



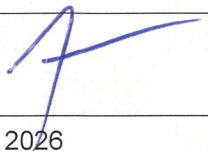
Centennial Springvale Pty Limited

2025 Annual Review

Springvale

March 2026

Annual Review Title Block

Name of Operation	Springvale Colliery
Name of Operator	Centennial Springvale Pty Limited
Development Consent/ Project Approval #	SSD5594
Name of holder of Development Consent/ Project Approval	Centennial Springvale Pty Limited
Mining Lease #	ML1303, ML 1323, ML 1326, part ML 1424, ML 1537, ML 1588, ML 1670, ML 1727, ML1843, CL 377, MPL 314, EL 6974, AUTH 460
Name of Holder of Mining Lease	Centennial Springvale Pty Limited and Boulder Mining Pty Limited
Water Licence #	10WA118719 (WAL 36383) 10BL603519 (WAL 36383) 10BL602017 (WAL 36443) 10BL601863 (WAL 36446)
Name of Holder of Water Licence	Centennial Springvale Pty Limited
MOP/RMP Start Date	1 August 2022 (RMP)
MOP/RMP End Date	N/A (RMP)
Annual Review Start Date	1 January 2025
Annual Review End Date	31 December 2025
I, Kyle Egan certify that this audit report is a true and accurate record of the compliance status of Centennial Springvale for the period 1 January to 31 December 2025 and that I am authorised to make this statement on behalf of Centennial Springvale. <i>Note:</i> a) <i>The Annual Review is an 'environmental audit' for the purposes of s122B(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 Authorised Reporting Officer	Kyle Egan
Title of Authorised Reporting Officer	Springvale Mining Engineering Manager
Signature of Authorised Reporting Officer	
Date	27 March 2026

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Regional Location Plan	1	SVY09236.1
Mine Production	2	SVY09236.2
Borehole Locations-Completed	3A	SVY09236.3A
Borehole Locations-Proposed	3B	SVY09236.3B
Environmental Monitoring Locations	4	SVY09236.4
Proposed Rehabilitation	5	SVY09236.5
Pit Top Vectorized Mapping	6	SVY09236.6
Pit Top Aerial	7	SVY09236.7
Final Rehabilitation	8	Figure 6 RMP
Subsidence Monitoring Locations	9	SVY09236.9
Subsidence Protection Zones	10	SVY09236.10
Springvale Water Transfer System	11	SVY09236.11
Completed Rehabilitation	12	SVY09236.12
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Abbreviation Table

AR	Annual Review
BAM	Beta Attenuation Mass (BAM); real time air quality monitoring system.
BCS	Biodiversity, Conservation and Science Directorate, NSW DPE
BMWS	Blue Mountains Water Skink
BMP	Biodiversity Management Plan
BOM	Bureau of Meteorology
CEPSA	Consolidated Extraction Plan Study Area (comprises multiple EP Areas)
CL	Coal Lease
CILMP	Catchment Improvement and Land Management Plan (CILMP)
CRD	Cumulative Rainfall Departure (cumulative departure from the mean rainfall)
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DPHI	Department of Planning, Housing and Infrastructure
DPIE	Former NSW Department of Planning, Industry and Environment (now DPHI)
DPE	Former NSW Department of Planning & Environment (now DPHI)
DRNSW-MEG	Department of Regional NSW – Mining, Exploration & Geosciences
EEC	Endangered Ecological Community
EMMA	Extended Monitoring and Management Area (in relation to an EP)
EP	Extraction Plan
EPA	Environmental Protection Authority
EPL	Environmental Protection Licence
GDE	Groundwater Dependent Ecosystem
HHMP	Historic Heritage Management Plan
IMP	Independent Monitoring Panel
LDP	Licensed Discharge Point
ML	Mining Lease
MOP	Mining Operations Plan
NPSS	Newnes Plateau Shrub Swamps
NPHS	Newnes Plateau Hanging Swamps
THPSS MMP	Temperate Highland Peat Swamps on Sandstone (THPSS) Monitoring and Management Plan (MMP)
TIA	Trigger Investigation Area
PA	Project Approval
SSA	Soil Surface Assessment
SSD	State Significant Development
TSS	Total Suspended Solids
WMP	Water Management Plan
WR- AQGHGMP	Western Region Air Quality and Greenhouse Gas Management Plan
WR-BMP	Western Region Biodiversity Management Plan
WR-BOS	Western Region Biodiversity Offset Strategy
WR-ACHMP	Western Region Aboriginal Cultural Heritage Management Plan
WR-NMP	Western Region Noise Management Plan

1 STATEMENT OF COMPLIANCE

A summary of compliance for Centennial Springvale Mine (Springvale) for the year 2025 is provided in **Table 1-1** below. There were one incident during the reporting period as detailed in **Section 11**. These incidents did not result in non-compliances with the relevant approvals.

Table 1-1: Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	
Development Consent SSD5594	Yes
Environmental Protection Licence (EPL) 3607	Yes
EPBC 2011/5949	Yes
EPBC 2013/6881	Yes
SMP LW411-418 (04/1673)	Yes
Mining Lease 1303	Yes
Mining Lease 1323	Yes
Mining Lease 1326	Yes
Mining Lease 1424 (part)	Yes
Mining Lease 1537	Yes
Mining Lease 1588	Yes
Mining Lease 1670	Yes
Mining Lease 1727	Yes
Coal Lease 377	Yes
Mining Purpose Lease 314	Yes
Exploration Licence 6974	Yes
Authorisation 460	Yes
Water Access Licence 36383	Yes
Water Access Licence 36443	Yes
Water Access Licence 36446	Yes

Table 1-2: 2025 Non-Compliances

Relevant Approval	Condition #	Condition summary	Compliance Status	Comment	Where Addressed in Annual Review
Nil non-compliances during the Reporting period. Incidents are discussed in Section 11					

Note: Compliance Status Key for Table 1-2

Risk Level	Colour Code	Description
High	Non-Compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium	Non-Compliant	Non-compliance with: - Potential for serious environmental consequences, but is unlikely to occur; or - Potential for moderate environmental consequences, but is likely to occur
Low	Non-Compliant	Non-compliance with: - Potential for moderate environmental consequences, but is unlikely to occur; or - Potential for low environmental consequences, but is likely to occur
Administrative	Non-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)

2 INTRODUCTION

Centennial Springvale Mine (Springvale) is an existing underground coal mine producing high quality thermal coal which is supplied to both domestic and international markets. It is located 15 kilometres to the northwest of the regional city of Lithgow and 120 kilometres west-northwest of Sydney in New South Wales (NSW), as shown on **Figure 2-1**.

Underground mining at Springvale first commenced in 1995. The current consolidated Development Consent for Springvale was approved on 21 September 2015 by the Department of Planning and Environment¹ (DPE), now the Department of Planning, Housing and Infrastructure (DPHI) as State Significant Development (SSD) Consent 5594. This superseded DA11/92, and has been modified on four (4) occasions (refer **Section 3**). The consent allows extraction of 5.5 million tonnes of run-of-mine (ROM) coal per calendar year until 2028, utilising longwall mining methods to extract coal from the Lithgow Seam. **Figure 2-2** and **Figure 2-3** illustrate approved consent and mining lease boundaries for the mine.

Springvale comprises an underground longwall mine, the pit top, and supporting infrastructure on Newnes Plateau within the Gardens of Stone State Conservation Area. The key components of the Springvale surface facilities area comprises of administration buildings, bathhouse, workshop, mine ventilation infrastructure and coal handling infrastructure. Operational areas are illustrated on **Figure 2-4** and **Figure 2-5**.

Mining operations have approval under SSD5594 until 31 December 2028. All mining operations are conducted in accordance with SSD5594 (as modified).

Mining operations are also undertaken in accordance with a range of related approvals issued under both Commonwealth and NSW legislation as outlined further in **Section 3**.

2.1 SCOPE

This Annual Review (AR) details the compliance and environmental management performance of Springvale over the Period 1 January 2025 to 31 December 2025. It has been prepared to demonstrate the sites performance and community engagement activities. The AR has been prepared in accordance with the *Annual Review Guideline* (DPIE, 2015), and satisfies the following:

- Schedule 6, Condition 12(a-f) (Annual Review) of Consent SSD5594.
- Related conditions 27(c) of Schedule 4, and conditions 6(b) and 15(a) of Schedule 6, SSD5594.
- Reporting requirements of Extraction Plans and relevant Management Plans.

¹ References to the former Department of Planning, Industry and Environment (DPIE) have been changed throughout this document to Department of Planning and Environment (DPE).

² Refer **Appendix 1** for a checklist of annual review reporting requirements and where they have been addressed in this Annual Review

2.2 MINE CONTACTS

The contact details for the personnel responsible for environmental management and community relations at Springvale are provided in **Table 2-1** below.

Table 2-1: Springvale Site Environmental Contact Details

Name	Position	Contact Details
Kyle Egan	Mine Manager	T: (02) 6350 1699
		E: kyle.egan@centennialcoal.com.au
Natalie Gardiner	Environment & Community Superintendent	T: (02) 6350 1620
		E: natalie.gardiner@centennialcoal.com.au
Community Information and Complaints Line		(02) 6350 1640

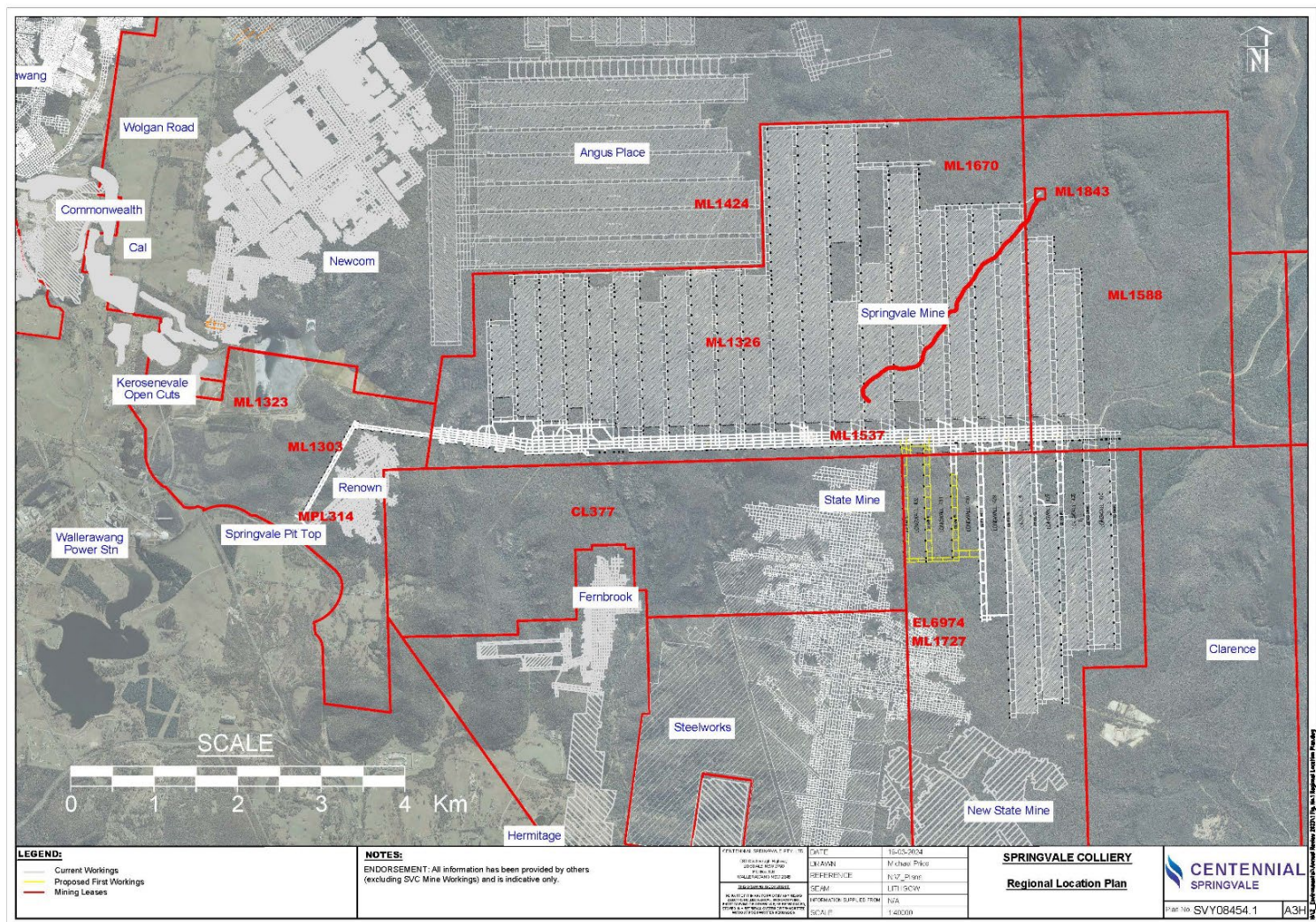


Figure 2-1. Regional Context

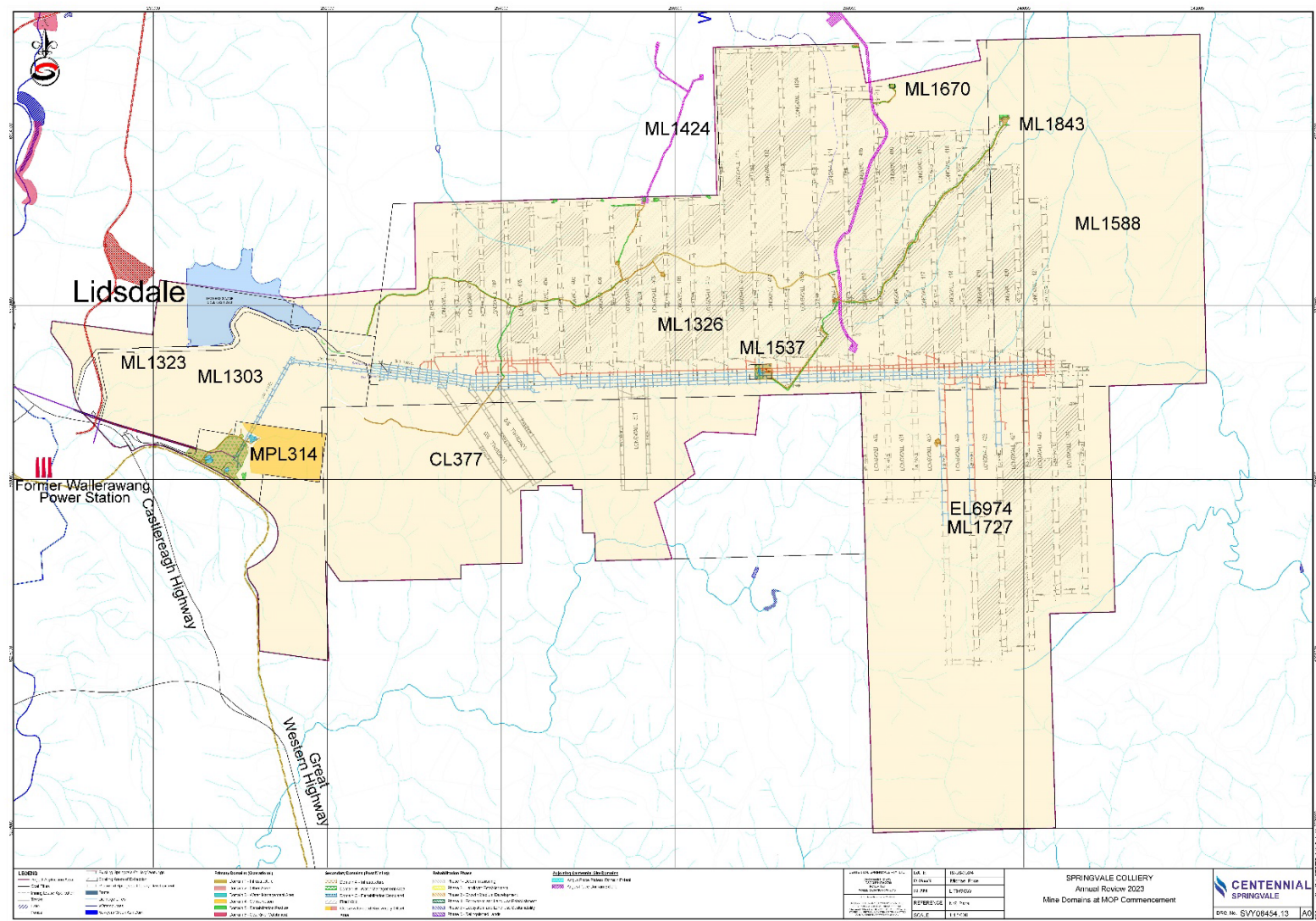


Figure 2-3. Mining Lease Boundaries

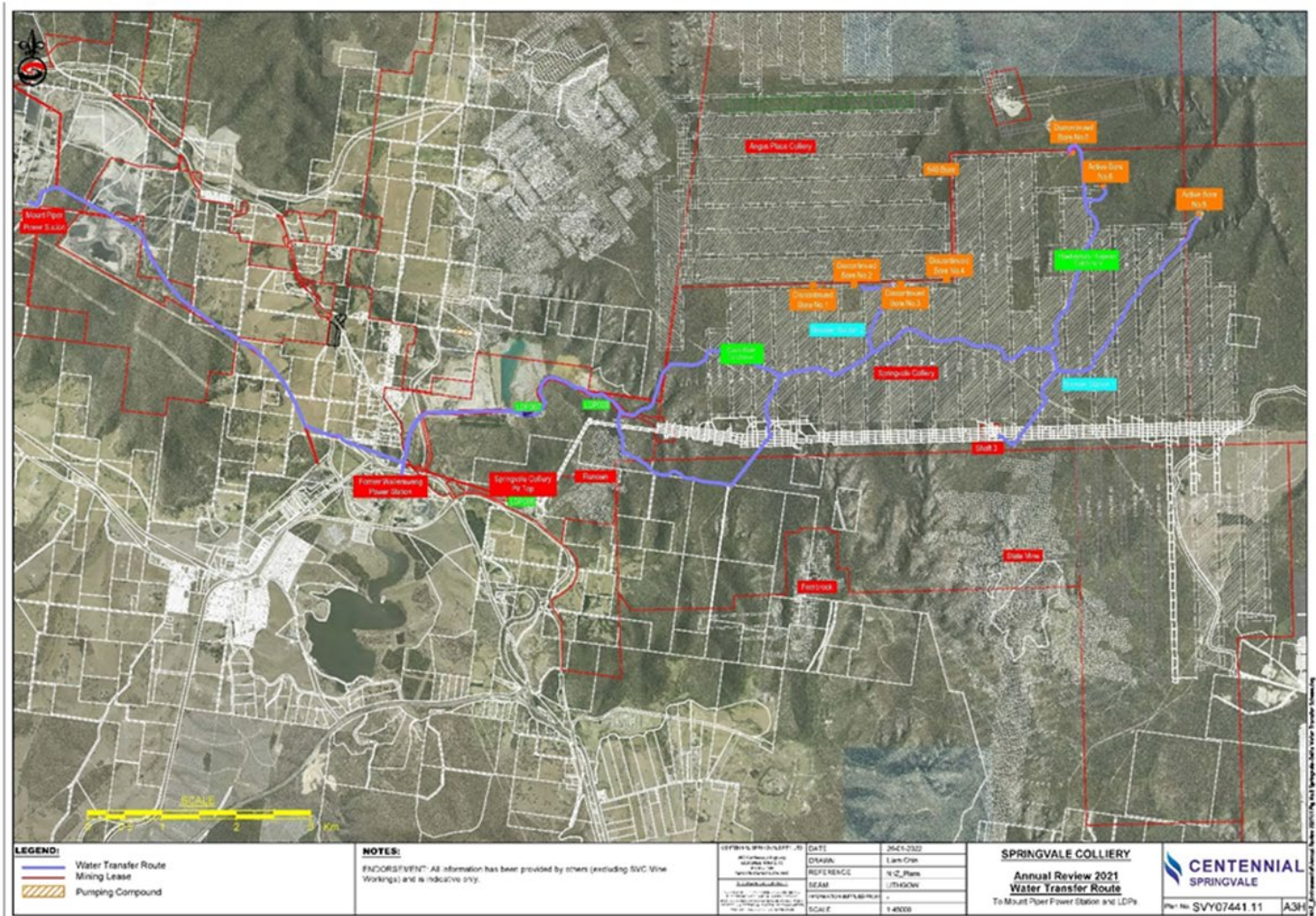


Figure 2-4. Newnes Plateau Operational Areas

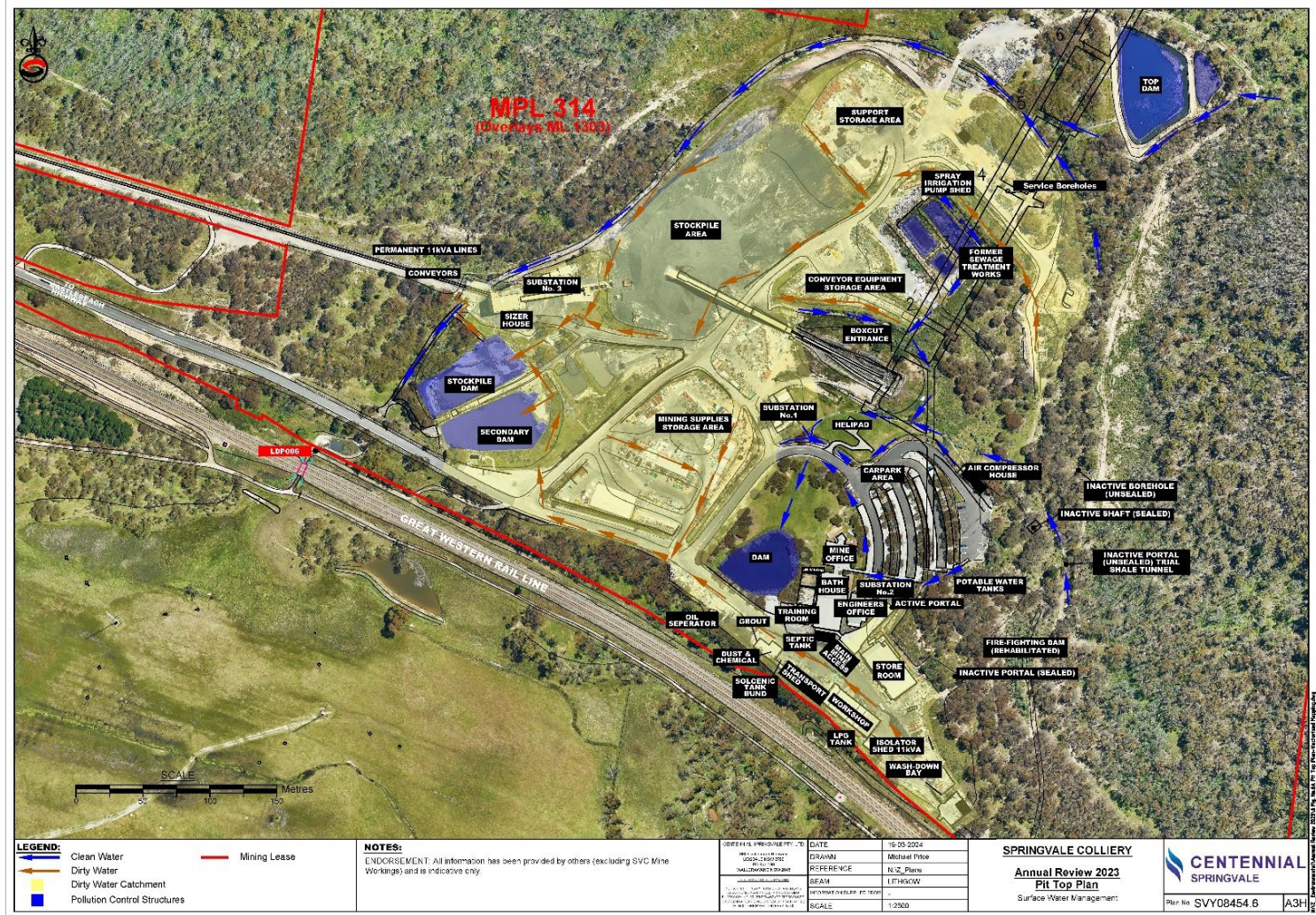


Figure 2-5. Springvale Pit Top Operational Area

3 APPROVALS

3.1 PROJECT APPROVALS, MINING AUTHORISATIONS, AND OTHER LICENCES

Development Consent SSD5594 was granted to Springvale on 21 September 2015 and has been modified four times as outlined further below. This consolidated consent supersedes Development Consent DA 11/92 which was voluntarily surrendered pursuant to section 4.63 of the Environmental Planning and Assessment Act 1979 and section 68 of the Environmental Planning and Assessment Regulation 2021 on 25 October 2023. SSD5594 has been modified on four occasions, most recently in November 2022:

- **Modification 1 (MOD1)** was approved on 19 April 2017 to allow for 450 Full Time Equivalent (FTE) personnel, ROM production of 5.5 Mtpa and a stockpile capacity of 200,000 tonnes.
- **Modification 2 (MOD2)** was approved on 19 June 2017 and relates to the development consent granted for the Springvale Water Treatment Project (SWTP) (SSD7592) in that it was required to defer the salinity limits until the SWTP is constructed and operational.
- **Modification 3 (MOD3)** was approved by the Director – Resource Assessments on 2 June 2021 to allow for the management of newly identified Aboriginal cultural heritage sites.
- **Modification 4 (MOD4)** was approved by the Director – Resource Assessments on 25 November 2022 to include rehabilitation reforms that have come into effect in 2021 for all new mining leases issued from that date, and 2 July 2022 for mining leases that were pre-existing prior to July 2021.

In addition to SSD5594, Springvale operates in accordance with federal approvals under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) granted by the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW since July 2022, formerly the Department of Agriculture, Water and Environment, Department of Energy and Environment, and former Department of Sustainability, Environment, Water, Population and Communities). Approval EPBC 2011/5949 was granted on the 14 March 2012 and allows Springvale to extract coal from Longwalls 415 – 417. A second approval (EPBC 2013/6881) was issued on 15 October 2015 to allow secondary extraction associated with the Springvale Mine Extension Project SSD5594.

A summary of Project Approvals, Mining Authorisations, and other Licences relevant to Springvale is provided in **Table 3-1**. **Table 3-2** in **Section 3.1.3** provides a list of other additional related approvals. Current Project Approvals, EPBC Approvals, Exploration Licences, and Mining Leases are available at the Centennial Springvale website.¹

¹ <https://www.centennialcoal.com.au/operations/springvale/>

Table 3-1. Key Approvals held by Springvale

Approvals	Description	Issue Date (Grant, Renewal, Variation)	Expiry Date	Change to Approval during Reporting Period
Project Approvals				
SSD5594	Springvale Mine Extension Project	21 Sep 2015 (<i>last modified 22 Nov 2022 – MOD4</i>)	31 December 2028	No
EPBC Approvals				
EPBC 2011/5949	Mining of Longwalls 415 - 417	14 March 2012	19 March 2032	No
EPBC 2013/6881	Mining associated with the Springvale Mine Extension Project	15 October 2015, as varied 16 March 2022	October 2035	No
Mining Leases				
ML 1303	Mining Lease	15 December 1992, renewed 8 May 2014, varied 17 Oct 2022	15 December 2034	No
ML 1323 ¹	Mining Lease	3 August 1993, renewed 28 June 2014, varied 17 Oct 2022	3 August 2035	No
ML 1326	Mining Lease	28 September 1993, varied 17 Oct 2022	18 August 2045	No
ML 1424 (part)	Mining Lease	18 August 2003, varied 17 Oct 2022	18 August 2045	No
ML 1537	Mining Lease	15 June 2003, varied 17 Oct 2022	15 June 2045	No
ML 1588	Mining Lease	19 June 2006, varied 17 Oct 2022	19 October 2027	No
ML 1670	Mining Lease	17 February 2012, varied 17 Oct 2022	17 February 2033	No
ML 1727	Mining Lease	4 February 2016, varied 17 Oct 2022	4 February 2037	No
ML1843	Mining Lease	7 February 2023	4 February 2044	No
MPL 314	Mining Purposes Lease	3 August 1993, renewed 16 June 2014, varied 17 Oct 2022	3 August 2035	No
Coal Leases				
CL 377	Coal Lease	24 February 1992, renewed 26 April 2022	20 July 2039	No
Exploration Licenses				
EL 6974		11 December 2007, renewed 12 May 2014	13 December 2017*	No

Approvals	Description	Issue Date (Grant, Renewal, Variation)	Expiry Date	Change to Approval during Reporting Period
Rehabilitation Management Plans				
Rehabilitation Management Plan (29 July 2022)	Rehabilitation of Springvale Colliery	1 August 2022 (commencement date)	Not Applicable	No
Environmental Protection Licenses				
EPL 3607	Springvale Colliery	Current licence version date 8 May 2019	Reviewed Annually 1 January	No
Extraction Plans				
Longwall (LW) 419	Mining of LW 419	11 July 2016	-	No
LW 420-422	Mining of LW 420-422	21 April 2017	-	No
LW 424-427	Mining of LW 424-427	27 July 2018 (425-427 only, 424 removed from mine plan)	-	No
LW 428-432	Mining of LW 420-422	15 March 2022 ³	-	No

3.1.1 Changes During the Reporting Period

There were no changes to key approvals listed in **Tables 3-1** in 2025.

Springvale propose two approval changes to maintain continuity of operations at Springvale Mine, support domestic energy supply to Mount Piper Power Station (MPPS), and enable an orderly transition to longer-term mining operations.

SSD-5594 Modification 5 (MOD 5) seeks to extend the existing Springvale consent by four years, from 31 December 2028 to 31 December 2032, and to permit mining of residual coal resources within three additional areas (500 East, 500 West North and 500 West South) located inside the approved SSD94 project boundary. The modification would allow extraction of approximately 3.3 Mt of ROM coal over about 249 hectares using bord and pillar methods. The purpose of MOD 5 is to optimise recovery of remaining resources using existing infrastructure, maintain coal supply to MPPS following completion of the 500 series longwalls, sustain local employment and economic activity in the Lithgow region, and provide a transition period while longer-term approvals are progressed.

The Springvale West Project is a new consent application that proposes a further extension of mining operations beyond the current life of mine. The project would allow approximately 10 years of mining within the Springvale and adjoining Angus Place mining lease areas, recovering about 10 Mt ROM coal at an average rate of around 1.2 Mtpa using bord and pillar extraction (first workings and partial pillar extraction). The project is intended as a mine continuity project aligned with the forecast operational life of MPPS, supporting ongoing domestic coal supply and regional employment while utilising existing operational systems and infrastructure.

MOD 5 and Springvale West both form a staged continuation strategy to bridge the current approved operations and a longer-term mining future at Springvale and are planned for submission in 2026.

3.1.2 Extraction Plans

As summarised in **Table 3-1** Extraction Plans (EP) approved under Schedule 3, Condition 10 of SSD5594 include:

- **LW 419** (approved 11 July 2016, extraction in LW419 completed May 2016).
- **LW 420-422** (approved 21 April 2017, extraction in LW422 completed in June 2018).
- **LW 424-427** (approved 2018, extraction in LW427 completed in January 2022).
- **LW 428-432** – (approved March 2022 and amended 9 August 2023, extraction in LW428 commenced 26 March 2022).

Monitoring activities undertaken under EP approvals are currently reported quarterly in accordance with Condition 5 of the LW428-432 EP approval and summarised the Annual Review in accordance with Schedule 6, Condition 12 of SSD5594. There were no changes to the EP's during the reporting period.

During the reporting period Springvale and endorsement suitably qualified consultants, prepared and undertook consultation with relevant stakeholders on the LW 501-503 Extraction Plan. At the end of 2025, Springvale was addressing feedback from stakeholders to finalise submission to DPHI 2026.

3.1.3 Other Related Approvals

The Gardens of Stone State Conservation Area (GOSCA) was formally proclaimed on 6 May 2022. The GOSCA encompasses the Newnes Plateau (as Newnes State Forest), Ben Bullen State Forest, Wolgan State Forest as well as other crown lands. The Swamp Offset Deed was signed in July 2022.

Springvale also holds several Section 95 Certificates and Threatened Species Licences as issued by the Biodiversity and Conservation Division (BCD), formerly the Office of Environment and Heritage (OEH) within DPHI.

Table 3-2 summarises other related approvals held by Springvale relevant to the Annual Review.

Table 3-2: Other Related Approvals

Approval	Description	Expiry Date	Change to Approval during Reporting Period (Y/N)
NPWS Approvals			
March 2023	Bore 8 to Booster 1 Project (ML 1843 Pipeline Installation)	6 October 2023	N
April 2023	Springvale LW 431-432 and 500 Area Exploration Program	31 May 2024 (varied 2 November 2023 DOC23/937286-1)	N
September 2023	Vegetation Management Nearby Powerlines (inspection, maintenance and emergency works)	18 September 2028	N
November 2024	Springvale 500 area swamp piezometer installation	1 August 2025	N

Approval	Description	Expiry Date	Change to Approval during Reporting Period (Y/N)
November 2024	Springvale 500 area Groundwater Monitoring	30 June 2025	N
November 2024	Springvale 500 area exploration program	1 September 2025	N
January 2025	Springvale 500 area ecology monitoring	1 October 2025	Y
August 2025	Groundwater borehole installation, access and monitoring FTSVWP1 - fern tree swamp	31 January 2026	Y
Assessment Phase	Groundwater borehole installatiSPR2503SP	Not Applicable	Not Applicable
NSW Biodiversity and Conservation Approvals and Licences			
Document No C0006077	Threatened Species Licence	31 December 2028	N
Document No C0006298	Threatened Species Licence	31 December 2028	N
Document No C0006026	Threatened Species Licence	31 December 2028	N
Document No C0003184	Threatened Species Licence	31 December 2028	N
Document No C0005809	Threatened Species Licence	31 December 2028	N
Document No C0006026	Threatened Species Licence	31 December 2028	N
Document No C0006096	Threatened Species Licence	31 December 2028	N
Document No C0006185	Threatened Species Licence	31 December 2028	N
Document No C0006242	Threatened Species Licence	31 December 2028	N
Document No C0003839	Threatened Species Licence	12 July 2028	N
Document No C0003684	Threatened Species Licence	31 December 2028	N
Document No C0004842	Threatened Species Licence	31 December 2028	N
Document No C0006488	Threatened Species Licence	31 December 2028	N
Document Number NW-324608-2024	Threatened Species Licence	31 December 2028	N
Document Number NW-DOC24/752816	Threatened Species Licence	31 December 2028	N

During the reporting period Springvale did not receive any new Threatened species licences. Two NPWS Consents were issued for exploration and environmental monitoring purposes.

3.2 ANNUAL REPORTING REQUIREMENTS

This Annual Review is prepared in accordance with Schedule 6, Condition 12 of SSD5594, and several related conditions of the consent, primarily associated with annual reporting requirements/commitments within associated management plans, and in the project Statements of Commitment (Appendix 3 to SSD5594). **Appendix 1** provides a checklist of reporting requirements and performance conditions addressed within the Annual Review.

In accordance with the requirements of SSD5594 (Schedule 6, Conditions 12 and 15), a copy of the Annual Review is provided to DPHI and subject to its approval and is made available on the *Springvale* website¹. A copy of the Annual Review is also provided to DCCEEW as per the Statement of Commitments in SSD5594.

¹ www.centennialcoal.com.au/operations/springvale/

4 OPERATIONS SUMMARY

4.1 PRODUCTION

Details of production and associated waste generated by the site for the report period and next reporting is provided in **Table 4-1**. There were no inconsistencies between the approved limit and actual production for the reporting period.

Table 4-1: Production Summary & Forecast

Material	Approved Limit	Previous Reporting Period (Actual)	This Reporting Period (Actual)	Next Reporting Period (Forecast)
Waste Rock / Overburden	NIL	Not Applicable	Not Applicable	Not Applicable
ROM Coal ¹	5.5 million tonnes per calendar yr.	2,812,585 t	2,535,599T	2,540,645T
Coarse reject	NIL	Not Applicable	Not Applicable	Not Applicable
Fine reject (tailings)	NIL	Not Applicable	Not Applicable	Not Applicable
Saleable Product	NIL	Not Applicable	Not Applicable	Not Applicable

1. receive, handle or process, SSD5594 (Schedule 2, Cond 6).

A summary of the other operations and coal processing, handling and transport relevant to Springvale is provided in **Table 4-2**. There were no inconsistencies between the hours of operation and transport limits during the reporting period.

Table 4-2: Other Operations

Approved Operation	Approved Limit	Previous Reporting Period (Actual)	This Reporting Period (Actual)
Hours of operation	24 hours a day, 7 days a week ¹	24 hours a day, 7 days a week	24 hours a day, 7 days a week
Transport (rail)	NIL	Not applicable	Not applicable
Transport (road)	50,000 tonnes of ROM Coal per calendar year ²	0 t	0 t

¹ SSD5594 (Schedule 2, Cond 7)

² SSD5594 (Schedule 2, Cond 8)

4.2 MINING OPERATIONS

Mining activities undertaken during the 2025 reporting period were as follows:

- First Workings were undertaken within Longwall 431, 432 and 501. All first working are designed to be long term stable and non-subsiding in accordance with Schedule 3 Condition 9 of SSD 5594.

- Secondary Extraction was undertaken within LW430 and LW431 in accordance with Schedule 3 Condition 10 of SSD 5594.
- Coal processing of ROM product presented in **Table 4-1**.

It is noted that a range of adaptive management measures have been implemented for the current mine plan since the granting of SSD5594 to mitigate potential for impact. These include, but are not necessarily limited to, the following key measures:

- Removing LW 422, 423 and 424 from the proposed mine plan.
- Shortening LW 421, 425 and 427 to avoid mining through major lineaments, and
- Reduction in longwall lengths to both LW 429, 430, 431 and 432.

4.3 EXPLORATION

During the reporting period, exploration activities were undertaken at four locations within Mining Leases ML 1323, ML 1303 and Consolidated Lease CL 377 to support geological investigations associated with the proposed Springvale West Project. Activities comprised surface exploration drilling and associated geological assessments to improve understanding of resource conditions and inform future project planning.

All exploration works were undertaken in accordance with relevant approvals and site environmental management measures, with appropriate controls implemented to minimise environmental disturbance. Drill sites were rehabilitated following completion of activities and no environmental incidents, non-compliances or community complaints were associated with the exploration works.

4.4 LAND DISTURBANCE

During 2025, land disturbance within the project area was limited to exploration activities, routine maintenance of existing GOSCA access tracks, and the installation of groundwater monitoring infrastructure.

Licences and Consents associated with the activity have been included with **Section 3.1.3**.

4.5 CONSTRUCTION

There was no construction or demolition undertaken during the 2025 reporting period.

4.6 NEXT REPORTING PERIOD

In the next reporting period Springvale will complete LW 431. Both Longwall 432 and 501 are forecasted to commence in 2026. Longwall 501 extraction commencement is subject to the approval of the Longwall 501-503 Extraction Plan which was submitted to DPHI in March 2026. First workings for future longwalls are planned to continue in accordance with approved mine layouts.

One exploration borehole is planned to be drilled during 2026 within ML 1323, ML 1303 and CL 377 to support ongoing geological investigations associated with the proposed Springvale West Project.

Additionally in 2026 Springvale will establish standpipe groundwater monitoring installations within the LW500 extraction plan area (FTSVWP, FTSSP1, FTSSP2 and SPR2503SP).

5 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

Table 5-1 summarises the outcomes of the 2024 Annual Review, including actions issued by Regulators and actions outlined by Springvale.

Table 5-1: Actions from Previous Annual Review

Action Required	Requested By	Action Taken	Where addressed in Annual Review
Regulator Requirements			
Publish to web	DPHI	Published on the centennial Springvale Website (https://www.centennialcoal.com.au/operations/springvale/)	N/A
Improvement Actions			
Independent Environmental Audit in accordance with Schedule 6 Condition 13 of SSD5594	Springvale	3-year independent Audit completed during the reporting period	Section 10
Extraction Plan Preparation 500 series	Springvale	Extraction Plan prepared and submitted for consultation in the reporting period. Assessment will be undertaken in 2026.	Section 3.12 and 9.1
Groundwater and Surface Water TAP Recommendations	Springvale	Actions completed in reporting period documented in Annual Review.	Section 8.2.6
Ongoing Swamp Impact Reporting	Springvale	Complete up to the current Extraction Area Swamps.	Section 6.5.6.2
Management Plan Revisions			
Extraction Plan Subcomponent Plan re-submission as triggered by IMP advice.	Springvale	Groundwater model complete in 2025. Revised plans to be submitted 2026.	Section 6.7.4
Biodiversity Management Plan resubmission to DPHI for approval	Springvale	Site specific approach adopted and submitted in reporting period. Under DPHI assessment.	Section 6.5.1
Water Management Plan resubmission to DPHI for approval	Springvale	Revised Water Management Plan submitted and under DPHI assessment.	Section 7.1
Condition Triggers			
Undertake revisions to Management Plans within three months of Annual Review Submission	Springvale	Submitted 13 May 2025	Not Applicable
Undertake revisions to Management Plans within three months of Independent Audit Submission	Springvale	Submitted 12 November 2025	Not Applicable

On 31 May 2025, the NSW Environment Protection Authority (EPA) acknowledged receipt of the Springvale 2024 Annual Review submitted on 31 March 2025 and noted that the report

confirmed compliance with the conditions of EPL 3607, consistent with the information reported in the Annual Return. The EPA also reiterated that proponents are encouraged to develop plans and strategies to meet statutory obligations and environmental objectives under relevant approvals and licences.

6 ENVIRONMENTAL PERFORMANCE

Springvale implements an Environmental Management Strategy (EMS), including management plans, procedures and monitoring programs that provide a framework for managing environment and community risks and impacts. To measure compliance with site approvals and licences, Springvale undertakes a comprehensive monitoring program. Environmental monitoring locations are shown in **Figure 6-1** and **Figure 6-2**.

Within each Extraction Plan, Springvale has developed Trigger Action Response Plans (TARPs) using the performance indicators for subsidence impacts relevant to each component of the Management Plan. The TARP provides a process of tiered/escalating trigger levels for contingency measures, should measurements and impacts be greater than predicted/approved. Relevant monitoring sections summarise the triggers reported during the reporting period. The Extraction Plan should be referred to for additional detail.

This section provides a summary of environmental performance in the reporting period, including:

- **Section 6.1** – Meteorological Summary
- **Section 6.2**– Noise
- **Section 6.3**– Air Quality
- **Section 6.4**– Greenhouse Gas Emissions
- **Section 6.5** – Biodiversity
- **Section 6.6** – Heritage
- **Section 6.7** – Mine Subsidence
- **Section 6.8** – Waste
- **Section 6.9** – Other Matters
 - Bushfire

The environmental performance for water, rehabilitation and community aspects are reported in **Sections 7, 8, and 9** respectively.

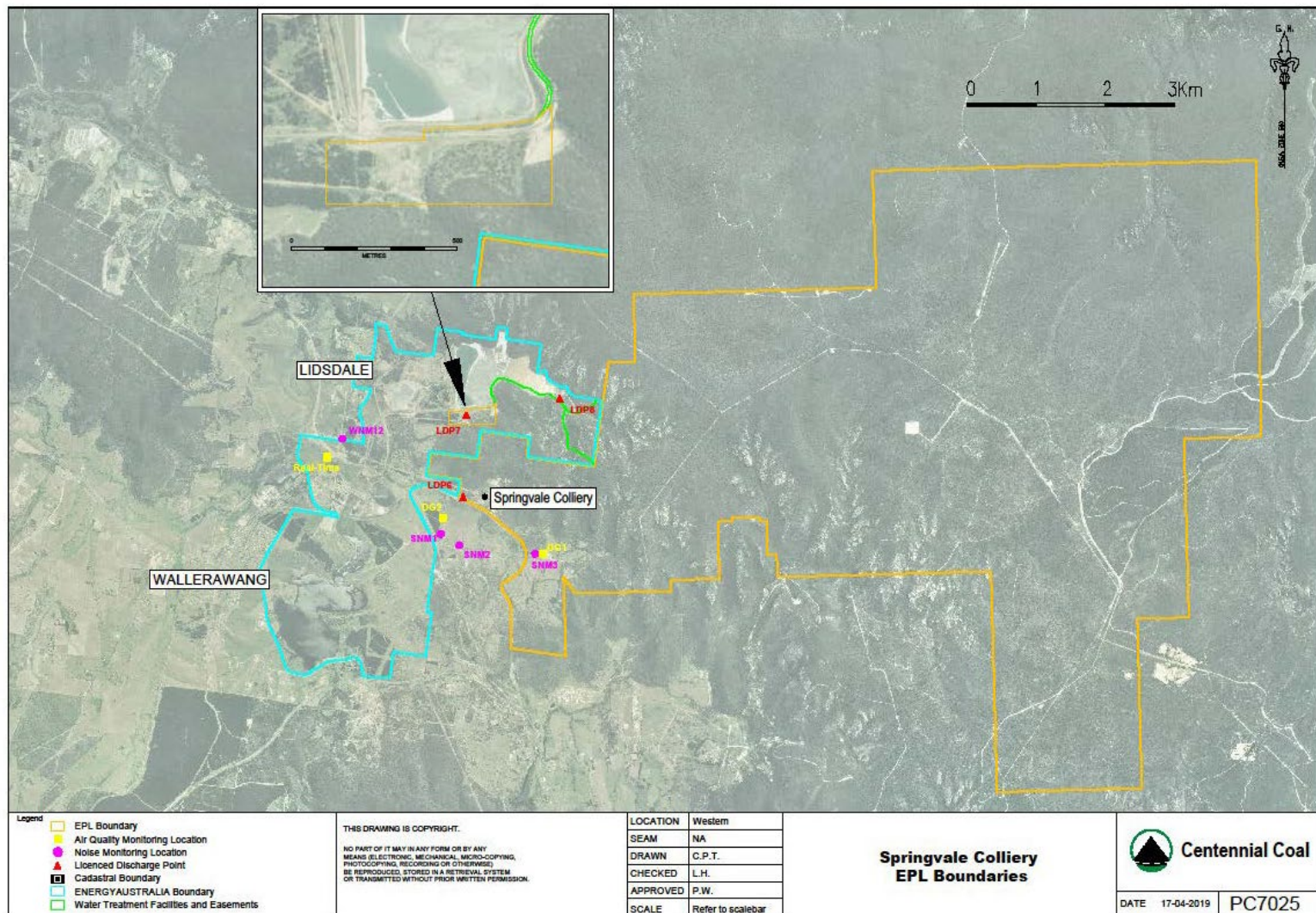


Figure 6-1: Springvale Operational Monitoring Locations

6.1 METEOROLOGICAL SUMMARY

Meteorological monitoring is undertaken near the pit top, at an onsite Automatic Weather Station (AWS) since 2012, in accordance with the requirements of EPL 3607 (Condition M4.1) and SSD5594 (Schedule 4, Condition 8). Meteorological parameters recorded by the AWS include temperature, rainfall, relative humidity, evaporation, wind speed and wind direction. A summary of rainfall and temperature data collected from Springvale during 2025 is presented in **Table 6-1** and illustrated on **Figure 6-3**.

A total of 607.0 mm of rain was recorded in 2025, which is below both the average and 90th percentile ('wet year') rainfall conditions used in the water balance in the site Water Management Plan (2020). August 2025 had the highest rainfall (92.8 mm), and October 2025 had the lowest (19.2 mm). The minimum temperature recorded on site during the reporting period was -4.74°C in June 2025. The maximum temperature recorded was 21.38°C in December 2025.

Table 6-1. Meteorological Summary at Springvale Mine

Month	Rainfall (mm)	Cumulative rainfall (mm)	Min Temperature @2m*	Max Temperature @2m*
Jan-25	83.0	83	10.93	18.41
Feb-25	66.2	149.2	7.78	17.70
Mar-25	34.2	183.4	9.36	21.38
Apr-25	50.0	233.4	2.90	14.66
May-25	51.4	284.8	1.67	13.22
Jun-25	20.0	304.8	-4.74	10.71
Jul-25	64.4	369.2	-4.15	9.94
Aug-25	92.8	462	-1.86	13.52
Sept-25	52.2	514.2	0.74	16.05
Oct-25	19.2	533.4	3.20	19.60
Nov-25	29.4	562.8	2.51	18.75
Dec-25	44.2	607	4.14	21.16

Note: Calculated using data at 10 minute intervals

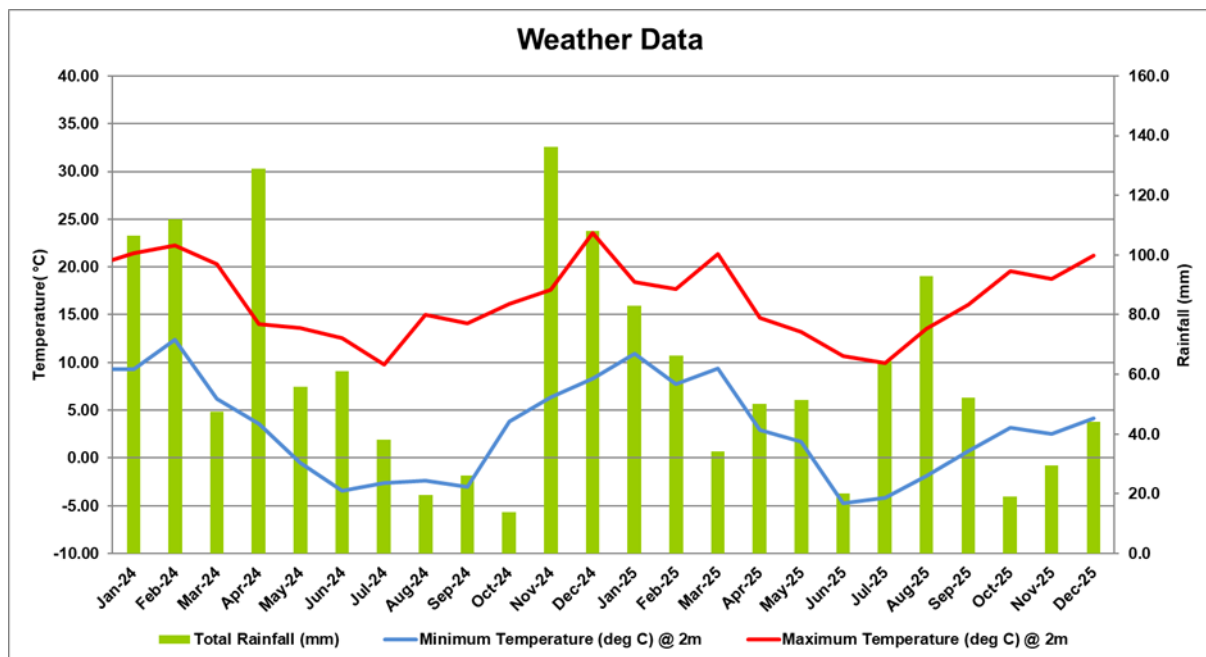


Figure 6-3. Annual temperature and rainfall from Jan 2025 to Dec 2025

An annual wind and velocity direction wind rose is presented in **Figure 6-4** below.

ALS Hydrographics Environmental

HYWROSE V87 Output 13/03/2026

Site SVAWS001 Springvale AWS
 Start Time 00:00_01/01/2025
 End Time 00:00_01/01/2026
 Wind Direction as Percentage of Time

0-0.5 m/s
 0.5-1.0 m/s
 1.0-3.0 m/s
 3.0-5.0 m/s
 5.0-7.0 m/s
 7.0-10.0 m/s
 >10.0 m/s

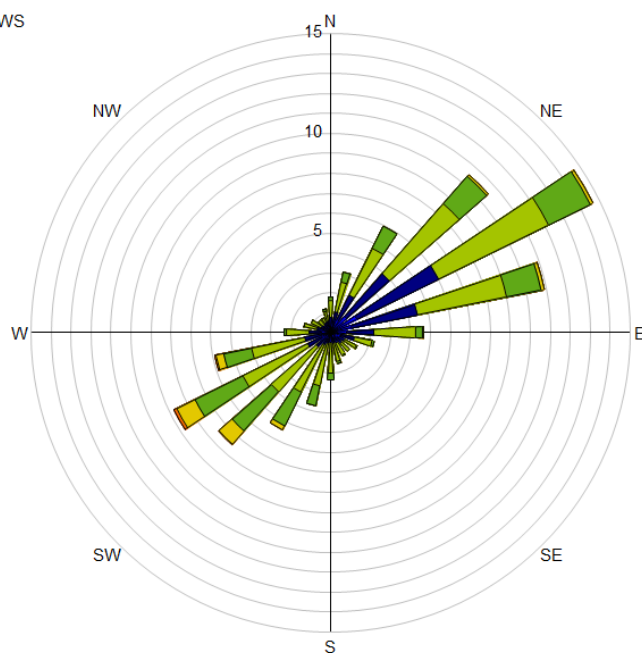


Figure 6-4: Wind Rose (2025)

6.2 NOISE

6.2.1 Environmental Management

Springvale manages noise in accordance with the *Western Region Noise Management Plan (WR-NMP)*. The WR-NMP is periodically revised in accordance with review requirements of Schedule 6, Condition 6 of SSD5594. The current approved version of the WR-NMP is dated November 2021. The WRNMP identifies sources of noise relevant to Springvale operations, which include:

- Operation of mobile equipment – e.g. trucks, dozers, loaders.
- Coal handling/processing plant – e.g. conveyors, washery, screens and hopper filling.
- Coal transporting activities – e.g. overland conveyors, haul trucks.
- Ventilation fans.

Key Noise mitigation measures for Springvale operations are:

- Maintaining all plant and equipment to manufactures specifications (ongoing).
- Operate mobile plant in a quiet, efficient manner and regular training of operators (ongoing).
- Installation of frequency modulated reversing alarms or “quakers” on mobile plant to replace reversing alarms (complete).
- Installing acoustic enclosures around processing plants (ongoing as required to ensure compliance).
- Switching off vehicles and plan when not in use (ongoing).

Additional noise management measures are outlined the WR-NMP.

6.2.2 Environmental Performance

Noise Criteria

Schedule 4, Condition 2 of SSD5594 provides noise criteria for three specified locations, and for all other privately-owned land. Condition L4.2 of EPL 3607 specifies noise limits at “*the nearest or most affected residence to determine compliance with L4.1*”.

Table 6-2 Noise Criteria

Receiver ID	Day LAeq (15 min)	Evening LAeq (15 min)	Night LAeq (15 min)	Night LA1 (1min)
S1	44	44	42	52
S2	43	43	43	53
S3	35	35	35	60
All other privately owned land	35	35	35	45

Attended Noise Monitoring

Quarterly noise monitoring surveys were undertaken during the 2025 reporting period in accordance with the WR-NMP. Attended noise surveys were undertaken at five locations shown on **Figure 6-1** which have been selected to be representative of identified receiver locations. Results for day, evening and night are presented in **Table 6-3**.

The monitoring results identified zero non compliances during the 2025 reporting period. The Springvale ventilation fan was not observed to be audible during the reporting period.

Table 6-3: Noise Results

EPL Location	Project Approval Location	Q1	Q2	Q3	Q4	Criteria Limit
Estimated Springvale Day (LAeq(15 minute)) Contribution (dBA) Results						
EPL ID No. 3	S1	Inaudible	Inaudible	Inaudible	Inaudible	44
EPL ID No. 4	S2	40	<30	<30	<30	43
Not Applicable	S3	Inaudible	Inaudible	Inaudible	Inaudible	35
EPL ID No. 5	S4	Inaudible	Inaudible	Inaudible	Inaudible	35
Not Applicable	S5	<24	Inaudible	Inaudible	Inaudible	35
Estimated Springvale Evening (LAeq(15 minute)) Contribution(dBA) Results						
EPL ID No. 3	S	35	36	<30	<30	44
EPL ID No. 4	S2	22	36	37	30	43
Not Applicable	S3	Inaudible	Inaudible	Inaudible	Inaudible	35
EPL ID No. 5	S4	Inaudible	Inaudible	Inaudible	Inaudible	35
Not Applicable	S5	<20	Inaudible	Inaudible	Inaudible	35
Estimated Springvale Night (LAeq (15 minute)) Contribution(dBA) Results						
EPL ID No. 3	S1	<20	39	32	33	42
EPL ID No. 4	S2	31	34	38	35	43
Not Applicable	S3	Inaudible	Inaudible	Inaudible	Inaudible	35
EPL ID No. 5	S4	<24	Inaudible	<20	<20	35
Not Applicable	S5	Inaudible	Inaudible	Inaudible	Inaudible	35
Estimated Springvale Night (LA) (1 minute)) Contribution (dBA) Results						
EPL ID No. 3	S1	<37	43	38	48	52
EPL ID No. 4	S2	53	43	42	45	53
Not Applicable	S3	Inaudible	Inaudible	Inaudible	Inaudible	60
EPL ID No. 5	S4	<24	Inaudible	<20	<20	45
Not Applicable	S5	Inaudible	Inaudible	Inaudible	Inaudible	45

6.2.3 Comparison against Predictions

Table 6-4 summarises the approved predictions for construction and operational noise, and performance against those for the 2025 reporting period.

Table 6-4. Summary of EIS Noise Predictions and Performance

EIS Predictions– Summary of Environmental Impacts	Performance During the Current Reporting Period
Construction Noise: Noise from construction of Newnes State Forest (now Gardens of Stone) surface infrastructure will be within the project specific noise limits.	There was no construction activities undertaken within the 2025 reporting period.

EIS Predictions– Summary of Environmental Impacts	Performance During the Current Reporting Period
Operational Noise: Pit top noise will be within the project specific noise limits following the staged implementation of a wide range of mitigation measures that will reduce existing noise levels. The consequence of the implementation of the Project mitigation measures will be the reduction in the historic noise exceedances for residential receivers along Springvale Lane. Noise modelling for the EIS predicted noise to exceed project-specific intrusive and amenity noise levels by up to 4 dba during the night-time period in adverse meteorological conditions.	No recorded exceedances of noise as summarised in Table 6-5. The last noise exceedance was recorded in 2019. No noise complaints recorded from sensitive receptors during 2025 reporting period.

6.2.4 Long Terms Analysis

Table 6-5 shows the number of noise non-compliances recorded by Springvale during the period 2021 to 2025.

Since 2019 there have been no recorded non-compliances in the quarterly noise assessments.

Table 6-5 Long Term Attended Noise Monitoring Trends

Project Approval Location	2021	2022	2023	2024	2025
S1	0	0	0	0	0
S2	0	0	0	0	0
S3	0	0	0	0	0
S4	0	0	0	0	0
S5	0	0	0	0	0

6.2.5 Implemented / Proposed Improvements

Noise management controls are considered effective based upon compliance with the noise criteria. Springvale will continue to implement the WR-NMP.

Springvale will review and revise, if necessary, the WR-NMP in accordance with Schedule 6, Condition 6 of SSD5594.

6.2.6 Acquisition

There have been no requests received or actions undertaken during the reporting period.

6.2.7 Blasting

There was no blasting carried out at the Springvale site during the 2025 reporting period.

6.3 AIR QUALITY

6.3.1 Environmental Management

Springvale manages air quality in accordance with the Western Region Air Quality and Greenhouse Gas Management Plan (WR-AQGHGMP) required by Schedule 4, Condition 7 of SSD5594. The WR-AQGHGMP is progressively updated in accordance with Schedule 6, Condition 6 of SSD5594. The current version (V7) was approved by DPHI on 19 February 2025.

The following sources of dust emissions were identified in the WR-AQGHGMP relevant to Springvale Mine operations:

- Wind erosion from coal stockpiles;
- Wind erosion from disturbed areas and coal stockpiles;
- Wheel generated dust from vehicle movements;
- Fugitive emissions from coal handling and processing.
- Fugitive emissions through mine ventilation fans as a result of underground mining operations;
- Coal transporting activities; and
- Operation of mobile equipment.

Key dust mitigation measures for Springvale Mine operations are:

- Signage to display speed limits on all unsealed roads in the surface facilities area;
- Water sprays on unsealed areas during use or windy conditions; and
- Water sprays (sprinkler system) on the coal product stockpile as required.

Air quality monitoring is undertaken in accordance with the Western Region Air Quality and Greenhouse Gas Management Plan (WR-AQGHGMP), which comprises both short-term and long-term monitoring programs. Springvale transitioned from the short-term to the long-term monitoring program in 2022, as detailed in correspondence to DPHI dated 15 June 2022, and the short-term suspended dust monitoring network has since been retired. The long-term monitoring network currently comprises two dust deposition gauges (DG1 and DG2) and one real-time PM₁₀ monitoring station, consistent with commitments under SSD 5594, including the installation of real-time monitoring to assess regional air quality. Specific monitoring locations are defined in the WR-AQGHGMP, prepared in accordance with Schedule 4, Condition 7 of SSD 5594.

Two monitoring locations for depositional dust are also prescribed in Condition P1.1 of EPL3607.

The air quality monitoring locations assessed under the WR-AQGHGMP are shown in **Figure 6-1**.

6.3.2 Environmental Performance

Air Quality Criteria

Air quality is assessed against the performance criteria as per Schedule 4, Condition 5 of SSD5594. The relevant air quality criteria is displayed in **Table 6-6**. Springvale undertakes air quality monitoring in accordance the WR-AQGHGMP.

Table 6-6: Air Quality Criteria as per SSD5594 (Cond 5, Sch 4)

Pollutant	Averaging period	Criterion	
Total suspended particulate (TSP) matter	Annual	90 µg/m ³ (a,d)	
Particulate matter < 10 µm (PM ₁₀)	Annual	25 µg/m ³ (a,d)	
Particulate matter < 10 µm (PM ₁₀)	24 hour	50 µg/m ³ (a)	
		Max. rolling average increase	Max. annual average
Deposited Dust	Annual	2 g/m ² /month (b)	4 g/m ² /month (a,d)

Notes:

a Cumulative impact (i.e. increase in concentrations due to the development plus background concentrations due to all other sources).

b Incremental impact (i.e. increase in concentrations due to the development alone, with zero allowable exceedances of the criteria over the life of the development).

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, fire incidents or any other activity agreed by the Secretary.

e "Reasonable and feasible avoidance measures" includes, but is not limited to, the operational requirements in conditions 6 and 7 to develop and implement an air quality management system that ensures operational responses to the risks of exceedance of the criteria.

Dust Deposition

The annual dust deposition results are presented in **Table 6-7** below and graphically in **Appendix 3**. The annual averages for deposited dust are below the predicted ranges and remain compliant with the performance criteria.

Table 6-7: Summary of Dust Deposition Results (2025)

Dust Deposition Gauge		Insoluble Solids (g/m ² /month)			Air Quality Criteria ¹
Site ID	General Location	Min	Mean	Max	
DG 1	Off Springvale Lane within Lot 73 DP 751651 midway along southern boundary of allotment	0.10	0.54	1.68	4 (total) 2 (Maximum increase annual average)
DG 2	Off Millers Road within Lot 1 DP 856879 south west corner of allotment	0.07	0.67	1.80	

¹ Annual Average insoluble solids (g/m²/month) as per Condition 5, Schedule 4 of SSD5594.

Real Time Monitoring

Real time air quality monitoring for PM₁₀ utilises a BAM unit (**Figure 6-1**). Due to the single monitoring unit being shared across multiple operations (e.g. Lidsdale Siding), a conservative ratio of 0.45 has been applied to assess compliance with TSP criteria using PM₁₀ data.

The 24hr average and annual average real time results for PM₁₀ are presented in **Table 6-8** and **Appendix 4**. The results were compliant with the goals of the WR-AQGHGMP of 50µg/m³ and 25µg/m³ respectively. The annual average real time results for TSP were also below the goal of 90µg/m³ (refer **Table 6-8**) within the WR-AQGHGMP.

The BAM unit PM₁₀ data capture rate was 98.6% during the 2025 Reporting Period. Due to an equipment malfunction, the BAM unit did not record data from 9 to 13 January 2025. Notwithstanding this short outage, the overall data capture rate remained high and exceeded typical data availability expectations for continuous particulate monitoring systems operating within the framework of the National Environment Protection (Ambient Air Quality) Measure (Air NEPM).

Table 6-8: Real Time Results for Particulate Matter

Pollutant (Averaging Period)	Criterion (µg/m ³)	Maximum (µg/m ³)	Mean (µg/m ³)
PM ₁₀ – 24-hour (short-term)	50	36.3	N/A
PM ₁₀ – annual (long-term)	25	N/A	11.2
TSP (estimated) ¹ annual	90	N/A	27.9

Notes: ¹ Calculated TSP concentration estimate (PM₁₀ annual average divided by 0.45)

6.3.3 Comparison against Predictions

Predicted dust levels from the project (as approved) were expected to meet relevant air quality criteria for TSP, PM₁₀, PM_{2.5} and dust deposition. Dust deposition, TSP and PM₁₀ as monitored were compliant during the reporting period, which is consistent with EIS predictions that dust levels are expected to meet relevant air quality criteria listed in SSD5594 for TSP, PM₁₀ and depositional dust.

6.3.4 Long Terms Analysis

Table 6-9 provides a summary of air quality monitoring annual averages for the five years from 2021 to 2025 for the following:

- Deposition dust (insoluble solids)
- PM₁₀
- TSP

Since 2021, the depositional dust levels at DG 1 and DG 2 have been stable and remain compliant with the performance criteria.

BAM results are consistent with previous years. All long-term results meet the relevant air quality criteria.

Table 6-9: Long term trends for Deposited Dust, PM10 and TSP

Monitoring Location	Annual Averages					Development Consent Criteria (Annual Average) ¹
	2021	2022	2023	2024	2025	
Depositional Dusts - Insoluble						
DG1	0.74	0.70	0.76	1.70	0.54	4 g/m ² /month
DG2	0.53	0.42	0.40	0.58	0.67	
Suspended Dust - PM ₁₀ (µg/m ³)						
HVAS / BAM	6.25	12.9 ²	13.8	13.98	11.2	25 µg/m ³
Suspended Dust - TSP (µg/m ³)						
HVAS / BAM	12.51	28.7 ²	30.8	31.06	27.9	90 µg/m ³

¹ As per footnote (d) of Schedule 4 Condition 5, the criteria **exclude** extraordinary events such as fires. Data from the long term reporting period has therefore been excluded where bushfire occurred.

² During 2022 suspended dust monitoring transitioned to the long term network. Accordingly, averages presented for 2022 onwards are from BAM real time monitoring of PM₁₀. TSP is estimated on a ratio basis as detailed further in **Section 6.3.2** above.

6.3.5 Implemented / Proposed Improvements

Dust emission controls are currently considered effective based upon compliance of suspended and depositional dust with air quality criteria.

Springvale will continue to implement the WR-AQGHGMP and will review and revise the WR-AQGHGMP in accordance with Schedule 6, Condition 6 of SSD5594 as required.

6.4 GREENHOUSE GAS EMISSIONS

6.4.1 Environmental Management

Springvale manages, monitors, and reports Greenhouse Gas (GHG) Emissions in accordance with the Western Region Air Quality and Greenhouse Gas Management Plan (WR-AQGHGMP).

Direct GHG emissions (Scope 1) and indirect GHG emissions (Scope 2) from Springvale continue to be monitored and reported annually in accordance with the Commonwealth Government National Greenhouse and Energy Reporting System (NGERS). An Energy and Greenhouse Management System is used to monitor and report energy usage. Key Performance Indicators (KPIs) are tracked, which include energy demand and GHG emissions per tonne of ROM coal produced.

6.4.2 Environmental Performance

Table 6-10 reports the Scope 1 Emissions (Direct) and Scope 2 Emissions (Indirect) in tonnes CO₂-e produced for the last five reporting periods including the current period and compares these against EIS/EIA predictions. It is noted that this is *inclusive* of Springvale Coal Services too, due to being collectively considered as one 'facility' for the purposes of NGERS reporting.

Table 6-10: Summary of GHG Emissions Reporting for 2021-2025 Financial Years

Emission Sources	Estimated Emissions (tonnes CO _{2-e}) ²					Predicted Emissions (as modified ¹)
	FY21	FY22	FY23	FY24	FY25	
Scope 1 Emissions (direct emissions)						
Coal Extraction (Fugitives)	28,005	15,742	14,543	7,747	17,703	28,496
Post Mining	0	0	0	0	0	-
Diesel Fuel Used	3,346	3,228	2,389	2,635	2,488	6,322
Oil Used	121	130	184	162	183	180
Grease Used	0	1	0	0	0	
SF6 Used	14	13	13	16	16	-
Total Scope 1²	31,628	19,256	17,402	10,640	20,389	34,998
Scope 2 Indirect Emissions						
Electricity Consumption	72,337	72,824	69,589	62,852	59,723	97,997
Total Scope 2²	72,337	72,824	69,589	62,852	59,723	97,997
Combined Greenhouse Gas Emissions (Scope 1 and 2)						
Scope 1 and Scope 2 Emissions²	103,965	92,080	86,991	73,491	80,113 +9.0%	132,995

¹ as per approved modifications to SSD5594. GHG was varied only by MOD1 (2016), approved April 2017.

² This is inclusive of Springvale Coal Services (considered as one 'facility' for NGERs reporting).

³ 2022 Annual review presented LPG only. Historic data has been corrected and this year's data includes LPG, Oil and Grease usage.

During the 2025 reporting period, total greenhouse gas emissions (Scope 1 and Scope 2) increased relative to the previous year. The variation can be explained as Springvale experiences variation in gas content with limited samples of the insitu content available to model this variation. Production uplift was also experienced in Financial Year 2025 (July24 - Jun25) with Springvale producing 2.92Mt ROM in FY25 versus 2.364Mt ROM in FY24. This increase in production, alongside the variable insitu gas content resulted in the 9% increase in Scope 1 emissions.

Over the FY21–FY25 reporting period, total greenhouse gas emissions (Scope 1 and Scope 2) demonstrate an overall declining trend, despite year-to-year variability associated with operational conditions, with emissions in recent years remaining consistently below predicted levels.

6.4.3 Comparison Against Predictions

Table 6-10 summarises greenhouse gas emissions predicted for the project, with comparison to actual emissions during the current and previous reporting periods.

Across the reporting period, total greenhouse gas emissions (Scope 1 and Scope 2) have remained consistently below predicted levels in each year. Scope 1 emissions, including fugitive emissions, show the greatest variation relative to predicted values, with actual emissions substantially lower than predicted across all reporting years. Scope 2 emissions are

also consistently below predicted levels, with a smaller but persistent variance between actual and predicted values. This pattern is consistent across all reporting years, with no instances where actual emissions exceed predictions.

6.4.4 Long Term Analysis

Table 6-10 presents a summary of GHG emissions reported over the last five financial years. Based on the information reported, GHG emissions have been below predictions for the project since 2020, with Scope 2 emissions below predictions since 2018. Further measures to reduce and minimise GHG emissions are discussed in **Section 6.4.5** below.

6.4.5 Implemented / Proposed Improvements

Springvale implements measures to minimise GHG emissions to the greatest extent practicable and will continue to implement emission reduction measures in accordance with the WR-AQGHGMP.

Springvale has been investigating potential mitigation measures to reduce and minimise GHG for a number of years. The following key sources of GHG emissions have been identified relevant to the Centennial operations:

- Energy usage (fuel and electricity).
- Ventilation Air Methane (VAM), which is the release of dilute methane gas from ventilation fans to the atmosphere.

Additional emissions reduction measures implemented as per the management plan include:

- Cost effective measures to improve energy efficiency.
- Regular maintenance of plant and equipment to minimise fuel consumption, and
- Consideration of energy efficiency in plant and equipment selection.

6.5 BIODIVERSITY

6.5.1 Environmental Management

Management and monitoring of biodiversity at Springvale is undertaken in accordance with a number of management plans required under conditions of both state and commonwealth approvals as outlined below.

- The Western Region Biodiversity Management Plan (WR-BMP) was prepared to address Schedule 4, Condition 18 of SSD5594 and has been periodically revised in accordance with Schedule 6, Condition 6 and agency feedback. Due to the complexities associated with obtaining approval for the WR-BMP, a site-specific Biodiversity Management Plan was submitted to DPHI in April 2025 and remained under assessment at the end of the reporting period (SSD-5594-PA-132).
- Management of potential subsidence-related impacts on biodiversity within underground mining areas (extraction areas) is undertaken in accordance with:
 - Biodiversity Management Plans (BMP) and Swamp Monitoring Programs (SMP) developed as part of Extraction Plans (EP) progressively approved as mining moves through the development consent area, in accordance with Schedule 4, Conditions 10h(iv) and 10h(v) of SSD5594.
 - Specific conditions of Commonwealth approvals under the EPBC Act - including requirements to develop specific management, monitoring and research plans for biodiversity protected at national level, as outlined further below.

In addition to the above management plans, biodiversity at Springvale is further managed by:

- Biodiversity offsetting requirements under conditions of SSD5594 and EPBC approvals - including relevant impact swamps EEC and associated threatened species, is managed in accordance with:
 - Western Region Biodiversity Offset Strategy (WR-BOS); and
 - Springvale Swamp Offset Strategy, as detailed further in **Section 6.5.5.1**.
- Threatened Species Licences and (former) Section 95(2) Certificates - issued under the *NSW Biodiversity Conservation Act* and (former) *NSW Threatened Species Conservation Act* respectively as detailed further in **Section 3**.
- Springvale also implements a Catchment Improvement and Land Management Plan (CILMP) for dedicated lands located within the Cocks River catchment in accordance with Condition 18a, Schedule 2 of consent SSD5594. The CILMP (October 2017) was initially approved by DPIE (now DPHI) on 8 March 2018 as detailed further in **Section 6.5.5.1**.

Trigger Action Response Plans (TARPs) are developed and appended to relevant plans of management as required. Monitoring against TARP triggers and reporting (notifications) of trigger exceedances is undertaken in accordance with the related plan of management and reported in relevant sections of this Annual Review.

Monitoring undertaken in relation to relevant management plans discussed above is discussed in **Section 6.5.2**. Management and monitoring of biodiversity offset areas is detailed in **Section 6.5.5.1**. Related surface and groundwater monitoring relevant to biodiversity is detailed in **Section 7**.

This section of the Annual Review focuses on the extraction area (Newnes Plateau) of Springvale.

6.5.2 Environmental Performance

This section presents the performance measures and criteria applicable to, and results of, biodiversity monitoring undertaken during the 2025 reporting period. Preliminary discussion to provide broader context is provided immediately below.

Context to biodiversity impacts resulting from the 2019-2020 wildfires:

During 2019-2020 the Gospers Mountain fire extensively impacted the surface environment within and significantly beyond the mining lease at Springvale. This resulted in significant impacts to biodiversity (flora and fauna) that is expected to take a number of years (and in cases decades) to recover. Accordingly, monitoring programs include consideration and discussion in this context as appropriate.

Context to approved offsets for swamps impacted by mining:

Biodiversity management and monitoring at Springvale includes a focus on Temperate Highland Peat Swamps on Sandstone (THPSS) and associated threatened species. Within the mining lease THPSS is comprised of Newnes Plateau Shrub Swamps (NPSS) and Newnes Plateau Hanging Swamps (NPHS). NPSS 'impact swamps' identified within the mining area that have or may be impacted by existing and future mining (detailed further in **Section 6.5.2.2**) have been offset under approved strategies in accordance with the requirements of SSD5594 and EPBC approvals, as detailed in **Section 6.5.6**. Impact swamps continue to be monitored as required under related swamp monitoring programs discussed in **Section 6.5.2.2**.

6.5.2.1 Performance Measures

SSD5594 and EPBC conditions of approval prescribe performance measures for Springvale mine in relation to biodiversity. Impact swamps have approved offsets as required under SSD5594 and commonwealth EPBC approvals, as detailed in **Section 6.5** of this annual review.

Springvale has established performance indicators with escalating triggers and levels of investigation via TARPs within each EP. Specific floristic triggers for swamp monitoring are prescribed in Table 9.3 of the LW 415-432 BMP.

A summary of control swamps and potential impact swamps by longwall mining area as relevant to SSD5594 is presented in **Table 6-11**.

Table 6-11 List of Impact Swamps and Control Swamps

Longwalls	Newnes Plateau Shrub Swamps (NPSS) (MU50)		Newnes Plateau Hanging Swamps (NPHS) (MU51)	
	Impact Swamps	Control Swamps	Impact Swamps	Control Swamps
413A/413B - 414	Sunnyside	Barrier Best Carne Central Firetail Twin Gully Tristar	-	Amphitheatre Firetail Twin Gully
415-417	Carne West Sunnyside Sunnyside East		Sunnyside East	
418	Carne West Sunnyside East		-	
419	Gang Gang East Gang Gang West Carne West Sunnyside East		-	
420-422	Nine Mile Sunnyside East Carne West		-	
424-427	Pine Marrangaroo Paddys Creek Nine Mile		Pine	
428-432	Marrangaroo Lost City Lost City North Lost City South		Marrangaroo Lost City Lost City North Lost City South Plum Ninox Wishbone	

The following section provides details for specific aspects of monitoring undertaken during the 2025 reporting period, including further discussion in relation to triggers. For the purpose of providing a summary in the Annual Review, results have been grouped by the monitoring methodology prescribed in the relevant Extraction Management Plans.

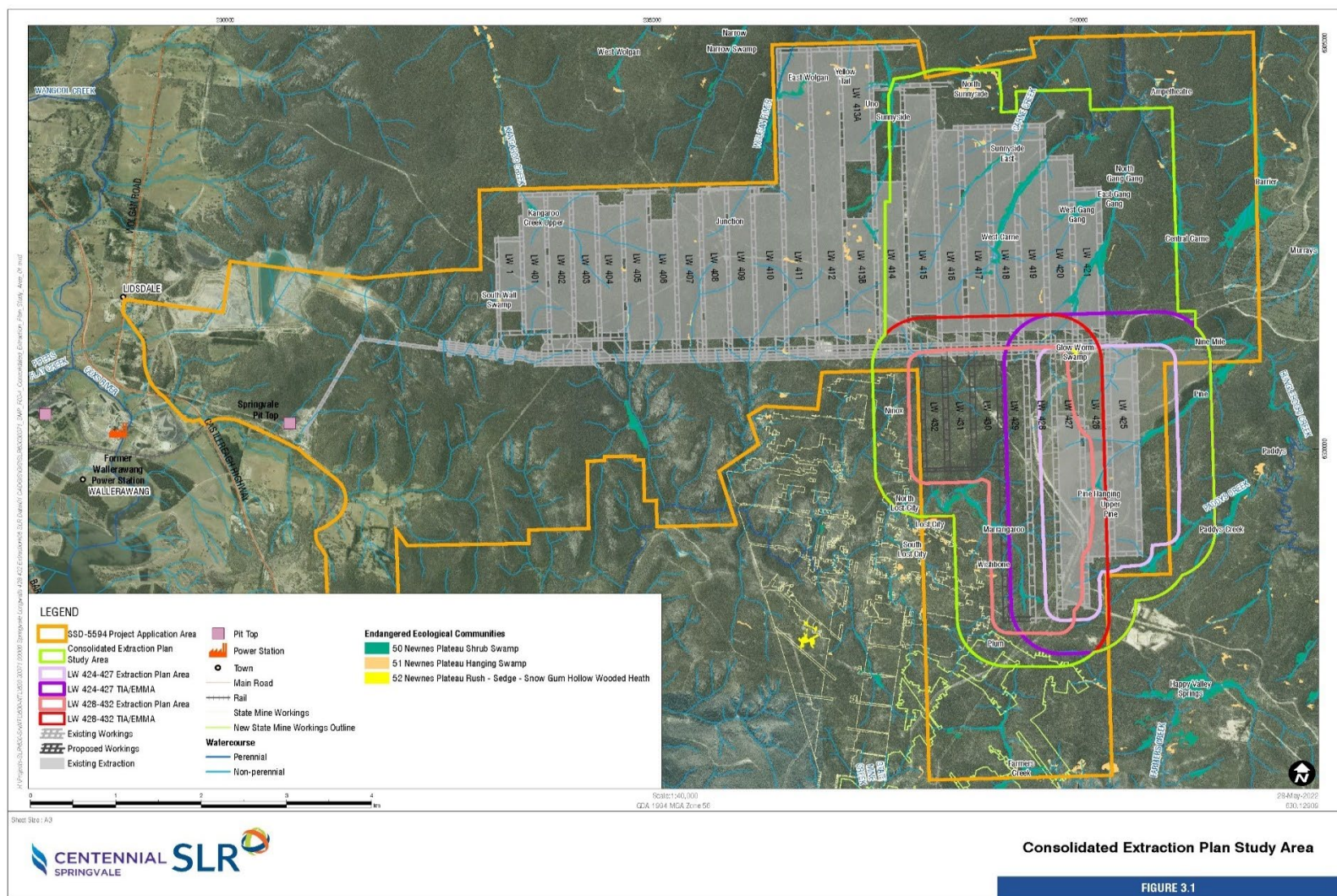


Figure 6-5: Springvale Consolidated Extraction Plan Study Area (CEPSA)

6.5.2.2 Swamps / Flora Monitoring

The following sections discuss 2025 monitoring results and provides context to performance indicators in associated TARPs as applicable to approved management and monitoring plans.

The Temperate Highland Peat Swamps on Sandstone (THPSS) Monitoring and Management Plan (MMP) (LW 415-417) prescribes the requirements for monitoring the effects of mining on THPSS located above LW 415-417. The applicable Swamp Monitoring Programs (SMP) as detailed in **Section 6.5.2.1** prescribe the requirements for monitoring THPSS in all other extraction areas, including swamp-obligate species such as the Blue Mountains Water Skink (BMWS) and Giant Dragonfly.

Flora monitoring for THPSS for LW 415 – 417 and LW 418 are methodologically identical. Flora monitoring for LW 419, LW 420-422, LW 424 – 427 and LW 428-432 are methodologically identical but apply to different swamps with varying baseline and trigger levels. The exception to this is Marrangaroo Swamp which was considered in the LW 424-427 and LW 428-432 section. Due to the timing of groundwater impacts flora data is presented in the LW 428-432 section to remove duplication.

LW 415-418 Flora Monitoring - THPSS MMP Nested Transect Monitoring

The monitoring for this program consists of established 20m x 20m flora quadrats, within which transects occur with 0.5m point intercepts. Trigger analysis for this program against the related TARP are summarised in **Table 6-12**.

LW419-432 Flora Monitoring - Brownstein et al flora monitoring

The Brownstein et al flora monitoring methodology is conducted for swamps within the investigation area for LW 419-428. The seasonal component of Brownstein et al flora monitoring within the surveyed areas included an analysis of aerial imagery using a Soil Adjusted Vegetation Index, and field validation using Ground Control Point (GCP) flora data.

Longwall 415-418

Sustained triggers continued to be observed at both West Carne and Sunnyside East swamps during the Spring 2025 monitoring. Floristic composition within the impacted West Carne sites continues to show persistent change, with the species assemblage progressively transitioning away from that associated with the THPSS EEC and increasingly favouring woodland species under ongoing dry conditions. While Sunnyside East remains broadly comparable to reference sites in terms of species richness and condition, some indicators such as increased eucalypt occurrence and bare ground suggest potential emerging moisture stress. Overall, the Spring 2025 results remain consistent with recent monitoring trends and indicate continued dry conditions influencing vegetation composition within the impacted swamps.

Wildfire influence on the Spring 2025 survey results varies according to fire intensity and swamp condition. Low moisture levels prior to the Gospers Mountain Fire likely exacerbated fire impacts by reducing the swamps' ability to form moisture-retaining peat and increasing desiccation risk (Tomkins and Humphries 2006; Commonwealth of Australia 2014; Krogh 2022), often promoting woodland species better adapted to drier conditions. Nearly six years after the fire, reference swamps appear to have largely recovered toward pre-fire functionality, while regeneration in impact swamps remains slower, reflected in higher eucalypt occurrence, greater non-live ground cover, and reduced vegetation recovery relative to reference swamps.

West Carne Swamp and Sunnyside East Swamp have been offset in accordance SSD 5594 Schedule 3, 4 and 5, EPBC 2013/6881 Condition 5 and EPBC 2011/5949 Condition 14.

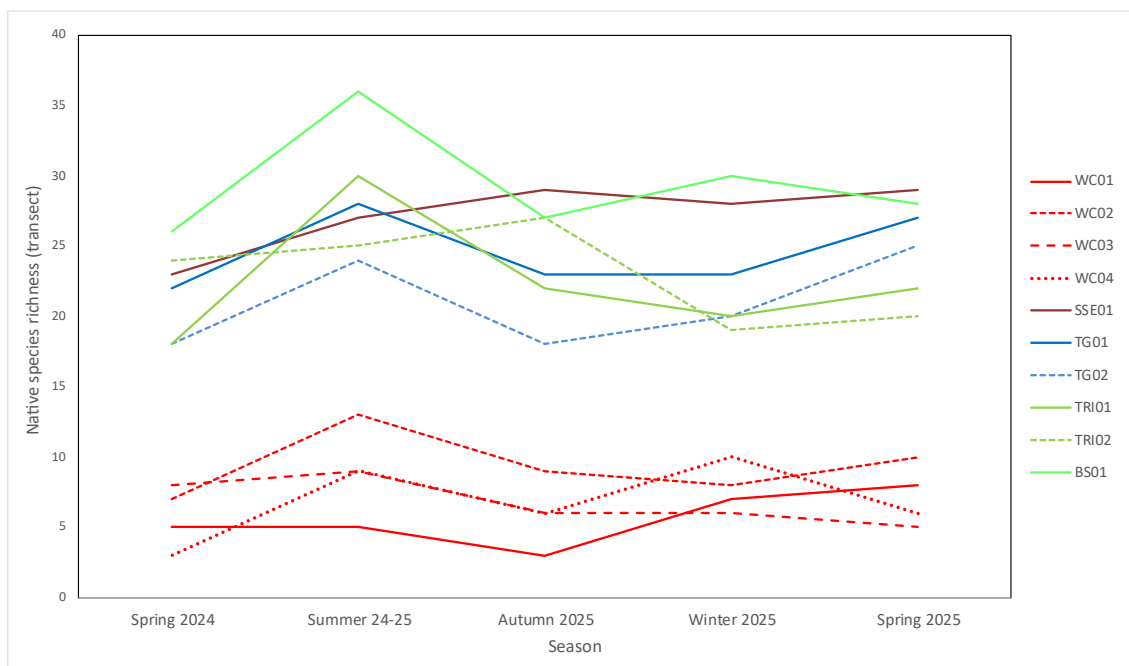


Figure 6-6 Native Species Trends

Longwall 419

The 2025 monitoring results indicate that all impacted shrub swamps remained below their baseline minimum swamp extent, consistent with previous years. Three of the four shrub swamps showed further declines in planar area compared with 2024 with Carne West displaying the most substantial reduction, falling to almost half of the previous year's average.

SAVI live-green analysis also identified trigger exceedances in three of the four impact shrub swamps, Carne West, Gang Gang East and Gang Gang West. For Carne West and Gang Gang East, these exceedances have persisted since 2022. These same swamps also recorded live-green cover below the lower threshold in the GCP data, reinforcing the SAVI trends. In contrast, control shrub swamps did not exhibit comparable declines, with planar area and live-green cover remaining within baseline variability, albeit with a slower recovery trajectory following the 2019/20 fire.

Impact hanging swamps (Carne West Hanging and Sunnyside East Hanging) performed more strongly across all remote sensing indicators. Neither swamp fell below the baseline minimum extent, and both maintained SAVI live-green cover above trigger thresholds. This pattern aligns with observations in the corresponding control hanging swamps, which also demonstrated stable or improving live-green cover.

Results are presented in **Figure 6-7** to **Figure 6-9**.

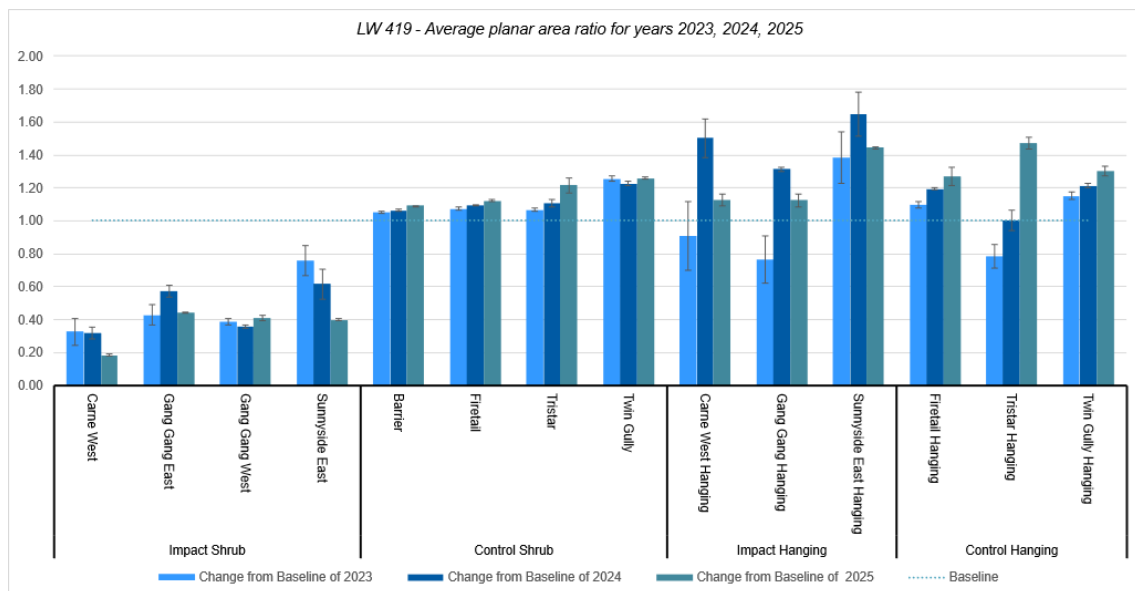


Figure 6-7 LW 419 average planar area ratio and SE for years 2023, 2024 and 2025

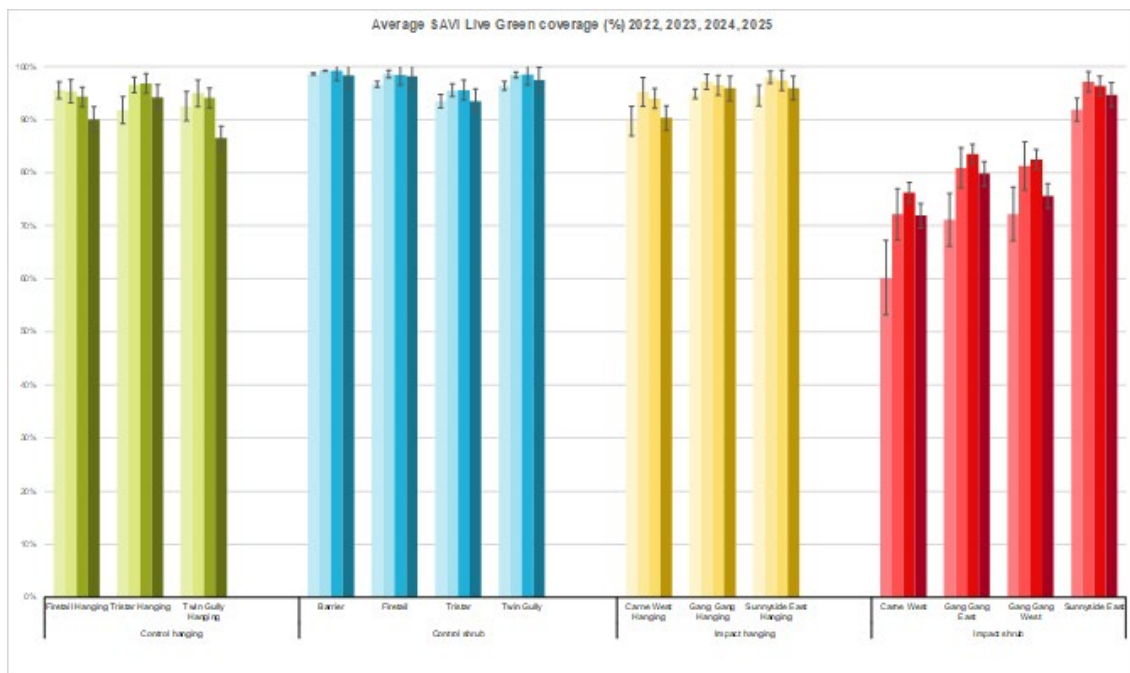


Figure 6-8 LW 419 – SAVI average live green cover (%) and SE of control and impact swamps in 2023, 2024 and 2025

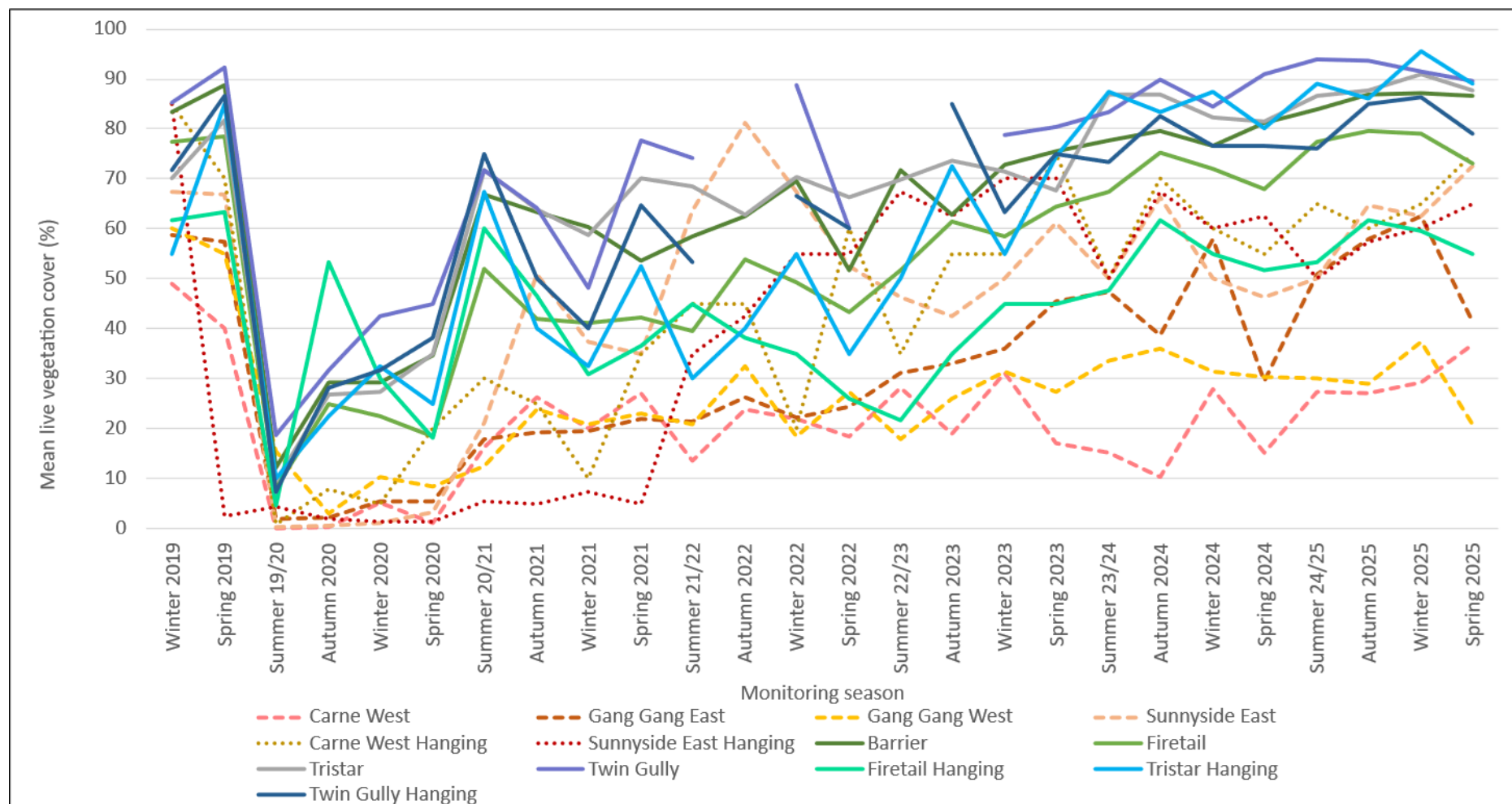


Figure 6-9 LW 419 impact and control shrub and hanging swamp mean GCP live green vegetation cover % recorded since winter 2019.

Longwall 420-422

Remote sensing results continue to show stable swamp extent and vegetation health at Nine Mile. Planar area has remained above the baseline minimum extent since 2023 with no indication of contraction during 2025.

SAVI analysis also indicates consistently high live green cover (~98%), reflecting strong photosynthetic activity. The 1% seasonal decrease recorded in 2025 is minor and remains within natural variability, aligning with trends observed in the LW 420–422 control swamps.

Although GCP monitoring recorded a hard trigger for live green cover in spring 2025, approximately, 10% below baseline, this result appears to be a single-season deviation, not a persistent decline. This is evident in where the Nine Mile confidence interval for live green cover is narrow and does not show progressive degradation. The broader remote sensing dataset therefore supports the interpretation that canopy health remains stable at Nine Mile.

Results are presented in **Figure 6.10 to 6.12**.

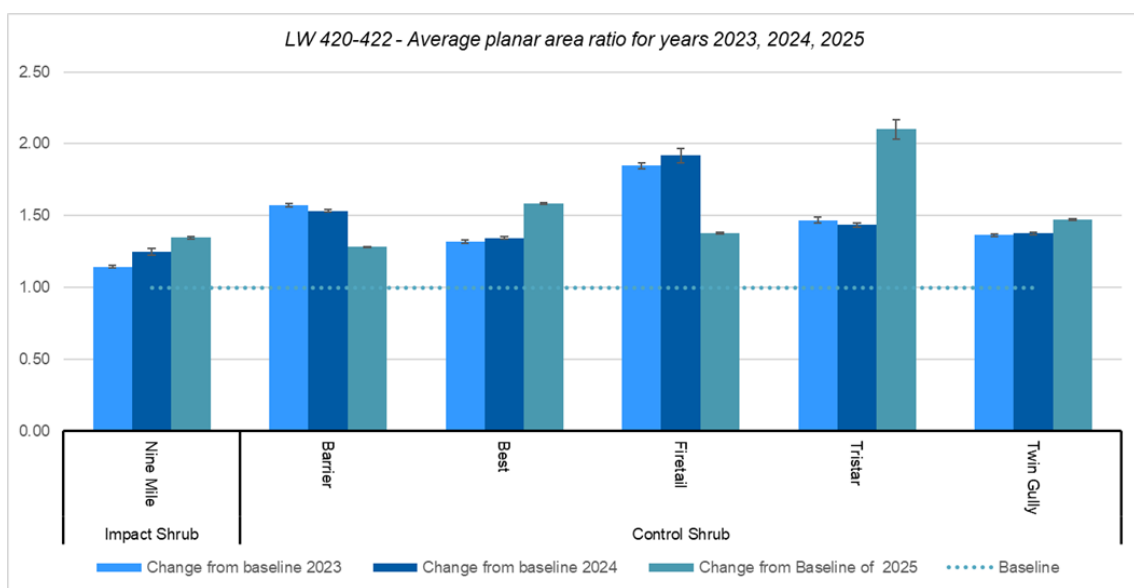


Figure 6-10 LW 420-422 average planar area ratio and SE for years 2023, 2024 and 2025

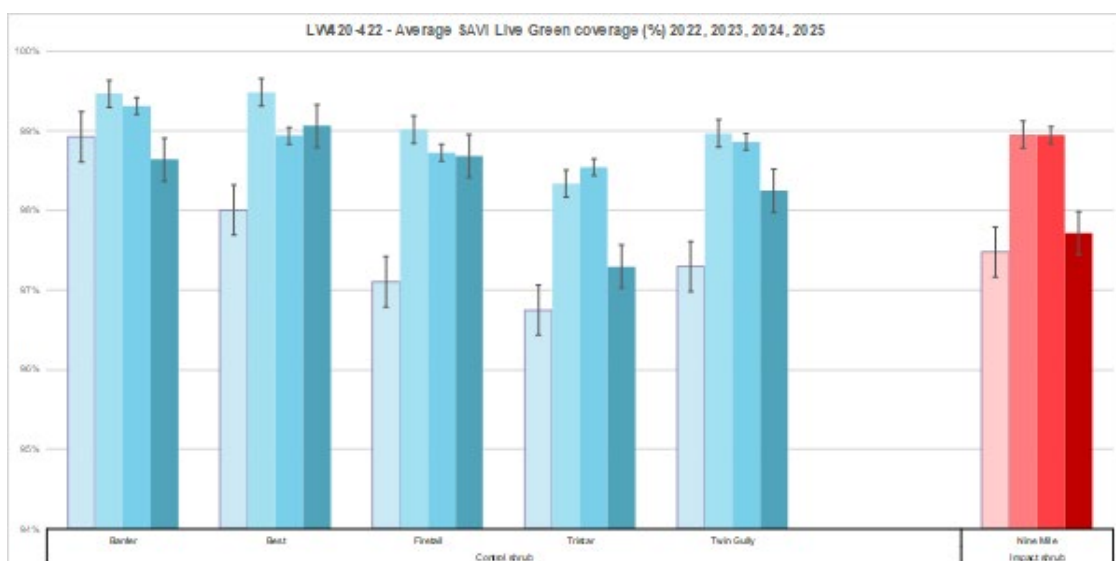


Figure 6-11 LW 420-422 SAVI average live green cover (%) and SE of control and impact swamps in 2023, 2024, and 2025



Figure 6-12 LW 420-422 impact and control shrub and hanging swamp mean GCP live green vegetation cover % recorded since winter 2019.

Longwall 424-427

Remote sensing shows that swamp planar areas within the LW 424–427 Trigger Investigation Area (TIA) have remained stable and above the baseline minimum extent since 2022. Pine Upper exhibited an atypical size increase in 2022, and Pine Hanging has shown a moderate upward trend, likely reflecting post-fire expansion of low-growing vegetation during the wetter La Niña years.

SAVI results indicate that live-green cover remained high (>95%) across all swamps, consistent with strong photosynthetic activity and comparable to 2023. However, two impact swamps, Marrangaroo and Paddy's Creek, recorded lower SAVI live-green cover relative to the control shrub swamps. This decline aligns with the GCP results, where both swamps recorded live-green cover below their lower baseline thresholds. While these values remain well above critical vegetation loss levels, they signal potential early signs of ecological stress.

Pine Hanging impact swamp, however, showed SAVI live-green cover comparable to all control hanging swamps, indicating a stable canopy condition.

Results are presented in **Figure 6-13** to **Figure 6-15**.

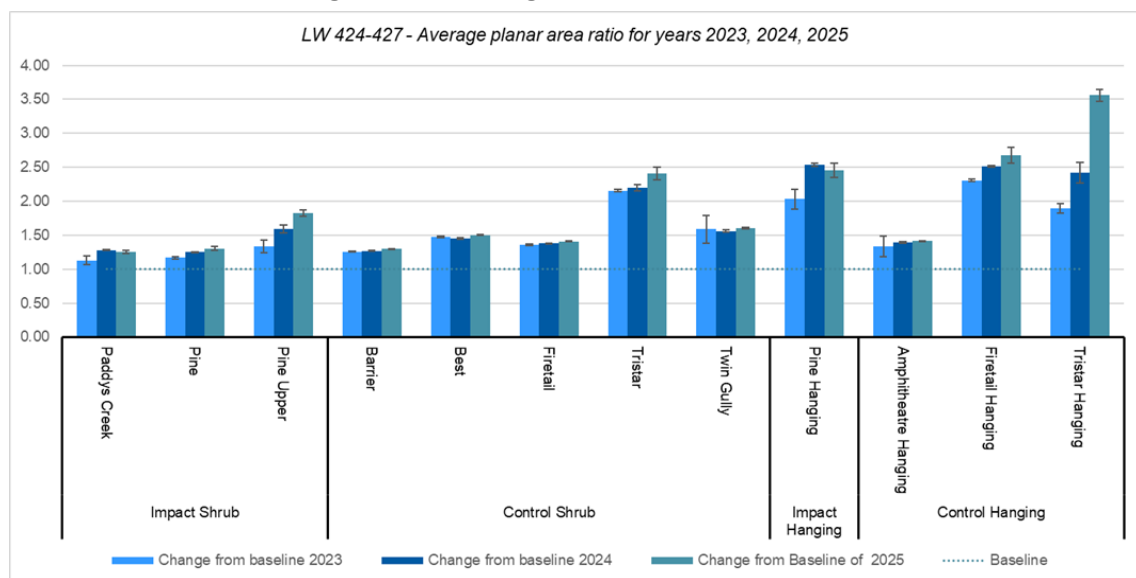


Figure 6-13 LW 424-427 average planar area ratio and SE for years 2023, 2024 and 2025

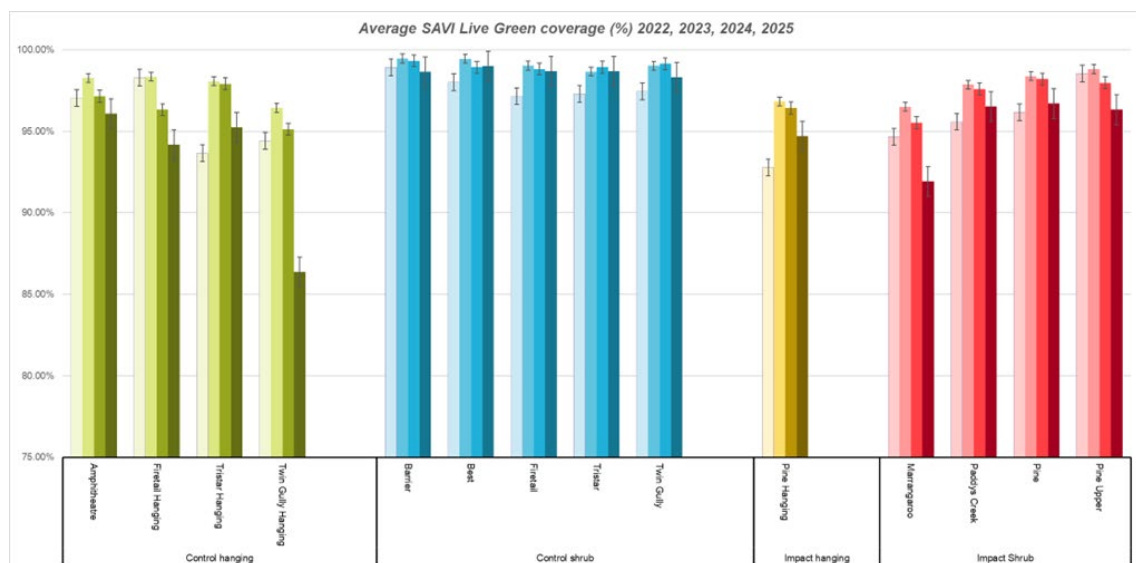


Figure 6-14 LW 424-427 SAVI average live green cover (%) and SE of control and impact swamps in 2023, 2024 and 2025

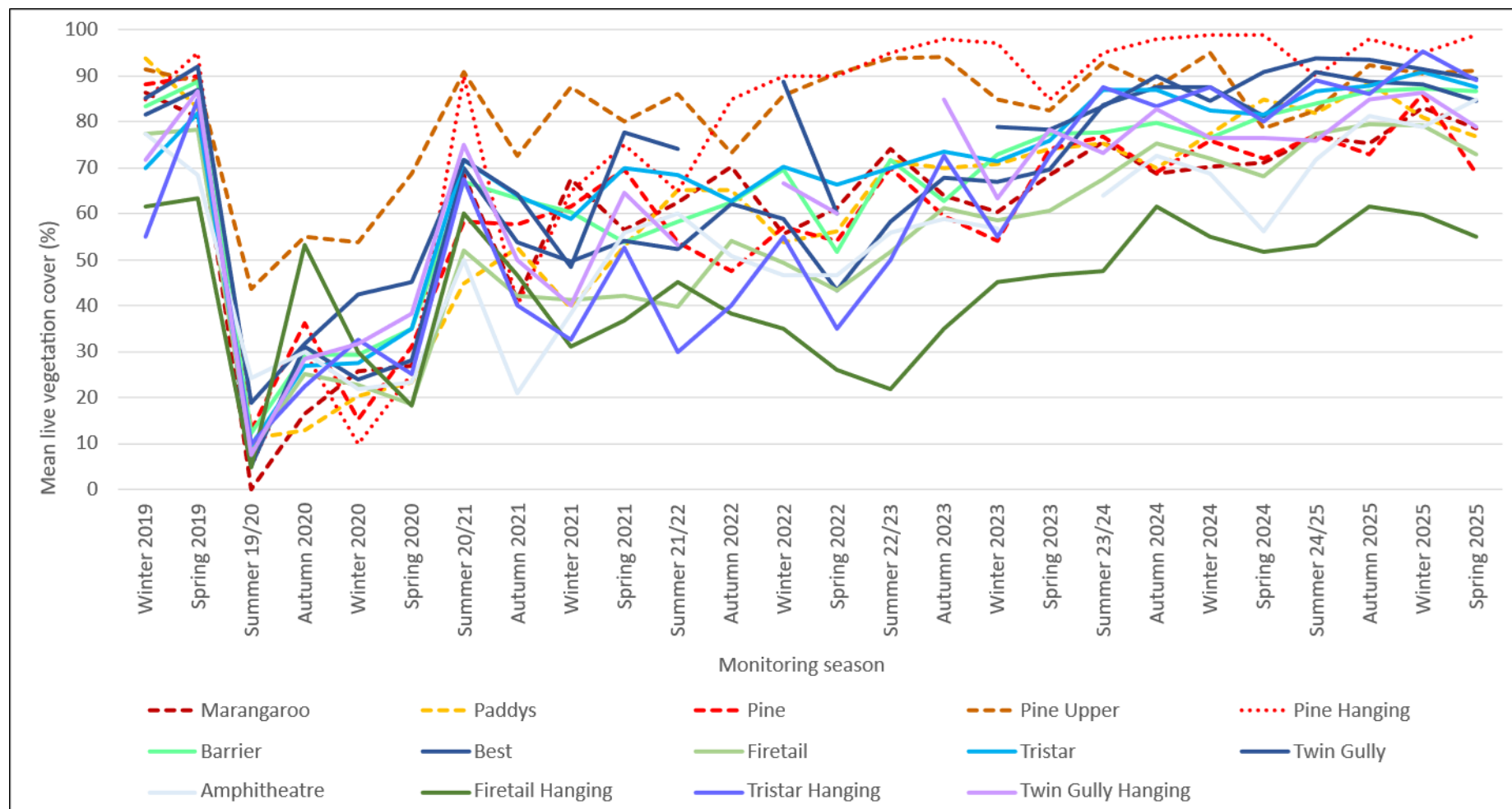


Figure 6-15 LW 424-427 impact and control shrub and hanging swamp mean GCP live green vegetation cover % recorded since winter 2019.

Longwall 428-432

Analysis of the spring 2025 remote sensing data indicates that all impact and control swamps maintained planar areas at or above their respective baseline extents, continuing the general pattern observed since the commencement of seasonal monitoring. Between 2024 and 2025, most swamps showed incremental increases or stable conditions, with no sites approaching the 10% reduction trigger threshold.

Across the impact shrub swamps, planar area has displayed a gradual, consistent upward trend over the monitoring period. Lost City, Lost City North and Lost City South each show a pattern of progressive recovery and stabilisation relative to their baselines, likely reflecting ongoing vegetation regrowth and the natural post-fire recovery trajectory described in earlier sections. Marrangaroo Shrub demonstrates a more moderate but steady pattern of improvement, consistent with its larger size and more complex internal structure.

Within the impact hanging swamps, a broadly similar trend is evident. Several Marrangaroo Hanging swamps—particularly Marrangaroo Hanging 1—show noticeable year-on-year expansion in mapped vegetated extent, while others (e.g., Marrangaroo Hanging 2 and 3) have shown fluctuating but generally increasing planar areas over the monitoring period. These fluctuations are typical of hanging swamps, which are more sensitive to seasonal moisture availability and shading effects in aerial imagery. Overall, the collective pattern across the hanging swamp group is one of ongoing gradual recovery, with most sites tracking above baseline and continuing on a positive long-term trajectory.

When considered together, the data show that impact swamps exhibit greater variability across years than control swamps, which is consistent with their differing hydrological contexts and post-disturbance recovery dynamics. However, this variability does not represent a downward trend or impact-related decline. Instead, the general direction across the dataset remains positive, with planar areas stabilising or expanding at a rate broadly comparable to the control swamps.

An analysis of the proportion of amphibious, terrestrial dry and terrestrial damp species from 2019 to 2025 shows that amphibious species declined at Lost City during 2025, coinciding with increases in both terrestrial dry and terrestrial damp functional groups. This pattern suggests a temporary shift towards drier and transitional species, which is consistent with the warm and dry climatic conditions recorded across the region leading into the 2025 monitoring event. In contrast, two of the three monitored shrub swamps displayed stable or improved amphibious species cover in 2025, indicating variable but generally positive recovery trajectories since the post-fire period.

Overall, the 2025 spring and annual flora monitoring results do not provide evidence that impact shrub swamps within the LW 428–432 TIA are being adversely affected by longwall mining. The observed decrease in amphibious species and corresponding increase in terrestrial assemblages in Lost City appear to align with climatic conditions rather than mining-induced change. Continued close monitoring, combined with integration of hydrological and geological data, is recommended to identify any emerging trends or cumulative ecosystem responses over time.

Results are presented in **Figure 6-16** to **Figure 6-20**.

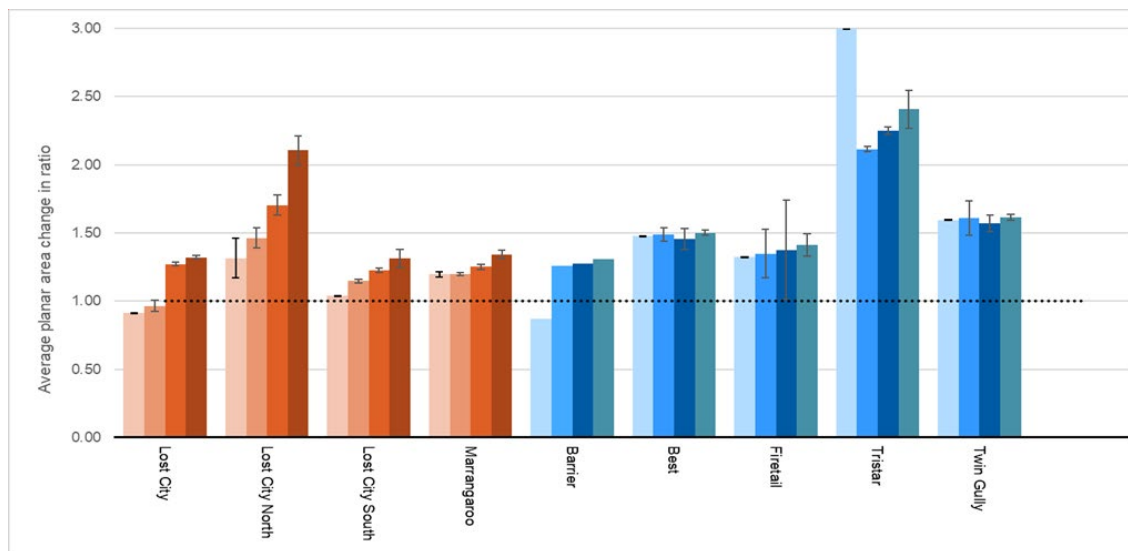


Figure 6-16 LW 428-432 shrub swamp average planar area ratio and standard error in 2023, 2024 and 2025

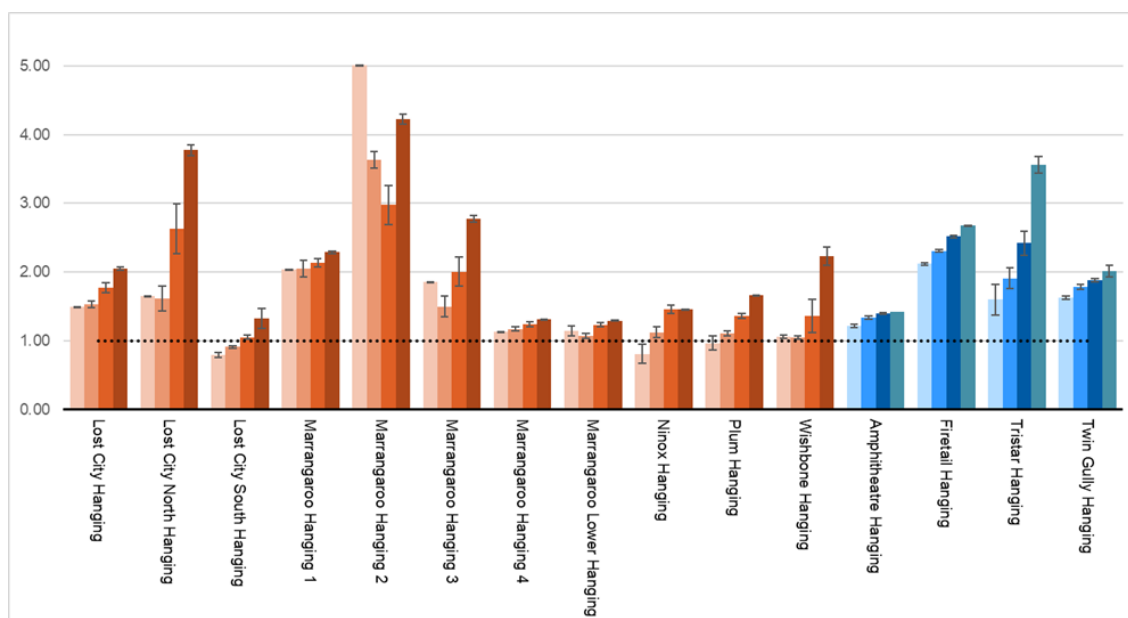


Figure 6-17 LW 428-432 hanging swamp average planar area ratio and standard error in 2023, 2024 and 2025

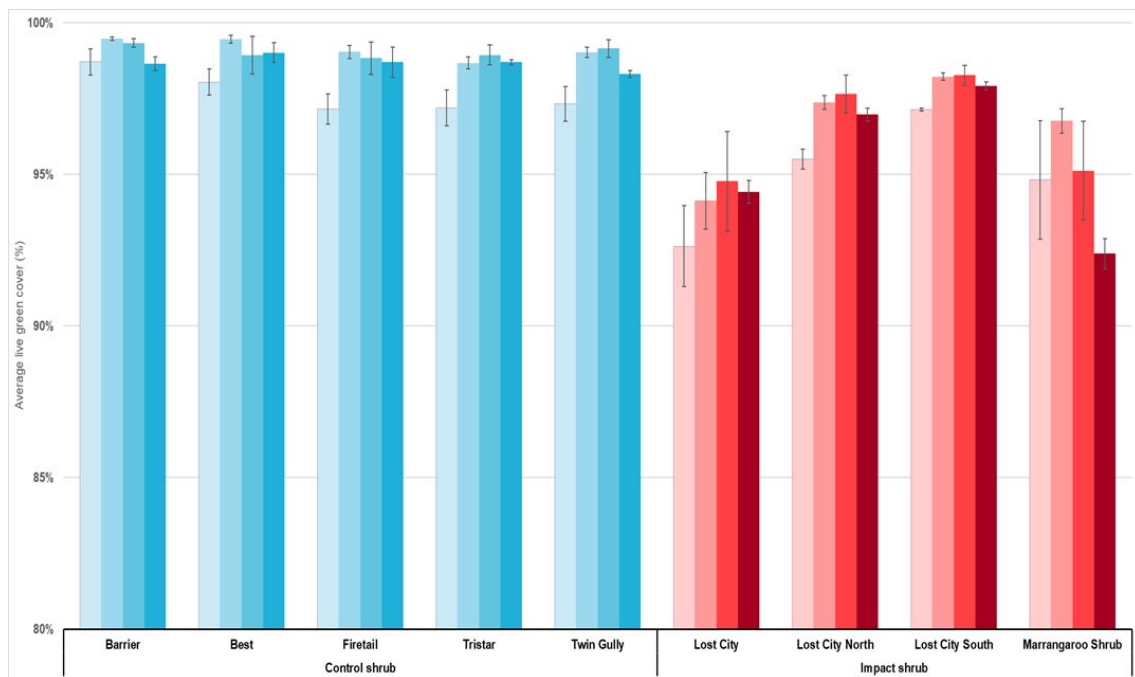


Figure 6-18 Average live green cover (%) and SE of control and impact shrub swamps in 2023, 2024 and 2025

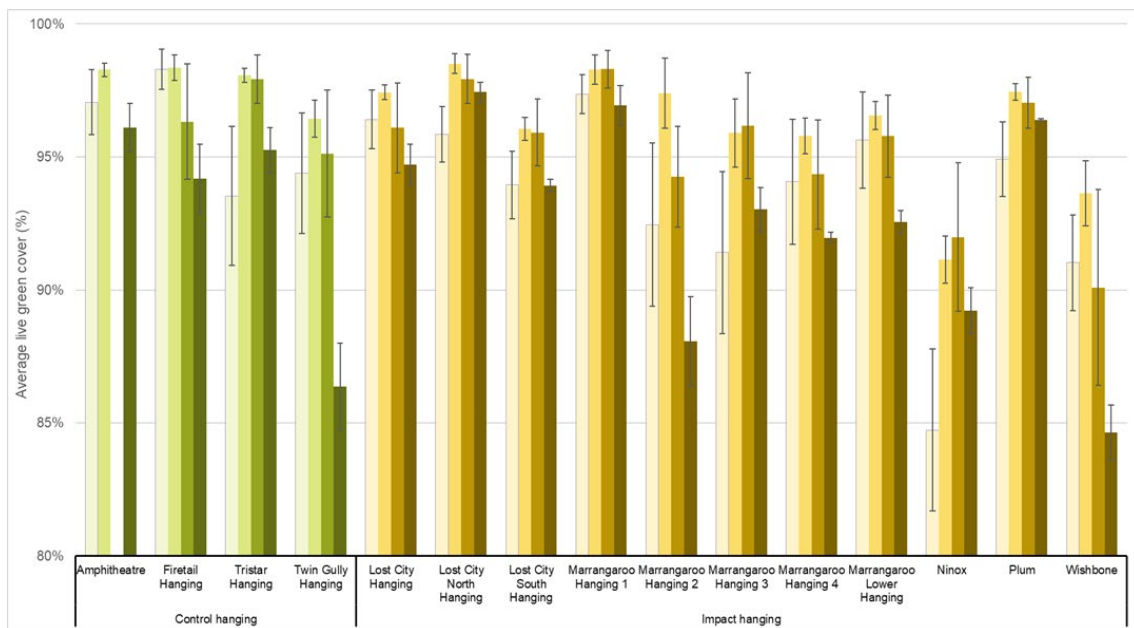


Figure 6-19 Average live green cover (%) and SE of control and impact hanging swamps in 2023, 2024 and 2025

Trigger Notification

Notification of flora exceedances within Marrangaroo Shrub Swamp, Paddy's Creek Shrub Swamp, Pine Shrub Swamp and Pine Hanging Swamp was provided to the Department on 19 March 2025. Flora metrics are described in the 415-432 Swamp Monitoring Program.

The 8 May 2025 trigger investigation report identified drying trends in the above mentioned swamps, with vegetation shifting from amphibious to terrestrial species. Similar exceedances in control swamps indicate broader climatic influences, including preceding dry conditions and the legacy of the 2019–2020 Gospers Mountain fire.

Trigger exceedances are documented in the Quarterly Extraction Plan Reports submitted to the Independent Monitoring Panel and relevant stakeholders.

6.5.2.3 Threatened Species Monitoring - *Boronia deanei*

Monitoring requirements for threatened species including *Boronia deanei* is detailed within the LW 415-432 Swamp Monitoring Program (*Boronia deanei* Research and Monitoring Program). Monitoring locations for threatened species targeted within the SMP is shown on **Figure 6-21**.

Results

Boronia deanei counts in 2025 remained below baseline in impact swamps East Gang Gang, Paddy's Creek and West Gang Gang, and above baseline in Nine Mile and West Carne. Nine Mile continued to increase across all quadrats, while West Carne declined but remained marginally above baseline. Central Carne has exceeded baseline for the past three years but exhibits high variability, likely reflecting ongoing post-fire recovery dynamics.

Minor increases were recorded at East Gang Gang and Paddy's Creek, while West Gang Gang showed limited recovery since re-establishment in 2023. Murray's declined, with some quadrats below baseline, while Barrier increased to near-baseline levels. Stem counts remained below baseline in East Gang Gang, Paddy's Creek, West Gang Gang and Barrier, consistent with 2024 trends. Mean condition scores were generally above baseline, except for Paddy's Creek and Murray's, which remain below baseline.

Height class data indicates ongoing recruitment and maturation, with most swamps exceeding baseline in the <0.5 m class and several also exceeding baseline in the 0.5–1.5 m class. No individuals were recorded in the >1.5 m category. Regeneration strategies comprised a mix of basal resprouting and seeding, consistent with continued post-fire recovery.

Boronia Deanei triggers were reported in 2022 and all swamps have been offset in the Swamp Offset Strategy.

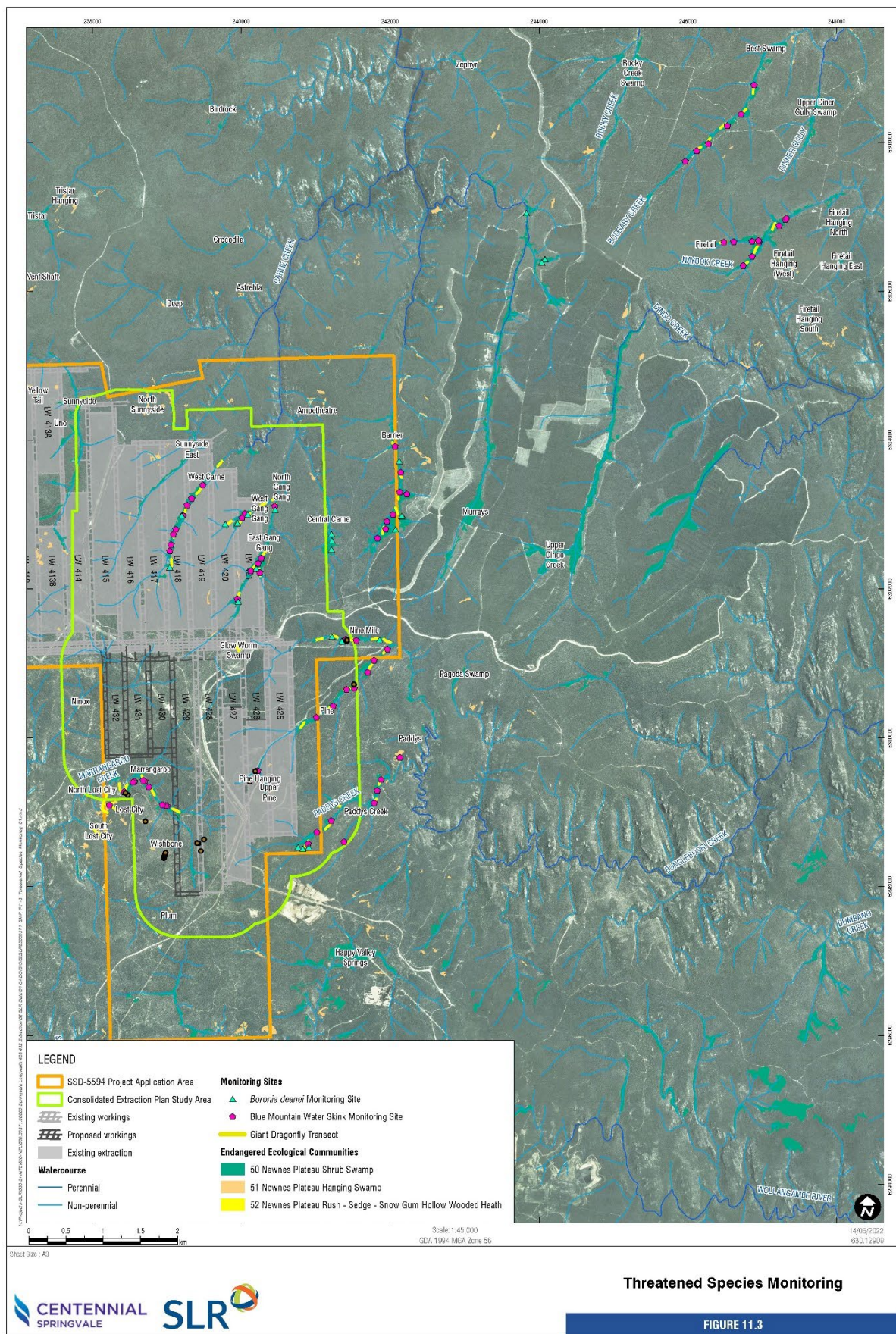


Figure 6-21 Threatened Species Monitoring Locations

6.5.2.4 Threatened Species Monitoring - Giant Dragonfly

Monitoring of the Giant Dragonfly (*Petalura gigantea*) is undertaken in accordance with the requirements of the Giant Dragonfly Research and Management Program required under Section 11.4 of the LW 415-432 Swamp Monitoring Program (SMP).

Before and After Control Impact (BACI) monitoring is undertaken annually between January and February at six impact swamps and three control swamps (refer **Figure 6-21** for no less than five years post-mining in respective panels for LW 418-432. Following the severe 2019-2020 Gospers Mountain fire, the following was included in the program: Post-fire condition assessment; remnant post fire habitat surveys; and a pilot study for sampling of 'environmental DNA' in larval sheddings within its habitat.

The 2024 Annual Review presented the results of the 2024/2025 monitoring event. Results for the 2025/2026 monitoring event were not available at the time of reporting and will be reported in the relevant Quarterly Extraction Plan reports and subsequent Annual Review, as required.

Data collected to date supports Springvales position that there has been negligible change to the composition and distribution of Giant Dragonflies in swamps within this monitoring program.

6.5.2.5 Threatened Species Monitoring - Blue Mountains Water Skink

Monitoring of the Blue Mountains Water Skink (BMWS) (*Eulamprus leuraensis*) is undertaken in accordance with the BMWS Research and Management Program (2015), as approved by DCCEEW on 27 November 2015, which satisfied Condition 13 of EPBC 2013/6881. The program has been implemented over multiple years and is integrated with the LW 415-432 Swamp Monitoring Program (BMWS Research and Monitoring Program) and the LW 415-432 Biodiversity Management Plan prepared under SSD5594, ensuring alignment between Commonwealth and NSW approval requirements.

In November 2025, Springvale notified DCCEEW that the BMWS Research and Management Program had been completed, with monitoring undertaken beyond the minimum requirements in both duration and spatial extent. Notwithstanding completion of the EPBC program, ongoing BMWS monitoring will continue under the approved NSW framework. This includes a Spatial Monitoring Program to be implemented for a minimum of five years following completion of mining in relevant areas, providing a lower-disturbance, landscape-scale approach to track post-mining ecological response and recovery.

Results

Within the 2024/25 monitoring period, fewer BMWS' were captured in impact swamps than control swamps. This occurred for both the spatial and population monitoring programs. A summary of the key findings include:

- During the population monitoring program no BMWS were captured within impact swamps, whilst 11 BMWS were captured in control swamps
- There was an increase in captures across the spatial monitoring program for the 2024/25 period in both impact and control swamps since last monitoring period
- Control swamp Best yielded the highest number of neonates during the 2024/25 program with seven captures. Additionally, six neonates were caught in Firetail, five in Barrier and one each in Marrangaroo and Nine Mile
- Morphotype 1 (i.e., dark scales over more than half of the ventral surface and a black edge on individual scales) was not observed in juvenile BMWS' (i.e., ~1 year old individuals) except for one outlier
- Blue throats were observed across all age categories of skinks. All skinks of a middle range weight and age (and therefore 1-2 years old) had blue throats

- A higher number of non-target fauna captures was observed within impact swamps compared to control swamps (61 and 29 respectively) across both spatial and population studies
- BMWS only persist in swamps with the proportion of amphibious vegetation cover is above 50%.

