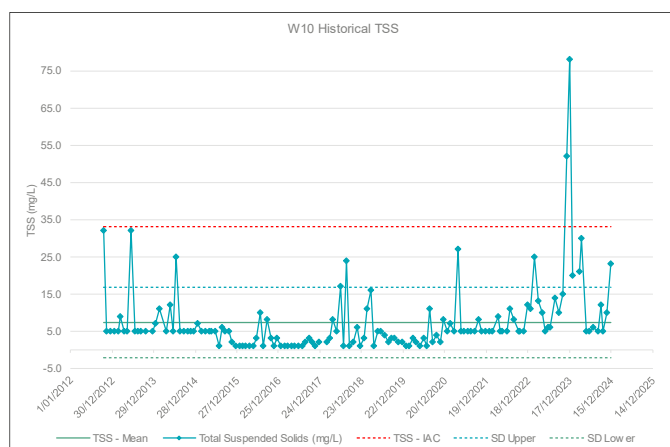


FIGURE B.20: BAYSWATER CREEK (RUM) TDS – W10

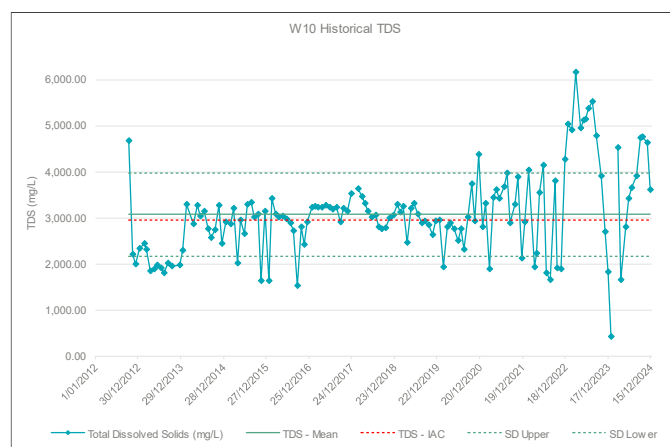


FIGURE B.21: BAYSWATER CREEK (RUM) PH – W11

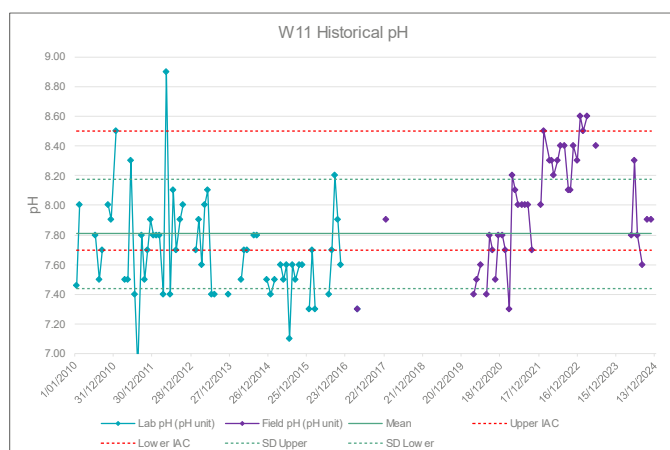


FIGURE B.22: BAYSWATER CREEK (RUM) EC – W11

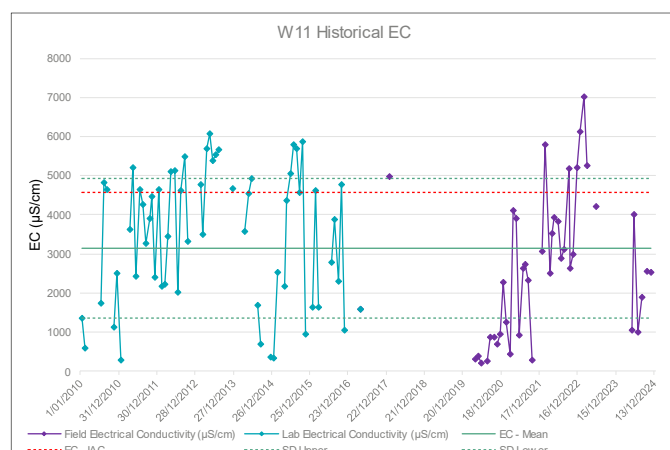


FIGURE B.23: BAYSWATER CREEK (RUM) TSS – W11

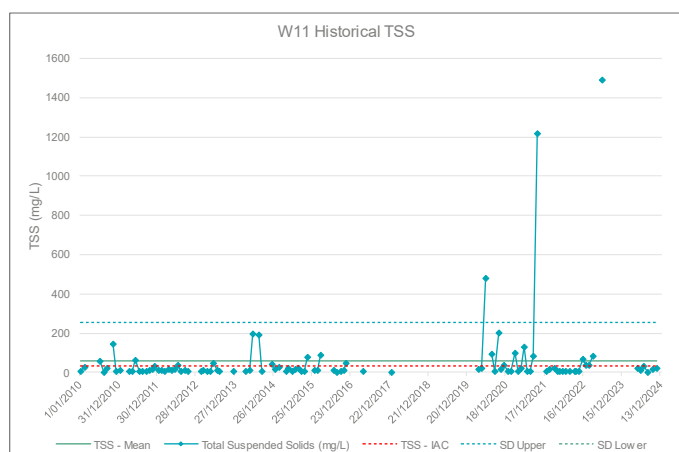


FIGURE B.24: BAYSWATER CREEK (RUM) TDS – W11

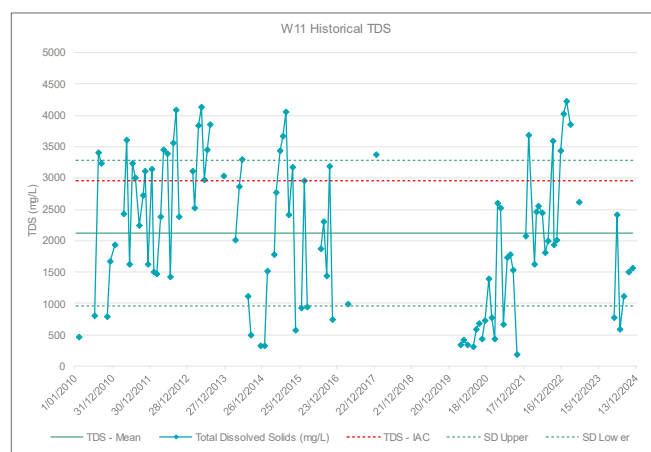


FIGURE B.25: DAVIS CREEK PH – W152

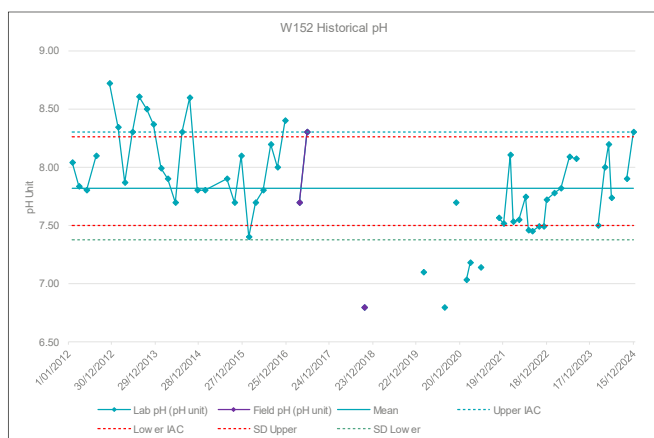


FIGURE B.26: DAVIS CREEK EC – W152

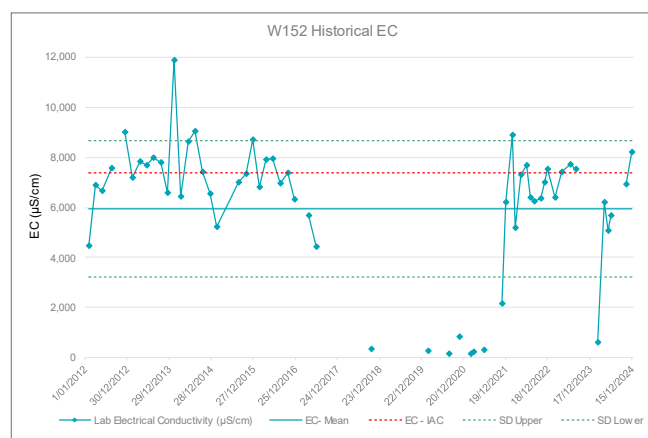


FIGURE B.27: DAVIS CREEK TSS – W152

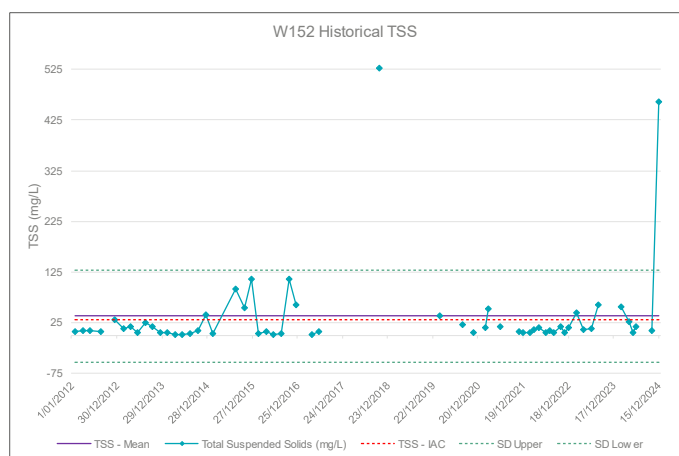


FIGURE B.28: DAVIS CREEK TDS – W152

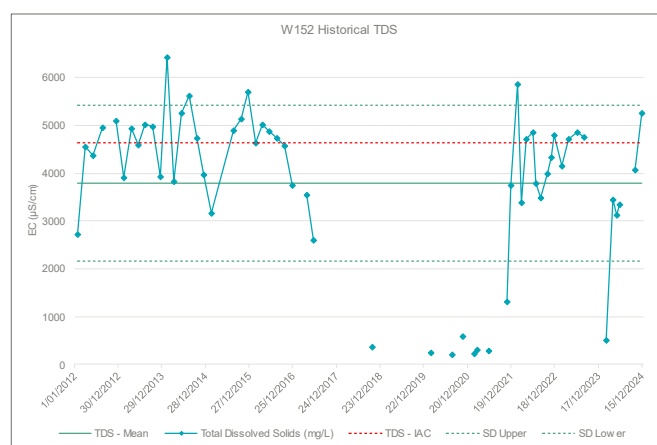


FIGURE B.29: DAVIS CREEK DOWN PH – W164

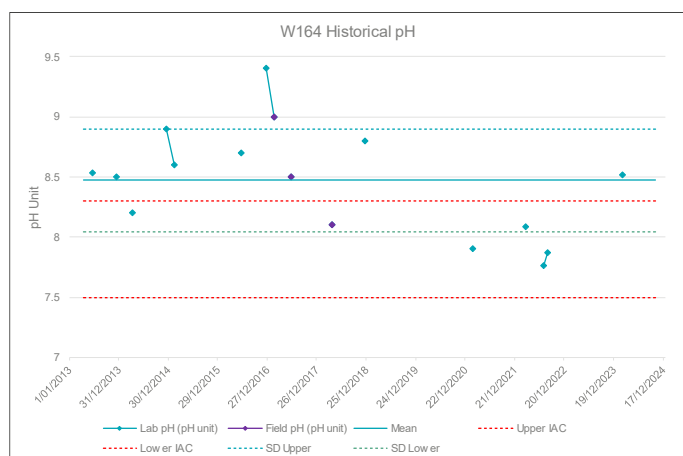


FIGURE B.30: DAVIS CREEK DOWN EC – W164

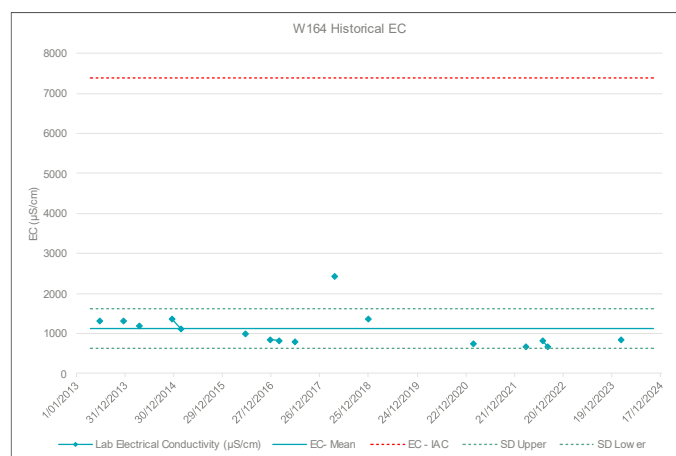


FIGURE B.31: DAVIS CREEK DOWN TSS – W164

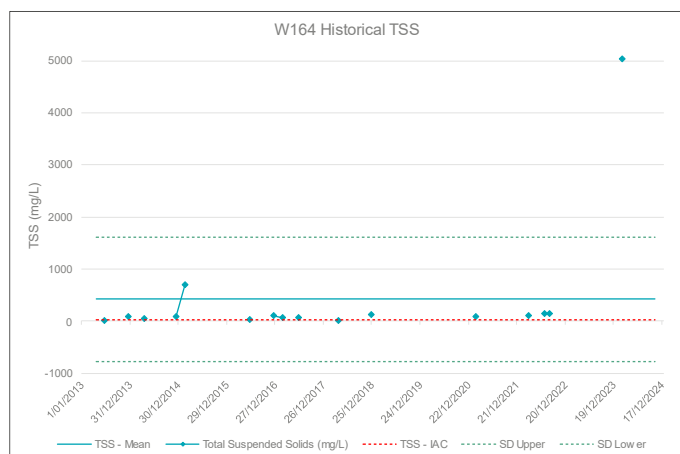


FIGURE B.32: DAVIS CREEK DOWN TDS – W164

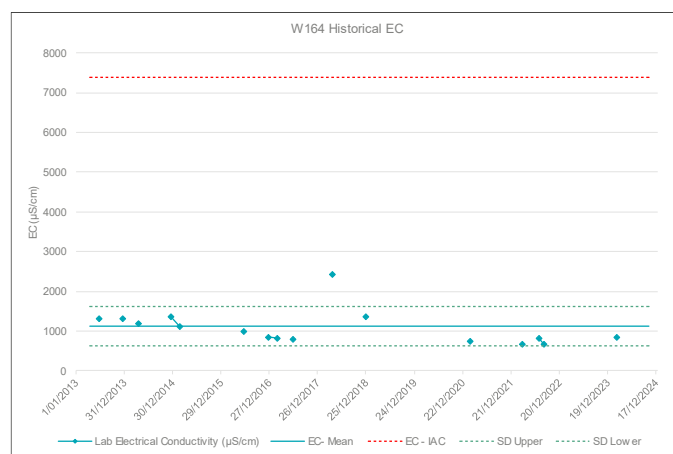


FIGURE B.33: PIKES GULLY PH – W135

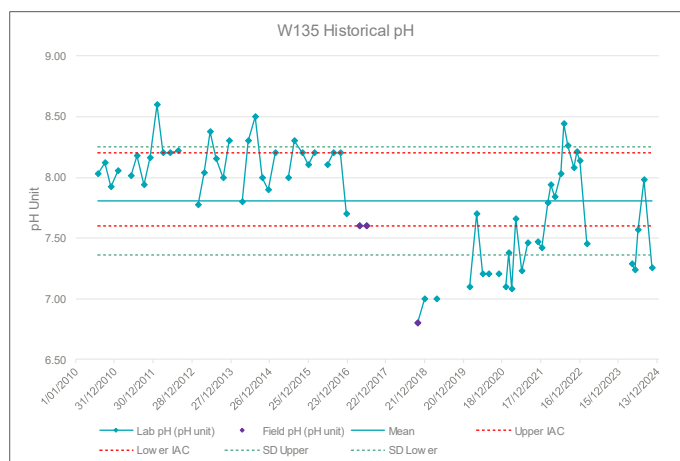


FIGURE B.34: PIKES GULLY EC – W135

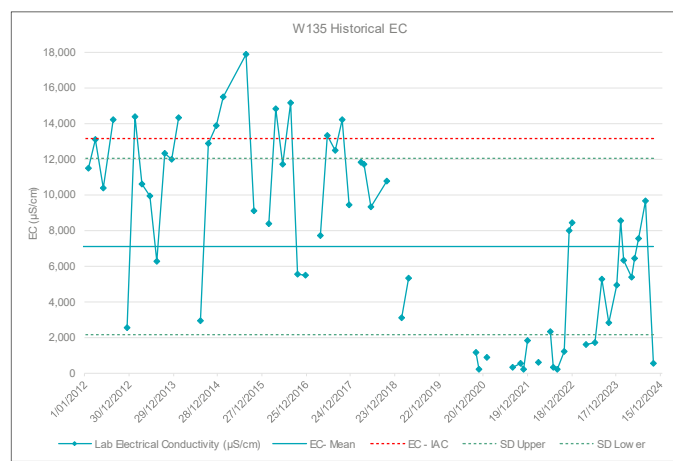


FIGURE B.35: PIKES GULLY TSS – W135

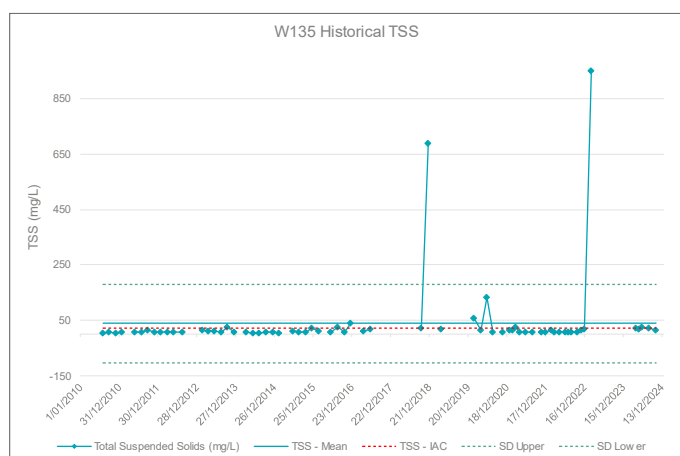


FIGURE B.36: PIKES GULLY TDS – W135

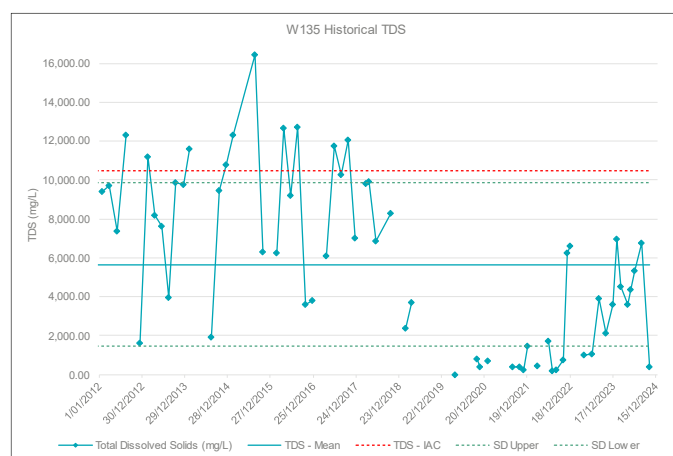


FIGURE B.37: PIKES GULLY PH – W136

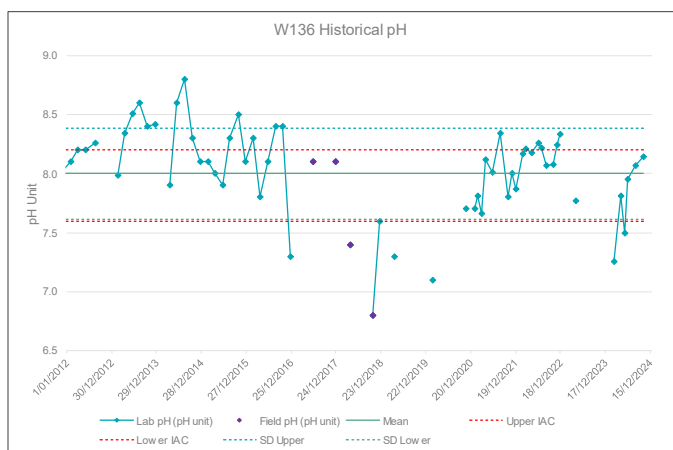


FIGURE B.38: PIKES GULLY EC – W136

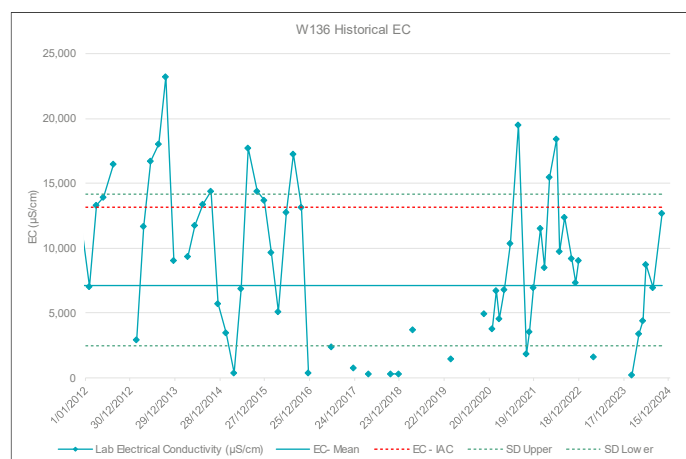


FIGURE B.39: PIKES GULLY TSS – W136

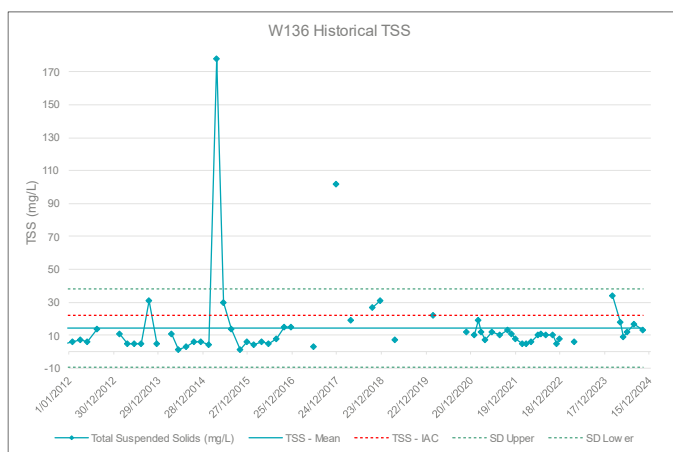


FIGURE B.40: PIKES GULLY TDS – W136

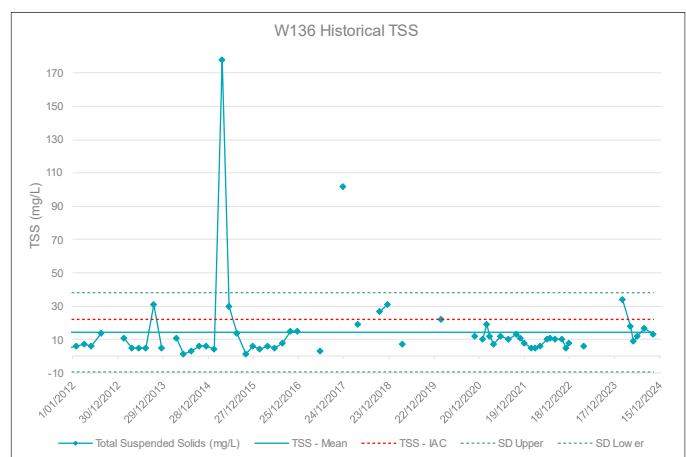


FIGURE B.41: PIKES GULLY PH – W137

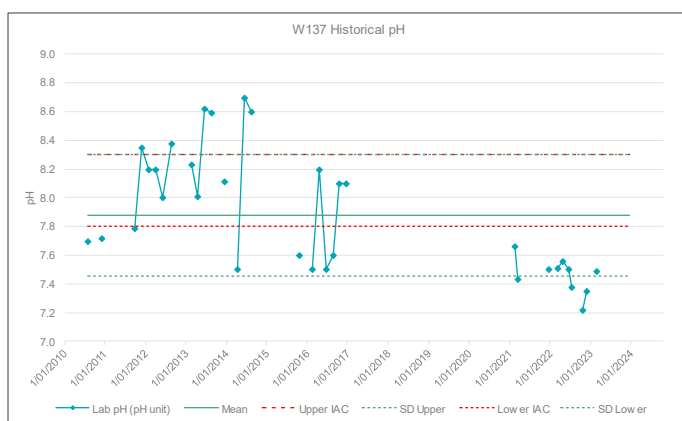


FIGURE B.42: PIKES GULLY EC – W137

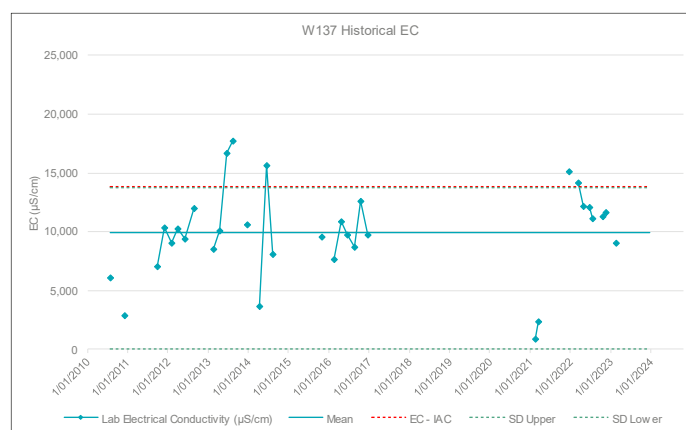


FIGURE B.43: PIKES GULLY TSS – W137

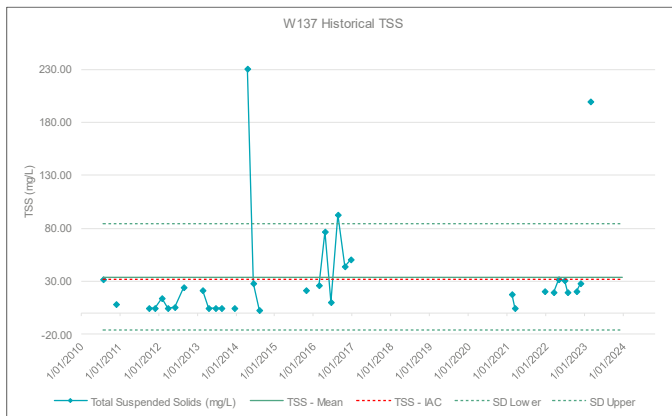
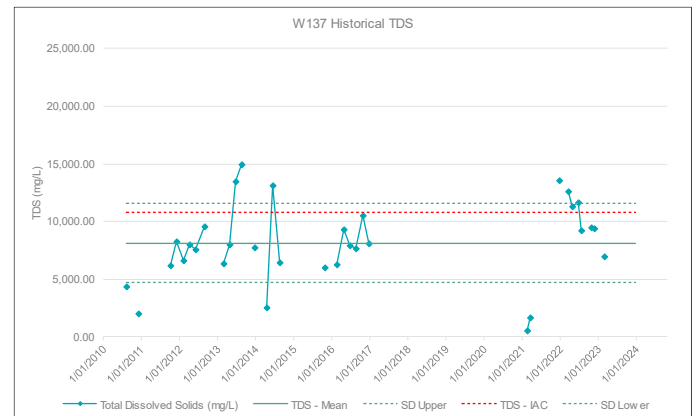


FIGURE B.44: PIKES GULLY TDS – W137



APPENDIX C: GROUNDWATER MONITORING LOCATIONS AND IMPACT ASSESSMENT CRITERIA



TABLE C.1: GROUNDWATER MONITORING LOCATION AND FREQUENCY

Monitoring Location	Target	Monitoring Frequency			
		Water Level	pH	EC	Speciation
Coffey Dam Borehole	Liddell	Monthly	Quarterly	Quarterly	Annually
CS4641C	Pikes Gully	Monthly	Quarterly	Quarterly	Annually
NPZ1 Mid	Bayswater	Monthly	Quarterly	Quarterly	Annually
