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SIX MONTHLY SUBSIDENCE IMPACT REPORT

Tahmoor South Domain Longwalls South 1A – South 6A

1 July 2024 – 31 December 2024

Report 5 – September 2025

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AUTHORS:	Natalie Brumby – Environmental Specialist *Tahmoor Coal – SIMEC Mining* Nick Le Baut – Project Manager Environmental Projects *Tahmoor Coal – SIMEC Mining*
REVIEW:	Zina Ainsworth – Environment and Community Manager *Tahmoor Coal – SIMEC Mining*
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Executive Summary

This report is the fifth six-monthly report to be submitted since the commencement of extraction in the Tahmoor South Domain, in accordance with the requirements of the Longwall South 1A to South 6A (LW S1A-S6A) Extraction Plan.

Extraction of coal from Longwall South 1A (LW S1A) commenced on 18 October 2022 and was completed on 4 July 2023. The extraction of Longwall South 2A (LW S2A) commenced on 2 August 2023 and was completed on 6 April 2024. Extraction of Longwall South 3A (LW S3A) commenced on 8 May 2024 and was completed on 17 December 2024. Longwall South 4A is expected to commence extraction in January 2026.

The reporting period of this report is from 1 July 2024 to 31 December 2024 and includes observations noted during the extraction of LW S3A.

During the reporting period, a maximum of 1087 mm of vertical subsidence relating to the extraction of LW S3A was recorded at GNSS S26.

During the reporting period, the following seventeen (17) TARPs for environmental and built features were triggered as summarised below:

- Surface Water Quality TARP (WMP1) - Level 1 TARP triggered for monitoring site TT13-QLa for dissolved Aluminium. Elevated dissolved zinc concentrations, in excess of the SSGV, have been recorded historically at TT13-QLa. The elevated dissolved zinc concentrations recorded at pool TT13 are likely to be related to the interaction of underflow with subsurface geology (following the high rainfall event in June 2024) and re-emergence of elevated dissolved zinc underflow as surface flow in the vicinity of pool TT13.
- Surface Water Level TARP (WMP3) – Reduction in pool water level at various sites resulted in Level 2 and 3 triggers during this reporting period. This included Level 3 TARP triggers at monitoring sites TT2, TT3, TT7, TT12 and TT13. Observations of water level decline at these monitoring sites were confirmed to be associated with direct or indirect mining impacts, in addition to influence from prevailing climatic conditions. A WCAMP will be prepared and implemented (if required) following the cessation of subsidence movements associated with Tahmoor South mining;
- Physical Features and Natural Behaviour TARP (WMP5) – Reduction in pool water level and the development of new or existing fractures resulted in Level 1, 2 and 3 TARP triggers during this reporting period. This included a Level 3 TARP trigger at monitoring site TT9. Changes to physical features and natural behaviour of this pool and reaches were confirmed to be associated with indirect mining impacts, in addition to influence from prevailing climatic conditions. WCAMP will be prepared and implemented (if required) following the cessation of subsidence movements associated with Tahmoor South mining;
- Channel Stability, Sedimentation and Erosion (WMP7) – Moderate development of erosion at knickpoint site K64 resulted in a Level 2 trigger during this reporting period. The combination of high rainfall / flow event and mining-induced subsidence has been proposed to have attributed to this erosion development. At this time, Corrective Management Actions have not been considered to be reasonable or feasible;
- Groundwater Level TARP for Shallow Groundwater Level (Open Standpipes and Private Bores; WMP8) – Reduction in bore water level was noted at various sites during this reporting period, resulting in nine (9) sites obtaining a Level 1, 2 or 3 TARP trigger, with Level 3 TARP triggers observed at P55B and P55C. The drawdown experienced at P55B and P55C suggests a potential mining related influence. No further actions other than ongoing monitoring is required;

- Groundwater Level TARP for Shallow Groundwater Pressure (VWPs; WMP9) – Four (4) TARP triggers were identified during the reporting period. The triggers included one Level 1 trigger, one Level 2 trigger, and two Level 3 triggers. TBC032 sensors at 95 m and 131 m reached Level 3 status indicating water level reductions greater than maximum modelled drawdown for periods exceeding six months. The groundwater decline is likely a regional groundwater drawdown in response to mining activity. The continued exceedances reflect ongoing regional drawdown patterns, likely linked to longwall progression. No further actions other than ongoing monitoring is required;
- Groundwater Quality TARP (WMP11) - Three (3) TARP triggers occurred as a result of Barium exceedances where three or more consecutive exceedances occurred across more than three locations. This occurred at sites REA4, P53B and P53C. Further investigation into the potential link between mining impacts and barium is recommended.
- Groundwater – Surface Water Interaction TARP (WMP12) – Seven (7) TARP triggers occurred at multiple sites during the reporting period corresponding to WMP8, exceedances at bores aligned with surface water monitoring sites. The triggers included four Level 1 triggers, one Level 2 trigger, and two Level 3 triggers. however, no corresponding surface water exceedances were observed. Significant vertical separation persists, and available data do not suggest measurable mining-related impacts on surface water conditions during this period.
- Farm Dams TARP (LMP3) – Level 1 triggered for development of isolated seepage without suspended solids from the toe of the farm dam embankment at farm dam FD18 during the October 2024 inspection. Isolated seepage was identified from existing erosion rills near the middle of the dam embankment following recent rainfalls. Subsequent inspections in November and December 2024 revealed that no seepage was present.
- Aquatic Habitat and Macroinvertebrate Indicators (BMP1) – Level 1, Level 2 and Level 3 triggered during the monitoring period. A Level 3 was triggered at monitoring sites TTH16 and TTHt7 due to reduced aquatic pool habitats (dry pools) compared to baseline observations for three consecutive sampling occasions. These monitoring sites correlate to surface water monitoring sites where reduction of water levels is related to mining-induced impacts. At this time, Corrective Management Actions have not been considered to be reasonable or feasible.
- Historical Heritage TARP (HMP2) – Level 1 triggered for detectable environmental consequences observed at Tahmoor Mine Site. A surface crack was identified on the surface of the northern facing reinforced concrete element of the 1200t raw coal bins that link the two silos together. An assessment was completed by a heritage consultant, it was concluded that the impact was minor and such crack does not affect the mine site heritage value. Furthermore, at mine closure the infrastructure will be removed, and the land will be rehabilitated as required by the Tahmoor Mine's consent condition. No further actions other than ongoing monitoring is required;
- Main Southern Rail TARP – Yellow trigger due to non-conventional subsidence that developed neat 99.62km and 99.56km resulting in change in rail alignment. A temporary speed restriction was imposed on both tracks from 99.5km to 99.8km. The temporary speed restriction was removed following improvement of the track geometry by tamping. No further actions other than ongoing monitoring is required;
- Telecommunication TARP – Telstra direct buried IEN/CAN optical fibre cable trigger exceedance for OTDR loss on fibre (greater than 0.3dB). Tahmoor Coal was notified by Telstra of a loss of signal strength that was observed by remote monitoring on Telstra's optical fibre cable on 10 September 2024. Tahmoor Coal uncoupled and exposed the buried cable at both locations on 11 September 2024. A kink was found in the cable and was relieved manually. OTDR testing by Telstra on 11 September 2024 identified that the signal was back to baseline with no ongoing losses detected.

- Tahmoor Mine Site TARP – Trigger due to observed crack (greater than 0.5mm width) on the 1200t raw coal bins unreinforced concrete web. An inspection by a structural engineer noted no immediate concerns. Ongoing monitoring is required;
- Australian Wildlife Sanctuary TARP – Trigger due to impacts to gates and gravel path. Ground movement impacted the functionality of gates within the Tasmanian Devil Enclosure and created a trip hazard in the gravel footpath at the Australian Wildlife Sanctuary. Tahmoor Coal repaired the gates and removed the trip hazard on the gravel footpath.
- Australian Wildlife Sanctuary – Natural Features TARP – Sustained Level 4 trigger relating to pool water level reduction and fracturing in Wirrimbirra Creek. This trigger is largely managed by the Water Management Plan TARPs. A WCAMP will be prepared (if required) and implemented following the cessation of subsidence movements associated with Tahmoor South mining; and
- Tahmoor Garden Centre TARP – Trigger due to impact to floor coating from expansion joint opening (3mm). Tahmoor Coal carried out repairs to the expansion joint using flexible sealant.

During the reporting period, there were no exceedances of environmental performance measures or indicators, as adopted from Condition C1 and Condition C5 of SSD 8445.

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1 Introduction

1.1 Background

Tahmoor Coal Pty Ltd (Tahmoor Coal) owns and operates the Tahmoor Mine, an existing underground coal mine located approximately 80 kilometres (km) south-west of Sydney in the Southern Coalfields of New South Wales (NSW) (refer to **Figure 1-1**). The mine has previously extracted longwalls to the north and west of the surface facilities and has been operating continuously since 1979 when coal was first mined using bord and pillar mining methods, followed by longwall mining methods since 1987.

Tahmoor Mine produces a primary hard coking coal product and a secondary higher ash coking coal product that are used predominantly for coke manufacture for steel production. Extracted coal is processed on site at the coal handling and preparation plant (CHPP) and coal clearance facilities prior to transportation via rail to Port Kembla and Newcastle for Australian domestic and export customers.

In April 2021, Tahmoor Coal received Development Application Approval (SSD 8445) from NSW Department of Planning and Environment (DPE) (now the NSW Department of Planning, Housing and Infrastructure (DPHI)) for the Tahmoor South Domain using existing surface infrastructure and extension of underground longwall mining to the south of existing workings. The approval allows the extraction of up to 4 Mtpa of ROM coal, with a total of up to around 33 Mt of ROM coal proposed to be extracted over a 10-year period.

In addition to the SSD 8445 approval Tahmoor Coal also received conditions of approval (EPBC 2017/8084) under the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) in October 2021.

The Tahmoor South Domain is located south of the Bargo River and east of Remembrance Driveway and the township of Bargo. Longwall mining would be used to extract coal from the Bulli coal seam within the bounds of Consolidated Coal Lease (CCL) 716 and CCL 747. Twelve longwalls are proposed in this domain which are divided into a series of six northern (A series) and six southern (B series) longwalls. An extraction plan for the A series, Longwalls South 1A to South 6A (LW S1A-S6A), was granted approval on 20 September 2022. The Study Area for this extraction plan is provided in **Figure 1-2**.

The progress of extract from Tahmoor South longwalls is as follows:

- Longwall South 1A (LW S1A): Commenced 18 October 2022, completed on 4 July 2023;
- Longwall South 2A (LW S2A): Commenced 2 August 2023, completed on 6 April 2024; and
- Longwall South 3A (LW S3A): Commenced 8 May 2024, completed on 17 December 2024.
- Longwall South 4A (LW S4A): Extraction expected to commence in January 2026.

1.2 Purpose

1.2.1 Six-Monthly Subsidence Impact Report Requirements

The purpose of this report is to address the requirements for six-monthly reporting on impacts and environmental monitoring results associated with the extraction of LW S1A-S6A. These requirements are outlined in Section 7.1.1 of the LW S1A-S6A Extraction Plan, which are derived from the DPE *Draft Guidelines for the Preparation of Extraction Plans V5* (DPE, 2025).

This report provides a summary of subsidence and environment monitoring results, subsidence impacts and management actions undertaken during the reporting period. The reporting period for this report is defined in **Section 1.3**.

Reporting requirements are listed in **Table 1-1** below, together with the cross-reference where the requirements are addressed in this report.

Table 1-1 Six Monthly Subsidence Impact Report Requirements

Requirement No.	Requirement Description	Section Addressed
Reporting Requirements as per Section 7.1.1 of the LW S1A-S6A Extraction Plan		
1	A comprehensive summary of all impacts, including a revised characterisation according to the relevant TARP(s);	Section 3
2	Any proposed actions resulting from triggers being met in the TARP, or other actions;	Section 3
3	An assessment of compliance with all relevant performance measures and indicators; and	Section 4
4	A comprehensive summary of all quantitative and qualitative environmental monitoring results, including landscape monitoring, water quality data, water flow and level data, piezometer readings.	Section 3

This report will be distributed to the stakeholders listed in **Section 5.4**.

1.2.2 Annual Review Requirements

An Annual Review for Tahmoor Mine operations during the previous calendar year is required in accordance with Condition E13 (SSD 8445) and is submitted by 31 March annually to DPHI and other stakeholders, as well as uploaded to the Tahmoor Coal website. This Six-Monthly Subsidence Impact Report will assist with the completion of the 2025 Annual Review and will be included as an appendix to the Annual Review.

The Annual Review will address compliance with Condition 22 of the EPBC Act (EPBC 2017/8084) approval, which requires the submission of an Annual Compliance Report to DPHI by 31 March of each year.

Note: On 6 March 2025 and 21 May 2025, Tahmoor Coal submitted requests to DPHI to seek an extension of time for the submission of Tahmoor Coal's Annual Environmental Management Report (AEMR) and Six-Monthly Subsidence Impact Report. On 23 May 2025, DPHI approved the extension of time to submit the reports on 30 September 2025.

1.3 Scope

1.3.1 Reporting Period

This report is the fifth six-monthly report to be submitted since the commencement of extraction of LW S1A, in accordance with the requirements of the LW S1A-S6A Extraction Plan. The reporting period of this report is from 1 July 2024 to 31 December 2024 and covers subsidence impacts observed during the extraction of LW S3A.

Table 1-2 summarises the monitoring and reporting completed during the reporting period, as well as the timeframe of data reviewed for each monitoring component.

1.3.2 LW S1A-S6A Study Area

The Extraction Plan Study Area for LW S1A-S6A is defined as the surface area that is likely to be affected by the extraction of LW S1A-S6A from the Bulli Coal Seam. This Study Area has been calculated by combining the areas bound by the following limits:

- The predicted limit of vertical subsidence, taken as the 20 millimetre (mm) subsidence contour resulting from the extraction of LW S1A-S6A; and
- A 35° angle of draw line from the limit of proposed extraction for LW S1A-S6A.

The Study Area is illustrated in **Figure 1-2**.

1.3.3 LW S1A-S6A Extraction Plan Context

The LW S1A-S6A Extraction Plan is part of the Tahmoor Coal Environmental Management Structure, as illustrated in **Figure 1-3**.

As part of the LW S1A-S6A Extraction Plan, a set of management plans was prepared to manage particular environment or built features with the LW S1A-S6A Study Area, which consisted of the following:

- Water Management Plan;
- Land Management Plan;
- Biodiversity Management Plan;
- Heritage Management Plan;
- Built Features Management Plan, with a number of sub-plans to manage potential environmental consequences to infrastructure and specific building structures as a result of secondary extraction; and
- Public Safety Management Plan.

The overall framework for subsidence monitoring and management of impacts of the LW S1A-S6A Extraction Plan is provided in the relevant Subsidence Monitoring Programs. Monitoring of environmental and built features has been completed by Tahmoor Coal in accordance with management plans listed above.

It is noted that the management requirements for public safety are covered in the Built Features Management Plan and the Land Management Plan.

Table 1-2 Monitoring and Reports Reviewed for this Reporting Period

Management Plan	Aspect	Feature	Monitoring Completed By	Monitoring Reported by	Monitoring Reports Completed during this Reporting Period	Section Discussed	Reference
Subsidence Monitoring Program	Subsidence	General subsidence	• SMEC • Building Inspection Services & Tahmoor Coal	• Mine Subsidence Engineering Consultants (MSEC)	• Weekly reports during mining	Section 3.1	Appendix A (referenced reports only)
Water Management Plan	Surface Water	Streamflow Pool water level Stream water quality	• ALS • SMEC	• ATC Williams	• Report for 1 July 2024 to 31 December 2024	Sections 3.2.1, 3.2.4	Appendix B
		Physical features and natural behaviour of pools and reaches Morphology and channel stability	• ENRS	• ENRS	• Monthly and fortnightly reports during mining	Sections 3.2.2, 3.2.3	Available on request
	Groundwater	Groundwater quality Groundwater bore level at open standpipes and private bores Shallow groundwater pressures Deep groundwater pressures	• CES	• SLR	• Report for 1 July 2024 to 31 December 2024	Section 3.3	Appendix C
		Groundwater level and quality at Thirlmere Lakes	• NSW Government				
		Groundwater Inflow	• Tahmoor Coal				

Management Plan	Aspect	Feature	Monitoring Completed By	Monitoring Reported by	Monitoring Reports Completed during this Reporting Period	Section Discussed	Reference
Land Management Plan	Landscape	Cliffs Natural steep slopes Farm dams	• Douglas Partners	• Douglas Partners	• Geotechnical reports during mining (monthly)	Sections 3.4.1, 3.4.2, 3.4.3	Appendix D
	Agricultural Land	Agricultural Land	• SMEC • BIS/Tahmoor Coal	• MSEC	• Weekly inspections along local roads – completed as part of roads survey	Section 3.4.4	Appendix A (referenced report only)
			• SLR	• SLR	• Visual inspections at the completion of LW S3A (December 2024)	Section 3.4.4	Available on request
Biodiversity Management Plan	Aquatic Ecology	Macroinvertebrates	• Stantec	• Stantec	• Aquatic Ecology Monitoring Report for Spring 2024 (August 2025)	Section 3.5.1	Appendix E
	Terrestrial Ecology	Amphibians Riparian vegetation Threatened flora and fauna Threatened Ecological Communities	• Stantec	• Stantec	• Terrestrial Ecology Monitoring Report for Spring 2024 (August 2025)	Section 3.5.2	Available on request
Heritage Management Plan	Aboriginal heritage	Teatree Hollow 2013.1	• SMEC	• MSEC	• Weekly reports during mining	Section 3.6.1	Appendix A (referenced report only)
			• Tahmoor Coal • Douglas Partners	• Tahmoor Coal • Douglas Partners	• Monthly inspection and reporting (alternate fortnights) during period of active subsidence for LW S1A, S2A, S3A and S4A	Section 3.6.1	Available on request
			• EMM	• EMM	• Visual inspection at the completion of LW S3A (December 2024)	Section 3.6.1	Available on request

Management Plan	Aspect	Feature	Monitoring Completed By	Monitoring Reported by	Monitoring Reports Completed during this Reporting Period	Section Discussed	Reference
Heritage Management Plan	Historical heritage	Great Southern Road (partial)	• SMEC • BIS/Tahmoor Coal	• MSEC	• Weekly reports during mining – not required during this reporting period	Sections 3.6.2, 3.7.2	Not required
		Picton Weir	• SMEC • BIS/Tahmoor Coal	• MSEC	• Weekly reports during mining – not required during this reporting period	Sections 3.6.2, 3.7.13	Not required
		Bargo Cemetery	• SMEC • BIS/Tahmoor Coal	• MSEC	• Weekly reports during mining – not required during this reporting period	Sections 3.6.2, 3.7.9	Not required
			• EMM	• EMM	• Visual inspections at the completion of LW S6A – not required during this reporting period	Not required	Not required
		Wirrimbirra Sanctuary (Australian Wildlife Sanctuary)	• SMEC	• MSEC	• AWS Subsidence Status Reports (weekly during active subsidence)	Sections 3.6.2, 3.7.12	Appendix H (referenced only)
			• EMM	• EMM	• Visual inspections at the completion of LW S5A – not required during this reporting period	Not required	Not required
		Tahmoor Colliery (Tahmoor Mine Site)	• SMEC • BIS/Tahmoor Coal	• MSEC	• Tahmoor Mine Site Status Reports (weekly during active subsidence)	Sections 3.6.2, 3.7.11	Appendix I (referenced only)
			• Tahmoor Coal	• Tahmoor Coal • EMM	• Tahmoor Mine Site Photo Reports (weekly during active subsidence)	Sections 3.6.2, 3.7.11	Not required
		Bargo Railway Bridge North (Wellers Road Overbridge)	• SMEC • Southern rail Services • Bloor Rail • Newcastle Geotech	• MSEC	• MSR Weekly Status Reports (weekly during active subsidence)	Sections 3.6.2, 3.7.1	Appendix G (referenced report only)
			• EMM	• EMM	• Visual inspections at the completion of LW S6A – not required during this reporting period	Not required	Not required

Management Plan	Aspect	Feature	Monitoring Completed By	Monitoring Reported by	Monitoring Reports Completed during this Reporting Period	Section Discussed	Reference
Heritage Management Plan	Historical heritage	Bargo Railway Viaduct	• SMEC • Southern rail Services • Bloor Rail • Newcastle Geotech	• MSEC	• MSR Weekly Status Reports (weekly during active subsidence)	Sections 3.6.2, 3.7.1	Appendix G (referenced report only)
			• EMM	• EMM	• Visual inspections at the completion of LW S6A – not required during this reporting period	Not required	Not required
Built Features Management Plan	Built Features	Local roads, bridges and culverts	• SMEC • BIS / Tahmoor Coal	• MSEC	• Weekly reports during mining	Section 3.7.2	Appendix A (referenced report only)
		Potable Water Infrastructure				Section 3.7.3	
		Sewerage Infrastructure				Section 3.7.4	
		Gas Infrastructure				Section 3.7.5	
		Electricity Infrastructure				Section 3.7.6	
		Telecommunications Infrastructure				Section 3.7.7	
		Residential structures				Section 3.7.8	
		Structures for public amenity, commercial, industrial and agricultural purposes				Section 3.7 (various)	
		Picton Weir				Section 3.7.13	

Management Plan	Aspect	Feature	Monitoring Completed By	Monitoring Reported by	Monitoring Reports Completed during this Reporting Period	Section Discussed	Reference
Built Features Management Plan	Built Features	Main Southern Railway (MSR)	• SMEC • Southern rail Services • Bloor Rail • Newcastle Geotech	• MSEC	• MSR Weekly Status Reports (weekly during active subsidence)	Sections 3.6.2, 3.7.1	Appendix G (referenced report only)
		Wollondilly Anglican College (WAC)	• SMEC	• MSEC	• Wollondilly Anglican College Status Report (weekly during active subsidence)	Section 3.7.10	Available on request
		Tahmoor Mine Site	• SMEC • BIS/Tahmoor Coal	• MSEC	• Tahmoor Mine Site Status Reports (weekly during active subsidence)	Sections 3.6.2, 3.7.11	Appendix I (referenced reports only)
			• Douglas Partners	• Douglas Partners	• Tahmoor Mine Ponds and Embankment Reports (monthly during active subsidence)	Section 3.7.11	Available on request
			• Tahmoor Coal	• Tahmoor Coal	• Mine Site Photo Reports (weekly during active subsidence)	Sections 3.6.2, 3.7.11	Appendix I (referenced reports only)
		Australian Wildlife Sanctuary (AWS)	• SMEC	• MSEC	• AWS Subsidence Status Reports (weekly during active subsidence)	Sections 3.6.2, 3.7.12	Appendix H (referenced reports only)
		Bargo Petroleum	• SMEC	• MSEC	• Petrol Station Status Report (weekly during active subsidence)	Section 3.7.14	Available on request
		Tahmoor Garden Centre	• SMEC	• MSEC	• Tahmoor Garden Centre Status Report (weekly during active subsidence)	Section 3.7.16	Appendix J (referenced reports only)

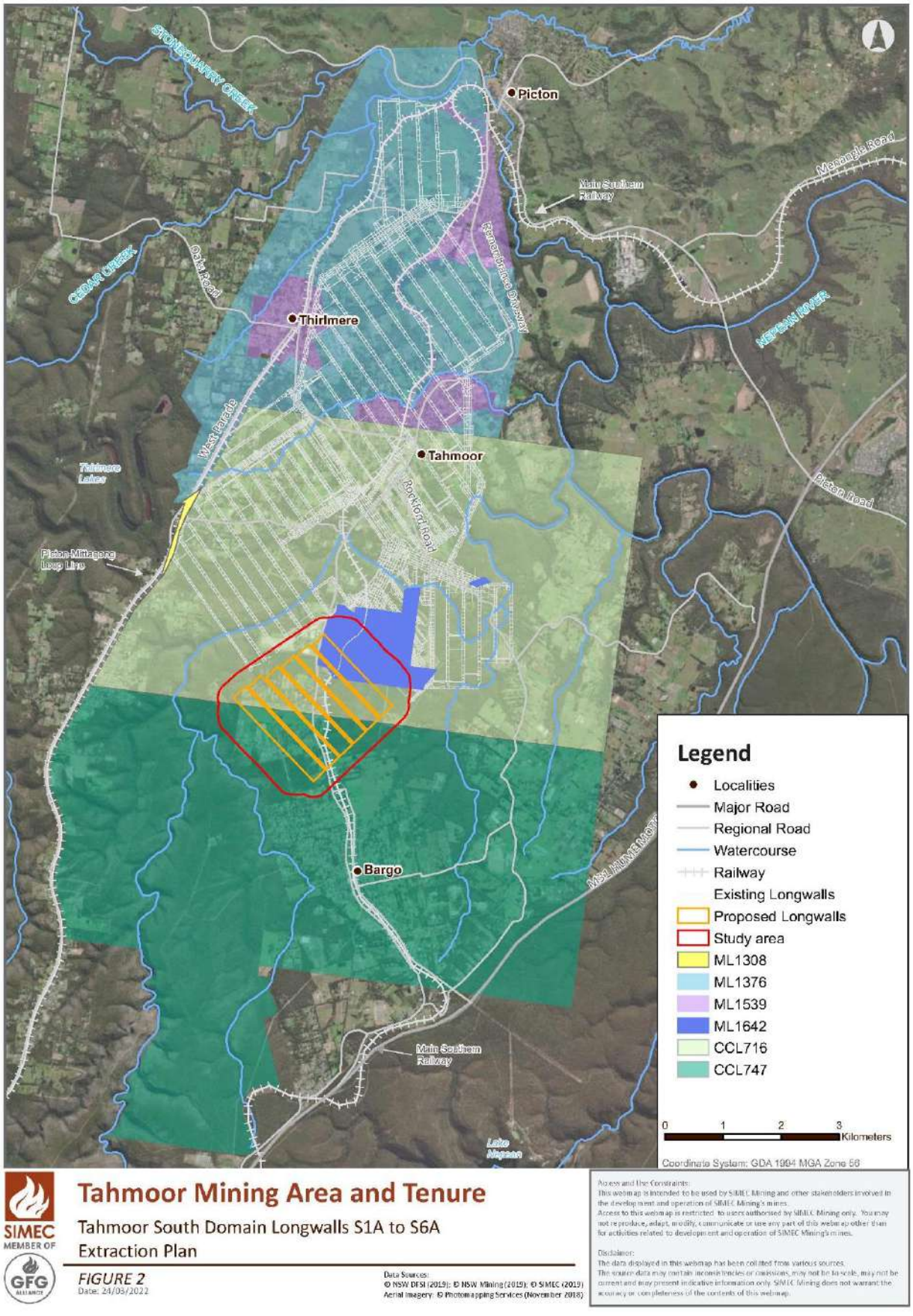

Figure 1-1 Tahmoor Mine Area and Tenure (source: LW S1A-S6A Extraction Plan)

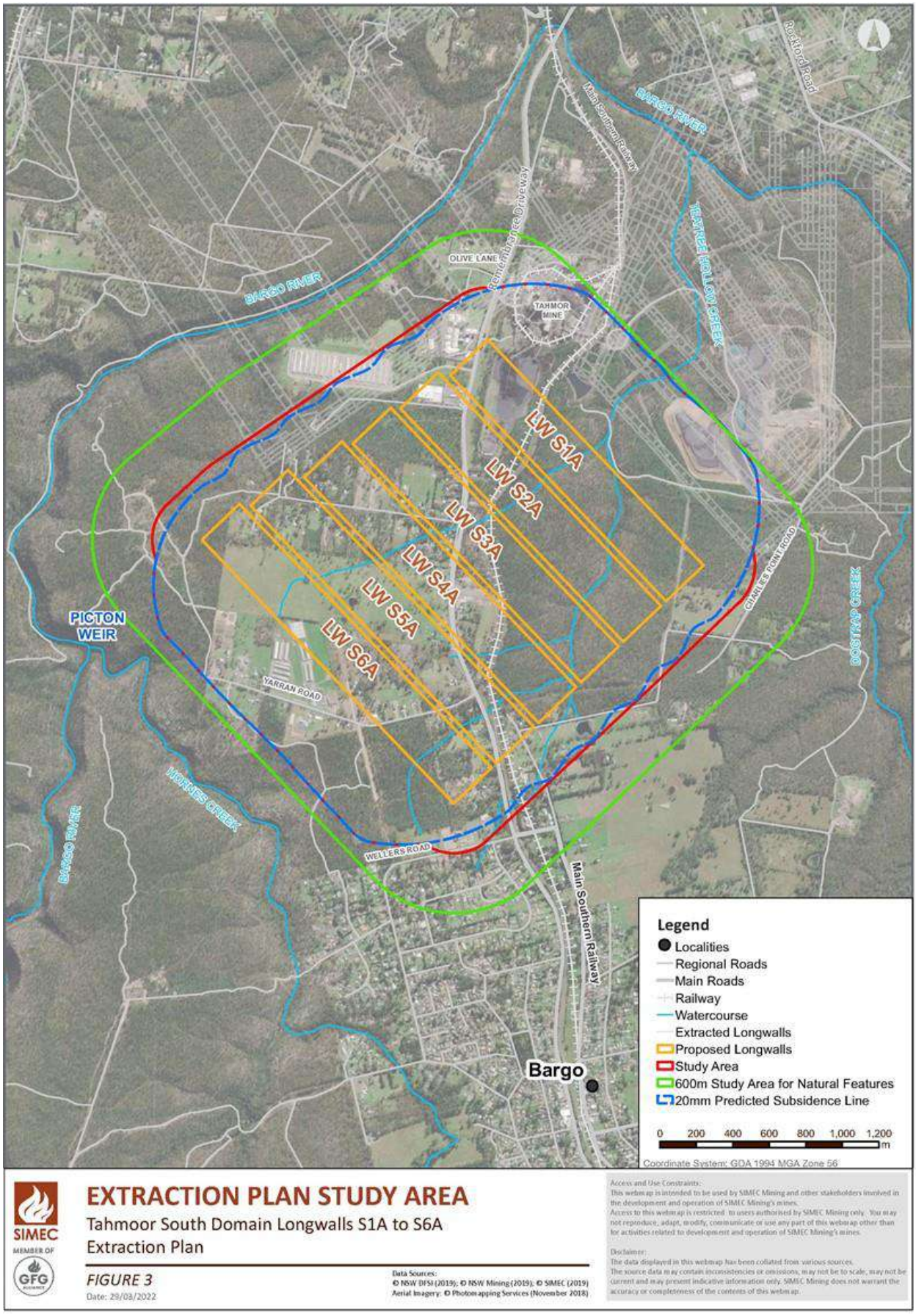

Figure 1-2 LW S1A-S6A Extraction Plan Study Area (source: LW S1A-S6A Extraction Plan)

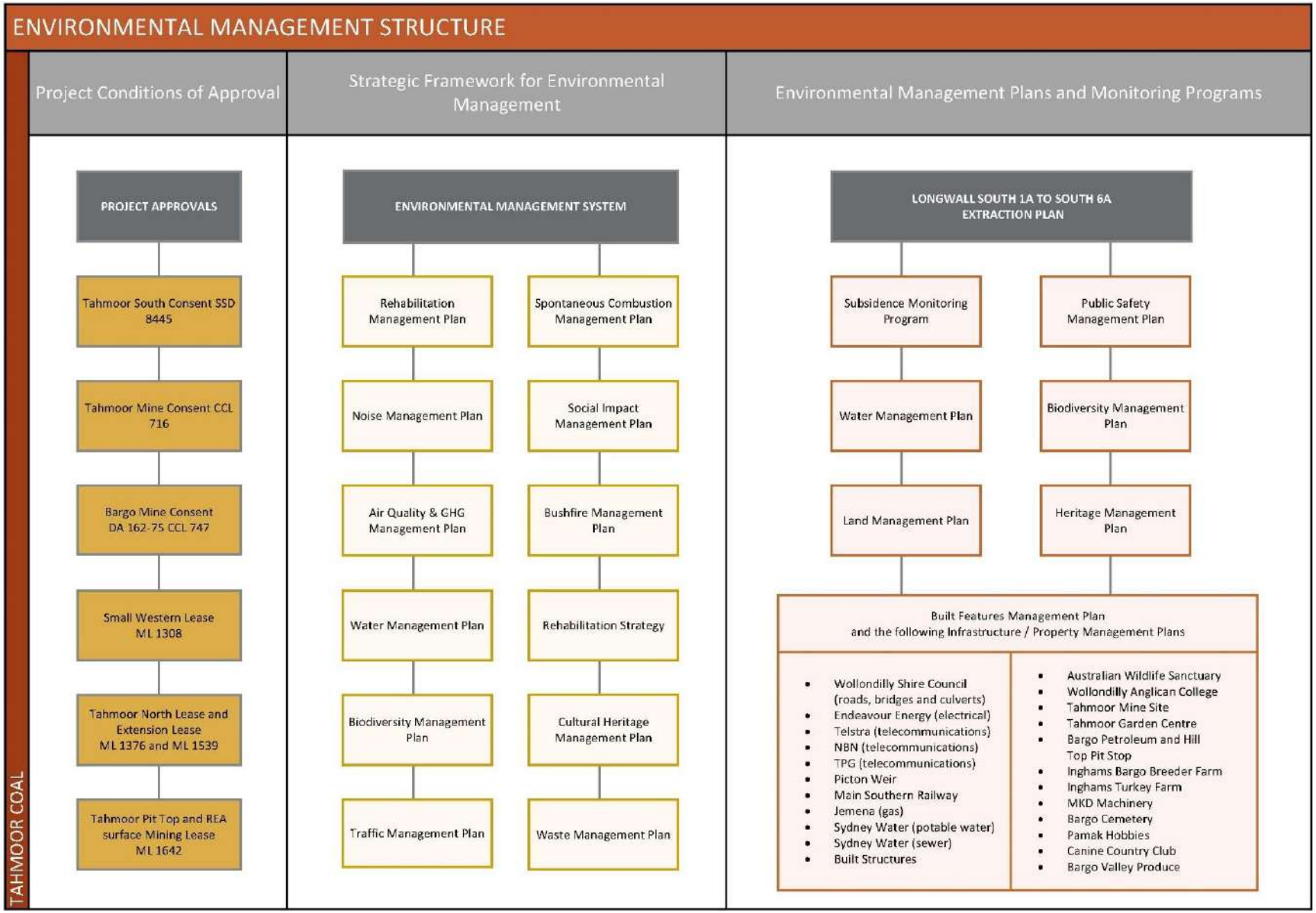

Figure 1-3 Overview of Environmental Management Structure for Tahmoor Coal (source: LW S1A-S6A Extraction Plan)

2 Overview of TARP Triggers

2.1 Summary of TARP Triggers

Table 2-1 provides a summary of monitoring results for TARPS. A full list of TARPs for environmental features that are applicable is provided in Appendix B of the LW S1A-S6A Extraction Plan.

A comprehensive discussion of TARP triggers and a summary of actions and responses for each trigger, as well as the progress and success of any remediation actions, is provided in **Section 3.**

Table 2-1 Summary of TARP Triggers for July to December 2024

Management Plan	TARP Reference / Sub-Management Plan	TARP Description	July 2024	August 2024	September 2024	October 2024	November 2024	December 2024
Water Management Plan	WMP1	Stream Water Quality for all Watercourses within the Subsidence Area	Exceedance of an SSGV did not occur or occurred for less than three consecutive months.	LEVEL 1 TRIGGERED[1] Exceedance of an SSGV occurs at a given potential impact site in three consecutive months and the same has not occurred at the reference site(s) occurred at TT13 (Dissolved Zinc).	Exceedance of an SSGV did not occur or occurred for less than three consecutive months.	Exceedance of an SSGV did not occur or occurred for less than three consecutive months.	Exceedance of an SSGV did not occur or occurred for less than three consecutive months.	Exceedance of an SSGV did not occur or occurred for less than three consecutive months.
	WMP2	Stream Water Quality for other Watercourses (Bargo River and Hornes Creek)	Exceedance of an SSGV did not occur or occurred for less than three consecutive months.	Exceedance of an SSGV did not occur or occurred for less than three consecutive months.	Exceedance of an SSGV did not occur or occurred for less than three consecutive months.	Exceedance of an SSGV did not occur or occurred for less than three consecutive months.	Exceedance of an SSGV did not occur or occurred for less than three consecutive months.	Exceedance of an SSGV did not occur or occurred for less than three consecutive months.
	WMP3	Pool Water Level for all Watercourses within the Subsidence Area	LEVEL 2 TRIGGERED[2] The recorded water level declined atypically below the recorded baseline minimum level for less than one month (as a consecutive period) at TT2 (22 July-14 August), TT3 (3-4 July, 5-7 2024), TT12 (22-27 July, 29 July-13 August).	LEVEL 2 TRIGGERED[2] The recorded water level declined atypically below the recorded baseline minimum level for less than one month (as a consecutive period) at TT2 (22 July-14 August), TT12 (29 July-13 August).	LEVEL 2 TRIGGERED[2] The recorded water level declined atypically below the recorded baseline minimum level for less than one month (as a consecutive period) at TT7 (17-29 September 20024), TT9 (9-26 September 2024).	LEVEL 2 TRIGGERED[2] The recorded water level declined atypically below the recorded baseline minimum level for less than one month (as a consecutive period) at TT7 (1-14 October 2024), TT9 (7-14 October, 26 October-12 November 2024).	LEVEL 2 TRIGGERED[2] The recorded water level declined atypically below the recorded baseline minimum level for less than one month (as a consecutive period) at TT9 (26 October-12 November, 22 November-29 November 2024).	LEVEL 2 TRIGGERED[2] The recorded water level declined atypically below the recorded baseline minimum level for less than one month (as a consecutive period) at TT2 (4-6 December 2024), TT3 (5-7 and 9-31 December 2024), TT7 (27-31 December 2024), TT9 (18-31 December 2024), TT12 (9-31 December 2024).
			LEVEL 3 TRIGGERED[3] The recorded water level declined atypically for greater than one month (as a consecutive period) at TT3 (14 July -29 November 2024), TT13 (30 July-30 November 2024)	LEVEL 3 TRIGGERED[3] The recorded water level declined atypically for greater than one month (as a consecutive period) at TT2 (30 August-29 November 2024), TT3 (14 July-29 November 2024), TT12 (18 August-29 November 2024), TT13 (30 July-30 November 2024).	LEVEL 3 TRIGGERED[3] The recorded water level declined atypically for greater than one month (as a consecutive period) at TT2 (30 August-29 November 2024), TT3 (14 July-29 November 2024), TT12 (18 August-29 November 2024), TT13 (30 July-30 November 2024).	LEVEL 3 TRIGGERED[3] The recorded water level declined atypically for greater than one month (as a consecutive period) at TT2 (30 August-29 November 2024), TT3 (14 July-29 November 2024), TT7 (30 October-29 November 2024), TT12 (18 August-29 November 2024), TT13 (30 July-30 November 2024).	LEVEL 3 TRIGGERED[3] The recorded water level declined atypically for greater than one month (as a consecutive period) at TT2 (30 August-29 November 2024), TT3 (14 July-29 November 2024), TT7 (30 October-29 November 2024), TT12 (18 August-29 November 2024), TT13 (30 July-30 November 2024).	LEVEL 3 TRIGGERED[3] The recorded water level declined atypically for greater than one month (as a consecutive period) at TT2 (9-31 December 2024), TT13 (13-31 December 2024).
	WMP4	Pool Water Level for other Watercourses (Bargo River and Hornes Creek)	The recorded water level did not decline below the recorded baseline minimum level (for more than one 24 hour period for automated pool water level).	The recorded water level did not decline below the recorded baseline minimum level (for more than one 24 hour period for automated pool water level).	The recorded water level did not decline below the recorded baseline minimum level (for more than one 24 hour period for automated pool water level).	The recorded water level did not decline below the recorded baseline minimum level (for more than one 24 hour period for automated pool water level).	The recorded water level did not decline below the recorded baseline minimum level (for more than one 24 hour period for automated pool water level).	The recorded water level did not decline below the recorded baseline minimum level (for more than one 24 hour period for automated pool water level).
	WMP5	Physical Features and Natural Behaviour of Watercourses within the Subsidence Area	LEVEL 3 TRIGGERED[6] Visually observed anomalous change observed for three consecutive months at monitoring sites TT2, TT3, TT11, TT12.	LEVEL 1 TRIGGERED[4] Visually observed anomalous change observed for one month at monitoring site TT13.	LEVEL 2 TRIGGERED[5] Visually observed anomalous change observed for two consecutive months at monitoring site TT13.	LEVEL 1 TRIGGERED[4] Visually observed anomalous change observed for one month at monitoring sites TT9, TT10 and TT15.	LEVEL 1 TRIGGERED[4] Visually observed anomalous change observed for one month at monitoring site TT7. LEVEL 2 TRIGGERED[5] Visually observed anomalous change observed for two consecutive months at monitoring sites TT9, TT10 and TT15.	LEVEL 2 TRIGGERED[5] Visually observed anomalous change observed for two consecutive months at monitoring sites TT10 and TT15.
				LEVEL 3 TRIGGERED[6] Visually observed anomalous change observed for three consecutive months at monitoring sites TT2, TT3, TT11, TT12.	LEVEL 3 TRIGGERED[6] Visually observed anomalous change observed for three consecutive months at monitoring sites TT2, TT3, TT11, TT12.	LEVEL 3 TRIGGERED[6] Visually observed anomalous change observed for three consecutive months at monitoring sites TT2, TT3, TT11, TT12 and TT13.	LEVEL 3 TRIGGERED[6] Visually observed anomalous change observed for three consecutive months at monitoring sites TT2, TT3, TT11, TT12 and TT13.	LEVEL 3 TRIGGERED[6] Visually observed anomalous change observed for three consecutive months at monitoring sites TT2, TT3, TT9, TT11, TT12.

Management Plan	TARP Reference / Sub-Management Plan	TARP Description	July 2024	August 2024	September 2024	October 2024	November 2024	December 2024
	WMP6	Physical Features and Natural Behaviour of Pools for other Watercourses (Bargo River and Hornes Creek)	No observed impacts to pool water level, overland connected flow, iron staining, gas release or turbidity – as compared with baseline conditions.	No observed impacts to pool water level, overland connected flow, iron staining, gas release or turbidity – as compared with baseline conditions.	No observed impacts to pool water level, overland connected flow, iron staining, gas release or turbidity – as compared with baseline conditions.	No observed impacts to pool water level, overland connected flow, iron staining, gas release or turbidity – as compared with baseline conditions.	No observed impacts to pool water level, overland connected flow, iron staining, gas release or turbidity – as compared with baseline conditions.	No observed impacts to pool water level, overland connected flow, iron staining, gas release or turbidity – as compared with baseline conditions.
	WMP7	Channel Stability, Sedimentation and Erosion	LEVEL 1 TRIGGERED[7] Visually observed minor increase in knickpoint development and/or minor erosion and sedimentation of headwater streams for K57.	LEVEL 1 TRIGGERED[7] Visually observed minor increase in knickpoint development and/or minor erosion and sedimentation of headwater streams for K57.	LEVEL 1 TRIGGERED[7] Visually observed minor increase in knickpoint development and/or minor erosion and sedimentation of headwater streams for K57.	LEVEL 2 TRIGGERED[8] Visually observed moderate increased in knickpoint development noted at knickpoint K64.	LEVEL 2 TRIGGERED[8] Visually observed moderate increased in knickpoint development noted at knickpoint K64.	LEVEL 2 TRIGGERED[7] Visually observed moderate increased in knickpoint development noted at knickpoint K64.
			LEVEL 2 TRIGGERED[8] Visually observed moderate increased in knickpoint development noted at knickpoint K64.	LEVEL 2 TRIGGERED[8] Visually observed moderate increased in knickpoint development noted at knickpoint K64.	LEVEL 2 TRIGGERED[8] Visually observed moderate increased in knickpoint development noted at knickpoint K64.			
	WMP8	Shallow Groundwater Level (Open Standpipes and Private Bores)	LEVEL 1 TRIGGERED[9] Greater than 2 m water level reduction for a period of 6 months at P53A, P53B, P55A, GW104659, GW109257.	LEVEL 1 TRIGGERED[9] Greater than 2 m water level reduction for a period of 6 months at P53A, P53B, P55A, GW104659, GW109257.	LEVEL 1 TRIGGERED[9] Greater than 2 m water level reduction for a period of 6 months at P53A, P53B, P55A, P56B, GW104659, GW109257.	LEVEL 1 TRIGGERED[9] Greater than 2 m water level reduction for a period of 6 months at P53A, P53B, P55A, GW104659, GW109257.	LEVEL 1 TRIGGERED[9] Greater than 2 m water level reduction for a period of 6 months at P53A, P53B, P55A, GW104659, GW109257.	LEVEL 1 TRIGGERED[9] Greater than 2 m water level reduction for a period of 6 months at P51B, P53A, P53B, P55A, GW104659, GW109257.
			LEVEL 2 TRIGGERED[10] Water level reduction below the average of 2 m water level reduction and maximum modelled drawdown for a period of 6 months at P53C, P55C and P56C.	LEVEL 2 TRIGGERED[10] Water level reduction below the average of 2 m water level reduction and maximum modelled drawdown for a period of 6 months at P53C, P55C and P56C.	LEVEL 2 TRIGGERED[10] Water level reduction below the average of 2 m water level reduction and maximum modelled drawdown for a period of 6 months at P53C, P55C and P56C.	LEVEL 2 TRIGGERED[10] Water level reduction below the average of 2 m water level reduction and maximum modelled drawdown for a period of 6 months at P53C, P55C	LEVEL 2 TRIGGERED[10] Water level reduction below the average of 2 m water level reduction and maximum modelled drawdown for a period of 6 months at P53C and P55C	LEVEL 2 TRIGGERED[10] Water level reduction below the average of 2 m water level reduction and maximum modelled drawdown for a period of 6 months at P53C.
			LEVEL 3 TRIGGERED[11] Water level reduction below the maximum modelled drawdown for a period of 6 months at P55B.	LEVEL 3 TRIGGERED[11] Water level reduction below the maximum modelled drawdown for a period of 6 months at P55B.	LEVEL 3 TRIGGERED[11] Water level reduction below the maximum modelled drawdown for a period of 6 months at P55B.	LEVEL 3 TRIGGERED[11] Water level reduction below the maximum modelled drawdown for a period of 6 months at P55B.	LEVEL 3 TRIGGERED[11] Water level reduction below the maximum modelled drawdown for a period of 6 months at P55B.	LEVEL 3 TRIGGERED[11] Water level reduction below the maximum modelled drawdown for a period of 6 months at P55B and P55C
	WMP9	Shallow Groundwater Pressure (VWP Sensors < 200 m Depth) – original TARP	LEVEL 1 TRIGGERED[12] Greater than 5 m water level reduction in VWP intakes for a period of greater than six months at TBC032 (BHCS-181m) and TBC032 (BGSS-200m).	LEVEL 1 TRIGGERED[12] Greater than 5 m water level reduction in VWP intakes for a period of greater than six months at TBC032 (BHCS-181m) and TBC032 (BGSS-200m).	LEVEL 1 TRIGGERED[12] Greater than 5 m water level reduction in VWP intakes for a period of greater than six months at TBC032 (BHCS-181m) and TBC032 (BGSS-200m).	LEVEL 1 TRIGGERED[12] Greater than 5 m water level reduction in VWP intakes for a period of greater than six months at TBC032 (BHCS-181m) and TBC032 (BGSS-200m).	LEVEL 1 TRIGGERED[12] Greater than 5 m water level reduction in VWP intakes for a period of greater than six months at TBC027 (HBSS-95m), TBC032 (BHCS-181m) and TBC032 (BGSS-200m).	LEVEL 1 TRIGGERED[12] Greater than 5 m water level reduction in VWP intakes for a period of greater than six months at TBC027 (HBSS-95m) and TBC032 (BGSS-200m).
			LEVEL 3 TRIGGERED[14] Water level reductions greater than the maximum modelled drawdown following commencement of extraction for a period of greater than six months and the reduction in water level is determined not to be controlled by climatic or external anthropogenic factors for TBC032 (HBSS-95m) and TBC032 (HBSS-131m).	LEVEL 3 TRIGGERED[14] Water level reductions greater than the maximum modelled drawdown following commencement of extraction for a period of greater than six months and the reduction in water level is determined not to be controlled by climatic or external anthropogenic factors for TBC032 (HBSS-95m) and TBC032 (HBSS-131m).	LEVEL 3 TRIGGERED[14] Water level reductions greater than the maximum modelled drawdown following commencement of extraction for a period of greater than six months and the reduction in water level is determined not to be controlled by climatic or external anthropogenic factors for TBC032 (HBSS-95m) and TBC032 (HBSS-131m).	LEVEL 3 TRIGGERED[14] Water level reductions greater than the maximum modelled drawdown following commencement of extraction for a period of greater than six months and the reduction in water level is determined not to be controlled by climatic or external anthropogenic factors for TBC032 (HBSS-95m) and TBC032 (HBSS-131m).	LEVEL 3 TRIGGERED[14] Water level reductions greater than the maximum modelled drawdown following commencement of extraction for a period of greater than six months and the reduction in water level is determined not to be controlled by climatic or external anthropogenic factors for TBC032 (HBSS-95m) and TBC032 (HBSS-131m).	LEVEL 2 TRIGGERED[13] Water level reduction declines below the calculated Level 2 trigger following the commencement of extraction for a period of greater than 6 months and the reduction in water level is determined not to be controlled by climatic or external anthropogenic factors for TBC032 (BHCS-181m)
								LEVEL 3 TRIGGERED[14] Water level reductions greater than the maximum modelled drawdown following commencement of extraction for a period of greater than six months and the reduction in water level is

Management Plan	TARP Reference / Sub-Management Plan	TARP Description	July 2024	August 2024	September 2024	October 2024	November 2024	December 2024
								determined not to be controlled by climatic or external anthropogenic factors for TBC032 (HBSS-95m) and TBC032 (HBSS-131m).
	WMP10	Groundwater Level / Pressure Deep VWPs (> 200 m Depth excluding Monitoring the Bulli Coal Seam)	No observed exceedance of modelled impacts to predicted drawdown by greater than 30 metres, or exceedance of the modelled predicted drawdown by greater than 30 metres occurred for less than three consecutive months.	No observed exceedance of modelled impacts to predicted drawdown by greater than 30 metres, or exceedance of the modelled predicted drawdown by greater than 30 metres occurred for less than three consecutive months.	No observed exceedance of modelled impacts to predicted drawdown by greater than 30 metres, or exceedance of the modelled predicted drawdown by greater than 30 metres occurred for less than three consecutive months.	No observed exceedance of modelled impacts to predicted drawdown by greater than 30 metres, or exceedance of the modelled predicted drawdown by greater than 30 metres occurred for less than three consecutive months.	No observed exceedance of modelled impacts to predicted drawdown by greater than 30 metres, or exceedance of the modelled predicted drawdown by greater than 30 metres occurred for less than three consecutive months.	No observed exceedance of modelled impacts to predicted drawdown by greater than 30 metres, or exceedance of the modelled predicted drawdown by greater than 30 metres occurred for less than three consecutive months.
	WMP11	Groundwater Quality (Open Standpipes and Private Bores)	LEVEL 2 TRIGGERED[15] Observed salinity and/or metals or pH outside of defined trigger levels for 3 consecutive months or more. The effect persists after a significant rainfall recharge event and the change in water quality is determined not to be controlled by climatic or external anthropogenic factors for REA4, P53B and P53C.	LEVEL 2 TRIGGERED[15] Observed salinity and/or metals or pH outside of defined trigger levels for 3 consecutive months or more. The effect persists after a significant rainfall recharge event and the change in water quality is determined not to be controlled by climatic or external anthropogenic factors for REA4, P53B and P53C.	LEVEL 2 TRIGGERED[15] Observed salinity and/or metals or pH outside of defined trigger levels for 3 consecutive months or more. The effect persists after a significant rainfall recharge event and the change in water quality is determined not to be controlled by climatic or external anthropogenic factors for REA4, P53B and P53C.	LEVEL 2 TRIGGERED[15] Observed salinity and/or metals or pH outside of defined trigger levels for 3 consecutive months or more. The effect persists after a significant rainfall recharge event and the change in water quality is determined not to be controlled by climatic or external anthropogenic factors for REA4, P53B and P53C.	LEVEL 2 TRIGGERED[15] Observed salinity and/or metals or pH outside of defined trigger levels for 3 consecutive months or more. The effect persists after a significant rainfall recharge event and the change in water quality is determined not to be controlled by climatic or external anthropogenic factors for REA4, P53B and P53C.	LEVEL 2 TRIGGERED[15] Observed salinity and/or metals or pH outside of defined trigger levels for 3 consecutive months or more. The effect persists after a significant rainfall recharge event and the change in water quality is determined not to be controlled by climatic or external anthropogenic factors for REA4, P53B and P53C..
	WMP12	Groundwater – Surface Water Interaction	LEVEL 1 TRIGGERED[16] Observed (or inferred where not immediately neighbouring a surface water site) groundwater levels at surface water monitoring site decline below Level 1 (in TARP WMP8) at P53A, P53B and P55A	LEVEL 1 TRIGGERED[16] Observed (or inferred where not immediately neighbouring a surface water site) groundwater levels at surface water monitoring site decline below Level 1 (in TARP WMP8) at P53A, P53B and P55A.	LEVEL 1 TRIGGERED[16] Observed (or inferred where not immediately neighbouring a surface water site) groundwater levels at surface water monitoring site decline below Level 1 (in TARP WMP8) at P53A, P53B, P55A and P56B	LEVEL 1 TRIGGERED[16] Observed (or inferred where not immediately neighbouring a surface water site) groundwater levels at surface water monitoring site decline below Level 1 (in TARP WMP8) at P53A, P53B, P55A.	LEVEL 1 TRIGGERED[16] Observed (or inferred where not immediately neighbouring a surface water site) groundwater levels at surface water monitoring site decline below Level 1 (in TARP WMP8) at P53A, P53B and P55A.	LEVEL 1 TRIGGERED[16] Observed (or inferred where not immediately neighbouring a surface water site) groundwater levels at surface water monitoring site decline below Level 1 (in TARP WMP8) at P53A, P53B, P55A and P51B
			LEVEL 2 TRIGGERED[17] Observed (or inferred where not immediately neighbouring a surface water site) groundwater levels at surface water monitoring site decline below Level 2 (in TARP WMP8) at P53C, P55C and P56C.	LEVEL 2 TRIGGERED[17] Observed (or inferred where not immediately neighbouring a surface water site) groundwater levels at surface water monitoring site decline below Level 2 (in TARP WMP8) at P53C, P55C and P56C.	LEVEL 2 TRIGGERED[17] Observed (or inferred where not immediately neighbouring a surface water site) groundwater levels at surface water monitoring site decline below Level 2 (in TARP WMP8) at P53C, P55C and P56C.	LEVEL 2 TRIGGERED[17] Observed (or inferred where not immediately neighbouring a surface water site) groundwater levels at surface water monitoring site decline below Level 2 (in TARP WMP8) at P53C, P55C.	LEVEL 2 TRIGGERED[17] Observed (or inferred where not immediately neighbouring a surface water site) groundwater levels at surface water monitoring site decline below Level 2 (in TARP WMP8) at P53C, P55C.	LEVEL 2 TRIGGERED[17] Observed (or inferred where not immediately neighbouring a surface water site) groundwater levels at surface water monitoring site decline below Level 2 (in TARP WMP8) at P53C, P55C.
			LEVEL 3 TRIGGERED[18] Observed (or inferred where not immediately neighbouring a surface water site) groundwater levels at surface water monitoring site decline below Level 3 (in TARP WMP8) at P55B.	LEVEL 3 TRIGGERED[18] Observed (or inferred where not immediately neighbouring a surface water site) groundwater levels at surface water monitoring site decline below Level 3 (in TARP WMP8) at P55B.	LEVEL 3 TRIGGERED[18] Observed (or inferred where not immediately neighbouring a surface water site) groundwater levels at surface water monitoring site decline below Level 3 (in TARP WMP8) at P55B.	LEVEL 3 TRIGGERED[18] Observed (or inferred where not immediately neighbouring a surface water site) groundwater levels at surface water monitoring site decline below Level 3 (in TARP WMP8) at P55B	LEVEL 3 TRIGGERED[18] Observed (or inferred where not immediately neighbouring a surface water site) groundwater levels at surface water monitoring site decline below Level 3 (in TARP WMP8) at P55B.	LEVEL 3 TRIGGERED[18] Observed (or inferred where not immediately neighbouring a surface water site) groundwater levels at surface water monitoring site decline below Level 3 (in TARP WMP8) at P55B and P55C.
	WMP13	Groundwater Bores Monitoring for Thirlmere Lakes	An assessment under this TARP was not initiated during this month.	An assessment under this TARP was not initiated during this month.	An assessment under this TARP was not initiated during this month.	An assessment under this TARP was not initiated during this month.	An assessment under this TARP was not initiated during this month.	An assessment under this TARP was not initiated during this month.
	LMP1	Cliffs	NA – No monitoring required.	NA – No monitoring required.	NA – No monitoring required.	NA – No monitoring required.	NA – No monitoring required.	NA – No monitoring required.

Management Plan	TARP Reference / Sub-Management Plan	TARP Description	July 2024	August 2024	September 2024	October 2024	November 2024	December 2024
Land Management Plan	LMP2	Natural Steep Slope (excluding Constructed Steep Slopes associated with Roads, Railway and the Tahmoor Mine Site)	No observations of surface cracking, or localised ground bulging, buckling or shearing as a result of mining.	No observations of surface cracking, or localised ground bulging, buckling or shearing as a result of mining.	No observations of surface cracking, or localised ground bulging, buckling or shearing as a result of mining.	No observations of surface cracking, or localised ground bulging, buckling or shearing as a result of mining.	No observations of surface cracking, or localised ground bulging, buckling or shearing as a result of mining.	No observations of surface cracking, or localised ground bulging, buckling or shearing as a result of mining.
	LMP3	Farm Dams	No observations of cracks developing within dam embankments as a result of mining.	No observations of cracks developing within dam embankments as a result of mining.	No observations of cracks developing within dam embankments as a result of mining.	No observations of cracks developing within dam embankments as a result of mining.	LEVEL 1 TRIGGERED[19] Observed seepage from existing erosion rills on dam wall following a rain event	No observations of cracks developing within dam embankments as a result of mining.
	LMP4	Agricultural Land	NA – No monitoring required.	NA – No monitoring required.	NA – No monitoring required.	NA – No monitoring required.	NA – No monitoring required.	No observations of impact to agricultural production or use of land, mining-induced changes to slope on ponding / flooding or increase in soil / tunnel erosion.
Biodiversity Management Plan	BMP1	Aquatic Habitat and Macroinvertebrate Indicators (Stream Health)	NA – No monitoring required.	NA – No monitoring required.	NA – No monitoring required.	NA – No monitoring required.	LEVEL 1 TRIGGERED[20] Visual monitoring indicates a reduction in aquatic pool habitat compared to baseline observations at aquatic ecology monitoring sites TTH13 and BRt6 for two consecutive sampling occasions.	NA – No monitoring required.
			NA – No monitoring required.	NA – No monitoring required.	NA – No monitoring required.	NA – No monitoring required.	LEVEL 2 TRIGGERED[21] Visual monitoring indicates aquatic pool habitat parameters have been impacted by mining at Impact Sites TTHt9 for three consecutive sampling occasions.	NA – No monitoring required.
			NA – No monitoring required.	NA – No monitoring required.	NA – No monitoring required.	NA – No monitoring required.	LEVEL 3 TRIGGERED[22] Visual monitoring indicates a reduction in aquatic pool habitat compared to baseline observations at aquatic ecology monitoring sites TTH16 and TTH17 for four consecutive sampling occasions.	NA – No monitoring required.
	BMP2	Amphibian Populations	NA – No monitoring required.	NA – No monitoring required.	NA – No monitoring required.	NA – No monitoring required.	No mining impacts or environmental consequences observed.	NA – No monitoring required.
	BMP3	Riparian Vegetation	NA – No monitoring required.	NA – No monitoring required.	NA – No monitoring required.	NA – No monitoring required.	No mining impacts or environmental consequences observed.	NA – No monitoring required.
	BMP4	Threatened Species, Threatened Populations and Endangered Ecological Communities	NA – No monitoring required.	NA – No monitoring required.	NA – No monitoring required.	NA – No monitoring required.	No mining impacts or environmental consequences observed.	NA – No monitoring required.
Heritage Management Plan	HMP1	Aboriginal Cultural Heritage Sites – Teatree Hollow 2013.1	No detectable environmental consequences observed.	No detectable environmental consequences observed.	No detectable environmental consequences observed.	No detectable environmental consequences observed.	No detectable environmental consequences observed.	No detectable environmental consequences observed.
	HMP2	Historical Heritage Items - Wirrimbirra Sanctuary (Australian Wildlife Sanctuary) - Bargo Cemetery	NA – No monitoring required.	NA – No monitoring required.	NA – No monitoring required.	NA – No monitoring required.	LEVEL 1 TRIGGERED[23] An environmental consequence of mining was detected at the Tahmoor Mine Site (cracking 1200t raw coal bins unreinforced concrete web).	NA – No monitoring required.

Management Plan	TARP Reference / Sub-Management Plan	TARP Description	July 2024	August 2024	September 2024	October 2024	November 2024	December 2024
		- Bargo Railway Bridge North (Wellers Road Overbridge) - Picton Wier - Tahmoor Colliery (Tahmoor Mine Site) - Bargo Railway Viaduct - Great Southern Road (partial)						
Built Features Management Plan	1. Main Southern Railway Management Plan	Main Southern Railway Infrastructure	No mining impacts observed.	YELLOW TRIGGER[24] Temporary speed restriction on both tracks from 99.5km to 99.8km due to track geometry misalignment	YELLOW TRIGGER[24] Temporary speed restriction on both tracks from 99.5km to 99.8km due to track geometry misalignment	YELLOW TRIGGER[24] Temporary speed restriction on both tracks from 99.5km to 99.8km due to track geometry misalignment	YELLOW TRIGGER[24] Temporary speed restriction on both tracks from 99.5km to 99.8km due to track geometry misalignment	No mining impacts observed.
	2. Wellers Road Overbridge Management Plan	Wellers Road Overbridge	NA – This structure is located outside the active subsidence zone of LW S3A.	NA – This structure is located outside the active subsidence zone of LW S3A.	NA – This structure is located outside the active subsidence zone of LW S3A.	NA – This structure is located outside the active subsidence zone of LW S3A.	NA – This structure is located outside the active subsidence zone of LW S3A.	NA – This structure is located outside the active subsidence zone of LW S3A.
	3. Wollondilly Shire Council Management Plan	Public roads, bridges and culverts	No mining impacts or environmental consequences observed.	No mining impacts or environmental consequences observed.	No mining impacts or environmental consequences observed.	No mining impacts or environmental consequences observed.	No mining impacts or environmental consequences observed.	No mining impacts or environmental consequences observed.
	4. Sydney Water Potable Water Management Plan	Potable Water Infrastructure	No mining impacts or environmental consequences observed.	No mining impacts or environmental consequences observed.	No mining impacts or environmental consequences observed.	No mining impacts or environmental consequences observed.	No mining impacts or environmental consequences observed.	No mining impacts or environmental consequences observed.
	5. Sydney Water Sewer Management Plan	Sewerage Infrastructure	No mining impacts or environmental consequences observed.	No mining impacts or environmental consequences observed.	No mining impacts or environmental consequences observed.	No mining impacts or environmental consequences observed.	No mining impacts or environmental consequences observed.	No mining impacts or environmental consequences observed.
	6. Jemena Management Plan	Gas Infrastructure	No mining impacts or environmental consequences observed.	No mining impacts or environmental consequences observed.	No mining impacts or environmental consequences observed.	No mining impacts or environmental consequences observed.	No mining impacts or environmental consequences observed.	No mining impacts or environmental consequences observed.
	7. Endeavour Energy Management Plan	Electricity Infrastructure	No mining impacts or environmental consequences observed.	No mining impacts or environmental consequences observed.	No mining impacts or environmental consequences observed.	No mining impacts or environmental consequences observed.	No mining impacts or environmental consequences observed.	No mining impacts or environmental consequences observed.
	8. Telecommunications Management Plan	Telecommunications	No mining impacts or environmental consequences observed.	No mining impacts or environmental consequences observed.	TARP TRIGGER – Telstra Direct buried IEN/CAN optical fibre cable [25] Signal loss detected on the Telstra direct buried optical fibre cable	No mining impacts or environmental consequences observed.	No mining impacts or environmental consequences observed.	No mining impacts or environmental consequences observed.
	9. Built Structures Management Plan	Public amenities, private structures	No mining impacts observed.	No mining impacts observed.	No mining impacts observed.	No mining impacts observed.	No mining impacts observed.	No mining impacts observed.
	10. Bargo Cemetery Management Plan	Bargo Cemetery (Heritage Site)	NA – This property is located outside the active subsidence zone of LW S3A.	NA – This property is located outside the active subsidence zone of LW S3A.	NA – This property is located outside the active subsidence zone of LW S3A.	NA – This property is located outside the active subsidence zone of LW S3A.	NA – This property is located outside the active subsidence zone of LW S3A.	NA – This property is located outside the active subsidence zone of LW S3A.
	11. Wollondilly Anglican College Management Plan	Wollondilly Anglican College	NA – No monitoring required.	NA – No monitoring required.	NA – No monitoring required.	No mining impacts observed.	No mining impacts observed.	No mining impacts observed.
	12. Tahmoor Mine Site Management Plan	Tahmoor Mine Site	NA – No monitoring required.	NA – No monitoring required.	NA – No monitoring required.	No mining impacts observed.	TARP TRIGGER – CONCRETE SILO BINS[26] A new crack greater than 0.5mm was detected on the 1200t raw coal bins unreinforced concrete web at the Tahmoor Mine Site.	TARP TRIGGER – CONCRETE SILO BINS[26] A new crack greater than 0.5mm was detected on the 1200t raw coal bins unreinforced concrete web at the Tahmoor Mine Site.

Management Plan	TARP Reference / Sub-Management Plan	TARP Description	July 2024	August 2024	September 2024	October 2024	November 2024	December 2024
	12. Australian Wildlife Sanctuary Management Plan	Australian Wildlife Sanctuary – Natural Features – Impacts Generally Observed	No mining impacts observed.	TARP TRIGGER – Impacts Generally Observed[27] Ground compression on gravel footpath and functionality of animal enclosure gates affected	TARP TRIGGER – Impacts Generally Observed[27] Ground compression on gravel footpath and functionality of animal enclosure gates affected	No mining impacts observed.	NA – No monitoring required.	NA – No monitoring required.
		Australian Wildlife Sanctuary – Natural Features	LEVEL 4 TRIGGERED[28] Reduction in pool water level and fracturing observed in Wirrimbirra Creek.	LEVEL 4 TRIGGERED[28] Reduction in pool water level and fracturing observed in Wirrimbirra Creek.	LEVEL 4 TRIGGERED[28] Reduction in pool water level and fracturing observed in Wirrimbirra Creek.	LEVEL 4 TRIGGERED[28] Reduction in pool water level and fracturing observed in Wirrimbirra Creek.	LEVEL 4 TRIGGERED[28] Reduction in pool water level and fracturing observed in Wirrimbirra Creek.	LEVEL 4 TRIGGERED[28] Reduction in pool water level and fracturing observed in Wirrimbirra Creek.
	14. Picton Weir Management Plan	Picton Weir	NA – This property is located outside the active subsidence zone of LW S3A.	NA – This property is located outside the active subsidence zone of LW S3A.	NA – This property is located outside the active subsidence zone of LW S3A.	NA – This property is located outside the active subsidence zone of LW S3A.	NA – This property is located outside the active subsidence zone of LW S3A.	NA – This property is located outside the active subsidence zone of LW S3A.
	15. 3030 Remembrance Drive Management Plan	Bargo Petroleum	NA – No monitoring required.	NA – No monitoring required.	NA – No monitoring required.	No mining impacts observed.	No mining impacts observed.	No mining impacts observed.
	16. Inghams Bargo Chicken Breeder Production Complex Management Plan	Inghams Bargo Breeder Farm	NA – No monitoring required.	NA – No monitoring required.	NA – No monitoring required.	No mining impacts observed.	No mining impacts observed.	No mining impacts observed.
	17. Inghams Bargo Turkey Farm Management Plan	Inghams Bargo Turkey Farm	NA – This property is located outside the active subsidence zone of LW S3A.	NA – This property is located outside the active subsidence zone of LW S3A.	NA – This property is located outside the active subsidence zone of LW S3A.	NA – This property is located outside the active subsidence zone of LW S3A.	NA – This property is located outside the active subsidence zone of LW S3A.	NA – This property is located outside the active subsidence zone of LW S3A.
	18. Tahmoor Garden Centre Management Plan	Tahmoor Garden Centre	NA – No monitoring required.	NA – No monitoring required.	No mining impacts observed.	TARP TRIGGER – IMPACT OBSERVED GENERALLY[29] Observed damaged of epoxy coating following opening of expansion joint	TARP TRIGGER – IMPACT OBSERVED GENERALLY[29] Observed damaged of epoxy coating following opening of expansion joint	No mining impacts observed.
	19. MKD Machinery Management Plan	MKD Machinery	No mining impacts observed.	No mining impacts observed.	No mining impacts observed.	No mining impacts observed.	NA – No monitoring required.	NA – No monitoring required.
	20. Bargo Valley Produce Management Plan	Bargo Valley Produce	NA – This property is located outside the active subsidence zone of LW S3A.	NA – This property is located outside the active subsidence zone of LW S3A.	NA – This property is located outside the active subsidence zone of LW S3A.	NA – This property is located outside the active subsidence zone of LW S3A.	NA – This property is located outside the active subsidence zone of LW S3A.	NA – This property is located outside the active subsidence zone of LW S3A.
	21. Canine Country Club Management Plan	Canine Country Club	NA – This property is located outside the active subsidence zone of LW S3A.	NA – This property is located outside the active subsidence zone of LW S3A.	NA – This property is located outside the active subsidence zone of LW S3A.	NA – This property is located outside the active subsidence zone of LW S3A.	NA – This property is located outside the active subsidence zone of LW S3A.	NA – This property is located outside the active subsidence zone of LW S3A.

Notes:

NR – Monitoring not required this month.

NA – Monitoring data not available as monitoring not completed this month or reporting not yet available.

[1] TARP WMP3 Level 1 Trigger (LW S1A-S6A Water Management Plan): Exceedance of an SSGV occurs at a given potential impact site in three consecutive months and the same has not occurred at the reference site(s).

[2] TARP WMP3 Level 2 Trigger (LW S1A-S6A Water Management Plan): The recorded water level has declined atypically below the recorded baseline minimum level for less than one month (as a consecutive period) and the same has not occurred at the reference site(s).

[3] TARP WMP3 Level 3 Trigger (LW S1A-S6A Water Management Plan): The recorded water level has declined atypically below the recorded baseline minimum level for greater than one month (as a consecutive period) and the same has not occurred at the reference site(s).

[4] TARP WMP5 Level 1 Trigger (LW S1A-S6A Water Management Plan): Visually observed anomalous change in water level, overland connected flow, iron staining, gas release or turbidity - as compared with baseline conditions - occurs in one month and the same has not occurred at the reference site(s) AND/OR Visual observation of fracturing.

[5] TARP WMP5 Level 2 Trigger (LW S1A-S6A Water Management Plan): Visually observed anomalous change in water level, overland connected flow, iron staining, gas release or turbidity - as compared with baseline conditions - occurs for two consecutive months and the same has not occurred at the reference site(s).

[6] TARP WMP5 Level 3 Trigger (LW S1A-S6A Water Management Plan): Visually observed anomalous change in water level, overland connected flow, iron staining, gas release or turbidity - as compared with baseline conditions - occurs for three consecutive months and the same has not occurred at the reference site(s) AND The change in behaviour has been investigated and confirmed to be related to mining effects.

[7] TARP WMP7 Level 1 Trigger (LW S1A-S6A Water Management Plan): Visually observed minor increase in knickpoint development and/or minor erosion and sedimentation of headwater streams.

[8] TARP WMP7 Level 2 Trigger (LW S1A-S6A Water Management Plan): Visually observed moderate increase in knickpoint development and/or moderate or greater increase in erosion and sedimentation of headwater streams.

[9] TARP WMP8 Level 1 Trigger (LW S1A-S6A Water Management Plan): Greater than 2 m water level reduction for a period of 6 months following the commencement of extraction.

[10] TARP WMP8 Level 2 Trigger (LW S1A-S6A Water Management Plan): Water level declines below the average between the 'maximum modelled drawdown' (Level 3 trigger) and the '2 m drawdown' (Level 1 trigger) for a period of greater than 6 months following the commencement of extraction AND the reduction in water level is determined not to be controlled by climatic or external anthropogenic factors.

[11] TARP WMP8 Level 3 Trigger (LW S1A-S6A Water Management Plan): Water level reduction greater than the maximum modelled drawdown for a period of greater than 6 months following the commencement of extraction AND the reduction in water level is determined not to be controlled by climatic or external anthropogenic factors.

[12] TARP WMP9 Level 1 Trigger (LW S1A-S6A Water Management Plan): Greater than 5 m water level reduction in VWP intakes following the commencement of extraction for a period of greater than six months.

[13] TARP WMP9 Level 2 Trigger (LW S1A-S6A Water Management Plan): Water level declines below the calculated Level 2 trigger following the commencement of extraction for a period of greater than 6 months AND the reduction in water level is determined not to be controlled by climatic or external anthropogenic factors.

[14] TARP WMP9 Level 3 Trigger (LW S1A-S6A Water Management Plan): Water level reduction greater than the maximum modelled drawdown following the commencement of extraction for a period of greater than six months AND the reduction in water level is determined not to be controlled by climatic or external anthropogenic factors.

[15] TARP WMP11 Level 2 Trigger (LW S1A-S6A Water Management Plan): Observed salinity and/or metals or pH outside of defined trigger levels1, for 3 consecutive months or more. The effect persists after a significant rainfall recharge event. And The change in water quality is determined not to be controlled by climatic or external anthropogenic factors.

[16] TARP WMP12 Level 1 Trigger (LW S1A-S6A Water Management Plan): Observed (or inferred where not immediately neighbouring a surface water site) groundwater levels at surface water monitoring site decline below Level 1 (in TARP WMP8) following the commencement of extraction.

[17] TARP WMP12 Level 2 Trigger (LW S1A-S6A Water Management Plan): Observed (or inferred where not immediately neighbouring a surface water site) groundwater levels at surface water monitoring site decline below Level 2 (in TARP WMP8) following the commencement of extraction AND the reduction in water level is determined not to be controlled by climatic or external anthropogenic factor.

[18] TARP WMP12 Level 3 Trigger (LW S1A-S6A Water Management Plan): Inferred groundwater levels at surface water monitoring site decline below Level 3 (in TARP WMP8) following the commencement of extraction AND The reduction in water level is determined not to be controlled by climatic or external anthropogenic factors.

[19] TARP LMP3 Level 1 Trigger (LW S1A-S6A Land Management Plan): Observed seepage from existing erosion rills on dam wall following a rain event.

[20] TARP BMP1 Level 1 Trigger (LW S1A-S6A Biodiversity Management Plan): Visual monitoring indicates reduction in aquatic pool habitat compared to baseline observations at aquatic ecology monitoring sites for two consecutive sampling occasions. OR AUSRIVAS score of Band D recorded for three consecutive sampling occasions at one or more aquatic ecology monitoring site(s).

[21] TARP BMP1 Level 2 Trigger (LW S1A-S6A Biodiversity Management Plan): Visual monitoring indicates reduction in aquatic pool habitat compared to baseline observations at aquatic ecology monitoring sites for three consecutive sampling occasions. OR AUSRIVAS score of Band D recorded for three consecutive sampling occasions at one or more aquatic ecology monitoring site(s).

[22] TARP BMP1 Level 3 Trigger (LW S1A-S6A Biodiversity Management Plan): Visual monitoring indicates reduction in aquatic pool habitat compared to baseline observations at aquatic ecology monitoring sites for four consecutive sampling occasions. OR AUSRIVAS score of Band D recorded for three consecutive sampling occasions at one or more aquatic ecology monitoring site(s).

[23] TARP HMP2 Level 1 Trigger (LW S1A-S6A Heritage Management Plan): Historical heritage site monitoring indicates potential detectable environmental consequences, but with negligible impacts to the heritage value of the heritage site(s).

[24] TARP MSR Yellow Trigger (LWS1A-S6A Built Features Management Plan): Yellow Trigger for temporary speed restriction on both tracks from 99.5km to 99.8km due to track geometry misalignment.

[25] TARP Level Trigger - Telecommunications Management Plan (LWS1A-S6A Built Features Management Plan): Telstra Direct buried IEN/CAN optical fibre cable - Signal loss detected on the Telstra direct buried optical fibre cable.

[26] TARP Level Trigger (Tahmoor Mine Site Management Plan): Concrete silo bins, new cracks > 0.5mm observed.

[27] TARP Level Trigger (Australian Wildlife Sanctuary Management Plan): Impacts observed generally - Ground compression on gravel footpath and functionality of animal enclosure gates affected.

[28] TARP Level Trigger (Australian Wildlife Sanctuary Management Plan): Visually observed reduction in pool water level, drainage or overland connected flow and the above change has not occurred at one of the upstream pools (beyond mining effects).

[29] TARP Level Trigger (Tahmoor Garden Centre Management Plan): Impacts observed generally – Impacts on fire protection services, security services, essential services, access and mobility, finishes and public safety services

3 Summary of Environmental Monitoring Results

3.1 Subsidence Monitoring

During the reporting period, the LW S1A-S6A Subsidence Monitoring Program have been implemented to monitor subsidence impacts within the Study Area. The details of the Subsidence Monitoring Program are illustrated in **Figure 3-1**.

The Subsidence Monitoring Program includes twenty-eight (28) Global Navigation Satellite System (GNSS) units measuring absolute horizontal and vertical positions in real time installed directly above and adjacent to LW S1A-S6A. These include four (4) units above the commencing end and along the centreline of LW S2A, being Sites S05, S06, S26 and S27. In addition, two (2) units are also located above the commencing end of LW S3A, being Sites S09 and S10.

Extraction of LW S3A commenced on 8 May 2024 and was completed on 17 December 2024. Extraction of LW S4A is scheduled to commence in January 2026. This reporting period includes observations noted during the extraction of LW S3A.

Table 3-1 summarises the maximum observed ground movements within the active subsidence zone at the start and end of this reporting period. During the reporting period, a maximum of 1087 mm of vertical subsidence relating to the extraction of LW S3A was recorded at GNSS S26.

Table 3-1 Subsidence Monitoring Observations for LW S3A to end of this Reporting Period (source: MSEC1430 Report R34, Appendix A)

	MSEC1430 LW S3A Subsidence Monitoring Report 34	
Monitoring Period	1 July 2024 to 31 December 2024	
Progress of extraction	LW S3A commenced on 8 May 2024 LW S3A completed extraction 17 December 2024	
Observed Ground Movement Parameters	**Maximum Observed Total**	**Location**
Subsidence (mm)	1087	GNSS S26
Tilt (mm/m)	7.4	Main Southern Railway
Hogging Curvature (km^{-1})	0.34	Main Southern Railway
Sagging Curvature (km^{-1})	-0.20	Main Southern Railway and Remembrance Drive
Tensile Strain (mm/m)	0.7	Remembrance Drive and Caloola Road
Compressive Strain (mm/m)	-2.9	Remembrance Drive

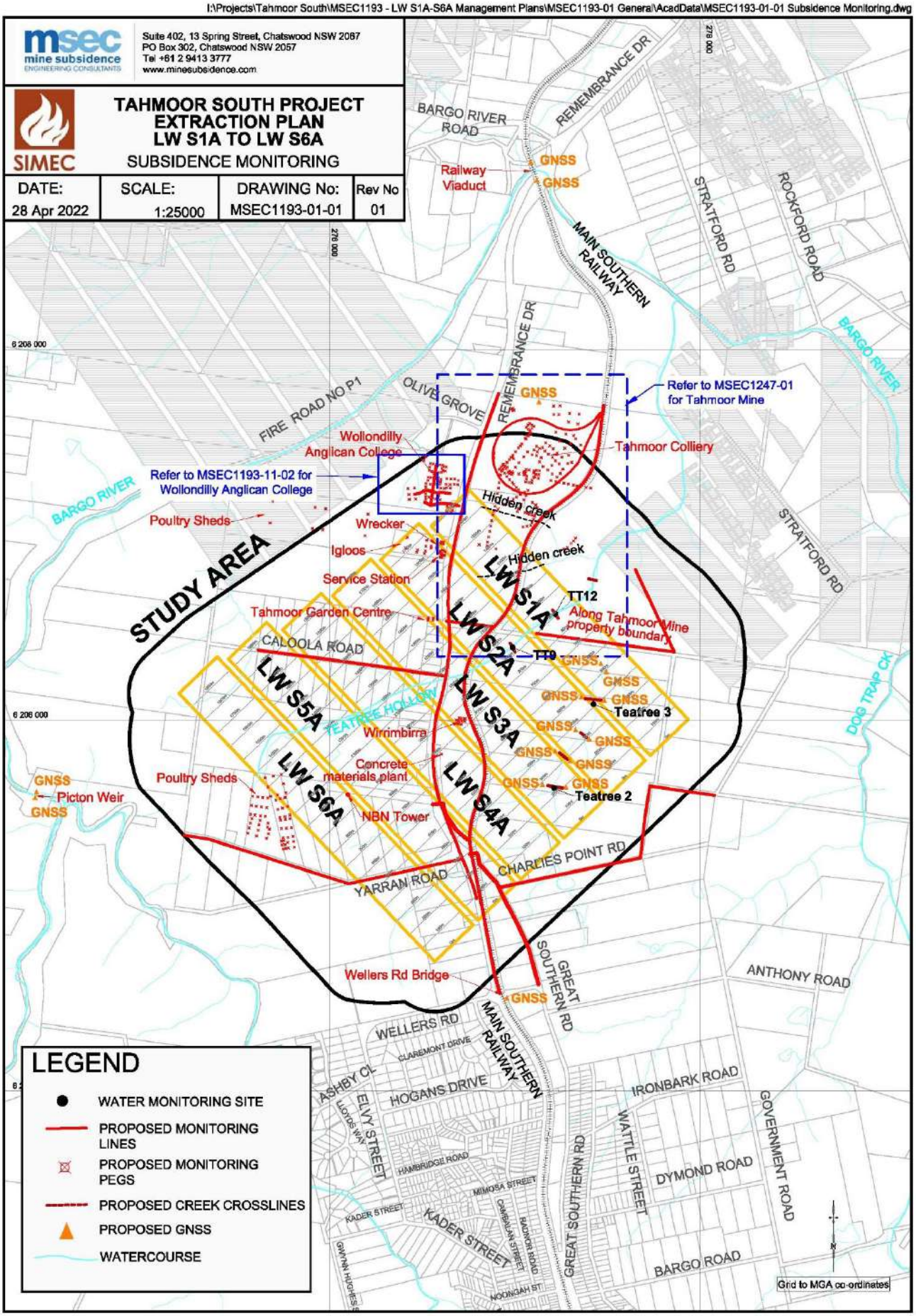

Figure 3-1 *LW S1A-S6A Subsidence Monitoring Program (source: LW S1A-S6A Subsidence Monitoring Program)*

3.1.1 Ground Survey Results

A summary of all surveys and inspections completed during the reporting period is provided in MSEC1430 LW S3A Subsidence Monitoring Report 34 (refer **Appendix A**). A weekly review of the subsidence survey results was completed by Tahmoor Coal and MSEC during the extraction period. A comparison between assessed and observed impacts to surface features is summarised in Table 1 of the MSEC1430 Subsidence Monitoring Report 34 (refer to **Appendix A**).

Survey results associated with built features are discussed in **Section 3.7**.

3.1.2 Tahmoor Mine Boundary Survey Line (V-Line)

The latest survey along the V-Line was conducted on December 2024 during active subsidence from LW S3A. Rates of change have reduced to low levels.

3.1.3 GNSS Unit Results

The development of subsidence along the centreline of LW S3A is illustrated in **Figure 3-2** and **Figure 3-3**, respectively.

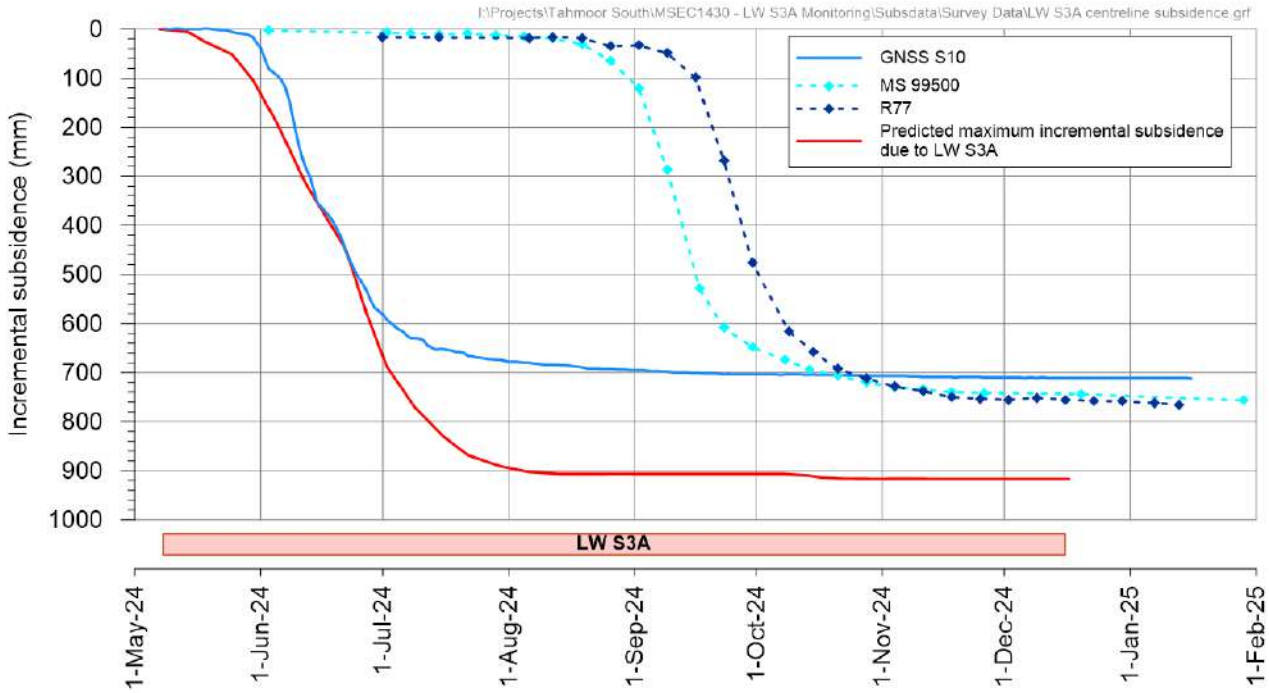

*Figure 3-2 Development of observed subsidence above LW S3A (source: MSEC1430, Report R34, **Appendix A**)*

Since the commencement of LW S3A, mining-induced movements have developed at the GNSS units, with maximum measured incremental subsidence of 712 mm at Site S10 above LW S3A. Rates of change have reduced to low levels. Observed development of subsidence above LW S3A has developed within predictions. Rates of change in subsidence has reduced to low levels along the Main southern Railway and Remembrance Driveway (MSEC1430 Subsidence Monitoring Report 34, **Appendix A**).

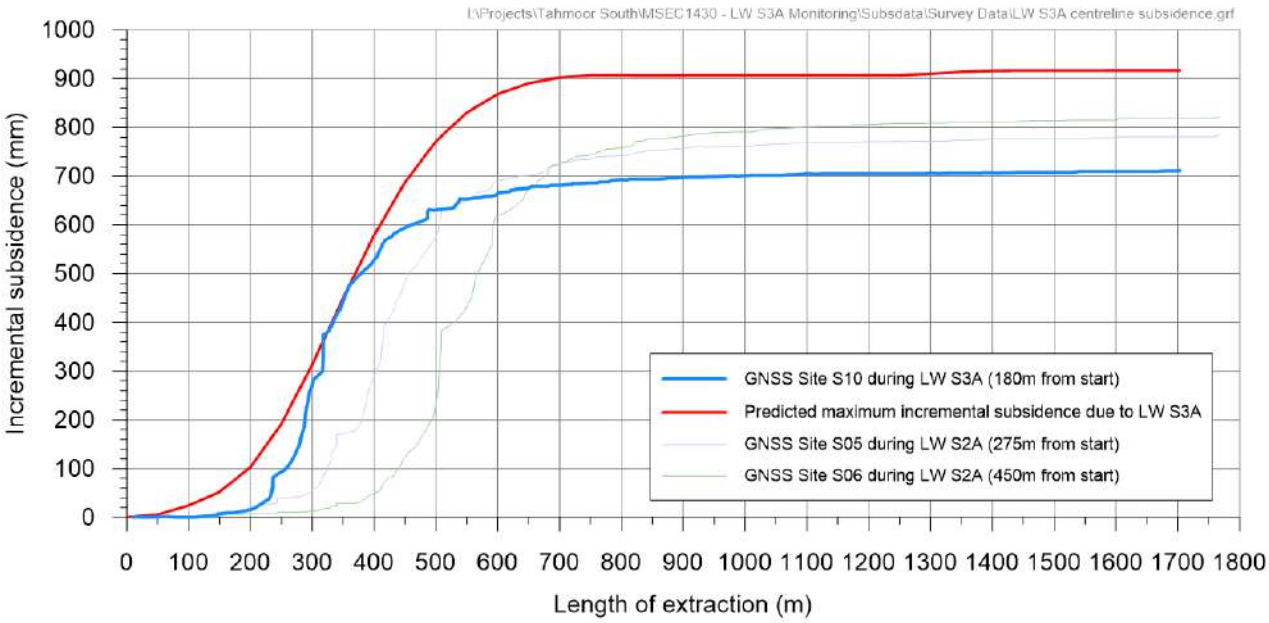

*Figure 3-3 Development of observed subsidence above LW S3A (source: MSEC1430 Subsidence Monitoring Report 34, **Appendix A**)*

During the extraction of LW S3A, changes in horizontal distances between paired GNSS units that are stationed close together on opposite sides of Teatree Hollow and Teatree Hollow Tributary (also known as 'Wirrimbirra Creek') are illustrated in **Figure 3-4**. Closure has developed across Wirrimbirra Creek. The greatest closure across Wirrimbirra Creek during the mining of LW S3A between Sites S09 and S10 directly above LW S3A. Rates of change have reduced at all sites.

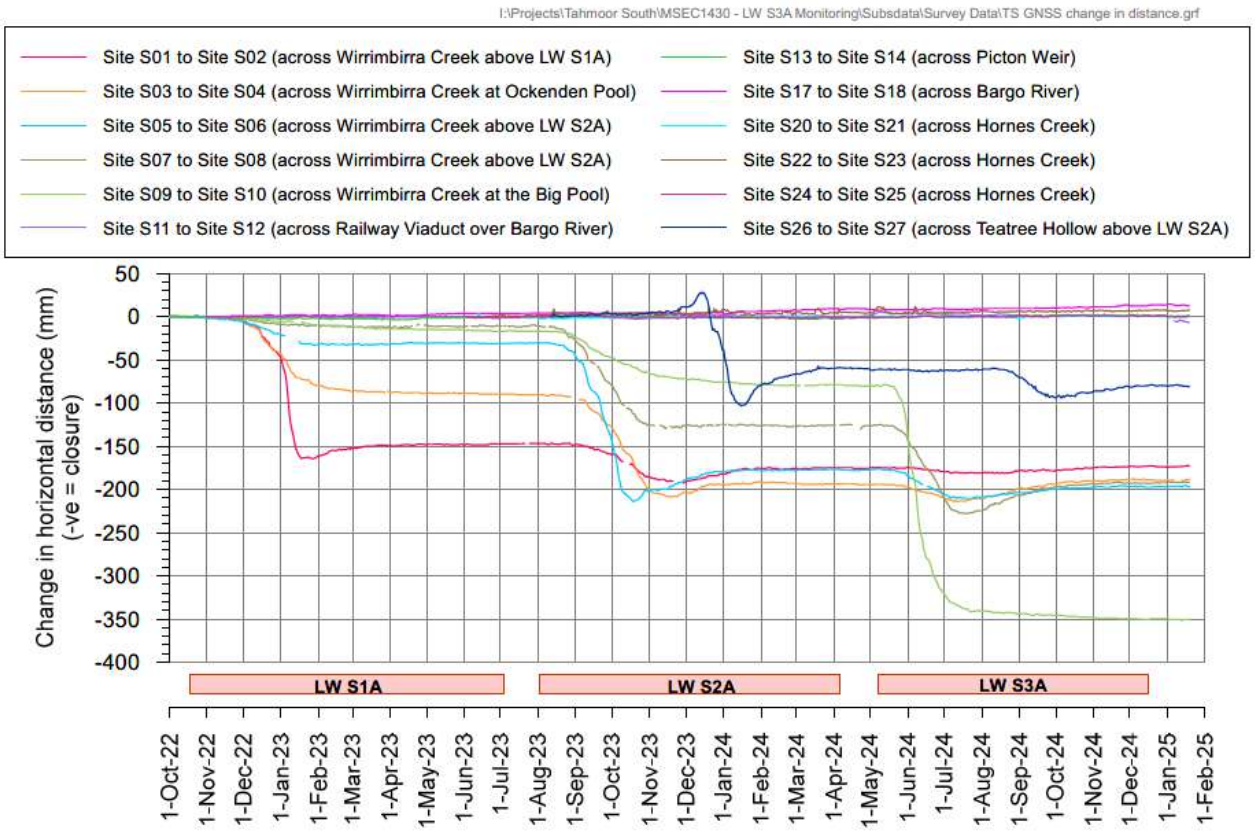

*Figure 3-4 Observed changes in horizontal distances between GNSS units during LW S3A extraction (source: MSEC1430 Subsidence Monitoring Report 34, **Appendix A**)*

3.2 Surface Water Monitoring

The LW S1A-S6A Water Management Plan was prepared to manage the potential environmental consequences of LW S1A-S6A extraction on surface water in accordance with Condition C8 of SSD 8445.

During this reporting period, the LW S1A-S6A Water Management Plan was implemented to monitor surface water:

- Flow, pool water level and surface water quality monitored for Teatree Hollow, Teatree Hollow tributary ('Wirrimbirra Creek'), Bargo River, and Bargo River Tributary – monthly monitoring data reviewed by ATC Williams on a monthly basis, as well as a fortnightly basis for impacted sites (refer to **Appendix B**); and
- Creek monitoring for physical features and natural behaviour of pools, as well as channel stability, sedimentation and erosion – visual inspections and reporting by ENRS on a monthly basis (reports available on request, summarised in **Appendix B**).

The following sections summarise the observations made during the reporting period for each surface water category. Performance against all Surface Water Management Plan TARPs for the reporting period are summarised in **Table 2-1**, and actions and responses completed relating to any TARP triggers are discussed in the following sections.

3.2.1 Stream Water Quality

3.2.1.1 Overview of Monitoring Results

Surface water quality data has been recorded at the following sites (refer to **Figure 3-5**):

- Teatree Hollow:
  - Reference site: TT1-QLa;
  - Potential impact sites: TT2-QLa, TT3-QLa, TT7-QLa, TT9-QLa, TT12-QLa, TT13-QLa, TT14-QLa;
- Bargo River:
  - Reference site: BR16-QLa; and
  - Potential impact sites: BR12-QLa, BR13-QLa, BR17-QLa, BR18-QLa.

Water quality data consisted of constituents which are considered to be primary indicators of mining. These constituents include pH, electrical conductivity (EC), and specific dissolved metals (aluminium, copper, iron, manganese, nickel and zinc).

Charts illustrating water quality results for monitored pools in Teatree Hollow and Bargo River are presented in Appendix C of the Surface Water Monitoring Report (refer to **Appendix B**).

The water quality characteristics of monitoring sites during the reporting period have been largely consistent with baseline conditions and / or consistent with reference site conditions. During the reporting period, the following sites recorded elevated results of specific constituents:

- Teatree Hollow Catchment sites:
  - Variable concentrations of dissolved aluminium were recorded at most sites during the review period;
- BR13-QRLa:
  - A historical high concentration of EC was recorded in August 2024;
- TT9-QLa:
  - A historical high concentration of dissolved Aluminium was recorded in November 2024;
  - A historical high concentration of dissolved Copper was recorded in November 2024;

- TT13-QLa:
    - Elevated pH of 8.45 during August 2024.

3.2.1.2 TARP WMP1 – Stream Water Quality for all Watercourses within the Subsidence Area

During the reporting period, the following TARP trigger for Water Quality occurred as summarised below:

- Monitoring Site TT13-QLa - Level 1 TARP trigger occurred for dissolved Zinc in August 2024.

Further discussion of this trigger, including direct or indirect mining influence is provided in the Surface Water Report (refer to **Appendix B**) for this reporting period.

Actions and Responses Completed

Table 3-2 outlines the actions and responses that are required to be completed in accordance with the Level 1 TARP trigger for Surface Water Quality (TARP WMP1), as well as how these actions and responses have been addressed.

Table 3-2 Actions and Responses for Level 1, 2 and 3 TARP Triggers for Pool Water Level Reduction (TARP WMP3)

Action / Responses from TARP WMP1	Tahmoor Coal response
Actions	
Level 1, 2 and 3 triggers Continue monitoring and review of data as per monitoring program.	Monthly (or more frequent) monitoring and review of data is ongoing according to the monitoring program.
Level 1, 2 and 3 triggers Assess if the trigger was exceeded during the baseline period prior to commencement of mining activities.	Exceedance of the trigger level during the baseline period was reviewed (refer to Section 6.4 of **Appendix B**). A Level 1 trigger was recorded for dissolved zinc at pool TT13 during 1 July to 31 December 2024 review period. A Level 1 trigger for dissolved zinc was not recorded at pool TT13 during the baseline monitoring period.
Level 1, 2 and 3 triggers Review water quality trends along watercourse (upstream to downstream) to identify spatial changes with consideration to climatic conditions.	Water quality trends were reviewed for the watercourse reach.
Level 1, 2 and 3 triggers Discuss findings with and obtain other relevant information from key specialists (e.g. subsidence monitoring results, groundwater quality monitoring results) necessary to inform assessment.	Relevant information was obtained from key specialists necessary to inform assessment.
Level 1, 2 and 3 triggers Consider and decide on reasonable and feasible options for remediation as relevant (e.g. limestone cobbles for increasing pH level).	Reasonable and feasible options for remediation were considered (refer to Section 7.3 of **Appendix B**). With respect to the water quality trigger exceedance recorded at TT13-QLa during the review period of 1 July to 31 December 2024, there are limited feasible corrective management actions (CMAs) that could be implemented prior to the cessation of subsidence movements associated with mining of LW S1A-S6A. Presently, there is negligible indication of a material impact to the water quality of Teatree Hollow, given that water quality effects were limited to pool TT13 during the review period.

Action / Responses from TARP WMP1	Tahmoor Coal response
	Accordingly, it is considered that there is negligible indication of material environmental harm to Teatree Hollow. Therefore, no CMAs are not considered reasonable or feasible at this stage.
Responses	
Level 1, 2 and 3 triggers Report trigger exceedance to DPHI and key stakeholders	Trigger exceedances during the reporting period were notified to DPE (now DPHI) on 4 October and 20 December 2024. (Triggers for the April to June 2024 period and July to September 2024 period respectively). Notification to NRAR was required as part of the conditions of the Enforceable Undertaking (in force from 24 July 2023). Tahmoor Colliery Community Consultative Committee was advised of water quality triggers on 6 June and 5 September 2024. Future meetings will include further notification of additional TARP triggers.
Level 1, 2 and 3 triggers Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review	Completed as part of this report.
Level 1, 2 and 3 triggers Provide DPE and key stakeholders with proposed corrective management actions (CMAs) for consultation (e.g. limestone cobbles for increasing pH level).	CMAs are not considered reasonable or feasible.
Level 1, 2 and 3 triggers Implement CMAs, subject to land access.	CMAs are not considered reasonable or feasible.
Level 1, 2 and 3 triggers Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.	CMAs are not considered reasonable or feasible.

Proposed Actions and Responses

From the review of actions and responses (as discussed in **Table 3-2**), the following remain outstanding:

- Preparation of a WCAMP (if required) to address damage to watercourses will be prepared and implemented following the cessation of subsidence movements associated with Tahmoor South mining.

The current monitoring program will continue in accordance with the LW S1A-S6A Water Management Plan. The next update will be provided as part of the next reporting requirement.

3.2.1.3 TARP WMP2 – Stream Water Quality for other Watercourses (Bargo River and Hornes Creek)

During this reporting period, there have been no triggers under this TARP.

3.2.2 Pool Water Level

3.2.2.1 Overview of Monitoring Results

Surface water level data has been recorded at the pool monitoring sites on Teatree Hollow, Teatree Hollow Tributary (also known as Wirrimbirra Creek), Bargo River, and Bargo River Tributary as shown in **Figure 3-6**. Continuous surface water level data and manual monthly water level measurements have been recorded at

seven monitoring sites on Teatree Hollow (and tributary) and six monitoring sites on Bargo River (and tributary).

Streamflow recorded from TT-F1 in Teatree Hollow indicate that streamflow is intermittent, with extended periods of no flow recorded prior to the commencement of mining of LW S1A. During the review period, flow occurred intermittently in response to rainfall. The streamflow recession rate recorded during the review period was similar to that of historical rates, including during periods prior to the commencement of mining of LW S1A.

From June to mid November 2024, generally below average rainfall conditions were recorded for the area. Above average rainfall was recorded from late November to early December 2024, followed by below average rainfall for the remainder of December 2024 (ATC Williams, 2025a).

During the reporting period, the following monitoring sites on Teatree Hollow and Bargo River (and their tributaries) observed a reduction below baseline minimum levels:

- Monitoring site TT2 – pool was recorded as dry or water level was below the sensor level for majority of the monitoring period, however during a brief period between late November and early December 2024 water level was recorded above the baseline minimum (during and following a rainfall event).
- Monitoring site TT3 – pool was recorded as dry or water level was below the sensor level for majority of the monitoring period, however during brief periods in July and between late November and early December 2024 water level was recorded above the CTF (Cease to Flow) (during and following rainfall events).
- Monitoring site TT7 – water level was recorded above the baseline minimum for brief periods during and following rainfall events throughout the review period.
- Monitoring site TT9 – water level was recorded above the baseline minimum for brief periods during and following rainfall events throughout the review period.
- Monitoring site TT12 – pool was recorded as dry or water level was below the sensor level for majority of the monitoring period. Water level was recorded above the baseline minimum for brief periods during and following rainfall events in July and late November to early December 2024.
- Monitoring site TT13 – water level was below the baseline minimum for majority of the review period, except for a brief period following rainfall in late November 2024.

Charts illustrating monitored pool water level hydrographs for pools on Teatree Hollow and Bargo River (and their tributaries) are presented in the Surface Water Monitoring Report (refer to **Appendix B**).

3.2.2.2 TARP WMP3 - Pool Water Level for all Watercourses within the Subsidence Area

Background

During the reporting period, a number of TARP triggers for pool water level occurred as summarised below:

- Monitoring site TT2: Level 2 TARP triggered during 22 July to 14 August and 4-6 December 2024; Level 3 TARP triggered during 30 August to 29 November and 9-31 December 2024;
- Monitoring site TT3: Level 2 TARP triggered during 3-4 July, 5-7 and 9-31 December 2024; Level 3 TARP triggered during 14 July to 29 November 2024;
- Monitoring site TT7: Level 2 TARP triggered during 17-29 September, 1-14 October and 27-31 December 2024; Level 3 TARP triggered during 30 October to 29 November 2024;
- Monitoring site TT9: Level 2 TARP triggered during 9-26 September, 7-14 October, 26 October to 12 November, 22-29 November, 18-31 December 2024;
- Monitoring site TT12: Level 2 TARP triggered during 22-27 July, 29 July to 13 August, 5-6 and 9-31 December 2024; Level 3 TARP triggered during 18 August to 29 November 2024; and

- Monitoring site TT13: Level 3 TARP triggered during 30 July to 30 November and 13-31 December 2024.

Further discussion of these triggers, including confirmation of direct and indirect mining impacts, is provided in the Surface Water Report (refer **Appendix B**) for this reporting period. In summary, it is considered that the water level decline recorded at these monitoring sites during the review period is related to direct and indirect mining effects in combination with prevailing climatic conditions.

Actions and Responses Completed

Table 3-3 outlines the actions and responses that are required to be completed in accordance with Level 1, 2 and 3 TARP triggers for pool water level (TARP WMP3), as well as how these actions and responses have been addressed.

Table 3-3 Actions and Responses for Level 1, 2 and 3 TARP Triggers for Pool Water Level Reduction (TARP WMP3)

Action / Responses from TARP WMP3	Tahmoor Coal response
Actions	
Level 1, 2 and 3 triggers Continue monitoring and review of data as per monitoring program.	Monthly (or more frequent) monitoring and review of data is ongoing according to the monitoring program.
Level 1, 2 and 3 triggers Review water level trends along watercourse (upstream to downstream) to identify spatial changes with consideration to climatic conditions.	Water level trends for all sites in Teatree Hollow and Teatree Hollow tributary were reviewed with consideration to climatic conditions (refer to Section 6.1 of **Appendix B**).
Level 1, 2 and 3 triggers Review streamflow data recorded at TT-F1 and conduct streamflow reduction assessment.	Streamflow data recorded at TT-F1 was reviewed and streamflow reduction assessment conducted (refer to Section 5.3 and Section 6.2 of **Appendix B**). The streamflow assessment indicated that streamflow trends recorded at monitoring site TT-F1 in Teatree Hollow have been consistent with rainfall trends for the duration of the review period. It is also considered that the rate of streamflow decline recorded during the review period is consistent with historical declines, including periods prior to the commencement of mining of LW S1A.
Level 1, 2 and 3 triggers Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, groundwater level monitoring results) necessary to inform assessment.	Relevant information was obtained from key specialists necessary to inform assessment (refer to **Appendix B**).
Level 2 and 3 triggers Consider increasing monitoring and review of data frequency at sites where Level 2 has been reached or at other relevant sites, subject to land access, as follows: • Fortnightly, for sites within the active subsidence zone. • Monthly, out of the active subsidence period. Reasons for not increasing monitoring frequency could include confident identification of causation (e.g. singular, anthropogenic, non-mining related change or confirmed as a mining-related impact that resulted in a water level change).	Causation was identified for the Level 2 and 3 triggers equated for TT2-QLa, TT3-QLa, TT7-QLa, TT9-QLa, TT12-QLa and TT13-Qla (refer to Section 6.1 of **Appendix B**). For sites TT2-QLa and TT3-QLa, monitoring and review of data frequency occurs on a fortnightly basis as real-time telemetry data is available for these sites. The monitoring frequency was not increased for TT7-QLa, TT9-QLa, TT12-QLa and TT13-QLa as causation has been confidently identified.

Action / Responses from TARP WMP3	Tahmoor Coal response
Level 2 and 3 triggers If increased monitoring is undertaken, conduct further analysis of water level trends along creek (upstream to downstream) to identify spatial changes with consideration to climatic conditions.	Water level trends for all sites in Teatree Hollow and Teatree Hollow tributary were reviewed with consideration to climatic conditions (refer to Section 6.1 of **Appendix B**).
Level 2 and 3 triggers Review Water Management Plan and modify if necessary.	The LW S1A-S6A Water Management Plan was reviewed and proposed amendments were approved by DPHI on 14/8/2024. No further modifications to the Water Management Plan are currently planned.
Level 3 trigger If mining related impact unconfirmed, increase monitoring and review of data frequency at sites where Level 3 has been reached or at other relevant sites, subject to land access, as follows: • Fortnightly, for sites within the active subsidence zone. • Monthly, outside of the active subsidence period.	Causation was identified for the Level 3 triggers (related to subsidence induced fracturing and the prevailing climate, refer to Section 6.1 of **Appendix B**). As such, the monitoring frequency was not increased.
Level 3 trigger Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing), other catchment changes, effect unrelated to mining or the prevailing climate.	A detailed investigation was undertaken to assess if the change in behaviour at is related to mining effects (refer to Section 6 of **Appendix B**). Direct and indirect impacts from mining have been confirmed at the pools in question, as summarised in **Table 3-4**.
Responses	
Level 1, 2 and 3 triggers Report trigger exceedance to DPHI and key stakeholders	Trigger exceedances during the reporting period were notified to DPHI on 4 October and 20 December 2024. (Triggers for the April to June 2024 period and July to September 2024 period respectively). Notification to NRAR was required as part of the conditions of the Enforceable Undertaking (in force from 24 July 2023). Tahmoor Colliery Community Consultative Committee was advised of water level triggers on 6 June 2024 and 5 September 2024. Future meetings will include further notification of additional TARP triggers.
Level 1, 2 and 3 triggers Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review	Completed as part of this report.
Level 2 and 3 triggers Advise DPHI and key stakeholders of any required amendments to Water Management Plan	The LW S1A-S6A Water Management Plan was reviewed and proposed amendments were approved by DPHI on 14/8/2024. No further modifications to the Water Management Plan are currently planned.
Level 3 trigger If it is concluded from the detailed investigation that watercourses have been damaged by subsidence impacts: • Offer site visit with DPHI and other key stakeholders.	A site visit was offered to DPIE and NRAR in relation to Level 3 TARP triggers of TARPs WMP3 and WMP5. This offer was extended via letter dated 10 November 2023. A site visit was also offered to the National Trust NSW and Australian Wildlife Sanctuary and took place on 22 November 2023. In accordance with C12 of SSD 8445 and as detailed in the WMP, a Watercourse Corrective Action Management Plan

Action / Responses from TARP WMP3	Tahmoor Coal response
• Develop Watercourse Corrective Action Management Plan (WCAMP) in consultation with the Resources Regulator, DPHI and other key stakeholders (in accordance with C12 of SSD 8445). The stream remediation measures in the WCAMP could include grout curtain and grout pattern injection. • Implement approved WCAMP, subject to land access.	(WCAMP) will be prepared (if required) for watercourses damaged by subsidence impacts in consultation with relevant government agencies, as defined in the WMP. The WCAMP will be prepared and implemented (if required) at the cessation of subsidence movements associated with Tahmoor South mining.

Proposed Actions and Responses

From the review of actions and responses (as discussed in **Table 3-3**), the following remain outstanding:

- Preparation of a WCAMP (if required) to address damage to watercourses will be prepared and implemented following the cessation of subsidence movements associated with Tahmoor South mining.

The current monitoring program will continue in accordance with the LW S1A-S6A Water Management Plan. The next update will be provided as part of the next reporting requirement.

3.2.2.3 TARP WMP4 – Pool Water Level for other Watercourses (Bargo River and Hornes Creek)

During this reporting period, there have been no triggers under this TARP.

3.2.3 Physical Features and Natural Behaviour

3.2.3.1 Overview of Monitoring Results

Visual and photographic surveys for subsidence impacts on creeks have been completed monthly for monitoring pools and reaches in Teatree Hollow and Teatree Hollow tributary within the active subsidence zone of LW S2A and LW S3A.

The purpose of these surveys is to note whether change has occurred to pool level, drainage or overland flow, and to assist in determining if any change can be attributed to mining impacts. Surveys are carried out to identify rock bar and/or stream base cracking, changes in overland connected flow, gas release, turbidity or increased iron precipitation. Creek monitoring locations for physical features and natural behaviour are illustrated on **Figure 3-7**.

During this reporting period, there were numerous observed occurrences of impacts to pool water level, overland connected flow and observations of iron staining, turbidity and fracturing. These observations are summarised below:

- Pool TT1 (reference site):
  - Moderate turbidity was noted during the review period.
- Pool TT2:
  - Water level was visually lower than baseline conditions in July, October and December 2024, no flow over the hydraulic control at the October and December inspection, dry pool noted in August, September and November;
  - Two (2) new fractures (Fracture 4 and 5) were observed in July 2024; Fracture 5 was noted to have widened at the August inspection. New Fracture 6 noted during October 2024 inspection. New Fracture 7 noted in November 2024;
  - Turbidity was noted as high during July, October to December 2024.
- Pool TT3:
  - The pool was observed as dry for the reporting period.

- Pool TT7:
    - Water level was visually lower than baseline conditions in September and November 2024;
    - Iron staining at the upstream reach of the pool was noted in August to November 2024 (consistent with baseline inspection);
    - Moderate turbidity was observed during August and September 2024, and high turbidity observed in October and November 2024.
- Pool TT9:
    - Water level was visually lower than baseline conditions in July, September to December 2024, with no flow over the hydraulic control during September to December 2024;
    - Four (4) new fractures noted upstream of TT9 during November 2024;
    - Moderate turbidity was observed in August to December 2024 (consistent with baseline inspection).
- Pool TT10:
    - A decline in water level was observed in October to December 2024, with no flow over the hydraulic control during November and December 2024;
    - One (1) fracture was observed (Fracture 1) upstream of TT10 during October 2024;
    - Moderate turbidity was observed during October to December 2024.
- Pool TT11:
    - The pool was observed as dry during the reporting period;
    - Four (4) fractures were observed upstream of Pool TT11 during July 2024.
- Pool TT12:
    - A decline in water level was observed in August with no flow over the hydraulic control. The pool was observed as dry during September to December 2024;
    - Iron staining downstream of TT12 was observed, consistent with that observed in the previous reporting period.
- Pool TT13:
    - A decline in water level was observed in August and December 2024, with no flow over the hydraulic control. The pool was observed as dry in September to November 2024;
    - Fractures observed within the centre of the TT13 Pool with no visually observable change in comparison to the baseline inspection. Fractures may be inferred to have naturally occurred;
    - Moderate turbidity was observed during August to December 2024.
- Pool TT15:
    - Water level was visually lower than baseline conditions during October to December 2024, no flow over the hydraulic control at the October to December inspections;
    - Moderate turbidity was noted during the reporting period.

Figure 3-7 presents the location of flow re-emergence, fracturing, ponded water, iron staining and overland flow observed at the end of the reporting period (December 2024).

A summary of mining related impacts to pools and stream reaches as a result of mining of LW S3A is provided in **Table 3-4** below. It is noted that the LW S3A mining related impacts to the watercourse features listed in the **Table 3-4** are consistent with that predicted in the Tahmoor South Project Environmental Impact Statement, and no greater impact than that predicted in the EIS has occurred to watercourses within the Subsidence Area.

Table 3-4 Summary of mining related impacts to watercourse features (source: ATC Williams, 2024; Appendix B)

Watercourse Feature	Impact Feature	Impact Type
Pool TT2	• Pool water level • Physical (fractures)	Direct mining impact
Pool TT3	• Pool water level	Indirect mining impact
Pool TT7	• Pool water level	Indirect mining impact
Pool TT9	• Pool water level	Indirect mining impact
Pool TT11	• Pool water level	Indirect mining impact
Pool TT12	• Pool water level • Physical (fractures) • Iron staining	Direct mining impact
Pool TT13	• Pool water level	Indirect mining impact
Knickpoint K64	• Physical (erosion)	Direct mining impact

Direct and indirect mining impacts, in the form of surface fracturing and associated flow diversion, have occurred at several locations in Teatree Hollow and Teatree Hollow tributary, upstream of monitoring site TT-F1. During the review period, the reduction in surface flow recorded at TT-F1 was generally consistent with natural (climatic) variability. As such, there is no indication of material environmental harm to Teatree Hollow or other watercourses caused by mining activities (**Appendix B**).

Pool TT2

At pool TT2 (Big Pool), four (4) new fractures were observed during the reporting period.

Water level in July was reported as slightly lower than baseline conditions. No inflow to the pool was present however there was outflow over the downstream hydraulic control. No connective flow was reported in August and December 2024. During September, October and November 2024 visual inspections, the pool was reported as dry. No iron staining or gas release was observed during the reporting period. High turbidity was reported during the review period (**Appendix B**).

Pool TT3

No fractures, iron staining or gas release were observed during the reporting period.

The pool was reported as dry during the reporting period, with no connective flow observed during monthly inspections (**Appendix B**).

Pool TT7

No new fractures or gas release were observed during the reporting period. Iron staining at the upstream reach of the pool was consistent with baseline conditions. Moderate turbidity was observed during August and September inspections. With high turbidity being reported for October and November 2024

The water level was consistent with baseline conditions in August and October 2024. In September and November 2024, the water level was reported to be lower than baseline conditions, with no flow over the hydraulic control (**Appendix B**).

Pool TT9

Four new fractures were observed in November 2024, approximately 140 m upstream of pool TT9. No iron staining or gas discharge was noted although moderate turbidity was observed during the review period.

The water level was consistent with baseline conditions in August 2024. From September to December 2024, the water levels were visually lower than baseline conditions, with no flow over the hydraulic control (**Appendix B**).

Pool TT10

A fracture upstream of pool TT10 was observed in October 2024. No gas discharge or iron staining were observed although moderate turbidity was noted.

The water level observed was consistent with baseline conditions in July 2024. From October to December 2024, the water level was lower than the baseline condition (**Appendix B**).

Pool TT11

No new fractures were observed, and no development of the historical fractures was noted. No gas discharge or iron staining was observed.

The pool was reported as dry during the reporting period which was inconsistent with baseline conditions (**Appendix B**).

Pool TT12

No development of historical fractures, new fractures or gas release were noted during the reporting period. No changes to the iron staining previously observed downstream of the pool, initially observed 1 March 2023.

The water level was lower than baseline conditions in July and August. During the visual inspections conducted from September to December 2024, the pool was observed as dry (**Appendix B**).

Pool TT13

No changes to fractures, inferred to be natural, were noted. No iron staining or gas release was observed although moderate turbidity was noted for the review period.

The water level was lower than baseline conditions in August. During the visual inspections conducted from September to December 2024, the pool was observed as dry (**Appendix B**).

Pool TT15

A fracture was identified approximately 22 m downstream of the pool in October 2024. No gas discharge or iron staining was observed although moderate turbidity was noted during the reporting period.

The water level was consistent with baseline conditions in July 2024. From October to December 2024, the water level was lower than baseline conditions, with no connective flow observed (**Appendix B**).

3.2.3.2 TARP WMP5 – Physical Features and Natural Behaviour of Watercourses within the Subsidence Area

Background

During the reporting period, a number of TARP triggers for physical features and natural behaviour of watercourses occurred as summarised below:

- Pool TT2: Level 3 triggered for the entire reporting period;
- Pool TT3: Level 3 triggered from July-August and October to December 2024;
- Pool TT7: Level 1 triggered in November; Level 2 triggered for September and October 2024;
- Pool TT9: Level 1 triggered in October, Level 2 triggered in November, Level 3 triggered in December 2024;

- Pool TT10: Level 1 triggered in October, Level 2 triggered in November and December 2024;
- Pool TT11: Level 3 triggered for the entire reporting period;
- Pool TT12: Level 3 triggered for the entire reporting period; and
- Pool TT13: Level 1 triggered in August, Level 2 triggered in September, Level 3 triggered in October and November 2024;
- Pool TT15: Level 1 triggered in October and December 2024;

Further discussion of these triggers, including confirmation of direct and indirect mining impacts, is provided in **Section 3.2.3.1**, as well as the Surface Water Report (refer to **Appendix B**) for this reporting period.

Actions and Responses Completed

Table 3-5 outlines the actions and responses that are required to be completed in accordance with Level 1, 2 and 3 TARP triggers for physical features and natural behaviour (TARP WMP5), as well as how these actions and responses have been addressed.

Table 3-5 Actions and Responses for Level 1, 2 and 3 TARP Triggers for Physical Features and Natural Behaviour of Watercourses (TARP WMP5)

Action / Responses from TARP WMP5	Tahmoor Coal response
Actions	
Level 1, 2 and 3 trigger Continue monitoring and review of data as per monitoring program.	Monthly monitoring and review of data is ongoing according to the monitoring program.
Level 1, 2 and 3 trigger Assess visual change along watercourse (upstream to downstream) to observe any spatial changes with consideration to climatic conditions.	Visual changes along watercourse were reviewed with consideration to climatic conditions (refer to Section 6.3 of **Appendix B**).
Level 1, 2 and 3 trigger Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, surface water monitoring results, groundwater monitoring results) necessary to inform assessment.	Relevant information was obtained from key specialists necessary to inform assessment (refer to **Appendix B**).
Level 2 and 3 trigger Consider increasing monitoring and review of data frequency to fortnightly at sites where Level 1 has been reached and at other relevant sites, subject to land access, as follows: • Fortnightly, for sites within the active subsidence zone. • Monthly, outside of the active subsidence period. Reasons for not increasing monitoring frequency could include confident identification of causation (e.g., surface fracturing of weathered bedrock that does not affect water holding capacity of rockbar control or pool base or confirmed as a mining-related impact)	Monitoring and review of data frequency was not increased at pools TT2, TT3, TT7, TT9, TT12 and TT13.
Level 2 and 3 trigger Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing other catchment changes, effect unrelated to mining or the prevailing climate).	A detailed investigation was undertaken to assess if the change in behaviour at is related to mining effects (refer to Section 6 of **Appendix B**). Direct and indirect impacts from mining have been confirmed at the pools in question, as summarised in **Table 3-4**.

Action / Responses from TARP WMP5	Tahmoor Coal response
Level 2 and 3 trigger Review Water management Plan and modify if necessary.	The LW S1A-S6A Water Management Plan was reviewed and proposed amendments were approved by DPHI on 14/8/2024. No further modifications to the Water Management Plan are currently planned.
Level 2 and 3 trigger If mining related impact unconfirmed, increase monitoring and review of data frequency at sites where Level 2 has been reached or at other relevant sites, subject to land access, as follows: • Fortnightly, for sites within the active subsidence zone. • Monthly, outside of the active subsidence period.	Monitoring and review of data frequency was not increased at pools TT2, TT3, TT7, TT9, TT12 and TT13 as mining impacts were confirmed.
Responses	
Level 1, 2 and 3 trigger Report trigger exceedance to DPHI and key stakeholders	Trigger exceedances during the reporting period were notified to DPHI on 4 October and 20 December 2024. (Triggers for the April to June 2024 period and July to September 2024 period respectively). Notification to NRAR was required as part of the conditions of the Enforceable Undertaking (in force from 24 July 2023). Tahmoor Colliery Community Consultative Committee was advised of water level triggers on 6 June 2024 and 5 September 2024. Future meetings will include further notification of additional TARP triggers.
Level 1, 2 and 3 trigger Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review	Completed as part of this report.
Level 2 and 3 trigger Advise DPHI and key stakeholders of any required amendments to Water Management Plan	The LW S1A-S6A Water Management Plan was reviewed and proposed amendments were approved by DPHI on 14/8/2024. No further modifications to the Water Management Plan are currently planned.
Level 3 trigger Offer site visit with DPHI and other key stakeholders.	A site visit was offered to DPIE and NRAR in relation to Level 3 TARP triggers of TARPs WMP3 and WMP5. This offer was extended via letter dated 10 November 2023. A site visit was also offered to the National Trust NSW and Australian Wildlife Sanctuary, and took place on 22 November 2023.
Level 3 trigger Develop Watercourse Corrective Action Management Plan (WCAMP) in consultation with the Resources Regulator, DPHI and other key stakeholders (in accordance with C12 of SSD 8445). The stream remediation measures in the WCAMP could include grout curtain and grout pattern injection.	In accordance with C12 of SSD 8445 and as detailed in the WMP, a Watercourse Corrective Action Management Plan (WCAMP) will be prepared (if required) for watercourses damaged by subsidence impacts in consultation with relevant government agencies, as defined in the WMP. The WCAMP will be prepared and implemented (if required) at the cessation of subsidence movements associated with Tahmoor South mining.
Level 3 trigger Implement approved WCAMP, subject to land access.	Refer to response above.

Proposed Actions and Responses

From the review of actions and responses (as discussed in **Table 3-5**), the following actions and responses remain outstanding:

- Preparation of a WCAMP (if required) to address damage to watercourses will be prepared and implemented following the cessation of subsidence movements associated with Tahmoor South mining.

The current monitoring program will continue in accordance with the LW S1A-S6A Water Management Plan. The next update will be provided as part of the next reporting requirement.

3.2.3.3 TARP WMP6 – Physical Features and Natural Behaviour of Pools for Other Watercourses (Bargo River and Hornes Creek)

During this reporting period, there have been no triggers under this TARP.

3.2.4 Channel Stability, Sedimentation and Erosion

3.2.4.1 Overview of Monitoring Results

Visual and photographic surveys for subsidence impacts on creeks have been completed monthly for morphology and channel stability monitoring sites in Teatree Hollow and Teatree Hollow tributary within the active subsidence zone of LW S1A to LW S3A, except for headwater sites which are completed on an annual basis.

The purpose of these surveys is to note whether change has occurred to channel stability, erosion and sedimentation, and to assist in determining if any change can be attributed to mining impacts. Surveys are carried out to identify any visual changes in knickpoint development and channel morphology. In addition, annual visual inspections are conducted at headwater sites to characterise erosion and sedimentation.

Creek monitoring locations for channel stability, sedimentation and erosion are illustrated on **Figure 3-8**.

During September 2024, the Annual Headwaters Inspection was completed to satisfy the monitoring requirements of the LW S1A-S6A Extraction Plan Water Management Plan. Ten (10) sites were inspected and results compared against baseline inspections from September 2022. Normal conditions were reported for all ten (10) headwater sites and no TARP triggers during the inspection with no further visible increase of erosion or sedimentation of the headwater stream.

Visual inspections observations recorded during active mining have been compared to the baseline visual inspection records from September 2022 (headwater sites) and October 2022 (channel morphology sites and knickpoints).

At knickpoint site K64, moderate erosion development was observed in August 2024 in comparison to baseline conditions. High rainfall / flow events occurred when first observed, in addition to direct impacts from undermining of knickpoint site K64. Changes at this site are considered to be associated with high rainfall / flow events in combination with mining-induced subsidence (refer to **Appendix B**).

3.2.4.2 TARP WMP7 – Channel Stability, Sedimentation and Erosion

Background

During the reporting period, a number of channel stability, sedimentation and erosion TARP triggers were sustained, as summarised below:

- Knickpoint Site K57: Level 1 TARP triggered in July to August 2024; and
- Knickpoint Site K64: Level 2 TARP triggered in July to December 2024.

Further discussion of these triggers, including confirmation of direct and indirect mining impacts, is provided in the Surface Water Report (refer to **Appendix B**) for this reporting period.

Actions and Responses Completed

Table 3-6 outlines the actions and responses that are required to be completed in accordance with Level 1 and 2 TARP triggers for channel stability, sedimentation and erosion (TARP WMP7), as well as how these actions and responses have been addressed.

Table 3-6 Actions and Responses for Level 1 and 2 TARP Triggers for Channel Stability, Sedimentation and Erosion (TARP WMP7)

Action / Responses from TARP WMP7	Tahmoor Coal Response
Actions	
Level 1 and 2 trigger Continue monitoring and review of data as per monitoring program.	Monthly monitoring and review of data is ongoing according to the monitoring program.
Level 1 and 2 trigger Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, biodiversity monitoring results) necessary to inform assessment.	Relevant information was obtained from key specialists necessary to inform assessment (refer to **Appendix B**).
Level 1 and 2 trigger Consider increasing monitoring and review of data frequency at sites where Level 1 has been reached or at other relevant sites, subject to land access, as follows: • Fortnightly, for sites within the active subsidence zone. • Monthly, outside of the active subsidence period. Reasons for not increasing monitoring frequency could include confident identification of causation (e.g. singular, anthropogenic, non-mining related change or confirmed as a mining-related impact that resulted in increased erosion).	Frequency of monitoring and data review has not been increased as the causation of the erosion at the knickpoint sites K57 and K64 is considered to be understood.
Level 1 and 2 trigger Consider and decide on reasonable and feasible options for remediation as relevant (e.g. enhanced vegetation establishment, rock armouring).	CMAs are not considered reasonable or feasible until the extent and longevity of the impacts are confirmed. Monitoring will continue to assess if remediation actions are required.
Level 2 trigger If mining related impact unconfirmed, increase monitoring and review of data frequency at sites where Level 2 has been reached or at other relevant sites, subject to land access, as follows: • Fortnightly, for sites within the active subsidence zone. • Monthly, outside of the active subsidence period.	Frequency of monitoring and data review has not been increased as the causation of the erosion at the knickpoint site K64 is understood to be likely associated with high rainfall/flow events that occurred in May and June 2024 in addition to direct undermining. Monitoring as per the monitoring program and after large rainfall events will continue at K64 to assess if remediation actions are required.
Level 2 trigger Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g.	An investigation was undertaken to assess if the change in behaviour at K64 is related to mining effects (refer to **Section 6** of **Appendix B).** It is understood that high rainflow events in combination with mining-induced

Action / Responses from TARP WMP7	Tahmoor Coal Response
subsidence induced, other catchment changes, effects unrelated to mining or the prevailing climate).	subsidence caused a moderate increase in bank slipping and slumping at knickpoint K64.
Level 2 trigger Obtain specialist advice on further CMAs.	Advice was obtained by key specialists, as detailed in Section 6.3 of **Appendix B**.
Level 2 trigger Review CMAs in light of findings from further investigations and consider additional remediation options.	CMAs are not considered reasonable or feasible until the extent and longevity of the impacts are confirmed. Monitoring will continue at K64 to assess if remediation actions are required.
Level 2 trigger Review Water Management Plan and modify if necessary.	There are no proposed changes to the Water Management Plan in light of the Level 2 TARP trigger at K64.
Responses	
Level 1 and 2 trigger Report trigger exceedance to DPHI and key stakeholders	Completed as part of this report.
Level 1 and 2 trigger Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.	Completed as part of this report.
Level 1 and 2 trigger Provide DPHI and key stakeholders with proposed corrective management actions (CMAs) for approval (e.g. enhanced vegetation establishment, rock armouring).	CMAs are not considered reasonable or feasible until the extent and longevity of the impacts are confirmed. Monitoring will continue at K64 to assess if remediation actions are required.
Level 1 and 2 trigger Implement CMAs, subject to land access.	CMAs are not considered reasonable or feasible until the extent and longevity of the impacts are confirmed. Monitoring will continue at K64 to assess if remediation actions are required.
Level 1 and 2 trigger Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.	CMAs are not considered reasonable or feasible until the extent and longevity of the impacts are confirmed. Monitoring will continue at K64 to assess if remediation actions are required.
Level 2 trigger Advise DPHI and key stakeholders of any required amendments to Water Management Plan.	There are no proposed changes to the Water Management Plan in light of the Level 2 TARP trigger at K64.
Level 2 trigger If it is concluded from the detailed investigation that watercourses have been damaged by subsidence impacts: • Offer site visit with DPHI and other key stakeholders.	A site visit was offered to DPIE and NRAR in relation to Level 2 TARP trigger of TARP WMP7 for site K64. This offer was extended via letter dated 4 October 2024. Tahmoor Coal will offer a site visit to DPHI and other related stakeholders in relation to subsidence impacts (in relation to TARP triggers for other water TARPs) in the vicinity of K64.
Level 2 trigger If it is concluded from the detailed investigation that watercourses have been damaged by subsidence impacts:	CMAs are not considered reasonable or feasible until the extent and longevity of the impacts are confirmed. Monitoring will continue at K64 to assess if remediation actions are required.

Action / Responses from TARP WMP7	Tahmoor Coal Response
• Provide findings of CMA review to DPHI and key stakeholders for consultation.	
Level 2 trigger If it is concluded from the detailed investigation that watercourses have been damaged by subsidence impacts: • Implement additional CMAs, subject to land access.	CMAs are not considered reasonable or feasible until the extent and longevity of the impacts are confirmed. Monitoring will continue at K64 to assess if remediation actions are required.

Proposed Actions and Responses

The current monitoring program will continue in accordance with the LW S1A-S6A Water Management Plan. The next update will be provided as part of the next reporting requirement.

3.2.5 Recommendations and Actions for Surface Water

3.2.5.1 Current Surface Water Monitoring Recommendations

Based on the assessment outcomes discussed in the Surface Water Review for July to December 2024 (**Appendix B**), ATC Williams recommended that ongoing review of surface monitoring data is continued to be undertaken in accordance with the LW S1A-S6A Water Management Plan. No changes to the current monitoring program are proposed at this time.

With respect to the water quality trigger exceedance recorded at TT13-QLa during the review period, there are limited feasible corrective management actions (CMAs) that could be implemented prior to the cessation of subsidence movements associated with mining of LW S1A-S7A. It is also noted that dissolved zinc concentrations recorded at TT13-QLa were only elevated from June to August 2024, declining to near baseline conditions in late 2024. Based on the water quality records for monitoring sites located downstream of TT13-QLa, there has not been a persistent effect to water quality associated with the temporary increase in dissolved zinc recorded at TT13-QLa. Accordingly, it is considered that water quality effects were limited to pool TT13 during the review period with negligible indication of material environmental harm to Teatree Hollow.

Direct and indirect mining impacts, in the form of surface fracturing and associated flow diversion, have occurred at several locations in Teatree Hollow and Teatree Hollow tributary, upstream of monitoring site TT-F1. During the review period, the reduction in surface flow recorded at TT-F1 was generally consistent with natural (climatic) variability (refer to Section 5.3 of **Appendix B).** As such, there is negligible indication of material environmental harm to Teatree Hollow downstream of TT-F1, or to other watercourses outside of the Study Area, associated with mining activities. Nonetheless, surface water monitoring and data review will continue to be undertaken in accordance with the WMP.

In accordance with C12 of SSD 8445 and as detailed in the LW S1A-S6A Water Management Plan, a Watercourse Corrective Action Management Plan (WCAMP) will be prepared (if required) for watercourses damaged by subsidence impacts. The WCAMP will be prepared in consultation with relevant government agencies, as defined in the WMP. The WCAMP will be prepared and implemented at the cessation of subsidence movements associated with Tahmoor South mining.

Impacts at K57 are considered to be associated with high rainfall/flow events. Impacts at K64 are considered to be associated with high rainfall/flow events combined with mining-induced subsidence effects. An increase in monitoring frequency is not required at these sites (in accordance with the WMP). Tahmoor Coal will continue to undertake visual inspections of K57 and K64 in accordance with the WMP to assess the potential cause, extent and longevity of impacts. The requirement for remediation works would subsequently be assessed at a later stage.

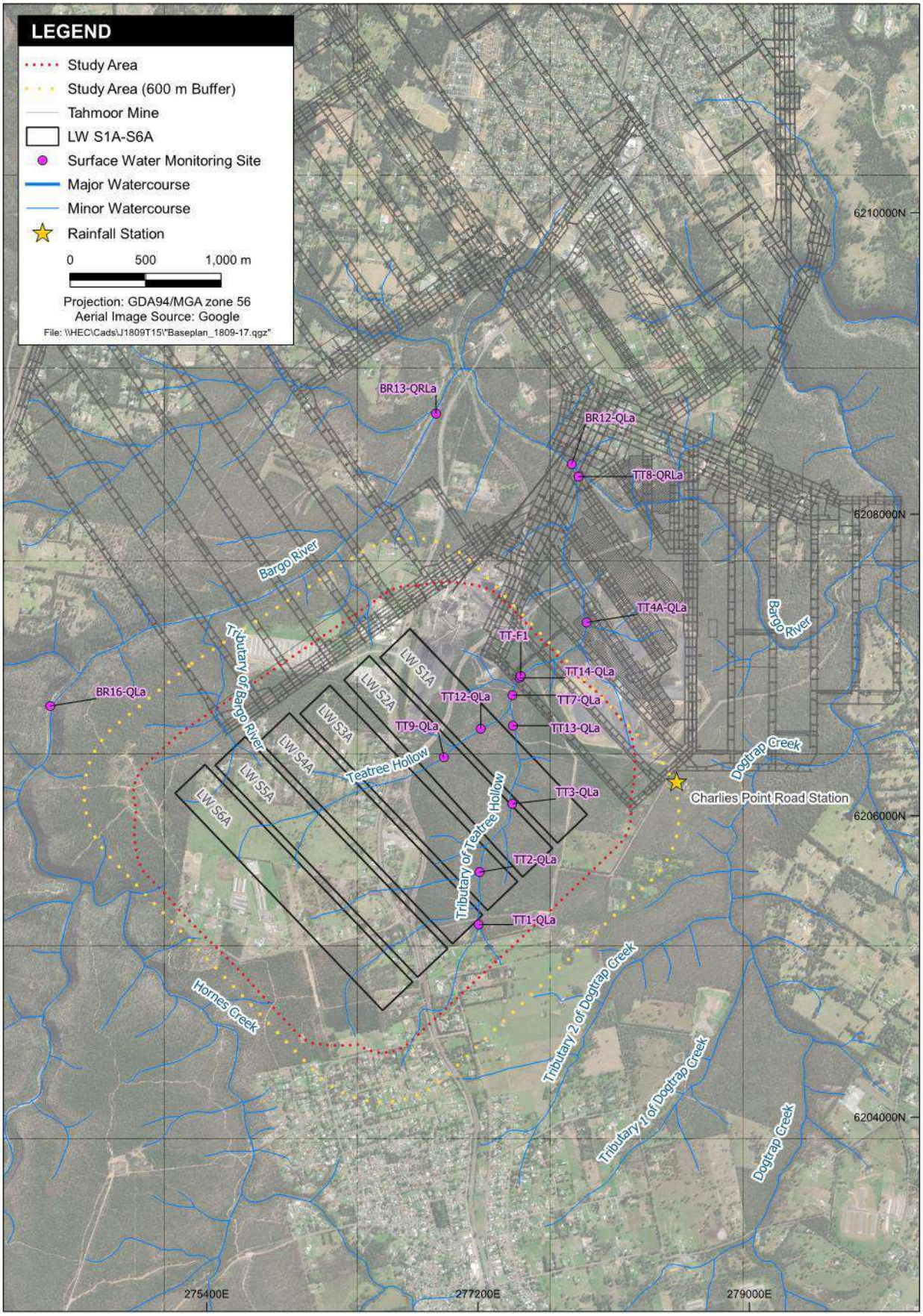

Figure 3-5 *LW S1A-S6A Surface Water Monitoring Sites Specific to LW S1A-S6A (source: ATC Williams, 2025a; **Appendix B**)*

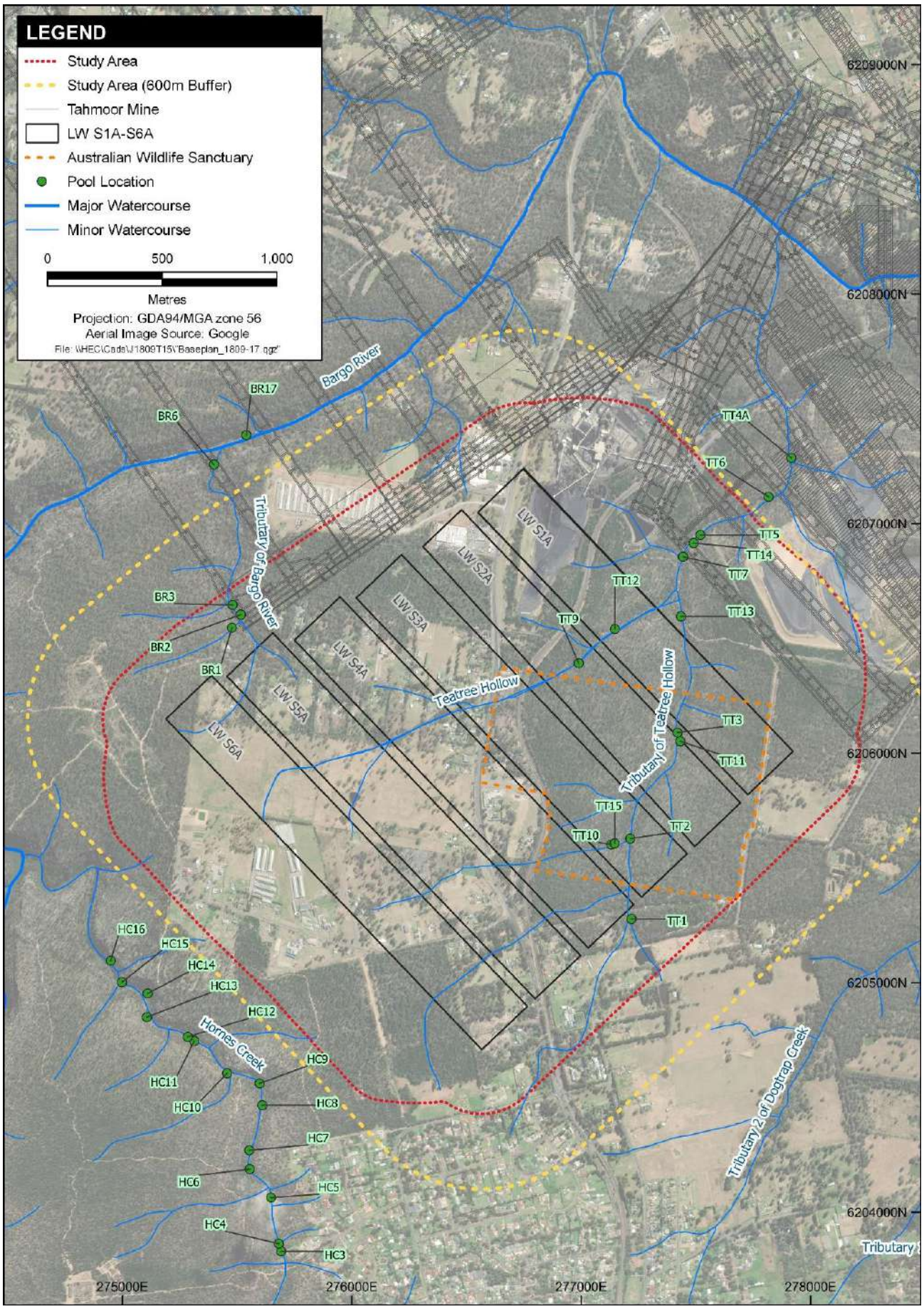

Figure 3-6 *LW S1A-S6A Pool Visual Inspection Sites (source: LW S1A-S6A Water Management Plan)*

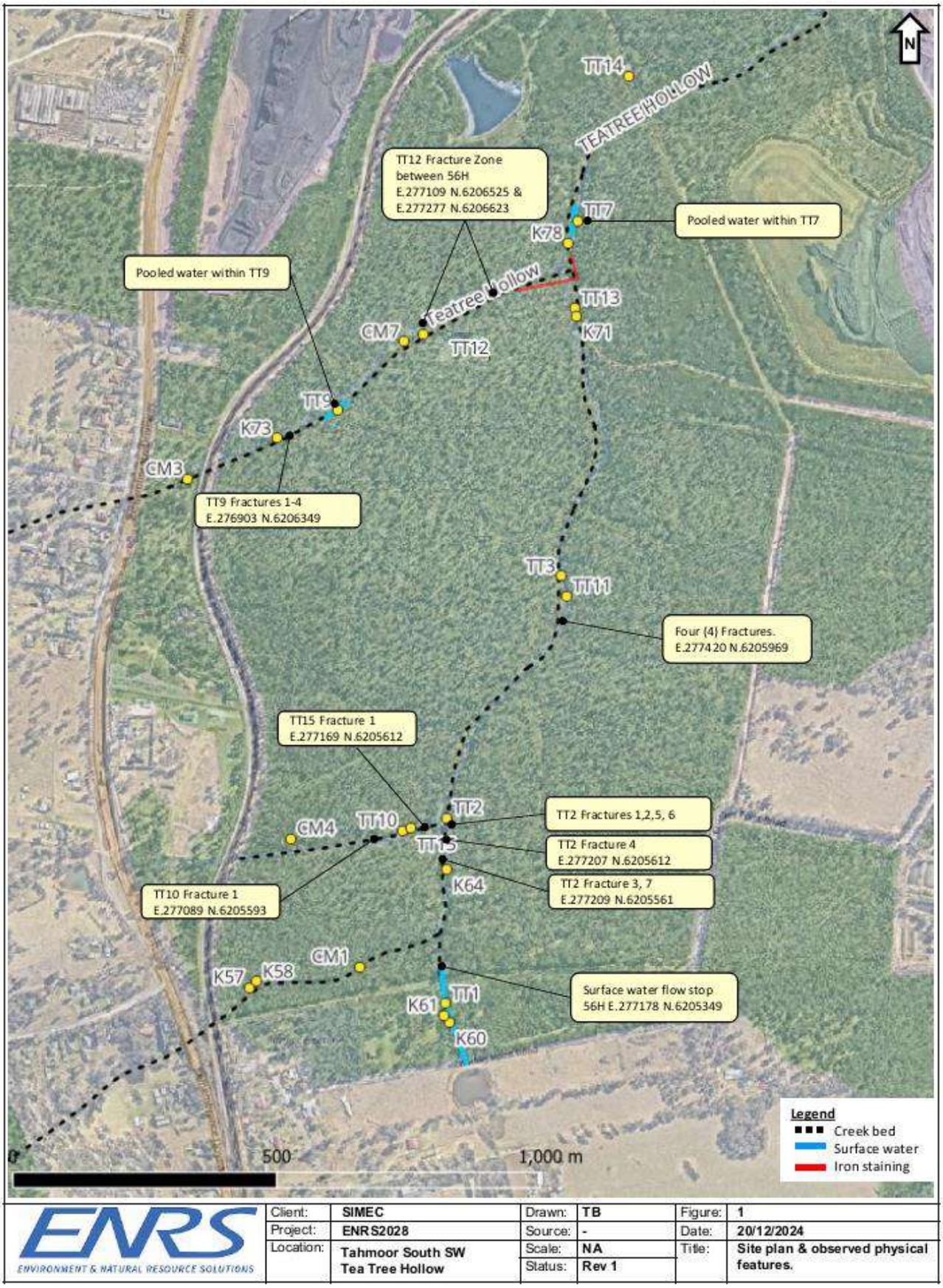

Figure 3-7 *Visual depiction of surface water characteristics and physical effects in December 2024 (source: **Appendix B**)*

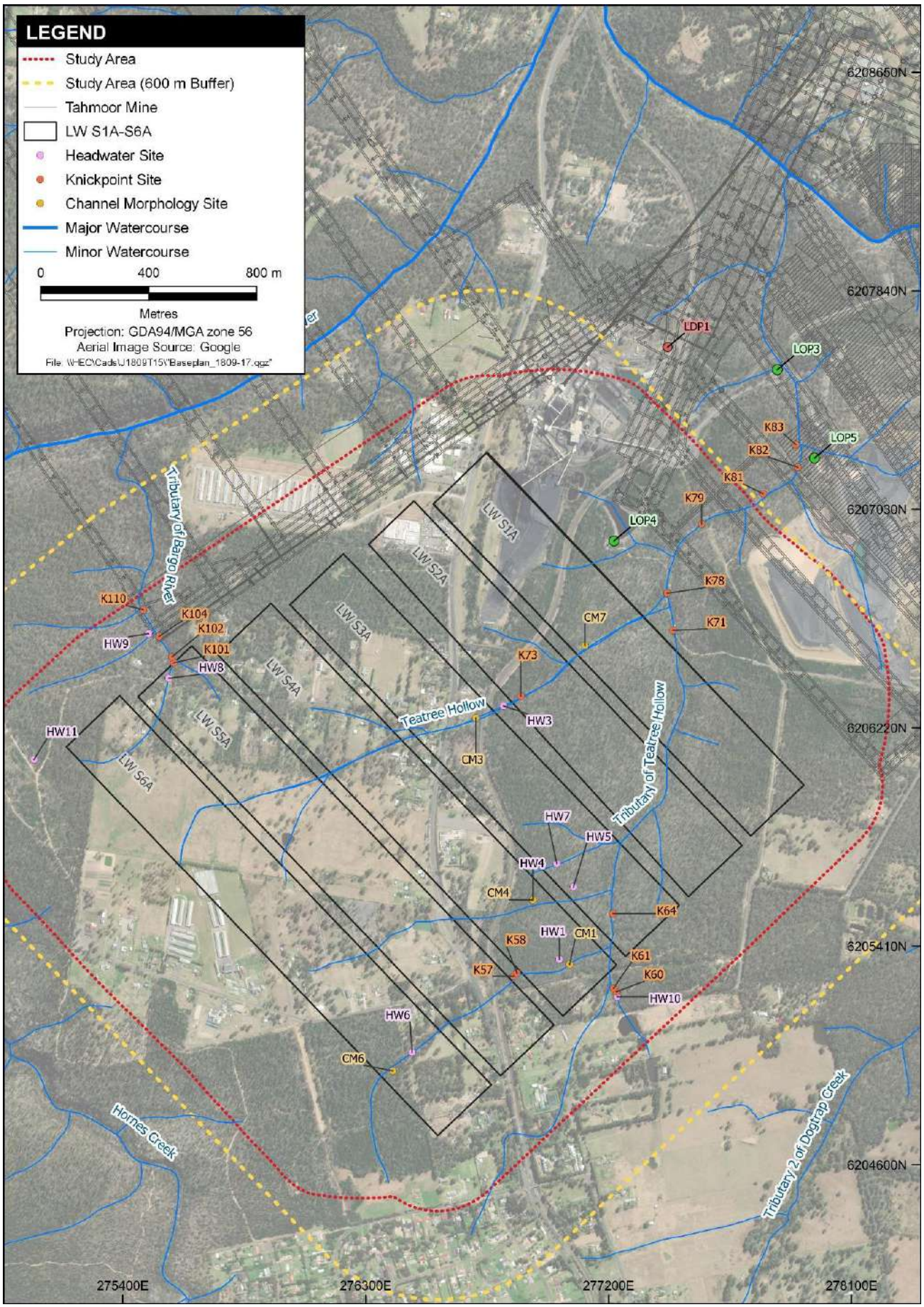

Figure 3-8 *LW S1A-S6A Morphology and Channel Stability Monitoring Sites (source: LW S1A-S6A Water Management Plan)*

3.3 Groundwater Monitoring

The LW S1A-S6A Water Management Plan was prepared to manage the potential environmental consequences of LW S1A-S6A extraction on groundwater in accordance with Condition C8 of SSD 8445.

During this reporting period, the following groundwater monitoring was conducted:

- shallow groundwater levels, quality and pressures, and deep groundwater levels / pressures – monthly monitoring data reviewed by SLR on a monthly basis (SLR, 2025; refer to **Appendix C**); and
- mine water intake – data for this reporting period reviewed and reported by SLR (SLR, 2025; refer to **Appendix C**).

The following sections summarise the observations made during the reporting period for each groundwater category. Performance against all Groundwater Management Plan TARPs for the reporting period are summarised in **Table 2-1**, and actions and responses completed relating to any TARP triggers are discussed below.

3.3.1 Groundwater Bore Levels

3.3.1.1 Overview of Monitoring Results

The Tahmoor South Monitoring Network comprises both open standpipes (OSP) and Vibrating Wire Piezometers (VWPs). The standpipe piezometers can be used for monitoring water levels manually or with an automated datalogger, as well as for collection of water samples for groundwater quality monitoring purposes. The VWPs are grouted and therefore can only be used for monitoring groundwater pressures but do allow for multiple instruments to be installed at different depths within a single borehole. The locations of groundwater monitoring bores are provided in **Figure 3-10**.

Further detail on groundwater level results, including graphs showing progressive groundwater levels, are provided in the SLR Groundwater Monitoring Report (refer to SLR, 2025; **Appendix C**).

Shallow OSPs bores

Groundwater level monitoring of shallow standpipe bores during the July–December 2024 reporting period identified three new TARP trigger activations where existing exceedances crossed the six-month duration threshold required for formal trigger status (SLR, 2025).

P55B recorded a new TARP Level 3 trigger, with groundwater levels below the 262.87 mAHD threshold extending beyond six months from the initial exceedance in November 2023. P55C similarly achieved TARP Level 3 trigger status, remaining below 256.64 mAHD for 207 consecutive days (6.8 months) from May through December 2024. P51B recorded a new TARP Level 1 trigger period commencing May 2024, with levels below 297.52 mAHD for 197 consecutive days (6.5 months) through December 2024. P51B had previously been below TARP Level 1 from May 2023 to April 2024, with groundwater levels only briefly recovering above the threshold for approximately 20 days before declining again (SLR, 2025).

Twelve additional TARP triggers remained active throughout the reporting period across the shallow standpipe network, representing sustained exceedances that achieved trigger status in previous monitoring periods. These include established Level 1 triggers at P53A, P53B, P53C, and P55A. P56B recorded a short-term Level 1 event in September only (no data thereafter). Multiple Level 2 and Level 3 triggers at P53C, P55B, P55C, and P56C. REA4 maintained a completed historical Level 1 trigger period but did not record a new exceedance during the reporting period. Short-term breaches were observed at some sites (e.g. P56B in September) but these did not meet the six-month threshold for formal exceedance (SLR, 2025).

The new Level 3 triggers at P55B and P55C require implementation of enhanced response protocols under WMP8, including detailed investigations to assess mining-related causation, increased monitoring frequency, and assessment of long-term supply viability impacts (SLR, 2025).

No consistent relationship is evident between groundwater level fluctuations and groundwater quality parameters during the reporting period (SLR, 2025).

Several groundwater monitoring sites recorded notable declines during the reporting period. The causation of these declines, including the potential influence of mining progression, climatic variability, and natural aquifer dynamics, is explored in **Appendix C**.

Overall, shallow groundwater levels in both OSP bores and VWPs continued to show widespread departures from baseline and modelled predictions, with multiple sustained exceedances under WMP8 and WMP9. While some short-term breaches were observed at other sites, these did not meet the formal exceedance definition under the WMP (SLR, 2025).

Private bores

Groundwater levels in private bores varied throughout the monitoring period, with a mixture of sustained TARP exceedances and short-term breaches observed across the network. GW104659 recorded a sustained Level 1 exceedance, with all six monthly measurements below the 248.36 mAHD threshold during July to December 2024. This continues an extended period of non-compliance that commenced in April 2023 and now extends for 21 consecutive months. In addition, GW104659 recorded a completed Level 2 exceedance earlier in January to June 2024 and experienced isolated short-term Level 3 breaches in August and December 2024 (SLR, 2025).

GW109257 also recorded a sustained Level 1 exceedance, with all six monthly measurements below the 276.26 mAHD threshold during the reporting period. This continues a period of sustained exceedance commencing in August 2023 and extending for 17 consecutive months. Short-term Level 2 breaches were observed in August and again in November and December 2024, but these did not meet the threshold for formal exceedance under the WMP definition (SLR, 2025).

In contrast, GW104323 only recorded short-term breaches below all three TARP levels during November and December 2024. As these declines were limited to a two-month period, they did not satisfy the requirement for a six-month consecutive exceedance and therefore do not qualify as a formal trigger exceedance (SLR, 2025).

No landholders reported any adverse impacts to water supply use during the reporting period, and investigations have not identified direct evidence linking the observed drawdowns to mining activities. The overall exceedance patterns remain consistent with rainfall variability and historical groundwater usage trends within the region (SLR, 2025).

Shallow VWPs (sensors <200 metres)

Shallow VWP monitoring during the July–December 2024 reporting period demonstrated continuation of TARP triggers established earlier in 2024, with multiple exceedances crossing the six-month duration threshold to achieve formal trigger status (SLR, 2025).

Formal exceedances were recorded at TBC027 (HBSS-95 m, Level 1), TBC032 (HBSS-95 m, Level 2 and Level 3), and TBC032 (HBSS-131 m, Level 3). In addition to the sustained Level 3 triggers at TBC032 (95m and 131m), TBC032 (200m) recorded a formal Level 1 exceedance throughout Jul–Dec 2024, and TBC032 (181m) escalated from Level 1 (Jul–Nov) to Level 2 in December (SLR, 2025).

Overall, shallow groundwater levels in both OSP bores and VWPs continued to show widespread departures from baseline and modelled predictions, with multiple sustained exceedances under WMP8 and WMP9. While some short-term breaches were observed at other sites, these did not meet the formal exceedance definition under the WMP (SLR, 2025).

Deep VWPs (sensors >200 metres)

No TARP triggers were recorded for deep groundwater levels (WMP10) during the reporting period. Analysis of 41 deep VWP sensors confirmed that observed drawdown differences from modelled predictions remained within acceptable thresholds, with no exceedances of the ±30 m criterion for consecutive 3, 6 or 12-month periods (SLR, 2025).

3.3.1.2 TARP WMP8 – Shallow Groundwater Level (Open Standpipes and Private Bores)

Background

During the reporting period, a number of groundwater TARP triggers occurred as summarised below:

- Monitoring bore P51B: Level 1 TARP triggered in December 2024;
- Monitoring bore P53A: Level 1 TARP triggered from the entire monitoring period;
- Monitoring bore P53B: Level 1 TARP triggered from the entire monitoring period;
- Monitoring bore P53C: Level 2 TARP triggered for the entire monitoring period;
- Monitoring bore P55B: Level 3 TARP triggered for the entire monitoring period;
- Monitoring bore P55C: Level 2 TARP trigger for July to November, Level 3 TARP trigger for December 2024;
- Monitoring bore P56C: Level 2 TARP trigger for July to September 2024;
- Private bore GW104659: Level 1 TARP triggered for the entire monitoring period; and
- Private bore GW109257: Level 1 TARP triggered for the entire monitoring period.

The spatial distribution of these triggers is illustrated in **Figure 3-11**. Further discussion of these triggers is provided in the Groundwater Monitoring Report (refer to **Appendix C**).

Actions and Responses Completed

Table 3-7 outlines the actions and responses that are required to be completed in accordance with Level 1, 2 and 3 TARP triggers for shallow groundwater level reduction (TARP WMP8), as well as how these actions and responses have been addressed.

Table 3-7 Actions and Responses for Level 1, 2 and 3 TARP Triggers for Groundwater Level Reduction (TARP WMP8)

Action / Response from TARP WMP8	Tahmoor Coal response
Actions	
Level 1, 2 and 3 TARP Continue monitoring and review of data as per monitoring program.	Monthly monitoring and review of data is ongoing according to the monitoring program.
Level 1, 2 and 3 TARP Undertake an investigation to assess cause and determine if mining related.	An investigation to assess cause of the water level decline is provided in Section 4 of **Appendix C.** Groundwater level decline at P53, P55 and GW104659 could be due to ongoing mining effect. However, at the remaining locations, it cannot definitively be attributed to extraction activities.
Level 1, 2 and 3 TARP Undertake investigation to determine if the decline will impact the long-term viability of the affected water supply works.	Current drawdown associated with exceedances is localised. Consequently, there is no indication that extensive regional aquifer drawdown is occurring of that any impact would be observed in existing water supply works.
Level 1, 2 and 3 TARP Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, surface water level results).	Relevant information was obtained from key specialists necessary to inform assessment (refer Section 4 of **Appendix C**).

Action / Response from TARP WMP8	Tahmoor Coal response
Level 1, 2 and 3 TARP If the changes have been confirmed to be related to mining effects: For Open Standpipe Monitoring Bores: • For monitoring sites relevant to Thirlmere Lakes or associated with surface water monitoring sites, initiate groundwater – surface water interaction TARP. For Private Bores: • Initiate negotiations with impacts landowners as soon as practicable. Consider all reasonable and feasible options for remediation as relevant (e.g. extending the depth of the bore, establishment of additional bores, etc – as per Section 6.2.1.4 of the Water Management Plan).	Regarding open standpipe monitoring bores, it is noted that WMP12 has been initiated for P53 and P55 nested bores. WMP13 (Thirlmere Lakes) has not been enacted. Regarding private bores, no private bore decline has been definitively attributed to mining. No landholder has reported impacts requiring ameliorative actions at this point in time.
Level 2 and 3 TARP Consider increasing monitoring and review of data at sites where Level 2 has been reached, subject to land access. Reasons for not increasing monitoring frequency could include confident identification causation that do not require further monitoring (e.g. singular anthropogenic impact resulting in water level change, or confirmed as a mining-related impact). Increased monitoring could be beneficial where commensurate responses in paired surface water monitoring locations have been observed.	Review indicates the cause of the triggers is known and no cause for additional monitoring and data review is required. The current frequency of water level monitoring is sufficient for impact assessments (i.e. 15 minute readings capture minor water level fluctuations, with monthly review allowing enough temporal scale for causation analysis).
Level 2 and 3 TARP Compare against base case and deterministic model scenarios.	TARP trigger levels accommodate the base case and deterministic model scenarios. With each model update, these levels will continue to be reviewed and revised as necessary.
Level 2 and 3 TARP Review Water Management Plan and modify if necessary.	Update of the WMP completed in June 2024. No update required at this point, which will be reviewed upon submission of the next annual report.
Level 2 and 3 TARP For Private Bores: • Review CMAs in light of findings from further investigations and consider additional reasonable and feasible options.	Not applicate as no Level 2 TARP triggers have occurred for private bores.
Level 3 TARP Increase monitoring and review of data frequency for sites where Level 3 has been reached, and cause is unknown, subject to land access.	Cause of Level 3 trigger is known, and no increase in monitoring frequency is necessary.
Level 3 TARP Undertake a detailed investigation to assess the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing, effect unrelated to mining or the prevailing climate).	Detailed investigation, including comparison to local monitored subsidence data and climate data, has been completed in **Appendix C**.

Action / Response from TARP WMP8	Tahmoor Coal response
Responses	
Level 1, 2 and 3 TARP Report trigger exceedance to DPHI and key stakeholders.	Notification of this exceedance to DPHI is completed as part of this report.
Level 1, 2 and 3 TARP Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.	Completed as part of this report, and to be incorporated into forthcoming Annual Review (which will include subsidence impact reporting).
Level 1, 2 and 3 TARP If the changes have been confirmed to be related to mining effects: For Private Bores: • Provide DPHI and key stakeholders with proposed corrective management actions (CMAs) for consultation (e.g. extending the depth of the bore, establishment of additional bores, compensation to affected landowners as detailed in Section 6.2.1.4 of the Water Management Plan). • Implement CMAs, subject to land access (finalise negotiations and implement the agreed "make-good" arrangements). • Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.	No private bore decline has been attributed to mining. No landholder has reported impacts requiring ameliorative actions at this point in time.
Level 2 and 3 TARP Advise DPHI and key stakeholders of any required amendments to Water Management Plan.	Changes to the WMP will be made in accordance with the regulatory guidelines, provided as track changes to the Department for review. No required changes have been identified via this reporting.
Level 2 and 3 TARP For Private Bores: Provide findings of CMA review to DPHI and key stakeholders for consultation.	No CMA required at this point.
Level 2 and 3 TARP For Private Bores: Implement additional CMAs, subject to land access.	No CMA required at this point.
Level 3 TARP For Private Bores: • Develop a Rehabilitation Management Plan in consultation with DPHI and key stakeholders. • Implement Rehabilitation Management Plan, subject to land access.	No level 3 triggers for private bores.

Proposed Actions and Responses

The current monitoring program will continue in accordance with the LW S1A-S6A Water Management Plan. The next update will be provided as part of the next reporting requirement.

3.3.1.3 TARP WMP9 – Shallow Groundwater Pressure (VWP Sensors < 200 m depth)

Background

During the reporting period, a number of groundwater TARP triggers occurred in shallow VWP sensors, as summarised below:

- TBC027 (HBSS-95m): Level 1 TARP triggered for November to December 2024;
- TBC032 (BHCS-95m): Level 3 TARP triggered for November to December 2024;
- TBC032 (HBSS-131m): Level 3 TARP triggered for the entire reporting period;
- TBC032 (BHCS-181m): Level 1 TARP triggered for July to November 2024, Level 2 triggered for December 2024; and
- TBC032 (BGSS-200m): Level 1 TARP triggered for the entire reporting period.

The spatial distribution of these triggers is illustrated in **Figure 3-11**. Further discussion of these triggers is provided in the Groundwater Monitoring Report (refer to **Appendix C**).

Actions and Responses Completed

Table 3-8 outlines the actions and responses that are required to be completed in accordance with Level 1, 2 and 3 TARP triggers for shallow groundwater pressure (TARP WMP9), as well as how these actions and responses have been addressed.

Table 3-8 Actions and Responses for Level 1,2 and 3 TARP Triggers for Shallow Groundwater Pressure (TARP WMP9)

Action / Response from TARP WMP9	Tahmoor Coal response
Actions	
Level 1, 2 and 3 TARP Continue monitoring and review of data as per monitoring program.	Monthly monitoring and review of data is ongoing according to the monitoring program.
Level 1, 2 and 3 TARP Undertake an investigation to assess cause and determine if mining related.	An investigation to assess cause of the water level decline TBC032 is provided in Section 4 of **Appendix C**. The cause appears to be mining related.
Level 1, 2 and 3 TARP Discuss findings and obtain other relevant information from key specialists (e.g., subsidence monitoring results, surface water level results).	Relevant information was obtained from key specialists necessary to inform assessment (refer to Section 4 of **Appendix C**).
Level 2 and 3 TARP Review deeper VWP data at monitored sites. Determine whether additional review of data is required.	Deeper VWP datasets were reviewed in conjunction with shallow VWP exceedances. No additional review was required beyond the ongoing monitoring and reporting program.
Level 2 and 3 TARP Compare against base case and deterministic model scenarios.	Observed exceedances were compared against base case and deterministic model scenarios in **Appendix C**. Results remain consistent with predicted drawdown envelopes, with exceedances managed in accordance with the WMP.
Level 2 and 3 TARP Review Water Management Plan and modify if necessary.	Update of the WMP completed in June 2024. No update required at this point, which will be reviewed upon submission of the next annual report.
Level 3 TARP (action as per Level 2 TARP) Review deeper VWP data at monitored sites. Determine whether additional review of data is required.	Current drawdown associated with exceedances is localised. Consequently, there is no indication that regional aquifer drawdown is occurring of that any impact would be observed in existing water supply works.
Level 3 TARP (action as per Level 2 TARP)	Review of all VWP sites included in this reporting. Only TBC032 reporting TARP triggers.

Action / Response from TARP WMP9	Tahmoor Coal response
Determine if review of additional existing VWP sites is required.	
Level 3 TARP (action as per Level 2 TARP) Consider increasing frequency of data review at sites where Level 2 has been reached or at other relevant sites. Reasons for not increasing monitoring frequency could include confident identification causation that do not require further monitoring (e.g. singular anthropogenic impact resulting in water level change or confirmed as a mining-related impact). Increased monitoring could be beneficial where commensurate responses in paired surface water monitoring locations have been observed.	Cause of TARP trigger known, no cause for increase of monitoring frequency.
Level 3 TARP (action as per Level 2 TARP) Compare against base case and deterministic model scenarios.	TARP trigger levels accommodate the base case and deterministic model scenarios. With each model update, these levels will continue to be reviewed and revised as necessary.
Level 3 TARP (action as per Level 2 TARP) Review Water Management Plan and modify if necessary.	Update of the WMP completed in June 2024. No update required at this point, which will be reviewed upon submission of the next annual report.
Level 3 TARP Increase frequency of data review for sites where Level 3 has been reached and the cause is unknown.	Cause of Level 3 trigger identified and discussed in Section 4 of **Appendix C**.
Level 3 TARP Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing, other catchment changes, effect unrelated to mining or the prevailing climate). Commence/complete as soon as practicable.	Detailed investigation, including comparison to local monitored subsidence data and climate data, has been completed (refer to **Appendix C**).
Level 3 TARP Undertake investigative to review model results in conjunction with field data.	Review of updated model results compared to field data will be undertaken with next iteration of the Groundwater Management Plan.
Responses	
Level 1, 2 and 3 TARP Report trigger exceedance to DPHI and key stakeholders.	Notification of exceedances to DPHI is completed as part of this report.
Level 1, 2 and 3 TARP Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review	Completed as part of this report, and to be incorporated into forthcoming Annual Review (which will include subsidence impact reporting).
Level 1, 2 and 3 TARP Advise DPHI and key stakeholders of any required amendments to Water Management Plan.	Changes to the WMP will be made in accordance with the regulatory guidelines, provided as track changes to the Department for review.

Proposed Actions and Responses

The current monitoring program will continue in accordance with the LW S1A-S6A Water Management Plan. The next update will be provided as part of the next reporting requirement.

3.3.1.4 TARP WMP10 – Groundwater Level / Pressure Deep VWPs (>200 m depth excluding monitoring the Bulli Coal Seam)

During this reporting period, there have been no triggers under this TARP.

3.3.2 Groundwater Quality

3.3.2.1 Overview of Monitoring Results

Groundwater quality has been monitored monthly in the OSPs (monitoring network and private bores) since the commencement of extraction. The Tahmoor South Groundwater Monitoring Network, and the locations of groundwater monitoring bores is provided in **Figure 3-10**.

Further detail on groundwater quality results, including graphs showing progressive groundwater quality results, are provided in the Groundwater Monitoring Report (refer to **Appendix C**). Further detail and discussion of TARP triggers for groundwater level are also discussed in the sections below.

Electrical conductivity and pH

Several bores recorded short-term breaches of salinity (EC) and pH triggers during the reporting period. These were generally sporadic and not consistent across multiple sites. The most notable changes were observed in the P55 cluster, where progressive salinity increases coincided with groundwater level declines. However, these breaches did not meet the WMP definition for an exceedance (i.e. six or more consecutive months across three or more sites) (SLR, 2025).

Metal concentrations

Sporadic metal breaches were recorded for Fe, Mn, Cu and Pb at some standpipes and private bores (e.g. REA4, GW104008, GW109257). These were isolated events and not consistent in space or time, and therefore are considered breaches only, not exceedances.

In contrast, Barium recorded sustained exceedances across multiple sites. Barium levels at P53B, P53C and REA4 remained above their respective trigger values for six or more consecutive months during July to December 2024. This constitutes a formal Level 2 TARP exceedance under WMP11 (SLR, 2025).

3.3.2.2 TARP WMP11 – Groundwater Quality (Open Standpipes and Private Bores)

Background

Overall, groundwater quality in the reporting period was characterised by a formal exceedance for Barium (Level 2 at P53B, P53C and REA4). All other observed parameter exceedances were breaches only, being either short-term or limited to individual sites, and therefore did not meet the definition of a TARP exceedance (SLR, 2025).

The nested P53 bores remain inconsistent, with P53B and P53C showing increasing Barium trends, while P53A shows a decreasing trend. REA4 continues to show elevated Barium relative to P52, which shows no trend. Further investigation into potential mining-related influences on Barium is recommended (SLR, 2025).

Actions and Responses Completed

Table 3-9 outlines the actions and responses that are required to be completed in accordance with Level 2 TARP triggers for Groundwater Water Quality (TARP WMP11), as well as how these actions and responses have been addressed.

Table 3-9 Actions and Responses for Level 2 TARP Triggers for Groundwater Water Quality (TARP WMP11)

Action / Response from TARP WMP11	Tahmoor Coal response
Actions	
Level 1 and 2 TARP Continue monitoring and review of data as per monitoring program.	Continue routine groundwater quality monitoring. Conduct internal review of groundwater quality trends at impacted sites, considering climate variability and nearby groundwater trends. Attribute cause where possible and document in Annual Reviews. No further action required unless triggers escalate or sustained deterioration is observed. Routine groundwater quality monitoring continued at all sites. Monitoring and review undertaken in accordance with the WMP.
Level 1 and 2 TARP Undertake an investigation to assess cause and determine if mining related.	Investigation of Barium exceedances at P53B, P53C and REA4 undertaken. While elevated levels were sustained, causation remains uncertain with both mining and natural variability considered. Continued monitoring recommended.
Level 1 and 2 TARP Undertake investigation to demonstrate if the change in quality will impact the long-term viability of the affected water supply works.	Assessment indicated that current Barium exceedances do not compromise the long-term viability of water supply works. No impacts to landholder supply identified during the reporting period.
Level 1 and 2 TARP Discuss findings and obtain other relevant information from key specialists (e.g., subsidence monitoring results, surface water level results).	Groundwater quality exceedances reviewed with subsidence and surface water specialists. No direct linkage identified; further monitoring will continue.
Level 1 and 2 TARP If the changes have been confirmed to be related to mining effects: • For Private Bores: Initiate negotiations with impacted landholders as soon as practicable. Consider all reasonable and feasible options for remediation as relevant. This could include potential for implementation of make-good provisions as per Section 6.2.1.4 of the Water Management Plan for affected private bore owners (e.g. provision of access to an alternative source of water). • For Open Standpipe Monitoring Bores: For monitoring sites relevant to Thirlmere Lakes or associated with surface water monitoring sites, initiate groundwater – surface water interaction TARP.	No private bore exceedances attributable to mining during this period; make-good not required. No evidence of groundwater–surface water interaction impacts; WMP12 not initiated.
Level 1 and 2 TARP Consider increasing monitoring and review of data at sites where Level 2 has been reached, subject to land access. Reasons for not increasing monitoring frequency could include solid identification causation that do not require further monitoring (e.g. singular anthropogenic impact resulting in water quality change).	Monitoring frequency maintained as sufficient to capture water quality trends. No increase required for this reporting period.
Level 1 and 2 TARP Review Water Management Plan and modify if necessary.	Update of the WMP completed in June 2024. No update required at this point, which will be reviewed upon submission of the next annual report.
Level 1 and 2 TARP For Private Bores:	No private bore quality exceedances attributable to mining. Review of CMAs not required.

Action / Response from TARP WMP11	Tahmoor Coal response
• Review CMAs in light of findings from further investigations and consider additional reasonable and feasible options	
Responses	
Level 1, 2 and 3 TARP Report trigger exceedance to DPHI and key stakeholders.	Exceedances reported to DCCEEW/DPHI within required timeframes.
Level 1, 2 and 3 TARP Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review	Completed as part of this report, and to be incorporated into the Annual Review.
Level 1, 2 and 3 TARP If the changes have been confirmed to be related to mining effects: **For Private Bores:** • Provide DPHI and key stakeholders with proposed corrective management actions (CMAs) for consultation (e.g, provision of access to an alternative source of water as detailed in Section 6.2.1.4 of the Water Management Plan). • Implement CMAs, subject to land access. • Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.	Not applicable. No exceedances at private bores attributed to mining.
Level 2 TARP Advise DPHI and key stakeholders of any required amendments to Water Management Plan.	No amendments to the WMP required at this time. Any future changes will be submitted in accordance with regulatory requirements.
Level 2 TARP **For Private Bores:** • Provide findings of CMA review to DPHI and key stakeholders for consultation. • Implement additional CMAs, subject to land access.	Not applicable. No CMAs triggered.

Proposed Actions and Responses

The current monitoring program will continue in accordance with the LW S1A-S6A Water Management Plan. The next update will be provided as part of the next reporting requirement.

3.3.3 Groundwater and Surface Water Interaction

3.3.3.1 Overview of Monitoring Results for Groundwater – Surface Water Connectivity

Groundwater monitoring is undertaken within nearby vicinity of surface watering at multiple locations to assist with the review of groundwater – surface water interaction. Namely to assist with defining if surface flow changes identified are attributable to baseflow loss due to groundwater depressurisation resultant from mining activities. Further detail of the groundwater – surface water interaction review is provided in the Surface Water Monitoring Report (**Appendix B**) and Groundwater Monitoring Report (**Appendix C**).

WMP12 pertains specifically to the monitoring of potential impacts on groundwater – surface water interactions. Assessment under this TARP is initiated if a TARP WMP8 trigger is confirmed to be related to mining effects.

3.3.3.2 TARP WMP12 – Groundwater – Surface Water Interaction

Background

Numerous triggers of TARP WMP8 occurred during this reporting period. It is enacted when one of the TARP bores (those associated with surface water monitoring units) has triggered TARP WMP8. The bores for which TARP WMP12 has been enacted include:

- P53 nested bores – associated with surface water site TT13-Qla; and
- P55 nested bores – associated with surface water site TT1-QLa.

As discussed in **Section 3.3.1.2**, the following bores triggered a TARP level for TARP WMP8:

- Monitoring bore P51B: Level 1 TARP triggered for December 2024;
- Monitoring bore P53A: Level 1 TARP triggered for the entire monitoring period;
- Monitoring bore P53B: Level 1 TARP triggered for the entire monitoring period;
- Monitoring bore P53C: Level 2 TARP triggered for the entire monitoring period;
- Monitoring bore P55A: Level 1 TARP triggered for the entire monitoring period;
- Monitoring bore P55B: Level 3 TARP triggered for the entire monitoring period;
- Monitoring bore P55C: Level 2 triggered for July to November 2024, Level 3 TARP triggered in December;
- Monitoring bore P56B: Level 1 triggered for September 2024; and
- Monitoring bore P56C: Level 2 triggered for July to September 2024.

WMP12 triggers remained active at P53 and P55 clusters; however, no corresponding surface water exceedances were observed. Significant vertical separation persists, and available data do not suggest measurable mining-related impacts on surface water conditions during this period (SLR, 2025).

Further discussion of this review is provided in the Groundwater Monitoring Report (SLR, 2025; refer to **Appendix C**).

Actions and Responses Completed

Table 3-10 outlines the actions and responses that are required to be completed in accordance with Level 1, 2 and 3 TARP triggers for groundwater – surface water interaction (TARP WMP12), as well as how these actions and responses have been addressed.

Table 3-10 Actions and Responses for Level 1, 2 and 3 TARP Triggers for Groundwater – Surface Water Interactions (TARP WMP12)

Action / Response from TARP WMP12	Tahmoor Coal response
Actions	
Level 1, 2 and 3 TARP Continue monitoring and review of data as per monitoring program.	Monthly monitoring and review of data is ongoing according to the monitoring program.
Level 1, 2 and 3 TARP Undertake an investigation to assess cause and determine if mining related.	An investigation to review if the trigger at WMP8 is indicative of groundwater – surface water interaction changes (WMP12) has been completed. TARP WMP12 has been initiated for P53 and P55 due to TARP triggers (WMP8) and the assessment that groundwater level decline could be due to ongoing mining effect. There are no surface water triggers at the associated sites. Detailed investigation into the site-specific groundwater surface water relationship indicated there is unlikely to be a direct relationship between groundwater drawdown and surface water changes.

Action / Response from TARP WMP12	Tahmoor Coal response
	It was determined that it is unlikely that mining activities are influencing groundwater – surface water interactions during the reporting period.
Level 1, 2 and 3 TARP Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, surface water level results).	Relevant information was obtained from key specialists necessary to inform assessment and discussed with the Environmental Response Group (refer Section 4.2 of **Appendix C**).
Level 2 and 3 TARP Increase frequency of data review to fortnightly at sites where Level 2 has been reached, subject to land access. Reasons for not increasing frequency could include solid identification causation that do not require further monitoring (e.g. singular anthropogenic impact resulting in water level change).	Update of network to install loggers in all P53 and P55 bores has been completed, with monthly review of the data occurring. The current frequency of water level monitoring is sufficient for impact assessments (i.e. 15-minute readings capture minor water level fluctuations, with monthly reporting allowing enough temporal scale for causation analysis).
Level 2 and 3 TARP Compare against base case and deterministic model scenarios.	Completed as part of trigger level review.
Level 2 and 3 TARP Review manual water level measurements for additional monitoring sites to identify potential spatial trends in water level decline.	Review of spatial trends of water level was undertaken as part of this report.
Level 2 and 3 TARP Review surface water data to assess for surface water level decline at relevant site.	Review of surface water data in conjunction with groundwater data at the relevant site was undertaken as part of this report. No triggers were observed at relative surface water sites.
Level 2 and 3 TARP Review CMAs in light of findings from further investigations and consider additional reasonable and feasible options.	CMAs are not required at this point (no correlation between groundwater impacts and the surface water site noted at this point).
Level 2 and 3 TARP Review Water Management Plan and modify if necessary.	Changes to the WMP will be made in accordance with the regulatory guidelines, provided as track changes to the Department for review. No required changes have been identified via this reporting.
Level 3 TARP Increase frequency of data review for sites where Level 3 has been reached and cause is unknown, subject to land access.	Data frequency review is sufficient, given no triggers at relative surface water sites and cause of groundwater decline is known.
Level 3 TARP Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing, other catchment changes, effect unrelated to mining or the prevailing climate). Report to be commenced and completed as soon as practicable.	Investigation undertaken as part of this reporting, and previous detailed analysis of groundwater – surface water interaction. No further investigation required at this point.
Responses	
Level 1, 2 and 3 TARP Report trigger exceedance to DPHI and key stakeholders.	Notification of this exceedance to DPHI is completed as part of this report.
Level 1, 2 and 3 TARP Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.	Completed as part of this report.

Action / Response from TARP WMP12	Tahmoor Coal response
Level 1, 2 and 3 TARP If the changes have been confirmed to be related to mining effects: • Provide DPHI and key stakeholders with proposed corrective management actions (CMAs) for consultation (e.g. extending the depth of the bore, establishment of additional bores, compensation to affected landowners as detailed in Section 6.2.1.4 of the Water Management Plan). • Implement CMAs, subject to land access. • Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.	It was determined that it is unlikely that extraction is currently impacting groundwater – surface water interactions. Therefore, these responses have not been enacted at this time.
Level 2 and 3 TARP Provide findings of CMA review to DPHI and key stakeholders for consultation.	CMA not required at this point.
Level 2 and 3 TARP Implement additional CMAs, subject to land access.	CMA not required at this point.
Level 2 and 3 TARP Advise DPHI and key stakeholders of any required amendments to Water Management Plan, including reporting on relationship of observations to baseline and deterministic model scenarios, as necessary.	Changes to the WMP will be made in accordance with the regulatory guidelines, provided as track changes to the Department for review. No required changes have been identified via this reporting.
Level 3 TARP Develop a Rehabilitation Management Plan in consultation with DPHI and key stakeholders.	Not required at this point.
Level 3 TARP Implement Rehabilitation Management Plan, subject to land access.	Not required at this point.

Proposed Actions

The current monitoring program will continue in accordance with the LW S1A-S6A Water Management Plan. The next update will be provided as part of the next reporting requirement.

3.3.3.3 TARP WMP13 – Groundwater Bores Monitoring for Thirlmere Lakes

During this reporting period, there have been no triggers under this TARP.

3.3.4 Mine Water Intake

Tahmoor Coal has a Groundwater Licence (WAL 36442) to extract 1642 ML/year of groundwater make from underground.

The inferred water make is calculated from the difference between total mine inflows and total mine outflows. This calculation is assisted by input from flow meters installed on fresh water supply lines that pump water into the mine (mine inflow from Sydney Water supply to underground workings), and flow meters on three pipelines that extract water from underground (mine outflow). In addition, mine inflow and outflow also include a measurement of water that enters and exits the mine through other means such as moisture in air vented in and out of the mine (water in vented air), and moisture in coal extracted from the mine.

Water make calculations provide an indication of the groundwater pumped out of the total Tahmoor Mine underground workings.

Since 2009, observed inflows to Tahmoor Mine have ranged from approximately 2 to 7 ML/d. In October 2022, the Western Domain blocks were sealed. Since this time, the average groundwater inflow from Tahmoor underground workings is reported as 2.3 ML/d (SLR, 2025; **Appendix C**).

The reporting period falls within the first half of the 2024-25 water year. As of 31 December 2024, the cumulative groundwater make for water year 2024-25 (first six months of the water year) is 587 ML/y, which currently remains below the groundwater entitlement of 1,642 ML/y (i.e. water year) (refer **Figure 3-9**).

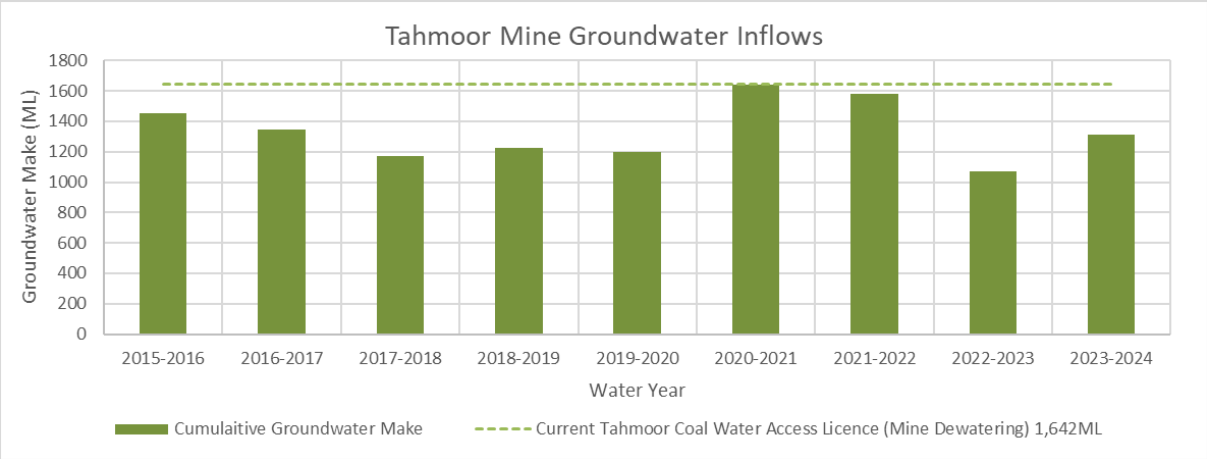

*Figure 3-9 Groundwater Make per Water Year (financial year) from 2015/16 to 2023/24 (source SLR 2025; **Appendix C**).*

3.3.5 Recommendations and Actions

3.3.5.1 Current Groundwater Monitoring Recommendations

As discussed in the Groundwater Review for July to December 2024 (SLR, 2025; **Appendix C**), the following groundwater recommendations were made for this reporting period by SLR:

- Continue the established monitoring program, including routine groundwater level and quality monitoring in accordance with the approved Water Management Plan (WMP). Monitoring outcomes should continue to be reported in six-monthly groundwater reports and at Environmental Response Group (ERG) meetings;
- Undertake an internal review of WMP11 (groundwater quality) exceedances, focusing on:
    - Reviewing quality trends at impacted bores (e.g., P55 cluster, REA4, private bores);
    - Considering groundwater level trends and climate conditions;
    - Confirming alignment with the WMP11 response framework; and
    - Documenting outcomes within the Annual Review.
- Initiate an internal review of sustained Level 3 groundwater level triggers (WMP8 and WMP9), specifically:
    - Reviewing the duration and spatial extent of Level 3 exceedances (P55B, P55C, TBC032, TBC024, TBC034);
    - Considering whether any adaptive management actions are warranted; and
    - Assessing the need to review groundwater model predictions and trigger thresholds.
- Maintain readiness to implement WMP-defined make-good or remedial actions, particularly where ongoing Level 1 water quality or Level 3 groundwater level exceedances may impact private bore users;
- Monitor for any need to review or update the WMP or TARP framework, should exceedances escalate, or cumulative trends indicate potential for broader aquifer impact; and
- Continue to monitor Thirlmere Lakes (WMP13) where data becomes available and review any relevant exceedances in line with the WMP13 TARP structure.

Progress of these recommendations will be provided in the next Annual Review report, to be provided to DPHI by 31 March 2026.

3.3.5.2 Previous Groundwater Monitoring Recommendations

Table 3-11 provides the recommendations as made in the previous Six-Monthly Subsidence Impact Report (January to June 2024) for groundwater, along with an update on the progress of these recommendations.

Table 3-11 Groundwater recommendations from the previous Six-Monthly Subsidence Impact Report and Current Progress

Item	Previous Recommendation	Progress of Recommendation
1	Continue the monitoring program, and the reporting of groundwater level and quality data in the monthly groundwater monitoring reporting.	Ongoing: reporting of groundwater level and quality data to be presented at monthly Environmental Response Group (ERG) meetings
2	Once groundwater level data become available at the Thirlmere Lakes bores, assess groundwater levels against WMP13 to confirm that no groundwater level exceedances occurred following the commencement of LW S1A.	Ongoing: data yet to become available.

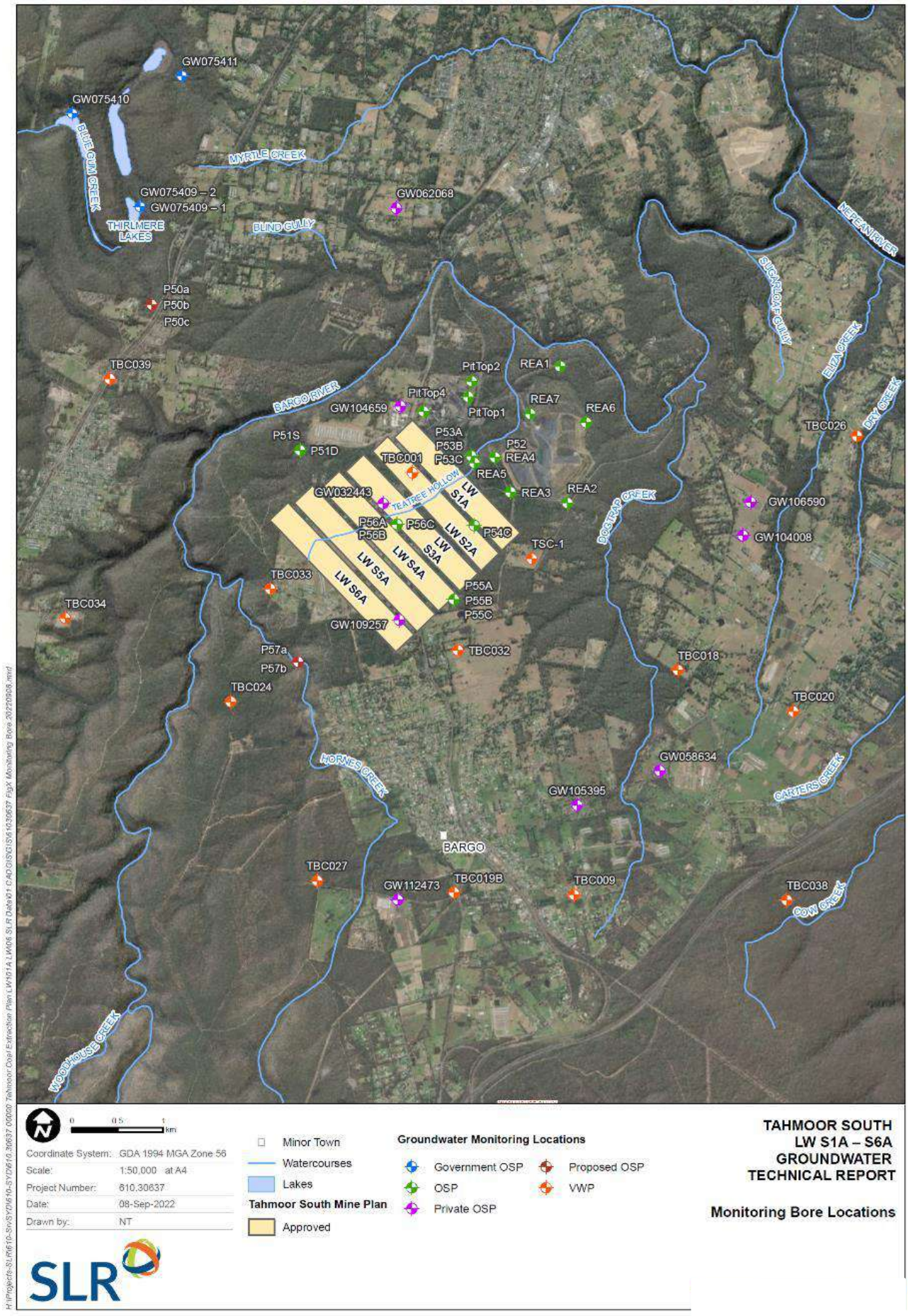

Figure 3-10 LW S1A-S6A Groundwater Monitoring Site (source: LW S1A-S6A Water Management Plan)

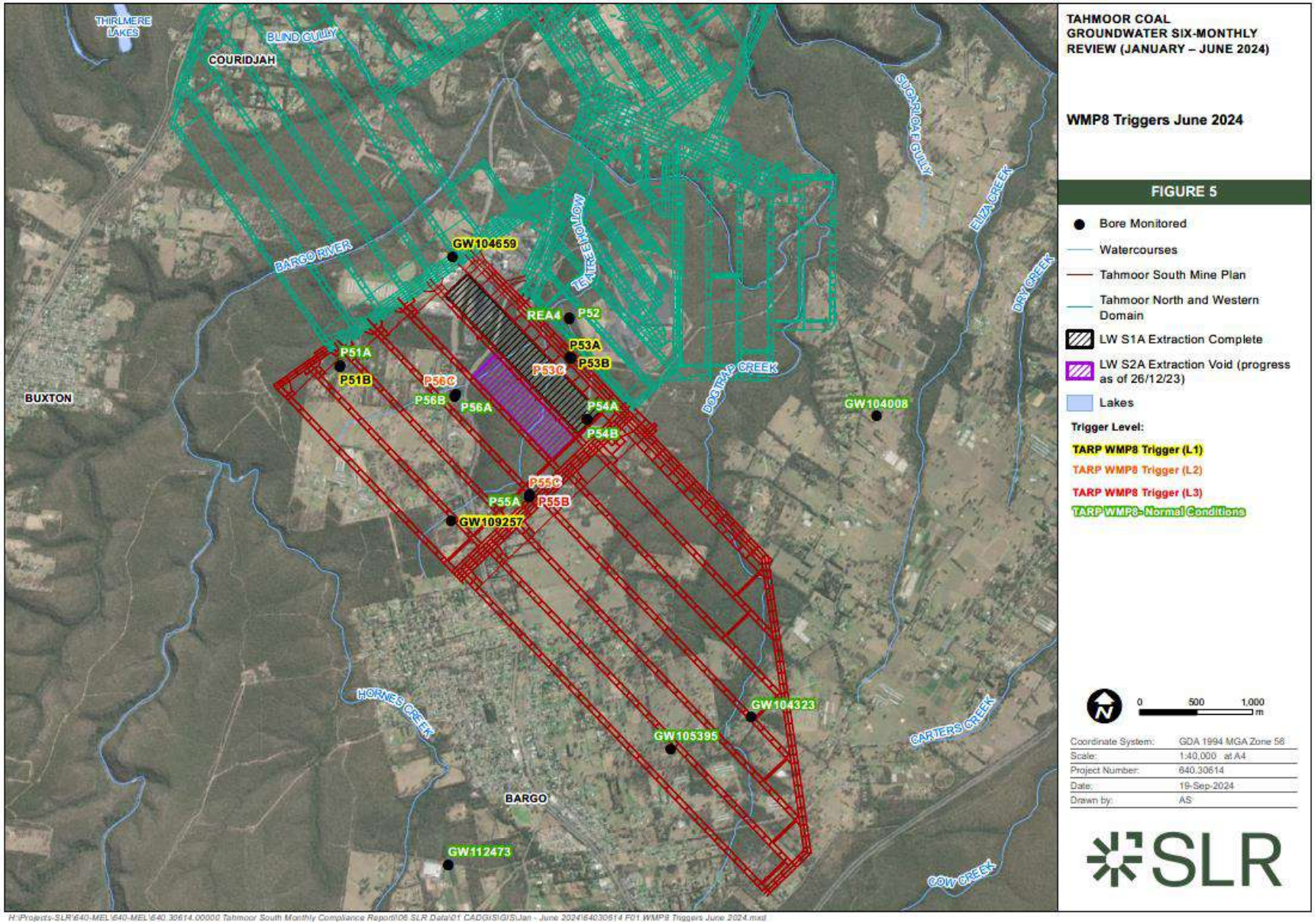

Figure 3-11 *WMP8 Shallow Groundwater Level (Open Standpipes and Private Bores) TARP triggers (source SLR, 2025;* ***Appendix C****).*

3.4 Land Monitoring

The LW S1A-S6A Land Management Plan was prepared to manage the potential environmental consequences of LW S1A-S6A extraction on cliffs, natural steep slopes, farm dams, agricultural land in accordance with Condition C8 of SSD 8445.

During this reporting period, the LW S1A-S6A Land Management Plan has been implemented to monitor the following landscape features:

- Cliffs – visual inspection at the completion of mining by a geotechnical engineer (Cliff BC1 after LW S6A, Cliff BC2 after LW S3A, S4A, S5A and S6A). No further visual inspections have been required during this reporting period;
- Natural steep slopes – monthly visual inspection during active subsidence period by a geotechnical engineer. This monitoring and reporting is completed by Douglas Partners (available on request);
- Farm dams – dam embankment integrity and water level observation every month the active subsidence period by a geotechnical consultant. This monitoring is completed by Douglas Partners on a monthly basis, and reported in their reports (available on request); and
- Agricultural land – weekly inspections along local roads, monthly inspections of farm dams and visual inspection at the completion of each longwall for land within the predicted limit of subsidence for each longwall. This monitoring is covered by the farm dam inspections discussed above and built features monitoring discussed in **Section 3.7.2**. An inspection of agricultural land was completed in December 2024 following the completion of LW S3A (report available on request).

The following sections summarise the observations made during the reporting period for each land category. Performance against all Land Management Plan TARPs for the reporting period are summarised in **Table 2-1**, and actions and responses completed relating to any TARP triggers are discussed in the following sections.

3.4.1 Cliffs

3.4.1.1 Overview of Monitoring Results

The locations of cliffs (BC1 and BC2) within the LW S1A-S6A Study Area are illustrated in **Figure 3-12**.

No active monitoring was required during the reporting period. Cliff BC2 end of LW S3A panel visual inspection will be undertaken prior to commencement of LW S4A extraction.

3.4.1.2 TARP LMP1 – Cliffs

During this reporting period, there have been no triggers under this TARP.

3.4.2 Natural Steep Slopes

3.4.2.1 Overview of Monitoring Results

The locations of natural steep slopes within the LW S1A-S6A Study Area are illustrated in **Figure 3-12**.

During the reporting period, visual and photographic surveys of natural steep slopes were completed monthly for features within LW S3A active subsidence zone. With the exception of steep slope WC1, no visual observations or cracks, localised ground bulging, buckling or shearing was observed at natural steep slopes.

The following describes the inspection findings at WC1:

- From August 2024 to October 2024 inspection, a new fracture measuring approximately 15 mm wide and 600 mm long was observed adjacent to one previously observed in the rocky outcrop

near the 'Big Pool' in Wirrimbirra Creek at the steep slope WC1. From a geotechnical viewpoint, the current movement/cracking at the location is not considered to be detrimental to the stability of the rocky outcrop.

- During the November 2024 inspection a new fracture was observed in the base of the creek upstream of the fractured sandstone block at the steep slope WC1. Fracturing in the creek line adjacent to the Big Pool corresponds to ongoing valley closure measured by nearby GNSS units, and is likely to be due to mine subsidence. From a geotechnical viewpoint, the fractures are considered to not reduce the stability of the rocky outcrop.

From a geotechnical viewpoint, the observed movement/cracking observed at WC1 is not considered to be detrimental to the stability of the rocky outcrop or the water carrying capacity of the creek. No additional movement is discernible between the two boulders / blocks since this initial observation. No TARPs have been triggered in relation to this movement.

Note: during the November to December 2024 inspection, fractures were noted in the bedrock at the vicinity of the WC4. It should be noted that this observation is not directly related to the stability of WC4 and not related to TARP LMP2 – Natural Steep Slopes. This fracturing was also identified by the surface water consultant during survey of the stream. The findings are discussed in **Section 3.2.3**.

3.4.2.2 TARP LMP2 – Natural Steep Slopes

During this reporting period, there have been no triggers under this TARP.

3.4.3 Farm Dams

3.4.3.1 Overview of Monitoring Results

The location of dams within the LW S1A-S6A Study Area are illustrated in **Figure 3-13**.

During the reporting period, visual and photographic surveys for subsidence impacts on dams were completed by a geotechnical engineer on a monthly basis of dams within LW S3A active subsidence zone.

Visual inspections of dams located in the active subsidence zone did not identify any mining-related impacts during the reporting period. Farm dam FD18 experienced some seepage at the toe of the dam wall in during the October 2024 inspection, which is discussed in detailed in **Section 3.4.3.2**.

3.4.3.2 TARP LMP3 – Farm Dams

Background

A Level 1 TARP trigger notification was reported by Douglas Partners following the inspection of Farm Dam FD18 at 15 Caloola Road, Bargo on 3 October 2024 and subsequent reporting on 21 October 2024. The inspection revealed that seepage (without suspended solids) was observed from a couple of existing erosion rills up to 150mm deep near the middle of the dam embankment resulting in a Level 1 trigger under the Land Management Plan, TARP LMP3 (development of isolated seepage without suspended solids from the toe of the farm dam embankment). At one location, the flow was a trickle, i.e. very slow. It was also noted during the inspection that the freeboard was about 150mm at its lowest point (Douglas Partners, December 2024, report available on request).

According to Douglas Partners engineer geologist (refer to Douglas Partners, 2025; **Appendix D**), the erosion rills on the downstream face of the embankment are likely due to overtopping of the dam embankment during heavy rainfall. It was also noted that over 32mm of rainfall occurred in the 7 days prior to the inspection. Douglas Partners indicated that it is likely that the dam has been constructed with no design or specification leading to negligible freeboard and inadequate spillway. Douglas Partners advised that the owner should seek professional advice to increase the freeboard and spillway capacity of the dam, augment the dam embankment and reinstate the erosion rills.

In addition, seepage had previously been identified at the toe of the embankment during the baseline inspection in February 2024; further investigation is required to assess if mine subsidence has contributed to increased seepage during the October 2024 inspection. Douglas Partners indicated that from a risk viewpoint, the volume of water in the pond is small and the consequence category for FD18 is considered to be low. The risk to public and property downstream due to a dam break event is also considered to be low (i.e. within acceptable risk range).

A subsequent inspection on 29 October 2024 revealed that no seepage was present. The Level 1 TARP trigger has returned to Normal Range during the November and December 2024 inspections.

Actions and Responses Completed

Table 3-12 outlines the actions and responses that are required to be completed in accordance with a Level 1 TARP trigger for change to historical heritage items (TARP LMP3), as well as how these actions and responses have been addressed.

Table 3-12 Actions and Responses for Level 1, for Land Management Plan TARP – LMP3 Farm Dams

Action / Response from TARP WMP12	Tahmoor Coal response
Actions	
Level 1 TARP Continue monitoring and review of data as per monitoring program.	Monitoring and review of inspection finding is ongoing according to the monitoring program.
Level 1 TARP Geotechnical consultant inspection to assess cause and determine need for further action/investigation.	Douglas Partners provided an assessment report of the observations up to date at Farm Dam FD18 (refer to Letter Report **Appendix D**). The report outlined the following: - It is likely that the farm dam has been constructed with no design of specifications leading to negligible freeboard and inadequate spillway. Douglas Partners advised that the freeboard and spillway should be increased. - Due to the design, the dam appears to be overtopping during heavy rainfall events. - Seepage was identified through the farm dam foundation and lower embankment during the initial baseline inspection in February 2024. - Desilting work from the owner may have removed or damaged clay or sediment lining in the pond. - It is unclear if mining impacts has caused the erosion rills or if they are due to poor construction or natural processes. Further investigation is required. - The Level 1 TARP trigger has since returned to Normal Range during the subsequent November and December inspections. - From a risk viewpoint, the volume of water in the pond is small and the consequence category for FD18 is considered to be low. The risk to public and property downstream due to a dam break event is also considered to be low (i.e. within acceptable risk range).

Action / Response from TARP WMP12	Tahmoor Coal response
Level 1 TARP Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results).	- Meeting between Tahmoor Coal and Douglas Partners on 29 October 2024 to discuss the inspection findings at FD18. - Inspection by Tahmoor Coal of Farm Dam FD18 on 29 October 2024 with the landowner. The landowner was made aware of the Level 1 TARP trigger and advised from Douglas Partners to seek professional advice to increase the freeboard and spillway of the dam. - Additional survey pegs installed on the dam wall of FD18 and on the property at 15 Caloola Road on 31 October 2024. - Total maximum subsidence observed around the property at 15 Caloola Rd: 68mm (survey carried out February 2025).
Level 1 TARP If it is concluded that dam has been damaged by subsidence impacts: • Consider and decide on reasonable and feasible options for remediation as relevant (e.g. backfilling surface cracking, reinstatement). • Notify and consult with affected landowner. • Erect warning signs and restrict access to areas where necessary and permitted by the landowner.	As outlined in **Appendix D**: - It is unclear if mine subsidence has contributed to increased seepage during the October 2024 inspection. As discussed in **Section 3.4.3.2**, the baseline inspection in February 2024 identified seepage at the toe of the dam wall. Further investigation is required. - Inspection of Farm Dam FD18 on 29 October 2024 with the landowner. The landowner was made aware of the Level 1 TARP trigger and advice from Douglas Partners to seek professional advice to increase the freeboard and spillway of the dam. - Risk to property and the public is low (i.e. within an acceptable risk range) due to the volume of the dam, no mitigation actions required by Douglas Partners.
Responses	
Level 1 TARP Report trigger exceedance to DPHI, Subsidence Advisory NSW and key stakeholders.	Notification of this exceedance to DPHI completed on 13 November 2024.
Level 1 TARP Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.	Completed as part of this report.
Level 1 TARP If the changes have been confirmed to be related to mining effects: • Provide DPHI and key stakeholders with proposed corrective management actions (CMAs) for consultation (e.g. backfilling surface cracking, reinstatement). • Implement CMAs, subject to land access. • Monitor and report on success of CMAs in Annual Review.	Not applicable. As per Douglas Partner report, it is unclear if mine subsidence has contributed to increased seepage during the October 2024 inspection. Further investigation is required. The TARP trigger has since returned to Normal Range in subsequent inspections. No mitigation action specified by Douglas Partner's assessment report.

Proposed Actions

The current monitoring program will continue in accordance with the LW S1A-S6A Land Management Plan. The next update will be provided as part of the next reporting requirement.

3.4.4 Agricultural Land

3.4.4.1 Overview of Monitoring Results

Agricultural land identified within the LW S1A-S6A Study Area are illustrated on **Figure 3-14**.

Inspections points were set up prior to the commencement of LW S1A mining to provide vantage of agricultural land within the LW S1A-S6A Study Area. The purpose of the surveys is to note whether change has occurred to agricultural land, and to assist in determining if any change can be attributed to mining impacts. Surveys noted the presence of erosion, condition of boundary and internal fencing components, paddock gate condition, out-building condition, paddock dam condition, presence of any surface slumping or cracking, and the presence of vegetation dieback.

During the reporting period, visual and photographic surveys of agricultural land have been completed as part of inspections for local roads, which are discussed in **Section 3.7.2**.

A post-longwall visual inspection was completed on 18 December 2024 following the completion of LW S3A extraction. The report noted that ground surface features observed during the post-mining agricultural land monitoring were considered typical for the age, location, type of construction and climatic conditions present at the time of the inspection. There were no identified assets or land that were associated with potential hazards as a result of LW S3A extraction.

3.4.4.2 TARP LMP4 – Agricultural Land

During this reporting period, there have been no triggers under this TARP.

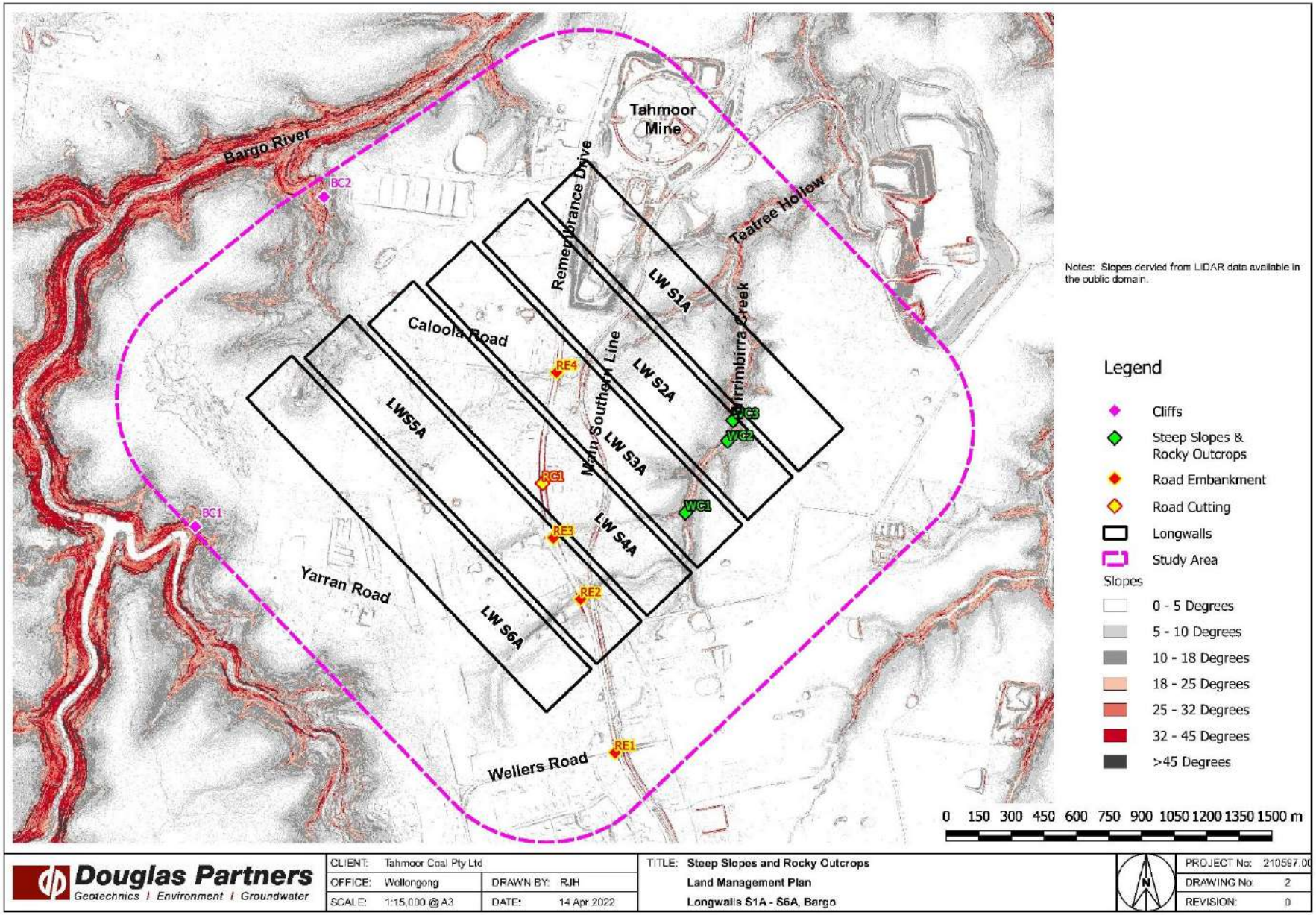

Figure 3-12 Cliffs and natural steep slopes within the LW S1A-S6A Study Area (source: LW S1A-S6A Land Management Plan)

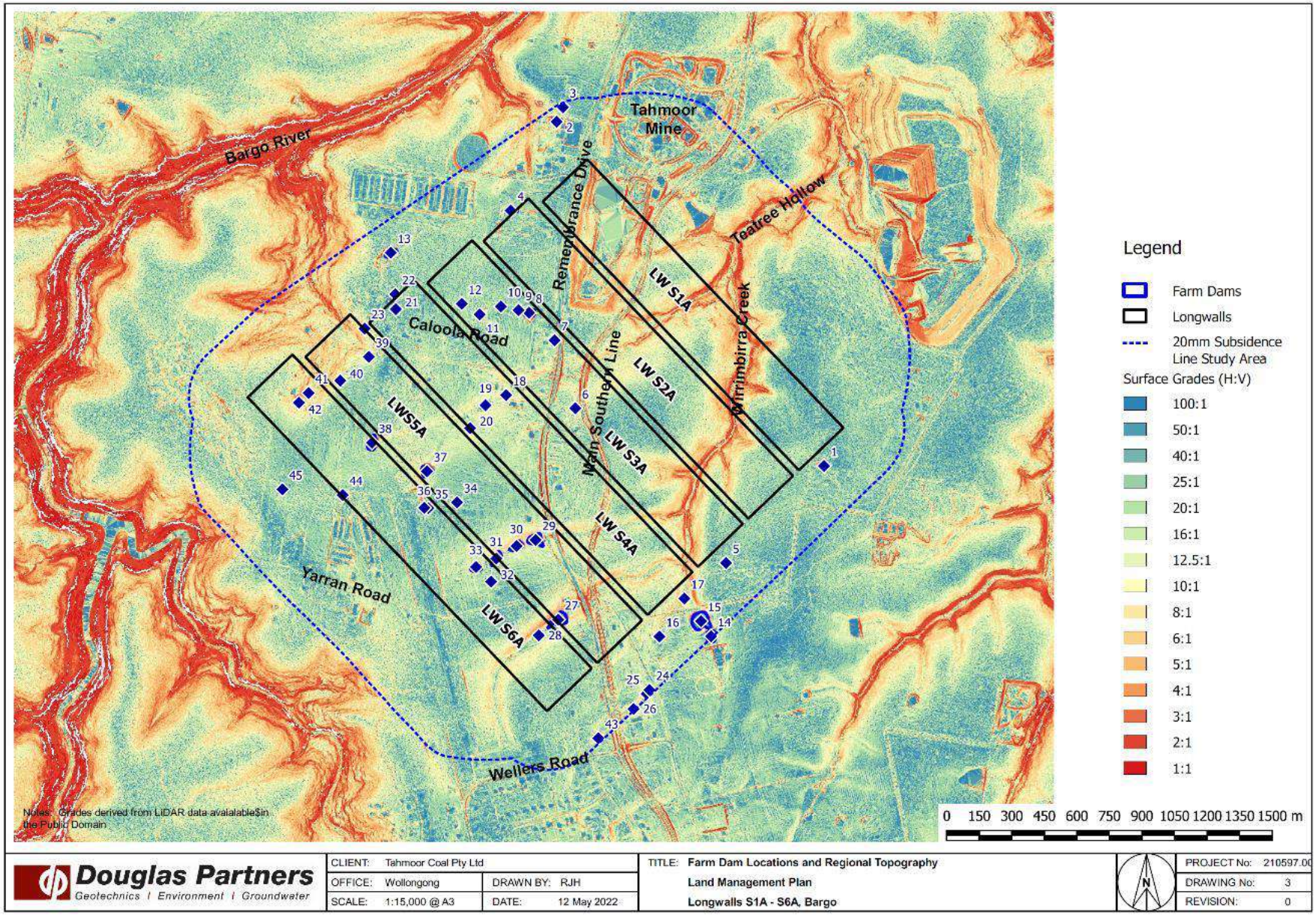

Figure 3-13 Dams within the LW S1A-S6A Study Area (source: LW S1A-S6A Land Management Plan)

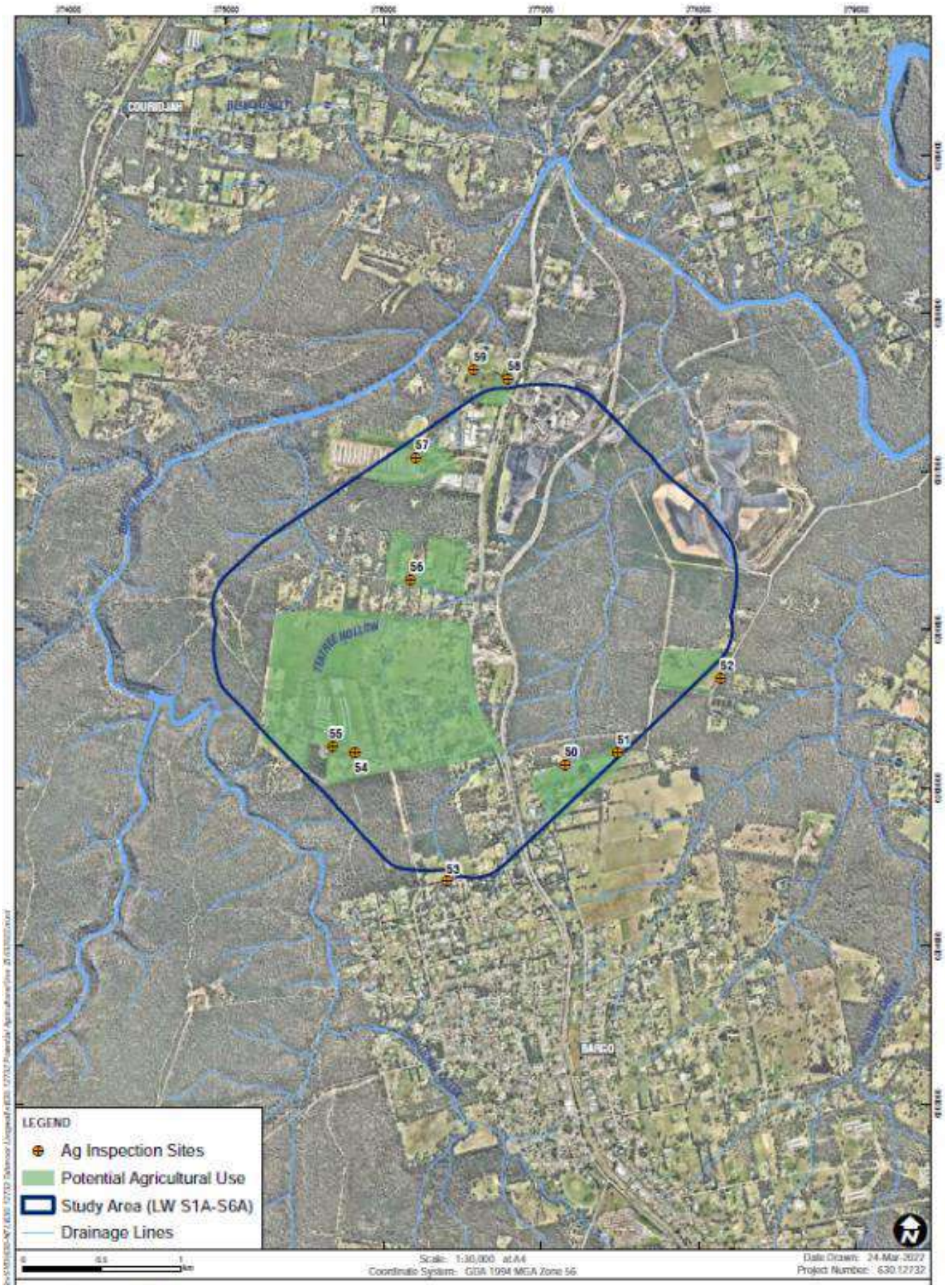

Figure 3-14 Agricultural land and inspection sites within the LW S1A-S6A Study Area (source: LW S1A-S6A Land Management Plan)

3.5 Biodiversity Monitoring

The LW S1A-S6A Biodiversity Management Plan was prepared to manage the potential environmental consequences of LW S1A-S6A extraction on aquatic and terrestrial flora and fauna in accordance with Condition C8 of SSD 8445.

During the reporting period, the LW S1A-S6A Biodiversity Management Plan has been implemented to monitor ecology in the Study Area, as outlined below:

- Aquatic ecology – Bi-annual (Spring and Autumn) monitoring. During this reporting period, monitoring was completed during Spring 2024 by Stantec (Stantec, 2025a) (**Appendix E**); and
- Terrestrial ecology – Bi-annual (Spring and Autumn) monitoring. During this reporting period, monitoring was completed during Spring 2024 by Stantec (Stantec, 2025b).

The following sections summarise the observations made during the reporting period for aquatic and terrestrial ecology. Performance against all Biodiversity Management Plan TARPs (BMP1-4) for the reporting period are summarised in **Table 2-1**, and actions and responses completed relating to any TARP triggers are discussed in the following sections.

3.5.1 Aquatic Ecology

The aquatic ecology monitoring program for LW S1A-S6A has been designed to monitor subsidence-induced impacts on aquatic ecology. The following survey methods have been completed during baseline and during mining monitoring sampling:

- Aquatic habitat assessment of geomorphology, channel diversity, bank stability, riparian vegetation and adjacent land use, water quality, macrophytes and local impacts and land use practices in accordance with the Australian River Assessment System (AUSRIVAS);
- Macroinvertebrate survey:
    - AUSRIVAS macroinvertebrate sampling; and
    - Quantitative benthic macroinvertebrate monitoring program.

The aquatic ecology monitoring program is primarily focused on macroinvertebrate monitoring regimes including AUSRIVAS and quantitative using Before After Control Impact (BACI) design.

3.5.1.1 Overview of Monitoring Results

Aquatic monitoring for Spring 2024 was conducted by Stantec from 11-14 and 18-22 November 2024. A total of thirteen locations were sampled within Teatree Hollow, Hornes Creek and Moore Creek. These sites comprised eight impact sites (TTHt9, TTH12, TTH13, TTH13 (d/s), TTH16, TTH17, TTHt17 (d/s), BRt6) and five control sites (HC6, HC7, HC8, MC14, MC15). The locations of monitoring sites are illustrated in **Figure 3-15**.

Control sites HC6 and impact sites BRt6 and TTHt9 were added to the program in the Spring 2023 round of monitoring in order to assess potential impacts to these sections of a waterway associated with potential future longwall panels.

The following results were observed for this monitoring period (Stantec, 2024a):

- Spring 2024 surveys were preceded by close to typical rainfall pattern, demonstrated by rainfall data;
- Impact sites were found to be dry during the Spring 2024 survey except for small, isolated pools at BRt6 and TTH13 (d/s), meanwhile control sites had sufficient aquatic habitat for sampling;

- The observations made during the Spring 2024 monitoring support the conclusions from previous monitoring and related surface water reviews that there has been mining-induced change to aquatic habitat within the locality of the A series longwalls;
- Only one impact site, TTH13(d/s) was sampled for AUSRIVAS in Spring 24. The results indicate a general impoverishment of macroinvertebrate assemblage at TTH13(d/s), this trend was also observed at the control sites;
- No quantitative sampling was undertaken at the two impact sites containing any water, TTH13(d/s) and BRt6, due to insufficient water depth;
- Quantitative analysis shows that control sites have maintained similar levels of variability to the before period while also maintaining sufficient aquatic habitat for sampling in the during period. Impact sites have conversely followed a downward trend since the commencement of mining, resulting in an increased frequency of dry conditions being recorded and subsequently no macroinvertebrate samples being collected.

3.5.1.2 TARP BMP1 – Aquatic Habitat and Macroinvertebrate Indicators (Stream Health)

Background

During this reporting period, impact site TTH12 aligned with a 'Normal Condition' in accordance with the BMP1 aquatic habitat and macroinvertebrate indicators (stream health) TARP in Spring 2024.

A level 1 TARP trigger exceedance (TARP BMP1) was reported for sites TTH13 and BRt6 in Spring 2024 in relating to a reduction in aquatic pool habitat being observed over two consecutive sampling occasions.

It should be noted that the surface water data shows that pools within Bargo River Tributary (sites monitored up and downstream of BRt6) typically hold little to no water during periods of low rainfall (ATC Williams, 2025a). The observed dryness is therefore likely to be within the expected variability of this waterway and unrelated to mining of the A series longwalls.

A level 2 TARP trigger exceedance (TARP BMP1) was reported for site TTHt9 in Autumn 2024 in relating to a reduction in aquatic pool habitat being observed over three consecutive sampling occasions.

A level 3 TARP trigger exceedance (TARP BMP1) was reported for sites TTH16 and TTHt17 in Autumn 2024 in relating to a reduction in aquatic pool habitat being observed over four consecutive sampling occasions.

Further discussion of these triggers is provided in the Aquatic Monitoring Report for Spring 2024 (Stantec, 2025a; **Appendix E**).

Actions and Responses Completed

Table 3-13 outlines the actions and responses that are required to be completed in accordance with a Level 2 TARP trigger for aquatic habitat and macroinvertebrate indicators (stream health) (TARP BMP1), as well as how these actions and responses have been addressed.

Table 3-13 Actions and Responses for Level 2 TARP Trigger for Aquatic Habitat and Macroinvertebrate Indicators (stream health) (TARP BMP1)

Action / Responses from TARP BMP1	Tahmoor Coal response
Actions	
Level 1, 2 and 3 Trigger Continue monitoring and review of data as per monitoring program.	Bi-annual seasonal monitoring (Spring and Autumn) and review of data is ongoing according to the monitoring program.
Level 1, 2 and 3 Trigger Undertake an investigation of BACI quantitative macroinvertebrate data to assess Level 1, 2 and 3	Not applicable as no samples could be collected.

Action / Responses from TARP BMP1	Tahmoor Coal response
observations and determine if mining related or the response to environmental conditions (e.g. drought) within the catchment.	
Level 1, 2 and 3 Trigger Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, surface water monitoring results, groundwater monitoring results).	Meeting held on 5 August 2025 between Tahmoor Coal, Stantec and ATC Williams to discuss findings. **TTH13:** It is noted that surface water level data concluded that the water level at this site are related to the cessation of surface water flow in Teatree Hollow tributary due to mining induced fracturing upstream in conjunction with the prevailing climatic conditions **BRt6:** The surface water data shows that pools within Bargo River Tributary (sites monitored up and downstream of BRt6) typically hold little to no water during periods of low rainfall (ATC Williams, 2025b). The observed dryness is therefore likely to be within the expected variability of this waterway and unrelated to mining of the A series longwalls. **TTHt9:** TTHt9 has been monitored as part of this program since Spring 2023 and has not yet been found to contain water in three total surveys. ATC Williams (2024) note this pool experiences fluctuations in water level above and below trigger levels in response to rainfall conditions, but that the pool has experienced an increase in the rate of water recession compared to historical conditions. **TTH16 & TTHt17:** The surface water review by ATC Williams (2024) concluded that these sites have experienced atypical declines in water level due to mining induced fracturing in combination with prevailing climatic conditions (TTHt17) and the diversion of surface flow via upstream fractures (TTH16).
Level 1, 2 and 3 Trigger Consider and decide on reasonable and feasible options for remediation, where relevant (e.g. limestone cobble for pH management).	No corrective management actions are proposed as there are no actions that can currently be completed to correct water level decline. In accordance with C12 of SSD 8445 and as detailed in the Water Management Plan, a Watercourse Corrective Action Management Plan (WCAMP) will be prepared (if required) for watercourses damaged by subsidence impacts in consultation with relevant government agencies, as defined in the WMP. The WCAMP will be prepared and implemented (if required) at the cessation of subsidence movements associated with Tahmoor South mining.
Level 1, 2 and 3 Trigger Following investigation, any declines detected that are not attributable to mining impacts (e.g. are a result of environmental conditions or stochastic events) are to be considered 'normal condition' and are continued to be included in the ongoing development of the ecological monitoring dataset.	Only relevant to BRt6. The surface water data shows that pools within Bargo River Tributary (sites monitored up and downstream of BRt6) typically hold little to no water during periods of low rainfall (ATC Williams, 2025b). The observed dryness is therefore likely to be within the expected variability of this waterway and unrelated to mining of the A series longwalls. Therefore, the decline should be considered "normal condition".

Action / Responses from TARP BMP1	Tahmoor Coal response
Level 2 and 3 Trigger Consider increasing monitoring and review of data frequency where Level 2 or 3 has been reached and at other relevant sites, subject to land access.	Monitoring is completed bi-annually in line with AUSRIVAS monitoring protocols and collection of baseline data. As mining induced change has so far manifested in pool-drying, rather than water quality decline, there is limited value in increasing biological sampling frequency.
Level 2 and 3 Trigger Consider the inclusion of additional sites within impact area.	Additional AUSRIVAS sites downstream of areas of mining induced change observed, TTH13 (d/s) and TTH17 (d/s), have been included in the program since Autumn 2023 when impacts were first observed. These additional sites have been established as part of an adaptive monitoring approach to provide an indication of potential impacts downstream of areas of observed mining induced change. Due to the intermittent nature of the Teatree Hollow stream network and prevailing dry conditions, there is limited scope to include additional monitoring sites. Data from related program sites may be called upon as relevant, to assist in the interpretation of impacts. This has not been completed to date as the potential impacts to data have so far been primarily via pool drying/reduced flows rather than declining water quality.
Level 2 and 3 Trigger Review CMAs in light of findings from further investigations and consider additional reasonable and feasible options.	No corrective management actions are proposed as there are no actions that can currently be completed to correct water level decline. In accordance with C12 of SSD 8445 and as detailed in the Water Management Plan, a Watercourse Corrective Action Management Plan (WCAMP) will be prepared (if required) for watercourses damaged by subsidence impacts in consultation with relevant government agencies, as defined in the WMP. The WCAMP will be prepared and implemented (if required) at the cessation of subsidence movements associated with Tahmoor South mining.
Level 2 and 3 Trigger Review Biodiversity Management Plan and modify if necessary.	No further updates are required in line with the above outcomes.
Level 3 Trigger Increase monitoring frequency for sites where Level 3 has been reached and at corresponding reference sites, subject to land access.	Monitoring is completed bi-annually in line with AUSRIVAS monitoring protocols and collection of baseline data. As mining induced change has so far manifested in pool-drying, rather than water quality decline, there is limited value in increasing biological sampling frequency.
Level 3 Trigger Add additional monitoring sites as required.	Additional AUSRIVAS sites downstream of areas of mining induced change observed, TTH13 (d/s) and TTH17 (d/s), have been included in the program since Autumn 2023 when impacts were first observed. These additional sites have been established as part of an adaptive monitoring approach to provide an indication of potential impacts downstream of areas of observed mining induced change. Due to the intermittent nature of the Teatree Hollow stream network and prevailing dry conditions, there is limited scope to include additional monitoring sites.

Action / Responses from TARP BMP1	Tahmoor Coal response
Level 3 Trigger Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing, other catchment changes, effects unrelated to mining or the prevailing climate).	A detailed investigation was undertaken by ATC Williams. The surface water review by ATC Williams (Refer to **Appendix B**) concluded that these sites have experienced atypical declines in water level due to mining induced fracturing in combination with prevailing climatic conditions (TTHt17) and the diversion of surface flow via upstream fractures (TTH16).
Level 3 Trigger Undertake an investigation to determine if an exceedance of the performance measure is likely.	A detailed investigation was undertaken by ATC Williams (Refer to **Appendix B**). No corrective management actions are proposed as there are no actions that can currently be completed to correct water level decline. In accordance with C12 of SSD 8445 and as detailed in the Water Management Plan, a Watercourse Corrective Action Management Plan (WCAMP) will be prepared (if required) for watercourses damaged by subsidence impacts in consultation with relevant government agencies, as defined in the WMP. The WCAMP will be prepared and implemented (if required) at the cessation of subsidence movements associated with Tahmoor South mining.
Responses	
Level 1, 2 and 3 Trigger Report trigger exceedance to DPHI and key stakeholders.	Completed as part of this report.
Level 1, 2 and 3 Trigger Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.	Completed as part of this report.
Level 1, 2 and 3 Trigger Provide DPHI and key stakeholders with proposed corrective management actions (CMAs) for consultation (e.g. limestone cobbles for pH management).	No CMAs are proposed.
Level 1, 2 and 3 Trigger Implement CMAs, subject to land access.	No CMAs are proposed.
Level 1, 2 and 3 Trigger Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.	No CMAs are proposed.
Level 1, 2 and 3 Trigger Continue monitoring to determine if a TARP trigger level will occur.	Bi-annual seasonal monitoring (Spring and Autumn) and review of data is ongoing according to the monitoring program.
Level 2 and 3 Trigger Provide findings of CMA review to DPHI and key stakeholders for consultation.	No CMAs are proposed.
Level 2 and 3 Trigger Implement additional CMAs, subject to land access.	No CMAs are proposed.

Action / Responses from TARP BMP1	Tahmoor Coal response
Level 2 and 3 Trigger Advise DPHI and key stakeholders of any required amendments to Biodiversity Management Plan.	No further updates are required in line with the above outcomes.
Level 2 and 3 Trigger Continue monitoring to determine if a Level 3 TARP trigger will occur.	Continue monitoring and review of data as per existing monitoring program.
Level 3 Trigger If it is concluded that pools/aquatic habitat have been damaged by subsidence impacts: • Offer site visit with DPHI and key stakeholders. • If relevant, notify Commonwealth DCCEEW of any predictions of an exceedance of a performance measure within two business days. • Develop a Rehabilitation Management Plan in consultation with DPHI and key stakeholders. • Implement Rehabilitation Management Plan, subject to land access. • Continue monitoring to determine if an exceedance of the performance measure will occur.	Tahmoor Coal extends an offer of a site visit to DPHI to view site where a Level 3 TARP trigger for Stream Health (BMP1) have occurred. A site visit invitation letter will be sent to DPHI following the submission of the six-monthly report. A site visit was offered to Australian Wildlife Sanctuary and National Trust in relation to Level 3 TARP trigger of TARP BMP1 (stream Health). This offer was extended via letter dated 13 August 2025. In accordance with C12 of SSD 8445 and as detailed in the WMP, a Watercourse Corrective Action Management Plan (WCAMP) will be prepared (if required) for watercourses damaged by subsidence impacts in consultation with relevant government agencies, as defined in the WMP. The WCAMP will be prepared and implemented (if required) at the cessation of subsidence movements associated with Tahmoor South mining. Monitoring is ongoing as per monitoring program outlined in the Biodiversity Management Plan.

Proposed Actions and Responses

The current monitoring program will continue in accordance with the LW S1A-S6A Biodiversity Management Plan. The next update will be provided as part of the next reporting requirement.

3.5.2 Terrestrial Ecology

The terrestrial ecology monitoring program for LW S1A-S6A has been designed to monitor subsidence-induced impacts on terrestrial ecology including riparian vegetation and amphibian monitoring.

The terrestrial ecology monitoring program uses a Before After Control Impact (BACI) design to identify ecological change within the Study Area as a result of mine subsidence by permitting comparisons of population trends between control and impact areas, before and after the impact. The following survey methods have been completed during baseline and during mining monitoring sampling:

- Floristic surveys within established vegetation monitoring plots for riparian vegetation, Threatened Ecological Communities (TEC), and threatened flora species;
- Amphibian monitoring along established transects:
    - Spotlighting;
    - Call provocation;
    - Listening for diagnostic frog calls; and
    - Tadpole identification.

3.5.2.1 Overview of Monitoring Results - Amphibian Monitoring

Amphibian monitoring for Spring 2024 was conducted by Stantec from 11-13 November 2024 and 18-22 November 2024. A total of nine locations were sampled for amphibians, including four impact sites (i01, i02, i03 and i09) and five control sites (c04, c05, c06, c07 and c08). The locations of monitoring sites are illustrated in **Figure 3-16**.

Amphibian monitoring targeted two threatened frog species – the Giant Burrowing Frog (*Heleioporus australiacus*) and the Red-crowned Toadlet (*Pseudophryne australis*).

The following results were observed for this monitoring period (Stantec, 2025b):

- A high rainfall event occurred on or preceded surveys and sustained suitable waterways for the duration of Spring 2024 monitoring for amphibian surveys.
- No threatened frogs, including Red-crowned Toadlet (*Pseudophryne australis)* and Giant Burrowing Frog (*Heleioporus australiacus),* were detected during Spring 2024. These species have not been detected for the life of the monitoring project.
- Both Red-crowned Toadlet and Giant Burrowing Frog are highly susceptible to predation and erratic fluctuations in water levels in the early stages of their lifecycle, which would make the species vulnerable to predators such as the Eastern Gambusia (*Gambusia holbrooki)* and the Freshwater Crayfish (*Cherax destructor)* (which are widespread and have been recorded at most monitoring Sites).
- Spring 2024 surveys recorded 128 individual amphibians across nine species. The most commonly detected species was the Common Eastern Froglet (*Crinia signifera),* which was the only species recorded within the Impact sites. In contrast, nine species were detected within the control sites. Amphibian abundance was lower at impact sites compared to control sites, which is a consistent trend.
- Statistical analysis did not detect any significant interactions with amphibian assemblages but did detect a significant difference between amphibian assemblages in Autumn and amphibian assemblages in Spring, indicating that any changes in vegetation assemblages through the monitoring period were influenced by seasonal variability, but occurred similarly at the impact and control sites through time.

3.5.2.2 TARP BMP2 – Amphibian Populations

During this reporting period, there have been no triggers under this TARP.

3.5.2.3 Overview of Monitoring Results - Riparian Vegetation

Riparian vegetation monitoring for Spring 2024 was conducted by Stantec from 11-13 November 2024 and 18-22 November 2024. A total of nine locations were sampled for riparian vegetation, including four impact sites (i01, i02, i03 and i09) and five control sites (c04, c05, c06, c07 and c08). The locations of monitoring sites are illustrated in **Figure 3-16**.

The following results were observed for this monitoring period for riparian vegetation (Stantec, 2025b):

- Mean native species richness at all four impact sites was within or above the ranges recorded during the baseline monitoring period and has shown a mean increasing trend. Between Spring 2023 and Spring 2024, mean native species richness increased by 3.8% for the impact sites, compared to a 37.4% decline observed for the control sites. A higher variation in native species richness has been observed at the control sites over the life of the monitoring project.
- Overall, a higher native species richness has typically been recorded at control sites. The mean native vegetation cover at the impact sites increased between the Spring 2023 and Spring 2024 monitoring periods, while a slight decrease was observed at the control sites.

- In Spring 2024, a total of 31 exotic species were recorded across all monitoring sites. This included a range of 6-19 individuals at impact sites and 1-4 individuals at control sites. Mean exotic vegetation cover has decreased overall, compared to Spring 2020, at the impact and control sites and has remained relatively stable since Spring 2022.
- The mean VI scores for Spring 2024 reflected an improved vegetation condition at the impact sites and a minor decline in condition of the control sites. Statistical analysis found the PERMANOVA and PCO analyses do not provide any evidence of an existing or developing project-related impact on vegetation assemblages at the impact sites.
- Variation in species composition, leaf litter cover and fallen woody debris is expected between monitoring events due to stochastic environmental factors such as variation in foliage cover, vegetation growth, branch loss and natural dieback of species, including annuals.

3.5.2.4 TARP BMP3 – Riparian Vegetation

During this reporting period, there have been no triggers under this TARP.

3.5.2.5 Overview of Monitoring Results – Threatened Species, Threatened Populations and Endangered Ecological Communities

Threatened Flora Species

Monitoring of threatened flora for Spring 2024 was conducted by Stantec from 11-13 November 2024 and 18-22 November 2024. Threatened flora species were monitored at six plot sites in areas with known threatened flora records, including three impact sites (TF4, TF5 and TF6) and three control sites (TF1, TF2 and TF3). The locations of monitoring sites are illustrated in **Figure 3-16**.

The six threatened flora monitoring sites were established in September 2022 prior to disturbance. These six plots have been designed to monitor a subset of individuals of the following species: *Pomaderris brunnea* (Brown Pomaderris), *Persoonia bargoensis* (Bargo Geebung) and *Grevillea parviflora* subsp. *Parviflora* (Small-flowered Grevillea). Several rounds of monitoring have been undertaken since the commencement of mining in November 2022, including Autumn 2023, Spring 2023, Autumn 2024 and Spring 2024.

During this round of monitoring (Spring 2024) there was an increase at all the control sites (TF4, TF5 and TF6). At TF4, the counts of *Persoonia bargoensis* increased from Autumn 2024 (14) to Spring 2024 (28). At TF5, *Pomaderris brunnea* increased from Autumn 2024 (73) to Spring 2024 (103). TF6, *Grevillea parviflora* subsp. *Parviflora*, saw an increase from Autumn 2024 (159) to Spring 2024 (173). The number of individuals at all control sites (TF1, TF2 and TF3) decreased in Spring 2024. Spring 2024 was the first monitoring period that *Persoonia bargoensis* was below the Spring 2022 (Before) data. The mean count of individuals shows that sites TF2, TF4 and TF6 have a greater mean than the original individual count in September 2022, prior to mining disturbance.

Given the fluctuations in the data, it is unlikely that these species would be significantly impacted by mining, therefore these results are more likely due to differences in site location and response to weather events such as high or low rainfall.

Threatened Ecological Communities

Monitoring of TEC vegetation flora for Spring 2024 was conducted by Stantec from 11-13 November 2024 and 18-22 November 2024. TEC vegetation surveys were conducted at six plot sites including three impact sites (TEC4, TEC5 and TEC6) and three control sites (TEC1, TEC2 and TEC3). The locations of monitoring sites are illustrated in **Figure 3-16**.

During the Spring 2024 monitoring campaign, all TEC sites were in moderate condition with VI scores (condition) between 53-71. This range of VI scores is an increase on the range of previous monitoring

campaigns. All TEC sites, except for TEC2 and TEC4, had either an increase in VI score or remained the same as the Autumn 2024 monitoring period. When reviewing the before data, all sites except for TEC2 and TEC5 have improved in condition during the Spring 2024 (after) campaign.

There are no obvious trends occurring across any of the control and impact sites post mining. Slight changes in VI score observed across seasons may be due to seasonality, reduced structural condition and shifts in exotic species coverage or weather events. There are no detectable subsidence related impacts on TECs as a result of mining and no visual signs of dieback or other environmental stressors were observed during monitoring.

3.5.2.6 TARP BMP4 – Threatened Species, Threatened Populations and Endangered Ecological Communities

During this reporting period, there have been no triggers under this TARP.

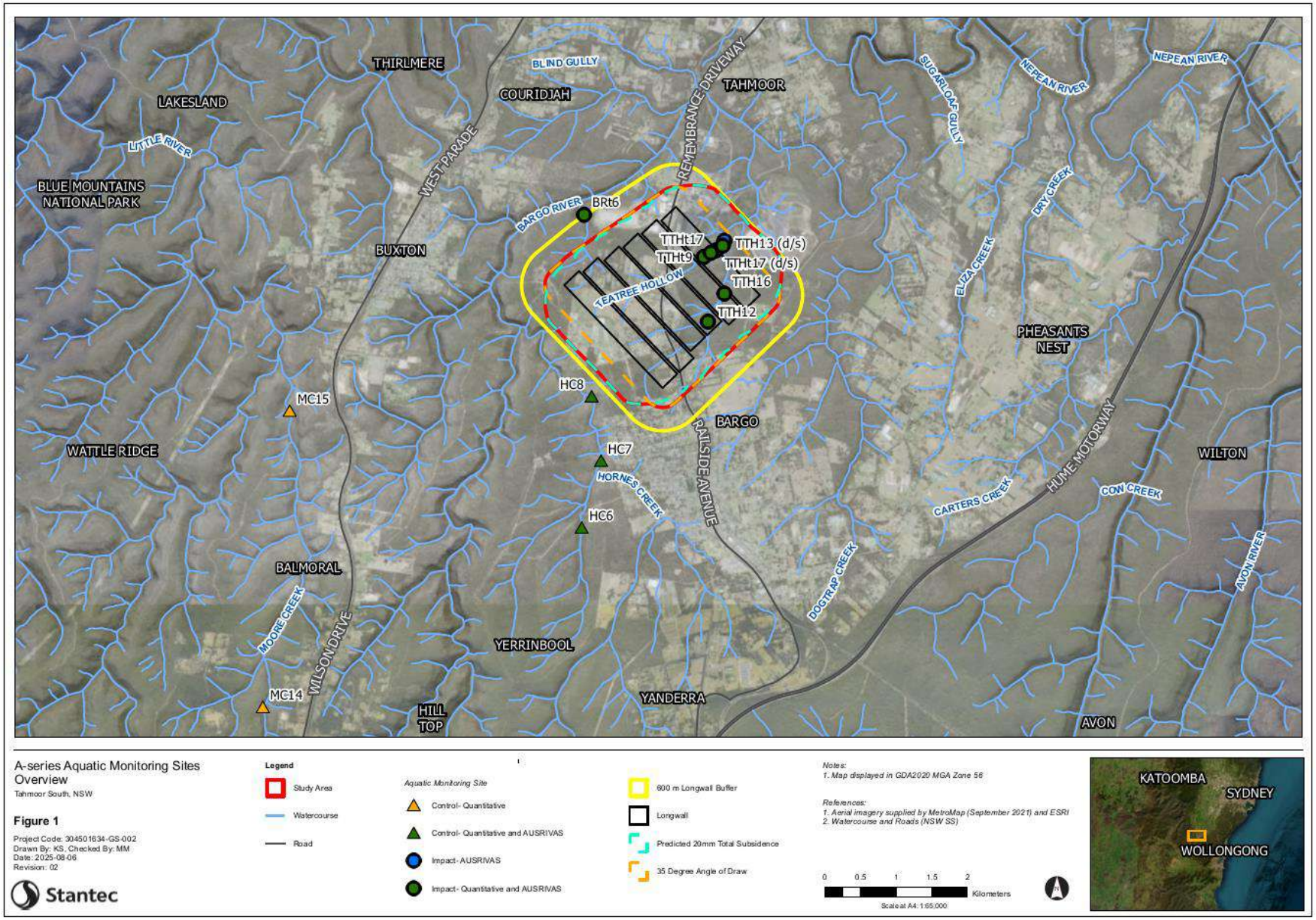

Figure 3-15 LW S1A-S6A Aquatic Ecology Monitoring Locations (source: Stantec, 2025a)

This information has been retracted
- For more information contact Tahmoor Coal

SIMEC
Level 28, 88 Phillip Street,
Sydney NSW 2000
Legal entity name goes here ABN: 00 000 000 000

T: +61 (0) 2 0000 0000
E: xxxxxxx.xxxxxxx@simecgfg.com
simec.com

MEMBER OF GFG ALLIANCE

3.6 Heritage Monitoring

The LW S1A-S6A Heritage Management Plan was prepared to manage the potential environmental consequences of LW S1A-S6A extraction on Aboriginal heritage and historical heritage sites and values in accordance with Condition C8 of SSD 8445.

The following sections summarise the observations made during the reporting period for Aboriginal and historical heritage items. Performance against all Heritage Management Plan TARPs (HMP1 and HMP2) for the reporting period are summarised in **Table 2-1**, and actions and responses completed relating to any TARP triggers are discussed in the following sections**.**

3.6.1 Aboriginal Heritage

3.6.1.1 Overview of Monitoring Results

During this reporting period, the LW S1A-S6A Heritage Management Plan has been implemented to monitor subsidence impacts on the rockshelter Teatree Hollow 2013.1 (AHIMS 52-2-4471) (refer **Figure 3-17**). The Aboriginal heritage monitoring of this rockshelter requires the following monitoring during and post-mining:

- Fortnightly visual inspection of the rockshelter (monitoring overall rockshelter stability) during periods of active subsidence for LW S1A, S2A, S3A and S4A, to be completed from a safe distance. This monitoring is completed by Building Inspection Services and Douglas Partners on an alternative monthly schedule, and reported in their monthly reports (available on request);
- Monitoring of GNSS units / survey lines in proximity to the rockshelter, reviewed on a monthly basis during periods of active subsidence for LW S1A, S2A, S3A and S4A. This monitoring is summarised in the weekly MSEC Subsidence Reports (refer to **Appendix A** for referenced report); and
- Visual inspection by archaeologist with RAPs at the completion of LW S1A, S2A, S3A and S4A. An end of panel inspection for LW S3A was completed on 3 December 2024 (available on request).

It is noted that the artefact scatter Remembrance Drive 2013.1 (AHIMS 52-2-3968) and isolated find TC14-2-19 (AHIMS 48-2-0275) were also assessed in the LW S1A-S6A Heritage Management Plan, however no pre-mining, during mining or post-mining monitoring is required for these sites.

During the reporting period, gradual developing movements have been measured by GNSS units S03 and S04 located on either side of Wirrimbirra Creek (in vicinity of the rockshelter site) (**Appendix A**).

The LW S3A end of panel inspection of the rockshelter completed by archaeologist with RAPs on 3 December 2024 did not identify any observable impacts such as cracks, exfoliation, or collapse, as a result of subsidence or other activities. Further, the floor of the rockshelter showed no evidence of recent rockfall or other moved material that may suggest collapse or movement has occurred.

The small area of abrasion on the rear wall at the southern end of the site that was identified during the 2023 site inspection had not changed and did not appear to exhibit any further signs of fresh abrasion. These changes were confirmed likely to be the result of animal activity or changing climatic conditions. There is no evidence that this relates to mining activities, nor does it require any form of remediation.

Water was present in Teatree Hollow Creek adjacent to the rockshelter at the time of the inspection.

3.6.1.2 TARP HMP1 – Aboriginal Cultural Heritage Sites

During this reporting period, there have been no triggers under this TARP.

3.6.2 Historical Heritage

During this reporting period, the LW S1A-S6A Heritage Management Plan was implemented to monitor subsidence impacts for the following historical heritage items (refer **Figure 3-18**):

- Wirrimbirra Sanctuary (Australian Wildlife Sanctuary):
  - Various monitoring as per the Australian Wildlife Sanctuary Management Plan - This monitoring is summarised into Weekly Subsidence Status Reports by MSEC (refer **Appendix A** and **Appendix H** for referenced reports);
  - Visual inspection by a heritage consultant at the completion of LW S5A - No visual inspections have been required during this reporting period;
- Bargo Railway Bridge North (Wellers Road Overbridge) and Bargo Railway Viaduct:
  - Various monitoring as per the Main Southern Railway Management Plan and the Wellers Road Overbridge Management Plan - This monitoring is summarised into Weekly Subsidence Status Reports by MSEC (refer **Appendix A** and **Appendix G** for referenced reports);
  - Visual inspection by a heritage consultant at the completion of LW S6A - No visual inspections have been required during this reporting period;
- Bargo Cemetery:
  - Various monitoring as per the Wollondilly Shire Council Management Plan - This monitoring will be summarised into Weekly Subsidence Status Reports by MSEC and is not yet required;
  - Visual inspection by a heritage consultant at the completion of LW S6A - No visual inspections have been required during this reporting period;
- Picton Weir:
  - Various monitoring as per the Picton Weir Management Plan - This monitoring will be summarised into a Weekly Subsidence Status Report by MSEC and is not yet required;
- Tahmoor Colliery (Tahmoor Mine Site):
  - Various monitoring as per the Tahmoor Mine Site Management Plan and additional monitoring commitments as outlined in an email to the NSW Resources Regulator on 6 May 2024 (available on request). This monitoring is summarised in **Section 3.7.11**, (refer to **Appendix I** for referenced Mine Site Reports by Tahmoor Coal);
- Great Southern Road (partial):
  - Various monitoring as per the Main Southern Railway Management Plan - This monitoring is summarised in weekly MSEC Subsidence Reports (refer to **Appendix A** for referenced report).

3.6.2.1 Overview of Monitoring Results

During the reporting period, no observations of impacts to heritage structures were made at the Australian Wildlife Sanctuary (Refer **Section 3.7.12**), Wellers Road Overbridge and Bargo Railway Viaduct (refer **Section 3.7.1**), Bargo Cemetery (refer **Section 3.7.9**), Picton Weir (refer **Section 3.7.13**) or the Great Southern Road (refer **Section 3.7.2**).

The following changes were observed at the Tahmoor Mine Site during the reporting period:

- A new vertical crack was identified on 6 November 2024 on the surface of the northern facing reinforced concrete element of the 1200t raw coal bins that link the two silos together. The vertical crack width varies from hairline to approximately 1.5mm. The length of the crack extends from approximately 3m above ground level to 5m below the top of the silo wall (refer to **Appendix I** for detailed inspection report). It should be noted that a number of pre-existing vertical cracks were identified on the silos and unreinforced concrete element during the pre-mining inspection.

Impacts to Tahmoor Mine Site infrastructure were noted to be *possible* in the LW S1A-S6A Heritage Management Plan. An assessment was completed by a heritage consultant (Refer to **Appendix F** for assessment Report). It was concluded that the impact was minor and such crack does not affect the mine site heritage value. Furthermore, at mine closure the infrastructure will be removed and the land will be rehabilitated are required by the Tahmoor Mine's consent condition. Therefore, it is unlikely that the performance measures identified in the LW S1A-S6A Heritage Management Plan will be exceeded.

During the reporting period, the Tahmoor Mine Site remained safe and serviceable. Further discussion of these observations is provided in **Section 3.7.11**.

3.6.2.2 TARP HMP2 – Historical Heritage Items

Background

During the reporting period, a Level 1 TARP trigger of the TARP HMP2 (historical heritage items) occurred due to the following detectable environmental consequences at the Tahmoor Mine Site (or Tahmoor Colliery):

- New vertical crack on the surface of the northern facing reinforced concrete element of the 1200t raw coal bins that link the two silos together.

Actions and Responses Completed

Table 3-14 outlines the actions and responses that are required to be completed in accordance with a Level 1 TARP trigger for change to historical heritage items (TARP HMP2), as well as how these actions and responses have been addressed.

Table 3-14 Actions and Responses for Level 1 TARP Trigger for Change to Historical Heritage Item (TARP HMP2)

Action / Response from TARP HMP2	Tahmoor Coal response
Actions	
Continue monitoring and review of data as per monitoring program.	Monitoring is ongoing in accordance with the LW S1A-S6A Tahmoor Mine Site Management Plan and the LW S1A-S6A Heritage Management Plan.
Co-ordinate a site inspection with a structural engineer.	A structural engineer inspected the vertical crack on the raw coal bins unreinforced concrete element on 15 November 2024 and reported no immediate concerns as the structure remains safe and serviceable.
Consult with a qualified archaeologist or heritage architect to determine whether impacts to heritage sites have occurred.	A review of the vertical crack on the raw coal bins unreinforced concrete element was completed by a qualified archaeologist (refer **Appendix F).** The concrete wall that connects the two silos has numerous existing cracks and the new vertical crack does not reduce the heritage value of the site. In addition, the Tahmoor Mine Site is a working site and minor impacts such smalls cracks are unlikely to affect its heritage values.
Consider increasing monitoring and review of data frequency for sites subject to a Level 1 trigger event, subject to land access.	The 1200t raw coal bin is outside of the subsidence zone. As per the Structural Engineer report, crack gauges are planned to be installed along the crack for monitoring purposes. Monitoring is ongoing using tiltmeter data installed on the raw coal bins.
Detailed photographic recording of any damage to be documented.	Refer to inspection report (**Appendix I**) for photographic evidence of the vertical crack on the raw coal bins unreinforced concrete element.

Action / Response from TARP HMP2	Tahmoor Coal response
Erect warning signs and restrict access to areas where necessary.	The Tahmoor Mine Site remained safe and serviceable during the reporting period, and no warning signs or restricted access to the areas in question were deemed necessary.
Responses	
Report trigger exceedance to DPHI and Heritage NSW.	Notification of this exceedance to DPHI is completed as part of this report. As discussed in the historical heritage review (refer **Appendix F**), as the heritage value of the item has not been impacted, there is no requirement to report this trigger to Heritage NSW.
Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review	Completed as part of this report.

Proposed Actions

The current monitoring program will continue in accordance with the LW S1A-S6A Tahmoor Mine Site Management Plan.

The review of the 1200t raw coal bin vertical crack by a qualified archaeologist (refer **Appendix F**) recommended the following actions:

- There is insignificant heritage value requiring any further action or investigation. The concrete wall that connects the two silos has numerous existing cracks and the new vertical crack does not reduce the heritage value of the site.
- The site should continue to be monitored, and the data reviewed as per the Tahmoor Mine Site Management Plan;
- The TARP requires that trigger exceedance and investigation outcomes be included in the Six-Monthly Subsidence Impact Report (this document) and Annual Review.

This information has been retracted
- For more information contact Tahmoor Coal

SIMEC
Level 28, 88 Phillip Street,
Sydney NSW 2000
Legal entity name goes here ABN: 00 000 000 000

T: +61 (0) 2 0000 0000
E: xxxxxxx.xxxxxxx@simecgfg.com
simec.com

MEMBER OF GFG ALLIANCE

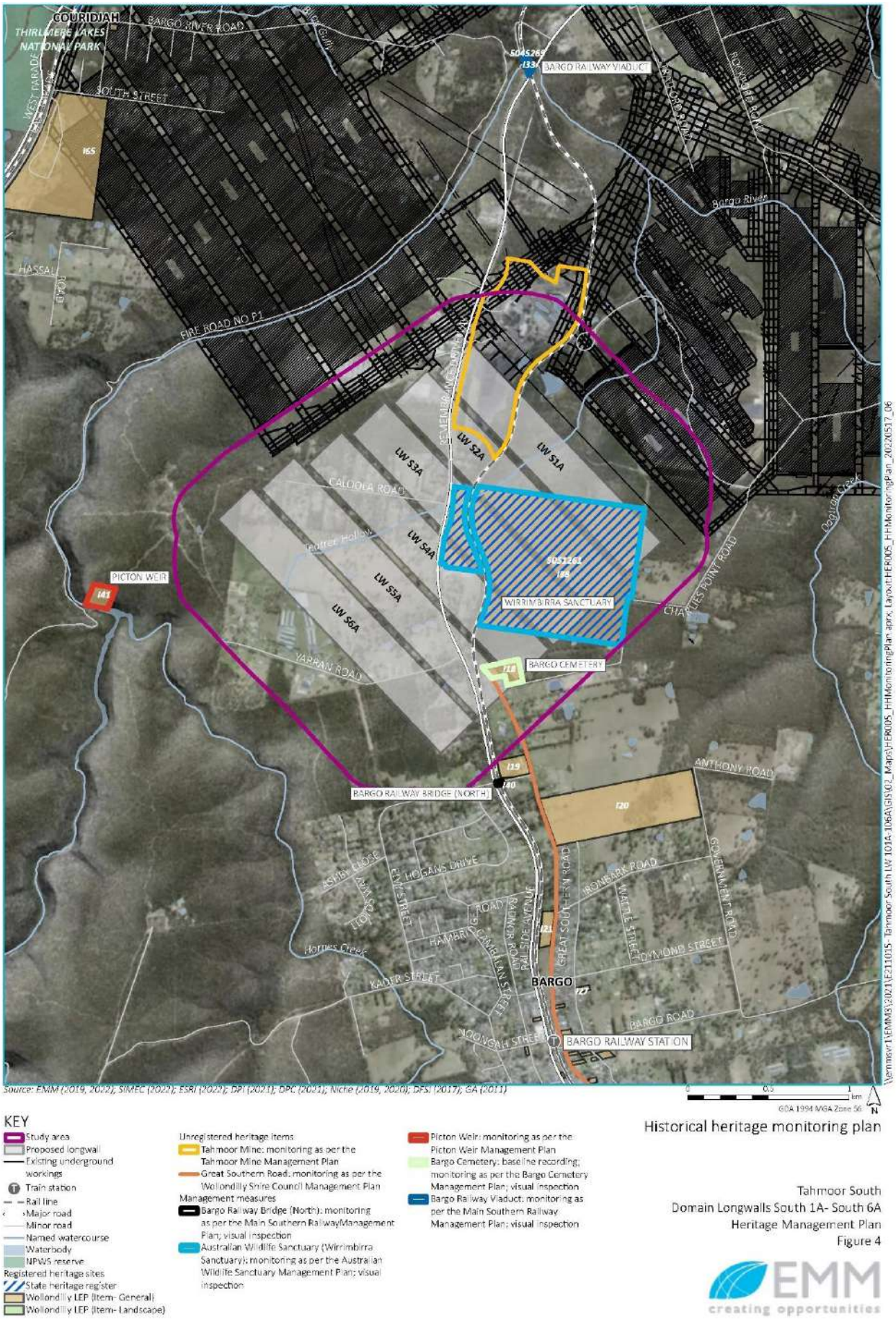

Figure 3-18 Historical Heritage Sites in the LW S1A-S6A Study Area and Surrounds (Source LW S1A-S6A Heritage Management Plan)

3.7 Built Features Monitoring

The LW S1A-S6A Built Features Management Plan and associated sub-plans were prepared to manage the potential environmental consequences of LW S1A-S6A extraction on built features in accordance with Condition C8 of SSD 8445.

During this reporting period, the LW S1A-S6A Subsidence Monitoring Program was implemented to monitor subsidence impacts on infrastructure owned by Wollondilly Shire Council (roads, bridges and culverts), ARTC (rail infrastructure), Sydney Water (potable water infrastructure and sewer infrastructure), Endeavour Energy (electrical infrastructure), Jemena (gas infrastructure), Telstra (telecommunications infrastructure), NBN (telecommunications infrastructure), TPG (telecommunications infrastructure) and private property owners. The details of the Subsidence Monitoring Program are illustrated in **Figure 3-1**.

A weekly review of the subsidence survey results during the reporting period has been completed by MSEC during mining of LW S3A (referred document provided in **Appendix A**). In addition, weekly reports by MSEC are prepared for specific built features including the Main Southern Railway, 3030 Remembrance Driveway (Petrol Station), MKD Machinery, Tahmoor Garden Centre, Wollondilly Anglican College, and Australian Wildlife Sanctuary.

The following sections summarise the observations made during the reporting period for built features, as well as actions and responses completed relating to any TARP triggers. Performance against all built features TARPs for the reporting period are summarised in **Table 2-1**.

3.7.1 Main Southern Railway

3.7.1.1 Overview of Monitoring Results

Weekly surveys have been conducted on the Main Southern Railway when located in the LW S3A active subsidence zones. Weekly Subsidence Status Reports have been prepared for the Main Southern Railway during active subsidence, which summarise monitoring and inspection results for the railway track, early warning monitoring, embankment and culvert at 100.425 km (including Water Main crossing at 100.380 km), cutting at 100.310 km, embankment and culvert at 100.121 km, cutting at 99.690 km, embankment and culvert at 99.338 km, cutting at 99.165 Km, embankment and culvert at 99.035 km, embankment and culvert at 98.739 km, embankment and culvert at 98.445 km, Bargo River Railway Viaduct at 96.256 km, Remembrance Drive Bridge over Bargo River at 96.385 km, Bargo River Road Overbridge at 96.049 km, and Wellers Road Overbridge at 101.162 km.

During the reporting period, non-conventional subsidence developed near 99.62 km and 99.56 km in August 2024 resulting in up to 1.8mm/m compressive ground strains and observed changes in track alignment triggering a track speed restriction. Rates of change have reduced to low levels along the railway. The temporary speed restriction has been removed on both tracks since 24 November 2024 after track geometry was adjusted (refer to MSR Status Report R24 in **Appendix G**). A final survey for LW S3A was conducted on 20 December 2024.

The Main Southern Railway was maintained in a safe and serviceable condition during mining of LW S3A.

3.7.1.2 Main Southern Railway TARP

Background

As discussed in **Section 3.7.1.1**. non-conventional subsidence developed near 99.560 km and 99.620 km resulting in a Yellow trigger on 22 August 2024.

Actions and Responses Completed

- On 22 August 2024, a change in rail alignment observed from visual inspection at 99.625km to 99.635km resulted in a Yellow trigger:
  - A subsidence event notification was sent to the relevant stakeholders as per MSR Management Plan TARP on 23 August 2024.
  - Following a review of the data, the RMG agreed to implement a temporary speed restriction of 40/40 km/h imposed on both tracks from 99.5km to 99.8km.
  - The track geometry improved after localised temping on 27 August and 2, 15 and 19 September 2024. (Refer to MSR Status Report R10, **Appendix G**).
  - Following the track geometry improvement, the temporary speed restriction was raised to 60km/h on the down main on 27 September 2024 and raise to 60km/h on the up main on 17 October 2024.
  - Temporary speed restriction of 60 km/h was removed from the up main on 2 November 2024 following localised tamping to improve track geometry.
  - Temporary speed restriction of 60 km/h was removed from the down main on 24 November 2024 following improvement of track geometry.

Proposed Actions

Monitoring is ongoing for the Main Southern Railway in accordance with the Main Southern Railway Management Plan.

3.7.2 Local Roads and Bridges

3.7.2.1 Overview of Monitoring Results

Monthly and weekly surveys have been conducted on local roads and bridges during LW S3A in accordance with the Wollondilly Shire Council Management Plan, Main Southern Railway Management Plan, Jemena Management Plan, Sydney Water Potable Water Management Plan, Sydney Water Sewer Management Plan and Telecommunication Management Plan. Observations have been reported in the weekly Subsidence Monitoring Reports (refer to in **Appendix A** for referenced report).

Remembrance Drive

Remembrance Drive has experienced the most active period of subsidence due to the extraction of LW S3A with rates of change reducing. The observed subsidence profile is relatively smooth, with compressive strains developing broadly above the central section of LW S3A as seen in **Figure 3-19** (Report MSEC 1430 R34, **Appendix A**).

The observed development of non-conventional compressive strain at previously observed impact sites, including Pegs R46 to R48 and Pegs R54 and R55, during the mining of LW S1A and LW S2A has reduced to minor changes during the latest survey as seen in **Figure 3-20** (Report MSEC 1430 R34, **Appendix A**). No further impact has been observed on Remembrance Drive during the reporting period.

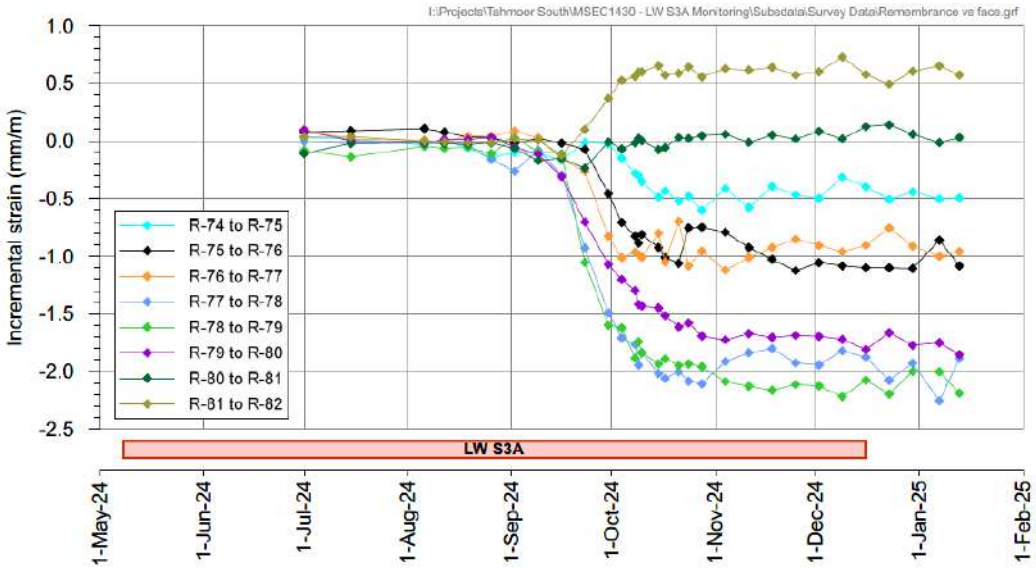

Figure 3-19: Observed development of ground strain along Remembrance Drive above central section of LW S3A over time

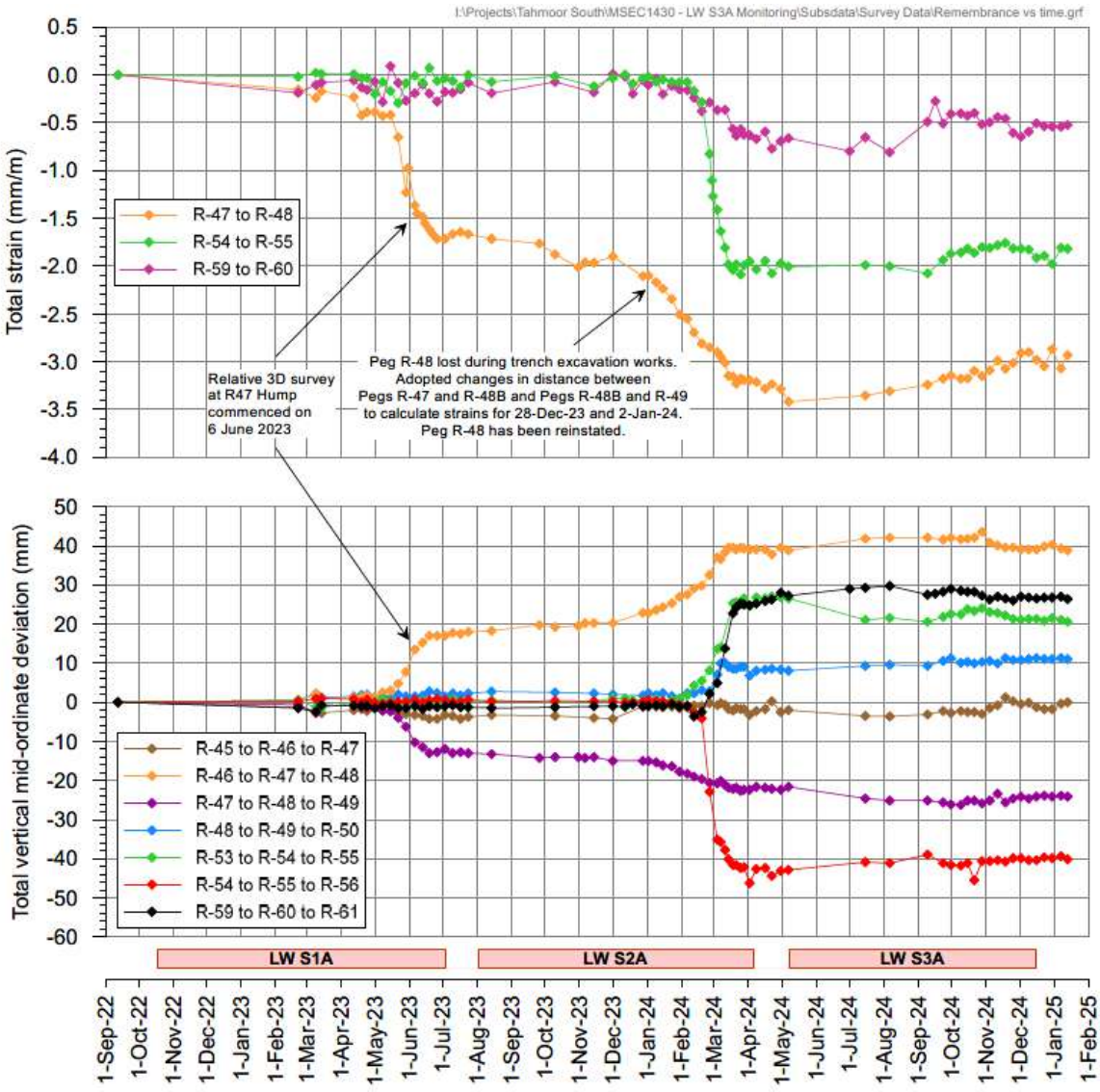

Figure 3-20: Observed development of ground strain and changes in vertical alignment at previously observed impact sites along Remembrance Drive

Compressive strains have developed over time along all survey lines along the Remembrance Drive / Caloola Road embankment. The observed subsidence profiles are relatively smooth along the crest and toe on both sides of the embankment. Closure has focussed between the crest and toe of the embankment on the southbound side (Refer to report MSEC1430 R10 and MSEC 1430 R14 in **Appendix A** for further details). A final survey was conducted on 21 January 2025, the data confirmed that the rate of change have reduced to low levels.

Charlies Point Road

Ground surveys have been conducted along Charlies Point Road and completed on 2 July 2024 with very minor changes observed. An end of panel visual inspection was completed on 13 December 2024. Visual inspections have not identified any issues or impacts.

Caloola Road

Caloola Road has experienced the most active period of subsidence due to the extraction of LW S3A, with rates of change reducing. The observed subsidence profile is relatively smooth, with minor ground strains currently observed (Report MSEC 1430 R34, **Appendix A**). No issues or impacts were observed from visual inspections.

Bridges

Surveys of Arina Road Bridge and Rockford Road Bridge on 23 August 2024 measured very minor changes. Visual inspections of Arina Road Bridge and Rockford Road Bridge on 9 October 2024 found no issues.

3.7.2.2 Wollondilly Shire Council TARP

During this reporting period, there have been no triggers under this TARP.

3.7.3 Potable Water Infrastructure

3.7.3.1 Overview of Monitoring Results

Compressive ground strains have developed, adjacent to the 450mm diameter DICL water main (near Remembrance Drive Embankment at Caloola Road). The observed subsidence profiles are relatively smooth along the crest and toe on both sides of the embankment. Closure has focussed between the crest and toe of the embankment on the southbound side. A final survey was conducted on 21 January 2025, the data confirmed that the rate of change have reduced to low levels.

Ground survey data of Remembrance Drive embankment at Caloola Road in late September 2024 measured increased closure between Pegs R-76C and R-78C, which exceeded the combined increased closure measured at the Gibault joints. This observation suggested that existing pipe joints had been closing in addition to the gibault joints. Minor changes have been observed since early October 2024, with a very small jump in closure detected at the end of November 2024 and another in mid-January 2025.

Whilst non-conventional subsidence movements have not been identified, Tahmoor Coal have been conducting twice weekly focussed ground surveys along the C-Line and focussed visual inspections three times a week with no concerns observed. Tahmoor Coal has also notified the landowner where the pipeline crosses through the private property outside Pegs R-79C and R-80C. The survey frequency returned to weekly as rates of change reduced. The frequency of visual inspections reduced from three times a week to weekly and have now ceased.

No impacts to Sydney Water potable water infrastructure were observed during the LW S3A monitoring period.

3.7.3.2 Sydney Water Potable Water TARP

During this reporting period, there have been no triggers under this TARP.

3.7.4 Sewer Infrastructure

3.7.4.1 Overview of Monitoring Results

As discussed in **Section 3.7.2.1**, weekly surveys were conducted along Remembrance Drive and the Remembrance Drive Embankment at Caloola Road during periods of active subsidence. Remembrance Drive has experienced the most active period of subsidence due to the extraction of LW S3A with rates of change reducing. Minor changes in compressive strain were measured at previously observed impact sites above LW S2A.

No impacts to Sydney Water sewer infrastructure were observed during the LW S3A monitoring period.

3.7.4.2 Sydney Water Sewer TARP

During this reporting period, there have been no triggers under this TARP.

3.7.5 Gas Infrastructure

3.7.5.1 Overview of Monitoring Results

Weekly surveys were conducted along Remembrance Drive and cutting RC1 during periods of active subsidence. Remembrance Drive has experienced the most active period of subsidence due to the extraction of LW S3A with rates of change reducing.

The gas pipeline was exposed along the section of Remembrance Drive embankment where it crosses Teatree Hollow prior to being in the zone of active subsidence, as planned. Monitoring has been conducted during the period of active subsidence. During the October 2024 survey, the measured compressive ground strains exceeded 1.5 mm/m, between Pegs R76 and R78, which are located at either end of the trench.

Following a review of the monitoring data, Tahmoor Coal completed the following actions (noting that no TARP triggers were exceeded as the Jemena gas pipeline was uncoupled prior to being in the zone of active subsidence):

- Tahmoor Coal and Jemena inspected the exposed pipeline on 1 October 2024. The following observations were made:
  - The pipeline was observed to be bowing outwards in response to the compressive strains, as expected.
  - The pipeline was pressing against the side walls of the trench resulting in a second bow forming at the southern end of the trench and lifting of the pipeline from the floor.
- Following a review of the inspection finding with Jemena the following additional management measures were implemented:
  - Widened the trench to remove the second bow. Tahmoor Coal widened the trench on 9 October under supervision of Jemena and successfully removed the second bow.
  - Undertook twice weekly strain focused ground surveys and visual inspections during the period of most active subsidence.
  - Conducted regular meetings with Jemena (once a week during most active period of subsidence) to discuss survey and visual inspection findings.
  - The pipe was repositioned in December 2024 and January 2025 and has been backfilled as per approved methodology in January 2025.
  - Engineering analyses confirmed that pipeline stresses have reduced and are within acceptable levels for managing potential future impacts due to the extraction of LW S4A.

No impacts to Jemena gas infrastructure were observed during the LW S3A monitoring period. The Jemena gas infrastructure remained safe and serviceable during the monitoring period.

3.7.5.2 Jemena TARP

During this reporting period, there have been no triggers under this TARP.

3.7.6 Electrical Infrastructure

3.7.6.1 Overview of Monitoring Results

Ground surveys of critical power poles are conducted once a month when Endeavour Energy critical electrical poles are within the active subsidence zone. Observations during LW S3A extraction were reported in the weekly Subsidence Monitoring Reports (refer to **Appendix A** for referenced report).

As discussed in **Section 3.7.2.1**, weekly surveys and inspections were conducted along Remembrance Drive and the Remembrance Drive Embankment at Caloola Road during periods of active subsidence. Remembrance Drive has experienced the most active period of subsidence due to the extraction of LW S3A with rates of change reducing. Minor changes in compressive strain were measured at previously observed impact sites above LW S3A.

No impacts to Endeavour Energy electrical infrastructure were observed during the reporting period.

3.7.6.2 Endeavour Energy TARP

During this reporting period, there have been no triggers under this TARP.

3.7.7 Telecommunications Infrastructure

3.7.7.1 Overview of Monitoring Results

Weekly surveys continue along the Main Southern Railway with the optical fibre cable along the Main Southern Railway having experienced the most active period of subsidence.

As discussed in **Section 3.7.1.1**, non-conventional subsidence developed near 99.62 km and 99.56 km on the rail corridor in August 2024 resulting in compressive ground strains.

Tahmoor Coal advised Telstra of an increased ground strain (below 1.5mm/m trigger level as per Telecommunication Management Plan TARP) in the rail corridor at 99.625 km. Telstra advised on 27 August that a minor indication of loss (0.2 dB) was observed from OTDR monitoring. Cracking and shearing was observed on the ground surface that intersect the buried cable. Tahmoor Coal excavated a narrow trench on 3 September to relieve the stress on the fibre optic cable. After the cable was free to move in within the trench, Telstra recorded an improvement in performance of approximately 0.3 dB when compared to the previous test. The trench was then backfilled as per Telstra specifications.