6.5.2.6 Fauna and Habitat Monitoring

Fauna monitoring at Springvale is undertaken in accordance with the LW 415-432 Biodiversity Management Plan. A Biodiversity and Water Management Plan is also prepared for DCCEEW. The Plan was prepared in accordance with relevant conditions of EPBC Approval 2013/6881. They also considered relevant requirements of the LW 415-432 Biodiversity Management Plan and Water Management Plan which were prepared in accordance with Development Consent SSD5594 and approved in March 2022.

EPBC Act pre-clearance surveys targeting Matters of National Environmental Significance (MNES) that may occur within the area were performed prior to longwall development using methods consistent with relevant Commonwealth threatened species survey guidelines. The LW 428 pre-mining survey (including the Extended Monitoring and Management Area (EMMA)) was completed in November 2021, with no EPBC listed species identified. Copies of the LW 428-432 EPBC pre-mining survey by RPS and the SLR LW 428 pre-mining survey are appended the LW 428-432 Biodiversity and Water Management Plan (March 2022).

As required under EPBC 2013/6881 (as varied 2022) Condition 12e, additional pre mining surveys for LW 429, 430, 431 and 432 were completed in November-December 2022 and March 2023.

Results

During the reporting period, post-mining surveys were completed for Longwalls 429 and 430. Results for Longwall 430 are not yet available, as surveys were undertaken in accordance with seasonal requirements and data analysis is ongoing; results will be reported in the 2026 Annual Review and forthcoming Quarterly Extraction Plan updates.

Surveys were undertaken within the study area and control sites by SLR staff in November 2024 and January 2025 with a variety of passive and active survey methods employed, including microbat detectors (Anabats), camera traps, active riparian searches, spotlight surveys and diurnal habitat assessment.

A wide variety of fauna was encountered during surveys, including one native amphibian, 13 native birds, 15 native mammals and one native reptile.

A total of four threatened fauna species were detected during surveys, as summarised in **Table 6-12**.

Table 6-12 Summary of threatened Fauna Encountered During Surveys

Common Name	Scientific Name	BC Act	EPBC Act	Notes
Eastern False Pipistrelle	<i>Falsistrellus tasmaniensis</i>	Vulnerable	-	Recorded at two Anabat survey locations (both control sites)
Large Bentwing-bat	<i>Miniopterus orianae oceanensis</i>	Vulnerable	-	Recorded at all three Anabat survey locations (definitively detected in the study area and likely detected in both control sites)
Yellow-bellied Glider	<i>Petaurus australis</i>	Vulnerable	Vulnerable	Multiple adult and sub-adult individuals seen in the Study Area during the January 2025 spotlight surveys
Yellow-bellied Sheath-tailed Bat	<i>Saccolaimus flaviventris</i>	Vulnerable	-	Possibly recorded at one Anabat survey location (study area)

The results of this survey are presented in **Figure 6-22**.

Comparison with the pre-mining survey results and relevant data from other surveys within the study area concluded that the undermining of LW 429 has had a negligible impact on these species and their habitats and the TARP process for additional monitoring has not been triggered.

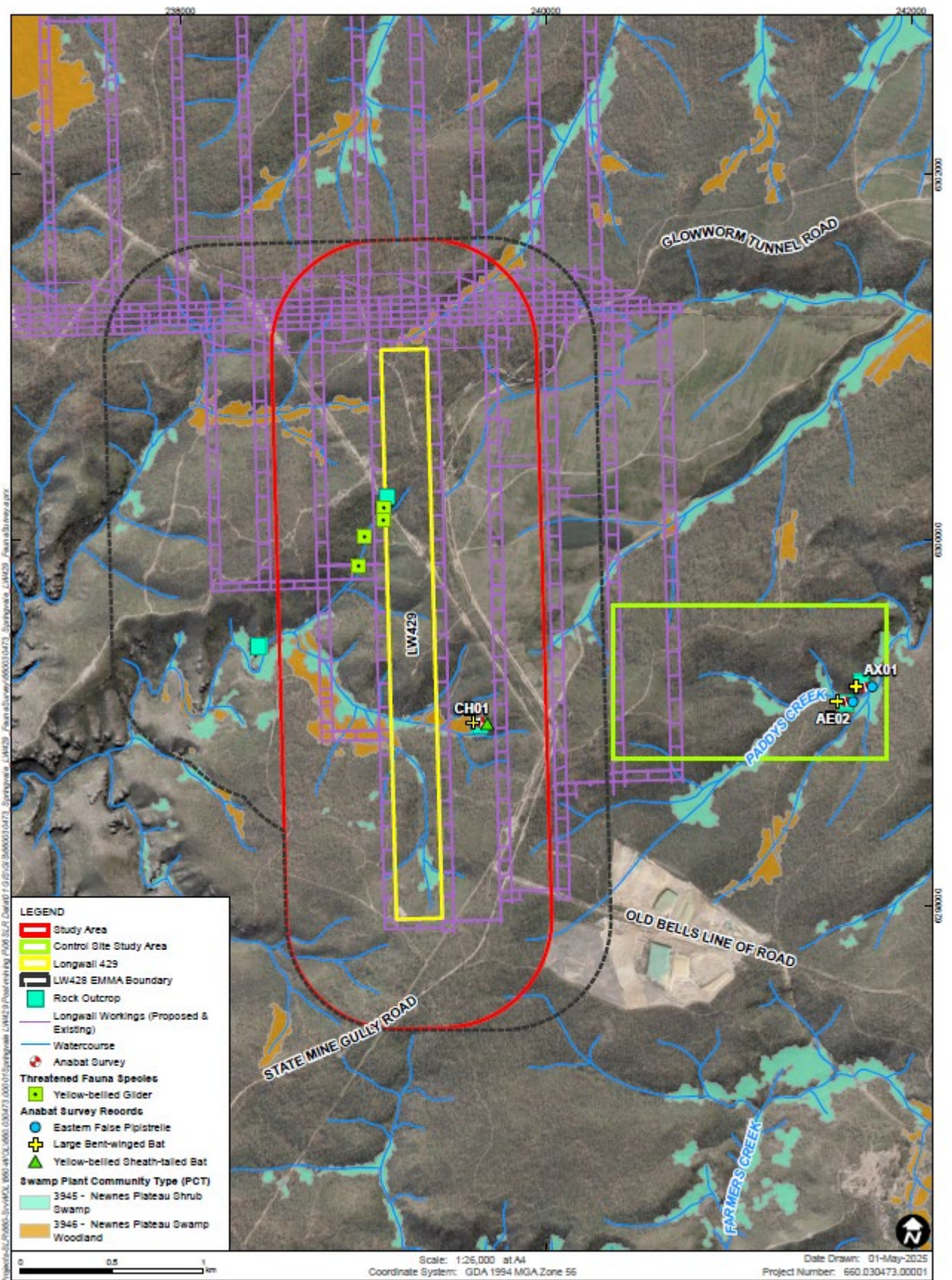


Figure 6-22 Survey Result Plan

6.5.2.7 Aquatic Ecology

Monitoring of aquatic ecology at Springvale is comprised by:

- **Newnes Plateau Swamps** (swamp monitoring, associated with extraction areas).
- **Upper Coks River Catchment (UCRC)** (creek monitoring, associated with surface operations areas).

Aquatic ecology monitoring for Newnes Plateau Swamps is detailed below. Aquatic ecology monitoring associated with surface operations and the UCRC is detailed in **Section 7.4.2**. Aquatic ecology monitoring associated with extraction areas, including surface waters and groundwater (stygo fauna), is addressed separately in **Section 7.4**.

Newnes Plateau Swamps Aquatic Ecology

Aquatic ecology monitoring is undertaken on the Newnes Plateau in accordance with the Biodiversity Management Plans (BMPs) approved under related Extraction Plans. These include monitoring of Newnes Plateau swamps and associated waterways, including macroinvertebrate sampling and aquatic habitat assessments. Monitoring location sites are summarised in **Table 6-13** below.

Table 6-13: Aquatic Monitoring Locations of Newnes Plateau

Site	Site Type	Catchment Area	Description
CC1	Undermined	Carne Creek	Located downstream of Sunnyside East Swamp.
CC2	Undermined	Carne Creek	Located at the downstream end of Carne West Swamp.
CC3	Undermined	Carne Creek	Located at the downstream end of Gang Gang Swamp, below the confluence of two swamp flow channels.
CC4	Reference	Carne Creek	Located at the downstream end of a hanging swamp adjacent to Barrier Swamp.
CC5	Undermined	Carne Creek	Located below confluence of upper catchment tributaries draining CC1 and CC2-CC3.
BCN2	Undermined	Bungleboori Creek (Nine Mile Creek)	Located on the northern unnamed drainage to Bungleboori Creek tributary that drains Pine Swamp.
MC1	Undermined	Marrangaroo Creek	Located in upper Marrangaroo Creek.
PC1	Undermined	Paddys Creek	Located midway along Paddys Creek below two swamps.

¹ Approved swamp offset under related offset strategies approved under SSD5594 and EPBC conditions of approval as detailed in Section 6.5.6.2 of this annual review.

Aquatic ecology macroinvertebrate sampling and aquatic habitat assessments were undertaken by GHD in 2025. Aquatic ecology monitoring was conducted at eight swamp sites in autumn and spring 2025, including:

- One reference site, which will not be impacted by mining; and
- Seven potentially influenced sites, the headwaters of which have been undermined.

Regular monitoring of groundwater bores and patterns in groundwater levels have identified potential impacts from underground mining on some swamps, including Sunnyside East Swamp (CC1), Carne West Swamp (CC2), Gang Gang West Swamp (CC3), Gang Gang East Swamp (CC3), Marrangaroo Swamp (MS1) and Nine Mile Swamp (BCN2). The impacts to

groundwater levels in these swamps have influenced the surface water availability at some of the aquatic ecology monitoring locations, including CC2 and CC3, where water levels are typically too low to allow for the collection of macroinvertebrate samples, indicating a substantial impact to macroinvertebrate communities relative to the Springvale Extension EIS conditions.

At all other sites there was no indication of impacts from undermining on the macroinvertebrate communities in 2025. Water and sediment quality was similar between sites (including the reference site) in 2025. Differences observed between sites in the macroinvertebrate communities in 2025 were most likely due to differences in habitat and flow conditions. Macroinvertebrate communities at most sites in 2025 showed improvement from recent historical (2020 to 2021) conditions, with most results now similar to those in the pre-EIS monitoring period (2010 to 2016), indicating continued recovery following the drought and bushfire period (2017 to early-2020). There has been continued recovery of fire damaged vegetation at all sites, particularly of groundcover vegetation including grasses and ferns, which has increased aquatic habitats and contributed to the improvement in macroinvertebrate results observed.

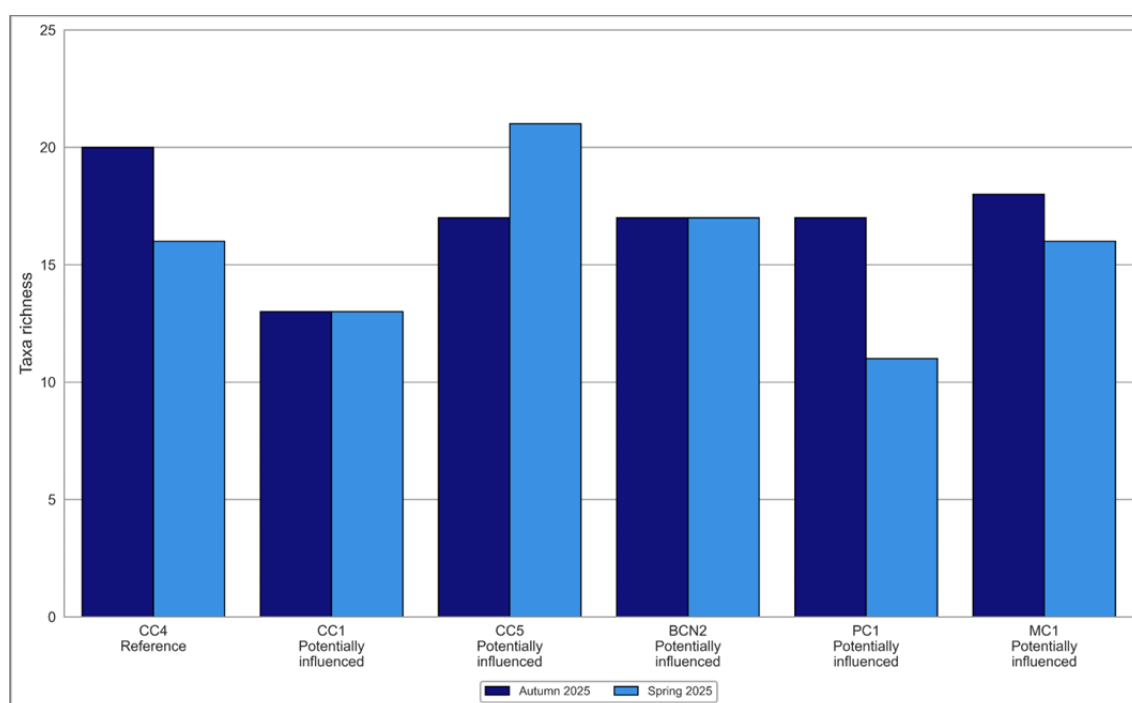


Figure 6-23: Taxa richness in Newnes Plateau swamp site samples, autumn and spring 2025.

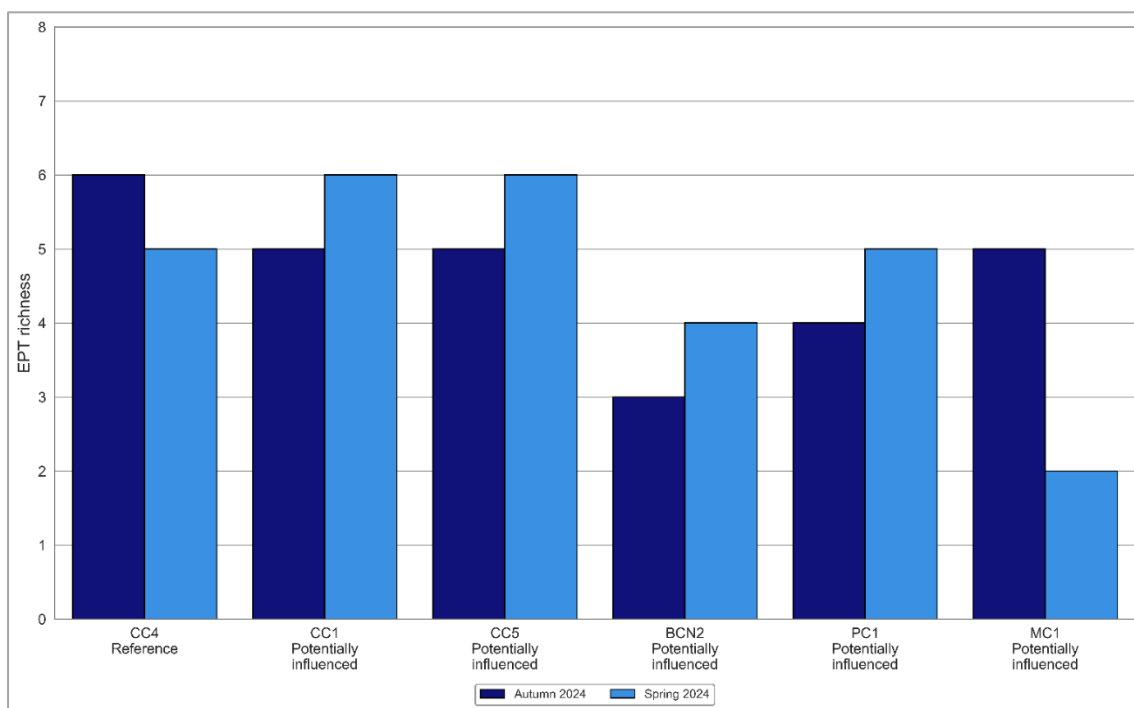


Figure 6-24: EPT richness in Newnes Plateau swamp site samples, autumn, and spring 2025.

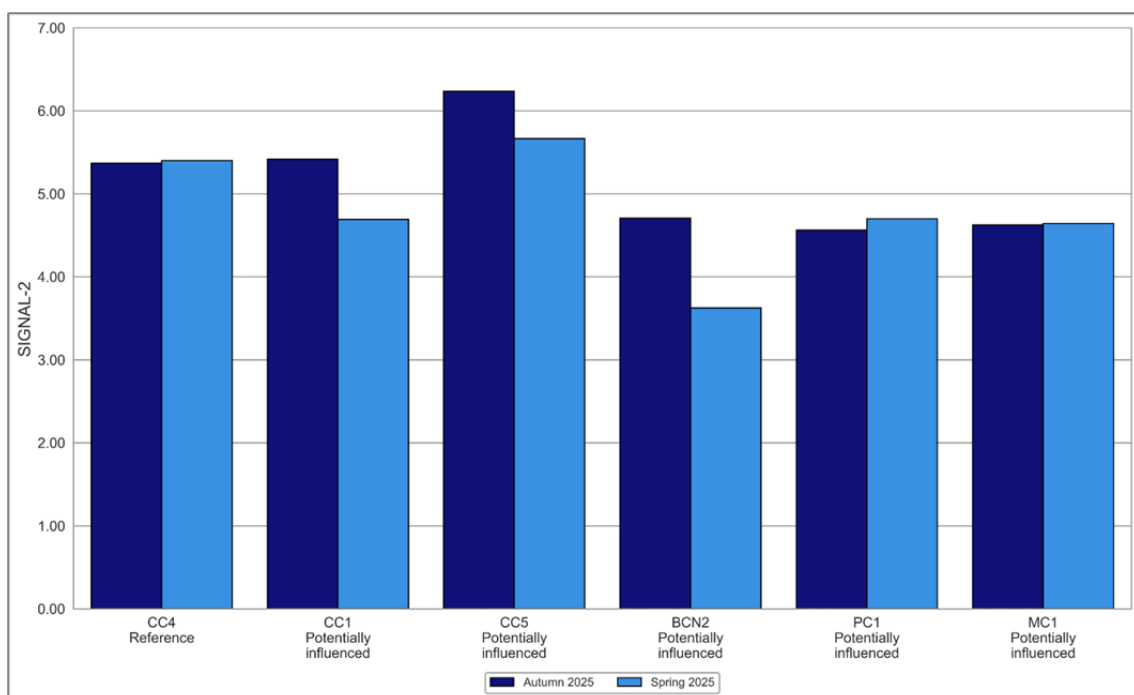


Figure 6-25: SIGNAL-2 in Newnes Plateau swamp site samples, autumn, and spring 2025.

Aquatic Ecology - Upper Coxs River Catchment

Detailed discussion of aquatic ecology monitoring in the UCRC undertaken in accordance with the Upper Coxs River Aquatic Ecology Monitoring Program (AEMP) is provided separately in **Section 7.3.2.2** of this Annual Review.

6.5.3 Comparison against Predictions

An interrelationship exists between the conditions of approval and impacts predicated in the subsidence and environmental assessments which form components of approved Extraction Plans. To ensure information is not misrepresented in the summary presented in the Annual Review, both the Approval and Extraction Plans available on the website shall be referred to for detail on the predictions for the Project.

Approved performance measures of SSD5594 and EPBC approvals and related predictions are used to establish the staged triggers of TARPs in approved management and monitoring plans for the project, including BMPs and SMPs among others. Approved offsets for biodiversity including impact swamps are detailed in **Section 6.5.6**.

6.5.4 Long Terms Analysis

Historical performance by previous mining activities in areas prior to LW 428-432 Area (current EP Area) have been reported in past annual reviews available on the Centennial Springvale website. In accordance with the approved Springvale Swamp Offset Strategy identified NPSS impact swamps have secured appropriate offsets satisfying both state and Commonwealth requirements.

Since the granting of the SSD5594 and as the understanding of how NPSS were impacted by mining, further adaptive management measures have been committed to by Springvale to minimise the risk or extent of impacts to NPSS. These measures included:

- Removing LW 422, 423 and 424 from the proposed mine plan.
- Shortening LW 421, 425 and 427 to avoid mining through major lineaments.
- Reduction in longwall lengths to both longwalls 429, 430, 431 and 432.

The adaptive management mine plan changes resulted in the sterilisation of approximately 8.8 million tonnes of coal resource and a three year reduction in the production life of Springvale. Despite the measures taken to minimise the risk of impacts to NPSS through adaptive management mine plan changes, changes to groundwater levels in NPSS have been measured that can be attributed to Springvale's previous mining activities. Accordingly, greater than negligible impacts to NPSS from past and future mining have been **offset** in accordance with SSD5594 and EPBC conditions of approval, as detailed further in **Section 6.5.6**.

6.5.5 Implemented / Proposed Improvements

- Springvale will continue to monitor and manage biodiversity in accordance with the relevant management plans, strategies, and approvals.
- In accordance with the Springvale Swamp Offset Strategy approved by DPHI and DCCEEW, Springvale will continue to prepare a detailed Environmental Monitoring Report for each THPSS within the Consolidated Approval Area that provides an analysis of monitoring data, identifies if impacts are mining related and assess the extent of any impact to NPSS and associated threatened species.
- In accordance with Condition 12e under EPBC 2013/6681 (as varied 2022), additional pre mining surveys for LW 429, 430, 431 and 432 were completed by March 2023.

6.5.5.1 Coxs River Land Management

Monitoring of catchment improvements targeted under the CILMP are undertaken in accordance with Section 3.5 of the CILMP, which requires the Annual Review to report monitoring and management activities undertaken. Sections 4 and 5 of the CILMP describes the schedule of works for each year and completion criteria subject to reporting. The location of the two management areas and three component sites is presented in **Figure 6-26**.

Monitoring works required under Section 3.5 of the CILMP include:

- Annual photo monitoring.
- Quarterly routine site inspections.
- Biannual and annual reporting.
- Water quality monitoring as described in the UCRAMP (Upper Coxs River Action and Monitoring Plan), reported in **Section 7** of this Annual Review; and
- Annual and 3-yearly review of the CILMP.

The above monitoring requirements were all completed during the current reporting period. The status of management works is presented in **Table 6-14**.

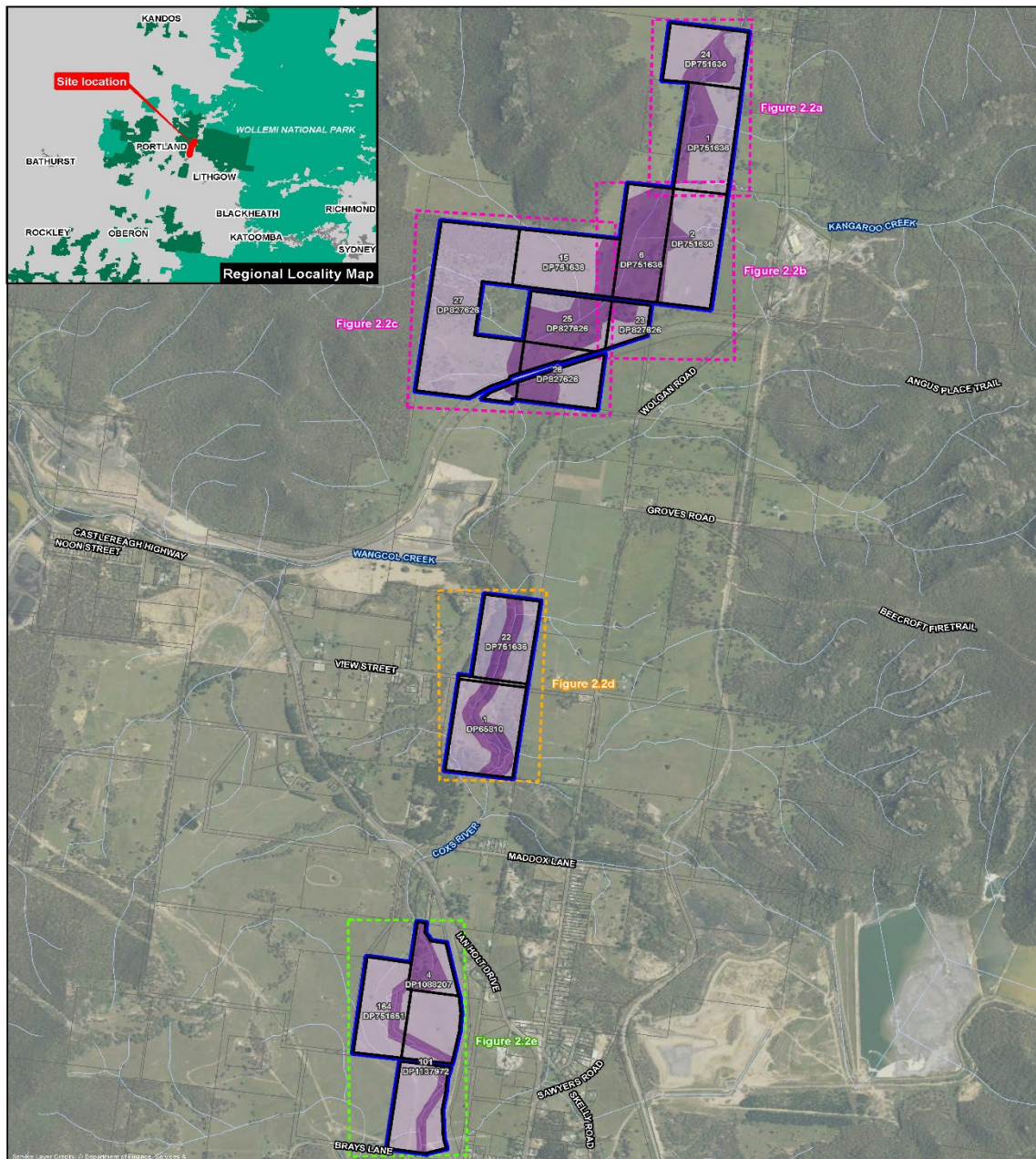


Figure 6-26. Cocks River Land Improvement Management Site Location

Table 6-14: CILMP Management Activities

Site	Management Works	Status	Year Complete
CILMP North	Fence Installation	New fencing installed on the eastern side 2020 is in good condition. Cattle movements in the northern section are absent. Access into the riparian management area requires review as there are some signs of cattle movement in the area which will be discussed with lease occupant.	2020
	Cattle crossing stabilisation and bank stabilisation and flows control	Reviewed in 2023 - The river base is rocky and is stable. Rescheduled as unable to bring in excavator into the site to undertake earthworks and rock work.	Ongoing
	Environmental and noxious weed control	Primary weed control carried out and completed. Secondary control weed control ongoing.	Ongoing
	Revegetation: shrub/canopy mid-upper banks	Completed in 2021 – Reviewed in 2023. Plants established well. Planting numbers are in accordance with the plan. Success rates have met target survival rates.	2021
	Revegetation: instream/bank stabilisation	Work to be rescheduled due to site not being accessible to vehicles due to wet conditions and surface water	Ongoing
	Revegetation: Revegetation watering and maintenance	Plants have established. Some eucalypts observed to be over 2m in height.	Ongoing
	Mountain Hollow Grassy Fen re-wetting	Work has been successful in southern section. Northern section to be rescheduled.	Ongoing
CILMP Central	Environmental and noxious weed control	Primary weed control carried out and completed. Secondary control weed control ongoing.	Ongoing
	Revegetation: shrub/canopy mid-upper banks	Work to be rescheduled due to due to site not being accessible to vehicles due to wet conditions and surface water.	Ongoing
	Revegetation: Revegetation Watering and Maintenance	Work to be rescheduled due to due to site not being accessible to vehicles due to wet conditions and surface water	Ongoing
CILMP South	Fence Installation	Fence in good condition.	2020
	Environmental and Noxious Weed Control	Primary weed control carried out and completed. Secondary control weed control ongoing.	2021
	Bank Stabilisation and Flow Controls	Reviewed in 2023 - Rescheduled as unable to bring in excavator into the site to undertake earthworks and rock work.	Ongoing
	Revegetation: shrub/canopy mid-upper banks	Reviewed in 2023 - Planting completed.	Ongoing
	Revegetation: In-stream/bank stabilisation	Reviewed in 2023 - instream growth of macrophytes has increased with silt deposits being colonised by sedges and rushes. It is not considered necessary to undertake additional planting. Carex and juncus species naturally regenerating on the edge of the Coxs River. Blechnum fern growing on the riverbank, frequently observed along the river.	Ongoing
	Revegetation: Revegetation watering and maintenance	Forestry tube stock planted supplied by Lithgow community nursery.	2021

A comprehensive review of the work program was undertaken in 2023 due to limited site access associated with wet weather conditions. In 2024, alternative contractors were identified and engaged to develop a revised improvement program for implementation in 2025.

The 2025 Coxs River Land Improvement Campaign focused on weed management, with Blackberry as the primary target species. Secondary species controlled included St John's Wort and Sweet Briar.

6.5.6 Biodiversity Offsets

Springvale manages biodiversity offsets in accordance with the Western Region Biodiversity Offset Strategy for surface disturbance offsets, and the Springvale Swamp Offset Strategy for subsidence-related offsets relating to underground mining. These are discussed separately in the following sections.

6.5.6.1 Western Region Biodiversity Offset Strategy

Management of offsets relating specifically to applicable surface clearing disturbance for Springvale Mine is undertaken in accordance with the Western Region Biodiversity Offset Strategy (WR-BOS). Version 8 of the WR-BOS (Nov 2020) was approved by DPHI on 27 January 2021.

In accordance with the NSW Framework for Biodiversity Assessment (FBA), the WR-BOS addresses vegetation impacts specifically related to surface clearing of vegetation only. Accordingly, the WR-BOS was prepared to offset 8.94ha of surface disturbance associated with the Springvale Mine Extension Project including Springvale Bore 8, satisfying Conditions 15, 16 (Schedule 3) and 5 (Schedule 4) of SSD5594. For clarity and completeness the WR-BOS also offsets the Springvale Water Treatment Plant under a separate consent SSD7592, which is reported under a separate Annual Review.

Under the WR-BOS, supporting plans of management for each offset area prescribe monitoring and reporting requirements to the NSW Biodiversity Conservation Trust (BCT). These include:

Conservation Agreement Sites:

- Carinya Biodiversity Offset Management Plan (Carinya BOMP) CA292.

BioBanking Sites:

- Pipers Flat Lot 5 Biodiversity Offset Management Plan (PF-BOMP) BA448.
- Springvale Lot 125 Biobanking Management Plan (SVL125-BBMP) BA425.
- Wolgan Road Lot 56 Biobanking Offset Management Plan (WRL56-BBMP) BA427.

Figure 6-27 shows the Biodiversity Offset sites for the Western Region applicable under the WR-BOS.

In 2025, management activities have focused on weed and pest management.

- CA292: Approximately 3.1ha was sprayed targeting blackberry. A high volume spray treated prickly pear near the southern boundary, while a back pack spray was conducted throughout Torrance Creek for Sparse blackberry, tree of heaven, prickly pear, Patersons curse and Arron's rod. During this period two feral pigs were controlled within the area as part of the management program.
- BA448: Approximately 10.8ha was sprayed targeting Blackberry which had been sprayed in previous campaigns. Secondary weed target species were include St John's Wort, Patersons Curse and various thistles. During the reporting period no pest animals were recorded or controlled. The absence of pest animals during the management program suggests low pest animal activity during the reporting period.
- BA425: Approximately 4.1 ha was sprayed focusing on Blackberry. Due to the challenging terrain within the offset site, backpack sprayers were utilised to undertake the spraying works as well as two weeks of wildlife camera monitoring. The camera monitoring recorded minimal wildlife activity, with observations limited to Superb Lyrebird (*Menura novaehollandiae*) and Red-necked Wallaby (*Notomacropus rufogriseus*). No pest animal activity was recorded during the monitoring period.
- BA427: Approximately 12.9 ha was sprayed targeting blackberry. Secondary targets include Paterson's Curse, Saffron Thistle and St Johns Wort. A total of 13 pest

animals were controlled, comprising six rabbits, six foxes and one feral pig. The results indicate active pest species presence within the property, particularly foxes and rabbits, and the control program successfully reduced pest animal pressure during the reporting period.

Up to the end of 2025 Springvale has submitted Annual Management Reports to BCT for these sites to address reporting requirements for the sites. During the reporting period approval was sought from the BCT to modify and combine the Centennial Biobanking sites to allow for a more streamlined and efficient reporting process, reducing duplication across sites and enabling consolidated management of outcomes and obligations. This request was approved, and the revised submission date is 31 May 2026.

In addition to formal registered offsets, the WR-BOS also includes *Supplementary Offset Measures* whereby research funding contributions are made to assist a number of threatened species where actions for recovery can be supported by additional investment in research, including for *Persoonia hindii*; and *Caesia parviflora var. minor* as outlined below.

Persoonia hindii

Schedule 2, Condition 19C of Springvale's Development Consent 11/92 which required the development of a *Persoonia Hindii* Management and Research Program to mitigate impacts to *Persoonia hindii* (*P. hindii*) from the development of Bore 8. No translocation was required for Bore 8 project as project management was able to locate the pipeline away from plant colonies during project execution.

P. hindii monitoring, management and research programs are now reported under Angus Place project approval MP06_0021, Condition 24A to address residual offset requirements for the loss of *P. hindii* as a result of the Angus Place Ventilation Shaft.

Caesia parviflora var. minor

The project highlights documented in "*The Conservation genomics of Caesia parviflora var. minor in support of management and translocation activities Report* (August 2022)" are:

- *Caesia parviflora var. minor* is genetically akin to *C. parviflora var. parviflora* such that both should be lumped as one taxonomic entity and the endangered status of *C. parviflora var. minor* should be reassessed;
- More intensive sampling of *C. parviflora var. minor* and *var. parviflora* is recommended to ascertain the geographic extent of the taxon that encompasses both *C. parviflora var. minor* and *var. parviflora*;
- Low genetic variability is present at the Newnes population indicating that genetic rescue through mixing with nearby *C. parviflora var. minor* or *var. parviflora* populations is likely to be beneficial.

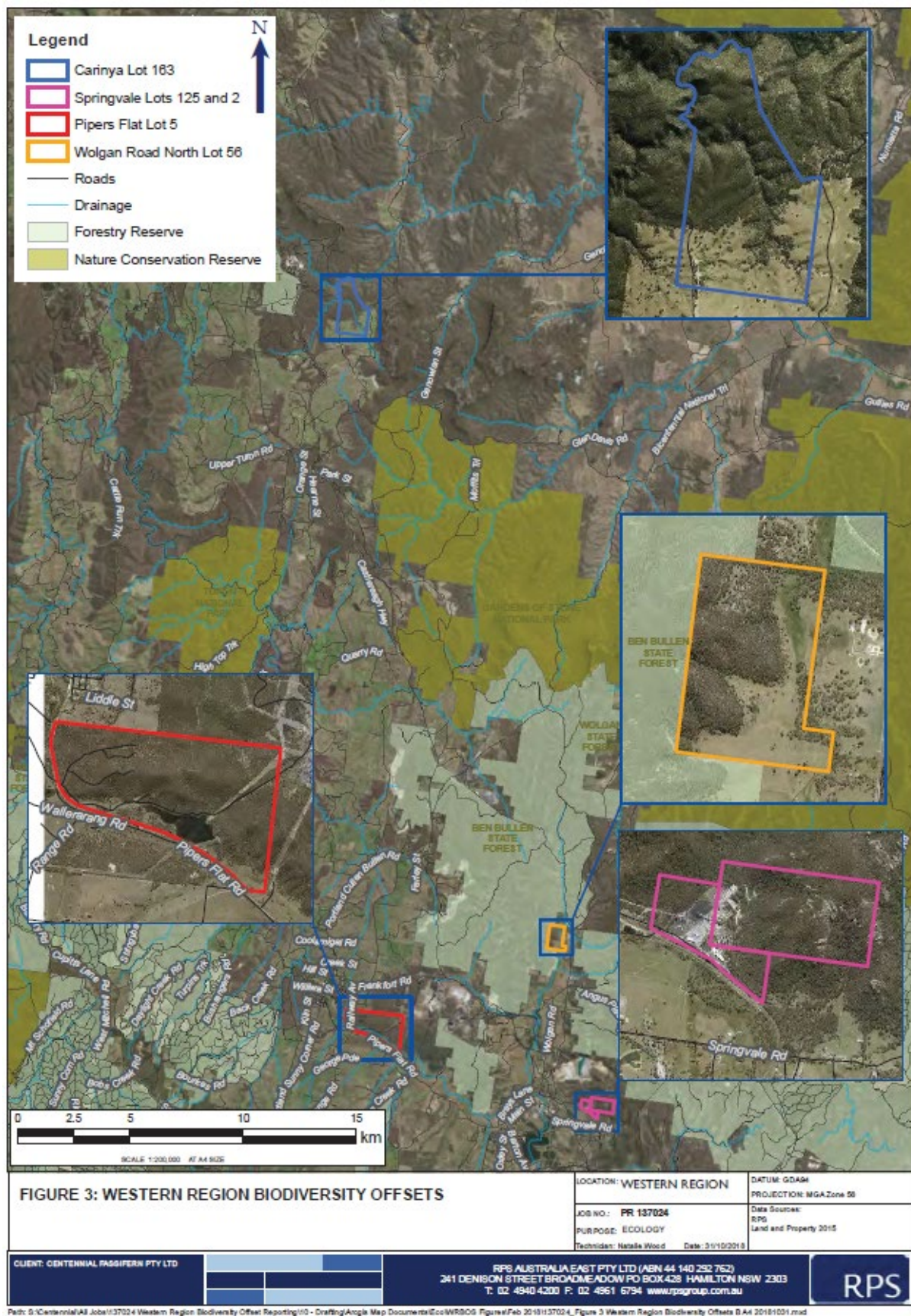


Figure 6-27: Western Region Biodiversity Offset

6.5.6.2 Springvale Swamp Offset Strategy

The Springvale Swamp Offset Strategy was developed to satisfy EPBC and SSD5594 approval requirements (including Conditions 3, 4 and 5 of Schedule 3 in SSD5594) for offsets to be secured should greater than negligible impacts to THPSS and associated threatened species be realised due to mine subsidence.

The Springvale Swamp Offset Strategy was revised in 2022 and Version 8 (Feb 2022) was conditionally approved by DPHI on 28 March 2022. Following a minor amendment V8.1 (April 2022) was submitted to the Commonwealth Department of Agriculture Water and the Environment (now DCCEEW) in relation to EPBC approvals 2011/5949 and 2013/6881 for LW 415-417 and was approved on 27 April 2022.

The strategy was revised in August 2022 (V9) to include details of the payments and bank guarantees set out in the executed offset deed and was submitted to DPE and now DCCEEW for approval on 5 August 2022. DPHI approved the revised offset strategy on 16 August 2022.

In 2024 following Environmental Monitoring Reports were submitted as committed in the approved Swamp Offset Strategy:

- Carne West Swamp
- Gang Gang South West Swamp
- Gang Gang East Swamp
- Sunnyside East Swamp

A memo was also submitted in December 2024 with regards to the remaining THPSS covered under the Swamp Offset Strategy.

In 2025 the remaining Environmental Monitoring Reports (up to the current 428-432 Extraction Plan Area) were submitted, including:

- Sunnyside Swamp
- Paddys Creek Swamp
- Pine Swamp
- Nine Mile Swamp
- Carne Central Swamp

Springvale will continue to submit the Environmental Monitoring Reports as mining operations continue within SSD5594.

6.6 HERITAGE

6.6.1 Environmental Management

Springvale manages Aboriginal Heritage in accordance with the Western Region Aboriginal Cultural Heritage Management Plan (WR-ACHMP) which was approved by DPHI on 4 June 2025.

European Heritage is managed in accordance with the Historic Heritage Management Plan (HHMP) dated June 2018. The plan was approved by DPHI on 4 July 2018. Heritage management is also included within each Extraction Plan. The Springvale HHMP is also supported by the Western Region Historic Heritage Management Plan (WR-HHMP). Rev 4 (Sep 2021) of the WR-HHMP.

The management of heritage items within specific EP Areas (longwall mining areas) is also included within each Extraction Plan, including the *Land Management Plan for LW428-432*.

6.6.2 Environmental Performance

Indigenous Heritage

Aboriginal cultural heritage sites located within LW 428-432 EP Area are illustrated on **Figure 6-28**, including existing registered sites located over LW 427 (45-1-2805, grinding grooves) and LW 428 (45-1-002, grinding groove – axe) as relevant to secondary extraction undertaken during the 2023 reporting period.

Five registered sites are located in the LW 428-432 EP Area in total, two of which are in the extended area within 600m of longwall panels. Other registered sites located within these EP Areas and over previously mined longwalls (including site 45-1-005 over LW 426) are also illustrated on **Figure 6-28**.

Potential impacts to 45-1-005 and 45-1-2805 have been avoided due to the longwall being shortened as shown in **Figure 6-28**.

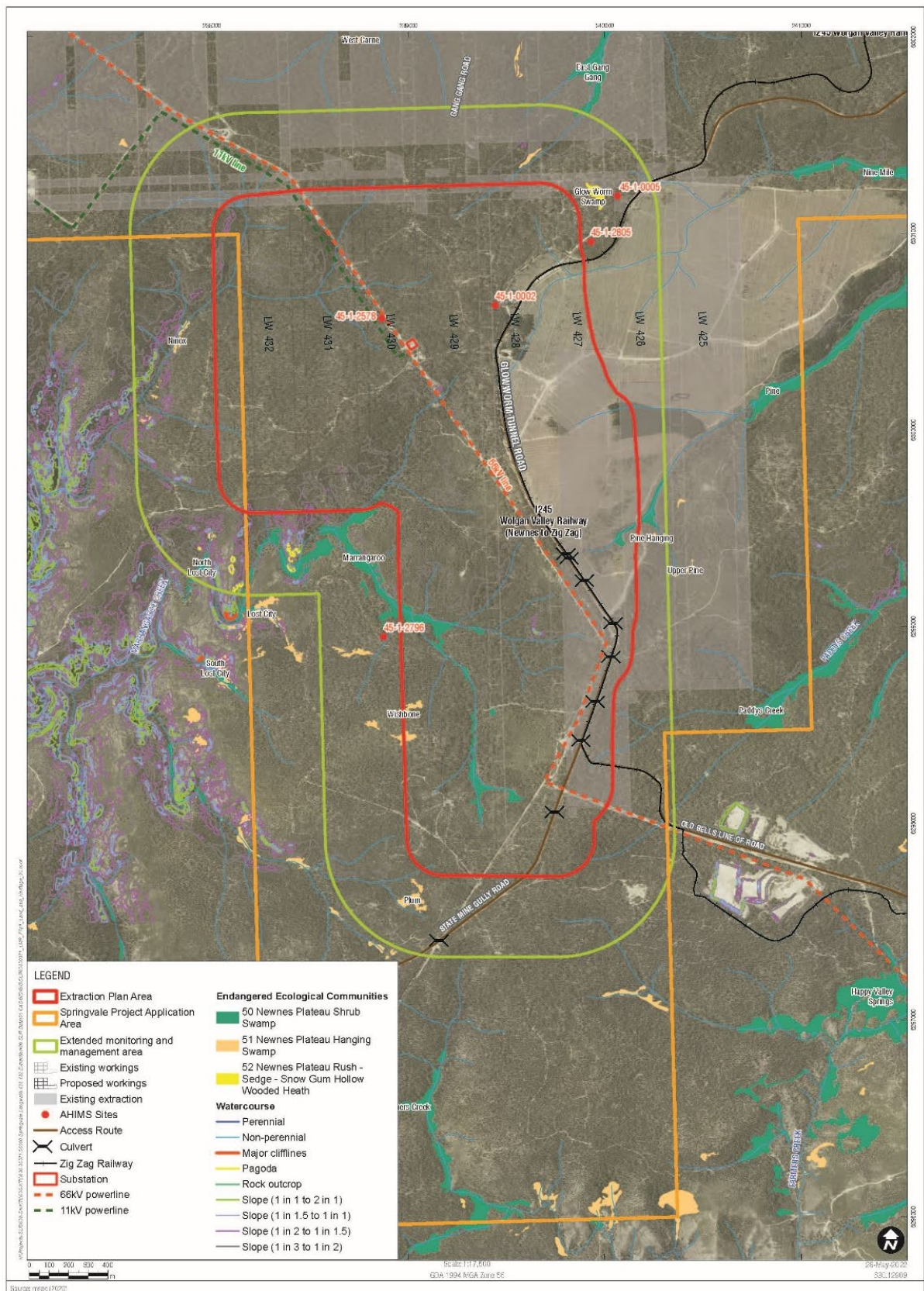


Figure 6-28 Springvale Longwall 428-432 Heritage Features

The following sections provide a summary of site surveys during the reporting period:

AIHMS Site 45-1-2578

AHIMS Site 45-1-2796 is located on a simple slope adjacent to a cleared area bounded by a sediment control barrier. The surrounding area has been heavily impacted by bushfires, with evidence of felled burnt trees and high ground surface visibility within the clearing, and moderate native regrowth beyond.

During the inspection the registered site area was again fenced and dense vegetation within the enclosure limited visibility. Despite targeted inspection of the fenced area and adjacent downslope drainage features, the previously recorded quartz artefact was not located which is consistent with previous survey efforts. Sediment accumulation against the fencing and control barrier, along with evidence of surface runoff, suggests the artefact may have been displaced and buried or transported downslope.

No impacts attributable to longwall mining were identified. Given the artefact has not been located during inspections in 2020, 2022 and 2025, and the area has been subject to significant disturbance from bushfire and associated processes, the site is considered to have been destroyed by natural and/or unauthorised impacts.

AIHMS Site 45-01-0002

AIHMS Site 45-1-002 was inspected on 14 May 2025 by representatives from Heritage Now, ArcSurv, and Aboriginal stakeholders including Warrabinga/Wiradjuri Native Title Claimants Aboriginal Corporation, North-East Wiradjuri Corporation, Wellington Valley Wiradjuri Aboriginal Corporation, Bathurst Local Aboriginal Land Council, and Mingaan Aboriginal Corporation.

Based on the inspection, no observable impacts attributable to longwall mining were identified at Site 45-1-002. However, the site has experienced significant disturbance from recreational activities. Since the Phase 2 inspection (February 2024), the sandstone platform has deteriorated, with large volumes of rubbish present, and evidence of vehicle-related damage including fresh scrapes and gouges across the platform surface and access points.

An increase in the number and size of campfires has resulted in more widespread surface impacts. Thermal stress from repeated heating and cooling has accelerated natural weathering processes, resulting in heat damage and spalling across the central portion of the platform. This has led to cracking and lifting of the surface, and Groups 2 and 5 were unable to be relocated during the Phase 3 inspection.

Photogrammetric recording of the site was completed using pole-mounted digital SLR imagery, processed into a detailed 3D model. Due to poor GNSS reception, a static GNSS method was used with two control points, with data post-processed to align the model to real-world coordinates. As the originally established RPS control points could not be relocated, a State Survey marker (SS1976) was used as an alternative reference.

A positional discrepancy of approximately 0.5 m was identified in the GNSS location of the survey marker; however, an elevation was successfully obtained. Comparison of recorded data indicates a minor change in elevation between survey datasets reflecting a decrease in elevation of approximately 0.954 m over time.

A representation of AIHMS Site 45-1-002 and 2025 elevations is provided **Figure 6-29**.

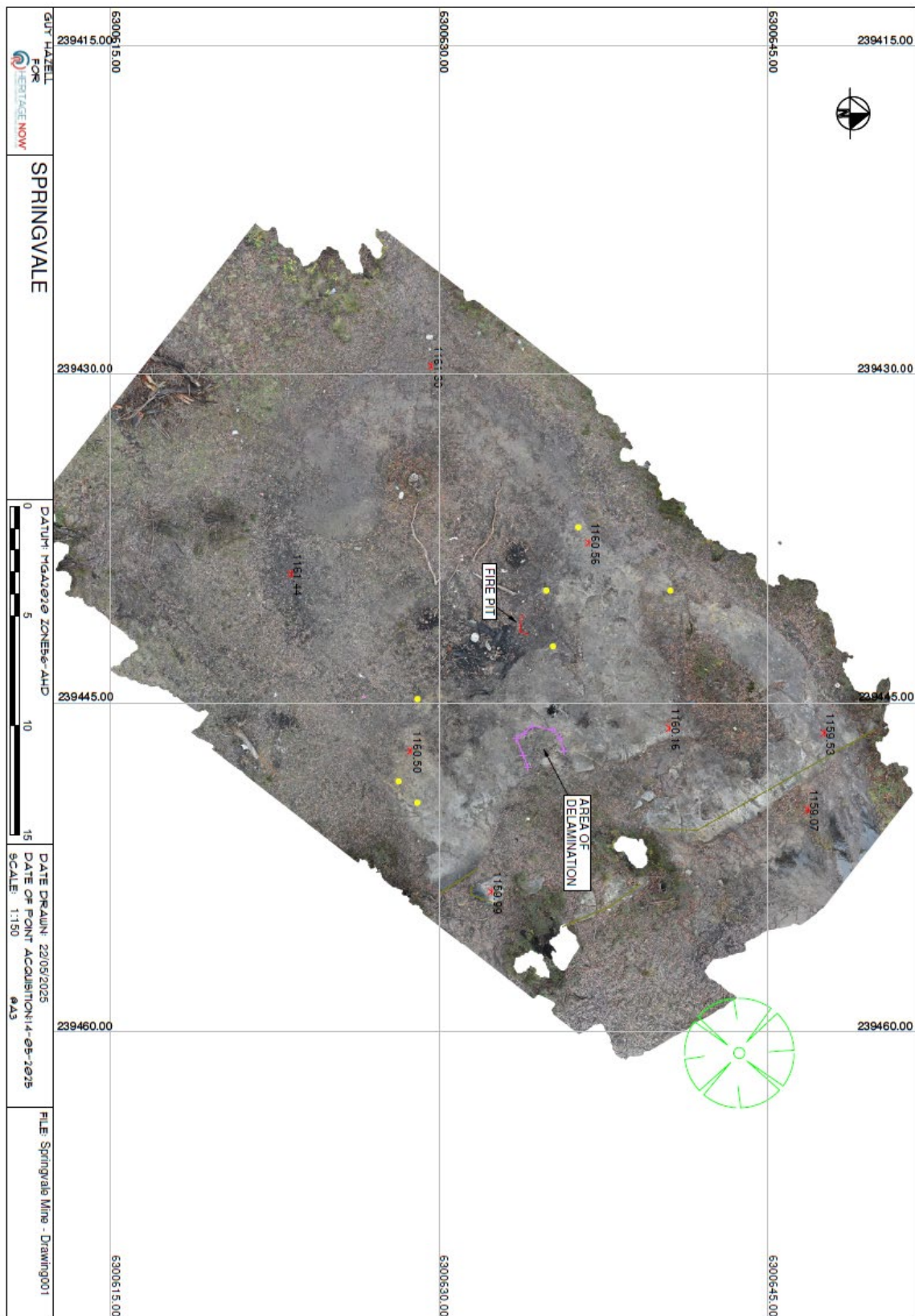


Figure 6-29 Representation of AIHMS Site 45-1-002

European Heritage

No heritage items listed on the Commonwealth Heritage Register, the NSW State Heritage Register (SHR), and the s170 registers (state owned items) have been identified in the Springvale lease boundary from searches conducted in January 2016. Additionally, no unlisted heritage items have been identified to date within the Springvale Lease Boundary, including by specialist assessments undertaken for the EIS and subsequent extraction plans.

The Lithgow City Council LEP, Schedule 5 – Environmental Heritage identifies three (3) heritage items of local significance within the Springvale Lease Boundary. One site is located within the LW 428-432 Extraction Plan Area (Wolgan Valley Railway Corridor associated with the Zig Zag railway). The railway is managed in accordance with procedures outlined in the LMP.

No impacts to heritage sites were identified by subsidence and environmental monitoring undertaken during the 2025 reporting period, as presented in associated quarterly Extraction Plan reporting.

6.6.3 Comparisons against Predictions

The report by MSEC (2020) prepared for Modification 3 of SSD5594 provides subsidence predictions for all sites (Aboriginal and European), providing maximum predicted tilt, curvature and strain with predicted values based on the EIS layout.

Table 6-15 below provides a summary of EIS predictions for potential impact to indigenous and historic heritage, and performance during the 2025 reporting period. There has been no impact due to mining operations observed to Indigenous or European heritage identified by monitoring during the 2025 reporting period.

Table 6-15. Summary of Heritage Impact Predictions and Performance during 2025

Summary of Predicted Environmental Impacts	Performance During the Current Reporting Period
Aboriginal Cultural Heritage: - Of the 34 Aboriginal cultural heritage sites recorded within the original EIS Project Area, three sites were predicted to experience subsidence >20mm as follows: - Predicted subsidence at sites 45-1-0005 (50mm) and 45-1-0065 (25mm) is not expected to damage these two sites. Tilts, strains and curvature are predicted to be negligible at these two sites. - Subsidence at site 45-1-0002 may cause the sandstone where the grinding groove is or was located to fracture and damage the site should it still remain. The recent survey was unable to find any evidence remaining of the site, probably due to the extensive vehicle traffic. - Two newly identified ACH sites were also included under MOD3 to SSD5594, with potential impact predicted as: - AHIMS 45-1-2805: Fracturing of bedrock in the vicinity of the site, typically between 10 mm and 50 mm wide, however potentially up to 200 mm wide. Likelihood that fracturing would coincide with site 45-1-2805 is low (less than 10%). - AHIMS 45-1-2796: Minor surface cracking in vicinity of site. Artefact unlikely to be impacted. MSEC (2020) predicted: - Sagging curvature slightly increases for artefact site 45-1-2669, however predicted hogging curvature for this site decreases. Potential for surface cracking in this location	Subsidence and associated monitoring undertaken during 2025 indicates no significant impact due to mining operations.

Summary of Predicted Environmental Impacts	Performance During the Current Reporting Period
does not change. It is unlikely that artefact scatter sites would experience adverse impacts due to surface cracking Unlikely that grinding groove sites and rock shelters would experience adverse impacts due to their distances from the longwalls.	
European Heritage: - No historic heritage items or areas have been identified within the Project Area and accordingly no historic heritage consequences are predicted. - The nearest conservation reserve, the Gardens of Stone National Park (part of the larger National Heritage Place and World Heritage Area) will not experience any measurable subsidence movements as a result of the Project.	Not applicable (no sites with potential for impact).

6.6.4 Long Term Analysis

Table 6-16 summarises heritage impact performance over the last five reporting periods for any exceedances above approved impacts / TARP condition red.

Table 6-16: Long Term Heritage Monitoring Trends

Project Approval Location	2021	2022	2023	2024	2025
Historic Heritage sites	0	0	0	0	0
Aboriginal and Cultural Heritage sites	0	0	0	0	0

6.6.5 Implemented / Proposed Improvements

Springvale will continue to monitor and implement mitigation and management measures (as triggered) to ensure inadvertent harm to sites can be avoided.

Western Region Heritage Committee Meetings were held on in March and October 2025.

The land disturbance due diligence process implemented by site is considered appropriate for the management of heritage items.

6.7 MINE SUBSIDENCE

6.7.1 Environmental Management

During the 2025 reporting period, secondary extraction was undertaken in LW 429 and LW 430 and LW 431 as described further in **Section 6.7.2**.

Subsidence Monitoring Programs (SMP) are developed for each Extraction Plan. The Extraction Plans approved under SSD5594 to date are listed in **Section 3.1.2** of this Annual Review. Results pertaining to the Subsidence Monitoring Program (including built features and public safety are listed as follows:

- Unsealed roads and culverts;
- Cliffs, minor cliffs and pagodas;
- Steep slopes and rock outcrops;
- Heritage items; including:
 - Five Aboriginal sites registered on the Aboriginal Heritage Information Management System (AHIMS);

- The Wolgan Valley Railway Corridor;
- Drainage lines;
- Surface cracking;
- Groundwater bores, with locations obtained from the National Groundwater Information System;
- Two permanent survey control marks (SS 19176 and SS 21304);
- Mine related exploration boreholes (noting these are not shown on figures); and
- 11kV and 66kV powerlines.

Monitoring summaries associated with other environmental aspects (including but not limited to water, biodiversity and heritage) are presented separately in other relevant sections of this Annual Review (**Sections 6 and 7**).

Monitoring of subsidence within the LW 428-432 EP Area includes:

- Visual inspection program.
- Photographic monitoring.
- Conventional survey of subsidence lines above extracted longwall panels.
- LIDAR remote surface survey monitoring.

Further details including method and frequency are detailed in the approved monitoring programs available on the Springvale website.

6.7.2 Environmental Performance

Performance Measures

Subsidence performance measures prescribed within SSD5594 relevant to subsidence impact and performance are presented in **Table 6-17**.

Table 6-17: Heritage, Natural, Built Features & Public Safety Performance Measures

Heritage and Natural Features (Cond1, Sch3)	Performance Measure
Water Resources	
Wolgan River, and other watercourses located outside the site	Negligible subsidence impacts or environmental consequences including: • Negligible diversion of flows or changes in the natural drainage behavior of pools; • Negligible reduction in water quality • Negligible increase in bank erosion or sediment load.
Carne Creek, Marrangaroo Creek and Paddys Creek	No greater subsidence impacts or environmental consequences than predicted in the EIS.
All other watercourses	No greater subsidence impacts or environmental consequences than predicted in the EIS.
Swamps	
Shrub swamps. Sunnyside and Nine Mile	Negligible environmental consequences including: • Negligible change to the shallow groundwater regime when compared with control swamps • Negligible erosion of the surface of the swamp

Heritage and Natural Features (Cond1, Sch3)	Performance Measure
	• Negligible change in the size of the swamp • Negligible change in the ecosystem functionality of the swamp • Negligible change to the composition or distribution of species within the swamp • Negligible change to the structural integrity of the bedrock base or any controlling rockbar/s of the swamp
Hanging swamps	Negligible environmental consequences including: • Negligible change in the size of the swamp; • Negligible change in the ecosystem functionality of the swamp; and • Negligible change to the composition
Land	
Cliffs, minor cliffs, steep slopes and pagoda formations	No greater subsidence impacts or environmental consequences than predicted in the EIS.
Biodiversity	
Threatened species, populations or their habitats and EECs (except Sunnyside East, Carne West, Gang Gang South West, Gang Gang East, Pine, Pine Upper, Paddys, Marangaroo Creek and Marrangaroo Creek Upper Swamps)	Negligible environmental consequences
Heritage Features	
Aboriginal heritage sites identified in Appendix 6 (except sites 45-1-002, 4-1-005, 45-1-2805 and 45-1-0065)	Negligible subsidence impact or environmental consequences.
Aboriginal heritage sites 45-1-002, 45-1-005, 45-1-2805 and 45-1-065	No greater subsidence impact or environmental consequences than predicted in the EIS.
Historic heritage sites	Negligible subsidence impact or environmental consequences.
Mine Workings	
First workings beneath any feature where performance measures in this table require negligible subsidence impact or environmental consequences. First workings within a 26.5 degree angle of draw cliffs.	To remain long-term stable and non-subsiding
Second workings	To be carried out only in accordance with an approved Extraction Plan.
Built Features & Public Safety (Cond7, Sch3)	
Key public infrastructure: Lithgow Water Supply Dam	No damage or additional risk

Heritage and Natural Features (Cond1, Sch3)	Performance Measure
Power transmission lines and associated towers, unsealed roads and road culverts, fire trails, other public infrastructure, fences and other built features	Always safe. Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated. Damage must be fully repairable and must be fully repaired or else replaced or fully compensated.
Public Safety	
Public safety	Negligible additional risk

Survey Results

During the 2025 reporting period, coal was extracted from LW 429, LW430 and LW431. Extraction of LW 429 commenced on 16 March 2024 and was completed on 11 January 2025. LW 429 has a total length of 1950 metres. Extraction of LW430 commenced on 1 March 2025 and was completed on 5 August 2025. LW430 has a total length of 1167 metres. Extraction of LW431 commenced on 20 September 2025. LW431 has a total length of 1245 metres. The total cut chainage of LW431 was 533 meters on 31 December 2025. First working were undertaken within Longwall 431, 432, and 501.

Photographic monitoring was undertaken in accordance with the approved monitoring program, with surveys completed at key stages including baseline, quarterly (undermining), end-of-panel and post-mining phases for relevant longwalls.

During the 2025 reporting period:

- **Longwall 428** progressed to post-mining monitoring, with surveys completed in February 2025 following earlier end-of-panel monitoring in February 2024.
- **Longwall 429** continued quarterly undermining monitoring throughout 2025 (March, June, September and December 2024 surveys extending into January/February 2025 end-of-panel monitoring).
- **Longwall 430** commenced monitoring with baseline surveys completed in August and December 2024, followed by quarterly undermining monitoring in March and June 2025, and end-of-panel monitoring in September 2025.
- **Longwall 431** had baseline monitoring completed in March 2025, with quarterly monitoring commencing in October 2025.
- **Longwall 432** had baseline monitoring completed in December 2025, with no further monitoring triggered during the reporting period.

Overall, the 2025 photographic monitoring program was implemented in accordance with the prescribed schedule, capturing baseline conditions and progressive changes associated with undermining and post-mining phases across active longwall.

Annual LiDAR monitoring of the EP Area is undertaken via a single survey flight, capturing all longwall panels completed during the previous reporting period.

Table 6-18 presents the results of subsidence lines for LW 429 in the reporting period against relevant trigger values.

Table 6-18 Subsidence Survey Results for LW 429 in 2025 Reporting Period

Subsidence Line	Required Survey Frequency	Survey date	Subsidence		Tilt		Strain		TARP Trigger
			(mm)		(mm/meter)		(mm/meter)		
			Max Result	Trigger value	Max Result	Trigger value	Max Result	Trigger Value	
PCS Line	Start & End	20/1/2025	152	1350	1.0	10	1.3	8.3	No
MCS2 Line	Start	21/1/2025	703	1350	7.2	10	6.8	8.3	No
MCS Line	Start	29/1/2025	814	1350	2.2	10	2.9	8.3	No
MCS3 Line	Start	4/2/2025	50	1350	0.7	10	0.6	8.3	No

Table 6-19 presents the results of subsidence lines These surveys were undertaken during the extraction of LW430 in the reporting period against relevant trigger values.

Table 6-19 Subsidence Survey Results for LW 430 in 2025 Reporting Period

Subsidence Line	Required Survey Frequency	Survey date	Subsidence		Tilt		Strain		TARP Trigger
			(mm)		(mm/meter)		(mm/meter)		
			Max Result	Trigger value	Max Result	Trigger value	Max Result	Trigger Value	
Z Line	CH 902 CH 302	10/4/2025 17/6/2025	838 972	1400 1400	8.7 7.1	10 10	11.1 10.8	8.3 8.3	Yes
Power Line	CH 200	26/6/2025	839	1400	3.3	10	6.7	8.3	No
AA Line	CH 1061	1/4/2025	1358	1400	7.6	10	4.7	8.3	No
MCS3 Line	End	6/8/2025	50	1400	0.8	10	0.6	8.3	No

Table 6-20 presents the results of subsidence lines These surveys were undertaken during the extraction of LW431 in the reporting period against relevant trigger values.

Table 6-20 Subsidence Survey Results for LW 431 in 2025 Reporting Period

Subsidence Line	Required Survey Frequency	Survey date	Subsidence		Tilt		Strain		TARP Trigger
			(mm)		(mm/meter)		(mm/meter)		
			Max Result	Trigger value	Max Result	Trigger value	Max Result	Trigger Value	
Z Line	CH 902	11/11/2025	1081	1500	4.2	13	10.9	8.3	Yes
Power Line	CH 200	26/6/2025	839	1500	3.3	13	6.7	8.3	No
AA Line	CH 1061	21/10/2025	985	1500	7.8	13	5.4	8.3	No
MCS3 Line	CH 1061	23/10/2025	68	1500	1.0	13	0.6	8.3	No
MCS2 Line	During	9/12/2025	712	1500	7.2	13	6.8	8.3	No
MCS Line	During	17/12/2025	851	1500	2.2	13	3.2	8.3	No

As presented in **Table 6-19** and **Table 6-20**, the Z Line continued to record TARP trigger exceedances during the reporting period. Monitoring surveys undertaken on 10 April 2025, 17 June 2025 and 11 November 2025 identified strain exceedances between Z143 and Z144, with no material change in magnitude observed across these events. Subsidence monitoring pegs within the Gardens of Stone State Conservation Area continue to be subject to

disturbance from third-party activities, particularly where located in close proximity to access tracks.

Comparisons against Predictions

Subsidence reviews are undertaken as part of the Extraction Plan process. The following section compares observed subsidence with predictions, with reference to Extraction Plans for additional information.

The predicted maximum vertical subsidence after the completion of all the proposed longwalls is 1650 mm, which represents approximately 52% of the 3.2 m maximum extraction height. The predicted total tilt is 25 mm/m (i.e. 2.5%), which represents a change in grade of 1 in 40. The maximum predicted total curvatures are 0.60 km⁻¹ hogging and 0.60 km⁻¹ sagging, which represent minimum radii of curvature of 1.7 kilometres and 1.7 kilometres, respectively. Non-conventional subsidence has been predicted, in brackets, for subsidence above lineaments.

Maximum predicted subsidence parameters are summarised in **Table 6-21** (note – predicted subsidence shown in brackets is the cumulative maximum, if different to predicted maximum for any one panel as otherwise shown).

Table 6-21 Maximum predicted Total Conventional Subsidence

Longwall	Subsidence (mm)	Tilt (mm/m)	Hogging Curvature (km-1)	Sagging Curvature (km-1)
LW424 to LW427	1,150 (1,150) ^{1,2}	9.5	0.15	0.16
LW428 to LW432	1,350 (1,650) ^{1,3}	13	0.20	0.35
LW501	1,350 ²	25	0.60	0.60
LW502 and LW503	1,650 ²	25	0.60	0.60

¹ Values shown in brackets are associated with areas with structural faults

² Maximum predicted value for vertical subsidence per 424-427 Extraction Plan. Tilt and curvature per EIS.

³ Maximum predicted value for vertical subsidence per 428-432 Extraction Plan (modified approved layout). Tilt and curvature per EIS.

6.7.3 Long Term Analysis

Table 6-22 summarises survey results reported for the past five Annual Reviews.

Table 6-22: Maximum vertical subsidence (all subsidence lines) – Last Five Reporting Periods

Longwall	Maximum Vertical Subsidence (mm)					Extraction Plan Predictions (mm)
	2021	2022	2023	2023	2025	
LW425	NA	NA	NA	NA	NA	1150 (1650)
LW426	NA	NA	NA	NA	NA	1150 (1650)
LW427	993 (B line)	875 (AA Line)	1055	NA	NA	1150 (1650)
LW428	NA	875 (AA Line)	1055 ¹ (AA Line)	1199mm ² (AA Line)	NA	1350 (1650)
LW429	NA	NA	NA	757	948(1358)	1250

				(AA Line)	(AA Line)	(EP 428-432 Amendment 1)
LW430	NA	NA	NA	NA	985 (AA Line)	1250 (EP 428-432 Amendment 1)
LW 431	NA	NA	NA	NA	1081 (Z Line)	1250 (EP 428-432 Amendment 1)

Note: Values shown in brackets are associated with areas with structural faults

¹At peg AA95 in 2023

²At peg AA114 in 2024

The maximum vertical subsidence has been within the approved Extraction Plan predications.

6.7.4 Subsidence Correspondence

During the reporting period, feedback on the Extraction Plan Quarterly Reports was received from the Independent Monitoring Panel (IMP) via the NSW Department of Planning, Housing and Infrastructure (DPHI) in January 2025. Actions to address the IMP comments and requests have been incorporated into the relevant Quarterly Extraction Plan Reports.

The Longwalls 428–432 Swamp Management Plan and Water Management Plan remained under review as at 31 December 2025, reflecting updates to the groundwater model and changes to the mine design. The status of these plans is reported in the Quarterly Extraction Plan Reports.

6.7.5 Implemented / Proposed Improvements

There are currently no further changes to the subsidence survey program proposed for 2026.

6.8 WASTE

6.8.1 Environmental Management

Waste minimisation and management measures at Springvale are monitored and reported in accordance with Schedule 4, Condition 27 (c) of SSD5594. General waste (non-production) at Springvale is disposed of to landfill by licensed waste contractors. Recyclable materials, such as, plastic, paper and cardboard products, are recycled whenever possible at the site. Oil drums and filters are recycled with other waste metals and are removed from site by a metal recycling company. Waste oil collected in the workshop is stored in an underground collection sump before being removed off site by a licensed contractor for recycling.

6.8.2 Environmental Performance

During the reporting period 513.606 tonnes (38.19%) of waste was recycled, including, steel, timber, liquid waste, oils paper and cardboard, filters grease, oily rags and oil filters. This rate is above the long-term recycling trend average. Primary recycling contributions were the removal of approx. 218.650 t of oily water, and 262.740 t of scrap steel.

Springvale continues to implement the Return and Earn program. Due to limitations in data capture during the reporting period, a minimum of 635 containers were recorded as recycled, yielding the following estimated metrics:

- 1,905 liters of water saved
- 950–1,270 megajoules of energy saved
- 60–63 kg saved from landfill
- 120–125 kgs of carbon dioxide (CO₂) emissions.

6.8.3 Comparisons against Predictions

Table 6-23 provides a comparison of 2025 performance against EIS predictions for waste.

Table 6-23. Summary of Production Waste (last five reporting years)

EIS Prediction	Performance
No change to the annualised waste materials volumes due to the Project.	Waste generation volumes (tonnages) in were lower in 2025
No production waste comprising reject materials from ROM coal processing (washing) will arise from the Project	Not Applicable to reporting period.

6.8.4 Long Term Analysis

Waste disposal and recycling for the last five (5) reporting periods is summarised in **Table 6-24**.

Table 6-24. Summary of Non-Production Waste Recycling and Disposal (last five years)

Waste Generation (tonnes)	Reporting Year				
	2021	2022	2023	2024	2025
Waste Recycling					
Hazardous Recycled (e.g. Waste Oil, Oily Water)	47.308	46.493	26.820	65.571	246.491
Recycled (Non-Hazardous) (e.g. Steel, Paper & Cardboard tonnes)	224.161	225.557	505.884	317.427	267.115
Hazardous Disposal (e.g. Oily Rags / tonnes)	111.66	19.3	3.460	1.452	9.514
Non-Hazardous Disposal (e.g. Mixed Solid Waste / tonnes)	738.425	2,746.7	826.954	718.470	821.893
Total Waste Recycled (tonnes)	271.469	272.05	532.704	382.938	513.606
% Recycled vs disposed	24.20%	8.95%	39.08%	34.73%	38.19%
Total Waste Disposed to landfill (tonnes)	850.304	2,767.6	1,363.118	1,102.920	513.606
% Disposed vs Recycled	75.80%	91.05%	60.92%	65.27%	68.81%

6.9 OTHER MATTERS

6.9.1 Bushfire

There were no bushfires during reporting period.

7 WATER MANAGEMENT

7.1 WATER MANAGEMENT

Springvale manages water in accordance with the Water Management Plan (WMP), Rev2.0, March 2020, prepared in accordance with Schedule 4, Condition 14 of SSD5594. The WMP was approved by DPHI on 19 February 2021.

In 2025 Springvale submitted the revised Water Management Plan (SSD-5594-PA-97) to reflect the increased groundwater inflows observed during the previous year(s) following consultation with relevant stakeholders

Springvale also implements water management and monitoring programs within mining areas approved under Extraction Plans, and in other areas in accordance with following documents:

- Environmental Protection Licence 3607 (EPL3607);
- Upper Cocks River Action and Monitoring Plan (UCRAMP), required by Condition 13, Schedule 4 of SSD5594. Revision 10 (June 2023) was approved by DPHI on 5 June 2023;
- Cocks River Catchment Improvement and Land Management Plan (CILMP), prepared in accordance with Condition 18A, Schedule 4 of SSD5594. Revision 2.0 was approved by DPE on 8 March 2018; and
- Other related plans of management and monitoring for extraction plans, including for biodiversity (e.g. swamp monitoring programs) as outlined further in **Sections 7.3.1** and **7.4.1**.

7.1.1 Water Access Licenses and Extraction Volumes

Table 7-1 compares actual water demand against Water Access Licenses (WAL) held by Springvale for the water reporting period 1 July 2024 to 30 June 2025

Table 7-1: Water Licenses and Take

Licence	Works Approvals	Water sharing plan, source and management zone	Entitlement (ML)	Passive take/inflows	Active pumping	TOTAL (ML)
WAL 36383	10WA118719 – Bore 6 and 8	Sydney Basin Richmond Groundwater Source	5,958	N/A	9946.4	9946.4
WAL36449	10WA118719 – Bore 6 and 8		2,523	N/A	2523	2523
WAL 36446	10WA118752 – 24C/T to 8ML Dam	Sydney Basin Cocks River Groundwater Source	3,300	N/A	463.2	463.2
WAL 36443	10WA118754 – 85 C/T Pump Station		585	N/A	0	0

On 1 July 2023, the Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2023 commenced. As a result, the Sydney Basin Richmond Groundwater Source and Sydney Basin Cocks River Groundwater Source have been amalgamated to reflect their connectivity, now named the Sydney Basin West Groundwater Source.

Springvale submitted Water Supply Works Approvals on 28 October 2024, with revised application on 31 August 2025 in this newly formed groundwater source, however, at the time of report preparation these approvals were still under assessment.

Centennials compliance with the extraction limits for the new Sydney Basin West Groundwater source for is shown in **Table 7-2**.

Table 7-2 Centennial Amalgamated Groundwater licences and Take

Groundwater source	Total WAL volume (ML/Annum)	2024/25 Water Take (ML/Annum)
Sydney Basin Richmond Groundwater Source - Angus Place - Springvale - Clarence	15,139 ML/Annum	19,092.4 ML / Annum
Sydney Basin Cox's River Groundwater Source - Angus Place - Springvale - Clarence	9,152 ML/Annum	2,011.8 ML / Annum
Sydney Basin West Ground water source - Angus Place - Springvale - Clarence	24,629 ML/Annum	21,104.3 ML/Annum (-3,524.7 ML)

7.1.2 Bore Water Quality

Water quality of water extracted from mine dewatering Bore 6 and Bore 8 is provided in **Table 7-3** below. Timeseries charts and tabulated statistics for water quality are also provided in groundwater appendices to the '2025 Annual Environmental Monitoring Review – Surface and Groundwater' presented in **Appendix 3** to this Annual Review. Generally, both bores show variability consistent with previous years.

Table 7-3. Bore 6 and Bore 8 Groundwater Quality

Monitoring ID	Data Range	Analyte	Units	Minimum	Median	Maximum
Bore 6	4/09/2009 – present	pH	Units	7.2	7.4	7.7
		EC	µS/cm	982	1,090	1,273
		Fe	mg/L	<0.05	0.28	1.08
Bore 8	15/01/2013 - present	pH	Units	4.4	7.5	7.9
		EC	µS/cm	950	1,084	1,204
		Fe	mg/L	<0.05	0.075	2.54

7.1.3 Water Balance

The site water balance model (2016) was developed to quantify transfers within the site under existing and future operational conditions using various rainfall patterns. The model was

revised during the reporting period based on 2025 operational data and is presented in **Table 7-4**. An overview of Springvale's water management system is displayed below in **Figure 7-1**.

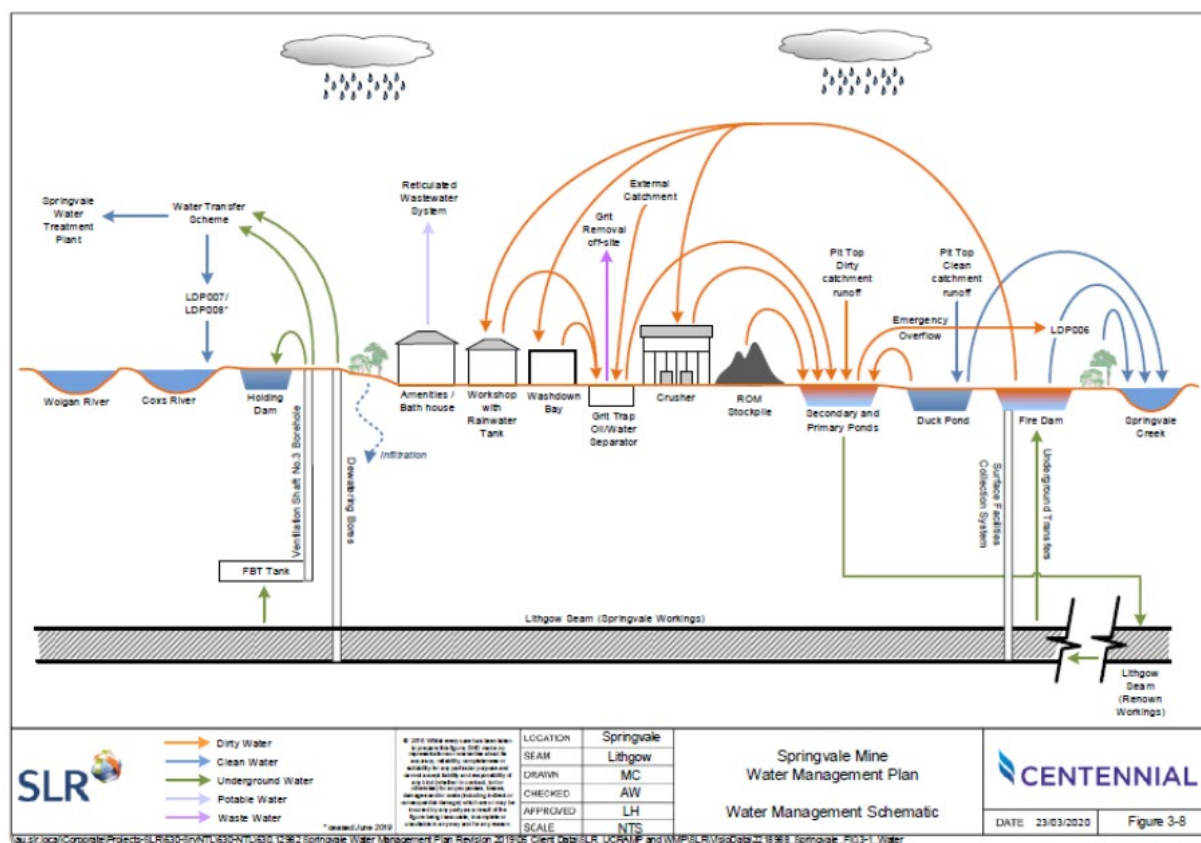


Figure 7-1 Water Balance Schematic (2020)

Table 7-4 presents output elements of the water balance in 2025 against the 2020 Springvale Water Management Plan predications and forecasts for 2025.

Table 7-4: Site Water Balance for Springvale

Input-Output	Element	Sub-Element	2025 Annual	2025 predication (WMP)
Input	Surface Water	Runoff into Storages (clean)	33.75	173
		Runoff into Storages (disturbed)	24.23	
		Precipitation	5.90	
	Groundwater	Groundwater inflow	13,032.60	9,920
	Third Party Water	LCC Potable	13.32	16
	TOTAL INPUTS		13109.80	10,109
Output	Surface Water discharge	Trade waste (grit removal)	0.09	0
		LDP discharges	220.88	589
	Task	Sewage System	13.32	16
	Third Party Water	MPPS Reuse/SWTP	12,853.50	9,420
	TOTAL DISCHARGES		13,087.79	10,025
	Task	Task Loss (Dust suppression)	3.63	4
	Evaporation	Evaporation	11.43	13
	TOTAL CONSUMPTION		15.06	17
Other	Task	Underground demand	213.60	Not Applicable
	Task	Washdown	146.91	Not Applicable
	Task	Crusher	95.48	Not Applicable
	Worked water	To_CT24	176.63	Not Applicable
	TOTAL CONSUMPTION		632.62	
Change in storage				177.08
Balance				0

It is noted that the comparison has been presented against the approved 2020 WMP, however, an updated water balance is currently presented in the revised Springvale Water Management Plan.

Surface inputs are below predictions due to below average rainfall conditions. Groundwater inflows have been greater than predicted due to mining near historic workings (State Mine). This is discussed further in **Section 7.2**.

7.2 GROUNDWATER MODEL UPDATE

Groundwater models are updated every six months and a review is presented within the Annual Review in accordance with the project Statement of Commitments (Appendix 3 to SSD5594), and in accordance with conditional approval of Extraction Plans where applicable (e.g. Condition 7 of the LW428-432 EP approval from DPHI).

The long term and current data trends are presented in **Figure 7-2** and **Figure 7-3**.

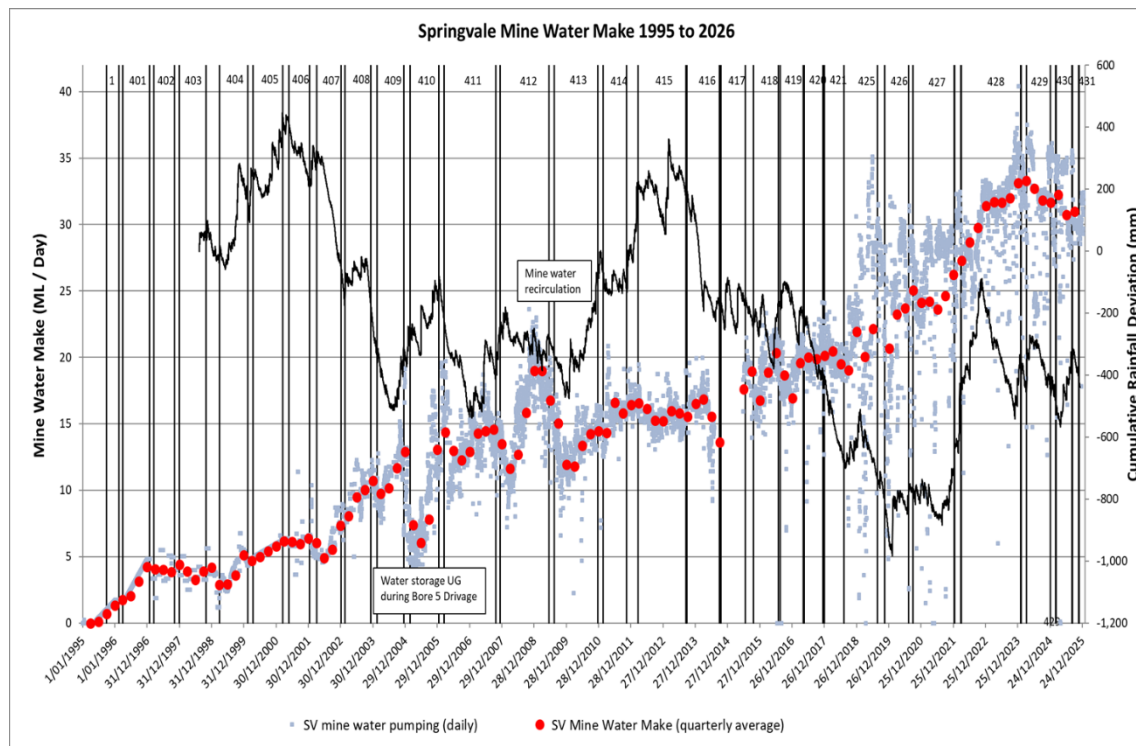


Figure 7-2 Springvale Mine Pumping Rates 1995 to 2026

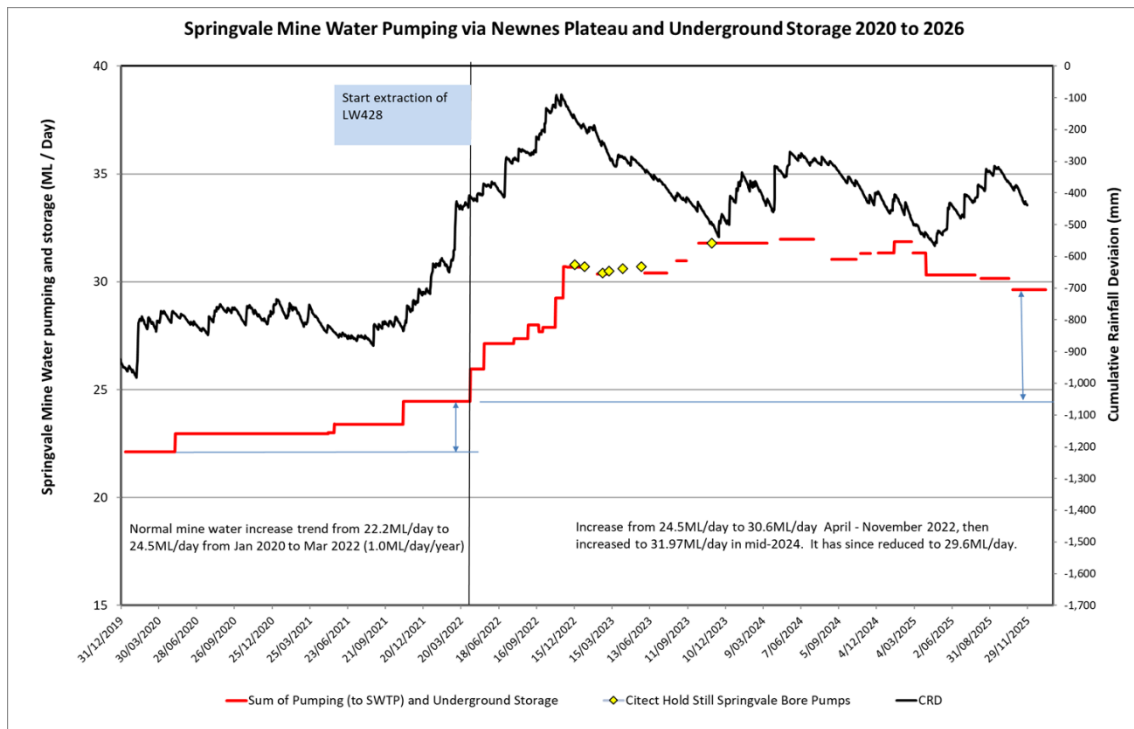


Figure 7-3 Springvale Mine Pumping Rates since the commencement of LW428 Extraction

Mine water inflows increased at an approximate rate of 1 ML/day between January 2020 and March 2022, reaching around 24 ML/day during this period. In 2022, inflows departed from the long-term trend and temporarily reduced to approximately 7 ML/day; however, inflows subsequently increased and are now above the 90th percentile groundwater model predictions.

Water make increased from approximately 24 ML/day and stabilised at around 30.6 ML/day during Longwall 428 production (inbye third of the block) and a period of very high rainfall between April and November 2022. The anomalous increase in inflows is interpreted to be associated with high permeability flowpaths linked to geological fault zones (lineaments) within the barrier between State Mine and Springvale Mine and/or elevated rainfall conditions.

Adaptive management of mine workings has been implemented to mitigate above-trend mine water inflows, including repositioning the Longwall 429 installation face at 17C/T rather than the originally planned 26C/T (LW428–432 Amendment 1).

Since completion of Longwall 428 in January 2024, mine water inflows have remained slightly below the peak inflows recorded during Longwall 429 and have stabilised at approximately 30–31 ML/day. During 2025, the apparent reduction in pumping reflects an increase in available underground water storage capacity following the commencement of Longwall 431, rather than a reduction in mine water inflows.

Figure 7-4 presents the revised dewatering rate predictions until 2032 which are presented in the revised Springvale Water Management Plan under assessment.

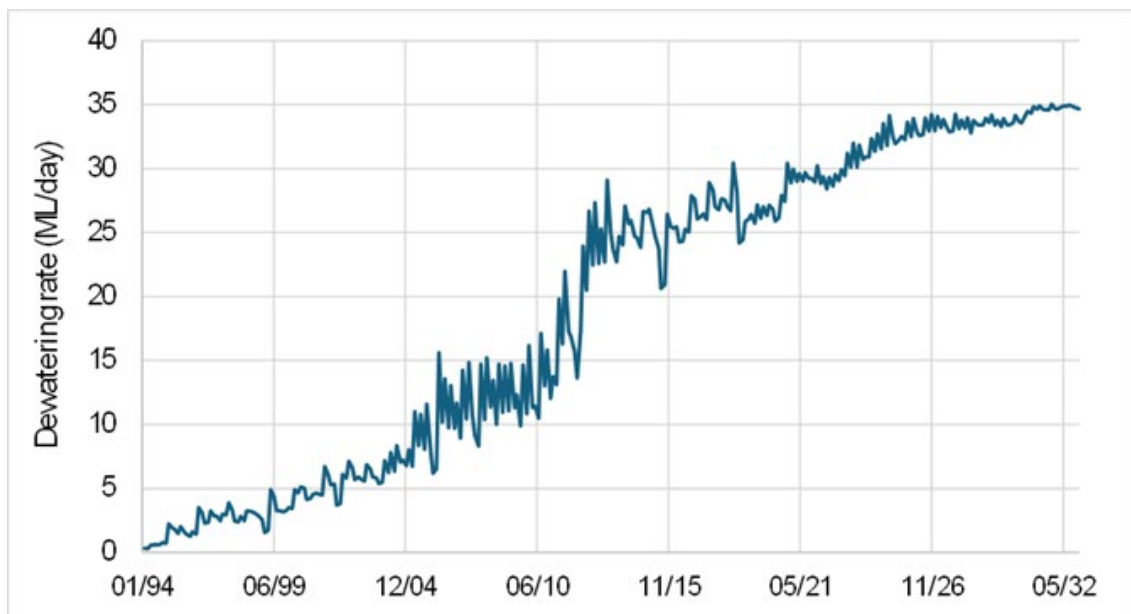


Figure 7-4 Predicted Mine Dewatering (Dwg) Rate – Springvale Mine (Proposed Case) (JBS&G 2024)

7.3 SURFACE OPERATIONS

This section presents water management and monitoring undertaken beyond secondary extraction areas, primarily associated with pit top mine water discharges, and receiving water environments, in line with the Springvale Water Management Plan (WMP) as discussed further below.

Water management and monitoring within extraction areas is discussed separately in **Section 7.4**.

7.3.1 Environmental Management

The surface water management systems at the pit top relies on the separation of clean and dirty water and the effective management of water through collection, treatment, and discharge. This is managed through several separate water systems including surface water dams and/or settling ponds, and clean water diversion channels.

Mine inflows, encountered during mining operations, require to be managed so that water levels can be kept at safe levels underground, and therefore operational risks can be reduced. Both clean and dirty water are generated underground. Clean water is water make from the goaf areas that do not experience machine movements. Dirty water comprises water that run along roadways and mine inflows from production panels. The dirty water is collected into portable staging tanks and pumped into the existing workings for the sediment to settle out before being diverted to the clean water system for transfer to the surface.

Discharges

Management and monitoring of mine water discharges is undertaken in accordance with EPL3607, the Springvale WMP, and Section 8 of the UCRAMP. Monitoring results for 2025 are presented in **Section 7.3.2.1**.

Receiving Waters

Management and monitoring of receiving surface waters in the Upper Coxes River Catchment (UCRC) is undertaken in accordance with the UCRAMP. Monitoring results for 2025 are presented in **Section 7.3.2.2**. Monitoring locations for the UCRAMP are shown on **Figure 7-5**.

A key management focus of the UCRAMP involved the cessation of discharges from LDP007 and LDP008, and subsequent monitoring of aquatic ecology for stream health. Management

and monitoring of aquatic ecology within receiving waters of the UCRC is undertaken in accordance with the UCRC Aquatic Ecology Monitoring Program (AEMP), which addresses the specific aquatic ecology monitoring requirements of the broader UCRAMP. Monitoring results for 2025 are presented in **Section 7.3.2.2**.

7.3.2 Environmental Performance

7.3.2.1 Licenced Discharges

Discharge Volumes

Springvale measures daily discharge volumes against the criteria outlined in EPL3607. The annual discharge volumes are displayed in **Table 7-5** below.

Table 7-5: Licensed Discharge Points Volume

LDP	2025 lowest sample value (kL/day)	2025 Mean of sample (kL/day)	2025 Highest Sample Value (kL/day)	Total 2025 (kL/year)	EPL Limit (kL/day)
LDP006 <i>(formally LDP001)</i>	0	154.951	935.00	56,557.00	10,000
LDP007 <i>(formally LDP009)</i>	No discharge				
LDP008 <i>(formally LDP010)</i>	No discharge				

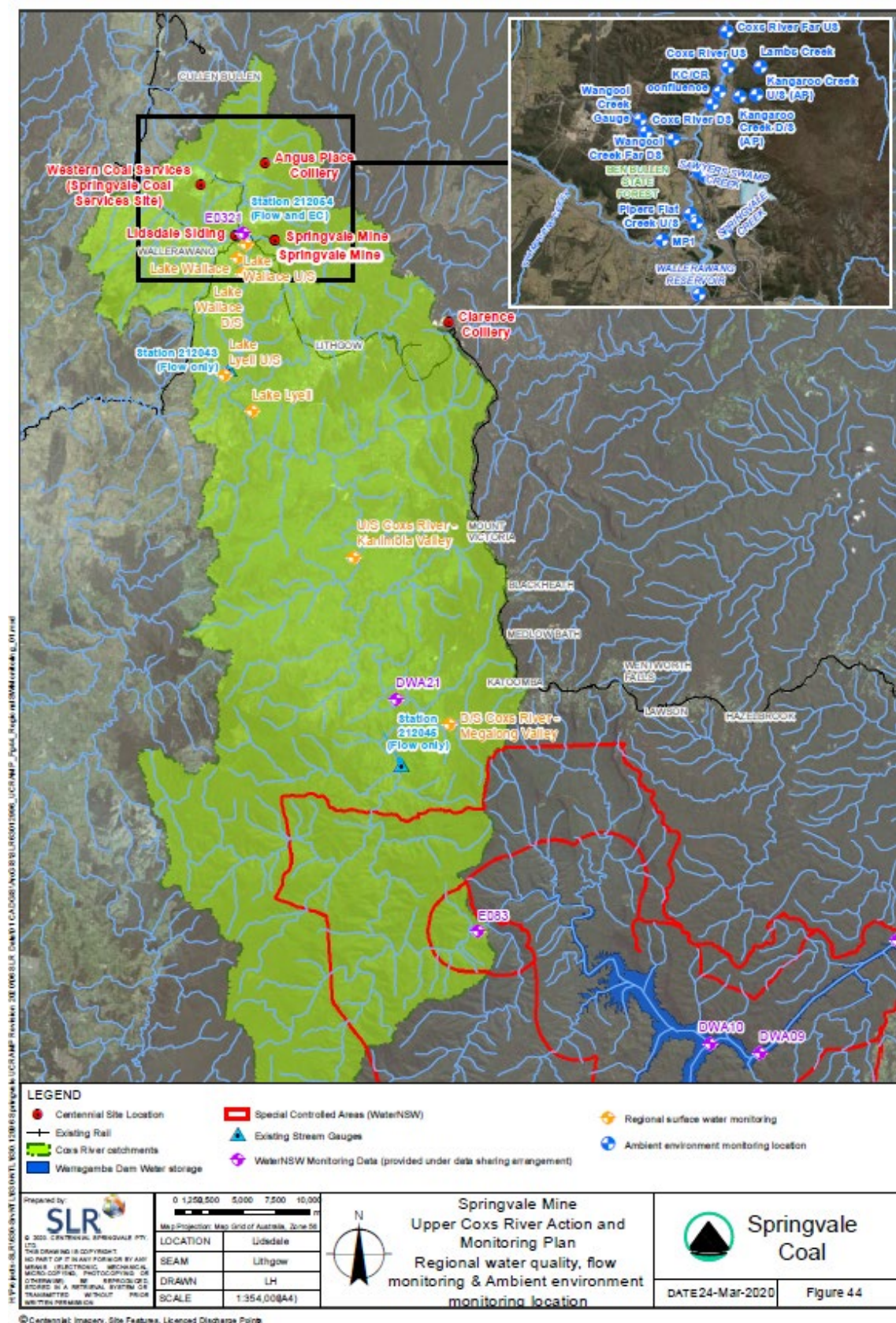


Figure 7-5: UCRAMP Monitoring Locations

Discharge Water Quality – LDP006

Surface water monitoring of licenced discharges is undertaken in accordance with EPL3607 and the WMP. Water quality results for LDP006 (formally LDP001) are presented in **Table 7-6** and graphically in **Appendix 3**. The Springvale Water Treatment Project (SWTP) is operational with offsite discharge to natural watercourses ceasing at LDP007 on 30 June 2019.

Table 7-6 LDP006 Water Quality Summary 2025

Pollutant	No. of samples required by license	No. samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value	EPL3607 100 percentile concentration limit
Conductivity (µS/cm)	52	52	277	593	943	NA
Filterable iron (mg/l)	52	52	<0.05	0.01	0.17	NA
Filterable manganese (mg/l)	52	52	0.006	0.042	0.122	NA
Oil and Grease (mg/l)	52	52	<5	<5	<5	10
pH	52	52	6.90	7.94	8.60	6.5-9.0
Total suspended solids (mg/l)	52	52	<5	1	16	30
Turbidity (NTU)	52	52	0.6	4.4	40.0	50

7.3.2.2 Surface Water Quality - Upper Coxs River Catchment

Since the commencement of the UCRAMP, significant changes to catchment water management have occurred that have reduced the volume of mine water discharges to the Coxs River. Specific to Springvale:

1. Until June 2019, Springvale discharged up to 30 ML/day from LDP007 (formerly LDP009) to the Coxs River via Sawyers Swamp Creek. Since June 2019, mine water is treated in the SWTP and transferred to MPPS for beneficial reuse; and
2. Discharge of surface water runoff occurs through LDP006 (formerly LDP001) to the Coxs River via Springvale Creek in accordance with EPL 3607. The average discharge and the maximum daily during the reporting period is displayed in **Table 7-5** above.

The long-term water quality target for EC (salinity) in the Coxs River is 350 µS/cm. EC in the Coxs River is continuously monitored at stream gauge 202154 (Wallerawang Power Station). EC monitoring results and streamflow are shown in **Figure 7-6**.

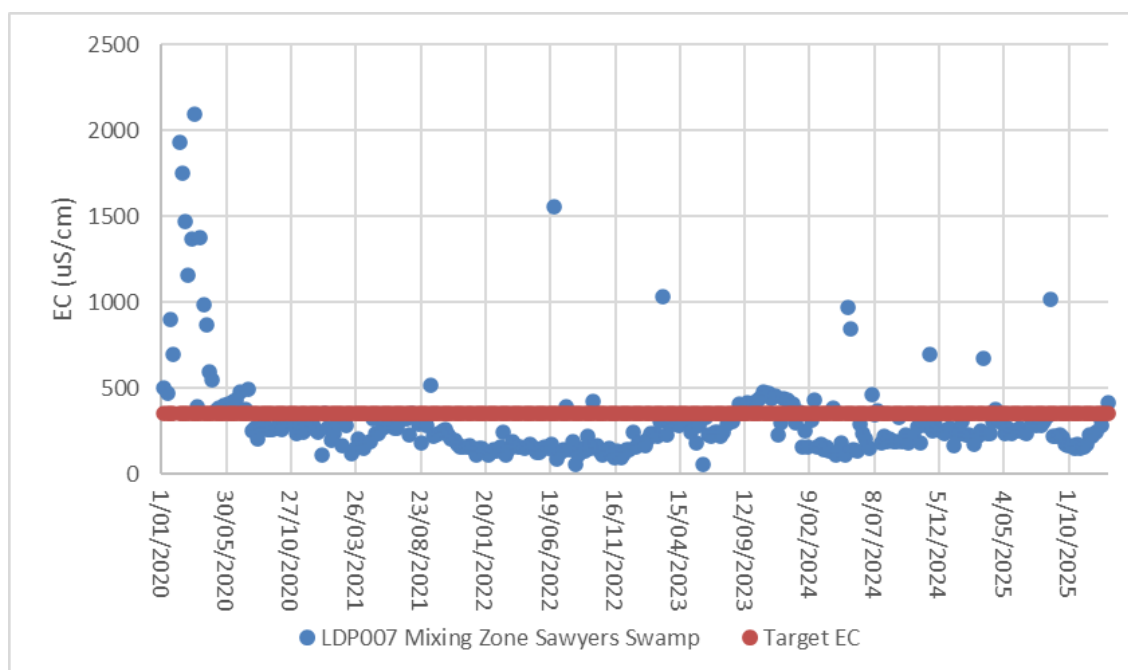


Figure 7-6 Cox River Water Quality Time Series for Electrical Conductivity

During the reporting period the average EC was approximately 270 $\mu\text{S}/\text{cm}$, which is below the long term target of 350 $\mu\text{S}/\text{cm}$. 90% of samples were below the target EC level. Long term a decreased level of salinity has been observed following the cessation of discharge from LDP007 and results have been stable since 2021 with isolated spikes. Discharges from Western Coal Services are discussed in the Western Coal Services Annual Review

Aquatic Ecology - Upper Coxs River Catchment

The UCRC is a highly modified environment due to historical and current primary production and industrial activities. In 2017, a coordinated, catchment-wide approach for aquatic ecology was implemented with the aim of understanding the overall health of the UCRC. The monitoring program, known as the UCRC Aquatic Ecology Monitoring Program (AEMP), addresses the aquatic ecology monitoring requirements of Centennial operations and the Springvale Upper Coxs River Action and Monitoring Program (UCRAMP; 2023).

The AEMP allows for identification of both positive and negative impacts within the catchment due to mine water discharge from Centennial operated licensed discharge points (LDPs) on the ecosystem health of waterways in the UCRC (GHD 2016).

Monitoring Sites associates with Springvale are presented in **Table 7-7**.

Table 7-7: Aquatic Ecology Monitoring Sites

Site	Description	Site Type
Sawyers Swamp Creek		
SSCup	Upstream reference site in Sawyers Swamp Creek, located upstream of Sawyers Swamp Creek Ash Dam.	Background
DP9dn	Located downstream of Springvale LDP7 (inactive) within offline drainage channel receiving runoff from Sawyers Swamp Creek.	Historical impact
Springvale Creek		
MC2	Located on Marrangaroo Creek. Replacement background site for SCup.	Background
SCdn	Downstream from Springvale Mine pit top located at the railway crossing 200 m upstream of the Castlereagh Highway.	Impact
Coxs River		
CR0	Upstream of all Centennial LDPs	Background
CR1	Upstream of all Centennial LDPs	Background
CR3	Located downstream of Wangcol Creek and upstream of Sawyers Swamp Creek confluence.	Upstream (Sawyers Swamp Creek and LDP7 - inactive)
CR4	Located at the Maddox Lane road crossing downstream of Angus Place LDP1 (decommissioned), Springvale LDP7 (inactive) and SCS LDP1.	Historical impact (Sawyers Swamp Creek and LDP7 - inactive)
CR5	Located at the Main Street road crossing downstream of Angus Place LDP1 (decommissioned), Springvale LDP7 (inactive), SCS LDP1 and Lidsdale LDP4. Upstream of Springvale LDP6.	Upstream (Springvale Creek and LDP6)
CR6	Coxs River directly downstream of Lake Wallace, on the downstream side of Rocky Waterhole Drive. Downstream of all Centennial LDPs.	Impact (Springvale Creek and LDP6)
CR7	Located in the Marrangaroo National Park approximately 5 km downstream of the Lake Wallace dam wall.	Recovery

Sawyers Swamp Creek

In 2025, macroinvertebrate monitoring showed higher taxa richness, EPT richness and SIGNAL-2 scores at background site SSCup compared to historical impact site DP9dn, although limited wetted habitat at SSCup in autumn restricted sampling to one sample. EPT taxa were recorded at both sites, with Plecoptera more consistently present at SSCup.

Water quality exceedances (metals and nutrients) were recorded at SSCup, while DP9dn showed fewer exceedances, and sediment quality was generally within guidelines except for elevated nickel at DP9dn in autumn. Differences in taxa richness, EPT richness and SIGNAL-2 between sites are likely influenced by habitat variability, with SSCup supporting more diverse instream habitat than DP9dn.

Overall, results indicate no notable impact on water quality, sediment quality or macroinvertebrate communities in 2025 from historical LDP7 discharges.

Results are presented in **Figure 7-7 to Figure 7-9**.

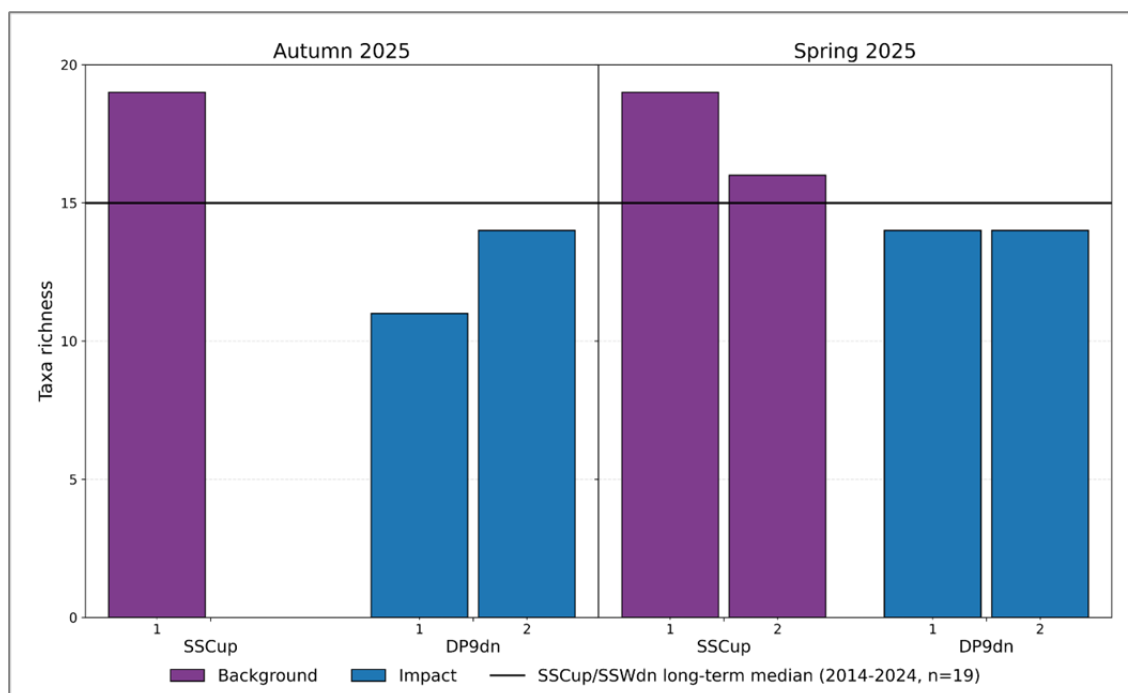


Figure 7-7: Taxa Richness in Sawyers Swamp Creek samples in 2025

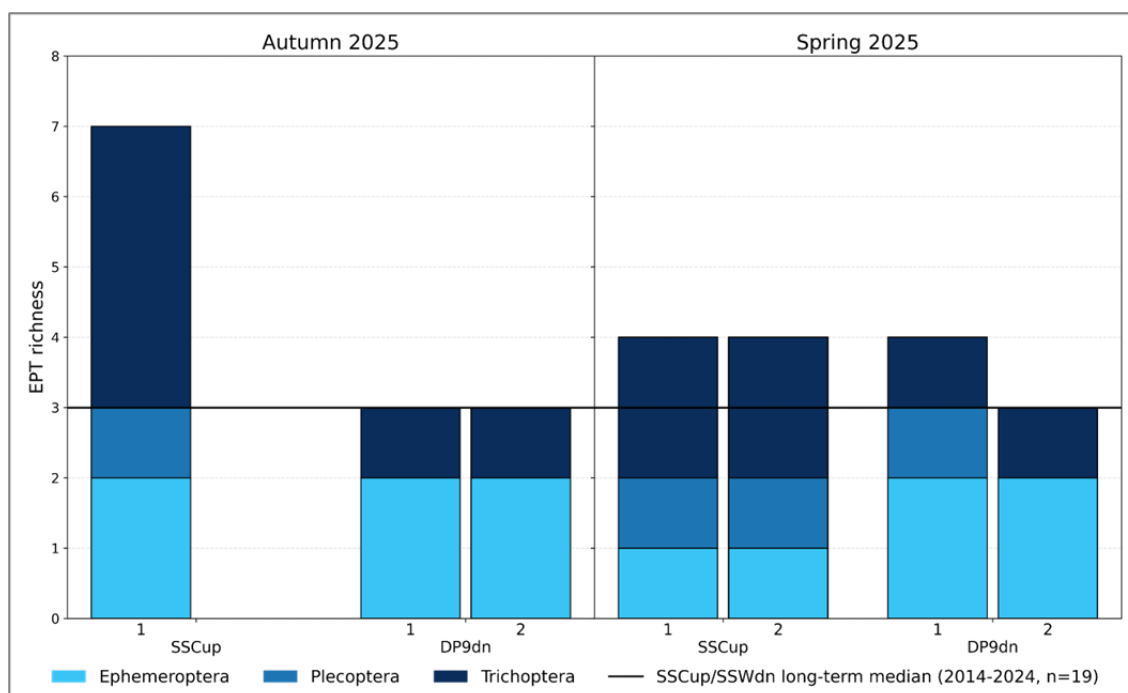


Figure 7-8: EPT Richness in Sawyers Swamp Creek samples in 2025

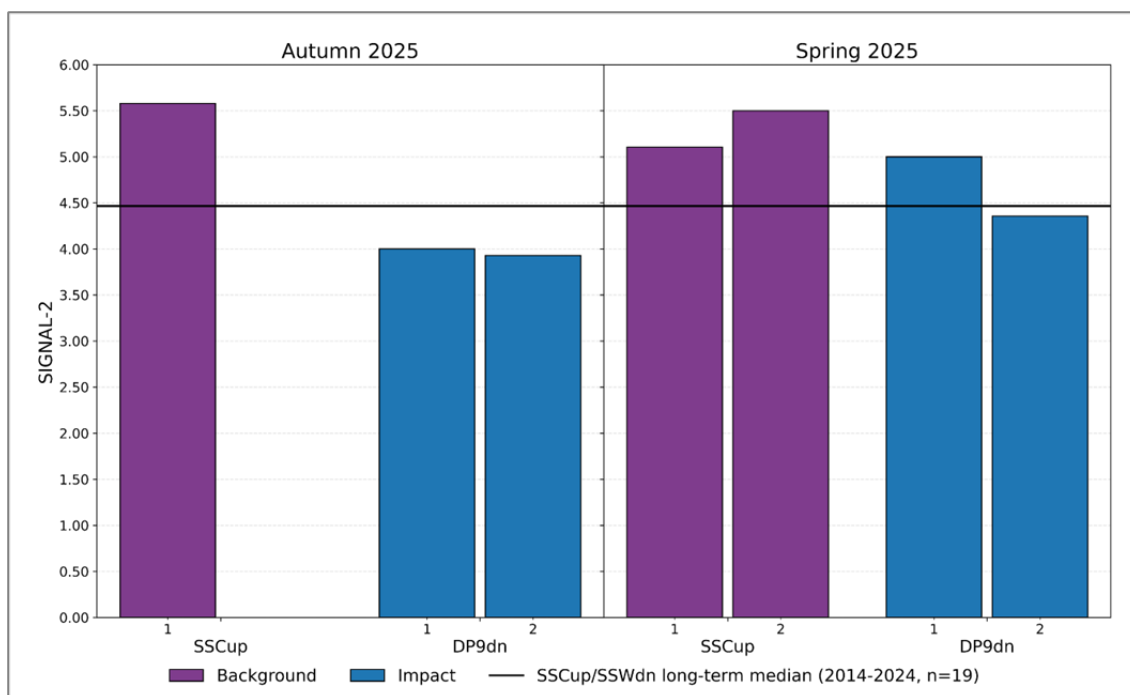


Figure 7-9: SIGNAL-2 in Sawyers Swamp Creek samples in 2025

Springvale Creek

In 2025, macroinvertebrate monitoring showed variable taxa richness between sites, with generally higher and more consistent results at background site MC2 compared to impact site SCdn, particularly in spring. EPT richness was consistently higher at MC2 than SCdn across both seasons, and SIGNAL-2 scores were also higher at MC2, with SCdn results generally below long-term medians.

Water quality indicated minimal risk to macroinvertebrates at both sites, with limited exceedances of guideline values. However, sediment quality at SCdn showed elevated nickel and zinc in both seasons, which may have influenced macroinvertebrate communities, while sediment quality at MC2 remained low. Differences in taxa richness, EPT richness and SIGNAL-2 between sites are also likely influenced by habitat variability, with MC2 supporting more diverse instream habitat than SCdn.

Overall, results indicate no evident impact on macroinvertebrate communities from LDP6 discharges in 2025, although some influence from sediment quality at SCdn cannot be ruled out.

Results are presented in **Figure 7-10** to **Figure 7-12**.

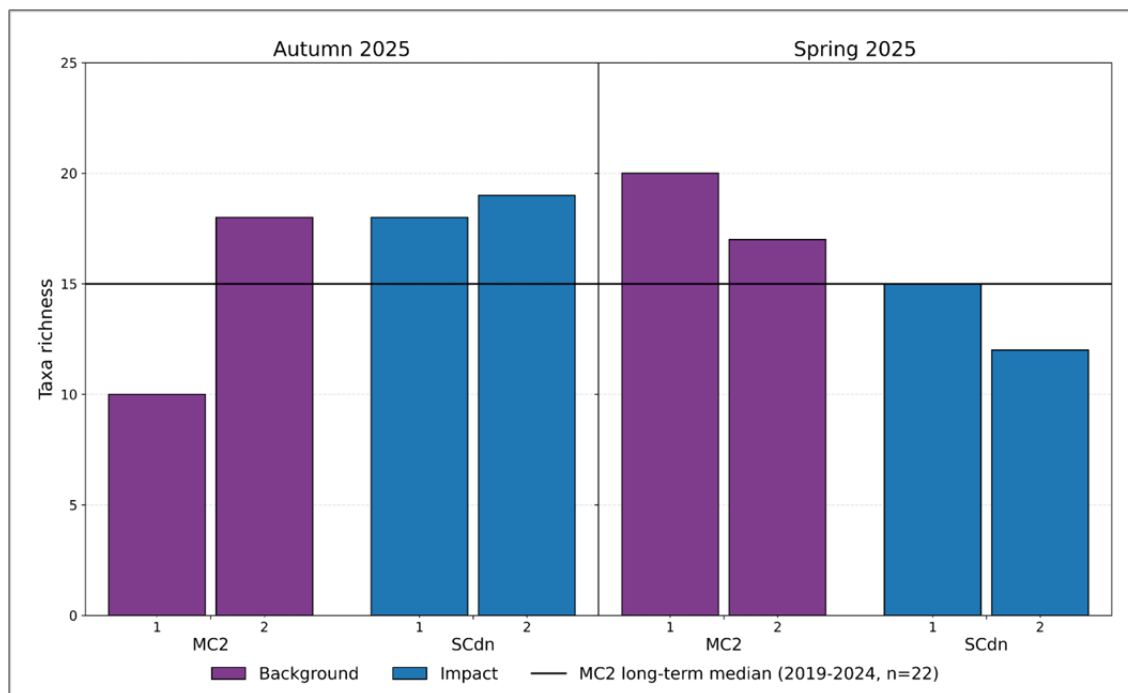


Figure 7-10. Taxa richness in Coxs River samples associated with Springvale Mine LDP6 in 2025

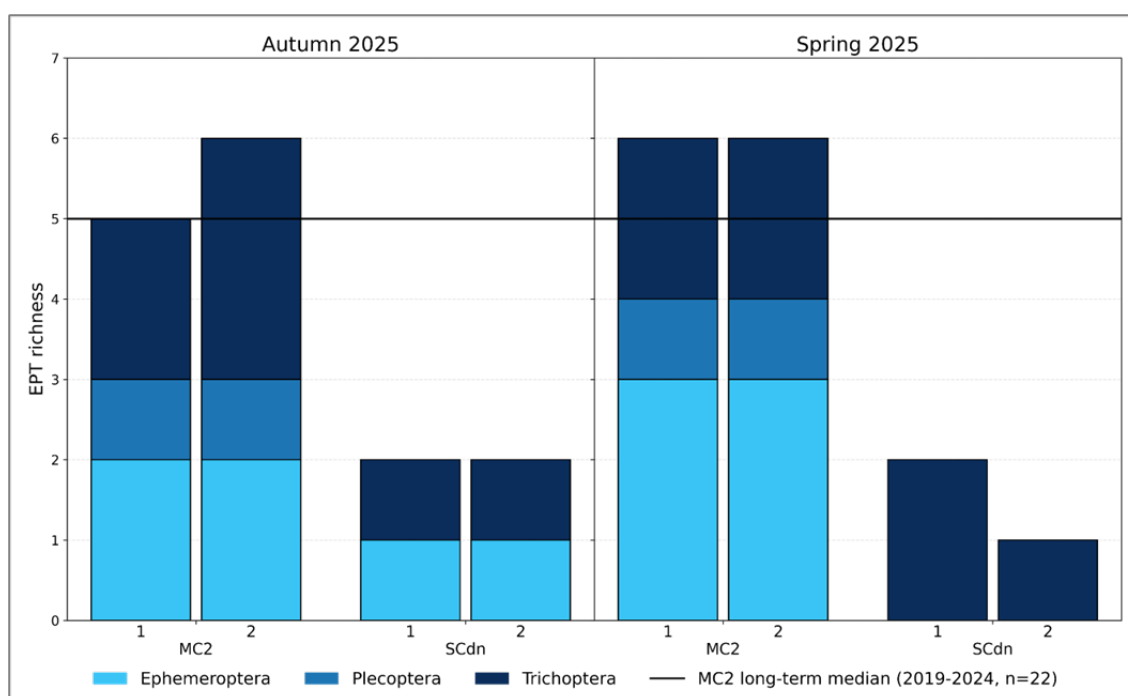


Figure 7-11. EPT richness in Coxs River samples associated with Springvale Mine LDP6 in 2025

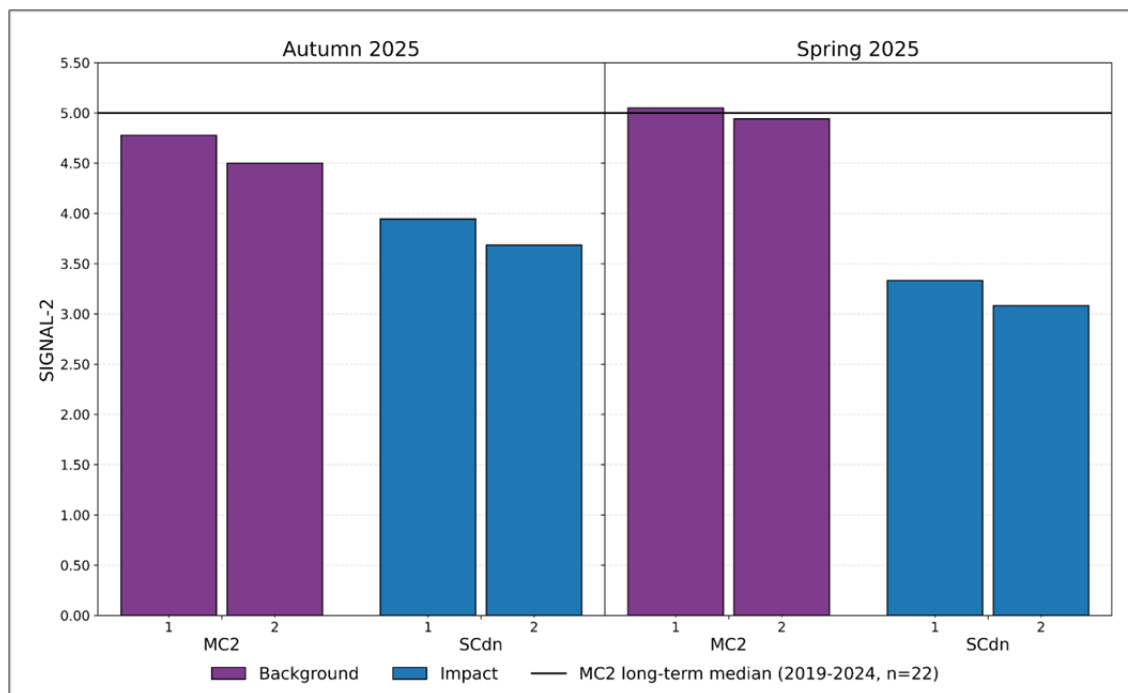


Figure 7-12. SIGNAL-2 in Coxs River samples associated with Springvale Mine LDP6 in 2025

7.3.2.3 Stream Stability - Upper Coxs River Catchment

Stream stability and geomorphic condition is monitored in accordance with Section 8.1 of the UCRAMP and also assessed against the objectives of the CILMP and the WMP.

Monitoring was undertaken this reporting period in August 2025 which assessed existing erosion and vegetation conditions using multiple methodologies including Rapid Appraisal of Riparian Condition (RARC), visual assessment and CSIRO Ephemeral Stream Assessment. Monitored streams included the following as shown on **Figure 7-13**. Assessed streams included:

- Marrangaroo Creek (MC)
- Carne Creek (CC)
- Springvale Creek (SC)
- Bungleboori Creek (BC)

Following the previous assessment in early 2024, below average rainfall prevailed at the site with annual totals of 796.8 mm and 853.4 mm recorded at the Lidsdale BoM gauge and Springvale site AWS, respectively. Due to reduced rainfall, a release volume of 98.0 ML was reported at LDP006 which, while greater than the 2023 total recorded (88.5 ML), is well below average discharge volumes captured in historic Springvale Annual Review documents. During 2025, below average rainfall conditions have continued in the region to the time of writing. Impacts to vegetation in the Newnes Plateau due to the 2019-20 Black Summer bushfires remain apparent as widespread woodland regeneration is ongoing.

The results of this monitoring survey indicate that both stream health and channel stability vary over the creeks in vicinity of the site. The survey identified that a number of the creeks, including the areas of Carne Creek, Marrangaroo Creek and Bungleboori Creek are currently in a stable to very stable condition, likely in their original form, with good to excellent vegetation. Upper reaches of Carne Creek have been vulnerable to erosion and movement of stream sediments due to impacts from the previous bushfires, however, most sites appear to be potentially stabilising as vegetation is re-establishing in these areas. Previously disturbed areas of Bungleboori Creek appear stable with good grassland growth. Springvale Creek

downstream of LDP006 appears stable, however, some bed sediment movement is apparent in the area.

The RARC stream health assessment identified the majority of monitoring locations as 'Excellent' condition. This is due to lengths of Carne Creek, Marrangaroo Creek and downstream sections of Bungleboori Creek being located within remnant bushland with very little to no human disturbance within the riparian corridor. The two upper stream points on Bungleboori Creek (BC01 and BC02) were rated 'Very Poor' due to absence of canopy caused by historical logging at these locations, while SC01 on Springvale Creek was also rated 'Very Poor' as most the site is within open paddocks of exotic groundcover, limited canopy species and an absence of midstorey cover.

The results are summarised in summarised in **Table 7 8**. Long term trends are presented in **Appendix 2**.

Table 7-8: Summary of Stream Stability Assessment (2025)

Site	RARC Stream Health Assessment Classification	CSIRO Ephemeral Stream Assessment Classification	Primary Cause of Erosion
	2025	2025	
Marrangaroo Creek			
MC01	Good	Very Stable	NA
MC02	Excellent	Very Stable	NA
MC03	Excellent	Very Stable	NA
MC04	Excellent	Stable	NA
MC05	Excellent	Potentially Stabilising	Unstable Wall materials
Carne Creek			
CC01	Good	Stable	NA
CC02	Excellent	Stable	NA
CC03	Excellent	Stable	NA
CC04	Good	Potentially Stabilising	Previous Bushfires, Unstable Wall and Bed Materials
CC05	Excellent	Stable	Previous Bushfires, Unstable Wall and Bed Materials
CC06	Good	Potentially Stabilising	Previous Bushfires, Unstable Wall and Bed Materials
CC07	Excellent	Stable	NA
CC08	Excellent	Very Stable	NA
CC09	Excellent	Very Stable	NA
Springvale Creek			
SC01	Very Poor	Stable	NA
Bungleboori Creek			
BC01	Very Poor	Very Stable	NA
BC02	Very Poor	Stable	NA

Site	RARC Stream Heath Assessment Classification	CSIRO Ephemeral Stream Assessment Classification	Primary Cause of Erosion
	2025	2025	
BC03	Good	Very Stable	NA
BC04	Excellent	Very Stable	NA
BC05	Good	Very Stable	NA
BC06	Good	Stable	NA

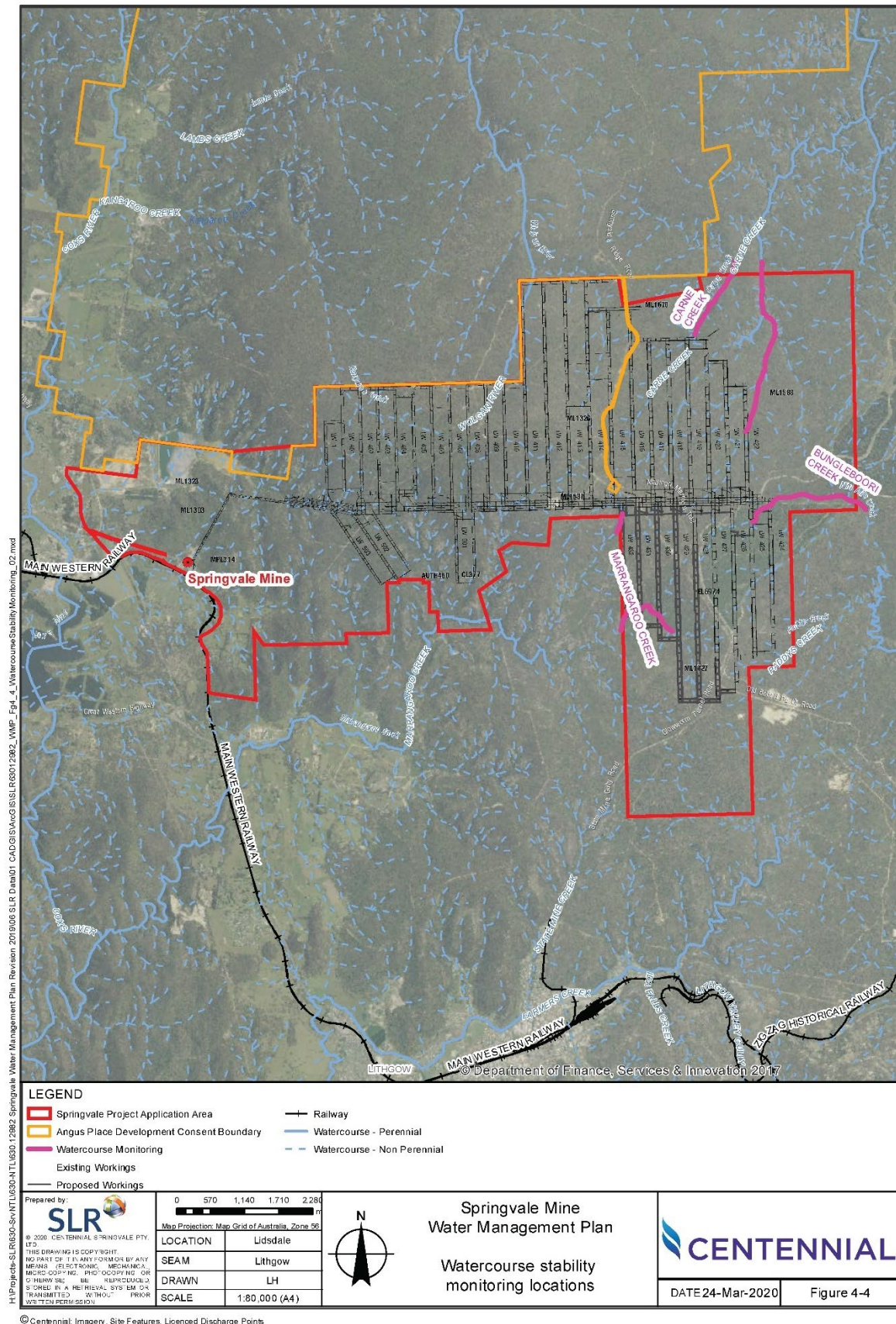


Figure 7-13. Watercourse Stability Monitoring Locations (WMP 2020)

7.3.3 Comparisons against Predictions

The following summarises predictions for riparian habitats for LW 428-432 as outlined in the subsidence assessment for the project and LW 428-432 Extraction Plan.

The predicted post mining grades along the drainage lines are similar to the natural grades. Therefore, it is not expected that there would be any significant adverse changes in ponding or scouring resulting from the proposed mining. There may be some very minor localised areas which could experience small increases in the levels of ponding, where the natural gradients are low immediately upstream of the longwall chain pillars. It is expected that fracturing of the bedrock would occur beneath some sections of the drainage lines which are located directly above the proposed longwalls. Results obtained in the reporting period are consistent with these predictions.

In relation to mine discharges to receiving surface watercourses, successful commissioning of the Springvale Water Treatment Plant (SWTP) in recent years has resulted in the cessation of previous discharges from target LDPs as was predicted, with mine waters redirected to beneficial reuse by the Mount Piper Power Station (MPSS). This has been a significant achievement for Centennial to improve water management both at Springvale Mine and regionally.

7.3.4 Long Term Analysis

The results of this monitoring survey indicate that both stream health and channel stability fluctuate over different creeks in vicinity of the site. The survey identified that a number of the creeks, including the areas of Carne Creek, Marrangaroo Creek and Bungleboori Creek are currently in a stable to very stable condition, likely in their original form, with excellent vegetation. Upper reaches of Carne Creek have been vulnerable to erosion and movement of stream sediments due to impacts from the recent bushfires, however, most sites appear to be potentially stabilising as vegetation is re-established in these areas. Previously disturbed areas of Bungleboori Creek appear stable with good grassland growth. Springvale Creek downstream of LDP006 appears stable, however some bed sediment movement is apparent in the area.

7.3.5 Implemented / Proposed Improvements

The following improvements will be undertaken in accordance with the UCRAMP:

- In accordance with Section 8 of the UCRAMP, monitoring programs will be modified or rationalised as required with the actions proposed as part of the UCRAMP.
- Implementation of commitments for catchment improvement works in accordance with the CILMP (refer **Section 6.5.5.1**);

7.4 WATER MANAGEMENT IN EXTRACTION AREAS

This section presents water management and monitoring undertaken within mining extraction areas only, primarily associated with potential impacts related with mine subsidence in line with the Springvale Water Management Plan (WMP) and WMP's prepared for specific Extraction Plan (EP) areas as progressively approved in accordance with Schedule 3, Condition 10 of SSD5594, as outlined further in the following sections below.

Water management and monitoring beyond extraction areas, including surface water discharges and receiving water environments, is discussed separately in **Section 7.3**.

7.4.1 Environmental Management

Subsidence from longwall mining has potential to cause changes to hydrogeological regimes. Management and monitoring programs target swamps (NPSS and NPSS), perched aquifers,

shallow aquifers and the deep aquifers using standpipe piezometers and vibrating wire piezometers (VWPs), as illustrated on **Figure 7-14** and **Figure 7-15**. Potential impacts are assessed against performance triggers established within related TARPs to identify when observed variances in groundwater levels, soil moisture and water quality exceed natural ranges. Groundwater models informing the WMP, SMPs and associated TARPs are regularly updated as detailed in **Section 7.2**.