NPZ1 Tall	Lemington	Monthly	Quarterly	Quarterly	Annually
NPZ2 Tall	Lemington	Monthly	Quarterly	Quarterly	Annually
NPZ5B P1	Broonies	Monthly	Quarterly	Quarterly	Annually
NPZ5B P2	Bayswater Alluvium	Monthly	Quarterly	Quarterly	Annually
NPZ6 Tall	Broonies	Monthly	Quarterly	Quarterly	Annually
NPZ7 Small	Weathered Permian Coal Measures Underlying Hunter River Alluvium	Monthly	Quarterly	Quarterly	Annually
NPZ7 Tall	Bayswater	Monthly	Quarterly	Quarterly	Annually
NPZ7 Mid	Broonies	Monthly	Quarterly	Quarterly	Annually
Borehole P	Liddell	Monthly	Not Sampled	Not Sampled	Not Sampled
WPP1	-	Monthly	Quarterly	Quarterly	Annually
WPP2	-	Monthly	Quarterly	Quarterly	Annually

TABLE C.2: IMPACT ASSESSMENT CRITERIA VALUES FOR SPECIATION DATA FOR SELECT SITES

Site	Parameter	Unit of Measurement	IAC Value 80 th Percentile	IAC Value 20 th Percentile
CS4641C	Sodium	mg/L	1,980	1,820
	Chloride	mg/L	2,482	2,310
NPZ1 Tall	Sodium	mg/L	2,048	1,820
	Chloride	mg/L	2,744	2,225
NPZ2 Tall	Sodium	mg/L	2,178	2,100
	Chloride	mg/L	2,685	2,430
NPZ5B P1	Sodium	mg/L	939	820
	Chloride	mg/L	1,020	830
NPZ7 Small	Sodium	mg/L	1,496	1,300
	Chloride	mg/L	2,492	1,990
NPZ7 Tall	Sodium	mg/L	1,602	1,320
	Chloride	mg/L	2,542	2,099

TABLE C.3: INTERIM IMPACT ASSESSMENT CRITERIA VALUES FOR SPECIATION DATA

Parameter	Unit of Measurement	IAC Value
Sodium	mg/L	300
Sulphate	mg/L	400
Chloride	mg/L	400
Iron	mg/L	0.3
Silver	mg/L	0.05
Aluminium	mg/L	0.2
Barium	mg/L	1
Cadmium	mg/L	0.005
Copper	mg/L	1
Manganese	mg/L	0.1
Nickel	mg/L	0.1
Lead	mg/L	0.05
Selenium	mg/L	0.01
Zinc	mg/L	5
Mercury	mg/L	0.001
Nitrite N	mg/L	1
Nitrate as N	mg/L	10

TABLE C.4: ADOPTED IMPACT ASSESSMENT CRITERIA VALUES FOR WATER QUALITY PARAMETERS

Monitoring Location	Target	Water Quality Parameter	IAC
Coffey Dam Borehole	Liddell	pH	9.2 - 10.0
		EC (µS/cm)	3,160
CS4641C	Pikes Gully	pH	8.8 - 11.9
		EC (µS/cm)	8,900
NPZ1 Mid	Bayswater	pH	6.6 - 6.8
		EC (µS/cm)	15,015
NPZ1 Tall	Lemington	pH	7.0 - 7.3
		EC (µS/cm)	9,736
NPZ2 Tall	Lemington	pH	8.3 - 8.4
		EC (µS/cm)	9,765
NPZ5B P1	Broonies	pH	7.2 - 7.4

Monitoring Location	Target	Water Quality Parameter	IAC
NPZ5B P2	Bayswater Creek Alluvium	EC (µS/cm)	6,340
		pH	7.1 - 7.3
NPZ6 Tall	Broonies	EC (µS/cm)	2,193
		pH	7.5 - 7.7
NPZ7 Small	Hunter River Alluvium	EC (µS/cm)	7,120
		pH	7.3 - 7.4
NPZ7 Tall	Bayswater	EC (µS/cm)	5,259
		pH	7.4 - 7.5
NPZ7 Mid	Broonies	EC (µS/cm)	8,678
		pH	7.3 - 7.7
WPP1	-	EC (µS/cm)	8,446
		pH	7.0 - 7.1
WPP2	-	EC (µS/cm)	8,604
		pH	7.0 - 7.3
		EC (µS/cm)	9,352