On 9 September 2024, additional cracks were observed across the Telstra optical fibre cable at 99.56 km. A loss of signal strength was observed by remote monitoring on Telstra's optical fibre cable on 10 September. Tahmoor Coal excavated and exposed Telstra's optical fibre cable on 11 September at two locations. The first excavation was between 99.440 km and 99.460 km based on information from remote monitoring. Some improvement in signal strength was observed. Signal strength later returned to previously observed levels after the cable was exposed at the second trench at 99.560 km, where surface cracks were observed to intersect it and a noticeable kink was exposed and straightened.

Telstra advised on 14 January 2025 that there is currently no indication of mining-induced loss observed from OTDR monitoring.

3.7.7.2 Telecommunication TARPs

Background

As discussed in **Section 3.7.7.1**, non-conventional subsidence developed near 99.62 km and 99.56 km on the rail corridor in August 2024 resulting in compressive ground strains. Visual inspections observed cracks

on the ground surface that intersect the buried optical fibre cable. On 9 September 2024, additional cracks were observed across the Telstra optical fibre cable at 99.560 km. Tahmoor Coal was notified by Telstra of a loss of signal strength that was observed by remote monitoring on Telstra's optical fibre cable on 10 September 2024.

These observations exceeded trigger levels in the Telecommunication Management Plan.

Actions and Responses Completed

In accordance with the Telecommunication Management Plan, Tahmoor Coal completed the following actions:

- Tahmoor Coal IMG met on 10 September to review subsidence and strain data in the locations where surface cracks were observed in the rail corridor (locations 99.400-99.460 km and 99.560-99.568 km).
- The review did not identify high strains at the locations.
- Telstra was notified of the review and inspection findings on 10 September 2024.
- Tahmoor Coal advised Telstra that the cable will be uncoupled at both locations.
- Tahmoor Coal uncoupled and exposed the buried cable at both locations on 11 September 2024. A kink was found in the cable and was relieved manually.
- OTDR testing by Telstra on 11 September identified that the signal was back to baseline with no ongoing losses detected.
- Tahmoor Coal backfilled the exposed section of buried cable as per Telstra specifications.
- A debrief meeting was held with Tahmoor Coal and Telstra regarding the uncoupling. It was noted that a red alarm was identified by Telstra on 7 September 2024, however it was not reported to Tahmoor Coal. It was agreed that Telstra would review internal communications to ensure prompt notifications on any loss in critical areas.
- Tahmoor Coal to continue to keep Telstra informed on the status of ground movements, visual inspections and OTDR via monitoring reports and weekly teleconferences.

Proposed Actions

The current monitoring program will continue in accordance with the various Management Plans discussed in the sections above.

3.7.8 Built Structures (General)

3.7.8.1 Overview of Monitoring Results

Monthly and weekly surveys are conducted at farm structures (farm buildings, sheds, tanks, fences) and residential structures (houses, swimming pools, associated residential structures, fences, pavement) during active subsidence as required.

During the reporting period and the mining of LW S3A, no triggers were exceeded at farm structures or residential structures.

A summary of observations of farm dams is provided in **Section 3.4.3**.

3.7.8.2 Built Structures TARP

During this reporting period, there have been no triggers under this TARP.

3.7.9 Bargo Cemetery

3.7.9.1 Overview of Monitoring Results

During the reporting period and the mining of LW S3A, no impacts have been observed at this location. This location is located directly above LW S5A and was outside the active subsidence zone of LW S3A.

It is noted that as per approval letter from DPHI on 11 November 2024, the management of Bargo Cemetery will be incorporated into the existing LW S1A – S6A Wollondilly Shire Council Management Plan.

3.7.9.2 Wollondilly Shire Council TARP

During this reporting period, there have been no triggers under this TARP.

3.7.10 Wollondilly Anglican College

3.7.10.1 Overview of Monitoring Results

Subsidence Status Reports have been prepared for Wollondilly Anglican College, which summarise monitoring and inspection results for Remembrance Driveway, monitoring lines between the college buildings, structures, fence lines, dams, and sensitive equipment. Visual inspections were conducted at the property from 1400m extraction until the end of LW S3A panel as per Amendment 1 to the Wollondilly Anglican College Management Plan.

During the reporting period and the mining of LW S3A, no impacts to built features were observed at this property.

3.7.10.2 Wollondilly Anglican College TARP

During this reporting period, there have been no triggers under this TARP.

3.7.11 Tahmoor Mine Site

3.7.11.1 Overview of Monitoring Results

Inspection and monitoring were conducted at the Tahmoor Mine Site during LWS3A in accordance with the Tahmoor Mine Site Management Plan and additional monitoring commitments as outlined in an email to the NSW Resources Regulator on 6 May 2024 (available on request). The monitoring program included the following:

- Continuous GNSS monitoring, including at the Gantry and Site S16 (shaft site)
- Continuous tilt monitoring at the Gantry
- Continuous expansion joint monitoring by displacement sensor and tilt monitoring at Trestle T4 on the 5C conveyor
- Continuous stress monitoring at Trestle T4
- Continuous tilt monitoring at Winder, Raw Coal Bins and Shaft Site
- Weekly surveys along the Main Southern Railway, Remembrance Drive when within the active subsidence zone
- Weekly inspections and reporting when within the active subsidence: 6C tunnel, 5C, 7C, 4C and 4S conveyors
- End of Panel survey of the mine site after the mining of LW S3A.

During the reporting period, the following changes were observed:

- A vertical crack was identified on 6 November 2024 on the surface of the northern facing reinforced concrete element of the 1200t raw coal bins that link the two silos together. The vertical crack width varies from hairline to approximately 1.5 mm. The length of the crack extends from approximately 3 m above ground level to 5 m below the top of the silo wall (refer to 20240512 Raw Coal Bins report, **Appendix I** for detailed inspection report). It should be noted that pre-existing vertical cracks were identified on the silos and unreinforced concrete element during the pre-mining inspection.

The mine site remained safe and serviceable during LW S3A extraction. A structural engineer inspected the crack on the 1200t raw coal bin and reported no immediate concerns.

3.7.11.2 Tahmoor Mine Site TARP

Background

As discussed in the above section (**Section 3.7.11.1**), the following trigger occurred during the reporting period (refer to **Appendix I**):

- 6 November 2024 – Vertical crack (1.5 mm wide) on the surface of the northern facing reinforced concrete element of the 1200t raw coal bins.

Actions and Responses Completed

Table 3-15 outlines the actions and responses that are required to be completed in accordance with a trigger exceedance for the 1200t raw coal bins unreinforced concrete web in accordance with the Mine Site Management Plan; as well as how these actions and responses have been addressed.

Table 3-15 Actions and Responses for TARP Trigger for impact to concrete silo bins

Action / Response from TARP	Tahmoor Coal response
Actions	
Notify IMG	Notification to IMG via email on 7 November 2024
IMG to meet and decide whether any additional management measures are required	Meeting with IMG on 8 November 2024. Actions included: - Review of reported impact – cracking is minor in 1 to 2 mm range - Review of subsidence data: No significant change observed - Review of tilt data: small increase in tilt delta in September 2024 however, tilt has return to baseline since - Structural Engineer to conduct a structural inspection - Continue monitoring tilt on the structure (Continuous monitoring)
Action undertaken by Tahmoor Coal following exceedance of trigger	The following actions were undertaken: - Structural inspection by Structural Engineer on 15 November 2024. No safety concerns or immediate issues reported - Drone inspection to confirm the crack length - Additional ground survey and bin structure survey. The following actions yet to be undertaken: - Install crack gauges along the crack and existing cracks - Paint-mark the upper and lower extend of the crack - Conduct ultrasonic testing (if applicable)

Proposed Actions

The review of the 1200t raw coal bin vertical crack by a Structural Engineer (refer to **Appendix I** for detailed inspection report) recommended the following actions:

- An EWP should be provided on site to enable the upper and lower extent of the crack to be paint-marked.

- Crack gauges to be installed at agreed locations along the crack for monitoring, possibly at ¼, ½ & ¾ of the crack height. Crack width to be measured at these locations and/or where observed crack width is greatest.
- A pair of crack gauges should also be installed across the pair of cracks observed on the internal walls and across any other cracks that are observed within the silo structure when access is available.
- Ultrasonic testing (if practicable) to assess crack depth and diamond core drilling to track the direction of the crack and determine whether the crack was pre-existing should be considered.

In addition to the above actions, continuous tilt monitoring of the silos is ongoing with review of the data as required.

3.7.12 Australian Wildlife Sanctuary

3.7.12.1 Overview of Monitoring Results

Weekly Subsidence Status Reports have been prepared for the Australian Wildlife Sanctuary during active subsidence, which summarises monitoring and inspection results from relevant GNSS units, ground survey (Tahmoor Mine Boundary line (V line)), survey and visual inspections of Main Southern Railway, local streets, structures; and natural features observations.

During the reporting period and mining of LW S3A, the following impacts to fences and gates were observed at this property:

- On 28 August 2024, cracks observed in adjacent railway cutting extended into the Australian Wildlife Sanctuary property, where a compression hump was developing to the northeast and through the new Tasmanian Devil enclosures affecting the functionality of the gates. Four gates were repaired (refer to AWS Report R14, **Appendix H**).
- On 11 September 2024, a new timber and steel-framed gate between animal enclosures was out of alignment and could not be properly closed. Ground movement was observed in this location affecting Colorbond fences which have slightly buckled. Additional repairs were carried out to gates. Trip hazards formed in gravel footpaths which were also repaired (refer to AWS Report R16, **Appendix H**).
- On 18 September 2024, the northern gate of the Tasmanian Devil enclosure was found to be catching and was repaired (refer to AWS Report R17, **Appendix H**).

During the reporting period, changes were observed in Wirrimbirra Creek (a tributary of Teatree Hollow) with regards to water level, flow and fracturing within the waterways (refer to **Appendix A**). These changes are summarised below:

- Surface flow were noted to decrease in Wirrimbirra Creek:
    - On 20 August 2024, flows in the creek were observed to have reduced since the previous inspection on 17 July 2024 after a period of dry weather. Surface water was observed to cease at K64, re-emerging upstream of Pool TT2, which holds water. Surface water then ceased again downstream of Pool TT2, re-emerging at K71, upstream of the confluence with Teatree Hollow. A new fracture approximately 6 metres long was observed upstream of Pool TT2 on 17 July.
- Low water levels were observed at Pool TT2 and were assessed to be atypical in comparison with what would be considered 'normal' conditions. This atypical water level was considered likely to be due to mining-induced reduction in groundwater baseflow into the pool;
- Fractures within a surface boulder upstream of Pool TT2 were noted to increase in size during the mining of LWS3A. The fracture was not visible in the boulder to the same scale and extent as observed prior to or after the mining of LW S1A.

- On 9 November 2023, a geotechnical inspection of the fracture site confirmed that the boulder was once connected to the host rock on both sides of the stream, however became dislocated due to natural weather and erosion of the underlying strata prior to mining. The boulder remained in contact with the host rock, however mining-induced closure has resulted in almost immediate fracturing.
- On 8 April 2024, an inspection of the boulder found that the detached sandstone block had been displaced following the heavy rainfall event on 6 April 2024;
- During the reporting period, the fracture did not have any effect on surface flows into Pool TT2.

These changes in water level and physical features of the pools are noted to be related to observations discussed in **Section 3.2.3.1**.

No impacts were observed to the rockshelter located on the Australian Wildlife Sanctuary property (refer to **Section 3.6.1** for more details of this observation).

3.7.12.2 Australian Wildlife Sanctuary TARP – Impacts Observed Generally

Background

As discussed in **Section 3.7.12.1**, ground movement observed on 28 August 2024 impacted the functionality of gates within the Tasmanian Devil enclosure and created a trip hazard in the gravel footpath at the Australian Wildlife Sanctuary. These observations exceeded a trigger level in the Australian Wildlife Sanctuary Management Plan (refer to trigger "Impacts Observed Generally").

Actions and Responses Completed

Tahmoor Coal repaired the gates and removed the trip hazard on the gravel footpath to make it safe and serviceable.

Proposed Actions

The current monitoring program will continue in accordance with the Australian Wildlife Sanctuary Management Plan.

3.7.12.3 Australian Wildlife Sanctuary TARP – Impacts on Natural Features

Background

The combination of observed increase in fracturing and pool water level reduction, as discussed in the above section (**Section 3.7.12.1**), resulted in a sustained Level 4 TARP trigger in accordance with the Australian Wildlife Sanctuary TARP (refer to report R21, **Appendix H**) for the reporting period.

Actions and Responses Completed

Table 3-16 outlines the actions and responses that are required to be completed in accordance with a Level 4 TARP trigger in the Australian Wildlife Sanctuary Management Plan, as well as how these actions and responses have been addressed.

Table 3-16 Actions and Responses for a Level 4 TARP Trigger (Australian Wildlife Sanctuary Management Plan TARP)

Action / Response from TARP	Tahmoor Coal response
Actions	
Tahmoor Coal to consider whether any additional management measures are required, including: - Investigation to assess if the observed change is related to mining effects, other catchment changes or the prevailing climate.	Detailed assessment of the observed water level changes and fracturing in Wirrimbirra Creek have been completed (refer to **Appendix B**) and a summary is provided in **Section 3.2** of this report.

Action / Response from TARP	Tahmoor Coal response
	Changes to water level were noted to be related to both mining-induced changes as well as prevailing weather conditions. Fracturing was confirmed to be directly related to mining.
Tahmoor Coal to consider whether any additional management measures are required, including: - Increase monitoring and reporting procedures.	As the cause of the changes have been confirmed to be associated with mining impact (as stated in the relevant TARPs in the Water Management Plan), increase in the frequency of monitoring and reporting is not deemed necessary.
Tahmoor Coal to consider whether any additional management measures are required, including: - If it is concluded that the impact is due to mining, implement a corrective management action plan (CMAP) in consultation with Australian Wildlife Sanctuary.	As required under the LW S1A-S6A Water Management Plan, Tahmoor Coal will develop a Waterways Corrective Action Management Plan (WCAMP) in consultation with AWS as required. The WCAMP is noted to be equivalent to a CMAP. The preparation of this WCAMP (if required) will likely commence following the cessation of subsidence movements associated with Tahmoor South mining.
Notify AWS of trigger exceedance and any management decisions undertaken.	AWS were notified of this trigger on 24 October 2023. A site inspection with the National Trust NSW and AWS staff to Pools TT2 and TT3 was conducted on 22 November 2023.

In addition, due to the reduction in water in the Wirrimbirra Creek, temporary water supply for wildlife was installed on 25 July 2023 and continued to be maintained during the reporting period.

Proposed Actions

The current monitoring program will continue in accordance with the Australian Wildlife Sanctuary Management Plan.

3.7.13 Picton Weir

3.7.13.1 Overview of Monitoring Results

This built feature is located outside the active subsidence zone of LW S3A.

3.7.13.2 Picton Weir TARP

During this reporting period, there have been no triggers under this TARP.

3.7.14 Bargo Petroleum (3030 Remembrance Drive)

3.7.14.1 Overview of Monitoring Results

Weekly Subsidence Status Reports have been prepared for the Bargo Petroleum (3030 Remembrance Drive) during active subsidence, which summarise monitoring and inspection results from survey and visual inspections on Remembrance Drive, structures, fuel balance monitoring and pressure testing of fuel tanks and fuel lines, hydrocarbon testing and visual inspections of groundwater, and alignment survey of vehicle hoists.

During the reporting period and the mining of LW S3A, no impacts to built features have been observed at this property.

3.7.14.2 3030 Remembrance Drive TARP

During this reporting period, there have been no TARP triggers under this TARP.

3.7.15 Inghams Farms

3.7.15.1 Overview of Monitoring Results

During the reporting period, there were no triggers under the Inghams Bargo Chicken Breeder Production Complex Management Plan and no impacts were observed at this property.

3.7.15.2 Inghams Farms TARPs

During this reporting period, there have been no TARP triggers under this TARP.

3.7.16 Tahmoor Garden Centre

3.7.16.1 Overview of Monitoring Results

Weekly Subsidence Status Reports have been prepared for the Tahmoor Garden Centre during active subsidence of LW S3A, which summarise monitoring and inspection and survey results from Remembrance Drive, structures, and outdoor storage racks.

During the reporting period and mining of LW S3A, the following impacts have been observed at this property:

- On 23 October 2024 a 3 mm opening of a concrete expansion joint was observed causing damage to the epoxy coating in the café area. Due to food safety regulations, the opening was repaired by Tahmoor Coal using flexible sealant (refer to Tahmoor Garden Centre Report R06, **Appendix J**).
- On 19 November 2024, further minor opening (1 mm) to the expansion joint in the café area was observed. The opening was further repaired by Tahmoor Coal using flexible sealant (refer to Tahmoor Garden Centre Report R10, **Appendix J**).

3.7.16.2 Tahmoor Garden Centre TARP – Impacts Observed Generally

Background

As discussed in **Section 3.7.16.1**, a slight opening of an expansion joint caused damage to the epoxy coating in the café area on two occasions.

Actions and Responses Completed

Tahmoor Coal carried out repairs to the expansion joint using flexible sealant.

Proposed Actions

The current monitoring program will continue in accordance with the Tahmoor Garden Centre Management Plan.

3.7.17 MKD Machinery

3.7.17.1 Overview of Monitoring Results

Weekly Subsidence Status Reports have been prepared for the MKD Machinery property during active subsidence of LW S3A, which summarises monitoring and inspection results from Remembrance Drive, Main Southern Railway, structures, silo hopper tower, and visual inspections of the concrete plant, external pavement, fences and gates, pool and the air strip.

During the reporting period and mining of LW S3A, no impacts to built features were observed at this property.

3.7.17.2 MKD Machinery TARP

During this reporting period, there have been no triggers under this TARP.

3.7.18 Bargo Valley Produce

3.7.18.1 Overview of Monitoring Results

This property is located outside the active subsidence zones of LW S3A.

3.7.18.2 Bargo Valley Produce TARP

During this reporting period, there have been no triggers under this TARP.

3.7.19 Canine Country Club

3.7.19.1 Overview of Monitoring Results

This property is located outside the active subsidence zones of LW S3A.

3.7.19.2 Canine Country Club TARP

During this reporting period, there have been no triggers under this TARP.

3.7.20 Pamak Hobbies

As per approval letter from DPHI on 11 November 2024, the management of Pamak Hobbies has been incorporated into the existing LW S1A – S6A Built Structure Management Plan. Reporting for Pamak Hobbies will be under **Section 3.7.8** in future reports.

3.8 Public Safety Monitoring

The LW S1A-S6A Public Safety Management Plan was prepared to manage the potential consequences as a result of LW S1A-S6A extraction on public safety within the Study Area in accordance with Condition C8 of SSD 8445.

As noted in **Section 1.3.3** of this report, management requirements for public safety are covered in the Built Features Management Plan and the Land Management Plan. Monitoring of cliffs, natural steep slopes and other landscape features were conducted for the reporting period in accordance with the LW S1A-S6A Land Management Plan (refer to **Section 3.4** for a summary of monitoring results). In addition, monitoring of built features has been conducted for the reporting period in accordance with the LW S1A-S6A Built Features Management Plan (refer to **Section 3.7** for a summary of monitoring results).

No subsidence impacts were identified during the reporting period that were considered to pose a risk to public safety.

4 Assessment of Environmental Performance

4.1 Environmental Performance Measures and Indicators

The following development consents include subsidence impact performance measures as conditions for the extraction of LW S1A-S6A:

- SSD 8445:
    - Performance Measures – Natural and heritage features: Condition C1 (Table 7); and
    - Performance Measures – Built Features: Condition C5 (Table 8).

The subsidence impact performance measures were adopted as part of the LW S1A-S6A Extraction Plan and associated management plans. To assist in defining the performance measures, each measure has been assigned subsidence performance indicator(s) and addressed in relevant TARPs.

These performance measures and indicators are provided in **Table 4-1**, as well as an assessment of performance in accordance with the TARPs (as discussed previously in **Table 2-1** and **Section 3**).

Table 4-1 Assessment of Environmental Performance

Feature	Subsidence Performance Measure	Subsidence Performance Indicator	Relevant TARP	Subsidence Performance Measure Exceeded?
Water Resources				
All watercourses within the Subsidence Area	• No greater subsidence impact or environmental consequences to water quality, water flows (including baseflow) or stream health (including riparian vegetation), than predicted in the EIS.	Exceedance of the impact assessment criteria, as defined in the relevant Level 1 to Level 3 trigger, where a Level 3 trigger denotes progression towards a potential exceedance of the performance measure.	TARP WMP1, WMP3 and WMP5.	**No**
Other watercourses	• Negligible environmental consequences including beyond those predicted in the EIS, including: - Negligible diversion of flows or changes in the natural drainage behaviour of pools; - Negligible decline in baseline channel stability; - Negligible gas releases and iron staining; and - Negligible increase in water turbidity.	The performance measure will be considered to be exceeded if a Level 3 TARP is triggered in relation to water level decline and/or water quality changes and the investigation outcomes indicate a mining related impact based on monitoring data for sites in Hornes Creek and the Bargo River. Performance indicators in relation to channel stability are not proposed as soft knickpoints have not been mapped in Hornes Creek or the Bargo River.	TARP WMP2, WMP4 and WMP6.	**No**
GDEs including Thirlmere Lakes	• Negligible impacts including: - Negligible change in groundwater levels; and - Negligible change in groundwater quality.	The performance measure will be considered to be exceeded if a Level 3 TARP is triggered and the investigation outcomes indicate a mining related impact based on monitoring data for the Thirlmere Lakes.	TARP WMP13.	**No**

Feature	Subsidence Performance Measure	Subsidence Performance Indicator	Relevant TARP	Subsidence Performance Measure Exceeded?
Land				
Any cliff located directly above longwalls	• Minor environmental consequences (that is occasional rockfalls, displacement or dislodgement of boulders or slabs, or fracturing, that in total do not impact more than 5% of the total face area of the cliff within any longwall mining domain)	This performance measure is not relevant to this Extraction Plan, as there are no cliffs located directly above LW S1A-S6A.	None, not applicable to LW S1A-S6A.	Not applicable.
Any cliff within Subsidence Area beyond the extent of longwalls	• Negligible environmental consequences (that is occasional rockfalls, displacement or dislodgement of boulders or slabs, or fracturing, that in total do not impact more than 0.5% of the total face area of such cliffs within Subsidence Area)	This performance measure will be considered to be triggered if more than 0.5% of the total face area of the cliffs within the 600 m Environmental Features Study Area is impacted by mining (i.e. by occasional rockfalls, displacement or dislodgement of boulders or slabs, or fracturing).	TARP LMP1.	**No**
All land within the Subsidence Area	• No greater subsidence impacts or environmental consequences than predicted in the EIS	This performance measure will be considered to be triggered if mining results in mine subsidence-induced slope instability, which would be a greater subsidence impact or consequence than predicted in the EIS.	TARP LMP2.	**No**
All land outside the Subsidence Area	• Negligible subsidence impacts or environmental consequences	This performance measure is not relevant to this Extraction Plan, as there are no steep slopes identified within the 600 m Environmental Features Study Area, other than the three steep slopes located within the Subsidence Area and already assessment in accordance with the 'All land within the Subsidence Area' performance measure.	None, not applicable to LW S1A-S6A.	Not applicable.

Feature	Subsidence Performance Measure	Subsidence Performance Indicator	Relevant TARP	Subsidence Performance Measure Exceeded?
Biodiversity				
Threatened species, threatened populations, or endangered ecological communities	• No greater subsidence impacts or environmental consequences than predicted in the EIS. • Negligible impacts on threatened species, populations or communities due to remediation of subsidence cracking.	This performance measure will be triggered if subsidence impacts cannot be remediated in a manner that restores habitat of threatened species, threatened populations, or endangered ecological communities.	TARP BMP4.	**No**
GDEs including Thirlmere Lakes	• Negligible impacts including: - Negligible change in groundwater levels; and - Negligible change in groundwater quality	The performance measure will be considered to be exceeded if the groundwater levels or groundwater quality decline below Level 3 (in the relevant groundwater TARP triggers for water level and water quality – TARP WMP8 or WMP11) following the commencement of extraction, and the investigation outcomes indicate a mining related impact based on monitoring data for riparian vegetation.	TARP BMP3.	**No**

Feature	Subsidence Performance Measure	Subsidence Performance Indicator	Relevant TARP	Subsidence Performance Measure Exceeded?
Heritage sites				
Aboriginal cultural heritage sites	• No greater subsidence impacts or loss of heritage values than predicted in the EIS.	**TC14-2-19** (Isolated find): No performance indicators are currently established as impacts are predicted to be negligible.	None, not applicable to LW S1A-S6A.	Not applicable.
		Remembrance Drive 2013.1 (open camp site): No performance indicators are currently established as impacts are predicted to be negligible.	None, not applicable to LW S1A-S6A.	Not applicable.
		Teatree Hollow 2013.1 (rockshelter with art and deposit): This performance indicator will be considered to be triggered if more than 10% of rockshelters (i.e. more than two) in the Tahmoor South Domain (including A and B series longwalls) are impacted by: • Subsidence monitoring identifies obvious perceptible change, e.g. rockfall, cracking, or toppling within rockshelters; and • These subsidence impacts result in impacts to the heritage values of the site, e.g. cracking or spalling of the art work panels or, elsewhere in the shelter, cracking or spalling greater than naturally caused examples in the rockshelter. This performance measure cannot be exceeded during the extraction of the A series longwalls, even if the above-mentioned performance indicators are fully triggered for Teatree Hollow 2013.1. Such impacts would not exceed the 10% threshold of impacts to the 19 total rockshelters in the longwalls A and B Study Area.	TARP HMP1.	**No**

Feature	Subsidence Performance Measure	Subsidence Performance Indicator	Relevant TARP	Subsidence Performance Measure Exceeded?
Heritage sites				
Historical heritage sites	• No greater subsidence impacts or loss of heritage values than predicted in the EIS.	This performance indicator will be considered to be triggered if subsidence impacts cannot be repaired in a manner that preserves the heritage value of the historical heritage items. This performance indicator is applicable to the following historical heritage items: • Wirrimbirra Sanctuary (Australian Wildlife Sanctuary); • Bargo Cemetery; • Bargo Railway Bridge North (Wellers Road Overbridge); • Picton Weir; • Tahmoor Colliery (Tahmoor Mine Site); • Great Southern Road (partial); and • Bargo Railway Viaduct.	TARP HMP2.	**No**
Mine workings				
First workings	• To remain long term stable and non-subsiding.	None allocated.	None – ongoing assessment in accordance with mine design.	**No**
Second workings	• To be carried out only within the approved mine plan, in accordance with an approved Extraction Plan.	None allocated.	None – ongoing assessment in accordance with LW S1A-S6A Extraction Plan mine plan.	**No**

Feature	Subsidence Performance Measure	Subsidence Performance Indicator	Relevant TARP	Subsidence Performance Measure Exceeded?
Public Infrastructure				
Key public infrastructure: • Main Southern Railway • Remembrance Drive • M31 Motorway • Moomba to Sydney Gas Pipeline • Gorodok Ethane Pipeline • Bargo Waste Management Centre	• Always safe and serviceable • Damage that does not affect safety or serviceability must be fully repairable, and must be fully investigated and repaired at the cost of the Applicant	None allocated.	Addressed in TARPs contained in the Main Southern Railway Management Plan and Wollondilly Shire Council Management Plan. It is noted that the Bargo Waste Management Centre, M31 Motorway, Moomba to Sydney Gas Pipeline, and the Gorodok Ethane Pipelines are not located within the Study Area of this Extraction Plan.	**No**
• All other public infrastructure including roads, culverts, bridges, viaducts, water supply pipelines, sewerage mains, gas pipelines, electrical and telecommunication infrastructure and survey control marks.	• Always safe • Serviceability should be maintained wherever practicable • Loss of serviceability must be fully compensated • Damage must be fully repairable, and must be fully investigated and repaired or else replaced or fully compensated at the cost of the Applicant	None allocated.	Addressed in TARPs contained in Subsidence Management Plans for various built features.	**No**

Feature	Subsidence Performance Measure	Subsidence Performance Indicator	Relevant TARP	Subsidence Performance Measure Exceeded?
Other Built Features				
• Public amenities including schools, churches and community centres • Industrial, commercial and business premises • Bargo Cemetery • Wirrimbirra Sanctuary • Privately-owned residences • Other privately-owned built features and improvements, including petrol stations, sheds, garages, farm dams, tanks, swimming pools, tennis courts, roads, tracks and fences	• Always safe • Serviceability should be maintained wherever practicable • Loss of serviceability must be fully compensated • Damage must be fully repairable and must be fully investigated and repaired or else replaced or fully compensated at the cost of the Applicant.	**Farm dams**: This performance measure will be considered to be triggered if mining results in damage to a farm dam such that the dam is not safe and serviceable and/or any damages cannot be fully repairable and/or compensated.	TARP LMP3.	**No**
		All other features: None allocated.	Addressed in TARPs contained in Subsidence Management Plans for various built features.	**No**
Public Safety				
• Public safety	• Negligible additional risk	This performance measure will be considered to be triggered if subsidence monitoring identifies a mining induced hazard to the public that cannot be controlled or managed.	Assessed indirectly through TARP LMP1, LMP2, LMP3. Addressed in TARPs contained in Subsidence Management Plans for various built features.	**No**

5 Document Information

5.1 References

ATC Williams (2025a), Tahmoor South Domain, Surface Water Review 1 July to 31 December 2024, prepared for Tahmoor Coal, September 2025.

ATC Williams (2025b), Tahmoor South Domain, Tahmoor South Bargo Tributary Water Level Review, prepared for Tahmoor Coal, September 2025.

Department of Planning and Environment (DPE) (2015), Draft Guidelines for the Preparation of Extraction Plans V5.

Douglas Partners (2025), Geotechnical comment Mine Subsidence Impact Inspections Farm Dam 18, 15 Caloola Road Bargo, prepared for Tahmoor Coal. April 2025

SLR (2025), Six-Monthly Groundwater Monitoring: July to December 2024, Tahmoor South Domain, prepared for Tahmoor Coal, September 2025.

Stantec (2025a), Tahmoor South A series, Aquatic Monitoring Report Spring 2024, prepared for Tahmoor Coal, August 2025.

Stantec (2025b), Tahmoor South A series, Terrestrial Monitoring Report Spring 2024, prepared for Tahmoor Coal, August 2025.

Tahmoor Coal Documents:

- Extraction Plan LW S1A-S6A Extraction Plan Main Document, TAH-HSEC-00360
- Extraction Plan LW S1A-S6A Water Management Plan, TAH-HSEC-00361
- Extraction Plan LW S1A-S6A Land Management Plan, TAH-HSEC-00362
- Extraction Plan LW S1A-S6A Biodiversity Management Plan, TAH-HSEC-00363
- Extraction Plan LW S1A-S6A Heritage Management Plan, TAH-HSEC-00364
- Extraction Plan LW S1A-S6A Built Features Management Plan, TAH-HSEC-00366
- Extraction Plan LW S1A-S6A Public Safety Management Plan, TAH-HSEC-00365
- Extraction Plan LW S1A-S6A Subsidence Monitoring Program, TAH-HSEC-00367

5.2 Glossary of Terms

Terms references to this document are provided below in **Table 5-1**.

Table 5-1 Glossary of Terms

Term	Definition
Active Subsidence Zone	The active subsidence zone for each longwall is defined by the area bounded by the predicted 20 mm subsidence contour for the active longwall and a distance of 150 m in front of the active longwall face and 450 m behind the active longwall face or following 500 m of longwall extraction.
Angle of draw	The angle of inclination from the vertical of the line connecting the goaf edge of the workings and the limit of subsidence (which is usually taken as 20 mm of subsidence).

Term	Definition
Built features	Includes any building or work erected or constructed on land, including dwellings and infrastructure such as a formed road, street, path, walk, or driveway; any pipeline, water sewer, telephone, gas or other infrastructure service main.
Cliff	A continuous rock face, including overhangs, having a minimum length of 20 metres, a minimum height of 10 metres and a minimum slope of 2 to 1 (>63.4°).
Closure	The reduction in the horizontal distance between the valley sides. The magnitude of closure, which is typically expressed in the units of mm, is the greatest reduction in distance between any two points on the opposing valley sides. It should be noted that the observed closure movement across a valley is the total movement resulting from various mechanisms, including conventional mining induced movements, valley closure movements, far-field effects, downhill movements and other possible strata mechanisms.
Curvature	Second derivative of subsidence, or the rate of change of tilt, and is calculated as the change in tilt between two adjacent sections of the tilt profile divided by the average length of those sections. Curvature is usually expressed as the inverse of the Radius of Curvature with the units of 1/km (km-1), but the value of curvature can be inverted, if required, to obtain the radius of curvature, which is usually in km. Curvature can be either hogging (i.e. convex) or sagging (e.g. concave).
Longwall	A system of mining coal in which the seam is extracted on a broad front or long face using a coal shearer and the roof is supported by hydraulic roof supports.
Reporting period	1 July 2023 to 31 December 2023.
Run of mine (ROM)	Raw coal production. The unprocessed mined coal that is conveyed to the CPP. ROM may consist of coal and rock.
Steep slope	An area of land having a gradient between 1 in 3 (33% or 18.3°) and 2 in 1 (200% or 63.4°).
Strain	The change in the horizontal distance between two points divided by the original horizontal distance between the points, i.e. strain is the relative differential displacement of the ground along or across a subsidence monitoring line. Strain is dimensionless and can be expressed as a decimal, a percentage or in parts per notation. Tensile Strains are measured where the distance between two points or survey pegs increases and Compressive Strains where the distance between two points decreases. Whilst mining induced strains are measured along monitoring lines, ground shearing can occur both vertically, and horizontally across the directions of the monitoring lines.
Study Area	Study Area as defined in the LW S1A-S6A Extraction Plan.
Subsidence	The vertical movement of a point on the surface of the ground as it settles above an extracted panel, but 'subsidence of the ground' in some references can include both a vertical and horizontal movement component. The vertical component of subsidence is measured by determining the change in surface level of a peg that is fixed in the ground before mining commenced and this vertical subsidence is usually expressed in units of mm. Sometimes the horizontal component of a peg's movement is not measured, but in these cases, the horizontal distances between a particular peg and the adjacent pegs are measured.
Subsidence impacts	The physical changes or damage to the fabric or structure of the ground, its surface and environmental features, or built structures that are caused by the subsidence

Term	Definition
	effects. These impacts considerations can include tensile and shear cracking of the rock mass, localised buckling of strata, bed separation, rock falls, collapse of overhangs, failure of pillars, failure of pillar floors, dilation, slumping and also include subsidence depressions or troughs.
Subsidence consequences	The knock-on results of subsidence impacts, i.e. any change in the amenity or function of a natural feature or built structure that arises from subsidence impacts. Consequence considerations include public safety, loss of flows, reduction in water quality, damage to artwork, flooding, draining of aquifers, the environment, community, land use, loss of profits, surface improvements and infrastructure. Consequences related to environmental features are referred to as environmental consequences.
Tilt	The change in the slope of the ground as a result of differential subsidence and is calculated as the change in subsidence between two points divided by the horizontal distance between those points. Tilt is, therefore, the first derivative of the subsidence profile. Tilt is usually expressed in units of mm/m. A tilt of 1 mm/m is equivalent to a change in grade of 0.1 %, or 1 in 1000.

5.3 Abbreviations

Abbreviations used in this document are provided below in **Table 5-2**.

Table 5-2 Abbreviations

Abbreviation	Definition
AHIMS	Aboriginal Heritage Information System
ARTC	Australian Rail Track Corporation
AUSRIVAS	The Australian River Assessment System
BACI	Before After Control Impact design
BGSS	Bargo Sandstone
BIS	Building Inspection Service
CTF	Cease to flow
DPE	NSW Department of Planning and Environment (formerly DPIE, now DPHI)
DPIE	NSW Department of Planning, Industry and Environment (now DPHI, formerly DPIE and DPE)
DPHI	NSW Department of Planning, Housing and Infrastructure (formerly DPE, now DPHI)
EC	Electrical conductivity
EPA	NSW Environment Protection Authority
EPT	Ephemeroptera Plecoptera Trichoptera scores
GFG	GFG Alliance
GNSS	Global Navigation Satellite System units
HBSS	Hawkesbury Sandstone
Km	Kilometres
LW S1A	Longwall South 1A
LW S2A	Longwall South 2A

Abbreviation	Definition
LW S3A	Longwall South 3A
LW S4A	Longwall South 4A
LW S5A	Longwall South 5A
LW S6A	Longwall South 6A
LW S7A	Longwall South 7A
LW S1A-S6A	Longwall South 1A to South 6A
m	metres
mbgl	Metres below ground level
mg/L	Milligrams per litre
ML	Mining Lease
mm	millimetre
MSEC	Mine Subsidence Engineering Consultants
MSR	Main Southern Railway
NRAR	NSW Industry – Land & Water – Natural Resources Access Regulator – East
NSW	New South Wales
OE	Observed expected score
OSP	Open Standpipe Piezometers
pH	pH units
SSGVs	Site Specific Guideline Values
Tahmoor Coal	Tahmoor Coal Pty Ltd
Tahmoor Mine	Tahmoor Coal Mine
TARP	Trigger Action Response Plan
TCCCC	Tahmoor Colliery Community Consultative Committee
TDS	Total dissolved solids
TfNSW	Transport for NSW
VMP	Vibrating Wire Piezometer

5.4 Document Distribution

This report and associated documents have been distributed according to **Table 5-3**.

Table 5-3 Distribution List for Six Monthly Subsidence Impact Report

Agency	Contact Person	Position	Electronic Copy
DPHI	(Planning Portal)	(Planning Portal)	(https://www.planningportal.nsw.gov.au/major-projects)
	Jessie Evans	Director – Resource Assessments	Jessie.evans@dpie.nsw.gov.au
	Gabriel Wardenburg	Team Leader	Gabriel.wardenburg@dpie.nsw.gov.au
DCCEEW – Water	(General email)	(General email)	Waterlicensing.servicedesk@dpie.nsw.gov.au

Agency	Contact Person	Position	Electronic Copy
NSW Resources – Resources Regulator	(General email)	(General email)	subsidence.monitoring@planning.nsw.gov.au nswresourcesregulator@service-now.com
	Ray Ramage	Mine Safety Officer - Subsidence	ray.ramage@planning.nsw.gov.au
	Greg Kininmonth	Manager Environmental Operations (Southern)	greg.kininmonth@planning.nsw.gov.au
NSW Resources (formerly Mining Exploration and Geoscience)	(General email)	(General email)	resource.operations@planning.nsw.gov.au
Wollondilly Shire Council	(General email)	(General email)	council@wollondilly.nsw.gov.au
	David Henry	Environmental Assessment Planner	david.henry@wollondilly.nsw.gov.au
Subsidence Advisory NSW	(General email)	(General email)	subsidenceadvisory@customerservice.nsw.gov.au
NRAR	(General email)	(General email)	eucoordination@nrar.nsw.gov.au
EPA	(General email)	(General email)	epa.illawarra@epa.nsw.gov.au
	Andrew Couldridge	Senior Operations Officer - Metropolitan Illawarra	andrew.couldridge@epa.nsw.gov.au
Commonwealth Department of Climate Change, Energy, the Environment and Water	(General email)	(General email)	epbcmonitoring@dcceew.gov.au
TCCCC Committee Members	Documents sent to TCCCC Committee Members at private email addresses.		

Appendix A – Subsidence Monitoring Reports

Summary	
Monitoring period	27 July to 2 August 2024
Length of extraction of LW S3A	653 metres on 1 August 2024 LW commenced extraction on 8 May2024
Distance travelled by longwall since previous report	35 metres in the last week (since 25 July 2024)
Distance to completion of LW S3A	1051 metres

Summary of observed ground movements

Subsidence Parameter		Maximum observed during LW S3A	Location
Subsidence (mm)	Inc Total	678 960	GNSS S10 GNSS S06
Tilt (mm/m)	Inc Total	0.5 9.4	Remembrance Drive Main Southern Railway
Hogging Curvature (km^{-1})	Inc Total	0.03 0.21	Charlies Point Road Remembrance Drive
Sagging Curvature (km^{-1})	Inc Total	-0.04 -0.20	Remembrance Drive Remembrance Drive
Tensile Strain (mm/m)	Inc Total	0.3 0.4	Remembrance Drive Main Southern Railway & Remembrance Drive
Compressive Strain (mm/m)	Inc Total	-0.3 -3.4	Charlies Point Road & Remembrance Drive Remembrance Drive
Subsidence since previous survey (mm)		22 mm	GNSS S08 since 25 July

Actions

HAVE ANY DEFINED TRIGGERS BEEN REACHED SINCE PREVIOUS REPORT?	NO.
IS ANY URGENT ACTION REQUIRED?	NO.

This monitoring report provides the results of the latest ground surveys during the mining of LW S3A, in accordance with the requirements of subsidence management plans.

Longwall face position

LW S3A commenced on 8 May 2024 and at the time of this report had progressed a distance of 653 metres from its start position. The mine layout and the monitoring peg positions are shown in Drawing No. MSEC1430-01.

Monitoring results

Ground monitoring is being undertaken within the active subsidence zone of LW S3A. Maximum incremental subsidence parameters within the current extent of monitoring are summarised in Table 1.

Table 1 Summary of maximum observed subsidence parameters

Monitoring Line		Maximum observed subs (mm)	Maximum observed tilt (mm/m)	Maximum observed hogging curvature (km^{-1})	Maximum observed sagging curvature (km^{-1})	Maximum observed tensile strain (mm/m)	Maximum observed comp. strain (mm/m)
Charlies Point Road	Inc Total	14 71	0.3 0.4	0.03 0.03	-0.03 -0.02	0.2 0.3	-0.3 -0.3
Main Southern Railway	Inc Total	43 835	0.4 9.4	0.01 0.15	-0.02 -0.19	0.1 0.4	-0.1 -1.6
Remembrance Drive	Inc Total	32 585	0.5 4.3	0.02 0.21	-0.04 -0.20	0.3 0.4	-0.3 -3.4
Great Southern Road	Inc	17	0.2	0.01	-0.01	0.2	-0.2
Yarran Road	Inc	27	0.4	0.03	-0.02	0.2	-0.2

Ground survey results

Ground monitoring is being undertaken within the active subsidence zone of LW S3A. Monitoring results are shown graphically at the back of this report.

The spatial distribution of incremental subsidence is shown in Drawing No. MSEC1430-02. Changes in subsidence since the previous survey are shown in Drawing No. MSEC1430-03.

Main Southern Railway

Monthly surveys have commenced, with small changes observed on 3 June. Weekly surveys are continuing, with small changes observed on 29 July. Visual inspections have not identified any issues at this stage.

GNSS monitoring

Global Navigation Satellite System (GNSS) units are fixed survey stations that continuously measure their absolute horizontal and vertical positions in real time. There are 28 units located directly above and adjacent to LW S1A to S6A. These include two units above the commencing end of LW S3A, being Sites S09 and S10.

The measured position of each GNSS unit varies depending on atmospheric conditions and the array of satellites that are present in the sky at each time, and the vegetation cover surrounding each unit. Measured variations in height are typically greater than the variations for eastings and northings.

The results from the GNSS units are shown in Fig. S01 to Fig. S27 and Fig. TM. Mining-induced movements have developed at the GNSS units, with maximum measured incremental subsidence of 678 mm at Site S10 above LW S3A. Rates of change are reducing.

Observed development of subsidence above LW S3A is shown in Figure A. Subsidence is increasing at Site S10 above LW S3A, close to prediction. It is predicted that subsidence above LW S3A will be greater than observed above LW S2A because it is the third panel in the longwall series.

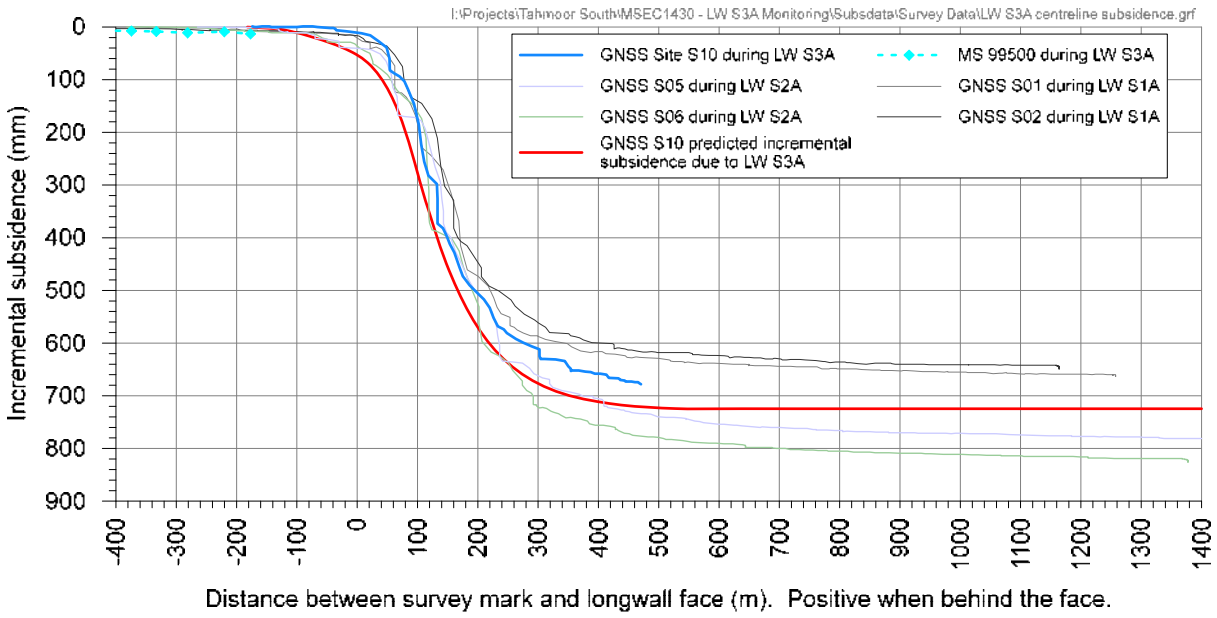

Figure A Development of subsidence along centreline of LW S3A

Changes in horizontal distances can be calculated between GNSS units that are stationed close together and results are shown in Figure B. Closure has developed across the Tributary to Teatree Hollow (Wirrimbirra Creek). Closure is currently developing across Wirrimbirra Creek between Sites S09 and S10 directly above LW S3A. Rates of change are reducing at all sites.

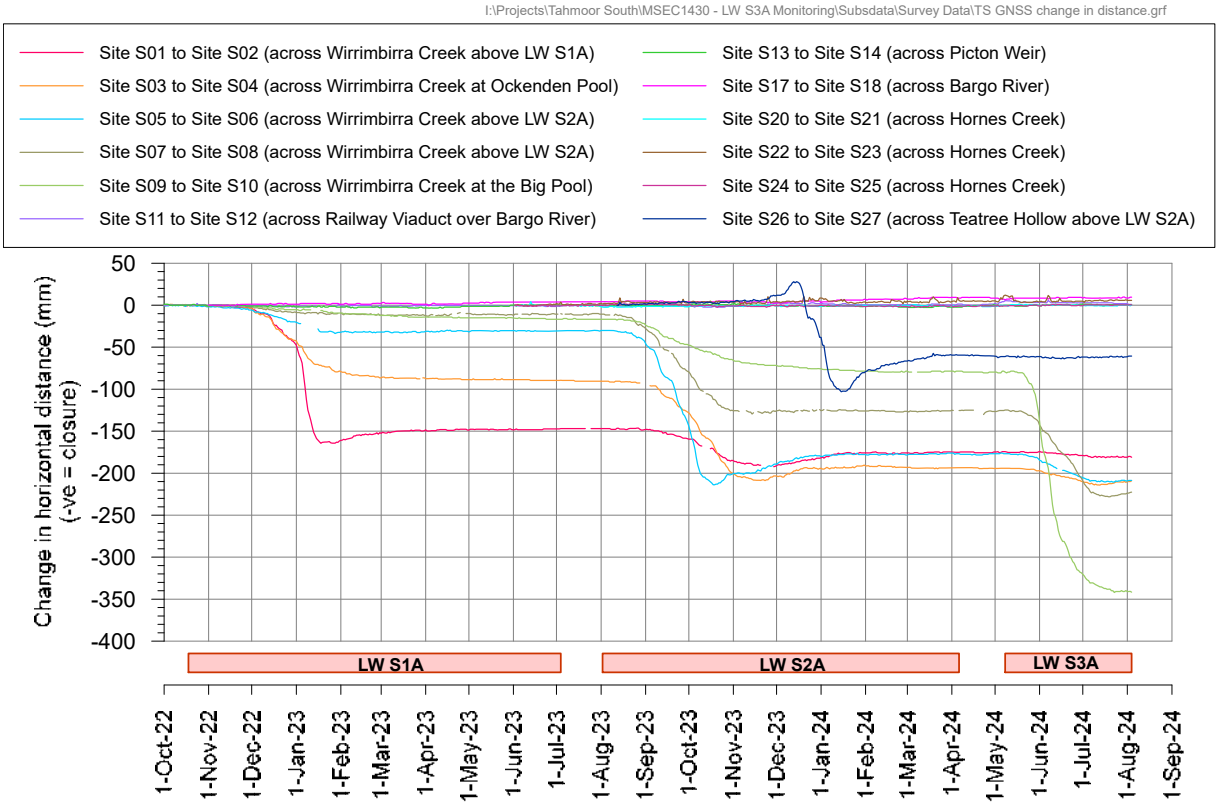

Figure B Observed changes in horizontal distances between GNSS units

Charlies Point Road

Monthly surveys have commenced, with small changes observed on 2 July. Visual inspections have not identified any issues at this stage.

Remembrance Drive

A monthly survey was conducted on 1 July. Approximately 30 mm subsidence has been measured since the final survey for LW S2A. Minor changes were measured on 15 July, including at previously observed locations of non-conventional compressive strains and bumps in the observed subsidence profiles between Pegs R47 and R48, and between Pegs R54 and R55. Minor changes were measured on 29 July.

The observed development of compressive strain at previously observed impact sites during the mining of LW S2A is shown in Figure C. Minor changes were measured on 15 July.

Visual inspections have not identified any issues at this stage.

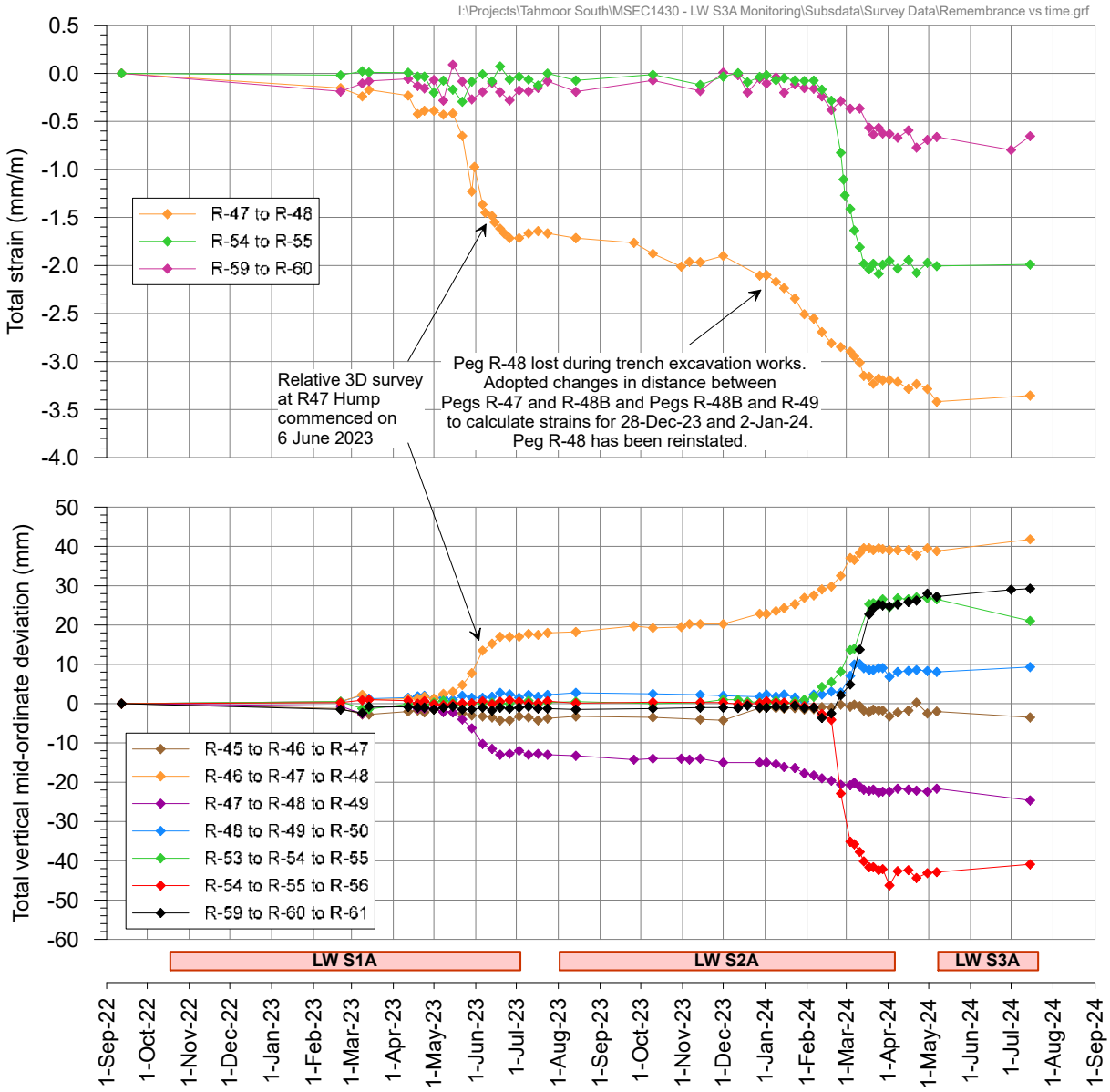

Figure C Observed development of ground strain and changes in vertical alignment at selected pegs along Remembrance Drive

Natural Features

In addition to the GNSS units, survey marks have been installed at four locations across the Tributary to Teatree Hollow (Wirrimbirra Creek), and at four locations across Teatree Hollow, as shown in Drawing No. MSEC1430-01.

An end of LW S2A survey was conducted on 30 April along ground survey lines that were installed across the Tributary to Teatree Hollow, and a summary is shown in Figure D. The results correlate reasonably well with the observations from GNSS units, taking into account the shorter lengths of the survey lines, which are based within the floor of the creek valley, compared to the distances between the GNSS units, which are mounted at the tops of the valleys.

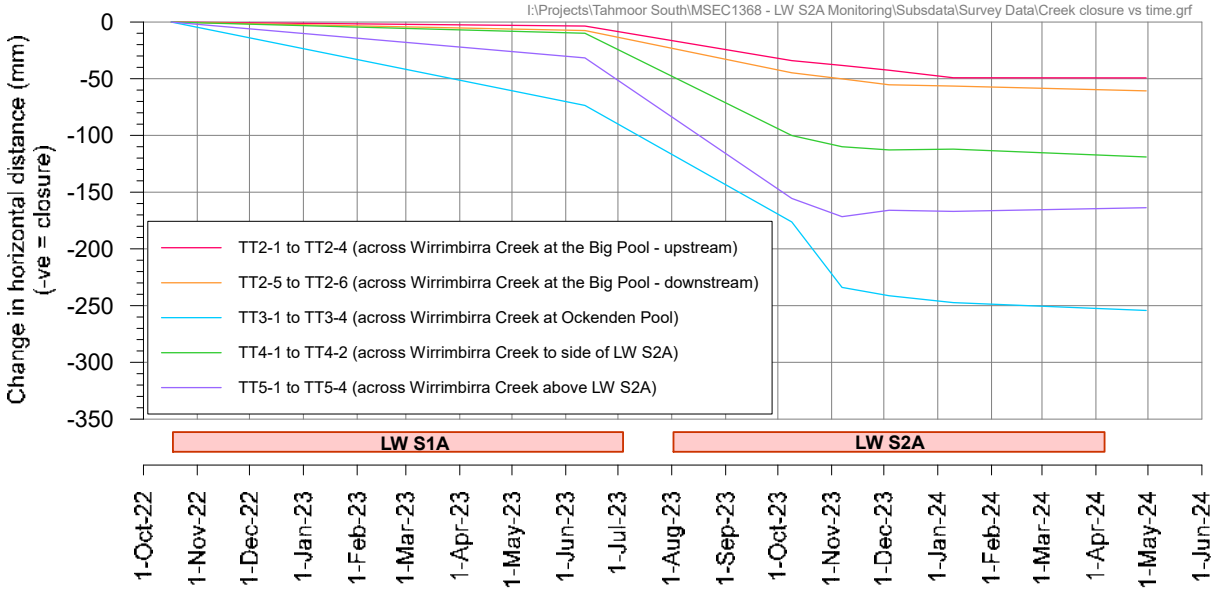

Figure D Observed development of closure across Tributary to Teatree Hollow from ground surveys

Tributary to Teatree Hollow (Wirrimbirra Creek)

Impacts were first detected in the Tributary to Teatree Hollow (Wirrimbirra Creek) on 8 February 2023. Surface water flows were first observed to stop approximately 120 metres upstream of monitoring site TT3, above the centreline of future LW S3A. A surface crack was observed in the bedrock downstream of this location. On 17 July, flows in the creek were observed to have reduced since the previous inspection on 12 June after a period of dry weather. Surface water was observed to cease at K64, re-emerging upstream of Pool TT2, which holds water. Surface water then ceases again downstream of Pool TT2, re-emerging at K71, upstream of the confluence with Teatree Hollow. A new fracture approximately 6 metres long was observed upstream of Pool TT2.

Additional impacts have been observed at TT2 since October 2023. A fracture within a surface boulder upstream of Pool TT2 has been observed to increase in size during the mining of LW S3A. The boulder is wedged between two larger rocks on either side of the creek. Investigations have found that the fracture was present in July 2023, after the mining of LW S1A and prior to the commencement of LW S3A. The fracture contained some debris and some ageing of the exposed rock inside the fracture at this time. While pre-mining photographs and videos identified pre-existing fractures elsewhere within the boulder field upstream of Pool TT2, the fracture was not visible prior to the mining of LW S1A to the scale and extent as observed in July and September. The images, however, were not focussed directly on the boulder in question and could not definitively confirm whether there were any pre-existing hairline or slight fractures in it.

A geotechnical inspection was conducted by Douglas Partners on 9 November 2023. The fractured boulder has been assessed to be a detached sandstone block, which was previously part of the rock strata on either side of the valley prior to mining. The host rock had been naturally eroded and undercut by the weaker underlying strata, resulting in dislocation and fracturing along naturally formed joints at the fracture site. Pre-mining photographs show surface water was flowing underneath the site. While dislocated from the host rock on either side of the valley, the detached sandstone block remained in contact on both sides, such that mining-induced valley closure almost immediately resulted in fracturing. New fractures are developing at the detached sandstone block and within the adjoining rock strata at the contact points due to ongoing closure. The fracture site is situated above Pool TT2 and has no effect on surface water levels in Pool TT2.

A local 3D ground survey was conducted on 9 October 2023 along the TT2 line that is located upstream of Pool TT2 and very close to the fracture in the boulder. The results are shown in Figure E. It can be seen

that very little tilt or strain had developed after the mining of LW S1A but valley closure strains and upsidence have developed since the completion of LW S1A. The fracture in the boulder is located between Pegs TT2-2 and TT2-3. The latest survey on 30 April measured no change in compressive strain.

While this section of the Tributary to Teatree Hollow has been previously observed to be dry during periods of dry weather, the observations indicate that the changes may be mining-induced.

A visual inspection of the rock shelter on 2 June 2023 found no water in the pool at TT3, and the pool has remained dry since 26 June 2023. A visual inspection on 18 December found no changes.

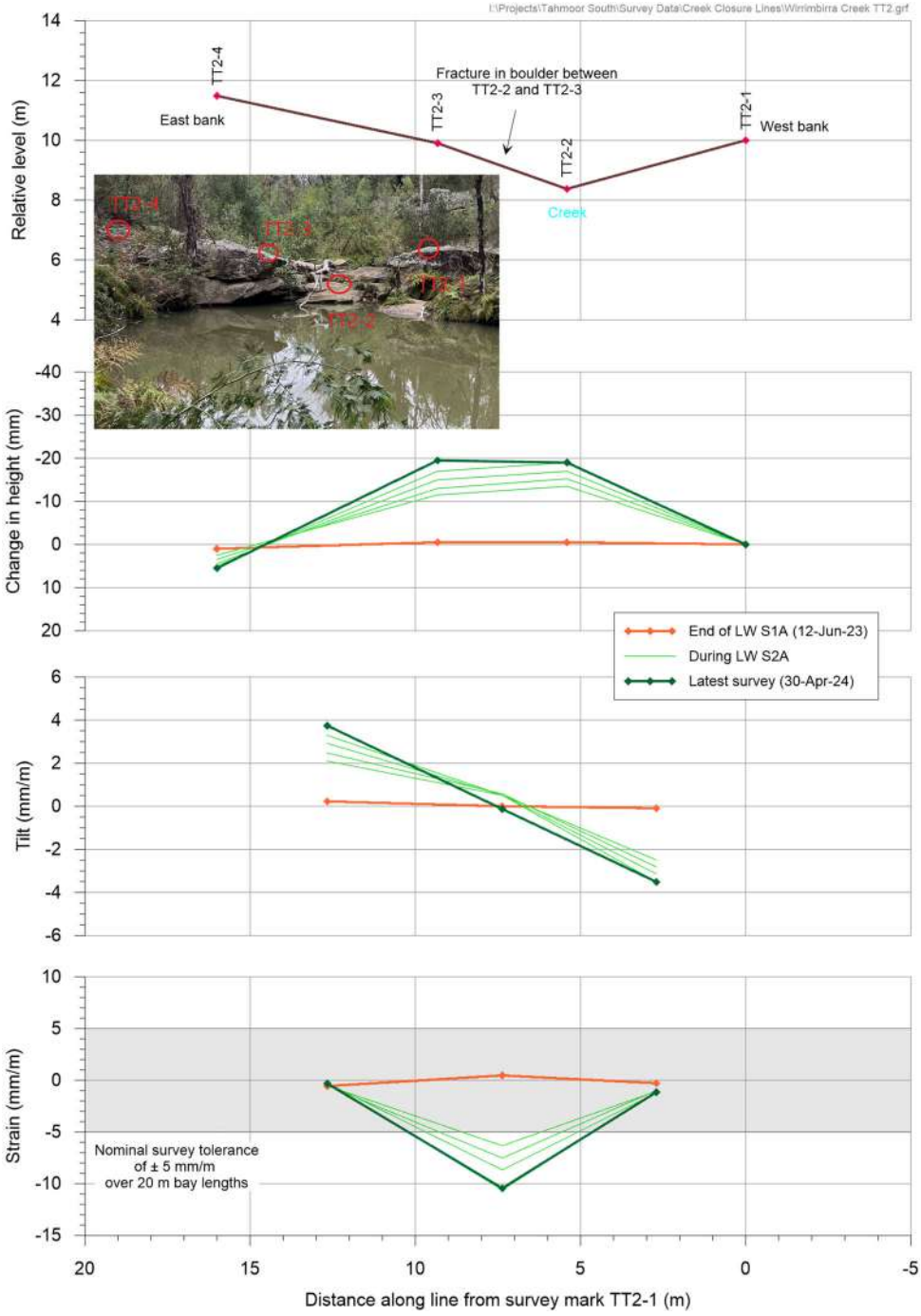

Figure E Observed subsidence, tilt and strain along TT2 line, upstream of Pool TT2

Teatree Hollow

Surveys were conducted across Teatree Hollow between 23 February 2023 and 12 June 2023 during LW S1A, with very little closure observed at TT6, TT9 and TT12 (6 mm or less).

The first survey for LW S2A was conducted across Teatree Hollow on 30 August 2023, with subsequent surveys on 9 October 2023, 7 November 2023, 4 December 2023, 10 January 2024and 30 April 2024. Very little closure is observed at TT6 and TT12 (3 mm or less). GNSS units S26 and S27 have been installed

across Teatree Hollow directly above LW S2A to measure valley closure. Approximately 100 mm closure has been measured by the GNSS units.

Impacts were first observed along Teatree Hollow directly above LW S1A on 1 March 2023. Surface water flows have been observed to stop near the upstream edge of LW S1A and reappear with iron staining present above the downstream edge of LW S1A. On 17 July, flows in the creek were observed to have reduced since the previous inspection on 12 June after a period of dry weather. Surface water was observed to cease downstream of Pool TT12, re-emerging upstream of Pool TT13.

Structures

Mitigation works at MKD Machinery have been completed in accordance with the Management Plan. Weekly surveys are ongoing, with no impacts observed on 30 July.

Weekly surveys are ongoing at the Australian Wildlife Sanctuary. Approximately 25 mm subsidence has been measured since the final survey for LW S2A. No impacts to structures observed on 31 July.

Local Roads

Weekly visual inspections have commenced within the active subsidence zone. Visual inspections along Charlies Point Road and Great Southern Road have not identified any issues.

Visual inspections along Remembrance Drive and cutting RC1 have not identified any issues. Minor changes in compressive strain were observed at previously observed impact sites above LW S2A.

Gas Infrastructure

Weekly surveys have commenced along Remembrance Drive and cutting RC1, with minor changes measured on 29 July. Minor changes in compressive strain were observed at previously observed impact sites above LW S2A.

Electrical Infrastructure

Weekly surveys have commenced along Remembrance Drive and cutting RC1, with minor changes measured on 29 July.

Ground surveys of critical power poles are conducted when poles are within the active subsidence zone.

Telecommunications Infrastructure

Weekly surveys have commenced along Remembrance Drive and cutting RC1, with minor changes measured on 29 July. Minor changes in compressive strain were observed at previously observed impact sites above LW S2A.

Potable Water Infrastructure

Weekly surveys have commenced along Remembrance Drive and cutting RC1, with minor changes measured on 29 July. Minor changes in compressive strain were observed at previously observed impact sites above LW S2A.

Very little change has been observed at the displacement sensors that were installed on all four Gibault joints at the first impact site between Pegs R47 and R48, as shown in Figure F. The northern-most Gibault joint had reached the limit of its capacity on 25 February, and closure has been taken up by the next joint. Closure had gradually developed on the southern Gibault joint at the northern connection, with rates of change reduced to low levels. The displacement sensors across the other two joints are currently recording very minor changes.

The observed changes are compared with changes in horizontal distance between Pegs R47A and R48A, which are located on either side of the joints. It can be seen from Figure F that the joint displacement is less than measured between the survey pegs, though there has been a good correlation between the survey methods on weekly changes.

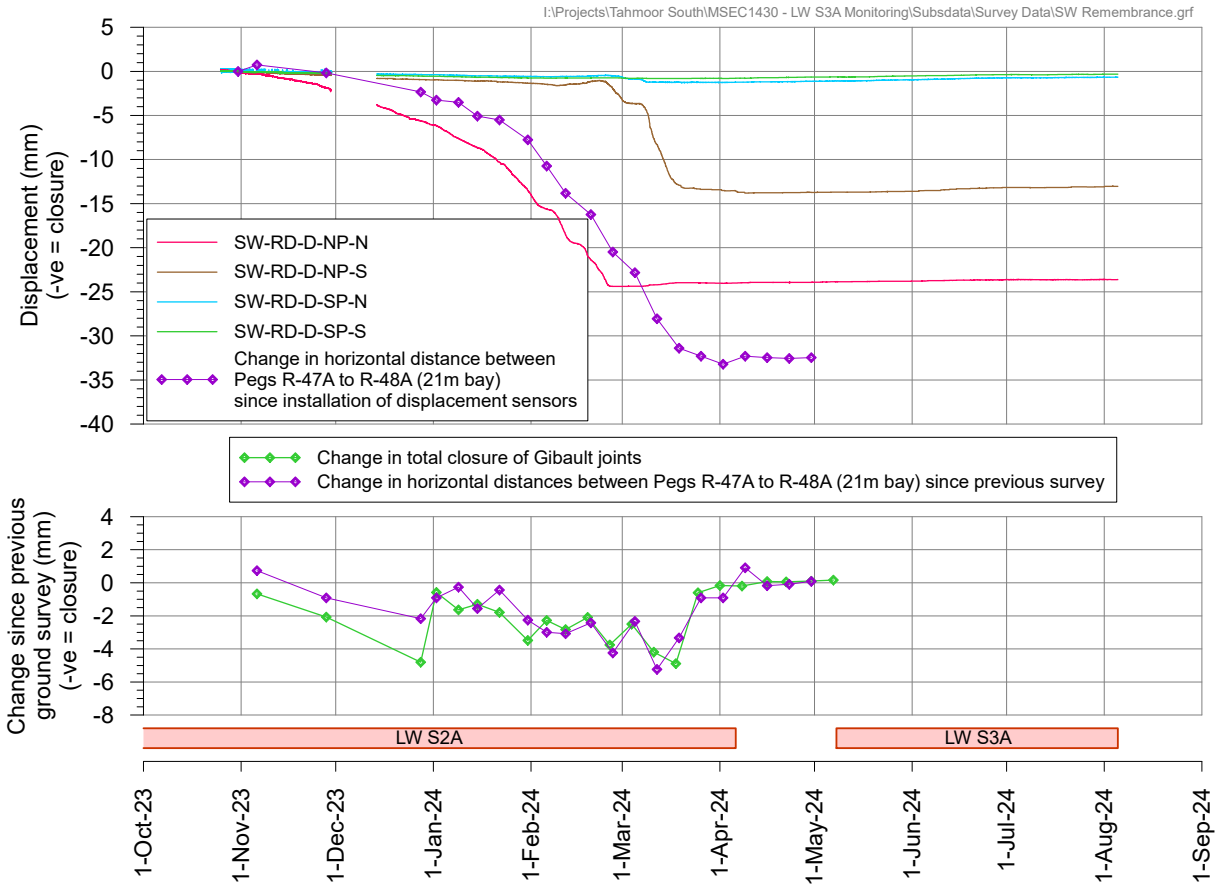

Figure F Observed change in distance across Gibault joints at Remembrance Drive between Pegs R47A and R48A on Sydney Water potable water main

Minor changes have also been observed on the four Gibault joints of the 100 mm water main on Caloola Road, as shown in Figure G. The northern displacement sensor across the southern joint was replaced in late February 2024. The observed changes are compared with changes in horizontal distance between Pegs R76C and R78C, which are located on either side of the joints. It can be seen from Figure G that the measured changes are within survey tolerances. A previously observed very small trend of closure at the joint sensors has been gradually reversing.

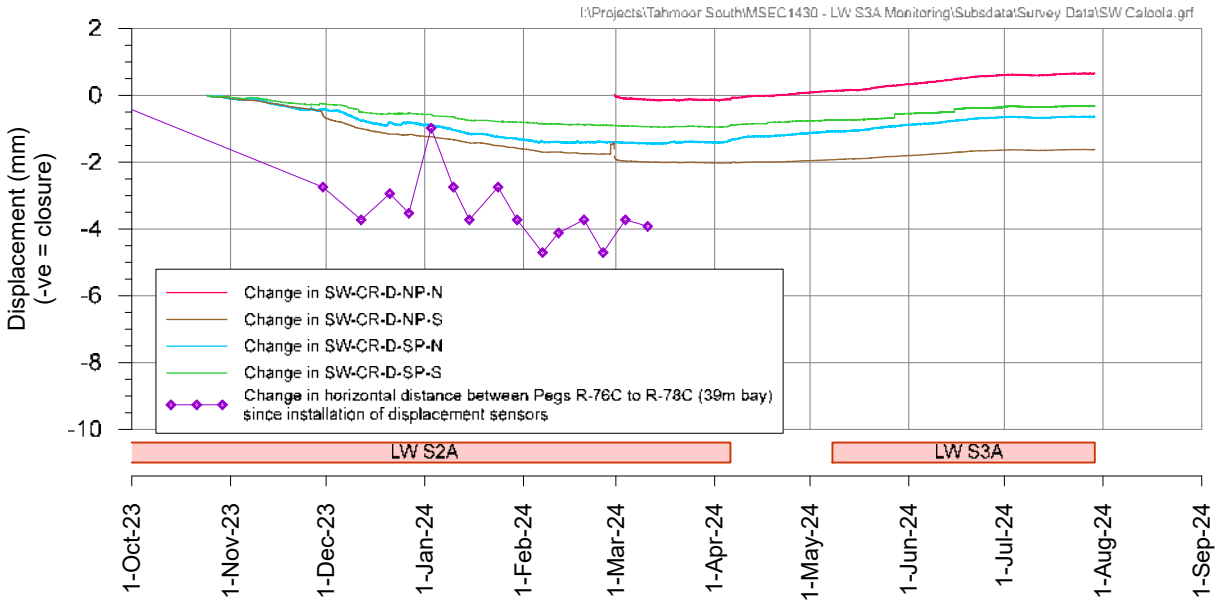

Figure G Observed change in distance across Gibault joints at Caloola Road on Sydney Water potable water main

Sewer Infrastructure

Weekly surveys have commenced along Remembrance Drive and cutting RC1, with minor changes measured on 29 July. Minor changes in compressive strain were observed at previously observed impact sites above LW S2A.

Dams

Weekly visual inspections, and monthly geotechnical inspections have been undertaken when dams are within the active subsidence zone. No issues were observed at Dam FD-5 during a geotechnical inspection on 7 June and a visual inspection on 1 July.

Archaeological Sites

Gradually developing movements have been measured by GNSS units S03 and S04 located on either side of Wirrimbirra Creek, with no impacts observed. The most recent visual inspection at rock shelter site 52-2-4471 was on 31 July 2024. No significant changes were observed.

Summary

LW S3A commenced extraction on 8 May 2024. Subsidence is developing gradually within expectations.

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msec mine subsidence ENGINEERING CONSULTANTS
Suite 402, 13 Spring Street, Chatswood NSW 2067
PO Box 302, Chatswood NSW 2057
Tel +61 2 9413 3777
www.minesubsidence.com

SIMEC

TAHMOOR SOUTH LWS3A

MONITORING PLAN

DATE:	SCALE:	DRAWING No:	Rev No
6 Aug 2024	as shown	MSEC1430-01	10

LW S3A Started : 8-May-2024

LEGEND

- WATER MONITORING SITE
- MONITORING LINES
- MONITORING PEGS
- GNSS
- BOREHOLES
- CRITICAL POLES MONITORING
- EMBANKMENT & CUTTING MONITORING
- ROADS & TRACKS
- WATERCOURSE

S18 · S17 · S16 · S27 · S26 · S02 · S01 · S04 · S03 · S06 · S05 · S08 · S07 · S10 · S09

FIRE ROAD NO P1 · BARGO RIVER · OLIVE LANE · REMEMBRANCE DR

Wollondilly Anglican College · Wrecker · Igloos · Service Station · DT Line · Gantry · Hidden creek · Hidden creek · MAIN SOUTHERN RAILWAY · Tahmoor Colliery

103 · TT14 Weir · Site13 · 101 · TT13 · TT12 Site17 · TT-6 · TT-12 · TT-9 · TT9 · TT-3 · Site16 · TT-5 · TT-4 · Teatree 2 The Big Pool Site12 · TT-2 · 102

LW S3A · LW S2A · LW S1A · LW S4A · LW S5A · LW S6A

1700m · 1600m · 1500m · 1400m · 1300m · 1200m · 1100m · 1000m · 900m · 800m · 700m · 600m · 500m · 400m · 300m · 200m · 100m · 0m

1-Aug-2024 · LW S3A Started : 8-May-2024

Tahmoor Garden Centre · CALOOLA RD · Caloola Rd Embankment (RE4) · Australian Wildlife Sanctuary · TEATREE HOLLOW · TRIBUTARY OF TEATREE HOLLOW · V LINE · Remembrance Drive Cutting (RC1) · REMEMBRANCE DR · Concrete materials plant · NBN Tower · Remembrance Drive Embankment 3 (RE3) · Yarran Road Utilities · YARRAN ROAD · GREAT SOUTHERN ROAD · CHARLIES POINT RD · Remembrance Drive Embankment 2 (RE2)

SCALE 0m 100m 200m 300m 400m 500m

Tahmoor South LW S3A
Incremental subsidence profiles along Charlies Point Road

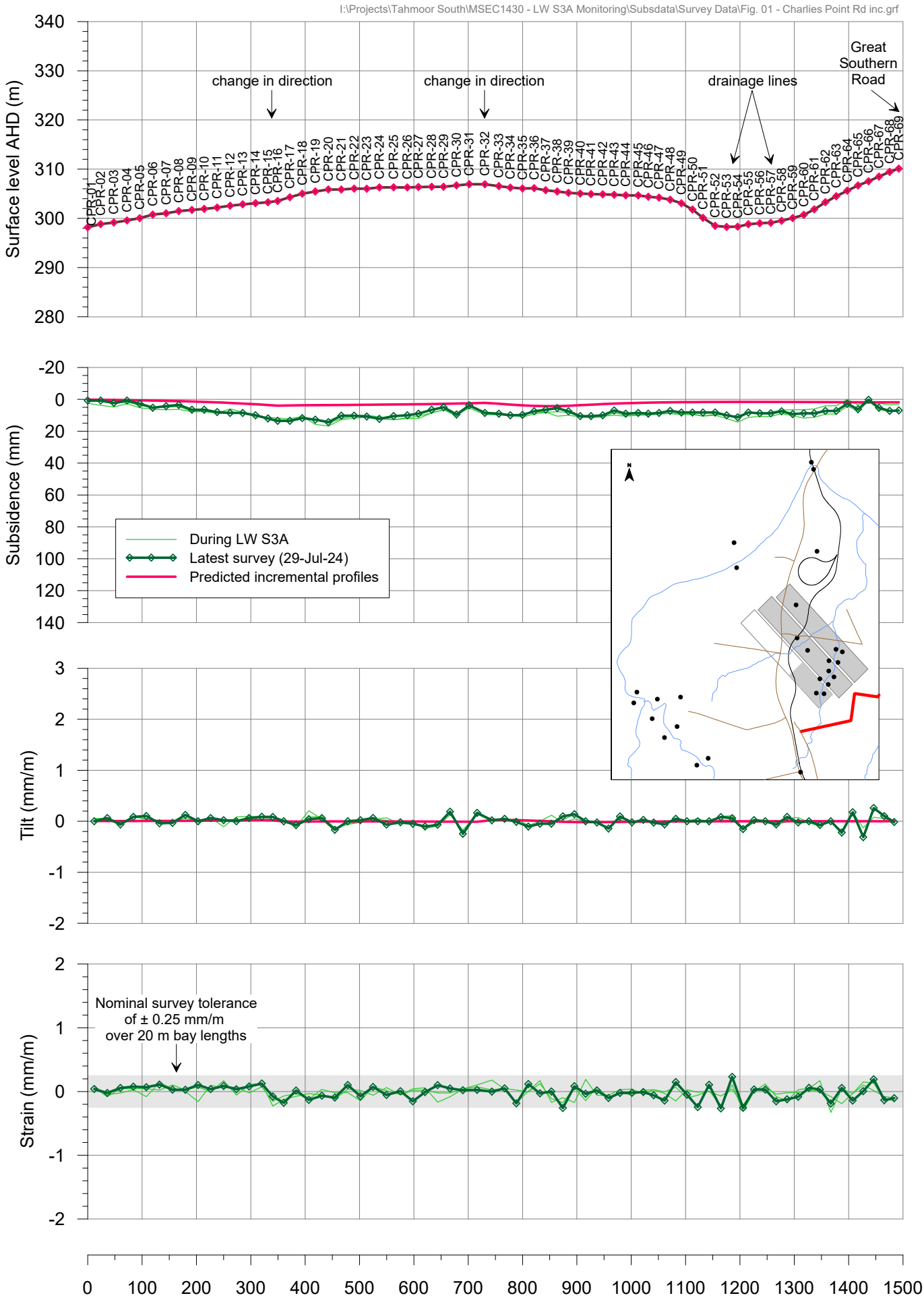


Fig. 1-R10

Tahmoor South LW S3A
Total subsidence profiles along Charlies Point Road

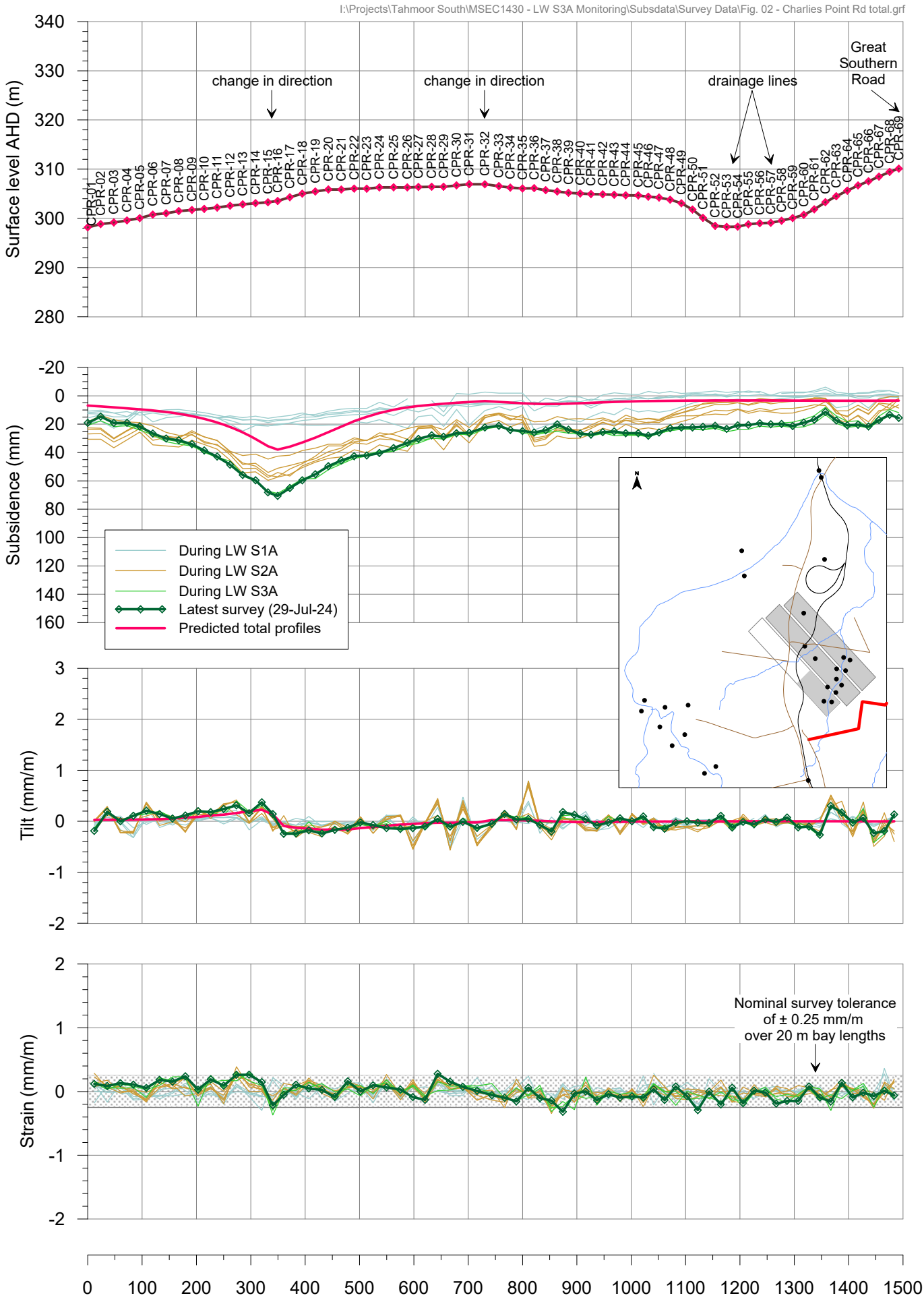
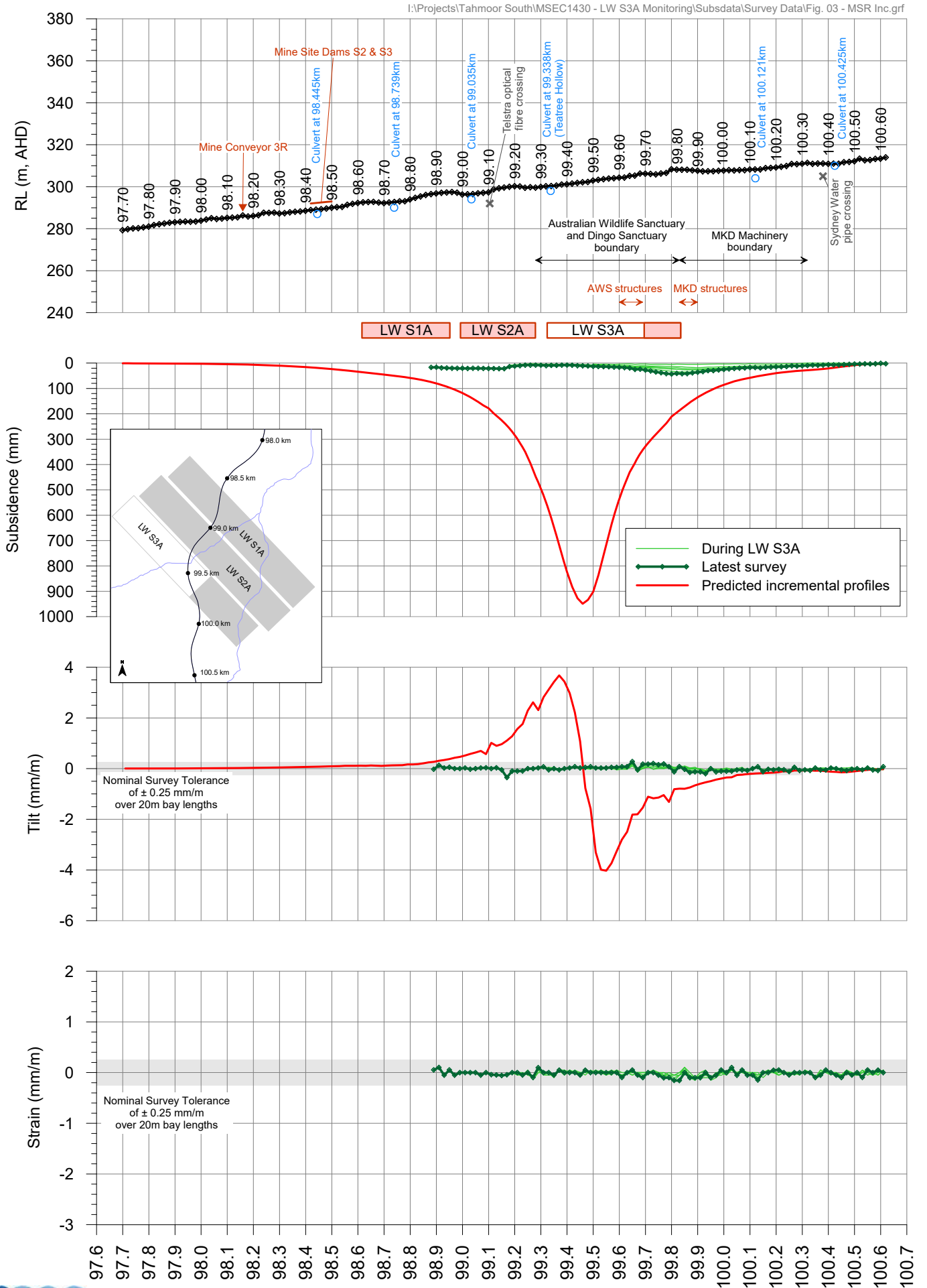


Fig. 2-R10

Tahmoor South LW S3A - Main Southern Railway
Incremental subsidence profiles
Survey date: 29 July 2024



msec

Fig. 3-R10

Tahmoor South LW S3A - Main Southern Railway
Total subsidence profiles
Survey date: 29 July 2024

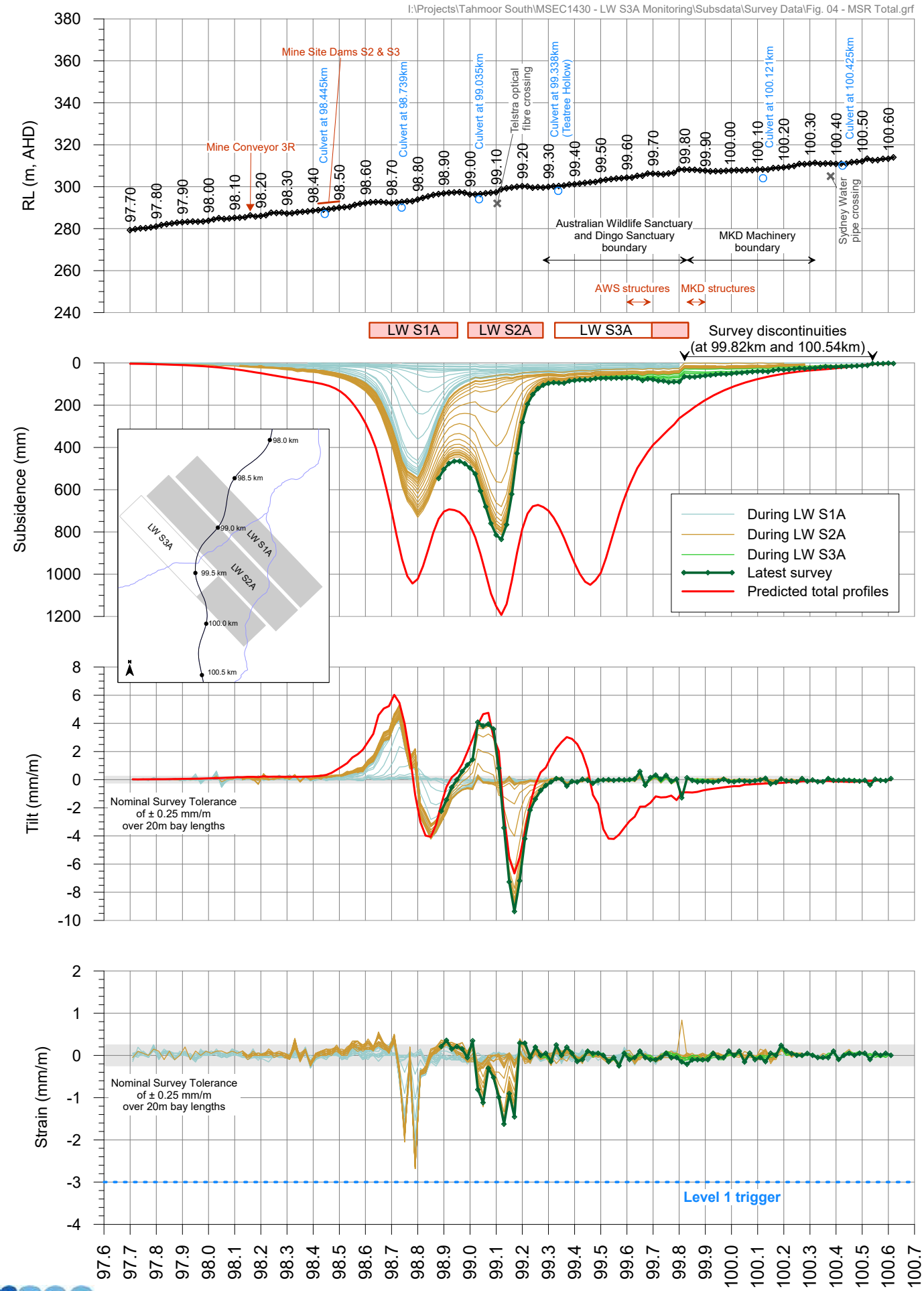
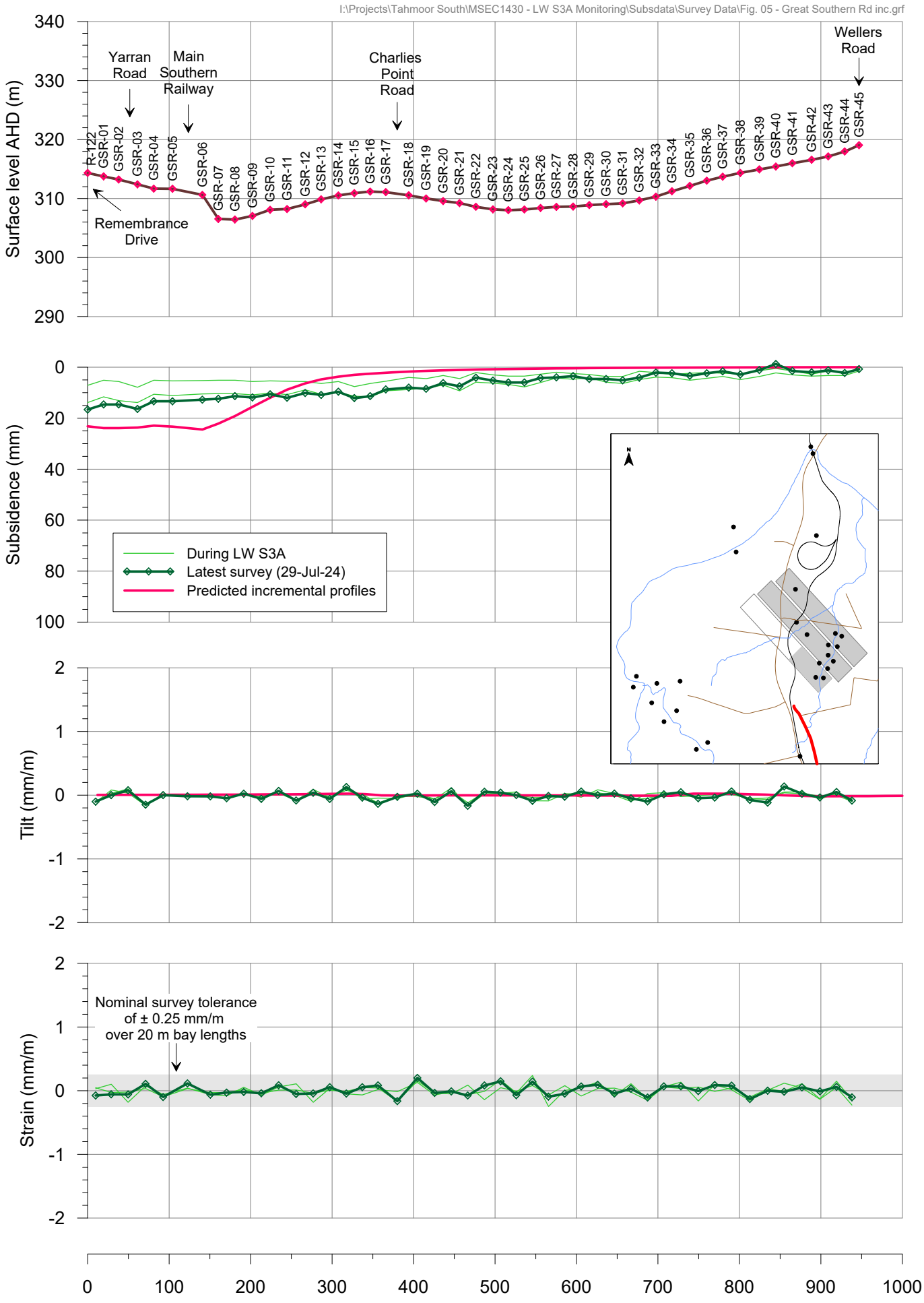


Fig.4-R10

Tahmoor South LW S3A
Incremental subsidence profiles along Great Southern Road



msec

Fig. 5-R10

Tahmoor South LW S3A
Incremental subsidence profiles along Remembrance Drive

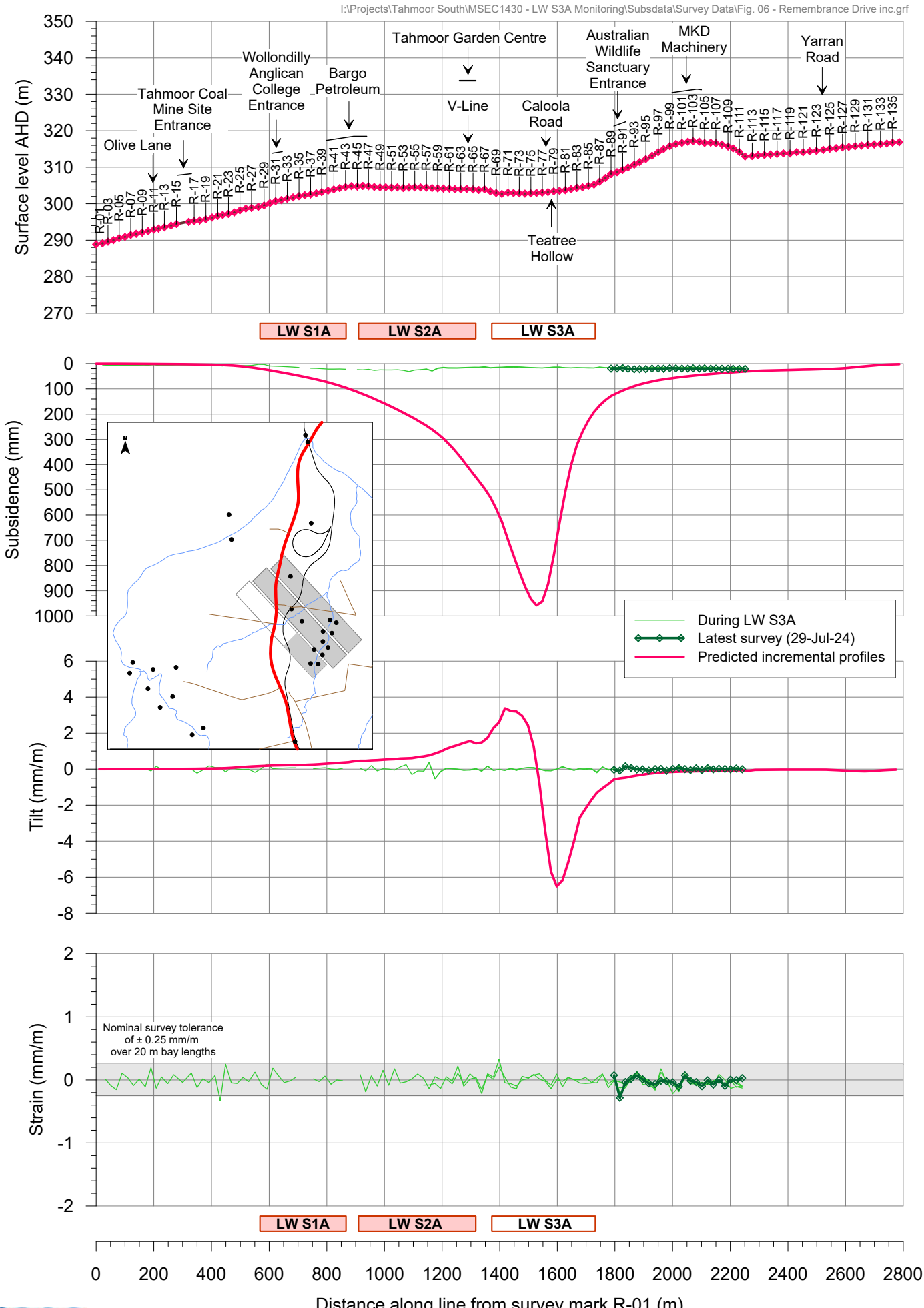


Fig. 6-R10

Tahmoor South LW S3A
Total subsidence profiles along Remembrance Drive

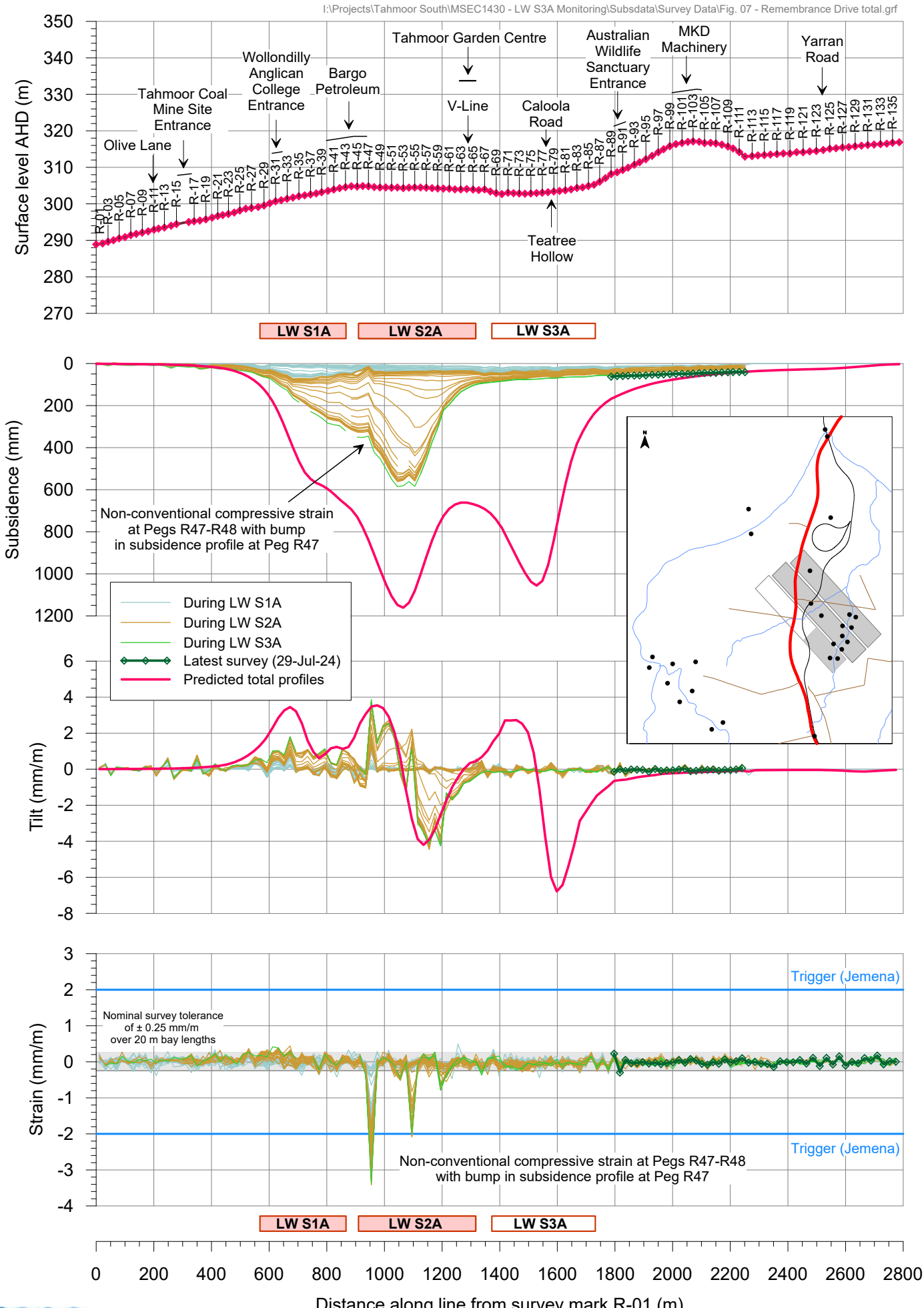
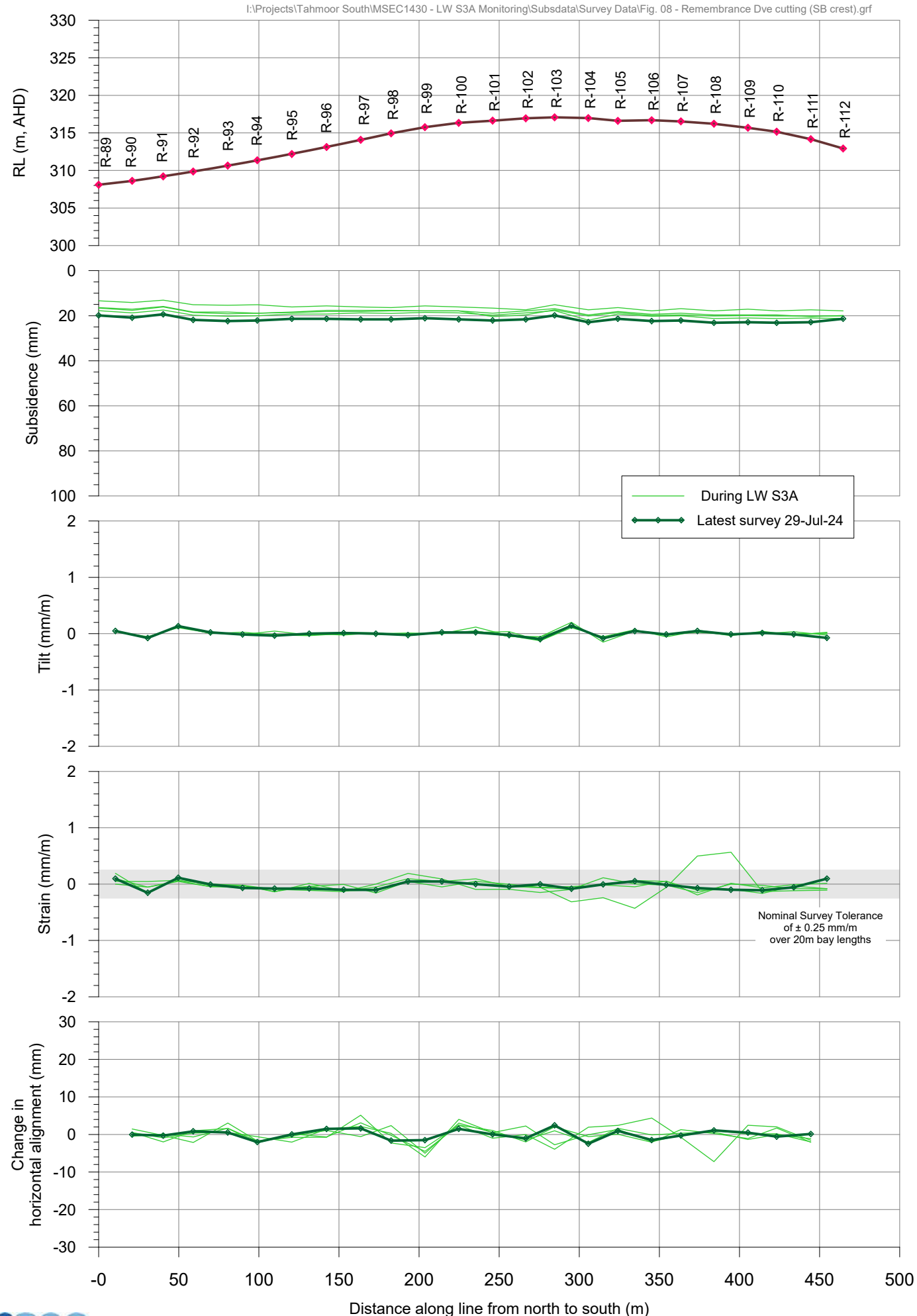


Fig. 7-R10

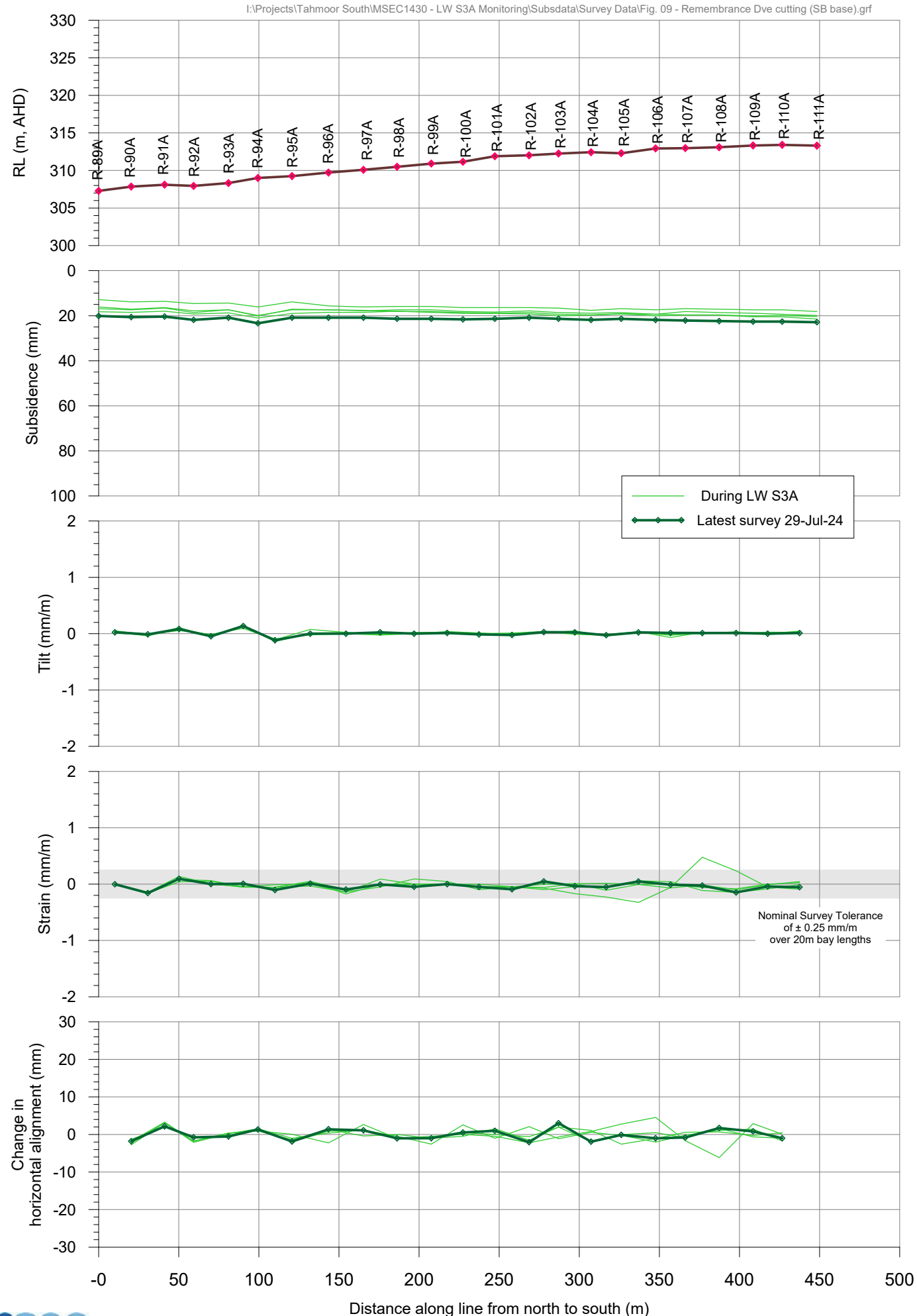
Tahmoor South LW S3A - Remembrance Drive Cutting (RC1)
Incremental subsidence profiles along southbound crest



msec

Fig. 8-R10

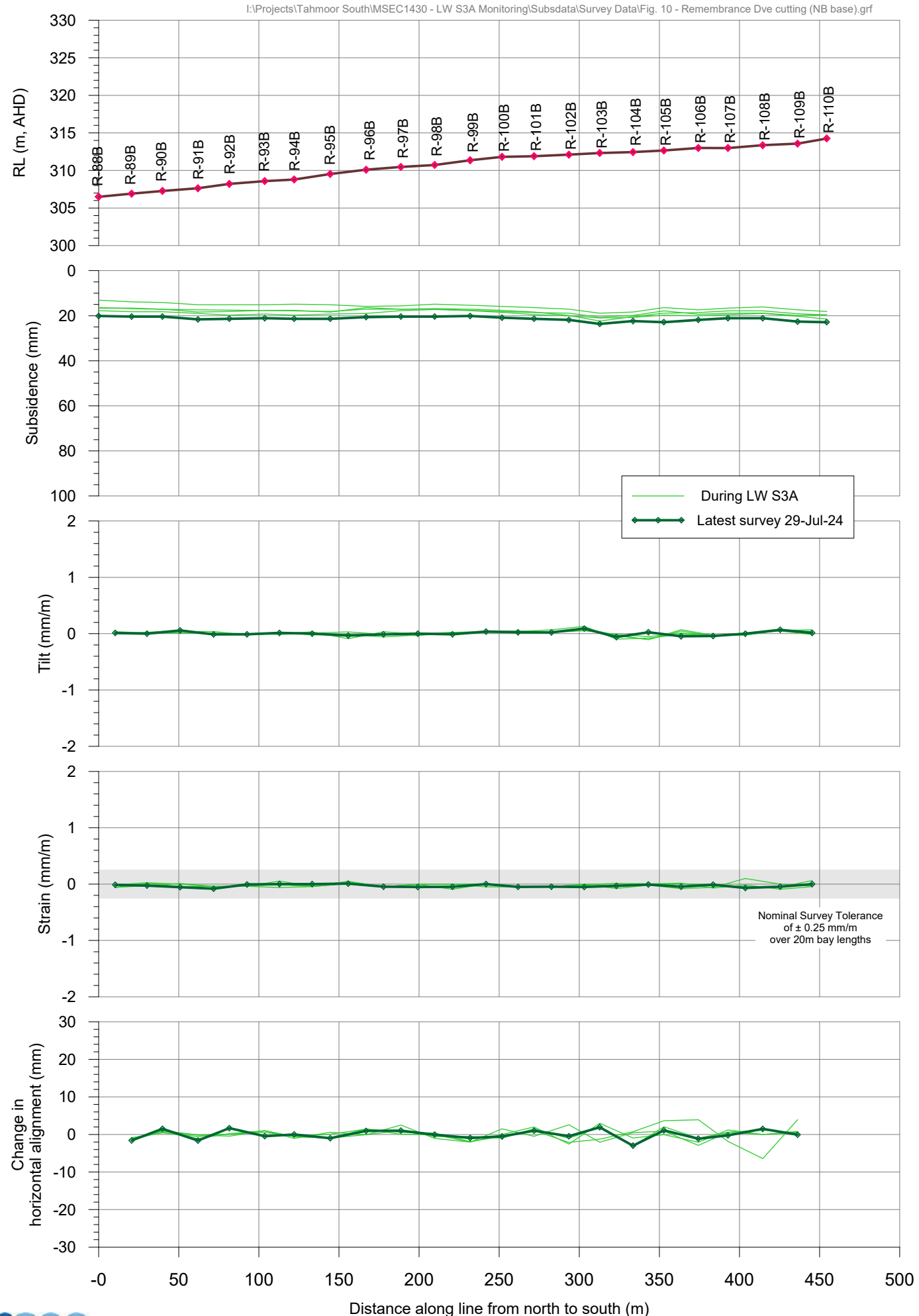
Tahmoor South LW S3A - Remembrance Drive Cutting (RC1)
Incremental subsidence profiles along southbound base



msec

Fig. 9-R10

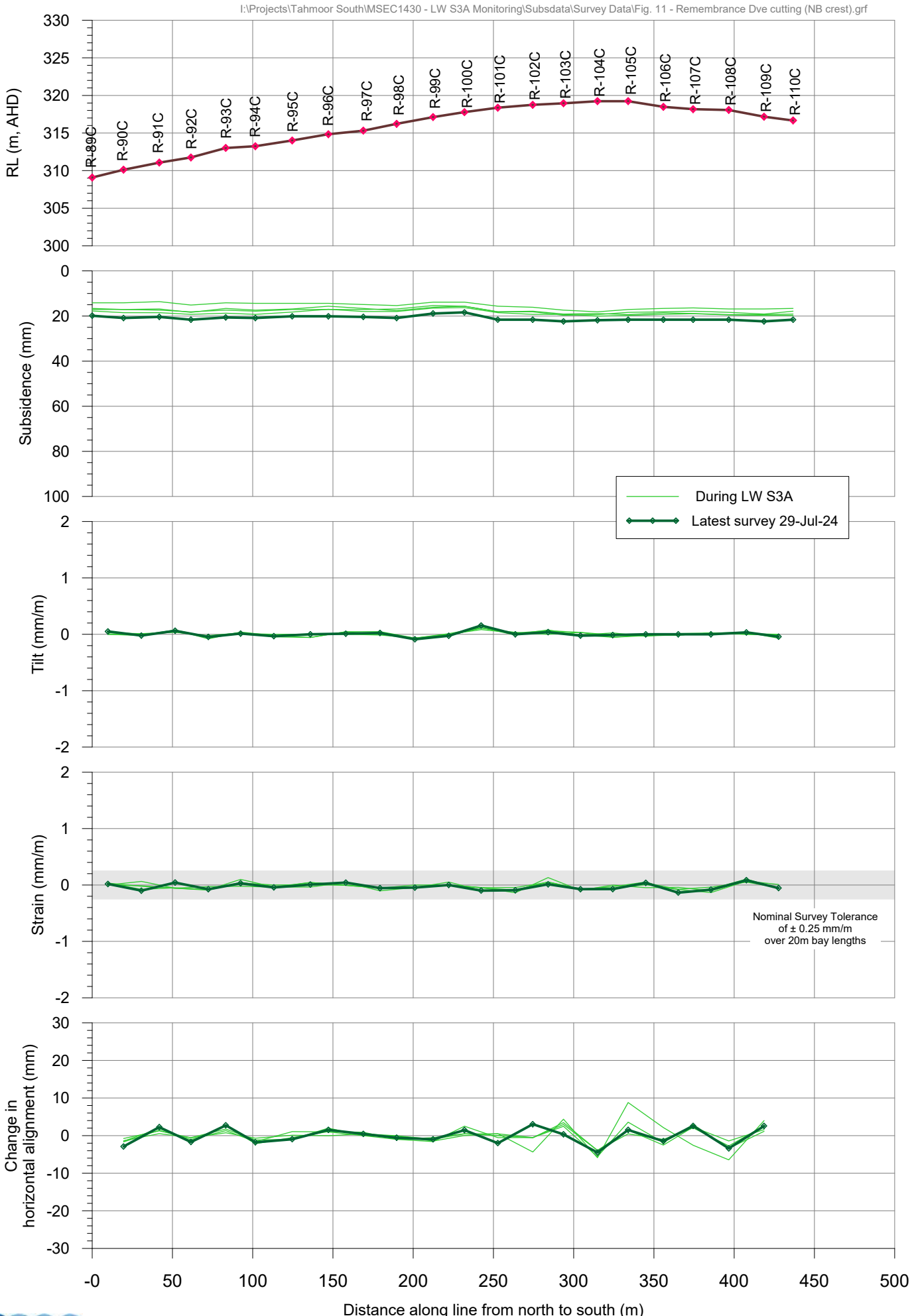
Tahmoor South LW S3A - Remembrance Drive Cutting (RC1)
Incremental subsidence profiles along northbound base



msec

Fig. 10-R10

Tahmoor South LW S3A - Remembrance Drive Cutting (RC1)
Incremental subsidence profiles along northbound crest

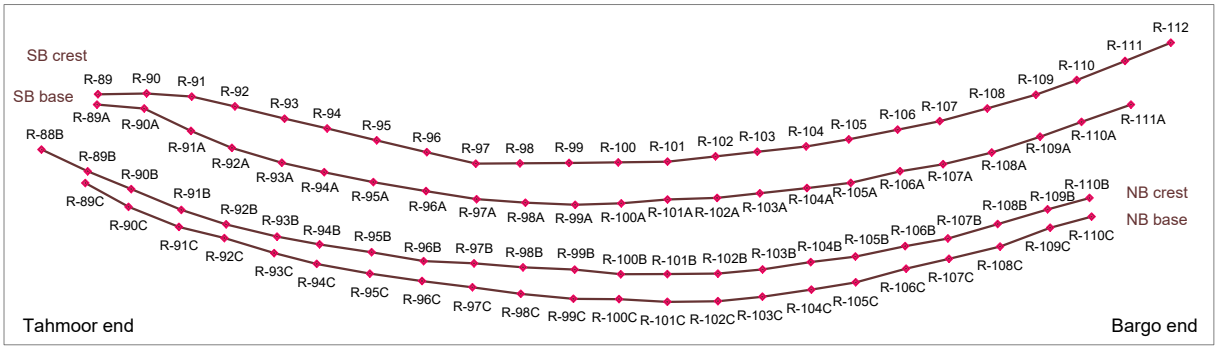


msec

Fig. 11-R10

Tahmoor South LW S3A - Remembrance Drive Cutting (RC1)
Incremental closure across the cutting

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. 12 - Remembrance Dve cutting (closure).grf



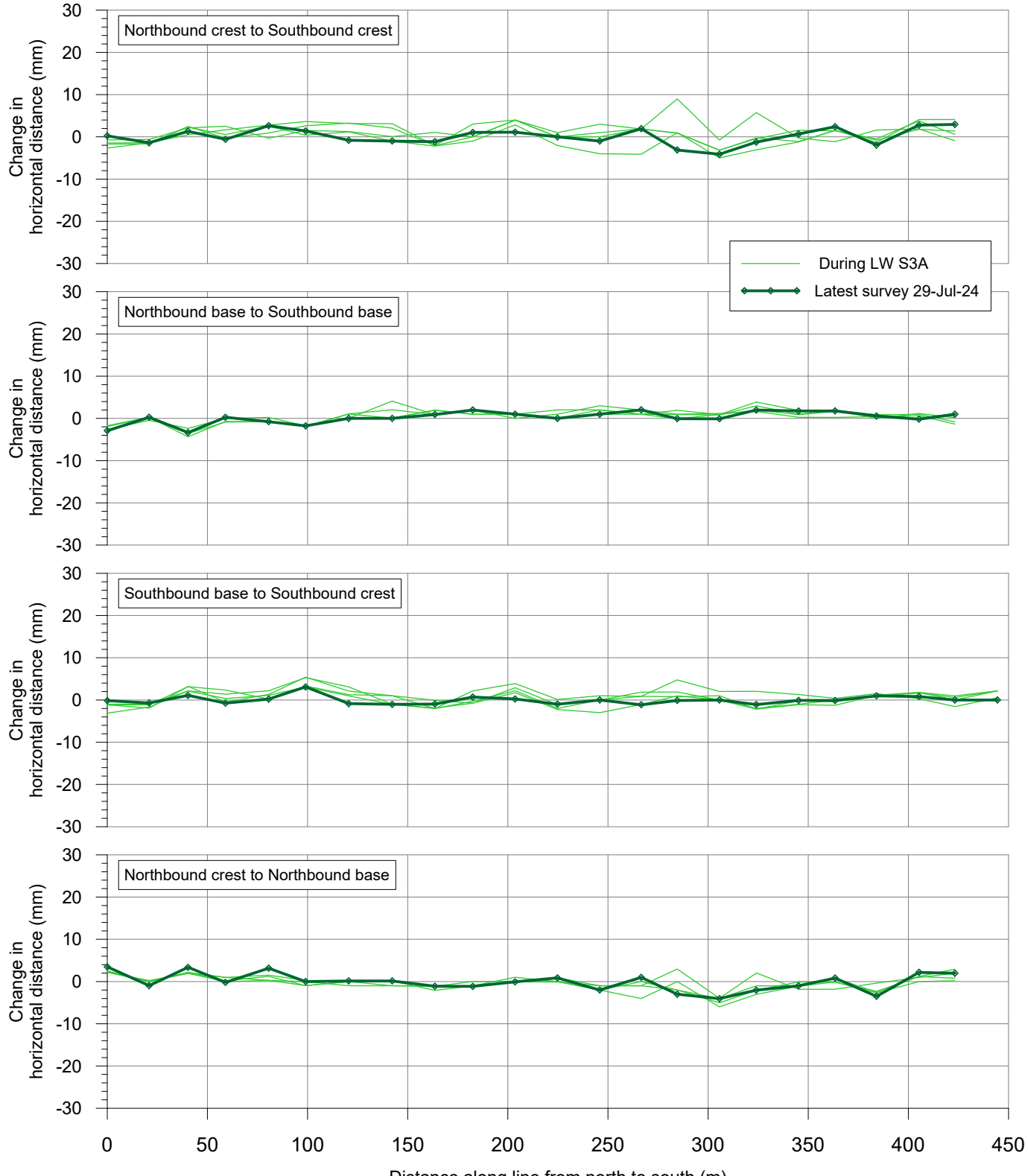


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Fig. 12-R10

Tahmoor South LW S3A - GNSS Monitoring

Site S01 above LW S1A

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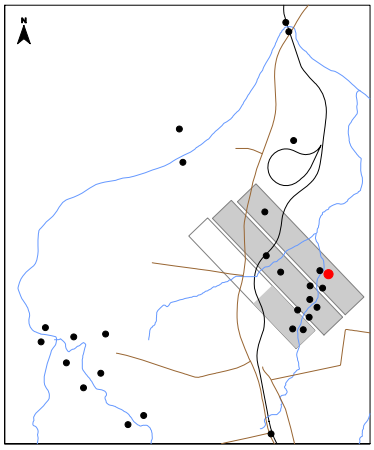
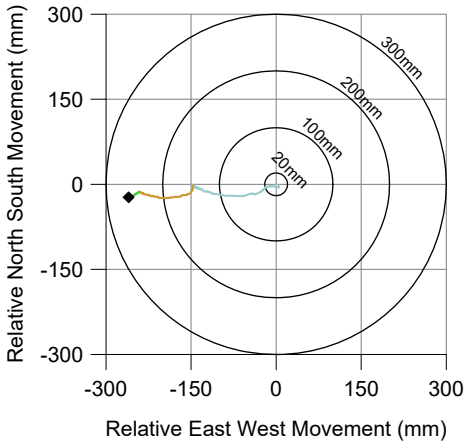
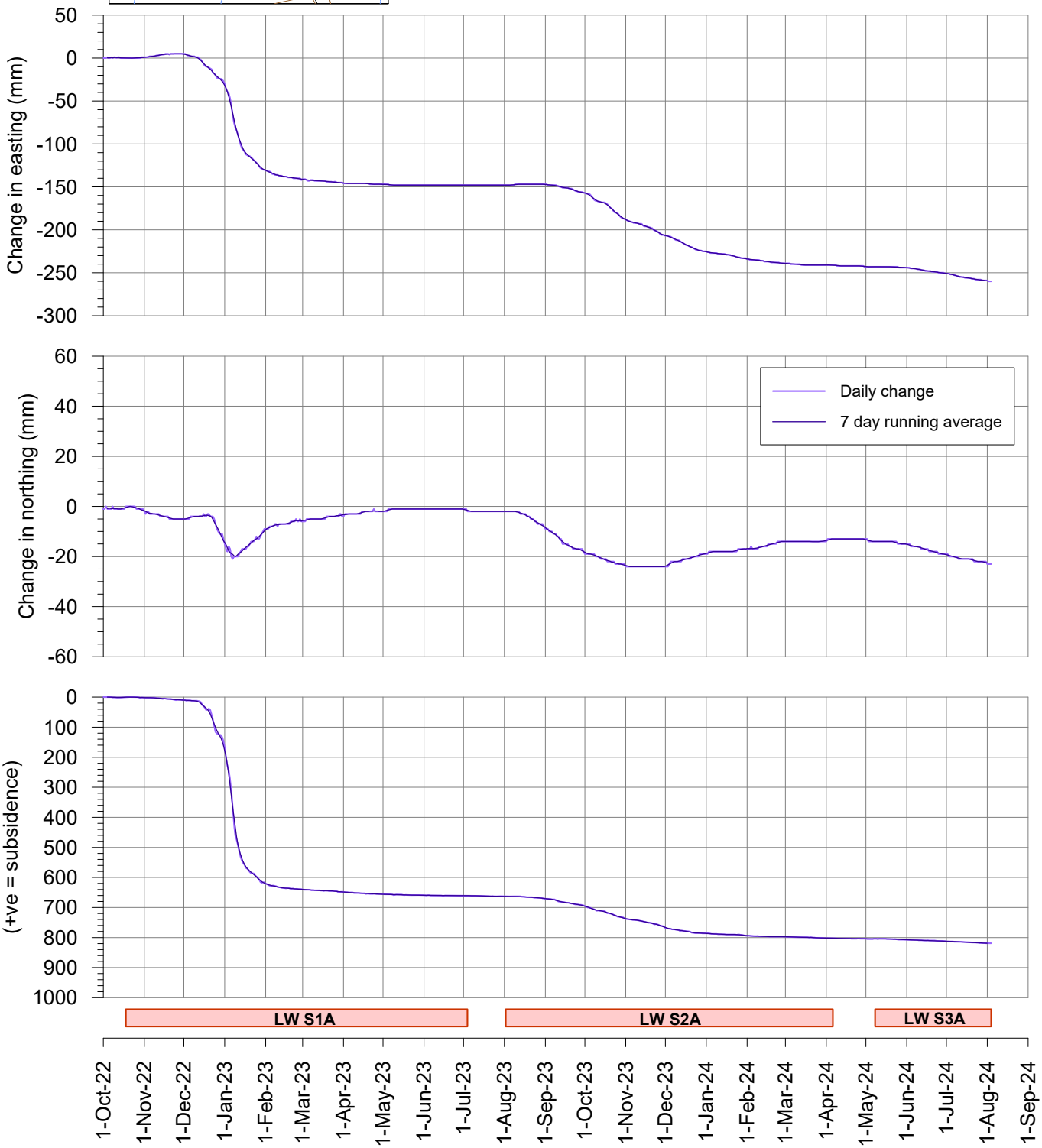


During LW S1A
During LW S2A
During LW S3A





msec

Fig. S01-R10

Tahmoor South LW S3A - GNSS Monitoring

Site S02 above LW S1A

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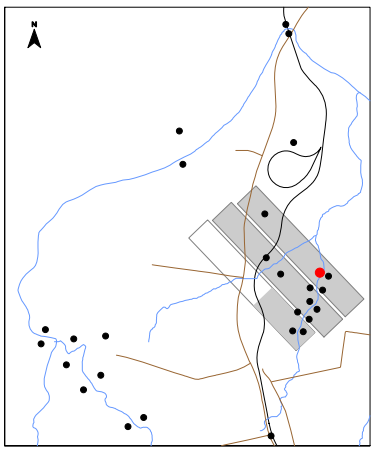
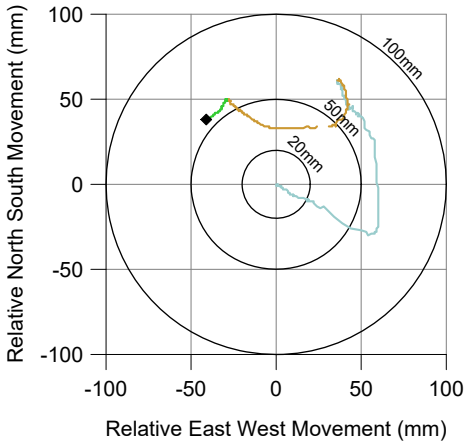
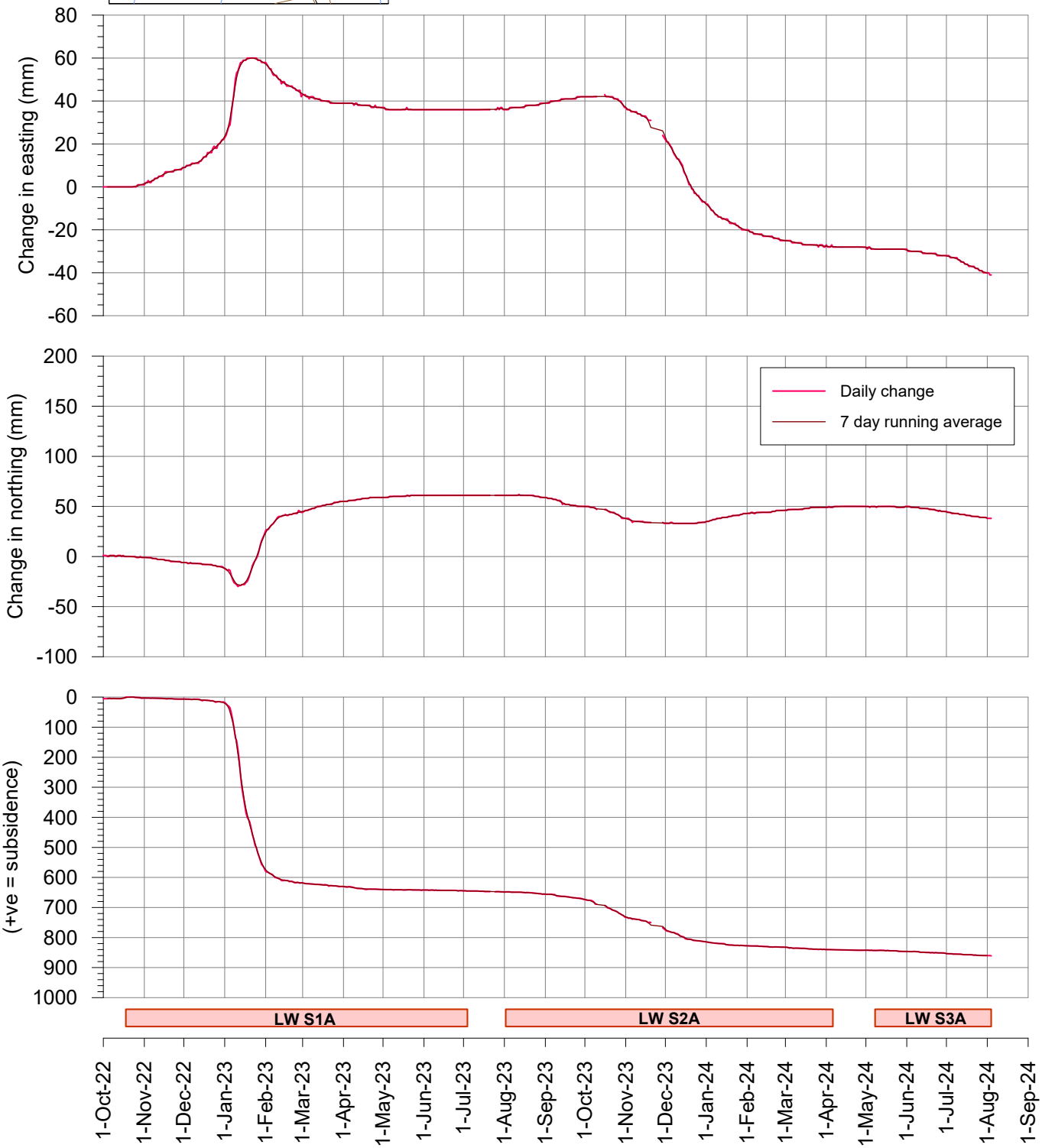






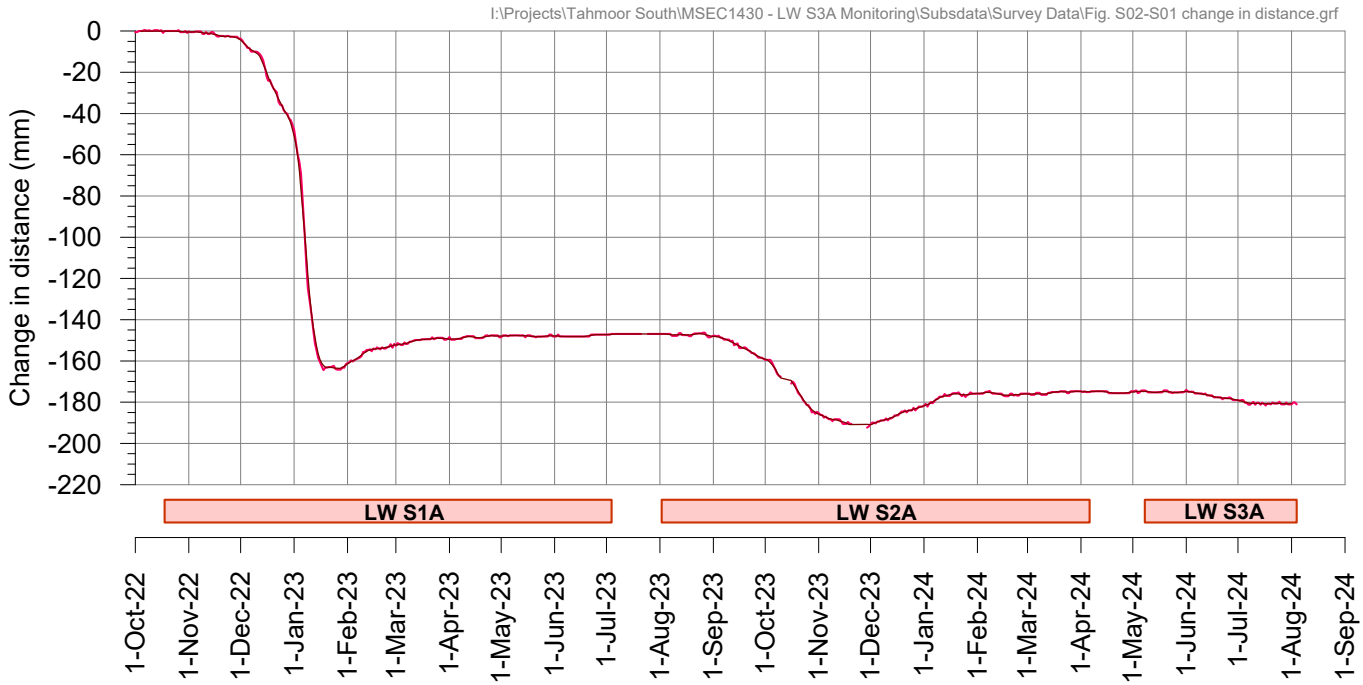


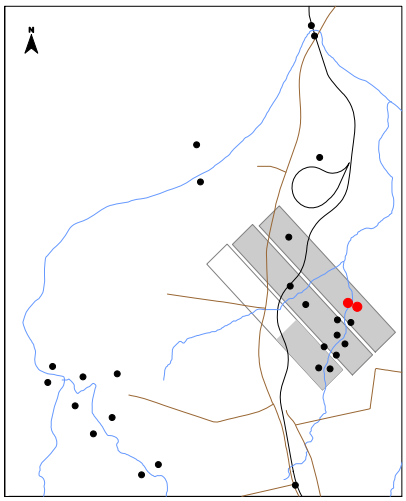
msec

Fig. S02-R10

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek
Sites S01 and S02 above LW S1A





Tahmoor South LW S3A - GNSS Monitoring

Site S03 above LW S1A at Teatree 3

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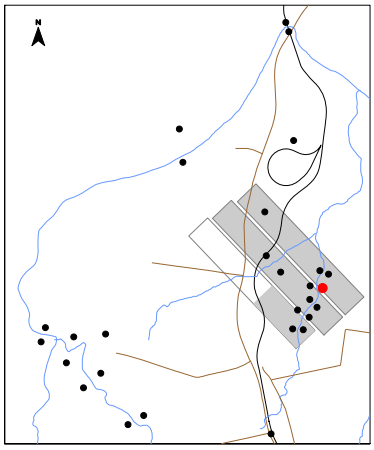
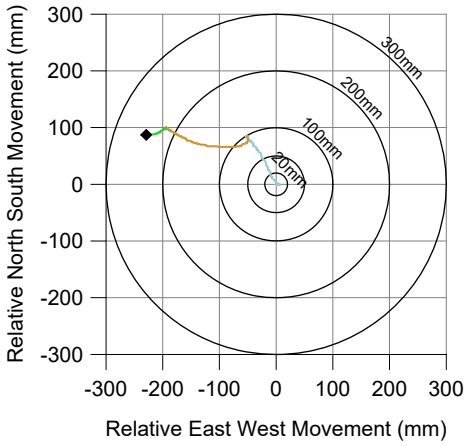
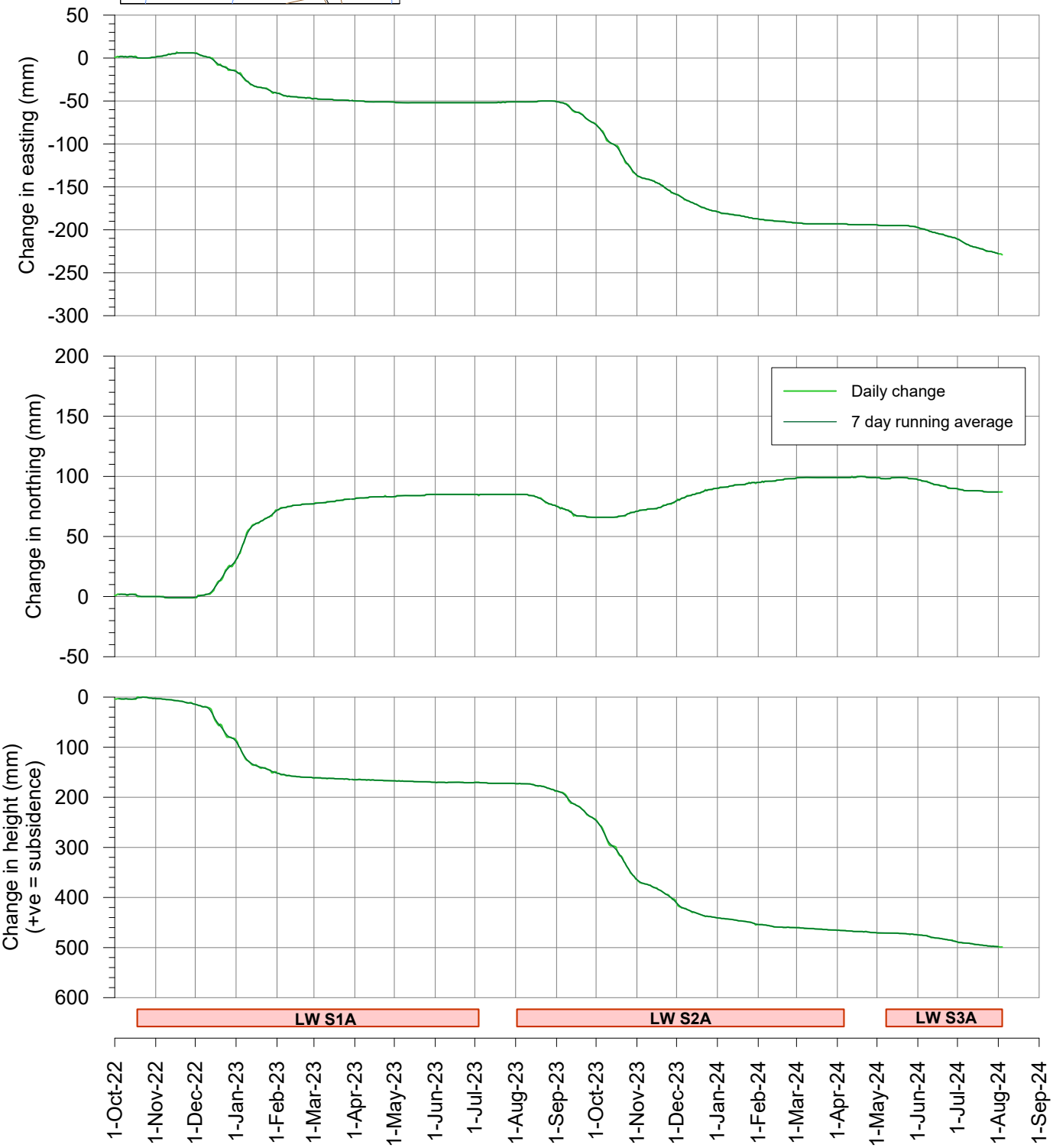


During LW S1A
During LW S2A
During LW S3A





msec

Fig. S03-R10

Tahmoor South LW S3A - GNSS Monitoring

Site S04 above LW S2A at Teatree 3

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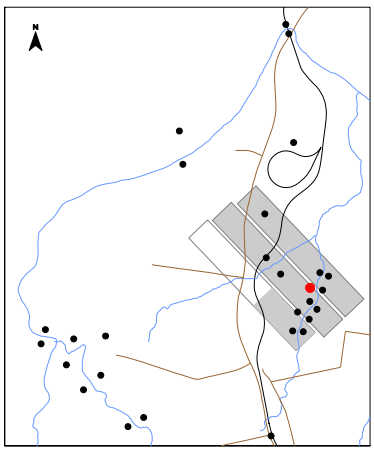
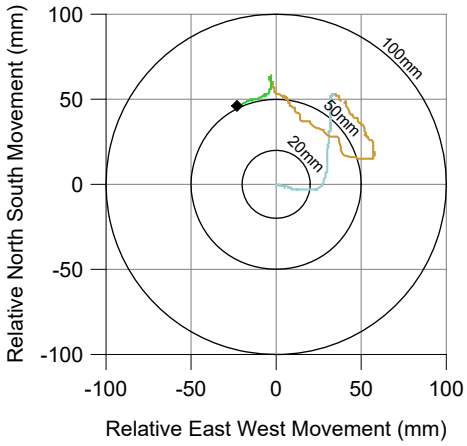
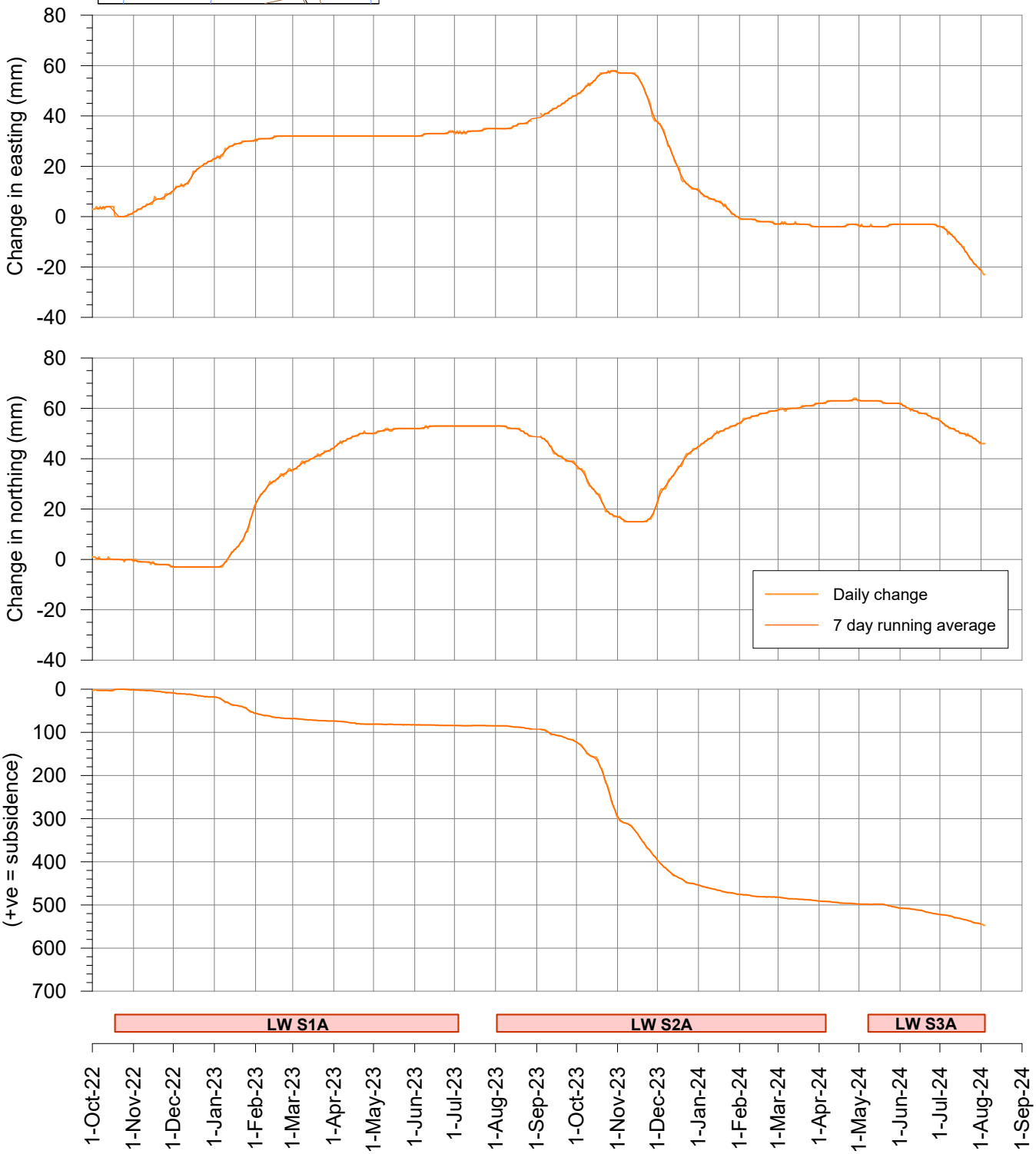


During LW S1A
During LW S2A
During LW S3A



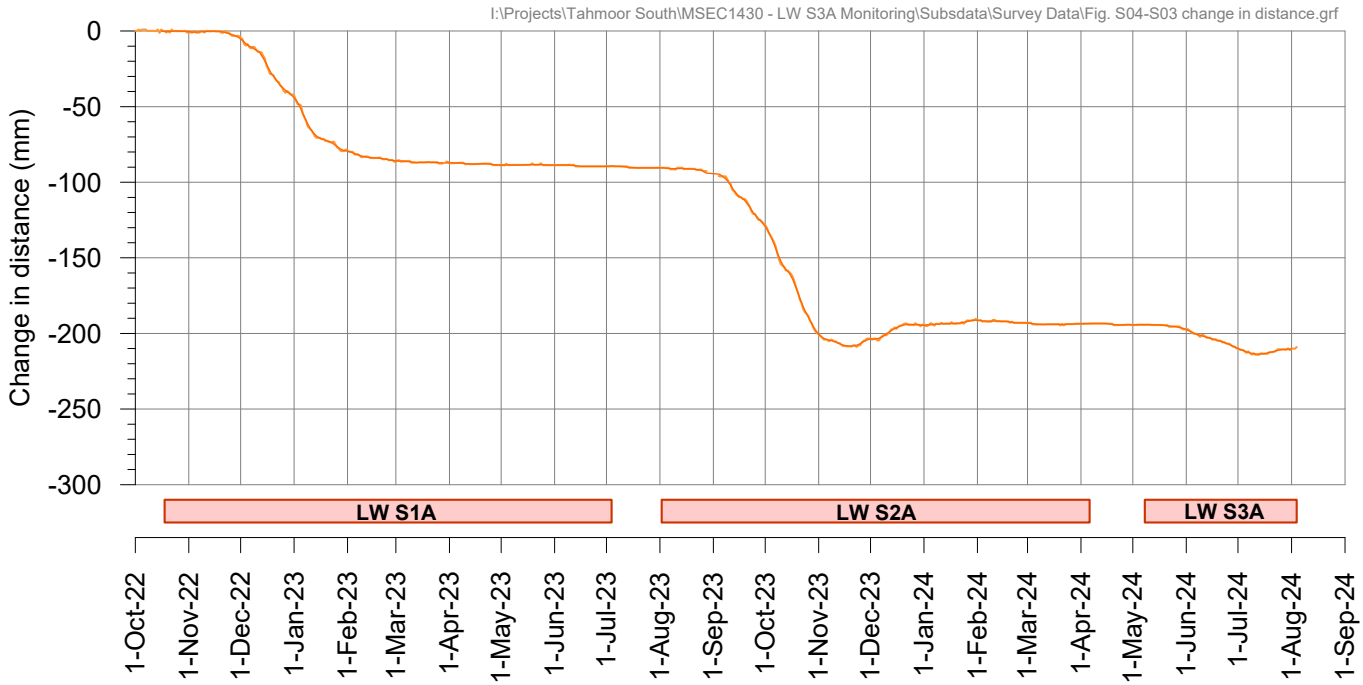


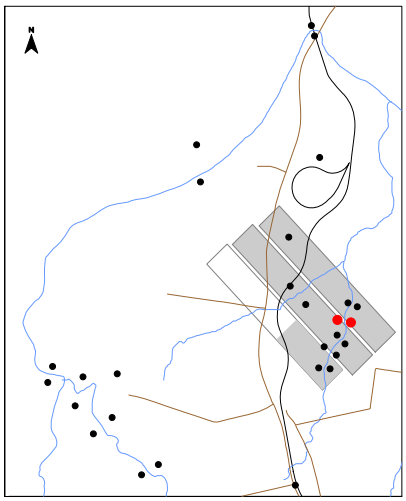
msec

Fig. S04-R10

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek at Teatree 3
Site S03 above LW S1A and Site S04 above LW S2A

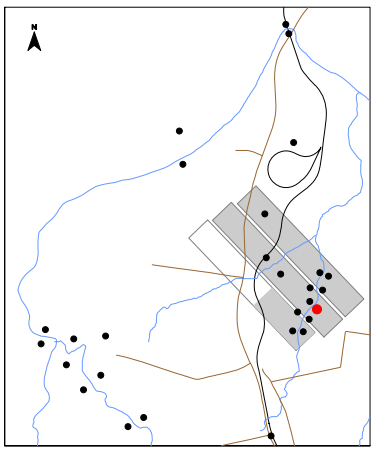




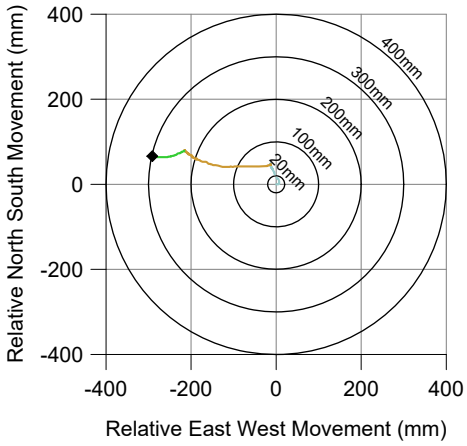
Tahmoor South LW S3A - GNSS Monitoring

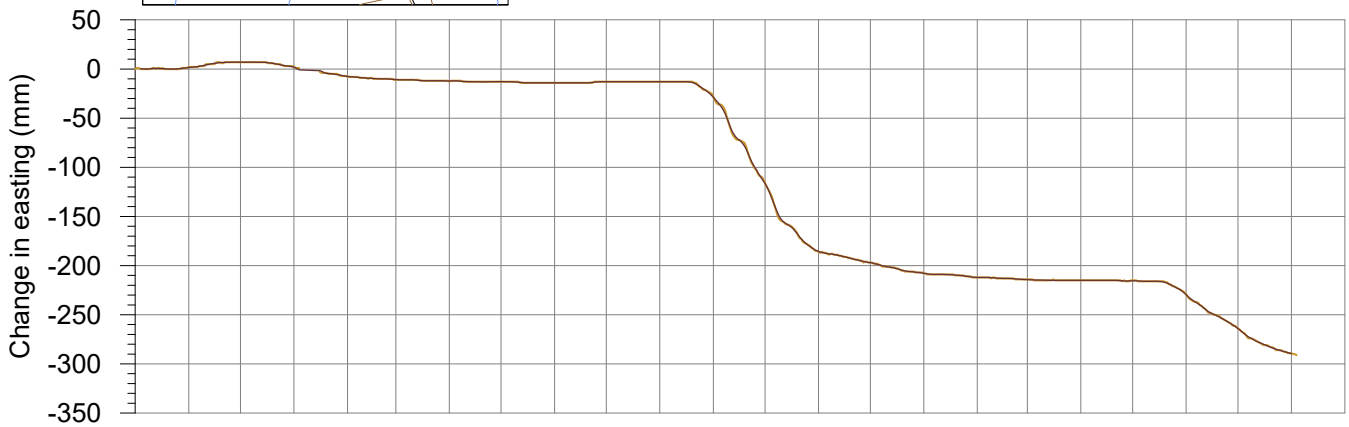
Site S05 above LW S2A

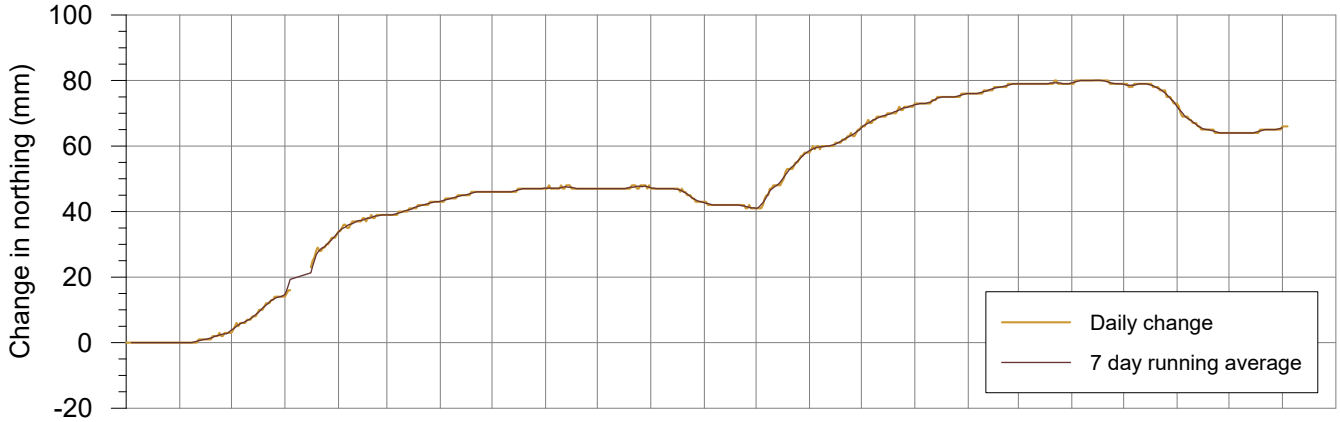
I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S05 GNSS.grf

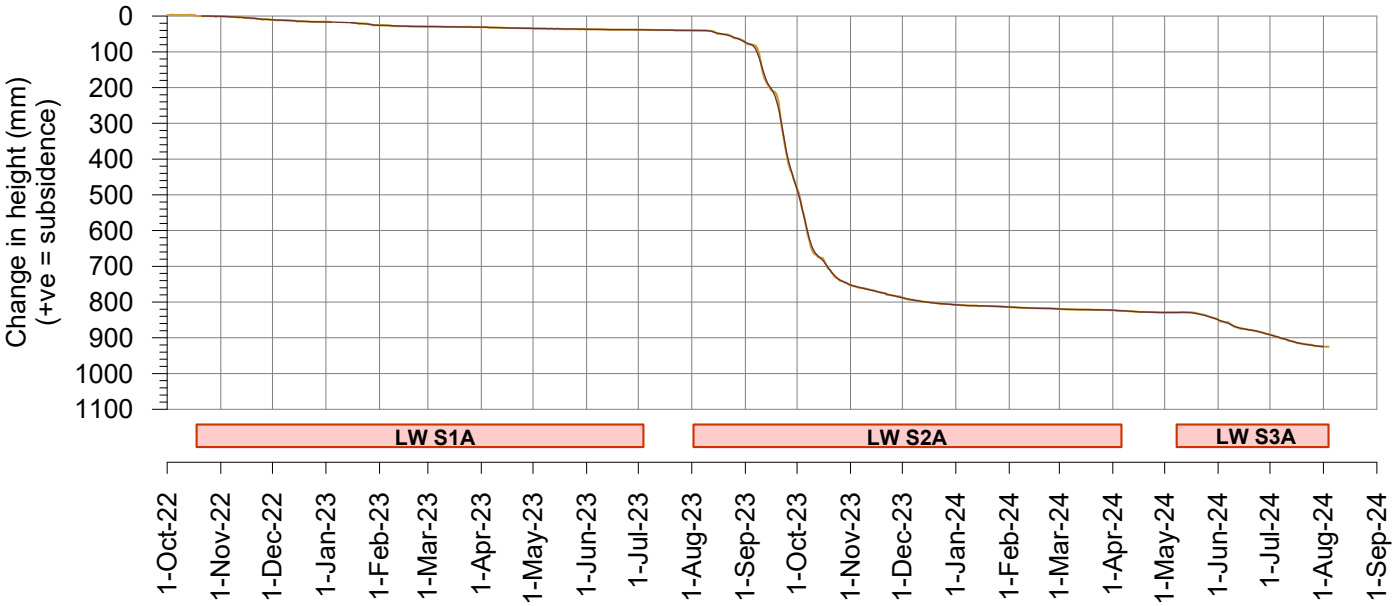


During LW S1A
During LW S2A
During LW S3A









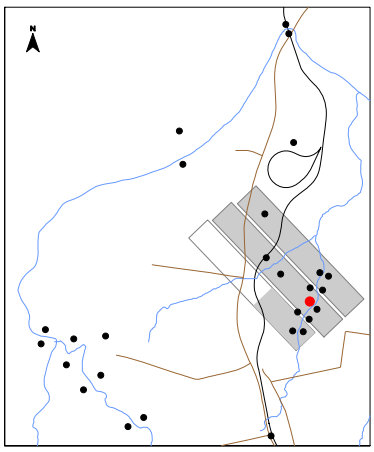
msec

Fig. S05-R10

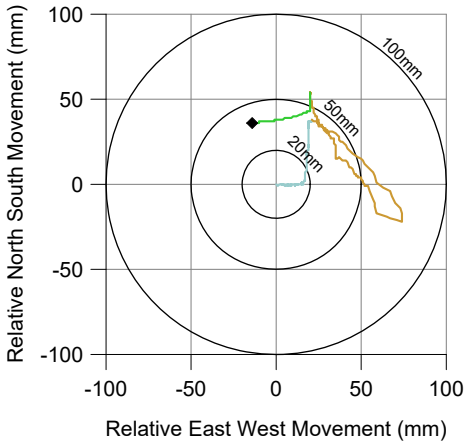
Tahmoor South LW S3A - GNSS Monitoring

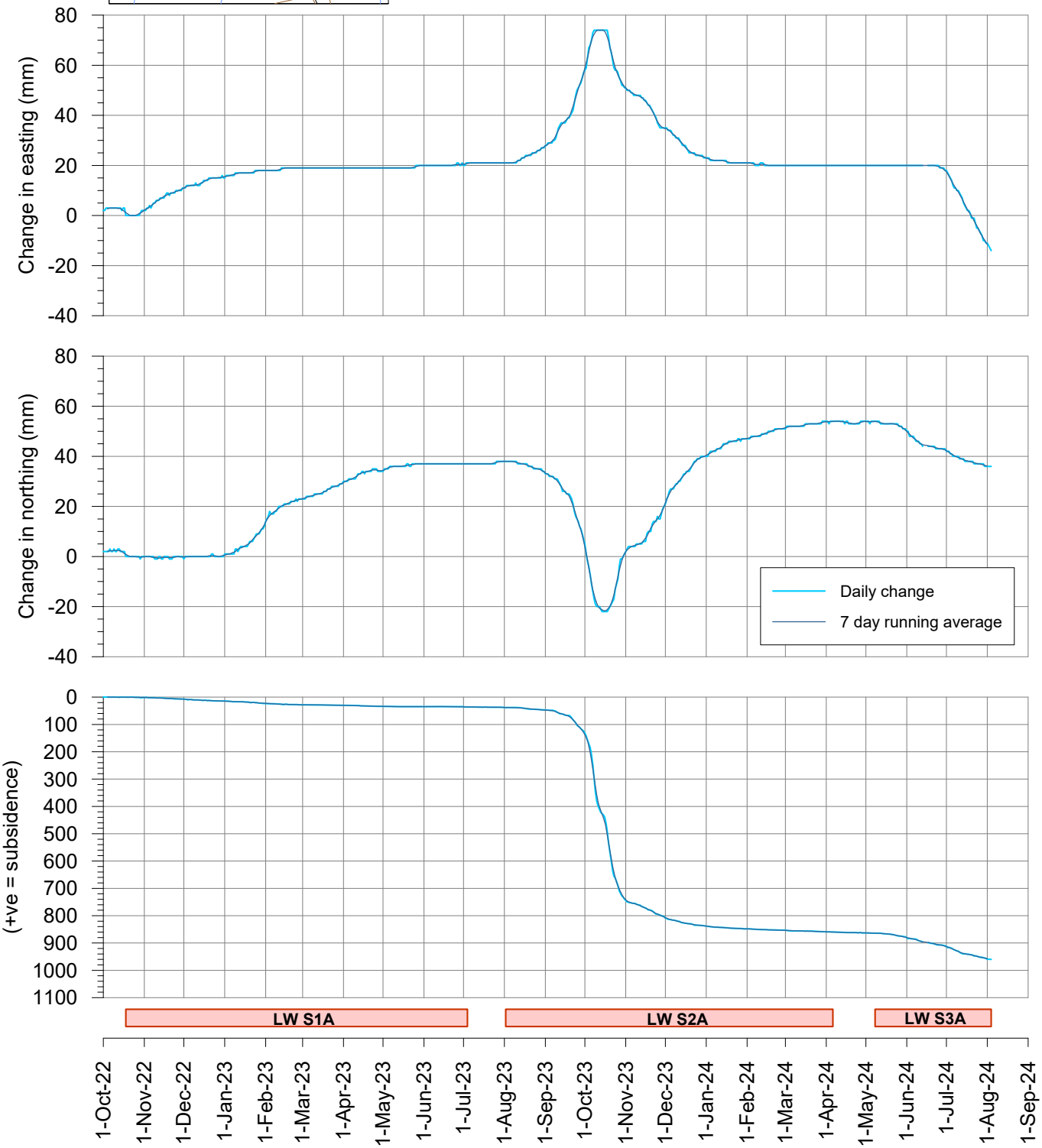
Site S06 above LW S2A

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S06 GNSS.grf







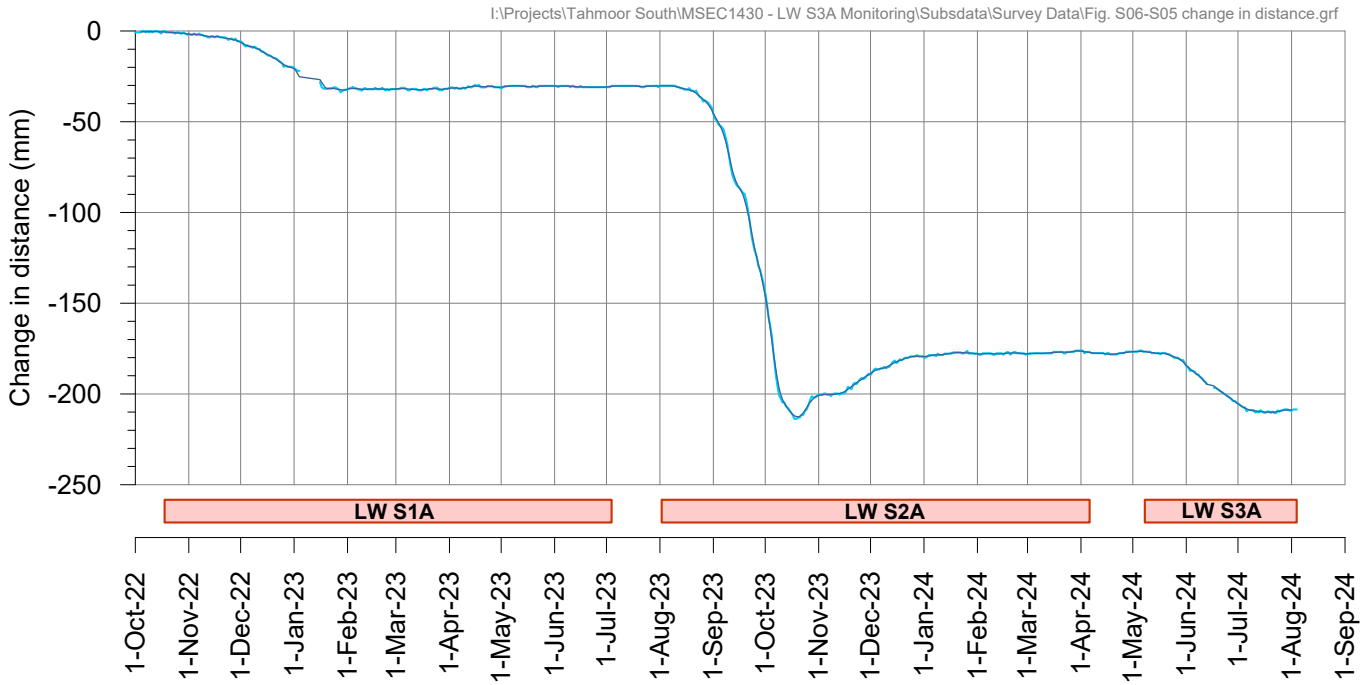


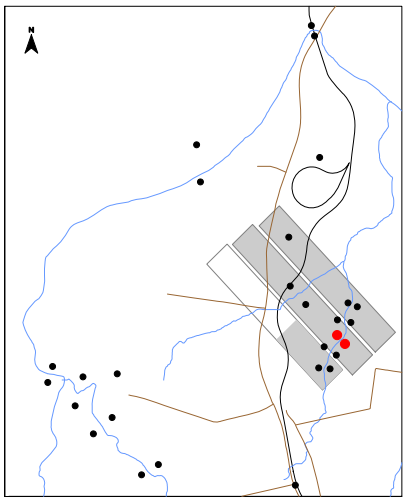
msec

Fig. S06-R10

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek
Sites S05 and S06 above LW S2A

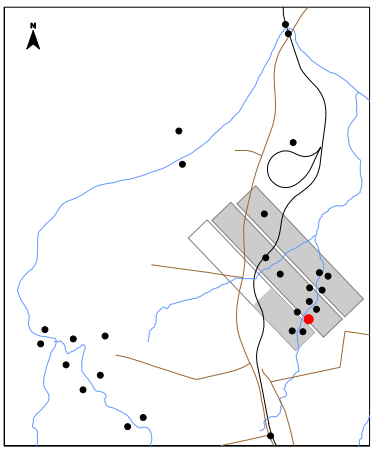




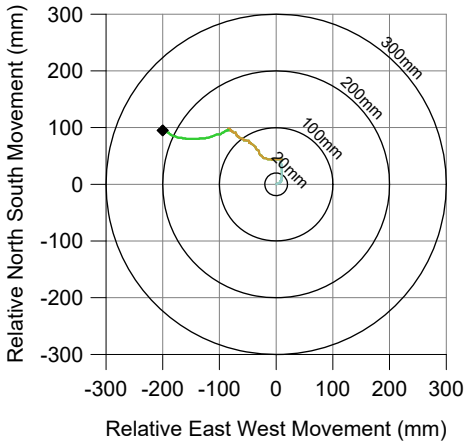
Tahmoor South LW S3A - GNSS Monitoring

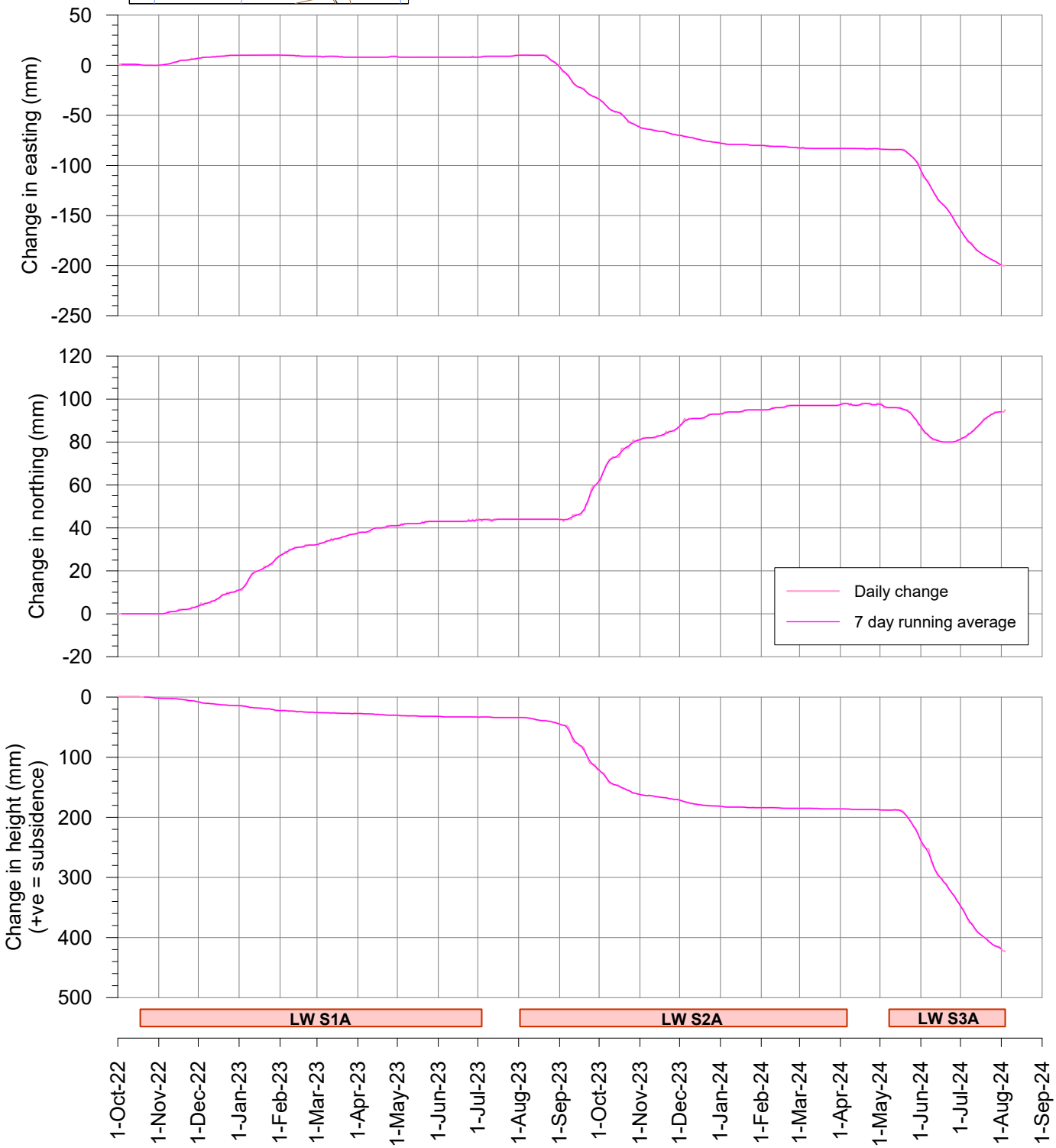
Site S07 above LW S2A

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S07 GNSS.grf



During LW S1A
During LW S2A
During LW S3A





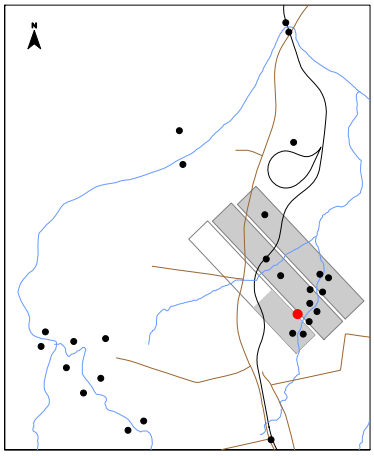
msec

Fig. S07-R10

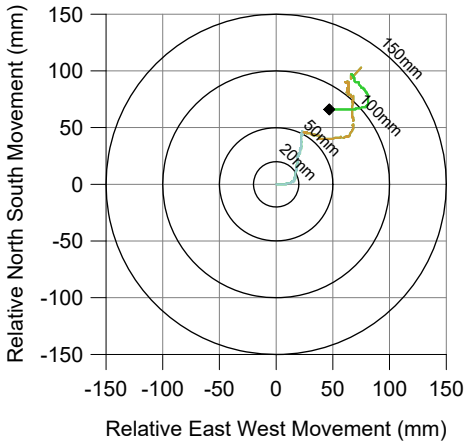
Tahmoor South LW S3A - GNSS Monitoring

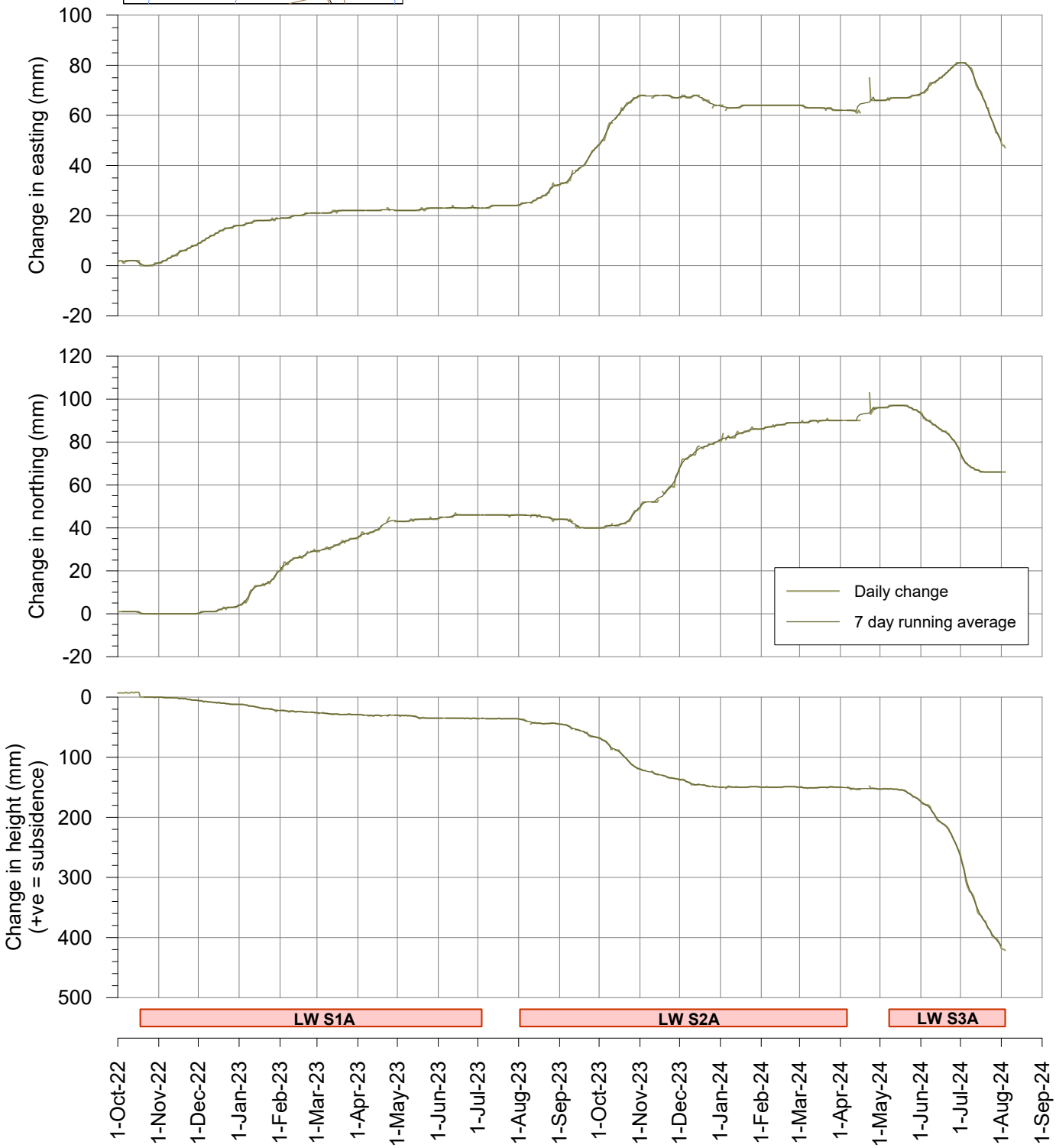
Site S08 between LW S2A and LW S3A

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S08 GNSS.grf







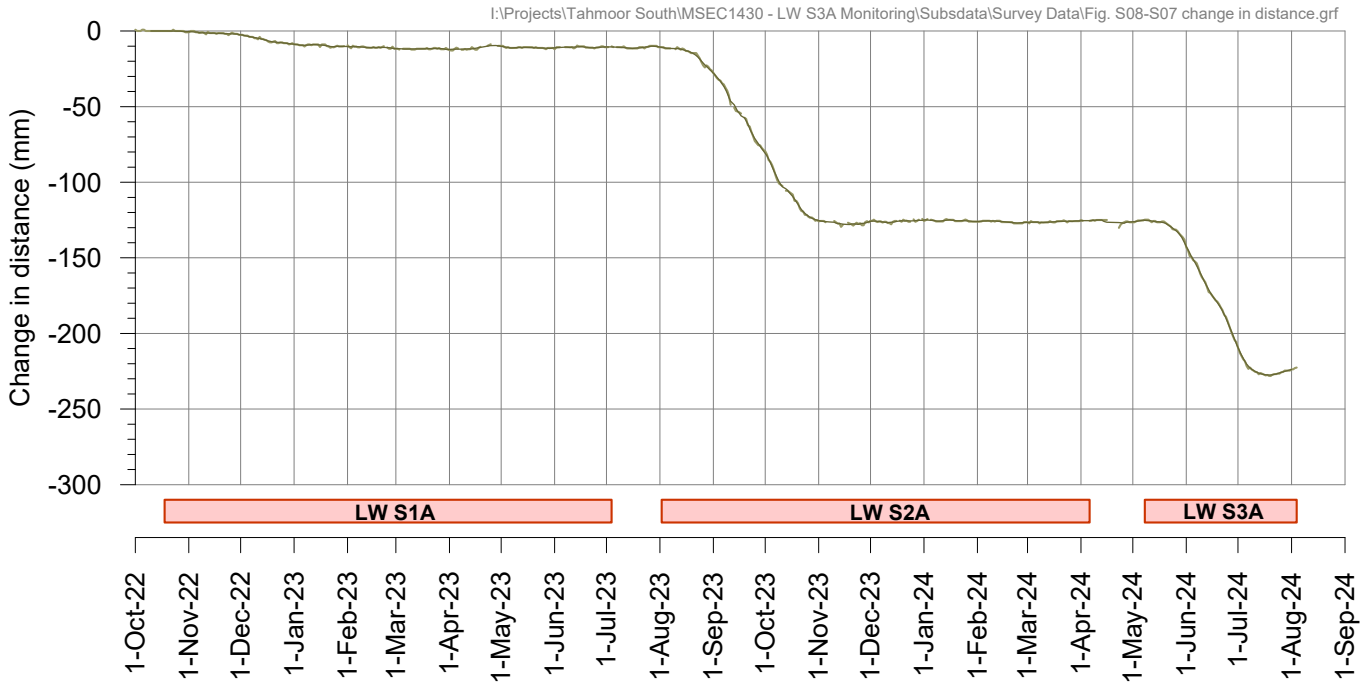


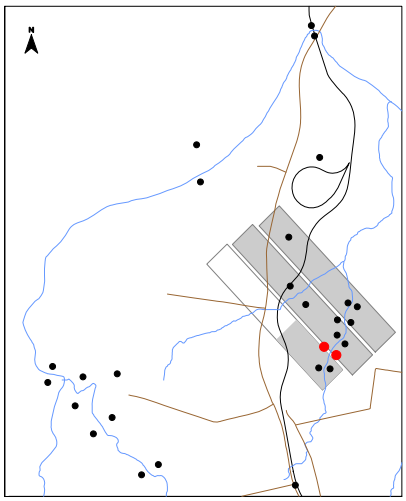
msec

Fig. S08-R10

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek
Site S07 above LW S2A and Site S08 between LW S2A and LW S3A

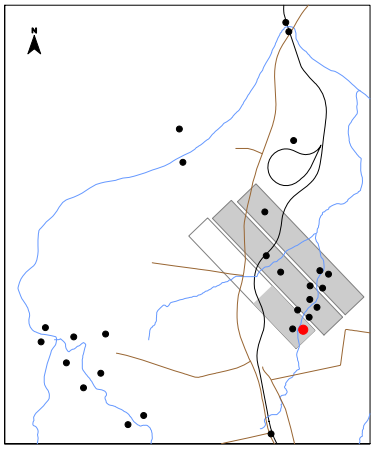




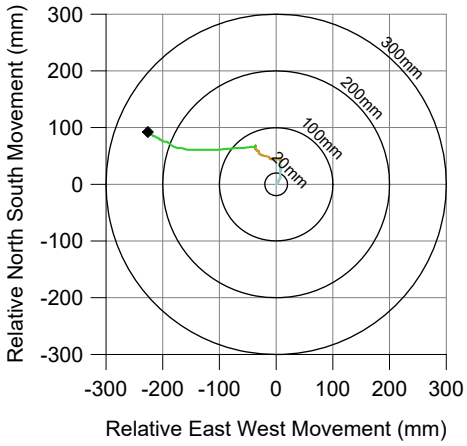
Tahmoor South LW S3A - GNSS Monitoring

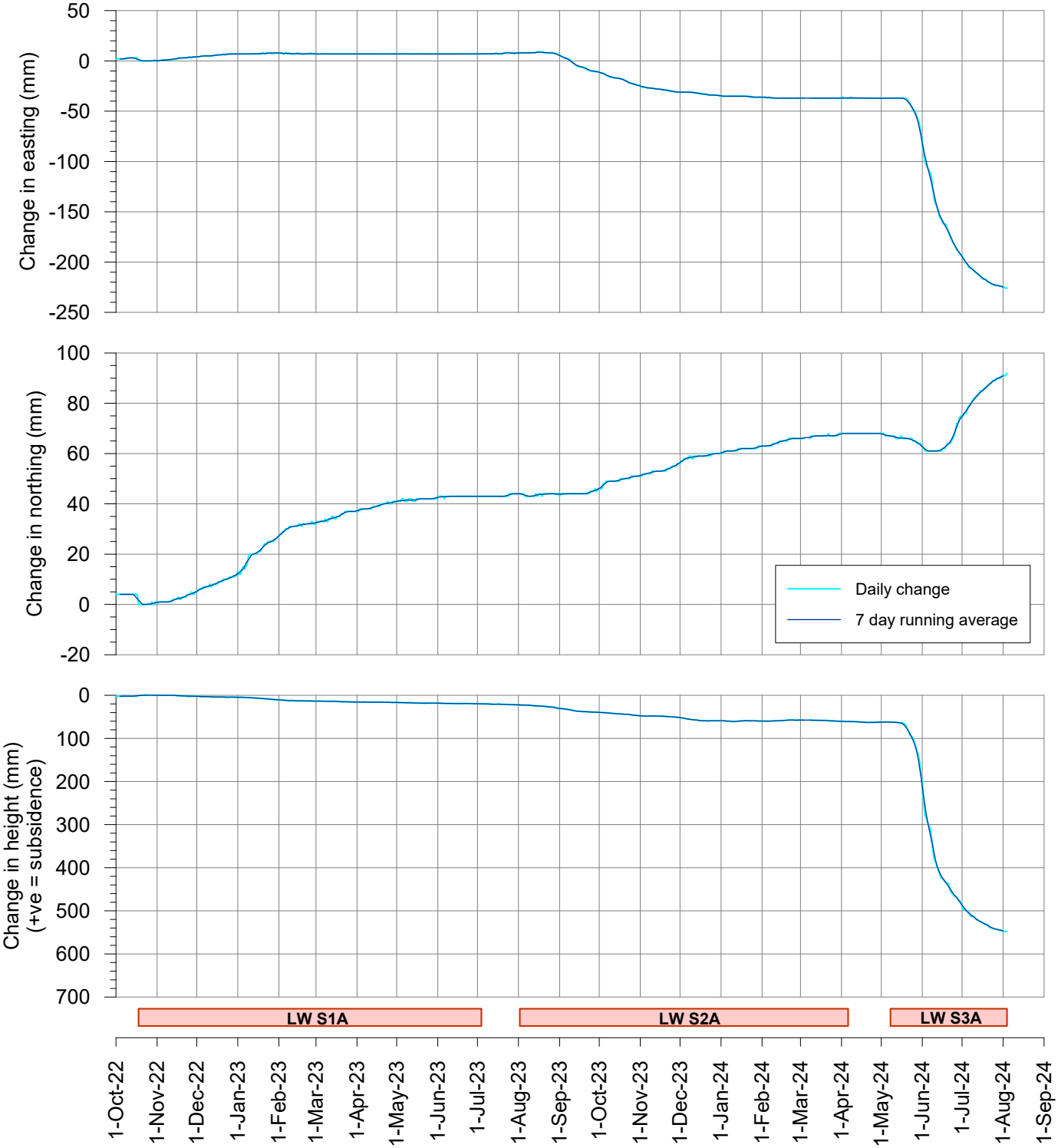
Site S09 above LW S3A at Teatree 2

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S09 GNSS.grf



During LW S1A
During LW S2A
During LW S3A





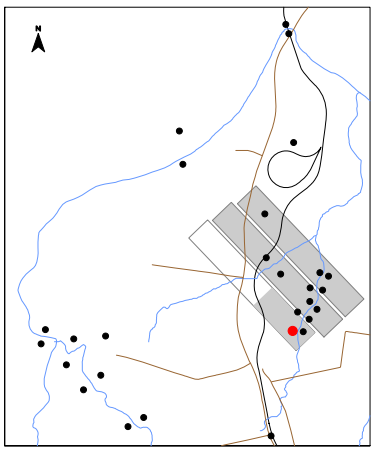
msec

Fig. S09-R10

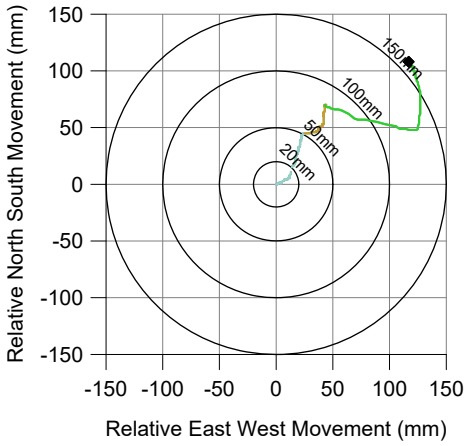
Tahmoor South LW S3A - GNSS Monitoring

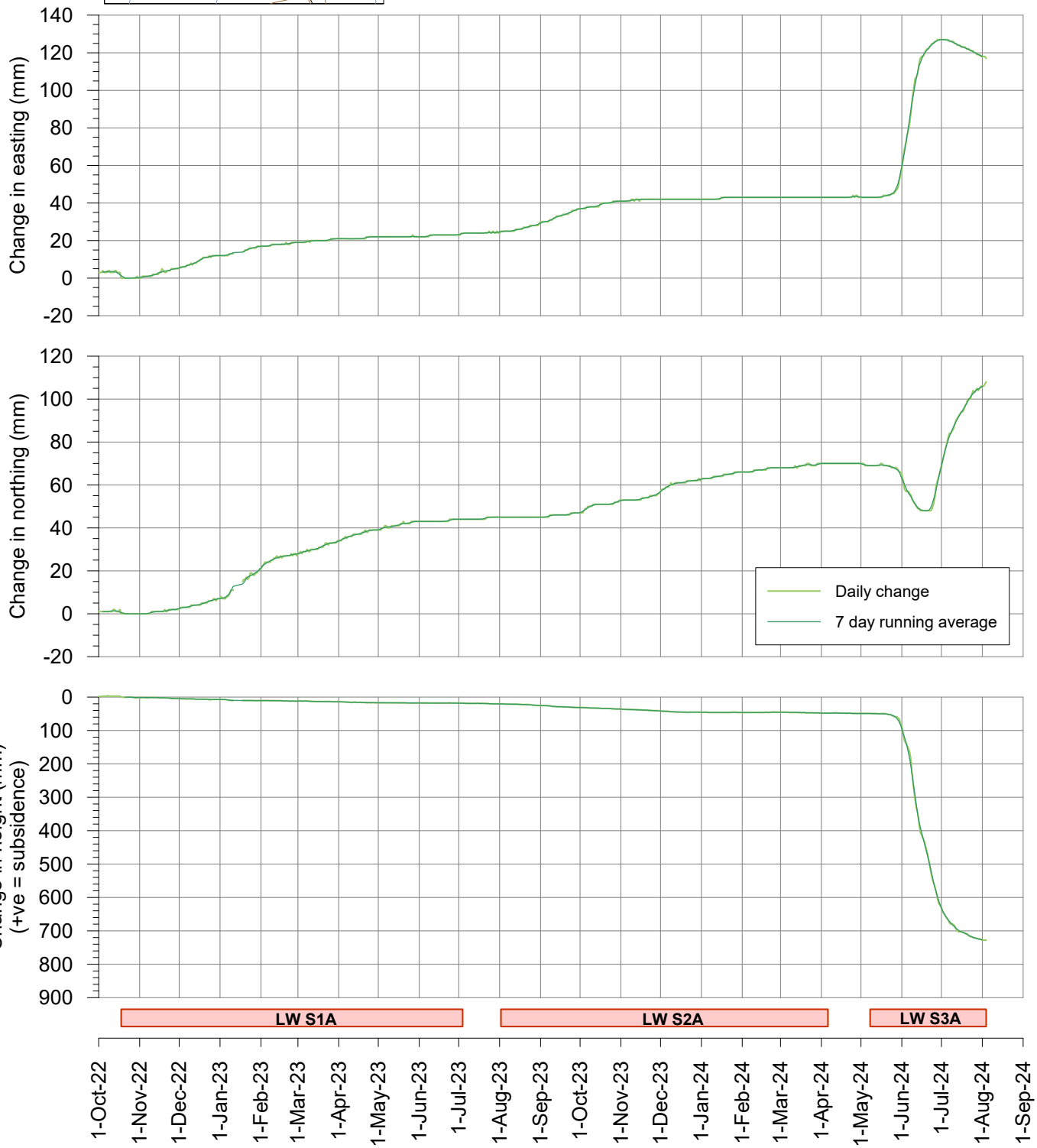
Site S10 above LW S3A at Teatree 2

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S10 GNSS.grf



During LW S1A
During LW S2A
During LW S3A



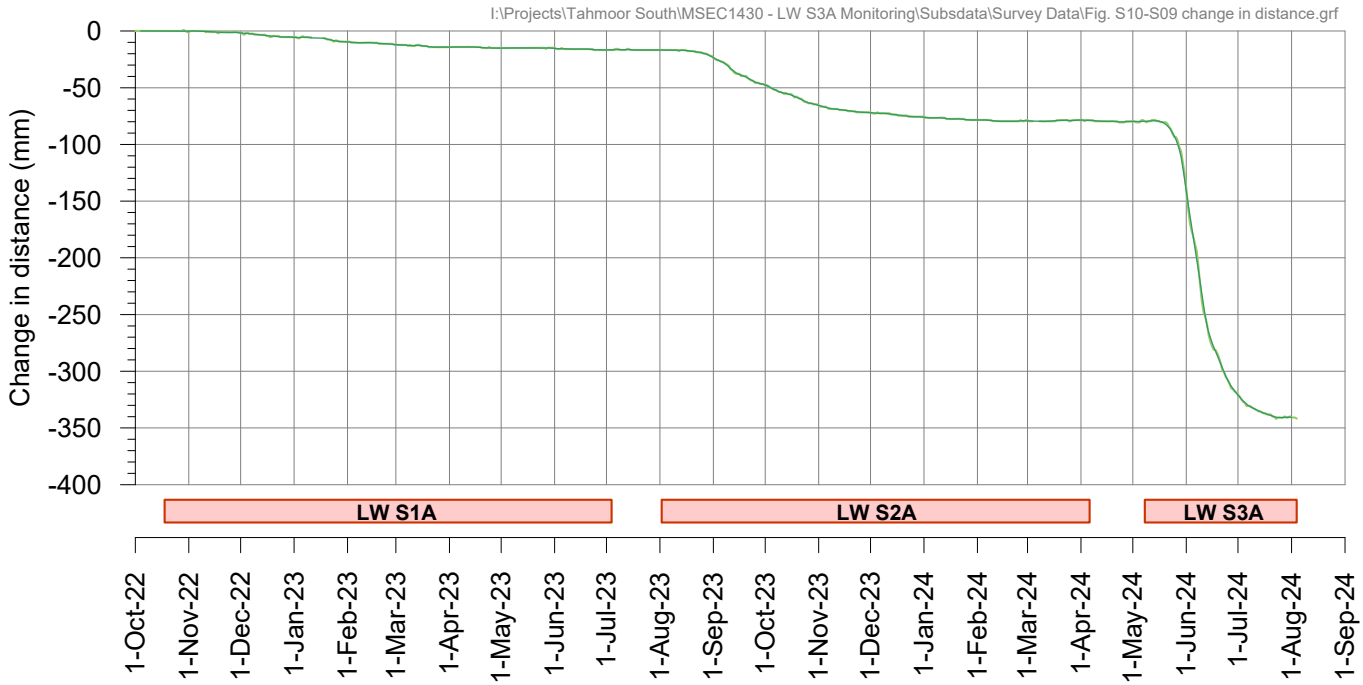


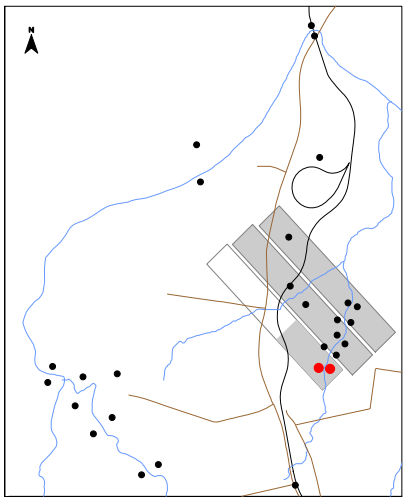
msec

Fig. S10-R10

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek at Teatree 2
Sites S09 and S10 above LW S3A

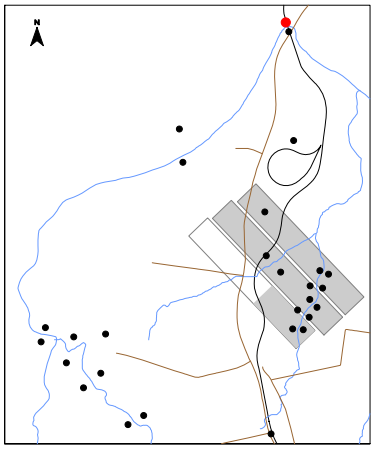




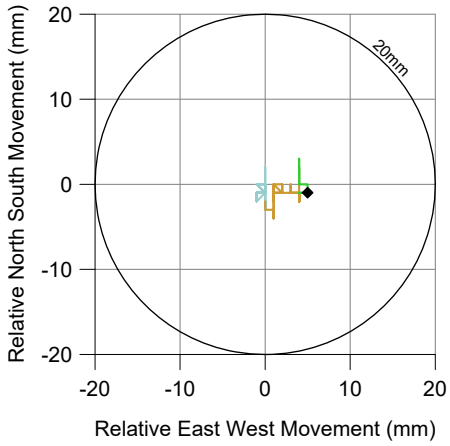
Tahmoor South LW S3A - GNSS Monitoring

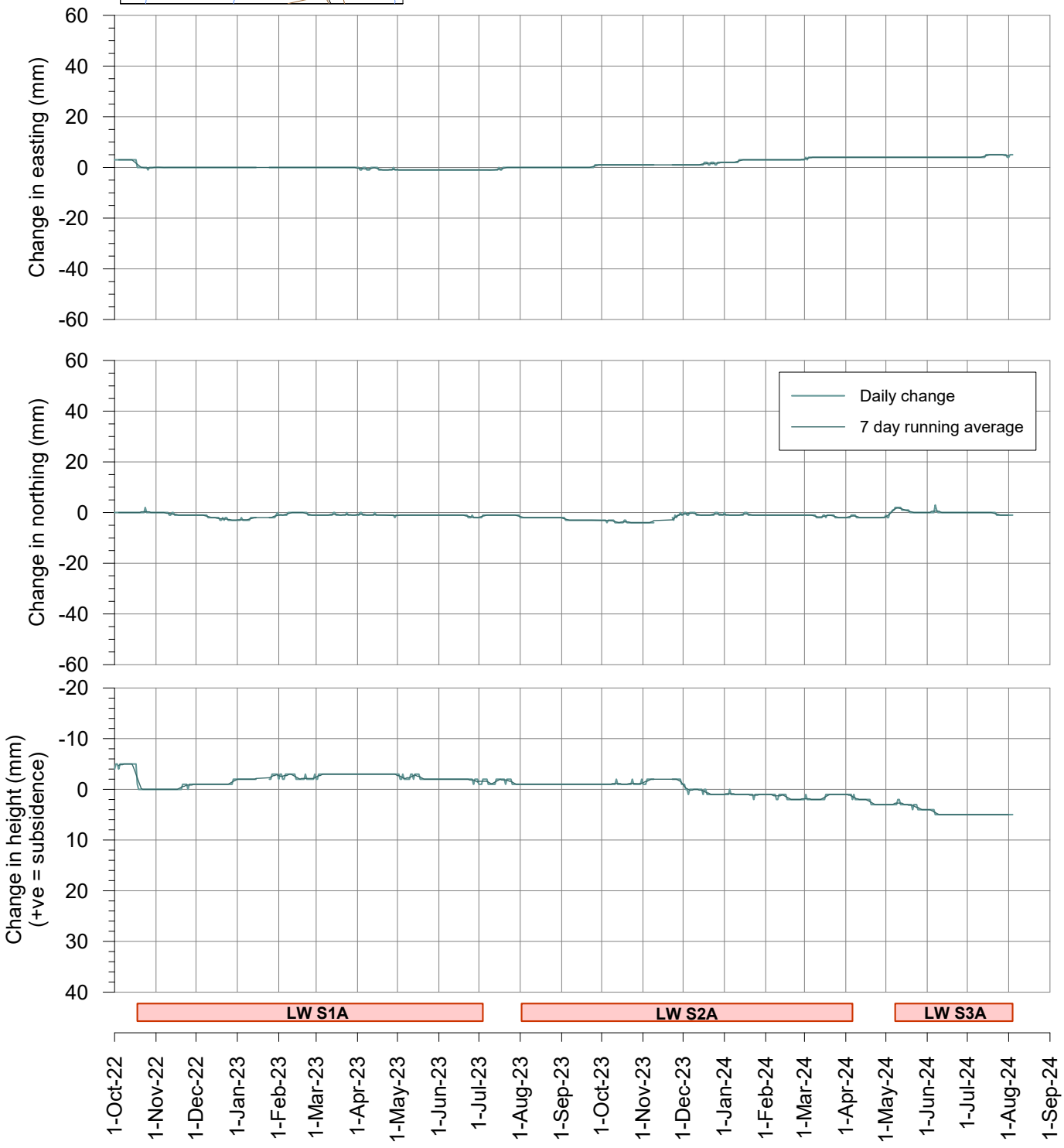
Site S11 at northern end of railway viaduct over Bargo River

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S11 GNSS.grf









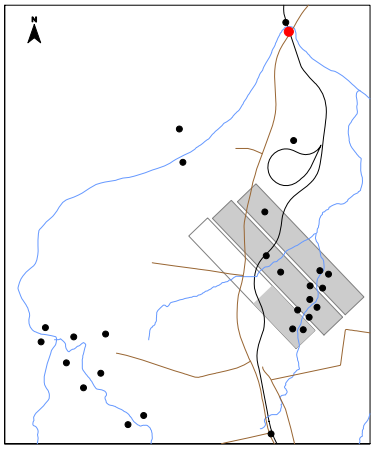
msec

Fig. S11-R10

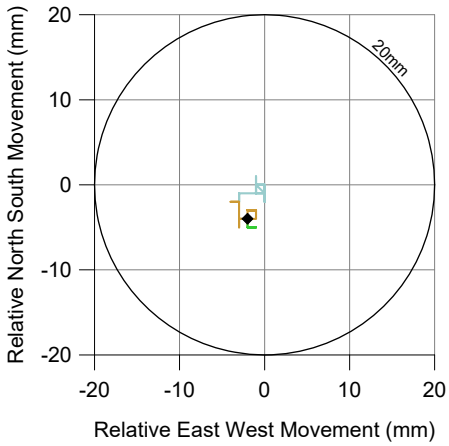
Tahmoor South LW S3A - GNSS Monitoring

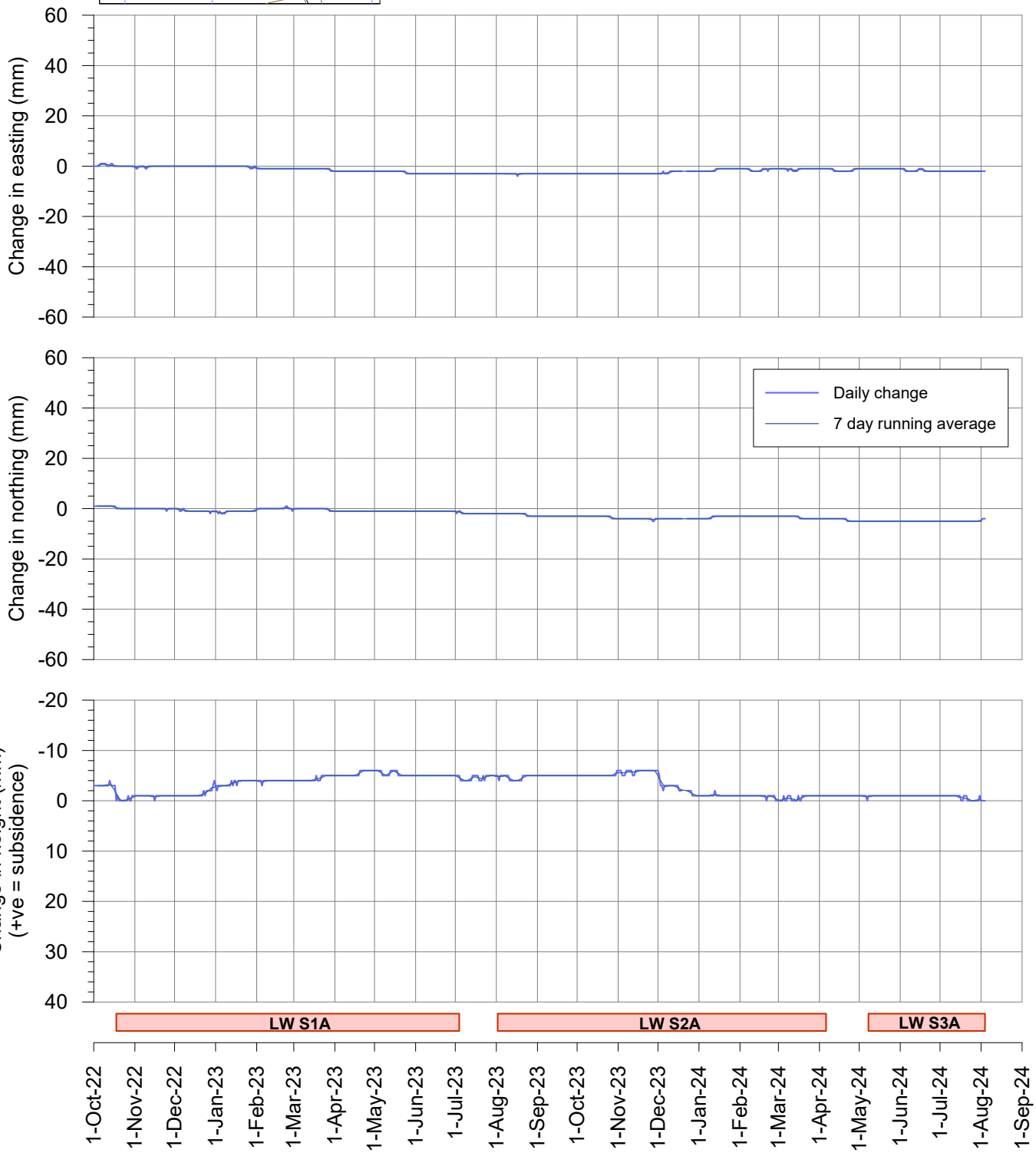
Site S12 at southern end of railway viaduct over Bargo River

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S12 GNSS.grf







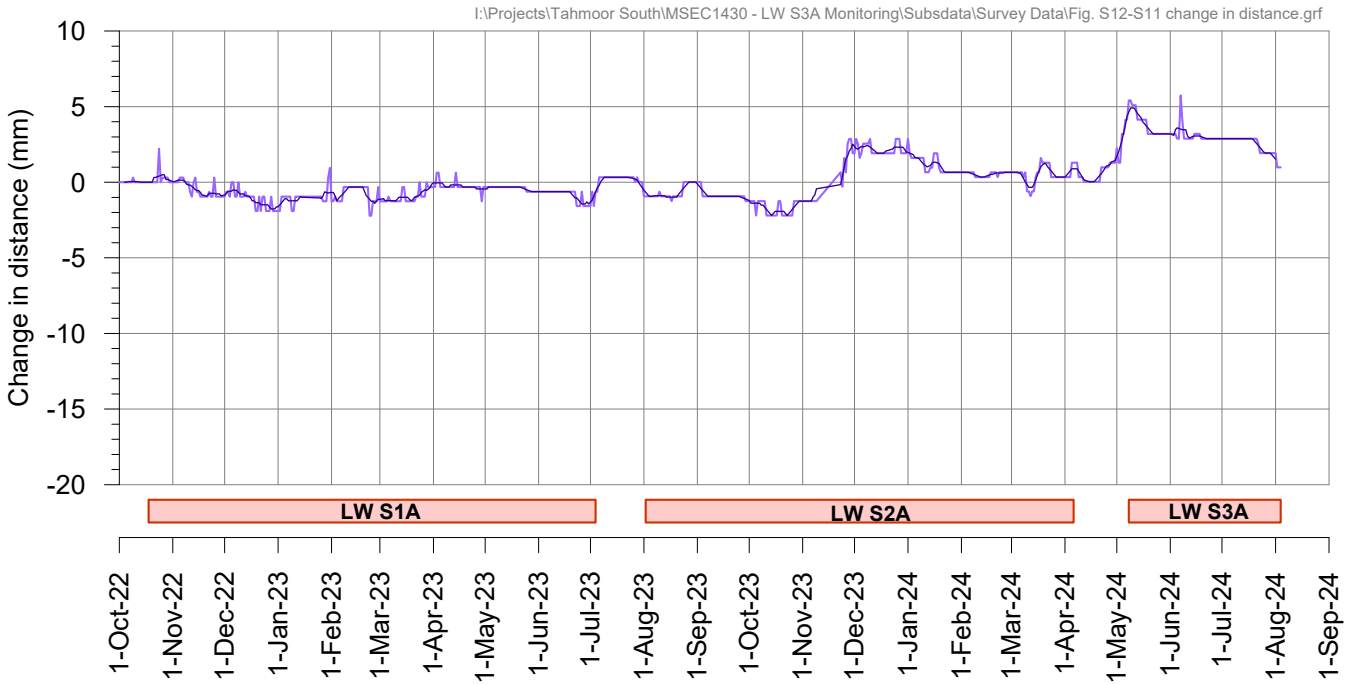


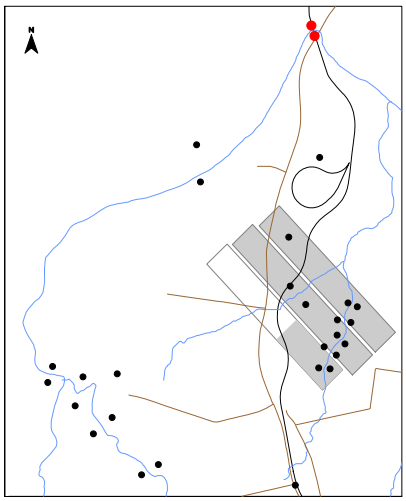
msec

Fig. S12-R10

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Railway Viaduct over Bargo River
Sites S11 and S12

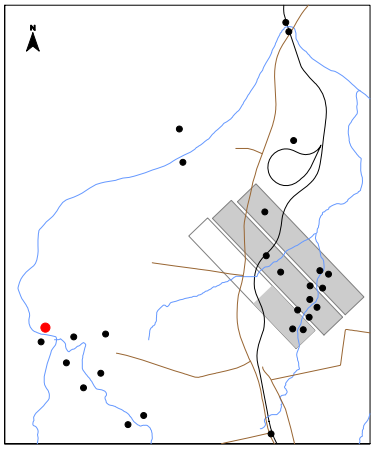




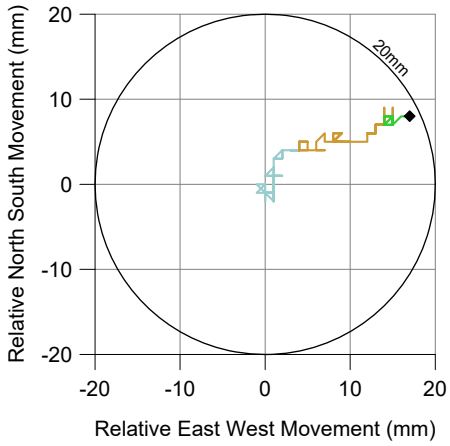
Tahmoor South LW S3A - GNSS Monitoring

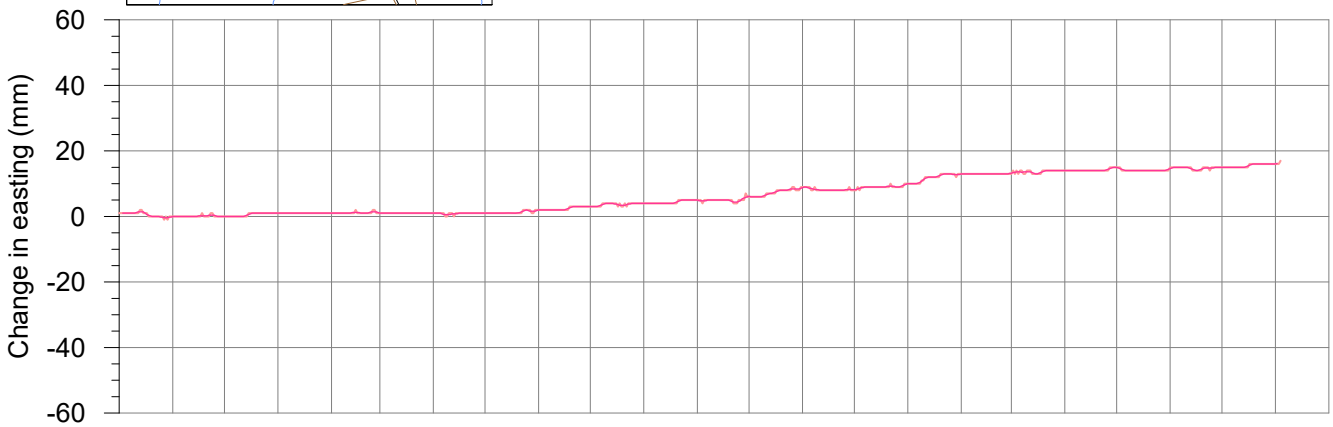
Site S13 on northern side of Picton Weir

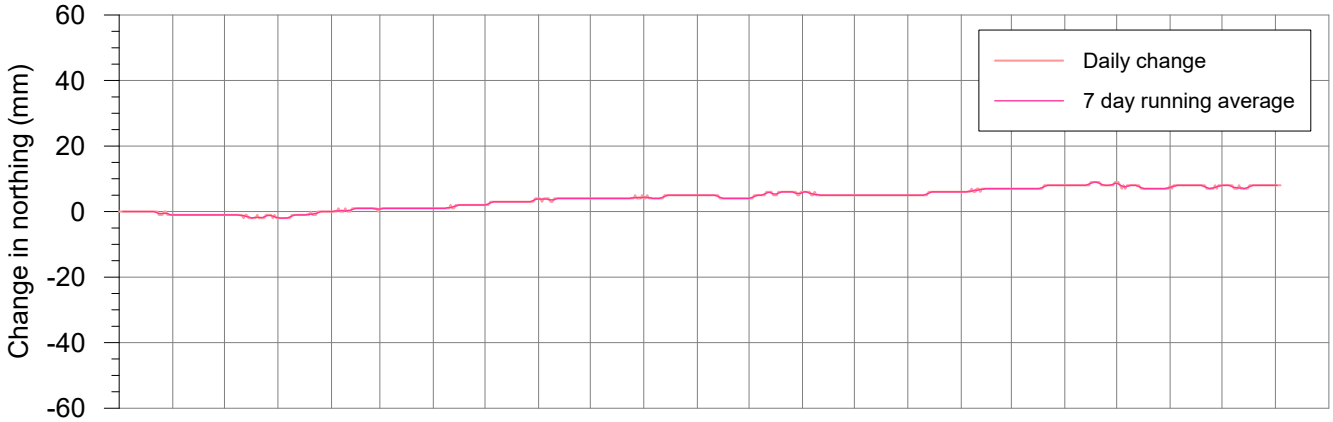
I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S13 GNSS.grf

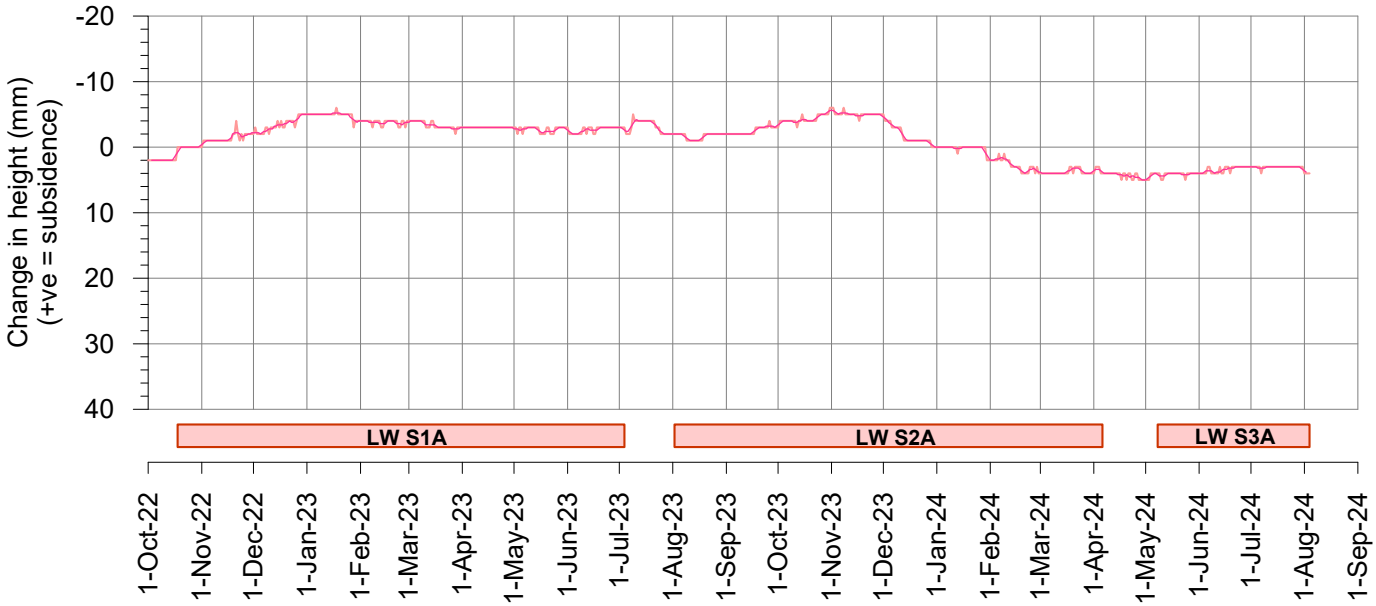


During LW S1A
During LW S2A
During LWS3A









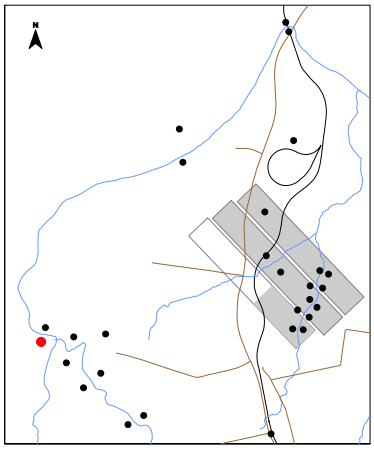
msec

Fig. S13-R10

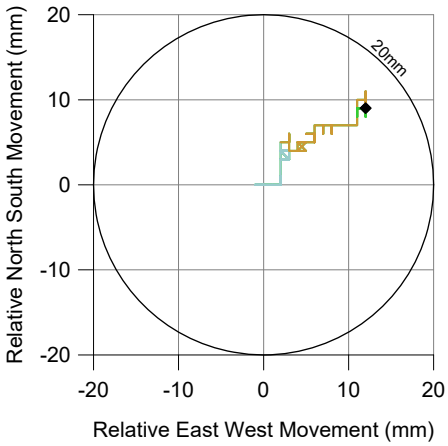
Tahmoor South LW S3A - GNSS Monitoring

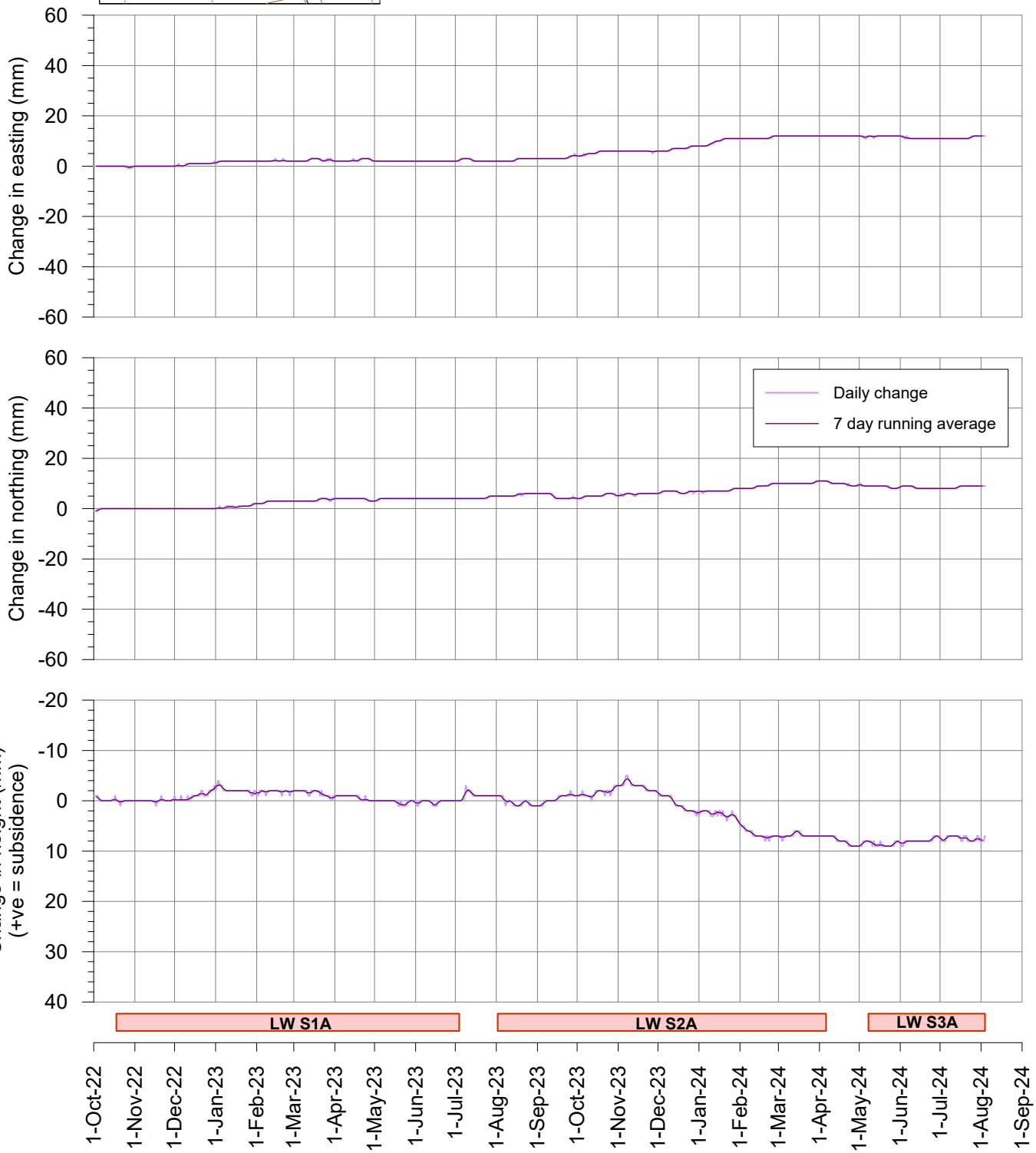
Site S14 on southern side of Picton Weir

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S14 GNSS.grf



During LW S1A
During LW S2A
During LW S3A



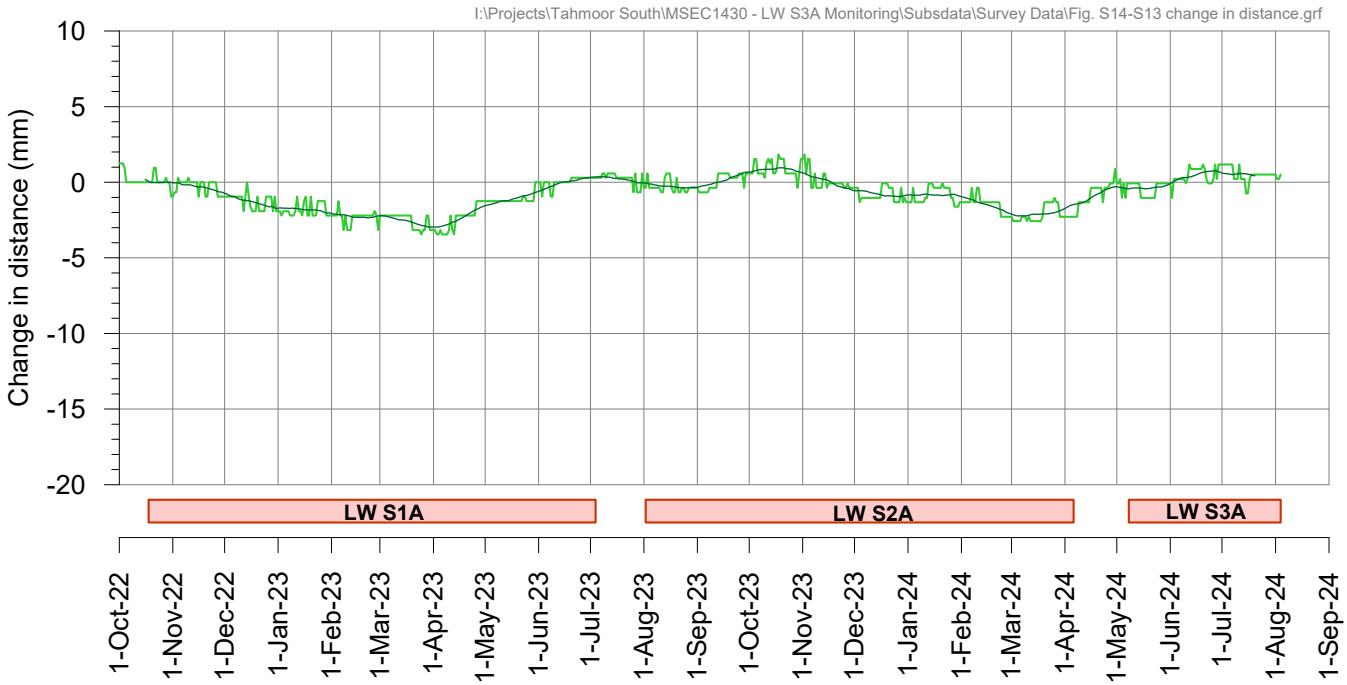


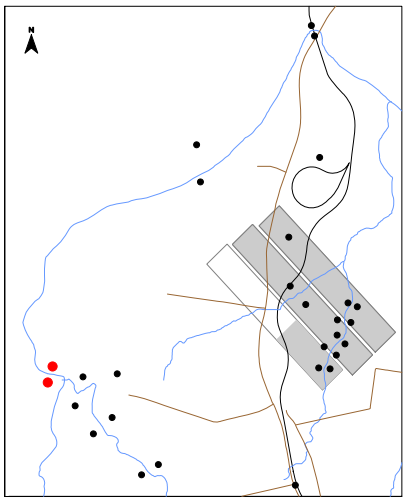
msec

Fig. S14-R10

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Picton Weir
Sites S13 and S14





Tahmoor South LW S3A - GNSS Monitoring

Site S15 at Wellers Road Overbridge

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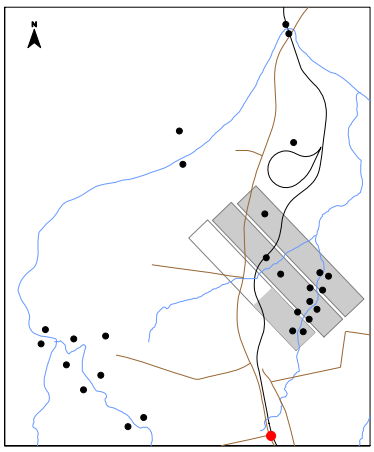
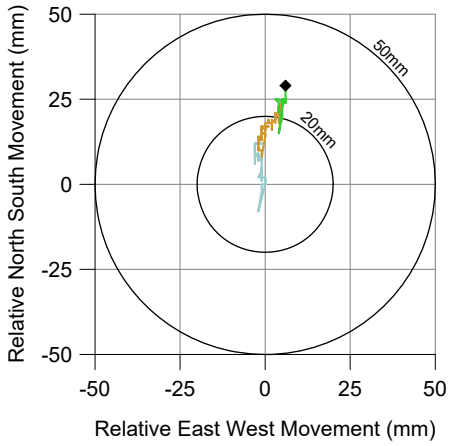
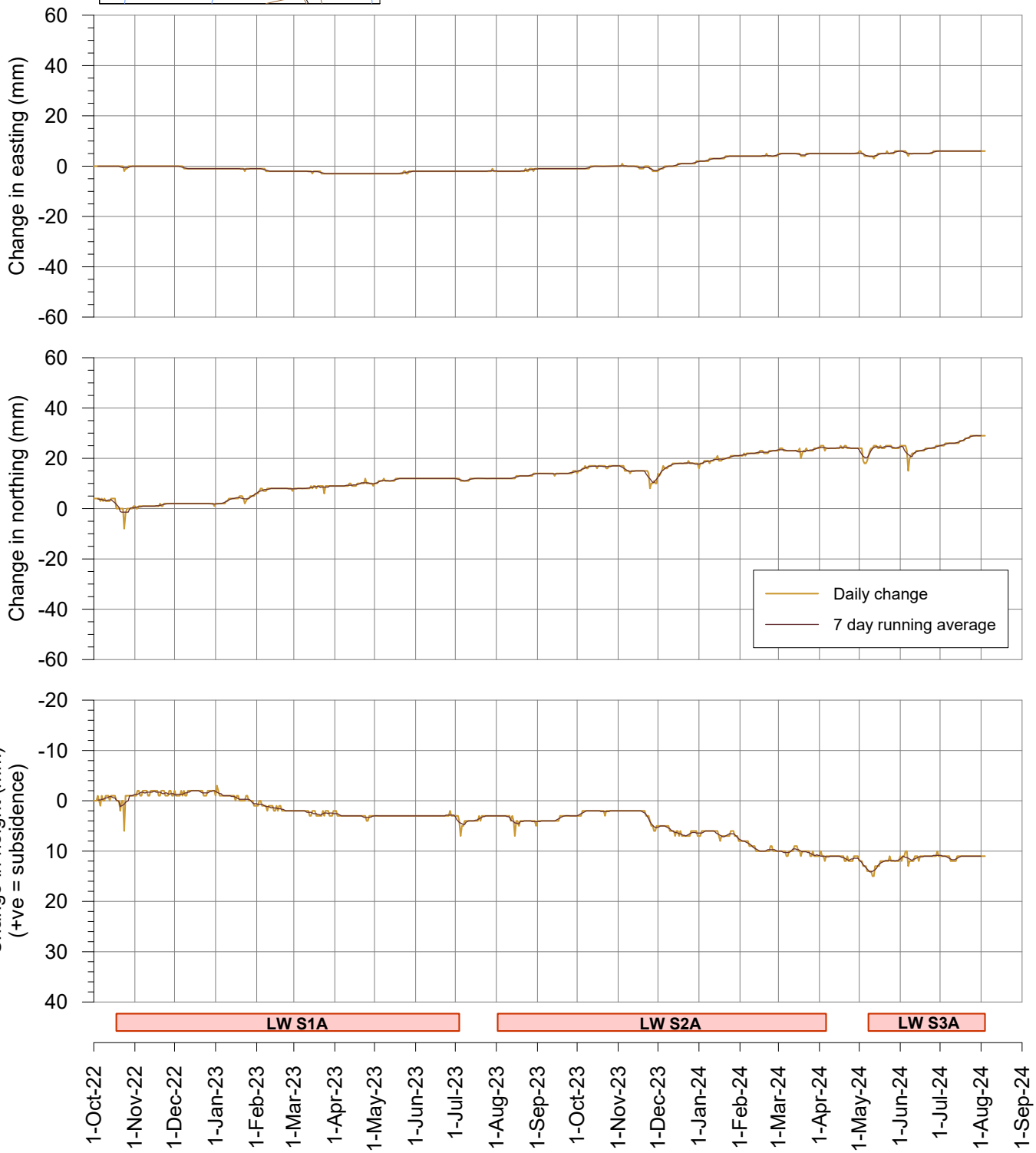


During LW S1A
During LW S2A
During LW S3A





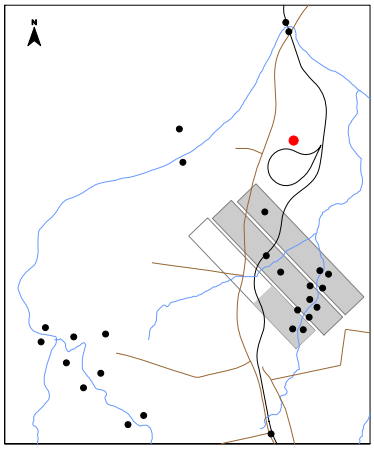
msec

Fig. S15-R10

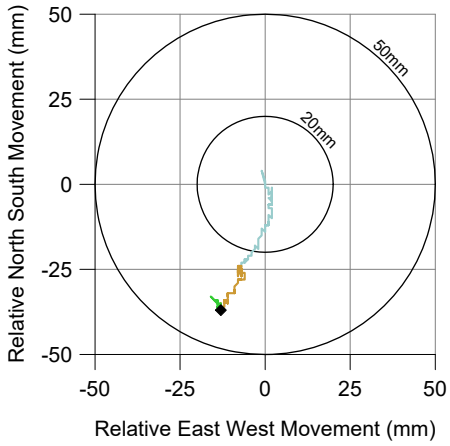
Tahmoor South LW S3A - GNSS Monitoring

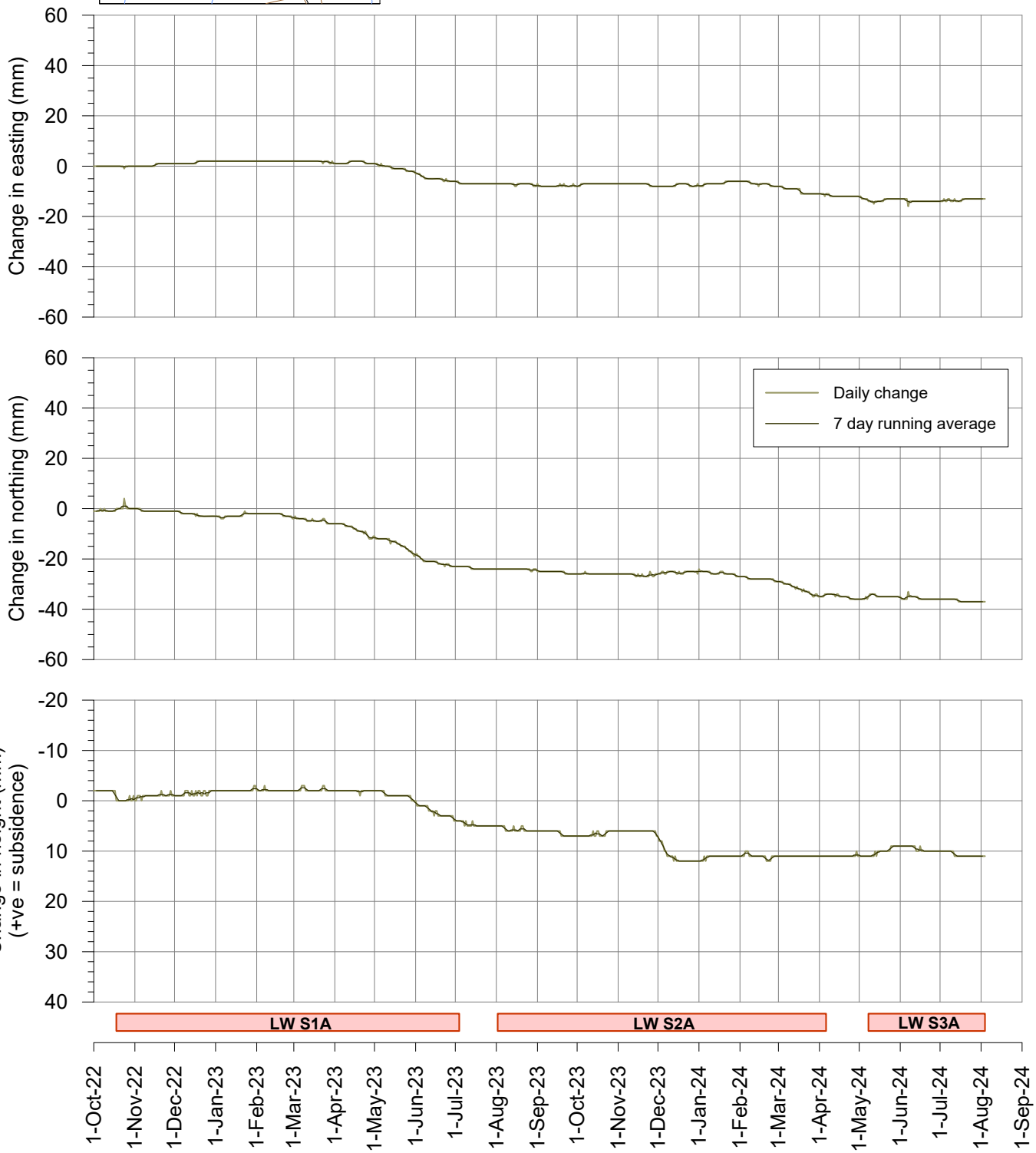
Site S16 at Tahmoor Mine site

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S16 GNSS.grf



During LW S1A
During LW S1A
During LW S3A





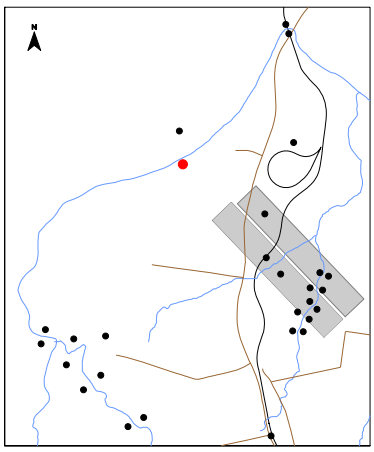
msec

Fig. S16-R10

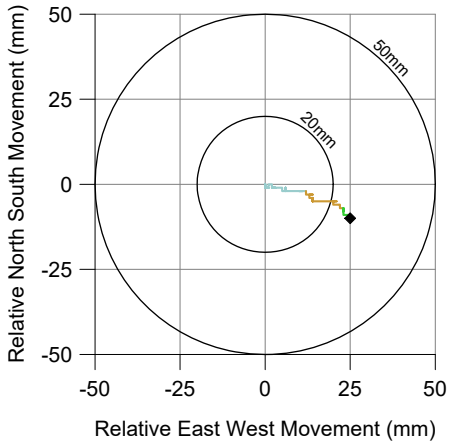
Tahmoor South LW S3A - GNSS Monitoring

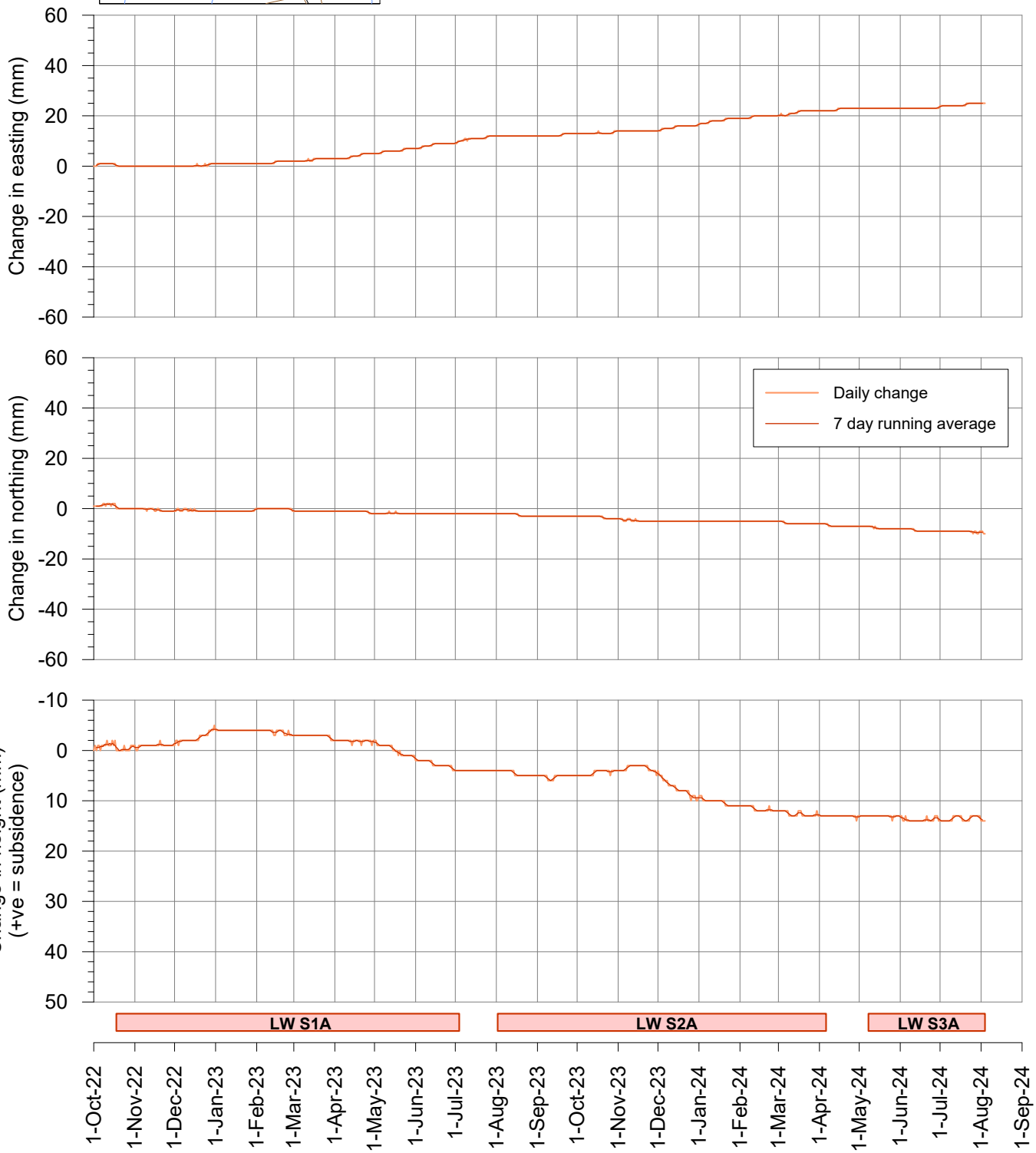
Site S17 on east bank of Bargo River

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S17 GNSS.grf









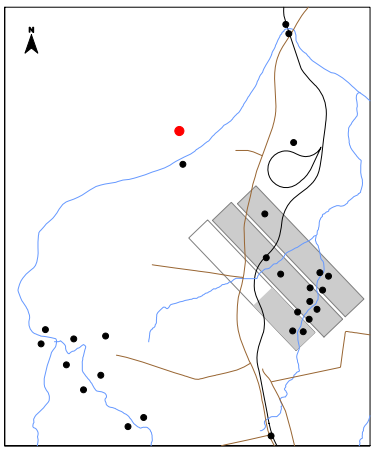
msec

Fig. S17-R10

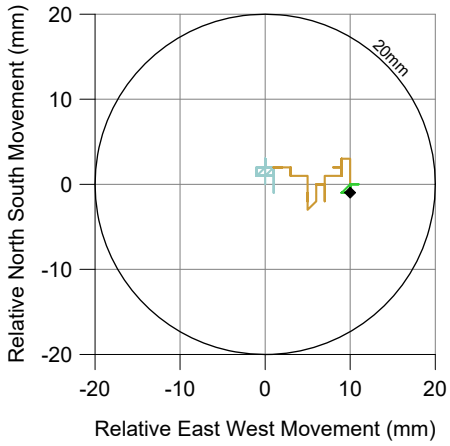
Tahmoor South LW S3A - GNSS Monitoring

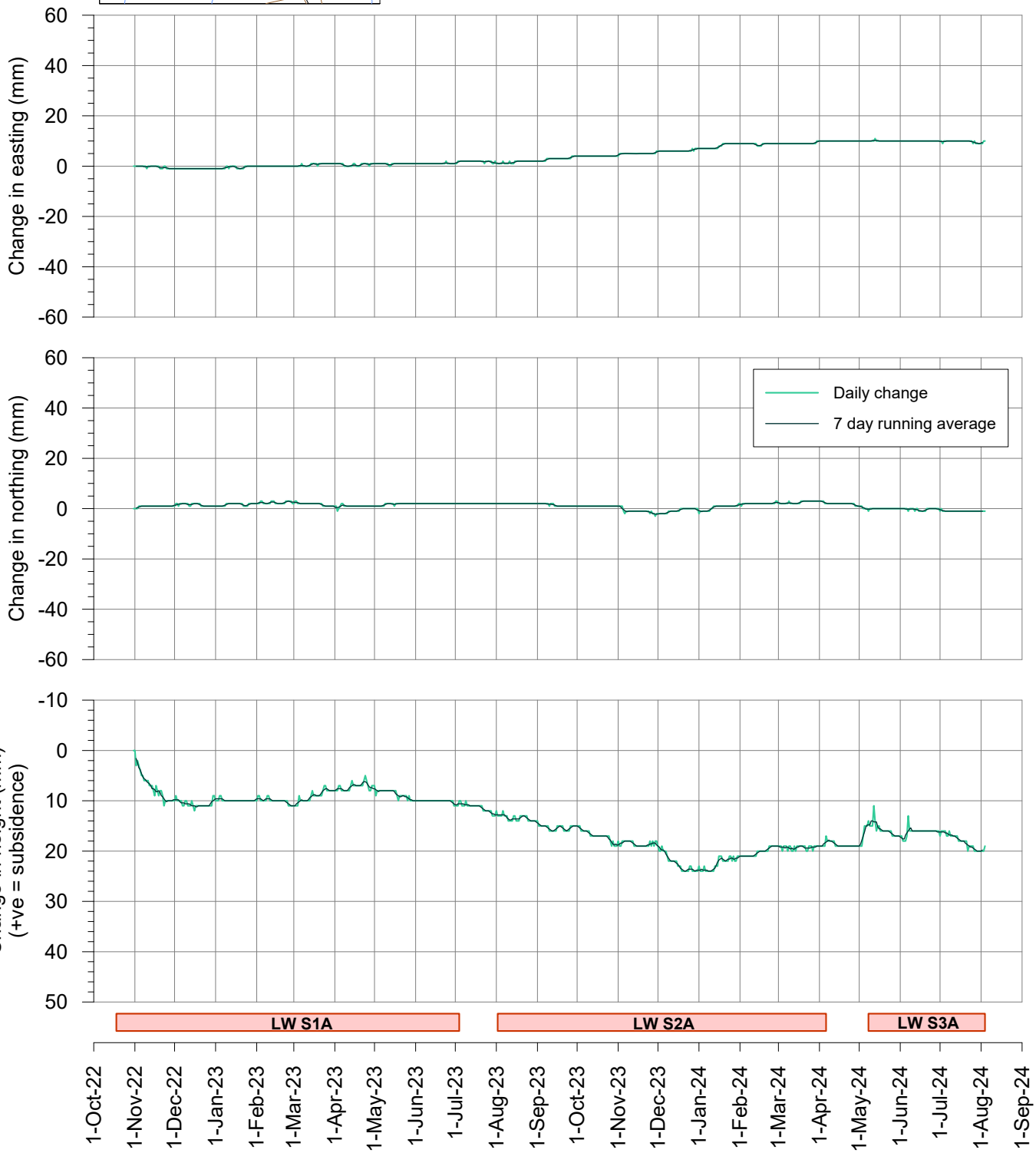
Site S18 on west bank of Bargo River

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S18 GNSS.grf



During LW S1A
During LW S2A
During LW S3A



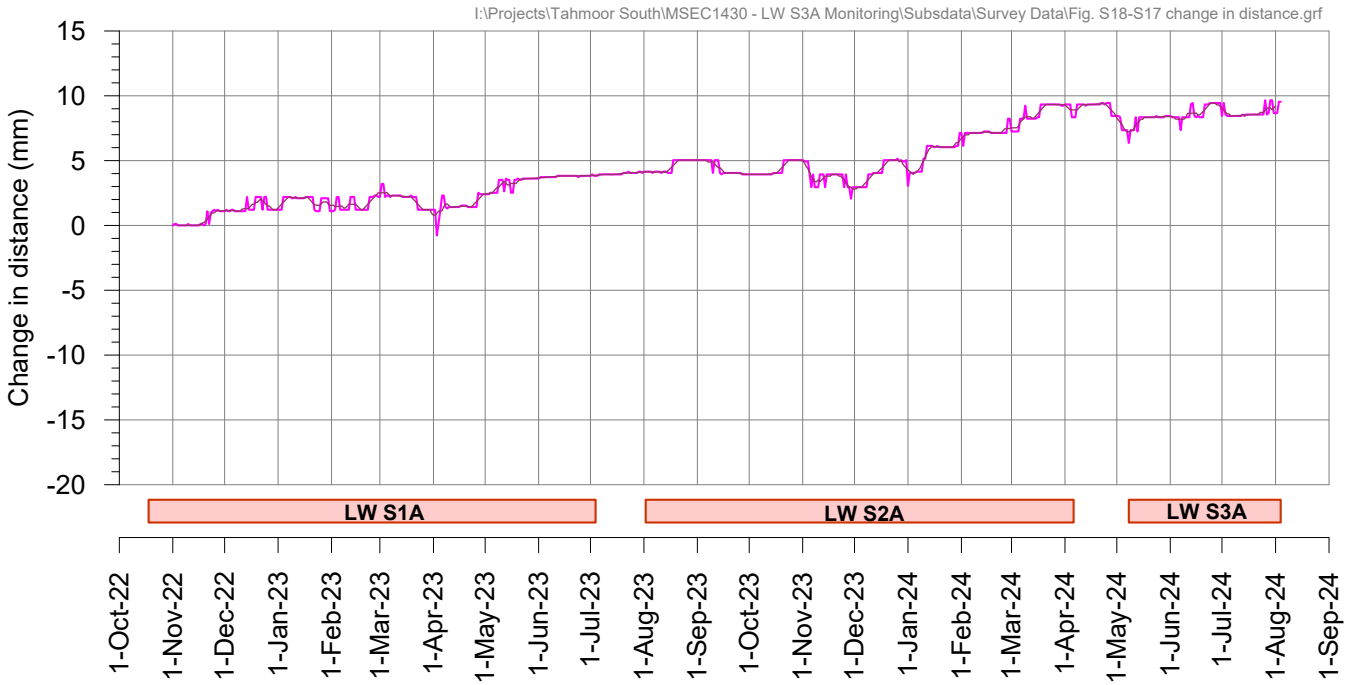


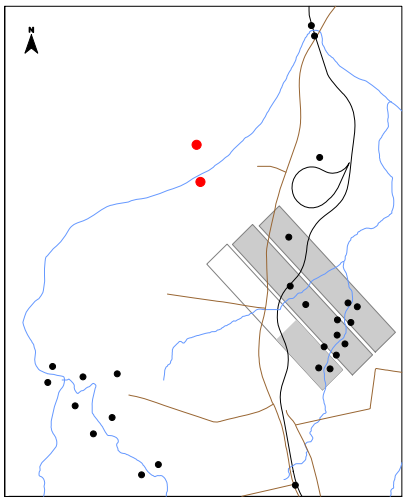
msec

Fig. S18-R10

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Bargo River
Sites S17 and S18

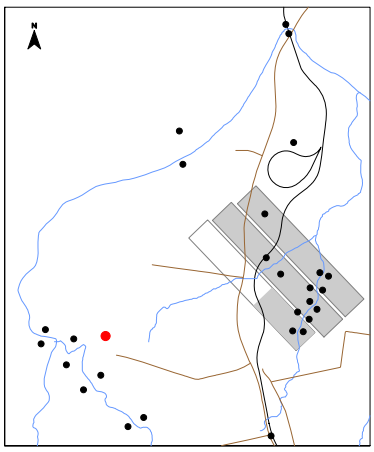




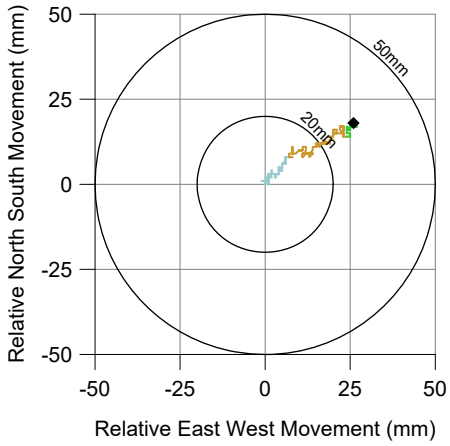
Tahmoor South LW S3A - GNSS Monitoring

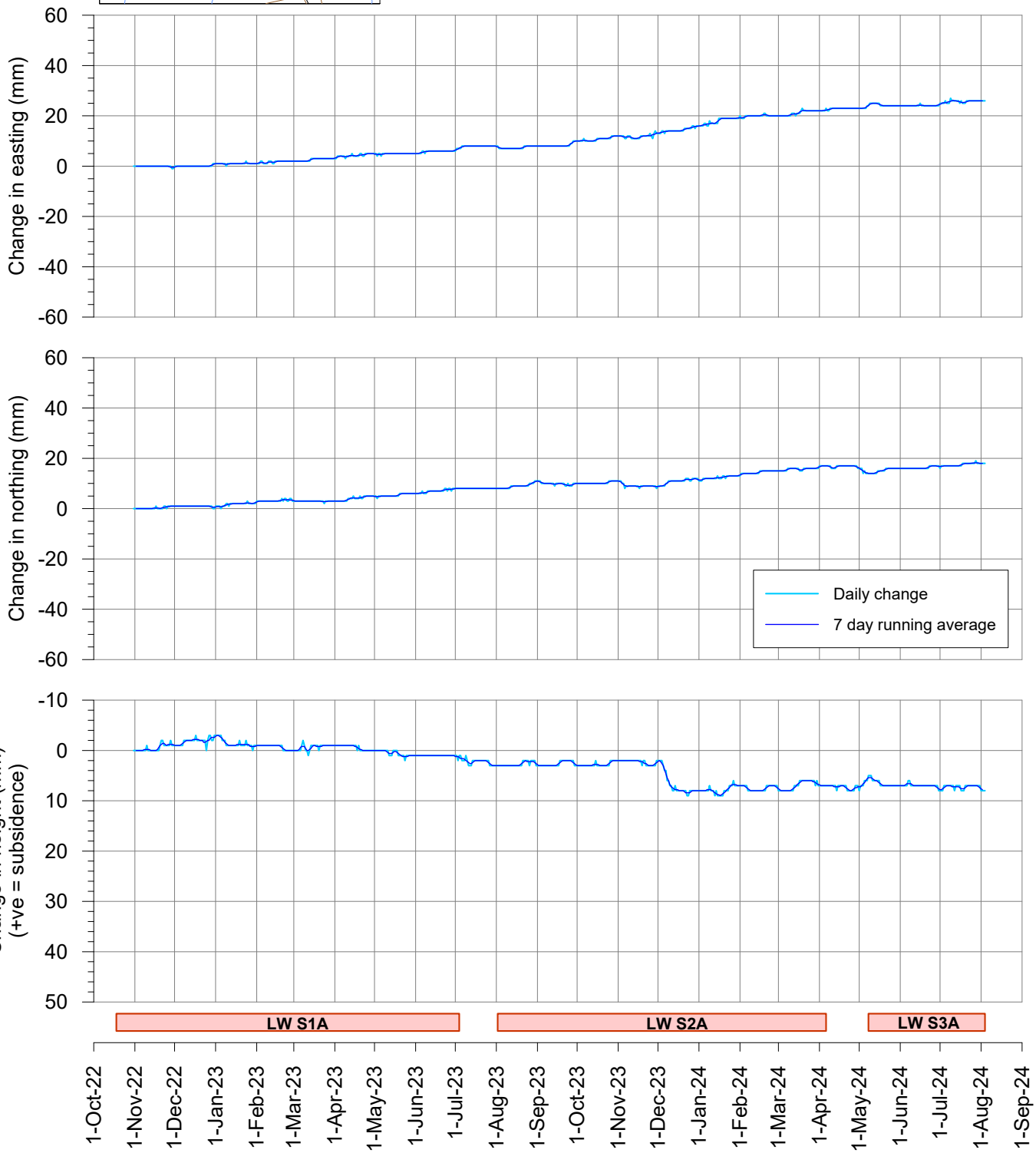
Site S19 near Hornes Creek

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S19 GNSS.grf



During LW S1A
During LW S2A
During LW S3A





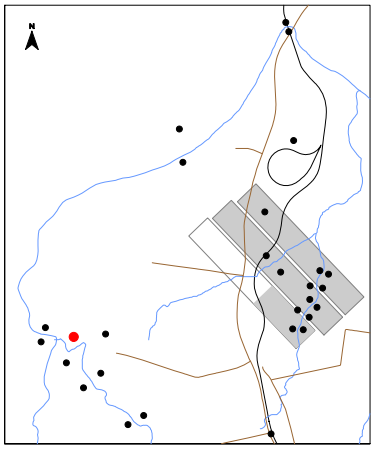
msec

Fig. S19-R10

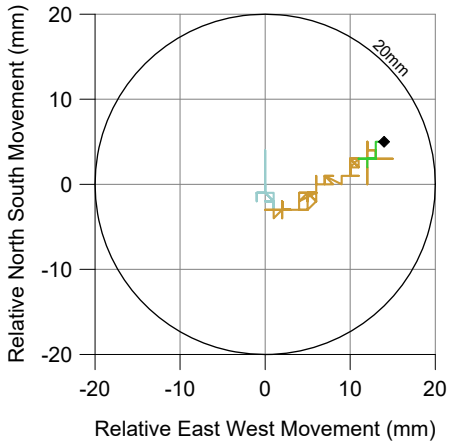
Tahmoor South LW S3A - GNSS Monitoring

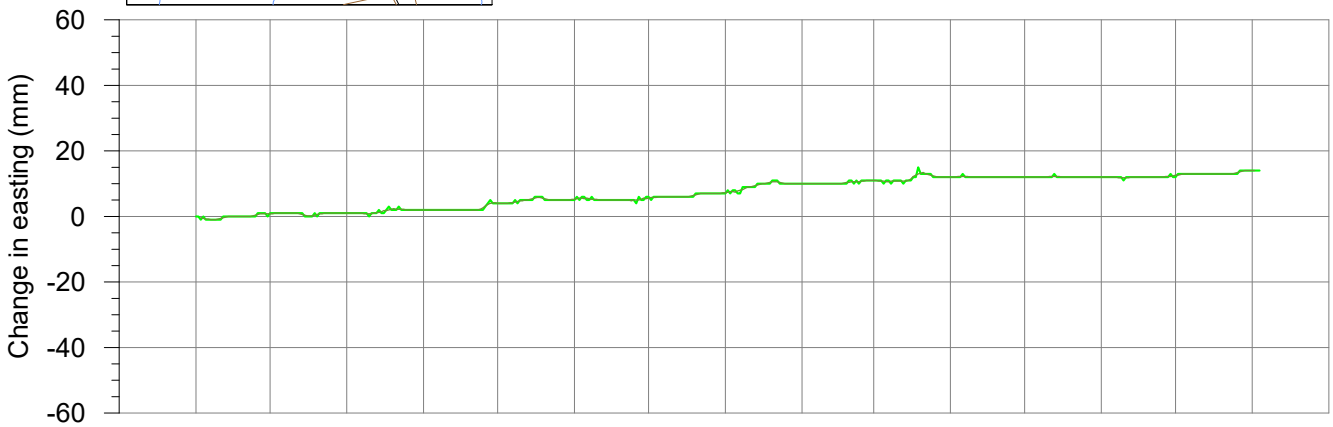
Site S20 on northern side of Hornes Creek

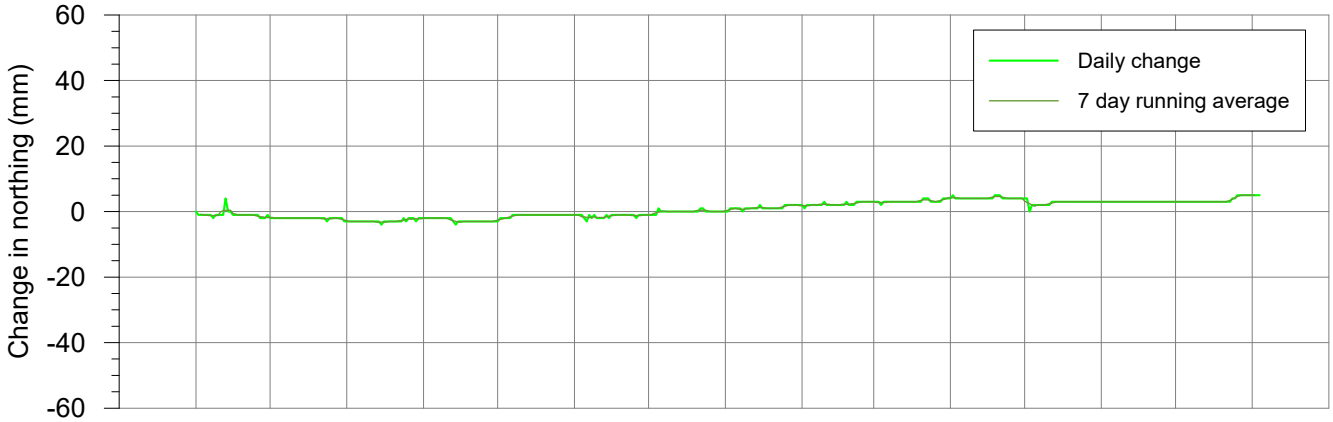
I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S20 GNSS.grf

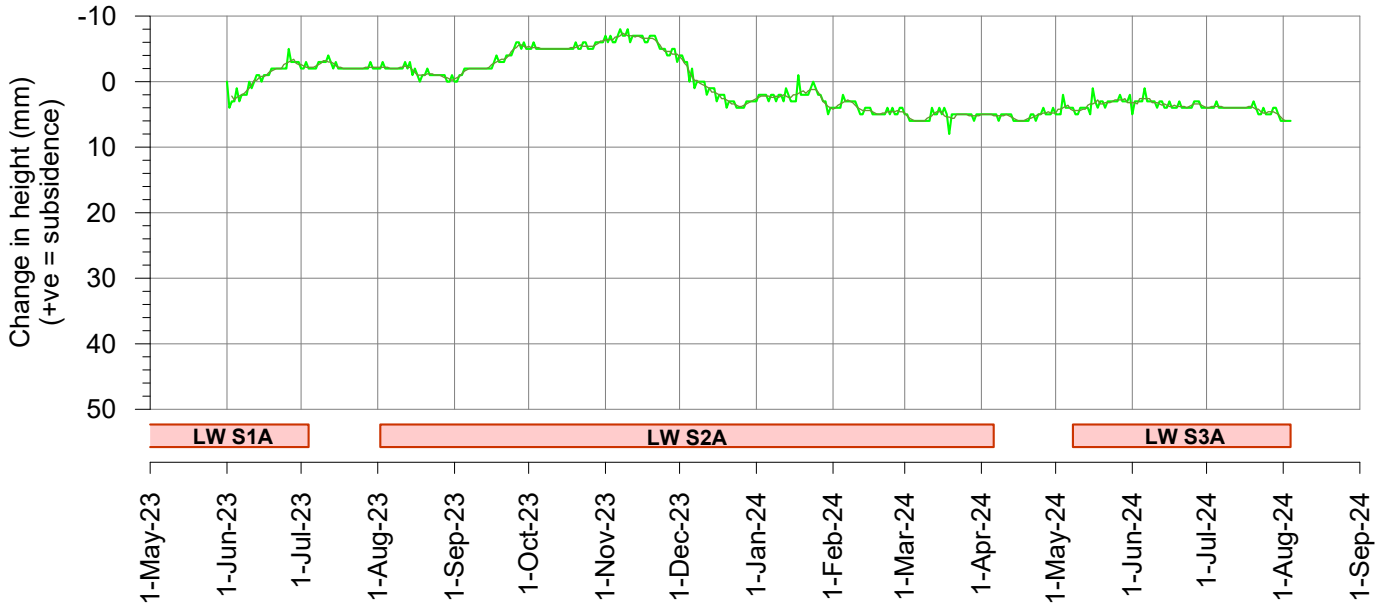


During LW S1A
During LW S2A
During LW S3A









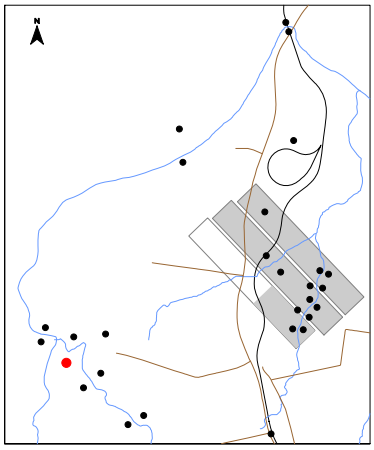
msec

Fig. S20-R10

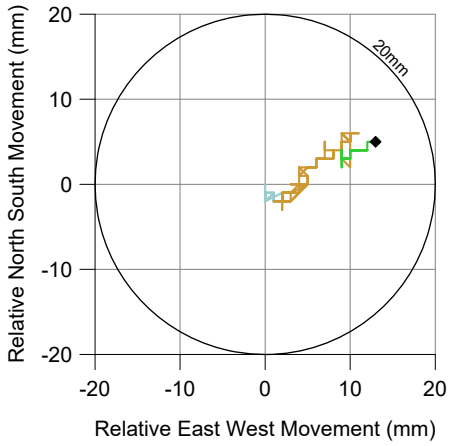
Tahmoor South LW S3A - GNSS Monitoring

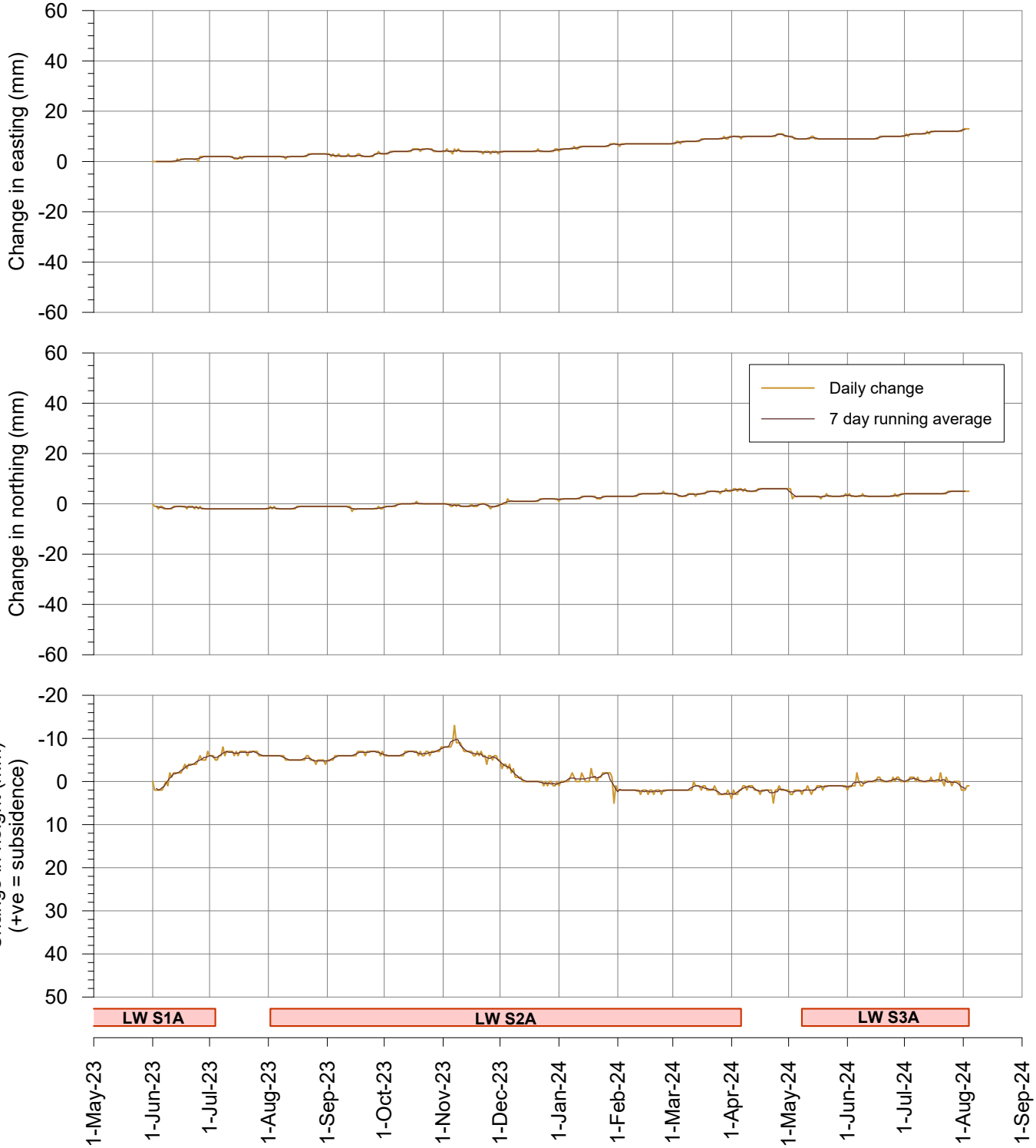
Site S21 on southern side of Hornes Creek

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S21 GNSS.grf



During LW S1A
During LW S2A
During LW S3A



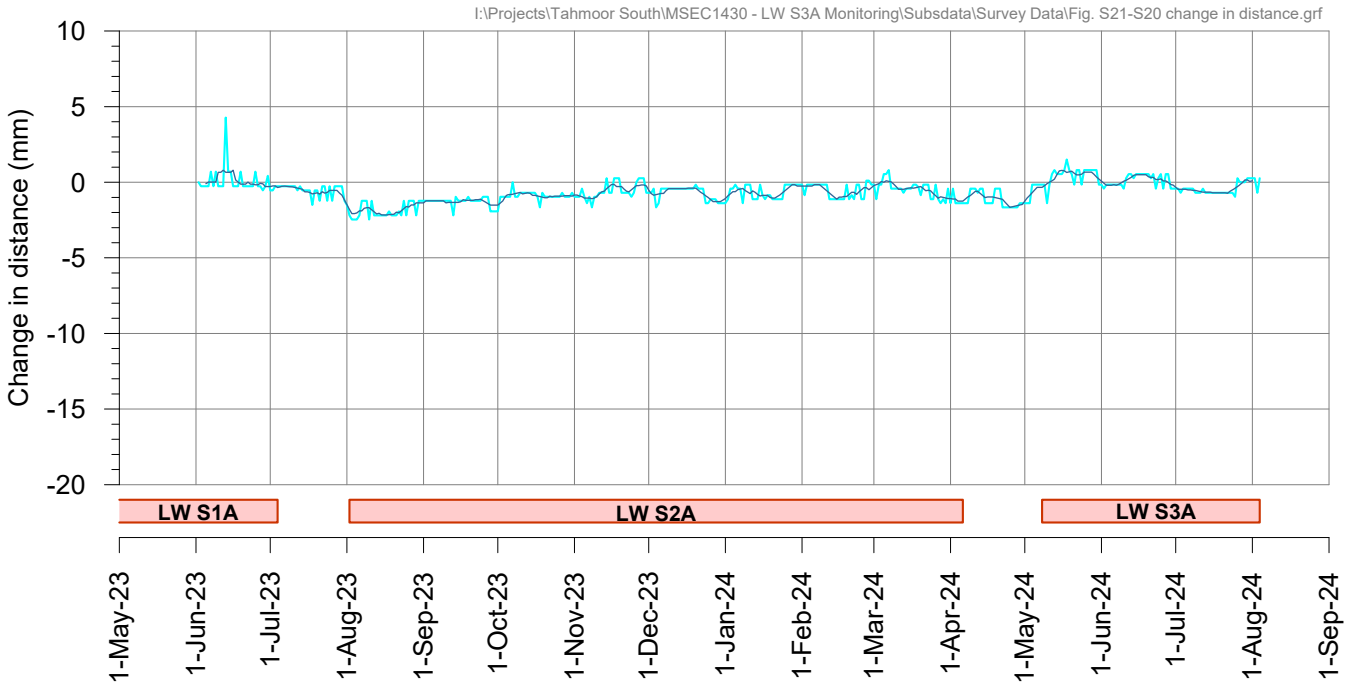


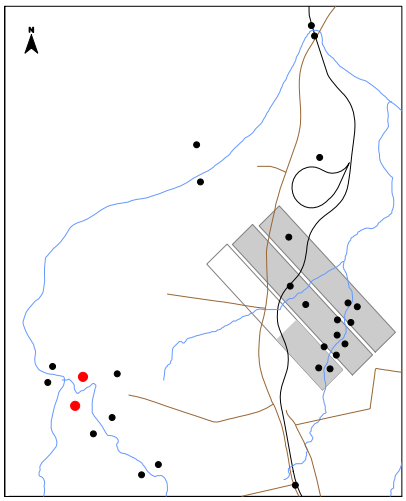
msec

Fig. S21-R10

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Hornes Creek
Sites S20 and S21

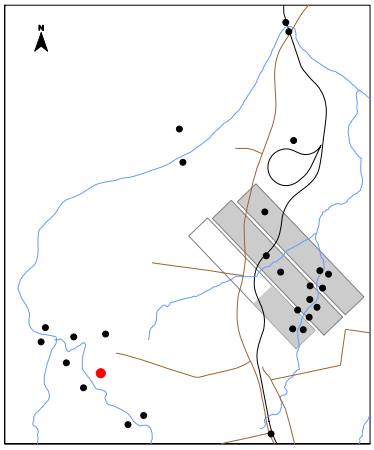




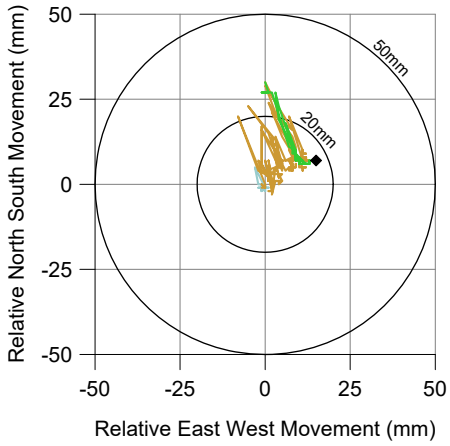
Tahmoor South LW S3A - GNSS Monitoring

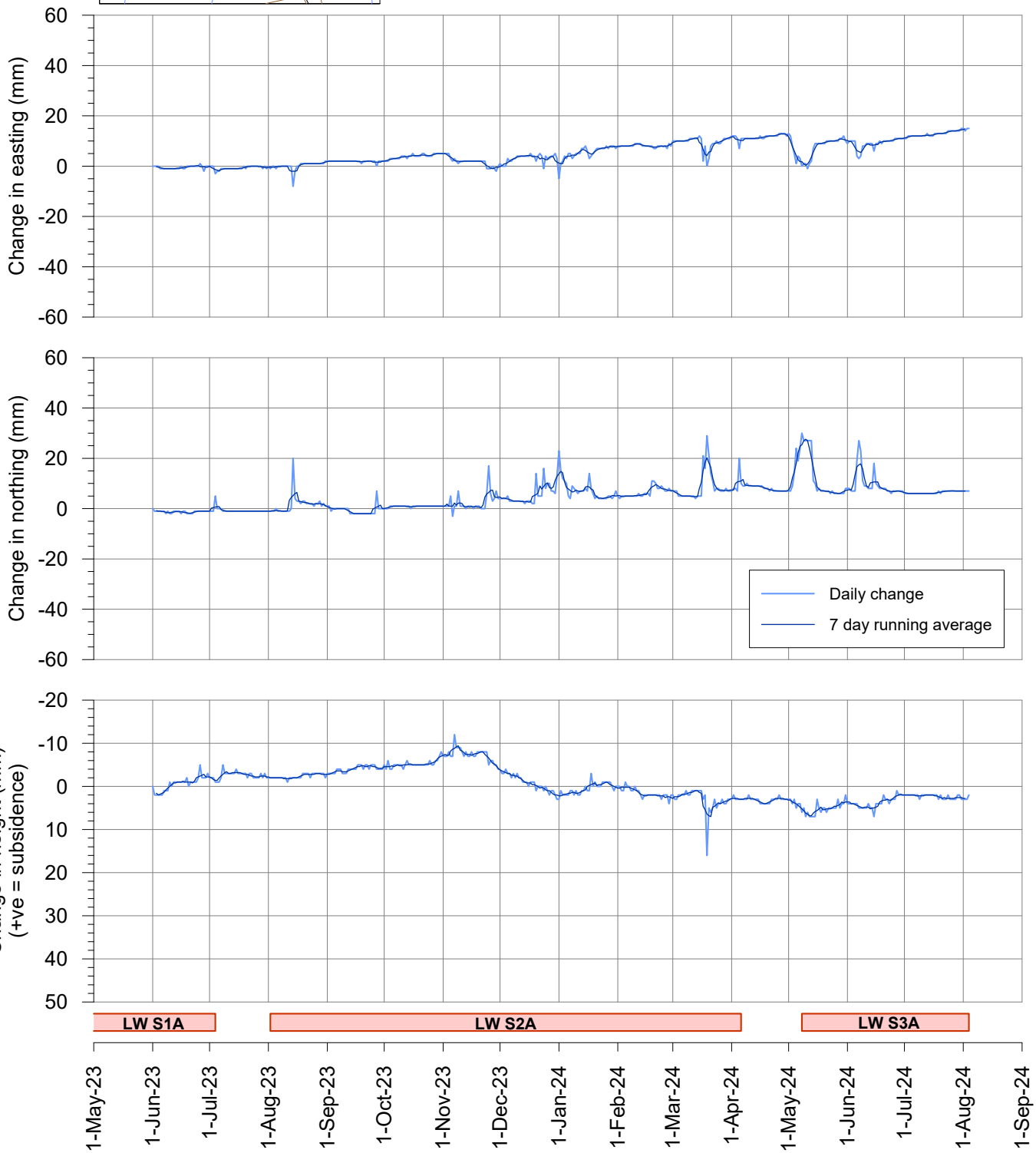
Site S22 on northern side of Hornes Creek