Groundwater management and monitoring at Springvale is undertaken in accordance with the following guiding documents required by SSD5594:

- Springvale Water Management Plan (including Groundwater Management Plan and Groundwater Monitoring Program), prepared in accordance with Condition 14, Schedule 4, as detailed further in **Section 7.1**;
- Swamp Monitoring Programs (SMP) (shallow groundwater), developed and approved under SSD5594 and EPBC approvals as outlined further in **Section 6.5.1**;
- Western Region Stygofauna Monitoring and Assessment Plan (WR-SMAP), prepared in accordance with Schedule 4, Condition 17 (June 2018 approved by DPHI on 3 July 2018). The prescribed monitoring events required by the plan were completed in 2019.
- Subsidence Monitoring Programs developed and approved for each Extraction Plan in accordance with Condition of SSD5594, also inform water management within extraction areas.

It is important to note that an interrelationship exists between the Swamp, Biodiversity, Subsidence and Water Monitoring Programs and Management Plans. As discussed in **Section 6.5.1**, the recent LW 428-432 Extraction Plan consolidated monitoring sites and methodologies for past and present areas (LW 415-432) to address the approval requirements for SSD5594. Notwithstanding this, the consolidation process has not yet been approved at Commonwealth level and subsequently the previously Commonwealth-approved management and monitoring programs for individual EP areas remain applicable (refer **Section 6.5** for further details).

7.4.2 Environmental Performance

Water monitoring results in extraction areas is analysed in detail by an Annual Environmental Monitoring Review - Surface and Groundwater which is presented in **Appendix 4** (EMM, March 2026), including data and graphical trend analysis. A summary of the report's findings and conclusions is provided in the following sections. The full report should be referred to for further details.

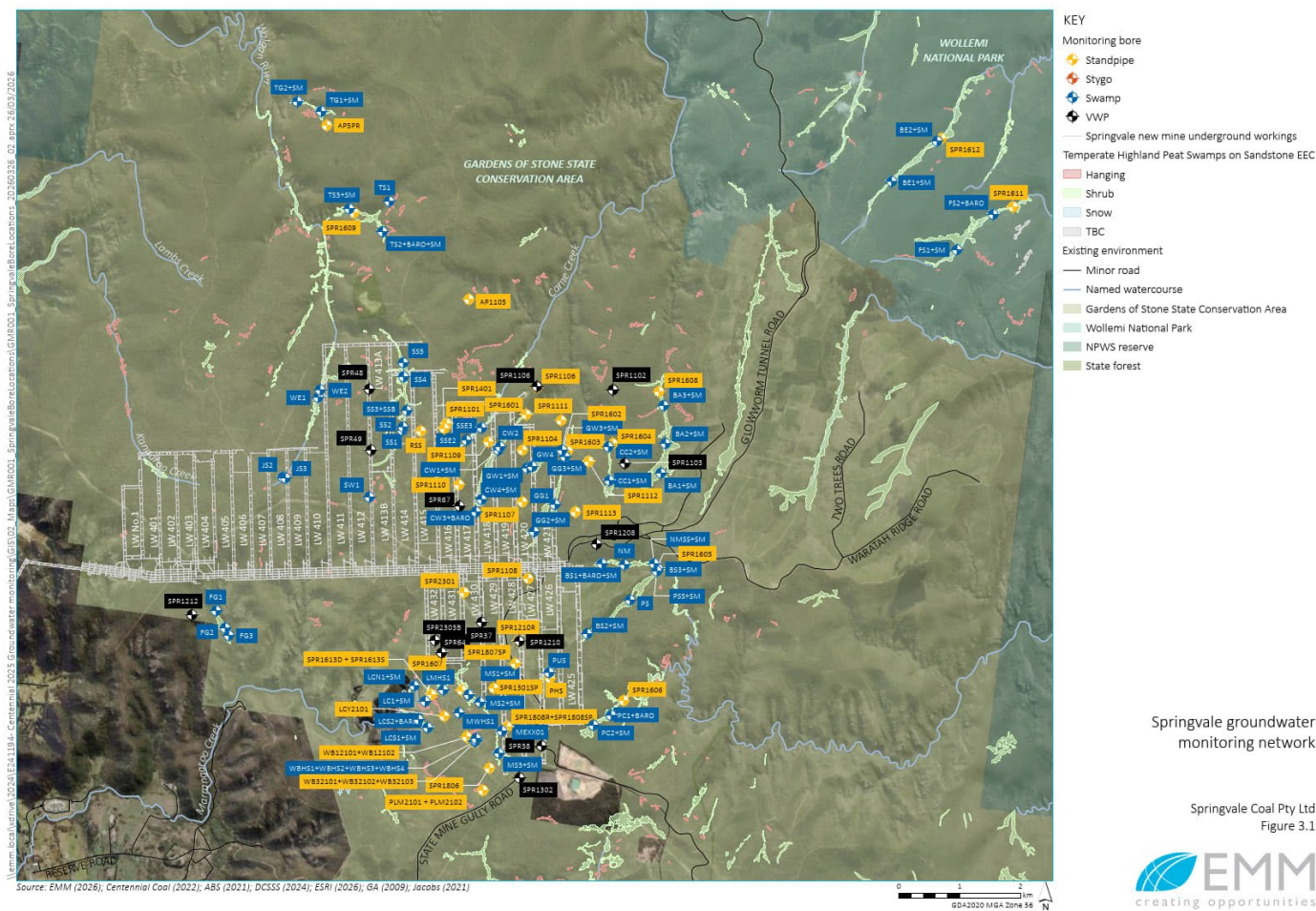


Figure 7-14: Springvale Ground Monitoring Network

7.4.2.1 Swamp Groundwater and Surface Water

Swamp Groundwater Levels

Swamp standpipe piezometers are installed in the unconsolidated sediments of NPSS, typically to refusal on bedrock. Groundwater levels are monitored at 22 NPSS with a total of 54 standpipe piezometers. Groundwater levels are monitored at three NPHS, with a total of eight standpipe piezometers (hanging swamp piezometers). Groundwater level loggers record levels daily and are downloaded monthly with manual groundwater level measurements taken concurrently.

Table 7-9 summarises observed trends in swamp groundwater levels during the 2025 reporting period. CRD refers to Cumulative Rainfall Departure.

Table 7-9. Swamp Groundwater Level Trend Summary for 2025

Swamp	Monitoring ID	Site type as per SMP	Mined status	Comment
Barrier Swamp	BA1	Reference	NA	Stable – minor fluctuations due to rainfall; changes of 0.03 m are common. The logger may have shifted from 20 June to 14 July, possibly due to a build-up of sediment
	BA2			Stable – groundwater levels react to rainfall events; changes of approximately 0.1 m are common. A suspected seasonal trend showed increasing groundwater levels from January to August, and decreasing levels from August to December
	BA3			Stable – trends with the daily CRD. When the water level is above ground level, 0.03 m fluctuations are common. When the water level is below the ground level, fluctuations increase, changes over 0.1 m are common. Groundwater levels increased from January to May, remained above ground level until September, and decreased from September to December.
Best Swamp	BE1	Reference	NA	Stable – fluctuations due to rainfall; changes of up to 0.15 m are common. Slight increasing trend from January to August followed by a slight decline from September to December
	BE2			Stable – fluctuations due to rainfall; changes of up to 0.1 m are common. Slight increasing trend from January to August followed by a slight decline from September to December.
Carne Central	CC1	Reference	NA	Variable – fluctuations due to rainfall of over 0.4 m from January to May. Groundwater levels stabilised near the ground surface from May to October. In October the level decreased by over 0.3 m before recovering at the start of November. Data was not recorded from November onwards.
	CC2			Variable – fluctuations due to rainfall of 0.3 m are common. From January to March the piezometer was dry. In May levels increased due to rainfall, remaining stable from July to September. From September to December groundwater levels declined to approximately 1.15 mbgl, only briefly increasing in response to rainfall

Swamp	Monitoring ID	Site type as per SMP	Mined status	Comment
Fire Tail	FS1	Reference	NA	Stable – trends with the daily CRD. Fluctuations are attributed to individual rainfall events.
	FS2			Stable – trends with the daily CRD. Relatively stable until mid-August followed by a declining trend corresponding to below average rainfall. Fluctuations are attributed to individual rainfall events.
Twin Gully	TG1	Reference	NA	Decreasing – trends with the daily CRD. Fluctuations attributed to individual rainfall events. Decreasing trend observed from September to December
	TG2			Variable – trends with the daily CRD. Increasing from January to August followed by a declining trend from September to December, corresponding to below average rainfall. Fluctuations are attributed to individual rainfall events.
Tristar	TS1	Reference	NA	Variable – trends with the daily CRD. Increasing from May to August, declining from August to December. Responsive to individual rainfall events; changes of 0.3 m are common with changes greater than 1 m for heavy periods of rainfall (as seen in August).
	TS2			Stable – trends with daily CRD. Water level responds to rainfall events. From January to May water levels remained relatively stable fluctuating with rainfall. In May water levels increased to close to ground level and responses to rainfall events reduced. Levels declined from October to December
	TS3			Stable – water level remained stable close to ground level, with minor responses to rainfall events. Trends with daily CRD.
East Wolgan	WE1	Impact	Adjacent LW411	Dry – briefly responded to rainfall events in August and September.
	WE2			Stable – Data not recorded from July 2024 to August 2025 due to logger malfunction. Responds intense to rainfall events; changes of 0.3 m are common. Between events the piezometer is dry.
Sunnyside West	SW1	Impact	LW413B/414	Variable - Responsive to rainfall events, changes of 0.3 m are common. Generally dry from January to May. Levels responded to a prolonged and heavy rainfall event in May increasing the recorded level by approximately 1.5 m. Water level declined from September to November, becoming dry for the remainder of the year
Sunnyside	SS1	Impact	LW414	Stable – responsive to large rainfall events. Minor short-term decreases in water level attributed to water quality sampling. Not data recorded from August to December due to a expired logger.
	SS2			Decreasing – No data from November 2024 to August 2025 due to a malfunctioning logger. Responsive to large rainfall events. Decreasing trend from August to December.

Swamp	Monitoring ID	Site type as per SMP	Mined status	Comment
	SS3			Variable –highly responsive to rainfall events. No data from March 2025 onwards due to a malfunctioning logger.
	SS4			Stable – responsive to rainfall events. Trends with daily CRD. Increasing from January to August 2025, decreasing from August to December 2025.
	SS5			Stable – responsive to large rainfall events. No data from March 2025 onwards due to logger expiry.
Sunnyside East	SSE1	Impact	LW417	Damaged by bushfire – decommissioned.
	SSE2			Dry – historically responsive to large rainfall events with a short sharp rise in groundwater level.
	SSE3			Dry – historically responsive to large rainfall events with a short sharp rise in groundwater level.
Carne West	CW1	Impact	LW149	Dry.
	CW2			Dry – responsive to large rainfall events with short sharp rises in groundwater level.
	CW3		LW417	Dry.
	CW4			Dry.
Junction	JS1	Impact	LW408	Decommissioned – piezometer damaged by road grading in February 2021.
	JS2			Stable – trends closely with daily CRD. Increasing trend from May to September 2025, decreasing from September to December 2025.
	JS3			Stable – trends closely with daily CRD. Increasing trend from May to September 2025, decreasing from September to December 2025.
Gang Gang West	GW1	Impact	LW420	Dry – Generally dry, except for responses to heavy or prolonged rainfall events. Piezometer briefly response to events in May, July, and August.
	GW2			Decommissioned – damaged by bushfire.
	GW3			Generally dry, except for responses to heavy or prolonged rainfall events. Piezometer briefly response to events in May, July, and August.
	GW4			Dry – Generally dry, except for responses to very heavy or prolonged rainfall events. Groundwater levels responded to rainfall in August, fluctuating by over 0.75 m. By October the bore was dry for the remainder of the year.
Gang Gang	GG1	Impact	LW420	Dry - Periodically responsive to heavy or prolonged rainfall events. Piezometer responded to rainfall in May, June, August, and September. Observed level changes were up to 0.35 m.

Swamp	Monitoring ID	Site type as per SMP	Mined status	Comment
	GG2			Dry.
	GG3			Dry - Periodically responsive to heavy or prolonged rainfall events. Groundwater levels responded to rainfall in February, May, June, August, and September. Observed level changes were up to 0.6 m
Pine	BS2	Impact	LW425	Dry - Periodically responsive to very heavy or prolonged rainfall events. Groundwater levels responded to rainfall in February, May, June, August, and September. Observed level changes were up to 0.1 m.
	BS3			Stable – consistent with historical observations
	BS4 (PSS)			Stable – Trends with daily CRD. Groundwater level fluctuates in response to rainfall below ground level. Levels become stable when groundwater level rises to the ground level. Water levels stabilised around ground level between May and September.
	PS			Declining – Trends with daily CRD. Groundwater level fluctuates in response to rainfall when below 0.1 mbgl. Levels become stable when groundwater level rises above 0.1 mbgl. Water levels stabilised around 0.1 mbgl between May and September. Levels declined from September to December
	PUS			Variable – trends with the daily CRD and is responsive to rainfall events, fluctuations of 0.9 m are common for individual rainfall events. Groundwater level responded to rainfall in January and February. Accumulating rainfall events from August increased water levels until September. Levels declined from September to December 2025.
Nine Mile	BS1	Impact	NA	Variable – Trends with daily CRD, responds to heavy or prolonged rainfall. Fluctuations of 0.4 m are common. Groundwater decreased from January, becoming dry in March. Increasing from late-May with rainfall then decreasing in September for the remainder of the year
	BS5 (NMSS)			Stable – minor fluctuations with rainfall
	NM			Variable – Trends with daily CRD, responded to rainfall events. Groundwater level increased from January to August 2025, decreasing from August to December 2025.
Marrangaroo	MS1	Impact	LW428	Variable – Trends with daily CRD, responds to rainfall events. When water levels are below 0.5 mbgl, response to rainfall events is increased. Groundwater fluctuations of over 0.5 m were common from January to May. Water levels increased from January to September 2025, decreasing from September to December 2025.
	MS2			Variable – highly responsive to individual rainfall events seen as sharp increases in groundwater levels that slowly decline over

Swamp	Monitoring ID	Site type as per SMP	Mined status	Comment
				several days to weeks depending on the intensity of the rainfall event. Dry between rainfall events. The trend is not consistent with historical observations, and it is believed MS2 has been impacted by mining. Trigger investigation completed in August 2023 and July 2024 (with SPR1301).
	MS3			Variable – Trends with daily CRD, responsive to rainfall. Rainfall responses reduce when the water level approaches ground level. Groundwater level increased from January to September 2025, decreasing from September to December 2025.
Lost City	LCS1	Impact	NA	Stable.
	LCS2			Stable – minor fluctuations in trend.
	LC1			Stable – trends with daily CRD, responsive to rainfall events. Level changes of 0.1 m are common when the water is below ground level.
	LCN1			Declining – Trends with daily CRD, level changes over 0.2 m are common. Groundwater level decline from January to April, increase from April to September, and decline from September to December 2025.
Paddys Creek	PC1	Impact	NA	Stable – minor fluctuations due to rainfall. Decreasing trend from September to December due to below average rainfall.
	PC2			Stable – minor fluctuations due to rainfall. Decreasing trend from September to December due to below average rainfall.
Wishbone Hanging Swamp	WBHS1	Impact	LW428	Responded to rainfall in January, and from May to September and was dry between events. Fluctuations of over 0.2 m appear common in response to rainfall.
	WBHS2			Responded to rainfall in January, and from May to September and was dry between events. Fluctuations of over 0.3 m appear common in response to rainfall.
	WBHS3			Responded to rainfall from May to October and was dry between events. Fluctuations of over 0.5 m appear common in response to heavy or prolonged rainfall.
	WBH4			Responded to rainfall in January, February, and from April to September and was dry between events. Fluctuations of over 0.2 m appear common in response to rainfall.
Marrangaroo Hanging Swamp	LHMS1	Impact	LW428	Stable.
	MEXX01			Dry – brief responses due to rainfall events in May, July, August and September.
	MWHS1			Responded to rainfall in January to November. Sustained water levels trend with increasing daily CRD. Fluctuations due to rainfall are reduced as the water level approaches the ground level. The water level approached the ground level from May to September, at around 0.1 mbgl.

Swamp Groundwater Quality

Table 7-10 presents a summary of water quality trends at impact swamps during the reporting period. pH, salinity and filtered iron are key parameters of focus. Refer to the full detailed report in **Appendix 4** for further details.

Table 7-10. Summary of Impact swamp groundwater quality trends for 2025

Monitoring ID	Analyte	2025 Comment
Sunnyside Swamp		
SS1	pH	Stable trend generally between pH 5–6. In December pH became neutral at 6.9.
	EC	Stable trend, increasing from July to December.
SS5	pH	Variable – generally within pH 5–6, decreasing to 4.2 in August. From August to December pH increased, returning to the historical range between 5–6.
	EC	Variable – recording a low of 26 $\mu\text{S}/\text{cm}$ in May and a high of 130 $\mu\text{S}/\text{cm}$ in November.
Pine Swamp		
BS2	pH	Dry - No data available over the reporting period.
	EC	Dry - No data available over the reporting period.
BS3	pH	Declining trend from January (pH 5.2) to August (pH 3.8), increasing to pH 4.8 in September and October before becoming more acidic in November (pH 3.9) and December (pH 4.5).
	EC	Stable trend, generally decreasing from June to December.
PSS (BS4)	pH	Variable throughout 2025, generally between pH 4.0–5.5.
	EC	Stable trend, increasing from September to December.
Nine Mile Swamp		
BS1	pH	Limited data recorded from August to October. General decreasing trend from December 2024.
	EC	Stable trend.
NMSS (BS5)	pH	Decreasing trend from January to July, increasing from July to December.
	EC	Stable trend.
Marrangaroo Swamp		
MS1	pH	Slightly decreasing trend, within pH 4.5–5.5.
	EC	Stable trend.
MS2	pH	Limited data, observed in February, April and August because the water level was too low to sample. pH ranged from 4.6–5.8.
	EC	Limited data, observed in February, April and August because the water level was too low to sample. February recorded a high of 657 $\mu\text{S}/\text{cm}$, before returning to 28 $\mu\text{S}/\text{cm}$ in April and August.
MS3	pH	Stable within pH 4.5–5, except for a spike in September of 6.9 due to rainfall.
	EC	Stable trend.
Paddys Creek Swamp		
PC1	pH	Declining trend, between pH 4.1–5.3.

Monitoring ID	Analyte	2025 Comment
	EC	Increasing trend, from 30 µS/cm in January to 42 µS/cm in December.
PC2	pH	Declining trend, between pH 4.2–5.2.
	EC	Increasing trend, from 33 µS/cm in January to 46 µS/cm in December.
Lost City Swamp		
LC1	pH	Decreasing from January to July, increasing from July to September, decreasing from September to October and remaining stable for the remainder of the year. Generally within pH 4.0–5.5, with a spike becoming neutral in September due to rainfall.
	EC	Stable trend.
LCN1	pH	Slight decrease from January to July, increasing from July to September, decreasing from September to October and remaining stable for the remainder of the year. Generally within pH 4.0–5.5, with a spike becoming neutral in September due to rainfall.
	EC	Stable trend.
LCS1	pH	Decreasing from January to August, increasing from August to September, decreasing from September to October and remaining stable for the remainder of the year. Generally within pH 4.0–5.5, with a spike becoming neutral in September due to rainfall.
	EC	Stable trend.
LCS2	pH	Decreasing from January to July, increasing from July to September, decreasing from September to October and remaining stable for the remainder of the year. Generally within pH 4.0–5.5, with a spike becoming neutral in September due to rainfall.
	EC	Stable trend.

Swamp Surface Water Quality and Flow

A summary of results observed in the 2025 reporting period is provided in **Table 7-11** below. For further details refer to the detailed annual report (EMM, 2025) provided in **Appendix 4**.

Table 7-11. Swamp Surface Water Quality and Flow

Monitoring ID	Date Range	Frequency	Analyte	2025 Water Quality Comment
Reference Sites				
Barrier Swamp	27/09/2016 - present	Fortnightly/ monthly	pH	Stable trend within historic observations. pH dropped in December to 3.3 before returning to the slightly acidic conditions.
			EC	Stable trend within historic observations. A spikes in April and December that are correlated with rainfall.
			Flow	Stable from January to May, becoming variable and increasing to a peak in July. For the remainder of the year flow declined from July and remained stable.
Best Creek	24/11/2017 -	Fortnightly/ Monthly	pH	Stable trend within historic observations.

Monitoring ID	Date Range	Frequency	Analyte	2025 Water Quality Comment
	present		EC	Stable trend within historic observations.
			Flow	Stable trend except for spikes in March and August. Flow too low for monitoring from December.
Carne Central Swamp	27/09/2016 - present	Fortnightly/Monthly	pH	Stable trend between pH 4.4–5.8.
			EC	Trend within historical observations.
			Flow	Flow too low to monitor during 2025.
Firetail Swamp	24/11/2017 - present	Fortnightly/ monthly	pH	A peak of 6.8 in January before remaining stable between pH 4.4–5.4.
			EC	Stable trend.
			Flow	Stable trend, except for a spike in August of about 12,000 m³/day.
Tristar (Springvale site)	2/11/2016	Fortnightly/monthly	pH	Fluctuating between neutral and slightly acidic, generally between pH 4–6.
			EC	Stable trend.
			Flow	Variable between approximately 900–1,600 m³/day
Twin Gully (Springvale Site)	2/11/2016	Fortnightly/monthly	pH	No data available over the reporting period due to access constraints.
			EC	No data available over the reporting period due to access constraints.
			Flow	No data available over the reporting period due to access constraints.
Impact				
Carne Swamp	5/01/2005 – present	Fortnightly/monthly	pH	Limited data due to dry conditions. Available data between July and September show trends consistent with previous observations.
			EC	Limited data due to dry conditions. Available data between July and September show trends consistent with previous observations.
			Flow	No flow or too low to monitor during 2025.
Gang Gang South West	27/09/2016 - present	Fortnightly/monthly	pH	Dry or pooled during 2025.
			EC	Dry or pooled during 2025.

Monitoring ID	Date Range	Frequency	Analyte	2025 Water Quality Comment
			Flow	Dry or pooled during 2025.
Gang Gang East	27/09/2016 – present	Fortnightly/ monthly	pH	Dry or pooled during 2025.
			EC	Dry or pooled during 2025.
			Flow	Dry or pooled during 2025.
Marangaroo Swamp	24/11/2017 – present	Fortnightly/ monthly	pH	Generally stable between pH 4.5–5.5, with one spike to 6.5 in April.
			EC	Stable trend.
			Flow	Variable trend. Increasing from March to June, decreasing from August to September. Flow too low to monitor from September onwards.
Nine Mile Swamp	27/11/2017 - present	Fortnightly/monthly	pH	Stable between pH 4.5–5.5.
			EC	Stable trend.
			Flow	No data available over the reporting period due to low flow conditions.
Sunnyside U/S Junction	31/03/2006 - present	Fortnightly/monthly	pH	Generally stable trend, fluctuating between pH 5.0–6.5.
			EC	Stable trend.
			Flow	Variable trend. Increasing from May to July, decreasing from September to November.
Sunnyside Swamp Upstream	24/05/2005 - present	Fortnightly/ monthly	pH	Stable trend.
			EC	Stable trend.
			Flow	No data available over the reporting period due to low flow conditions.
Sunnyside Swamp Downstream	24/05/2005 - present	Fortnightly/ monthly	pH	Generally stable, fluctuating between pH 5.0–6.5.
			EC	Stable trend.
			Flow	Limited data due to low flow conditions, decreasing from July to November.
Sunnyside East Swamp (SS3 D/S)	10/06/2010 – present	Fortnightly/ monthly	pH	Dry or pooled during 2025.
			EC	Dry or pooled during 2025.
			Flow	Dry or pooled during 2025.
Sunnyside East	21/03/2016 - present	Fortnightly/ monthly	pH	Variable trend between pH 3.9–6.1. Decreasing from April to September, increasing from September to December.
			EC	Stable trend.

Monitoring ID	Date Range	Frequency	Analyte	2025 Water Quality Comment
			Flow	No data available over the reporting period due to low flow conditions.
Paddys Creek	24/11/2017 - present	Fortnightly/ monthly	pH	Generally within 4.5–6.0, except for acidic conditions in January at pH 3.1.
			EC	Stable throughout the year after a peak in January.
			Flow	One flow reading was recorded in September. Flow too low for monitoring in other months. Insufficient flow data to determine trends.
Pine / Nine Mile Swamp	27/11/2017 - present	Fortnightly/ monthly	pH	Generally stable between pH 5.0–6.0 from January to September. From September to December pH varied from 3.1–5.6.
			EC	Generally stable with spikes in October and December, corresponding to pH changes.
			Flow	Flow measured in June and July. Flow too low for monitoring in other months. Insufficient flow data to determine trends.

7.4.2.2 Shallow Aquifer Piezometers

Monitoring of the shallow groundwater system by 13 standpipe piezometers (shallow aquifer piezometers). Groundwater level loggers record groundwater levels daily and are downloaded monthly with manual groundwater level measurements taken concurrently.

A summary of results observed in 2025 for water quality is provided in **Table 7-12** below, and water level is presented in **Table 7-13**.

Table 7-12. Shallow Aquifer Groundwater Quality Summary (2025)

Monitoring ID	Site type	Date range	Frequency	Analyte	2025 Water Quality Comment
AP9PR	Reference	17/03/2016 - present	Quarterly	pH	Stable trend.
			Quarterly	EC	Stable trend.
AP8PR	Reference	17/03/2016 - present	Quarterly	pH	Stable trend. pH generally between 4.5–5.0.
			Quarterly	EC	Stable trend.
AP5PR	Reference	17/03/2016 - present	Quarterly	pH	Slightly declining trend.
			Quarterly	EC	Stable trend.
AP4PR	Reference	17/03/2016 - present	Quarterly	pH	Stable trend. pH generally between 4.5–5.0.
			Quarterly	EC	Stable trend.

Monitoring ID	Site type	Date range	Frequency	Analyte	2025 Water Quality Comment
AP1204	Reference	17/03/2016 - present	Quarterly	pH	Stable trend with pH generally between 4.5–5.0.
			Quarterly	EC	Stable from March to September 2025. Increasing trend from September to December 2025.
AP1105	Reference	4/12/2018 - present	Quarterly	pH	Stable trend with pH between 4.2–4.6.
			Quarterly	EC	Stable trend.
AP10PR	Reference	6/12/2022 - present	Quarterly	pH	Increasing from pH of approximately 3.7 in March to 4.9 in September 2025.
			Quarterly	EC	Stable trend.
SPR1401	Impact	17/03/2016 - present	Quarterly	pH	pH increased from March to a peak of 5.4 in June, decreasing for the remainder of the year to 4.6 in December.
			Quarterly	EC	Stable trend.
SPR1109	Impact	18/03/2016 – 30/11/2016	Not sampled	pH	Damaged by subsidence, no water quality data available since 2016.
			Not sampled	EC	Damaged by subsidence, no water quality data available since 2016.
SPR1106	Impact	18/03/2016 – present	Quarterly	pH	pH increased from 4.2 in March to a peak of 4.9 in June, stabilising around 4.5–4.6 for the remainder of the year.
			Quarterly	EC	Stable.
SPR1210	Impact	5/03/2019 – 28/05/2019	Quarterly	pH	Damaged by subsidence, no water quality data available since June 2019.
			Quarterly	EC	Damaged by subsidence, no water quality data available since June 2019.
SPR1211	Impact	4/12/2018 – 12/09/2019	Not sampled	pH	Damaged by subsidence, no water quality data available since October 2019.
			Not sampled	EC	Damaged by subsidence, no water quality data available since October 2019.

Table 7-13. Shallow Groundwater Level Trend (2025)

Monitoring ID	Site type	Mined status	Comments
AP5PR	Reference	NA	Stable – trends with daily CRD. No data from September 2025 due to an expired logger.
AP1105	Reference	NA	Decreasing – shows a delayed and subdued repose to long-term daily CRD. Steady decreasing trend of about 0.5 m from January to December.
SPR1106	Impact	NA	Decreasing – shows a delayed and subdued repose to long-term daily CRD. Steady decreasing trend of approximately 3 m from January to September. No data from September onwards due to logger hang issues.
SPR1109	Impact	LW418	Decreasing – Previously depressurised by mining. Generally, trends with long-term daily CRD. Groundwater level variability of up to 0.5 m, due to rainfall, increases when it drops below 1,060 mAHD. Steady decreasing trend of approximately 3 m from January to November. No data for December due to logger expiry.
SPR1111	Impact	NA	Decreasing – previously depressurised by mining. Shows a delayed response to long-term daily CRD. Steady decreasing trend of approximately 0.5 m from January to November 2025. No data for December due to access issues.
SPR1112	Impact	NA	Decreasing – shows a delayed and subdued repose to long-term daily CRD. Steady decreasing trend of approximately 2 m from January to November. No data in December 2025.
SPR1211	Impact	LW426	Damaged by subsidence in 2020 – decommissioned.
SPR1402	Impact	NA	Vandalised – decommissioned in 2016.
SPR1403	Impact	NA	Damaged by bushfire in 2019 – decommissioned

7.4.2.3 Perched Aquifers Piezometers

Monitoring of the perched groundwater system by 35 standpipe piezometers (perched aquifer piezometers) targeting aquifers in the Buralow Formation. Most standpipe piezometers are located downgradient of swamp piezometers. Groundwater level loggers record groundwater levels daily and are downloaded monthly with manual groundwater level measurements taken concurrently.

Results are summarised in **Table 7-14** below.

Table 7-14. Perched Groundwater Level Trend Summary

Monitoring ID	Associated swamp	Site type	Comment
SPR1101	Sunny Side East	Impact	Damaged by subsidence in 2013. The piezometer was inspected with a downhole camera in July 2024 and a groundwater level was observed. A logger was reinstalled in November 2024. In 2013, the water level was relatively stable around 1,122.5 mAHD. Decreasing in 2025 – declined from approximately 1 m from January to December.
SPR1104	Carne West	Impact	Dry. No water level recorded since June 2017
SPR1107	Gang Gang	Impact	Slightly increasing – trending with daily CRD with minor responses to rainfall.
SPR1108	Gang Gang	Impact	Decreasing – declined from approximately 1 m from

Monitoring ID	Associated swamp	Site type	Comment
			January to December.
SPR1110	Carne West	Impact	Dry. No water level recorded since January 2014.
SPR1113	Gang Gang	Impact	Decreasing – trending with long-term daily CRD. Declined from approximately 2 m from January to November.
SPR1210R		Impact	Decreasing – Trending with long-term daily CRD. Declined approximately 0.5 m throughout 2025 with fluctuations due to rainfall.
SPR1301	Marrangaroo	Impact	Impacted by LW429. Steady decline up to mid-April 2024 followed by a stepped decline due to undermining. Dry since May 2024.
SPR1401	Sunny Side East	Impact	Decreasing – declined from approximately 1 m from January to December.
SPR1601	Carne West	Impact	Variable – trends with the daily CRD and is responsive to large rainfall events. Water levels rapidly decline during periods of below average rainfall. Declined from January to May by approximately 2.8 m. During a rainfall event in May, the water level increased by approximately 5 m.
SPR1602	Gang Gang West	Impact	Variable – trends with the daily CRD with subdued responses to rainfall. Stable from January to March, decreasing in April, increasing from May to September, and decreasing from September to December.
SPR1603	Gang Gang	Impact	Variable – declining from January to May. From May to August groundwater levels increased, trending with CRD but predominantly responding to three heavy rainfall events in late May, early July and early August. From September to December groundwater levels decreased.
SPR1604	Carne Central	Impact	Stable – trends with the daily CRD.
SPR1605	Pine/Nine Mile	Impact	Stable – subdued trends with daily CRD and minor responses to heavy rainfall events.
SPR1606	Paddys Creek	Impact	Stable – trending with the daily CRD and responding to heavy rainfall events. Changes of 0.3 m are common following heavy rainfall events.
SPR1607	Marrangaroo	Impact	Declining – trends with the daily CRD and responds to heavy or prolonged rainfall. Decreasing from January to April, increasing from May to August, and decreasing from September to December.
SPR1608	Barrier	Reference	Stable – trends with the daily CRD.
SPR1609	Tri Star	NA	Stable – generally trends with daily CRD. Responds to rainfall events, changes of 0.2 m are common.
SPR1611	Fire Tail	Reference	Stable – trends with daily CRD and responds to rainfall events, changes of 0.2 m are common.
SPR1612	Best	Reference	Stable – trends with daily CRD and responds to rainfall events, changes over 0.2 m are common. Generally increasing from January to August, decreasing from September to December.
SPR1806	Marrangaroo	Impact	Decreasing – steady decline of about 0.5 m from January to December.
SPR1807		Impact	Dry since August 2020. Damaged by subsidence.
SPR1808	Marrangaroo	Impact	Dry since June 2022 – Impacted by LW426, LW427 and 428 with stepped water level declines.
SPR1808R	Marrangaroo	Impact	Adjacent SPR1808. No data from November 2024 to August 2025 due to a malfunctioning logger.

Monitoring ID	Associated swamp	Site type	Comment
			Trends with daily CRD. Data from August 2025 shows and increasing trend to September and decreasing from October to December.
LCY2101	Lost City	NA	Stable – trends with the daily CRD and is responsive to rainfall events. Decreasing from January to April, increasing from April to September, and decreasing from September to December. Fluctuations of 0.1 m are common.
PHS	Pine	NA	Variable – When groundwater levels fall below 1,121 mAHD, it drops very quickly while above this level it tends to follow daily CRD. Heavy and prolonged rainfall events typically precede sudden increases in groundwater levels. Two sharp increases were observed in February and May. With water elvels above 1,121 mAHD, a steady decline was observed in April and from September onwards in response to below average rainfall.
PLM2101	Plum	NA	Variable – trends with the daily CRD and is highly responsive to individual rainfall events. Declined about 3.5 m From September to December.
PLM2102	Plum	NA	Stable – trends with daily CRD, fluctuations of 0.5 m are common.
RSS	Sunny Side	Impact	Decreasing – long-term decreasing trend since January 2023. Responds to large rainfall events, seen as short sharp rises in groundwater levels that plateau over several weeks. This likely indicates a compromised annulus or seepage from a nearby fire dam. In 2025, rises in response to rainfall were from approximately 2 to 8 m.
WB12101	Wishbone	NA	Dry from October 2024 to May 2025. When saturated, trends with daily CRD and responds to rainfall events. Water levels increased from June to September due to above average rainfall and decreasing from September to December due to below average rainfall.
WB12102	Wishbone	NA	Dry since installation in October 2021.
WB32101	Wishbone	NA	Variable – responsive to individual rainfall events with water levels tapering off over several days to several weeks. In response to heavy or prolonged rainfall, levels groundwater can rise over 1 m, with common rises of approximately 0.5 m. Dry from late November to December.
WB32102	Wishbone	NA	Dry since installation in October 2021.
WB32103	Wishbone	NA	Declining – shows a delayed and subdued response to long-term daily CRD. Water level decreased about 0.5 m from January to December.

7.4.2.4 Vibrating Wire Piezometers

Multi-level VWP arrays used to monitor piezometric pressures in the shallow and deep groundwater systems. VWP loggers are downloaded monthly at 12 locations. VWPs are used as a proxy for possible impacts to shallow aquifer and swamp piezometers and to monitor for potential connective cracking to swamps and perched and shallow groundwater sources (above the MYC).

The hydrographs for the VWP reference and impact monitoring sites, are shown Appendix 4. **Table 7-15** includes comments on the piezometric head trends.

Table 7-15. Vibrating wire piezometer piezometric head trend summary

Monitoring ID	Sensor depth (mbgl) ¹	Comment
SPR37	#1 405 (AQ1), #2 350 (AQ1), #3 320 (SP1), #4 260 (AQ3), #5 187 (AQ3), #6 165 (AQ4), #7 135 (AQ4), #8 110 (AQ4)	SPR37 is positioned between LW429 and 430. Pre-mining data collection ended on 6 April 2023 when LW428 approached within 600m of SPR37. LW429 passed SPR37 around 12 August 2024. A trigger investigation for SPR37 VWP was issued to the regulators on 6 December 2024 following piezometric pressure declines from 28 May 2024. The trigger investigation found the piezometric pressure declines observed above the MYC were not consistent with reference piezometers or most near-by piezometers and SPR37 had been impacted by the mining of LW429. By early October 2024, all sensors had failed due to subsidence. A summary is provided below: •P1 depressurised in August 2022 and displayed erratic/erroneous data from the end of October 2022. Non-functional from 13 August 2024. •P2 erroneous data from February 2013. •P3 unsaturated since August 2016. Erroneous data from 15 August 2024 and non-functional from 8 October 2024. •P4 depressurisation observed from mid July 2024. Nonfunctional from 13 August 2024. •P5 depressurisation observed from late May 2024. Erroneous data from 1 October 24 and non-functional from 10 October 24. •P6 erroneous data from August 2020. Patchy data from August 2024 to October 2024 shows a declining trend. Non-functional from 18 October 2024. •P7 depressurisation observed from late May 2024. Non-functional from 29 September 2024. •P8 erroneous data from late November 2023. Non-functional from 14 August 2024.
SPR38	#1 80 (AQ4), #2 100 (AQ4), #3 135 (AQ4), #4 190 (AQ3), #5 230 (AQ3), #6 300 (semi permeable layer), #7 355 (AQ1), #8 370 (AQ1)	SPR38 was previously undermined by LW427 and was outside the LW429 TIA during the reporting period. It has previously been impacted by mining and a trigger investigation was completed (Jacobs, 2020). The functionality and trends of the sensors during the reporting period is summarised below: •P1, P6, P7 and P8 lost communication with the logger in 2020 possibly due to subsidence caused by LW427. •P5 has been unsaturated since 2016. •P2 slight declining trend showing a delayed response to below average rainfall between January 2023 and November 2024. Non-functional since November 2024. •P3 slight declining trend showing a delayed response to below average rainfall from March 2024 to December 2025. •P4 stable throughout the monitoring period.
SPR1208	#8 90 m, #7 130 m, #6 226 m, #5 303 m, #4 330 m, #3 380 m, #2 411 m, #1 421 m.	SPR1208 was previously impacted by LW429 and was damaged by bushfire in January 2020. A new data logger was installed in May 2024 and the site was re-commissioned. All sensors showed stable trends throughout 2024 and were comparable observations prior to logger failure. The replacement logger was damaged by lightning in December 2024 and has not been replaced in 2025.

Monitoring ID	Sensor depth (mbgl) ¹	Comment
SPR1210	#1 388 (AQ1), #2 376 (AQ1), #3 326 (AQ2), #4 308 (semi permeable layer), #5 224 (AQ3), #6 160 (AQ4), #7 76 (AQ6)	SPR1210 was previously undermined by LW428 in early May 2023 and saw piezometric pressure declines from 27 March 2023. A trigger investigation was completed during the previous reporting period (1 January 2023 – 31 December 2023) and submitted to the regulators on 2 November 2023. The trigger investigation found the response observed at SPR1210 VWP was like other VWP sites impacted by earlier longwalls, however no impact was seen at nearby standpipe piezometer SPR1210R, indicating the perched aquifer could still be intact. SPR1210 remained within the LW429 TIA during the current reporting period. The functionality and trends of the VWP sensors is summarised below. •P1, P2 and P3 (below the MYC) failed in April 2023 due to the passing of LW428. •P4 and P5 (below MYC) showed declining trends in 2025. P4 declined approximately 3.5 m, while P5 declined approximately 2.2 m. •P6 (above MYC) has shown a slight increasing trend. •P7 (above MYC) increased in 2025 from approximately 1 m from January to December.
SPR1212	182 (#6), 197 (#5), 208 (#4), 229 (#3), 264 (2), 280 (#1)	From late December 2023 the data logger recorded spot data across all sensors, resulting in data gaps throughout the reporting period. In mid-July the logger completely failed and was replaced with a spare Ontoto telemetry VWP system in late November 2024. Data was sporadically collected by the old logger in January, February, August, and September 2025. All sensors showed stable trends corresponding to previous observations.
SPR1302	#1 390 (AQ1), #2 370 (AQ1), #3 310 (AQ2), #4 270 (AQ3), #5 200 (AQ3)	SPR1302 was outside the TIA during the reporting period. Depressurisation responses were seen in September 2021 due to the commencement of first workings of LW428. The functionality and trends of the VWP sensors during the reporting period is summarised below: •P1 – failed from February 2025 onwards. •P2 – remained stable throughout the year. •P3 – no data observed since November 2020. •P4 – no data observed since January 2024. •P5 – declining trend from approximately 2 m from January to December.
SPR1804	345 (#1), 291 (#2), 217 (#3), 118 (#4), 69 (#5), 38 (#6)	Undermined by LW425 – decommissioned.
AP10PR	343 (#1), 327 (#2), 300 (#3), 270 (#4), 248(#5), 205 (#6), 150 (#7), 103 (#8), 60 (#9)	AP10PR is a reference site. •P1, P2, P3, and P7 showed increasing trends from January to December. •P4, P5, and P6 showed decreasing trends. •P8 and P9 trend with daily CRD, slightly declining over the monitoring period.
SPR64	390 (#1), 370 (#2), 310 (#3), 270 (#4), 200 (#5), 150 (#6), 100 (#7), 30 (#8)	SPR64 is in an unmined section above LW432, outside the LW429 TIA. SPR64 was previously damaged by the Gaspers Mountain bushfire and was decommissioned. A new data logger was installed in November 2023 and in January 2024 all sensor wires were repaired. All sensors are currently functional, and three sensors are installed above the MYC (P6, P7 and P8). A trigger investigation was issued to regulators in September 2025 for sensors above the MYC.

Monitoring ID	Sensor depth (mbgl) ¹	Comment
		•P1 declined from approximately 19 m from January to September, and increased from about 7 m from September to November. •P2 declined from approximately 10 m from January to April. The sensor failed from April. •P3 failed February . •P4 was variable. Increasing from January to March 2025 and decreasing from March to July 2025. Levels increased by approximately 6 m before declining in October and returning to pre-September levels. •P5 varied in 2025, like P4. It showed an overall declining trend of about 3 m from January to November. •P6 and P7 followed similar trends to P4 and P5, before each sharply declined in October by over 22 m. •P8 slightly increased from January to February. No data was recorded for the remainder of the year because it was unsaturated.
SPR67	35 (#8), 50 (#7), 70 (6), 90 (#5), 110 (#4), 160 (#3), 200 (#2), 260 (#1)	SPR67 is in a previously mined area above LW417. Data was not recorded from June 2025 due to logger issues. The functionality and trends of the VWP sensors during the reporting period is summarised below: •Sensor P1, P2 and P3 have been non-functional since 2015. Piezo P4 has been non-functional since September 2020. Malfunctions are due to mining. •Sensor P5 showed a stable trend throughout the reporting period. •Sensor P6 showed an increasing trend from January to April before stabilising. •Sensor P7 showed a stable trend throughout the reporting period. •Sensor P8 increased from late-January to April before stabilising.
SPR1102	82 (#9), 125 (#8), 148 (#7), 160 (#6), 203 (#5), 292 (#4), 312 (#3), 380 (#2), 404 (#1)	No mining has occurred in the vicinity of SPR1102 and piezometric pressure trends are typically stable. Several data gaps are present due to logger failures. No data was recorded in 2025 due to logger malfunction.
SPR1103	138 (#9), 151 (#8), 178 (#7), 236 (#6), 290 (#5), 313 (#4), 326 (#3), 381 (#2), 401 (#1)	Piezometric pressure trends are typically stable. Several data gaps are present due to logger failures. A summary is provided below: •Sensor P1 slight increasing trend. •Sensor P2, P3, P4,P6, and P9 did not record information since January due to logger issues. •Sensor P5 failed in December 2016. •Sensor P7 recorded an increasing trend from July to October 2025. No other data was recorded. The increasing trend follows the previous sudden and depressurisation of approximately 14.5 m from 9 May 2024. The depressurisation is unexplainable and likely due to sensor malfunction. A recovering trend has been observed since. •Sensor P8 remained stable from January to March, declined approximately 1 m from March to May, then increased approximately 1 m until October. No data was recorded for the remainder of the year.
SPR1106	123 (#8), 163 (#7), 251 (#6), 261 (#5), 277 (#4), 323 (#3), 341 (#2), 362 (#1)	Vandalised in August 2023.

Monitoring ID	Sensor depth (mbgl) ¹	Comment
SPR2303B	46 (#8), 146 (#7), 203 (#6), 247 (#5), 279 (#4), 316 (#3), 356 (#2), 387 (#1)	SPR2303B was installed in mid-December 2023. A summary is provided below: •P1 decreased approximately 8 m from January to March. It increased approximately 69 m from March to December. •P2 remained stable from January to March at around 877 mAHD. Declined approximately 12 m from March to October, before sharply declining approximately 13 m in late October. From November levels remained stable around 852 mAHD. •P3 followed a similar trend to sensor P2, overall declining approximately 13 m from January to November. From November onwards levels slightly increased. •P4 over all declining trend decreasing by approximately 10 m in 2025, with a notable drop of approximately 5 m in October. •P5 stable. •P6 declining trend with a sharp decrease in October. •P7 (above MYC) declining trend with a sharp decrease in October. •P8 (above MYC) stable.

7.4.2.5 Tributary Surface Water Quality and Flow

Tributary surface water quality and flow is summarised in **Table 7-16**. The timeseries for long term water quality trends are shown in Appendix G of the 2025 Annual Environmental Monitoring Review Surface and Groundwater Report' (EMM, 2026), and tabulated statistics are shown in Appendix H.

Table 7-16. Tributary Surface Water Quality and Flow

Monitoring ID	Date range	Frequency	Analyte	2025 Water Quality Comment
Carne Central				
Carne Central	21/03/2016 - present	Fortnightly/ monthly	pH	Variable trend between pH 3.8–6.2.
		Fortnightly/ monthly	EC	Stable trend.
		Fortnightly/ monthly	Flow	No data available over the reporting period due to low flow conditions.
Wolgan River				
Wolgan River Downstream	4/01/2002 - present	Fortnightly/ monthly	pH	Generally decreasing from 7.2 in January to 5.5 in October, increasing to 6.2 in December. In March pH spiked at 7.8.
		Fortnightly/ monthly	EC	Generally stable trend, with increases in February, June, and August.
		Fortnightly/ monthly	Flow	Variable trend, with increased flow in May to June and September. Flow too low to monitor from November.
Wolgan River (Wolgan Valley)	30/04/2018 - present	Fortnightly/ monthly	pH	Increasing trend from January to highs above pH 8 in April, from June onwards pH remained generally stable around 6.5.
		Fortnightly/ monthly	EC	Slightly increasing stable trend
		Fortnightly/ monthly	Flow	Flow was measured sporadically through the year. No data was available in some months due to low flow conditions. Available data is consistent with historical

Monitoring ID	Date range	Frequency	Analyte	2025 Water Quality Comment
				observations.
East Wolgan				
East Wolgan Upstream	8/04/2005 - present	Fortnightly/ monthly	pH	Dry or pooled during 2025.
		Fortnightly/ monthly	EC	Dry or pooled during 2025.
		Fortnightly/ monthly	Flow	Dry or pooled during 2025.
East Wolgan Downstream	8/04/2005 - present	Fortnightly/ monthly	pH	Dry or pooled during 2025.
		Fortnightly/ monthly	EC	Dry or pooled during 2025.
		Fortnightly/ monthly	Flow	Dry or pooled during 2025.
East Wolgan DS Junction	8/04/2005 - present	Fortnightly/ monthly	pH	Generally stable between pH 5.0–6.5, with a low of 4.1 in February.
		Fortnightly/ monthly	EC	Stable trend.
		Fortnightly/ monthly	Flow	Variable, generally increasing from February to July and decreasing for the remainder of the year.
Carne Creek – Western (Carne West) Tributary				
Carne West	12/07/2016 - present	Fortnightly/ monthly	pH	Dry or pooled during 2025.
		Fortnightly/ monthly	EC	Dry or pooled during 2025.
		Fortnightly/ monthly	Flow	Dry or pooled during 2025.
Gang Gang				
Gang Gang	21/3/2016 - present	Fortnightly/ monthly	pH	No observations from January to June due to low flow conditions. Observations from July to November are generally within historical data besides November which recorded pH 3.3. No data was recorded in December due to low flow conditions.
		Fortnightly/ monthly	EC	Data availability is the same as pH. EC trend was consistent with previous observations.
		Fortnightly/ monthly	Flow	No data available over the reporting period due to low flow conditions.
Marrangaroo Creek				
Marrangaroo Creek	30/01/2014 - present	Fortnightly/ monthly	pH	Decreasing trend from pH 6.0 in January to 4.5 in October, increasing to 5.5 and 5.1 in October and November, respectively.
		Fortnightly/ monthly	EC	Stable trend.
		Fortnightly/ monthly	Flow	No data available over the reporting period due to low flow conditions.

7.4.2.6 Soil Moisture

Soil moisture probes were installed within swamps, immediately adjacent to swamp piezometers, to provide data to support impact assessments and trigger investigations.

Soil moisture probes were installed between July and October 2018. The soil moisture systems were damaged in the 2019-2020 bushfires and were subsequently reinstated in September 2020. Four additional probes were installed in September 2021 at Lost City Swamp.

A summary of reported trends at each site is provided in **Table 7-17** and in Appendix 4.

Table 7-17 Summary of Swamp Soil Moisture Trends

Monitoring ID	Site type	Comment
BA1SM	Reference	The 10 cm sensor generally remained stable around 2% moisture content with singular spikes throughout 2025. The 20 cm sensor shows a variable trend. Remaining sensors displayed stable moisture, from fully saturated at 30 cm, decreasing with sensor depth to approximately 65% moisture at 120 cm.
BA2SM	Reference	Sensors at 10 cm, 20 cm, and 40 cm dipped in moisture between February and July 2025. Remaining sensors displayed stable moisture. Sensors showed moisture content generally reduced from fully saturated near ground level to approximately 65% moisture content at 80 cm.
BA3SM	Reference	Stable moisture content. Sensors showed moisture content generally reduced from fully saturated near ground level to approximately 65% moisture content at 80 cm.
BE1SM	Reference	The 10 cm, 20 cm, and 30 cm sensor showed variation in response to climate conditions, with increased moisture from March to October. Stable moisture content in remaining sensors. Sensors showed moisture content generally reduced from fully saturated near ground level to approximately 55% moisture content at 120 cm.
BE2SM	Reference	Shallower sensors typically show a more variable trend while deeper sensors are more stable. Sensors below 40 cm generally increased from January to August, then decreasing for the remainder of the year. Sensors below 40 cm showed a stable moisture content, generally reduced from fully saturated near ground level to approximately 55% moisture content at 120 cm.
BS1SM	Impact	Sensors between 10 cm and 100 cm generally showed a reducing trend from January to May 2025, before increasing. The response is subdued for sensors at a greater depth. Sensors shallower than 50 cm declined in late 2025, starting from September. The moisture content at 110 cm (~77%) and 120 cm (~69%) remained stable throughout the year.
BS2SM	Impact	All sensors varied with responses to rainfall.
BS3SM	Impact	Sensors were generally stable showing saturation near surface to approximately 65% moisture content at 80 cm.
BS4SM (PSS)	Impact	Sensors between 10 cm and 40 cm generally showed a variable trend from January to April 2025, before increasing and becoming stable until October 2025. The response is subdued for sensors at a greater depth. Sensors shallower than 50 cm declined in late 2025, starting from September. The moisture content below 50 cm remained stable throughout the year. Sensors near surface were close to saturation, decreasing in moisture content with depth to approximately 60% at 120 cm.
BS5SM (NMSS)	Impact	Moisture stable around 2% at 10 cm and 20 cm sensors. Increasing trend at 30 cm from approximately 22–37%. Remaining sensors were stable and showed moisture content decreased with depth, saturated at 40 cm reducing to 67% at 120 cm.
CC1SM	Reference	Sensors between 10 cm and 40 cm varied from January to May 2025, then stabilised for the remainder of the year. Remaining sensors were stable with a moisture content of 60–65%.
CC2SM	Reference	Variable moisture in all sensors from January to May. Moisture increased in May and remained stable in sensors below 70 cm for the remainder of the year. Sensors below 70 cm displayed a sharp decrease from June, increasing from July to September. From

Monitoring ID	Site type	Comment
		September moisture sharply decreased in sensors below 40 cm
CW1SM	Impact	Sensors shallower than 30 cm are unsaturated. Remaining sensors fluctuated with rainfall, generally increasing from January to August and decreasing for the remainder of the year. Fluctuations reduce with depth
CW4SM	Impact	All sensors fluctuated with rainfall between approximately 10 –30%, except for the 20 cm sensor which was highly variable. Sensors increased in May and decreased in September to December.
FS1SM	Reference	Sensors between 10 cm and 40 cm generally showed a variable trend from January to April 2025, before increasing and becoming stable until October 2025. Moisture stability increases with depth. Sensors shallower than 40 cm declined in late 2025, starting from September. The moisture content below 40 cm remained stable throughout the year. Sensors near surface were close to saturation, decreasing with depth to approximately 55% at 80 cm.
FS2SM	Reference	Sensors trend with daily CRD and fluctuate with rainfall. The 10 cm sensor varied from approximately 55–85% in 2025. Sensors below 10 cm were saturated.
GG2SM	Impact	Sensors fluctuate with rainfall with subdued responses at greater depths. Sensors show a slight increasing trend in 2025, with a spike in May due to rainfall. The moisture content near surface varies from approximately 30–60%, decreasing with depth to 50 cm. The 50 cm sensor is stable at approximately 8%. Moisture content increases with depth below 50 cm to approximately 35–40% at 120 cm.
GG3SM	Impact	The 10 to 40 cm sensors were dry. Remaining sensors fluctuated with rainfall. They increased from January to May and decreased from September to December.
GW1SM	Impact	The 10 and 20 cm sensors were dry. All other sensors varied with rainfall and showed an increasing trend. Moisture levels were generally between 7–20% in January and between 15–60% in August. No data was collected for the remainder of the year due to a faulty logger.
GW3SM	Impact	The 10 cm sensor was dry. Remaining sensors fluctuated with rainfall and showed slight increasing trends up until September, followed by declining trends. Sensors generally had moisture levels between 5 to 25%, except for spikes due to rainfall which increased moisture to 70%.
LC1SM	Impact	Sensors were stable. Saturated near surface, decreasing in moisture to a depth of 30 cm. From 30–60 cm moisture increased, before generally reducing with depth with a moisture content between 5–15% at 130 cm.
LCN1SM	Impact	The 10 and 20 cm sensors fluctuated with rainfall. Remaining sensors showed stable increasing trends.
LCS1SM	Impact	Sensors showed increasing trends. Shallow sensors fluctuated with rainfall, sensors below 80 cm were stable.
LC2SM	Impact	Sensors generally showed increasing trends, with fluctuations reduced at greater depths. The 10 cm sensor was unsaturated.
MS1SM	Impact	Shallow sensors below 70 cm showed variations due to rainfall, generally increasing until September before decreasing for the remainder of the year. Below 70 cm, sensors were relatively stable, showing a decrease in moisture with depth from approximately 80% at 70 cm to 60% at 120 cm.
MS2SM	Impact	Sensors trend with daily CRD and fluctuate with rainfall. Generally, deeper sensors are more stable and have a higher moisture content. However, sensors below 90 cm have a reduced moisture content. Increased moisture was observed between August and September.
MS3SM	Impact	Shallow sensors trend with daily CRD and fluctuate with rainfall, showing increasing trends from January to September 2025. Deeper sensors become more stable and reduce in moisture content from largely saturated above 50 cm, reducing to approximately 55% at 120 cm.
PC1SM	Impact	The 10, 20 and 30 cm sensors were unsaturated. The 40 cm sensor shows fluctuations with rainfall. Remaining sensors are stable with moisture content reducing with depth, from

Monitoring ID	Site type	Comment
		saturated at 50 cm reducing to approximately 65% at 120 cm.
PC2SM	Impact	Sensors show a high moisture content throughout the 2025, generally above 90%. Moisture stabilises with depth
TG1SM	Impact	The 10 cm sensor trends with daily CRD and fluctuates with rainfall. Deeper sensors become more stable and decrease in moisture content with depth, from saturated at 20 cm to approximately 50% at 120 cm.
TG2SM	Reference	The 10 cm and 20 cm sensors trends with daily CRD and fluctuate with rainfall. From 30 cm, deeper sensors become more stable and decrease in moisture content with depth, from approximately 70% at 30 cm to 48% at 80 cm.
TS2SM	Reference	Sensors below 40 cm are variable, trend with daily CRD, and fluctuate with rainfall. Sensors become stable with depth and decrease in moisture content. Below 90 cm moisture is stable at approximately 70%, decreasing to approximately 54%.
TS3SM	Reference	All sensors remained stable, moisture content varied with depth.

7.4.2.7 Water Trigger Notifications and Review

During 2025, one new trigger notification was made under the WMP TARP for groundwater and surface water within extraction areas. A summary of the triggers, associated notifications and review of findings is provided in the following sections.

SPR64

Notification of a vibrating wire piezometer trigger SPR64 was provided on 15 September 2025. Vibrating Wire Piezometer SPR64 is an impact groundwater monitoring location in the Water Management Plan for LW 415 to LW 432.

A Trigger Investigation was submitted on 5 November 2025. The report concluded SPR64 had depressurised at sensors above the MYC due to mining longwalls 429 and 430.

7.4.3 Comparison against Predictions

An interrelationship exists between the conditions of approval and impacts predicated in the subsidence and environmental assessments which form components of approved Extraction Plans. To ensure information is not misrepresented in the summary presented in the Annual Review, both the Approval and Extraction Plans available on the website shall be referred to for detail on the predications for the Project.

Approved performance measures of SSD5594 and EPBC approvals and related predictions are used to establish the staged triggers of TARPs in approved management and monitoring plans for the project, including the WMP and related SMPs among others.

7.4.4 Long Term Analysis

Long term groundwater and surface water monitoring data for quality and flow/level within extraction areas is presented in the 2025 Annual Environmental Monitoring Report (EMM, 2026) provided in **Appendix 4** to this Annual Review.

7.4.5 Implemented / Proposed Improvements

Springvale is continuing to implement an extensive groundwater and surface water monitoring program in accordance with the requirements of approved Extraction plans.

8 REHABILITATION

From 1 August 2022, Springvale commenced undertaking rehabilitation activities in accordance with the Rehabilitation Management Plan (RMP, 29 July 2022). A description of the proposed rehabilitation management and monitoring activities is provided in Part 6 and Part 8 of the RMP and is available on the Springvale website.⁴ The Final Landform and Rehabilitation Plan was Approved by the NSW Resource Regulator (NSWRR) on 8 November 2023.

For completeness, it is noted that the introduction of detailed annual rehabilitation reporting required under revised Mining Lease conditions (*'Annual Rehabilitation Report'*, in accordance with detailed 'Form and Way' reporting requirements set by NSWRR), is undertaken separately and in addition to the summary information provided in this Annual Review for SSD5594.

Additionally, in accordance with Condition 31A in Schedule 4 of SSD5594, Springvale was required to develop a Rehabilitation Strategy within six months of the determination of Modification 4. The Rehabilitation Strategy was submitted to DPHI on 25 May 2023 and was approved on 3 July 2024.

8.1 REHABILITATION PERFORMANCE MEASURES

8.1.1 Rehabilitation Objectives set by Development Consent SSD5594

Rehabilitation objectives are prescribed by Condition 30, Schedule 4 of SSD5594, under which Springvale must:

- Rehabilitate the site in accordance with the conditions imposed on the mining lease(s) associated with the development under the *Mining Act 1992*;
- Rehabilitation must be generally consistent with the proposed rehabilitation strategy described in the EIS; and
- Comply with the objectives in Table 7, Condition 30, Schedule 4 of the consent.

To achieve the broad rehabilitation objectives presented in SSD5594, Springvale has developed specific domain rehabilitation objectives. The key rehabilitation objectives for each of the domains are defined in Part 4 of the RMP.

On 8 November 2023, the Springvale Rehabilitation Objectives Statement was approved by the NSWRR.

The approved final landform, land use and detailed performance criteria established within the RMP to move towards achieving these are discussed in the following sections below.

8.1.2 Approved Final Landform and Land Use Objectives

The approved final landform for Springvale aims to provide a low maintenance, geotechnically stable and safe environment that is commensurate with the surrounding area.

The intended post-mining land use is native woodland that is consistent with surrounding lands and pre-mining conditions.

Some water bodies and drainage structures will be maintained to manage surface water flows and provide water resources for native fauna. Some existing internal roads will be retained to allow for access to manage the final landform and to serve as fire breaks.

The long-term rehabilitation objective, as stated within the RMP, is:

"Springvale is required under the Development Consent and mining tenements to return any land disturbed by mining operations to its pre-mining capacity. The

⁴ www.centennialcoal.com.au/operations/springvale/

proposed post-mining land use at Springvale includes rehabilitating all major infrastructure/disturbance areas with woodland species commensurate with adjacent remnant vegetation. Additionally, a network of dams and associated water management structures will be retained in the final landform for future use”.

The post-mining land use has been determined through consultation and agreement with landowners and relevant stakeholders during the preparation of the EIS.

Centennial however is actively progressing, in collaboration with Lithgow City Council, the potential for rezoning the Springvale pit top to an industrial land use classification via Council's Growth Management Strategy and the proposed Shire wide Local Environmental Plan review. The rezoning process is intended to facilitate the orderly transition of the pit top landholding at the time of mine closure to alternative post mining land uses, thereby supporting future employment generating opportunities (subject to future approvals, site rehabilitation and mine closure requirements). This proposed change is captured within the 2025 Rehabilitation Report.

8.2 REHABILITATION PERFORMANCE DURING THE REPORTING PERIOD

8.2.1 Rehabilitation Performance Criteria (RMP)

Rehabilitation performance criteria is provided within the RMP. The current monitoring program has been designed to monitor the progress of rehabilitation against the rehabilitation objectives/criteria developed for the RMP in accordance with Form and Way RMP requirements set by the NSWRR.

Relevant objectives and completion criteria were further developed for all Centennial Coal operations in the NSW Rehabilitation Reform Support Rehabilitation Monitoring Review and Proposed Method (SLR 2022).

In accordance with relevant criteria, the rehabilitation monitoring focussed on the following key aspects:

- Vegetation composition - Characteristic native species of adjacent vegetation;
- Vegetation structure - Establishment of tree, shrub, and groundcover species;
- Ecosystem function:
 - Natural regeneration of native tree species;
 - Weed infestation, being the presence of 'priority' (formerly noxious) weeds; and High Threat Exotics (HTEs);
 - Soil chemistry and microbiology; and
 - General stability of the rehabilitation areas.

8.2.2 Mining and Rehabilitation Status - Summary of Rehabilitation

Springvale adopts a progressive approach to rehabilitation which reduces and mitigates potential environmental impacts. Progressive rehabilitation at Springvale has mainly been associated with infrastructure corridors following the trenching of services. No major rehabilitation of the pit top and Newnes Plateau infrastructure is anticipated until site closure.

During the reporting period, approximately 2,725 m² of disturbance associated with drill pads, clearing and access track establishment occurred across ML1326 and CL377 within the Gardens of Stone State Conservation Area and adjacent private land. Following drilling activities, disturbed areas were re-profiled, topsoil was re-spread and cleared vegetation redistributed to support natural regeneration, with access retained for groundwater monitoring infrastructure.

One domain was also changed from land use development to land use development as documented in **Section 8.2.6**.

There is no outstanding progressive rehabilitation associated with SSD 5594 authorised construction. No additional pit-top progressive rehabilitation is currently required.

The status of disturbance and rehabilitation for Springvale (SSD5594) and the SWTP is presented in **Table 8-1**.

Table 8-1. Rehabilitation Status

Mine Area Type	Approval	Previous Reporting Period (Actual) 2024 (ha)	This Reporting Period (Actual) 2025 (ha)	Next Reporting Period (Forecast) 2026(ha)
A1 Total Disturbance Footprint¹- Surface Disturbance (ha)	Springvale	42.97	43.23	43.23
A2. Total Underground Mining Area (ha)²	Springvale	3075.45	3075.45	3075.45
Total active disturbance	Springvale	31.79	32.02	32.02
Land being prepared for rehabilitation	Springvale	Nil	0.03	0.03
Rehabilitation – Ecosystem and land use establishment	Springvale	10.36	10.64	10.64
Rehabilitation - Ecosystem and land use development	Springvale	0.82	0.54	0.54
Completed rehabilitation	Springvale	0	0	0

Notes:

¹ **Total mine footprint:** includes all areas within a mining lease that either have at some point in time or continue to pose a rehabilitation liability due to mining and associated activities. As such it is the sum of total active disturbance, decommissioning, landform establishment, growth medium development, ecosystem establishment, ecosystem development and relinquished lands (as defined in the DRE MOP/RMP Guidelines). Please note that subsidence remediation areas are excluded.

² **Total active disturbance:** includes all areas requiring rehabilitation.

³ **Land being prepared for rehabilitation:** includes the sum of mine disturbed land that is under the following rehabilitation phases – decommissioning, landform establishment and growth medium development (as defined in DRE MOP/RMP Guidelines).

⁴ **Land under active rehabilitation:** includes areas under rehabilitation and being managed to achieve relinquishment – includes 'ecosystem and land use establishment' and 'ecosystem and land use sustainability (as defined under the DRE MOP/RMP Guidelines).

⁵ **Completed rehabilitation:** requires formal sign off from DRE that the area has successfully met the rehabilitation land use objectives or completion criteria

NR = Not Required (prior to introduction of rehabilitation reforms. NS = not specified in Annual Rehabilitation Report and Forward Plan. NA = Not Applicable

8.2.3 Rehabilitation Schedule

Springvale remains in Phase 1 – Active Mining as defined in the Rehabilitation Management Plan (RMP).

As an underground operation, most surface infrastructure is required for the life of mine and is therefore not available for rehabilitation until mining ceases. SSD 5594 allows rehabilitation to commence following cessation of mining on 31 December 2028. It is noted that Springvale is currently seeking approval for continuation projects (SSD 5594 Modification 5 and Springvale West Project) to support the ongoing operation of Mt Piper Power Station and intends to pursue development consent modifications to support potential future operations

Over the next three years, Centennial will focus on closure planning activities, including engagement with the NSW RR regarding the Section 240 Notice and long-term groundwater management strategy, pursuing a consent modification to update the proposed final land use for the pit top area, and refining closure assumptions, rehabilitation methodologies and infrastructure decommissioning sequencing to support transition to Phase 2 – Decommissioning. The RMP demonstrates that a credible closure pathway exists independently of proposed continuity projects.

Further detail is provided in the 2025 Forward Plan.

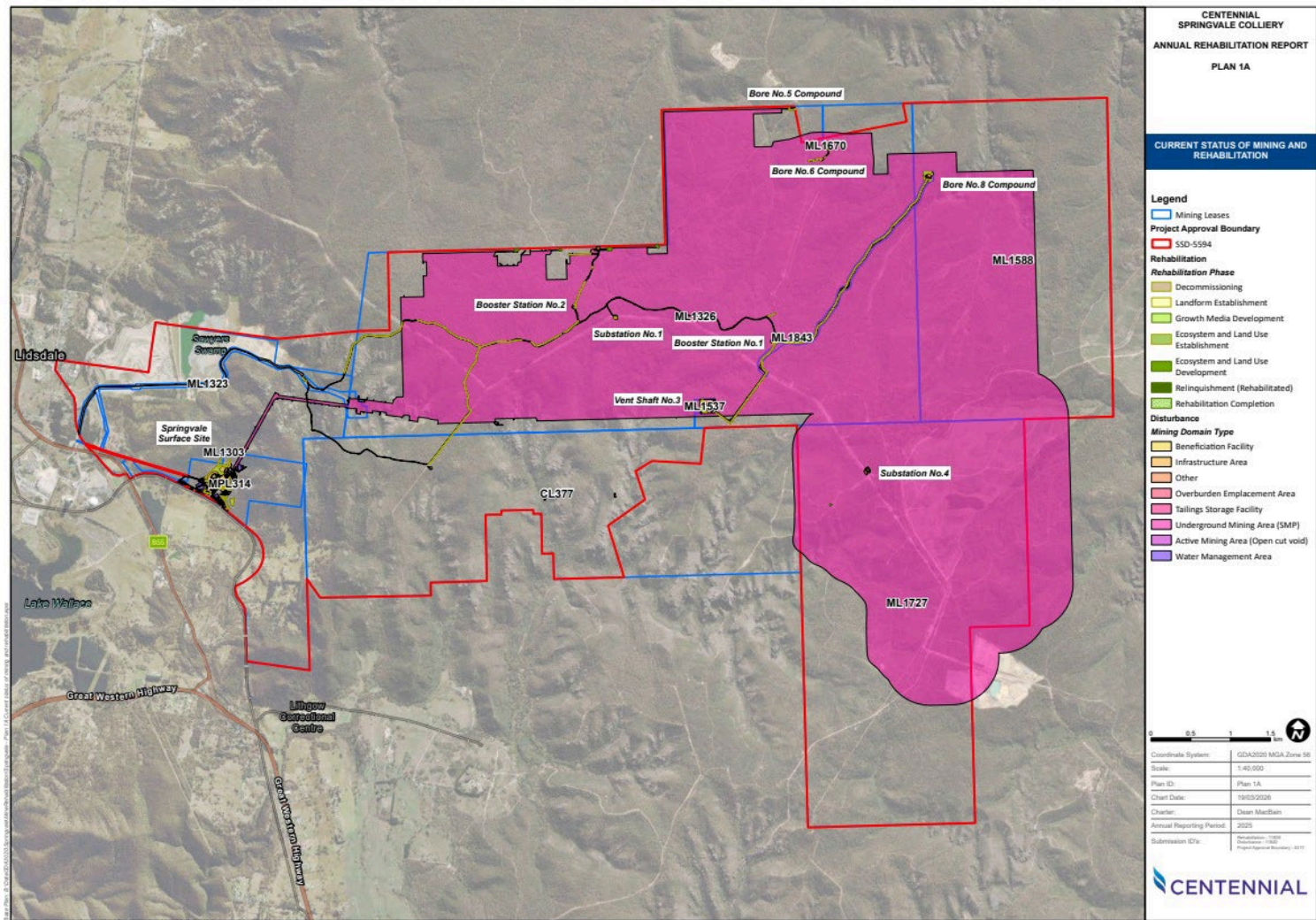
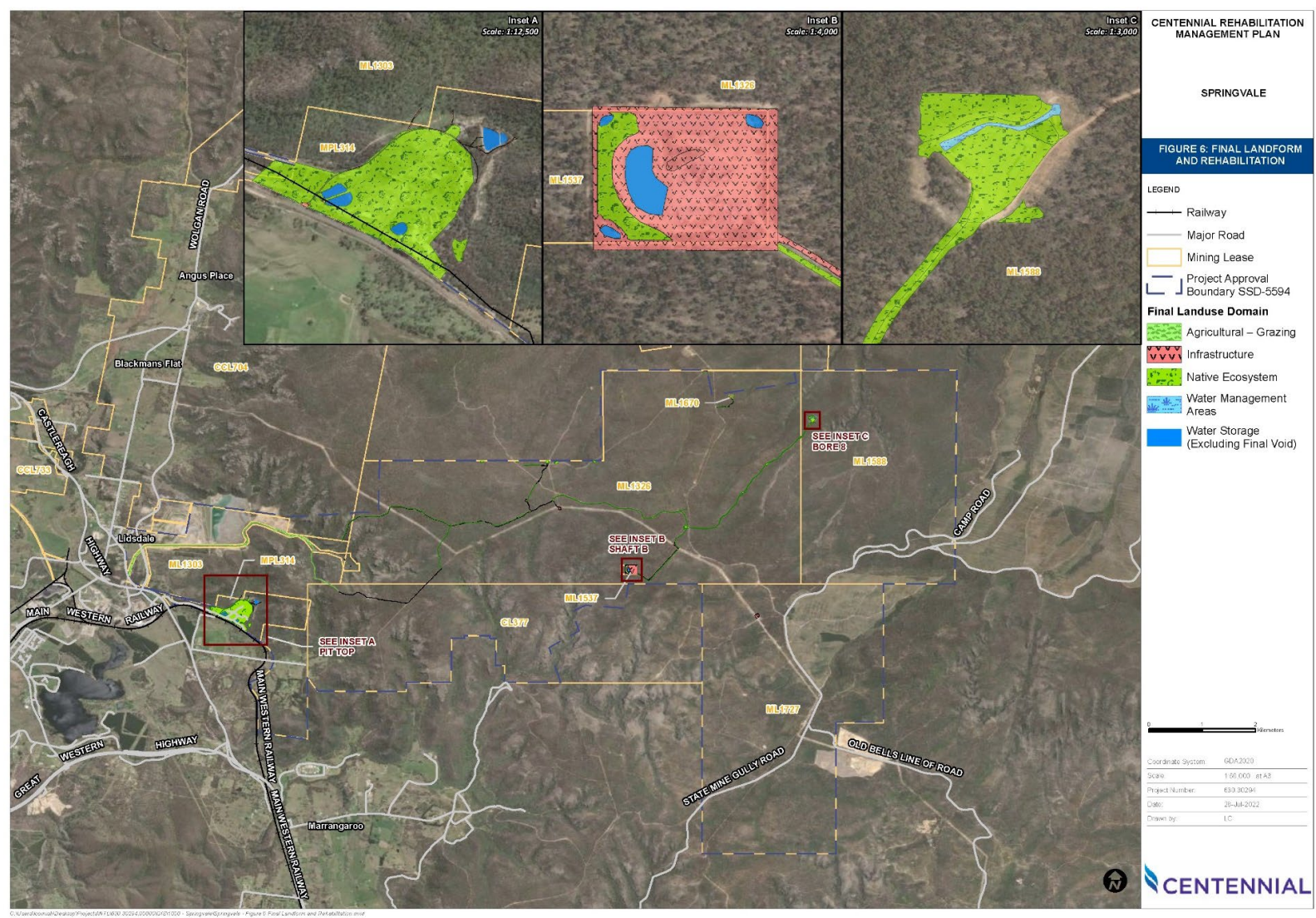


Figure 8-1 Disturbance and Rehabilitation as at December 2025



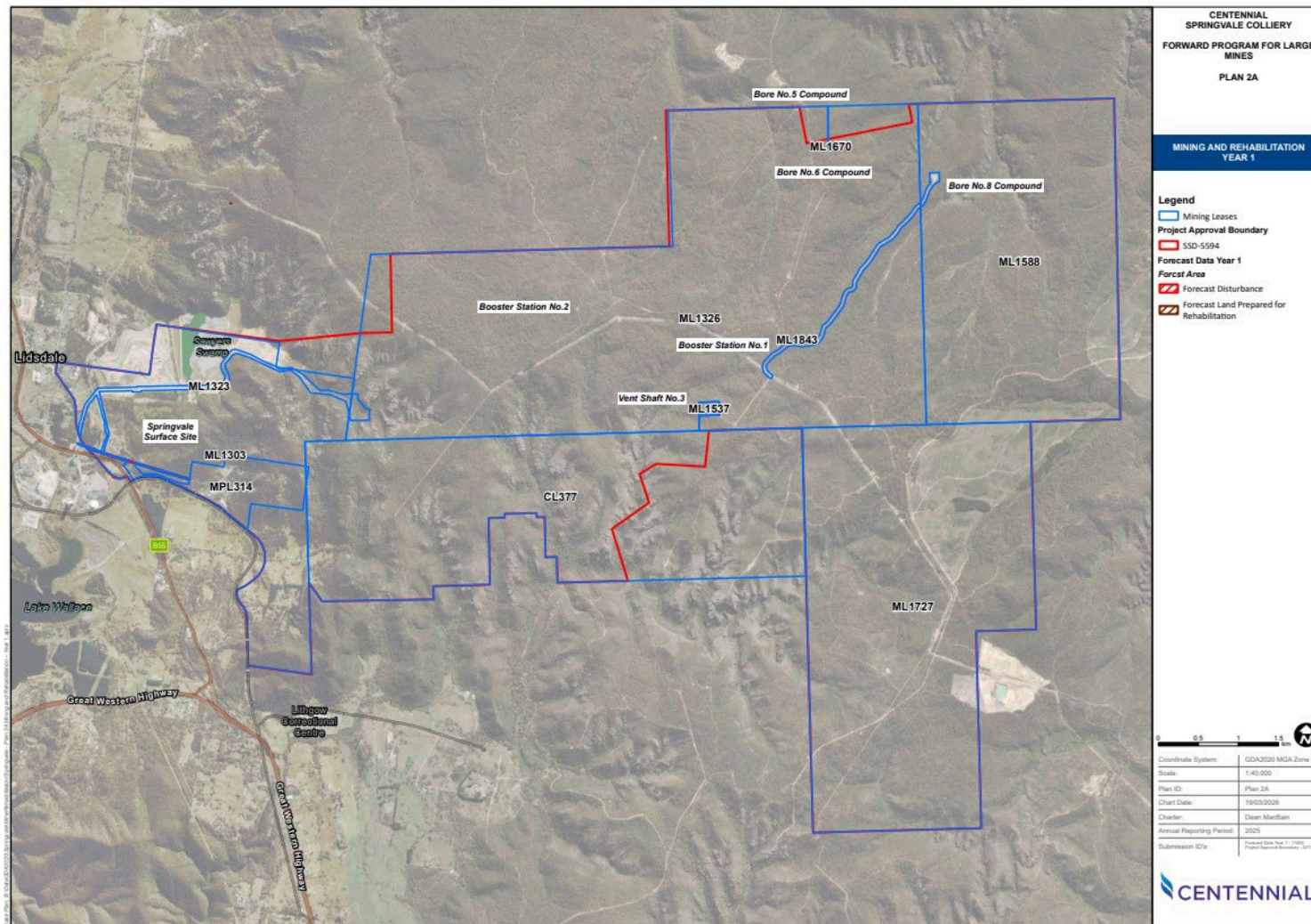


Figure 8-3 Rehabilitation 3 Year Forward Plan – Year 1 (2026)

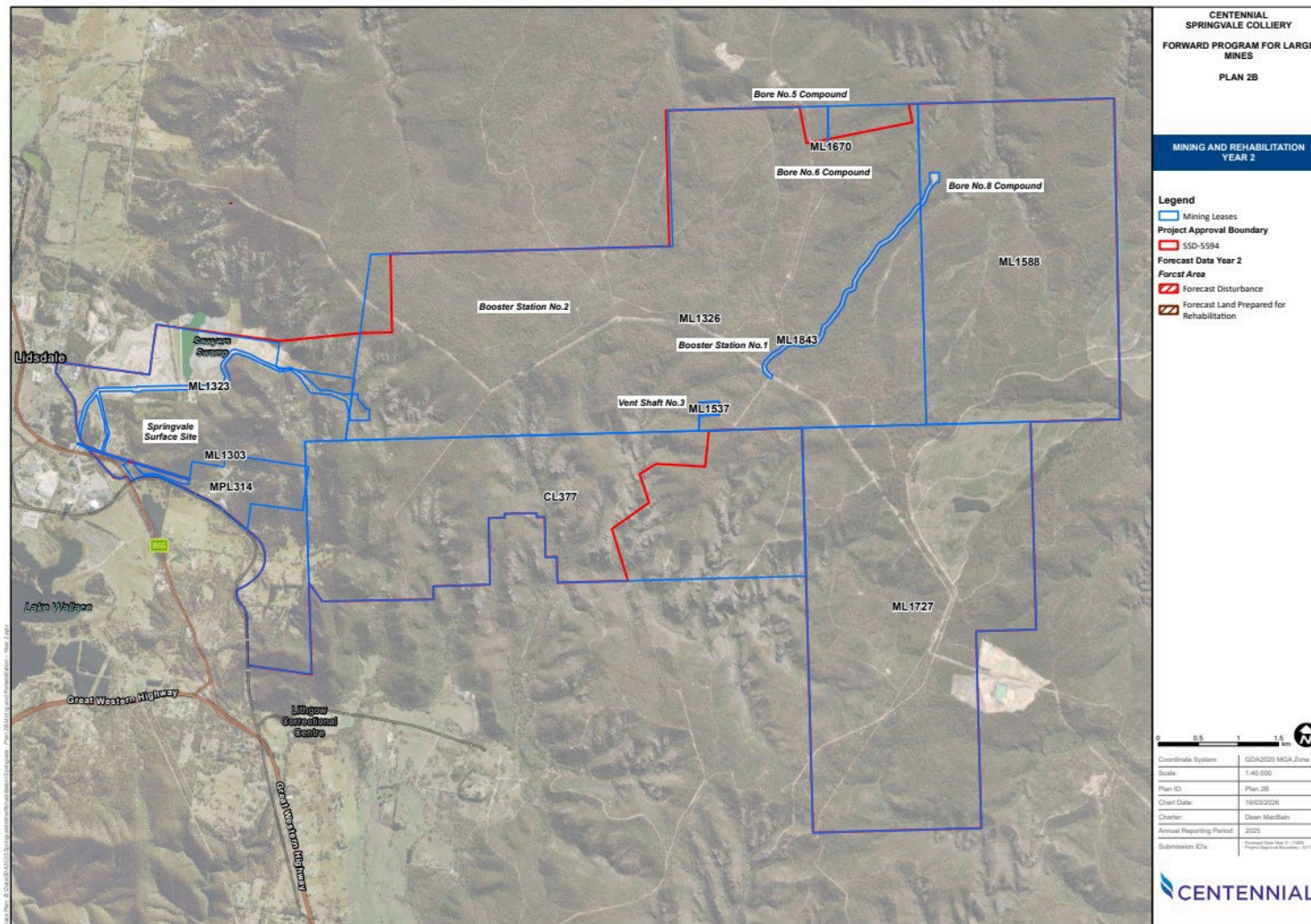


Figure 8-4 Rehabilitation 3 Year Forward Plan – Year 2 (2027)

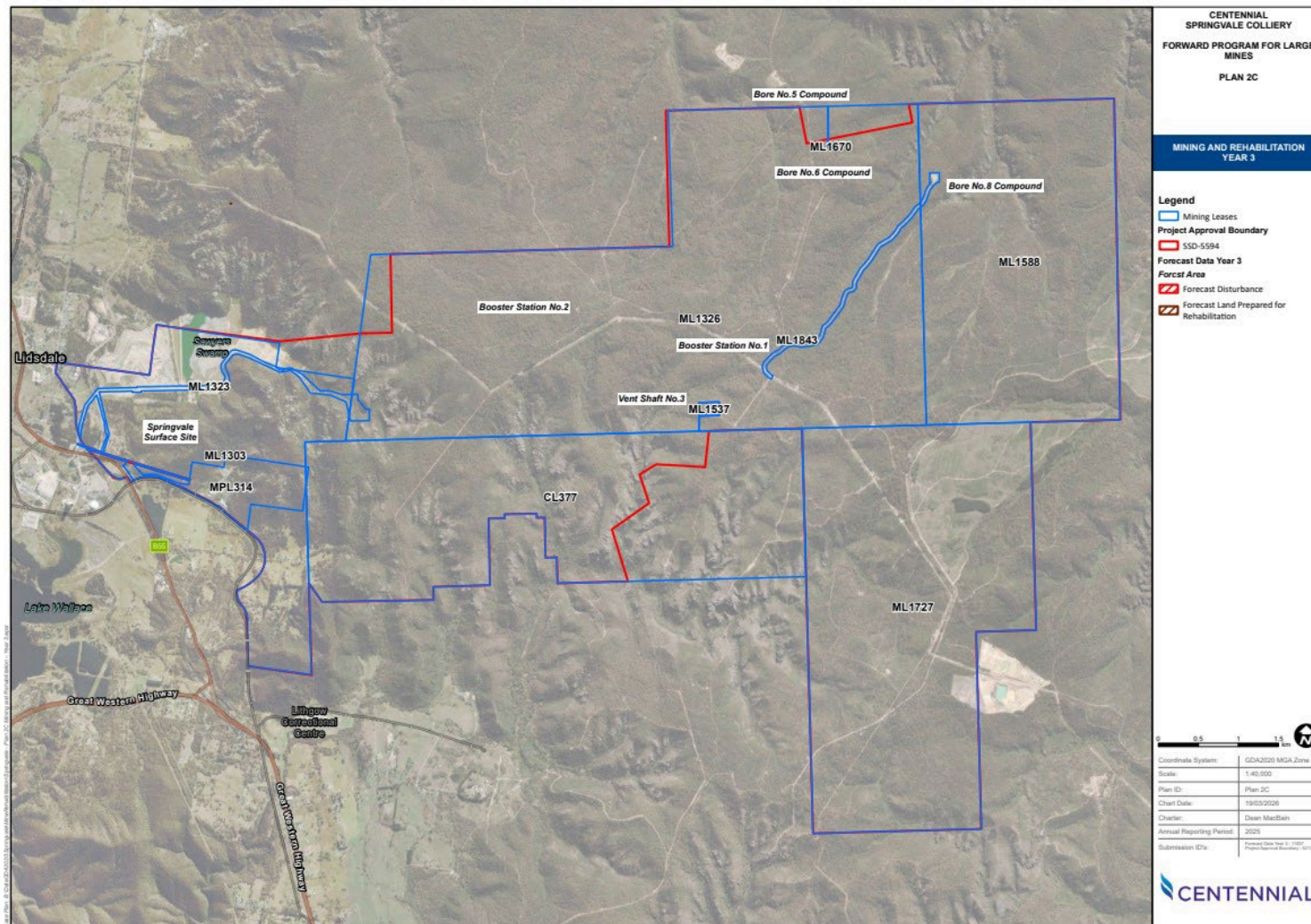


Figure 8-5 Rehabilitation 3 Year Forward Plan – Year 3 (2028)

8.2.4 Rehabilitation Signoff

In 2025, Springvale did not seek formal signoff from the NSWRR that required land use objectives and completion criteria have been met for any rehabilitation areas.

8.2.5 Building Restoration or Removal

In 2025, no buildings were removed, demolished or restored.

8.2.6 Other Rehabilitation Works & Activities

Springvale participated in the NSW RR Targeted Assessment Program (TAP) for Groundwater and Surface Water in 2024. The TAP assessed how effectively the site manages groundwater and surface water risks relevant to rehabilitation outcomes, including review of both documentation and on-site practices, and provided recommendations for continual improvement. Actions undertaken during 2025 to address TAP Recommendations include:

- Rehabilitation Risk Assessment Review: The Rehabilitation Risk Assessment was reviewed on 23 June 2025 to address identified risks and uncertainties, including potential mine water discharge and treatment requirements at closure.
- Geochemical Risk Review: Monitoring confirms a low likelihood of acid generation, with no history of acid mine drainage at Springvale and coal reject material not emplaced onsite.
- RMP and Reporting Updates: Updates to the Rehabilitation Management Plan commenced in 2025 and will be finalised in 2026, with reporting aligned to the September 2025 Resources Regulator guidelines.
- Rehabilitation Phase Review: A third-party review resulted in the Old Fire Dam area being reclassified to the “Ecosystem Establishment” phase based on monitoring results

Springvale also worked collaboratively with National Parks and Wildlife Services to identify opportunity for road/track closure. This project aims to:

- conserve biodiversity, maintain ecosystem functions, protect geological and geomorphological features and natural phenomena and maintain natural landscapes;
- conserve places, objects, features and landscapes of cultural value; and
- protect the ecological integrity of one or more ecosystems for present and future generations.

During the reporting period there has been no subsidence repair activities.

8.3 REHABILITATION MONITORING

During 2025 rehabilitation monitoring was undertaken in accordance with the Rehabilitation Management Plan (RMP), prepared in accordance with Schedule 4, Condition 32, of SSD5594 and the conditions of relevant Mining Leases, in accordance with the regulatory reforms introduced by the NSW RR (see **Section 8.2**). Section 8 of the RMP details rehabilitation monitoring and reporting requirements.

Annual rehabilitation monitoring has been undertaken at Springvale since 2015, tracking rehabilitation success against previous completion criteria and informing any maintenance requirements. During 2022 a Rehabilitation Review was undertaken by Centennial to establish a site-specific monitoring program to support the ongoing refinement of rehabilitation objectives and completion criteria assessment, and alignment with the new associated guidelines and rehabilitation reforms under which the RMP was prepared. This included transitioning Centennial operations to the NSW Biodiversity Assessment Method (‘BAM’) (OEH 2020) to align with new rehabilitation objectives and completion criteria assessment as detailed in Section 4 of the RMP.

The RMP monitoring program assesses the condition, performance and progress of rehabilitated areas across the site. The monitoring results are also used to identify the need for corrective actions for rehabilitation performance. Monitoring results inform refinements to rehabilitation methodology as required and will be continued until rehabilitation has satisfied all rehabilitation and closure criteria.

Monitoring locations are used that are representative of the range of conditions for:

- rehabilitation areas; and
- at appropriate reference sites (analogue sites).

As part of the RMP transition, if/where required new reference control ('analogue') sites have been established in accordance with Section 8.1.1 of the RMP to increase statistical strength and allow comparison of rehabilitation scores to reference site scores (within percentile ranges) for certain variables. Accordingly, three (3) analogue sites were established in adjacent native bushland during 2022 to support ongoing monitoring. The location of analogue and rehabilitation monitoring sites is presented in **Figure 8-6**.

The RMP monitoring program is comprised of:

- Analogue Site Baseline Monitoring; and
- Establishment Monitoring in Rehabilitation Areas, comprised of detailed annual monitoring and regular monitoring inspections, with performance considered against the Rehabilitation TARP with adaptive management responses if/where required.

In accordance with Section 8.3 of the RMP, detailed annual monitoring in rehabilitation areas is typically undertaken in spring and is comprised of the following and reported in the Annual Rehabilitation Report and summarised in the Annual Review:

- Photographic monitoring of vegetation (BAM) plots;
- BAM data collection (vegetation composition, function and structure);
- Soil chemistry Analysis;
- Soil microbial analysis; and
- Monitoring inspections and general observations of erosion, presence of threatened or other significant species, weeds, evidence of native fauna using the site, and signs of pests or undesired disturbance.

8.3.1 Summary of Rehabilitation Monitoring

This section presents the results of rehabilitation monitoring undertaken during the 2025 reporting period as required under the Springvale Rehabilitation Management Plan.

With respect to vegetation composition, the total number of species is considered consistent with the rehabilitation objectives in all rehabilitation plots except SPR1. Further, the diversity and types of plant species recorded on rehabilitation plots are similar to their respective control plots, as well as respective target Plant Community Types (PCTs) that occur in adjoining undisturbed bushland.

Regarding vegetation structure, foliage cover by growth form at rehabilitation plots is generally comparable to that of control plots. SPR1 (located on the Pit Top) has a low species cover across most growth forms.

In relation to vegetation function, resilience to bush fire and drought, exotic pests, domestic stock and native fauna activity were all similar to those observed at the control plots. Conversely, litter cover is generally good across the rehabilitation areas, although litter cover

SPR1 is outside of the 10th-90th percentile range of control plots and PCT benchmark values. Second-generation tree recruitment was recorded within all rehabilitation plots.

In general, soil chemistry results from the laboratory analysis show that the rehabilitation plots have favourable growth media for native vegetation. Organic carbon scores at SPR1 are outside those of the control plots and considered less favourable conditions. Sodicity was comparable across most rehabilitation plots except SPR2. Although salinity levels were outside of the percentile range for most rehabilitation plots, the rehabilitation plots have better conditions than the control plots and are suitable for the growth of native vegetation.

The decomposer microbial communities of the Pit Top and Newnes Plateau site soils were very different. Those of the Pit Top rehabilitation and control plots were thought to be similar. However, those of the Newnes Plateau rehabilitation plots were not thought to be similar to their analogue site soil at this stage.

In summary, the 2025 monitoring results are similar to those of 2024. The vegetation composition, structure and ecosystem function within rehabilitation areas are trending towards completion criteria and showing early stages of native woodland regeneration. However, no rehabilitation plot currently satisfy all completion criteria. Further weed control is required at SPR1.

Table 8-2: BAM Rehabilitation objectives and completion criteria assessment (2025)

Ecological Rehabilitation Objective	Modified Rehabilitation Completion Criteria	SPR1	SPR2	SPR3	SPR6	SPR7	SPR8
Vegetation composition recognisable as target vegetation community	Native plant species are characteristic of the target vegetation community(s)	Not achieved	Achieved	Achieved	Achieved	Achieved	Achieved
Vegetation structure recognisable as, or is trending towards target vegetation community	Cover and abundance of native plant growth forms are characteristic of target vegetation community type(s)	Not achieved	Achieved	Achieved	Achieved	Achieved	Achieved
Ecosystem function demonstrates rehabilitation is self- sustainable	Litter cover is within 10th-90th percentile variation range of reference sites/data	Not achieved	Achieved Above or near PCT benchmark	Achieved Above or near PCT benchmark	Achieved Above or near PCT benchmark	Achieved Above or near PCT benchmark	Achieved Above or near PCT benchmark
	Minimal erosion that would require moderate to significant ongoing management and maintenance. No visual signs of land instability such as mass movement	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved
	Second generation individuals of trees are within the 10th-90th percentile variation range of reference sites	Not achieved	Achieved	Not achieved	Not achieved	Not achieved	Achieved
	Foliage cover of 'high threat exotic' (HTE) weeds is within 10th-90th percentile variation range of reference sites	Not achieved	Achieved	Achieved	Achieved	Achieved	Achieved
	Soil chemistry Total organic carbon is within 10th-90th percentile variation range of reference sites; Soil analytes ECe (salinity) and ESP (sodicity) at rehab sites are similar to reference sites	Soil carbon Not achieved ECe and ESP comparable (non-saline and non-sodic)	Achieved for soil carbon. ECe comparable (non-saline) ESP Not achieved	Achieved for soil carbon. ECe and ESP comparable (non-saline and non-sodic)	Achieved for soil carbon. ECe and ESP comparable (non-saline and non-sodic)	Achieved for soil carbon. ECe and ESP comparable (non-saline and non-sodic)	Achieved for soil carbon. ECe and ESP comparable (non-saline and non-sodic)
	Soil microbiology Decomposer microbial populations in the soils are similar to those of reference sites, using a metric that distinguishes soils at different stages of and in different types of mine rehabilitation. The specific parameters of the metric are:	Similar to control plot	Represented by SPR6, SPR7 & SPR8 results Not similar to control plot	Represented by SPR6, SPR7 & SPR8 results Not similar to control plot	Not similar to control plot	Not similar to control plot	Not similar to control plot

Ecological Rehabilitation Objective	Modified Rehabilitation Completion Criteria	SPR1	SPR2	SPR3	SPR6	SPR7	SPR8
	1) the actinomycete: bacteria ratio (lower values are associated with increased soil disturbance), 2) the proportion of copiotrophic bacteria (higher values are associated with increased labile soil organic carbon), and 3) the presence of the fungus Trichoderma (an indicator of significant amounts of plant cellulosic substrates in soils).						
	Resilience to drought and fire	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved
		Soil moisture and litter scores comparable to control plots	Soil moisture and litter scores comparable to control plots	Soil moisture and litter scores comparable to control plots	Soil moisture and litter scores comparable to control plots	Soil moisture and litter scores comparable to control plots	Soil moisture and litter scores comparable to control plots
	Vertebrate pest species – presence and damage is recorded and controlled.	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved
	Domesticated stock - presence and damage is recorded and controlled.	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved
	Native fauna activity – evidence of fauna habitation and/or utilisation of rehabilitation areas over time	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved

8.4 PROPOSED ACTIONS IN NEXT REPORTING PERIOD

Monitoring outcomes indicate that rehabilitation areas are generally progressing in accordance with completion criteria, with no active management required across most domains. Targeted weed control is recommended at SPR1 to manage Sweet Briar and Blackberry, and a review of soil completion criteria is proposed to better reflect conditions where rehabilitation outcomes exceed control site benchmarks.

8.5 REHABILITATION TRIALS AND RESEARCH

Rehabilitation research, modelling and trials are undertaken in accordance with Section 9 of the RMP. Springvale contributes to rehabilitation research primarily through ecological monitoring programs on the Newnes Plateau, which support improved understanding of local species, ecological communities and ecosystem function. These activities also contribute to the Western Region Biodiversity Offset Strategy, as summarised in **Section 6.5.6**.

Given the limited surface disturbance (and proposed change in Springvale Pit Top final landform) associated with the Springvale underground mining operation, large-scale rehabilitation trials are not currently proposed

9 Community Consultation

Springvale consults with the community through forums such as, the Western Region Community Consultative Committee and community organised events.

Meetings of the Centennial Western Region Community Consultative Committee (CCC) were held on:

- 11 March 2025;
- 10 June 2025;
- 16 September 2025; and
- 9 December 2025.

Representatives of the appointed community representatives, relevant government organisations and company representatives attended the meetings. A detailed presentation was provided to attendees at each CCC meeting on the operational activities at the site.

9.1 EXTRACTION PLAN CONSULTATION

Extensive community consultation with landowners in the Springvale mining area is undertaken for the purpose of monitoring and assessing subsidence effects on private properties. In general, the Springvale community consultation has included:

- DPHI
- Conservation Programs, heritage and Regulation Division (CHPR)
- Independent Monitoring Panel (IMP)
- Water NSW
- Heritage NSW
- Resource Regulator (NSWRR)
- Spatial Services NSW
- NSW National Parks and Wildlife Service (NPWS)
- Land Registry Services
- Lithgow City Council
- Endeavour Energy
- Owner(s) of potentially affected features
- Registered Aboriginal Parties (RAPs)

Full details of the consultation undertaken and associated outcomes are detailed within each Extraction Plan, which can be accessed on the company website.

Quarterly Extraction plan reports are provided to provide the DPHI Planning & Assessment Group and Biodiversity Conservation and Science Group, the Springvale Independent Monitoring Panel, National Parks & Wildlife Service and Commonwealth DCCEEW.

9.2 COMMUNITY SPONSORSHIPS AND DONATIONS

Springvale continues to support the local community through various sponsorship avenues and donations to community activities, groups and associations.

In accordance with Schedule 2, Condition 15 of SSD5594, during 2025 Springvale paid the Lithgow City Council (LCC) community contributions based on saleable tonnes for use in long-term community activities and agreed projects (scholarships, online resources, and the adventure playground). This was calculated at a total of \$75,889.26 the calendar year 2025.

It is also noted that at corporate level, Centennial Coal, of which Springvale is a subsidiary, additionally donated to local sporting and community groups in the Lithgow area during 2025.

9.3 COMMUNITY COMPLAINTS

In accordance with Schedule 5, Condition 15 of SSD5594, Springvale is required to make a complaint register available monthly on the Centennial website. The register is available at <https://www.centennialcoal.com.au/operations/springvale/>.

Long term trends in complaints are presented in **Table 9-1** below.

During the 2025 calendar year reporting period, were no community complaints received.

Table 9-1. Record of annual community complaints for 2021 to 2025

Community Complaints						
Year	Air	Water	Noise	Waste	Other	Total
2021	0	0	0	0	0	0
2022	0	0	2	0	0	2
2023	0	0	1	1	0	2
2024	0	0	0	0	0	0
2025	0	0	0	0	0	0

10 INDEPENDENT ENVIRONMENTAL AUDIT

Springvale underwent an Independent Environmental Audit (IEA) in the 2025 reporting period to satisfy Schedule 6, Conditions 13 and 14 of SSD5594. During the IEA there were a number of positive environmental management aspects that were observed, and were considered noteworthy:

- There has been consistent environmental support for this site for many years. This has led to a very good understanding of potential environment and community risks associated with the development.
- The site had a high rate of compliance (field and administrative) and has managed the site to a high standard.
- Record keeping has been very well managed, and the use of the Compliance Database software has assistance with tracking actions and documentation.
- The site inspection noted that the site was generally well maintained and no major issues were identified in the field.

The site generally had a very high compliance rate as shown in **Table 10-1**.

Table 10-1 IEA Compliance Summary

Compliance Status	SSD 5594	SOC	EPL	Mining Act	Mining Leases (all)	Total
Compliant	73	13	58	34	27	205
Not Triggered	12	2	8	12	35	69
Non-compliance	1	0	4	4	0	9
Total	86	15	70	50	62	283

Table 10-2 shows the Springvale response to the auditor's recommendations within the 2025 Independent Environmental Audit (IEA) Report relating to non-compliance recommendations while **Table 10-3** provides and update on additional Recommended Actions.

The next Independent Audit will be completed in 2028.

Table 10-2: Non-Compliance Findings and Action Status from 2025 IEA Report

Schedule and Condition Number	Details	Recommended Action	Springvale Response	Timeframe for Action Completion	Status at end of 2025
Schedule 4, Condition 12 (part) And EPL O1.1	Non-compliant with relevant hydrocarbon storage standards as observed during site inspection. This is based on seeing some hydrocarbons not stored as per Australian Standards AS 1940, which requires bunding of AS 1940 requires that bunds or secondary containment systems must have a capacity of at least 110% of the volume of the largest tank or container stored within that bunded area. Despite noting these issues around 95% of hydrocarbons onsite were stored as per AS 1940 requirements.	NC REC 1: Ensure hydrocarbons are stored as per AS 1940.	95% of hydrocarbons were stored correctly. Springvale will continue to undertake inspections and enforce Hydrocarbon storage and management requirements.	Ongoing Management recommendation	Not Applicable
		NC REC 2: Remove the mobile electrical transformer unit from site and ensure the leakages are handled correctly.	Springvale will confirm whether the transformer can be removed from site by licensed third party contractor and arrange for removal by site if no longer required.	February 2026	Planned for 2026
		IMP REC 3: Ensure older hydrocarbon stains in the laydown area are scalped up, with material removed from site to a licensed facility to handle the contamination.	Springvale will revise Hazardous Spill Response Procedure to capture the material removal collection/disposal	November 2025	Complete- SV_SWP-4318has been updated

Table 10-3 Response to Additional Audit Recommendations

Aspect	Condition Reference	Improvement REC Number	Recommendations	Springvale Response	Timeframe for Action Completion	Status at end of 2025
Extraction Plan	SSD-5594 Schedule 3 Condition 10	IMP REC 1	Develop an internal register for EP triggers. This would likely be an excel spreadsheet that pulls out triggers, timing, notification requirements. This would be useful for the site team to continue to manage the EP implementation.	Springvale will continue to update the Extraction Plan Trigger Register with new triggers for internal purposes noting the quarterly report and annual review documents triggers relevant to the respective reporting frequencies.	Ongoing updates required as triggered.	Not Applicable- ongoing updates at required
Water Management Performance Measures	SSD-5594 Schedule 4 Condition 12 & EPL 3607 O1.1	IMP REC 2	Review the Stream Health and Channel Stability Monitoring Program for the suitability of locations for areas. E.g. Areas that have been subsided many years ago may not need to be monitored. This may require updates to approvals.	Springvale will engage with DPHI regarding the transition of monitoring arrangements with ongoing extraction relevant to the operation.	December 2025	A comprehensive environmental monitoring program has been undertaken in the Northern Extraction Area (up to Longwall 421) for a minimum of seven years, exceeding the five-year requirement under EPBC 2013/6881. Mining is now outside the 600 m Extraction Plan monitoring area, Trigger Investigation Area and 26.6° Angle of Draw, with the final subsidence profile achieved and recorded subsidence within

Aspect	Condition Reference	Improvement REC Number	Recommendations	Springvale Response	Timeframe for Action Completion	Status at end of 2025
						predictions. Accordingly, monitoring demonstrates that ground movement has ceased and land and stream systems have stabilised, and continuation of monitoring is not warranted. In 2026, environmental monitoring programs will be refined to target areas of subsidence risk and support future operational requirements.
Mine Access Road Intersection Upgrade	SSD-5144 Schedule 4 Condition 21	IMP REC 4	Follow up with DPHI on the outcome of the intersection letter.	Springvale note the consent currently expires 31 December 2028 Springvale note the presence of both a public sporting oval and electrical infrastructure within the immediate vicinity of the intersection Springvale will undertake a further survey to reflect current	December 2026	Traffic monitoring in 2025 indicates the intersection is generally operating below the 400 vehicles per hour threshold, with an average hourly volume of approximately 221 vehicles per hour and 96% of hours compliant. A single exceedance (482 vehicles per hour) occurred between 15:00–16:00; however,

Aspect	Condition Reference	Improvement REC Number	Recommendations	Springvale Response	Timeframe for Action Completion	Status at end of 2025
				traffic conditions at the intersections.		this was isolated, not sustained, and does not align with Springvale shift change times, and is therefore likely attributable to school pick-up and general afternoon traffic rather than mine-related movements.
Location of monitoring/discharge points and areas	EPL 3607 P1.4	IMP REC 5	In next update to EPL, update EPL figure to remove WNM12 as it is not a noted location in this EPL.	Springvale note this is an additional site rather than a site missing.	Noted to be incorporated with next EPL update.	Noted to be incorporated with next EPL update.
Rehabilitation management plans for large mines	Mining Amendment Regulation 2021	IMP REC 6	Update the RMP to reference ML 1843.	Springvale will update the RMP to reference ML 1843	June 2026	A third-party contractor is currently updating the RMP. This is forecasted to be completed in 2026.

11 INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

This section refers to non-compliances and incidents reported during the reporting period. IEA period non-compliances have been discussed in **Section 10**.

During the 2025 calendar year reporting period there was one (1) reportable incident. The incident was not considered non-compliant with relevant approvals; however, it was reported in accordance with the POEO Act due to the potential for environmental harm and forecast clean-up costs

Table 11-1 provides a summary of the incidents, including the actions taken by Springvale in response to the incident. There were no non-compliances against relevant approvals.

Table 11-1 Incidents and Non-Compliances during the Reporting Period

Compliance ⁵	Overview of incident/non-compliance	Description of incident/non-compliance	Actions
LOW	PIRMP Activation	The incident involved the accidental release of approximately 1,000 litres of Marisil at the Pit Top on 26 October 2025. Site spill response products, including Spill Sorb absorbent, were immediately deployed to prevent the material from entering the water management system. As a result, the spill was fully contained on site and did not enter any waterways.	Spill response equipment was deployed to contain and recover the material, including dry sorb, sawdust and spill pads, and a spill barrier was established to prevent migration to nearby drains. The recovered material was placed in a designated bin for specialist assessment, with the Environmental Department engaging a licensed contractor (JR Richards) to undertake waste classification and disposal advice. Preventative actions include reviewing lighting adequacy in the area and assessing the suitability of protective guards for 1,000 L containers to prevent accidental puncture by forklifts.

⁵ See Compliance Status Key beneath Table 1-2 for risk level, colour code and description.

A summary of incident and regulatory action is presented in the following table.

Table 11-2 Summary of Reportable Incidents and Regulatory Actions in 2025

Compliance Type	Regulator / Agency	Number
Incidents	EPA and DPHI	1
Caution Notices		0
Warning Letters	-	0
Penalty Notices	-	0
Prosecutions	-	0

Key regulatory correspondence relevant to the reporting period is summarised below:

NSW Resource Regulator (NSW RR)

In July 2025 Springvale received Section 240 notices from the NSW RR in relation to post-closure groundwater strategy for Springvale Colliery. Springvale engaged with the NSW RR throughout the reporting period to discuss this approach to the notice. A revised Notice was issued on 24 December 2025.

The outputs required to address the notice are currently being prepared and will be submitted to the NSW RR in 2026.

The Rehabilitation Report and Forward Plan submitted to the NSW RR provides additional information on this matter.

NSW Natural Resources Access Regulator (NRAR)

On 20 December 2024, Springvale received a notice to provide information and records in relation to an alleged contravention of Section 60A(2) of the Water Management Act 2000. Centennial (on behalf of Springvale) provided a response to this allegation which resulted in the revoking of the notice in February 2025.

12 ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

Table 12-1 presents activities that are currently planned for the next reporting period.

Table 12-1: Forecast Operations for 2026

Improvement Actions
Refine Environmental Monitoring Program in Previous Extraction Plan Areas to target areas of subsidence risk and support future operational requirements.
Management Plan Revisions
- Rehabilitation Management Plan Update - Extraction Plan Subcomponent Plan re-submission as triggered by IMP advice. - Decoupling of Air and Noise Western Region Management Plans
Condition Triggers
- Longwall 501-5403 Extraction Plan Approval (and Federal Approval of Management Plans) prior to the commencement of secondary extraction - Undertake revisions to Management Plans within three months of Annual Review Submission

13 REFERENCES

EMM, March 2026, Annual Environmental Monitoring Review – Surface and Groundwater, January to December 2025

GHD, January 2026, UCRC Aquatic Ecology Springvale Mine site summaries from 2025 monitoring

GHD, March 2026, Newnes Plateau Swamps Aquatic Ecology Annual Report 2025

RPS, May 2025, Blue Mountains Water Skink Research and Management Program. Annual Report: 2024 – 25 Monitoring Period

SLR, April 2025, Springvale Colliery Quarterly Noise Monitoring 1st Quarter, 2025

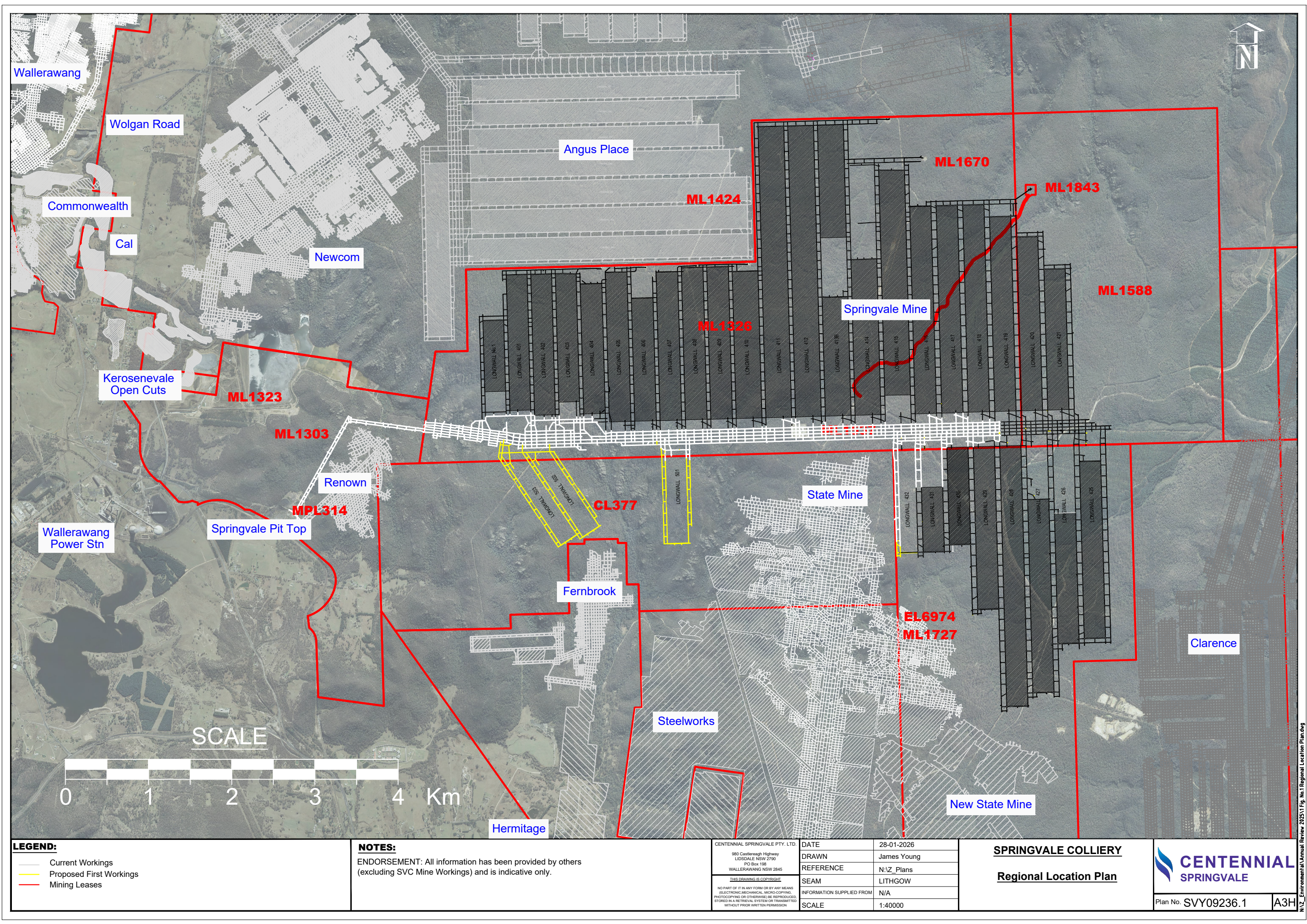
SLR, July 2025, Springvale Colliery Quarterly Noise Monitoring 2nd Quarter, 2025

SLR, October 2025, Springvale Colliery Quarterly Noise Monitoring 3rd Quarter, 2025

SLR, December 2025, Springvale Colliery Quarterly Noise Monitoring 4th Quarter, 2025

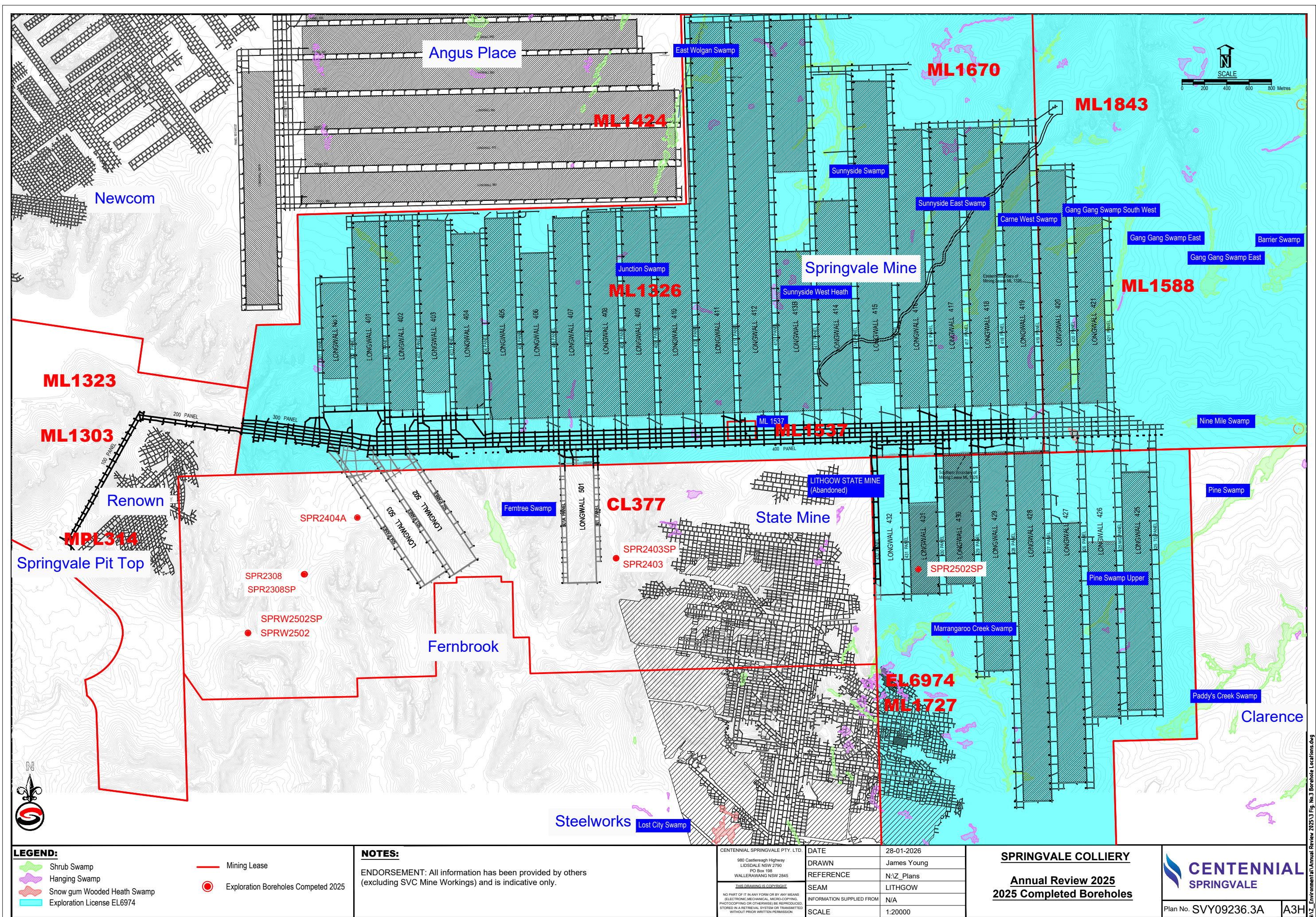
SLR, November 2025, Springvale Mine Stream Health Monitoring 2025

PLANS





LEGEND:		NOTES:		CENTENNIAL SPRINGVALE PTY. LTD. 980 Castlereagh Highway LIDSDALE NSW 2790 PO Box 198 WALLERAWANG NSW 2845 THIS DRAWING IS COPYRIGHTED NO PART OF IT IN ANY FORM OR BY ANY MEANS (ELECTRONIC, MECHANICAL, MICRO-COPYING, PHOTOCOPYING OR OTHERWISE) BE REPRODUCED, STORED IN A RETRIEVAL SYSTEM OR TRANSMITTED WITHOUT PRIOR WRITTEN PERMISSION		<table><tr><td>DATE</td><td>28-01-2026</td></tr><tr><td>DRAWN</td><td>James Young</td></tr><tr><td>REFERENCE</td><td>N:\Z_Plans</td></tr><tr><td>SEAM</td><td>LITHGOW</td></tr><tr><td>INFORMATION SUPPLIED FROM</td><td>-</td></tr><tr><td>SCALE</td><td>Diagram Only</td></tr></table>		DATE	28-01-2026	DRAWN	James Young	REFERENCE	N:\Z_Plans	SEAM	LITHGOW	INFORMATION SUPPLIED FROM	-	SCALE	Diagram Only	SPRINGVALE COLLIERY Annual Review 2025 Mine Production 2025		CENTENNIAL SPRINGVALE Plan No. SVY09236.2 A3H	
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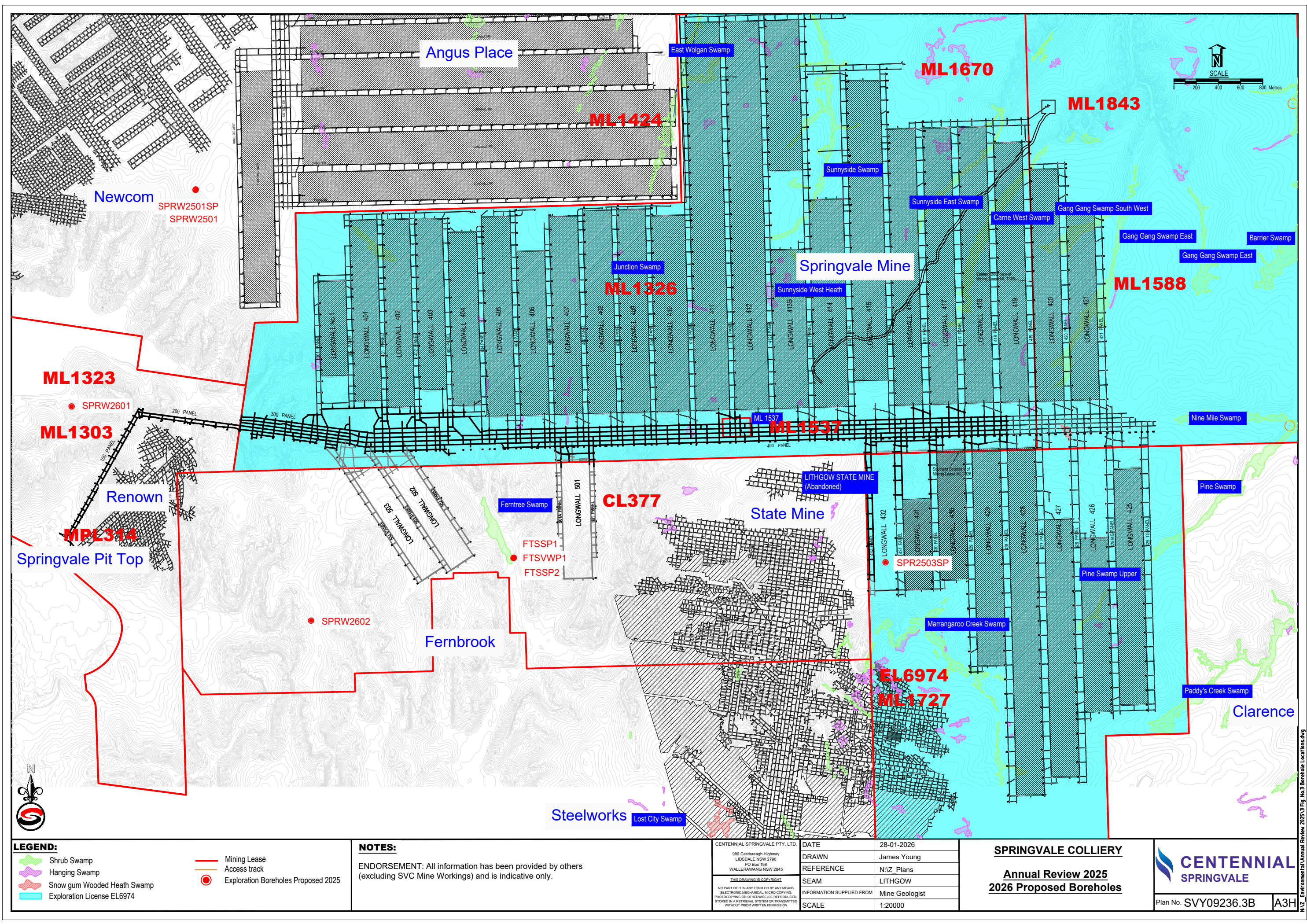
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	Shrub Swamp
	Hanging Swamp
	Snow gum Wooded Heath Swamp
	Exploration License EL6974
	Mining Lease
	Exploration Boreholes Completed 2025

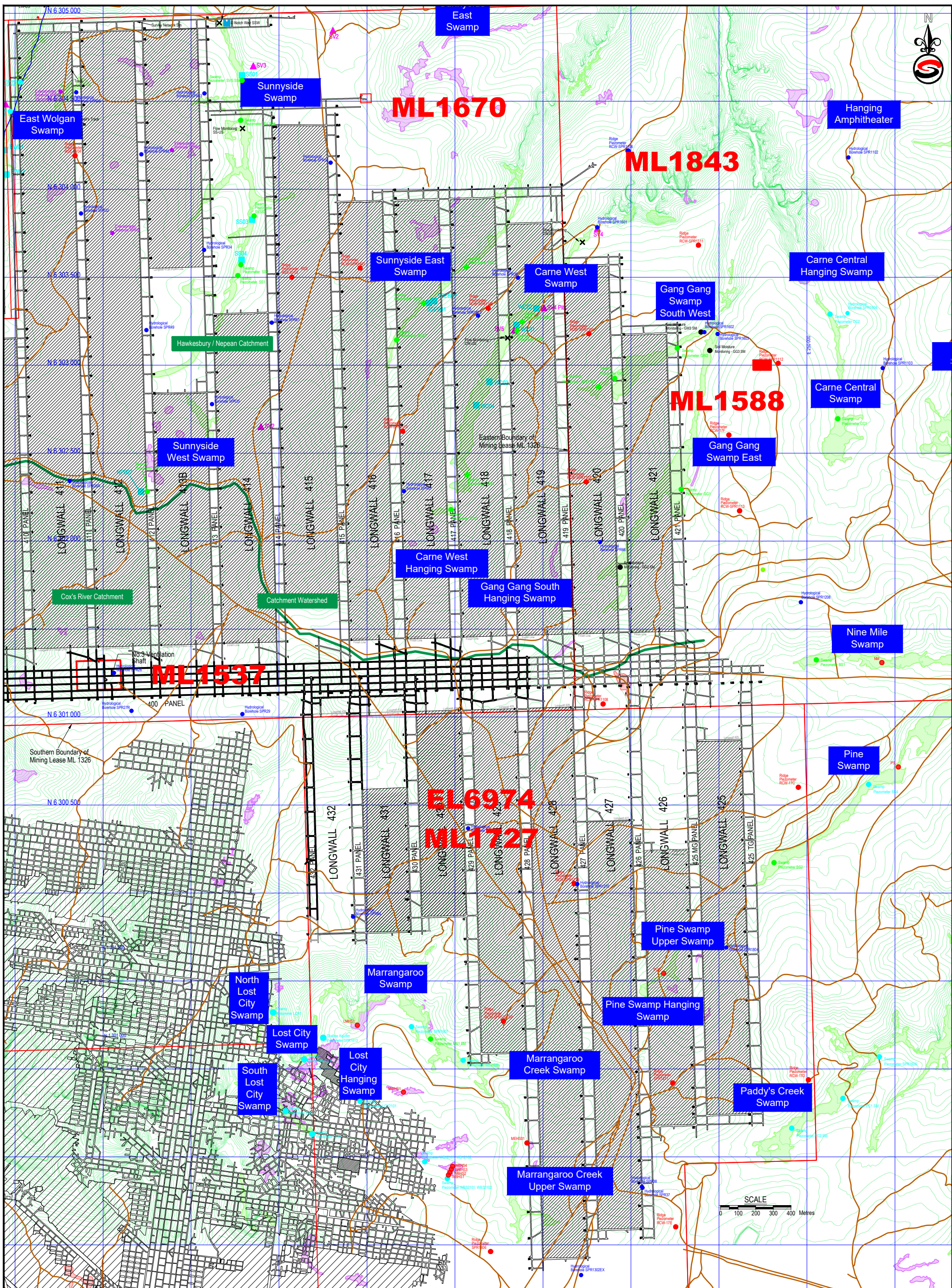
NOTES:	
ENDORSEMENT: All information has been provided by others (excluding SVC Mine Workings) and is indicative only.	