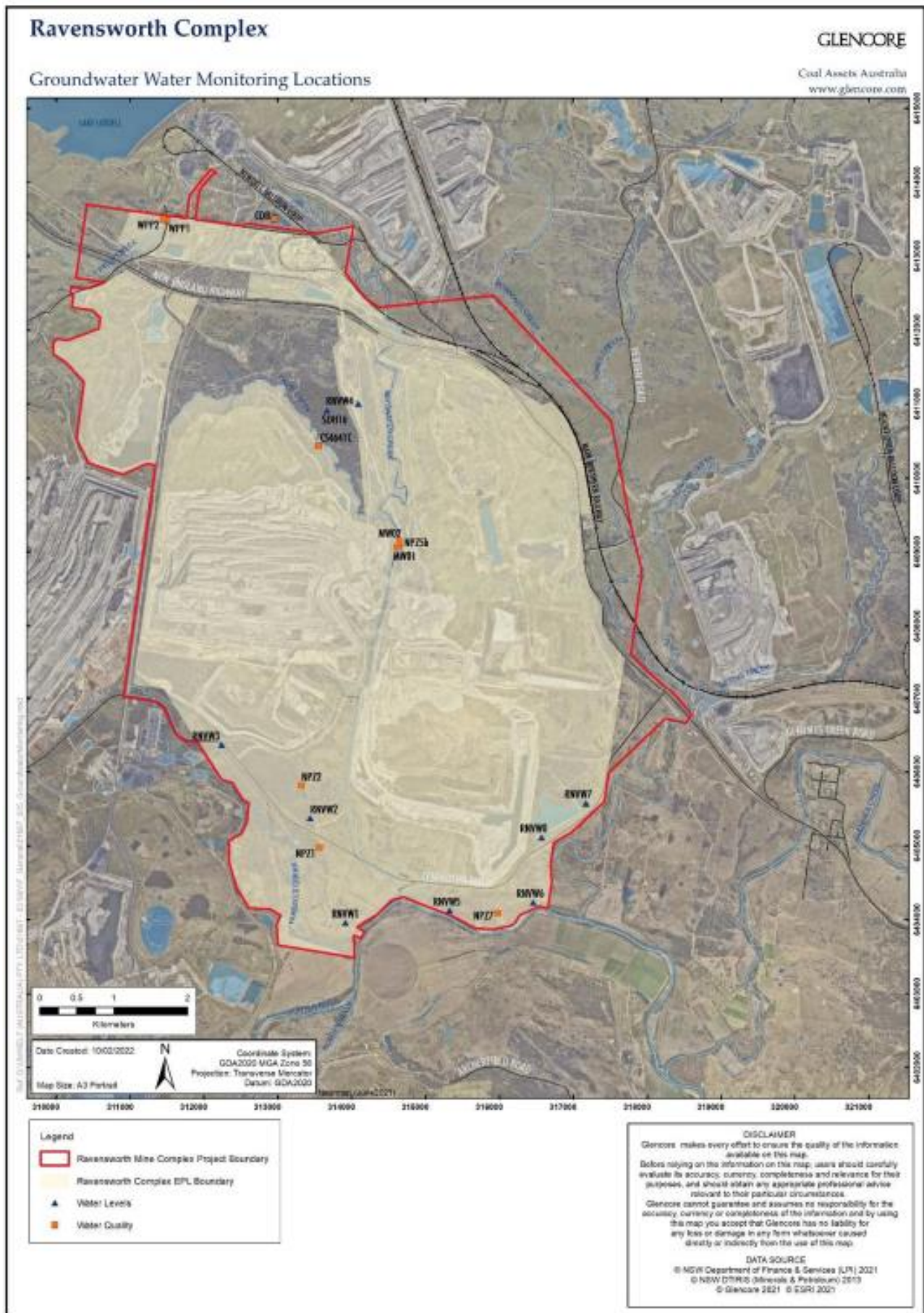


FIGURE C.1: GROUNDWATER MONITORING LOCATIONS FROM 2024 WATER MANAGMENT PLAN

APPENDIX D: GROUNDWATER QUALITY MONITORING RESULTS



TABLE D.1: SUMMARY OF GROUNDWATER PH AND EC RESULTS - 2024

Monitoring Location	Target	pH			Electrical Conductivity			No. of samples
		Min	Max	Mean	Min	Max	Mean	
Coffey Dam Borehole	Liddell	7.1	7.2	7.18	6,290	6,530	6,497	6
CS4641C	Pikes Gully	-	-	-	-	-	-	0
NPZ1 Mid	Bayswater	-	-	-	-	-	-	0
NPZ1 Tall	Lemington	7.2	7.4	7.3	7,480	7,760	7,567	6
NPZ2 Tall	Lemington	8.3	8.4	8.4	1,004	9,870	6,893	6
NPZ5B P1	Broonies	7.4	8.0	7.6	969	1,236	1,109	10
NPZ5B P2	Bayswater Creek Alluvium	6.8	7.7	7.0	6,040	7,030	6,788	10
NPZ6 Tall	Broonies	7.6	8.2	7.8	6,860	7,180	7,038	10
NPZ7 Small	Hunter River Alluvium	7.2	7.4	7.3	2,050	4,600	3,707	6
NPZ7 Tall	Bayswater	7.2	7.5	7.3	5,190	5,600	5,402	6
NPZ7 Mid	Broonies	-	-	-	-	-	-	0
WPP1	Cumnock	7.0	7.5	7.2	7,820	8,560	8,120	6
WPP2	Cumnock	7.0	7.5	7.3	9,510	10,140	9,882	6

The 2024 groundwater monthly water quality monitoring results for pH and EC are presented in Tables D.2 to D.3, respectively. Table D.4 represents the 2024 groundwater speciation results.

Figures D.1 to D.6 present historical pH and EC results for all current and decommissioned monitoring bores. Historical pH and EC results for current monitoring bores are presented in Figures D.7 to D.32 with the mean and standard deviation for each bore shown on each figure. The mean and standard deviation values shown on these figures are based on historical monitoring data from January 2010 to December 2024, as made available through the Glencore Environmental Monitoring Database.

Tables D.2 – D.3 contain the following formatting:

	Indicates non-sampling month.
XXX	Indicates a value that has exceeded the IAC range

TABLE D.2: RAVENSWORTH OPERATIONS GROUNDWATER PH FOR 2024

Target	Borehole	IAC	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24
Liddell	Coffey Dam Borehole	9.2 - 10		7.1		7.2		7.2		7.2		7.2		7.2
Pikes Gully	CS4641C	8.8 - 11.9	Insufficient water to obtain sample.											
Bayswater	NPZ1 Mid	6.6 - 6.8	Blocked											
Lemington	NPZ1 Tall	7 - 7.3		7.2		7.2		7.4		7.4		7.3		7.2
Lemington	NPZ2 Tall	8.3 - 8.4		8.3		8.3		8.4		8.4		8.4		8.4
Broonies	NPZ5B P1	7.2 - 7.4		7.4	7.4	7.5	7.6	7.7	7.6	7.6	7.5	7.6		8.0
Bayswater Creek Alluvium	NPZ5B P2	7.1 - 7.3		6.8	6.8	6.9	6.9	7	7	7	6.9	7		7.7
Broonies	NPZ6 Tall	7.5 - 7.7		7.7	7.7	7.8	7.7	7.8	7.9	7.8	7.6	7.6		8.2
Weathered Coal Measures	NPZ7 Small	7.3 - 7.4		7.3		7.3		7.2		7.3		7.2		7.4
Bayswater	NPZ7 Tall	7.4 - 7.5		7.3		7.2		7.4		7.5		7.2		7.3
Broonies	NPZ7 Mid	7.3 - 7.7	Blocked											
Cumnock	WPP1	7 - 7.1		7		7		7.3		7.3		7.5		7.1
Cumnock	WPP2	7 - 7.3		7		7		7.5		7.4		7.4		7.5

TABLE D.3: RAVENSWORTH OPERATIONS GROUNDWATER EC FOR 2024

Target	Borehole	IAC	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24
Liddell	Coffey Dam Borehole	3160		6,290		6,480		6,490		6,490		6,530		6,700
Pikes Gully	CS4641C	8900	Not sampled in 2024											
Bayswater	NPZ1 Mid	15015	Blocked											
Lemington	NPZ1 Tall	9736		7,520		7,660		7,490		7,480		7,490		7,760
Lemington	NPZ2 Tall	9765		9,740		9,870		9,840		9,790		1,004		1,113
Broonies	NPZ5B P1	6340		1,140	1,088	1,187	1,112	969	1,091	9,70	1,151	1,142		1,236
Bayswater Creek Alluvium	NPZ5B P2	2193		7,030	6,040	6,850	7,000	6,710	6,770	6,740	6,830	7,010		6,900
Broonies	NPZ6 Tall	7120		7,100	6,890	7,120	7,120	6,880	6,970	6,860	7,180	7,080		7,180
Weathered Coal Measures	NPZ7 Small	5259		4,190		4,280		4,510		4,600		2,610		2,050
Bayswater	NPZ7 Tall	8678		5,400		5,510		5,280		5,190		5,430		5,600
Broonies	NPZ7 Mid	8446	Blocked											
Cumnock	WPP1	8604		7,820		8,270		8,000		8,060		8,010		8,560
Cumnock	WPP2	9352		9,510		10,130		9,720		9,690		10,100		10,140

TABLE D.4: RAVENSWORTH OPERATIONS GROUNDWATER SPECIATION FOR 2024

Analysis	Interim IAC (ANZECC)	LIDDELL SEAM		BROONIES SEAM				ALLUVIUM & WEATHERED COAL MEASURES			
		COFFEE DAM BOREHOLE		NPZ6 Tall		NPZ5B P1		NPZ7 Small		NPZ5B P2	
		Apr-24	Oct-24	Apr-24	Oct-24	Apr-24	Oct-24	Apr-24	Oct-24	Apr-24	Oct-24
Field Ph	6.5 - 8.5	7.2	7.2	7.8	7.6	7.5	7.6	7.3	7.2	6.9	7
Field Conductivity (µS/cm)	X	6480	6530	7120	7080	1187	1142	4280	2610	6850	7010
Calcium (mg/L)	X	130	167	17	16	101	85	44	32	309	291
Magnesium (mg/L)	X	200	206	5	5	70	82	69	35	228	221
Sodium (mg/L)	300	1120	1160	1500	1620	45	41	749	326	845	918
Potassium (mg/L)	X	16	17	7	8	5	3	13	25	9	9
Hydroxide Alkalinity as CaCO3	X	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Carbonate Alkalinity as CaCO3	X	<1.00	<1.00	26	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Bicarbonate Alkalinity as CaCO3	X	1200	1130	1000	1040	379	377	573	315	745	790
Alkalinity as CaCO3 (mg/L)	X	1200	1130	1030	1040	379	377	573	315	745	790
Sulfate (mg/L)	400	734	1150	<10.00	<1.00	187	110	32	50	588	533
Chloride (mg/L)	400	1030	974	1670	1690	32	33	1050	433	1570	1370
Hexavalent Chromium (mg/L)	X	\	\	\	\	\	\	\	\	\	\
Reactive Silica (mg/L)	X	18	17	27	27	29	24	17	20	39	37
Ammonia as N (mg/L)	X	1.98	2.24	2.13	2.3	0.01	0.07	3.99	7.19	0.41	0.35
Nitrite as N (mg/L)	1	<0.01	<0.01	<0.01	0.01	0.01	0.02	0.01	<0.01	<0.01	0.01
Nitrate as N (mg/L)	10	<0.01	0.01	0.15	0.08	19.8	14.1	0.03	0.05	0.18	0.23
Nitrite + Nitrate as N (mg/L)	X	<0.01	0.01	0.15	0.09	19.8	14.1	0.04	0.05	0.18	0.24
TKN as N (mg/L)	X	2.8	2.4	5.6	4.8	3.6	2.7	4.8	9.2	2.9	1.6
Total Nitrogen as N (mg/L)	X	2.8	2.4	5.8	4.9	23.4	16.8	4.8	9.2	3.1	1.8
Total Cations (meq/L)	X	72.1	76.2	66.7	71.9	11.8	12.8	40.8	19.3	61.7	72.9
Total Anions (meq/L)	X	68.3	74	67.7	68.4	12.4	10.8	41.7	19.5	69.2	65.5
Zinc (µg/L)	5000	<5.000	<5.000	<5.000	<5.000	45	42	<5.000	<5.000	33	13
Silver (µg/L)	50	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000
Selenium (µg/L)	10	<10.000	<10.000	<10.000	<10.000	<10.000	<10.000	<10.000	<10.000	<10.000	<10.000
Nickel (µg/L)	100	3	4	<1.000	2	2	2	2	6	8	6
Mercury (µg/L)	1	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Manganese (µg/L)	100	101	181	90	100	5	6	114	210	1460	1230
Lead (µg/L)	50	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000
Iron (µg/L)	300	770	690	300	380	<50.000	<50.000	<50.000	<50.000	780	790
Copper (µg/L)	1000	2	<1.000	<1.000	<1.000	19	8	<1.000	<1.000	<1.000	<1.000
Cadmium (µg/L)	5	<0.100	<0.100	<0.100	<0.100	0.1	<0.100	<0.100	<0.100	<0.100	<0.100
Barium (µg/L)	1000	36	30	258	254	102	58	291	110	219	219
Antimony (µg/L)	X	<1.000	<1.000	1	5	2	5	<1.000	4	3	2
Aluminium (µg/L)	200	<10.000	<10.000	<10.000	<10.000	<10.000	<10.000	<10.000	<10.000	<10.000	<10.000
Site Specific IAC for pH		9.2 - 10		7.5 - 7.7		7.2 - 7.4		7.3 - 7.4		7.1 - 7.3	
Site Specific IAC for EC (µS/cm)		3,160		7,120		6,340		5,259		2,193	

Analysis	Interim IAC (ANZECC)	LIDDELL SEAM		BROONIES SEAM				ALLUVIUM & WEATHERED COAL MEASURES			
		COFFEE DAM BOREHOLE		NPZ6 Tall		NPZ5B P1		NPZ7 Small		NPZ5B P2	
		Apr-24	Oct-24	Apr-24	Oct-24	Apr-24	Oct-24	Apr-24	Oct-24	Apr-24	Oct-24
Site Specific IAC for Sodium (mg/L)		N/A		N/A		820 - 939		1,300 – 1,496		N/A	
Site Specific IAC for Chloride (mg/L)		N/A		N/A		830 – 1,020		1,990 - 2492		N/A	

TABLE D.5: RAVENSWORTH OPERATIONS GROUNDWATER SPECIATION FOR 2024 - CONTINUED

Analysis	Interim IAC (ANZECC)	BAYSWATER SEAM				LEMINGTON SEAM				CUMNOCK OPEN CUT	
		NPZ7 Tall		NPZ1 Tall		NPZ2 Tall		WPP1		WPP2	
		Apr-24	Oct-24	Apr-24	Oct-24	Apr-24	Oct-24	Apr-24	Oct-24	Apr-24	Oct-24
Field Ph	6.5-8.5	7.2	7.2	7.2	7.3	8.3	8.4	7	7.5	7	7.4
Field Conductivity (µS/cm)	X	5510	5430	7660	7490	9870	1004	8270	8010	10130	10100
Calcium (mg/L)	X	52	75	18	17	24	23	295	307	271	296
Magnesium (mg/L)	X	86	93	9	8	8	8	457	476	485	517
Sodium (mg/L)	300	974	999	1740	1760	2270	2240	1180	1220	1730	1860
Potassium (mg/L)	X	9	9	10	8	14	12	6	6	14	15
Hydroxide Alkalinity as CaCO3	X	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Carbonate Alkalinity as CaCO3	X	<1.00	<1.00	<1.00	<1.00	82	95	<1.00	<1.00	<1.00	<1.00
Bicarbonate Alkalinity as CaCO3	X	664	620	1270	1180	1420	1300	895	833	958	926
Alkalinity as CaCO3 (mg/L)	X	664	620	1270	1180	1500	1390	895	833	958	926
Sulfate (mg/L)	400	166	233	<10.00	<10.00	<10.00	<10.00	3130	3260	3628	4060
Chloride (mg/L)	400	1360	1270	1790	1710	2580	2470	844	767	1028	918
Hexavalent Chromium (mg/L)	X	\	\	\	\	\	\	\	\	\	\
Reactive Silica (mg/L)	X	10	21	27	26	27	25	382	36	232	41
Ammonia as N (mg/L)	X	3.07	3.54	8.19	6.52	4.02	4.43	0.11	0.12	0.18	0.08
Nitrite as N (mg/L)	1	<0.01	<0.01	0.03	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate as N (mg/L)	10	0.03	<0.01	0.12	0.37	0.02	<0.01	0.49	0.12	0.05	0.22
Nitrite + Nitrate as N (mg/L)	X	0.03	<0.01	0.15	0.39	0.02	<0.01	0.49	0.12	0.05	0.22
TKN as N (mg/L)	X	4.5	4	10.8	7.4	5.3	5.4	0.2	0.4	3.2	0.2
Total Nitrogen as N (mg/L)	X	4.5	4	11	7.8	5.3	5.4	0.7	0.5	3.2	0.4
Total Cations (meq/L)	X	52.3	55.1	77.6	78.3	101	99.5	104	108	129	139
Total Anions (meq/L)	X	55.1	53.1	75.9	71.8	103	97.4	107	106	122	129
Zinc (µg/L)	5000	8	<5.000	16	8	15	<5.000	57	10	27	5
Silver (µg/L)	50	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000
Selenium (µg/L)	10	<10.000	<10.000	<10.000	<10.000	<10.000	<10.000	<10.000	<10.000	<10.000	<10.000
Nickel (µg/L)	100	4	<1.000	2	2	1	<1.000	5	3	6	6
Mercury (µg/L)	1	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Manganese (µg/L)	100	56	38	132	131	68	62	211	7	186	24
Lead (µg/L)	50	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000
Iron (µg/L)	300	50	<50.000	590	1300	100	90	830	<50.000	180	<50.000
Copper (µg/L)	1000	<1.000	<1.000	1	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000	<1.000