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S22 GNSS.grf



During LW S1A
During LW S2A
During LW S3A





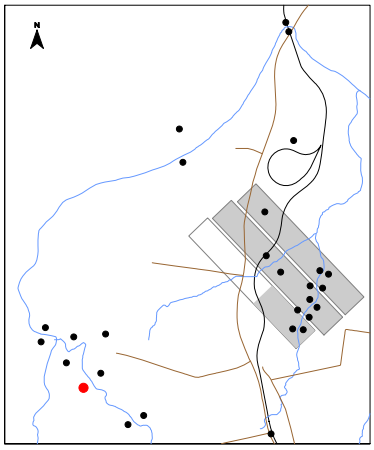
msec

Fig. S22-R10

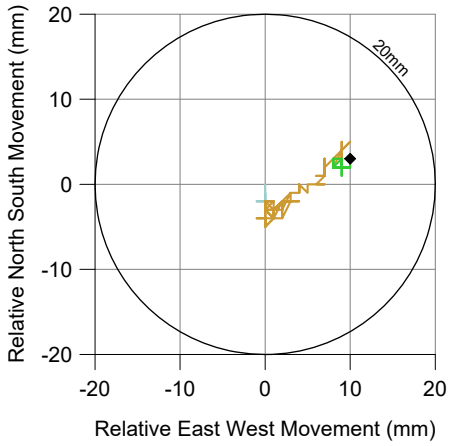
Tahmoor South LW S3A - GNSS Monitoring

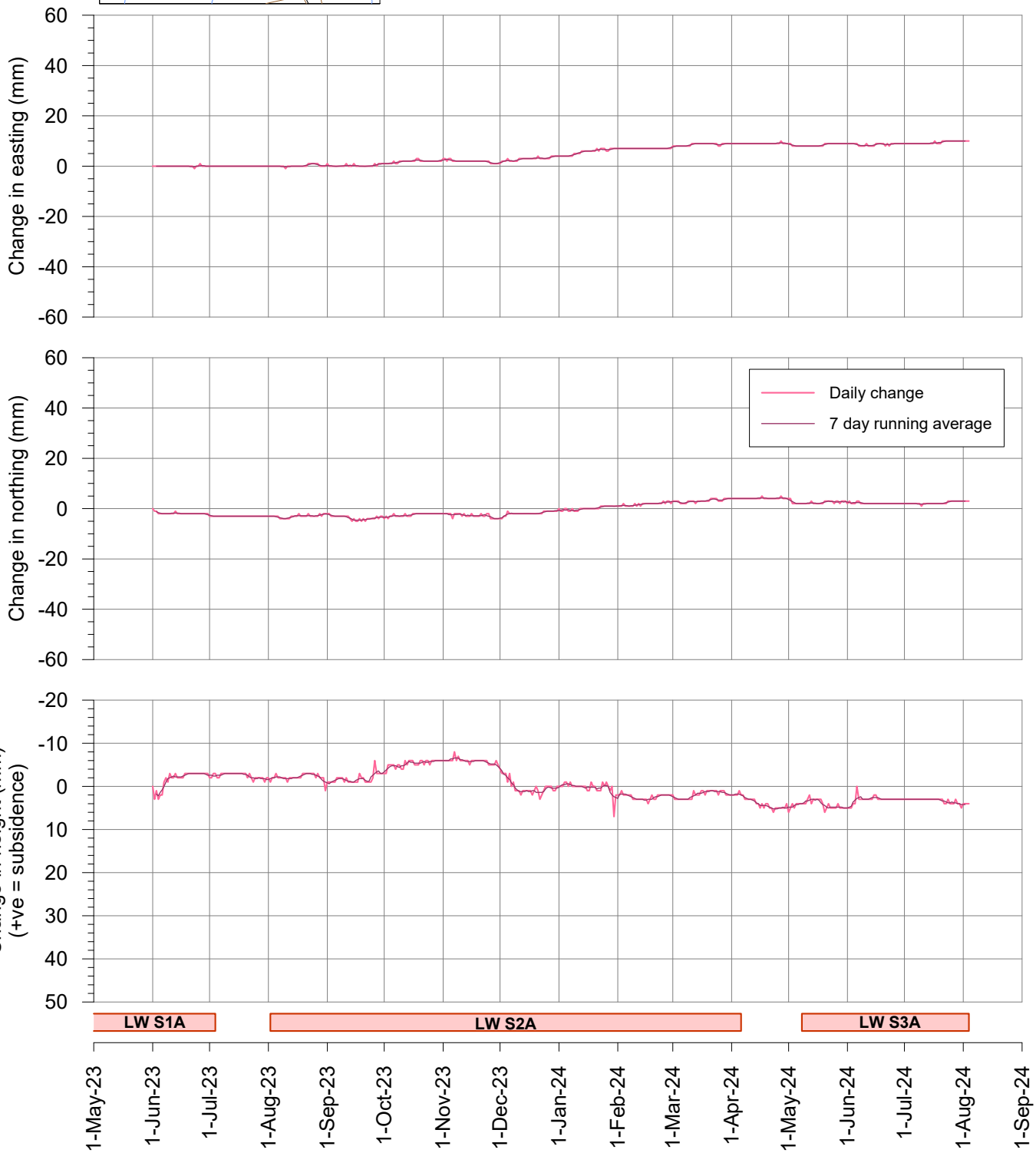
Site S23 on southern side of Hornes Creek

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S23 GNSS.grf



During LW S1A
During LW S2A
During LW S3A



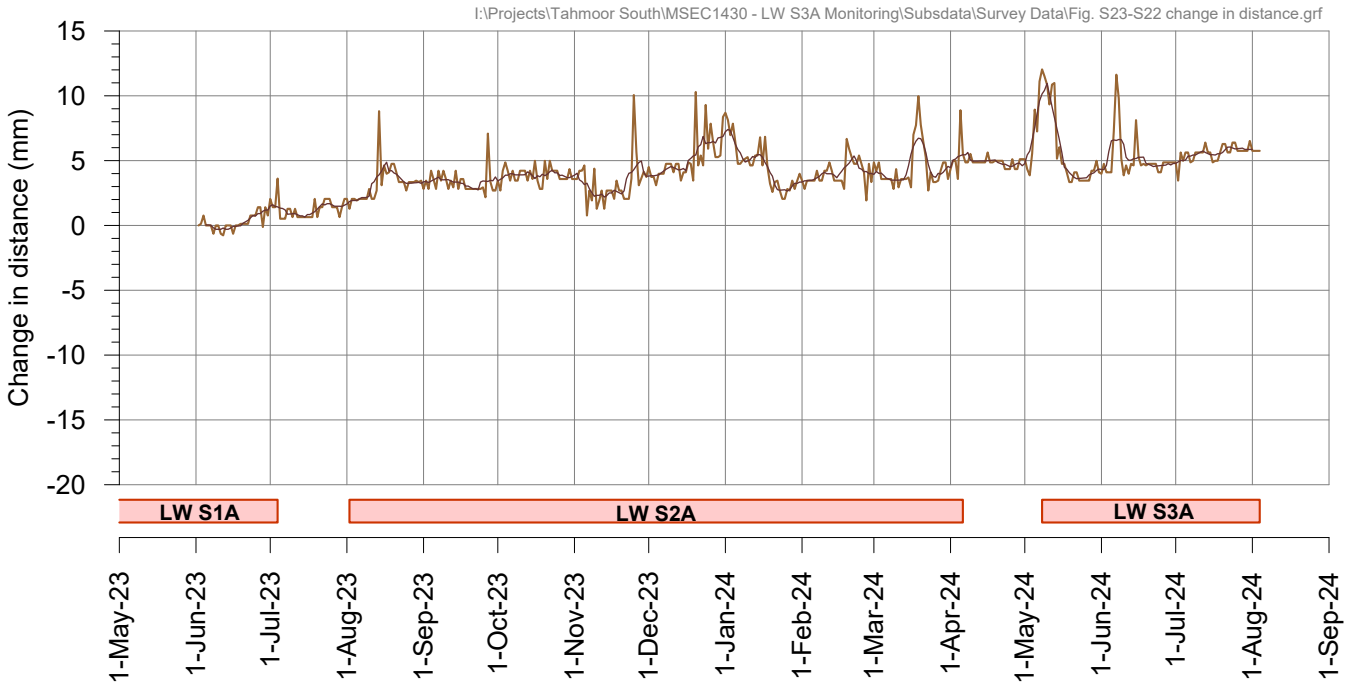


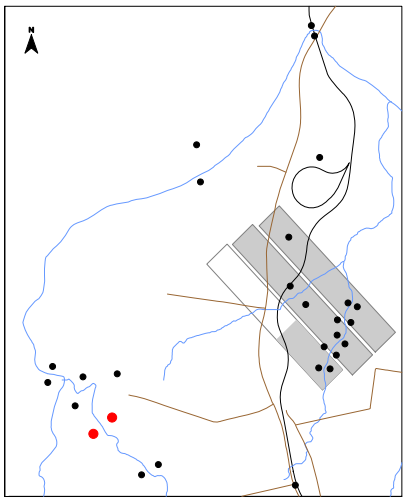
msec

Fig. S23-R10

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Hornes Creek
Sites S22 and S23

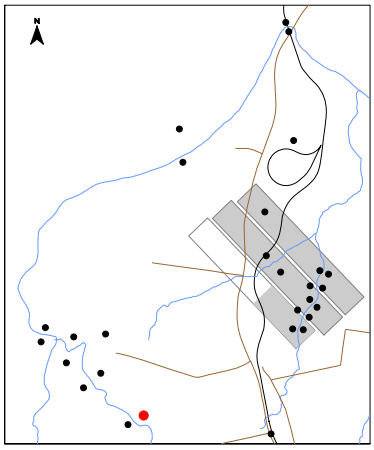




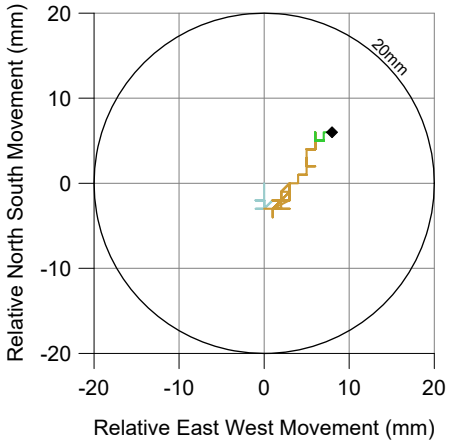
Tahmoor South LW S3A - GNSS Monitoring

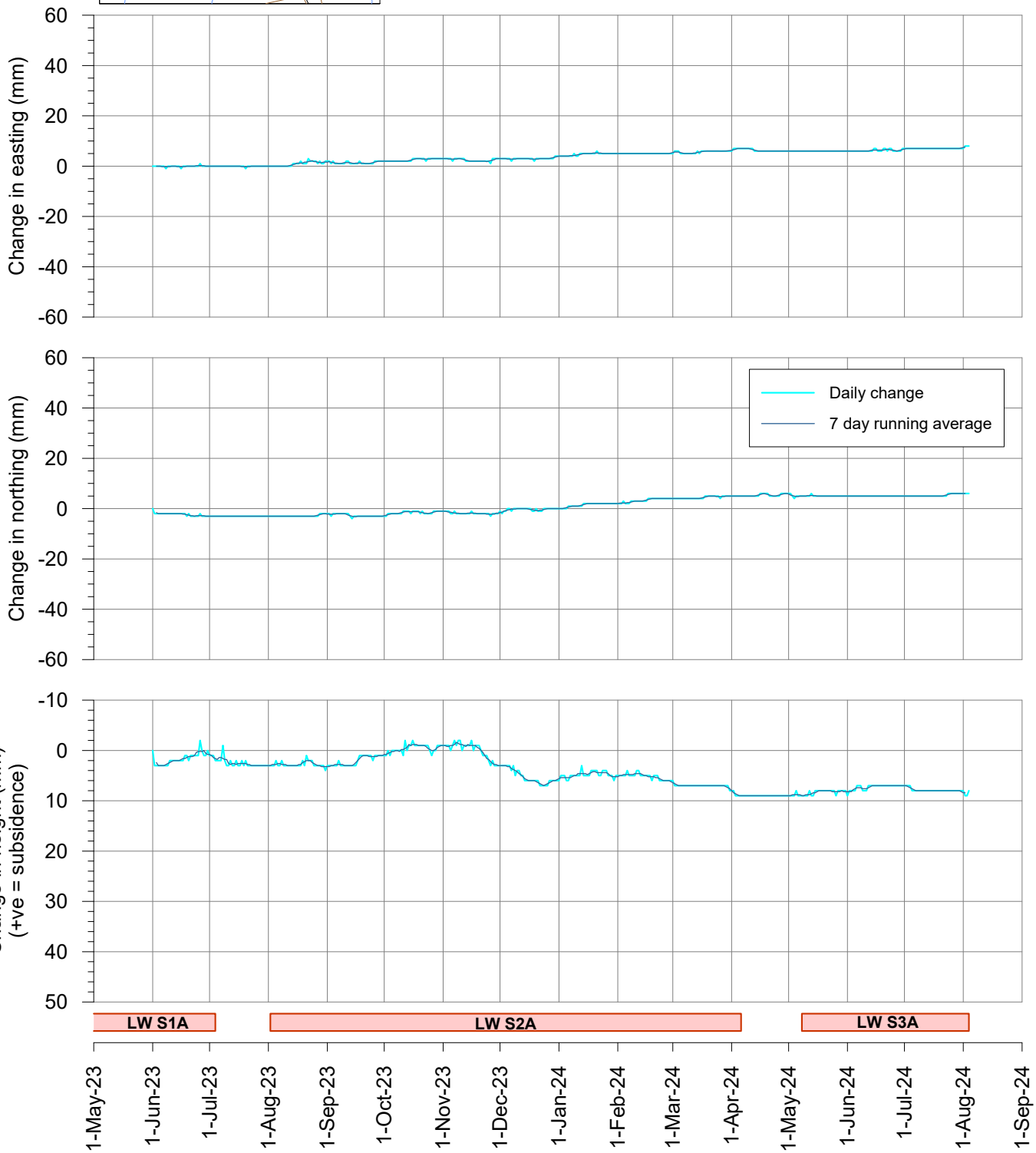
Site S24 on northern side of Hornes Creek

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S24 GNSS.grf









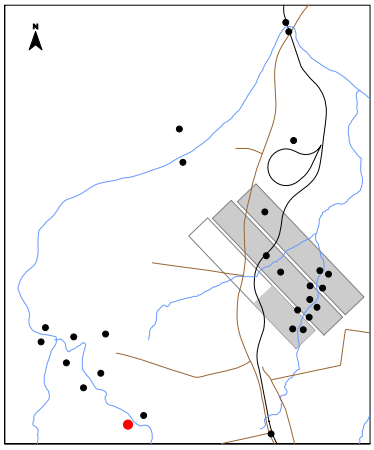
msec

Fig. S24-R10

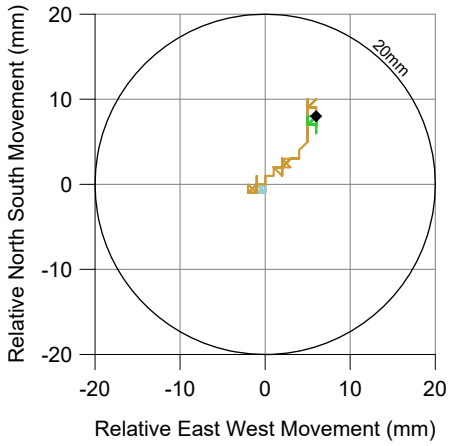
Tahmoor South LW S3A - GNSS Monitoring

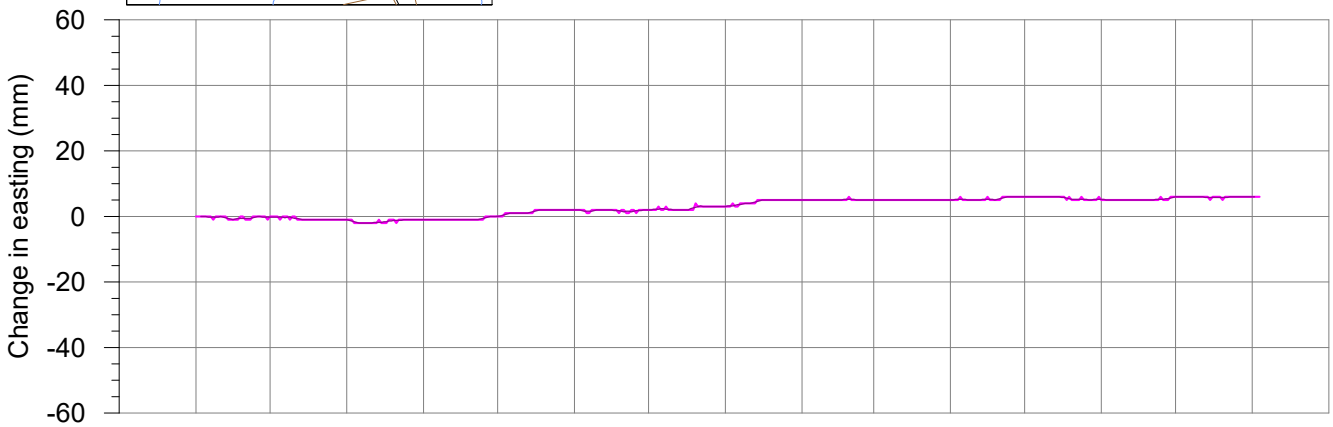
Site S25 on southern side of Hornes Creek

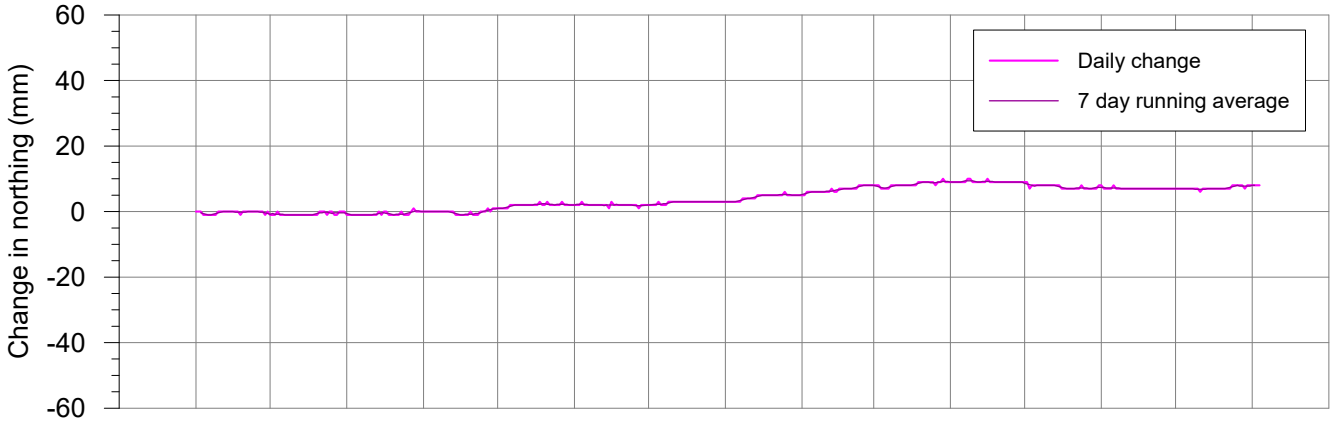
I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S25 GNSS.grf

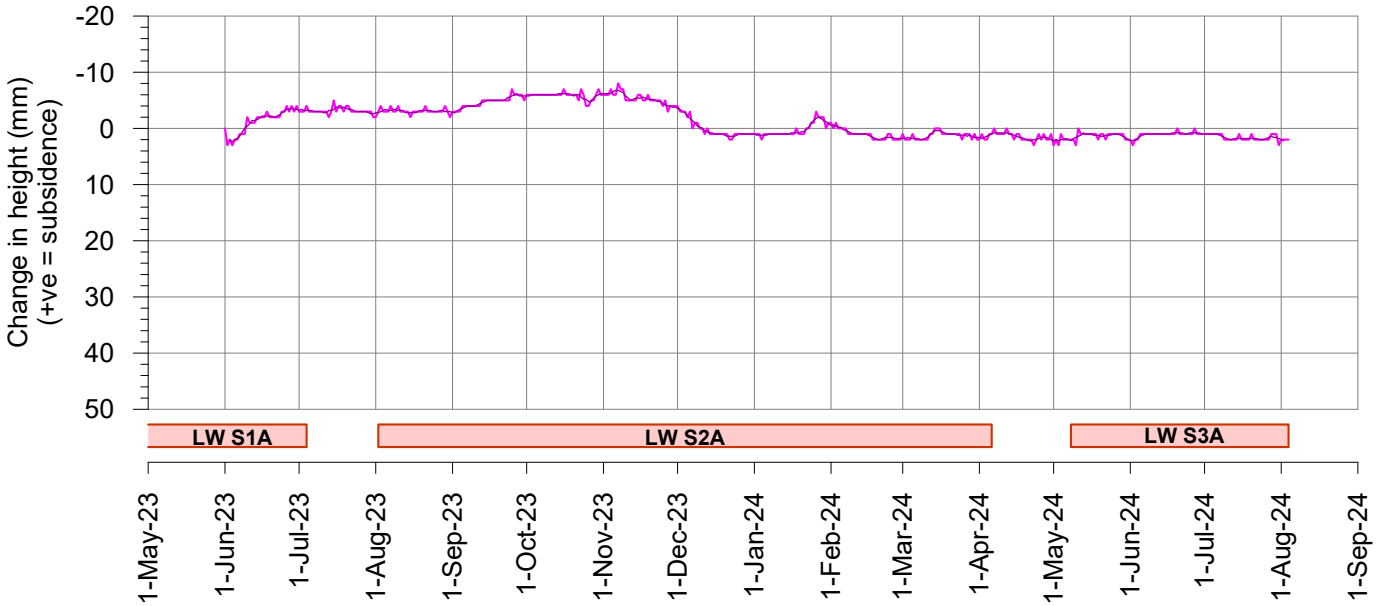


During LW S1A
During LW S2A
During LW S3A







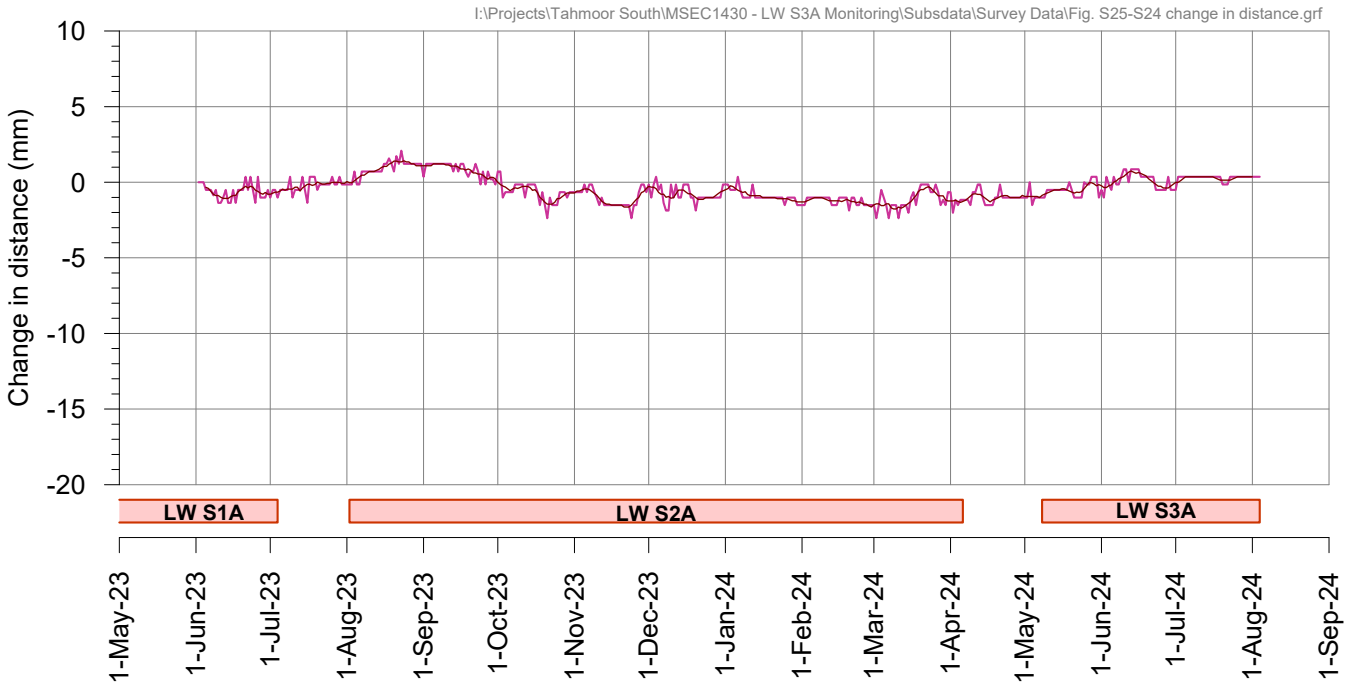


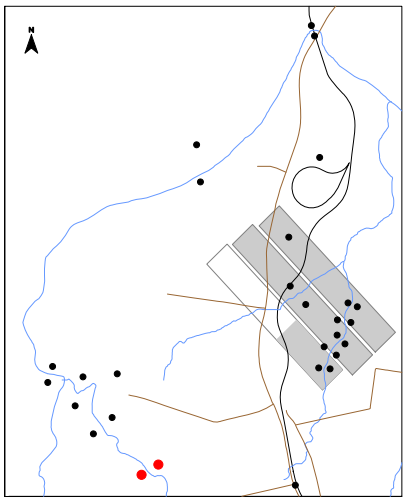
msec

Fig. S25-R10

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Hornes Creek
Sites S24 and S25

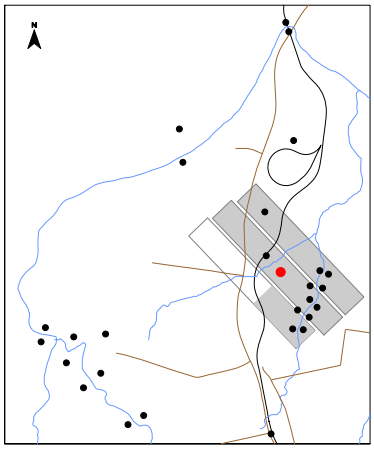




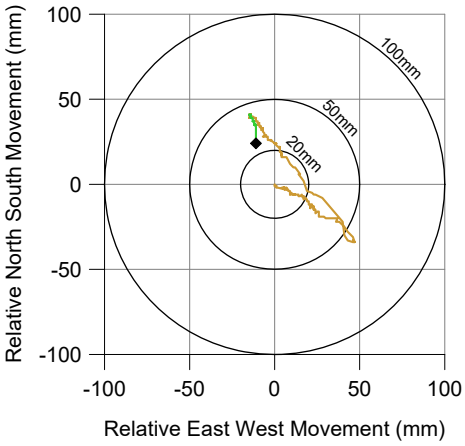
Tahmoor South LW S3A - GNSS Monitoring

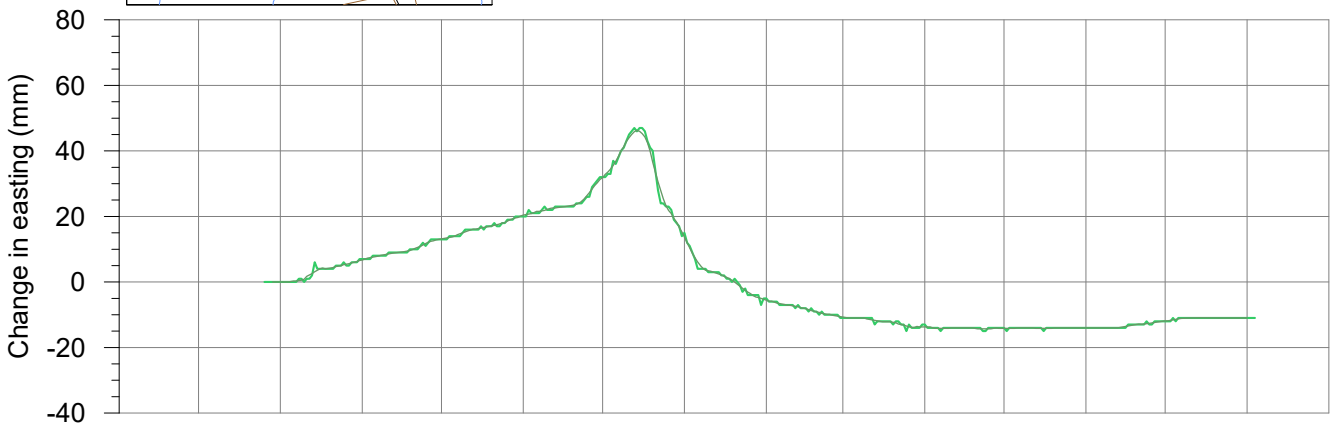
Site S26 above LW S2A

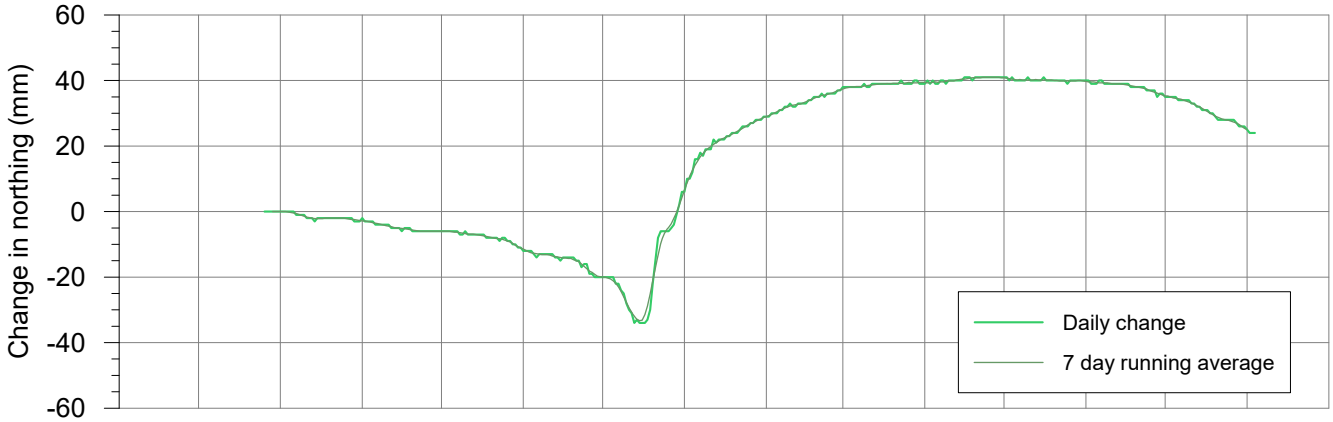
I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S26 GNSS.grf

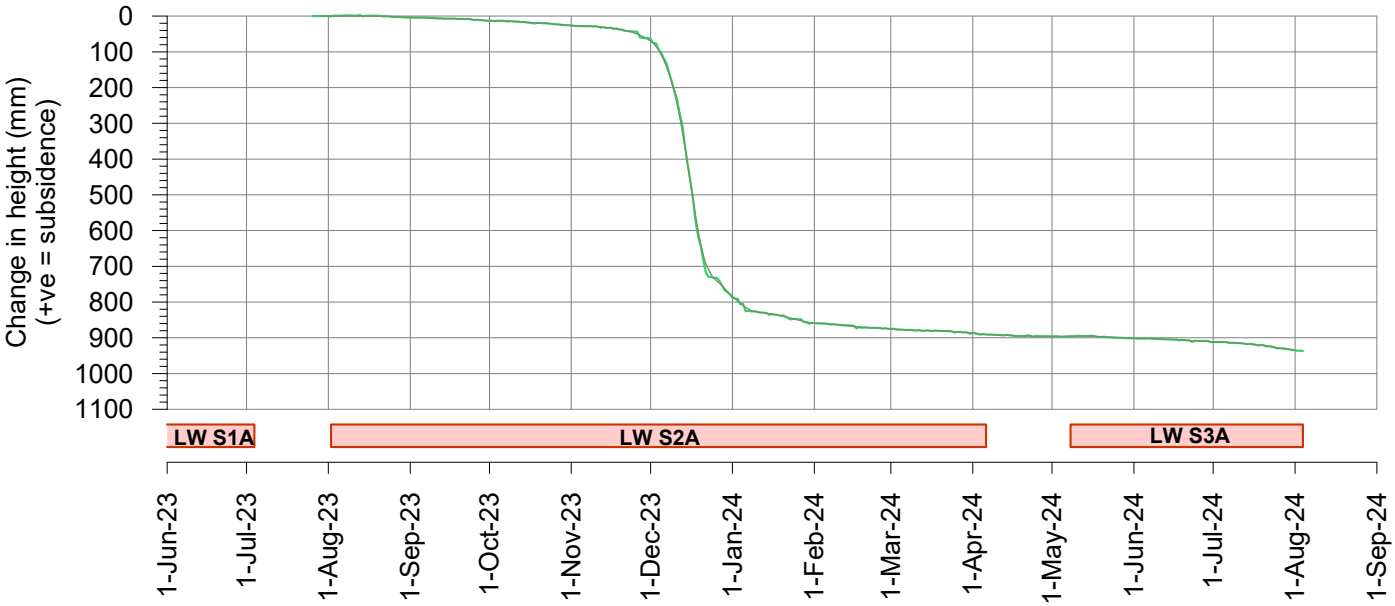


During LW S2A
During LW S3A









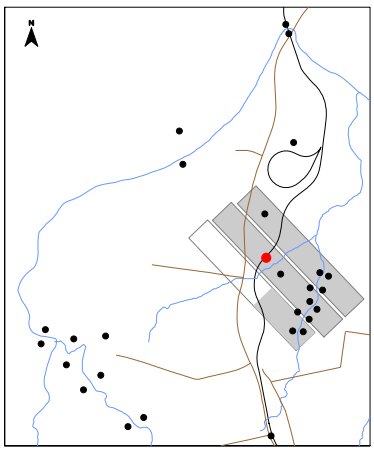
msec

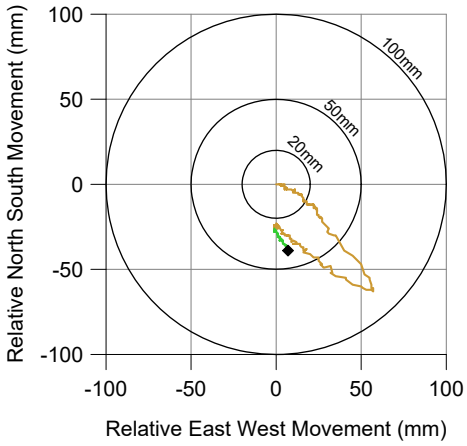
Fig. S26-R10

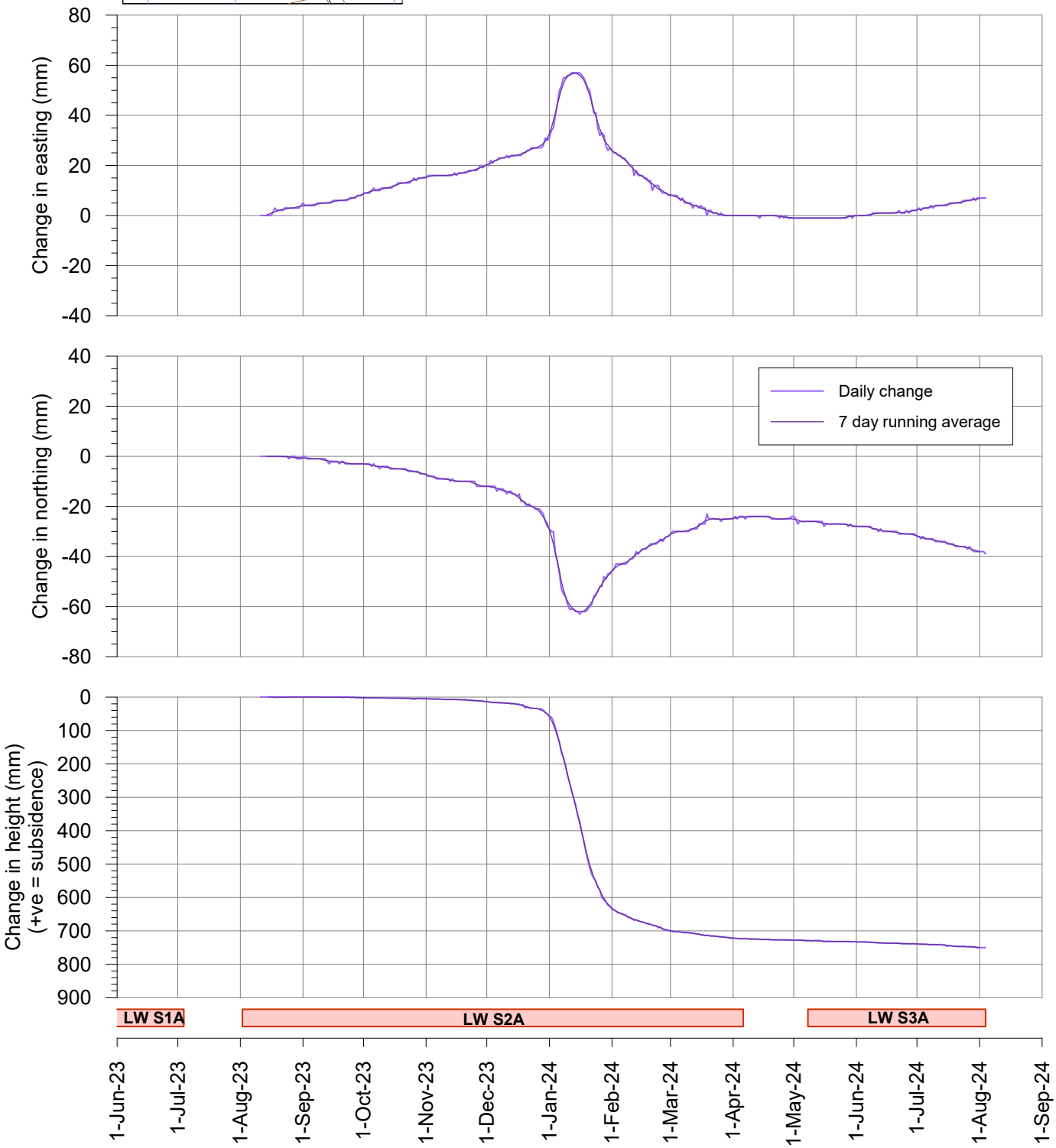
Tahmoor South LW S3A - GNSS Monitoring

Site S27 on railway embankment above LW S2A

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S27 GNSS.grf





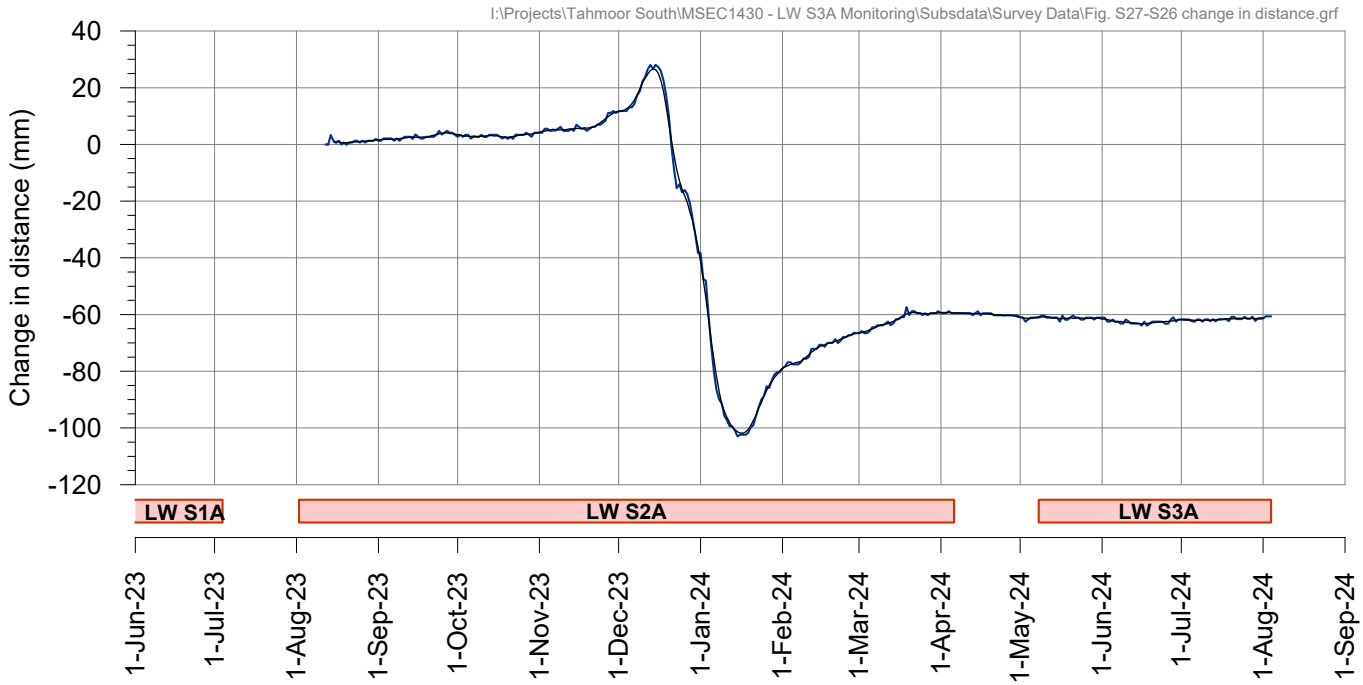


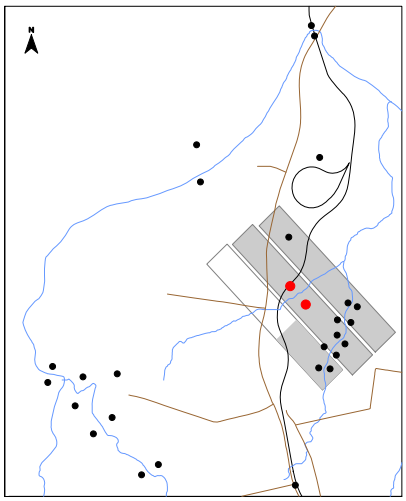
msec

Fig. S27-R10

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Teatree Hollow above LW S2A
Sites S26 and S27

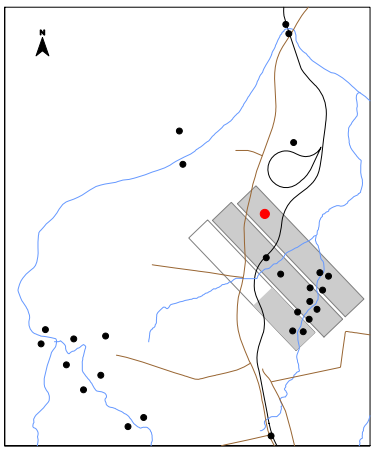




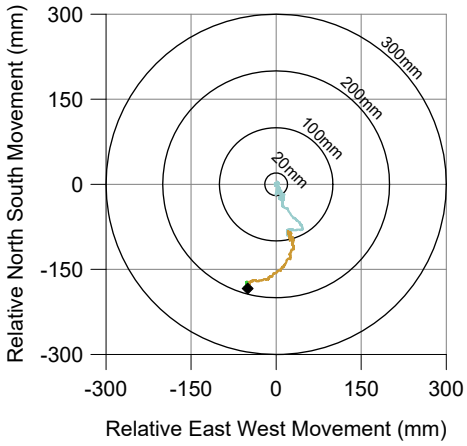
Tahmoor South LW S3A - GNSS Monitoring

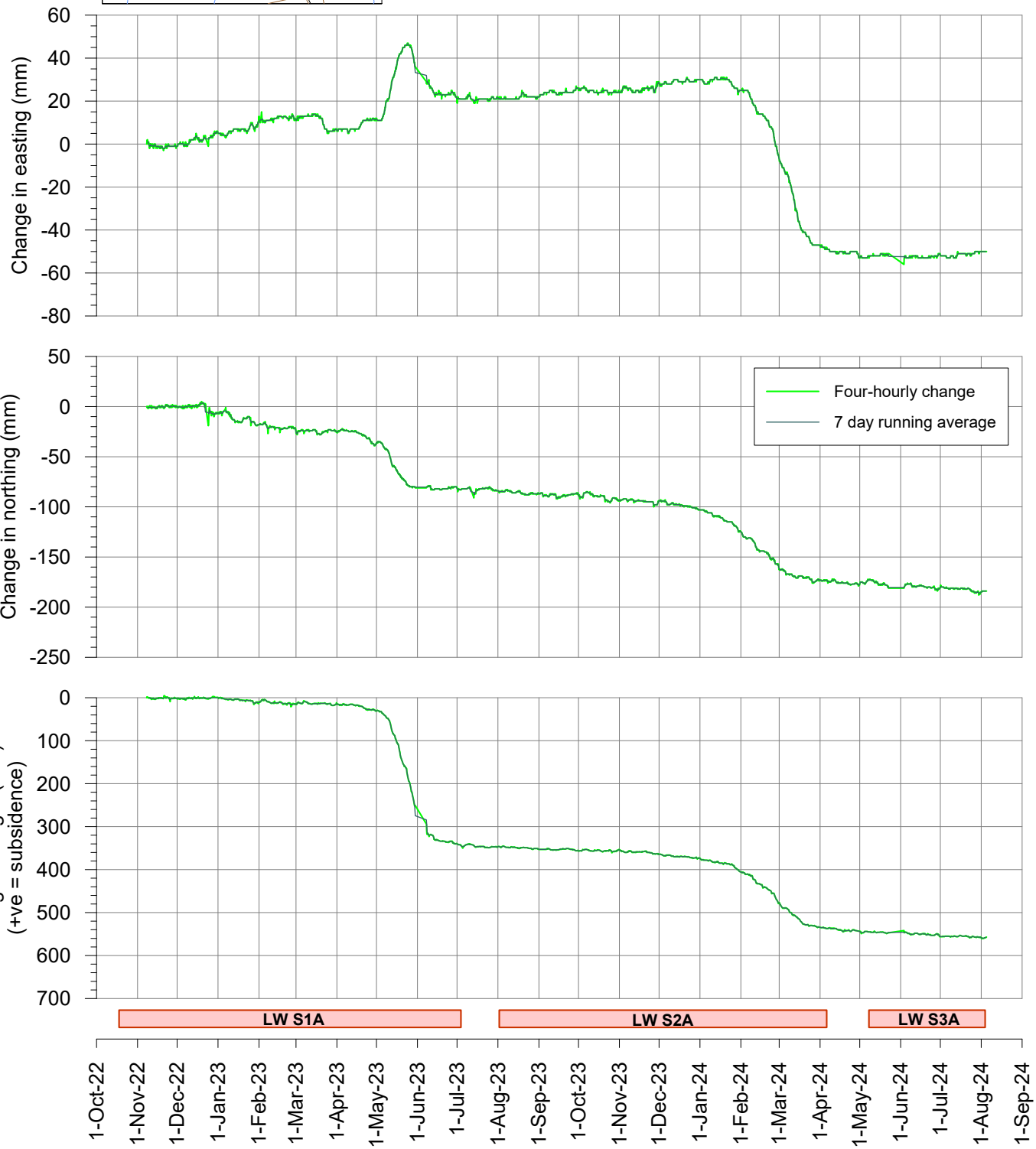
Gantry at Tahmoor Mine site

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. TM GNSS gantry.grf



During LW S1A
During LW S2A
During LW S3A





msec

Fig. TM-R10

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msec mine subsidence ENGINEERING CONSULTANTS
Suite 402, 13 Spring Street, Chatswood NSW 2067
PO Box 302, Chatswood NSW 2057
Tel +61 2 9413 3777
www.minesubsidence.com

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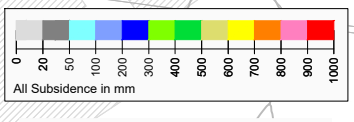
TAHMOOR SOUTH
LWS3A
OBSERVED INCREMENTAL
SUBSIDENCE DUE TO LW S3A

DATE:	SCALE:	DRAWING No:	Rev No
6 Aug 2024	1:10000	MSEC1430-02	10



LW S3A Started : 8-May-2024

LW S3A
LW S1A
LW S2A
LW S4A
LW S5A
LW S6A
1700m
1600m
1500m
1400m
1300m
1200m
1100m
1000m
900m
800m
700m
600m
500m
400m
300m
200m
100m
0m
1-Aug-2024
LWS3A Started : 8-May-2024
BARGO R
CALOOLA RD
REMEMBRANCE DR
MAIN SOUTHERN RAILWAY
GREAT SOUTHERN ROAD
YARRAN ROAD
CHARLIES POINT RD
TEATREE HOLLOW
TRIBUTARY OF TEA TREE HOLLOW
Hidden creek
Gantry
Dam S2
Dam S3
Dam S4
625946
625925
625937
624471
853038
S01
S02
S03
S04
S05
S06
S07
S08
S09
S10
S26
S27
N

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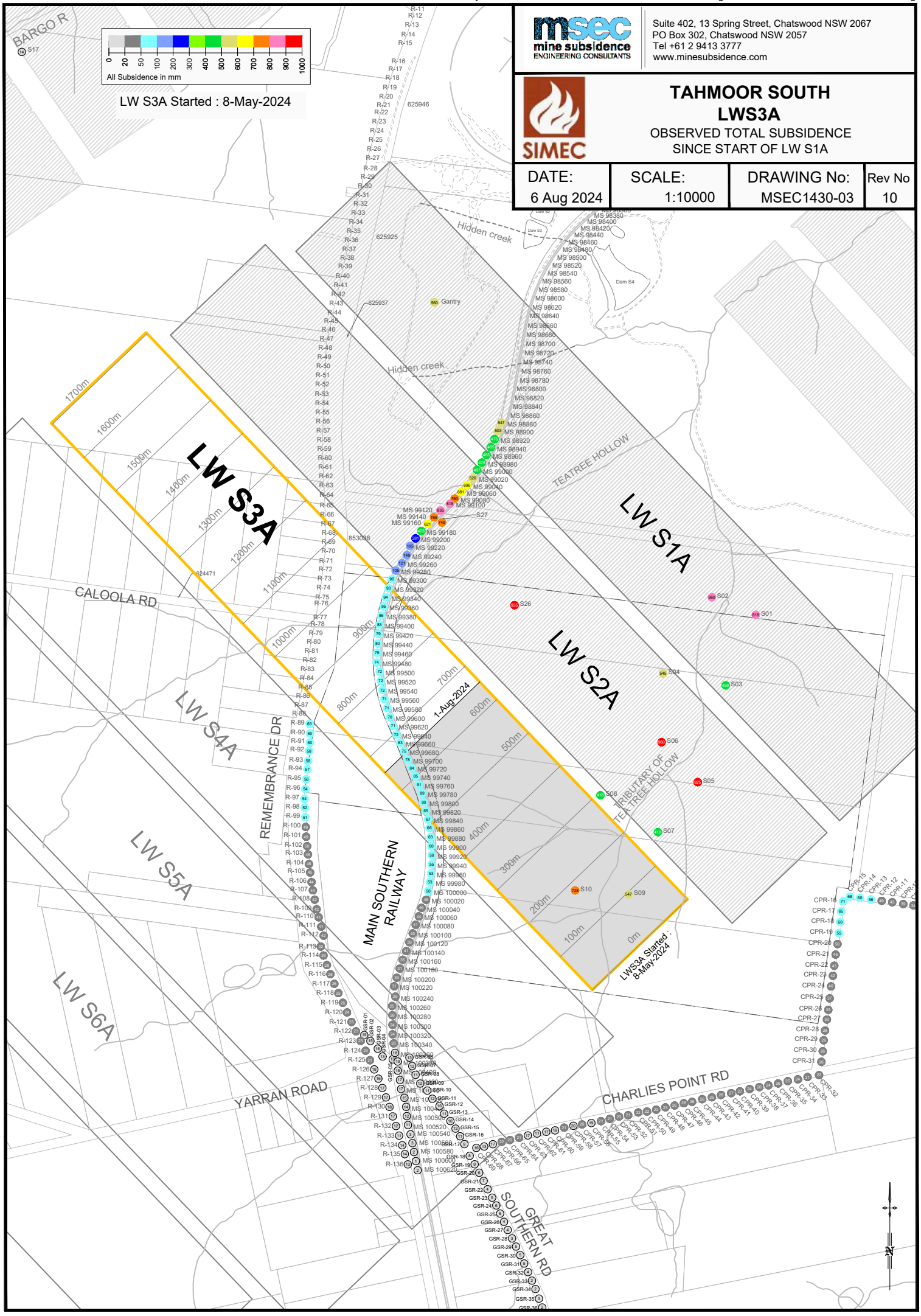

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Suite 402, 13 Spring Street, Chatswood NSW 2067
PO Box 302, Chatswood NSW 2057
Tel +61 2 9413 3777
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TAHMOOR SOUTH LWS3A

OBSERVED TOTAL SUBSIDENCE SINCE START OF LW S1A

DATE:	SCALE:	DRAWING No:	Rev No
6 Aug 2024	1:10000	MSEC1430-03	10

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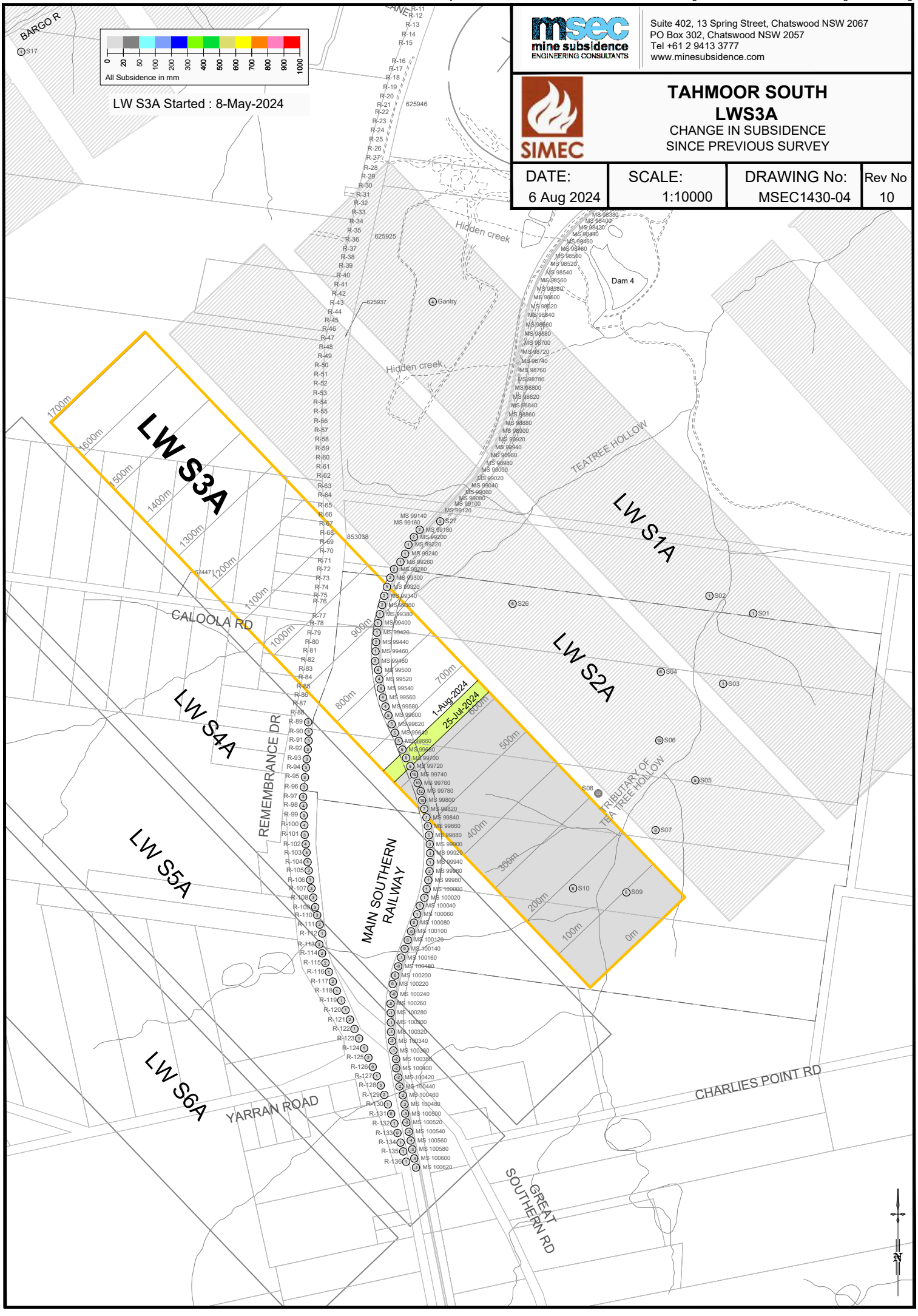
TAHMOOR SOUTH LWS3A

CHANGE IN SUBSIDENCE SINCE PREVIOUS SURVEY

DATE:	SCALE:	DRAWING No:	Rev No
6 Aug 2024	1:10000	MSEC1430-04	10



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TAHMOOR SOUTH
LWS3A
OBSERVED INCREMENTAL ABSOLUTE HORIZONTAL MOVEMENT SINCE START OF LW S3A

DATE:	SCALE:	DRAWING No:	Rev No
6 Aug 2024	1:10000	MSEC1430-05	10

LW S3A Started : 8-May-2024

LEGEND
- Horizontal displacements shown in mm at survey mark locations
- GNSS horizontal displacements shown in mm at unit locations

FIRE ROAD NO P1
BARGO RIVER
OLIVE LANE
Hidden creek
Gantry
TEATREE HOLLOW
LW S1A
LW S2A
LW S3A
LW S4A
LW S5A
LW S6A
CALOOLA RD
REMEMBRANCE DR
MAIN SOUTHERN RAILWAY
TRIBUTARY OF TEATREE HOLLOW
YARRAN ROAD
GREAT SOUTHERN RD
CHARLIES POINT RD
1-Aug-2024
LWS3A Started : 8-May-2024
1700m
1600m
1500m
1400m
1300m
1200m
1100m
1000m
900m
800m
700m
600m
500m
400m
300m
200m
100m
0m
S18
S17
S27
S26
S02
S01
S04
S03
S06
S05
S08
S07
S10
S09
Gantry

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TAHMOOR SOUTH
LWS3A

OBSERVED TOTAL ABSOLUTE HORIZONTAL MOVEMENT SINCE START OF LW S1A

DATE:	SCALE:	DRAWING No:	Rev No
6 Aug 2024	1:10000	MSEC1430-06	10

LW S3A Started : 8-May-2024

LEGEND

- Horizontal displacements shown in mm at survey mark locations
- GNSS horizontal displacements shown in mm at unit locations

FIRE ROAD NO P1
BARGO RIVER
OLIVE LANE
Hidden creek
Gantry
192
Hidden creek
TEATREE HOLLOW
TRIBUTARY OF TEA TREE HOLLOW
LW S3A
LW S1A
LW S2A
LW S4A
LW S5A
LW S6A
1700m
1600m
1500m
1400m
1300m
1200m
1100m
1000m
900m
800m
700m
600m
500m
400m
300m
200m
100m
0m
1-Aug-2024
LW S3A Started : 8-May-2024
S27 Installed after LWS1A
40
S26 Installed after LWS1A
27
S01
281
S02
56
S03
244
S04
51
S05
297
S06
38
S07
229
S08
62
S09
243
S10
159
CALOOLA RD
REMEMBRANCE DR
MAIN SOUTHERN RAILWAY
YARRAN ROAD
GREAT SOUTHERN RD
CHARLIES POINT RD
N

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Tel +61 2 9413 3777
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TAHMOOR SOUTH
LWS3A

OBSERVED PATH OF TOTAL ABSOLUTE HORIZONTAL MOVEMENT SINCE START OF LW S1A

DATE:	SCALE:	DRAWING No:	Rev No
6 Aug 2024	1:10000	MSEC1430-07	10

LW S3A Started : 8-May-2024

LEGEND

- Path of horizontal movement
- Path of horizontal movement since last survey
- Path of GNSS horizontal movement during LW S1A
- Path of GNSS horizontal movement during LW S2A
- Path of GNSS horizontal movement during LW S3A
- Path of GNSS horizontal movement since last survey

LW S3A
LW S1A
LW S2A
LW S4A
LW S5A
LW S6A
1700m
1600m
1500m
1400m
1300m
1200m
1100m
1000m
800m
700m
600m
500m
400m
300m
200m
100m
0m
1-Aug-2024
LWS3A Started : 8-May-2024
FIRE ROAD NO P1
BARGO RIVER
OLIVE LANE
Hidden creek
Hidden creek
Gantry
TEATREE HOLLOW
CALOOLA RD
REMEMBRANCE DR
MAIN SOUTHERN RAILWAY
TRIBUTARY OF TEATREE HOLLOW
YARRAN ROAD
GREAT SOUTHERN RD
CHARLIES POINT RD
S01
S02
S03
S04
S05
S06
S07
S08
S09
S10
S17
S18
S26
S27

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PO Box 302, Chatswood NSW 2057
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TAHMOOR SOUTH
LW S3A

REMEMBRANCE DRIVE CUTTING (RC1)

DATE:	SCALE:	DRAWING No:	Rev No
6 Aug 2024	as shown	MSEC1430-08	10

0m 25m 50m
SCALE

LWS3A

MSR

800m

700m

1-Aug-2024

LWS4A

REMEMBRANCE DR

LW S5A

N

LW S3A Started : 8-May-2024

RAILWAY TRACKS ARE INDICATIVE

1m SURFACE LEVEL CONTOURS

Latest Survey 29-Jul-2024

mm Incremental Subsidence

Horizontal displacement of survey marks since start of LW S3A

mm Nominal Survey Accuracy
Absolute ± 14mm

Change in horizontal distance between survey marks

mm Closure

mm Opening

Summary	
Monitoring period	24 August 2024 to 30 August 2024
Length of extraction of LW S3A	871 metres on 29 August 2024 LW commenced extraction on 8 May2024
Distance travelled by longwall since previous report	62 metres in the last week (since 22 August 2024)
Distance to completion of LW S3A	833 metres

Summary of observed ground movements

Subsidence Parameter		Maximum observed during LW S3A	Location
Subsidence (mm)	Inc Total	694 983	GNSS S10 GNSS S26
Tilt (mm/m)	Inc Total	1.8 9.3	Main Southern Railway Main Southern Railway
Hogging Curvature (km^{-1})	Inc Total	0.14 0.21	Main Southern Railway Remembrance Drive
Sagging Curvature (km^{-1})	Inc Total	-0.13 -0.20	Main Southern Railway Remembrance Drive
Tensile Strain (mm/m)	Inc Total	0.3 0.6	Remembrance Drive Main Southern Railway
Compressive Strain (mm/m)	Inc Total	-1.6 -3.3	Main Southern Railway Remembrance Drive
Subsidence since previous survey (mm)		73 mm	MSR since 19 August

Actions

HAVE ANY DEFINED TRIGGERS BEEN REACHED SINCE PREVIOUS REPORT?	YES. Compressive ground strains have exceeded the early warning trigger for Telstra's optical fibre cable where it runs along the Main Southern Railway at 99.62 km. A minor loss is observed from remote monitoring.
IS ANY URGENT ACTION REQUIRED?	NO. Tahmoor Coal plans to relieve stresses and deformations in the cable on 3 September. Tahmoor Coal is also managing related subsidence impacts along the Railway and at the Australian Wildlife Sanctuary.

This monitoring report provides the results of the latest ground surveys during the mining of LW S3A, in accordance with the requirements of subsidence management plans.

Longwall face position

LW S3A commenced on 8 May 2024 and at the time of this report had progressed a distance of 871 metres from its start position. The mine layout and the monitoring peg positions are shown in Drawing No. MSEC1430-01.

Monitoring results

Ground monitoring is being undertaken within the active subsidence zone of LW S3A. Maximum incremental subsidence parameters within the current extent of monitoring are summarised in Table 1.

Table 1 Summary of maximum observed subsidence parameters

Monitoring Line		Maximum observed subs (mm)	Maximum observed tilt (mm/m)	Maximum observed hogging curvature (km^{-1})	Maximum observed sagging curvature (km^{-1})	Maximum observed tensile strain (mm/m)	Maximum observed comp. strain (mm/m)
Charlies Point Road	Inc Total	14 71	0.3 0.4	0.03 0.03	-0.03 -0.02	0.2 0.3	-0.3 -0.3
Main Southern Railway	Inc Total	149 852	1.8 9.3	0.14 0.15	-0.13 -0.19	0.1 0.6	-1.6 -2.6
Remembrance Drive	Inc Total	35 587	0.6 4.3	0.03 0.21	-0.05 -0.20	0.3 0.4	-0.2 -3.3
Great Southern Road	Inc	17	0.2	0.01	-0.01	0.2	-0.2
Yarran Road	Inc	27	0.4	0.03	-0.02	0.2	-0.2

Ground survey results

Ground monitoring is being undertaken within the active subsidence zone of LW S3A. Monitoring results are shown graphically at the back of this report.

The spatial distribution of incremental subsidence is shown in Drawing No. MSEC1430-02. Changes in subsidence since the previous survey are shown in Drawing No. MSEC1430-03.

Main Southern Railway

Monthly 3D surveys and weekly 2D surveys are continuing, with increasing rates of subsidence developing as the railway experiences the most active period of subsidence. Non-conventional subsidence is developing near 99.62 km. Visual inspections have identified changes in track geometry above LW S3A, resulting in the implementation of a temporary speed restriction on the track. The observations on the railway have been tracked into the adjacent property at the Australian Wildlife Sanctuary, where impacts have occurred to some gates and fences. Impacts have also been observed on Telstra's optical fibre cable at this location.

GNSS monitoring

Global Navigation Satellite System (GNSS) units are fixed survey stations that continuously measure their absolute horizontal and vertical positions in real time. There are 28 units located directly above and adjacent to LW S1A to S6A. These include two units above the commencing end of LW S3A, being Sites S09 and S10.

The measured position of each GNSS unit varies depending on atmospheric conditions and the array of satellites that are present in the sky at each time, and the vegetation cover surrounding each unit. Measured variations in height are typically greater than the variations for eastings and northings.

The results from the GNSS units are shown in Fig. S01 to Fig. S27 and Fig. TM. Mining-induced movements have developed at the GNSS units, with maximum measured incremental subsidence of 694 mm at Site S10 above LW S3A. Rates of change are reducing.

Observed development of subsidence above LW S3A is shown in Figure A. Subsidence is increasing at Site S10 above LW S3A, at reducing rate of change. It is predicted that subsidence above LW S3A will be greater than observed above LW S2A because it is the third panel in the longwall series.

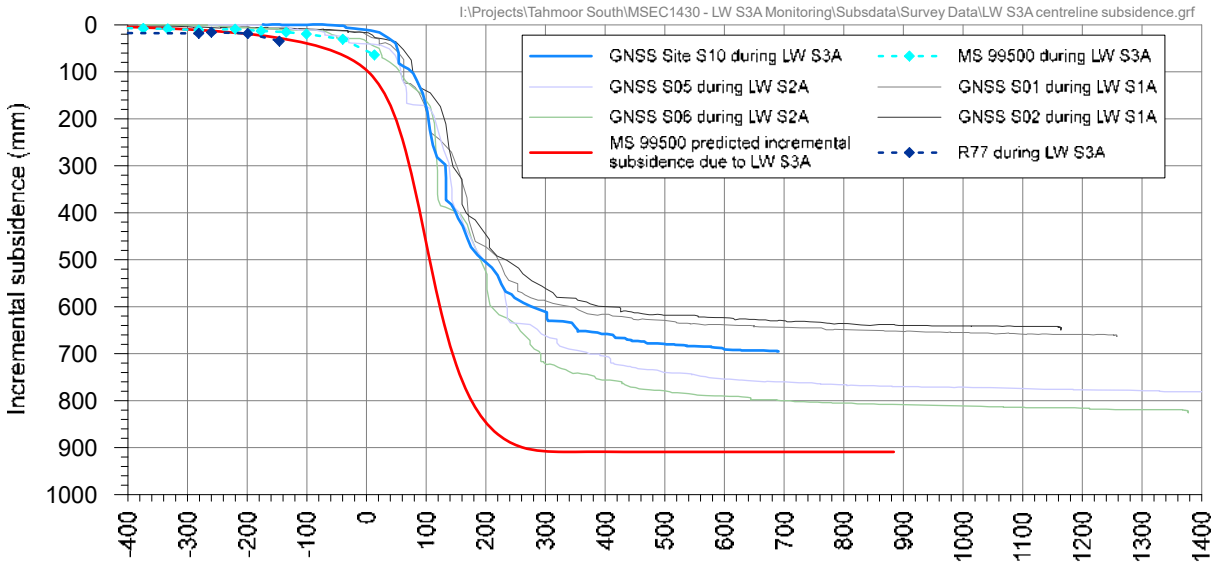


Figure A Development of subsidence along centreline of LW S3A

Changes in horizontal distances can be calculated between GNSS units that are stationed close together and results are shown in Figure B. Closure has developed across the Tributary to Teatree Hollow (Wirrimbirra Creek). Closure is currently developing across Wirrimbirra Creek between Sites S09 and S10 directly above LW S3A. Rates of change are reducing at all sites, with the exception of Sites S26 to S27, where minor closure is measured.

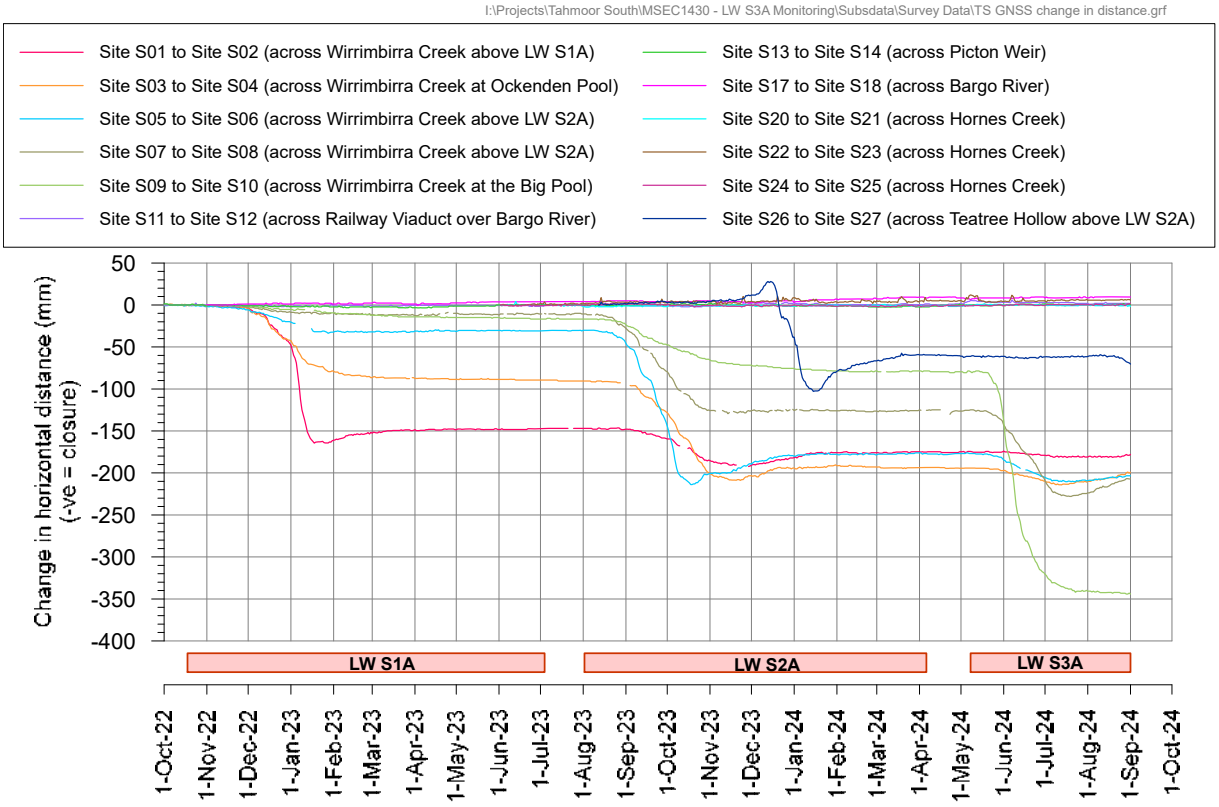


Figure B Observed changes in horizontal distances between GNSS units

Charlies Point Road

Monthly surveys have commenced, with small changes observed on 2 July. A final visual inspection for LW S3A was conducted on 26 August. Inspections have not identified any issues.

Remembrance Drive

A monthly 3D survey was conducted on 1 July. Approximately 30 mm subsidence has been measured since the final survey for LW S2A. Minor changes were measured during a 3D survey on 6 August, including at previously observed locations of non-conventional compressive strains and bumps in the observed subsidence profiles between Pegs R47 and R48, and between Pegs R54 and R55. A minor increase in strain was measured between Pegs R59 and R60 since the previous survey but as shown in Figure C, the measurement effectively confirmed that the previous survey may have been slightly erroneous.

The observed development of compressive strain at previously observed impact sites during the mining of LW S2A is shown in Figure C. Minor changes were measured on 6 August.

Visual inspections have not identified any issues at this stage.

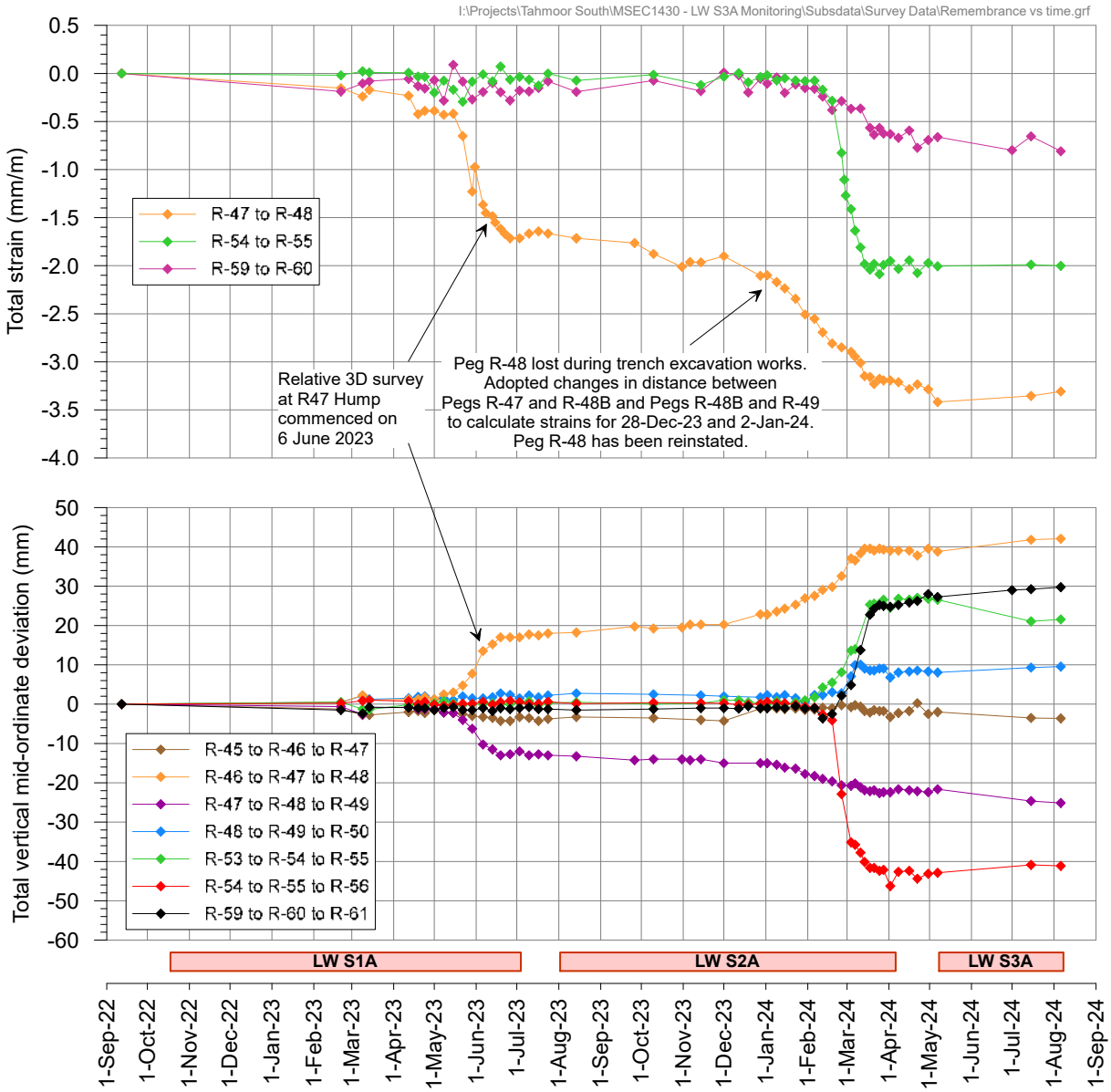


Figure C Observed development of ground strain and changes in vertical alignment at selected pegs along Remembrance Drive

Surveys are continuing along the cutting. Minor changes were observed on 26 August.

Surveys are continuing along the Caloola Road embankment. The Jemena gas pipe has been exposed where it crosses above Teattree Hollow, as planned. The civil works have resulted in a change in survey methodology due to lines of sight. Four marks are currently not visible but could be re-surveyed if required. Peg R76 was disturbed and the base coordinates have been normalised. Minor changes were observed.

Natural Features

In addition to the GNSS units, survey marks have been installed at four locations across the Tributary to Teatree Hollow (Wirrimbirra Creek), and at four locations across Teatree Hollow, as shown in Drawing No. MSEC1430-01.

An end of LW S2A survey was conducted on 30 April along ground survey lines that were installed across the Tributary to Teatree Hollow, and a summary is shown in Figure D. The results correlate reasonably well with the observations from GNSS units, taking into account the shorter lengths of the survey lines, which are based within the floor of the creek valley, compared to the distances between the GNSS units, which are mounted at the tops of the valleys.

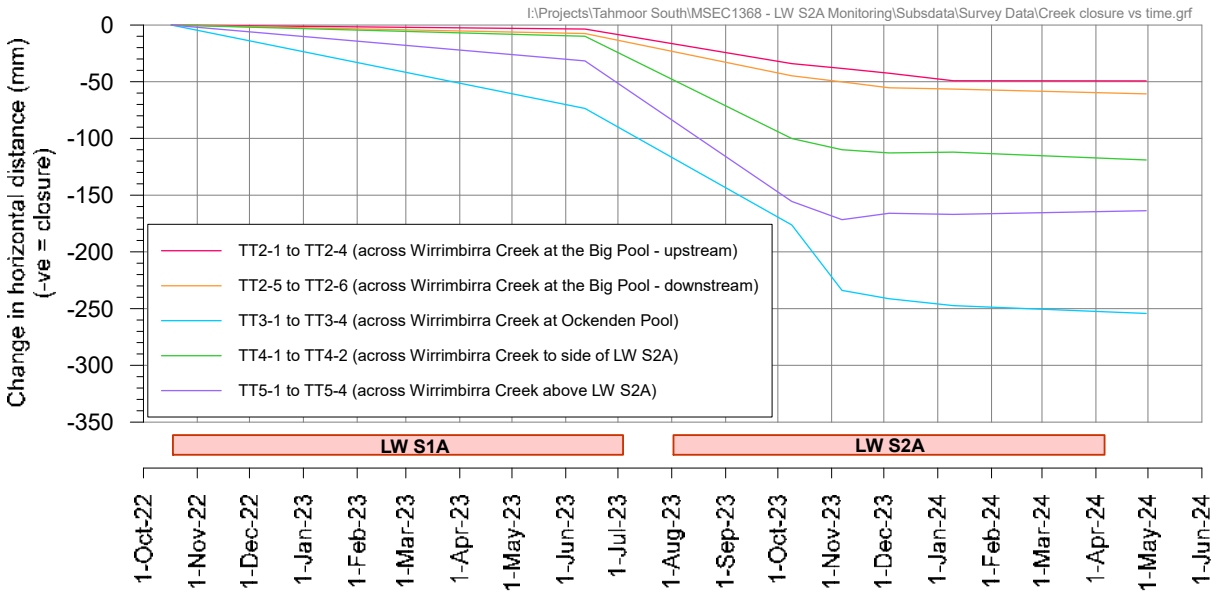


Figure D Observed development of closure across Tributary to Teatree Hollow from ground surveys

Tributary to Teatree Hollow (Wirrimbirra Creek)

Impacts were first detected in the Tributary to Teatree Hollow (Wirrimbirra Creek) on 8 February 2023. Surface water flows were first observed to stop approximately 120 metres upstream of monitoring site TT3, above the centreline of future LW S3A. A surface crack was observed in the bedrock downstream of this location. On 20 August, flows in the creek were observed to have reduced since the previous inspection on 17 July after a period of dry weather. Surface water was observed to cease at K64, re-emerging upstream of Pool TT2, which holds water. Surface water then ceases again downstream of Pool TT2, re-emerging at K71, upstream of the confluence with Teatree Hollow. A new fracture approximately 6 metres long was observed upstream of Pool TT2 on 17 July.

Additional impacts have been observed at TT2 since October 2023. A fracture within a surface boulder upstream of Pool TT2 has been observed to increase in size during the mining of LW S3A. The boulder is wedged between two larger rocks on either side of the creek. Investigations have found that the fracture was present in July 2023, after the mining of LW S1A and prior to the commencement of LW S3A. The fracture contained some debris and some ageing of the exposed rock inside the fracture at this time. While pre-mining photographs and videos identified pre-existing fractures elsewhere within the boulder field upstream of Pool TT2, the fracture was not visible prior to the mining of LW S1A to the scale and extent as observed in July and September. The images, however, were not focussed directly on the boulder in question and could not definitively confirm whether there were any pre-existing hairline or slight fractures in it.

A geotechnical inspection was conducted by Douglas Partners on 9 November 2023. The fractured boulder has been assessed to be a detached sandstone block, which was previously part of the rock strata on either side of the valley prior to mining. The host rock had been naturally eroded and undercut by the weaker underlying strata, resulting in dislocation and fracturing along naturally formed joints at the fracture site. Pre-mining photographs show surface water was flowing underneath the site. While dislocated from the host rock on either side of the valley, the detached sandstone block remained in contact on both sides, such that mining-induced valley closure almost immediately resulted in fracturing. New fractures are developing at the detached sandstone block and within the adjoining rock strata at the contact points due to ongoing closure. The fracture site is situated above Pool TT2 and has no effect on surface water levels in Pool TT2.

A local 3D ground survey was conducted on 9 October 2023 along the TT2 line that is located upstream of Pool TT2 and very close to the fracture in the boulder. The results are shown in Figure E. It can be seen

that very little tilt or strain had developed after the mining of LW S1A but valley closure strains and upsidence have developed since the completion of LW S1A. The fracture in the boulder is located between Pegs TT2-2 and TT2-3. The latest survey on 30 April measured no change in compressive strain.

While this section of the Tributary to Teatree Hollow has been previously observed to be dry during periods of dry weather, the observations indicate that the changes may be mining-induced.

A visual inspection of the rock shelter on 2 June 2023 found no water in the pool at TT3, and the pool has remained dry since 26 June 2023. A visual inspection on 18 December found no changes.

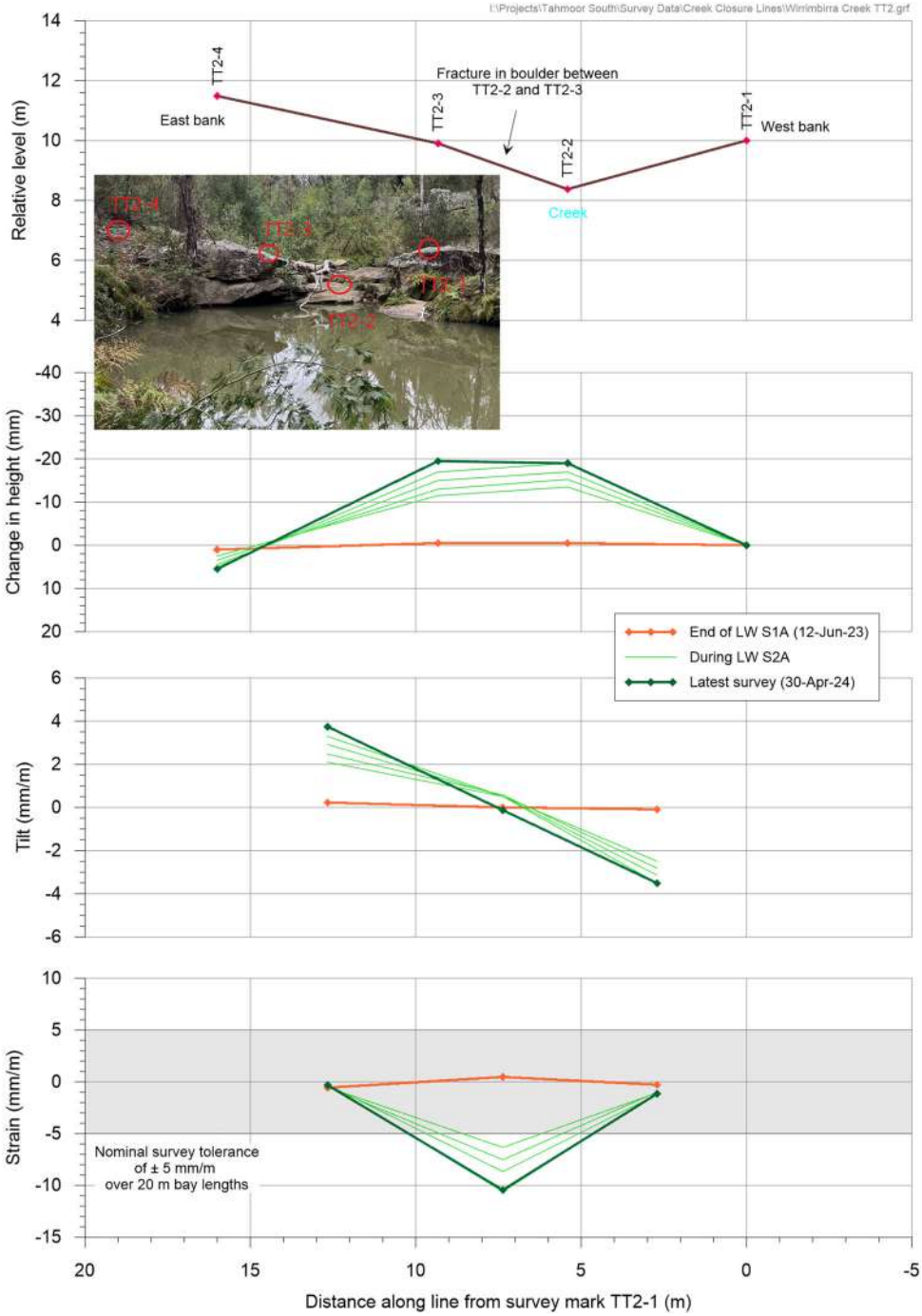


Figure E Observed subsidence, tilt and strain along TT2 line, upstream of Pool TT2

Teatree Hollow

Surveys were conducted across Teatree Hollow between 23 February 2023 and 12 June 2023 during LW S1A, with very little closure observed at TT6, TT9 and TT12 (6 mm or less).

The first survey for LW S2A was conducted across Teatree Hollow on 30 August 2023, with subsequent surveys on 9 October 2023, 7 November 2023, 4 December 2023, 10 January 2024and 30 April 2024. Very little closure is observed at TT6 and TT12 (3 mm or less). GNSS units S26 and S27 have been installed across Teatree Hollow directly above LW S2A to measure valley closure. Approximately 100 mm closure has been measured by the GNSS units.

Impacts were first observed along Teatree Hollow directly above LW S1A on 1 March 2023. Surface water flows have been observed to stop near the upstream edge of LW S1A and reappear with iron staining present above the downstream edge of LW S1A. On 20 August, flows in the creek were observed to have reduced since the previous inspection on 17 July after a period of dry weather. Surface water was observed to cease downstream of Pool TT12, re-emerging upstream of Pool TT13.

Steep Slopes

Monthly geotechnical inspections are undertaken when steep slopes are within the active subsidence zone. This month's inspection on 15 August noted a new fracture in a rock outcrop near the Big Pool. No concerns with slope instability were observed.

Structures

Mitigation works at MKD Machinery have been completed in accordance with the Management Plan. Weekly surveys are ongoing, with minor changes observed. No impacts to structures observed on 30 August.

Weekly surveys are ongoing at the Australian Wildlife Sanctuary. Subsidence is increasing as LW S3A has moved beneath the property. No impacts to structures observed on 28 August, however. Four new timber and steel-framed gates were found to not be properly closing and some fenced enclosures were compromised. All four gates were repaired on 27 August. A compression hump is observed in this location and linked to the observed impacts on the Main Southern Railway.

Local Roads

Weekly visual inspections continue within the active subsidence zone. Visual inspections along Charlies Point Road and Great Southern Road have not identified any issues.

Visual inspections along Remembrance Drive and cutting RC1 have not identified any issues. Minor changes in compressive strain were observed at previously observed impact sites above LW S2A.

Gas Infrastructure

Weekly surveys have commenced along Remembrance Drive and cutting RC1, with minor changes measured on 26 August. Minor changes in compressive strain were observed at previously observed impact sites above LW S2A.

Macarthur Gas conducted a gas detection survey on 19 August. A very minor leak was detected at a valve along Remembrance Drive near Wellers Road.

The gas pipeline was exposed along the section of Remembrance Drive embankment where it crosses Teatree Hollow, as planned. Monitoring will be conducted as the longwall face approaches.

Electrical Infrastructure

Weekly surveys continue along Remembrance Drive and cutting RC1, with minor changes measured on 26 August.

Ground surveys of critical power poles are conducted when poles are within the active subsidence zone.

Telecommunications Infrastructure

Weekly surveys continue along the Main Southern Railway, Remembrance Drive and Cutting RC1, with minor changes measured 26 August. Minor changes in compressive strain were observed at previously observed impact sites above LW S2A.

Rates of change in subsidence are increasing along the section of cable that is directly above LW S3A along the Main Southern Railway near 99.62 km. Telstra advised on 27 August that a minor indication of loss (0.2 dB) was observed from OTDR monitoring. Cracking and shearing has been observed to intersect

the buried cable. Tahmoor Coal plans to relieve stresses and deformations in the cable on 3 September by excavating a narrow trench.

Potable Water Infrastructure

Weekly surveys continue along the Main Southern Railway, Remembrance Drive and cutting RC1, with minor changes measured on 26 August. Minor changes in compressive strain were observed at previously observed impact sites above LW S2A.

Very little change has been observed at the displacement sensors that were installed on all four Gibault joints at the first impact site between Pegs R47 and R48, as shown in Figure F. The northern-most Gibault joint had reached the limit of its capacity on 25 February, and closure has been taken up by the next joint. Closure had gradually developed on the southern Gibault joint at the northern connection, with rates of change reduced to low levels. The displacement sensors across the other two joints are currently recording very minor changes.

The observed changes are compared with changes in horizontal distance between Pegs R47A and R48A, which are located on either side of the joints. It can be seen from Figure F that the joint displacement is less than measured between the survey pegs, though there has been a good correlation between the survey methods on weekly changes.

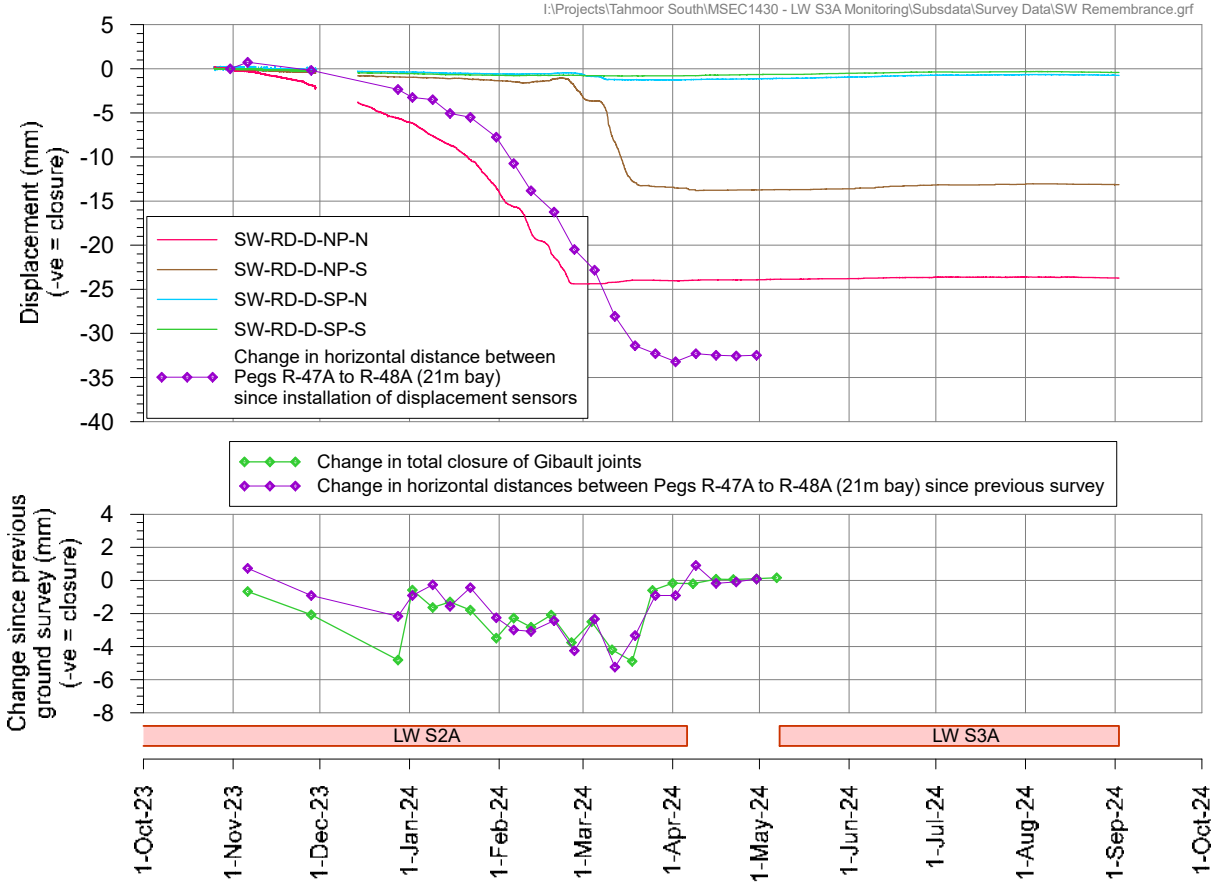


Figure F Observed change in distance across Gibault joints at Remembrance Drive between Pegs R47A and R48A on Sydney Water potable water main

Minor changes have also been observed on the four Gibault joints of the 100 mm water main on Caloola Road, as shown in Figure G. The northern displacement sensor across the southern joint was replaced in late February 2024. It can be seen from Figure G that the measured changes are within survey tolerances. A previously observed very small trend of closure at the joint sensors has been gradually reversing. The observed changes are compared with changes in horizontal distance between Pegs R76C and R78C, which are located on either side of the joints. This week's survey on 26 August measured a small increase in closure.

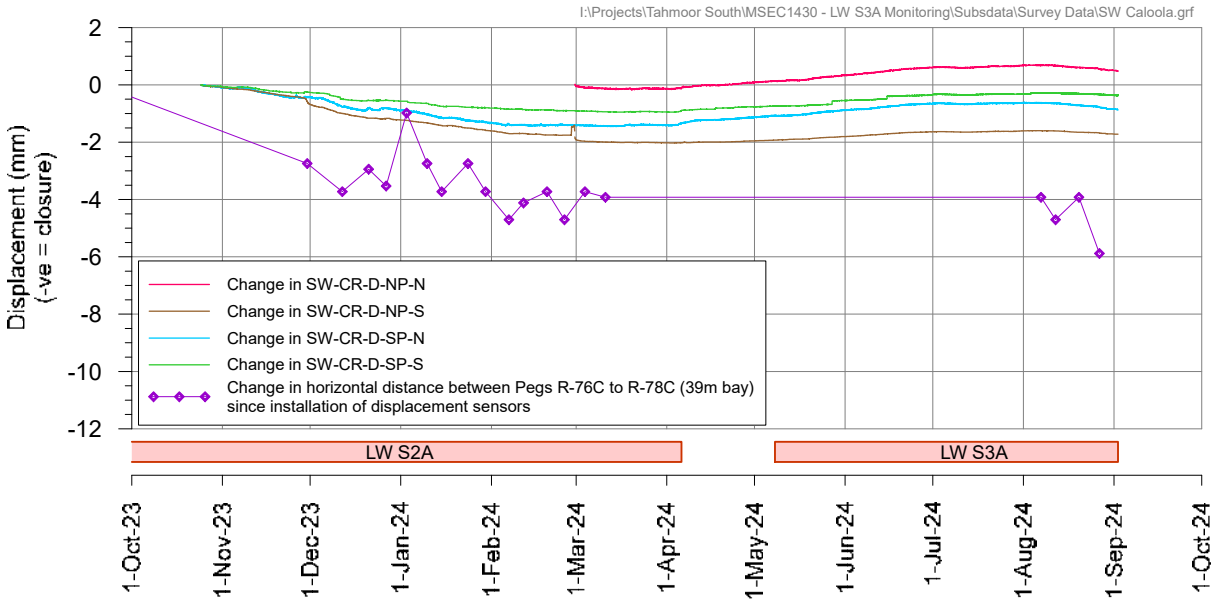


Figure G Observed change in distance across Gibault joints at Caloola Road on Sydney Water potable water main

Sewer Infrastructure

Weekly surveys continue along Remembrance Drive and cutting RC1, with minor changes measured on 26 August. Minor changes in compressive strain were observed at previously observed impact sites above LW S2A.

Dams

Weekly visual inspections, and monthly geotechnical inspections have been undertaken when dams are within the active subsidence zone. No issues were observed at Dams FD-6 to FD-10 during a geotechnical inspection on 15 August.

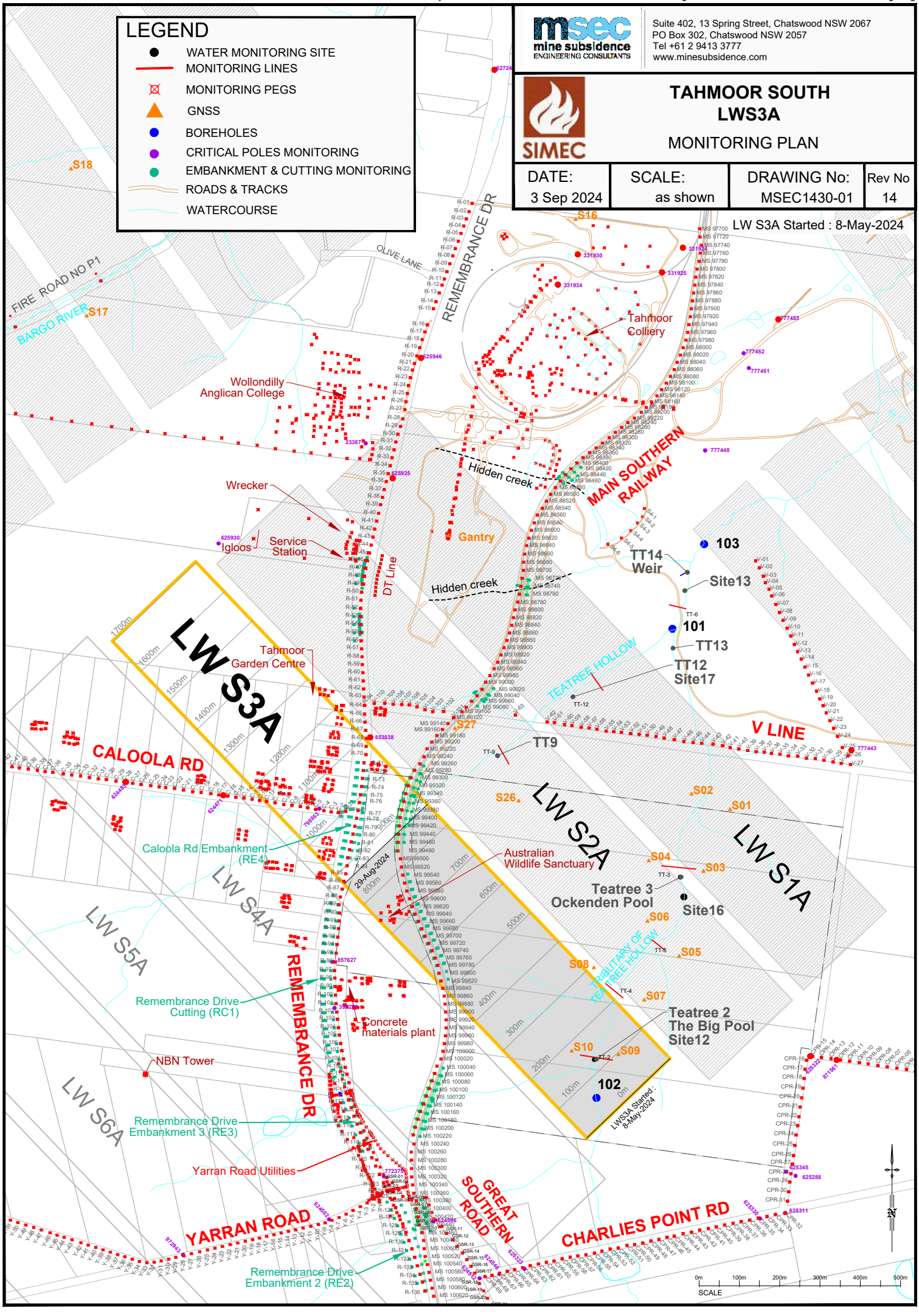
Archaeological Sites

Gradually developing movements have been measured by GNSS units S03 and S04 located on either side of Wirrimbirra Creek, with no impacts observed. The most recent visual inspection at rock shelter site 52-2-4471 was on 15 August 2024. No significant changes were observed.

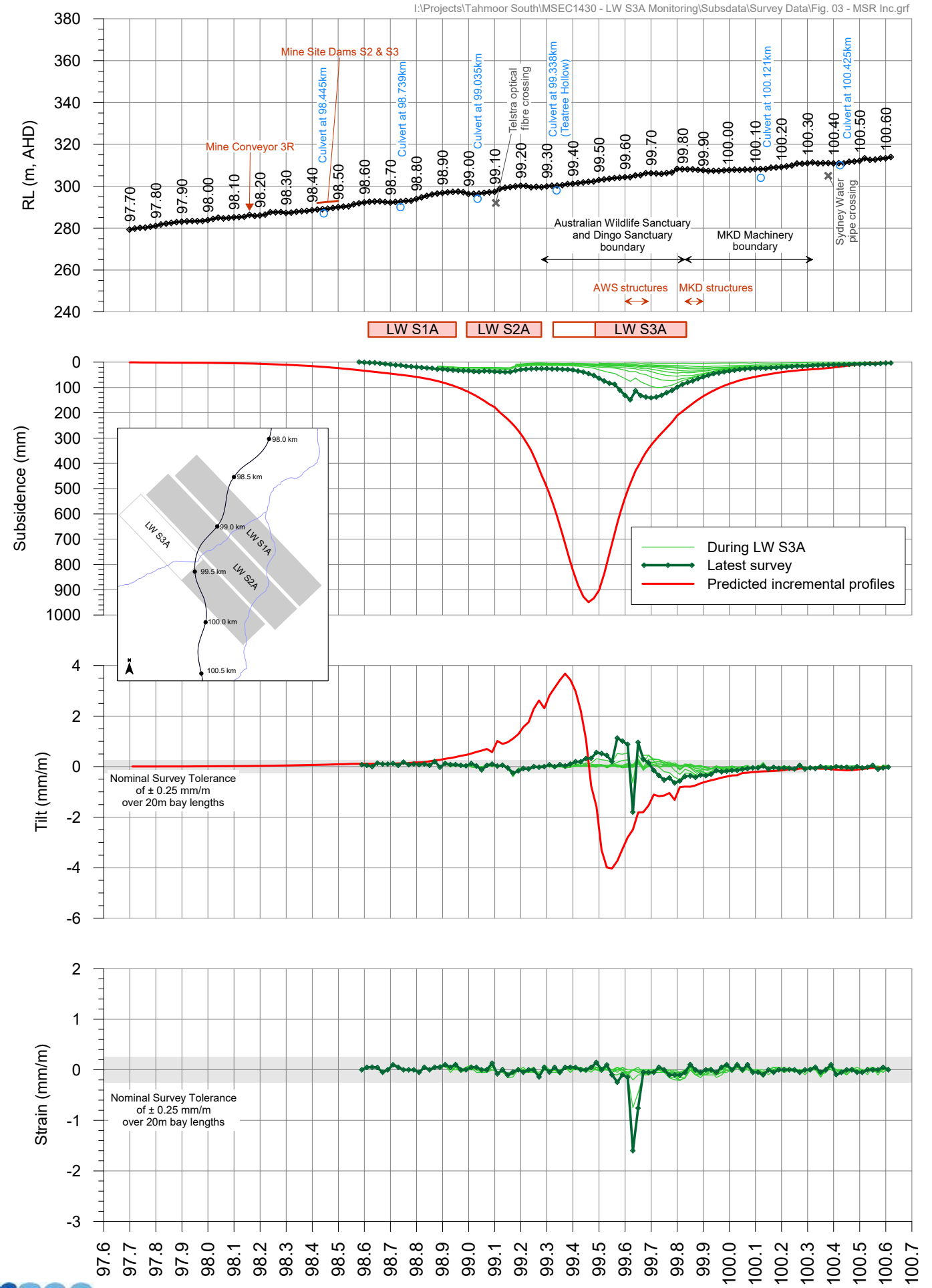
Summary

LW S3A commenced extraction on 8 May 2024. Subsidence is developing gradually within expectations. Non-conventional subsidence movements have been identified

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\AcadData\MSEC1430-01 LWS3A Monitoring.dwg



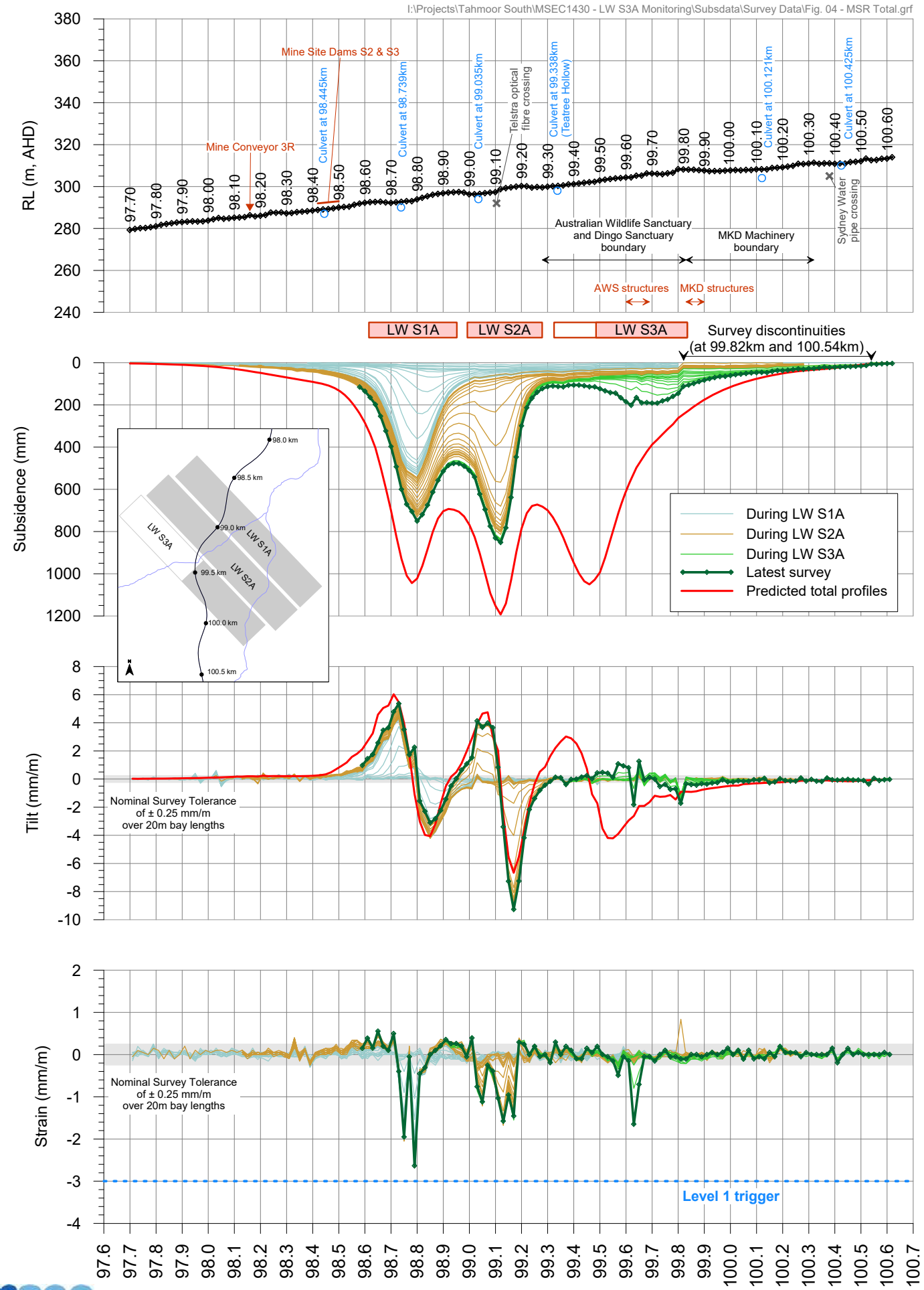
Tahmoor South LW S3A - Main Southern Railway
Incremental subsidence profiles
Survey date: 26 August 2024



msec

Fig. 3-R14

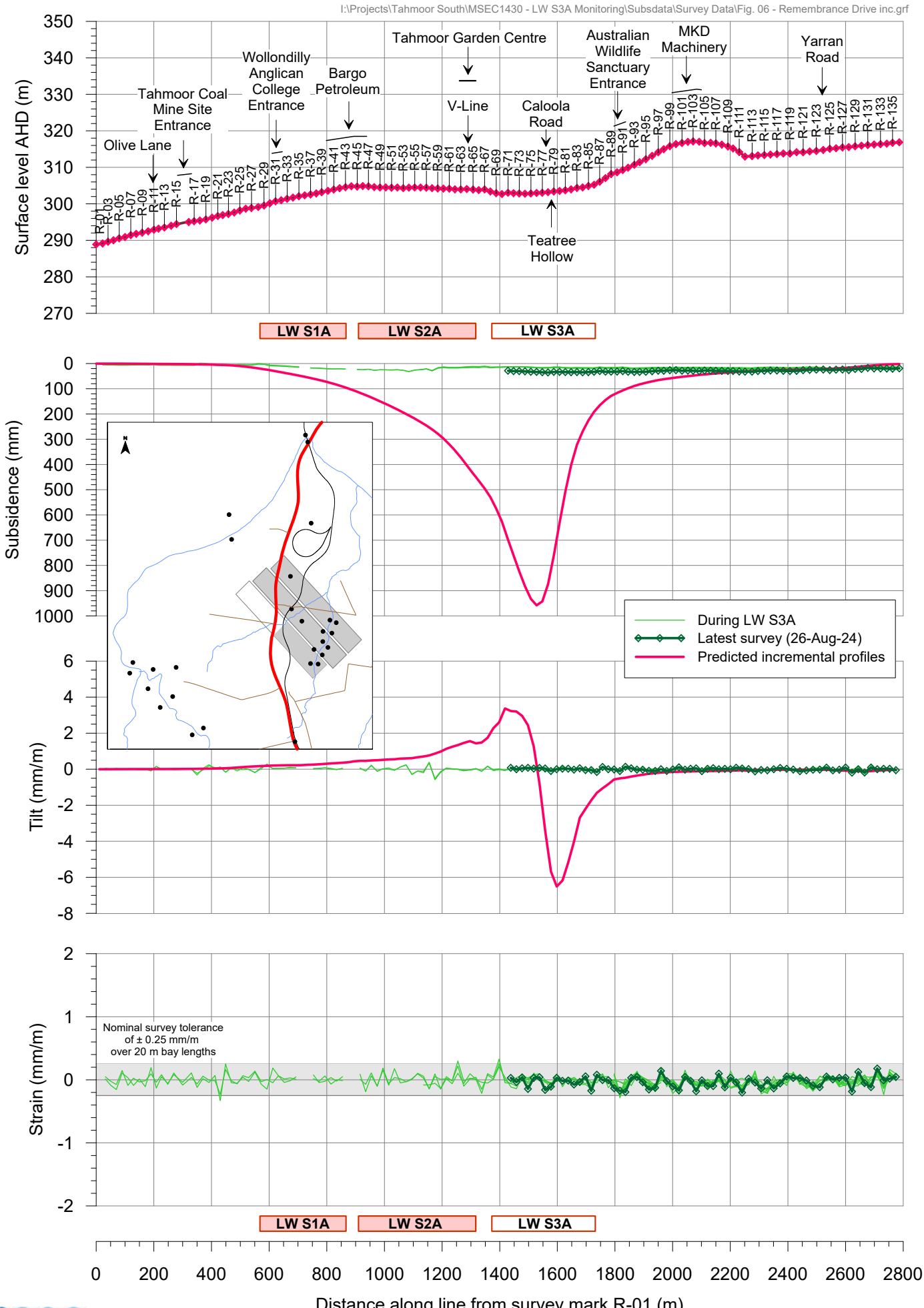
Tahmoor South LW S3A - Main Southern Railway
Total subsidence profiles
Survey date: 26 August 2024



msec

Fig.4-R14

Tahmoor South LW S3A
Incremental subsidence profiles along Remembrance Drive



msec

Fig. 6-R14

Tahmoor South LW S3A
Total subsidence profiles along Remembrance Drive

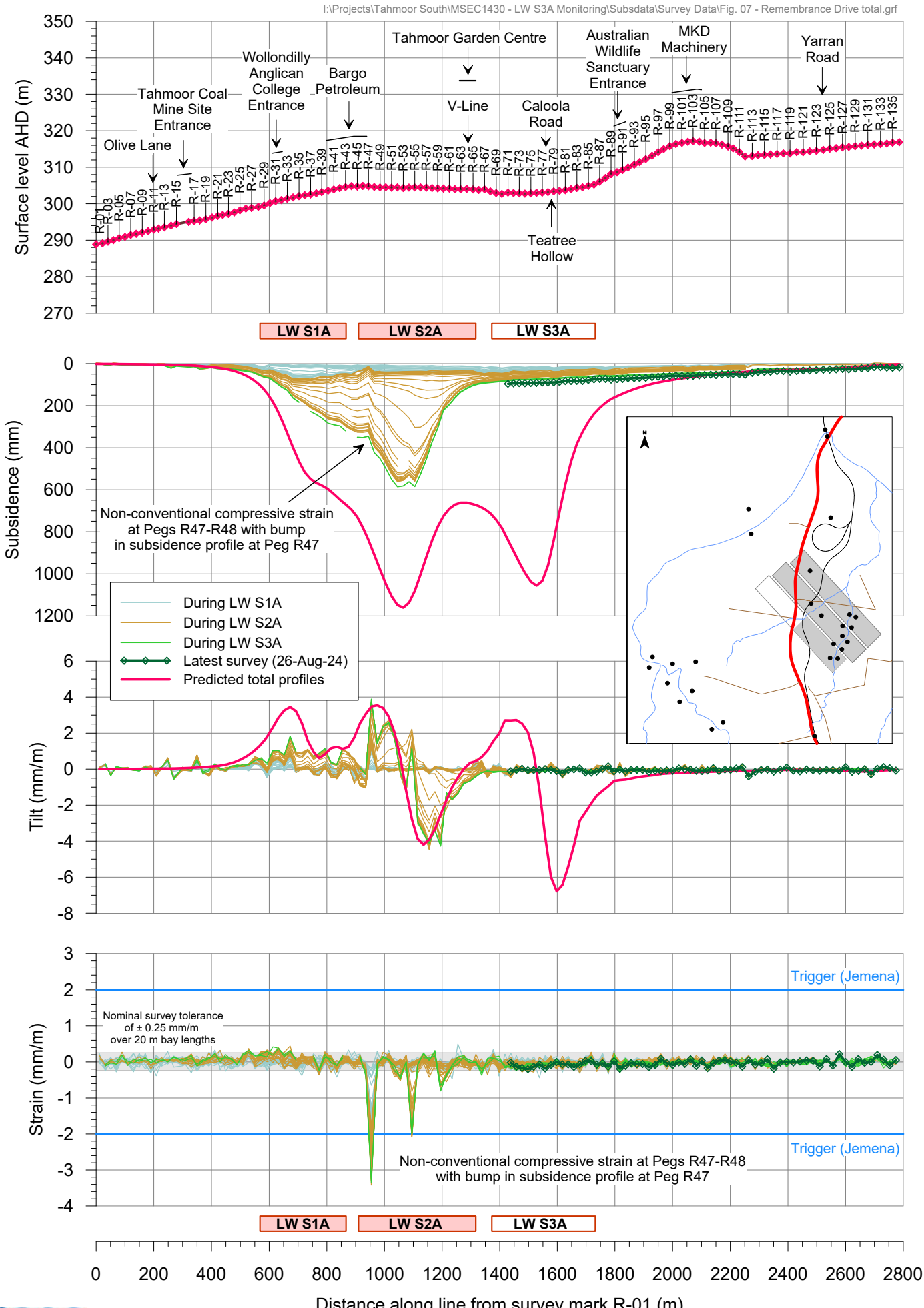
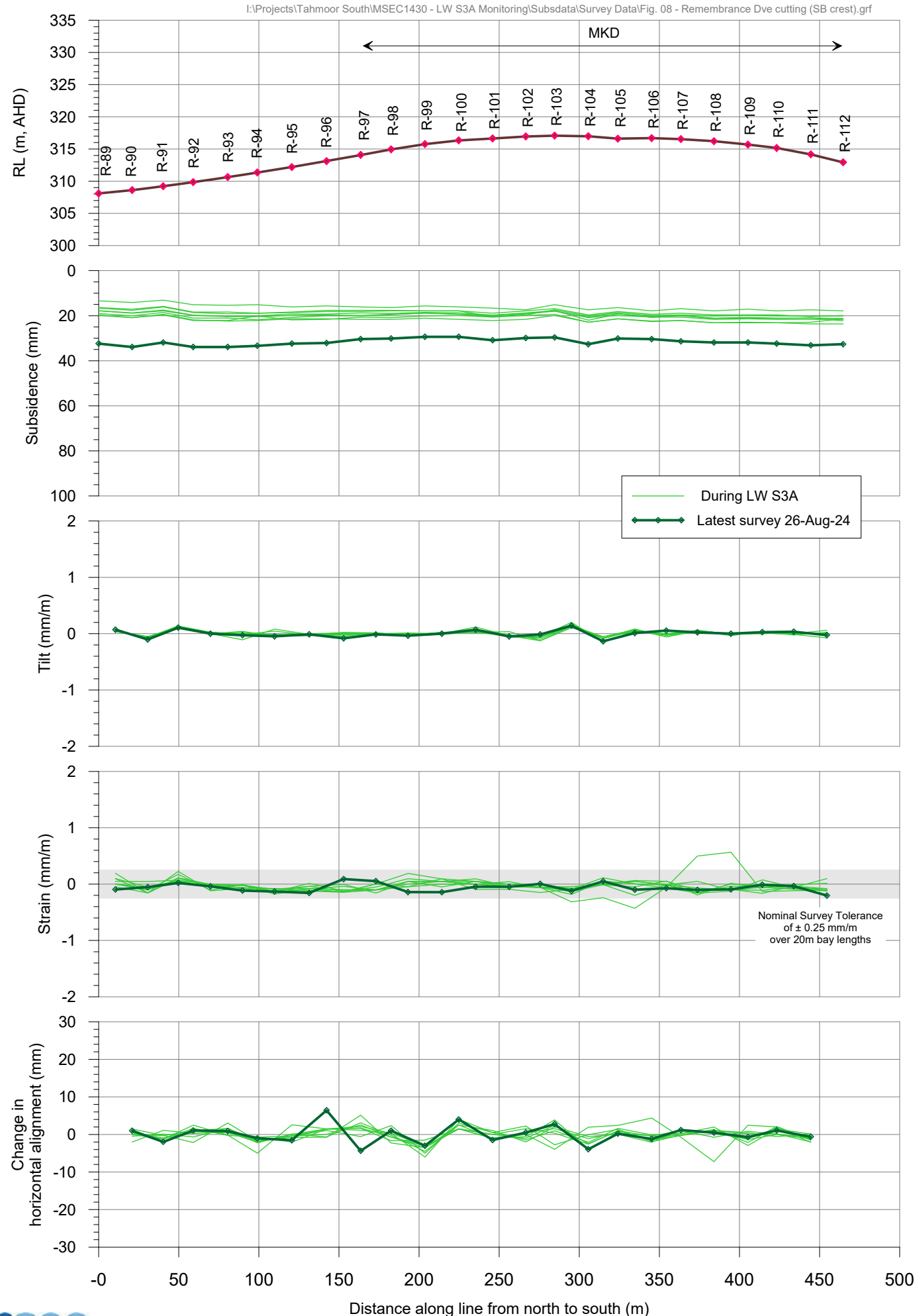


Fig. 7-R14

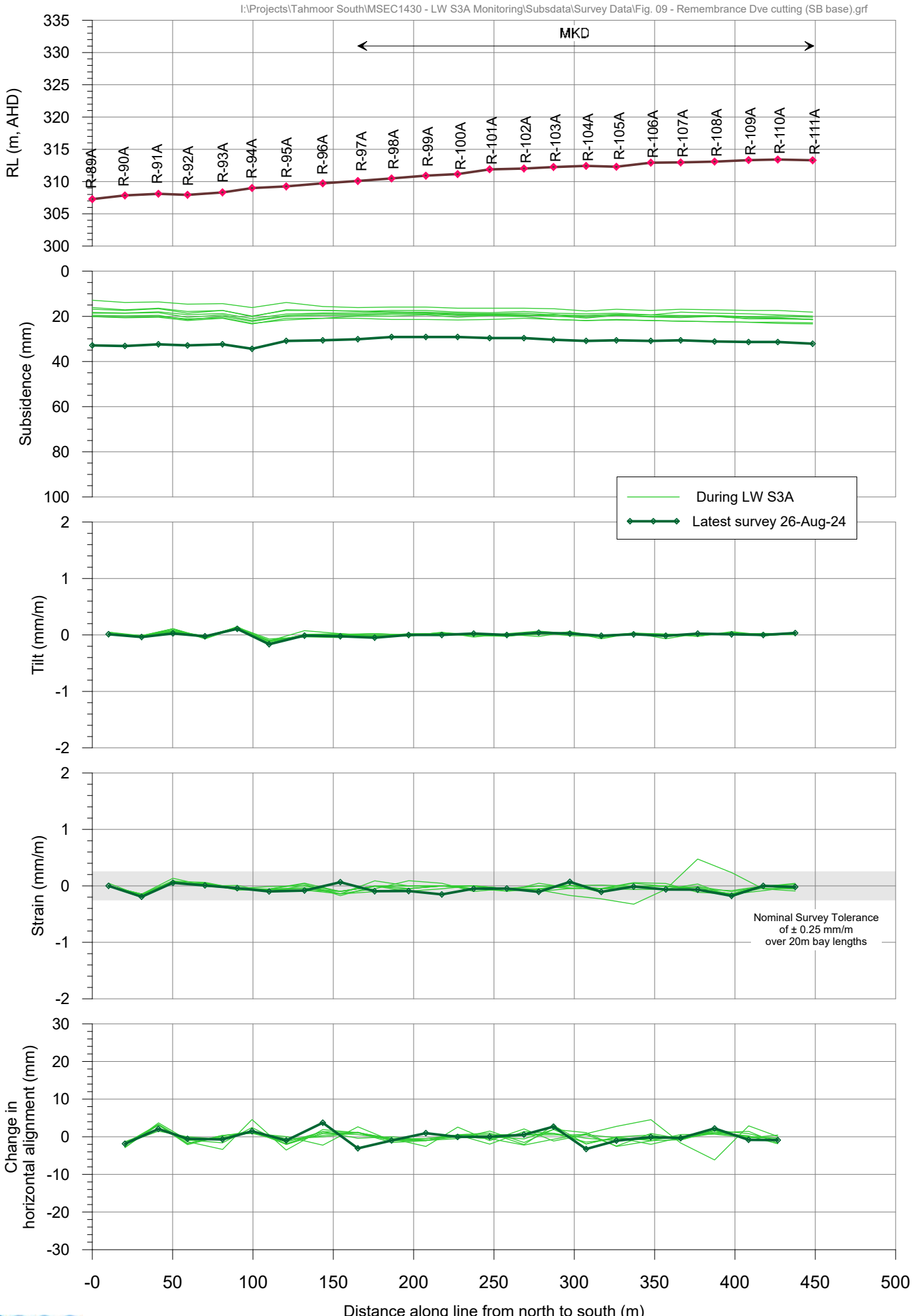
Tahmoor South LW S3A - Remembrance Drive Cutting (RC1)
Incremental subsidence profiles along southbound crest



msec

Fig. 8-R14

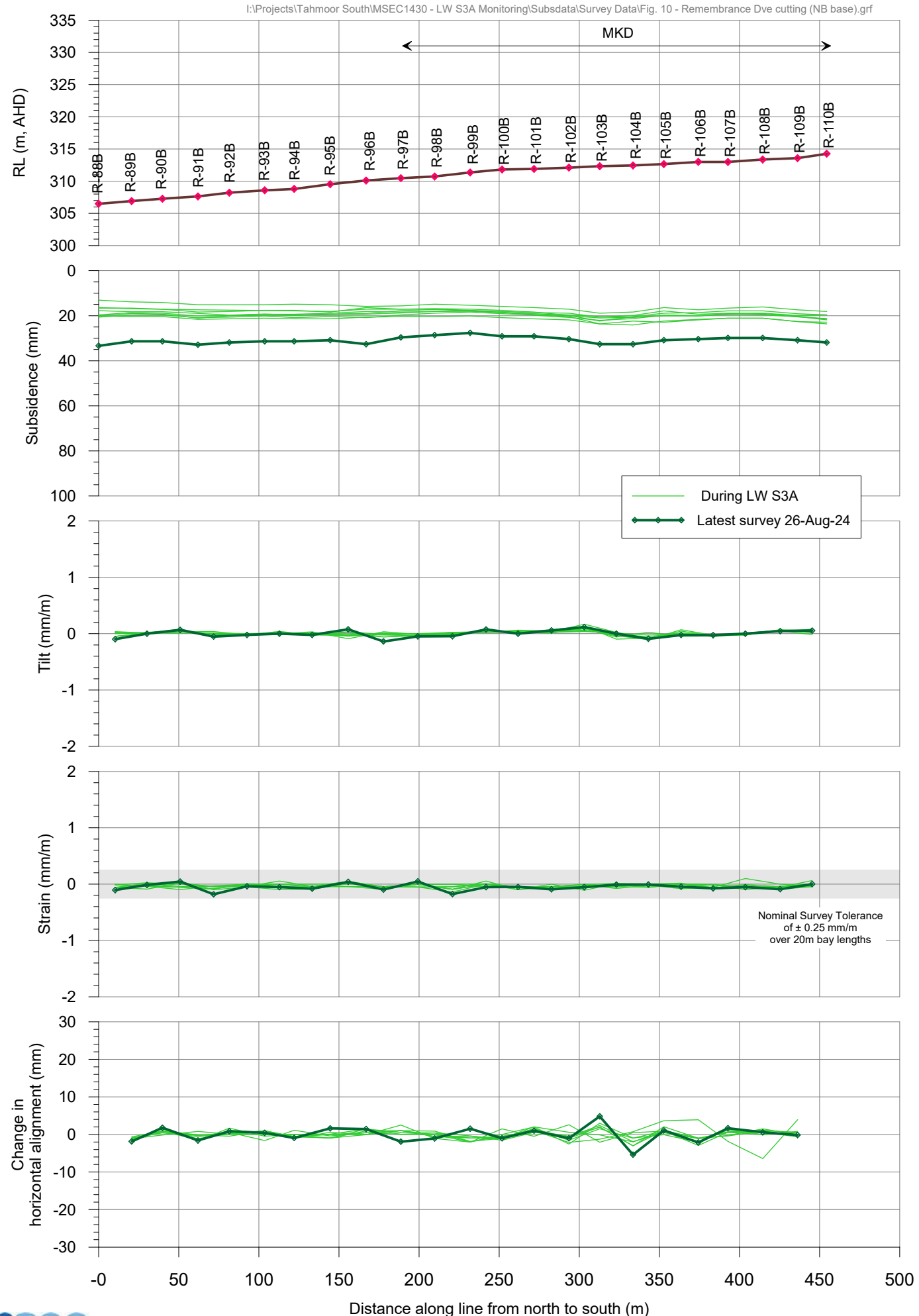
Tahmoor South LW S3A - Remembrance Drive Cutting (RC1)
Incremental subsidence profiles along southbound base



msec

Fig. 9-R14

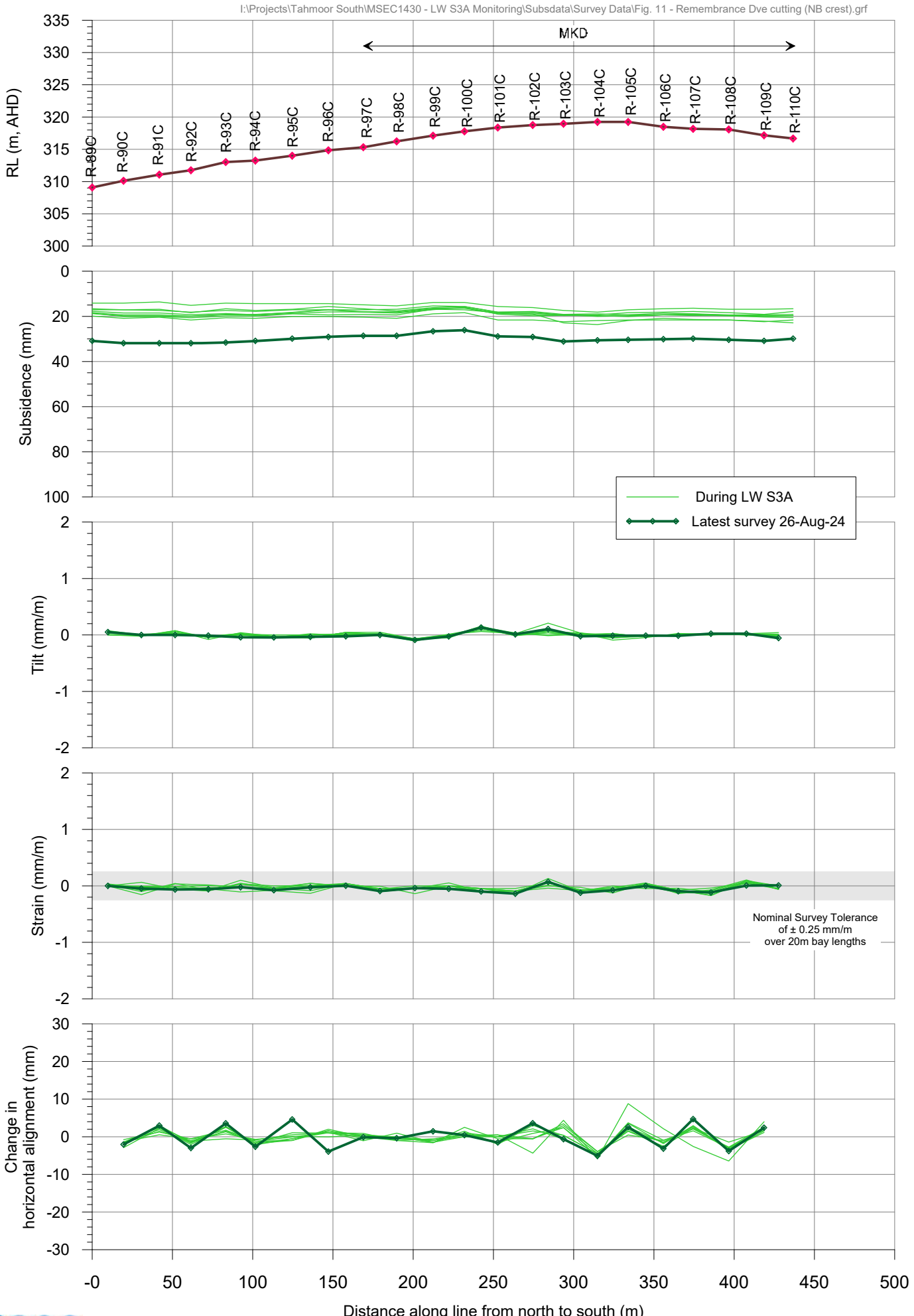
Tahmoor South LW S3A - Remembrance Drive Cutting (RC1)
Incremental subsidence profiles along northbound base



msec

Fig. 10-R14

Tahmoor South LW S3A - Remembrance Drive Cutting (RC1)
Incremental subsidence profiles along northbound crest

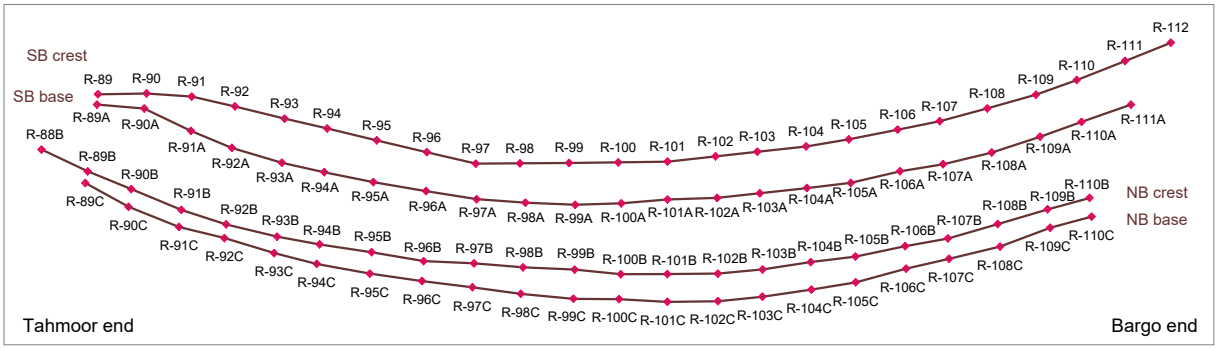


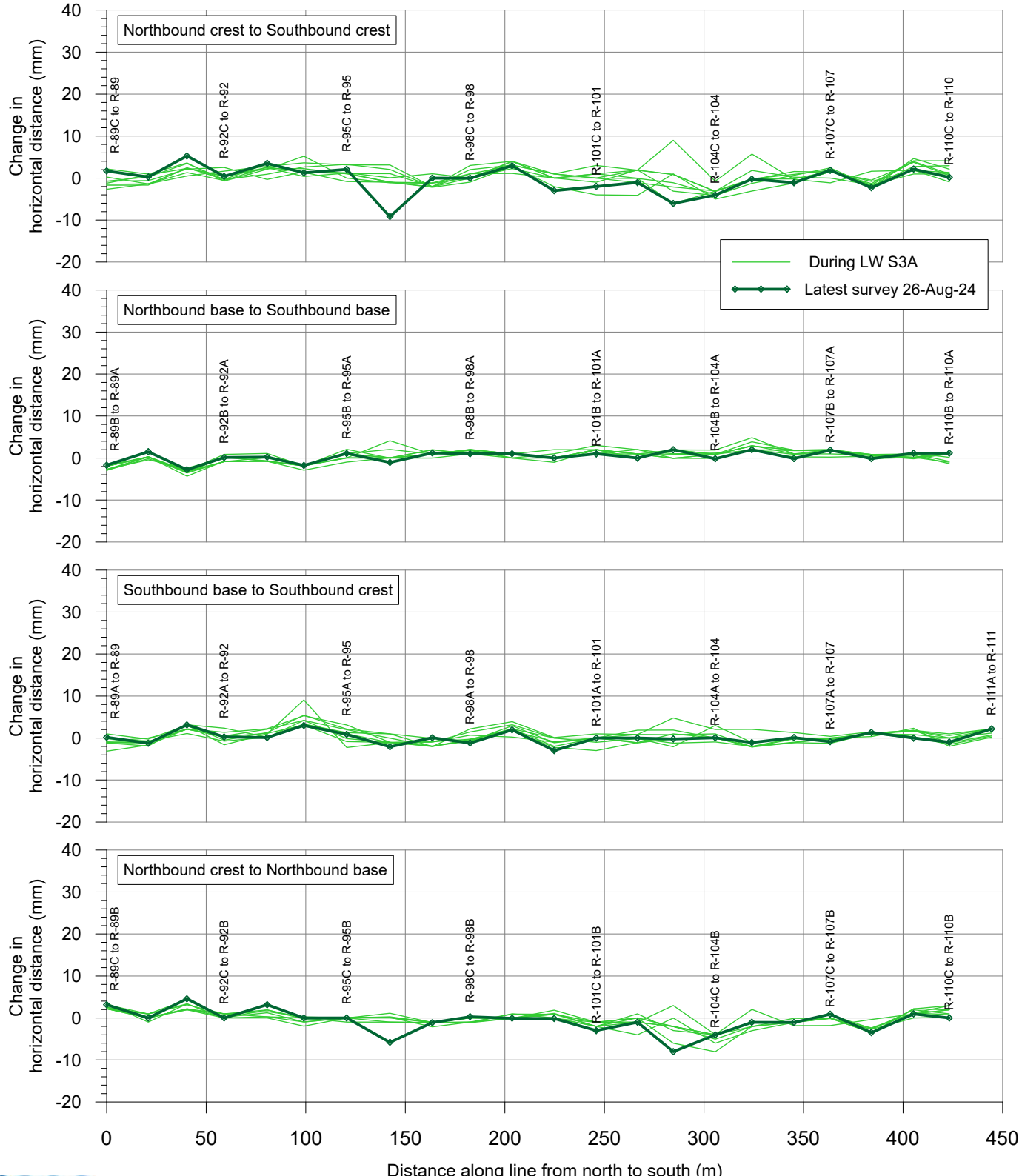
msec

Fig. 11-R14

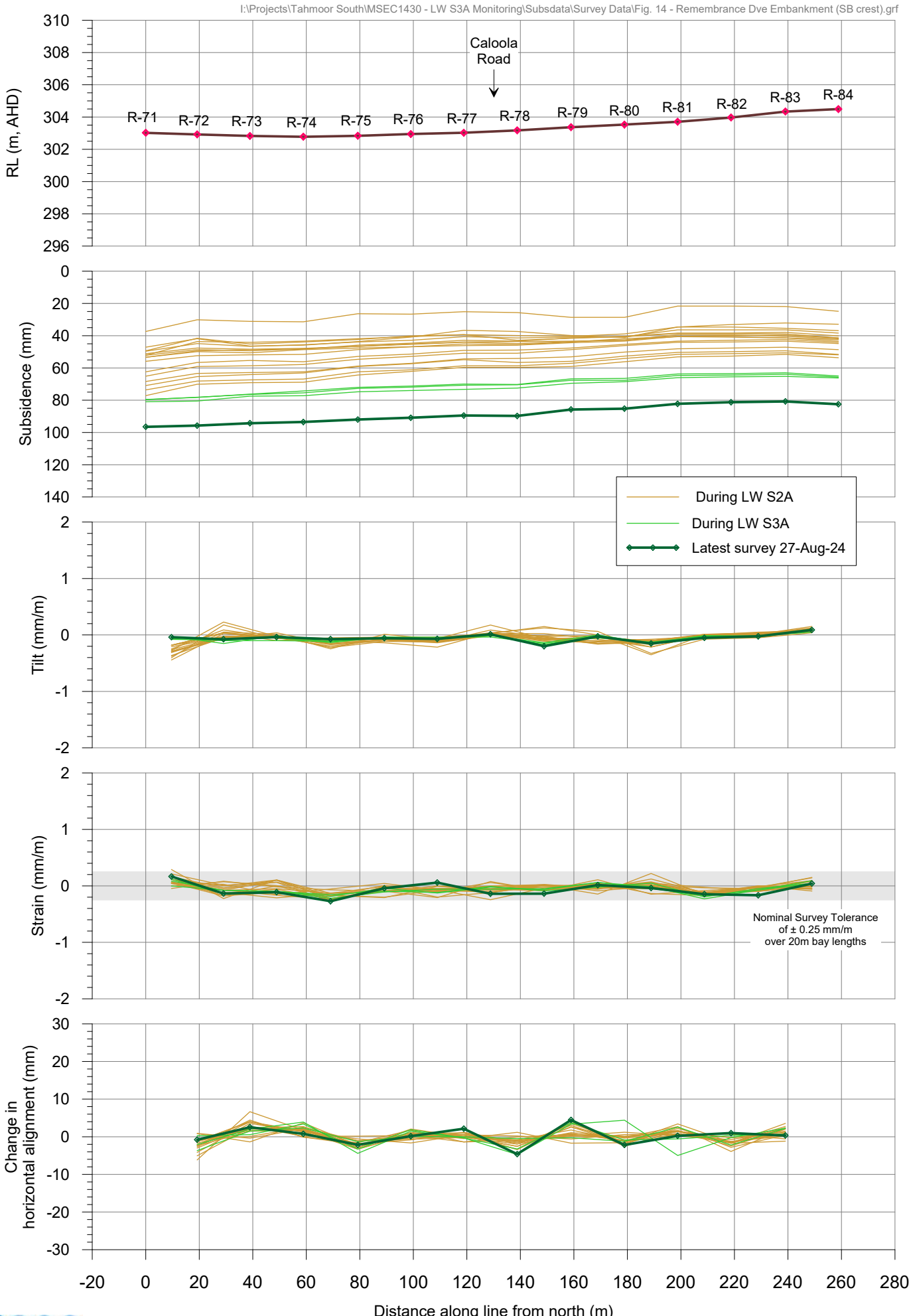
Tahmoor South LW S3A - Remembrance Drive Cutting (RC1)
Incremental closure across the cutting

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. 12 - Remembrance Dve cutting (closure).grf





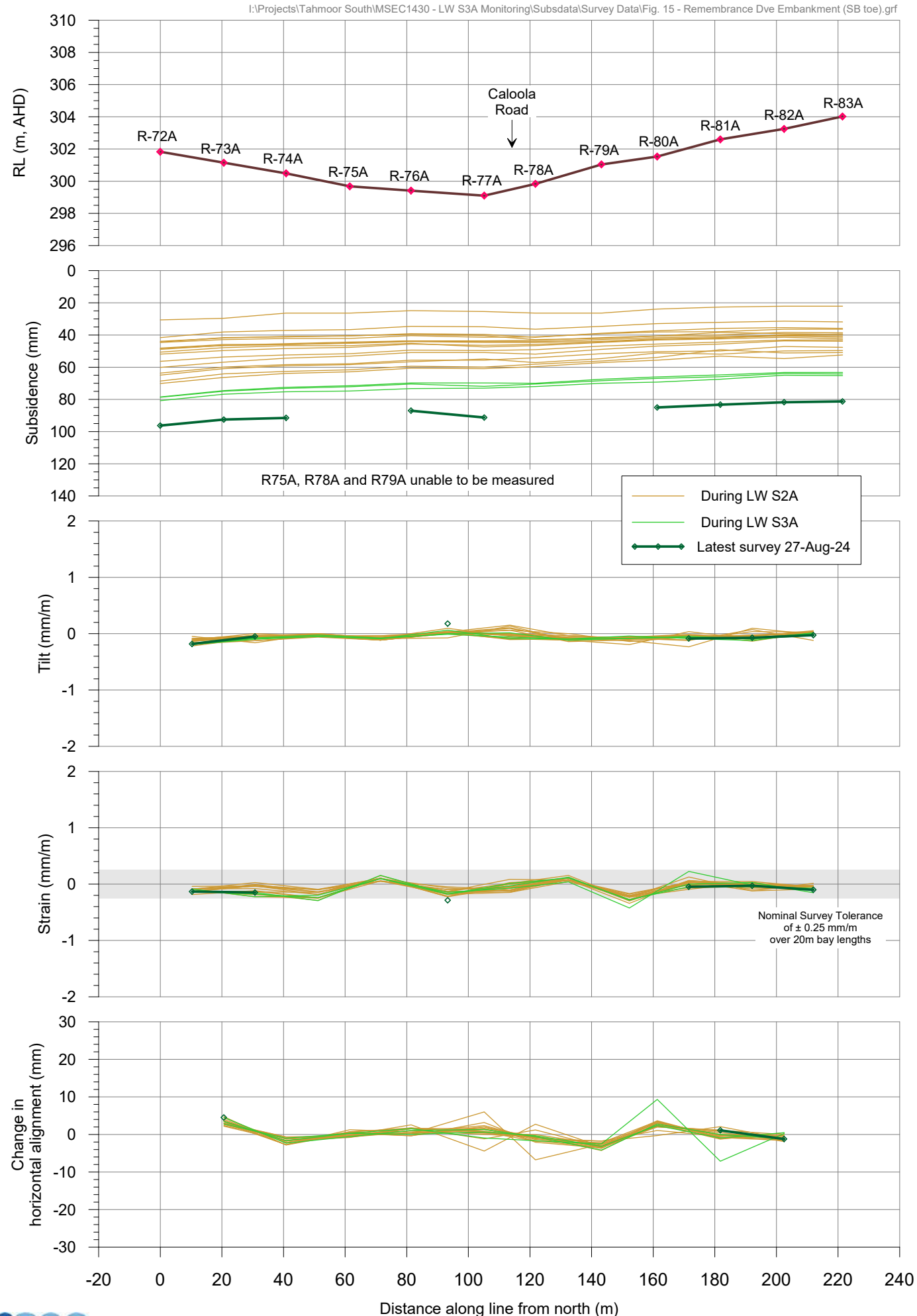
Tahmoor South LW S3A - Remembrance Drive Embankment
Total subsidence profiles along southbound crest



msec

Fig. 14-R14

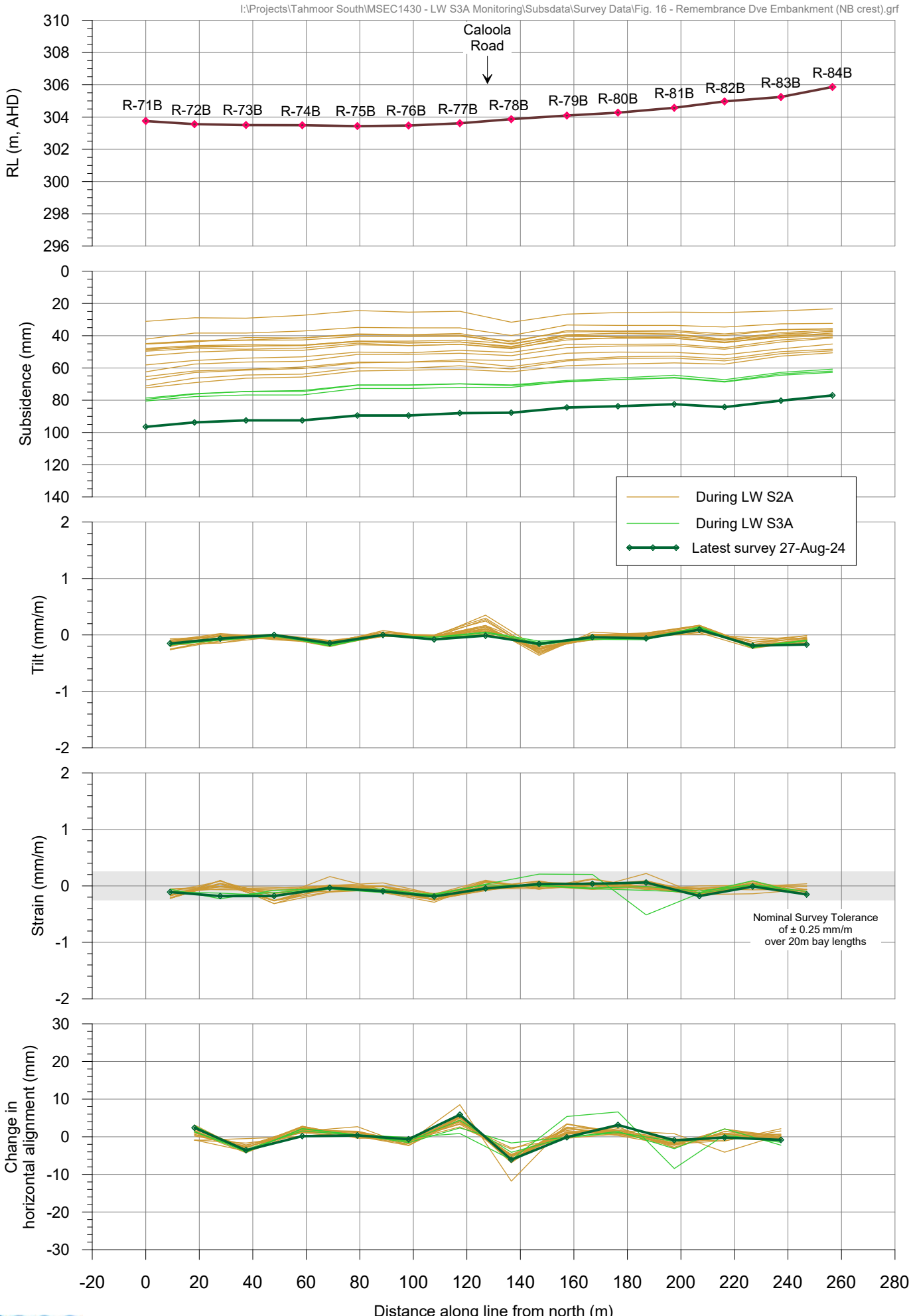
Tahmoor South LW S3A - Remembrance Drive Embankment
Total subsidence profiles along southbound toe



msec

Fig. 15-R14

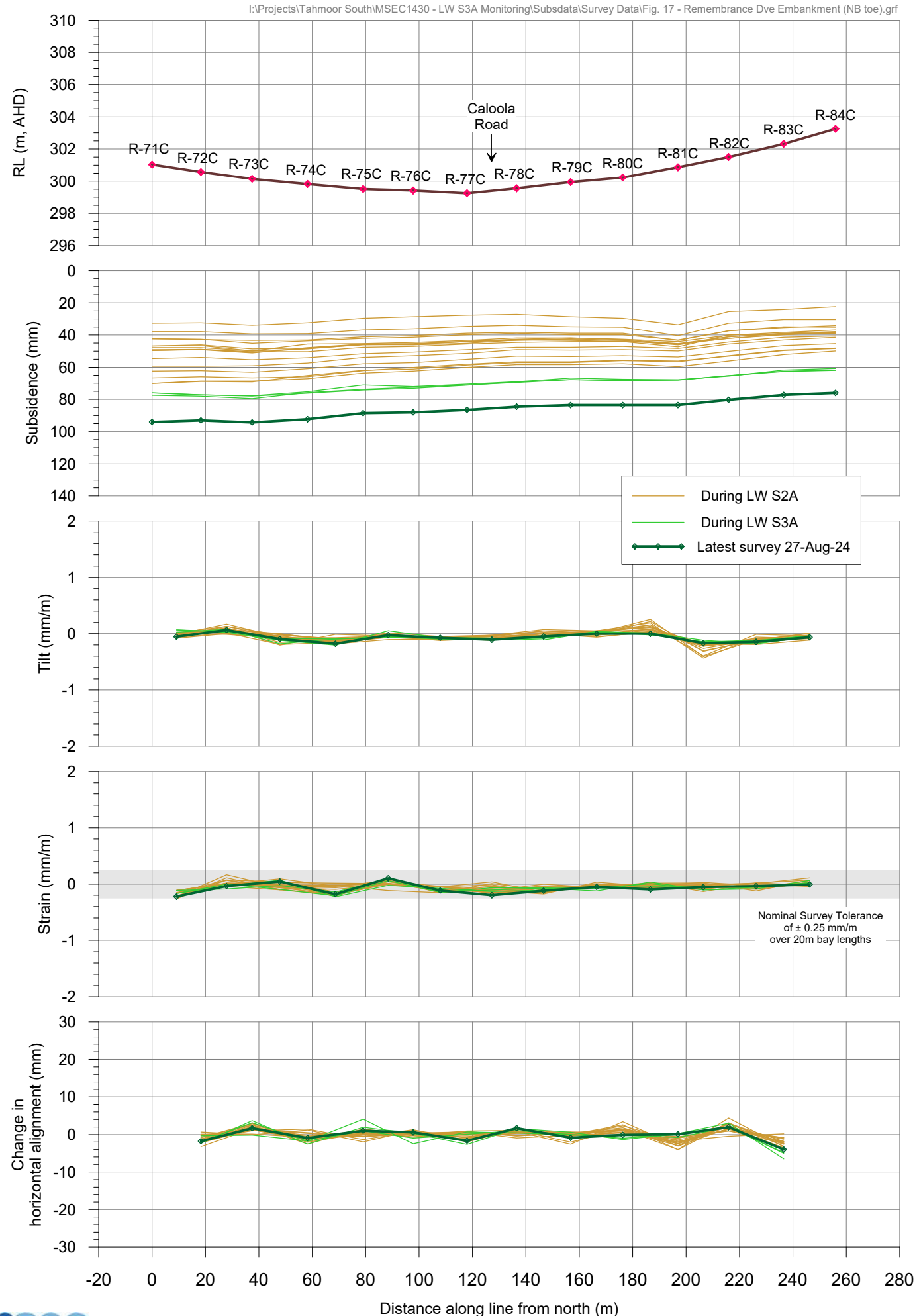
Tahmoor South LW S3A - Remembrance Drive Embankment
Total subsidence profiles along northbound crest



msec

Fig. 16-R14

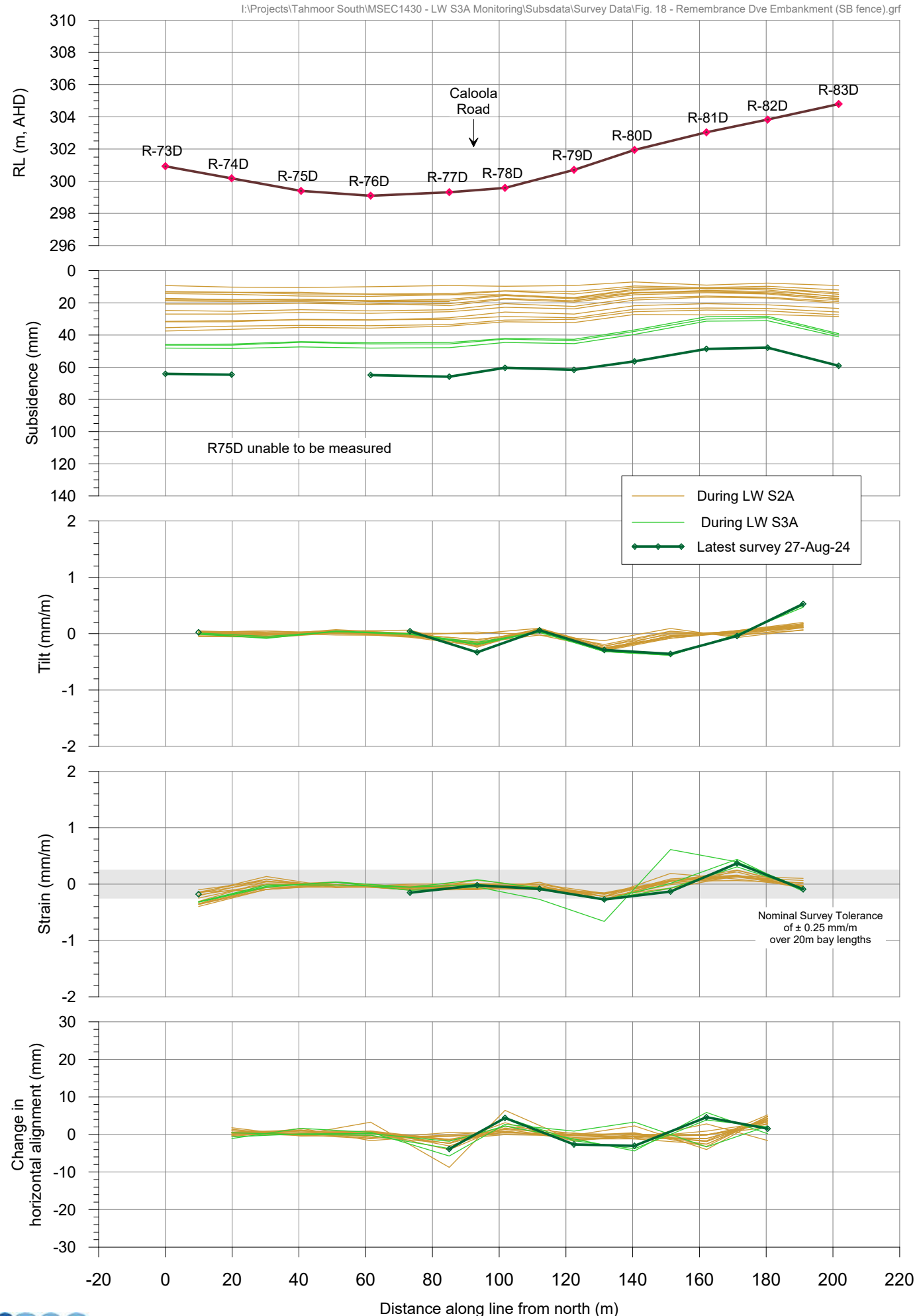
Tahmoor South LW S3A - Remembrance Drive Embankment
Total subsidence profiles along northbound toe



msec

Fig. 17-R14

Tahmoor South LW S3A - Remembrance Drive Embankment
Total subsidence profiles along southbound fence

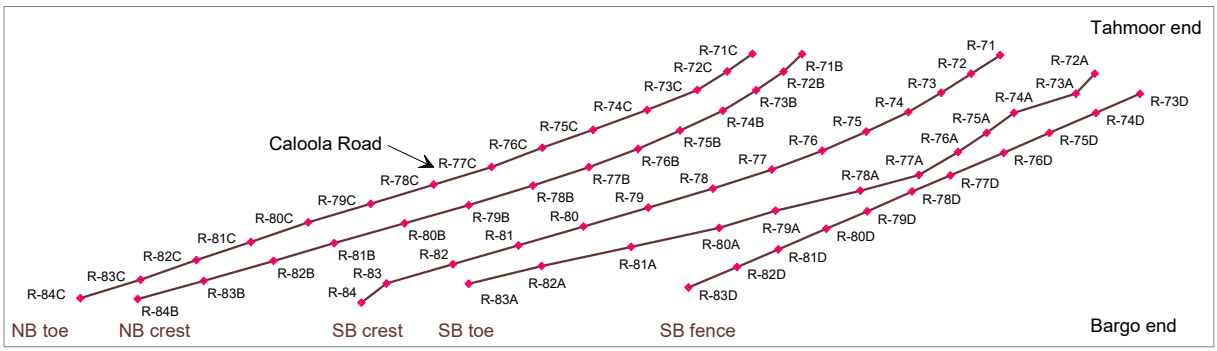


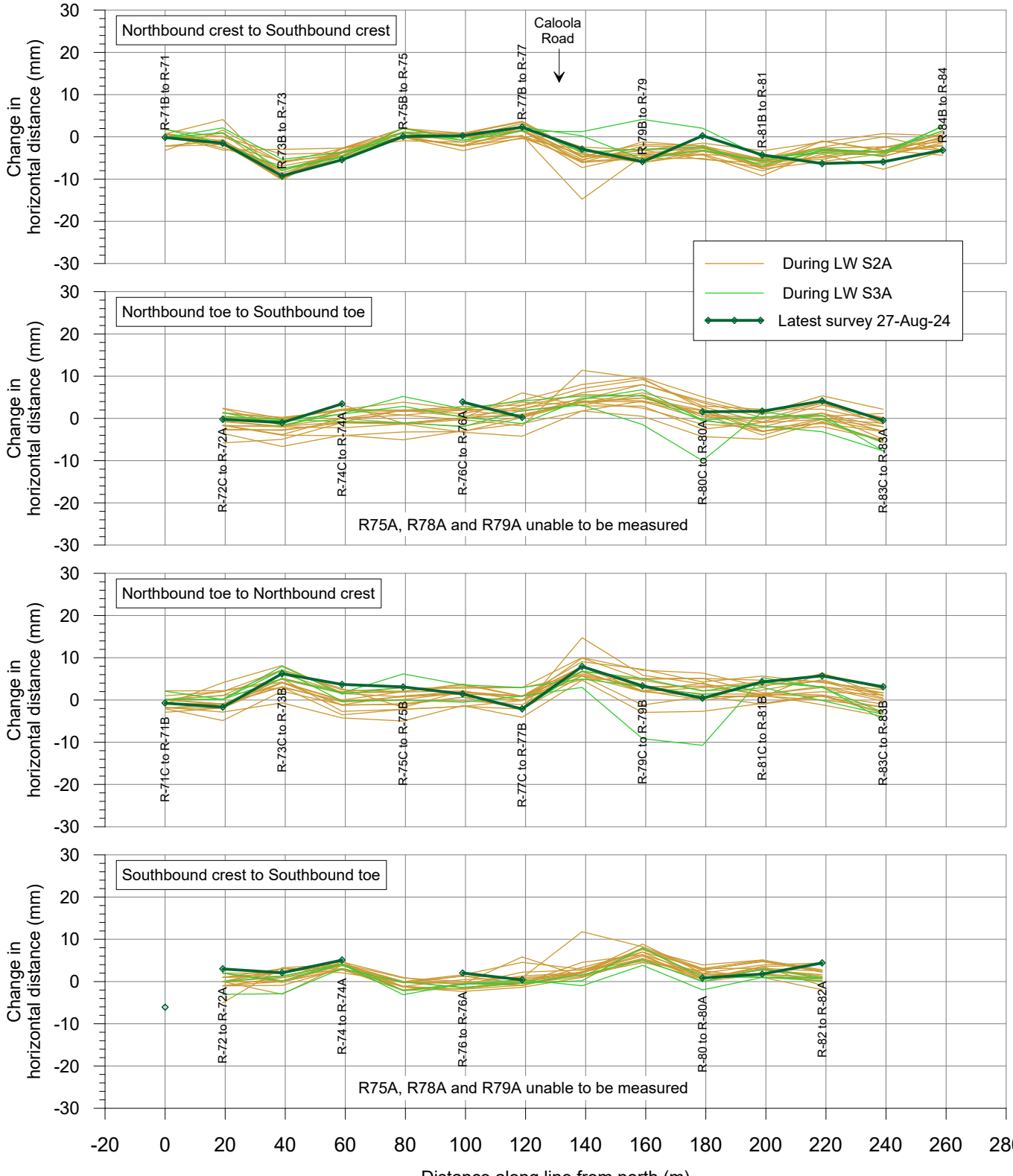
msec

Fig. 18-R14

Tahmoor South LW S3A - Remembrance Drive Embankment
Total closure across the embankment

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. 19 - Remembrance Dve Embankment (closure).grf





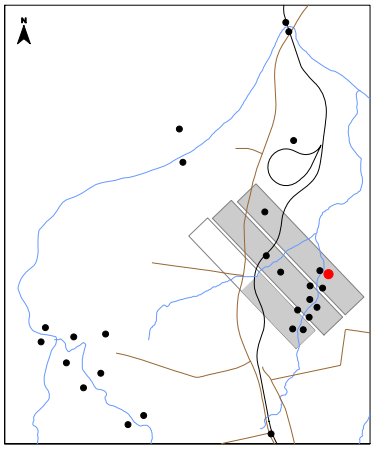
msec

Fig. 19-R14

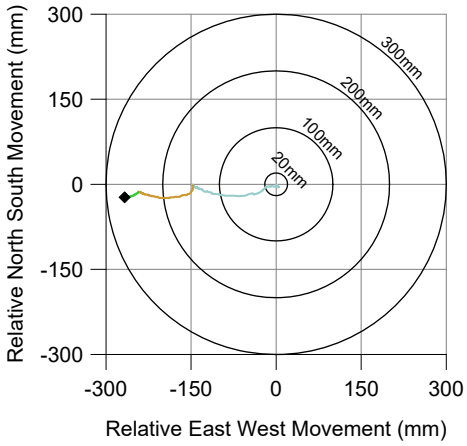
Tahmoor South LW S3A - GNSS Monitoring

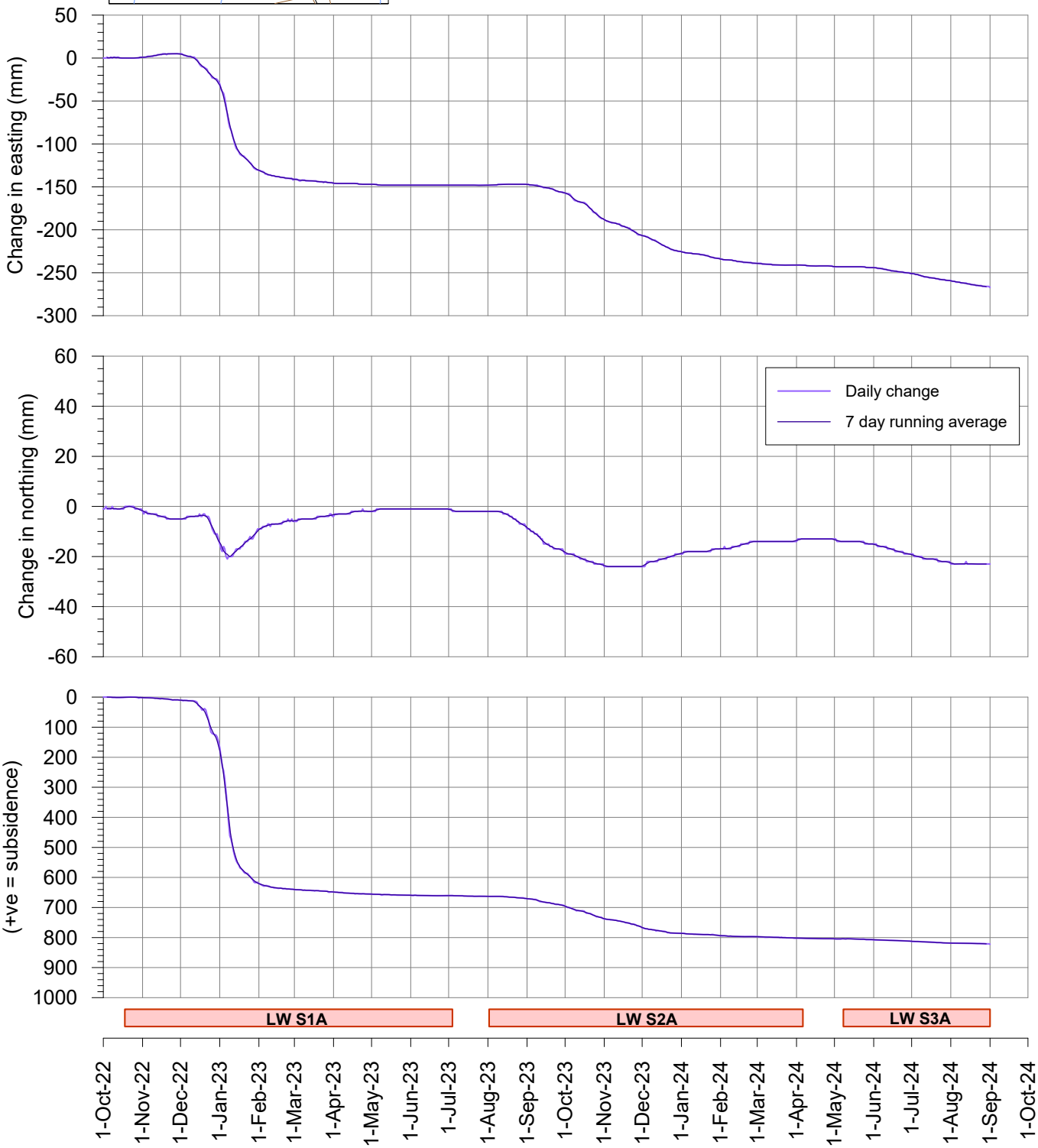
Site S01 above LW S1A

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S01 GNSS.grf



During LW S1A
During LW S2A
During LW S3A





msec

Fig. S01-R14

Tahmoor South LW S3A - GNSS Monitoring

Site S02 above LW S1A

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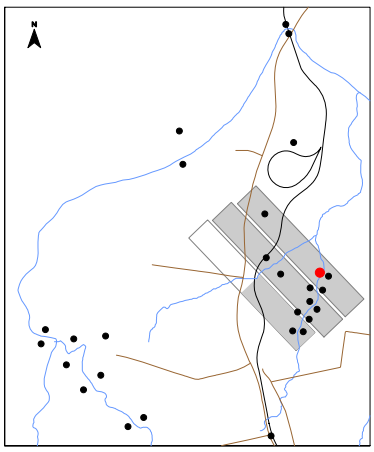
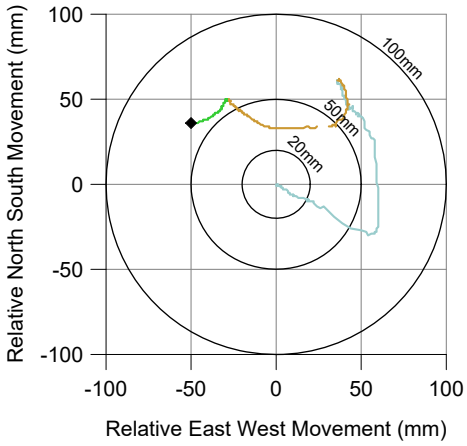
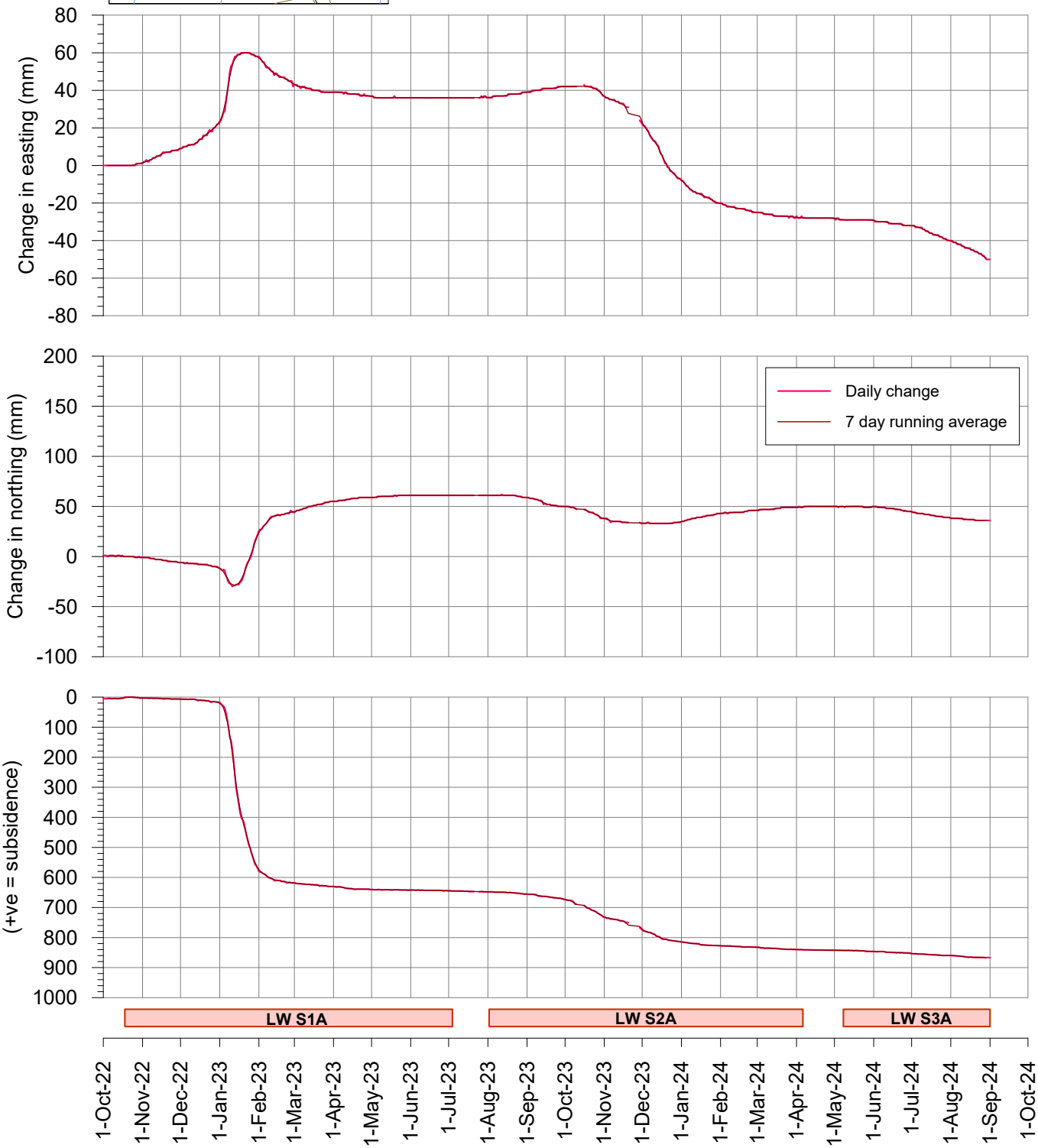






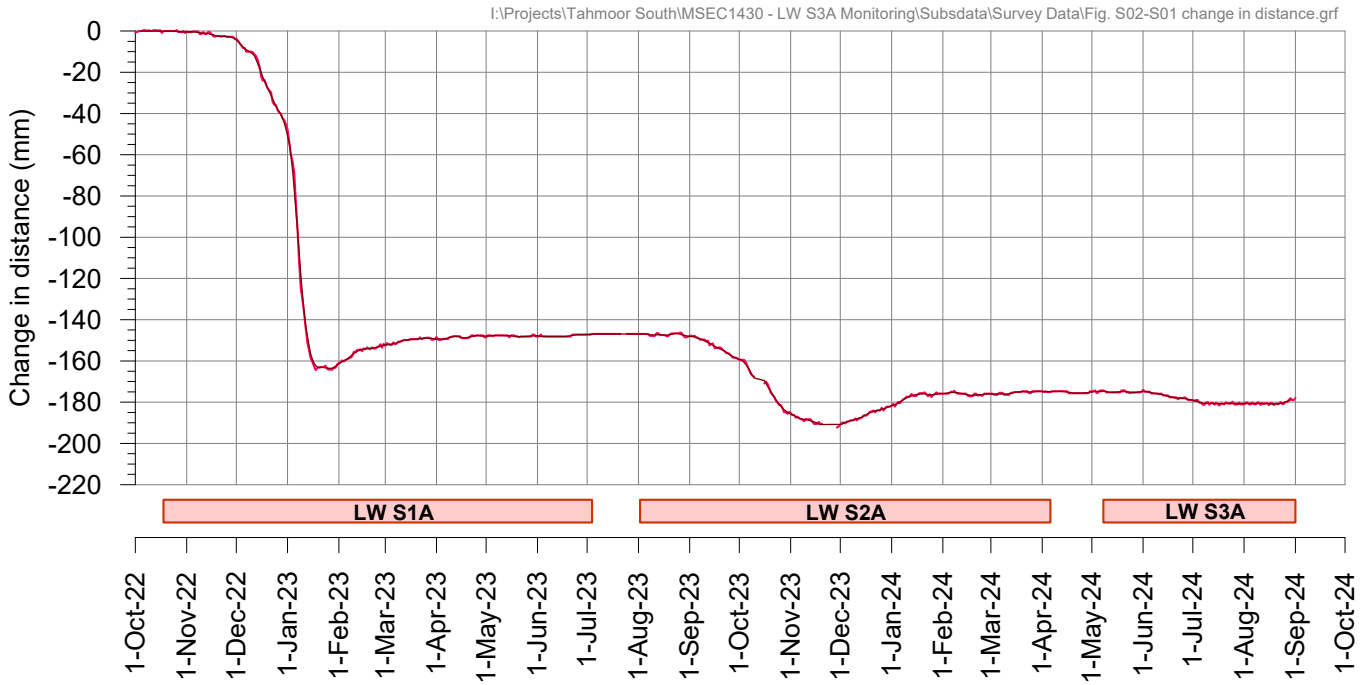


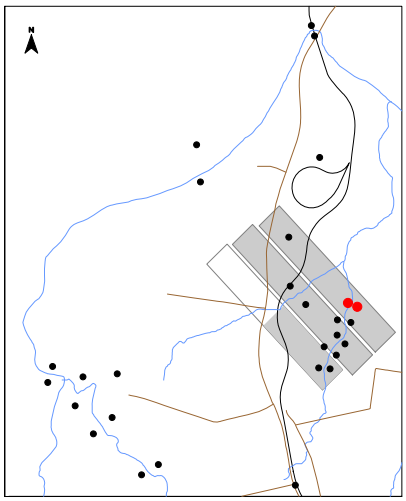
msec

Fig. S02-R14

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek
Sites S01 and S02 above LW S1A





Tahmoor South LW S3A - GNSS Monitoring

Site S03 above LW S1A at Teatree 3

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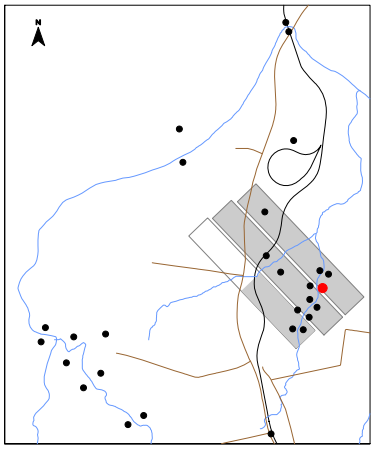
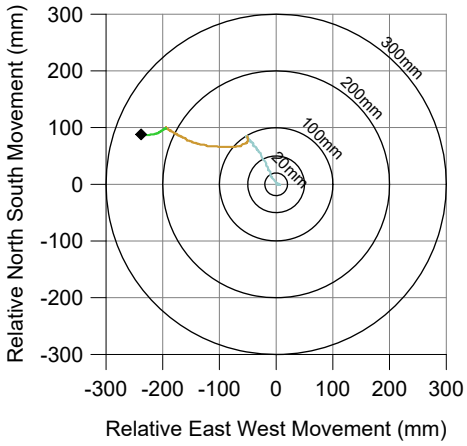
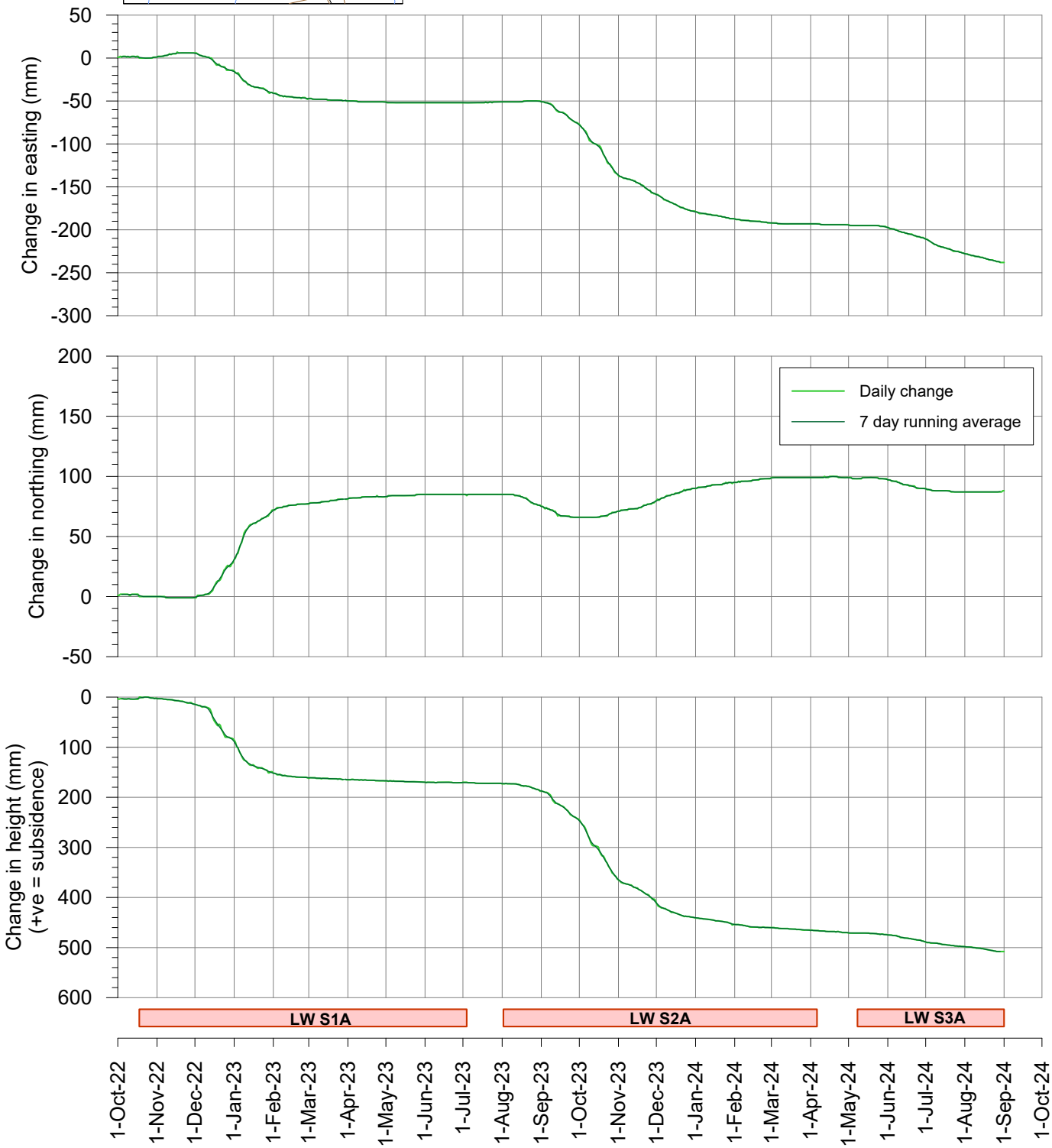


During LW S1A
During LW S2A
During LW S3A





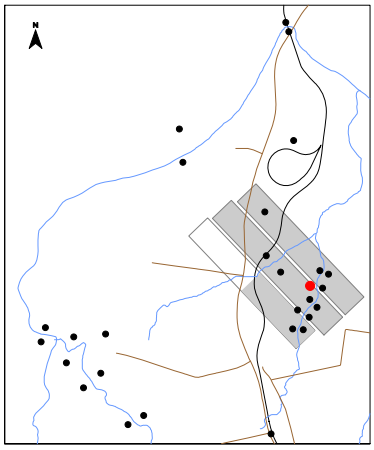
msec

Fig. S03-R14

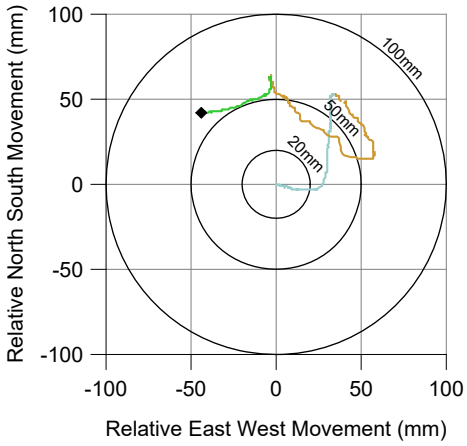
Tahmoor South LW S3A - GNSS Monitoring

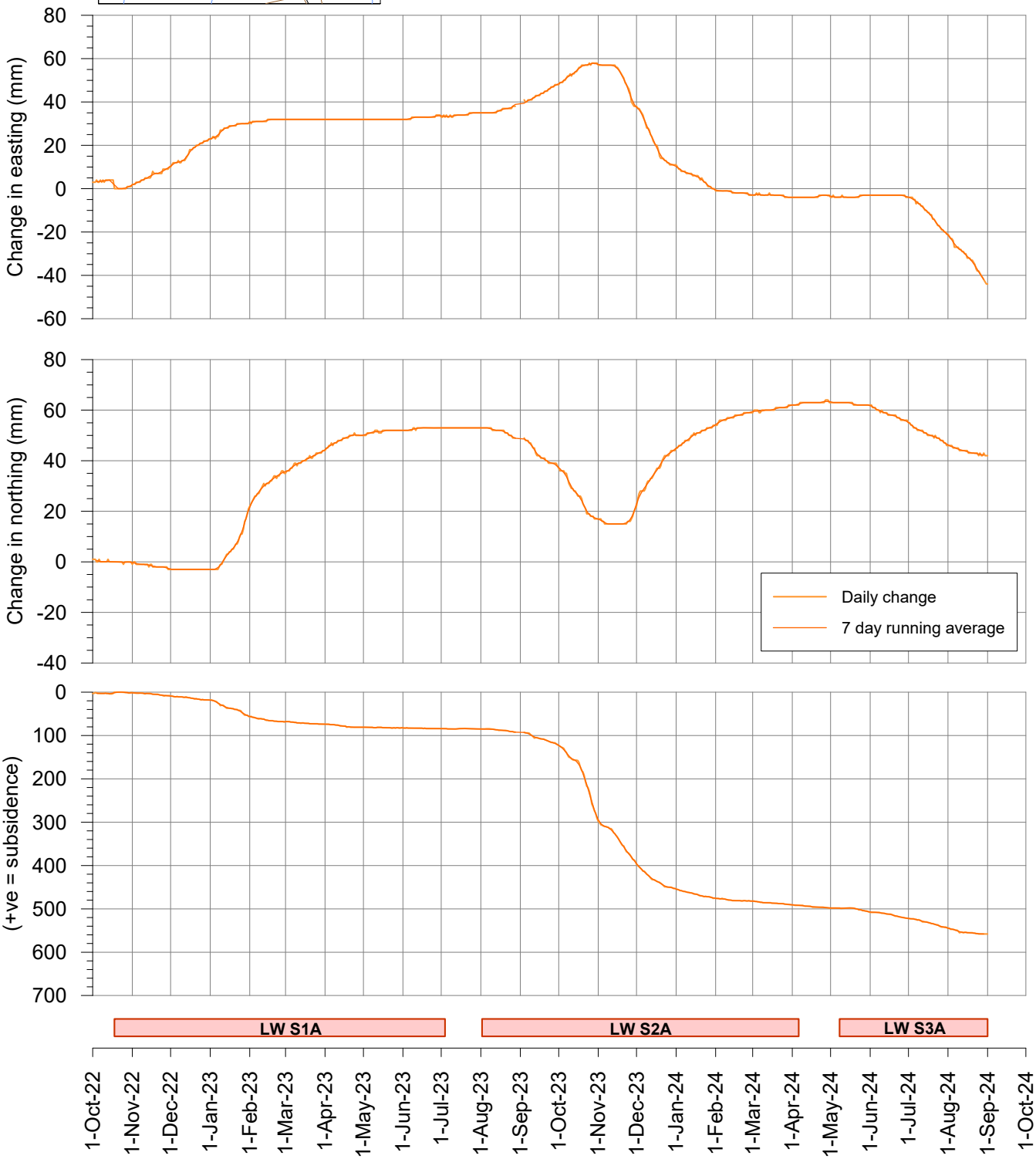
Site S04 above LW S2A at Teatree 3

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S04 GNSS.grf



During LW S1A
During LW S2A
During LW S3A



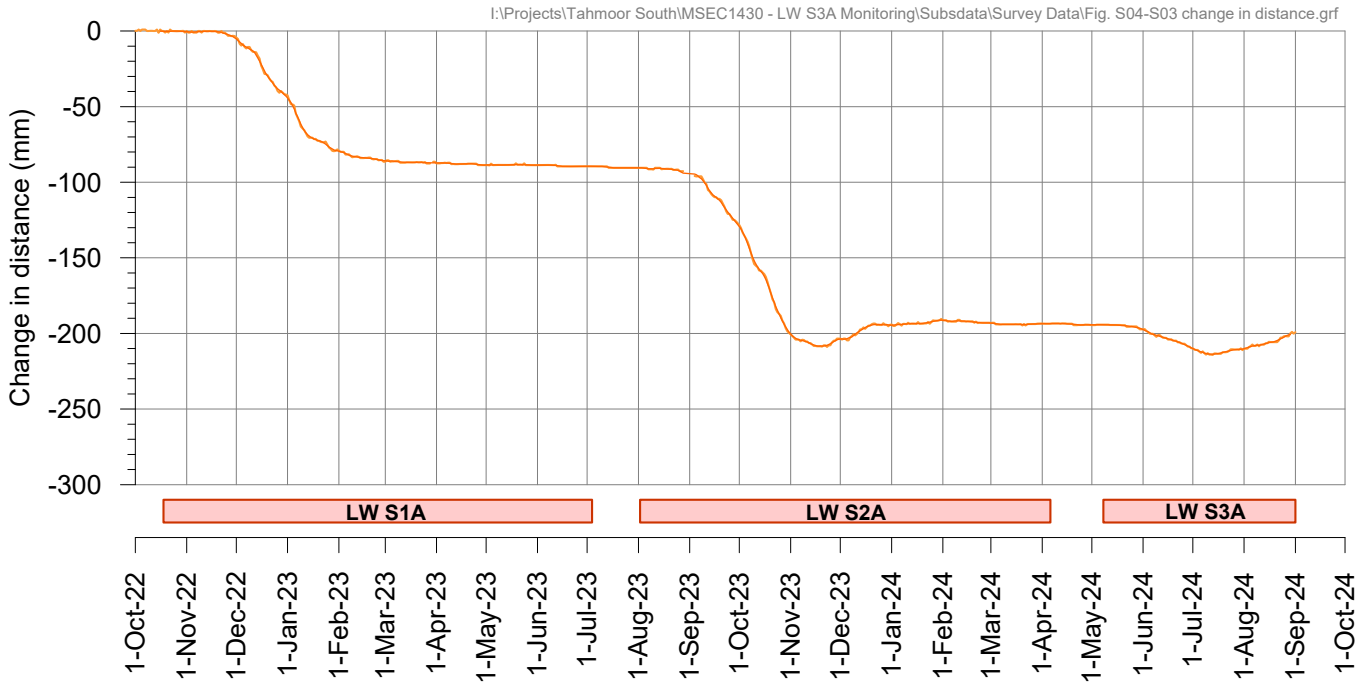


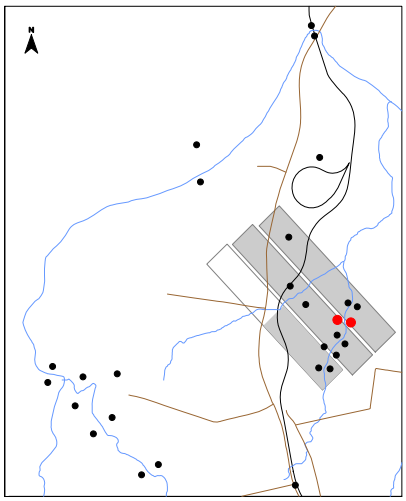
msec

Fig. S04-R14

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek at Teatree 3
Site S03 above LW S1A and Site S04 above LW S2A





Tahmoor South LW S3A - GNSS Monitoring

Site S05 above LW S2A

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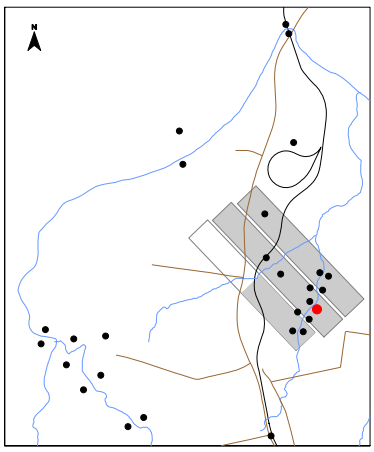
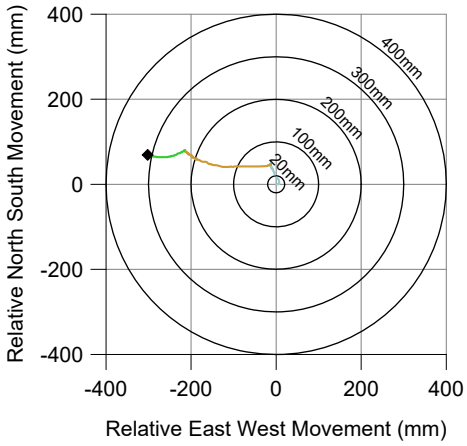
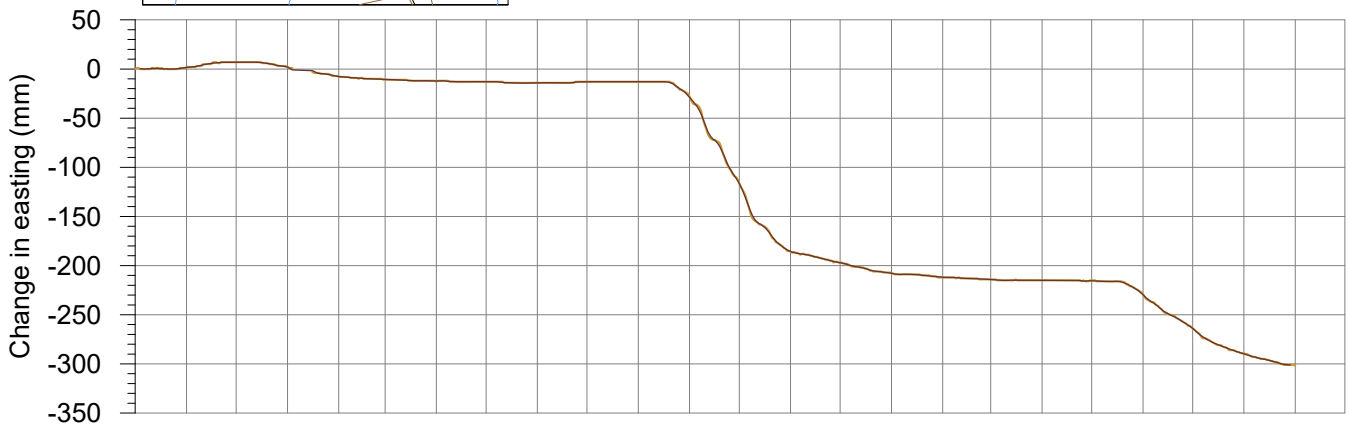
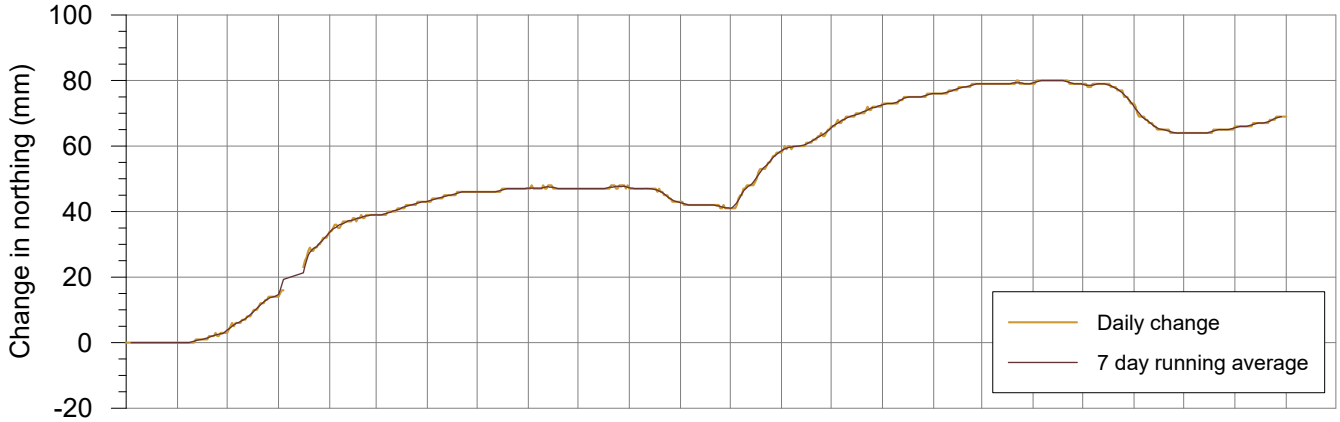
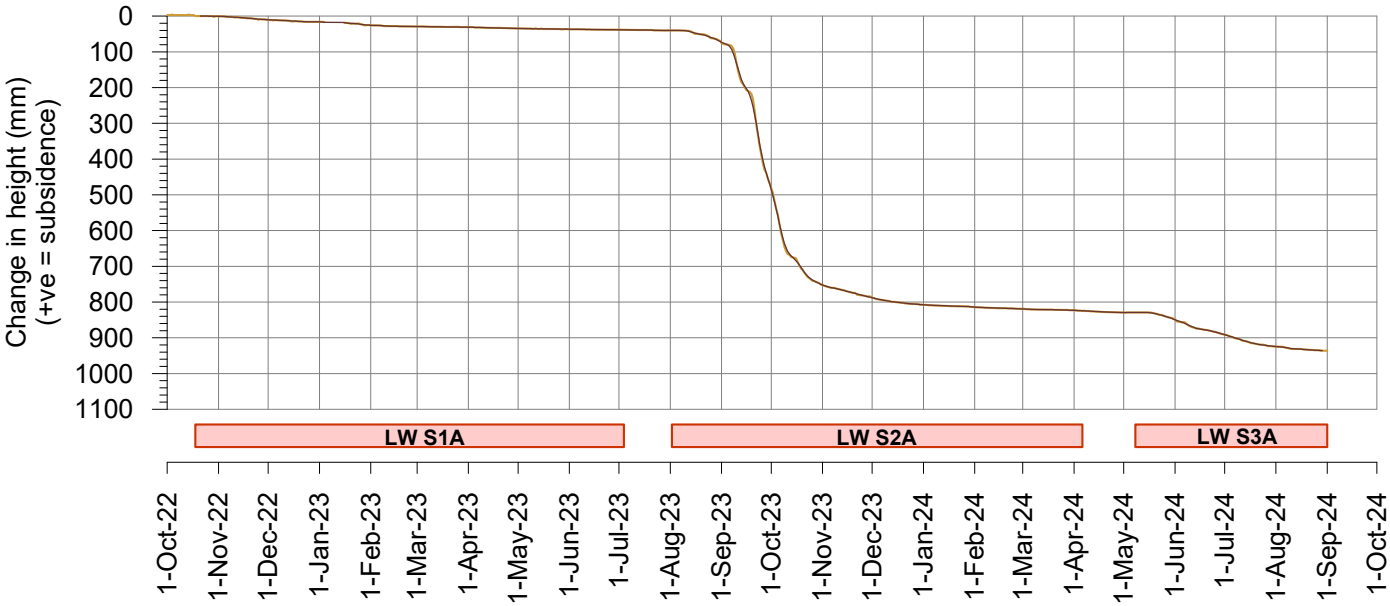


During LW S1A
During LW S2A
During LW S3A









msec

Fig. S05-R14

Tahmoor South LW S3A - GNSS Monitoring

Site S06 above LW S2A

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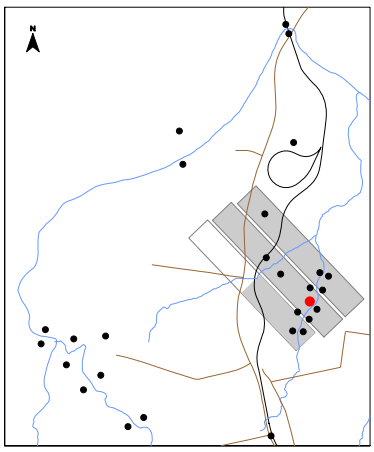
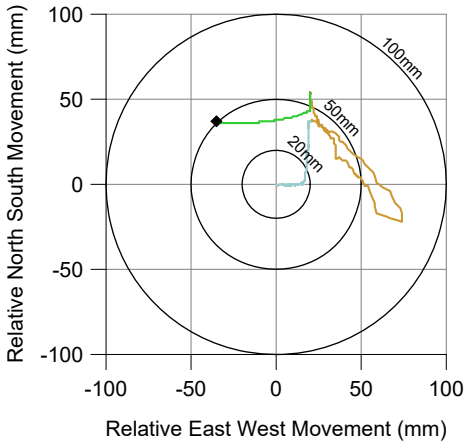
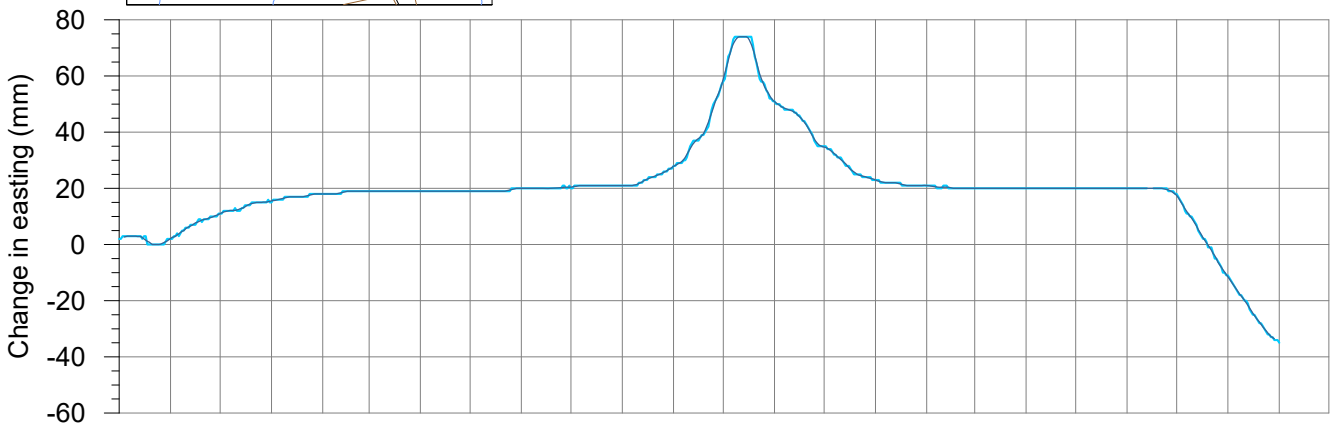
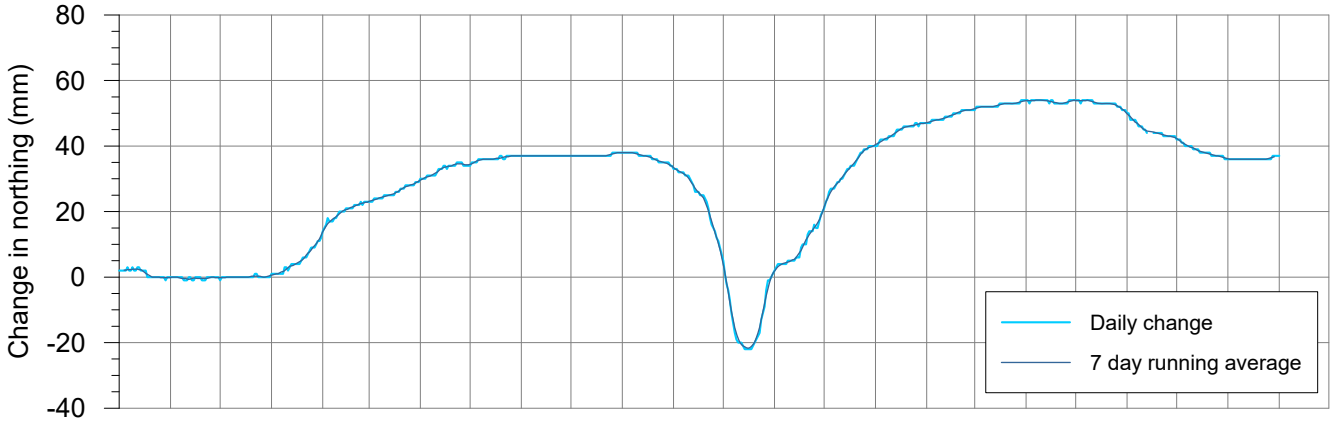
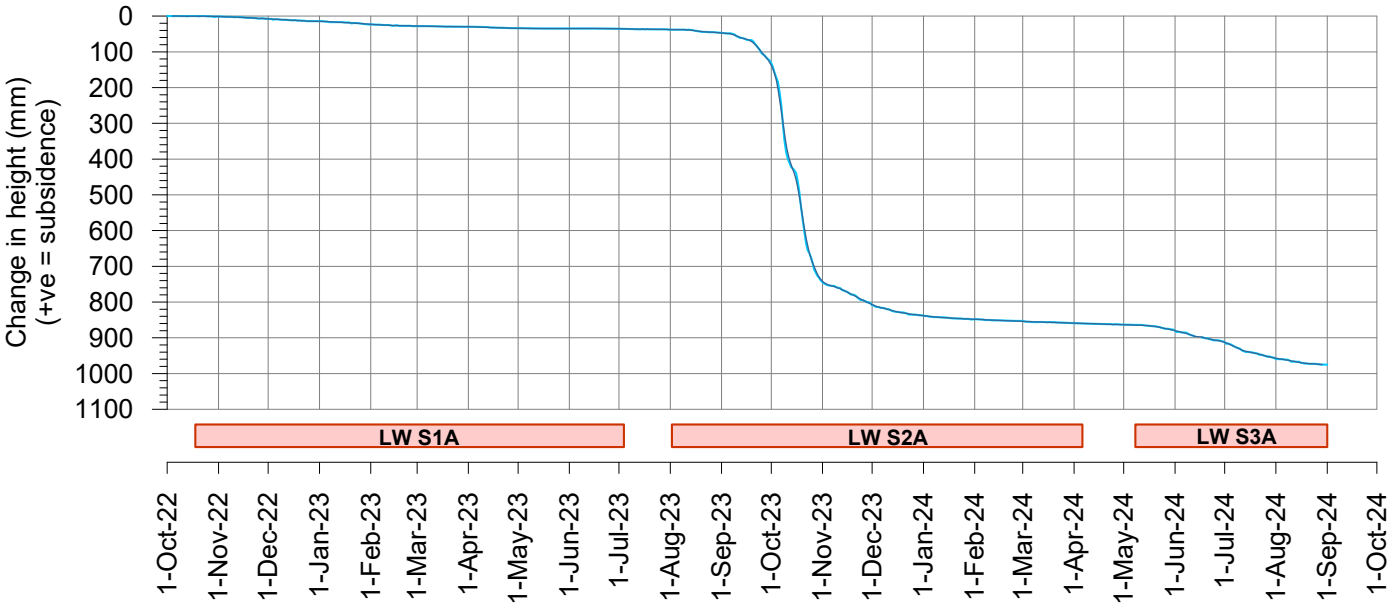


During LW S1A
During LW S2A
During LW S3A







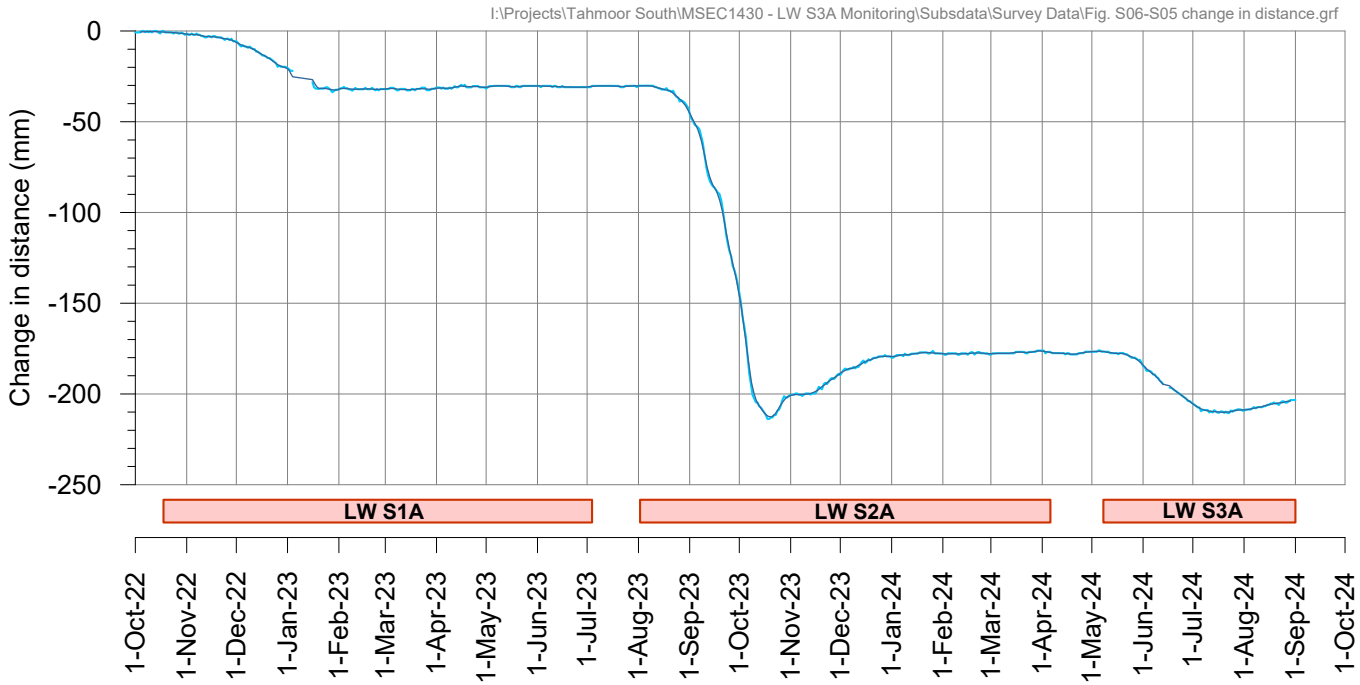


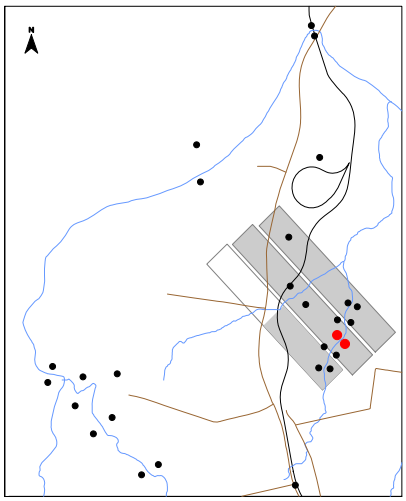
msec

Fig. S06-R14

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek
Sites S05 and S06 above LW S2A





Tahmoor South LW S3A - GNSS Monitoring

Site S07 above LW S2A

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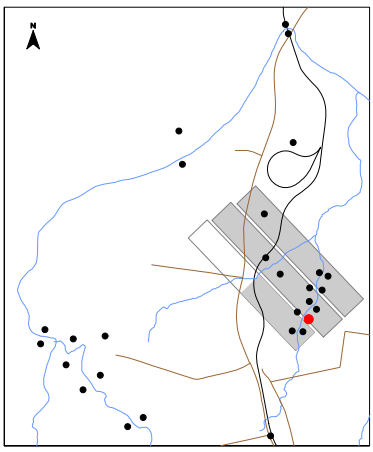
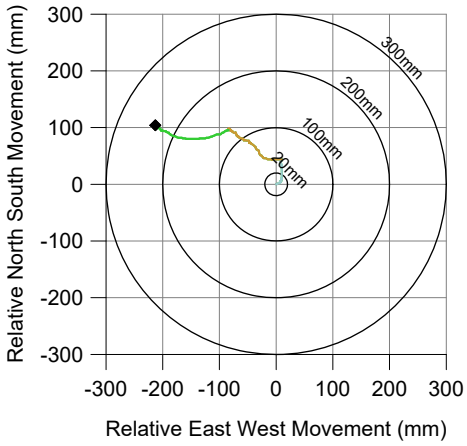
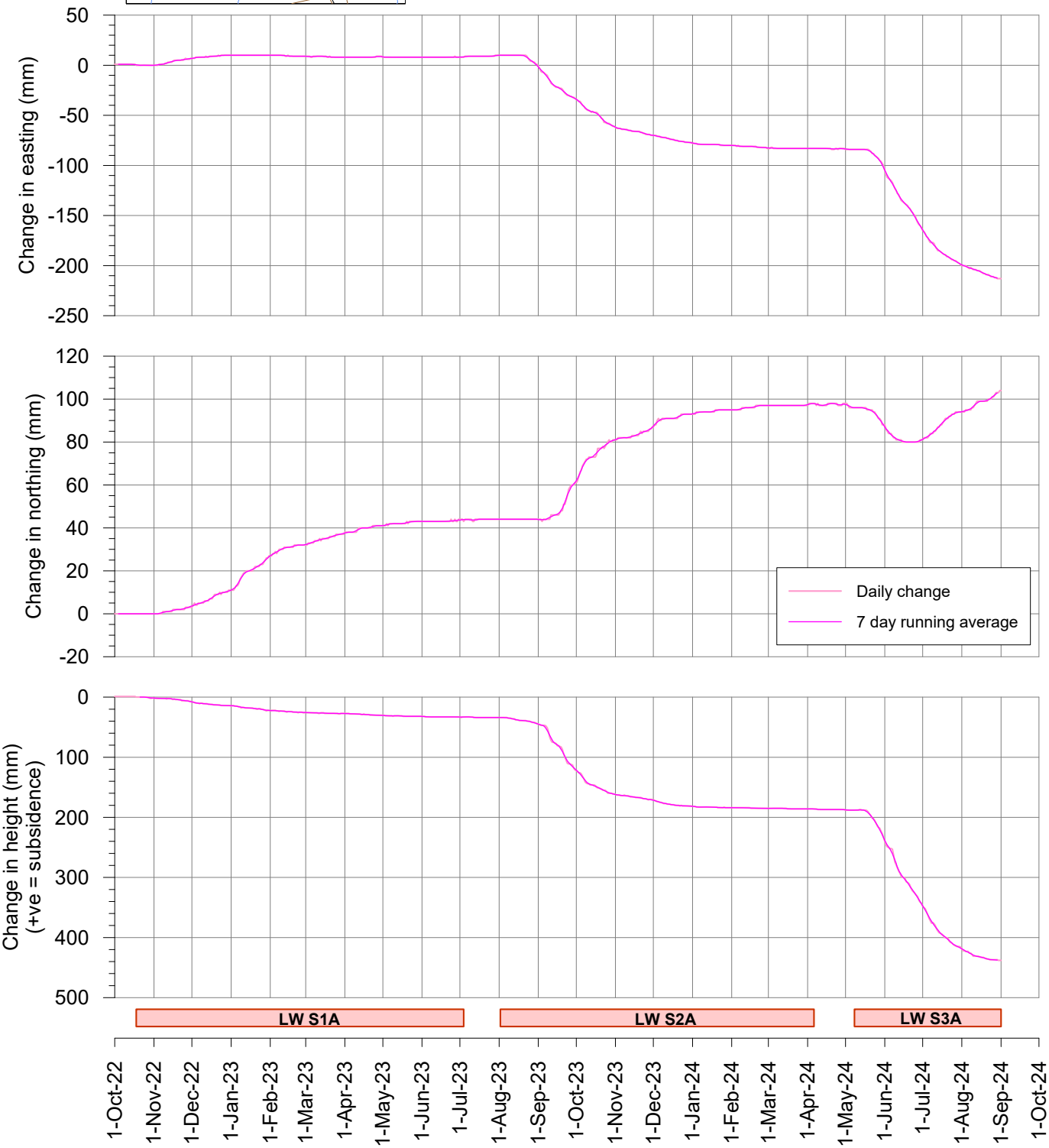








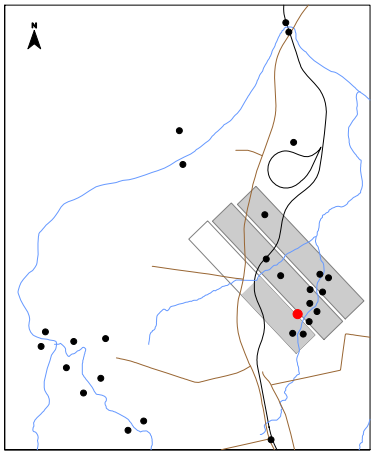
msec

Fig. S07-R14

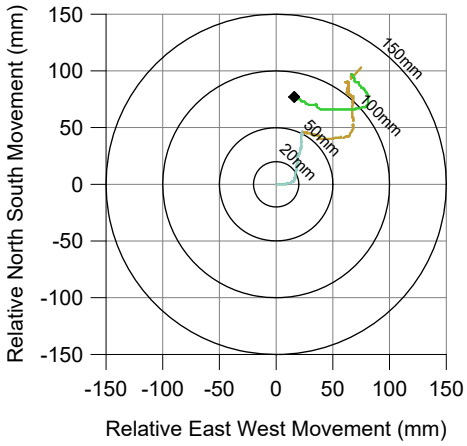
Tahmoor South LW S3A - GNSS Monitoring

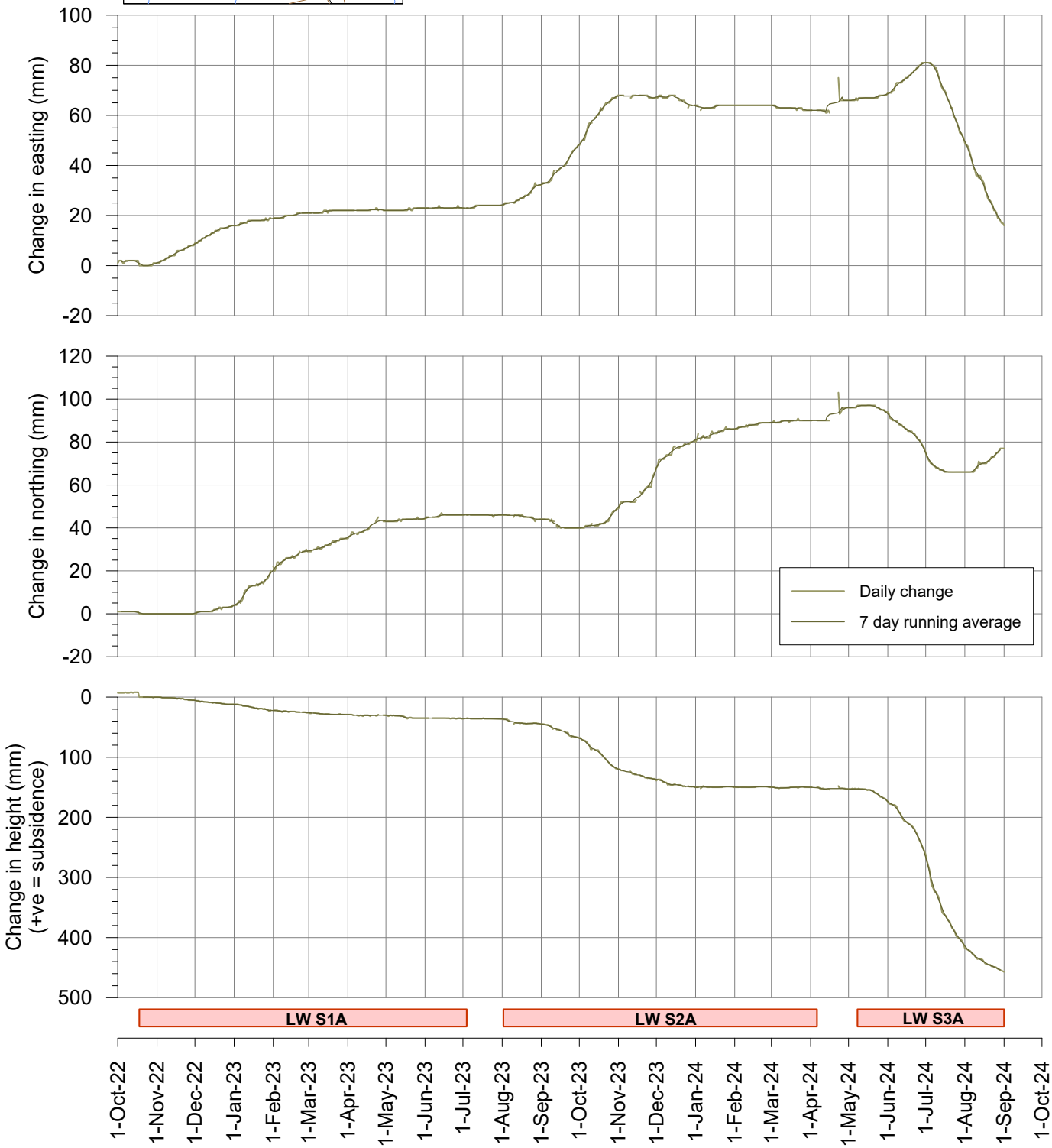
Site S08 between LW S2A and LW S3A

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S08 GNSS.grf







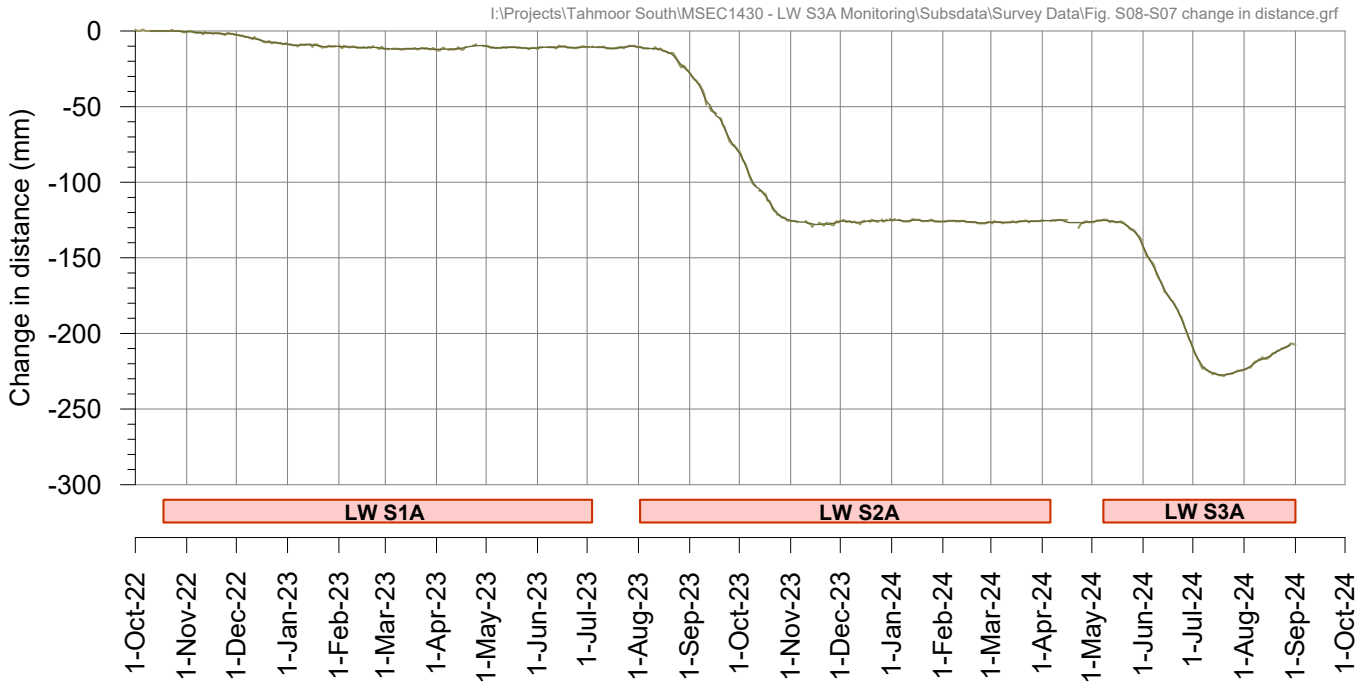


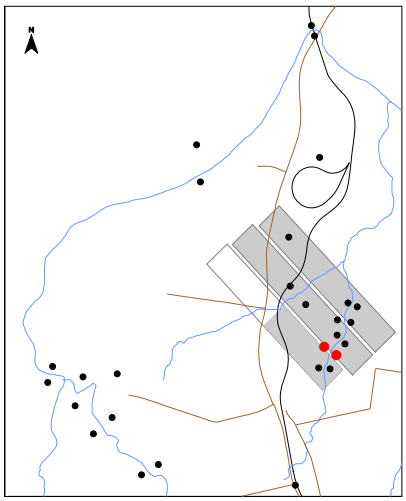
msec

Fig. S08-R14

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek
Site S07 above LW S2A and Site S08 between LW S2A and LW S3A

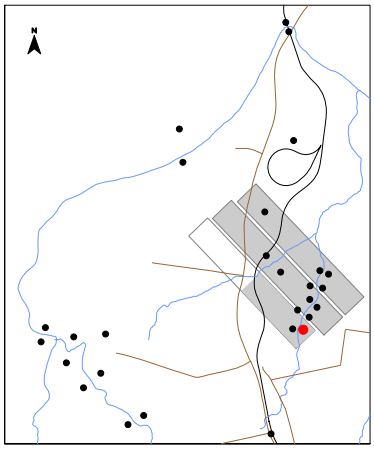




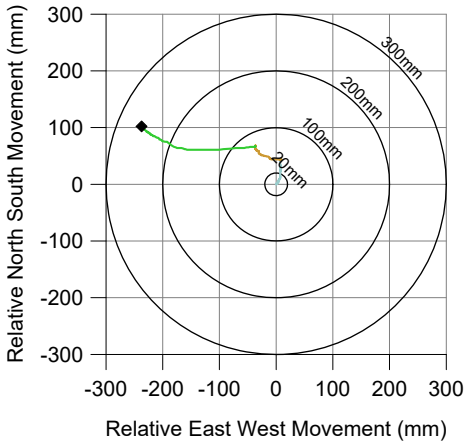
Tahmoor South LW S3A - GNSS Monitoring

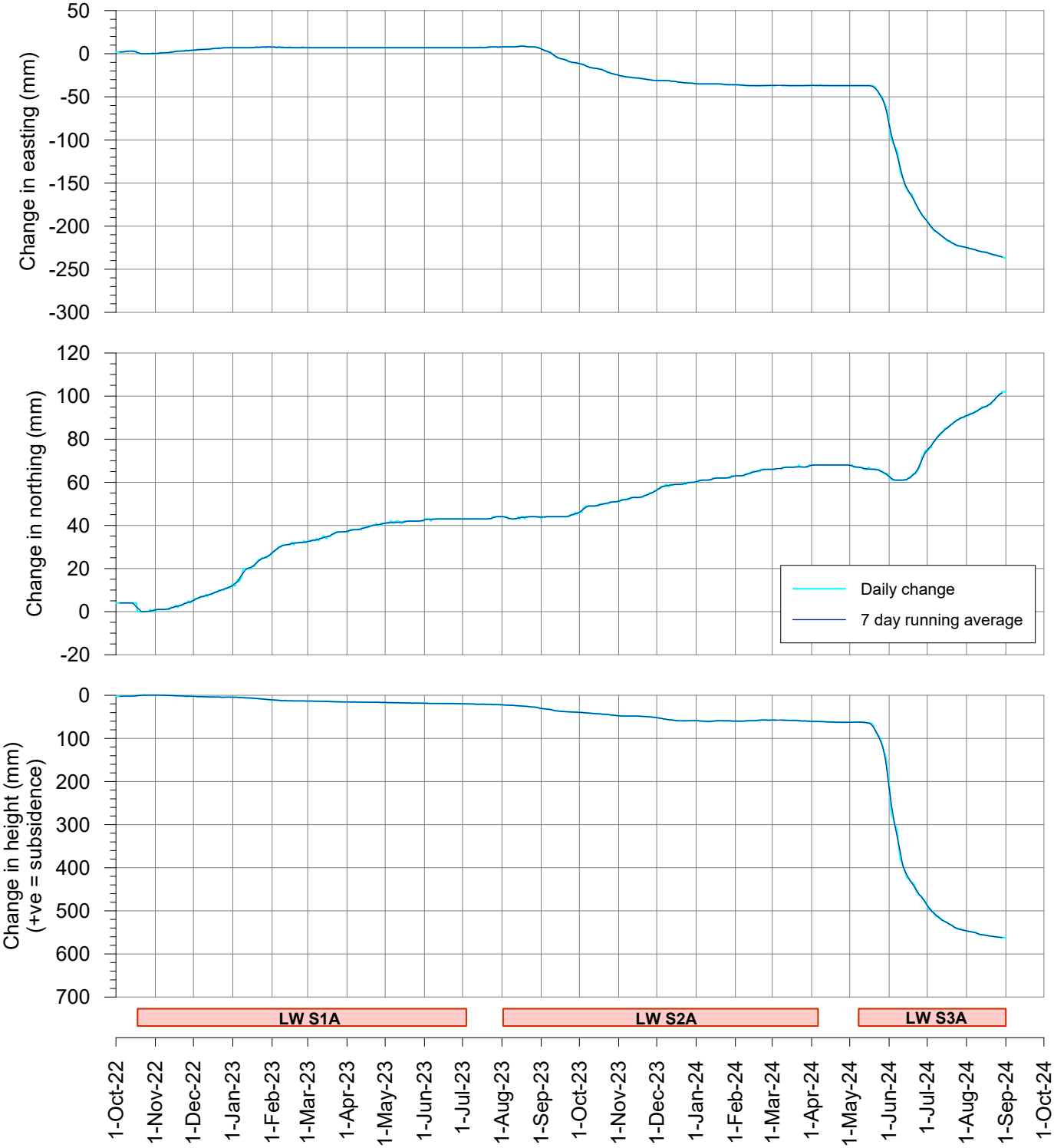
Site S09 above LW S3A at Teatree 2

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S09 GNSS.grf



During LW S1A
During LW S2A
During LW S3A





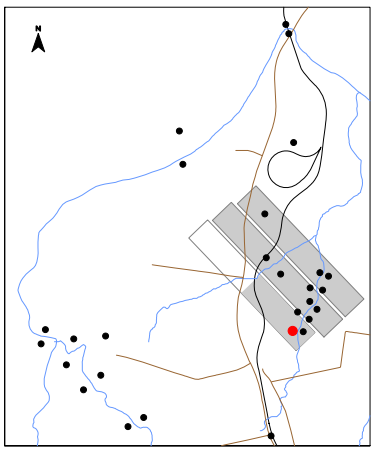
msec

Fig. S09-R14

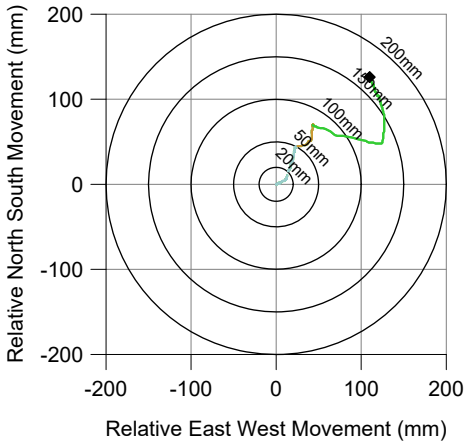
Tahmoor South LW S3A - GNSS Monitoring

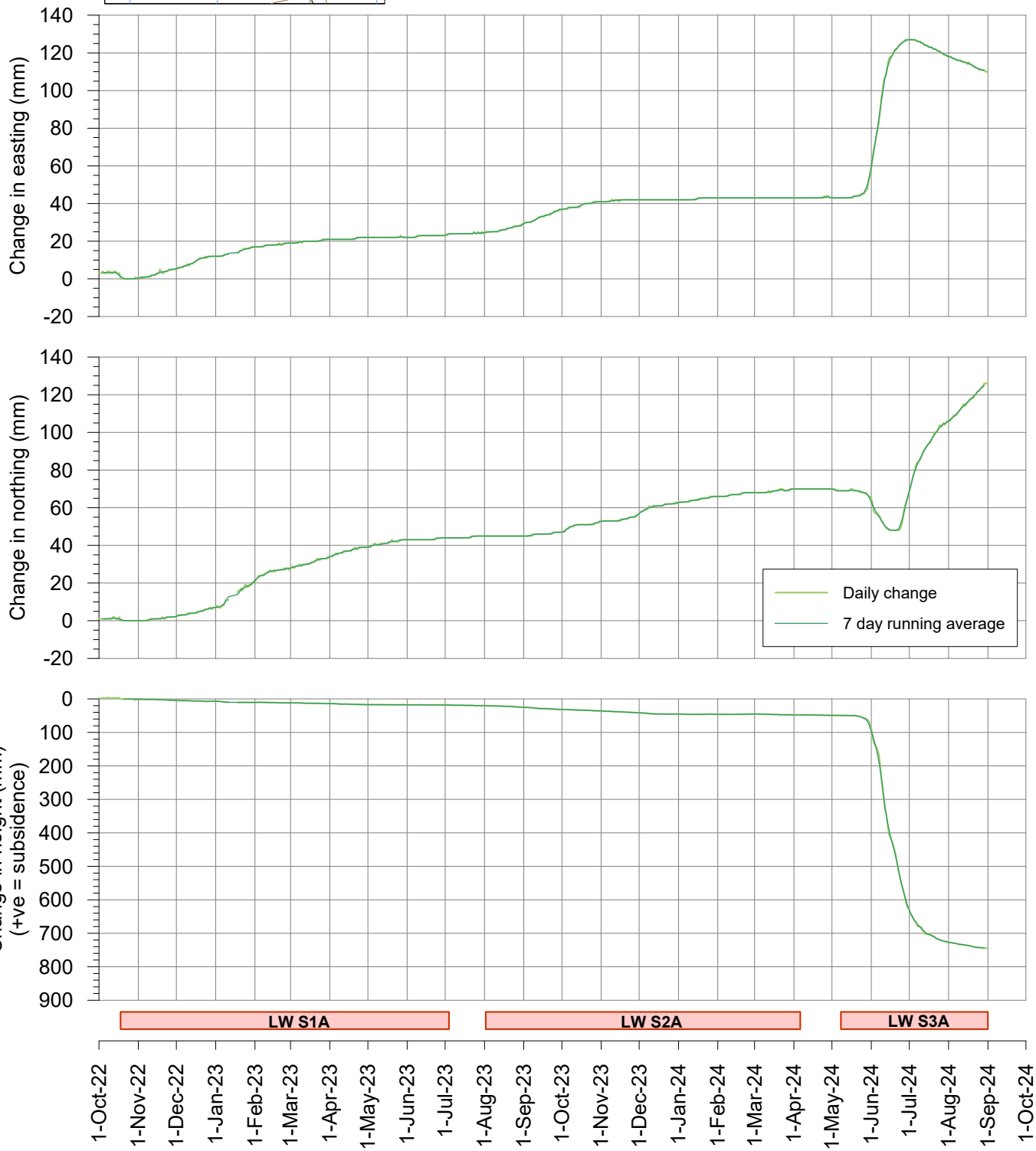
Site S10 above LW S3A at Teatree 2

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S10 GNSS.grf



During LW S1A
During LW S2A
During LW S3A



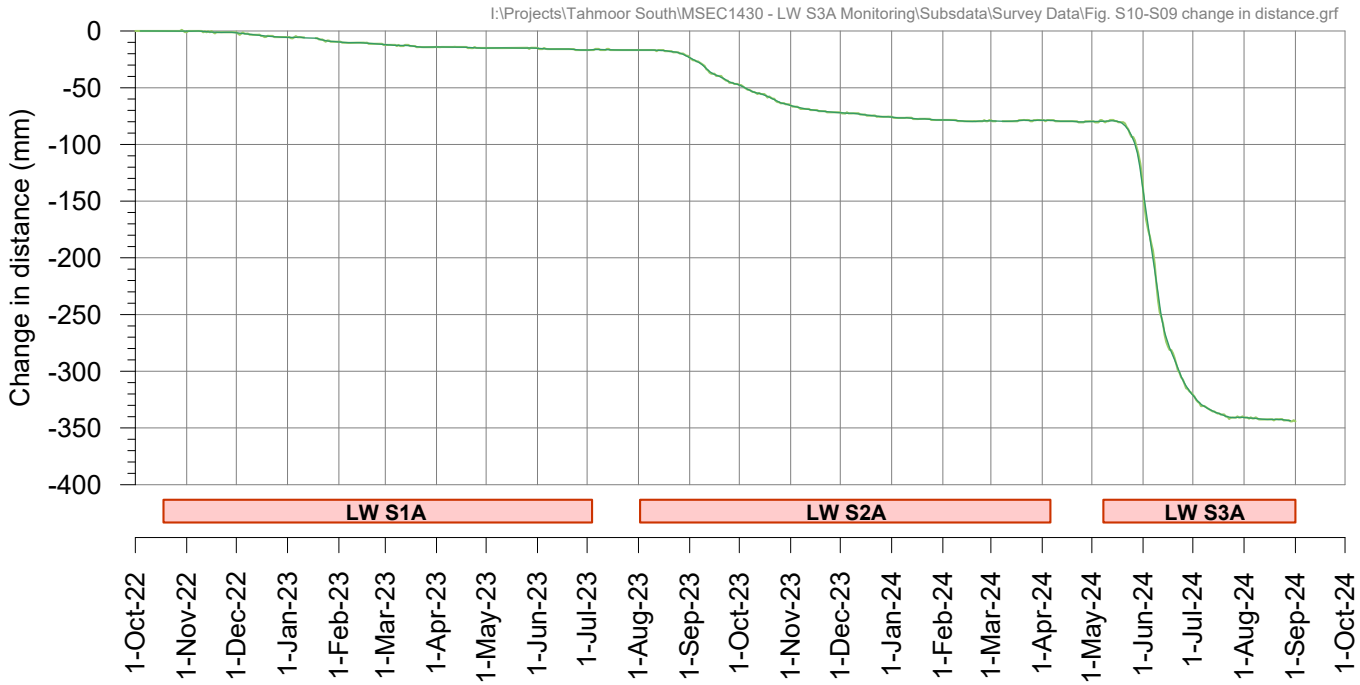


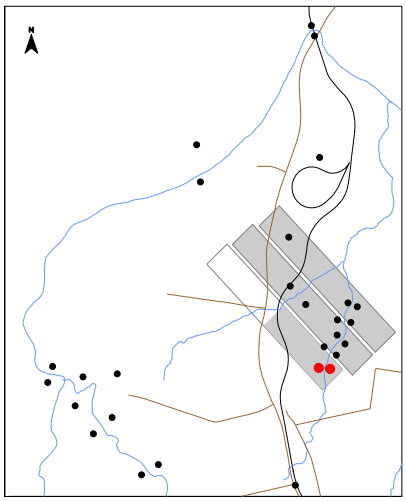
msec

Fig. S10-R14

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek at Teatree 2
Sites S09 and S10 above LW S3A

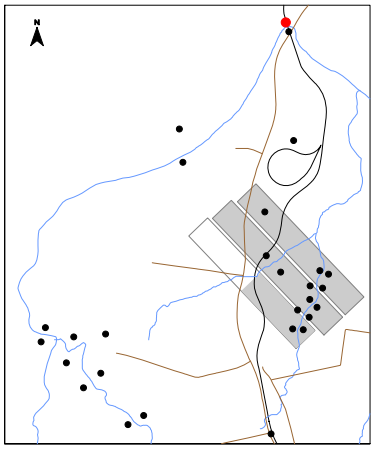




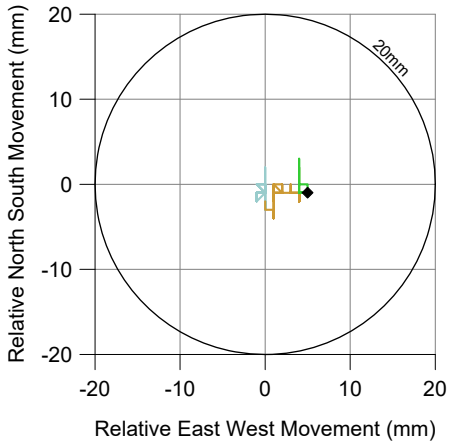
Tahmoor South LW S3A - GNSS Monitoring

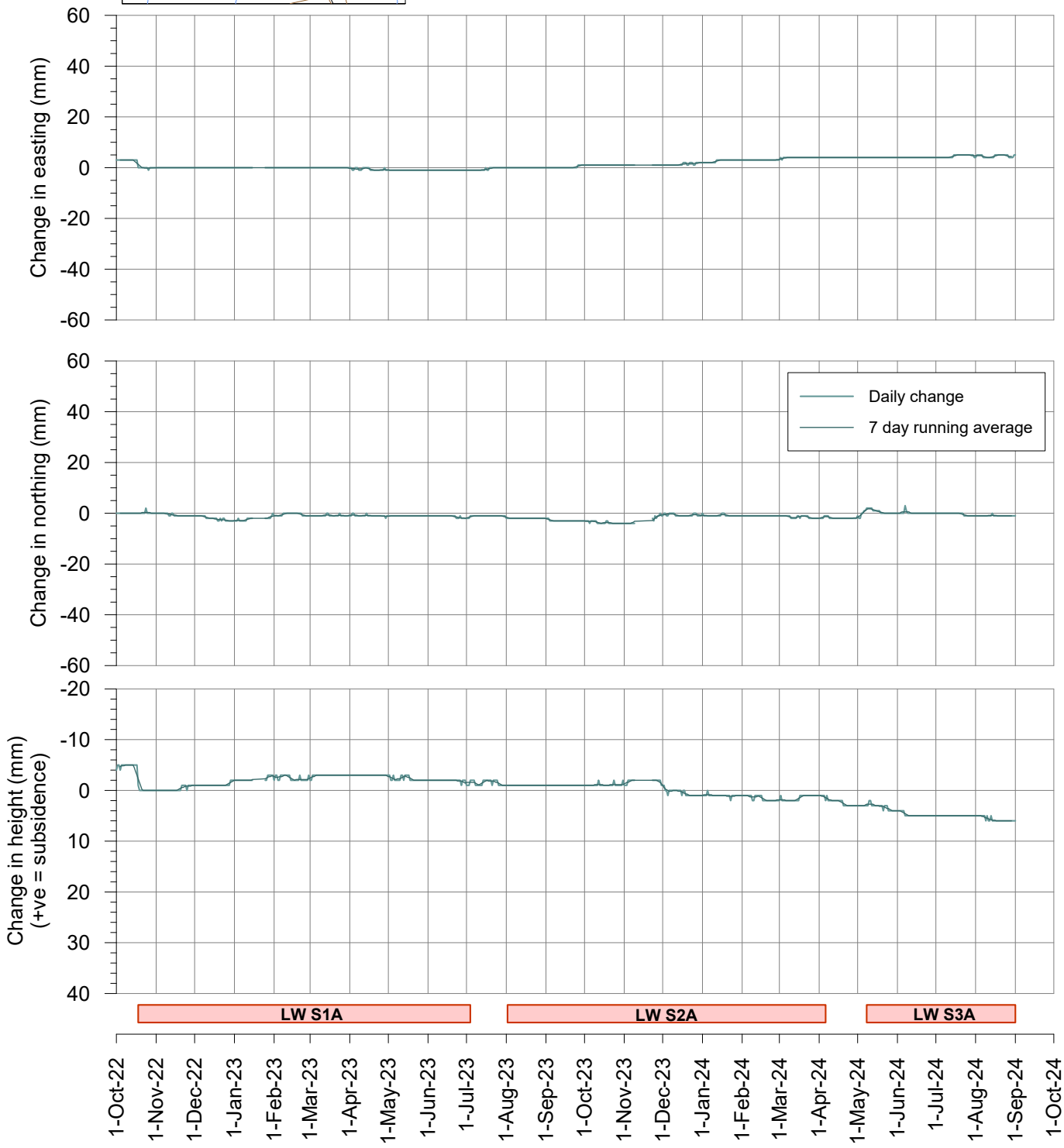
Site S11 at northern end of railway viaduct over Bargo River

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S11 GNSS.grf



During LW S1A
During LW S2A
During LW S3A





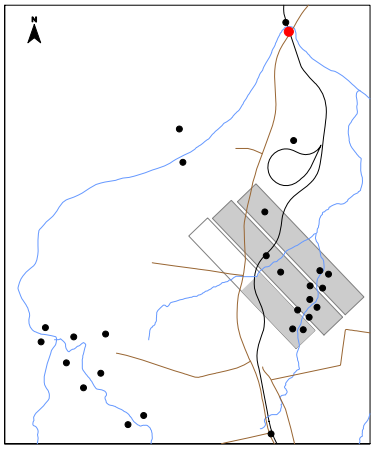
msec

Fig. S11-R14

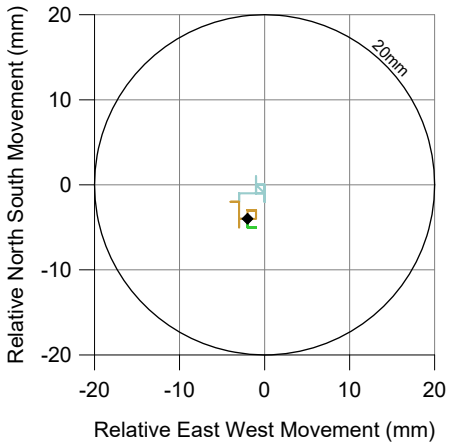
Tahmoor South LW S3A - GNSS Monitoring

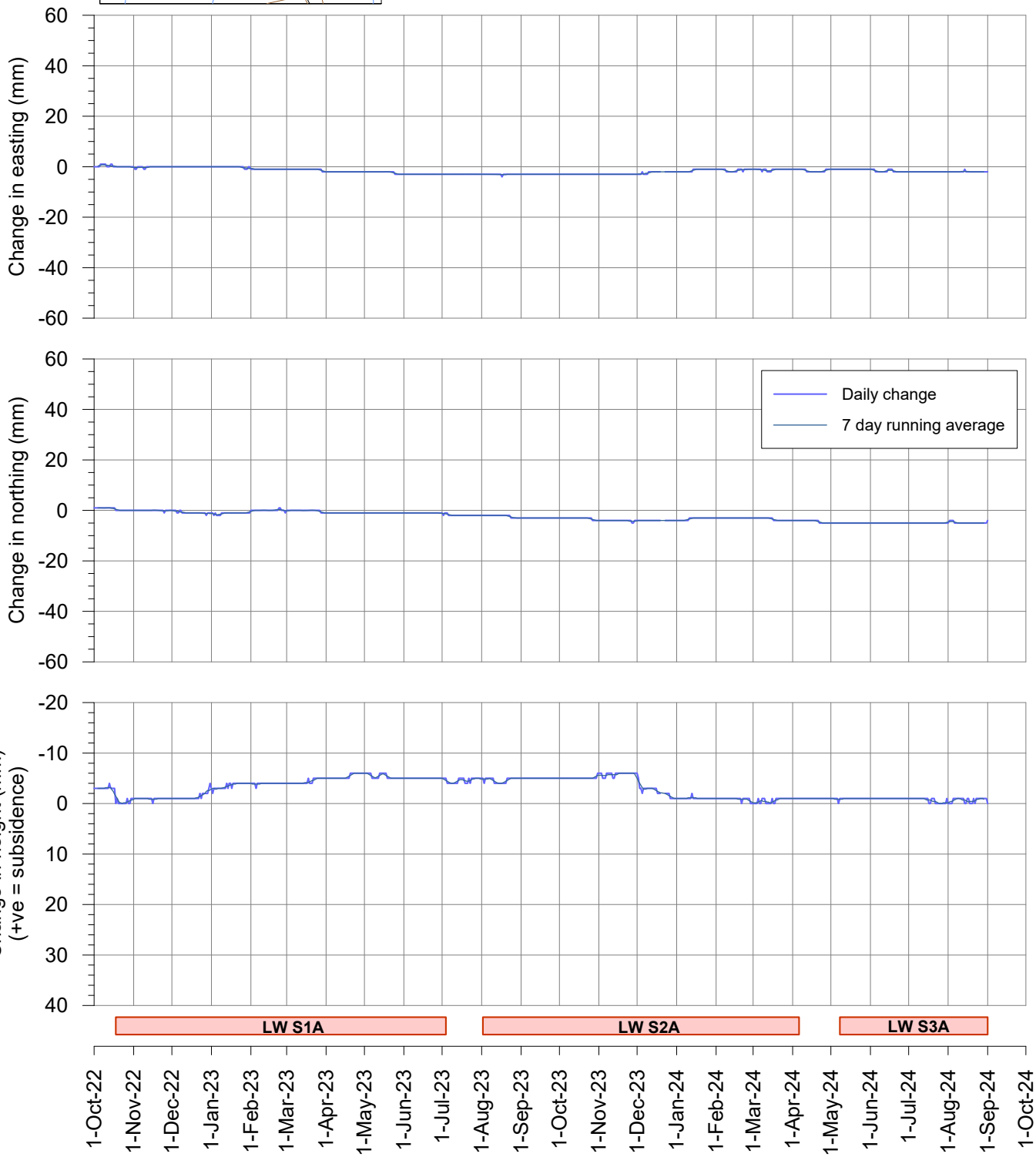
Site S12 at southern end of railway viaduct over Bargo River

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S12 GNSS.grf







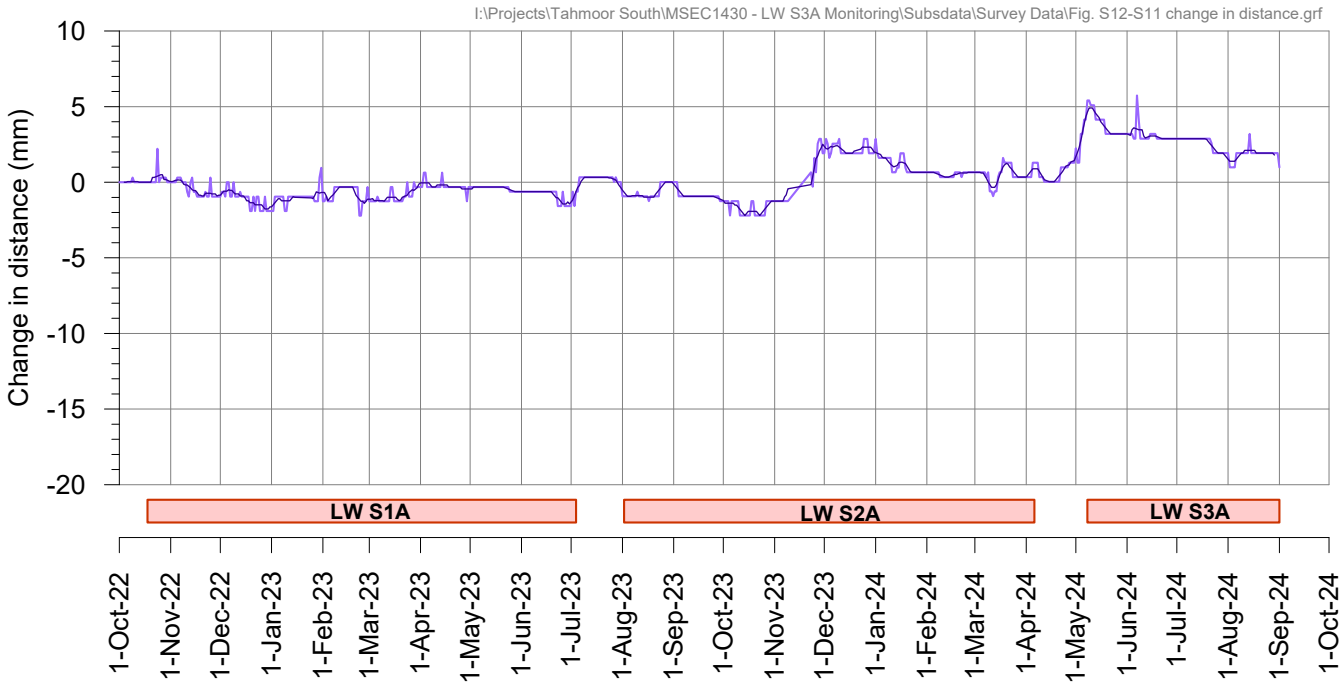


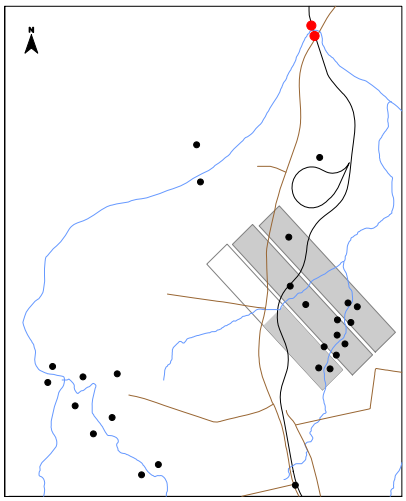
msec

Fig. S12-R14

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Railway Viaduct over Bargo River
Sites S11 and S12

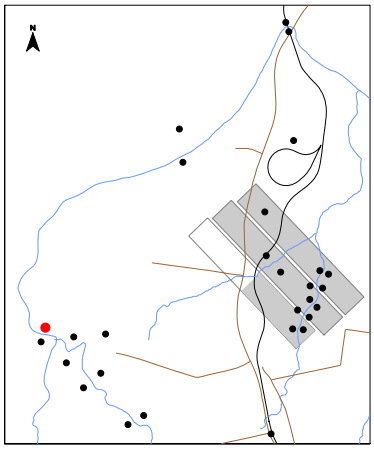




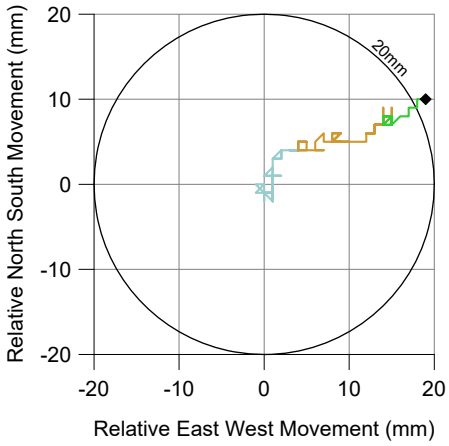
Tahmoor South LW S3A - GNSS Monitoring

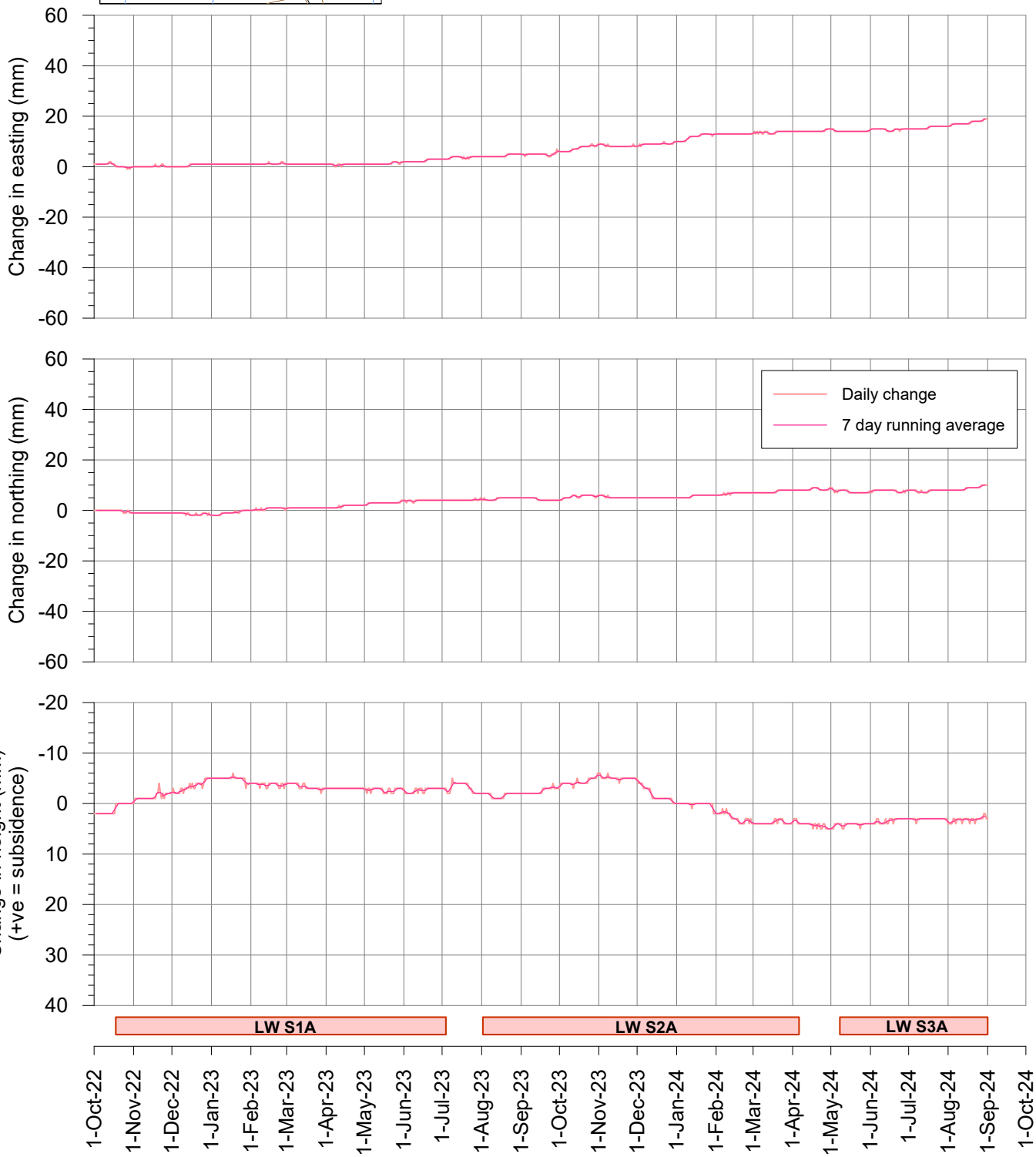
Site S13 on northern side of Picton Weir

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S13 GNSS.grf



During LW S1A
During LW S2A
During LWS3A





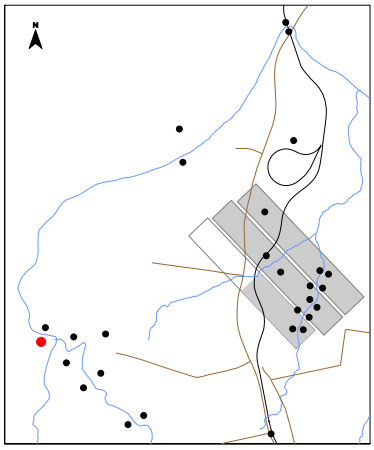
msec

Fig. S13-R14

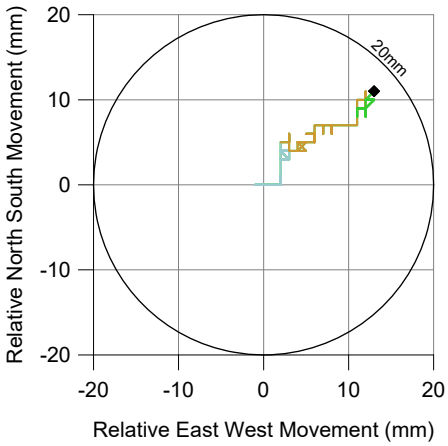
Tahmoor South LW S3A - GNSS Monitoring

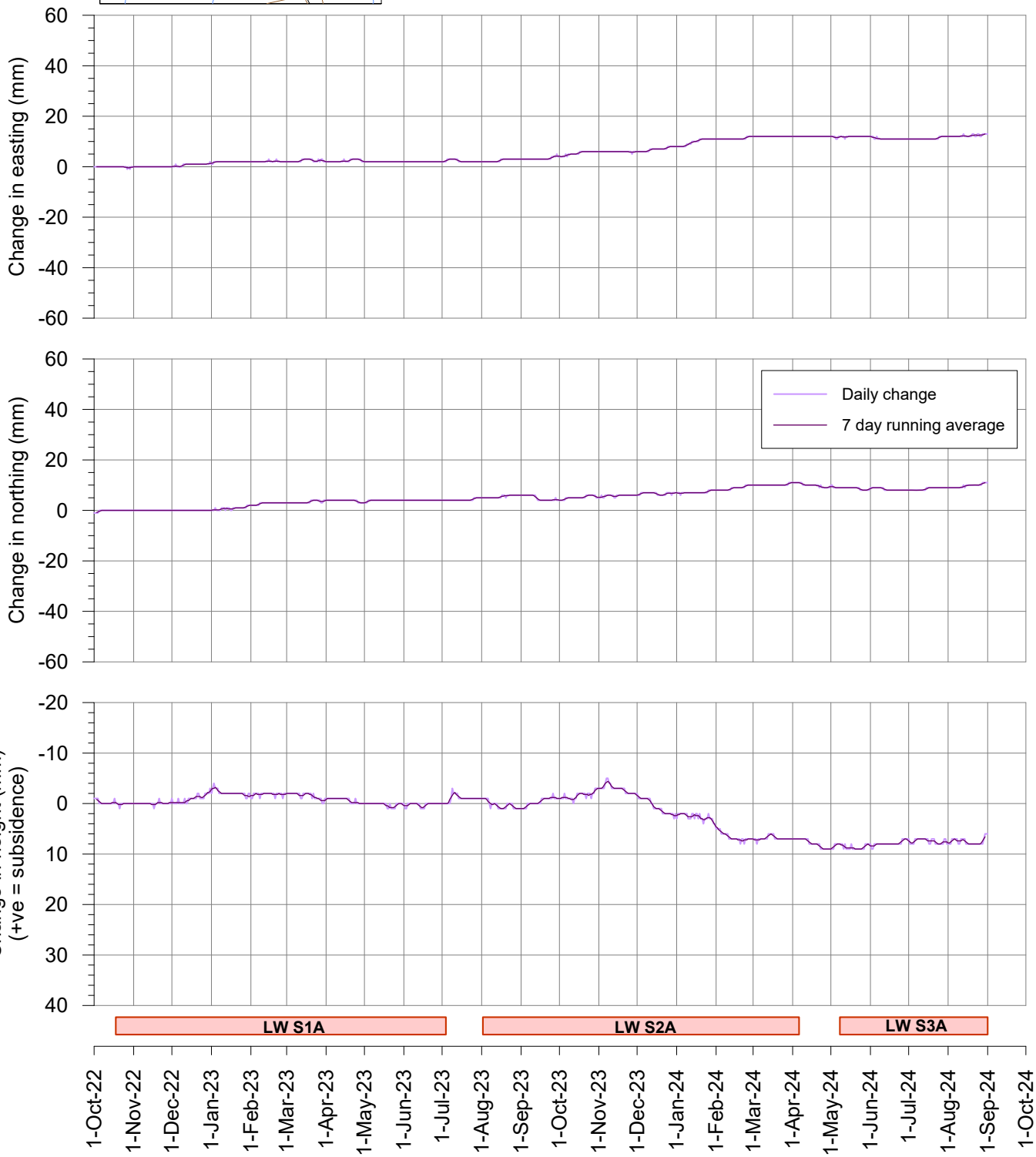
Site S14 on southern side of Picton Weir

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S14 GNSS.grf



During LW S1A
During LW S2A
During LW S3A



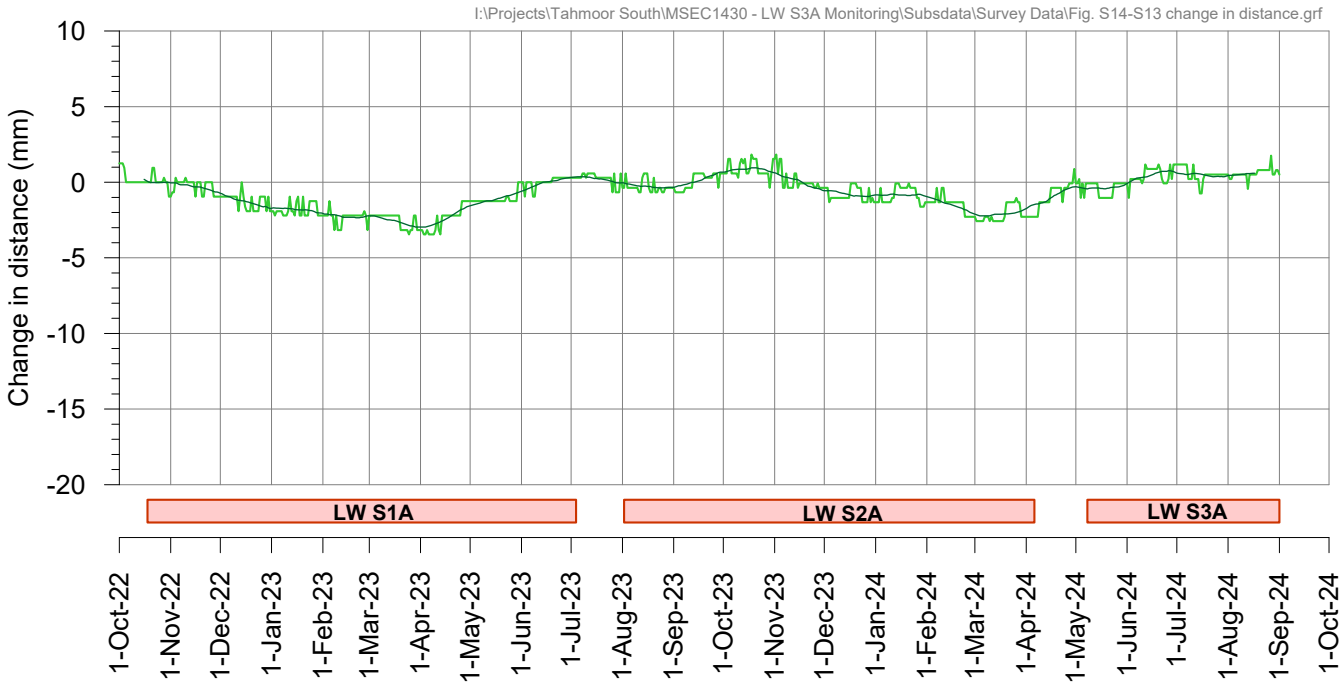


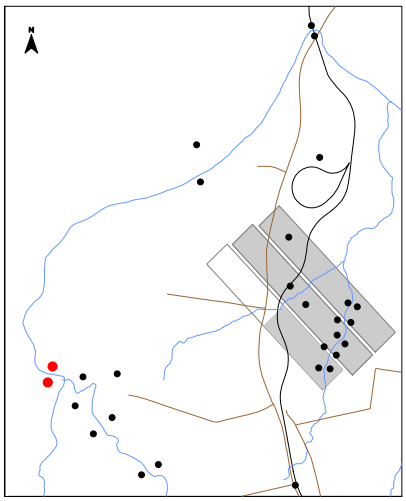
msec

Fig. S14-R14

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Picton Weir
Sites S13 and S14