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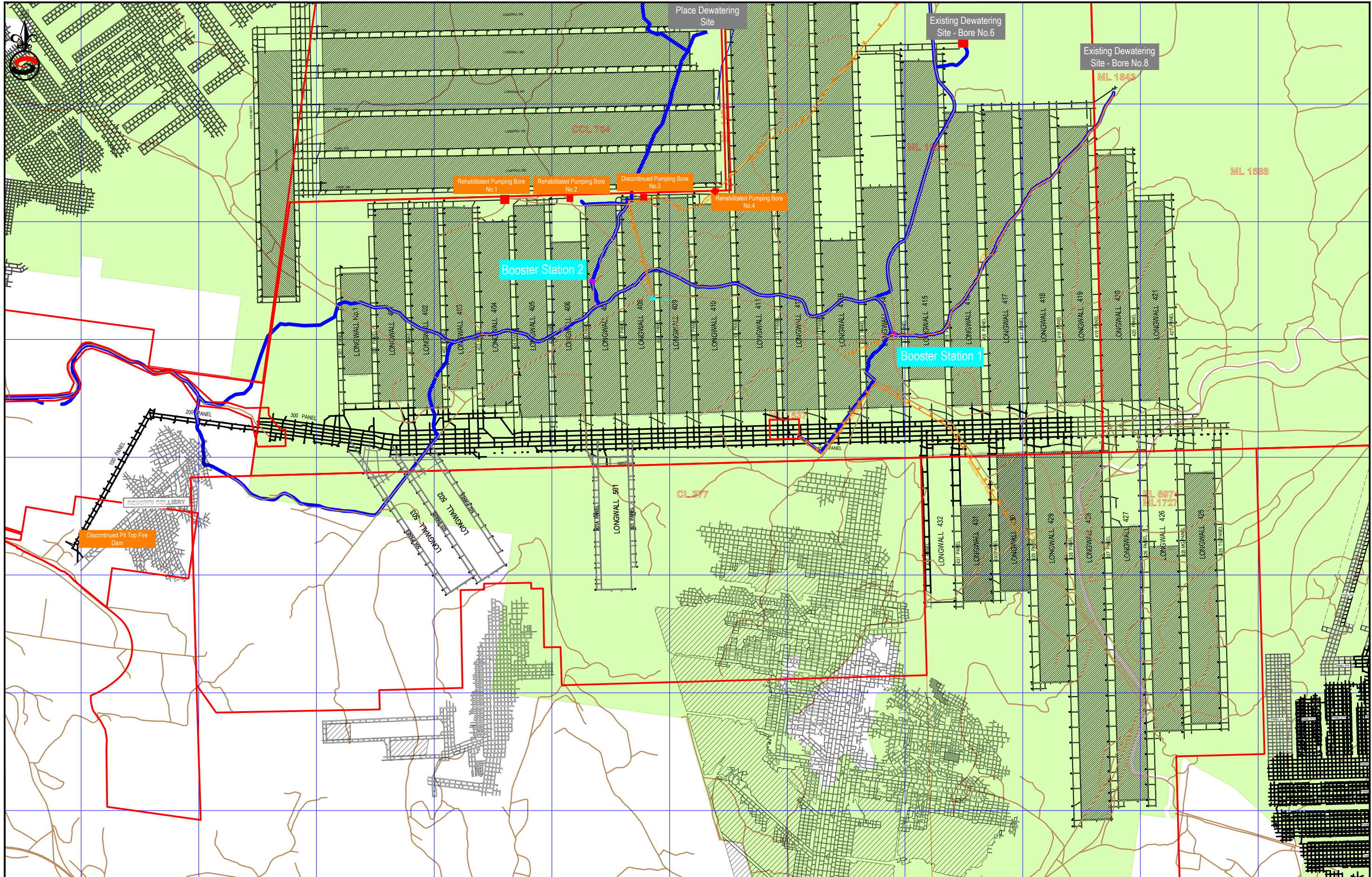
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Annual Review 2025 2025 Completed Boreholes	

Plan No. SVY09236.3A	A3H





LEGEND: - Shrub Swamp - Hanging Swamp - Snow gum Wooded Heath Swamp - Mining Lease - Access track	NOTES: ENDORSEMENT: All information has been provided by others (excluding SVC Mine Workings) and is indicative only.	CENTENNIAL SPRINGVALE PTY. LTD. 980 Castlereagh Highway LIDSDALE NSW 2790 PO Box 198 WALLERAWANG NSW 2845 THIS DRAWING IS COPYRIGHT NO PART OF IT IN ANY FORM OR BY ANY MEANS (ELECTRONIC MECHANICAL MICRO-COPYING, PHOTOCOPYING OR OTHERWISE) BE REPRODUCED, STORED IN A RETRIEVAL SYSTEM OR TRANSMITTED WITHOUT PRIOR WRITTEN PERMISSION	DATE	28-01-2026	SPRINGVALE COLLIERY Annual Review 2025 Environmental Monitoring Locations	 CENTENNIAL SPRINGVALE Plan No:SVY09236.4	A3V
			DRAWN	James Young			
			REFERENCE	N\Z Plans			
			SEAM	LITHGOW			
			INFORMATION SUPPLIED FROM	-			
			SCALE	1:20000			



LEGEND:

State Conservation Area

Formed Track

Proposed Rehabilitation Areas 2026

Longwall Extraction

Water Transfer Pipeline

11KV Powerline Path

Rehabilitated Areas prior to 2021

Mining Lease

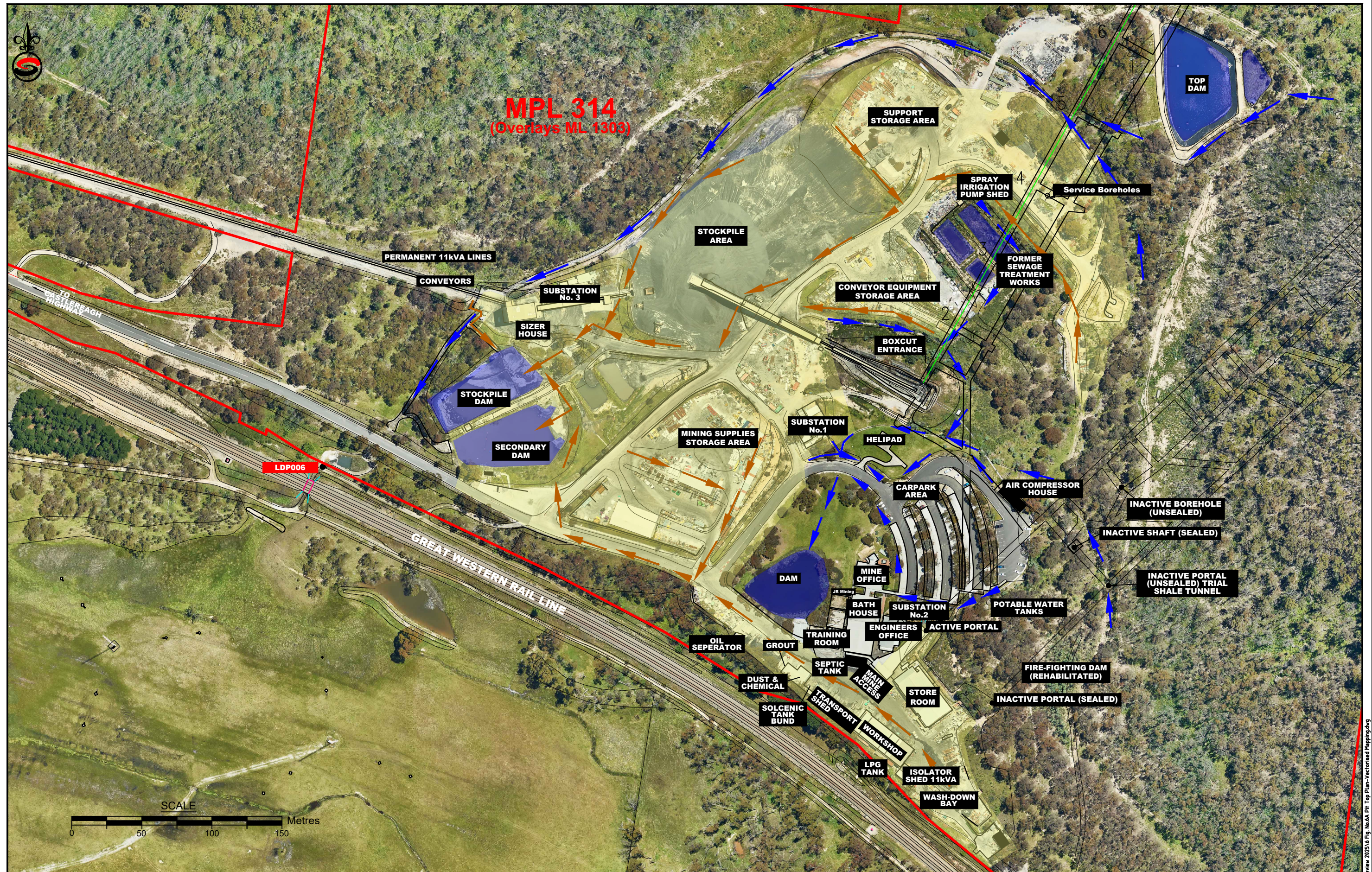
Active Infrastructure Area

NOTES:	
No Proposed Rehabilitation for 2026	

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		INFORMATION SUPPLIED FROM	-
		SCALE	1:30000

SPRINGVALE COLLIERY	
Annual Review 2025 Proposed Rehabilitation 2026	
Newnes Plateau	

Plan No. SVY09236.5	A3H



LEGEND:	
	Clean Water
	Dirty Water
	Dirty Water Catchment
	Pollution Control Structures
	Mining Lease

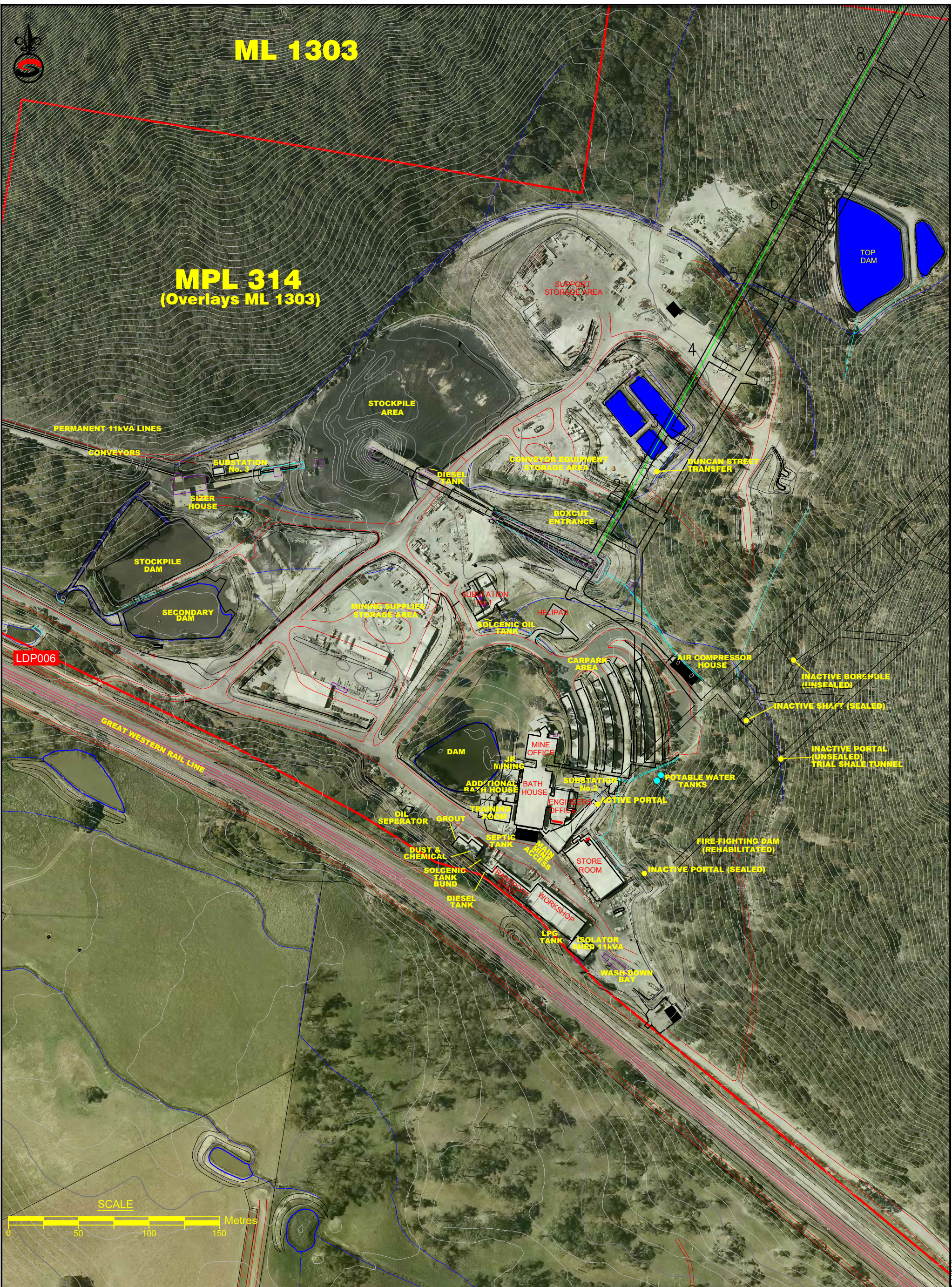
NOTES:	
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	SEAM	LITHGOW
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SCALE		1:2500

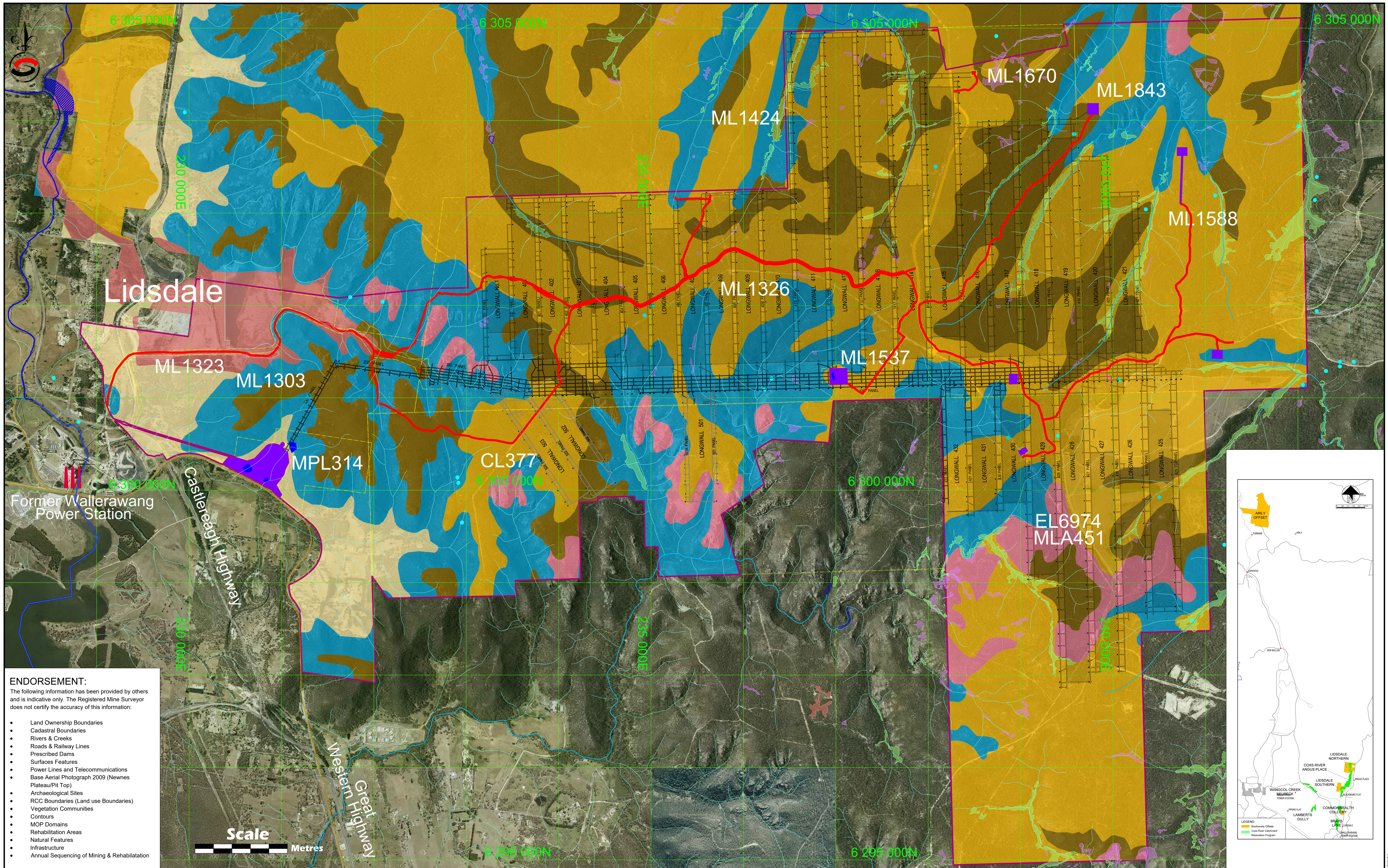
SPRINGVALE COLLIERY	
Annual Review 2025	
Pit Top Plan	
Surface Water Management	

	Plan No. SVY09236.6	
	A3H	

N:\2_Environmental\Annual Review 2025\6 Fig No.64 Pit Top Plan-Vectorised Mapping.dwg



LEGEND: Mining Lease	NOTES: ENDORSEMENT: All information has been provided by others (excluding SVC Mine Workings) and is indicative only.	CENTENNIAL SPRINGVALE PTY. LTD. 980 Castlereagh Highway LIDSDALE NSW 2790 PO Box 198 WALLERAWANG NSW 2845 THIS DRAWING IS COPYRIGHT NO PART OF IT IN ANY FORM OR BY ANY MEANS (ELECTRONIC MECHANICAL MICRO-COPYING PHOTOCOPYING OR OTHERWISE) BE REPRODUCED STORED IN A RETRIEVAL SYSTEM OR TRANSMITTED WITHOUT PRIOR WRITTEN PERMISSION	DATE	28-01-2026	SPRINGVALE COLLIERY Annual Report 2025 Pit Top Plan - Aerial Photograph	 CENTENNIAL SPRINGVALE	Plan No. SVY09236.7	A3V
			DRAWN	James Young				
			REFERENCE	N:\Z_Plans				
			SEAM	LITHGOW				
			INFORMATION SUPPLIED FROM	-				
			SCALE	1:25000				



ENDORSEMENT:
The following information has been provided by others and is indicative only. The Registered Mine Surveyor does not certify the accuracy of this information:

- Land Ownership Boundaries
- Cadastral Boundaries
- Rivers & Creeks
- Roads & Railway Lines
- Prescribed Dams
- Surfaces Features
- Power Lines and Telecommunications
- Base Aerial Photograph 2009 (Newnes Plateau/Pit Top)
- Archaeological Sites
- RCC Boundaries (Land use Boundaries)
- Vegetation Communities
- Contours
- MOP Domains
- Rehabilitation Areas
- Natural Features
- Infrastructure
- Annual Sequencing of Mining & Rehabilitation

LEGEND:

	Project Approval Area		MU50 Newnes Plateau Shrub Swamp		Land Capability - Class 4
	Mining Tenement		MU51 Newnes Plateau Hanging Swamp		Land Capability - Class 5
	Surface Contour - 5m		MU52 Newnes Plateau Rush Sedge Snow Gum Hollow Wooded Heath		Land Capability - Class 6
	River		Secondary Domain - Infrastructure (Existing Forestry Tracks)		Land Capability - Class 7
	Creek		Secondary Domain - Water Management		Land Capability - Class 8
	Drainage Line		Secondary Domain - Rehabilitation - Woodland		Land Capability - Disturbed Land
	Aboriginal Cultural Heritage Sites				

NOTES:
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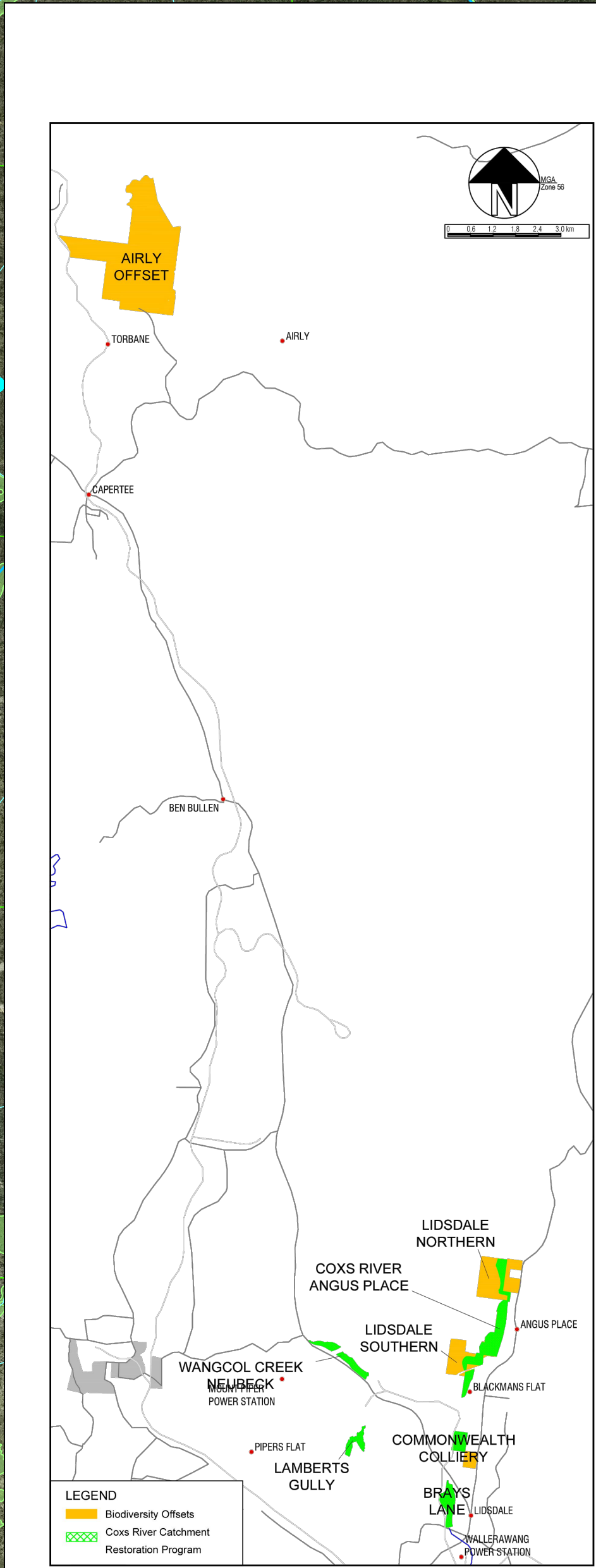
SPRINGVALE COLLIERY

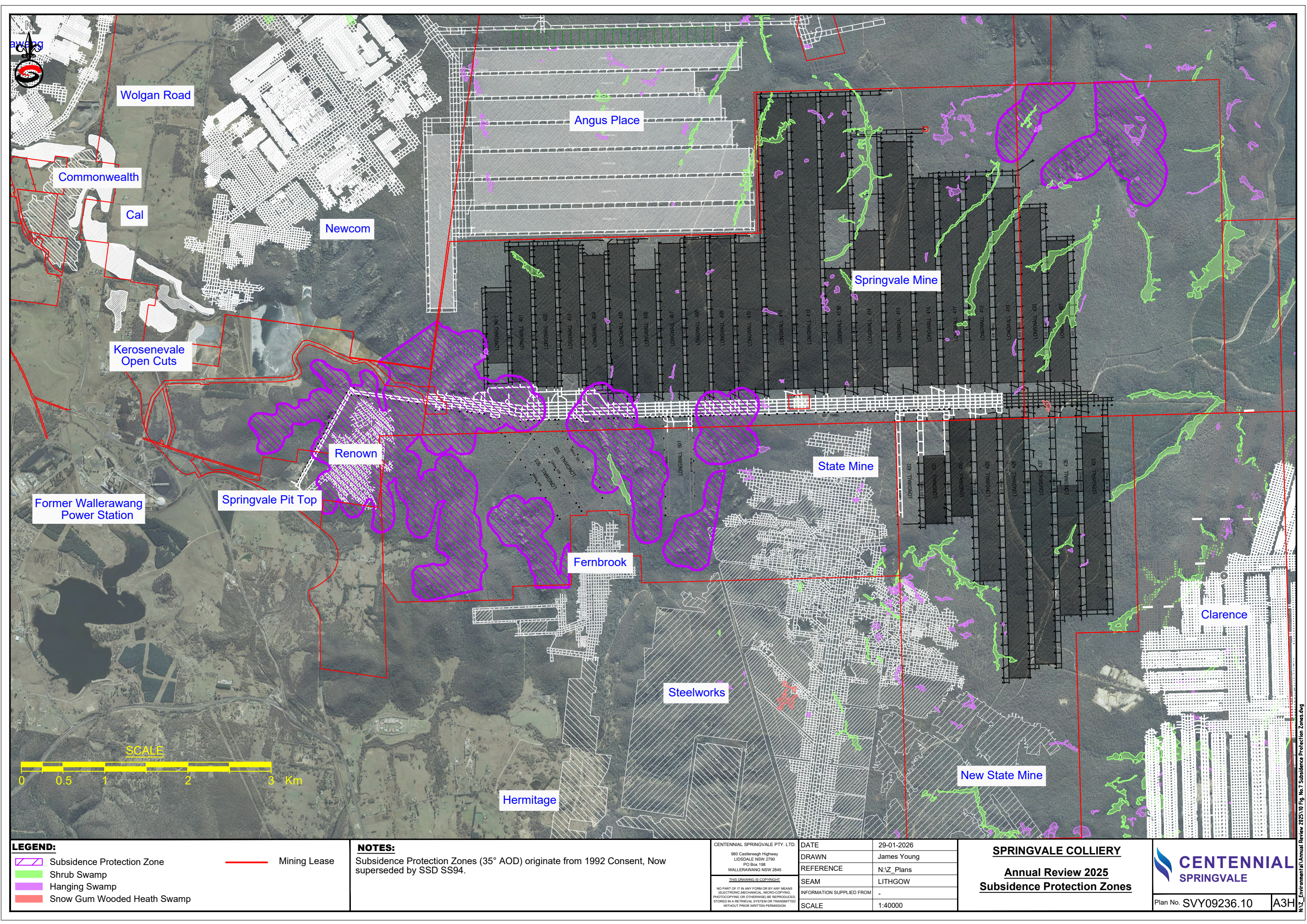
Annual Review 2025
Final Rehabilitation

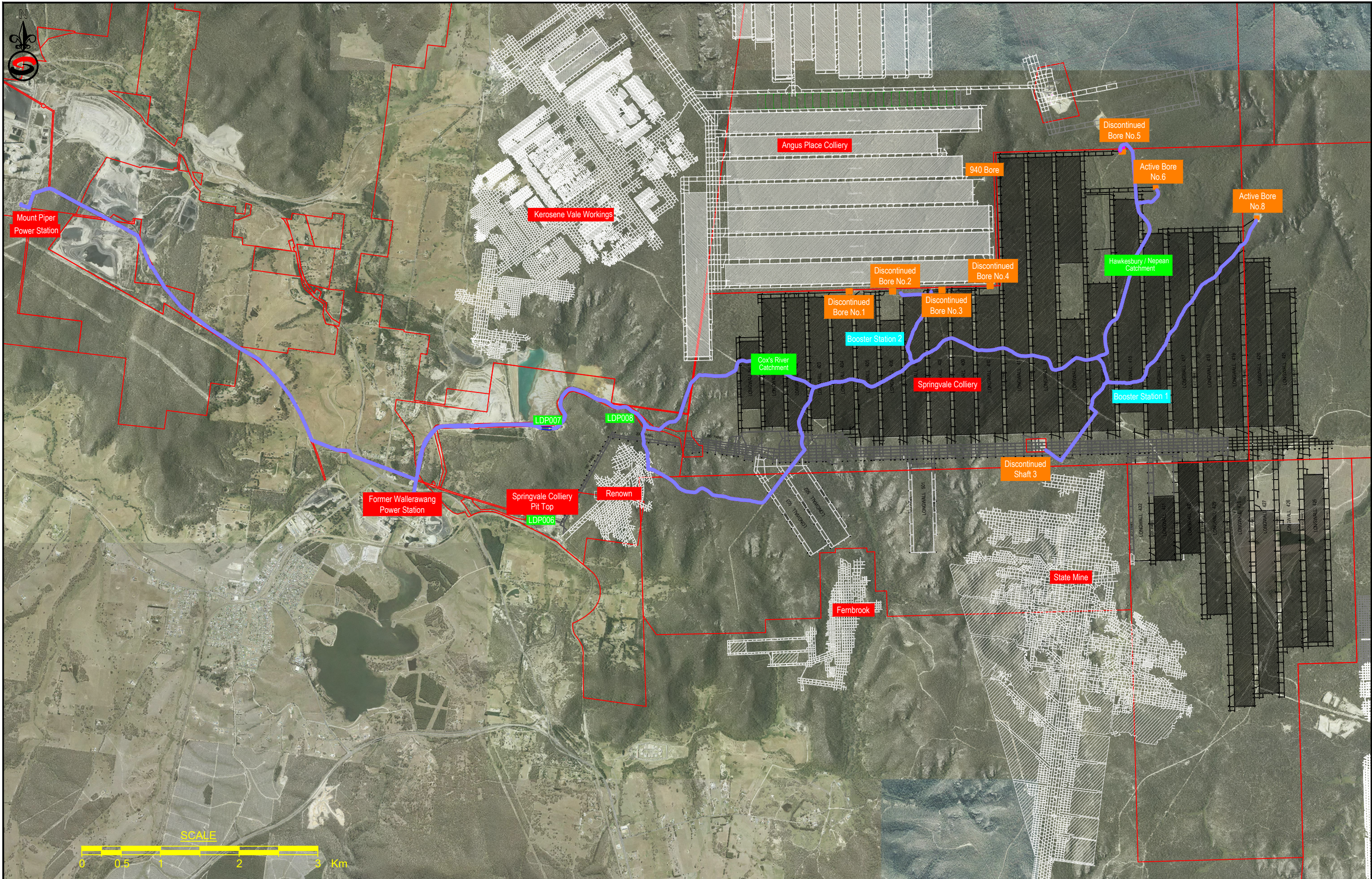
**CENTENNIAL
SPRINGVALE**

Plan No. SVY09236.8

A0H







LEGEND:

- Water Transfer Route
- Mining Lease
- Pumping Compound

NOTES:

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Annual Review 2025

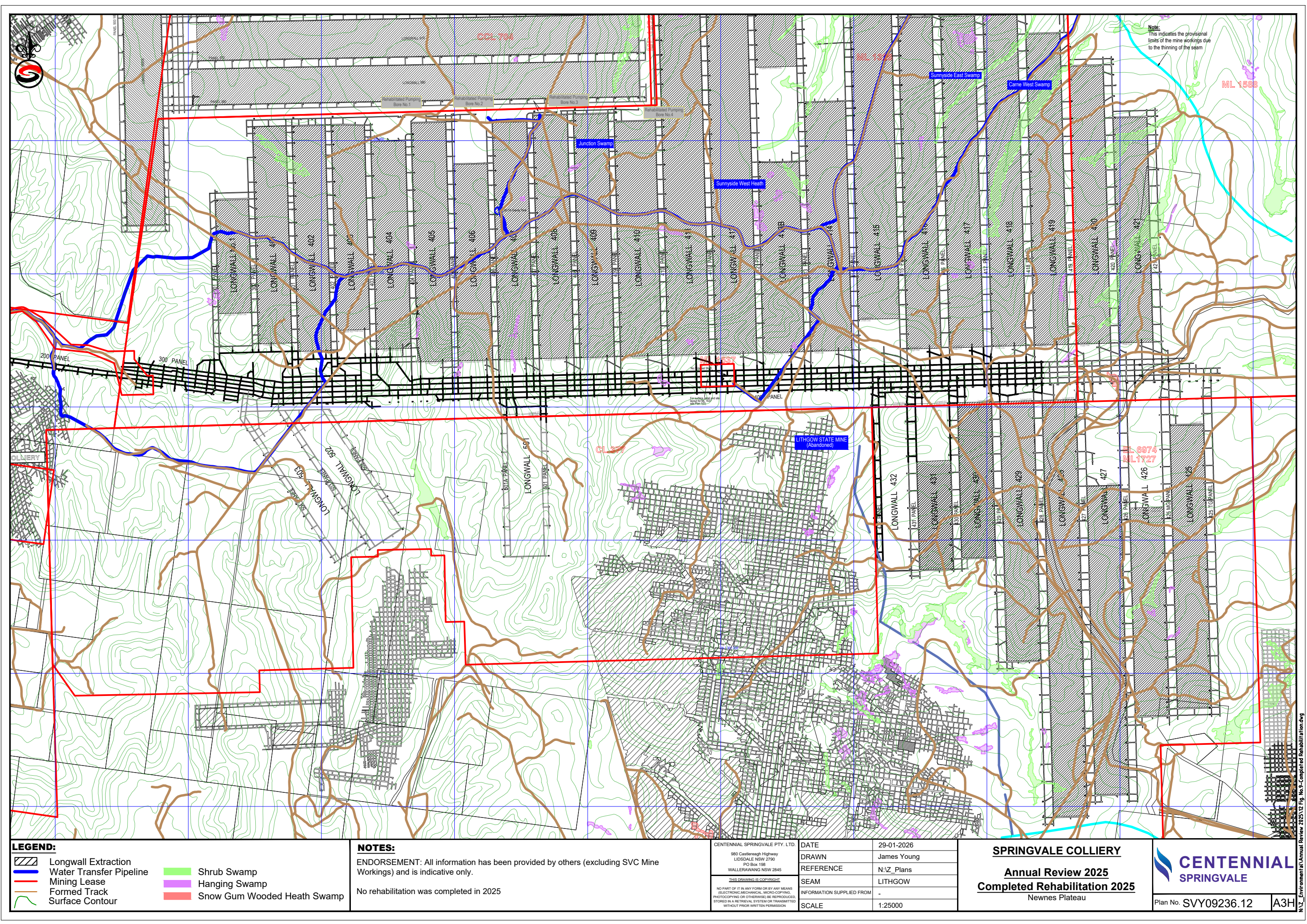
Water Transfer Route

To Mount Piper Power Station and LDPs.

**CENTENNIAL
SPRINGVALE**

Plan No. SVY09236.11

A3H



LEGEND:

	Longwall Extraction		Shrub Swamp
	Water Transfer Pipeline		Hanging Swamp
	Mining Lease		Snow Gum Wooded Heath Swamp
	Formed Track		
	Surface Contour		

NOTES:

ENDORSEMENT: All information has been provided by others (excluding SVC Mine Workings) and is indicative only.

No rehabilitation was completed in 2025

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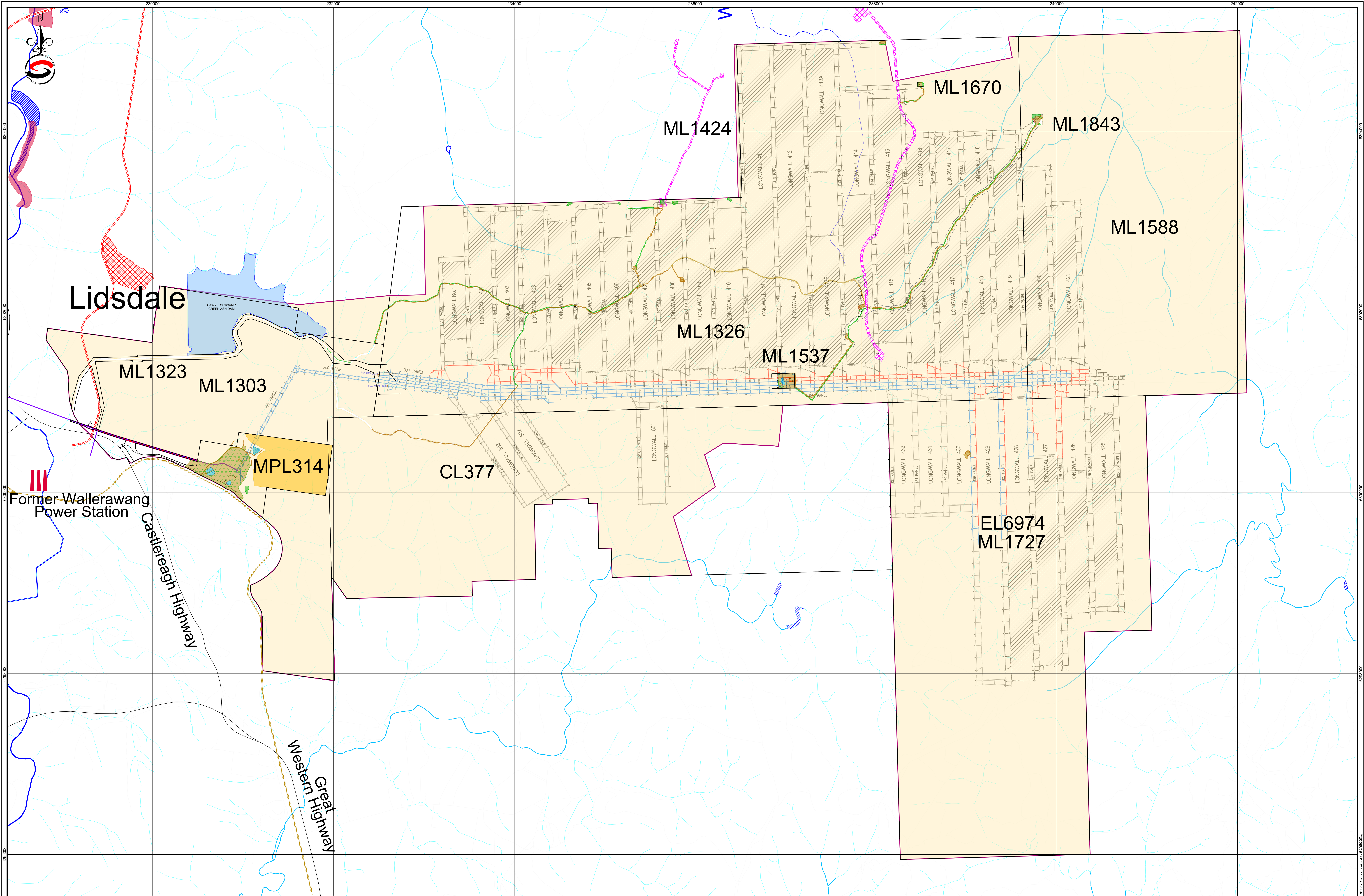
Annual Review 2025

Completed Rehabilitation 2025

Newnes Plateau

Plan No. SVY09236.12

A3H



LEGEND

Existing Springvale Colliery Workings

Existing Areas of Extraction

Proposed Springvale Colliery Development

Dams

Drainage Lines

Lake

Fence

Existing Springvale Colliery Workings

Existing Areas of Extraction

Proposed Springvale Colliery Development

Dams

Drainage Lines

Lake

Fence

Sawyers Creek Ash Dam

Primary Domains (Operational)

Domain 1 - Infrastructure

Domain 2 - Other Areas

Domain 3 - Water Management Area

Domain 4 - Conservation

Domain 5 - Rehabilitation Pasture

Domain 6 - Cox River Catchment

Secondary Domains (Post Mining)

Domain A - Infrastructure

Domain B - Water Management Area

Domain C - Rehabilitation Woodland

Final Void

Conservation and Biodiversity Offset Area

Rehabilitation Phase

Phase 1 - Decommissioning

Phase 2 - Landform Establishment

Phase 3 - Growth Medium Development

Phase 4 - Ecosystem and Land Use Establishment

Phase 5 - Ecosystem and Land Use Sustainability

Phase 6 - Relinquished Lands

Adjoining Centennial Site Domains

Angus Place Plateau Domain Extent

Angus Place Domain Extent

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LIDSDALE NSW 2390

PO Box 198

WALLERAWANG NSW 2645

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SPRINGVALE COLLIERY

Annual Review 2025

Mine Domains at MOP Commencement

CENTENNIAL

SPRINGVALE

DRG. No. SVY09236.13

A0

APPENDICES

Appendix 1: Checklist of Annual Review Reporting Requirements

This appendix provides a checklist of reporting requirements and performance conditions addressed within the Annual Review, including:

- **Table A1-1** provides a checklist of reporting requirements and performance conditions addressed within the Annual Review; and
- **Table A1-2** provides other Annual Review requirements outlined in the Project Approvals.

Table A1-1: Project Approval Annual Review Requirements

Approval	Requirement	Annual Review Section
Development Consent SSD5594, Schedule 6, Condition 12.	By the end of March each year, or as otherwise agreed by the Secretary, the Applicant shall review the environmental performance of the development to the satisfaction of the Secretary. This review must:	Noted
	(a) describe the development (including any rehabilitation) that was carried out in the past calendar year, and the development that is proposed to be carried out over the current calendar year;	Section 8
	(b) include a comprehensive review of the monitoring results and complaints records of the development over the past calendar year, which includes a comparison of these results against the: i. relevant statutory requirements, limits or performance measures/criteria. ii. requirements of any plan or program required under this consent; iii. monitoring results of previous years; and relevant predictions in the EIS;	Sections 6 & 7
	(c) identify any non-compliance over the past calendar year, and describe what actions were (or are being) taken to ensure compliance;	Sections 1 & 11
	(d) identify any trends in the monitoring data over the life of the development;	Sections 6 & 7
	(e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and	Sections 6 & 7
	(f) describe what measures will be implemented over the current calendar year to improve the environmental performance of the development.	Section 6

Table A1-2: Other Annual Reporting Requirements

Approval	Requirement	Annual Review Section
LW 419 Extraction Plan	Annual Review The Annual Review is completed in accordance with the post-approval requirements for State significant mining developments Annual Review Guidelines (2015) as required by the Department of Planning and Environment, incorporating the reporting requirements of the Department of Resources and Energy. The Annual Review will include information on operational activities, environmental performance and non-conformances and complaints received. This report is made available on the Centennial Coal website.	Section 4, 6, 7, 8 and 11
LW420-422 Extraction Plan		
LW424 – 427 Extraction Plan		
LW 428 – 432 Extraction Plan		

Appendix 2: Water Monitoring Results and Trends

Appendix 1: Discharge Water Monitoring Results and Trends

This Appendix presents a summary of discharge water monitoring results for the 2025 Reporting Period, required by Water Management Plan approved under SSD5594

- **LDP006** (primary discharge point)
- LDP007 – *Nil discharges in 2025*
- LDP008 – *Nil discharges in 2025*
- Analytes with performance criteria prescribed within the WMP and EPL3607 are presented graphically in **Figures 2A.1 – 2A.4**.
- **Table 7.4 in Section 7** of the Annual Review main report provides a summary of water quality analytes required to be monitored by the WMP and EPL3607.

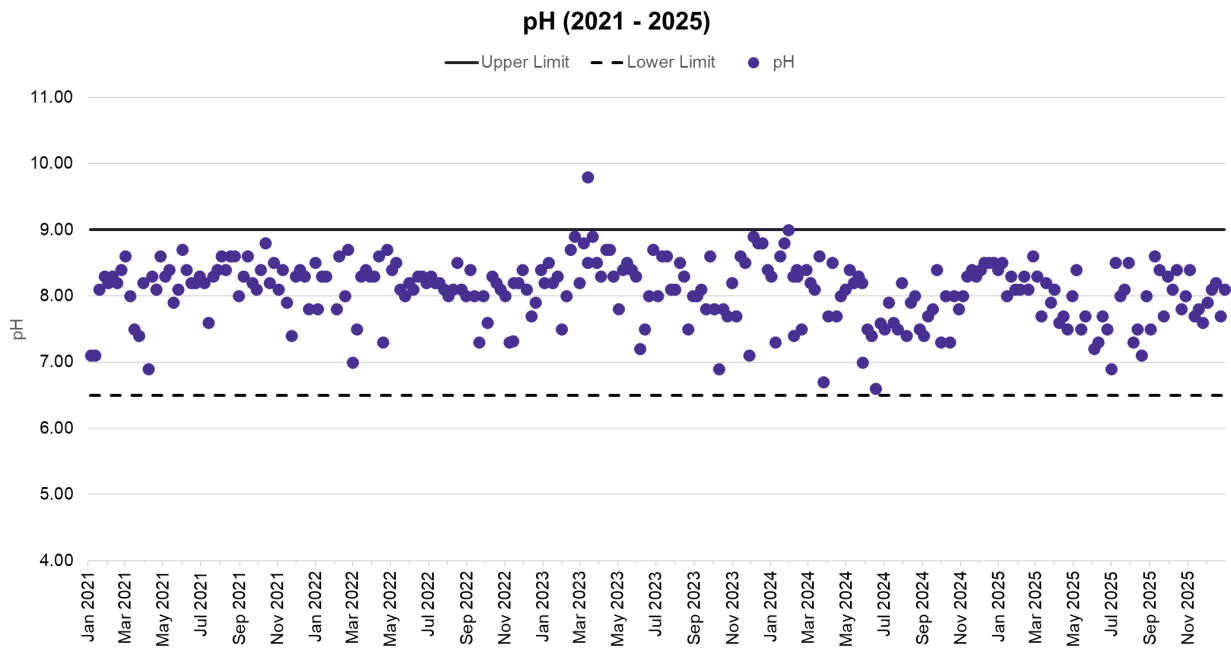


Figure 2A.1 LDP006 pH

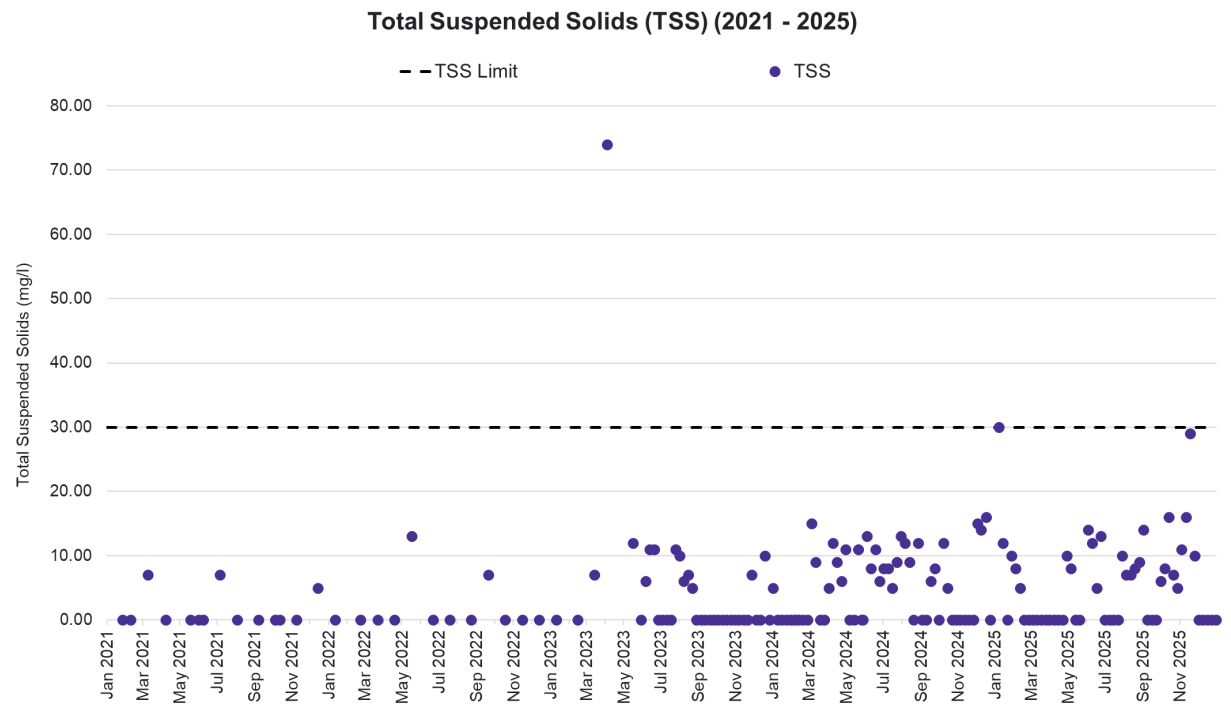


Figure 2A.2 LDP006 Total Suspended Solids

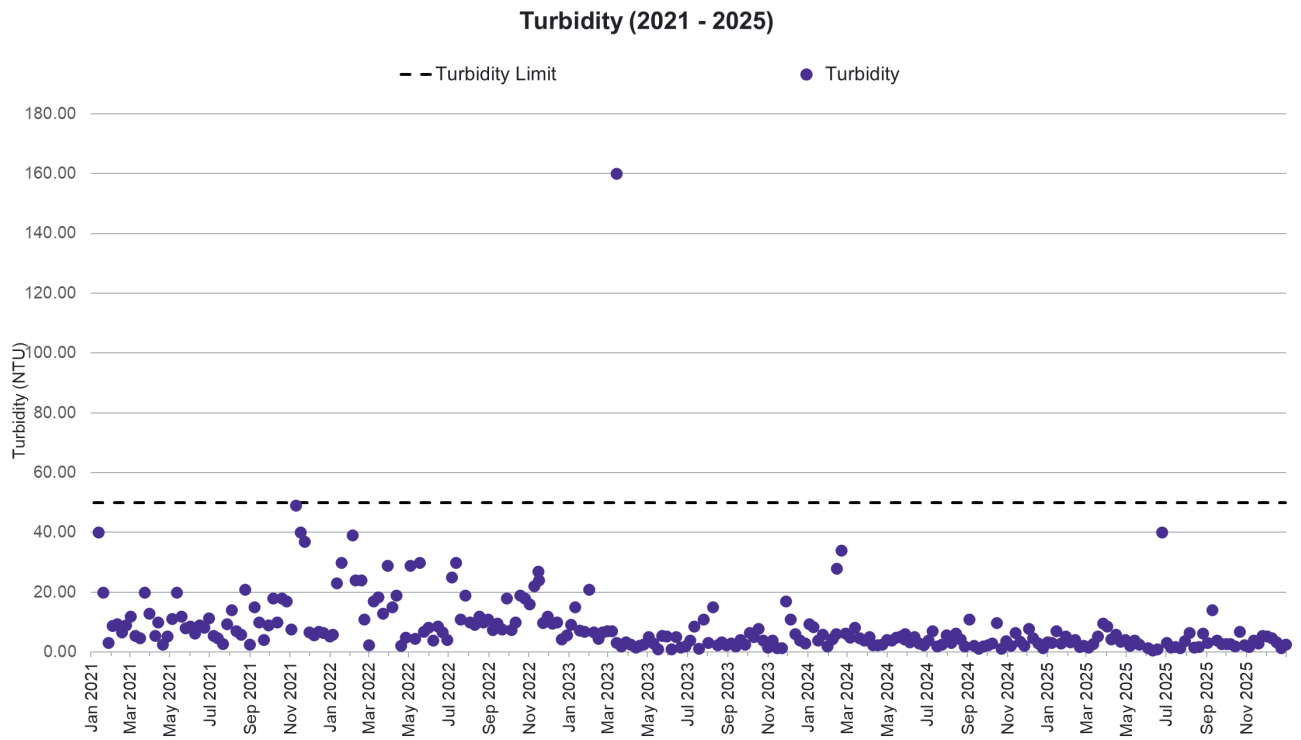


Figure 2A.3 LDP006 Turbidity

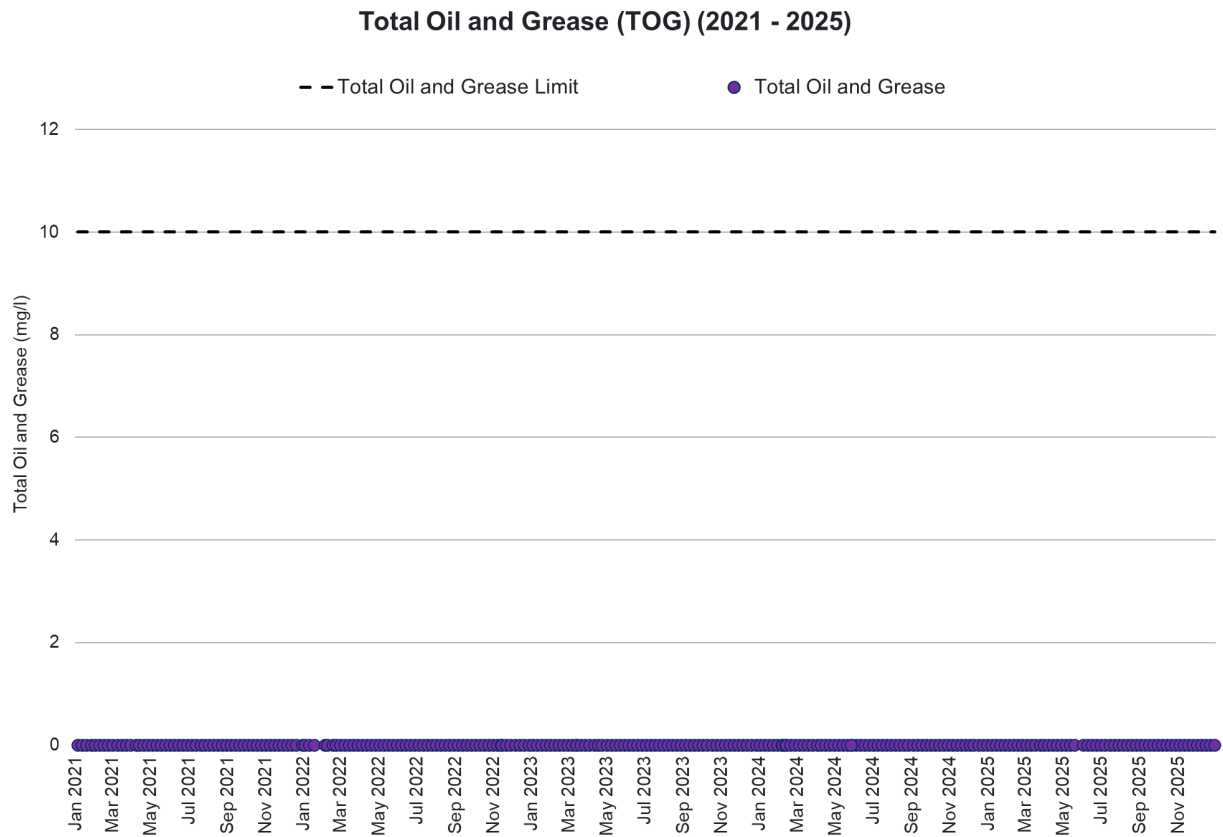


Figure 2A.4. LDP006 Total Oil and Grease

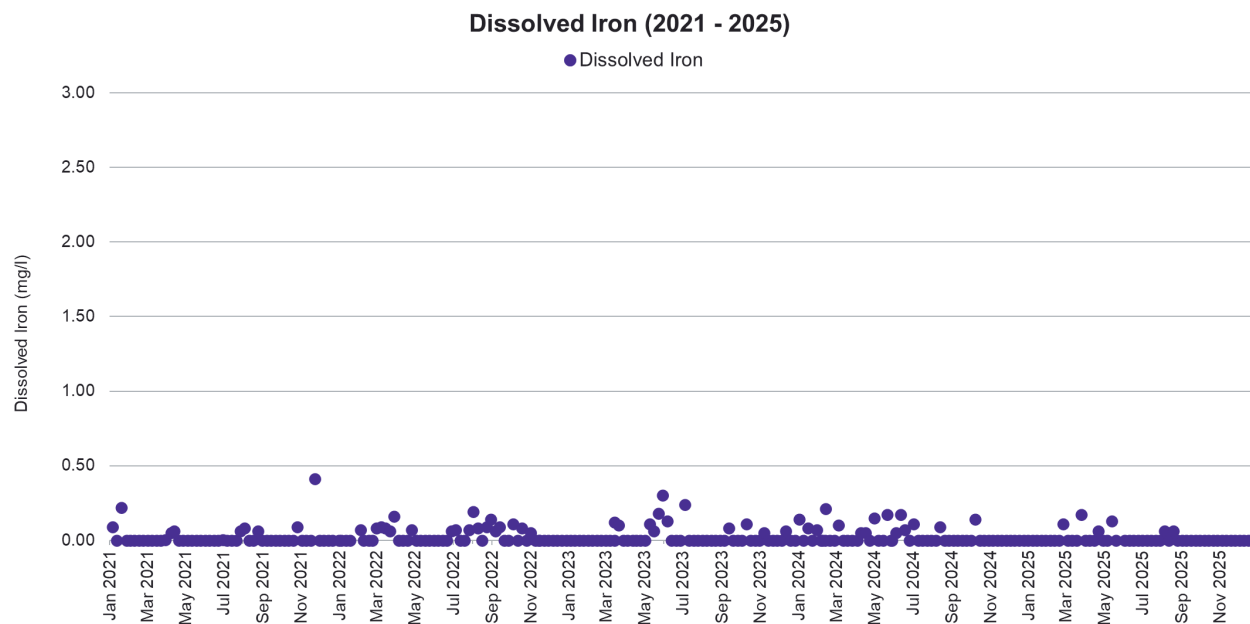


Figure 2A.5 LDP006 Dissolved Iron

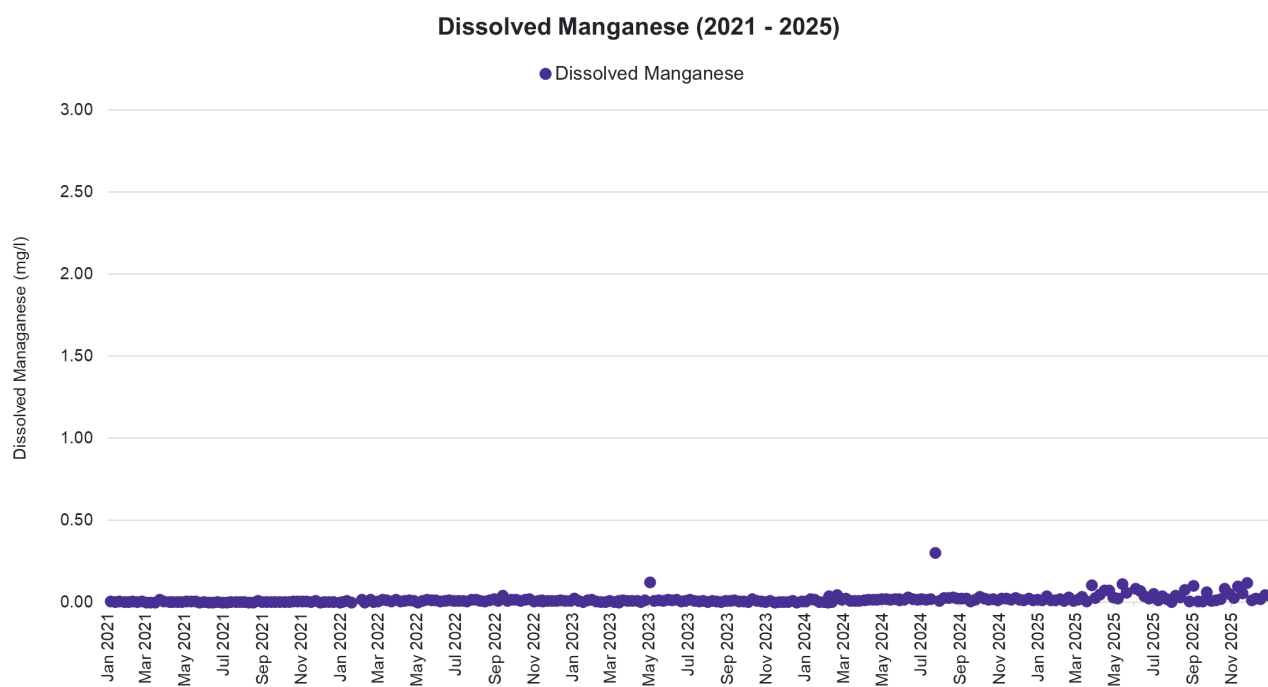


Figure 2A.6 LDP006 Dissolved Manganese

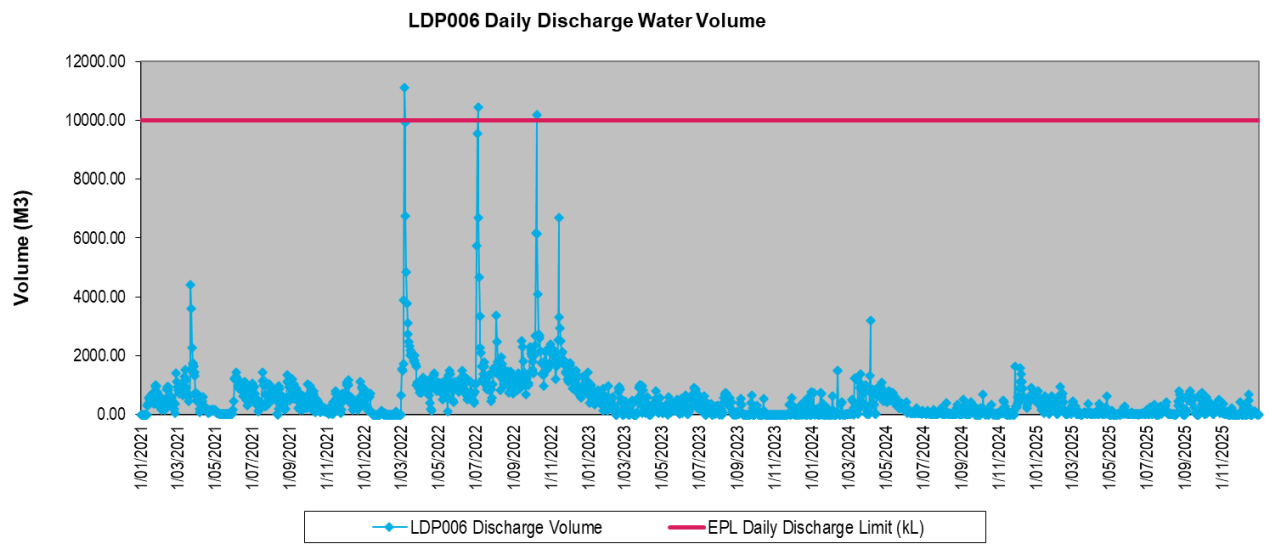


Figure 2A.7 LDP006 Daily Flow

Table 2A.1 RARC Stream Heath Assessment Classification Trends

Site	RARC Stream Heath Assessment Classification				Description of Trend
	2022	2023	2024	2025	
Marrangaroo Creek					
MC01	Good	Good	Good	Good	Static since 2022
MC02	Excellent	Excellent	Excellent	Excellent	Static since 2022
MC03	Excellent	Excellent	Excellent	Excellent	Static since 2022
MC04	Excellent	Excellent	Excellent	Excellent	Static since 2022
MC05	Excellent	Excellent	Excellent	Excellent	Static since 2022
Carne Creek					
CC01	Excellent	Excellent	Good	Good	Reduction in natives' regeneration
CC02	Excellent	Excellent	Excellent	Excellent	Static since 2022
CC03	Excellent	Excellent	Excellent	Excellent	Static since 2022
CC04	Excellent	Excellent	Good	Good	Less groundcover
CC05	Excellent	Excellent	Excellent	Excellent	Static since 2022
CC06	Excellent	Excellent	Good	Good	Less understorey cover
CC07	Excellent	Excellent	Excellent	Excellent	Static since 2022
CC08	Excellent	Excellent	Excellent	Excellent	Static since 2022
CC09	Excellent	Excellent	Good	Excellent	Greater quantity of vegetative debris, native understorey regeneration and growth of tussock grasses
Springvale Creek					
SC01	Very Poor	Very Poor	Very Poor	Very Poor	Static since 2022
Bungleboori Creek					
BC01	Very Poor	Very Poor	Very Poor	Very Poor	Static since 2022
BC02	Very Poor	Very Poor	Very Poor	Very Poor	Static since 2022
BC03	Average	Average	Good	Good	Upstream transect shows improved cover
BC04	Excellent	Excellent	Excellent	Excellent	Static since 2022
BC05	Excellent	Good	Good	Good	Static since 2023
BC06	Excellent	Good	Good	Good	Static since 2023

Table 2A.2 CSIRO Ephemeral Stream Assessment Classification Trends

Site	CSIRO Ephemeral Stream Assessment Classification				Description of Trend
	2022	2023	2024	2025	
Marrangaroo Creek					
MC01	Very Stable	Very Stable	Very Stable	Very Stable	Steady since 2022
MC02	Very Stable	Very Stable	Very Stable	Very Stable	Steady since 2022
MC03	Very Stable	Very Stable	Very Stable	Very Stable	Steady since 2022
MC04	Stable	Stable	Stable	Stable	Steady since 2022
MC05	Potentially Stabilising	Potentially Stabilising	Potentially Stabilising	Potentially Stabilising	Steady since 2022
Carne Creek					
CC01	Very Stable	Stable	Stable	Stable	Generally steady since 2023
CC02	Very Stable	Stable	Stable	Stable	Generally steady since 2023
CC03	Very Stable	Stable	Stable	Stable	Generally steady since 2023
CC04	Potentially Stabilising	Active	Potentially Stabilising	Potentially Stabilising	Improved riparian cover to regulate lateral inflows
CC05	Potentially Stabilising	Potentially Stabilising	Stable	Stable	Improved riparian cover to regulate lateral inflows, greater vegetation cover on channel walls
CC06	Potentially Stabilising	Potentially Stabilising	Potentially Stabilising	Potentially Stabilising	Generally steady since 2022

Site	CSIRO Ephemeral Stream Assessment Classification				Description of Trend
	2022	2023	2024	2025	
CC07	Potentially Stabilising	Stable	Stable	Stable	Generally steady since 2023
CC08	Stable	Stable	Stable	Very Stable	Country rock visible on bed (armouring)
CC09	Very Stable	Very Stable	Very Stable	Very Stable	Generally steady since 2022
Springvale Creek					
SC01	Stable	Stable	Stable	Stable	Generally steady since 2022
Bungleboori Creek					
BC01	Very Stable	Very Stable	Very Stable	Very Stable	Generally steady since 2022
BC02	Stable	Stable	Stable	Stable	Generally steady since 2022
BC03	Stable	Very Stable	Very Stable	Very Stable	Less sediment exposed across channel than in 2022
BC04	Very Stable	Very Stable	Very Stable	Very Stable	Generally steady since 2022
BC05	Very Stable	Very Stable	Very Stable	Very Stable	Generally steady since 2022
BC06	Very Stable	Very Stable	Stable	Stable	Generally steady since 2022

Appendix 3: Air Quality Monitoring Results

Appendix 3: Air Quality Monitoring Results

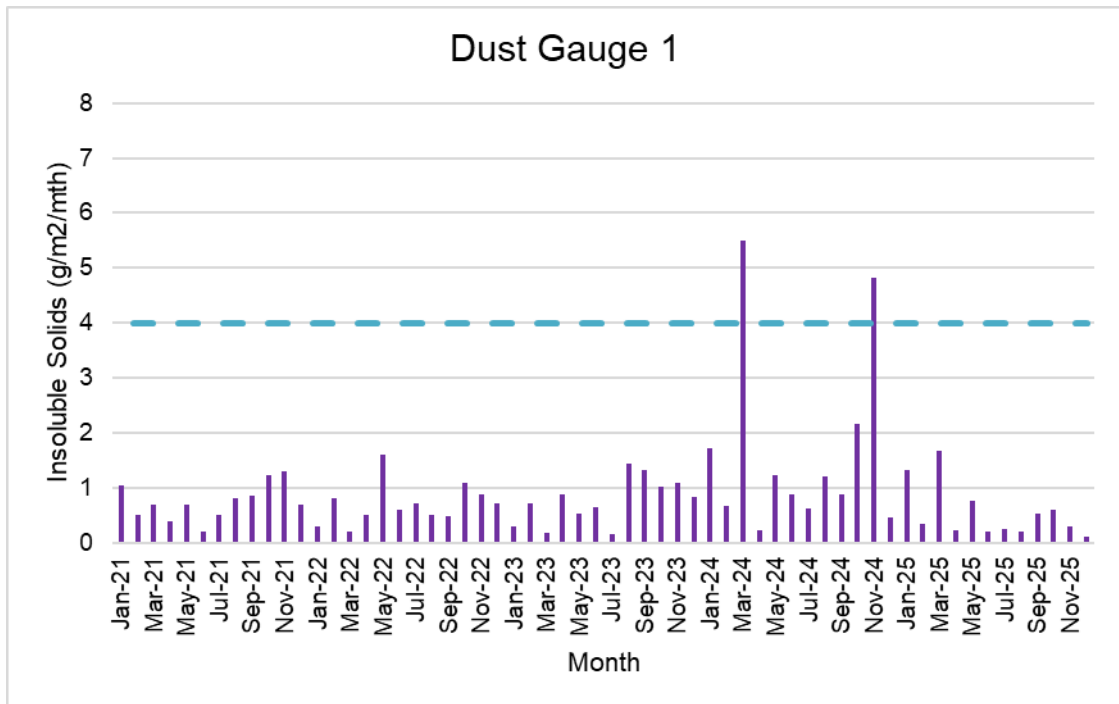


Figure 3A.1 Deposited Dust Gauge 1

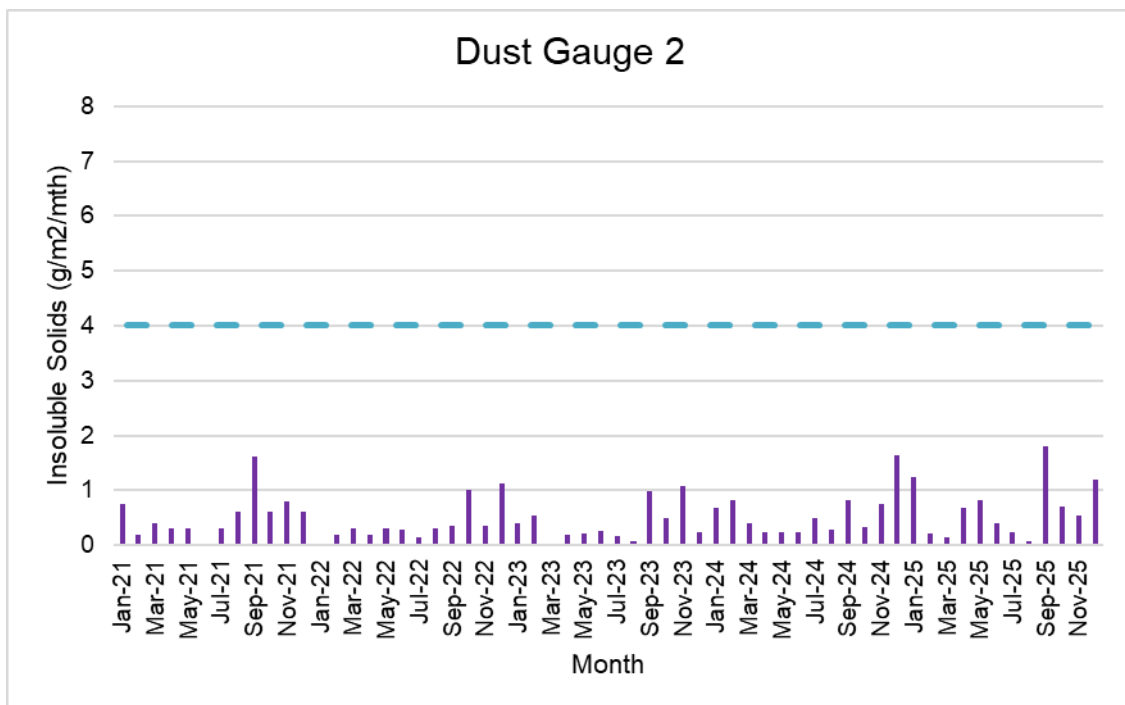


Figure 3A.2 Deposited Dust Gauge 2

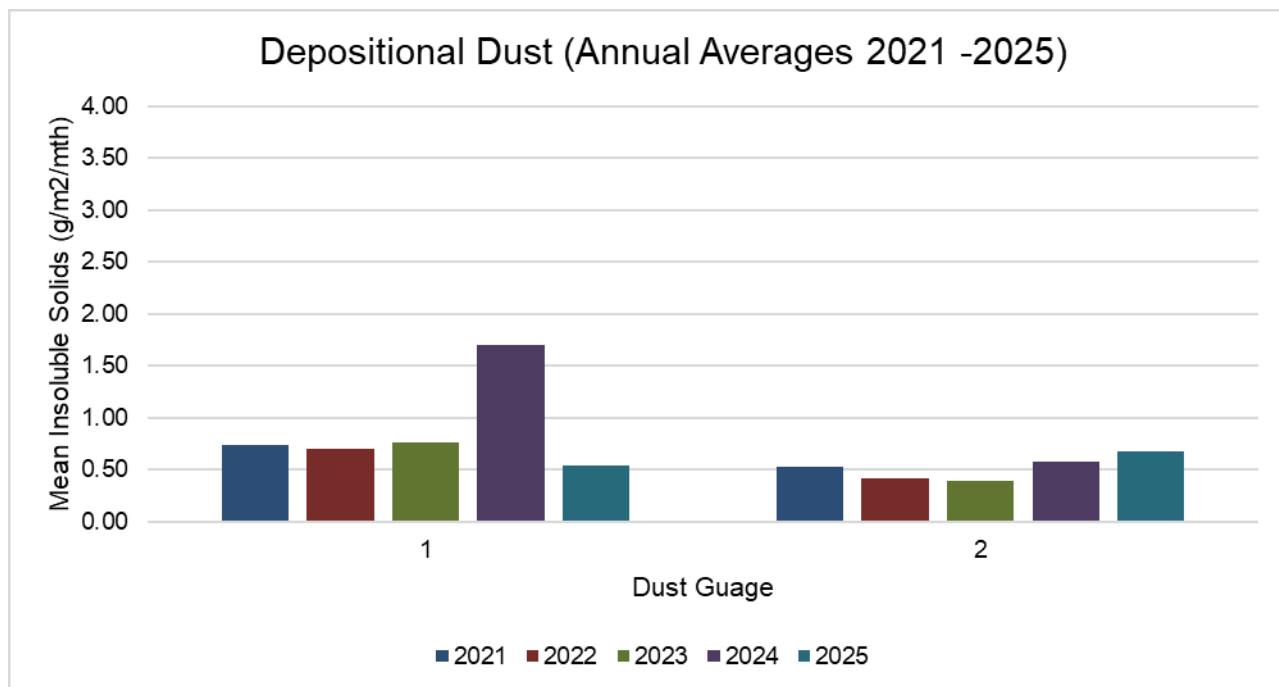


Figure 3A.3 Annual Averages

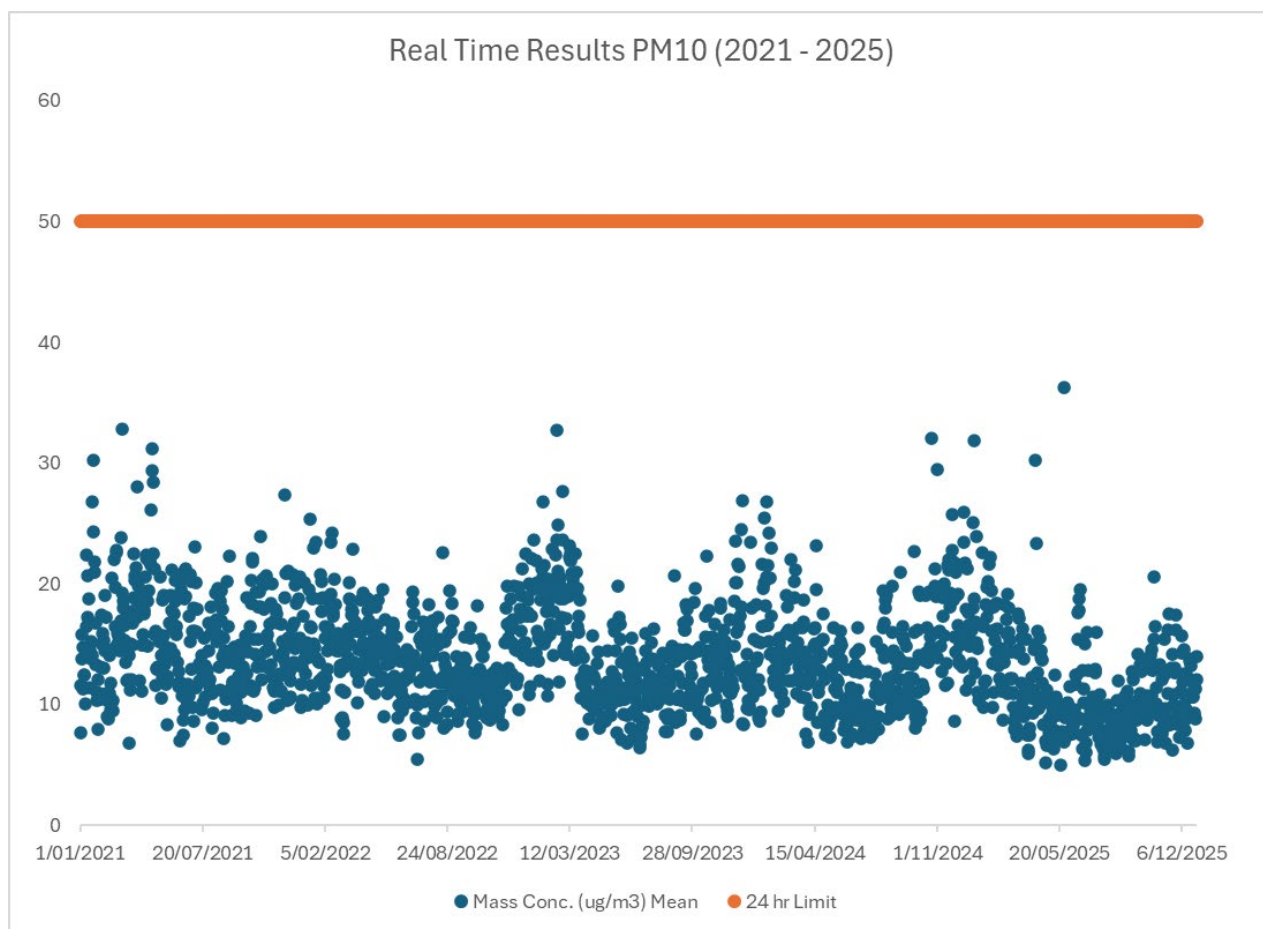


Figure 3A.4 Real Time Monitoring – 24hr Average PM10

Appendix 4: Annual Environmental Monitoring Review – Surface and Groundwater

Springvale Groundwater Monitoring

Annual Review 2025

Prepared for Springvale Coal Pty Limited

March 2026

Springvale Groundwater Monitoring

Annual Review 2025

Springvale Coal Pty Limited

E231268SV RP5

March 2026

Version	Date	Prepared by	Reviewed by	Comments
1	11 March 2026	Dan Irwin	Jonathon Tait	Draft
2	26 March 2026	Dan Irwin Jonathon Tait	Kate Holder	Final

Approved by

K Holder

Kate Holder

Associate Director - Hydrogeology

26 March 2026

Level 10 201 Pacific Highway

St Leonards NSW 2065

ABN: 28 141 736 558

This report has been prepared in accordance with the brief provided by Springvale Coal Pty Limited and, in its preparation, EMM has relied upon the information collected at the times and under the conditions specified in this report. All findings, conclusions or recommendations contained in this report are based on those aforementioned circumstances. This report is to only be used for the purpose for which it has been provided. Except as permitted by the Copyright Act 1968 (Cth) and only to the extent incapable of exclusion, any other use (including use or reproduction of this report for resale or other commercial purposes) is prohibited without EMM's prior written consent. Except where expressly agreed to by EMM in writing, and to the extent permitted by law, EMM will have no liability (and assumes no duty of care) to any person in relation to this document, other than to Springvale Coal Pty Limited (and subject to the terms of EMM's agreement with Springvale Coal Pty Limited).

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ABN: 28 141 736 558

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1 Introduction

1.1 Background

Springvale Colliery (Springvale) is an operational underground coal mine located approximately 15 kilometres (km) north-west of Lithgow. Underground coal mining commenced at Springvale in 1995 under development consent (DA 11/92 which was granted on 27 July 1992. A subsequent development consent (SSD-5594) was granted on 21 September 2015 permitting operations to continue until 2028. Current mining operations are regulated and managed under the Extraction Plan for Longwalls 428 to 432 (Centennial Coal 2021). Springvale Coal Pty Ltd (Springvale Coal) operate Springvale.

This annual review covers the reporting period from 1 January to 31 December 2025 and focuses on the monitoring requirements outlined in the Longwall (LW) 415 to 432 Water Management Plan (WMP) (Centennial Coal, 2022a) and LW415 to 432 Swamp Monitoring Program (SMP) (Centennial Coal, 2022b). The WMP outlines Springvale Coal's approach to managing and monitoring shallow and deep groundwater systems, while the SMP addresses perched groundwater systems, swamp systems and surface water features in and around Springvale.

The SMP and WMP outline the monitoring programs that have been implemented to monitor and assess potential impacts from underground mining on the groundwater regime, and in particular the Newnes Plateau Shrub Swamps (NPSS) and Newnes Plateau Hanging Swamps (NPHS). The NPSS and NPHS are listed as Endangered Ecological Community (EEC) under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). The monitoring program includes groundwater monitoring locations above both Springvale and Angus Place Colliery.

1.2 Purpose of this report

This annual review complies with requirements specified in the WMP and SMP and summarises important surface water and groundwater observations or trends that occurred during the reporting period. The annual review provides a summary of trigger exceedances and the outcomes of any trigger investigations that occurred during the reporting period.

1.3 Impact sites

Groundwater piezometers within the LW 428 to LW432 impact area are summarised in Table 1.1.

Table 1.1 Piezometers within the LW428 to 432 impact area

Piezometer type	Impact piezometers
Swamp	MS1, MS2, MS3, LCS1, LCS2, LCN1 and LC1
Hanging swamp	WBHS1, WBHS2, WBHS3, WBHS4, LMHS1, MEXX01 and MWH51
Perched aquifer	SPR1607, SPR1613S, SPR1613D, SPR1808R, LCY2101, PLM2101, PLM2102, WB3210, WB32102, WB32103 WB12101 and WB12102
Shallow aquifer	SPR1108, SPR1210R, SPR1301, SPR1301R, SPR1806, SPR1807, SPR1808 and SPR2301
Deep aquifer (vibrating wire piezometer (VWP))	SPR37, SPR38, SPR64, SPR2303B, SPR1210 and SPR1302

1.4 Mining progress

During 2025, Springvale advanced LW 429, 430, and 431. Table 1.2 summarises the longwall progression in 2025. Appendix A details the historical long wall mining progression at Springvale.

Table 1.2 Longwall mining progression in 2025

Month in 2025	Longwall progression		
	429	430	431
January	Completed on 12 January	-	-
February	-	-	-
March	-	Active from 1 March	-
April	-	Active	-
May	-	Active	-
June	-	Active	-
July	-	Active	-
August	-	Completed on 6 August	-
September	-	-	Active from 20 September
October	-	-	Active
November	-	-	Active
December	-	-	Active

2 Existing environment

2.1 Rainfall

Daily rainfall data is obtained from two primary sources: the Australian Laboratory Services Pty Ltd (ALS) Newnes Plateau Prison Farm Rain Gauge (NPPF) and the Bureau of Meteorology (BoM) weather station at Maddox Lane, Lidsdale (Station No. 063132). A summary of the rainfall data over the reporting period is provided in Table 2.1. A comparative analysis of the two weather stations is included below due to the varying weather patterns occurring across the region, influenced by topography.

The rainfall recorded at the NPPF and Lidsdale gauges showed comparable patterns. Generally higher rainfall occurs in the summer months, while lower rainfall occurs over winter. The NPPF gauge generally records more rainfall than the Lidsdale gauge.

During the monitoring period, the monthly summary observed above average rainfall in January, April, May, July, and August. Rainfall was notably greater than the monthly average at the NPPF gauge in May, July and August; exceeding the average by 86.8 millimetres (mm), 62.8 mm, and 81.2 mm, respectively. Both gauges recorded below average monthly rainfall in February, March, June, October, November and December. The annual rainfall totals were below the long-term averages, resulting in a slightly drier-than-average year overall (Table 2.1 and Figure 2.1).

Daily Cumulative Rainfall Deviation (CRD) was calculated using the NPPF, data from 1998 to present. The average daily rainfall was identified for each month over the data range; it was used to calculate daily deviations in rainfall followed by the cumulative deviation. The daily CRD identifies long-term rainfall trends. A positive CRD trend relates to above average rainfall conditions, while a negative CRD trend shows below average rainfall conditions. Figure 2.2 presents the daily CRD and daily rainfall for the period 1 January 2018 to 31 December 2025.

The CRD trend shows:

- below average rainfall from January 2018 to February 2020
- average rainfall from February 2020 to August 2021
- above average rainfall from August 2021 to November 2022
- below average rainfall from November 2022 to November 2023
- above average rainfall from November 2023 to May 2024
- below average rainfall from May 2024 to April 2025
- above average conditions from April 2025 to August 2025
- below average rainfall from August 2025 to December 2025.

Table 2.1 **Monthly rainfall summary**

Month	Rainfall during the monitoring period (mm)		Long-term average rainfall (mm)	
	Newnes Plateau Prison Farm	Lidsdale (BoM station 063132)	Newnes Plateau Prison Farm ¹	Lidsdale (BoM station 063132) ²
January	110.6	96.8	90.2	86.7
February	62.6	56.2	113.8	76.3
March	75.4	36.8	113.3	69.9
April	72.4	51	63.9	44.5
May	131	55.8	44.2	47.3
June	26.6	27	67.3	48.8
July	124.4	65.2	61.6	51.0
August	140.6	80.2	59.4	63.2
September	50.6	52.8	56.6	53.1
October	28.4	18.4	75.3	66.0
November	40	32.6	95.2	75.1
December	46.8	43.8	83.6	72.8
Total	909.4	616.6	924.4	754.7

Notes: 1. 16 August 1998 to 31 December 2025.
 2. 1 August 1959 to 31 December 2025.

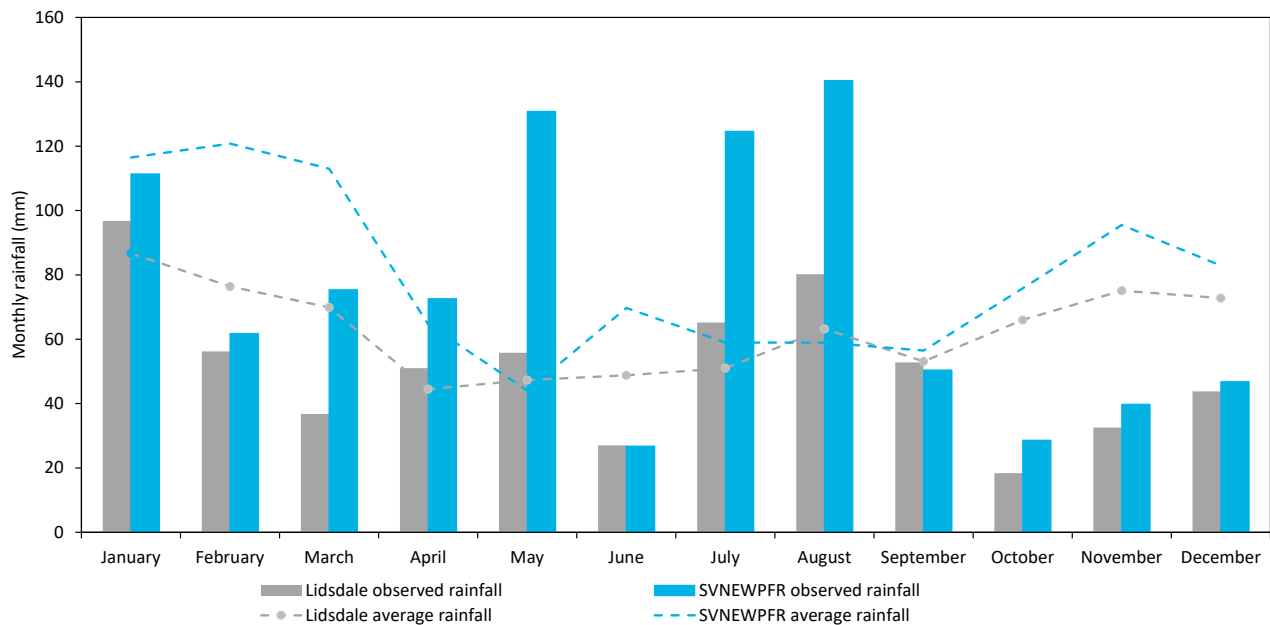


Figure 2.1 **Total month rainfall comparison from Newnes Plateau Prison Farm and Lidsdale against long term averages**

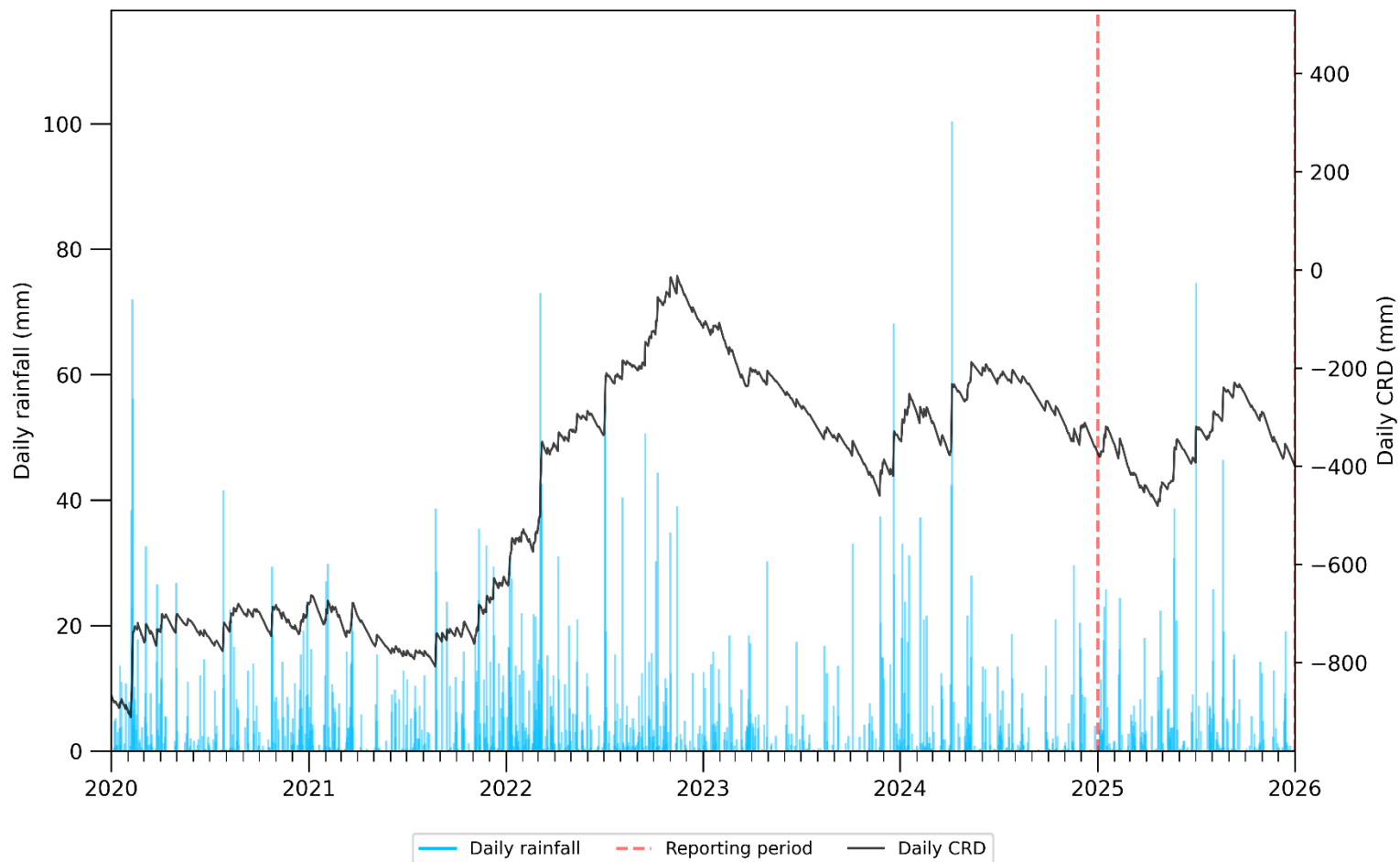


Figure 2.2 Daily CRD from the daily rainfall mean – August 1998 to December 2025

2.2 Hydrology

Springvale is situated within the Cocks River and Wolgan River catchments, both of which are part of the greater Hawkesbury-Nepean River catchment. The Cocks River catchment is bounded by the Great Dividing Range to the west, upper Colo River to the north, and Wollondilly River catchment to the south. The Cocks River rises within the Gardens of Stone Conservation Area to the north of Springvale and flows generally in a south-east direction into Lake Burragorang (impounded by Warragamba Dam), which is the primary reservoir for drinking water supply to Sydney. The Wolgan River flows north off the Newnes Plateau into the Wolgan Valley to join the Capertee River in Wollemi National Park to the east of Springvale.

Watercourses off the Newnes Plateau are often deeply incised in their lower reaches, incorporating numerous cliff lines and pagodas bordering the valley flanks. In the upper catchment areas, drainage lines are typically poorly defined to non-existent with overland sheet flow being the typical mode of drainage during rainfall events. Watercourses in this area are typically ephemeral, noting there are periods of persistent flow.

2.3 Hydrogeology

The hydrogeological complexities at Springvale have been well investigated over time. The groundwater systems interacting with Springvale have been conceptualised, and are divided into three distinct aquifers (McHugh, 2018):

- perched groundwater system, predominantly sandstone aquifers between several claystone, siltstone and clayey sandstone aquiclude units, ranging from unconfined to semi-confined
- shallow groundwater system, predominantly regional sandstone aquifers, ranging from unconfined to semi-confined
- deep groundwater system, which is confined at Springvale and surrounds and includes the Katoomba and Lithgow Coal seams.

2.3.1 Perched aquifer – Burralow Formation

The perched aquifer is located within the Burralow Formation (Triassic Narrabeen Group). The Burralow Formation comprises multiple discontinuous perched sandstone aquifers that act as localised flow bands that are recharged by infiltration of rainfall.

Seven distinct fine-grained claystone and siltstone units (YS1 to YS6, including YS5a) function as semi permeable layers. The basal unit within the Burralow Formation is YS6. These layers limit the infiltration of rainfall to the shallow aquifer associated with the underlying Banks Wall Sandstone (McHugh 2018). These hydrogeological units are also known as AQ6 (sandstone aquifers above YS4) and AQ5 (sandstone aquifers below YS4 and to YS6). For clarity, this system has been summarised in Table 2.2.

Groundwater flow within the perched aquifer occurs primarily through fractures, bedding planes, and the contact zones between sandstone aquifers and YS plies. Discharge from the groundwater system primarily occurs in incised gullies where YS plies outcrop and sub-crop.

The NPSS and NPHS make up the federally listed Temperate Highland Peat Swamps on Sandstone (THPSS) Endangered Ecological Community (EEC) under the EPBC Act. These swamps coincide with the lithographic and topographic occurrence of YS plies in the Burralow Formation (McHugh 2018).

Table 2.2 **Perched aquifer groundwater system**

Aquifer	Formation	Ply	Hydrostratigraphic unit
Perched	Burralow Formation	YS1, YS2, YS3, YS4	AQ6
		YS5, YS5a, YS6	AQ5

2.3.2 Shallow aquifer – Banks Wall Sandstone

The Banks Wall Sandstone shallow aquifer, also known as AQ4, is a regional groundwater system within the Banks Wall Sandstone (Triassic Narrabeen Group) and has a thickness of up to 100 metres (m) (McHugh 2018). This shallow aquifer is recharged by rainfall infiltration, leakage from overlying watercourses and downward leakage from the overlying Burralow Formation aquifer (where connected). Regional recharge is likely to occur in areas of outcrop and sub-crop to the west and south-west of the area (Jacobs 2019).

Groundwater flow in this system is primarily controlled by interconnective fracturing, bedding planes and structural features such as lineaments and faults, with some contribution from pore porosity (Jacobs 2019). Due to the low permeability of the rock matrix, the fracture system serves as the primary control of groundwater flow. Regionally, groundwater flows towards the north-east, consistent with the dip of the strata.

Local discharge is inferred to occur in incised gullies that intercept the watertable, with some NPSS and NPHS coinciding with this occurrence (McHugh 2014). Regional discharge is inferred to occur to the north-east, where the unit outcrops in the scarp of the Newnes Plateau.

The base of the shallow aquifer is marked by the Mount York Claystone (MYC). This unit comprises a sequence of sandstone, shale and claystone that form a semi-permeable layer which limits connectivity between the shallow and deep aquifers, acting as a confining layer.

2.3.3 Deep aquifer – Illawarra Coal measures

The deep aquifer occurs beneath the MYC and is associated with the Triassic Burra-moko Head Sandstone, Caley Formation and Permian Illawarra Coal Measures. This includes the Katoomba Seam, Farmers Creek Formation, Gap Sandstone, Denman Formation, Long Swamp Formation, Blackmans Flat Conglomerate, Lithgow Seam and Marrangaroo Conglomerate, collectively forming a system up to 200 m in thickness.

Hydrogeological units within this system are classified as follows:

- AQ3: Burra-moko Head Sandstone, Caley Formation and Katoomba Seam.
- AQ2: Farmers Creek Formation and Gap Sandstone.
- AQ1: Long Swamp Formation, Blackmans Flat Conglomerate, and Lithgow Seam.
- SP1: Denman Formation, acting as a semi-permeable layer.

Groundwater flow in the deep aquifer is primarily controlled by interconnective fracturing, bedding planes, cleated coal seams and structural features such as lineaments and faults. The low permeability of the rock matrix means the fracture system is the primary control of groundwater flow.

The general groundwater flow direction in the deep aquifer is towards the north-east, which is consistent with the dip of the strata. Regional recharge is thought to occur in areas of outcrop and sub-crop to the west and south-west of Springvale by rainfall infiltration, leakage from overlying watercourses, dams and minor leakage from the shallow aquifer. Groundwater discharge is inferred to occur to the north-east, where the units outcrop in the scarp of the plateau and through mine dewatering.

2.4 Surface water and groundwater interaction

The interaction between surface water and groundwater on the Newnes Plateau is primarily characterised by the recharge of the shallow groundwater system by surface water infiltration and through the discharge of groundwater to surface water systems (Jacobs, 2019).

Groundwater recharge occurs as surface water infiltrates into the shallow groundwater systems, primarily through leakage from overlying watercourses. Conversely, groundwater discharge contributes to surface water flow through seepages and drips from exposed cliff line faces or exposed bedrock in drainage lines, or as seepage from sub-cropping bedrock into regolith or residual soil profiles along valley flanks and valley floors (Jacobs, 2019).

In areas where sufficient seepage occurs, the development of NPHS or NPSS may be supported. Groundwater seepage may contribute to stream baseflow either directly as discharge to drainage lines in the valley floor, or indirectly as a contribution to catchment subsurface flow (Jacobs, 2019).

3 Monitoring program

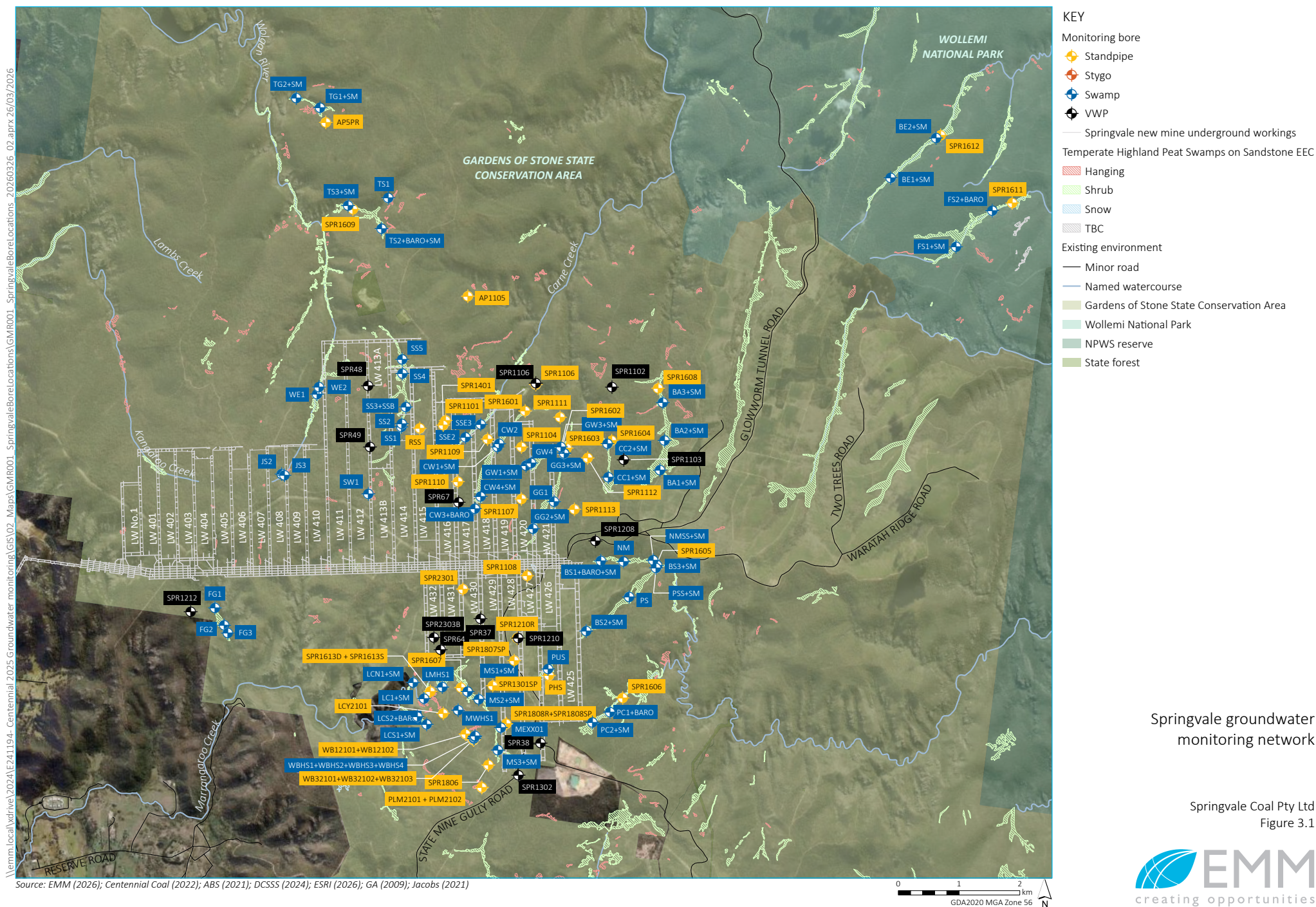
3.1 Overview

The groundwater monitoring program outlined in the WMP (Centennial, 2022a) and SMP (Centennial, 2022b) targets the NPSS and NPHS, as well as the perched, shallow and deep aquifers using standpipe piezometers, VWP and soil moisture loggers. The monitoring network at Springvale comprises the following:

- **NPSS monitoring:** Swamp standpipe piezometers (swamp piezometers) are installed in NPSS unconsolidated sediments, typically extending to refusal on bedrock. Groundwater levels are monitored at 22 NPSS sites with a total of 54 standpipe piezometers. Groundwater levels are recorded daily using groundwater level loggers which are downloaded monthly, with manual groundwater measurements taken concurrently.
- **NPHS monitoring:** Groundwater levels are monitored at three NPHS, with a total of seven standpipe piezometers (hanging swamp piezometers). Piezometers are installed to refusal on bedrock. Groundwater level loggers record groundwater levels daily and are downloaded monthly, with manual groundwater level measurements taken concurrently.
- **Perched groundwater system:** Monitoring of the perched groundwater system by 35 standpipe piezometers (perched aquifer piezometers) targeting aquifers in the Burralow Formation. Groundwater level loggers record groundwater levels daily and are downloaded monthly with manual groundwater level measurements taken concurrently.
- **Shallow groundwater system:** Monitoring of the shallow groundwater system by 13 standpipe piezometers (shallow aquifer piezometers). Groundwater level loggers record groundwater levels daily and are downloaded monthly with manual groundwater level measurements taken concurrently.
- **VWP monitoring:** Multi-level VWP arrays used to monitor piezometric pressures in the shallow and deep groundwater systems. VWP loggers are downloaded monthly at 12 locations. VWPs are used as a proxy for possible impacts to the shallow aquifer and swamp systems and to monitor for potential connective cracking to swamps and perched and shallow groundwater sources (above the MYC).
- **Soil moisture monitoring:** Daily measurement of soil moisture by 33 soil moisture loggers at 15 NPSS. Soil moisture loggers record daily and are downloaded monthly.
- **Groundwater quality monitoring:** Groundwater samples collected monthly for laboratory analysis at 22 swamp piezometers and quarterly at 16 shallow aquifer piezometers.
- **Mine inflow monitoring:** Bore 6 and Bore 8.
- **Surface water monitoring:** Measurement of surface water for water quality and flow at 11 locations on a fortnightly basis and monthly at an additional 16 locations.

The locations of the groundwater and surface water monitoring sites are shown on Figure 3.1 and Figure 3.2. Further details regarding monitoring frequencies for standpipe piezometers and VWPs are summarised in Appendix B.

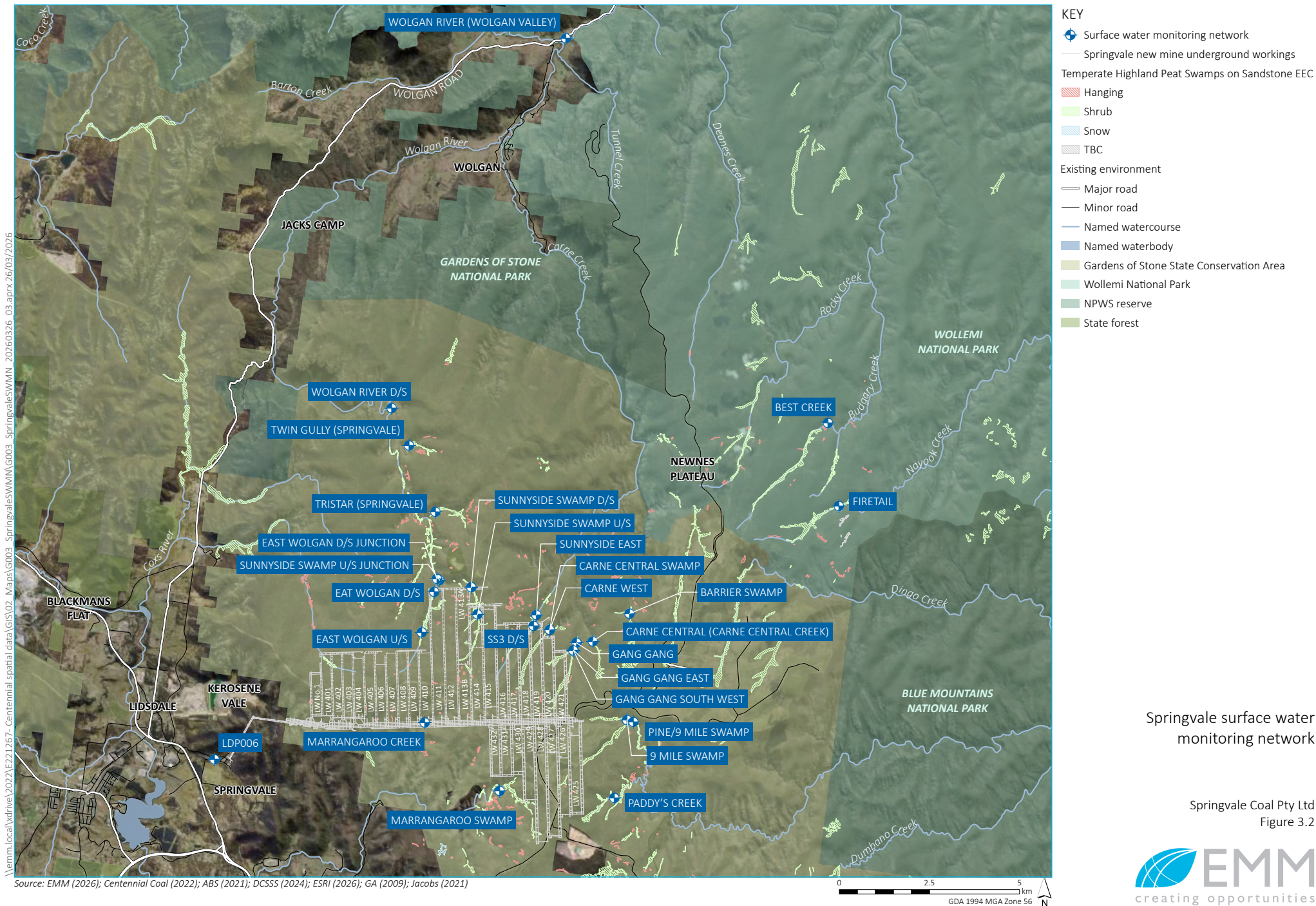
\\emm.local\drive\2024\1E241194- Centennial 2025 Groundwater monitoring\GIS\02_Maps\GMR001_SpringvaleBoreLocations_20260326_02.aprx 26/03/2026



Source: EMM (2026); Centennial Coal (2022); ABS (2021); DCSSS (2024); ESRI (2026); GA (2009); Jacobs (2021)

Springvale groundwater monitoring network

Springvale Coal Pty Ltd
Figure 3.1



Springvale surface water monitoring network

Springvale Coal Pty Ltd
Figure 3.2

3.2 Performance measurement

The WMP (Centennial, 2022a) and SMP (Centennial, 2022b) include details relating to surface water and groundwater trigger levels for swamp piezometers, standpipe piezometers, VWPs and surface water monitoring sites within the LW428 to 432 trigger investigation area (TIA). The TIA is defined as a 600 m buffer around the active longwall mining face.

There are two types of piezometers that form the basis of the SMP and WMP:

1. Piezometers at impact sites – located within the LW428 to 432 TIA.
2. Piezometers at control sites – located outside the LW428 to 432 TIA and distant from active mining. Control sites have similar climatic, geological, hydrogeological, hydrological and vegetative conditions to impact sites and are used to help discern natural and anthropogenic influences at impact sites.

When an impact piezometer falls within the TIA:

1. The pre-mining period of data collection ends and the pre-mining trigger level is established.
2. If an impact piezometer is within 2 km of an undermined significant lineament, the pre-mining period of data collection ends and pre-mining trigger levels are established. Affects from lineaments are difficult to establish, therefore only used if an impact piezometer is clearly affected by mining through a lineament.

Groundwater level data collected once an impact piezometer is located within the TIA or within 2 km of an intercepted significant lineament is referred to as post-mining data. Post-mining data from impact piezometers are compared against trigger levels derived from pre-mining data and trends observed at reference site piezometers to evaluate whether the groundwater system has been impacted by mining.

3.3 Trigger criteria

Performance triggers are used to identify exceedances in groundwater levels and quality that may be due to mining activity. The WMP (Centennial, 2022a) and SMP (Centennial, 2022b) includes surface and groundwater trigger levels for swamp piezometers, standpipe piezometers and surface water monitoring sites within the LW424 to 427 and LW428 to 432 TIA. Groundwater level triggers have not been developed for perched groundwater piezometers in the LW415 to 424 areas due to insufficient pre-mining baseline data.

The focus of this report is to assess annual changes against the established performance criteria, to identify potential impacts or trends in groundwater levels and quality. Conclusions are drawn through detailed investigation as specified in the WMP (Centennial, 2022a) and SMP (Centennial, 2022b). The trigger criteria outlined in the WMP (Centennial, 2022a) and SMP (Centennial, 2022b) are summarised in Table 3.1.

Table 3.1 Springvale management plan performance criteria

SMP short-term performance criteria		
Groundwater levels	Swamp piezometer	Trigger level is exceeded if the post-mining water level depth in any swamp piezometer is greater than the 95th percentile pre-mining water level depth for more than seven consecutive days.
	Perched aquifer piezometer	There is insufficient pre-mining baseline data to establish triggers for impact sites in the LW 415 to 424 areas.
Groundwater quality	Swamp piezometer	Trigger level is exceeded if electrical conductivity (EC) and pH is greater than the pre-mining 80th percentile by two standard deviations for more than two months. For the lower pH trigger, the same method is applied, but using the 20th percentile.
	Perched aquifer piezometer	There is insufficient pre-mining baseline data to establish triggers for impact sites.
Surface water	Swamp flow	If noticeable deviation from historical hydrograph trends is observed for more than three consecutive monitoring events, which cannot be explained by climate trends and is not replicated at a reference site, then the surface water flow trigger is considered breached.
	Swamp quality	If post-mining pH and EC values are greater than the pre-mining 80th percentile values (or 20th percentile for lower pH values) by two standard deviations for more than two consecutive months, the short-term change trigger is breached.
WMP performance criteria		
Groundwater levels	Shallow aquifer piezometers	Trigger level is exceeded if the groundwater level in the impact shallow aquifer piezometer is less than the pre-mining 5th percentile for more than one month.
	Vibrating wire piezometer	Trigger level is exceeded If the piezometric level in groundwater systems above the MYC shows a stepped decline in piezometric head of more than 5 m.
Groundwater quality	Shallow aquifer piezometers	If pH and EC values are greater than 80th percentile (or less than the 20th percentile for lower pH values) at a reference site (greatest value of all reference sites) for 3 consecutive monitoring events, the trigger is exceeded; otherwise use the following default trigger values: • pH <2.73 or >7.87 • EC >100 micro siemens per centimetre (µS/cm)

3.4 Observed trigger exceedances

Trigger exceedances identified during the reporting period are summarised in Table 3.2.

Table 3.2 Groundwater level trigger investigations during 2025

Monitoring ID	Type	Comment	Submitted to the Department?
MS1	Swamp piezometer	MS1 exceeded its groundwater level trigger between 22 December 2024 and 7 January 2025. The exceedance was not identified until the 13 January due to the Christmas/New Year public holiday period (i.e. business closure/shutdown) by which time the water level had recovered above the trigger level. Between March and May 2024, MS1 was within the LW429 TIA. No mining-related impacts were observed. At the time of the December 2024 exceedance, mining in LW429 was about 2 km north of MS1; MS1 is not positioned on a lineament therefore the TIA applies (see Section 3.2). The trend was closely monitored following the initial event. While water levels briefly fell below trigger thresholds from 6–9 February 2025 and 20–23 April 2025, these fluctuations did not persist for more than 7 consecutive days. Under the current management criteria, these short-term deviations did not constitute formal triggers requiring reporting. In accordance with the Trigger Action Response Plan (TARP), all exceedances were investigated by comparing hydrographs against pre-mining baseline trends, local climate data, and regional control sites. The analysis concluded that the water level declines were consistent with established pre-mining responses during periods of reduced rainfall. Furthermore, similar trends were observed at control sites, confirming that the fluctuations were climatically driven rather than mining-induced.	No – internal review only
SPR64	Vibrating wire piezometer	From mid-March 2024, sensors installed above the MYC recorded stepped pressure declines of less than 5 m due to mining in LW429. A second decline was observed in May 2025 that was also less than 5 m due to mining in LW430. The TARP was reviewed and EMM and Springvale Coal concluded that while the individual events did not constitute a trigger, the cumulative pressure response from both mining events exceeded the 5 m threshold. Subsequently, a formal trigger investigation for SPR64 was initiated, and the findings were submitted to the regulators on 15 September 2025. At the time of reporting, nearby swamp piezometers MS1 and MS3 did not show any changes attributable to mining activity.	Yes
MS1	Swamp piezometer	MS1 exceeded its trigger value in early December 2025. A trigger notification letter for MS1 groundwater level exceedance was issued to regulators on 13 January 2026. The investigation report was issued to regulators on 10 March 2025. MS1 continues to demonstrate behaviour comparable to reference swamp piezometers with a declining water level trend from September 2025 consistent with the daily CRD trend. Previous trigger investigations for SPR1301SP (located near MS1) found that part of Marrangaroo Swamp was likely fed from the aquifer above YS5 which has been impacted by mining to the north-east of MS1. Given the consistency between MS1 and control sites, the groundwater level declines observed at MS1 since September 2025 are primarily climatically driven however further observation is needed to evaluate groundwater changes attributable to mining.	Yes

4 Groundwater level monitoring

This section summarises groundwater level trends at monitoring locations within the TIA during the reporting period. The following subsections focus on piezometers and performance criteria outlined in the SMP and WMP. Groundwater levels are compared to the trigger criteria for the reporting period.

4.1 Swamp piezometers

Hydrographs for impact and reference swamp piezometers within the LW428 to 432 TIA are shown in Figure 4.1 to Figure 4.21 and comments on groundwater level trends are summarised in Table 4.1. A summary of historical observations prior to the reporting period is in Appendix C.

Table 4.1 Swamp groundwater level trend summary

Swamp	Monitoring ID	Site type as per SMP	Mined status	Comment
Barrier Swamp	BA1	Reference	NA	Stable – minor fluctuations due to rainfall; changes of 0.03 m are common. The logger may have shifted from 20 June to 14 July, possibly due to a build-up of sediment.
	BA2			Stable – groundwater levels react to rainfall events; changes of approximately 0.1 m are common. A climate trend is observed, showing increasing groundwater levels from January to August, and decreasing levels from August to December.
	BA3			Stable – trends correlate with the daily CRD. When the water level is above ground level, 0.03 m fluctuations are common. When the water level is below the ground level, fluctuations increase and changes over 0.1 m are common. Groundwater levels increased from January to May, remained above ground level until September, and decreased from September to December. Trends are consistent with historical observations.
Best Swamp	BE1	Reference	NA	Stable – fluctuations due to rainfall; changes of up to 0.15 m are common. Slight increasing trend from January to August followed by a slight decline from September to December.
	BE2			Stable – fluctuations due to rainfall; changes of up to 0.1 m are common. Slight increasing trend from January to August followed by a slight decline from September to December.
Carne Central	CC1	Reference	NA	Variable – fluctuations due to rainfall of over 0.4 m from January to May. Groundwater levels stabilised near the ground surface from May to October. From October to December the level generally decreased to approximately 0.78 metres below ground level (mbgl), with fluctuations responding to rainfall events.
	CC2			Variable – fluctuations due to rainfall of 0.3 m are common. From January to March the piezometer was dry. In May levels increased due to rainfall, remaining stable from July to September. From September to December groundwater levels declined to approximately 1.15 mbgl and was mostly dry, only briefly increasing in response to rainfall.

Swamp	Monitoring ID	Site type as per SMP	Mined status	Comment
Fire Tail	FS1	Reference	NA	Stable – trends with the daily CRD. Fluctuations are attributed to individual rainfall events.
	FS2			Stable – trends with the daily CRD. Relatively stable until mid-August followed by a declining trend corresponding to below average rainfall. Fluctuations are attributed to individual rainfall events.
Twin Gully	TG1	Reference	NA	Variable – trends with the daily CRD. Fluctuations attributed to individual rainfall events. Decreasing trend observed from September to December.
	TG2			Variable – trends with the daily CRD. Increasing from January to August followed by a declining trend from September to December, corresponding to below average rainfall. Fluctuations are attributed to individual rainfall events.
Tristar	TS1	Reference	NA	Stable – trends with the daily CRD. Increasing from May to August, declining from August to December. Responsive to individual rainfall events; changes of 0.3 m are common with changes greater than 1 m for heavy periods of rainfall (as seen in August).
	TS2			Stable – trends with daily CRD. Water level responds to rainfall events. From January to May water levels remained relatively stable with small fluctuations associated with rainfall. In May water levels increased to close to ground level and responses to rainfall events reduced. Levels declined from October to December.
	TS3			Stable – water level remained stable close to ground level, with minor responses to rainfall events. Trends with daily CRD.
East Wolgan	WE1	Impact	Adjacent LW411	Dry – briefly responded to rainfall events in August and September.
	WE2			Data not recorded from July 2024 to August 2025 due to logger malfunction. Responds intense to rainfall events; changes of 0.3 m are common. Between events the piezometer is dry.
Sunnyside West	SW1	Impact	LW413B/414	Variable - Responsive to rainfall events, changes of 0.3 m are common. Generally dry from January to May. Levels responded to a prolonged rainfall event in May increasing the recorded level by approximately 1.5 m. Water level declined from September to November, becoming dry for the remainder of the year.
Sunnyside	SS1	Impact	LW414	Stable – responsive to large rainfall events. Minor short-term decreases in water level attributed to water quality sampling. Not data recorded from August to December due to an malfunctioning logger.
	SS2			Decreasing – No data from November 2024 to August 2025 due to a malfunctioning logger. Responsive to large rainfall events. Decreasing trend from August to December.
	SS3			Variable –highly responsive to rainfall events. No data from March 2025 onwards due to a malfunctioning logger and will be replaced.
	SS4			Declining – responsive to rainfall events. Trends with daily CRD. Increasing from January to August 2025, decreasing from August to December 2025.
	SS5			Stable – responsive to large rainfall events. No data from March 2025 onwards due to logger malfunction.

Swamp	Monitoring ID	Site type as per SMP	Mined status	Comment
Sunnyside East	SSE1	Impact	LW417	Damaged by bushfire – decommissioned.
	SSE2			Dry – historically responsive to large rainfall events with a short sharp rise in groundwater level.
	SSE3			Dry – historically responsive to large rainfall events with a short sharp rise in groundwater level.
Carne West	CW1	Impact	LW419	Dry.
	CW2			Dry – responsive to large rainfall events with short sharp rises in groundwater level.
	CW3		LW417	Dry.
	CW4			Dry.
Junction	JS1	Impact	LW408	Decommissioned – piezometer damaged by road grading in February 2021.
	JS2			Stable – trends closely with daily CRD. Increasing trend from May to September 2025, decreasing from September to December 2025.
	JS3			Stable – trends closely with daily CRD. Increasing trend from May to September 2025, decreasing from September to December 2025.
Gang Gang West	GW1	Impact	LW420	Dry – Generally dry, except for responses to heavy or prolonged rainfall events. Piezometer briefly responded to rainfall events in May, July, and August.
	GW2			Decommissioned – damaged by bushfire.
	GW3			Generally dry, except for responses to heavy or prolonged rainfall events. Piezometer briefly responded to rainfall events in May, July, and August.
	GW4			Dry – Generally dry, except for responses to very heavy or prolonged rainfall events. Groundwater levels responded to rainfall in August, fluctuating by over 0.75 m. By October the piezometer was dry for the remainder of the year. .
Gang Gang	GG1	Impact	LW420	Dry - Periodically responsive to heavy or prolonged rainfall events. Piezometer responded to rainfall in May, June, August, and September. Observed level changes were up to 0.35 m.
	GG2			Dry.
	GG3			Dry - Periodically responsive to heavy or prolonged rainfall events. Groundwater levels responded to rainfall in February, May, June, August, and September. Observed level changes were up to 0.6 m.
Pine	BS2	Impact	LW425	Dry - Periodically responsive to very heavy or prolonged rainfall events. Groundwater levels responded to rainfall in August. Observed level changes were up to 0.1 m.
	BS3			Stable – consistent with historical observations.
	BS4 (PSS)			Stable – Trends with daily CRD. Groundwater level fluctuates in response to rainfall below ground level. Levels become stable when groundwater level rises to the ground level. Water levels stabilised around ground level between May and September and declined from September to December due to reduced rainfall.

Swamp	Monitoring ID	Site type as per SMP	Mined status	Comment
	PS			Declining – Trends with daily CRD. Groundwater level fluctuates in response to rainfall when below 0.1 mbgl. Levels become stable when groundwater level rises above 0.1 mbgl. Water levels stabilised around 0.1 mbgl between May and September. Levels declined from September to December.
	PUS			Variable – trends with the daily CRD and is responsive to rainfall events, fluctuations of 0.9 m are common for individual rainfall events. Groundwater level responded to rainfall in January and February. Accumulating rainfall events from August increased water levels until September. Levels declined from September to December 2025.
Nine Mile	BS1	Impact	NA	Variable – Trends with daily CRD, responds to heavy or prolonged rainfall. Fluctuations of 0.4 m are common. Groundwater decreased from January, becoming dry in March. Increasing from late-May with rainfall then decreasing in September for the remainder of the year.
	BS5 (NMSS)			Stable – minor fluctuations with rainfall.
	NM			Variable – Trends with daily CRD, responded to rainfall events. Groundwater level increased from January to August 2025, decreasing from August to December 2025.
Marrangaroo	MS1	Impact	LW428	Variable – Trends with daily CRD, responds to rainfall events. When water levels are below 0.5 mbgl, response to rainfall events is increased. Groundwater fluctuations of over 0.5 m were common from January to May. Water levels increased from January to September 2025, decreasing from September to December 2025.
	MS2			Variable – highly responsive to individual rainfall events seen as sharp increases in groundwater levels that slowly decline over several days to weeks depending on the intensity of the rainfall event. Dry between rainfall events. The trend is not consistent with historical observations, and it is believed MS2 has been impacted by mining. Trigger investigation completed in August 2023 and July 2024 (with SPR1301).
	MS3			Variable – Trends with daily CRD, responsive to rainfall. Rainfall responses reduce when the water level approaches ground level. Groundwater level increased from January to September 2025, decreasing from September to December 2025.
Lost City	LCS1	Impact	NA	Stable.
	LCS2			Stable – minor fluctuations in trend.
	LC1			Variable – trends with daily CRD, responsive to rainfall events. Level changes of 0.1 m are common when the water is below ground level.
	LCN1			Declining – Trends with daily CRD, level changes over 0.2 m are common. Groundwater level decline from January to April, increase from April to September, and decline from September to December 2025.
Paddys Creek	PC1	Impact	NA	Stable – minor fluctuations due to rainfall. Decreasing trend from September to December due to below average rainfall.
	PC2			Stable – minor fluctuations due to rainfall. Decreasing trend from September to December due to below average rainfall.

Swamp	Monitoring ID	Site type as per SMP	Mined status	Comment
Wishbone Hanging swamp	WBHS1	Impact	LW428	Variable – Responded to rainfall in January, and from May to September and was dry between events. Fluctuations of over 0.2 m appear common in response to rainfall.
	WBHS2			Variable – Responded to rainfall in January, and from May to September and was dry between events. Fluctuations of over 0.3 m appear common in response to rainfall.
	WBHS3			Variable – Responded to rainfall from May to October and was dry between events. Fluctuations of over 0.5 m appear common in response to heavy or prolonged rainfall.
	WBHS4			Variable – Responded to rainfall in January, February, and from April to September and was dry between events. Fluctuations of over 0.2 m appear common in response to rainfall.
Marangaroo hanging swamp	LMHS1	Impact	LW428	Stable.
	MEXX01			Dry – brief responses due to rainfall events in May, July, August and September.
	MWHS1			Variable - Responded to rainfall in January to November. Sustained water levels trend with increasing daily CRD. Fluctuations due to rainfall are reduced as the water level approaches the ground level. The water level approached the ground level from May to September, at around 0.1 mbgl.