Analysis	Interim IAC (ANZECC)	BAYSWATER SEAM				LEMINGTON SEAM				CUMNOCK OPEN CUT	
		NPZ7 Tall		NPZ1 Tall		NPZ2 Tall		WPP1		WPP2	
		Apr-24	Oct-24	Apr-24	Oct-24	Apr-24	Oct-24	Apr-24	Oct-24	Apr-24	Oct-24
Cadmium (µg/L)	5	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Barium (µg/L)	1000	404	371	342	424	1340	1280	32	17	22	21
Antimony (µg/L)	X	3	<1.000	1	2	1	2	<1.000	<1.000	<1.000	<1.000
Aluminium (µg/L)	200	<10.000	<10.000	20	<10.000	<10.000	<10.000	<10.000	<10.000	<10.000	<10.000
Site Specific IAC for pH		7.4 - 7.5		7 - 7.3		8.3 - 8.4		7 - 7.1		7 - 7.3	
Site Specific IAC for EC (µS/cm)		8,678		9,736		9,765		8,604		9,352	
Site Specific IAC for Sodium (mg/L)		1,320 – 1,602		1,820 – 2,048		2,100 – 2,178		N/A		N/A	
Site Specific IAC for Chloride (mg/L)		2,099 - 2,542		2,225 – 2,744		2,430 – 2,685		N/A		N/A	

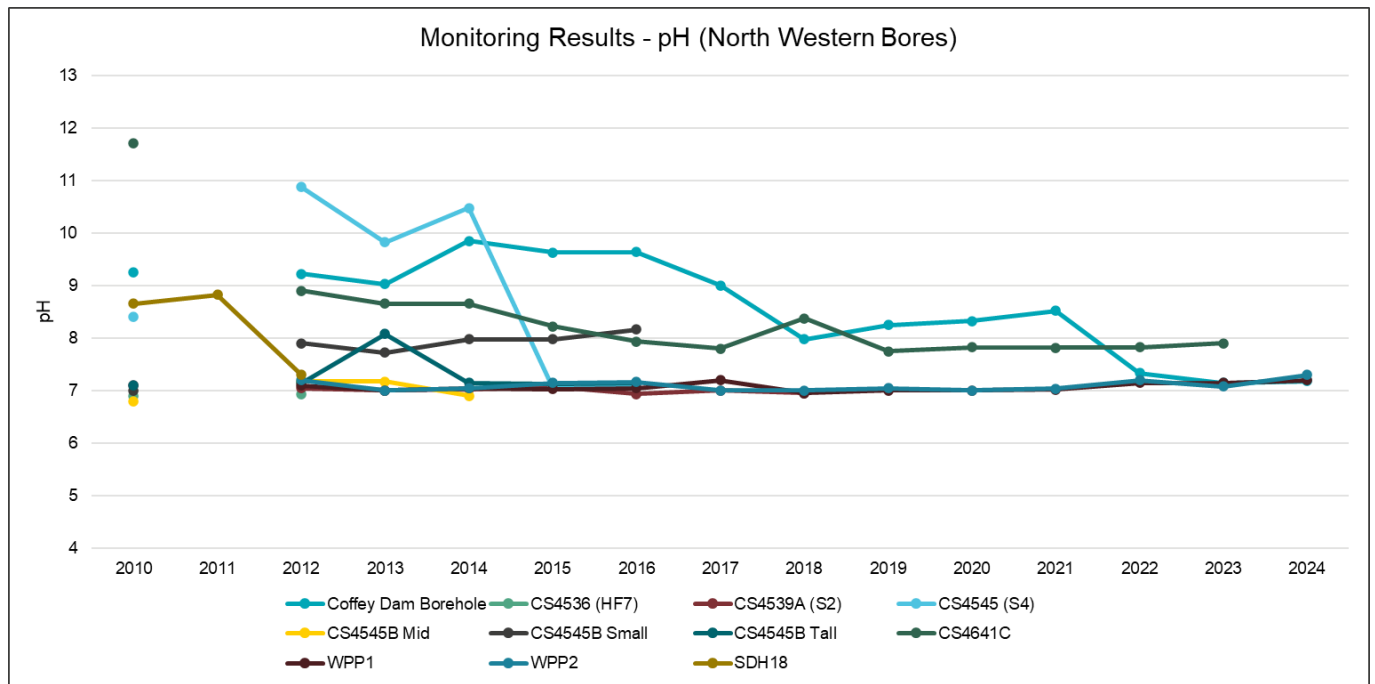


FIGURE D.1: RAVENSWORTH OPERATIONS GROUNDWATER HISTORICAL AVERAGE PH (NORTHWESTERN BORES)

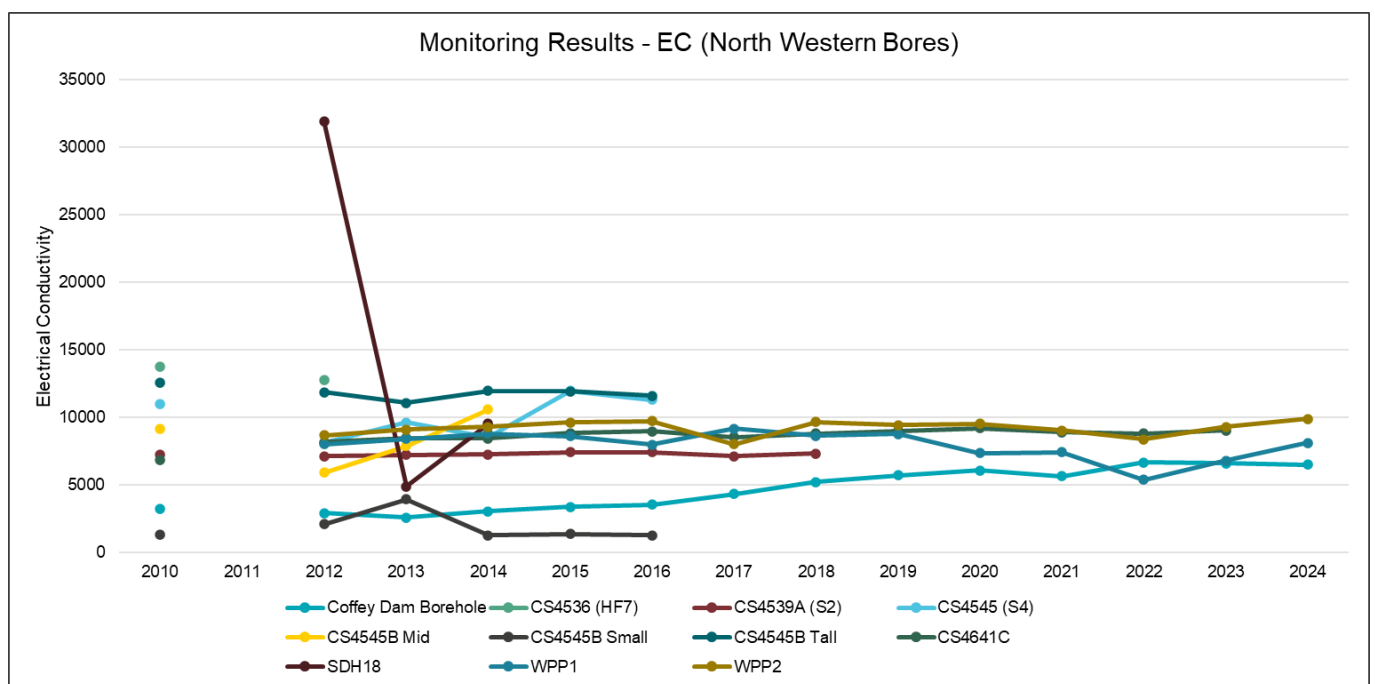


FIGURE D.2: RAVENSWORTH OPERATIONS GROUNDWATER HISTORICAL AVERAGE EC (NORTHWESTERN BORES)

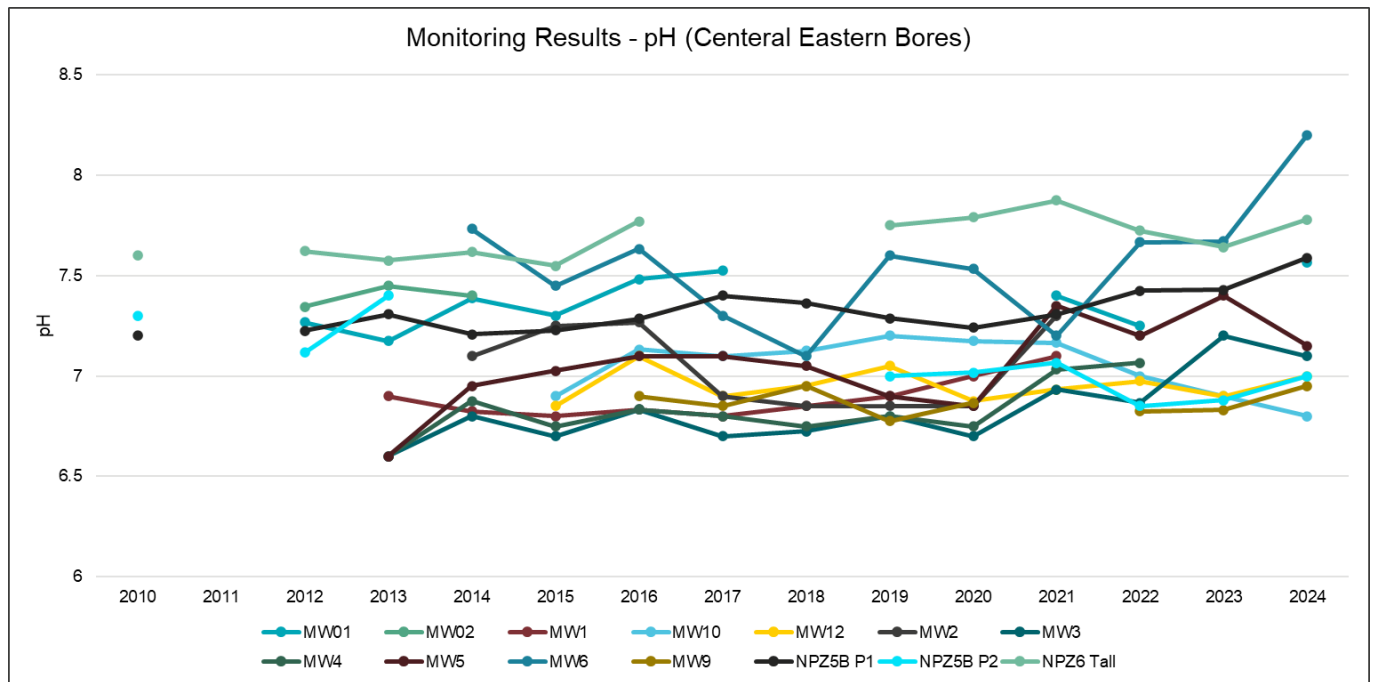


FIGURE D.3: RAVENSWORTH OPERATIONS GROUNDWATER HISTORICAL AVERAGE PH (CENTRAL EASTERN BORES)

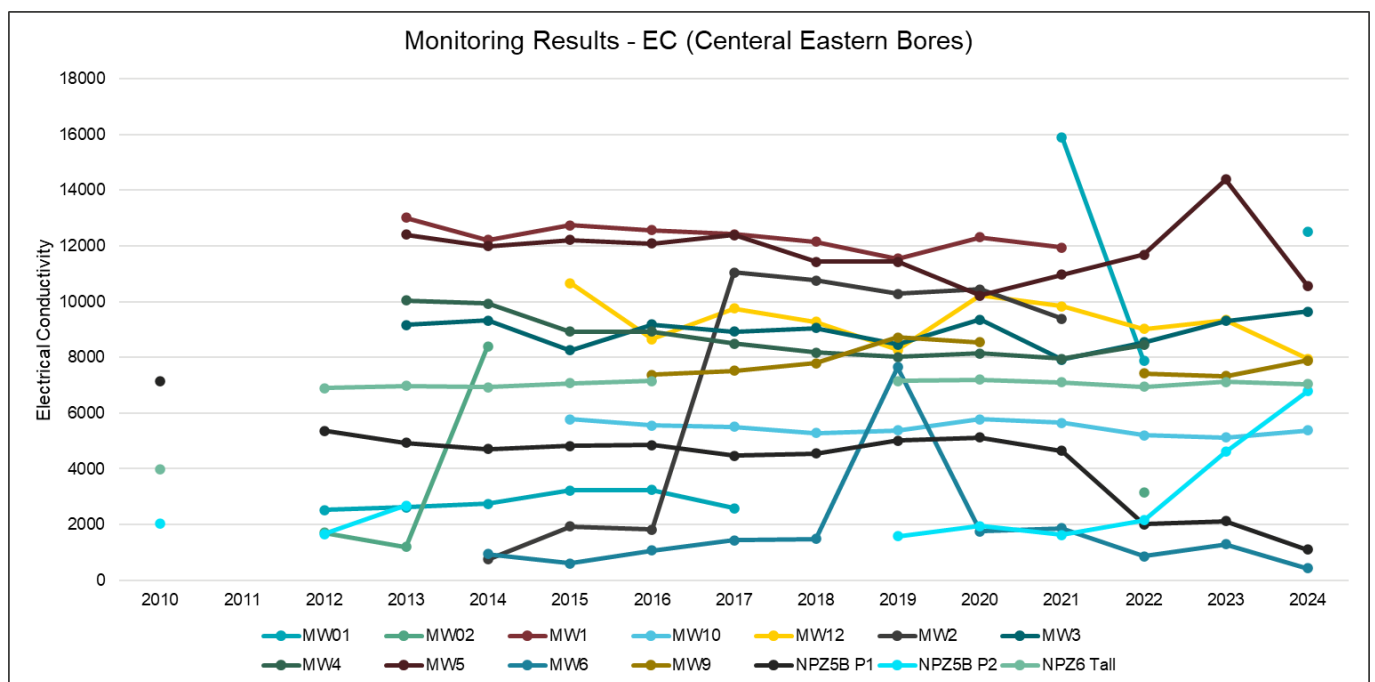


FIGURE D.4: RAVENSWORTH OPERATIONS GROUNDWATER HISTORICAL AVERAGE EC (CENTRAL EASTERN BORES)

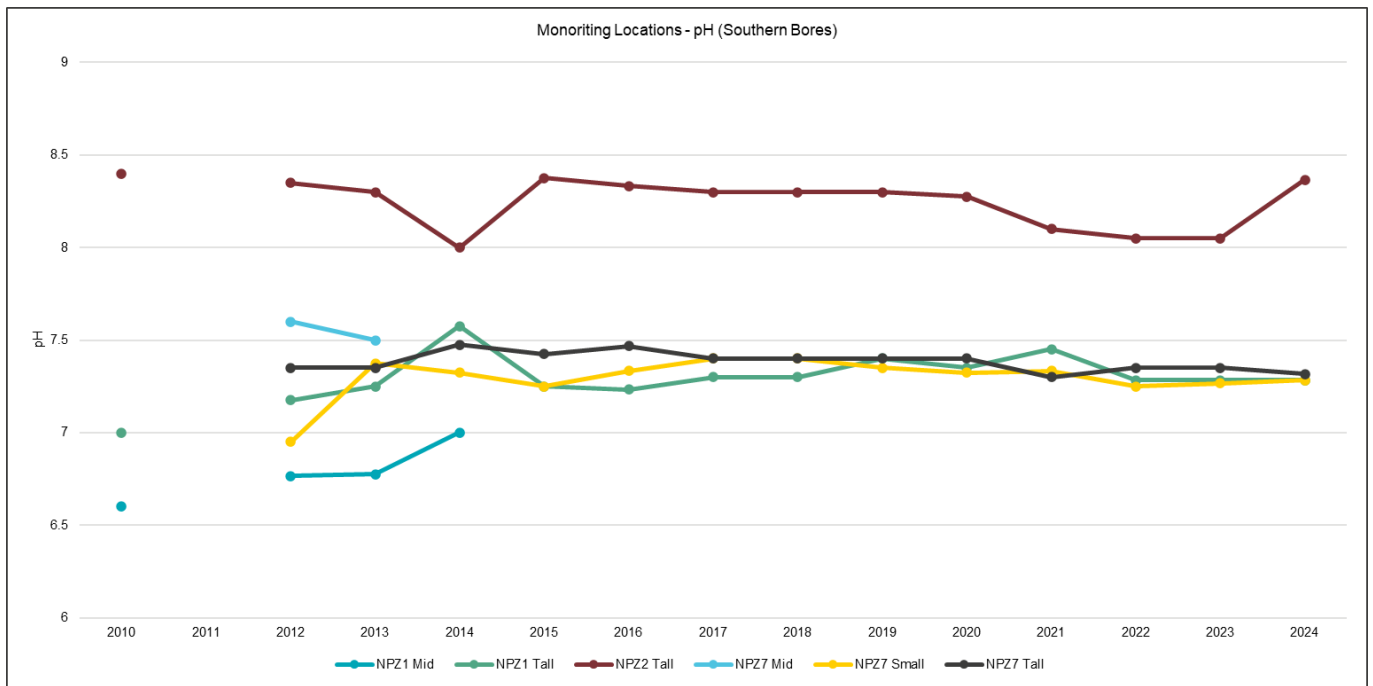


FIGURE D.5: RAVENSWORTH OPERATIONS GROUNDWATER HISTORICAL AVERAGE PH (SOUTHERN BORES)