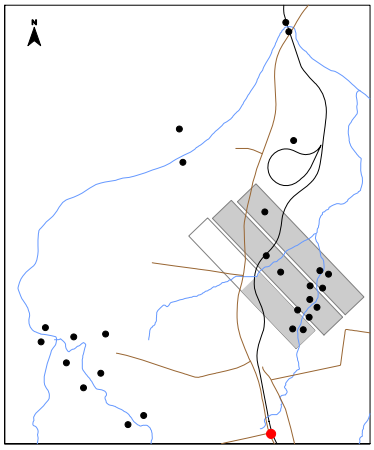




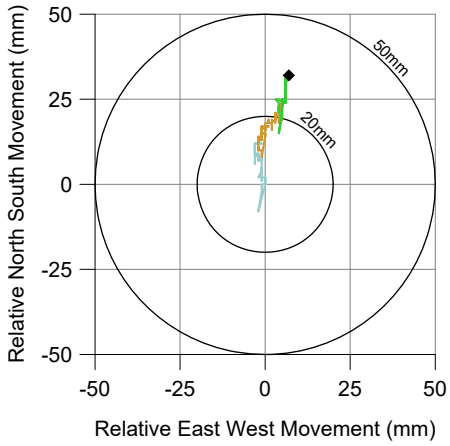
Tahmoor South LW S3A - GNSS Monitoring

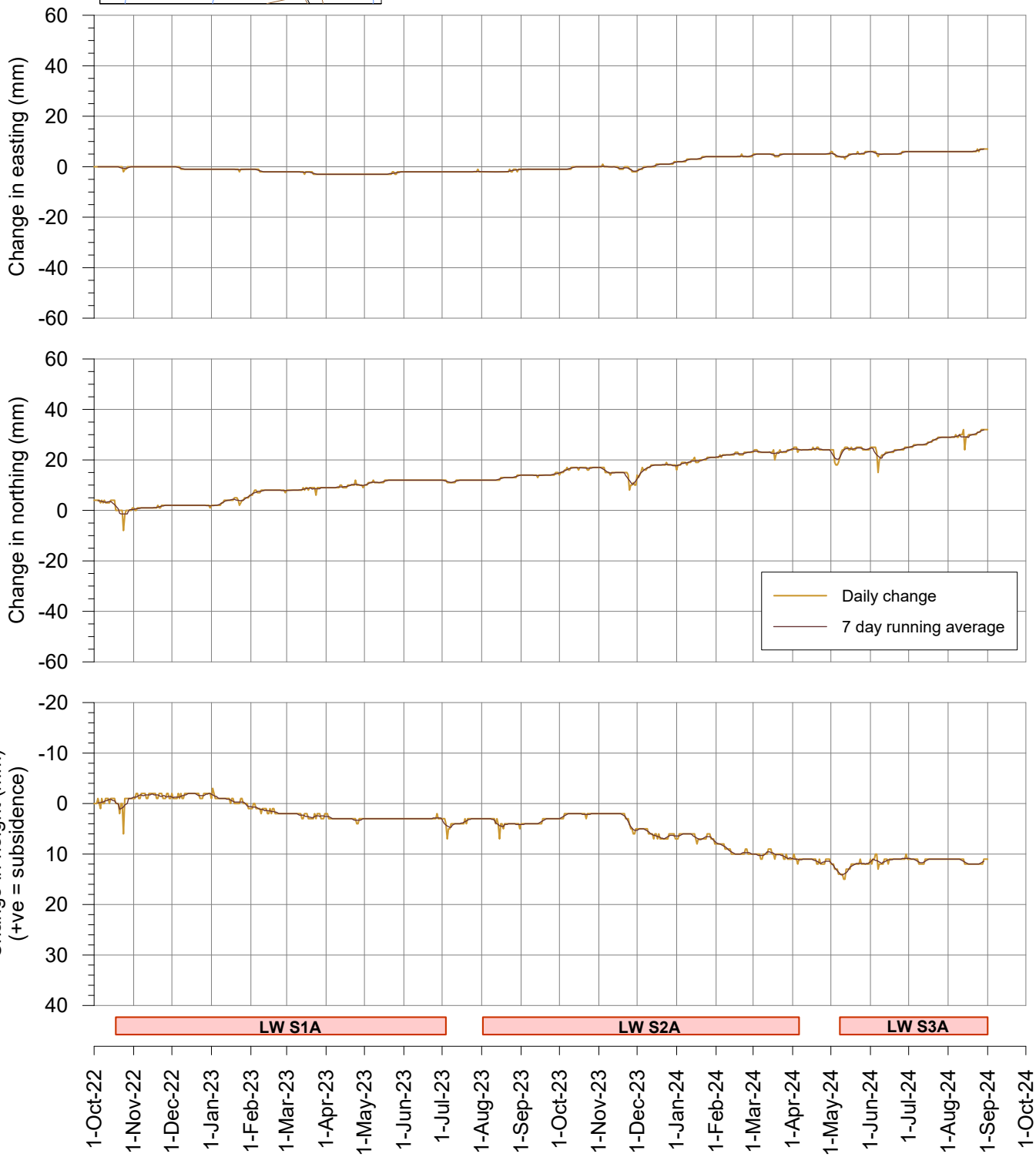
Site S15 at Wellers Road Overbridge

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S15 GNSS.grf



During LW S1A
During LW S2A
During LW S3A





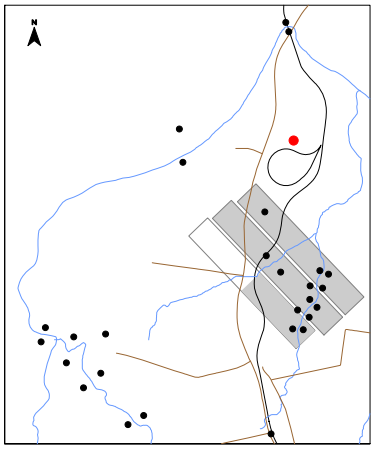
msec

Fig. S15-R14

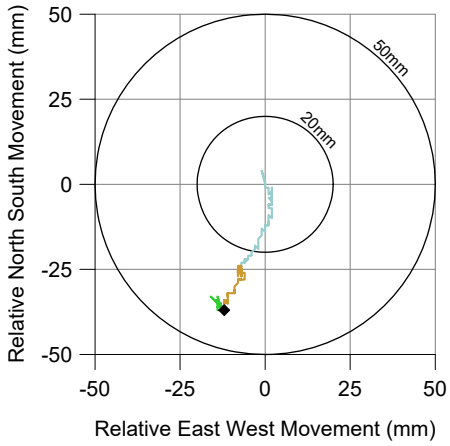
Tahmoor South LW S3A - GNSS Monitoring

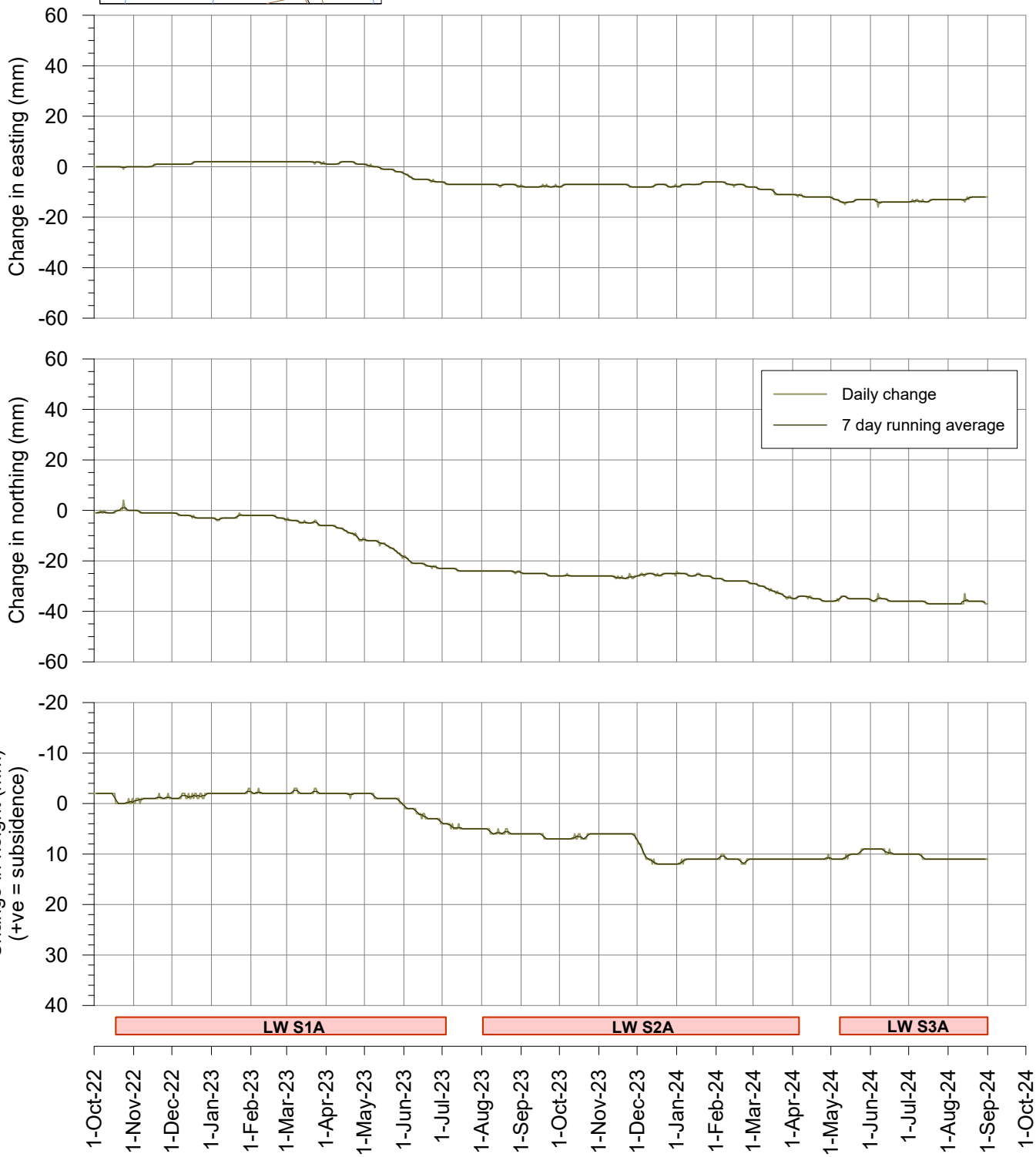
Site S16 at Tahmoor Mine site

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S16 GNSS.grf



During LW S1A
During LW S1A
During LW S3A





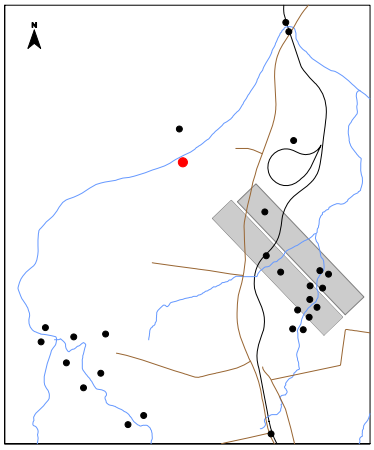
msec

Fig. S16-R14

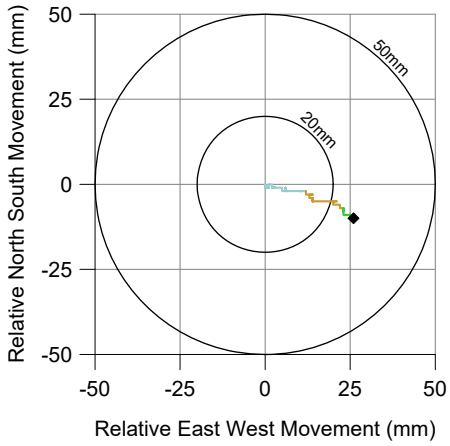
Tahmoor South LW S3A - GNSS Monitoring

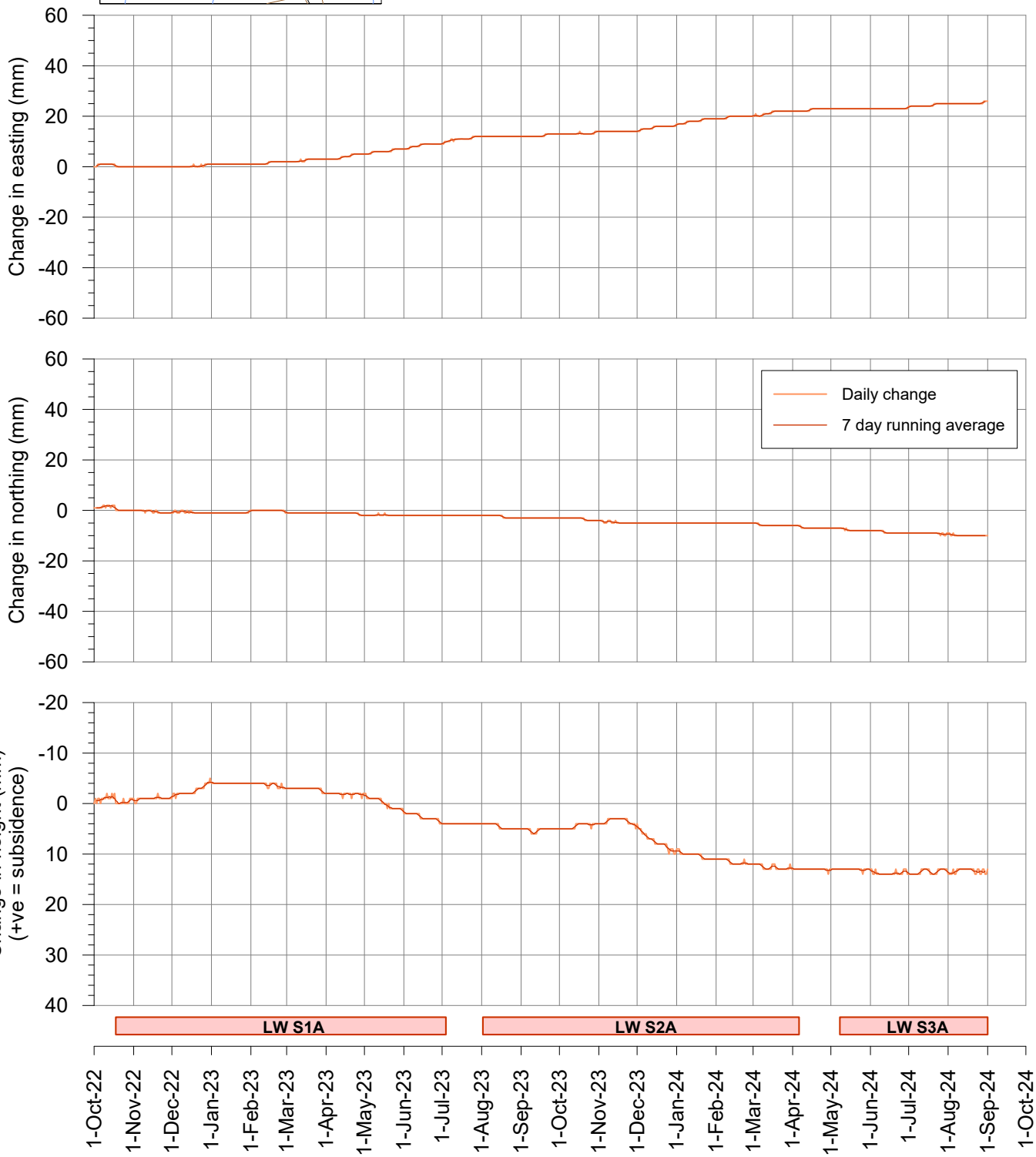
Site S17 on east bank of Bargo River

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S17 GNSS.grf



During LW S1A
During LW S2A
During LW S3A





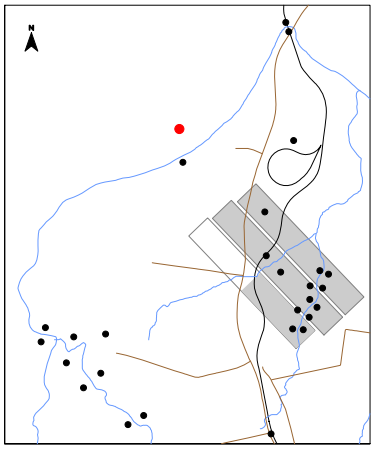
msec

Fig. S17-R14

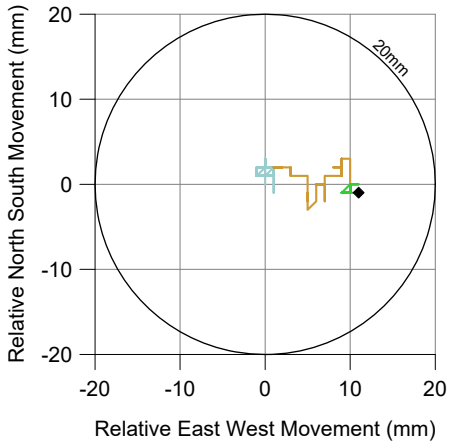
Tahmoor South LW S3A - GNSS Monitoring

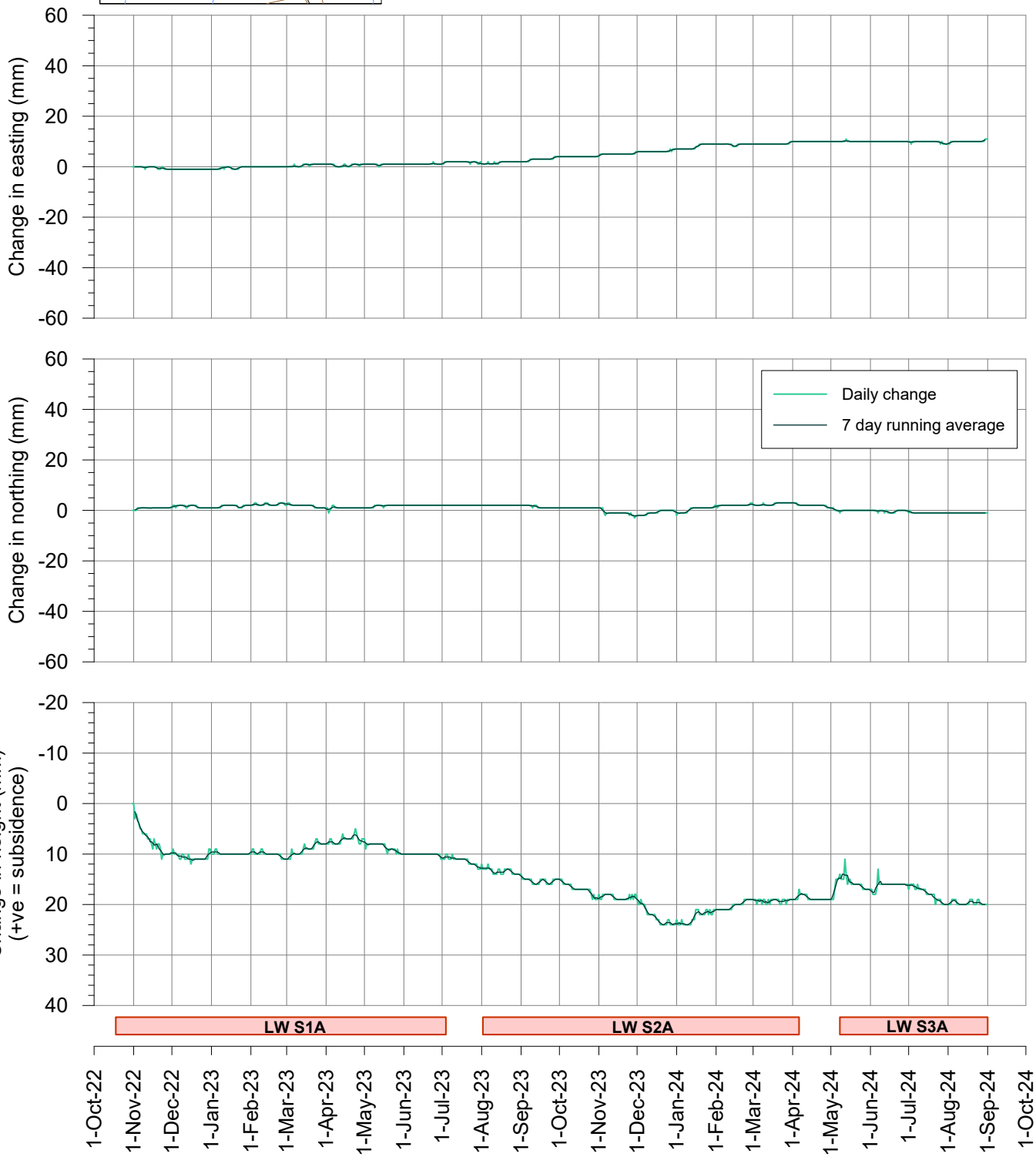
Site S18 on west bank of Bargo River

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S18 GNSS.grf



During LW S1A
During LW S2A
During LW S3A



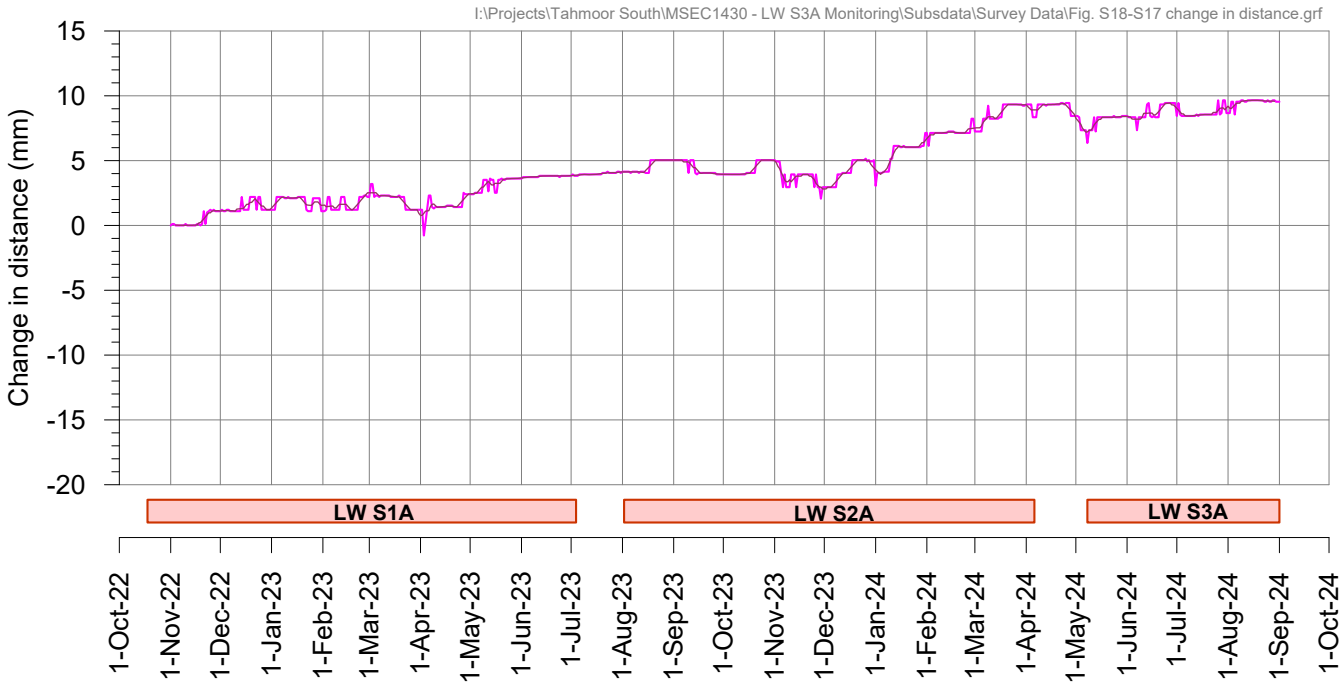


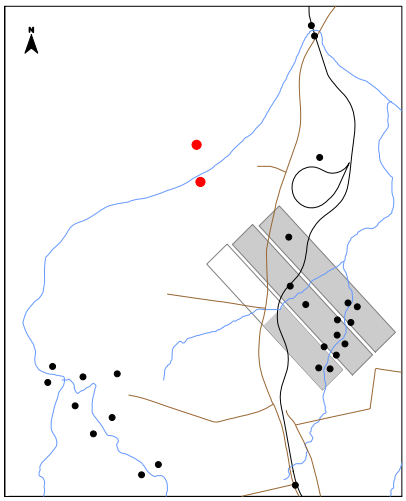
msec

Fig. S18-R14

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Bargo River
Sites S17 and S18

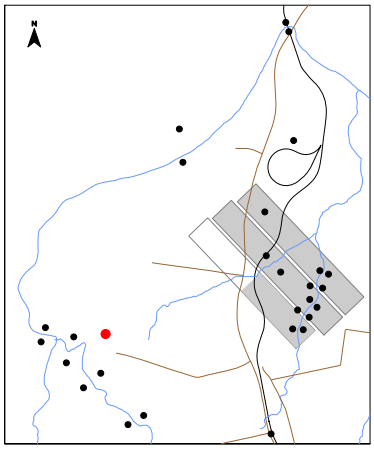




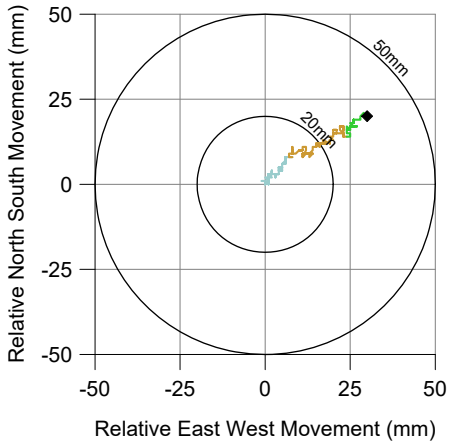
Tahmoor South LW S3A - GNSS Monitoring

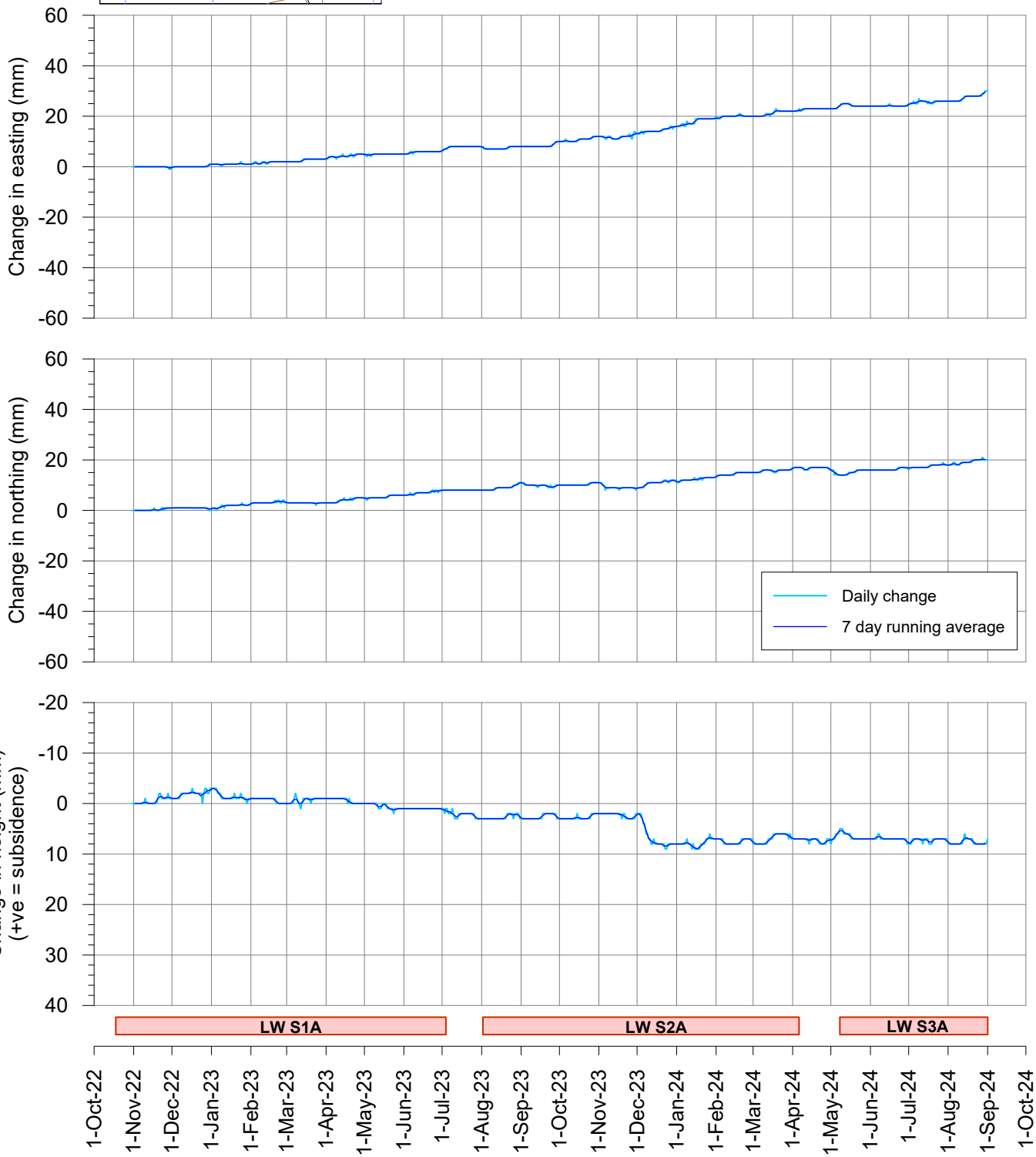
Site S19 near Hornes Creek

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S19 GNSS.grf



During LW S1A
During LW S2A
During LW S3A





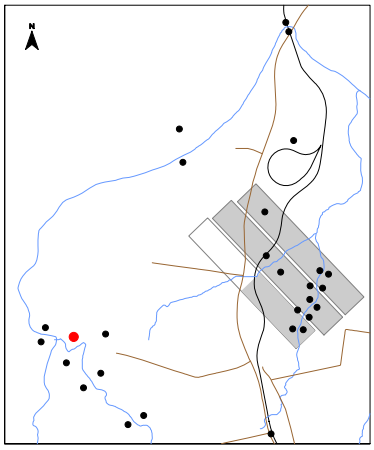
msec

Fig. S19-R14

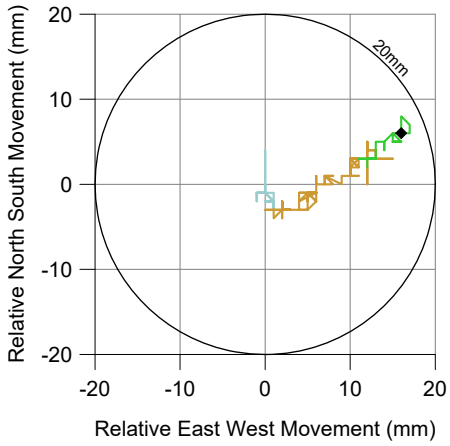
Tahmoor South LW S3A - GNSS Monitoring

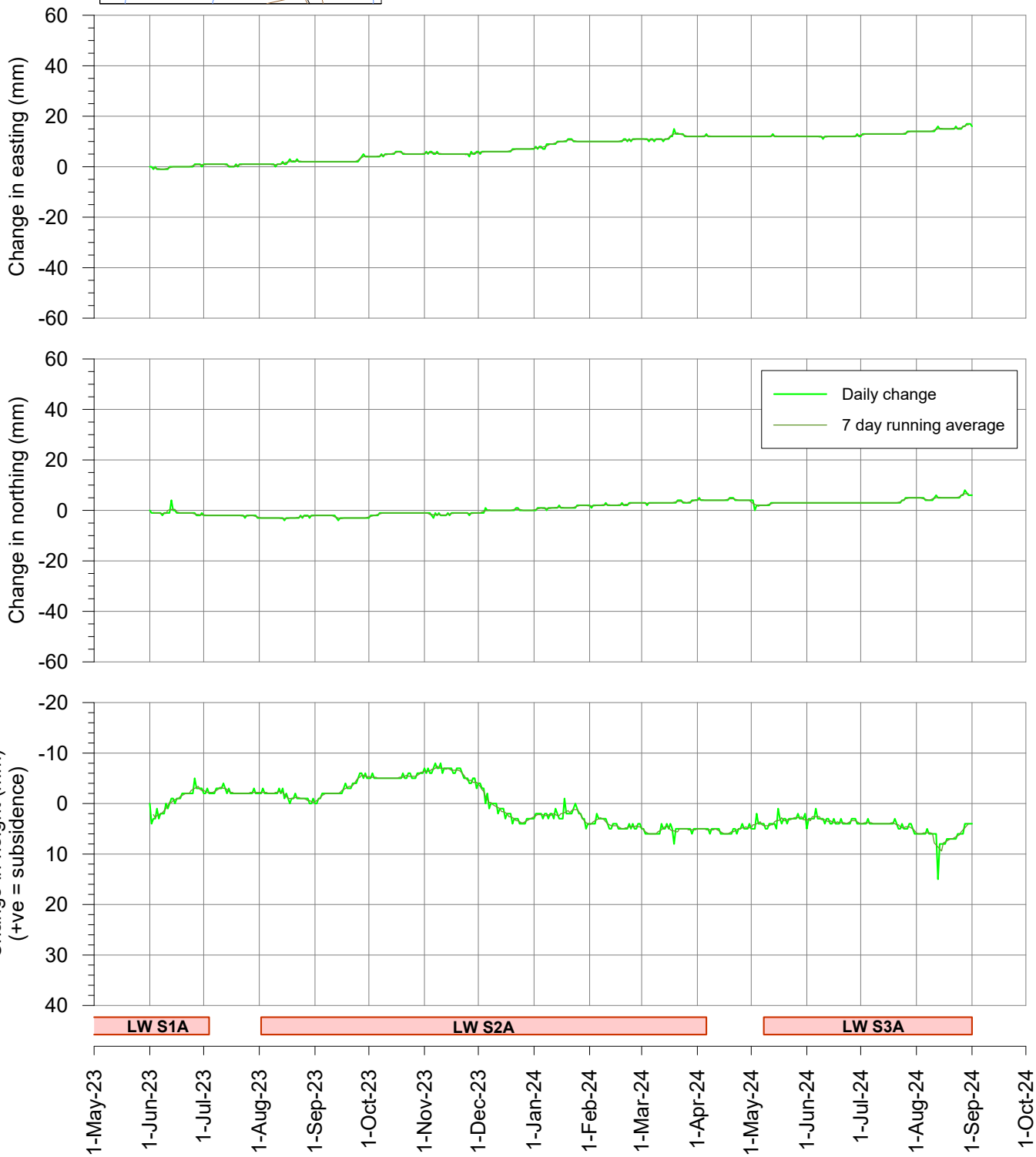
Site S20 on northern side of Hornes Creek

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S20 GNSS.grf







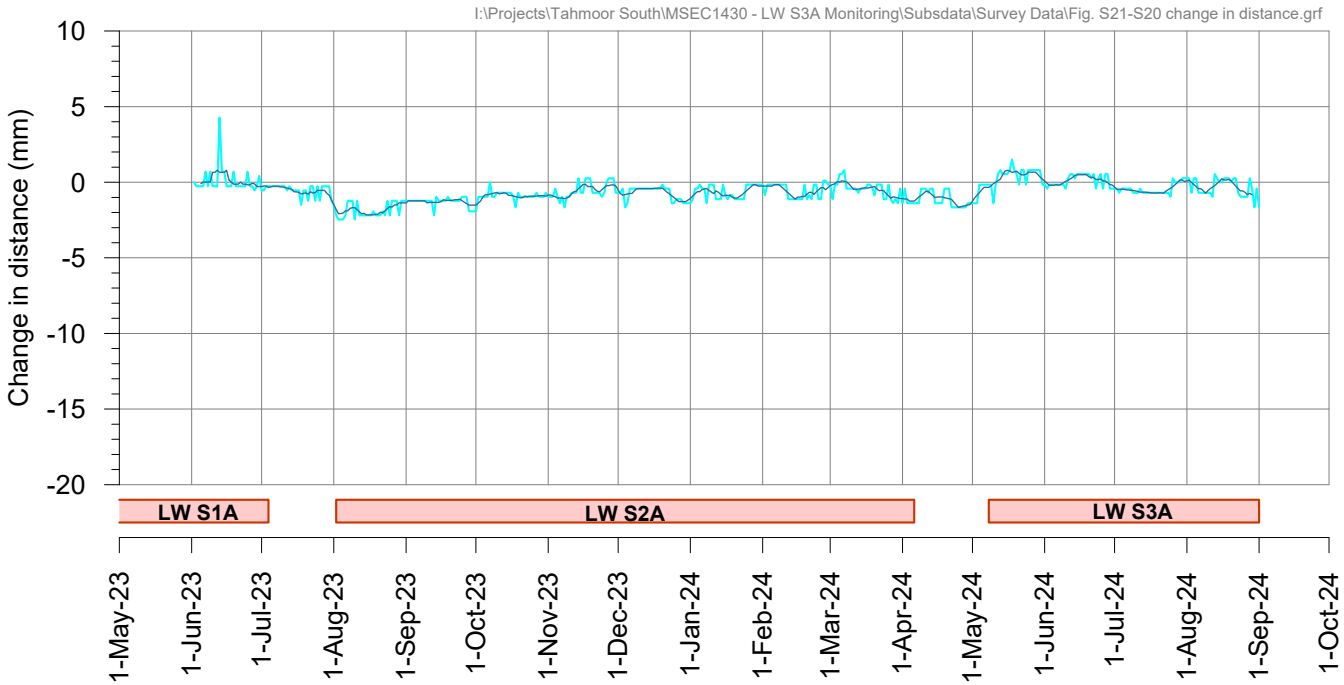


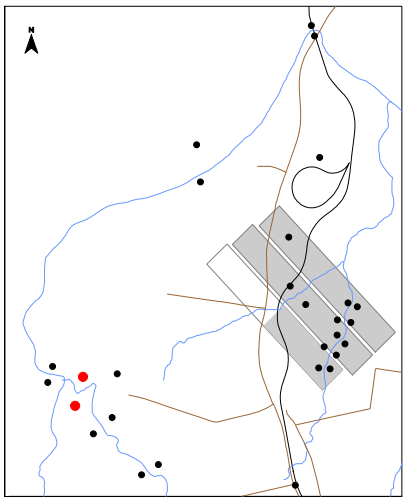
msec

Fig. S20-R14

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Hornes Creek
Sites S20 and S21

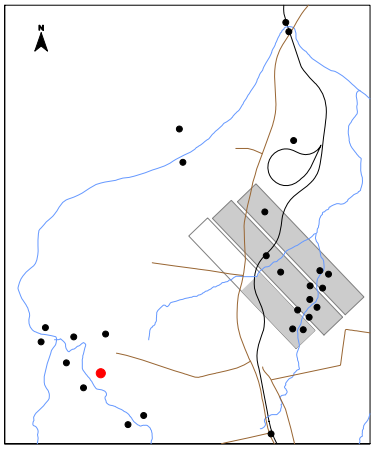




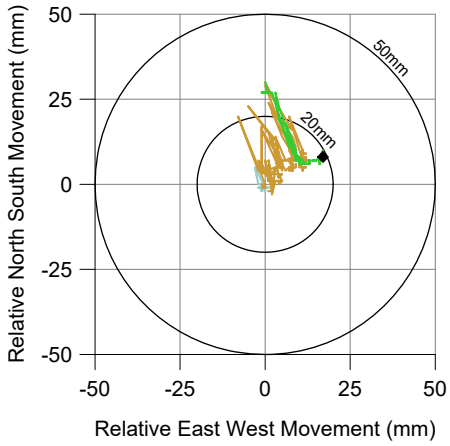
Tahmoor South LW S3A - GNSS Monitoring

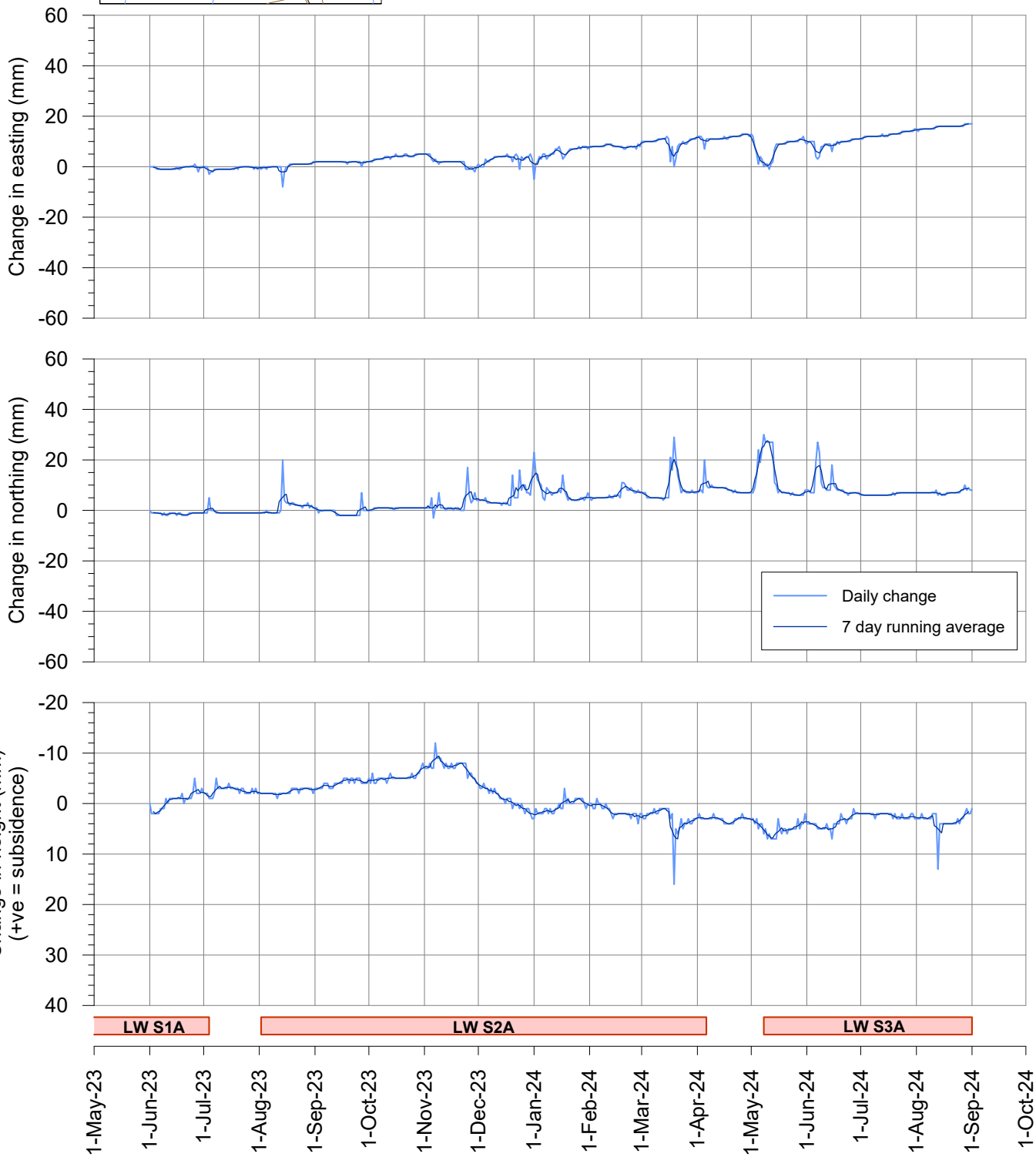
Site S22 on northern side of Hornes Creek

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S22 GNSS.grf



During LW S1A
During LW S2A
During LW S3A





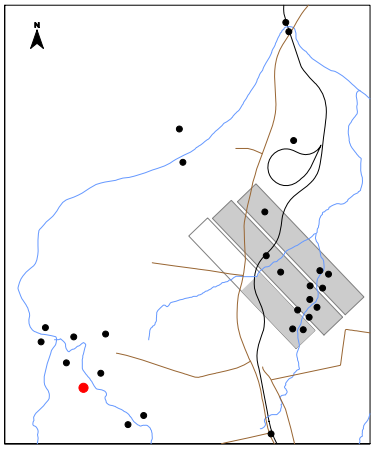
msec

Fig. S22-R14

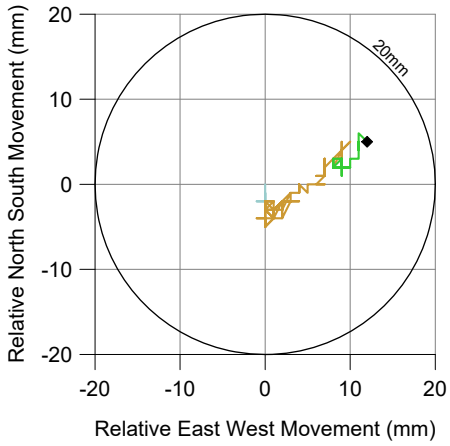
Tahmoor South LW S3A - GNSS Monitoring

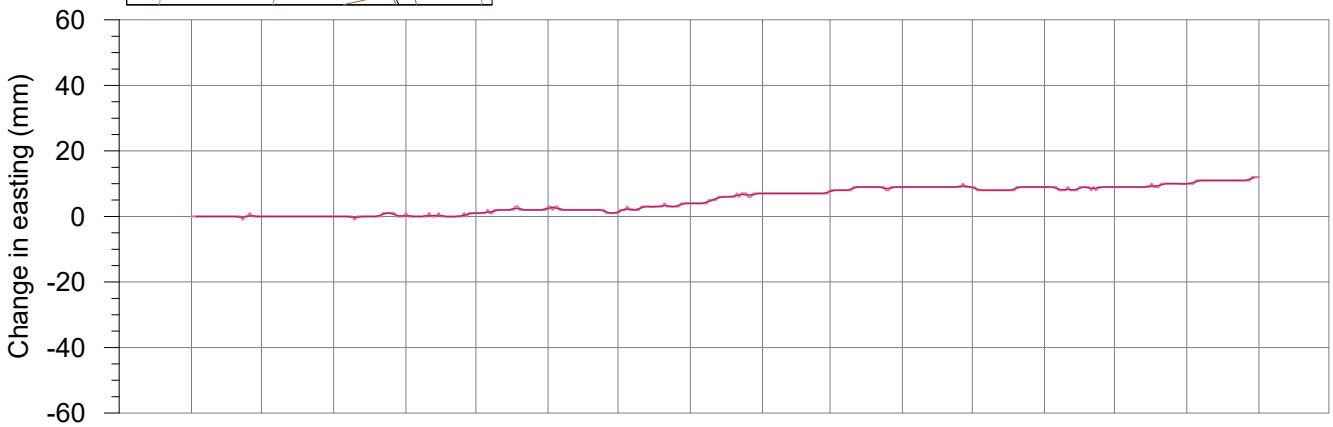
Site S23 on southern side of Hornes Creek

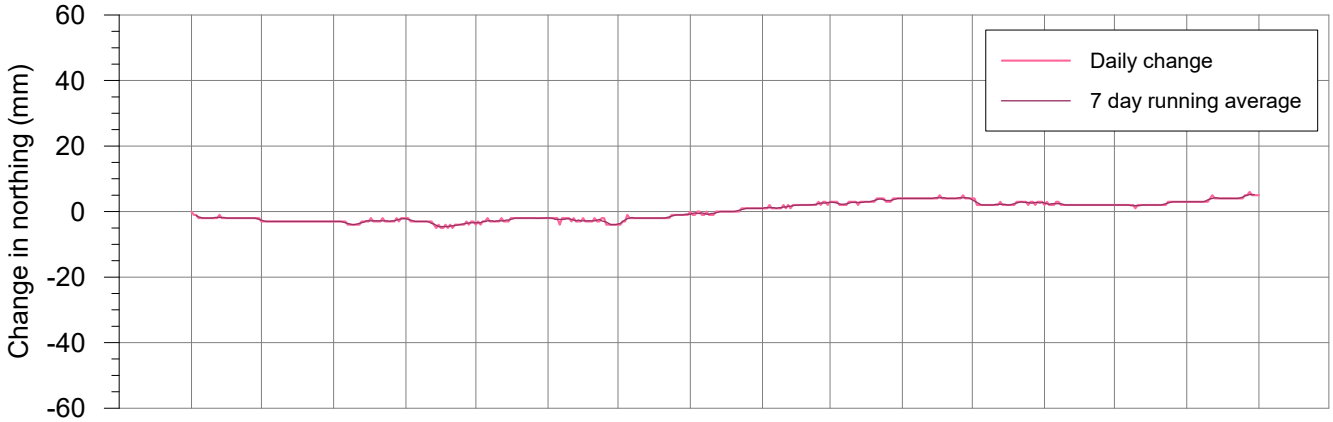
I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S23 GNSS.grf

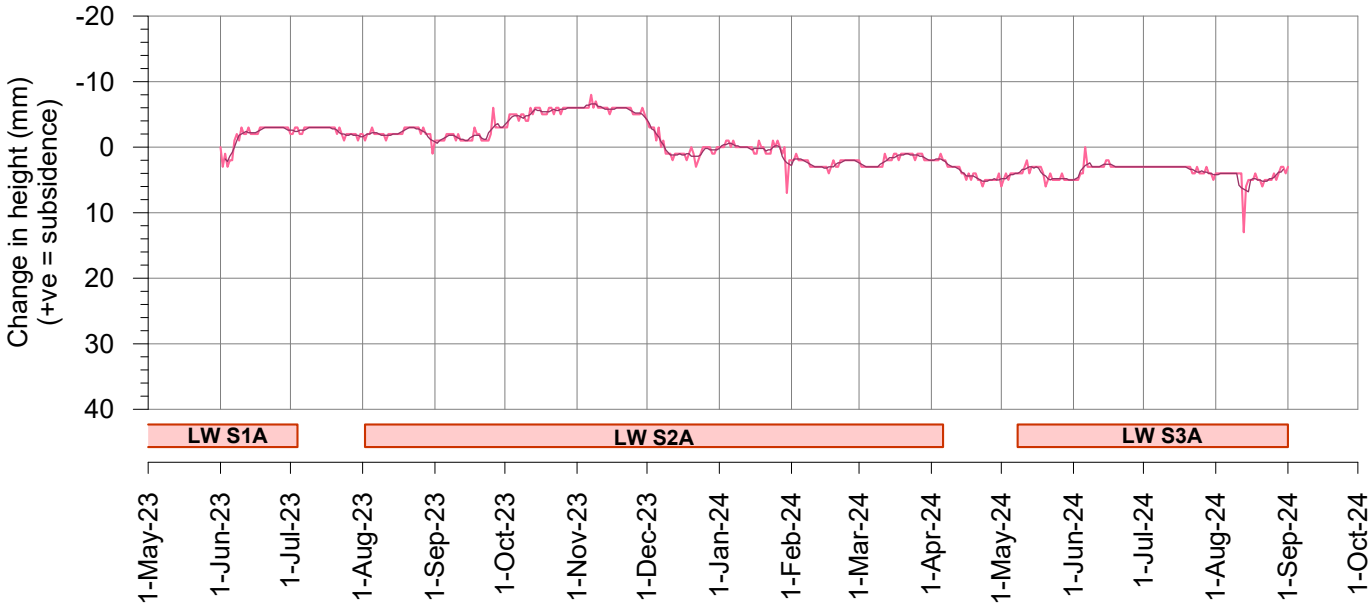


During LW S1A
During LW S2A
During LW S3A







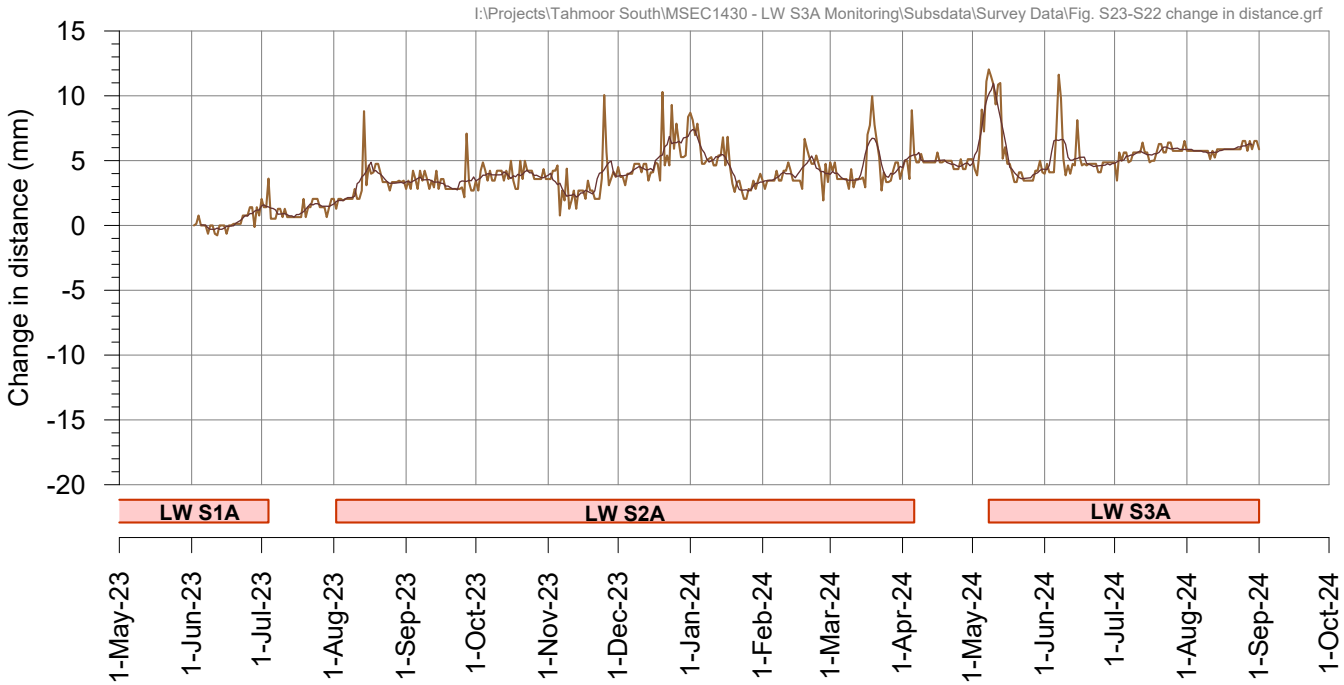


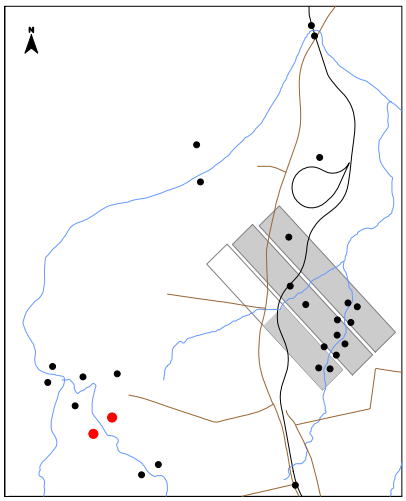
msec

Fig. S23-R14

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Hornes Creek
Sites S22 and S23

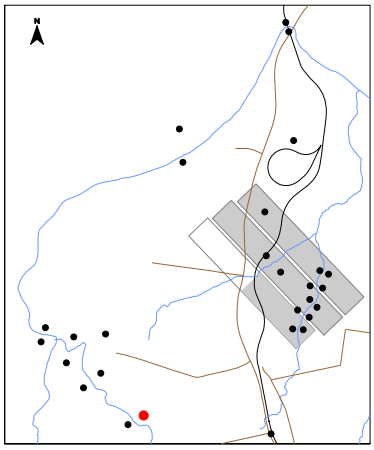




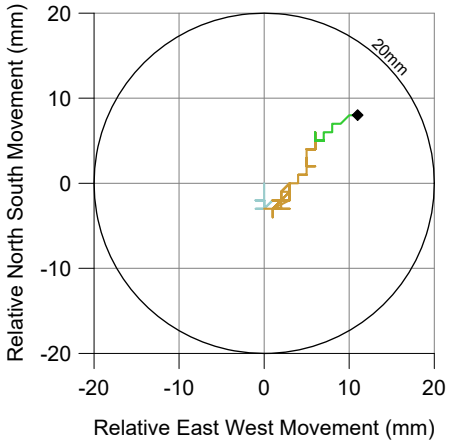
Tahmoor South LW S3A - GNSS Monitoring

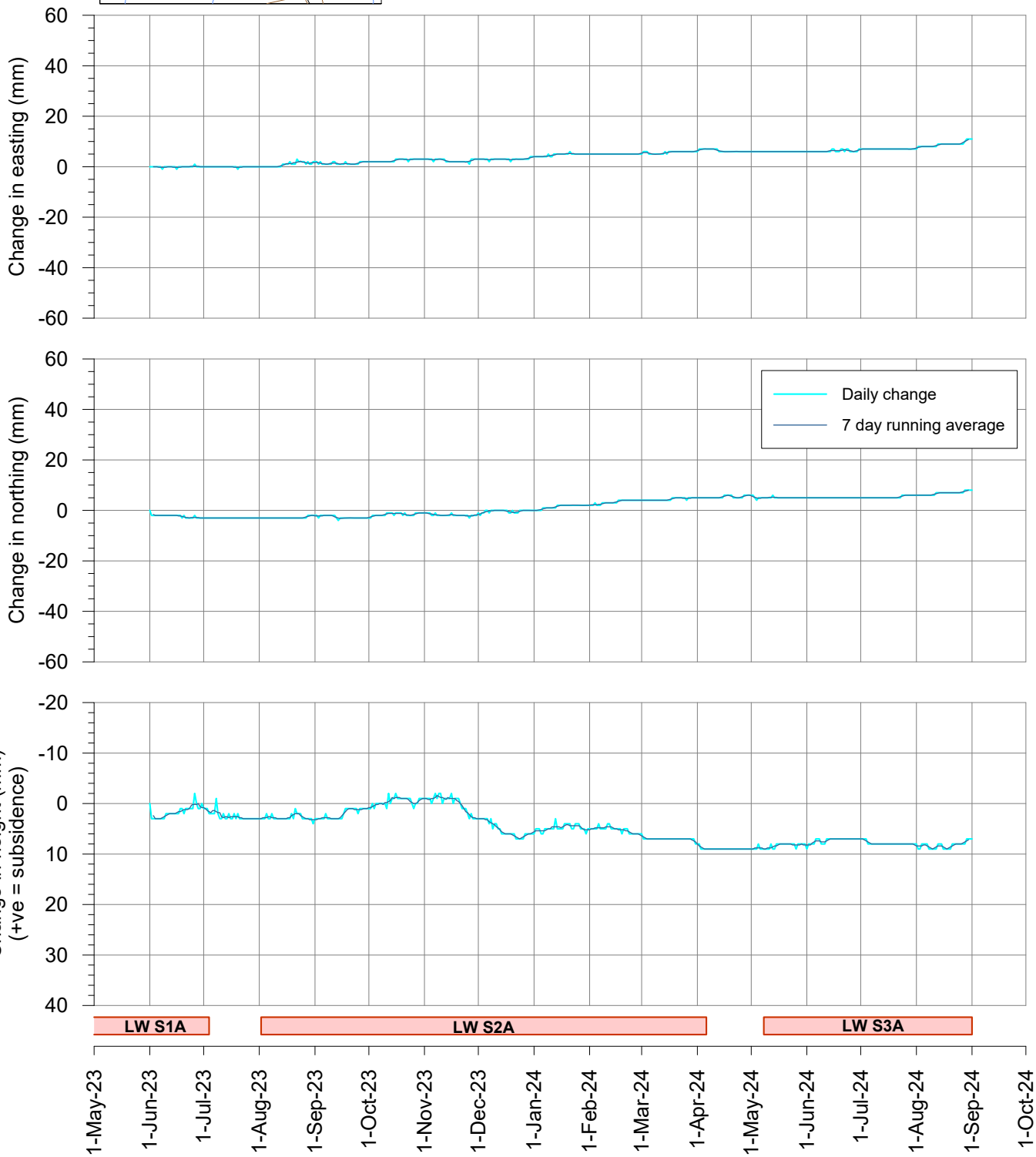
Site S24 on northern side of Hornes Creek

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S24 GNSS.grf



During LW S1A
During LW S2A
During LW S3A





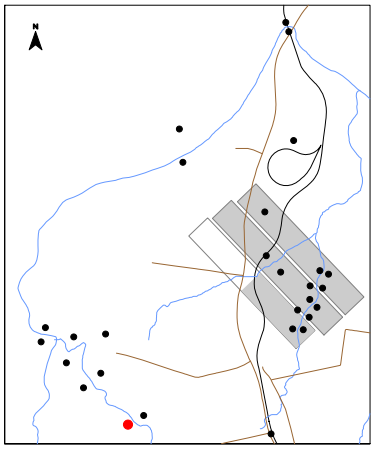
msec

Fig. S24-R14

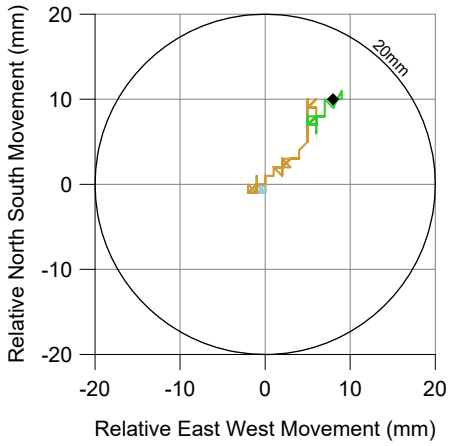
Tahmoor South LW S3A - GNSS Monitoring

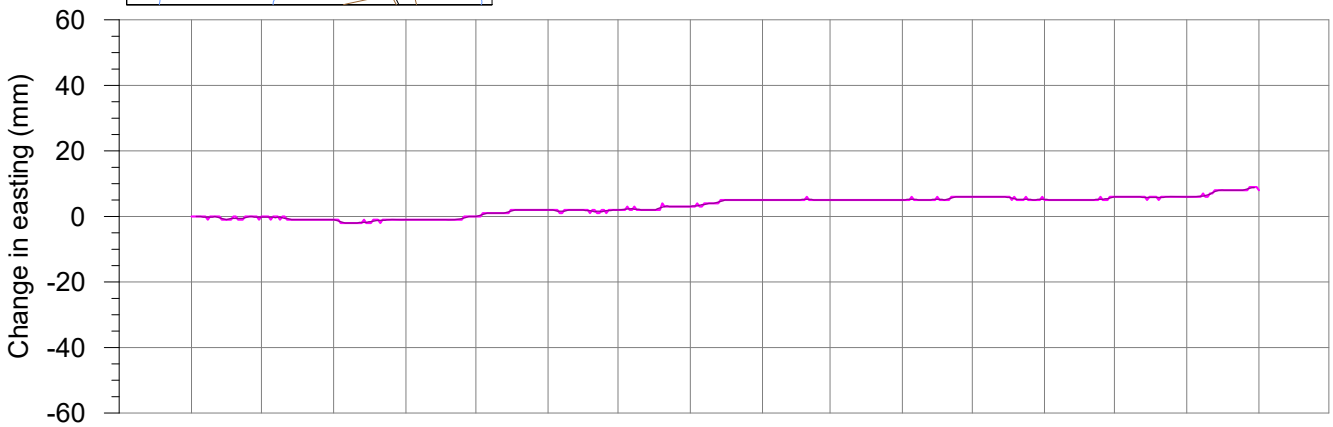
Site S25 on southern side of Hornes Creek

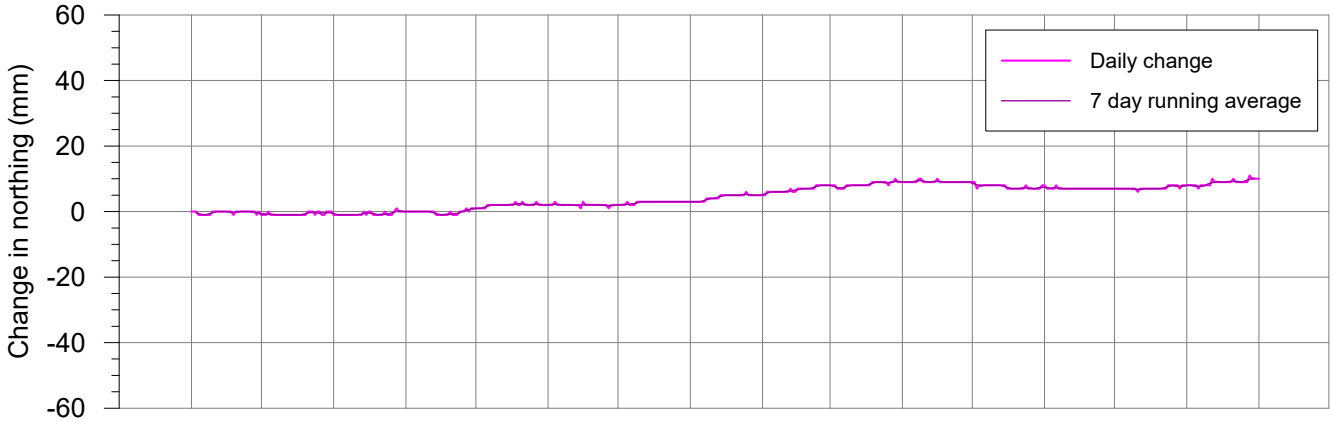
I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S25 GNSS.grf

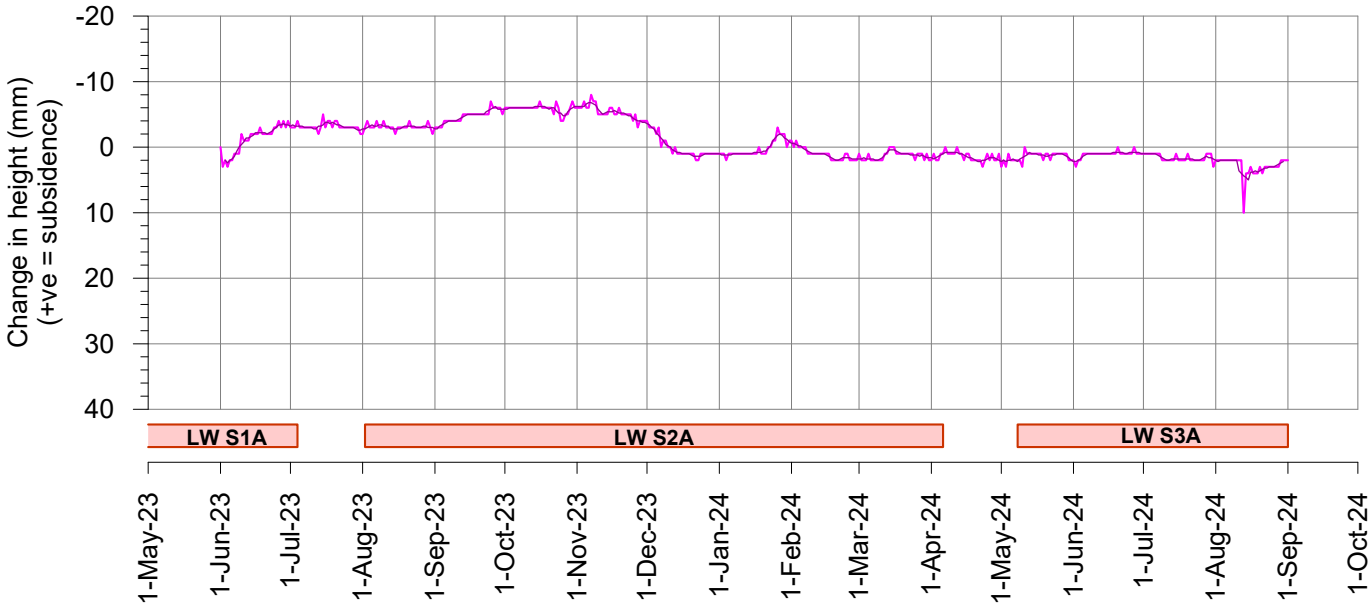


During LW S1A
During LW S2A
During LW S3A







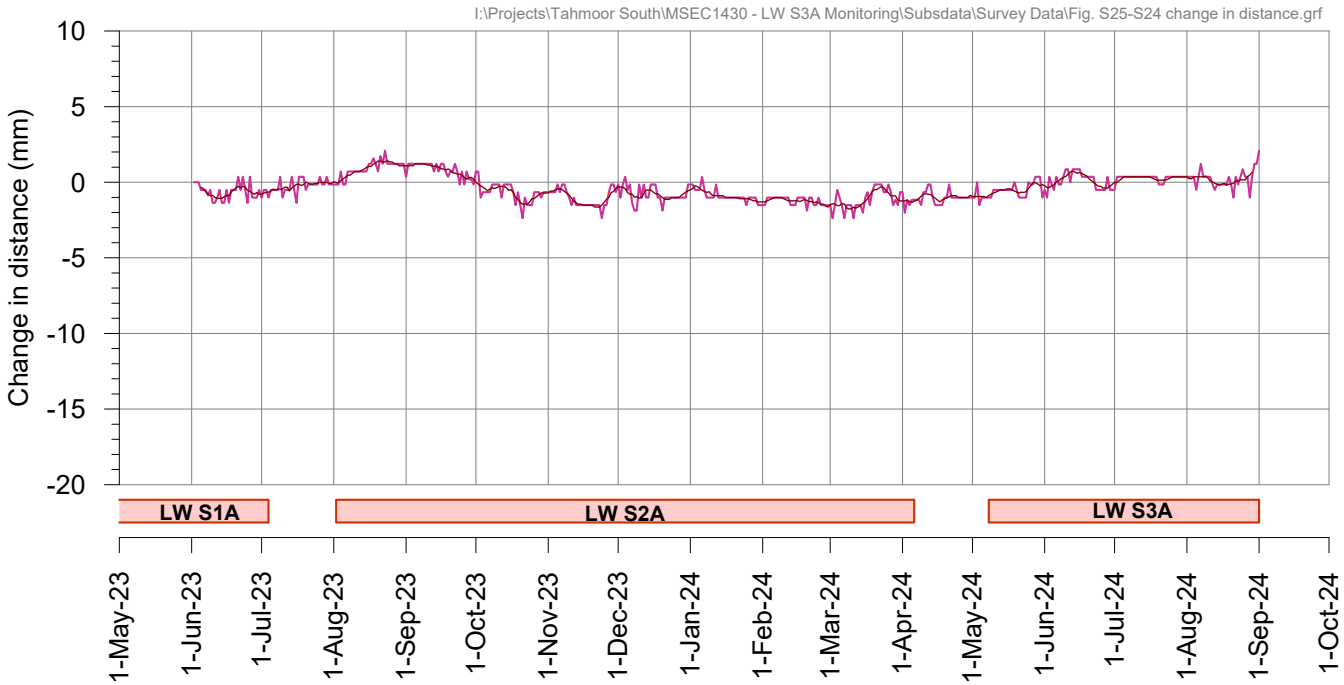


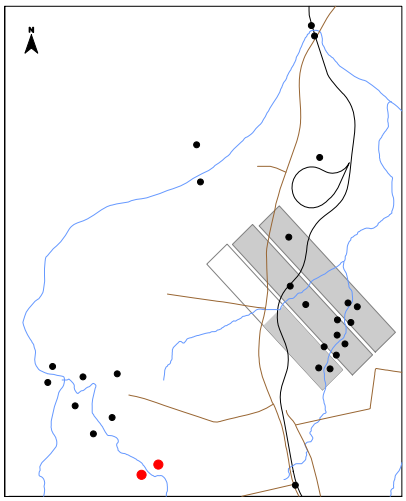
msec

Fig. S25-R14

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Hornes Creek
Sites S24 and S25





Tahmoor South LW S3A - GNSS Monitoring

Site S26 above LW S2A

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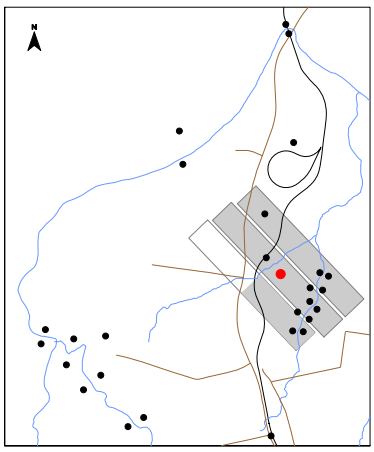
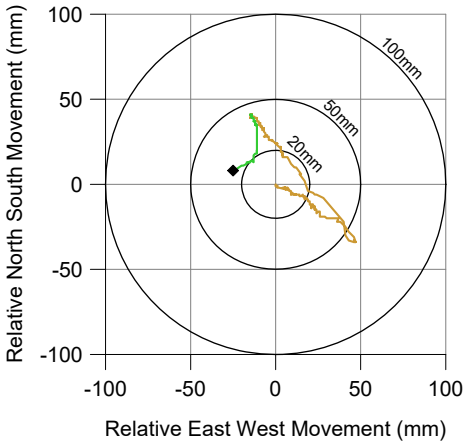
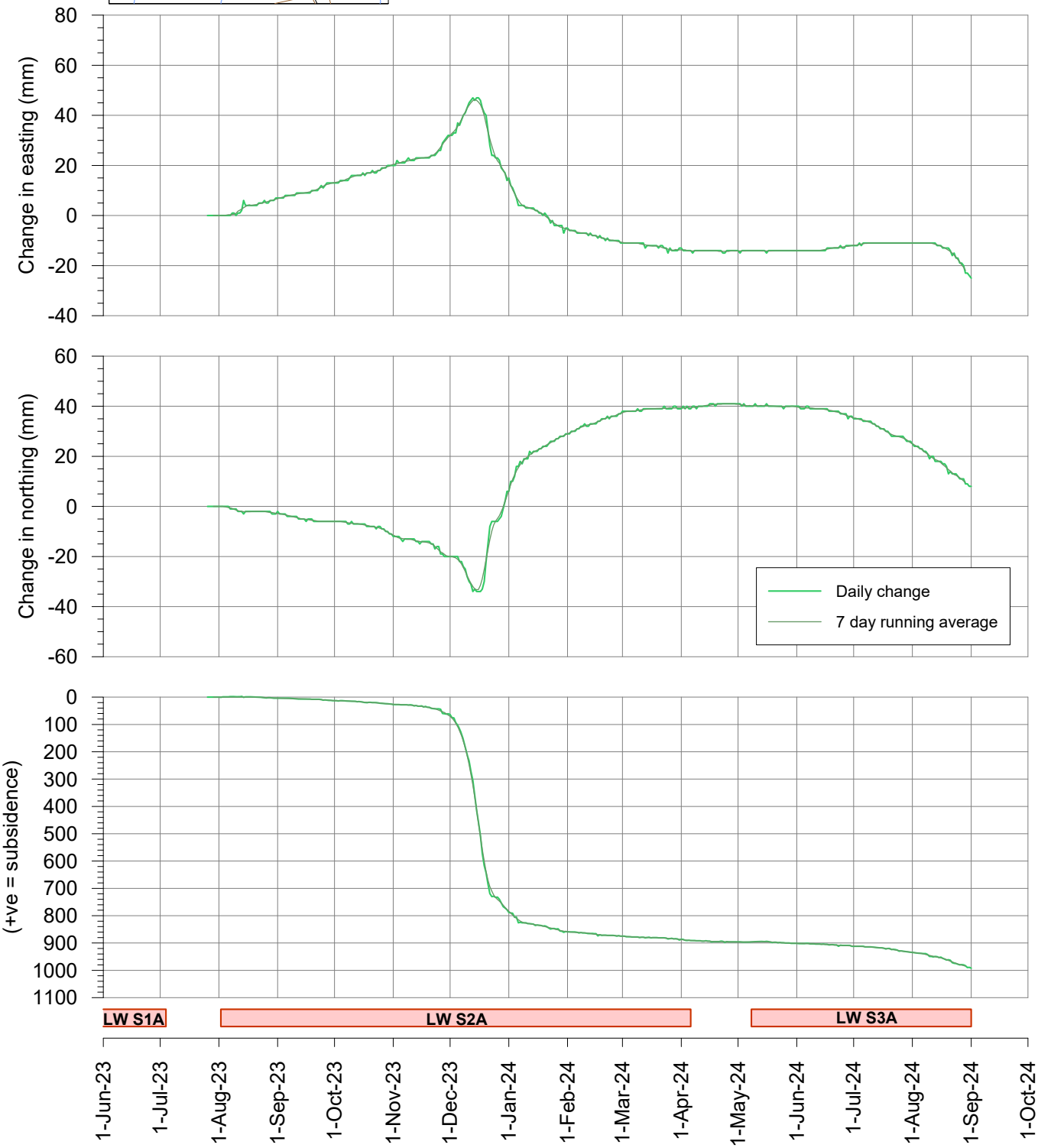








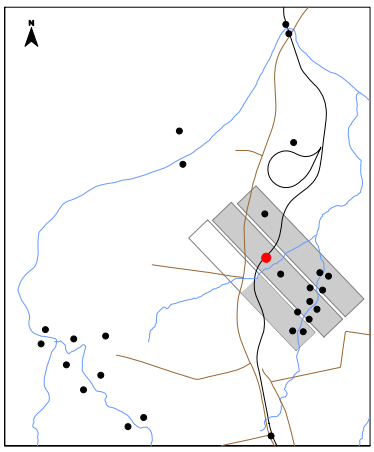
msec

Fig. S26-R144

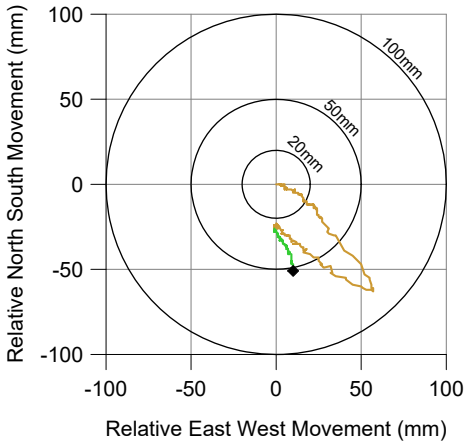
Tahmoor South LW S3A - GNSS Monitoring

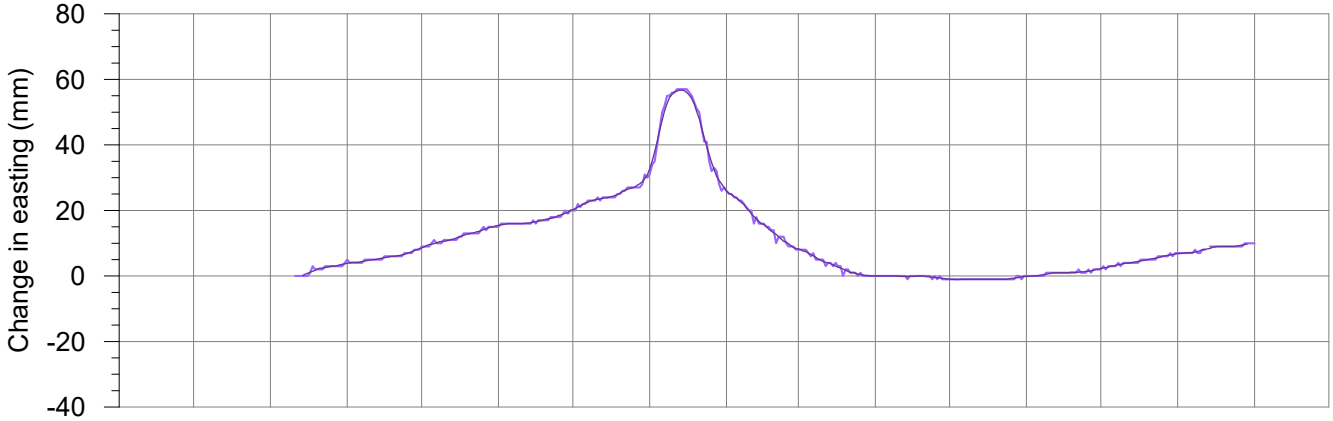
Site S27 on railway embankment above LW S2A

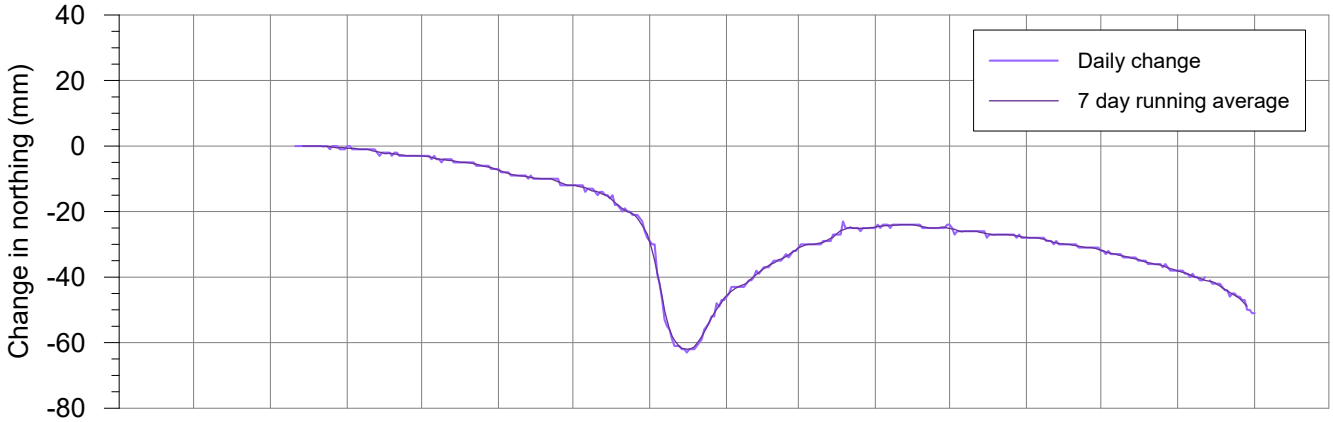
I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S27 GNSS.grf

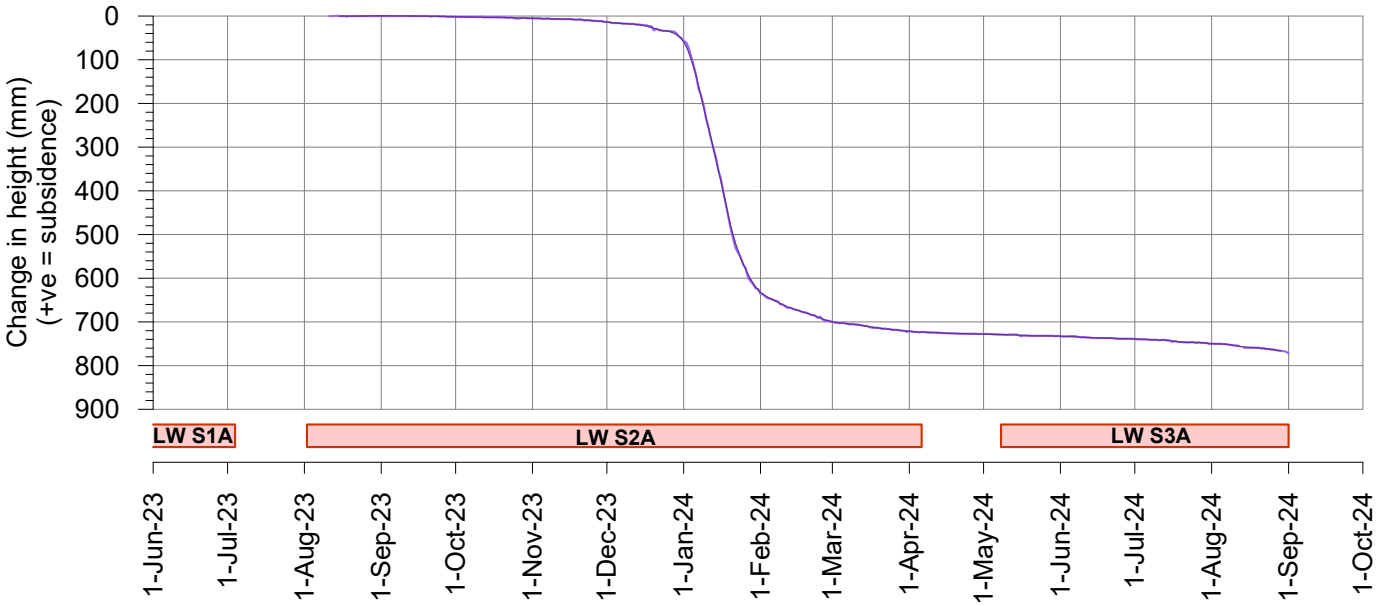


During LW S2A
During LW S3A







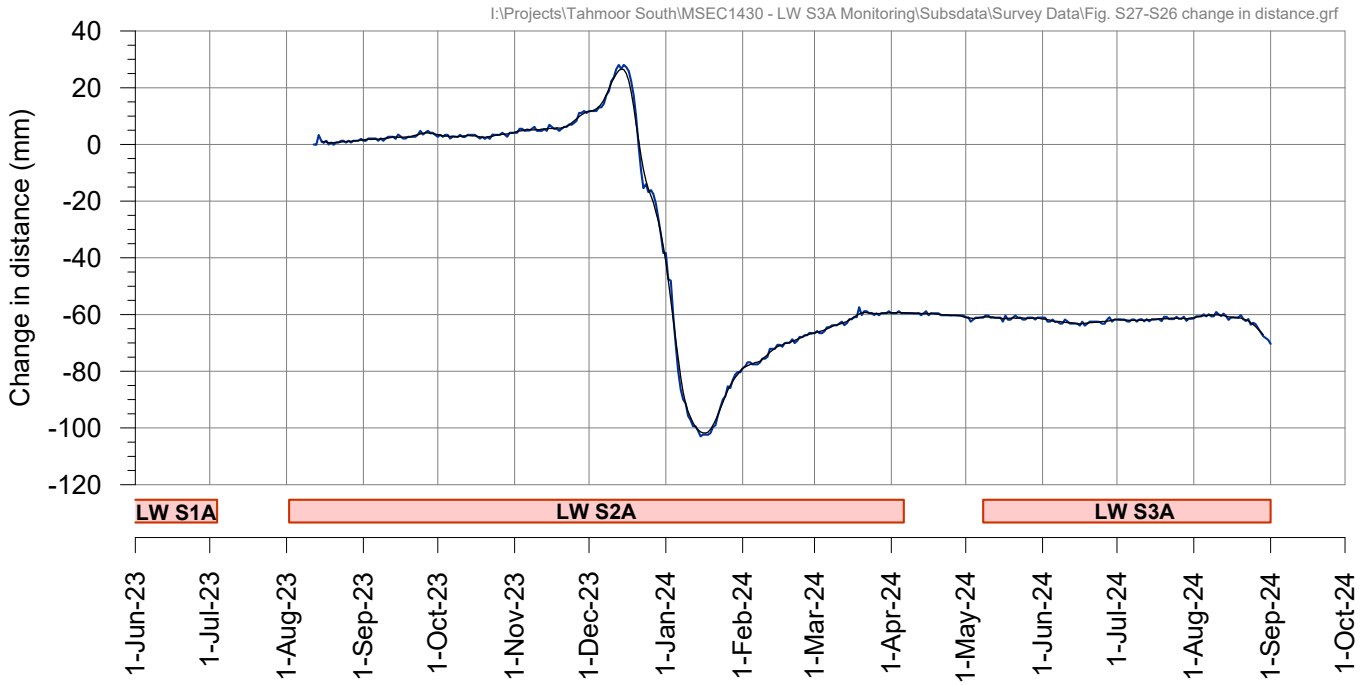


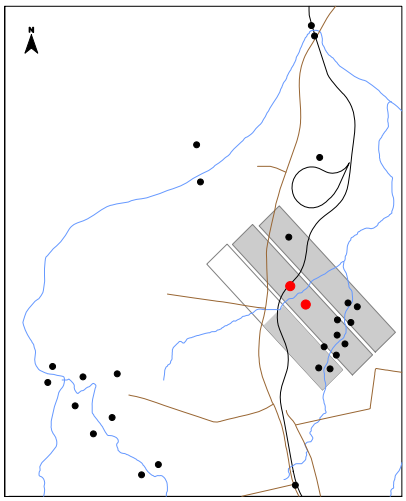
msec

Fig. S27-R14

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Teatree Hollow above LW S2A
Sites S26 and S27

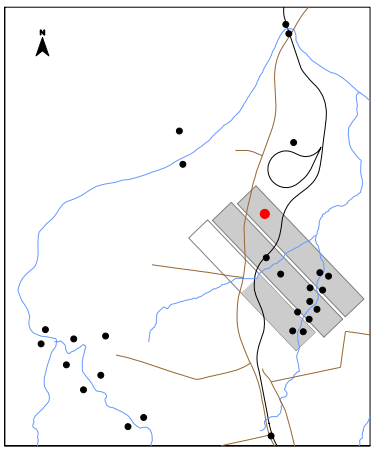




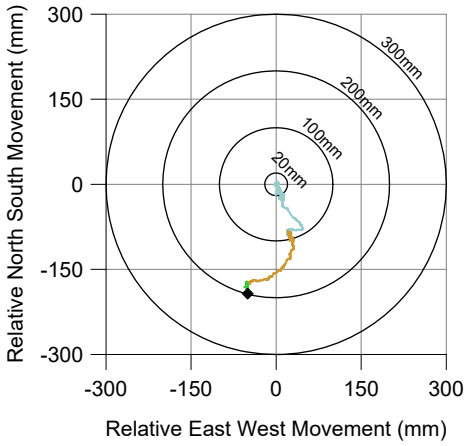
Tahmoor South LW S3A - GNSS Monitoring

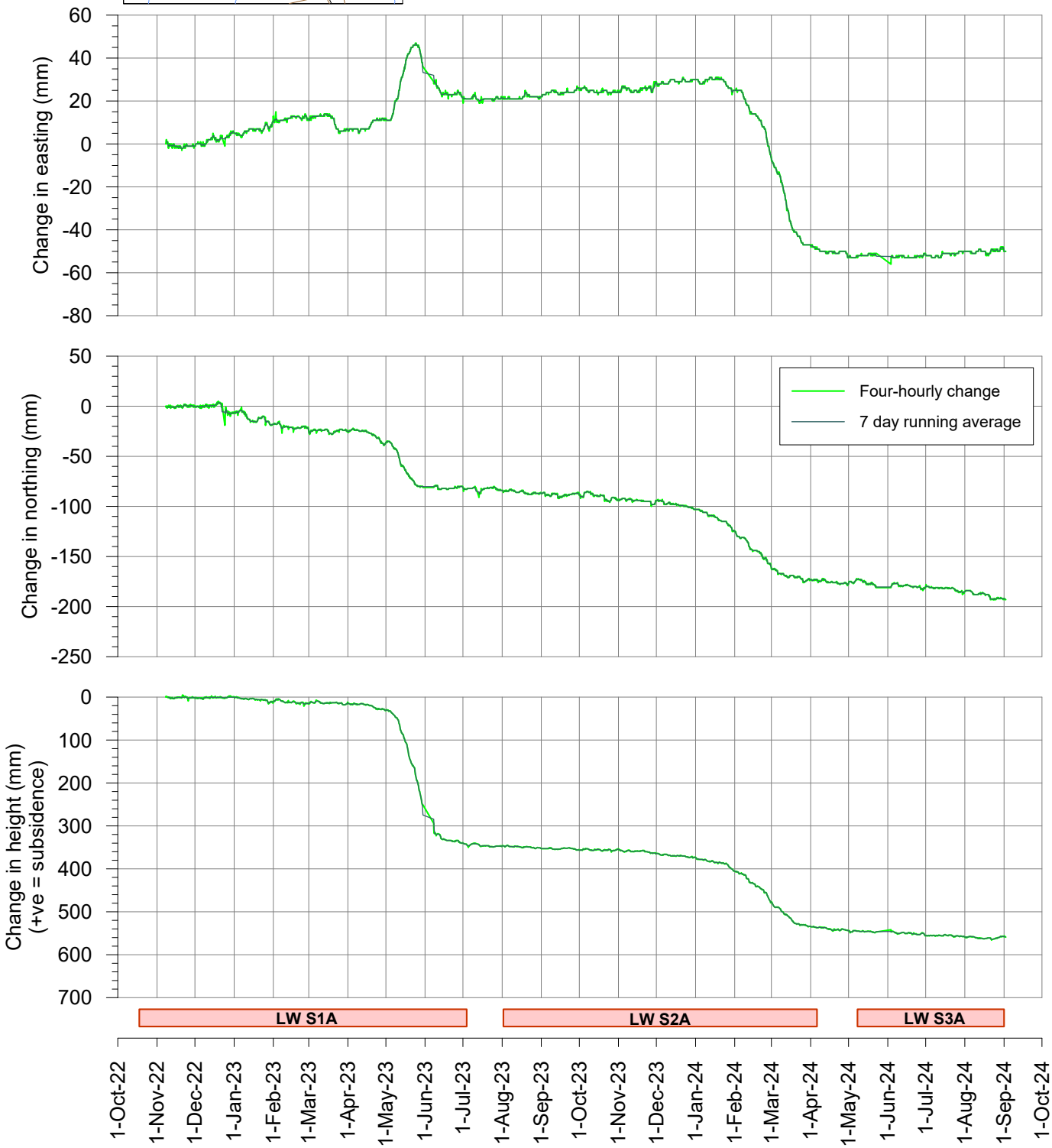
Gantry at Tahmoor Mine site

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. TM GNSS gantry.grf









msec

Fig. TM-R14

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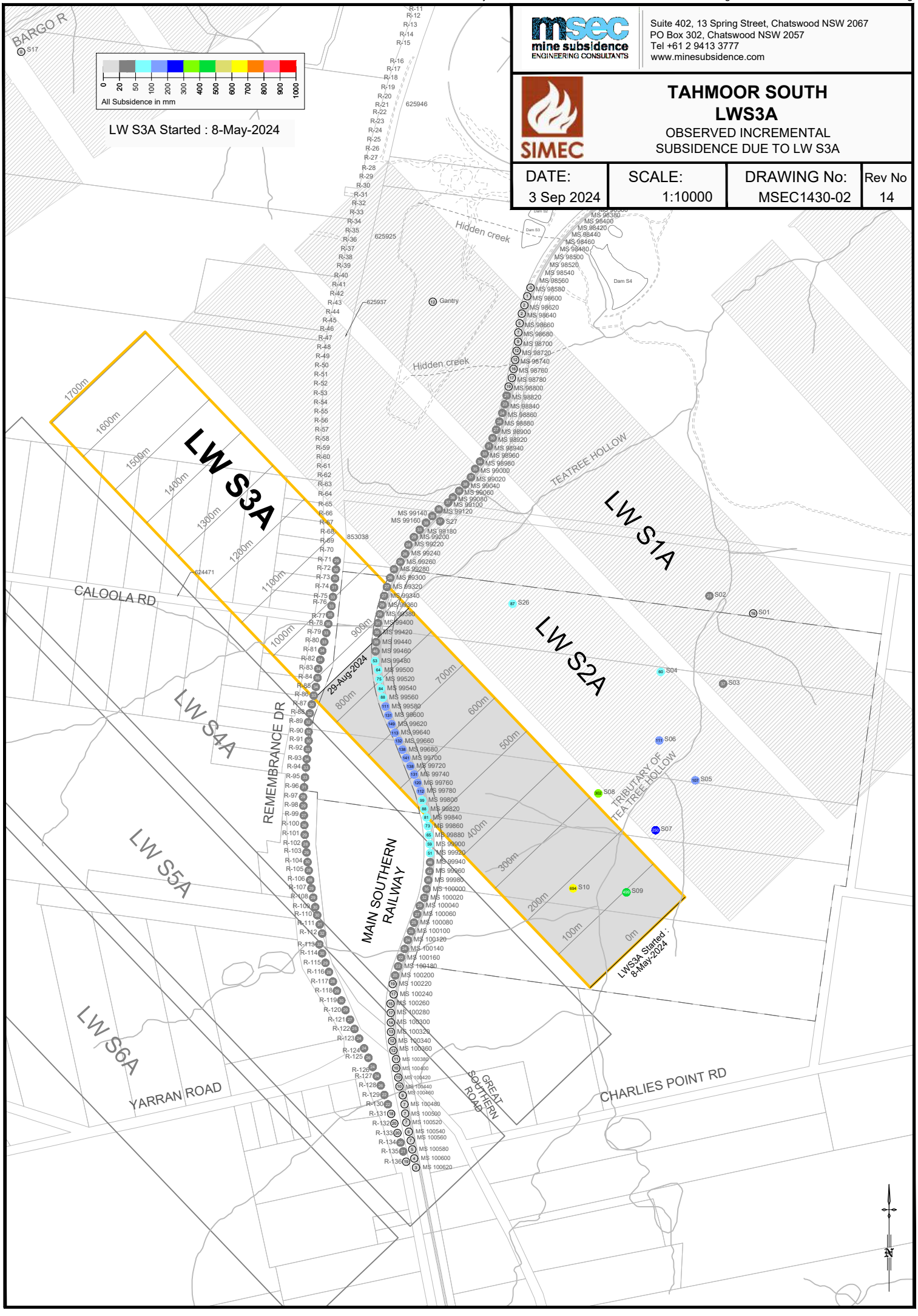
TAHMOOR SOUTH LWS3A

OBSERVED INCREMENTAL SUBSIDENCE DUE TO LW S3A

DATE:	SCALE:	DRAWING No:	Rev No
3 Sep 2024	1:10000	MSEC1430-02	14



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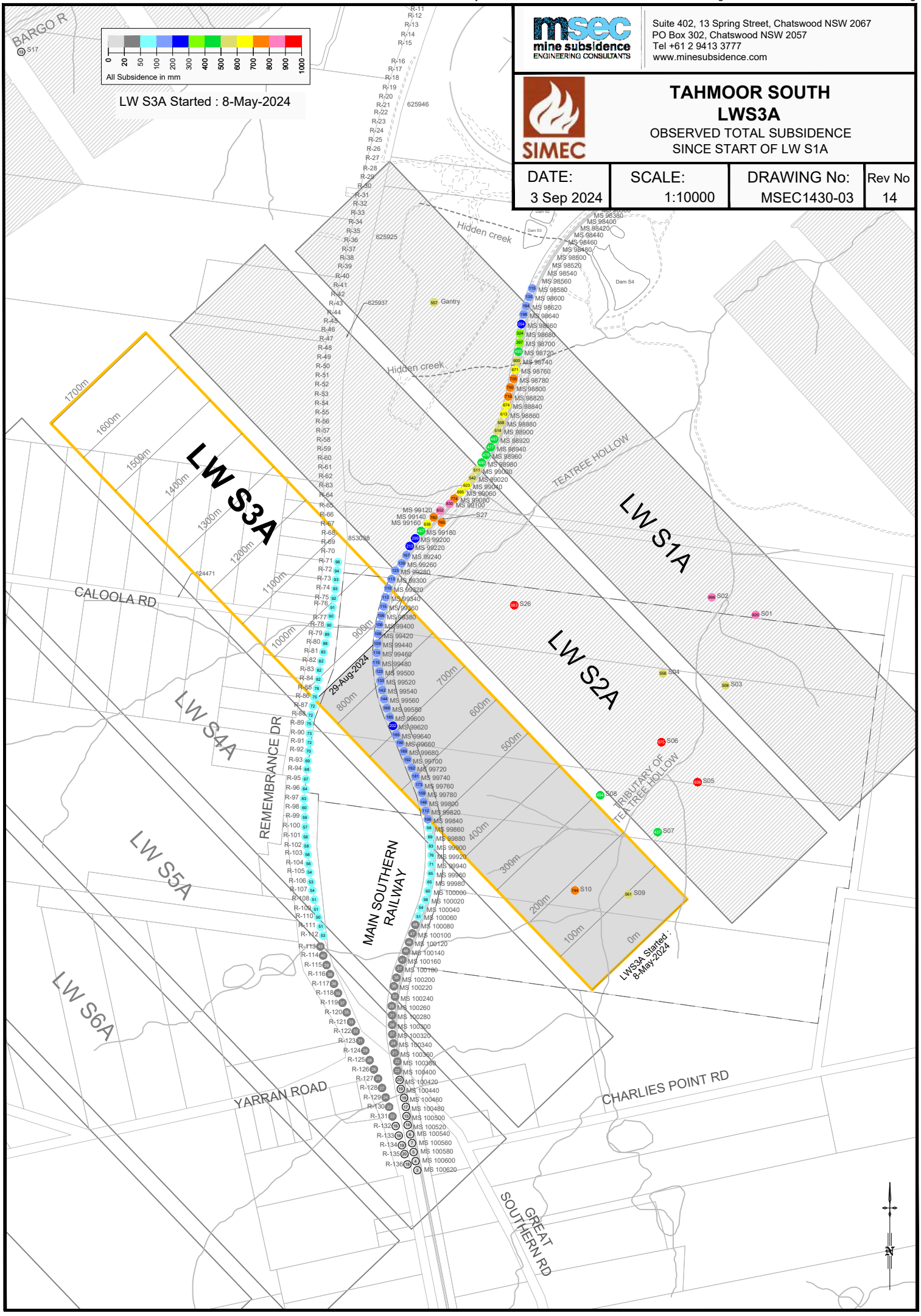

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TAHMOOR SOUTH LWS3A

OBSERVED TOTAL SUBSIDENCE SINCE START OF LW S1A

DATE:	SCALE:	DRAWING No:	Rev No
3 Sep 2024	1:10000	MSEC1430-03	14

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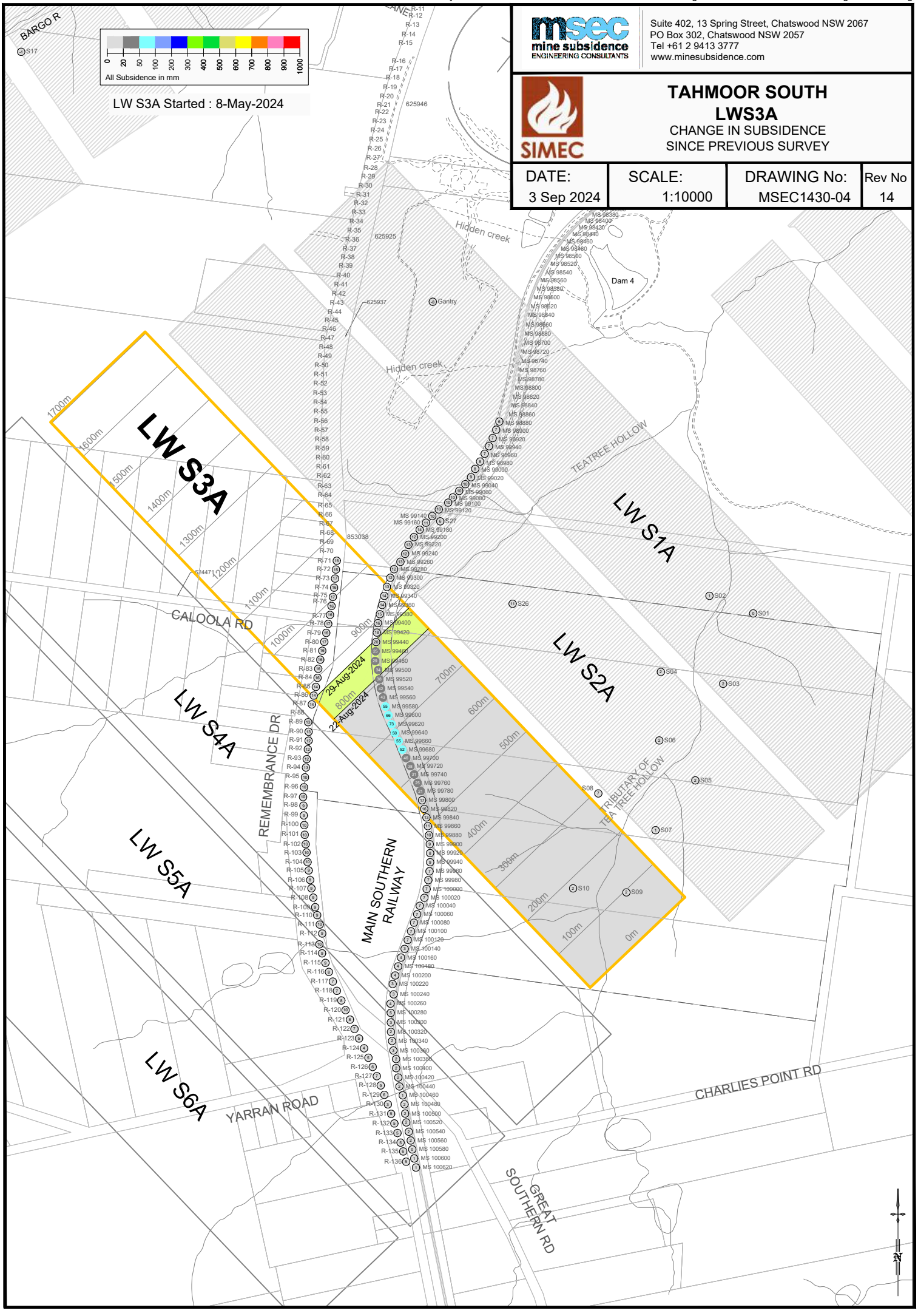
TAHMOOR SOUTH LWS3A

CHANGE IN SUBSIDENCE SINCE PREVIOUS SURVEY

DATE:	SCALE:	DRAWING No:	Rev No
3 Sep 2024	1:10000	MSEC1430-04	14



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TAHMOOR SOUTH
LWS3A
OBSERVED INCREMENTAL ABSOLUTE HORIZONTAL MOVEMENT SINCE START OF LW S3A

DATE:	SCALE:	DRAWING No:	Rev No
3 Sep 2024	1:10000	MSEC1430-05	14

LW S3A Started : 8-May-2024

LEGEND
- Horizontal displacements shown in mm at survey mark locations
- GNSS horizontal displacements shown in mm at unit locations

FIRE ROAD NO P1
BARGO RIVER
OLIVE LANE
Hidden creek
Gantry
TEATREE HOLLOW
LW S1A
LW S2A
LW S3A
LW S4A
LW S5A
LW S6A
1700m
1600m
1500m
1400m
1300m
1200m
1100m
1000m
900m
800m
700m
600m
500m
400m
300m
200m
100m
0m
29-Aug-2024
CALOOLA RD
REMEMBRANCE DR
MAIN SOUTHERN RAILWAY
TRIBUTARY OF TEATREE HOLLOW
LWS3A Started : 8-May-2024
YARRAN ROAD
GREAT SOUTHERN RD
CHARLIES POINT RD
S01
S02
S03
S04
S05
S06
S07
S08
S09
S10
S17
S18
S26
S27
N

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TAHMOOR SOUTH
LWS3A

OBSERVED TOTAL ABSOLUTE HORIZONTAL MOVEMENT SINCE START OF LW S1A

DATE:	SCALE:	DRAWING No:	Rev No
3 Sep 2024	1:10000	MSEC1430-06	14

LW S3A Started : 8-May-2024

LEGEND

- Horizontal displacements shown in mm at survey mark locations
- GNSS horizontal displacements shown in mm at unit locations

LW S3A
LW S1A
LW S2A
LW S4A
LW S5A
LW S6A
1700m
1600m
1500m
1400m
1300m
1200m
1100m
1000m
900m
800m
700m
600m
500m
400m
300m
200m
100m
0m
29-Aug-2024
LWS3A Started : 8-May-2024
S01
S02
S03
S04
S05
S06
S07
S08
S09
S10
S26 Installed after LWS1A
S27 Installed after LWS1A
Gantry
Hidden creek
Hidden creek
TEATREE HOLLOW
TRIBUTARY OF TEA TREE HOLLOW
CALOOLA RD
REMEMBRANCE DR
MAIN SOUTHERN RAILWAY
GREAT SOUTHERN RD
YARRAN ROAD
CHARLIES POINT RD
FIRE ROAD NO P1
BARGO RIVER
OLIVE LANE
N

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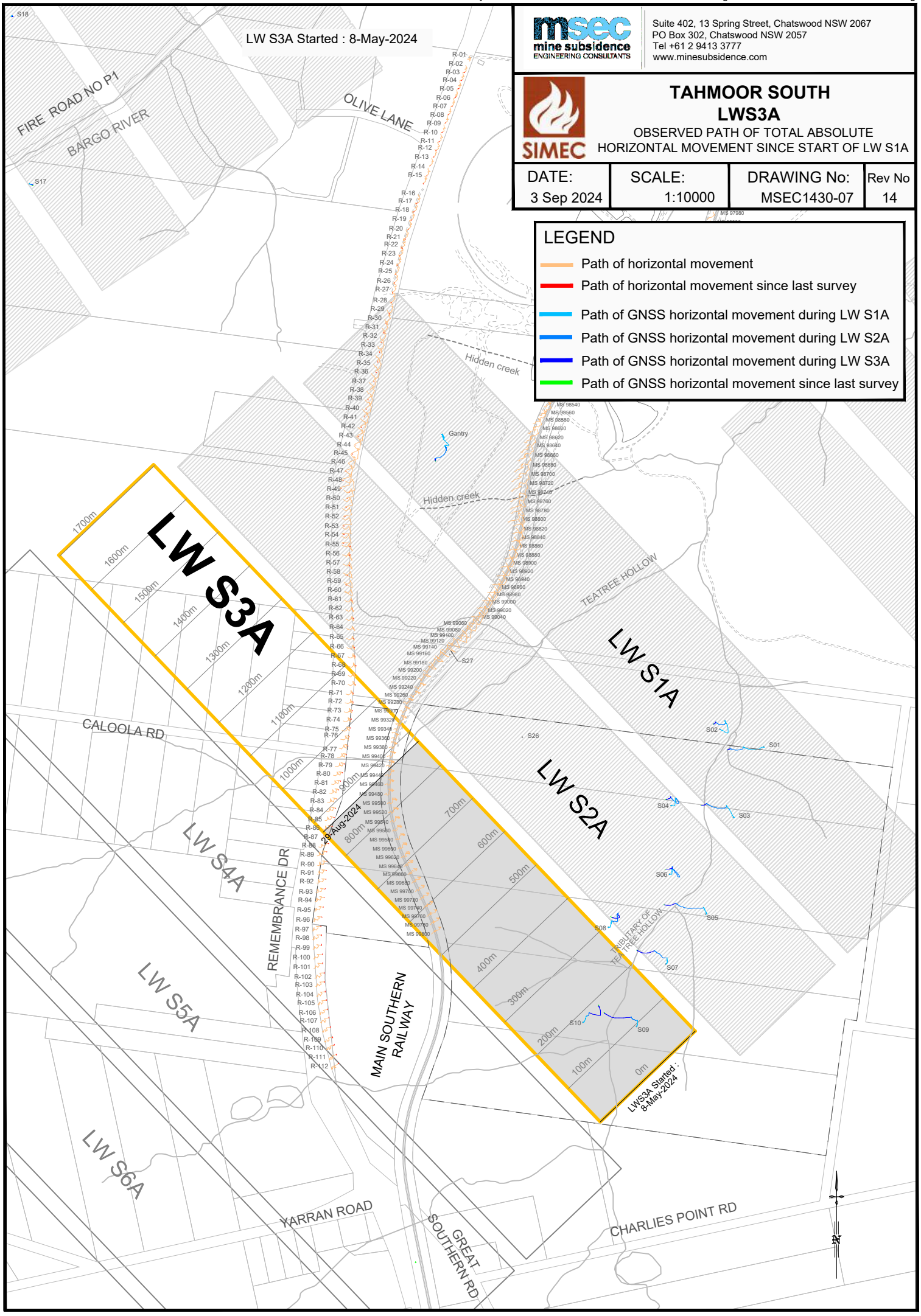

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TAHMOOR SOUTH
LWS3A

OBSERVED PATH OF TOTAL ABSOLUTE HORIZONTAL MOVEMENT SINCE START OF LW S1A

DATE:	SCALE:	DRAWING No:	Rev No
3 Sep 2024	1:10000	MSEC1430-07	14

LEGEND

- Path of horizontal movement
- Path of horizontal movement since last survey
- Path of GNSS horizontal movement during LW S1A
- Path of GNSS horizontal movement during LW S2A
- Path of GNSS horizontal movement during LW S3A
- Path of GNSS horizontal movement since last survey

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TAHMOOR SOUTH
LW S3A

REMEMBRANCE DRIVE CUTTING (RC1)

DATE:	SCALE:	DRAWING No:	Rev No
3 Sep 2024	as shown	MSEC1430-08	14

0m 25m 50m
SCALE

29-Aug-2024

LWS3A

MSR

800m

700m

LWS4A

REMEMBRANCE DR

LW S5A

N

LW S3A Started : 8-May-2024

RAILWAY TRACKS ARE INDICATIVE

1m SURFACE LEVEL CONTOURS

Latest Survey 26-Aug-2024

mm Incremental Subsidence

Horizontal displacement of survey marks since start of LW S3A

mm Nominal Survey Accuracy
Absolute ± 14mm

Change in horizontal distance between survey marks

mm Closure

mm Opening

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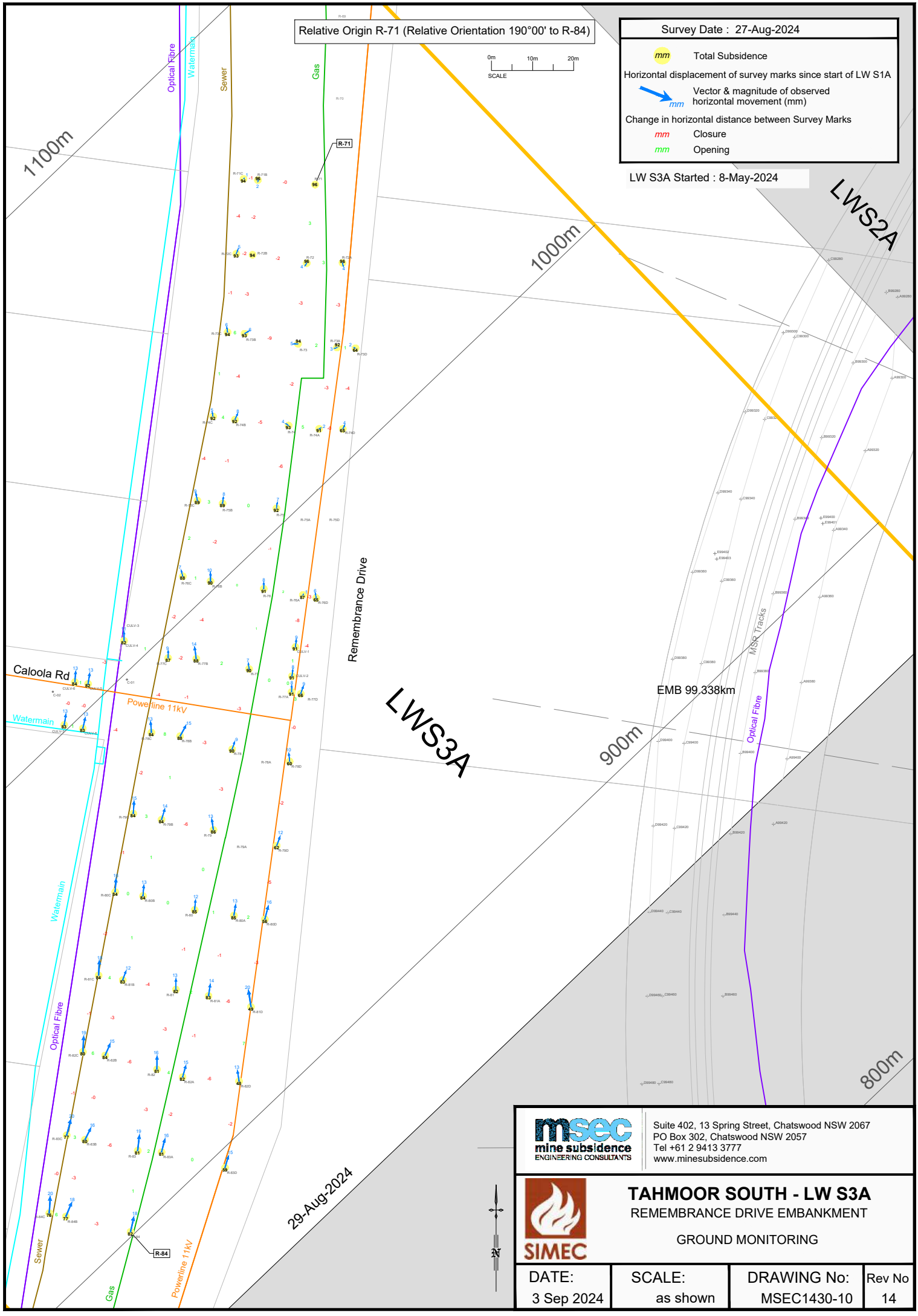

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TAHMOOR SOUTH - LW S3A

REMEMBRANCE DRIVE EMBANKMENT

GROUND MONITORING

DATE:	SCALE:	DRAWING No:	Rev No
3 Sep 2024	as shown	MSEC1430-10	14

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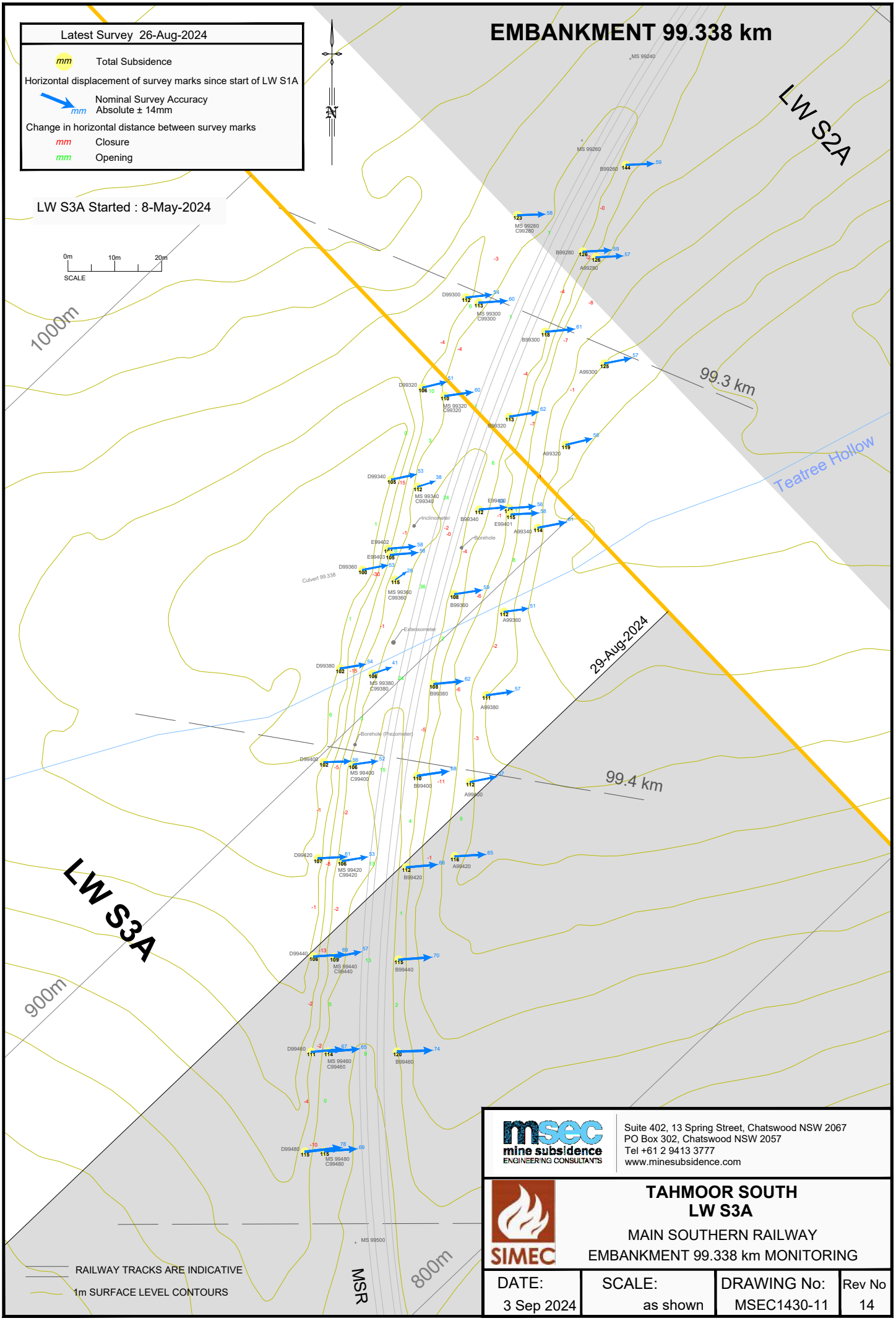

msec mine subsidence ENGINEERING CONSULTANTS
Suite 402, 13 Spring Street, Chatswood NSW 2067
PO Box 302, Chatswood NSW 2057
Tel +61 2 9413 3777
www.minesubsidence.com

SIMEC

TAHMOOR SOUTH
LW S3A

MAIN SOUTHERN RAILWAY
EMBANKMENT 99.338 km MONITORING

DATE:	SCALE:	DRAWING No:	Rev No
3 Sep 2024	as shown	MSEC1430-11	14

Six Monthly Subsidence Monitoring Report for Tahmoor South LW S3A
1 July 2024 to 21 January 2025

Summary	
Monitoring period	11 January 2025 to 21 January 2025
Length of extraction of LW S3A	LW commenced extraction on 8 May 2024 LW completed extraction on 17 December 2024
Distance travelled by longwall since previous report	
Distance to completion of LW S3A	

Summary of observed ground movements

Subsidence Parameter		Maximum observed during LW S3A	Location
Subsidence (mm)	Inc Total	773 1087	Remembrance Drive GNSS S26
Tilt (mm/m)	Inc Total	7.0 7.4	Remembrance Drive Main Southern Railway
Hogging Curvature (km^{-1})	Inc Total	0.32 0.34	Main Southern Railway Main Southern Railway
Sagging Curvature (km^{-1})	Inc Total	-0.21 -0.20	Main Southern Railway Main Southern Railway & Remembrance Drive
Tensile Strain (mm/m)	Inc Total	0.6 0.7	Remembrance Drive & Caloola Rd Caloola Rd
Compressive Strain (mm/m)	Inc Total	-2.2 -2.9	Remembrance Drive Remembrance Drive
Subsidence since previous survey (mm)		12 mm	Remembrance Drive since 7 January 2025

This monitoring report provides the results of the latest ground surveys during the mining of LW S3A, in accordance with the requirements of subsidence management plans.

Longwall face position

LW S3A commenced on 8 May 2024 and completed extraction on 17 December 2024. The mine layout and the monitoring peg positions are shown in Drawing No. MSEC1430-01.

Monitoring results

Ground monitoring is being undertaken within the active subsidence zone of LW S3A. Maximum incremental subsidence parameters within the current extent of monitoring are summarised in Table 1.

Table 1 Summary of maximum observed subsidence parameters

Monitoring Line		Maximum observed subs (mm)	Maximum observed tilt (mm/m)	Maximum observed hogging curvature (km^{-1})	Maximum observed sagging curvature (km^{-1})	Maximum observed tensile strain (mm/m)	Maximum observed comp. strain (mm/m)
Main Southern Railway	Inc Total	762 981	6.2 7.4	0.32 0.34	-0.21 -0.20	0.4 0.6	-1.5 -2.6
Remembrance Drive	Inc Total	773 830	7.0 7.2	0.09 0.19	-0.12 -0.20	0.6 0.5	-2.2 -2.9
V-Line	Inc Total	383 946	1.3 4.0	0.02 0.07	-0.03 -0.04	0.1 0.2	-0.1 -0.5
Caloola Road	Inc Total	510 565	5.1 5.2	0.13 0.13	-0.04 -0.04	0.6 0.7	-0.8 -0.8
DT LIne	Inc Total	58 475	0.3 6.2	0.02 0.73	-0.03 -0.29	0.2 0.6	-0.1 -1.7
Charlies Point Road	Inc Total	23 69	0.4 0.6	0.04 0.05	-0.03 -0.04	0.2 0.4	-0.4 -0.4
Great Southern Road	Inc	40	0.8	0.04	-0.08	0.3	-0.4
Yarran Road	Inc	27	0.2	0.02	-0.01	0.2	-0.3

Ground survey results

Ground monitoring is being undertaken within the active subsidence zone of LW S3A. Monitoring results are shown graphically at the back of this report.

The spatial distribution of incremental subsidence is shown in Drawing No. MSEC1430-02. Changes in subsidence since the previous survey are shown in Drawing No. MSEC1430-03.

Main Southern Railway

A final survey for LW S3A was conducted on 20 December 2024. Non-conventional subsidence developed near 99.62 km and 99.56 km though rates of change have reduced to low levels along the railway. Visual inspections had identified changes in track geometry above LW S3A, resulting in the implementation of a temporary speed restriction on the track. The temporary speed restriction has been removed on both tracks since 24 November after track geometry was adjusted. The observations on the railway have been tracked into the adjacent property at the Australian Wildlife Sanctuary, where impacts have occurred to some gates and fences. Impacts have also been observed on Telstra's optical fibre cable at both locations. Impacts at both locations were repaired by Tahmoor Coal. No new impacts were observed in recent months.

GNSS monitoring

Global Navigation Satellite System (GNSS) units are fixed survey stations that continuously measure their absolute horizontal and vertical positions in real time. There are 28 units located directly above and adjacent to LW S1A to S6A. These include two units above the commencing end of LW S3A, being Sites S09 and S10.

The measured position of each GNSS unit varies depending on atmospheric conditions and the array of satellites that are present in the sky at each time, and the vegetation cover surrounding each unit. Measured variations in height are typically greater than the variations for eastings and northings.

The results from the GNSS units are shown in Fig. S01 to Fig. S27 and Fig. TM. Mining-induced movements have developed at the GNSS units, with maximum measured incremental subsidence of 712 mm at Site S10 above LW S3A. Rates of change at Site S10 have reduced to low levels.

Observed development of subsidence above LW S3A is shown in Figure A. Observed subsidence has developed within predictions. Rates of change in subsidence have reduced to low levels along the Main Southern Railway and Remembrance Drive.

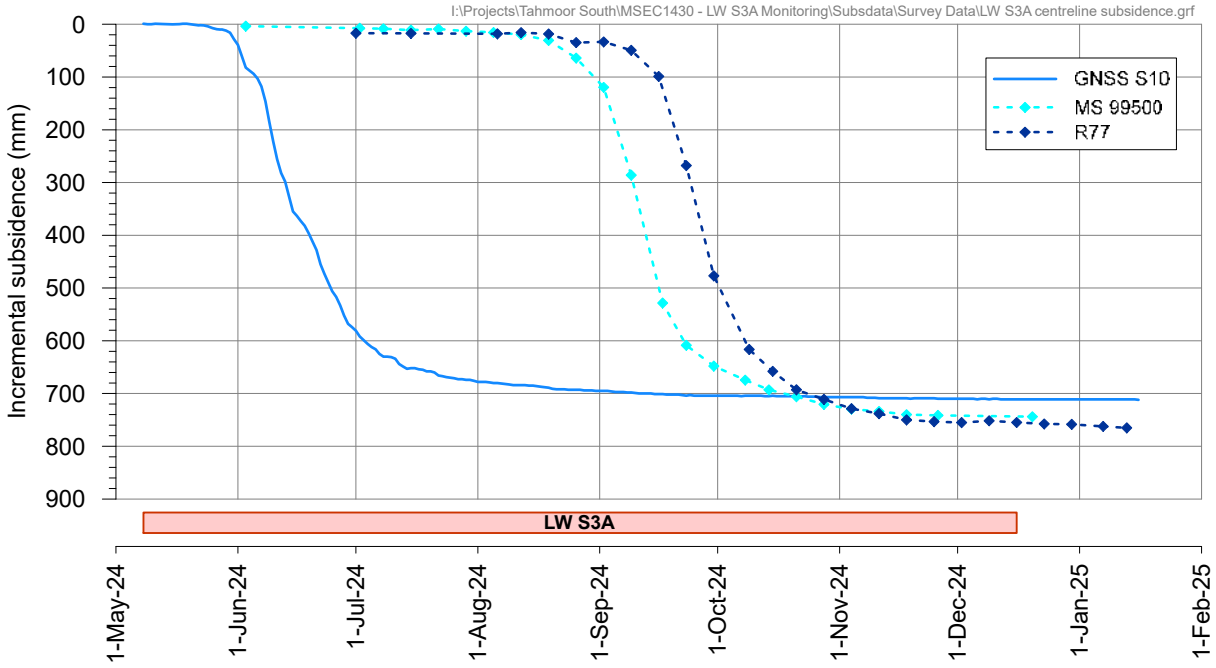

Figure A Development of subsidence along centreline of LW S3A

Changes in horizontal distances can be calculated between GNSS units that are stationed close together and results are shown in Figure B. Closure has developed across the Tributary to Teatree Hollow (Wirrimbirra Creek). The greatest closure across Wirrimbirra Creek during the mining of LW S3A occurred between Sites S09 and S10, which are located directly above LW S3A. Rates of change have reduced at all sites.

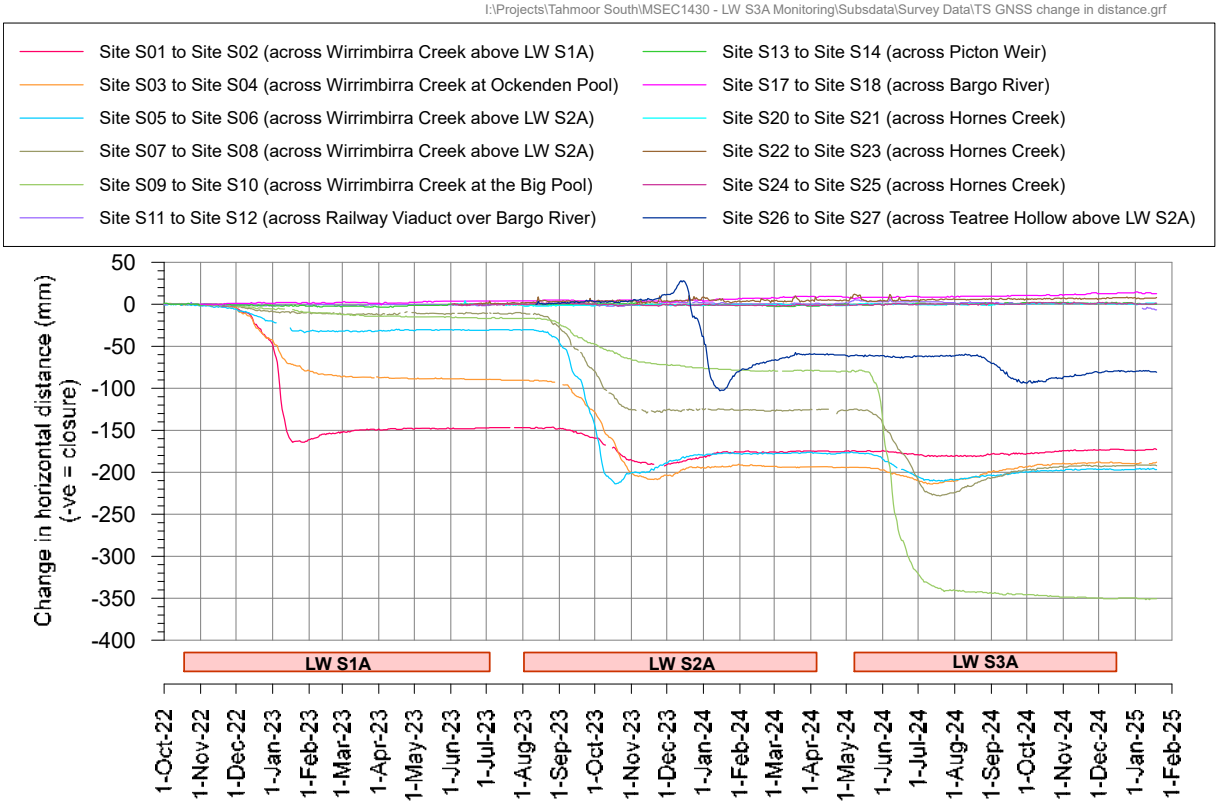

Figure B Observed changes in horizontal distances between GNSS units

Charlies Point Road

Monthly surveys have been completed, with small changes observed on 2 July. A final visual inspection for LW S3A was conducted on 13 December. Inspections have not identified any issues.

Remembrance Drive

Remembrance Drive has experienced the most active period of subsidence due to the extraction of LW S3A with rates of change reducing. The observed subsidence profile is relatively smooth, with compressive strains developing broadly above the central section of LW S3A, as shown in Fig. 6.

The observed development of compressive ground strains along Remembrance Drive above the central section of LW S3A is shown in Figure C.

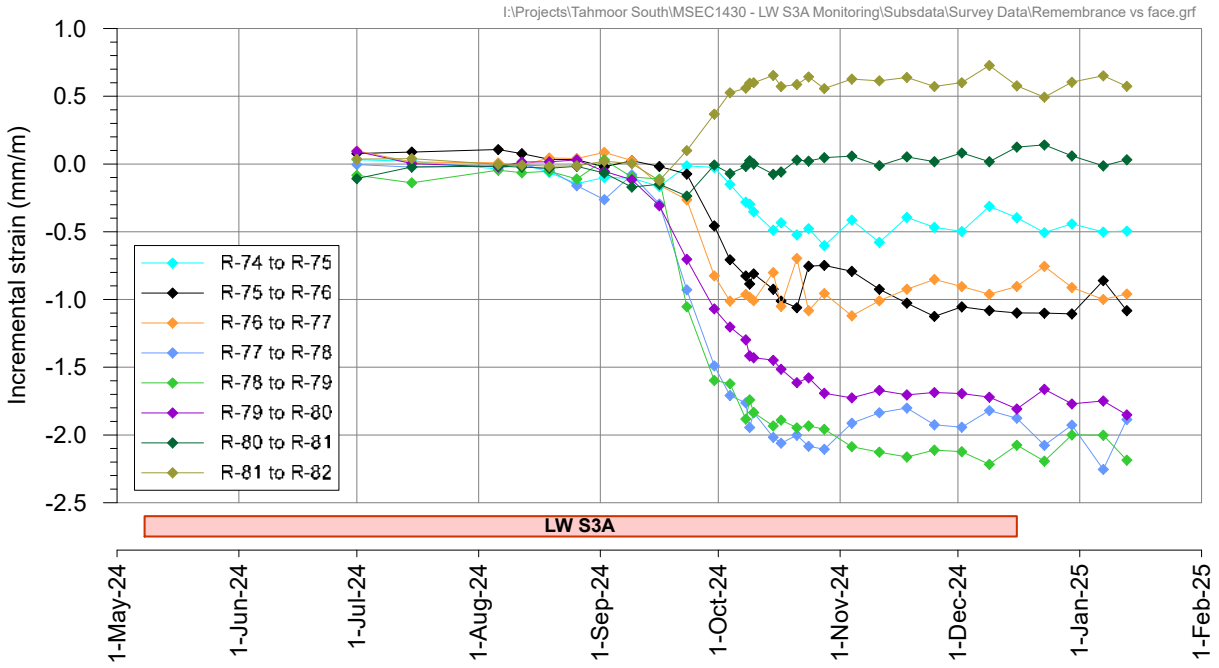

Figure C Observed development of ground strain along Remembrance Drive above central section of LW S3A over time

The observed development of compressive strain at previously observed impact sites during the mining of LW S2A is shown in Figure D. Minor changes were measured from the final survey on 13 January. A one-off survey was conducted along the northbound side of Remembrance Drive with minor changes observed since the end of LW S2A.

Visual inspections on 24 September observed possible undulations in the pavement south of the intersection with Caloola Road. A 3 mm wide crack was observed in the southbound shoulder opposite Tahmoor Garden Centre near Peg R64 on 22 October. No significant changes were observed on 14 January.

Surveys have ceased along the cutting. Minor changes were observed on 28 October.

The last absolute 3D survey for LW S3A along the Embankment at Caloola Road was conducted on 15 January 2025 and the results for absolute and local 3D surveys on 15 January 2025 are shown in Drawings Nos. MSEC1430-10 and MSEC1430-14 and Figs. 14 to 19. Compressive strains have developed along all five survey lines along the embankment and their developments over time are shown in Figure E. A final additional local 3D survey was conducted on 21 January 2025 to confirm that rates of change have reduced to low levels. The results from the additional survey on 21 January 2025 are shown only in Figure E. Very small, ongoing increases in compressive strains are expected to occur along the embankment over time. The observed subsidence profiles are relatively smooth along the crest and toe on both sides of the embankment, as shown in Fig. 14 to Fig. 18.

The embankment is experiencing relatively minor changes in horizontal distances across it, as shown in Fig. 19. Closure has focussed between the crest and toe of the embankment on the Southbound side.

Caloola Road

Caloola Road has experienced the most active period of subsidence due to the extraction of LW S3A, with rates of change reducing. The observed subsidence profile is relatively smooth, with minor ground strains currently observed, as shown in Fig. 22. No issues were observed from visual inspections.

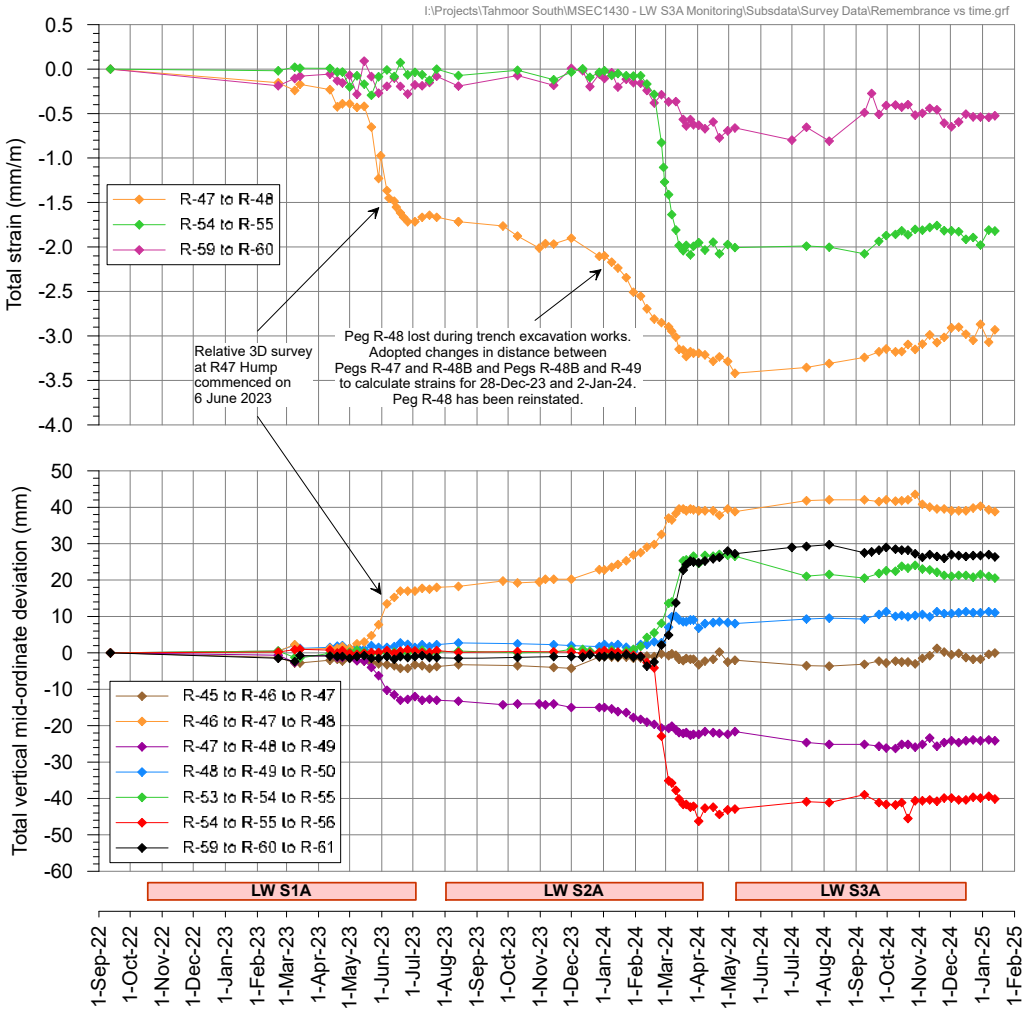

Figure D Observed development of ground strain and changes in vertical alignment at previously observed impact sites along Remembrance Drive

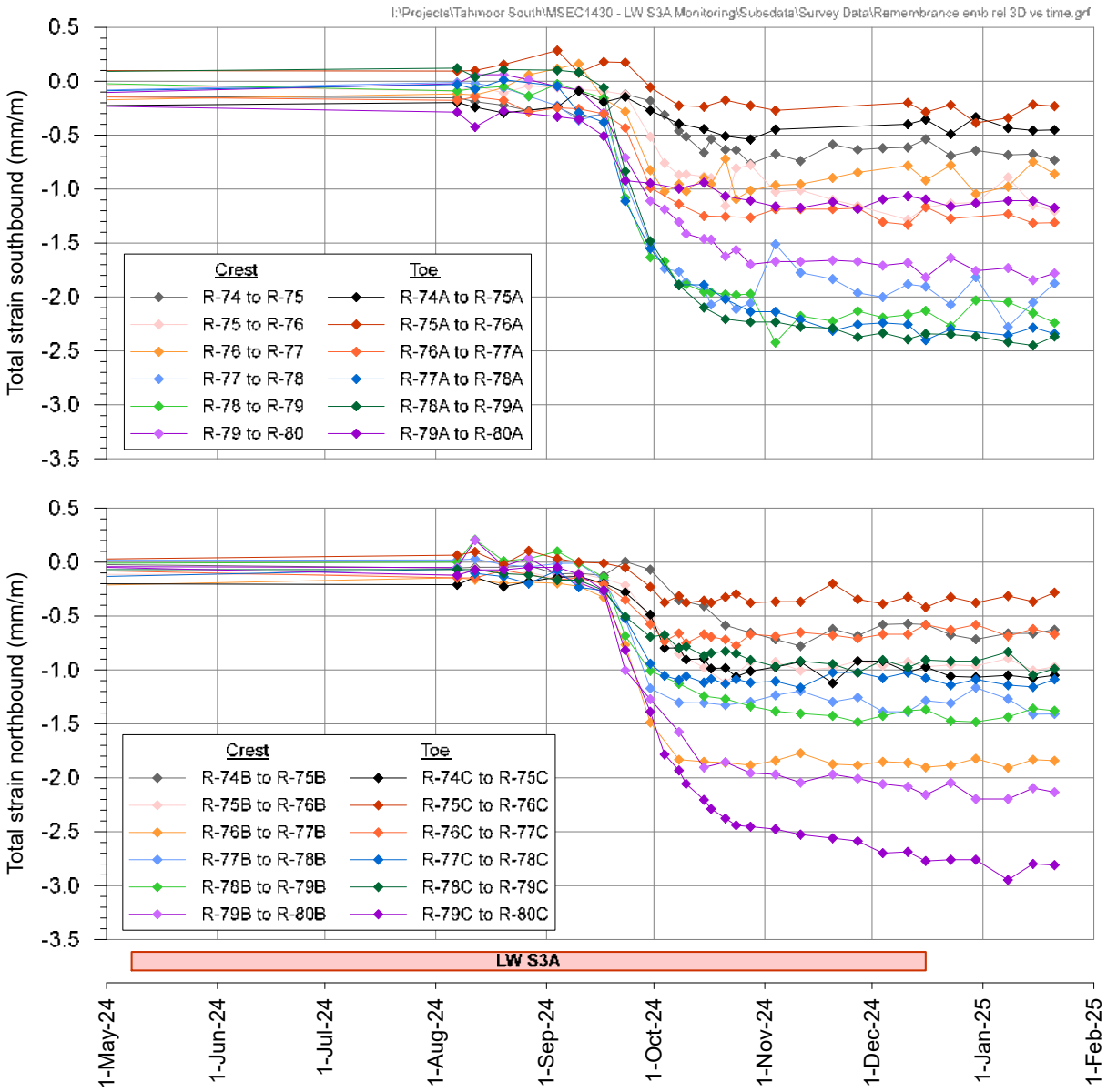

Figure E Observed development of ground strain along Remembrance Drive Embankment at Caloola Road

Natural Features

In addition to the GNSS units, survey marks have been installed at four locations across the Tributary to Teatree Hollow (Wirrimbirra Creek), and at four locations across Teatree Hollow, as shown in Drawing No. MSEC1430-01.

An End of LW S2A survey was conducted on 30 April 2024 along ground survey lines that were installed across the Tributary to Teatree Hollow, and a summary is shown in Figure F. The results correlate reasonably well with the observations from GNSS units, taking into account the shorter lengths of the survey lines, which are based within the floor of the creek valley, compared to the distances between the GNSS units, which are mounted at the tops of the valleys.

An End of LW S3A survey was conducted on 28 January 2025. The maximum measured incremental closure during the mining of LW S3A was 178 mm, which was measured across Wirrimbirra Creek at TT2 (the Big Pool), located directly above the commencing end of LW S3A. It is observed that the ground surveys have measured less closure compared to closure that has been measured by the GNSS units. This is because the ground survey lines are shorter, concentrating across the bases of the valley due to lines of sight.

Incremental closure of 66 mm was measured across Wirrimbirra Creek at TT4, located between LW S2A and LW S3A during the mining of LW S3A.

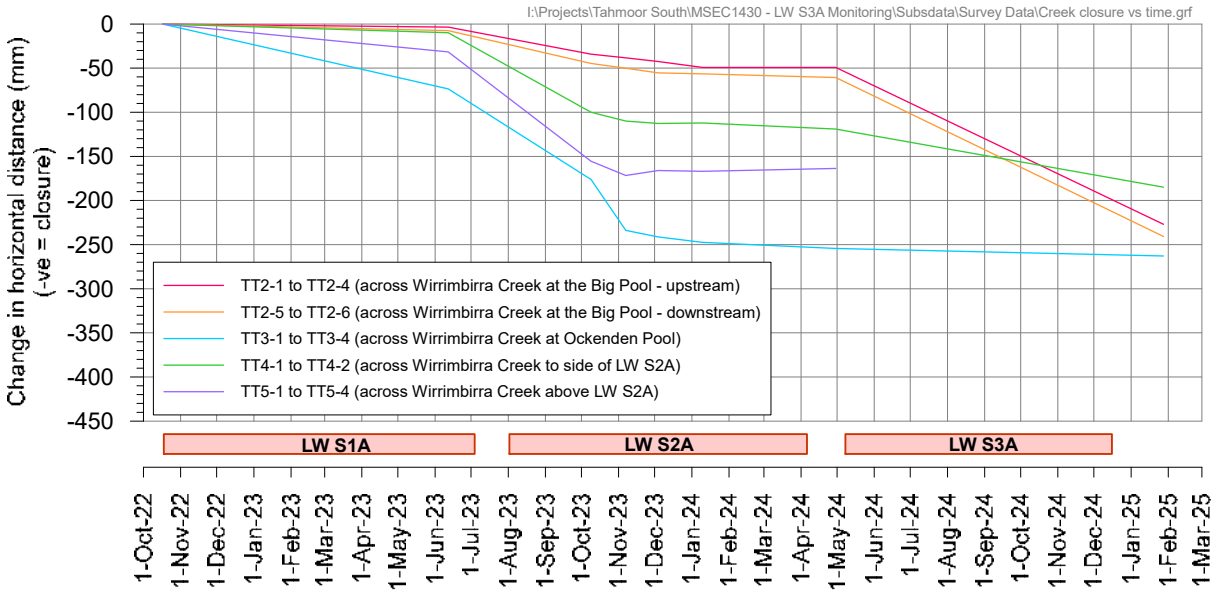

Figure F Observed development of closure across Tributary to Teatree Hollow from ground surveys

Tributary to Teatree Hollow (Wirrimbirra Creek)

Impacts were first detected in the Tributary to Teatree Hollow (Wirrimbirra Creek) on 8 February 2023. Surface water flows were first observed to stop approximately 120 metres upstream of monitoring site TT3, above the centreline of future LW S3A. A surface crack was observed in the bedrock downstream of this location. A new fracture approximately 6 metres long was observed upstream of Pool TT2 on 17 July. On 20 December, flows in the creek were observed to be at a similar reduced level when compared with the previous inspection on 19 November. Surface water was observed to start upstream of pool TT1, and cease upstream of a tributary junction upstream of Site K64. No surface flows were observed along the tributary. Ponded water was observed at Pool TT2 and Pool TT7, downstream of the confluence with the Tributary to Teatree Hollow.

Additional impacts have been observed at TT2 since October 2023. A fracture within a surface boulder upstream of Pool TT2 has been observed to increase in size during the mining of LW S3A. The boulder is wedged between two larger rocks on either side of the creek. Investigations have found that the fracture was present in July 2023, after the mining of LW S1A and prior to the commencement of LW S3A. The fracture contained some debris and some ageing of the exposed rock inside the fracture at this time. While pre-mining photographs and videos identified pre-existing fractures elsewhere within the boulder field upstream of Pool TT2, the fracture was not visible prior to the mining of LW S1A to the scale and extent as observed in July and September. The images, however, were not focussed directly on the boulder in question and could not definitively confirm whether there were any pre-existing hairline or slight fractures in it.

A geotechnical inspection was conducted by Douglas Partners on 9 November 2023. The fractured boulder has been assessed to be a detached sandstone block, which was previously part of the rock strata on either side of the valley prior to mining. The host rock had been naturally eroded and undercut by the weaker underlying strata, resulting in dislocation and fracturing along naturally formed joints at the fracture site. Pre-mining photographs show surface water was flowing underneath the site. While dislocated from the host rock on either side of the valley, the detached sandstone block remained in contact on both sides, such that mining-induced valley closure almost immediately resulted in fracturing. New fractures are developing at the detached sandstone block and within the adjoining rock strata at the contact points due to ongoing closure, with continued growth observed until November 2024 and no change in December 2024. The fracture site is situated above Pool TT2 and has no effect on surface water levels in Pool TT2.

A local 3D ground survey was conducted on 9 October 2023 along the TT2 line that is located upstream of Pool TT2 and very close to the fracture in the boulder. The results are shown in Figure G. It can be seen that very little tilt or strain had developed after the mining of LW S1A but valley closure strains and upsidence have developed since the completion of LW S1A. The fracture in the boulder is located between Pegs TT2-2 and TT2-3. The End of LW S2A survey on 30 April 2024 measured no change in compressive strain. The end of panel survey for LW S3A has measured a substantial increase in closure, as expected, with the majority of closure concentrating across the base of the valley, where fracturing has been observed.

While this section of the Tributary to Teatree Hollow has been previously observed to be dry during periods of dry weather, the observations indicate that the changes may be mining-induced.

A visual inspection of the rock shelter on 2 June 2023 found no water in the pool at TT3, and the pool was currently dry. A visual inspection in December 2024 found no changes.

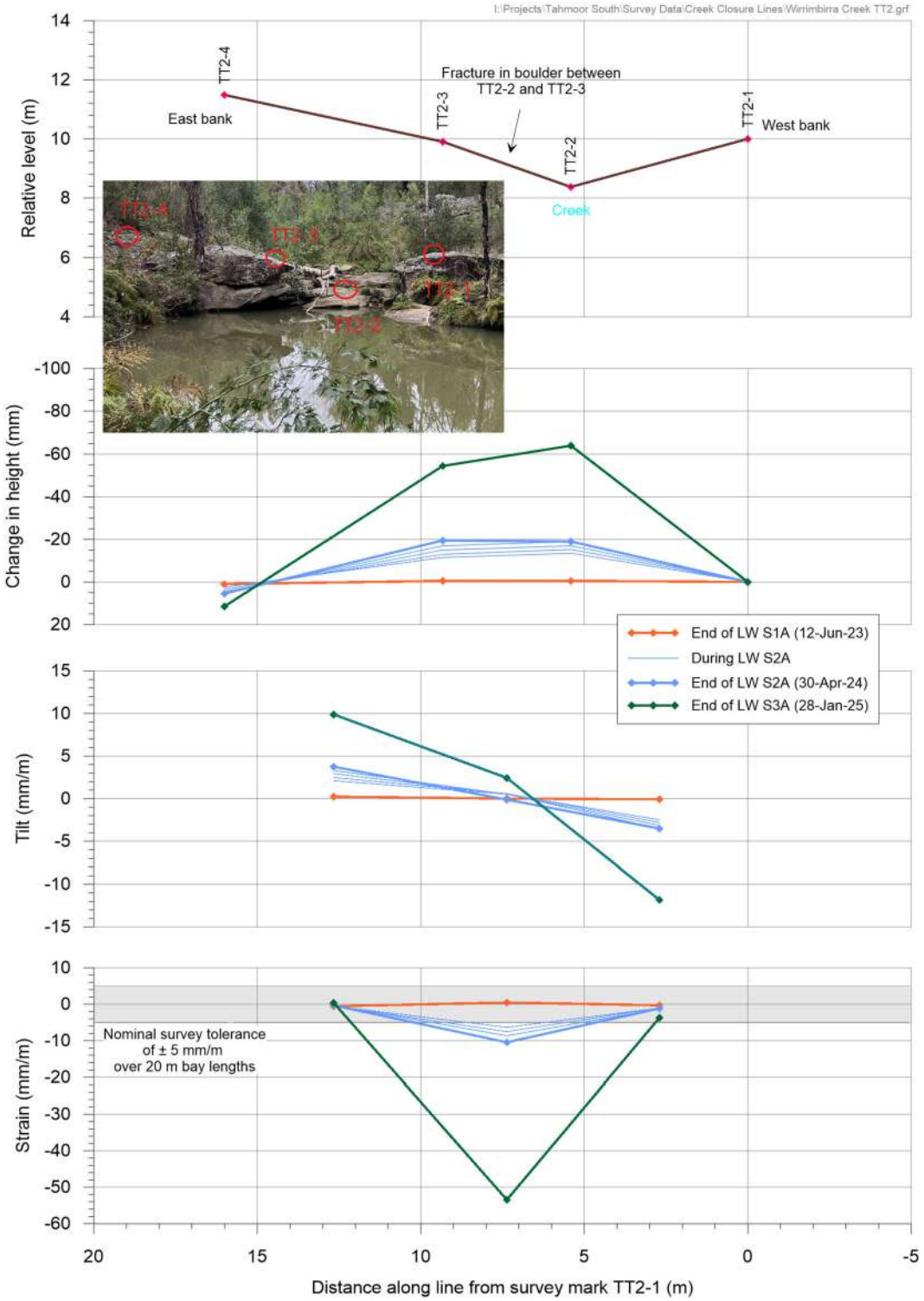

Figure G Observed subsidence, tilt and strain along TT2 line, upstream of Pool TT2

Teatree Hollow

Surveys were conducted across Teatree Hollow between 23 February 2023 and 12 June 2023 during LW S1A, with very little closure observed at TT6, TT9 and TT12 (6 mm or less).

The first survey for LW S2A was conducted across Teatree Hollow on 30 August 2023, with subsequent surveys on 9 October 2023, 7 November 2023, 4 December 2023, 10 January 2024 and 30 April 2024. An End of LW S3A survey was conducted on 28 January 2025. Very little closure is observed at TT6 (4 mm) and TT12 (4 mm). Observed closure across TT9 was 34 mm after the mining of LW S2A, with no measurable change observed after the mining of LW S3A.

GNSS units S26 and S27 were installed across Teatree Hollow directly above LW S2A to measure valley closure. As shown in Figure B, approximately 100 mm maximum closure was measured by the GNSS units during the mining of LW S2A though closure reduced after the travelling subsidence passed through the valley. Total closure then briefly increased to approximately 100 mm during the mining of LW S3A before reducing again after the travelling subsidence passed through the valley.

Compressive strains have developed across Teatree Hollow where it intersects Remembrance Drive and Caloola Road, as described earlier in the report.

Impacts were first observed along Teatree Hollow directly above LW S1A on 1 March 2023. Surface water flows have been observed to stop near the upstream edge of LW S1A and reappear with iron staining present above the downstream edge of LW S1A. On 20 December, flows in the creek were observed to be at a similar reduced level when compared with the previous inspection on 19 November. No surface water flows were observed downstream of the Main Southern Railway to the confluence with the Tributary to Teatree Hollow. Ponded surface water was observed at Pool TT9. Ponded surface water was observed at Pool TT7, downstream of the confluence with the Tributary to Teatree Hollow.

Steep Slopes

Monthly geotechnical inspections are undertaken when steep slopes are within the active subsidence zone. The inspection on 15 August 2024 noted a new fracture in a rock outcrop near the Big Pool with minor changes observed in October 2024. No concerns with slope instability were observed.

Structures

Surveys and inspections at MKD Machinery have ceased for LW S3A in accordance with the Management Plan.

Surveys and inspections at Australian Wildlife Sanctuary have ceased for LW S3A in accordance with the Management Plan, though Australian Wildlife Sanctuary will contact Tahmoor Coal if further impacts are observed.

Surveys and inspections at Tahmoor Garden Centre have ceased for LW S3A in accordance with the Management Plan. Minor impacts were observed during mining. An expansion joint in the café floor was observed to open and form a step. The impact was repaired by epoxy coating along the joint. Gaps opened between the decking and the main shed floorboards. The business was maintained in a safe and serviceable condition during mining.

Weekly surveys and inspections have been conducted at Bargo Petroleum with no mining-related impacts observed. A crack in the west wall of the shop was noted during a visual inspection on 8 January. The crack is at the wall / floor interface and is likely pre-existing.

Impacts have been reported at two residential properties along Caloola Road. The houses remain safe and serviceable. One sliding entry gate has experienced misalignment and the track has been adjusted, with further adjustments anticipated as mining continues. Minor cracking and lateral shifting of the driveway slab was observed, and an additional joint has been cut. Ground surveys have measured 26 mm closure between the house and Caloola Road. Cracks are also developing in the concrete slab in the shed. A gap between the floor and skirting board in the shed has been temporarily repaired. Damage to front verandah tiles. The owner reported odour from the septic system. A plumber attended and no subsidence impact observed. A new crack in the driveway has been observed.

The latch on a pool access gate at another residential property was found to be catching and has been adjusted.

Local Roads

Weekly visual inspections were conducted within the active subsidence zone. Visual inspections along Remembrance Drive did not identify any substantial issues.

Along Remembrance Drive, minor changes in compressive strain were observed at previously observed impact sites above LW S2A. No significant changes were observed on 14 January. A short section of unreinforced concrete kerb on the Remembrance Drive embankment near the Caloola Road intersection was discovered damaged when vehicle protection barriers were removed on 5 February 2025.

Surveys of Arina Road Bridge and Rockford Road Bridge on 23 August 2024 measured very minor changes.

Visual inspections of Arina Road Bridge and Rockford Road Bridge on 9 October 2024 found no issues.

Gas Infrastructure

Weekly surveys were conducted along Remembrance Drive and Cutting RC1 during periods of active subsidence. Remembrance Drive has experienced the most active period of subsidence due to the extraction of LW S3A with rates of change reducing.

The gas pipeline was exposed along the section of Remembrance Drive embankment where it crosses Teatree Hollow, as planned. Monitoring has been conducted during the period of active subsidence.

Observed changes in horizontal distance between Pegs R76 and R78, which are located at either end of the trench, are shown in Figure H. The measured compressive ground strains have exceeded 1.5 mm/m. Tahmoor Coal and Jemena inspected the exposed pipeline on 1 October and observed the pipeline to be bowing outwards in response to the compressive strains, as expected. The pipeline was, however, pressing against the side walls of the trench resulting in a second bow forming at the southern end of the trench and lifting of the pipeline from the floor. The trench was widened on 9 October under supervision by Jemena inspectors. The pipeline is now resting on the floor of the trench and the second bow has been removed.

Focussed strain surveys and focussed visual inspections were conducted on a twice-weekly basis during the most active period of subsidence. The survey frequency returned to weekly as rates of change have reduced as the LW face moves further away from it. Tahmoor met regularly with Jemena to discuss the observations, with a final meeting for LW S3A held on 21 January 2025. The pipeline's position in the trench was adjusted in late December 2024 and further adjustments of the pipeline were undertaken on 14 and 15 January 2025. Engineering analyses have confirmed that pipeline stresses have reduced and are within acceptable levels for managing potential future impacts due to the extraction of LW S4A. Additional engineering analyses will be conducted following feedback provided by Jemena. The analyses will include selection of an appropriate early warning trigger for undertaking additional management actions during the extraction of LW S4A and consideration of an appropriate location for excavating a trench, if required. The pipeline was backfilled between 3 and 5 February.

Minor changes in compressive strain were observed at previously observed impact sites above LW S2A. Macarthur Gas conducted a gas detection survey on 19 August. A very minor leak was detected at a valve along Remembrance Drive near Wellers Road (not mining related).

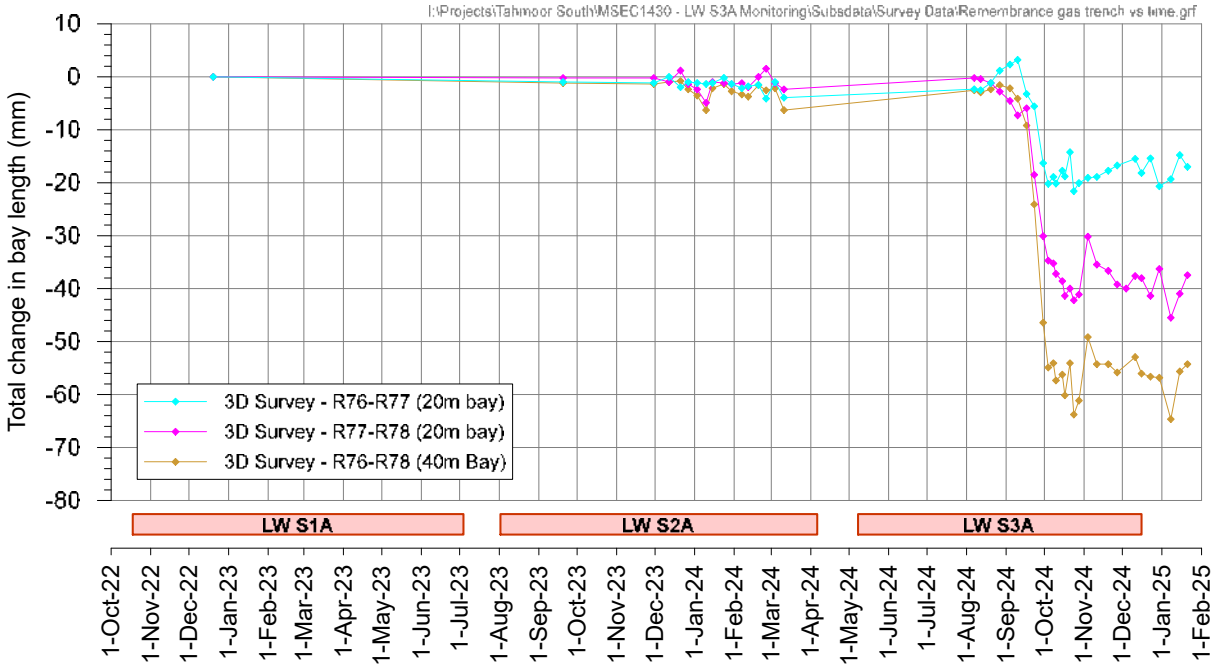

Figure H Observed changes in distance along Remembrance Drive at location of exposed Jemena gas main

Electrical Infrastructure

Weekly surveys and inspections were conducted along Remembrance Drive and Cutting RC1 during periods of active subsidence. Remembrance Drive has experienced the most active period of subsidence due to the extraction of LW S3A with rates of change reducing. No concerns for electrical infrastructure were observed.

Ground surveys of critical power poles are conducted once a month when poles are within the active subsidence zone.

Telecommunications Infrastructure

Weekly surveys continue along the Main Southern Railway with the optical fibre cable along the Main Southern Railway having experienced the most period of subsidence.

A bump in the subsidence profile with compressive strain was observed along the section of cable that is directly above LW S3A along the Main Southern Railway near 99.62 km. Telstra advised on 27 August that a minor indication of loss (0.2 dB) was observed from OTDR monitoring. Cracking and shearing has been observed to intersect the buried cable. Tahmoor Coal excavated a narrow trench on 3 September to relieve stresses and deformations in the cable. After the cable was free to move within the trench, Telstra recorded an improvement in performance of approximately 0.3 dB when compared to the previous test.

Additional cracks were observed across the Telstra optical fibre cable on 9 September at 99.56 km. A loss of signal strength was observed by remote monitoring on Telstra's optical fibre cable on 10 September. Tahmoor Coal excavated and exposed Telstra's optical fibre cable on 11 September at two locations. The first excavation was between 99.440 km and 99.460 km based on information from remote monitoring. Some improvement in signal strength was observed. Signal strength later returned to previously observed levels after the cable was exposed at the second trench at 99.560 km, where surface cracks were observed to intersect it and a noticeable kink was exposed and straightened.

Telstra advised on 14 January 2025 that there is currently no indication of mining-induced loss observed from OTDR monitoring.

Weekly surveys were conducted along Remembrance Drive until one month after the cessation of mining. Telecommunications cables along Remembrance Drive have experienced the most active period of subsidence with rates of change reducing. The cables are buried in conduit with no concerns observed.

Potable Water Infrastructure

Weekly surveys were conducted along Remembrance Drive and Cutting RC1 during periods of active subsidence. Remembrance Drive has experienced the most active period of subsidence due to the extraction of LW S3A with rates of change reducing.

The 450 mm diameter DICL water main runs alongside the C-Line at the Remembrance Drive Embankment at Caloola Road. Compressive ground strains have developed where the pegs cross Teatree Hollow, as shown in Figure E. It can be seen that compressive strains between Pegs R79C to R80C have very gradually increased over the last month, with rates of change reducing. Surveys and visual inspections have ceased for LW S3A, as one month has passed since the completion of LW S3A and rates of change have reduced to low levels.

As shown in Drawing No. MSEC1430-10, closure developed along an 80 metre length of the pipeline from Pegs R-76C to R-80C. It is assessed that the existing joints have been closing in response to the mining-induced compressive ground strains.

Minor changes have been observed on the four Gibault joints of the 100 mm water main on Caloola Road, as shown in Figure I. The northern displacement sensor across the southern joint was replaced in late February 2024. It can be seen from Figure I that is developing at the northern end of the southern joint and both ends of the northern joint. Rates of change are reducing. The observed changes are compared with changes in horizontal distance between Pegs R76C and R78C, which are located on either side of the joints.

The previous week's survey of Remembrance Drive embankment at Caloola Road in late September measured increased closure between Pegs R-76C and R-78C, which exceeded the combined increased closure measured at the Gibault joints. This observation suggested that existing pipe joints had been closing in addition to the Gibault joints. Minor changes have been observed since early October, with a very small jump in closure detected at the end of November and another in mid January.

Whilst non-conventional subsidence movements have not been identified, Tahmoor Coal have been conducting twice weekly focussed ground surveys along the C-Line and focussed visual inspections three times a week with no concerns observed. Tahmoor Coal has also notified the landowner where the pipeline crosses through the private property outside Pegs R-79C and R-80C. The survey frequency returned to weekly as rates of change reduced. The frequency of visual inspections reduced from three times a week to weekly. Surveys and inspections ceased one month after the completion of LW S3A.

Tahmoor Coal has regularly met with Sydney Water to discuss the observations. Meetings have ceased with LW S3A completed and rates of change reduced, though additional meetings can be conducted if adverse changes are observed.

Minor additional changes in compressive strain were observed during the mining of LW S3A at previously observed impact sites above LW S2A.

Very little change was observed at the displacement sensors that were installed on all four Gibault joints at the first impact site between Pegs R47 and R48, as shown in Figure J. The northern-most Gibault joint had reached the limit of its capacity on 25 February, and closure has been taken up by the next joint. Closure had gradually developed on the southern Gibault joint at the northern connection, with rates of change reduced to low levels. The displacement sensors across the other two joints are currently recording very minor changes.

The observed changes are compared with changes in horizontal distance between Pegs R47A and R48A, which are located on either side of the joints. It can be seen from Figure J that the joint displacement is less than measured between the survey pegs, though there has been a good correlation between the survey methods on weekly changes.

Weekly surveys were conducted during active subsidence along the Main Southern Railway where the Sydney Water potable water main crosses beneath the Railway. Minor changes were observed during the mining of LW S3A, as expected.

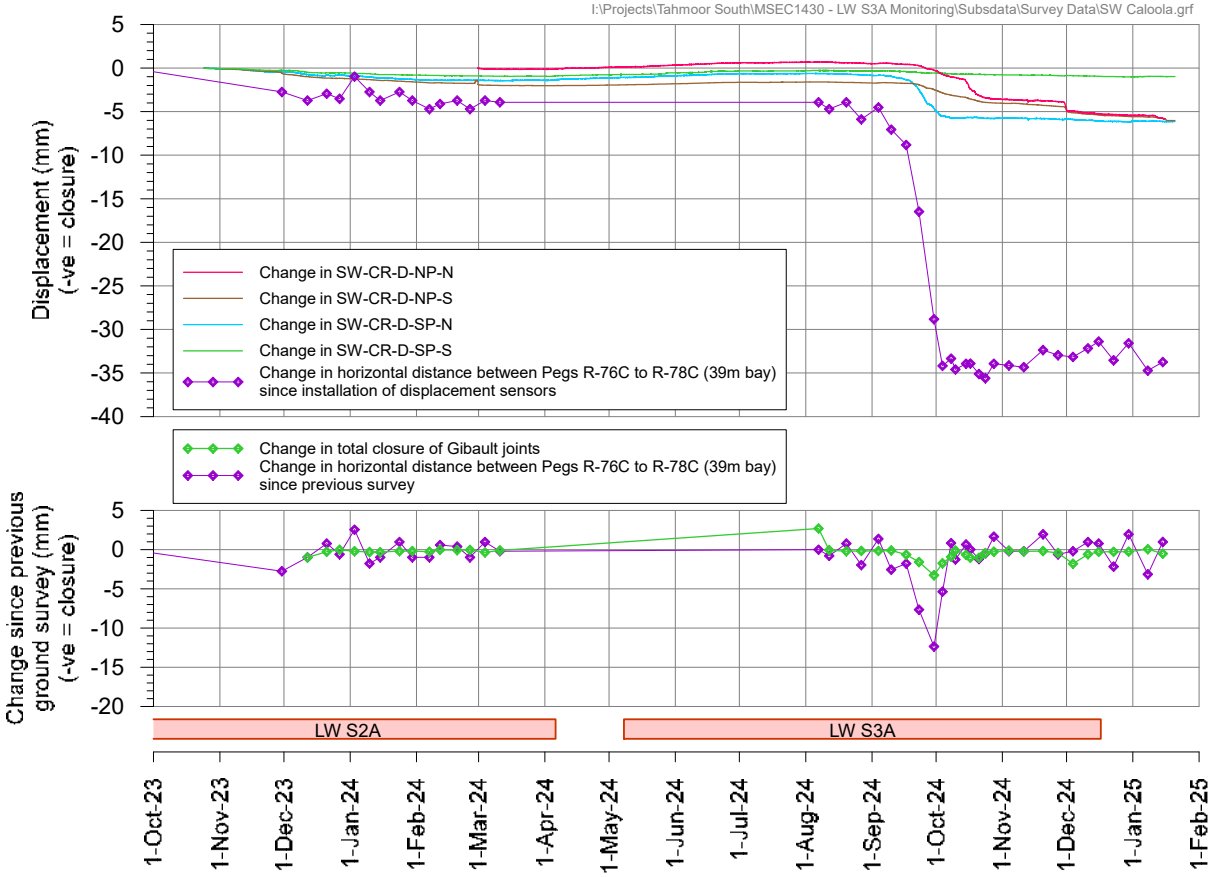

Figure I Observed change in distance across Gibault joints at Caloola Road on Sydney Water potable water main

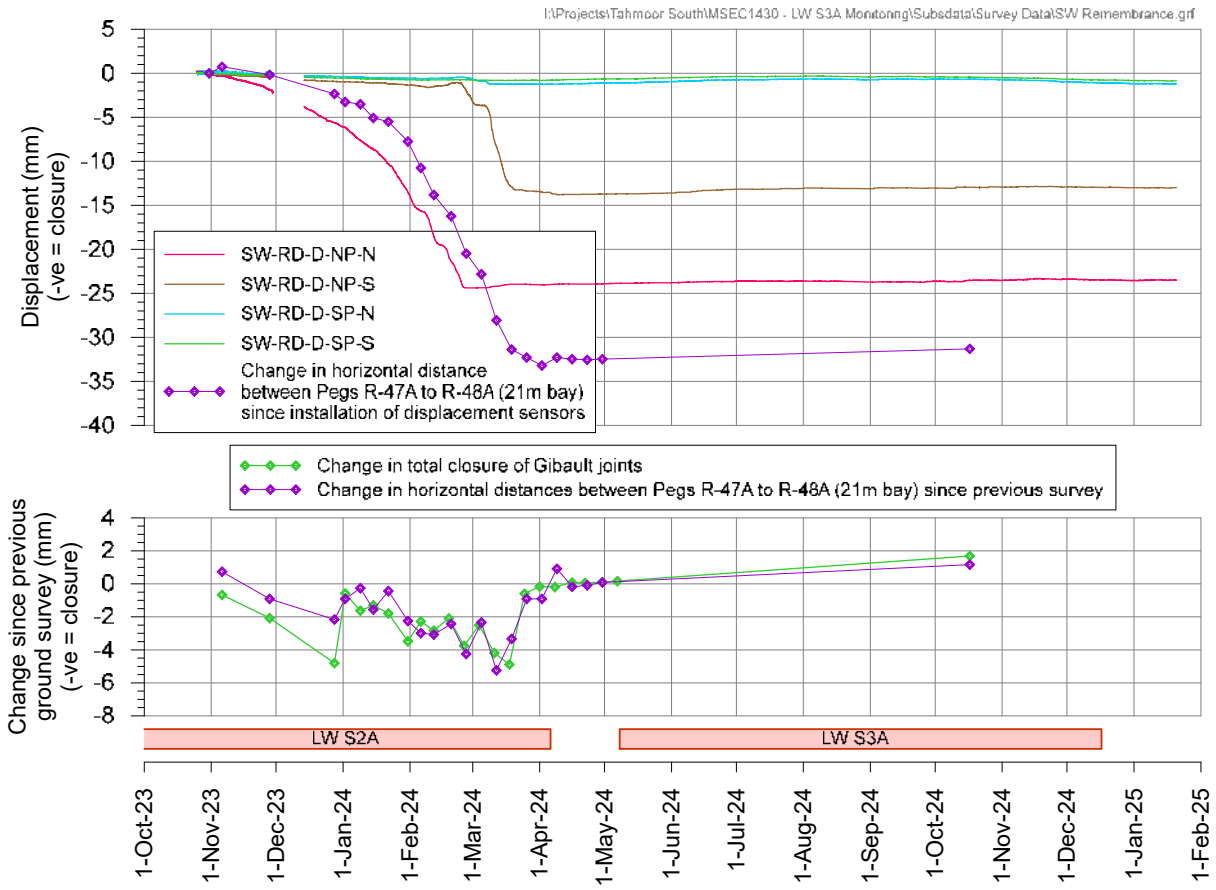

Figure J Observed change in distance across Gibault joints at Remembrance Drive between Pegs R47A and R48A on Sydney Water potable water main

Sewer Infrastructure

Weekly surveys were conducted along Remembrance Drive and the Remembrance Drive Embankment at Caloola Road during periods of active subsidence. Remembrance Drive has experienced the most active period of subsidence due to the extraction of LW S3A with rates of change reducing. No concerns for sewer infrastructure are observed. Minor changes in compressive strain were measured at previously observed impact sites above LW S2A.

Dams

Monthly geotechnical inspections have been undertaken when dams are within the active subsidence zone. No issues were observed except for Farm Dam FD18 where a TARP Level 1 was triggered during the November 2024 inspection due to the seepage through erosion rills. The TARP level was back to normal range during the December 2024 inspection.

Archaeological Sites

Gradually developing movements have been measured by GNSS units S03 and S04 located on either side of Wirrimbirra Creek, with no impacts observed. The most recent visual inspection at rock shelter site 52-2-4471 was on 3 December 2024. No significant changes were observed. This was the final inspection for LW S3A.

Summary

LW S3A commenced extraction on 8 May 2024 and completed extraction on 17 December. Minor subsidence is continuing to develop above the finishing end of the longwall panel but observed rates of change have reduced to low levels.

Subsidence has developed gradually within expectations. Non-conventional subsidence movements have been identified along the Main Southern Railway. Impacts on the railway, Telstra optical fibre cable, Australian Wildlife Sanctuary and Tahmoor Garden Centre have been managed in consultation with infrastructure owners.

Summary of surveys and inspections completed during LW S3A

Surveys and inspections have been conducted to meet the requirements of the LW S1A-S6A Extraction Plan. A timeline showing when each type of survey and inspection was conducted during LW S3A is shown in Figure K.

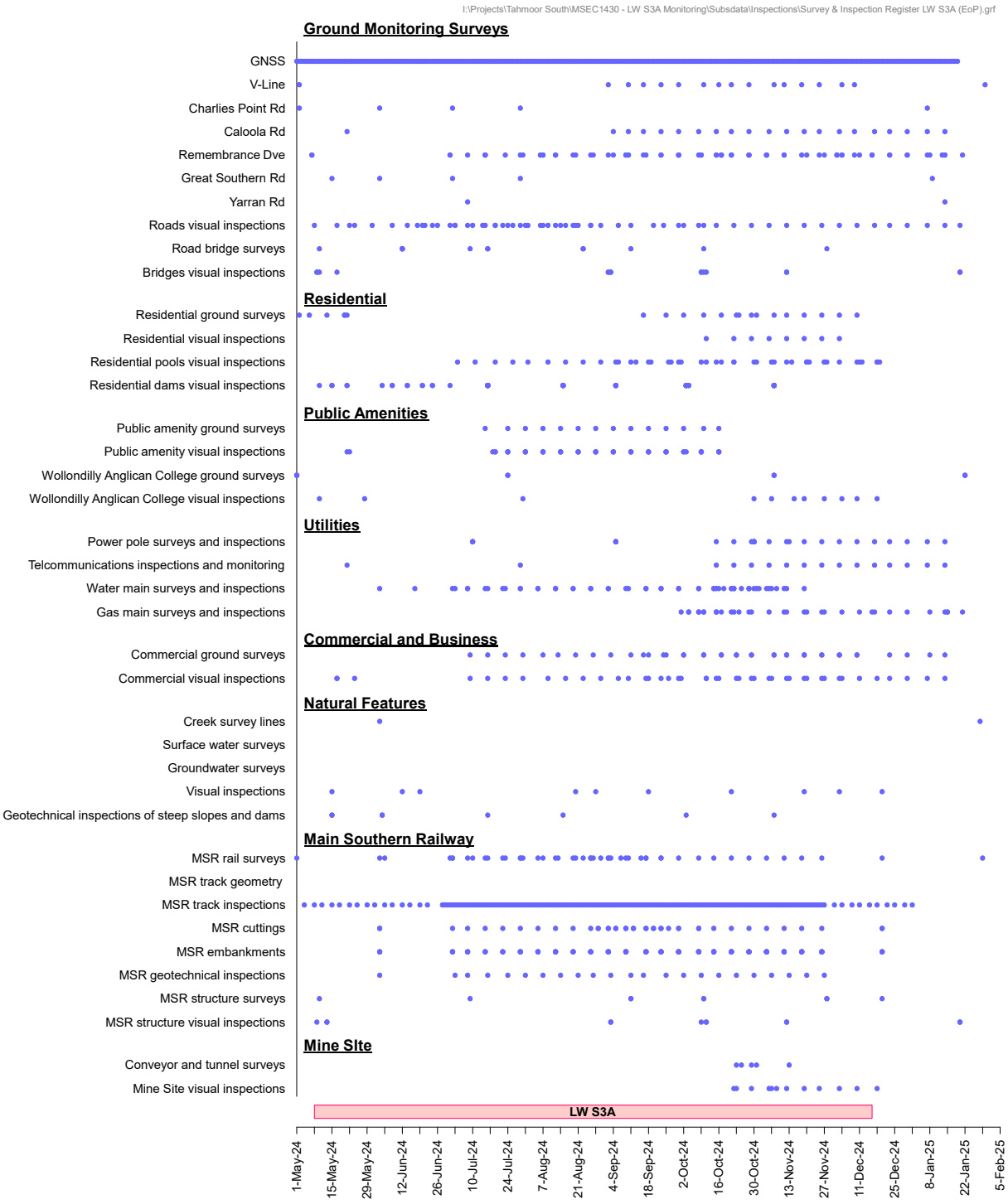

Figure K Surveys and inspections during LW S3A

A summary of surveys and inspections is provided in Table 2.

Table 2 Surveys and inspections conducted during LW S3A

Inspection / Survey	Responsibility	Number of Inspections / Surveys
Ground Monitoring Surveys		
GNSS	Geomatix	203
Local road surveys	SMEC	117
Local road inspections	Tahmoor Coal	61
Local road bridge surveys	SMEC	10
Local road bridge inspections	Tahmoor Coal	12
Sub-Total		**403**
Natural Features		
Teatree Hollow, Wirrimbirra Creek and Bargo River Survey Lines	SMEC	2
Teatree Hollow and Wirrimbirra Creek Visual inspections	ENRS	10
Surface water manual monitoring	ATC Williams	(Report pending)
Groundwater manual monitoring	SLR	(Report pending)
Cliffs and steep slopes geotechnical inspections	Douglas Partners	8
Sub-Total		**20**
Main Southern Railway		
Ground Surveys	Southern Rail Surveys	29
Track Geometry Surveys	BloorRail	18
Track Inspections	BloorRail	179
Main Southern Railway structure surveys	Southern Rail Surveys	8
Main Southern Railway structure visual inspections	Southern Rail Surveys	10
Embankments and cutting surveys	Southern Rail Surveys	158
Embankments and cuttings geotechnical inspections	Newcastle Geotech	23
Sub-Total		**425**
Utilities		
Endeavour Energy Power Pole Surveys and Inspections	SMEC & Tahmoor Coal	30
Telecommunications Monitoring and Inspections	Telstra & Tahmoor Coal	15
Water Main Surveys and inspections	SMEC & Tahmoor Coal	55
Gas Main Surveys and inspections	SMEC & Tahmoor Coal	33
Sub-Total		**133**
Mine Site		
Conveyor, Tunnel and Structure Surveys	SMEC	5
Visual inspections	Tahmoor Coal	13
Sub-Total		**18**
Public Amenities		
Public Amenity Ground Surveys	SMEC	14
Public Amenity Visual inspections	Tahmoor Coal	44
Sub-Total		**58**
Commercial and Business		
Commercial Ground Surveys	SMEC	40
Commercial Visual inspections	Tahmoor Coal	40
Sub-Total		**80**
Residential		
Pre-mining Front of House inspections (LW W S1A-S6A)	JMA Solutions	-
Pre-mining Structural Hazard Identification inspection and PMI (LW W S1A-S6A)	JMA Solutions	64
Private property ground surveys	SMEC	15
Private property visual inspections	Tahmoor Coal	8
Private property pool inspections	Tahmoor Coal	45
Private property dam inspections	Douglas Partners & Tahmoor Coal	78
Sub-Total		**210**
Total		**1347**

A comparison between assessed and observed impacts to surface features is summarised in Table 3. The assessed and observed impacts to surface features compare reasonably well with predictions.

Table 3 Summary of predicted and observed impacts during LW S3A

Surface Feature	Predicted Impacts	Observed Impacts
Natural Features		
Teatree Hollow and Wirrimbirra Creek	Likely fracturing in creek bed. Likely surface flow diversion Likely reduction in water quality during times of low flow. Likely gas emissions.	Fracturing, surface flow diversion and reduction in water quality observed in Tributary to Teatree Hollow and Teatree Hollow. No gas emissions observed. (Surface water report for LW S3A pending)
Aquifers or known groundwater resources	Temporary lowering of piezometric surface by up to 4m. Groundwater levels should recover with no permanent post mining reduction in water levels in bores. Potential impacts to privately owned groundwater bores. Please refer Water Management Plan.	Groundwater levels fallen in response to mining. (Groundwater report for LW S3A pending).
Steep slopes and cliffs	Potential soil slippage and cracking to slopes. Large scale slope failures or cliff instabilities unlikely.	No impacts observed during LW S3A.
Natural vegetation	No impacts anticipated.	No impacts observed during LW S3A.
Public Utilities		
Main Southern Railway	Impacts expected at isolated locations. Railway bridges and Viaduct very unlikely to experience adverse impacts. Railway will remain safe and serviceable with a management plan in place.	Changes to track geometry observed in cutting during LW S3A at creek crossing. Localised adjustments completed. Temporary speed restrictions imposed on both tracks. No adverse impacts observed on bridges and Viaduct. Railway maintained in safe and serviceable condition during mining.
Tahmoor Mine Rail Loop	Very minor impacts possible at isolated locations. Railway will remain safe and serviceable with a management plan in place.	Railway maintained in safe and serviceable condition during mining. No adverse impacts observed.
Roads and Bridges (all types)	Cracking and buckling may occur in isolated locations. Road bridges very unlikely to experience adverse impacts. Local roads will remain safe and serviceable with a management plan in place.	Crack in southbound shoulder of Remembrance Driveway near Peg R64. Pavement maintained in safe and serviceable condition during mining. No impacts observed to bridges.
Potable water pipelines	Impacts and minor leakages possible at isolated locations, particularly at creek crossings. Potable water pipelines will remain safe and serviceable with a management plan in place.	No impacts observed during LW S3A.
Sewer pipelines	Impacts possible at isolated locations, particularly at creek crossings. Sewer pipelines will remain safe and serviceable with a management plan in place.	No impacts observed during LW S3A.
Gas pipelines	Impacts possible at isolated locations, particularly at creek crossings. Gas pipelines will remain safe and serviceable with a management plan in place.	Gas pipeline temporarily exposed at one location during LW S3A. Trench widened to relieve stress. Backfilling of trench completed in February.
Electricity infrastructure	Some adjustments of power poles, catenaries or aerial powerline connections may be required. Electricity infrastructure will remain safe and serviceable with a management plan in place.	No impacts observed during LW S3A.

Surface Feature	Predicted Impacts	Observed Impacts
Telecommunication infrastructure	Impacts possible at isolated locations, particularly at creek crossings. Telecommunications cables will remain safe and serviceable with a management plan in place.	Minor losses detected in optic fibre cable near location of compressive strain on Main Southern Railway. Cable temporarily exposed at three locations during LW S3A to relieve stresses and deformations. Trenches have been backfilled.
Public Amenities		
Wollondilly Anglican College	Damage may occur in isolated locations but will remain safe and serviceable with a management plan in place.	One gate jammed and not closing. Adjustment completed. No significant changes to previously observed cosmetic impacts to pavements and brick walls. Repairs have been undertaken. College maintained in safe and serviceable condition during mining.
Australian Wildlife Sanctuary	Damage may occur but will remain safe and serviceable with a management plan in place.	Four gates at Tassie Devil enclosure jammed and out of alignment. Multiple adjustments and repairs undertaken. Ground movement and buckled Colorbond fences. Trip hazards in gravel footpaths. Repairs undertaken. Business maintained in safe and serviceable condition during mining.
Dingo Sanctuary	Damage may occur but will remain safe and serviceable with a management plan in place.	No impacts observed during LW S3A.
Bargo Cemetery	Damage may occur but will remain safe and serviceable with a management plan in place.	No impacts observed during LW S3A. Cemetery is located directly above LW S5A.
Commercial and Business Establishments		
MKD	Minor damage may occur but will remain safe and serviceable with a management plan in place.	No impacts observed during LW S3A.
Tahmoor Garden Centre	Damage may occur but will remain safe and serviceable with a management plan in place.	Opening and step at expansion joint in café floor. Repair of epoxy coating along joint completed. Gaps in decking and main shed floorboards. Business maintained in safe and serviceable condition during mining.
Bargo Petroleum	Damage may occur but will remain safe and serviceable with a management plan in place.	No impacts observed during LW S3A.
Poultry sheds	Damage may occur in isolated locations but will remain safe and serviceable with a management plan in place.	No impacts observed during LW S3A.
Tahmoor Mine Site	Damage may occur but will remain safe and serviceable with a management plan in place.	Minor opening of pre-existing cracking in roof and wall joints in 6C tunnel. Minor cracking in connection joints of raw coal bins. Mine site maintained in safe and serviceable condition during mining.
Farmland and Facilities		
Farm buildings, sheds, tanks	Negligible to slight impacts predicted for all farm buildings and sheds with management plan in place.	No impacts observed during LW S3A.
Fences	Potential for impacts to fences and gates.	No impacts reported to fences on farm properties during LW S3A.

Surface Feature	Predicted Impacts	Observed Impacts
Farm dams	Potential adverse effects on dam walls and storage capacity.	A TARP Level 1 was exceeded at Farm Dam FD18 during the November 2024 inspection due to the seepage through erosion rills. The TARP level was back to normal range during the December 2024 inspection.
Wells or bores	Potential impact to groundwater bores, particularly bores located directly above LWs.	No impacts observed during LW S3A.
Areas of Archaeological Significance	Rock shelter site may experience adverse impacts. Open Camp site and Isolated Find site unlikely to experience adverse impacts.	No impacts observed during LW S3A.
Areas of Heritage Significance	Picton Weir extremely unlikely to experience adverse impacts. The Weir will remain safe and serviceable with a management plan in place.	No impacts observed during LW S3A. Picton Weir is located west of LW S6A.
Permanent Survey Control Marks	Ground movement predicted at identified survey marks.	Ground movement occurred.
Residential Establishments		
Houses	Damage may occur to houses but they will remain safe and serviceable with a management plan in place.	Damage to front verandah tiles. Houses maintained in safe and serviceable condition during mining.
Swimming pools	Damage may occur to pools but they will remain safe and serviceable with a management plan in place.	One pool access gate adjusted.
Associated structures such as workshops, garages, on-site wastewater systems, water or gas tanks or tennis courts	Potential impact to pipes connected to inground septic tanks. Damage may occur to structures but they will remain safe and serviceable with a management plan in place.	Cracks in concrete slab in shed. A gap between the floor and skirting board has been repaired.
External residential pavements and fences	Damage may occur but they will remain safe and serviceable with a management plan in place.	Compression hump in driveway and minor cracking and lateral shifting of concrete driveway pavement at one property where the driveway crosses a creek. Additional joints cut.. Sliding entry gate at same property misaligned due to concrete driveway movement. Track adjustments undertaken.

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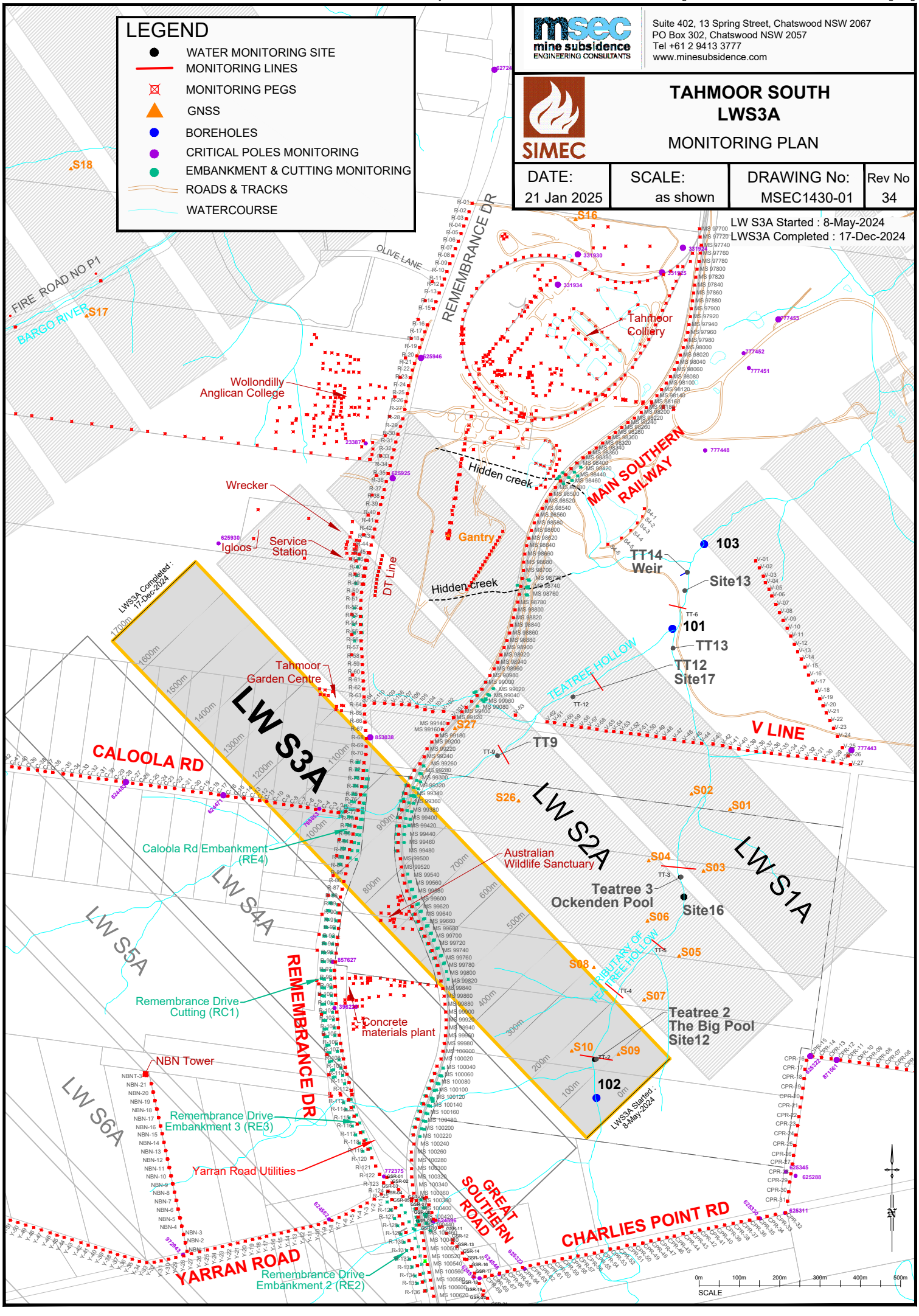

Tahmoor South LW S3A
Incremental subsidence profiles along Charlies Point Road

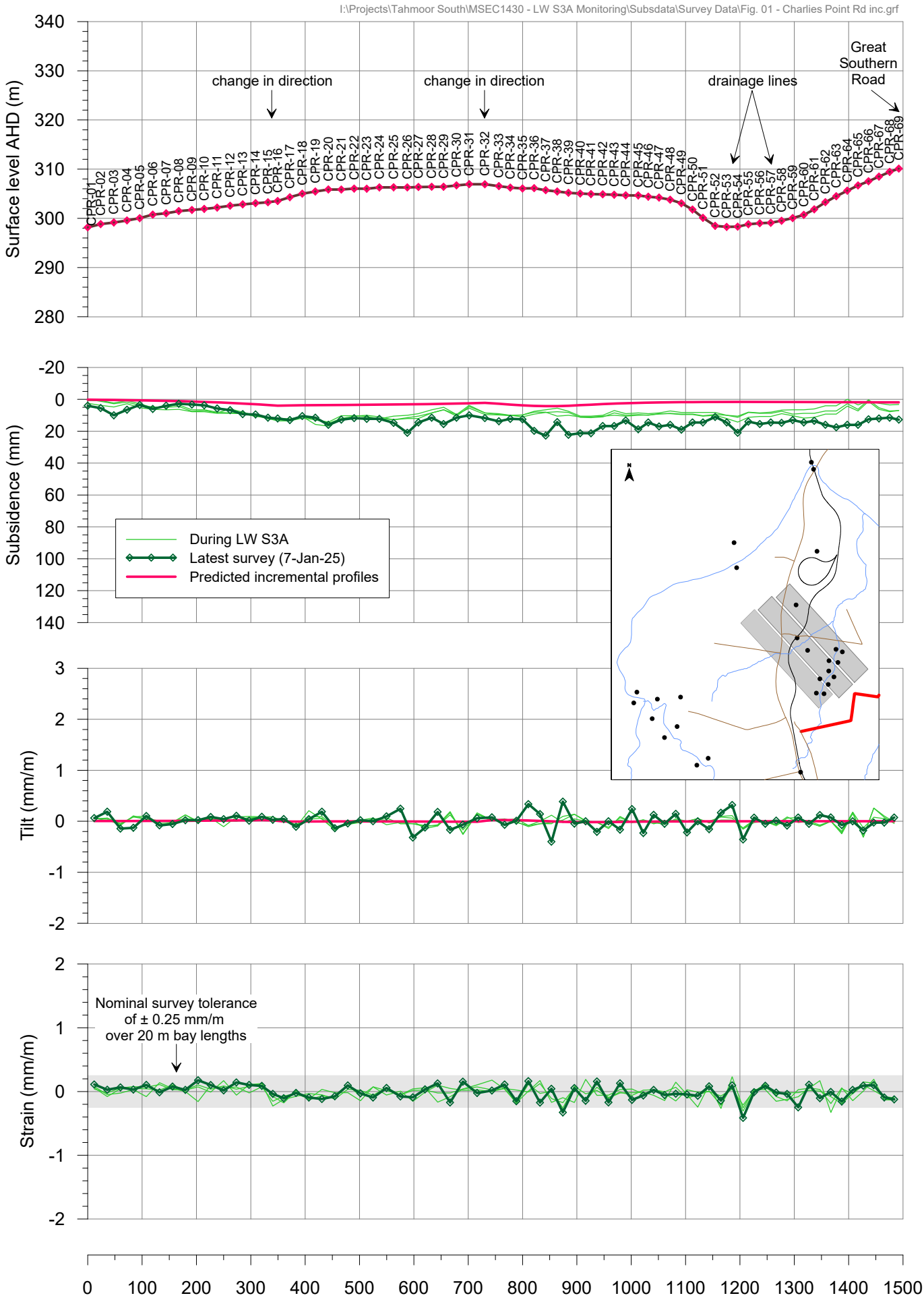

Fig. 1-R34

Tahmoor South LW S3A
Total subsidence profiles along Charlies Point Road

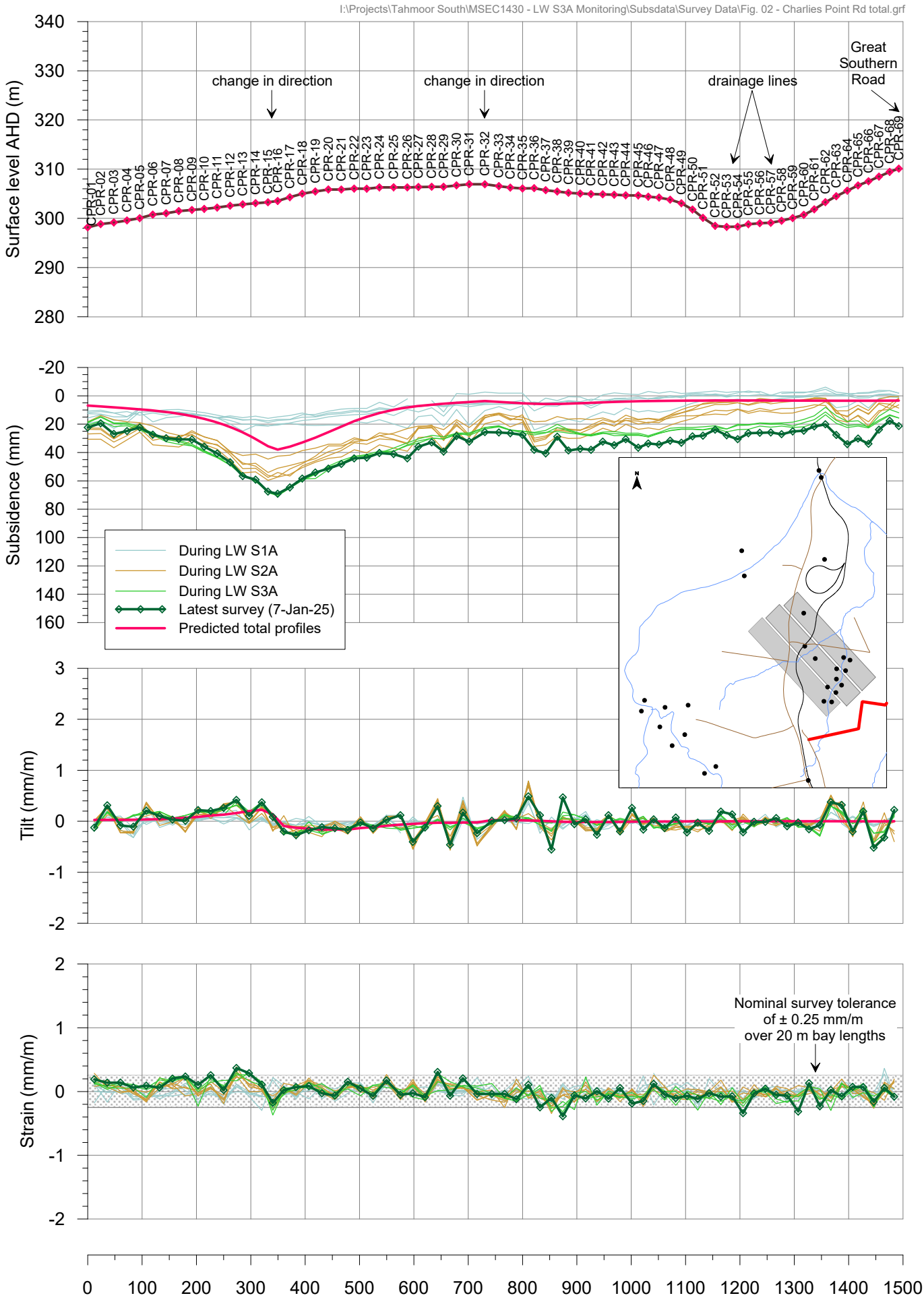

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Fig. 2-R34

Tahmoor South LW S3A
Incremental subsidence profiles along Great Southern Road

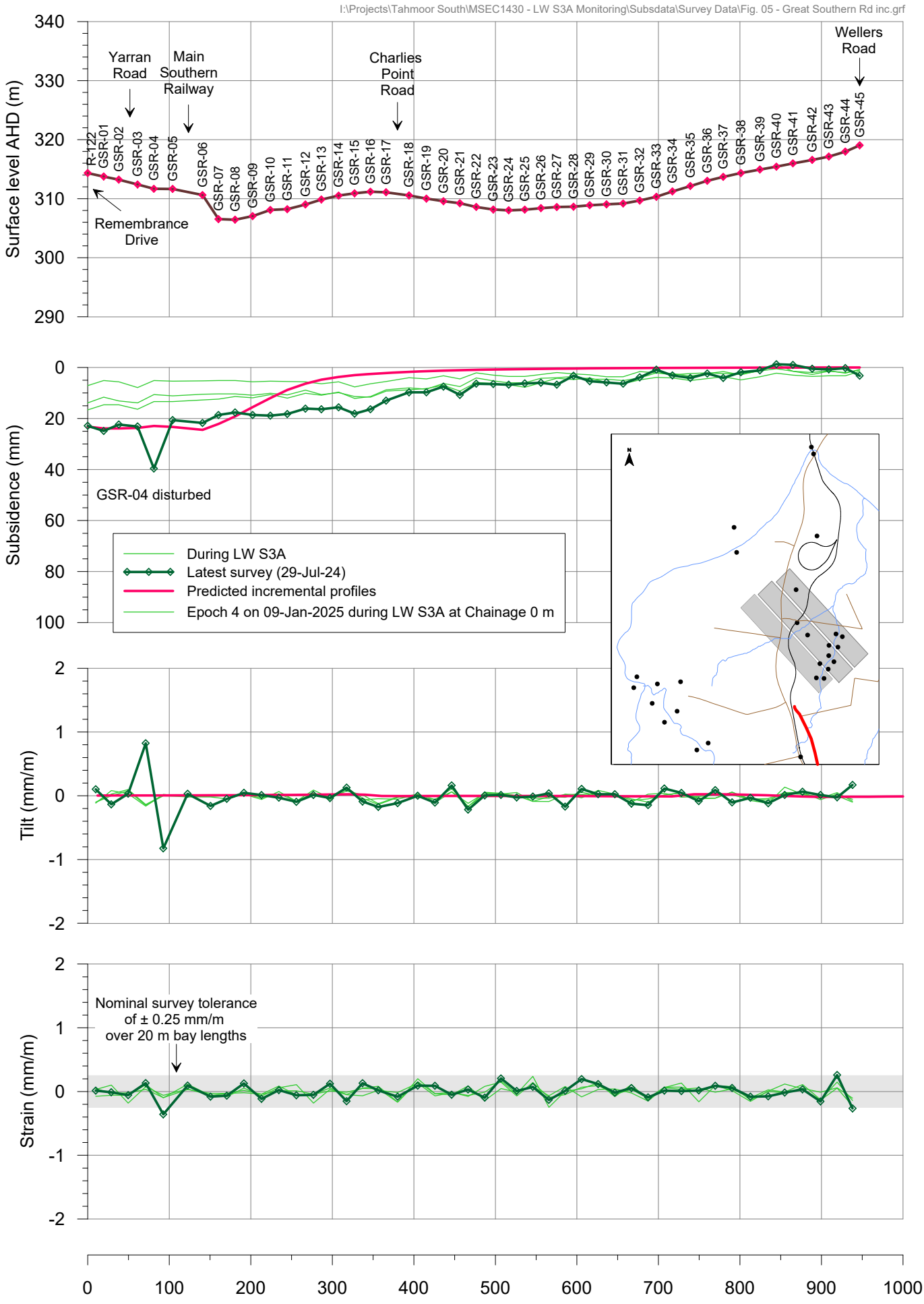

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Fig. 5-R34

Tahmoor South LW S3A
Incremental subsidence profiles along Remembrance Drive

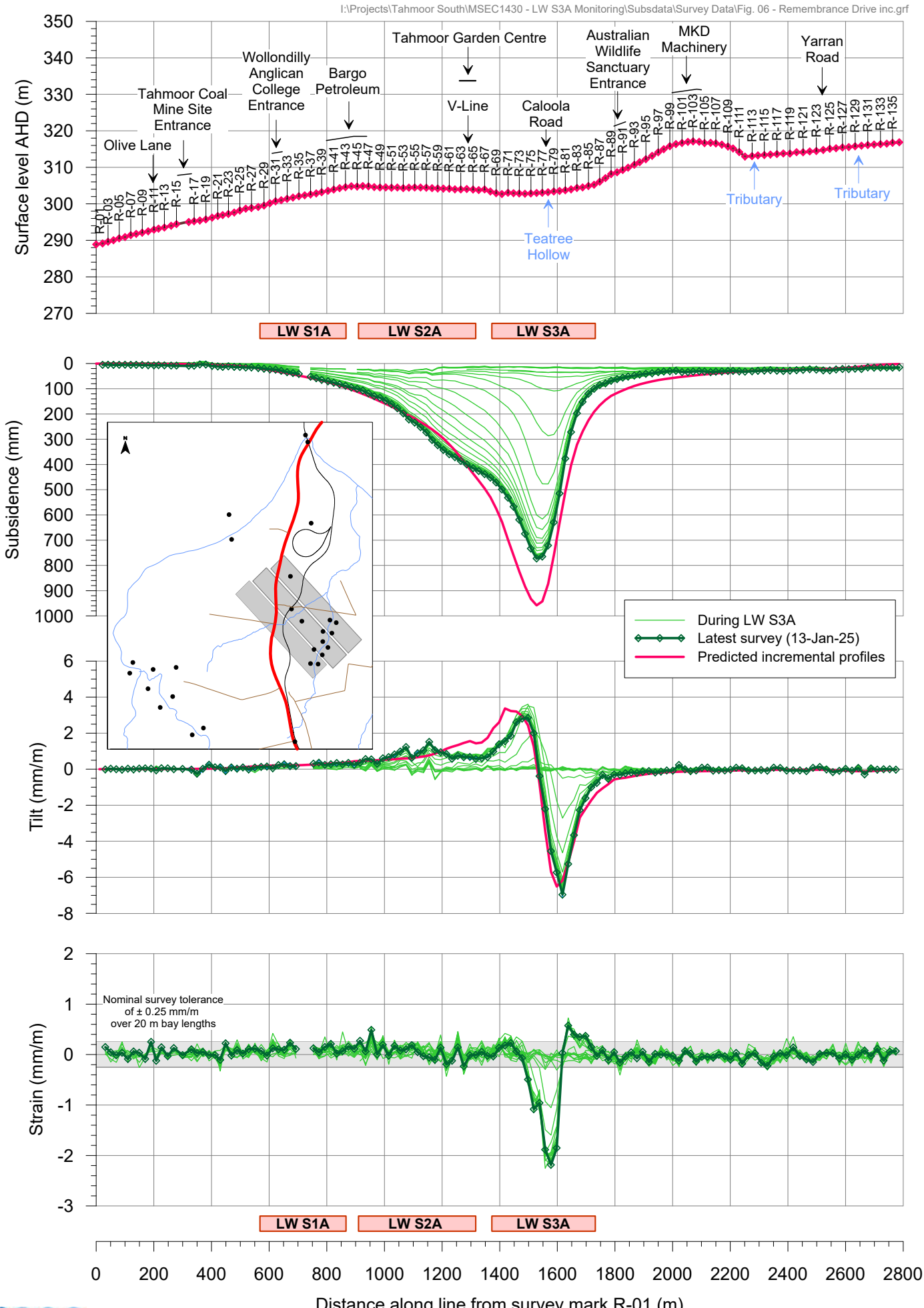

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Fig. 6-R34

Tahmoor South LW S3A
Total subsidence profiles along Remembrance Drive

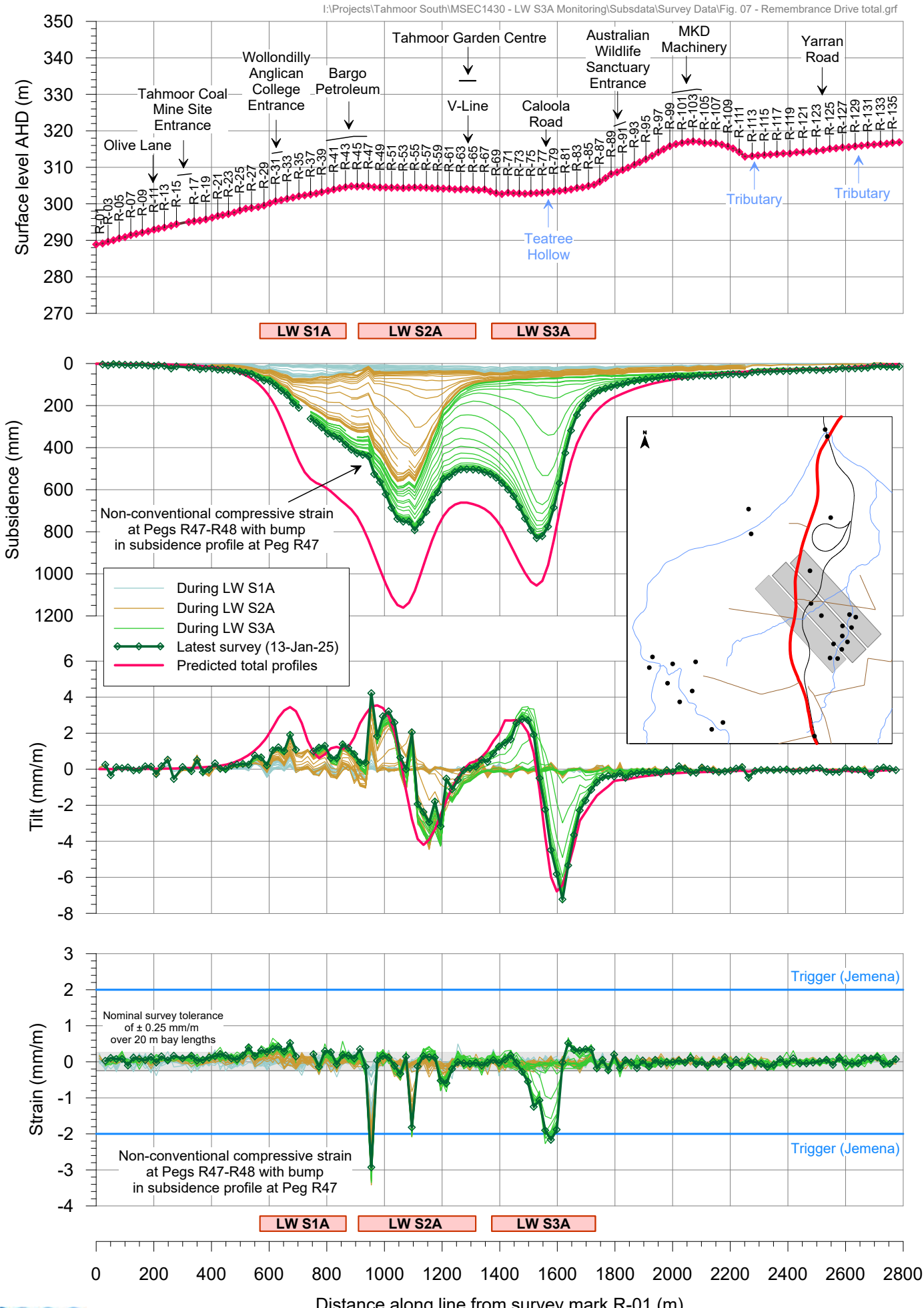

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Fig. 7-R34

Tahmoor South LW S3A
Incremental subsidence profiles along Yarran Road

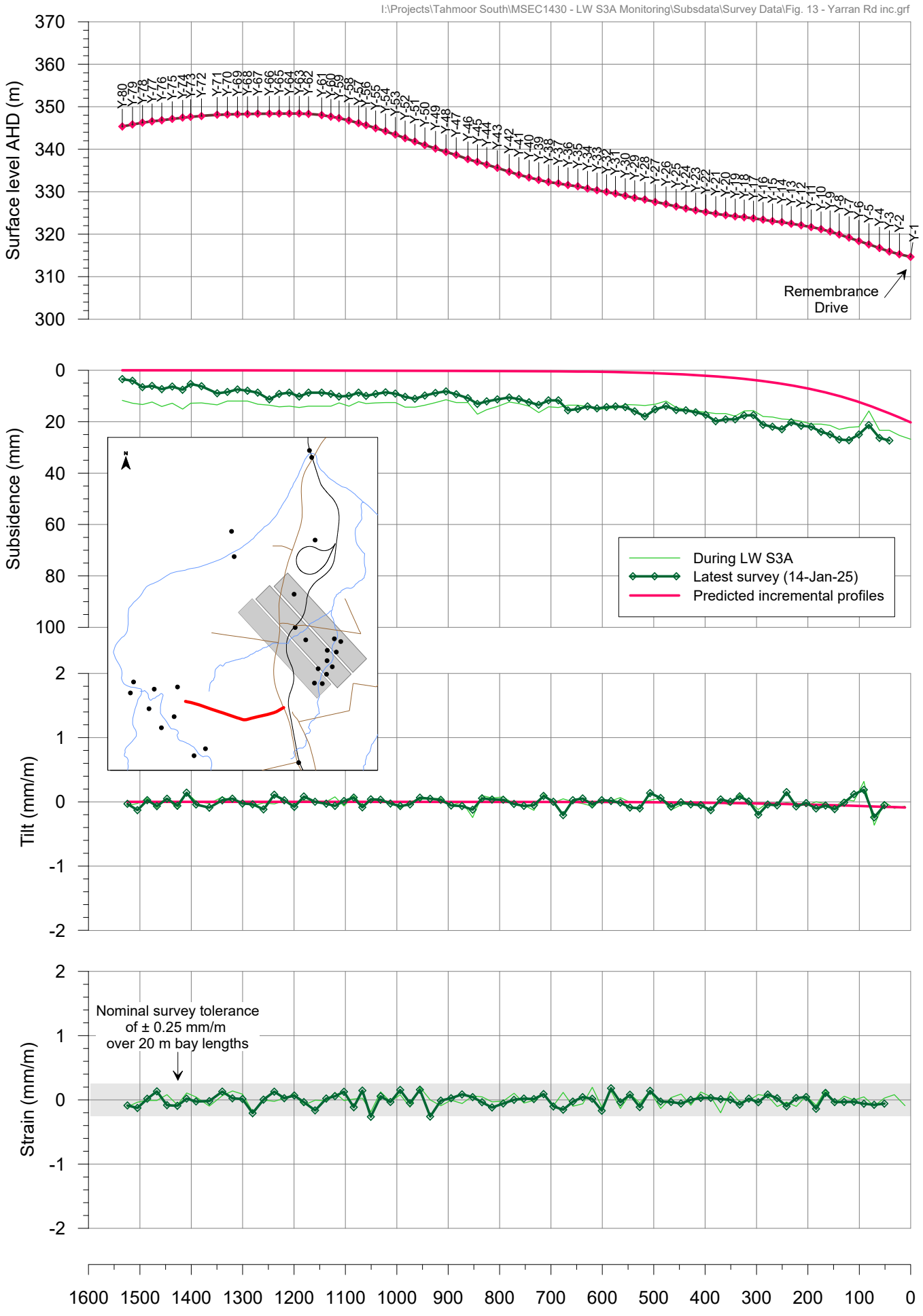

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Fig. 13-R34

Tahmoor South LW S3A - Remembrance Drive Embankment
Total subsidence profiles along southbound crest

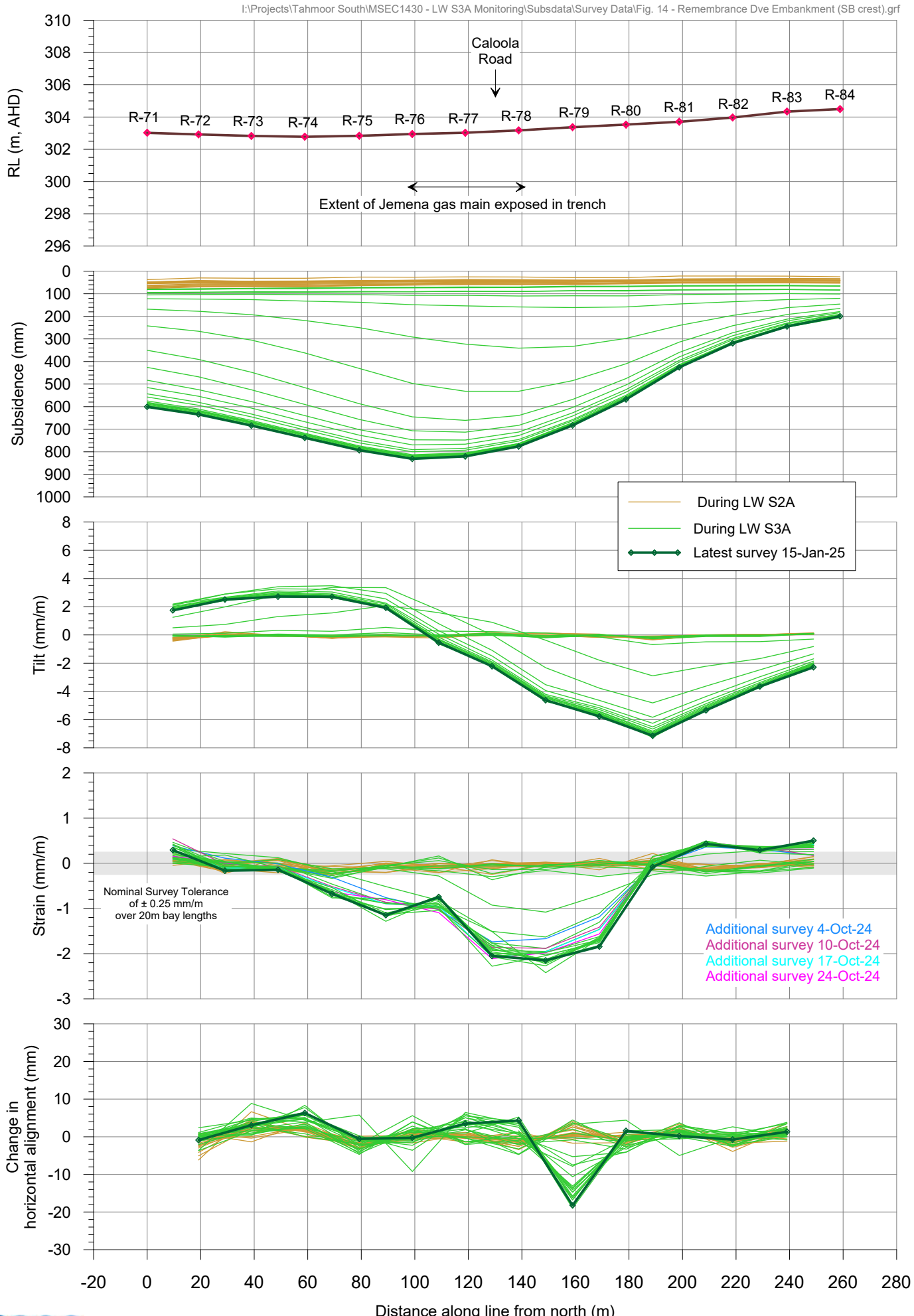

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Fig. 14-R34

Tahmoor South LW S3A - Remembrance Drive Embankment
Total subsidence profiles along southbound toe

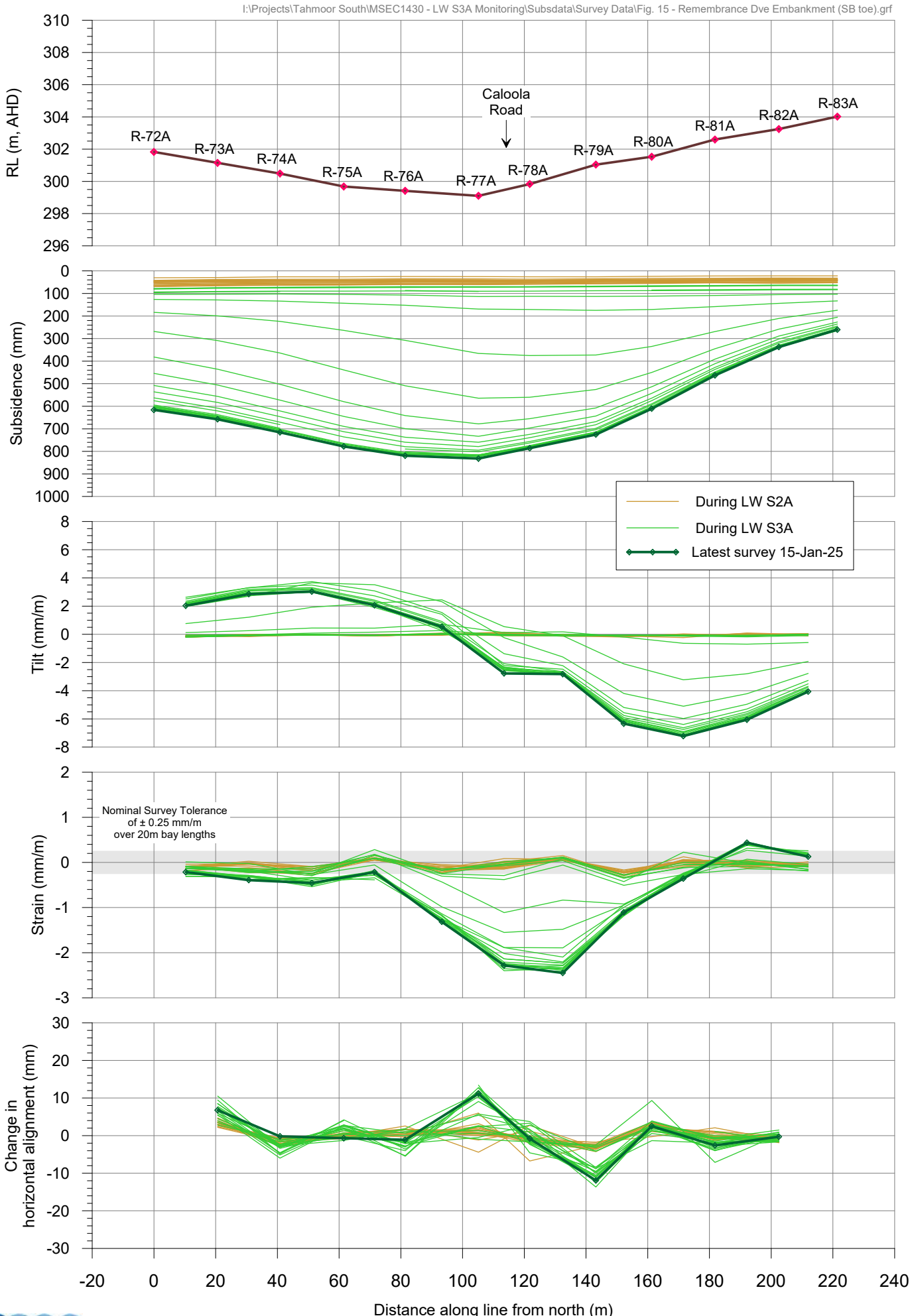

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Fig. 15-R34

Tahmoor South LW S3A - Remembrance Drive Embankment
Total subsidence profiles along northbound crest

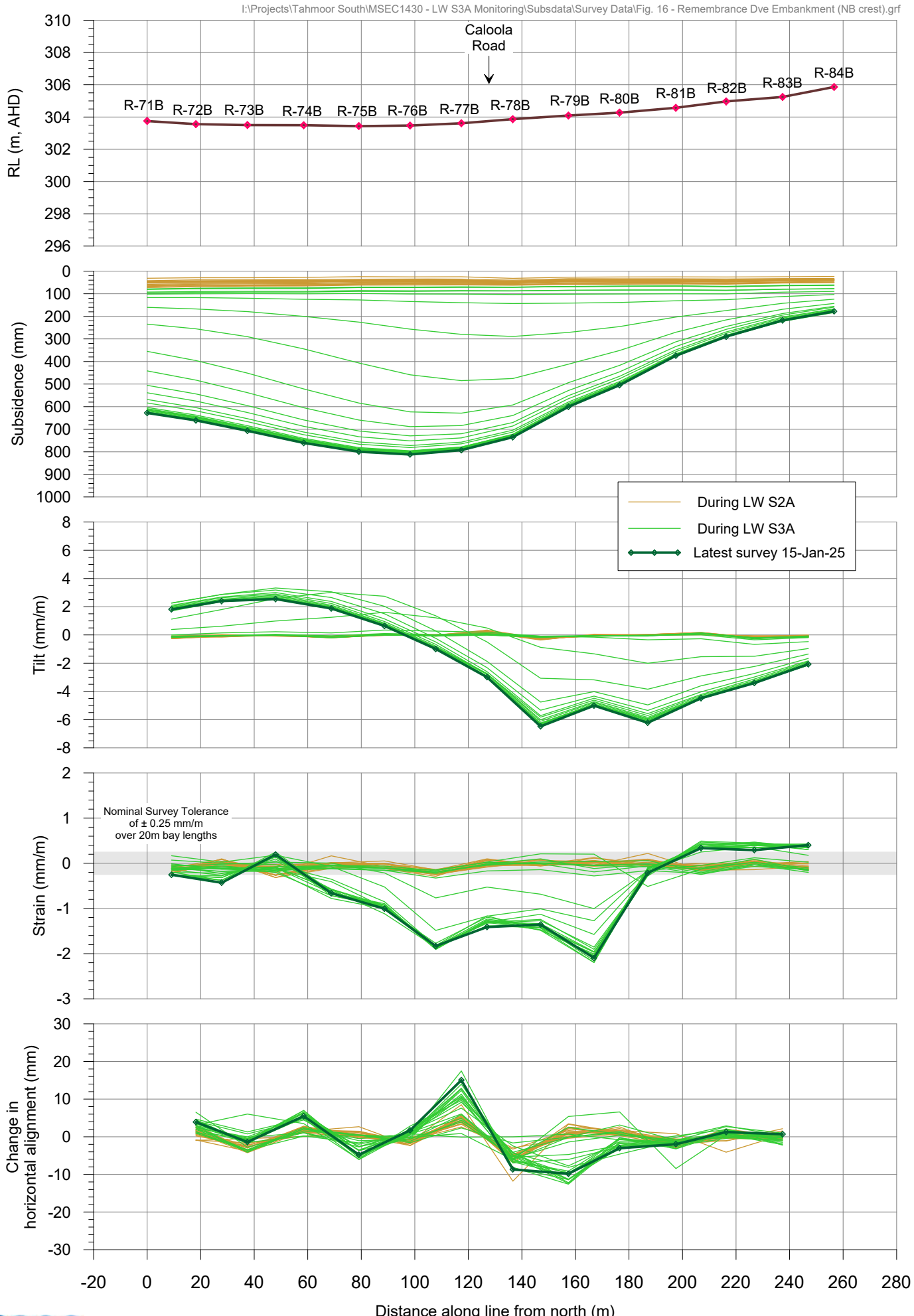

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Fig. 16-R34

Tahmoor South LW S3A - Remembrance Drive Embankment
Total subsidence profiles along northbound toe

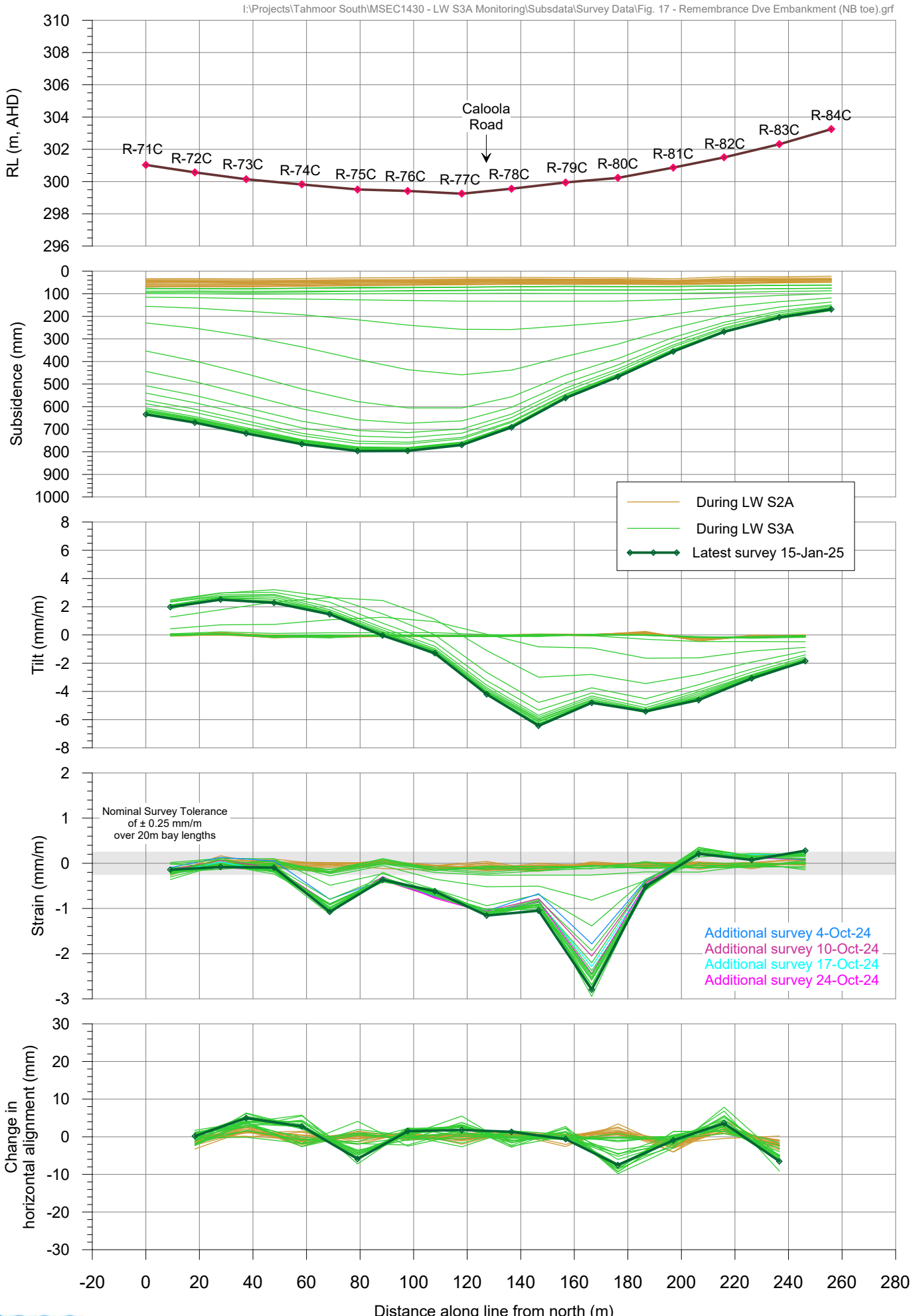

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Fig. 17-R34

Tahmoor South LW S3A - Remembrance Drive Embankment
Total subsidence profiles along southbound fence

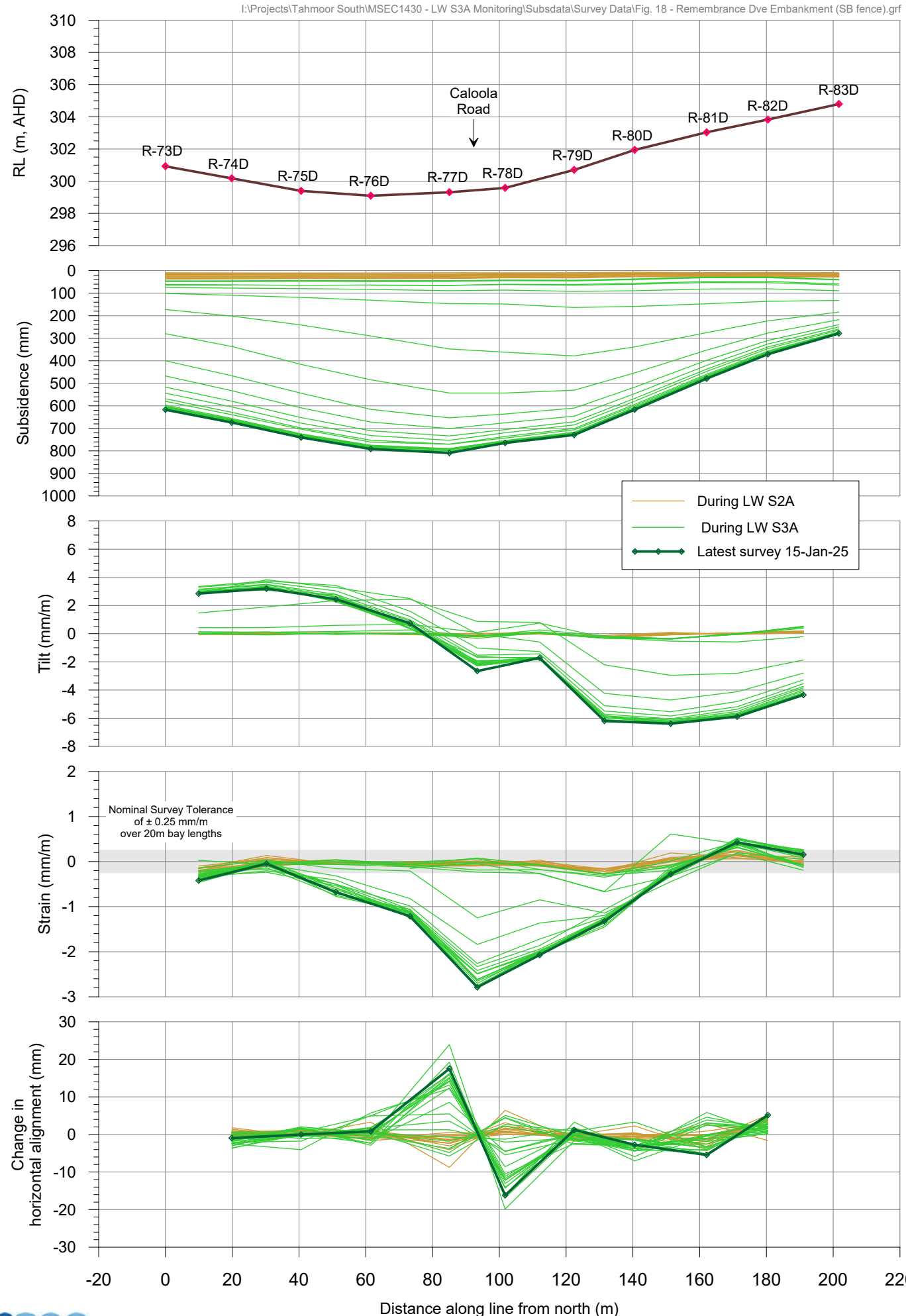

Fig. 18-R34

Tahmoor South LW S3A - Remembrance Drive Embankment
Total closure across the embankment

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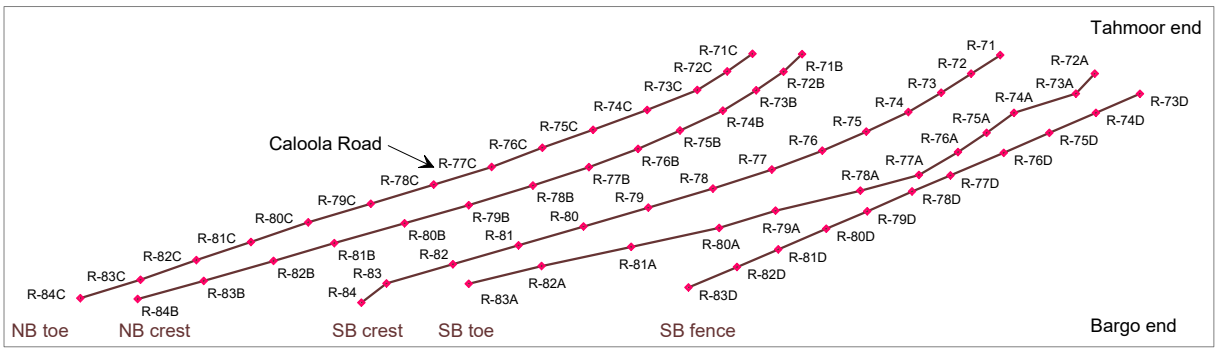

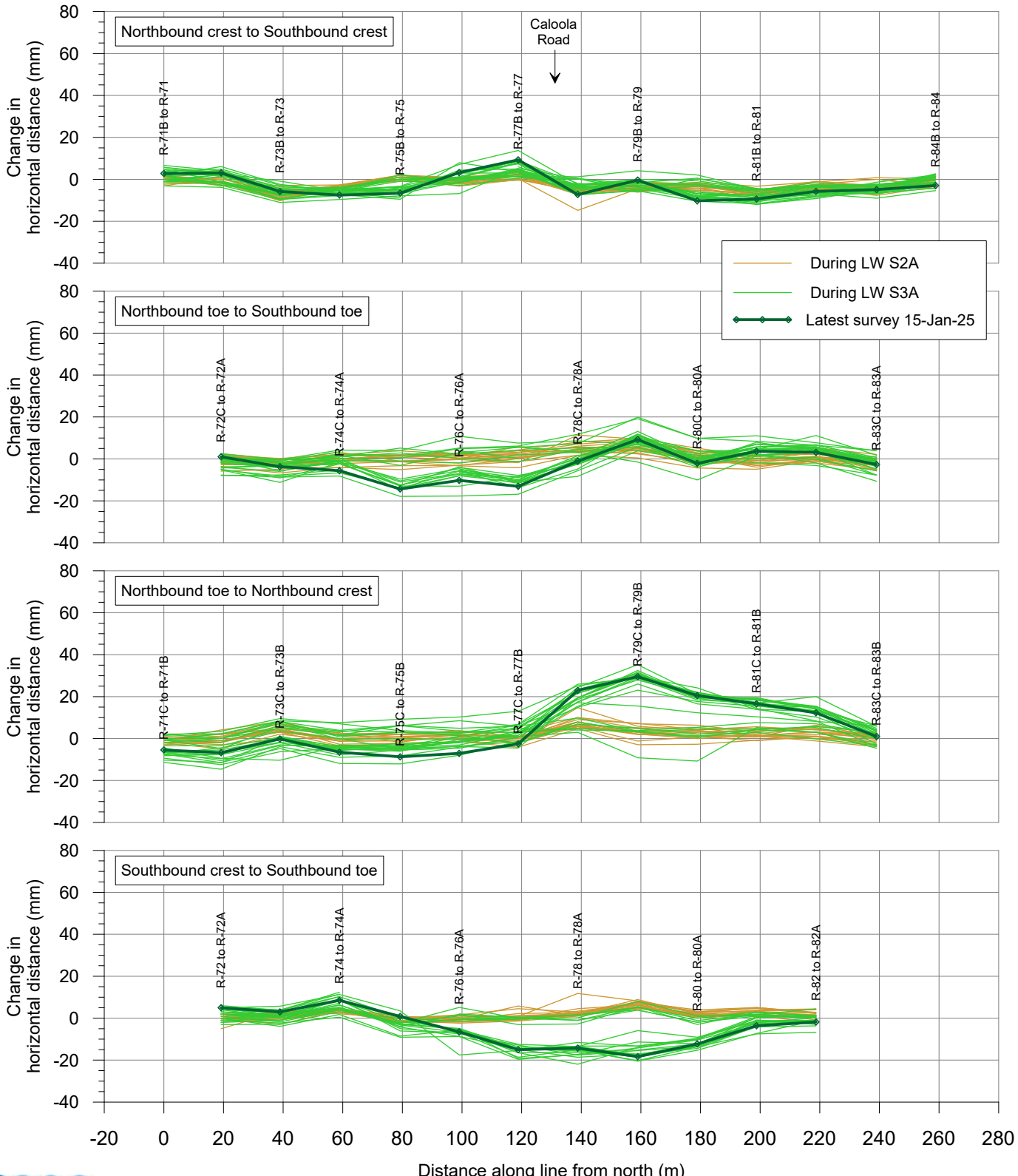

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Fig. 19-R34

Tahmoor South LW S3A
Incremental subsidence profiles along V-Line

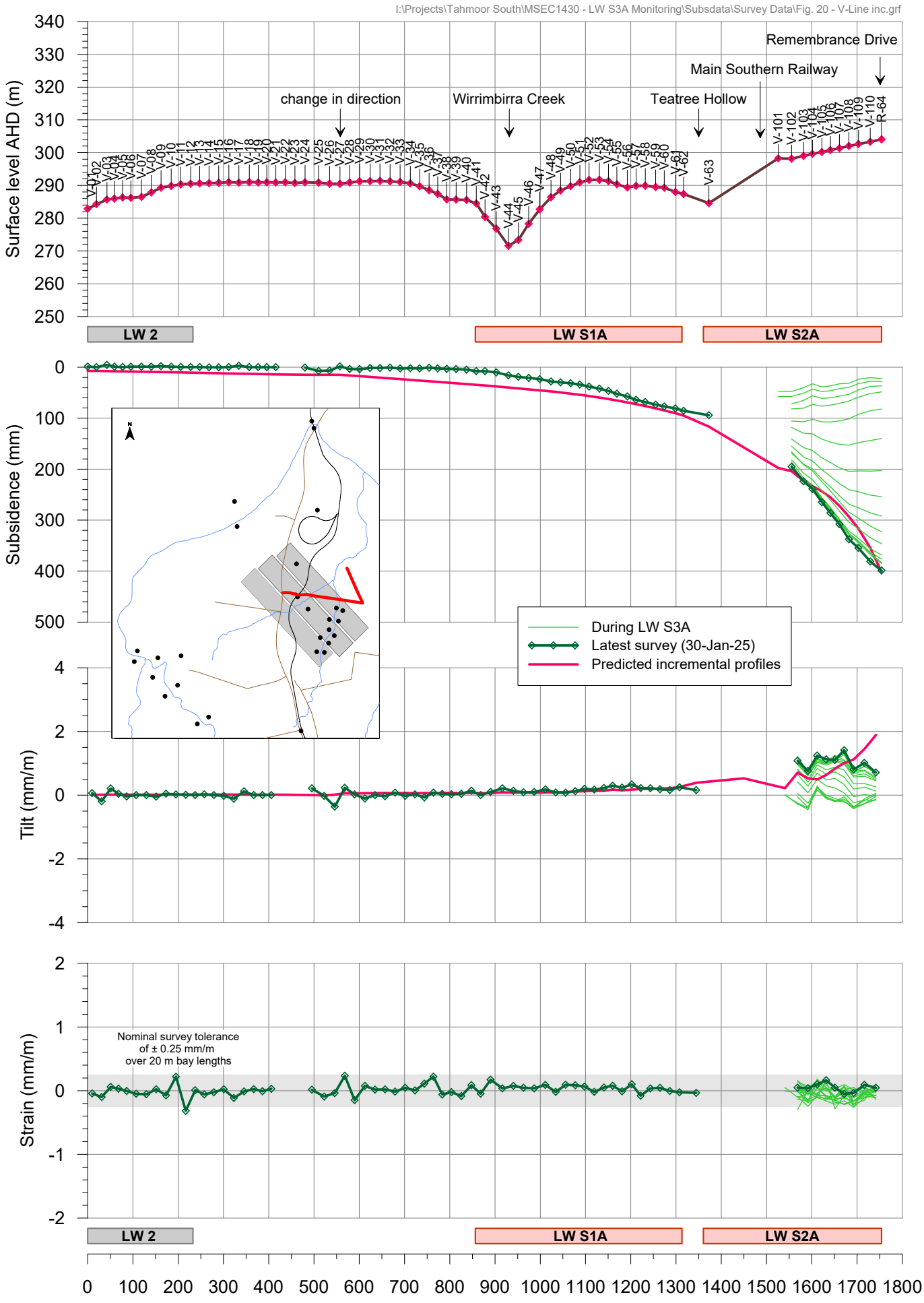
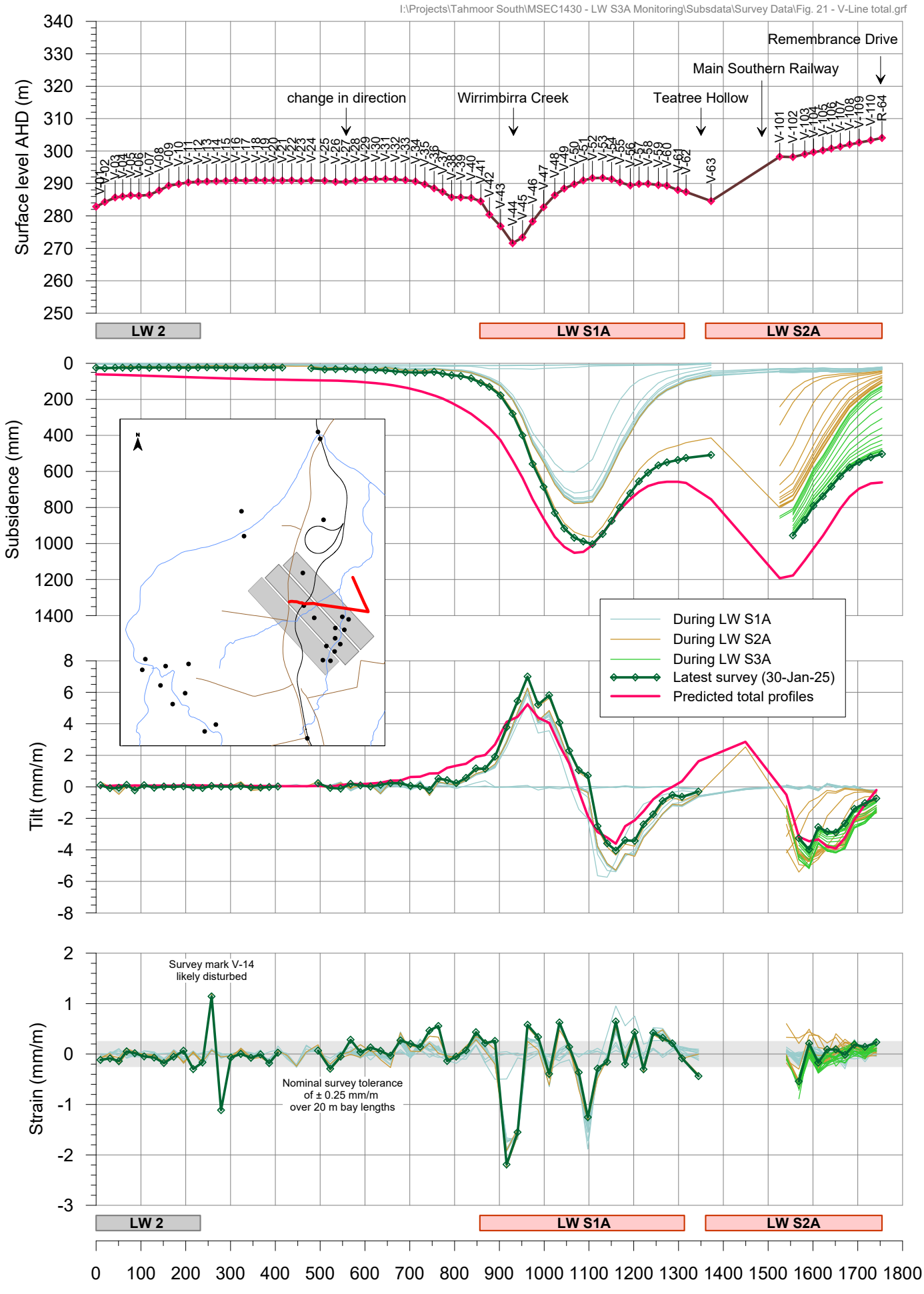


Fig. 20-R34

Tahmoor South LW S3A
Total subsidence profiles along V-Line



Tahmoor South LW S3A
Incremental subsidence profiles along Caloola Road

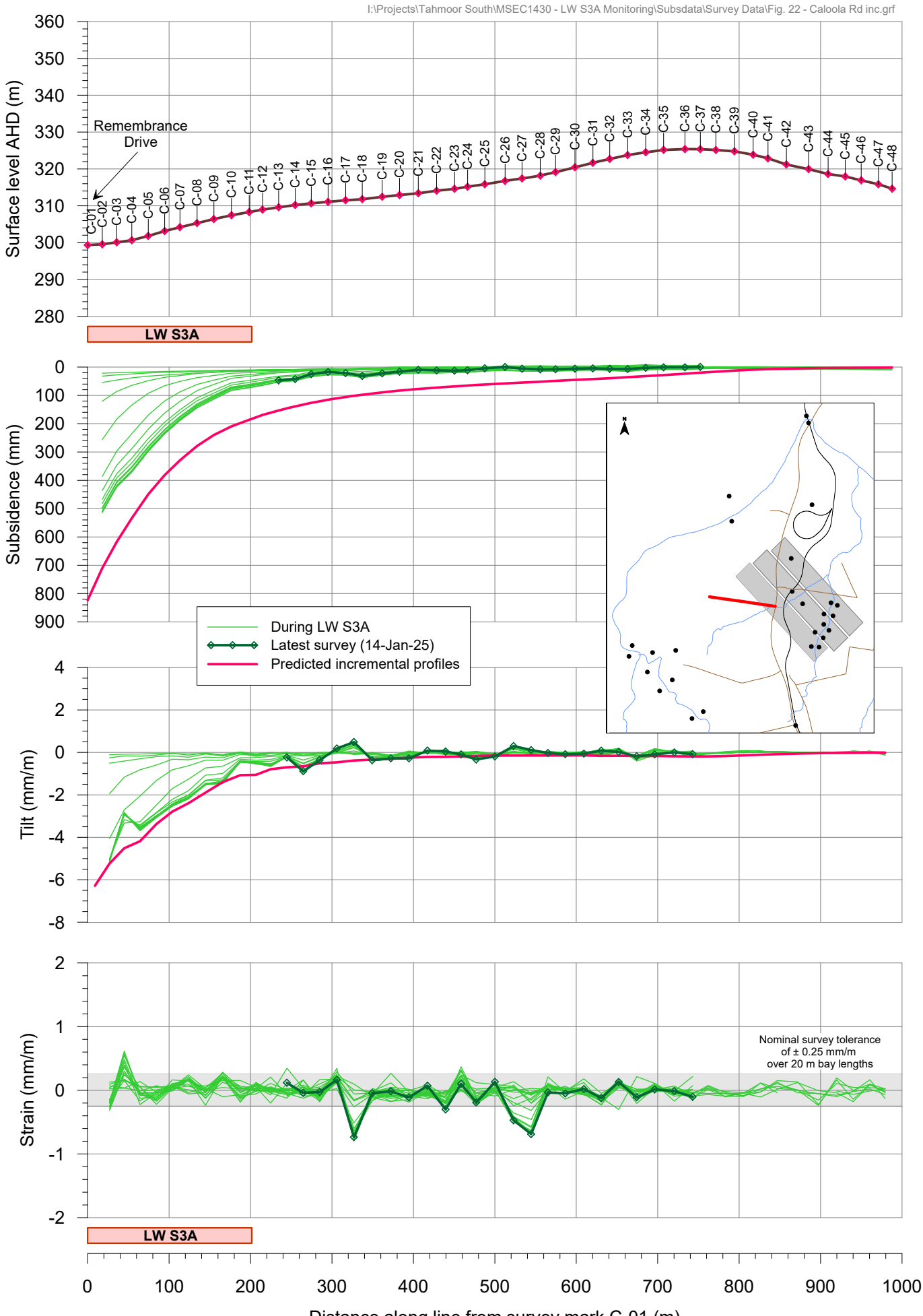


Fig. 22-R34

Tahmoor South LW S3A
Total subsidence profiles along Caloola Road

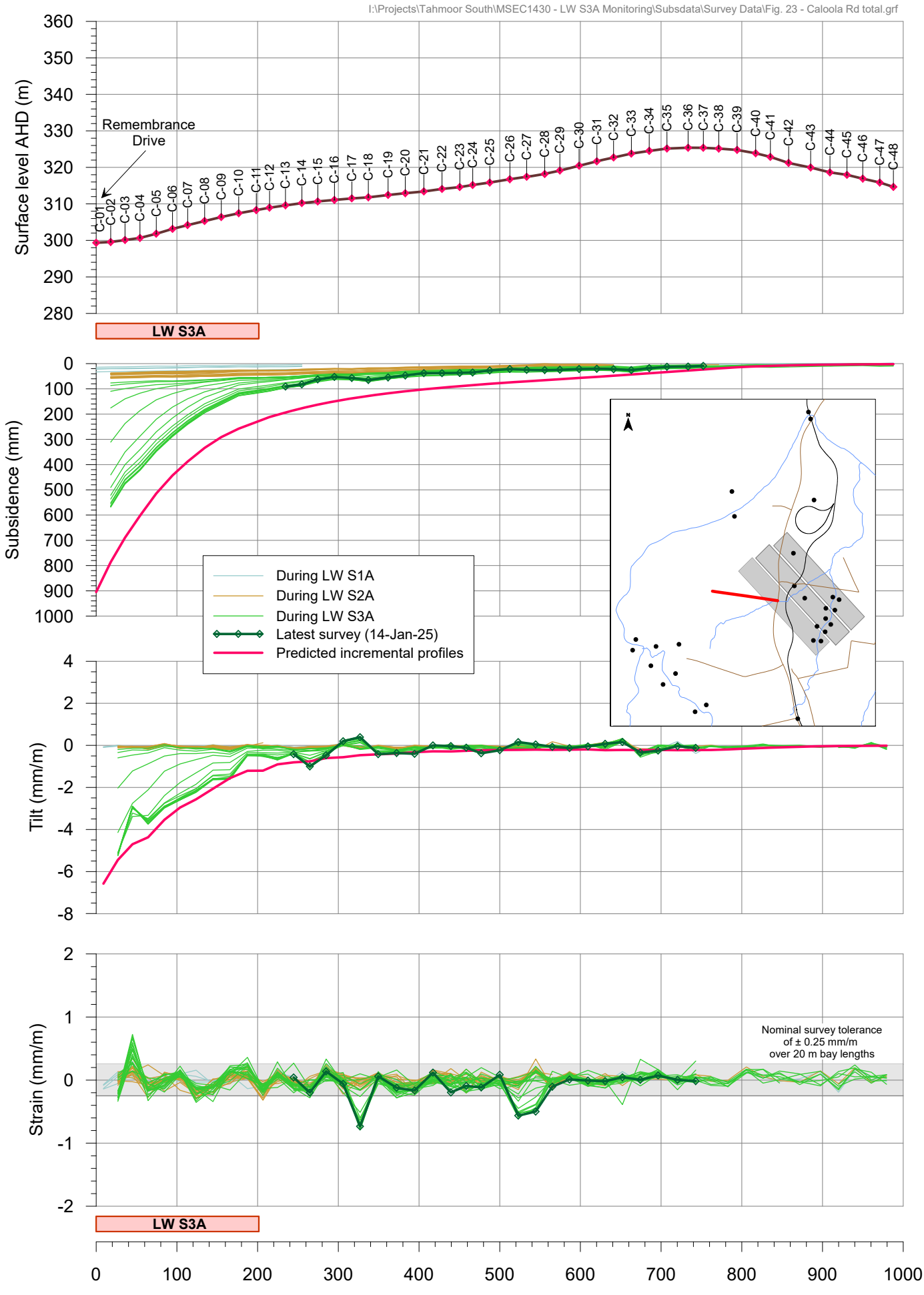


Fig. 23-R34

Tahmoor South LW S3A - GNSS Monitoring

Site S01 above LW S1A

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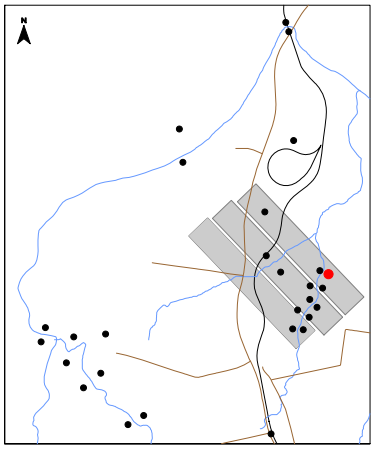



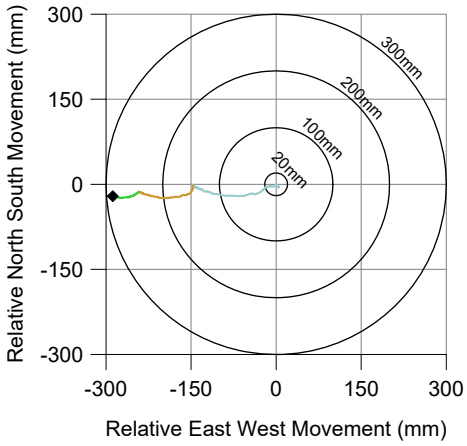

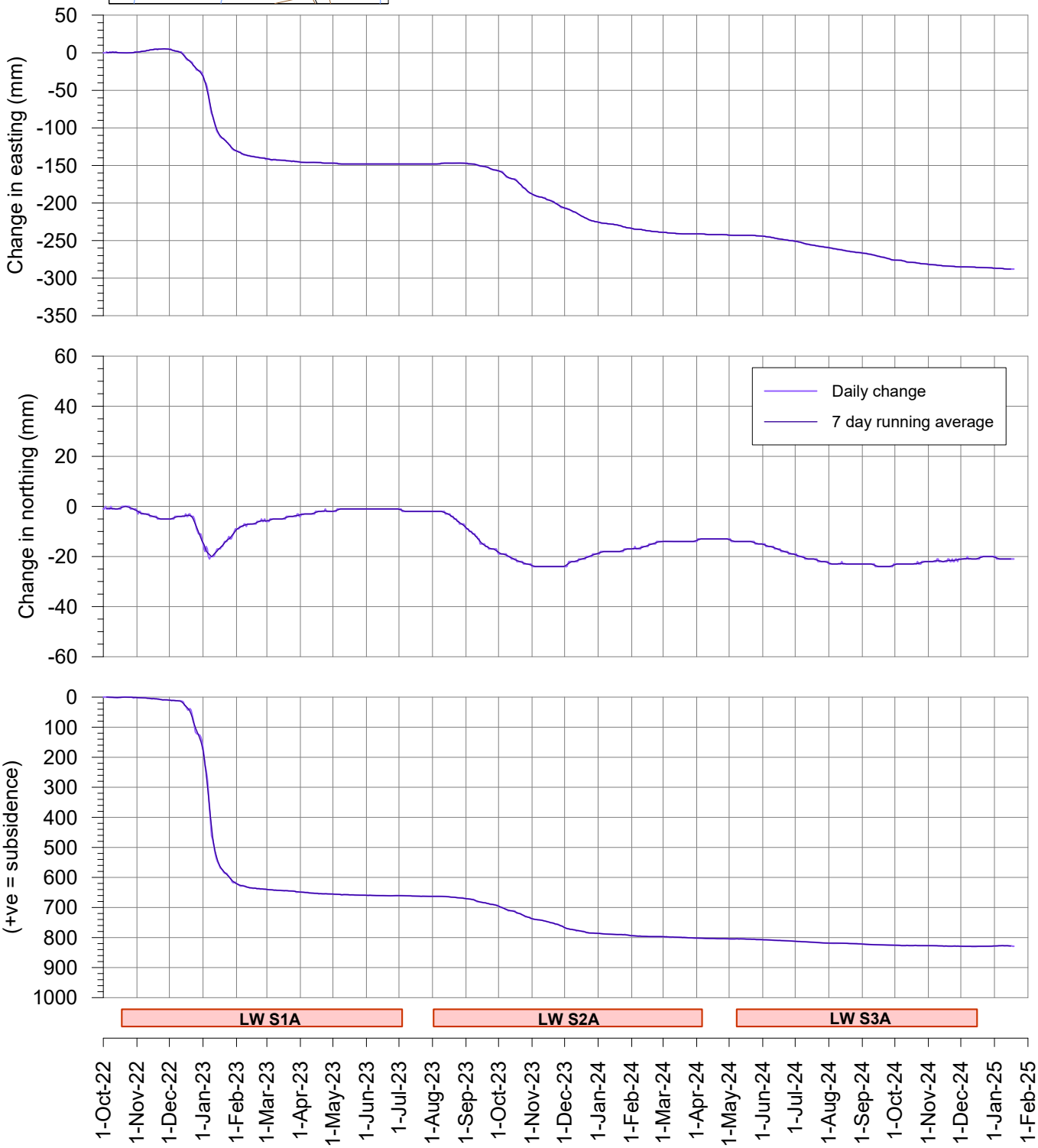

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Fig. S01-R34

Tahmoor South LW S3A - GNSS Monitoring

Site S02 above LW S1A

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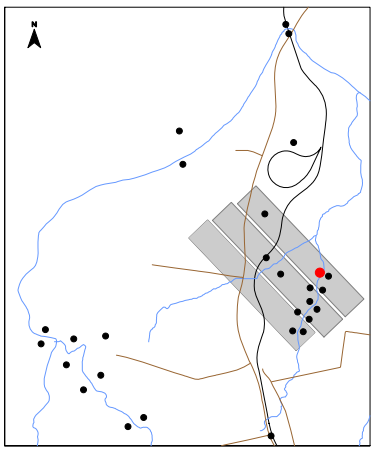



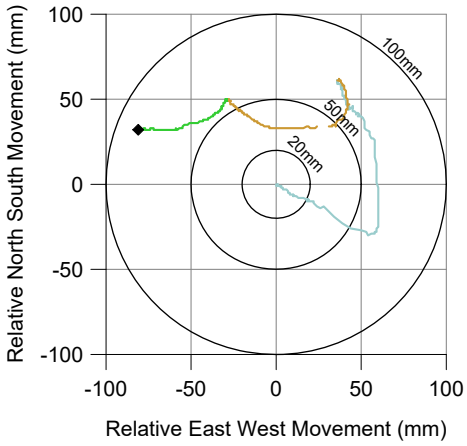

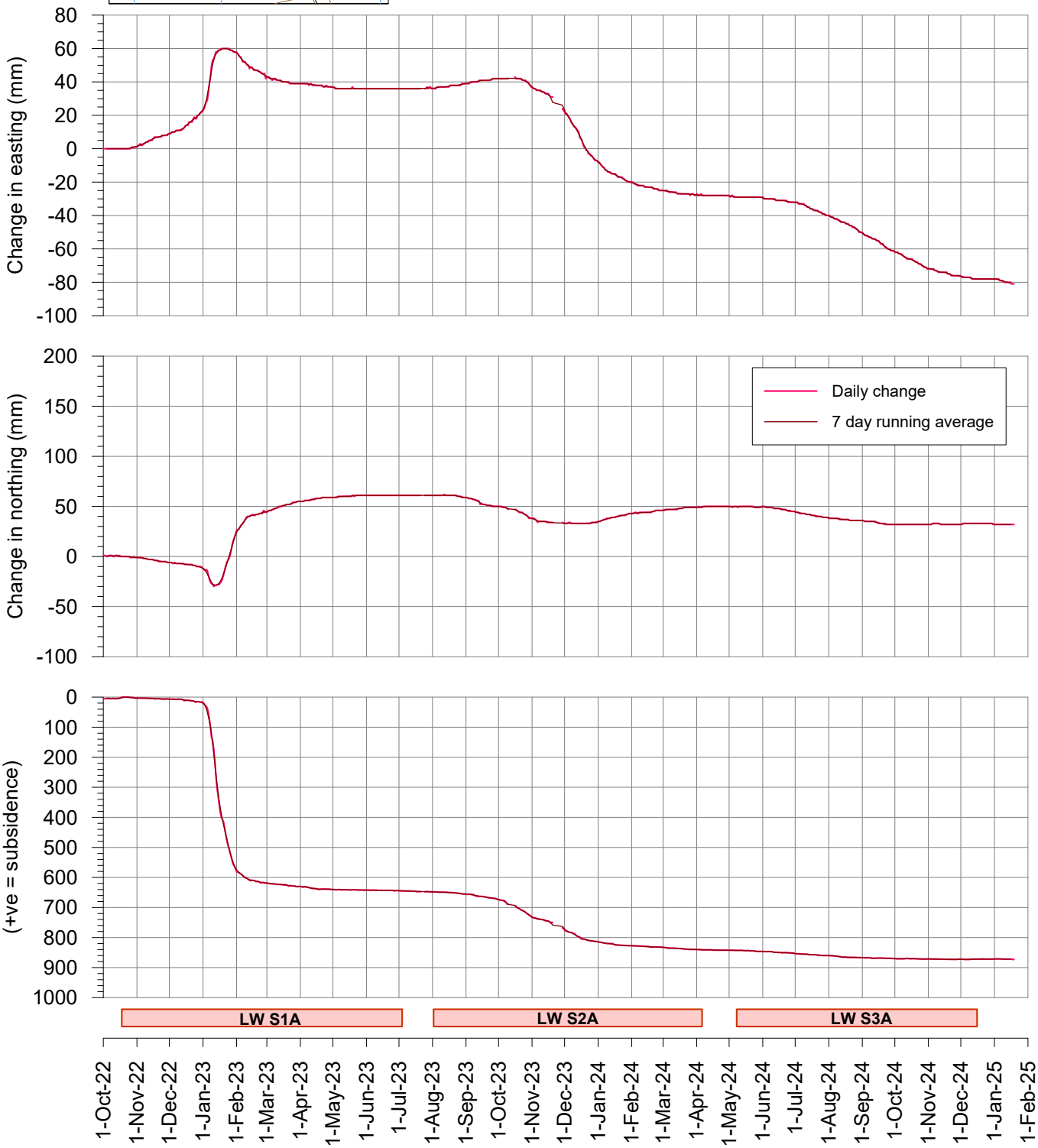

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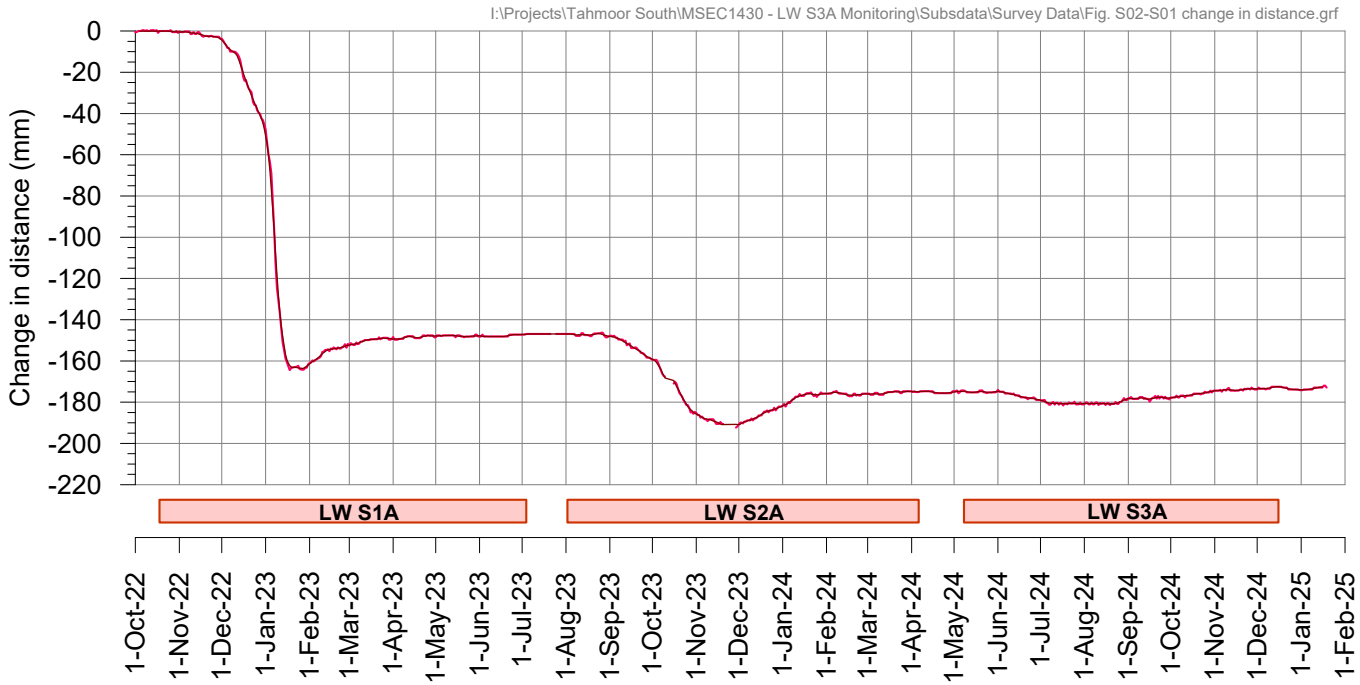
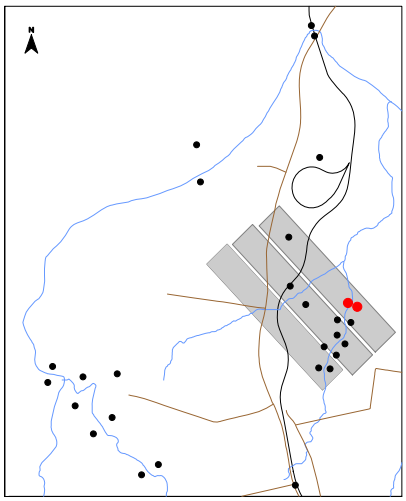
Fig. S02-R34

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek
Sites S01 and S02 above LW S1A





Tahmoor South LW S3A - GNSS Monitoring

Site S03 above LW S1A at Teatree 3

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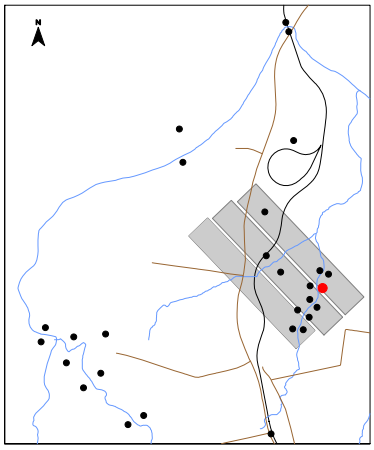



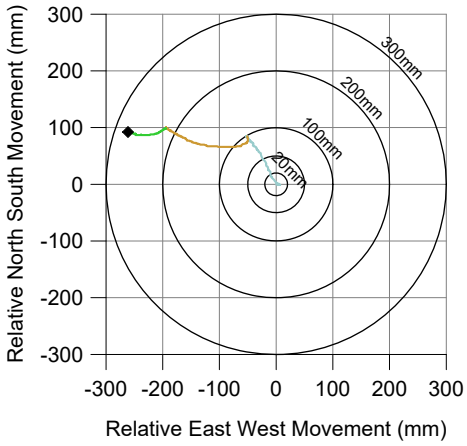

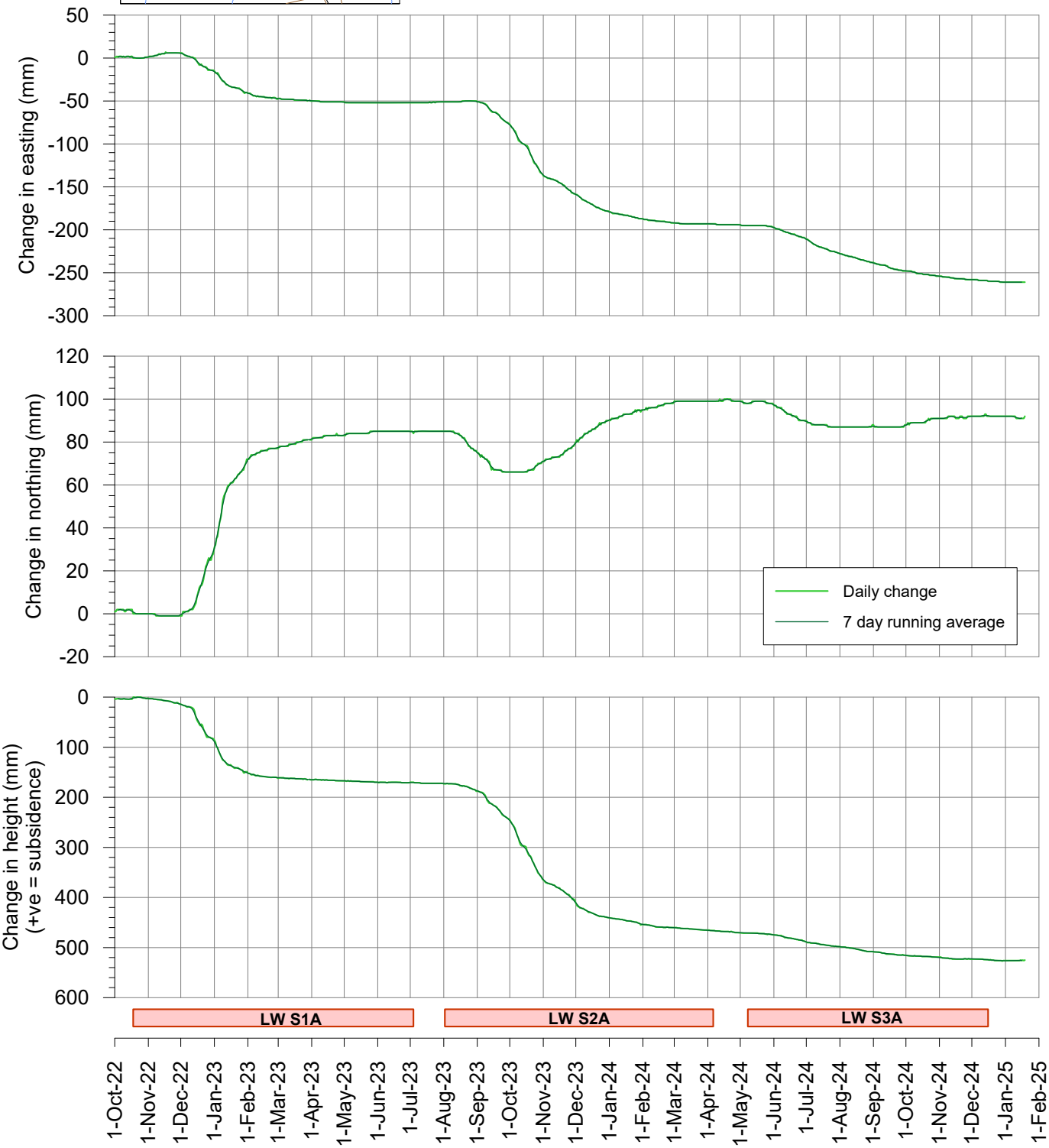

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Fig. S03-R34

Tahmoor South LW S3A - GNSS Monitoring

Site S04 above LW S2A at Teatree 3

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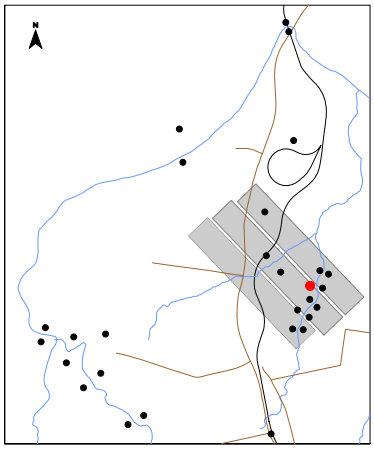
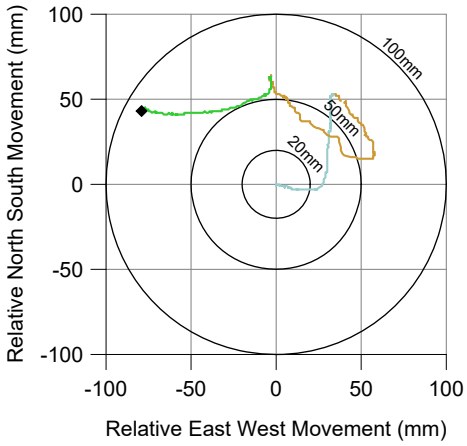
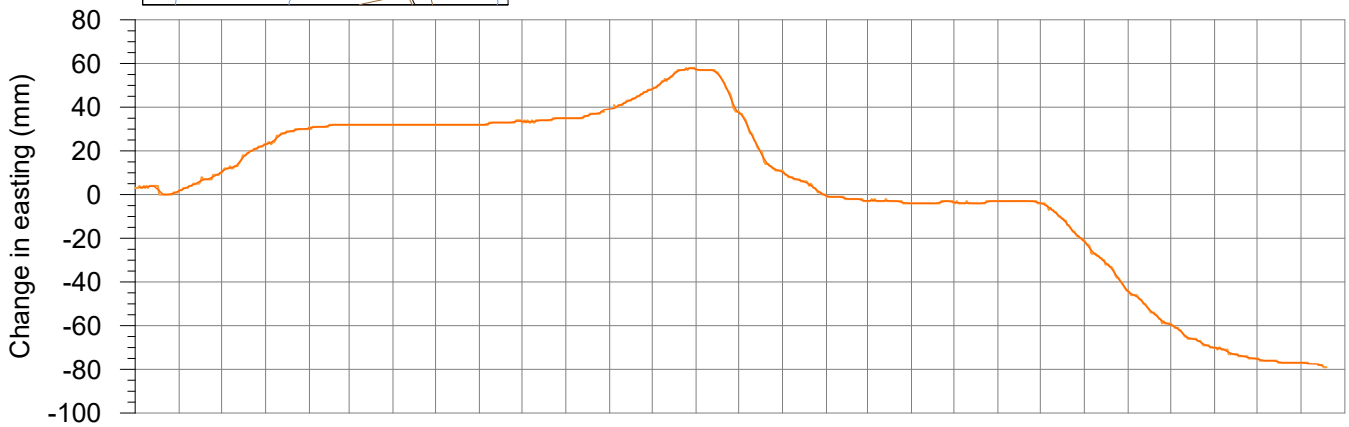
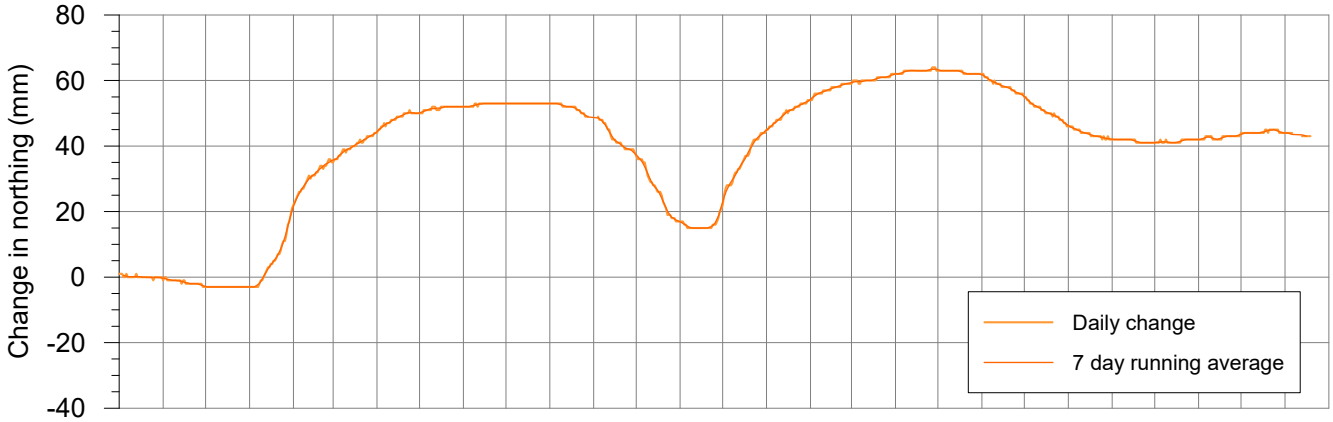
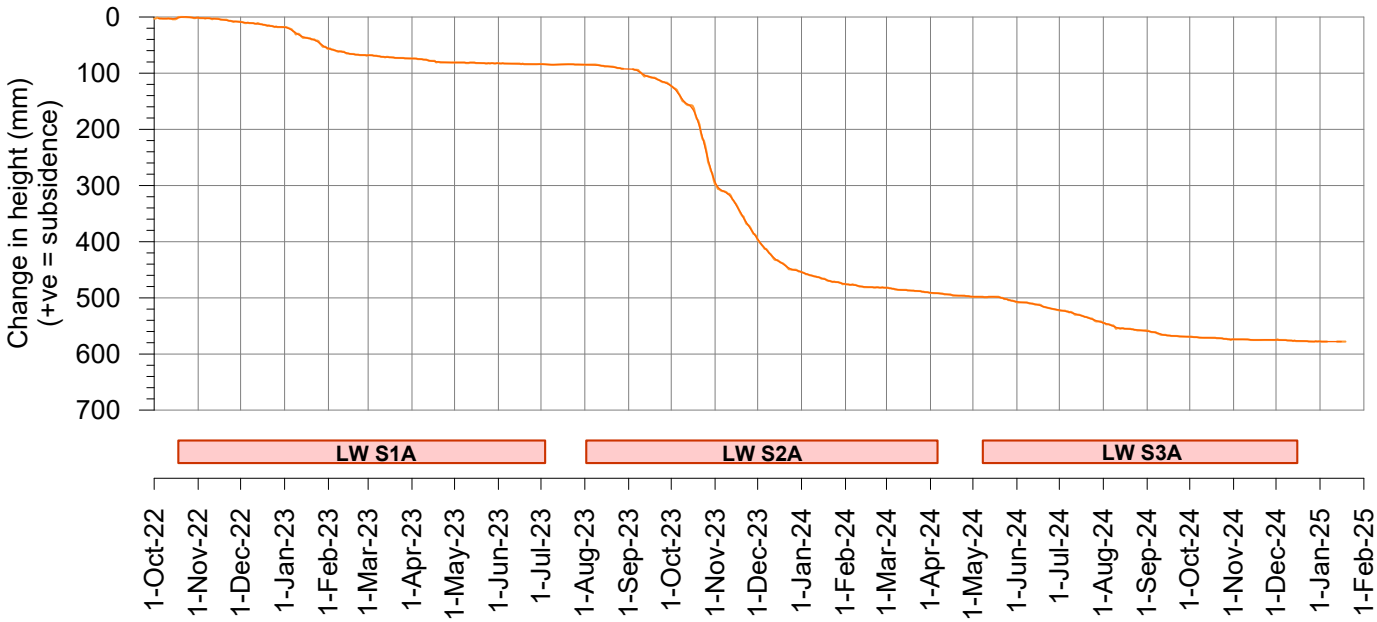


During LW S1A
During LW S2A
During LW S3A







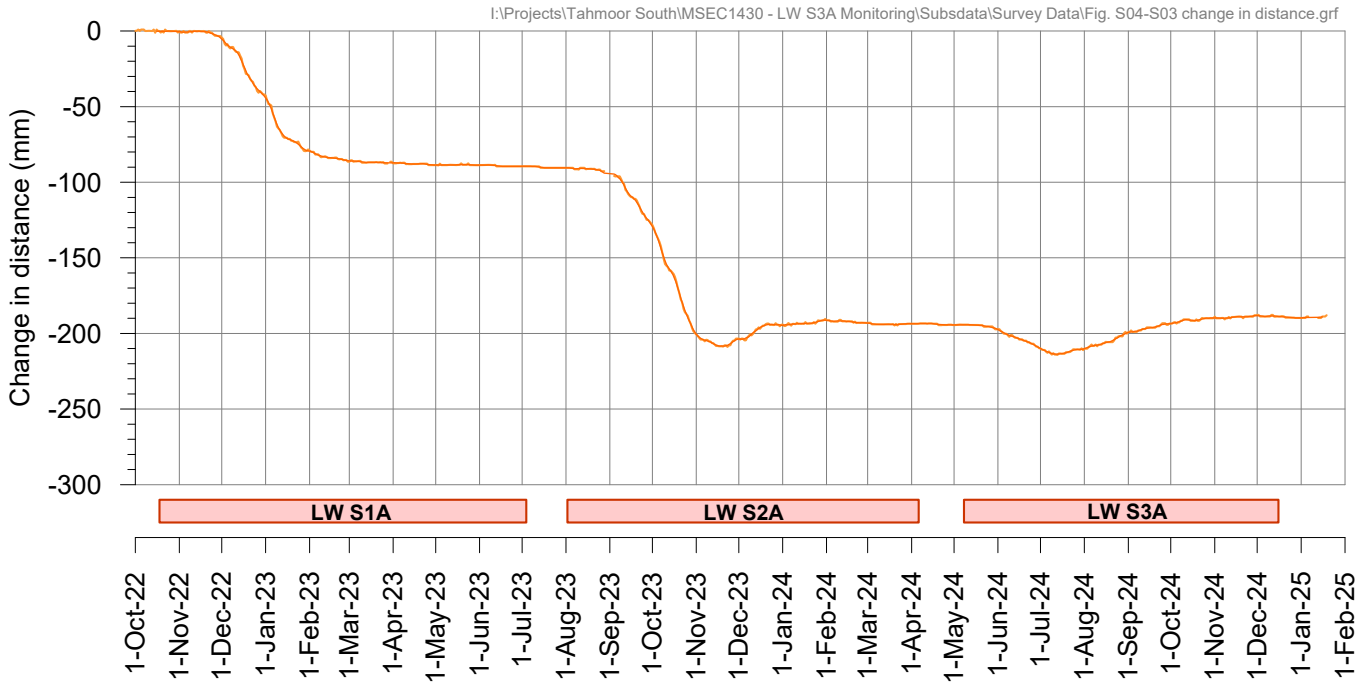


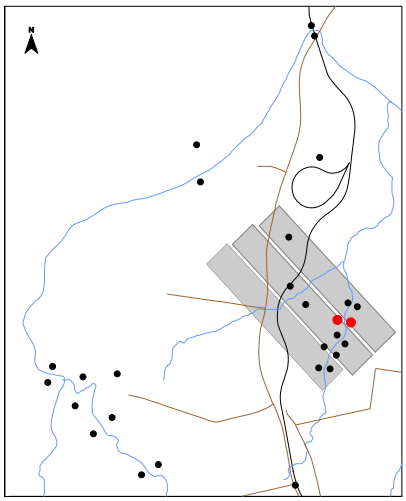
msec

Fig. S04-R34

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek at Teatree 3
Site S03 above LW S1A and Site S04 above LW S2A