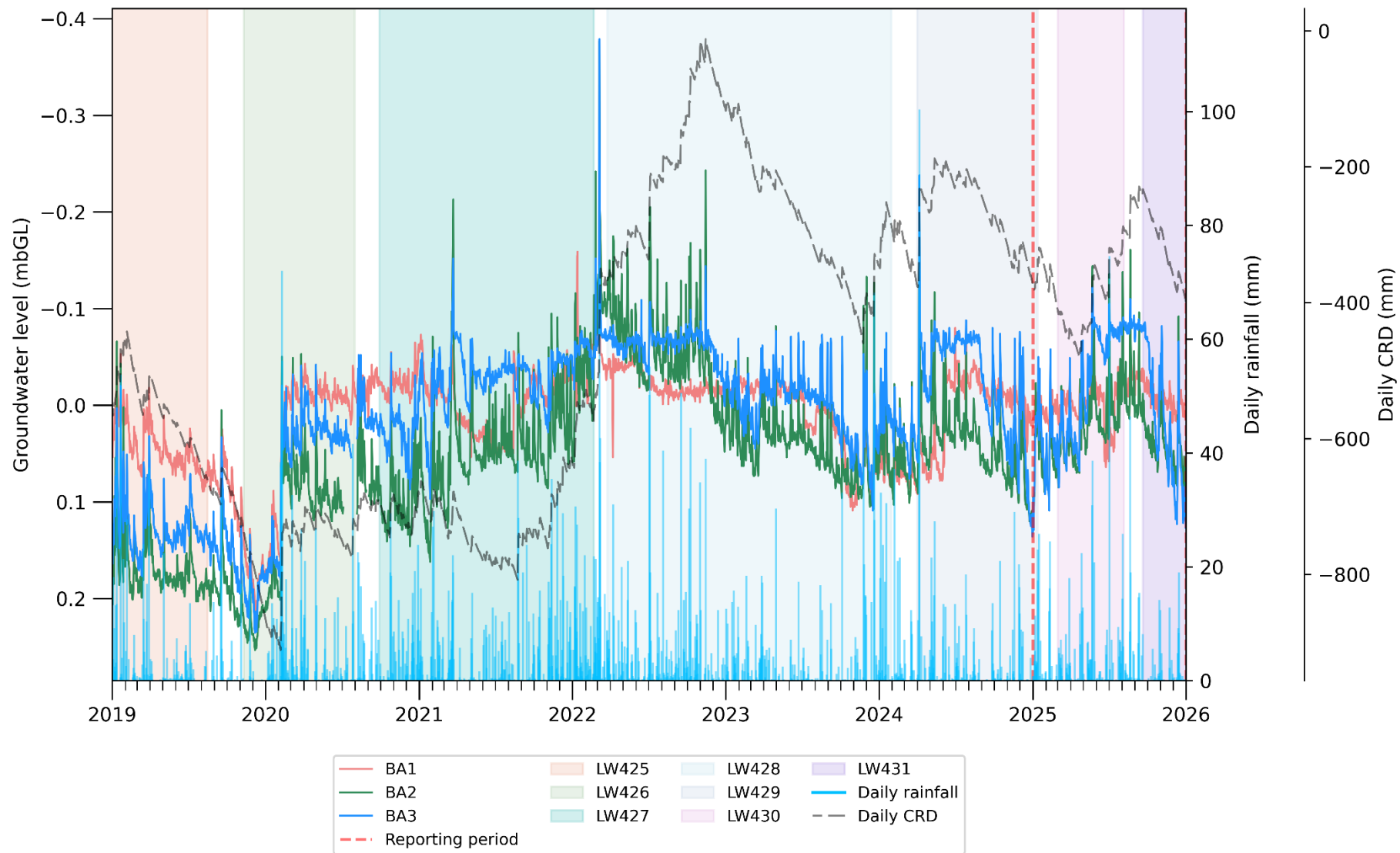


Figure 4.1 Barrier Swamp hydrograph

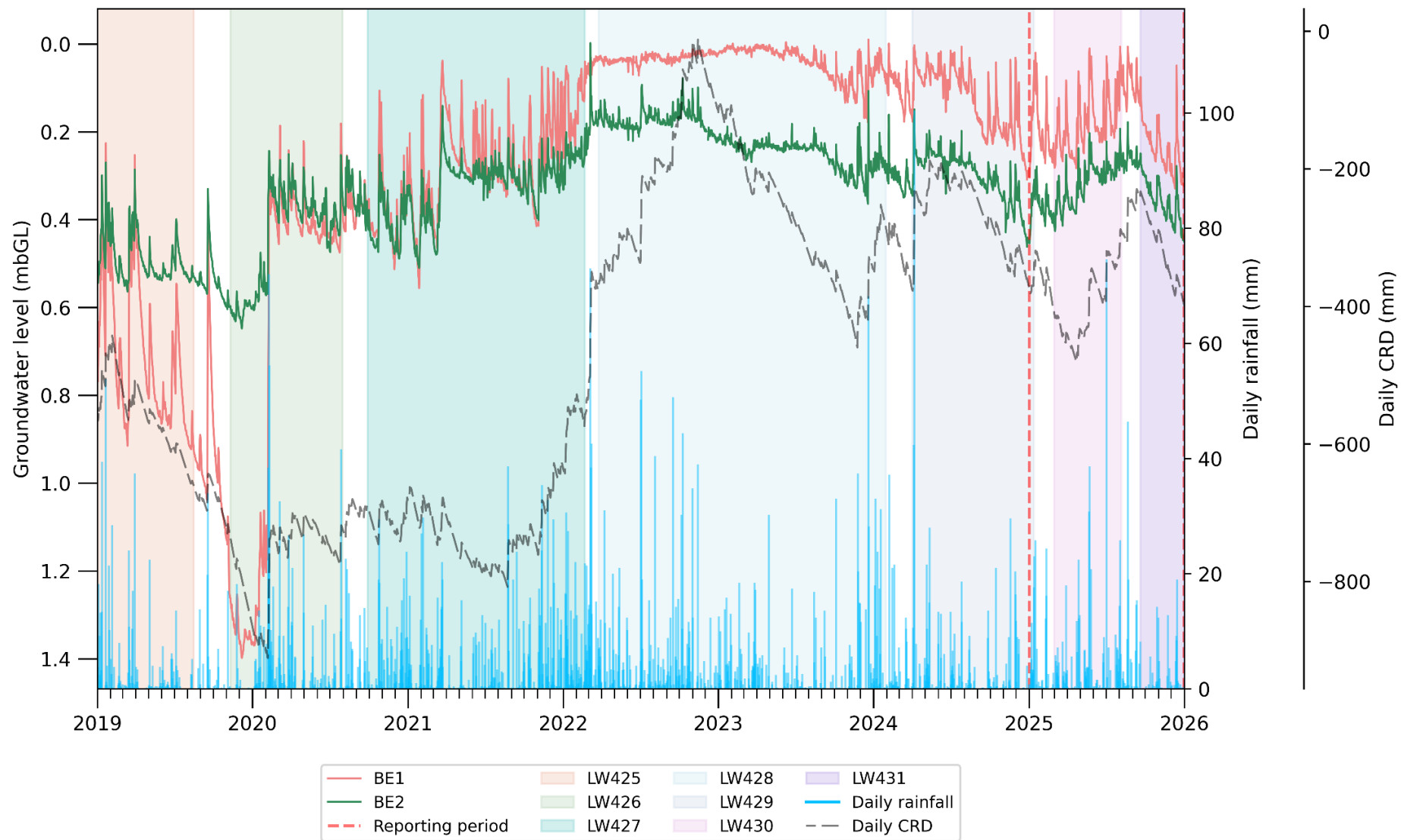


Figure 4.2 Best Swamp hydrograph

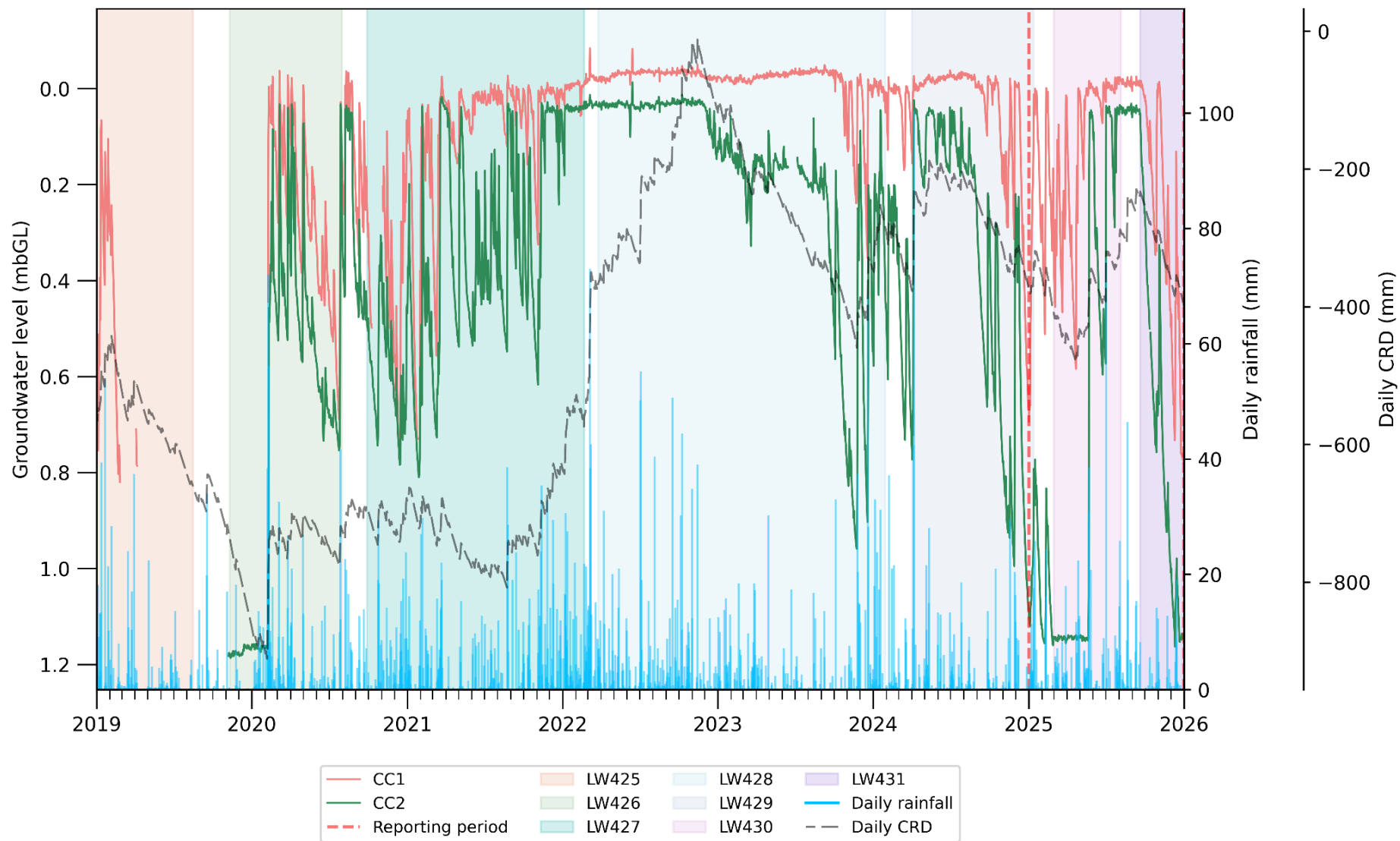


Figure 4.3 Carne Central Swamp hydrograph

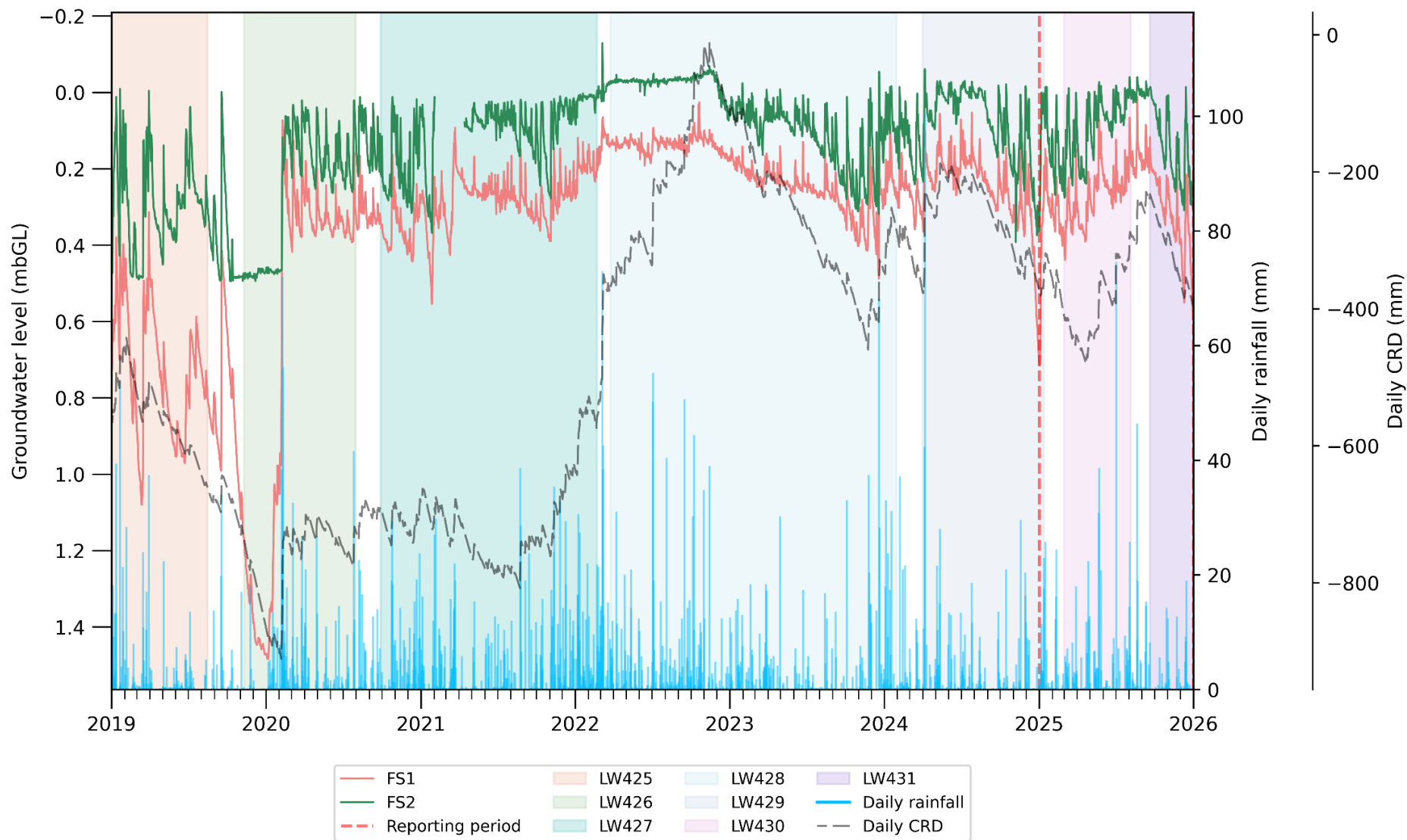


Figure 4.4 Fire Tail Swamp hydrograph

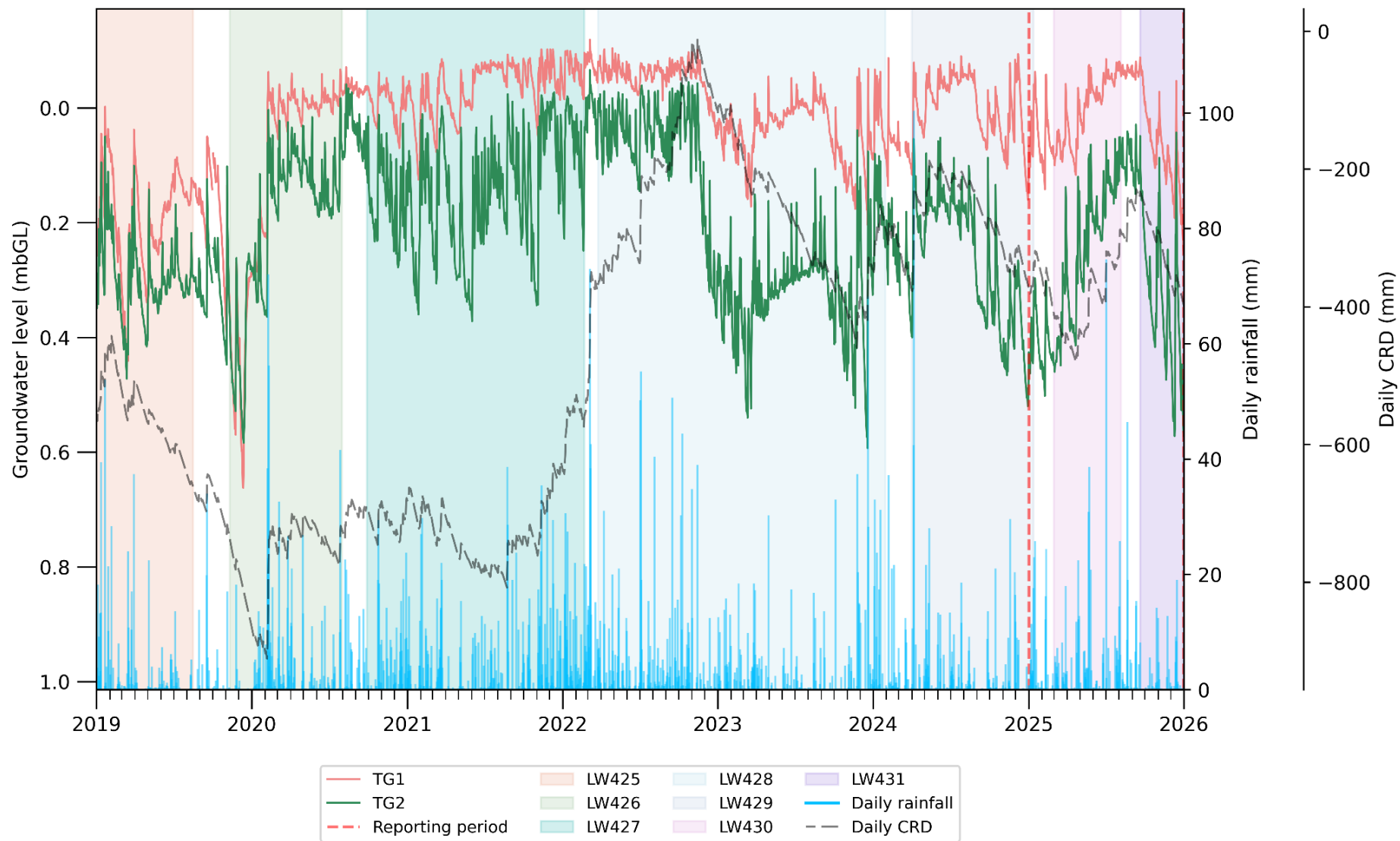


Figure 4.5 Twin Gully Swamp hydrograph

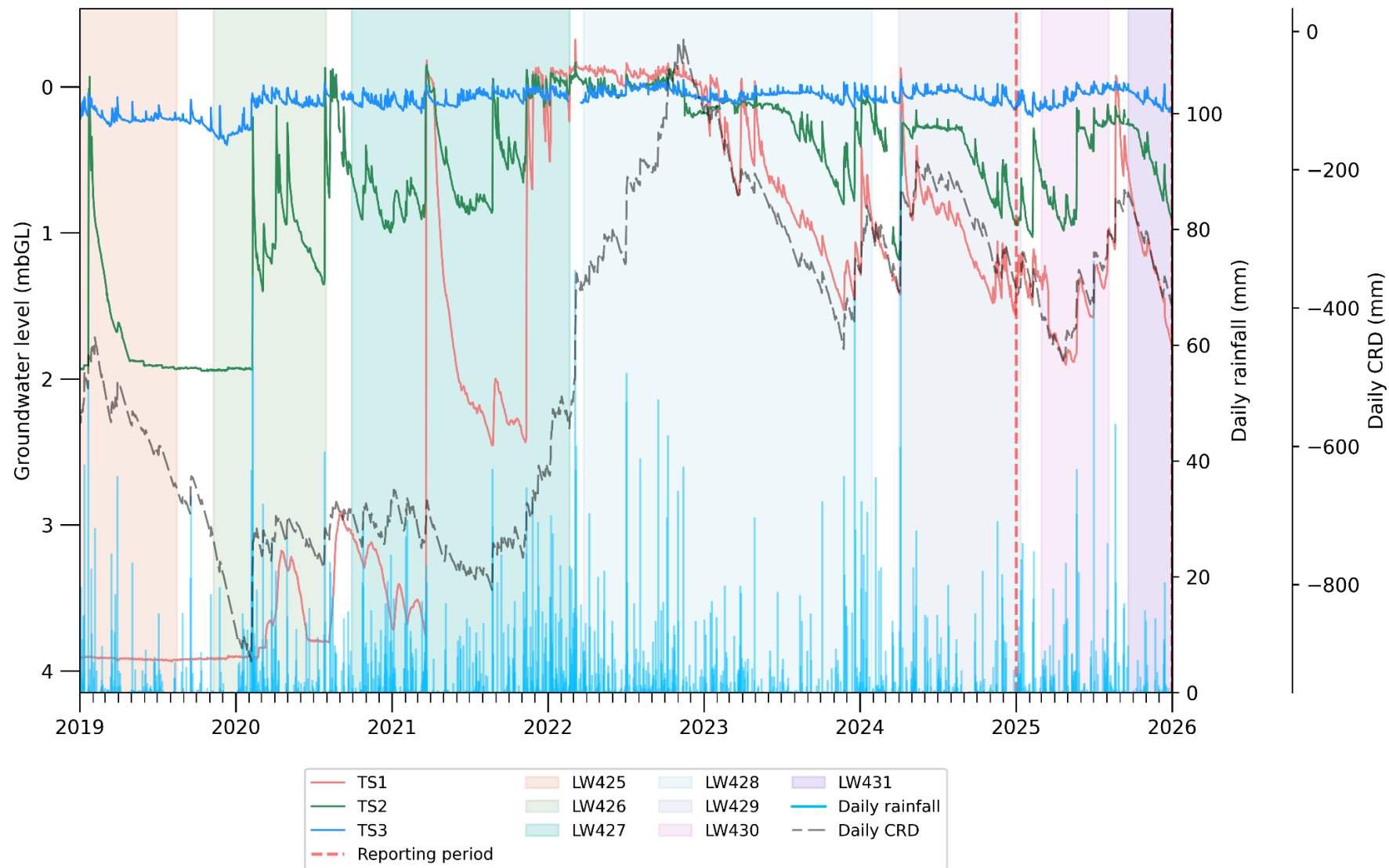


Figure 4.6 Tristar Swamp hydrograph

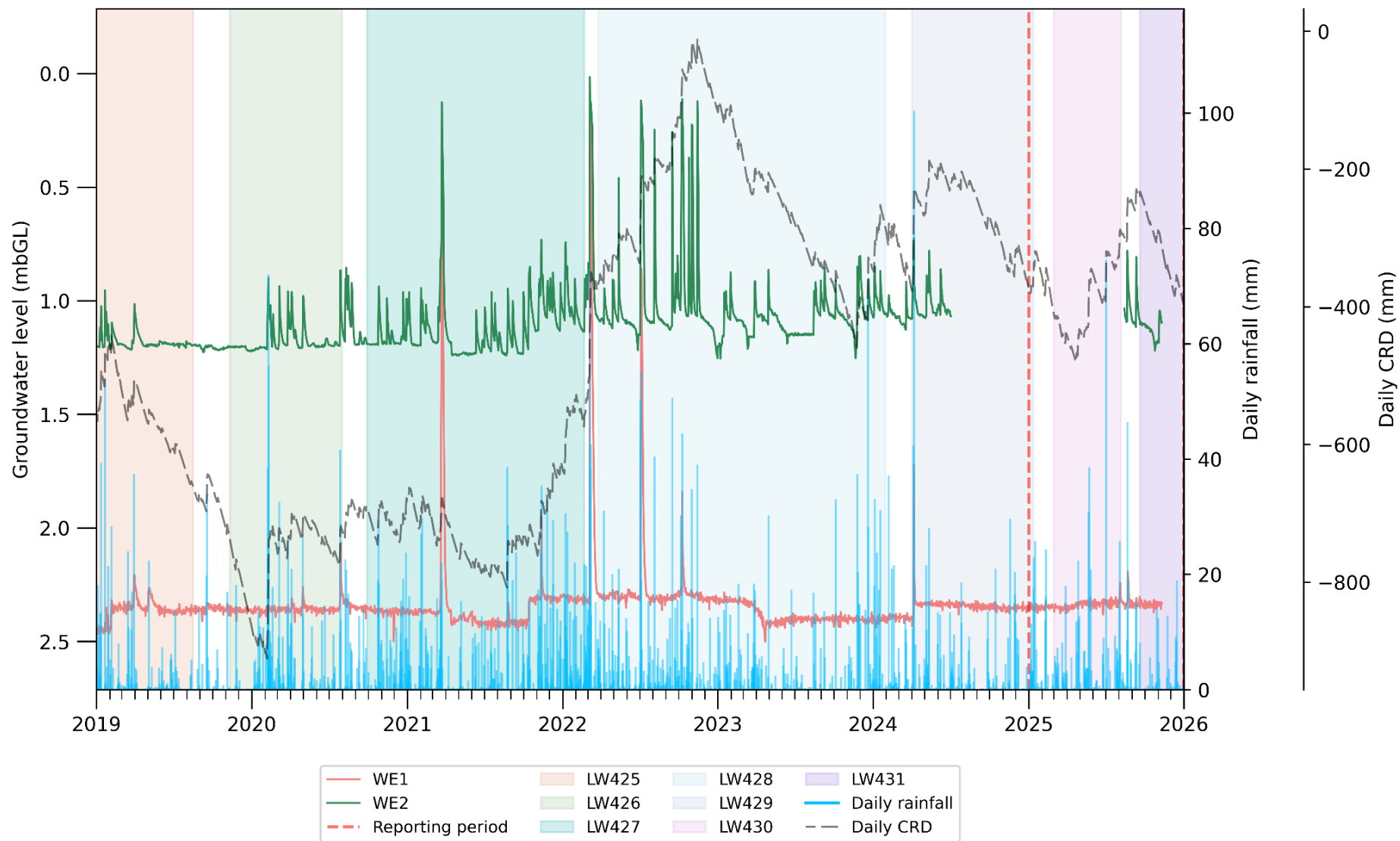


Figure 4.7 Wolgan East Swamp hydrograph

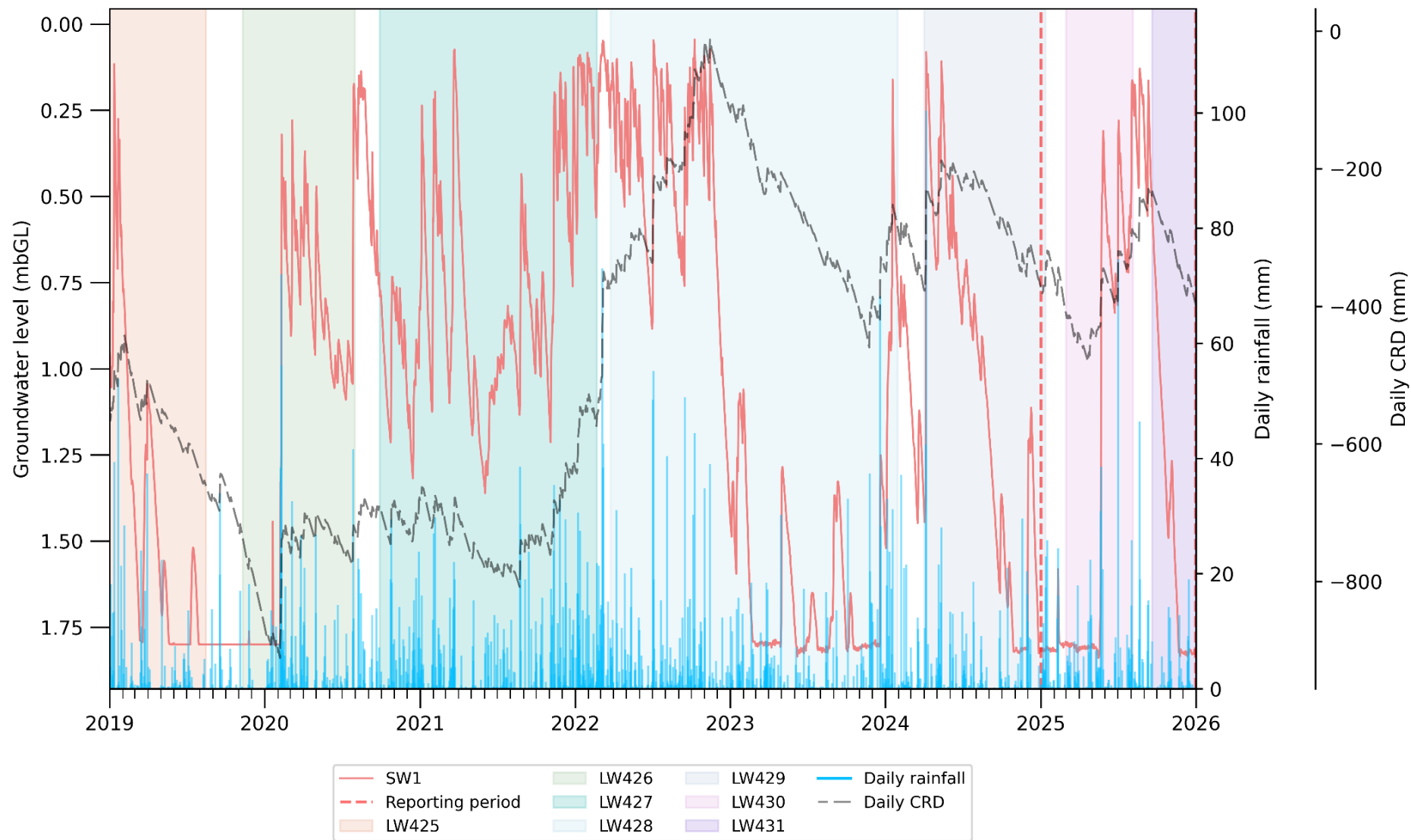


Figure 4.8 Sunnyside West Swamp hydrograph

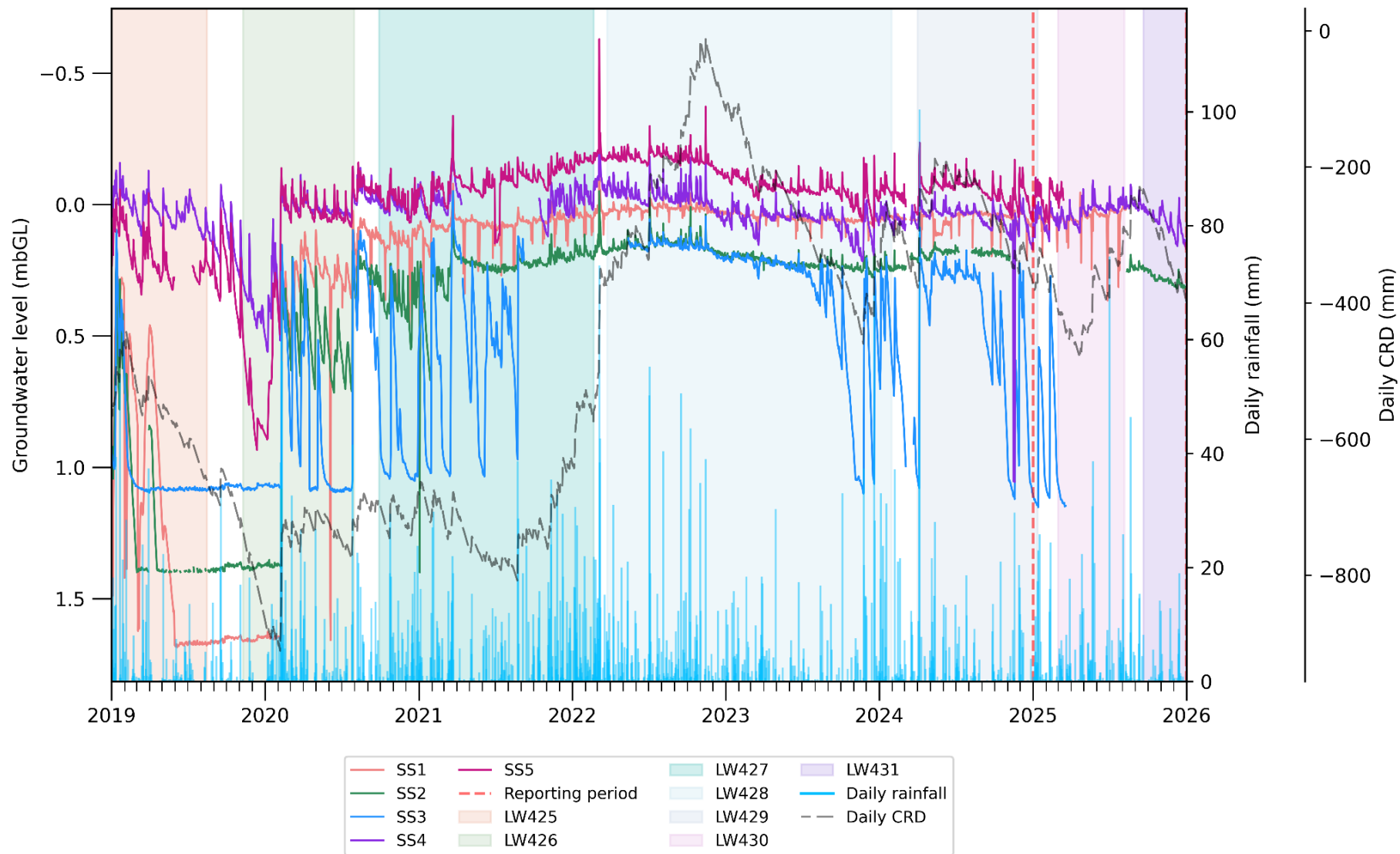


Figure 4.9 Sunnyside Swamp hydrograph

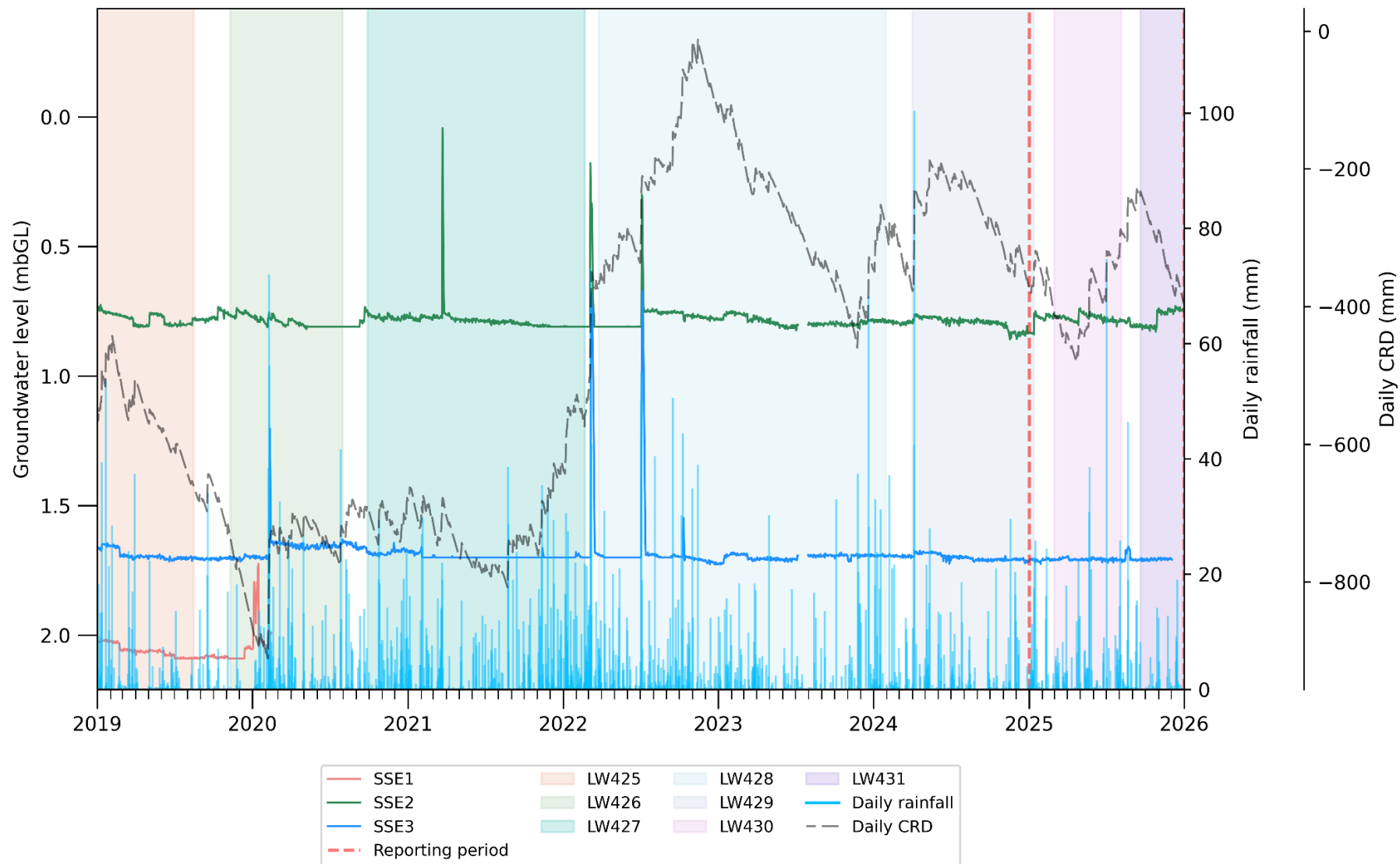


Figure 4.10 Sunnyside East Swamp hydrograph

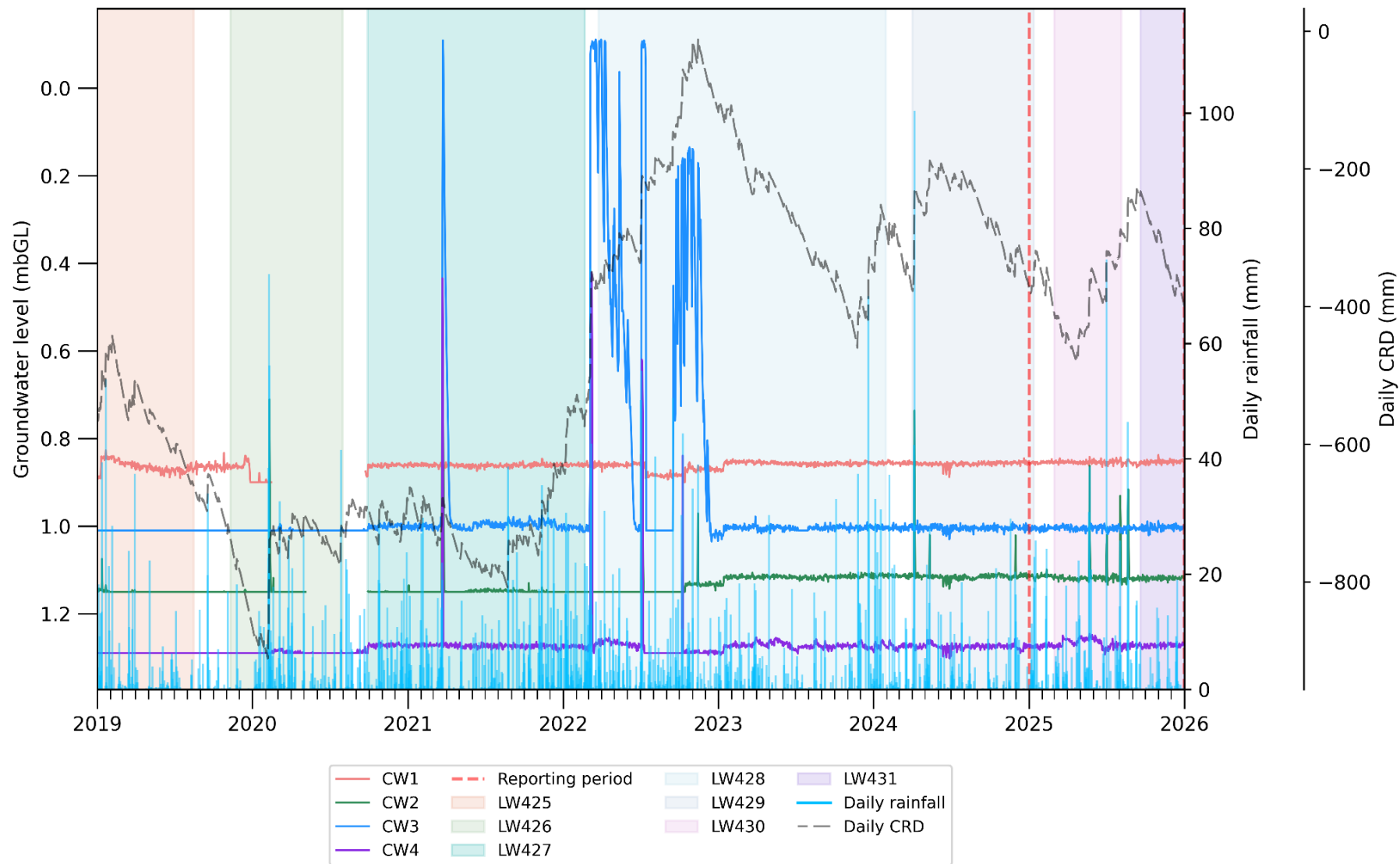


Figure 4.11 Carne West Swamp hydrograph

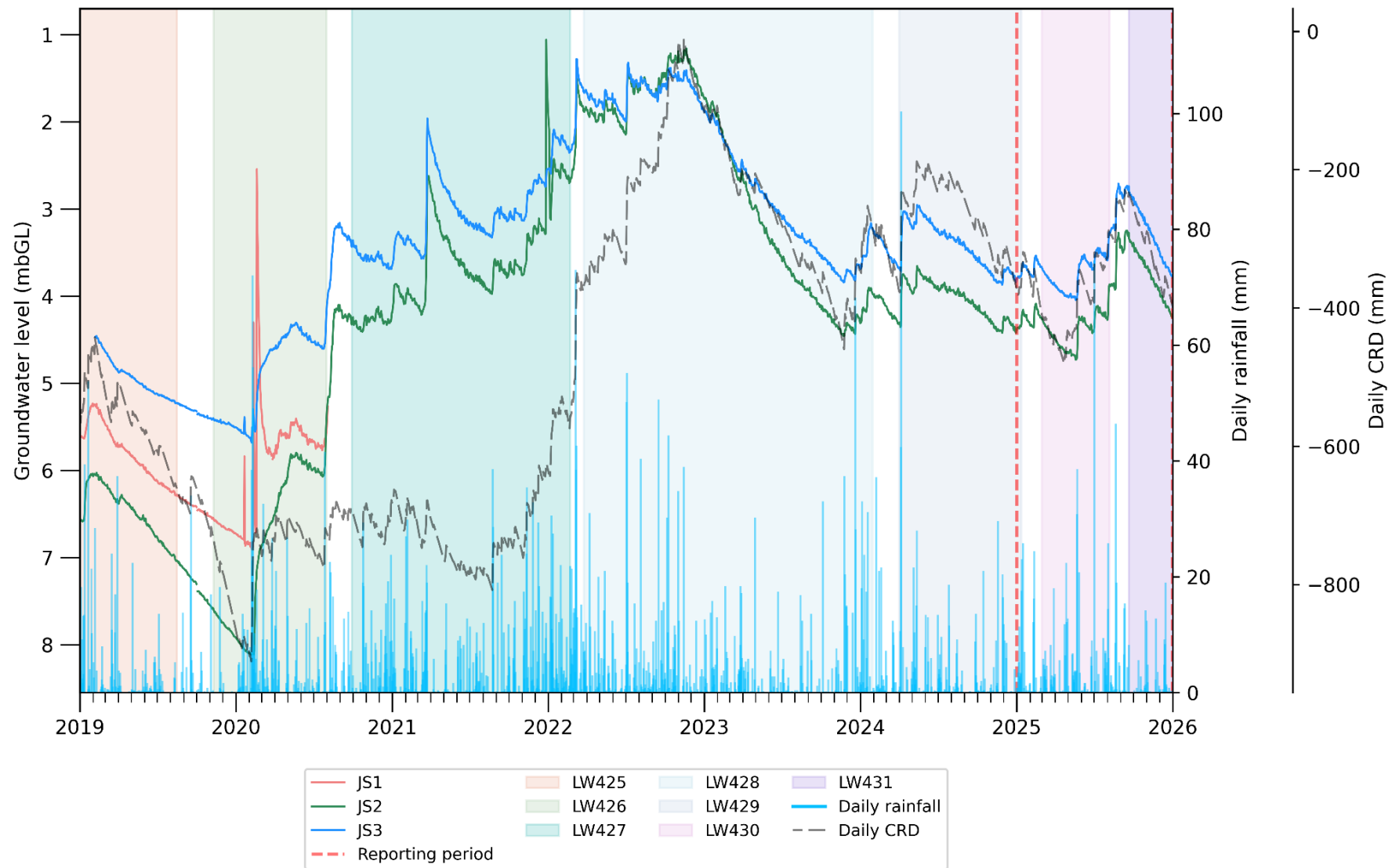


Figure 4.12 Junction Swamp hydrograph

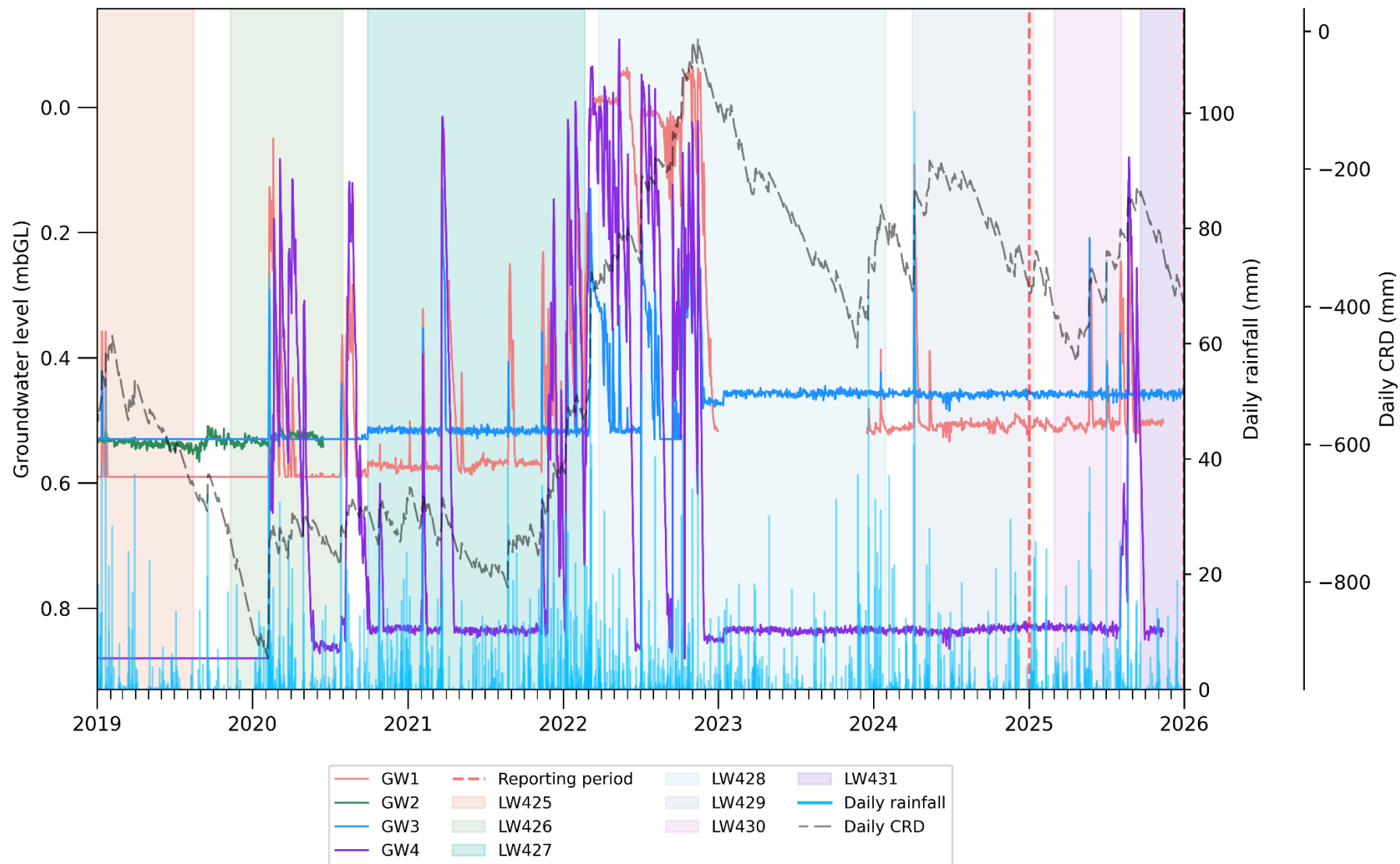


Figure 4.13 Gang Gang West Swamp hydrograph

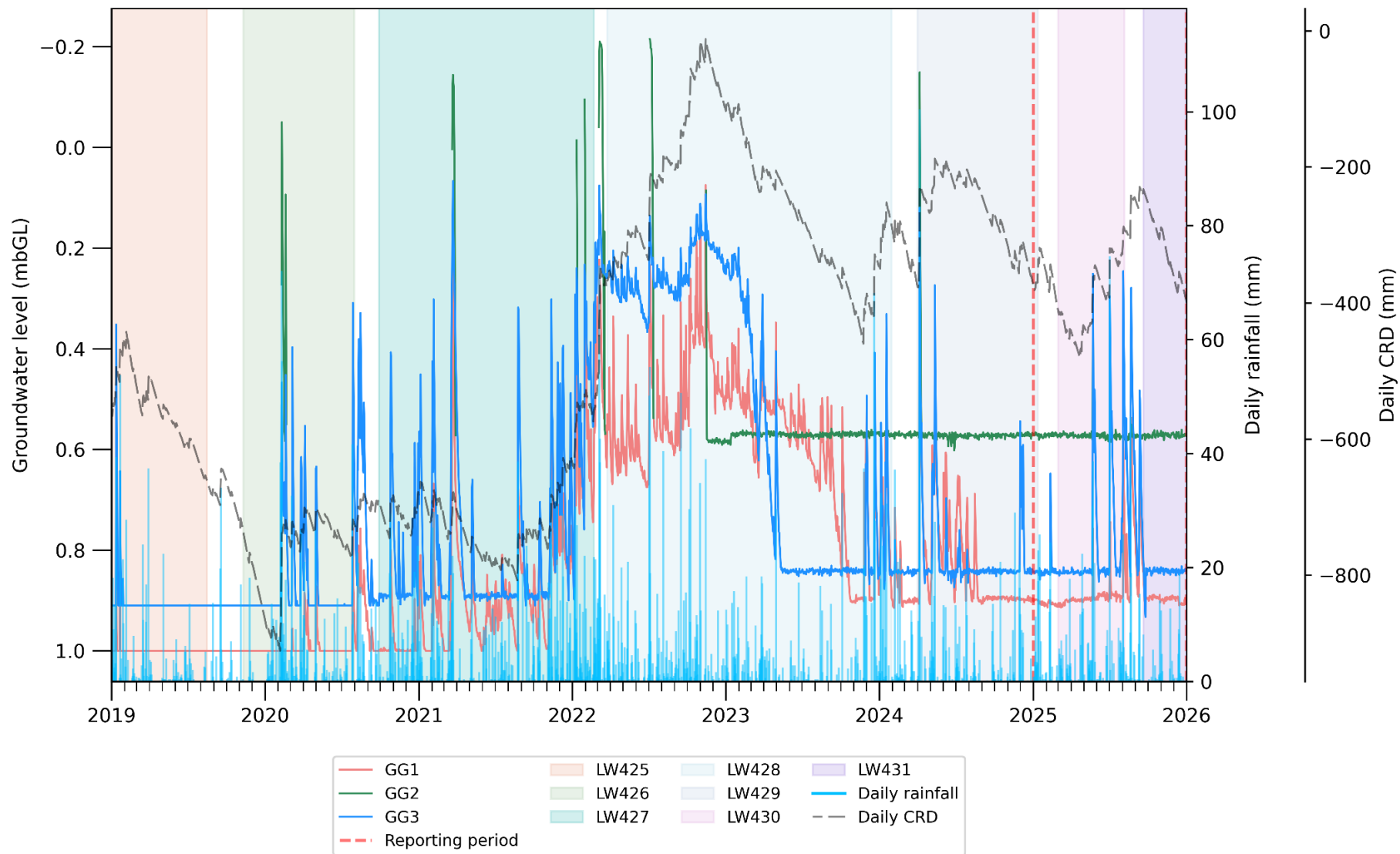


Figure 4.14 Gang Gang Swamp hydrograph

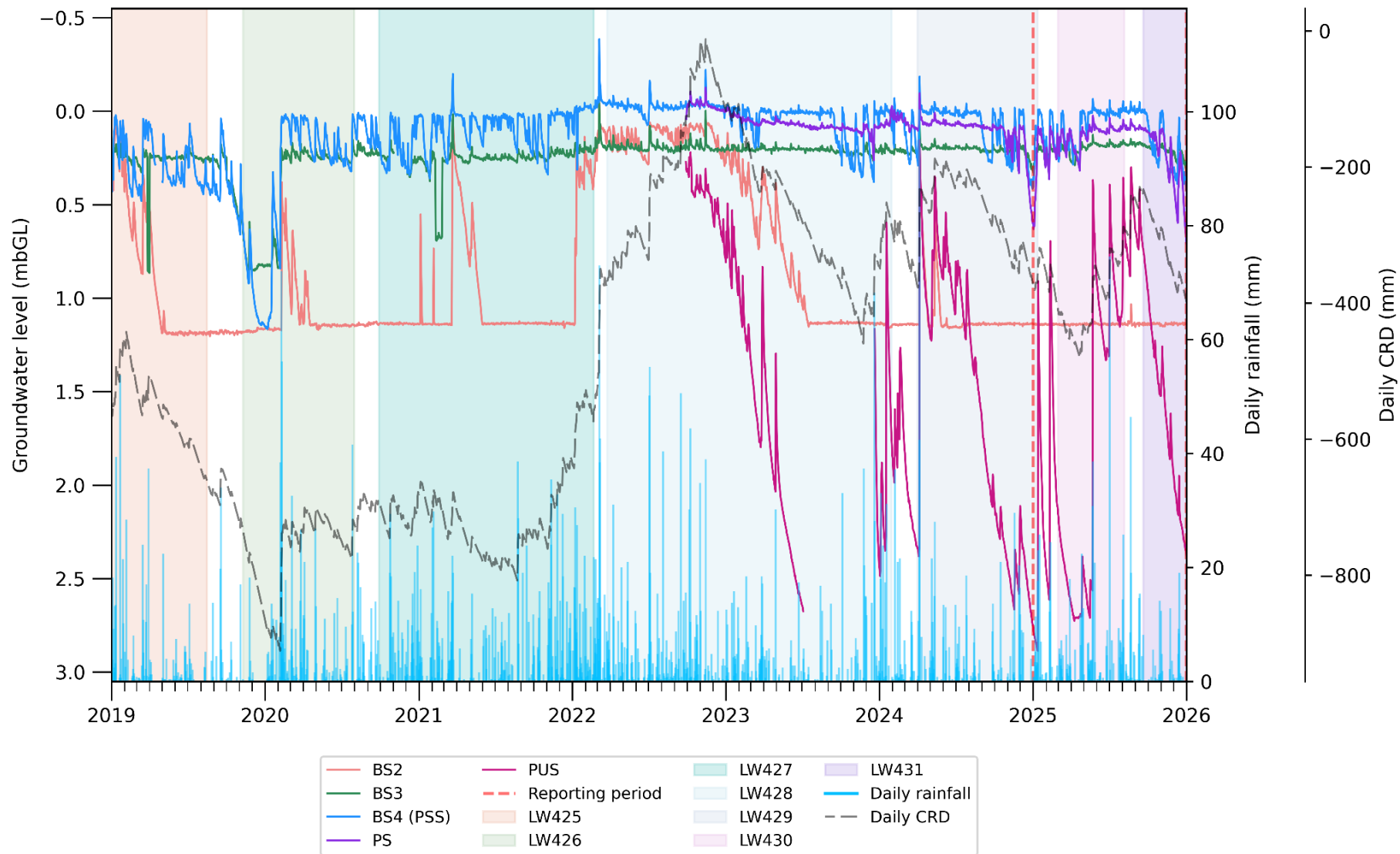


Figure 4.15 Pine Swamp hydrograph

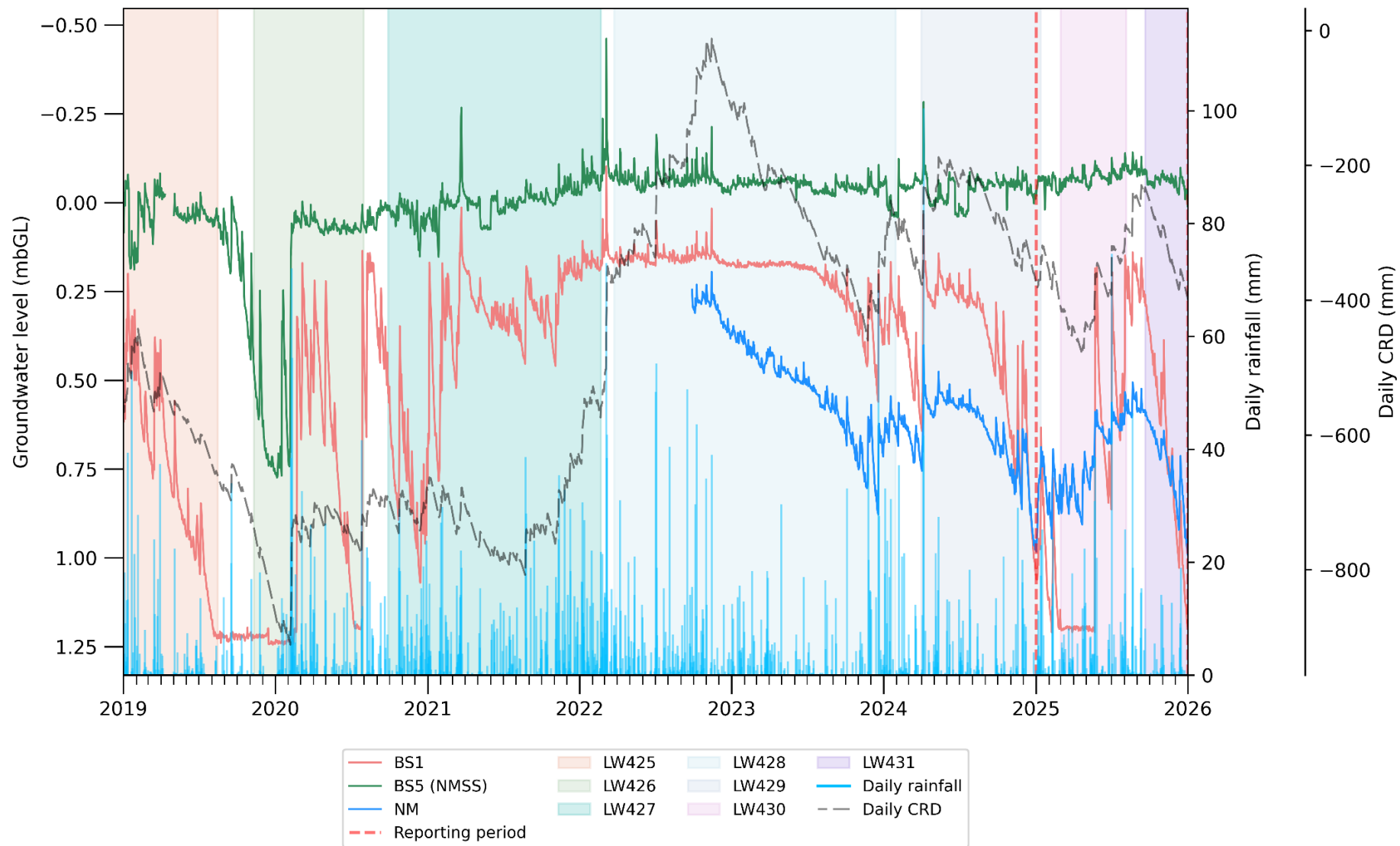


Figure 4.16 Nine Mile Swamp hydrograph

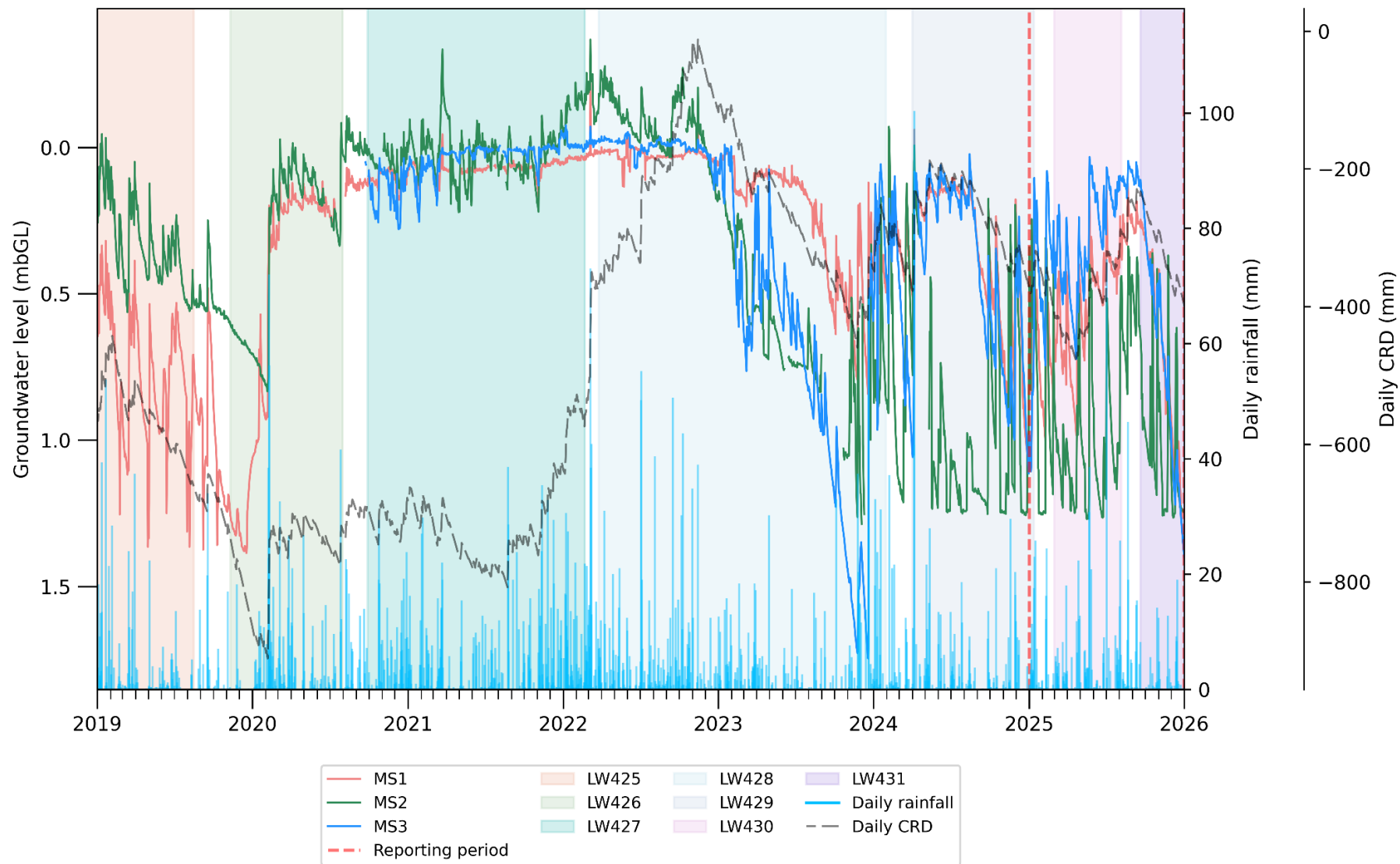


Figure 4.17 Marrangaroo Swamp hydrograph

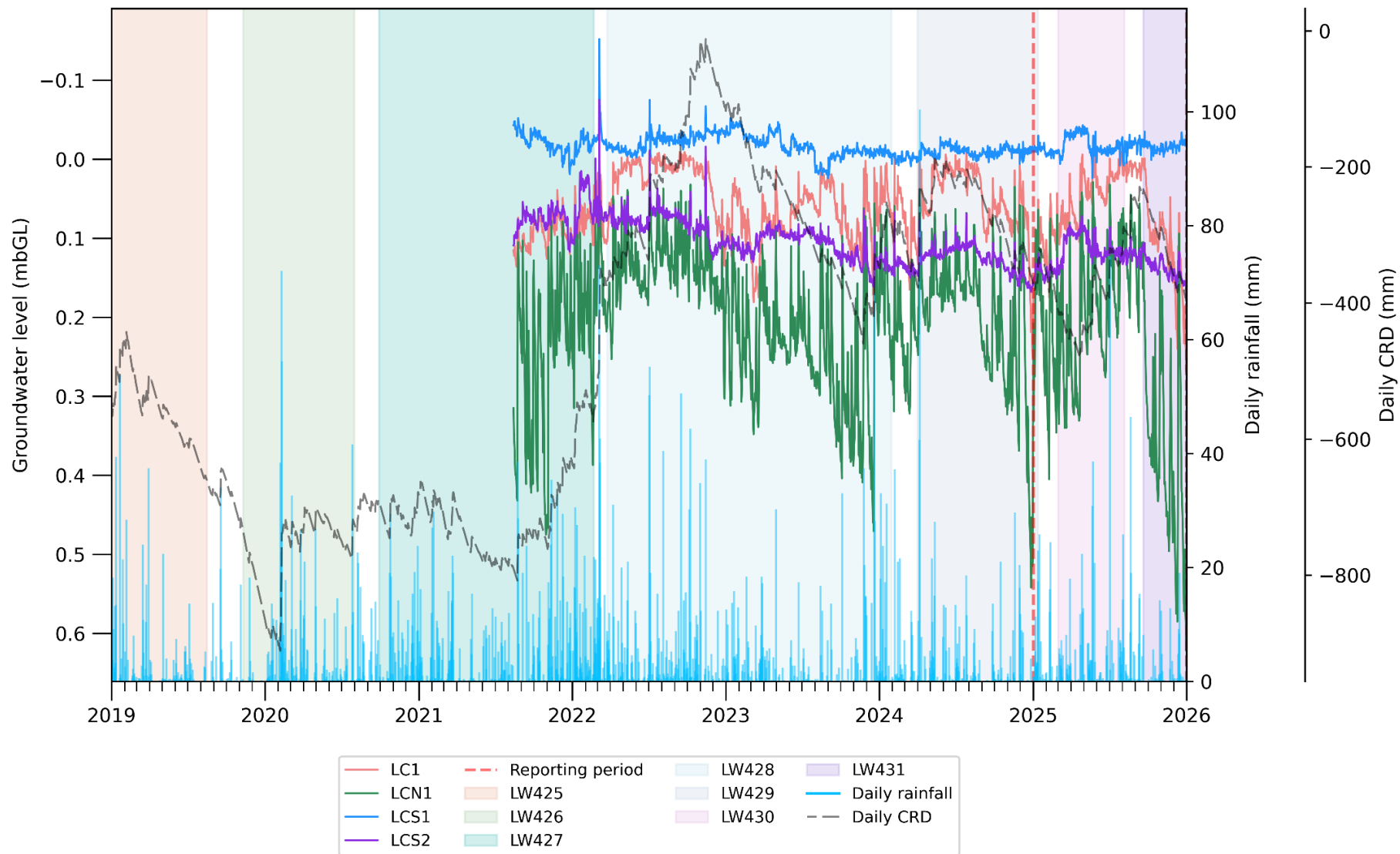


Figure 4.18 Lost City Swamp hydrograph

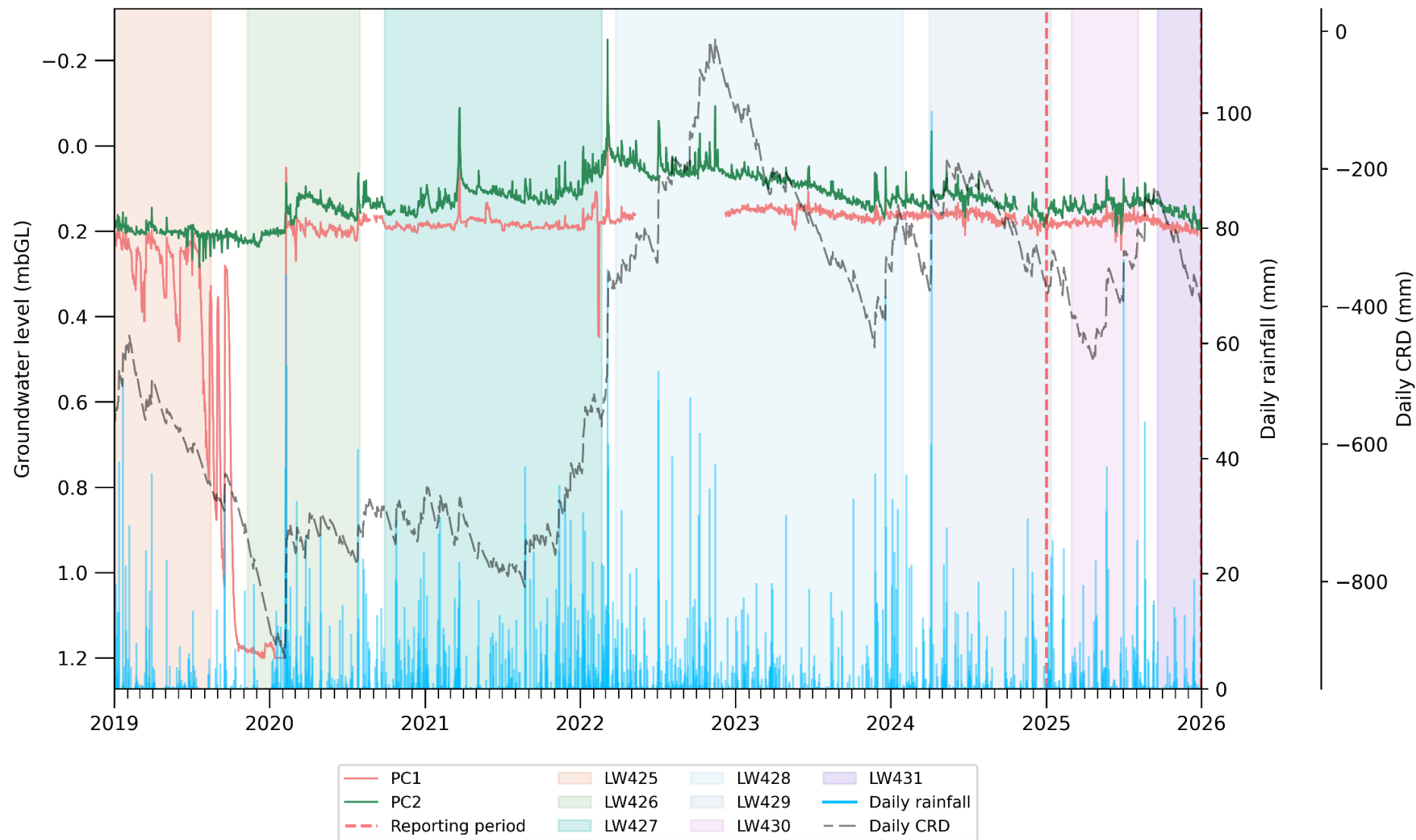


Figure 4.19 Paddys Creek hydrograph

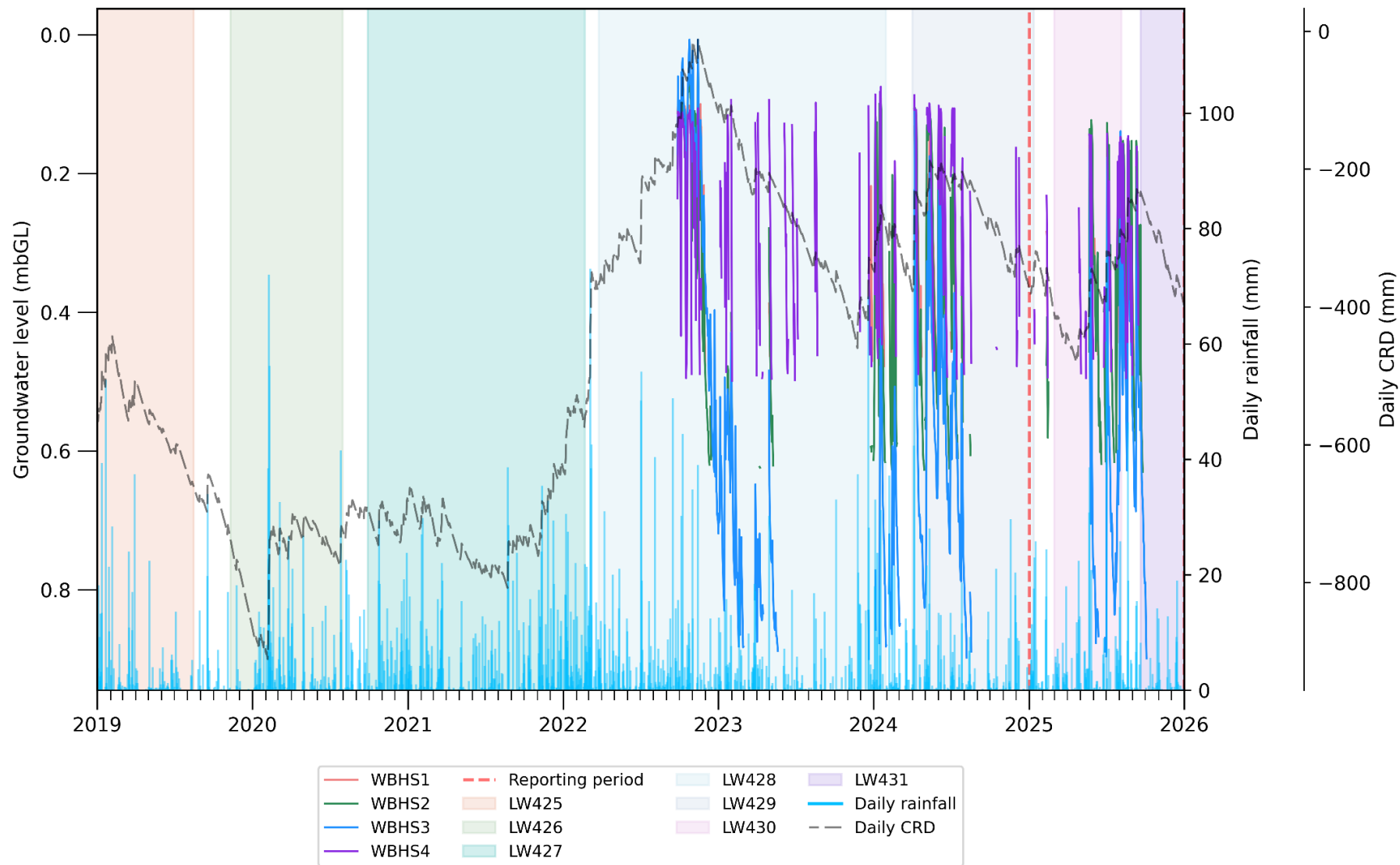


Figure 4.20 Wishbone Hanging Swamp hydrograph

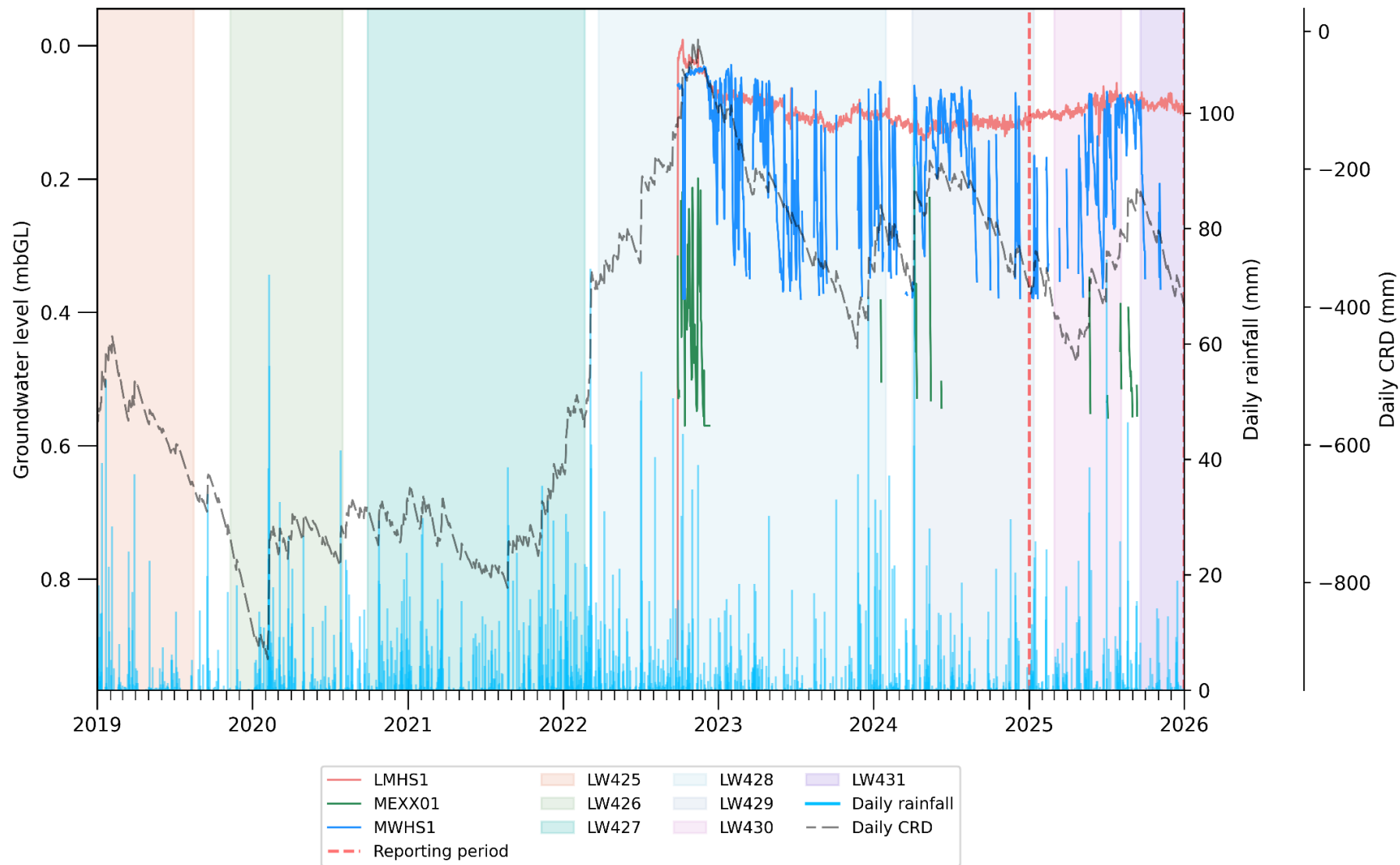


Figure 4.21 Marrangaroo Hanging swamp hydrograph

4.2 Perched aquifer piezometers

Hydrographs for reference and impact perched aquifer piezometers (in metres above Australian Height Datum (mAHD)) is shown in Figure 4.22 to Figure 4.24. Comments on groundwater level trends during the reporting period are summarised in Table 4.2.

Table 4.2 Perched groundwater level trend summary

Monitoring ID	Associated swamp	Site type	Comment
SPR1101	Sunny Side East	Impact	Damaged by subsidence in 2013. The piezometer was inspected with a downhole camera in July 2024 and a groundwater level was observed. A logger was reinstalled in November 2024. In 2013, the water level was relatively stable around 1,122.5 mAHD. Decreasing in 2025 – declined from approximately 1 m from January to December.
SPR1104	Carne West	Impact	Dry. No water level recorded since June 2017.
SPR1107	Gang Gang	Impact	Slightly increasing – trending with daily CRD with minor responses to rainfall.
SPR1108	Gang Gang	Impact	Decreasing – declined from approximately 1 m from January to December.
SPR1110	Carne West	Impact	Dry. No water level recorded since January 2014.
SPR1113	Gang Gang	Impact	Decreasing – trending with long-term daily CRD. Declined from approximately 2 m from January to November.
SPR1210R	-	Impact	Decreasing – Trending with long-term daily CRD. Declined approximately 0.5 m throughout 2025 with fluctuations due to rainfall.
SPR1301SP	Marrangaroo	Impact	Impacted by LW429. Steady decline up to mid-April 2024 followed by a stepped decline due to undermining. Dry since May 2024.
SPR1401	Sunny Side East	Impact	Decreasing – declined from approximately 1 m from January to December.
SPR1601	Carne West	Impact	Variable – trends with the daily CRD and is responsive to large rainfall events. Water levels rapidly decline during periods of below average rainfall. Declined from January to May by approximately 2.8 m. During a rainfall event in May, the water level increased by approximately 5 m.
SPR1602	Gang Gang West	Impact	Variable – trends with the daily CRD with subdued responses to rainfall. Stable from January to March, decreasing in April, increasing from May to September, and decreasing from September to December.
SPR1603	Gang Gang	Impact	Variable – declining from January to May. From May to August groundwater levels increased, trending with CRD but predominantly responding to three heavy rainfall events in late May, early July and early August. From September to December groundwater levels decreased.
SPR1604	Carne Central	Impact	Stable – trends with the daily CRD.
SPR1605	Pine/Nine Mile	Impact	Stable – subdued trends with daily CRD and minor responses to heavy rainfall events.
SPR1606	Paddys Creek	Impact	Stable – trending with the daily CRD and responding to heavy rainfall events. Changes of 0.3 m are common following heavy rainfall events.
SPR1607	Marrangaroo	Impact	Declining – trends with the daily CRD and responds to heavy or prolonged rainfall. Decreasing from January to April, increasing from May to August, and decreasing from September to December.
SPR1608	Barrier	Reference	Stable – trends with the daily CRD.

Monitoring ID	Associated swamp	Site type	Comment
SPR1609	Tri Star	NA	Stable – generally trends with daily CRD. Responds to rainfall events, changes of 0.2 m are common.
SPR1611	Fire Tail	Reference	Stable – trends with daily CRD and responds to rainfall events, changes of 0.2 m are common.
SPR1612	Best	Reference	Stable – trends with daily CRD and responds to rainfall events, changes over 0.2 m are common. Generally increasing from January to August, decreasing from September to December.
SPR1806	Marrangaroo	Impact	Decreasing – steady decline of about 0.5 m from January to December.
SPR1807	-	Impact	Dry since August 2020. Damaged by subsidence.
SPR1808	Marrangaroo	Impact	Dry since June 2022 – Impacted by LW426, LW427 and 428 with stepped water level declines.
SPR1808R	Marrangaroo	Impact	Adjacent to SPR1808. No data from November 2024 to August 2025 due to a malfunctioning logger. Stable - trends with daily CRD. Data from August 2025 shows and increasing trend to September and decreasing from October to December.
LCY2101	Lost City	NA	Stable – trends with the daily CRD and is responsive to rainfall events. Decreasing from January to April, increasing from April to September, and decreasing from September to December. Fluctuations of 0.1 m are common.
PHS	Pine	NA	Variable – When groundwater levels fall below 1,121 mAHD, it drops very quickly while above this level it tends to follow daily CRD. Heavy and prolonged rainfall events typically precede sudden increases in groundwater levels. Two sharp increases were observed in February and May. A steady decline was observed in April and from September onwards in response to below average rainfall.
PLM2101	Plum	NA	Variable – trends with the daily CRD and is highly responsive to individual rainfall events. Declined about 3.5 m From September to December.
PLM2102	Plum	NA	Stable – trends with daily CRD, fluctuations of 0.5 m are common.
RSS	Sunny Side	Impact	Decreasing – long-term decreasing trend since January 2023. Responds to large rainfall events, seen as short sharp rises in groundwater levels that plateau over several weeks. This likely indicates a compromised annulus or seepage from a nearby fire dam. In 2025, rises in response to rainfall were from approximately 2 to 8 m.
WB12101	Wishbone	NA	Dry from October 2024 to May 2025. When saturated, trends with daily CRD and responds to rainfall events. Water levels increased from June to September due to above average rainfall and decreasing from September to December due to below average rainfall.
WB12102	Wishbone	NA	Dry since installation in October 2021.
WB32101	Wishbone	NA	Variable – responsive to individual rainfall events with water levels tapering off over several days to several weeks. In response to heavy or prolonged rainfall, groundwater levels can rise over 1 m, with common rises of approximately 0.5 m. Dry from late November to December.
WB32102	Wishbone	NA	Dry since installation in October 2021.
WB32103	Wishbone	NA	Declining – shows a delayed and subdued response to long-term daily CRD. Water level decreased about 0.5 m from January to December.

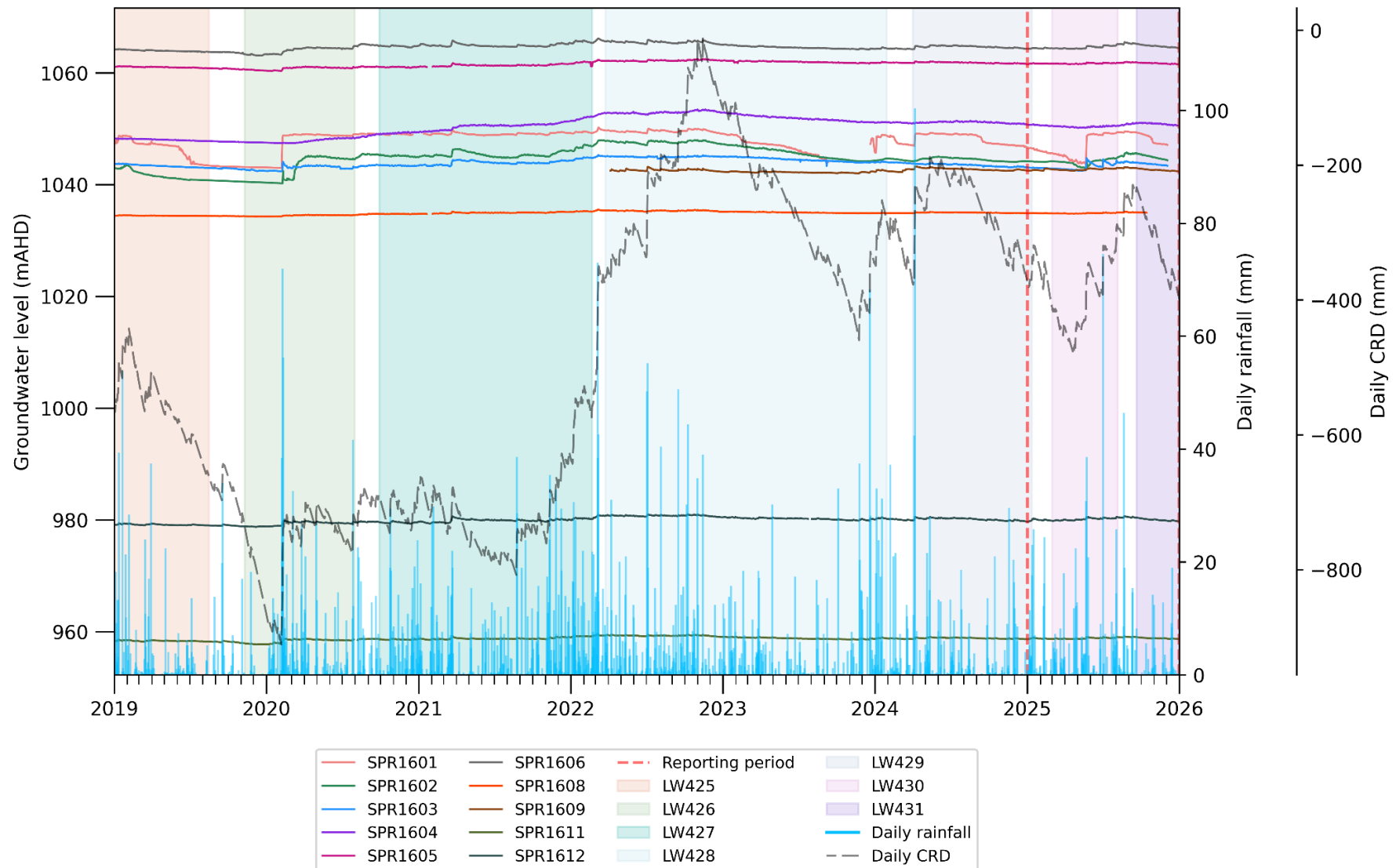


Figure 4.22 Perched aquifer hydrograph

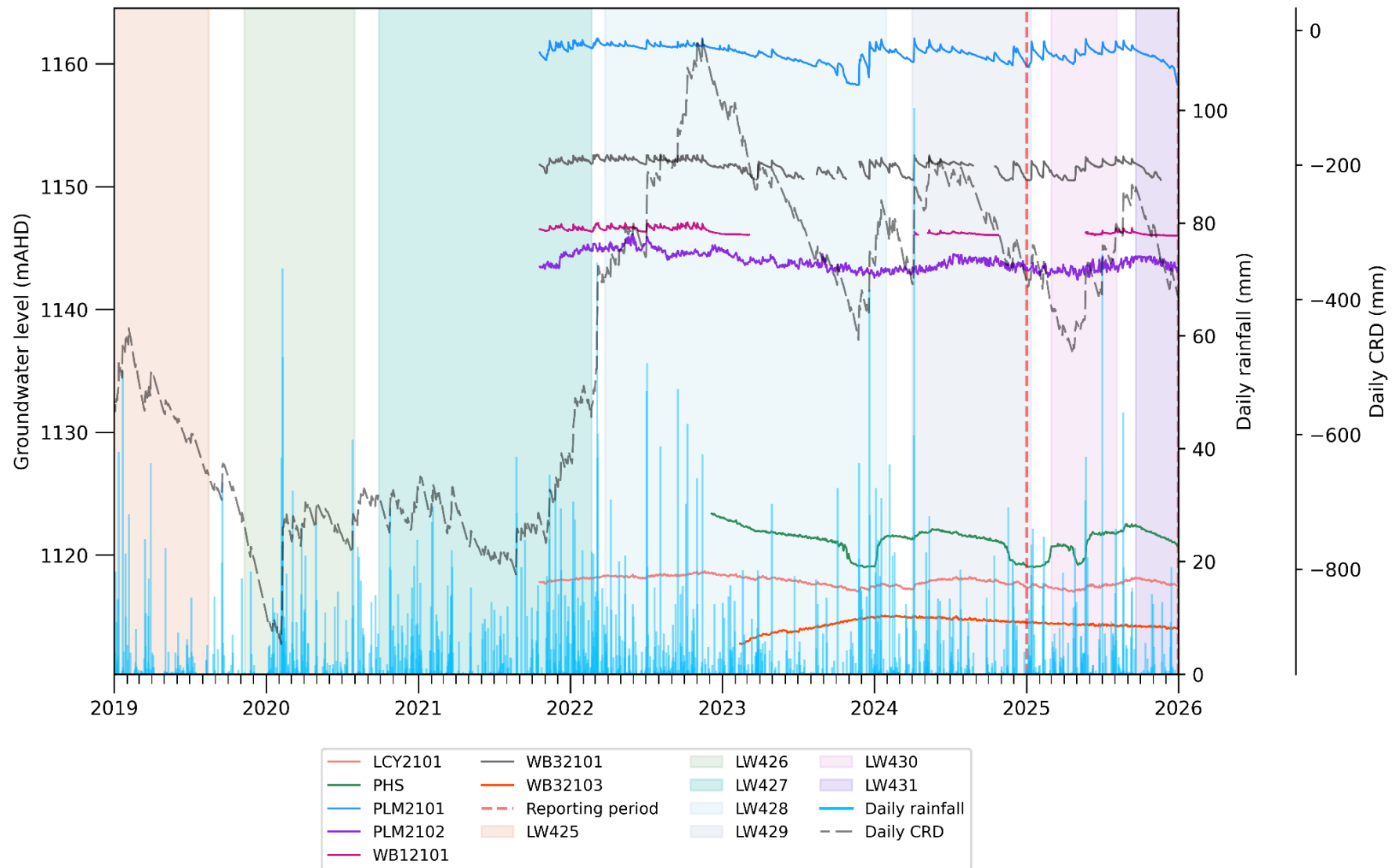


Figure 4.23 Perched aquifer hydrograph

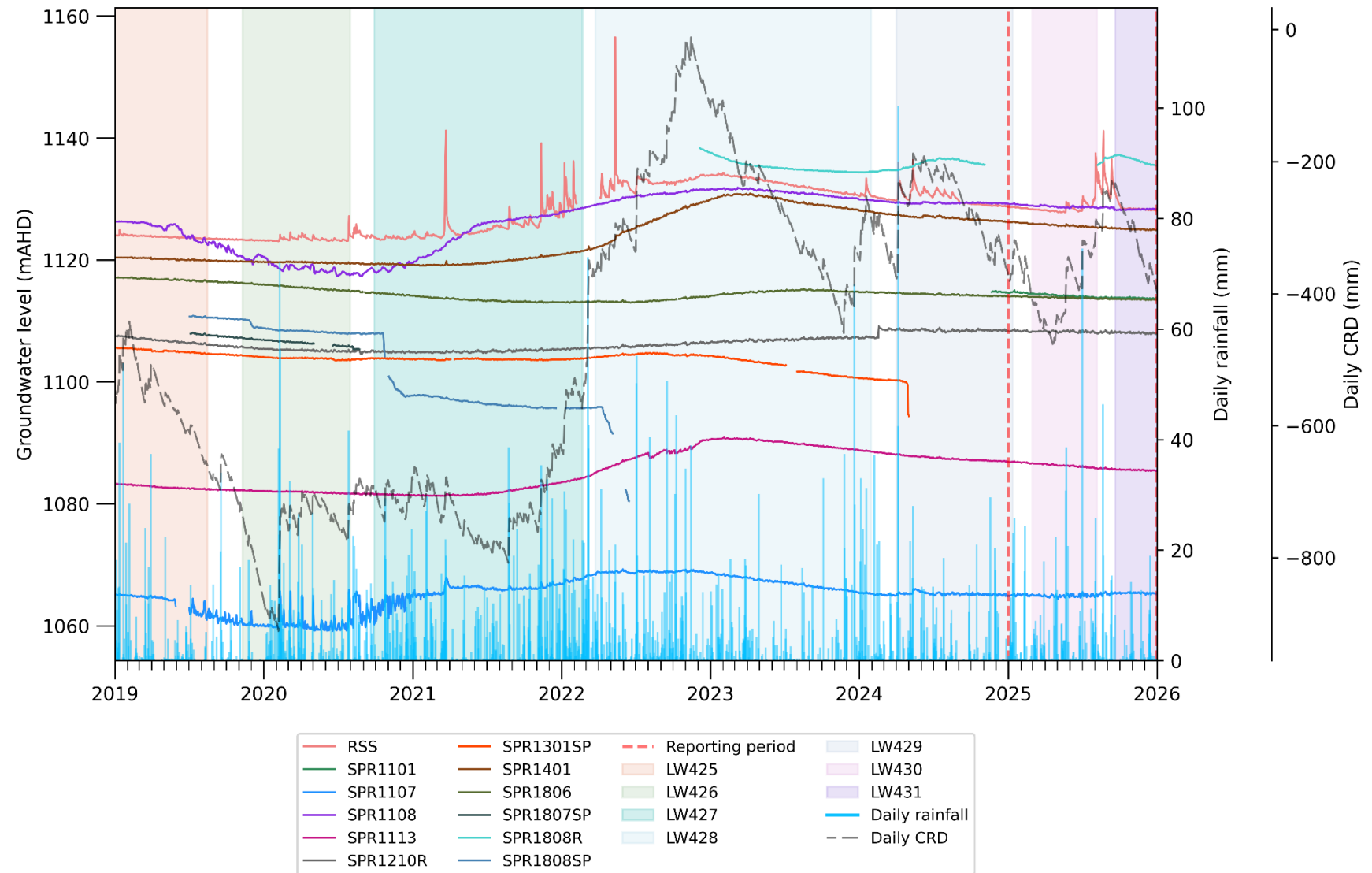


Figure 4.24 Perched aquifer hydrograph

4.3 Standpipe piezometers

Hydrographs for reference and impact standpipe piezometers are shown in Figure 4.25. Comments on groundwater level trends during the reporting period are shown on Table 4.3.

Table 4.3 Shallow groundwater level trend summary

Monitoring ID	Site type	Mined status	Comments
AP5PR	Reference	NA	Stable – trends with daily CRD. No data from September 2025 due to an expired logger.
AP1105	Reference	NA	Decreasing – shows a delayed and subdued repose to long-term daily CRD. Steady decreasing trend of about 0.5 m from January to December.
SPR1106SP	Impact	NA	Decreasing – shows a delayed and subdued repose to long-term daily CRD. Steady decreasing trend of approximately 3 m from January to September. No data from September onwards due to logger hang issues.
SPR1109	Impact	LW418	Decreasing – Previously depressurised by mining. Generally, trends with long-term daily CRD. Groundwater level variability of up to 0.5 m, due to rainfall, increases when it drops below 1,060 mAHD. Steady decreasing trend of approximately 3 m from January to November. No data for December due to logger expiry.
SPR1111	Impact	NA	Decreasing – previously depressurised by mining. Shows a delayed response to long-term daily CRD. Steady decreasing trend of approximately 0.5 m from January to November 2025. The level suddenly dropped by approximately 4 m over one day at the start of December, this is likely due to a change of logger depth. Excluding the sudden drop, trends remain consistent in December.
SPR1112	Impact	NA	Decreasing – shows a delayed and subdued response to long-term daily CRD. Steady decreasing trend of approximately 2 m from January to November. No data in December 2025.
SPR1211	Impact	LW426	Damaged by subsidence in 2020 – decommissioned.
SPR1402	Impact	NA	Vandalised – decommissioned in 2016.
SPR1403	Impact	NA	Damaged by bushfire in 2019 – decommissioned.
SPR1613S	Impact	NA	Stable – trends with daily CRD. Relatively stable trend with short term fluctuations corresponding to rainfall events.
SPR1613D	Impact	NA	Stable – relatively stable trend with fluctuations of up to 0.5 m corresponding to rainfall events. Rainfall between July and September saw groundwater level increases of up to 1 m.
SPR2301	Impact	NA	The groundwater level declined throughout 2024 and 2025 as LW429 approached. Groundwater declined from approximately 17 m from January to December.

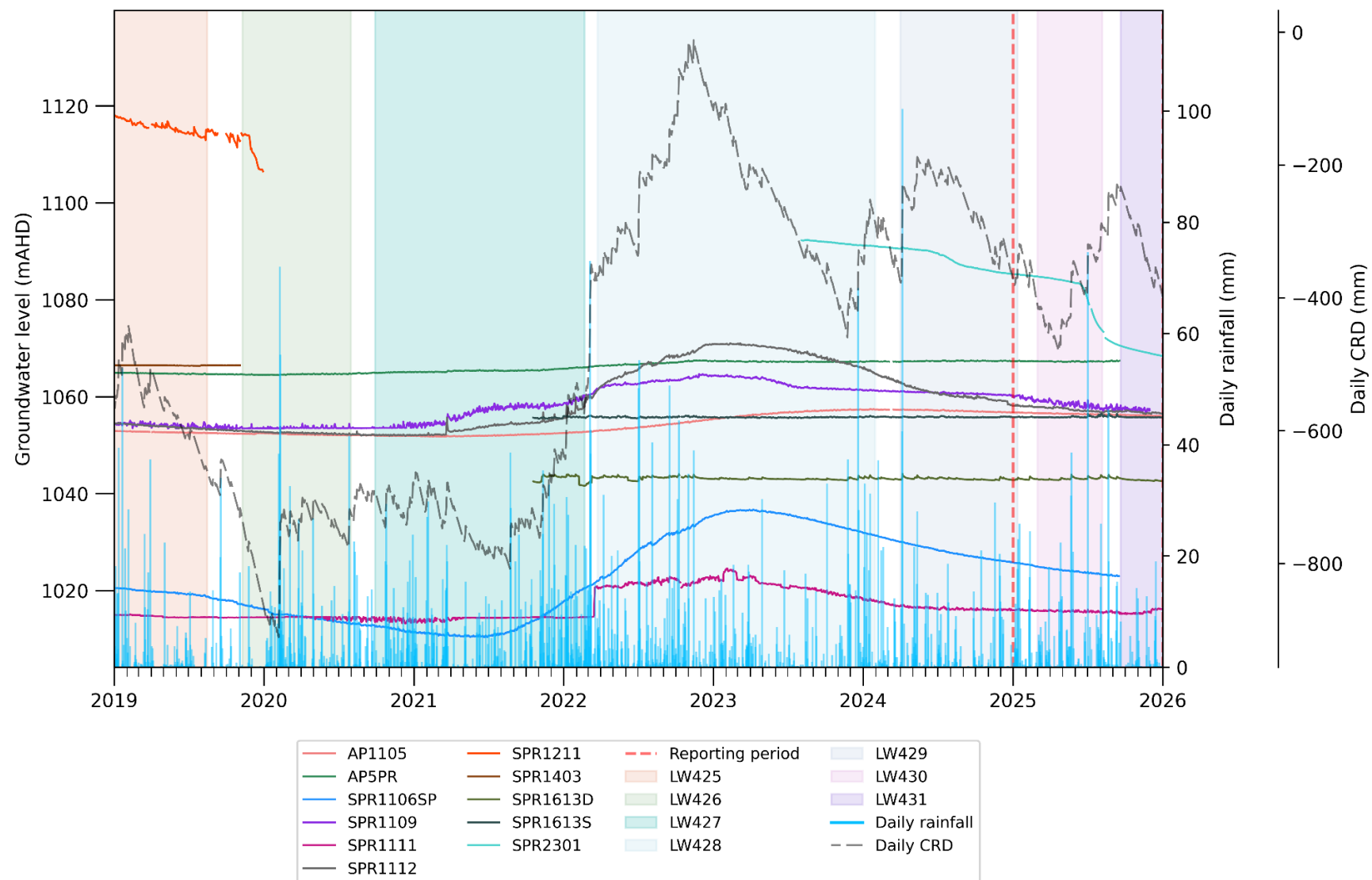


Figure 4.25 Shallow aquifer hydrograph

4.4 Vibrating wire piezometers

Hydrographs for the reference and impact VWP are shown in Figure 4.26 to Figure 4.38. Table 4.4 summarises key groundwater level observations for VWPs during the reporting period. Sensors that are **bold** have been either damaged by subsidence, are no longer functional, unsaturated, or do not have data during the monitoring period.

Table 4.4 Vibrating wire piezometer piezometric head trend summary

Monitoring ID	Sensor depth (mbgl) ¹	Comment
SPR37	P1 405 m (AQ1), P2 350 m (AQ1), P3 320 m (SP1), P4 260 m (AQ3), P5 187 m (AQ3), P6 165 m (AQ4), P7 135 m (AQ4), P8 110 m (AQ4)	SPR37 is positioned between LW429 and 430. Pre-mining data collection ended on 6 April 2023 when LW428 approached within 600 m of SPR37. LW429 passed SPR37 around 12 August 2024. A trigger investigation for SPR37 VWP was issued to the regulators on 6 December 2024 following piezometric pressure declines from 28 May 2024. The trigger investigation found the piezometric pressure declines observed above the MYC were not consistent with reference piezometers or most near-by piezometers and SPR37 had been impacted by the mining of LW429. By early October 2024, all sensors had failed due to subsidence. A summary is provided below: • P1 depressurised in August 2022 and displayed erratic/erroneous data from the end of October 2022. Non-functional from 13 August 2024. • P2 erroneous data from February 2013. • P3 unsaturated since August 2016. Erroneous data from 15 August 2024 and non-functional from 8 October 2024. • P4 depressurisation observed from mid July 2024. Nonfunctional from 13 August 2024. • P5 depressurisation observed from late May 2024. Erroneous data from 1 October 24 and non-functional from 10 October 24. • P6 erroneous data from August 2020. Patchy data from August 2024 to October 2024 shows a declining trend. Non-functional from 18 October 2024. • P7 depressurisation observed from late May 2024. Non-functional from 29 September 2024. • P8 erroneous data from late November 2023. Non-functional from 14 August 2024.
SPR38	P1 80 m (AQ4), P2 100 m (AQ4), P3 135 m (AQ4), P4 190 m (AQ3), P5 230 m (AQ3), P6 300 m (semi-permeable layer), P7 355 m (AQ1), P8 370 m (AQ1)	SPR38 was previously undermined by LW427 and was outside the LW429 TIA during the reporting period. It has previously been impacted by mining and a trigger investigation was completed (Jacobs, 2020). The functionality and trends of the sensors during the reporting period is summarised below: • P1, P6, P7 and P8 lost communication with the logger in 2020 possibly due to subsidence caused by LW427. • P5 has been unsaturated since 2016. • P2 slight declining trend showing a delayed response to below average rainfall between January 2023 and November 2024. Non-functional since November 2024. • P3 slight declining trend showing a delayed response to below average rainfall from March 2024 to December 2025. • P4 stable throughout the monitoring period.

Monitoring ID	Sensor depth (mbgl) ¹	Comment
SPR48	P1 200 m, P2 170 m, P3 140 m, P4 110 m, P5 90 m, P6 70 m, P7 50 m, P8 30 m.	SPR48 was previously undermined by LW412 and 413. A data gap exists between mid-February and early September 2024 due to a logger malfunction, however trends correspond to historical observations. The functionality and trends of the sensors during the reporting period is summarised below: • P1, P2 and P4 are non-functional. • P3, P5, P6, P7, and P8 show stable trends during 2025. No data from October 2025 onwards due to battery expiry.
SPR49	P1 295 m, P2 250 m, P3 200 m, P4 150 m, P5 110 m, P6 80 m, P7 50 m, P8 30 m	SPR49 was previously undermined by LW412 and 413. A data gap is present between mid-April and mid-November 2024 due to logger failure. Currently only sensors P7 and P8 remain functional and are summarised below: • P7 shows an increasing trend in 2025. • P8 shows a decreasing trend in 2025.
SPR1208	P8 90 m, P7 130 m, P6 226 m, P5 303 m, P4 330 m, P3 380 m, P2 411 m, P1 421 m.	SPR1208 was previously impacted by LW429 and was damaged by bushfire in January 2020. A new data logger was installed in May 2024 and the site was re-commissioned. All sensors showed stable trends throughout 2024 and were comparable observations prior to logger failure. The replacement logger as damaged by lightning in December 2024 and was not replaced in 2025.
SPR1210	P1 388 m (AQ1), P2 376 m (AQ1), P3 326 m (AQ2), P4 308 m (semi-permeable layer), P5 224 m (AQ3), P6 160 m (AQ4), P7 76 m (AQ6)	SPR1210 was previously undermined by LW428 in early May 2023 and saw piezometric pressure declines from 27 March 2023. A trigger investigation was completed during the previous reporting period (1 January 2023 – 31 December 2023) and submitted to the regulators on 2 November 2023. The trigger investigation found the response observed at SPR1210 VWP was like other VWP sites impacted by earlier longwalls, however no impact was seen at nearby standpipe piezometer SPR1210R, indicating the perched aquifer could still be intact. SPR1210 remained within the LW429 TIA during the current reporting period. The functionality and trends of the VWP sensors is summarised below. • P1, P2 and P3 (below the MYC) failed in April 2023 due to the passing of LW428. • P4 and P5 (below MYC) showed declining trends in 2025. P4 declined approximately 3.5 m, while P5 declined approximately 2.2 m. • P6 (above MYC) has shown a slight increasing trend. • P7 (above MYC) increased in 2025 from approximately 1 m from January to December.
SPR1212	P6 182 m, P5 197 m, P4 208 m, P3 229 m, P2 264 m, P1 280 m	From late December 2023 the data logger recorded spot data across all sensors, resulting in data gaps throughout the reporting period. In mid-July the logger completely failed and was replaced with a spare Ontoto telemetry VWP system in late November 2024. Data was sporadically collected by the old logger in January, February, August, and September 2025. All sensors showed stable trends corresponding to previous observations.
SPR1302	P1 390 m (AQ1), P2 370 m (AQ1), P3 310 m (AQ2), P4 270 m (AQ3), P5 200 m (AQ3)	SPR1302 was outside the TIA during the reporting period. Depressurisation responses were seen in September 2021 due to the commencement of first workings of LW428. The functionality and trends of the VWP sensors during the reporting period is summarised below: • P1 – failed from February 2025 onwards. • P2 – remained stable throughout the year. • P3 – no data observed since November 2020. • P4 – no data observed since January 2024. • P5 – declining trend from approximately 2 m from January to December.

Monitoring ID	Sensor depth (mbgl) ¹	Comment
SPR1804	P1 345 m, P2 291 m, P2 217 m, P4 118 m, P5 69 m, P6 38 m	Undermined by LW425 – decommissioned. No hydrograph shown.
AP10PR	P1 343 m, P2 327 m, P3 300 m, P4 270 m, P5 248 m, P6 205 m, P7 150 m, P8 103 m, P9 60 m	AP10PR is a reference site. • P1, P2, P3, and P7 showed increasing trends from January to December. • P4, P5, and P6 showed decreasing trends. • P8 and P9 trend with daily CRD, slightly declining over the monitoring period.
SPR64	P1 390 m, P2 370 m, P3 310 m , P4 270 m, P5 200 m, P6 150 m, P7 100 m, P8 30 m	SPR64 is in an unmined section above LW432, outside the LW429 TIA. SPR64 was previously damaged by the Gaspers Mountain bushfire and was decommissioned. A new data logger was installed in November 2023 and in January 2024 all sensor wires were repaired. All sensors are currently functional, and three sensors are installed above the MYC (P6, P7 and P8). A trigger investigation was issued to regulators in September 2025 for sensors above the MYC. • P1 declined from approximately 19 m from January to September, and increased from about 7 m from September to November. • P2 declined from approximately 10 m from January to April. The sensor failed from April. • P3 failed February. • P4 was variable. Increasing from January to March 2025 and decreasing from March to July 2025. Levels increased by approximately 6 m before declining in October and returning to pre-September levels. • P5 varied in 2025, like P4. It showed an overall declining trend of about 3 m from January to November. • P6 and P7 followed similar trends to P4 and P5, before each sharply declined in October by over 22 m. • P8 slightly increased from January to February. No data was recorded for the remainder of the year because it was unsaturated.
SPR67	P8 35 m, P7 50 m, P6 70 m, P5 90 m, P4 110 m, P3160 m, P2 200 m, P1 260 m	SPR67 is in a previously mined area above LW417. Data was not recorded from June 2025 due to logger issues. The functionality and trends of the VWP sensors during the reporting period is summarised below: • Sensor P1, P2 and P3 have been non-functional since 2015. Piezo P4 has been non-functional since September 2020. Malfunctions are due to mining. • Sensor P5 showed a stable trend throughout the reporting period. • Sensor P6 showed an increasing trend from January to April before stabilising. • Sensor P7 showed a stable trend throughout the reporting period. • Sensor P8 increased from late-January to April before stabilising.
SPR1102	P9 82 m, P8 125 m, P7 148 m, P6 160 m, P5 203 m, P4 292 m, P3 312 m, P2 380 m, P1 404 m	No mining has occurred in the vicinity of SPR1102 and piezometric pressure trends are typically stable. Several data gaps are present due to logger failures. No data was recorded in 2025 due to logger malfunction.

Monitoring ID	Sensor depth (mbgl) ¹	Comment
SPR1103	138 (P9), 151 (P8), 178 (P7), 236 (P6), 290 (P5) , 313 (P4), 326 (P3), 381 (P2), 401 (P1)	Piezometric pressure trends are typically stable. Several data gaps are present due to logger failures. A summary is provided below: • Sensor P1 slight increasing trend. • Sensor P2, P3, P4, P6, and P9 did not record information since January due to logger issues. • Sensor P5 failed in December 2016. • Sensor P7 recorded an increasing trend from July to October 2025. No other data was recorded. The increasing trend follows the previous sudden and depressurisation of approximately 14.5 m from 9 May 2024. The depressurisation is unexplainable and likely due to sensor malfunction. A recovering trend has been observed since. • Sensor P8 remained stable from January to March, declined approximately 1 m from March to May, then increased approximately 1 m until October. No data was recorded for the remainder of the year.
SPR1106	P8 123 m, P7 163 m, P6 251 m, P5 261 m, P4 277 m, P3 323 m, P2 341 m, P1 362 m	Vandalised in August 2023.
SPR2303B	P8 46 m, P7 146 m, P6 203 m, P5 247 m, P4 279 m, P3 316 m, P2 356 m, P1 387 m	SPR2303B was installed in mid-December 2023. A summary is provided below: • P1 decreased approximately 8 m from January to March. It increased approximately 69 m from March to December. • P2 remained stable from January to March at around 877 mAHD. Declined approximately 12 m from March to October, before sharply declining approximately 13 m in late October. From November levels remained stable around 852 mAHD. • P3 followed a similar trend to sensor P2, overall declining approximately 13 m from January to November. From November onwards levels slightly increased. • P4 over all declining trend decreasing by approximately 10 m in 2025, with a notable drop of approximately 5 m in October. • P5 stable. • P6 declining trend with a sharp decrease in October. • P7 (above MYC) declining trend with a sharp decrease in October. • P8 (above MYC) stable.

Notes: 1. mbgl = metres below ground level

Bold numbers indicate sensors that are faulty or damaged by subsidence.