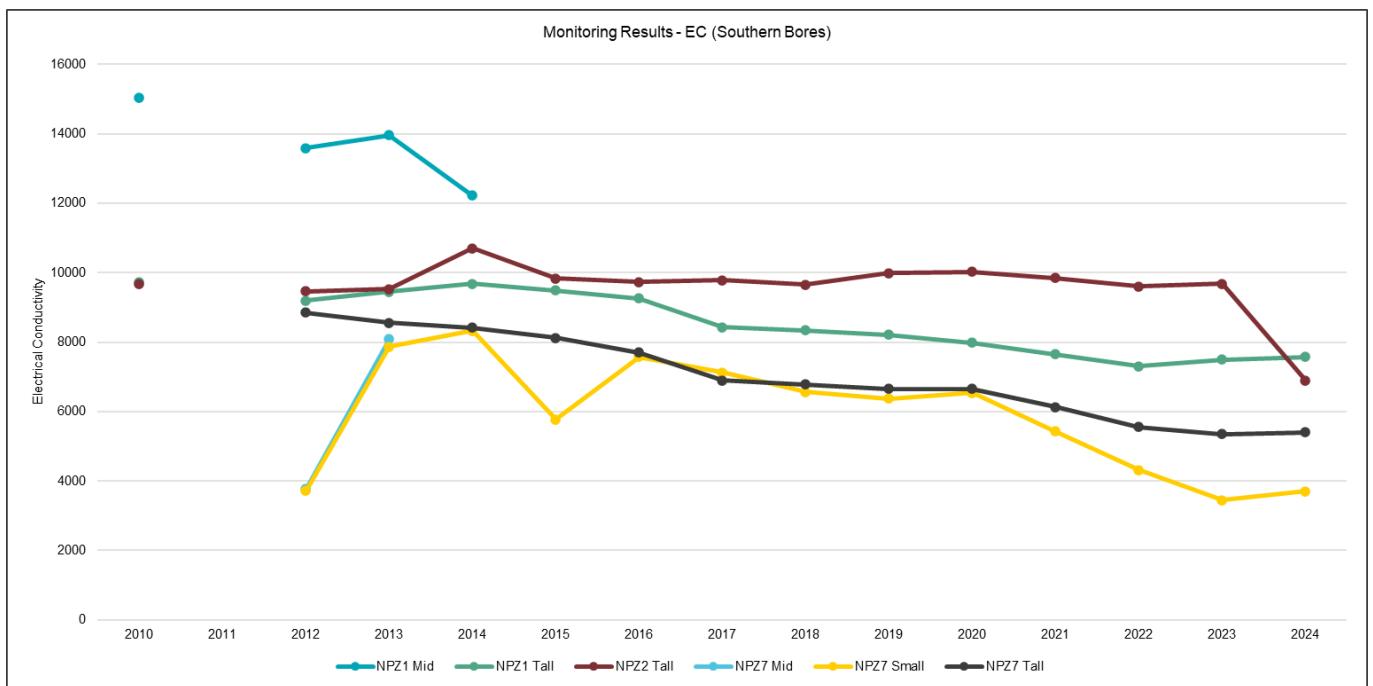


FIGURE D.6: RAVENSWORTH OPERATIONS GROUNDWATER HISTORICAL AVERAGE EC (SOUTHERN BORES)

Note: available data switched from “lab” results to “field” results in approximately 2017. This change is shown on the below graphs. Mean and standard deviation values were calculated from all historical field and lab values.