Tahmoor South LW S3A - GNSS Monitoring

Site S05 above LW S2A

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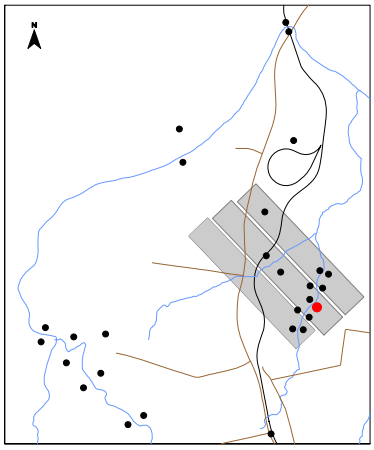
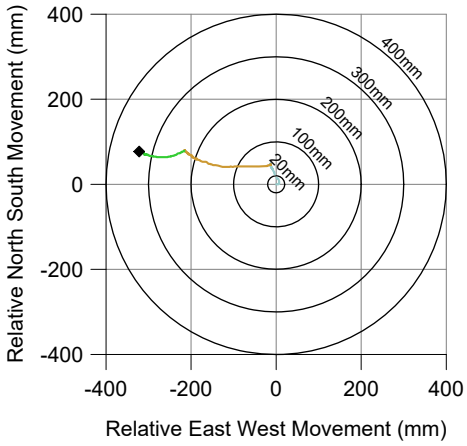
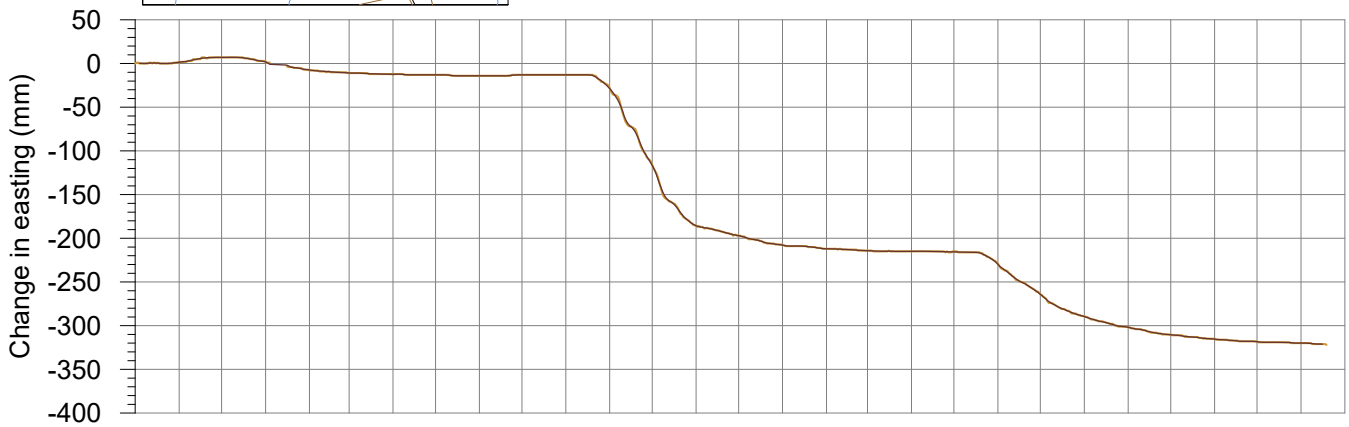
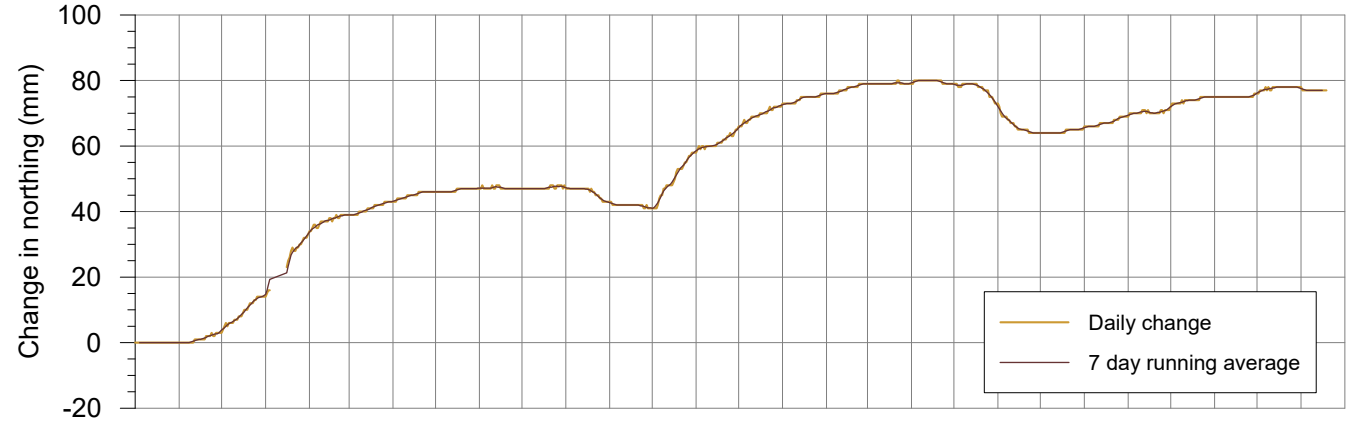
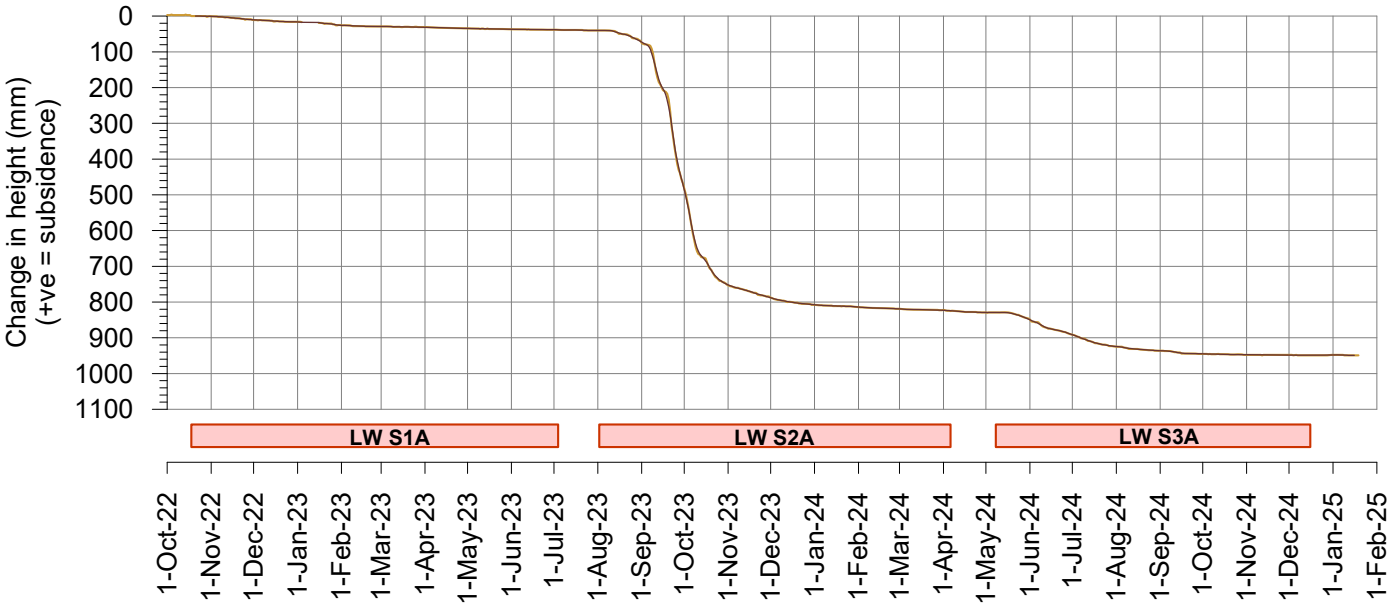












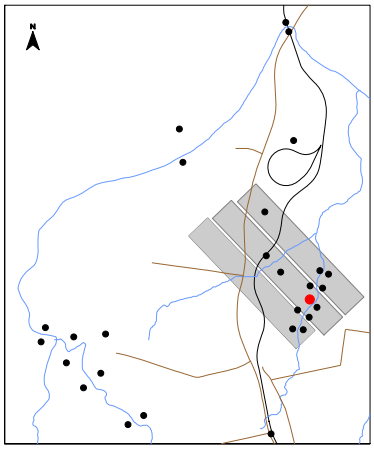
msec

Fig. S05-R34

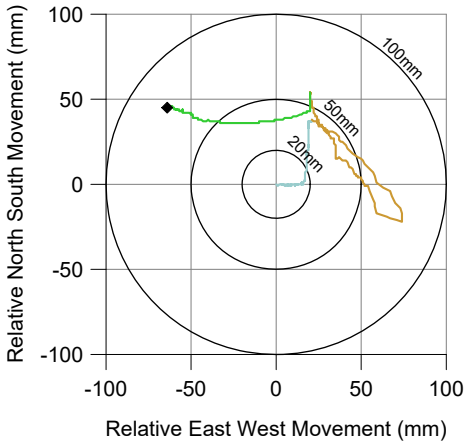
Tahmoor South LW S3A - GNSS Monitoring

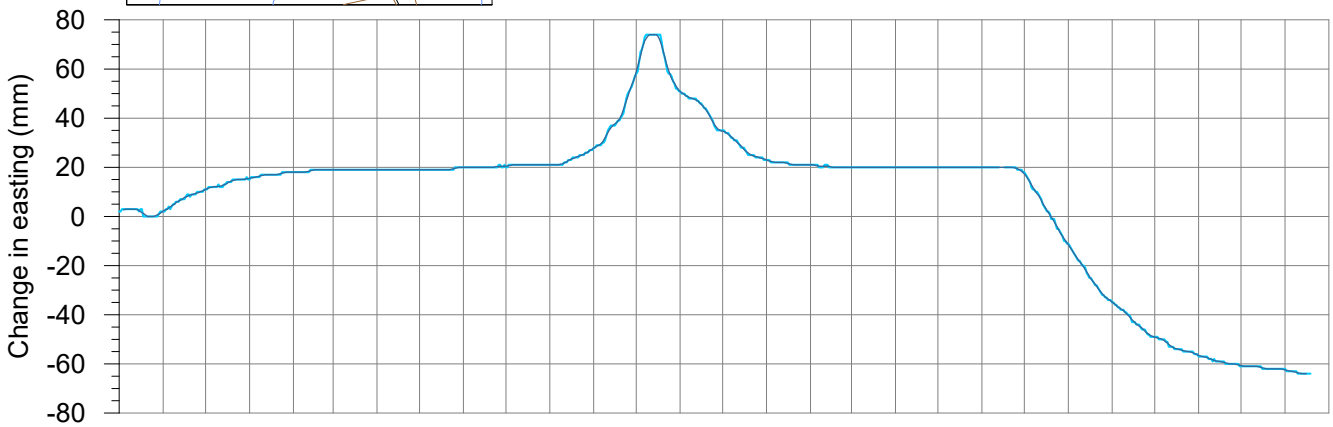
Site S06 above LW S2A

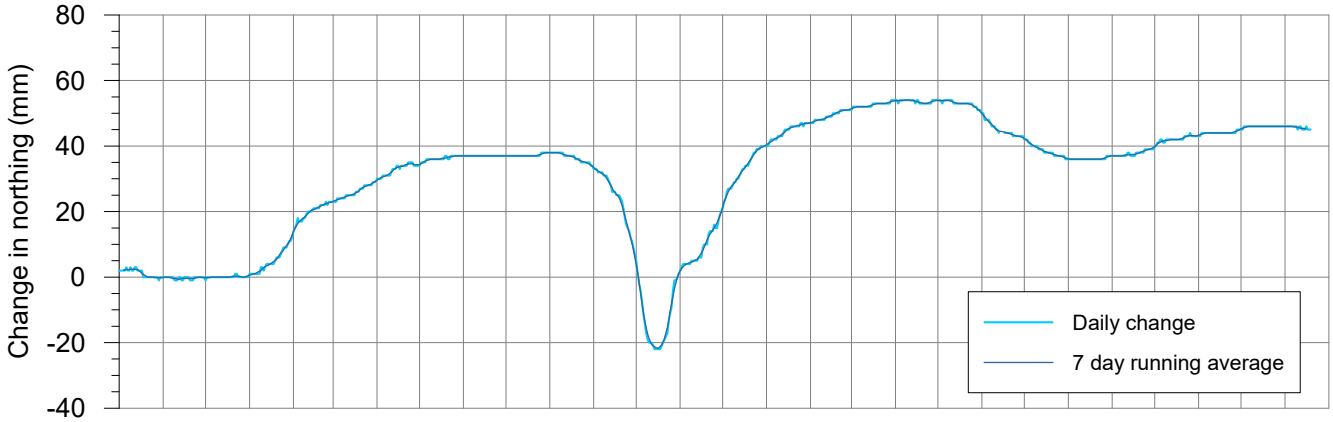
I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S06 GNSS.grf

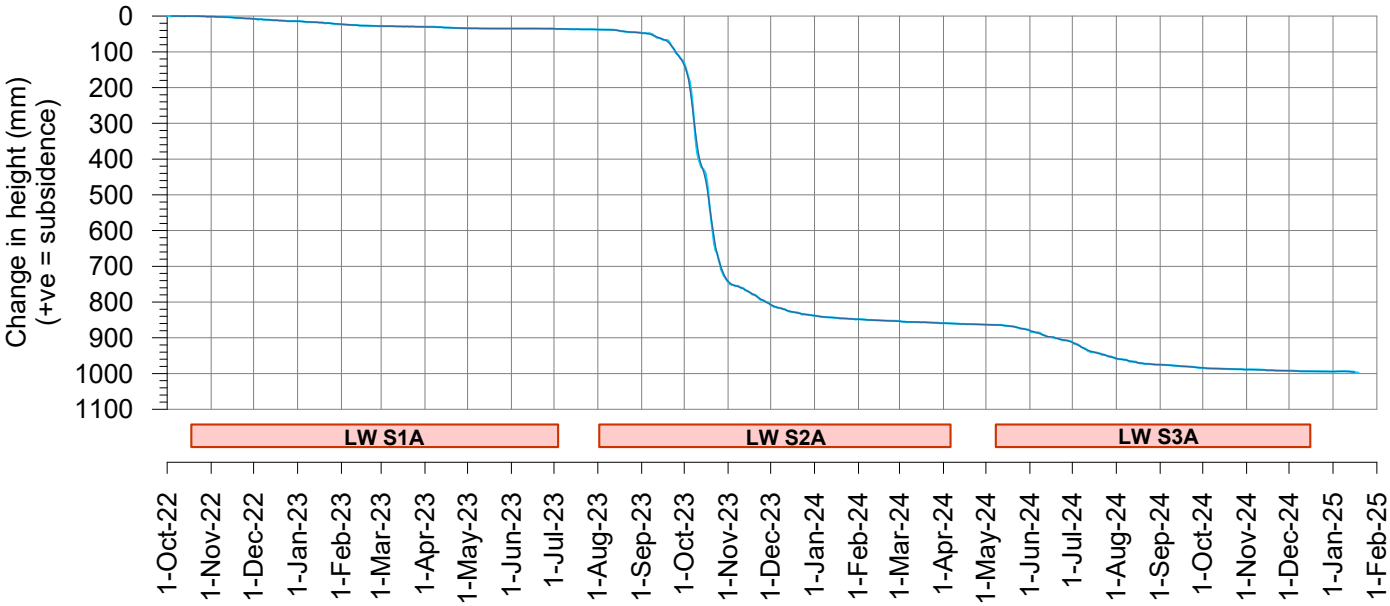










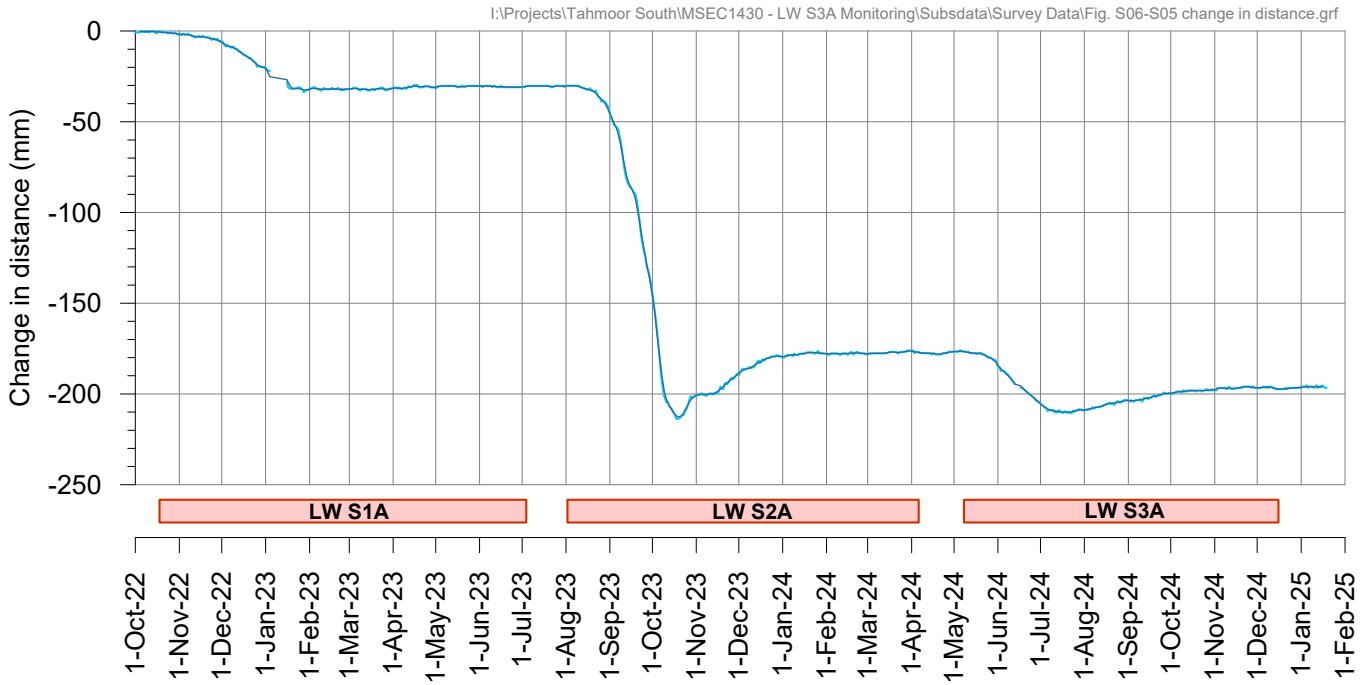


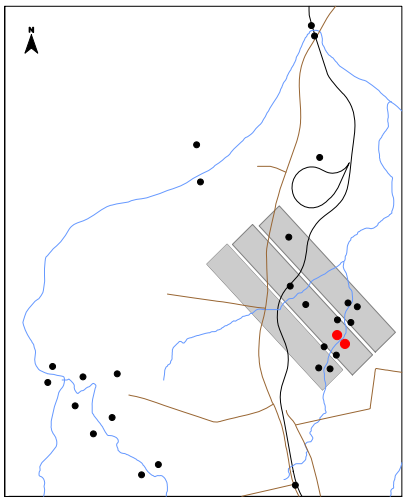
msec

Fig. S06-R34

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek
Sites S05 and S06 above LW S2A





Tahmoor South LW S3A - GNSS Monitoring

Site S07 above LW S2A

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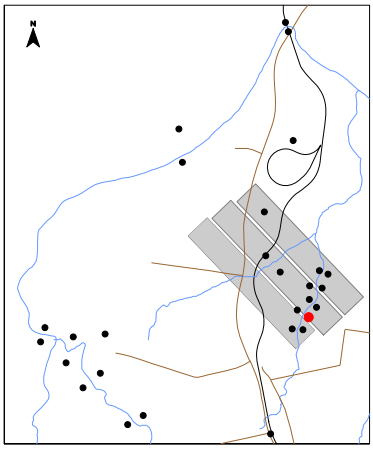
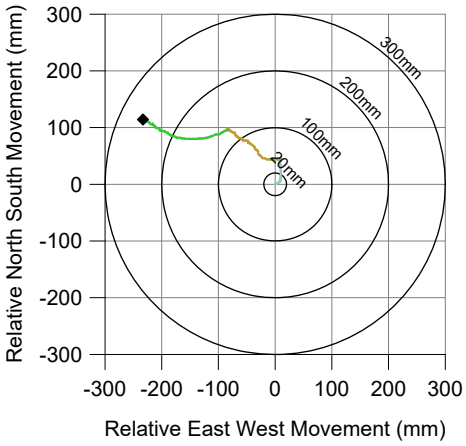
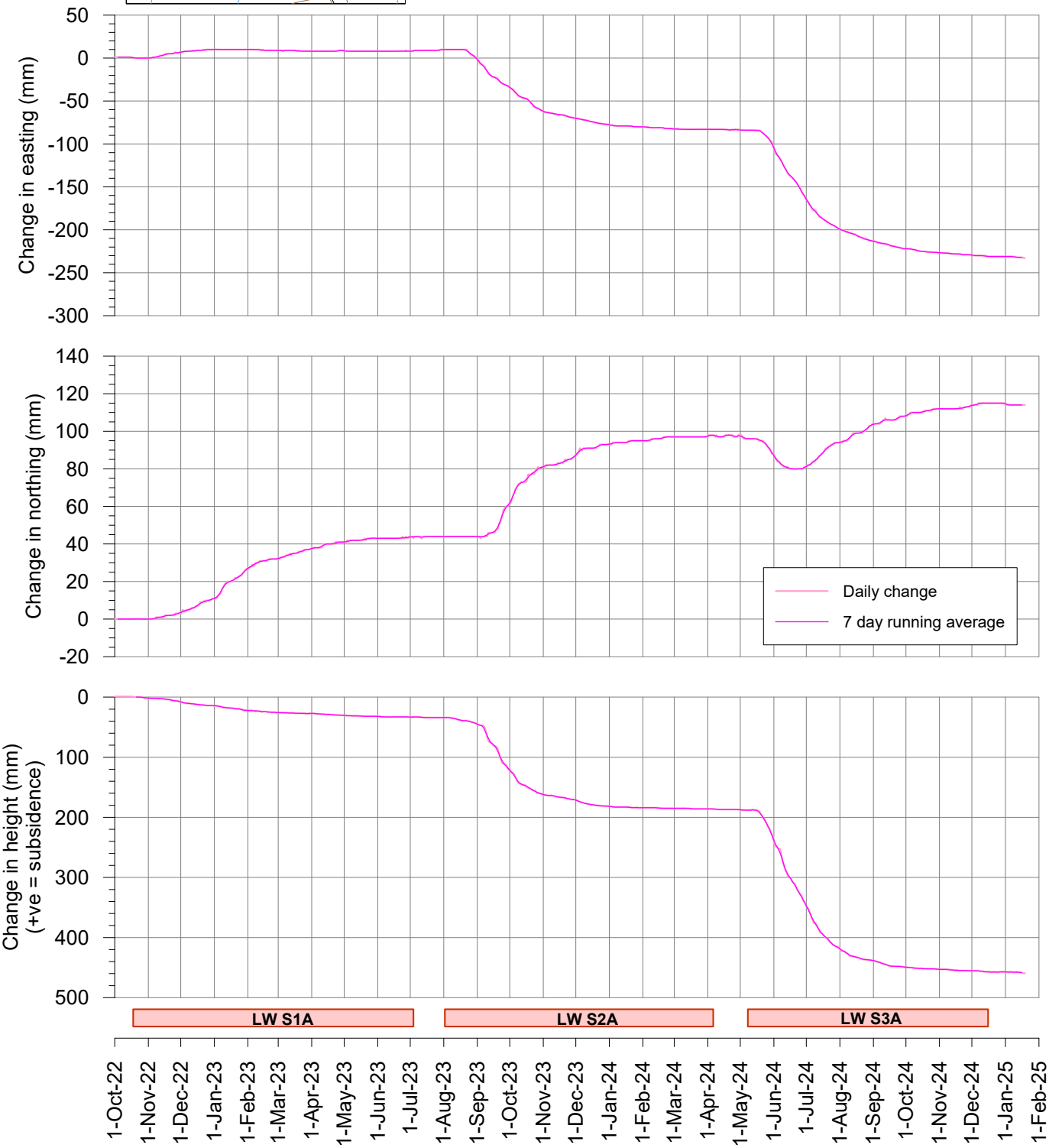


During LW S1A
During LW S2A
During LW S3A





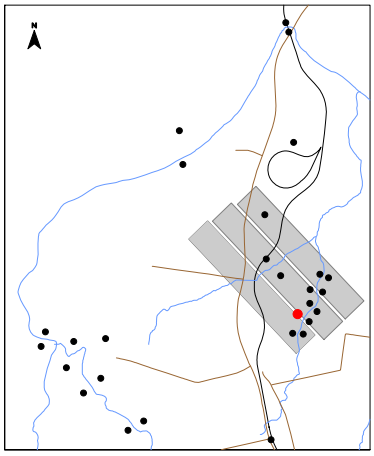
msec

Fig. S07-R34

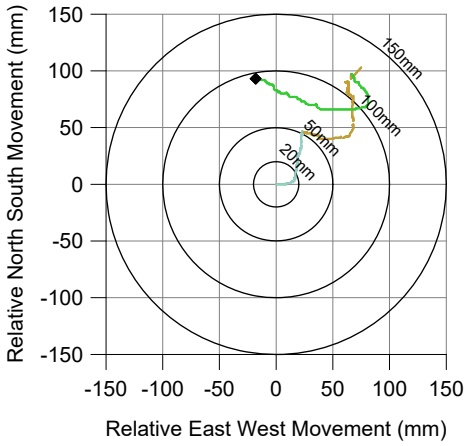
Tahmoor South LW S3A - GNSS Monitoring

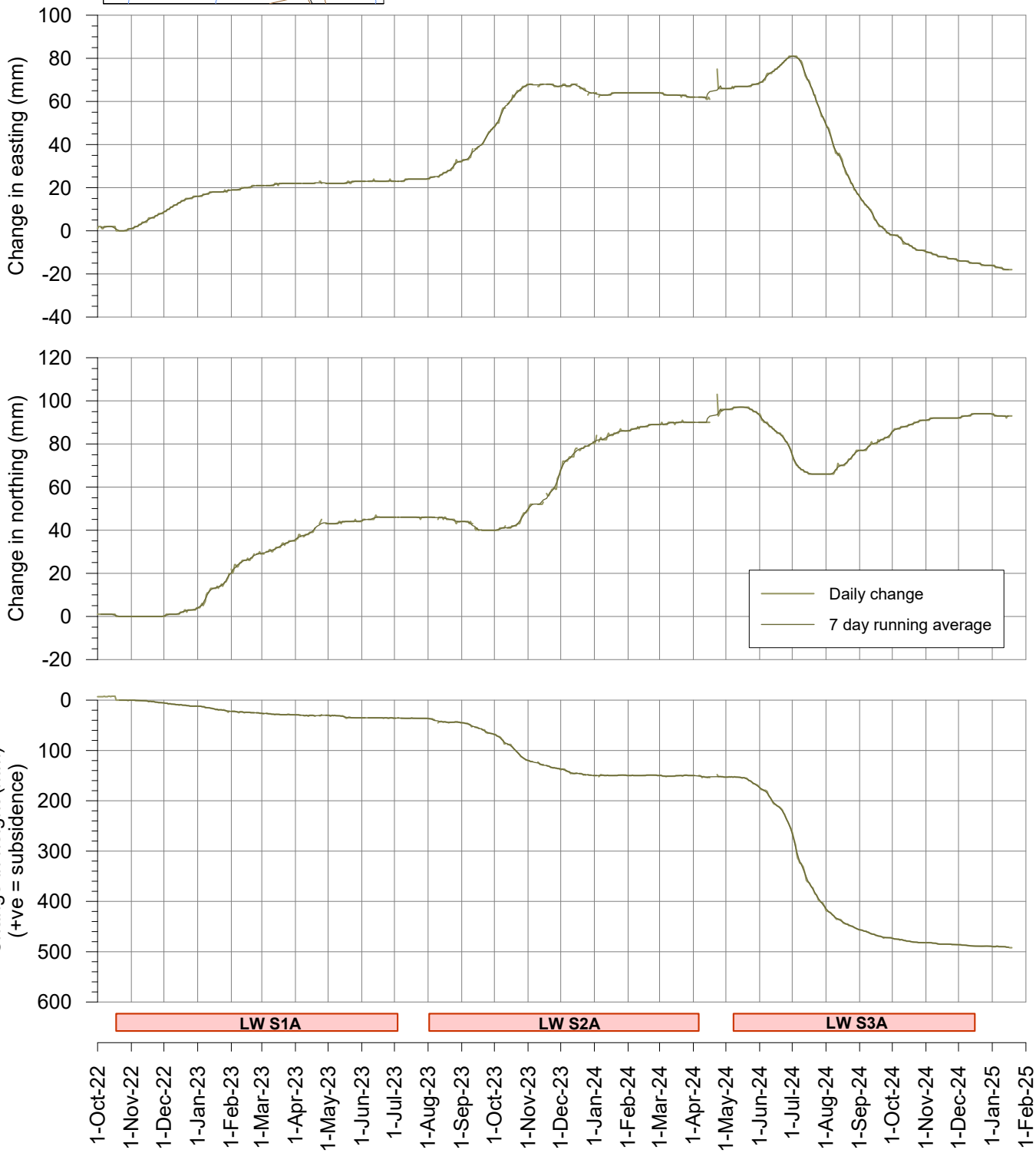
Site S08 between LW S2A and LW S3A

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S08 GNSS.grf







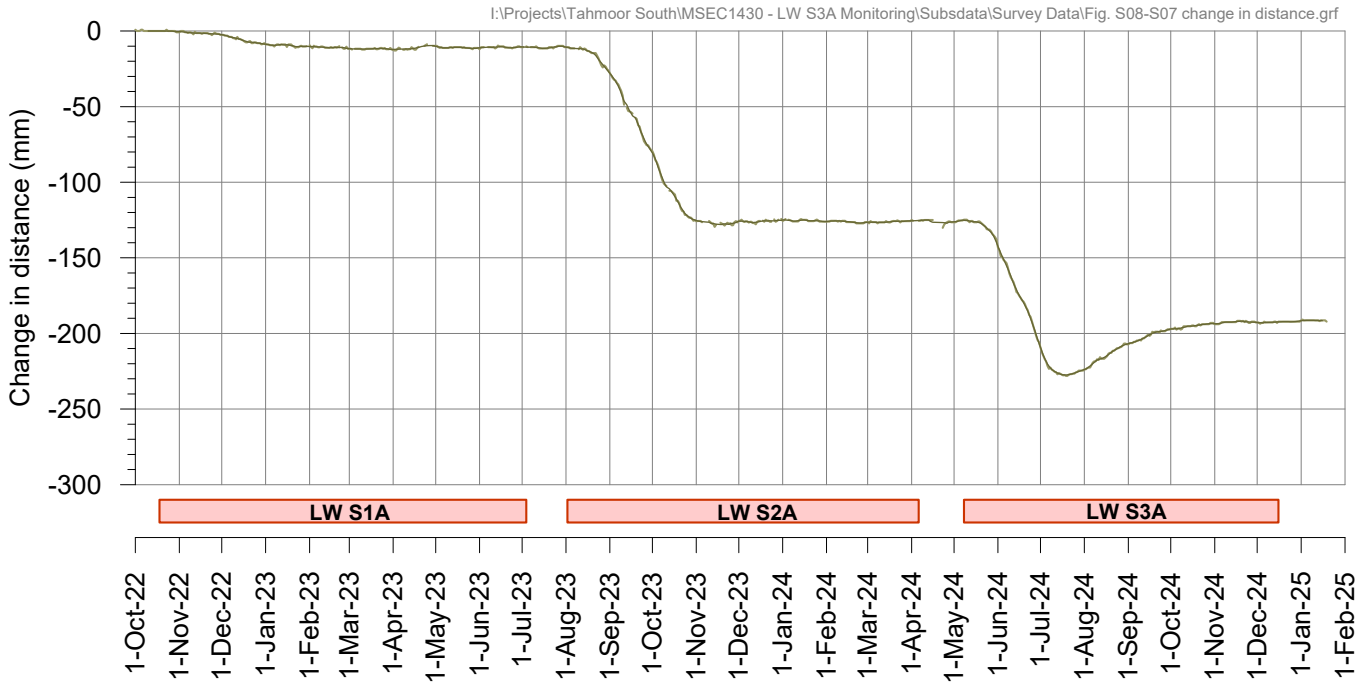


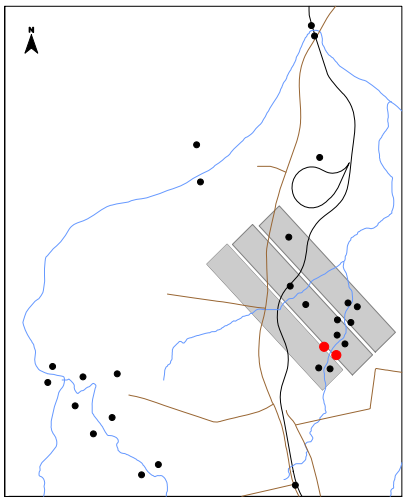
msec

Fig. S08-R34

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek
Site S07 above LW S2A and Site S08 between LW S2A and LW S3A





Tahmoor South LW S3A - GNSS Monitoring

Site S09 above LW S3A at Teatree 2

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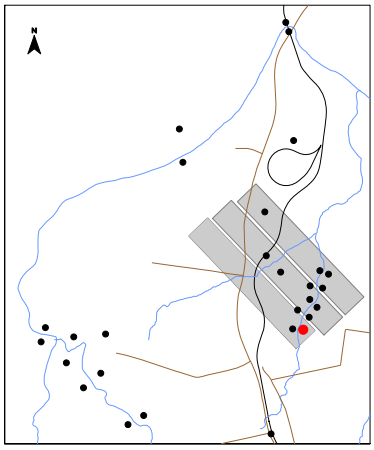
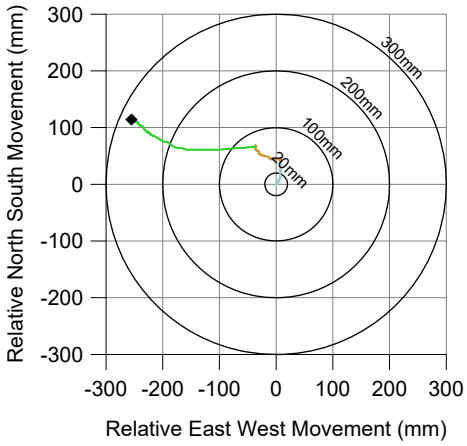
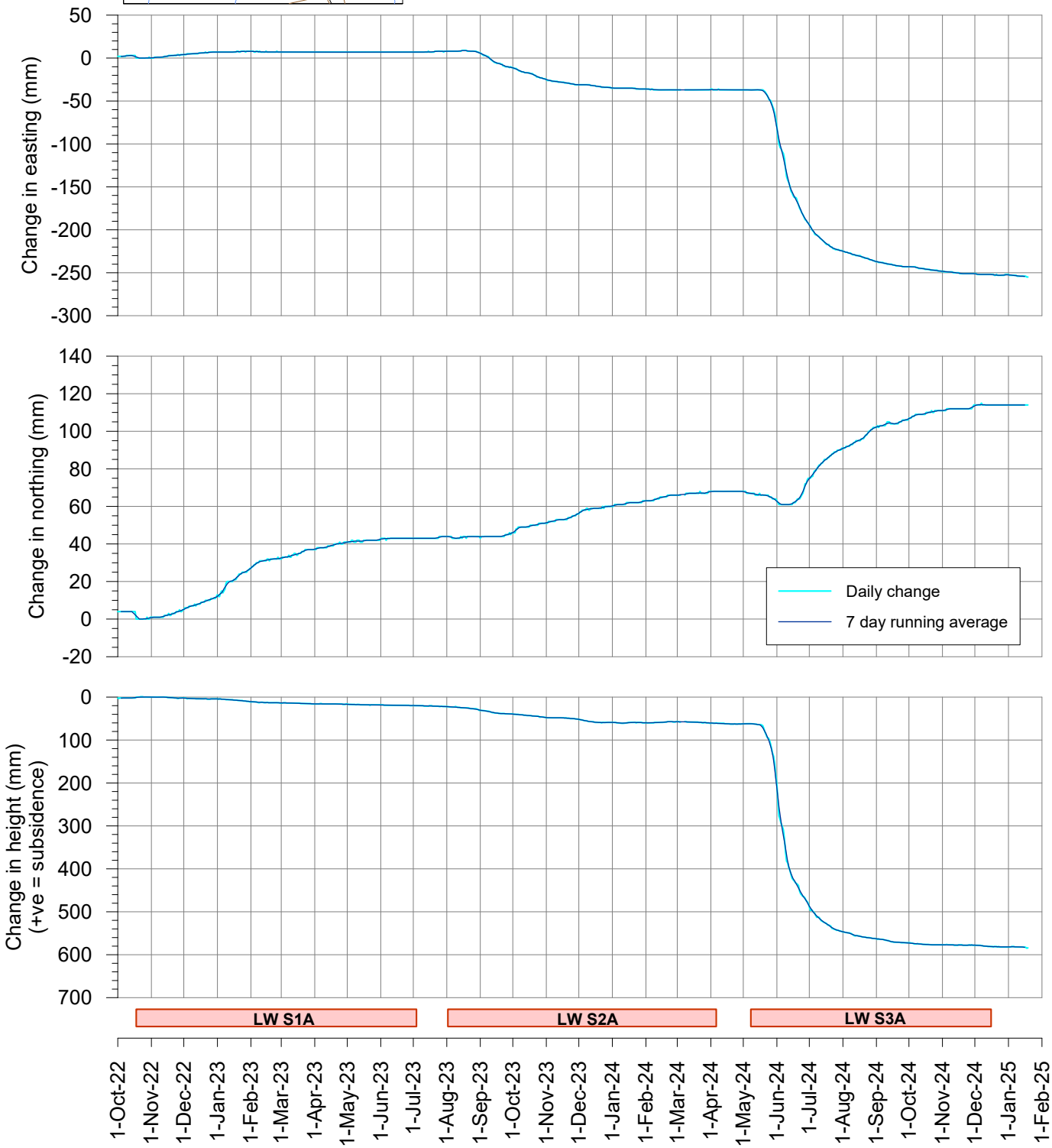






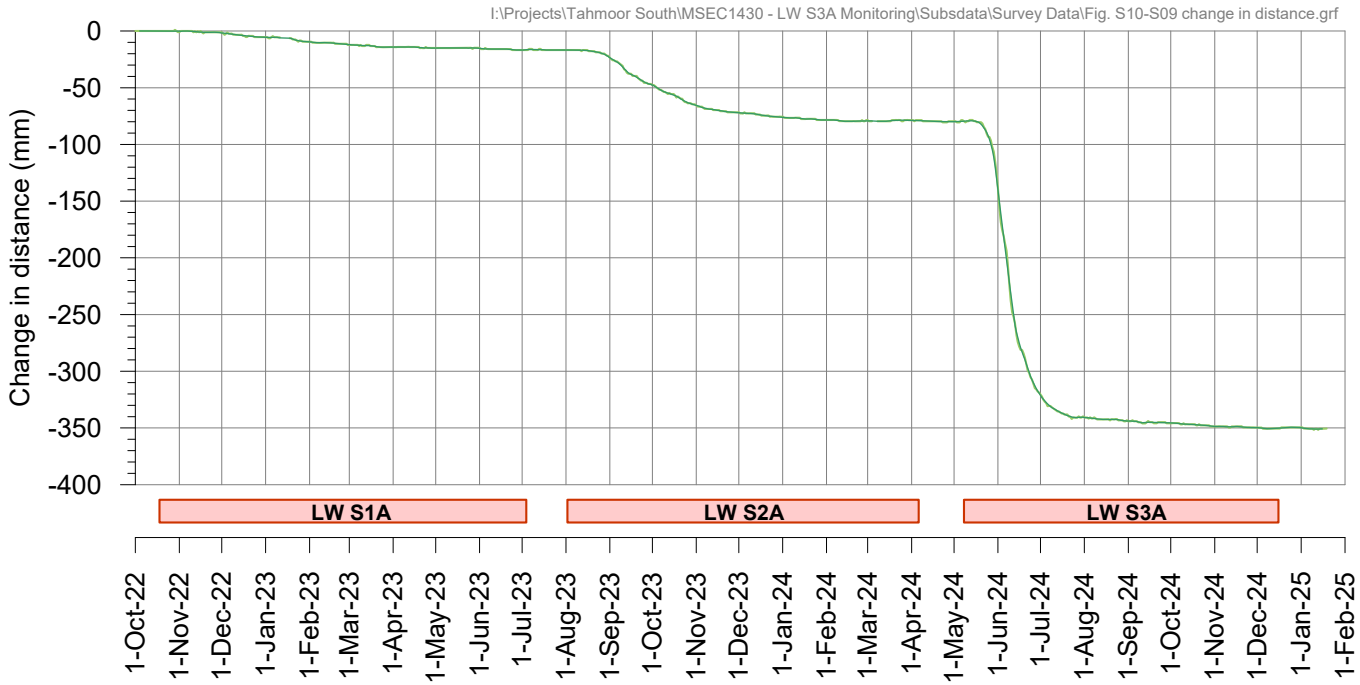


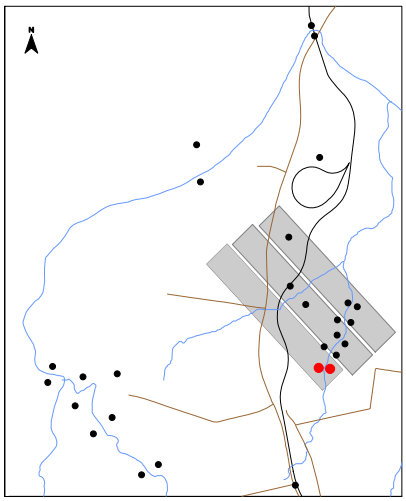
msec

Fig. S09-R34

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek at Teatree 2
Sites S09 and S10 above LW S3A

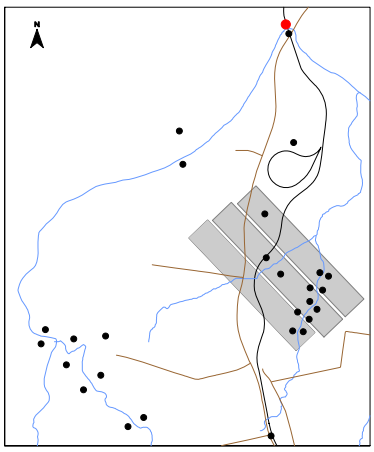




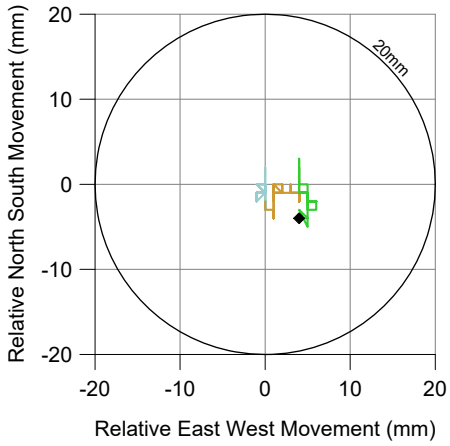
Tahmoor South LW S3A - GNSS Monitoring

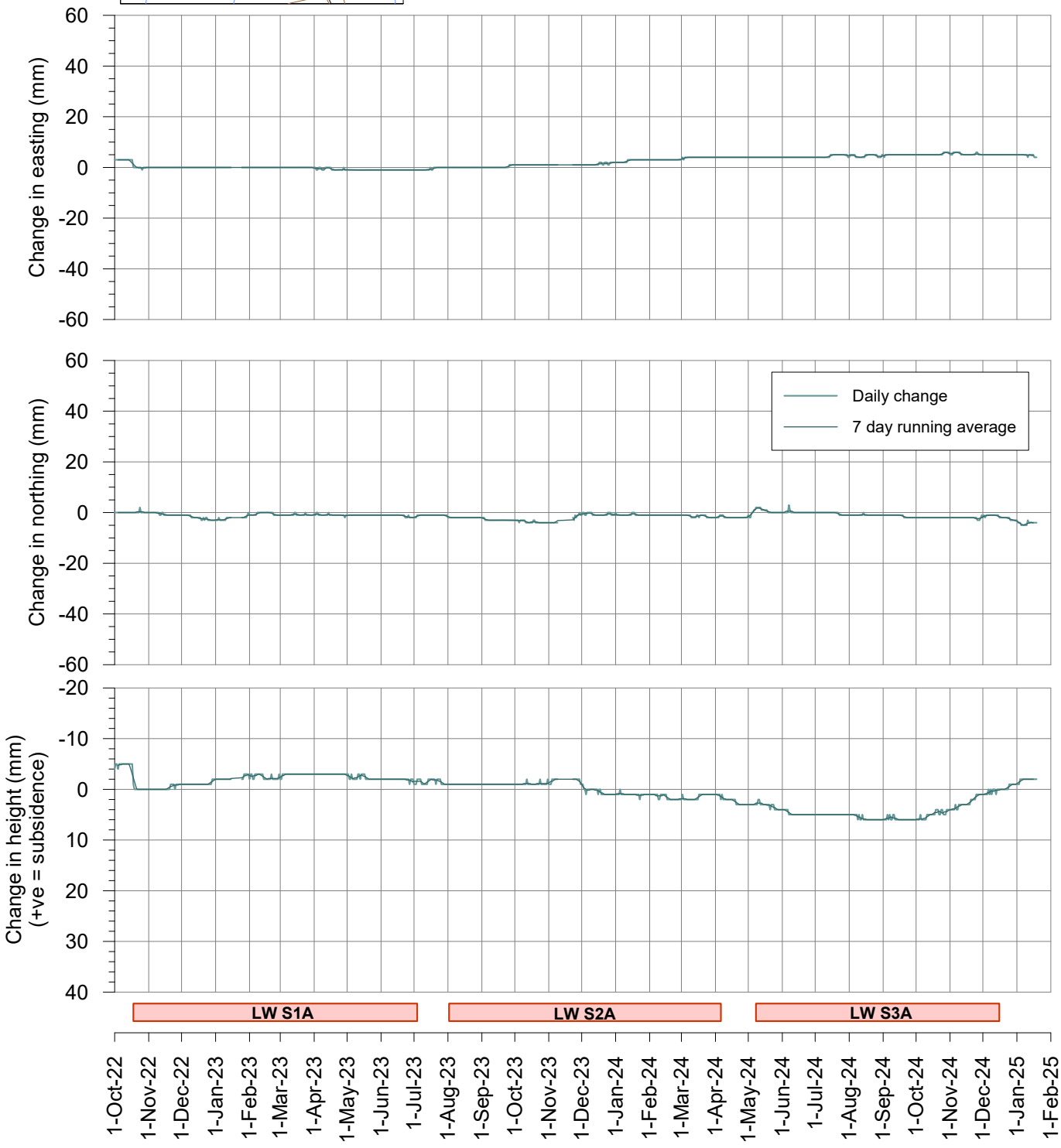
Site S11 at northern end of railway viaduct over Bargo River

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S11 GNSS.grf









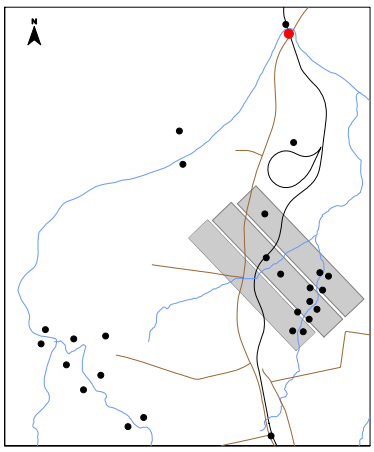
msec

Fig. S11-R34

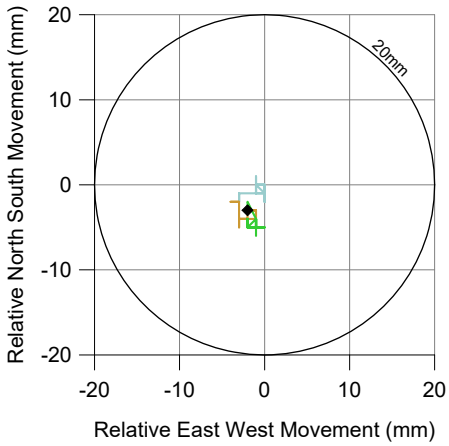
Tahmoor South LW S3A - GNSS Monitoring

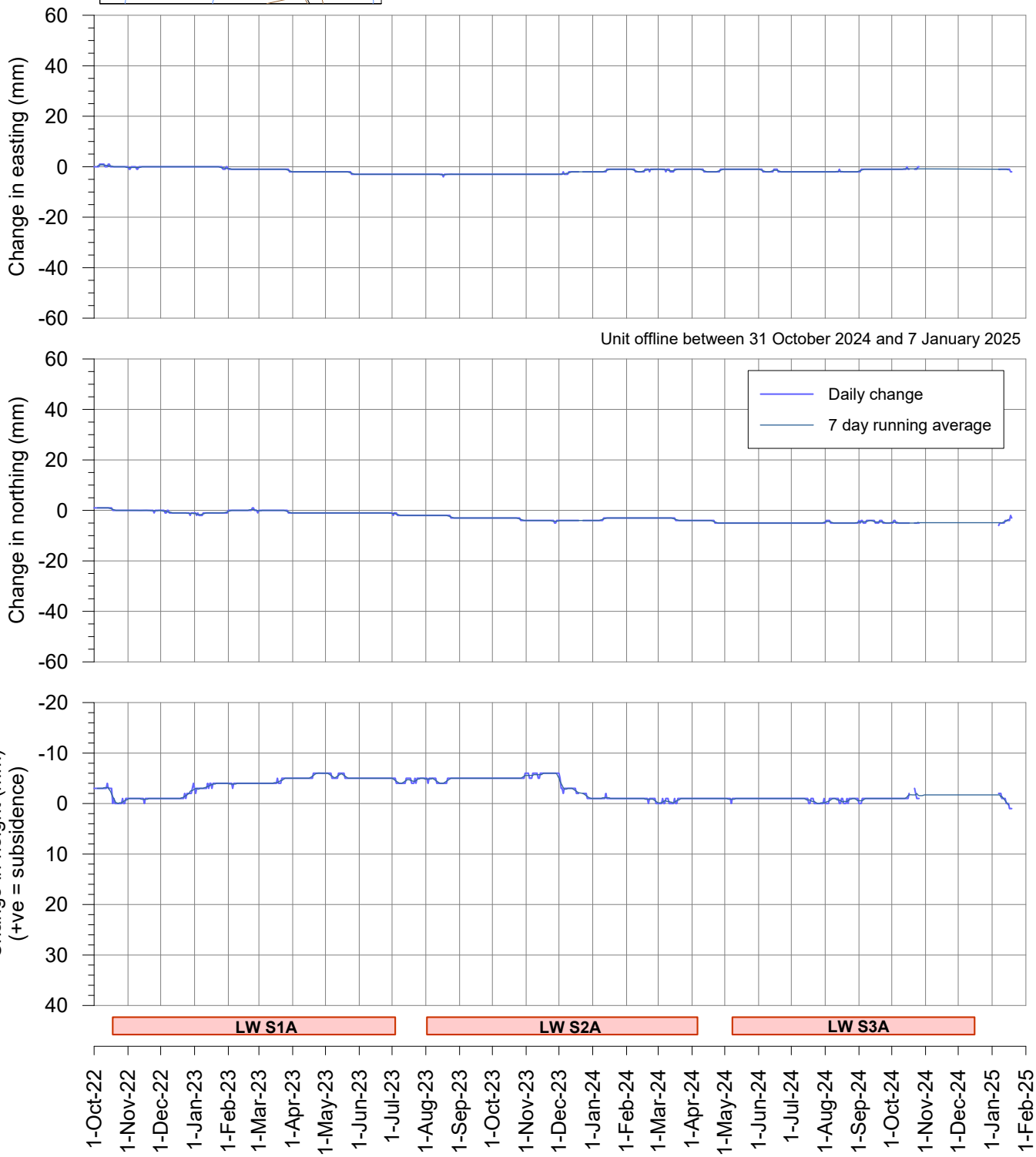
Site S12 at southern end of railway viaduct over Bargo River

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S12 GNSS.grf







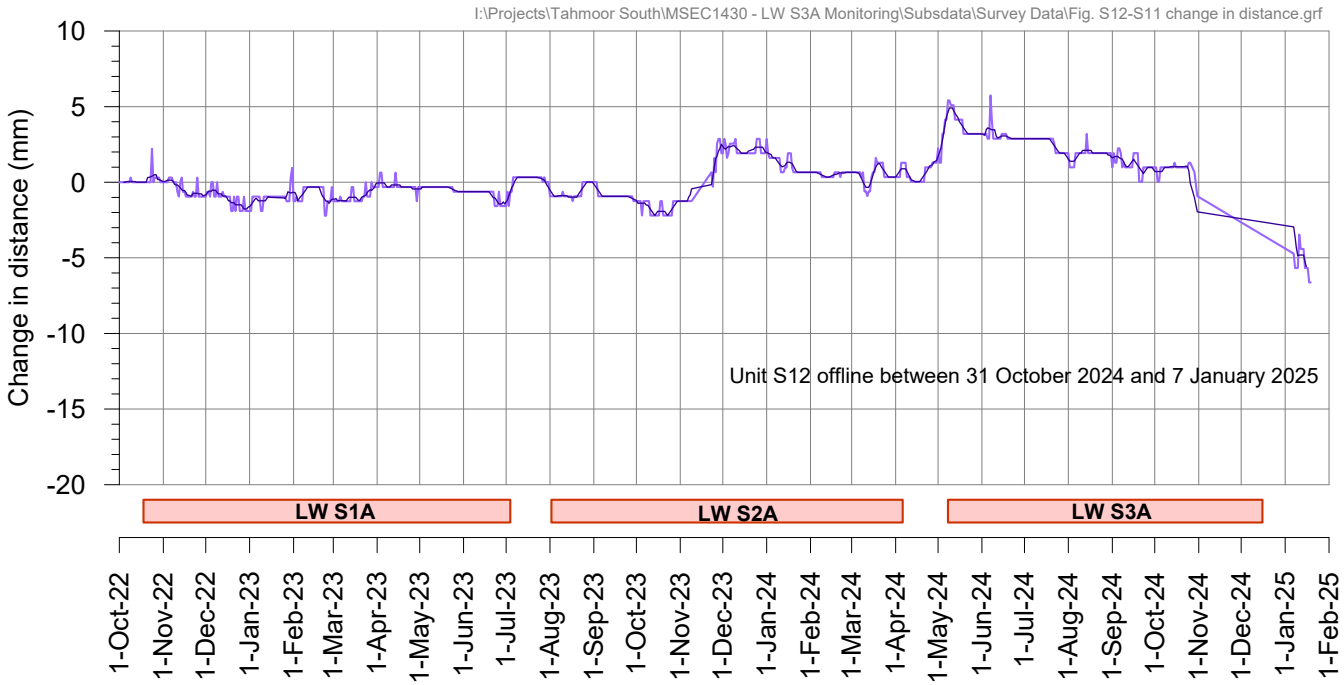


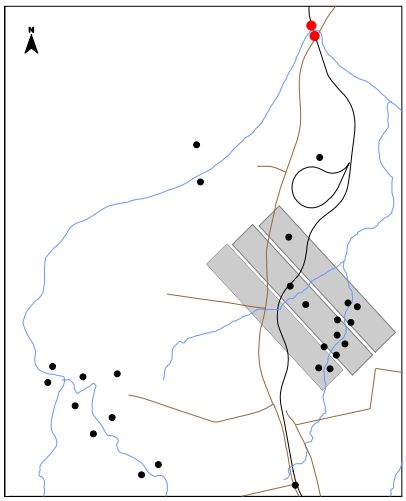
msec

Fig. S12-R34

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Railway Viaduct over Bargo River
Sites S11 and S12





Tahmoor South LW S3A - GNSS Monitoring

Site S13 on northern side of Picton Weir

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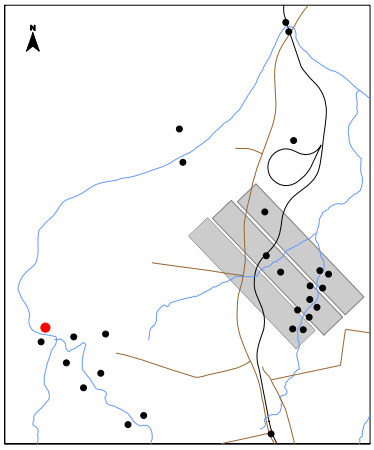
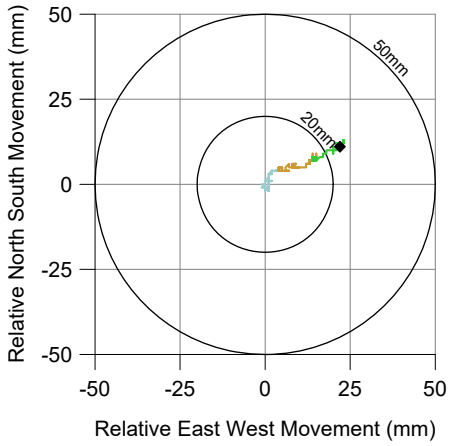
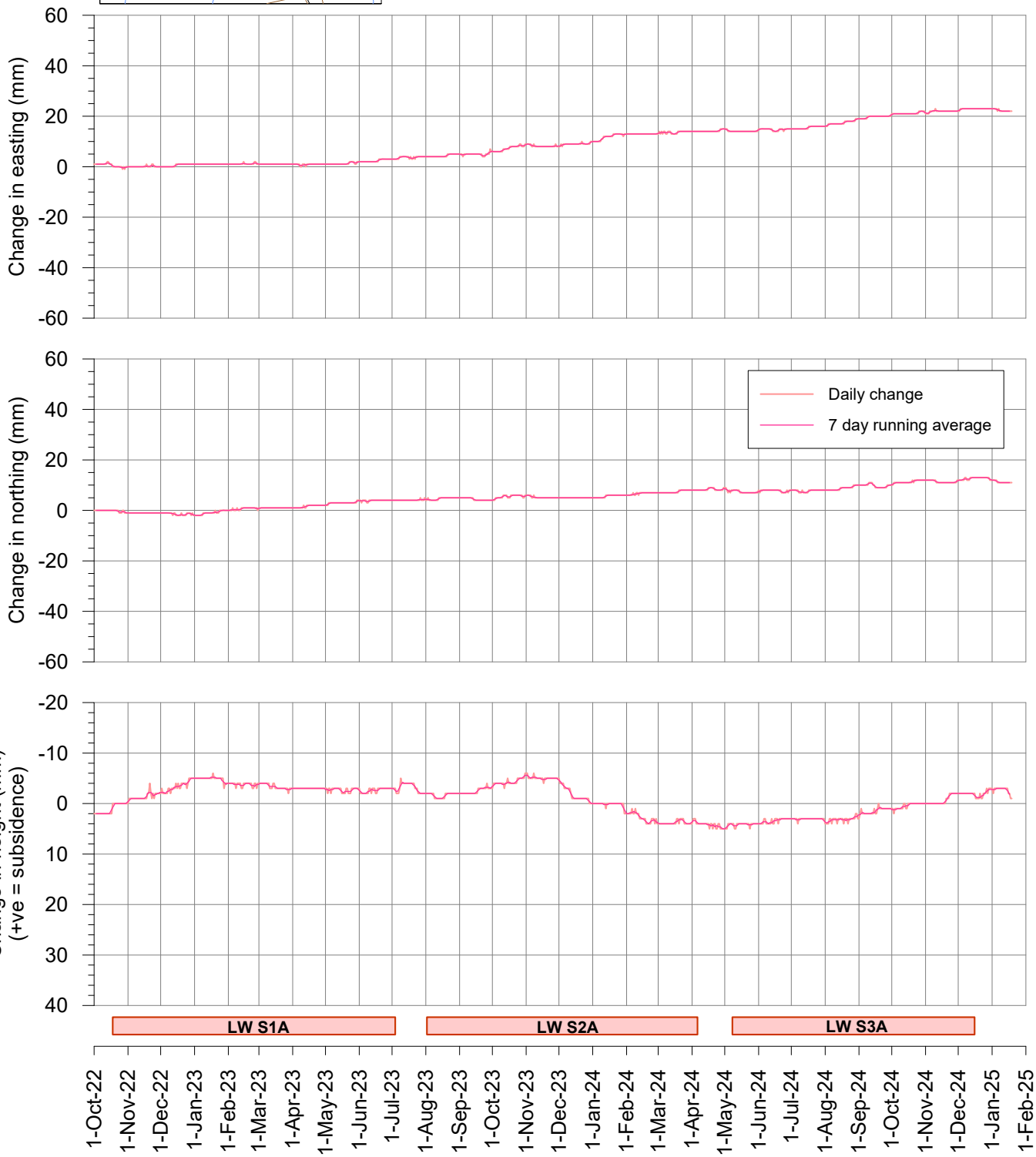


During LW S1A
During LW S2A
During LWS3A





msec

Fig. S13-R34

Tahmoor South LW S3A - GNSS Monitoring

Site S14 on southern side of Picton Weir

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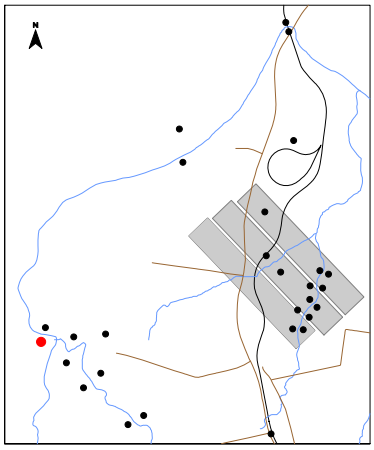
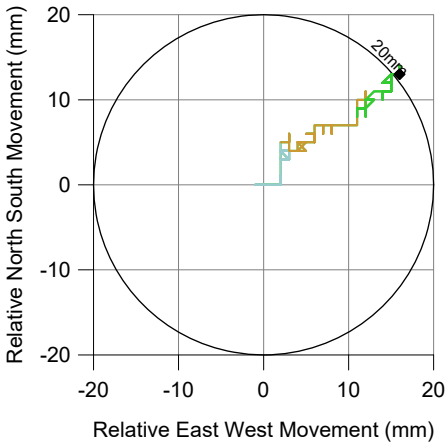
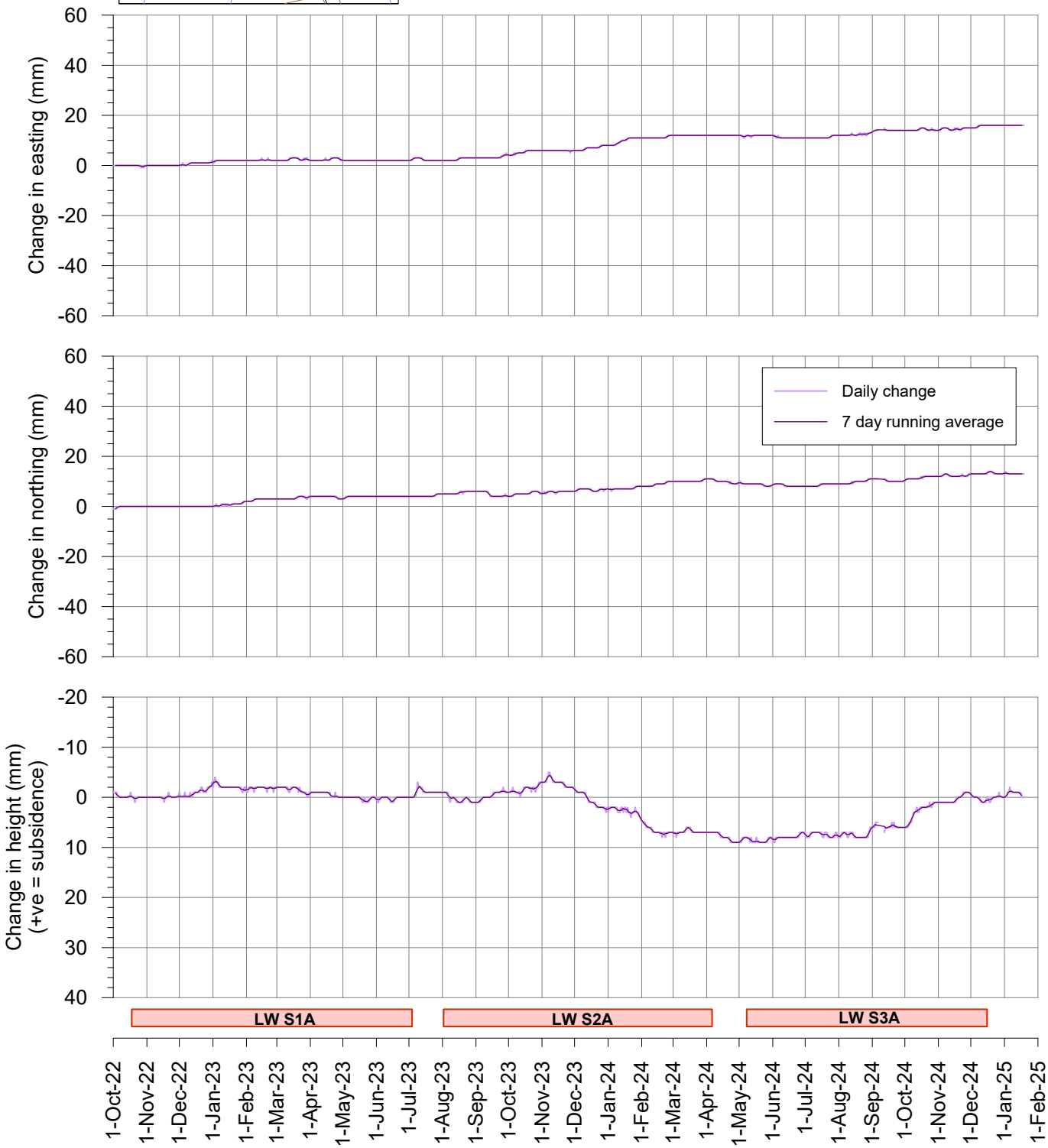






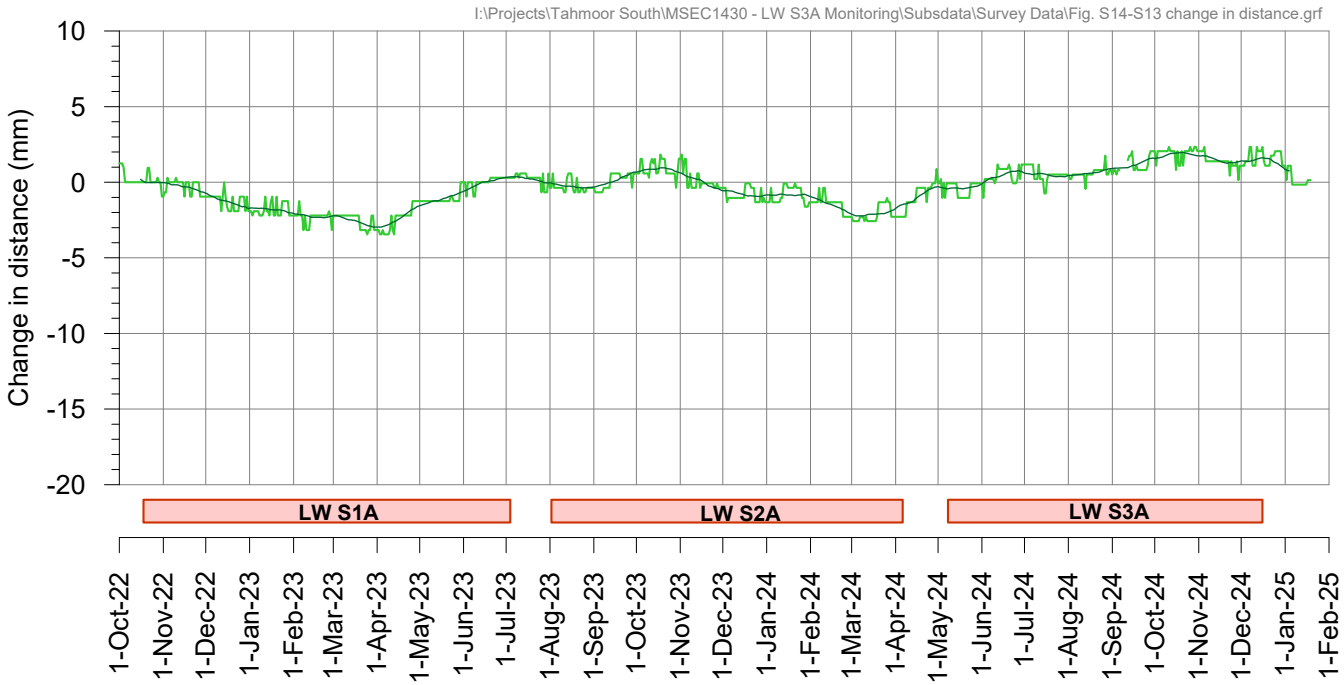


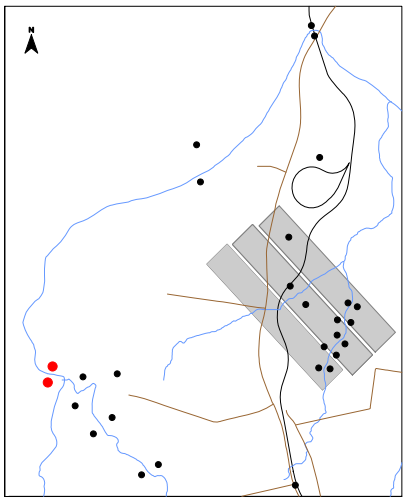
msec

Fig. S14-R34

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Picton Weir
Sites S13 and S14





Tahmoor South LW S3A - GNSS Monitoring

Site S15 at Wellers Road Overbridge

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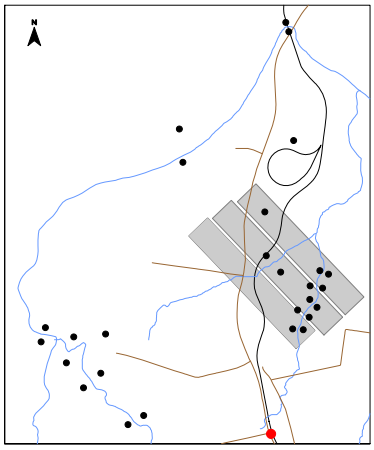
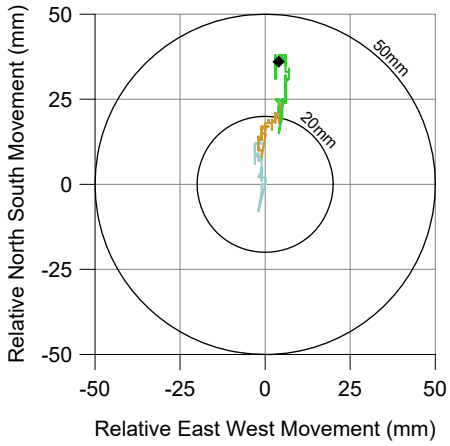
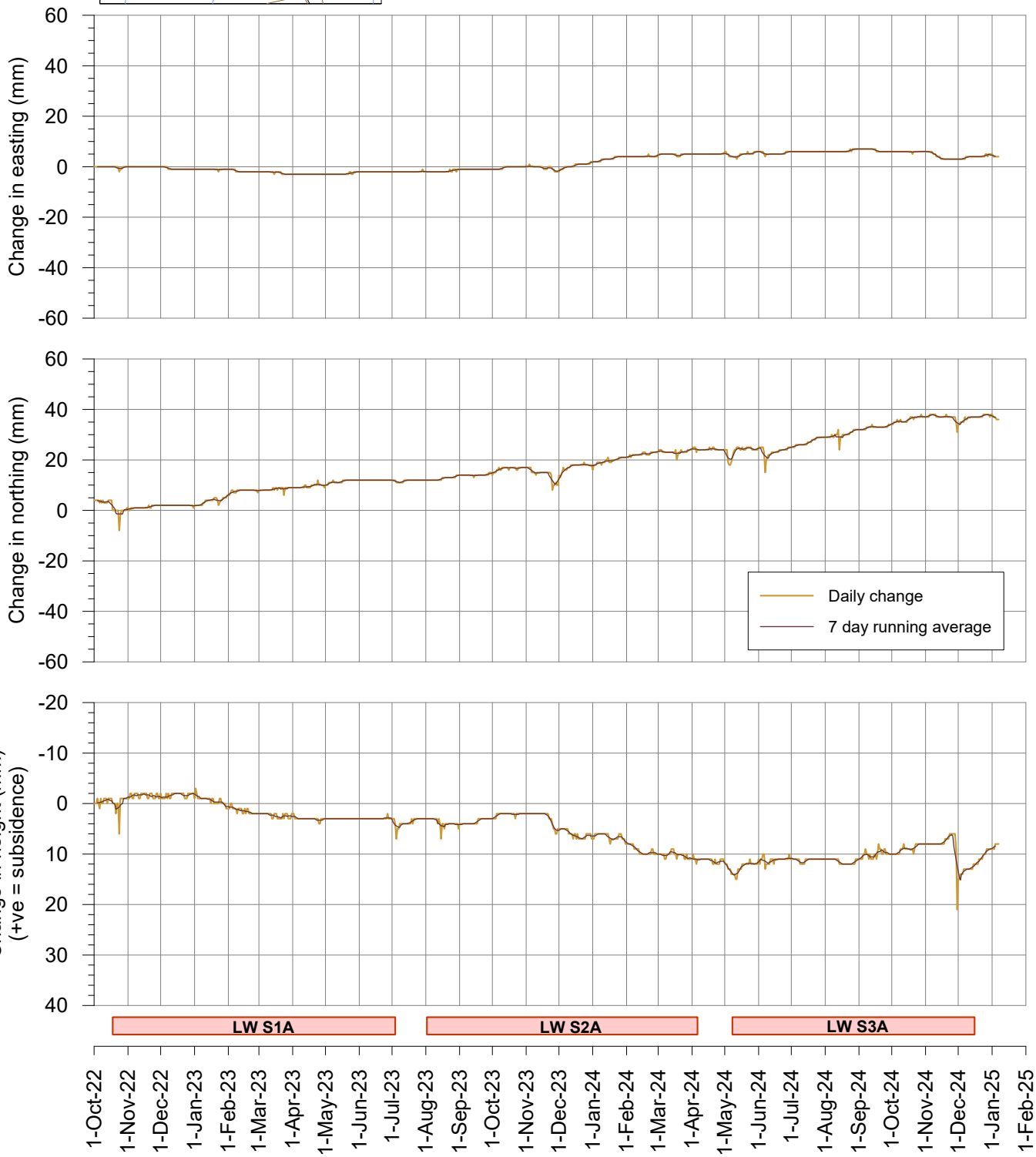








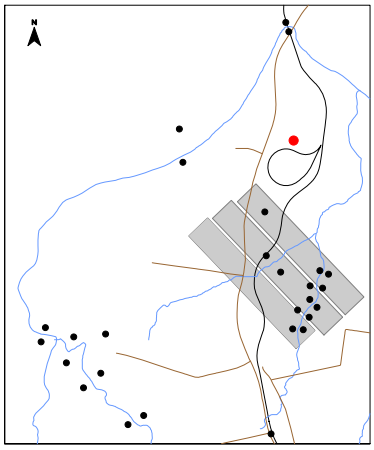
msec

Fig. S15-R34

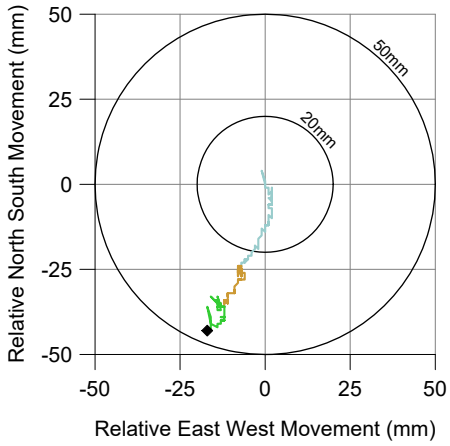
Tahmoor South LW S3A - GNSS Monitoring

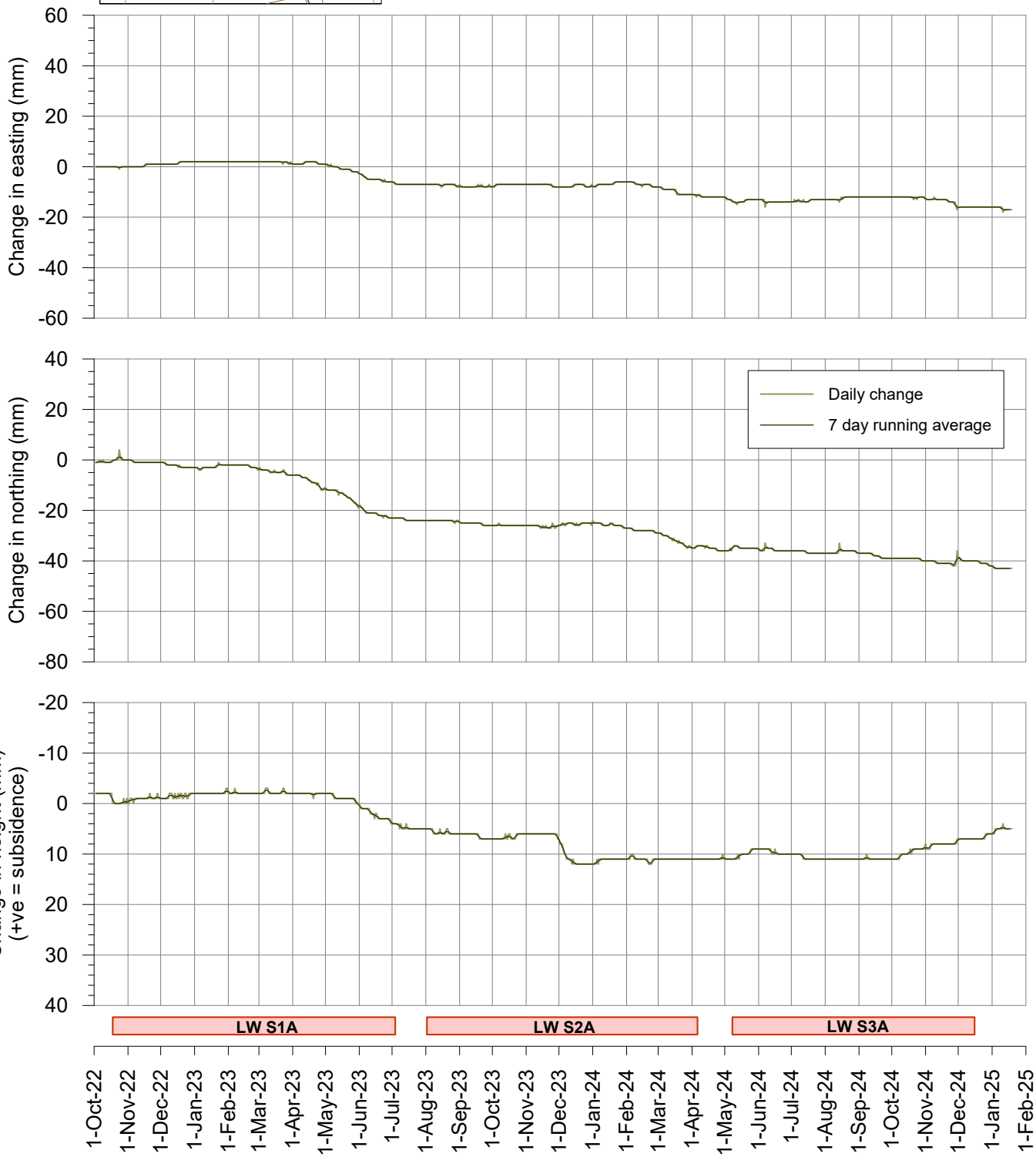
Site S16 at Tahmoor Mine site

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S16 GNSS.grf



During LW S1A
During LW S1A
During LW S3A





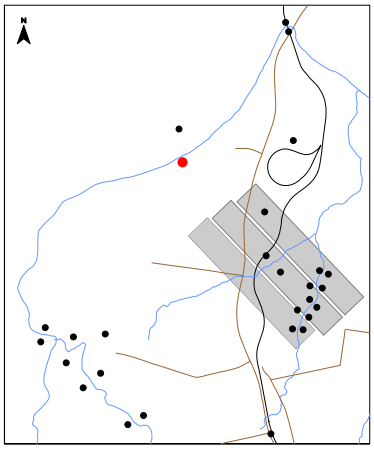
msec

Fig. S16-R34

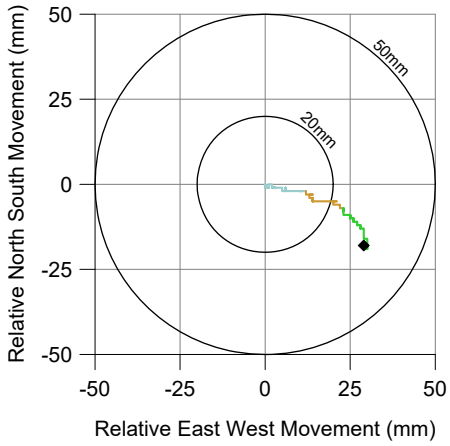
Tahmoor South LW S3A - GNSS Monitoring

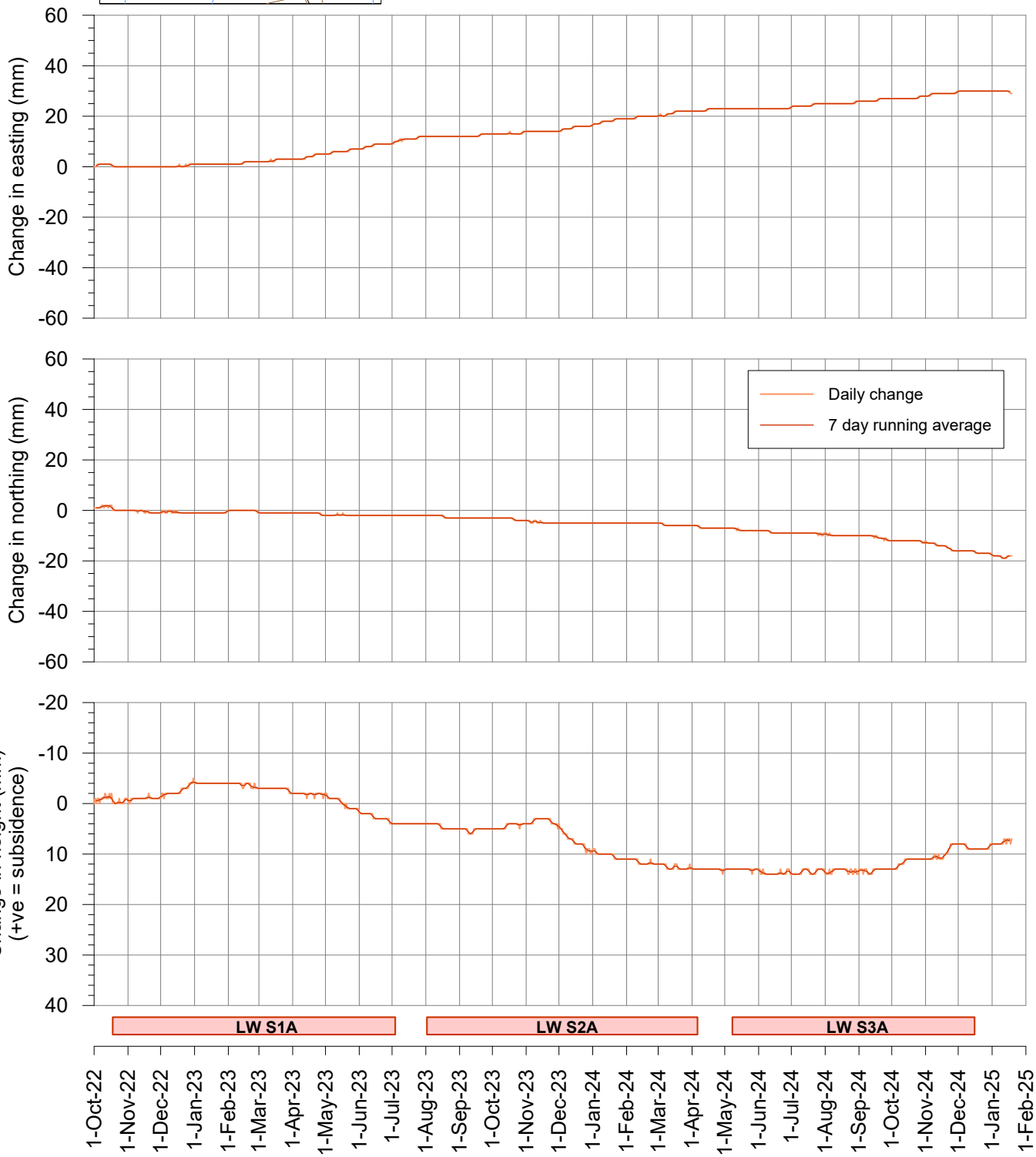
Site S17 on east bank of Bargo River

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S17 GNSS.grf









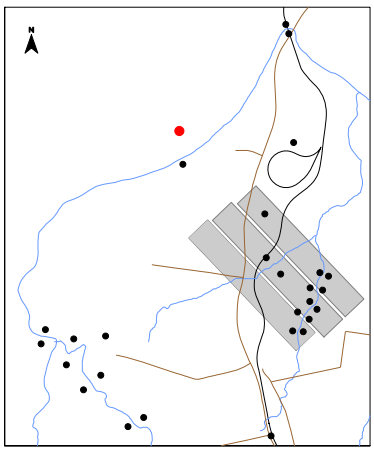
msec

Fig. S17-R34

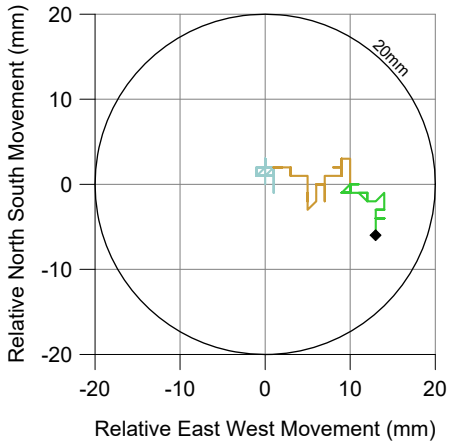
Tahmoor South LW S3A - GNSS Monitoring

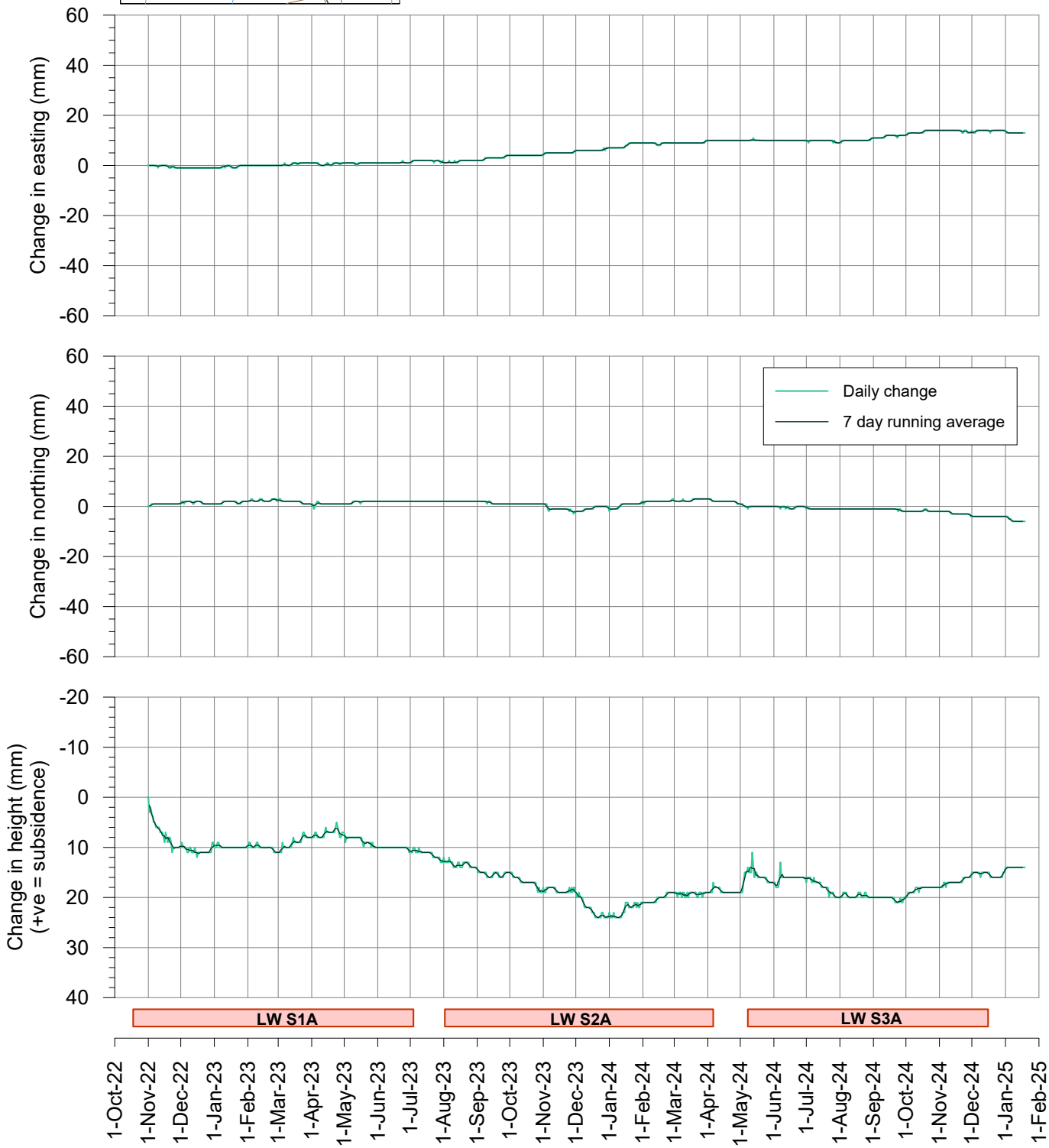
Site S18 on west bank of Bargo River

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S18 GNSS.grf







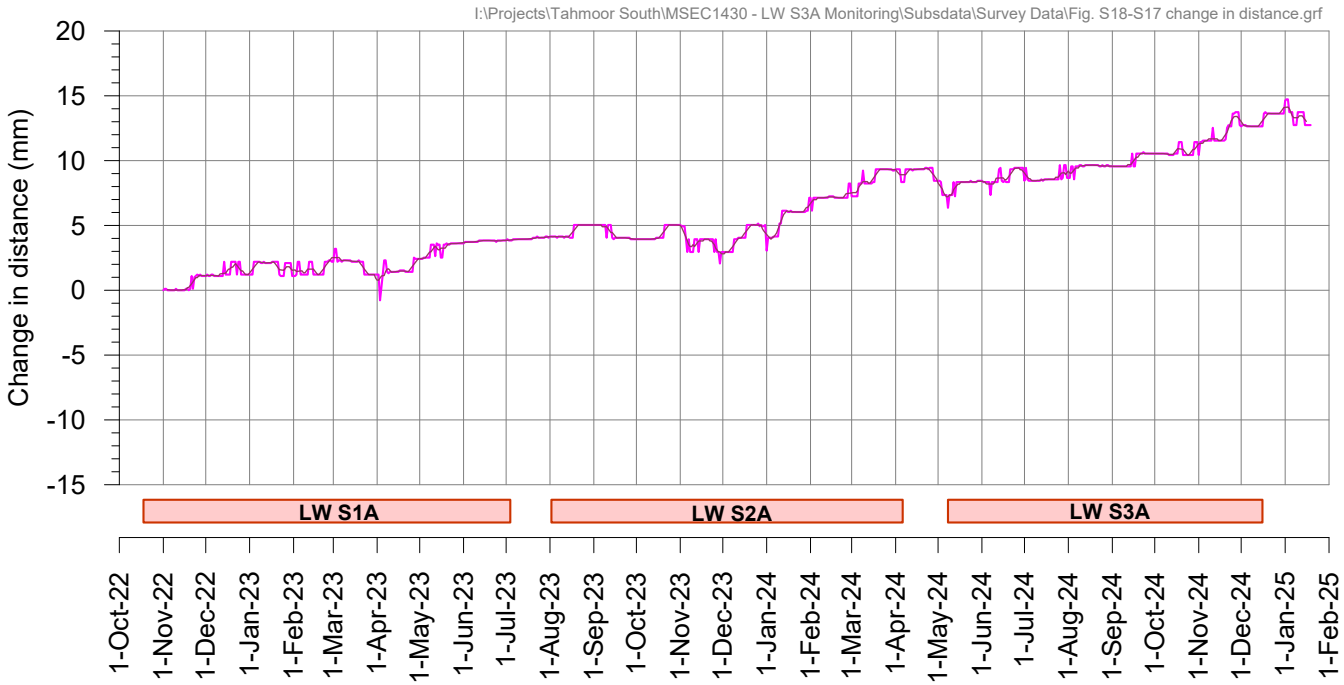


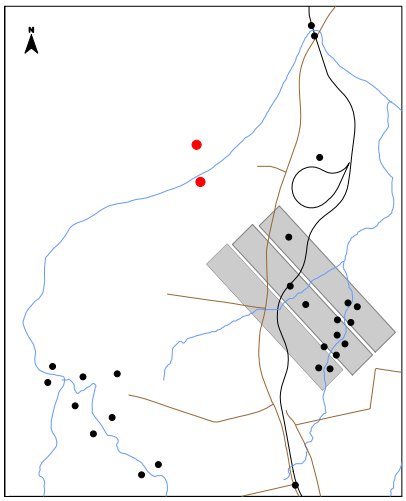
msec

Fig. S18-R34

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Bargo River
Sites S17 and S18

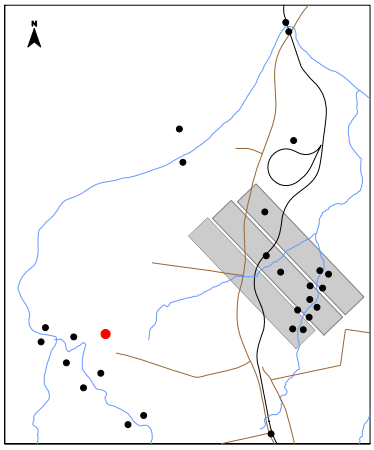




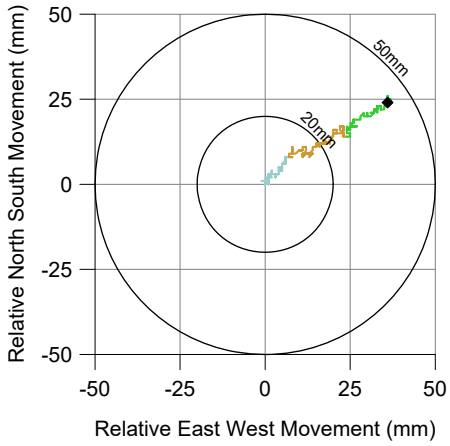
Tahmoor South LW S3A - GNSS Monitoring

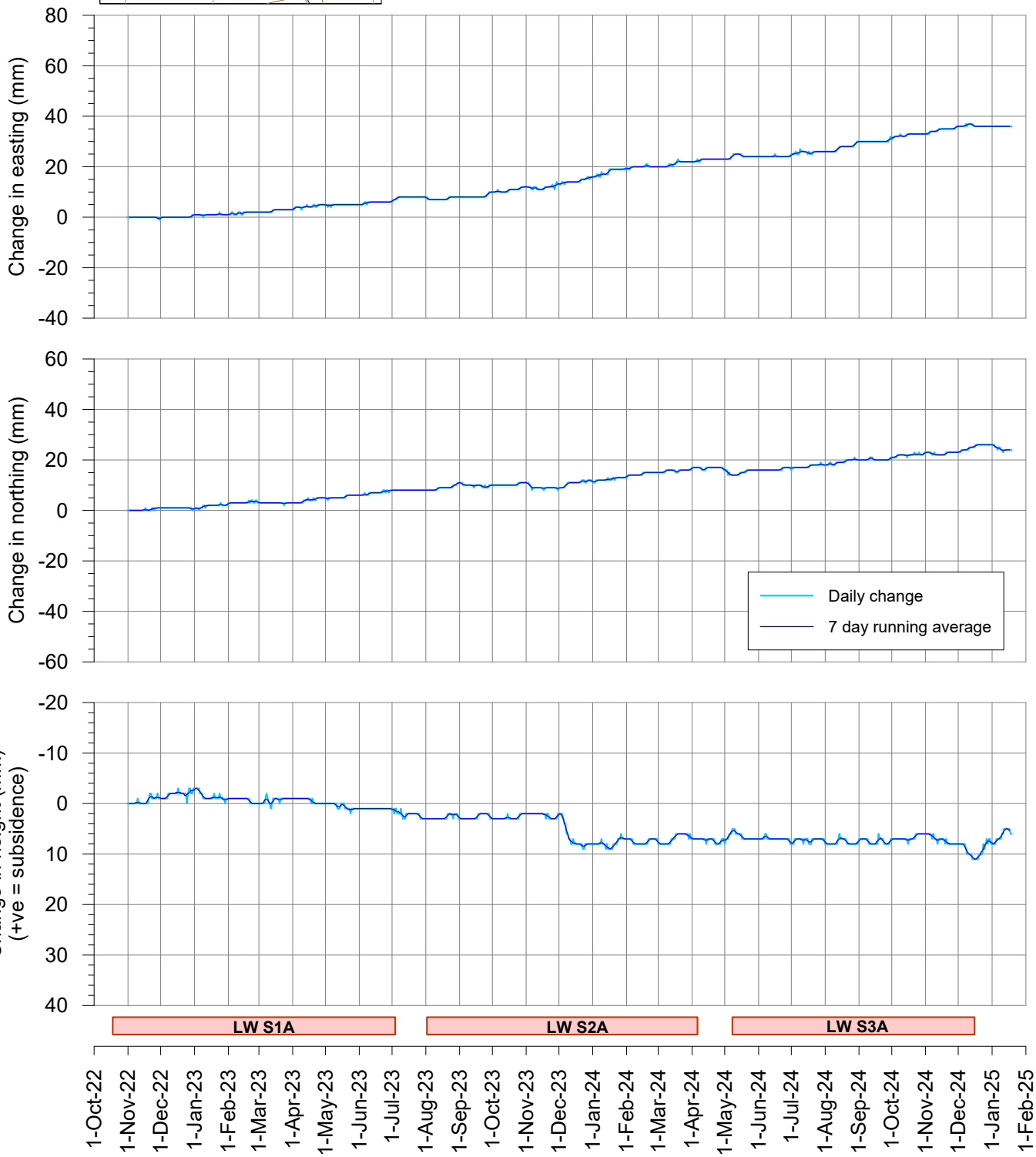
Site S19 near Hornes Creek

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S19 GNSS.grf



During LW S1A
During LW S2A
During LW S3A





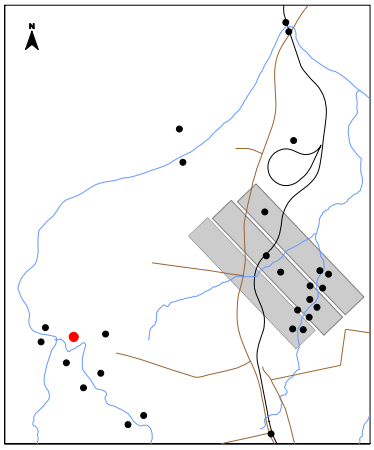
msec

Fig. S19-R34

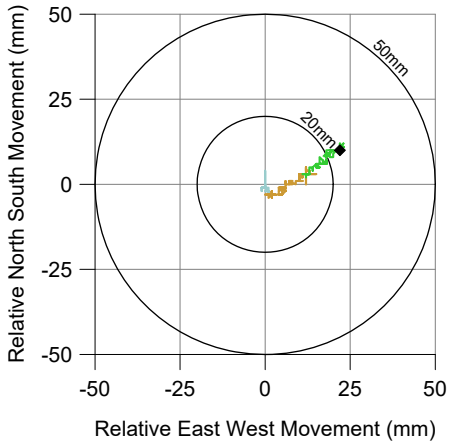
Tahmoor South LW S3A - GNSS Monitoring

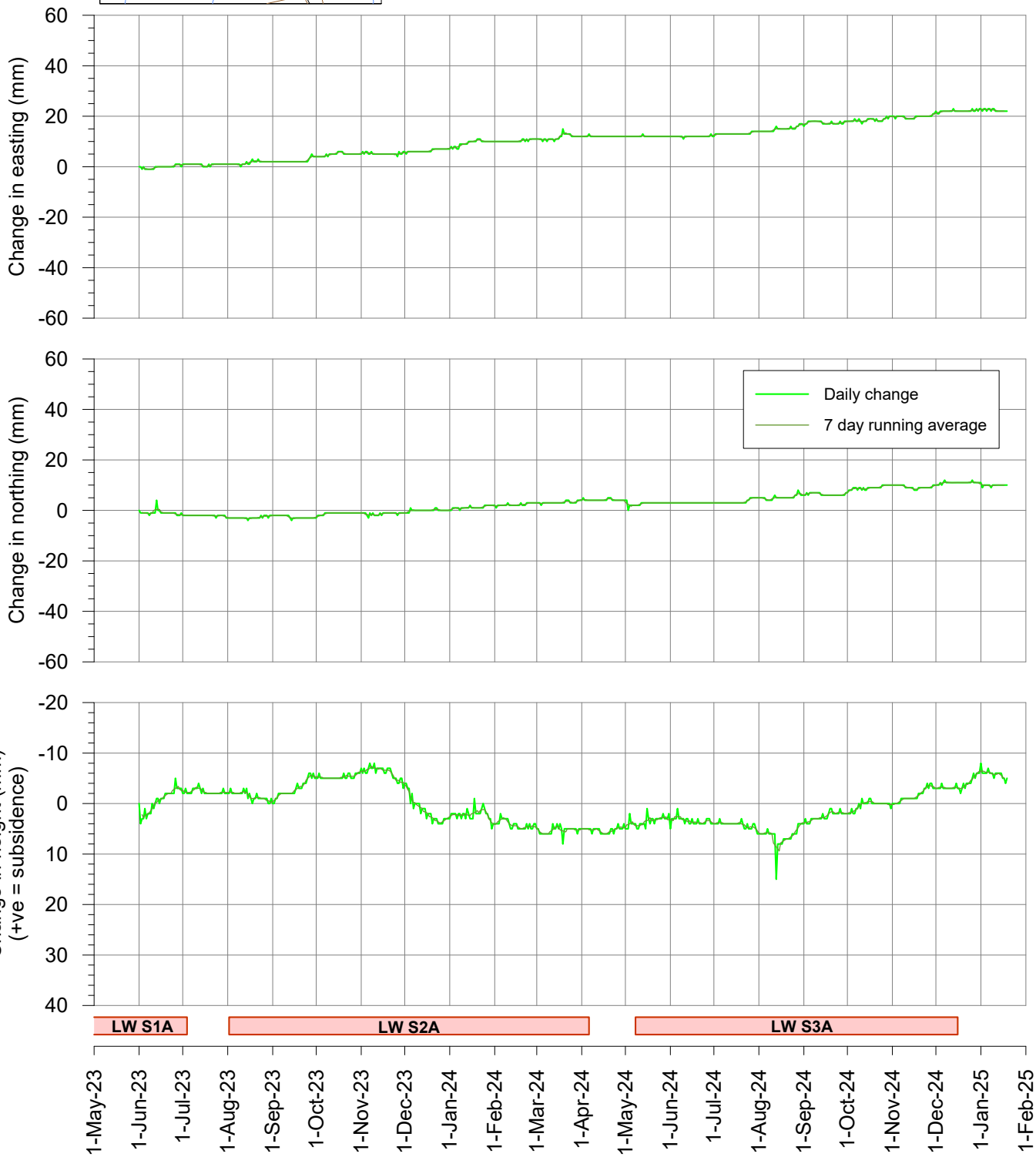
Site S20 on northern side of Hornes Creek

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S20 GNSS.grf



During LW S1A
During LW S2A
During LW S3A





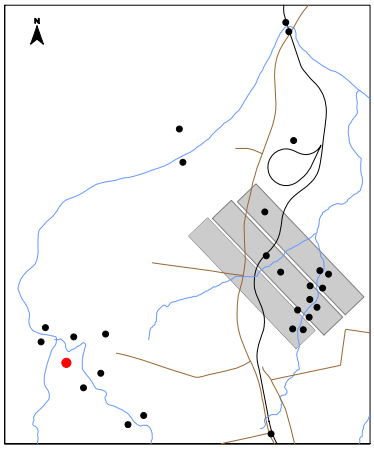
msec

Fig. S20-R34

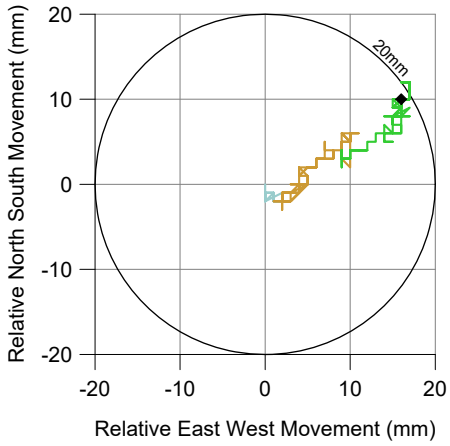
Tahmoor South LW S3A - GNSS Monitoring

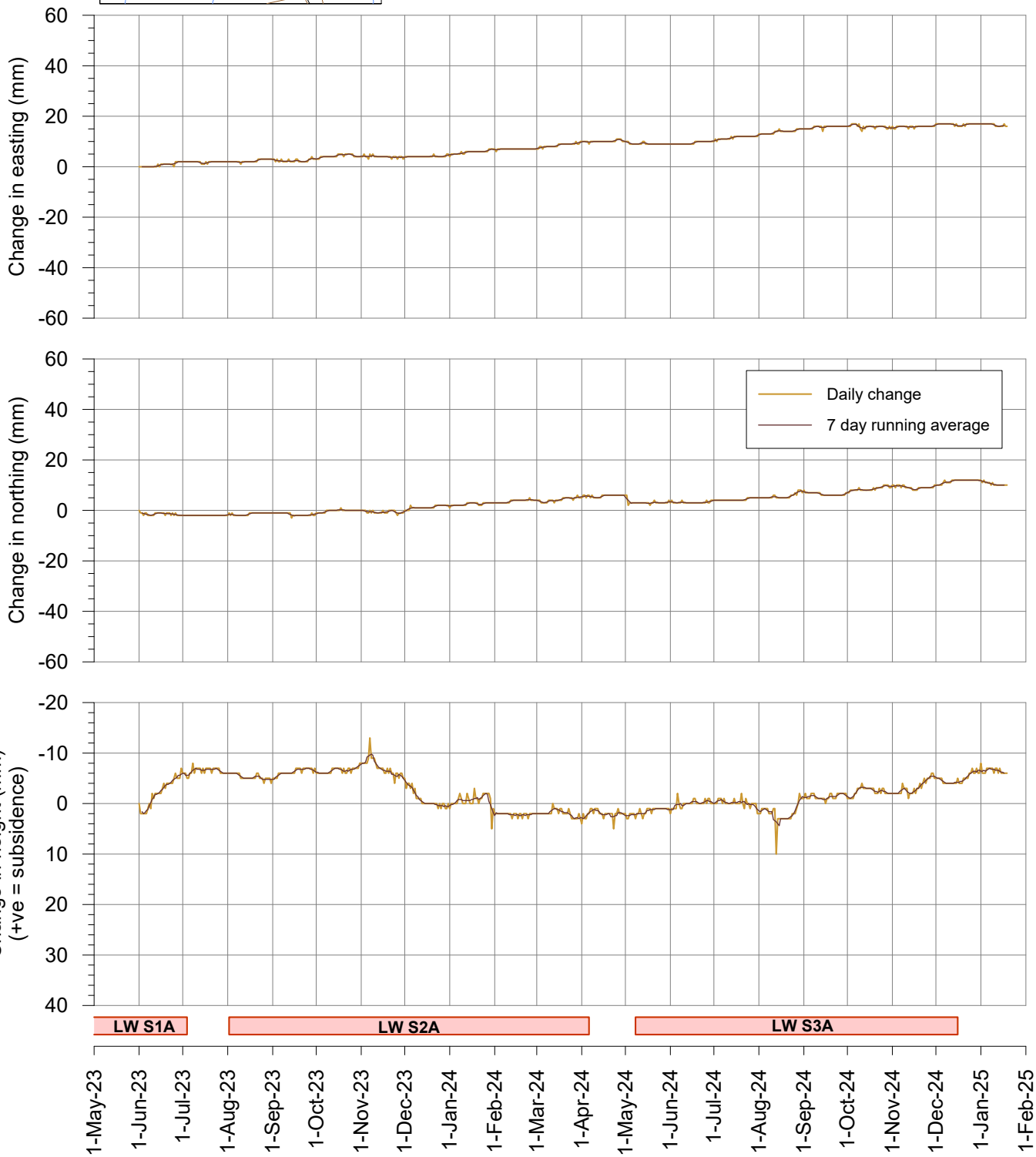
Site S21 on southern side of Hornes Creek

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S21 GNSS.grf



During LW S1A
During LW S2A
During LW S3A



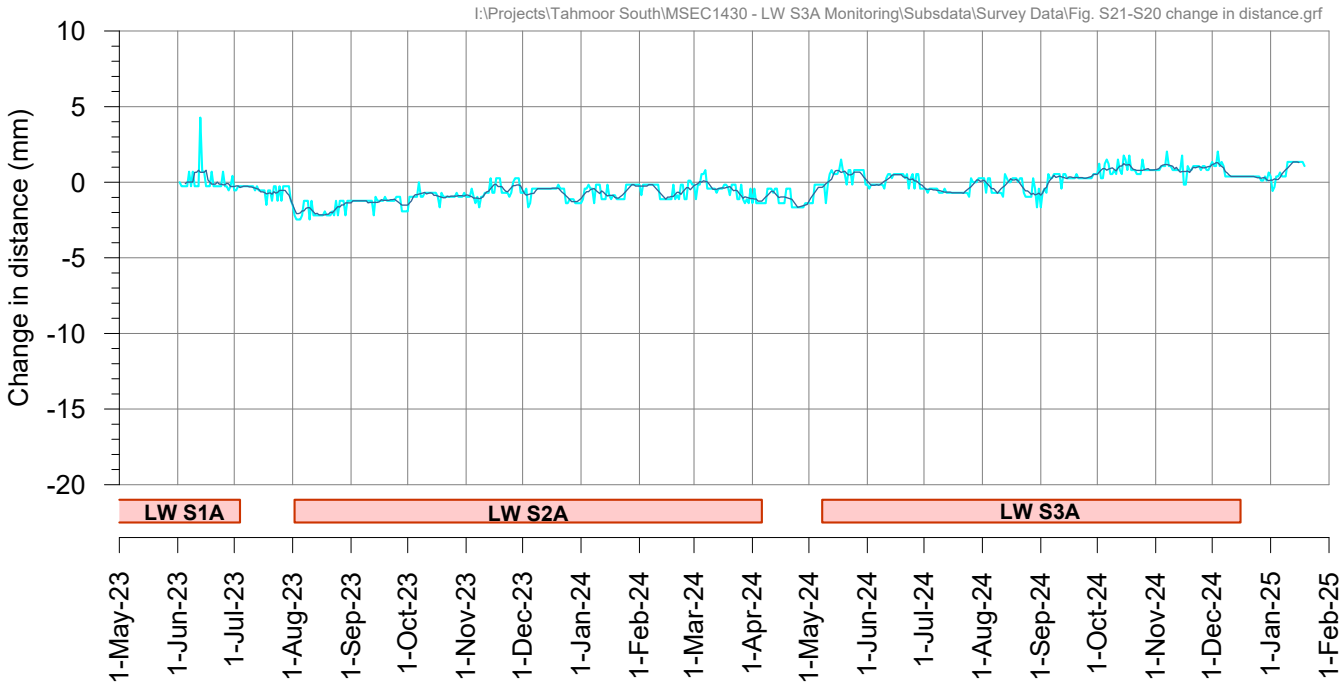


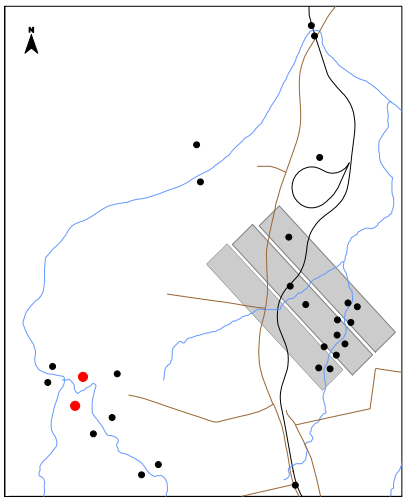
msec

Fig. S21-R34

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Hornes Creek
Sites S20 and S21

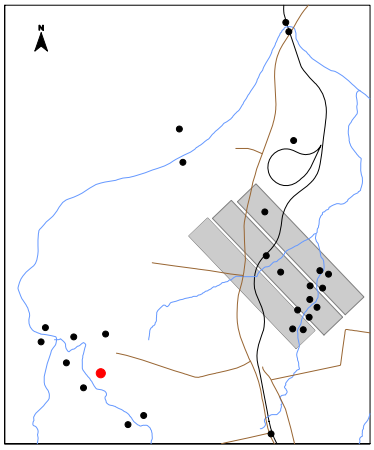




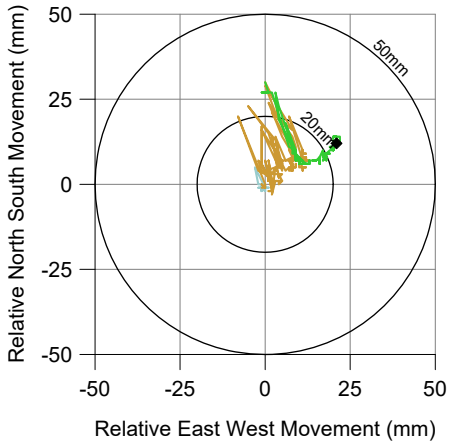
Tahmoor South LW S3A - GNSS Monitoring

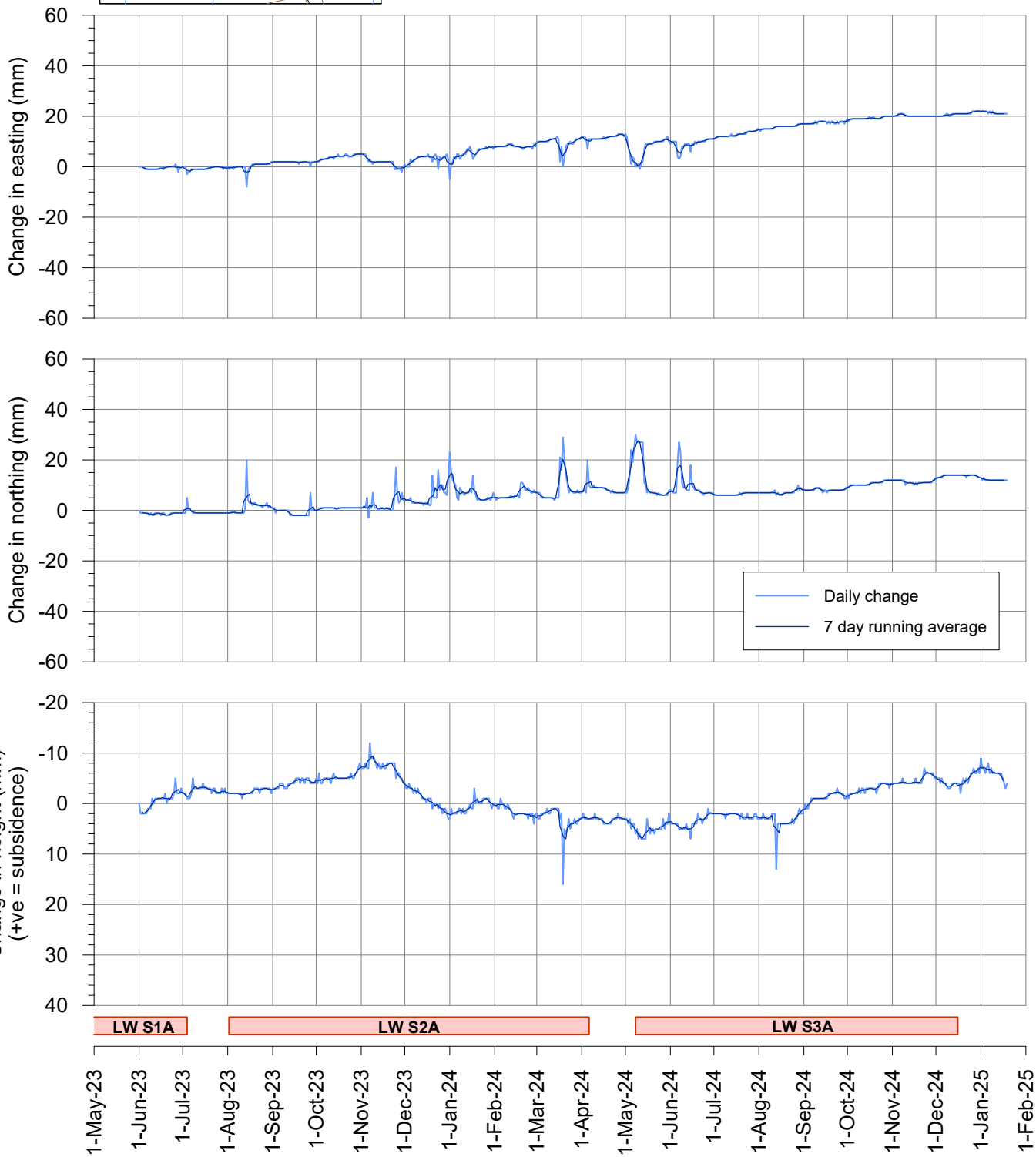
Site S22 on northern side of Hornes Creek

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S22 GNSS.grf



During LW S1A
During LW S2A
During LW S3A





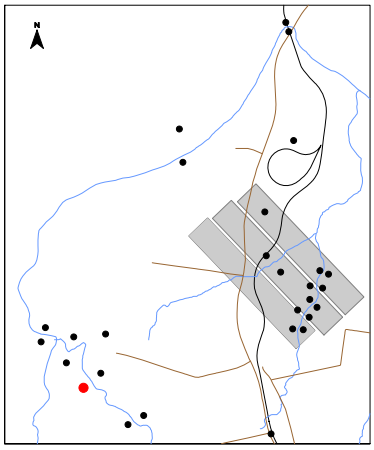
msec

Fig. S22-R34

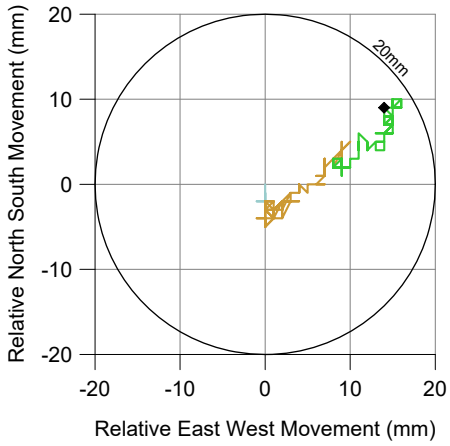
Tahmoor South LW S3A - GNSS Monitoring

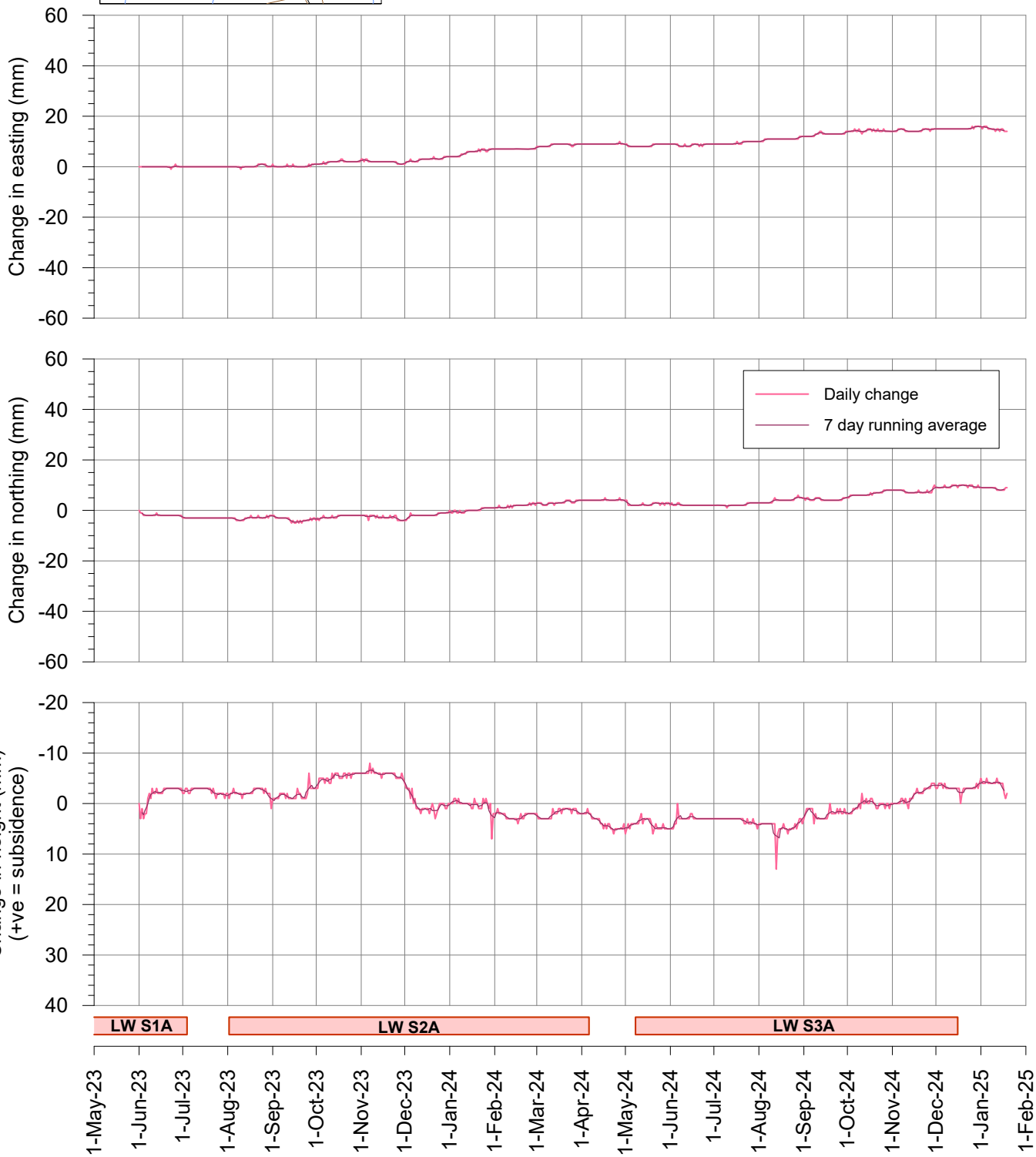
Site S23 on southern side of Hornes Creek

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S23 GNSS.grf



During LW S1A
During LW S2A
During LW S3A



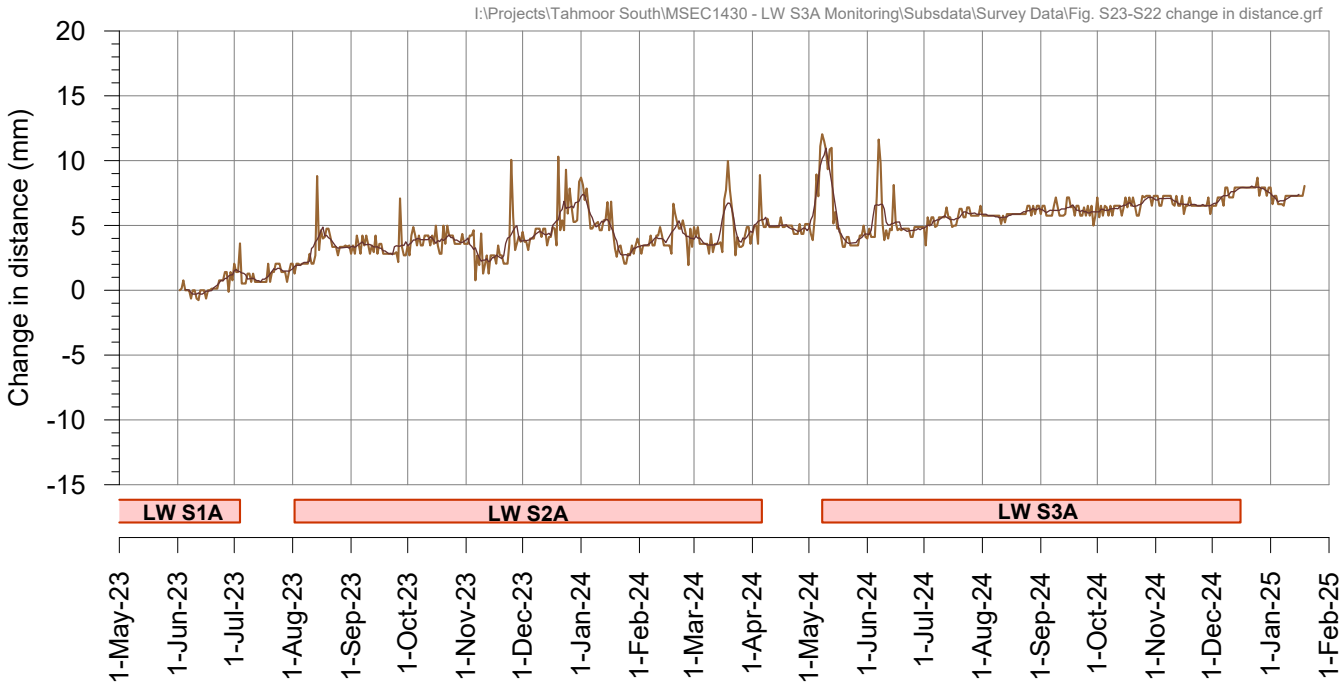


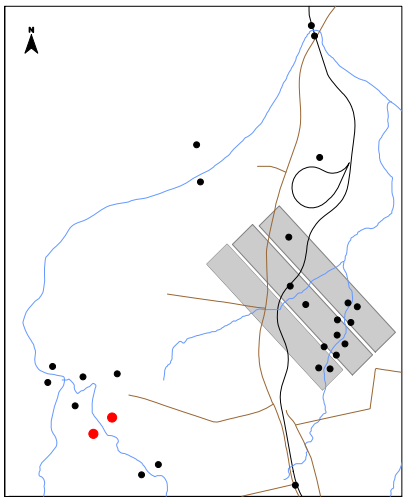
msec

Fig. S23-R34

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Hornes Creek
Sites S22 and S23

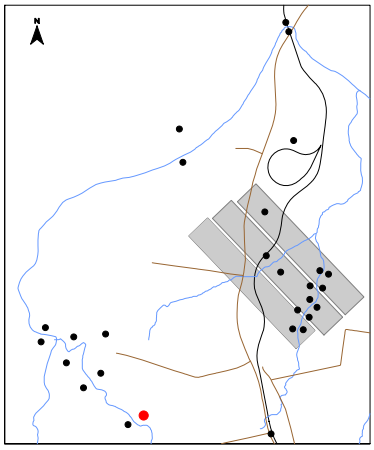




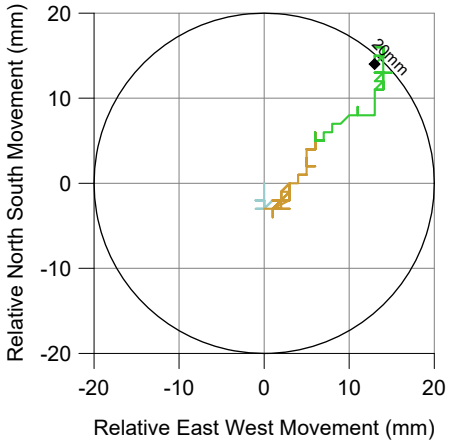
Tahmoor South LW S3A - GNSS Monitoring

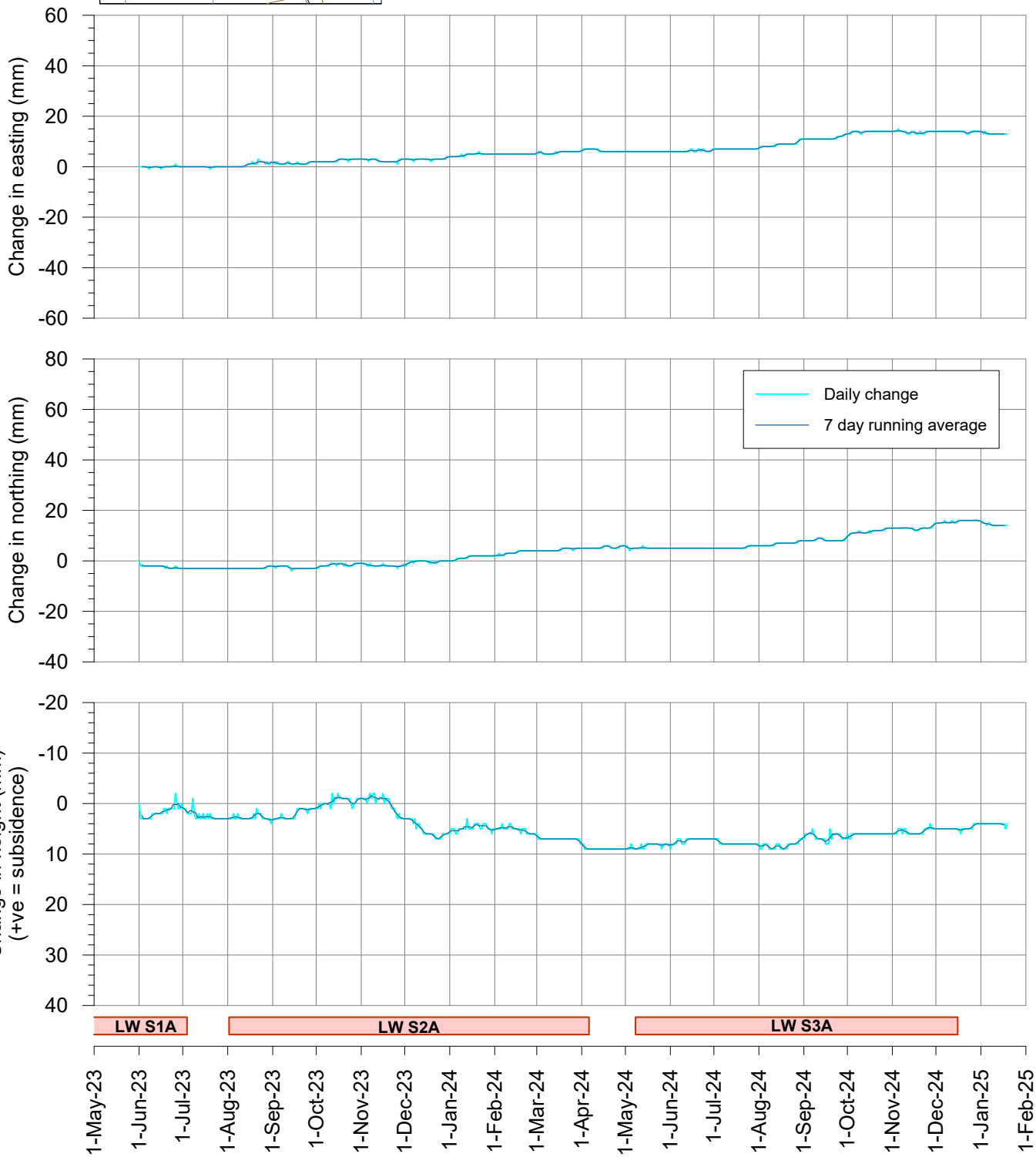
Site S24 on northern side of Hornes Creek

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S24 GNSS.grf



During LW S1A
During LW S2A
During LW S3A





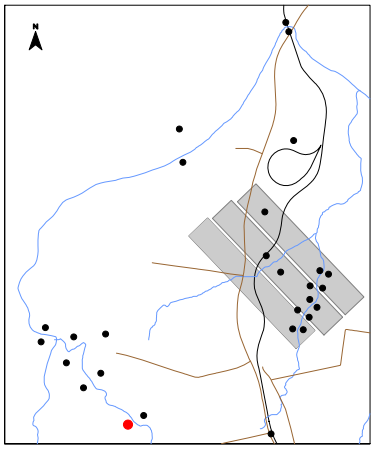
msec

Fig. S24-R34

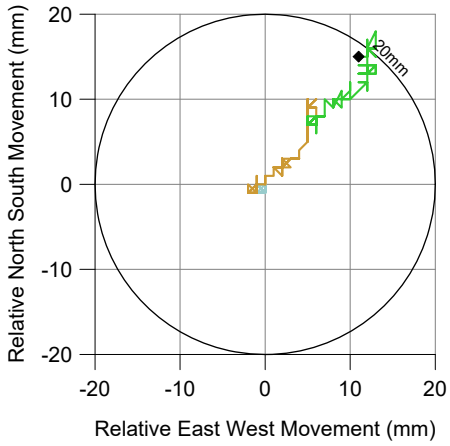
Tahmoor South LW S3A - GNSS Monitoring

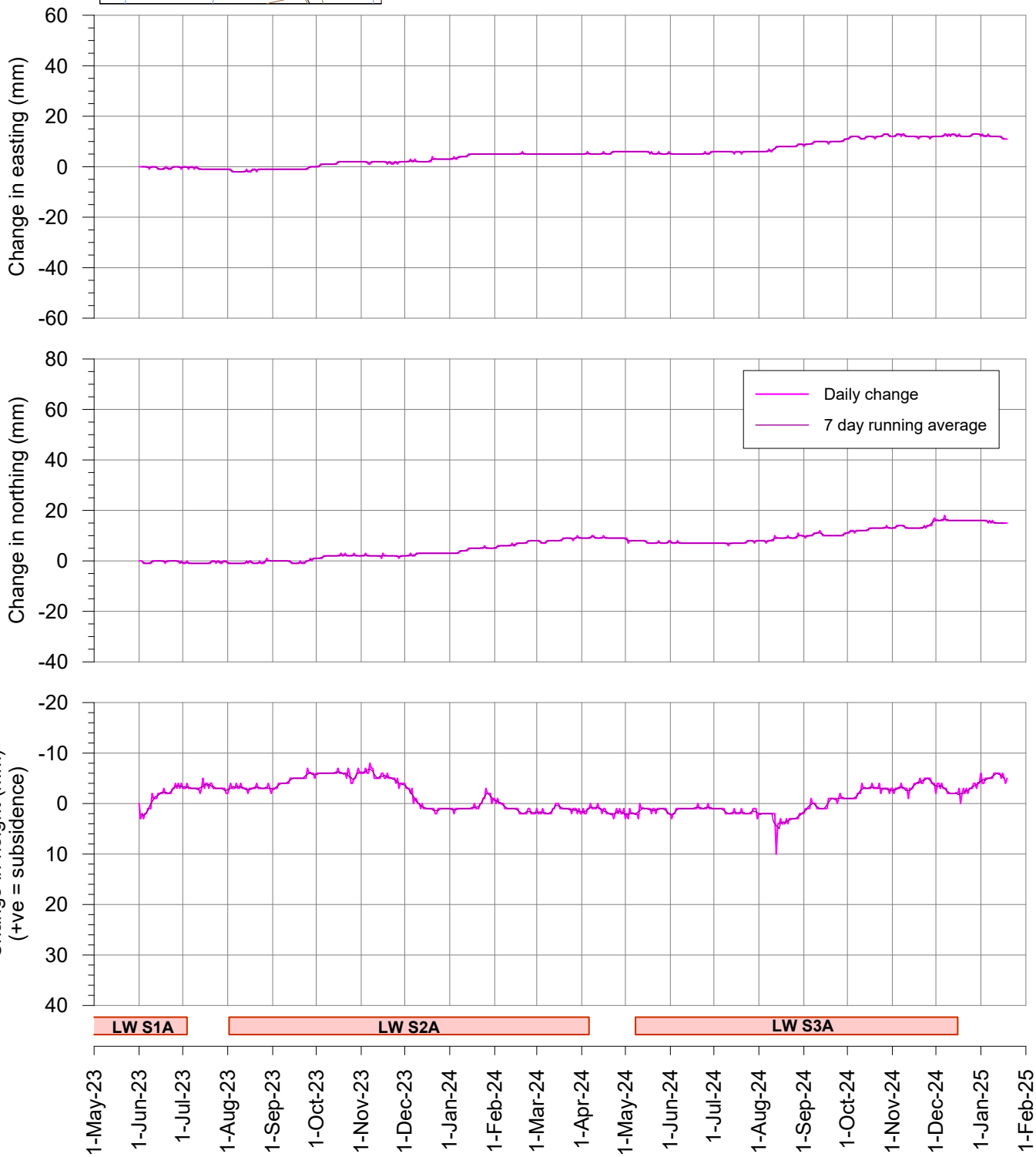
Site S25 on southern side of Hornes Creek

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S25 GNSS.grf



During LW S1A
During LW S2A
During LW S3A



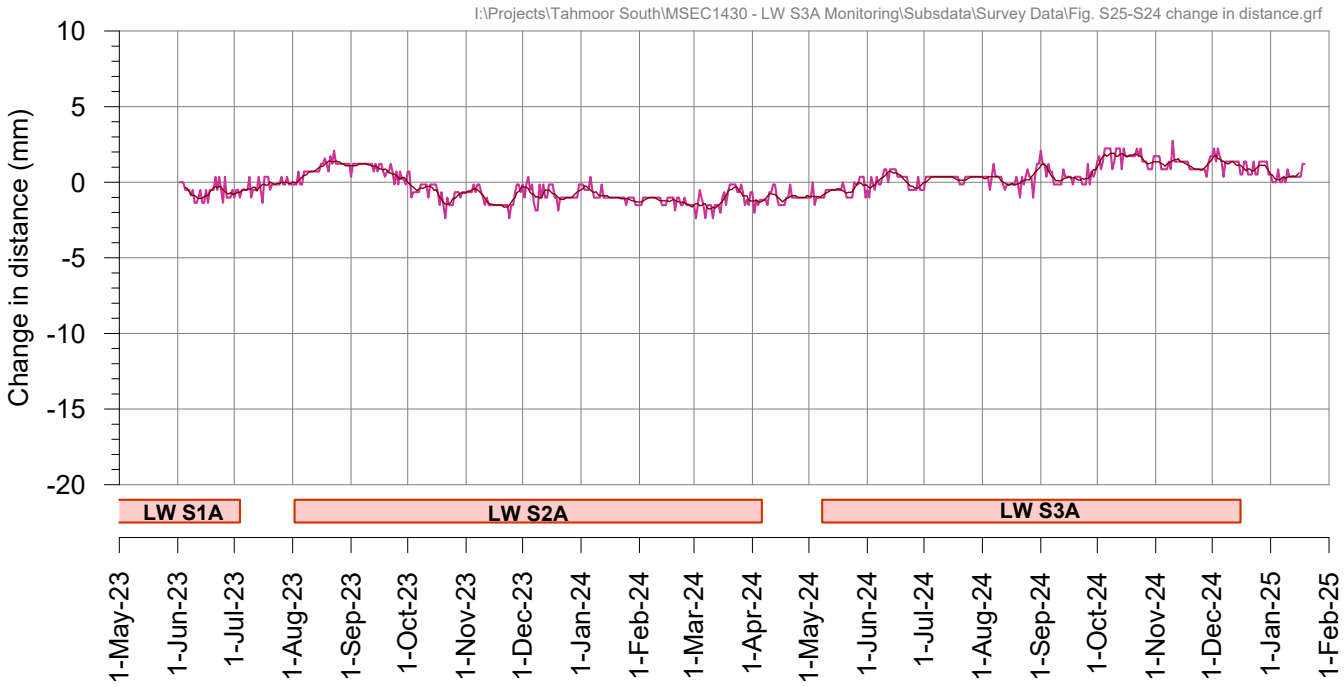


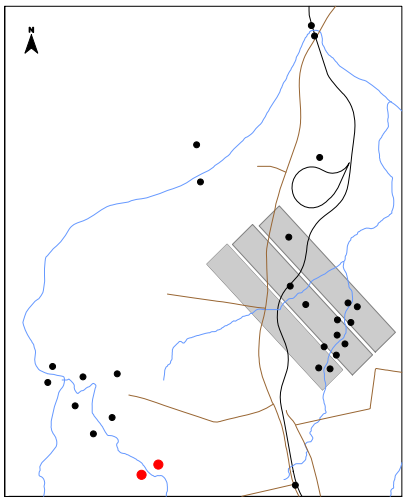
msec

Fig. S25-R34

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Hornes Creek
Sites S24 and S25

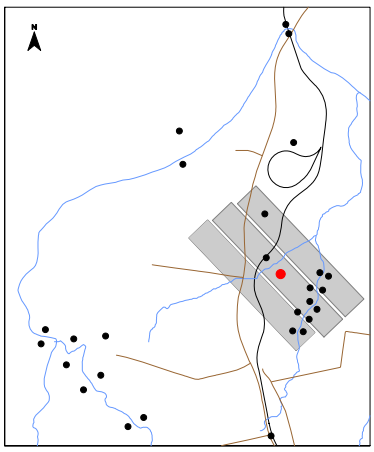


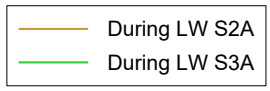


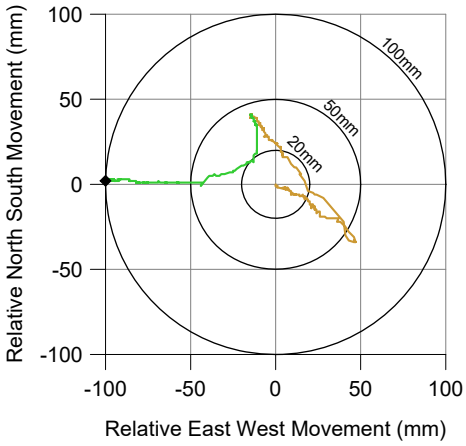
Tahmoor South LW S3A - GNSS Monitoring

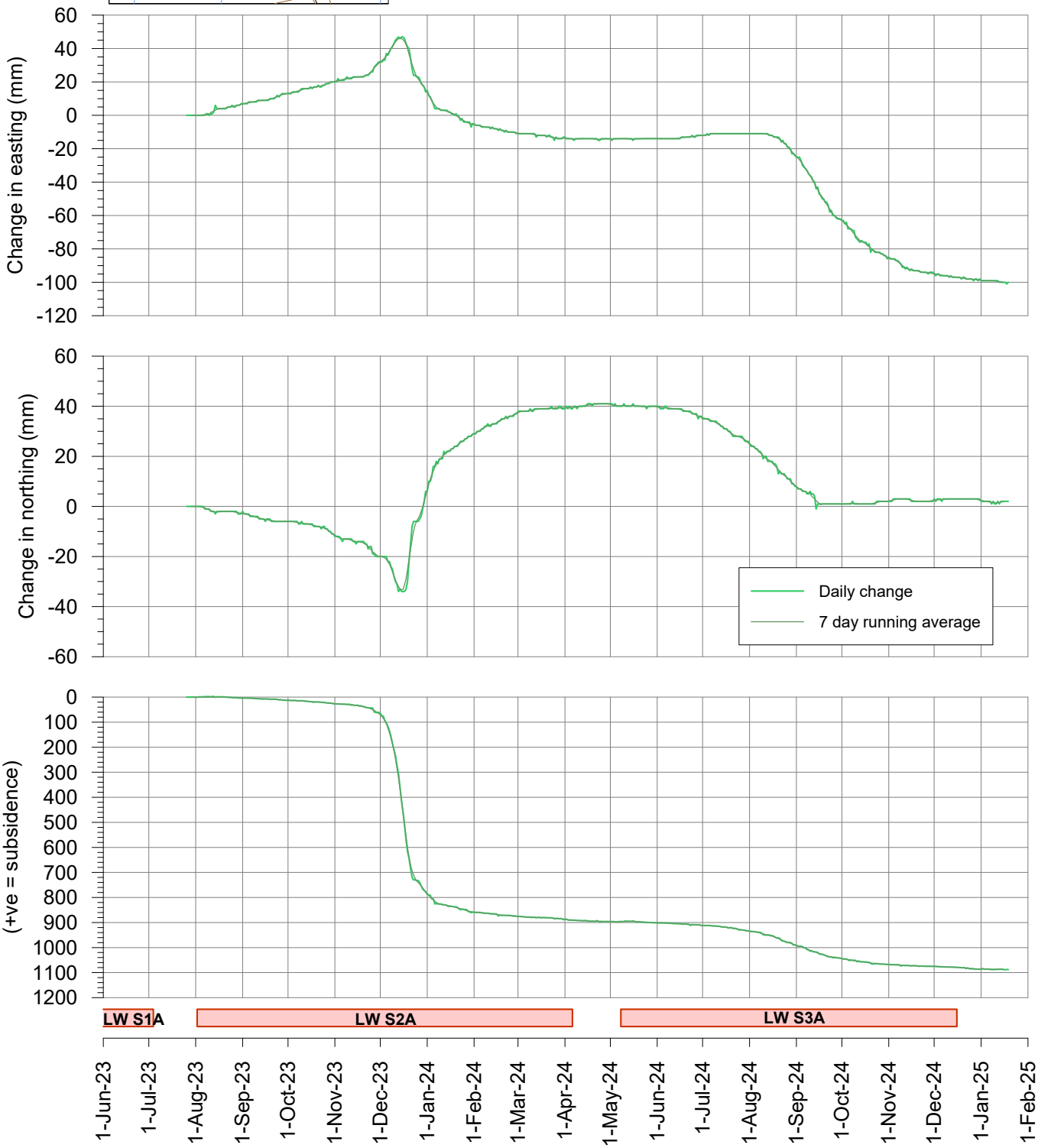
Site S26 above LW S2A

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S26 GNSS.grf









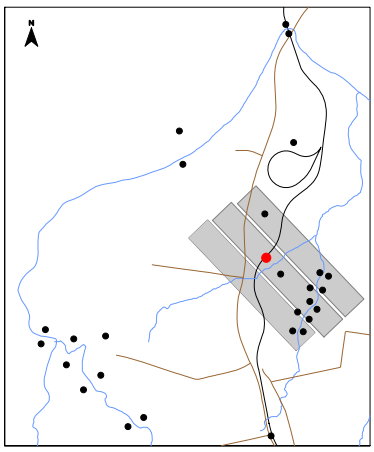
msec

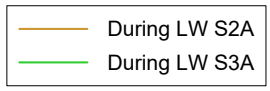
Fig. S26-R34

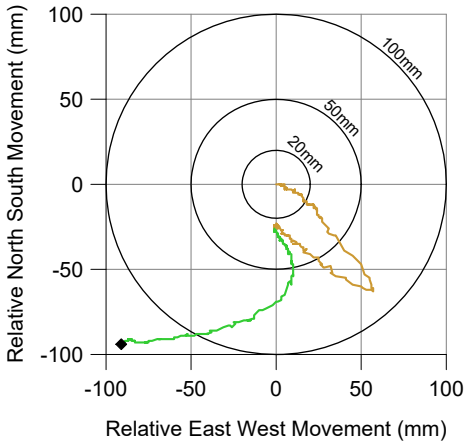
Tahmoor South LW S3A - GNSS Monitoring

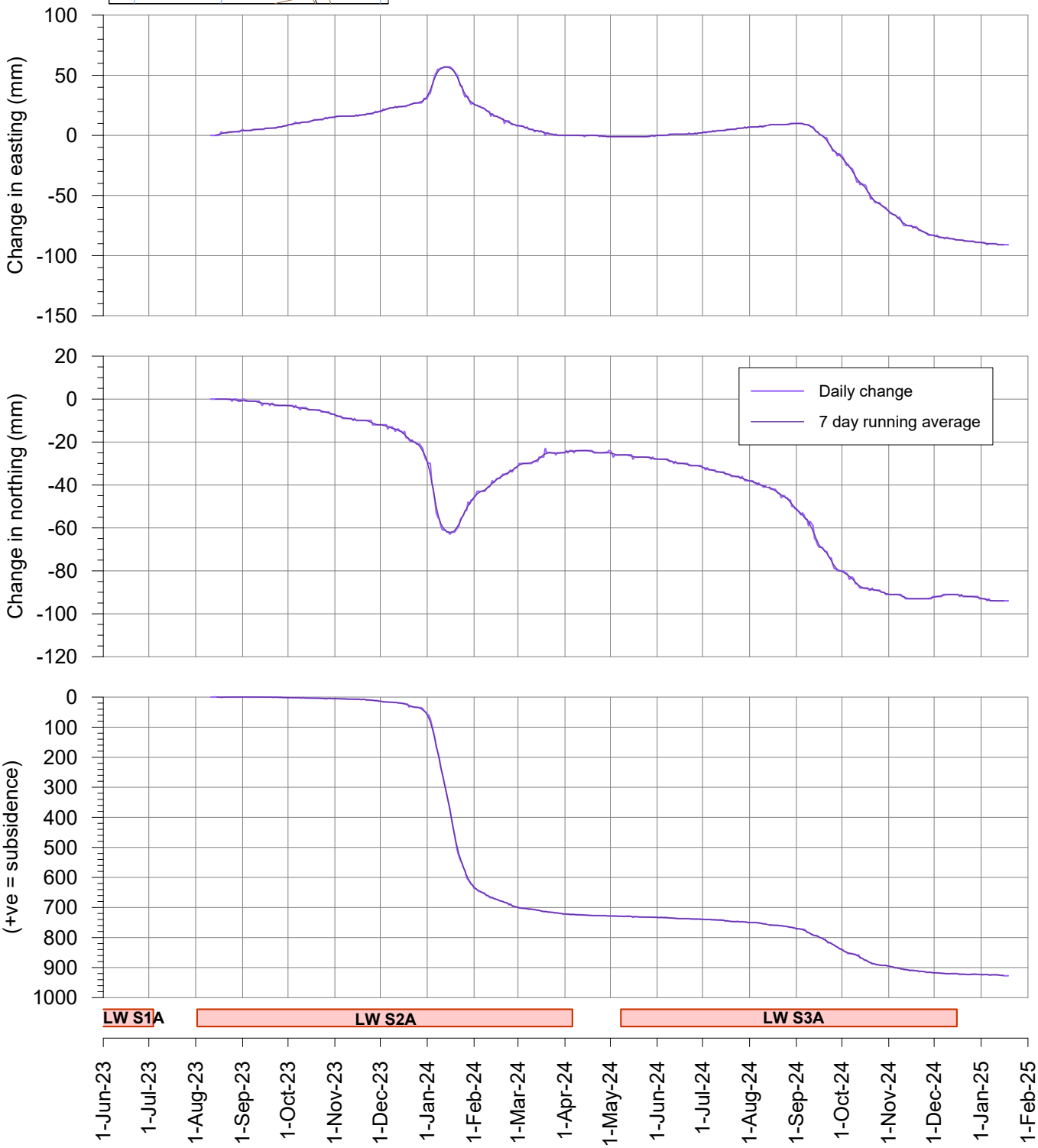
Site S27 on railway embankment above LW S2A

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S27 GNSS.grf







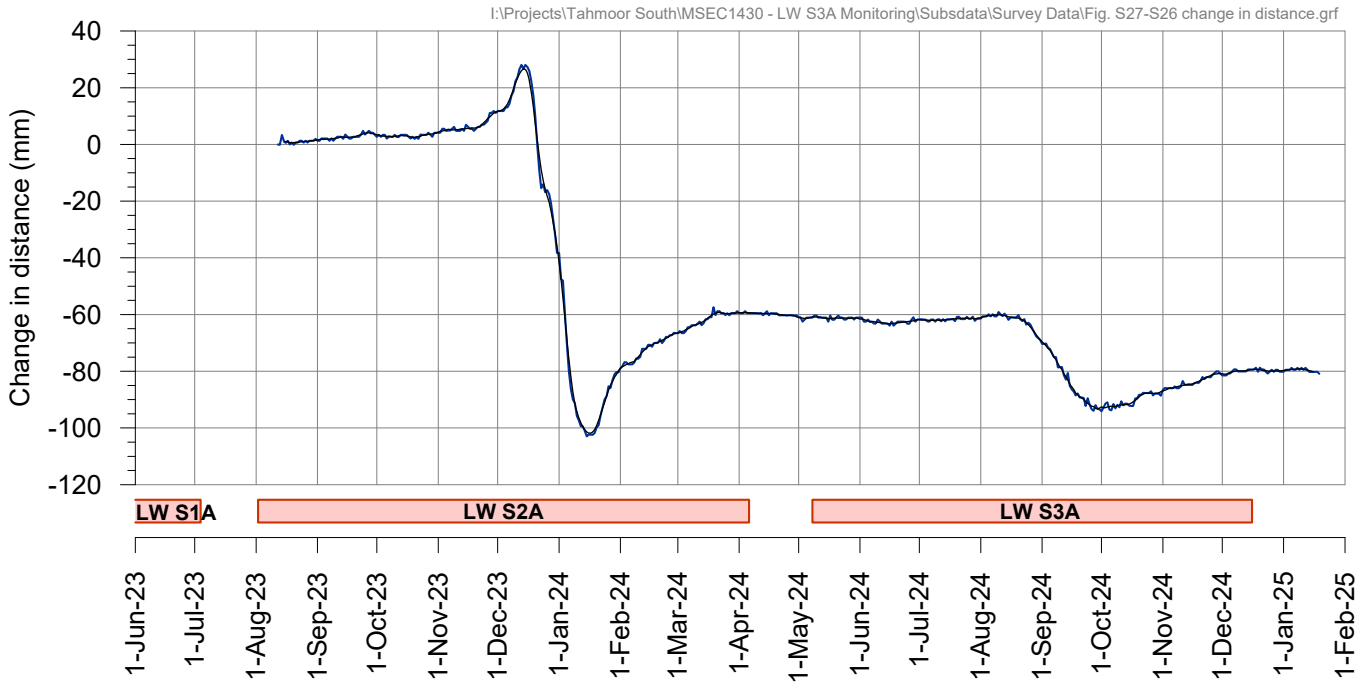


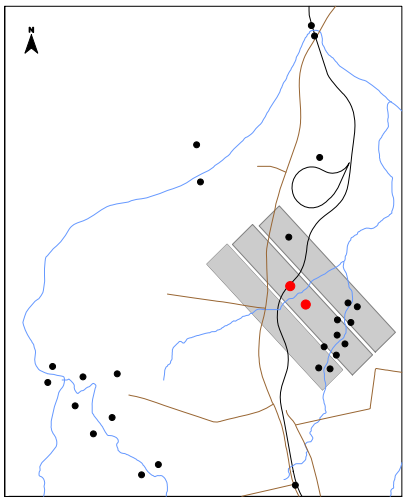
msec

Fig. S27-R34

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Teatree Hollow above LW S2A
Sites S26 and S27

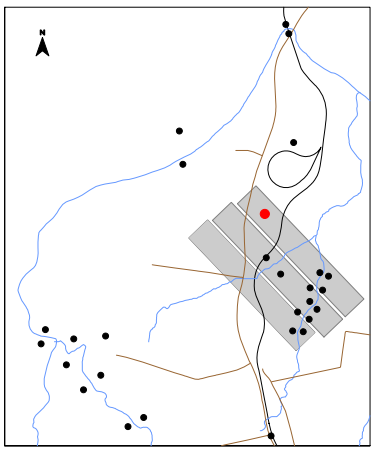




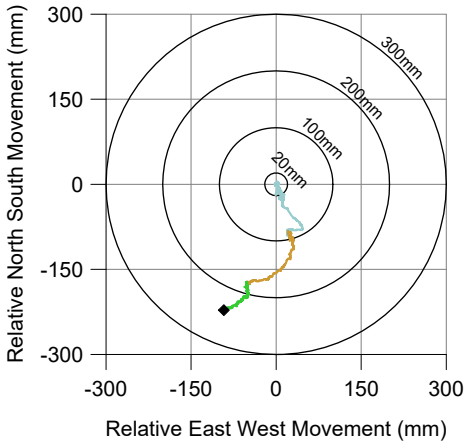
Tahmoor South LW S3A - GNSS Monitoring

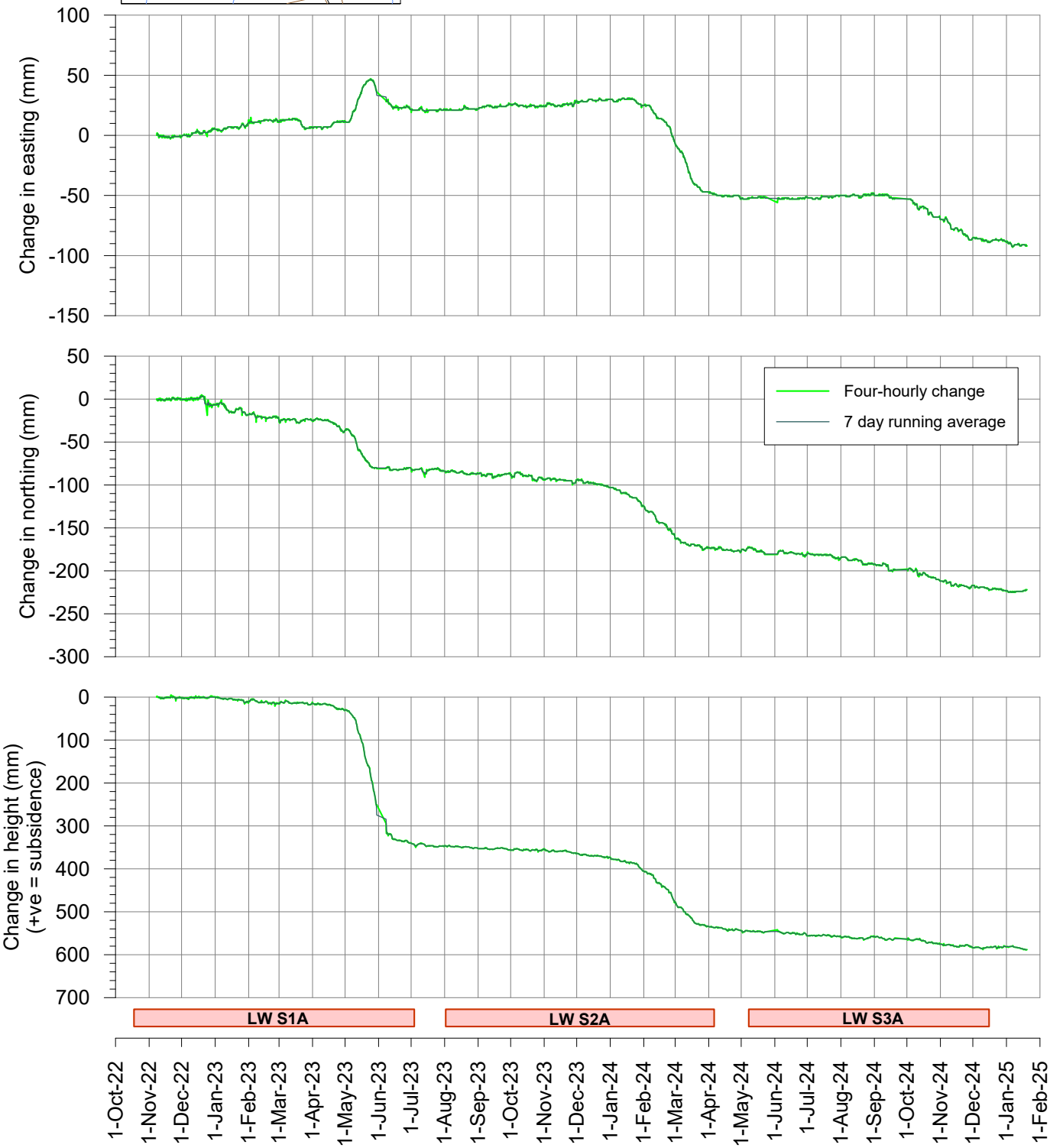
Gantry at Tahmoor Mine site

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. TM GNSS gantry.grf



During LW S1A
During LW S2A
During LW S3A





msec

Fig. TM-R34

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\AcadData\MSEC1430-02 Inc Subs.dwg

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PO Box 302, Chatswood NSW 2057
Tel +61 2 9413 3777
www.minesubsidence.com

SIMEC

TAHMOOR SOUTH
LWS3A
OBSERVED INCREMENTAL
SUBSIDENCE DUE TO LW S3A

DATE:	SCALE:	DRAWING No:	Rev No
21 Jan 2025	1:10000	MSEC1430-02	34

All Subsidence in mm
0 20 50 100 200 300 400 500 600 700 800 900 1000

LW S3A Started : 8-May-2024
LWS3A Completed : 17-Dec-2024

LWS3A Completed : 17-Dec-2024
LWS3A Started : 8-May-2024

LW S3A
LW S1A
LW S2A
LW S4A
LW S5A
LW S6A

1700m 1600m 1500m 1400m 1300m 1200m 1100m 1000m 900m 800m 700m 600m 500m 400m 300m 200m 100m 0m

BARGO R
Hidden creek
TEATREE HOLLOW
TRIBUTARY OF TEA TREE HOLLOW
CALOOLA RD
REMEMBRANCE DR
MAIN SOUTHERN RAILWAY
GREAT SOUTHERN ROAD
YARRAN ROAD
CHARLIES POINT RD
Gantry
Dam S2
Dam S3
Dam S4
625946
625925
625937
624471
853038
S01 S02 S03 S04 S05 S06 S07 S08 S09 S10 S26 S27
N

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\AcadData\MSEC1430-03 Total Subs.dwg

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Tel +61 2 9413 3777
www.minesubsidence.com

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TAHMOOR SOUTH
LWS3A
OBSERVED TOTAL SUBSIDENCE
SINCE START OF LW S1A

DATE:	SCALE:	DRAWING No:	Rev No
21 Jan 2025	1:10000	MSEC1430-03	34

All Subsidence in mm
0 20 50 100 200 300 400 500 600 700 800 900 1000 1100

LW S3A Started : 8-May-2024
LWS3A Completed : 17-Dec-2024

LWS3A Completed : 17-Dec-2024
LWS3A Started : 8-May-2024

LW S3A
LW S1A
LW S2A
LW S4A
LW S5A
LW S6A

1700m 1600m 1500m 1400m 1300m 1200m 1100m 1000m 900m 800m 700m 600m 500m 400m 300m 200m 100m 0m

BARGO R
CALOOLA RD
REMEMBRANCE DR
MAIN SOUTHERN RAILWAY
YARRAN ROAD
CHARLIES POINT RD
GREAT SOUTHERN RD
TEATREE HOLLOW
TRIBUTARY OF TEA TREE HOLLOW
Hidden creek
Hidden creek
Dam S2
Dam S3
Dam S4
Gantry
625946
625925
625937
853038
524471
S01
S02
S03
S04
S05
S06
S07
S08
S09
S10
S26
S27

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Suite 402, 13 Spring Street, Chatswood NSW 2067
PO Box 302, Chatswood NSW 2057
Tel +61 2 9413 3777
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TAHMOOR SOUTH LWS3A

CHANGE IN SUBSIDENCE SINCE PREVIOUS SURVEY

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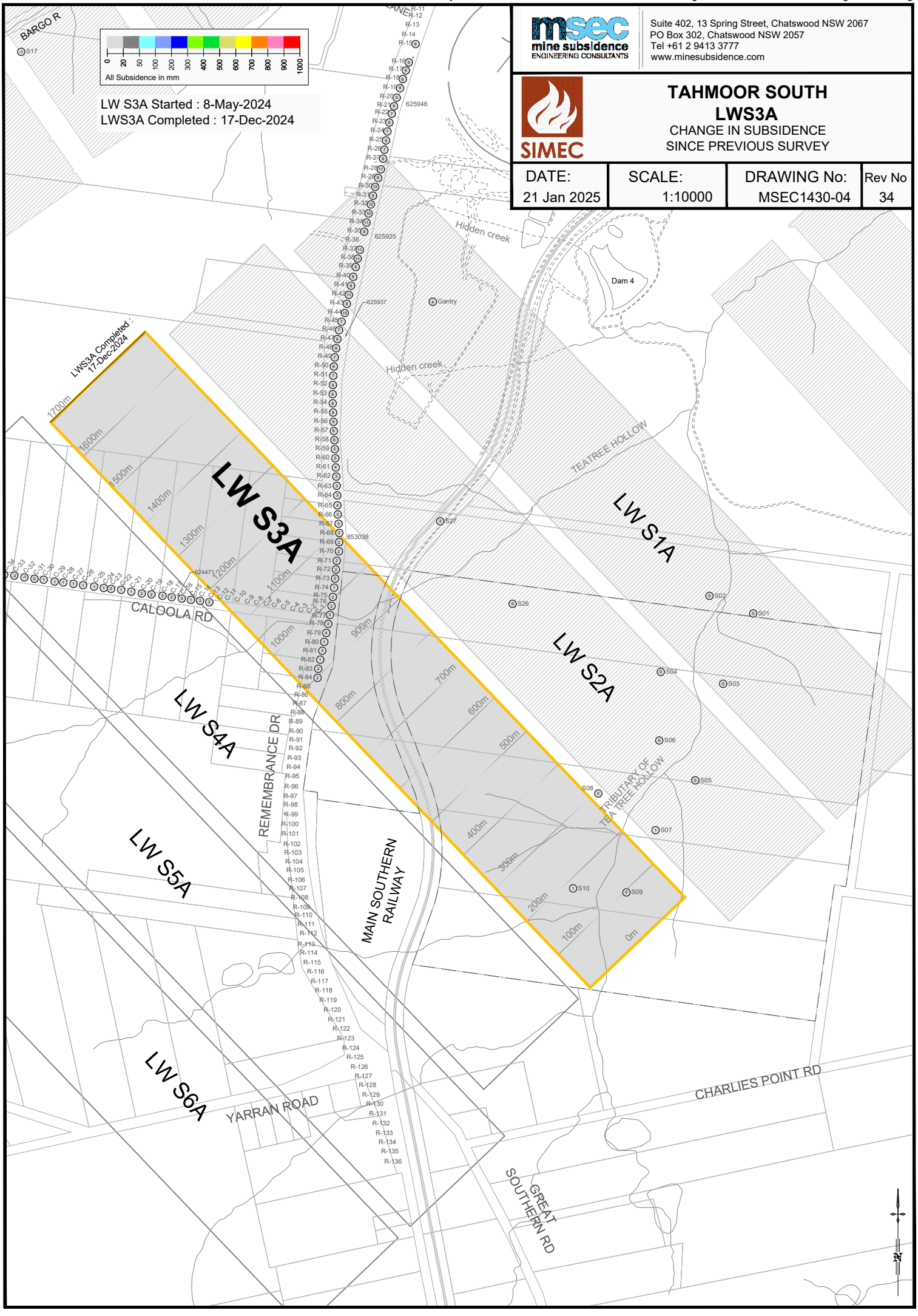

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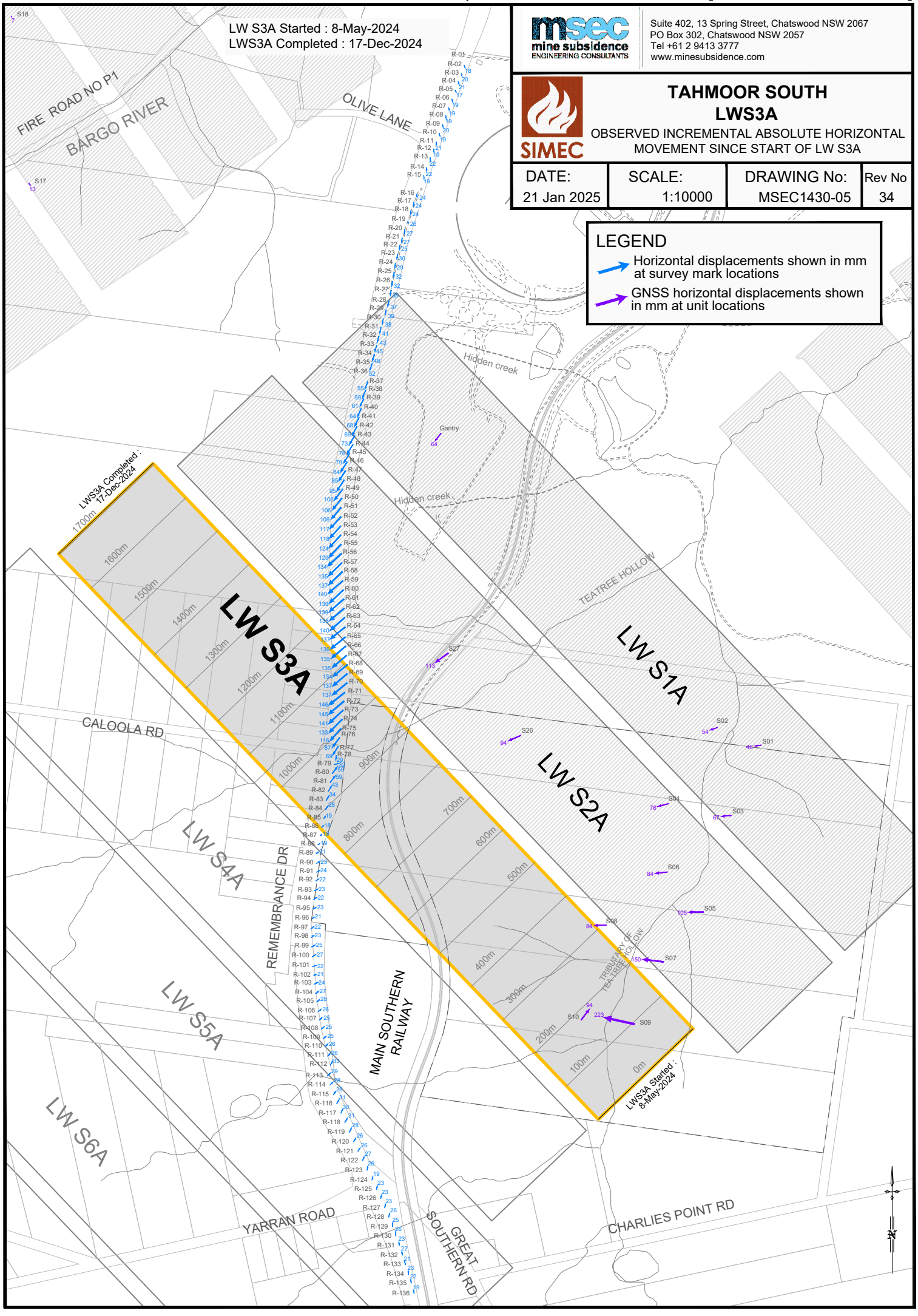

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TAHMOOR SOUTH
LWS3A

OBSERVED INCREMENTAL ABSOLUTE HORIZONTAL MOVEMENT SINCE START OF LW S3A

DATE:	SCALE:	DRAWING No:	Rev No
21 Jan 2025	1:10000	MSEC1430-05	34

LEGEND

- Horizontal displacements shown in mm at survey mark locations
- GNSS horizontal displacements shown in mm at unit locations

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TAHMOOR SOUTH
LWS3A
OBSERVED TOTAL ABSOLUTE HORIZONTAL MOVEMENT SINCE START OF LW S1A

DATE:	SCALE:	DRAWING No:	Rev No
21 Jan 2025	1:10000	MSEC1430-06	34

LW S3A Started : 8-May-2024
LWS3A Completed : 17-Dec-2024

LEGEND
- Horizontal displacements shown in mm at survey mark locations
- GNSS horizontal displacements shown in mm at unit locations

FIRE ROAD NO P1
BARGO RIVER
OLIVE LANE
Hidden creek
Gantry
TEATREE HOLLOW
TRIBUTARY OF TEA TREE HOLLOW
LW S1A
LW S2A
LW S3A
LW S4A
LW S5A
LW S6A
CALOOLA RD
REMEMBRANCE DR
MAIN SOUTHERN RAILWAY
GREAT SOUTHERN RD
YARRAN ROAD
CHARLIES POINT RD
LWS3A Completed : 17-Dec-2024
LWS3A Started : 8-May-2024
S01
S02
S03
S04
S05
S06
S07
S08
S09
S10
S26 Installed after LWS1A
S27 Installed after LWS1A
0m
100m
200m
300m
400m
500m
600m
700m
800m
900m
1000m
1100m
1200m
1300m
1400m
1500m
1600m
1700m
N

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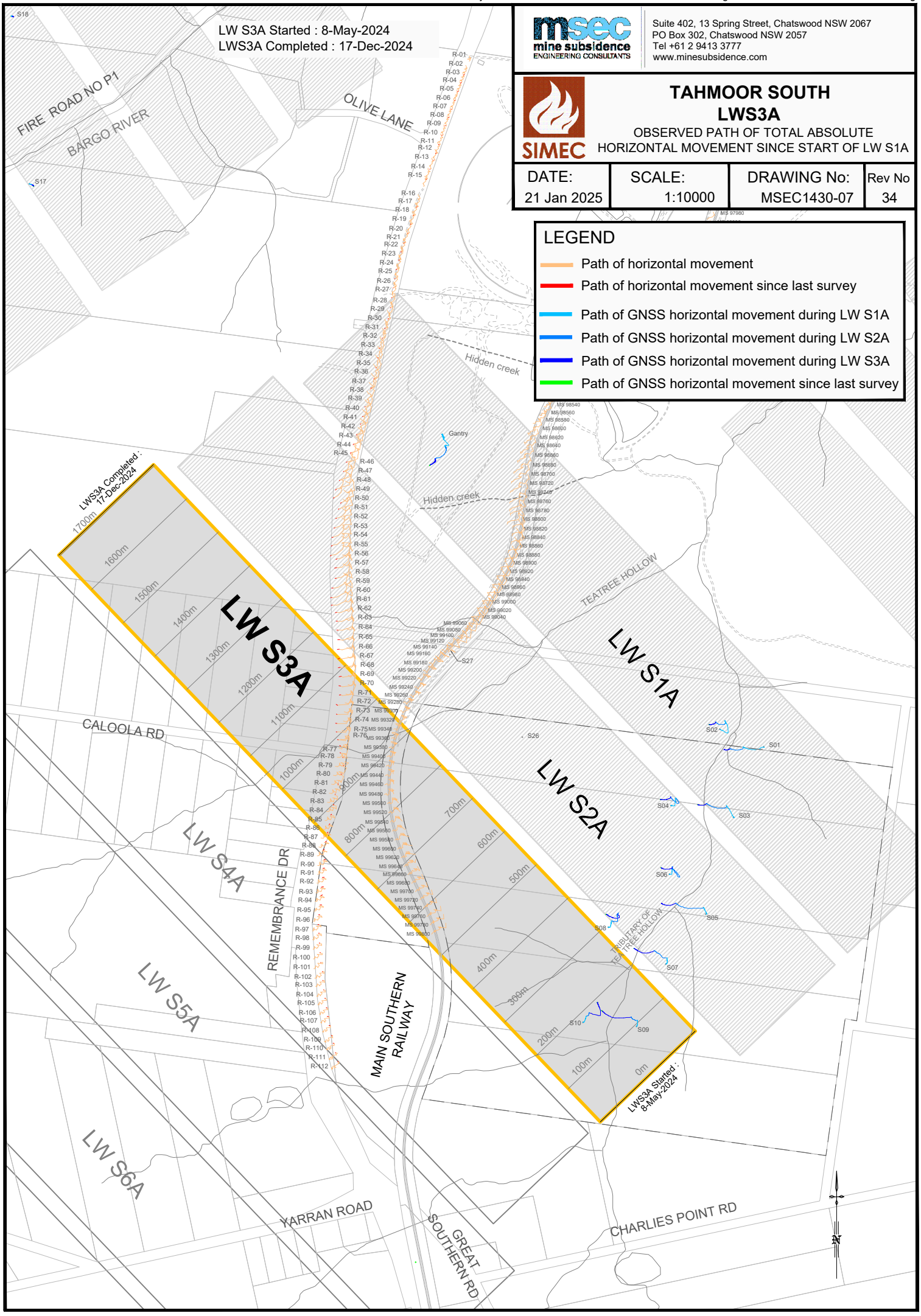

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TAHMOOR SOUTH
LWS3A

OBSERVED PATH OF TOTAL ABSOLUTE HORIZONTAL MOVEMENT SINCE START OF LW S1A

DATE:	SCALE:	DRAWING No:	Rev No
21 Jan 2025	1:10000	MSEC1430-07	34

LEGEND

- Path of horizontal movement
- Path of horizontal movement since last survey
- Path of GNSS horizontal movement during LW S1A
- Path of GNSS horizontal movement during LW S2A
- Path of GNSS horizontal movement during LW S3A
- Path of GNSS horizontal movement since last survey

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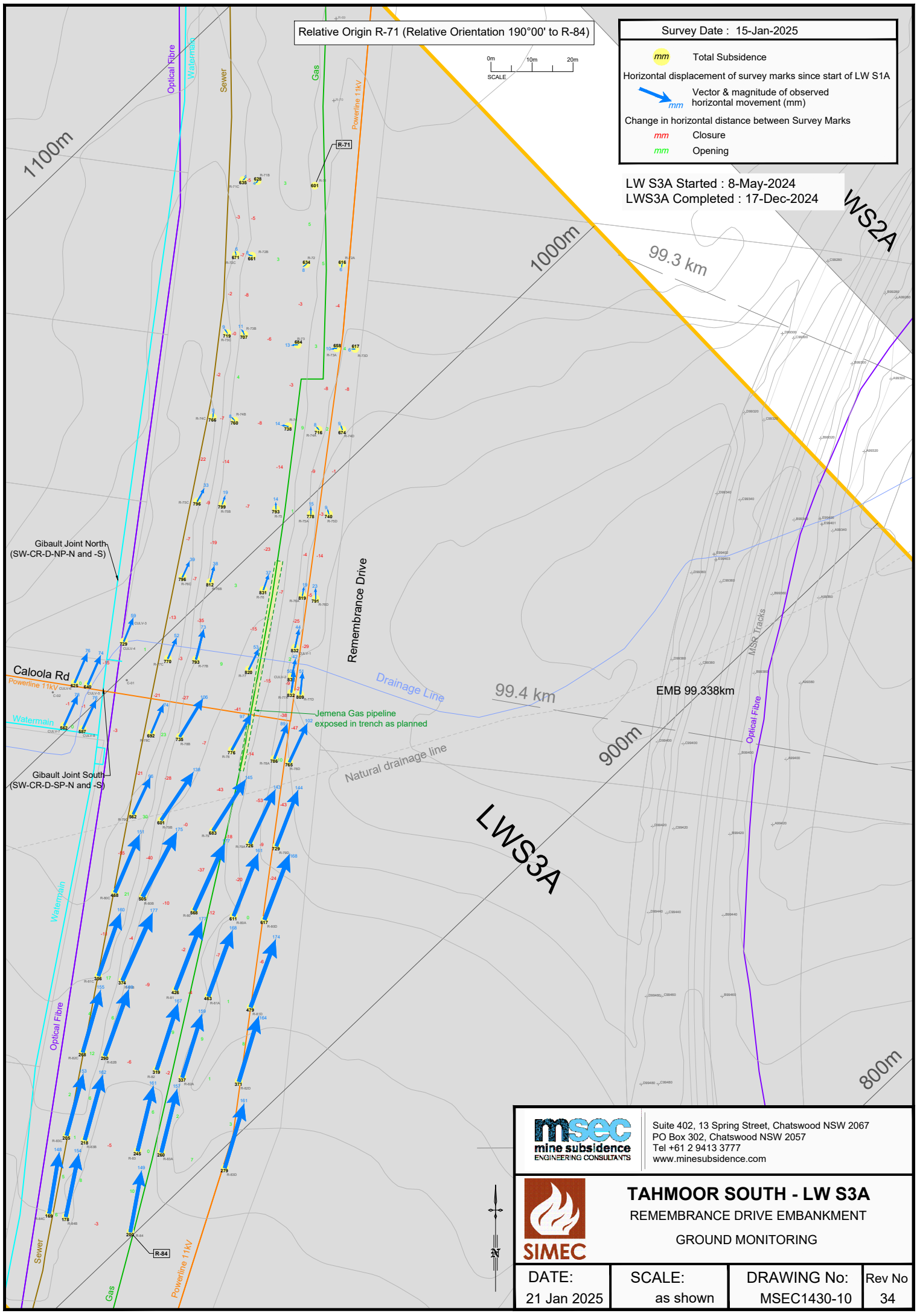

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TAHMOOR SOUTH - LW S3A

REMEMBRANCE DRIVE EMBANKMENT

GROUND MONITORING

DATE:	SCALE:	DRAWING No:	Rev No
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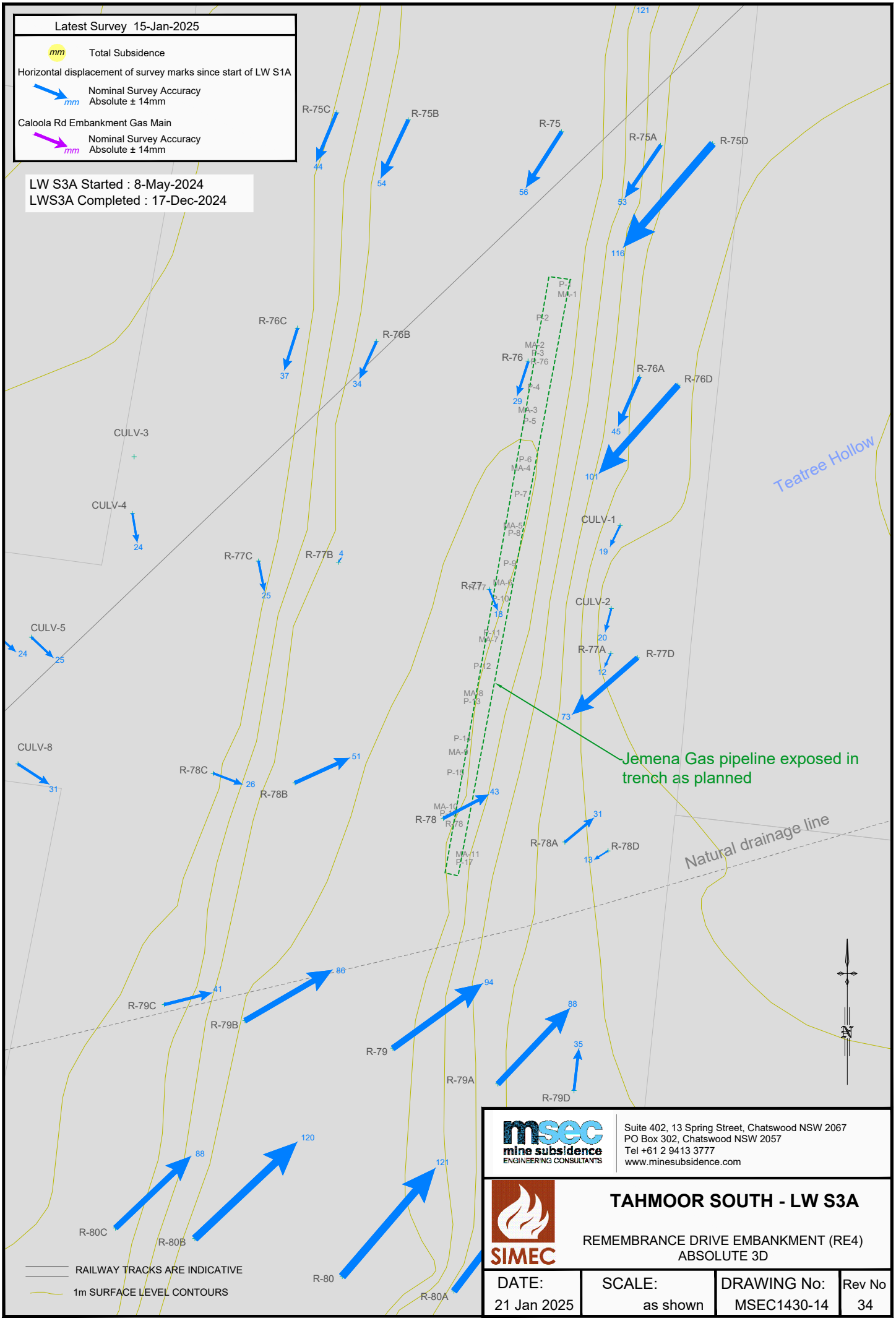

Appendix B – Surface Water Monitoring Report

REPORT

TAHMOOR COAL PTY LTD
ABN: 97076663968

Tahmoor South Domain

Surface Water Review
1 July to 31 December 2024

240396R001-rev0
SEPTEMBER 2025



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Document Control

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Document Title:	Surface Water Review 1 July to 31 December 2024
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Document Number:	240396R001-rev0

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ATC Williams Company Details

Prepared By:	Makaela McGrath
Approved By:	Camilla West
Address:	16-20 Edmondstone St, Newmarket QLD 4051
Email:	CamillaW@atcwilliams.com.au

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1 INTRODUCTION

1.1 Background

Tahmoor Coal Pty Ltd (Tahmoor Coal) engaged ATC Williams Pty Ltd (ATCW) to undertake a review and analysis of surface water monitoring data recorded at sites within and adjacent to Tahmoor South for the period of 1 July to 31 December 2025. The groundwater and subsidence review were undertaken by independent specialists, with relevant details summarised in this report.

Tahmoor Coal owns and operates Tahmoor Mine, an underground coking coal mine. The mine surface operations are located south of Tahmoor NSW (within the Greater Sydney Basin) approximately 80 km southwest of Sydney. Tahmoor Mine is located within the Wollondilly Shire Council (WSC) Local Government Area (LGA). Underground workings extend north under the town of Tahmoor and Picton, with two ventilation shafts being located on the outskirts of Tahmoor.

The Tahmoor South Domain (Tahmoor South) is located south of the Bargo River and east of Remembrance Driveway and the township of Bargo. Mining of the six Longwalls (LW) S1A-S6A within Tahmoor South was approved on 23 April 2021 in accordance with Approval SSD 8445. Modification 3 to Development Consent SSD 8445, which sought approval for mining of longwall S7A, was approved in May 2025. The location of LW S1A-S7A and the associated Study Area are illustrated on **MAP 1**, with mining commencement and completion dates as follows:

- LW S1A commenced on 18 October 2022, completed on 4 July 2023
- LW S2A commenced on the 2 August 2023, completed on 6 April 2024
- LW S3A commenced on 8 May 2024, completed on 17 December 2024
- Mining of LW S4A had not commenced at the time of this report.

Tahmoor Coal are required to implement a monitoring program that includes groundwater, surface water and subsidence in accordance with the *Tahmoor Water Management Plan - Tahmoor South Domain – Longwalls South S1A-S7A* (WMP).

As a component of the monitoring program, Tahmoor Coal has developed a comprehensive rainfall, surface water and groundwater monitoring network within and adjacent to Tahmoor South. The surface water monitoring network comprises water level, streamflow and water quality monitoring sites in addition to visual inspection sites. The locations of the relevant monitoring sites are shown in **Section 4**.

1.2 Scope and Report Purpose

In accordance with the WMP, a Trigger Action Response Plan (TARP) is required to be implemented, including an assessment of surface water monitoring data. The purpose of this report is to present:

- Review and interpretation of monitoring data for the period of 1 July to 31 December 2024 - referred to as the review period herein.
- Assessment against the performance measures and performance indicators for surface water.
- Recommendations in relation to ongoing monitoring and/or corrective actions.

This report predominantly presents and interprets surface water monitoring data recorded in the vicinity of LW S1A-S7A.

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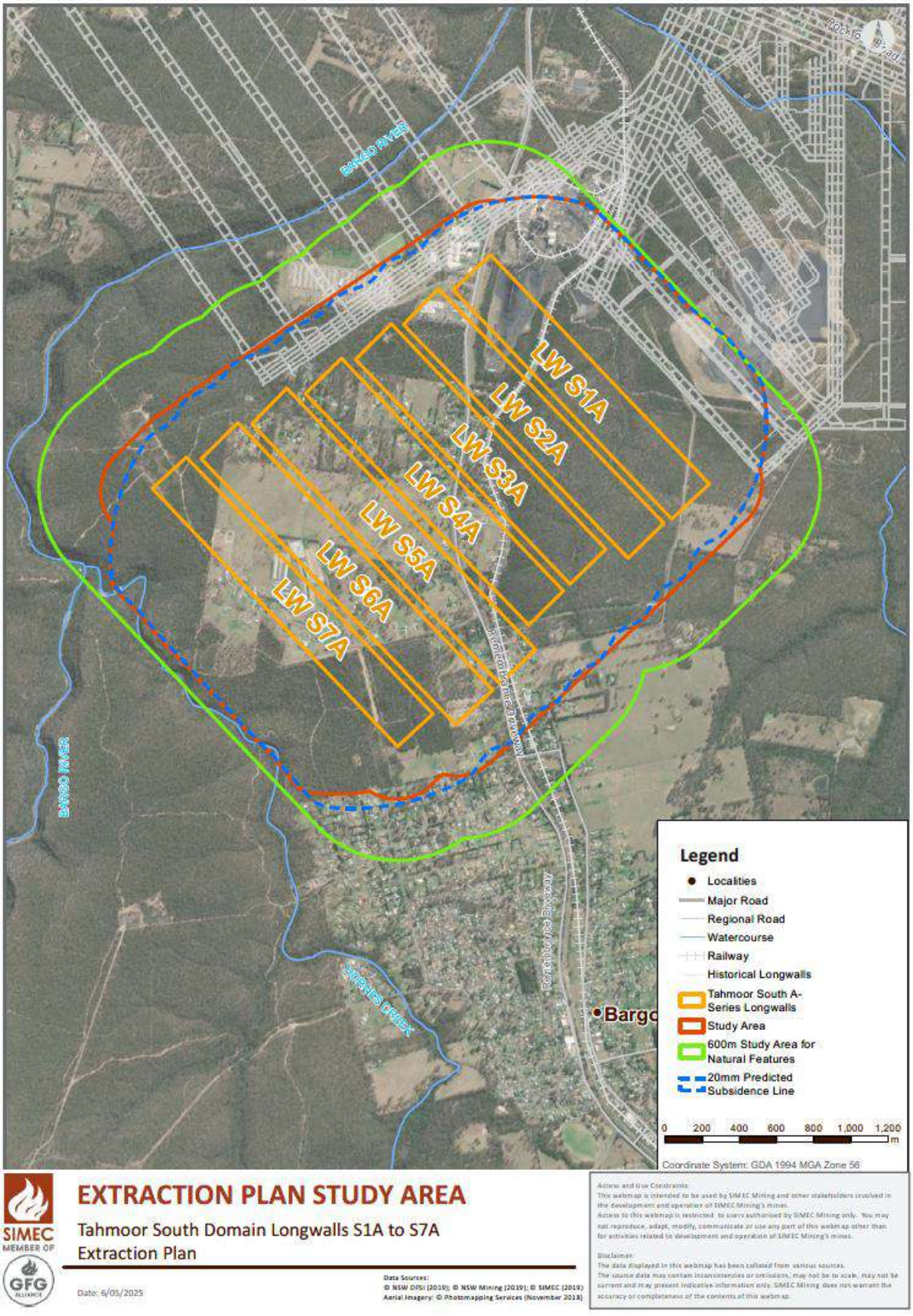
MAP 1: TAHMOOR SOUTH MINING AREA



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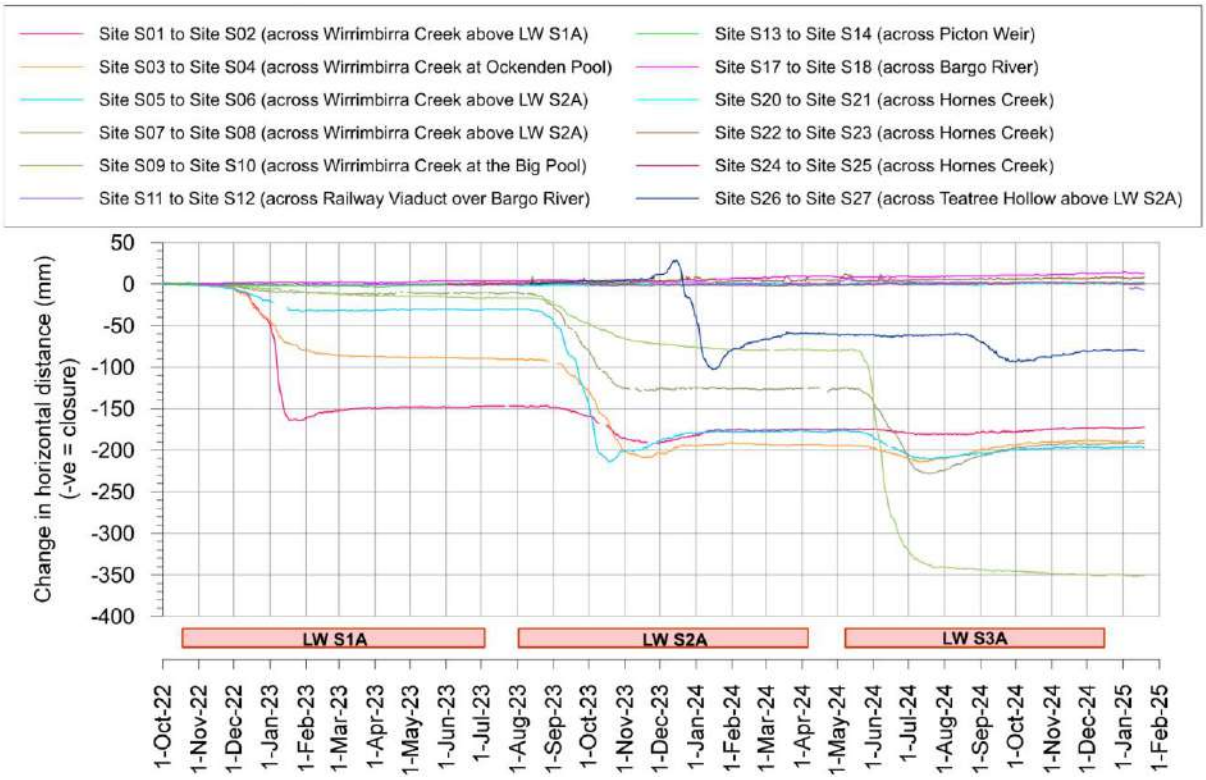
2 SUMMARY OF MONITORED SUBSIDENCE MOVEMENTS

Tahmoor Coal has installed ground survey marks above and adjacent to LW S1A-S7A, with monitoring of subsidence movements undertaken at key locations within and adjacent to Tahmoor South (refer **MAP 2**). The subsidence monitoring is detailed in the six monthly subsidence monitoring reports prepared by Mine Subsidence Engineering Consultants (MSEC) and summarised below. Changes in horizontal distances calculated between GNSS[1] units located at key locations associated with Tahmoor South are presented on **GRAPH 1** extracted from MSEC (2025).

GRAPH 1: OBSERVED CHANGES IN HORIZONTAL DISTANCES BETWEEN GNSS UNITS



Subsidence monitoring of surface water features indicates the following:

- During the review period, negligible change to closure was recorded between S01 to S02 across Wirrimbirra Creek (Teatree Hollow tributary), above LW S1A. A total of approximately 180 mm of closure has developed between S01 and S02 since the commencement of mining.
- From July to October 2024, closure reduced by approximately 30 mm between S03 and S04 across Wirrimbirra Creek (Ockenden Pool - TT3, located between LW S2A and LW S1A) and between S05 and S06 across Wirrimbirra Creek (located above LW S2A). Changes in horizontal distance were relatively stable from October to December 2024. In total, approximately 190 mm closure has developed between S03 and S04 since the commencement of mining.
- Approximately 30 mm of closure developed between sites S26 and S27 across Teatree Hollow from late August to October 2024. From October to December 2024, closure reduced by approximately 15 mm.
- Approximately 270 mm of closure developed between sites S09 and S10 across Wirrimbirra Creek (Big Pool - TT2, located directly above LW S3A) between late May to end of October 2024. From November, closure generally stabilised.

[1] Global Navigation Satellite System (GNSS) units are fixed survey stations that continuously measure absolute horizontal and vertical positions at a location in real time.

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- Approximately 100 mm of closure developed from late May to mid-July 2024 between site S07 and S08 (across Wirrimbirra Creek, above LW S2A). Closure then reduced by approximately 40 mm from mid-July to December 2024.
- Negligible change in horizontal distance has been recorded at sites across the Bargo River and Hornes Creek.

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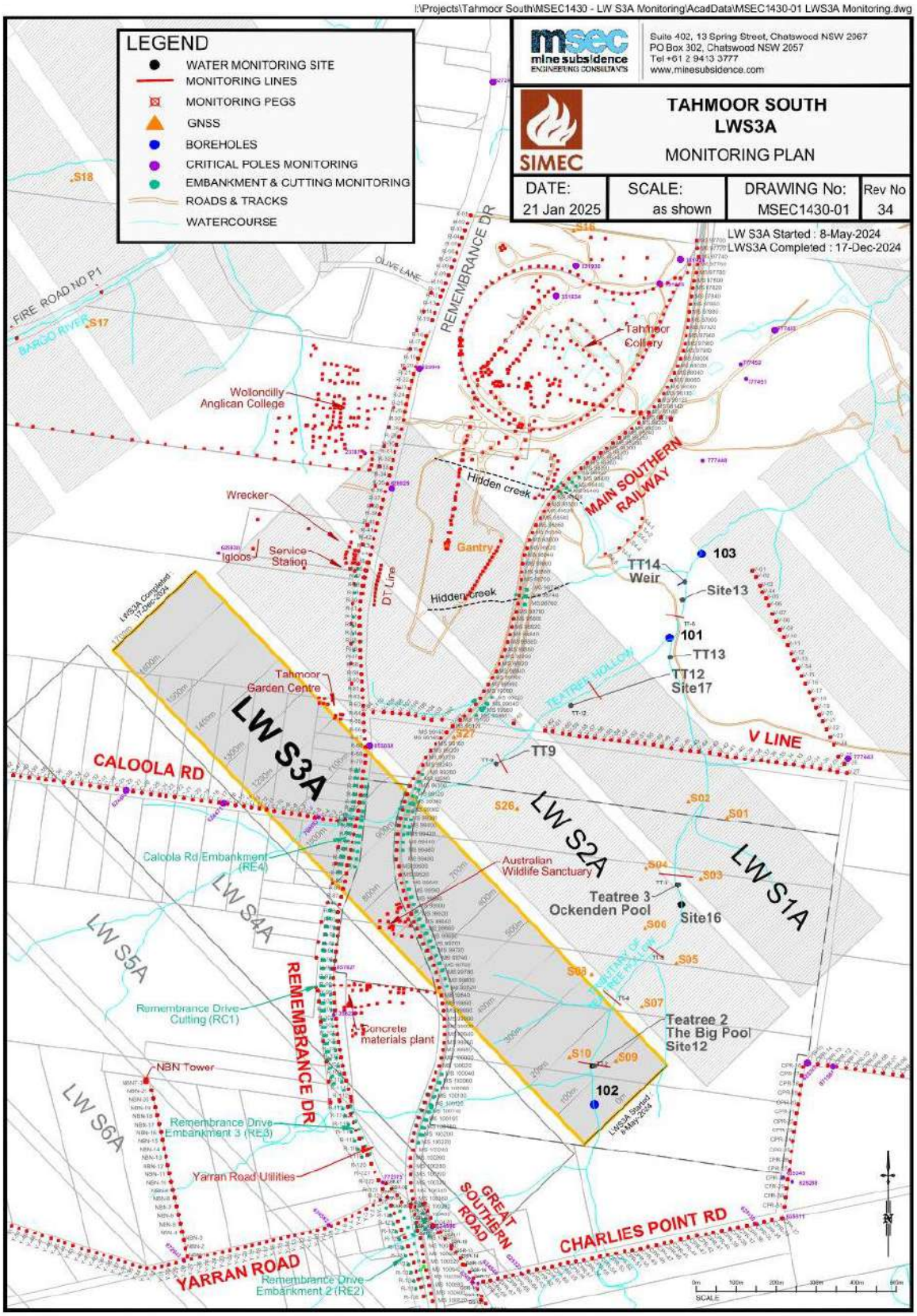
MAP 2: GNSS MONITORING LOCATIONS – TAHMOOR SOUTH (MSEC 2024)



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3 SUMMARY OF GROUNDWATER LEVEL TRENDS

Groundwater levels were reviewed to assess the potential for baseflow contribution (groundwater discharge to the surface water system) and surface water-groundwater interaction within the Study Area. A summary of groundwater level trends recorded during the review period of 1 July to 31 December 2024 is provided below. The monitoring bores considered for this review are situated near the surface water monitoring sites as illustrated on **MAP 3**.

The monitoring bores referenced are shallow open standpipe bores where 'C' denotes the lowest elevation sensor and 'A' denotes the highest elevation sensor in the open standpipe. Detailed discussion of groundwater monitoring data recorded within and adjacent to the Study Area is presented in SLR (2025).

- **Monitoring Bore P55A-C**: located approximately 100 m to the east of monitoring site TT1-QLa in Teatree Hollow tributary.
  - During the review period the maximum groundwater level recorded at P55A was approximately 271 m AHD, around 20 m below the bed elevation of Teatree Hollow tributary at TT1-QLa.
  - At P55A, a TARP Level 1 exceedance for groundwater level was reported for the duration of the review period.
  - At P55B, a TARP Level 3 exceedance for groundwater level was reported for the duration of the review period, due to recorded reduction in groundwater level greater than the maximum modelled drawdown for a period of greater than six months.
  - At P55C, a TARP Level 2 exceedance was reported from July to November and a Level 3 exceedance was reported in December 2024 for groundwater level. SLR (2025) reported that persistent drawdown has occurred at P55C since May 2024, with spatial and temporal patterns in groundwater drawdown recorded at the P55 monitoring bores potentially linked to mining activities**.**
  - Based on the groundwater levels recorded at P55A during the review period, baseflow contribution to Teatree Hollow tributary in the vicinity of TT1-QLa was likely to be negligible.
- **Monitoring Bore P54A-B**: located approximately 400 m to the south-east of monitoring site TT3-QLa in Teatree Hollow tributary.
  - Since February 2023, the monitoring bores P54A and P54B have been recorded as dry.
- **Monitoring Bore P53A-C**: located approximately 250 m to the south-east of monitoring site TT13-QLa in Teatree Hollow tributary.
  - During the review period the maximum groundwater level recorded at P53A was approximately 255 m AHD, around 16 m below the bed elevation of Teatree Hollow tributary at TT13-QLa.
  - At P53A and P53B, a TARP Level 1 exceedance for groundwater level was reported for the duration of the review period.
  - At P53C a TARP Level 2 exceedance for groundwater level was reported for the duration of the review period, due to a decline in groundwater level for greater than six months.
  - Based on the groundwater levels recorded at P53A during the review period, baseflow contribution to Teatree Hollow tributary in the vicinity of TT13-QLa was likely to be negligible.
- **Monitoring Bore P52:** located approximately 230 m and 190 m to the east of monitoring sites TT7-QLa and TT14-QLa in Teatree Hollow, respectively.
  - No trigger exceedances were reported for P52 during the review period.
  - For the duration of the monitoring period, a generally declining trend in groundwater levels was recorded at P52. The maximum groundwater level recorded during the review period was approximately 248 m AHD.

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- The maximum groundwater level was approximately 14 m below the bed elevation of Teatree Hollow at TT7-QLa.
- The baseflow contribution was likely to be negligible in the vicinity of TT7-QLa, based on the groundwater levels recorded during the review period.

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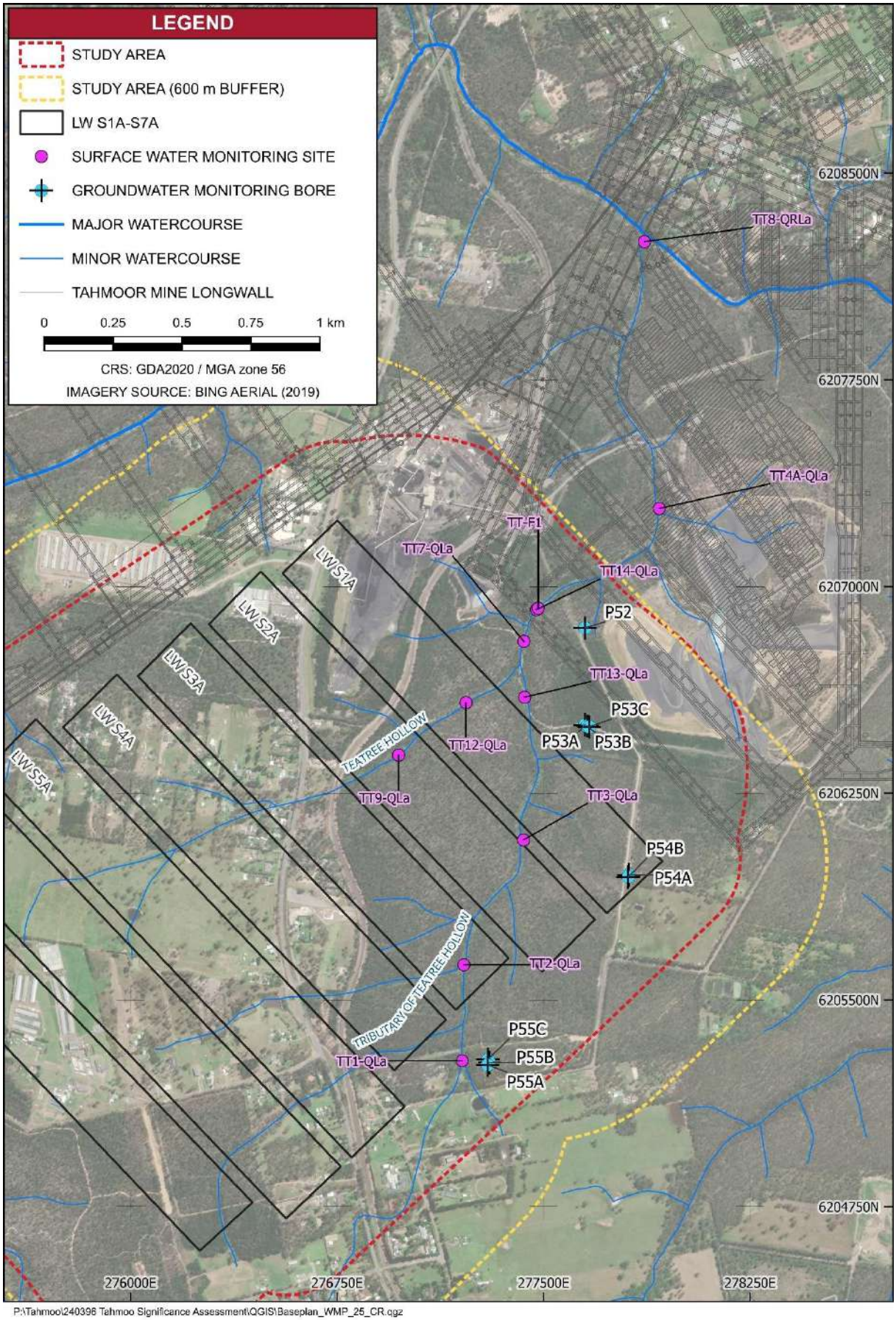
MAP 3: GROUNDWATER MONITORING BORES RELEVANT TO TEATREE HOLLOW



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4 SURFACE WATER MONITORING PROGRAM

Tahmoor Coal has implemented an extensive surface water monitoring program in the vicinity of LW S1A-S7A, as detailed in the WMP. The LW S1A-S7A surface water monitoring program includes the following:

- water level
- streamflow
- water quality
- visual inspection

The surface water monitoring program seeks to ensure compliance with regulatory requirements and to enable identification of potential mining related impacts to:

- pool and watercourse physical features and natural behaviour
- surface water level and streamflow
- surface water quality

The monitoring program developed a baseline dataset for a range of surface water features, and it is used to assess operational and post-mining impacts through the monitoring of reference sites (control) and potential impact sites (impact).

The monitoring sites are characterised as follows:

Baseline Site:	Surface water monitoring site that has been monitored for water level and quality prior to the commencement of mining in the South Domain. Baseline surface water monitoring data was used to derive water quality Site Specific Guideline Values (SSGVs) and water level trigger values.
Reference Site:	Surface water monitoring site located upstream of the subsidence impact zone and considered unlikely to be affected by mining activity. These sites are utilised as benchmarks for observations from potential impact sites.
Potential Impact Site:	Surface water monitoring site located within the potential subsidence impact zone (as defined based on mining induced subsidence predictions), from which a potential effect on surface water level or quality from the site activity may be detected.

4.1 Monitoring Program Summary

Surface water monitoring sites are located on key watercourses within and adjacent to LW S1A-S7A, and includes Teatree Hollow, Teatree Hollow tributary, Bargo River, Bargo River tributary and Hornes Creek. The locations of the monitoring sites relevant to the Study Area are shown on **MAP 4** to **MAP 6,** the surface water monitoring program for LWS1A-S7A is summarised in **Appendix A**.

The monitoring site nomenclature is associated with the watercourse and pool number (i.e., TT9 is pool 9 on Teatree Hollow), and the type of monitoring to be implemented as follows:

- water quality: Q
- automated (continuous) water level monitoring: La
- streamflow: F
- channel morphology: CM
- knickpoint: K
- headwater reaches: HW

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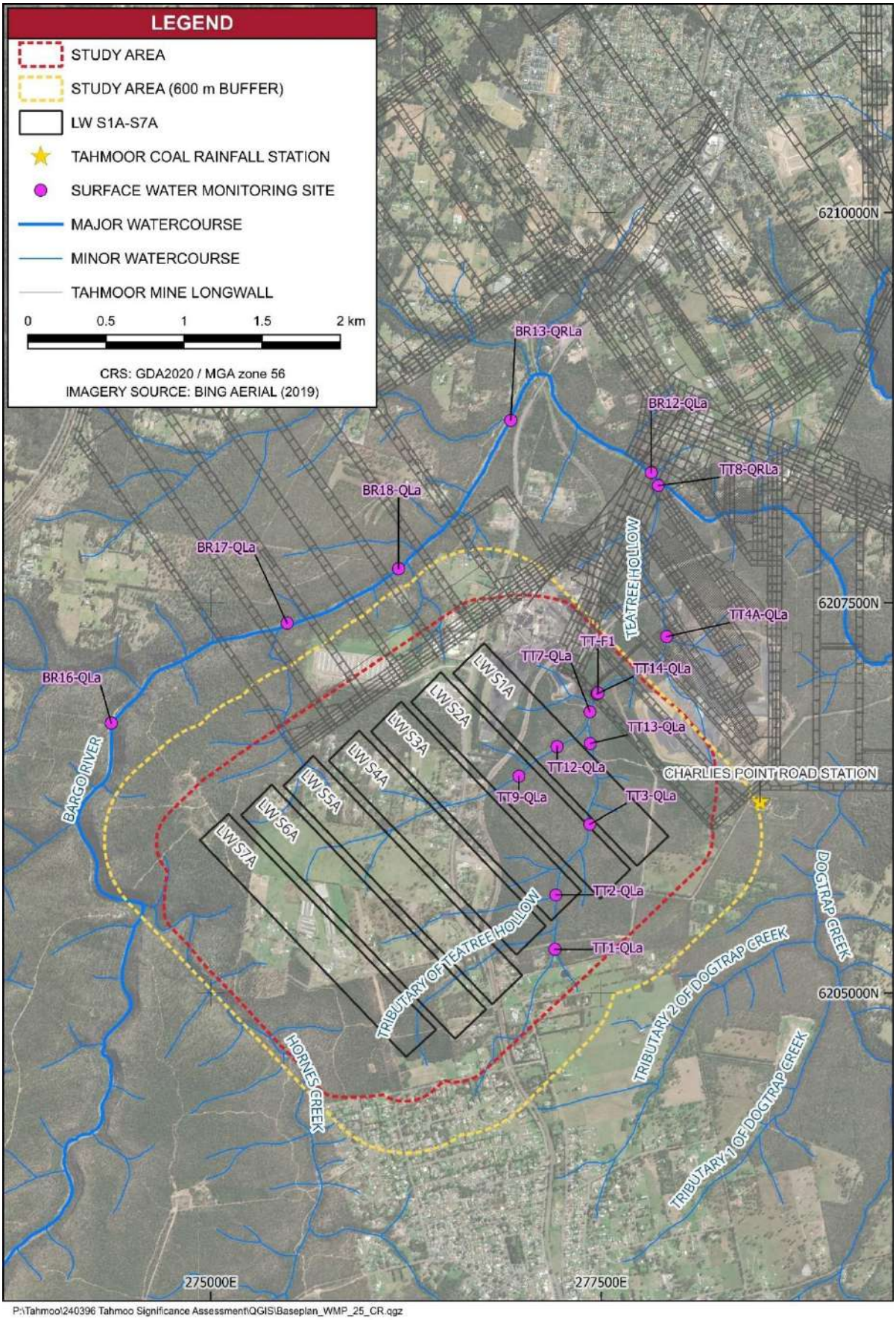
MAP 4: RELEVANT RAINFALL STATIONS AND SURFACE WATER MONITORING SITES SPECIFIC TO LWS1A-S7A



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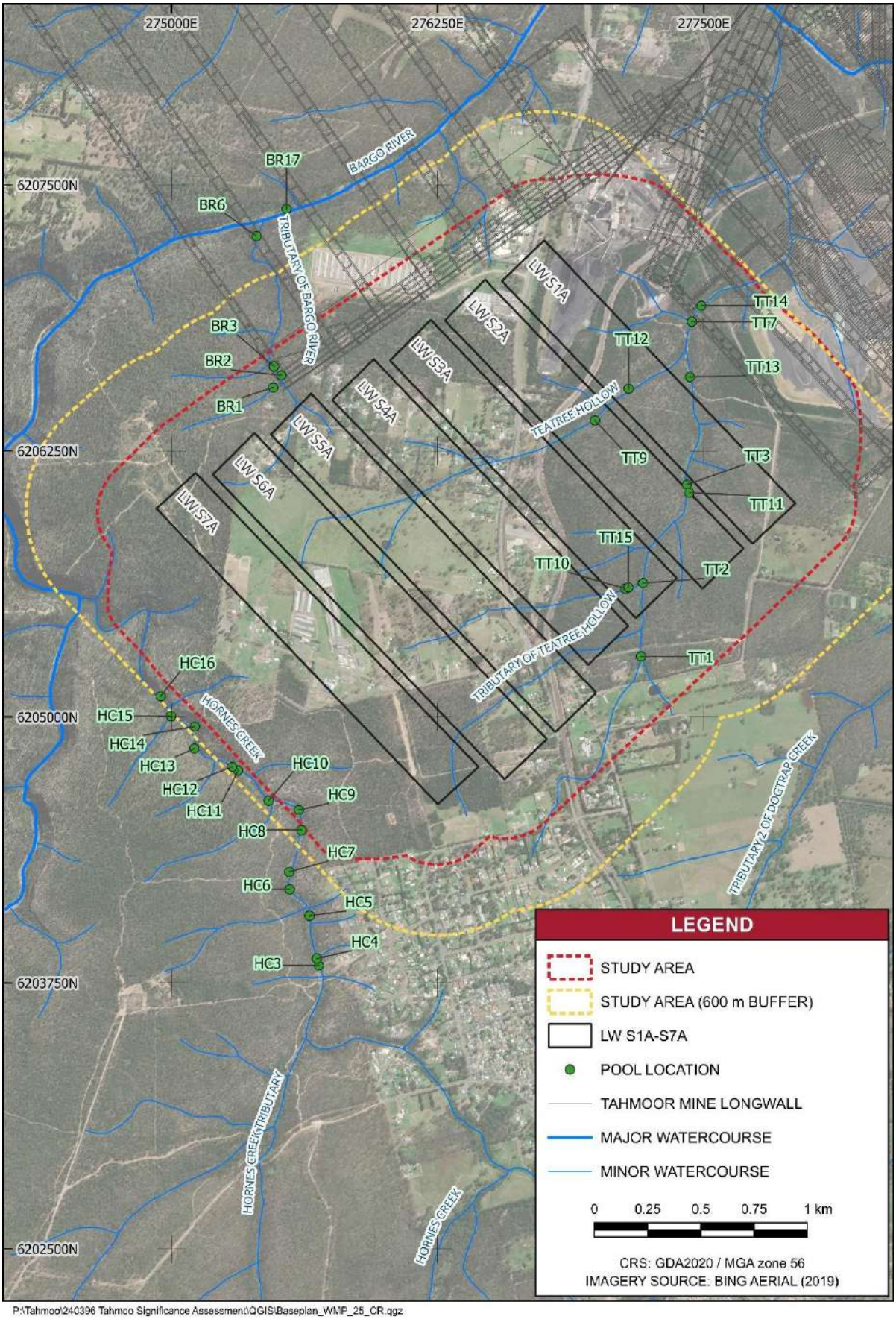
MAP 5: POOL VISUAL INSPECTION SITES SPECIFIC TO LWS1A-S7A



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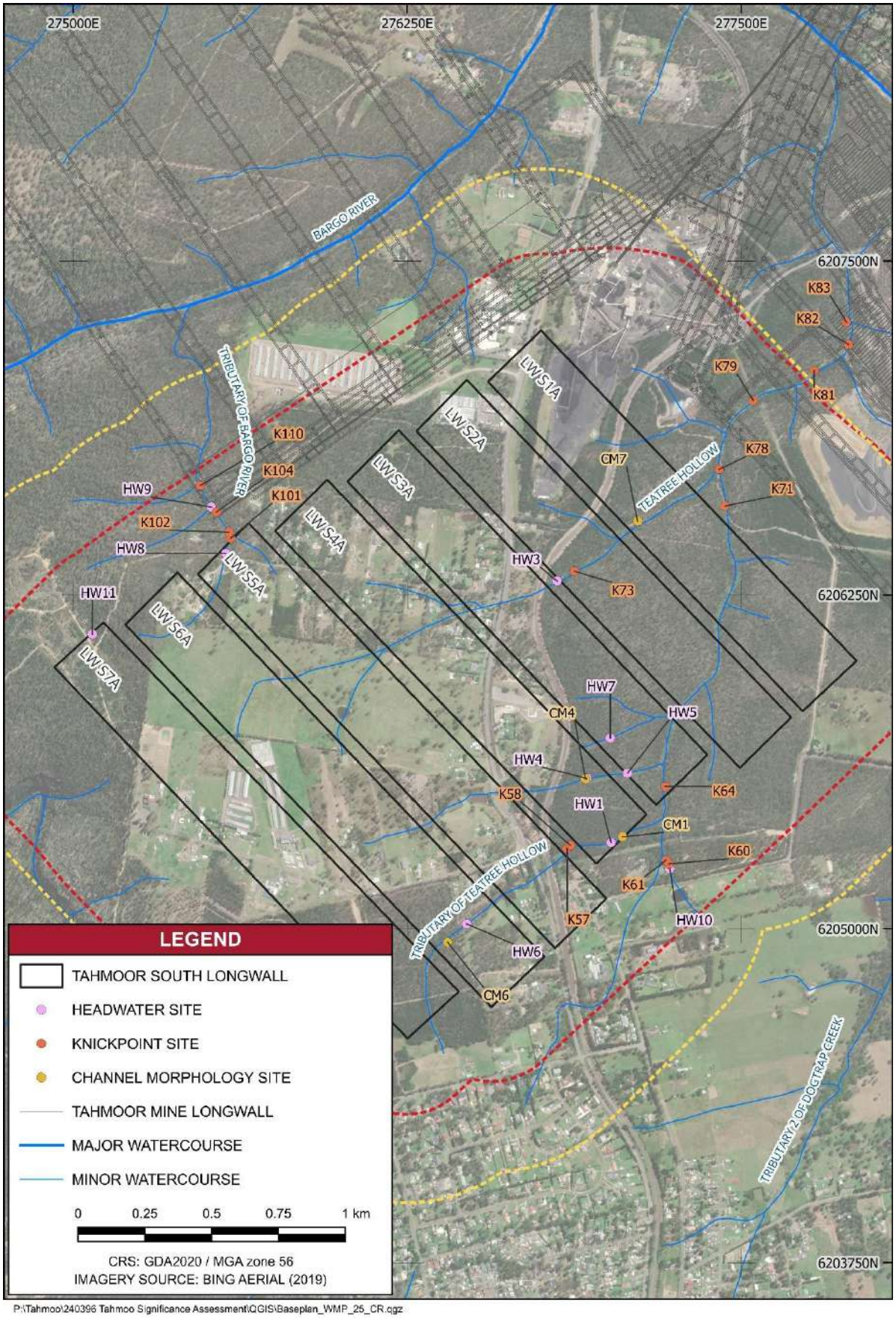
MAP 6: MORPHOLOGY AND CHANNEL STABILITY MONITORING SITES SPECIFIC TO LWS1A-S6A



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4.2 Monitoring Constraints

Monitoring site TT4-QLa was not accessible during September and October 2024, due to construction works undertaken for an additional sediment dam (referred to as S12). As such, water quality samples were unable to be collected at that time. The site was accessible from November 2024.

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5 SURFACE WATER MONITORING DATA REVIEW

A summary of the monitoring data for the period review from 1 July to 31 December 2024 is presented in the following sections. Monitoring sites on Hornes Creek and Bargo River tributary (refer **MAP 4**), are located outside of the subsidence zone associated with mining of LW S1A, LW S2A and LW S3A. As such, review of the monitoring data for these sites has been excluded from the assessment for the current review period.

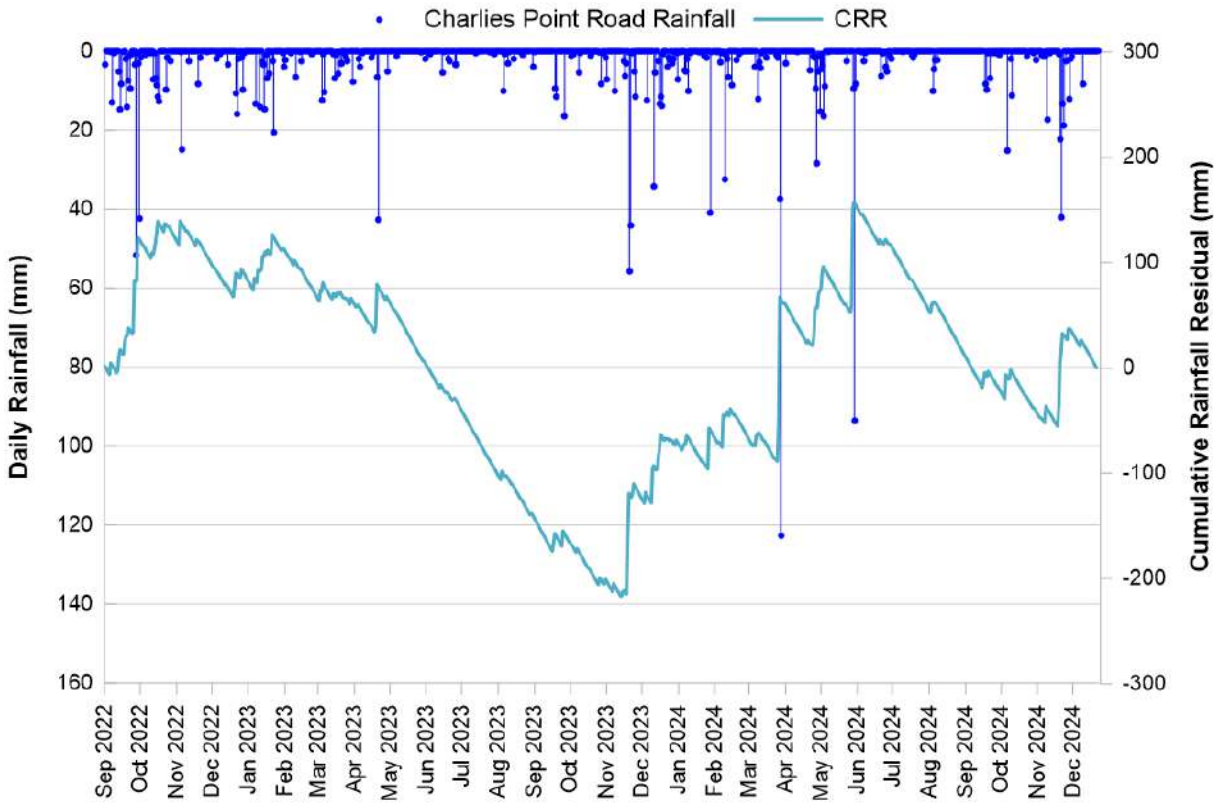
The assessment of monitoring data against the TARP trigger levels defined in the WMP is provided in **Section 6**.

5.1 Rainfall Trends

GRAPH 2 presents daily rainfall data recorded at the Tahmoor Coal rainfall station (refer **MAP 4**), referred to as "Charlies Point Road". Rainfall data from 8 September to 31 December 2024 (period of available data) is displayed with the cumulative rainfall residual (CRR)[2], to illustrate climatic trends over a long-term period.

The CRR depicted in **GRAPH 2** indicates that from June to mid-November 2024, generally below average rainfall conditions were recorded. Above average rainfall was recorded from late November to early December 2024, followed by below average rainfall for the remainder of December 2024.

GRAPH 2: DAILY RAINFALL AND CUMULATIVE RAINFALL RESIDUAL



[2] The cumulative rainfall residual is calculated as the cumulative deviation from the average daily rainfall, where positive (upward) slope in the plot indicates periods of above average rainfall and negative (downward) slope indicates periods of below average rainfall.

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5.2 Surface Water Level Data

Automated water level data for the full period of record is presented as a series of graphs in **Appendix B**. Note that the cease to flow (CTF) level shown on the automated water level graphs refers to the point at which surface water ceases to flow over the pool control (i.e., the lowest point on a rockbar, boulder field or other feature that contains water within the pool / controls surface flow from the pool). If surface flow over the pool control ceases, there may still be leakage from the pool occurring around, through or under the pool control and reporting downstream.

TABLE 1 presents a summary of the water level trends during the review period of 1 July to 31 December 2024. Note that the water level data recorded at the monitoring site TT14-QLa is not summarised in **TABLE 1,** rather the water level data is converted to streamflow using a rating relationship derived for the low flow gauging weir at TT-F1 (refer **MAP 4** for location). Streamflow records for TT-F1, derived based on TT14-QLa water level data, are presented in **Section 5.3**.

TABLE 1: SUMMARY OF WATER LEVEL TRENDS - 1 JULY TO 31 DECEMBER 2024

Monitoring Site	Classification	Summary of Water Level Trends	Appendix B Graph Reference
Teatree Hollow Catchment			
TT1-QLa	Reference Site	The water level remained above the baseline minimum during the review period, and trends were consistent with rainfall conditions.	B1.1
TT2-QLa	Potential Impact Site	Pool TT2 was dry or the water level was below the sensor level for majority of the monitoring period. The water level was recorded above the baseline minimum for a brief period from late November to early December 2024 (during and following a rainfall event).	B1.2
TT3-QLa	Potential Impact Site	Pool TT3 was dry or the water level was below the sensor level for majority of the review period. The water level was recorded above the CTF level for brief periods during and following rainfall events in July and late November to early December 2024.	B1.3
TT7-QLa	Potential Impact Site	The water level was recorded above the baseline minimum for brief periods during and following rainfall events throughout the review period.	B1.4
TT9-QLa	Potential Impact Site	The water level was recorded above the baseline minimum for brief periods during and following rainfall events throughout the review period.	B1.5
TT12-QLa	Potential Impact Site	Pool TT12 was recorded as dry or below the sensor level for majority of the review period. The water level was recorded above the baseline minimum for brief periods following rainfall events in July, August and late November to early December 2024.	B1.6
TT13-QLa	Potential Impact Site	The water level was below the baseline minimum for majority of the review period, with the exception of a brief period following rainfall in late November.	B1.7

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Monitoring Site	Classification	Summary of Water Level Trends	Appendix B Graph Reference
Bargo River			
BR16-QLa	Reference Site	During the review period, the water level remained above the baseline minimum, with trends consistent with rainfall conditions.	B2.1
BR12-QLa	Potential Impact Site	The water level remained above the baseline minimum for the duration of the review period, with trends consistent with rainfall conditions.	B2.2
BR13-QRLa	Potential Impact Site	The water level remained above the baseline minimum for the duration of the review period, with trends consistent with rainfall conditions.	B2.3
BR17-QLa	Potential Impact Site	The water level remained at or above the baseline minimum for the duration of the review period, with trends consistent with rainfall conditions.	B2.4
BR18-QLa	Potential Impact Site	The water level remained above the baseline minimum during the review period, with trends consistent with rainfall conditions.	B2.5

5.3 Streamflow Data

The TT-F1 streamflow data for the period of record is presented in **GRAPH 3**. Daily rainfall from Scientific Information for Land Owners (SILO) Point Data[3] and rainfall data recorded at Charlies Point Road is also is presented in **GRAPH 3**. The cumulative rainfall (CRR) and cumulative streamflow residual (CSR) for the period of record are presented in **GRAPH 4**.

The streamflow records presented in **GRAPH 3** indicate that streamflow at TT-F1 in Teatree Hollow is intermittent, with extended periods of no flow recorded prior to the commencement of mining of LW S1A. During the review period, flow occurred intermittently in response to rainfall.

The comparison of the CRR and CSR presented in **GRAPH 3** indicates that streamflow trends have been consistent with rainfall trends, including during the review period of July to December 2024. **GRAPH 4** also indicates that the streamflow recession rate recorded during the current review period was similar to that of historical rates, including during periods prior to the commencement of mining of LW S1A.

[3] The SILO Point Data is a system which provides synthetic daily climate data sets for a specified point by interpolation between surrounding point records held by the Bureau of Meteorology (BoM) – LongPaddock (2025). Selected point co-ordinates: 32.2°S, 149.65°E.

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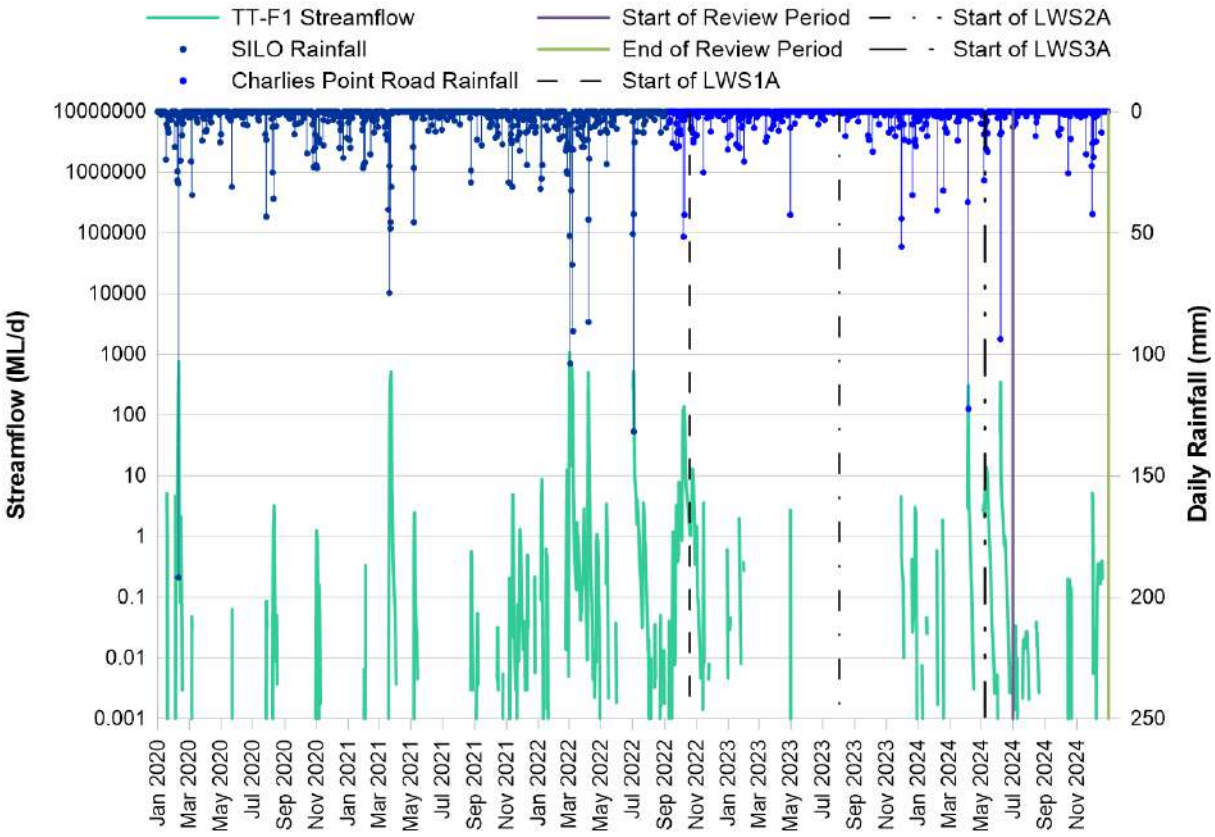
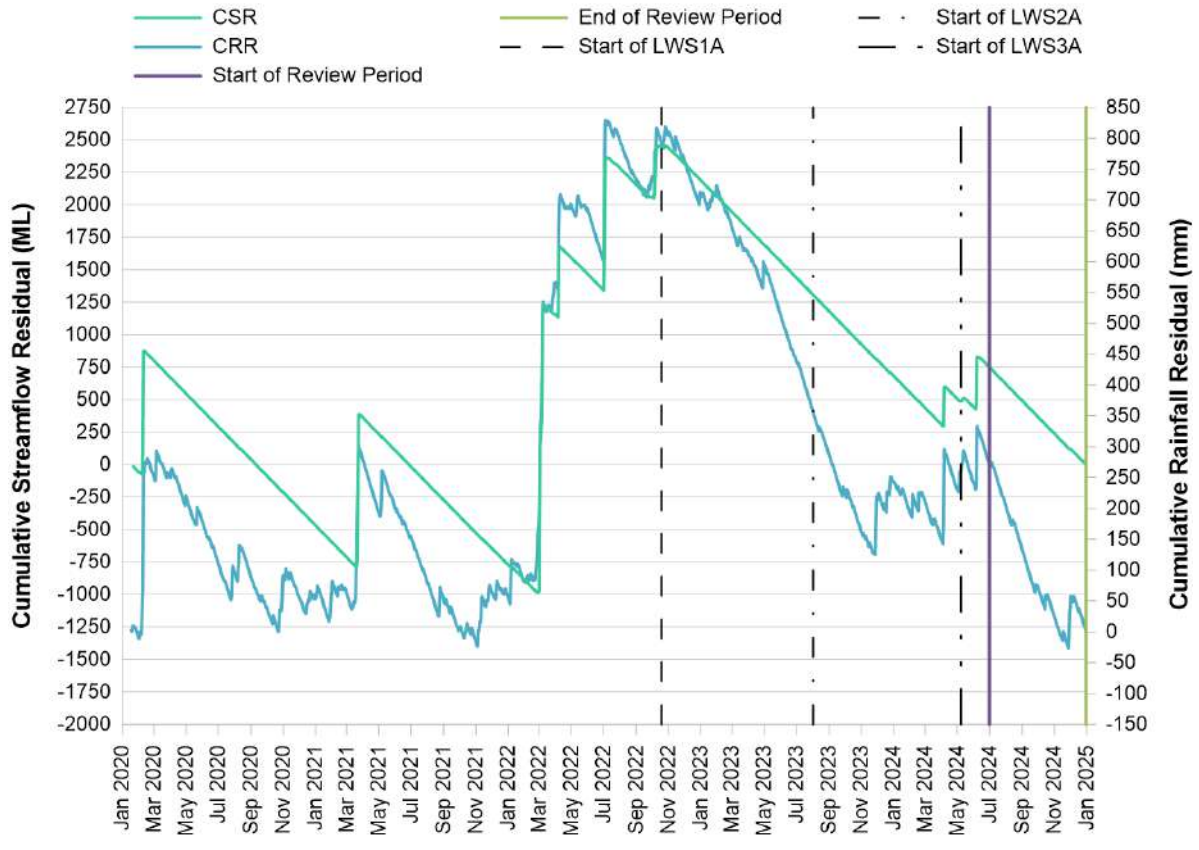
GRAPH 3: TEATREE HOLLOW (TT-F1) STREAMFLOW AND RAINFALL



GRAPH 4: TEATREE HOLLOW (TT-F1) CUMULATIVE STREAMFLOW AND RAINFALL RESIDUAL



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5.4 Surface Water Quality

The water quality recorded during the period of 1 July to 31 December 2024 is summarised in **TABLE** 2, and graphically presented in **Appendix C.**

The following constituents have been adopted for the assessment as they are considered to be primary indicators of a potential mining related effect (refer WMP):

- pH
- electrical conductivity (EC)
- specific dissolved metals: aluminium, copper, iron, manganese, nickel and zinc

TABLE 2: SUMMARY OF KEY WATER QUALITY CONSTITUENTS – 1 JULY TO 31 DECEMBER 2024

Constituent	Summary of Water Quality	
	Teatree Hollow Catchment TT1-QLa (reference site) TT2-QLa, TT3-QLa, TT7-QLa, TT9-QLa, TT12-QLa, TT13-QLa, TT14-QLa (potential impact sites)	**Bargo River** BR16-QLa (reference site) BR12-QLa, BR13-QRLa, BR17-QLa, BR18-QLa (potential impact sites)
Field pH	• Slightly acidic to slightly alkaline pH recorded at all monitoring sites. • The pH values recorded during the review period were within the range of baseline values for all sites with the exception of one record for TT13-QLa of pH 8.45 in August. It is noted that TT13-QLa was subsequently dry from September to November 2024. In December 2024, TT13-QLa pH was within the range of baseline values.	• Slightly acidic to slightly alkaline pH was recorded at most monitoring sites, with the exception of BR18-QLa where field pH of 4.94 was recorded in October. It is noted that the laboratory pH in October was 6.32, as such it is possible that the field record is erroneous. • With the exception of BR18-QLa, the pH recorded during the review period was within the range of baseline values for all sites.
Field Electrical Conductivity (EC)	• Field EC values recorded during the review period were within the range of historical values for all sites.	• Field EC values were within the range of baseline values for the duration of the review period. • A historical high EC value of 288 µS/cm was recorded at BR13-QRLa in August. It is noted that low flow conditions were recorded at this time. • With the exception of BR13-QRLa, EC values increased from June to November at all sites due to below average rainfall conditions. EC values declined at all sites in December 2024, coinciding with above average rainfall.

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Constituent	Summary of Water Quality	
	Teatree Hollow Catchment TT1-QLa (reference site) TT2-QLa, TT3-QLa, TT7-QLa, TT9-QLa, TT12-QLa, TT13-QLa, TT14-QLa (potential impact sites)	**Bargo River** BR16-QLa (reference site) BR12-QLa, BR13-QRLa, BR17-QLa, BR18-QLa (potential impact sites)
Dissolved Aluminium	• Dissolved aluminium concentrations were variable at most sites during the review period, with the exception of reference site TT1-QLa, which was relatively consistent was within the range of historical values. • A historically high concentration of 0.9 mg/L dissolved aluminium was recorded at TT9-QLa in November.	• The concentrations of dissolved aluminium recorded during the review period were generally less than that recorded from January and June 2024. • The dissolved aluminium concentrations were within the range of baseline or historical concentrations at all sites.
Dissolved Copper	• Dissolved copper concentrations were equal to or less than the limit of reporting at all sites during the review period with the exception of TT9-QLa. • A historically high concentration of 0.004 mg/L dissolved copper was recorded at TT9-QLa in November.	• Dissolved copper concentrations were equal to or less than the limit of reporting for the duration of the review period.
Dissolved Iron	• Dissolved iron concentrations were within the range of baseline concentrations at all sites.	• The dissolved iron concentrations were within the range of baseline or historical concentrations for the duration of the review period.
Dissolved Manganese	• Dissolved manganese concentrations recorded during the review period were within the range of baseline concentrations at majority of sites.	• Dissolved manganese concentrations recorded at all sites were within the range of baseline or historical values.
Dissolved Nickel	• Dissolved nickel concentrations recorded during the review period were within the range of baseline or historical concentrations at all sites.	• Dissolved nickel concentrations were within the range of baseline or historical concentrations for the duration of the review period at all sites.
Dissolved Zinc	• Dissolved zinc concentrations were within the range of baseline or historical concentrations at all sites.	• Dissolved zinc concentrations were within the range of baseline concentrations for the duration of the review period at all sites.

5.5 Pool Physical Features and Natural Behaviour

Inspections of the natural behaviour and physical features of pools are undertaken as follows:

- **Fortnightly**: for sites within the active subsidence zone.
- **Monthly**: for sites outside of the active subsidence period.

The inspections are undertaken to record visual observations of:

- **Natural behaviour**: pool water level and surface flow in the downstream watercourse reach.
- **Physical features**: iron staining, gas release, turbidity and fracturing.

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The visual inspection observations recorded during active mining have been compared to the baseline visual inspection recorded between July and October 2022, prior to the commencement of mining of LW S1A.

A summary of key visual observations recorded during the review period is presented in **TABLE 3**.

TABLE 3: SUMMARY OF POOL VISUAL INSPECTION RECORDS – 1 JULY TO 31 DECEMBER 2024

Pool	Classification	Inspection Date	Summary of Visual Inspection Records
TT1	Reference Site	July to December 2024	• The water level was consistent with baseline conditions during the review period. • Flow over the pool hydraulic control was observed during visual inspections. From September to December 2024, flow was reported as a trickle over the hydraulic control. • The observed pool physical features were consistent with baseline conditions during the review period, with no new fractures, iron staining or gas release observed. • Moderate turbidity was noted during the review period.
TT2	Potential Impact Site	July to December 2024	• The water level in July 2024 was reported as slightly lower than baseline conditions. No inflow to the pool was present however there was outflow over the downstream hydraulic control. • No connective flow was reported in August and December 2024. • During the September, October and November 2024 visual inspections, the pool was reported as dry. • Four new fractures were observed between July and November 2024. • No iron staining or gas release was observed during the review period. • High turbidity was reported for the duration of the review period.
TT3	Potential Impact Site	July to December 2024	• The pool was reported as dry from July to December 2024, with no connective flow observed during the period. • No fractures were observed. • No iron staining or gas release was noted.
TT7	Potential Impact Site	August to November 2024	• The water level was consistent with baseline conditions in August and October 2024. In September and November 2024, the water level was reported to be lower than baseline conditions, with no flow over the hydraulic control. • No new fractures or gas release were observed during the review period. • Iron staining at the upstream reach of the pool, consistent with baseline conditions, was noted. • Moderate turbidity was observed in August and September. In October and November, turbidity was reported as high.

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Pool	Classification	Inspection Date	Summary of Visual Inspection Records
TT9	Potential Impact Site	August to December 2024	• The water level was consistent with baseline conditions in August 2024. From September to December 2024, the water levels were visually lower than baseline conditions, with no flow over the hydraulic control. • Four new fractures were observed in November 2024, approximately 140 m upstream of pool TT9. • No iron staining or gas discharge was noted although moderate turbidity was observed during the review period.
TT10	Potential Impact Site	July and October to December 2024	• The water level observed was consistent with baseline conditions in July 2024. From October to December 2024, the water level was lower than the baseline condition. • A fracture upstream of pool TT10 was observed in October 2024. • No gas discharge or iron staining were observed although moderate turbidity was noted.
TT11	Potential Impact Site	July to December 2024	• The pool was reported as dry from July to December 2024, inconsistent with baseline conditions. • No gas discharge or iron staining was observed. • No new fractures were observed, and no development of the historical fractures was noted.
TT12	Potential Impact Site	July to December 2024	• The water level was lower than baseline conditions in July and August. During the visual inspections conducted from September to December 2024, the pool was observed as dry. • No development of historical fractures or new fractures were noted. • No changes to the iron staining previously observed downstream of the pool, initially observed 1 March 2023. • No gas discharge was observed.
TT13	Potential Impact Site	August to December 2024	• The water level was lower than baseline conditions in August. During the visual inspections conducted from September to December 2024, the pool was observed as dry. • No changes to fractures, inferred to be natural, were noted. • No iron staining or gas release was observed although moderate turbidity was noted for the review period.
TT15	Potential Impact Site	July, October to December 2024	• The water level was consistent with baseline conditions in July 2024. From October to December 2024, the water level was lower than baseline conditions, with no connective flow observed. • A fracture was identified approximately 22 m downstream of the pool in October 2024. • No gas discharge or iron staining was observed although moderate turbidity was noted.

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5.6 Channel Morphology and Knickpoint and Headwater Sites

Inspections of the physical features and natural behaviour of channel morphology and knickpoint sites are undertaken on a minimum monthly basis to record visual observations of the following:

- ponded / flowing water (where relevant)
- iron staining, gas release and turbidity (where relevant)
- fracturing or shearing (where relevant)
- knickpoint development
- erosion and sedimentation.

In addition, an annual visual inspection was conducted in September 2024 at headwater sites to identify potential anomalous increases in erosion and sedimentation.

The visual inspection observations recorded during active mining have been compared to the baseline visual inspection recorded in September 2022 (headwater sites) and October 2022 (channel morphology sites and knickpoints), prior to the commencement of mining of LW S1A.

A summary of the observations for channel morphology sites and knickpoints recorded during the review period is presented in **TABLE 5**.

The headwater annual inspection was conducted on 18 September 2024 and included the monitoring sites HW1, HW3, HW4, HW5, HW6, HW7, HW8, HW9, HW10, and HW11. During the inspection, no increase in erosion or sedimentation was observed in the headwater streams.

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TABLE 4: SUMMARY OF VISUAL INSPECTION RECORDS FOR CHANNEL MORPHOLOGY, KNICKPOINT AND HEADWATER SITES – 1 JULY TO 31 DECEMBER 2024

Pool	Classification	Inspection Date	Summary of Visual Inspection Records
CM1	Potential Impact Site	July and October	• No visual evidence of increased erosion in comparison to baseline conditions.
CM4	Potential Impact Site	July and October	• No visual evidence of increased erosion in comparison to baseline conditions. Dry conditions noted during the inspections.
CM7	Potential Impact Site	August to November	• No visual evidence of increased erosion in comparison to baseline conditions. • No changes to previously observed fracturing noted during the inspection period.
K57	Potential Impact Site	July and August	• Minor increase in erosion, likely associated with high flow events that occurred in May asnd June 2024. • No slips or slumps were observed.
K58	Potential Impact Site	July and August	• No visual evidence of increased erosion in comparison to baseline conditions.
K64	Potential Impact Site	July to December	• Moderate development of erosion and bank slumping in comparison to baseline conditions, likely associated with high rainfall/flow events that occurred in May and June 2024, in addition to direct undermining. Erosion and bank slumping was first observed 12 June 2024.
K71	Potential Impact Sites	August to December	• No visual evidence of increased erosion in comparison to baseline conditions.
K73	Potential Impact Sites	August to December	• No visual evidence of increased erosion in comparison to baseline conditions. • Dry conditions were noted during the inspection period.
K78	Potential Impact Sites	August to December	• No visual evidence of increased erosion in comparison to baseline conditions. • Dry conditions were noted during the inspection period.

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6 SURFACE WATER TRIGGER EXCEEDANCE ASSESSMENT

The surface water trigger levels exceeding 'Normal Condition' during the period of 1 July to 31 December 2024 are summarised in **TABLE 5**.

In summary, triggers exceedances have been recorded at the following sites:

- **Surface water level**: TT2-QLa, TT3-QLa, TT7-QLa, TT9-QLa, TT12-QLa and TT13-QLa.
- **Physical features and natural pool behaviour**: TT2, TT3, TT7, TT9, TT11, TT12, TT13, TT15, K57 and K64.
- **Surface water quality**: TT13-QLa for dissolved zinc.

A visual depiction of the Teatree Hollow and Teatree Hollow tributary surface water conditions and physical effects is presented in **MAP 7**. The information presented in **MAP 7** was predominantly collated from the visual inspection records (ENRS, 2024a-f) and represents conditions observed in December 2024.

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TABLE 5: SURFACE WATER TARP SIGNIFICANCE LEVELS AND ACTIONS – 1 JULY TO 31 DECEMBER 2024

Date	Location(s)	Comment	TARP Significance	Actions
Surface Water Level (TARP WMP3)				
22 July to 14 August 4 to 6 December 2024	TT2-QLa	The recorded water level has declined atypically below the recorded baseline minimum level for less than one month (as a consecutive period) and the same has not occurred at the reference site(s).	Level 2	• Water level trends for all sites in Teatree Hollow and Teatree Hollow tributary were reviewed with consideration to climatic conditions (refer **Section 6.1**). • Streamflow data recorded at TT-F1 was reviewed and streamflow reduction assessment conducted (refer **Section 5.3** and **Section 6.1**). • Relevant information was obtained from key specialists necessary to inform assessment (refer **Section 6.1**). • An investigation was undertaken to identify the potential cause of atypical water level decline (refer **Section 6.1**).
3 to 4 July, 5 to 7 and 9 to 31 December 2024	TT3-QLa			
17 to 29 September, 1 to 14 October, 27 to 31 December 2024	TT7-QLa			
9 to 26 September, 7 to 14 October, 26 October to 12 November, 22 to 29 November, 18 to 31 December 2024	TT9-QLa			
22 to 27 July, 29 July to 13 August, 5 to 6 and 9 to 31 December 2024	TT12-QLa			
30 August to 29 November, 9 to 31 December 2024	TT2-QLa	The recorded water level has declined atypically for greater than one month (as a consecutive period) and the same has not occurred at the reference site(s).	Level 3	• Actions as per Level 2. • An investigation was undertaken to identify the potential cause of atypical water level decline (refer **Section 6.1**).
14 July to 29 November 2024	TT3-QLa			
30 October to 29 November 2024	TT7-QLa			
18 August to 29 November 2024	TT12-QLa			
30 July to 30 November, 13 to 31 December 2024	TT13-QLa			

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Date	Location(s)	Comment	TARP Significance	Actions
Physical Features and Natural Pool Behaviour (TARP WMP5)				
August 2024	TT13	Visually observed anomalous change in water level, overland connected flow, iron staining, gas release or turbidity - as compared with baseline conditions - occurs in one month and the same has not occurred at the reference site(s) AND/OR visual observation of fracturing	Level 1	• Visual changes along watercourse were reviewed with consideration to climatic conditions (refer **Section 6.1**). • Monitoring and review of data frequency increased to fortnightly. • Relevant information was obtained from key specialists necessary to inform assessment (refer **Section 6.1**).
October 2024	TT9			
November 2024	TT7			
October 2024	TT10			
October and December 2024	TT15			
November 2024	TT9	Visually observed anomalous change in water level, overland connected flow, iron staining, gas release or turbidity - as compared with baseline conditions - occurs for two consecutive months and the same has not occurred at the reference site(s).	Level 2	• Actions as per Level 1. • An investigation was undertaken to assess if the change in behaviour is related to mining effects (refer **Section 6.1**).
November and December 2024	TT10			
September 2024	TT13			
July – December 2024	TT2	Visually observed anomalous change in water level, overland connected flow, iron staining, gas release or turbidity - as compared with baseline conditions - occurs for three consecutive months and the same has not occurred at the reference site(s) AND the change in behaviour has been investigated and confirmed to be related to mining effects.	Level 3	• Actions as per Level 2.
July to August and October to December 2024	TT3			
September and October 2024	TT7			
December 2024	TT9			

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Date	Location(s)	Comment	TARP Significance	Actions
Physical Features and Natural Pool Behaviour (TARP WMP5)				
July to December 2024	TT11	Visually observed anomalous change in water level, overland connected flow, iron staining, gas release or turbidity - as compared with baseline conditions - occurs for three consecutive months and the same has not occurred at the reference site(s) AND the change in behaviour has been investigated and confirmed to be related to mining effects.	Level 3	• Actions as per Level 2.
July to December 2024	TT12			
October and November 2024	TT13			
Surface Water Quality (TARP WMP1)				
August 2024	TT13-QLa (dissolved zinc)	Exceedance of an SSGV occurs at a given potential impact site in three consecutive months and the same has not occurred at the reference site(s).	Level 1	• Exceedance of the trigger level during the baseline period was reviewed (refer **Section 6.4**). • Water quality trends were reviewed for the watercourse reach (refer **Section 5.4**). • Relevant information was obtained from key specialists necessary to inform assessment (refer **Section 6.1**). • Reasonable and feasible options for remediation were considered where relevant (refer **Section 7.3**).
Channel Stability, Sedimentation and Erosion (TARP WMP7)				
July and August 2024	K57	Visually observed minor increase in knickpoint development and/or minor erosion and sedimentation of headwater streams.	Level 1	• Relevant information was obtained from key specialists necessary to inform assessment (refer **Section 6.3**). • Monitoring and review of data frequency increase considered (refer **Section 7.3**). • Reasonable and feasible options for remediation were considered where relevant (refer **Section 7.3**).

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Date	Location(s)	Comment	TARP Significance	Actions
Channel Stability, Sedimentation and Erosion (TARP WMP7)				
July to December 2024	K64	Visually observed moderate increase in knickpoint development and/or moderate or greater increase in erosion and sedimentation of headwater streams.	Level 2	• Actions as stated in Level 1. • An investigation was undertaken to assess if the change in behaviour is related to mining effects (refer **Section 6.3**). • Advise was obtained by specialists as detailed in **Section 6.3.**

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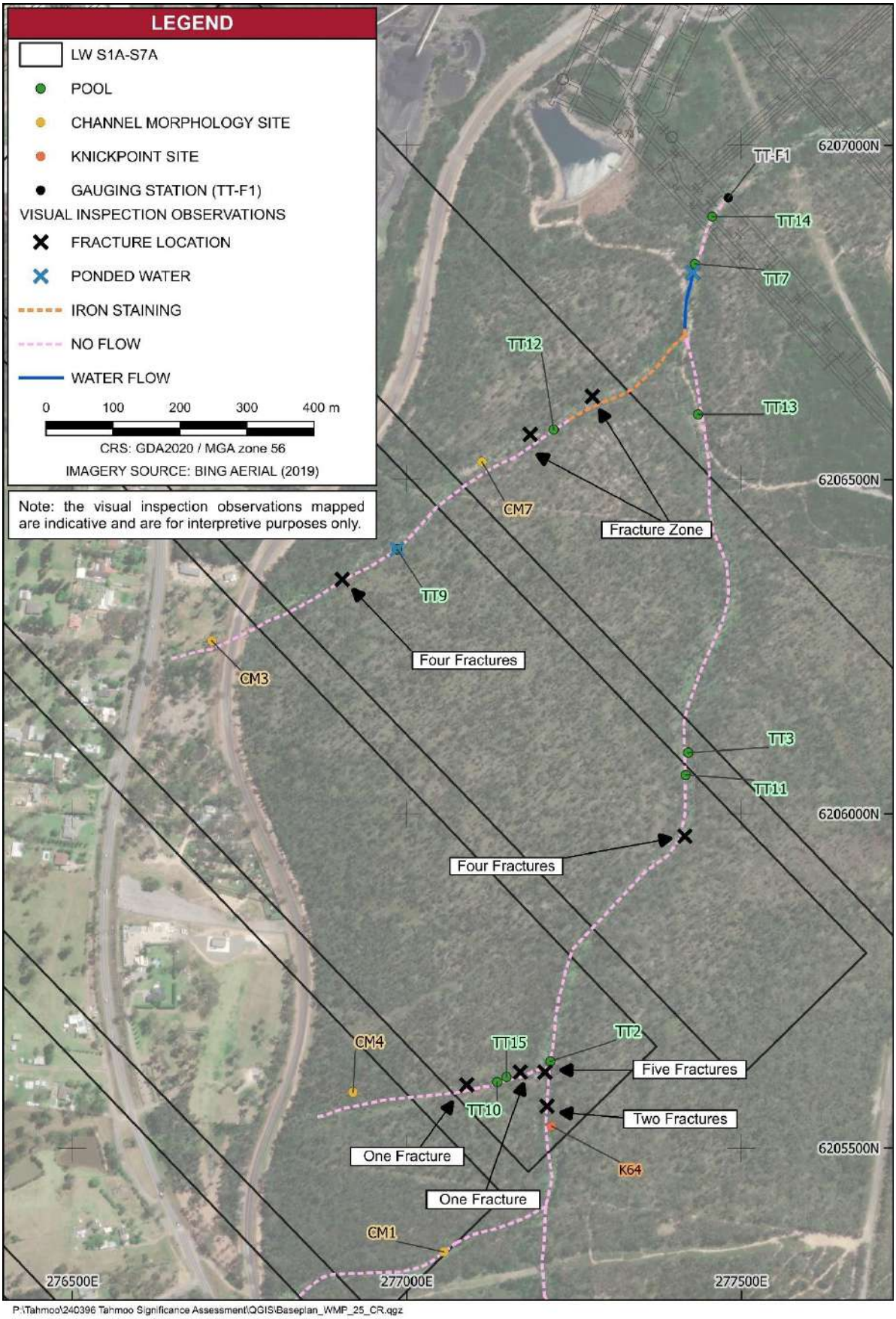
MAP 7: VISUAL DEPICTION OF SURFACE WATER CHARACTERISTICS AND PHYSICAL EFFECTS (DECEMBER 2024)



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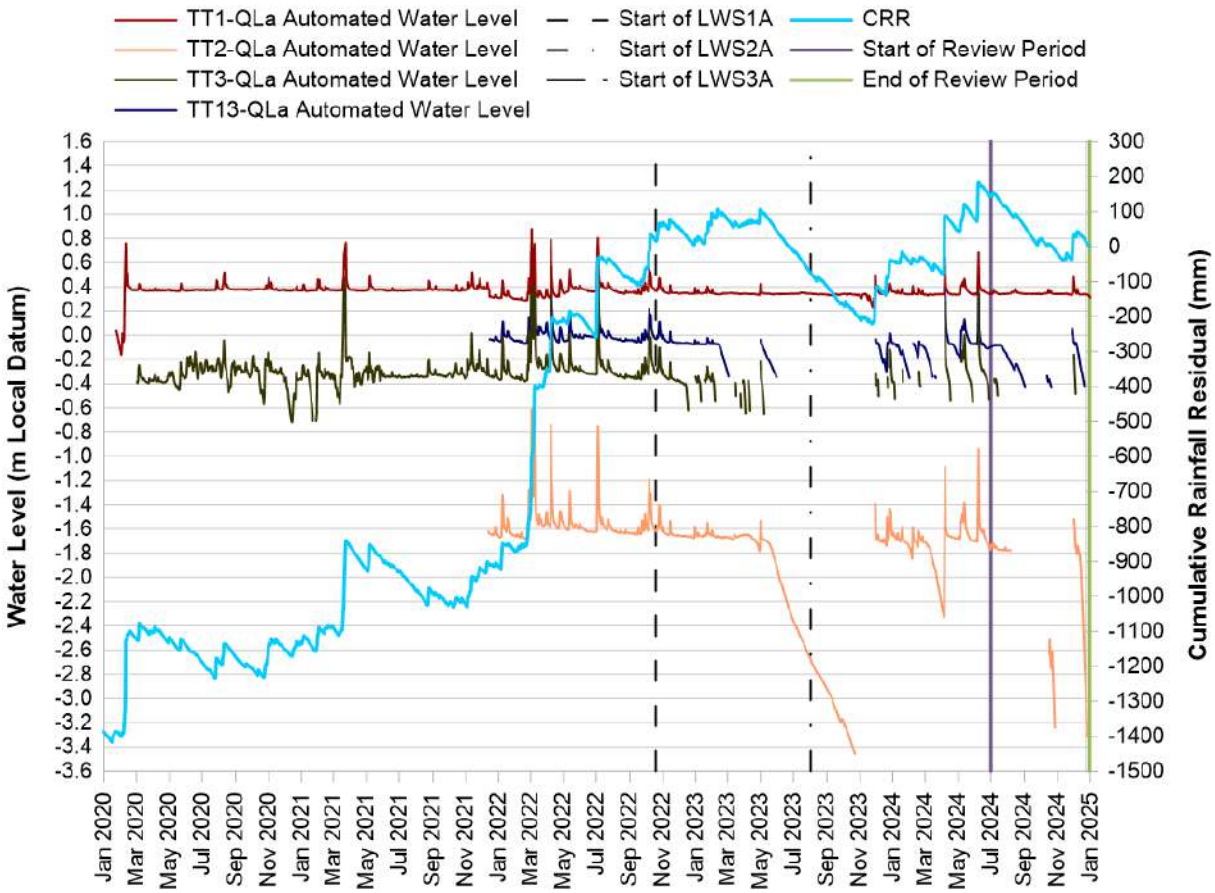
6.1 Water Level Assessment

6.1.1 Teatree Hollow Tributary

GRAPH 5 presents a comparison of the water level data recorded at monitoring sites on Teatree Hollow tributary for the full period of record. The cumulative rainfall residual (CRR),calculated for the period 1 January 2000 to 31 December 2024 to illustrate long-term trends in rainfall, is also presented.

Note that the water levels have been converted to metres local datum to facilitate the comparative assessment.

GRAPH 5: TEATREE HOLLOW TRIBUTARY WATER LEVEL COMPARISON



Reference Site TT1-QLa – Pool TT1

As illustrated in **GRAPH 5**, the water level trends recorded at pool TT1 (reference site TT1-QLa) were consistent with climatic conditions during the review period.

It is noted that pool TT1 is located upstream of the zone of active subsidence. The groundwater levels recorded at P55A-C for the period of record, indicated that baseflow contribution is likely to be negligible in the vicinity of TT1-QLa (refer **Section 3**).

Monitoring Site TT2-QLa – Pools TT2, TT10 and TT15

A Level 3 trigger was initially reported at pool TT2 (monitoring site TT2-QLa) in August 2023. During the current review period, the water level at pool TT2 rose in response to rainfall events, however, declined atypically below the trigger level for the majority of the review period (Level 3 trigger).

It is noted that 350 mm of closure developed at pool TT2 (Big Pool) from late May to end of October 2024 (refer **Section 2**). Four new fractures were observed between July and November 2024 (refer **MAP 7**).

Fracturing was also observed at pool TT10 and pool TT15 in October 2024. These pools are located on a minor tributary which discharges to Teatree Hollow tributary immediately upstream of pool TT2. Water

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level observations for these pools were reported as consistent with baseline conditions in July. From October to December 2024, the water level was lower than baseline conditions, with no connective flow observed (refer **TABLE 3** and ENRS [2024a,d-f]).

There is insufficient groundwater monitoring data to assess surface water-groundwater connectivity in the vicinity of pool TT2 (refer **Section 3**). As such, a decline in baseflow contribution to pool TT2 during the review period can be neither confirmed nor discounted.

The water level decline recorded at pool TT2, is considered atypical and inconsistent with historical conditions. In addition, fracturing has been recorded at and upstream of pool TT2, indicating that mining related effects have occurred in the direct vicinity of pool TT2.

As such, it is considered that the water level decline recorded at pool TT2 during the review period is related to mining effects in combination with the prevailing climatic conditions.

Monitoring Site TT3-QLa – Pools TT3 and TT11

Pool TT3 and pool TT11 were reported as dry during the visual inspections conducted from July to December 2024, with no connective surface flow observed as reporting from pool TT2 to pool TT3 and pool TT11. The water level rose at pool TT3 from late November to early December in response to rainfall.

The water level at pool TT3 has been recorded below the sensor level since mid-December 2022, except for brief intervals during or following rainfall (refer **GRAPH 5**). As illustrated in **MAP 7**, fracturing has occurred upstream of pool TT3 and pool TT11.

It is noted that closure reduced by approximately 30 mm between sites S03 and S04 during July to September 2024 (refer **Section 2**).Changes in horizontal distance were relatively stable from October to December 2024 (refer **Section 2**). No new fracturing or development of historical fractures were recorded at pools TT3 and TT11 during the review period.

As indicated by SLR (2025), the likelihood of groundwater-surface water connectivity in the vicinity of pool TT11 and pool TT3 is considered low (refer **Section 3**). As such, the decline in water level recorded at pool TT3 is unlikely related to a decline in baseflow contribution.

The water level decline recorded at pool TT3 is considered atypical and inconsistent with historical conditions. It is considered that the atypical decline in water level recorded at pool TT3 is related to the diversion of surface flow via upstream mining-related fractures.

Monitoring Site TT13-QLa – Pool TT13

The water level at pool TT13 declined below the baseline minimum in July and was below the sensor level for periods of September, October, November and December 2024. The water level briefly rose above the baseline minimum for a brief period in late November to early December 2024. From mid-December, the water level declined and remained below the sensor level for the rest of the review period. The water level declines occurred during periods of below average rainfall, however, are considered atypical in comparison to baseline conditions.

As indicated by SLR (2025), the likelihood of groundwater-surface water connectivity in the vicinity of pool TT13 is considered low (refer **Section 3**). As such, the decline in water level recorded at pool TT3 is unlikely related to a decline in baseflow contribution.

The declines in water level recorded during the review period are considered related to the cessation of surface water flow in Teatree Hollow tributary due to mining induced fracturing upstream of pool TT11 in combination with the prevailing climatic conditions.

6.1.2 Teatree Hollow

GRAPH 6 presents a comparison of the water level recorded at monitoring sites on Teatree Hollow for the period of record. The CRR is also presented (calculated for the period 1 January 2000 to 31 December 2024).

Note that the water levels have been converted to metres local datum to facilitate the comparative assessment.

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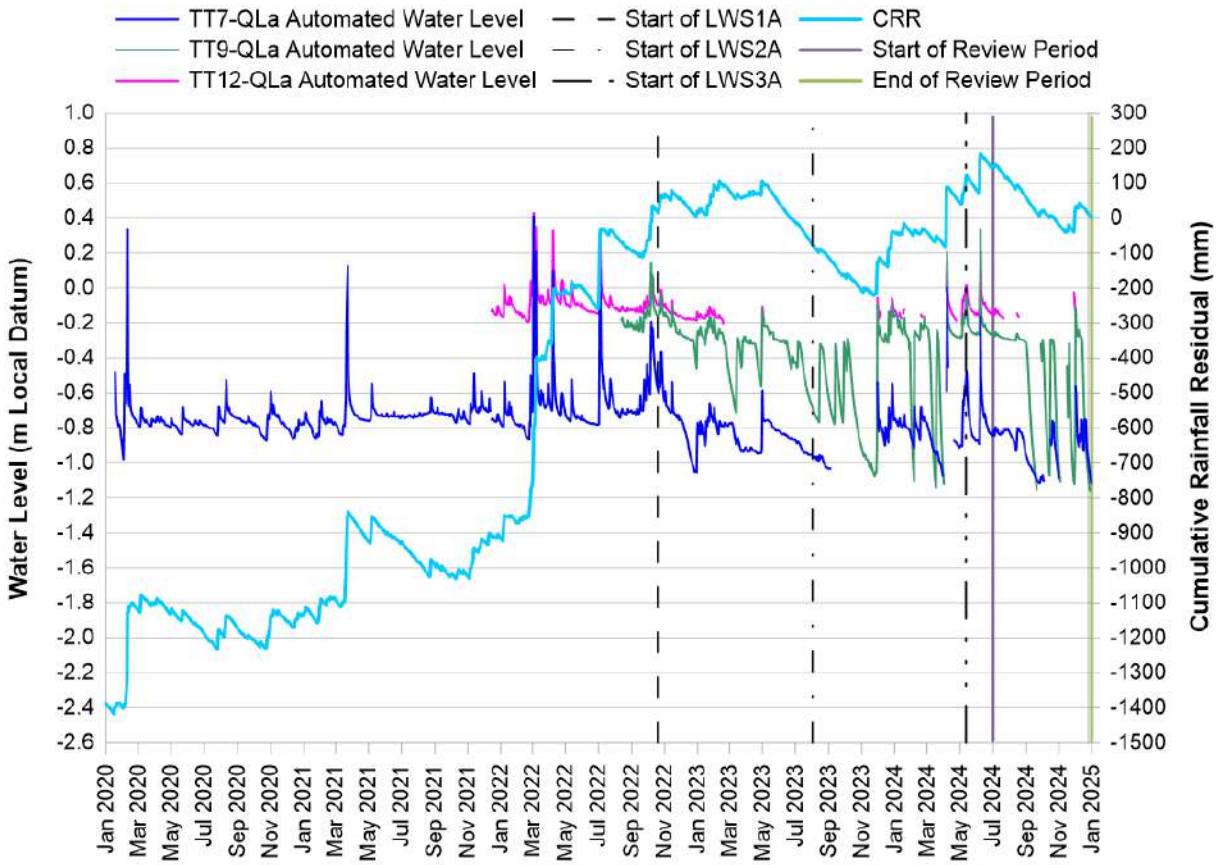
GRAPH 6: TEATREE HOLLOW WATER LEVEL COMPARISON



Monitoring Site TT7-QLa – Pool TT7

As illustrated in **GRAPH 6**, the water level recorded at pool TT7 during July and August 2024 was generally consistent with rainfall conditions. From late August, the water level declined until a new minimum water level was recorded in late September (the water level declined below the sensor level or the pool was dry). ENRS (2025c-e) state that in September and November 2024, the water level was reported to be lower than baseline conditions, with no flow over the hydraulic control.

With water level trends coinciding with rainfall, it is considered that the decline in water level recorded at pool TT7 is related to the prevailing climatic conditions. However, mine-induced fracturing has occurred at locations in Teatree Hollow and Teatree Hollow tributary upstream of pool TT7. As such, it is considered that upstream fracturing has likely resulted in a change in surface flow reporting to pool TT7.

It is noted that the groundwater levels recorded at monitoring bore P52 indicate that baseflow contribution was likely negligible in the vicinity of TT7-QLa during the review period (refer **Section 3**).

Monitoring Site TT9-QLa – Pool TT9

The water level at pool TT9 (monitoring site TT9-QLa) fluctuated in response to rainfall conditions during the review period. The water level was periodically recorded below the trigger level from September to December 2024 (maximum Level 2 trigger). ENRS (2024 c-f) reported that from September to December 2024, the water levels were visually lower than baseline conditions, with no flow over the hydraulic control. Additionally, four new fractures were observed in November 2024, approximately 140 m upstream of pool TT9 (refer **MAP 7**)

It is noted that only two months of baseline data are available for this site prior to the commencement of mining of LW S1A (refer **GRAPH 6**). As such, there is potential that the water level at monitoring site TT9-QLa declined to similar levels historically. Notwithstanding, it is considered that the water level declines recorded during the review period were atypical, with an increased rate of water level recession evident in comparison to historical conditions.

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It is noted that there is insufficient groundwater monitoring data to assess surface water-groundwater connectivity in the vicinity of pool TT9. As such, a decline in baseflow contribution to pool TT9 during the review period can be neither confirmed nor discounted.

The water level data recorded at pool TT9 during the review period indicates a change in water level behaviour and an increase in the rate of water level recession in comparison to historical conditions. Accordingly, it is considered that the decline in water level recorded at pool TT9 during the review period is related to the prevailing climatic conditions in addition to mining effects.

Monitoring Site TT12-QLa – Pool TT12

From August to December 2024, the water level was recorded below the sensor level or the pool was dry, except for brief periods during rainfall events. During this period, a maximum Level 3 trigger was recorded.

Mining-related fracturing has previously occurred upstream and downstream of pool TT12. During the review period, no new fractures or further development of existing fractures was reported. Notwithstanding, the decline in water level recorded during the review period is considered atypical and considered related to mining induced fracturing (previously recorded) in combination with the prevailing climatic conditions.

6.2 Streamflow Assessment

Despite mining related impacts recorded at locations in Teatree Hollow and Teatree Hollow tributary, the streamflow data presented in **Section 5.3** indicates that streamflow trends recorded at monitoring site TT-F1 have been consistent with rainfall trends from July to December 2024. The rate of streamflow decline recorded during the review period is considered consistent with that recorded prior to the commencement of mining of LW S1A and consistent with climatic conditions during the review period.

Notwithstanding, a streamflow reduction assessment has been conducted for the period from commencement of mining of LW S1A (October 2022) to end December 2024 to estimate the volume of surface water reduction attributable to mining effects. In accordance with the SSD 8445, the surface water reduction volumes will be presented in the Annual Review and compared to the Water Access Licence (WAL) volumes held by Tahmoor Coal for the Maldon Weir Management Zone of the Upper Nepean and Upstream Warragamba Water Source (regulated by the *Water Sharing Plan for Greater Metropolitan Region Unregulated River Water Sources)*.

6.3 Channel Morphology and Knickpoint Assessment

Further minor development of erosion, initially reported in May 2024, was recorded at knickpoint K57 in July and August 2024. Knickpoint K57 was just within the zone of active subsidence around June 2024, during mining of longwall LW S3A. It is considered likely that erosion first occurred at this location in April 2024 when 122 mm of rainfall was recorded in a single day. In June 2024, 94 mm of rainfall was recorded in a single day, likely further contributing to erosion development. Accordingly, it is considered that the erosion development at knickpoint K57 is likely related predominately to high rainfall/flow events rather than mining effects.

Erosion development and a moderate increase in bank slipping and slumping were first recorded at knickpoint K64 in June 2024. High rainfall/flow events occurred in May and June 2024, in addition to direct undermining of K64. MSEC (2024) reported incremental subsidence of 533 mm at pool TT2 located downstream of K64 during May and June 2024. Accordingly, the erosion development and bank slipping and slumping is considered to be associated with high rainfall/flow events in combination with mining-induced subsidence.