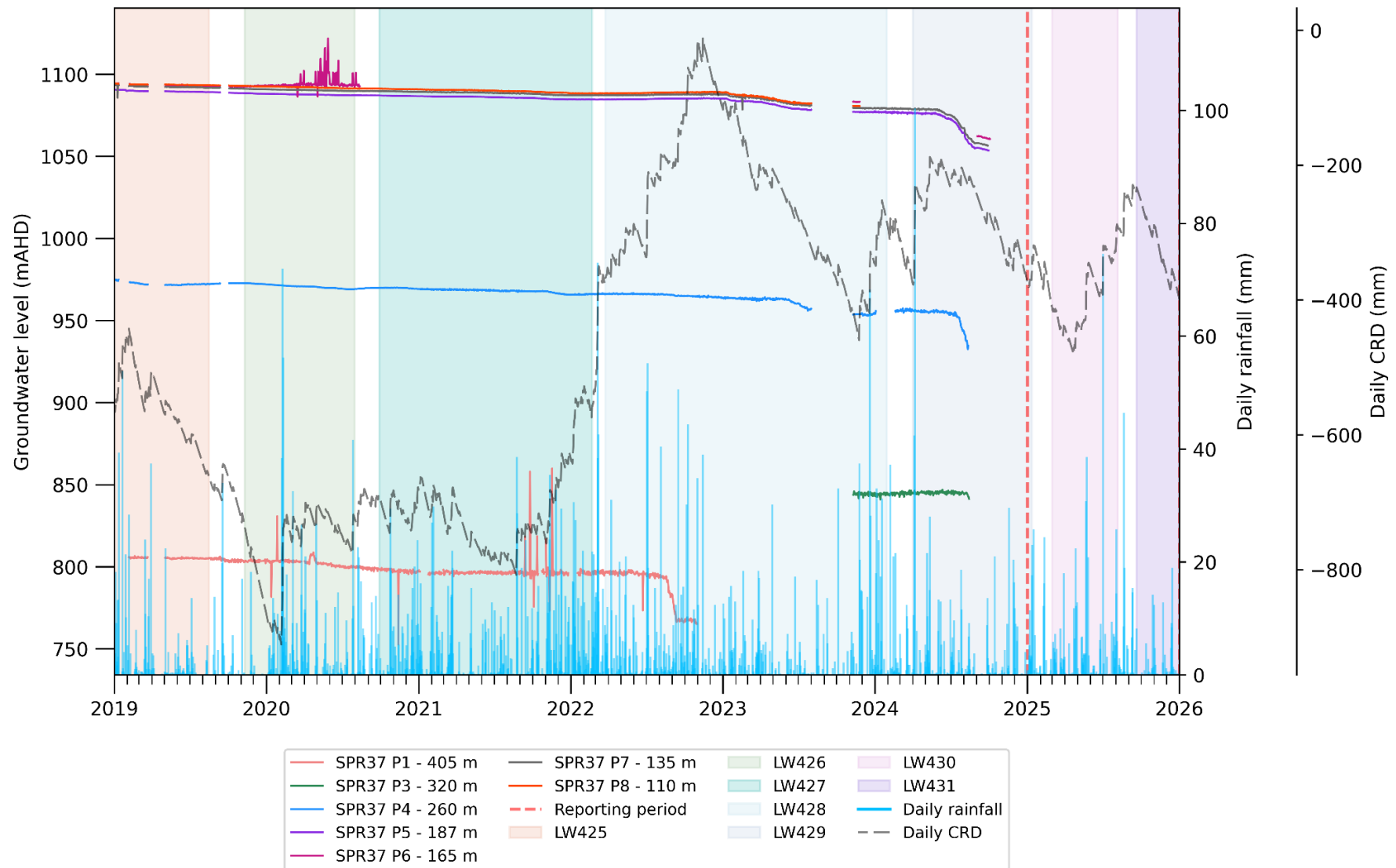


Figure 4.26 SPR37R hydrograph

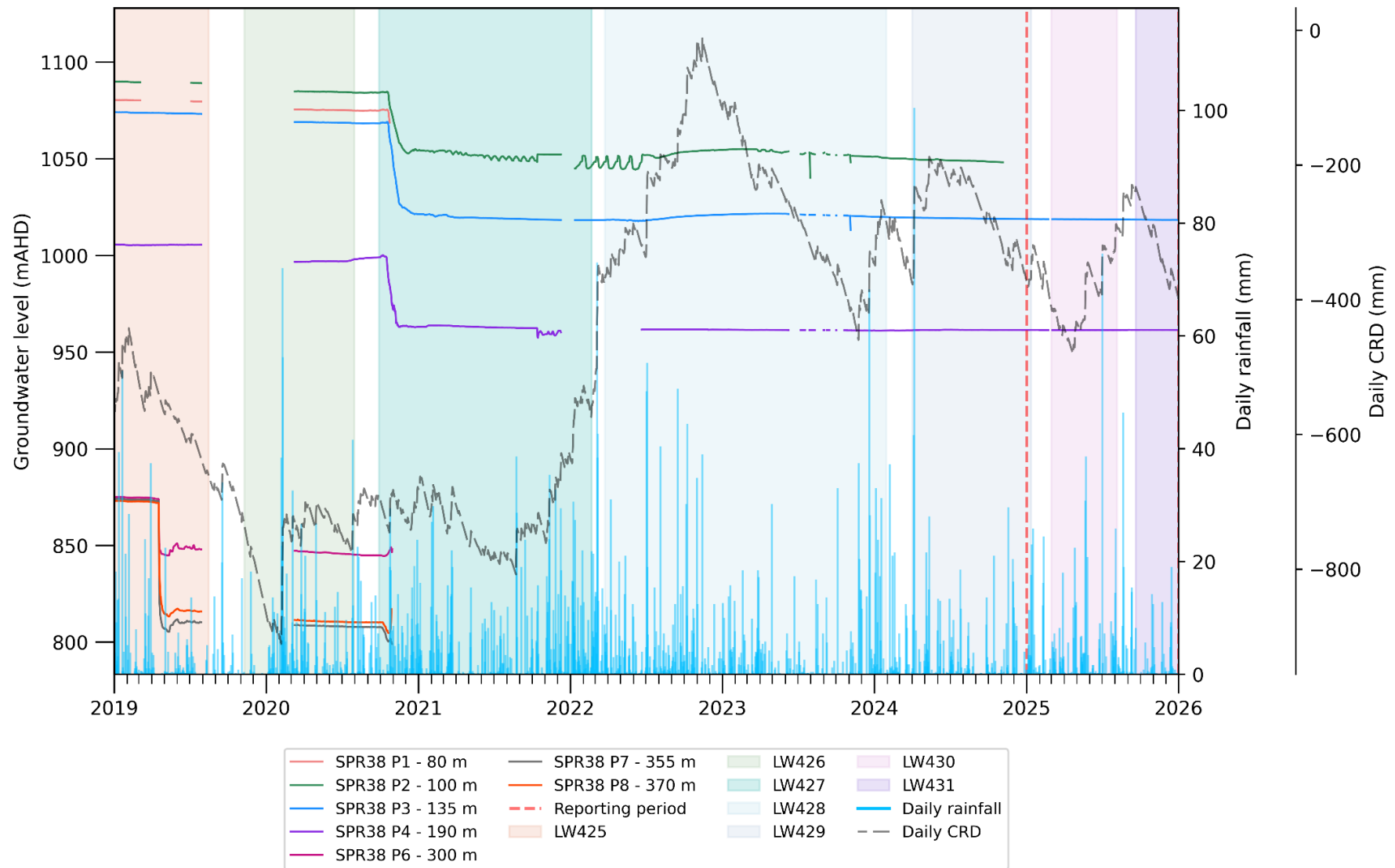


Figure 4.27 SPR38 hydrograph

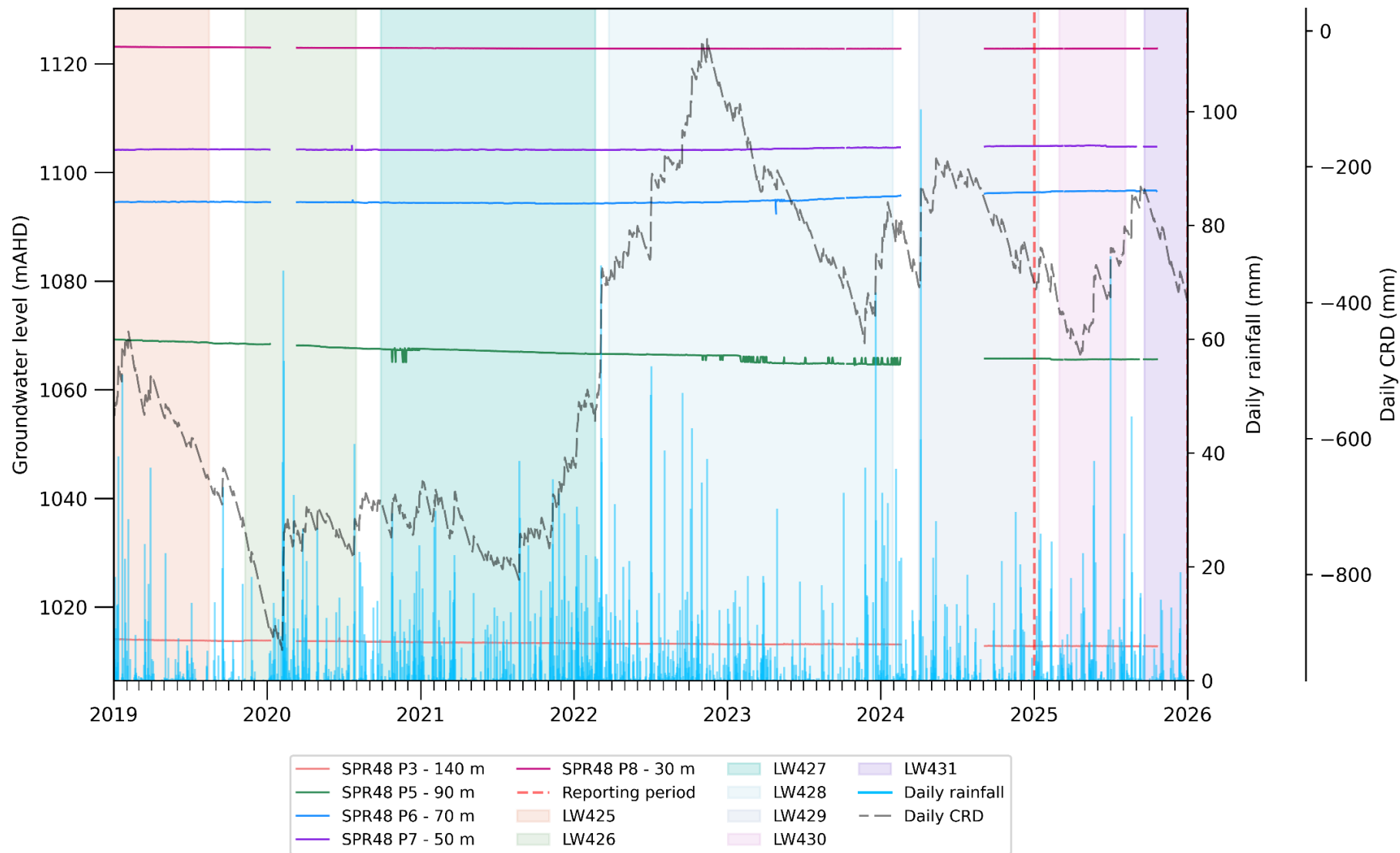


Figure 4.28 SPR48 hydrograph

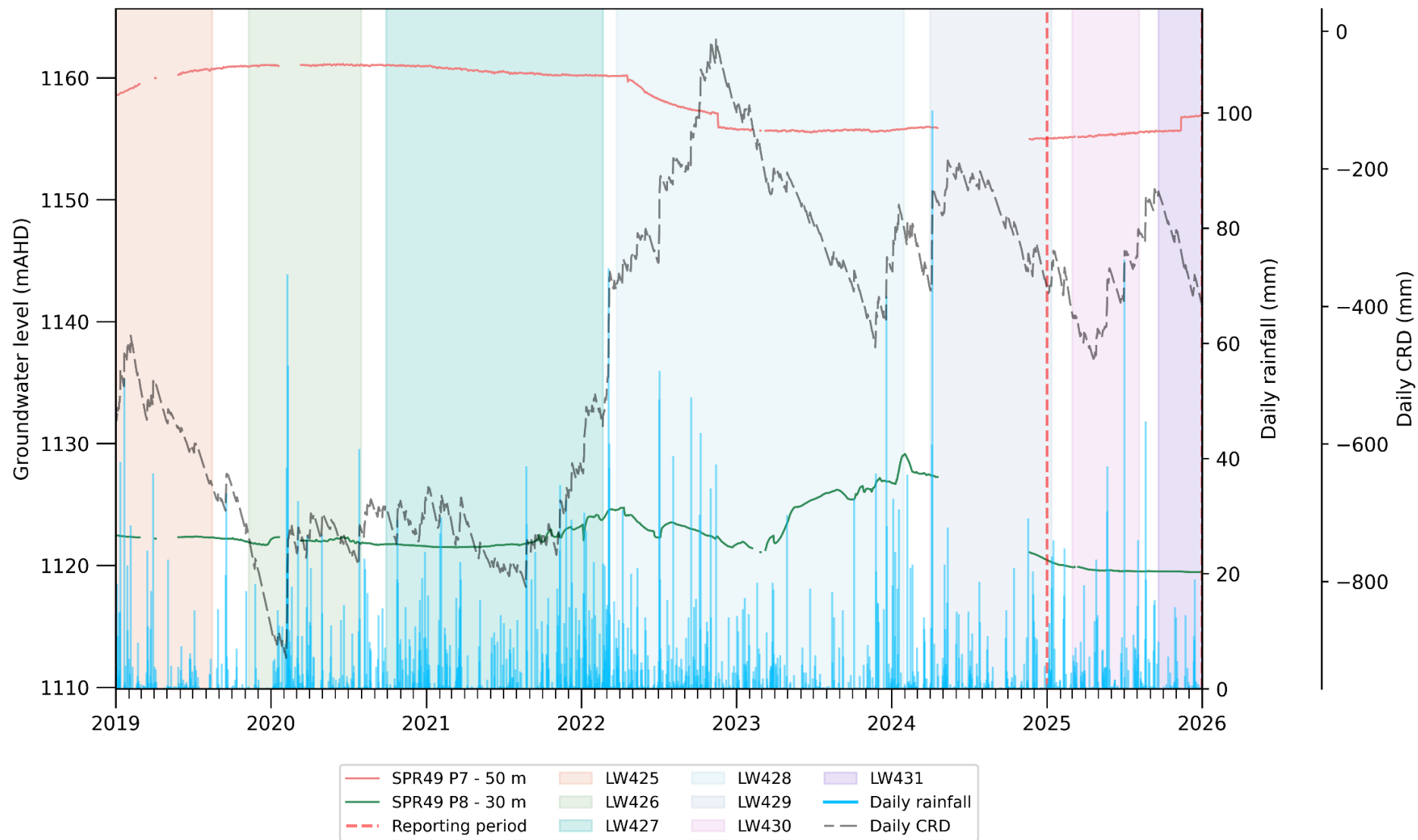


Figure 4.29 SPR49 hydrograph

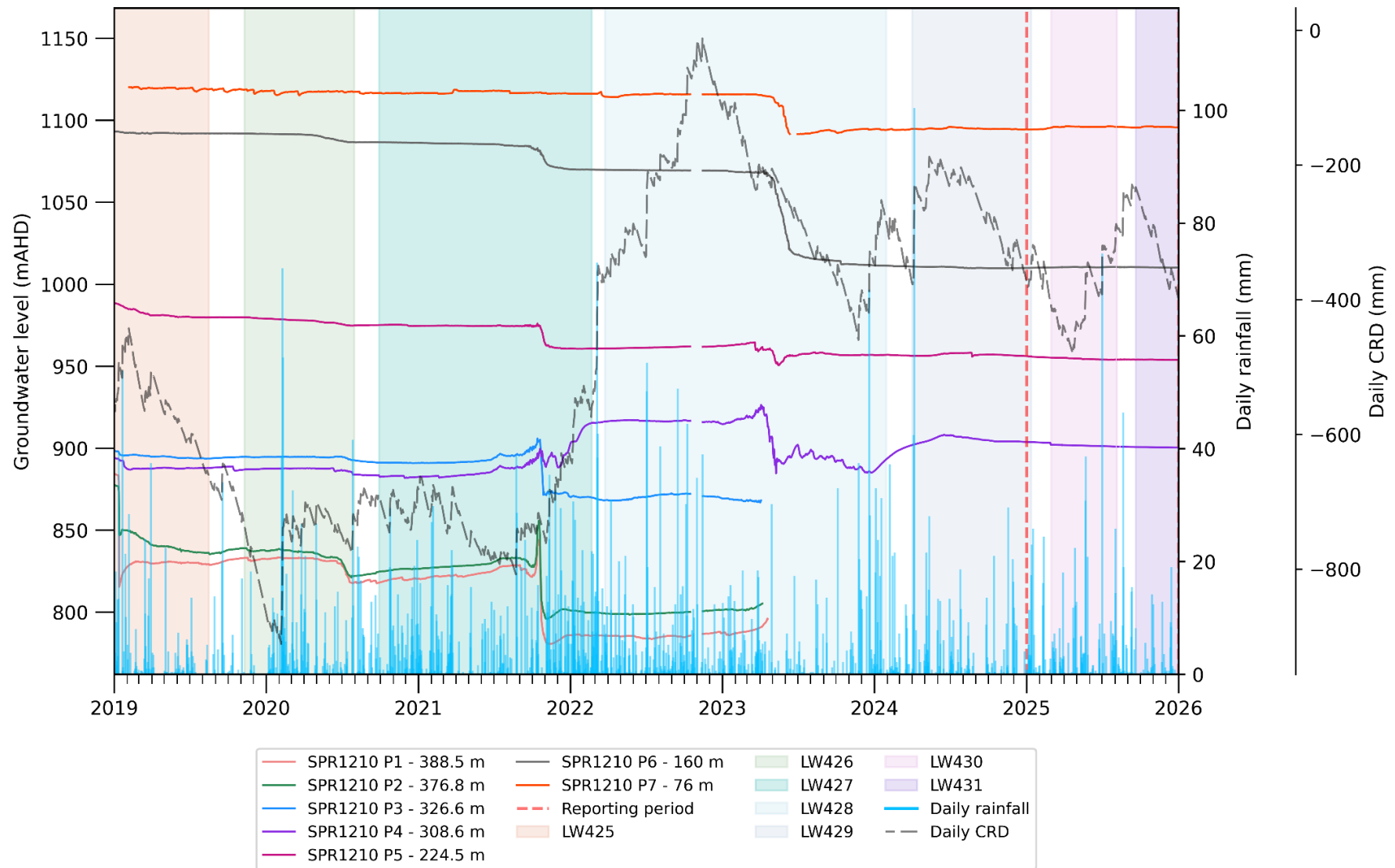


Figure 4.30 SPR1210 hydrograph

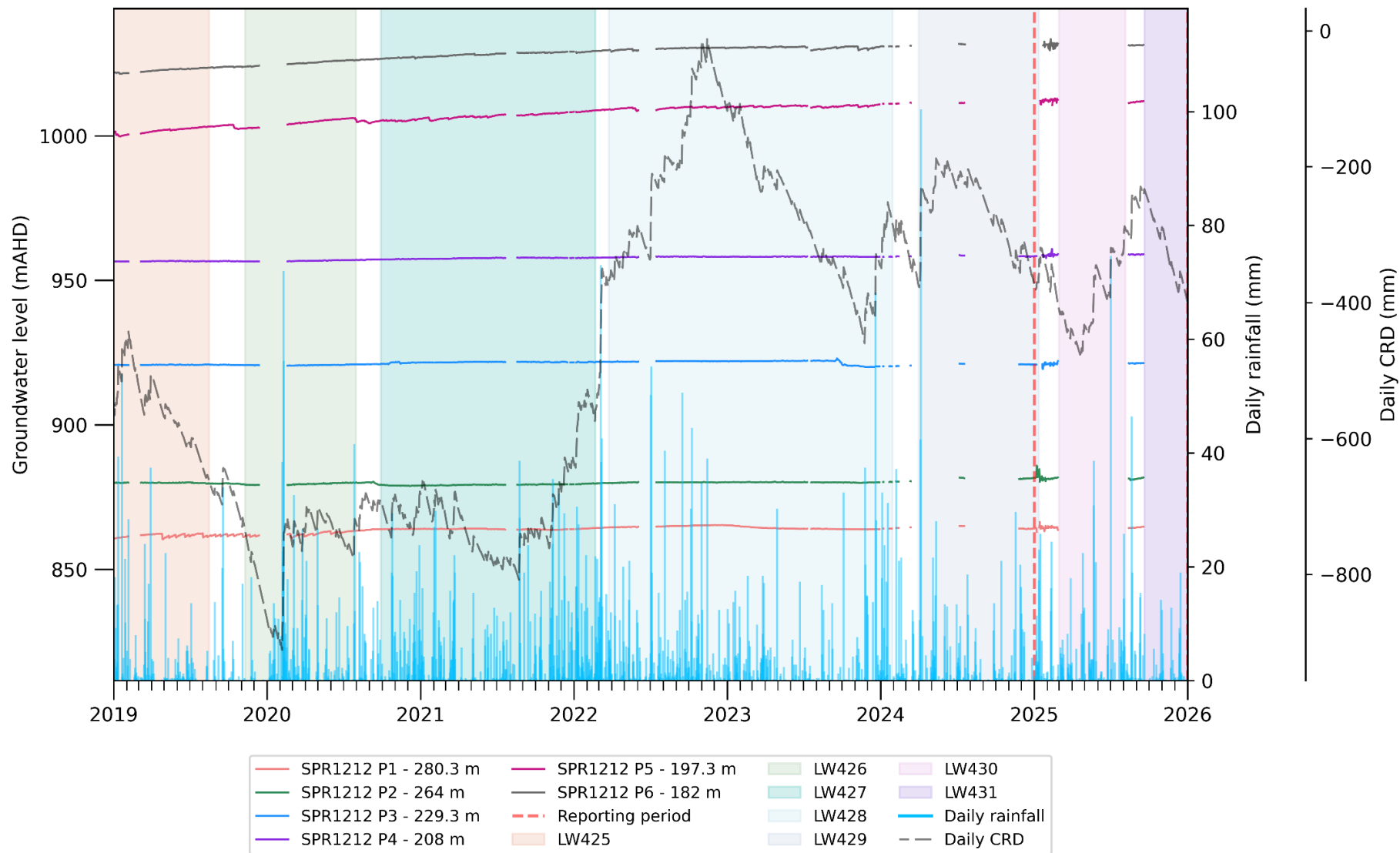


Figure 4.31 SPR1212 hydrograph

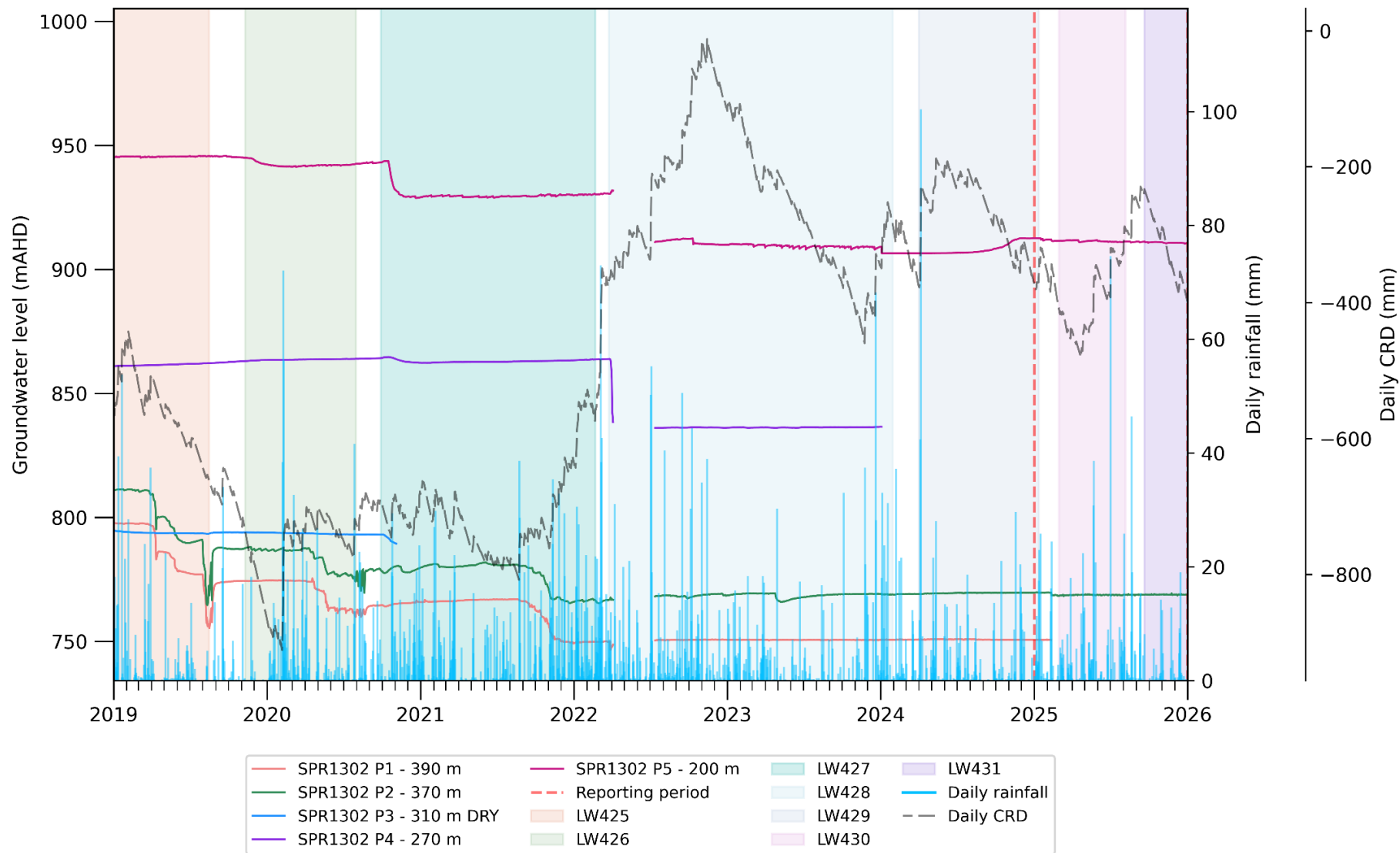


Figure 4.32 SPR1302 hydrograph

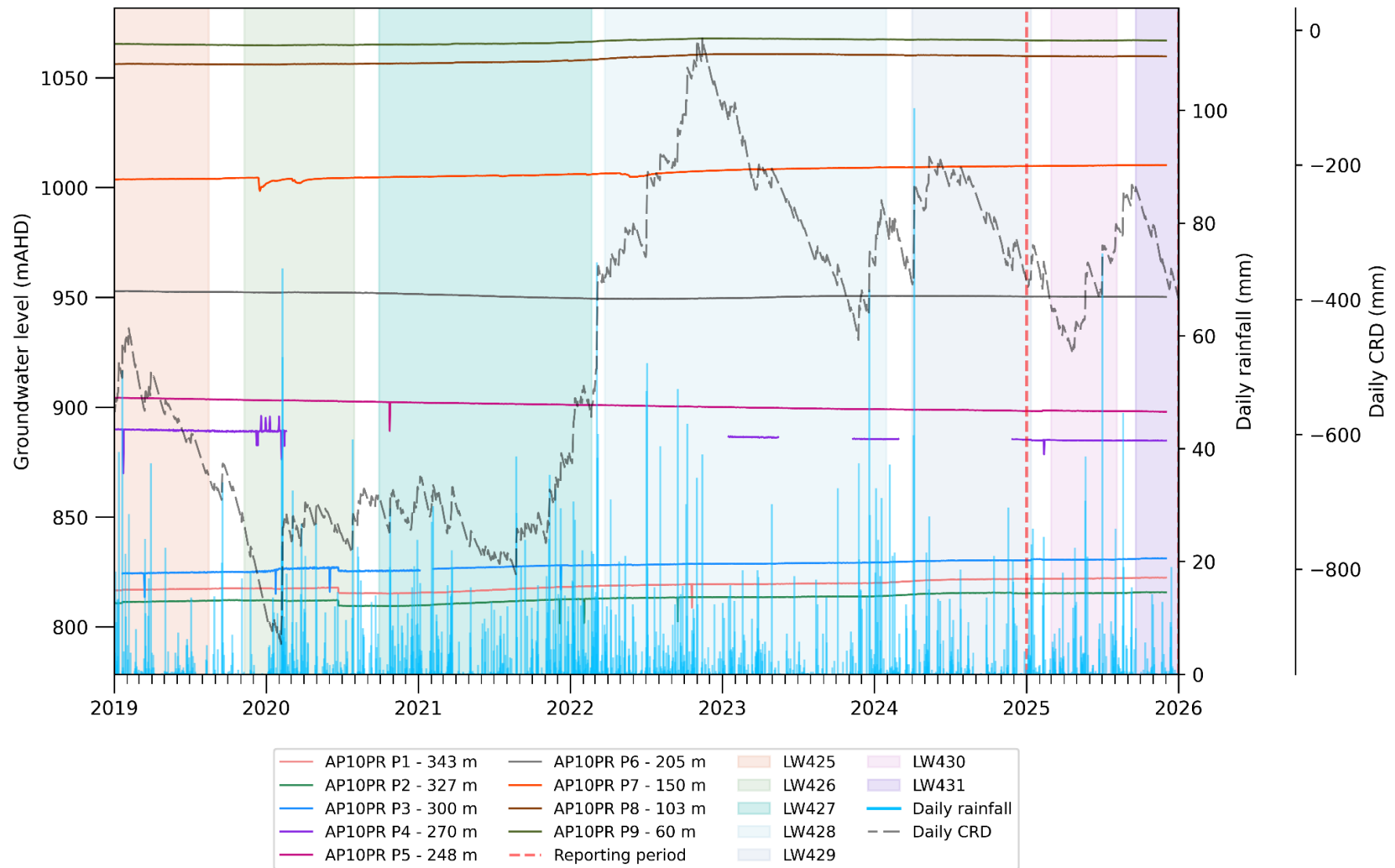


Figure 4.33 AP10PR hydrograph

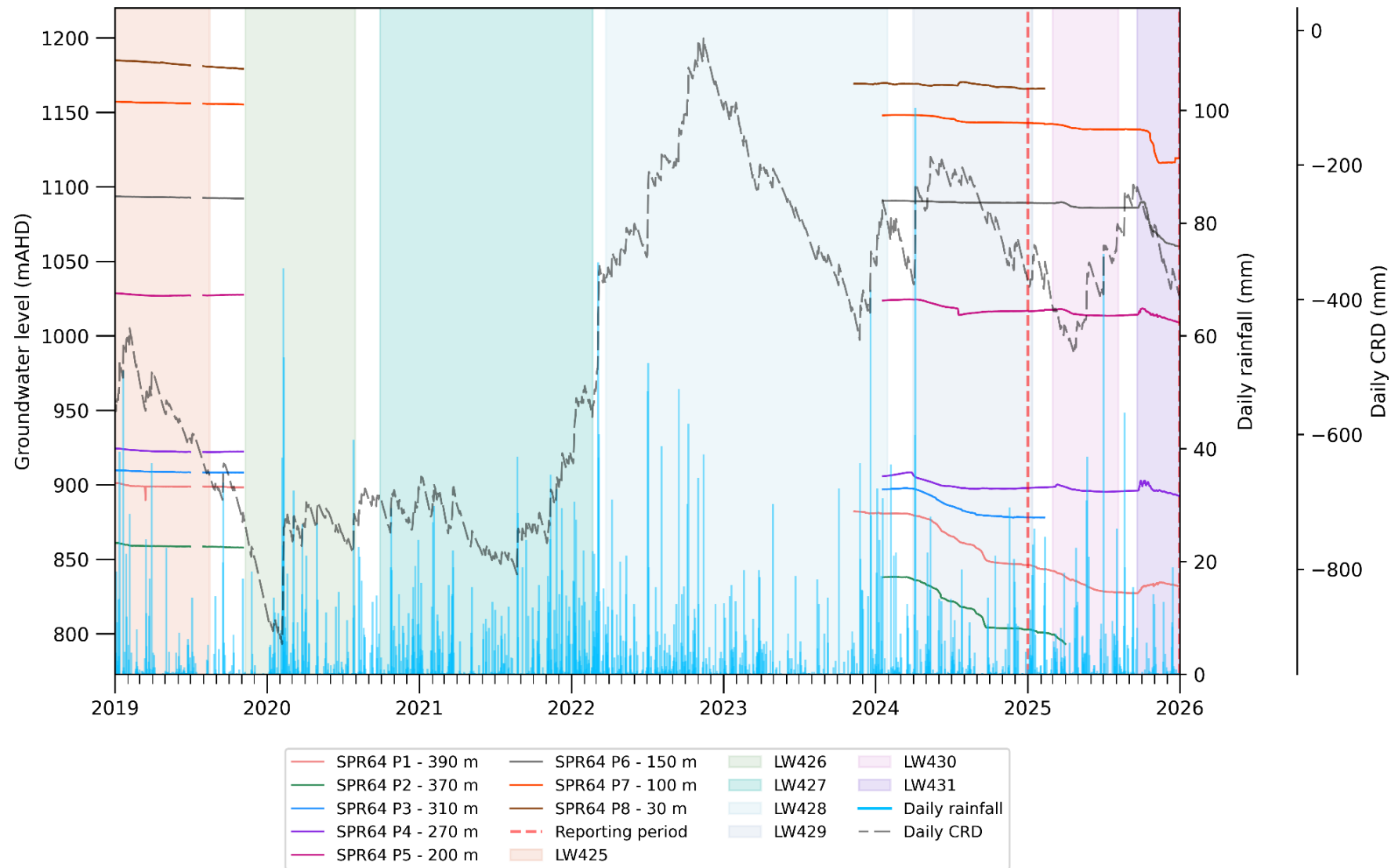


Figure 4.34 SPR64 hydrograph

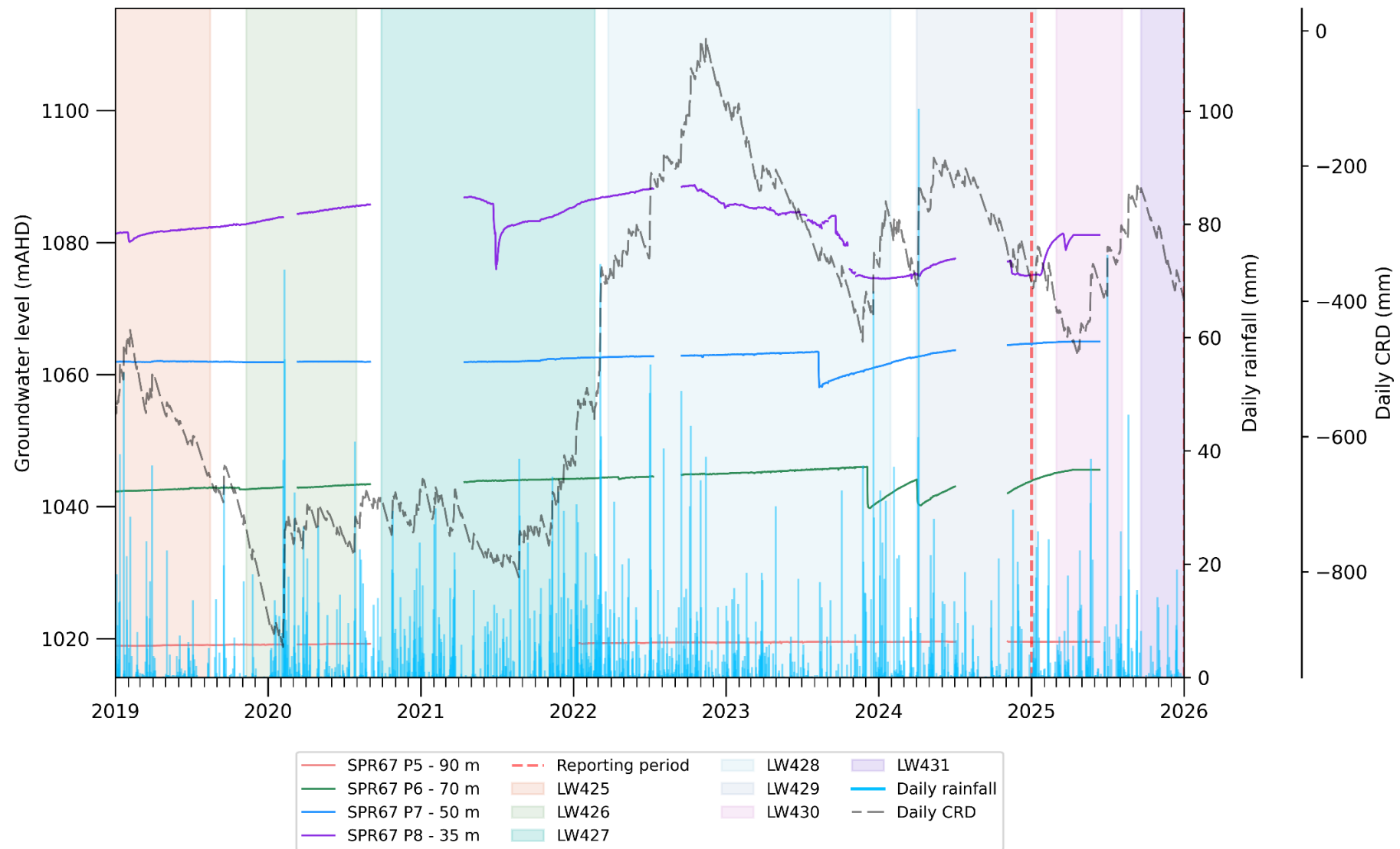


Figure 4.35 SPR67 hydrograph

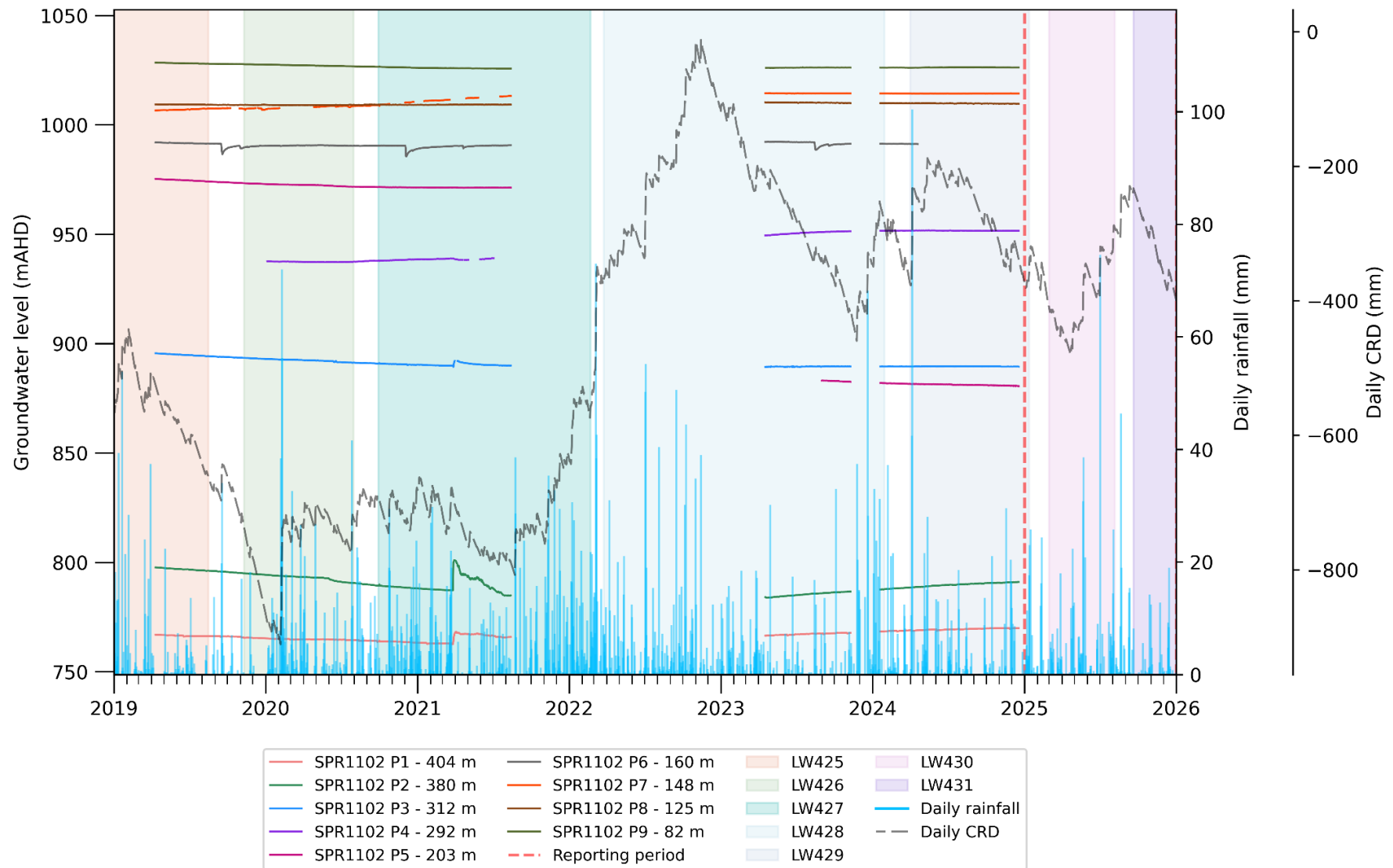


Figure 4.36 SPR1102 hydrograph

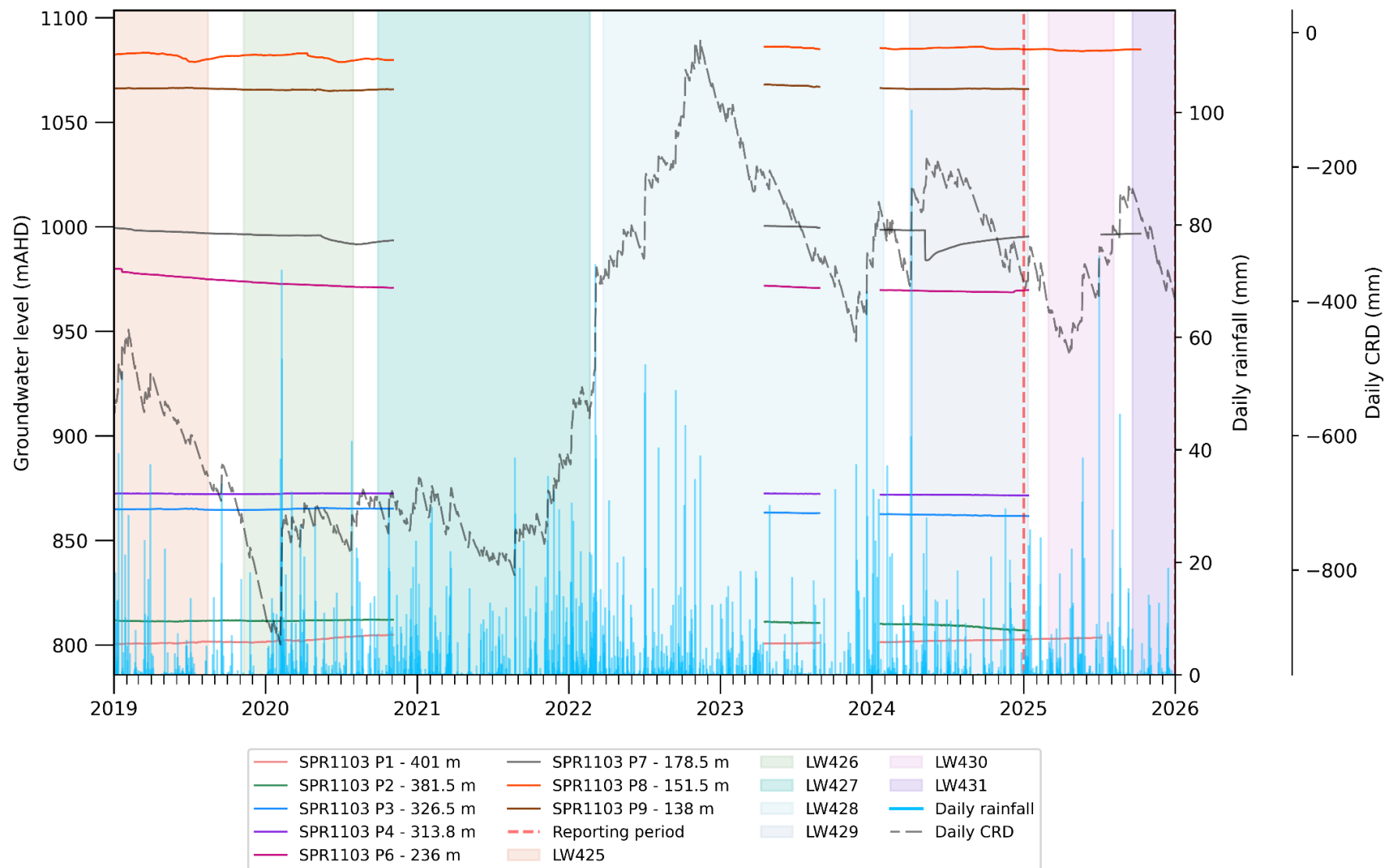


Figure 4.37 SPR1103 hydrograph

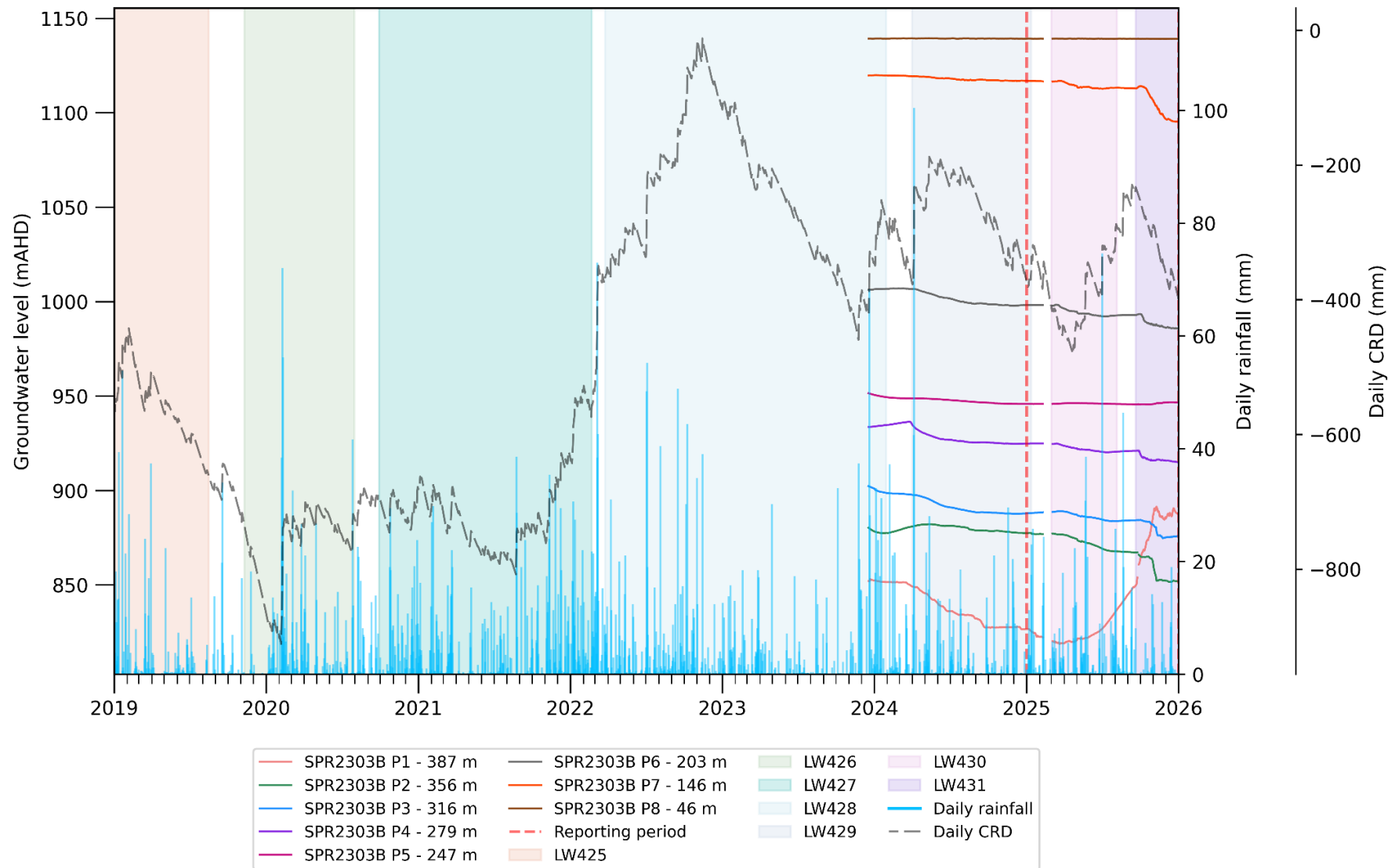


Figure 4.38 SPR2303B Hydrograph

5 Soil moisture monitoring

Soil moisture probes were installed within swamps, positioned adjacent to swamp piezometers, to collect data supporting impact assessments and trigger investigations (Centennial, 2022a).

Most soil moisture probes were installed between July and October 2018 however many were damaged in the 2019/2020 bushfires and were subsequently reinstated in September 2020. Four additional probes were installed in September 2021 at Lost City Swamp.

Table 5.1 provides a summary of the soil moisture trends. Time series for soil moisture sites are shown in Appendix D.

Table 5.1 Soil moisture monitoring trend summary

Monitoring ID	Site type	Comment
BA1SM	Reference	The 10 centimetre (cm) sensor generally remained stable around 2% moisture content with singular spikes throughout 20BA125. The 20 cm sensor shows a variable trend. Remaining sensors displayed stable moisture, from fully saturated at 30 cm, decreasing with sensor depth to approximately 65% moisture at 120 cm.
BA2SM	Reference	Sensors at 10 cm, 20 cm, and 40 cm dipped in moisture between February and July 2025. Remaining sensors displayed stable moisture. Sensors showed moisture content generally reduced from fully saturated near ground level to approximately 65% moisture content at 80 cm.
BA3SM	Reference	Stable moisture content. Sensors showed moisture content generally reduced from fully saturated near ground level to approximately 65% moisture content at 80 cm.
BE1SM	Reference	The 10 cm, 20 cm, and 30 cm sensor showed variation in response to climate conditions, with increased moisture from March to October. Stable moisture content in remaining sensors. Sensors showed moisture content generally reduced from fully saturated near ground level to approximately 55% moisture content at 120 cm.
BE2SM	Reference	Shallower sensors typically show a more variable trend while deeper sensors are more stable. Sensors below 40 cm generally increased from January to August, then decreasing for the remainder of the year. Sensors below 40 cm showed a stable moisture content, generally reduced from fully saturated near ground level to approximately 55% moisture content at 120 cm.
BS1SM	Impact	Sensors between 10 cm and 100 cm generally showed a reducing trend from January to May 2025, before increasing. The response is subdued for sensors at a greater depth. Sensors shallower than 50 cm declined in late 2025, starting from September. The moisture content at 110 cm (~77%) and 120 cm (~69%) remained stable throughout the year.
BS2SM	Impact	All sensors varied with responses to rainfall.
BS3SM	Impact	Sensors were generally stable showing saturation near surface to approximately 65% moisture content at 80 cm.
BS4SM (PSS)	Impact	Sensors between 10 cm and 40 cm generally showed a variable trend from January to April 2025, before increasing and becoming stable until October 2025. The response is subdued for sensors at a greater depth. Sensors shallower than 50 cm declined in late 2025, starting from September. The moisture content below 50 cm remained stable throughout the year. Sensors near surface were close to saturation, decreasing in moisture content with depth to approximately 60% at 120 cm.
BS5SM (NMSS)	Impact	Moisture stable around 2% at 10 cm and 20 cm sensors. Increasing trend at 30 cm from approximately 22–37%. Remaining sensors were stable and showed moisture content decreased with depth, saturated at 40 cm reducing to 67% at 120 cm.
CC1SM	Reference	Sensors between 10 cm and 40 cm varied from January to May 2025, then stabilised for the remainder of the year. Remaining sensors were stable with a moisture content of 60–65%.

Monitoring ID	Site type	Comment
CC2SM	Reference	Variable moisture in all sensors from January to May. Moisture increased in May and remained stable in sensors below 70 cm for the remainder of the year. Sensors below 70 cm displayed a sharp decrease from June, increasing from July to September. From September moisture sharply decreased in sensors below 40 cm.
CW1SM	Impact	Sensors shallower than 30 cm are unsaturated. Remaining sensors fluctuated with rainfall, generally increasing from January to August and decreasing for the remainder of the year. Fluctuations reduce with depth.
CW4SM	Impact	All sensors fluctuated with rainfall between approximately 10–30%, except for the 20 cm sensor which was highly variable. Sensors increased in May and decreased in September to December.
FS1SM	Reference	Sensors between 10 cm and 40 cm generally showed a variable trend from January to April 2025, before increasing and becoming stable until October 2025. Moisture stability increases with depth. Sensors shallower than 40 cm declined in late 2025, starting from September. The moisture content below 40 cm remained stable throughout the year. Sensors near surface were close to saturation, decreasing with depth to approximately 55% at 80 cm.
FS2SM	Reference	Sensors trend with daily CRD and fluctuate with rainfall. The 10 cm sensor varied from approximately 55–85% in 2025. Sensors below 10 cm were saturated.
GG2SM	Impact	Sensors fluctuate with rainfall with subdued responses at greater depths. Sensors show a slight increasing trend in 2025, with a spike in May due to rainfall. The moisture content near surface varies from approximately 30–60%, decreasing with depth to 50 cm. The 50 cm sensor is stable at approximately 8%. Moisture content increases with depth below 50 cm to approximately 35–40% at 120 cm.
GG3SM	Impact	The 10 to 40 cm sensors were dry. Remaining sensors fluctuated with rainfall. They increased from January to May and decreased from September to December.
GW1SM	Impact	The 10 and 20 cm sensors were dry. All other sensors varied with rainfall and showed an increasing trend. Moisture levels were generally between 7–20% in January and between 15–60% in August. No data was collected for the remainder of the year due to a faulty logger.
GW3SM	Impact	The 10 cm sensor was dry. Remaining sensors fluctuated with rainfall and showed slight increasing trends up until September, followed by declining trends. Sensors generally had moisture levels between 5–25%, except for spikes due to rainfall which increased moisture to 70%.
LC1SM	Impact	Sensors were stable. Saturated near surface, decreasing in moisture to a depth of 30 cm. From 30–60 cm moisture increased, before generally reducing with depth with a moisture content between 5–15% at 130 cm.
LCN1SM	Impact	The 10 and 20 cm sensors fluctuated with rainfall. Remaining sensors showed stable increasing trends.
LCS1SM	Impact	Sensors showed increasing trends. Shallow sensors fluctuated with rainfall, sensors below 80 cm were stable.
LCS2SM	Impact	Sensors generally showed increasing trends, with fluctuations reduced at greater depths. The 10 cm sensor was unsaturated.
MS1SM	Impact	Shallow sensors below 70 cm showed variations due to rainfall, generally increasing until September before decreasing for the remainder of the year. Below 70 cm, sensors were relatively stable, showing a decrease in moisture with depth from approximately 80% at 70 cm to 60% at 120 cm.
MS2SM	Impact	Sensors trend with daily CRD and fluctuate with rainfall. Generally, deeper sensors are more stable and have a higher moisture content. However, sensors below 90 cm have a reduced moisture content. Increased moisture was observed between August and September.
MS3SM	Impact	Shallow sensors trend with daily CRD and fluctuate with rainfall, showing increasing trends from January to September 2025. Deeper sensors become more stable and reduce in moisture content from largely saturated above 50 cm, reducing to approximately 55% at 120 cm.

Monitoring ID	Site type	Comment
PC1SM	Impact	The 10, 20 and 30 cm sensors were unsaturated. The 40 cm sensor shows fluctuations with rainfall. Remaining sensors are stable with moisture content reducing with depth, from saturated at 50 cm reducing to approximately 65% at 120 cm.
PC2SM	Impact	Sensors show a high moisture content throughout the 2025, generally above 90%. Moisture stabilises with depth.
TG1SM	Impact	The 10 cm sensor trends with daily CRD and fluctuates with rainfall. Deeper sensors become more stable and decrease in moisture content with depth, from saturated at 20 cm to approximately 50% at 120 cm.
TG2SM	Reference	The 10 cm and 20 cm sensors trends with daily CRD and fluctuate with rainfall. From 30 cm, deeper sensors become more stable and decrease in moisture content with depth, from approximately 70% at 30 cm to 48% at 80 cm.
TS2SM	Reference	Sensors below 40 cm are variable, trend with daily CRD, and fluctuate with rainfall. Sensors become stable with depth and decrease in moisture content. Below 90 cm moisture is stable at approximately 70%, decreasing to approximately 54%.
TS3SM	Reference	All sensors remained stable, moisture content varied with depth.

6 Swamp groundwater quality

Section 6.1 and Section 6.2 summarise trends of key groundwater quality parameters pH and electrical conductivity (EC) at reference and impact sites, respectively. The sections also include a review of the swamp piezometers compliance status against site-specific trigger values.

The timeseries charts for swamp water quality are presented in Appendix E and tabulated statistics are provided in Appendix F.

6.1 Reference sites

6.1.1 Barrier Swamp

Table 6.1 Barrier Swamp groundwater quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
BA1	18/03/2018 – present	Monthly	pH	Stable trend – fluctuating within historical observations. Generally remained between pH 4–5, except for September. In September the water became slightly acidic to neutral at 6.5.
	18/03/2018 – present	Monthly	EC	Stable trend – fluctuating within historical observations. Slight increase in March.
BA2	18/03/2018 – 13/12/2024	Monthly	pH	No data due to NPWS access constraints.
	18/03/2018 – 13/12/2024	Monthly	EC	No data due to NPWS access constraints.
BA3	18/03/2018 – 14/04/2025	Monthly	pH	Limited data in 2025 due to NPWS access constraints, following trends seen in BA1.
	18/03/2018 – 14/04/2025	Monthly	EC	Limited data in 2025 due to NPWs access constraints, following trends seen in BA1.

6.1.2 Best Swamp

Table 6.2 Best Swamp groundwater quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
BE1	18/03/2018 – present	Monthly	pH	Stable trend – generally fluctuating between pH 4–5, within historical observations.
	18/03/2018 – present	Monthly	EC	Stable trend – fluctuating within historical observations.
BE2	18/03/2018 – present	Monthly	pH	Stable trend – generally fluctuating between pH 4–5, within historical observations.
	18/03/2018 – present	Monthly	EC	Stable trend – fluctuating within historical observations.

6.1.3 Carne Central Swamp

CC2 was not collected from August 2023 to March 2024 due to a reported NPWS road closure.

Table 6.3 Carne Central Swamp groundwater quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
CC1	12/06/2012 – present	Monthly	pH	Decreasing trend – from approximately 5.5 in January to 4.6 in December. Within historical observations.
	12/06/2012 – present	Monthly	EC	Stable trend, increasing in December 2025. Fluctuating within historical observations.
CC2	8/07/2019 – 22/10/2025	Monthly	pH	Decreasing trend – from approximately 5 in January to 4.5 in October. Within historical observations.
	8/07/2019 – 22/10/2025	Monthly	EC	Stable trend – fluctuating within historical observations.

6.1.4 Firetail Swamp

Table 6.4 Firetail Swamp groundwater quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
FS1	18/03/2018 – present	Monthly	pH	Stable between 4–5 for most of the year, except for September (pH 6.4) and November (pH 7.0) where the water became slightly acidic to neutral likely due to rainfall.
	18/03/2018 – present	Monthly	EC	Stable trend.
FS2	29/05/2019 – 08/11/2024	Monthly	pH	No data due to NPWS access constraints.
	29/05/2019 – 08/11/2024	Monthly	EC	No data due to NPWS access constraints.

6.1.5 Twin Gully Swamp

Access to Twin Gully Swamp was limited due to degraded access tracks, no samples were collected at TG1 or TG2 during the reporting period.

Table 6.5 Twin Gully Swamp groundwater quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
TG1	15/10/2012 – 17/02/2022	Monthly	pH	No data available during the reporting period.
	15/10/2012 – 17/02/2022	Monthly	EC	No data available during the reporting period.
TG2	19/11/2018 – 16/09/2022	Monthly	pH	No data available during the reporting period.
	19/11/2018 – 16/09/2022	Monthly	EC	No data available during the reporting period.

6.1.6 Tristar Swamp

Table 6.6 Tristar Swamp groundwater quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
TS1	12/06/2014 – present	Monthly	pH	Generally varying between pH 4–6. Increasing from January to a peak of 5.8 in February, decreasing from February to a low of 3.9 in October. Fluctuating within historical observations.
	12/06/2014 – present	Monthly	EC	Stable trend fluctuating within historical observations.
TS2	16/10/2012 – present	Monthly	pH	Fluctuating within historical observations. Decreasing from January to August and increasing for the remainder of the year.
	16/10/2012 – present	Monthly	EC	Stable trend fluctuating within historical observations.
TS3	17/10/2012 – present	Monthly	pH	Generally varying between pH 4–6. Increasing from January to a peak of 5.7 in February, decreasing from February to a low of 4.0 in August, before increasing for the remainder of the year. Fluctuating within historical observations.
	17/10/2012 – present	Monthly	EC	Stable trend fluctuating within historical observations. Slightly elevated in November (75 µS/cm) and December (69 µS/cm) when compared to TS1 and TS2.

6.2 Impact sites

6.2.1 Sunnyside Swamp

Sunnyside Swamp is an impact swamp located above LW413–LW414. Water quality sampling commenced after mining began in LW413–LW414. Subsequently there is no baseline pre-mining data and no triggers defined.

Table 6.7 Sunnyside Swamp groundwater quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
SS1	22/02/2011 – present	Monthly	pH	Stable trend generally between pH 5–6. In December pH became neutral at 6.9.
		Monthly	EC	Stable trend, increasing from July to December.
SS5	22/02/2011 – present	Monthly	pH	Variable – generally within pH 5–6, decreasing to 4.2 in August. From August to December pH increased, returning to the historical range between 5–6.
		Monthly	EC	Variable – recording a low of 26 µS/cm in May and a high of 130 µS/cm in November.

6.2.2 Sunnyside East Swamp

Sunnyside East Swamp is an impact swamp located above LW416–LW418. It has remained predominately dry since mid-2013, with limited sampling conducted since 2017 due to ongoing dry conditions.

Table 6.8 Sunnyside East Swamp groundwater quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
SSE2	12/06/2012 – 06/08/2013	Monthly	pH	Dry - No data available over the reporting period.
		Monthly	EC	Dry - No data available over the reporting period.
SSE3	22/02/2011 – 14/03/2022	Monthly	pH	Dry - No data available over the reporting period.
		Monthly	EC	Dry - No data available over the reporting period.

6.2.3 Carne West Swamp

Carne West is an impact swamp located above LW417–LW419. It has remained predominately dry since 2016.

Table 6.9 Carne West Swamp groundwater quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
CW1	22/02/2011 – 29/04/2014	Monthly	pH	Dry - No data available over the reporting period.
		Monthly	EC	Dry - No data available over the reporting period.
CW2	22/02/2011 – 25/07/2016	Monthly	pH	Dry - No data available over the reporting period.
		Monthly	EC	Dry - No data available over the reporting period.
CW4	22/02/2011 – 21/05/2013	Monthly	pH	Dry - No data available over the reporting period.
		Monthly	EC	Dry - No data available over the reporting period.

6.2.4 Gang Gang West Swamp

Gang Gang West is an impact swamp located above LW419. It has remained predominately dry since 2016, including throughout 2024.

Table 6.10 Gang Gang West Swamp groundwater quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
GW1	13/12/2012 – present	Monthly	pH	Dry - No data available over the reporting period.
		Monthly	EC	Dry - No data available over the reporting period.

6.2.5 Gang Gang East Swamp

Gang Gang East is an impact swamp located above LW419. It has remained predominately dry since 2018.

Table 6.11 Gang Gang Swamp groundwater quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
GG1	16/10/2012 – 10/08/2023	Monthly	pH	Dry - No data available over the reporting period.
		Monthly	EC	Dry - No data available over the reporting period.

6.2.6 Pine Swamp

Pine is an impact swamp located within the TIA for LW424–LW427. BS2 has been predominately dry since 2019.

Table 6.12 Pine Swamp groundwater quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
BS2	15/10/2012 – 25/05/2023	Monthly	pH	Dry - No data available over the reporting period.
		Monthly	EC	Dry - No data available over the reporting period.
BS3	15/10/2012 – present	Monthly	pH	Declining trend from January (pH 5.2) to August (pH 3.8), increasing to pH 4.8 in September and October before becoming more acidic in November (pH 3.9) and December (pH 4.5).
		Monthly	EC	Stable trend, generally decreasing from June to December.
PSS (BS4)	18/02/2018 – present	Monthly	pH	Variable throughout 2025, generally between pH 4.0–5.5.
		Monthly	EC	Stable trend, increasing from September to December.

6.2.7 Nine Mile Swamp

Nine Mile is an impact swamp within the TIA for LW420–LW427.

Table 6.13 Nine Mile Swamp groundwater quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
BS1	16/10/2012 – present	Monthly	pH	Limited data recorded from August to October. General decreasing trend from December 2024.
		Monthly	EC	Stable trend.
NMSS (BS5)	18/02/2018 – present	Monthly	pH	Decreasing trend from January to July, increasing from July to December.
		Monthly	EC	Stable trend.

6.2.8 Marrangaroo Swamp

Marrangaroo is an impact swamp in proximity of LW428. MS3 was within the TIA when works for LW427 commenced in 2020 however sampling commenced in 2022.

Table 6.14 Marrangaroo Swamp groundwater quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
MS1	12/06/2012 – present	Monthly	pH	Slightly decreasing trend, within pH 4.5–5.5.
		Monthly	EC	Stable trend.
MS2	19/11/2018 – 27/08/2025	Monthly	pH	Limited data, observed in February, April and August because the water level was too low to sample. pH ranged from 4.6–5.8.
		Monthly	EC	Limited data, observed in February, April and August because the water level was too low to sample. February recorded a high of 657 $\mu\text{S}/\text{cm}$, before returning to 28 $\mu\text{S}/\text{cm}$ in April and August.
MS3	27/06/2022 – present	Monthly	pH	Stable within pH 4.5–5, except for a spike in September of 6.9 due to rainfall.
		Monthly	EC	Stable trend.

6.2.9 Paddys Creek Swamp

Paddys Creek is an impact swamp within the TIA for LW424–LW427. Water quality sampling commenced after mining began in LW415 and subsequently there is no baseline pre-mining data and no triggers defined.

Table 6.15 Paddys Creek Swamp groundwater quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
PC1	18/02/2018 – present	Monthly	pH	Declining trend, between pH 4.1–5.3.
		Monthly	EC	Increasing trend, from 30 $\mu\text{S}/\text{cm}$ in January to 42 $\mu\text{S}/\text{cm}$ in December.
PC2	18/02/2018 – present	Monthly	pH	Declining trend, between pH 4.2–5.2.
		Monthly	EC	Increasing trend, from 33 $\mu\text{S}/\text{cm}$ in January to 46 $\mu\text{S}/\text{cm}$ in December.

6.2.10 Lost City Swamp

Lost City is an impact swamp within the TIA for LW428–LW432. Water quality sampling commenced in 2022 and no baseline is applicable because the site was established after the LW424-427 SMP.

Table 6.16 **Lost City Swamp groundwater quality summary**

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
LC1	27/06/2022 – present	Monthly	pH	Decreasing from January to July, increasing from July to September, decreasing from September to October and remaining stable for the remainder of the year. Generally within pH 4.0–5.5, with a spike becoming neutral in September due to rainfall.
		Monthly	EC	Stable trend.
LCN1	27/06/2022 – present	Monthly	pH	Slight decrease from January to July, increasing from July to September, decreasing from September to October and remaining stable for the remainder of the year. Generally within pH 4.0–5.5, with a spike becoming neutral in September due to rainfall.
		Monthly	EC	Stable trend.
LCS1	27/06/2022 – present	Monthly	pH	Decreasing from January to August, increasing from August to September, decreasing from September to October and remaining stable for the remainder of the year. Generally within pH 4.0–5.5, with a spike becoming neutral in September due to rainfall..
		Monthly	EC	Stable trend.
LCS2	27/06/2022 – present	Monthly	pH	Decreasing from January to July, increasing from July to September, decreasing from September to October and remaining stable for the remainder of the year. Generally within pH 4.0–5.5, with a spike becoming neutral in September due to rainfall..
		Monthly	EC	Stable trend.

7 Shallow & perched aquifer groundwater quality

The timeseries for long term shallow groundwater quality trends are presented in Appendix E, with tabulated statistics provided in Appendix F. Table 7.1 summarises the trends of key groundwater quality parameters at reference and impact sites, and reviews the standpipes piezometers compliance status against respective site-specific trigger values outlined in Section 3.3.

Table 7.1 Shallow aquifer groundwater quality summary

Monitoring ID	Target aquifer	Site type	Date range	Frequency	Analyte	2025 water quality comment
AP9PR	AQ4	Reference	17/03/2016 – present	Quarterly	pH	Stable trend.
				Quarterly	EC	Stable trend.
AP8PR	AQ4	Reference	17/03/2016 – present	Quarterly	pH	Stable trend. pH generally between 4.5–5.0.
				Quarterly	EC	Stable trend.
AP5PR	AQ4	Reference	17/03/2016 – present	Quarterly	pH	Slightly declining trend.
				Quarterly	EC	Stable trend.
AP4PR	AQ4	Reference	17/03/2016 – present	Quarterly	pH	Stable trend. pH generally between 4.5–5.0.
				Quarterly	EC	Stable trend.
AP1204	AQ4	Reference	17/03/2016 – present	Quarterly	pH	Stable trend with pH generally between 4.5–5.0.
				Quarterly	EC	Stable from March to September 2025. Increasing trend from September to December 2025.
AP1105	AQ4	Reference	4/12/2018 – present	Quarterly	pH	Stable trend with pH between 4.2–4.6.
				Quarterly	EC	Stable trend.
AP10PR	AQ4	Reference	6/12/2022 – 17/09/2025	Quarterly	pH	Increasing from pH of approximately 3.7 in March to 4.9 in September 2025.
				Quarterly	EC	Stable trend.
SPR1401	AQ5	Impact	17/03/2016 – present	Quarterly	pH	pH increased from March to a peak of 5.4 in June, decreasing for the remainder of the year to 4.6 in December.
				Quarterly	EC	Stable trend.
SPR1106	AQ4	Impact	18/03/2016 – present	Quarterly	pH	pH increased from 4.2 in March to a peak of 4.9 in June, stabilising around 4.5–4.6 for the remainder of the year.
				Quarterly	EC	Stable.
SPR1109	AQ4	Impact	18/03/2016 – 30/11/2016	Not sampled	pH	Damaged by subsidence, no water quality data available since 2016.
				Not sampled	EC	Damaged by subsidence, no water quality data available since 2016.

Monitoring ID	Target aquifer	Site type	Date range	Frequency	Analyte	2025 water quality comment
SPR1210R	AQ5	Impact	5/03/2019 – 28/05/2019	Not sampled	pH	Damaged by subsidence, no water quality data available since June 2019.
				Not sampled	EC	Damaged by subsidence, no water quality data available since June 2019.
SPR1211	AQ4	Impact	4/12/2018 – 12/09/2019	Not sampled	pH	Damaged by subsidence, no water quality data available since October 2019.
				Not sampled	EC	Damaged by subsidence, no water quality data available since October 2019.
SPR1301	AQ5	Impact	4/12/2018 – 14/03/2024	Quarterly	pH	SPR1301 was damaged by subsidence from the mining of LW429 and could not be sampled beyond March 2025.
				Quarterly	EC	SPR1301 was damaged by subsidence from the mining of LW429 and could not be sampled beyond March 2025.
RSS	AQ5	Impact	17/03/2016 – present	Quarterly	pH	pH increased from 3.9 in March to a peak of 4.9 in June, decreasing for the remainder of the year to 4.4 in December.
				Quarterly	EC	Stable trend.
SPR1806	AQ5	Impact	3/12/2020 – 02/06/2025	Quarterly	pH	Insufficient data to determine trends. pH was 6.09 in June which is within historical observations.
				Quarterly	EC	Insufficient data to determine trends. EC was 65 µS/cm in June which is within historical observations.
SPR1807	AQ5	Impact	5/07/2019 – 14/02/2020	Quarterly	pH	Dry - Damaged by subsidence. No sample take since installation in July 2019.
				Quarterly	EC	Dry - Damaged by subsidence. No sample take since installation in July 2019.
SPR1808	AQ5	Impact	2/12/2020 – 01/09/2024	Quarterly	pH	Damaged by subsidence, no water quality data available since 2022.
				Quarterly	EC	Damaged by subsidence, no water quality data available since 2022.

8 Bore 6 and 8

Bore 6 and 8 are dewatering bores that provide indicative water quality of mine inflows. They can also be influenced by underground mining activities. The timeseries charts for water quality are provided in Appendix E. Tabulated statistics are provided in Appendix F. In general, both sites show variability that is consistent with previous observations.

Table 8.1 Bore 6 and Bore 8 groundwater quality summary for 2025

Bore ID	Date Range	Frequency	Analyte	Units	Minimum	Median	Maximum
Bore 6	4/09/2009 – present	Weekly	pH	pH units	7.2	7.4	7.7
			EC	µS/cm	982	1,090	1,273
			Iron	mg/L	<0.05	0.28	1.08
Bore 8	15/01/2012 – present	Weekly	pH	pH units	4.4	7.5	7.9
			EC	µS/cm	950	1,084	1,204
			Iron	mg/L	<0.05	0.075	2.54

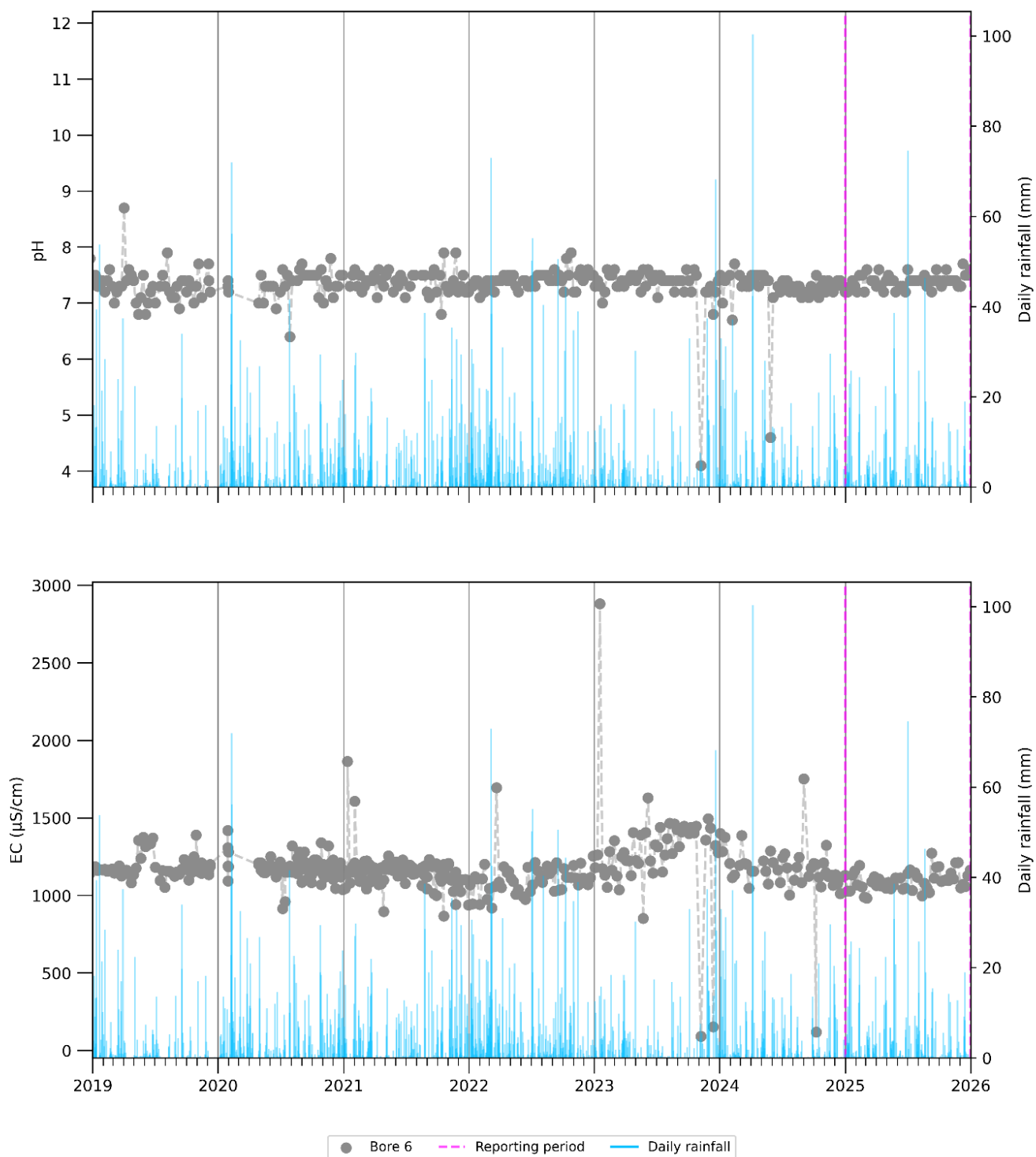


Figure 8.1 Bore 6 water quality

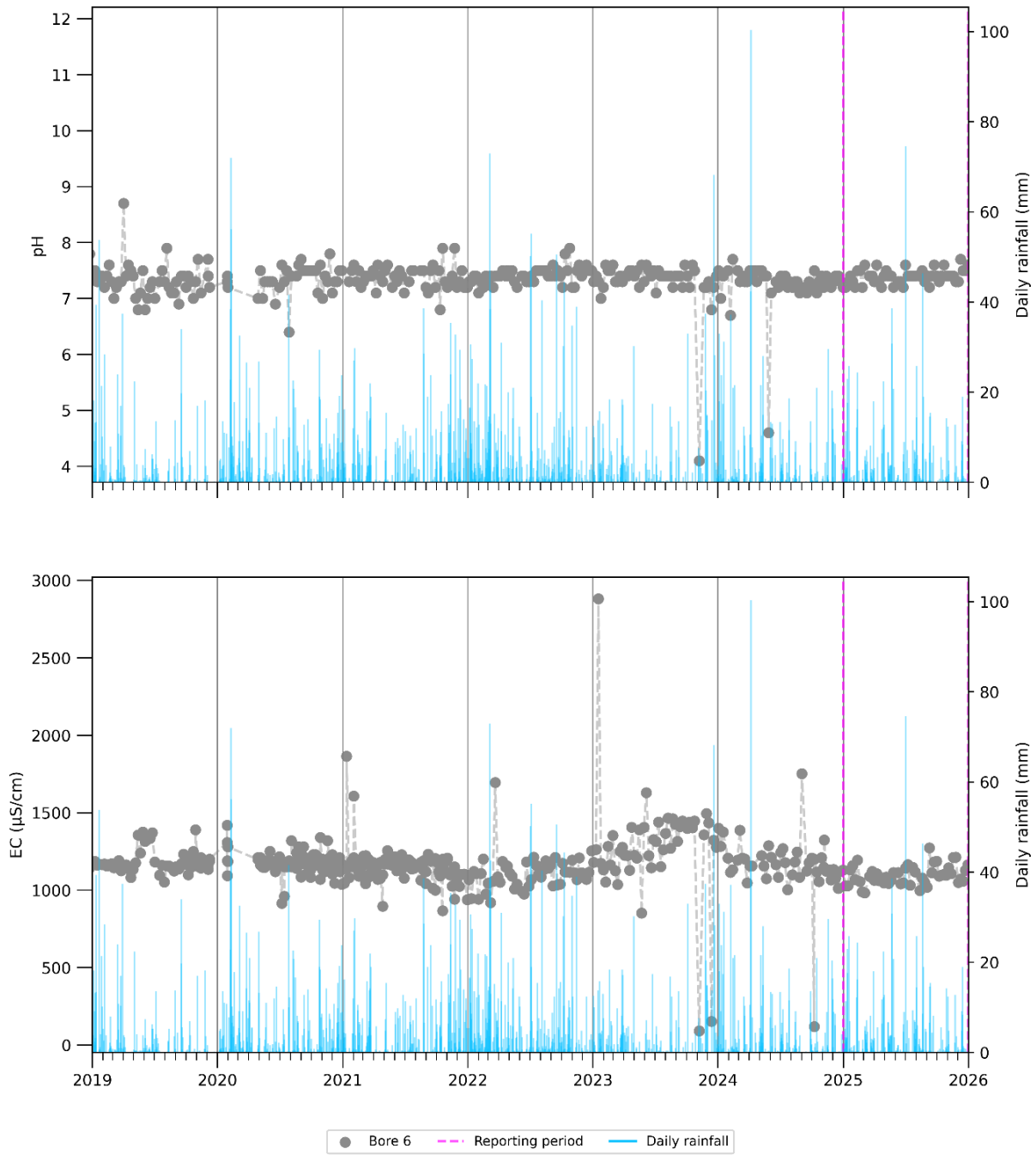


Figure 8.2 Bore 8 water quality

9 Swamp surface water quality and flow

Section 9.1 and Section 9.2 summarise the trends of key surface water quality parameters at reference and impact swamp sites. The sections also provide comparison of the site's compliance status against respective site-specific trigger values outlined in Section 3.3.

The timeseries for long term water quality trends are shown in Appendix G and tabulated statistics are shown in Appendix H.

9.1 Reference sites

9.1.1 Barrier Swamp

Table 9.1 Barrier Swamp surface water quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
Barrier Swamp	27/09/2016 – present	Fortnightly/monthly	pH	Stable trend within historic observations. pH dropped in December to 3.3 before returning to the slightly acidic conditions.
		Fortnightly/monthly	EC	Stable trend within historic observations. Spikes in April and December that are correlated with rainfall.
		Fortnightly/monthly	Flow	Stable from January to May, becoming variable and increasing to a peak in July. For the remainder of the year flow declined from July and remained stable.

9.1.2 Best Creek

Table 9.2 Best Creek surface water quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
Best Creek	24/11/2017 – present	Fortnightly/monthly	pH	Stable trend within historic observations.
		Fortnightly/monthly	EC	Stable trend within historic observations.
		Fortnightly/monthly	Flow	Stable trend except for spikes in March and August. Flow too low for monitoring from December.

9.1.3 Carne Central Swamp

Table 9.3 Carne Central Swamp surface water quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
Carne Central Swamp	27/09/2016 – present	Fortnightly/monthly	pH	Stable trend between pH 4.4–5.8.
		Fortnightly/monthly	EC	Trend within historical observations.
		Fortnightly/monthly	Flow	Flow too low to monitor during 2025.

9.1.4 Firetail Swamp

Table 9.4 Firetail surface water quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
Firetail	24/11/2017 – present	Fortnightly/monthly	pH	A peak of 6.8 in January before remaining stable between pH 4.4–5.4.
		Fortnightly/monthly	EC	Stable trend.
		Fortnightly/monthly	Flow	Stable trend, except for a spike in August of about 12,000 m ³ /day.

9.1.5 Tristar Swamp

Table 9.5 Tristar surface water quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
Tristar (Springvale site)	2/11/2016 – present	Fortnightly/monthly	pH	Fluctuating between neutral and slightly acidic, generally between pH 4–6.
		Fortnightly/monthly	EC	Stable trend.
		Fortnightly/monthly	Flow	Variable between approximately 900–1,600 m ³ /day

9.1.6 Twin Gully Swamp

Access was limited during the reporting period due to degraded track conditions. No data was available throughout the reporting period.

Table 9.6 Twin Gully surface water quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
Twin Gully (Springvale site)	2/11/2016 – 02/03/2023	Fortnightly/monthly	pH	No data available over the reporting period due to access constraints.
		Fortnightly/monthly	EC	No data available over the reporting period due to access constraints.
		Fortnightly/monthly	Flow	No data available over the reporting period due to access constraints.

9.2 Impact Site

9.2.1 Carne West Swamp

Table 9.7 Carne Swamp surface water quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
Carne Swamp	5/01/2005 – present	Fortnightly/monthly	pH	Limited data due to dry conditions. Available data between July and September show trends consistent with previous observations.
		Fortnightly/monthly	EC	Limited data due to dry conditions. Available data between July and September show trends consistent with previous observations.
		Fortnightly/monthly	Flow	No flow or too low to monitor during 2025.

9.2.2 Gang Gang West Swamp

Surface water monitoring commenced after impact therefore no trigger levels were developed.

Table 9.8 Gang Gang South West Swamp surface water quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
Gang Gang South West	27/09/2016 – 01/05/2024	Fortnightly/monthly	pH	Dry or pooled during 2025.
		Fortnightly/monthly	EC	Dry or pooled during 2025.
		Fortnightly/monthly	Flow	Dry or pooled during 2025.

9.2.3 Gang Gang East

Table 9.9 Gang Gang East surface water quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
Gang Gang East	27/09/2016 – 13/05/2024	Fortnightly/monthly	pH	Dry or pooled during 2025.
		Fortnightly/monthly	EC	Dry or pooled during 2025.
		Fortnightly/monthly	Flow	Dry or pooled during 2025.

9.2.4 Marrangaroo Swamp

Table 9.10 Marrangaroo Swamp surface water quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
Marrangaroo Swamp	24/11/2017 – present	Fortnightly/monthly	pH	Generally stable between pH 4.5–5.5, with one spike to 6.5 in April.
		Fortnightly/monthly	EC	Stable trend.
		Fortnightly/monthly	Flow	Variable trend. Increasing from March to June, decreasing from August to September. Flow too low to monitor from September onwards.

9.2.5 Nine Mile Swamp

Table 9.11 Nine Mile Swamp surface water quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
9 Mile Swamp	27/11/2017 – present	Fortnightly/monthly	pH	Stable between pH 4.5–5.5.
		Fortnightly/monthly	EC	Stable trend.
		Fortnightly/monthly	Flow	No data available over the reporting period due to low flow conditions.

9.2.6 Sunnyside Swamp

Table 9.12 Sunnyside Swamp surface water quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
Sunnyside U/S Junction	31/03/2006 – present	Fortnightly/monthly	pH	Generally stable trend, fluctuating between pH 5.0–6.5.
		Fortnightly/monthly	EC	Stable trend.
		Fortnightly/monthly	Flow	Variable trend. Increasing from May to July, decreasing from September to November.
Sunnyside Swamp Upstream	24/05/2005 – present	Fortnightly/monthly	pH	Stable trend.
		Fortnightly/monthly	EC	Stable trend.
		Fortnightly/monthly	Flow	No data available over the reporting period due to low flow conditions.
Sunnyside Swamp Downstream	24/05/2005 – present	Fortnightly/monthly	pH	Generally stable, fluctuating between pH 5.0–6.5.
		Fortnightly/monthly	EC	Stable trend.
		Fortnightly/monthly	Flow	Limited data due to low flow conditions, decreasing from July to November.

9.2.7 Sunnyside East Swamp - Downstream

Surface water monitoring commenced after impact therefore no trigger levels were developed.

Table 9.13 Sunnyside East downstream surface water quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
SS3 D/S	10/06/2010 – 24/09/2014	Fortnightly/monthly	pH	Dry or pooled during 2025.
		Fortnightly/monthly	EC	Dry or pooled during 2025.
		Fortnightly/monthly	Flow	Dry or pooled during 2025.

9.2.8 Sunnyside East Swamp - Upstream

Surface water monitoring commenced after impact therefore no trigger levels were developed.

Table 9.14 Sunnyside East upstream surface water quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
Sunnyside East	21/03/2016 – present	Fortnightly/monthly	pH	Variable trend between pH 3.9–6.1. Decreasing from April to September, increasing from September to December.
		Fortnightly/monthly	EC	Stable trend.
		Fortnightly/monthly	Flow	No data available over the reporting period due to low flow conditions.

9.2.9 Paddys Creek

Table 9.15 Paddys Creek surface water quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
Paddys Creek	24/11/2017 – present	Fortnightly/monthly	pH	Generally within 4.5–6.0, except for acidic conditions in January at pH 3.1.
		Fortnightly/monthly	EC	Stable throughout the year after a peak in January.
		Fortnightly/monthly	Flow	One flow reading was recorded in September. Flow too low for monitoring in other months. Insufficient flow data to determine trends.

9.2.10 Pine/Nine Mile Swamp

Table 9.16 Pine/Nine Mile Swamp surface water quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
Pine/9 Mile Swamp	27/11/2017 – present	Fortnightly/monthly	pH	Generally stable between pH 5.0–6.0 from January to September. From September to December pH varied from 3.1–5.6.
		Fortnightly/monthly	EC	Generally stable with spikes in October and December, corresponding to pH changes.
		Fortnightly/monthly	Flow	Flow measured in June and July. Flow too low for monitoring in other months. Insufficient flow data to determine trends.

10 Tributary surface water quality and flow

Table 10.1 to Table 10.6 summarises the trends of key surface water quality parameters at reference and impact tributary sites and reviews the sites compliance status against respective site-specific trigger values outlined in Section 3.3.

The timeseries for long term water quality trends are shown in Appendix G and tabulated statistics are shown in Appendix H.

10.1 Carne Central Tributary

Table 10.1 Carne Central surface water quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
Carne Central	21/03/2016 – present	Fortnightly/monthly	pH	Variable trend between pH 3.8–6.2.
		Fortnightly/monthly	EC	Stable trend.
		Fortnightly/monthly	Flow	No data available over the reporting period due to low flow conditions.

10.2 Wolgan River

Table 10.2 Wolgan River surface water quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
Wolgan River Downstream	4/01/2002 – present	Fortnightly/monthly	pH	Generally decreasing from 7.2 in January to 5.5 in October, increasing to 6.2 in December. In March pH spiked at 7.8.
		Fortnightly/monthly	EC	Generally stable trend, with increases in February, June, and August.
		Fortnightly/monthly	Flow	Variable trend, with increased flow in May to June and September. Flow too low to monitor from November.
Wolgan River (Wolgan Valley)	30/04/2018 – present	Fortnightly/monthly	pH	Increasing trend from January to highs above pH 8 in April, from June onwards pH remained generally stable around 6.5.
		Fortnightly/monthly	EC	Slightly increasing stable trend
		Fortnightly/monthly	Flow	Flow was measured sporadically through the year. No data was available in some months due to low flow conditions. Available data is consistent with historical observations.

10.3 East Wolgan Tributary

Surface water monitoring commenced after impact therefore no trigger levels were developed.

Table 10.3 East Wolgan surface water quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
East Wolgan Upstream	8/04/2005 – 13/02/2023	Fortnightly/monthly	pH	Dry or pooled during 2025.
		Fortnightly/monthly	EC	Dry or pooled during 2025.
		Fortnightly/monthly	Flow	Dry or pooled during 2025.
East Wolgan Downstream	8/04/2005 – 20/09/2022	Fortnightly/monthly	pH	Dry or pooled during 2025.
		Fortnightly/monthly	EC	Dry or pooled during 2025.
		Fortnightly/monthly	Flow	Dry or pooled during 2025.
East Wolgan DS Junction	8/04/2005 – present	Fortnightly/monthly	pH	Generally stable between pH 5.0–6.5, with a low of 4.1 in February.
		Fortnightly/monthly	EC	Stable trend.
		Fortnightly/monthly	Flow	Variable, generally increasing from February to July and decreasing for the remainder of the year.

10.4 Carne Creek – Western (Carne West) Tributary

Surface water monitoring commenced after impact therefore no trigger levels were developed.

Table 10.4 Carne West surface water quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
Carne West	12/07/2016 – present	Fortnightly/monthly	pH	Dry or pooled during 2025.
		Fortnightly/monthly	EC	Dry or pooled during 2025.
		Fortnightly/monthly	Flow	Dry or pooled during 2025.

10.5 Gang Gang Tributary

Surface water monitoring commenced after impact therefore no trigger levels were developed.

Table 10.5 Gang Gang surface water quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
Gang Gang	21/3/2016 – present	Fortnightly/monthly	pH	No observations from January to June due to low flow conditions. Observations from July to November are generally within historical data besides November which recorded pH 3.3. No data was recorded in December due to low flow conditions.
		Fortnightly/monthly	EC	Data availability is the same as pH. EC trend was consistent with previous observations.
		Fortnightly/monthly	Flow	No data available over the reporting period due to low flow conditions.

10.6 Marrangaroo Creek

Table 10.6 Marrangaroo Creek surface water quality summary

Monitoring ID	Date range	Frequency	Analyte	2025 water quality comment
Marrangaroo Creek	30/01/2014 – present	Fortnightly/monthly	pH	Decreasing trend from pH 6.0 in January to 4.5 in October, increasing to 5.5 and 5.1 in October and November, respectively.
		Fortnightly/monthly	EC	Stable trend.
		Fortnightly/monthly	Flow	No data available over the reporting period due to low flow conditions.

11 Conclusions

This report has reviewed groundwater level and quality as well as surface water quality and flow data for the reporting period 1 January to 31 December 2025. The key outcomes of this review, in accordance with the WMP (Centennial, 2022a) and SMP (Centennial, 2022b) are:

- Swamp piezometers:
 - Shrub swamps: Groundwater levels are typically stable at NPSS corresponding to climatic conditions. A slight decline was typically observed from around August to December due to below average rainfall. MS1 exceeded its trigger limit in early December, an investigation was submitted to the Regulators on 10 March 2026. Apart from Marrangaroo Swamp piezometers MS1 and MS2, there are no obvious indication of mining impacts due to the mining of LW429–LW432.
 - Hanging swamps: Groundwater level trends remained consistent with historical observations and climatic conditions. Most hanging swamp piezometers are dry or have low water levels, only responding to periods of sustained rainfall.
- Perched groundwater system: Groundwater levels in perched piezometers that are control sites or have not been impacted by mining show a stable or slightly declining trends consistent with climatic conditions. Perched piezometers that are classified as impact piezometers, discussed in Section 4.2, or that were installed post mining, show groundwater trends like reference sites or historical observations.
- Shallow groundwater system: Groundwater levels in shallow aquifer piezometers that have not been directly impacted by mining show slightly decreasing trends, as a delayed and/or subdued response to below average rainfall conditions. SPR2301 continued to decline due to mining.
- Vibrating wire piezometers: VWPs located adjacent to longwalls and targeting the shallow and deep groundwater systems show typical depressurisation responses due to subsidence from nearby longwall mining. Depressurisation of VWP sensors above and below the MYC have been recorded during the reporting period at SPR64 and SPR2303B due to LW430 and LW431. A trigger investigation report for SPR64 was issued to the Regulators on 5 November 2025. SPR2303B is not an impact site and does not require an investigation.
- Swamp groundwater water quality: Trends at all sites are typically stable and consistent with previous observations. LCS1 recorded a historically low pH, but it was within the historical range of other swamp piezometers.
- Shallow aquifer groundwater quality: Trends at all sites are typically stable and consistent with previous observations. Measured water quality from reference shallow aquifer piezometers and reference perched aquifer piezometers suggest trends are consistent with natural variability. There were no data available for the impact perched aquifer piezometers over the reporting period because they have been impacted by mining or damaged by subsidence and cannot be sampled (i.e. damaged casing from subsidence restricting the deployment as sampling devices).
- Surface water quality and flow: Most surface water quality and flows are consistent with climatic observations. During low rainfall periods from January to April and September to December, flow could not be measured at some sites because it was too low to measure or pooled. Where water could be sampled, EC and pH trends were consistent with previous observations and natural variability.

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Appendix A

Longwall progression

A.1 Longwall dates

Table A.1 Springvale mining progress

Longwall	Start	Finish
No 1	March 1995	January 1996
401	March/April 1996	January/February 1997
402	February/March 1997	November/December 1997
403	January/February 1998	November/December 1998
404	January/February 1999	February/March 2000
405	10 April 2000	26 March 2001
406	27 May 2001	23 January 2002
407	28 March 2002	9 January 2003
408	20 February 2003	18 December 2003
409	18 February 2004	10 December 2004
410	9 February 2005	19 January 2006
411	10 March 2006	26 October 2007
412	14 December 2007	22 June 2009
413A	7 August 2009	1 April 2010
413B	20 May 2010	29 December 2010
414	11 February 2011	21 November 2011
415	15 March 2012	17 September 2013
416	24 September 2013	19 August 2014

Longwall	Start	Finish
417	11 October 2014	4 July 2015
418	22 October 2015	30 May 2016
419	2 August 2016	18 March 2017
420	29 April 2017	9 November 2017
421	23 December 2017	15 June 2018
425	2 August 2018	16 August 2019
426	22 November 2019	31 July 2020
427	28 September 2020	21 February 2022
428	26 March 2022	22 January 2024
429	1 April 2024	12 January 2025
430	1 March 2025	6 August 2025
431	20 September 2025	Currently active

Appendix B

Springvale monitoring network

B.1 Monitoring locations

Table B.1 Springvale swamp monitoring network

Site	Monitoring ID	Easting (GDA94)	Northing (GDA94)	Target	Comments
Barrier Swamp	BA1	242024	6302814	Swamp water level + Soil moisture + Quality	Surface water quality monthly.
	BA2	242099	6303297	Swamp water level + Soil moisture + Quality	Flows fortnightly.
	BA3	242070	6303923	Swamp water level + Soil moisture + Quality	Swamp groundwater quality monthly.
	SPR1608	241991	6304157	Burralow Formation	Perched groundwater quality monthly.
	Barrier Swamp	242026	6304243	Surface water quality	
Best Swamp	BE1	245818	6307614	Swamp water level + Soil moisture + Quality	Surface water quality monthly.
	BE2	246565	6308274	Swamp water level + Soil moisture + Quality	Flows fortnightly.
	SPR1612	246637	6308319	Burralow Formation	Swamp groundwater quality monthly.
	Best Creek	247523	6309517	Surface water quality	Perched groundwater quality monthly.
Carne Central Swamp	CC1	241175	6302695	Swamp water level + Soil moisture + Quality	Surface water quality monthly.
	CC2	241131	6303290	Swamp water level + Soil moisture + Quality	Flows fortnightly.
	SPR1604	241231	6303296	Burralow Formation	Swamp groundwater quality monthly.
	Carne Central Swamp	239810	6303794	Surface water quality	Perched groundwater quality monthly.
	Carne Central (Carne Central Creek)	241008	6303476	Surface water quality	
Carne West Swamp	CW1	239350	6303195	Swamp water level + Soil moisture + Quality	Surface water quality monthly.
	CW2	239379	6303249	Swamp water level + Quality	Flows fortnightly.
	CW3	238982	6302173	Swamp water level	Swamp groundwater quality monthly.
	CW4	239075	6302375	Swamp water level + Soil moisture	Perched groundwater quality monthly.

Site	Monitoring ID	Easting (GDA94)	Northing (GDA94)	Target	Comments
Ferntree Gully Swamp	SPR1601	239808	6303789	Burralow Formation	Baseline data collection.
	Carne West	239809	6303794	Swamp water level	
	FG1	234708	6300548	Swamp water level + Soil moisture	
	FG2	234860	6300267	Swamp water level	
	FG3	234925	6300138	Swamp water level + Soil moisture	
Firetail Swamp	FS1	246893	6306485	Swamp water level + Soil moisture + Quality	Surface water quality monthly.
	FS2	247489	6307074	Swamp water level + Soil moisture + Quality	Flows fortnightly.
	SPR1611	247843	6307206	Burralow Formation	Swamp groundwater quality monthly.
	Firetail	247829	6307217	Surface water quality	Perched groundwater quality monthly.
Gang Gang Swamp	GG1	240283	6302299	Swamp water level + Quality	Surface water quality monthly.
	GG2	239937	6301850	Swamp water level + Soil moisture	Flows fortnightly.
	GG3	240449	6303084	Swamp water level + Soil moisture	Swamp groundwater quality monthly.
	SPR1603	240491	6303177	Burralow Formation	Perched groundwater quality monthly.
	Gang Gang East	240486	6303211	Surface water quality	
	Gang Gang	240553	6303429	Surface water quality	
Gang Gang West Swamp	GW1	239820	6302891	Swamp water level + Soil moisture + Quality	Surface water quality monthly.
	GW2	240258	6303093	Swamp water level + Quality	Flows fortnightly.
	GW3	240397	6303190	Swamp water level + Soil moisture	Swamp groundwater quality monthly.
	GW4	239906	6302926	Swamp water level	Perched groundwater quality monthly.
	SPR1602	240414	6303186	Burralow Formation	
	Gang Gang South West	240467	6303220	Surface water quality	

Site	Monitoring ID	Easting (GDA94)	Northing (GDA94)	Target	Comments
Junction Swamp	JS1	235774	6302686	Burralow Formation	
	JS2	235800	6302753	Burralow Formation	
	JS3	235857	6302737	Burralow Formation	
Lost City Swamp	LCN1	237966	6299321	Swamp water level + Soil moisture	Baseline data collection.
	LC1	238146	6299054	Swamp water level + Soil moisture	
	LCS1	238188	6298631	Swamp water level + Soil moisture	
	LCS2	238037	6298759	Swamp water level + Soil moisture	
	LCY2101	238460	6298816	Burralow Formation	
	SPR1613S	238246	6299175	Banks Wall Sandstone	
	SPR1613D	238246	6299175	Banks Wall Sandstone	
Marrangaroo Swamp	MS1	238861	6299170	Swamp water level + Soil moisture + Quality	Surface water quality monthly. Flows fortnightly. Swamp groundwater quality monthly. Perched groundwater quality monthly
	MS2	239046	6299049	Swamp water level + Soil moisture + Quality	
	MS3	239359	6298208	Swamp water level + Soil moisture + Quality	
	LMHS1	238445	6299248	Hanging swamp water level	
	MWHS1	238707	6298868	Hanging swamp water level	
	SPR1607	238751	6299241	Perched groundwater system	
	MExx01	239409	6298579	Hanging swamp water level	
	Marrangaroo Swamp	238424	6299331	Surface water quality	
	Marrangaroo Creek	237050	6298480	Surface water quality	

Site	Monitoring ID	Easting (GDA94)	Northing (GDA94)	Target	Comments
Paddys Creek Swamp	PC1	241204	6298832	Swamp water level + Soil moisture + Quality	Surface water quality monthly. Flows fortnightly. Swamp groundwater quality monthly. Perched groundwater quality monthly.
	PC2	240913	6298663	Swamp water level + Soil moisture + Quality	
	SPR1606	241416	6299066	Banks Wall Sandstone	
	Paddy's Creek	241601	6299127	Surface water quality	
Pine/9 Mile Swamp	BS1 (Nine Mile)	241053	6301325	Swamp water level + Soil moisture + Quality	Surface water quality monthly. Flows fortnightly. Swamp groundwater quality monthly. Perched groundwater quality monthly.
	BS2 (Pine)	240813	6300172	Swamp water level + Soil moisture + Quality	
	BS3 (Pine)	241980	6301243	Swamp water level + Soil moisture + Quality	
	PSS (BS4) (Pine confluence)	241959	6301202	Swamp water level + Soil moisture + Quality	
	NMSS (BS5) (Nine Mile confluence)	241913	6301328	Swamp water level + Soil moisture + Quality	
	NM (Nine Mile)	241425	6301309	Swamp water level	
	PS (Pine Swamp)	241516	6300728	Swamp water level	
	PUS (Pine Swamp)	240199	6299453	Swamp water level	
	PHS	240199	6299435	Perched groundwater system	
	SPR1605	241965	6301250	Burralow Formation	
	9 Mile Swamp	241955	6301301	Surface water quality	
	Pine/9 Mile swamp	242130	6301240	Surface water quality	
Plum Swamp	PLM2101	239095	6297595	Burralow Formation	Baseline data collection.
	PLM2102	239095	6297595	Burralow Formation	

Site	Monitoring ID	Easting (GDA94)	Northing (GDA94)	Target	Comments
Sunnyside Swamp	SS1	237770	6303520	Swamp water level + Quality	Surface water quality monthly. Flows fortnightly. Swamp groundwater quality monthly.
	SS2	237780	6303573	Swamp water level	
	SS3	237844	6303844	Swamp water level + Quality	
	SS4	237791	6304398	Swamp water level + Quality	
	SS5	237787	6304631	Swamp water level + Quality	
	Sunnyside Swamp Upstream	237809	6304220	Surface water quality	
	Sunnyside Swamp Downstream	237637	6304967	Surface water quality	
	Sunnyside Swamp Upstream Junction	236752	6305174	Surface water quality	
Sunnyside East Swamp	SSE2	238825	6303351	Swamp water level + Quality	Surface water quality monthly. Flows fortnightly. Swamp groundwater quality monthly.
	SSE3	239075	6303566	Swamp water level + Quality	
	SS3 D/S (Sunnyside East Downstream)	239363	6303908	Surface water quality	
	Sunnyside East	239442	6304205	Surface water quality	
Sunnyside West Swamp	SW1	237230	6302421	Swamp water level	
Tristar Swamp	TS1	237555	6307286	Swamp water level + Quality	Surface water quality monthly. Flows fortnightly. Swamp groundwater quality monthly.
	TS2	237446	6306779	Swamp water level + Soil moisture + Quality	
	TS3	236897	6307163	Swamp water level + Soil moisture + Quality	
	Tristar (Springvale)	236644	6307057	Surface water quality	
	SPR1609	236975	6307097	Banks Wall Sandstone	

Site	Monitoring ID	Easting (GDA94)	Northing (GDA94)	Target	Comments
Twin Gully Swamp	TG1	236436	6308767	Swamp water level + Soil moisture + Quality	Surface water quality monthly. Flows fortnightly. Swamp groundwater quality monthly.
	TG2	236043	6308932	Swamp water level + Soil moisture + Quality	
	Twin Gully (Springvale)	235912	6308894	Surface water quality	
Wishbone Swamp	WB12101	238830	6298471	Burralow Formation	Baseline data collection.
	WB12102	238830	6298471	Burralow Formation	
	WB32101	238957	6298378	Burralow Formation	
	WB32102	238957	6298378	Burralow Formation	
	WB32103	238957	6298378	Burralow Formation	
	WBSH1	238962	6298397	Hanging swamp water level	
	WBSH2	238970	6298411	Hanging swamp water level	
	WBSH3	238979	6298430	Hanging swamp water level	
	WBSH4	238985	6298446	Hanging swamp water level	
Wolgan East Swamp	WE1	236387	6304057	Swamp water level	Surface water quality monthly. Flows fortnightly. Swamp groundwater quality monthly.
	WE2	236419	6304178	Swamp water level	
	East Wolgan Upstream	236262	6303726	Surface water quality	
	Eat Wolgan Downstream	236606	6304856	Surface water quality	
	East Wolgan Downstream Junction	236684	6305200	Surface water quality	
Wolgan River	Wolgan River (Wolgan Valley)	240256	6320189	Springvale water quality site	Surface water quality monthly. Flows monthly.
	Wolgan river Downstream	235432	6309941	Springvale water quality site	Groundwater quality weekly.

Site	Monitoring ID	Easting (GDA94)	Northing (GDA94)	Target	Comments
Springvale discharge points	Bore 6	238507	6304494	Springvale water quality site	
	Bore 8	239763	6304072	Springvale water quality site	
	LDP006	230519	6300198	Springvale water quality site	

Appendix C

Historical piezometer observations

C.1 Historical observations

Table C.1 Swamp groundwater level history

Swamp name	Piezometers	Swamp characteristics and mining history
Barrier Swamp	BA1 BA2 BA3 SPR1608	There are three piezometers installed in Barrier Swamp and the perched groundwater system is monitored by SPR1608. Groundwater at Barrier swamp is primarily fed by the outcropping of the YS4 ply which runs parallel to the length of the swamp. The swamp terminates downstream intersecting with the YS5, YS5a and YS6 plies. From bore logs, the surface peat layer is typically 0.3 m to 0.6 m thick, under which lies a clayey sand or sand that transitions into a weathered sandstone. Barrier Swamp is a waterlogged swamp that exhibits stable water levels with consistent groundwater base flow contribution. Water levels at the three piezometers reflect the general trends of the daily CRD curve and respond to rainfall events in relative agreement.
Best Swamp	BE1 BE2 SPR1612	There are two piezometers installed in Best Swamp and the perched groundwater system is monitored by SPR1612. The profile is varied with the peat layer in the upstream section at BE1 approximately 0.7 m thick and at BE2 it is 0.3 m thick. At BE1 beneath the peat is a thick 0.2 m layer of clayey sand that transitions to a 0.5 m thick weathered sandstone soil that terminates on bedrock. At BE2 beneath the peat is a 0.2 m layer of sand, then a 0.4 m layer of clayey sand with bands of clay, then a 0.6 m thick weathered sandstone soil that terminates on bedrock. Best Swamp is a waterlogged swamp with water levels strongly correlated to the daily CRD trend particularly upstream at BE1. The declining water levels since installation to January 2020 reflect the below average rainfall conditions since 2016. A declining trend was observed over the reporting period reflecting periods of below average rainfall.
Carne Central Swamp	CC1 CC2 SPR1604	There are two piezometers installed in Carne Central Swamp and the perched groundwater system is monitored by SPR1604. The swamp is fed by outcropping of the YS4 ply in the upstream section near CC1 and YS5 ply near CC2. Further downstream Carne Central hanging swamp is supported by outcropping of the YS5, YS5a and YS6 plies near the end of the swamp that becomes a cliff. The upstream section at CC1 has 0.2 m of root mat followed by 0.2 m of sandy clay, then a 0.5 m layer of clayey sands which terminates on weathered sandstone bedrock at 0.95 m. The downstream section at CC2 is characterised by a 0.3 m surface peat layer followed by a 0.3 m clayey sand layer followed by a 0.2 m sandy clay layer that transitions into a weathered sandstone profile (0.4 m thick) where it refused on bedrock. The clay layers within the swamp profile are likely related to the outcropping plies. Carne Central swamp is a reference swamp with water levels strongly correlating to the daily CRD trend. The sharp drawdowns observed in the hydrograph are sampling spikes caused by bore purging for water quality sampling. The declining water levels from 2016 to early 2020 at CC1 reflect the drought conditions experienced on the plateau. During this time, Carne Central Swamp has transitioned from a permanently waterlogged swamp into a periodically waterlogged swamp. Following the above average rainfall conditions since February 2020 to November 2022 waterlogged conditions were once again observed at the swamp. A variable trend was observed during the reporting period correlating with climatic conditions.
Firetail Swamp	FS1 FS2 SPR1611	There are two piezometers installed in Fire Tail Swamp and the perched groundwater system is monitored by SPR1611. The profile at FS1 is relatively deep at 2.9 m with a 0.4 m surface peat layer, followed by a 2.5 m layer of clayey sands with two 0.2 m bands of clay between 1 m and 1.5 m depth, and terminating on bedrock. The profile at FS2 is relatively shallow at 0.5 m deep with a 0.3 m surface peat layer followed by a thick 0.1m sandy layer that transitions into the weathered sandstone bedrock. Fire Tail Swamp is a reference swamp located out of the extraction area. Water levels at FS1 (located upgradient), are influenced by rainfall variation seen as fluctuations in groundwater level. Trends appear to correlate with the daily CRD. FS2 is observed to have a baseflow contribution that keeps the swamp waterlogged. It is also influenced by rainfall variation and trends with the daily CRD.

Swamp name	Piezometers	Swamp characteristics and mining history
Twin Gully	TG1 TG2	There are two piezometers installed in Twin Gully Swamp. Twin Gully lies predominantly over the Banks Wall sandstone and commences between the YS5 and YS6 plies where hanging swamps are observed. On the southern side of the swamp, a hanging swamp outcrops from the YS6 ply where there is a permanent pool of water. Twin Gully Swamp is highly channelised with free-flowing surface water. The swamp is characterised by a surface peat layer above a sandy/weathered sandstone profile. TG1 is located on the edge of the swamp and there is only a think root mat layer, whereas TG2, which is located within the swamp has a 0.3m peat layer. The depth of the swamp varies from 0.9 m to greater than 1.1 m. It is noted the total depth from the bore log of TG1 is not representative as drilling was terminated prior to refusal on bedrock due to collapse of the borehole. Water levels are correlated to the daily CRD trend and the trends between TG1 and TG2 are very similar. Long term water level trends at Twin Gully are relatively stable. This suggests there is a large groundwater baseflow contribution to the swamp that maintains waterlogged conditions.
Tristar Swamp	TS1 TS2 TS3 SPR1609	There are three piezometers installed in TriStar Swamp and the perched groundwater system is monitored by SPR1609. The swamp consists of two arms that converge in the main swamp valley. The swamp commences below YS5. Two substantial hanging swamps coincide with the location of YS5 above the upper reaches of the two arms of the swamp. A large proportion of the swamp is situated within the Banks Wall Sandstone. The swamp is characterised by a peaty/highly organic surface soil layer that ranges from 0.3 m to 1.1 m, and a sandy profile that extends to the weathered sandstone bedrock. The valley walls are steep, and the swamp is highly channelised with free-flowing surface water observed down gradient at TS3. The swamp profile is very deep compared to other swamp on the plateau with the bedrock encountered 3.95 m below ground level at TS1 and hole termination beyond 2 m due to collapse at TS2. The swamp at TS1 is rainfall dependent with water levels only observed during periods of prolonged above average rainfalls. The swamp at TS2 is strongly influenced by the prevailing rainfall conditions closely following the daily CRD curve. The swamp at TS3 is permanently waterlogged with evidence of a strong groundwater contribution. Water levels remained stable at TS3 through the drought from 2016 and rainfall events do not significantly influence water levels compared to TS1 and TS2.
East Wolgan Swamp	WE1 WE2	The swamp intercepts the YS4 ply that runs along the length of the swamp. The bore logs show the depth of the swamp at WE1 is 2.8 m with a 0.5 m surface peat layer, followed by a 0.8 m sand layer, followed by a 1.5 m clayey sand layer and terminating on sandstone bedrock. At WE2, a 1.0 m thick peat layer is present, followed by a 0.3 m clayey sand layer and terminates on sunstone bedrock. Wolgan East Swamp was within the Angle of Draw of Springvale Longwall 411 in July 2006 and undermined by Angus Place Longwall 960 in August and September 2011. It was also used as an emergency licenced discharge point (LDP004) for Springvale from 2005 to 2009. Water levels in East Wolgan are believed to be rainfall dependent with little groundwater contribution, likely due to mining impact. The elevated water levels on the hydrograph apparent during 2005, 2006, 2008 and early 2009 are due to the upstream discharge from LDP004. It is difficult to characterise the swamp's natural water level behaviour prior to 2005 because the swamp was subject to mine water discharge at the time of installation and was soon passed by LW411.
Sunnyside West Swamp	SW1	The swamp is located south west, upgradient of Sunnyside Swamp. Sunnyside West swamp is a shrub swamp lying on a local high point with no visible surface water. The bore log shows there is a 0.4 m peat layer above a 1.1 m clayey sand layer, and below that a 0.5 m silty clay and terminates at 2 m on siltstone. The groundwater is likely from the perched aquifer/sub surface flow from above the YS1 ply. Sunnyside West Swamp was undermined by LW412 which commenced in December 2007. It is difficult to assess the pre-mining hydrogeological conditions of the swamp as the baseline period is short. Water levels are highly variable and correlate to periods of above average rainfall. SW1 tends to go dry during periods of sustained below average rainfall.

Swamp name	Piezometers	Swamp characteristics and mining history
Sunnyside Swamp	SS1	Sunnyside Swamp generally commences below YS2; however the western branch (containing SS3) commences between YS1 and YS2. The swamp likely receives seepage contribution from above the YS2 to YS4 plies. Sunnyside swamp has not been undermined but was within 600 m of LW413 and LW414. No mining impacts have been observed. Drawdown from groundwater sampling is evident in some piezometers. Sunnyside Swamp has been a permanently waterlogged swamp until the drought between 2016 to 2020, where the upper reaches of the swamp at SS1, SS2 and SS3 were observed to become dry. Waterlogging resumed following above average rainfall from February 2020.
	SS2	
	SS3	
	SS4	
	SS5	
Sunnyside East Swamp	SSE1	Groundwater seepage is likely from the YS4 ply where it outcrops above the edges of the swamp. The swamp alignment coincides with a significant lineament that trends parallel with the Deanes Creek Lineament Zone. Sunnyside East Swamp profile is relatively deep compared to other swamps on the plateau with logs suggesting depths of approximately 1.8 m to 2.3 m. The swamp profile is characterised by a surface layer of peat with depths of 0.2 m to 0.4 m, below that a clayey sand layer with thicknesses of 1.0 m to 1.5 m, below that a thick interface approximately 0.2 m to 0.4 m between the swamp and the underlying bedrock. This interface is a sandy gravel in the upgradient section and a silty clay in the downgradient section. It is noted that SSE2, which monitors the middle section, may not provide a full representation of the swamp as the installation reached refusal on tree roots and did not go all the way to the bedrock. Sunnyside swamp water level impacts were first observed towards the end of LW414 when it intersected with the lineament underlying the swamp. Water levels made a subsequent recovery but when the Deanes Creek lineament was undermined by LW415, changes to the groundwater regime were observed. The swamp was dry by the time LW417 and LW418 directly undermined the swamp. The swamp currently remains dry.
	SSE2	
	SSE3	
Carne West Swamp	CW1	The hanging swamp upstream of Carne West coincides with the outcropping of the YS2 ply and the swamp terminates downstream of YS5. Carne West likely receives groundwater input from above the YS3 and YS4 plies, and to a lesser extent YS5 plies. CW1 and CW2 are installed below the YS4 ply. CW3 is installed above and the YS3 ply and CW4 is installed above the YS4 ply. SPR1601 is installed above YS6. The swamp alignment also coincides with the regional Deanes Creek lineament structural zone. Data from the four swamp bore logs were used to characterise the swamp. There is a 0.4 to 0.8 m peat layer, and below that a layer of sand/gravelly sand that transitions into the weathered bedrock. At CW3 there is a clay presence that is likely related to the YS3 ply. The depth of the swamp varies from 1 to 1.5 m. The first indications of impact at Carne West swamp were observed in September 2013 towards the completion of LW415 when it approached the Deanes Creek lineament. The significant water level decline was more apparent by September 2014 when the lineament was once again approached by LW416. By the time Carne West was directly undermined by LW418 and LW419, the swamp had become dry and currently remains dry.
	CW2	
	CW3	
	CW4	
	SPR1601	
Junction Swamp	JS1	Three piezometers were installed in the Burralow Formation using a drill rig. The profile consists of a thin topsoil with a clayey sand layer than transitions into the sandstone bedrock. At JS1, YS1 ply is present at the base of the borehole. Since installation in May 2002, water levels at JS1, JS2 and JS3 show a strong correlation with rainfall and daily CRD except for the period when LW408 was extracted from February 2003 to December 2003. During this period water levels were out on sync with the daily CRD and remained stable to slightly declining despite increasing daily CRD.
	JS2	
	JS3	
Gang Gang West Swamp	GW1	The upper reach of the swamp starts just above the YS4 ply and the swamp terminates on the YS5 ply. A lineament is mapped along the length of the swamp and is correlated to the Deanes Creek lineament. Data from GW1 and GW2 bore logs and the GW3 soil analysis were used to characterise the swamp profile. The top layer comprises of a highly organic sandy clay/peat about 0.3 m thick. Below this is a layer of sand that transitions into the weathered sandstone bedrock. Mining impacts were observed in the upper reaches at GW1 in August 2014 toward the completion of LW416 as it intersected the Deanes Creek lineament. The subsequent longwalls saw increasing changes due to decreasing groundwater baseflow contribution. By the time the swamp was directly undermined by LW420, the swamp had become dry and currently remains dry.
	GW2	
	GW3	
	GW4	
	SPR1602	

Swamp name	Piezometers	Swamp characteristics and mining history
Gang Gang Swamp	GG1 GG2 GG3	Gang swamp intercepts YS2 to YS5 plies. A lineament is mapped along the length of the swamp and is correlated to the Deanes Creek lineament. Data from the GG1 bore log and the soil analysis from GG2 and GG3 were used to characterise the swamp profile. The swamp is characterised by a thin shallow organic peat/clay layer less than 0.3 m; overlying a sandy gravel and weathered sandstone bedrock. In some areas, e.g. at GG2, a very fine sand/clay layer approximately 20cm thick is observed at the interface between the bedrock. Gang Water level declines were first observed at GG1 in August 2016 during the extraction of LW419. GG2 and GG3 were installed October 2016 and only capture the respective declines. In August 2017, GG1 displayed a rapid decline in water levels as LW420 advanced. Downgradient at GG3, water levels remained elevated until February 2018 until LW421 undermined the swamp. Gang Gang Swamp remained predominately dry after April 2018 with brief responses to prolonged periods of above average rainfall.
Pine Swamp	BS2 BS3 BS4 SPR1605	There are three piezometers installed in Pine Swamp and the perched groundwater system is monitored by SPR1605. Pine Swamp intercepts the YS2 and YS3 plie in the upper reaches, with the confluence with Nine Mile Swamp occurring below the YS4 ply. A mapped lineament coincides with the strike of the swamp. The top layer consists of a clayey sand/sand with high organics approximately 0.8 m to 1 m in thickness. At BS4, a thin 0. 2 m peat layer is present above this layer. There is a thin sand interface approximately 0.2 m thick above the weathered sandstone bedrock but at BS4 this interface is slightly thicker at 0.4 m. At BS4 where the YS4 ply runs parallel to the swamp and a clay band is observed beneath the peat layer. Pine Swamp has been a historically waterlogged swamp with stable water level trends that suggest a significant component of groundwater contribution. In February 2019, when the upper reaches of the swamp were undermined LW425, water levels in the upper reaches rapidly declined and BS2 became dry three months later in May 2019. Downgradient at BS3 and BS4, water levels began to show indications of decline in mid-2019 and commencing rapid decline in October 2019. Since February 2020, the above average rainfalls have caused water levels return to pre-mining conditions in the lower reaches of the swamp at BS3 and BS4. However, in the upper reaches at BS2 the brief water level increases suggest an altered groundwater regime with the primary contribution now from precipitation.
Nine Mile Swamp	BS1 BS5 SPR1605	The YS3 ply runs parallel to the length of the swamp and the confluence with Pine Swamp occurs around the YS4 outcrop. Pine Swamp receives groundwater seepages from YS2 to YS4 plies. There is a major NNE-SSW fault zone in this area that intersects with both LW425, LW426 and Pine and Nine Mile Swamps. The swamp profile is varied. In the upstream section, the bore log at BS1 does not penetrate the full depth of the swamp due to refusal on caving at 1.1 m. This top layer consists of a highly organic clay. In the downstream section at BS5 there is a 0.4 m peat top layer that transitions into a peaty clay layer (0.3 m thick) and below that is a 0.3 m thick layer of gravelly sand that terminates on weathered sandstone bedrock at 1 m. Nine Mile swamp is a historically waterlogged swamp with relatively stable water levels. Drawdown from groundwater sampling is evident. From mid-2017 water levels at BS1 began declined in response to drought in 2016. The water level decline at BS1 was accelerated during the extraction of LW425 (800 m from BS1) and in February 2019 when the longwall passed through the Pine Swamp lineament. Towards the end of extraction of LW425, when the mining face was approximately 600 m away from Nine Mile Swamp, BS1 went dry and BS5 was observed to decline rapidly. The rains in February 2020 recharged water levels at Nine Mile Swamp. BS5 water levels returned to historic levels and have remained stable. Water levels at BS1 have also recovered but appear to respond to rainfall more readily than previously observed.

Swamp name	Piezometers	Swamp characteristics and mining history
Marrangaroo Swamp	MS1 MS2 SPR1607	The Marrangaroo Swamp overlies YS3 to YS6 plies along its length. The bore logs indicate the swamp depth is approximately 1.3 m to 1.5 m. A 0.3 m peat layer is only present in the upper segment (MS2 and MS3) of the swamp. The swamp has a sandy profile above a weathered sandstone bedrock. Bore logs indicate the presence of a clayey layer in the order of 0.5 m to 0.6 m thickness at swamp piezometers. Marrangaroo Swamp is a waterlogged swamp and historical records show a strong correlation between water levels and daily CRD. The three swamp piezometers display similar water level fluctuations. The continued below average rainfall since mid-2016 resulted in declining swamp water levels. Marrangaroo Swamp hydrograph displayed less stability as the groundwater contribution decreased from YS plies. In February 2020, the above average rainfalls recharged the swamps to pre-drought water levels. Marrangaroo swamp was within proximity to LW428 and 429. MS1 appears to trend with the daily CRD showing variable water levels. MS2 shows highly variable trends correlating to rainfall events however did not show a recovery trend during above average rainfall between November 2023 and May 2024. MS3 appears to trend with the daily CRD showing variable water levels
Paddys Creek Swamp	PC1 PC2 SPR1606	There are two piezometers installed in Paddy's Creek Swamp and the perched groundwater system is monitored by SPR1606. The swamp overlies YS4 to YS6 plies along its length. The bore logs indicate the swamp depth is approximately 1.2 m to 1.6 m. The swamp is characterised by a 0.3 m peat layer followed by a clayey sand before refusing on weathered bedrock. Paddys Creek Swamp is located to the south east of LW425. Although the longwall did not directly undermine the swamp, it was within 600 m. Water levels downstream at PC1 began to decline in late 2018 despite an increasing rainfall. Water level declines at PC1 were likely influenced by below average rainfall as groundwater levels have recovered following above rainfall from February 2020. Water levels at PC2 (upstream) remained stable throughout this time.