FIGURE D.7: COFFEY DAM HISTORICAL PH

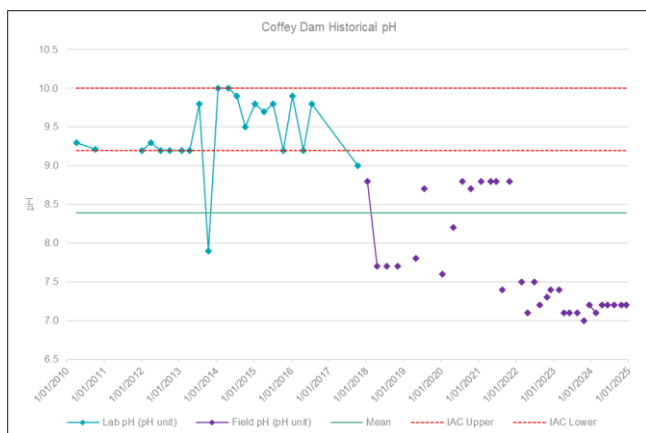


FIGURE D.8: COFFEY DAM HISTORICAL EC

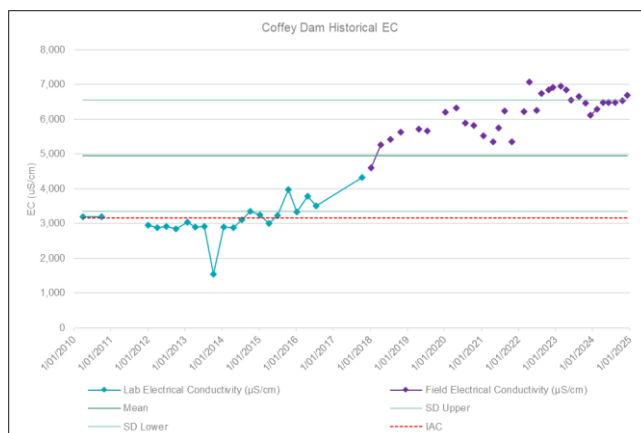


FIGURE D.9: CS4641C HISTORICAL PH

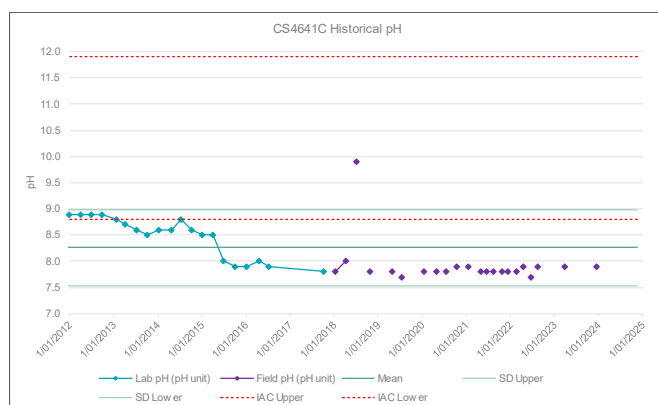


FIGURE D.10: CS4641C HISTORICAL EC

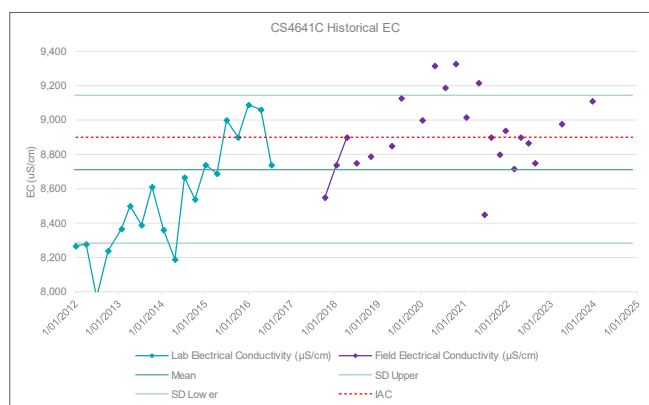


FIGURE D.11: NPZ1 MID HISTORICAL PH

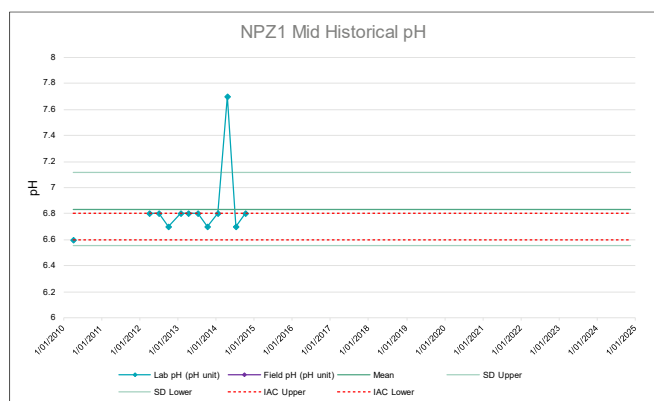


FIGURE D.12: NPZ1 MID HISTORICAL EC

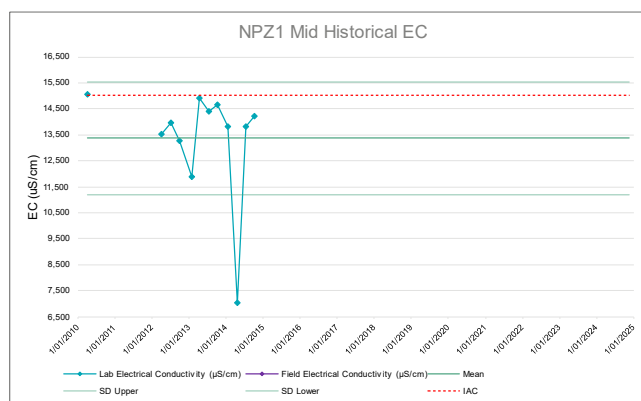


FIGURE D.13: NPZ1 TALL HISTORICAL PH

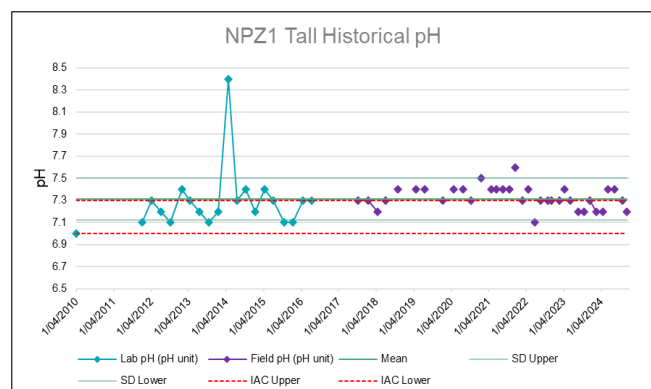


FIGURE D.14: NPZ1 TALL HISTORICAL EC

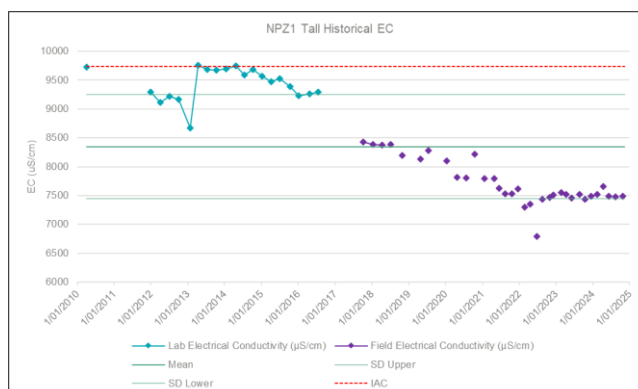


FIGURE D.15: NPZ2 TALL HISTORICAL PH

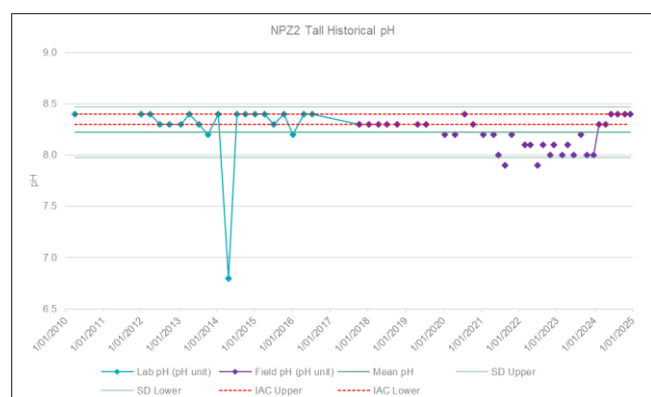


FIGURE D.16: NPZ2 TALL HISTORICAL EC

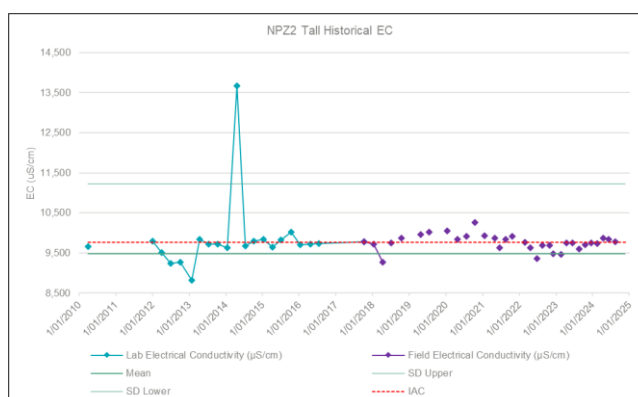


FIGURE D.17: NPZ5B P1 HISTORICAL PH

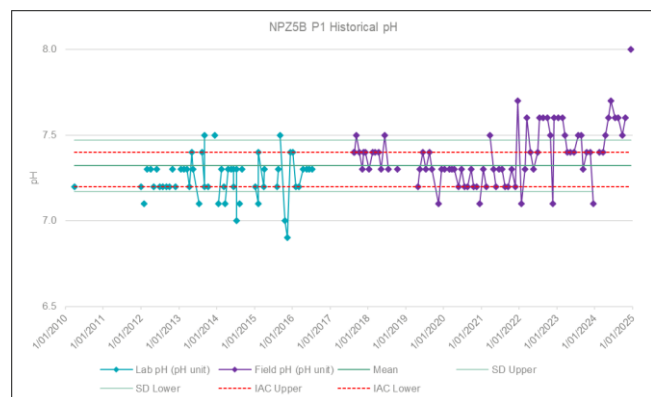


FIGURE D.18: NPZ5B P1 HISTORICAL EC

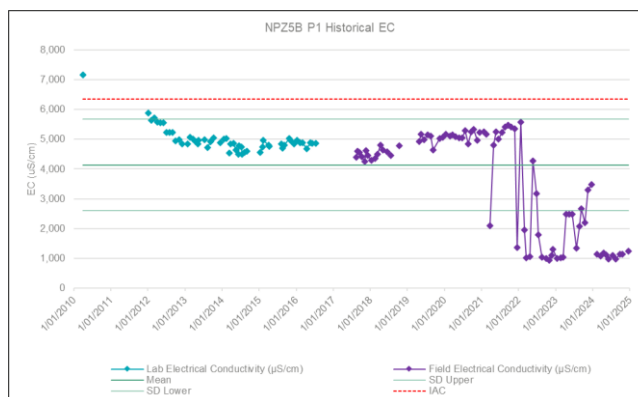


FIGURE D.19: NPZ5B P2 HISTORICAL PH

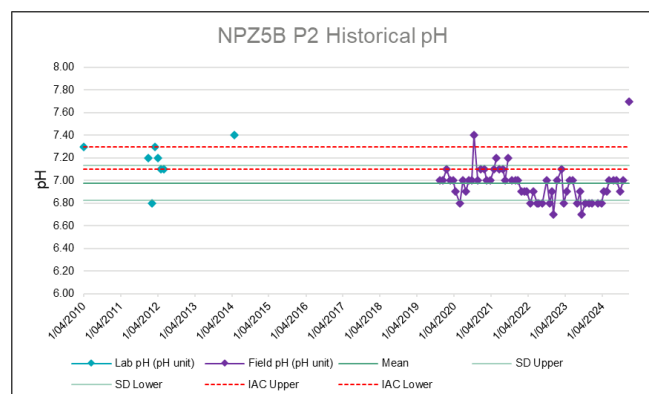


FIGURE D.20: NPZ5B P2 HISTORICAL EC

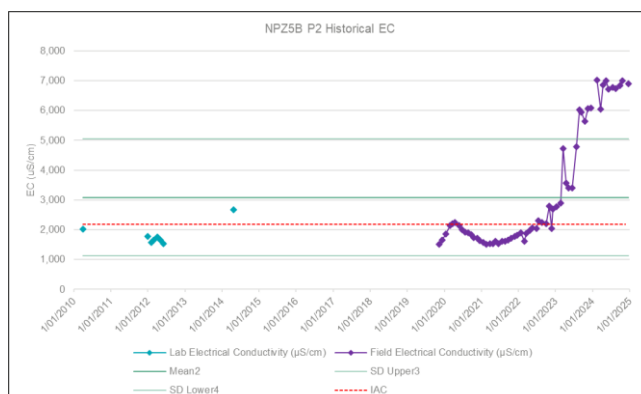


FIGURE D.21: NPZ6 TALL HISTORICAL PH

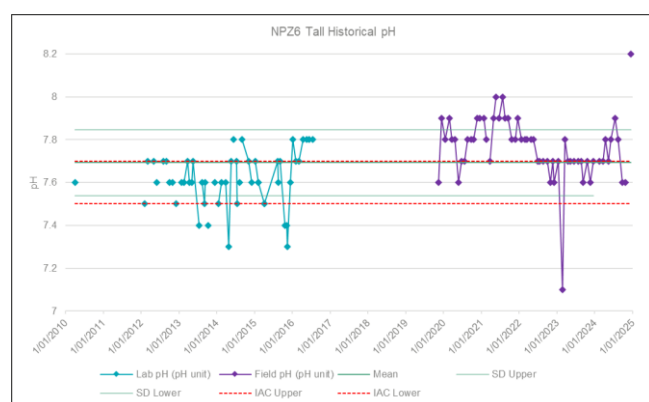


FIGURE D.22: NPZ6 TALL HISTORICAL EC

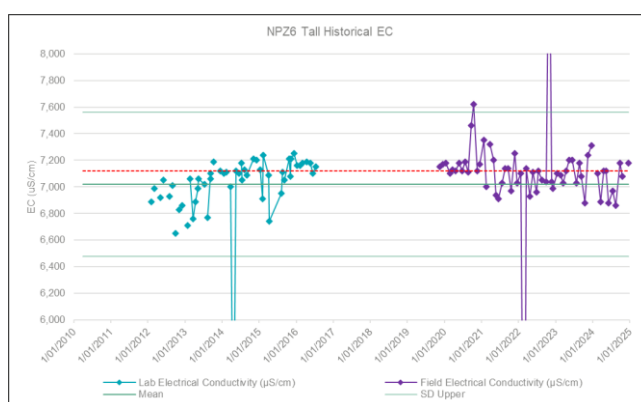


FIGURE D.23: NPZ7 SMALL HISTORICAL PH

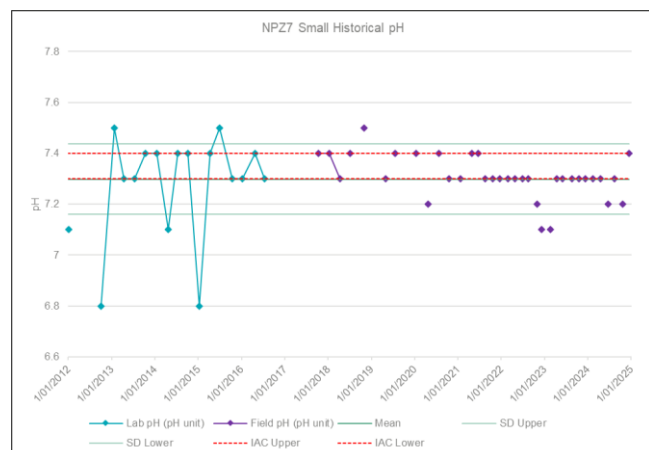


FIGURE D.24: NPZ7 SMALL HISTORICAL EC

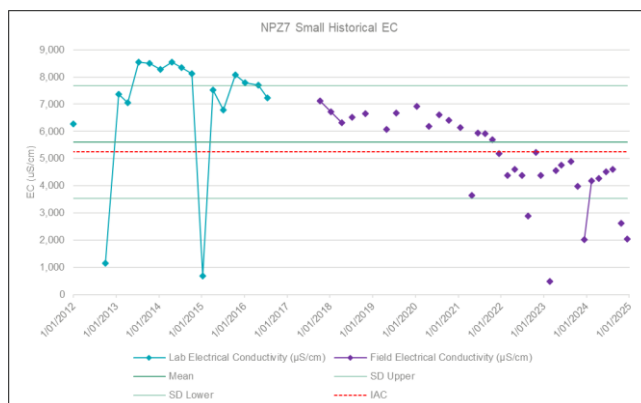


FIGURE D.25: NPZ7 TALL HISTORICAL PH

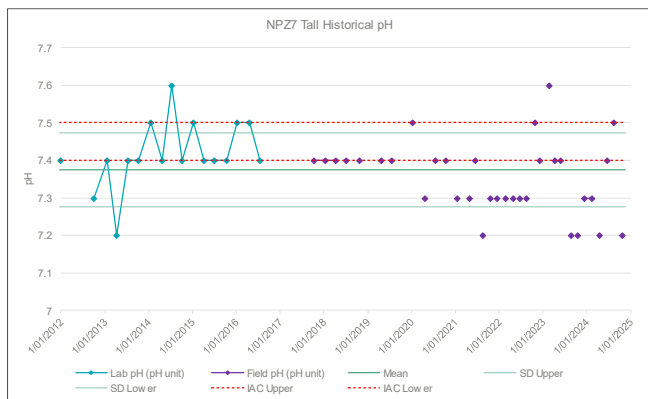


FIGURE D.26: NPZ7 TALL HISTORICAL EC

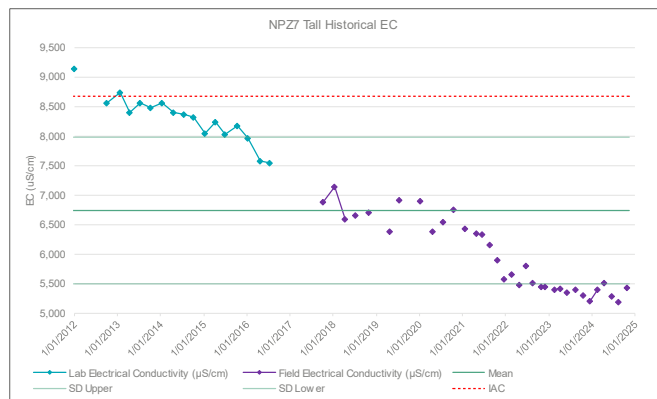


FIGURE D.27: NPZ7 MID HISTORICAL PH

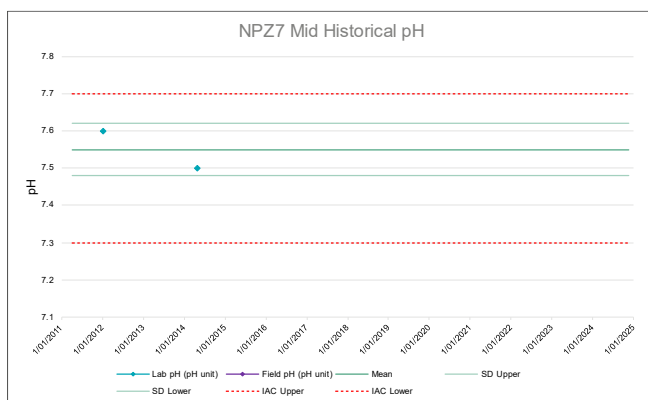


FIGURE D.28: NPZ7 MID HISTORICAL EC

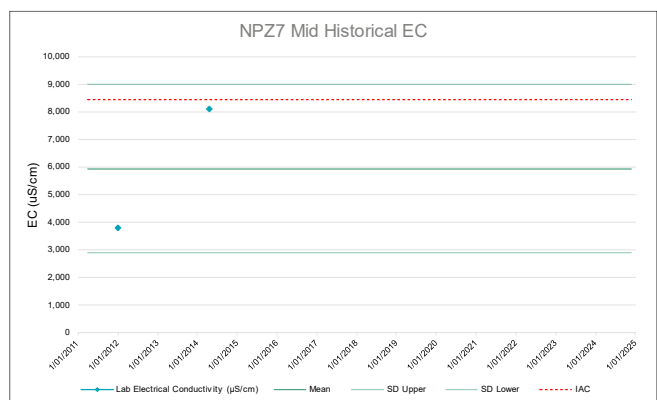


FIGURE D.29: WPP1 HISTORICAL PH

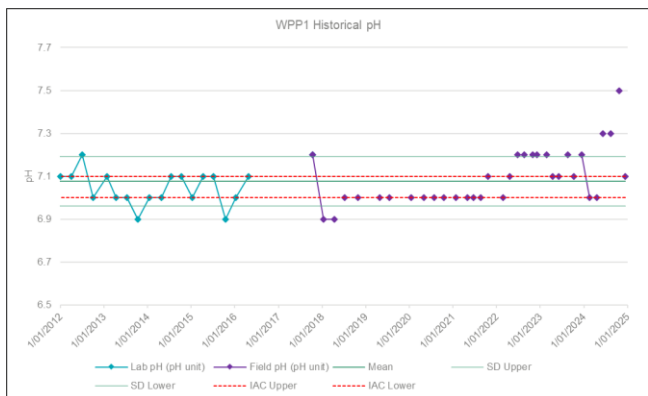


FIGURE D.30: WPP1 HISTORICAL EC

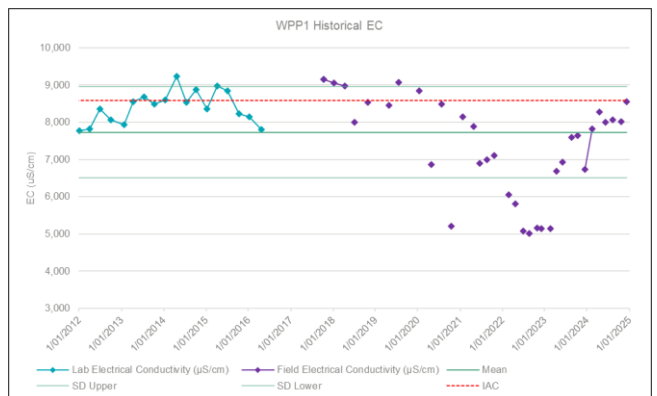


FIGURE D.31: WPP2 HISTORICAL PH

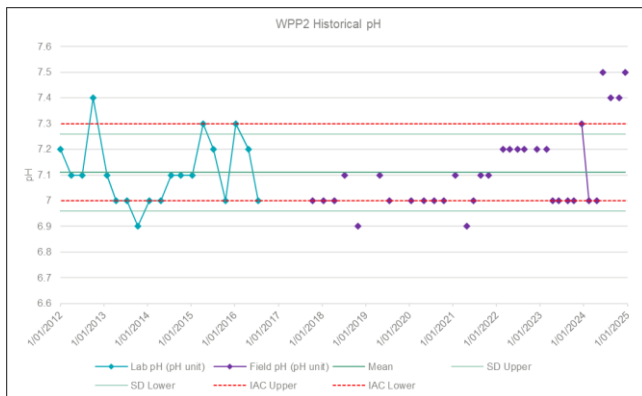
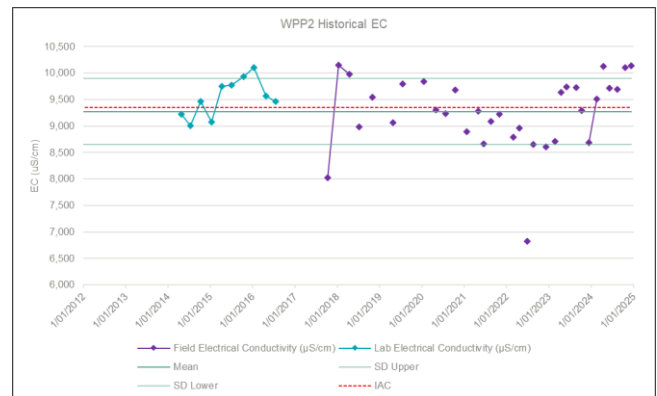


FIGURE D.32: WPP2 HISTORICAL EC



APPENDIX E: GROUNDWATER LEVEL MONITORING RESULTS



TABLE E.1: RAVENSWORTH OPERATIONS GROUNDWATER LEVELS 2024

Borehole	Coffey Dam Borehole		CS4641C		NP21 Mid		NP21 Tall		NP22 Tall		NP25B P1		NP25B P2	
Collar Level (RL)	100.4		81.6		91.4		91.4		100.9		76		76	
Date	Depth	RL	Depth	RL	Depth	RL	Depth	RL	Depth	RL	Depth	RL	Depth	RL
Jan-24	42.81	57.54	101.1 6	-19.52	Blocked or Dry		52.71	38.72	66.1	34.76	15.85	60.15	9.82	66.18
Feb-24	42.91	57.44	101.2 2	-19.58			53.09	38.34	65.90	34.96	16.13	59.87	9.90	66.10
Mar-24	43.01	57.34	101.2 0	-19.56			53.23	38.20	65.99	34.87	16.16	59.84	9.89	66.11
Apr-24	40.78	59.57	101.2 6	-19.62			53.37	38.06	66.20	34.66	16.14	59.86	9.85	66.15
May-24	43.18	57.17	101.5 8	-19.94			53.35	38.08	66.24	34.62	15.63	60.37	9.81	66.19
Jun-24	43.22	57.13	101.2 5	-19.61			53.31	38.12	66.06	34.80	14.42	61.58	9.71	66.29
Jul-24	43.80	56.55	101.4 4	-19.80			53.54	37.89	67.04	33.82	14.16	61.84	9.61	66.39
Aug-24	43.61	56.74	101.4 1	-19.77			53.50	37.93	66.93	33.93	14.56	61.44	9.56	66.44
Sep-24	43.14	57.21	101.2 5	-19.61			51.46	39.97	65.92	34.94	14.35	61.65	9.57	66.43
Oct-24	43.11	57.24	101.8 3	-20.19			50.88	40.55	65.58	35.28	14.53	61.47	9.56	66.44
Nov-24	43.10	57.25	101.8 3	-20.19			50.83	40.60	65.79	35.07	14.57	61.43	9.54	66.46
Dec-24	43.08	57.27	101.7 9	-20.15			50.85	40.58	65.56	35.30	15.06	60.94	9.64	66.36

TABLE E.2: RAVENSWORTH OPERATIONS GROUNDWATER LEVELS 2024 - CONTINUED

Borehole	NP26 Tall		NP27 Tall		NP27 Small		NP27 Mid		Borehole P		WPP1		WPP2	
Collar Level (RL)	76.3		61.91		61.91		61.91		82.06		108		110	
Date	Depth	RL	Depth	RL	Depth	RL	Depth	RL	Depth	RL	Depth	RL	Depth	RL
Jan-24	12.08	64.24	19.82	42.09	19.94	41.97	Blocked		96.70	-14.64	2.31	105.69	4.27	105.73
Feb-24	12.40	63.92	20.10	41.81	21.60	40.31			96.74	-14.68	2.41	105.59	4.41	105.59
Mar-24	12.41	63.91	20.46	41.45	20.63	41.28			94.76	-12.70	2.27	105.73	4.26	105.74
Apr-24	12.39	63.93	20.51	41.40	20.72	41.19			93.94	-11.88	1.47	106.53	3.55	106.45
May-24	12.44	63.88	20.58	41.33	20.80	41.11			93.91	-11.85	1.41	106.59	3.86	106.14
Jun-24	12.60	63.72	20.31	41.60	20.55	41.36			93.91	-11.85	0.96	107.04	2.76	107.24
Jul-24	11.03	65.29	20.14	41.77	20.60	41.31			90.36	-8.30	1.06	106.94	3.40	106.60
Aug-24	11.00	65.32	20.36	41.55	20.56	41.35			92.61	-10.55	1.01	106.99	3.10	106.90
Sep-24	11.92	64.40	20.10	41.81	20.47	41.44			97.69	-15.63	1.40	106.60	3.24	106.76
Oct-24	11.90	64.42	21.48	40.43	21.93	39.98			89.14	-7.08	1.05	106.95	3.00	107.00
Nov-24	12.03	64.29	21.38	40.53	21.90	40.01			88.20	-6.14	1.45	106.55	3.33	106.67
Dec-24	11.92	64.40	21.68	40.23	22.08	39.83			93.55	-11.49	1.75	106.25	3.63	106.37