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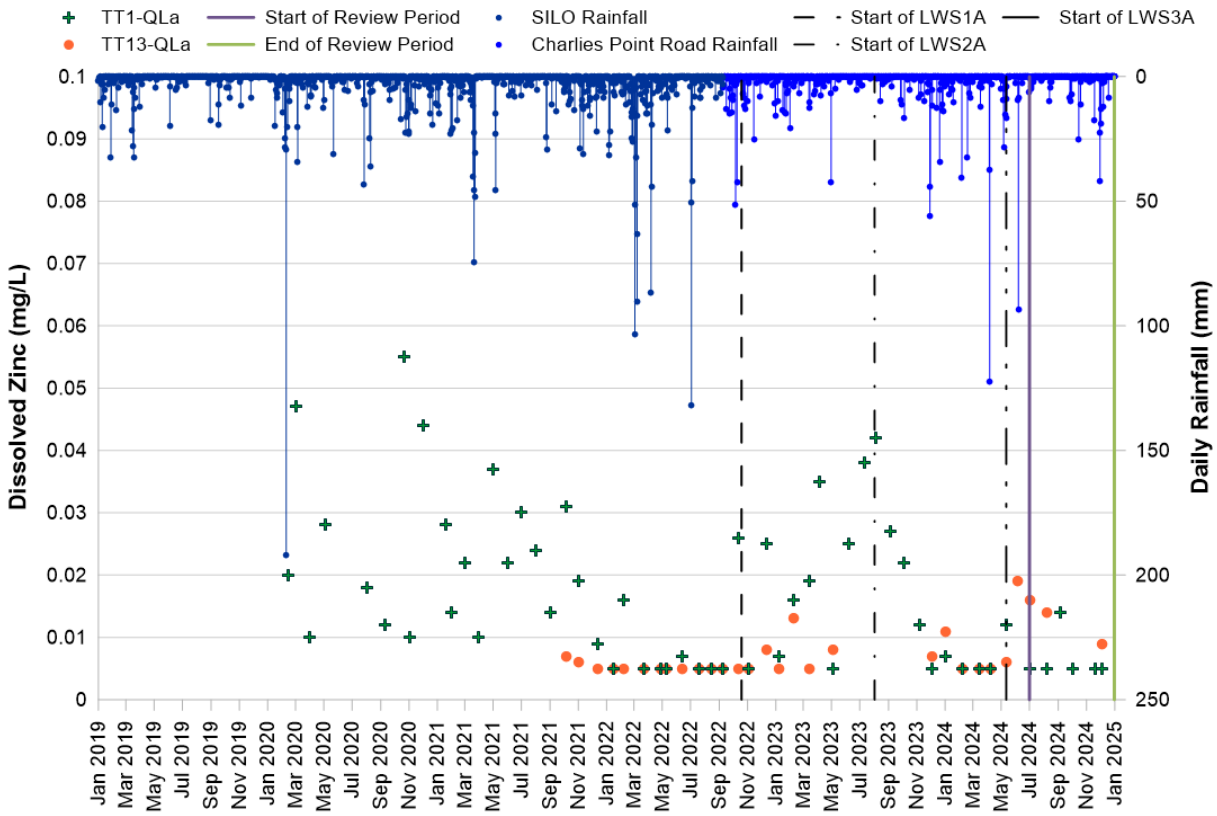
6.4 Water Quality

As summarised in **TABLE 5**, dissolved zinc concentrations recorded at TT13-QLa exceeded the corresponding SSGV in June, July and August 2024. The dissolved zinc concentrations recorded at reference site TT1-QLa and potential impact site TT13-QLa are shown on **GRAPH 7**.

GRAPH 7: DISSOLVED ZINC CONCENTRATIONS



The data presented in **GRAPH 7** indicates that:

- The TT13-QLa dissolved zinc SSGV (0.0008 mg/L) was exceeded for three consecutive months from June to August 2024 (inclusive) i.e., Level 1 trigger for August 2024.
- Pool TT13 was recorded as dry at the time of water quality sampling events in September, October and November 2024.
- Similar elevated dissolved zinc concentrations were not recorded at the upstream reference site (TT1-QLa) during the corresponding period.
- Elevated dissolved zinc concentrations, in excess of the SSGV, have been recorded historically at TT13-QLa.
- A Level 1 trigger or above for dissolved zinc (i.e. an exceedance of the SSGV for three consecutive months or greater) was not recorded at TT13-QLa during the baseline monitoring period prior to commencement of mining.

The elevated dissolved zinc concentrations recorded at pool TT13 are likely to be related to the interaction of underflow with subsurface geology (following the high rainfall event in June 2024) and re-emergence of elevated dissolved zinc underflow as surface flow in the vicinity of pool TT13.

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7 REVIEW OF SURFACE WATER PERFORMANCE

7.1 Subsidence Impact Performance Measures

The monitoring results, in conjunction with the TARPs, are used to assess the impacts of mining in Tahmoor South against the subsidence impact performance measures specified in **TABLE 6**, as replicated from the WMP.

TABLE 6: SUBSIDENCE PERFORMANCE MEASURES AND PERFORMANCE INDICATORS FOR SURFACE WATER

Feature	Subsidence Performance Measures	Subsidence Performance Indicators
All watercourses within the Subsidence Area	No greater subsidence impact or environmental consequences to water quality, water flows (including baseflow) or stream health (including riparian vegetation), than predicted in the EIS.	Exceedance of the impact assessment criteria, as defined in the relevant Level 1 to Level 3 trigger, where a Level 3 trigger denotes progression towards a potential exceedance of the performance measure.
Other watercourses	Negligible environmental consequences including beyond those predicted in the EIS, including: • negligible diversion of flows or changes in the natural drainage behaviour of pools; • negligible decline in baseline channel stability; • negligible gas releases and iron staining; and • negligible increase in water turbidity.	The performance measure will be considered to be exceeded if a Level 3 TARP is triggered in relation to water level decline and/or water quality changes and the investigation outcomes indicate a mining related impact based on monitoring data for sites in Hornes Creek and the Bargo River.

7.2 Assessment of Performance

TABLE 7 summarises the features considered to be directly or indirectly impacted by mining of LW S1A to LW S3A (to date).

TABLE 7: SUMMARY OF MINING RELATED IMPACTS

Watercourse Feature	Impact Feature	Impact Type
TT2	• Pool water level • Physical (fractures)	Direct
TT3	• Pool water level	Indirect
TT7	• Pool water level	Indirect
TT9	• Pool water level • Physical (fractures)	Indirect
TT10	• Pool water level • Physical (fractures)	Indirect
TT11	• Physical (fractures)	Indirect
TT12	• Pool water level • Physical (fractures) • Iron staining	Direct

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Watercourse Feature	Impact Feature	Impact Type
TT13	• Pool water level • Water quality	Indirect
TT15	• Pool water level	Indirect
K64 (upstream of TT2)	• Physical (erosion)	Direct

Where Teatree Hollow and Teatree Hollow tributary are directly mined beneath, subsidence effects are expected to be of sufficient magnitude to result in the buckling of underlying strata and associated surface fracturing at some locations, as detailed in the *Tahmoor South Project Environmental Impact Statement* (SIMEC, 2019).

At these locations, it is likely that water would be diverted from the watercourse into the underlying dilated strata, and the diverted flow would be conveyed via the dilated strata, remerging further downstream in the watercourse as surface flow. As such, localised reduction in pool water level and streamflow associated with fracturing in the vicinity of LW S1-S7A can occur. However, the net reduction in streamflow conveyed from Teatree Hollow to the Bargo River is expected to be negligible.

Additionally, isolated, episodic pulses in salinity and dissolved metals are expected to occur at Teatree Hollow due to subsidence induced changes in surface water runoff, underflow and baseflow discharging to these surface water systems.

Accordingly, it is considered that:

- The LW S1A to LW S3A mining related impacts to the watercourse features listed in **TABLE 7** are consistent with that predicted in the EIS.
- No greater impact than that predicted in the EIS has occurred to watercourses within the subsidence area.
- No impacts have occurred to other watercourses.
- No exceedance of the performance measures has occurred.
- No material environmental harm has occurred as a result of mining.

7.3 Impact Response

With respect to the water quality trigger exceedance recorded at TT13-QLa during the review period, there are limited feasible corrective management actions (CMAs) that could be implemented prior to the cessation of subsidence movements associated with mining of LW S1A-S7A. It is also noted that dissolved zinc concentrations recorded at TT13-QLa were only elevated from June to August 2024, declining to near baseline conditions in late 2024. Based on the water quality records for monitoring sites located downstream of TT13-QLa, there has not been a persistent effect to water quality associated with the temporary increase in dissolved zinc recorded at TT13-QLa. Accordingly, it is considered that water quality effects were limited to pool TT13 during the review period with negligible indication of material environmental harm to Teatree Hollow.

Direct and indirect mining impacts, in the form of surface fracturing and associated flow diversion, have occurred at several locations in Teatree Hollow and Teatree Hollow tributary, upstream of monitoring site TT-F1. During the review period, the reduction in surface flow recorded at TT-F1 was generally consistent with natural (climatic) variability (refer **Section 5.3**). As such, there is negligible indication of material environmental harm to Teatree Hollow downstream of TT-F1, or to other watercourses outside of the Study Area, associated with mining activities. Nonetheless, surface water monitoring and data review will continue to be undertaken in accordance with the WMP.

In accordance with C12 of SSD 8445 and as detailed in the WMP, a Watercourse Corrective Action Management Plan (WCAMP) will be prepared for watercourses damaged by subsidence impacts. The WCAMP will be prepared in consultation with relevant government agencies, as defined in the WMP. The WCAMP will be prepared and implemented at the cessation of subsidence movements associated with Tahmoor South mining.

Impacts at K57 are considered to be associated with high rainfall/flow events. Impacts at K64 are considered to be associated with high rainfall/flow events combined with mining-induced subsidence

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effects (i.e. direct mining impact was confirmed). An increase in monitoring frequency is not required at these sites (in accordance with the WMP). Tahmoor Coal will continue to undertake visual inspections of K57 and K64 in accordance with the WMP to assess the potential cause, extent and longevity of impacts. The requirement for remediation works would subsequently be assessed at a later stage.

A summary of the Tahmoor Coal responses to the action and responses detailed in the WMP TARPs (Tahmoor Coal, 2025) has been prepared in collaboration with Tahmoor Coal and is presented in **Appendix D**.

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8 SUMMARY AND RECOMMENDATIONS

8.1 Trigger Level Summary

Review and assessment of surface water monitoring data recorded prior to and during the review period of 1 July to 31 December 2024 has indicated the following.

Surface Water Level:

- A maximum Level 3 trigger exceedance was recorded at monitoring site TT2-QLa due to mining related fracturing immediately upstream of pool TT2 in combination with climatic conditions.
- A maximum Level 3 trigger exceedance was recoded at monitoring site TT3-QLa due to mining related fracturing in the vicinity of pool TT11 and pool TT3 in combination with climatic conditions.
- A maximum Level 3 trigger exceedance was recorded at monitoring site TT7-QLa and TT13-QLa as a result of upstream mining-related fracturing in combination with climatic conditions.
- A maximum Level 2 trigger exceedance was recorded at monitoring site TT9-QLa due to mining-related effects in combination with climatic conditions.
- A maximum Level 3 trigger exceedance was recorded at monitoring site TT12-QLa due to mining-related effects in combination with climatic conditions.
- The monitoring sites on the Bargo River were 'normal condition' for the duration of the review period.

Physical Features and Natural Behaviour of Pools:

- A maximum Level 3 trigger exceedance was recorded at pools TT3, TT7, TT11, TT12 and TT13 due to visually anomalous changes in water level.
- A maximum Level 3 trigger exceedance was recorded at pool TT2, TT9 and TT10 due to visually anomalous changes in water level and the observation of a new mining-related fracture upstream of pool TT2 (June 2024).

Channel Morphology and Knickpoint assessment

- A maximum Level 1 trigger exceedance was recorded at knickpoint K57 due to erosion development related to high rainfall.
- A maximum Level 2 trigger exceedance was recorded at knickpoint K64 due to erosion development in May and June 2024, related to high rainfall and mining-induced subsidence.

Water Quality

- A maximum Level 1 trigger exceedance was recorded at pool TT13 related to elevated dissolved zinc concentrations.

Based on the monitoring data for the period of 1 July to 31 December 2024, mining related impacts to the watercourse features are considered consistent with that detailed in the EIS.

8.2 Monitoring Recommendations

Based on the assessment outcomes contained herein, it is recommended that ongoing review of monitoring data is continued to be undertaken in accordance with the WMP. No changes to the monitoring program are proposed at this time.

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ENRS (2024a). July 2024 Tahmoor South Visual Inspections of Waterways. Report by Environment & Natural Resource Solutions prepared for Tahmoor Coal Pty Ltd.

ENRS (2024b). August 2024 Tahmoor South Visual Inspections of Waterways. Report by Environment & Natural Resource Solutions prepared for Tahmoor Coal Pty Ltd.

ENRS (2024c). September 2014 Tahmoor South Visual Inspections of Waterways. Report by Environment & Natural Resource Solutions prepared for Tahmoor Coal Pty Ltd.

ENRS (2024d). October 2024 Tahmoor South Visual Inspections of Waterways. Report by Environment & Natural Resource Solutions prepared for Tahmoor Coal Pty Ltd.

ENRS (2024e). November 2024 Tahmoor South Visual Inspections of Waterways. Report by Environment & Natural Resource Solutions prepared for Tahmoor Coal Pty Ltd.

ENRS (2024f). December 2024 Tahmoor South Visual Inspections of Waterways. Report by Environment & Natural Resource Solutions prepared for Tahmoor Coal Pty Ltd.

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MSEC (2025). Six Monthly Subsidence Monitoring Report for Tahmoor South LW S3A. 1 July 2024 to 21 January 2025.

Tahmoor Coal (2025). Tahmoor South Domain – Longwalls South S1A-S6A Water Management Plan, February.

ANZECC & ARMCANZ 2000, Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Canberra.

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APPENDICES

APPENDIX A – SUMMARY OF SURFACE WATER MONITORING PROGRAM

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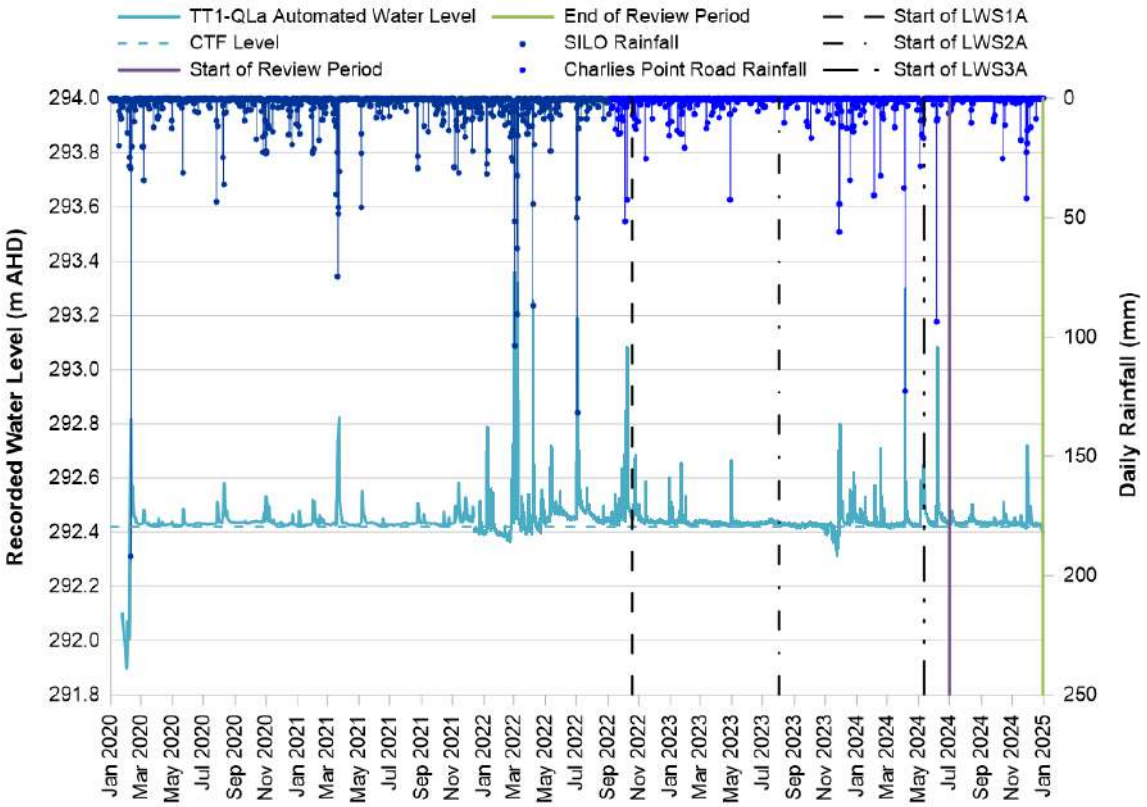
Feature	Locations	Monitoring		
		Prior to Mining	During Mining	Post Mining
Streamflow	Streamflow gauging stations: • TT-F1 • DT-F1	Continuous record. Data downloaded prior to the commencement of secondary extraction in relevant catchment.	Continuous record. Data downloaded and reviewed monthly.	Continuous record, data downloaded and reviewed quarterly for 12 months following the completion of relevant mining activities. This period may be extended as per decision by the Environmental Response Group*.
Surface Water Quality	TT1-QLa, TT2-QLa, TT3-QLa, TT7-QLa, TT9-QLa, TT12-QLa, TT13-QLa, TT14-QLa, HC1-QLa, HC2-QLa, HC3-QLa, HC9-QLa, HC4-QRLa, HC13-QLa, HC15-QLa, HC17-QLa, BR6-QLa, BR13-QRLa, BR12-QLa, BR16-QLa, BR17-QLa, BR18-QLa, DT4-QLa, DT3-QLa	Monthly sampling prior to secondary extraction or other relevant mining activity.	Monthly sampling and analysis or as required by a specified action relevant to a trigger level.	Monthly sampling and analysis for a minimum of 12 months following the completion of LW S7A or as required in accordance with a Watercourse Corrective Action Management Plan.
		Parameters: Field analysis: pH, EC and DO, temperature and ORP. Laboratory analysis for: pH, EC, total dissolved solids, total suspended solids, turbidity, major cations†, sulphate, alkalinity, chloride, dissolved metals‡, total metals≠, total kjeldahl nitrogen, total nitrogen, total phosphorus, total cations and total anions.		

Feature	Locations	Monitoring		
		Prior to Mining	During Mining	Post Mining
Automated pool water level	Existing sites: TT1-QLa, TT2-QLa, TT3-QLa, TT7-QLa, TT9-QLa, TT12-QLa, TT13-QLa, TT14-QLa, HC1-QLa, HC2-QLa, HC3-QLa, HC9-QLa, HC4-QRLa, HC13-QLa, HC15-QLa, HC17-QLa, BR6-QLa, BR13-QRLa, BR12-QLa, BR16-QLa, BR17-QLa, BR18-QLa, DT4-QLa, DT3-QLa	Continuous record and monthly manual measurements. Data downloaded prior to the commencement of secondary extraction of the relevant longwall.	Continuous record and monthly manual measurements. Data downloaded and reviewed monthly.	Continuous record and monthly manual measurements for a minimum of 12 months following the completion of LW S67A or as required in accordance with a Watercourse Corrective Action Management Plan.
Physical features and natural behaviour of pools and reaches	Teatree Hollow, Teatree Hollow tributary and the Bargo River tributary pools and reaches	One observation prior to mining using fixed location photo points.	Observations every month during the active subsidence period (after 200 m of secondary extraction of relevant longwall) for sites within the active subsidence zone using fixed location photo points.	Quarterly observations over 12 months for pools that are no longer within the active subsidence zone or as required in accordance with a Watercourse Corrective Action Management Plan.
Morphology and channel stability	Headwater and knickpoint sites in Teatree Hollow, Teatree Hollow tributary and the Bargo River tributary	One observation prior to mining using fixed location photo points. One catchment survey of 10 headwater sites	Observations of knickpoint formation every month during the active subsidence period for sites within the active subsidence zone using fixed location photo points. Annual catchment survey of 10 headwater sites.	One observation of knickpoint formation at sites that are no longer within the active subsidence zone using fixed location photo points. One catchment survey of 10 headwater sites. Post-mining geomorphology survey following completion of mining LW S7A.

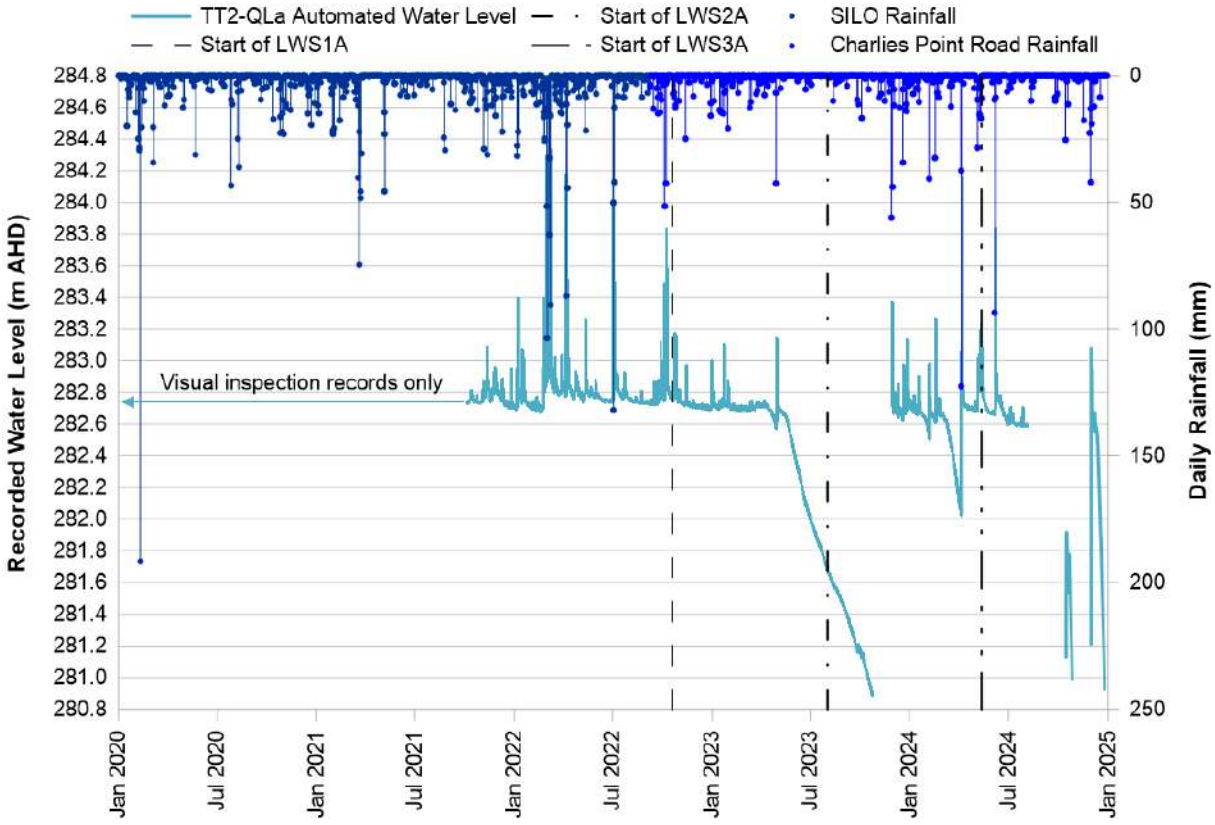
APPENDIX B – WATER LEVEL GRAPHS

APPENDIX B1 – TEATREE HOLLOW WATER LEVEL GRAPHS

GRAPH B1.1: MONITORING SITE TT1-QLA WATER LEVEL RECORDS



GRAPH B1.2: MONITORING SITE TT2-QLA WATER LEVEL RECORDS



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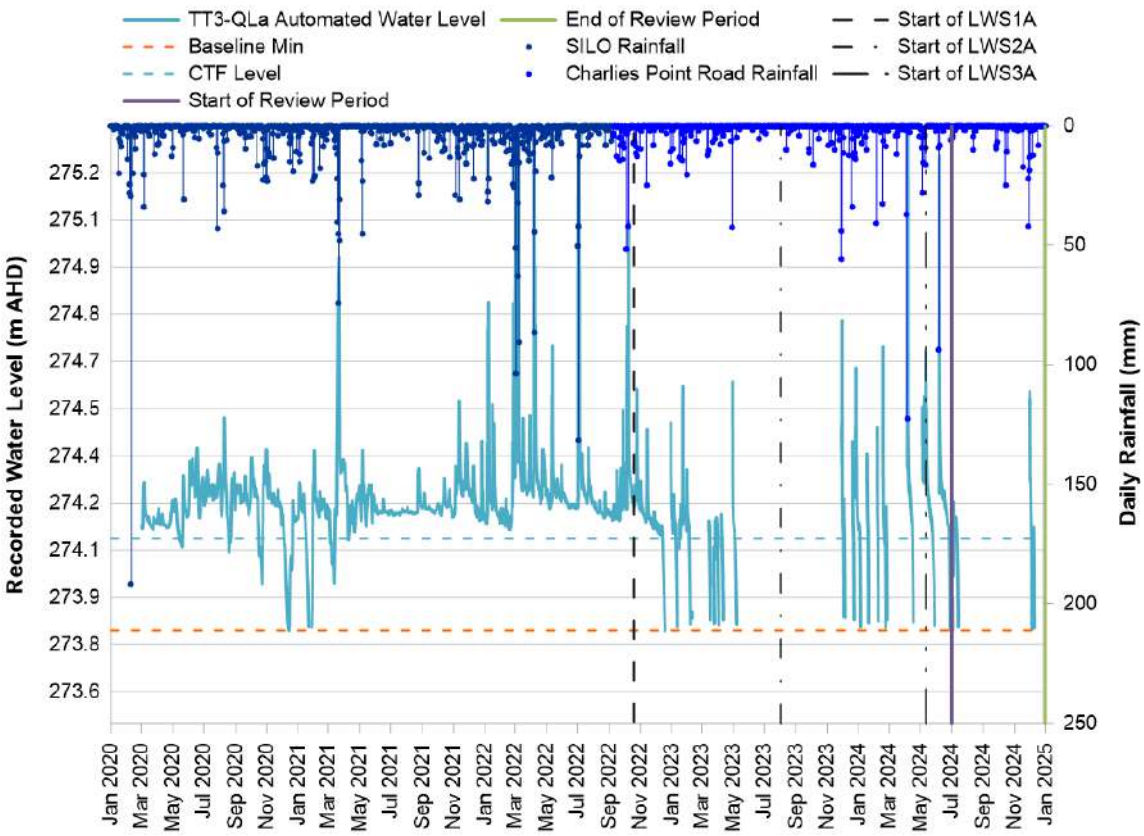
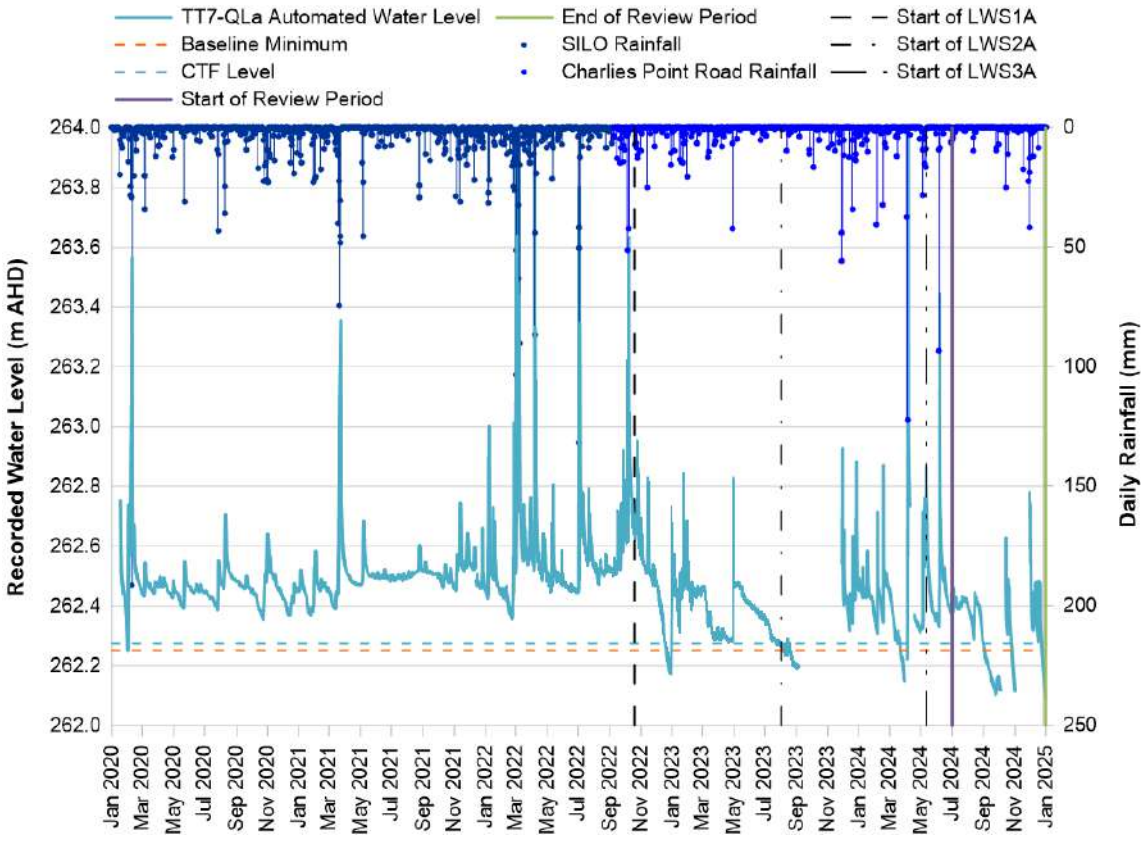
GRAPH B1.3: MONITORING SITE TT3-QLA WATER LEVEL RECORDS



GRAPH B1.4: MONITORING SITE TT7-QLA WATER LEVEL RECORDS



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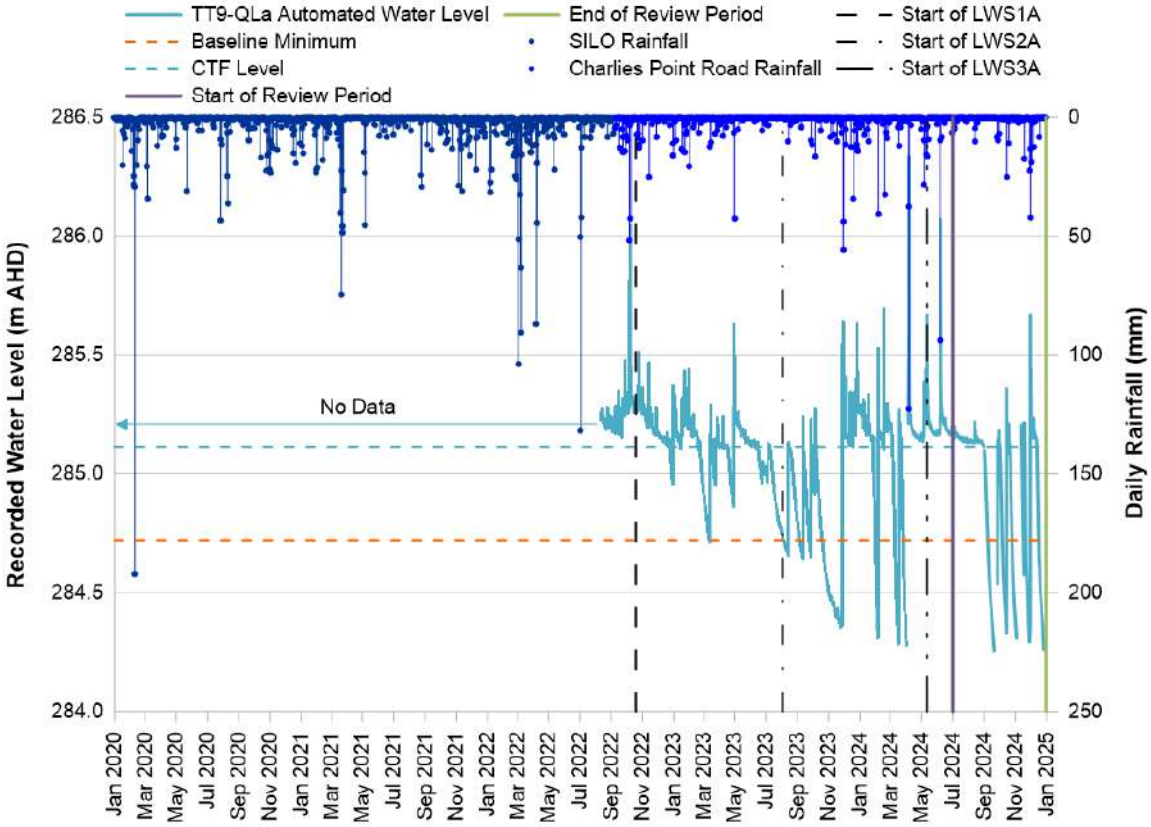
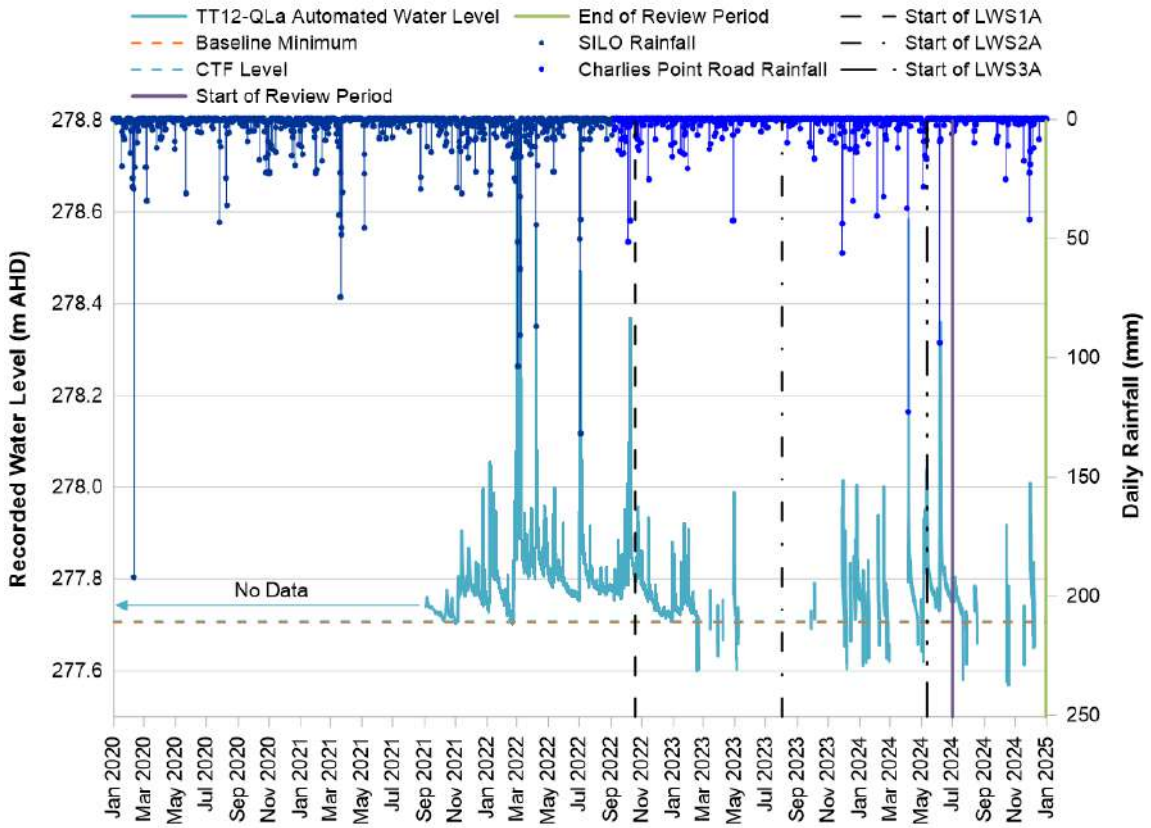
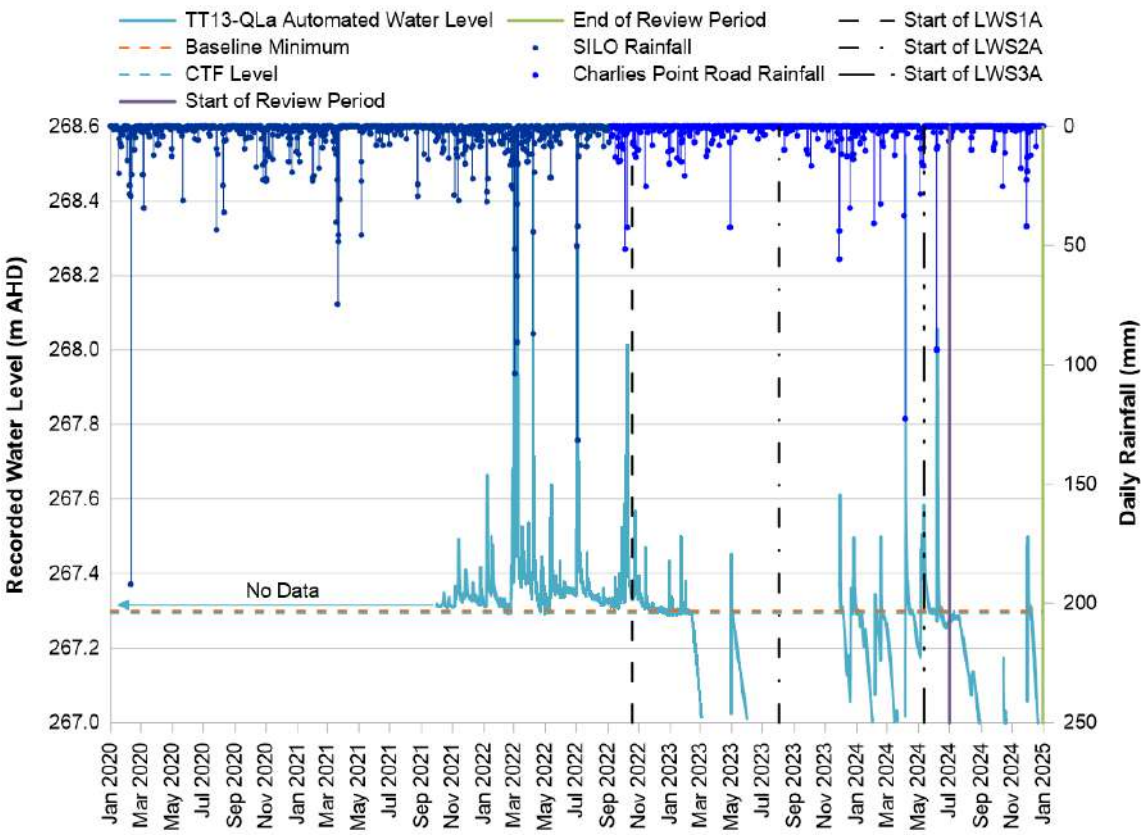
GRAPH B1.5: MONITORING SITE TT9-QLA WATER LEVEL RECORDS



GRAPH B1.6: MONITORING SITE TT12-QLA WATER LEVEL RECORDS

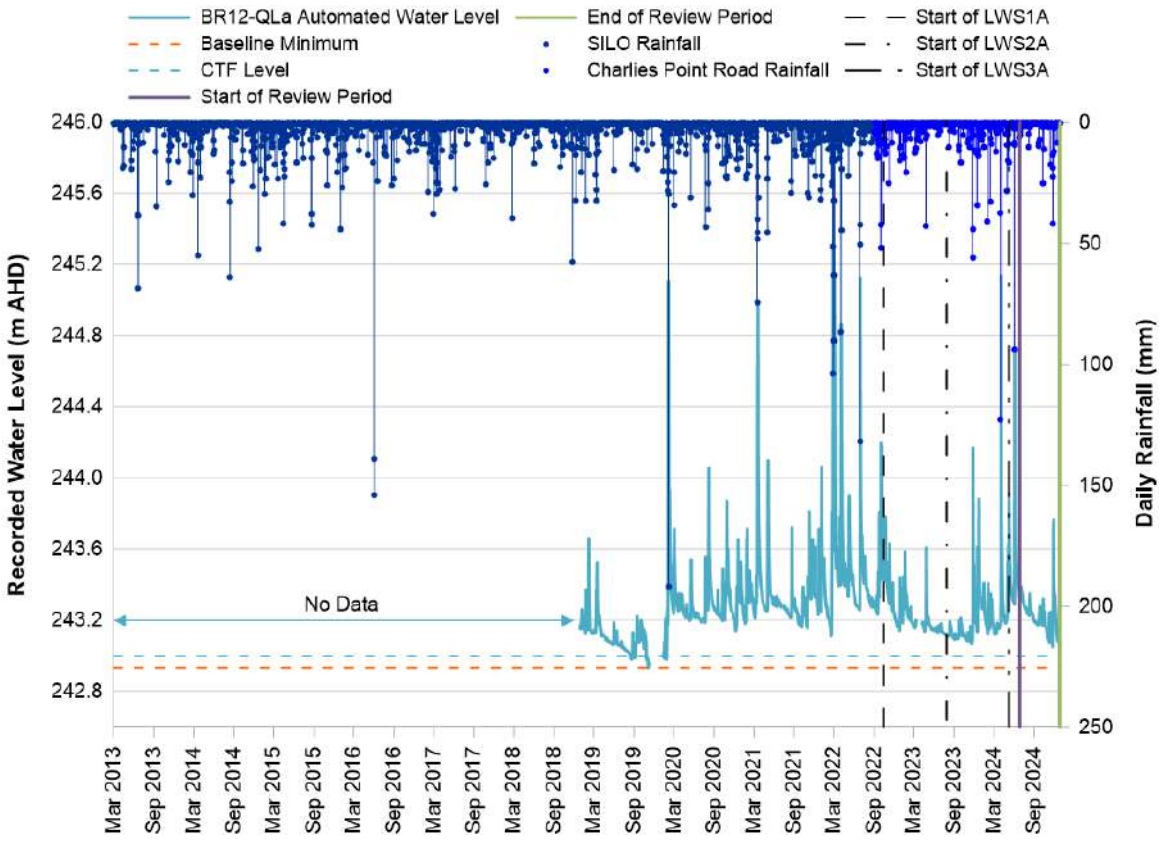


GRAPH B1.7: MONITORING SITE TT13-QLA WATER LEVEL RECORDS

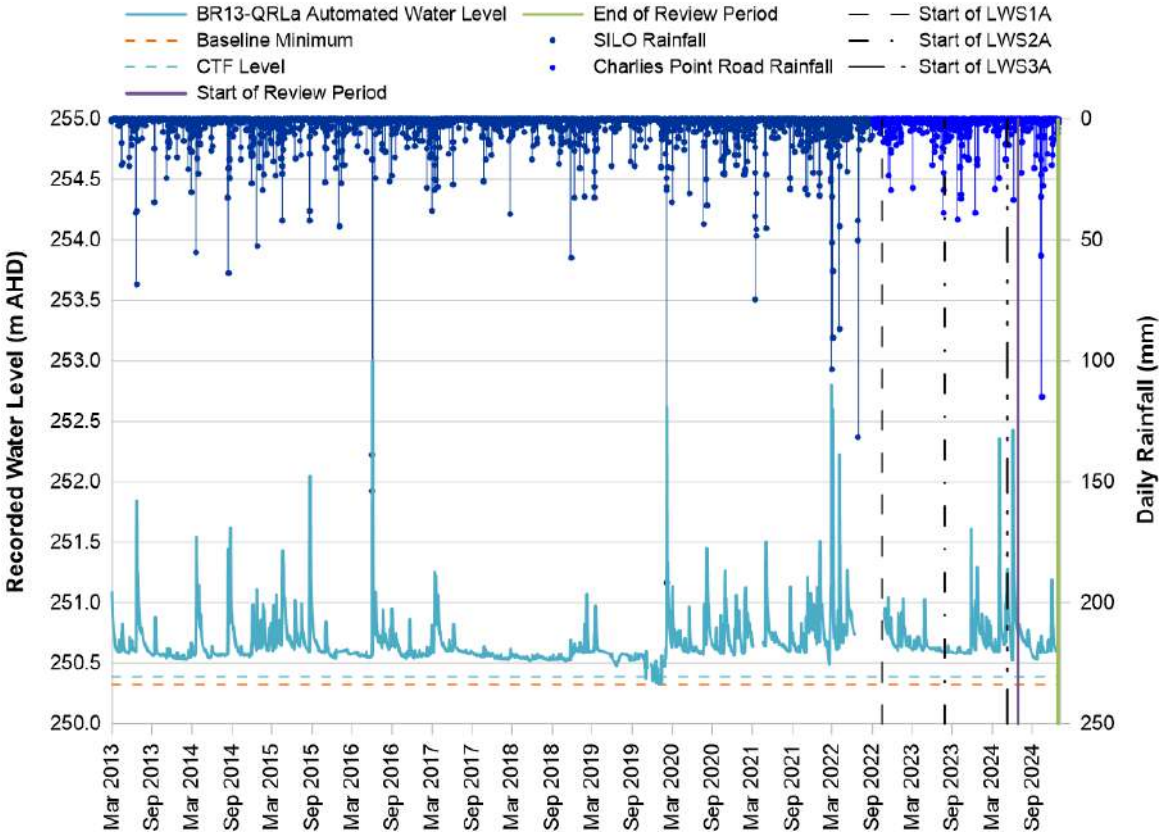


APPENDIX B2 – BARGO RIVER WATER LEVEL GRAPHS

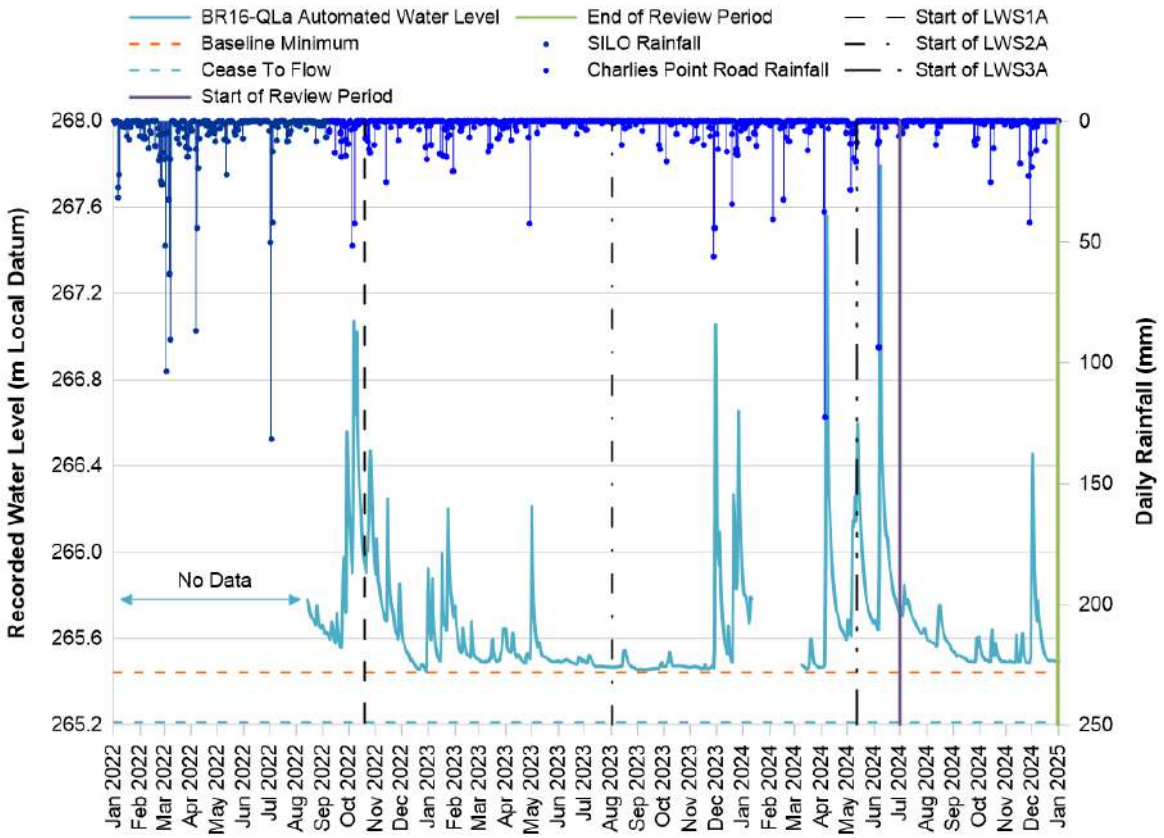
GRAPH B2.1: MONITORING SITE BR12-QLA WATER LEVEL RECORDS



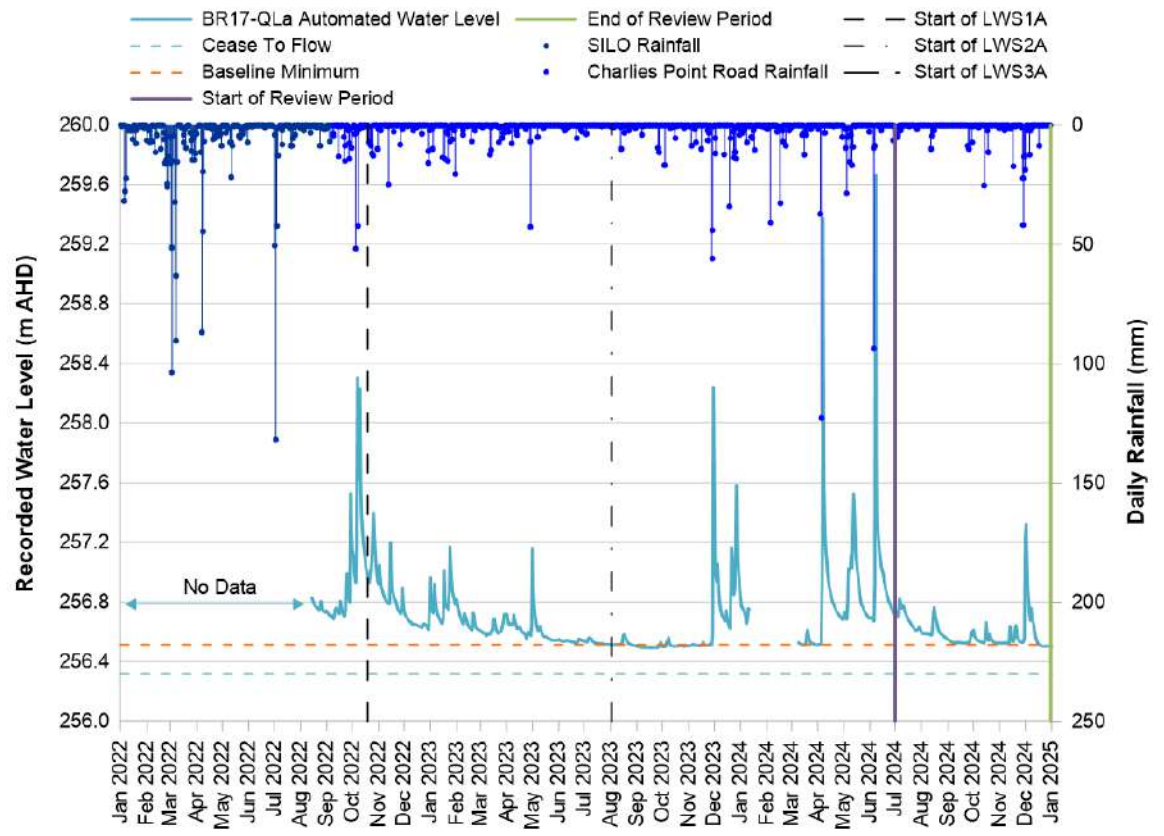
GRAPH B2.2: MONITORING SITE BR13-QLA WATER LEVEL RECORDS



GRAPH B2.3: MONITORING SITE BR16-QLA WATER LEVEL RECORDS



GRAPH B2.4: MONITORING SITE BR17-QLA WATER LEVEL RECORDS



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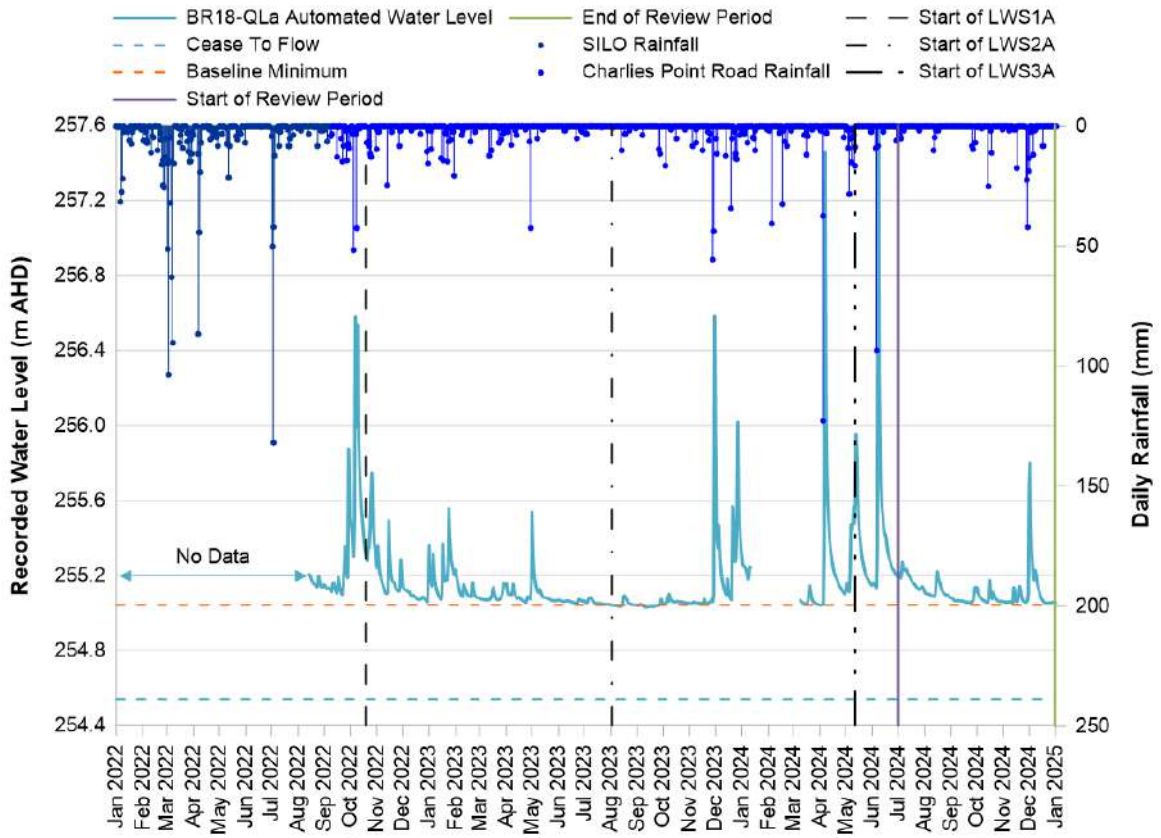
GRAPH B2.5: MONITORING SITE BR18-QLA WATER LEVEL RECORDS



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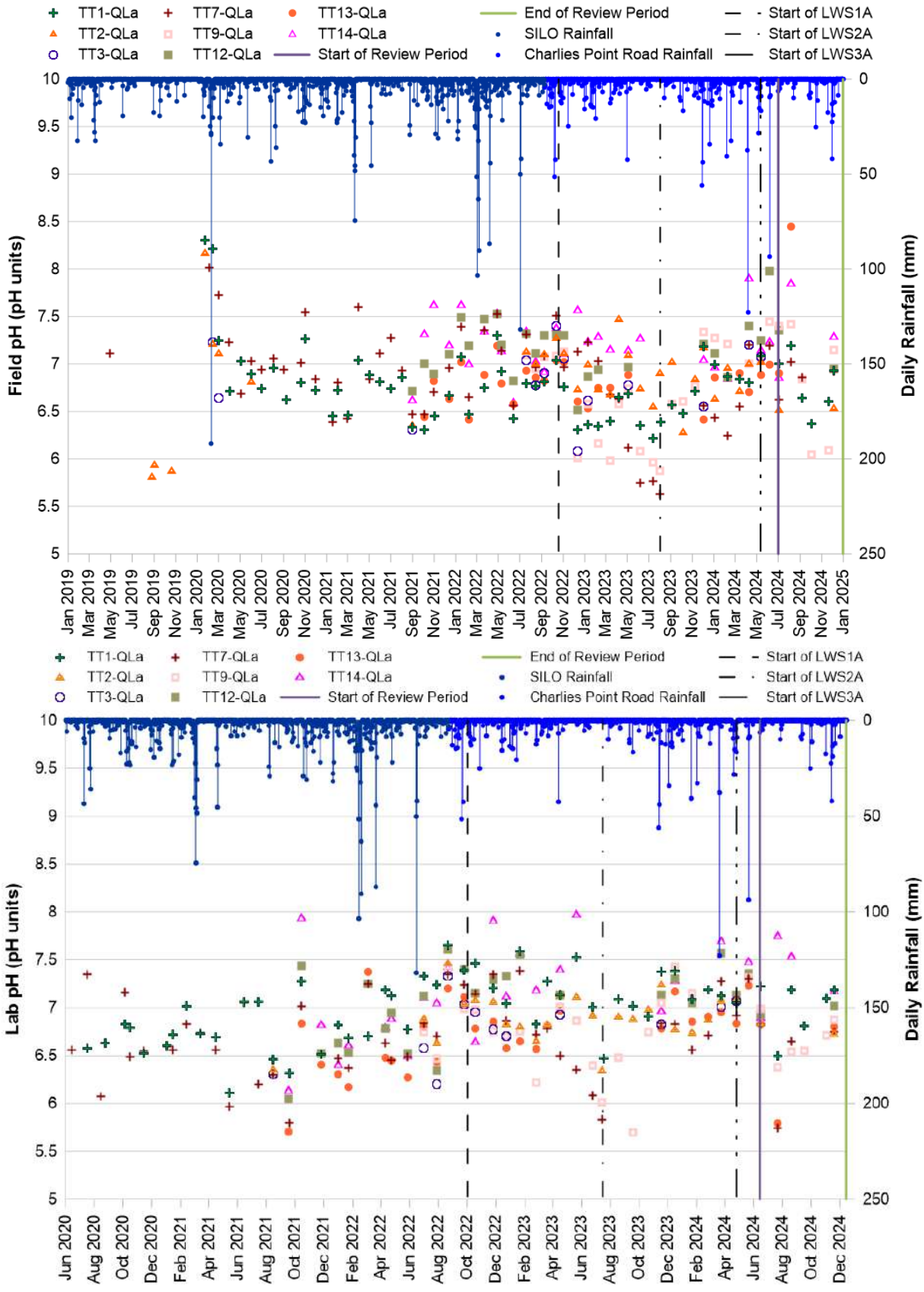
APPENDIX C – WATER QUALITY GRAPHS [4]

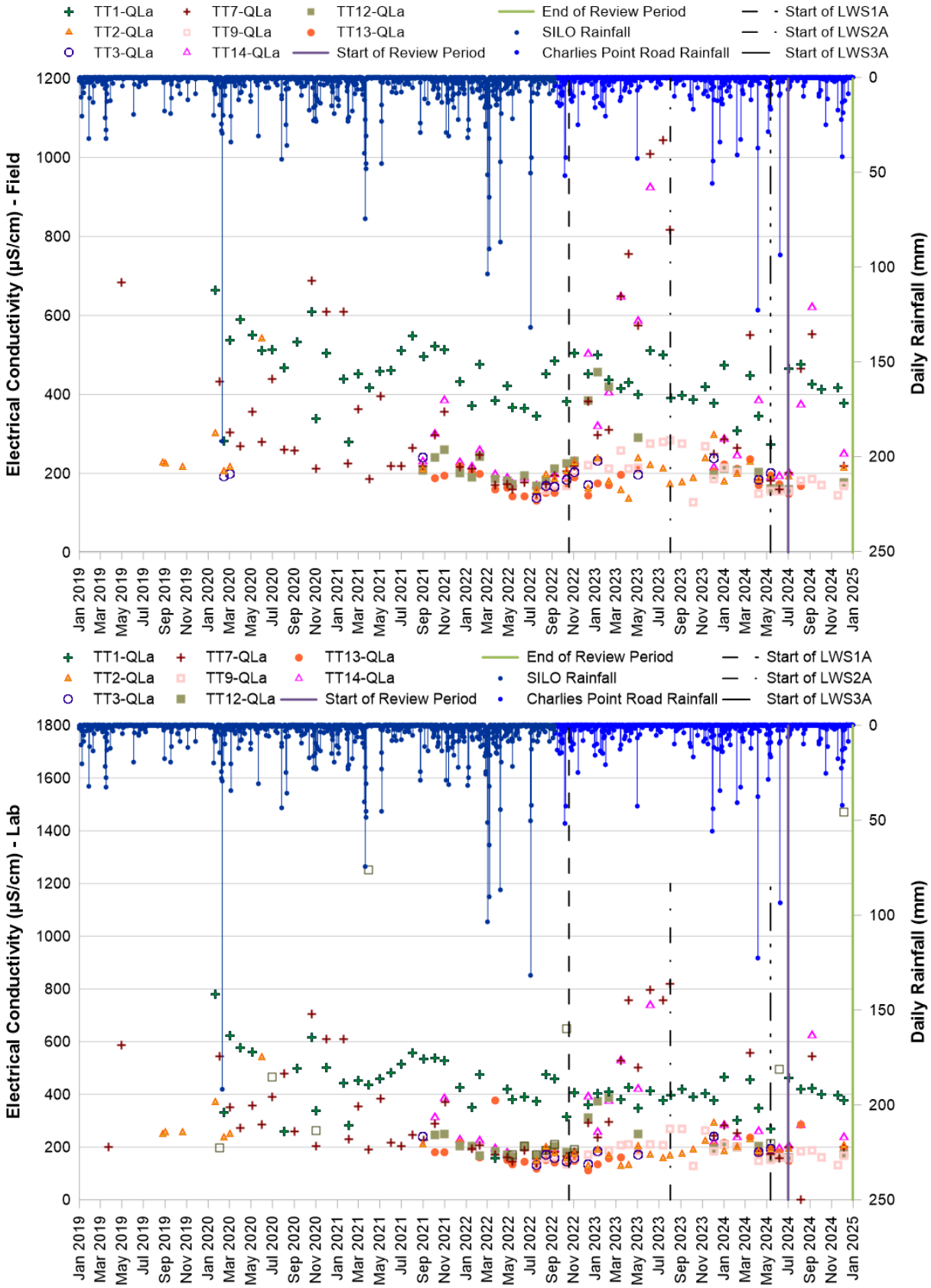
[4] When the recorded value was below the limit of reporting, the value has been graphed at the limit of reporting in the following graphs.

APPENDIX C1 – TEATREE HOLLOW WATER QUALITY GRAPHS

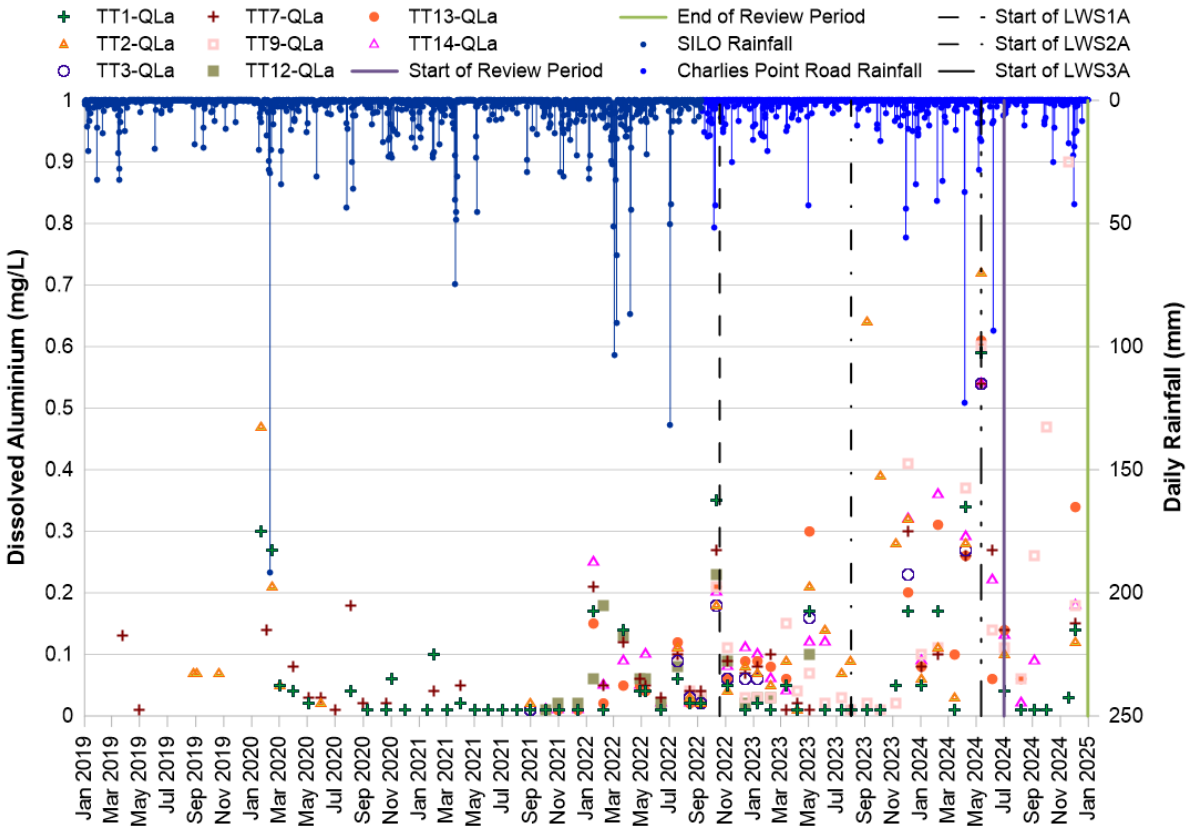
GRAPH C1.1: FIELD AND LABORATORY PH RECORDS



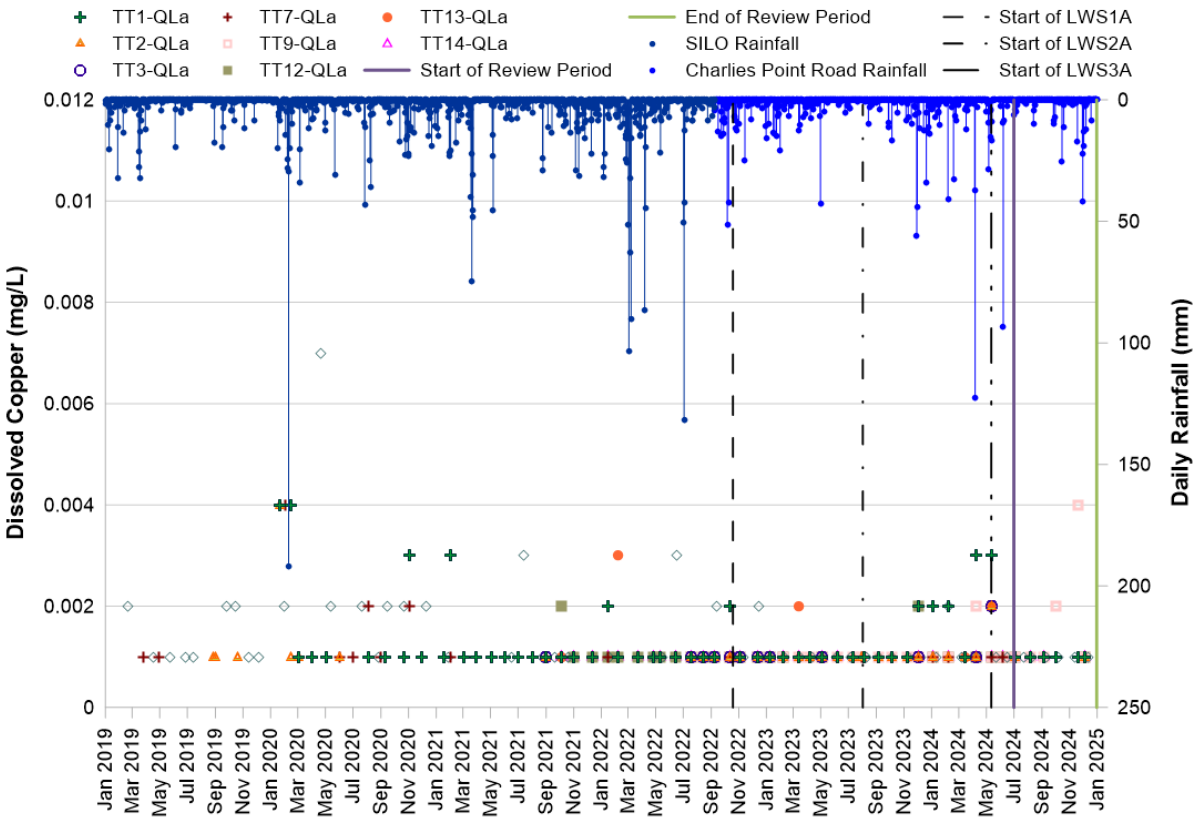
GRAPH C1.2: FIELD AND LABORATORY ELECTRICAL CONDUCTIVITY RECORDS



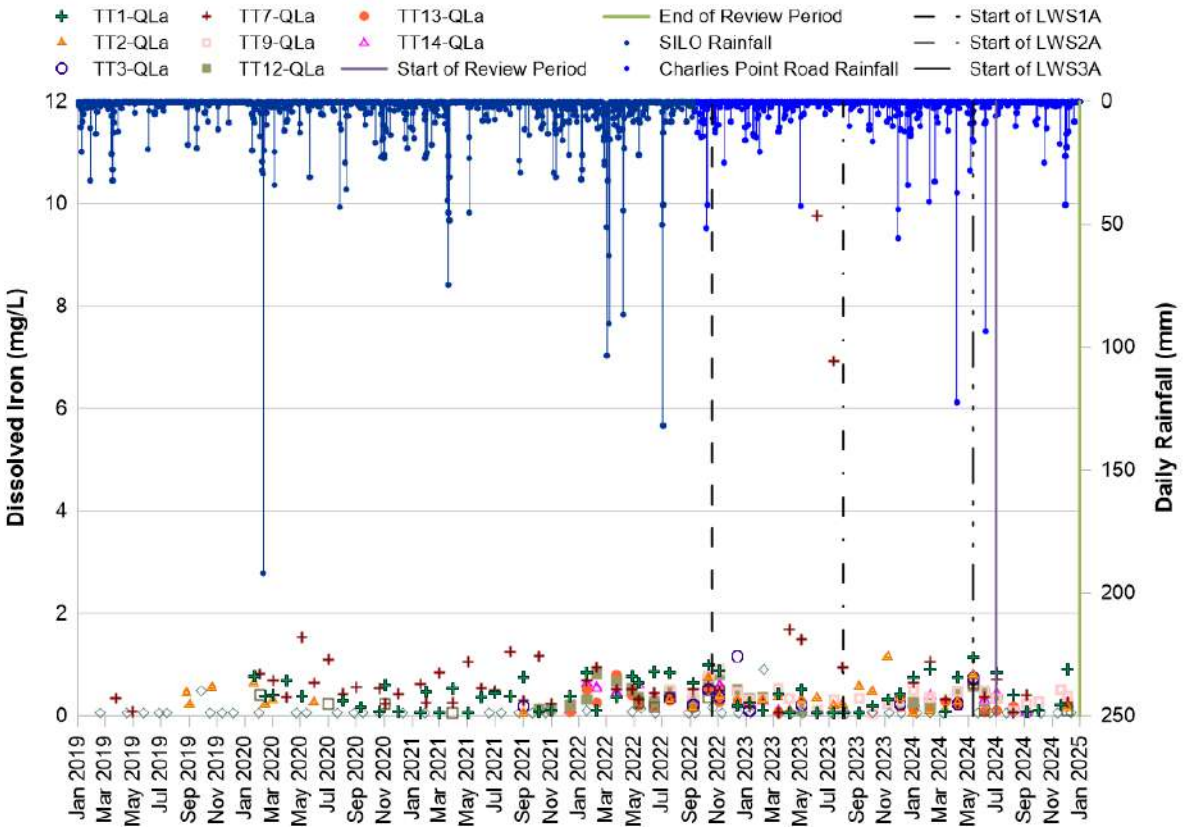
GRAPH C1.3: DISSOLVED ALUMINIUM RECORDS



GRAPH C1.4: DISSOLVED COPPER RECORDS



GRAPH C1.5: DISSOLVED IRON RECORDS



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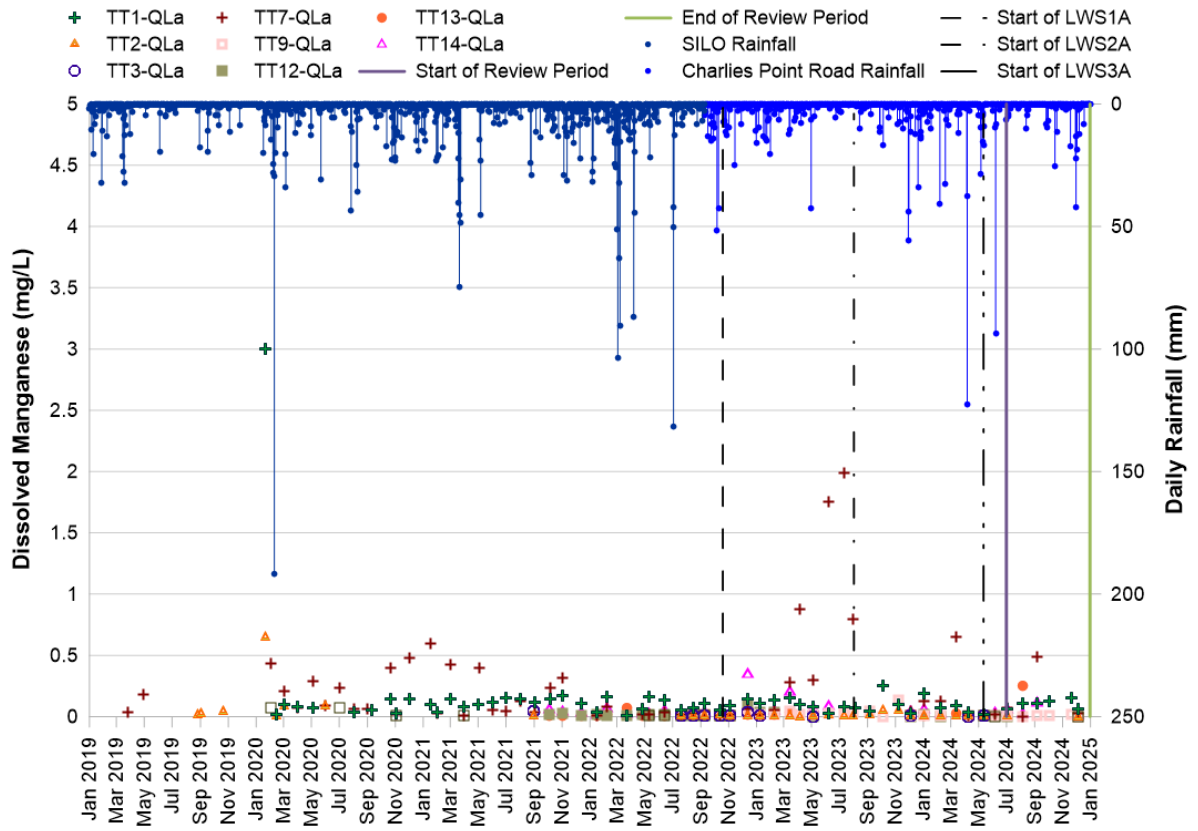
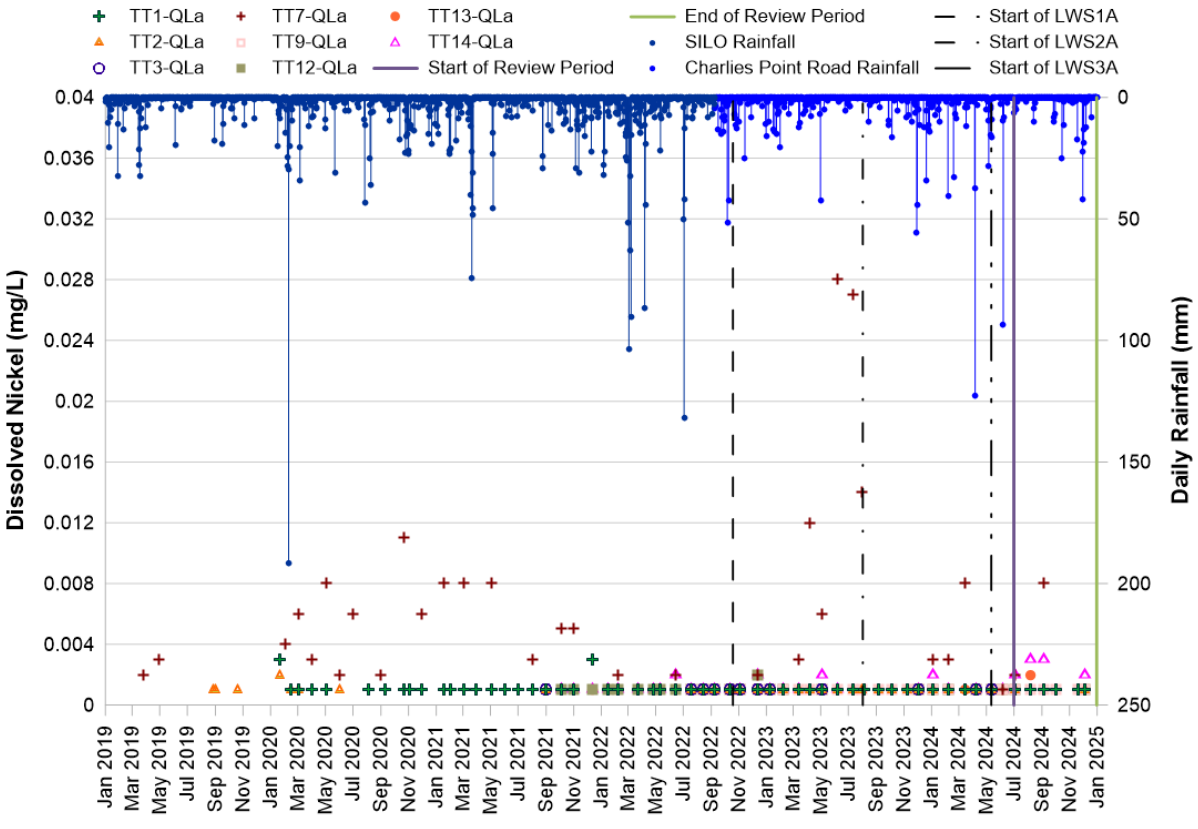
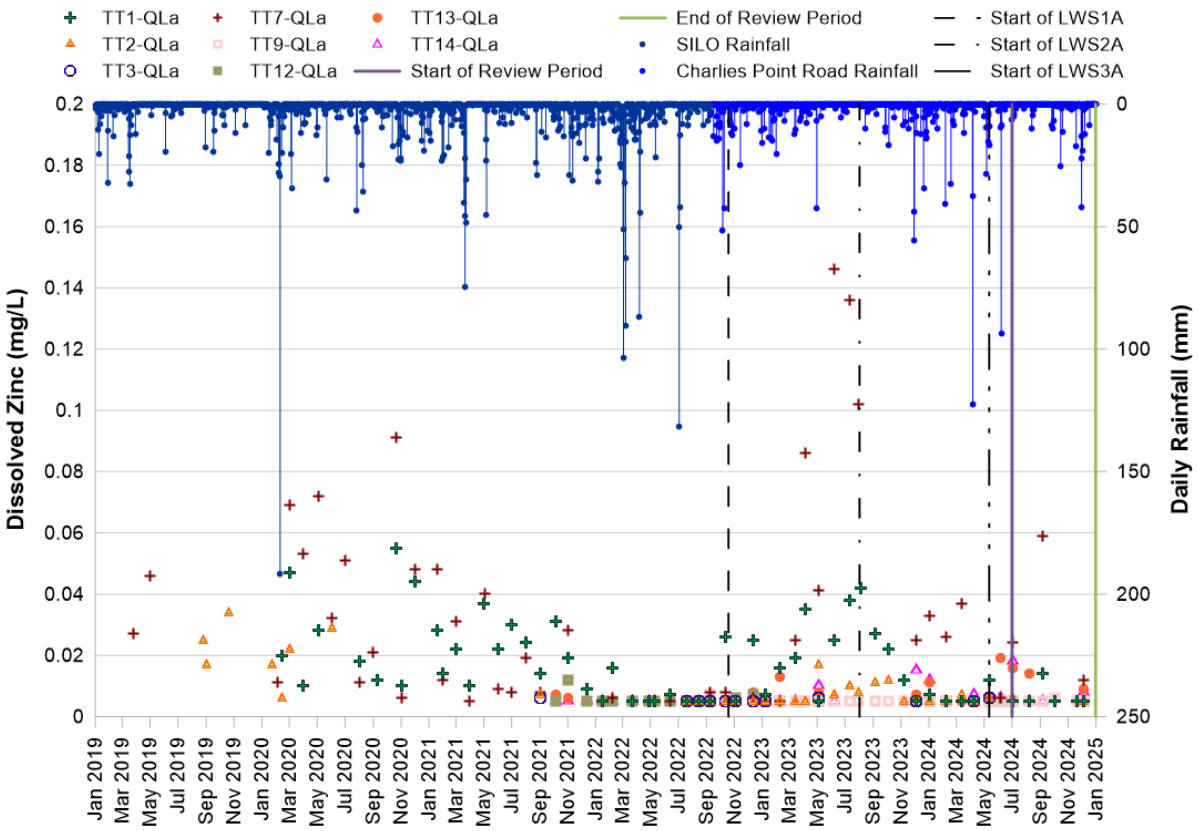
GRAPH C1.6: DISSOLVED MANGANESE RECORDS



GRAPH C1.7: DISSOLVED NICKEL RECORDS



GRAPH C1.8: DISSOLVED ZINC RECORDS



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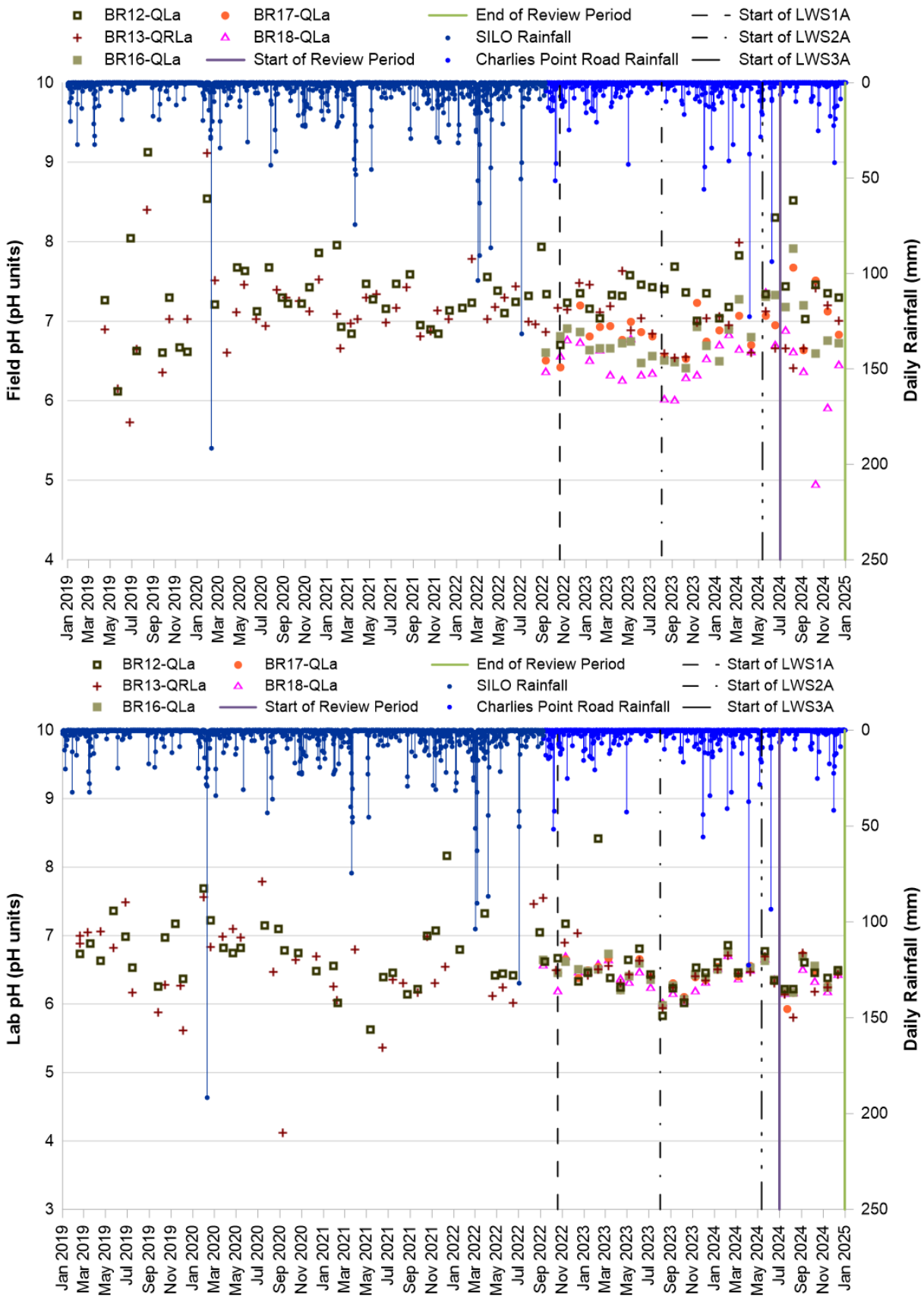
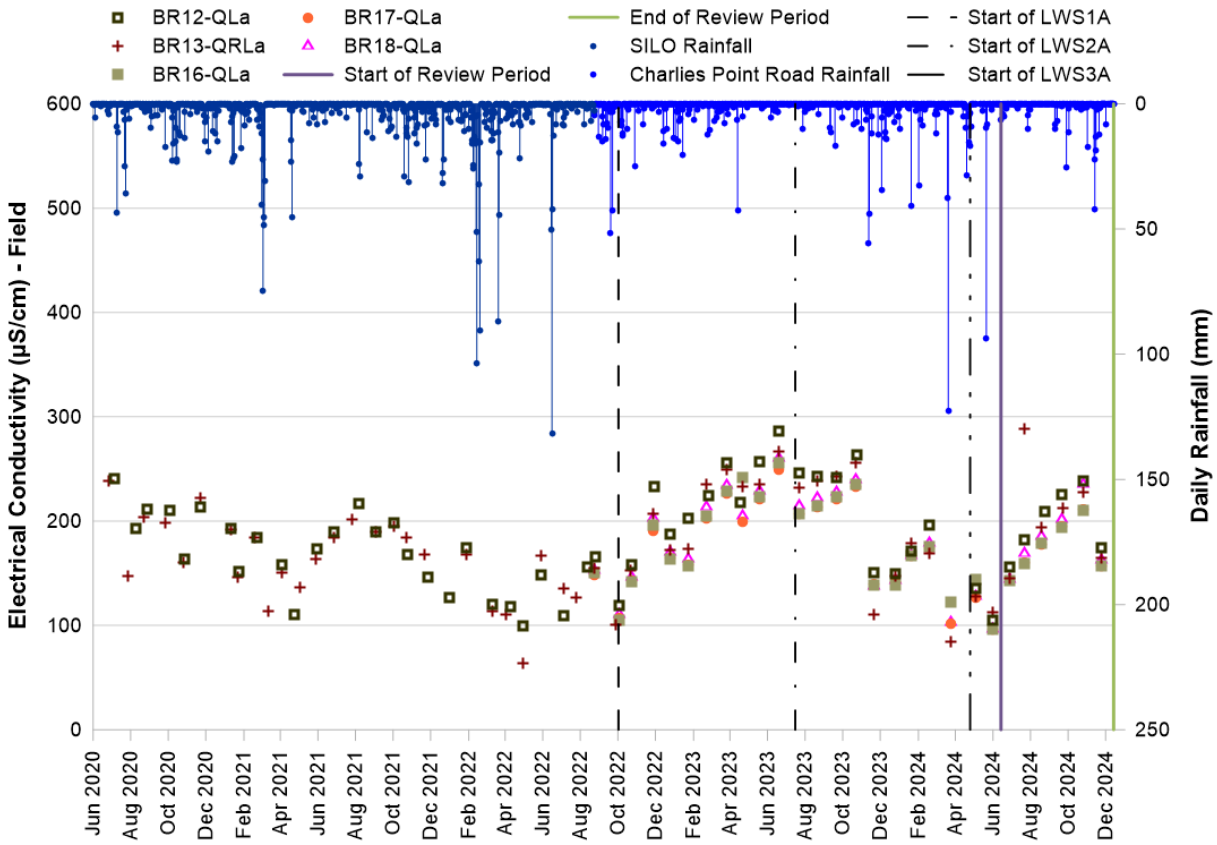
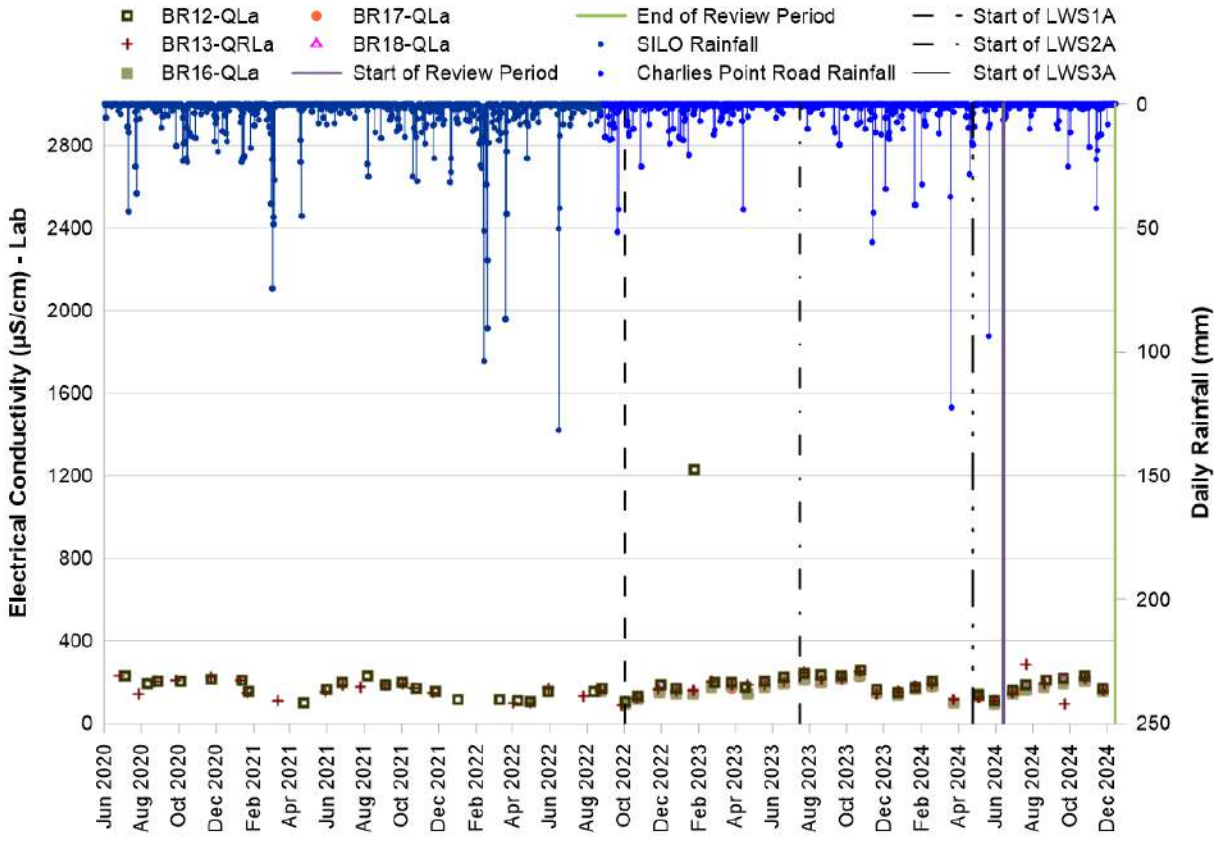
APPENDIX C2 – BARGO RIVER WATER QUALITY GRAPHS

GRAPH C2.1: FIELD AND LABORATORY PH RECORDS

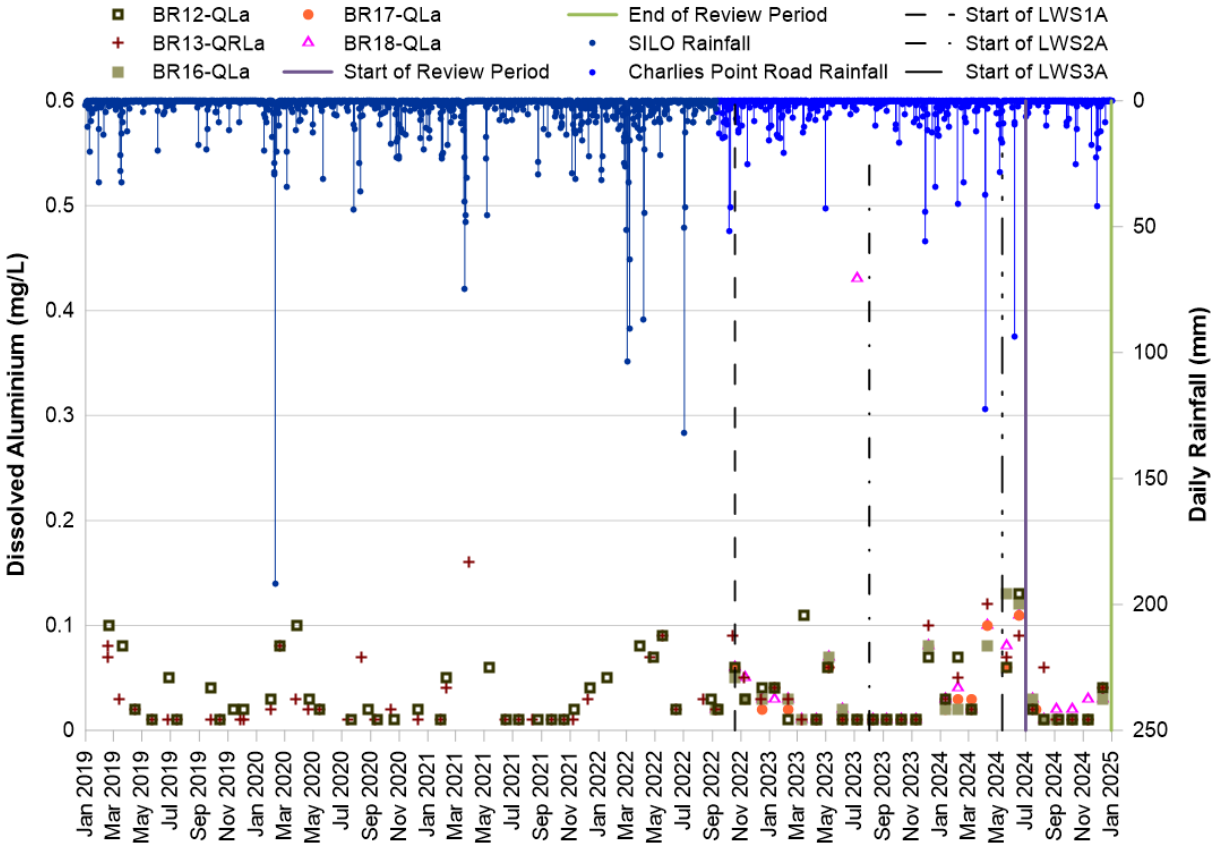


GRAPH C2.2: FIELD AND LABORATORY ELECTRICAL CONDUCTIVITY RECORDS

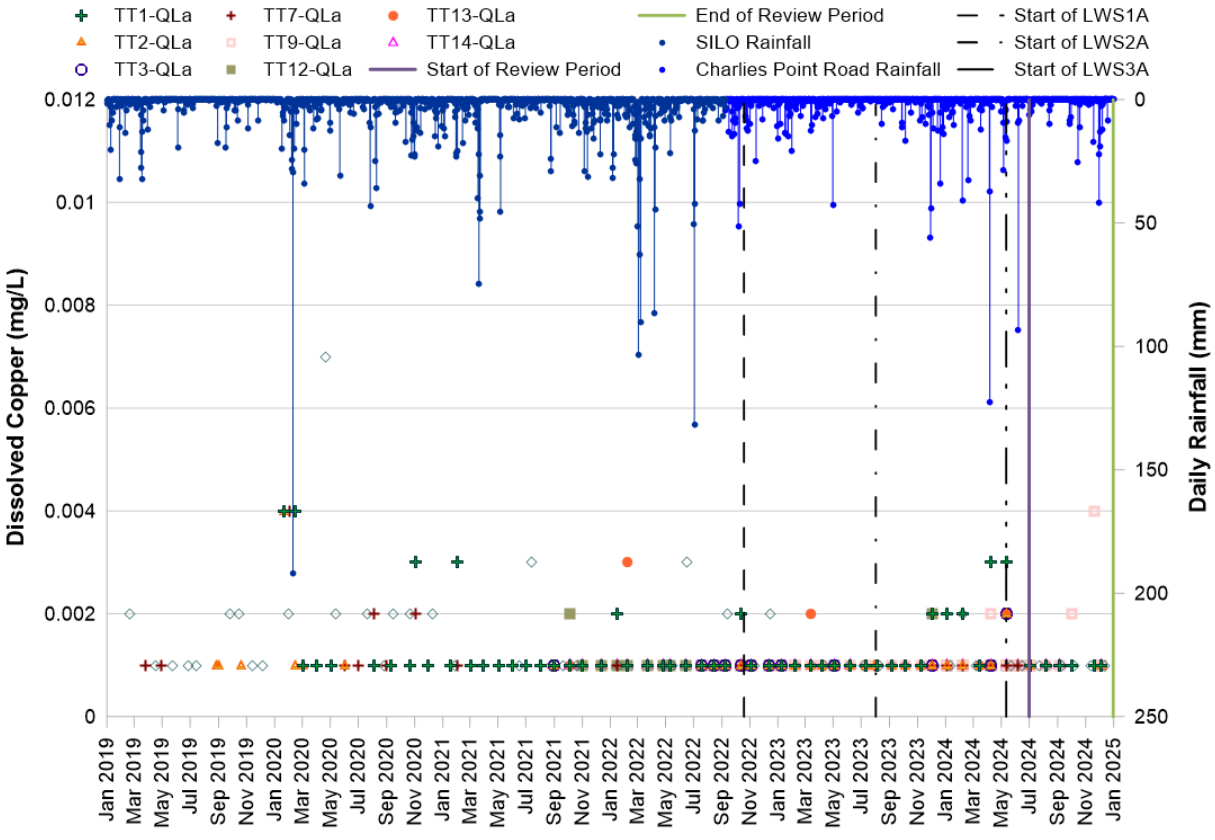




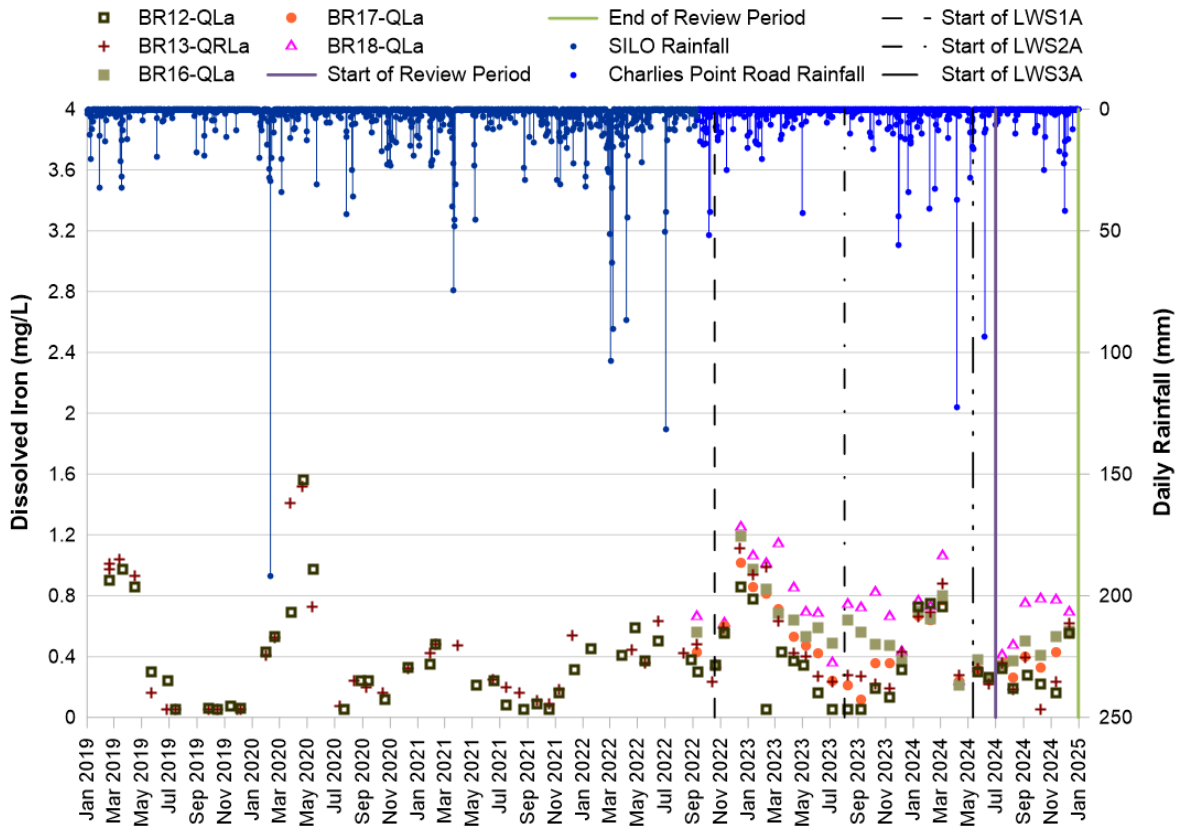
GRAPH C2.3: DISSOLVED ALUMINIUM RECORDS



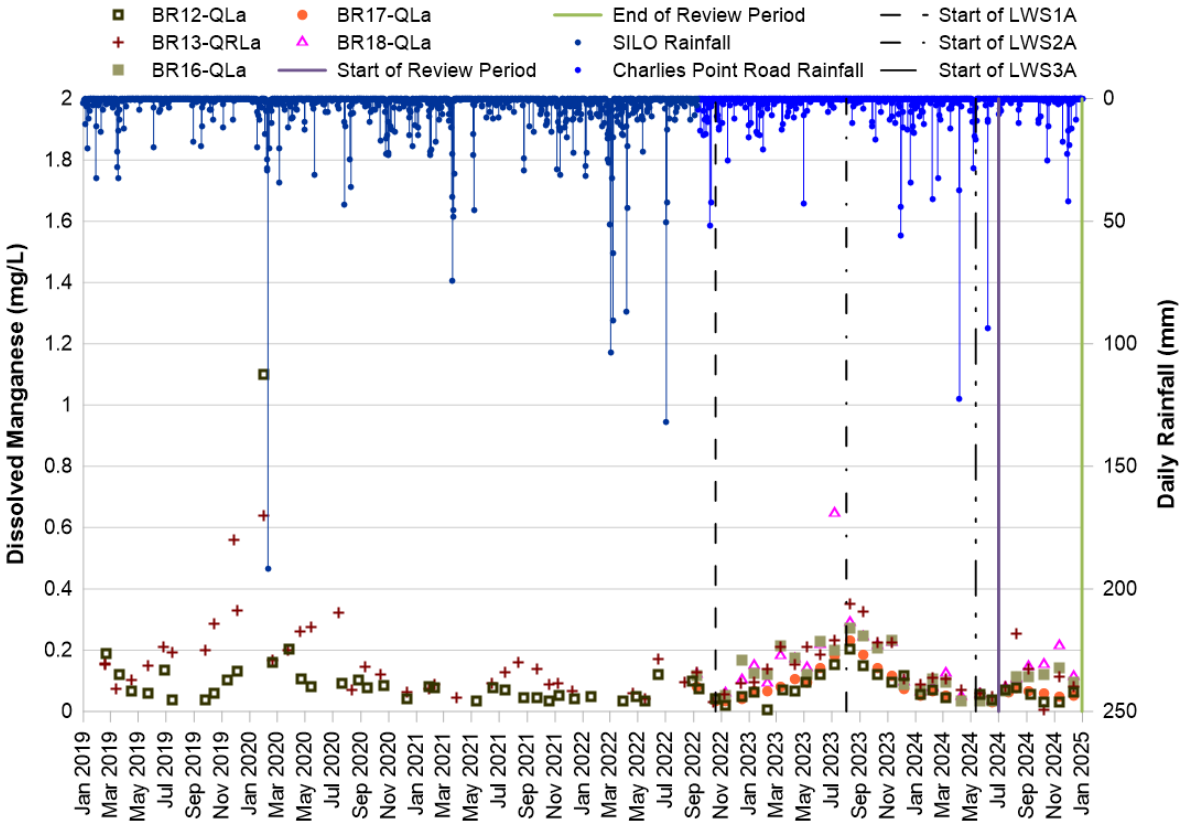
GRAPH C2.4: DISSOLVED COPPER RECORDS



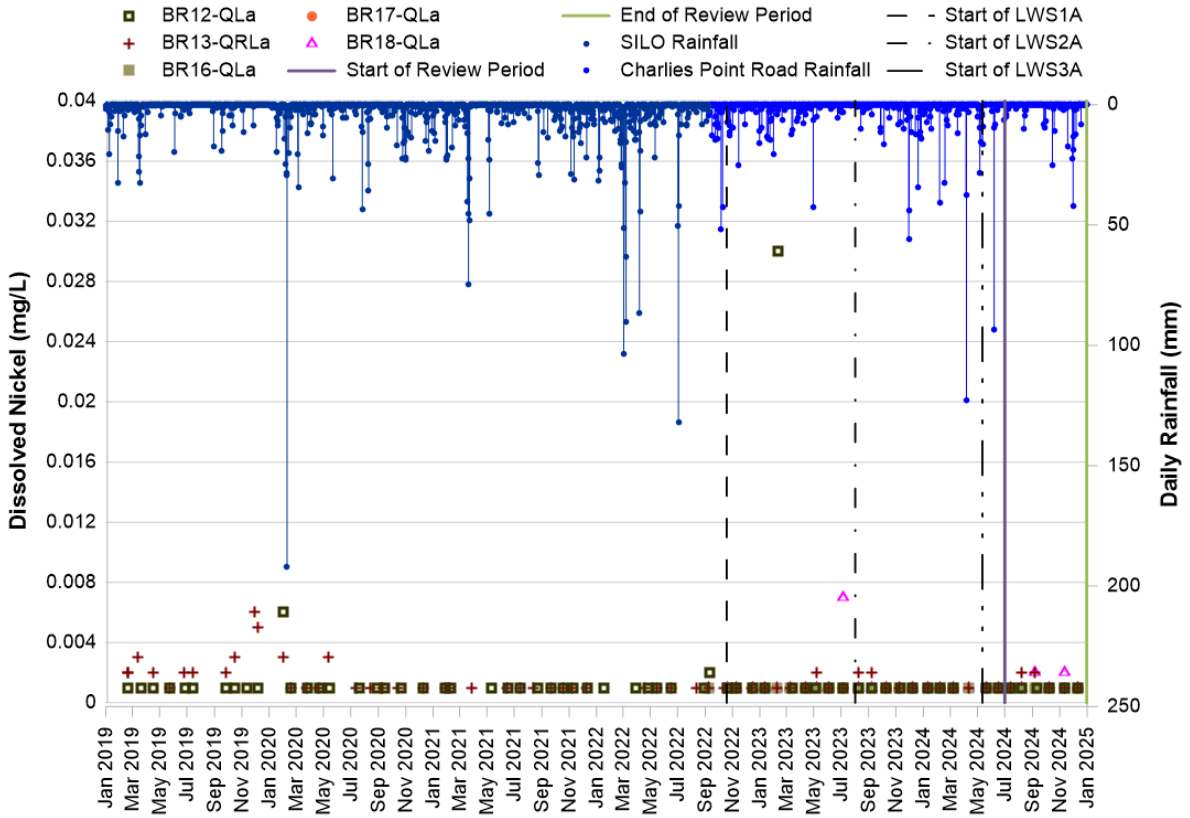
GRAPH C2.5: DISSOLVED IRON RECORDS



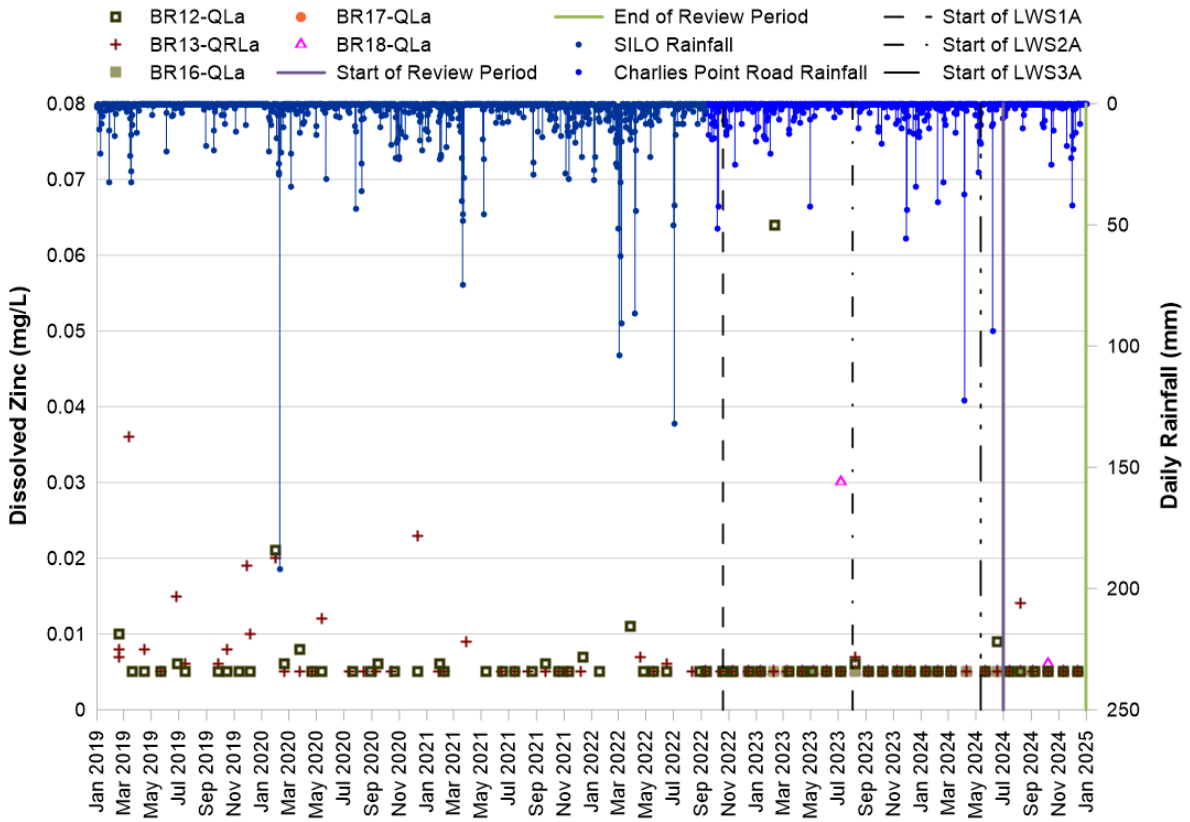
GRAPH C2.6: DISSOLVED MANGANESE RECORDS



GRAPH C2.7: DISSOLVED NICKEL RECORDS



GRAPH C2.8: DISSOLVED ZINC RECORDS



APPENDIX D – TAHMOOR COAL RESPONSES TO TARP ACTION AND RESPONSE REQUIREMENTS

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APPENDIX D1.1 – STREAM WATER QUALITY FOR ALL WATERCOURSES WITHIN THE SUBSIDENCE AREA: WMP1 ACTIONS

Response from TARP WMP1	Tahmoor Coal Response
Level 1, 2 and 3 trigger Continue monitoring and review of data as per monitoring program.	Monthly (or more frequent) monitoring and review of data is ongoing according to the monitoring program.
Level 1, 2 and 3 trigger Assess if the trigger was exceeded during the baseline period prior to commencement of mining activities.	Exceedance of the trigger level during the baseline period was reviewed (refer **Section 6.4**). A Level 1 trigger was recorded for dissolved zinc at pool TT13 during the 1 July to 31 December 2024 review period. A Level 1 trigger for dissolved zinc was not recorded at pool TT13 during the baseline monitoring period.
Level 1, 2 and 3 trigger Review water quality trends along watercourse (upstream to downstream) to identify spatial changes with consideration to climatic conditions.	Water quality trends were reviewed for the watercourse reach (refer **Section 5.4**).
Level 1, 2 and 3 trigger Discuss findings with and obtain other relevant information from key specialists (e.g. subsidence monitoring results, groundwater quality monitoring results) necessary to inform assessment.	Relevant information was obtained from key specialists necessary to inform assessment (refer **Section 2, 3** and **5**).
Level 1, 2 and 3 trigger Consider and decide on reasonable and feasible options for remediation as relevant (e.g. limestone cobbles for increasing pH level).	Reasonable and feasible options for remediation were considered (refer **Section 7.3**). With respect to the water quality trigger exceedance recorded at TT13-QLa during the review period of 1 July to 31 December 2024, there are limited feasible corrective management actions (CMAs) that could be implemented prior to the cessation of subsidence movements associated with mining of LW S1A-S7A. Presently, there is negligible indication of a material impact to the water quality of Teatree Hollow, given that water quality effects were limited to pool TT13 during the review period. Accordingly, it is considered that there is negligible indication of material environmental harm to Teatree Hollow. Therefore, no CMAs are not considered reasonable or feasible at this stage.
Level 2 and 3 trigger Consider increasing monitoring and review of data frequency at sites where Level 2 has been reached or at other relevant sites, subject to land access, as follows: • Fortnightly, for sites within the active subsidence zone; and	No level 2 or level 3 water quality triggers were recorded during the review period 1 July to 31 December 2024.

Response from TARP WMP1	Tahmoor Coal Response
• Monthly, outside of the active subsidence period. Reasons for not increasing monitoring frequency could include confident identification of causation (e.g. singular, anthropogenic, non-mining related change or confirmed as a mining-related impact that resulted in a water quality change).	
Level 2 and 3 trigger If increased monitoring is undertaken, conduct further analysis of water quality trends along creek (upstream to downstream) to identify spatial changes with consideration to climatic conditions.	
Level 2 and 3 trigger Review CMAs in light of findings from further investigations and consider additional remediation options.	
Level 2 and 3 trigger Review Water Management Plan and modify if necessary.	
Level 3 trigger If mining related impact unconfirmed, increase monitoring and review of data frequency at sites where Level 3 has been reached or at other relevant sites, subject to land access, as follows: • Fortnightly, for sites within the active subsidence zone. Monthly, outside of the active subsidence period.	No level 3 water quality triggers were recorded during the review period 1 July to 31 December 2024.
Level 3 trigger Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing), other catchment changes, effects unrelated to mining or the prevailing climate.	

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APPENDIX D1.2 – STREAM WATER QUALITY FOR ALL WATERCOURSES WITHIN THE SUBSIDENCE AREA: WMP1 RESPONSES

Response from TARP WMP1	Tahmoor Coal Response
Level 1, 2 and 3 trigger Report trigger exceedance to DPE and key stakeholders.	Trigger exceedances during the reporting period were notified to DPE (now DPHI) on 4 October and 20 December 2024. (triggers for the April to June 2024 period and July to September 2024 period respectively). Notification to NRAR was required as part of the conditions of the Enforceable Undertaking (in force from 24 July 2023). Tahmoor Colliery Community Consultative Committee was advised of water quality triggers on 6 June and 5 September 2024. Future meetings will include further notification of additional TARP triggers.
Level 1, 2 and 3 trigger Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review	Completed as part of the Annual Review.
Level 1, 2 and 3 trigger Provide DPE and key stakeholders with proposed corrective management actions (CMAs) for consultation (e.g. limestone cobbles for increasing pH level).	CMAs are not considered reasonable or feasible.
Level 1, 2 and 3 trigger Implement CMAs, subject to land access.	CMAs are not considered reasonable or feasible.
Level 1, 2 and 3 trigger Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.	CMAs are not considered reasonable or feasible.
Level 2 and 3 trigger Advise DPE and key stakeholders of any required amendments to Water Management Plan	No Level 2 or 3 triggers were recorded during the review period
Level 2 and 3 trigger Provide findings of CMA review to DPE and key stakeholders for consultation.	
Level 2 and 3 trigger Implement additional CMAs, subject to land access.	
Level 3 trigger If it is concluded from the detailed investigation that watercourses have been damaged by subsidence impacts: • Offer site visit with DPE and other key stakeholders. • Develop Watercourse Corrective Action Management Plan (WCAMP) in	

Response from TARP WMP1	Tahmoor Coal Response
consultation with the Resources Regulator, DPE and other key stakeholders (in accordance with C12 of SSD 8445). The stream remediation measures in the WCAMP could include grout curtain and grout pattern injection. • Implement approved WCAMP, subject to land access.	

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APPENDIX D2.1 – WATER LEVEL FOR ALL WATERCOURSES WITHIN THE SUBSIDENCE AREA: WMP3 ACTIONS

Action from TARP WMP3	Tahmoor Coal Response
Level 1, 2 and 3 trigger Continue monitoring and review of data as per monitoring program.	Monthly (or more frequent) monitoring and review of data is ongoing according to the monitoring program.
Level 1, 2 and 3 trigger Review water level trends along watercourse (upstream to downstream) to identify spatial changes with consideration to climatic conditions.	Water level trends for all sites in Teatree Hollow and Teatree Hollow tributary were reviewed with consideration to climatic conditions (refer **Section 6.1**).
Level 1, 2 and 3 trigger Review streamflow data recorded at TT-F1 and conduct streamflow reduction assessment.	Streamflow data recorded at TT-F1 was reviewed and streamflow reduction assessment conducted (refer **Section 5.3** and **Section 6.2**). The streamflow assessment indicated that trends have been consistent with rainfall trends for the duration of the review period. It is also considered that the rate of streamflow decline recorded during the review period is consistent with historical declines, including periods prior to the commencement of mining of LW S1A.
Level 1, 2 and 3 trigger Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, groundwater level monitoring results) necessary to inform assessment.	Relevant information was obtained from key specialists necessary to inform assessment (contained herein).
Level 2 and 3 trigger Consider increasing monitoring and review of data frequency at sites where Level 2 has been reached or at other relevant sites, subject to land access, as follows: • Fortnightly, for sites within the active subsidence zone. • Monthly, out of the active subsidence period. Reasons for not increasing monitoring frequency could include confident identification of causation (e.g. singular, anthropogenic, non-mining related change or confirmed as a mining-related impact that resulted in a water level change).	Causation was identified for the Level 2 and 3 triggers equated for TT2-QLa, TT3-QLa, TT7-QLa, TT9-QLa, TT12-QLa and TT13-QLa, refer **Section 6.1**). For sites TT2-QLa and TT3-QLa, monitoring and review of data frequency occurs on a fortnightly basis as real-time telemetry data is available for these sites. The monitoring frequency was not increased for TT7-QLa, TT9-QLa, TT12-QLa and TT13-QLa as causation has been confidently identified.
Level 2 and 3 trigger If increased monitoring is undertaken, conduct further analysis of water level trends along creek (upstream to downstream) to identify spatial changes with consideration to climatic conditions.	Water level trends for all sites in Teatree Hollow and Teatree Hollow tributary were reviewed with consideration to climatic conditions (refer **Section 6.1**).

Action from TARP WMP3	Tahmoor Coal Response
Level 2 and 3 trigger Review Water Management Plan and modify if necessary.	The LW S1A-S6A Water Management Plan was reviewed and proposed amendments were approved by DPHI on 14/8/2024. No further modifications to the Water Management Plan are currently planned.
Level 3 trigger If mining related impact unconfirmed, increase monitoring and review of data frequency at sites where Level 3 has been reached or at other relevant sites, subject to land access, as follows: • Fortnightly, for sites within the active subsidence zone. • Monthly, outside of the active subsidence period.	Causation was identified for the Level 3 triggers (related to subsidence induced fracturing and the prevailing climate, refer **Section 6.1**). As such, the monitoring frequency was not increased.
Level 3 trigger Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing), other catchment changes, effect unrelated to mining or the prevailing climate.	A detailed investigation was undertaken to assess if the change in behaviour was related to mining effects (refer **Section 6**). Direct and indirect impacts from mining have been confirmed at the related pools, as summarised in **Section 7.1.**

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APPENDIX D2.2 – WATER LEVEL FOR ALL WATERCOURSES WITHIN THE SUBSIDENCE AREA: WMP3 RESPONSES

Response from TARP WMP3	Tahmoor Coal Response
Level 1, 2 and 3 trigger Report trigger exceedance to DPHI and key stakeholders	Trigger exceedances during the reporting period were notified to DPE (now DPHI) on 4 October and 20 December 2024. (triggers for the April to June 2024 period and July to September 2024 period respectively). Notification to NRAR was required as part of the conditions of the Enforceable Undertaking (in force from 24 July 2023). Tahmoor Colliery Community Consultative Committee was advised of water level triggers on 6 June 2024 and 5 September 2024. Future meetings will include further notification of additional TARP triggers.
Level 1, 2 and 3 trigger Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review	Completed as part of the Annual Review.
Level 2 and 3 trigger Advise DPHI and key stakeholders of any required amendments to Water Management Plan	The LW S1A-S6A Water Management Plan was reviewed and proposed amendments were approved by DPHI on 14/8/2024. No further modifications to the Water Management Plan are currently planned.
Level 3 trigger If it is concluded from the detailed investigation that watercourses have been damaged by subsidence impacts: • Offer site visit with DPHI and other key stakeholders. • Develop Watercourse Corrective Action Management Plan (WCAMP) in consultation with the Resources Regulator, DPHI and other key stakeholders (in accordance with C12 of SSD 8445). The stream remediation measures in the WCAMP could include grout curtain and grout pattern injection. • Implement approved WCAMP, subject to land access.	A site visit was offered to DPIE and NRAR in relation to Level 3 TARP triggers of TARPs WMP1, WMP3 and WMP5. This offer was extended via letter dated 10 November 2023. A site visit was also offered to National Trust and Australian Wildlife Sanctuary and took place on 22 November 2023. In accordance with C12 of SSD 8445 and as detailed in the WMP, a Watercourse Corrective Action Management Plan (WCAMP) will be prepared for watercourses damaged by subsidence impacts. The WCAMP will be prepared in consultation with relevant government agencies, as defined in the WMP. The WCAMP will be prepared and implemented at the cessation of subsidence movements associated with Tahmoor South mining.

APPENDIX D3.1 – PHYSICAL FEATURES AND NATURAL BEHAVIOUR OF WATERCOURSES WITHIN THE SUBSIDENCE AREA: WMP5 ACTIONS

Action from TARP WMP5	Tahmoor Coal Response
Level 1, 2 and 3 trigger Continue monitoring and review of data as per monitoring program.	Monthly monitoring and review of data is ongoing according to the monitoring program.
Level 1, 2 and 3 trigger Assess visual change along watercourse (upstream to downstream) to observe any spatial changes with consideration to climatic conditions.	Visual changes along watercourse were reviewed with consideration to climatic conditions (refer **Section 6.3**).
Level 1, 2 and 3 trigger Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, surface water monitoring results, groundwater monitoring results) necessary to inform assessment.	Relevant information was obtained from key specialists necessary to inform assessment (contained herein).
Level 2 and 3 trigger Consider increasing monitoring and review of data frequency to fortnightly at sites where Level 1 has been reached and at other relevant sites, subject to land access, as follows: • Fortnightly, for sites within the active subsidence zone. • Monthly, outside of the active subsidence period. Reasons for not increasing monitoring frequency could include confident identification of causation (e.g., surface fracturing of weathered bedrock that does not affect water holding capacity of rockbar control or pool base or confirmed as a mining-related impact)	Monitoring and review of data frequency was not increased at pools TT2, TT3, TT7, TT9, TT12 and TT13.
Level 2 and 3 trigger Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing other catchment changes, effect unrelated to mining or the prevailing climate).	A detailed investigation was undertaken to assess if the change in behaviour at is related to mining effects (refer **Section 6**). Direct and indirect impacts from mining have been confirmed at the pools in question, as detailed in **Section 7.1.**
Level 2 and 3 trigger Review Water management Plan and modify if necessary.	The LW S1A-S6A Water Management Plan was reviewed and proposed amendments were approved by DPHI on 14/8/2024. No further modifications to the Water Management Plan are currently planned.
Level 2 and 3 trigger If mining related impact unconfirmed, increase monitoring and review of data frequency at	Monitoring and review of data frequency was not increased at pools TT2, TT3, TT7, TT9, TT12 and TT13 as mining impacts were confirmed.

Action from TARP WMP5	Tahmoor Coal Response
sites where Level 2 has been reached or at other relevant sites, subject to land access, as follows: • Fortnightly, for sites within the active subsidence zone. • Monthly, outside of the active subsidence period.	

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APPENDIX D3.2 – PHYSICAL FEATURES AND NATURAL BEHAVIOUR OF WATERCOURSES WITHIN THE SUBSIDENCE AREA: WMP5 RESPONSES

Response from TARP WMP5	Tahmoor Coal Response
Level 1, 2 and 3 trigger Report trigger exceedance to DPHI and key stakeholders	Trigger exceedances during the reporting period were notified to DPE (now DPHI) on 4 October and 20 December 2024. (triggers for the April to June 2024 period and July to September 2024 period respectively). Notification to NRAR was required as part of the conditions of the Enforceable Undertaking (in force from 24 July 2023). Tahmoor Colliery Community Consultative Committee was advised of water level triggers on 6 June 2024 and 5 September 2024. Future meetings will include further notification of additional TARP triggers.
Level 1, 2 and 3 T trigger ARP Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review	Completed as part of the Annual Review.
Level 2 and 3 trigger Advise DPHI and key stakeholders of any required amendments to Water Management Plan	The LW S1A-S6A Water Management Plan was reviewed and proposed amendments were approved by DPHI on 14/8/2024. No further modifications to the Water Management Plan are currently planned.
Level 3 trigger Offer site visit with DPHI and other key stakeholders.	A site visit was offered to DPIE and NRAR in relation to Level 3 TARP triggers of TARPs WMP1, WMP3 and WMP5. This offer was extended via letter dated 10 November 2023. A site visit was also offered to National Trust and Australian Wildlife Sanctuary and took place on 22 November 2023.
Level 3 trigger Develop Watercourse Corrective Action Management Plan (WCAMP) in consultation with the Resources Regulator, DPHI and other key stakeholders (in accordance with C12 of SSD 8445). The stream remediation measures in the WCAMP could include grout curtain and grout pattern injection.	In accordance with C12 of SSD 8445 and as detailed in the WMP, a Watercourse Corrective Action Management Plan (WCAMP) will be prepared for watercourses damaged by subsidence impacts. The WCAMP will be prepared in consultation with relevant government agencies, as defined in the WMP. The WCAMP will be prepared and implemented at the cessation of subsidence movements associated with Tahmoor South mining.
Level 3 trigger Implement approved WCAMP, subject to land access.	Refer to response above.

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APPENDIX D4.1 – CHANNEL STABILITY, SEDIMENTATION AND EROSION: WMP7 ACTIONS

Action from TARP WMP7	Tahmoor Coal Response
Level 1 and 2 trigger Continue monitoring and review of data as per monitoring program.	Monthly monitoring and review of data is ongoing according to the monitoring program.
Level 1 and 2 trigger Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, biodiversity monitoring results) necessary to inform assessment.	Relevant information was obtained from key specialists necessary to inform assessment (refer to **Appendix B**).
Level 1 and 2 trigger Consider increasing monitoring and review of data frequency at sites where Level 1 has been reached or at other relevant sites, subject to land access, as follows: • Fortnightly, for sites within the active subsidence zone. • Monthly, outside of the active subsidence period. Reasons for not increasing monitoring frequency could include confident identification of causation (e.g. singular, anthropogenic, non-mining related change or confirmed as a mining-related impact that resulted in increased erosion).	Frequency of monitoring and data review has not been increased as the causation of the erosion at the knickpoint sites K57 and K64 is considered to be understood.
Level 1 and 2 trigger Consider and decide on reasonable and feasible options for remediation as relevant (e.g. enhanced vegetation establishment, rock armouring).	CMAs are not considered reasonable or feasible until the extent and longevity of the impacts are confirmed. Monitoring will continue to assess if remediation actions are required.
Level 2 trigger If mining related impact unconfirmed, increase monitoring and review of data frequency at sites where Level 2 has been reached or at other relevant sites, subject to land access, as follows: • Fortnightly, for sites within the active subsidence zone. • Monthly, outside of the active subsidence period.	Frequency of monitoring and data review has not been increased as the causation of the erosion at the knickpoint site K64 is understood to be partially due to mining. Monitoring as per the monitoring program and after large rainfall events will continue at K64 to assess if remediation actions are required.
Level 2 trigger Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. subsidence induced, other catchment changes, effects unrelated to mining or the prevailing climate).	An investigation was undertaken to assess if the change in behaviour at K64 is related to mining effects (refer **Section 6** of **Appendix B**). Direct impacts from mining were confirmed for K64.

Action from TARP WMP7	Tahmoor Coal Response
Level 2 trigger Obtain specialist advice on further CMAs.	Advice was obtained by specialists as detailed in **Section 6.3** and **Section 8**.
Level 2 trigger Review CMAs in light of findings from further investigations and consider additional remediation options.	CMAs are not considered reasonable or feasible until the extent and longevity of the impacts are confirmed. Monitoring will continue at K64 to assess if remediation actions are required.
Level 2 trigger Review Water Management Plan and modify if necessary.	There are no proposed changes to the Water Management Plan in light of the Level 2 TARP trigger at K64.

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APPENDIX D4.2 – CHANNEL STABILITY, SEDIMENTATION AND EROSION: WMP7 RESPONSES

Response from TARP WMP7	Tahmoor Coal Response
Level 1 and 2 trigger Report trigger exceedance to DPHI and key stakeholders	Completed as part of this report.
Level 1 and 2 trigger Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.	Completed as part of this report.
Level 1 and 2 trigger Provide DPHI and key stakeholders with proposed corrective management actions (CMAs) for approval (e.g. enhanced vegetation establishment, rock armouring).	CMAs are not considered reasonable or feasible until the extent and longevity of the impacts are confirmed. Monitoring will continue at K64 to assess if remediation actions are required.
Level 1 and 2 trigger Implement CMAs, subject to land access.	
Level 1 and 2 trigger Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.	
Level 2 trigger Advise DPHI and key stakeholders of any required amendments to Water Management Plan.	There are no proposed changes to the Water Management Plan in light of the Level 2 TARP trigger at K64.
Level 2 trigger If it is concluded from the detailed investigation that watercourses have been damaged by subsidence impacts: • Offer site visit with DPHI and other key stakeholders.	A site visit was offered to DPIE and NRAR in relation to Level 2 TARP trigger of TARP WMP7 for site K64. This offer was extended via letter dated 4 October 2024. Tahmoor Coal will offer site visit to DPHI and other related stakeholders in relation to subsidence impacts (in relation to TARP triggers for other water TARPs) in the vicinity of K64.
Level 2 trigger If it is concluded from the detailed investigation that watercourses have been damaged by subsidence impacts: • Provide findings of CMA review to DPHI and key stakeholders for consultation.	CMAs are not considered reasonable or feasible until the extent and longevity of the impacts are confirmed. Monitoring will continue at K64 to assess if remediation actions are required.

Response from TARP WMP7	Tahmoor Coal Response
Level 2 trigger If it is concluded from the detailed investigation that watercourses have been damaged by subsidence impacts: • Implement additional CMAs, subject to land access.	CMAs are not considered reasonable or feasible until the extent and longevity of the impacts are confirmed. Monitoring will continue at K64 to assess if remediation actions are required.

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Appendix C – Groundwater Monitoring Report

Six-Monthly Groundwater Report: July – December 2024

Tahmoor South Domain

Tahmoor Coal Pty Ltd

2975 Remembrance Driveway, Bargo NSW 2574

Prepared by:

SLR Consulting Australia

SLR Project No.: 640.30614.00001

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1.0	15 September 2025	R Minnaar	R Minnaar	S Hulbert

Basis of Report

This report has been prepared by SLR Consulting Australia (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Tahmoor Coal Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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Acronyms and Abbreviations

Al	Aluminium
As	Arsenic
BHCS	Bald Hill Claystone
Ba	Barium
BGSS	Bulgo Sandstone
BUCO	Bulli Coal Seam
CCL	Consolidated Coal Lease
Cu	Copper
EC	Electrical Conductivity
Filt	Filtered
HBSS	Hawkesbury Sandstone
Fe	Iron
Pb	Lead
Li	Lithium
LW	Longwall
Mn	Manganese
ML	Mining Lease
Ni	Nickel
pH	Potential of Hydrogen
Se	Selenium
SSD	State Significant Development
Sr	Strontium
TDS	Total Dissolved Solids
TARP	Trigger Action Response Plan
VWP	Vibrating Wire Piezometer
WWCO	Wongawilli Coal Seam
WBCS	Wombarra Claystone
WMP	Water Management Plan
WWFM	Wianamatta Form
Zn	Zinc

1.0 Introduction

1.1 Background

SLR Consulting Australia Pty Ltd (SLR) was engaged by Tahmoor Coal Pty Ltd (Tahmoor Coal) to undertake a review of groundwater data, which has been collected by Consulting Earth Scientists Pty Ltd (CES), for the Tahmoor South Domain (Tahmoor South) of the Tahmoor Coal Mine (Tahmoor Mine) between 1st July 2024 and 31st December 2024.

Tahmoor Mine, located approximately 80 kilometres (km) south-west of Sydney in the Southern Coalfields of New South Wales (NSW), is an underground mine extracting from the Bulli Coal Seam via longwall mining.

Mining at Tahmoor South commenced on 18 October 2022. The Tahmoor South mining area is within Consolidated Coal Lease (CCL) 716 and CCL 747. Tahmoor South comprises 13 longwalls which includes the 'A series' panel of seven longwalls and the 'B series' panel of six longwalls. Tahmoor Coal is currently mining the Tahmoor South A series panel of longwalls, which includes longwall (LW) South 1A to South 7A (S1A – S7A). LW S1A – S7A are orientated north-west to south-east. Extraction of LW S1A, S2A and S3A are complete, with extraction concluding at LWS3A on the 18th December 2024. Extraction as LW S4A is yet to commence.

1.2 Trigger Action Response Plan

In accordance with Condition E5 (f) of the Development Consent (SDD 8445) (the Consent), in the event that performance measures (in the form of pre-defined triggers) are considered to have been exceeded or are likely to be exceeded, a response will be undertaken in accordance with the Trigger Action Response Plans (TARPs) (SLR, 2022).

TARPs for Tahmoor South were established in the Tahmoor South Water Management Plan (WMP) (Tahmoor Coal, 2022) to manage and protect surface water and groundwater within the vicinity of Tahmoor South.

Six TARPs (WMP8 – WMP13) address various components of the groundwater system, and these are presented in **Appendix A**. Tahmoor South groundwater monitoring sites are captured in the following TARPs:

- WMP8 Shallow Groundwater Level (Open Standpipes and Private Bores);
- WMP9 Shallow Groundwater Pressure (Vibrating Wire Piezometer (VWP) Sensors <200 m Depth);
- WMP10 Groundwater Pressure Deep (VWP Sensor >200 m Depth, excluding monitoring the Bulli Coal Seam);
- WMP11 Groundwater Quality (Open Standpipes and Private Bores);
- WMP12 Groundwater-Surface Water Interaction; and
- WMP13 Groundwater Monitoring Bores for Thirlmere Lakes.

Each TARP has four levels of triggers which range from "Normal Conditions", where the environment is behaving or performing within normal or expected levels, to "Level 1" (L1), "Level 2" (L2) and "Level 3" (L3), where with an increase in level there is an escalating risk to the environment via deviation from baseline or expected conditions (SLR, 2022).

Groundwater level triggers and groundwater quality triggers are provided in **Appendix A** and discussed in **Appendix B**.

1.3 Trigger Action Response Plan Amendments

The Water Management Plan (WMP), in accordance with Condition E7 (b-e) of the Consent, will be reviewed within three months of the submission of an Annual Review under Condition E13. Amendments were proposed to the original TARPs and detailed in the 2023 Six-Monthly Review documentation (SLR, 2024). Accordingly, the WMP was updated to reflect these changes and submitted to the Department of Climate Change, Energy, Environment and Water (DCCEEW) in June 2024. This six-monthly reporting is reflective of the updated WMP.

1.4 Report Objective

This report assesses the Tahmoor South groundwater monitoring data against the triggers of TARP WMP8 – WMP13 for the reporting period from 1st July 2024 through 31st December 2024 (inclusive).

This report includes:

- A summary of TARP triggers during the reporting period;
- A full summary of trigger level exceedances over time including the identification of breaches of triggers that remain within normal condition in this reporting period (**Appendix C**);
- An outline of potential factors influencing TARP triggers during the reporting period; and
- Recommendations of relevant actions and responses to be undertaken, in alignment with the TARPs.

The information in this six-monthly report will inform and be built upon in the overarching 2024 Annual Review.

2.0 Monitoring Period Summary

2.1 Mine Operation

Mining is currently underway at Tahmoor South, with the following progression;

- LW S1A – commenced 18th October 2022, concluded on Tuesday 4th July 2023;
- LW S2A – commenced 2nd August 2023, concluded on 6th April 2024; and
- LW S3A – commenced 8th May 2024, concluded on the 17th December 2024.

No further extraction occurred post 17th December 2024.

Figure 1 presents the extraction void progress and the Tahmoor South groundwater monitoring network.

2.2 Monitoring Network Status

The Tahmoor South groundwater monitoring network is shown on **Figure 1**. During the reporting period:

- Groundwater levels were monitored at open standpipes P50A-C, P51A-B, P52, P53A-C, P55A-C, P56A-C, at private bores GW104008, GW104323, GW104659, GW109257, GW112476, and at VWPs TBC027, TBC032, and TBC034.
- Groundwater quality samples were collected at private bores GW104008, GW104323, GW104659, GW109257, GW112473 and at open standpipes P53B, P53C, P56A, and P56B.
- Unavailable data were limited to P54A-B (dry throughout) and GW105395 (removed from program after March 2024 damage).

The groundwater monitoring network is shown alongside the subsidence monitoring network on **Figure 2**. Global Navigation Satellite System (GNSS) units are fixed survey stations that continuously measure their absolute horizontal and vertical positions in real time. There are 28 GNSS units located directly above and adjacent to LW S1A to S7A.

2.3 General Site Matters

General site matters or matters pertinent to other technical disciplines as noted at December Environmental Response Group (ERG) meeting, and via discussion with technical discipline experts, include:

- New fracture noted above TT9 – with this pool now only holding water after high rainfall events.

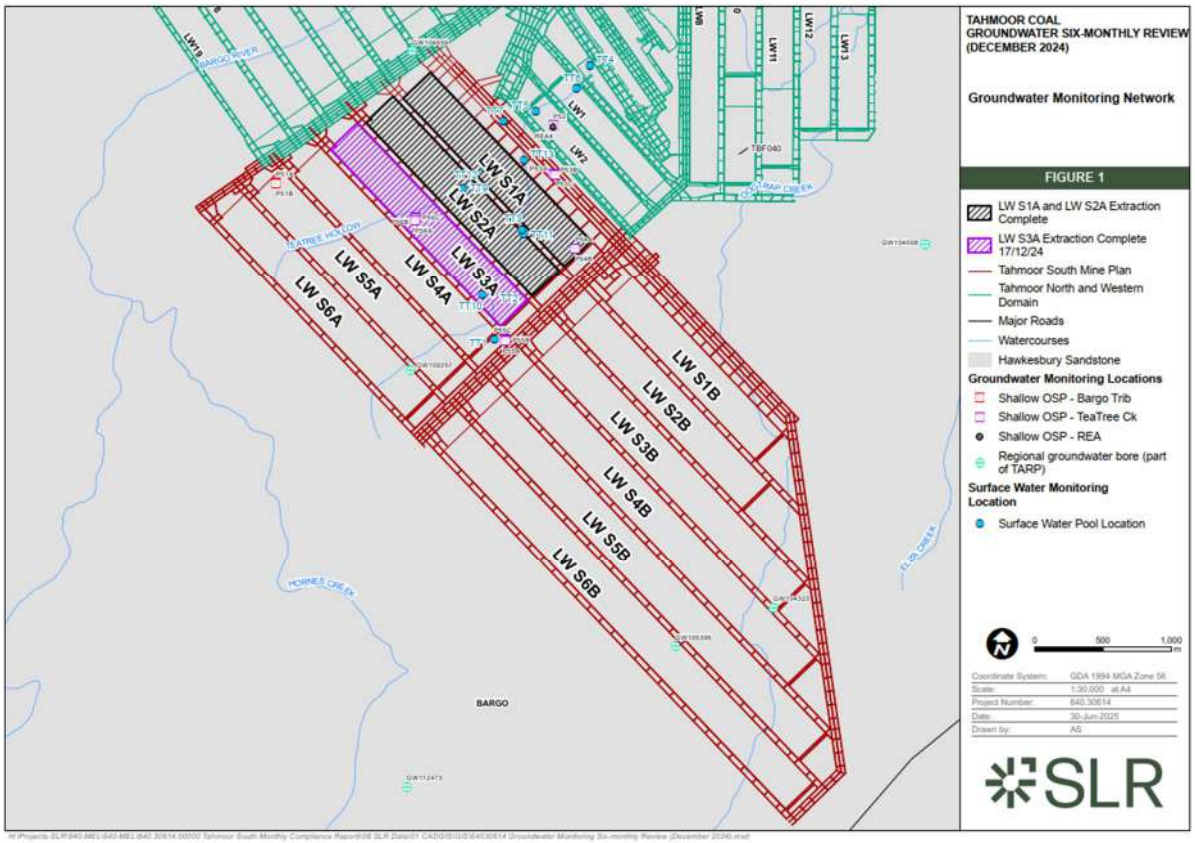


Figure 1 Tahmoor Mine Groundwater Monitoring Network and Mining Progression

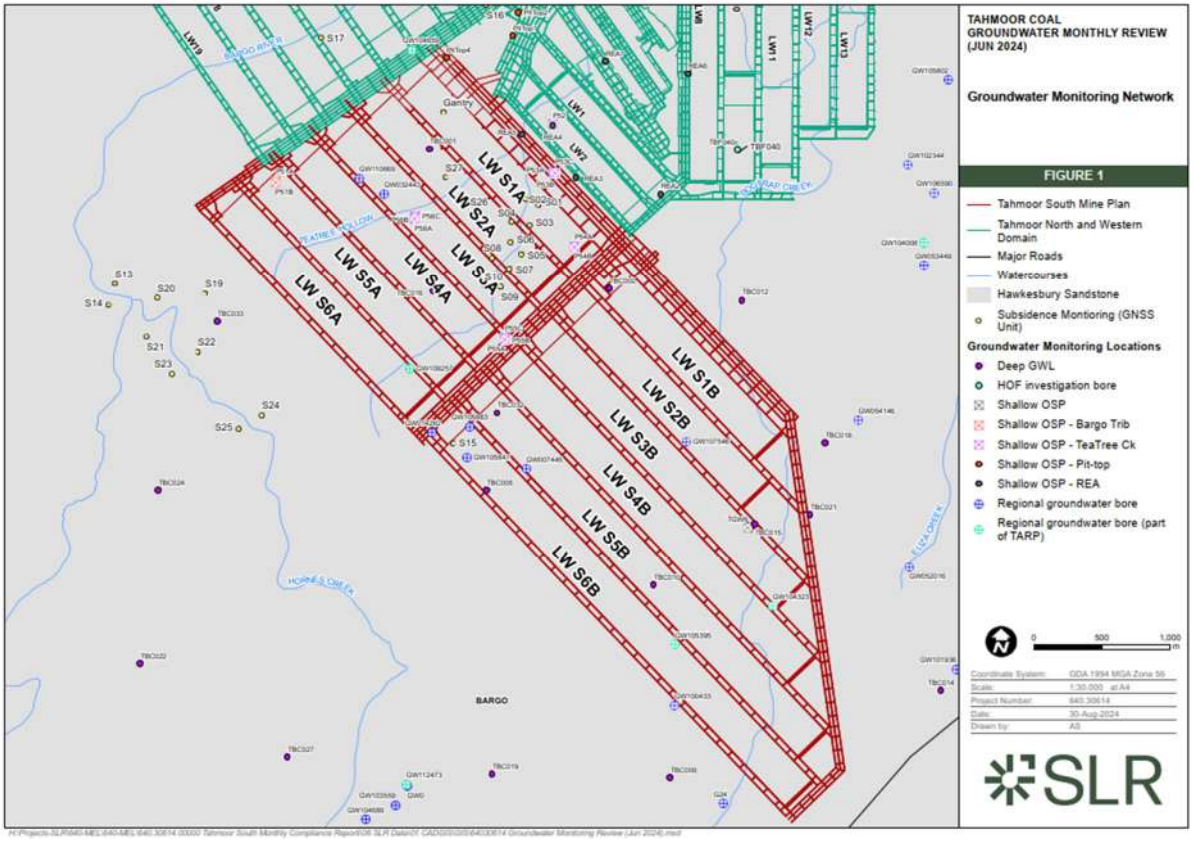


Figure 2 Tahmoor South Groundwater Monitoring Network and Subsidence Monitoring (GNSS units) Network

2.4 Climatic Conditions

Rainfall over the past 12 months, in comparison to the long-term average (i.e., January 1900 – present) is shown in **Table 1**. The SILO climate record for the location 0.05° x 0.05° tile centred on a location within proximity of Tahmoor Mine (latitude: -34.25, longitude: 150.60) has been used for this assessment to understand long-term rainfall trends (Queensland Government, 2025).

The July to December 2024 period was characterised by predominantly dry conditions, with five of the six months receiving below long-term average rainfall. Notably, July through October recorded less than half of the long-term average rainfall. However, November 2024 recorded above average rainfall (**Table 1**).

Table 1 Monthly Rainfall vs Long-Term Average Rainfall

SILO (-34.25, 150.60)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Long-term average rainfall (mm)	85.0	95.1	84.7	72.4	63.7	70.8	54.7	47.4	43.8	60.9	71.8	71.5
January 2024 – December 2024 monthly rainfall (mm)	69.7	69.0	34.7	190.8	105.7	135.9	31.8	21.9	30.5	30.0	107.5	51.1

Long-term monthly average rainfall, potential evaporation and estimated actual evapotranspiration is presented in **Figure 3.** The evaporation and evapotranspiration are, on average, higher than rainfall between September and December during the reporting period.

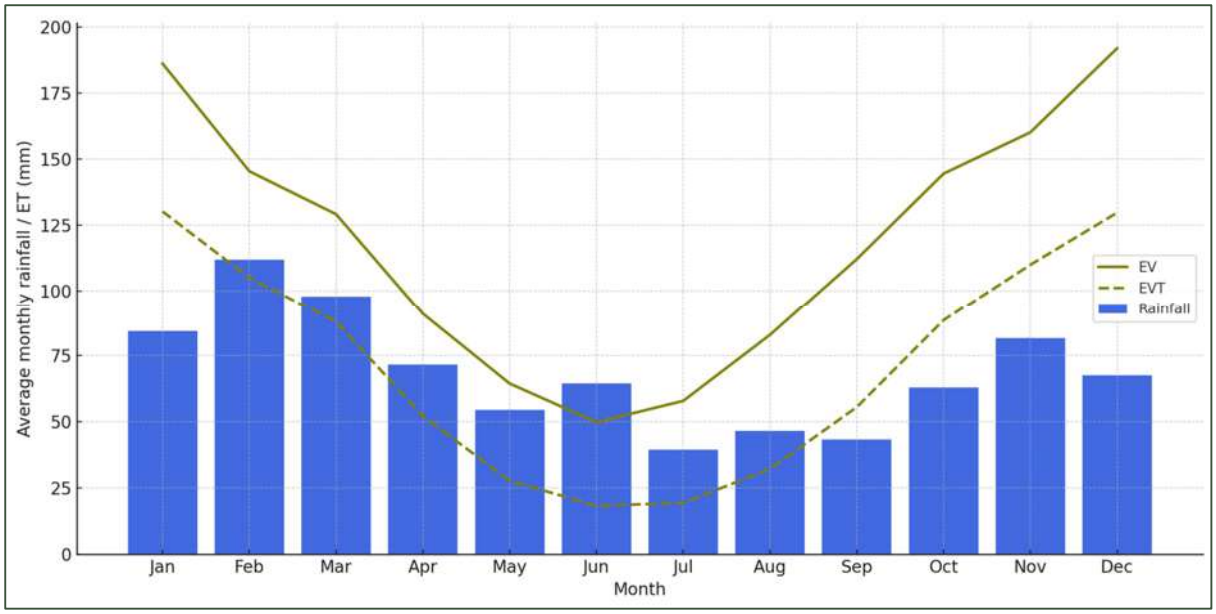


Figure 3 Long-term Average Monthly Rainfall, Evaporation and Evapotranspiration

The historical record of monthly rainfall and the calculated trend in rainfall, using the cumulative residual departure (CRD), is presented in **Figure 4** where a positive gradient indicates above average rainfall, whilst a declining trend represents below average. During the reporting period (July – December 2024), transitional rainfall conditions were experienced, with the CRD showing positive to neutral values but with a declining trend. While the CRD values remain above or near zero, indicating recent conditions have been

close to average, the declining gradient suggests a trend towards below-average conditions. This is consistent with site-specific measurements showing several months with below-average totals during the reporting period, including July (31.8 mm versus 54.7 mm average), August (21.9 mm versus 47.4 mm average), and October 30.0 mm versus 60.9 mm average).

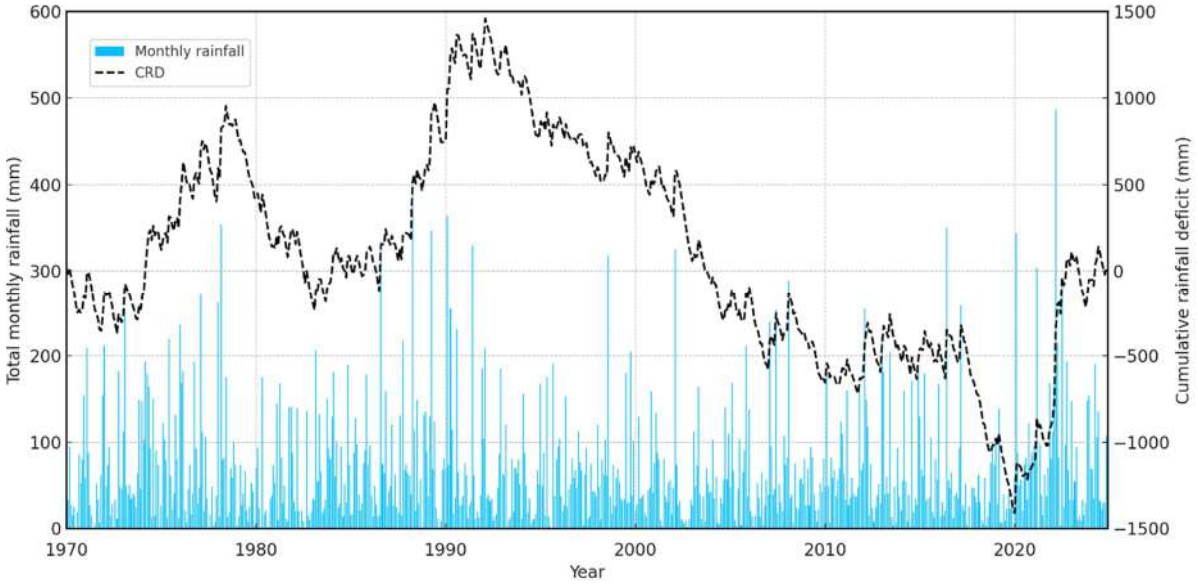


Figure 4 Cumulative Residual Departure and Total Monthly Rainfall

Observed groundwater responses to these climatic conditions, and other potential influencing factors such as mining or hydrogeological variability, are addressed in subsequent sections.

3.0 TARP Assessment

A review of the temporal data against pre-defined trigger levels has been completed for the reporting period (July – December 2024). The full summary, showing all trigger level breaches and exceedances, is provided in **Appendix C**. Groundwater level/potentiometric surface hydrographs are provided in **Appendix D**, with temporal groundwater quality plots provided in **Appendix E**.

The TARPs enacted during the reporting period are summarised in **Table 2** (WMP8), **Table 3** (WMP9), **Table 4** (WMP11), and **Table 5** (WMP12).

The shallow groundwater level monitoring program (WMP8) identified 9 TARP triggers during the reporting period, affecting both open standpipes and private bores. The triggers included six Level 1 triggers, one Level 2 triggers, and two Level 3 triggers. P55B and P55C showed Level 3 triggers indicating water level reductions greater than maximum modelled drawdown for periods exceeding six months. **Table 2** provides the complete summary of WMP8 triggers.

Analysis of 28 shallow VWP sensors (<200m depth) under the groundwater pressure monitoring program (WMP9) identified four TARP triggers during the reporting period. The triggers included one Level 1 trigger, one Level 2 trigger, and two Level 3 triggers. TBC032 sensors at 95 m and 131 m reached Level 3 status indicating water level reductions greater than maximum modelled drawdown for periods exceeding six months. **Table 3** summarises the WMP9 TARP status.

The deep groundwater pressure monitoring program (WMP10) did not record any TARP triggers during the reporting period. Analysis of 41 deep VWP sensors showed that observed drawdown differences from modelled predictions remained within acceptable thresholds, with no exceedances of the ±30m criterion for consecutive 3, 6, or 12-month periods.

Groundwater quality monitoring (WMP11) identified three official TARP triggers where three or more consecutive exceedances occurred across more than three locations. The parameters triggering TARP response was Barium, at REA4, P53C and P53B. **Table 4** provides the complete summary of WMP11 triggers.

The groundwater-surface water interaction monitoring program (WMP12) recorded seven TARP triggers at multiple sites during the reporting period, corresponding to WMP8 exceedances at bores aligned with surface water monitoring sites. The triggers included four Level 1 triggers, one Level 2 trigger, and two Level 3 triggers. **Table 5** summarises the WMP12 triggers, which mirror the groundwater level reductions identified in WMP8 analysis.

The "early warning" bores associated with WMP13 (Thirlmere Lakes) were not triggered during the reporting period based on the specific criteria requiring multiple early warning bore exceedances.

Table 2 WMP8 TARP Triggers

TARP Significance	Sites	Months Active	Comment
Level 1	**GW104659**	Jul, Aug, Sep, Oct, Nov, **Dec**	Greater than 2 metre water level reduction for a period of greater than 6 months following the commencement of extraction.
	GW109257	Jul, Aug, Sep, Oct, Nov, **Dec**	
	P51B	**Dec**	
	P53A	Jul, Aug, Sep, Oct, Nov, **Dec**	
	P53B	Jul, Aug, Sep, Oct, Nov, **Dec**	

TARP Significance	Sites	Months Active	Comment
	P55A	Jul, Aug, Sep, Oct, Nov, **Dec**	
	P56B	Sep*	
Level 2	**P53C**	Jul, Aug, Sep, Oct, Nov, **Dec**	Water level declines below Trigger Level 2 for a period of greater than 6 months
	P56C	Jul, Aug, Sep*	
	P55C	Jul, Aug, Sep, Oct, Nov	
Level 3	**P55B**	Jul, Aug, Sep, Oct, Nov, **Dec**	Water level reduction greater than the maximum modelled drawdown for a period of greater than 6 months following the commencement of extraction.
	P55C	**Dec**	

Note. Bold text to show TARPs active as conclusion of reporting period (December)
* No data available post-September

Table 3 WMP9 TARP Triggers

TARP Significance	Sites	Months Active	Comment
Level 1	**TBC027 (HBSS-95m)**	Nov, **Dec**	Greater than 5 metre water level reduction for a period of greater than 6 months following the commencement of extraction.
	TBC032 (BHCS-181m)	Jul, Aug, Sep, Oct, Nov	
	TBC032 (BHCS-200m)	Jul, Aug, Sep, Oct, Nov, **Dec**	
Level 2	**TBC032 (BHCS-181m)**	**Dec**	Water level declines below the calculated Level 2 trigger following the commencement of extraction for a period of greater than 6 months.
	TBC032 (HBSS-95m)	Nov, **Dec**	Water level reduction greater than maximum modelled drawdown following commencement of extraction for a period of greater than six months
	TBC032 (HBSS-131m)	Jul, Aug, Sep, Oct, Nov, **Dec**	

Note. Bold text to show TARPs active as conclusion of reporting period (December)

Table 4 WMP11 TARP Triggers

TARP Significance	Sites	Parameter	Months Active	Comment
Level 2	P53B	Barium	Jul, Aug, Sep, Oct, Nov, **Dec**	6+ consecutive exceedances above 0.194 mg/L trigger level
	P53C	Barium	Jul, Aug, Sep, Oct, Nov, **Dec**	6+ consecutive exceedances above 0.246 mg/L trigger level

TARP Significance	Sites	Parameter	Months Active	Comment
	REA4	Barium	Jul, Aug, Sep, Oct, Nov, **Dec**	6+ consecutive exceedances above 0.032 mg/L trigger level

Note. Bold text to show TARPs active as conclusion of reporting period (December)

Table 5 WMP12 TARP Triggers

TARP Significance	Sites	Months Active	Comment
	P51B	**Dec**	Greater than 2 metre water level reduction for a period of greater than 6 months following the commencement of extraction
	P53A	Jul, Aug, Sep, Oct, Nov, **Dec**	
	P53B	Jul, Aug, Sep, Oct, Nov, **Dec**	
	P55A	Jul, Aug, Sep, Oct, Nov, **Dec**	
	P56B	Sep*	
Level 2	**P53C**	Jul, Aug, Sep, Oct, Nov, **Dec**	Water level declines below Trigger Level 2 for a period of greater than 6 months
	P56C	Jul, Aug, Sep*	
	P55C	Jul, Aug, Sep, Oct, Nov	
Level 3	**P55B**	Jul, Aug, Sep, Oct, Nov, **Dec**	Water level reduction greater than the maximum modelled drawdown for a period of greater than 6 months following the commencement of extraction.
	P55C	**Dec**	

Note. Bold text to show TARPs active as conclusion of reporting period (December)
* No data available post-September

The triggers are presented spatially on **Figure 5**.

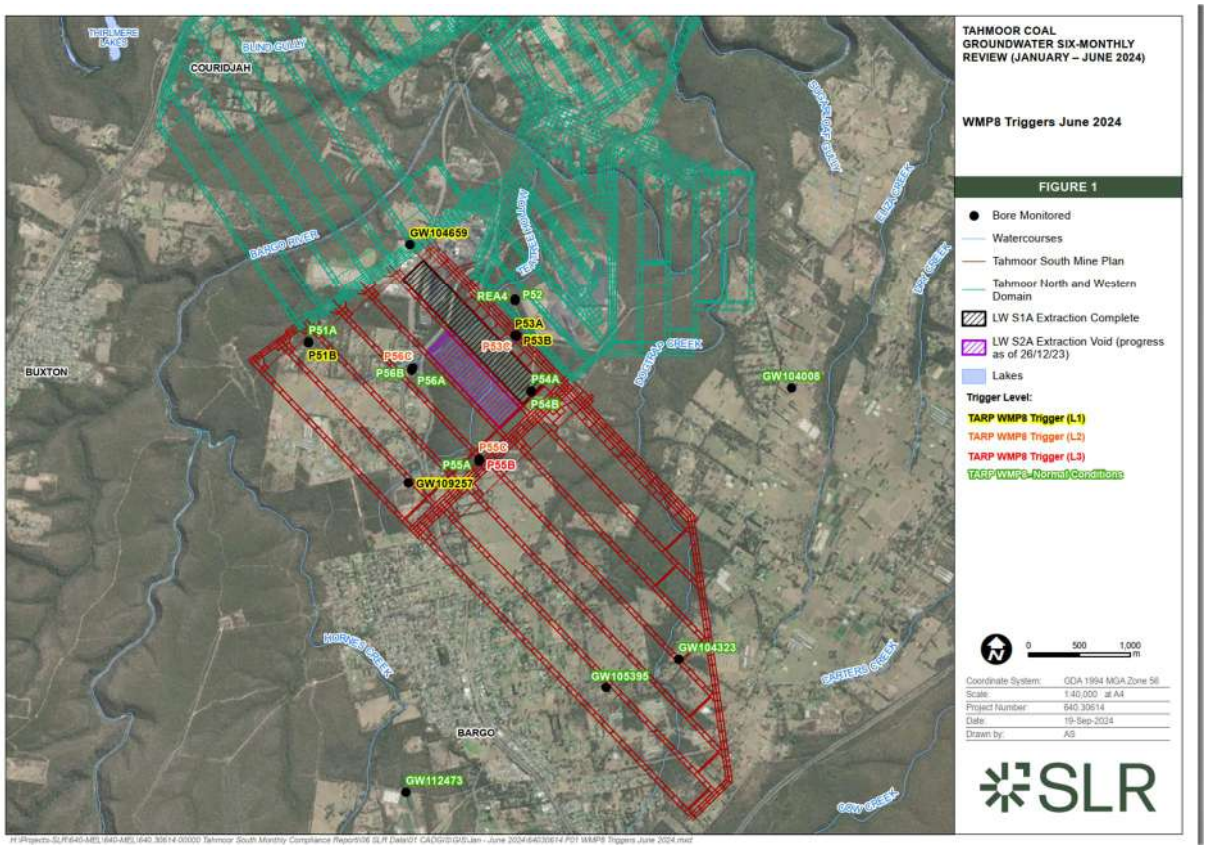


Figure 5 WMP8 Triggers

4.0 Potential Influence Discussion

This section provides an integrated assessment of the factors influencing observed groundwater responses during July – December 2024. Each influence, whether mining progression, climatic variability, and other potential hydrogeological factors, is assessed independently to provide transparency. Where the cause remains ambiguous, such as widespread increases in water quality parameters, this report highlights the need for further monitoring and investigation to establish causation.

4.1 TARP WMP8

TARP WMP8 pertains to shallow groundwater levels in OSPs and private bores. Multiple TARP exceedances remained active or escalated during the reporting period, with indications of a combination of potential mining-related influences and climatic variability.

4.1.1 Level 3 Triggers

- P55B: Level 3 TARP remained active throughout July – December 2024, continuing from November 2023. Groundwater levels declined from 260.9 mAHD to 251.9 mAHD, representing sustained drawdown exceeding 10 metres. Located mid-panel along LW S3A, spatial correlation suggests a potential mining-related influence. The hydrograph for P55B is presented in **Figure 6**.
- P55C: Sustained Level 3 TARP, with groundwater declining to 252.1 mAHD by December 2024. Persistent severe drawdown since May 2024, with spatial and temporal patterns potentially linked to mining activities at the P55 cluster. Hydrograph trends are presented in **Figure 7**.

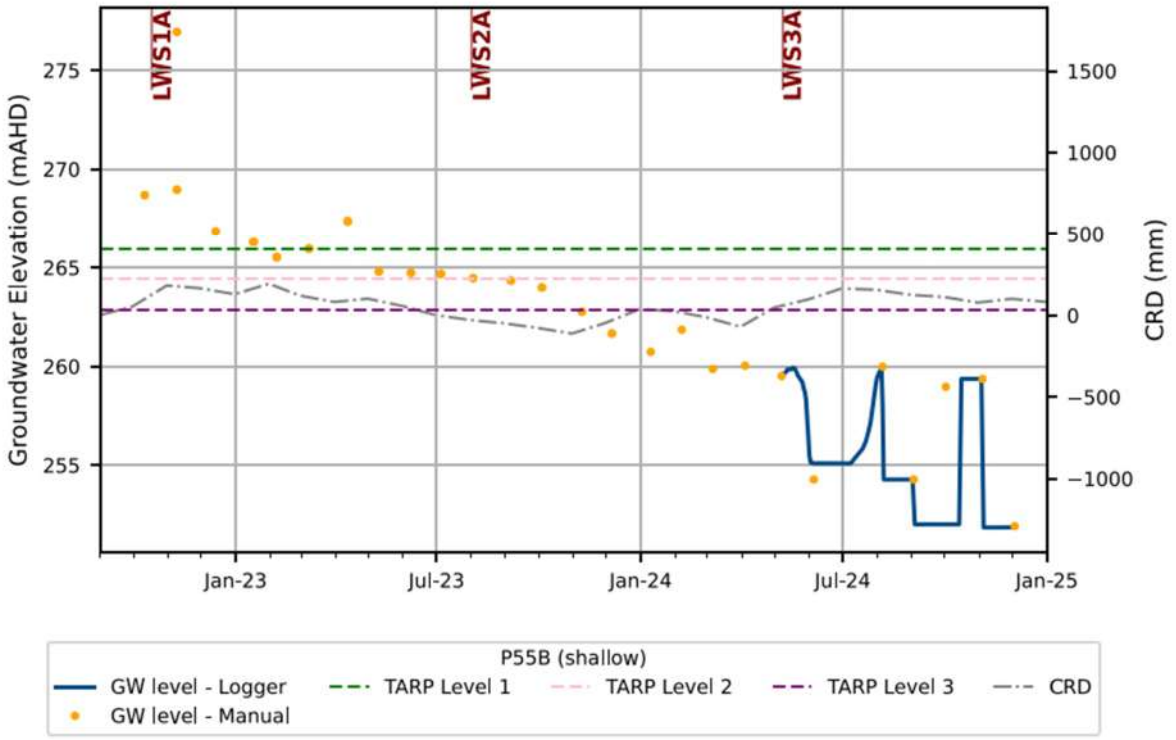


Figure 6 Hydrograph showing groundwater level trend at P55B

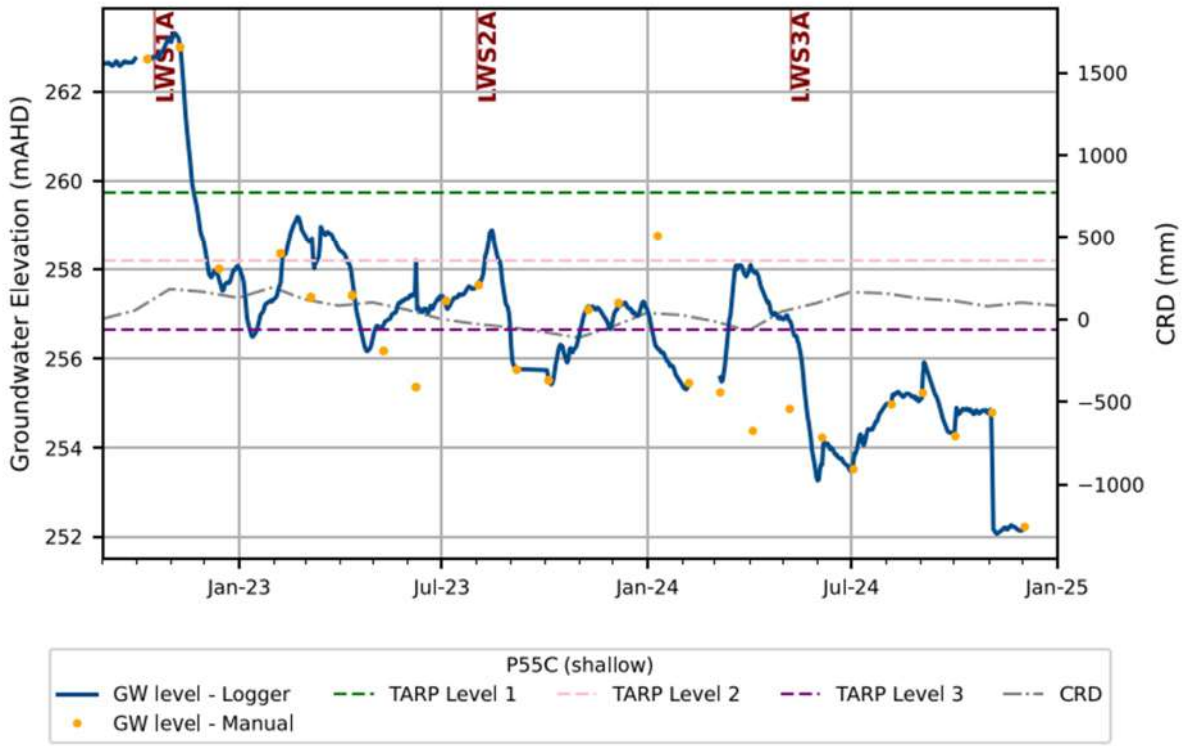


Figure 7 Hydrograph showing groundwater level trend at P55C

4.1.2 Level 2 Triggers

- P53C: Level 2 TARP remained active with groundwater levels declining to near Level 3 thresholds. Situated adjacent to LW S1A, the exceedance reflects cumulative trends potentially influenced by mining. The hydrograph is shown in **Figure 8**, illustrating the notable decline in October 2024.
- P56C: Continuation of Level 2 exceedance, with some stabilisation observed during late 2024, likely reflecting a combination of distance from active panels and post-mining recovery processes. Note data was only received up to the end of September 2024. Hydrograph trends are presented in **Figure 9**.

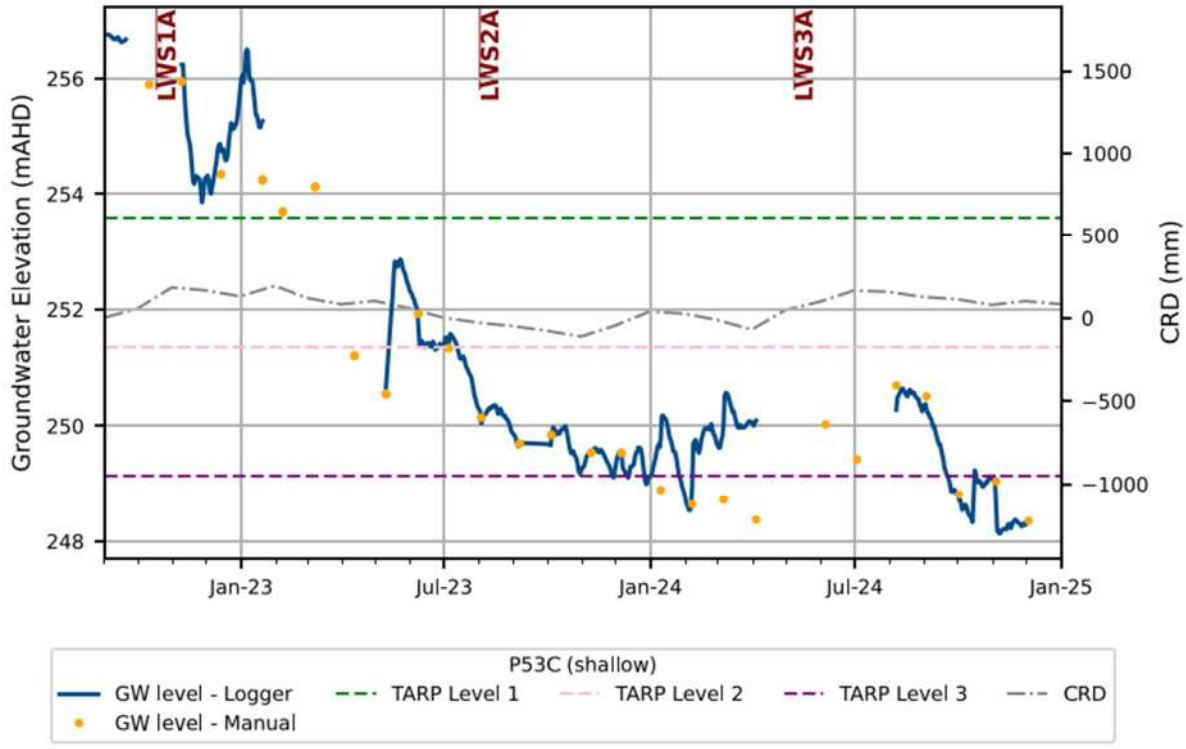


Figure 8 Hydrograph showing groundwater level trend at P53C

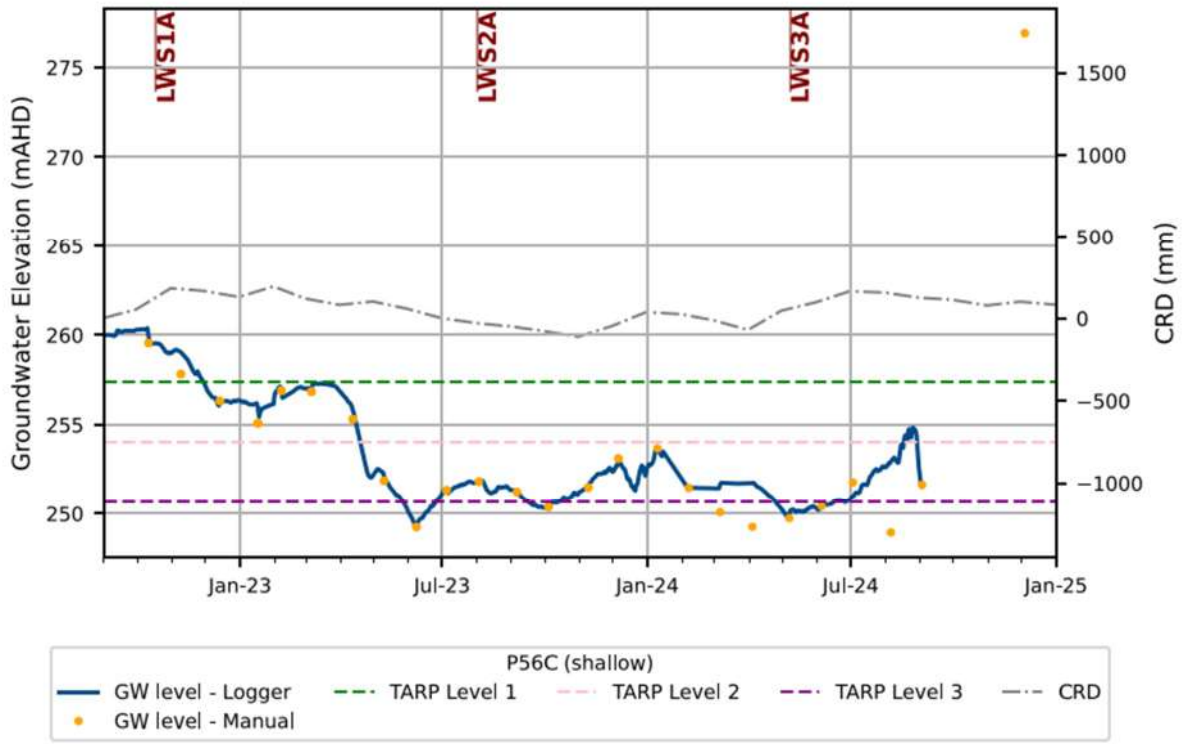


Figure 9 Hydrograph showing groundwater level trend at P56C

4.1.3 Level 1 Triggers

Level 1 exceedances persisted at several bores (P51B, P53A, P53B, P55A, P56B, GW104659, GW109257), most of which have been active for more than six months. Limited recovery or further declines observed suggest ongoing regional depressurisation, with potential mining-related contributions, particularly in proximity to longwall progression. Hydrographs for P51B and GW104659 are presented in **Figure 10** and **Figure 11**, respectively, illustrating overall declining trends.



Figure 10 Hydrograph showing groundwater level trend at P51B

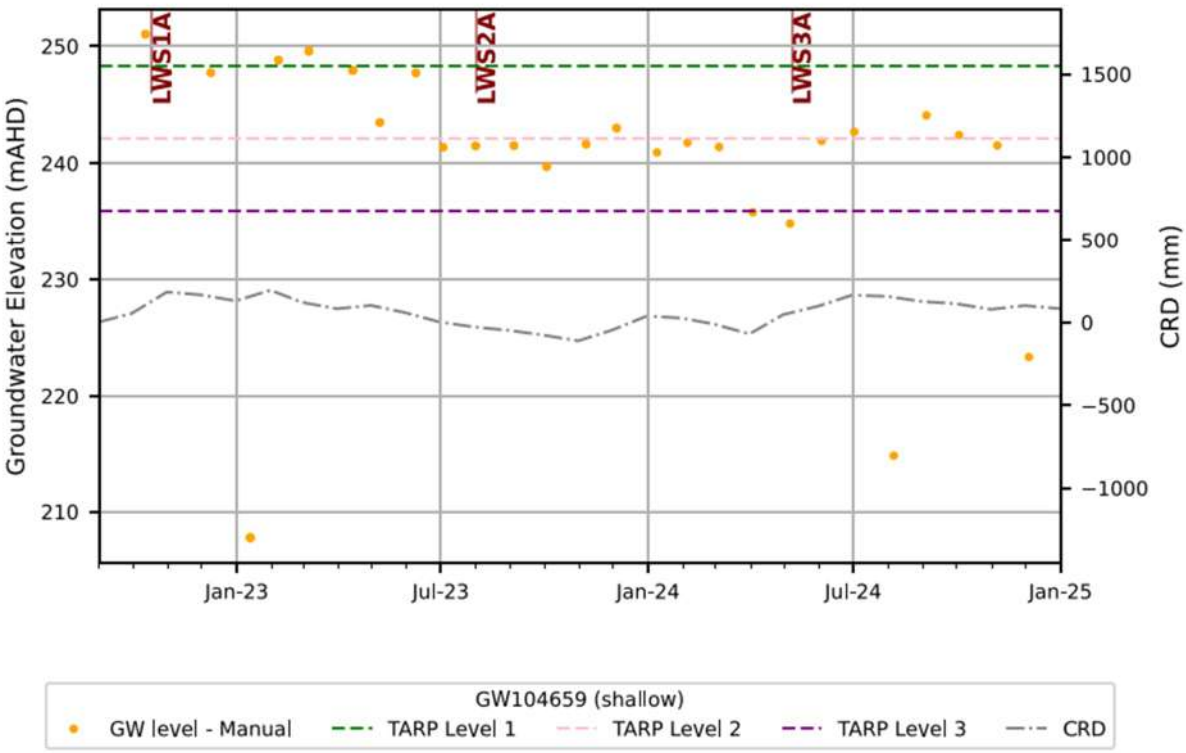


Figure 11 Hydrograph showing groundwater level trend at GW104659

4.2 TARP WMP9

TARP WMP9 pertains to shallow groundwater pressures, specifically targeting VWP sensors installed at depths less than 200 metres. This TARP identifies levels of deviation in groundwater pressure from pre-mining conditions and outlines actions to be implemented in response to exceedances. It captures short-term and long-term pressure changes likely influenced by mining extraction.

4.2.1 Level 3 Triggers

- TBC032 (HBSS-95m and 131m): Newly escalated Level 3 trigger exceedance was noted for TBC032 (HBSS-95m) and continuation of Level 3 trigger exceedance for TBC032 (HBSS-131m), likely coinciding with the progression of LW S3A, with the VWP located approximately 600 metres to the south. Observed patterns suggest a potential mining influence, noting this is the closest VWP to current extractive activities. Refer to **Figure 12** and **Figure 13** illustrating the Level 3 exceedances.

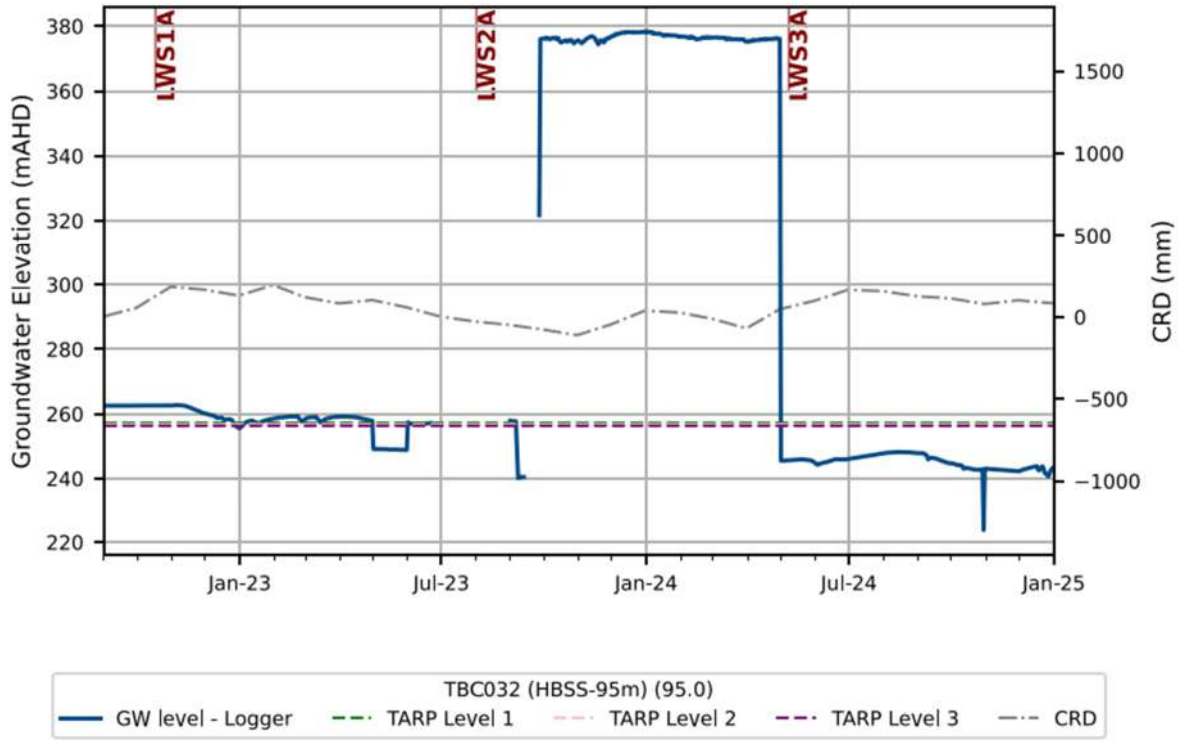


Figure 12 Hydrograph showing groundwater level trend at TBC032 (95m)



Figure 13 Hydrograph showing groundwater level trend at TBC032 (131m)

4.2.2 Level 2 and Level 1 Triggers

All Level 1 and Level 2 triggers recorded during this reporting period relate to other sensors of TBC032 representing a continuation of exceedances observed in the previous January – June 2024 period. No new Level 1 or Level 2 triggers were identified during the July – December 2024 period. The continued exceedances reflect ongoing regional drawdown patterns, likely linked to longwall progression.

4.3 TARP WMP11

TARP WMP11 covers groundwater quality monitoring at standpipe piezometers and private bores, focusing on changes in key water quality parameters including salinity, pH, and dissolved metals. It defines thresholds based on pre-mining baseline conditions and guides responses to sustained changes in groundwater quality beyond natural variability.

Although numerous breaches of individual trigger levels occurred, these did not show consistency (i.e. present in more than three bores), except for Barium and therefore do not currently qualify as trigger exceedances.

Noted here to for accountability and for ongoing consideration via continued monitoring and review, some potential patterns identified are as follows:

- P55 cluster: Progressive salinity increases and sporadic metal mobilisation coinciding with groundwater level declines, potentially linked to mining-induced depressurisation.
- REA4: sporadic multi-parameter exceedances, however no apparent trends.
- Private Bores (GW104008, GW109257): sporadic multi-parameter exceedances, however no apparent trends.

Active exceedances for Barium were observed in P53B, P53C and REA4, as shown in **Figure 14** through **Figure 16**.

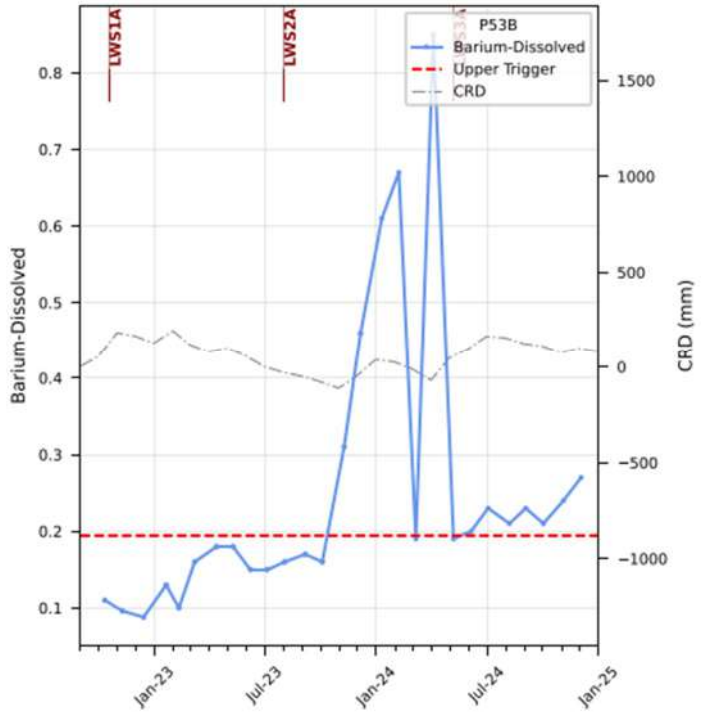


Figure 14 Temporal plot of Ba at P53B

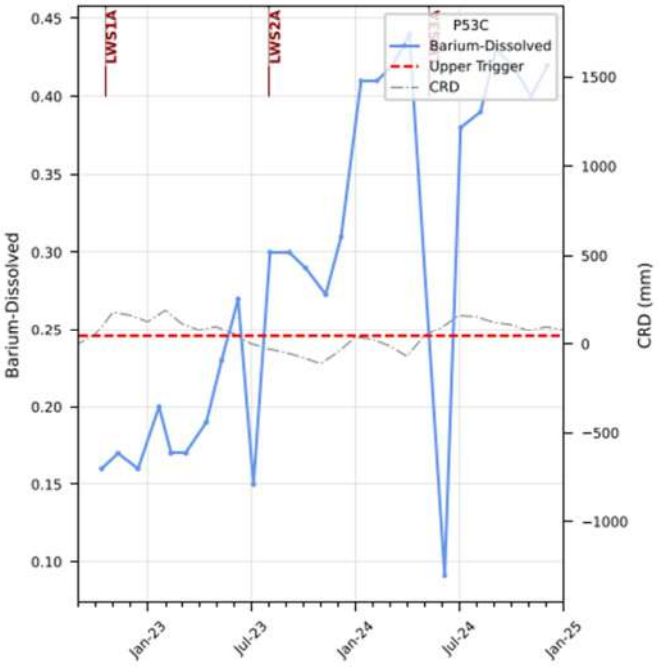


Figure 15 Temporal plot of Ba at P53C

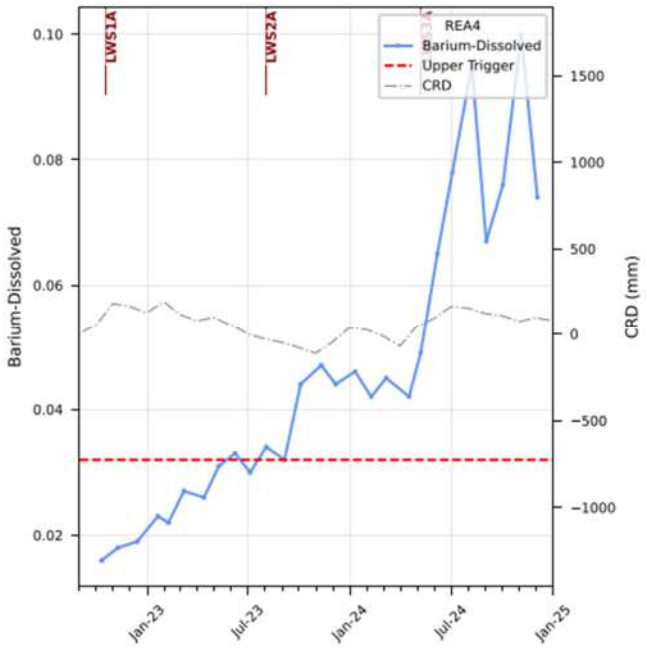


Figure 16 Temporal plot of Ba at REA4

The nested bores at P53 are inconsistent, with the deeper two bores (P53B and P53C) showing potential increasing trends, whilst P53A is showing a decreasing trend.

REA4 is nested with P52 which shows no trends in Barium.

Further investigation into the potential link between mining impacts and barium is recommended.

4.4 TARP WMP12

TARP WMP12 addresses the potential interaction between groundwater and surface water systems, particularly in areas with aligned monitoring sites. It focuses on assessing changes in groundwater levels that could influence connected surface water bodies, including potential impacts to groundwater-dependent ecosystems.

WMP12 triggers remained active at P53 and P55 clusters; however, no corresponding surface water exceedances were observed. Significant vertical separation persists, and available data do not suggest measurable mining-related impacts on surface water conditions during this period.

5.0 Mine Inflows

This section summarises groundwater inflows relative to licenced entitlements and observed groundwater level responses during the July – December 2024 reporting period. Groundwater inflows are compared against Water Access Licence (WAL) limits and relevant approvals. Groundwater level responses are assessed against modelled drawdown predictions and TARP trigger levels, consistent with the definitions outlined in the Water Management Plan (WMP), which applies drawdown TARPs to deep sensors and water level change TARPs to shallow monitoring locations.

5.1 Mine Inflows

Since 2009, observed inflows to Tahmoor Mine have ranged from approximately 2 to 7 ML/d. In October 2022, the Western Domain blocks were sealed. Since this time, the average groundwater inflow from Tahmoor underground workings is reported as 2.3 ML/d.

The cumulative groundwater inflows, as calculated from the mine water balance and pump-out records is presented in **Figure 17**.The reporting period falls within the first half of the 2024-25 water year. As of 31 December 2024, the cumulative groundwater make for water year 2024-25 (first six months of the water year) is 587 ML/y, which currently remains below the groundwater entitlement of 1,642 ML/y (**Figure 17**).

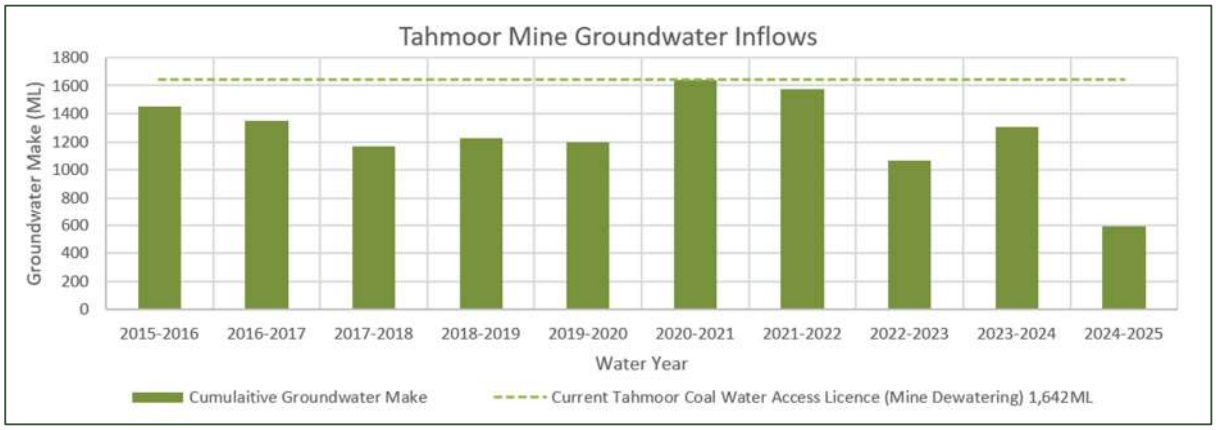


Figure 17 Tahmoor Mine Groundwater Inflows

6.0 Summary of Groundwater Conditions

6.1 Shallow Groundwater Level Response

6.1.1 Shallow Open Standpipe (OSP) Bores

Groundwater level monitoring of shallow standpipe bores during the July–December 2024 reporting period identified three new TARP trigger activations where existing exceedances crossed the six-month duration threshold required for formal trigger status.

P55B recorded a new TARP Level 3 trigger, with groundwater levels below the 262.87 mAHD threshold extending beyond six months from the initial exceedance in November 2023. P55C similarly achieved TARP Level 3 trigger status, remaining below 256.64 mAHD for 207 consecutive days (6.8 months) from May through December 2024. P51B recorded a new TARP Level 1 trigger period commencing May 2024, with levels below 297.52 mAHD for 197 consecutive days (6.5 months) through December 2024. P51B had previously been below TARP Level 1 from May 2023 to April 2024, with groundwater levels only briefly recovering above the threshold for approximately 20 days before declining again.

Twelve additional TARP triggers remained active throughout the reporting period across the shallow standpipe network, representing sustained exceedances that achieved trigger status in previous monitoring periods. These include established Level 1 triggers at established Level 1 triggers at P53A, P53B, P53C, and P55A. P56B recorded a short-term Level 1 event in September only (no data thereafter). Multiple Level 2 and Level 3 triggers at P53C, P55B, P55C, and P56C. REA4 maintained a completed historical Level 1 trigger period but did not record a new exceedance during the reporting period. Short-term breaches were observed at some sites (e.g. P56B in September) but these did not meet the six-month threshold for formal exceedance.

The new Level 3 triggers at P55B and P55C require implementation of enhanced response protocols under WMP8, including detailed investigations to assess mining-related causation, increased monitoring frequency, and assessment of long-term supply viability impacts.

No consistent relationship is evident between groundwater level fluctuations and groundwater quality parameters during the reporting period.

Several groundwater monitoring sites recorded notable declines during the reporting period. The causation of these declines, including the potential influence of mining progression, climatic variability, and natural aquifer dynamics, is explored in **Section 4.0**.

6.1.2 Shallow VWPs (<200 metres) Exceedances

Shallow VWP monitoring during the July–December 2024 reporting period demonstrated continuation of TARP triggers established earlier in 2024, with multiple exceedances crossing the six-month duration threshold to achieve formal trigger status.

Formal exceedances were recorded at TBC027 (HBSS-95 m, L1), TBC032 (HBSS-95 m, L2 and L3), and TBC032 (HBSS-131 m, L3). In addition to the sustained Level 3 triggers at TBC032 (95 m and 131 m), TBC032 (200 m) recorded a formal Level 1 exceedance throughout Jul–Dec 2024, and TBC032 (181 m) escalated from Level 1 (Jul–Nov) to Level 2 in December.

6.1.3 Overall Shallow Groundwater Levels Summary

Overall, shallow groundwater levels in both OSP bores and VWPs continued to show widespread departures from baseline and modelled predictions, with multiple sustained

exceedances under WMP8 and WMP9. While some short-term breaches were observed at other sites, these did not meet the formal exceedance definition under the WMP.

6.2 Deep Groundwater Levels

No TARP triggers were recorded for deep groundwater levels (WMP10) during the reporting period. Analysis of 41 deep VWP sensors confirmed that observed drawdown differences from modelled predictions remained within acceptable thresholds, with no exceedances of the ±30 m criterion for consecutive 3, 6 or 12-month periods.

6.3 Groundwater Quality

6.3.1 Salinity (as electrical conductivity) and pH

Several bores recorded short-term breaches of salinity (EC) and pH triggers during the reporting period. These were generally sporadic and not consistent across multiple sites. The most notable changes were observed in the P55 cluster, where progressive salinity increases coincided with groundwater level declines. However, these breaches did not meet the WMP definition for an exceedance (i.e. six or more consecutive months across three or more sites).

6.3.2 Metals

Sporadic metal breaches were recorded for Fe, Mn, Cu and Pb at some standpipes and private bores (e.g. REA4, GW104008, GW109257). These were isolated events and not consistent in space or time, and therefore are considered breaches only, not exceedances.

In contrast, Barium recorded sustained exceedances across multiple sites. Barium levels at P53B, P53C and REA4 remained above their respective trigger values for six or more consecutive months during Jul–Dec 2024. This constitutes a formal Level 2 TARP exceedance under WMP11. Temporal plots for these bores are presented in **Figure 14** to **Figure 16**.

6.3.3 Summary of Groundwater Quality Response

Overall, groundwater quality in the reporting period was characterised by a formal exceedance for Barium (Level 2 at P53B, P53C and REA4). All other observed parameter exceedances were breaches only, being either short-term or limited to individual sites, and therefore did not meet the definition of a TARP exceedance.

The nested P53 bores remain inconsistent, with P53B and P53C showing increasing Barium trends, while P53A shows a decreasing trend. REA4 continues to show elevated Barium relative to P52, which shows no trend. Further investigation into potential mining-related influences on Barium is recommended.

6.4 Groundwater – Surface Water Connectivity

Groundwater monitoring is undertaken within nearby vicinity of surface watering at multiple locations to assist with the review of groundwater – surface water interaction. This is done to assist with defining if surface flow changes identified are attributable to baseflow loss due to groundwater depressurisation resultant from mining activities.

Groundwater level decline was not found to be influencing surface water conditions. Previous investigations and ongoing monitoring confirm that a significant vertical separation exists between shallow groundwater systems and surface water (i.e. no direct interaction (baseflow) observed).

WMP12 triggers remained active at the P53 and P55 clusters. However, no corresponding surface water exceedances were observed. Significant vertical separation persists, and available data do not suggest measurable mining-related impacts on surface water conditions during this period.

6.5 Private Bores

Groundwater levels in private bores varied throughout the monitoring period, with a mixture of sustained TARP exceedances and short-term breaches observed across the network. GW104659 recorded a sustained Level 1 exceedance, with all six monthly measurements below the 248.36 mAHD threshold during July to December 2024. This continues an extended period of non-compliance that commenced in April 2023 and now extends for 21 consecutive months. In addition, GW104659 recorded a completed Level 2 exceedance earlier in January to June 2024 and experienced isolated short-term Level 3 breaches in August and December 2024.

GW109257 also recorded a sustained Level 1 exceedance, with all six monthly measurements below the 276.26 mAHD threshold during the reporting period. This continues a period of sustained exceedance commencing in August 2023 and extending for 17 consecutive months. Short-term Level 2 breaches were observed in August and again in November and December 2024, but these did not meet the threshold for formal exceedance under the WMP definition.

In contrast, GW104323 only recorded short-term breaches below all three TARP levels during November and December 2024. As these declines were limited to a two-month period, they did not satisfy the requirement for a six-month consecutive exceedance and therefore do not qualify as a formal trigger exceedance.

No landholders reported any adverse impacts to water supply use during the reporting period, and investigations have not identified direct evidence linking the observed drawdowns to mining activities. The overall exceedance patterns remain consistent with rainfall variability and historical groundwater usage trends within the region.

7.0 Action and Response

The following tables (**Table 6**, **Table 7**, and **Table 8** and **Table 9**) summarise the Actions and Responses in line with each relevant TARP that has been triggered (refer **Appendix A** for full TARPs).

Table 6 Actions and Responses for TARP Triggers for WMP8

Action / Response from TARP WMP8	Tahmoor Coal response
Actions	
Level 1, 2 and, 3 TARP Continue monitoring and review of data as per monitoring program.	Monthly monitoring and review of data is ongoing according to the monitoring program.
Level 1, 2 and, 3 TARP Undertake an investigation to assess cause and determine if mining related.	An investigation to assess cause of the water level decline is provided in **Section 4.0**. Groundwater level decline at P53, P55 and GW104659 could be due to ongoing mining effect. However, at the remaining locations, it cannot definitely be attributed to extraction activities.
Level 1, 2 and, 3 TARP Undertake investigation to determine if the decline will impact the long-term viability of the affected water supply works.	Current drawdown associated with exceedances is localised. Consequently, there is no indication that extensive regional aquifer drawdown is occurring of that any impact would be observed in existing water supply works.
Level 1, 2 and, 3 TARP Discuss findings and obtain other relevant information from key specialists (e.g., subsidence monitoring results, surface water level results).	Relevant information was obtained from key specialists (notably subsidence and surface water) necessary to inform assessment (refer **Section 4.0**).
Level 1, 2 and, 3 TARP If the changes have been confirmed to be related to mining effects: For Open Standpipe Monitoring Bores: • For monitoring sites relevant to Thirlmere Lakes or associated with surface water monitoring sites, initiate groundwater – surface water interaction TARP. For Private Bores: • Initiate negotiations with impacts landowners as soon as practicable. Consider all reasonable and feasible options for remediation as relevant (e.g. extending the depth of the bore, establishment of additional bores, etc – as per Section 6.2.1.4 of the Water Management Plan).	For Open Standpipe Monitoring Bores: • It is noted that WMP12 has been initiated for P53 and P55 nested bores. WMP13 (Thirlmere Lakes) has not been enacted) For Private Bores: • No private bore decline has been definitively attributed to mining. No landholder has reported impacts requiring ameliorative actions at this point in time.
Level 2 and 3 TARP Consider increasing monitoring and review of data at sites where Level 2 has been reached, subject to land	Review indicates the cause of the triggers is known and no cause for additional monitoring and data review is required. The current frequency of water level monitoring is sufficient for impact assessments (i.e. 15 minute readings capture minor water level

Action / Response from TARP WMP8	Tahmoor Coal response
access. Reasons for not increasing monitoring frequency could include confident identification causation that do not require further monitoring (e.g. singular anthropogenic impact resulting in water level change, or confirmed as a mining-related impact). Increased monitoring could be beneficial where commensurate responses in paired surface water monitoring locations have been observed.	fluctuations, with monthly review allowing enough temporal scale for causation analysis).
Level 2 and 3 TARP Compare against base case and deterministic model scenarios.	TARP trigger levels accommodate the base case and deterministic model scenarios. With each model update, these levels will continue to be reviewed and revised as necessary.
Level 2 and 3 TARP Review Water Management Plan and modify if necessary.	Update of the WMP completed in June 2024. No update required at this point, which will be reviewed upon submission of the next 6-monthly/annual report.
Level 2 and 3 TARP For Private Bores: • Review CMAs in light of findings from further investigations and consider additional reasonable and feasible options.	Not applicable as no Level 2 or 3 TARP triggers have occurred for private bores.
Level 3 TARP Increase monitoring and review of data frequency for sites where Level 3 has been reached, and cause is unknown, subject to land access.	Cause of Level 3 trigger is known, and no increase in monitoring frequency is necessary.
Level 3 TARP Undertake a detailed investigation to assess the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing, effect unrelated to mining or the prevailing climate).	Detailed investigation, including comparison to local monitored subsidence data and climate data, has been completed. See Section **4.0**.
Responses	
Level 1, 2 and 3 TARP Report trigger exceedance to DPHI and key stakeholders.	Notification of exceedances to DPHI is completed as part of this report.
Level 1, 2 and 3 TARP Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review	Completed as part of this report, and to be incorporated into forthcoming Six Monthly Subsidence Impact Report and Annual Review.
Level 1, 2 and 3 TARP If the changes have been confirmed to be related to mining effects: For Private Bores:	No private bore decline has been definitively attributed to mining. No landholder has reported impacts requiring ameliorative actions at this point in time.

Action / Response from TARP WMP8	Tahmoor Coal response
• Provide DPHI and key stakeholders with proposed corrective management actions (CMAs) for consultation (e.g. extending the depth of the bore, establishment of additional bores, compensation to affected landowners as detailed in Section 6.2.1.4 of the Water Management Plan). • Implement CMAs, subject to land access (finalise negotiations and implement the agreed "make-good" arrangements). • Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.	
Level 2 and 3 TARP Advise DPHI and key stakeholders of any required amendments to Water Management Plan.	Changes to the WMP will be made in accordance with the regulatory guidelines, provided as track changes to the Department for review. No required changes identified via this reporting.
Level 2 and 3 TARP For Private Bores: • Provide findings of CMA review to DPHI and key stakeholders for consultation. • Implement additional CMAs, subject to land access.	No CMA required at this point.
Level 3 TARP For Private Bores: • Develop a Rehabilitation Management Plan in consultation with DPHI and key stakeholders. • Implement Rehabilitation Management Plan, subject to land access.	No level 3 triggers for private bores.

Table 7 Actions and Responses for TARP Triggers for WMP9

Action / Response from TARP WMP8	Tahmoor Coal response
Actions	
Level 1, 2 and 3 TARP Continue monitoring and review of data as per monitoring program.	Monthly monitoring and review of data is ongoing according to the monitoring program.
Level 1, 2 and 3 TARP Undertake an investigation to assess cause and determine if mining related.	An investigation to assess cause of the water level decline TBC032 is provided in **Section 4.0.** Appears to be mining related.
Level 1, 2 and 3 TARP	Relevant information was obtained from key specialists necessary to inform assessment (refer **Section 4.0**).

Action / Response from TARP WMP8	Tahmoor Coal response
Discuss findings and obtain other relevant information from key specialists (e.g., subsidence monitoring results, surface water level results).	
Level 2 and 3 TARP Review deeper VWP data at monitored sites. Determine whether additional review of data is required.	Deeper VWP datasets were reviewed in conjunction with shallow VWP exceedances. No additional review was required beyond the ongoing monitoring and reporting program.
Level 2 and 3 TARP Compare against base case and deterministic model scenarios.	Observed exceedances were compared against base case and deterministic model scenarios in Appendix C. Results remain consistent with predicted drawdown envelopes, with exceedances managed in accordance with the WMP.
Level 2 and 3 TARP Review Water Management Plan and modify if necessary.	Update of the WMP completed in June 2024. No update required at this point, which will be reviewed upon submission of the next 6-monthly/annual report.
Level 3 TARP Actions as per Level 2: Review deeper VWP data at monitored sites. Determine whether additional review of data is required.	Current drawdown associated with exceedances is localised. Consequently, there is no indication that regional aquifer drawdown is occurring of that any impact would be observed in existing water supply works.
Level 3 TARP Actions as per Level 2: Determine if review of additional existing VWP sites is required.	Review of all VWP sites included in this reporting. Only TBC032 reporting TARP triggers.
Level 3 TARP Actions as per Level 2: Consider increasing frequency of data review at sites where Level 2 has been reached or at other relevant sites. • Reasons for not increasing monitoring frequency could include confident identification causation that do not require further monitoring (e.g. singular anthropogenic impact resulting in water level change, or confirmed as a mining-related impact). Increased monitoring could be beneficial where commensurate responses in paired surface water monitoring locations have been observed.	Cause of TARP trigger known, no cause for increase of monitoring frequency.
Level 3 TARP Actions as per Level 2: Compare against base case and deterministic model scenarios.	TARP trigger levels accommodate the base case and deterministic model scenarios. With each model update, these levels will continue to be reviewed and revised as necessary.
Level 3 TARP Actions as per Level 2: Review Water Management Plan and modify if necessary.	Update of the WMP completed in June 2024. No update required at this point, which will be reviewed upon submission of the next 6-monthly/annual report.
Level 3 TARP	Cause of Level 3 Trigger identified and discussed in Section **4.0**.

Action / Response from TARP WMP8	Tahmoor Coal response
Increase frequency of data review for sites where Level 3 has been reached and the cause is unknown.	
Level 3 TARP Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing, other catchment changes, effect unrelated to mining or the prevailing climate). Commence/complete as soon as practicable	Detailed investigation, including comparison to local monitored subsidence data and climate data, has been completed. See Section **4.0**.
Level 3 TARP Undertake investigative to review model results in conjunction with field data	Review of updated model results compared to field data will be undertaken with next iteration of the Groundwater Management Plan.
Responses	
Level 1, 2 and 3 TARP Report trigger exceedance to DPHI and key stakeholders.	Notification of exceedances to DPHI is completed as part of this report.
Level 1, 2 and 3 TARP Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review	Completed as part of this report, and to be incorporated into forthcoming Six Monthly Subsidence Impact Report and Annual Review.
Level 2 and 3 TARP Advise DPHI and key stakeholders of any required amendments to Water Management Plan.	Changes to the WMP will be made in accordance with the regulatory guidelines, provided as track changes to the Department for review.

Table 8 TARP WMP11 Groundwater Quality – Actions and Responses.

Action / Response from TARP WMP11	Tahmoor Coal response
Actions	
Level 1 and 2 TARP Continue monitoring and review of data as per monitoring program.	Continue routine groundwater quality monitoring. Conduct internal review of groundwater quality trends at impacted sites, considering climate variability and nearby groundwater trends. Attribute cause where possible and document in Six-Monthly and Annual Reviews. No further action required unless triggers escalate or sustained deterioration is observed.
Level 1 and 2 TARP Continue monitoring and review of data as per monitoring program.	Routine groundwater quality monitoring continued at all sites. Monitoring and review undertaken in accordance with the WMP.
Level 1 and 2 TARP Undertake an investigation to assess cause and determine if mining related.	Investigation of Barium exceedances at P53B, P53C and REA4 undertaken. While elevated levels were sustained, causation remains uncertain with both mining and natural variability considered. Further monitoring recommended.
Level 1 and 2 TARP Undertake investigation to demonstrate if the change in quality will impact the long-term viability of the affected water supply works.	Assessment indicated that current Barium exceedances do not compromise the long-term viability of water supply works. No impacts to

Action / Response from TARP WMP11	Tahmoor Coal response
	landholder supply identified during the reporting period.
Level 1 and 2 TARP Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, surface water level results).	Groundwater quality exceedances reviewed with subsidence and surface water specialists. No direct linkage identified; further monitoring will continue.
Level 1 and 2 TARP If the changes have been confirmed to be related to mining effects: For Private Bores: • Initiate negotiations with impacted landholders as soon as practicable. Consider all reasonable and feasible options for remediation as relevant. This could include potential for implementation of make-good provisions as per Section 6.2.1.4 of the Water Management Plan for affected private bore owners (e.g. provision of access to an alternative source of water). For Open Standpipe Monitoring Bores: • For monitoring sites relevant to Thirlmere Lakes or associated with surface water monitoring sites, initiate groundwater – surface water interaction TARP.	No private bore exceedances attributable to mining during this period; make-good not required. No evidence of groundwater–surface water interaction impacts; WMP12 not initiated.
Level 1 and 2 TARP Consider increasing monitoring and review of data at sites where Level 2 has been reached, subject to land access. Reasons for not increasing monitoring frequency could include solid identification causation that do not require further monitoring (e.g. singular anthropogenic impact resulting in water quality change).	Monitoring frequency maintained as sufficient to capture water quality trends. No increase required for this reporting period.
Level 1 and 2 TARP Review Water Management Plan and modify if necessary	Update of the WMP completed in June 2024. No update required at this point, which will be reviewed upon submission of the next 6-monthly/annual report.
Level 1 and 2 TARP For Private Bores: • Review CMAs in light of findings from further investigations and consider additional reasonable and feasible options	No private bore quality exceedances attributable to mining. Review of CMAs not required.
Response	
Level 1, 2 and 3 TARP Report trigger exceedance to DPHI and key stakeholders.	Exceedances reported to DCCEEW/DPHI within required timeframes.
Level 1, 2 and 3 TARP	Exceedances and outcomes documented in this Six-Monthly Report and will be incorporated into the Annual Review.

Action / Response from TARP WMP11	Tahmoor Coal response
Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.	
Level 1, 2 and 3 TARP If the changes have been confirmed to be related to mining effects: For Private Bores: • Provide DPHI and key stakeholders with proposed corrective management actions (CMAs) for consultation (e.g, provision of access to an alternative source of water as detailed in Section 6.2.1.4 of the Water Management Plan). • Implement CMAs, subject to land access. • Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.	Not applicable. No exceedances at private bores attributed to mining.
Level 2 TARP Advise DPHI and key stakeholders of any required amendments to Water Management Plan.	No amendments to the WMP required at this time. Any future changes will be submitted in accordance with regulatory requirements.
Level 2 TARP For Private Bores: • Provide findings of CMA review to DPHI and key stakeholders for consultation. • Implement additional CMAs, subject to land access.	Not applicable. No CMAs triggered.

Table 9 Actions and Responses for TARP Triggers for WMP12

Action / Response from TARP WMP12	Tahmoor Coal response
Actions	
Level 1,2 and 3 TARP Continue monitoring and review of data as per monitoring program.	Monthly monitoring and review of data is ongoing according to the monitoring program.
Level 1, 2 and 3 TARP Undertake an investigation to assess cause and determine if mining related.	An investigation to review if the trigger at WMP8 is indicative of groundwater – surface water interaction changes (WMP12) has been completed. TARP WMP12 has been initiated for P53 and P55 due to TARP triggers (WMP8) and the assessment that groundwater level decline could be due to ongoing mining effect. There are no surface water triggers at the associated sites. Detailed investigation into the site-specific groundwater surface water relationship indicated there is unlikely to be a direct relationship between groundwater drawdown and surface water changes.

Action / Response from TARP WMP12	Tahmoor Coal response
	It was determined that it is unlikely that mining activities are influencing groundwater – surface water interactions during the reporting period.
Level 1, 2 and 3 TARP Discuss findings and obtain other relevant information from key specialists (e.g., subsidence monitoring results, surface water level results).	Relevant information was obtained from key specialists necessary to inform assessment, and discussed at Environmental Response Group (ERG).
Level 2 and 3 TARP Increase frequency of data review to fortnightly at sites where Level 2 has been reached, subject to land access. Reasons for not increasing frequency could include solid identification causation that do not require further monitoring (e.g. singular anthropogenic impact resulting in water level change).	Update of network to install loggers in all P53 and P55 bores has been completed, with monthly review of the data occurring. The current frequency of water level monitoring is sufficient for impact assessments (i.e. 15 minute readings capture minor water level fluctuations, with monthly reporting allowing enough temporal scale for causation analysis).
Level 2 and 3 TARP Compare against base case and deterministic model scenarios.	Completed as part of trigger level review.
Level 2 and 3 TARP Review manual water level measurements for additional monitoring sites to identify potential spatial trends in water level decline.	Review of spatial trends of water level was undertaken as part of this report.
Level 2 and 3 TARP Review surface water data to assess for surface water level decline at relevant site.	Review of surface water data in conjunction with groundwater data at the relevant site was undertaken as part of this report. No triggers at relative surface water sites.
Level 2 and 3 TARP Review CMAs in light of findings from further investigations and consider additional reasonable and feasible options.	CMAs are not required at this point (no correlation between groundwater impacts and the surface water site noted at this point).
Level 2 and 3 TARP Review Water Management Plan and modify if necessary.	Changes to the WMP will be made in accordance with the regulatory guidelines, provided as track changes to the Department for review. No required changes have been identified via this reporting.
Level 3 TARP Increase frequency of data review for sites where Level 3 has been reached and cause is unknown, subject to land access.	Data frequency review sufficient, given no triggers at relative surface water sites and cause of groundwater decline is known.
Level 3 TARP Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing, other catchment changes, effect unrelated to mining or the prevailing climate). Report to be commenced and completed as soon as practicable.	Investigation undertaken as part of this reporting, and previous detailed analysis of groundwater – surface water interaction. No further investigation required at this point.
Responses	

Action / Response from TARP WMP12	Tahmoor Coal response
Level 1, 2 and 3 TARP Report trigger exceedance to DPHI and key stakeholders.	Notification of this exceedance to DPHI is completed as part of this report.
Level 1, 2 and 3 TARP Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review	Completed as part of this report.
Level 1, 2 and 3 TARP If the changes have been confirmed to be related to mining effects: For Private Bores: • Provide DPHI and key stakeholders with proposed corrective management actions (CMAs) for consultation (e.g., provision of access to an alternative source of water as detailed in Section 6.2.1.4 of the Water Management Plan). • Implement CMAs, subject to land access. • Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.	It was determined that it is unlikely that extraction is currently impacting groundwater – surface water interactions. Therefore, these responses have not been enacted at this time.
Level 2 and 3 TARP Provide findings of CMA review to DPHI and key stakeholders for consultation.	CMA not required at this point.
Level 2 and 3 TARP Implement additional CMAs, subject to land access.	CMA not required at this point.
Level 2 and 3 TARP Advise DPHI and key stakeholders of any required amendments to Water Management Plan, including reporting on relationship of observations to baseline and deterministic model scenarios, as necessary.	Changes to the WMP will be made in accordance with the regulatory guidelines, provided as track changes to the Department for review. No required changes have been identified via this reporting.
Level 3 TARP Develop a Rehibiltation Management Plan in consultation with DPHI and key stakeholders.	Not required at this point.
Level 3 TARP Implement Rehabilitation Management Plan, subject to land access.	Not required at this point.

8.0 Recommendations

Based on the TARP assessment and the discussion of potential influences driving the observed exceedances in the July–December 2024 reporting period, the following recommendations are made:

- Continue the established monitoring program, including routine groundwater level and quality monitoring in accordance with the approved Water Management Plan (WMP). Monitoring outcomes should continue to be reported in six-monthly groundwater reports and at Environmental Response Group (ERG) meetings;
- Undertake an internal review of WMP11 (groundwater quality) exceedances, focusing on:
  - Reviewing quality trends at impacted bores (e.g., P55 cluster, REA4, private bores);
  - Considering groundwater level trends and climate conditions;
  - Confirming alignment with the WMP11 response framework; and
  - Documenting outcomes within the Annual Review and subsequent six-monthly report.
- Initiate an internal review of sustained Level 3 groundwater level triggers (WMP8 and WMP9), specifically:
  - Reviewing the duration and spatial extent of Level 3 exceedances (P55B, P55C, TBC032, TBC024, TBC034);
  - Considering whether any adaptive management actions are warranted; and
  - Assessing the need to review groundwater model predictions and trigger thresholds.
- Maintain readiness to implement WMP-defined make-good or remedial actions, particularly where ongoing Level 1 water quality or Level 3 groundwater level exceedances may impact private bore users;
- Monitor for any need to review or update the WMP or TARP framework, should exceedances escalate, or cumulative trends indicate potential for broader aquifer impact; and
- Continue to monitor Thirlmere Lakes (WMP13) where data becomes available, and review any relevant exceedances in line with the WMP13 TARP structure.

Table 10 provides a summary of the status of the recommendations made in the previous 6-monthly report (January through June 2024).

Table 10 Update on Recommendation in Previous 6-Monthly Reporting

Item	Previous Recommendation	Progress of Recommendation
1	Continue the monitoring program, and the reporting of groundwater level and quality data in the monthly groundwater monitoring reporting.	Ongoing: reporting of groundwater level and quality data to be presented at monthly Environmental Response Group (ERG) meetings
2	Once groundwater level data become available at the Thirlmere Lakes bores, assess groundwater levels against WMP13 to confirm that no groundwater level exceedances	Ongoing: data yet to become available.

Item	Previous Recommendation	Progress of Recommendation
	occurred following the commencement of LW S1A.	

9.0 References

SLR, 2023. *Tahmoor South Groundwater Reporting October – December 2022*. SLR Report: 640.30614.00000-R01-v2.0.

SLR, 2022. *Extraction Plan Groundwater Technical Report*. Prepared for Tahmoor Coal, October 2022. SLR Report: 610.30637.00000-R01

SLR, 2024, Six-Monthly Groundwater Monitoring: January – June 2024, Tahmoor South Domain, September 2024, SLR Report: 640.30614.00000-R17

Queensland Government, 2025. SILO Long Paddock. Available at https://www.longpaddock.qld.gov.au/

Tahmoor Coal Pty Ltd, 2022. *Water Management Plan – Tahmoor South Domain – Longwalls South 1A-South 6A*. May 18,2022. Report: TAH-HSEC-00361

Appendix A Tahmoor South TARPS

Six-Monthly Groundwater Report: July – December 2024

Tahmoor South Domain

Tahmoor Coal Pty Ltd

SLR Project No.: 640.30614.00001

15 September 2025

Trigger Action Response Plan – WMP8 Shallow Groundwater Levels (Open standpipes and private bores)

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management		
		Trigger	**Action**	**Response**
Performance Measure Feature No performance measure relevant. **TARP Objective** This TARP defines levels of deviation in groundwater level from 'normal' or baseline conditions and the actions to be implemented in response to each level deviation. This TARP supports TARP WMP13, where groundwater levels as they pertain to groundwater dependent ecosystems (GDEs) (Thirlmere Lakes) are covered. **Assessment Criteria** Bore specific trigger values based on baselines data for each reporting level.	**Locations** **Open standpipes** Existing sites: P51a, P51b, P52, REA4, P53a, P53b, P53c, P54a, P54b, P54c, P55a, P55b, P55c, P56a, P56b, P56c P50a, P50b, P50c, P57a, P57b, P57c **Private bores** GW109257, GW104008, GW112473, GW104659, GW104323 All monitoring locations are shown in Figure 23 of the Water Management Plan. **Monitoring Frequency** **Pre-mining** Monthly manual measurements of water level. **During Mining** Monthly manual measurements of water level. **Post-mining** Quarterly manual measurements of water level for 12 months following the completion of LW S6A, or as required in accordance with a Rehabilitation Management Plan.	**Normal Condition**		
		• Groundwater level remains consistent with baseline variability and pre-mining trends with reductions in groundwater level less than two meters.	• Continue monitoring and review of data as per monitoring program.	• No response required.
		Level 1		
		• Greater than 2 m water level reduction[1] for a period of greater than 6 months following the commencement of extraction.	For Private Bores and Open Standpipe Monitoring Bores • *Actions as required for Normal Condition.* • Undertake an investigation to assess cause and determine if mining related. • Undertake investigation to demonstrate if the decline will impact the long-term viability of the affected water supply works. • Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, surface water level results). The investigation will be commenced/completed as efficiently as practicable. If the changes have been confirmed to be related to mining effects: For Private Bores: • Initiate negotiations with impacts landowners as soon as practicable. Consider all reasonable and feasible options for remediation as relevant (e.g. extending the depth of the bore, establishment of additional bores, etc - as per Section 6.2.1.4 of the Water Management Plan. " For Open Standpipe Monitoring Bores • For monitoring sites relevant to Thirlmere Lakes or associated with surface water monitoring sites, initiate groundwater – surface water interaction TARP.	For Private Bores and Open Standpipe Monitoring Bores • Report trigger exceedance to DPHI and key stakeholders. • Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review. If the changes have been confirmed to be related to mining effects: For Private Bores: • Provide DPHI and key stakeholders with proposed corrective management actions (CMAs) for consultation (e.g. extending the depth of the bore, establishment of additional bores, compensation to affected landowners as detailed in Section 6.2.1.4 of the Water Management Plan). • Implement CMAs, subject to land access (finalise negotiations and implement the agreed "make-good" arrangements) • Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.
		Level 2		
		• Water level declines below the average between the 'maximum modelled drawdown' (Level 3 trigger) and the '2 m drawdown' (Level 1 trigger)[1] for a period of greater than 6 months following the commencement of extraction. AND • The reduction in water level is determined not to be controlled by climatic or external anthropogenic factors.	For Private Bores and Open Standpipe Monitoring Bores • *Actions as stated in Level 1.* • Consider increasing frequency of monitoring and review of data at sites where Level 2 has been reached or at other relevant sites, subject to land access. Reasons for not increasing monitoring frequency could include confident identification causation that do not require further monitoring (e.g. singular anthropogenic impact resulting in water level change, or confirmed as a mining-related impact). Increased monitoring could be beneficial where commensurate responses in paired surface water monitoring locations have been observed. • Compare against base case and deterministic model scenarios[2]. • Review Water Management Plan and modify if necessary. For Private Bores: • Review CMAs in light of findings from further investigations and consider additional reasonable and feasible options.	For Private Bores and Open Standpipe Monitoring Bores • *Responses as stated in Level 1.* • Advise DPHI and key stakeholders of any required amendments to Water Management Plan. For Private Bores: • Provide findings of CMA review to DPHI and key stakeholders for consultation. • Implement additional CMAs, subject to land access.
		Level 3		
		• Water level reduction greater than the maximum modelled drawdown[1] for a period of greater than 6 months following the commencement of extraction. AND • The reduction in water level is determined not to be controlled by climatic or external anthropogenic factors.	For Private Bores and Open Standpipe Monitoring Bores • *Actions as stated in Level 2.* • Increase monitoring and review of data frequency for sites where Level 3 has been reached, and cause is unknown, subject to land access. • Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has	For Private Bores and Open Standpipe Monitoring Bores • *Responses as stated in Level 2.* For Private Bores: • Develop a Rehabilitation Management Plan in consultation with DPHI and key stakeholders. • Implement Rehabilitation Management Plan, subject to land access.

			been subsidence induced fracturing, other catchment changes, effect unrelated to mining or the prevailing climate).	
Notes: [1] Level 1, 2 and 3 triggers for water level reduction is provided in Table 6-3 in Appendix E of the Water Management Plan. [2] "Deterministic" model scenario refers to the predictive scenario modelling utilised to determine the trigger level. [3] Trigger levels to be developed for P50 and P57 bores when suitable baseline data available				

Trigger Action Response Plan – WMP9 Shallow Groundwater Pressures (VWP sensors < 200 m)

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management		
		Trigger	**Action**	**Response**
Performance Measure Feature No performance measure relevant. **TARP Objective** This TARP defines levels of deviation in groundwater level from 'normal' or baseline conditions and the actions to be implemented in response to each level deviation. **Assessment Criteria** Bore specific trigger values based on baselines data for each reporting level.	**Locations** TBC032, TBC033, TBC009, TBC018, TBC0039 Monitoring of all VWP < 200 m depth intakes. Reference Sites:TBC027, TBC034, TBC038 All monitoring locations are shown in Figure 23 of the Water Management Plan. **Monitoring Frequency** **Pre-mining** VWPs sensors take pressure readings hourly. The system is now telemetered so data is streamed continuously and can be accessed at any point in time. **During Mining** VWPs sensors take pressure readings hourly. The system is now telemetered so data is streamed continuously and can be accessed at any point in time. **Post-mining** Monitoring of data (streamed continuously) for 12 months following the completion of LW S6A.	**Normal Condition**		
		• No observable mining induced change at VWP intakes. • Greater than 5 m water level reduction in VWP intakes[1] following the commencement of extraction for a period of less than six months	• Continue monitoring and review of data as per monitoring program.	• No response required.
		Level 1		
		• Greater than 5 m water level reduction in VWP intakes[1] following the commencement of extraction for a period of greater than six months	• *Actions as required for Normal Condition.* • Undertake an investigation to assess cause and determine if mining related, commence/complete as soon as practicable. • Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, surface water level results).	• Report trigger exceedance to DPHI and key stakeholders. • Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.
		Level 2		
		• Water level declines below the calculated Level 2 trigger – being the average of Level 1 (the '5 m drawdown'[1]) and Level 3 (the 'maximum modelled drawdown') – following the commencement of extraction for a period of greater than six months. AND • The reduction in water level is determined not to be controlled by climatic or external anthropogenic factors.	• *Actions as stated in Level 1.* • Review deeper VWP data at monitored sites. Determine whether additional review of data is required. • Determine if review of additional existing VWP sites is required. • Consider increasing frequency of data review at sites where Level 2 has been reached or at other relevant sites. • Reasons for not increasing monitoring frequency could include confident identification causation that do not require further monitoring (e.g. singular anthropogenic impact resulting in water level change, or confirmed as a mining-related impact). Increased monitoring could be beneficial where commensurate responses in paired surface water monitoring locations have been observed.Compare against base case and deterministic model scenarios[2]. • Review Water Management Plan and modify if necessary.	• *Responses as stated in Level 1.* • Advise DPHI and key stakeholders of any required amendments to Water Management Plan.
		Level 3		
		• Water level reduction greater than the maximum modelled drawdown[1] following the commencement of extraction for a period of greater than six months. AND • The reduction in water level is determined not to be controlled by climatic or external anthropogenic factors.	• *Actions as stated in Level 2.* • Increase frequency of data review for sites where Level 3 has been reached and the cause is unknown. • Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing, other catchment changes, effect unrelated to mining or the prevailing climate). Commence/complete as soon as practicable • Undertake investigative to review model results in conjunction with field data.	• *Responses as stated in Level 2.*

Notes:
[1] Level 1, 2 and 3 triggers for water level reduction is provided in Table 6-4 in Appendix E of the Water Management Plan).
[2] "Deterministic" model scenario refers to the predictive scenario modelling utilised to determine the trigger level.

Trigger Action Response Plan – WMP10 Groundwater level/pressure Deep VWPs (> 200 m)

<table>
<tr><th rowspan="2">Performance Measure and Indicator, TARP Objective and Assessment Criteria</th><th rowspan="2">Monitoring Program</th><th colspan="3">Management</th></tr>
<tr><th>Trigger</th><th>Action</th><th>Response</th></tr>
<tr><td rowspan="8"><u>Performance Measure Feature</u>
No performance measure relevant.

<u>TARP Objective</u>
This TARP defines levels of deviation in groundwater level from ‘normal’ or baseline conditions and the actions to be implemented in response to each level deviation.

<u>Assessment Criteria</u>
Bore specific trigger values based on modelled data for each reporting level.
Model layers utilised to define predicted drawdown for each VWP logger provided in Table below.</td><td rowspan="8"><u>Locations</u>
TBC009, TBC0018, TBC020, TBC026, TBC032, TBC033, TBC039

Reference sites: TBC027, TBC034, TBC038

Monitoring of all VWP > 200 m depth intakes excluding those monitoring the Bulli Coal Seam.

All monitoring locations are shown in Figure 23 of the Water Management Plan.

<u>Monitoring Frequency</u>
Pre-mining
VWPs sensors take pressure readings hourly. The system is now telemetered so data is streamed continuously and can be accessed at any point in time.

During Mining
VWPs sensors take pressure readings hourly. The system is now telemetered so data is streamed continuously and can be accessed at any point in time.

Post-mining
Monitoring of data (streamed continuously) for 12 months following the completion of LW S6A.</td><td>Normal Condition</td><td></td><td></td></tr>
<tr><td>• Observed data does not exceed modelled impacts predicted drawdown by greater than 30 metres[1].
• Observed drawdown exceeds the modelled predicted drawdown[1], by greater than 30 metres for of less than three consecutive months</td><td>• Continue monitoring and review of data as per monitoring program.</td><td>• No response required.</td></tr>
<tr><td>Level 1</td><td></td><td></td></tr>
<tr><td>• Observed drawdown exceeds the modelled predicted drawdown[1], by greater than 30 metres for greater than three consecutive months.</td><td>• Actions as required for Normal Condition.
• Undertake an investigation to assess cause and determine if mining related, to be commenced/completed as soon as practicable.
• Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, surface water level results).</td><td>• Report trigger exceedance to DPHI and key stakeholders.
• Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.</td></tr>
<tr><td>Level 2</td><td></td><td></td></tr>
<tr><td>• Observed drawdown is exceeds modelled predicted drawdown[1], by more than 30 metres greater than 6 consecutive months.</td><td>• Actions as stated in Level 1.
• Consider increasing frequency of data review at sites where Level 2 has been reached or at other relevant sites.
• Reasons for not increasing monitoring frequency could include confident identification causation that do not require further monitoring (e.g. singular anthropogenic impact resulting in water level change, or confirmed as a mining-related impact). Increased monitoring could be beneficial where commensurate responses in paired surface water monitoring locations have been observed. Consider reviewing data in conjunction with VWP data from additional existing VWP sites.
• Compare against base case and deterministic model scenarios[2].
• Review Water Management Plan and modify if necessary.</td><td>• Responses as stated in Level 1.
• Inclusion of more regional VWPs into data review to determine likely extent and depth of depressurisation.
• Advise DPHI and key stakeholders of any required amendments to Water Management Plan.</td></tr>
<tr><td>Level 3</td><td></td><td></td></tr>
<tr><td>• Observed drawdown exceeds modelled predicted drawdown[1] by 30 m, for 12 consecutive months or more.</td><td>• Actions as stated in Level 2.
• Increase review of data frequency for sites where Level 3 has been reached if the cause is unknown.
• Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing, other catchment changes, effect unrelated to mining or the prevailing climate). To be commenced/completed as soon as practicable.
• Review base case and deterministic model scenarios[2] in conjunction with water pressure data and report findings.</td><td>• Responses as stated in Level 2.</td></tr>
<tr><td colspan="6">Notes:
[1] Predicted drawdown refers to the drawdown as generated by the groundwater model and varies over time as extraction progresses. Observed drawdown will be plotted on a monthly basis against the predicted drawdown to determine if a trigger has occurred. Therefore, as the predicted drawdown will be constantly changing according to extraction progression, it is not possible to set a specific trigger limit.
[2] “Deterministic” model scenario refers to the predictive scenario modelling utilised to determine the trigger level.</td></tr>
</table>

Sensor	Model Layer	Model Geology		Sensor	Model Layer	Model Geology
TBC09_322	8	BUSS Mid		TBC26_344	8	BUSS Mid
TBC09_343	8	BUSS Mid		TBC26_409	13	WBCS
TBC09_357	12	SBSS Lower		TBC26_432	15	Bulli Seam
TBC09_381	10	SPCS		TBC26_440	16	Eckersley
TBC09_391	15	Bulli Seam		TBC26_460	16	Eckersley
TBC09_397	17	Wongawilli		TBC32_200	8	BUSS Mid

TBC18_282	8	BUSS Mid		TBC32_237	8	BUSS Mid
TBC18_366	8	BUSS Mid		TBC32_257	8	BUSS Mid
TBC18_377	13	WBCS		TBC32_294	8	BUSS Mid
TBC18_404	15	Bulli Seam		TBC32_314	8	BUSS Mid
TBC18_426	17	Wongawilli		TBC33_247	8	BUSS Mid
TBC18_432	17	Wongawilli		TBC33_306	8	BUSS Mid
TBC20_211	8	BUSS Mid		TBC33_363	11	SBSS Upper
TBC20_293	8	BUSS Mid		TBC33_384	16	Eckersley
TBC20_375	8	BUSS Mid		TBC33_408	16	Eckersley
TBC20_397	13	WBCS		TBC39_243	8	BUSS Mid
TBC20_411	7	BUSS Upper		TBC39_299	8	BUSS Mid
TBC20_434	17	Wongawilli		TBC39_354	11	SBSS Upper
TBC20_439	4	HBSS Mid		TBC39_375	16	Eckersley
TBC26_211	8	BUSS Mid		TBC39_402	16	Eckersley
TBC26_278	8	BUSS Mid				

Trigger Action Response Plan – WMP11 Groundwater Quality (open standpipes and private bores)

<table>
<tr><th rowspan="2">Performance Measure and Indicator, TARP Objective and Assessment Criteria</th><th rowspan="2">Monitoring Program</th><th colspan="3">Management</th></tr>
<tr><th>Trigger</th><th>Action</th><th>Response</th></tr>
<tr>
<td rowspan="8"><u>Performance Measure Feature</u>
No performance measure relevant.

<u>TARP Objective</u>
This TARP defines levels of deviation in groundwater level from ‘normal’ or baseline conditions and the actions to be implemented in response to each level deviation.
This TARP supports TARP WMP13, where groundwater quality as it pertains to groundwater dependent ecosystems (GDEs) (Thirlmere Lakes) is covered.

<u>Assessment Criteria</u>
Bore specific trigger values based on baselines data for each reporting level.</td>
<td rowspan="8"><u>Locations</u>
Open standpipes
Existing sites:
P51a, P51b, P52, REA4, P53a, P53b, P53c, P54a, P54b, P55a, P55b, P55c, P56a, P56b, P56c
P50a, P50b, P50c, P57a, P57b. P57c[2]

Private bores
GW109257, GW104008, GW112473, GW104659, GW104323

All monitoring locations are shown in Figure 23 of the Water Management Plan.

<u>Monitoring Frequency</u>
Pre-mining
Monthly water quality sampling.

During Mining
Monthly water quality sampling

Post-mining
Quarterly water quality sampling.

Water Quality sample parameters:
Field Parameters
PH
EC
TDS
DO

Laboratory Analysis
Total alkalinity as CaCO3, HCO3, CO3, DOC
Dissolved Major Cations (Ca, K, Na, Mg, F, Cl, SO4)
Dissolved Metals (Al, As, Ba, Co, Cu, Pb, Li, Mn, Ni, Se, Sr, Zn, Fe)
Total Metals (Al, As, Ba, Co, Cu, Pb, Li, Mn, Ni, Se, Sr, Zn, Fe)
Total Nitrogen
Total Phosphorus
Ionic Balance (Total Anions and Total Cations)</td>
<td>Normal Condition</td><td></td><td></td>
</tr>
<tr>
<td>• No observable changes in salinity, pH or metals outside of the baseline variability.</td>
<td>• Continue monitoring and review of data as per monitoring program.</td>
<td>• No response required.</td>
</tr>
<tr>
<td>Level 1</td><td></td><td></td>
</tr>
<tr>
<td>• Observed salinity and/or metals or pH outside of defined trigger levels[1] for 3 consecutive months or more. The effect does not persist after a significant rainfall recharge event.
AND
• A similar trend or response is noted at other monitored bores or private groundwater bores.</td>
<td>For Private Bores and Open Standpipe Monitoring Bores
• Actions as required for Normal Condition.
• Undertake an investigation to assess cause and determine if mining related.
• Undertake investigation to demonstrate if the change in quality will impact the long-term viability of the affected water supply works.
• Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, surface water level results).
If the changes have been confirmed to be related to mining effects:
For Private Bores:
• Initiate negotiations with impacted landholders as soon as practicable. Consider all reasonable and feasible options for remediation as relevant. This could include potential for implementation of make-good provisions as per Section 6.2.1.4 of the Water Management Plan for affected private bore owners (e.g. provision of access to an alternative source of water).
For Open Standpipe Monitoring Bores
• For monitoring sites relevant to Thirlmere Lakes or associated with surface water monitoring sites, initiate groundwater – surface water interaction TARP.</td>
<td>For Private Bores and Open Standpipe Monitoring Bores
• Report trigger exceedance to DPHI and key stakeholders.
• Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.
If the changes have been confirmed to be related to mining effects:
For Private Bores:
• Provide DPHI and key stakeholders with proposed corrective management actions (CMAs) for consultation (e.g. provision of access to an alternative source of water as detailed in Section 6.2.1.4 of the Water Management Plan).
• Implement CMAs, subject to land access.
• Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.</td>
</tr>
<tr>
<td>Level 2</td><td></td><td></td>
</tr>
<tr>
<td>• Observed salinity and/or metals or pH outside of defined trigger levels[1], for 3 consecutive months or more. The effect persists after a significant rainfall recharge event.
AND
• The change in water quality is determined not to be controlled by climatic or external anthropogenic factors.</td>
<td>For Private Bores and Open Standpipe Monitoring Bores
• Actions as stated in Level 1.
• Consider increasing frequency of monitoring and review of data at sites where Level 2 has been reached or at other relevant sites, subject to land access and feasibility.
• Reasons for not increasing monitoring frequency could include confident identification causation that do not require further monitoring (e.g. singular anthropogenic impact resulting in water level change, or confirmed as a mining-related impact). Increased monitoring could be beneficial where commensurate responses in paired surface water monitoring locations have been observedReview Water Management Plan and modify if necessary.
For Private Bores:
• Review CMAs in light of findings from further investigations and consider additional reasonable and feasible options.</td>
<td>For Private Bores and Open Standpipe Monitoring Bores
• Responses as stated in Level 1.
• Advise DPHI and key stakeholders of any required amendments to Water Management Plan.
For Private Bores:
• Provide findings of CMA review to DPHI and key stakeholders for consultation.
• Implement additional CMAs, subject to land access.</td>
</tr>
<tr>
<td>Level 3</td><td></td><td></td>
</tr>
<tr>
<td>• Observed salinity and/or metals or pH outside of defined trigger levels[1], for greater than 6 consecutive months.
AND
• The change in water quality is determined not to be controlled by climatic or external anthropogenic factors.</td>
<td>For Private Bores and Open Standpipe Monitoring Bores
• Actions as stated in Level 2.
• Increase monitoring and review of data frequency for sites where Level 3 has been reached, and cause is unknown, subject to land access and feasibility.
• Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing, other catchment changes, effect unrelated to mining or the prevailing climate).
• Undertake investigative report to demonstrate if the water quality change will impact the long-term viability of any affected water supply works.</td>
<td>Private Bores and Open Standpipe Monitoring Bores
• Responses as stated in Level 2.
For Private Bores:
If ascertained impact is due to mining activities and has potential to impact long-term viability of supply for private groundwater bores:
• Develop a Rehabilitation Management Plan in consultation with DPHI and landowner.
• Implement Rehabilitation Management Plan, subject to land access.</td>
</tr>
<tr>
<td colspan="5">Notes:
[1] Defined trigger levels for groundwater quality are listed in Table 6-5 of Appendix E of the Water Management Plan.
[2] Trigger levels to be defined for P50 and P57 bores when adequate baseline data becomes available.</td>
</tr>
</table>

Trigger Action Response Plan – WMP12 Groundwater – surface water Interaction

<table>
<tr><th rowspan="2">Performance Measure and Indicator, TARP Objective and Assessment Criteria</th><th rowspan="2">Monitoring Program</th><th colspan="3">Management</th></tr>
<tr><th>Trigger</th><th>Action</th><th>Response</th></tr>
<tr><td rowspan="8"><u>Performance Measure Feature</u>
No performance measure relevant.

<u>TARP Objective</u>
This TARP defines levels of deviation in surface water - groundwater interactions from ‘normal’ conditions and the actions to be implemented in response to each level deviation.
The instigation of this TARP will be dictated by triggers exceedances in pertinent groundwater or surface water sites requiring further investigation of groundwater – surface water interactions.

Where groundwater – surface water connectivity indicates in a gaining stream, there is potential for groundwater supporting riparian vegetation. Consequently, Riparian vegetation in these situations could be a Groundwater Dependent Ecosystem (GDE), and the pertinent Performance Measure applicable:
Negligible impacts including:
• Negligible change in groundwater levels; and
• Negligible change in groundwater quality.

Riparian GDEs are addressed through the Riparian Vegetation TARP (BMP3). Consultation through the ERG will link this TARP (WMP12) to BMP3 via actions in BMP3 to consider groundwater – surface water relationships when pertinent.

<u>Assessment Criteria</u>
Bore specific trigger values based on baselines data for each reporting level. For this TARP, the aligned groundwater and surface water sites would be considered collectively to interpret potential changes/impacts to groundwater – surface water interaction.</td><td rowspan="8"><u>Locations</u>
Open standpipes
P51a, P51b, P52, REA4, P53a, P53b, P53c
P54a, P54b, P54c, P55a, P55b, P55c

The aligned surface water and groundwater sites are as follows:
• P51a, P51b with surface water site BR2-Qla
• P52, REA4 with surface water site-TT14-QLa
• P53a, P53b, P53c with surface water site-TT14-Qla
• P54a, P54b, P54c with surface water site TT3-QLa
• P55a, P55b, P55c with surface water site TT1-QRLa

All monitoring locations are shown in Figure 23 of the Water Management Plan.

<u>Monitoring Frequency</u>
Pre-mining
Monthly manual measurements of water level and water quality.

During Mining
Monthly manual measurements of water level and water quality.

Post-mining
Quarterly manual measurements of water level for 12 months following the completion of LW S6A, or as required in accordance with a Rehabilitation Management Plan.</td><td>Normal Condition</td><td></td><td></td></tr>
<tr><td>• Observed (or inferred where not immediately neighbouring a surface water site) groundwater and surface water interaction remains consistent with baseline variability and/pre-mining trends, and decrease in groundwater inflow not persisting after significant rainfall recharge events.</td><td>• Continue monitoring and review of data as per monitoring program.</td><td>• No response required.</td></tr>
<tr><td>Level 1</td><td></td><td></td></tr>
<tr><td>• Observed (or inferred where not immediately neighbouring a surface water site) groundwater levels at surface water monitoring site decline below Level 1 (in TARP WMP8) following the commencement of extraction.</td><td>• Actions as required for Normal Condition.
• Undertake an investigation to assess cause and determine if mining related.
• Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, surface water level results).</td><td>• Report trigger exceedance to DPHI and key stakeholders.
• Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.
If the changes have been confirmed to be related to mining effects:
• Provide DPHI and key stakeholders with proposed corrective management actions (CMAs) for consultation (e.g. extending the depth of the bore, establishment of additional bores, compensation to affected landowners as detailed in Section 6.2.1.4 of the Water Management Plan).
• Implement CMAs, subject to land access.
• Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.</td></tr>
<tr><td>Level 2</td><td></td><td></td></tr>
<tr><td>• Observed (or inferred where not immediately neighbouring a surface water site) groundwater levels at aligned surface water monitoring site decline below Level 2 (in TARP WMP8) following the commencement of extraction.
AND
• The reduction in water level is determined not to be controlled by climatic or external anthropogenic factor.</td><td>• Actions as stated in Level 1.
• Consider increasing frequency of monitoring and review of data at sites where Level 2 has been reached or at other relevant sites, subject to land access and feasibility.
• Reasons for not increasing monitoring frequency could include confident identification causation that do not require further monitoring (e.g. singular anthropogenic impact resulting in water level change, or confirmed as a mining-related impact.
• Compare against base case and deterministic model scenarios[1].
• Review manual water level measurements for additional monitoring sites to identify potential spatial trends in water level decline.
• Review surface water data to assess for surface water level decline at relevant site.
• Review CMAs in light of findings from further investigations and consider additional reasonable and feasible options.
• Review Water Management Plan and modify if necessary.</td><td>• Responses as stated in Level 1.
• Provide findings of CMA review to DPHI and key stakeholders for consultation.
• Implement additional CMAs, subject to land access.
• Advise DPHI and key stakeholders of any required amendments to Water Management Plan, including reporting on relationship of observations to baseline and deterministic model scenarios, as necessary.</td></tr>
<tr><td>Level 3</td><td></td><td></td></tr>
<tr><td>• Inferred groundwater levels at surface water monitoring site decline below Level 3 (in TARP WMP8) following the commencement of extraction.
AND
• The reduction in water level is determined not to be controlled by climatic or external anthropogenic factor.</td><td>• Actions as stated in Level 2.
• Increase frequency of data review for sites where Level 3 has been reached, and cause is unknown, subject to land access.
• Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing, other catchment changes, effect unrelated to mining or the prevailing climate). Report to be commenced and completed as soon as practicable.</td><td>• Responses as stated in Level 2.
• Develop a Rehabilitation Management Plan in consultation with DPHI and key stakeholders.
• Implement Rehabilitation Management Plan, subject to land access.</td></tr>
<tr><td colspan="5">Notes:
[1] “Deterministic” model scenario refers to the predictive scenario modelling utilised to determine the trigger level.</td></tr>
</table>

Trigger Action Response Plan – WMP13 Groundwater Bore Monitoring for Thirlmere Lakes

<table>
<tr><th rowspan="2">Performance Measure and Indicator, TARP Objective and Assessment Criteria</th><th rowspan="2">Monitoring Program</th><th colspan="3">Management</th></tr>
<tr><th>Trigger</th><th>Action</th><th>Response</th></tr>
<tr><td rowspan="5"><u>Performance Measure Feature</u>
GDEs including Thirlmere Lakes[1].

<u>Performance Measure</u>
Negligible impacts including:
• Negligible change in groundwater levels; and
• Negligible change in groundwater quality.

<u>Performance Indicator</u>
The performance measure will be considered to be exceeded if the groundwater levels or groundwater quality decline below Level 3 (in the relevant groundwater TARP triggers for water level and water quality – TARP WMP8 or WMP11) following the commencement of extraction, and the investigation outcomes indicate a mining related impact based on monitoring data for the Thirlmere Lakes.

<u>TARP Objective</u>
This TARP defines levels of deviation at Thirlmere Lakes from ‘normal’ conditions and the actions to be implemented in response to each level deviation.

<u>Assessment Criteria</u>
Bore specific trigger values based on baselines data for each reporting level.</td><td rowspan="5"><u>Locations</u>
“Early warning” bores
Existing sites:
GW062068, GW104659, TBC039 (sensor at 65 metres in Hawkesbury Sandstone (HBSS))
Proposed sites:
P50a, P50b, P50c

Thirlmere Lakes bores (not trigger bores)
Existing sites:
GW075409–1, GW075409–2, GW075410, GW075411 (paired with gauging station 212066)

All monitoring locations are shown in Figure 23 of the Water Management Plan.

<u>Monitoring Frequency (for “early warning” bores)</u>
Pre-mining
Monthly manual measurements of water level and water quality.

During Mining
Monthly manual measurements of water level and water quality.

Post-mining
Quarterly manual measurements of water level for 12 months following the completion of LW S6A, or as required in accordance with a Rehabilitation Management Plan.

Water Quality sample parameters:
<table><tr><th>Field Parameters</th></tr><tr><td>PH
EC
TDS
DO</td></tr><tr><th>Laboratory Analysis</th></tr><tr><td>Total alkalinity as CaCO3, HCO3, CO3, DOC
Dissolved Major Cations (Ca, K, Na, Mg, F, Cl, SO4)
Dissolved Metals (Al, As, Ba, Co, Cu, Pb, Li, Mn, Ni, Se, Sr, Zn, Fe)
Total Metals (Al, As, Ba, Co, Cu, Pb, Li, Mn, Ni, Se, Sr, Zn, Fe)
Total Nitrogen
Total Phosphorus
Ionic Balance (Total Anions and Total Cations)</td></tr></table></td><td colspan="3">Normal Condition</td></tr>
<tr><td>• Groundwater levels and quality remain consistent with baseline variability and/pre-mining trends, and changes in groundwater levels/quality not persisting after significant rainfall recharge events.</td><td>• Continue monitoring and review of data as per monitoring program.</td><td>• No response required.</td></tr>
<tr><td colspan="3">Level 1</td></tr>
<tr><td>• Level 1 trigger of TARP WMP8 for a minimum of two “early warning” bores.
OR
• Level 1 trigger of TARP WMP11 for a minimum of two “early warning” bores.</td><td>• Actions as required for Normal Condition.
• Undertake an investigation to assess cause and determine if mining related.
• Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, surface water level results).
If the changes have been confirmed to be related to mining effects:
• Consider all reasonable and feasible options for remediation as relevant (e.g. extending the depth of the bore, establishment of additional bores). This could include potential for implementation of make-good provisions as per Section 6.2.1.4 of the Water Management Plan for affected private bore owners.
• For monitoring sites relevant to Thirlmere Lakes or associated with surface water monitoring sites, initiate groundwater – surface water interaction TARP.</td><td>• Report trigger exceedance to DPE and key stakeholders.
• Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.
If the changes have been confirmed to be related to mining effects:
• Provide DPE and key stakeholders with proposed corrective management actions (CMAs) for consultation (e.g. extending the depth of the bore, establishment of additional bores, compensation to affected landowners as detailed in Section 6.2.1.4 of the Water Management Plan).
• Implement CMAs, subject to land access.
• Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.</td></tr>
<tr><td colspan="3">Level 2</td></tr>
<tr><td>• Level 2 trigger of TARP WMP8 for a minimum of three bores “early warning” bores
OR
• Level 2 trigger of TARP WMP11 for a minimum of three bores (“early warning” bores and Thirlmere Lakes bores).</td><td>• Actions as stated in Level 1.
If the changes have been confirmed to be related to mining effects:
• Consider increasing monitoring and review of data at sites where Level 2 has been reached, subject to land access. Reasons for not increasing monitoring frequency could include solid identification causation that do not require further monitoring (e.g. singular anthropogenic impact resulting in water level change).
Review Thirlmere Lakes monitoring bore data
• Compare against base case and deterministic model scenarios[2].
• Review manual water level measurements for additional monitoring sites to identify potential spatial trends in water level decline.
• Review surface water data to assess for surface water level decline at relevant site.
• Review CMAs in light of findings from further investigations and consider additional reasonable and feasible options.
• Review Water Management Plan and modify if necessary.
• Undertake an investigation to determine if an exceedance of the performance measure is likely. To be commenced/completed as soon as practicable.</td><td>• Responses as stated in Level 1.
• Provide findings of CMA review to DPE and key stakeholders for consultation.
• Implement additional CMAs, subject to land access.
• Advise DPE and key stakeholders of any required amendments to Water Management Plan.
• If relevant, notify DAWE of any predictions of an exceedance of a performance measure within two business days.</td></tr>
<tr><td colspan="3">Exceeds Performance Measure</td></tr>
<tr><td>• Level 3 trigger of TARPs WMP8 for a minimum of four bores “early warning” bores)
OR
• Level 3 trigger of TARPs WMP11 for a minimum of four bores (“early warning” bores and Thirlmere Lakes bores).
AND
• Review of Thirlmere Lakes bores indicated potential impacts resulting from extraction</td><td>• Actions as stated in Level 2.
If the changes have been confirmed to be related to mining effects:
• Increase monitoring and review of data frequency for sites where Level 3 has been reached, subject to land access.
• Investigate reasons for the performance measure exceedance. To be commenced/completed as soon as practicable.
• Review predictions of subsidence impacts and environmental consequences associated with further longwall extraction based on the outcomes of the investigation.
• Consider modifying mine plan.</td><td>• Responses as stated in Level 2.
• Submit a report to DPE (in accordance with Condition E4 of SSD 8445) within 14 days of the exceedance occurring (or other timeframe agreed by DPE) describing remediation options and any preferred remediation measures or other course of action.
• Implement any reasonable remediation measures as directed by DPE, subject to land access.
• Notify DAWE of any detection or predictions of an exceedance of a performance measure within two business days.
• Submit an Impact Response Plan to DAWE (in accordance with Condition 11 of the DAWE Consent for the Tahmoor South Project).</td></tr>
</table>

				• Update numerical groundwater model and re-run predictive scenarios to determine the likely extent and depth of depressurisation in the vicinity of Thirlmere Lakes, and to determine whether any additional management actions are required such as modifying the mine plan
Notes: [1] It is noted that the only Groundwater Dependent Ecosystem (GDE) pertinent to the Tahmoor South Project is that of Thirlmere Lakes[2] "Deterministic" model scenario refers to the predictive scenario modelling utilised to determine the trigger level.				

Appendix B Tahmoor South TARP Trigger Levels

Six-Monthly Groundwater Report: July – December 2024

Tahmoor South Domain

Tahmoor Coal Pty Ltd

SLR Project No.: 640.30614.00001

15 September 2025

B.1 WMP8, WMP9, WMP10, WMP13 Groundwater Level

Table B-1 Summary of Groundwater Level Triggers

Bore	Type	TARP Reference Level	TARP Level 1	TARP Level 2	TARP Level 3
P51A	Shallow Open Standpipe	298.3	296.3	292.4	288.5
P51B	Shallow Open Standpipe	299.5	297.5	293.6	289.7
P52	Shallow Open Standpipe	248.7	246.7	244.6	242.5
P53A	Shallow Open Standpipe	257.8	255.8	253.7	251.6
P53B	Shallow Open Standpipe	257.8	255.8	253.7	251.6
P53C	Shallow Open Standpipe	255.6	253.6	251.4	249.1
P54A	Shallow Open Standpipe	262.7	260.7	259.0	257.4
P54B	Shallow Open Standpipe	261.9	259.9	258.2	256.6
P55A	Shallow Open Standpipe	273.1	271.1	269.7	268.2
P55B	Shallow Open Standpipe	268.0	266.0	264.4	262.9
P55C	Shallow Open Standpipe	261.7	259.7	258.2	256.6
P56A	Shallow Open Standpipe	290.2	288.2	284.8	281.4
P56B	Shallow Open Standpipe	280.9	278.9	275.5	272.1
P56C	Shallow Open Standpipe	259.4	257.4	254.1	250.7
REA4	Shallow Open Standpipe	250.3	248.3	246.2	244.1
GW062068	Private Bore	276.0	274.0	270.5	267.1
GW104008	Private Bore	236.7	234.7	234.0	233.2
GW104323	Private Bore	258.9	256.9	256.8	256.8
GW104659	Private Bore	251.8	249.8	243.6	237.4

Bore	Type	TARP Reference Level	TARP Level 1	TARP Level 2	TARP Level 3
GW105395	Private Bore	324.1	322.1	Modelled drawdown is equal to 2 m	Modelled drawdown is equal to 2 m
GW109257	Private Bore	282.9	280.9	278.9	276.9
GW112473	Private Bore	319.1	317.1	Modelled drawdown is equal to 1 m	Modelled drawdown is equal to 1 m
TNC036 (HBSS-65m)	Shallow VWP	-	204.5	-	-
TNC036 (HBSS-97m)	Shallow VWP	-	191.3	185.7	180.0
TNC036 (BGSS-169m)	Shallow VWP	-	192.5	135.7	79.0
TNC040 (WMFM-27m)	Shallow VWP	-	203.3	198.2	193.1
TNC040 (HBSS-65m)	Shallow VWP	-	182.1	175.8	169.5
TNC043 (HBSS-65m)	Shallow VWP	-	153.7	152.50	151.3
TNC043 (HBSS-111.5m)	Shallow VWP	-	150.6	148.50	146.5
TBC09 (HBSS-30m)	Shallow VWP	287.6	321.8	321.6	321.5
TBC09 (HBSS-75m)	Shallow VWP	309.4	304.4	304.2	304.1
TBC09 (BHCS-182m)	Shallow VWP	293.0	288.0	287.4	286.8
TBC09 (BGSS-192m)	Shallow VWP	290.4	285.4	285.2	285.0
TBC018 (WWFM/HBSS-70m)	Shallow VWP	250.5	245.5	245.2	244.8
TBC018 (WWFM/HBSS-117m)	Shallow VWP	251.9	246.9	246.6	246.2
TBC018 (HBSS lower-164m)	Shallow VWP	250.7	245.7	245.4	245.1
TBC018 (BHCS-179m)	Shallow VWP	248.5	243.5	243.1	242.8
TBC018 (BGSS-198m)	Shallow VWP	244.7	239.7	237.8	236.0

Bore	Type	TARP Reference Level	TARP Level 1	TARP Level 2	TARP Level 3
TBC024 (HBSS-117m)	Shallow VWP	287.6	282.6	-	-
TBC024 (HBSS-139m)	Shallow VWP	287.0	282.0	281.5	281.0
TBC024 (BHCS-168m)	Shallow VWP	289.5	284.5	283.6	282.8
TBC024 (BGSS-185m)	Shallow VWP	289.3	284.3	282.3	280.3
TBC027 (HBSS-95m)	Shallow VWP	320.1	315.1	-	-
TBC027 (HBSS-132m)	Shallow VWP	312.8	307.8	307.6	307.3
TBC027 (HBSS-169m)	Shallow VWP	312.2	307.2	307	306.8
TBC027 (BHCS-181m)	Shallow VWP	310.7	305.7	305.5	305.3
TBC027 (BGSS-198m)	Shallow VWP	310.3	305.3	305.1	304.9
TBC032 (HBSS-95m)	Shallow VWP	262.3	257.3	256.7	256.2
TBC032 (HBSS-131m)	Shallow VWP	255.0	250	249.3	248.6
TBC032 (HBSS-168m)	Shallow VWP	266.9	261.9	261.1	260.4
TBC032 (BHCS-181m)	Shallow VWP	242.8	237.8	228.7	219.5
TBC032 (BGSS-200m)	Shallow VWP	243.8	238.8	208.7	178.7
TBC034 (HBSS-65m)	Shallow VWP	371.8	366.8	-	-
TBC034 (HBSS-113m)	Shallow VWP	368.0	363.0	362.7	362.3
TBC034 (HBSS-161m)	Shallow VWP	358.4	353.4	353.1	352.8
TBC034 (BHCS-176m)	Shallow VWP	354.9	349.9	349.4	348.9
TBC034 (BGSS-196m)	Shallow VWP	358.3	353.3	352.1	350.9
TBC039 (HBSS-65m)	Shallow VWP	313.5	308.7	-	-
TBC09 (BGSS-332m)	Deep VWP	-	N/A	N/A	N/A
TBC09 (BGSS-343m)	Deep VWP	-	N/A	N/A	N/A

Bore	Type	TARP Reference Level	TARP Level 1	TARP Level 2	TARP Level 3
TBC09 (SBSS-357m)	Deep VWP	-	N/A	N/A	N/A
TBC09 (BUSM-381m)	Deep VWP	-	N/A	N/A	N/A
TBC09 (WWCO-391m)	Deep VWP	-	N/A	N/A	N/A
TBC09 (WWCO-397m)	Deep VWP	-	N/A	N/A	N/A
TBC018 (BGSS-282m)	Deep VWP	-	N/A	N/A	N/A
TBC018 (BGSS-366m)	Deep VWP	-	N/A	N/A	N/A
TBC018 (WBCS-377m)	Deep VWP	-	N/A	N/A	N/A
TBC018 (BUSM-404m)	Deep VWP	-	N/A	N/A	N/A
TBC018 (WO-432m)	Deep VWP	-	N/A	N/A	N/A
TBC020 (BGSS-211m)	Deep VWP	-	N/A	N/A	N/A
TBC020 (BGSS-293m)	Deep VWP	-	N/A	N/A	N/A
TBC020 (BGSS-375m)	Deep VWP	-	N/A	N/A	N/A
TBC020 (WBCS-397m)	Deep VWP	-	N/A	N/A	N/A
TBC020 (BGSS-411m)	Deep VWP	-	N/A	N/A	N/A
TBC020 (WO-434m)	Deep VWP	-	N/A	N/A	N/A
TBC020 (WO-439m)	Deep VWP	-	N/A	N/A	N/A
TBC026 (BGSS-211m)	Deep VWP	-	N/A	N/A	N/A
TBC026 (BGSS-278m)	Deep VWP	-	N/A	N/A	N/A
TBC026 (BGSS-344m)	Deep VWP	-	N/A	N/A	N/A
TBC026 (WBCS-409m)	Deep VWP	-	N/A	N/A	N/A
TBC026 (BUSM-432m)	Deep VWP	-	N/A	N/A	N/A
TBC026 (ECSL-440m)	Deep VWP	-	N/A	N/A	N/A

Bore	Type	TARP Reference Level	TARP Level 1	TARP Level 2	TARP Level 3
TBC026 (ECSL-460m)	Deep VWP	-	N/A	N/A	N/A
TBC032 (BGSS-200m)	Deep VWP	-	N/A	N/A	N/A
TBC032 (BGSS-237m)	Deep VWP	-	N/A	N/A	N/A
TBC032 (BGSS-294m)	Deep VWP	-	N/A	N/A	N/A
TBC039 (BGSS-243m)	Deep VWP	-	N/A	N/A	N/A
TBC039 (BGSS-299m)	Deep VWP	-	N/A	N/A	N/A
TBC039 (SBSS-354m)	Deep VWP	-	N/A	N/A	N/A
TBC039 (BUSM-375m)	Deep VWP	-	N/A	N/A	N/A
TBC039 (WWCO-402m)	Deep VWP	-	N/A	N/A	N/A

"-" not defined

"N/A" not applicable; a specific trigger limit is not set as predicted drawdown constantly changes with extraction progression.

B.2 WMP11 Groundwater Quality

Table B-2 Summary of Groundwater Quality Triggers

Bore	pH Upper	pH Lower	EC	Fe Filt (mg/L)	Mn Filt (mg/L)	Cu Filt (mg/L)	Pb Filt (mg/L)	Zn Filt (mg/L)	Ni Filt (mg/L)	Al Filt (mg/L)	As Filt (mg/L)	Sr Filt (mg/L)	Li Filt (mg/L)	Ba Filt (mg/L)	Se Filt (mg/L)
GW109257	10.18	4.01	927	0.465	0.001	0.21	0.008	14.65	0.009	1.55	0.027	0.001	0.003	0.028	0.13
GW104008	7.15	4.5	1983	0.016	0.001	0.186	0.003	38.2	0.073	2.21	0.02	0.001	0.001	0.099	0.017
GW112473	7.08	3.32	574	0.621	0.001	0.157	0.003	24.75	0.007	1.71	0.016	0.005	0.001	0.017	0.063
GW104659	7.08	4.12	685	0.02	0.001	0.177	0.008	31.2	0.017	1.8	0.011	0.001	0.001	0.03	0.037
GW062068	2.59	6.1	2070	2.98	0.024	0.0194	0.218	7.52	0.001	0.002	0.0106	0.0296	0.142	0.0152	0.09
GW105395	8.24	4.5	4635	0.1	0.001	0.098	0.001	40.5	0.084	2	0.041	0.001	0.001	0.18	0.05
GW104323	6.95	2.63	1541	3.8	0.002	0.295	2.25	17	0.014	2.7	0.067	0.175	0.001	0.021	4.25
P51A	12.66	5.18	299	0.912	0.001	0.502	0.031	0.027	0.405	0.139	0.015	0.001	0.005	3.261	0.053
P51B	13.79	7.82	3971	4.57	0.017	1.418	0.007	13.135	0.764	0.255	0.013	0.003	0.005	3.575	0.039
P52	8.82	4.47	1450	0.221	0.004	0.315	0.004	61	0.018	4.245	0.049	0.104	0.003	0.064	0.316
P53A	8.94	5.07	896	0.298	0.008	0.16	0.002	38.2	0.04	2.24	0.019	0.003	0.003	0.22	0.064
P53B	12.87	5.56	1848	0.08	0.002	0.194	0.006	12.64	0.654	2.372	0.015	0.001	0.003	0.688	0.053
P53C	11.54	5.08	1879	0.172	0.011	0.246	0.002	30.6	0.049	2.74	0.042	0.001	0.002	1.64	0.239
P54A	9.61	5	1951	4.75	0.003	0.289	0.475	37.7	0.07	3.175	0.043	0.475	0.475	0.31	0.025
P54B	8.63	5.18	2182	0.029	0.003	0.317	0.004	43.4	0.082	2.997	0.049	0.001	0.004	0.515	0.076
P55A	12.33	4.26	1822	0.138	0.006	0.372	0.002	40.4	0.026	3.9	0.066	0.002	0.003	0.762	0.311
P55B	9.04	4.68	1699	0.136	0.01	0.39	0.007	49.8	0.087	5.68	0.232	0.049	0.002	0.278	0.254
P55C	11.07	3.92	2663	0.668	0.002	0.302	0.522	55	0.256	3.38	0.146	0.023	0.002	0.644	0.468
P56A	10.21	3.4	1560	1.77	0.001	0.17	0.009	0.04	0.023	0.134	0.012	0.01	0.005	0.174	0.041

Bore	pH Upper	pH Lower	EC	Fe Filt (mg/L)	Mn Filt (mg/L)	Cu Filt (mg/L)	Pb Filt (mg/L)	Zn Filt (mg/L)	Ni Filt (mg/L)	Al Filt (mg/L)	As Filt (mg/L)	Sr Filt (mg/L)	Li Filt (mg/L)	Ba Filt (mg/L)	Se Filt (mg/L)
P56B	13.22	6.06	1526	0.276	0.004	0.26	0.002	0.295	0.858	1.726	0.035	0.001	0.005	1.063	0.014
P56C	13.19	5.27	3520	0.237	0.007	0.685	0.001	17.2	0.497	1.635	0.003	0.001	0.005	1.652	0.012
REA4	10.41	5.31	1126	0.29	0.001	0.032	0.009	1.04	0.01	0.084	0.007	0.002	0.001	0.175	0.135

B.3 WMP12 Groundwater-Surface Water Interaction

Refer to **Table 1** for the relevant bores, as per **Appendix A**.

Appendix C Trigger Level Breach and Exceedance Discussion

Six-Monthly Groundwater Report: July – December 2024

Tahmoor South Domain

Tahmoor Coal Pty Ltd

SLR Project No.: 640.30614.00001

15 September 2025

C.1 Trigger Breach Discussion

Trigger Breaches & Exceedances As detailed in **Section 3.0 (main body)**, the groundwater level triggers and groundwater quality triggers are discussed in **Appendix A** and presented in **Appendix B**.

Two classes of data assessment are reported:

- **Breach**: a trigger breach is noted when an observed data point is outside of the defined trigger level. Breaches are reported to provide site context and inform where exceedances may occur in the future.

  An example of a breach for groundwater levels as detailed in WMP8, is where a groundwater level is reported with greater than 2 m water level reduction for a particular month for a period less than 6 consecutive months.

  An example for groundwater quality is where the measured concentration exceeds the defined trigger level but for a period of less than 3 consecutive months.

- **Exceedance**: An exceedance occurs when the TARP level has been exceeded.

  Using the same example above, an **exceedance** would be when the groundwater level is reported with greater than 2 m water level reduction for a particular month for a period of 6 months or more consecutively.

Pertaining to water quality, the criteria for a TARP Level 1 in WMP11 detailed below (Tahmoor Coal, 2022) where both criteria must be met for an exceedance, and a trigger breach occurs where only one criterion is met, or criteria are only partially met:

- **Criteria 1**: Observed salinity and/or metal or pH outside of defined trigger levels for 3 consecutive months or more. The effect does not persist after a significant rainfall recharge event.

  AND

- **Criteria 2**: A similar trend or response is noted at other monitored bores or private bores.

C.1.1 Water Levels (TARP WMP8, WMP9, WMP10, WMP12)

Table C-2 provides a summary of all Groundwater Level/Pressure trigger level breaches and exceedances over the reporting period.

Table C-1: Groundwater Level Trigger Summary (TARP WMP8, WMP9, WMP10, WMP12, WMP13) July to December 2024

Bore	Type	TARP WMP	July 2024	August 2024	September 2024	October 2024	November 2024	December 2024
P51A	SOP	8, 12						
P51B	SOP	8, 12	B1	B1	B1	B1	B1	L1
P52	SOP	8, 12				B1	B1	
P53A	SOP	8, 12	L1	L1, B2	L1, B2	L1, B3	L1, B2	L1, B2
P53B	SOP	8, 12	L1, B2	L1	L1	L1, B2	L1, B2	L1, B2
P53C	SOP	8, 12	L2	L2	L2	L2, B3	L2, B3	L2, B3
P54A	SOP	8, 12	#ND	#ND	#ND	#ND	#ND	#ND
P54B	SOP	8, 12	#ND	#ND	#ND	#ND	#ND	#ND
P54C	SOP	8, 12						
P55A	SOP	8, 12	L1	L1	L1	L1	L1	L1
P55B	SOP	8, 12	L3	L3	L3	L3	L3	L3
P55C	SOP	8, 12	L2, B3	L2, B3	L2, B3	L2, B3	L2, B3	L3
P56A	SOP	8				B1	B1	B1
P56B	SOP	8	B2	B1	L1, B2	#ND	#ND	#ND
P56C	SOP	8	L2	L2, B3	L2	#ND	#ND	#ND
P50A	SOP	8						
P50B	SOP	8						
P50C	SOP	8						
P57A	SOP	8						
P57B	SOP	8						

Bore	Type	TARP WMP	July 2024	August 2024	September 2024	October 2024	November 2024	December 2024
P57C	SOP	8						
REA4	SOP	8, 12				B1	B1	B1
GW104008	Private Bore	8						
GW104323	Private Bore	8			B1		B3	B3
GW104659	Private Bore	8, 13	L1	L1, B3	L1	L1	L1, B2	L1, B3
GW105395	Private Bore	8	#ND	#ND	#ND	#ND	#ND	#ND
GW109257	Private Bore	8	L1	L1, B2	L1	L1	L1, B2	L1, B2
GW112473	Private Bore	8			B1	B1	B1	
TBC09 (HBSS-30m)	Shallow VWP	9						
TBC09 (HBSS-75m)	Shallow VWP	9						
TBC09 (BHCS-182m)	Shallow VWP	9						
TBC09 (BGSS-192m)	Shallow VWP	9						
TBC018 (WWFM/HBSS-70m)	Shallow VWP	9						
TBC018 (WWFM/HBSS-117m)	Shallow VWP	9						
TBC018 (HBSS lower-164m)	Shallow VWP	9						
TBC018 (BHCS-179m)	Shallow VWP	9						
TBC018 (BGSS-198m)	Shallow VWP	9						
TBC024 (HBSS-117m)	Shallow VWP	9						
TBC024 (HBSS-139m)	Shallow VWP	9	*	*	*	*	*	*
TBC024 (BHCS-168m)	Shallow VWP	9	*	*	*	*	*	*

Bore	Type	TARP WMP	July 2024	August 2024	September 2024	October 2024	November 2024	December 2024
TBC024 (BGSS-185m)	Shallow VWP	9		B3*	B3*	B3*	B3*	B3*
TBC027 (HBSS-95m)	Shallow VWP	9	B1	B1	B1	B1	L1*	L1*
TBC027 (HBSS-132m)	Shallow VWP	9						
TBC027 (HBSS-169m)	Shallow VWP	9						
TBC027 (BHCS-181m)	Shallow VWP	9						
TBC027 (BGSS-198m)	Shallow VWP	9						
TBC032 (HBSS-95m)	Shallow VWP	9	B3	B3	B3	B3	L3	L3
TBC032 (HBSS-131m)	Shallow VWP	9	L3	L3	L3	L3	L3	L3
TBC032 (HBSS-168m)	Shallow VWP	9						
TBC032 (BHCS-181m)	Shallow VWP	9	L1, B2	L1, B2	L1, B2	L1, B2	L1, B2	L2
TBC032 (BGSS-200m)	Shallow VWP	9	L1	L1	L1	L1	L1	L1
TBC034 (HBSS-65m)	Shallow VWP	9	#ND	#ND	#ND	#ND	#ND	#ND
TBC034 (HBSS-113m)	Shallow VWP	9	#ND	#ND	#ND	#ND	#ND	#ND
TBC034 (HBSS-161m)	Shallow VWP	9						
TBC034 (BHCS-176m)	Shallow VWP	9	B3*	B3*	B3*	B3*	B3*	B3*
TBC034 (BGSS-196m)	Shallow VWP	9						
TBC039 (HBSS-65m)	Shallow VWP	9, 13	B1*	B1*	B1*	B1*	B1*	B1*
TBC09 (BGSS-332m)	Deep VWP	10						
TBC09 (BGSS-343m)	Deep VWP	10						
TBC09 (SBSS-357m)	Deep VWP	10						
TBC09 (BUSM-381m)	Deep VWP	10						

Bore	Type	TARP WMP	July 2024	August 2024	September 2024	October 2024	November 2024	December 2024
TBC09 (WWCO-391m)	Deep VWP	10						
TBC09 (WWCO-397m)	Deep VWP	10						
TBC018 (BGSS-282m)	Deep VWP	10						
TBC018 (BGSS-366m)	Deep VWP	10						
TBC018 (WBCS-377m)	Deep VWP	10	~NC					
TBC018 (BUSM-404m)	Deep VWP	10						
TBC018 (WWCO-432m)	Deep VWP	10	#ND	#ND	#ND	#ND	#ND	#ND
TBC020 (BGSS-211m)	Deep VWP	10						
TBC020 (BGSS-293m)	Deep VWP	10						
TBC020 (BGSS-375m)	Deep VWP	10						
TBC020 (WBCS-397m)	Deep VWP	10	~NC					
TBC020 (BGSS-411m)	Deep VWP	10						
TBC020 (WO-434m)	Deep VWP	10						
TBC020 (WO-439m)	Deep VWP	10	~NC					
TBC026 (BGSS-211m)	Deep VWP	10						
TBC026 (BGSS-278m)	Deep VWP	10						
TBC026 (BGSS-344m)	Deep VWP	10						
TBC026 (WBCS-409m)	Deep VWP	10						
TBC026 (BUSM-432m)	Deep VWP	10						
TBC026 (ECSL-440m)	Deep VWP	10						
TBC026 (ECSL-460m)	Deep VWP	10						

Bore	Type	TARP WMP	July 2024	August 2024	September 2024	October 2024	November 2024	December 2024
TBC032 (BGSS-200m)	Deep VWP	10						
TBC032 (BGSS-237m)	Deep VWP	10						
TBC032 (BGSS-294m)	Deep VWP	10						
TBC039 (BGSS-243m)	Deep VWP	10						
TBC039 (BGSS-299m)	Deep VWP	10						
TBC039 (SBSS-354m)	Deep VWP	10						
TBC039 (BUSM-375m)	Deep VWP	10						
TBC039 (WWCO-402m)	Deep VWP	10						

^ Bore was observed as dry during the reporting period.
* Data appears erroneous therefore not considered to be an exceedance.
¯ Not calculated (NC) as the historical groundwater level, upon which the drawdown calculation is based upon, is not available.
No data (ND) available for the reporting period.
Note: green shading indicates a trigger was breached and/or an exceedance occurred

C.1.2 Water Quality

A summary of groundwater quality trigger breaches and exceedances in this reporting period is presented in the Sections below where the performance of each bore against each trigger is:

- Within normal conditions (indicated by a blank cell);
- Indicated as “B”, meaning that the trigger was breached in the current reporting period but is not yet considered an exceedance; or
- Indicated as “L” and shaded in green, meaning that trigger was breached in the current reporting period for the third time or more and complies with Criteria 1 and 2 of TARP Level 1 in WMP11.