Appendix D

Soil moisture probe time series

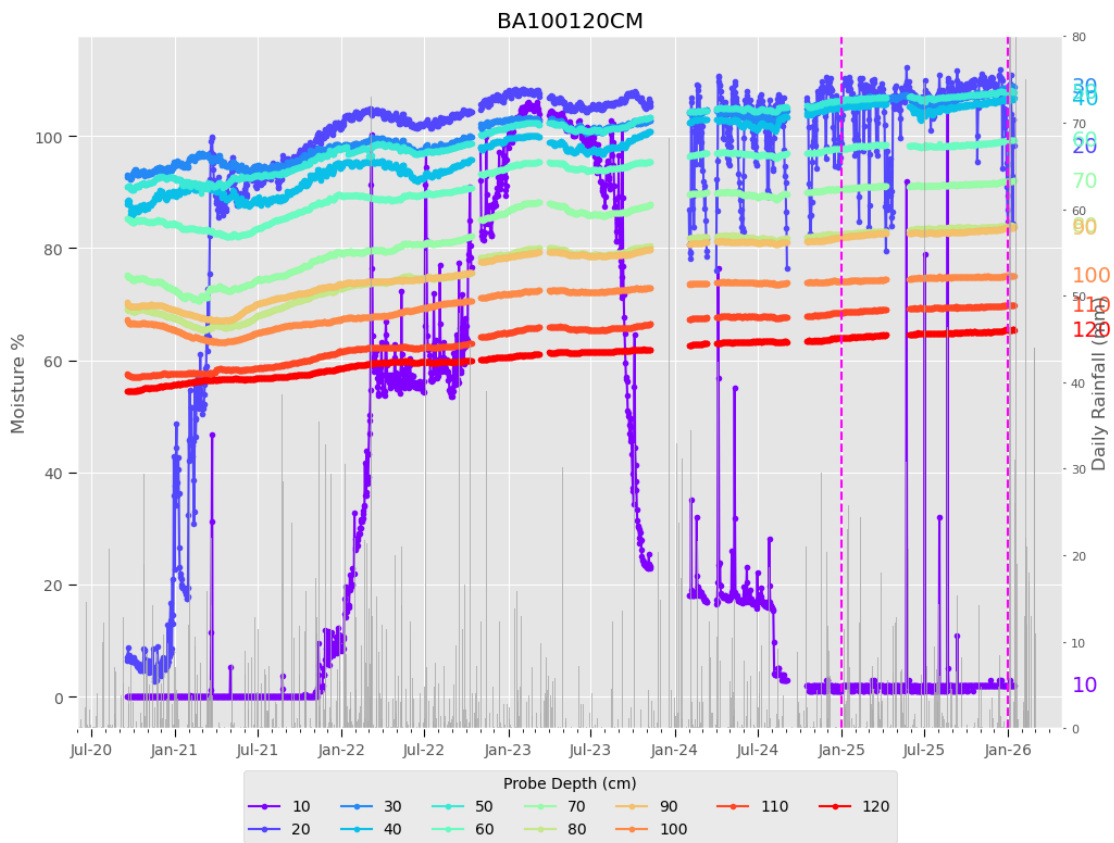


Figure D.1 BA1 soil moisture time series

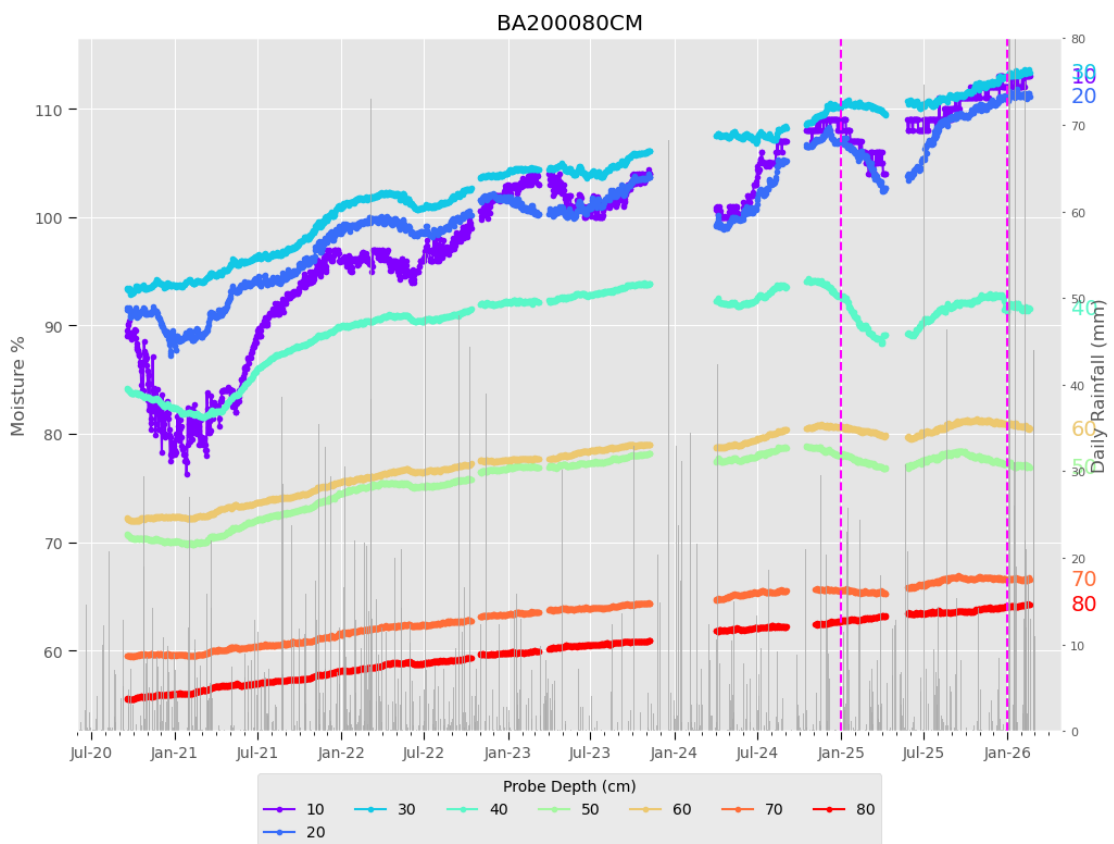


Figure D.2 BA2 soil moisture time series

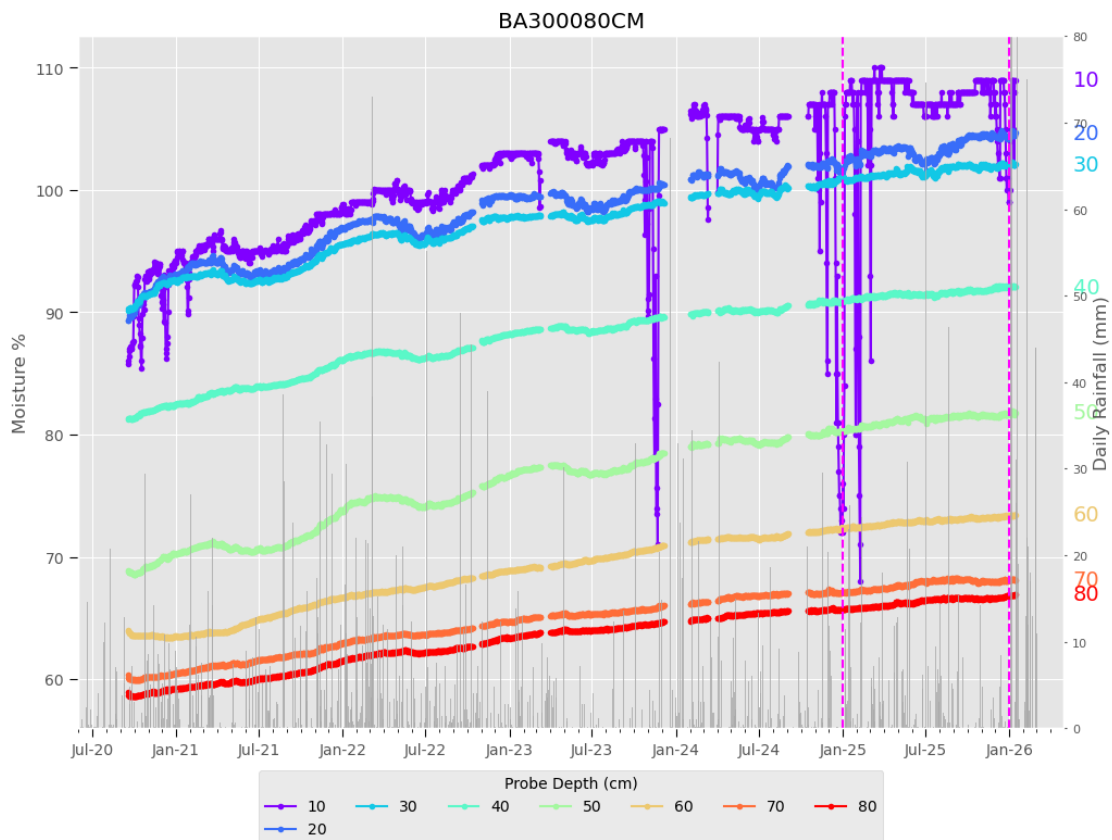


Figure D.3 BA3 soil moisture time series

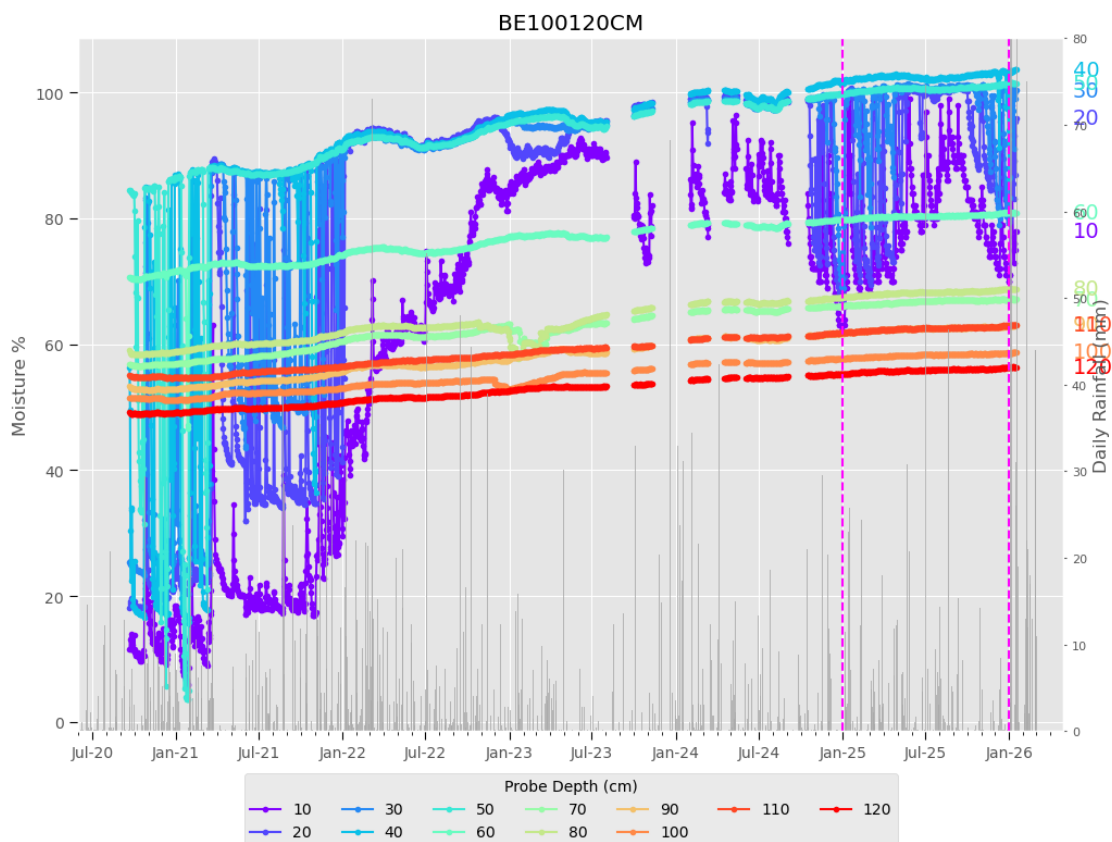


Figure D.4 BE1 soil moisture time series

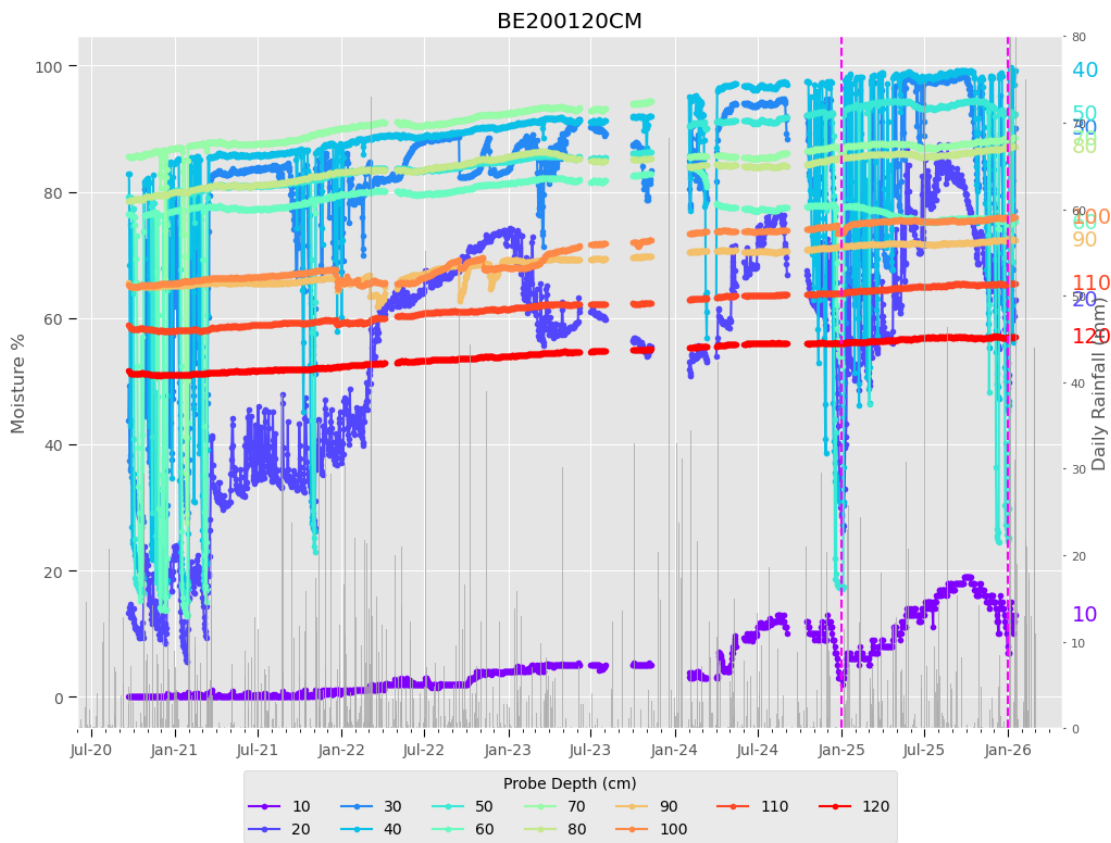


Figure D.5 BE2 soil moisture time series

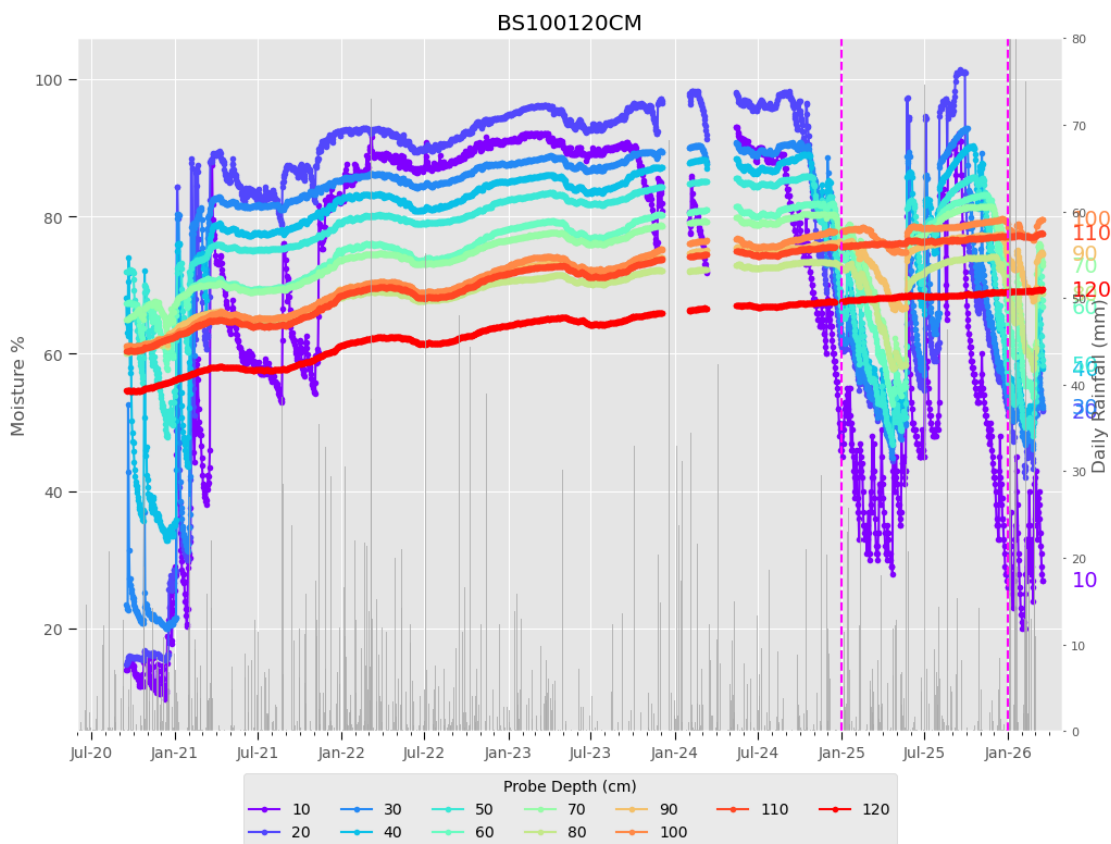


Figure D.6 BS1 soil moisture time series



Figure D.7 BS2 soil moisture time series

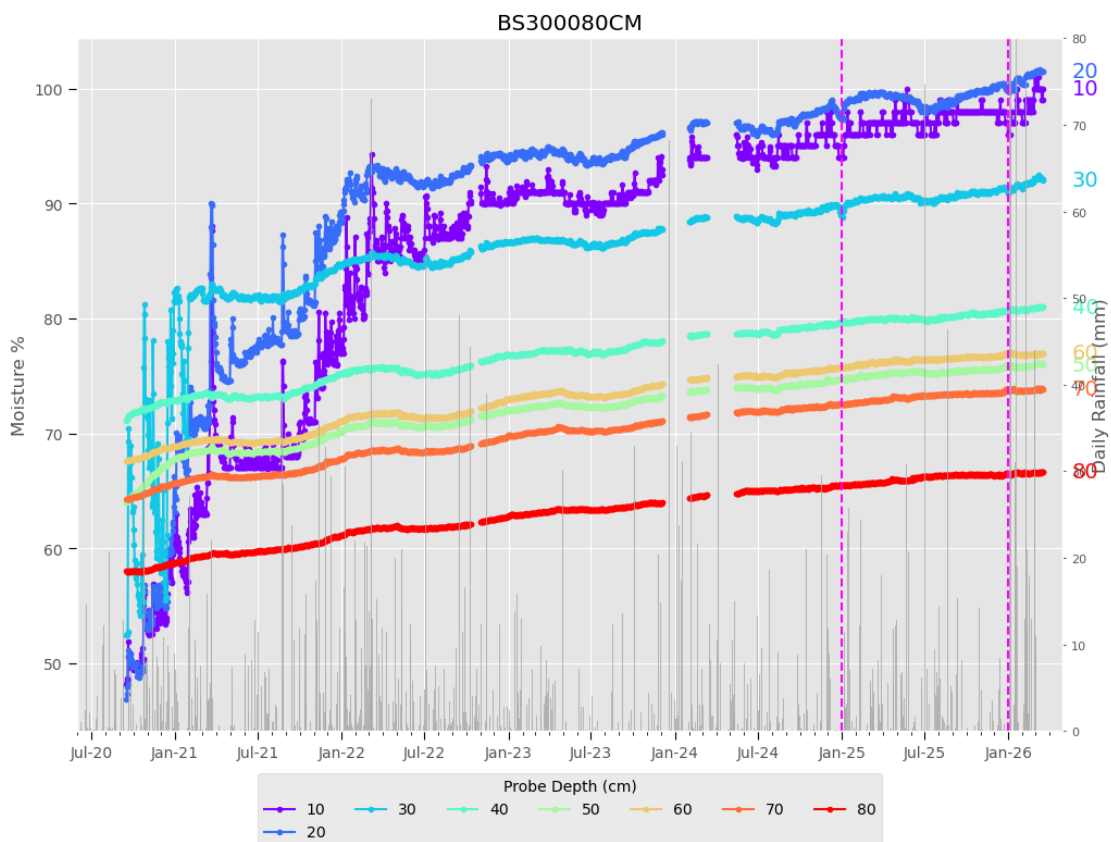


Figure D.8 BS3 soil moisture time series

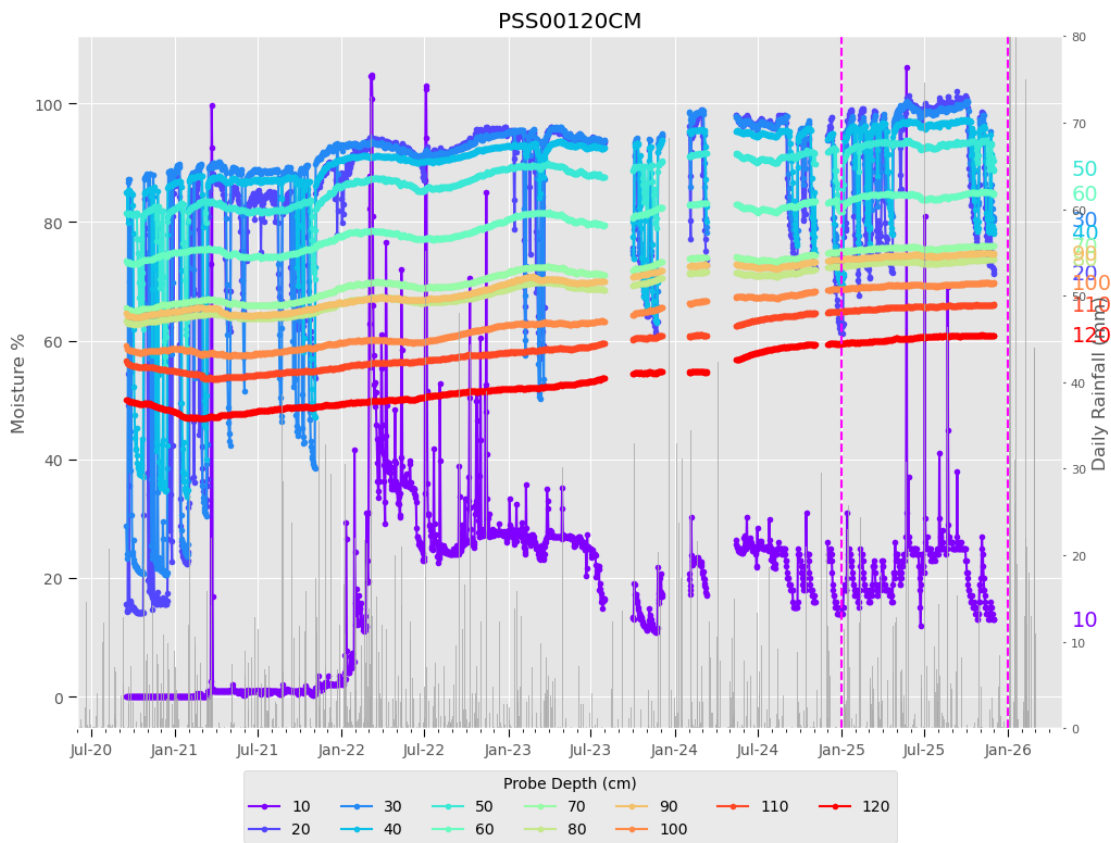


Figure D.9 PSS soil moisture time series

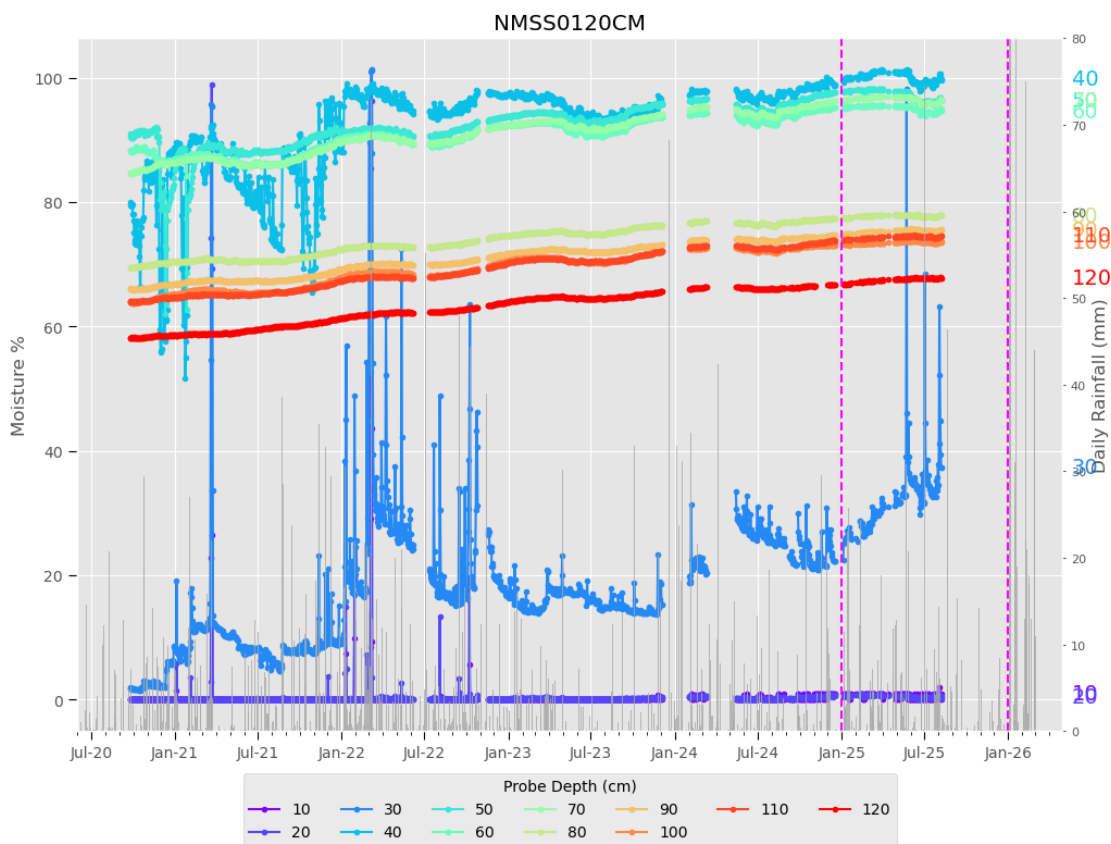


Figure D.10 NMSS soil moisture time series

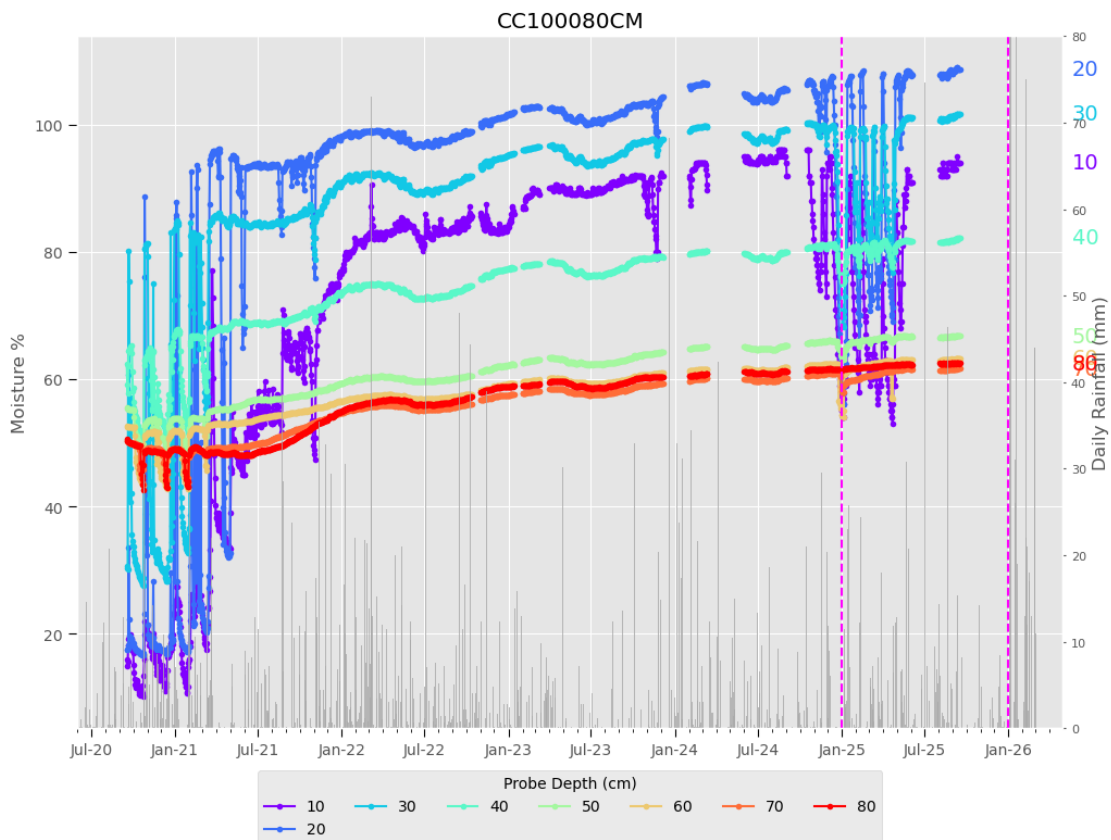


Figure D.11 CC1 soil moisture time series

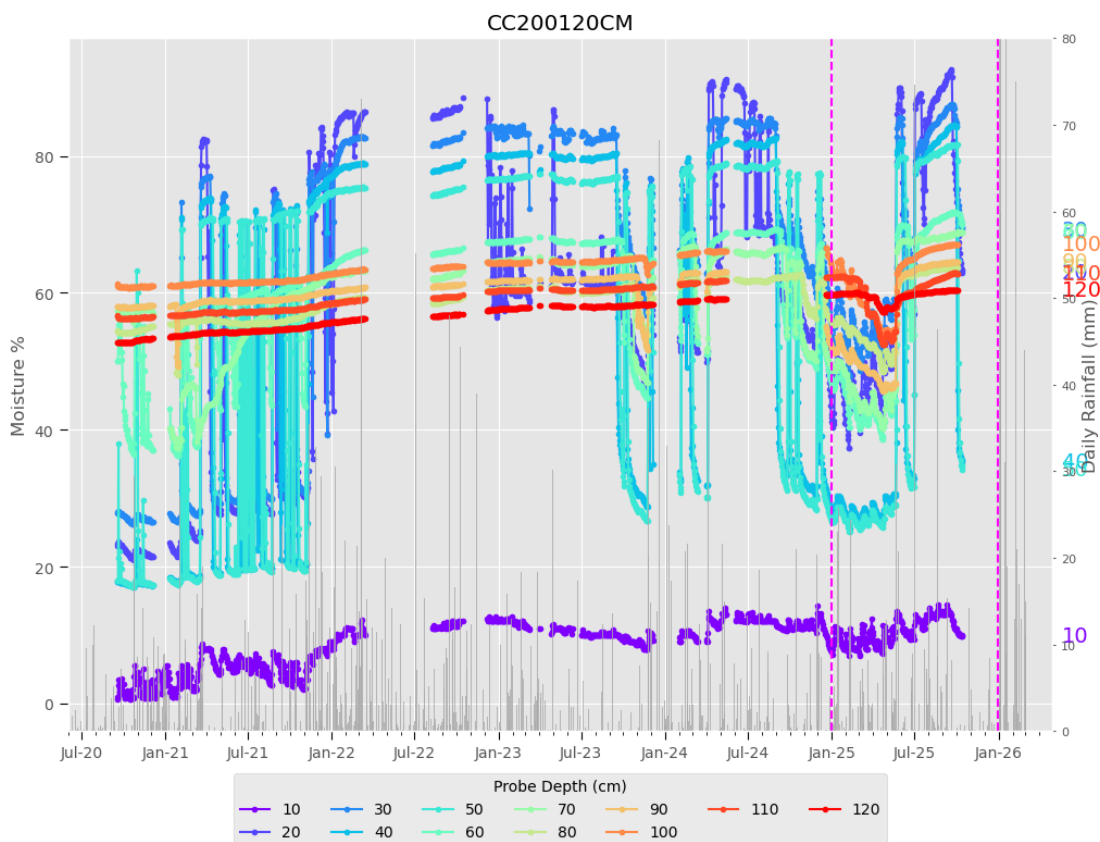


Figure D.12 CC2 soil moisture time series

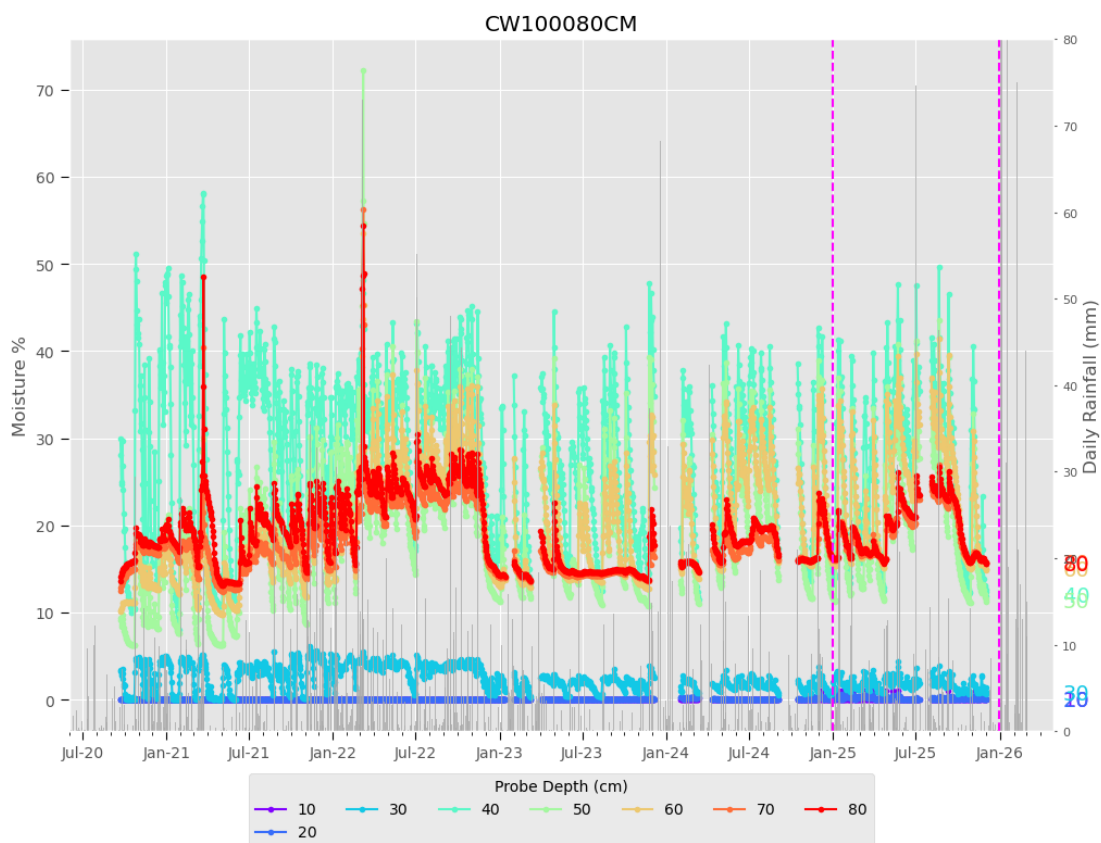


Figure D.13 CW1 soil moisture time series

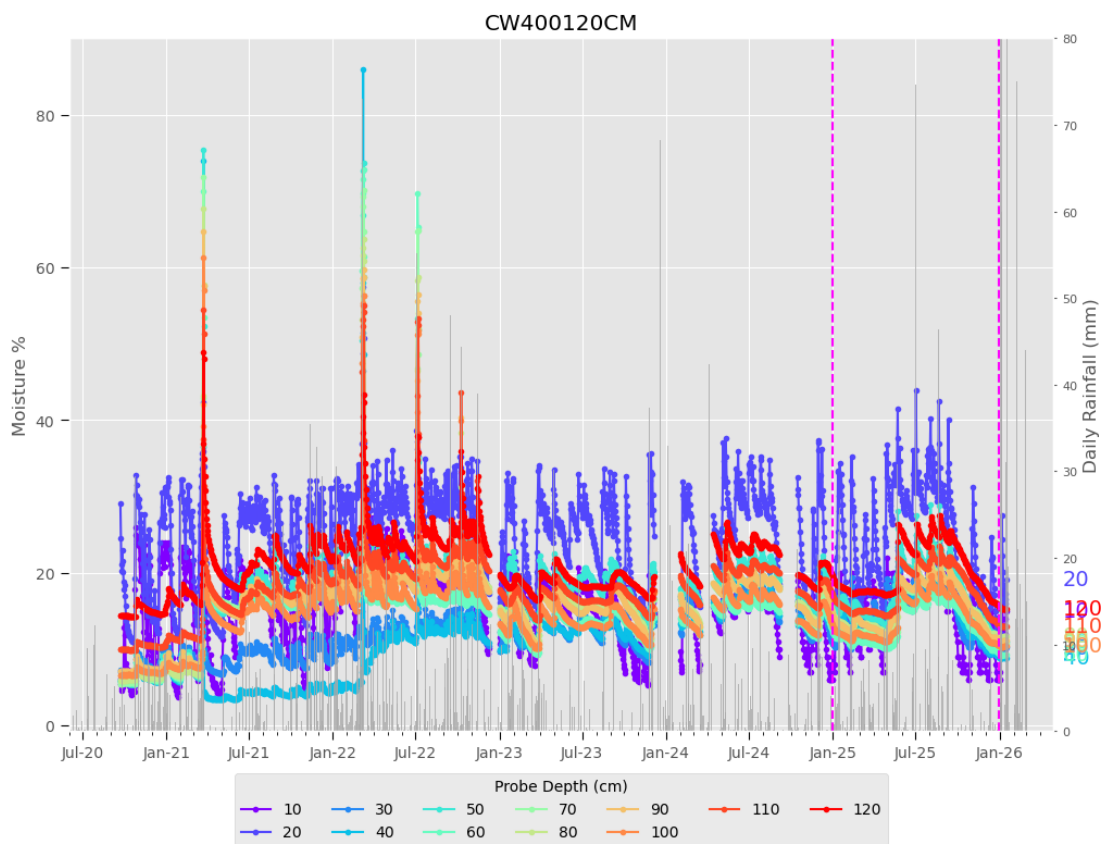


Figure D.14 CW4 soil moisture time series

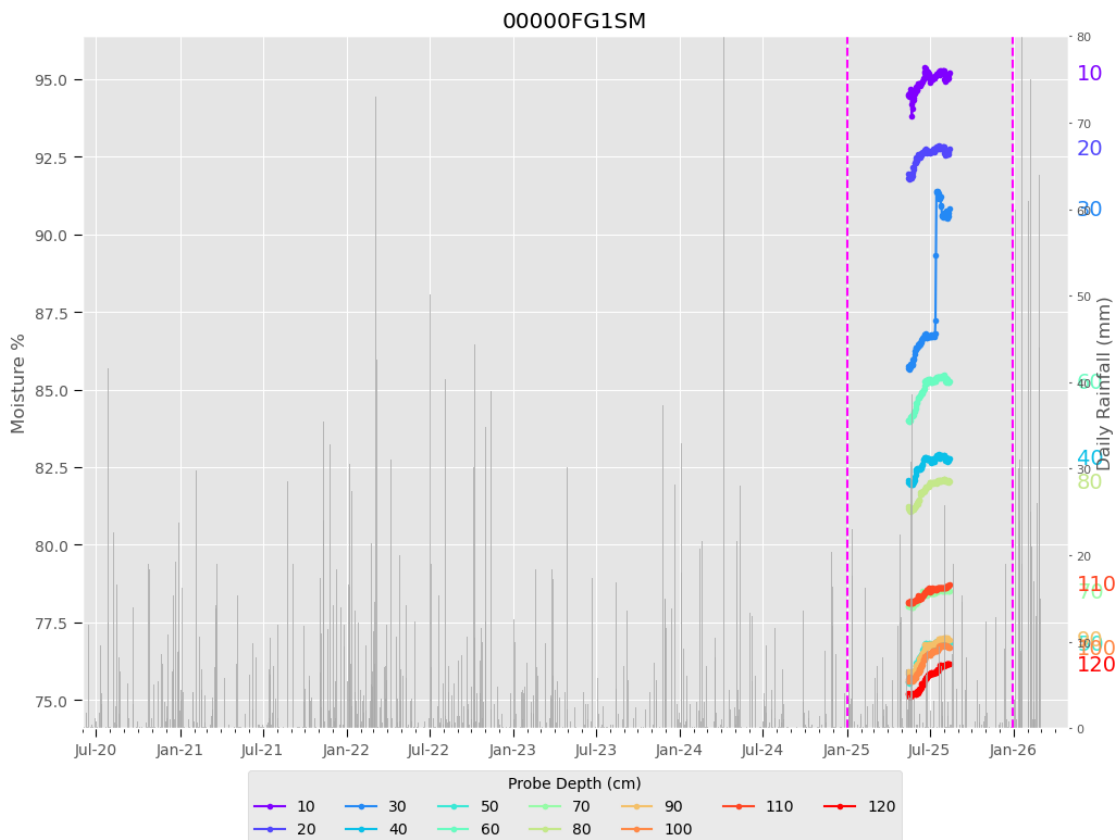


Figure D.15 FG1 soil moisture time series

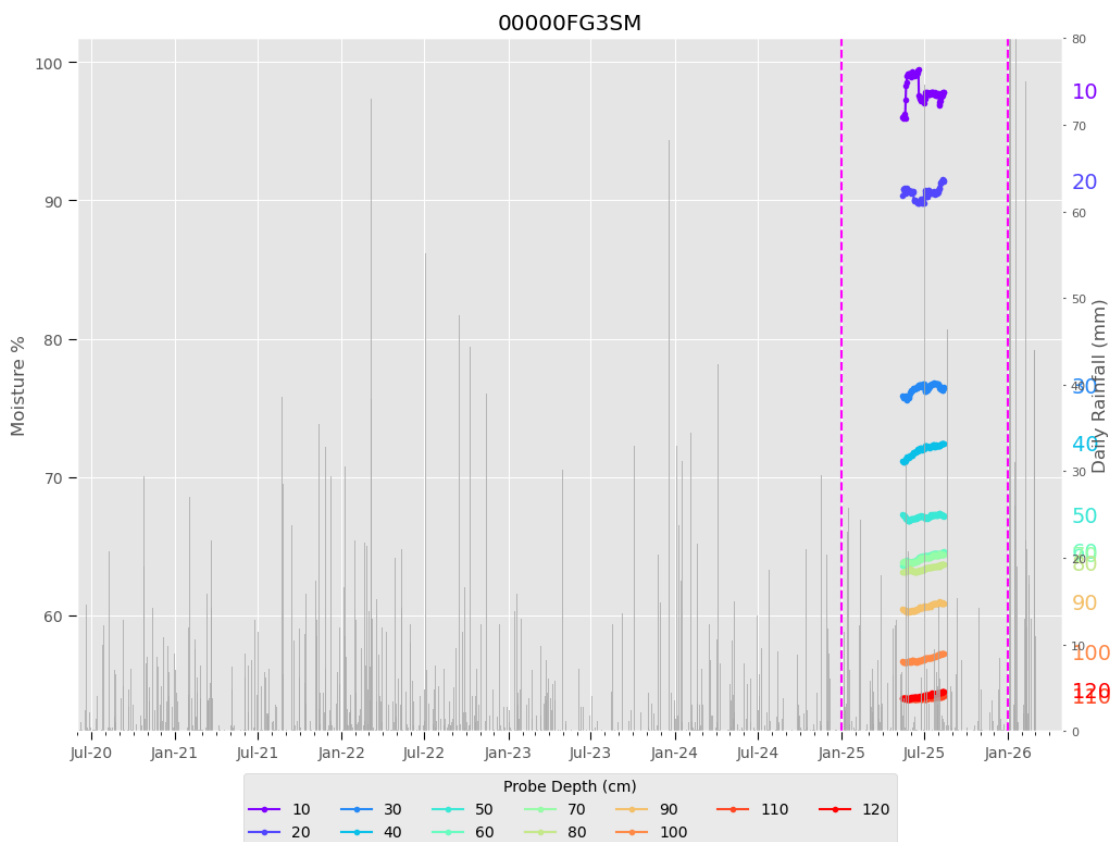


Figure D.16 FG3 soil moisture time series

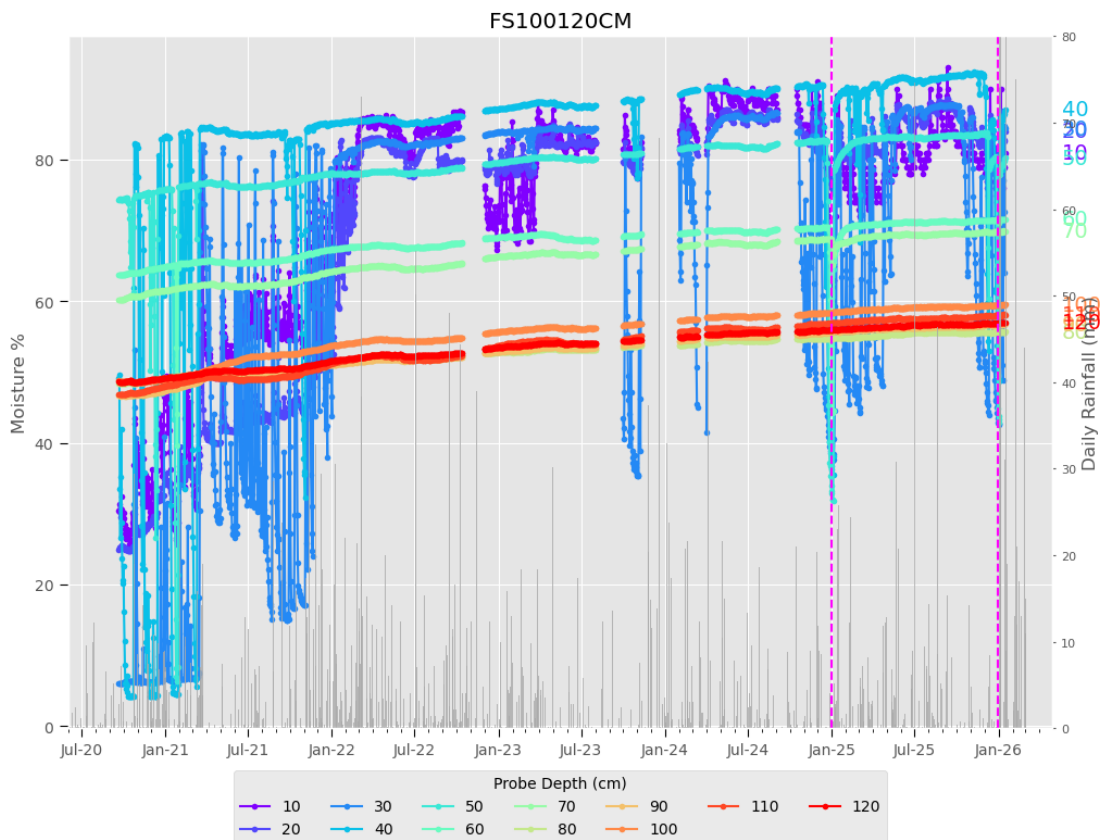


Figure D.17 FS1 soil moisture time series

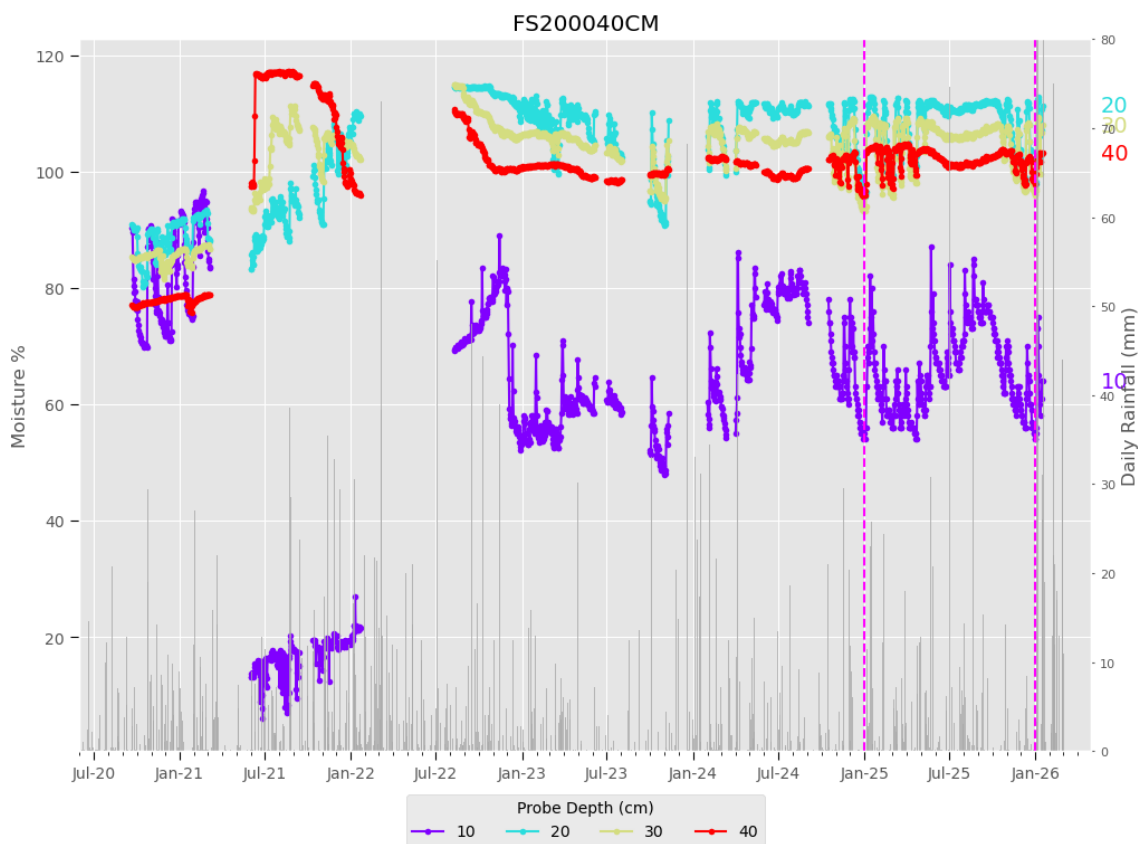


Figure D.18 FS2 soil moisture time series



Figure D.19 GG2 soil moisture time series

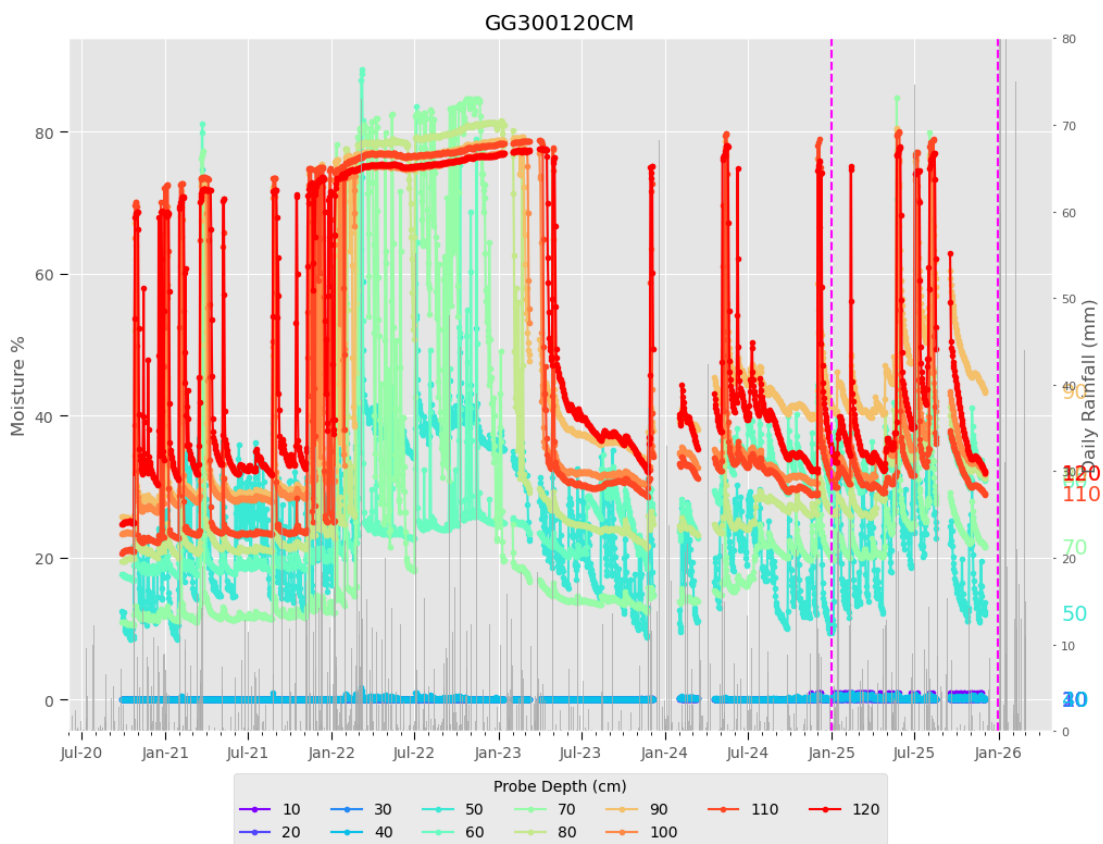


Figure D.20 GG3 soil moisture time series

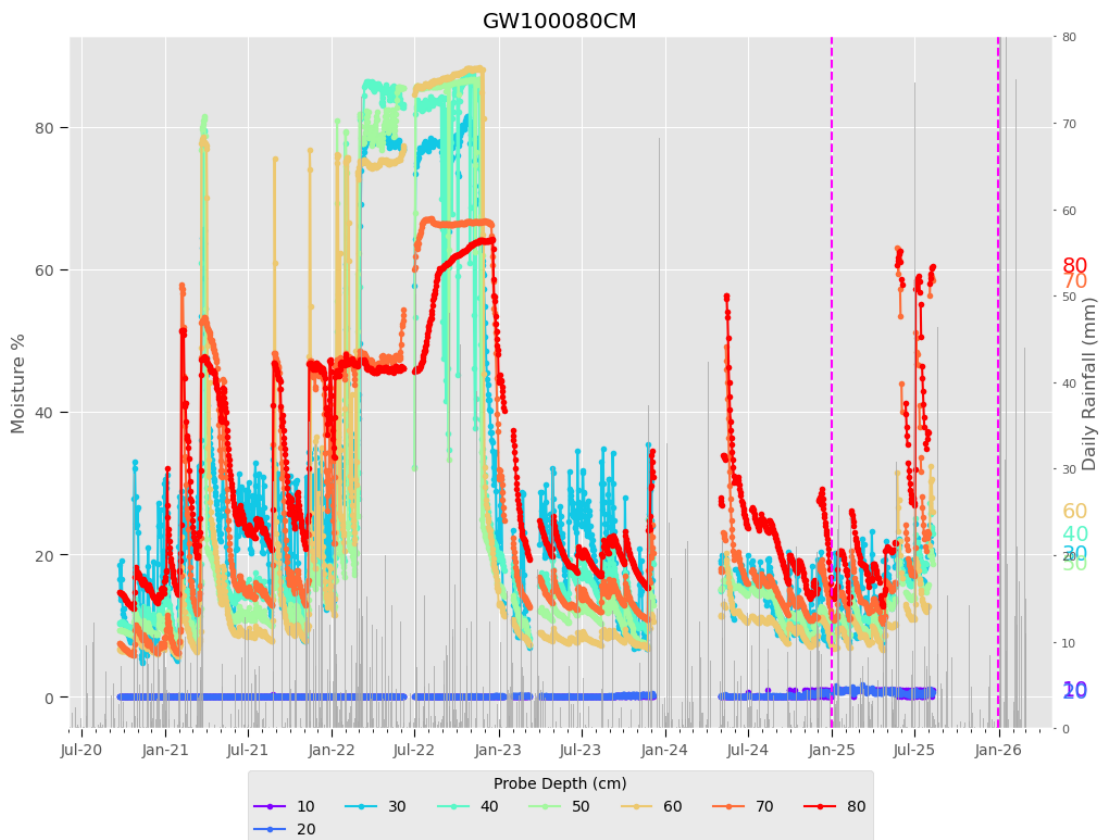


Figure D.21 GW1 soil moisture time series

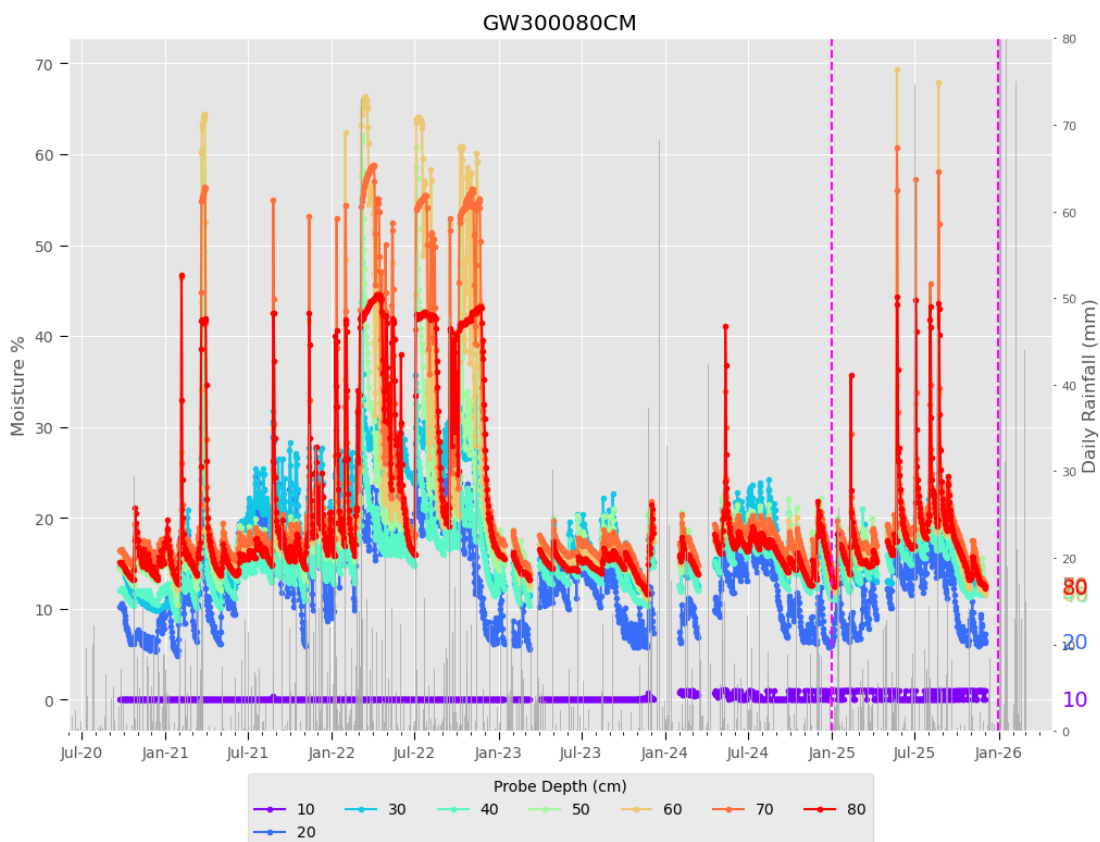


Figure D.22 GW3 soil moisture time series

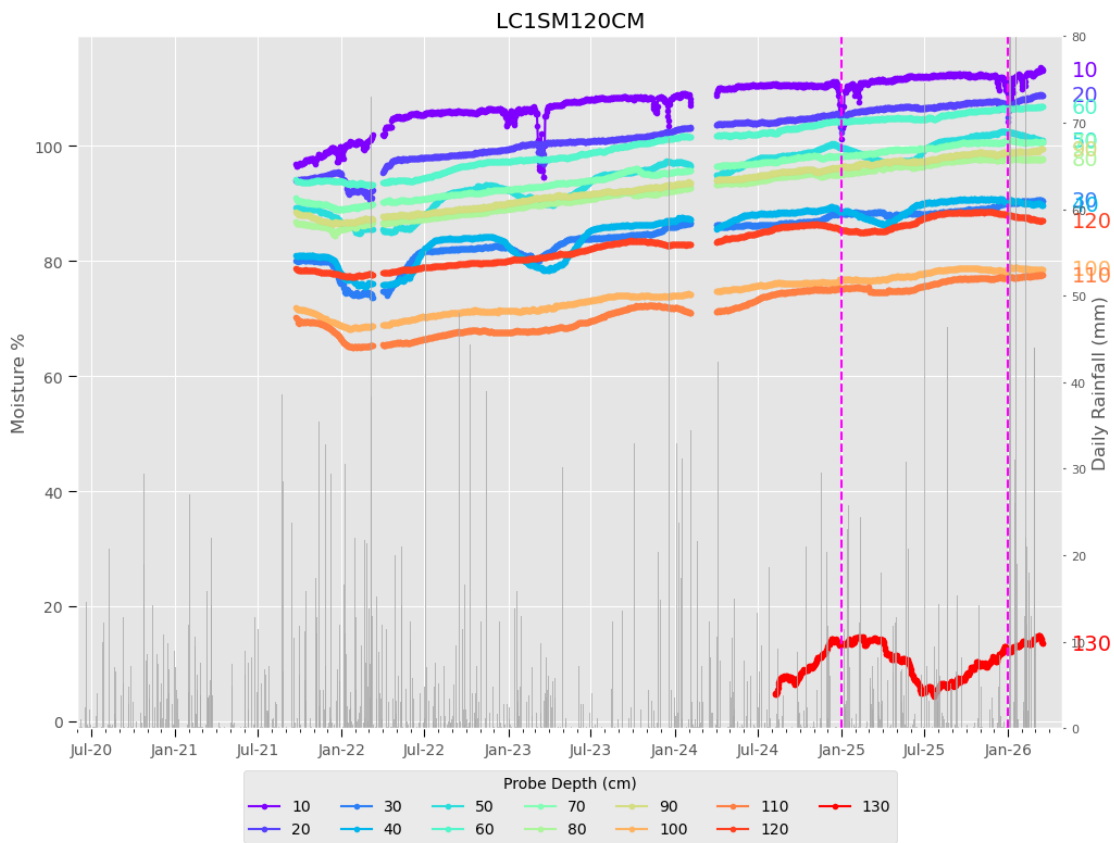


Figure D.23 LC1 soil moisture time series

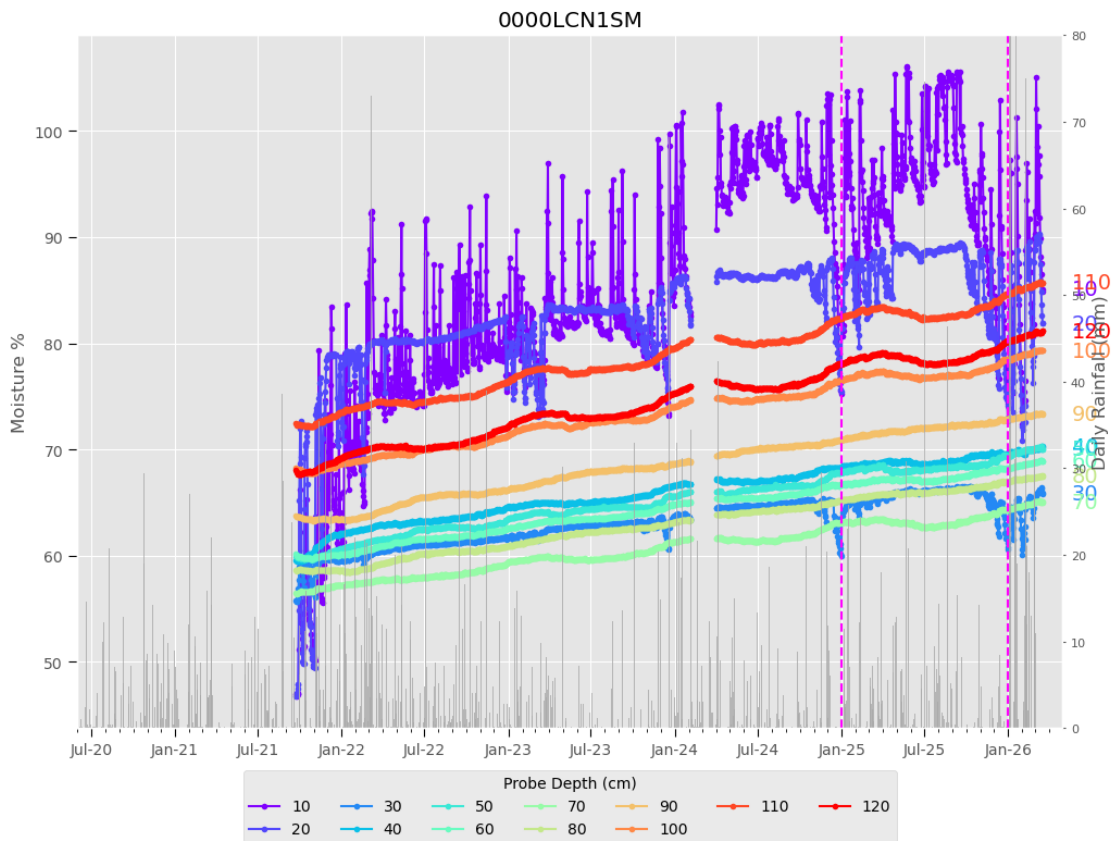


Figure D.24 LCN1 soil moisture time series

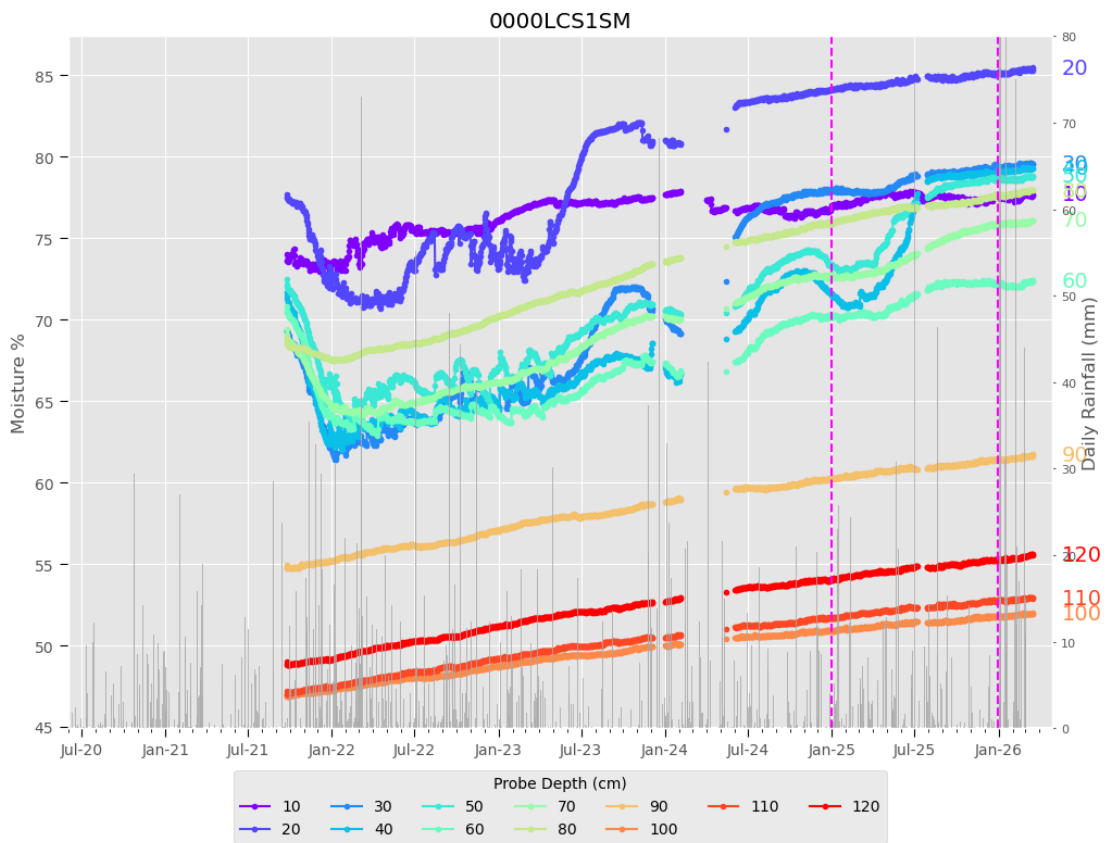


Figure D.25 LCS1 soil moisture time series

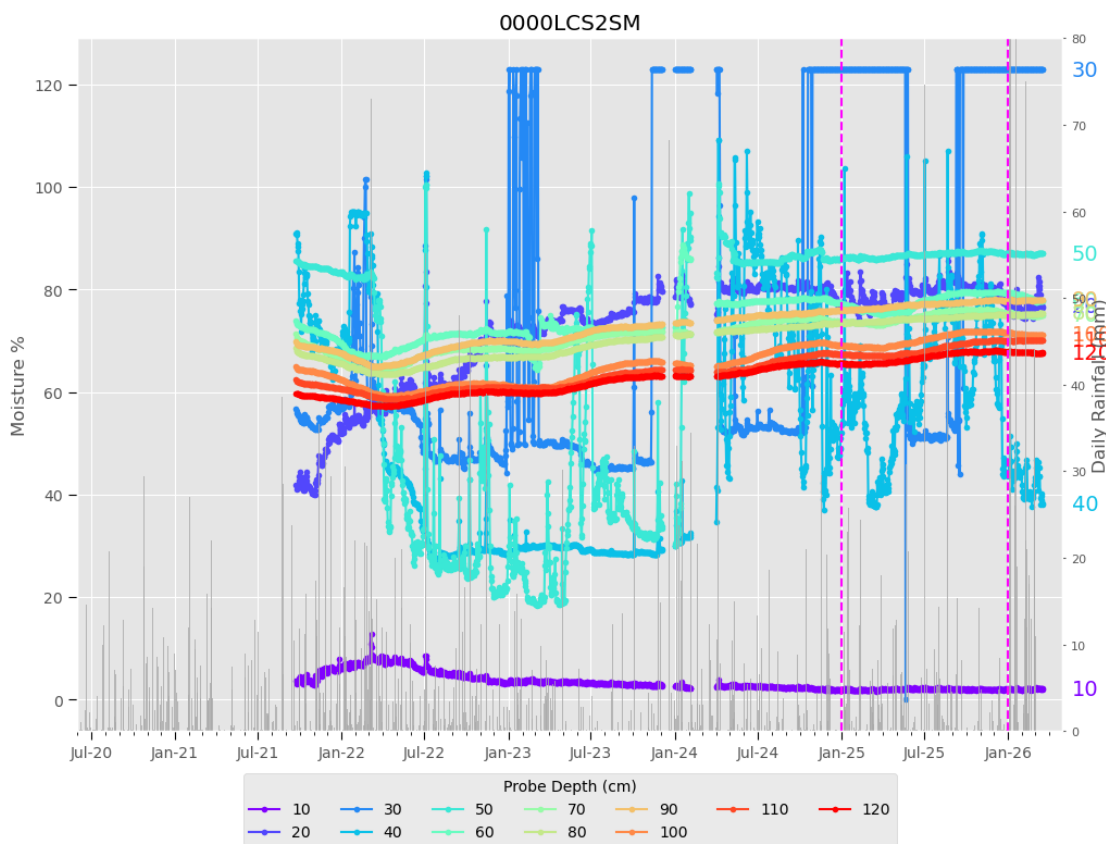


Figure D.26 LCS2 soil moisture time series

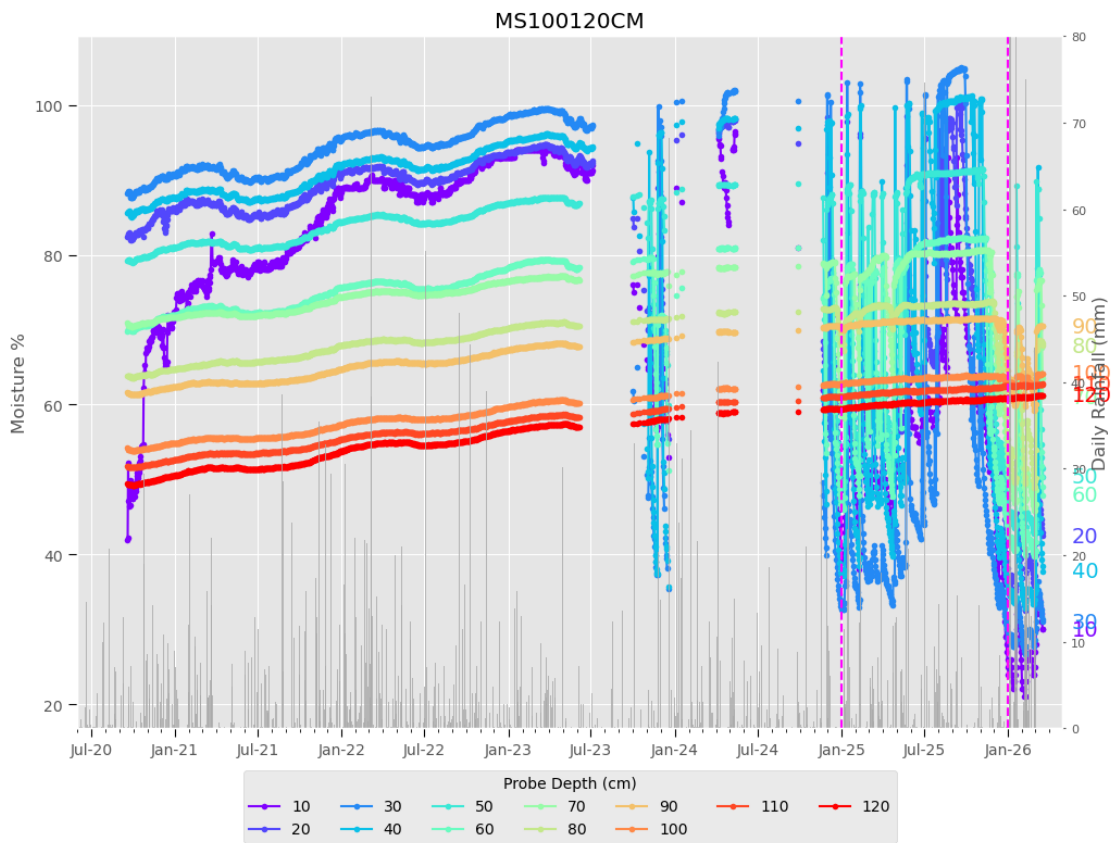


Figure D.27 MS1 soil moisture time series

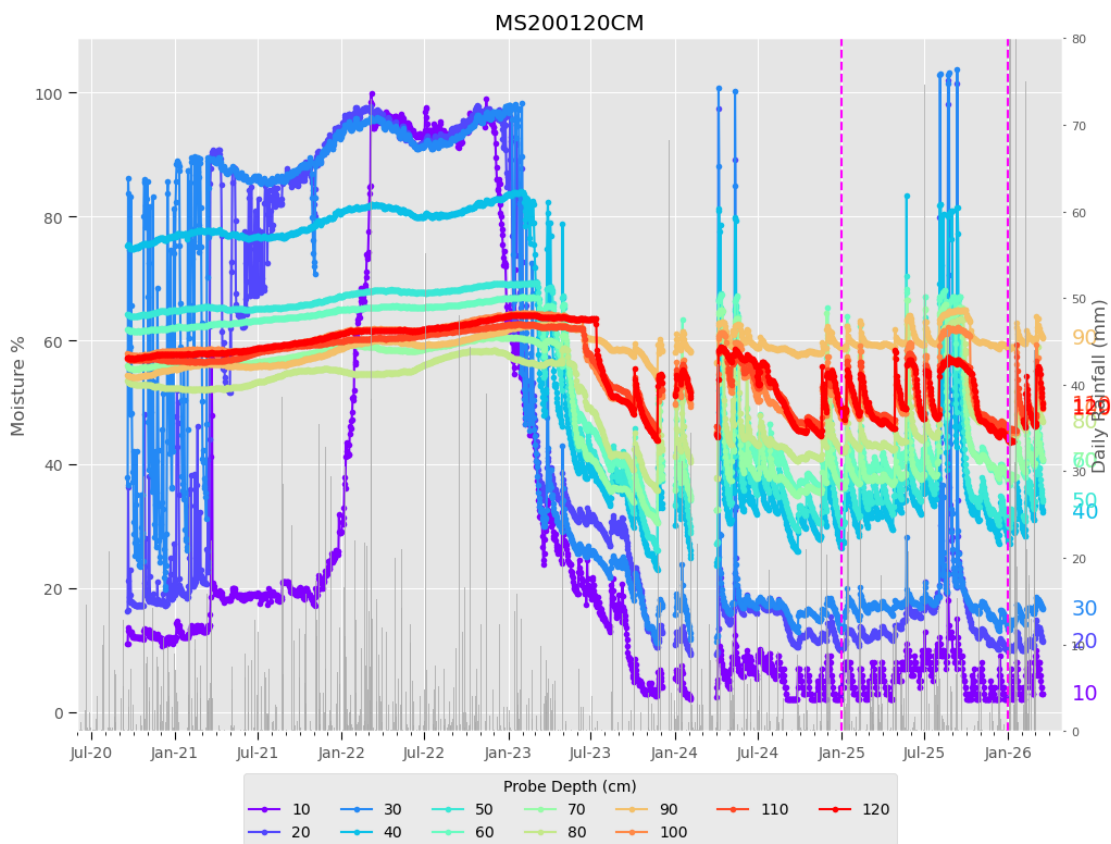


Figure D.28 MS2 soil moisture time series

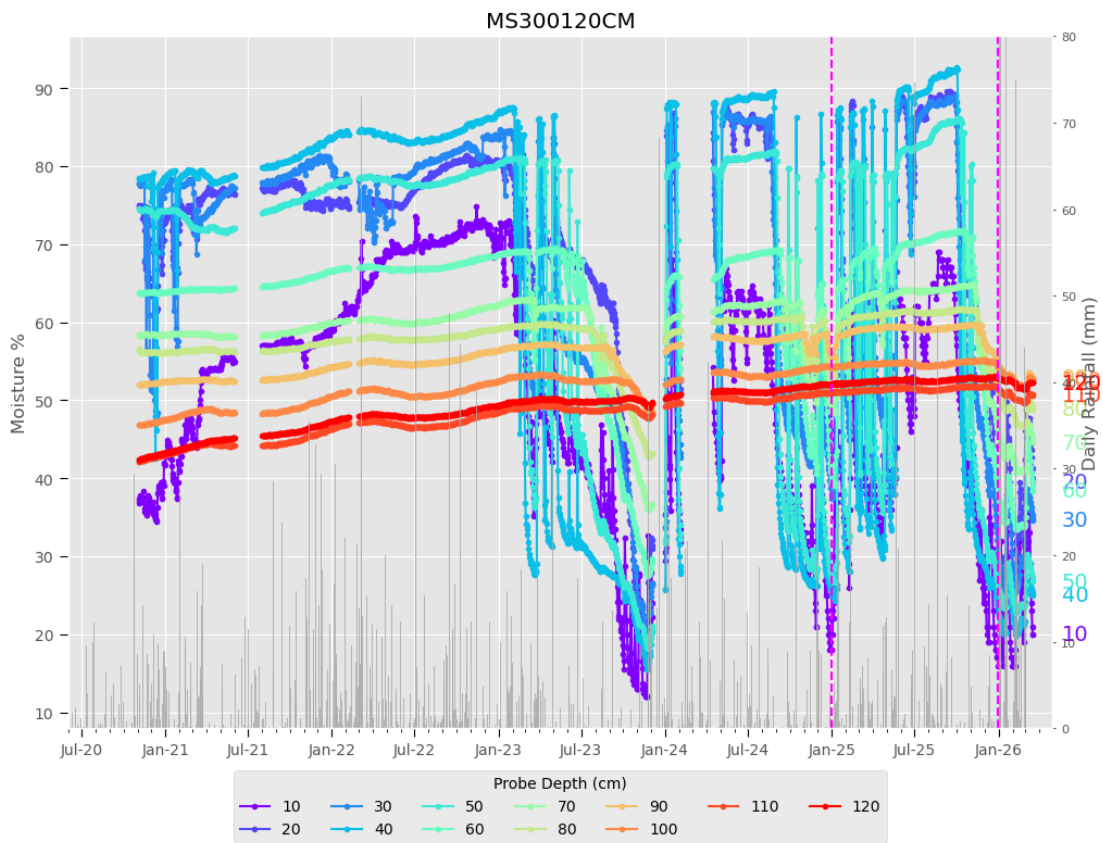


Figure D.29 MS3 soil moisture time series

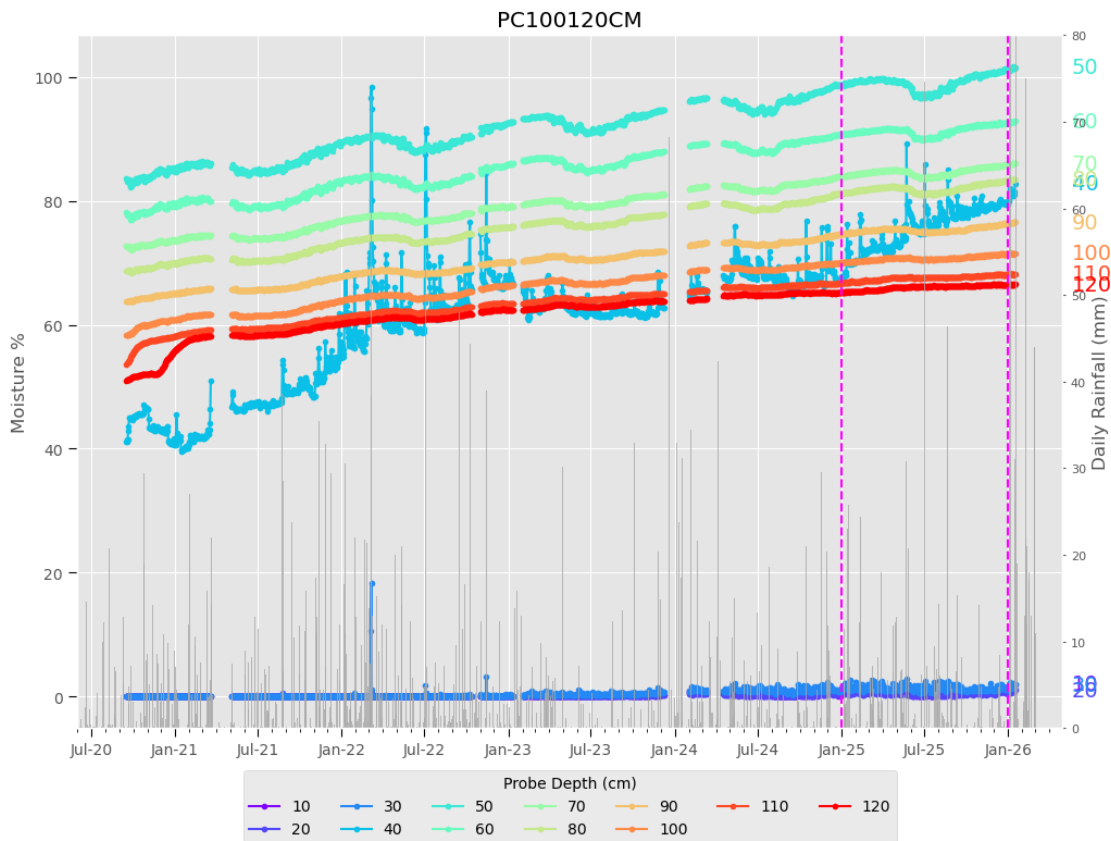


Figure D.30 PC1 soil moisture time series

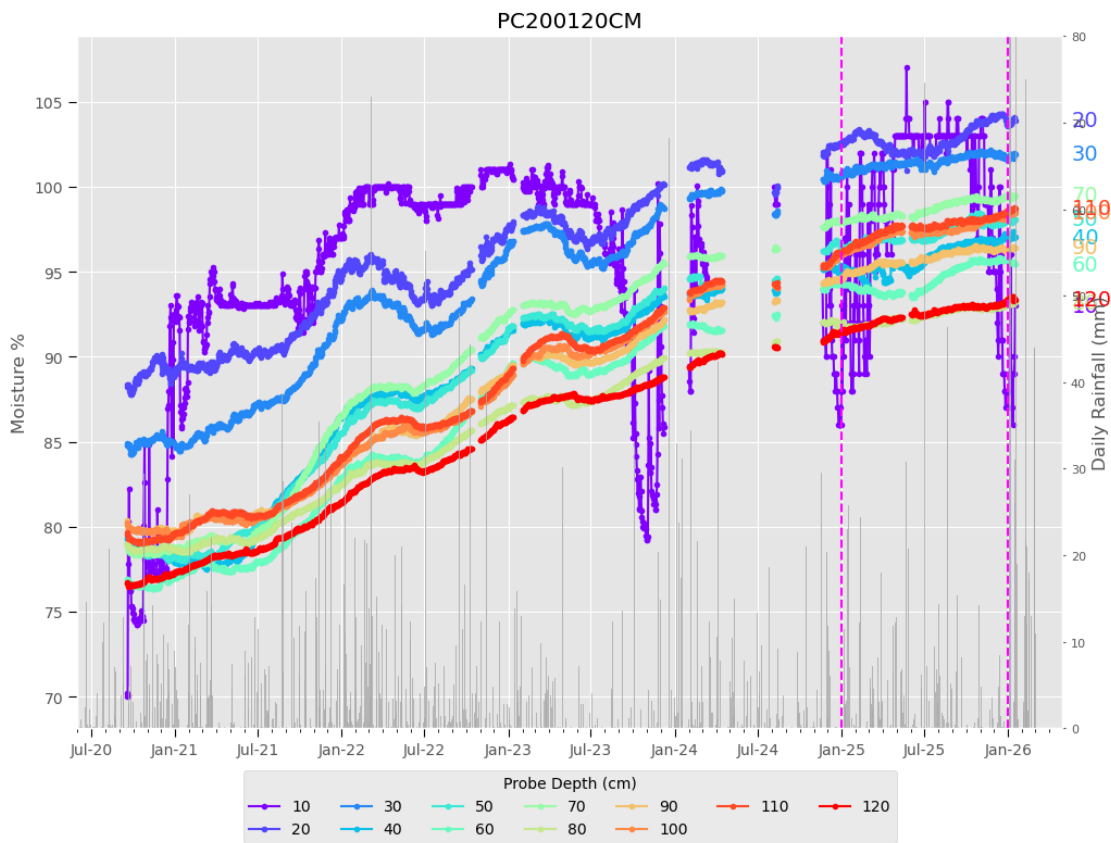


Figure D.31 PC2 soil moisture time series

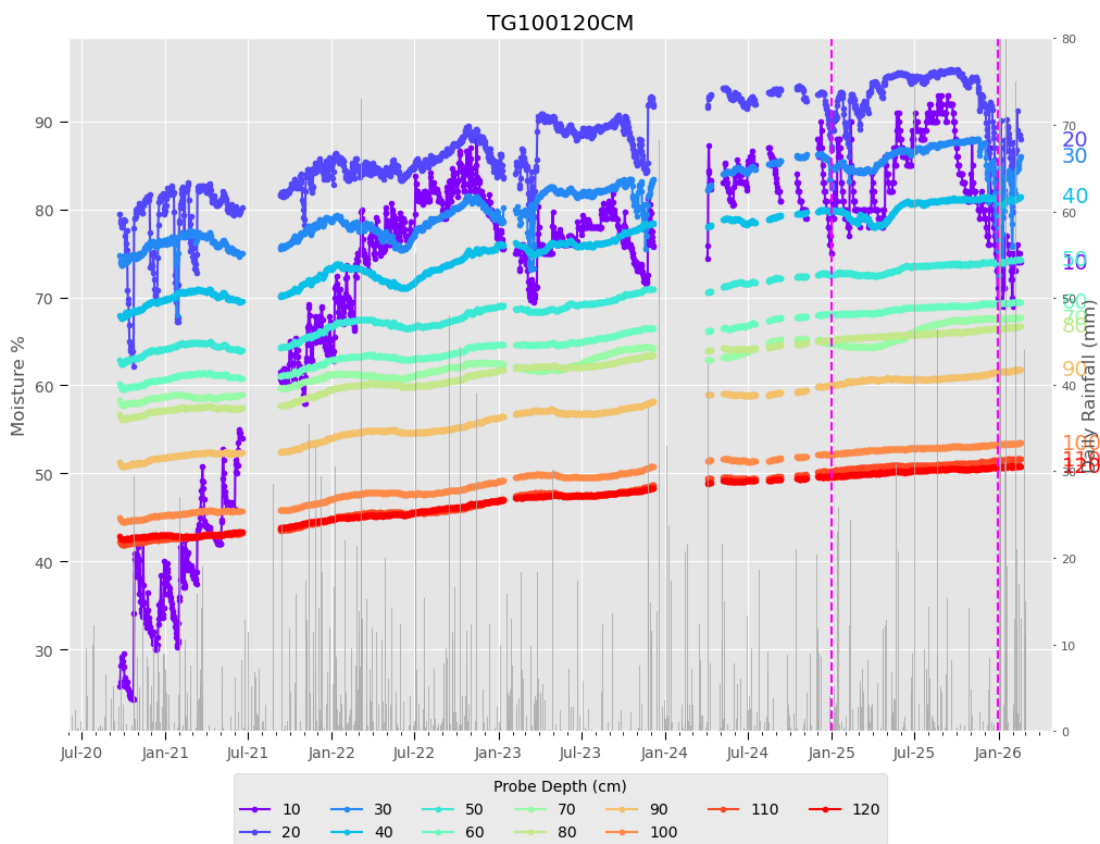


Figure D.32 TG1 soil moisture time series

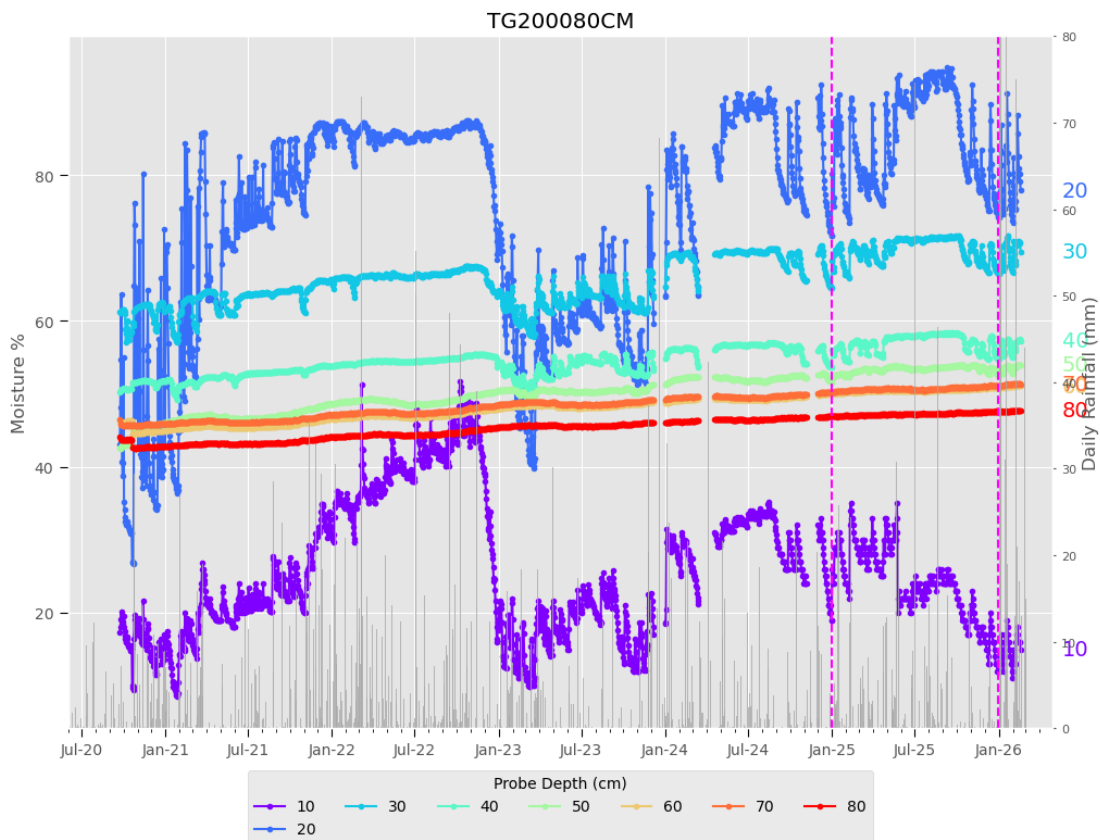


Figure D.33 TG2 soil moisture time series

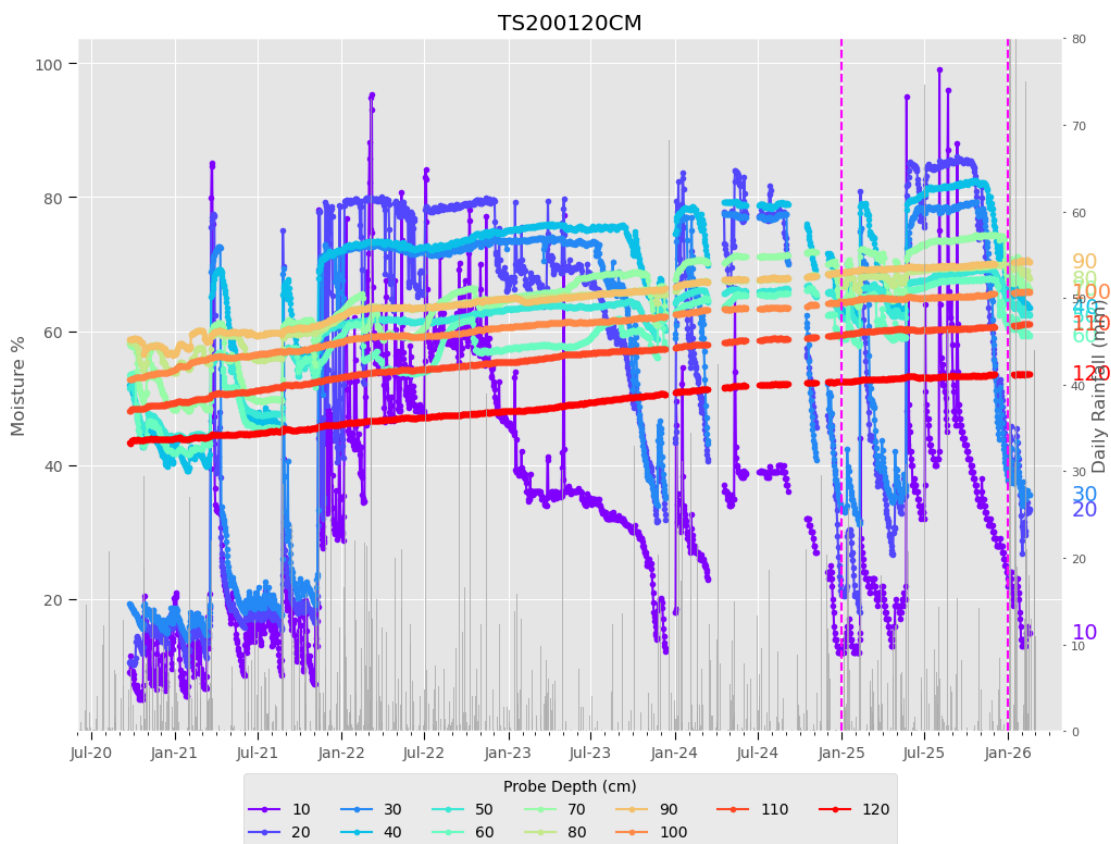


Figure D.34 TS2 soil moisture time series

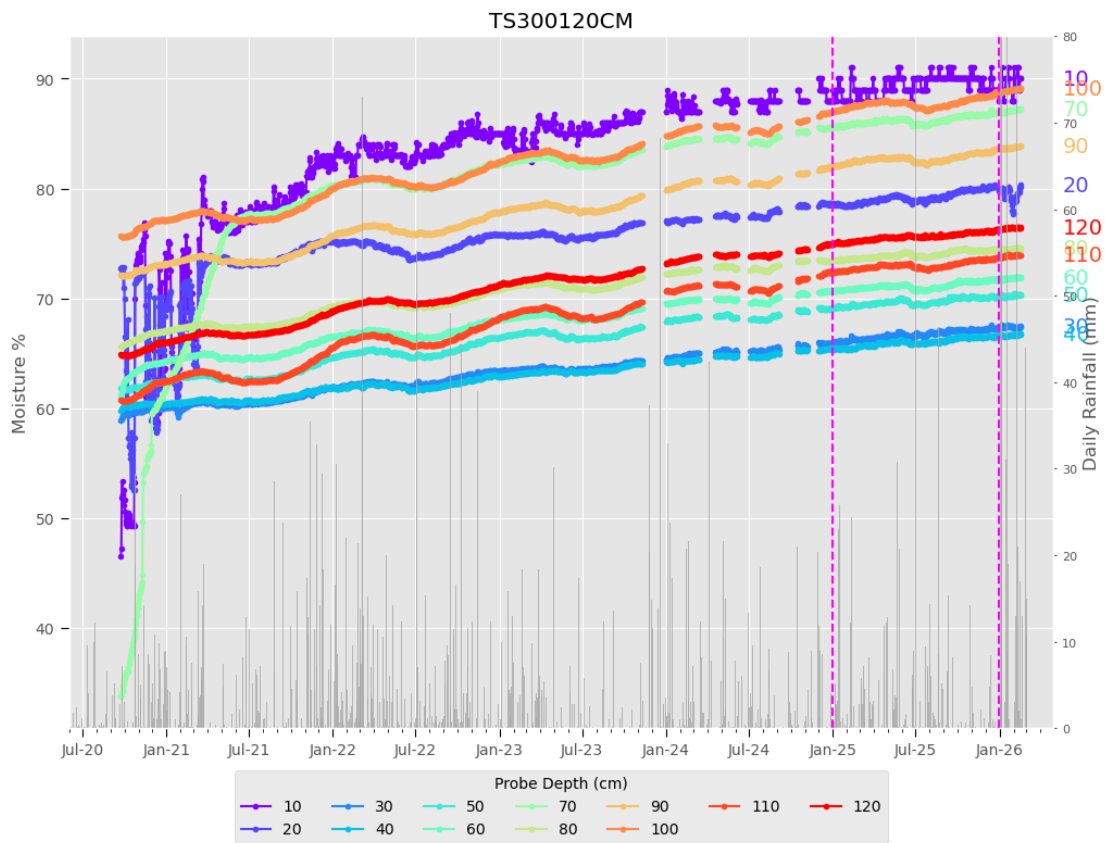


Figure D.35 TS3 soil moisture time series

Appendix E

Groundwater quality time series

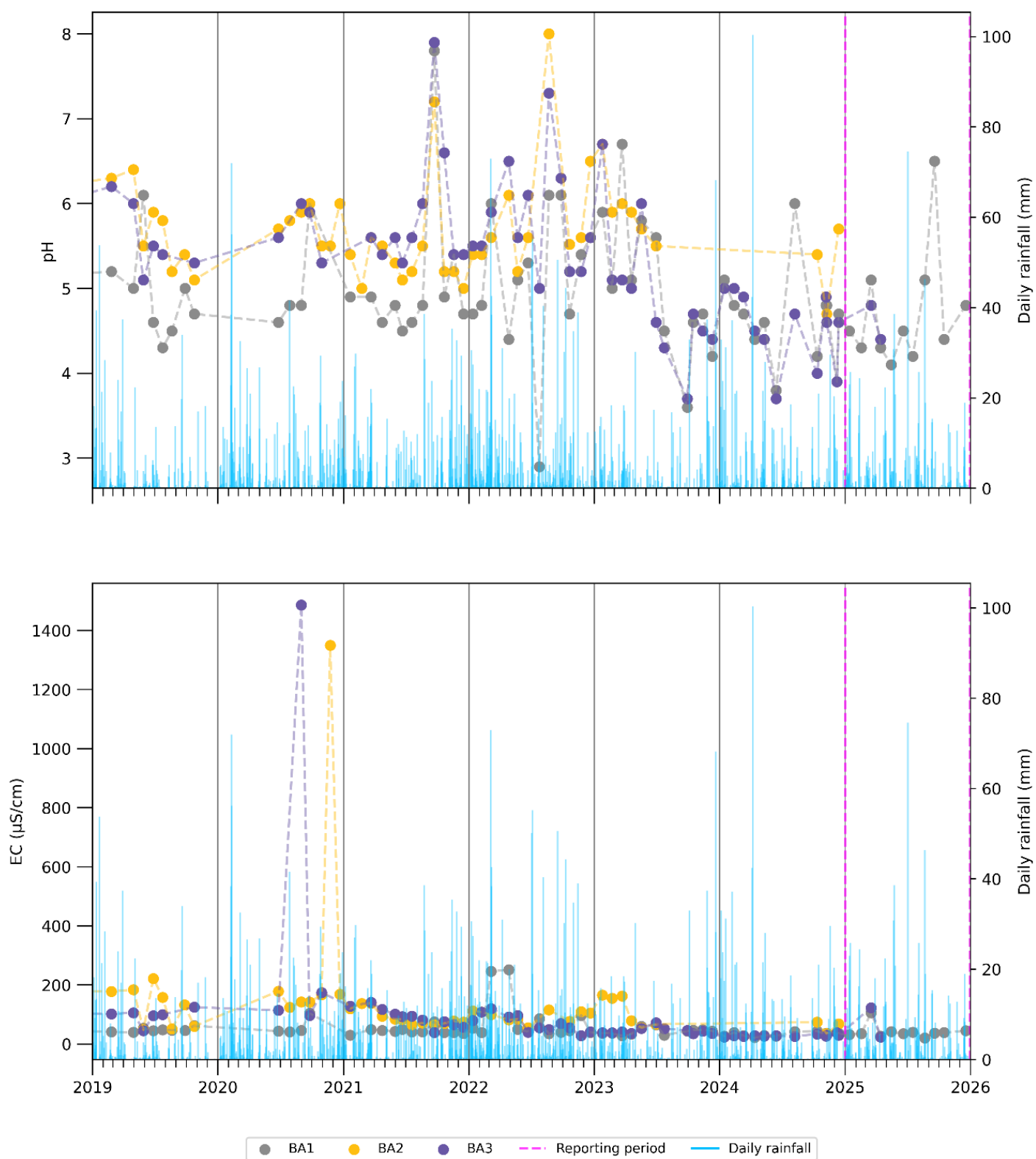


Figure E.1 Barrier Swamp piezometer water quality

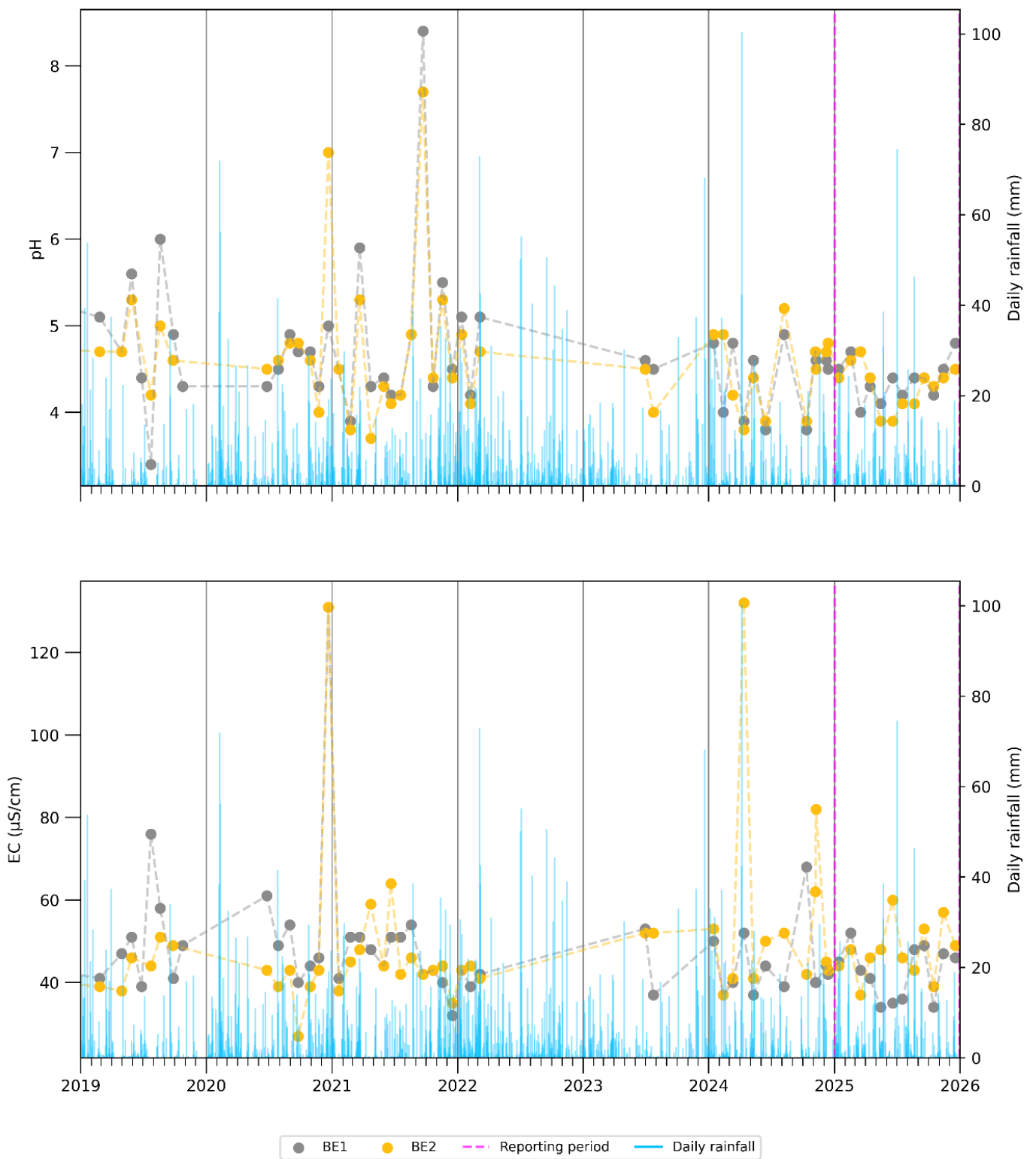


Figure E.2 Best Swamp piezometer water quality

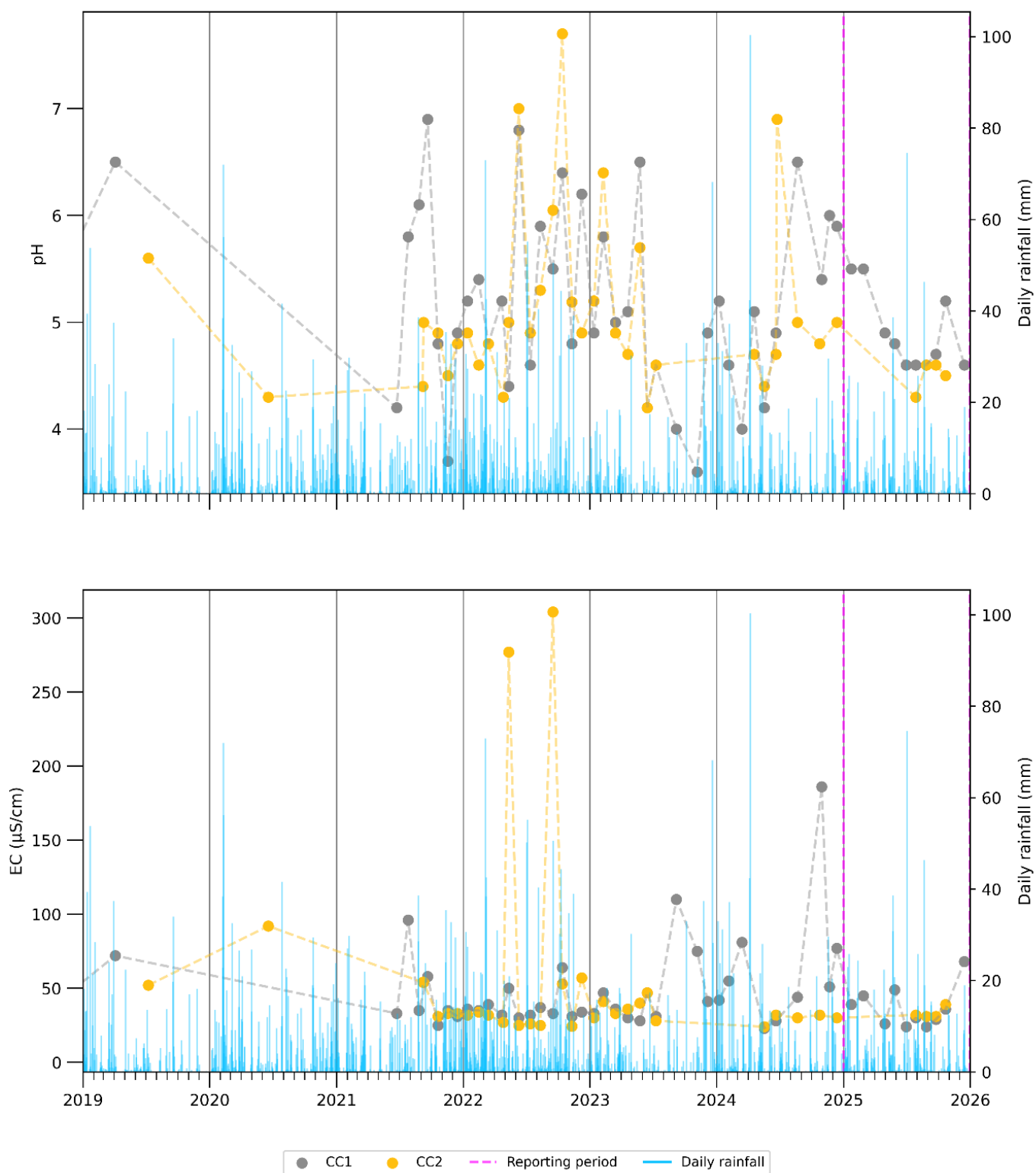


Figure E.3 Carne Central Swamp groundwater quality

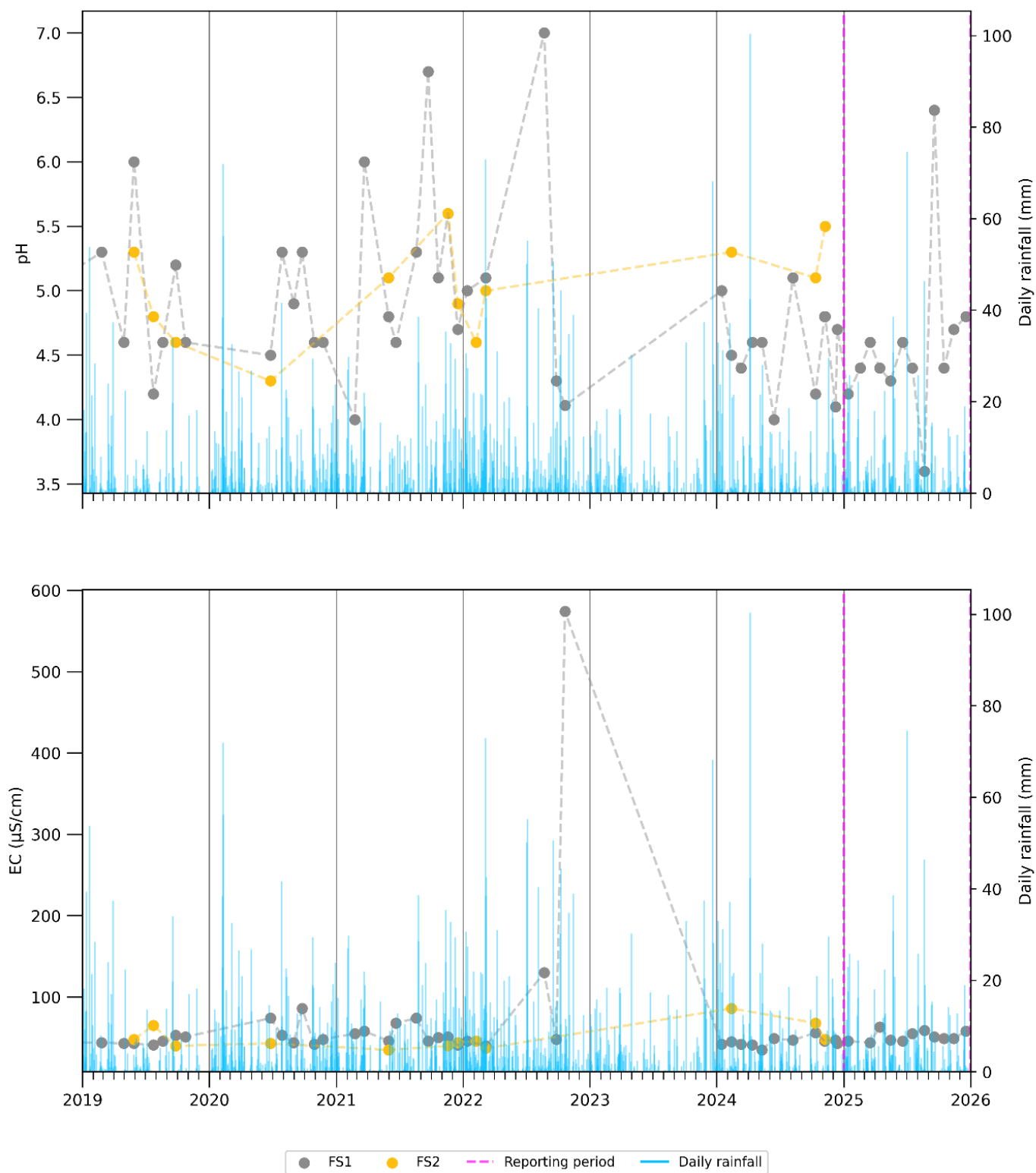


Figure E.4 Firetail Swamp groundwater quality

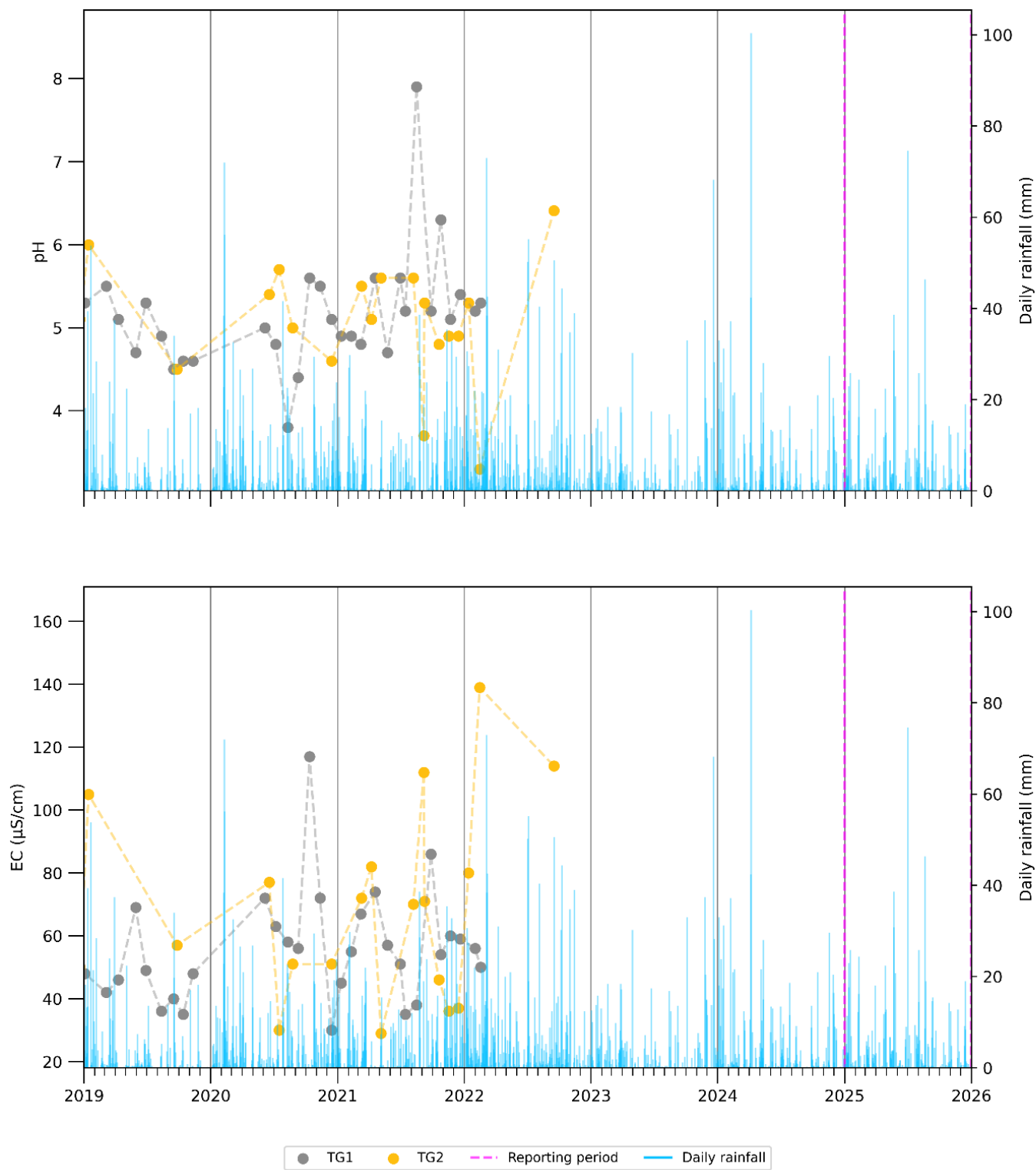


Figure E.5 Twin Gully Swamp groundwater quality

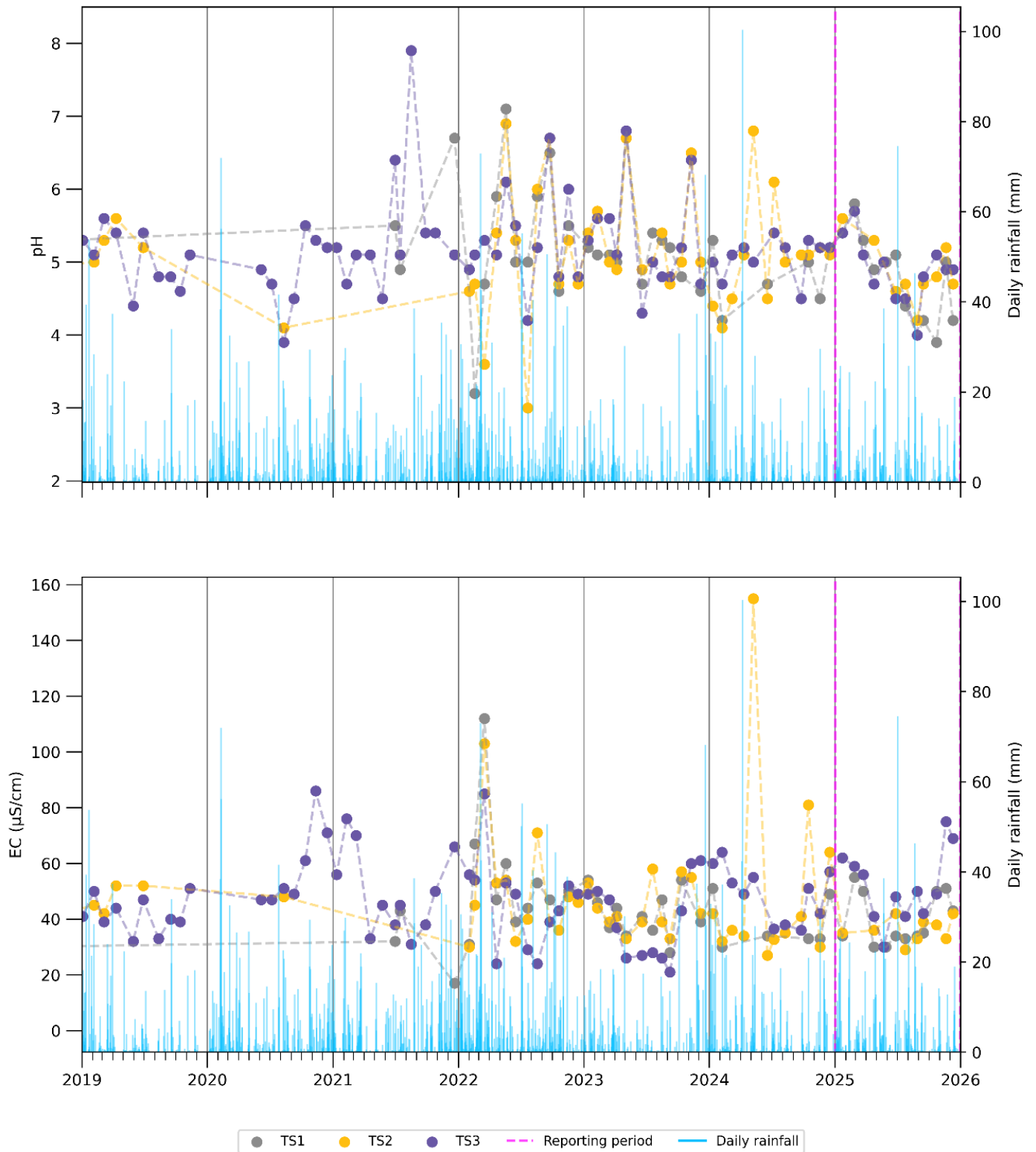


Figure E.6 Tristar Swamp groundwater quality

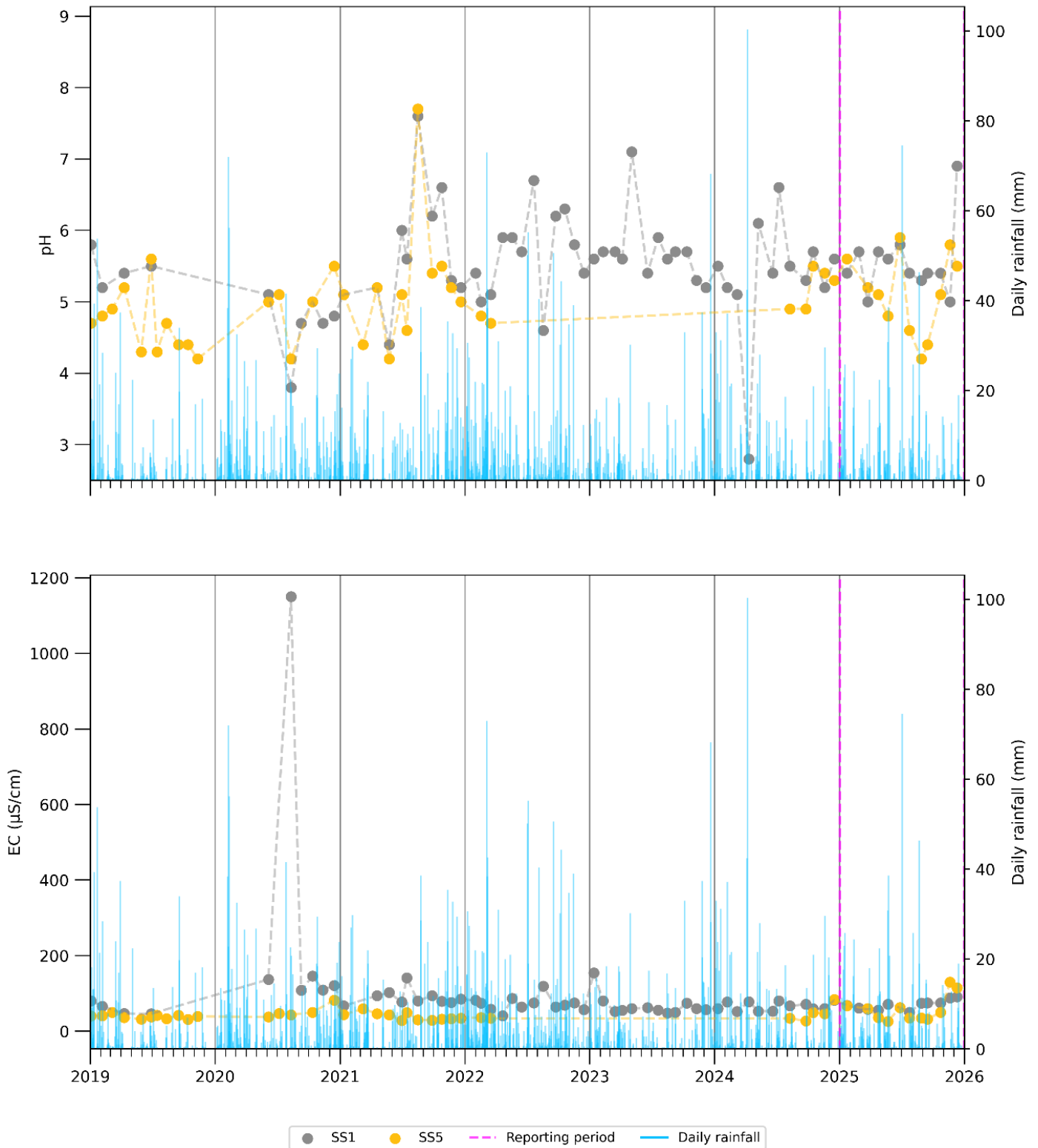


Figure E.7 Sunnyside Swamp groundwater quality

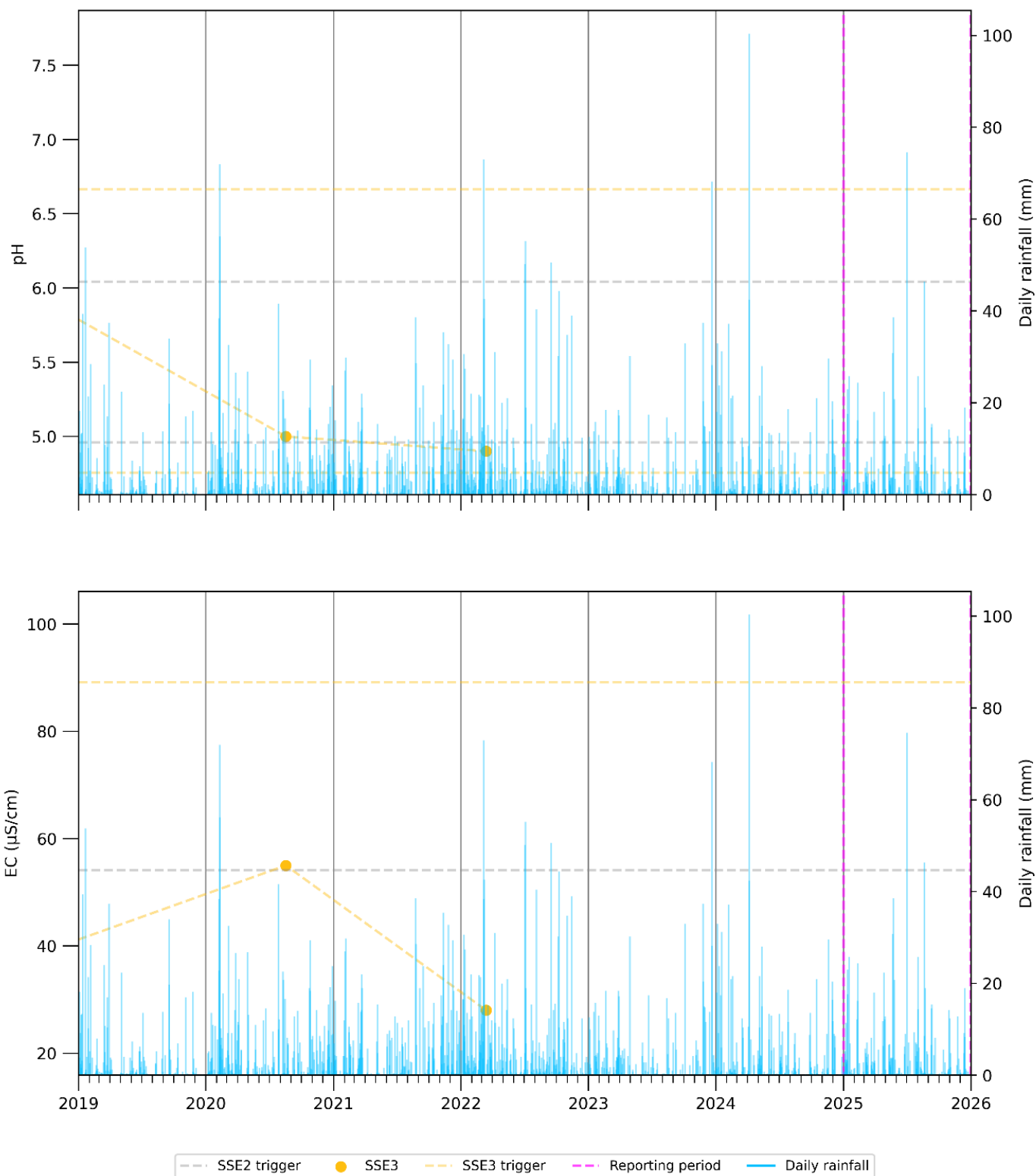


Figure E.8 Sunnyside East Swamp groundwater quality

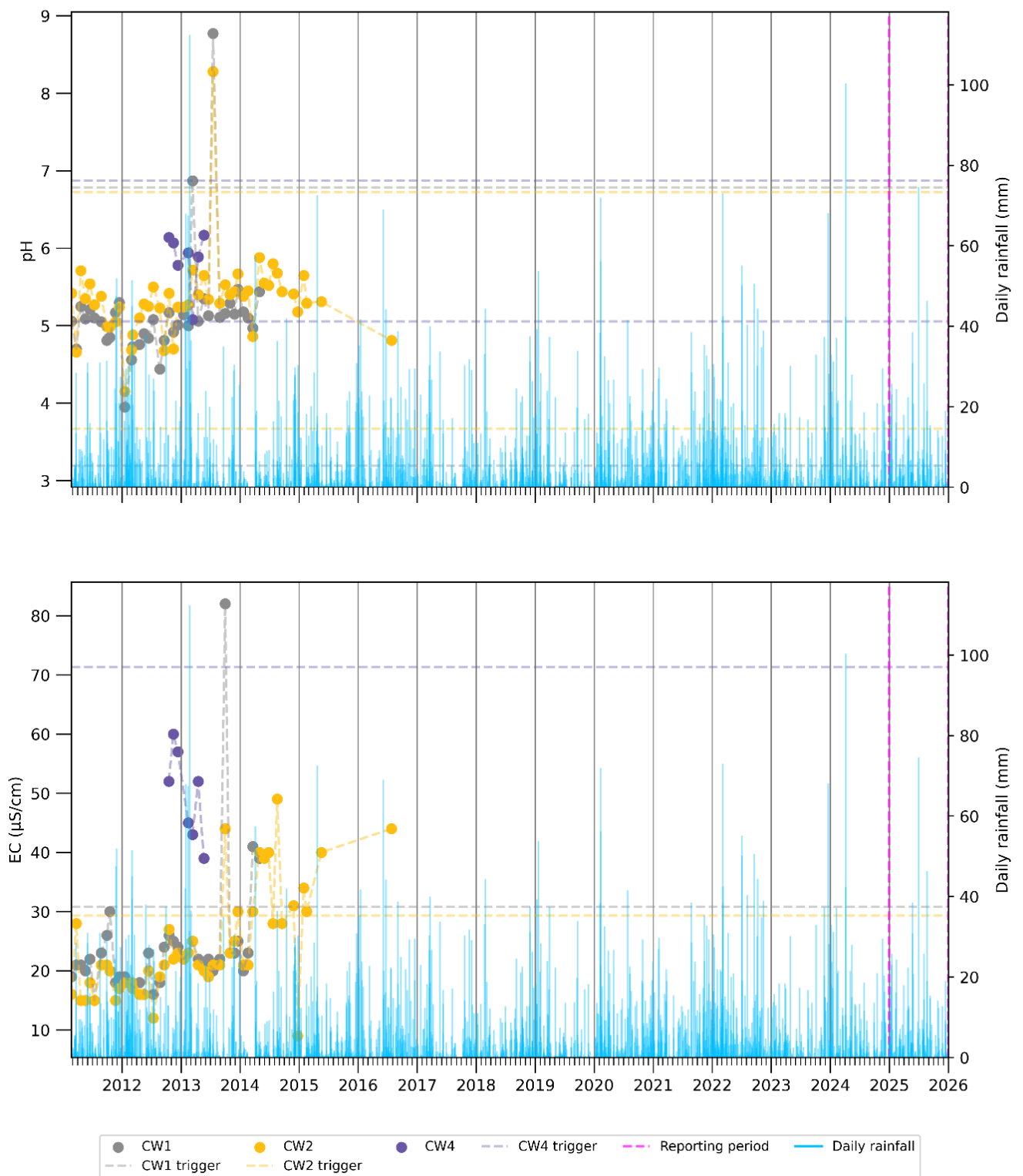


Figure E.9 Carne West Swamp groundwater quality

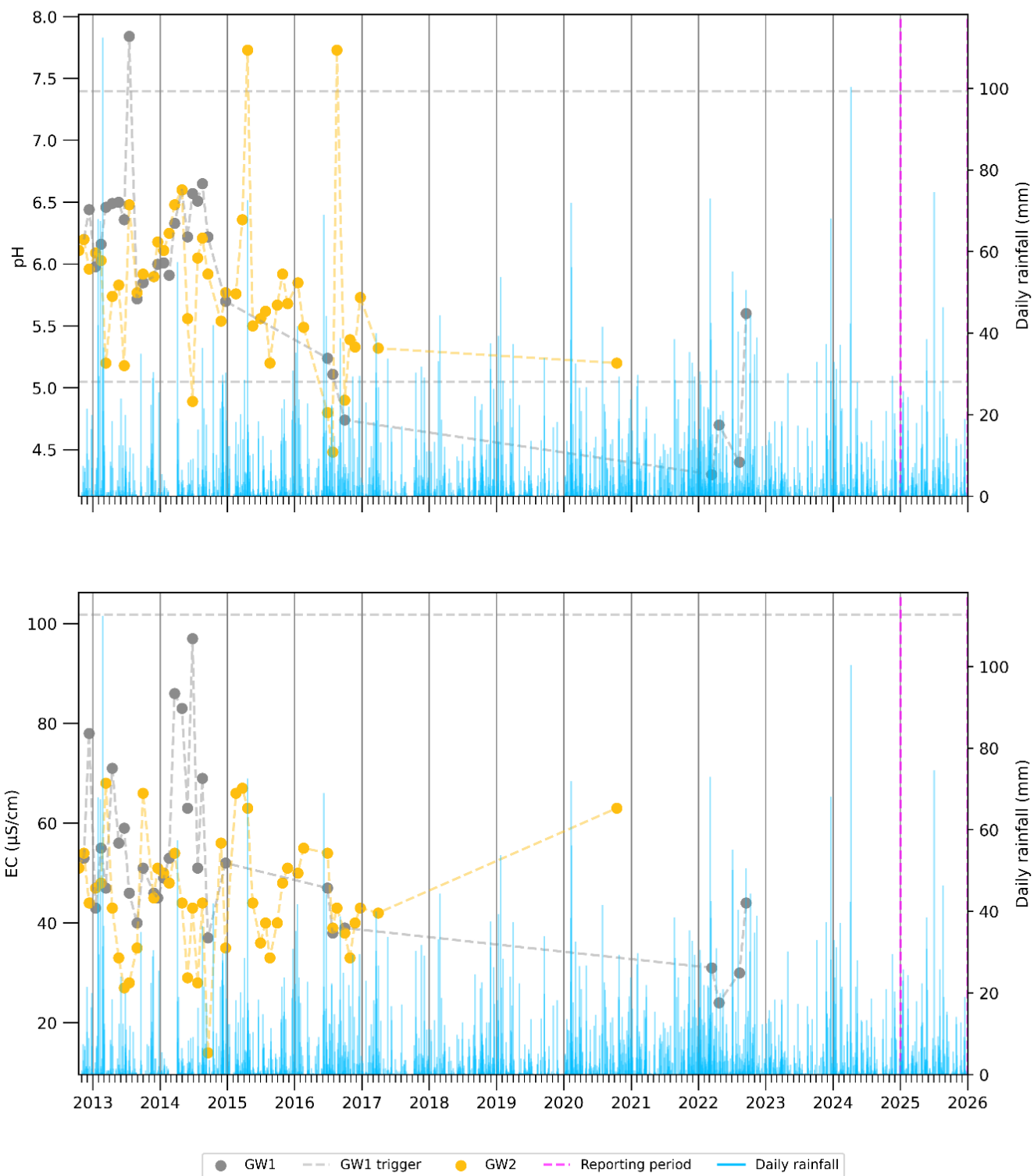


Figure E.10 Gang Gang West Swamp groundwater quality

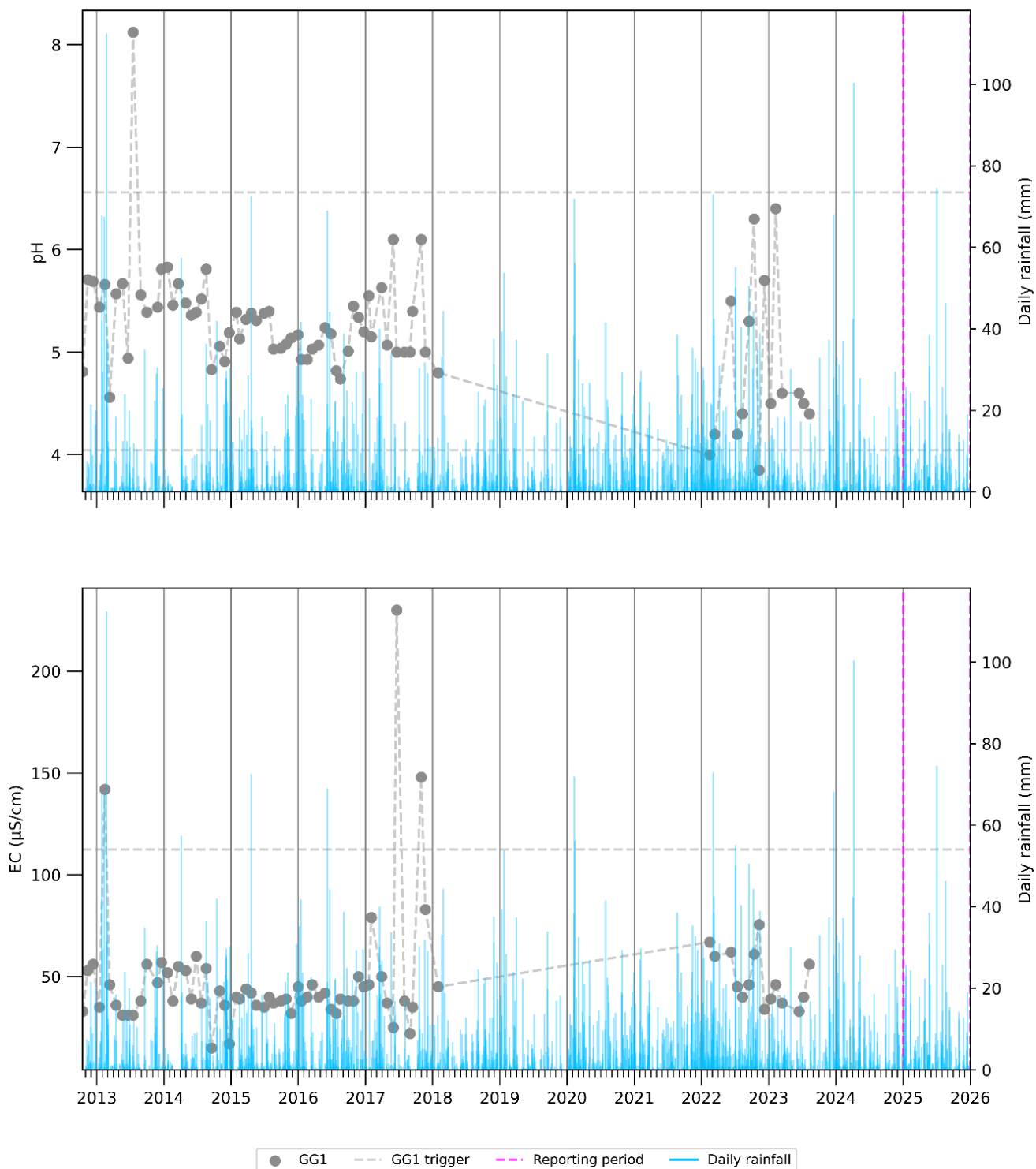


Figure E.11 Gang Gang Swamp groundwater quality

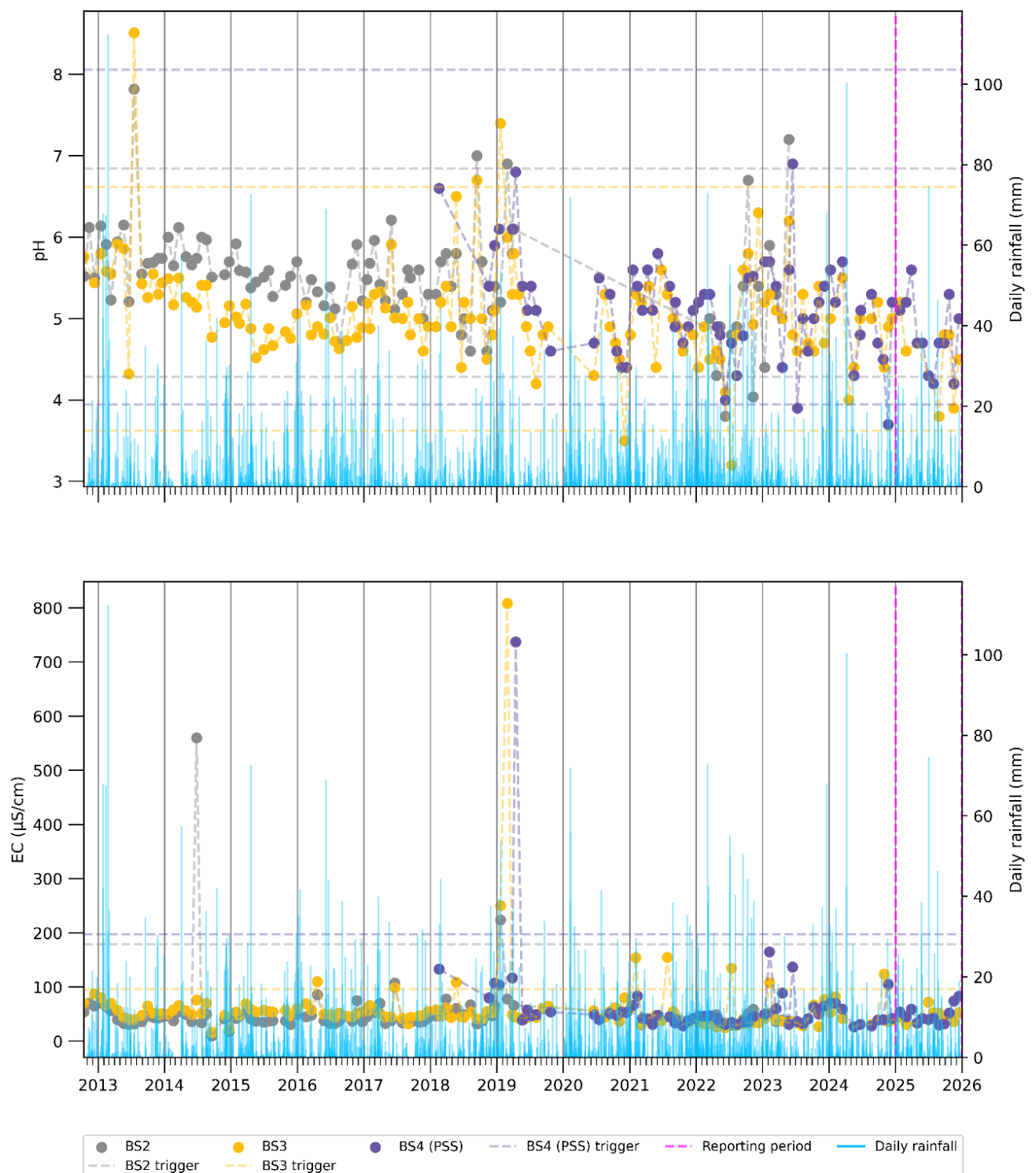


Figure E.12 Pine Swamp groundwater quality

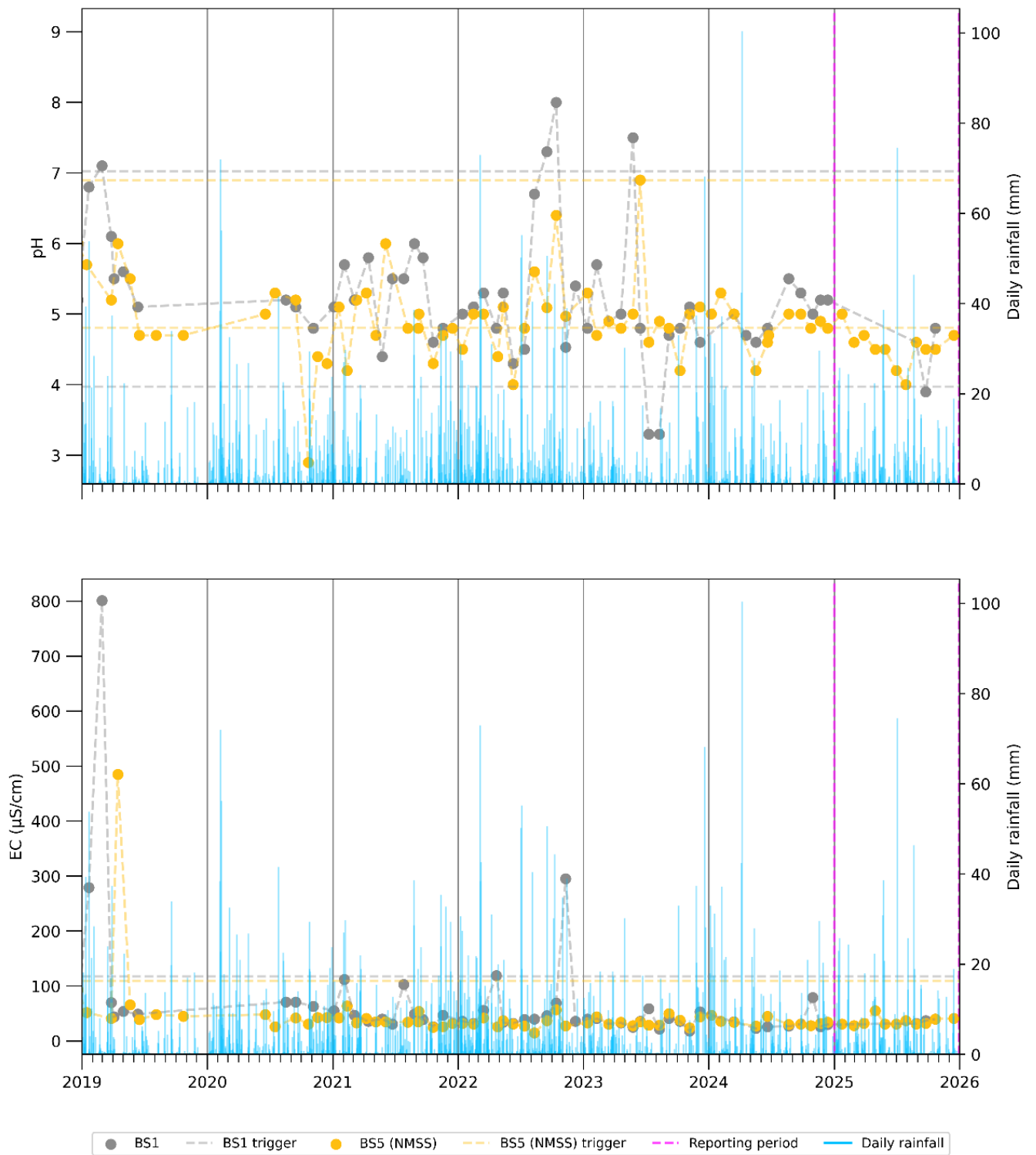


Figure E.13 Nine Mile Swamp groundwater quality

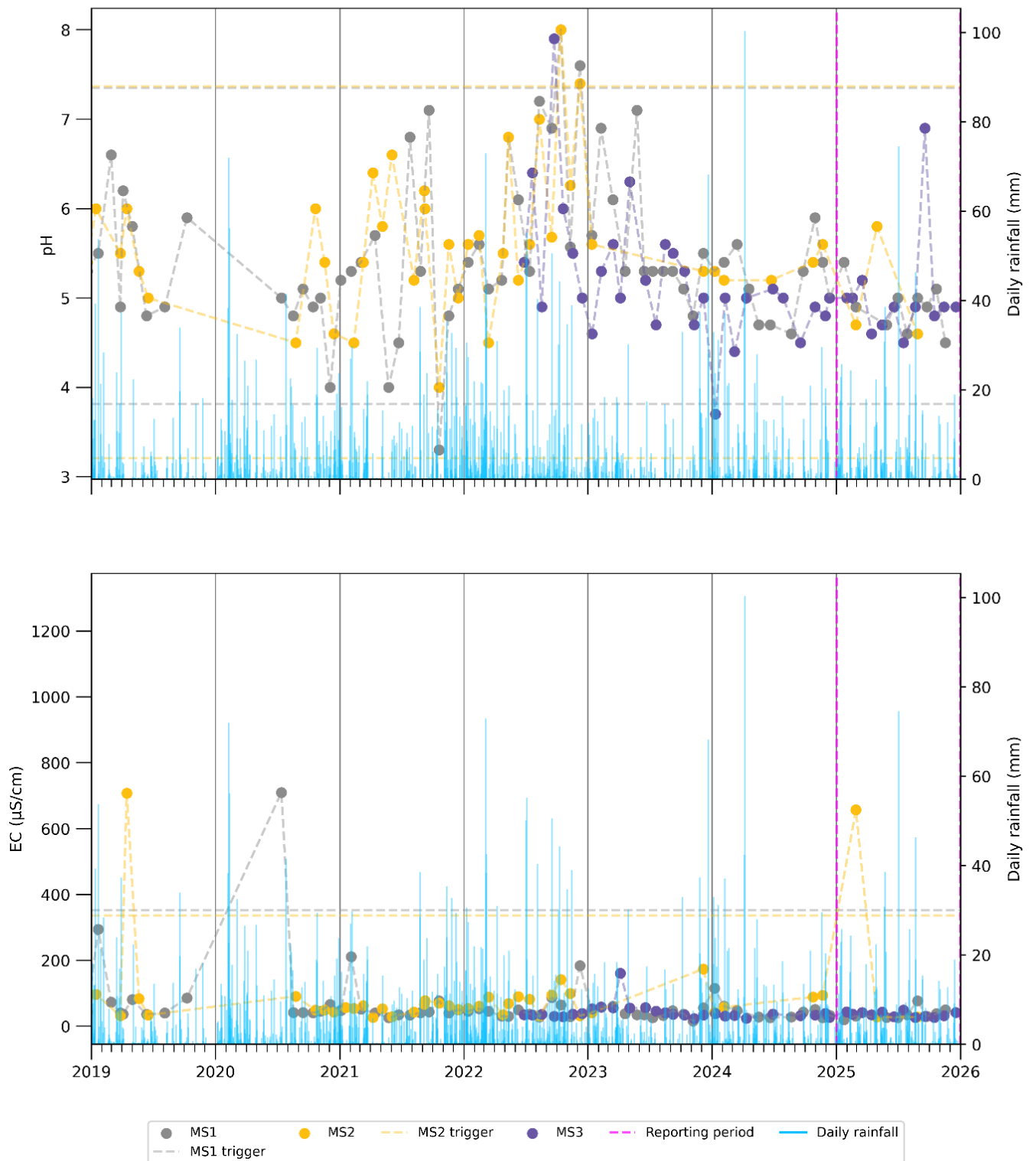


Figure E.14 Marrangaroo Swamp groundwater quality

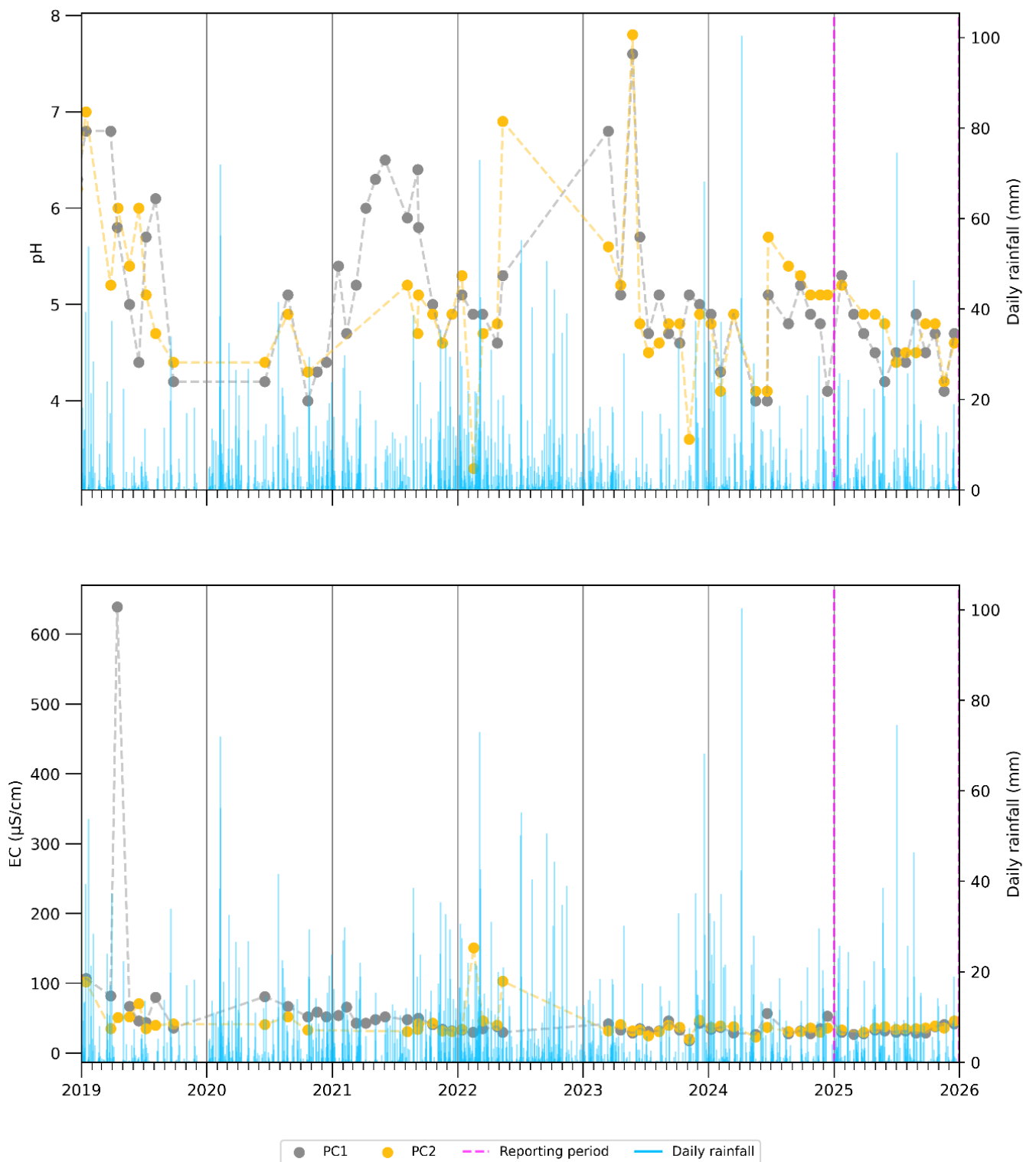


Figure E.15 Paddys Creek Swamp groundwater quality

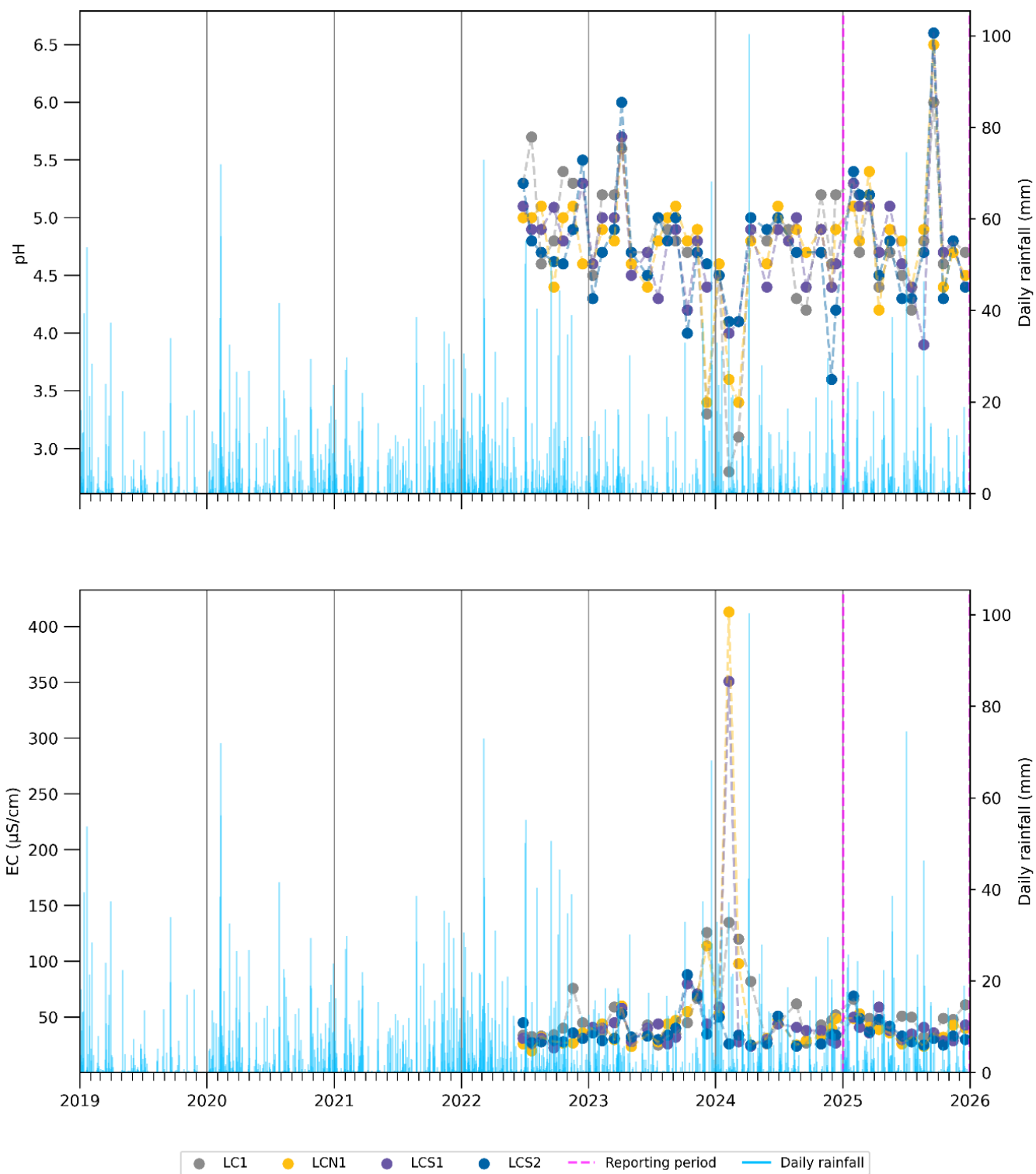


Figure E.16 Lost City Swamp groundwater quality

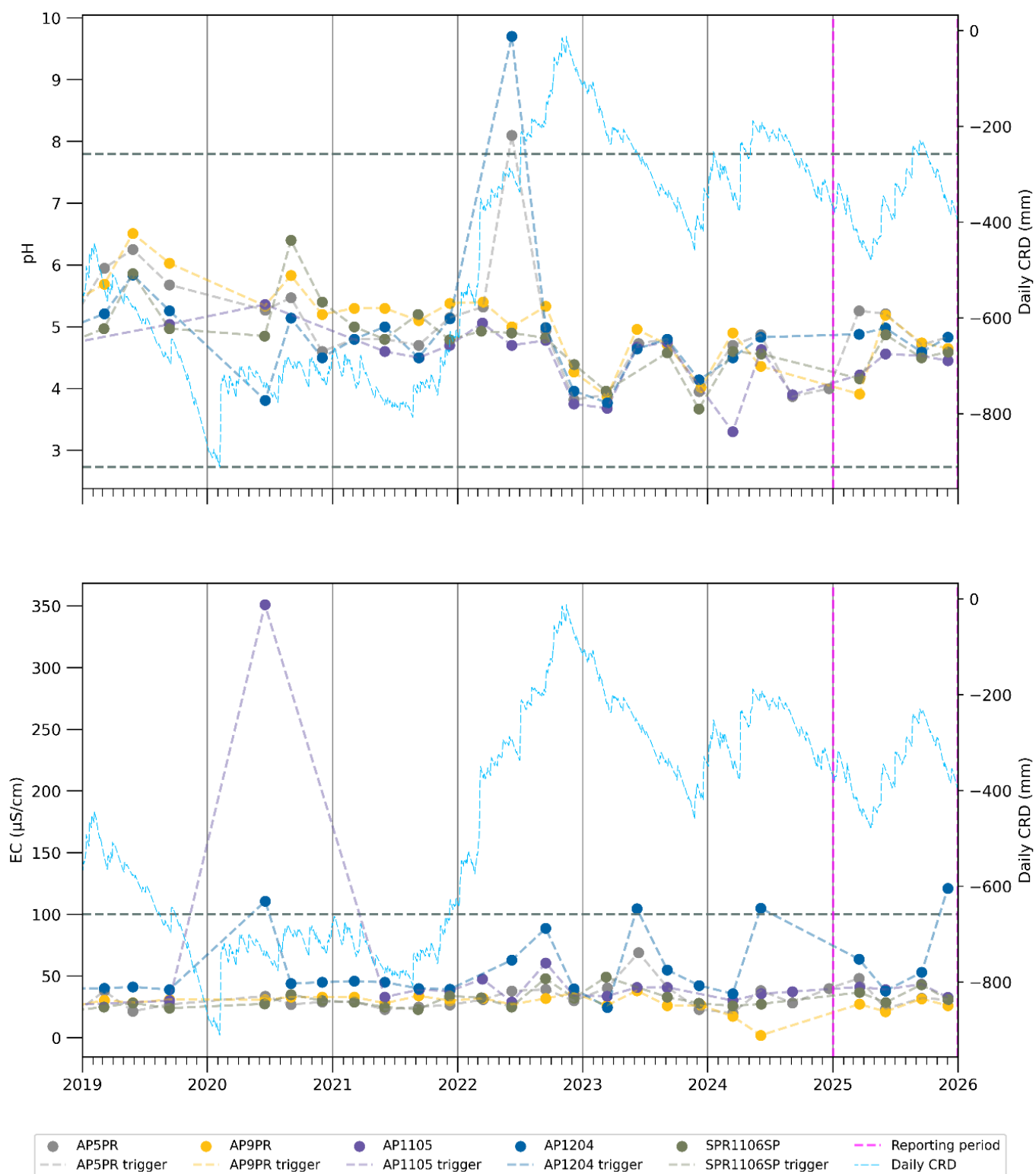


Figure E.17 Shallow aquifer (AQ4) piezometer water quality

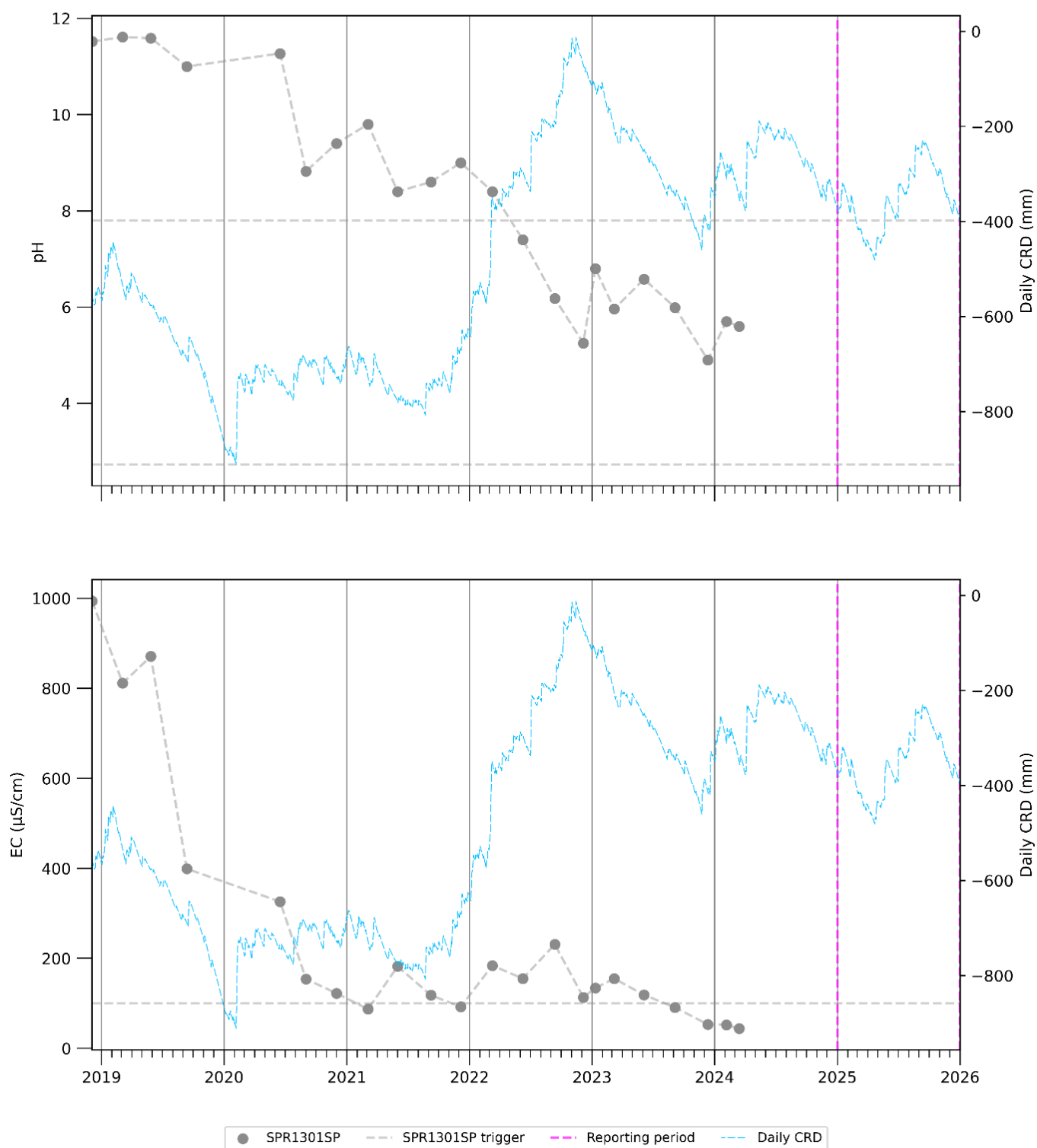


Figure E.18 Perched aquifer piezometer (SPR1301) water quality

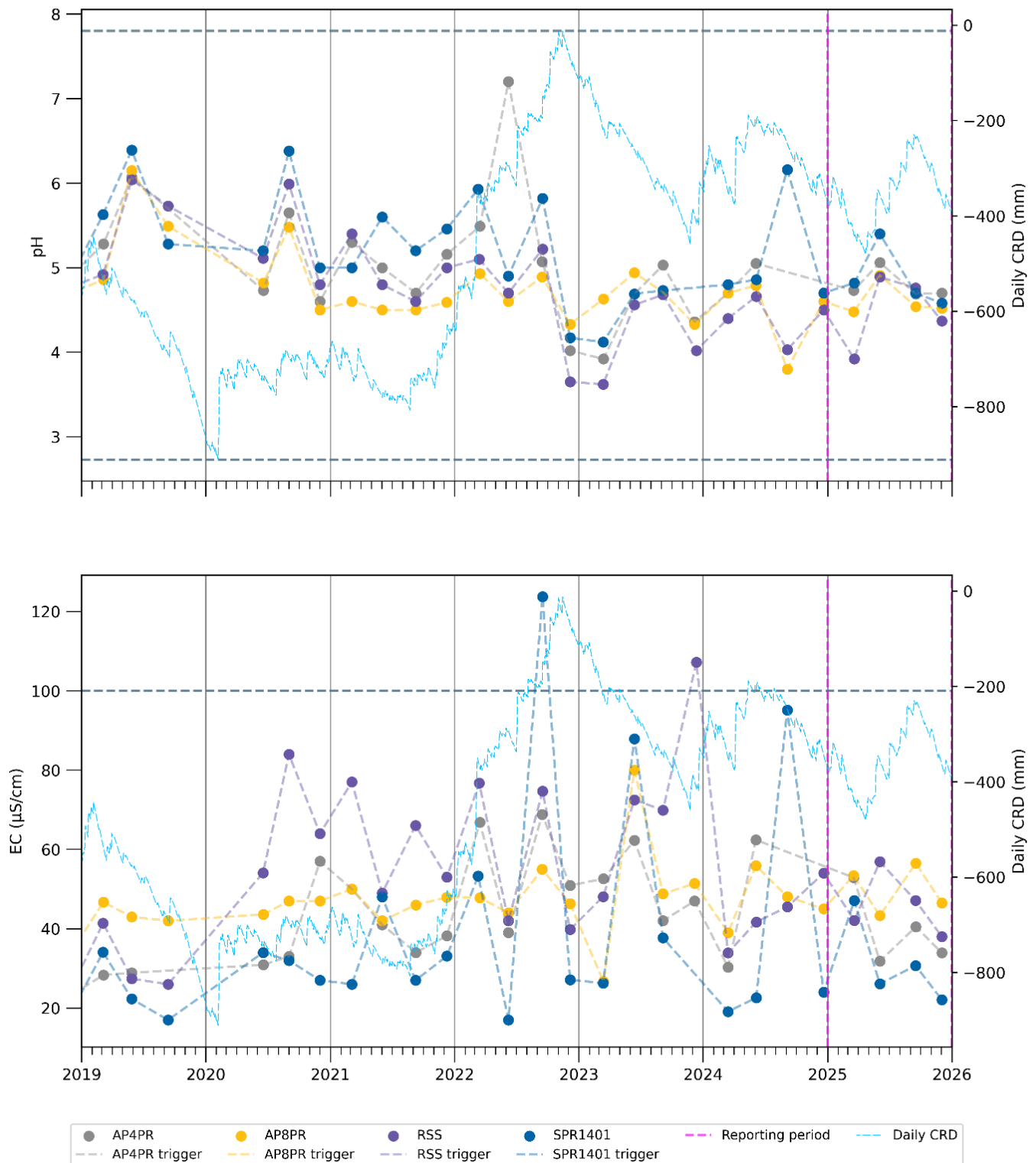


Figure E.19 Perched aquifer (RSS and SPR1401 - AQ5) and shallow aquifer (AP4PR and AP8PR – AQ4) piezometer water quality