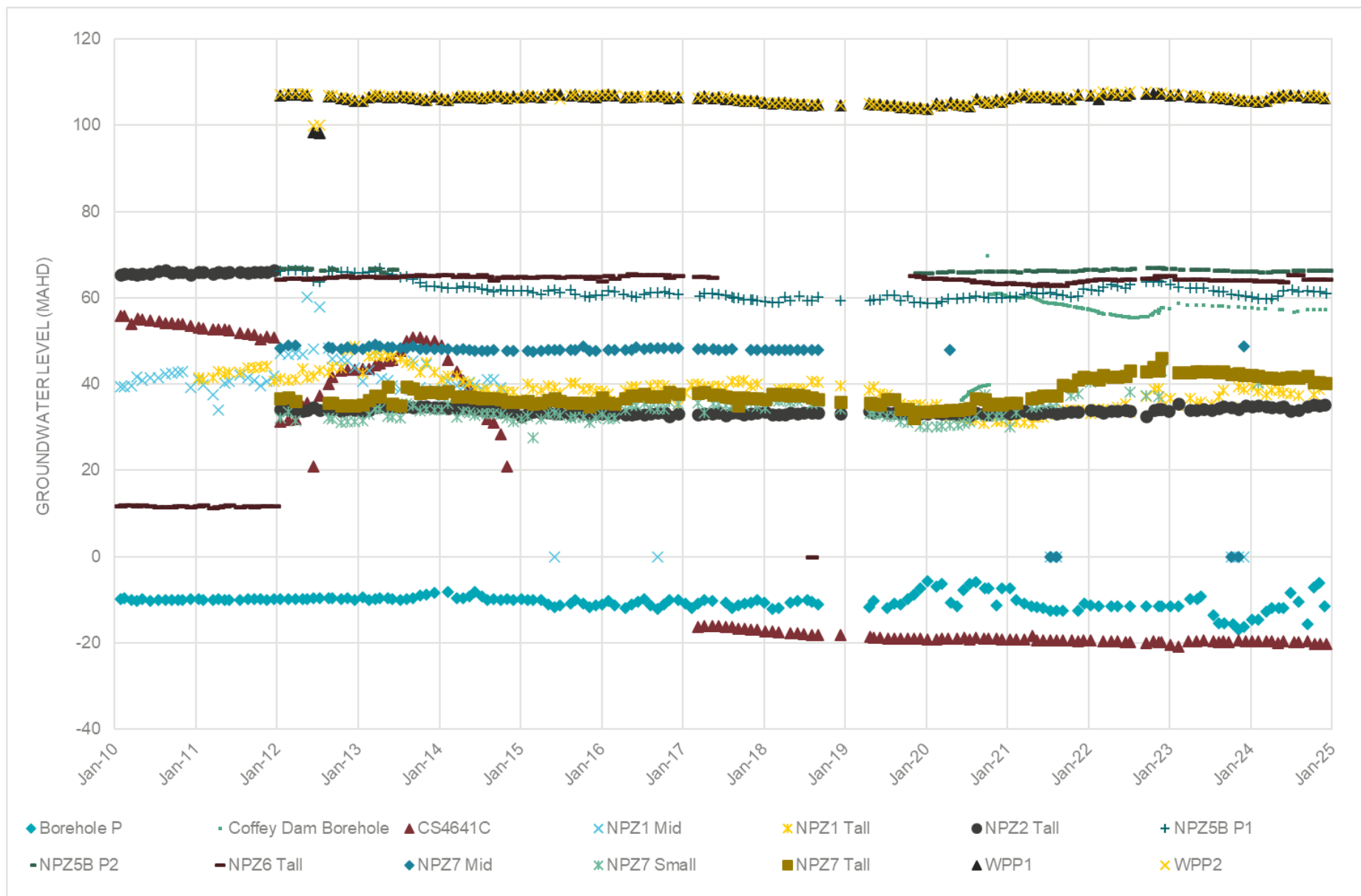


FIGURE E.1: RAVENSWORTH OPERATIONS HISTORICAL GROUNDWATER LEVELS

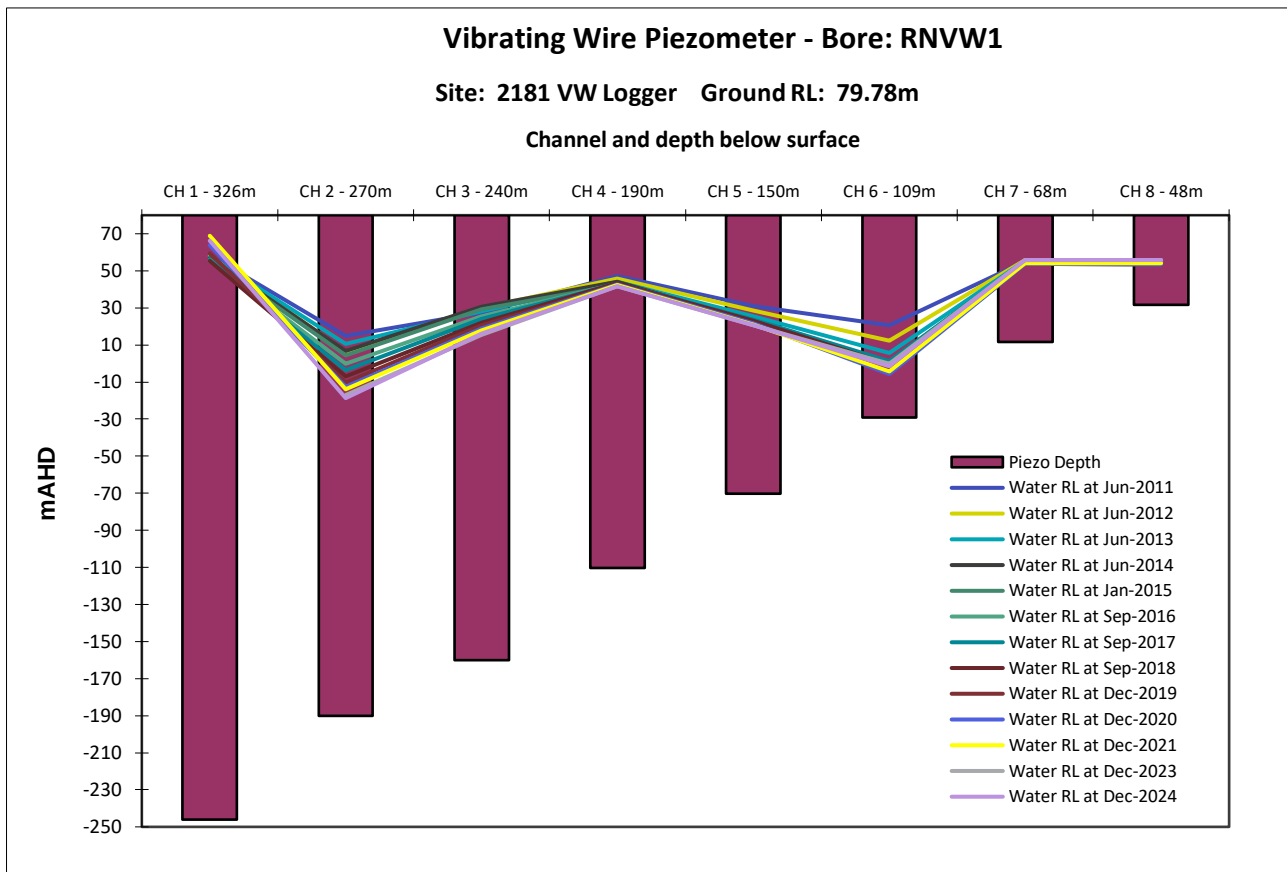


FIGURE E.2: VIBRATING WIRE PIEZOMETER - BORE: RNVW1 (SITE 2181)

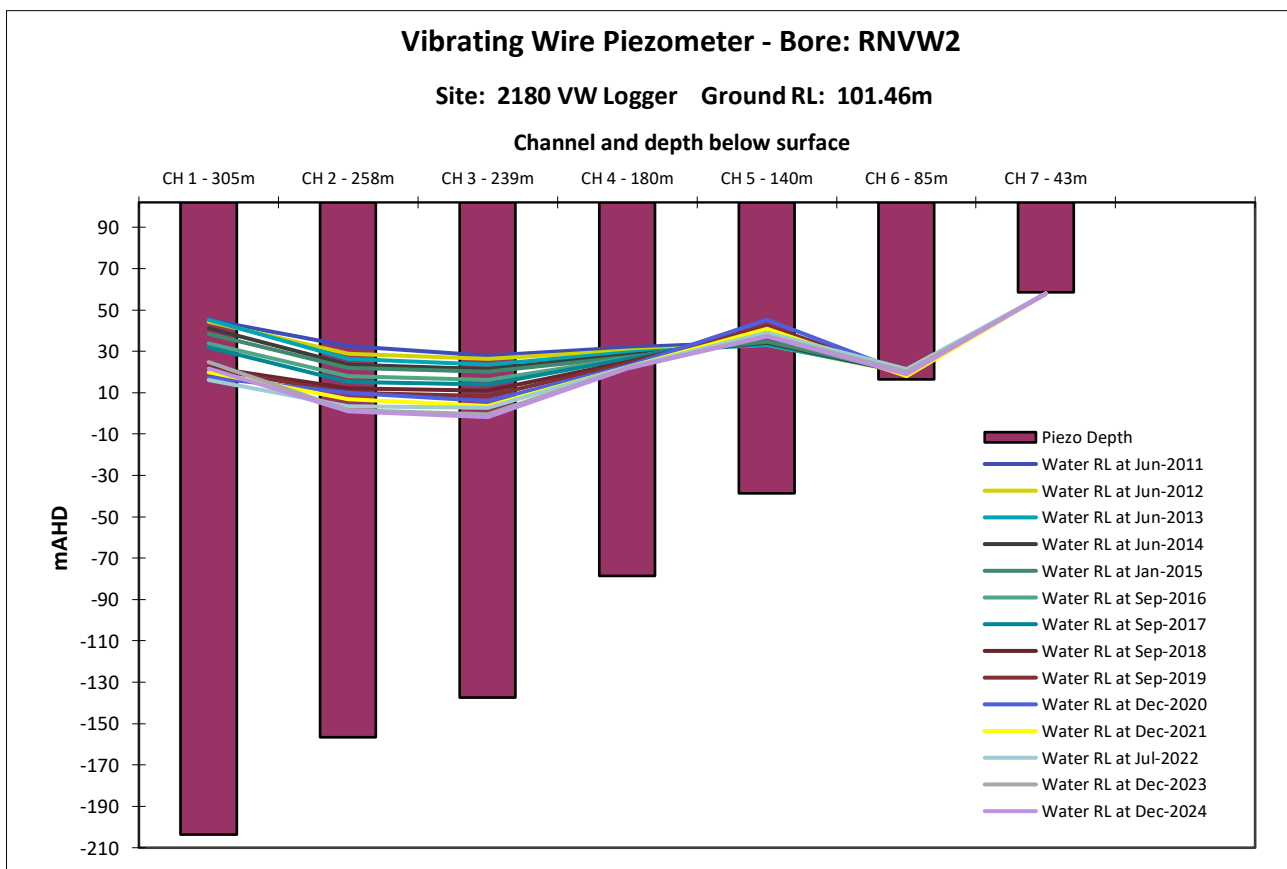


FIGURE E.3: VIBRATING WIRE PIEZOMETER - BORE: RNVW2 (SITE 2180)

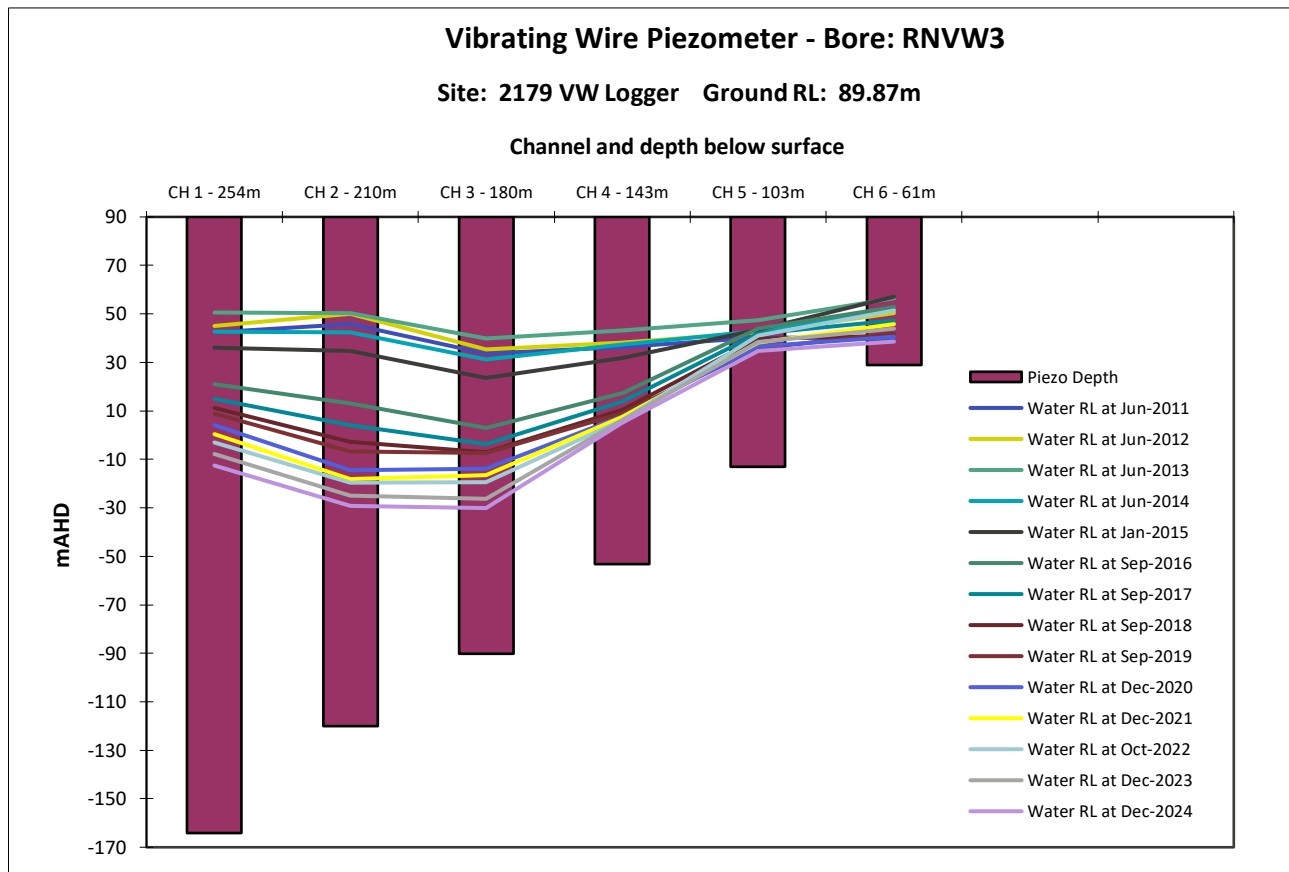


FIGURE E.4: VIBRATING WIRE PIEZOMETER - BORE: RNVW3 (SITE 2179)

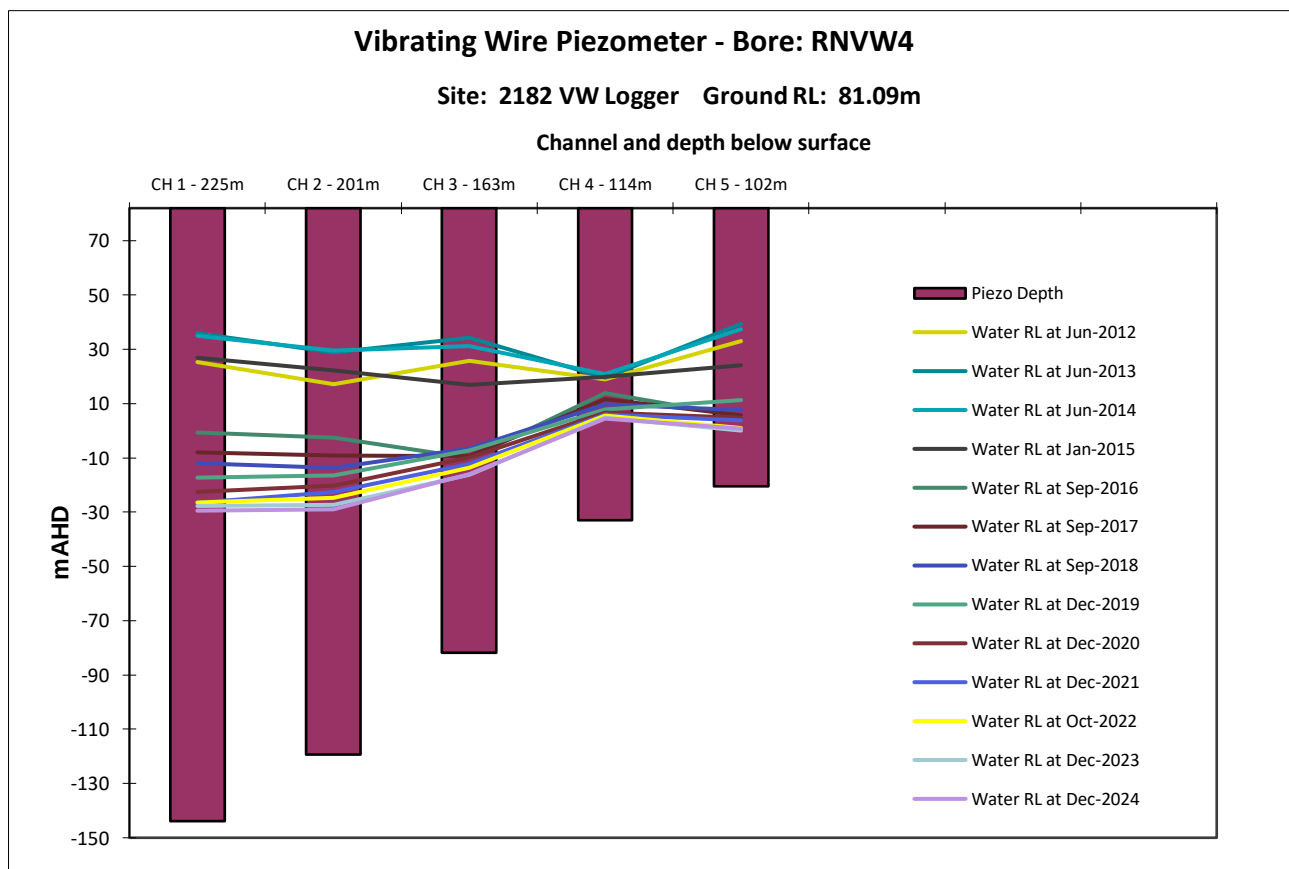


FIGURE E.5: VIBRATING WIRE PIEZOMETER - BORE: RNVW4 (SITE 2182)