C.1.3 TARP WMP11 and WMP13

Table C-2: Groundwater Quality Trigger Summary (TARP WMP11 and WMP13) – July to December 2024

Bore	TARP WMP	Month	pH Upper	pH Lower	EC	Fe	Mn	Cu	Pb	Zn	Ni	Al	As	Sr	Li	Ba	Se
GW104008	11	July-24					B1							B1			
GW104008	11	Aug-24					B1			B1	B1	B1		B1		B1	
GW104008	11	Sep-24					L1				B1						
GW104008	11	Oct-24		B1				B1	B1								B1
GW104008	11	Nov-24															
GW104008	**11**	**Dec-24**					**B1**				**B1**						
GW104323	11	July-24															
GW104323	11, 13	Aug-24					B1							B1			
GW104323	11	Sep-24															
GW104323	11	Oct-24															
GW104323	11	Nov-24															
GW104323	**11**	**Dec-24**					**B1**					**B1**				**B1**	
GW104659	11, 13	July-24															
GW104659	11	Aug-24										B1					
GW104659	11, 13	Sep-24												B1			
GW104659	11, 13	Oct-24										B1					
GW104659	11, 13	Nov-24															
GW104659	**11, 13**	**Dec-24**					**B1**										
GW105395	11	July-24	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#

Bore	TARP WMP	Month	pH Upper	pH Lower	EC	Fe	Mn	Cu	Pb	Zn	Ni	Al	As	Sr	Li	Ba	Se
GW105395	11, 13	Aug-24	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
GW105395	11	Sep-24	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
GW105395	11	Oct-24	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
GW105395	11	Nov-24	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
GW105395	11	Dec-24	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
GW109257	11	July-24					B1							B1			
GW109257	11	Aug-24					B1							B1			
GW109257	11	Sep-24		B1			B1				B1			B1			
GW109257	11	Oct-24											B1				
GW109257	11	Nov-24					B1										
GW109257	**11**	**Dec-24**					**B1**										
GW112473	11	July-24					L1				B1			L1			
GW112473	11	Aug-24					L1	B1			B1			L1			
GW112473	11	Sep-24					L1	B1		B1	B1			L1			
GW112473	11	Oct-24						L1		BI							
GW112473	11	Nov-24			BI									B1			
GW112473	**11**	**Dec-24**				**B1**	**B1**										
P51A	11	July-24		B1					B1								
P51A	11	Aug-24		B1													
P51A	11	Sep-24															
P51A	11	Oct-24															
P51A	11	Nov-24															

Bore	TARP WMP	Month	pH Upper	pH Lower	EC	Fe	Mn	Cu	Pb	Zn	Ni	Al	As	Sr	Li	Ba	Se
P51A	**11**	**Dec-24**									**B1**						
P51B	11	July-24															
P51B	11	Aug-24															
P51B	11	Sep-24															
P51B	11	Oct-24															
P51B	11	Nov-24															
P51B	**11**	**Dec-24**								**B1**							
P52	11	July-24															
P52	11	Aug-24															
P52	11	Sep-24								B1	B1						
P52	11	Oct-24								BI							
P52	11	Nov-24		B1						L1							
P52	**11**	**Dec-24**									**B1**				**B1**		**B1**
P53A	11	July-24															
P53A	11	Aug-24								B1	B1						
P53A	11	Sep-24															
P53A	11	Oct-24															
P53A	11	Nov-24															
P53A	**11**	**Dec-24**							**B1**		**B1**				**B1**		
P53B	11	July-24														B1	
P53B	11	Aug-24														B1	
P53B	11	Sep-24														L1	

Bore	TARP WMP	Month	pH Upper	pH Lower	EC	Fe	Mn	Cu	Pb	Zn	Ni	Al	As	Sr	Li	Ba	Se
P53B	11	Oct-24														L1	
P53B	11	Nov-24														L1	
P53B	**11**	**Dec-24**								**B1**	**B1**				**B1**	**L2**	
P53C	11	July-24														B1	
P53C	11	Aug-24													B1	B1	
P53C	11	Sep-24						B1	B1			B1				L1	
P53C	11	Oct-24														L1	
P53C	11	Nov-24														L1	
P53C	**11**	**Dec-24**							**B1**	**B1**	**B1**				**B1**	**L2**	
P54A	11	July-24	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
P54A	11	Aug-24	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
P54A	11	Sep-24	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
P54A	11	Oct-24	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
P54A	11	Nov-24	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
P54A	11	Dec-24	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
P54B	11	July-24	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
P54B	11	Aug-24	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
P54B	11	Sep-24	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
P54B	11	Oct-24	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
P54B	11	Nov-24	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
P54B	11	Dec-24	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
P55A	11	July-24			B1												

Bore	TARP WMP	Month	pH Upper	pH Lower	EC	Fe	Mn	Cu	Pb	Zn	Ni	Al	As	Sr	Li	Ba	Se
P55A	11	Aug-24			B1												
P55A	11	Sep-24			L1												
P55A	11	Oct-24			L1												
P55A	11	Nov-24			L1												
P55A	**11**	**Dec-24**			**L2**				**B1**		**B1**				**B1**		
P55B	11	July-24														B1	
P55B	11	Aug-24			B1	B1										B1	
P55B	11	Sep-24			B1								B1			B1	
P55B	11	Oct-24			L1								B1				
P55B	11	Nov-24			L1												
P55B	**11**	**Dec-24**			**L1**						**B1**		**B1**		**B1**	**B1**	
P55C	11	July-24			B1												
P55C	11	Aug-24			B1												
P55C	11	Sep-24															
P55C	11	Oct-24			B1												
P55C	11	Nov-24															
P55C	**11**	**Dec-24**							**B1**		**B1**				**B1**	**B1**	
P56A	11	July-24															
P56A	11	Aug-24														B1	
P56A	11	Sep-24				B1											
P56A	11	Oct-24					B1							B1			
P56A	11	Nov-24			B1		B1			B1				B1		B1	

Bore	TARP WMP	Month	pH Upper	pH Lower	EC	Fe	Mn	Cu	Pb	Zn	Ni	Al	As	Sr	Li	Ba	Se
P56A	**11**	**Dec-24**			**B1**	**B1**		**B1**	**B1**	**B1**	**B1**	**B1**	**B1**		**B1**	**B1**	**B1**
P56B	11	July-24															
P56B	11	Aug-24															
P56B	11	Sep-24															
P56B	11	Oct-24	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
P56B	11	Nov-24	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
P56B	11	Dec-24	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
P56C	11	July-24															
P56C	11	Aug-24															
P56C	11	Sep-24															
P56C	11	Oct-24															
P56C	11	Nov-24															
P56C	**11**	**Dec-24**		**B1**				**B1**	**B1**	**B1**	**B1**	**B1**					**B1**
REA4	11	July-24				B1	B1									L2	
REA4	11	Aug-24				B1	B1									L2	
REA4	11	Sep-24				L1	L1									L2	
REA4	11	Oct-24				L1	L1				B1					L2	
REA4	11	Nov-24					L1				B1					L2	
REA4	**11**	**Dec-24**							**B1**	**B1**	**L1**				**B1**	**L2**	

No data (ND) available for the reporting period.
^ Bore was observed as dry during the reporting period.
Green shading indicates that the bore and analyte comply with Criteria 1 of TARP Level 1 in WMP11.
Bolded text indicates that the bore and analyte comply with Criteria 1 and 2 of TARP Level 1 in WMP11.

C.1.4 Trigger Level Breach and Exceedance Summary

The following tables provide a summary of the Trigger Level breaches and Exceedances.

Table C-3: Active December 2024 Trigger Exceedances – WMP8, WMP12

Exceedance Site	Trigger Parameter	TARP Level	TARP
P51B	Groundwater level	1	WMP8, WMP12
P53A	Groundwater level	1	WMP8, WMP12
P53B	Groundwater level	1	WMP8, WMP12
P53C	Groundwater level	2	WMP8, WMP12
P55A	Groundwater level	1	WMP8, WMP12
P55B	Groundwater level	3	WMP8, WMP12
P55C	Groundwater level	3	WMP8, WMP12
GW104659	Groundwater level	1	WMP8
GW109257	Groundwater level	1	WMP8

Table C-4: Active December 2024 Trigger Exceedances – WMP9

Exceedance Site	Trigger Parameter	TARP Level	TARP
TBC032 (HBSS-95m)	Shallow VWP	3	WMP9
TBC032 (HBSS-131m)	Shallow VWP	3	WMP9
TBC032 (BHCS-181m)	Shallow VWP	2	WMP9
TBC032 (BGSS-200m)	Shallow VWP	1	WMP9

able C-5: Active December 2024 Trigger Exceedances – WMP 11

Exceedance Site	Breach Parameter (Criterion 1 met)	Exceedance Parameter (Criteria 1 and 2 met)	Exceedance Level
REA4	Ni	(no – only one bore with an active Ni exceedance)	1
REA4	**Ba**	**Ba (yes – three bores with active a exceedances)**	**2**
P56B	EC	(no – only two bores with an active EC exceedance)	1
P56A	EC	(no – only two bores with an active EC exceedance)	2
P53C	**Ba**	**Ba (yes – three bores with active a exceedances)**	**2**
P53B	**Ba**	**Ba (yes – three bores with active a exceedances)**	**2**

Note: for water quality exceedances those **bolded** are the only parameters that fulfil both criteria 1 and 2 of the TARP.

Appendix D Hydrographs – Groundwater Levels

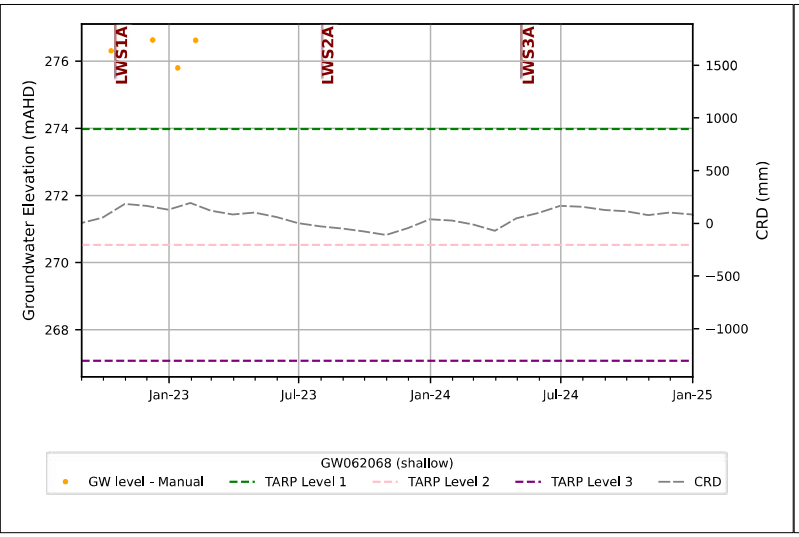
Six-Monthly Groundwater Report: July – December 2024

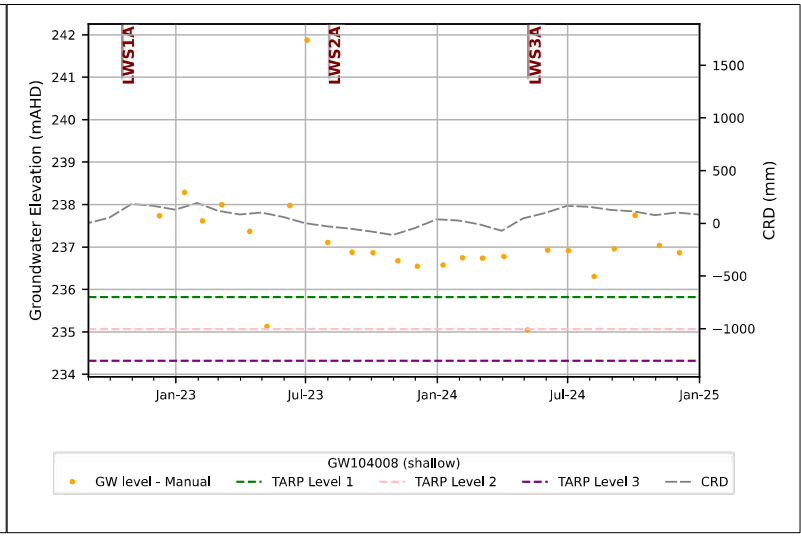
Tahmoor South Domain

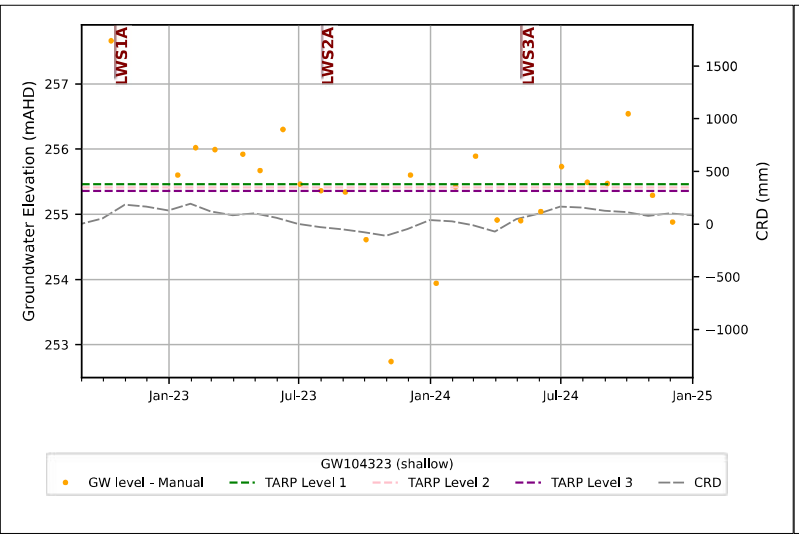
Tahmoor Coal Pty Ltd

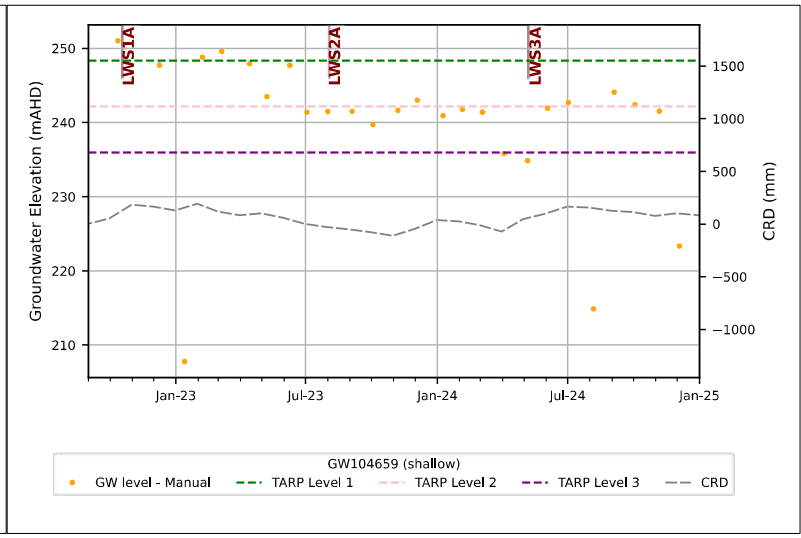
SLR Project No.: 640.30614.00001

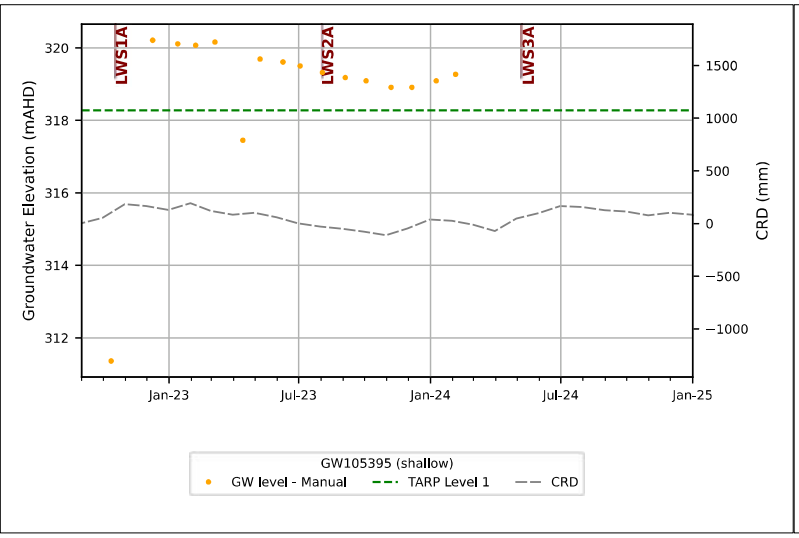
15 September 2025

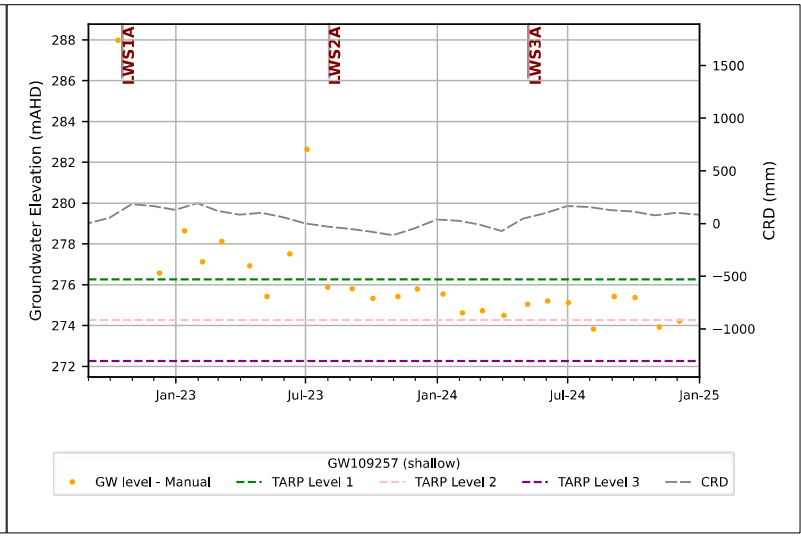

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
276
274
272
270
268
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
GW062068 (shallow)
GW level - Manual
TARP Level 1
TARP Level 2
TARP Level 3
CRD

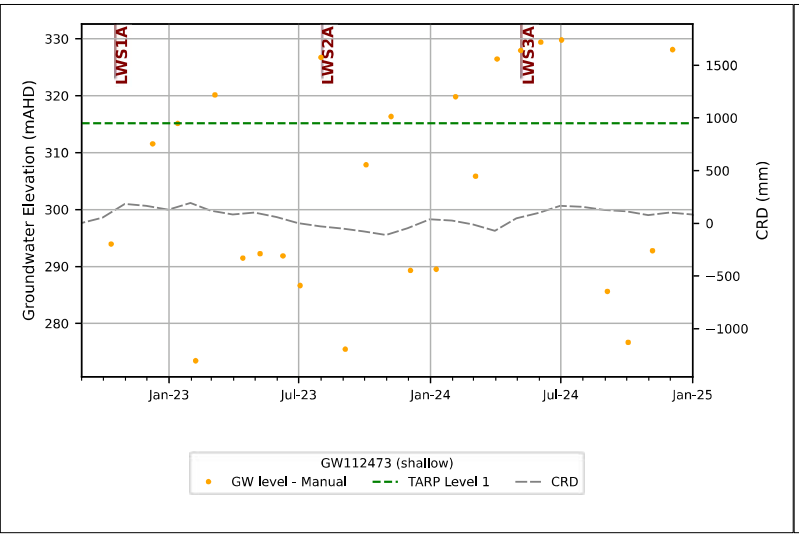

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
242
241
240
239
238
237
236
235
234
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
GW104008 (shallow)
GW level - Manual
TARP Level 1
TARP Level 2
TARP Level 3
CRD

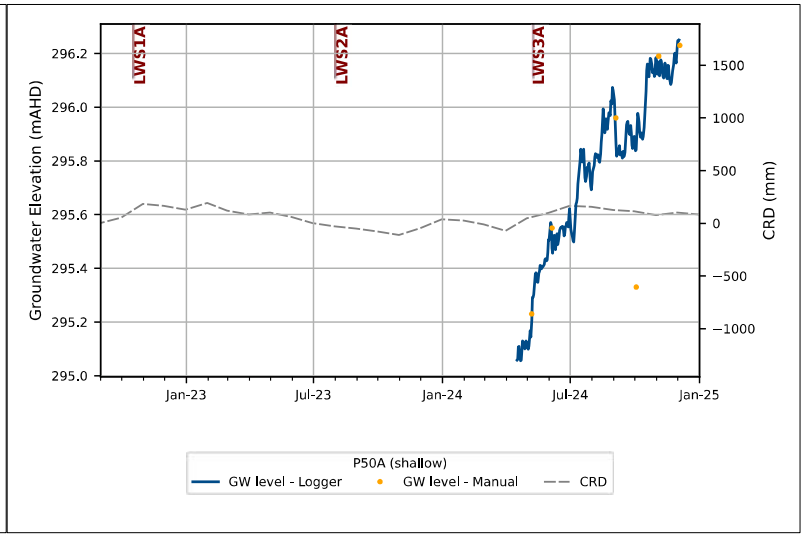

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
257
256
255
254
253
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
GW104323 (shallow)
GW level - Manual
TARP Level 1
TARP Level 2
TARP Level 3
CRD

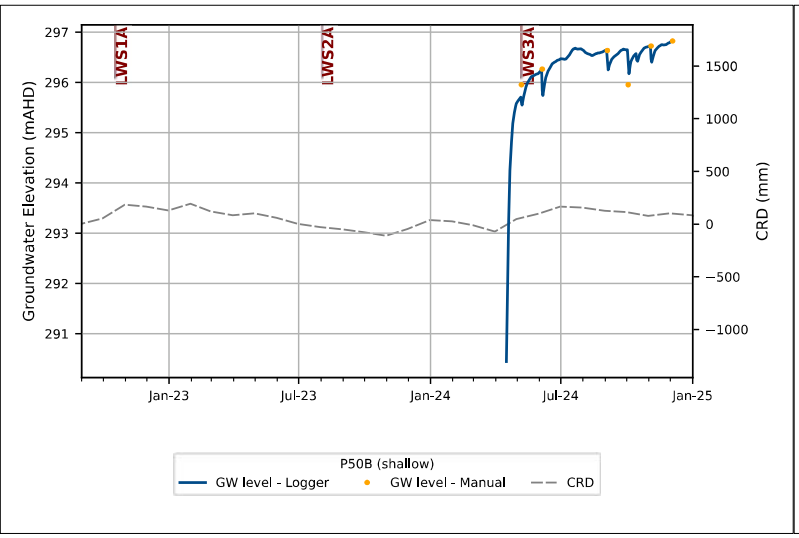

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
250
240
230
220
210
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
GW104659 (shallow)
GW level - Manual
TARP Level 1
TARP Level 2
TARP Level 3
CRD

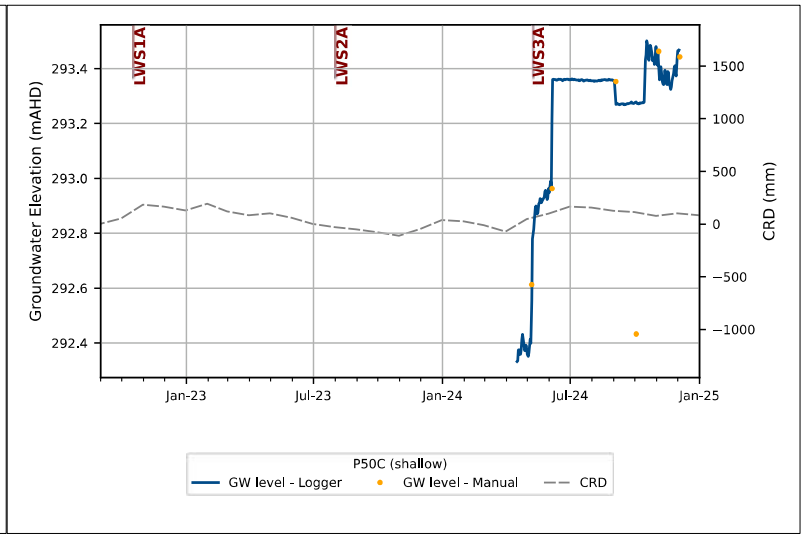

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
320
318
316
314
312
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
GW105395 (shallow)
GW level - Manual
TARP Level 1
CRD

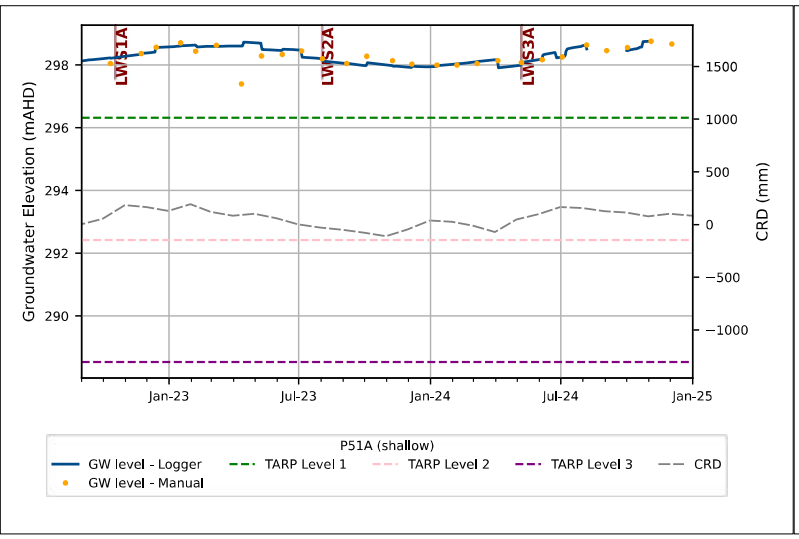

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
288
286
284
282
280
278
276
274
272
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
GW109257 (shallow)
GW level - Manual
TARP Level 1
TARP Level 2
TARP Level 3
CRD


LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
GW112473 (shallow)
GW level - Manual
TARP Level 1
CRD

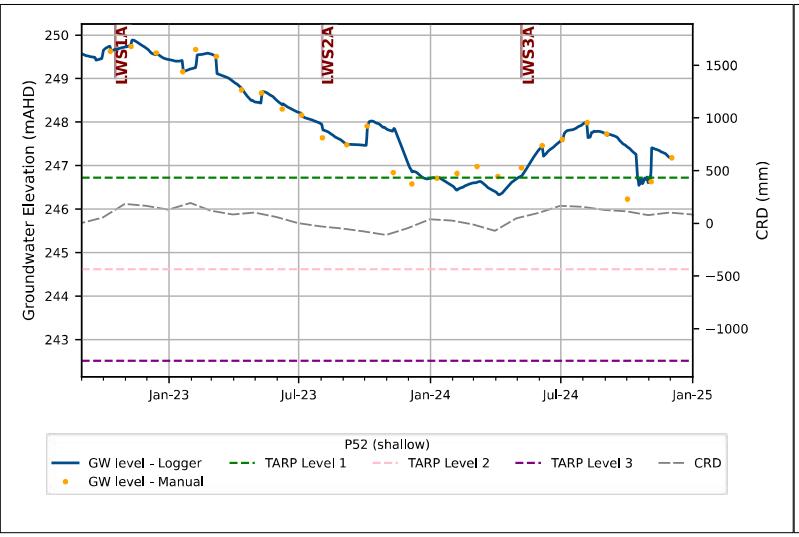

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
P50A (shallow)
GW level - Logger
GW level - Manual
CRD

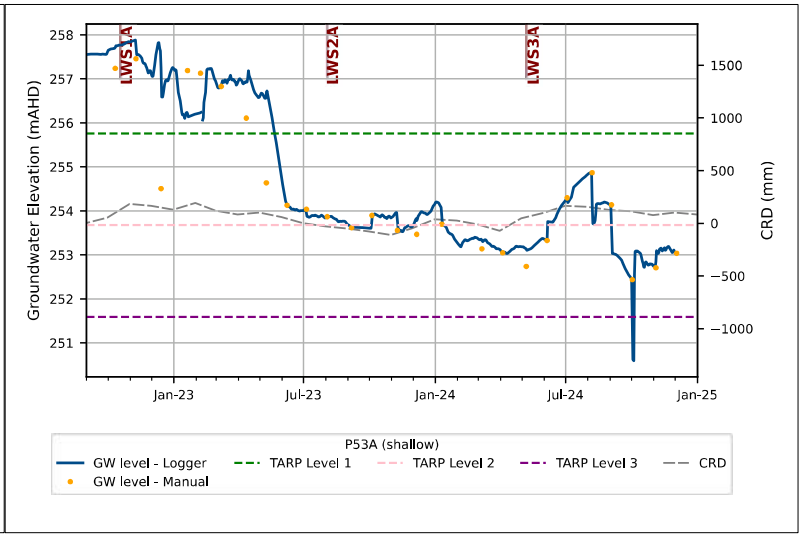

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
P50B (shallow)
GW level - Logger
GW level - Manual
CRD

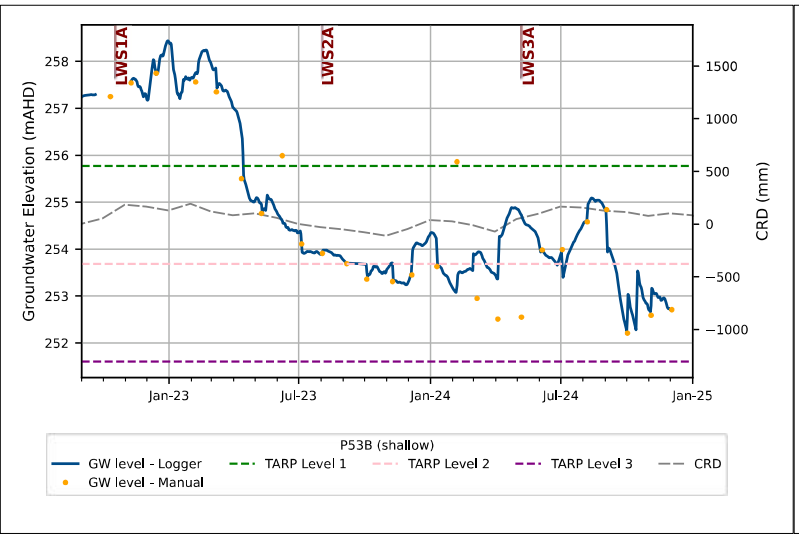

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
P50C (shallow)
GW level - Logger
GW level - Manual
CRD

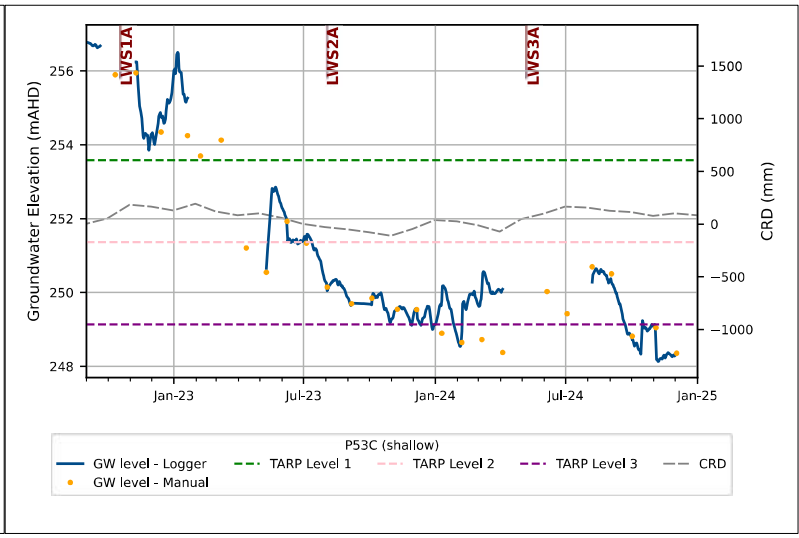

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
P51A (shallow)
GW level - Logger
GW level - Manual
TARP Level 1
TARP Level 2
TARP Level 3
CRD

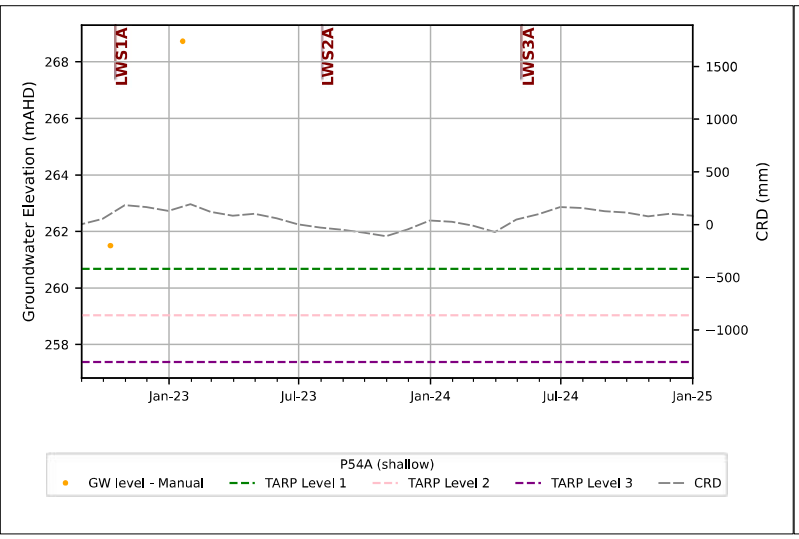

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
P51B (shallow)
GW level - Logger
GW level - Manual
TARP Level 1
TARP Level 2
TARP Level 3
CRD

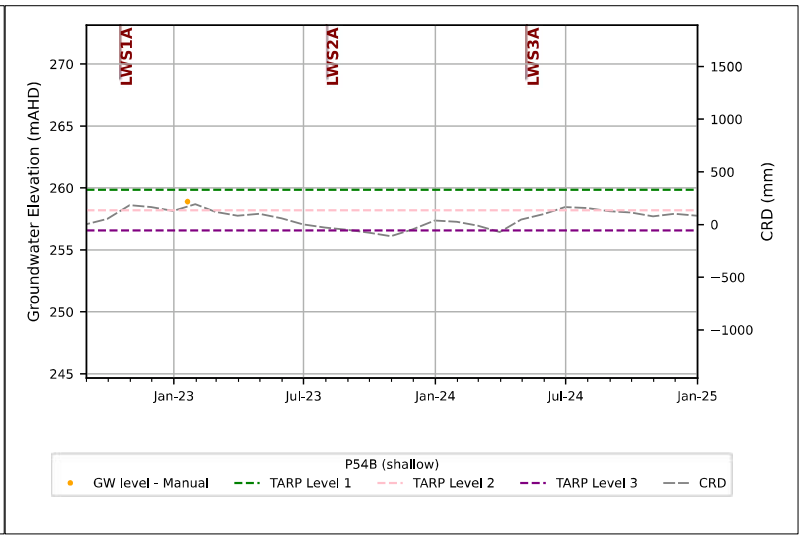

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
P52 (shallow)
GW level - Logger
GW level - Manual
TARP Level 1
TARP Level 2
TARP Level 3
CRD

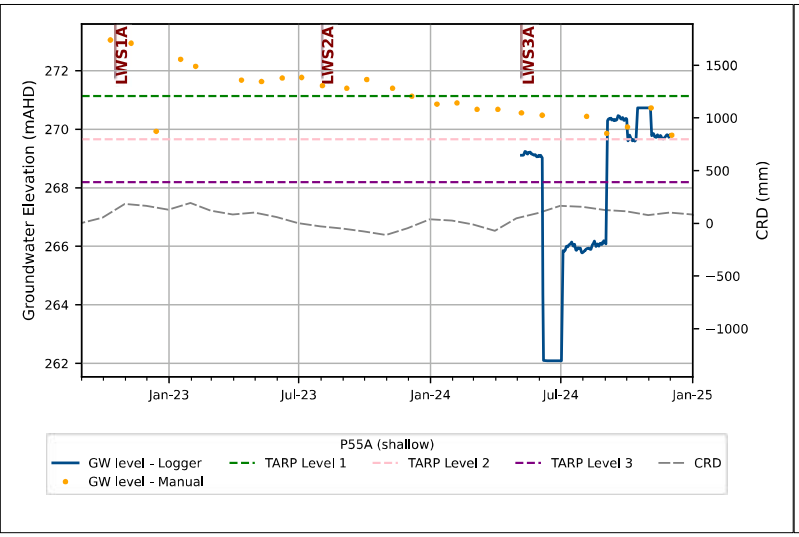

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
P53A (shallow)
GW level - Logger
GW level - Manual
TARP Level 1
TARP Level 2
TARP Level 3
CRD

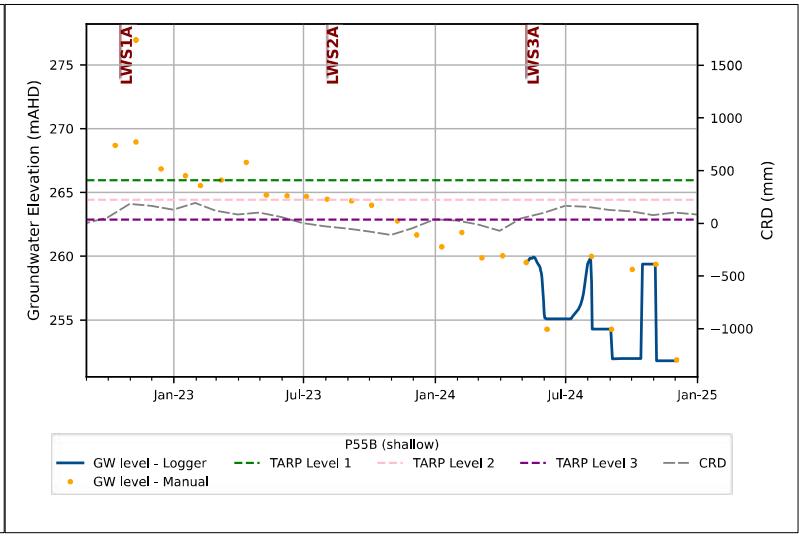

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
P53B (shallow)
GW level - Logger
GW level - Manual
TARP Level 1
TARP Level 2
TARP Level 3
CRD

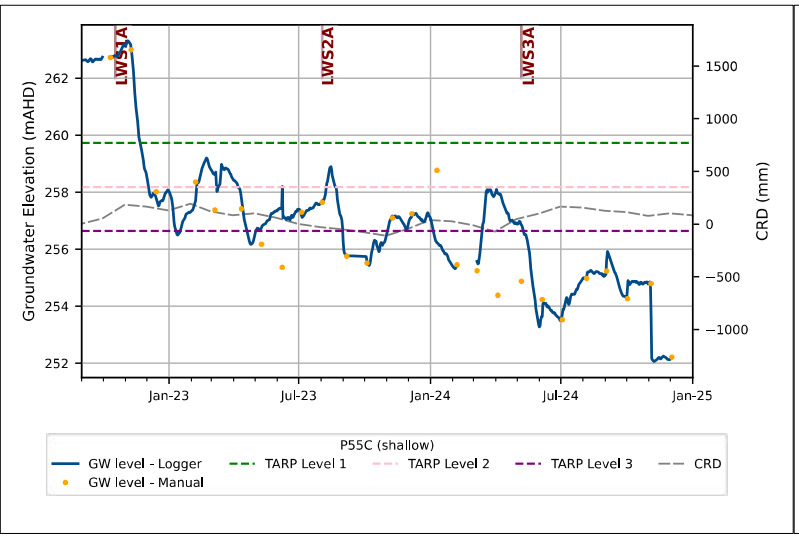

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
P53C (shallow)
GW level - Logger
GW level - Manual
TARP Level 1
TARP Level 2
TARP Level 3
CRD

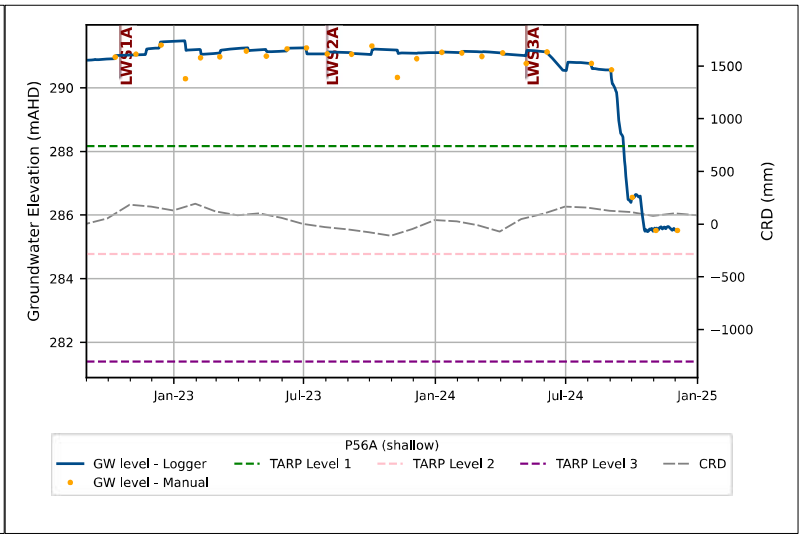

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
P54A (shallow)
GW level - Manual
TARP Level 1
TARP Level 2
TARP Level 3
CRD

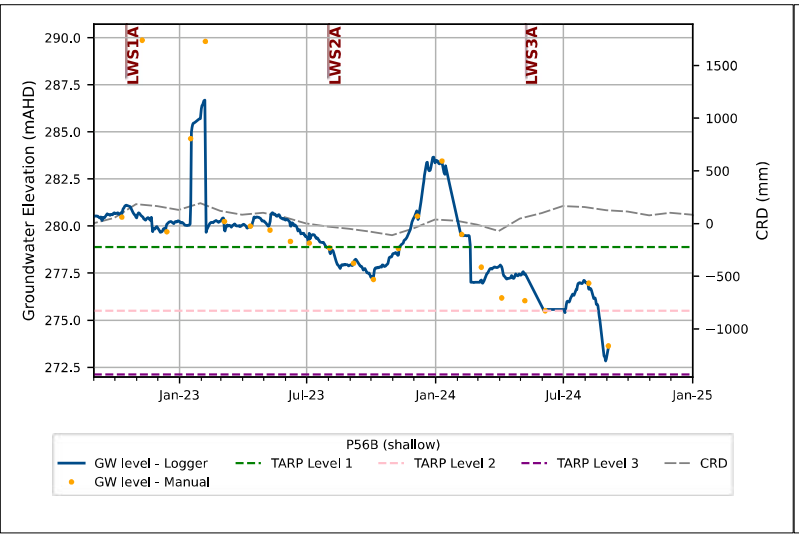

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
P54B (shallow)
GW level - Manual
TARP Level 1
TARP Level 2
TARP Level 3
CRD

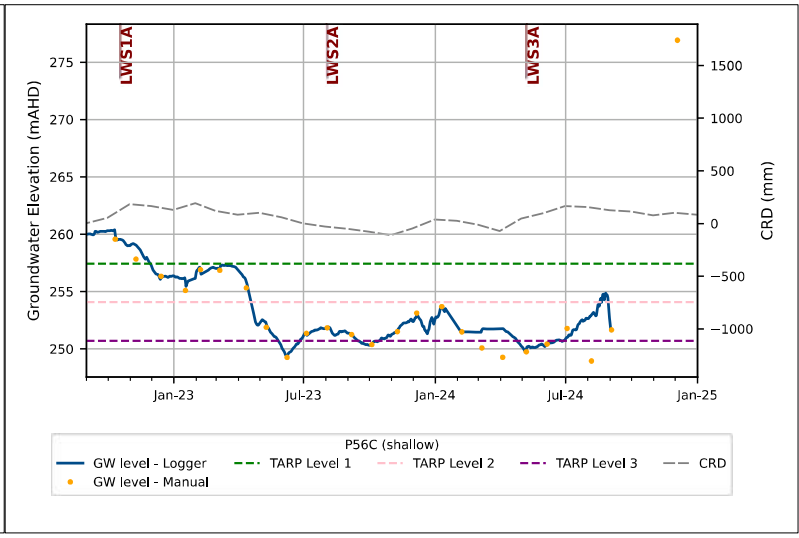

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
P55A (shallow)
GW level - Logger
GW level - Manual
TARP Level 1
TARP Level 2
TARP Level 3
CRD

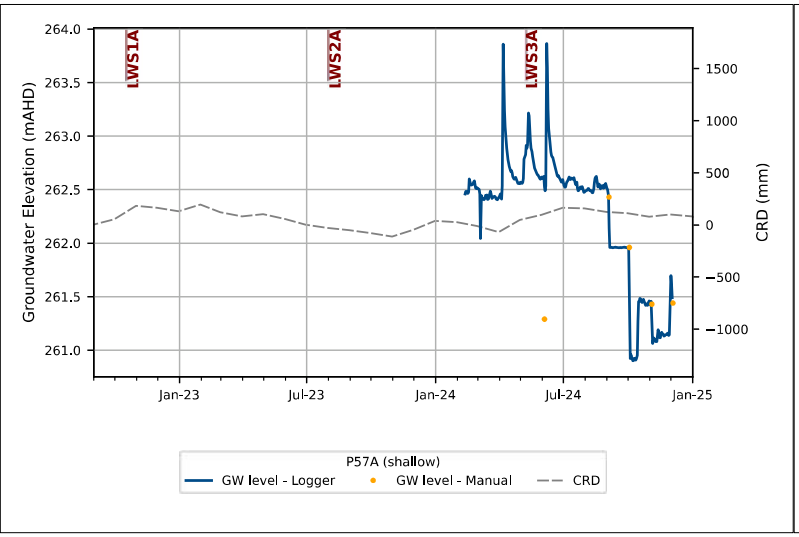

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
P55B (shallow)
GW level - Logger
GW level - Manual
TARP Level 1
TARP Level 2
TARP Level 3
CRD

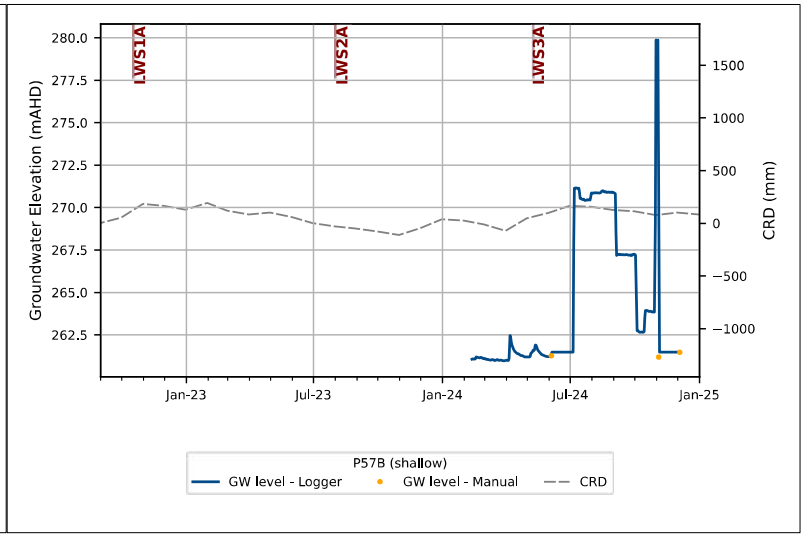

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
P55C (shallow)
GW level - Logger
GW level - Manual
TARP Level 1
TARP Level 2
TARP Level 3
CRD

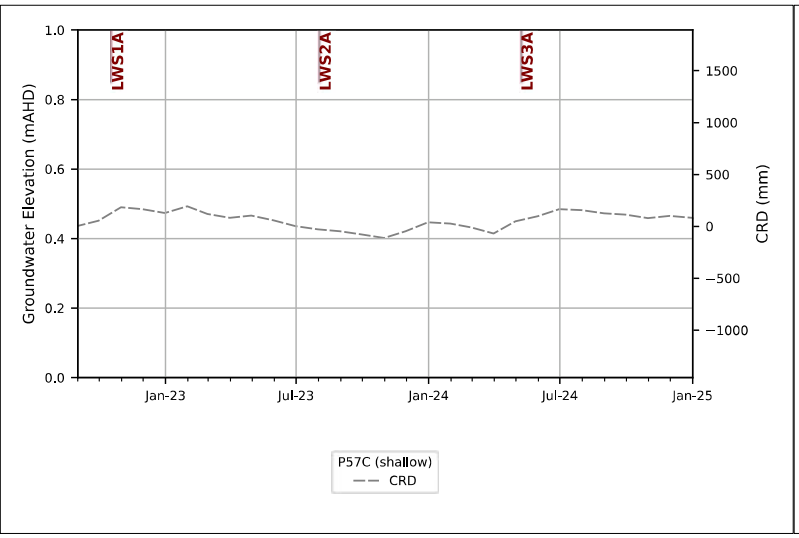

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
P56A (shallow)
GW level - Logger
GW level - Manual
TARP Level 1
TARP Level 2
TARP Level 3
CRD

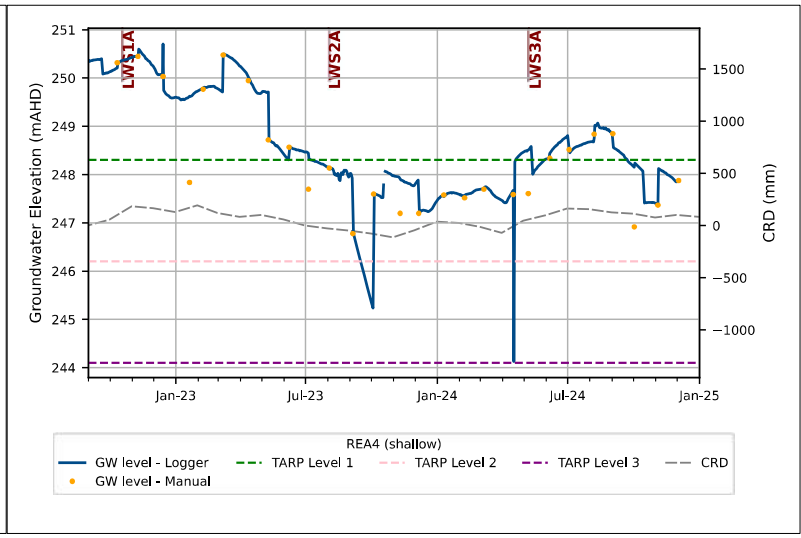

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
P56B (shallow)
GW level - Logger
GW level - Manual
TARP Level 1
TARP Level 2
TARP Level 3
CRD

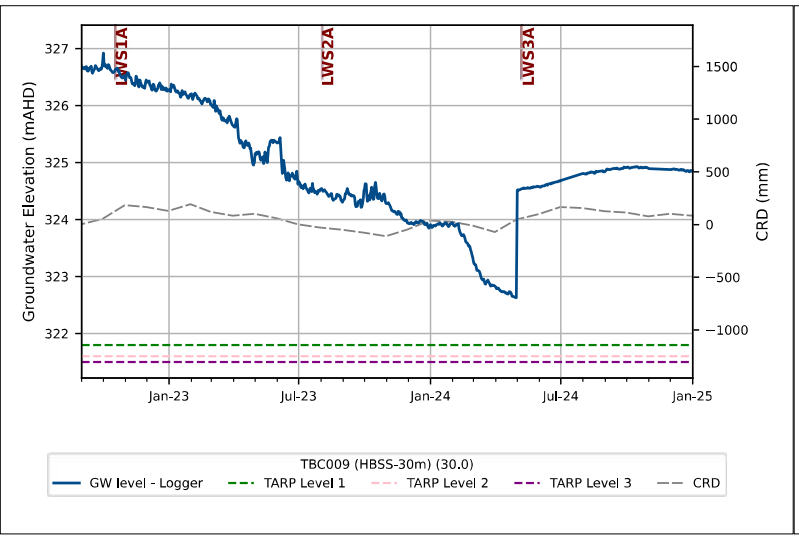

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
P56C (shallow)
GW level - Logger
GW level - Manual
TARP Level 1
TARP Level 2
TARP Level 3
CRD

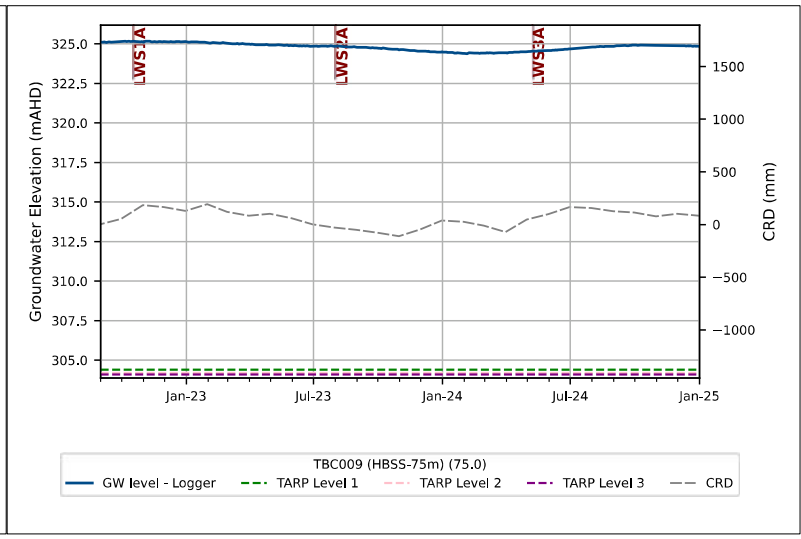

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
P57A (shallow)
GW level - Logger
GW level - Manual
CRD

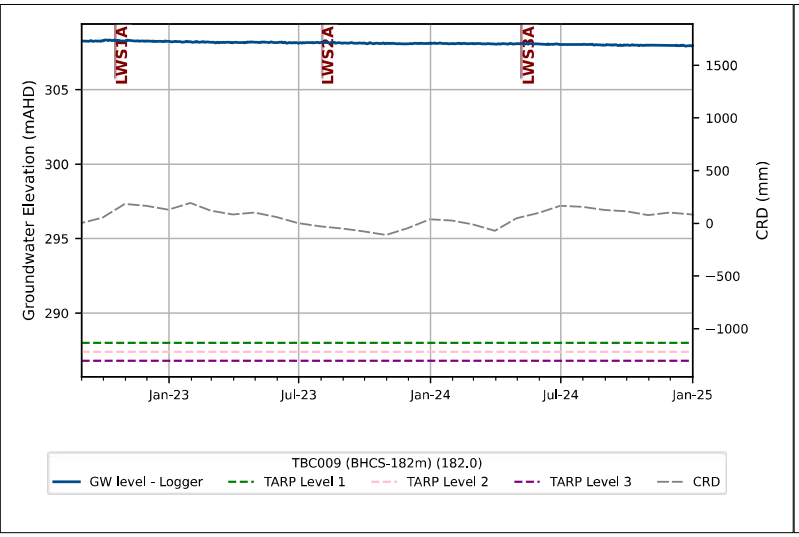

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
P57B (shallow)
GW level - Logger
GW level - Manual
CRD

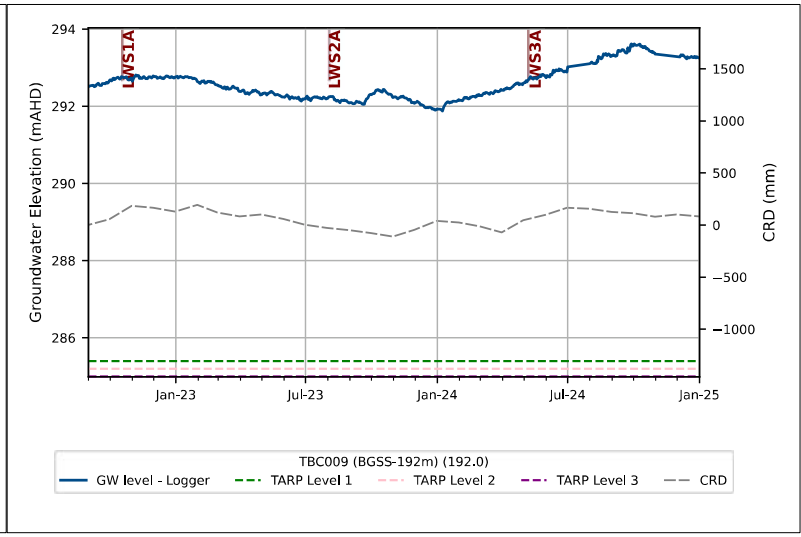

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
P57C (shallow)
CRD

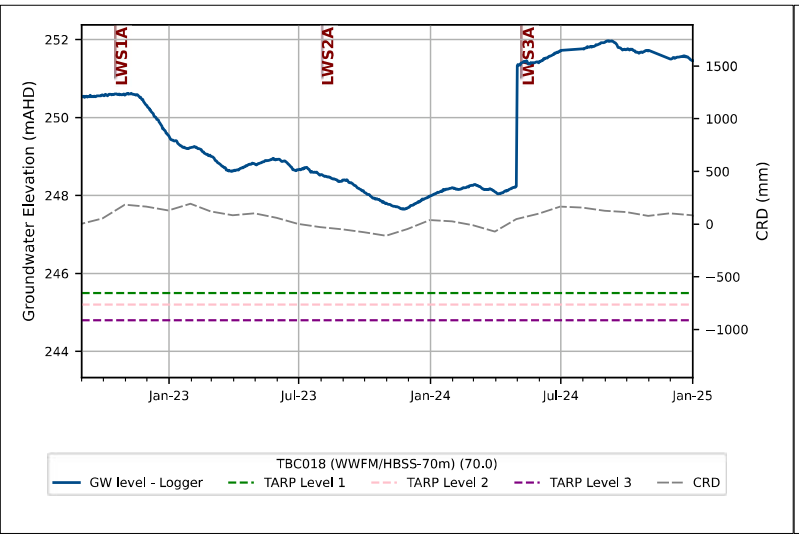

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
REA4 (shallow)
GW level - Logger
GW level - Manual
TARP Level 1
TARP Level 2
TARP Level 3
CRD

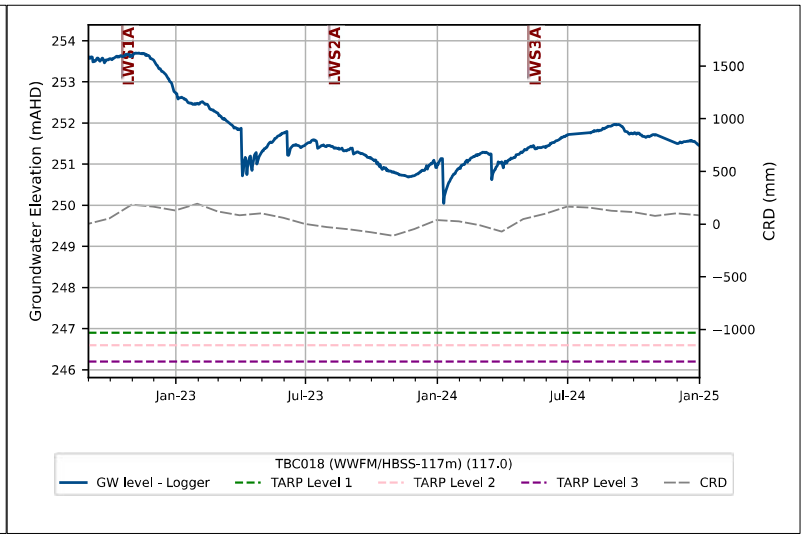

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC009 (HBSS-30m) (30.0)
GW level - Logger
TARP Level 1
TARP Level 2
TARP Level 3
CRD

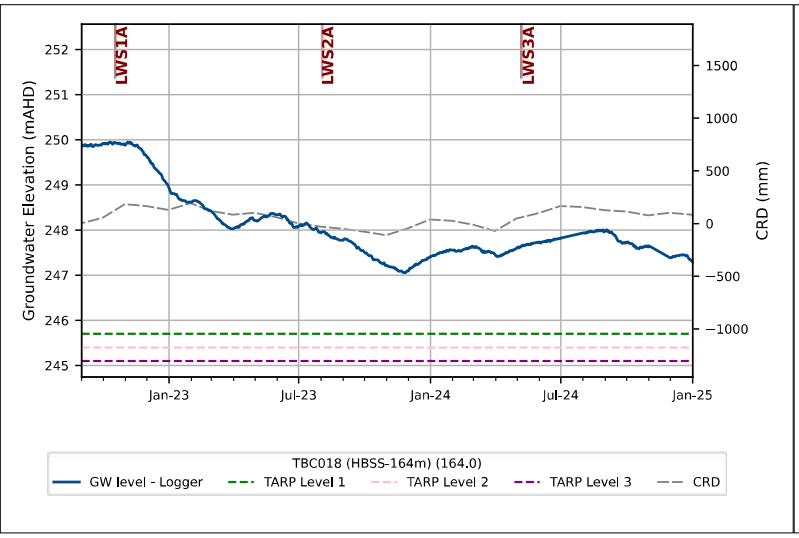

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC009 (HBSS-75m) (75.0)
GW level - Logger
TARP Level 1
TARP Level 2
TARP Level 3
CRD

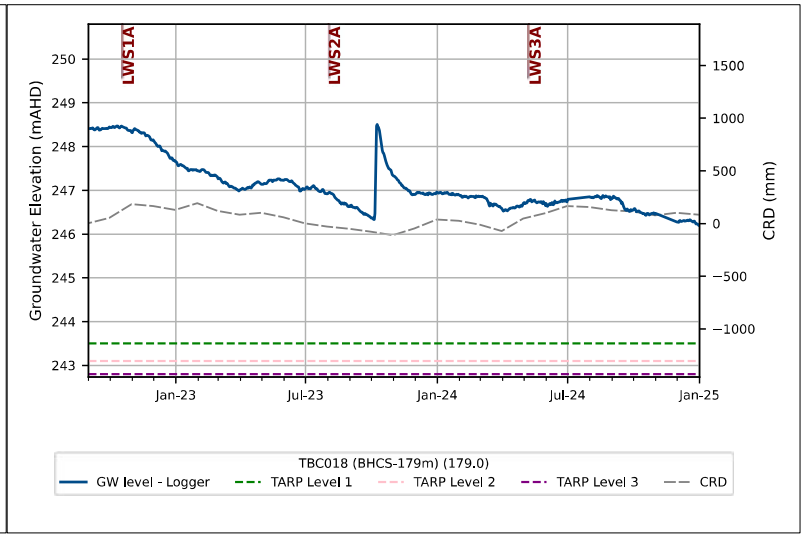

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
305
300
295
290
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC009 (BHCS-182m) (182.0)
GW level - Logger
TARP Level 1
TARP Level 2
TARP Level 3
CRD

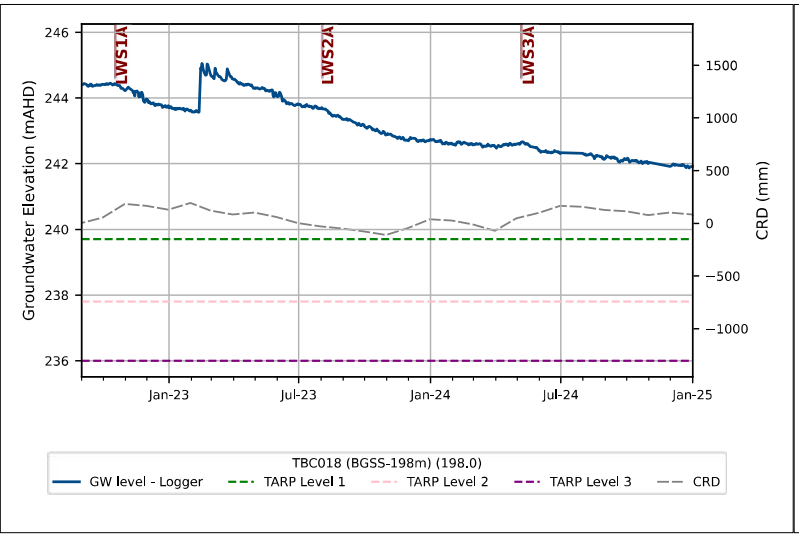

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
294
292
290
288
286
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC009 (BGSS-192m) (192.0)
GW level - Logger
TARP Level 1
TARP Level 2
TARP Level 3
CRD

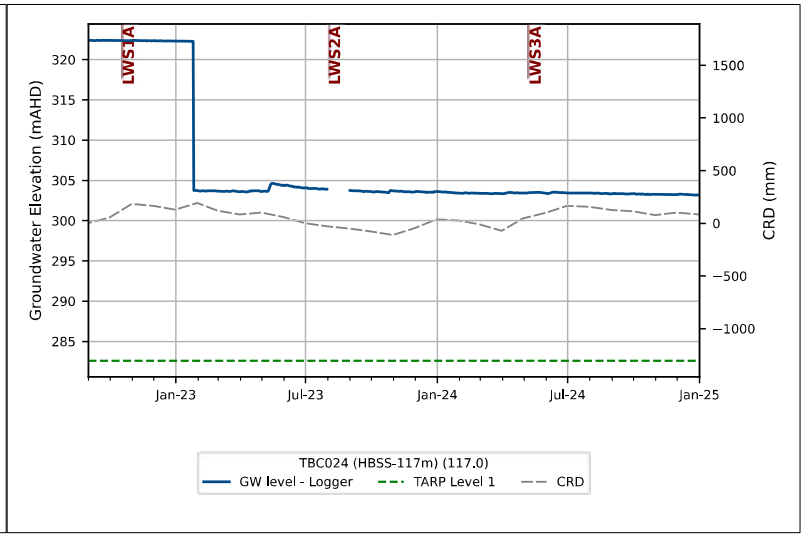

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
252
250
248
246
244
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC018 (WWFM/HBSS-70m) (70.0)
GW level - Logger
TARP Level 1
TARP Level 2
TARP Level 3
CRD

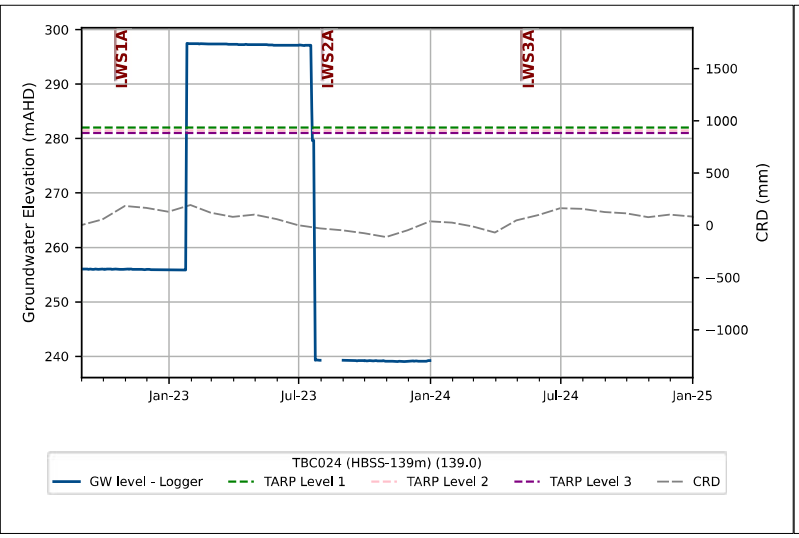

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
254
253
252
251
250
249
248
247
246
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC018 (WWFM/HBSS-117m) (117.0)
GW level - Logger
TARP Level 1
TARP Level 2
TARP Level 3
CRD

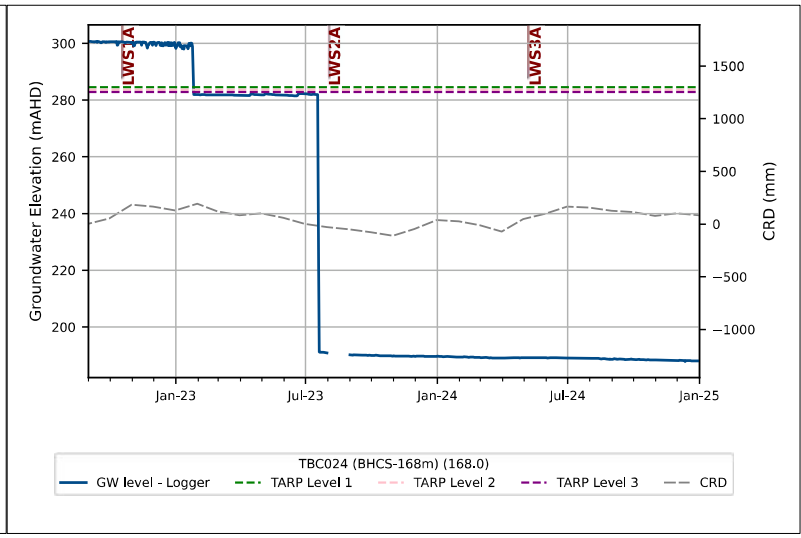

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
252
251
250
249
248
247
246
245
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC018 (HBSS-164m) (164.0)
GW level - Logger
TARP Level 1
TARP Level 2
TARP Level 3
CRD

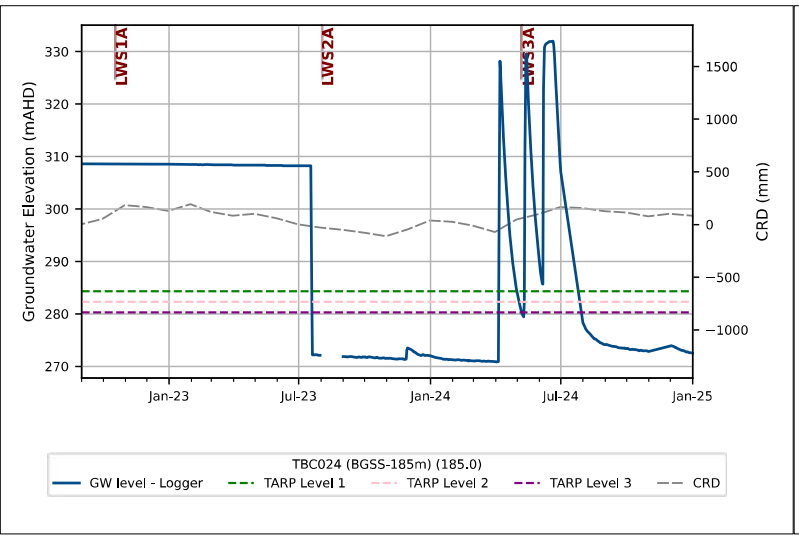

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
250
249
248
247
246
245
244
243
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC018 (BHCS-179m) (179.0)
GW level - Logger
TARP Level 1
TARP Level 2
TARP Level 3
CRD

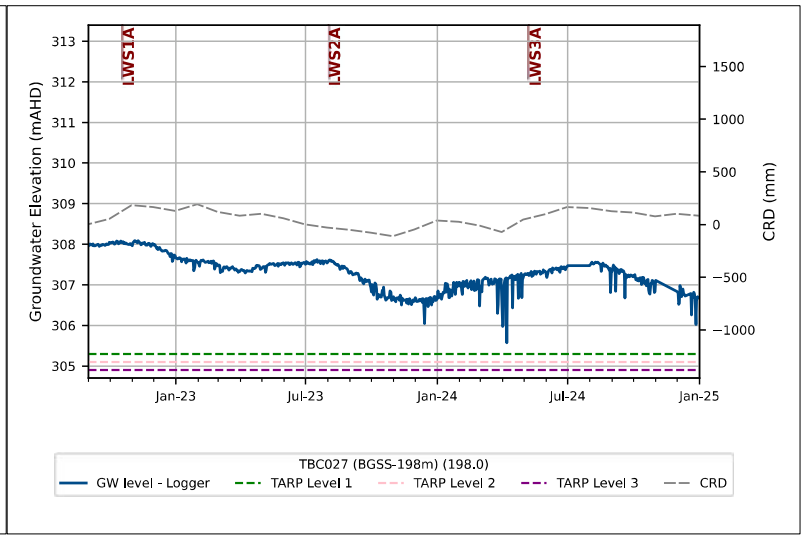

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
246
244
242
240
238
236
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC018 (BGSS-198m) (198.0)
GW level - Logger
TARP Level 1
TARP Level 2
TARP Level 3
CRD

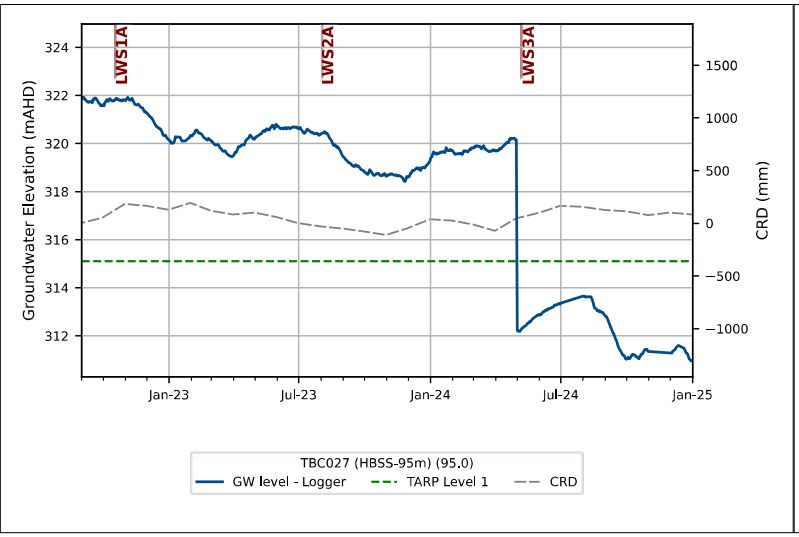

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
320
315
310
305
300
295
290
285
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC024 (HBSS-117m) (117.0)
GW level - Logger
TARP Level 1
CRD

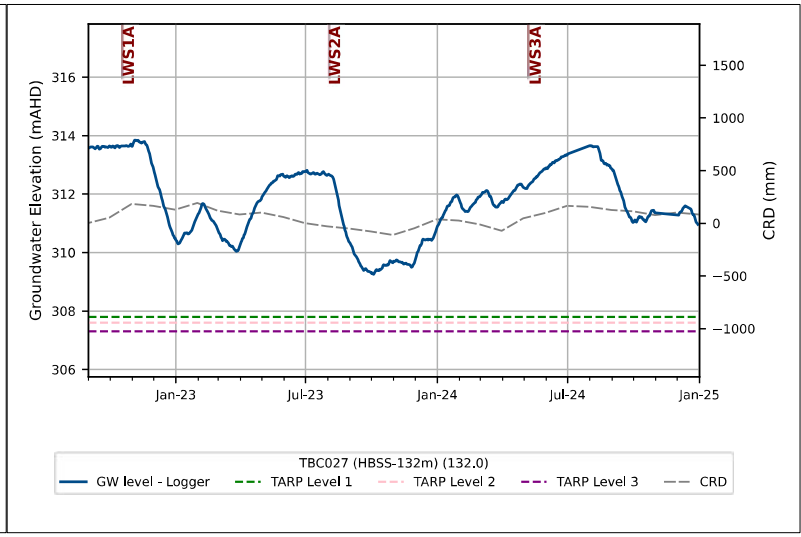

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
300
290
280
270
260
250
240
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC024 (HBSS-139m) (139.0)
GW level - Logger
TARP Level 1
TARP Level 2
TARP Level 3
CRD

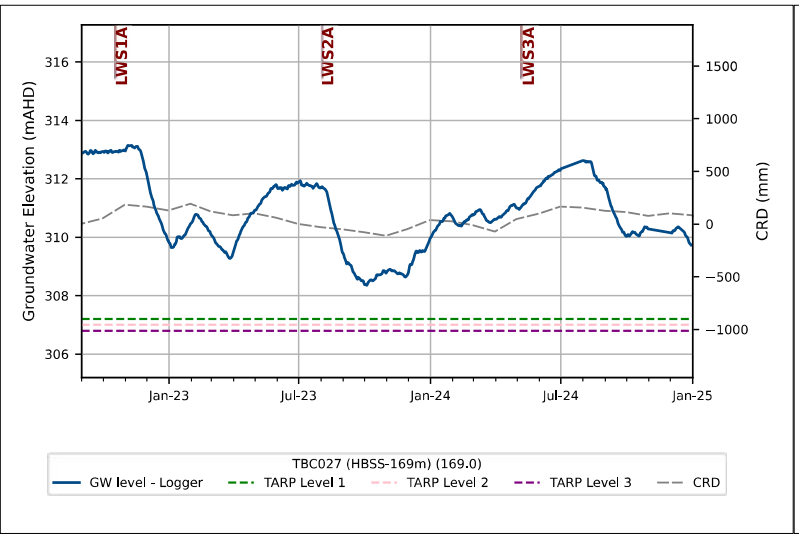

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
300
280
260
240
220
200
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC024 (BHCS-168m) (168.0)
GW level - Logger
TARP Level 1
TARP Level 2
TARP Level 3
CRD

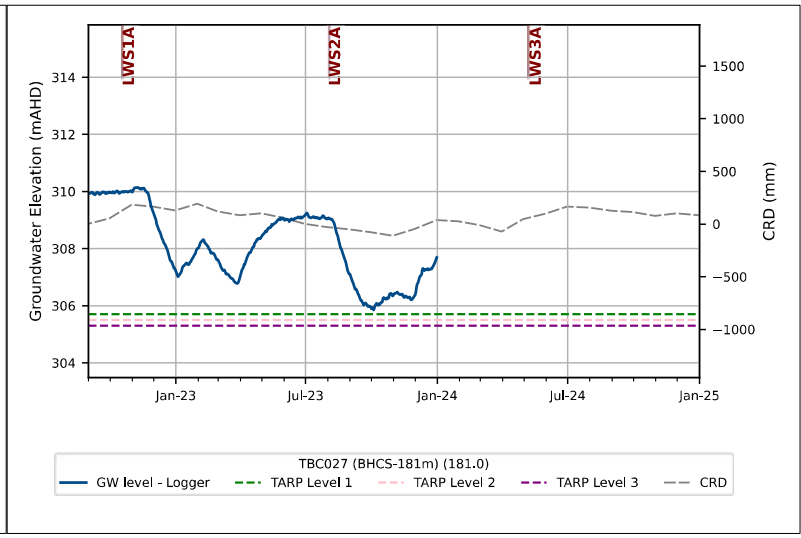

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
330
320
310
300
290
280
270
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC024 (BGSS-185m) (185.0)
GW level - Logger
TARP Level 1
TARP Level 2
TARP Level 3
CRD

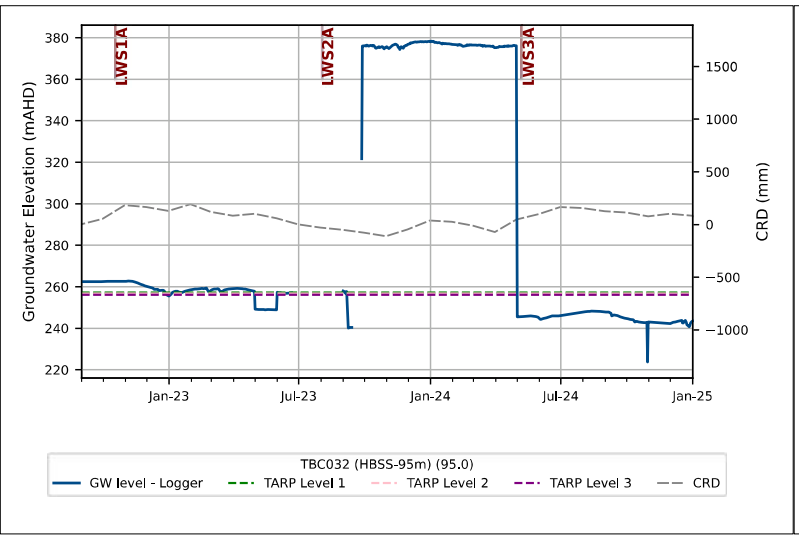

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
313
312
311
310
309
308
307
306
305
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC027 (BGSS-198m) (198.0)
GW level - Logger
TARP Level 1
TARP Level 2
TARP Level 3
CRD

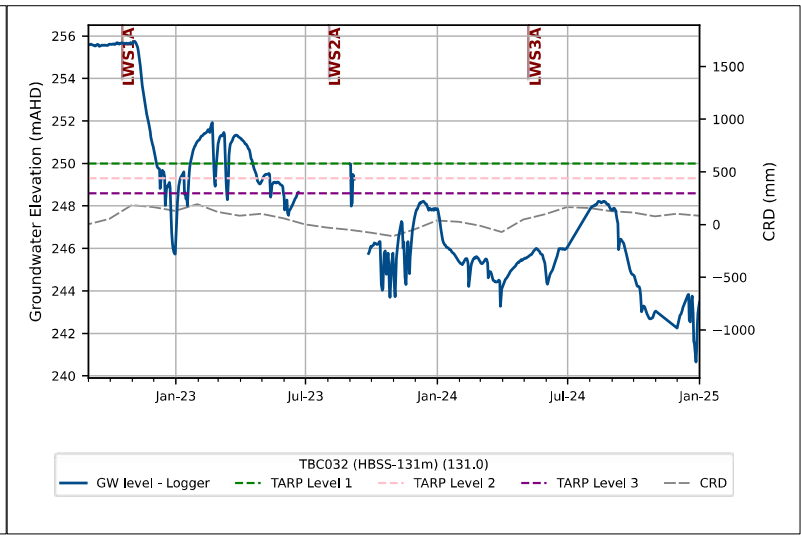

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC027 (HBSS-95m) (95.0)
GW level - Logger
TARP Level 1
CRD

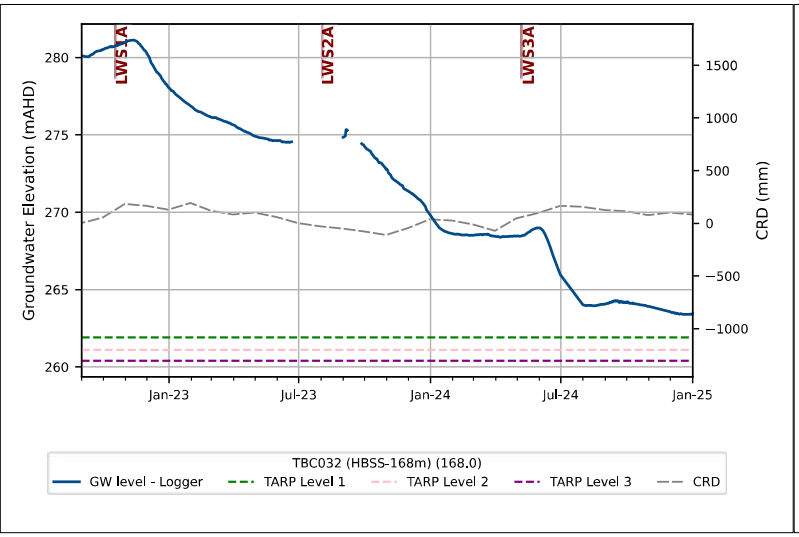

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC027 (HBSS-132m) (132.0)
GW level - Logger
TARP Level 1
TARP Level 2
TARP Level 3
CRD

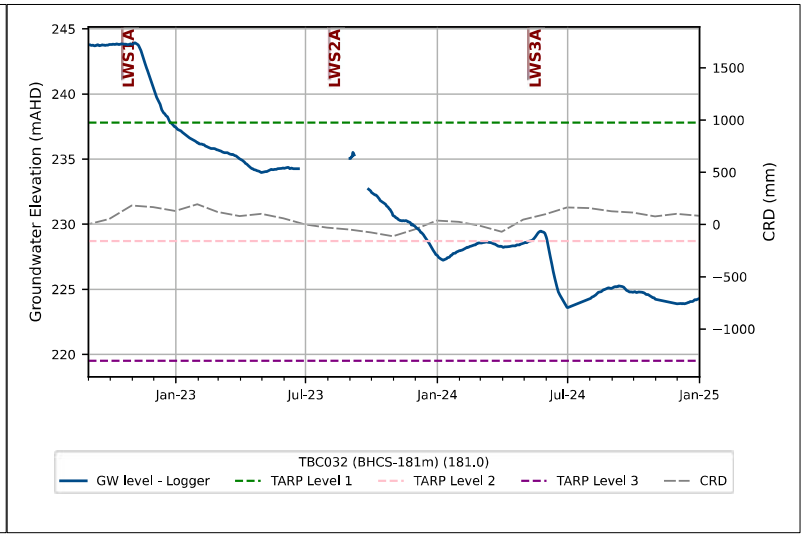

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC027 (HBSS-169m) (169.0)
GW level - Logger
TARP Level 1
TARP Level 2
TARP Level 3
CRD

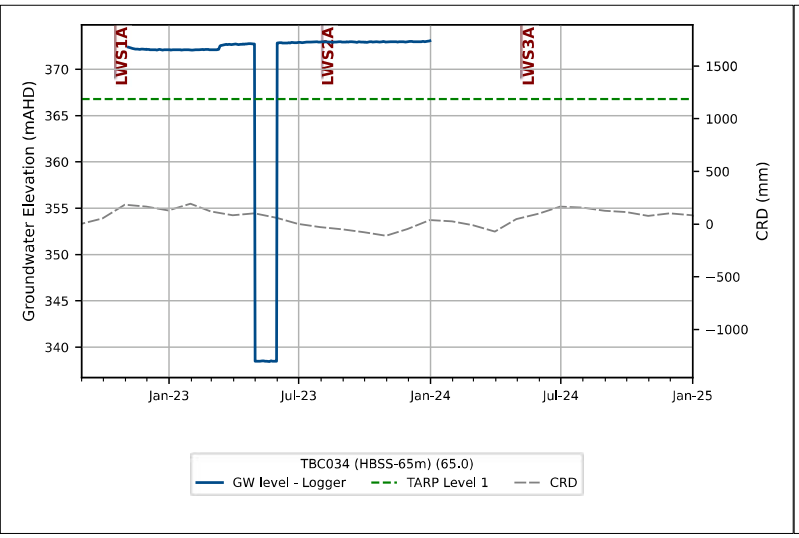

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC027 (BHCS-181m) (181.0)
GW level - Logger
TARP Level 1
TARP Level 2
TARP Level 3
CRD

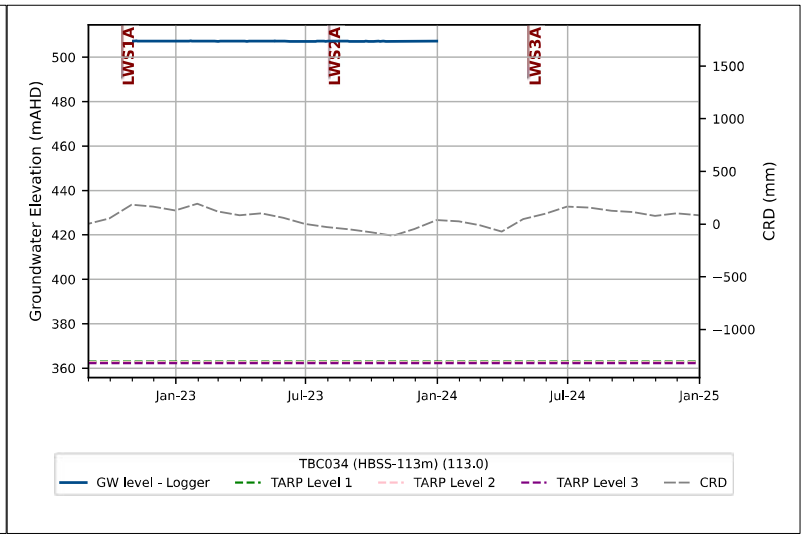

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC032 (HBSS-95m) (95.0)
GW level - Logger
TARP Level 1
TARP Level 2
TARP Level 3
CRD

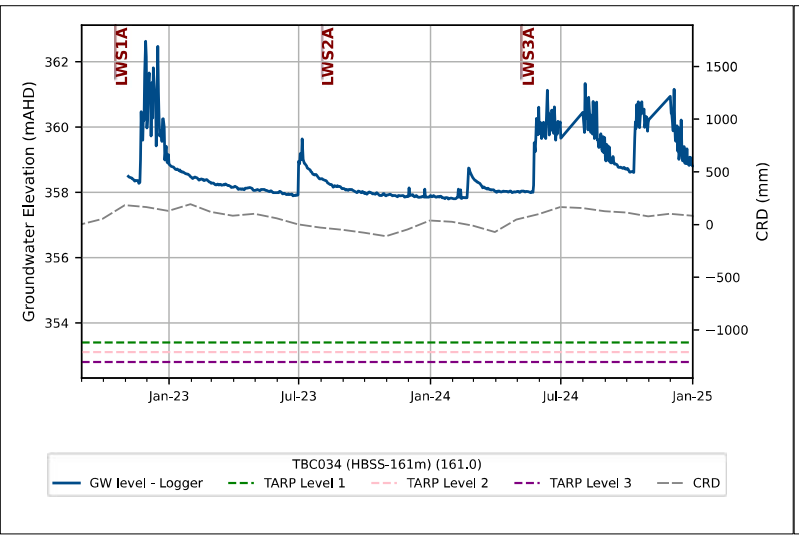

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC032 (HBSS-131m) (131.0)
GW level - Logger
TARP Level 1
TARP Level 2
TARP Level 3
CRD

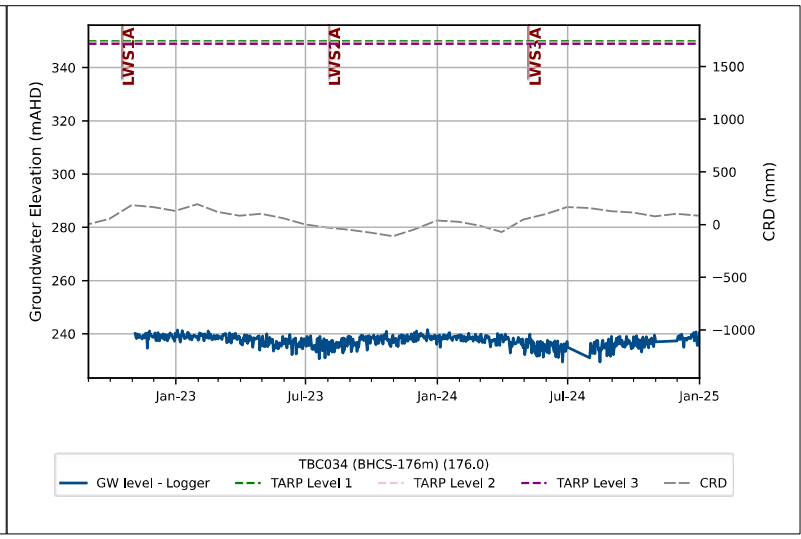

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
280
275
270
265
260
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC032 (HBSS-168m) (168.0)
GW level - Logger
TARP Level 1
TARP Level 2
TARP Level 3
CRD

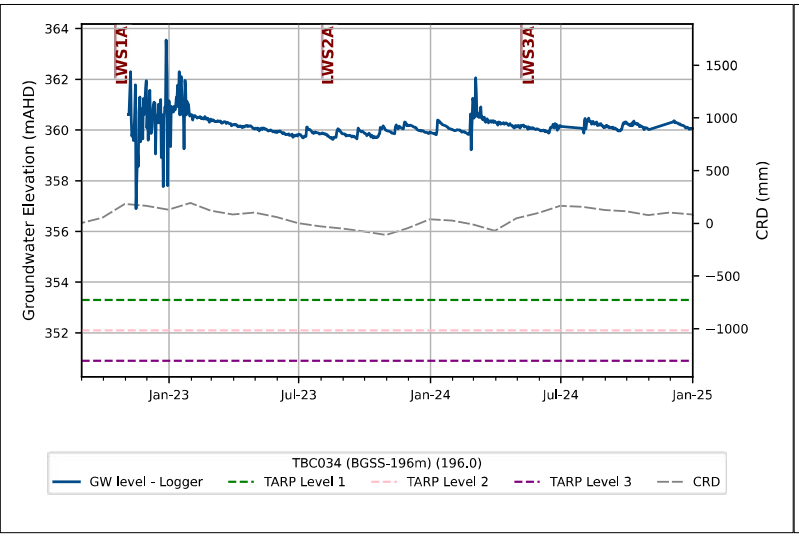

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
245
240
235
230
225
220
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC032 (BHCS-181m) (181.0)
GW level - Logger
TARP Level 1
TARP Level 2
TARP Level 3
CRD

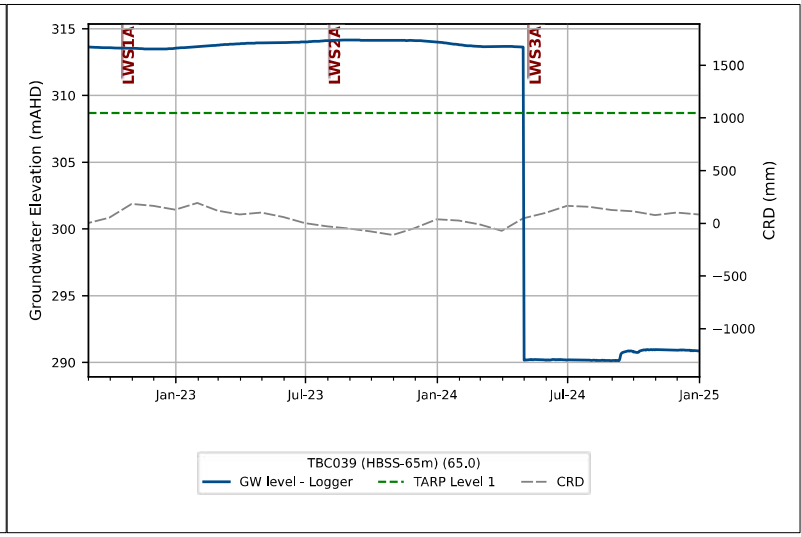

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
370
365
360
355
350
345
340
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC034 (HBSS-65m) (65.0)
GW level - Logger
TARP Level 1
CRD

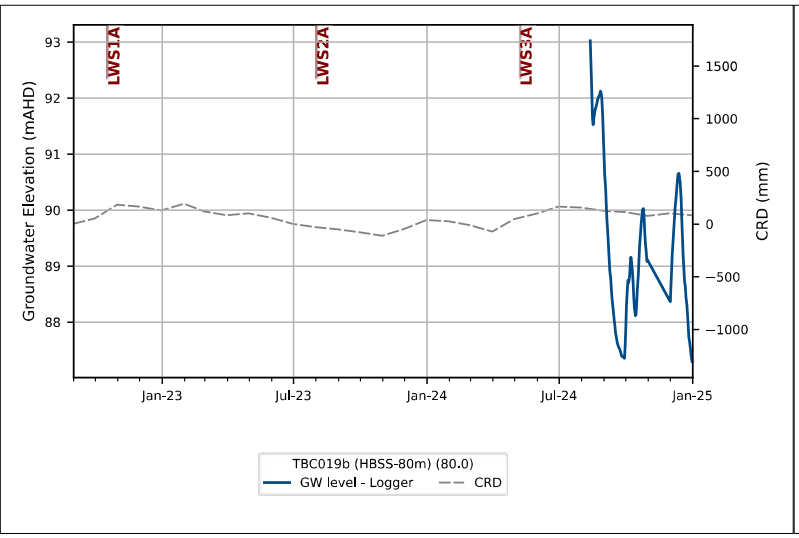

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
500
480
460
440
420
400
380
360
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC034 (HBSS-113m) (113.0)
GW level - Logger
TARP Level 1
TARP Level 2
TARP Level 3
CRD

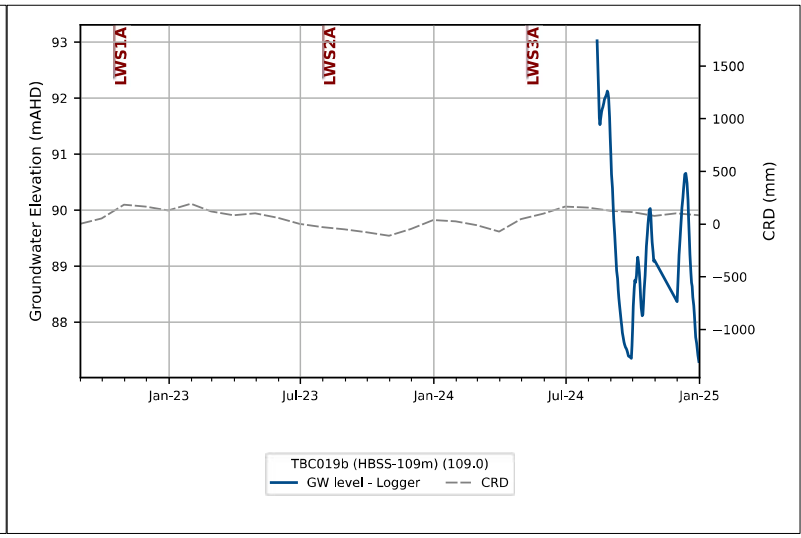

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
362
360
358
356
354
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC034 (HBSS-161m) (161.0)
GW level - Logger
TARP Level 1
TARP Level 2
TARP Level 3
CRD

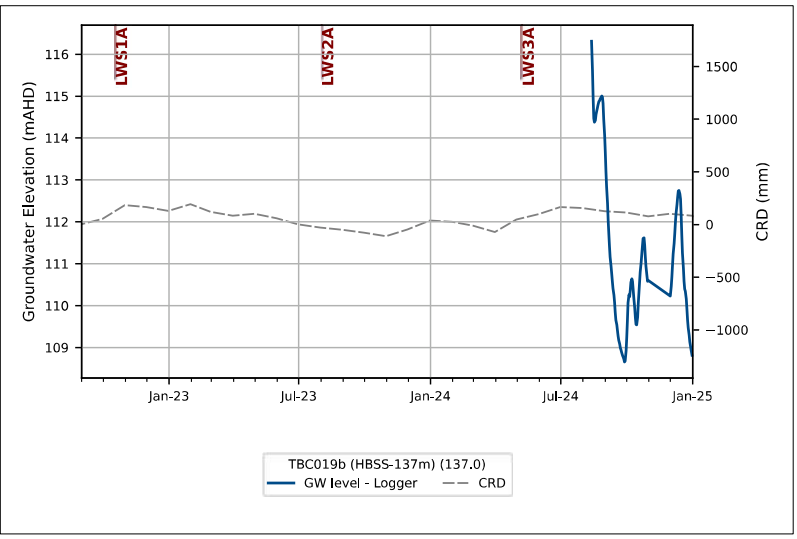

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
340
320
300
280
260
240
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC034 (BHCS-176m) (176.0)
GW level - Logger
TARP Level 1
TARP Level 2
TARP Level 3
CRD

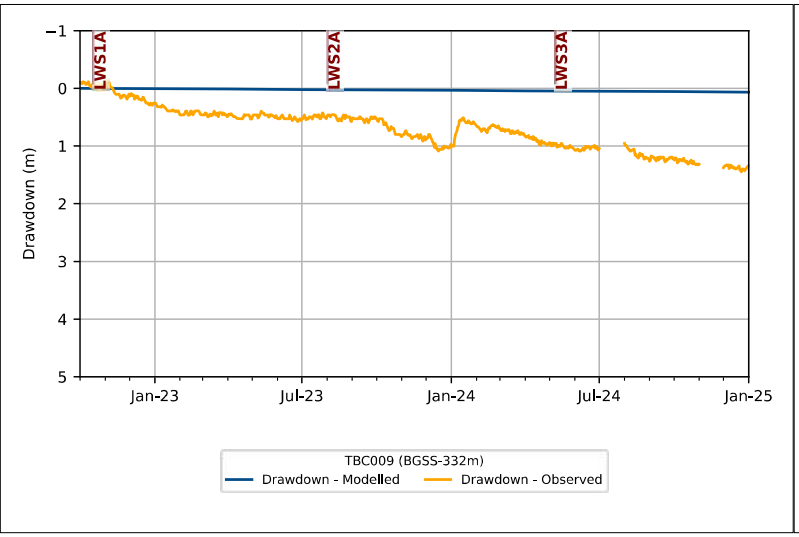

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
364
362
360
358
356
354
352
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC034 (BGSS-196m) (196.0)
GW level - Logger
TARP Level 1
TARP Level 2
TARP Level 3
CRD

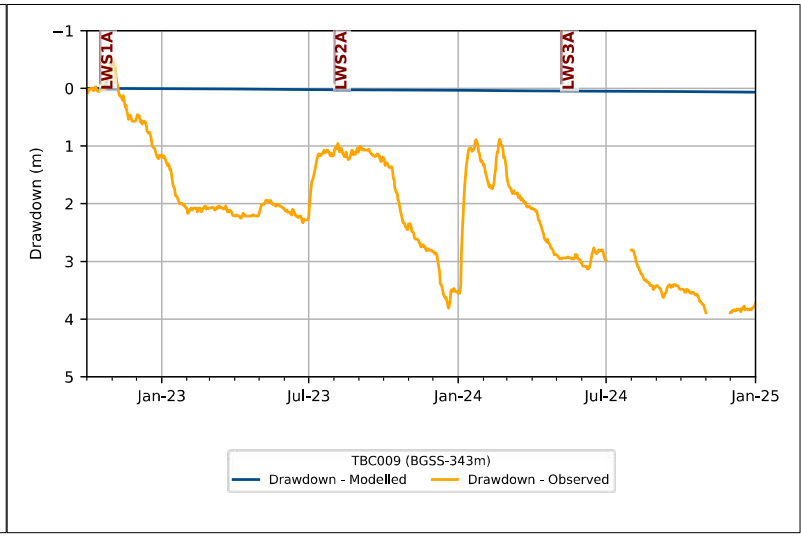

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
315
310
305
300
295
290
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC039 (HBSS-65m) (65.0)
GW level - Logger
TARP Level 1
CRD

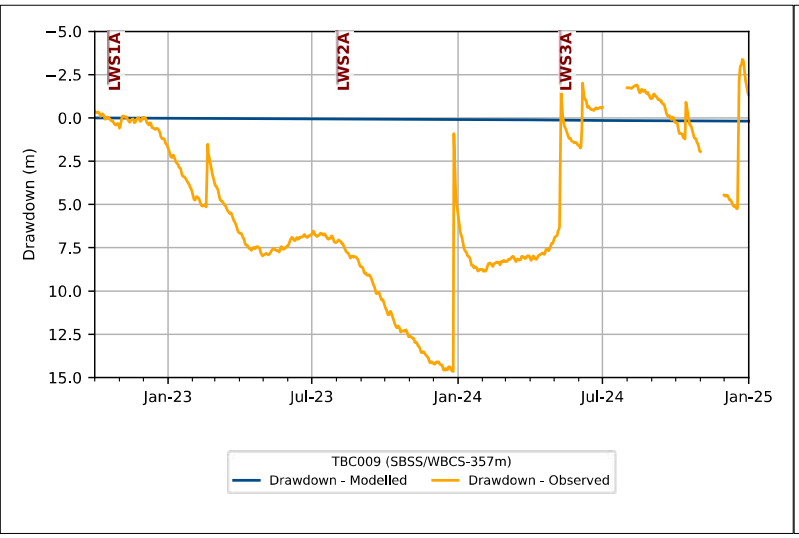

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
93
92
91
90
89
88
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC019b (HBSS-80m) (80.0)
GW level - Logger
CRD

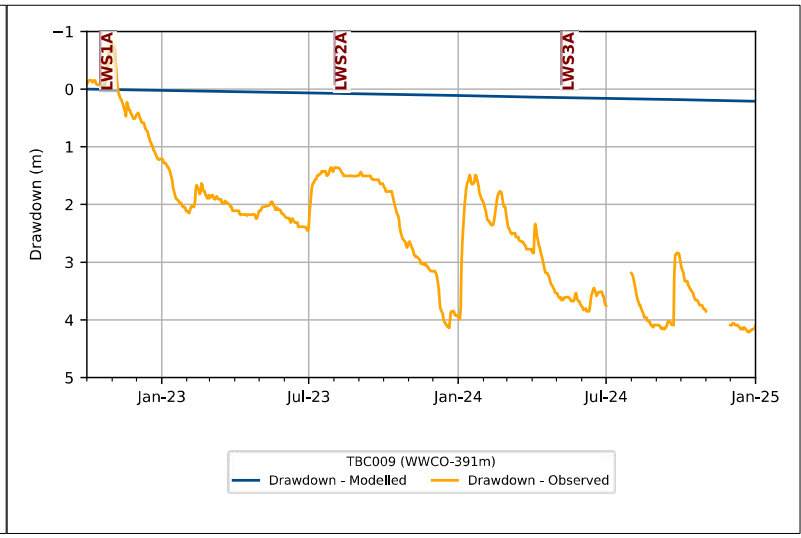

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
93
92
91
90
89
88
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC019b (HBSS-109m) (109.0)
GW level - Logger
CRD

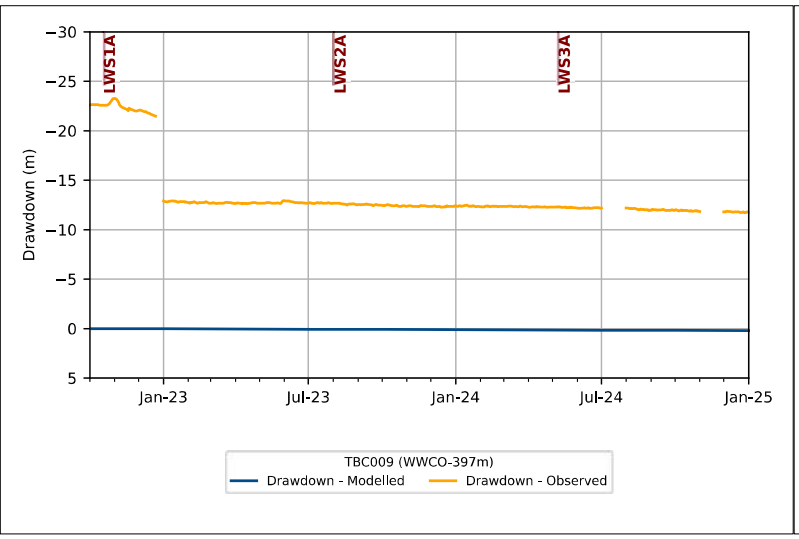

LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
CRD (mm)
116
115
114
113
112
111
110
109
1500
1000
500
0
−500
−1000
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC019b (HBSS-137m) (137.0)
GW level - Logger
CRD

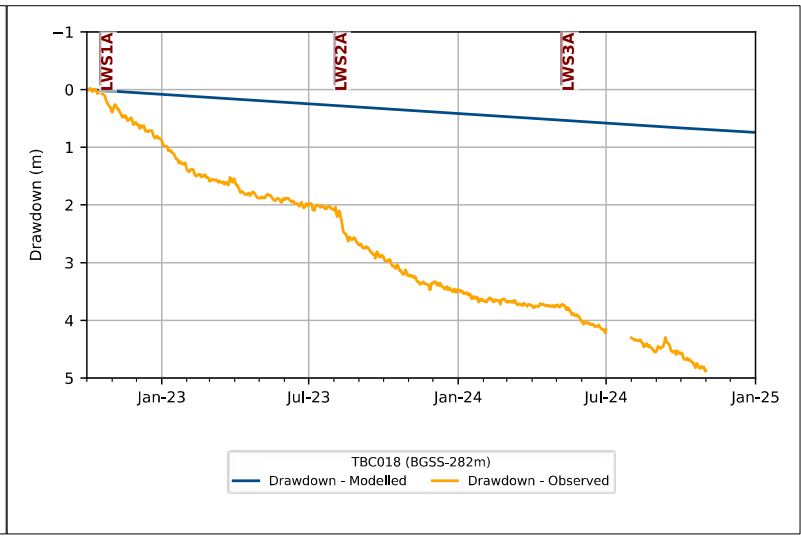

LWS1A
LWS2A
LWS3A
Drawdown (m)
−1
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC009 (BGSS-332m)
Drawdown - Modelled
Drawdown - Observed

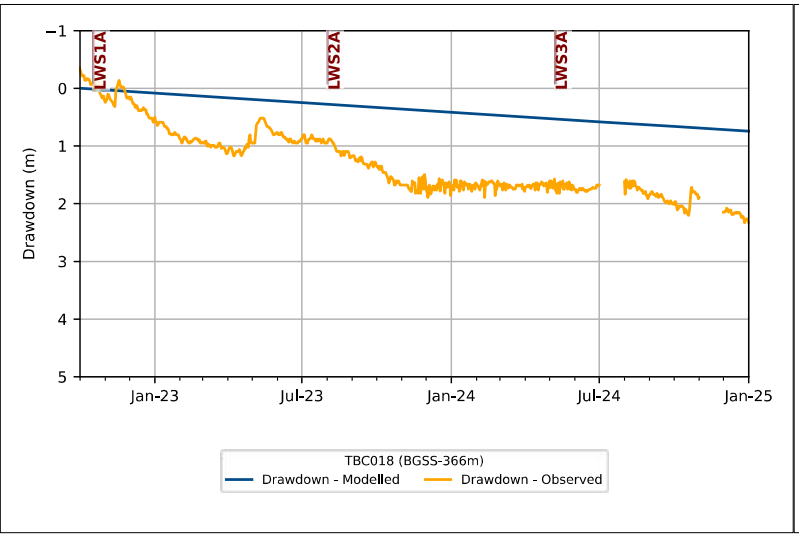

LWS1A
LWS2A
LWS3A
Drawdown (m)
−1
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC009 (BGSS-343m)
Drawdown - Modelled
Drawdown - Observed

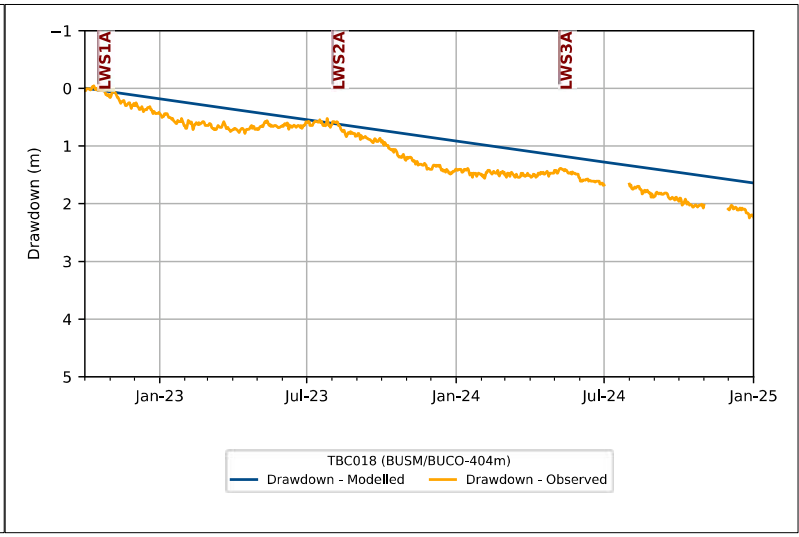

LWS1A
LWS2A
LWS3A
Drawdown (m)
−5.0
−2.5
0.0
2.5
5.0
7.5
10.0
12.5
15.0
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC009 (SBSS/WBCS-357m)
Drawdown - Modelled
Drawdown - Observed

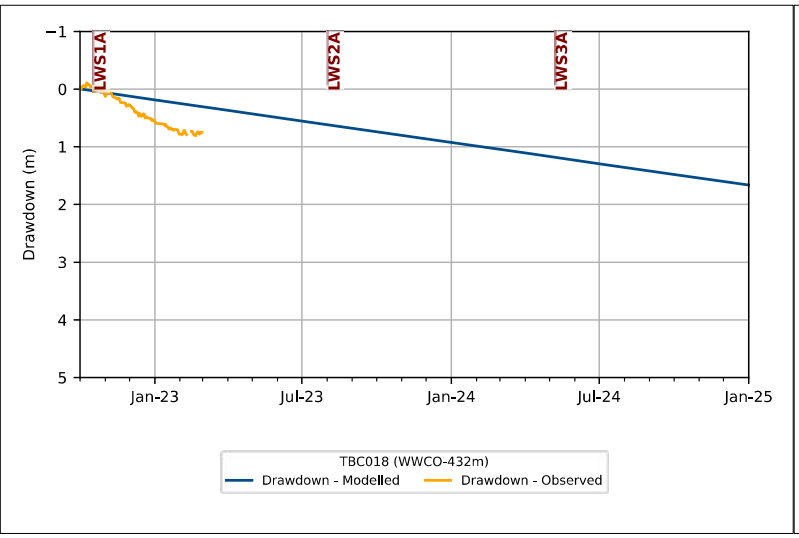

LWS1A
LWS2A
LWS3A
Drawdown (m)
−1
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC009 (WWCO-391m)
Drawdown - Modelled
Drawdown - Observed

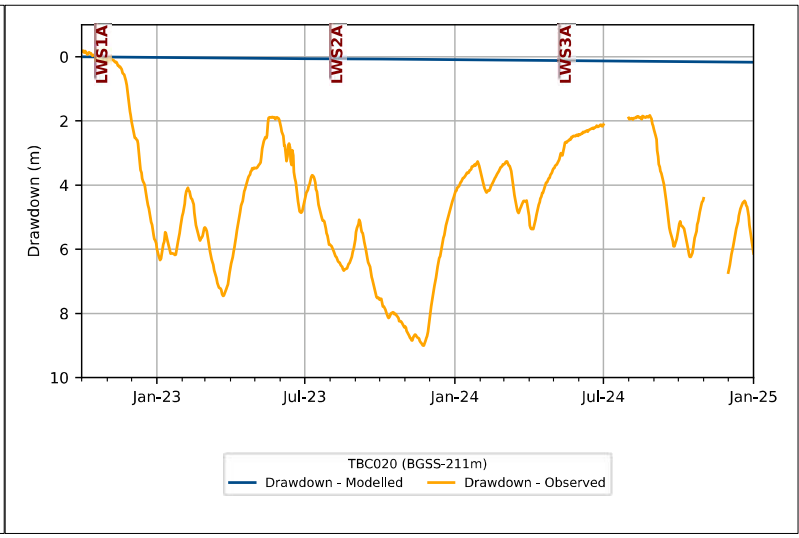

LWS1A
LWS2A
LWS3A
Drawdown (m)
−30
−25
−20
−15
−10
−5
0
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC009 (WWCO-397m)
Drawdown - Modelled
Drawdown - Observed

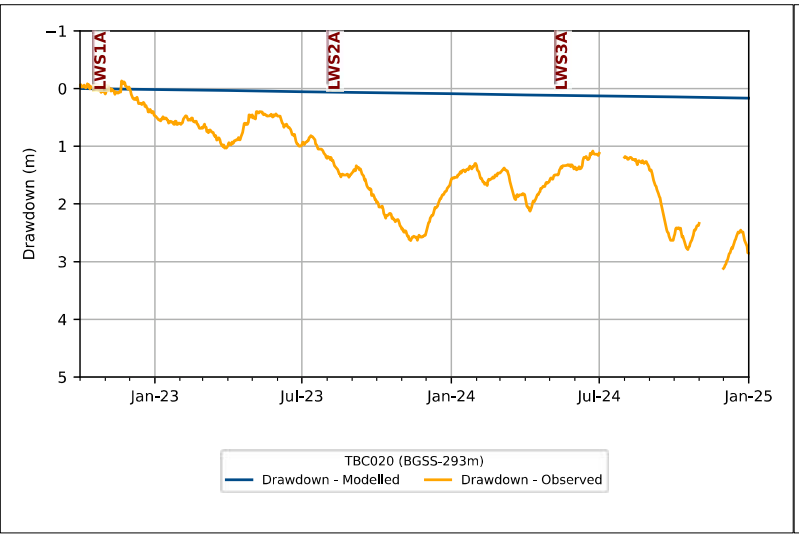

LWS1A
LWS2A
LWS3A
Drawdown (m)
−1
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC018 (BGSS-282m)
Drawdown - Modelled
Drawdown - Observed

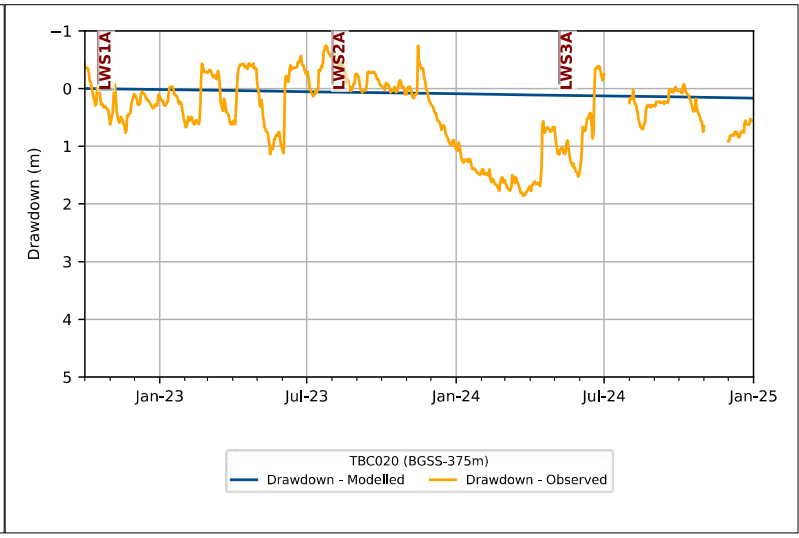

LWS1A
LWS2A
LWS3A
Drawdown (m)
−1
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC018 (BGSS-366m)
Drawdown - Modelled
Drawdown - Observed

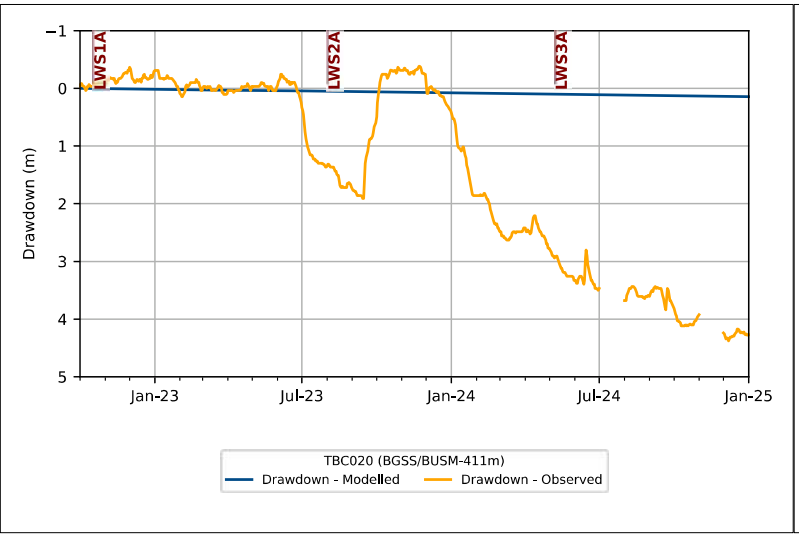

LWS1A
LWS2A
LWS3A
Drawdown (m)
−1
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC018 (BUSM/BUCO-404m)
Drawdown - Modelled
Drawdown - Observed

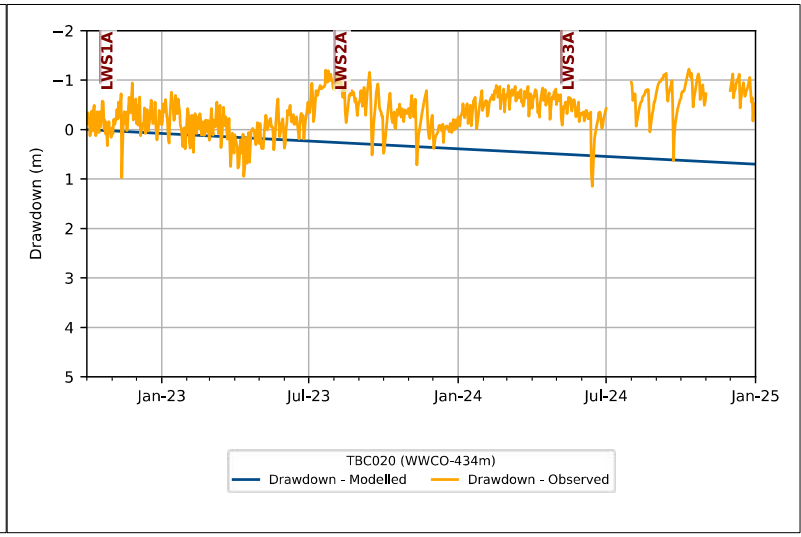

LWS1A
LWS2A
LWS3A
Drawdown (m)
−1
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC018 (WWCO-432m)
Drawdown - Modelled
Drawdown - Observed

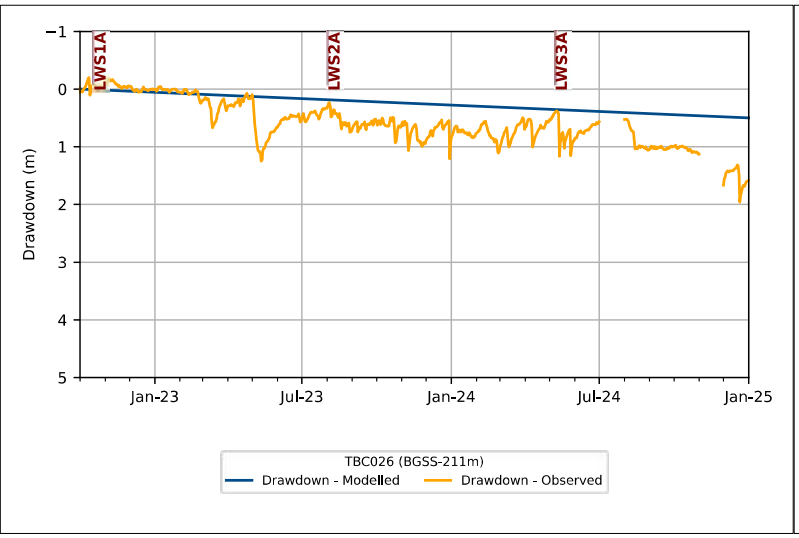

LWS1A
LWS2A
LWS3A
Drawdown (m)
0
2
4
6
8
10
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC020 (BGSS-211m)
Drawdown - Modelled
Drawdown - Observed

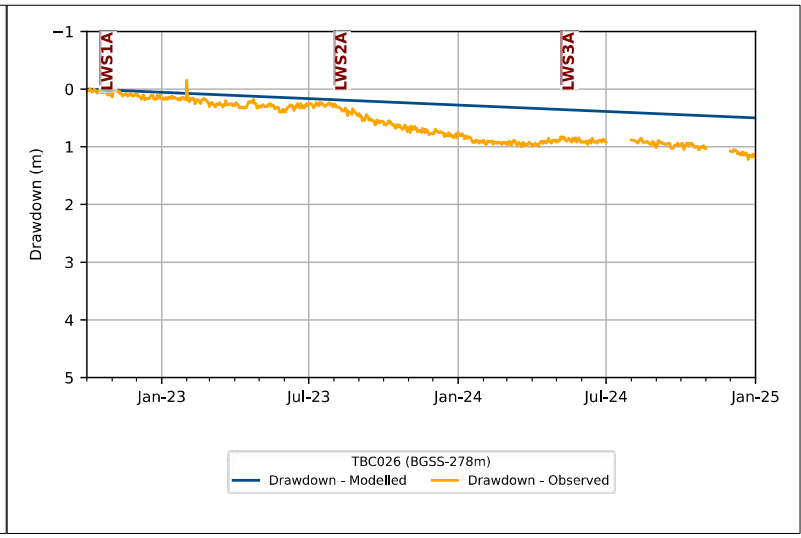

LWS1A
LWS2A
LWS3A
Drawdown (m)
−1
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC020 (BGSS-293m)
Drawdown - Modelled
Drawdown - Observed

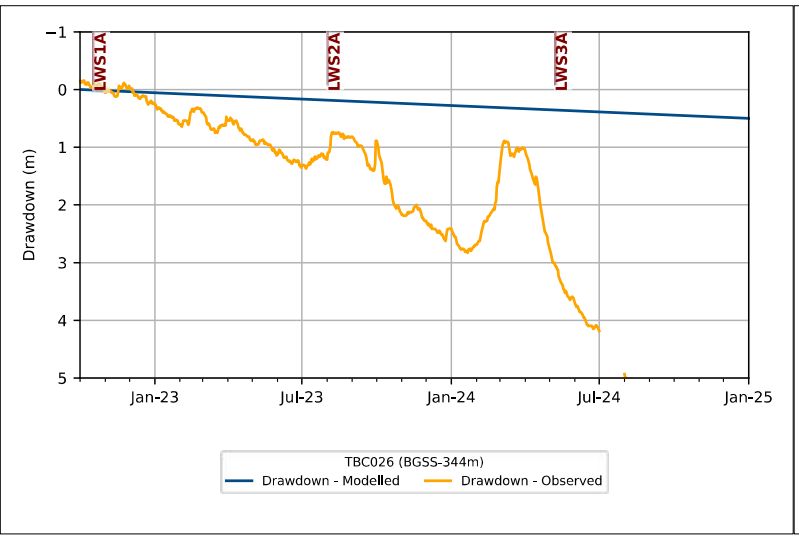

LWS1A
LWS2A
LWS3A
Drawdown (m)
−1
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC020 (BGSS-375m)
Drawdown - Modelled
Drawdown - Observed


LWS1A
LWS2A
LWS3A
Drawdown (m)
−1
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC020 (BGSS/BUSM-411m)
Drawdown - Modelled
Drawdown - Observed


LWS1A
LWS2A
LWS3A
Drawdown (m)
−2
−1
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC020 (WWCO-434m)
Drawdown - Modelled
Drawdown - Observed


LWS1A
LWS2A
LWS3A
Drawdown (m)
−1
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC026 (BGSS-211m)
Drawdown - Modelled
Drawdown - Observed


LWS1A
LWS2A
LWS3A
Drawdown (m)
−1
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC026 (BGSS-278m)
Drawdown - Modelled
Drawdown - Observed


LWS1A
LWS2A
LWS3A
Drawdown (m)
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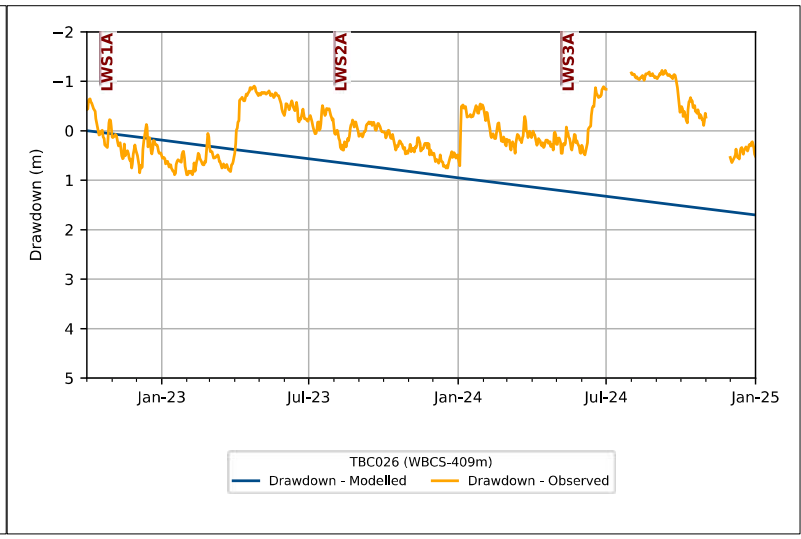
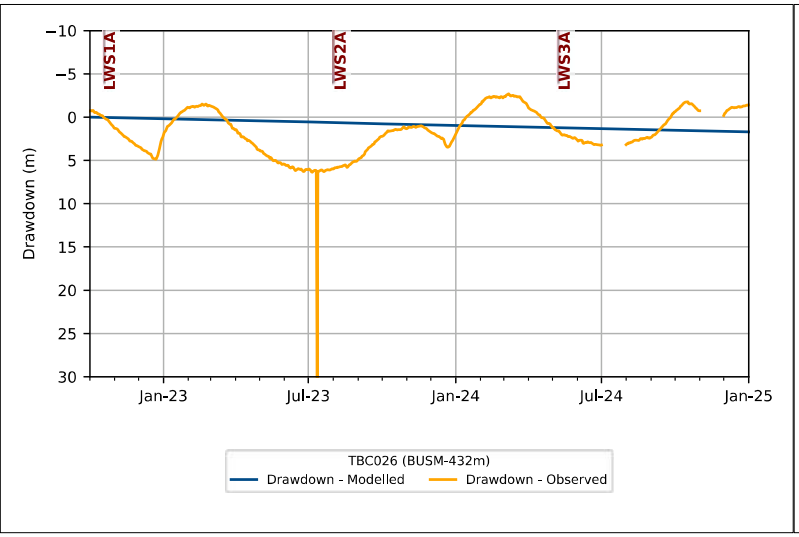
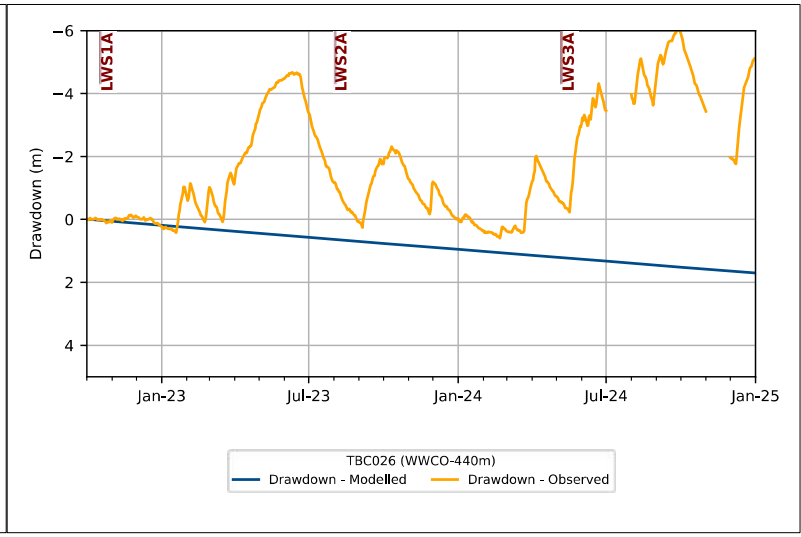
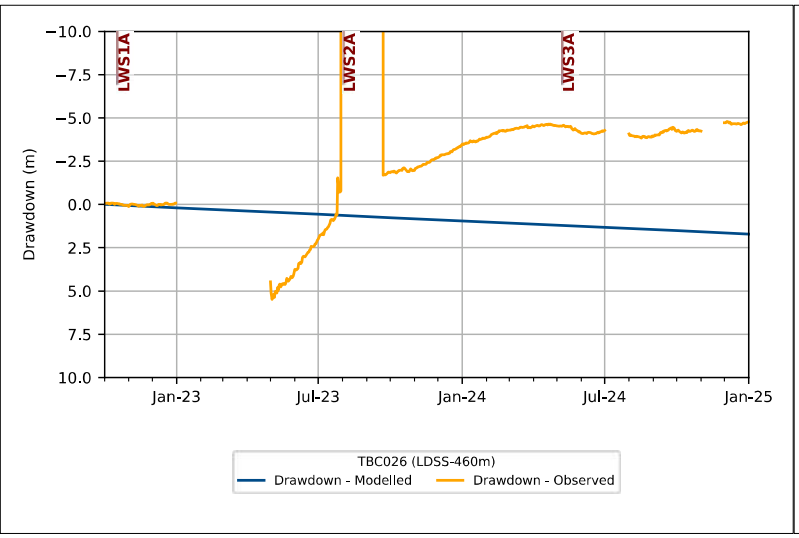
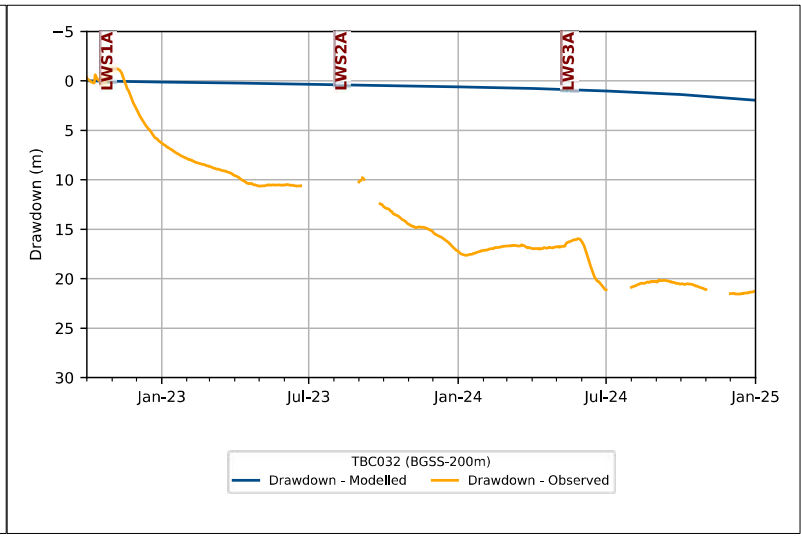
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC026 (BGSS-344m)
Drawdown - Modelled
Drawdown - Observed


LWS1A
LWS2A
LWS3A
Drawdown (m)
−2
−1
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC026 (WBCS-409m)
Drawdown - Modelled
Drawdown - Observed


LWS1A
LWS2A
LWS3A
Drawdown (m)
−10
−5
0
5
10
15
20
25
30
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC026 (BUSM-432m)
Drawdown - Modelled
Drawdown - Observed


LWS1A
LWS2A
LWS3A
Drawdown (m)
−6
−4
−2
0
2
4
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC026 (WWCO-440m)
Drawdown - Modelled
Drawdown - Observed


LWS1A
LWS2A
LWS3A
Drawdown (m)
−10.0
−7.5
−5.0
−2.5
0.0
2.5
5.0
7.5
10.0
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC026 (LDSS-460m)
Drawdown - Modelled
Drawdown - Observed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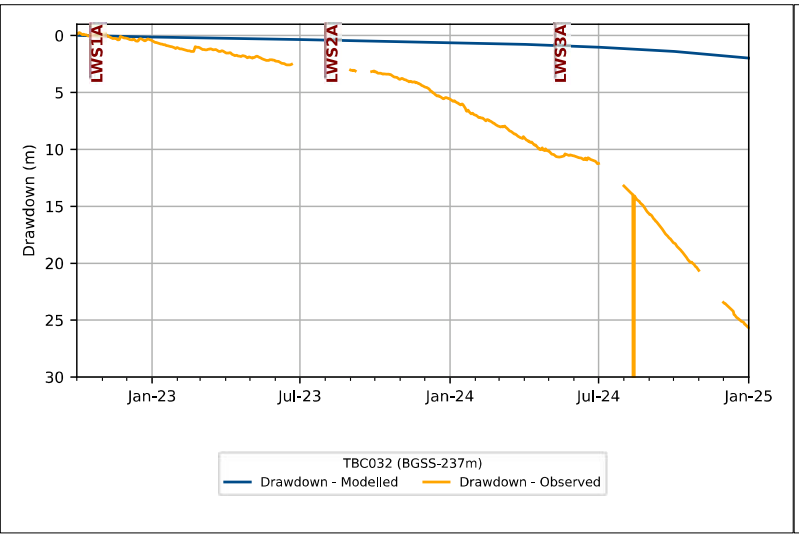
LWS2A
LWS3A
Drawdown (m)
−5
0
5
10
15
20
25
30
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC032 (BGSS-200m)
Drawdown - Modelled
Drawdown - Observed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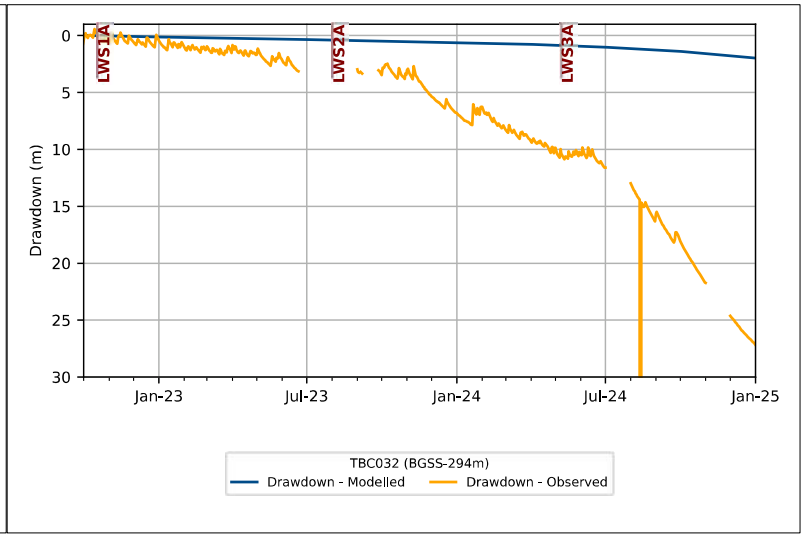
LWS2A
LWS3A
Drawdown (m)
0
5
10
15
20
25
30
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC032 (BGSS-237m)
Drawdown - Modelled
Drawdown - Observed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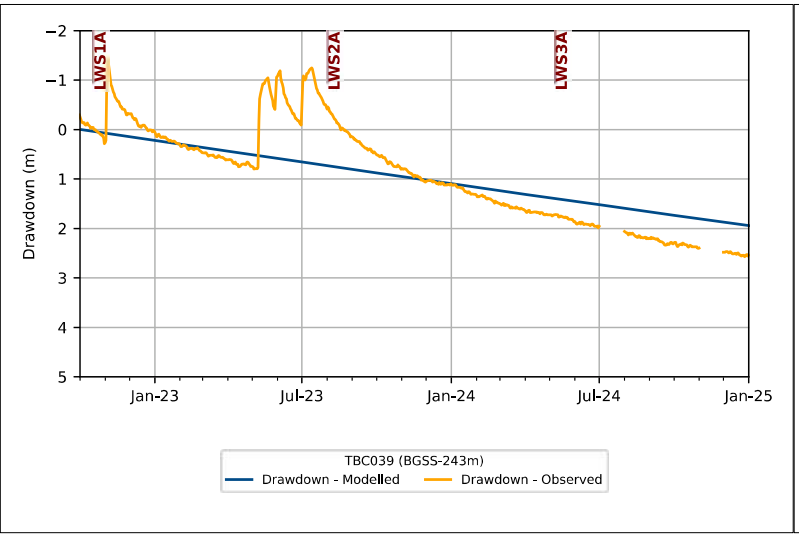
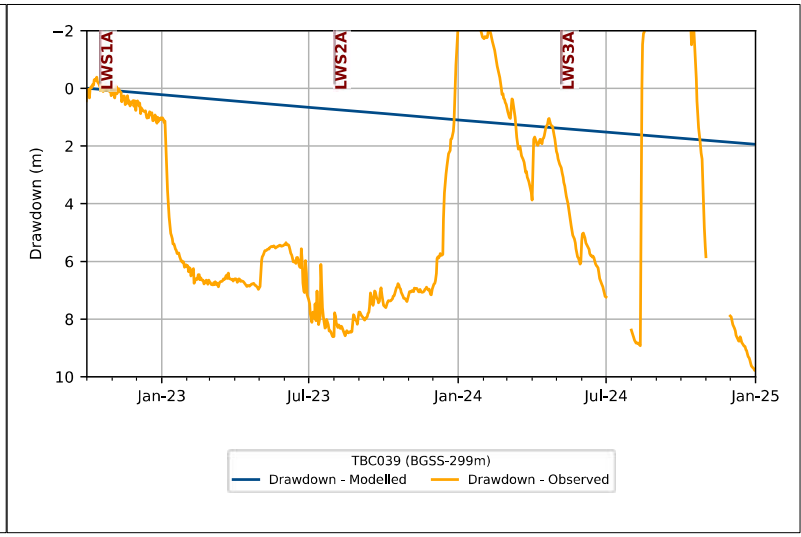
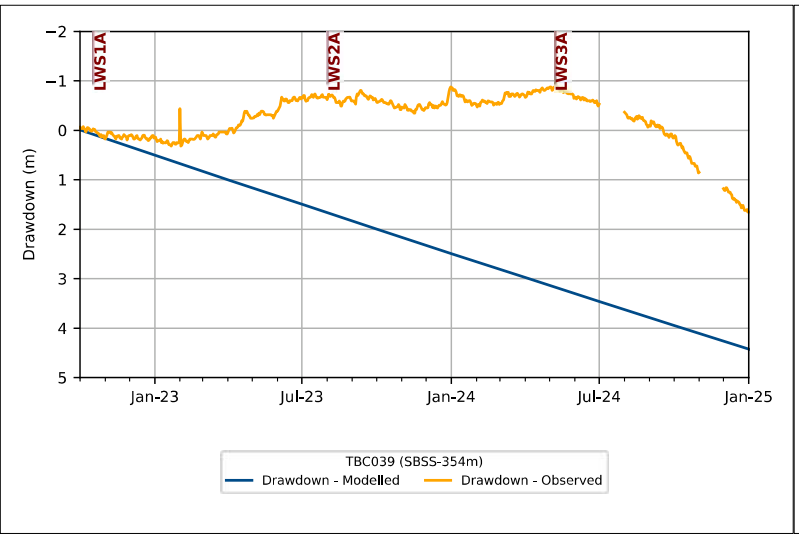
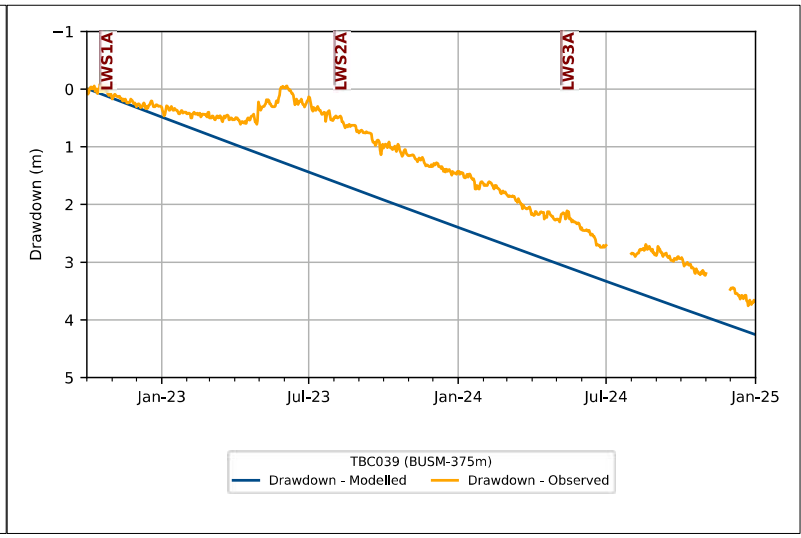
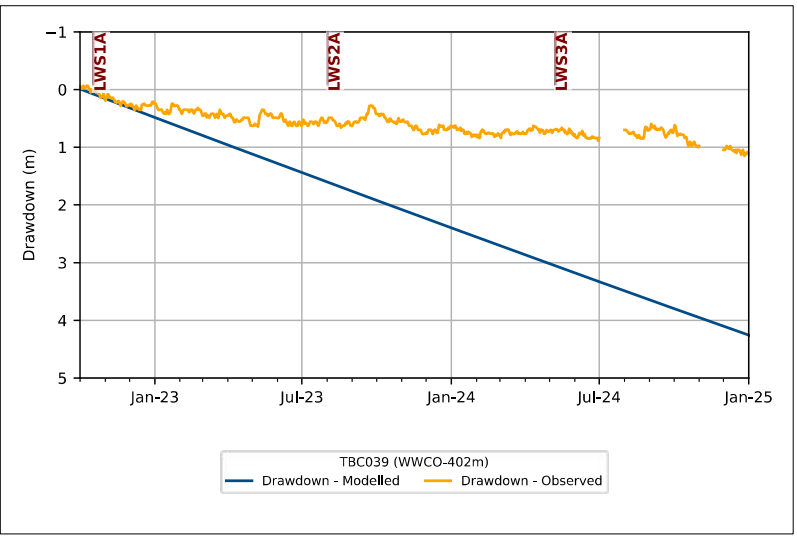
LWS2A
LWS3A
Drawdown (m)
0
5
10
15
20
25
30
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC032 (BGSS-294m)
Drawdown - Modelled
Drawdown - Observed


LWS1A
LWS2A
LWS3A
Drawdown (m)
−2
−1
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC039 (BGSS-243m)
Drawdown - Modelled
Drawdown - Observed


LWS1A
LWS2A
LWS3A
Drawdown (m)
−2
0
2
4
6
8
10
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC039 (BGSS-299m)
Drawdown - Modelled
Drawdown - Observed


LWS1A
LWS2A
LWS3A
Drawdown (m)
−2
−1
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC039 (SBSS-354m)
Drawdown - Modelled
Drawdown - Observed


LWS1A
LWS2A
LWS3A
Drawdown (m)
−1
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC039 (BUSM-375m)
Drawdown - Modelled
Drawdown - Observed


LWS1A
LWS2A
LWS3A
Drawdown (m)
−1
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC039 (WWCO-402m)
Drawdown - Modelled
Drawdown - Observed

Appendix E Temporal Groundwater Quality Plots

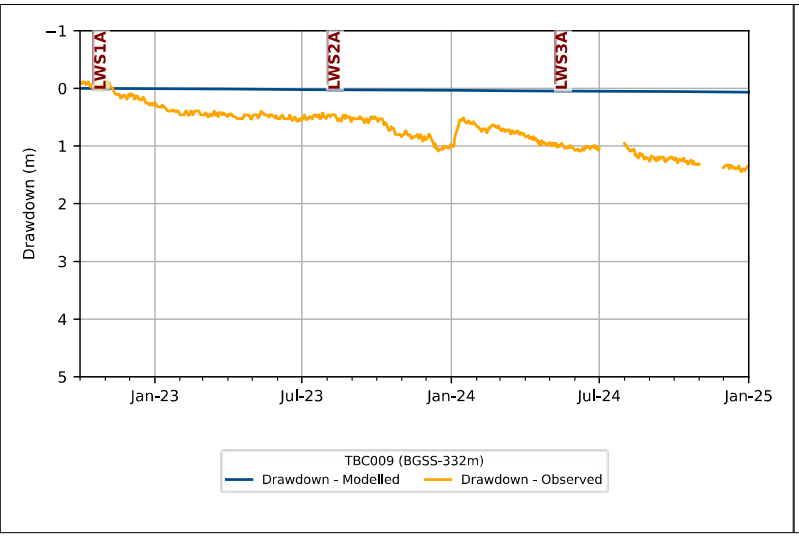
Six-Monthly Groundwater Report: July – December 2024

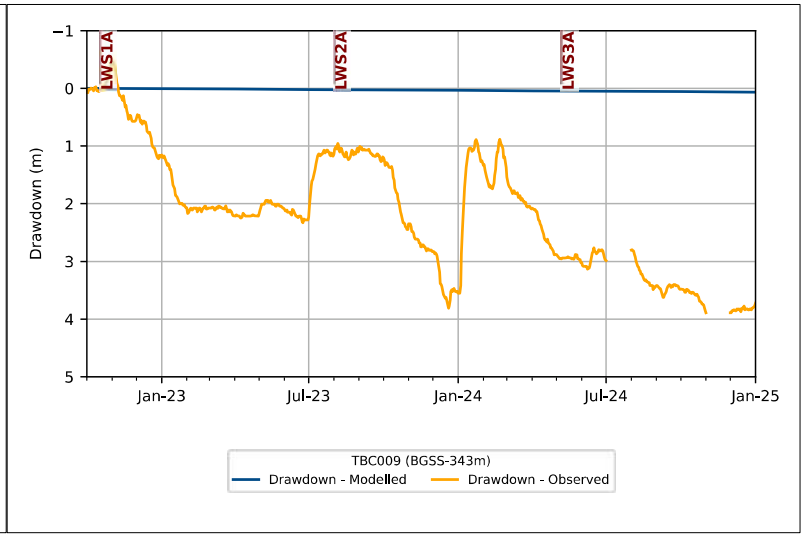
Tahmoor South Domain

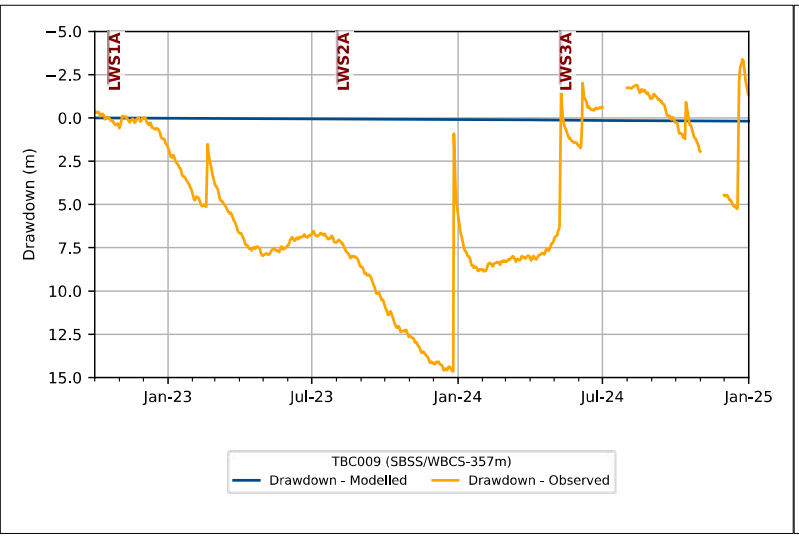
Tahmoor Coal Pty Ltd

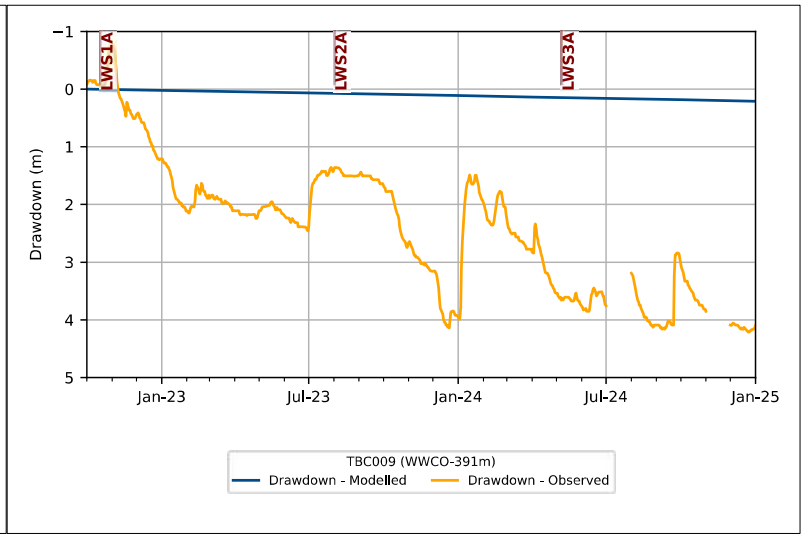
SLR Project No.: 640.30614.00001

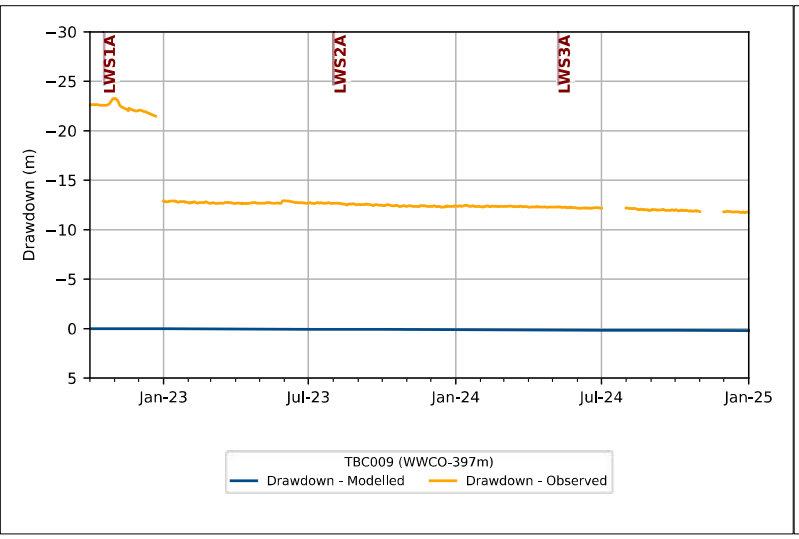
15 September 2025

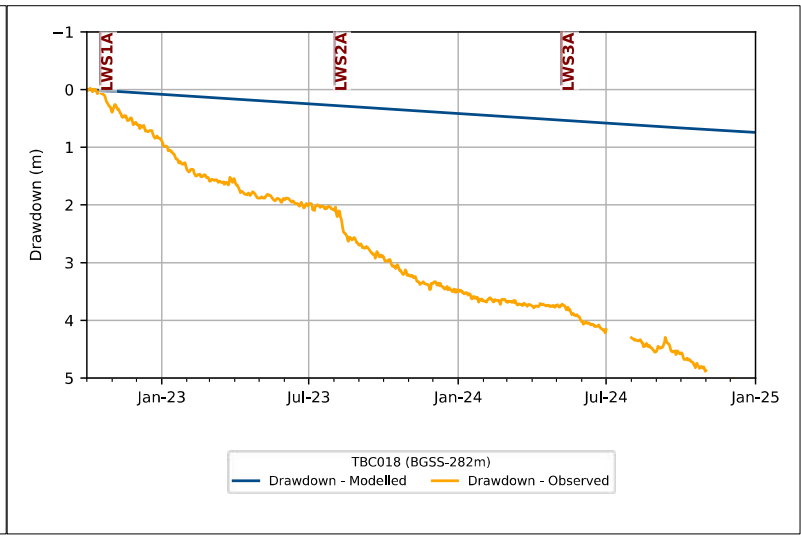

LWS1A
LWS2A
LWS3A
Drawdown (m)
−1
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC009 (BGSS-332m)
Drawdown - Modelled
Drawdown - Observed

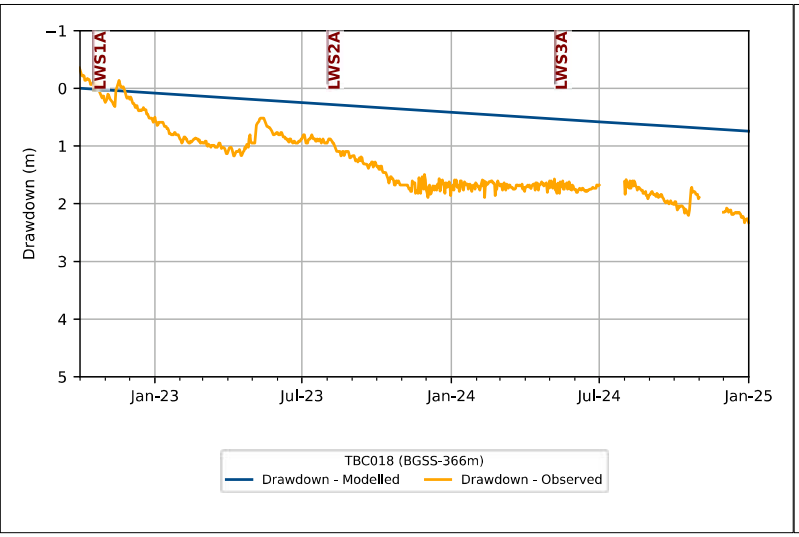

LWS1A
LWS2A
LWS3A
Drawdown (m)
−1
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC009 (BGSS-343m)
Drawdown - Modelled
Drawdown - Observed

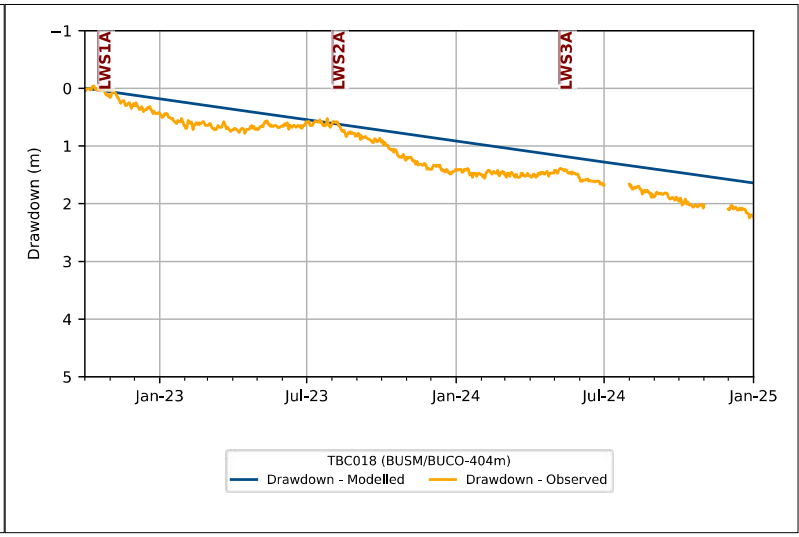

LWS1A
LWS2A
LWS3A
Drawdown (m)
−5.0
−2.5
0.0
2.5
5.0
7.5
10.0
12.5
15.0
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC009 (SBSS/WBCS-357m)
Drawdown - Modelled
Drawdown - Observed

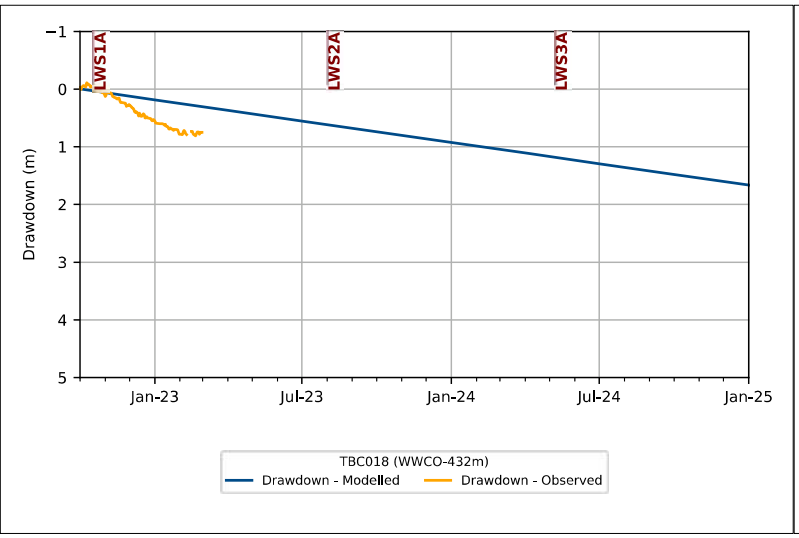

LWS1A
LWS2A
LWS3A
Drawdown (m)
−1
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC009 (WWCO-391m)
Drawdown - Modelled
Drawdown - Observed


LWS1A
LWS2A
LWS3A
Drawdown (m)
−30
−25
−20
−15
−10
−5
0
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC009 (WWCO-397m)
Drawdown - Modelled
Drawdown - Observed


LWS1A
LWS2A
LWS3A
Drawdown (m)
−1
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC018 (BGSS-282m)
Drawdown - Modelled
Drawdown - Observed


LWS1A
LWS2A
LWS3A
Drawdown (m)
−1
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC018 (BGSS-366m)
Drawdown - Modelled
Drawdown - Observed


LWS1A
LWS2A
LWS3A
Drawdown (m)
−1
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC018 (BUSM/BUCO-404m)
Drawdown - Modelled
Drawdown - Observed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LWS2A
LWS3A
Drawdown (m)
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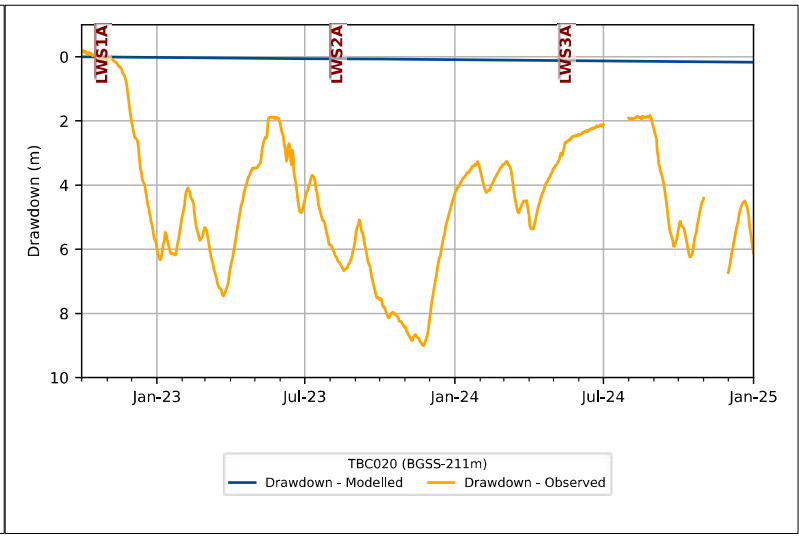
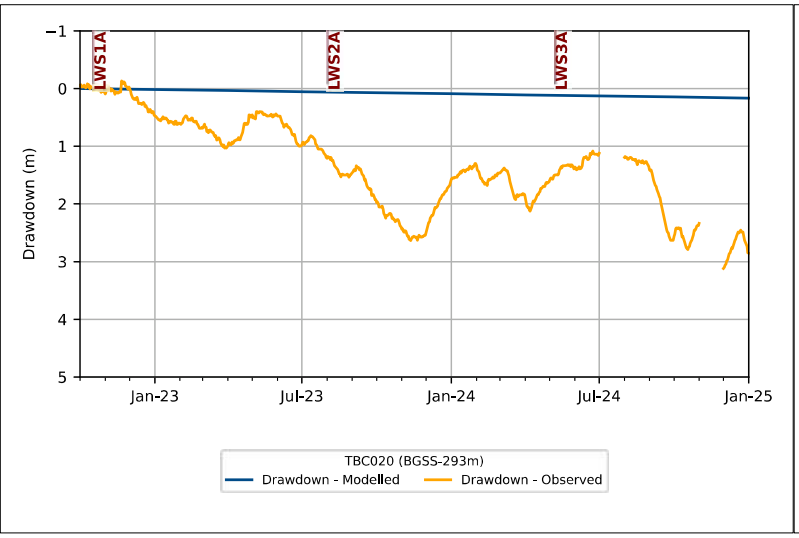
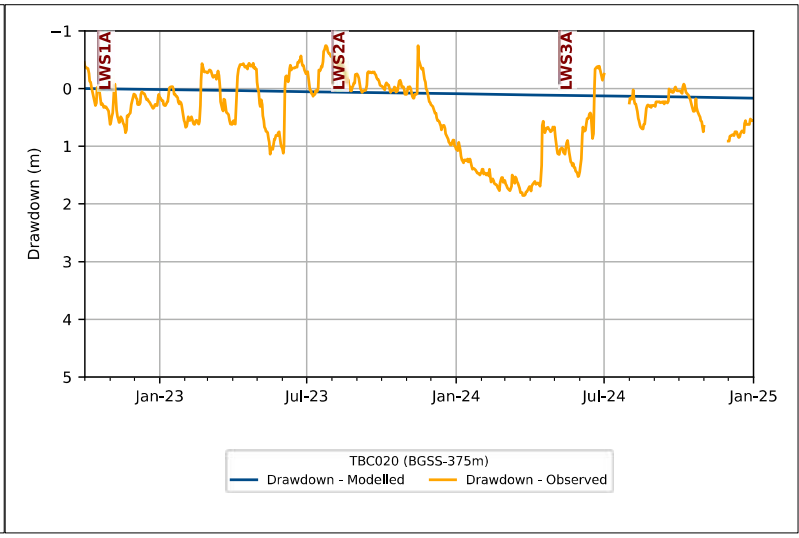
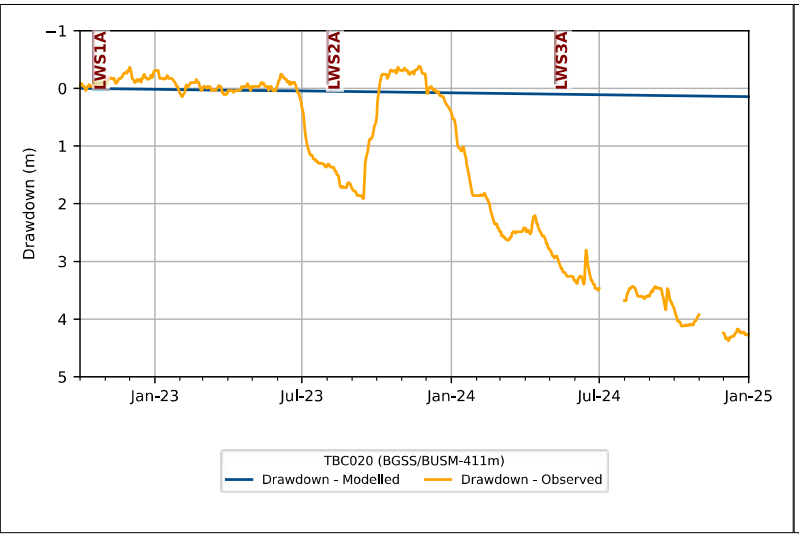
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC018 (WWCO-432m)
Drawdown - Modelled
Drawdown - Observed


LWS1A
LWS2A
LWS3A
Drawdown (m)
0
2
4
6
8
10
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC020 (BGSS-211m)
Drawdown - Modelled
Drawdown - Observed


LWS1A
LWS2A
LWS3A
Drawdown (m)
−1
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC020 (BGSS-293m)
Drawdown - Modelled
Drawdown - Observed


LWS1A
LWS2A
LWS3A
Drawdown (m)
−1
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC020 (BGSS-375m)
Drawdown - Modelled
Drawdown - Observed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LWS2A
LWS3A
Drawdown (m)
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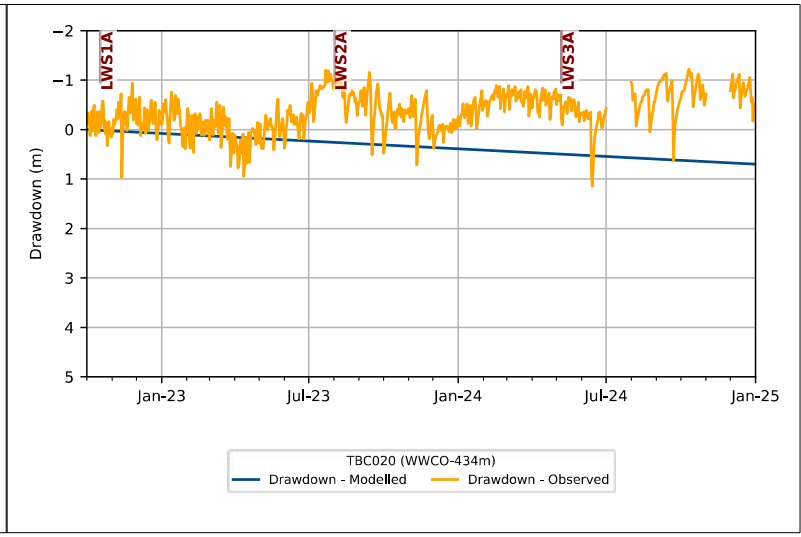
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC020 (BGSS/BUSM-411m)
Drawdown - Modelled
Drawdown - Observed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LWS2A
LWS3A
Drawdown (m)
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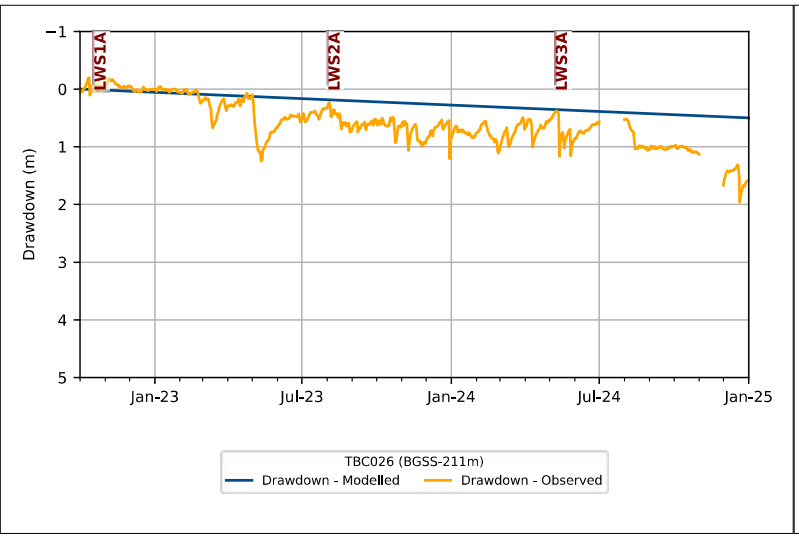
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC020 (WWCO-434m)
Drawdown - Modelled
Drawdown - Observed


LWS1A
LWS2A
LWS3A
Drawdown (m)
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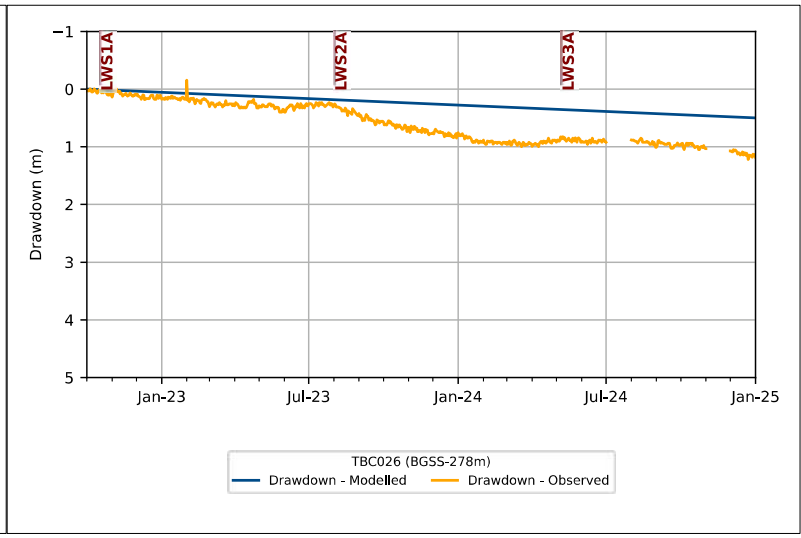
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC026 (BGSS-211m)
Drawdown - Modelled
Drawdown - Observed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LWS2A
LWS3A
Drawdown (m)
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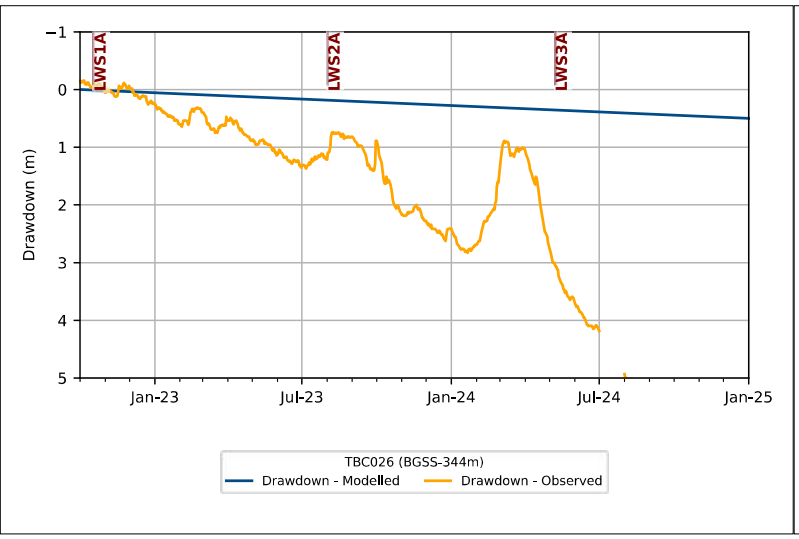
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC026 (BGSS-278m)
Drawdown - Modelled
Drawdown - Observed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LWS2A
LWS3A
Drawdown (m)
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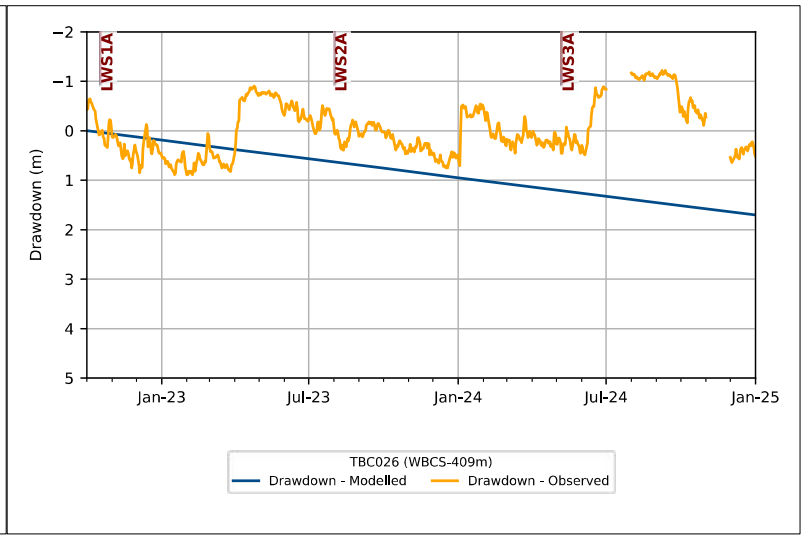
0
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC026 (BGSS-344m)
Drawdown - Modelled
Drawdown - Observed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LWS2A
LWS3A
Drawdown (m)
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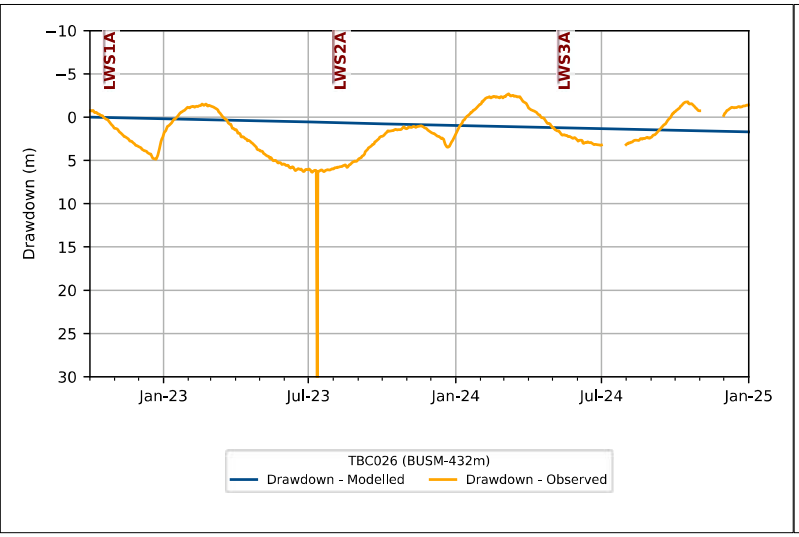
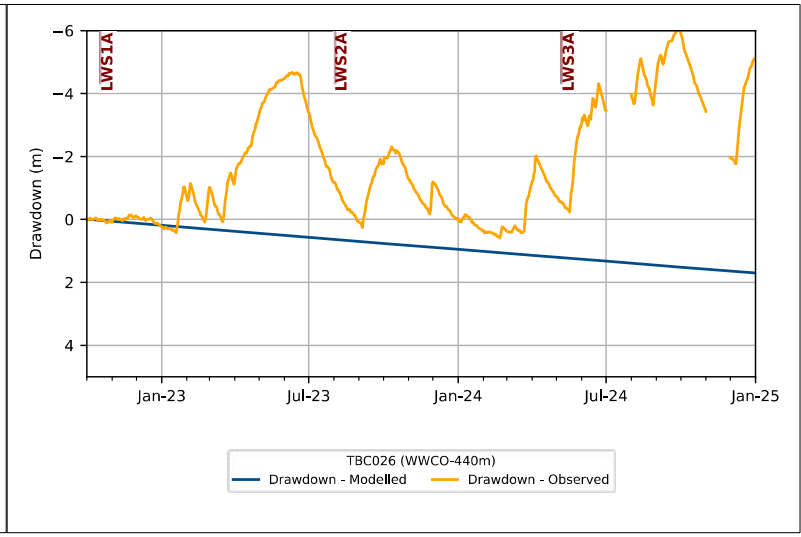
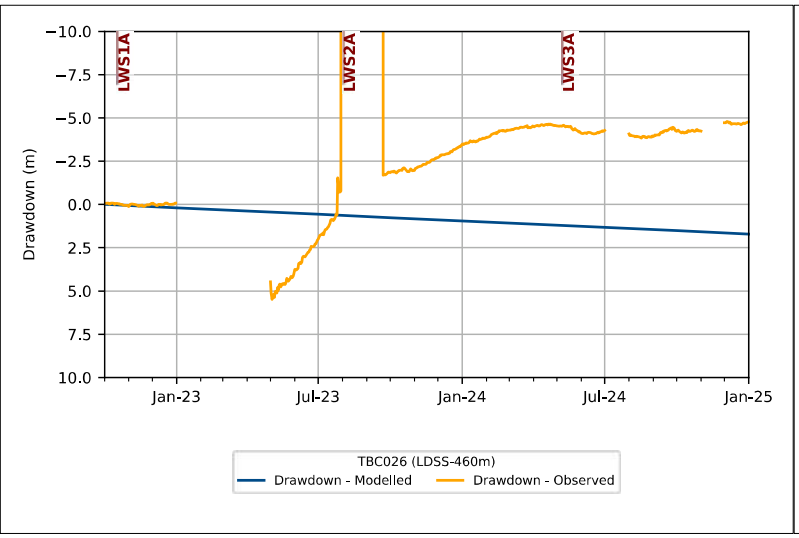
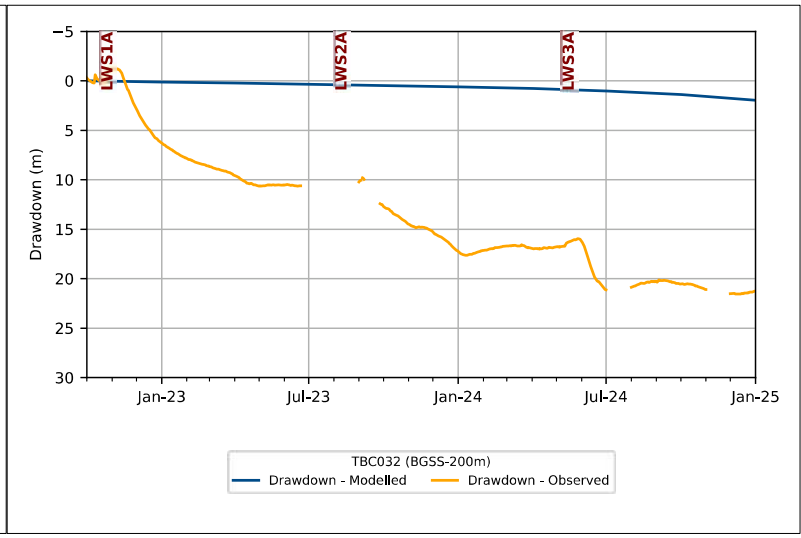
1
2
3
4
5
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC026 (WBCS-409m)
Drawdown - Modelled
Drawdown - Observed


LWS1A
LWS2A
LWS3A
Drawdown (m)
−10
−5
0
5
10
15
20
25
30
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC026 (BUSM-432m)
Drawdown - Modelled
Drawdown - Observed


LWS1A
LWS2A
LWS3A
Drawdown (m)
−6
−4
−2
0
2
4
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC026 (WWCO-440m)
Drawdown - Modelled
Drawdown - Observed


LWS1A
LWS2A
LWS3A
Drawdown (m)
−10.0
−7.5
−5.0
−2.5
0.0
2.5
5.0
7.5
10.0
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC026 (LDSS-460m)
Drawdown - Modelled
Drawdown - Observed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Jul-23
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Jul-24
Jan-25
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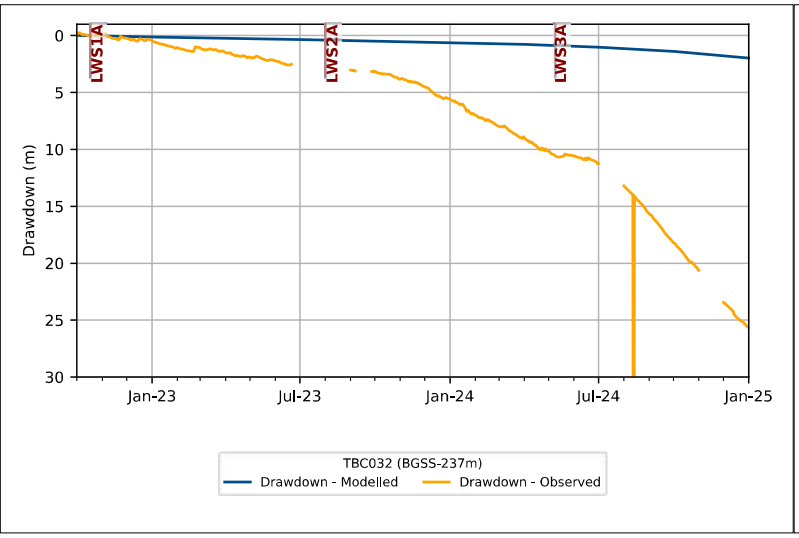
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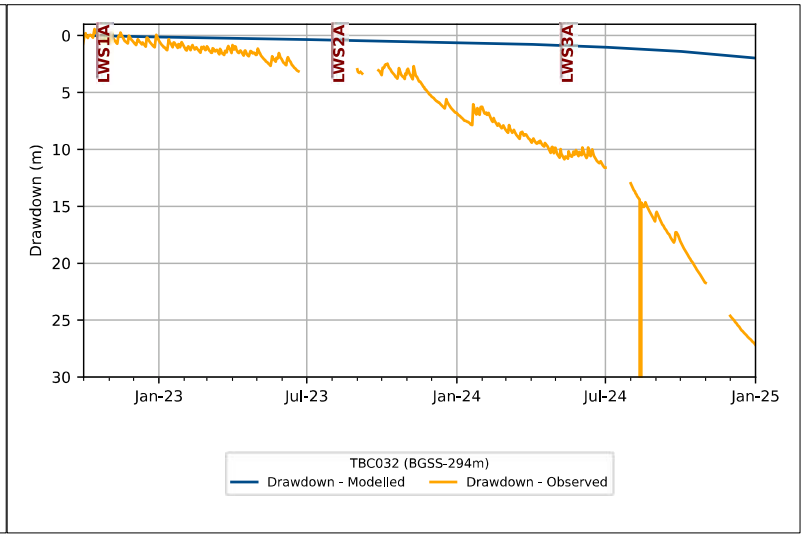
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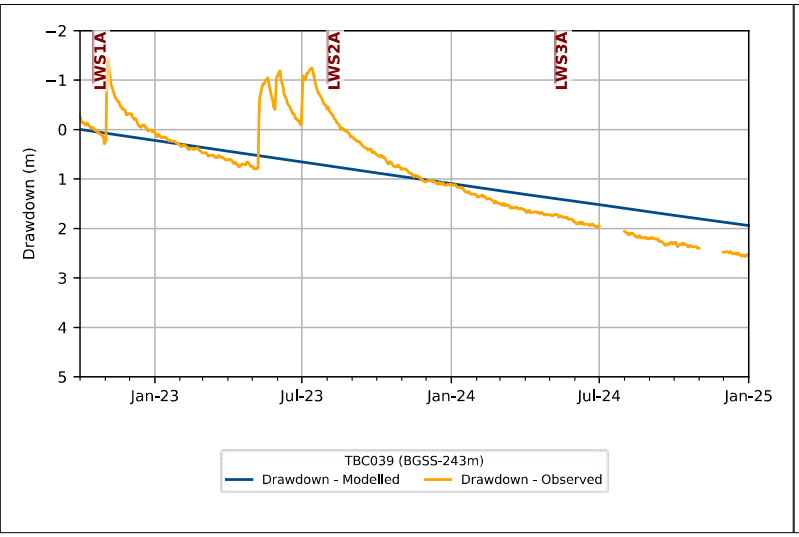
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Jan-25
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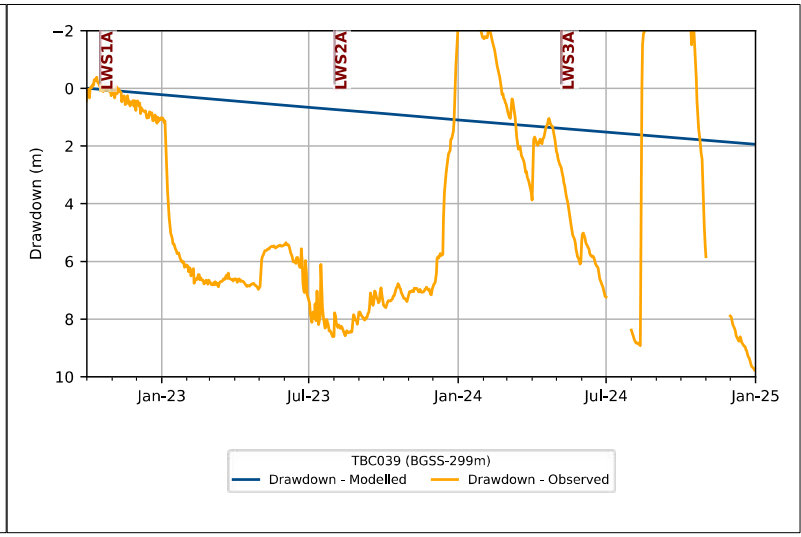
Drawdown - Observed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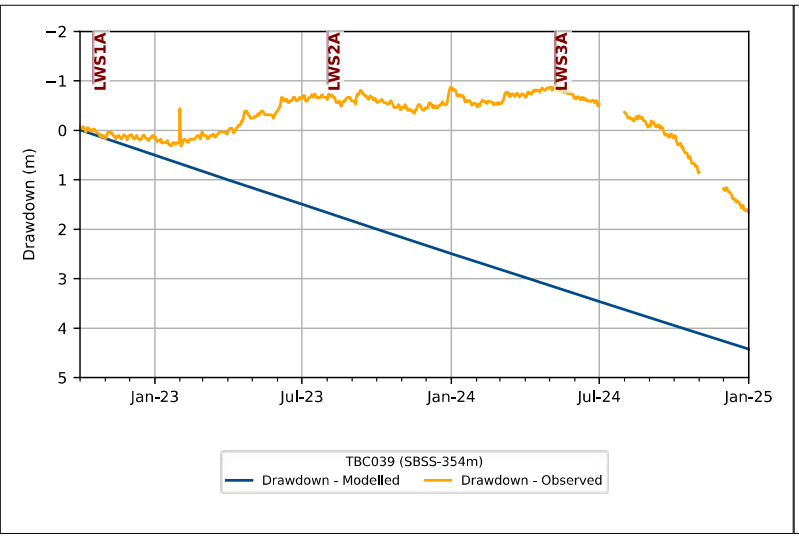
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Jan-25
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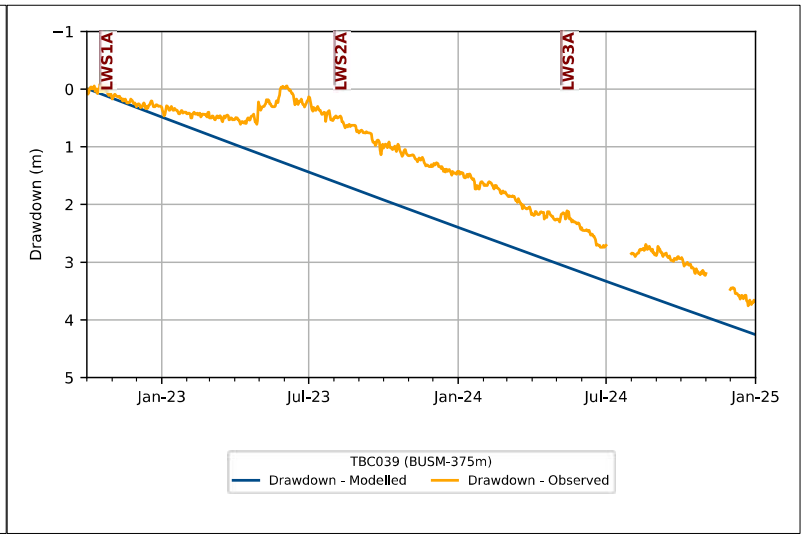
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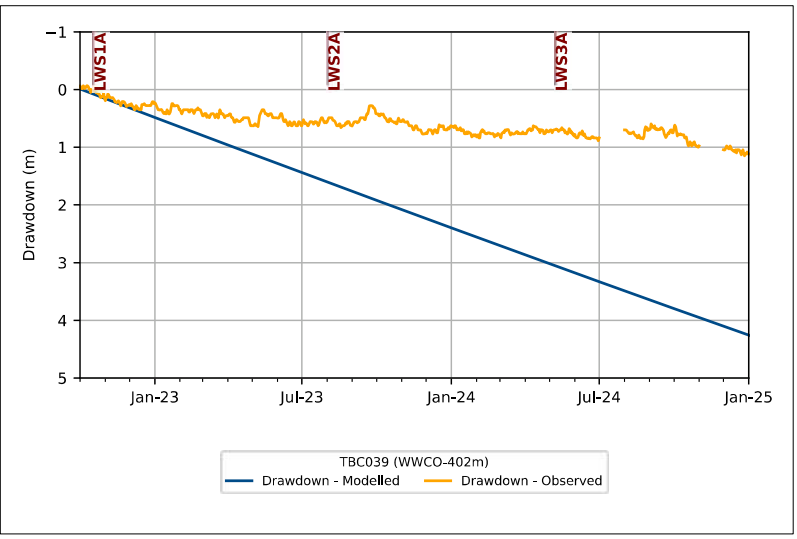
Drawdown - Observed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2
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4
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Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC039 (WWCO-402m)
Drawdown - Modelled
Drawdown - Observed

Appendix F Hydrograph and Subsidence Plots

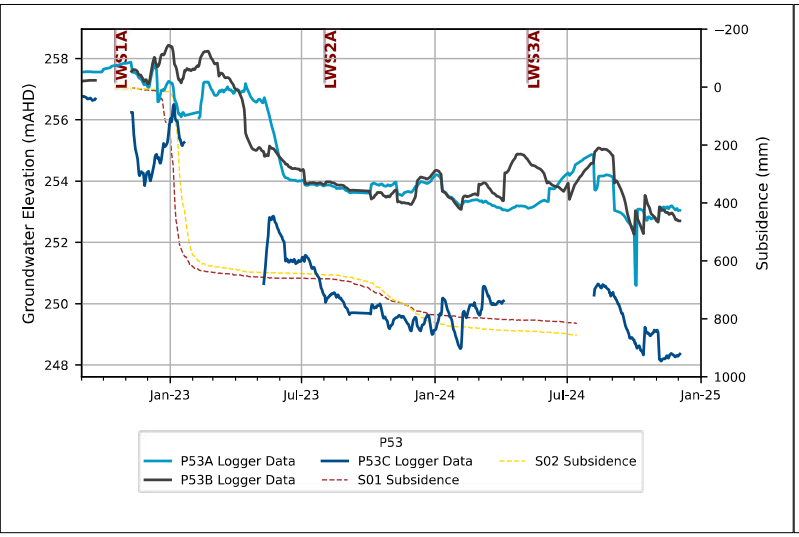
Six-Monthly Groundwater Report: July – December 2024

Tahmoor South Domain

Tahmoor Coal Pty Ltd

SLR Project No.: 640.30614.00001

15 September 2025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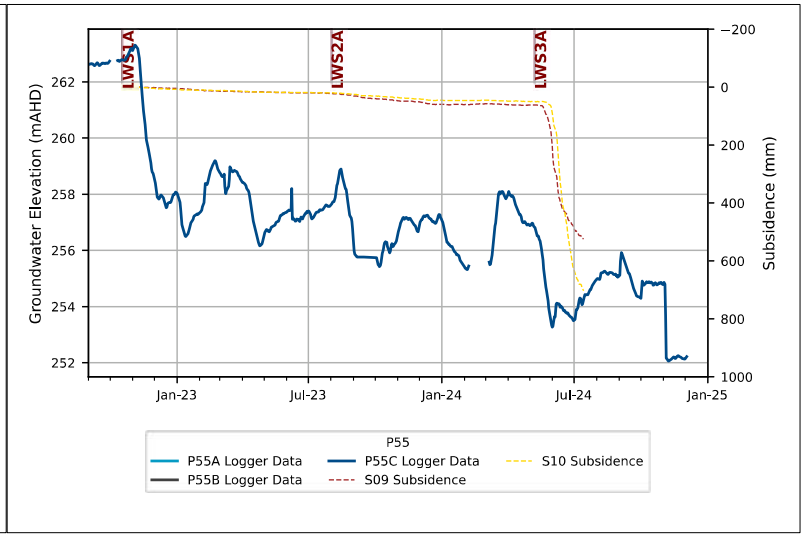
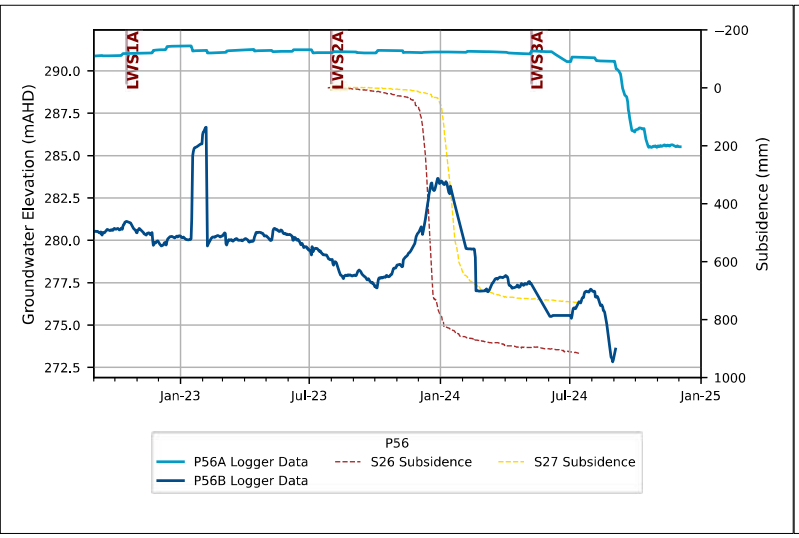
LWS2A
LWS3A
Groundwater Elevation (mAHD)
Subsidence (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
P53
P53A Logger Data
P53B Logger Data
P53C Logger Data
S01 Subsidence
S02 Subsidence


LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
Subsidence (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
P55
P55A Logger Data
P55B Logger Data
P55C Logger Data
S09 Subsidence
S10 Subsidence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LWS2A
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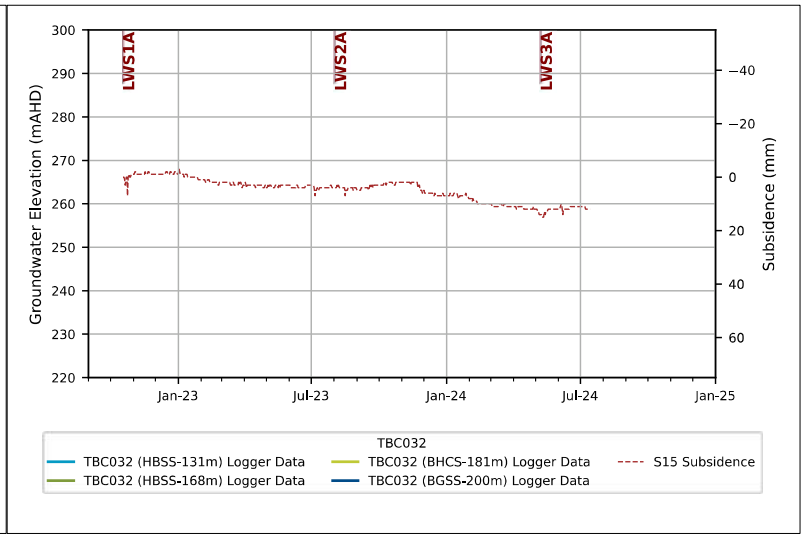
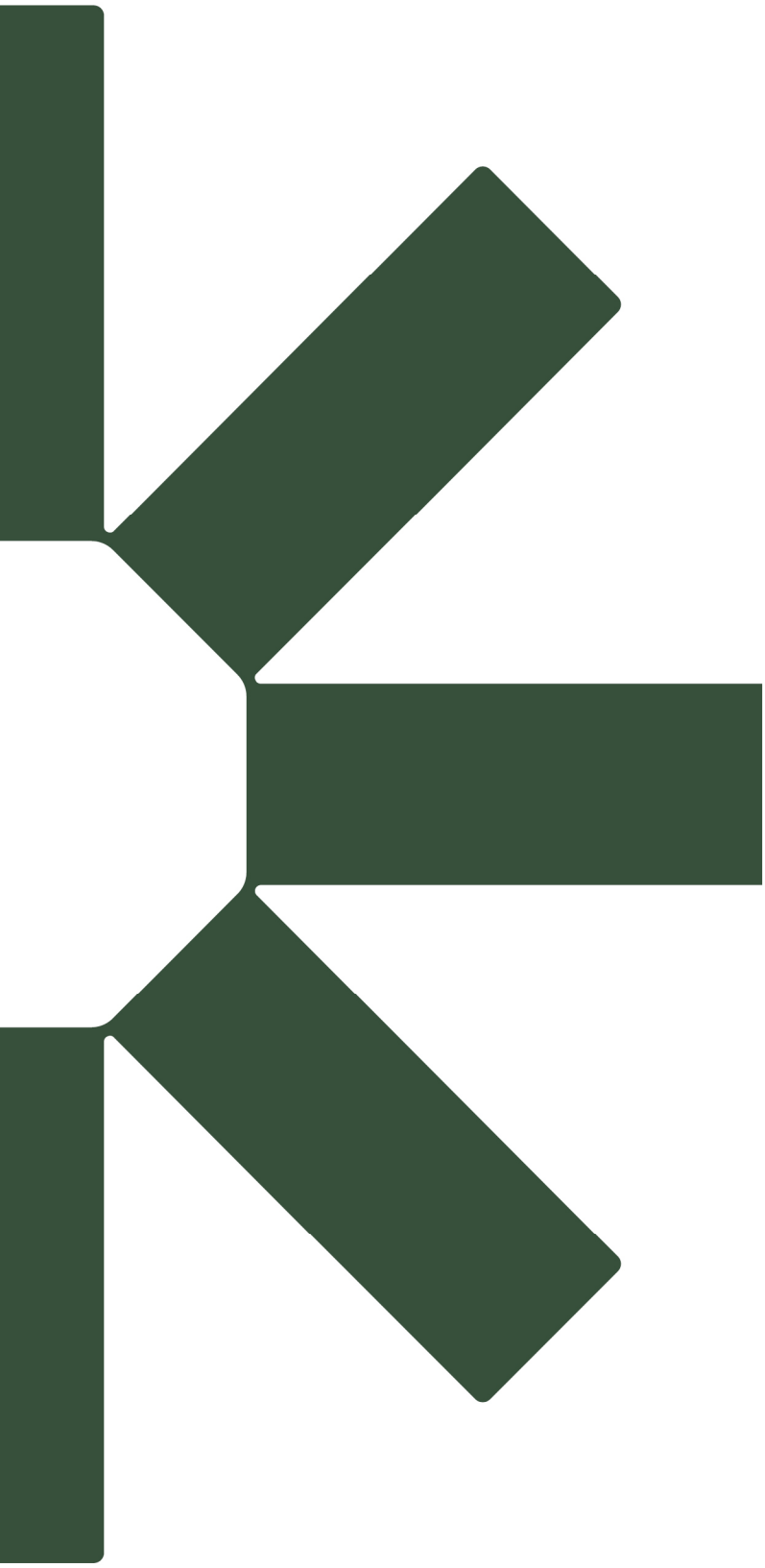
Groundwater Elevation (mAHD)
Subsidence (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
P56
P56A Logger Data
P56B Logger Data
S26 Subsidence
S27 Subsidence


LWS1A
LWS2A
LWS3A
Groundwater Elevation (mAHD)
Subsidence (mm)
Jan-23
Jul-23
Jan-24
Jul-24
Jan-25
TBC032
TBC032 (HBSS-131m) Logger Data
TBC032 (HBSS-168m) Logger Data
TBC032 (BHCS-181m) Logger Data
TBC032 (BGSS-200m) Logger Data
S15 Subsidence



Making Sustainability Happen

Appendix D – Geotechnical Report

Douglas PARTNERS | GROUNDED EXPERTISE

Tahmoor Coal Pty Ltd
PO Box 100
Tahmoor, NSW 2573

Attention: Nick Le Baut
Email: Nick.LeBaut@simecgfg.com

Project 210597.09
23 April 2025
R.010.Rev1
RJH

Geotechnical Comment
Mine Subsidence Impact Inspections
Farm Dam 18, 15 Caloola Road, Bargo

This report prepared by Douglas Partners Pty Ltd (Douglas) provides comments on mine subsidence impact inspections at Farm Dam 18 (FD18) located at 15 Caloola Road, Bargo. It is understood that following a 'Level 1' performance indicator trigger in the October 2024 inspection period, reporting to the Regulatory Authority on this performance indicator is required.

Douglas (2022) carried out a geotechnical assessment for landscape features, including farm dams, located within the 20 mm subsidence line for Longwalls(LW) S1A to S6A in Tahmoor Mines Southern Domain. For the farm dams, a high-level assessment was carried out to assess the consequence categories for a dam break scenario for farm dams with a capacity in excess of 1 ML. A monitoring program and performance indicators were recommended, and a Trigger Action Response Plan (TARP) was prepared. The performance indicators and trigger action response plan were prepared to facilitate the early detection of signs of distress and the implementation of remedial works (if any) to manage the identified hazards (eg a dam break event).

Douglas (2022) assessed FD18 to have a maximum embankment height of less than 1 m and a pond capacity of less than 0.1 ML. FD18 is located over LW S4A and has a predicted total vertical mine subsidence of approximately 1300 mm by Mine Subsidence Consulting Engineers (MSEC, 2022). Access to inspect FD18 during the Douglas' 2022 assessment was not granted by the landholder.

Douglas was initially granted access to carry out an inspection of FD18 in February 2024, when extraction of LW S2A was underway and FD18 was located on the periphery of the active mine subsidence zone (ie defined by the 20 mm mine subsidence line for LW S2A). Subsequent access was intermittent and often conditional on the owner being at home, due to dogs on the property. Subsequent inspections were carried out during extraction of LW 3SA when FD18 was again located in the zone of active mine subsidence. A summary of site observations during inspections is in provided in Table 1.

Table 1: Summary of Douglas' site inspection observations

Date	Observations	Trigger Level
7 February 2024	During the initial inspection (ie the baseline by necessity) the farm dam was at a full supply level and water was flowing over the spillway. Sand was observed at the surface on the southern embankment crest. The ground at the toe of the embankment was 'boggy' and seepage (refer Photo 1) was observed. The inspection was carried out following rainfall in the preceding days.	Not applicable (baseline inspection)
5 September 2024	FD18 was at full supply level and water was flowing over the spillway. A depression was observed in the central part of the embankment face with pooled, stagnant water and no flow (refer Photo 2). No seepage was observed along the downstream embankment or toe.	Normal Range
3 October 2024	No flow was observed over the spillway. The pond level was slightly lower than the previous inspection. A maximum freeboard at the lowest point of 150 mm was observed. Depressions have developed at three other locations. The depression appears to be erosions rills either from water flows overtopping the embankment or possibly from piping flows through the embankment. Seepage (ie slow flowing water, refer Photo 3) was observed in three of the four depressions. The owner advised that they had carried out de-silting of the dam with a small excavator, however, it was not large enough to reach the centre of the pond.	Level 1
12 November 2024	Douglas was not able to access the site on 7 November during the monthly inspection. Observations by Tahmoor Coal (TC) staff observed the pond level had decreased, depressions were unchanged, and there was no seepage.	Normal Range
3 December 2024	FD18 was at full supply level and water was flowing over the spillway. Depressions on the downstream embankment face have slightly increased in size since the last inspection and have pooled water, but no flow was observed.	Normal Range

It is noted that no turbid seepage was observed during Douglas' inspections. It is understood that mine subsidence has affected the driveway and the shed at No. 15 Caloola Road, to the north of the FD 18.

A review of Nearmap aerial imagery generally shows that the trees growing in the embankment obscure the downstream embankment face. Of note is that the farm is dry in the following image dates: 8 February 2018, 26 July 2018, 15 January 2019, 13 November 2019, 15 June 2023.

The following comments are made in regard to observations at the site and the Level 1 trigger:

- It is likely that the farm dam has been constructed with no design or specification. The farm dam has negligible freeboard, the spillway has inadequate capacity to pass flows during heavy rainfall and the dam appears to overtop during heavy rainfall events.
- Fill used in the earth embankment has probably been placed with no compaction testing or moisture control and is unlikely to meet current engineering standards.
- Trees growth in a dam embankment is considered to be poor practice. Roots can create pathways for seepage to occur through an embankment. The decay of roots in an embankment (eg following bushfires) can also create voids.
- Seepage was identified through the farm dam foundation and lower embankment during the initial (ie baseline) inspection on 7 February 2024, when the farm dam was located near the edge of active mine subsidence zone (ie when the site was subject to very low levels of movement, if any).
- It is highly probable that seepage has occurred through the embankment prior to the commencement of mining in Tahmoor Mines Southern Domain.
- De-silting works in the farm dam by the owner may have inadvertently removed or damaged clay or sediment lining the pond and therefore resulted in increased seepage rates through the farm dam embankment.
- The performance indicators for the Level 1 trigger in the TARP are considered to reflect low levels of damage, deformation or defects that could be a precursor to serious defects. They can also be attributed to the design philosophy or other natural processes that are not detrimental to the farm dam. Nevertheless, the Level 1 trigger has the requirement for further action and/or investigation to assess the potential cause/s of the damage and any risk that is posed.
- In Douglas' opinion, it is unclear with the available information whether mine subsidence has caused the depressions or if they are due to poor construction and/or natural processes (eg overtopping of the embankment or piping). Further investigation will be required including the establishment of survey stations and ongoing monitoring, subsurface investigation to assess the materials in the embankment and foundation, their consistency, and the potential for increased groundwater flows through the embankment following the de-silting works.
- From a risk viewpoint, the volume of water in the pond is small and the consequence category for FD18 is considered to be low. The risk to life and property downstream due to a dam break event at FD18 is also considered to be low (ie within an acceptable risk range).

We trust the above meets your current requirements. If there are any questions, do not hesitate to contact the undersigned.

Yours faithfully
Douglas Partners Pty Ltd



Roderick Haselden
Senior Associate / Engineering Geologist

Reviewed by



John Braybrooke
Principal

Attachments: About this Report, Photo Plates (2 No.)



Photo 1: Seepage observed from the embankment on 7 February 2024.
Note that the spillway is located to the right of the photo.



Photo 2: Localised depression with pooled water observed on 5 September 2024.
Note that the pooled water was not flowing.

Douglas PARTNERS	**Site Photographs**	PROJECT: 210597.09
	Farm Dam 18	PLATE No: 1
	15 Caloola Road, Bargo	REV: 0
	CLIENT: Tahmoor Coal Pty Ltd	DATE: Various

About this Report

October 2024

Introduction

These notes have been provided to amplify Douglas' report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

Douglas' reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

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This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Engagement Terms for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, Douglas will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, Douglas cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, Douglas will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, Douglas requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. Douglas would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

intentionally blank



Photo 3: Seepage observed in depression from the embankment on 3 October 2024. Note a second depression to the left of the trees in the photo.



Photo 4: Localised depression with pooled water observed on 3 December 2024. Note that the pooled water was not flowing.

Douglas PARTNERS	**Site Photographs**	PROJECT: 210597.09
	Farm Dam 18	PLATE No: 2
	15 Caloola Road, Bargo	REV: 0
	CLIENT: Tahmoor Coal Pty Ltd	DATE: Various

Appendix E – Aquatic Ecology Report

Tahmoor South A Series: Aquatic Monitoring Report

Spring 2024

Prepared for:
Tahmoor Coal Pty Ltd

7 August 2025

Prepared by:
Stantec Pty Ltd

Project/File:
304501634



Stantec Australia Pty Ltd

Revision	Description	Author	Date	Quality Check	Date	Independent Review	Date
1	Draft for client review	Clayton Mead	18 July 2025	Sean Smith	15 July 2025	Daniel Pygas	22 July 2025
2	Version 2	Clayton Mead	6 August 2025	-	-	Dane Fogliada	7 August 2025

The conclusions in the Report titled Tahmoor South A Series: Aquatic Monitoring Report are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

Stantec has assumed all information received from Tahmoor Coal Pty Ltd (the "Client") and third parties in the preparation of the Report to be correct. While Stantec has exercised a customary level of judgment or due diligence in the use of such information, Stantec assumes no responsibility for the consequences of any error or omission contained therein.

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Prepared by 

Signature

Clayton Mead

Printed Name

Reviewed by 

Signature

Dan Pygas

Printed Name

Approved by 

Signature

Sean Smith

Printed Name

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Executive Summary

Background

Extraction of coal from the Tahmoor South A series longwalls commenced in October 2022 and is projected to continue until 2028. A Biodiversity Management Plan (BMP) and aquatic ecology monitoring program have been prepared and established as part of the Tahmoor South Extraction Plan requirements incorporating bi-annual (Autumn and Spring) aquatic ecology monitoring, which commenced in Spring 2019.

The objective of the aquatic ecology monitoring program is to assess the condition of waterways that are predicted to be impacted by mining related subsidence and compare ecological indicators against the BMP Trigger Action Response Plans (TARPs).

This report documents and analyses the results from the most recent round of data collection (Spring 2024) in conjunction with the entire 'during mining' monitoring period, and compares it with the baseline monitoring period. This process informs the adaptive management of the waterways and monitoring under the BMP.

Methods

Thirteen sites (five Control, eight Impact) are currently included in the monitoring program. The following surveys are completed as part of this program:

- A descriptive aquatic habitat assessment, using AUSRIVAS methods and supported by a modified version of the Riparian Channel and Environmental Inventory method (RCE).
- In-situ measurements of key physico-chemical water quality parameters.
- Aquatic macroinvertebrate surveys including:
    - AUSRIVAS sampling
    - Quantitative sampling using a benthic suction pump.

In addition, a rainfall and surface water assessment using available surface water level, flow and water quality data was completed to aid in the interpretation of observed changes in indicators of aquatic ecology.

The results of these surveys were used to inform a TARP review for the potentially impacted waterways.

Results

Most Impact sites within the Teatree Hollow stream network were found to be dry during the Spring 2024 survey. These conditions have now persisted across multiple consecutive monitoring periods for some sites. The drying of these pools has been linked to mining-related subsidence, including fracturing of bedrock leading to flow diversion.

Dry conditions prevented sampling of most aquatic indicators at Impact sites. One Impact site, TTH13 (d/s), contained sufficient water for AUSRIVAS and water quality sampling, while another Impact site, BRt6 contained only enough water for in-situ water quality to be recorded. All five Control sites contained sufficient water for the completion of planned macroinvertebrate and water quality sampling.

Water quality at TTH13(d/s) was poor, with very high turbidity and low dissolved oxygen recorded, which were outside guideline values. Dissolved oxygen below the DGV value was also recorded at BRt6, MC15, HC6 and HC8 suggesting poor water quality at the Impact sites may be attributed to overall low-flow conditions observed in the locality during the Spring 2024 survey rather than mining.

AUSRIVAS monitoring results indicated a generally impoverished macroinvertebrate assemblages across the locality including Impact and Control sites. No observable temporal trends for Control sites were apparent. Impact sites were predominantly dry and could not be sampled, whereas Control sites retained sufficient water for sampling. As a result, quantitative analyses were limited to Control sites, as the absence of data from Impact sites prevented the planned Beyond-After Control-Impact (BACI) analysis. This analysis captured the natural variability within Control sites across the monitoring period, contrasted by the progressive loss of pool water at Impact sites where this analysis was originally intended.

A Trigger Action Response Plan (TARP) review was completed for Impact monitoring sites. One site had a normal trigger level. Two sites had a trigger of level one. One site had a trigger of level two. Two sites had a trigger of level three. These trigger levels were assigned based on indicators including reductions in aquatic pool habitat compared to baseline conditions, and AUSRIVAS scores falling below Band C. The assignment of trigger levels was supported by findings from the recent surface water review completed for the locality and common monitoring sites.

Conclusion

Eleven seasons of data have now been collected at Impact and Control sites for the Tahmoor A series aquatic monitoring program. Due to widespread dry conditions within Impact sites during the latest survey, the data available for key aquatic ecology indicators (water quality and macroinvertebrates using AUSRIVAS and quantitative methods) is limited for this season. Nevertheless, this report presents available data and provides important continuity to the monitoring program, especially for the physical habitat assessment at each site.

Importantly, the increased TARP levels and number of sites triggering those levels recorded this season compared to previous surveys highlight the need to continue the monitoring and adaptively manage the program and analysis approaches.

Recommendations & TARP Outcomes

Given the persistent dry conditions at several Impact sites and the resulting data limitations, there has been a reduced ability to detect and attribute ecological changes associated with mining during the current round of monitoring, using the indicators included in the program. Despite this limitation, the TARP trigger levels have been reviewed, and it is not recommended that monitoring frequency



increase nor new sites be added to the program at this stage, due to the low likelihood of either of these actions producing further useful data.

It recommended that existing surface water datasets for the Bargo River Tributary be made available to inform future adaptive management of the program and to better understand the behaviour of this waterway, as has been done for the sites within Teatree Hollow.

In addition, it is recommended that Ostracoda, Copepoda and Cladocera be included in future quantitative macroinvertebrate analyses to provide as broad a picture of aquatic biodiversity as possible.

Acronyms / Abbreviations

ANZECC	Australian and New Zealand Environment and Conservation Council
ANZG	Australian and New Zealand Guidelines
AUSRIVAS	Australian River Assessment System
BACI	Before-After, Control-Impact
BMP	Biodiversity Management Plan
BoM	Bureau of Meteorology
DGV	Default guideline value
DO	Dissolved oxygen
DPE	Department of Planning and Environment
DPHI	Department of Planning, Housing and Infrastructure
EC	Electrical conductivity
EPT	Ephemeroptera, Plecoptera and Trichoptera
LW	Longwall
Niche	Niche Environment and Heritage Pty Ltd
OE50	Observed to Expected ratio
ORP	Oxidation reduction potential
PCO	Principal Coordinate Analysis
PERMANOVA	Permutational Multivariate Analysis of Variance
RCE	Riparian Channel and Environmental Inventory
SIGNAL2	Stream Invertebrate Grade Number Average Level
SILO	Scientific Information for Landowners
Tahmoor Coal	Tahmoor Coal Pty Ltd
TARP	Trigger Action Response Plan
WMP	Water Management Plan



1 Introduction

1.1 Background

Tahmoor Coal Pty Ltd (Tahmoor Coal) owns and operates Tahmoor Colliery, an underground coal mine approximately 80 km south-west of Sydney in the Southern Coalfields of New South Wales.

In April 2021, Tahmoor Coal received State Significant Development Application Approval (SSD 8445) from NSW Department of Planning and Environment (DPE) (now Department of Planning, Housing and Infrastructure (DPHI)), for the Tahmoor South Project (the Project), which allows underground mining operations and associated infrastructure to extend to the south. The Tahmoor South Domain is located south of the Bargo River and east of Remembrance Driveway and the township of Bargo, and the extended underground coal mining area will continue to be accessed via the existing surface facilities at Tahmoor Colliery. In May 2025, DPHI approved Modification 3 for the inclusion of an additional longwall panel (Longwall South 7A (LW S7A)) to the existing approved mine plan. Thirteen longwalls are proposed in this domain which are divided into a series of six northern (A series) and six southern (B series) longwalls.

The Extraction Plan for Series A longwalls was approved in 2021 (DPE, 2021) and coal is currently being extracted with this projected to continue until 2028 (Table 1). Mining of the B series longwalls will likely commence in 2028 following approval of an extraction plan for this series.

As part of the development consent, a Biodiversity Management Plan (BMP) (LW S1A-S6A) (currently in review to incorporate LW S7A) has been established which incorporates bi-annual (Autumn and Spring) terrestrial and aquatic biodiversity monitoring (Tahmoor Coal, 2024a). The biodiversity monitoring program for the A series longwalls, covering both aquatic and terrestrial ecology, commenced in Spring 2019.

Additional monitoring commenced in Spring 2023 to collect baseline data in preparation for the extraction of the B series longwalls. Details of baseline aquatic and terrestrial ecology monitoring for proposed B series longwalls are presented in separate reports.

Table 1 A series longwall commencement and completion dates

Longwall	Mining Commenced	Mining Completed
LW S1A	18 October 2022	4 July 2023
LW S2A	2 August 2023	6 April 2024
LW S3A	8 May 2024	17 December 2024
LW S4A	Not commenced	-
LW S5A	Not commenced	-
LW S6A	Not commenced	-
LW S7A	Not commenced	Approx. 2028

1.2 Aquatic Monitoring Objectives

Aquatic ecology monitoring for the A series longwalls has involved sampling 'Impact' and 'Control' sites that are representative of the waterways present in the Tahmoor South Domain since 2019. Previously, Niche Environment and Heritage Pty Ltd (Niche) have reported on the results of the baseline monitoring period (Spring 2019 – Autumn 2022) (Niche, 2020a; 2020b; 2021; 2022) and the 'during mining' monitoring period (Spring 2022 – Autumn 2024) (Niche, 2023a; 2023b 2024a; 2024b) for the A series longwalls. Since the commencement of monitoring in 2019, some changes have been made to the monitoring program (see Section 1.3) (Tahmoor Coal, 2024).

The current report includes 13 sites monitored following these changes. These include Impact sites within the Teatree Hollow catchment and a tributary of the Bargo River, and Control sites to the southwest in Hornes Creek and Moore Creek. At the time of the Spring 2024 field surveys, extraction from LW S1A, LW S2A and LW S3A was complete or underway, but extraction of LW S4A had not yet commenced (Table 1).

The primary aim of the monitoring program is to assess the condition of potentially impacted waterways against the BMP1 TARP for aquatic ecology (Tahmoor Coal, 2024), which defines levels of deviation in indicators of aquatic habitat and associated stream health from normal conditions and the actions required to be implemented in response to each level of deviation. This report documents and analyses the results from the most recent round of data collection in Spring 2024, in conjunction with the entire 'during mining' monitoring period, and compares it with the baseline monitoring period. This process informs the adaptive management of the waterways and monitoring under the BMP (Tahmoor Coal, 2024) for the Project.

1.3 Monitoring Program History

The current monitoring program using the 13 sites listed in Table 2 is the product of a series of adaptive management decisions throughout the program's history.

1.3.1 2019 – 2022

Changes to the program from 2019 – 2022 are outlined in Section 3.2.2.1 of the BMP (Tahmoor Coal 2024). In this time a total of 17 sites were sampled in Teatree Hollow, Bargo River, Dogtrap Creek, Hornes Creek and Moore Creek. Four Impact sites (sites DTC9, DTC10, DTC11 and DTC13) and one Control site (Site 14) were found to be dry on more than one occasion and have since been excluded from the program. In addition, two sites (Site 1 and 2) were inaccessible in Autumn 2020 due to bushfires. Niche made recommendations to review the program in 2021 based on factors that could affect the program's efficacy, including:

- Mine water discharge potentially confounding downstream results in Bargo River;
- The highly variable nature of water availability in Teatree Hollow;
- Existing poor stream health in Teatree Hollow;
- Lack of available upstream reference sites in Teatree Hollow;



- Limited or no aquatic habitat in the western Teatree Hollow tributary.

To adapt the monitoring program and negate the influence of the above variables among other issues, some sites were both removed and added in for the Spring 2021 survey.

1.3.2 2023 – Present

In 2023, Niche advised changes to the monitoring program in response to longwall progression and detection of indicators of impact within waterways. These recommendations included the addition of monitoring sites. This included two additional Australian River Assessment System (AUSRIVAS) monitoring sites in Teatree Hollow, TTH13(d/s) and TTHt17(d/s), downstream of sites found to be impacted in Autumn 2023. Impact sites BRt6 and TTHt9 were added to the program in the Spring 2023 survey to assess potential impacts to these sections of waterway associated with future longwalls LW S3A – S6A. Control site HC6 was also added, in line with the potential future reclassification of downstream site HC8 from Control to Impact, associated with additional planned longwall LW S7A.

Dogtrap Creek and Bargo River are now monitored in separate programs, with Dogtrap Creek currently undergoing baseline assessment (started in Spring 2023) for future longwall mining (B series longwalls), and Bargo River being surveyed since Spring 2021 in relation to mine water discharge under Environmental Protection License (EPL) 1389.

Details of sites previously used in the monitoring program can be found in Niche (2024b) Annex 1, page 60. This report will refer only to the 13 sites currently included in the monitoring program (Table 2).

2 Methods

Spring 2024 field surveys were conducted by Stantec ecologists from 11 to 14 and 18 to 22 November 2024.

2.1 Monitoring Sites

Thirteen monitoring sites are currently included in the program. These include five 'Control' sites, three in Hornes Creek and two in Moore Creek (Figure 1, Figure 2, Table 2). Seven 'Impact' sites are within the Teatree Hollow stream network and one Impact site is in a tributary of the Bargo River (Figure 1, Figure 2, Table 2). Impact sites are those that are located within a 600 m buffer of longwall mining and are therefore considered at risk of potential impacts from mining operations, including subsidence. Control sites are located outside of this 600 m area, thus outside of predicted subsidence impacts.

Teatree Hollow is the primary waterway identified as being at risk of impacts under the Longwall (LW) S1A-S6A Extraction Plan (Tahmoor Coal, 2022, 2023).

Six of the current impact sampling sites correspond to pools used for surface water level, flow and water quality monitoring as part of the Tahmoor South Domain Water Management Plan (WMP), with analysis and reporting completed by ATC Williams. Corresponding site codes are listed in Table 2.

Table 2 outlines the site positions and planned aquatic macroinvertebrate sampling methods at each site as part of the A series monitoring.

Table 2 Site positions and sampling methods for the A series aquatic monitoring program.

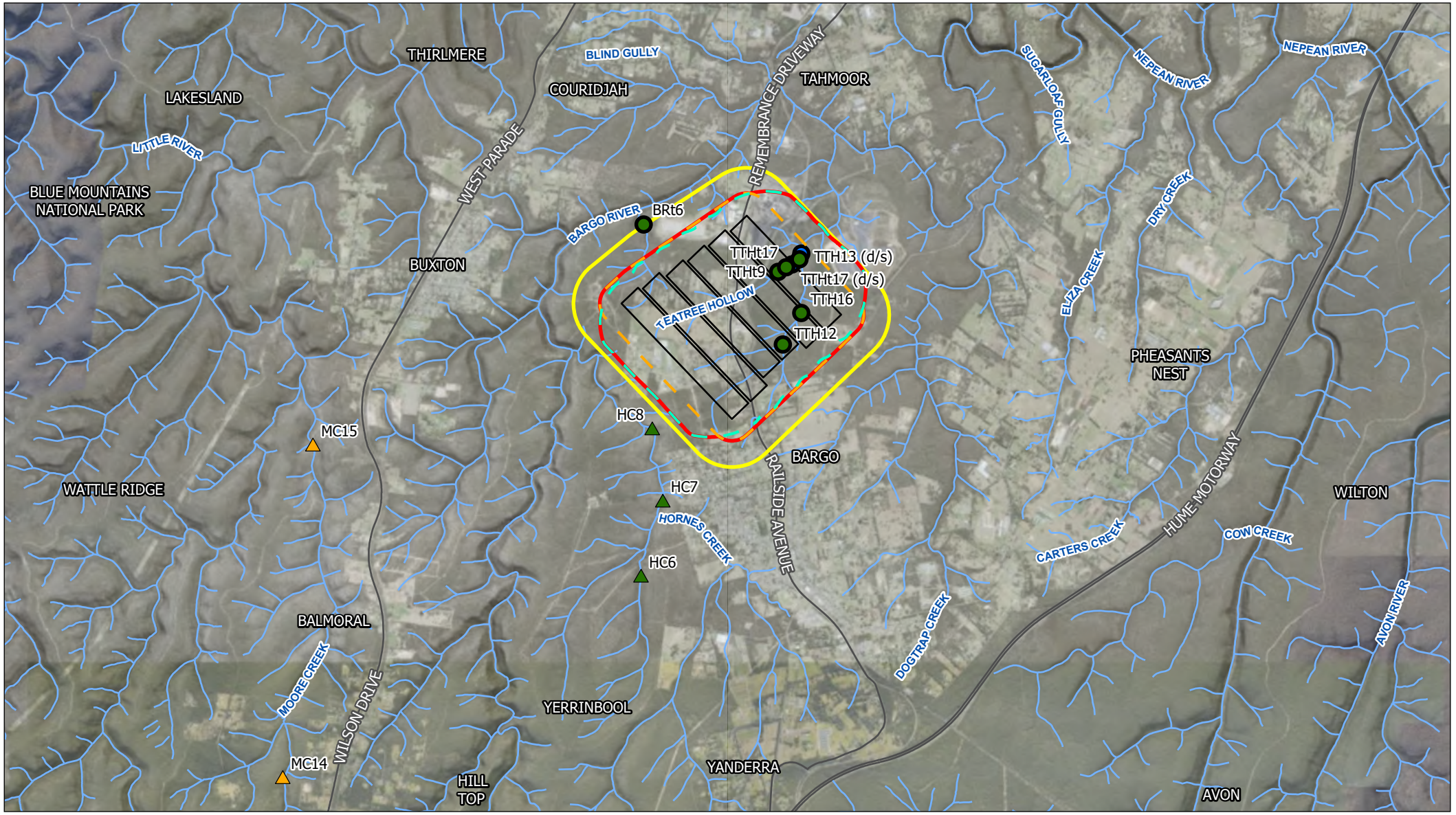
Site Code	Surface Water Sampling Pool Code	Waterway	Planned Sampling Methods	Monitoring Period	Easting	Northing
Impact						
TTHt9	TT9	Teatree Hollow tributary	AUSRIVAS and quantitative	Spring 2023 - Spring 2024	277146	6206543
TTHt17	TT12	Teatree Hollow tributary	AUSRIVAS and quantitative	Spring 2022 - Spring 2024	277246	6206601
TTHt17 (d/s)	-	Teatree Hollow tributary	AUSRIVAS	Autumn 2023 - Spring 2024	277315	6206638
TTH12	TT2	Teatree Hollow	AUSRIVAS and quantitative	Spring 2019 - Spring 2024	277204	6205632
TTH16	TT3	Teatree Hollow	AUSRIVAS and quantitative	Spring 2022 - Spring 2024	277432	6206040

Site Code	Surface Water Sampling Pool Code	Waterway	Planned Sampling Methods	Monitoring Period	Easting	Northing
TTH13 (formerly TTH11)	TT13	Teatree Hollow	AUSRIVAS and quantitative	Autumn 2020 - Spring 2024	277411	6206699
TTH13 (d/s)	-	Teatree Hollow	AUSRIVAS	Autumn 2023 - Spring 2024	277436	6206771
BRt6	BRt6 is upstream of pool BR6	Bargo River tributary	AUSRIVAS and quantitative	Spring 2023 - Spring 2024	275464	6207135
Control						
MC14	-	Moore Creek	Quantitative	Autumn 2020 - Spring 2024	270959	6200225
MC15	-	Moore Creek	Quantitative	Spring 2019 - Spring 2024	271328	6204392
HC6	-	Hornes Creek	AUSRIVAS and quantitative	Spring 2023 - Spring 2024	275438	6202753
HC7	-	Hornes Creek	AUSRIVAS and quantitative	Spring 2019 - Spring 2024	275705	6203691
HC8	HC9	Hornes Creek	AUSRIVAS and quantitative	Spring 2019 - Spring 2024	275575	6204588

Following review of the field data from Spring 2024, the Autumn 2024 rapid and full aquatic monitoring reports (Niche, 2024b & Niche, 2024c) and the BMP (Tahmoor Coal, 2024a), it was found that the site coordinates for site TTH13 are not consistent between recent documents. The site assessment for Spring 2024 was initially undertaken at the coordinates listed in the BMP Version 5 (Tahmoor Coal, 2024) and the Autumn 2024 aquatic monitoring report (Niche, 2024b) (easting 277437, northing 6206801).

Time series photographs from TTH13 confirm that the previously used location matches that reported in the Autumn 2024 rapid report (Niche, 2024c), at easting 277411 and northing 6206699, which is shown in Figure 1 and Figure 2. This area of the waterway was inspected in Spring 2024 during terrestrial ecology monitoring and was transversed for access to Teatree Hollow tributary, and can be confirmed to have been dry during the Spring 2024 survey. Photographs from the approximate location were taken and are used to complete the detailed habitat assessment in Appendix A, however further habitat description data will be collected for this location during the Autumn 2024 survey.

The BMP (Tahmoor Coal, 2024) should be updated with the accurate coordinates (easting 277411, northing 6206699).



A-series Aquatic Monitoring Sites Overview

Tahmoor South, NSW

Figure 1

Project Code: 304501634-GS-002
Drawn By: KS, Checked By: MM
Date: 2025-08-06
Revision: 02

Stantec

Legend

- Study Area
- Watercourse
- Road

Aquatic Monitoring Site

- Control- Quantitative
- Control- Quantitative and AUSRIVAS
- Impact- AUSRIVAS
- Impact- Quantitative and AUSRIVAS

- 600 m Longwall Buffer
- Longwall
- Predicted 20mm Total Subsidence
- 35 Degree Angle of Draw

Notes:
1. Map displayed in GDA2020 MGA Zone 56

References:
1. Aerial imagery supplied by MetroMap (September 2021) and ESRI
2. Watercourse and Roads (NSW SS)

0 0.5 1 1.5 2 Kilometers

Scale at A4: 1:65,000



\\au2012-ntap01_cfs02\shared_projects\304501634\gis\mapdocs\Aquatic Ecology Workspace - KS\304501634_TahmoorEcologicalMonitoring.aprx | 304501634-GS-002 A-Series Aquatic Monitoring Sites Overview | Last updated 2025-08-06 By: jmccutchen

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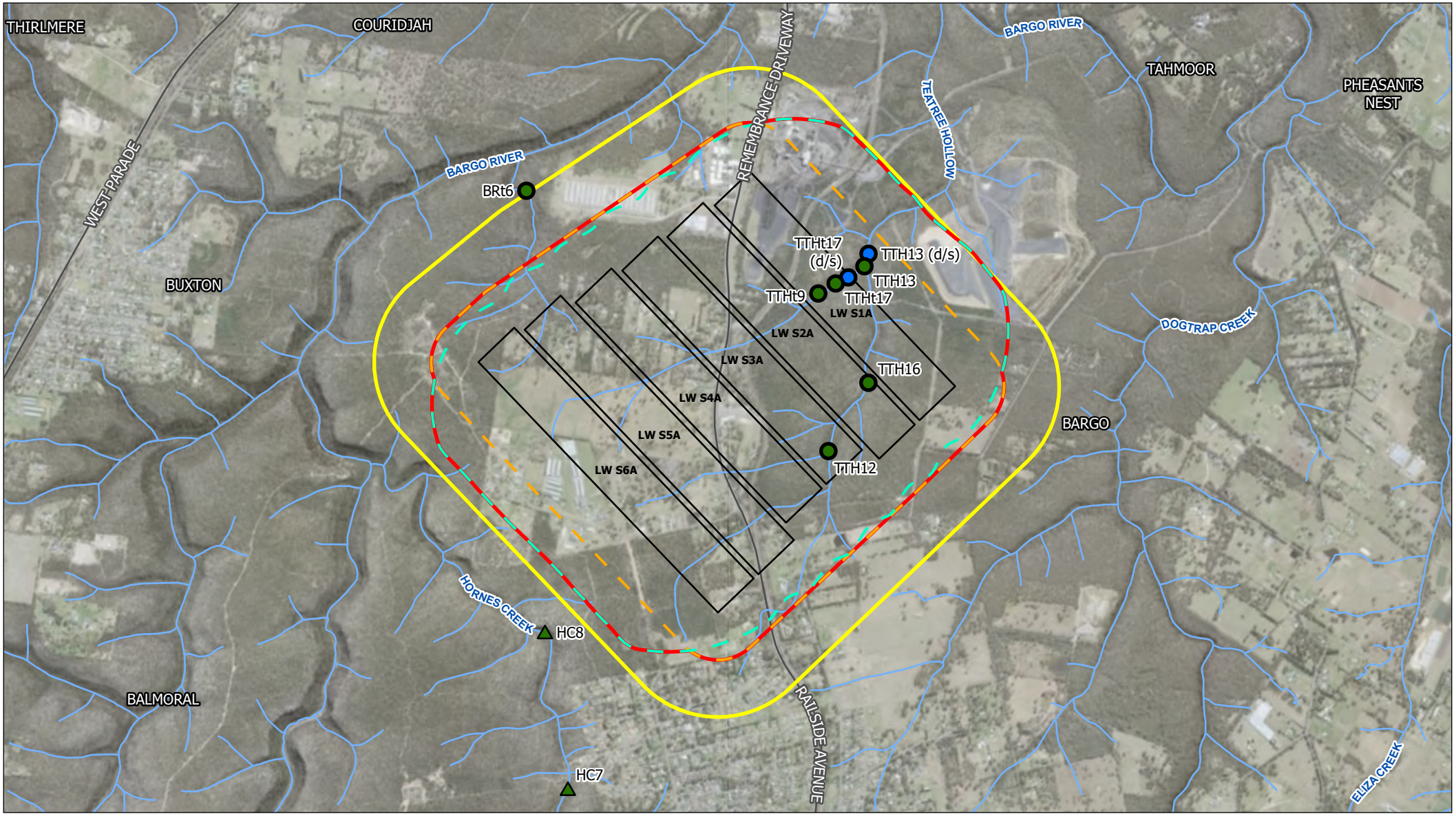

A-series Aquatic Impact Monitoring Sites

Tahmoor South, NSW

Figure 2

Project Code: 304501634-GS-003
Drawn By: KS, Checked By: MM
Date: 2025-08-06
Revision: 02

Stantec

Legend

- Study Area
- Watercourse
- Road

Aquatic Monitoring Site

- Control- Quantitative
- Control- Quantitative and AUSRIVAS
- Impact- AUSRIVAS
- Impact- Quantitative and AUSRIVAS

- 600 m Longwall Buffer
- Longwall
- Predicted 20mm Total Subsidence
- 35 Degree Angle of Draw

Notes:
1. Map displayed in GDA2020 MGA Zone 56

References:
1. Aerial imagery supplied by MetroMap (September 2021) and ESRI
2. Watercourse and Roads (NSW SS)

0 250 500 750 1,000 Meters

Scale at A4: 1:30,000



\\au2012-ntap01_cifs02\shared_projects\304501634\gis\mapdocs\Aquatic Ecology Workspace - KS\304501634_TahmoorEcologicalMonitoring.aprx | 304501634-GS-003 A-Series Aquatic Impact Monitoring Sites | Last updated 2025-08-06 By: jmcculchen

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2.2 Rainfall and Surface Water Assessment

Monthly median rainfall data (1966 – 2021) was obtained from the Bureau of Meteorology (BoM) station 68166 (Buxton – Amaroo). This station no longer records data, therefore daily rainfall data provided by Tahmoor Coal recorded at the stockpile weather station within the Tahmoor Colliery surface facilities (-34.255135, 150.575761) was also reviewed. The stockpile weather station data was used to review rainfall totals immediately preceding field surveys and to compare conditions during the survey year (in this case, 2024) to long term patterns.

Previously, interpolated Scientific Information for Landowners (SILO) grid point -34.25, 150.60 rainfall data have been used for this review, however the on-site measurements provided by the stockpile weather station are assumed to be more locally specific.

Tahmoor Coal monitor groundwater, surface water and subsidence in accordance with the WMP across a comprehensive network of monitoring locations. The findings of the most recent surface water review undertaken to fulfil the WMP (ATC Williams, 2024) for relevant sites (Table 2) were additionally reviewed and summarised to assist in the interpretation of biological data.

2.3 Aquatic Habitat Assessment

An aquatic habitat assessment was conducted at each site in accordance with AUSRIVAS protocols (Turak et al., 2004). This assessment describes the quality and form of aquatic habitat, focussing on key indicators such as level of shading, condition of riparian vegetation, surrounding land use and natural substrata, as detailed in Turak et al. (2004).

The assessment was aided by the Riparian Channel and Environmental Inventory (RCE) method, developed by Peterson (1992) and modified for Australian conditions by Chessman et al. (1997). This assessment was first incorporated in the current Spring 2024 survey. The RCE scores physical and biological characteristics of the waterway to give a general understanding of waterway condition, level of modification and allows for changes in physical form of waterways to be tracked over time. The modified RCE (Chessman et al., 1997), uses 13 descriptors of riparian and in-stream morphology and habitat, each scored from 1 (most modified) to 4 (least modified) (Appendix B). These scores are added to give an indication of the level of modification of the channel, with higher scores (closer to a maximum of 52) representing undisturbed, natural stream habitats.

RCE scores are reported for dry sites as physical habitat descriptors provide useful data against which to compare the results of future surveys when water may be present, and can indicate the capacity for those sites to provide aquatic habitat.

Any visual indications of environmental change that may be indicative of subsidence impacts such as iron staining, pool water loss, surface deformation and flocculant/leachate were also recorded.

Photographs of sites facing both upstream and downstream were taken at each site to build on a visual timeseries.

2.4 Water Quality

In-situ water quality was sampled at each site in accordance with AS/NZS 5667.1:1998 'Water quality - Sampling - Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples'. Two measurements were collected using a calibrated handheld YSI water quality probe from a flowing section of the waterway between the water surface and 0.5 metres depth, where possible. Where the water was deeper than 1 metre, the second measurement was taken at depth. Water quality measurements were collected prior to macroinvertebrate sampling.

The following water quality variables were recorded:

- Temperature (°C)
- Electrical conductivity (EC) (µS/cm)
- pH
- Alkalinity using a standard titration kit (mg CaCO3/L)
- Salinity (ppt)
- Turbidity (NTU)
- Dissolved oxygen (DO) (mg/L and %sat)
- Oxidation reduction potential (ORP) (mV)

The measurements at each site were averaged and compared to the Australian and New Zealand Environment and Conservation Council (ANZECC & ARMCANZ, 2000) physical and chemical stressors for protection of slightly upland aquatic ecosystems in South-Eastern Australia default guideline values (DGVs), as recommended by the Australian and New Zealand Guidelines (ANZG).

2.5 Macroinvertebrate Surveys

2.5.1 AUSRIVAS

2.5.1.1 Field Sampling

Aquatic macroinvertebrates were sampled at each site using the AUSRIVAS rapid assessment methodology (Turak et al., 2004). A single edge sample was collected at all sites containing water as no riffle habitat was present at any site. Each sample was collected from pool edges for a cumulative length of ten metres, representing each of the structural habitats present within the edge zone. The edge substratum was disturbed to dislodge animals. A dip net (250 µm mesh size) was swept through the water to catch dislodged animals. The dip net was used to agitate and scoop up material from vegetated river edges.

Each sample was rinsed from the net onto a white sorting tray from which macroinvertebrates were live-sorted on site, following the AUSRIVAS protocol, with the aim of collecting the maximum possible number of macroinvertebrate taxa. The macroinvertebrates collected at each site were preserved in a labelled jar containing a 70% ethanol solution for laboratory identification.

The chemical and physical variables required for running the AUSRIVAS predictive model were recorded including water alkalinity, modal depth and width of the stream, percentage bedrock, boulder or cobble and geographical coordinates. The distance from stream source, altitude, land-slope and rainfall predictor variables were determined using desktop data sources.

2.5.1.2 Laboratory Identification

Samples were processed in Stantec's in-house laboratory and identified to family level with the exception of Oligochaeta and Polychaeta (to Class), Ostracoda (to Subclass), Nematoda and Nemertea (to Phylum), Acarina (to Order) and Chironomidae (to Subfamily). If possible, mayflies, caddisflies and stoneflies were identified to genus level as this taxonomic resolution may be more appropriate to detection of changes in aquatic habitat and water quality (i.e., some genera may respond more rapidly to changed water quality than others).

An extensive reference collection of aquatic macroinvertebrates in conjunction with taxonomic keys were used to identify macroinvertebrates (Cranston, 1995; Cranston, 1999; CSIRO, 1991; Dean & Suter, 1996; Dean et al., 2004; Gooderham & Tsyrlin, 2002; Gunn et al., 1999; Hawking, 1995; Hawking & Theischinger, 1999; Hawking, 2000; Horwitz et al., 1995; Pinder & Brinkhurst, 1994; Smith, 1996; Theischinger, 2000 and Williams, 1980).

2.5.1.3 Data Analysis

Samples collected using AUSRIVAS protocol were analysed using the predictive models for NSW edge habitats (Turak et al., 2004). The AUSRIVAS model predicts the number and type of aquatic macroinvertebrate fauna expected to occur at a site in the absence of disturbance or environmental stressors, such as pollution or habitat degradation. The AUSRIVAS NSW Spring model was used to determine the Observed to Expected ratio (OE50), Stream Invertebrate Grade Number Average Level score (SIGNAL2), taxon richness and EPT (Ephemeroptera, Plecoptera and Trichoptera) richness at each site.

OE50 Ratio

The OE50 ratio of each site was calculated by determining the number of macroinvertebrate taxa observed at a site (NTC50) in relation to the number of taxa expected to occur at that site (NTE50), based upon the reference site data generated by the predictive model. Only macroinvertebrate taxa with a predicted probability of occurrence greater than 50% were used by the model. The OE50 ratio provides an indication of biological impairment at the site based on the 'band' the ratio falls in (Table 3).

Table 3 Interpretation of OE50 ratio bands

Score	Band	Impairment Indication
>1.0	X	Higher biologically diversity at the test site than the reference site
0.8 – 1.0	A	Similar biologically diversity at the test site and the reference site
0.6 – 0.8	B	Biological diversity significantly impaired at the test site in comparison to the reference site
0.4 – 0.6	C	Biological diversity severely impaired at the test site in comparison to the reference site
<0.4	D	Biological diversity extremely impaired at the test site in comparison to the reference site

SIGNAL2 Score

The SIGNAL2 score of each site was calculated by assigning grade numbers to each macroinvertebrate taxon based largely on their response to a range of environmental conditions (Chessman, 2003). Grade numbers range from one to ten, with a value of one indicating a taxon tolerant to pollution and a value of ten indicating a taxon sensitive to pollution. The sum of all grade numbers of macroinvertebrates found at a site was divided by the total number of taxa recorded at that site for which SIGNAL2 grades are available. SIGNAL2 scores provide the average sensitivity of macroinvertebrates occurring at a site to present an indication of water quality at the site (Table 4).

Table 4 Interpretation of SIGNAL2 scores

SIGNAL2 Score	Water Quality Indication
> 6	Not Impaired
5 – 6	Mildly impaired
4 – 5	Moderately impaired
< 4	Severely impaired

Taxon Richness

The taxon richness of each site was determined by calculating the total number of macroinvertebrate taxa present to provide an indication of ecosystem health.

EPT Richness

The EPT richness was determined at each site by calculating the number of distinct taxa present from orders Ephemeroptera (mayflies), Plecoptera (stoneflies) and Trichoptera (caddisflies) (EPT taxa). EPT taxa are sensitive to many pollutants in the stream environment, with mayflies considered particularly sensitive to salinity (Chadwick, 2001). Large numbers of EPT taxa are usually more representative of healthy conditions, whereas few or none of these groups can indicate more impaired conditions.

2.5.2 Quantitative Sampling

2.5.2.1 Field Sampling

Aquatic macroinvertebrates were sampled from three replicate random pool edges at each site within two metres of the bank from a depth of 0.2 metres (m) to 0.5 m. Macroinvertebrates were collected using a battery-operated suction pump placed over the substratum to draw water through a 250 µm mesh net for one minute at each sampling location. The pump system was designed after Brooks (1994) and standardised the area of substratum sampled during each replicate to 100 cm^2 (10 cm x 10 cm square). The sample was washed thoroughly over the sieve and all material retained was preserved in a labelled jar containing 70% ethanol solution for laboratory sorting and identification.

2.5.2.2 Laboratory Processing and Identification

Each sample was transferred to Stantec's in-house laboratory. Following previous methods for the monitoring program, each sample was rinsed through a coarse (5 mm) sieve to remove larger material (leaves and wood debris etc.) (coarse fraction). Each piece of debris was washed, checked for macroinvertebrates and the fraction placed in a separate container. The remaining material was rinsed over a 1 mm sieve (medium fraction) placed on top of a 250 µm sieve (fine fraction) and each fraction placed in separate containers.

The whole coarse fraction was searched using low power magnification and the whole medium fraction using a binocular microscope at 40X magnification. The fine fraction was elutriated to separate the heavier sand particles and the lighter debris and macroinvertebrates. The lighter portion was weighed then an approximate 5 ml subsample was taken (if the whole portion is greater than 5 ml), weighed and sorted under the microscope at 40X magnification. The relative weights were used to estimate the number of animals in the whole fine fraction to minimise laboratory processing time.

Species identification methodology for quantitative samples was consistent with that of AUSRIVAS samples (Section 2.5.1.2). This included the exclusion of crustaceans Ostracoda, Copepoda and Cladocera from the analysis, per the methods used to date.

2.5.2.3 Data Analysis

Data analysis for quantitative sampling was undertaken using three primary macroinvertebrate datasets collected using the quantitative suction sampler:

- Total Abundance (all taxa combined) – sum of all individuals across all taxa (except Cladocerans, Copepods and Ostracods) specified in section 2.5.1.2 (univariate – single indicator).
- Taxon Richness – sum of taxa (except Cladocerans, Copepods and Ostracods) identified to the taxonomic levels specified in section 2.5.1.2 (univariate – single indicator).
- Multivariate Assemblage Composition – number of individuals of each taxon (identified to the taxonomic levels specified in section 2.5.1.2) recorded at any time during the monitoring program.

Permutational analysis of variance (PERMANOVA) and other related procedures were performed on each of these three datasets (as applicable) using the Primer 7 (PERMANOVA+) statistical software package (Anderson et al., 2008). Resemblance matrices for univariate analyses (abundance and taxonomic richness) were based on Euclidean distances, while the matrix for the multivariate analysis (assemblage composition) was based on Bray-Curtis similarities. Raw data for the assemblage composition dataset were fourth-square-root transformed to down-weight the influence of more abundant taxa, while data for univariate analyses were not transformed.

Unlike previous survey reports, no quantitative macroinvertebrate data were able to be collected from any of the six Impact sites included in the analysis (i.e., TTHt9, TTH12, TTH13, TTH16,TTHt17 and BRt6) during the Spring 2024 sampling survey (see results in section 3). Therefore, the PERMANOVA design was restricted to analysing Control creek data only in the context of providing information about Spring 2024 macroinvertebrate data and comparisons with previous surveys. Given this, the



'Treatment' factor in PERMANOVA designs (i.e., Impact vs. Control) applied as part of previous sampling survey reports was excluded for this Spring 2024 report. However, a 'Season' factor has been included to provide the opportunity to investigate for the influence of climatic patterns on macroinvertebrate communities in the two Control creeks. The five factors in the analyses were:

- Period (PE) – 2 levels (Before and During); fixed, orthogonal to Season and Creek
- Season (SE) – 2 levels (Autumn and Spring); fixed, orthogonal to Period and Creek
- Creek (CR) – 2 levels (Control creeks Hornes Creek and Moore Creek); fixed, orthogonal to Period and Season
- Survey (SU) – 11 levels (six Before surveys from Spring 2019 to Autumn 2022, five During surveys from Spring 2022 to Spring 2024); random, nested in the PE x SE interaction
- Site (SI) – 5 levels (3 levels in Hornes Creek and 2 levels in Moore Creek); random, nested within Creek. Three replicate samples of the macroinvertebrate community were taken at each site (n = 3).

The significance level was set at $p \leq 0.05$ for all statistical tests. Any significant results identified for interaction and/or main effects (factor) terms of interest were further examined via PERMANOVA pairwise comparisons where appropriate. Where the significance level of the lowest-level interaction term exceeded $p = 0.25$, the degrees of freedom and sums of squares for the term were pooled with those of the Residual term to increase the statistical power of the remaining tests. In cases where the number of unique permutations for a particular PERMANOVA term was less than 100, the Monte Carlo probability value (P(MC)) was substituted to assess the significance of the test, as outlined by Anderson et al. (2008).

Data for abundance and taxonomic richness were summarised and presented as trend-line graphs (mean ± standard error) to examine spatial and temporal patterns. Patterns of differences in assemblage composition (multivariate) were further explored using Principal Coordinates Analysis (PCO), with vector overlays based on the Pearson's Correlation Coefficients representing taxa that are the strongest drivers of significant differences detected by multivariate PERMANOVA.

2.6 Limitations

The physico-chemical water quality data collected provide an indication of conditions at the time of sampling. Some of these indicators are typically variable and may change considerably over short time periods. These parameters are highly sensitive to stochastic events (e.g., high rainfall periods). As such, these physico-chemical readings are used to inform and support the interpretation of the biological analyses only.

Low SIGNAL2 scores may not necessarily be indicative of water pollution and should be interpreted with caution. For example, low SIGNAL2 scores may arise due to naturally low pH or other natural site-specific characteristics unrelated to any anthropogenic disturbance. Taxa with low SIGNAL2 grades are also a component of natural macroinvertebrate communities in the absence of any anthropogenic disturbance.

The RCE scoring system provides a simplified representation of aquatic habitat and does not fully capture its complex and dynamic nature. The inventory assigns equal weight to each descriptor, which may mask certain habitat features and differences among sites. Therefore, RCE scores should be interpreted as an additional tool used in an overall site assessment rather than a comprehensive evaluation.

AUSRIVAS was designed to provide a rapid assessment of stream health using a semi-quantitative methodology. While derived indices would respond to changes in aquatic habitat and water quality potentially linked with mining, they provide relatively coarse indicators of subtle changes in stream health. Therefore, the current monitoring program includes quantitative sampling, which is a more robust and sensitive method of identifying potential impacts associated with mining.

Due to widespread dry conditions within the impact area, the Spring 2024 quantitative macroinvertebrate analysis does not include Impact sites. Given the absence of macroinvertebrate samples from these sites, the experimental design was adjusted by removing the ‘Treatment’ factor (Impact vs. Control) from the PERMANOVA analysis. Instead, the analysis focused solely on Control sites, using temporal and spatial factors to assess trends in macroinvertebrate communities in these sites only.

3 Results

3.1 Rainfall and Surface Water Assessment

The months of August to November preceding the Spring 2024 survey were characterised by rainfall close to the historical monthly medians (Table 5). There was high rainfall recorded from April to June 2024 (Table 5).

The Tahmoor Colliery stockpile weather station recorded a total of 4.5mm of rain in the two weeks leading up to the Spring surveys, and a total of 30mm during the surveys (20mm of which fell on one day, 17th Nov) (Figure 3).

These results show that the locality was experiencing typical rainfall during the four months preceding the surveys.

Table 5 Rainfall data for 2024 from BoM and Tahmoor Colliery

Month	Median Monthly Rainfall (1966-2021) (mm) [1]	Total Monthly Rainfall (2024) (mm) [2]
January	81.3	51
February	76.3	100.5
March	81.2	30
April	39.2	201.5
May	32.4	129
June	38.8	142
July	21.7	18
August	26.3	23
September	38.8	31
October	50.8	52
November (up to 22 Nov 2024, end of Spring survey)	67.0	33
[1] BoM station 68166 [2] Tahmoor Coal stockpile weather station (-34.255135, 150.575761)		

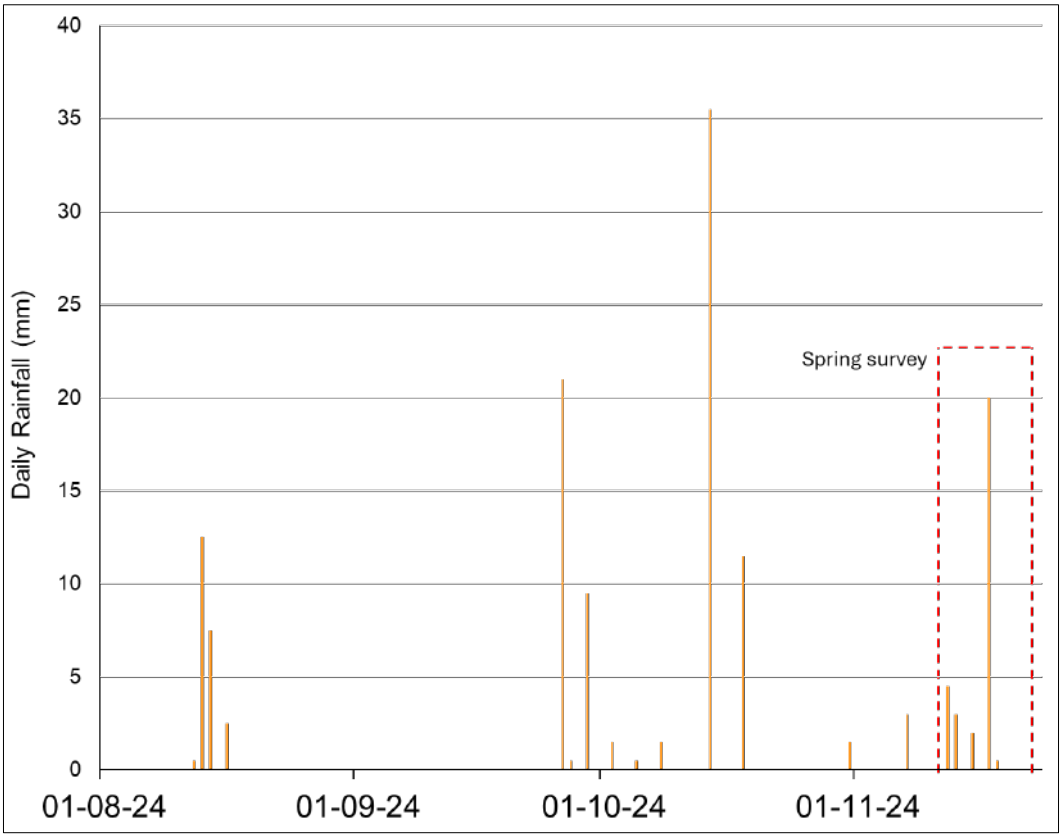

Figure 3 Daily rainfall totals for 2024 up to November 22, recorded at Tahmoor Colliery stockpile weather station.

Table 6 summarises the most recent surface water review (ATC Williams, 2024) for the A series longwalls. The review shows pools have undergone declines in water level due to direct and indirect effects of mining-related fracturing. As outlined in Section 5.2 of ATC Williams (2024), pool water levels in mining affected sections of Teatree Hollow increase temporarily following rainfall, but some pools do not retain this water (Table 6).

Table 6 Surface water review summary (ATC Williams, 2024)

Site Code	Surface Water Sampling Pool Code	Summary Conclusions (using data from 1 Jan 2024 – 30 Jun 2024) *
Teatree Hollow tributary		
TTHt9	TT9	• Indirect impact to pool water level (Table 8, ATC Williams, 2024) • A maximum level 2 trigger exceedance due to increase in the rate of water level decrease in comparison to historical conditions. Effects occurring in combination with prevailing climatic conditions.
TTHt17	TT12	• Direct impact to pool water level, physical features (fractures) and presence of iron staining (Table 8, ATC Williams, 2024)

Site Code	Surface Water Sampling Pool Code	Summary Conclusions (using data from 1 Jan 2024 – 30 Jun 2024) *
		• A maximum level 2 trigger exceedance due to atypical water level decline related to previously reported mining-related fracturing upstream and downstream. Effects occurring in combination with prevailing climatic conditions.
Teatree Hollow		
TTH12	TT2	• Indirect impact to pool water level and physical features (fractures) (Table 8, ATC Williams, 2024) • A maximum level 2 trigger exceedance due to mining related fracturing immediately upstream and atypical decline in water level. Effects occurring in combination with prevailing climatic conditions.
TTH16	TT3	• Indirect impact to pool water level (Table 8, ATC Williams, 2024) • A maximum level 3 trigger exceedance due to mining related fracturing in the vicinity of the pool, causing upstream diversion of flow and atypical decline in water level.
TTH13	TT13	• Indirect impact to pool water level (Table 8, ATC Williams, 2024) • A maximum level 2 trigger exceedance due to upstream mining related fracturing. Declines in water level are related to the cessation of surface flow in Teatree Hollow tributary due to fracturing. Effects occurring in combination with prevailing climatic conditions
*Trigger levels refer to those used in the surface water review and are different to the aquatic TARP.		

3.2 Aquatic Habitat Assessment

Aquatic habitat descriptions and photographs for all 13 sites are presented in Appendix A. Photographs from previous surveys are presented if available.

Six out of eight Impact sites were dry and not sampled for water quality or macroinvertebrates (either AUSRIVAS or quantitative sampling). TTH13(d/s) and BRt6 contained small, isolated pools of water from which water quality readings were taken (Appendix A). No other pools containing water were found nearby within Teatree Hollow. An AUSRIVAS sample was collected at TTH13(d/s), providing Impact site data in the absence of other pools, however BRt6 did not contain sufficient aquatic habitat for the completion of AUSRIVAS or quantitative macroinvertebrate sampling. Control sites all contained sufficient water for the completion of the required sampling.

Sites generally shared similar aquatic habitat features with other sites within the same waterway and are grouped below accordingly.

Teatree Hollow and Teatree Hollow Tributary – 'Impact' Creeks

Teatree Hollow and Teatree Hollow Tributary are narrow, moderately shaded waterways with low banks and a predominantly bedrock substratum. Riparian vegetation comprises mainly native species including *Acacia longifolia, Eucalyptus piperita*, *Melaleuca linariifolia*, *Callistemon* sp., *Lomandra* sp., rushes, grasses and sparse bracken fern. Dense groundcover along the banks creates overhanging habitat along with fallen logs. Erosion, slumping banks and fallen trees was observed along Teatree Hollow upstream of TTH12 (between TTH12 and riparian vegetation monitoring site i02) and at the junction of the two streams, near TTH13. This could be due to a range of factors, such as high rainfall events in recent years.

All sites along this waterway have experienced loss of pool water during and prior to Autumn 2024 and Spring 2024. TTH12 in particular has experienced a major reduction in aquatic habitat since Autumn 2024 (Appendix A). This includes complete draining of a large, deep pool that would not be expected to occur due only to natural conditions, given consistent rainfall throughout 2024. Over this time TTH13 (d/s) has retained only a small pool with poor water quality.

Sites within the Teatree Hollow stream network scored between 37 and 45 out of a possible 52 using the RCE method. The scores are reflective of the relatively undisturbed channel in a physical sense and predominantly native riparian vegetation, but a lack of functioning aquatic habitat due to mining-induced reductions in pool water levels.

Bargo River Tributary – 'Impact' Creek

Bargo River Tributary is a narrow waterway (modal width of 1m) in a steep valley with cliffs on one side. The waterway is moderately shaded by vegetation and cliffs. Riparian vegetation includes Eucalypts, with ferns, rushes and grasses dense along the stream edges. The streambed comprises sand, boulders and cobbles.

Water was confined to a single small pond at the time of the Spring 2024 survey (Appendix A), which was likely rainwater. The site was also dry in Autumn 2024 though contained sufficient water for AUSRIVAS sampling in Spring 2023 when first added to the monitoring program.

Monitoring results from Bargo River Tributary pools were excluded from the most recent surface water monitoring review by ATC Williams (2024) due to these being outside of the predicted subsidence zone for longwalls LW S1A – S3A. Analysis of the backdated pool observation data from surface water reviews would provide further understanding of long-term pool behaviour in Bargo River Tributary. A preliminary analysis of this data (ATC Williams, 2025) suggests that dry conditions within this tributary are expected in periods of low rainfall.

BRt6 scored 44 out of 52 using the RCE method, indicating intact riparian vegetation and diverse microhabitats. Aquatic habitat was limited due to dry conditions.

Moore Creek – 'Control' Creek

Moore Creek sites contain varying substrata with MC14 having sandy sediments, cobbles and boulders and MC15 being more dominated by bedrock. The creek varies in width between 2-5m across the two sites. Riparian vegetation is characterised by eucalypts, and smaller species such as *Acacia longifolia* and *Callistemon* sp. in moderate density. Bank edges are dominated by rushes,



grasses and some overhanging ferns. Native fish species were observed in this creek, with *Galaxias* sp. and Australian smelt *(Retropinna semoni)* identified at MC14. Moore Creek sites had low water levels and minimal flow between pools, but maintained substantial water within pools. Based on photographs (Appendix A), water levels in Spring 2024 appear to have been lower than is typical for this creek. Other than the effects of bushfires in 2019/2020 on vegetation, no other substantial physical change through time is apparent in these sites based on the available photographic record.

MC14 scored 43 and MC15 scored 48 out of a possible 52 using the RCE method. These scores are reflective of an intact riparian zone with functioning aquatic habitat, but with a narrow, shallow bedform and lack of in-stream retention (e.g. log, stick dams).

Hornes Creek – 'Control' Creek

Hornes Creek sites are characterised by similar riparian vegetation observed in the other waterways, with native species dominating. The substratum is relatively consistent and is characterised by bedrock with a thin layer of fine sediment in some sections. The waterway is moderately shaded with accumulations of organic debris, which have a damming effect in some locations. Overhanging vegetation, especially *Lomandra* sp. is common. Site HC7 showed signs of lower water quality than other Control sites, including surface spots, filamentous algae, medium turbidity and possible evidence of iron staining (Appendix A). Images from the monitoring program's history suggest that orange discolouration indicating possible iron staining around HC7 has been present since 2019. As this site is not within the predicted subsidence zone, it is likely that iron staining is a natural process in this waterway.

The photographic record shows that flow rate is variable in this site and that the physical habitat has not noticeably changed throughout the monitoring period, except for during bushfires in 2019/2020.

Hornes Creek sites scored between 40 and 47 out of a possible 52 using the RCE method. These scores, similarly, to Moore Creek, are reflective of an undisturbed riparian zone with functioning aquatic habitat, but with a shallow streambed and some microhabitats missing.

Aquatic Habitat Trends

Table 7 summarises which sampling was completed for each site and how many consecutive surveys individual sites have been dry for. Following the Spring 2024 survey, two sites (TTHt17 and TTH16) have been dry for four consecutive surveys. One site, TTHt9, has been dry for three consecutive surveys. Three sites, TTHt17(d/s), TTH13 and BRt6 have been dry for two consecutive surveys.

Table 7 Monitoring completed by Stantec in 2024 and total number of consecutive dry periods for each site.

Site Code	Waterway	Autumn 2024 sampling	Spring 2024 sampling	Number of consecutive dry periods
Impact				
TTHt9	Teatree Hollow tributary	**Dry**	**Dry**	3
TTHt17	Teatree Hollow tributary	**Dry**	**Dry**	4
TTHt17(d/s)	Teatree Hollow tributary	**Dry**	**Dry**	2
TTH12	Teatree Hollow	AUSRIVAS, quantitative, water quality	**Dry**	1
TTH16	Teatree Hollow	**Dry**	**Dry**	4
TTH13	Teatree Hollow	**Dry**	**Dry**	2
TTH13(d/s)	Teatree Hollow	AUSRIVAS, water quality	AUSRIVAS, water quality	0
BRt6	Bargo River tributary	**Dry**	Water quality, **Dry***	2
Control				
MC14	Moore Creek	Quantitative, water quality	Quantitative, water quality	0
MC15	Moore Creek	Quantitative, water quality	Quantitative, water quality	0
HC6	Hornes Creek	AUSRIVAS, quantitative, water quality	AUSRIVAS, quantitative, water quality	0
HC7	Hornes Creek	AUSRIVAS, quantitative, water quality	AUSRIVAS, quantitative, water quality	0
HC8	Hornes Creek	AUSRIVAS, quantitative, water quality	AUSRIVAS, quantitative, water quality	0
*BRt6 was dry except for a small, shallow pond that did not constitute sufficient habitat for macroinvertebrate sampling. Only water quality data was collected.				

3.3 Water Quality

Water quality results from Spring 2019 – Spring 2024 are presented in Table 8. The key findings were:

- TTH13(d/s) and BRt6 contained small amounts of pooled water which were sampled. Impact sites were otherwise dry.
- Turbidity above the upper DGV was recorded at Impact site TTH13 (d/s).
- DO (%) was below the lower DGV at Impact sites TTH13(d/s) and BRt6. DO was below the lower DGV range at Control sites MC15, HC6 and HC8 though to a lesser degree, however by a smaller margin.
- pH was below the DGV range at Impact site BRt6 and Control sites MC14 and MC15.
- Alkalinity levels varied between monitoring sites. Alkalinity at Impact site TTH13(d/s) was higher than in previous surveys. Alkalinity at Control sites MC14 and MC15 was higher than in previous surveys, while Hornes Creek sites had lower alkalinity than in previous surveys.

Other physico-chemical parameters were within the DGV range for slightly disturbed upland rivers in NSW.

Table 8 In-situ water quality results (2019-2024) (DGVs exceeded shown in shaded cells)

	Impact								Control				
	Teatree Hollow				Teatree Hollow tributary			Bargo River tributary	Moore Creek		Hornes Creek		
Site	**TTH12**	**TTH16**	**TTH13**	**TTH13(d/s)**	**TTHt9**	**TTHt17**	**TTHt17(d/s)**	**BRt6**	**MC14**	**MC15**	**HC6**	**HC7**	**HC8**
Temperature (°C)													
Spring 2019	17.70	-	Dry	-	-	-	-	-	Dry	18.64	-	19.20	20.27
Autumn 2020	20.34	-	21.16	-	-	-	-	-	17.99	21.29	-	20.64	20.76
Spring 2020	16.09	-	15.36	-	-	-	-	-	-	-	-	15.05	14.84
Autumn 2021	17.91	-	17.10	-	-	-	-	-	17.50	18.09	-	17.31	17.98
Spring 2021	13.15	12.98	12.80	-	-	12.71	-	-	17.50	12.12	-	14.22	14.80
Autumn 2022	18.15	18.29	19.06	-	-	20.12	-	-	18.58	18.97	-	19.64	19.97
Spring 2022	15.85	16.27	19.80	-	-	17.60	-	-	16.27	17.60	-	16.00	16.70
Autumn 2023	15.02	Dry	Dry	16.17	-	Dry	16.94	-	15.50	14.70	-	17.11	14.92
Spring 2023	22.46	Dry	19.91	19.66	Dry	Dry	17.73	21.26	23.34	23.81	22.40	25.57	24.08
Autumn 2024	18.64	Dry	Dry	17.77	Dry	Dry	Dry	Dry	15.69	18.74	16.69	16.73	15.25
Spring 2024	Dry	Dry	Dry	17.71	Dry	Dry	Dry	18.81	16.77	18.46	17.44	19.12	18.18
Electrical conductivity (µS/cm)													
Spring 2019	113	-	Dry	-	-	-	-	-	Dry	133	-	272	115
Autumn 2020	39	-	36	-	-	-	-	-	26	26	-	35	37
Spring 2020	213	-	201	-	-	-	-	-	-	-	-	260	252
Autumn 2021	179	-	200	-	-	-	-	-	105	109	-	171	174
Spring 2021	197	210	198	-	-	218	-	-	176	196	-	305	**357**

Site	TTH12	TTH16	TTH13	TTH13(d/s)	TTHt9	TTHt17	TTHt17(d/s)	BRt6	MC14	MC15	HC6	HC7	HC8
Autumn 2022	163	149	151	-	-	156	-	-	61	60	-	122	116
Spring 2022	146	89	167	-	-	93	-	-	89	93	-	144	150
Autumn 2023	125	Dry	Dry	**775**	-	Dry	**1155**	-	169	197	-	217	246
Spring 2023	250	Dry	306	**366**	Dry	Dry	228	128	114	141	104	517	244
Autumn 2024	120	Dry	Dry	**466**	Dry	Dry	Dry	Dry	90	104	76	152	156
Spring 2024	Dry	Dry	Dry	334	Dry	Dry	Dry	172	190	223	117	234	321
Turbidity (NTU)													
Spring 2019	**29.9**	-	Dry	-	-	-	-	-	Dry	10.8	-	23.2	**129.8**
Autumn 2020	6.6	-	12.6	-	-	-	-	-	7.4	13.9	-	8.2	11.0
Spring 2020	16.3	-	5.6	-	-	-	-	-	-	-	-	12.5	9.4
Autumn 2021	**112.0**	-	1.9	-	-	-	-	-	2.6	6.8	-	7.3	6.7
Spring 2021	9.8	9.4	3.0	-	-	10.2	-	-	5.5	1.0	-	10.0	6.4
Autumn 2022	20.8	19.1	10.5	-	-	**34.4**	-	-	4.1	3.0	-	10.7	9.0
Spring 2022	8.2	3.0	6.8	-	-	1.4	-	-	3.0	1.4	-	9.1	9.0
Autumn 2023	11.5	Dry	Dry	20.8	-	Dry	5.3	-	2.8	1.2	-	9.4	3.1
Spring 2023	19.3	Dry	8.7	11.4	Dry	Dry	2.6	2.6	1.6	1.8	3.5	**145.0**	4.0
Autumn 2024	17.7	Dry	Dry	**41.7**	Dry	Dry	Dry	Dry	5.0	6.8	5.0	**30.0**	5.0
Spring 2024	Dry	Dry	Dry	**415**	Dry	Dry	Dry	0	0	3.32	0	0	0.25
Dissolved oxygen (%sat)													
Spring 2019	**23.9**	-	Dry	-	-	-	-	-	Dry	102.4	-	101.4	**74.2**
Autumn 2020	**44.1**	-	**53.4**	-	-	-	-	-	47.1	80.8	-	**69.8**	**70.5**
Spring 2020	**83.6**	-	**81.5**	-	-	-	-	-	-	-	-	100.2	94.7
Autumn 2021	91.4	-	96.0	-	-	-	-	-	101.5	106.0	-	104.6	107.3

Site	TTH12	TTH16	TTH13	TTH13(d/s)	TTHt9	TTHt17	TTHt17(d/s)	BRt6	MC14	MC15	HC6	HC7	HC8
Spring 2021	105.5	104.4	97.6	-	-	103.1	-	-	119.3	99.5	-	114.7	120.8
Autumn 2022	100.3	99.6	109.0	-	-	108.8	-	-	99.4	100.4	-	102.7	109.1
Spring 2022	91.2	101.8	98.7	-	-	97.0	-	-	101.8	97.0	-	114.4	103.9
Autumn 2023	99.4	Dry	Dry	**76.8**	-	Dry	**42.9**	-	103.0	104.0	-	90.6	114.5
Spring 2023	129.5	Dry	**31.5**	**59.4**	Dry	Dry	**33.2**	**39.6**	**79.7**	**85.1**	**67.4**	**7.6**	107.7
Autumn 2024	**44.8**	Dry	Dry	**28.9**	Dry	Dry	Dry	Dry	**74.0**	**82.8**	**87.2**	**82.9**	**62.8**
Spring 2024	Dry	Dry	Dry	**47.2**	Dry	Dry	Dry	**46.25**	**80.8**	90.9	**83**	92.1	**88.8**
pH													
Spring 2019	**6.32**	-	Dry	-	-	-	-	-	Dry	**4.55**	-	**5.05**	**5.76**
Autumn 2020	7.47	-	7.26	-	-	-	-	-	**8.09**	7.78	-	7.90	7.87
Spring 2020	6.52	-	6.83	-	-	-	-	-	-	-	-	6.99	7.15
Autumn 2021	7.01	-	7.48	-	-	-	-	-	**8.30**	8.74	-	7.18	7.20
Spring 2021	**5.88**	**5.82**	**4.50**	-	-	**5.86**	-	-	6.50	**5.04**	-	**4.80**	**5.07**
Autumn 2022	7.35	7.38	7.33	-	-	7.39	-	-	6.71	7.03	-	6.76	6.79
Spring 2022	7.10	**6.48**	7.04	-	-	6.57	-	-	**6.48**	6.57	-	7.47	7.73
Autumn 2023	7.06	Dry	Dry	**6.26**	-	Dry	**4.17**	-	**5.66**	**4.92**	-	**6.40**	6.66
Spring 2023	6.63	Dry	**6.34**	**6.15**	Dry	Dry	**4.52**	5.70	**5.56**	7.10	**5.57**	**5.15**	8.14
Autumn 2024	7.03	Dry	Dry	7.41	Dry	Dry	Dry	Dry	**5.89**	**5.01**	**5.92**	6.61	7.40
Spring 2024	Dry	Dry	Dry	7.39	Dry	Dry	Dry	**5.42**	**6.39**	**5.13**	6.8	7.48	6.74
Alkalinity (mg CaCO3/L)													
Spring 2019	40	-	Dry	-	-	-	-	-	Dry	10	-	10	40
Autumn 2020	20	-	20	-	-	-	-	-	40	20	-	20	20
Spring 2020	20	-	40	-	-	-	-	-	-	-	-	20	40

Site	TTH12	TTH16	TTH13	TTH13(d/s)	TTHt9	TTHt17	TTHt17(d/s)	BRt6	MC14	MC15	HC6	HC7	HC8
Autumn 2021	20	-	40	-	-	-	-	-	20	20	-	20	20
Spring 2021	20	20	20	-	-	20	-	-	20	20	-	20	20
Autumn 2022	40	40	40	-	-	40	-	-	20	20	-	40	60
Spring 2022	20	20	20	-	-	20	-	-	20	20	-	20	20
Autumn 2023	20	Dry	Dry	20	-	Dry	<10	-	20	20	-	20	20
Spring 2023	60	Dry	40	20	Dry	Dry	60	20	20	40	20	40	40
Autumn 2024	40	Dry	Dry	40	Dry	Dry	Dry	Dry	20	20	20	40	40
Spring 2024	Dry	Dry	Dry	70	Dry	Dry	Dry	-	100	100	10	15	30
ORP													
Spring 2019 – Autumn 2024	-	-	-	-	-	-	-	-	-	-	-	-	-
Spring 2024	Dry	Dry	Dry	120.6	Dry	Dry	Dry	176.3	153.9	207	132.5	110.7	182.3

Default Guideline Values:

- Electrical conductivity: 30-350 µS/cm
- Turbidity: 2-25 NTU
- pH: 6.5-8.0
- Dissolved oxygen: 90-110%

Bold text & shaded cell denotes an exceedance.

3.4 Macroinvertebrate Surveys

3.4.1 AUSRIVAS

Only one Impact site (TTH13 (d/s)) contained sufficient water to be sampled for macroinvertebrates in Spring 2024. TTH13 (d/s) recorded an OE50 score within Band C (Table 9, Figure 4). This is the lowest recorded score for TTH13 (d/s) out of four total surveys (Figure 4), and the first time the score has fallen in Band C, however the AUSRIVAS results are consistent with the results for the broader locality, as discussed below.

Control sites HC6 and HC7 also recorded scores within Band C (Table 9, Figure 5). Control site HC8 scored within Band B (Table 9, Figure 4). The results for HC6 and HC7 suggest a reduction in habitat quality since Autumn 2024. HC6 has only been sampled twice before Spring 2024, both times recording higher scores than in Spring 2024. Longer term data from HC7 and HC8 shows scores within Hornes Creek fluctuate (Figure 4), however have consistently fallen within Bands B and C. The results indicate that overall, the macroinvertebrate assemblages present at all sites are impoverished when compared to the reference site data used by the AUSRIVAS predictive models. The observed impairment is likely attributable to broader catchment-scale disturbances not associated with mining activity, potentially reflecting natural variability or regional environmental stressors.

The SIGNAL2 scores for sites surveyed in Spring 2024 varied between 3.2 and 4.7, indicating moderate to severe levels of impaired water quality across the sites, including the Control sites (Table 9, Figure 5). The low scores were associated with the presence of pollution tolerant macroinvertebrates and few pollution-sensitive taxa. However, this is not considered mining related and is likely typical of low flow pool edge habitat sampled using AUSRIVAS methodology, particularly during dry conditions. TTH13(d/s) scored higher in Spring 2024 than in Autumn 2024, but slightly lower than the previous Spring survey in 2023. Hornes Creek Control sites scored comparably to previous monitoring periods.

Taxon richness at TTH13(d/s), HC6 and HC7 was comparable to previous monitoring periods. HC8 recorded the highest species richness and highest richness for any site in the monitoring program so far (24 taxa).

EPT richness showed that few families of these generally pollution-sensitive orders occurred at any site (Table 9). The number of EPT taxa recorded was comparable between the Impact and Control sites, and to previous surveys.