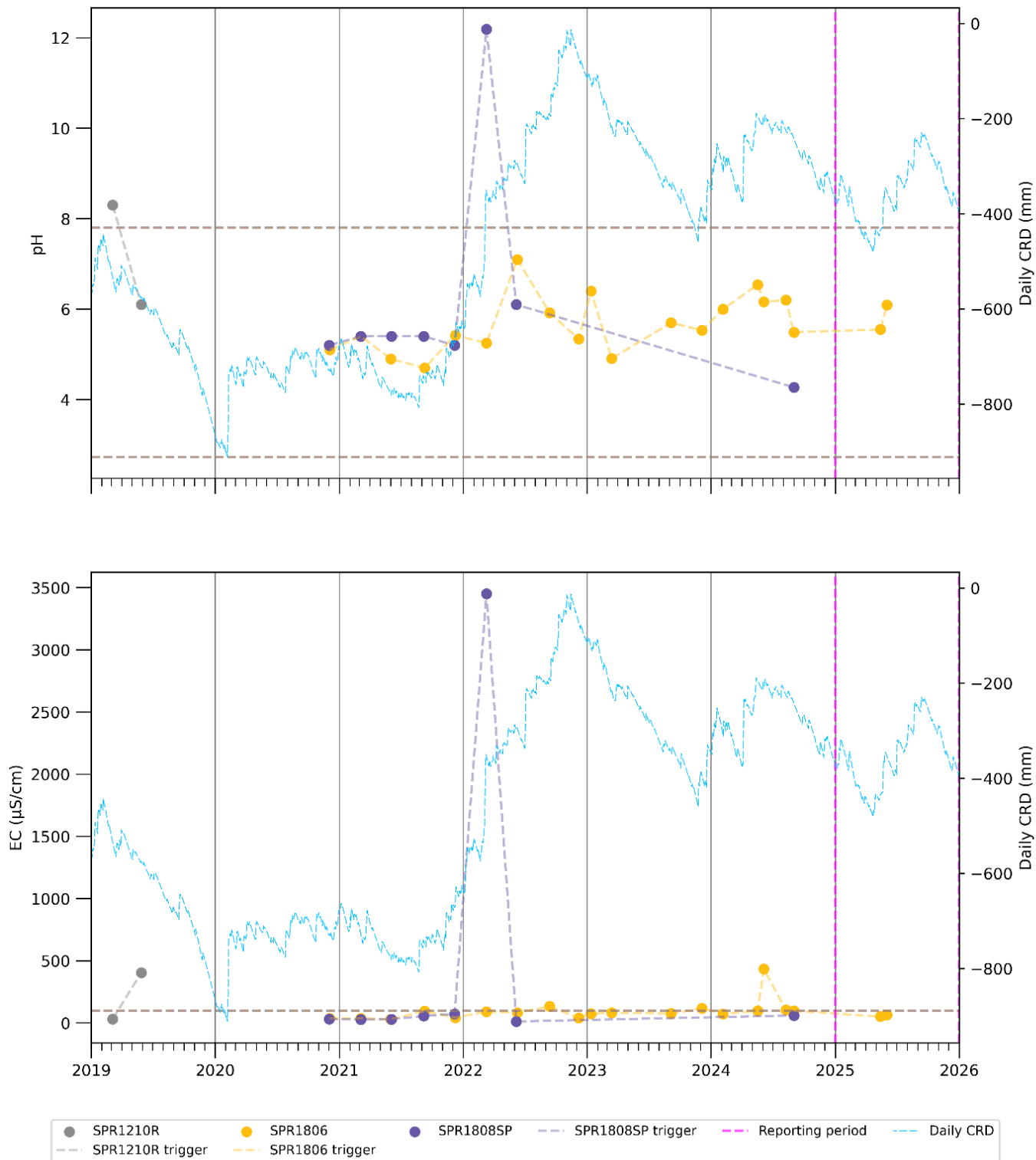


Figure E.20 Perched aquifer (AQ5) piezometer water quality

Appendix F

Groundwater quality statistics

F.1 Groundwater quality statistics

Table F.1 Swamp piezometer groundwater quality statistics (SMP)

Monitoring ID	Pre-mining statistics							Reporting period statistics (31 Jan to 31 Dec 2025)			
	Start	Finish	Analyte	Unit	Count ¹	20th %ile - 2×StDev	80th %ile + 2×StDev	Exceedance	Min	Median	Max
CW1	22/02/11	30/09/13	pH	Units	32	3.22	6.76	FALSE	Dry	Dry	Dry
CW1	22/02/11	30/09/13	EC (field)	µS/cm	32	NA	46.54	FALSE	Dry	Dry	Dry
CW1	22/02/11	30/09/13	Iron	mg/L	33	NA	0.48	FALSE	Dry	Dry	Dry
CW2	22/02/11	30/09/13	pH	Units	32	3.69	6.77	FALSE	Dry	Dry	Dry
CW2	22/02/11	30/09/13	EC (field)	µS/cm	32	NA	33.30	FALSE	Dry	Dry	Dry
CW2	22/02/11	30/09/13	Iron	mg/L	33	NA	0.36	FALSE	Dry	Dry	Dry
GG1	16/10/12	28/04/17	pH	Units	54	4.05	6.54	FALSE	Dry	Dry	Dry
GG1	16/10/12	28/04/17	EC (field)	µS/cm	54	NA	85.06	FALSE	Dry	Dry	Dry
GG1	16/10/12	28/04/17	Iron	mg/L	53	NA	5.38	FALSE	Dry	Dry	Dry
GW1	13/11/12	28/09/16	pH	Units	26	4.67	7.68	FALSE	Dry	Dry	Dry
GW1	13/11/12	28/09/16	EC (field)	µS/cm	26	NA	100.65	FALSE	Dry	Dry	Dry
GW1	13/11/12	25/07/16	Iron	mg/L	24	NA	1.26	FALSE	Dry	Dry	Dry
GW2	16/10/12	29/03/17	pH	Units	45	4.13	7.43	FALSE	Dry	Dry	Dry
GW2	16/10/12	29/03/17	EC (field)	µS/cm	45	NA	77.14	FALSE	Dry	Dry	Dry
GW2	16/10/12	29/03/17	Iron	mg/L	43	NA	10.00	FALSE	Dry	Dry	Dry
MS1	12/06/12	14/03/22	pH	Units	109	3.81	7.35	FALSE	4.5	4.9	5.4
MS1	12/06/12	14/03/22	EC (field)	µS/cm	109	NA	353.22	FALSE	20	31	77

Monitoring ID	Pre-mining statistics							Reporting period statistics (31 Jan to 31 Dec 2025)			
	Start	Finish	Analyte	Unit	Count ¹	20th %ile - 2×StDev	80th %ile + 2×StDev	Exceedance	Min	Median	Max
MS1	12/06/12	14/03/22	Iron	mg/L	109	NA	13.06	FALSE	<0.05	0.15	3.67
MS2	19/11/18	14/03/22	pH	Units	25	3.21	7.37	FALSE	4.6	4.7	5.8
MS2	19/11/18	14/03/22	EC (field)	µS/cm	26	NA	336.47	TRUE	28	28	657
MS2	19/11/18	14/03/22	Iron	mg/L	23	NA	3.21	FALSE	<0.05	0.59	1.37
MS3	27/06/2022	14/03/22	pH	Units	5	NA	NA	FALSE	4.5	4.9	6.9
MS3	27/06/2022	14/03/22	EC (field)	µS/cm	5	NA	NA	FALSE	27	36	49
MS3	27/06/2022	13/01/22	Iron	mg/L	5	NA	NA	FALSE	<0.05	0.0725	1.39
BS1	16/10/12	21/01/19	pH	Units	75	3.97	7.02	TRUE	3.9	4.6	4.8
BS1	16/10/12	21/01/19	EC (field)	µS/cm	75	NA	117.52	FALSE	32	37	40
NMSS	18/02/18	14/01/19	pH	Units	4	4.81	6.89	TRUE	4.0	4.5	5.0
NMSS	18/02/18	14/01/19	EC (field)	µS/cm	4	NA	109.34	FALSE	28	32	55
PC1	18/02/18	18/02/18	pH	Units	1	NA	NA	FALSE	4.1	4.6	5.3
PC1	18/02/18	18/02/18	EC (field)	µS/cm	1	NA	NA	FALSE	27	31	42
PC2	18/02/18	18/02/18	pH	Units	1	NA	NA	FALSE	4.2	4.8	5.2
PC2	18/02/18	18/02/18	EC (field)	µS/cm	1	NA	NA	FALSE	30	36	46
BS2	15/10/12	4/04/19	pH	Units	77	4.25	6.89	TRUE	4.2	4.8	5.2
BS2	15/10/12	4/04/19	EC (field)	µS/cm	77	NA	187.68	FALSE	30	36	46
BS3	15/10/12	9/10/19	pH	Units	83	3.55	6.69	FALSE	3.8	4.6	5.2
BS3	15/10/12	9/10/19	EC (field)	µS/cm	83	NA	237.95	FALSE	30	36	72
PSS	18/02/18	23/10/19	pH	Units	11	3.75	7.45	FALSE	4.2	4.7	5.6

Monitoring ID	Pre-mining statistics							Reporting period statistics (31 Jan to 31 Dec 2025)			
	Start	Finish	Analyte	Unit	Count ¹	20th %ile - 2×StDev	80th %ile + 2×StDev	Exceedance	Min	Median	Max
PSS	18/02/18	23/10/19	EC (field)	µS/cm	11	NA	519.10	FALSE	30	38	83
BA1	18/03/18	-	pH	Units	43	-	-	FALSE	4.1	4.55	6.5
BA1	18/03/18	-	EC (field)	µS/cm	45	-	-	FALSE	21	37	106
BA2	18/03/18	-	pH	Units	44	-	-	FALSE	No data	No data	No data
BA2	18/03/18	-	EC (field)	µS/cm	44	-	-	FALSE	No data	No data	No data
BA3	18/03/18	-	pH	Units	40	-	-	FALSE	4.2	4.8	5.2
BA3	18/03/18	-	EC (field)	µS/cm	43	-	-	FALSE	24	36	123
BE1	18/03/18	-	pH	Units	32	-	-	FALSE	4.0	4.4	4.8
BE1	18/03/18	-	EC (field)	µS/cm	33	-	-	FALSE	34	44	52
BE2	18/03/18	-	pH	Units	31	-	-	FALSE	3.9	4.4	4.7
BE2	18/03/18	-	EC (field)	µS/cm	31	-	-	FALSE	36	46	60
CC1	12/06/12	-	pH	Units	98	-	-	FALSE	4.6	4.75	5.5
CC1	12/06/12	-	EC (field)	µS/cm	99	-	-	FALSE	24	33	68
CC2	8/07/19	-	pH	Units	26	-	-	FALSE	4.3	4.55	4.6
CC2	8/07/19	-	EC (field)	µS/cm	26	-	-	FALSE	31	31.5	39
FS1	18/03/18	-	pH	Units	28	-	-	FALSE	-	-	-
FS1	18/03/18	-	EC (field)	µS/cm	28	-	-	FALSE	-	-	-
FS2	29/05/19	-	pH	Units	9	-	-	FALSE	-	-	-
FS2	29/05/19	-	EC (field)	µS/cm	9	-	-	FALSE	-	-	-
TS1	12/06/14	-	pH	Units	41	-	-	FALSE	3.9	4.95	5.8

Monitoring ID	Pre-mining statistics							Reporting period statistics (31 Jan to 31 Dec 2025)			
	Start	Finish	Analyte	Unit	Count ¹	20th %ile - 2×StDev	80th %ile + 2×StDev	Exceedance	Min	Median	Max
TS1	12/06/14	-	EC (field)	µS/cm	44	-	-	FALSE	30	34.5	55
TS2	16/10/12	-	pH	Units	90	-	-	FALSE	4.2	4.7	5.6
TS2	16/10/12	-	EC (field)	µS/cm	92	-	-	FALSE	29	36	42
TS3	17/10/12	-	pH	Units	120	-	-	FALSE	4.0	4.9	5.7
TS3	17/10/12	-	EC (field)	µS/cm	122	-	-	FALSE	30	49.5	75
TG1	15/10/12	-	pH	Units	100	-	-	FALSE	-	-	-
TG1	15/10/12	-	EC (field)	µS/cm	100	-	-	FALSE	-	-	-
TG2	19/11/18	-	pH	Units	20	-	-	FALSE	-	-	-
TG2	19/11/18	-	EC (field)	µS/cm	20	-	-	FALSE	-	-	-
SSE1	11/03/13	11/03/13	pH	Units	1	No pre-mining data		FALSE	Decommissioned		
SSE1	11/03/13	11/03/13	EC (field)	µS/cm	1			FALSE			
SSE2	12/06/12	6/08/13	pH	Units	13	4.80	6.03	FALSE	-	-	-
SSE2	12/06/12	6/08/13	EC (field)	µS/cm	13	NA	64.91	FALSE	-	-	-
SSE3	22/02/11	9/07/13	pH	Units	30	4.72	6.70	FALSE	-	-	-
SSE3	22/02/11	9/07/13	EC (field)	µS/cm	30	NA	94.05	FALSE	-	-	-
SS1	22/02/11	-	pH	Units	131	4.14	7.36	FALSE	5.0	5.4	6.9
SS1	22/02/11	-	EC (field)	µS/cm	133	NA	276.13	FALSE	50	69.5	91
SS3	22/02/11	-	pH	Units	124	4.13	7.81	FALSE	5.1	5.8	6.1
SS3	22/02/11	-	EC (field)	µS/cm	126	NA	134.87	FALSE	36	54.5	61
SS4	22/02/11	-	pH	Units	114	3.76	7.14	FALSE	4.2	5.15	6.5

Monitoring ID	Pre-mining statistics							Reporting period statistics (31 Jan to 31 Dec 2025)			
	Start	Finish	Analyte	Unit	Count ¹	20th %ile - 2×StDev	80th %ile + 2×StDev	Exceedance	Min	Median	Max
SS4	22/02/11	-	EC (field)	µS/cm	114	NA	123.02	FALSE	25	55	214
SS5	22/02/11	-	pH	Units	123	3.34	6.98	FALSE	4.2	5.1	5.9
SS5	22/02/11	-	EC (field)	µS/cm	123	NA	79.40	FALSE	26	50	130

Notes: 1. The count refers to the pre-mining statistics. It does not include the results from the reporting period.

Appendix G

Surface water quality time series

G.1 Surface water quality time series

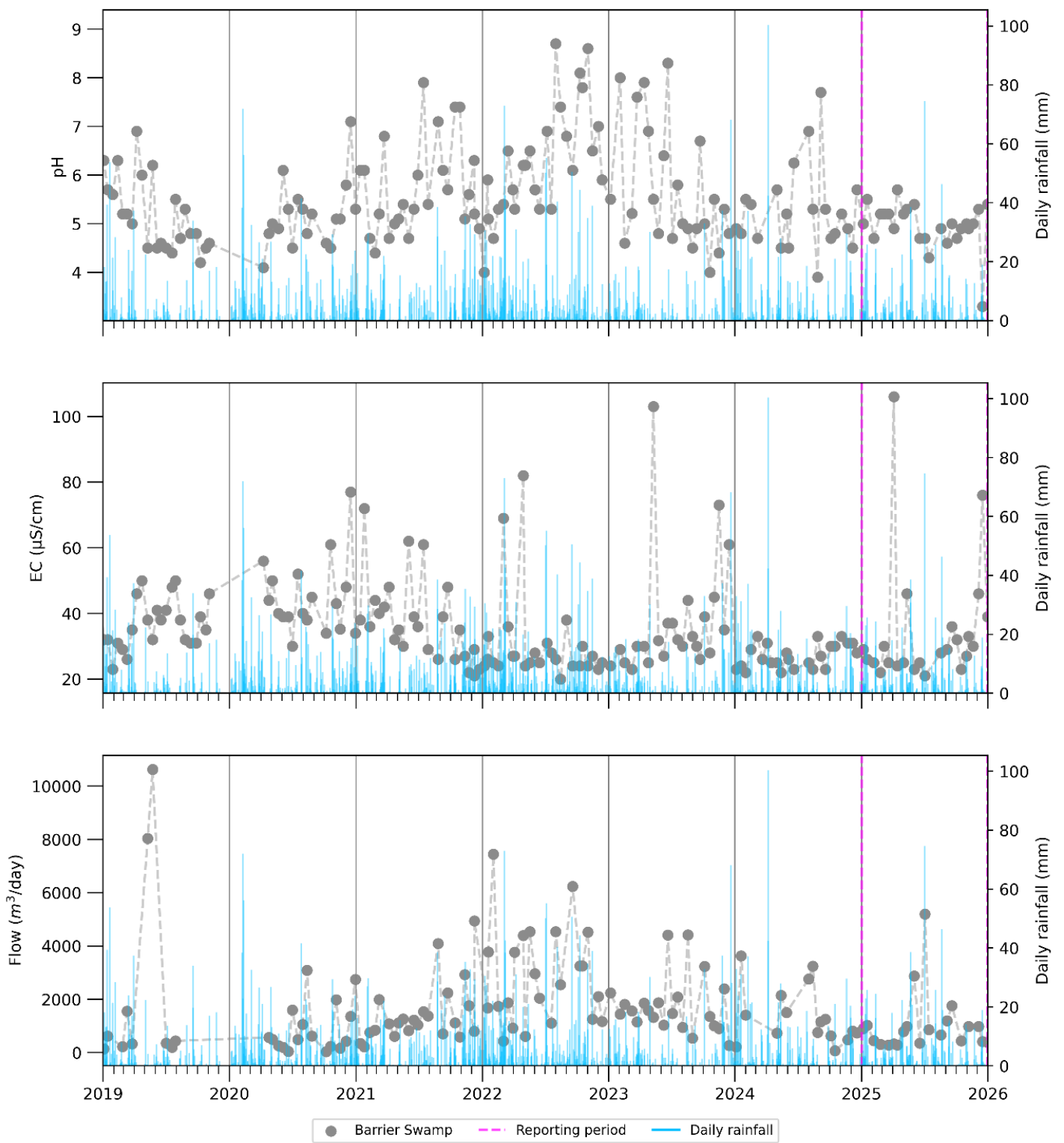


Figure G.1 Barrier Swamp water quality and flow

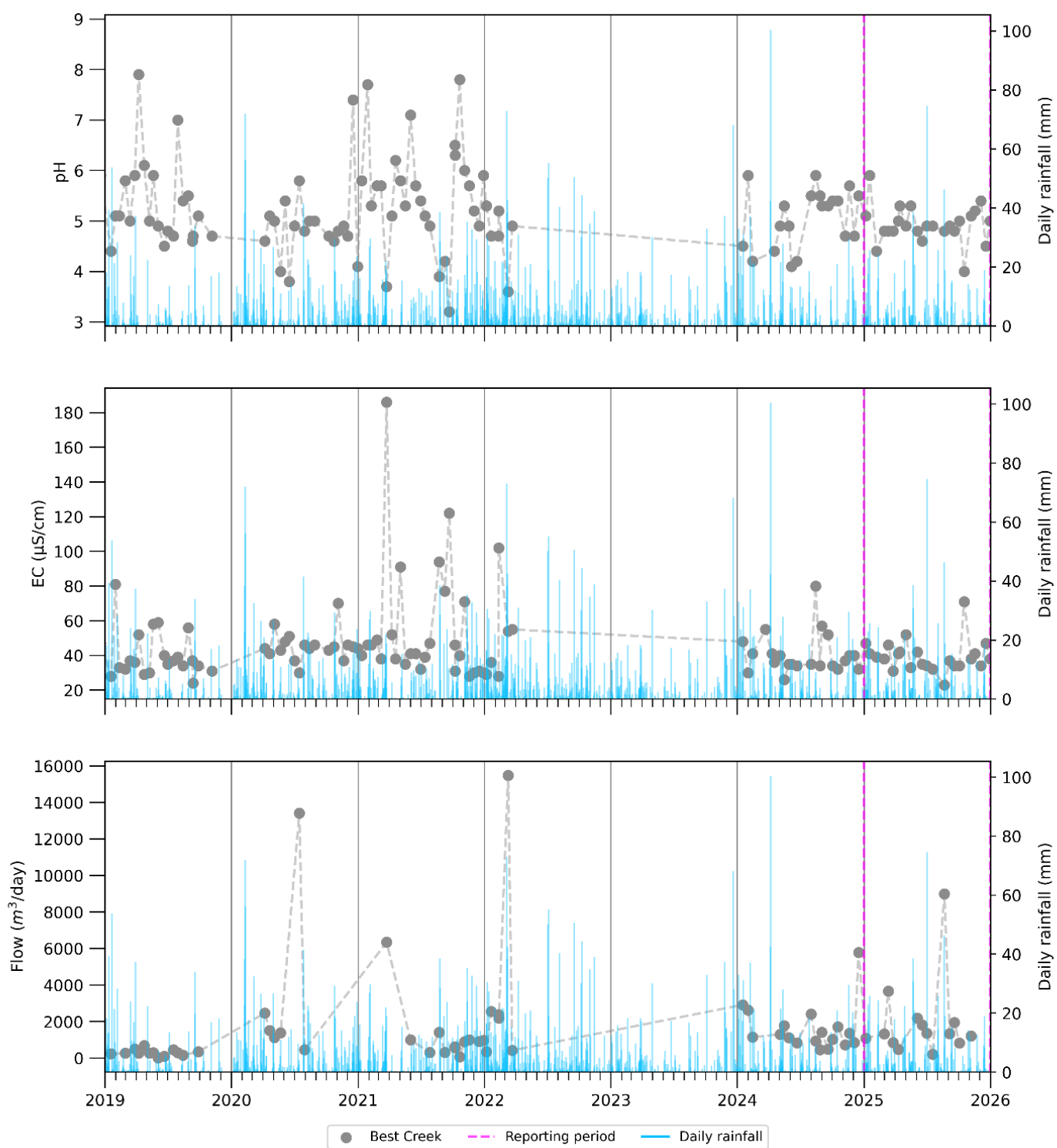


Figure G.2 Best Creek water quality and flow

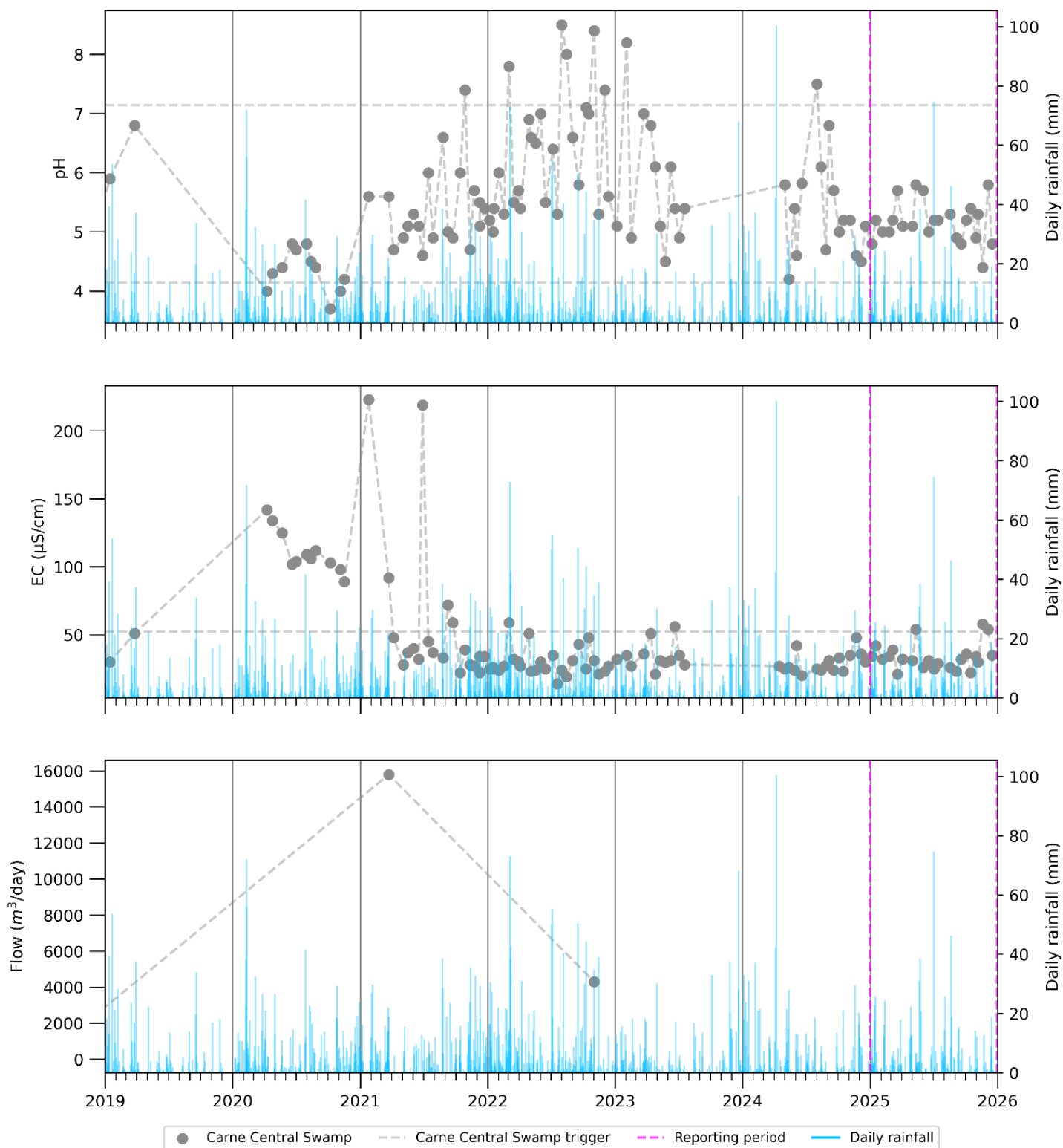


Figure G.3 Carne Central Swamp water quality and flow

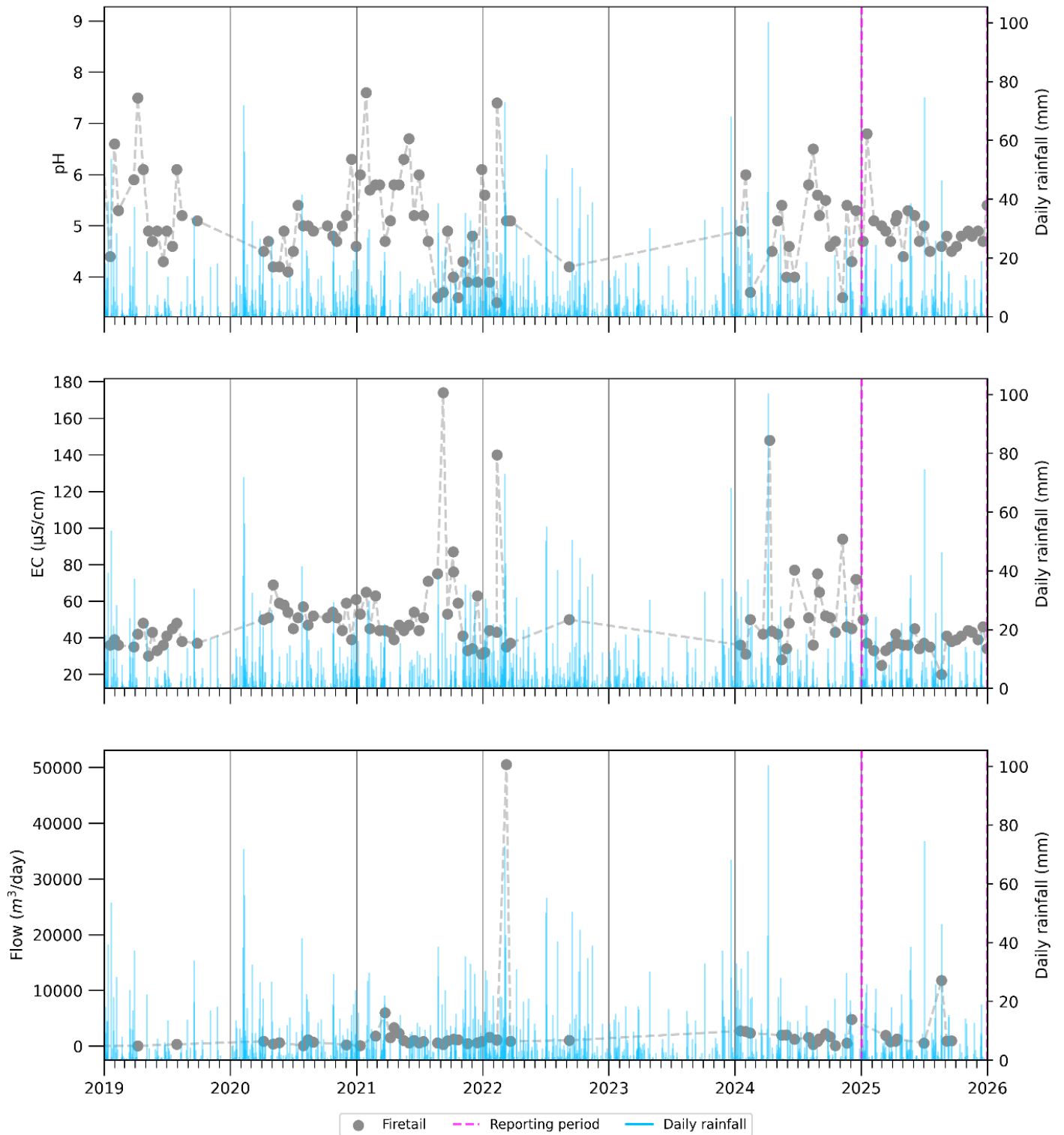


Figure G.4 Firetail Swamp water quality and flow

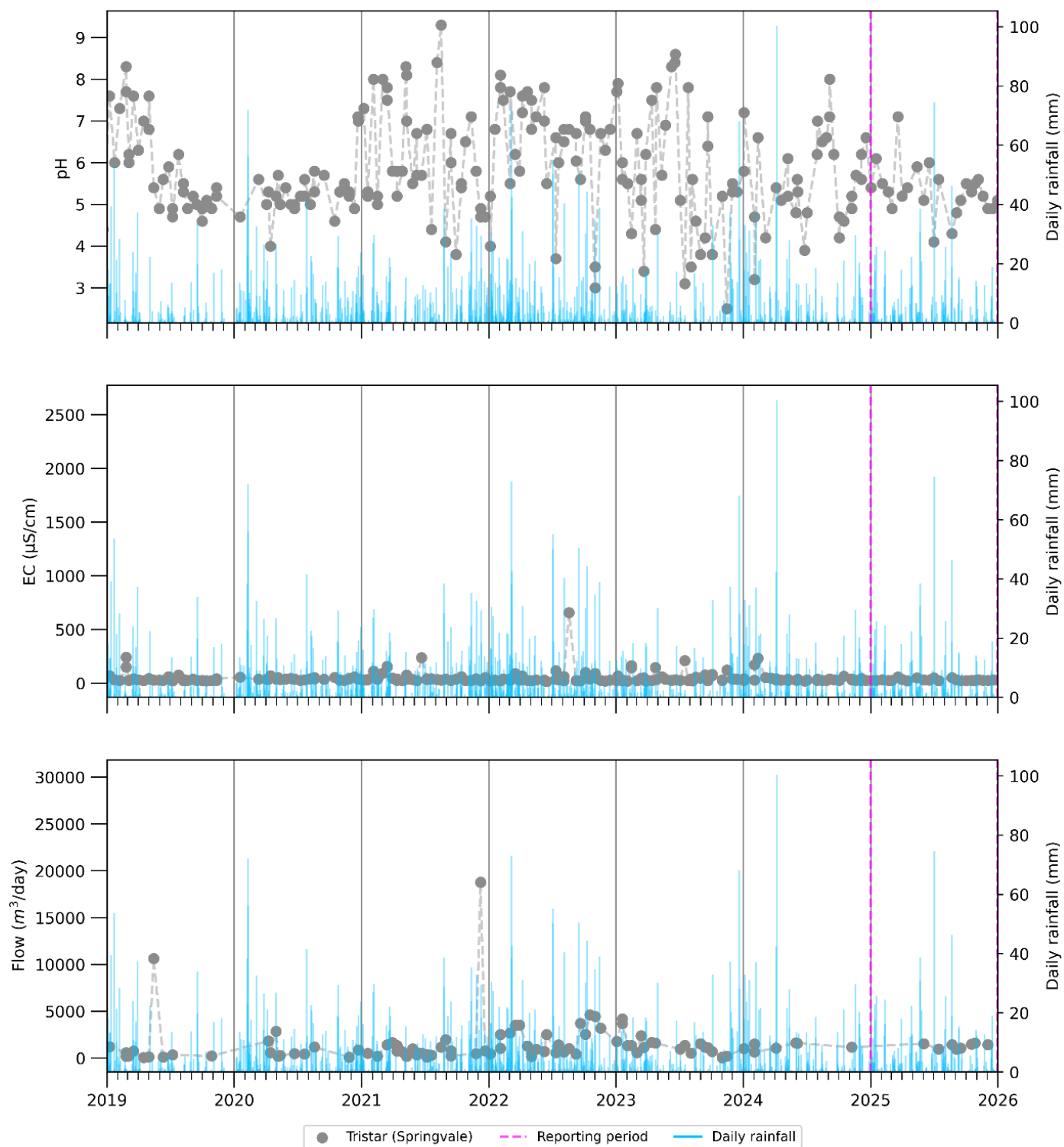


Figure G.5 Tristar Swamp water quality and flow

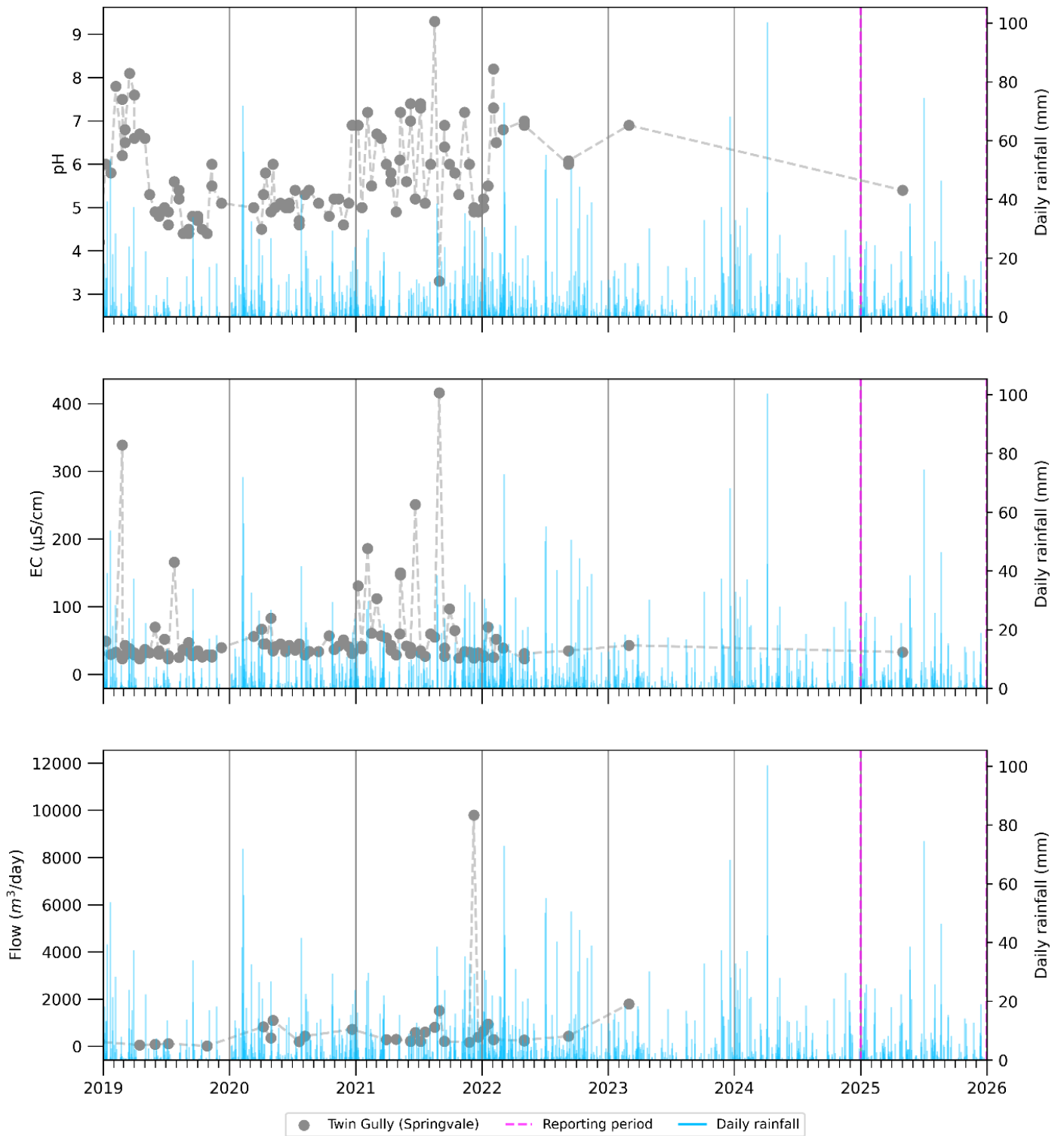


Figure G.6 Twin Gully Swamp water quality and flow

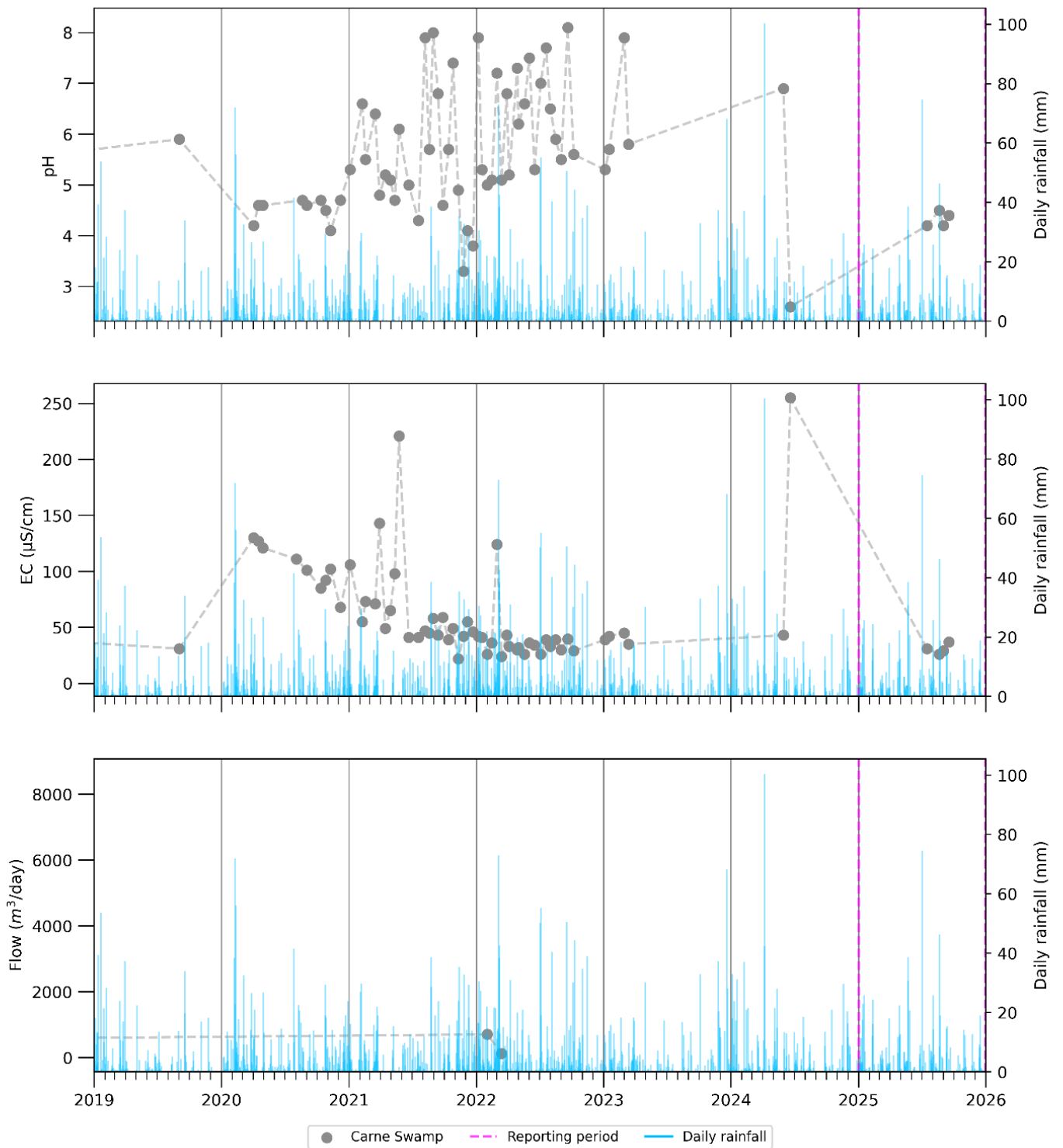


Figure G.7 Carne Swamp water quality and flow

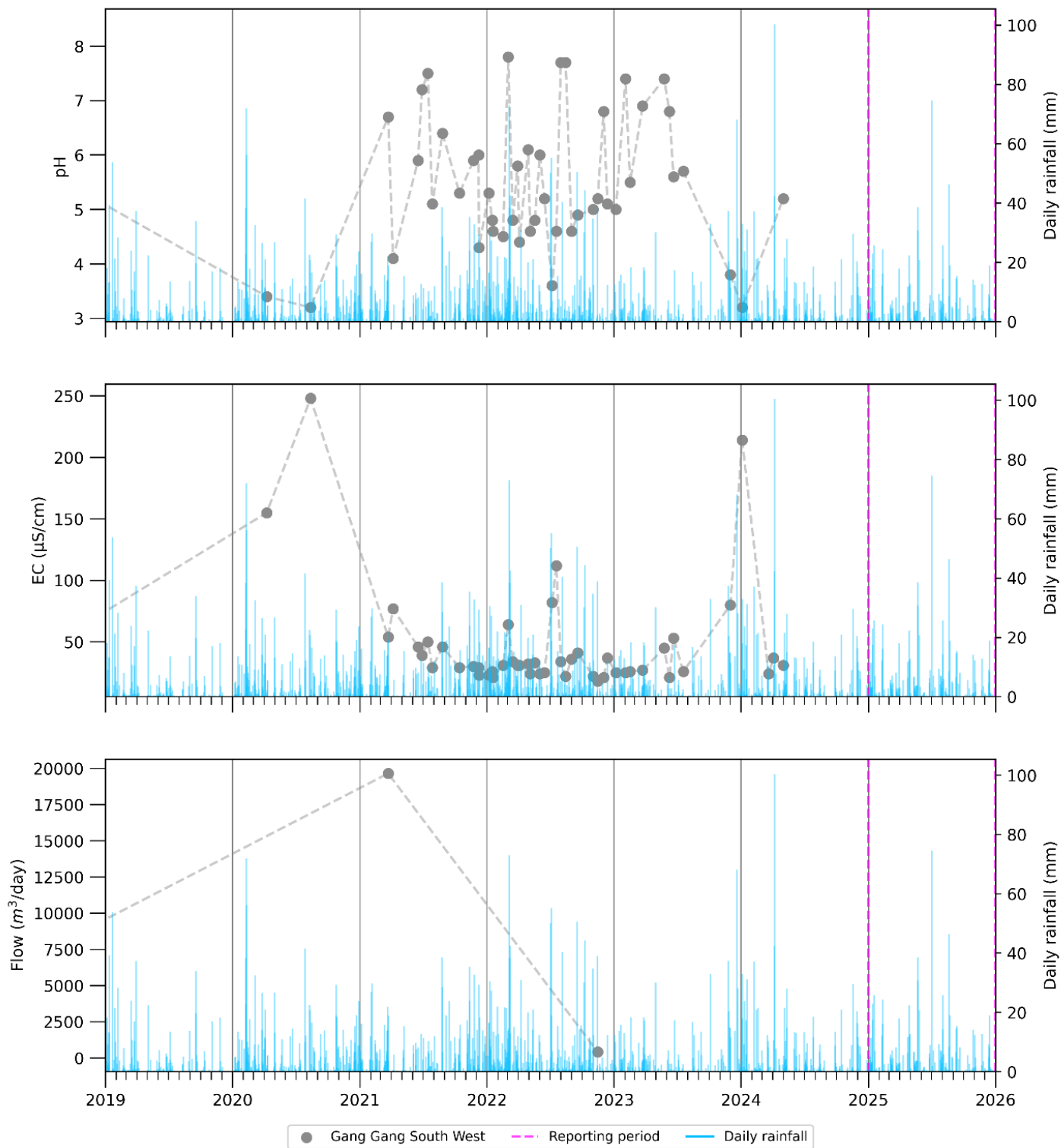


Figure G.8 **Gang Gang South West Swamp water quality and flow**

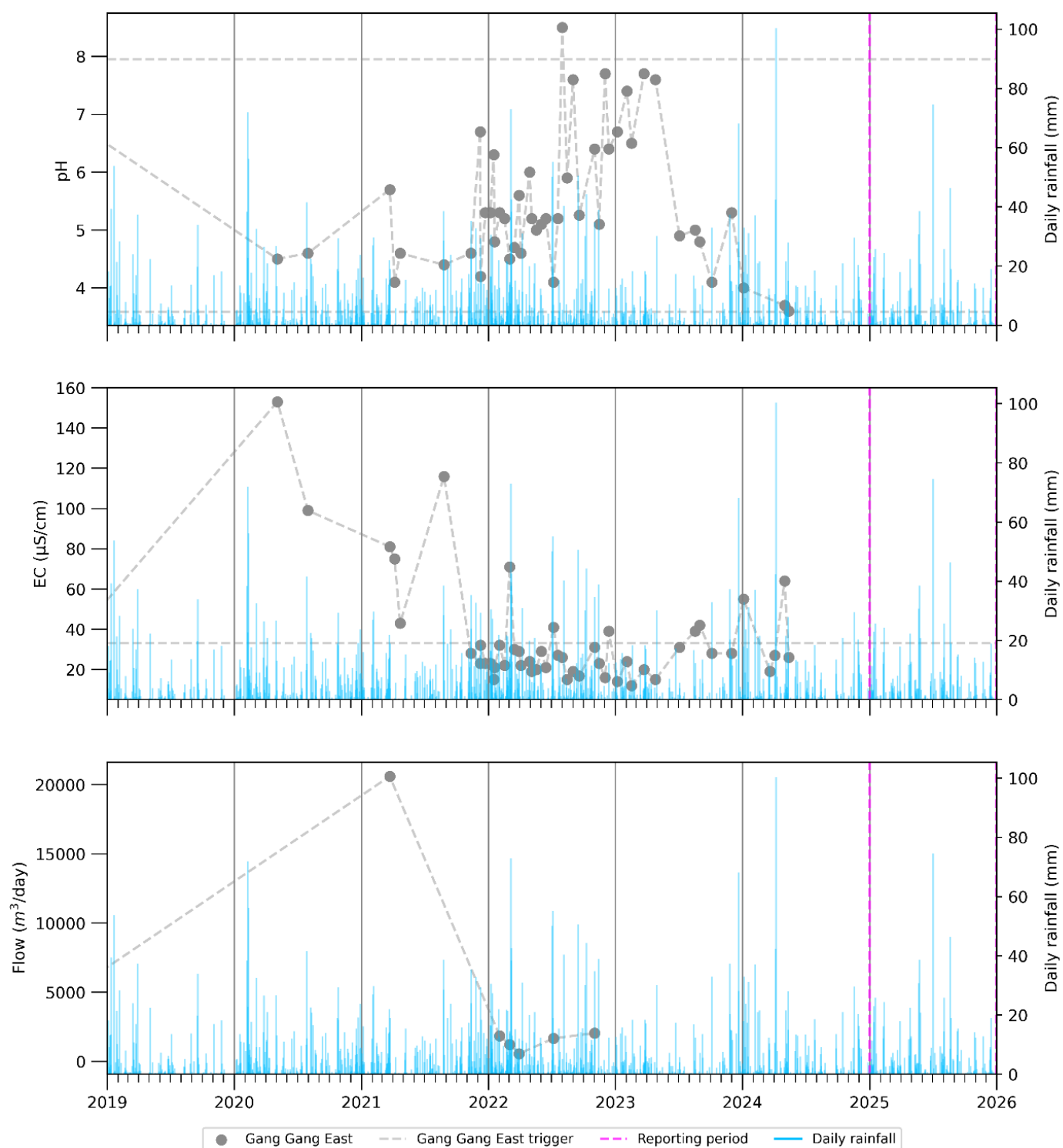


Figure G.9 Gang Gang East Swamp water quality and flow

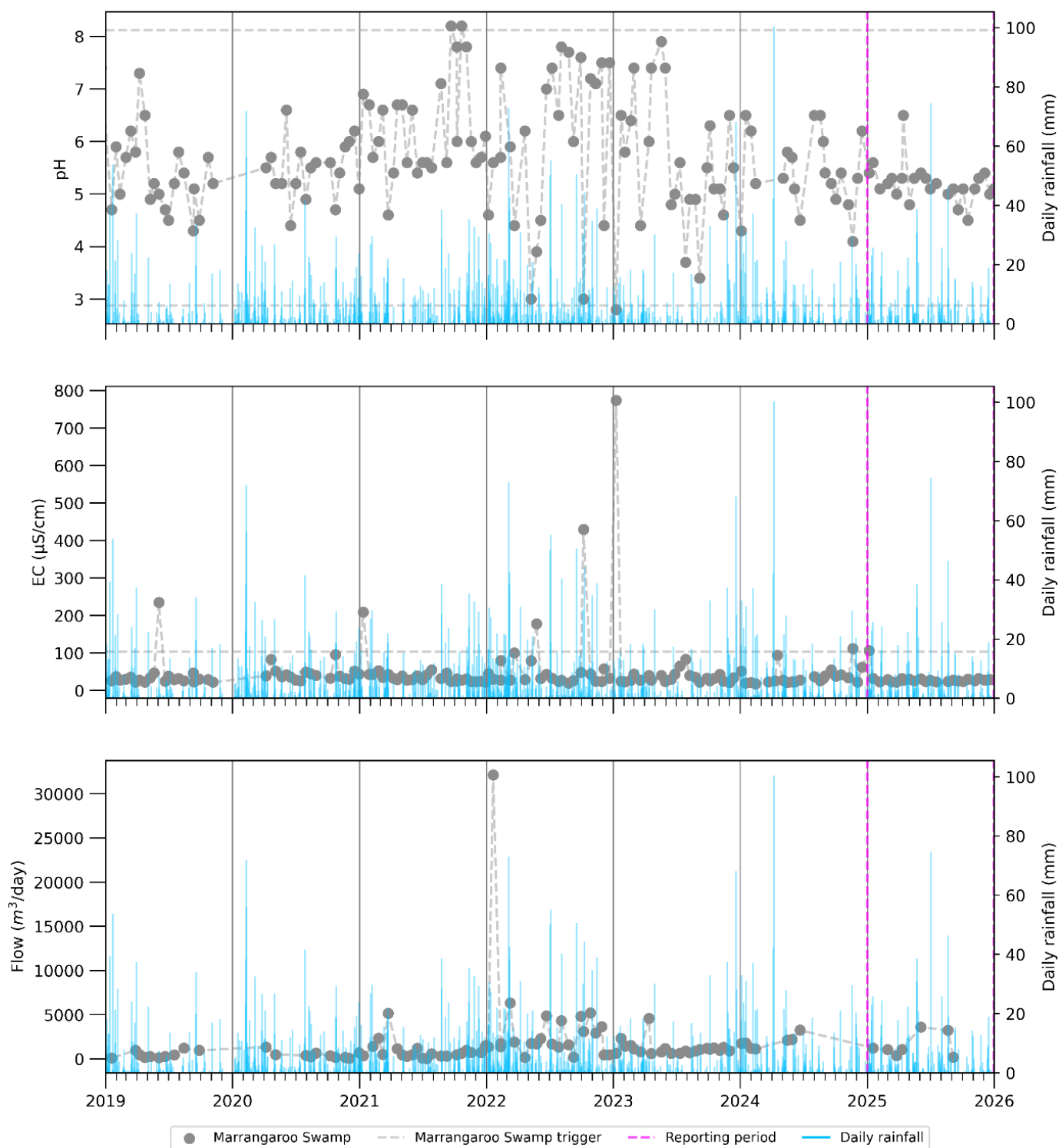


Figure G.10 Marrangaroo Swamp water quality and flow

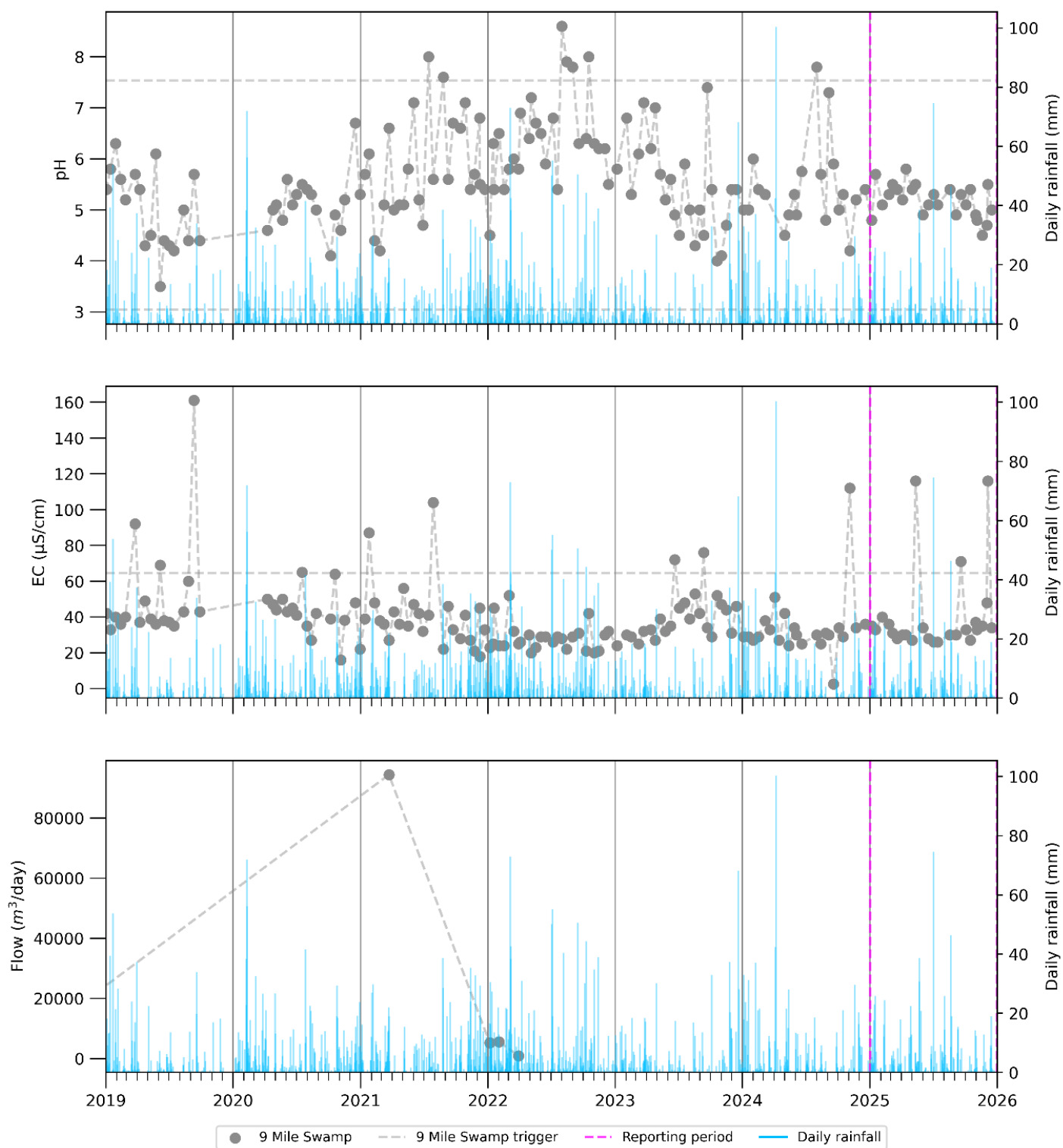


Figure G.11 9 Mile Swamp water quality and flow

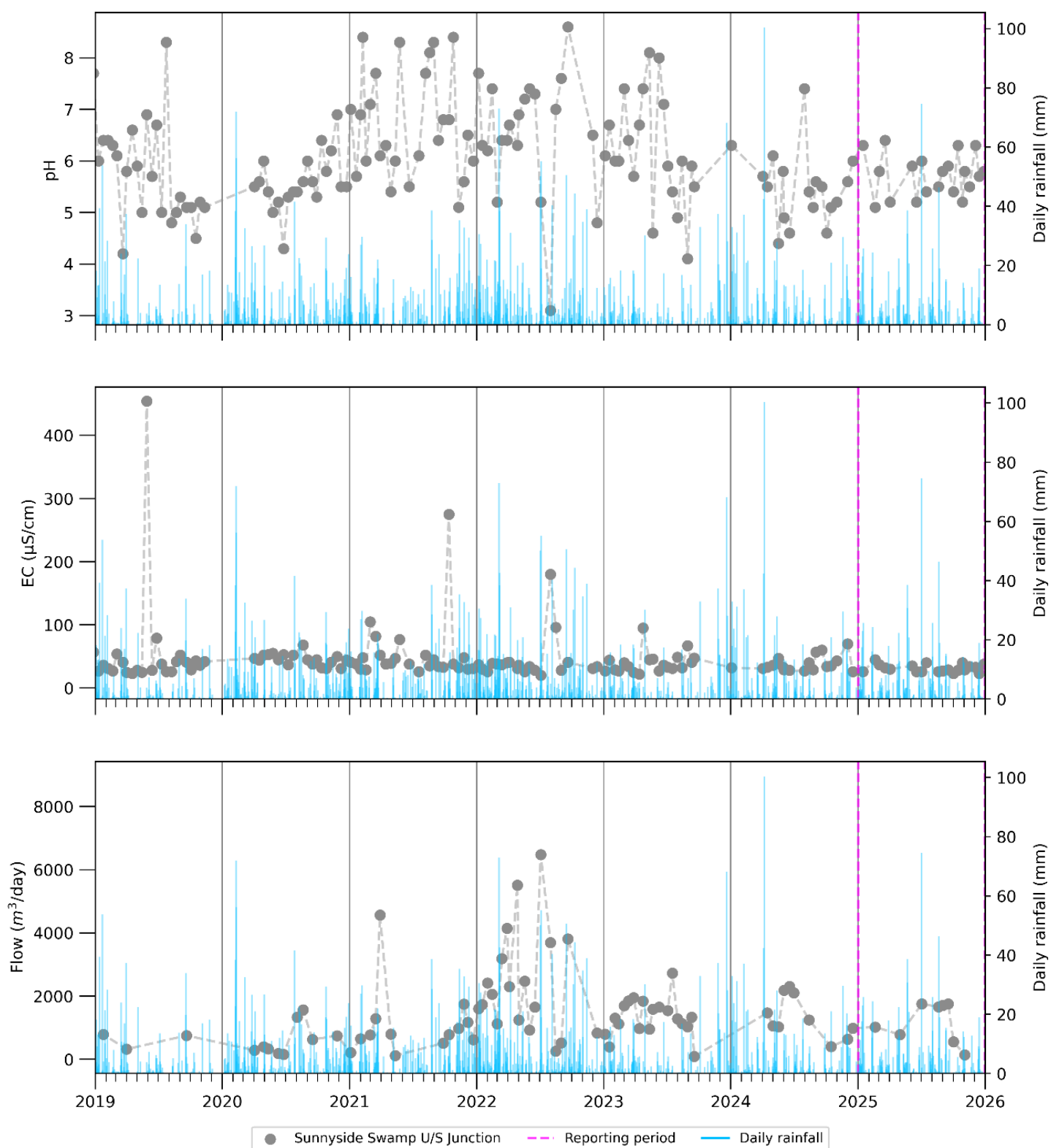


Figure G.12 Sunnyside U/S Junction water quality and flow

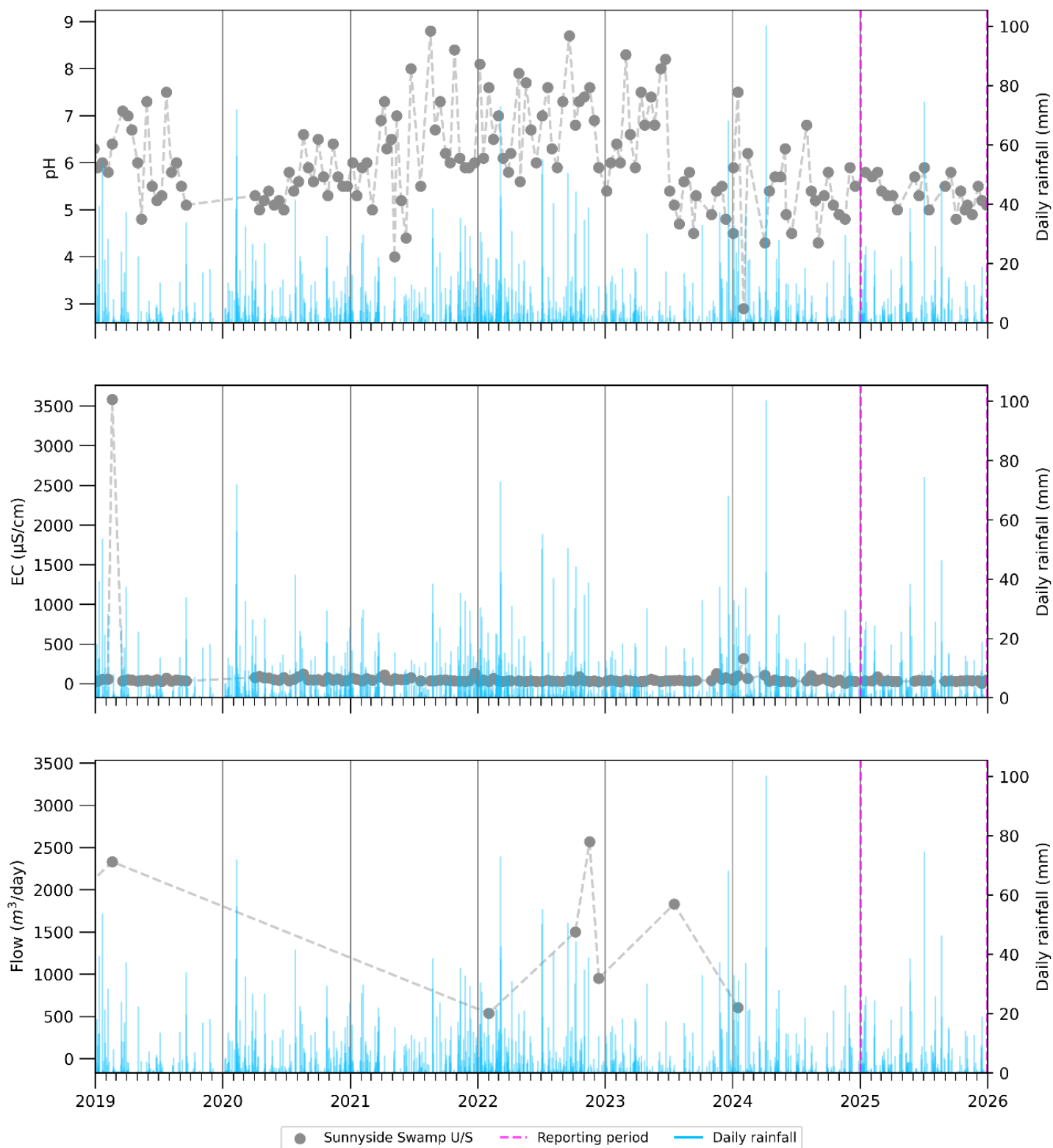


Figure G.13 Sunnyside Swamp Upstream water quality and flow

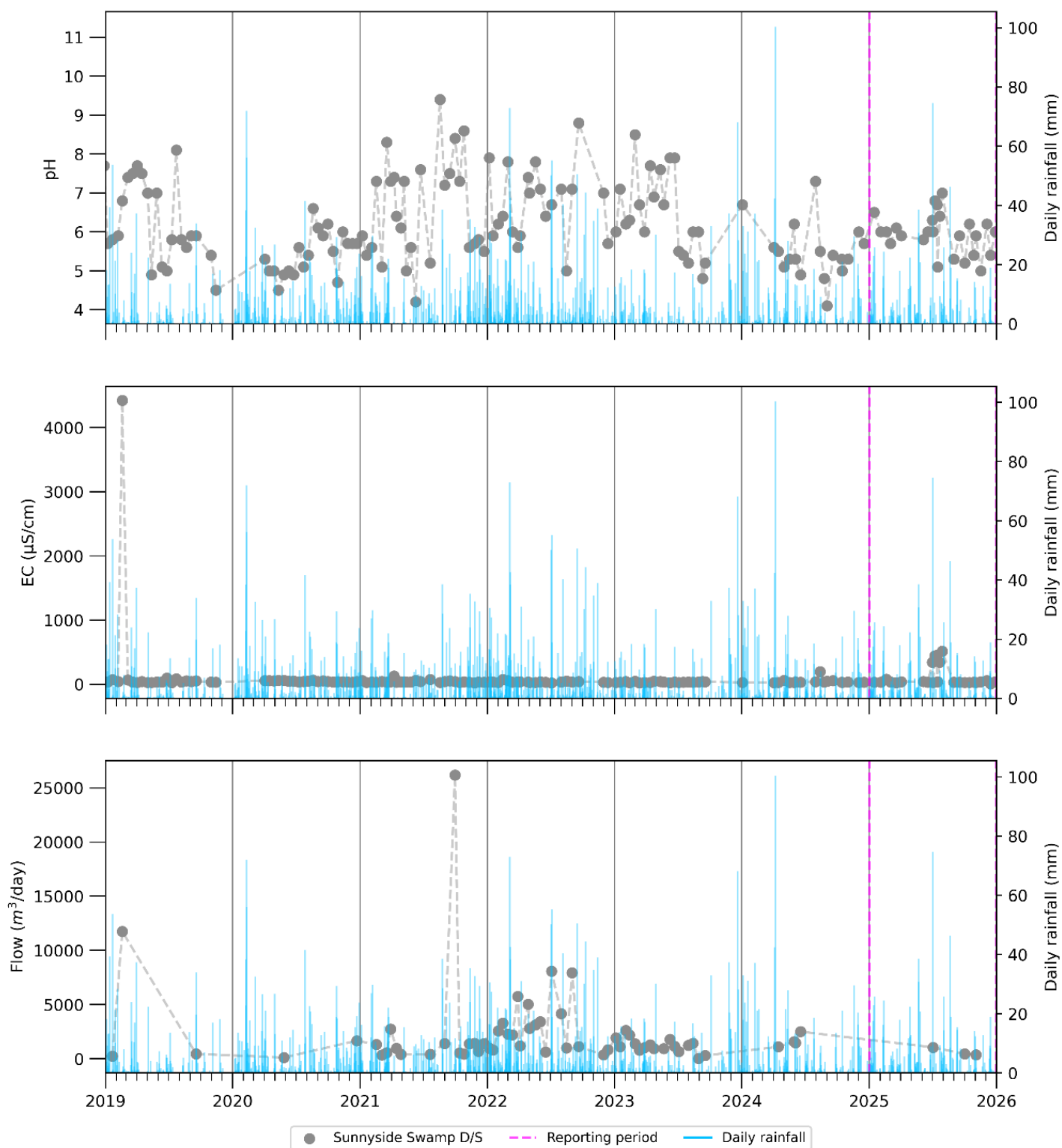


Figure G.14 Sunnyside Swamp Downstream water quality and flow

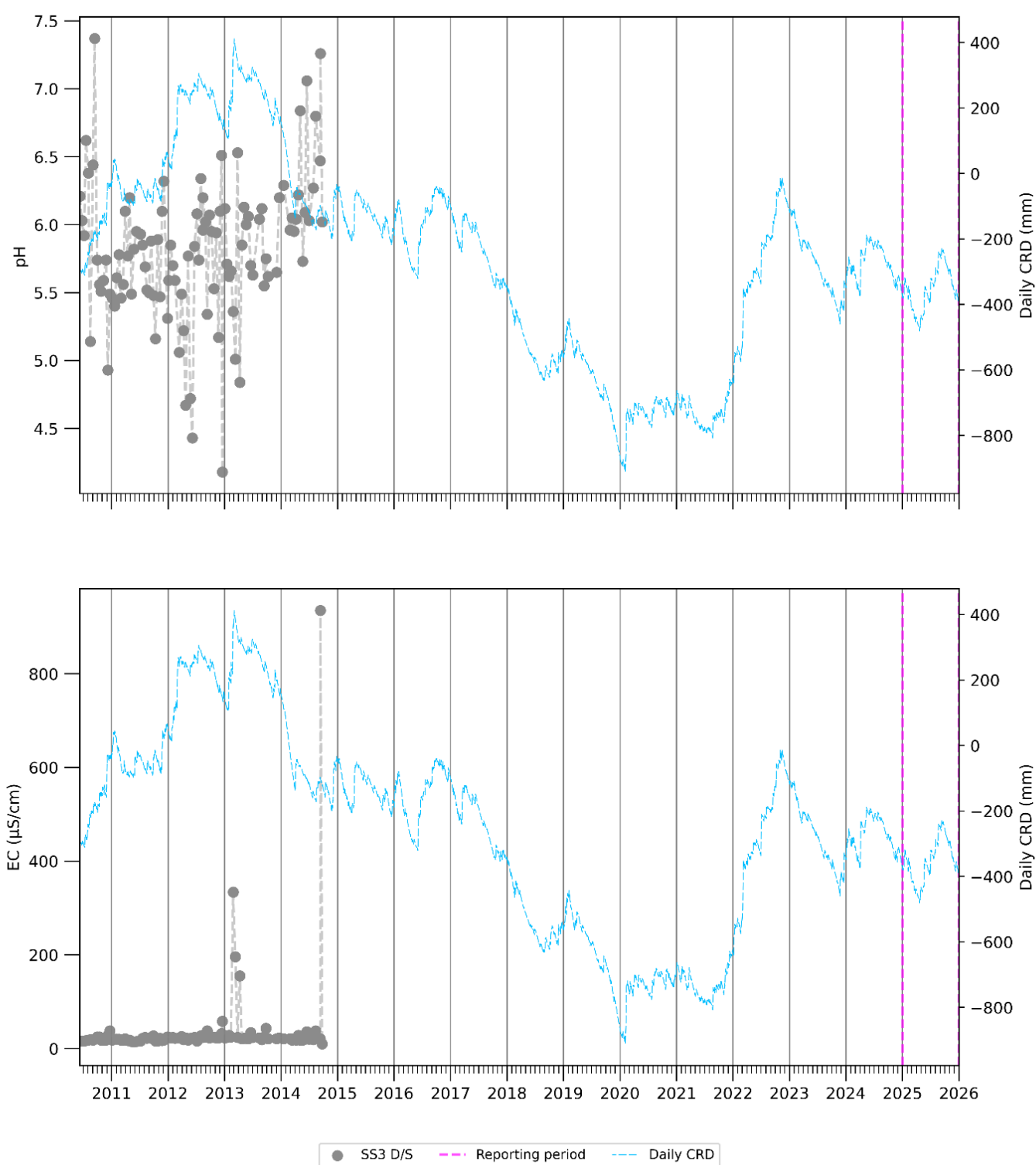


Figure G.15 Sunnyside East Downstream (SS3 D/S) water quality and flow

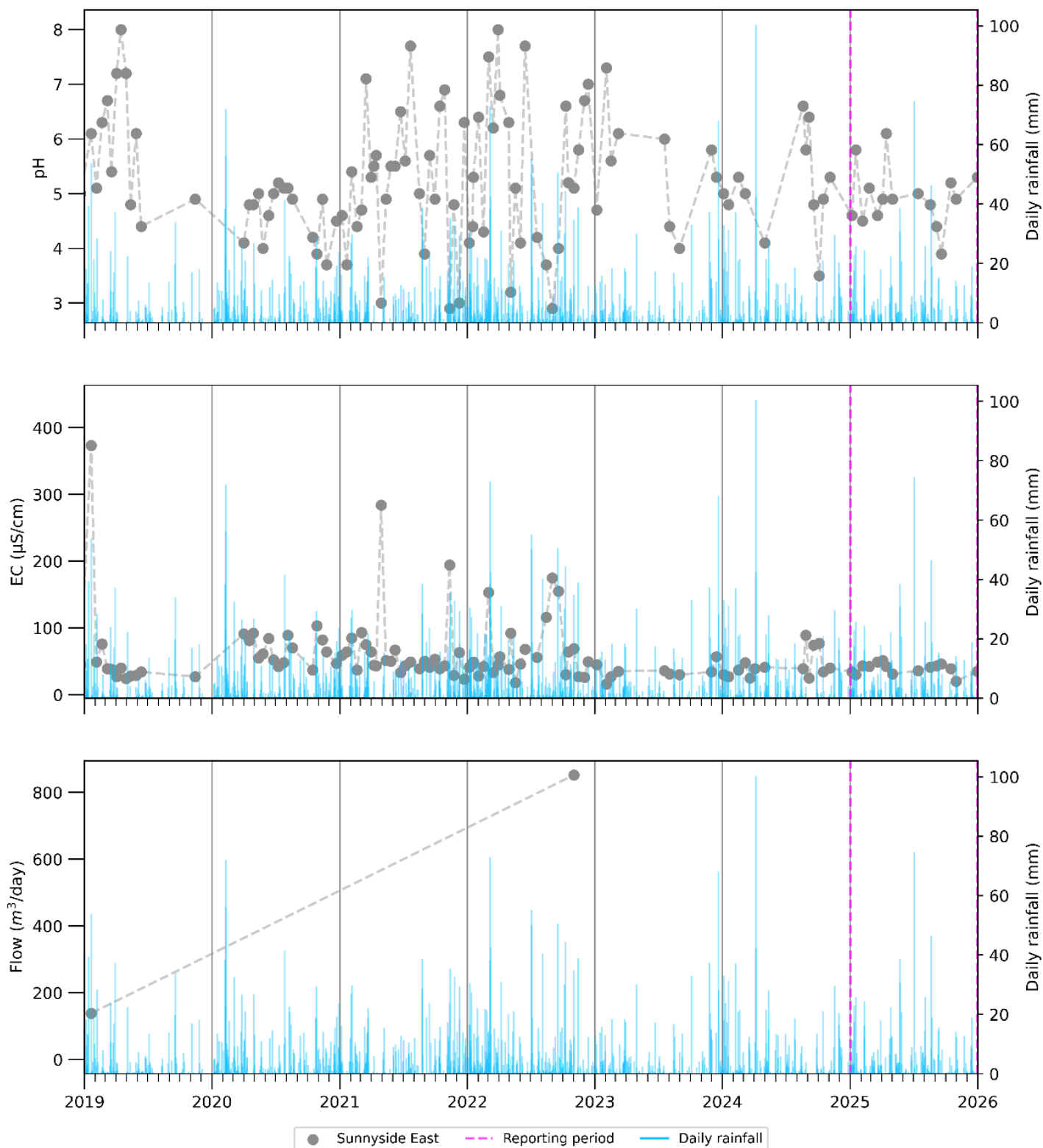


Figure G.16 Sunnyside East water quality and flow

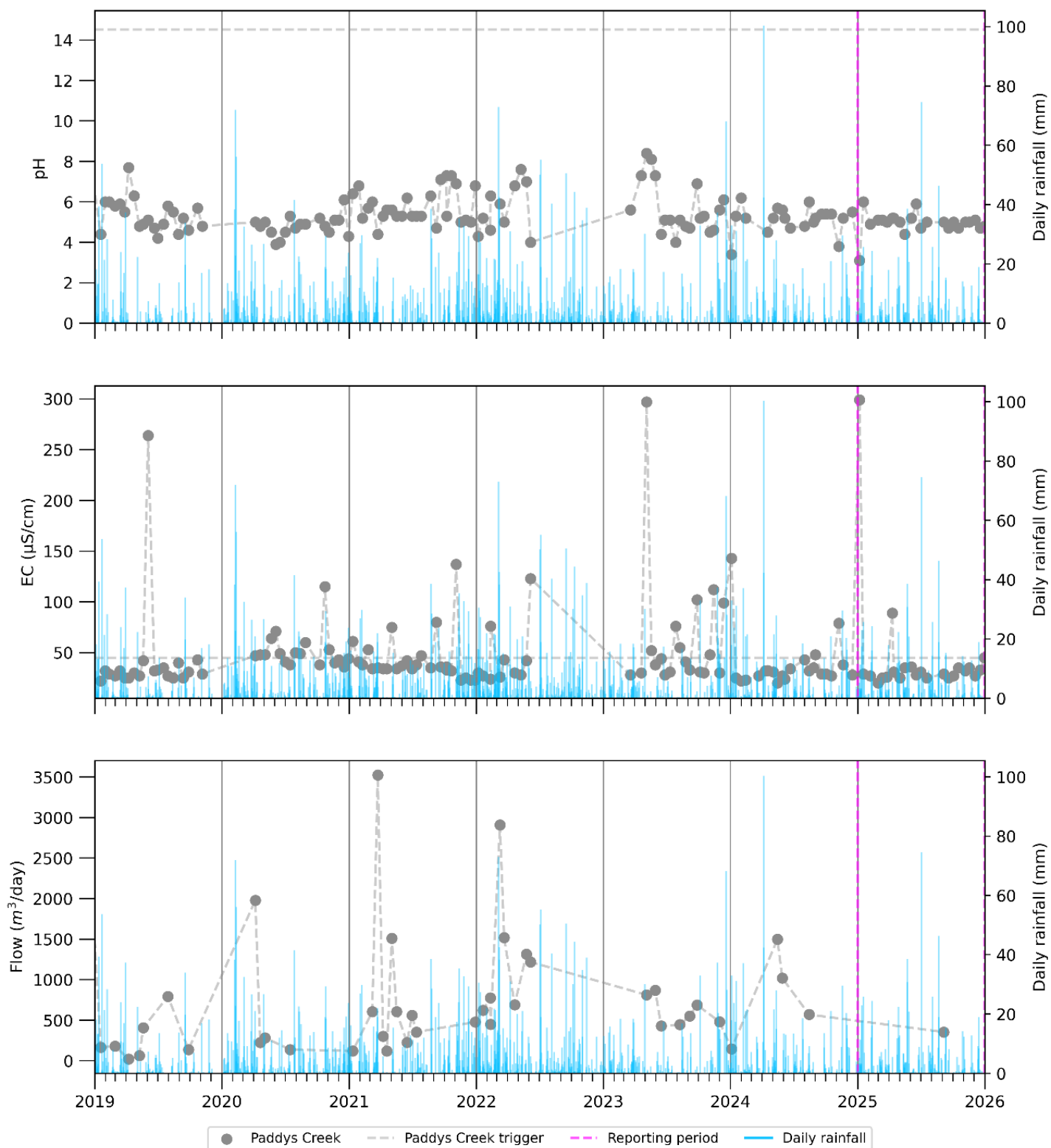


Figure G.17 Paddys Creek water quality and flow

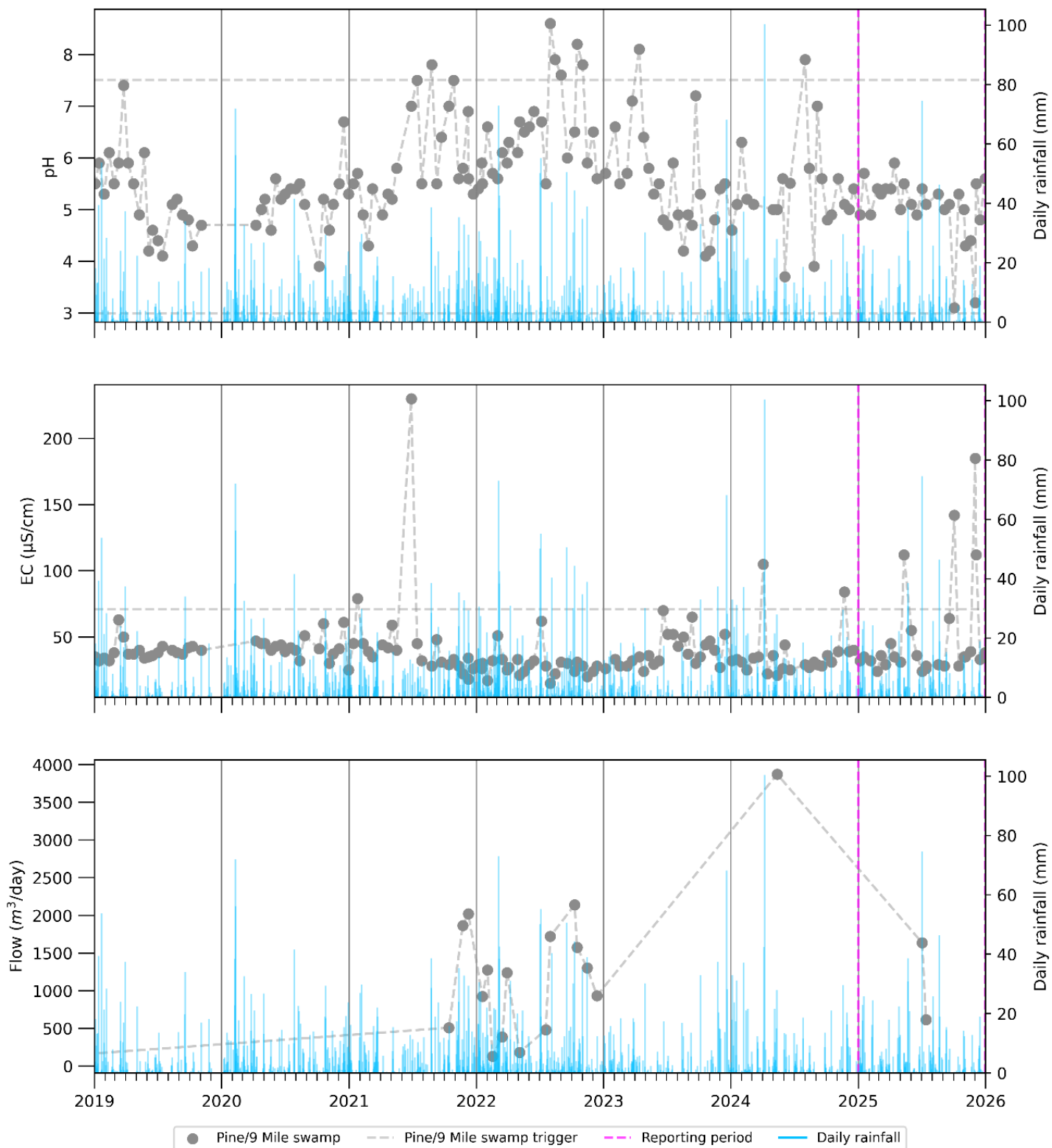


Figure G.18 Pine/9 Mile Swamp water quality and flow

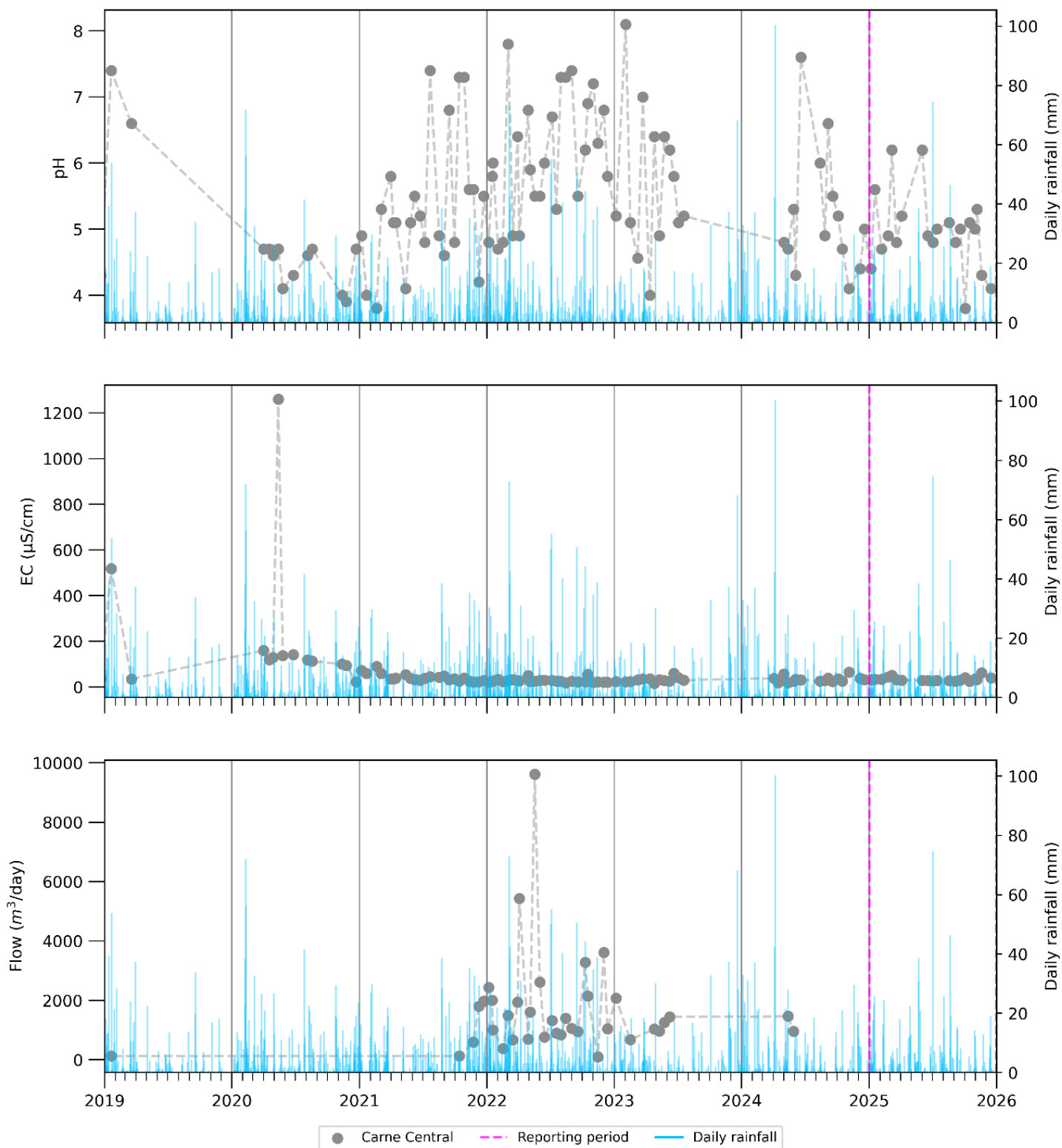


Figure G.19 Carne Central water quality and flow

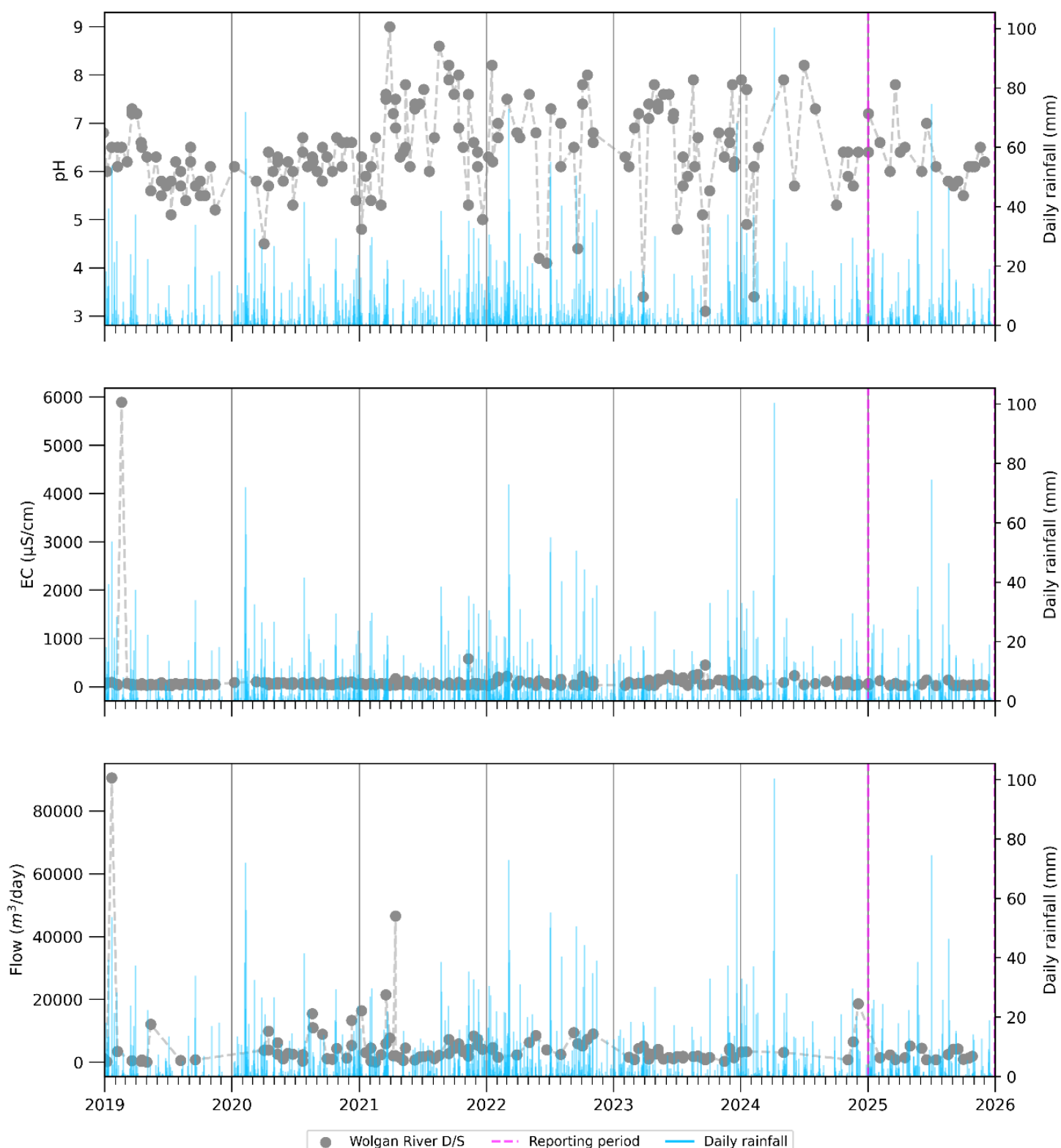


Figure G.20 Wolgan River Downstream water quality and flow

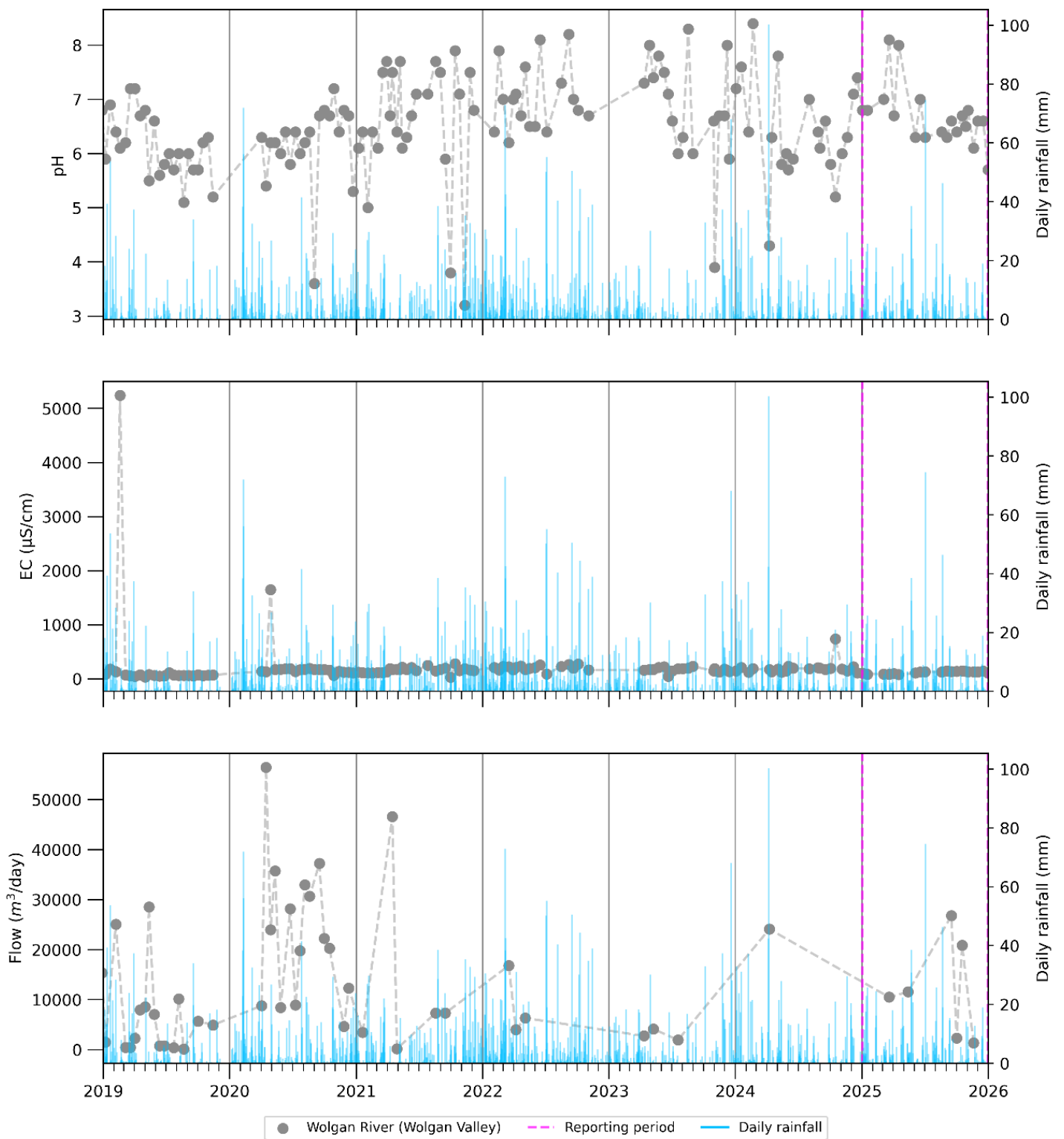


Figure G.21 Wolgan River (Wolgan Valley) water quality and flow

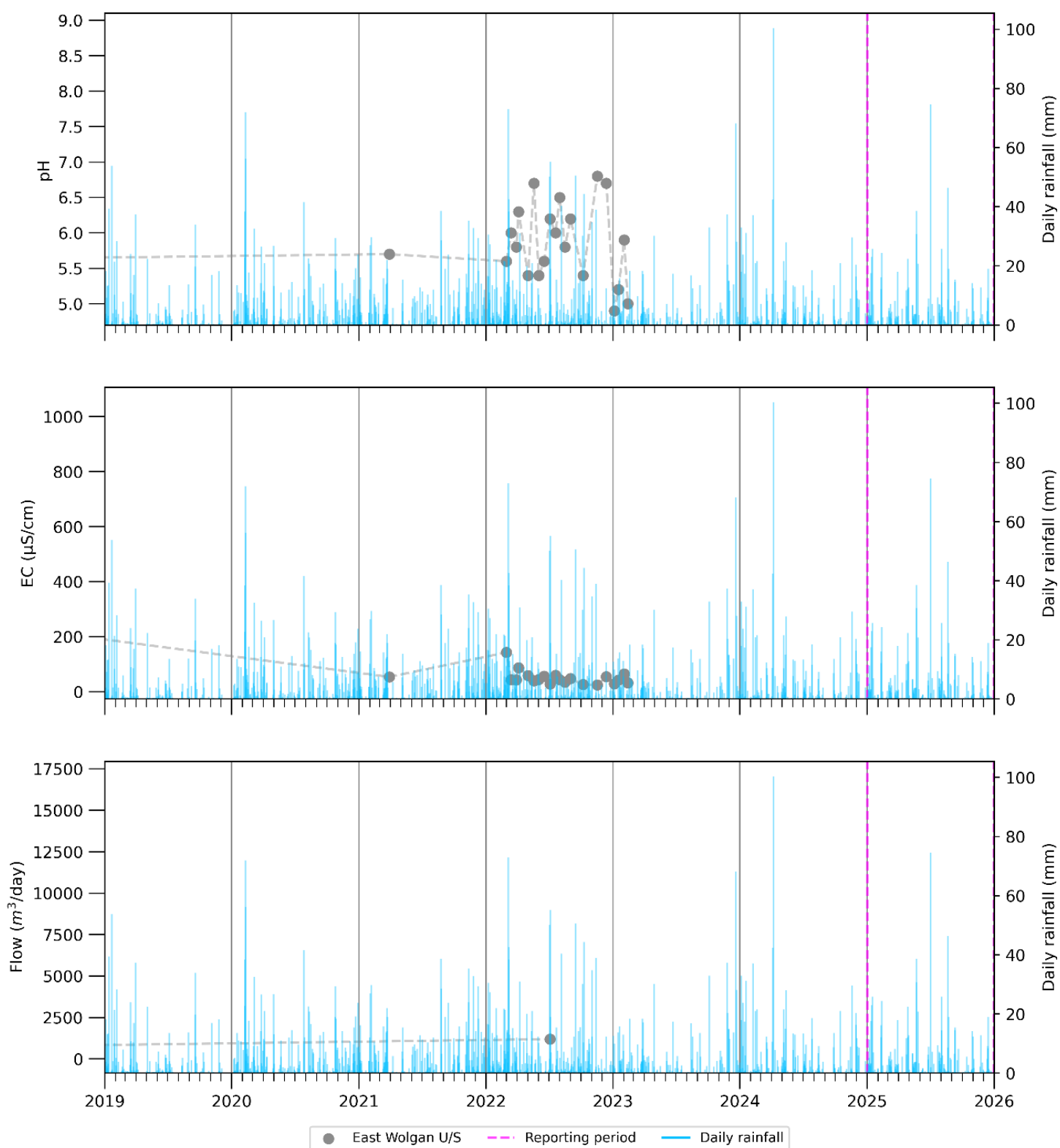


Figure G.22 East Wolgan Upstream water quality and flow

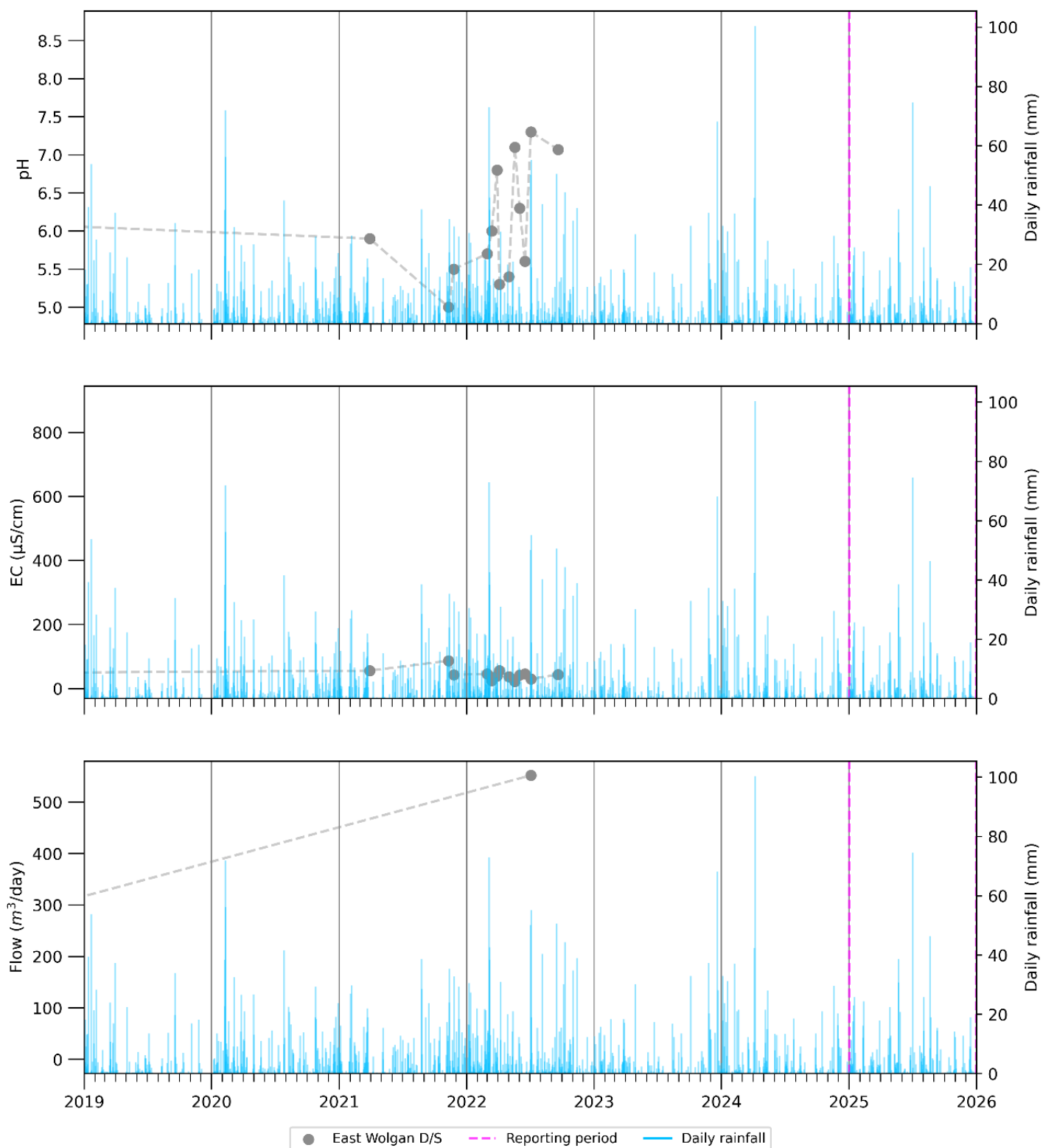


Figure G.23 East Wolgan Downstream water quality and flow

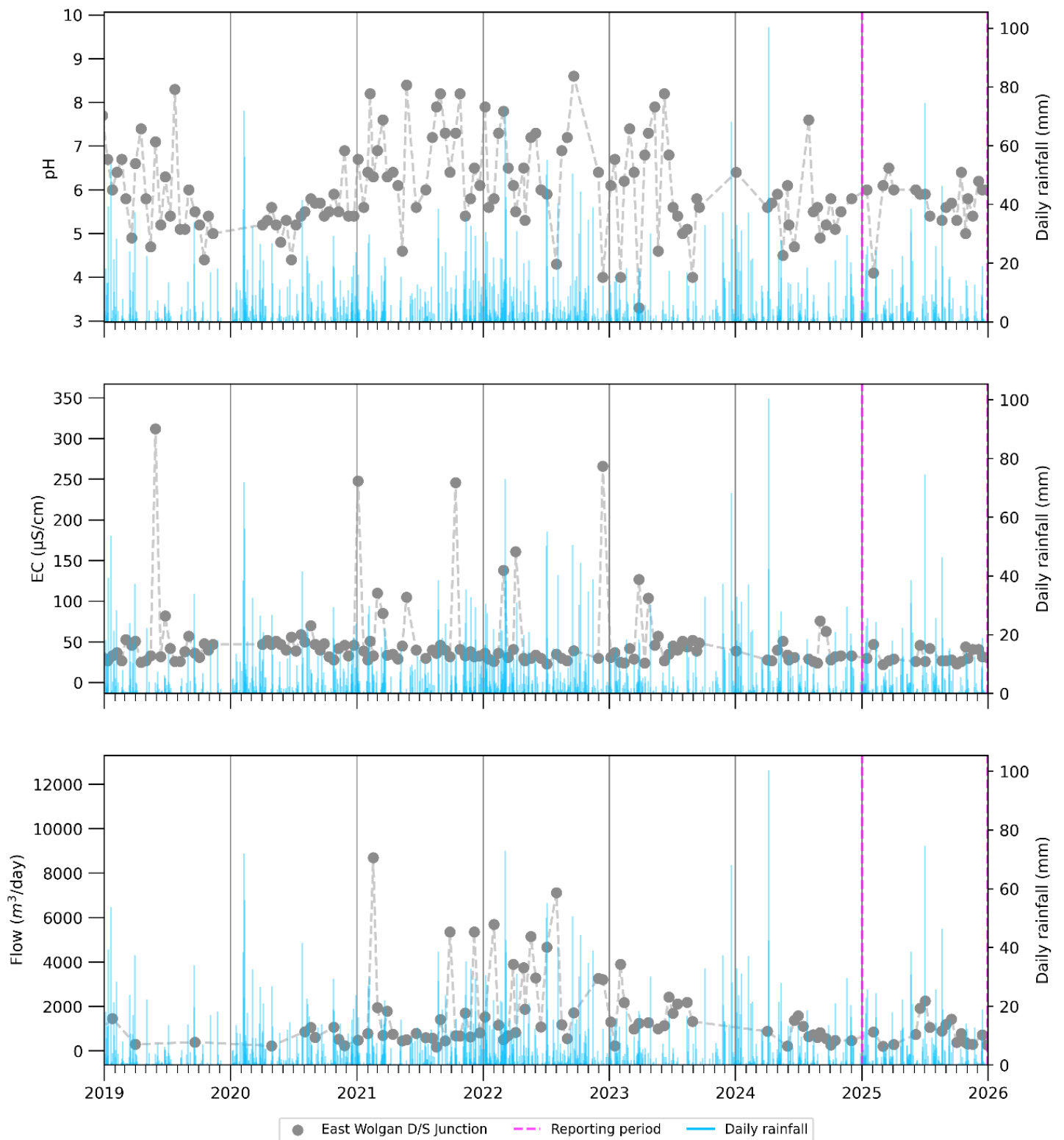


Figure G.24 East Wolgan DS Junction water quality and flow

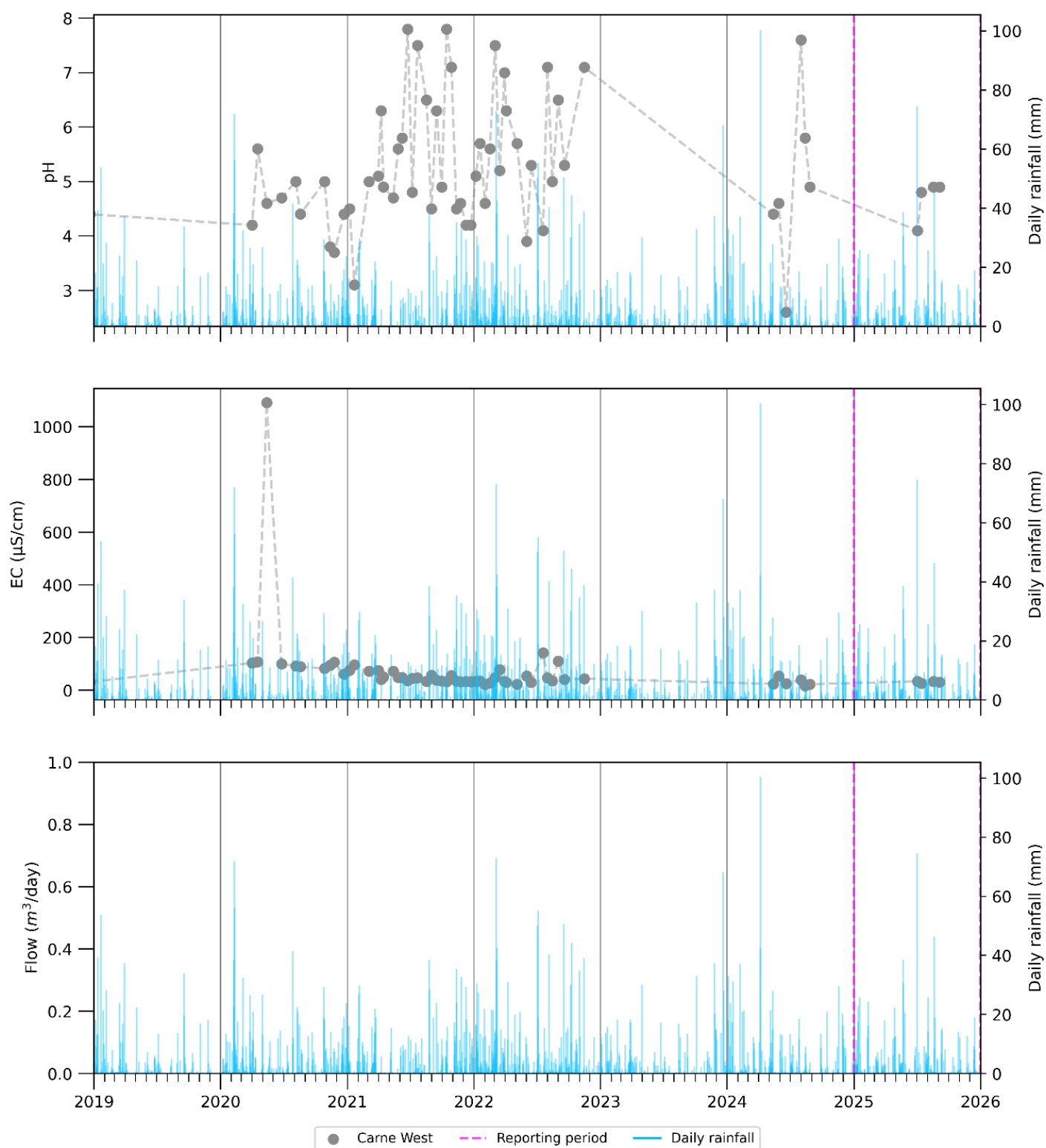


Figure G.25 Carne West water quality and flow

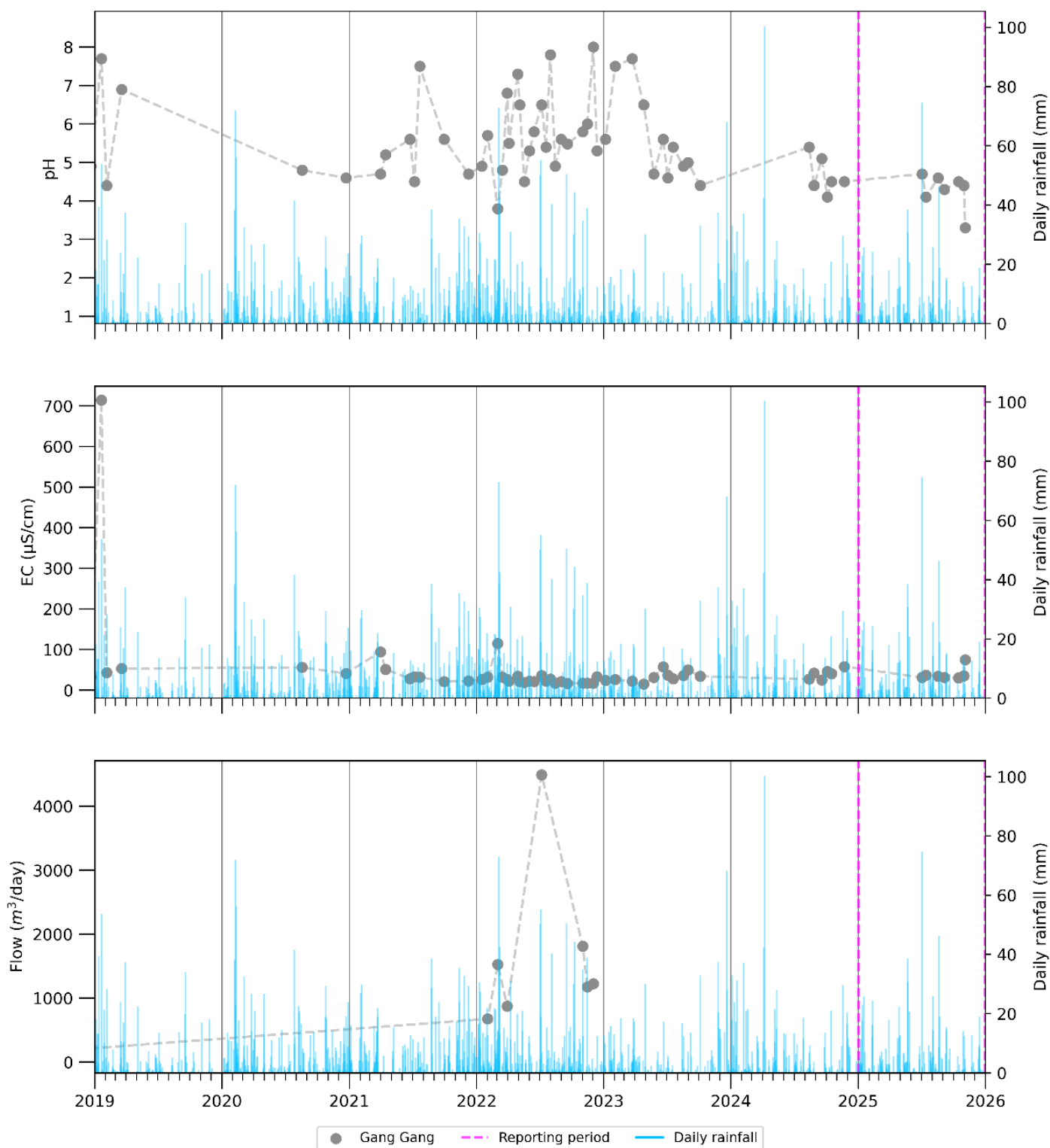


Figure G.26 Gang Gang water quality and flow

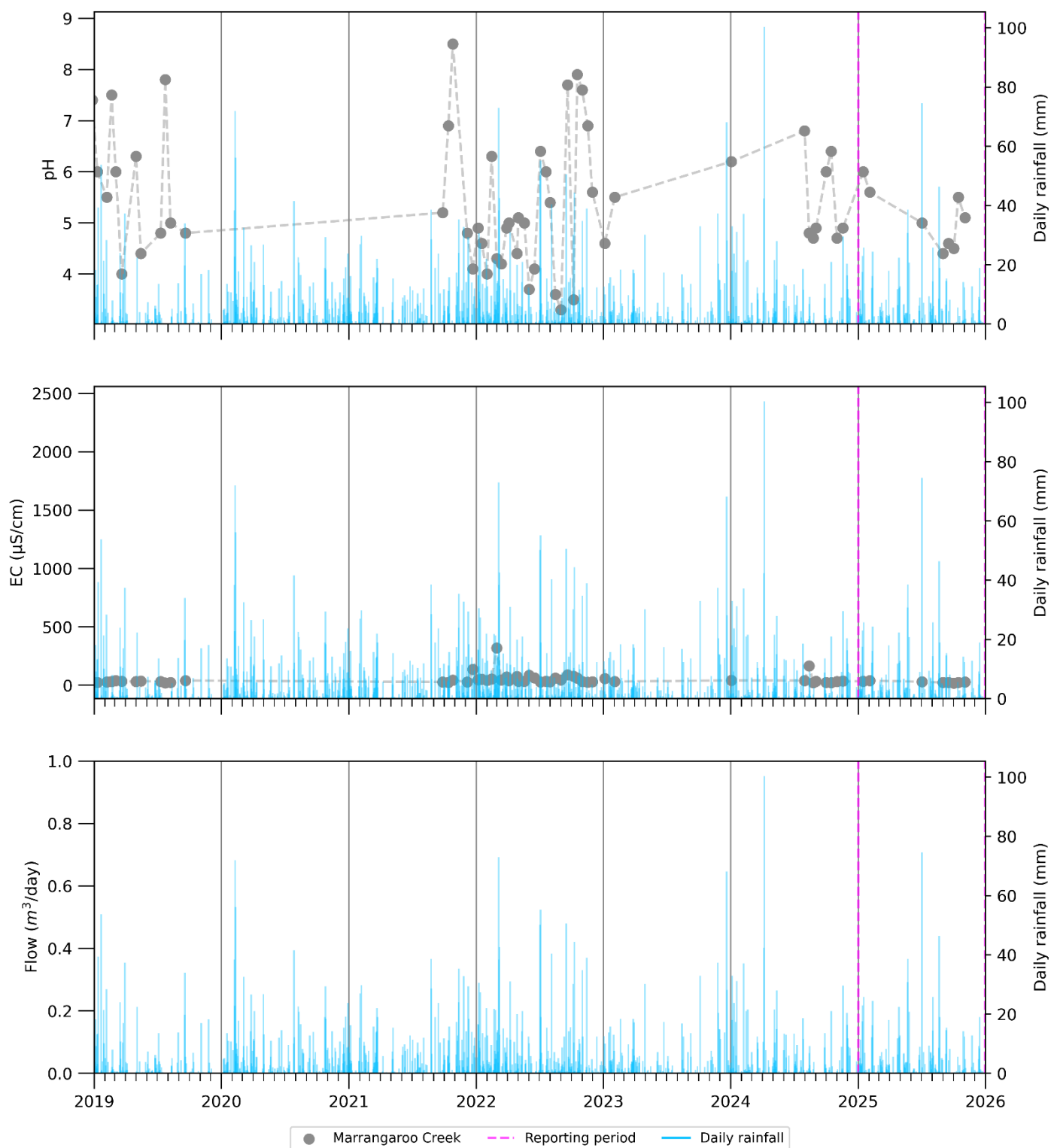


Figure G.27 Marrangaroo Creek water quality and flow

Appendix H

Surface water quality statistics

Table H.1 **Swamp surface water quality statistics**

Monitoring ID	Pre-mining statistics							Reporting period statistics (31 Jan to 31 Dec 2025)			
	Start	Finish	analyte	Unit	Count ¹	20th %ile–2×StDev	80th %ile + 2×StDev	Exceedance	Min	Median	Max
Carne Swamp	5/01/05	25/09/13	pH	units	263	4.15	7.14	FALSE	4.2	4.2	4.4
Carne Swamp	5/01/05	25/09/13	EC (field)	µS/cm	263	NA	51.99	FALSE	29	31	37
Carne Swamp	4/02/08	25/09/13	Flow Rate	kL/day	142	NA	NA	FALSE	-	-	-
East Wolgan Upstream	8/04/05	11/04/06	pH	units	25	7.79	9.71	FALSE	-	-	-
East Wolgan Upstream	8/04/05	11/04/06	EC (field)	µS/cm	25	NA	1098.55	FALSE	-	-	-
East Wolgan Upstream	8/04/05	11/04/06	Flow Rate	kL/day	0	No pre-mining data		FALSE	-	-	-
East Wolgan Downstream	8/04/05	24/04/06	pH	units	28	6.89	9.71	FALSE	-	-	-
East Wolgan Downstream	8/04/05	24/04/06	EC (field)	µS/cm	28	NA	1307.51	FALSE	-	-	-
East Wolgan Downstream	8/04/05	24/04/06	Flow Rate	kL/day	0	NA	NA	FALSE	-	-	-
East Wolgan D_S Junction	22/04/78	21/06/06	pH	units	8	5.77	8.39	FALSE	4.1	5.9	6.5
East Wolgan D_S Junction	22/04/78	21/06/06	EC (field)	µS/cm	8	NA	298.67	FALSE	22	29.5	47
East Wolgan D_S Junction	22/04/78	21/06/06	Flow Rate	kL/day	0	No pre-mining data		FALSE	-	-	-
Gang Gang-East	27/09/16	12/05/17	pH	units	9	3.59	7.95	FALSE	-	-	-
Gang Gang-East	27/09/16	12/05/17	EC (field)	µS/cm	9	NA	33.07	FALSE	-	-	-
Gang Gang-East	27/09/16	12/05/17	Flow Rate	kL/day	9	NA	NA	FALSE	-	-	-
Gang Gang-South West	27/09/16	12/05/17	pH	units	8	2.97	9.80	FALSE	-	-	-
Gang Gang-South West	27/09/16	12/05/17	EC (field)	µS/cm	8	NA	40.65	FALSE	-	-	-
Gang Gang-South West	27/09/16	22/11/16	Flow Rate	kL/day	3	NA	NA	FALSE	-	-	-
Marrangaroo Swamp	24/11/17	22/03/22	pH	units	97	2.87	8.12	FALSE	4.5	5.15	6.5

Monitoring ID	Pre-mining statistics							Reporting period statistics (31 Jan to 31 Dec 2025)			
	Start	Finish	analyte	Unit	Count ¹	20th %ile–2×StDev	80th %ile + 2×StDev	Exceedance	Min	Median	Max
Marrangaroo Swamp	24/11/17	22/03/22	EC (field)	µS/cm	97	NA	103.88	FALSE	22	27.5	106
Marrangaroo Swamp	24/11/17	22/03/22	Flow Rate	kL/day	69	NA	NA	FALSE	-	-	-
9 Mile Swamp	27/11/17	14/01/19	pH	units	30	3.04	7.64	FALSE	4.5	5.1	5.8
9 Mile Swamp	27/11/17	14/01/19	EC (field)	µS/cm	30	NA	56.19	FALSE	26	33	116
9 Mile Swamp	27/11/17	28/03/18	Flow Rate	kL/day	5	NA	NA	FALSE	-	-	-
Barrier Swamp	27/09/16	-	pH	units	166	2.71	8.35	FALSE	3.3	5.0	5.7
Barrier Swamp	27/09/16	-	EC (field)	µS/cm	173	NA	71.02	FALSE	21	27.5	106
Barrier Swamp	27/09/16	-	Flow Rate	kL/day	143	NA	NA	FALSE	-	-	-
Best Creek	24/11/17	-	pH	units	118	2.69	7.72	FALSE	4.0	4.9	5.9
Best Creek	24/11/17	-	EC (field)	µS/cm	120	NA	95.17	FALSE	23	38	71
Best Creek	24/11/17	-	Flow Rate	kL/day	79	NA	NA	FALSE	-	-	-
Carne Central Swamp	27/09/16	13/12/22	pH	units	86	2.69	9.01	FALSE	4.4	5.1	5.8
Carne Central Swamp	27/09/16	13/12/22	EC (field)	µS/cm	86	NA	138.40	FALSE	21	32	58
Carne Central Swamp	27/09/16	13/12/22	Flow Rate	kL/day	8	NA	NA	FALSE	-	-	-
Firetail	24/11/17	-	pH	units	111	2.57	7.79	FALSE	4.4	4.85	6.8
Firetail	24/11/17	-	EC (field)	µS/cm	113	NA	94.28	FALSE	20	37	50
Firetail	24/11/17	-	Flow Rate	kL/day	57	NA	NA	FALSE	-	-	-
SS3 D_S	10/06/10	25/09/13	pH	units	128	4.50	7.03	FALSE	-	-	-
SS3 D_S	10/06/10	25/09/13	EC (field)	µS/cm	128	NA	127.19	FALSE	-	-	-
Sunnyside U_S Junction	31/03/06	22/08/09	pH	units	76	5.85	8.35	TRUE	5.1	5.8	6.4

Monitoring ID	Pre-mining statistics							Reporting period statistics (31 Jan to 31 Dec 2025)			
	Start	Finish	analyte	Unit	Count ¹	20th %ile–2×StDev	80th %ile + 2×StDev	Exceedance	Min	Median	Max
Sunnyside U_S Junction	31/03/06	22/08/09	EC (field)	µS/cm	76	NA	136.21	FALSE	23	29.5	45
Sunnyside U_S Junction	21/02/08	22/08/09	Flow Rate	kL/day	36	NA	NA	FALSE	-	-	-
Sunnyside Swamp Upstream	24/05/05	19/08/09	pH	units	87	5.74	8.36	TRUE	4.8	5.3	5.9
Sunnyside Swamp Upstream	24/05/05	19/08/09	EC (field)	µS/cm	87	NA	548.61	FALSE	5.2	35	86
Sunnyside Swamp Upstream	4/02/08	19/08/09	Flow Rate	kL/day	37	NA	NA	FALSE	-	-	-
Sunnyside Swamp Downstream	24/05/05	19/08/09	pH	units	104	5.85	8.55	TRUE	5.0	5.9	6.5
Sunnyside Swamp Downstream	24/05/05	19/08/09	EC (field)	µS/cm	104	NA	447.61	FALSE	5.4	32	79
Sunnyside Swamp Downstream	4/02/08	19/08/09	Flow Rate	kL/day	37	NA	NA	FALSE	-	-	-

Notes: 1. The count refers to the pre-mining statistics. It does not include the results from the reporting period.

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