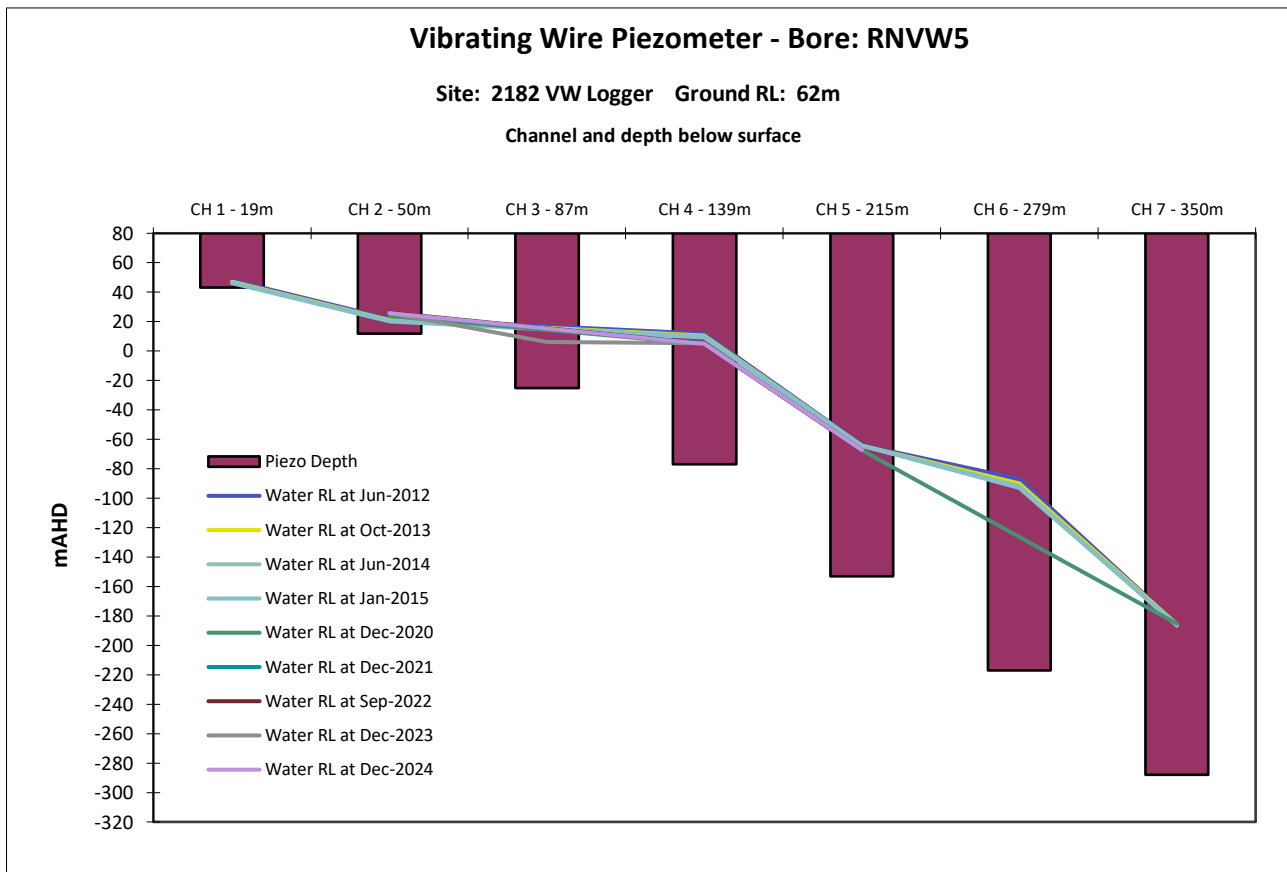


FIGURE E.6: VIBRATING WIRE PIEZOMETER - BORE: RNVW5 (SITE 2182)

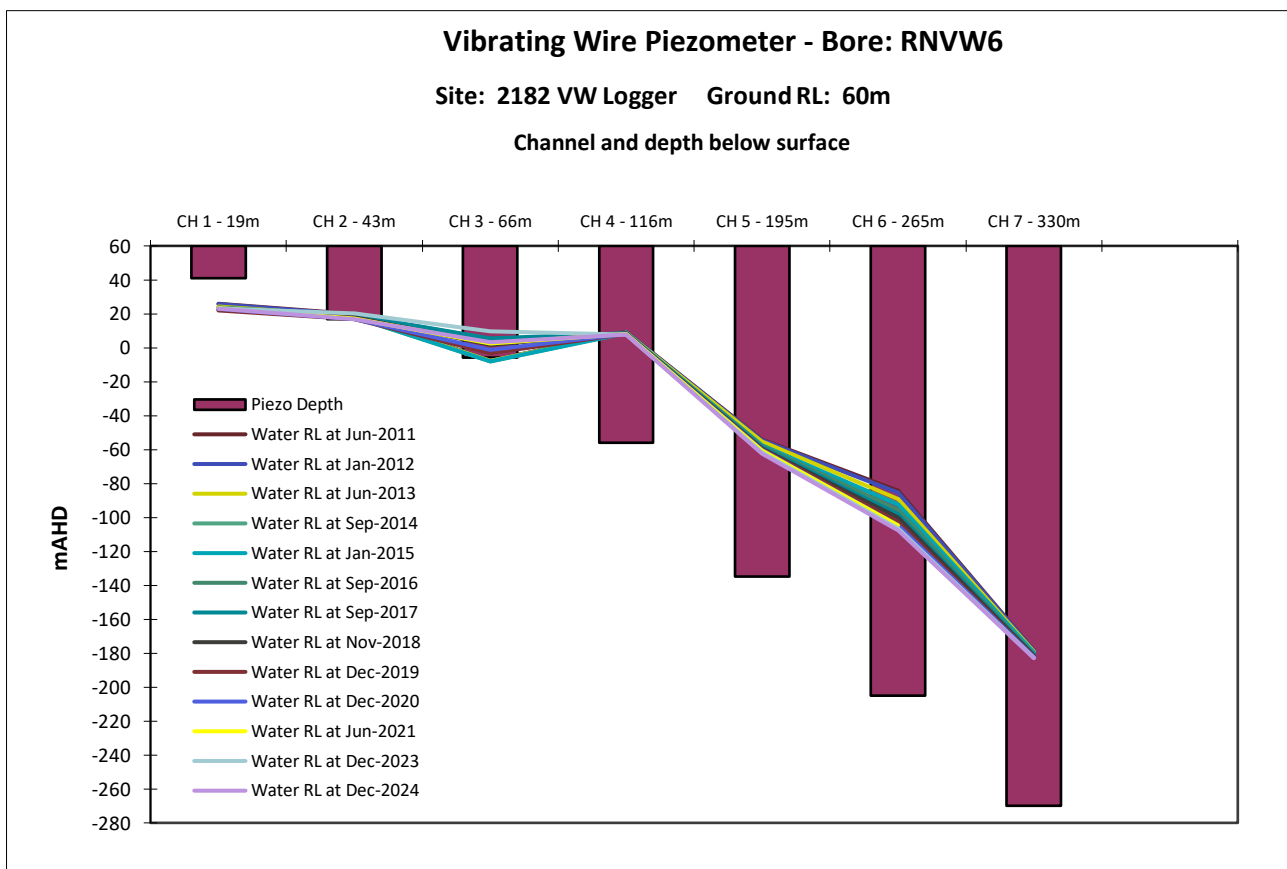


FIGURE E.7: VIBRATING WIRE PIEZOMETER - BORE: RNVW6 (SITE 2182)

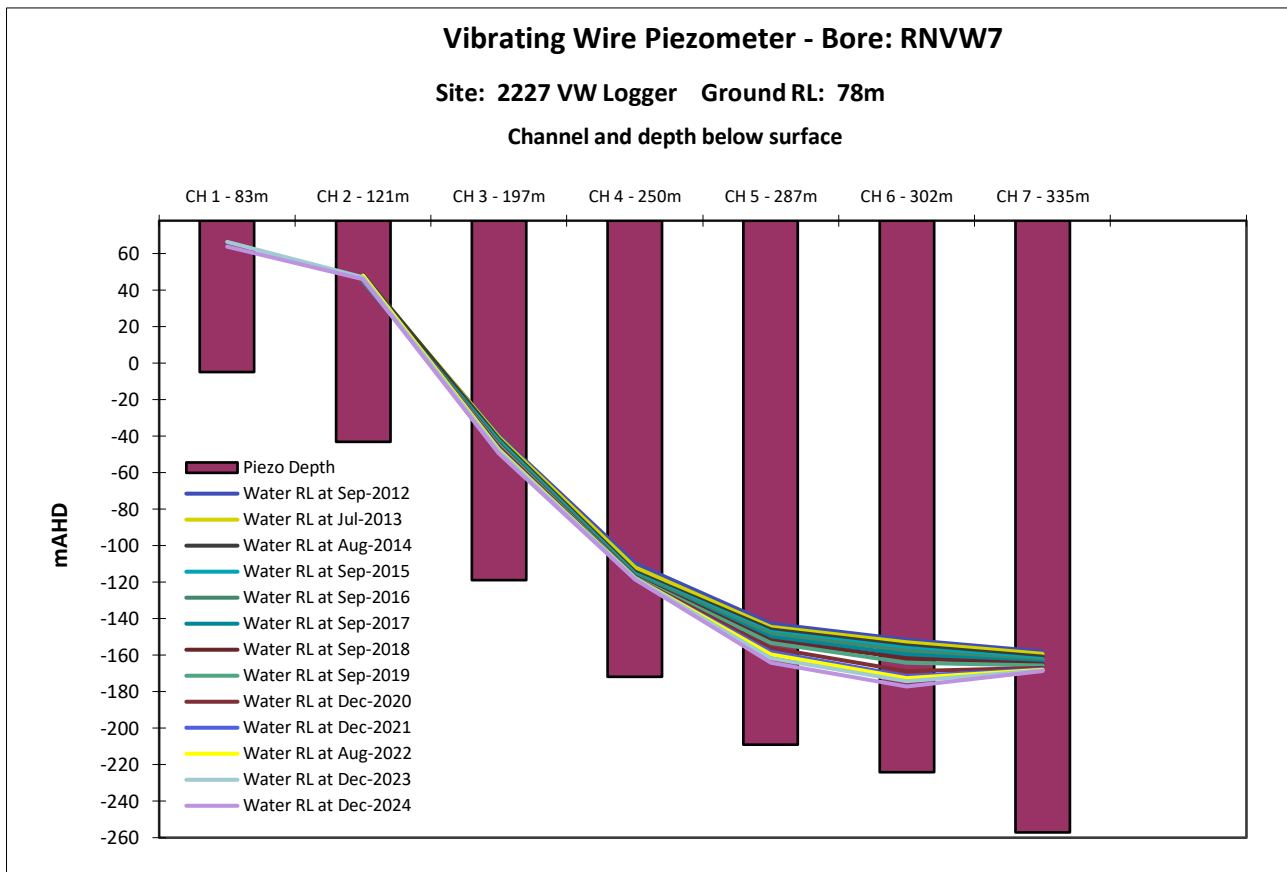


FIGURE E.8: VIBRATING WIRE PIEZOMETER - BORE: RNVW7 (SITE 2227)

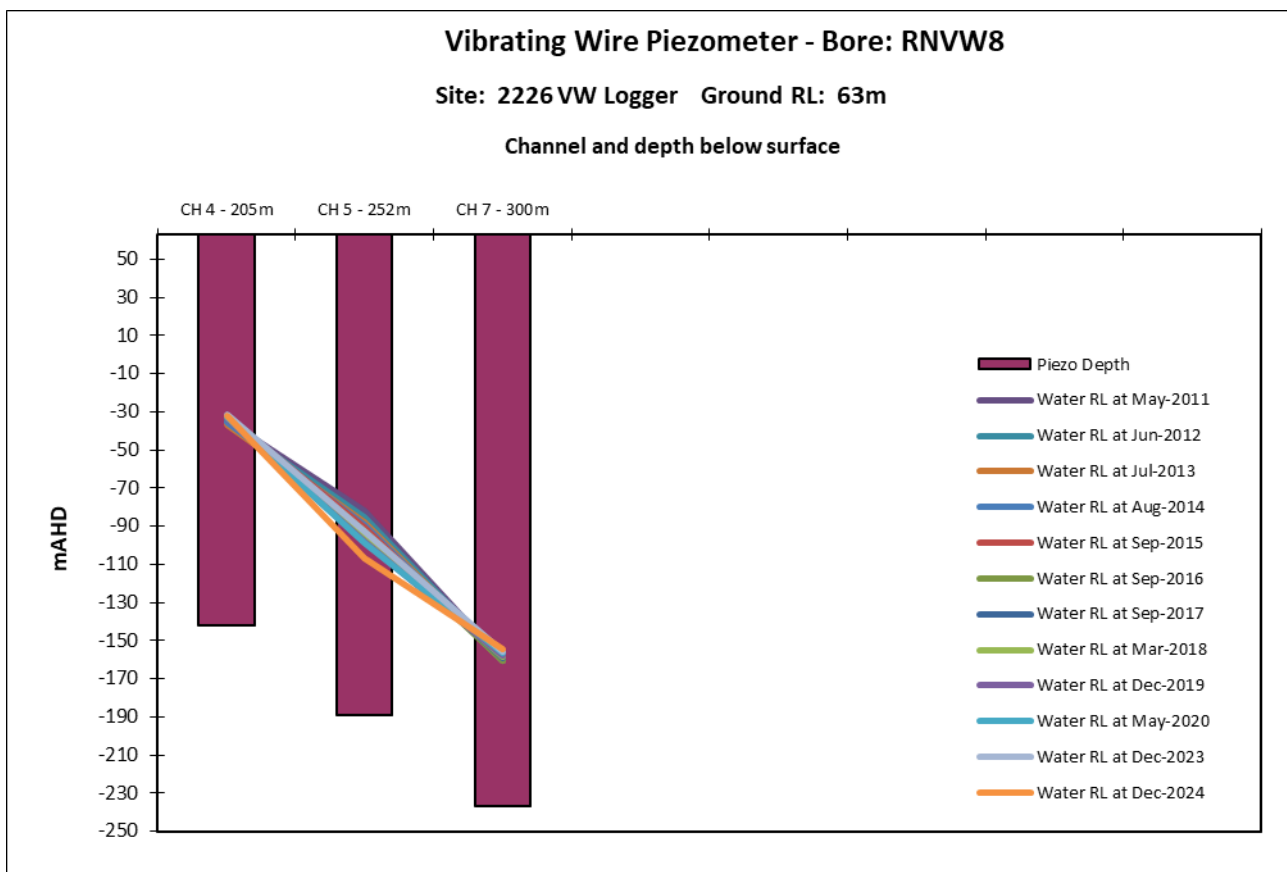


FIGURE E.9: VIBRATING WIRE PIEZOMETER - BORE: RNVW8 (SITE 2226)