Table 9 AUSRIVAS macroinvertebrate results (2019 – 2024)

	Impact								Control		
	Teatree Hollow				Teatree Hollow tributary			Bargo River tributary	Hornes Creek		
Site	**TTH12**	**TTH16**	**TTH13**	**TTH13(d/s)**	**TTHt9**	**TTHt17**	**TTHt17(d/s)**	**BRt6**	**HC6**	**HC7**	**HC8**
OE50 ratio											
Spring 2019	0.26	-	-	-	-	-	-	-	-	0.52	0.34
Autumn 2020	0.65	-	0.67	-	-	-	-	-	-	0.46	0.64
Spring 2020	0.7	-	0.38	-	-	-	-	-	-	0.50	0.59
Autumn 2021	0.09	-	0.46	-	-	-	-	-	-	0.55	0.74
Spring 2021	0.35	0.5	0.48	-	-	0.48	-	-	-	0.35	0.59
Autumn 2022	0.53	0.44	0.28	-	-	0.49	-	-	-	0.55	0.65
Spring 2022	0.61	0.67	0.48	-	-	0.77	-	-	-	0.64	0.59
Autumn 2023	0.46	**Dry**	**Dry**	0.65	-	**Dry**	0.47	-	-	0.37	0.37
Spring 2023	0.44	**Dry**	0.67	0.57	**Dry**	**Dry**	0.31	0.72	0.70	0.49	0.44
Autumn 2024	0.71	**Dry**	**Dry**	0.55	**Dry**	**Dry**	**Dry**	**Dry**	0.55	0.55	0.55
Spring 2024	**Dry**	**Dry**	**Dry**	0.49	**Dry**	**Dry**	**Dry**	**Dry**	0.42	0.45	0.64
Band											
Spring 2019	C	-	**Dry**	-	-	-	-	-	-	B	C
Autumn 2020	B	-	B	-	-	-	-	-	-	C	B
Spring 2020	B	-	C	-	-	-	-	-	-	C	B
Autumn 2021	D	-	C	-	-	-	-	-	-	B	B
Spring 2021	C	C	C	-	-	C	-	-	-	C	B

Site	TTH12	TTH16	TTH13	TTH13(d/s)	TTHt9	TTHt17	TTHt17(d/s)	BRt6	HC6	HC7	HC8
Autumn 2022	B	C	C	-	-	B	-	-	-	B	B
Spring 2022	B	B	C	-	-	B	-	-	-	B	B
Autumn 2023	C	**Dry**	**Dry**	B	-	**Dry**	B	-	-	C	C
Spring 2023	C	**Dry**	B	B	**Dry**	**Dry**	C	B	B	C	C
Autumn 2024	B	**Dry**	Dry	B	**Dry**	**Dry**	**Dry**	**Dry**	B	B	B
Spring 2024	**Dry**	**Dry**	**Dry**	C	**Dry**	**Dry**	**Dry**	**Dry**	C	C	B
SIGNAL2 score											
Spring 2019	3.00	-	-	-	-	-	-	-	-	2.83	3.25
Autumn 2020	3.77	-	3.47	-	-	-	-	-	-	4.07	3.53
Spring 2020	3.8	-	3.11	-	-	-	-	-	-	3.47	3.93
Autumn 2021	3.5	-	3.75	-	-	-	-	-	-	4.33	4.09
Spring 2021	3.88	3.80	4.56	-	-	3.67	-	-	-	4.8	4.19
Autumn 2022	3.9	3.75	4.33	-	-	3.86	-	-	-	4.21	4.00
Spring 2022	4.07	4.64	4.46	-	-	3.58	-	-	-	3.46	4.31
Autumn 2023	4.00	**Dry**	**Dry**	3.9	-	**Dry**	4	-	-	3.78	3.14
Spring 2023	2.88	**Dry**	3.31	2.38	**Dry**	**Dry**	2.4	3.5	4.33	3.2	3.54
Autumn 2024	3.08	**Dry**	Dry	3.73	**Dry**	**Dry**	**Dry**	**Dry**	4.73	3.15	3.09
Spring 2024	**Dry**	**Dry**	**Dry**	3.2	**Dry**	**Dry**	**Dry**	**Dry**	4.7	3.3	3.8
Taxon richness											
Spring 2019	6	-	**Dry**	-	-	-	-	-	-	13	19
Autumn 2020	13	-	15	-	-	-	-	-	-	14	15
Spring 2020	15	-	9	-	-	-	-	-	-	15	15
Autumn 2021	2	-	9	-	-	-	-	-	-	11	12

Site	TTH12	TTH16	TTH13	TTH13(d/s)	TTHt9	TTHt17	TTHt17(d/s)	BRt6	HC6	HC7	HC8
Spring 2021	12	11	13	-	-	13	-	-	-	11	17
Autumn 2022	10	14	9	-	-	8	-	-	-	19	14
Spring 2022	15	14	13	-	-	12	-	-	-	13	13
Autumn 2023	8	**Dry**	**Dry**	10	-	**Dry**	9	-	-	9	7
Spring 2023	8	**Dry**	13	8	**Dry**	**Dry**	5	12	12	10	13
Autumn 2024	13	**Dry**	**Dry**	12	**Dry**	**Dry**	**Dry**	**Dry**	11	14	12
Spring 2024	**Dry**	**Dry**	**Dry**	11	**Dry**	**Dry**	**Dry**	**Dry**	13	15	24
EPT richness											
Spring 2019	0	-	Dry	-	-	-	-	-	-	1	1
Autumn 2020	4	-	3	-	-	-	-	-	-	4	3
Spring 2020	4	-	2	-	-	-	-	-	-	3	5
Autumn 2021	0	-	2	-	-	-	-	-	-	3	2
Spring 2021	2	3	4	-	-	2	-	-	-	3	2
Autumn 2022	2	4	4	-	-	2	-	-	-	4	3
Spring 2022	3	4	3	-	-	2	-	-	-	3	3
Autumn 2023	3	**Dry**	**Dry**	3	-	**Dry**	2	-	-	2	1
Spring 2023	0	**Dry**	1	0	**Dry**	**Dry**	0	3	3	1	1
Autumn 2024	2	**Dry**	**Dry**	3	**Dry**	**Dry**	**Dry**	**Dry**	3	1	0
Spring 2024	**Dry**	**Dry**	**Dry**	1	**Dry**	**Dry**	**Dry**	**Dry**	2	2	2

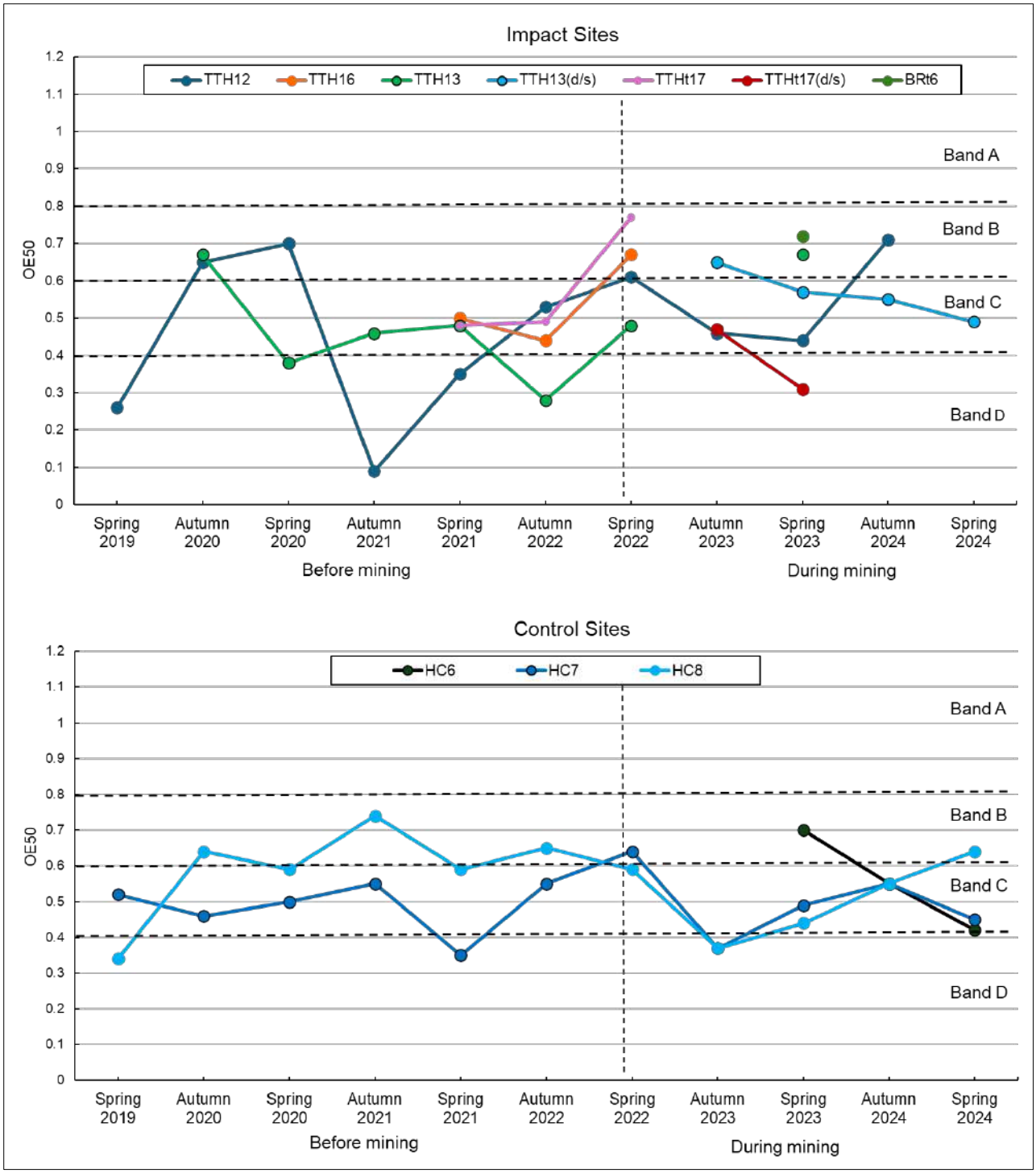

Figure 4 OE50 ratios and bands recorded at Impact and Control sites (2019 – 2024)

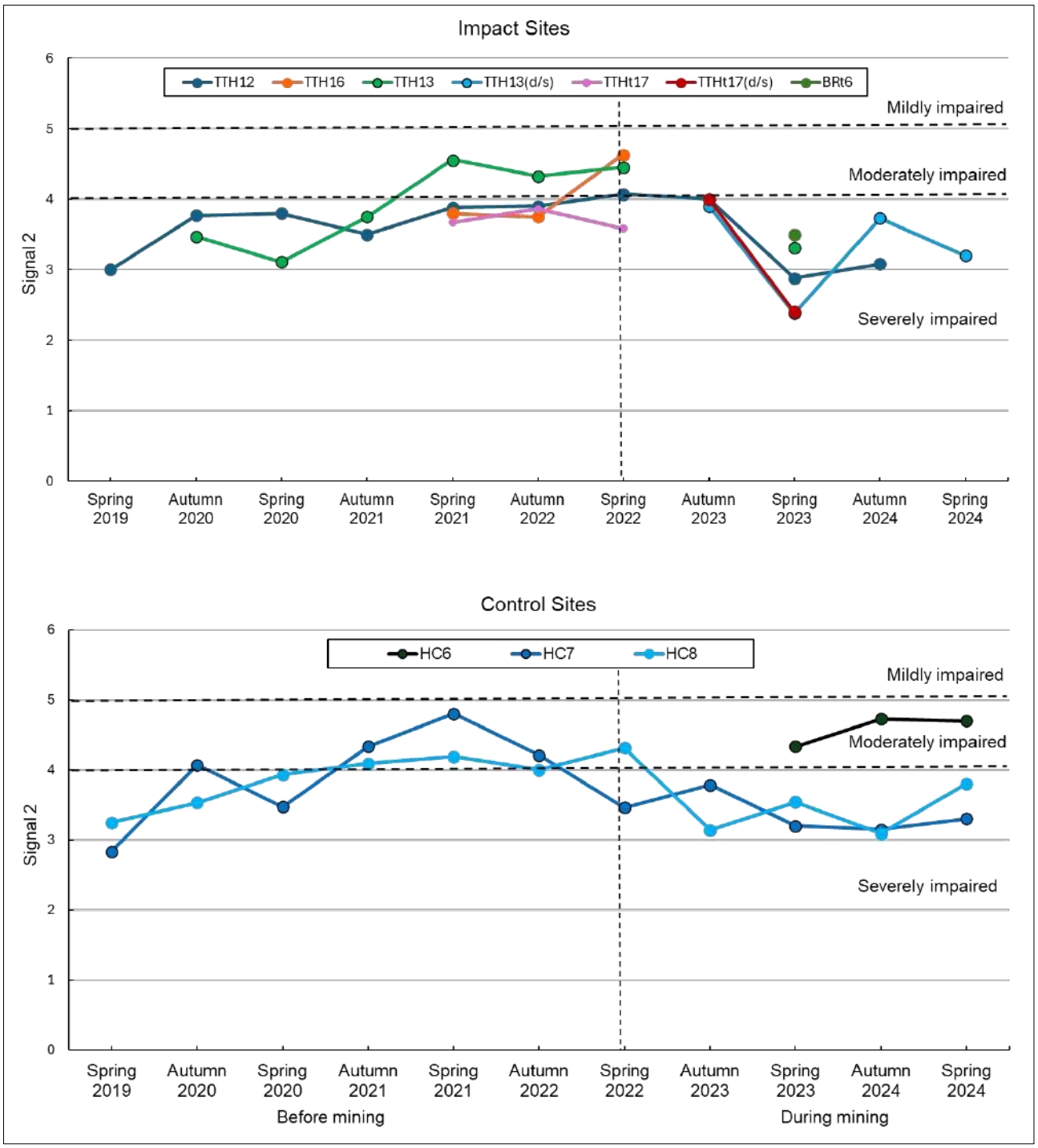

Figure 5 SIGNAL2 scores recorded at Impact and Control sites (2019 – 2024)

3.4.2 Quantitative Sampling

All six Impact sites included in the quantitative survey (i.e., TTHt9, TTH12, TTH13, TTH16, TTHt17 and BRt6) were dry in Spring 2024, preventing sampling of macroinvertebrate communities. The loss of aquatic habitat meant that further quantitative analysis using a BACI method was unnecessary. Notably, quantitative samples have been collected from only four of the intended Impact sites over the monitoring program's history (TTH12, TTH13, TTH16 and TTHt17).

The loss of aquatic habitat at Impact sites has not been observed at the Control sites. Only one of the five Control sites was found to be dry at any time (i.e., MC14 in Autumn 2024).

Although assessment of potential impacts following BACI approach was not possible following the current survey, natural non-mining related variability in aquatic indicators at the Control sites was explored using a comparable statistical design. This approach has maintained consistency with previous monitoring reports and has provided insight into the non-Project-related factors that influence macroinvertebrate assemblages at Impact and Control sites alike (e.g., climatic factors) that will aid interpretation of any future changes in macroinvertebrate indicators. General trends in these indicators observed of the monitoring program are described in the following sections.

3.4.2.1 Description of Trends

As outlined above, all Impact sites included in the analyses were found to be dry during the Spring 2024 survey, while sampling of macroinvertebrate communities was successfully completed at all the Control sites. Notably, no Impact or Control sites were found to be dry at the times of any of the six pre-extraction (Before) surveys completed up to and including Autumn 2022.

Following commencement of longwall extraction (S1A), which occurred following the Autumn 2022 survey, all four Impact sites included in quantitative analyses were able to be sampled as normal during the Spring 2022 survey. However, TTH13, TTH16 and TTHt17 were found to be dry at the time of the next, Autumn 2023 survey, with the dry creek bed condition repeated for all subsequent surveys in the cases of TTH16 and TTHt17. Pool water was present at TTH13 during the Spring 2023 survey (enabling sampling of macroinvertebrates), but not the two most recent surveys (Autumn and Spring 2024). Control site MC14 in Moore Creek was also found to be dry during the Autumn 2024 survey, but not at any other time during monitoring. These patterns are shown in Figure 6 and Figure 7.

3.4.2.2 Total Abundance

The patterns in abundance of macroinvertebrates (all taxa combined) were generally comparable across Impact and Control sites up until and including Spring 2022 (the survey immediately following commencement of longwall extraction), at which time there was an apparent increase in abundance across most sites (Figure 6). Since Spring 2022, reductions in pool water levels at three of the four Impact sites has prevented collection of macroinvertebrate samples in the During period (Figure 6). As mentioned above, this was the case for all four Impact sites included in the analyses for the Spring 2024 survey. Notably, while the trajectories among Control sites were generally consistent since Spring 2022, there has been a trend for a decline in abundance since Spring 2023, which was characterised by the lowest levels of abundance recorded during the monitoring program (Figure 6).



The PERMANOVA analysis detected a significant interaction between Survey (nested in the Before-During x Season interaction) and Site (nested in Creek) ($P < 0.001$, Table A 3, Appendix C) indicating significant localised / short term natural variability unrelated to mining. Nevertheless, despite the significant lower-level interaction, it indicates a broader pattern in the data whereby macroinvertebrate abundance has been, on average, greater in Spring than in Autumn across both creeks and through Before and During periods (Figure 6).

Subsequent pairwise comparisons undertaken to further examine the significant interaction term detected significant differences between surveys (within Season x Period) at some sites (Table A 4, Appendix C), there were no clear spatial or temporal patterns in these differences. Similarly, the cross-comparison found some significant differences between sites (within creeks) for some surveys, with no clear patterns apparent (Table A 5, Appendix C).

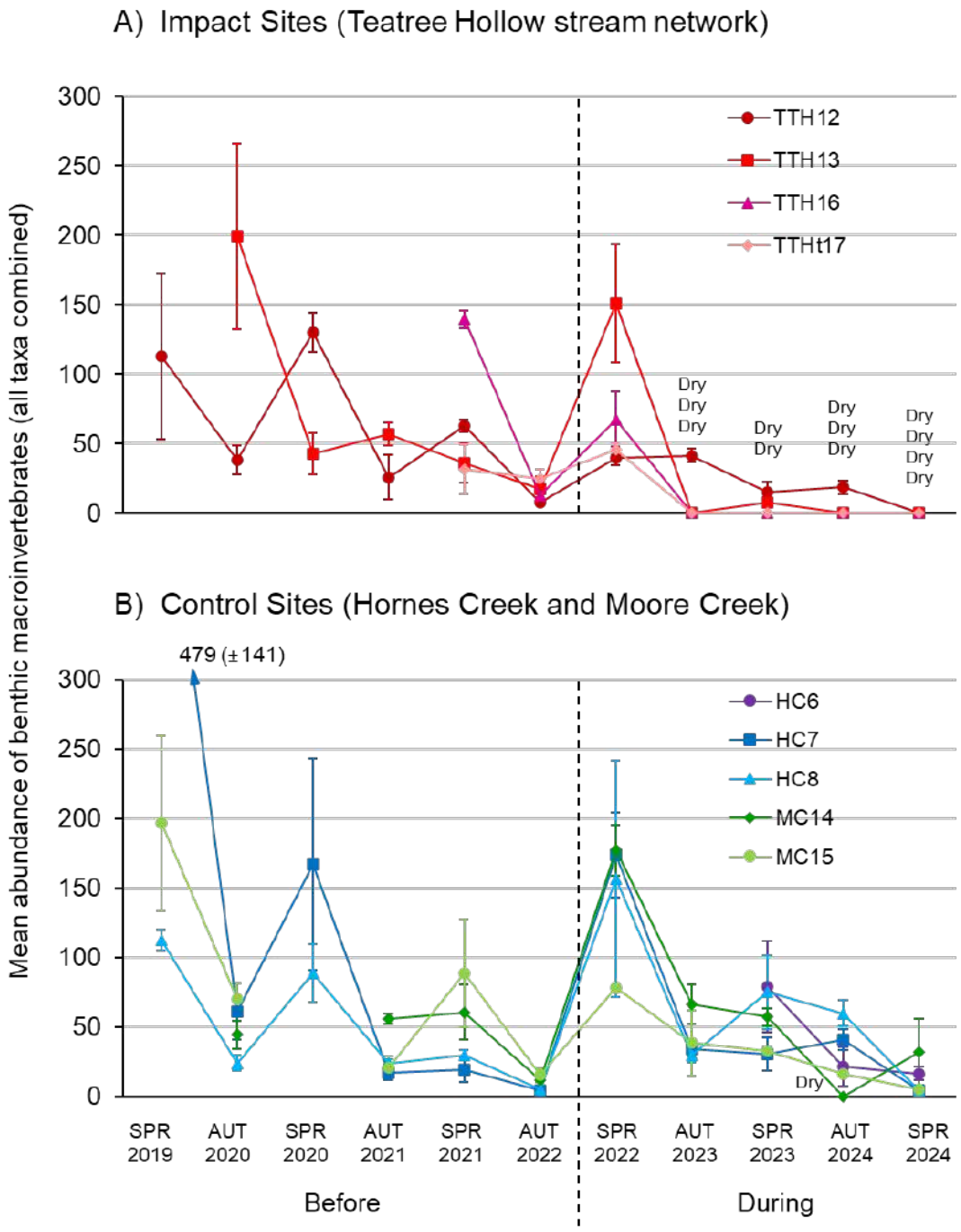

Figure 6 Mean (± standard error) abundance of macroinvertebrates (all taxa combined) at A) four Impact sites and B) five Control sites semi-annually sampled (where possible) before commencement of longwall extraction (six surveys, Spring 2019 to Autumn 2022) and during extraction (five surveys, Spring 2022 to Spring 2024) (n = 3 replicate samples).

3.4.2.3 Taxonomic Richness

As was the case for the macroinvertebrate abundance data, the temporal patterns in taxonomic richness were generally similar for all Impact and Control sites up until Spring 2022 inclusive, after which the propensity for most Impact sites to be dry at the times of sampling led to a divergence in broad trajectories for the Impact and Control sites (Figure 7). The TTH12 Impact site remained 'wet', with taxonomic richness at similar levels and comparable to Control sites until the Autumn 2024 survey (inclusive), while most other Impact sites were dry after the Spring 2022 survey (Figure 7). All Impact sites included in the quantitative survey (six sites) were dry at the time of the Spring 2024 sampling event. The temporal patterns for Control sites from the Autumn 2023 survey have generally shown a gradual decrease in taxonomic richness through time to the current survey, although Spring 2024 levels are comparable with levels at times during the Before period (Figure 7).

Subsequent pairwise comparisons found significant differences between surveys (within season x period) at some sites, but there were no clear spatial or temporal patterns (Table A 7, Appendix C). Similarly, there were significant differences between sites (within creeks) for some surveys, but no clear consistent pattern (Table A 8, Appendix C).

PERMANOVA detected a significant interaction between Survey (nested in the Before-During x Season interaction term) and Site (nested in Creek) ($P < 0.05$, Table A 6, Appendix C). None of the other terms were statistically significant.

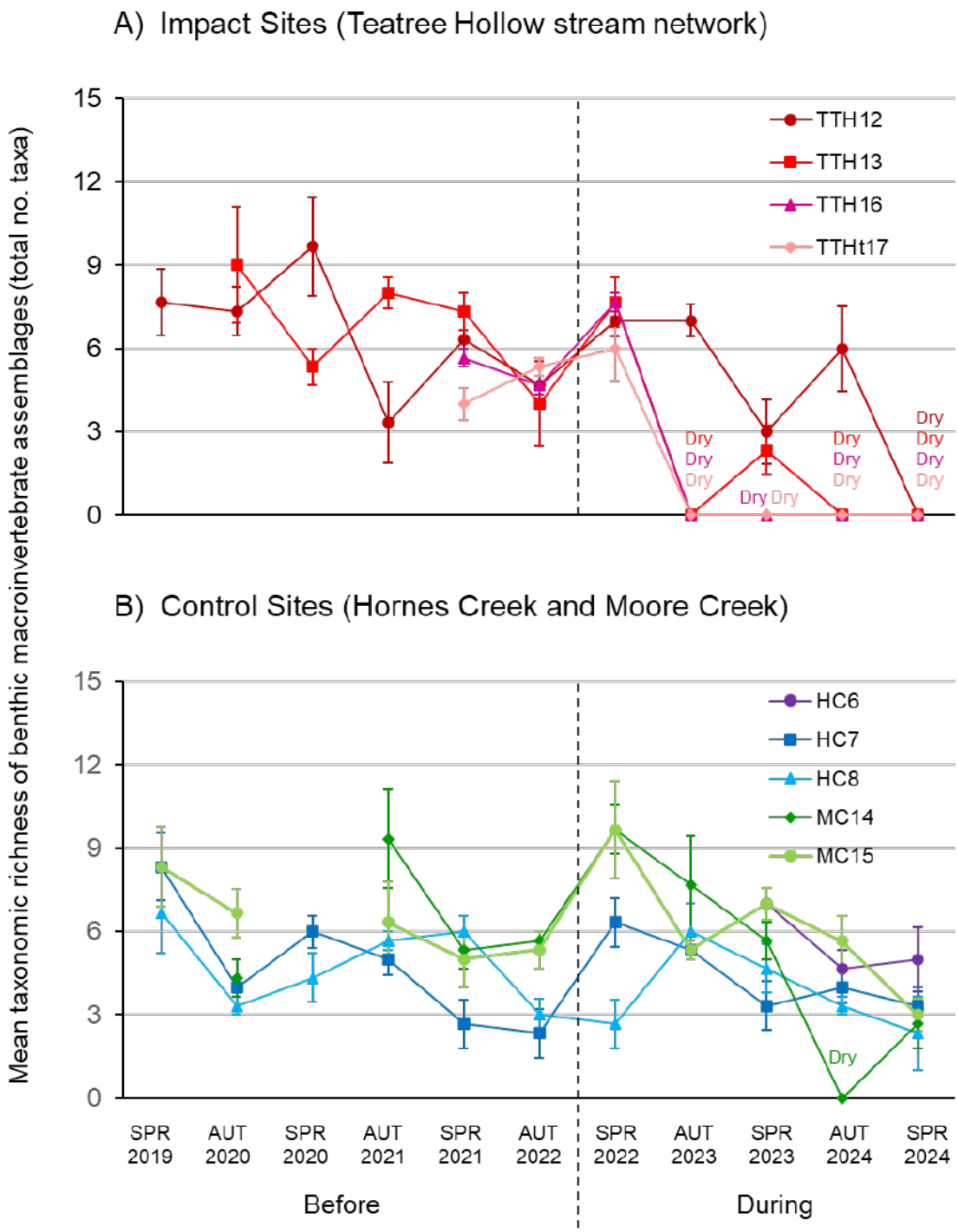

Figure 7 Mean (± standard error) taxonomic richness of macroinvertebrate assemblages (total no. taxa) for samples taken at A) four Impact sites and B) five Control sites semi-annually sampled (where possible) before commencement of longwall extraction (six sampling events, Spring 2019 to Autumn 2022) and during extraction (five sampling events, Spring 2022 to Spring 2024) (n = 3 replicate samples). Dashed line indicates commencement of longwall extraction.

3.4.2.4 Assemblage Composition

Analysis of the multivariate macroinvertebrate assemblage data (i.e., number of individuals by taxon for all taxa) via PERMANOVA is restricted to data collected at the Control sites.

The PERMANOVA detected a significant interaction between Survey (nested in the Before-During x Season interaction term) and Site (nested in Creek) ($P < 0.05$, Table A 9, Appendix C) along and between Creek and Survey (nested in Before-During x Season) ($P < 0.05$**,** Table A 9, Appendix C).

Pairwise comparisons examining the significant SU (BD x SE) x SI (CK) interaction detected significant differences in assemblages between surveys (within season x period) for some sites, and between sites (within creeks) for some surveys, but with no clear spatial or temporal patterns associated with those differences.

Pairwise comparisons examining the significant CK x SU (BD x SE) interaction term and the PCO plot (Figure 8) suggested macroinvertebrate assemblages in Hornes Creek and Moore Creek were not significantly different in Spring 2021 (Before period) nor in Autumn 2021 and 2022 (Before period) or Autumn 2023 (During period) (Table A 10 Appendix C, Figure 8). The comparisons between surveys at each Control creek were considered of limited relevance, but are presented in Table A 10, Appendix C.

This result suggests that while the macroinvertebrate assemblages are generally comparable between Control creeks, they may diverge at times, likely due to catchment-scale variability in natural environmental conditions. The only partial overlap in the two clusters of data-points in Figure 8 (i.e., blue for Hornes Creek and green for Moore Creek) illustrate this. Notably, the data-points for the current, Spring 2024 survey are positioned within the clusters, indicating that any changes in assemblages from previous surveys are generally minor. Pearson's Co-efficient vector overlays indicate that relatively higher abundance of baetids and leptophlebiids at Moore Creek sites, and of Oligochaetes at Hornes Creek sites, are contributing most to dissimilarities in terms of individual taxa (Figure 8).

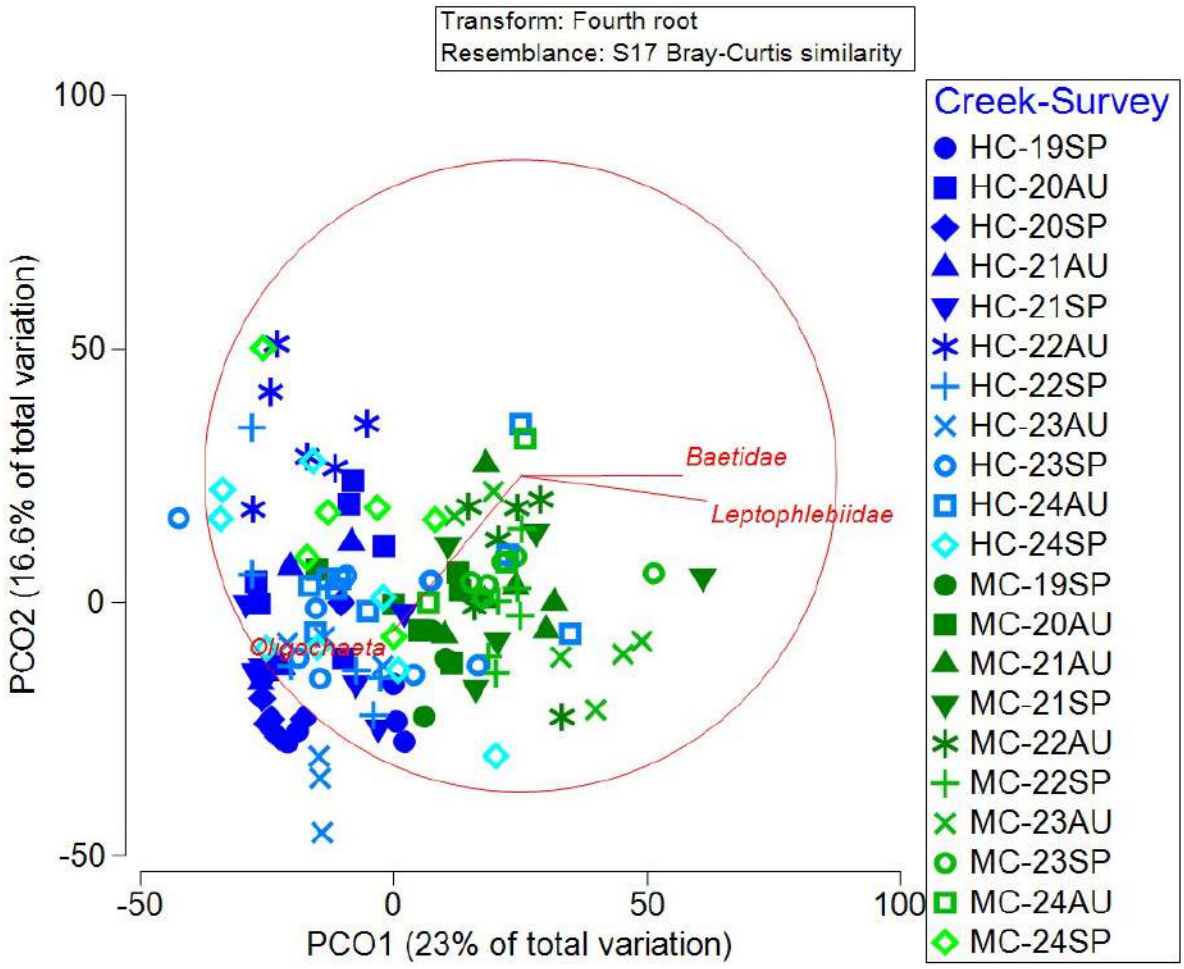

Figure 8 PCO plot for samples of macroinvertebrates assemblages taken at Hornes Creek and Moore Creek Control sites – Creek x Survey interaction. Pearson's Co-efficient vector overlays of notable taxa contributing to dissimilarities in red.

4 Discussion

Ecological trends

During the Spring 2024 survey, Impact sites were found to be dry and thus to have little to no aquatic habitat, except for small, isolated pools at BRt6 and TTH13(d/s). The loss of aquatic habitat and likely also aquatic biota within the Teatree Hollow stream network is attributed to the direct and indirect effects of mining induced subsidence, fracturing and flow diversions, as outlined in ATC Williams (2024). Meanwhile, Control sites had sufficient aquatic habitat for sampling. Rainfall data show that the locality was experiencing close to typical rainfall patterns prior to the surveys. Dry pools observed in Spring 2024 within the Teatree Hollow stream network were not an isolated occurrence, with multiple sites now recording between two and four consecutive monitoring periods (including Spring and Autumn surveys) in which they were found to be dry.

The observations made during this round of monitoring further support the conclusions from previous monitoring and related surface water reviews that there have been mining-induced changes to aquatic habitat within the locality of the A series longwalls. The reduction in aquatic habitat observed in Teatree Hollow was predicted to occur in the mine assessment (MSEC, 2022) and while significant impacts are occurring at the scale of individual watercourse, at a wider local and regional scale they are minor.

Further results presented in this report focus on continuing to track physical habitat condition and background variability within Control sites, assessing and confirming their continued suitability for use in the monitoring program.

Habitat observations and water quality

Despite changing water levels, Teatree Hollow sites have maintained relatively undisturbed riparian zones consisting of native vegetation, with high RCE scores supporting these observations. Ongoing monitoring of the physical condition of the Teatree Hollow stream network would provide insight into potential related changes due to sustained creek water loss and changed hydrology on vegetation and bank structure. Existing data and future monitoring will also enable assessment of potential recovery in creeks currently affected by mining. The photo time series shows aquatic habitat quality within Controls sites in Hornes Creek and Moore Creek has remained stable, other than following natural disturbance caused by bushfires and fluctuations in flow level.

Water quality at TTH13(d/s), which was the only Impact site within Teatree Hollow with water in the current survey, was poor with very high turbidity and low. Dissolved oxygen below the lower DGV value was also recorded at BRt6, MC15, HC6 and HC8 suggesting an effect of overall low flow conditions at the time of the survey and unrelated to mining. Water quality parameters for Impact and Control sites have fluctuated through time and values outside of the DGVs have been recorded for both Impact and Control sites during the Before and During mining periods, highlighting natural variability in water quality conditions in the region.

Macroinvertebrates

AUSRIVAS

Only one Impact site (TTH13 (d/s)) was sampled using AUSRIVAS in Spring 2024, returning the lowest OE50 score for the site yet recorded. TTH13(d/s) recorded a higher SIGNAL2 score in Spring 2024 than in the Autumn 2024 survey, but slightly lower than the previous most recent Spring survey in 2023. The OE50 score and SIGNAL2 score indicate the site is impaired. Taxon richness has fluctuated slightly at the site; however, the lowest EPT taxon richness (one taxon) so far was recorded, indicating key sensitive taxa to be mostly absent. Similar levels of macroinvertebrate impairment have been observed across the locality, as discussed below.

Control sites HC6, HC7 and HC8 also recorded OE50 scores indicating ‘significant’ or ‘severe’ impairment in terms of macroinvertebrate communities. These sites scored comparably to previous monitoring periods, with their SIGNAL2 scores also showing ‘moderate’ to ‘severe’ impairment. HC6 has consistently fallen in the ‘moderately’ impaired range while HC7 and HC8 have fallen in the lower ‘severely’ impaired range for several surveys in a row. These low scores and any impaired habitat and / or water quality are, however, unrelated to mining.

The results of the AUSRIVAS assessment indicate a general impoverishment of macroinvertebrate assemblages across the locality including Impact and Control sites, compared to the reference site data used by the AUSRIVAS predictive models. This possibly reflects nearby semi-urban / agricultural land-use unrelated to mining.

Quantitative

No quantitative sampling was undertaken at the two Impact sites containing any water, TTH13 (d/s) and BRt6, due to insufficient water depth.

Figures presented in Section 3.4.2 highlight the diversion in trajectories for macroinvertebrate indicators (total abundance, taxon richness) between Control and Impact sites that has occurred since the commencement of mining of the A series longwalls that is suggestive of a mining effect. Control sites have maintained similar levels of variability to the Before period while also maintaining sufficient aquatic habitat for sampling in the During period. Impact sites have conversely followed a downward trend since the commencement of mining, resulting in an increased frequency of dry conditions being recorded and subsequently no macroinvertebrate samples being collected.

While the completion of quantitative analyses on Control site data does not provide statistical insight into trajectories for macroinvertebrate communities at the Impact sites, it has provided a retrospective assessment that supports the suitability of the Control sites to this study and provided insight into natural variability in macroinvertebrate indicators unrelated to mining (e.g., climatic factors).

4.1 Trigger Action Response Plan Review

Table 10 summarises TARP levels (as per BMP1 aquatic habitat and macroinvertebrate indicators (stream health)), actions and outcomes (as recommended by Stantec) to be considered for each Impact site included in the TARP review per the BMP (Tahmoor Coal, 2024, version effective 28 June 2024, Page 79).

In Spring 2024, one site had a normal trigger level. Two sites had a trigger of level one, one site had a trigger of level two and two sites had a trigger of level three. Proposed outcomes are discussed below in 4.1.1 and summarised in Table 10.



4.1.1 TARP Outcomes Discussion

Normal level (TTH12)

Being the first recorded dry period for TTH12 during the aquatic monitoring program, no specific action is recommended in the TARP. Importantly, the Autumn 2024 survey during which the site was found to contain water occurred before the commencement of mining of Longwall S3A. TTH12 is situated above LW S3A and is the furthest upstream site in the direction of mining that is currently monitored in Teatree Hollow for the program, so could be expected to be the most recently impacted monitoring site. ATC Williams (2024) concluded this pool had experienced indirect impacts with mining related fracturing at and immediately upstream of the site resulting in atypical water decline (ATC Williams, 2024). Observations of new fracturing were made in June 2024 (ATC Williams, 2024), which follows the commencement of LW S3A in May 2024.

It is recommended that monitoring continue at this site.

Level 1 (TTH13, BRt6)

BRt6 was able to be sampled in Spring 2023 when it was added to the program; however, has been found dry in monitoring periods since. The small pool of water found in Spring 2024 (see Appendix A) is not considered to constitute functioning aquatic habitat. Monitoring data from the Bargo River tributary is currently excluded from the surface water review completed by ATC Williams as sites on this waterway outside of the subsidence zone (ATC Williams, 2024). Data has been requested from ATC Williams. The data shows that pools within Bargo River Tributary (sites monitored up and downstream of BRt6) typically hold little to no water during periods of low rainfall (ATC Williams, 2025). The observed dryness is therefore likely to be within the expected variability of this waterway and unrelated to mining of the A series longwalls.

TTH13 was recorded to periodically have a water level below the trigger level (under the WMP TARP) between January and June 2024, with water levels increasing during rainfall events (ATC Williams, 2024). It was considered that declines in water level at this site are related to the cessation of surface water flow in Teatree Hollow Tributary due to mining induced fracturing upstream in conjunction with the prevailing climatic conditions (ATC Williams, 2024). Recommended outcomes are as follows:

- Per the TARP, it is recommended that monitoring continue at TTH13 and BRt6.
- It is recommended that data pertaining to surface water along Bargo River Tributary be reviewed as the program continues to understand pool behaviour in the tributary.
- The trigger exceedance should be reported to DPHI and key stakeholders.
- Corrective management actions (CMAs) should be explored and implemented, if deemed feasible.

Level 2 (TTHt9)

TTHt9 has been monitored as part of this program since Spring 2023 and has not yet been found to contain water in three total surveys. ATC Williams note this pool experiences fluctuations in water level above and below trigger levels (per the WMP TARP) in response to rainfall conditions, but that



the pool has experienced an increase in the rate of water recession compared to historical conditions (ATC Williams, 2024). Actions listed for this TARP level include an increase in monitoring frequency, consideration of additional monitoring sites and a review of the BMP (Table 10).

To date, TTHt9 has not produced the required aquatic ecology data during either the Autumn or Spring monitoring periods, as the site remained dry and therefore unsuitable for macroinvertebrate sampling. It is therefore not recommended that monitoring frequency increase as biannual monitoring should be sufficient for capturing any seasonal variation in water level.

Further, it is not recommended that new Impact monitoring sites be added within Teatree Hollow as TTHt17 (d/s) and TTH13(d/s), which were added in response to previous TARP triggers, have so far produced useful data and at this stage are considered fit for purpose. Further, there is unlikely to be additional aquatic habitat, unconfounded by other mining influences such as water discharge, available for sampling in Teatree Hollow. It is therefore recommended that:

- Monitoring continues at this site at the frequency used to date. No additional sites are required to be added at this stage.
- The trigger exceedance should be reported to DPHI and key stakeholders via this report.
- Corrective management actions (CMAs) should be reviewed, explored and implemented if deemed feasible.

Level 3 (TTH16, TTHt17)

TTH16 and TTHt17 have now been found to be dry in four out of five During mining monitoring surveys. The surface water review by ATC Williams (2024) concluded that these sites have experienced atypical declines in water level due to mining induced fracturing in combination with prevailing climatic conditions (TTHt17) and the diversion of surface flow via upstream fractures (TTH16). It is therefore expected that outside of high rainfall events, these sites would be found dry during future monitoring surveys. Recommendations are as follows:

- As for TTHt9, it is not recommended that monitoring frequency at these or reference sites increase as biannual monitoring would be sufficient for capturing any seasonal variation in water level.
- As outlined above for TTHt9, the existing additional AUSRIVAS sites TTH13(d/s) and TTHt17(d/s) are considered fit for purpose and no additional sites are required at this stage.
- The trigger exceedance should be reported to DPHI and key stakeholders. Further actions may include the development of a Rehabilitation Management Plan.
- Undertake an investigation to determine if an exceedance of the performance measure is likely.

Table 10 TARP levels, actions and responses per the BMP (Tahmoor Coal, 2024).

Trigger level Spring 2024	Sites	Action	Outcomes
Normal: Visual monitoring indicates aquatic pool habitat parameters are similar to baseline observations at aquatic ecology monitoring sites. AND AUSRIVAS score equal to or greater than Band C.	**TTH12** TTH12 was dry in Spring 2024. As this was the first time it was found to be dry, 'Normal' TARP level is most appropriate.	• Continue monitoring and review of data per monitoring program.	• Continue monitoring.
Level 1: Visual monitoring indicates a reduction in aquatic pool habitat compared to baseline observations at aquatic ecology monitoring sites for two consecutive sampling occasions. OR AUSRIVAS score of Band D recorded for two consecutive sampling occasions at one or more aquatic ecology monitoring site(s).	**TTH13, BRt6** These sites were found dry for the second consecutive monitoring period. No macroinvertebrate sampling was able to be completed.	• Continue monitoring and review of data per monitoring program. • Undertake an investigation of BACI quantitative macroinvertebrate data to assess Level 1 observations and determine if mining related or the response to environmental conditions (e.g. drought) within the catchment. • Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, surface water monitoring results, groundwater monitoring results). • Consider and decide on reasonable and feasible options for remediation, where relevant (e.g. limestone cobble for pH management).	• Continue monitoring. • Review surface water data for Bargo River Tributary for future monitoring periods to understand pool behaviour in the waterway. • The trigger exceedance should be reported to DPHI and key stakeholders. • Corrective management actions (CMAs) should be explored and implemented, if deemed feasible.

Trigger level Spring 2024	Sites	Action	Outcomes
		• Following investigation, any declines detected that are not attributable to mining impacts (e.g. are a result of environmental conditions or stochastic events) are to be considered 'normal condition' and are continued to be included in the ongoing development of the ecological monitoring dataset.	
Level 2: Visual monitoring indicates reduction in aquatic pool habitat compared to baseline observations at aquatic ecology monitoring sites for three consecutive sampling occasions. OR AUSRIVAS score of Band D recorded for three consecutive sampling occasions at one or more aquatic ecology monitoring site(s).	**TTHt9** This site was found dry for the third consecutive monitoring period. No macroinvertebrate sampling was able to be completed.	• Actions as stated in Level 1. • Consider increasing monitoring and review of data frequency where Level 2 has been reached and at other relevant sites, subject to land access. • Consider the inclusion of additional sites within impact area. • Review CMAs in light of findings from further investigations and consider additional reasonable and feasible options. • Review BMP and modify if necessary.	• Continue monitoring at the biannual frequency. • No additional sites are recommended to be added at this stage due to low likelihood of suitable habitat being available in the waterway. Existing additional sites are fit for purpose. • The trigger exceedance should be reported to DPHI and key stakeholders. • Corrective management actions (CMAs) should be reviewed, explored and implemented if deemed feasible.
Level 3: Visual monitoring indicates a reduction in aquatic pool habitat compared to baseline observations at aquatic ecology monitoring sites for four consecutive sampling occasions. OR AUSRIVAS score of Band D recorded for four consecutive sampling occasions at one or more aquatic ecology monitoring site(s).	**TTH16, TTHt17** These sites were found dry for the fourth consecutive monitoring period. No macroinvertebrate sampling was able to be completed.	• Actions as stated in Level 2. • Increase monitoring frequency for sites where Level 3 has been reached and at corresponding reference sites, subject to land access. • Add additional monitoring sites as required. • Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing, other catchment changes,	• Continue monitoring at the biannual frequency. • No additional sites are recommended to be added at this stage due to low likelihood of suitable habitat being available in the waterway. Existing additional sites are fit for purpose. • The trigger exceedance should be reported to DPHI and key stakeholders. • Undertake an investigation to determine if an exceedance of the performance measure is likely.

Trigger level Spring 2024	Sites	Action	Outcomes
		effects unrelated to mining or the prevailing climate). • Undertake an investigation to determine if an exceedance of the performance measure is likely.	

5 Conclusion

This report presents the results of eleven seasons of data collected at Impact and Control sites for the Tahmoor A series aquatic monitoring program. Spring 2024 is the fifth ‘During’ mining survey. Due to predicted mining-related reductions in the availability of water and aquatic habitat within Impact sites in the Teatree Hollow stream network, data on some key aquatic ecology indicators (water quality and macroinvertebrates using AUSRIVAS and quantitative methods) could not be collected in the current survey. This report presents those data able to be collected and provides important continuity to the monitoring program, especially for the physical habitat assessment at each site. Importantly, the increased TARP levels and number of sites triggering those levels recorded this season compared to previous surveys highlight the need to continue the monitoring and adaptively manage the program and analysis approach, as has been done for this report.

A recommendation additional to those discussed in 4.1 is that Ostracoda, Copepoda and Cladocera should be included in future quantitative macroinvertebrate analyses to provide as broad a picture of aquatic biodiversity as possible.

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Appendices

Appendix A Aquatic Habitat Descriptions and Photographic Timeseries

Table A 1 Aquatic habitat descriptions and photographs

TTHt9	
Riparian Vegetation	Moderate to high density, large vegetation dominated by *Acacia longifolia*, *Eucalyptus piperita, Melaleuca linariifolia* and *Callistemon sp*. Dense groundcover including *Lomandra sp.*, rushes and grasses.
Macrophytes/algae	In-stream macrophytes absent. Rushes present.
Stream shading	Moderate
Modal width (m)	2
Substrate and sub-habitats	Substrate predominantly bedrock. Some logs present. Overhanging edge vegetation present.
Banks	Bedrock and consolidated sediments, approximately 0.5 in height.
Water level, flow and depth	Dry
Water quality observations	N/A
RCE score & comments	42
Spring 2024	





TTHt17	
Riparian Vegetation	Moderate to high density, large vegetation dominated by *Acacia longifolia*, *Eucalyptus piperita* and *Melaleuca linariifolia.* Dense groundcover including *Lomandra* sp., rushes and grasses. Some sparse bracken fern.
Macrophytes/algae	In-stream macrophytes absent. Rushes present.
Stream shading	Moderate
Modal width (m)	1
Substrate and sub-habitats	Substrate mixed bedrock, boulders, cobbles and sediments. Logs and leafy debris present. Overhanging edge vegetation present.
Banks	Bedrock and consolidated sediments, approximately 0.5-1m in height.
Water level, flow and depth	Dry
Water quality observations	N/A
RCE score & comments	45

Spring 2021	Autumn 2022
	
Spring 2022	**Autumn 2023**
	
Spring 2023	**Autumn 2024**
	
Spring 2024	





TTHt17 (d/s)	
Riparian Vegetation	Moderate to high density, large vegetation dominated by *Acacia longifolia*, *Eucalyptus piperita, Melaleuca linariifolia* and *Callistemon* sp. Dense groundcover including *Lomandra* sp., rushes and grasses. Some sparse bracken fern.
Macrophytes/algae	In-stream macrophytes absent. Rushes present.
Stream shading	Moderate
Modal width (m)	0.5
Substrate and sub-habitats	Substrate mostly bedrock, some small boulders and loose sediments. Small amount of organic debris. Overhanging edge vegetation present.
Banks	Bedrock and consolidated sediments, approximately 0.5 in height. Some slight undercutting visible.
Water level, flow and depth	Dry
Water quality observations	N/A
RCE score & comments	45

Other comments	Presence of burrows in areas with soft sediment/banks, potentially from yabbies (*Cherax destructor*).
Spring 2024	
	
TTH12	
Riparian Vegetation	Moderate to high density, large vegetation dominated by *Acacia longifolia*, *Eucalyptus piperita* and *Melaleuca linariifolia.* Dense groundcover dominated by grasses and bracken fern.
Macrophytes/algae	In-stream macrophytes absent. Sparse rushes present.
Stream shading	Low
Modal width (m)	5m – wide pool meeting narrower channel of ~2m width
Substrate and sub-habitats	Substrate clay and sand on bedrock, some logs and boulders present.
Banks	Bedrock and consolidated sediments with vegetation including bracken fern, maximum of 2m in height.
Water level, flow and depth	Dry – significant change since Autumn 2024

Water quality observations	N/A
RCE score & comments	39
Other comments	Bank erosion occurring between riparian vegetation monitoring site i02 and TTH12. Photographs included below.
Spring 2019	Autumn 2020
	
Spring 2020	Autumn 2021
	
Spring 2021	Autumn 2022

	
Spring 2022	Autumn 2023
	
Spring 2023	Autumn 2024
	
Spring 2024	









TTH16	
Riparian Vegetation	Moderate to high density, large vegetation dominated by *Acacia longifolia*, *Eucalyptus punctata* and *Melaleuca linariifolia.* Mix of native understory species including *Lomandra* sp., rushes, grasses, bracken fern *Callistemon* and *Grevillea.*
Macrophytes/algae	In-stream macrophytes absent. Rushes present.
Stream shading	Moderate, cliff on one side
Modal width (m)	1
Substrate and sub-habitats	Substrate mixed bedrock and boulders. Terrestrial grasses establishing in streambed. Some overhanding *Lomandra*.

Banks	Bedrock and firm sediments held by roots, approximately 0.5 height.
Water level, flow and depth	Dry
Water quality observations	N/A
RCE score & comments	40
Spring 2021	Autumn 2022
	
Spring 2022	Autumn 2023
	
Spring 2023	Autumn 2024

	
Spring 2024	
	
TTH13	
Riparian Vegetation	Moderate to high density, large vegetation dominated by *Acacia longifolia* and *Melaleuca linariifolia.* One bank has a thin riparian strip as it borders the road. Dense groundcover including *Lomandra* sp., rushes and grasses.
Macrophytes/algae	In-stream macrophytes absent. Rushes present.
Stream shading	Low, very open on road side
Modal width (m)	1.5

Substrate and sub-habitats	Substrate mixed bedrock, boulders, cobbles and fine sediments. Some logs present.
Banks	Bedrock and consolidated sediments, approximately 0.5-1m in height.
Water level, flow and depth	Dry
Water quality observations	N/A
RCE score & comments	37
Spring 2019	Autumn 2020
	
Spring 2021	Autumn 2022
	
Spring 2022	Autumn 2023



No image

Spring 2023



Autumn 2024



Spring 2024



TTH13 (d/s)	
Riparian Vegetation	Moderate density, large vegetation dominated by small eucalypts and *Melaleuca.* One bank has a thin riparian strip as it borders the road. Dense groundcover including bracken fern.
Macrophytes/algae	In-stream macrophytes absent.
Stream shading	Low
Modal width (m)	1
Substrate and sub-habitats	Substrate mixed bedrock, boulders, cobbles and muddy sediments. A few small logs present. Substrate slightly modified due to road crossing.
Banks	Consolidated sediments, up to 1.5m in height. Some undercutting and erosion exposing roots present.
Water level, flow and depth	Low water level, one pool.
Water quality observations	High turbidity, suspended sediment.
RCE score	37
Spring 2024	





BRt6	
Riparian Vegetation	Dense woody vegetation on steeply sloping banks including *Eucalyptus piperita* and *Corymbia sp.* Dense groundcover rushes and bracken fern.
Macrophytes/algae	In-stream macrophytes absent. Rushes present. Filamentous green algae present.
Stream shading	Moderate
Modal width (m)	1
Substrate and sub-habitats	Substrate small boulders, cobbles and sandy sediments. Sticks and leafy debris present.
Banks	Mixed bedrock and consolidated sediments, approximately 0.5 in height.
Water level, flow and depth	Mostly dry, one small pool.
Water quality observations	Pool water clear.
RCE score	44
Spring 2024	





MC14	
Riparian Vegetation	Moderate density large vegetation dominated by *Eucalyptus.* Dense groundcover including ferns, rushes and grasses.
Macrophytes/algae	In-stream macrophytes absent. Rushes present.
Stream shading	Low
Modal width (m)	2
Substrate and sub-habitats	Upstream side of road crossing mostly sandy sediments. Downstream side mostly clean cobbles and boulders. Overhanging edge vegetation present.
Banks	Mostly consolidated vegetated sediments, approximately 0.5-1m in height.
Water level, flow and depth	Below water mark, little flow
Water quality observations	Clear water, some filamentous algae
RCE score	43
Other comments	Native fish present – Australian smelt (*Retropinna semoni*) and *Galaxias* sp. Culvert pipes deliver water to downstream side, but up and downstream are not connected as pipes are well above water level on downstream side.

Spring 2019	Autumn 2020
	
Spring 2020	**Autumn 2021**
No image	
Spring 2021	**Autumn 2022**
	

Spring 2022	Autumn 2023
	
Spring 2023	**Autumn 2024**
	
Spring 2024	
	

MC15	
Riparian Vegetation	Moderate density large eucalypts, with *Acacia* and *Callistemon* dominating understory. Ferns, grasses and rushes dense along pool edges.
Macrophytes/algae	In-stream macrophytes absent
Stream shading	Low
Modal width (m)	5
Substrate and sub-habitats	Predominantly bedrock with overhanging edge vegetation present.
Banks	Bedrock with dense groundcover vegetation, approximately 0.5m in height.
Water level, flow and depth	Below watermark but deep pools holding significant water.
Water quality observations	Medium clarity. Rain quickly mobilising fine sediments and increasing turbidity.
RCE score	48
Other comments	Pool immediately upstream of the road crossing (shown in photo below) was used for invertebrate sampling as it contained water of sufficient depth.

Spring 2019	Autumn 2020
	
Spring 2020	**Autumn 2021**
No image	
Spring 2021	**Autumn 2022**

	
Spring 2022	Autumn 2023
	No image
Spring 2023	Autumn 2024
	
Spring 2024	





HC6	
Riparian Vegetation	Moderate density, large vegetation dominated by *Eucalyptus* and *Melaleuca and Acacia.* Dense groundcover including ferns, rushes and grasses.
Macrophytes/algae	In-stream macrophytes absent. Rushes present.
Stream shading	Moderate
Modal width (m)	1
Substrate and sub-habitats	Predominantly bedrock with thin layer of sandy sediment. Logs and sticks present, causing some damming effect.
Banks	Consolidated sediment and large boulders. Overhanging edge vegetation present. Between 0.5-1m in height.
Water level, flow and depth	Below watermark, little flow.
Water quality observations	Water clear, no surface spots or scum
RCE score & comments	43

Other comments	Large boulders divide waterway, sampling occurred both upstream and downstream of these.
Spring 2024	
	
HC7	
Riparian Vegetation	Moderate density, large vegetation dominated by *Acacia longifolia*, *Eucalyptus* and *Melaleuca linariifolia.* Dense groundcover dominated by *Lomandra* sp.
Macrophytes/algae	In-stream macrophytes absent. Rushes present. Small amounts of sedge (*Cyperus* sp.) present. Small amount of filamentous algae present.
Stream shading	Low
Modal width (m)	1.5
Substrate and sub-habitats	Bedrock with thin layer of sandy sediments in some locations. Overhanging edge vegetation present, mostly *Lomandra*.
Banks	Bedrock and consolidated sediments, approximately 0.5m in height. Some erosion exposing roots present.
Water level, flow and depth	Below watermark, low flow

Water quality observations	Medium turbidity and some surface scum present in pooled areas.
RCE score & comments	40
Other comments	Possible iron staining / flocculation (photos below). Previous photos indicate iron could have been present since Spring 2019.
Spring 2019	Autumn 2020
	
Spring 2020	Autumn 2021
	
Spring 2021	Autumn 2022



Spring 2022



Autumn 2023



Spring 2023



Autumn 2024





Spring 2024









HC8	
Riparian Vegetation	Moderate density, large vegetation dominated by *Acacia*, *Eucalyptus* and *Leptospermum.* Dense groundcover dominated by *Lomandra* sp. Ferns and *Callistemon* also present.
Macrophytes/algae	In-stream macrophytes absent. Rushes present.
Stream shading	Moderate
Modal width (m)	4
Substrate and sub-habitats	Predominantly bedrock with thin layer of fine silt. Overhanging edge vegetation present.

Banks	Bedrock, approximately 0.5m in height.
Water level, flow and depth	Below watermark, low flow
Water quality observations	Few surface spots
RCE score & comments	47
Spring 2019	Autumn 2020
	
Spring 2020	Autumn 2021
	
Spring 2021	Autumn 2022



Spring 2022



Autumn 2023



Spring 2023



Autumn 2024



Spring 2024







Appendix B RCE Descriptors and Scores

Table A 2 Site descriptors used to calculate RCE scores (after Chessman et al. 1997)

Descriptor and category	Value
1 Land use pattern beyond the immediate riparian zone	
Undisturbed native vegetation	4
Mixed native vegetation and pasture/exotics	3
Mainly pasture, crops or pine plantation	2
Urban	1
2 Width of riparian strip of woody vegetation	
More than 30 m	4
Between 5 and 30 m	3
Less than 5 m	2
No woody vegetation	1
3 Completeness of riparian strip of woody vegetation	
Riparian strip without breaks in vegetation	4
Breaks at intervals of more than 50 m	3
Breaks at intervals of 10 - 50 m	2
Breaks at intervals of less than 10 m	1
4 Vegetation of riparian zone within 10 m of channel	
Native tree and shrub species	4
Mixed native and exotic trees and shrubs	3
Exotic trees and shrubs	2
Exotic grasses / weeds only	1
5 Stream bank structure	
Banks fully stabilised by trees, shrubs etc	4
Banks firm but held mainly by grass and herbs	3
Banks loose, partly held by sparse grass etc	2
Banks unstable, mainly loose sand or soil	1
6 Bank undercutting	
None, or restricted by tree roots	4
Only on curves and at constrictions	3
Frequent along all parts of stream	2
Severe, bank collapses common	1
7 Channel form	
Deep: width / depth ratio less than 7:1	4
Medium: width / depth ratio 8:1 to 15:1	3
Shallow: width / depth ratio greater than 15:1	2
Artificial: concrete or excavated channel	1
8 Riffle / pool sequence	
Frequent alternation of riffles and pools	4
Long pools with infrequent short riffles	3
Natural channel without riffle / pool sequence	2
Artificial channel; no riffle / pool sequence	1
9 Retention devices in stream	
Many large boulders and/or debris dams	4
Rocks / logs present; limited damming effect	3
Rocks / logs present, but unstable, no damming	2
Stream with few or no rocks / logs	1
10 Channel sediment accumulations	
Little or no accumulation of loose sediments	4
Some gravel bars but little sand or silt	3
Bars of sand and silt common	2
Braiding by loose sediment	1
11 Stream bottom	
Mainly clean stones with obvious interstices	4
Mainly stones with some cover of algae / silt	3
Bottom heavily silted but stable	2
Bottom mainly loose and mobile sediment	1
12 Stream detritus	
Mainly unsilted wood, bark, leaves	4
Some wood, leaves etc. with much fine detritus	3
Mainly fine detritus mixed with sediment	2
Little or no organic detritus	1
13 Aquatic vegetation	
Little or no macrophyte or algal growth	4
Substantial algal growth; few macrophytes	3
Substantial macrophyte growth; little algae	2
Substantial macrophyte and algal growth	1

Appendix C PERMANOVA Results Tables

Table A 3 Results of five-factor univariate PERMANOVA analysing total abundance of macroinvertebrates (no. individuals, all taxa combined). Factors: BD = Before vs During, SE = Season, CR = Creek, SU = Survey, nested in BD x SE interaction, SI = Site, nested in CR. (= significant values in **bold**; RED= redundant term due to significant interaction).*

Source of Variation	df	SS	MS	Pseudo-F	P(perm)	Unique perms
BD	1	15,737	15,737	0.4884	0.7670	9966
SE	1	100,590	100,590	3.3058	0.0667	9960
CR	1	539	539	0.6243	0.6202	9940
BD x SE	1	32,507	32,507	0.9787	0.4661	9958
BD x CR	1	74	74	0.3894	0.8340	9958
SE x CR	1	8,841	8,841	1.5157	0.2558	9956
BD x SE x CR	1	1,680	1,680	0.6990	0.6212	9950
SU (BD x SE)	7	277,790	39,684	3.6600	RED	9955
CR x SU (BD x SE)	6	33,081	5,513	0.5085	0.7846	9953
SI (CR)	3	20,681	6,893	0.6358	RED	9959
BD x SI (CR)	2	35,320	17,660	1.6288	0.2429	9955
SE x SI (CR)	3	20,759	6,919	0.6382	0.5776	9962
BD x SE x SI (CR)	2	20,262	10,131	0.9344	0.4214	9963
SU (BD x SE) x SI (CR)	12	130,110	10,843	3.4426	*** 0.0006**	9928
Residual	86	270,860	3,149			
Total	128	1,124,400				

*Table A 4 Pairwise comparisons associated with the significant SU (BD x SE) x SI (CK) interaction term in the PERMANOVA for total abundance of macroinvertebrates (all taxa combined) (Table A 3). Multiple comparisons are between surveys (within season x period) for each site ('>' = significant result at p < 0.05, in **bold**). NLR = no logical resolution. n.a. = pairwise tests not applicable.*

Period	Season	Site	Surveys (ranked > from left to right)
Before	Spring	HC6	n.a.
		HC7	NLR (but **SPR-2019 > SPR-2021**)
		HC8	**(**SPR-2019 = SPR-2020**) > SPR-2021**
		MC14	n.a.
		MC15	SPR-2019 = SPR-2021

Period	Season	Site	Surveys (ranked > from left to right)
	Autumn	HC6	n.a.
		HC7	NLR (but **AUT-2020 > AUT-2022**)
		HC8	(AUT-2020 = AUT-2021) **> AUT-2022**
		MC14	**(**AUT-2021 = AUT-2020**) > AUT-2022**
		MC15	**AUT-2020 > (**AUT-2021 = AUT-2022**)**
During	Spring	HC6	SPR-2023 = SPR-2024
		HC7	**SPR-2022 >** (SPR-2023 = SPR-2024)
		HC8	SPR-2022 = SPR-2023 = SPR-2024
		MC14	**SPR-2022 >** (SPR-2023 = SPR-2024)
		MC15	**SPR-2022 > SPR-2023 > SPR-2024**
	Autumn	HC6	n.a.
		HC7	AUT-2024 = AUT-2023
		HC8	**AUT-2024 > AUT-2023**
		MC14	n.a. (Autumn 2024 was dry)
		MC15	AUT-2023 = AUT-2024

*Table A 5. Pairwise comparisons associated with the significant SU (BD x SE) x SI (CK) interaction term in the PERMANOVA for total abundance of macroinvertebrates (all taxa combined) (Table A 3). Multiple comparisons are between sites (within creeks) for each survey ('>' = significant result at p ≤ 0.05, in **bold**). NLR = no logical resolution. n.a. = pairwise tests not applicable.*

Period	Creek	Survey	Sites (ranked > from left to right)
Before	Hornes Ck	SPR-2019	HC7 = HC8
		SPR-2020	HC7 = HC8
		SPR-2021	HC8 = HC7
		AUT-2020	HC7 = HC8
		AUT-2021	HC8 = HC7
		AUT-2022	HC7 = HC8
	Moore Ck	SPR-2019	n.a.
		SPR-2020	n.a.
		SPR-2021	MC15 = MC14

Period	Creek	Survey	Sites (ranked > from left to right)
		AUT-2020	MC15 = MC14
		AUT-2021	**MC14 > MC15**
		AUT-2022	MC15 = MC14
During	Hornes Ck	SPR-2022	HC7 = HC8
		SPR-2023	HC6 = HC8 = HC7
		SPR-2024	HC6 = HC8 = HC7
		AUT-2023	HC7 = HC8
		AUT-2024	HC8 = HC7 = HC6
	Moore Ck	SPR-2022	**MC14 > MC15**
		SPR-2023	**MC14 > MC15**
		SPR-2024	MC14 = MC15
		AUT-2023	MC14 = MC15
		AUT-2024	n.a. (Autumn 2024 was dry)

Table A 6 Results of five-factor univariate PERMANOVA analysing taxonomic richness of macroinvertebrate assemblages (total no. taxa). Factors: BD = Before vs During, SE = Season, CR = Creek, SU = Survey, nested in BD x SE interaction, SI = Site, nested in CR. (= significant values in bold; RED= redundant term due to significant interaction).*

Source of Variation	df	SS	MS	Pseudo-F	P(perm)	Unique perms
BD	1	1.46	1.46	0.2192	0.9540	9952
SE	1	3.98	3.98	0.2961	0.8746	9956
CR	1	33.71	33.71	3.3235	0.0642	9957
BD x SE	1	15.64	15.64	0.7442	0.5782	9952
BD x CR	1	1.98	1.98	0.8180	0.5304	9965
SE x CR	1	4.72	4.72	0.9490	0.4271	9956
BD x SE x CR	1	5.39	5.39	1.0781	0.4149	9954
SU (BD x SE)	7	209.34	29.91	5.1004	RED	9954
CR x SU (BD x SE)	6	46.63	7.77	1.3255	0.3294	9950
SI (CR)	3	21.27	7.09	1.2093	0.3377	9954
BD x SI (CR)	2	2.47	1.24	0.2108	0.8134	9957
SE x SI (CR)	3	9.81	3.27	0.5580	0.6535	9946
BD x SE x SI (CR)	2	5.48	2.74	0.4677	0.6396	9964
SU (BD x SE) x SI (CR)	12	70.36	5.86	2.2247	*** 0.0176**	9931

Source of Variation	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Residual	86	226.67	2.64			
Total	128	715.21				

*Table A 7 Pairwise comparisons associated with the significant SU (BD x SE) x SI (CK) interaction term in the PERMANOVA for taxonomic richness of macroinvertebrate assemblages (total no. taxa) (Table A 6). Multiple comparisons are between surveys (within season x period) for each site ('>' = significant result at p < 0.05, in **bold**). NLR = no logical resolution. n.a. = pairwise tests not applicable.*

Period	Season	Site	Surveys (ranked > from left to right)
Before	Spring	HC6	n.a.
		HC7	**(**SPR-2019 = SPR-2020**) > SPR-2021**
		HC8	SPR-2019 = SPR-2021 = SPR-2020
		MC14	n.a.
		MC15	SPR-2019 = SPR-2021
	Autumn	HC6	n.a.
		HC7	AUT-2021 = AUT-2020 = AUT-2022
		HC8	**AUT-2021 > (**AUT-2020 = AUT-2022**)**
		MC14	AUT-2021 = AUT-2022 = AUT-2020
		MC15	AUT-2020 = AUT-2021 = AUT-2022
During	Spring	HC6	SPR-2023 = SPR-2024
		HC7	SPR-2022 = SPR-2023 = SPR-2024
		HC8	SPR-2023 = SPR-2022 = SPR-2024
		MC14	**SPR-2022 > (**SPR-2023 = SPR-2024**)**
		MC15	**(**SPR-2022 = SPR-2023**) > SPR-2024**
	Autumn	HC6	n.a.
		HC7	AUT-2023 = AUT-2024
		HC8	AUT-2023 = AUT-2024
		MC14	n.a. (Autumn 2024 was dry)
		MC15	AUT-2024 = AUT-2023

Table A 8 Pairwise comparisons associated with the significant SU (BD x SE) x SI (CK) interaction term in the PERMANOVA for taxonomic richness of macroinvertebrate assemblages (total no. taxa) (Table A 6). Multiple comparisons are between sites (within creeks) for each

*survey ('>' = significant result at p < 0.05, in **bold**). NLR = no logical resolution. n.a. = pairwise tests not applicable.*

Period	Creek	Survey	Sites (ranked > from left to right)
Before	Hornes Ck	SPR-2019	HC7 = HC8
		SPR-2020	HC7 = HC8
		SPR-2021	**HC8 > HC7**
		AUT-2020	HC7 = HC8
		AUT-2021	HC8 = HC7
		AUT-2022	HC8 = HC7
	Moore Ck	SPR-2019	n.a.
		SPR-2020	n.a.
		SPR-2021	MC14 = MC15
		AUT-2020	MC15 = MC14
		AUT-2021	MC14 = MC15
		AUT-2022	MC14 = MC15
During	Hornes Ck	SPR-2022	**HC7 > HC8**
		SPR-2023	NLR (but **HC6 > HC7**)
		SPR-2024	HC6 = HC7 = HC8
		AUT-2023	HC8 = HC7
		AUT-2024	HC6 = HC7 = HC8
	Moore Ck	SPR-2022	MC14 = MC15
		SPR-2023	MC15 = MC14
		SPR-2024	MC15 = MC14
		AUT-2023	MC14 = MC15
		AUT-2024	n.a. (Autumn 2024 was dry)

Table A 9 Results of five-factor PERMANOVA of composition of macroinvertebrate assemblages (number of individuals by taxon for all taxa). Factors: BD = Before vs During, SE = Season, CR = Creek, SU = Survey, nested in BD x SE interaction, SI = Site, nested in CR. (= significant values in **bold**; RED= redundant result due to significant interaction).*

Source of Variation	df	SS	MS	Pseudo-F	P(perm)	Unique perms
BD	1	5,406	5,406	1.0879	0.3898	9943

Source of Variation	df	SS	MS	Pseudo-F	P(perm)	Unique perms
SE	1	6,535	6,535	1.2781	0.2510	9911
CR	1	13,038	13,038	2.7183	RED	9938
BD x SE	1	7,494	7,494	1.3014	0.2539	9955
BD x CR	1	2,160	2,160	0.8610	0.6196	9936
SE x CR	1	3,411	3,411	1.0731	0.3873	9939
BD x SE x CR	1	4,519	4,519	1.2782	0.2769	9937
SU (BD x SE)	7	38,025	5,432	3.8704	RED	9891
CR x SU (BD x SE)	6	15,741	2,623	1.8692	* **0.0108**	9910
SI (CR)	3	12,233	4,077	2.9053	RED	9930
BD x SI (CR	2	3,375	1,687	1.2024	0.3047	9935
SE x SI (CR)	3	7,559	2,519	1.7954	0.0761	9931
BD x SE x SI (CR)	2	4,826	2,413	1.7195	0.0850	9925
SU (BD x SE) x SI (CR)	12	16,842	1,403	1.3494	* **0.0294**	9823
Residual	86	89,447	1,040			
Total	128	254,800				

*Table A 10 Pairwise comparisons associated with the significant CK x SU (BD x SE) interaction term in the PERMANOVA for composition of macroinvertebrate assemblages (number of individuals by taxon for all taxa). (Table A 9). Multiple comparisons are between Control creeks for each survey ('≠' = significant result at p < 0.05, in **bold**). n.a. = pairwise tests not applicable.*

Period	Season	Survey	Control Creeks
Before	Spring	SPR-2019	Hornes Ck = Moore Ck
		SPR-2020	n.a.
		SPR-2021	**Hornes Ck ≠ Moore Ck**
	Autumn	AUT-2020	Hornes Ck = Moore Ck
		AUT-2021	**Hornes Ck ≠ Moore Ck**
		AUT-2022	**Hornes Ck ≠ Moore Ck**
During	Spring	SPR-2022	Hornes Ck = Moore Ck
		SPR-2023	Hornes Ck = Moore Ck
		SPR-2024	Hornes Ck = Moore Ck
	Autumn	AUT-2023	**Hornes Ck ≠ Moore Ck**
		AUT-2024	Hornes Ck = Moore Ck

Appendix D Macroinvertebrate Data

Table A 11 AUSRIVAS macroinvertebrate raw data for Spring 2024. All dry Impact sites are excluded from this table as they were not sampled.

Taxon	Code	Impact	Control		
		TTH13 (d/s)	HC6	HC7	HC8
Temnocephalidae	IF419999	0	0	0	1
Lymnaeidae	KG059999	0	0	1	0
Physidae	KG089999	0	0	0	1
Hydrachnidae	MM019999	0	2	0	0
Cladocera*	OG999999	0	0	4	1
Ostracoda*	OH999999	6	0	10	10
Copepoda*	OJ999999	4	2	10	4
Atyidae	OT019999	0	0	0	0
Parastacidae	OV019999	0	0	0	0
Haliplidae	QC069999	3	0	0	0
Dytiscidae	QC099999	5	0	0	0
Gyrinidae	QC109999	0	1	0	0
Hydrophilidae	QC119999	0	0	0	1
Scirtidae	QC209999	0	0	0	2
Psephenidae	QC379999	0	0	0	0
Hydrochidae	QCAO9999	0	2	0	0
Tipulidae	QD019999	0	1	0	0
Dixidae	QD069999	0	0	0	1
Culicidae	QD079999	0	0	1	1
Ceratopogonidae	QD099999	0	2	0	0
Tanypodinae	QDAE9999	0	2	2	10
Chironominae	QDAJ9999	0	0	2	3
Baetidae	QE029999	0	0	0	0
Leptophlebiidae	QE069999	6	7	2	1
Mesoveliidae	QH529999	1	0	0	1
Hydrometridae	QH549999	0	0	0	1
Veliidae	QH569999	1	0	1	0

Gerridae	QH579999	2	0	2	1
Gelastocoridae	QH649999	0	0	0	1
Corixidae	QH659999	1	0	8	10
Notonectidae	QH679999	10	0	0	8
Pleidae	QH689999	0	2	0	0
Pyralidae	QL019999	0	0	0	0
Isostictidae	QO039999	0	0	0	1
Protoneuridae	QO049999	0	0	0	0
Megapodagrionidae	QO079999	0	1	0	0
Aeshnidae	QO129999	0	4	0	4
Gomphidae	QO139999	0	0	0	1
Synthemistidae	QO239999	0	0	0	1
Cordulephyidae	QO289999	0	0	1	0
Hemicorduliidae	QO309999	1	0	0	4
Gripopterygidae	QP039999	0	0	0	0
Ecnomidae	QT089999	0	0	0	0
Leptoceridae	QT259999	0	10	10	7
***Excluded from analyses**					

Table A 12 Quantitative (suction pump) macroinvertebrate raw data for Spring 2024. All dry Impact sites are excluded from this table as they were not sampled.

Taxon	HC6 1	HC6 2	HC6 3	HC7 1	HC7 2	HC7 3	HC8 1	HC8 2	HC8 3	MC14 1	MC14 2	MC14 3	MC15 1	MC15 2	MC15 3
Oligochaeta	3	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Corbiculidae		1		1	1				3				1		
Leptophlebiidae	2								1						
Corixidae			1								3		2		
Notonectidae				1			1								
Ceratopogonidae	1														2
Chironominae	6	2	1						1						
Tanypodinae	1	2		1	3	1		3	2	3	7	76	1		1
Orthocladinae		4	12			1			2		2	2		2	2
Culicidae				1	1										
Leptoceridae	1				1								3	1	
Cladocera*	4	1													
Copepoda*	17	3	5	1	7		2	5	3	3	3	1	4	14	
Ostracoda*		7	41	99	21	68	13	17	37	1		4	191	111	13
Hydracarina		9	3	2	6	12	1	18	29	3		3	1	1	
Oniscigastridae	3										1				
Dolichopodidae															
***Excluded from analyses**															

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Stantec is a global leader in sustainable architecture, engineering, and environmental consulting. The diverse perspectives of our partners and interested parties drive us to think beyond what's previously been done on critical issues like climate change, digital transformation, and future-proofing our cities and infrastructure. We innovate at the intersection of community, creativity, and client relationships to advance communities everywhere, so that together we can redefine what's possible.

Appendix F – Heritage Reports

Ground floor 20 Chandos Street
St Leonards NSW 2065
ABN: 28 141 736 558

02 9493 9500

www.emmconsulting.com.au

24 December 2024

Nick Le Baut
Project Manager - Environmental Projects
SIMEC Mining
2975 Remembrance Driveway
Bargo NSW 2574

Re: Tahmoor South coal bin silo crack - potential heritage impact

Dear Nick,

On 6 November 2024, during extraction of LW S3A, a vertical crack on the surface of the northern unreinforced concrete web that connects two raw bin silos was observed during an unmanned aerial vehicle (UAV) inspection at the Tahmoor Mine site.

As the Tahmoor Mine site (Tahmoor Colliery) has been identified as a heritage site as part of the *Heritage Management Plan – Tahmoor South Domain – Longwalls South 1A -South 6A* (2022), impacts to this item must be managed under the Heritage Management Plan Trigger Action Response Plan (TARP).

According to the TARP, this impact is deemed to be a Level 1 trigger:

> Historical heritage site monitoring indicates potential detectable environmental consequences with negligible impacts to the heritage value of the heritage site.

This trigger requires that a qualified archaeologist or heritage architect be consulted in order to determine whether impacts to heritage sites have occurred. This letter responds to this requirement. The desktop assessment has been undertaken by Pamela Chauvel (BA, MA (Research)) who is a qualified archaeologist.

1 Background

Tahmoor Mine Site (also known as Tahmoor Colliery) was identified in the *Macarthur Heritage Study* (1986) and in the *Historical Heritage Assessment: Tahmoor South Project* (HHA) (Niche 2018). However it is not listed on any local or State heritage registers (non-statutory). The HHA assessed the site, which was built in 1972, as having local significance for its role in illustrating the course and pattern of industrial development in Tahmoor.

Subsidence predictions for the existing and proposed longwalls (LW) S1A–S6A prepared by MSEC (2022), assessed the probability of impact from subsidence as 'possible'. The coal conveyor and associated plant and equipment at Tahmoor Mine site was predicted to subside approximately 1,000 mm. Impacts were anticipated

to be low and easily managed with appropriate monitoring. Table 20 in the *LW S1A – S6A Extraction Plan: Heritage Management Plan* (EMM 2022) sets out the subsidence performance indicators:

Site name	Site type	Subsidence Performance Measures	Probability of subsidence impact	Subsidence Performance Indicators
Tahmoor Colliery (Tahmoor Mine Site)	Complex / group	No greater subsidence impacts or loss of heritage values than predicted in the EIS (see HMP Section 4.2.7)	*Possible*	This performance indicator will be considered to be triggered if subsidence impacts cannot be repaired in a manner that preserves the heritage value of the historical heritage items. This performance measure and performance indicator have been incorporated into TARP HMP2 (Historical heritage items).

2 Heritage assessment

The coal silos are situated to the south of the mine entrance, beside the conveyors and visible from the road (Plate 3.1). They are joined by a narrow, unreinforced concrete wall (Plate 3.2). The vertical crack extends from approximately 3 m above ground surface to approximately 5 m below the top of the silo wall. The width of the crack varies from hairline to 1.5 mm (Plate 3.3). No noticeable change to pre-existing external cracks on the silo walls have been observed during inspections.

The Tahmoor Mine Site is a working site and minor impacts such as hairline cracks do not affect its heritage values. Furthermore, at mine closure the infrastructure will be removed and the land will be rehabilitated as required by the Tahmoor Mine's consent conditions

In summary, while the vertical crack represents a detectable environmental consequence from mining subsidence on the silo connecting wall at Tahmoor Colliery, the heritage values of the item (Tahmoor Mine) have not been impacted. Therefore, the recent cracking on the silo connecting wall is not considered to be a reportable trigger exceedance under the TARP.

3 Recommendations

1. There is insignificant heritage value requiring any further action or investigation. The concrete wall that connects the two silos has numerous existing cracks and the new vertical crack does not reduce the heritage value of the site.

2. The Tahmoor Mine site should continue to be monitored and the data reviewed as per the Tahmoor Mine Site Management Plan.

Yours sincerely



Pamela Chauvel
Senior Archaeologist
pchauvel@emmconsulting.com.au



Plate 3.1 **Raw coal bins, northern elevation. View south-east (SIMEC).**

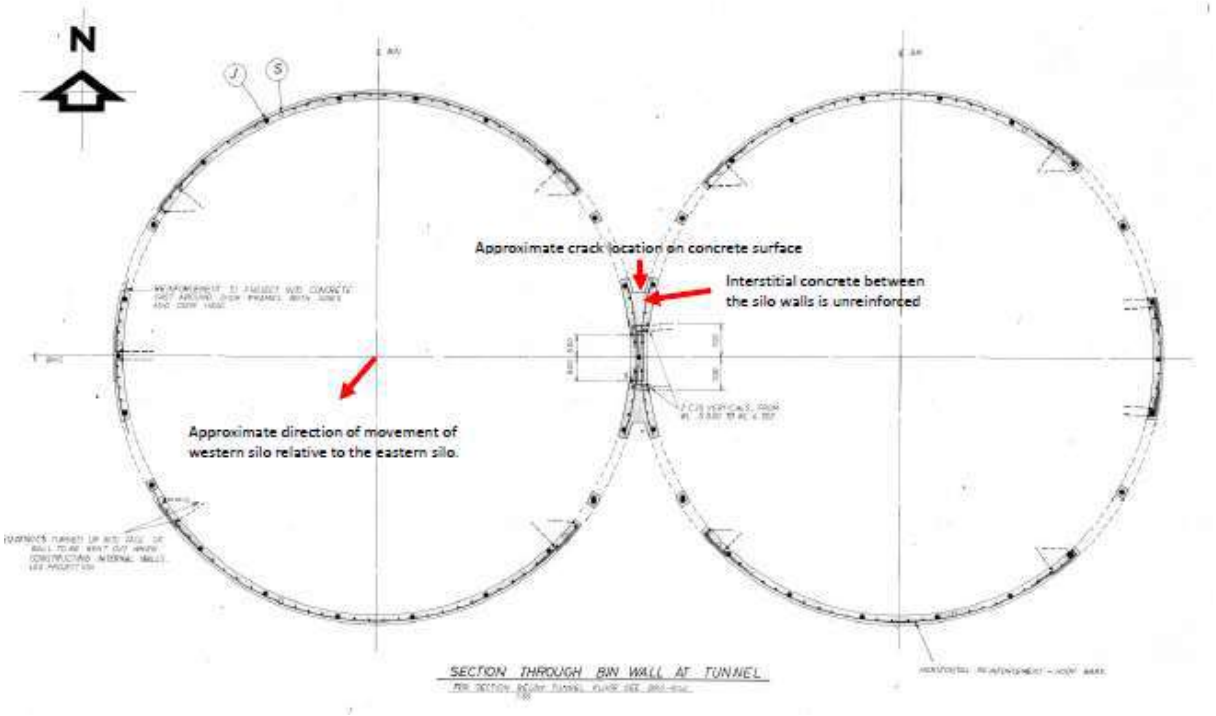


Plate 3.2 **Silo plan showing connecting concrete element and location of the vertical crack (John Matheson).**

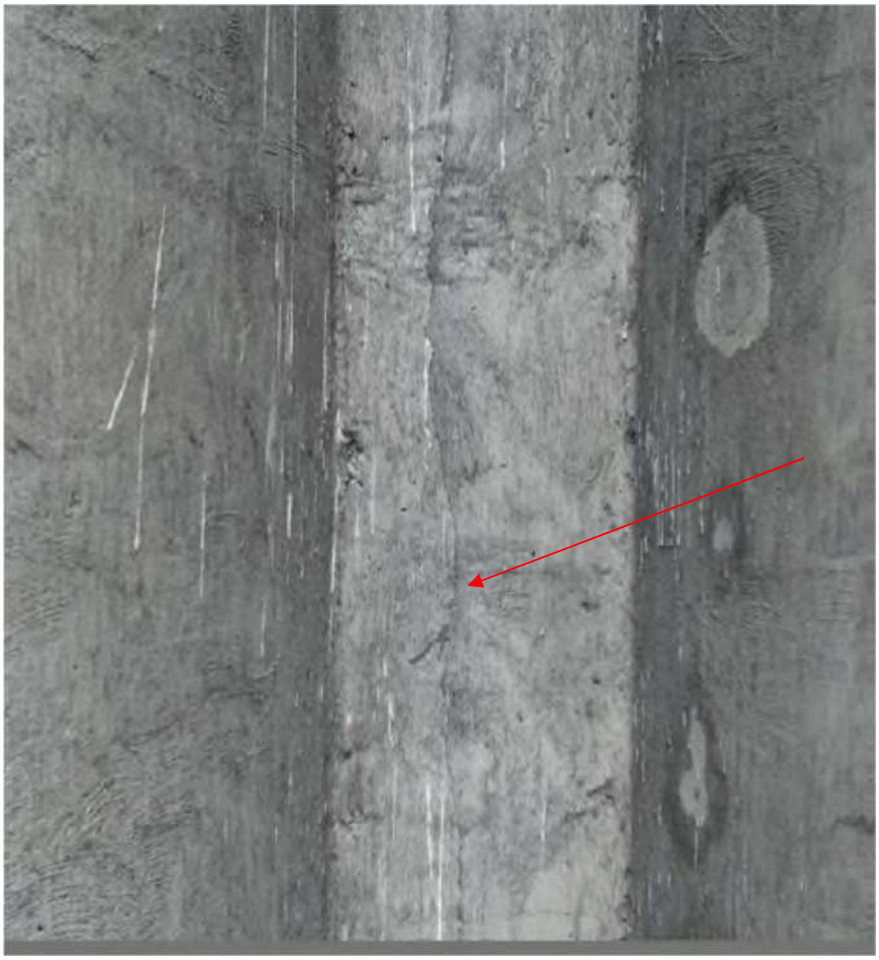


Plate 3.3 **Connecting wall between the silos, showing the crack at approximately ¾ height (UAV inspection November 2024).**

Appendix G – Main Southern Rail Monitoring Reports

TAHMOOR COAL: LW S3A

Subsidence Management Status Report No. 10
During the mining of LW S3A beneath the Main Southern Railway

Reporting Period	14 August 2024 to 20 August 2024	
Length of extraction of LW S3A	783 m	at 20 August 2024. LW S3A commenced extraction on 8 May 2024
Closest distance of LW S3A face to Railway	0 m	LW directly beneath railway at 99.54 km
Distance travelled by LW since previous report	51 m	since 13 August 2024
Maximum total subsidence along Railway since start of LW S1A	841 mm	at 99.12 km on 129August 2024
Maximum incremental subsidence along Railway due to LW S3A	100 mm	at 99.70 km on 19 August 2024
Maximum increase in subsidence since previous survey	38 mm	at 99.62 km (12 August to 19 August)
Safety Incidents	No incidents reported	
Rail Operations	No delays incurred. Precautionary temporary speed restriction of 40 / 40 km/hr from 99.5 km to 99.9 km implemented on both tracks on 22 August due to developing changes in track alignment at 99.625km to 99.635km.	

Summary of monitoring and inspections

Monitoring Activity	Date	Current Frequency	Highest Trigger	Comments
Railway Track				
3D ground survey	-	Monthly	N/A	Last survey 29 July. Minor changes in the last month.
2D ground survey	19 Aug	Weekly	N/A	Subsidence increasing above LW S3A. Minor bump in subsidence profile at 99.64 km and compressive strain developing 99.62 km to 99.66 km.
Rail creep surveys	19 Aug	Weekly	N/A	Small increase in rail creep measured at AP5 on the Up Main Up Rail.
Long bay length survey	19 Aug	Weekly	N/A	Ground shortening increasing between ES5 and AP5.
Rail stress	Every 5 mins			Changes in stresses within expectations. Nine gauges have been replaced. It is recommended that SFT be lowered at 98.140 km Up Up and raised at 98.320 km Up Down.
Switch displacements	Every 5 mins			Measurements within tolerances. As recommended, 75 mm has been cut out at ES5-C and 25 mm added at ES6-S on the Up Main Up Rail. It is further recommended to cut out 75 mm at ES5-C on the Up Main Down Rail within the next fortnight.
Track geometry survey	20 & 22 Aug	Weekly		Undercutting mud hole in cutting at 99.70 km completed 17 August, where exceedents have been recorded. Top on the Up Main improved by reconditioning but track geometry has deteriorated on 22 August at 99.625km to 99.635km. Additional track geometry survey conducted 22 August, with results to be issued next week.
Track centre measurements	-	Monthly	-	Last survey 2 July. Small changes measured.
Inspections by Track Certifier	Daily			Change in Line observed from visual inspection at 99.625km to 99.635km on 22 August. The change was not visible on 21 August. In light of observed rate of change, ground survey results and current position of LW face, the RRG agreed on 22 August to implement a Temporary speed restriction of 40/40 km/hr imposed on both tracks on 22 August. Maintenance contractor on standby to realign track if required. No other issues reported.
Early warning monitoring				
GNSS monitoring S1 to S15	Continuous		N/A	Subsidence gradually developing close to prediction above the LW, approximately 690 mm in magnitude at Site S10.

Monitoring Activity	Date	Current Frequency	Highest Trigger	Comments
Embankment and Culvert at 100.425 km, incl Water Main crossing at 100.380 km				
Absolute 3D survey	19 Aug	Weekly		Minor changes observed.
Extensometers	Every 15 minutes		N/A	Minor changes observed since sensor installed on 2 June.
Inclinometer	-	Monthly	N/A	Minor changes observed on 7 August.
Piezometer	Every 15 minutes		N/A	No water recorded since 7 June.
Visual inspection	19 Aug	Weekly	N/A	No noticeable changes observed since end of LW S2A. It is recommended to clean out sediment at culvert outlet. CCTV inspection on 12 July showed no change in culvert condition.
Cutting at 100.310km				
Visual inspection	19 Aug	Weekly	N/A	No issues observed.
Embankment and Culvert at 100.121 km				
Absolute 3D survey	19 Aug	Weekly		Minor changes observed.
Extensometers	Every 15 minutes		N/A	Minor changes observed since sensor installed on 25 April.
Inclinometer	-	Monthly	N/A	Minor changes observed on 7 August.
Piezometer	Every 15 minutes		N/A	No water recorded since 13 June.
Visual inspection	19 Aug	Weekly	N/A	Minor slip / scour identified above culvert inlet on Up side, exposing Telstra cable. The location is remote from the railway track and may have occurred after the heavy rainfall event on 6 April. It is recommended to clean out rock debris inside culvert and to replace existing Down side 1.2 m RCPs with 1.5m RCP.
Cutting at 99.690 km				
Absolute 3D survey	19 Aug	Weekly		Subsidence increasing. Closure developing across the crest and base at northern end of cutting above centre of LW S3A between 99.62 km and 99.68 km. Closure exceeded 20 mm trigger levels on 19 August. Undercutting of mud-hole in this area completed on 17 August.
Visual inspection	19 Aug	Weekly	N/A	No visual evidence of closure observed and no evidence of instability of the cutting. No issues observed, including at possible minor fault at 99.560 km on the Down side, potentially extending to Heritage Well at 99.530 km. Change in Line since observed on 22 Aug.
Embankment and Culvert at 99.338 km				
Absolute 3D survey	19 Aug	Weekly		Minor changes observed. Minor closure measured on the Up side at 99.36 km.
Extensometers	Every 15 minutes		N/A	Ground extension observed following rainfall event on 6 April. Measurements are currently 24 mm and below trigger level.
Inclinometer	-	Monthly	N/A	Minor changes observed on 7 August.
Piezometer	Every 15 minutes		N/A	Piezometer relocated to steel post to protect from debris, which caused sensor to not detect a flooding event on 6 April. 800 mm depth of water detected following rainfall on 2 June. No water recorded since 7 June.
Visual inspection	19 Aug	Weekly	N/A	No noticeable changes observed since end of LW S2A. CCTV inspection on 12 July showed no change in culvert condition.
Cutting at 99.165km				
Visual inspection	19 Aug	Weekly	N/A	No noticeable changes observed since end of LW S2A.

Monitoring Activity	Date	Current Frequency	Highest Trigger	Comments
Embankment and Culvert at 99.035 km				
Absolute 3D survey	19 Aug	Weekly		Very minor changes observed since end of LW S2A.
Visual inspection	19 Aug	Weekly	N/A	No noticeable changes observed since end of LW S2A. CCTV inspection on 11 July showed no change in culvert condition.
Embankment and Culvert at 98.739 km				
Absolute 3D survey	-	-	N/A	Surveys commence in Stage 1.
Visual inspection	-	Monthly	N/A	Last inspection 12 August. No noticeable changes observed since end of LW S2A. CCTV inspection on 11 July showed no change in culvert condition.
Embankment and Culvert at 98.445 km				
Absolute 3D survey	-	-	N/A	Surveys commence in Stage 1.
Visual inspection	19 Aug	-	N/A	No noticeable changes observed since end of LW S2A. CCTV inspection on 11 July showed no change in culvert condition. Build up of sediment observed at outlet.
Bargo River Railway Viaduct at 96.256 km and Remembrance Drive Bridge over Bargo River at 96.385 km				
GNSS units S11 and S12	Continuous		N/A	No measurable movements or change between GNSS units. Confirmed by manual survey on 9 July.
Far-field Absolute 3D survey	-	-	N/A	Surveys commence after 900 m of extraction. Minor changes observed on 9 July since previous survey in April 2024.
Absolute 3D survey	-	-	N/A	Surveys commence after 900 m of extraction. Minor changes observed on 9 July since previous survey in April 2024.
Precision 2D ground survey between ends of Viaduct and Bridge (valley closure)	-	-		Surveys commence after 900 m of extraction. Minor changes observed on 9 July since previous survey in April 2024.
Gap between deck and northern abutment of Bridge	-	-		Surveys commence after 900 m of extraction. Minor changes observed on 9 July since baseline survey in July 2022.
Bargo River Road Overbridge at 96.049 km (Potter's Cutting)				
Far-field Absolute 3D survey	-	-	N/A	Surveys commence after 900 m of extraction.
Local 3D survey of structure	-	-		Surveys commence after 900 m of extraction.
Crack gauges	-	-		Surveys commence after 900 m of extraction.
Wellers Road Overbridge at 101.162 km				
GNSS unit S15	Continuous		N/A	Minor movements observed.
Local 3D survey of structure	-	-		Survey planned at end of LW S3A.
Crack gauges	-	-		Measurement planned at end of LW S3A.

Management Actions
Other management actions since previous report: ● Cut out 75 mm at ES5-C and add 25 mm at ES6-S Up Main Up Rail, completed 17 August ● Undercutting of mud hole in cutting at 99.70 km where exceedents have been recorded completed 17 August ● Additional track geometry survey completed 22 August
Any additional and/or outstanding management actions: ● 99.625km an additional targeted Geometry Trolley run implemented ● 99.625km Planned alignment repair to remove 40/40km/hr Temporary Track Speed by 30th Aug ● Cut out 75 mm at ES5-C on the Up Main Down Rail within the next fortnight ● CWR adjustment at 98.140 km Up Up and 98.320 km Up Dn, prior to October ● Replace ZTL clips in Zone 2 with standard resilient fastenings and remove ES2, prior to October ● Clean out rock debris inside Culvert at 100.121 km, and protect exposed Telstra cable in embankment fill above culvert ● Clean out sediment at outlet of Culvert at 100.425 km ● Repair culvert headwall at 98.445 km, planned completion end of LW S3A ● Extend RCP and build headwall at 99.338 km, planned completion end of LW S3A ● Repair wash away at 98.720 km, planned completion end of LW S3A
Consultation with stakeholders since previous report: ● RRG meeting held 22 August 2024 following observation of changes in Line developing at 99.625km to 99.635km. ● Notification to ARTC of observations and decision to implement TSR from 99.5 km to 99.9 km on 22 August 2024 ● RMG meeting held 23 August 2024
Forecast whether continued longwall mining is likely to cause: **A. Track closure for any period unacceptable to ARTC** **B. Impact on the safety of operations on the Main Southern Railway** Based on monitoring results to date, and the controls implemented and available under the LW S1A-S6A Management Plan for Longwall Mining beneath and adjacent to the Main Southern Railway, it is possible that track geometry trigger levels will be exceeded in the next week. A TSR of 40 km/hour has been implemented on both tracks, additional track geometry surveys are being conducted and local resurfacing may be conducted as required. Accordingly continued longwall mining is not likely to result in the occurrence of either A or B above.

Certified by Tahmoor Coal	
Name	Ross Barber
Position	Project Manager
Signature	*Ross Barber*
Date	23 August 2024

Copy of Report to:

Daniel Wakefield, Area Manager Ingleburn, ARTC
Sladjan Mitic, Senior Track & Civil Engineer Sydney, ARTC
Brian Cooper, Manager Maintenance North-South, ARTC;
Clint Mason, Production Manager, Tahmoor Mine
Michael Irons, Property Manager – Wagga, ARTC
Peter Haskard, Manager Engineering, Interstate Network, ARTC
Ian Cochran, Bridges and Structures Specialist, ONRSR
Ray Ramage, Principal Inspector – Subsidence, Mine Safety Inspectorate, Resources Regulator

TAHMOOR COAL: LW S3A

Subsidence Management Status Report No. 24
During the mining of LW S3A beneath the Main Southern Railway

Reporting Period	20 November 2024 to 26 November 2024	
Length of extraction of LW S3A	1665 m	at 26 November 2024. LW S3A commenced extraction on 8 May 2024
Closest distance of LW S3A face to Railway	705 m	to 99.20 km. LW moving beyond railway.
Distance travelled by LW since previous report	62 m	since 19 November 2024
Maximum total subsidence along Railway since start of LW S1A	978 mm	at 99.12 km on 26 November 2024
Maximum incremental subsidence along Railway due to LW S3A	756 mm	at 99.48 km on 26 November 2024
Maximum increase in subsidence since previous survey	4 mm	at 99.32 km and 100.48 km (18 November to 26 November 2024)
Safety Incidents	No incidents reported	
Rail Operations	No delays incurred. TSR from 99.5 km to 99.8 km implemented on both tracks on 22 August due to mining-induced changes in track. TSR removed from the Up Main on 2 November. TSR of 60 km/hr removed from the Down Main on 24 November.	

Summary of monitoring and inspections

Monitoring Activity	Date	Current Frequency	Highest Trigger	Comments
Railway Track				
3D ground survey	26 Nov	Monthly	N/A	Minor changes measured this month.
2D ground survey	26 Nov	Cease for LW S3A	N/A	Railway has experienced the most active period of subsidence. Rates of change reducing, including at previously observed compressive strains and bumps in subsidence at 99.56 km and 99.64 km, and compressive strains across creek crossing from 99.36 km to 99.44 km. ARTC authorised change to Stage 3 subsidence management. Surveys for LW S3A will cease.
Rail creep surveys	26 Nov	Cease for LW S3A	N/A	No new rail creep this week.
Long bay length survey	26 Nov	Cease for LW S3A	N/A	Minor changes this week though there is continued ongoing closure between ES4 and AP4. ARTC authorised change to Stage 3 subsidence management. Surveys for LW S3A will cease.
Rail stress	Every 5 mins			Changes in stresses within expectations. Two gauges have been replaced. Four gauges require replacement. It is recommended to correct SFT in Zone 2 where ZTL clips have been replaced. ARTC authorised change to Stage 3 subsidence management. Alarms have been disabled from 98.38 km to 100.44 km.
Switch displacements	Every 5 mins			Measurements within tolerances. It is recommended to cut out 75 mm at ES4-C on the Up Main Up Rail. ES2 has been removed and ES7 has been installed on the Down Main at 100.420 km. Five gauges have been replaced. 2 GREY alarms received due to loose sensor plug and gauge failure. ARTC authorised change to Stage 3 subsidence management. Displacement alarms have been disabled.

Monitoring Activity	Date	Current Frequency	Highest Trigger	Comments
Track geometry survey	26 Nov	Cease for LW S3A		Track geometry deteriorated from 22 Aug at 99.625km to 99.635km. Track geometry improved after localised tamping on 27 Aug, 2, 15 and 19 September, 12 October and 2 November. It is recommended to inspect, record and correct track geometry between 99.55 km and 99.75 km as required. Track geometry improved after localised tamping on 24 November. ARTC authorised change to Stage 3 subsidence management. Surveys for LW S3A will cease.
Track centre measurements	-	Cease for LW S3A	-	Last survey 20 September. Some changes measured at 99.62 km and 99.68 km where maintenance has been undertaken. Track centres will be checked during planned maintenance works.
Inspections by Track Certifier	Twice weekly			TSR of 40 km/hr in place since 22 August due to adverse changes in track geometry at 99.500km to 99.800km. TSR raised to 60 km/hr on the Down Main on 27 September and on the Up Main on 17 October. TSR removed from the Up Main on 2 November. TSR removed from the Down Main on 24 November. No other issues reported. ARTC authorised change to Stage 3 subsidence management. Frequency of inspections will change from daily to twice weekly.
Early warning monitoring				
GNSS monitoring S1 to S15	Continuous		N/A	Minor ongoing changes observed.
Embankment and Culvert at 100.425 km, incl Water Main crossing at 100.380 km				
Absolute 3D survey	26 Nov	Cease for LW S3A		Minor changes observed. Survey marks WM3 and WM5 removed during water main works. ARTC authorised change to Stage 3 subsidence management. Weekly and monthly surveys for LW S3A will cease.
Extensometers	Every 15 minutes		N/A	Minor changes observed since sensor installed on 2 June 2024. A small sudden jump in readings occurred on 24 November, likely due to rerailling on the Up Main.
Inclinometer	-	Cease for LW S3A	N/A	Minor changes observed on 4 November. ARTC authorised change to Stage 3 subsidence management. Monitoring for LW S3A will cease.
Piezometer	Every 15 minutes		N/A	No water recorded since 18 October.
Visual inspection	25 Nov	Cease for LW S3A	N/A	No noticeable changes observed since end of LW S2A. It is recommended to clean out sediment at culvert outlet. CCTV inspection on 10 September showed no change in culvert condition. The watermain was exposed on 14 September. ARTC authorised change to Stage 3 subsidence management. Inspections for LW S3A will cease.
Cutting at 100.310km				
Visual inspection	25 Nov	Cease for LW S3A	N/A	No issues observed. ARTC authorised change to Stage 3 subsidence management. Inspections for LW S3A will cease.

Monitoring Activity	Date	Current Frequency	Highest Trigger	Comments
Embankment and Culvert at 100.121 km				
Absolute 3D survey	26 Nov	End of LW		Minor changes observed. ARTC authorised change to Stage 3 subsidence management. Weekly and monthly surveys for LW S3A will cease.
Extensometers	Every 15 minutes		N/A	Minor changes observed since sensor installed on 25 April 2024. ARTC authorised change to Stage 3 subsidence management. Alarm has been disabled.
Inclinometer	-	Monthly	N/A	Minor changes observed on 4 November. ARTC authorised change to Stage 3 subsidence management. Monitoring for LW S3A will cease.
Piezometer	Every 15 minutes		N/A	No water recorded since 15 October.
Visual inspection	25 Nov	Cease for LW S3A	N/A	Minor slip / scour identified above culvert inlet on Up side, exposing Telstra cable. The location is remote from the railway track and may have occurred after the heavy rainfall event on 6 April. It is recommended to clean out rock debris inside culvert and to replace existing Down side 1.2 m RCPs with 1.5m RCP. Minor erosion observed on the Up Side crest after rainfall this month. ARTC authorised change to Stage 3 subsidence management. Inspections for LW S3A will cease.
Cutting at 99.690 km				
Absolute 3D survey	26 Nov	End of LW		Subsidence and closure across the crest and base increasing at reduced rate of change at northern end of cutting above centre of LW S3A between 99.60 km and 99.74 km. Closure exceeded 20 mm trigger levels on 19 August, prior to deterioration of track geometry. ARTC authorised change to Stage 3 subsidence management. Weekly and monthly surveys for LW S3A will cease.
Visual inspection	25 Nov	Cease for LW S3A	N/A	No visual evidence of instability of the cutting, noting surveyed cutting closure and changes in alignment and changes in track geometry. Change in Line observed on 22 August. Cracks observed in Down side access road and crest of cutting on 25 August, which have been mapped. Cracks intersected Telstra cable, which has been excavated and exposed. Cracks observed at Down side crest of cutting on 9 September at 99.560 km and 99.720 km, which have been mapped. Telstra cable has been excavated and exposed 99.56 km to 99.47 km to relieve losses detected in the cable. No changes to cracks across access road for last two months. ARTC authorised change to Stage 3 subsidence management. Inspections for LW S3A will cease.

Monitoring Activity	Date	Current Frequency	Highest Trigger	Comments
Embankment and Culvert at 99.338 km				
Absolute 3D survey	26 Nov	End of LW		Subsidence increasing above LW S3A, at reduced rate of change. Closure developing across the crest and base and on the Up side. Minor compressive strain at 99.36 km to 99.38 km at creek crossing. ARTC authorised change to Stage 3 subsidence management. Weekly and monthly surveys for LW S3A will cease.
Extensometers	Every 15 minutes			Minor changes observed this week. ARTC authorised change to Stage 3 subsidence management. Alarm has been disabled.
Inclinometer	-	Cease for LW S3A	N/A	Minor changes observed on 4 November. ARTC authorised change to Stage 3 subsidence management. Monitoring for LW S3A will cease.
Piezometer	Every 15 minutes		N/A	No water recorded since 18 October.
Visual inspection	25 Nov	Cease for LW S3A	N/A	Minor vertical and stepped cracks up to 1 mm wide observed in lower brick courses on both sides of culvert above concrete floor. No change this week. CCTV inspection on 8 October showed no change in culvert condition. ARTC authorised change to Stage 3 subsidence management. Inspections for LW S3A will cease.
Cutting at 99.165km				
Visual inspection	25 Nov	Cease for LW S3A	N/A	No noticeable changes observed since end of LW S2A. ARTC authorised change to Stage 3 subsidence management. Inspections for LW S3A will cease.
Embankment and Culvert at 99.035 km				
Absolute 3D survey	26 Nov	End of LW		Very minor changes observed since end of LW S2A. ARTC authorised change to Stage 3 subsidence management. Weekly and monthly surveys for LW S3A will cease.
Visual inspection	25 Nov	Cease for LW S3A	N/A	No noticeable changes observed since end of LW S2A. CCTV inspection on 18 November showed no change in culvert condition. ARTC authorised change to Stage 3 subsidence management. Inspections for LW S3A will cease.
Embankment and Culvert at 98.739 km				
Absolute 3D survey	26 Nov	End of LW		Very minor changes observed since end of LW S2A. ARTC authorised change to Stage 3 subsidence management. Weekly and monthly surveys for LW S3A will cease.
Visual inspection	25 Nov	Cease for LW S3A	N/A	No noticeable changes observed since end of LW S2A. CCTV inspection on 18 November showed no change in culvert condition. ARTC authorised change to Stage 3 subsidence management. Inspections for LW S3A will cease.
Embankment and Culvert at 98.445 km				
Absolute 3D survey	26 Nov	End of LW	N/A	Very minor changes observed since end of LW S2A. Minor opening across the crest at 99.42 km. ARTC authorised change to Stage 3 subsidence management. Weekly and monthly surveys for LW S3A will cease.
Visual inspection	25 Nov	Cease for LW S3A	N/A	No noticeable changes observed since end of LW S2A. CCTV inspection on 8 October showed no change in culvert condition. Build up of sediment and partial blockage observed at downside RCP has been cleared. Water level at outlet due to backup of water from Dam S4 has reduced. ARTC authorised change to Stage 3 subsidence management. Inspections for LW S3A will cease.

Monitoring Activity	Date	Current Frequency	Highest Trigger	Comments
Bargo River Railway Viaduct at 96.256 km and Remembrance Drive Bridge over Bargo River at 96.385 km				
GNSS units S11 and S12	Continuous		N/A	No measurable movements or change between GNSS units. Confirmed by manual survey on 10 October. GNSS unit S12 offline since 31 October and under investigation.
Far-field Absolute 3D survey	-	Monthly	N/A	Last survey 10 October. Minor changes observed since previous survey on 11 September. ARTC authorised change to Stage 3 subsidence management. Surveys will cease after completion of LW S3A.
Absolute 3D survey	-	Monthly	N/A	Last survey 10 October. Minor changes observed since previous survey on 11 September. ARTC authorised change to Stage 3 subsidence management. Surveys will cease after completion of LW S3A.
Precision 2D ground survey between ends of Viaduct and Bridge (valley closure)	-	Monthly		Last survey 10 October. Minor changes observed since previous survey on 11 September. ARTC authorised change to Stage 3 subsidence management. Surveys will cease after completion of LW S3A.
Gap between deck and northern abutment of Bridge	-	Monthly		Last survey 10 October. Minor changes observed since baseline survey in July 2022. ARTC authorised change to Stage 3 subsidence management. Surveys will cease after completion of LW S3A.
Bargo River Road Overbridge at 96.049 km (Potter's Cutting)				
Far-field Absolute 3D survey	-	Monthly	N/A	Last survey 10 October. Minor changes observed since end of LW S2A. ARTC authorised change to Stage 3 subsidence management. Surveys will cease after completion of LW S3A.
Local 3D survey of structure	-	Monthly		Last survey 10 October. Minor changes observed since end of LW S2A. ARTC authorised change to Stage 3 subsidence management. Surveys will cease after completion of LW S3A.
Crack gauges	-	Monthly		Last readings 9 October. No measurable change observed. ARTC authorised change to Stage 3 subsidence management. Monitoring will cease after completion of LW S3A.
Wellers Road Overbridge at 101.162 km				
GNSS unit S15	Continuous		N/A	Minor movements observed.
Local 3D survey of structure	-	End of LW		Survey planned at end of LW S3A.
Crack gauges	-	End of LW		Measurement planned at end of LW S3A.

Management Actions
Other management actions since previous report: ● Track geometry adjustment between 99.55 km and 99.75 km completed on Down Main and TSR removed ● ES2 removed ● ES7 installed on Down Main ● Removal of ZTL clips in Zone 2 commenced
Any additional and/or outstanding management actions: ● Cut out 75 mm at ES4-C on the Up Main Up Rail. ● Install ZTL clips, switches and anchor points in Zone 7, planned December ● Install track baulks at culvert at 100.42 km, planned December ● Remove track baulk at culvert at 98.739 km, planned December ● Replace ZTL clips in Zone 2 with standard resilient fastenings, planned December ● Replace ZTL clips on the Down Main in Zone 3 with standard resilient fastenings, planned December ● Clean out rock debris inside Culvert at 100.121 km, and protect exposed Telstra cable in embankment fill above culvert
Consultation with stakeholders since previous report: ● Request LWS3A-02 for change to Stage 3 subsidence management approved by ARTC on 22 November 2024 ● Change to Stage 3 implemented on 26 November after length of extraction had exceeded 1650 metres and RMG approved change to Stage 3 based on review of latest monitoring data. ● RMG meeting held 29 November 2024
Forecast whether continued longwall mining is likely to cause: **A. Track closure for any period unacceptable to ARTC** **B. Impact on the safety of operations on the Main Southern Railway** Based on monitoring results to date, and the controls implemented and available under the LW S1A-S6A Management Plan for Longwall Mining beneath and adjacent to the Main Southern Railway, no triggers under this Management Plan are expected to be exceeded in the next month. Accordingly continued longwall mining is not likely to result in the occurrence of either A or B above.

Certified by Tahmoor Coal	
Name	Ross Barber
Position	Project Manager
Signature	*Ross Barber*
Date	29 November 2024

Copy of Report to:

Daniel Wakefield, Area Manager Ingleburn, ARTC
Sladjan Mitic, Senior Track & Civil Engineer Sydney, ARTC
Brian Cooper, Manager Maintenance North-South, ARTC;
Clint Mason, Production Manager, Tahmoor Mine
Michael Irons, Property Manager – Wagga, ARTC
Peter Haskard, Manager Engineering, Interstate Network, ARTC
Ian Cochran, Bridges and Structures Specialist, ONRSR
Ray Ramage, Principal Inspector – Subsidence, Mine Safety Inspectorate, Resources Regulator

Appendix H – Australian Wildlife Sanctuary Monitoring Reports

TAHMOOR COAL: Longwall S3A

Australian Wildlife Sanctuary Subsidence Status Report No. 14

(Please note the report numbers are aligned with the LW S3A monitoring report numbers for ease of comparison. Accordingly, there are no Report Nos. 1 and 2 for LW S3A)

Reporting Period	24 August 2024 to 30 August 2024	
Length of extraction of LW S3A	871 m	On 29 August 2024 LW S3A commenced extraction on 8 May 2024
Length of extraction remaining of LW S3A	833 m	
Distance travelled by LW since previous report	62 m	Since 22 August 2024
Closest distance of LW S3A face to AWS property	0 m	LW face directly beneath property at Teatree Hollow
Closest distance of LW S3A face to AWS structures	115 m	To visitor centre, with LW face moving away
Maximum incremental subsidence since start of LW S3A	694 mm 165 mm	GNSS Site S10 on 29 August 2024 AWS-7 (NW corner of bird enclosure)
Maximum total subsidence since start of LW S1A S3A	983 mm 181 mm	GNSS Site S26 on 29 August 2024 AWS-8 (south of bird enclosure)
Maximum increase in subsidence since previous report S3A	73 mm 75 mm	Main Southern Railway since 19 August AWS-7 (NW corner of bird enclosure) since 21 August

Summary of monitoring and inspections

Monitoring Activity	Date	Current Frequency	Highest Trigger	Comments
GNSS units				
Site S01 to S10, 26 & 27	Continuous		N/A	Subsidence increasing, particularly at Site S10 above LW S3A and Site 26 on AWS property above LW S3A.
Valley closure across Wirrimbirra Creek as measured by GNSS units				
Sites S01 and S02 above LW S1A	Continuous		N/A	Closure has gradually developed, up to 178 mm. Very minor changes since start of LW S3A.
Sites S03 and S04 at Ockenden Pool	Continuous		N/A	Closure has gradually developed, up to 200 mm Minor changes since start of LW S3A.
Sites S05 and S06 above LW S2A	Continuous		N/A	Closure has gradually developed, up to 203 mm. Small changes since start of LW S3A.
Sites S07 and S08 above LW S2A	Continuous		N/A	Approximately 207 mm closure developed. Closure increasing since start of LW S3A. Rates of change reducing.
Sites S09 and S10 at the Big Pool	Continuous		N/A	Approximately 344 mm closure developed. Closure increasing since start of LW S3A. Rates of change reducing.
Valley closure across Teatree Hollow as measured by GNSS units				
Sites S26 and S27 above LW S2A	Continuous		N/A	Valley closure gradually developed during LW S2A, up to approximately 100 mm by mid-January 2024, with closure reducing since that time as the LW face moved away. Minor changes since start of LW S3A.
Main Southern Railway				
Ground surveys	26 Aug	Weekly	N/A	Subsidence increasing.
Local streets				
Ground survey along Charlies Point Road	-	Monthly	N/A	Last survey 29 July. Minor changes since the end of LW S2A.
Ground survey along Remembrance Drive	26 Aug	Weekly	N/A	Monthly 3D survey on 6 August survey measured minor changes, including previously observed non-conventional compressive strains and bumps in the observed subsidence profiles between Pegs R47 and R48, and between Pegs R54 and R55. Minor changes observed this week.

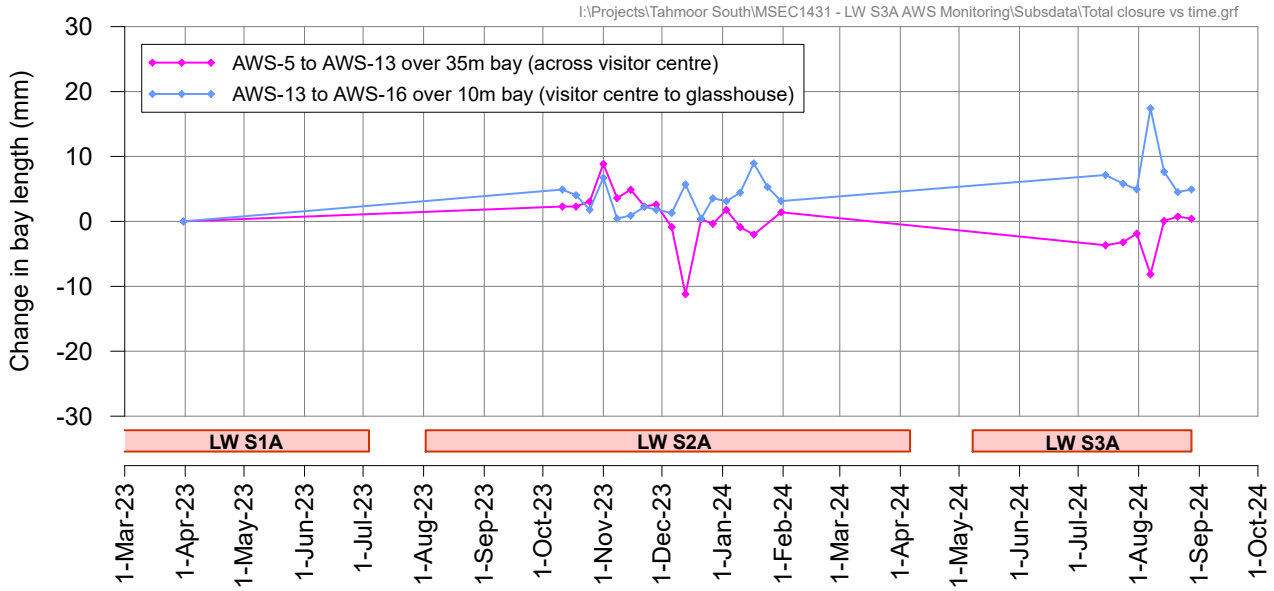
Monitoring Activity	Date	Current Frequency	Highest Trigger	Comments
Local streets (continued)				
Visual inspections along local roads	26 & 30 Aug	Weekly		No significant changes observed along Remembrance Drive on 30 August. No issues observed along Charlies Point Road on 26 August during final inspection for LW S3A.
Natural features				
Ground survey across Wirrimbirra Creek	-	End of LW	N/A	Closure and upsidence observed along TT2 line, upstream of Pool TT2 during LW S2A.
Water level and water quality monitoring	Continuous	Download monthly	Level 4	While the observed rates of water level recession at Pool TT2 are consistent with previously observed rates and consistent with evaporation rates, surface and ground water assessments have found that the low water levels are atypical than what would be considered 'normal' conditions and are likely due to mining-induced reduction in groundwater baseflow into the pool.
Visual inspections of streams and small cliffs	20 Aug	Monthly	Level 4	Latest inspection 20 August. Localised fracturing and loss of surface water has been observed, exceeding the Level 4 trigger level in the AWS Management Plan at Pool TT2 during the mining of LW S2A. Tahmoor Coal will develop a CMAP in consultation with AWS as required under the Management Plan. Temporary water supply continues to be maintained since installed on 25 July 2023. An inspection on 20 August observed reduced surface flows continuing along the full length of the Tributary to Teatree Hollow since the previous inspection on 17 July after a period of dry weather. Surface water stopped at K64, re-emerging upstream of Pool TT2, which holds water. Surface water then stops downstream of Pool TT2, re-emerging at K71, upstream of the confluence with Teatree Hollow. New fracture observed on 17 July in Tributary at Pool TT2, approximately 6 metres long. Visual inspection of rock shelter on 19 June 2024 found the creek flowing and no impacts to rock shelter.
Structures				
Local 3D surveys	28 Aug	Weekly	N/A	Subsidence increasing. Minor closure measured across the visitor centre (Pegs AW-5 and AWS-13) has reversed. Opening measured on southern sides of visitor centre and glasshouse (Pegs AW-13 and AWS-16) on 7 August likely to have been erroneous. Measurements this week are consistent with previous trends.
Visual inspections	28 Aug	Weekly	Impacts obs'd to gates and fences	Cracks observed in adjacent railway cutting on 25 August have extended into AWS property, where a compression hump is developing to the northeast and through the new Tassie Devil enclosures. Four gates have been repaired.
Asbestos air monitoring	28 Aug	Weekly	N/A	All results are below the lowest detectable limit.
Visual inspections				
Dingo Sanctuary	28 Aug	Weekly	N/A	No immediate issues of concern observed. Some cloth fencing has detached due to strong winds.
Farm dam	28 Aug	Weekly	N/A	No immediate issues of concern observed.
External pavements, fences and gates	28 Aug	Weekly	N/A	A new timber and steel-framed gate between animal enclosures is out of alignment and cannot be properly closed. Three additional gates found to be not closing. All four gates repaired 27 August. Ground movement observed in this location.
Walking trails	28 Aug	Weekly	N/A	No immediate issues of concern observed.

Management Actions
Other management actions since previous report: ● Repair of four gates completed 27 August. ● Four additional survey marks installed along perimeter fence of Tassie Devil enclosures on 28 August
Any additional and/or outstanding management actions: ● Tahmoor Coal will develop a CMAP in consultation with National Trust and AWS after effects of mining
Consultation with stakeholders since previous report: ● Weekly reports will be issued during the mining of LW S3A
Forecast whether continued longwall mining is likely to cause impacts on the health and safety of people who may be present at the property due to the extraction of LW S3A: Based on monitoring results to date, and the controls implemented and available under the LW S3A Management Plan, no triggers under this Management Plan are expected to be exceeded in the next week.

Certified by Tahmoor Coal	
Name	Ross Barber
Position	Project Manager
Signature	*Ross Barber*
Date	3 September 2024

Copy of Report to:

John Alcock and David Burdon, National Trust of Australia (NSW)
Brad Wilson, Managing Director, Australian Wildlife Sanctuary
Luci Ellem, Managing Director, Bargo Dingo Sanctuary
Australian Native Dog Conservation Society
Clint Mason, Production Manager, Tahmoor Mine
Ray Ramage, Principal Inspector – Subsidence, Mine Safety Inspectorate, Resources Regulator



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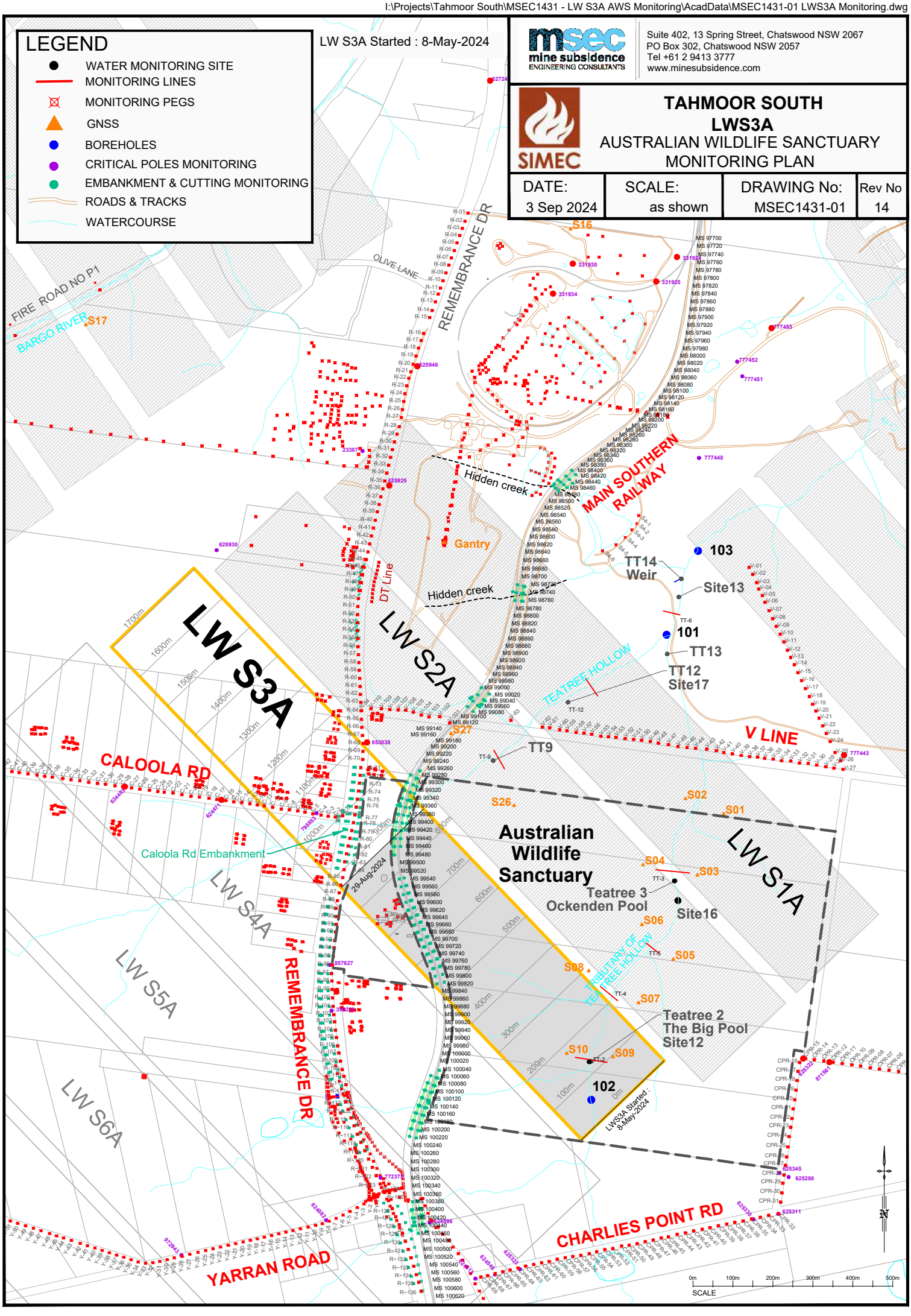

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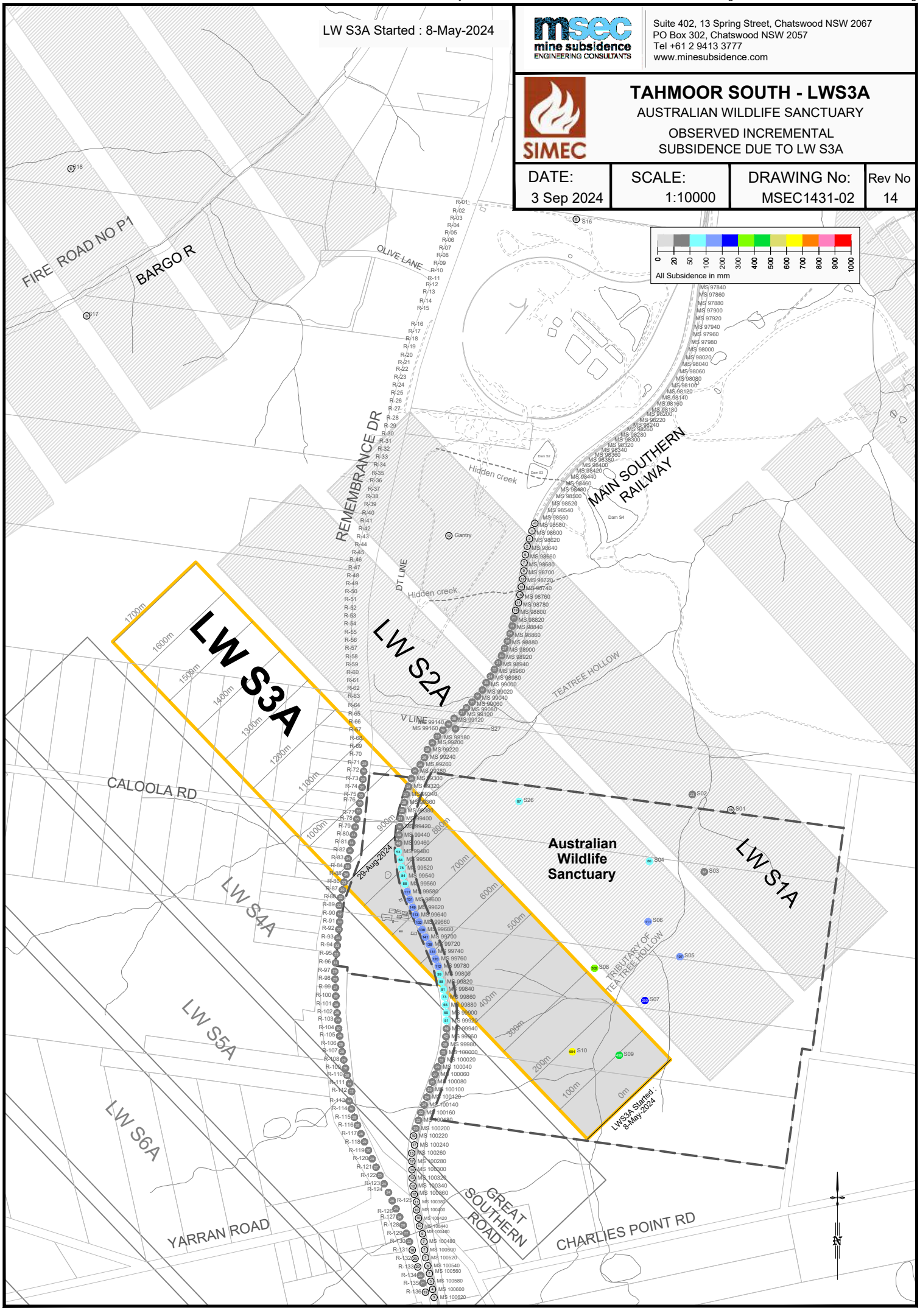

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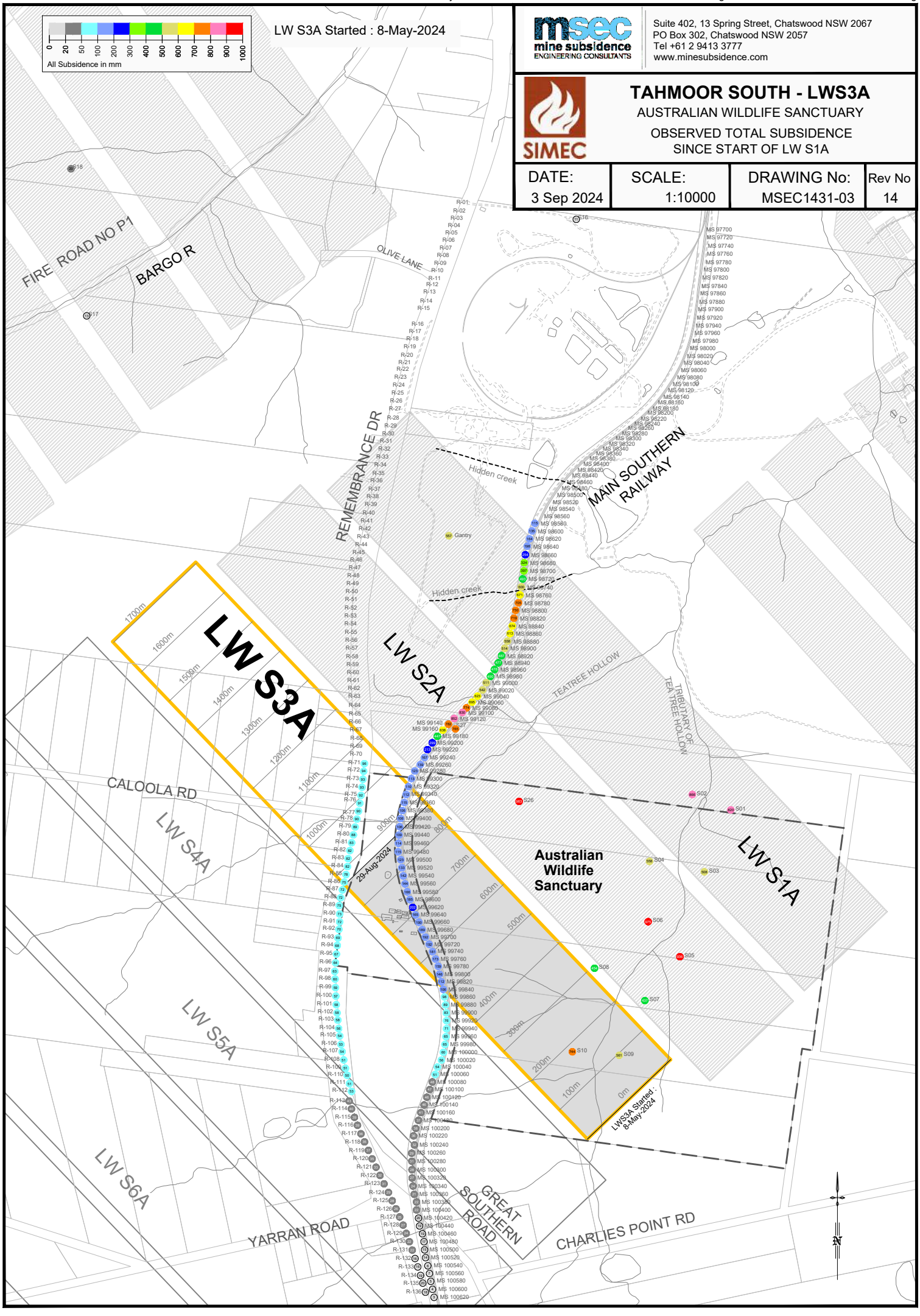

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msec mine subsidence ENGINEERING CONSULTANTS
Suite 402, 13 Spring Street, Chatswood NSW 2067
PO Box 302, Chatswood NSW 2057
Tel +61 2 9413 3777
www.minesubsidence.com

SIMEC

TAHMOOR SOUTH - LWS3A

AUSTRALIAN WILDLIFE SANCTUARY
CHANGE IN SUBSIDENCE
SINCE PREVIOUS SURVEY

DATE:	SCALE:	DRAWING No:	Rev No
3 Sep 2024	1:10000	MSEC1431-04	13

LW S3A Started : 8-May-2024

All Subsidence in mm
0 20 50 100 200 300 400 500 600 700 800 900 1000

LW S3A
LW S2A
LW S1A
LW S4A
LW S5A
LW S6A
1700m
1600m
1500m
1400m
1300m
1200m
1100m
1000m
900m
700m
600m
500m
400m
300m
200m
100m
0m
29-Aug-2024
22-Aug-2024
LW S3A Started : 8-May-2024
Australian Wildlife Sanctuary
FIRE ROAD NO P1
BARGO R
OLIVE LANE
REMEMBRANCE DR
MAIN SOUTHERN RAILWAY
Hidden creek
Gantry
TEATREE HOLLOW
TRIBUTARY OF TEA TREE HOLLOW
CALOOLA RD
YARRAN ROAD
GREAT SOUTHERN ROAD
CHARLIES POINT RD

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msec mine subsidence ENGINEERING CONSULTANTS
Suite 402, 13 Spring Street, Chatswood NSW 2067
PO Box 302, Chatswood NSW 2057
Tel +61 2 9413 3777
www.minesubsidence.com

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TAHMOOR SOUTH - LW S3A

AUSTRALIAN WILDLIFE SANCTUARY

GROUND MONITORING

DATE:	SCALE:	DRAWING No:	Rev No
3 Sep 2024	as shown	MSEC1431-05	14

Relative Origin AWS~11
(Relative Orientation 90°00' to AWS~8)

LW S3A Started : 8-May-2024

Survey Date : 28-Aug-2024

mm Total Subsidence

Horizontal displacement of survey marks since start of LW S2A

mm Vector & magnitude of observed horizontal movement (mm)

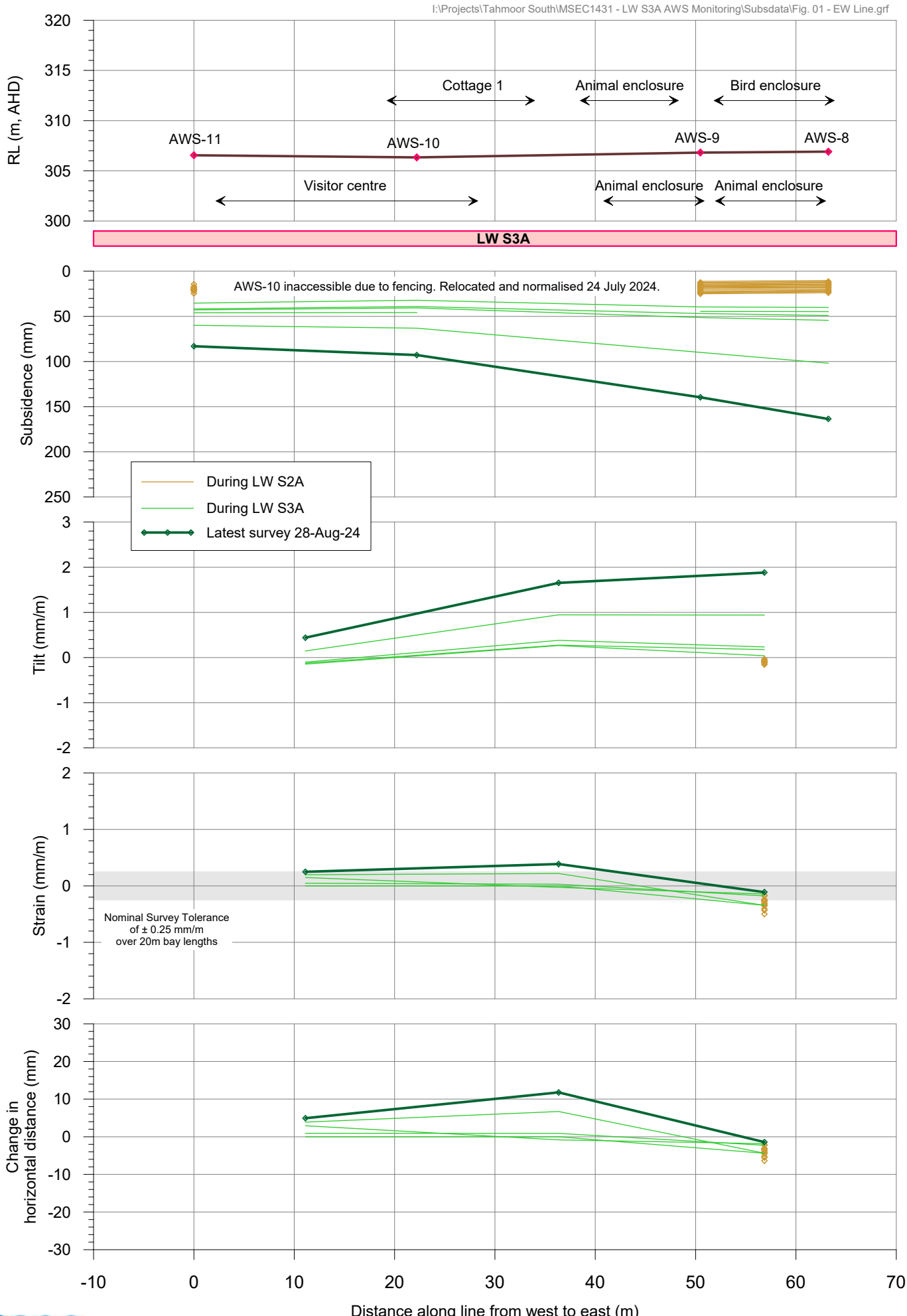
Change in horizontal distance between Survey Marks

mm Closure

mm Opening

FLT
CRCK
CRCK2
CRCK3
CRCK4
CRCK5
CRCK7
LWS3A
NS line
EW line
COTTAGE
COTTAGE 1
ANIMAL ENCLOSURE
BIRD ENCLOSURE
ANIMAL ENCLOSURE
ENCLOSURE
VISITORS CENTRE
GLASS HOUSE
NURSERY
SHED
Tassie Devil Enclosures
Fenced Enclosures
Gate not closing
Gate not closing
Fence buckling
Fence buckling
Railway Tracks
AWS-1
AWS-2
AWS-3
AWS-4
AWS-5
AWS-6
AWS-7
AWS-8
AWS-9
AWS-10
AWS-11
AWS-12
AWS-13
AWS-14
AWS-15
AWS-16
AWS-17
AWS-18
AWS-19
AWS-20

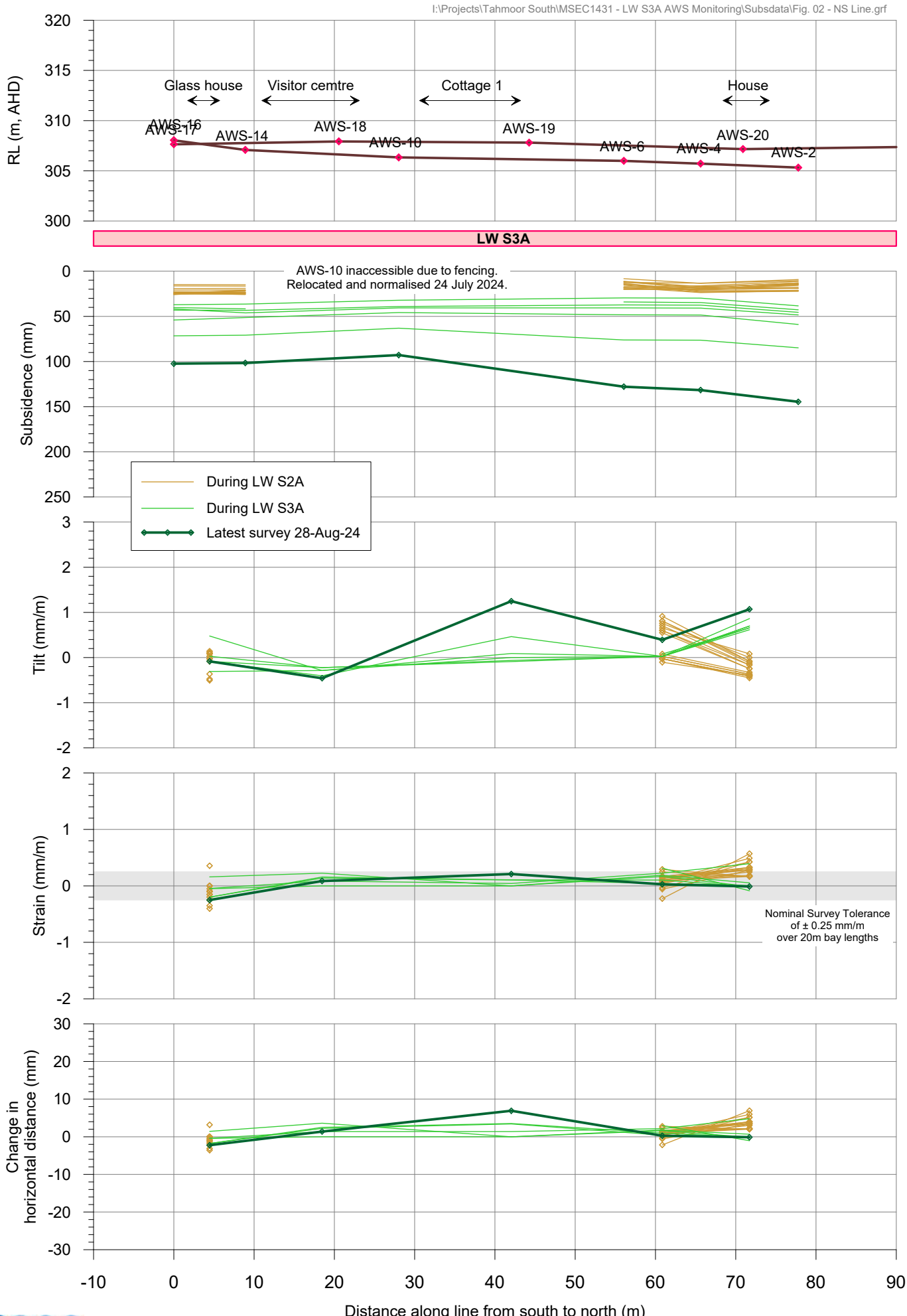
Tahmoor South LW S3A - AWS
Total subsidence profiles along East-West cross line



msec

Fig. 1-R14

Tahmoor South LW S3A - AWS
Total subsidence profiles along North-South cross line



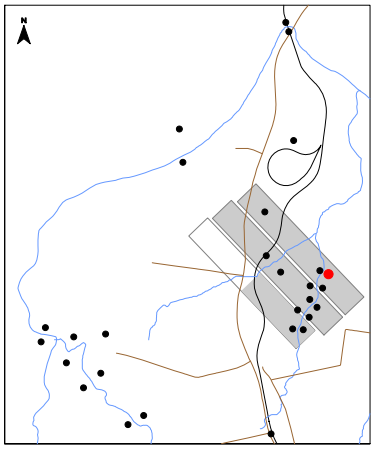
msec

Fig. 2-R14

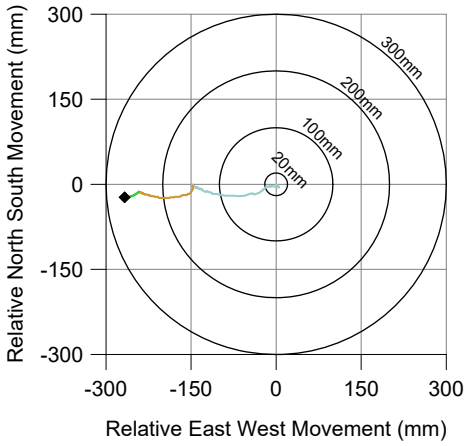
Tahmoor South LW S3A - GNSS Monitoring

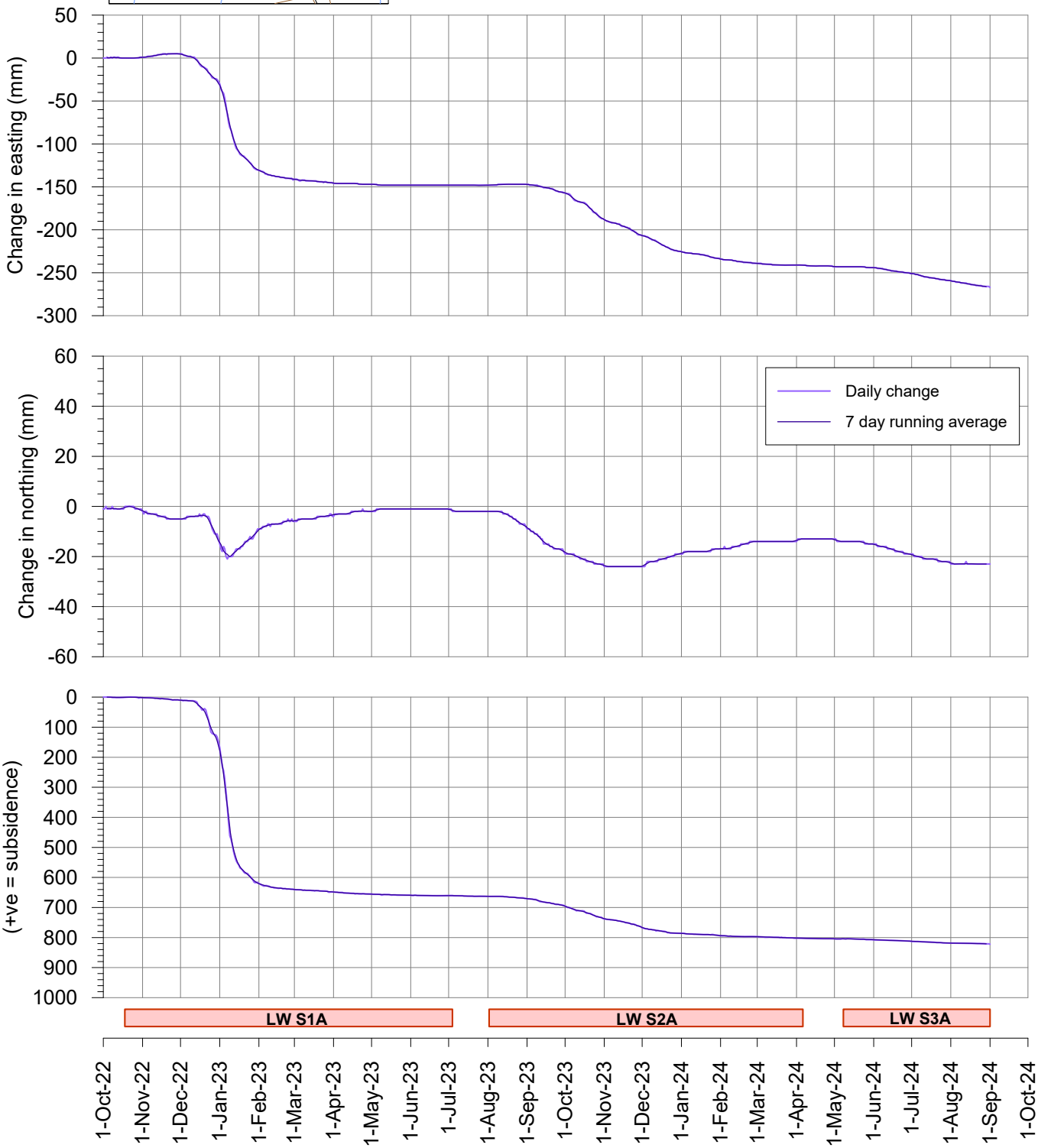
Site S01 above LW S1A

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S01 GNSS.grf



During LW S1A
During LW S2A
During LW S3A





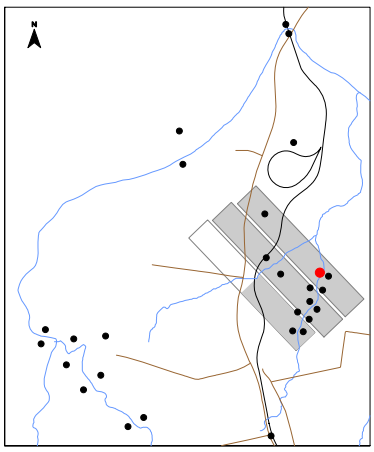
msec

Fig. S01-R14

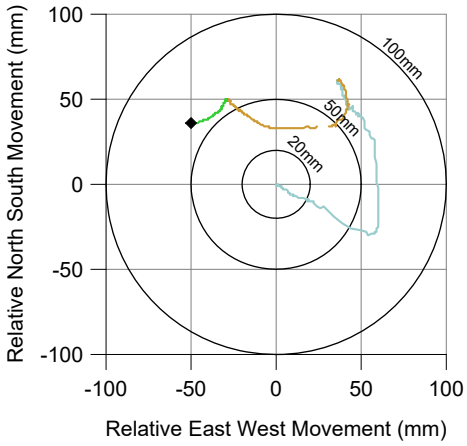
Tahmoor South LW S3A - GNSS Monitoring

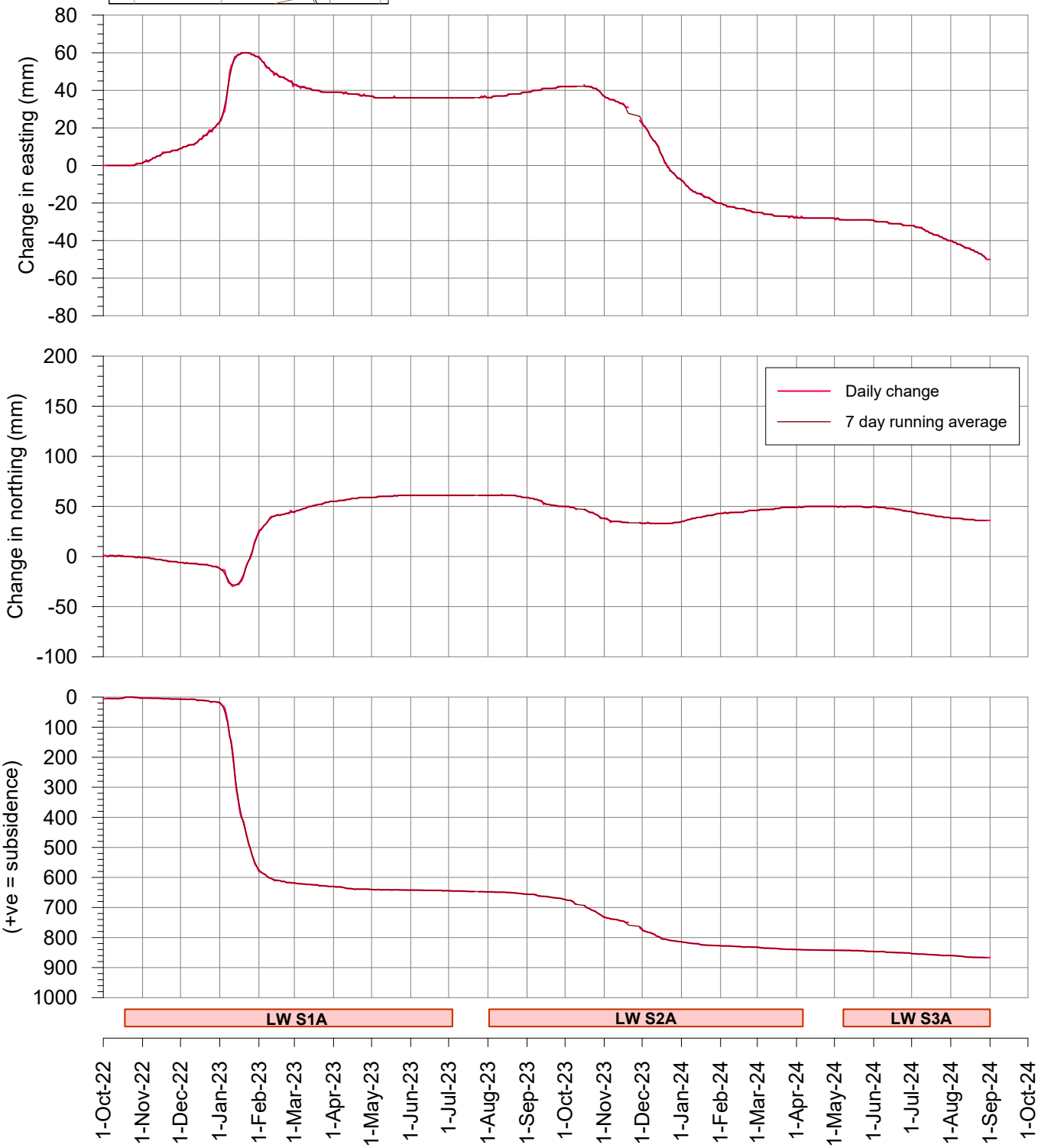
Site S02 above LW S1A

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S02 GNSS.grf







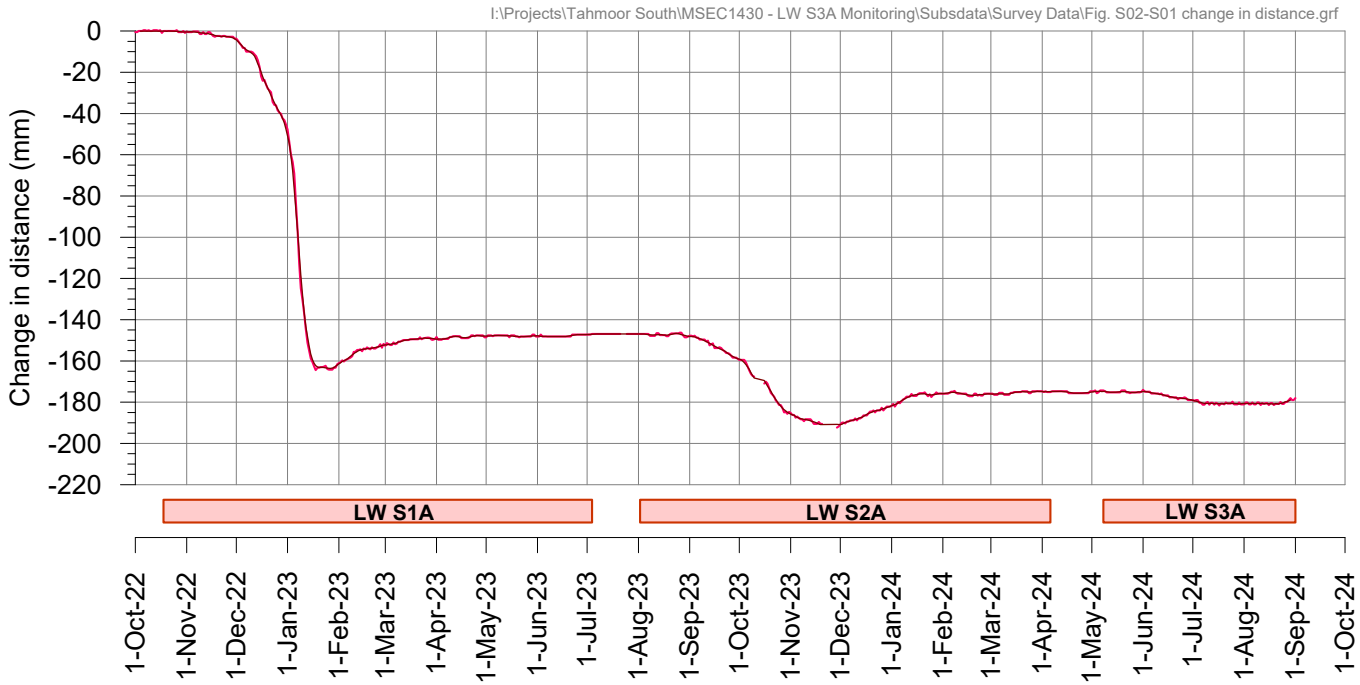


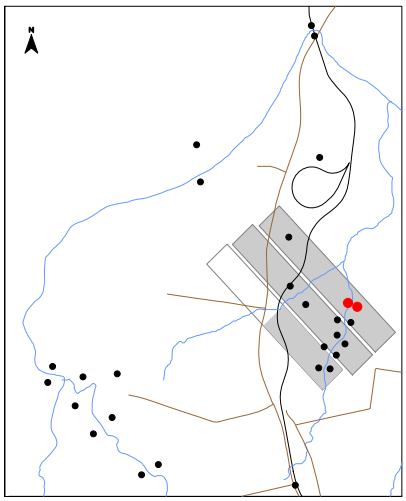
msec

Fig. S02-R14

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek
Sites S01 and S02 above LW S1A

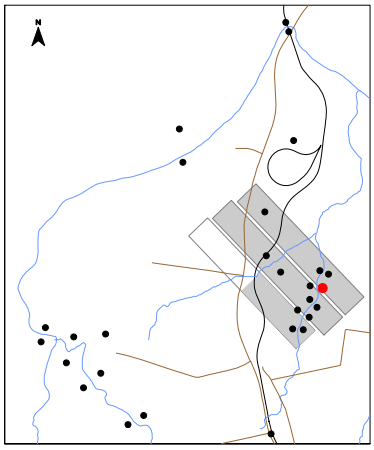




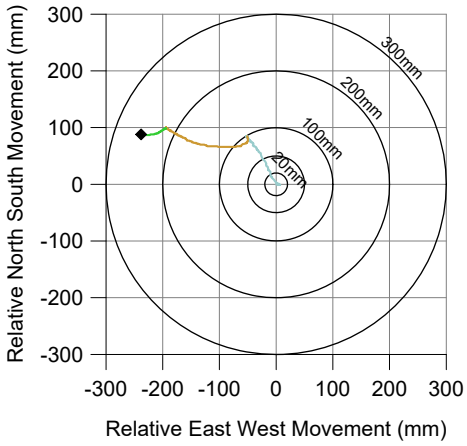
Tahmoor South LW S3A - GNSS Monitoring

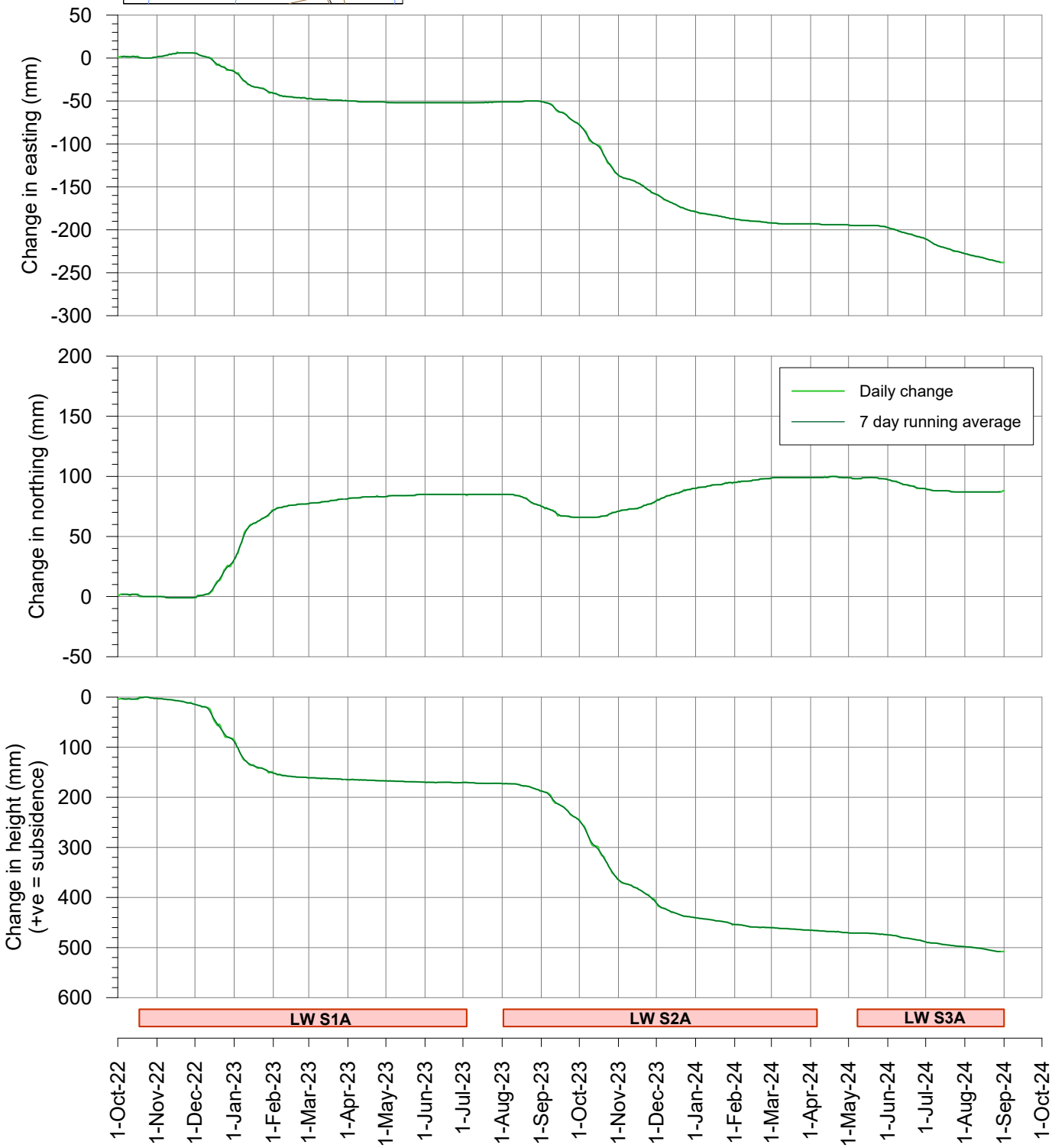
Site S03 above LW S1A at Teatree 3

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S03 GNSS.grf



During LW S1A
During LW S2A
During LW S3A





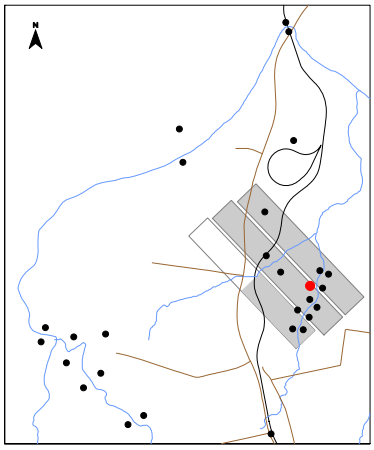
msec

Fig. S03-R14

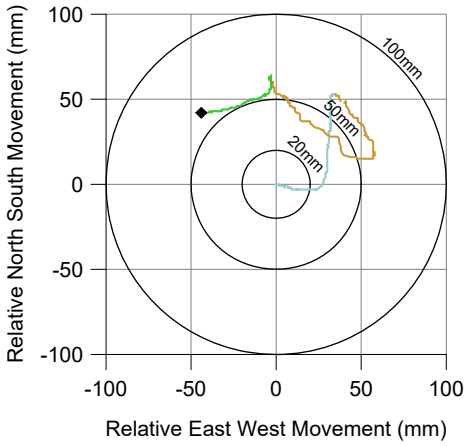
Tahmoor South LW S3A - GNSS Monitoring

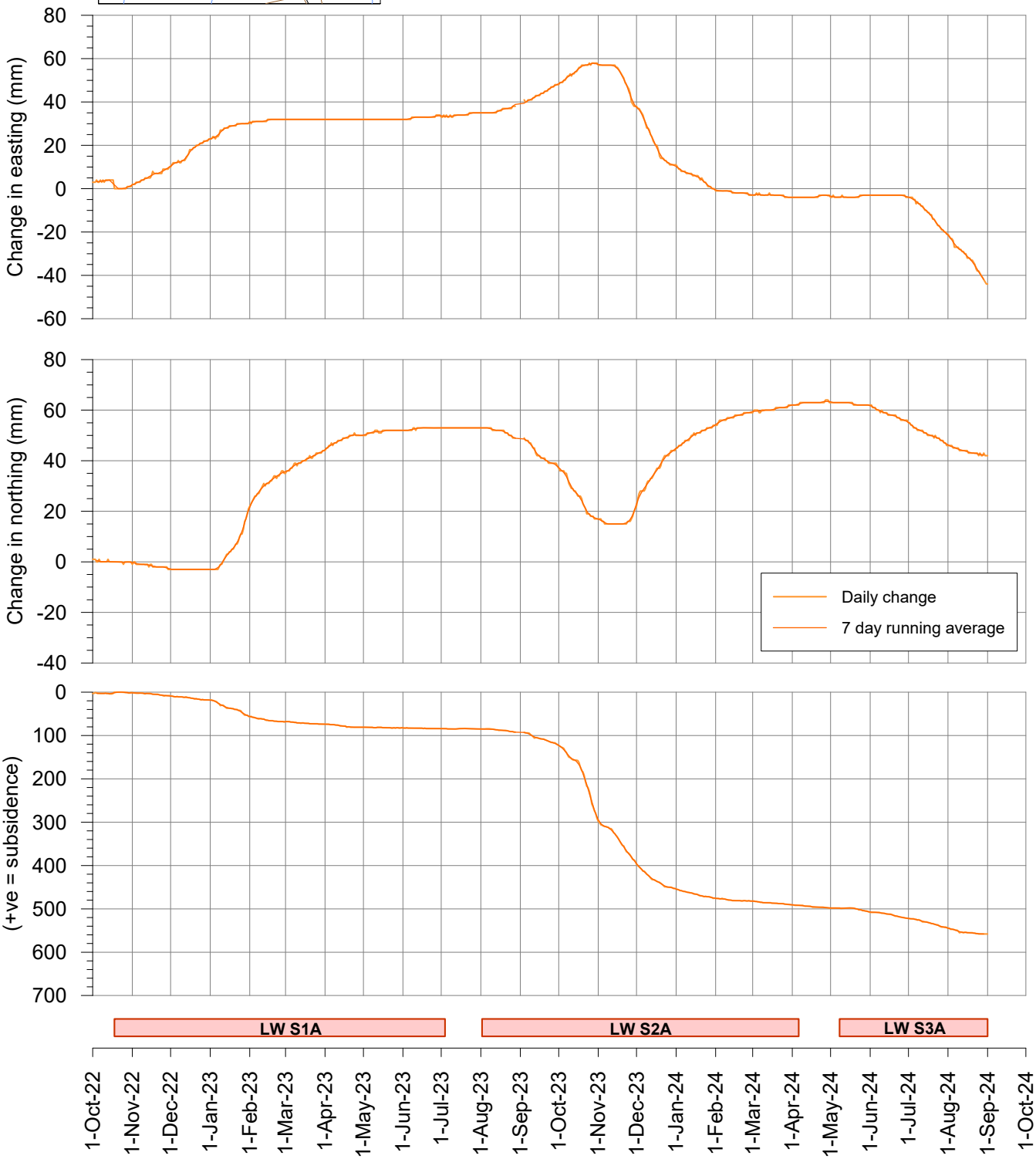
Site S04 above LW S2A at Teatree 3

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S04 GNSS.grf



During LW S1A
During LW S2A
During LW S3A



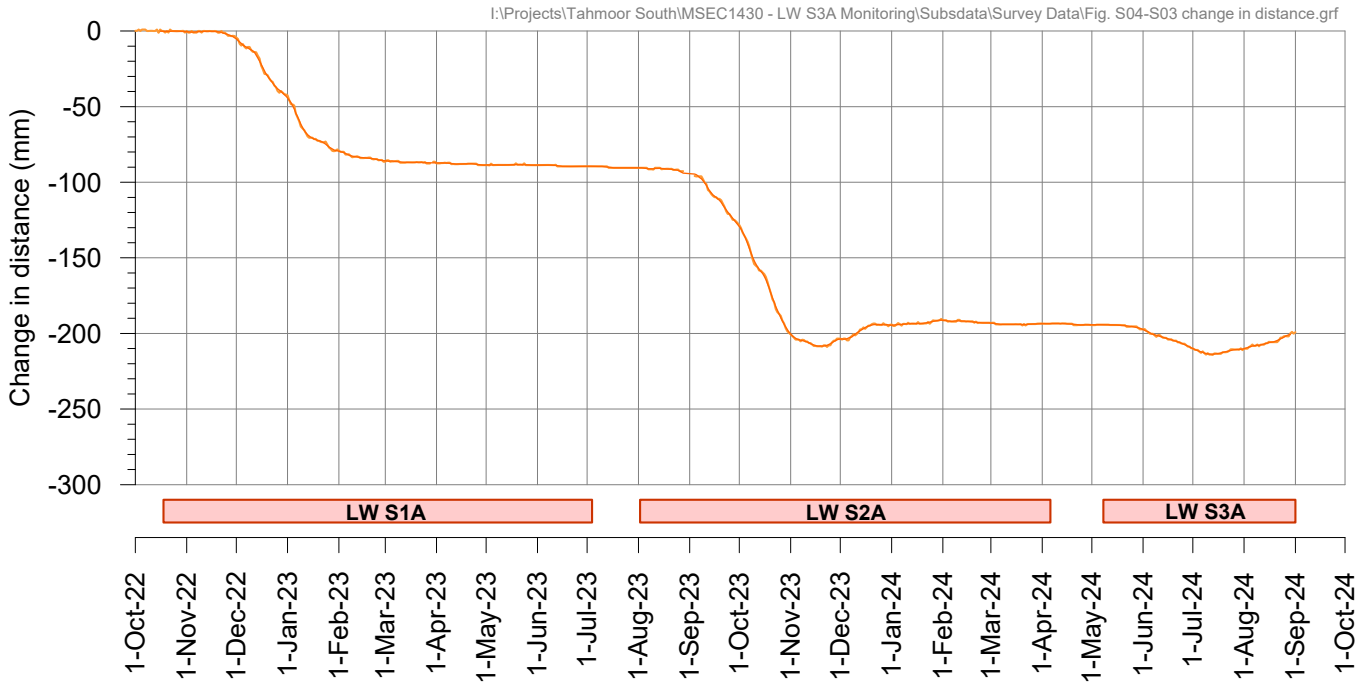


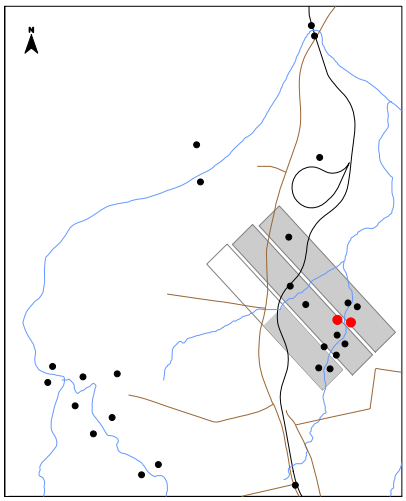
msec

Fig. S04-R14

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek at Teatree 3
Site S03 above LW S1A and Site S04 above LW S2A

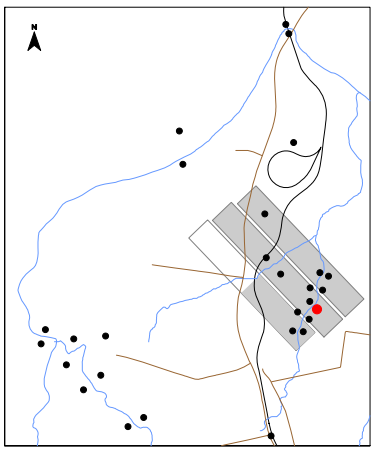




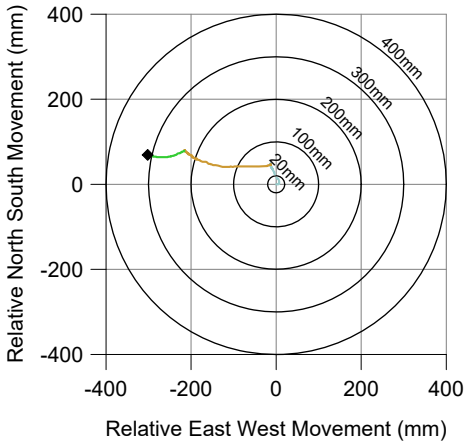
Tahmoor South LW S3A - GNSS Monitoring

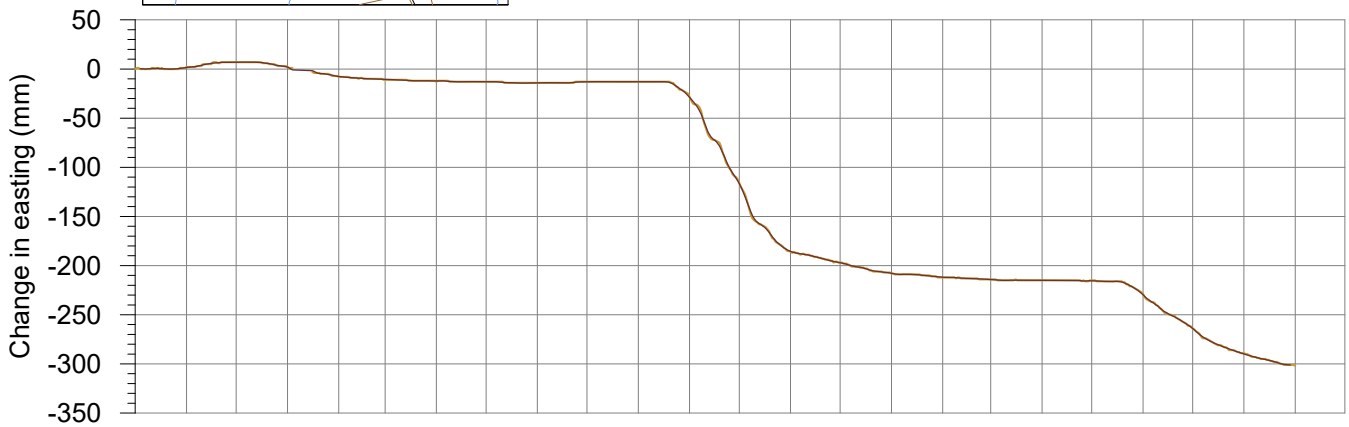
Site S05 above LW S2A

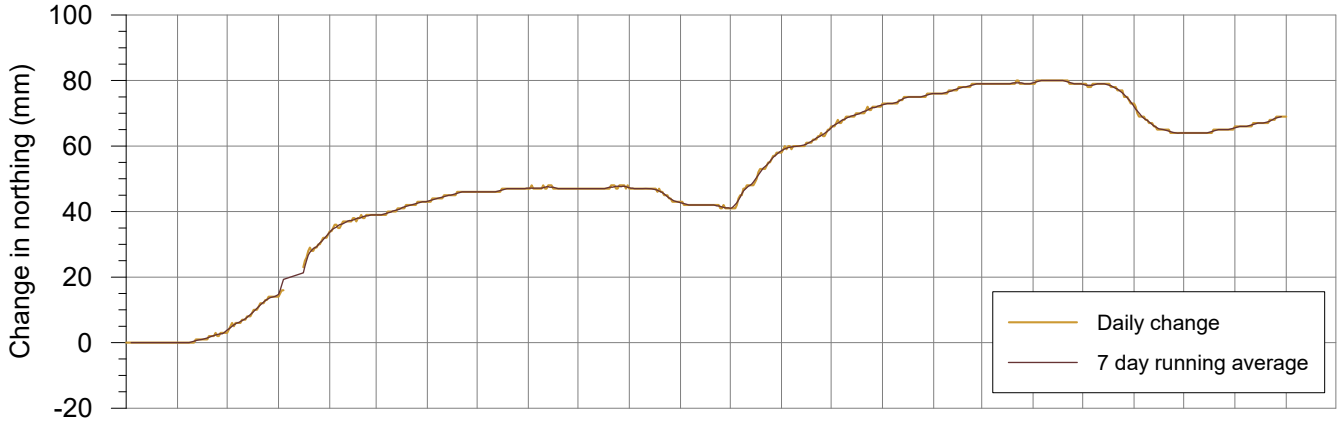
I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S05 GNSS.grf

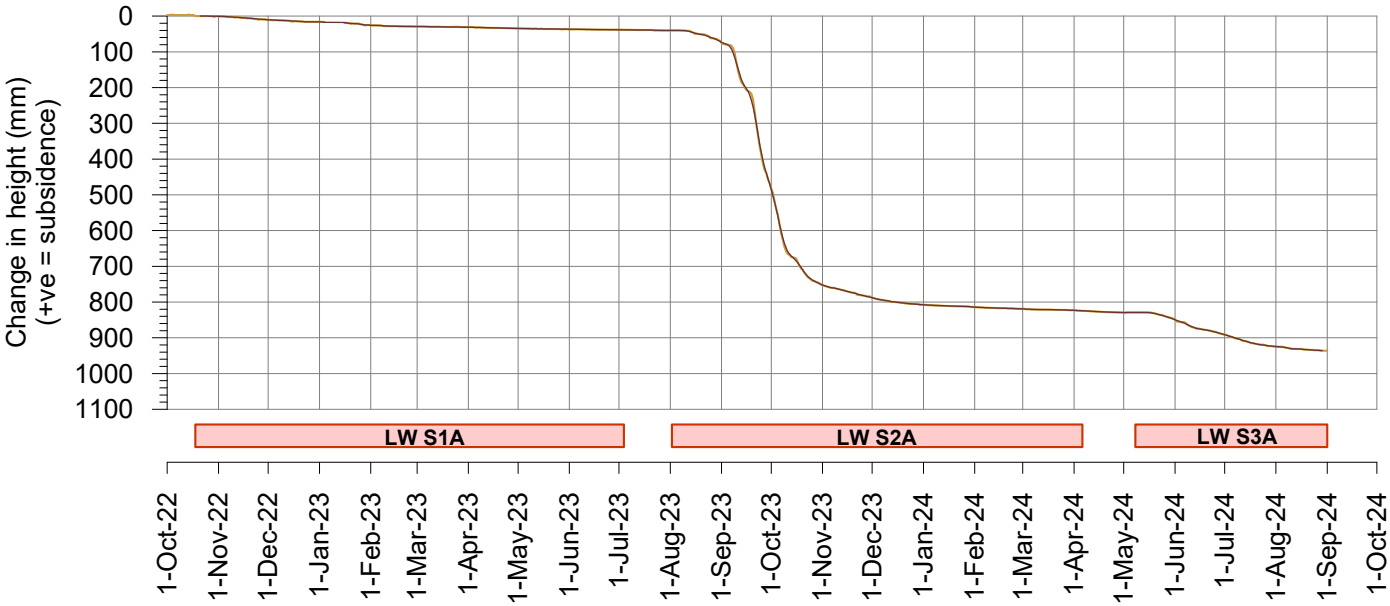


During LW S1A
During LW S2A
During LW S3A







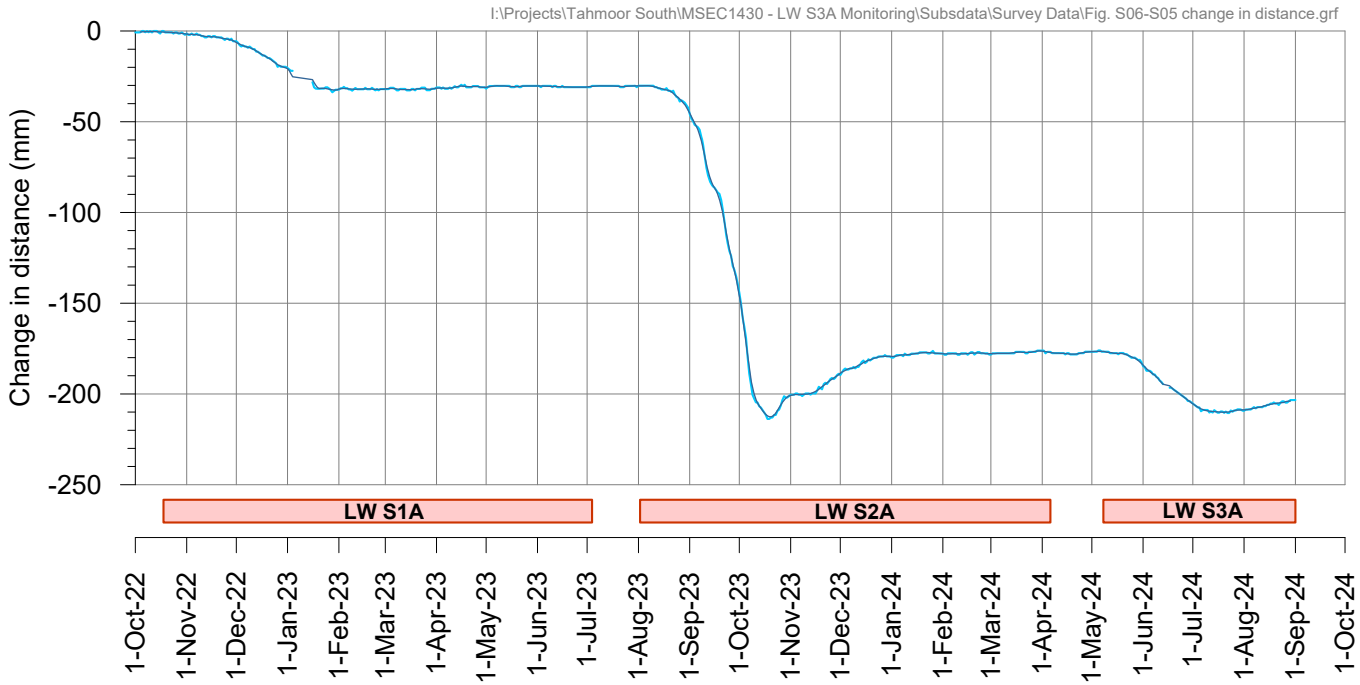


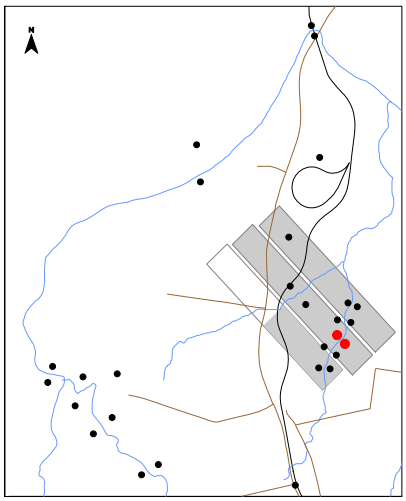
msec

Fig. S05-R14

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek
Sites S05 and S06 above LW S2A





Tahmoor South LW S3A - GNSS Monitoring

Site S07 above LW S2A

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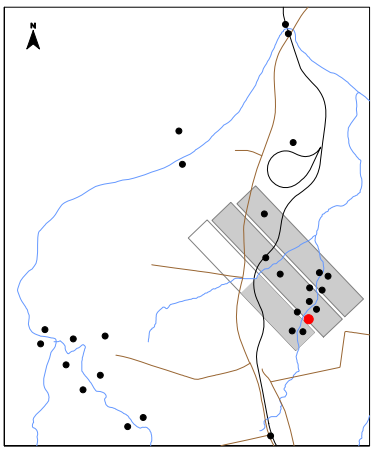
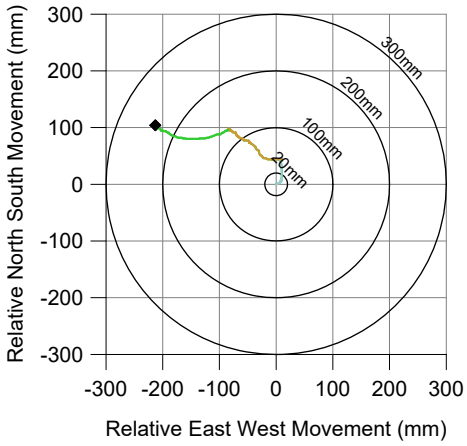
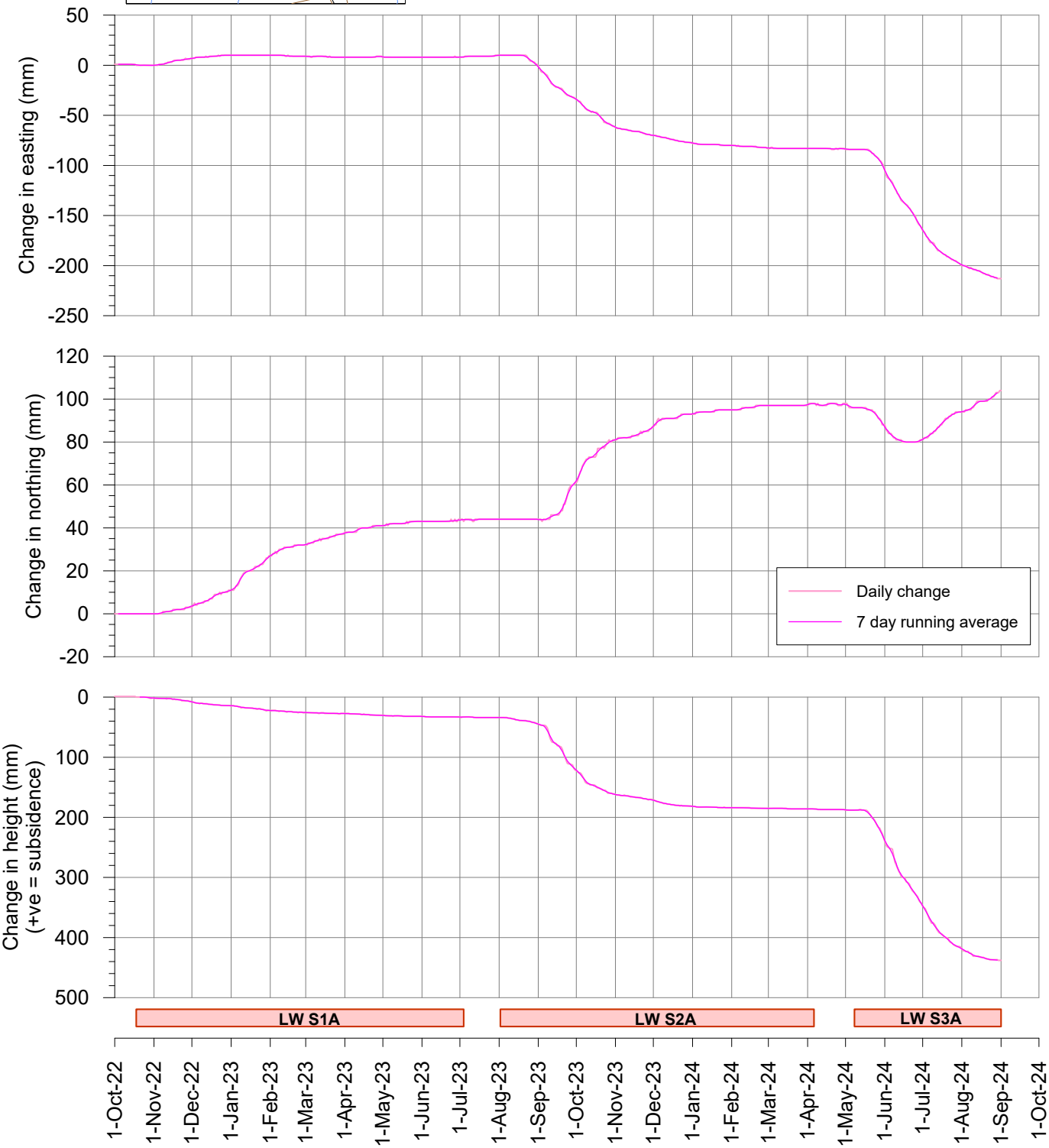








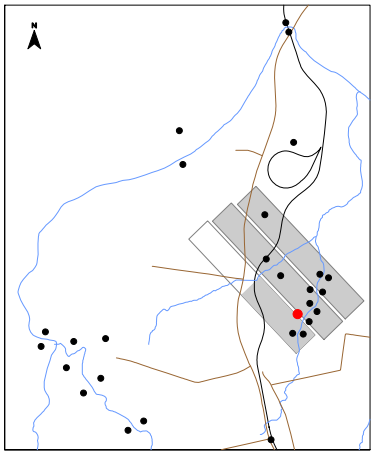
msec

Fig. S07-R14

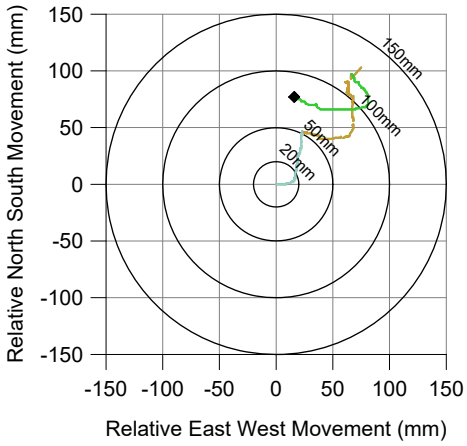
Tahmoor South LW S3A - GNSS Monitoring

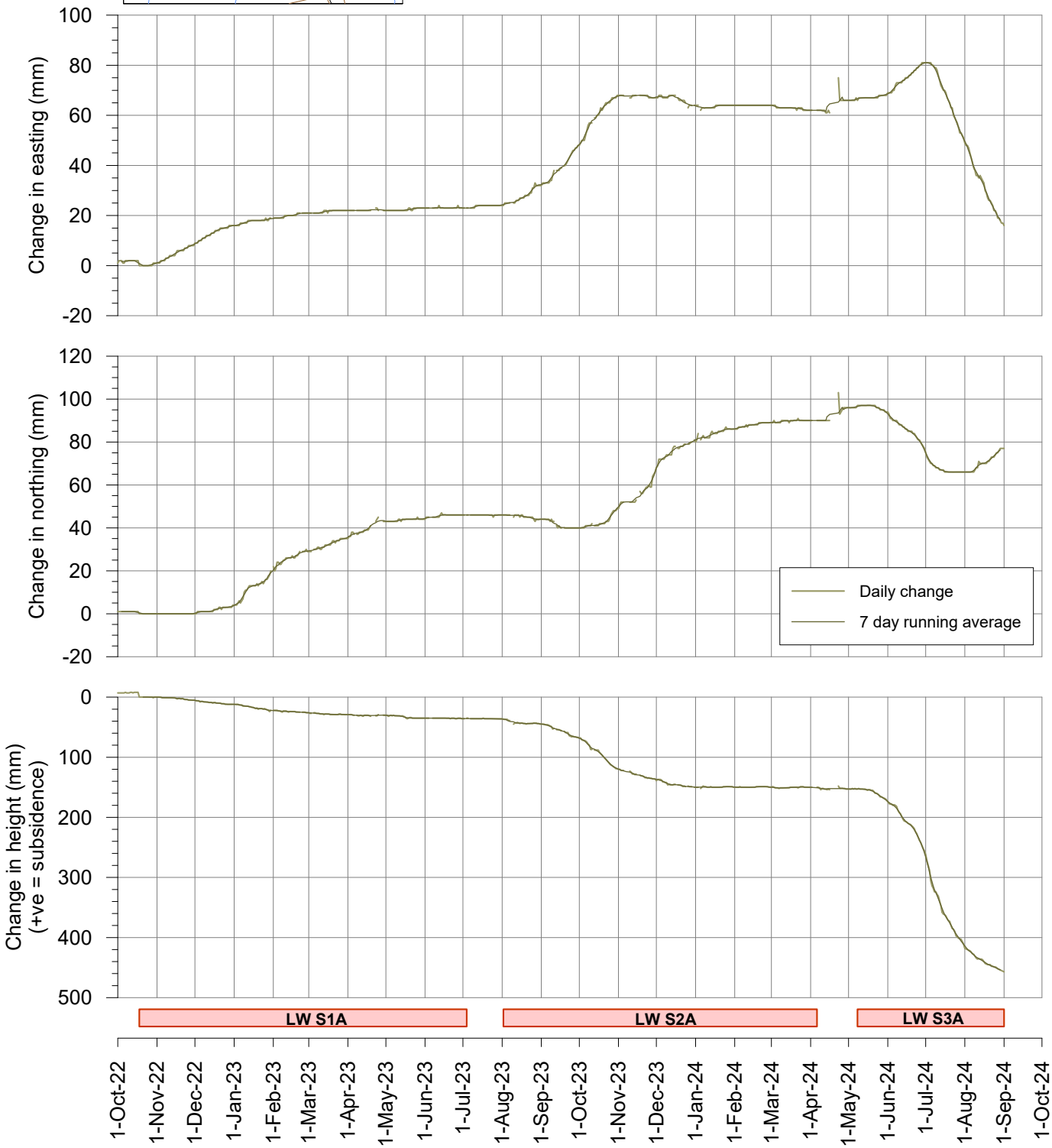
Site S08 between LW S2A and LW S3A

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S08 GNSS.grf







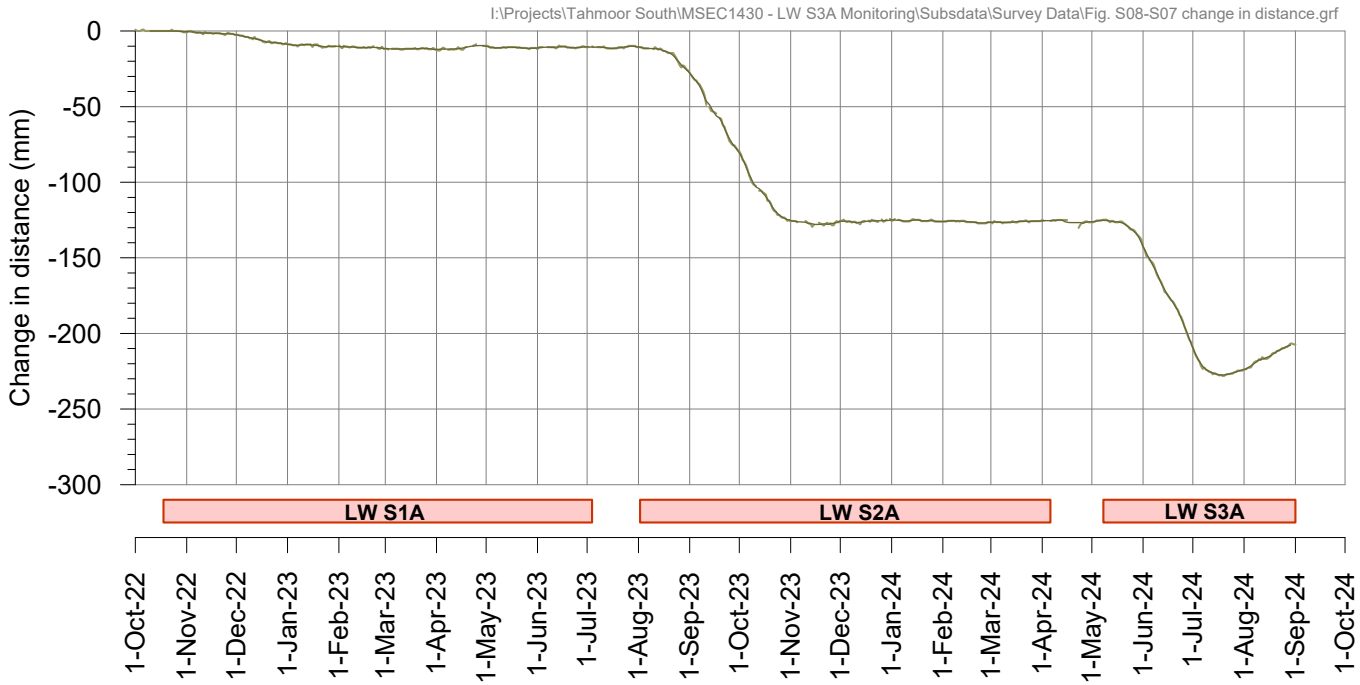


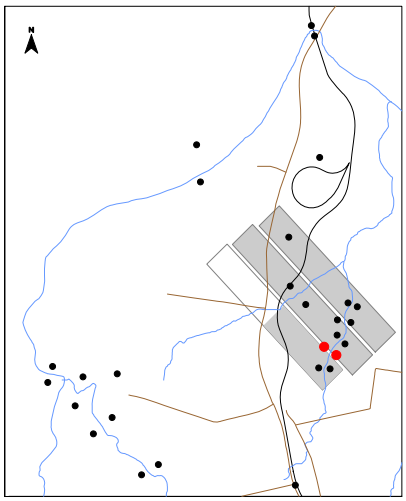
msec

Fig. S08-R14

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek
Site S07 above LW S2A and Site S08 between LW S2A and LW S3A

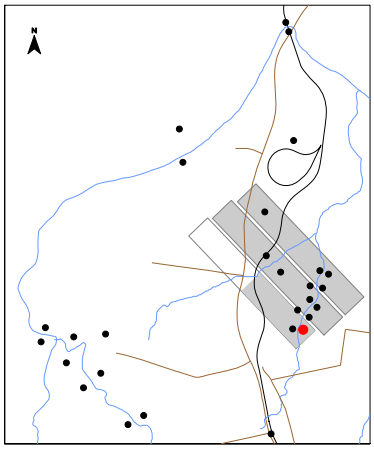




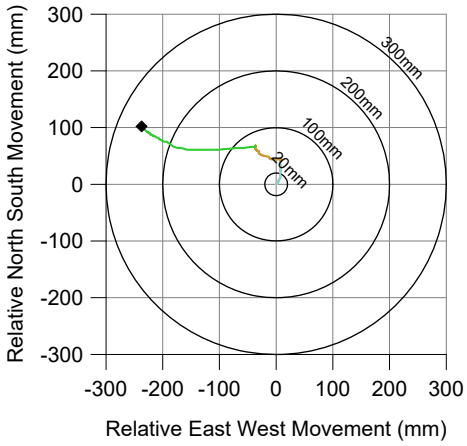
Tahmoor South LW S3A - GNSS Monitoring

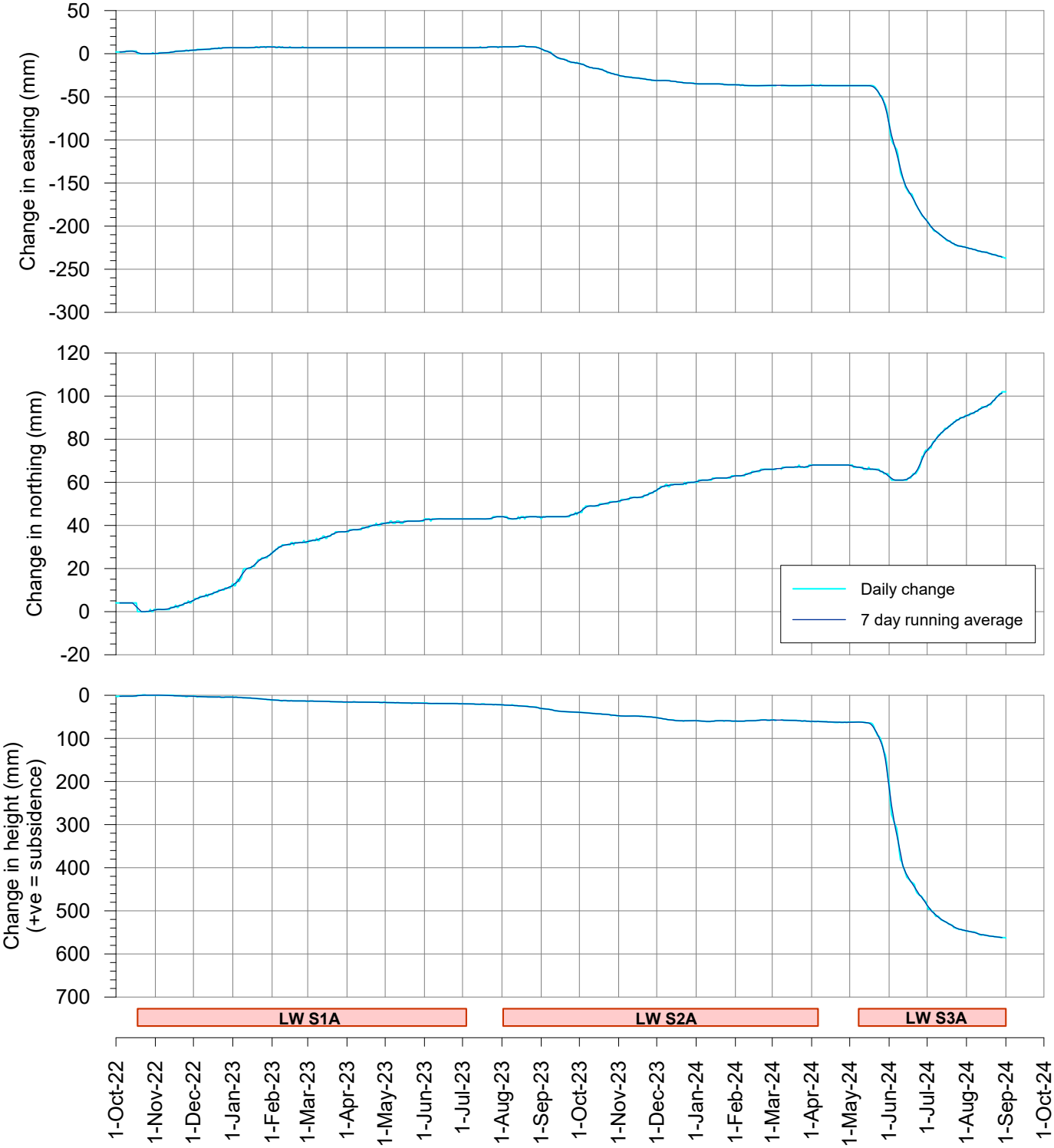
Site S09 above LW S3A at Teatree 2

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S09 GNSS.grf



During LW S1A
During LW S2A
During LW S3A





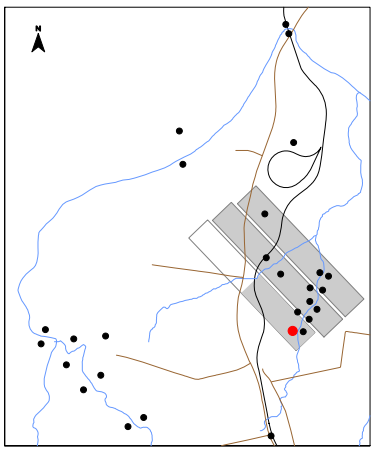
msec

Fig. S09-R14

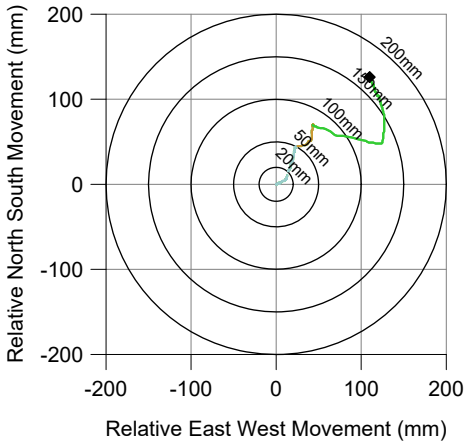
Tahmoor South LW S3A - GNSS Monitoring

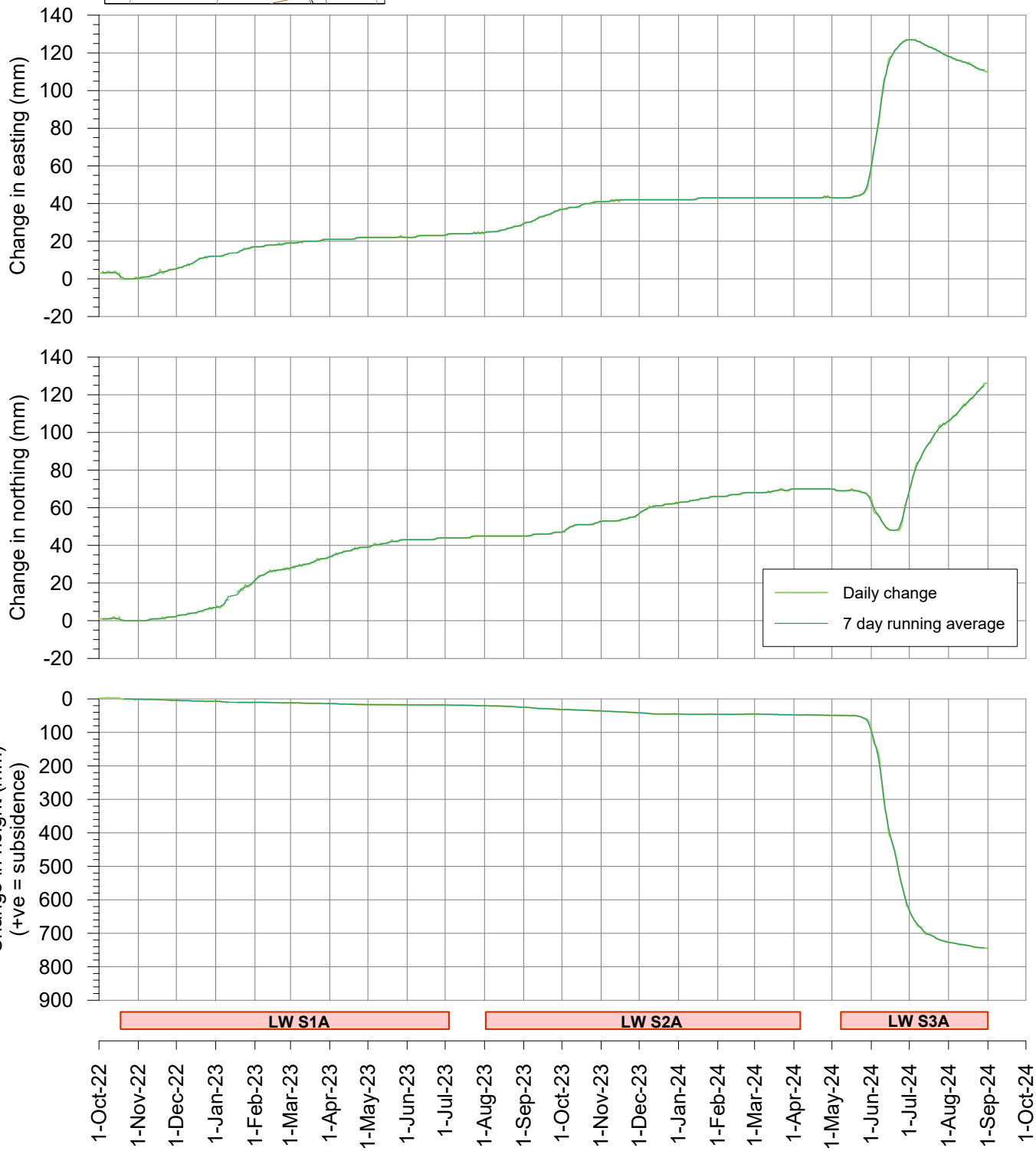
Site S10 above LW S3A at Teatree 2

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S10 GNSS.grf



During LW S1A
During LW S2A
During LW S3A



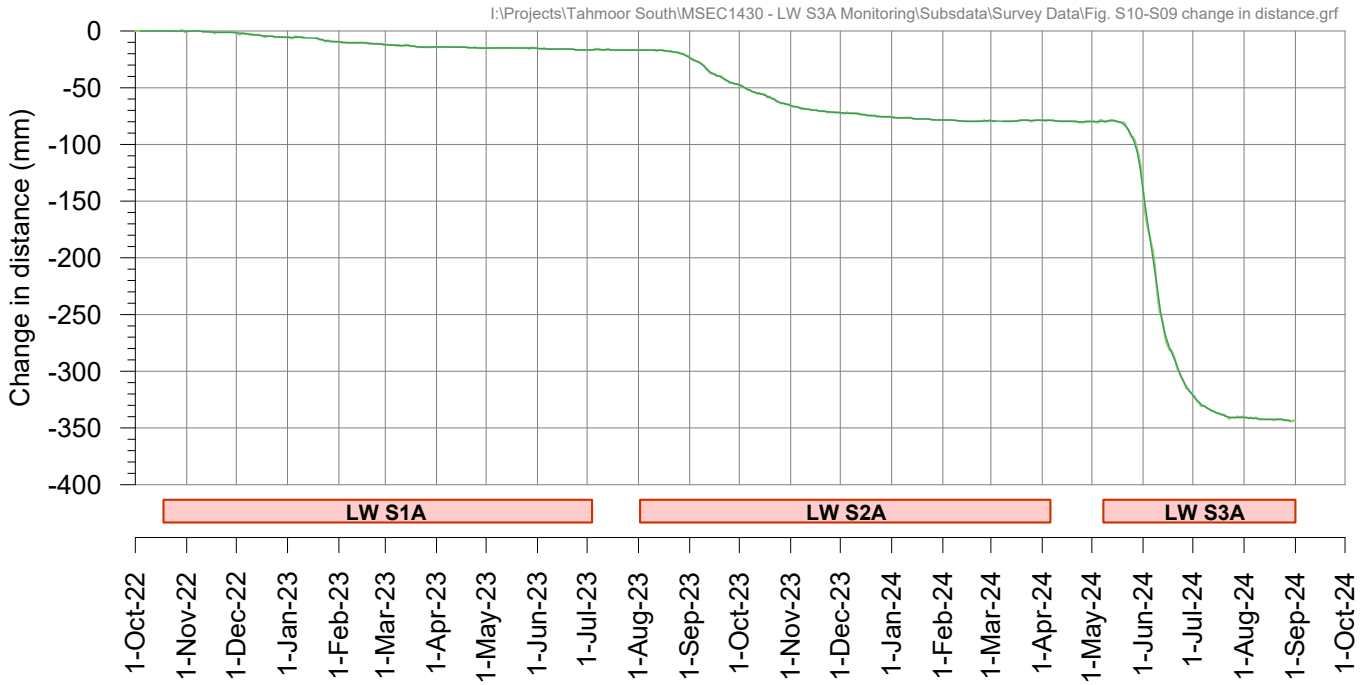


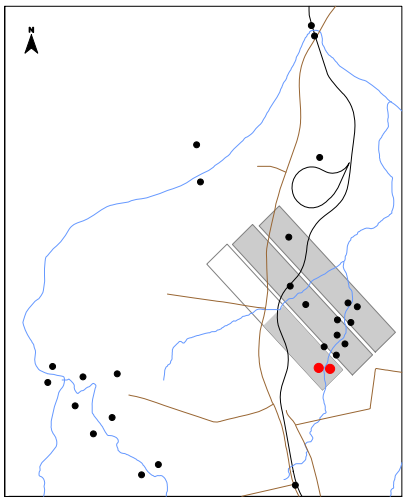
msec

Fig. S10-R14

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek at Teatree 2
Sites S09 and S10 above LW S3A

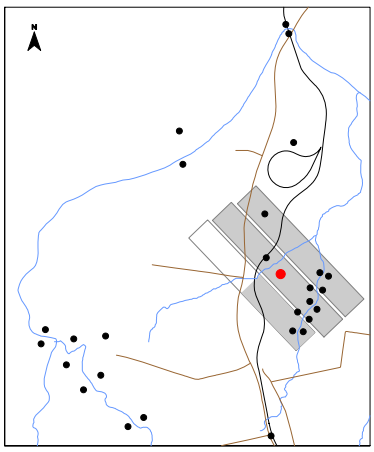




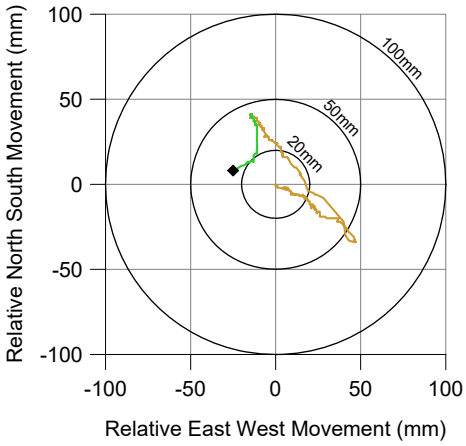
Tahmoor South LW S3A - GNSS Monitoring

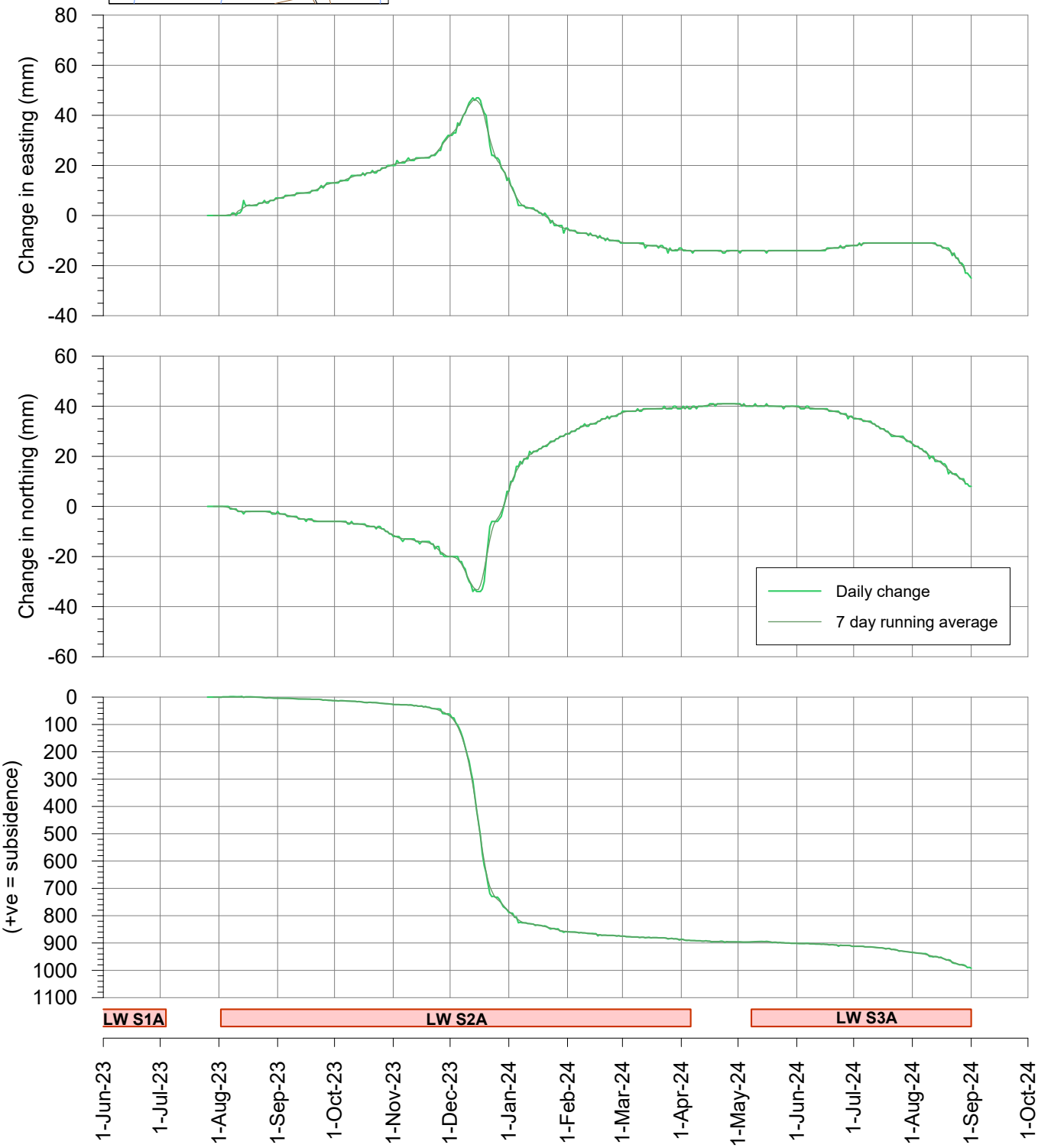
Site S26 above LW S2A

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S26 GNSS.grf









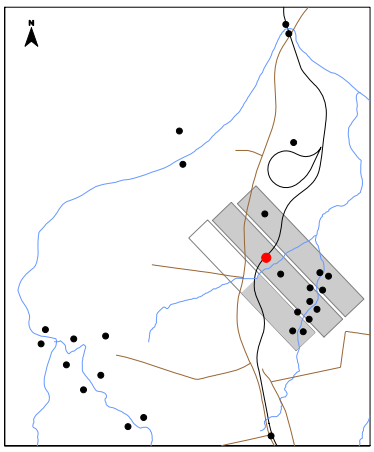
msec

Fig. S26-R144

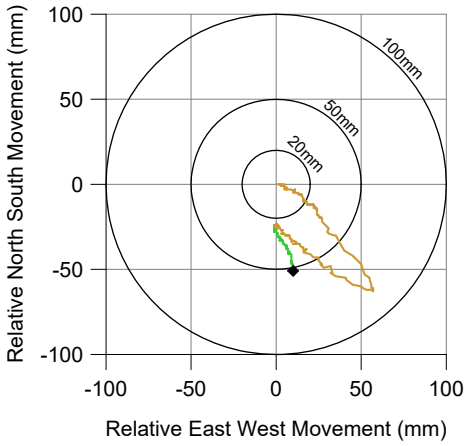
Tahmoor South LW S3A - GNSS Monitoring

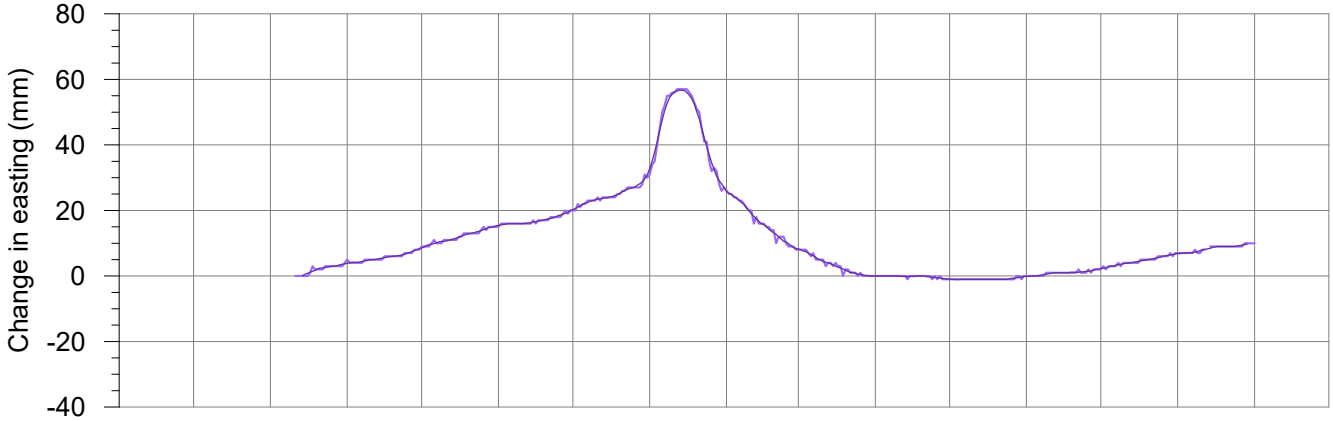
Site S27 on railway embankment above LW S2A

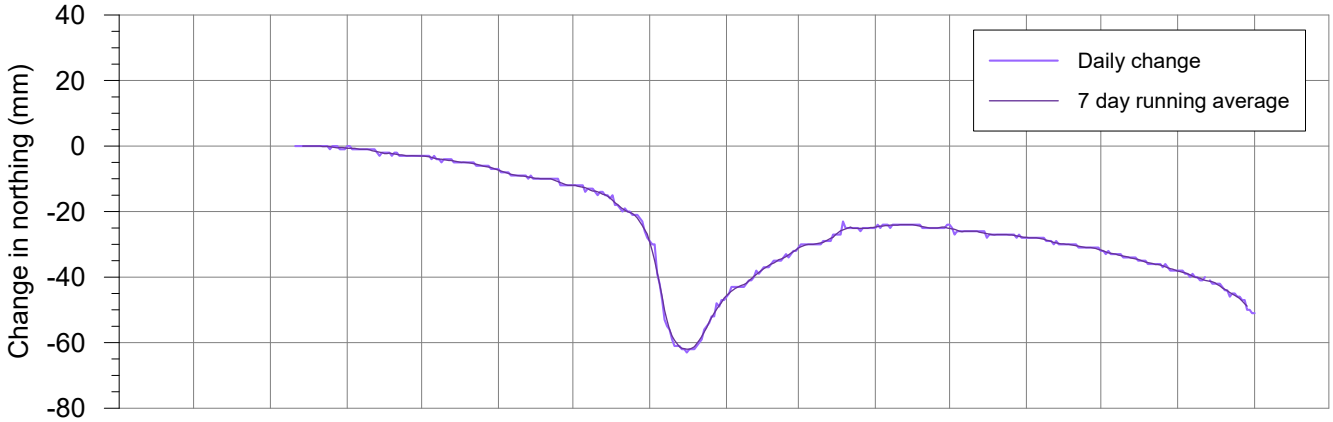
I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S27 GNSS.grf

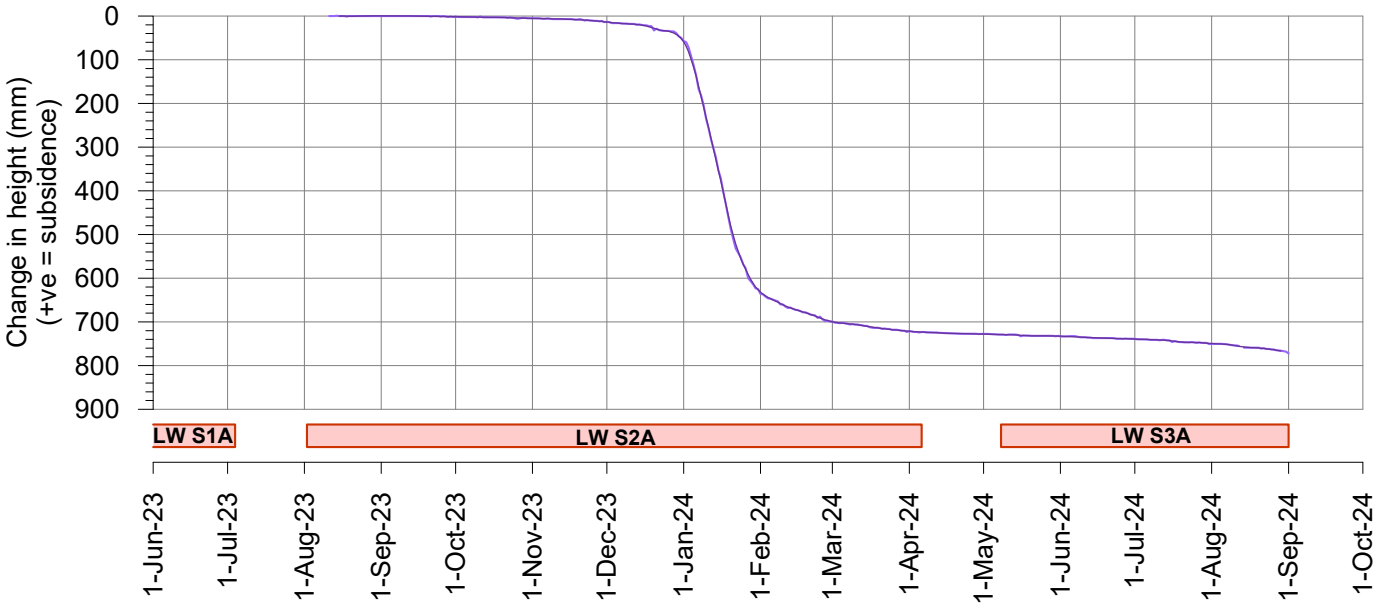


During LW S2A
During LW S3A







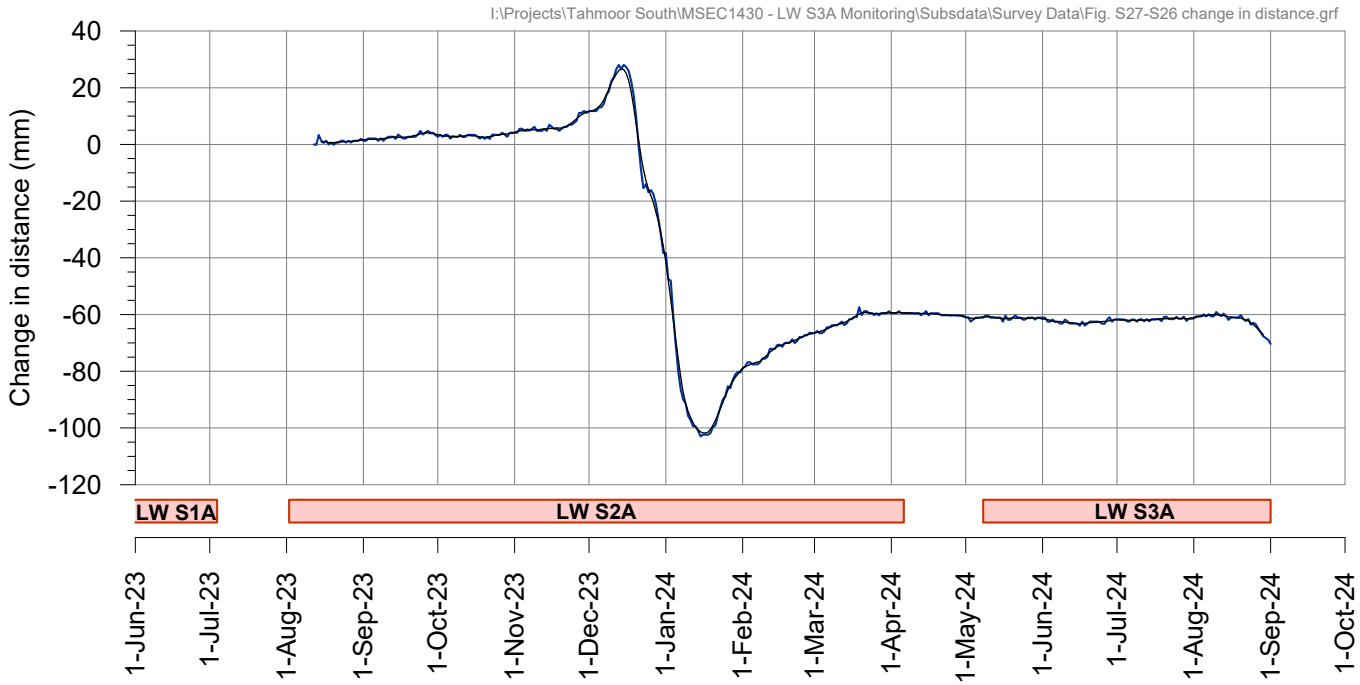


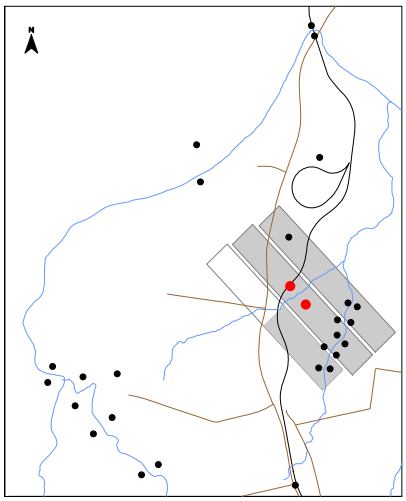
msec

Fig. S27-R14

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Teatree Hollow above LW S2A
Sites S26 and S27





TAHMOOR COAL: Longwall S3A

Australian Wildlife Sanctuary Subsidence Status Report No. 16

(Please note the report numbers are aligned with the LW S3A monitoring report numbers for ease of comparison. Accordingly, there are no Report Nos. 1 and 2 for LW S3A)

Reporting Period	7 September 2024 to 13 September 2024	
Length of extraction of LW S3A	990 m	On 12 September 2024 LW S3A commenced extraction on 8 May 2024
Length of extraction remaining of LW S3A	714 m	
Distance travelled by LW since previous report	79 m	Since 5 September 2024
Closest distance of LW S3A face to AWS property	0 m	LW face directly beneath property north of Teatree Hollow
Closest distance of LW S3A face to AWS structures	235 m	To visitor centre, with LW face moving away
Maximum incremental subsidence since start of LW S3A	700 mm 317 mm	GNSS Site S10 on 12 September 2024 AWS-2 (N corner of house)
Maximum total subsidence since start of LW S1A S3A	1017 mm 335 mm	GNSS Site S26 on 12 September 2024 AWS-2 (N corner of house)
Maximum increase in subsidence since previous report S3A	178 mm 144 mm	Main Southern Railway since 2 September AWS-2 (N corner of house) since 28 August

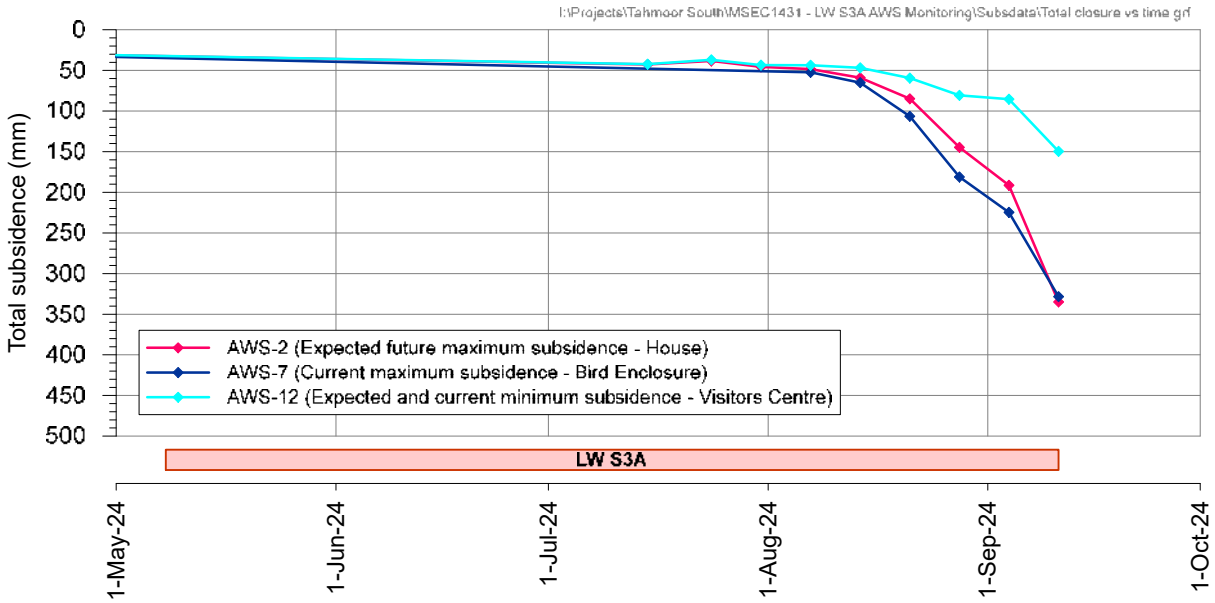
Summary of monitoring and inspections

Monitoring Activity	Date	Current Frequency	Highest Trigger	Comments
GNSS units				
Site S01 to S10, 26 & 27	Continuous		N/A	Subsidence increasing, particularly at Site 26 on AWS property above LW S3A and Site 27.
Valley closure across Wirrimbirra Creek as measured by GNSS units				
Sites S01 and S02 above LW S1A	Continuous		N/A	Closure has gradually developed, up to 178 mm. Very minor changes since start of LW S3A.
Sites S03 and S04 at Ockenden Pool	Continuous		N/A	Closure has gradually developed, up to 197 mm Minor changes since start of LW S3A.
Sites S05 and S06 above LW S2A	Continuous		N/A	Closure has gradually developed, up to 202 mm. Small changes since start of LW S3A.
Sites S07 and S08 above LW S2A	Continuous		N/A	Approximately 203 mm closure developed. Closure increasing since start of LW S3A. Rates of change reducing.
Sites S09 and S10 at the Big Pool	Continuous		N/A	Approximately 346 mm closure developed. Closure increasing since start of LW S3A. Rates of change reducing.
Valley closure across Teatree Hollow as measured by GNSS units				
Sites S26 and S27 above LW S2A	Continuous		N/A	Valley closure gradually developed during LW S2A, up to approximately 100 mm by mid-January 2024, with closure reducing as the LW face moved away. Closure increasing as the longwall approaches Site S27.
Main Southern Railway				
Ground surveys	9 Sep	Weekly	N/A	Subsidence increasing.
Local streets				
Ground survey along Charlies Point Road	-	Monthly	N/A	Last survey 29 July. Minor changes since the end of LW S2A.
Ground survey along Remembrance Drive	9 Sep	Weekly	N/A	Monthly 3D survey on 9 September measured minor changes, including previously observed non-conventional compressive strains and bumps in the observed subsidence profiles between Pegs R47 and R48, and between Pegs R54 and R55.

Monitoring Activity	Date	Current Frequency	Highest Trigger	Comments
Local streets (continued)				
Visual inspections along local roads	11 Sep	Weekly		No significant changes observed along Remembrance Drive.
Natural features				
Ground survey across Wirrimbirra Creek	-	End of LW	N/A	Closure and upsidence observed along TT2 line, upstream of Pool TT2 during LW S2A.
Water level and water quality monitoring	Continuous	Download monthly	Level 4	While the observed rates of water level recession at Pool TT2 are consistent with previously observed rates and consistent with evaporation rates, surface and ground water assessments have found that the low water levels are atypical than what would be considered 'normal' conditions and are likely due to mining-induced reduction in groundwater baseflow into the pool.
Visual inspections of streams and small cliffs	-	Monthly	Level 4	Latest inspection 20 August. Localised fracturing and loss of surface water has been observed, exceeding the Level 4 trigger level in the AWS Management Plan at Pool TT2 during the mining of LW S2A. Tahmoor Coal will develop a CMAP in consultation with AWS as required under the Management Plan. Temporary water supply continues to be maintained since installed on 25 July 2023. An inspection on 20 August observed reduced surface flows continuing along the full length of the Tributary to Teatree Hollow since the previous inspection on 17 July after a period of dry weather. Surface water stopped at K64, re-emerging upstream of Pool TT2, which holds water. Surface water then stops downstream of Pool TT2, re-emerging at K71, upstream of the confluence with Teatree Hollow. New fracture observed on 17 July in Tributary at Pool TT2, approximately 6 metres long. Visual inspection of rock shelter on 19 June 2024 found the creek flowing and no impacts to rock shelter.
Structures				
Local 3D surveys	11 Sep	Weekly	N/A	Subsidence increasing. Minor closure measured across the building structures. Closure measured across Tassie Devil enclosures where impacts have been observed.
Visual inspections	11 Sep	Weekly	N/A	Cracks observed in adjacent railway cutting on 25 August have extended into AWS property, where a compression hump has developed to the northeast and through the new Tassie Devil enclosures. No new evidence of compression this week.
Asbestos air monitoring	11 Sep	Weekly	N/A	All results are below the lowest detectable limit.
Visual inspections				
Dingo Sanctuary	11 Sep	Weekly	N/A	No immediate issues of concern observed.
Farm dam	11 Sep	Weekly	N/A	No immediate issues of concern observed.
External pavements, fences and gates	11 Sep	Weekly	Impacts obs'd to gates and fences	A new timber and steel-framed gate between animal enclosures is out of alignment and cannot be properly closed. Three additional gates found to be not closing. All four gates repaired 27 August. Ground movement observed in this location and Colorbond fences buckling. Two previously repaired gates jammed and were repaired 5 September. Trip hazards formed in gravel footpaths have been repaired. All gates are functioning correctly.
Walking trails	11 Sep	Weekly	N/A	No immediate issues of concern observed.

Management Actions	
Other management actions since previous report: ● Repair of trip hazards in gravel paths around new Tassie Devil enclosures	
Any additional and/or outstanding management actions: ● Tahmoor Coal will develop a CMAP in consultation with National Trust and AWS after effects of mining	
Consultation with stakeholders since previous report: ● Weekly reports will be issued during the mining of LW S3A	
Forecast whether continued longwall mining is likely to cause impacts on the health and safety of people who may be present at the property due to the extraction of LW S3A: Based on monitoring results to date, and the controls implemented and available under the LW S3A Management Plan, no triggers under this Management Plan are expected to be exceeded in the next week.	
Certified by Tahmoor Coal	
Name	Ross Barber
Position	Project Manager
Signature	*Ross Barber*
Date	17 September 2024

Copy of Report to:
John Alcock and David Burdon, National Trust of Australia (NSW)
Brad Wilson, Managing Director, Australian Wildlife Sanctuary
Luci Ellem, Managing Director, Bargo Dingo Sanctuary
Australian Native Dog Conservation Society
Clint Mason, Production Manager, Tahmoor Mine
Ray Ramage, Principal Inspector – Subsidence, Mine Safety Inspectorate, Resources Regulator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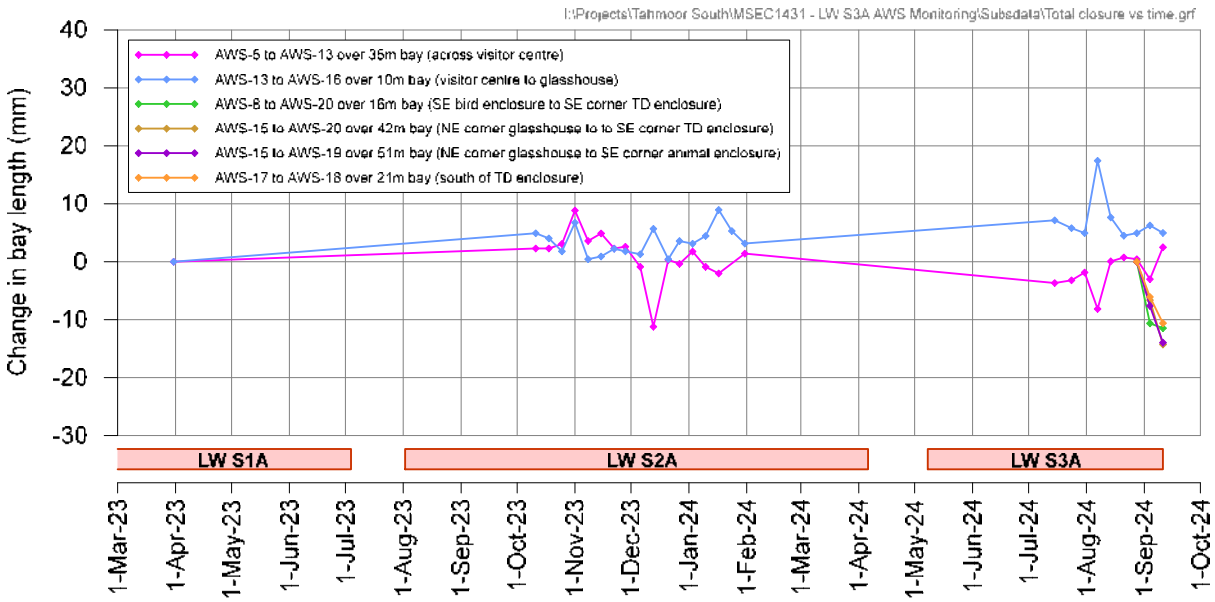
Total subsidence (mm)
0
50
100
150
200
250
300
350
400
450
500
AWS-2 (Expected future maximum subsidence - House)
AWS-7 (Current maximum subsidence - Bird Enclosure)
AWS-12 (Expected and current minimum subsidence - Visitors Centre)
LW S3A
1-May-24
1-Jun-24
1-Jul-24
1-Aug-24
1-Sep-24
1-Oct-24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Change in bay length (mm)
40
30
20
10
0
-10
-20
-30
AWS-5 to AWS-13 over 35m bay (across visitor centre)
AWS-13 to AWS-16 over 10m bay (visitor centre to glasshouse)
AWS-8 to AWS-20 over 16m bay (SE bird enclosure to SE corner TD enclosure)
AWS-15 to AWS-20 over 42m bay (NE corner glasshouse to to SE corner TD enclosure)
AWS-15 to AWS-19 over 51m bay (NE corner glasshouse to SE corner animal enclosure)
AWS-17 to AWS-18 over 21m bay (south of TD enclosure)
LW S1A
LW S2A
LW S3A
1-Mar-23
1-Apr-23
1-May-23
1-Jun-23
1-Jul-23
1-Aug-23
1-Sep-23
1-Oct-23
1-Nov-23
1-Dec-23
1-Jan-24
1-Feb-24
1-Mar-24
1-Apr-24
1-May-24
1-Jun-24
1-Jul-24
1-Aug-24
1-Sep-24
1-Oct-24

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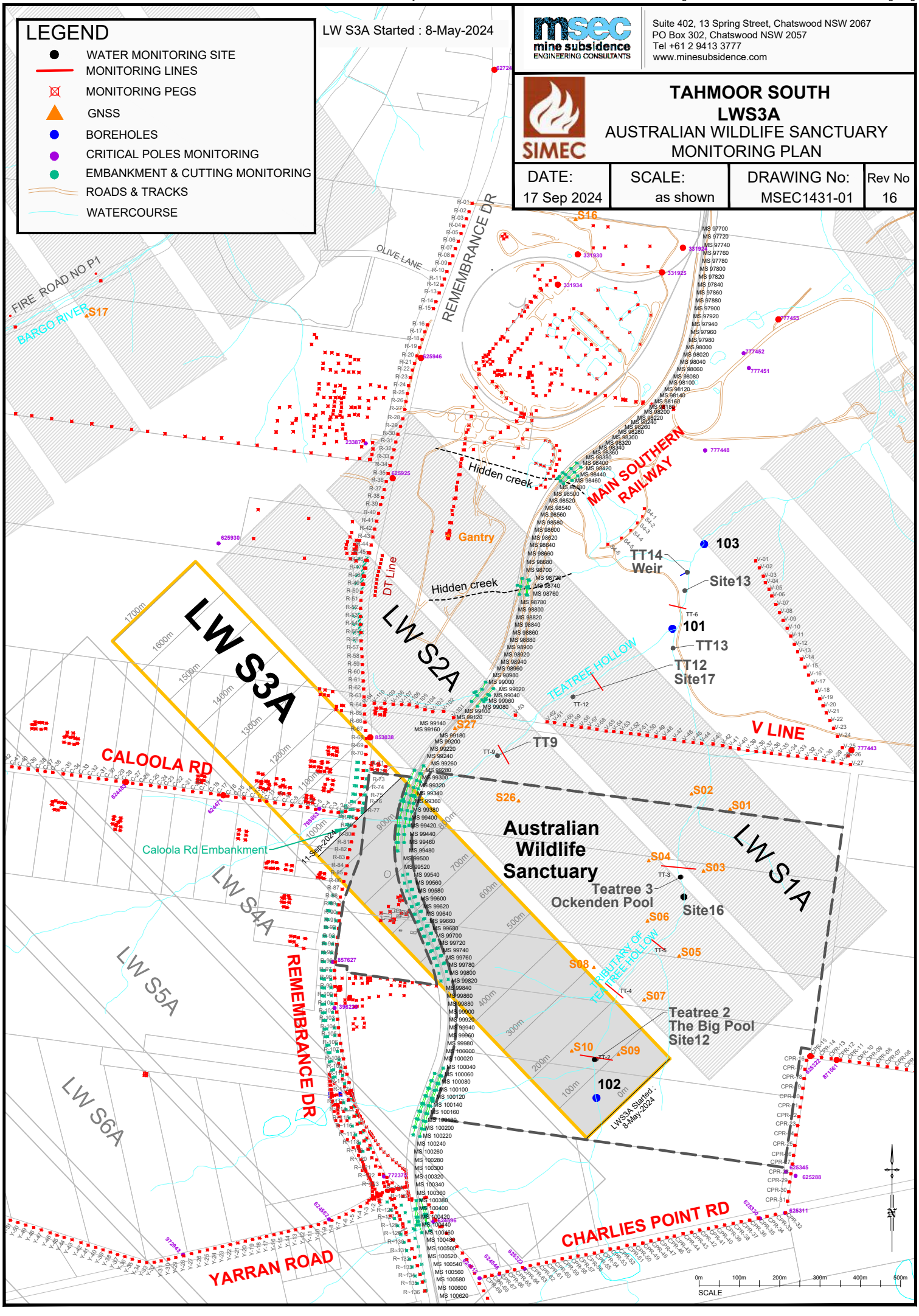
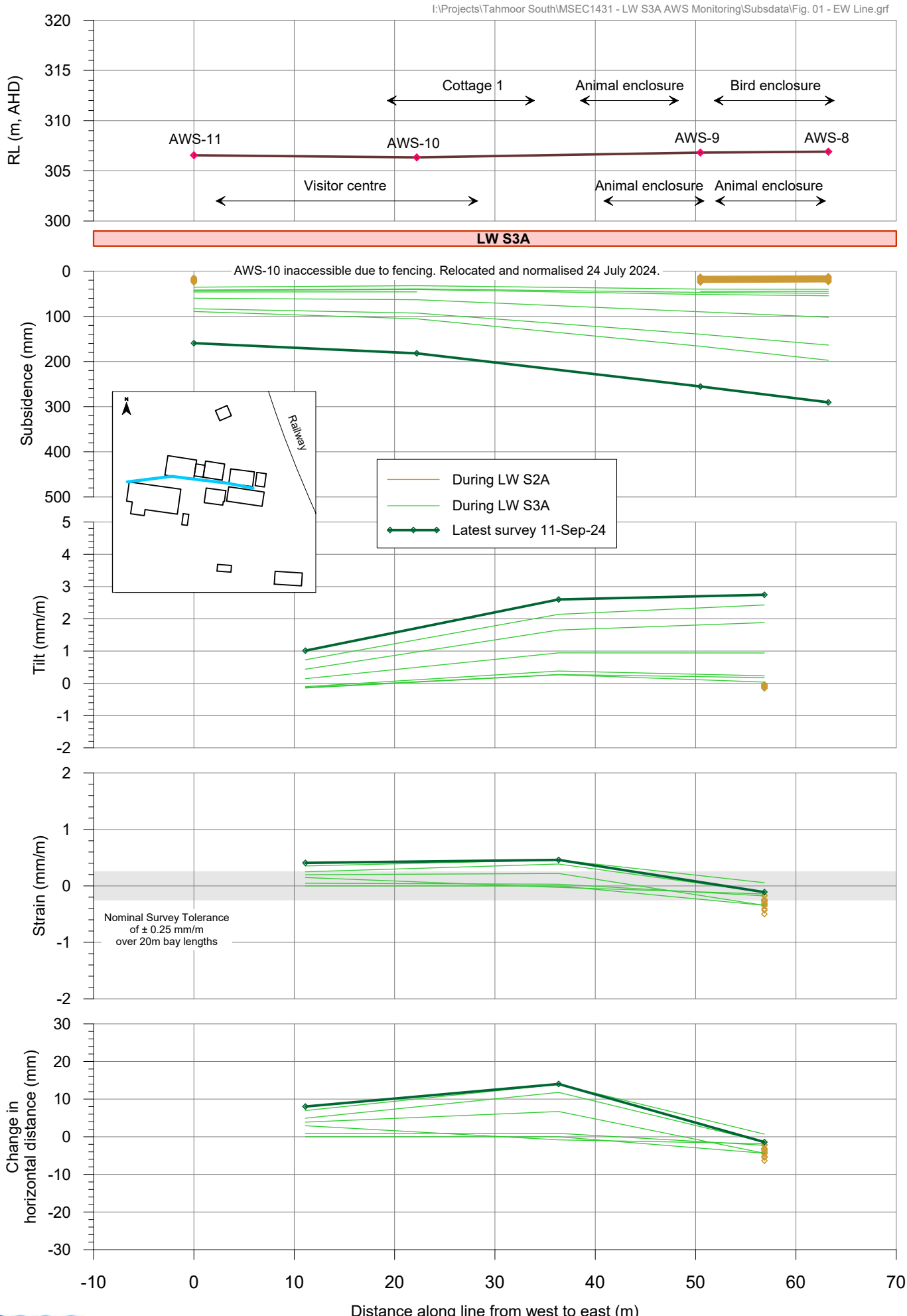


Tahmoor South LW S3A - AWS
Total subsidence profiles along East-West cross line



msec

Fig. 1-R16

Tahmoor South LW S3A - AWS
Total subsidence profiles along North-South cross line

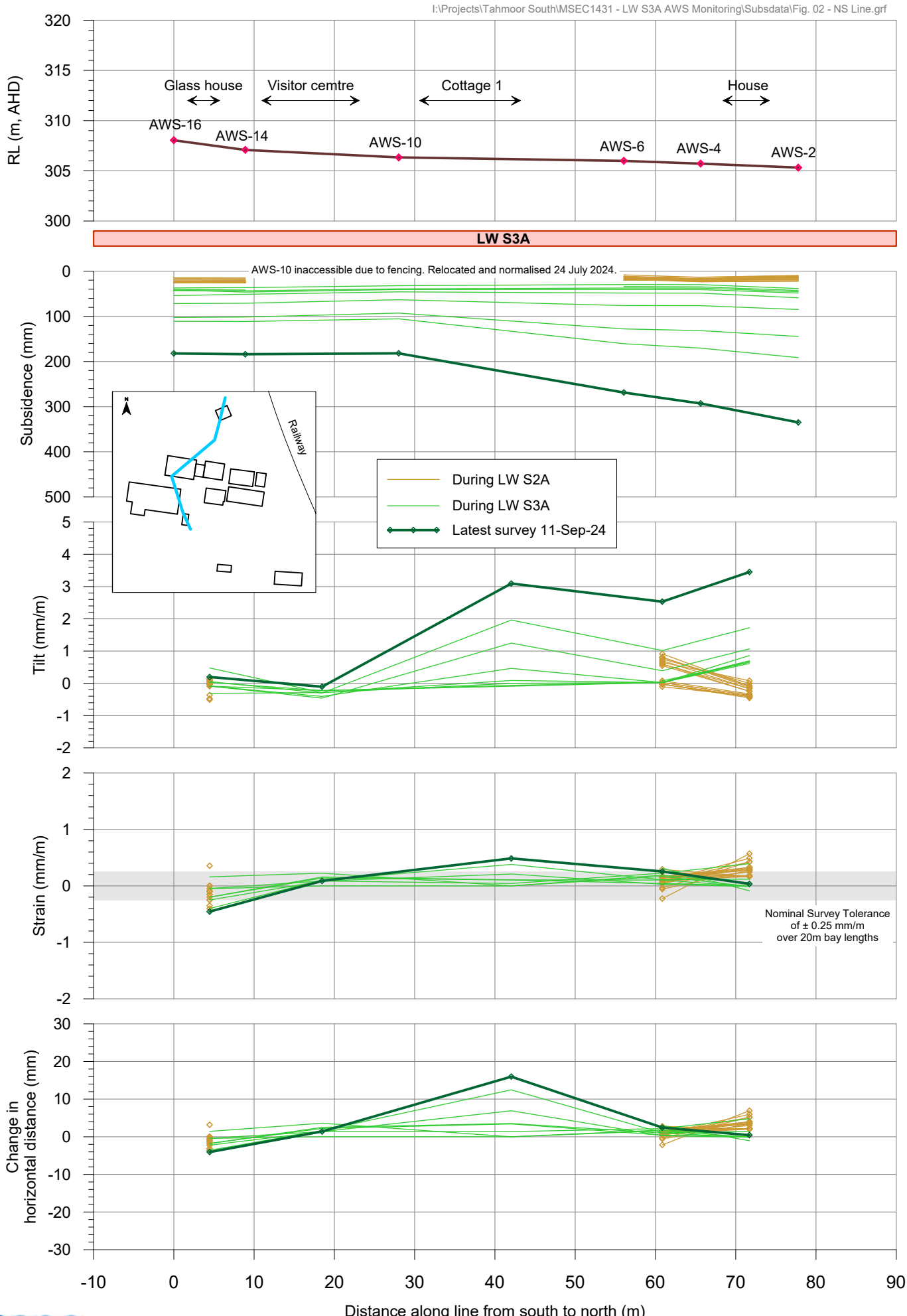


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Fig. 2-R16

Tahmoor South LW S3A - Main Southern Railway
Incremental subsidence profiles
Survey date: 9 September 2024

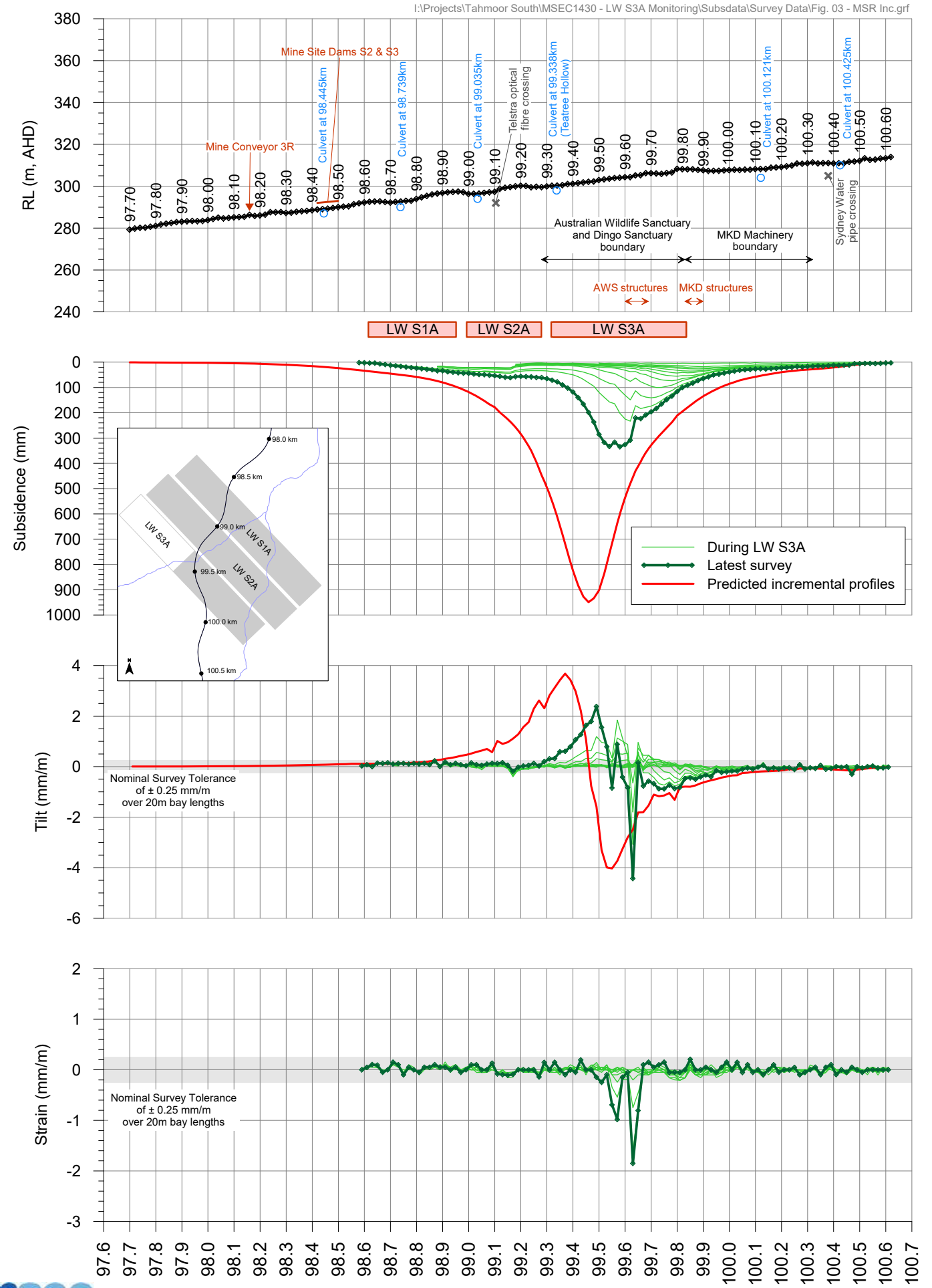

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Fig. 3-R16

Tahmoor South LW S3A - Main Southern Railway
Total subsidence profiles
Survey date: 9 September 2024

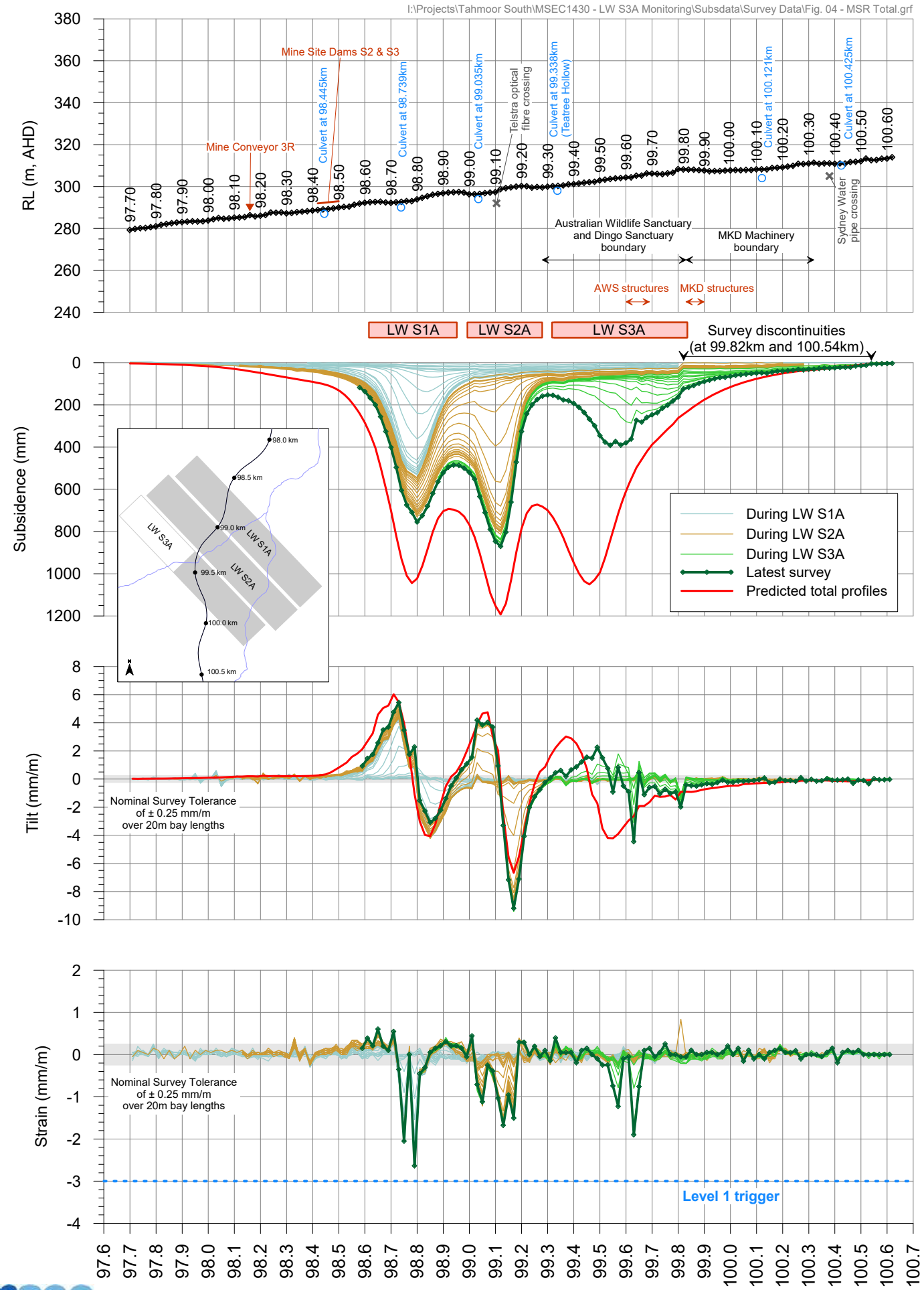

Fig.4-R16

Tahmoor South LW S3A
Incremental subsidence profiles along Remembrance Drive

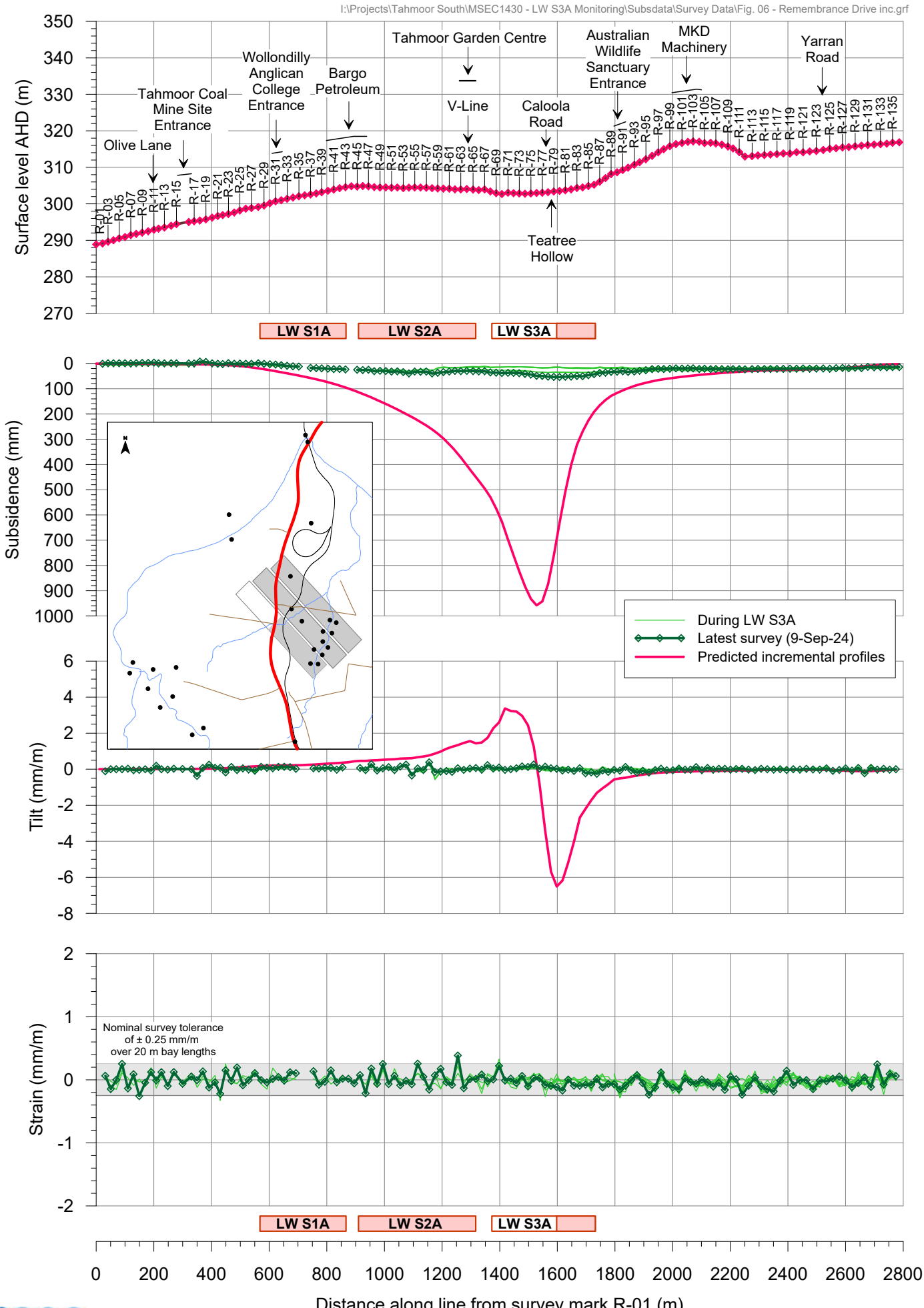

Fig. 6-R16

Tahmoor South LW S3A
Total subsidence profiles along Remembrance Drive

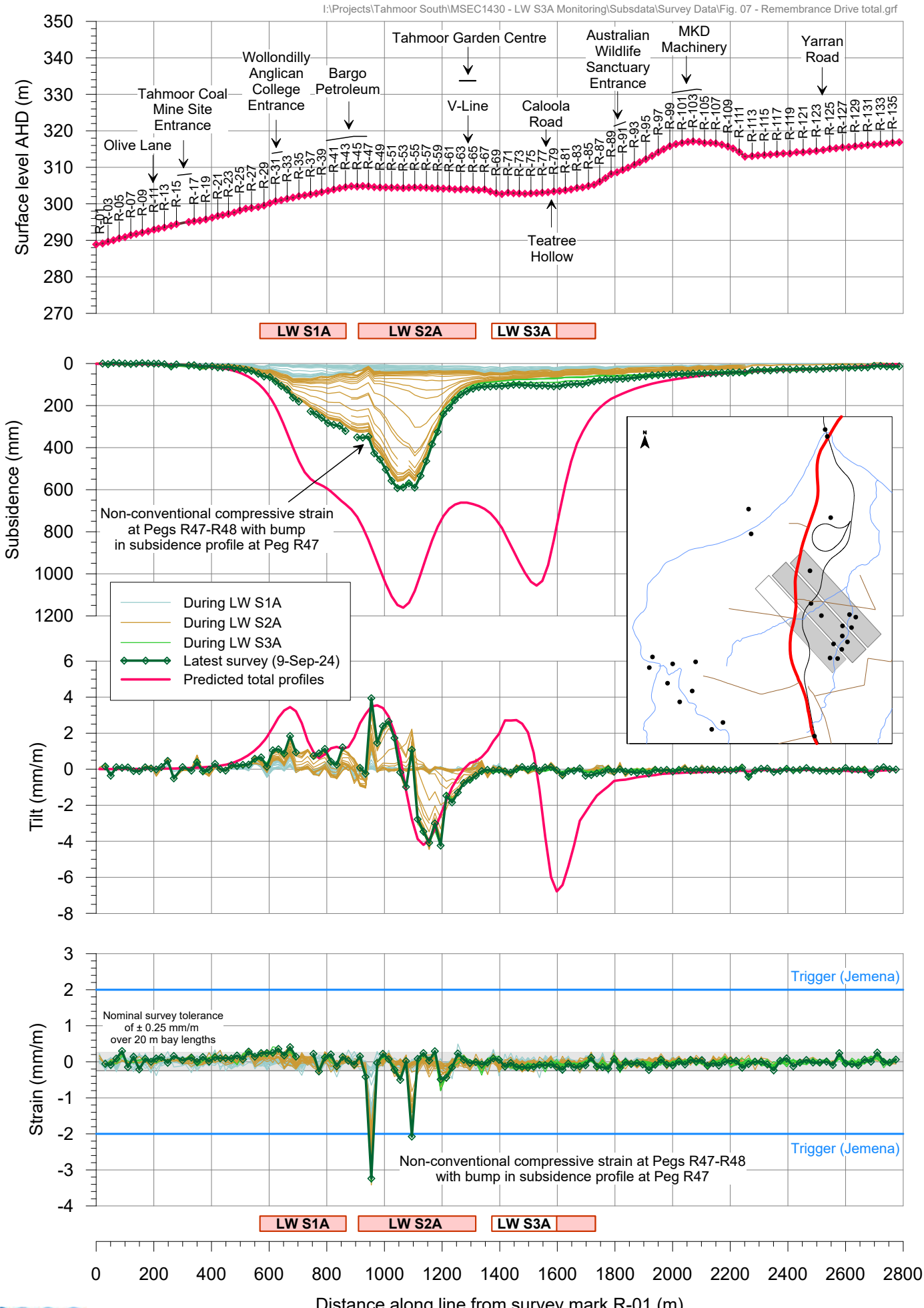

Fig. 7-R16

Tahmoor South LW S3A - AWS
Incremental subsidence profiles along enclosure fence line

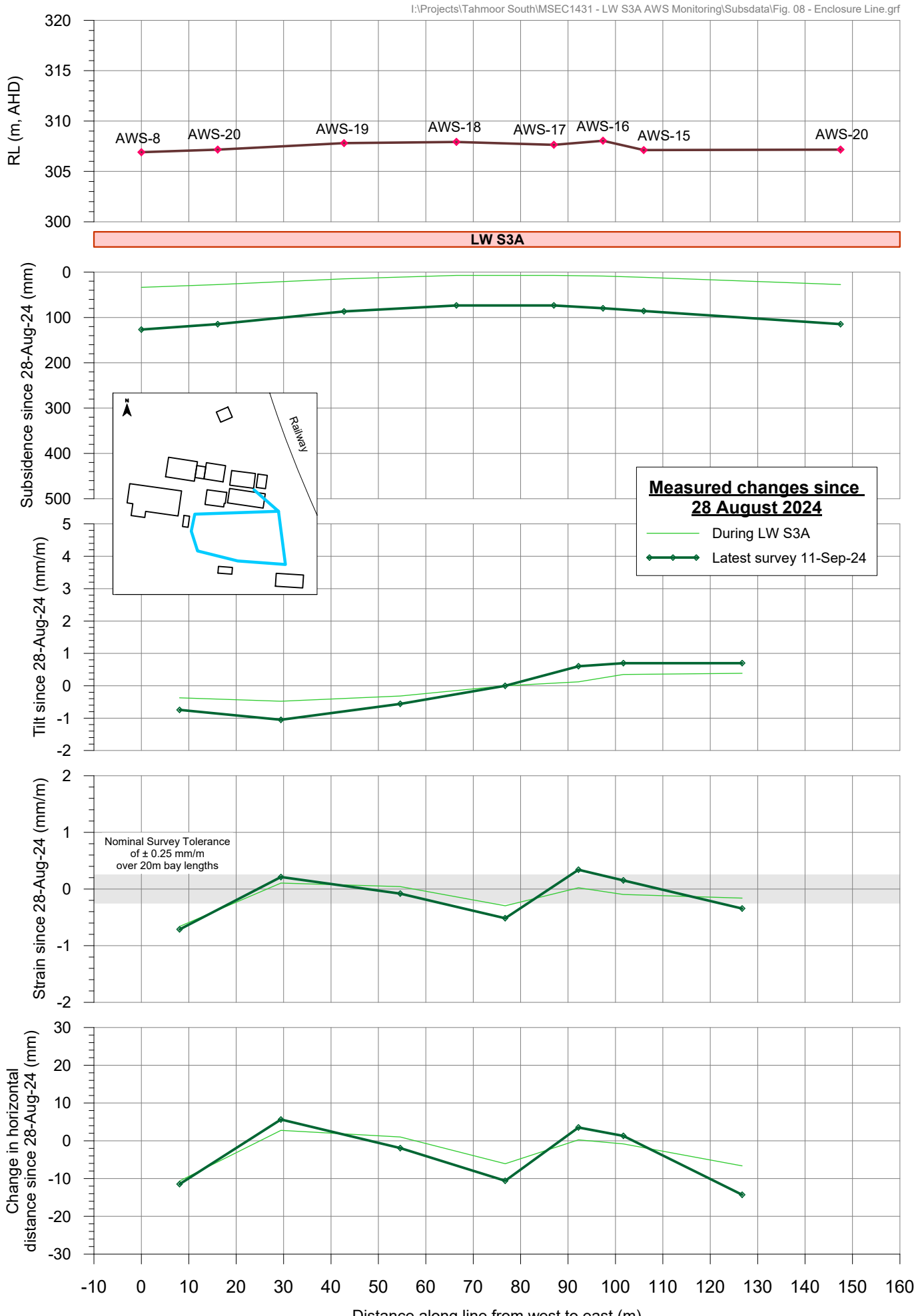

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Fig. 8-R16

Tahmoor South LW S3A - GNSS Monitoring

Site S01 above LW S1A

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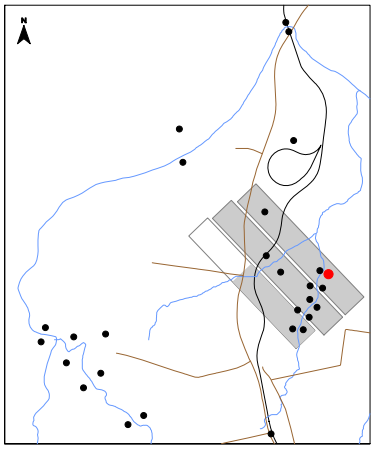



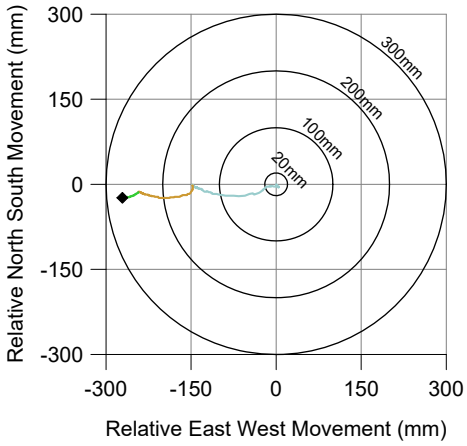

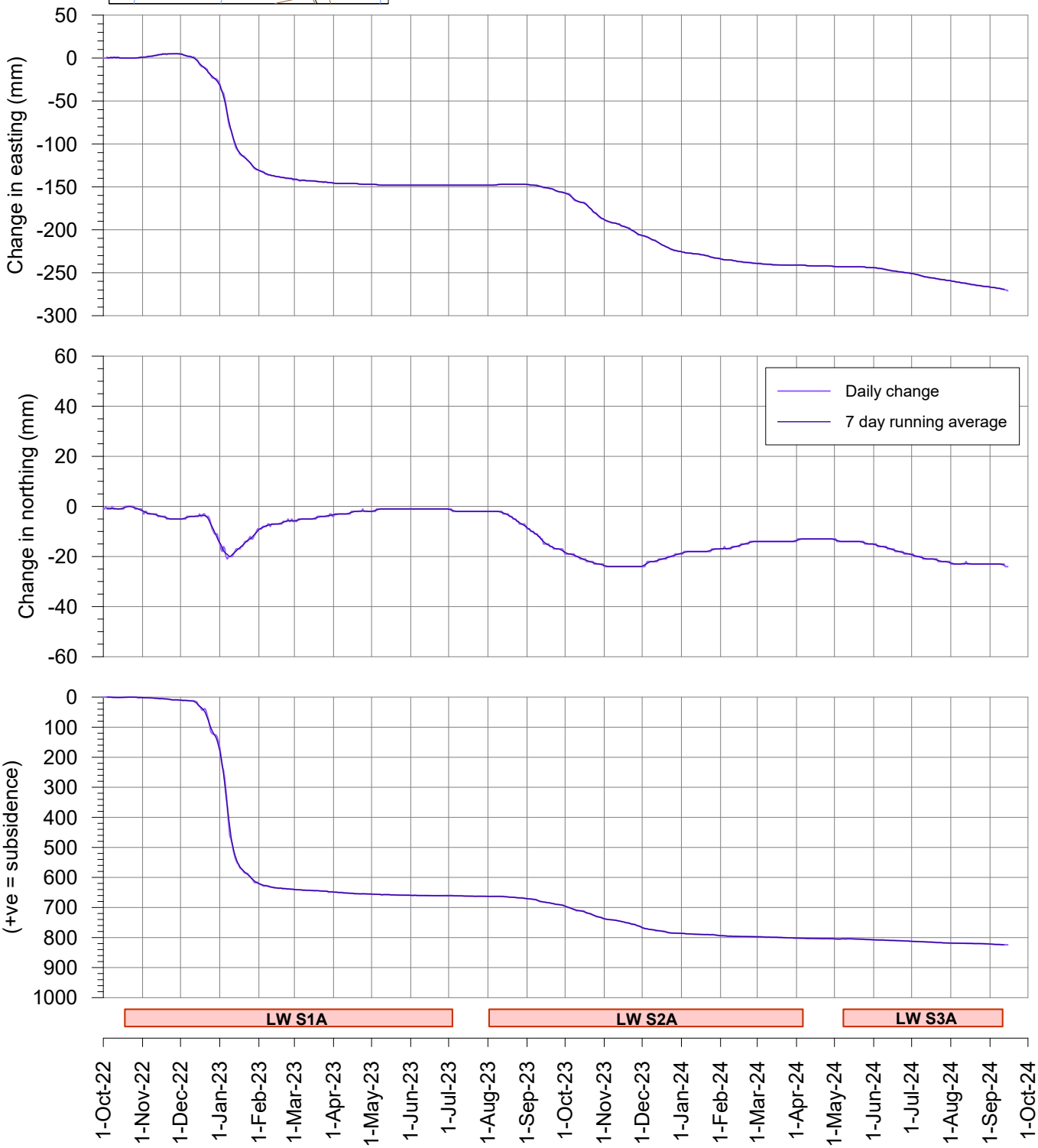

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Fig. S01-R16

Tahmoor South LW S3A - GNSS Monitoring

Site S02 above LW S1A

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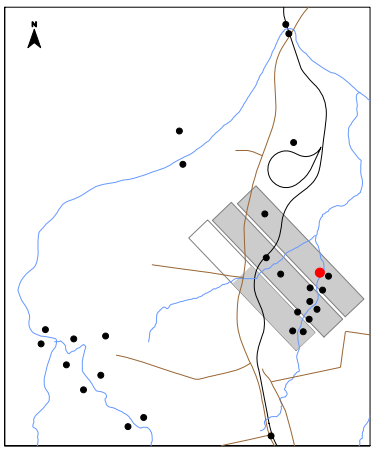



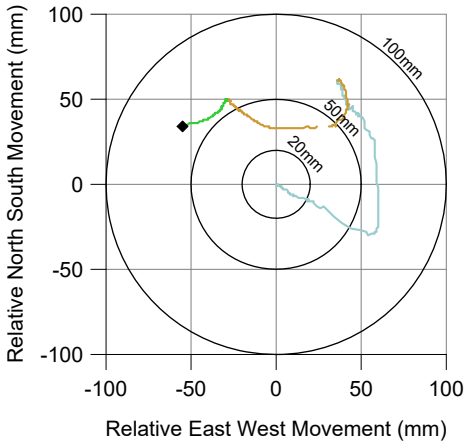

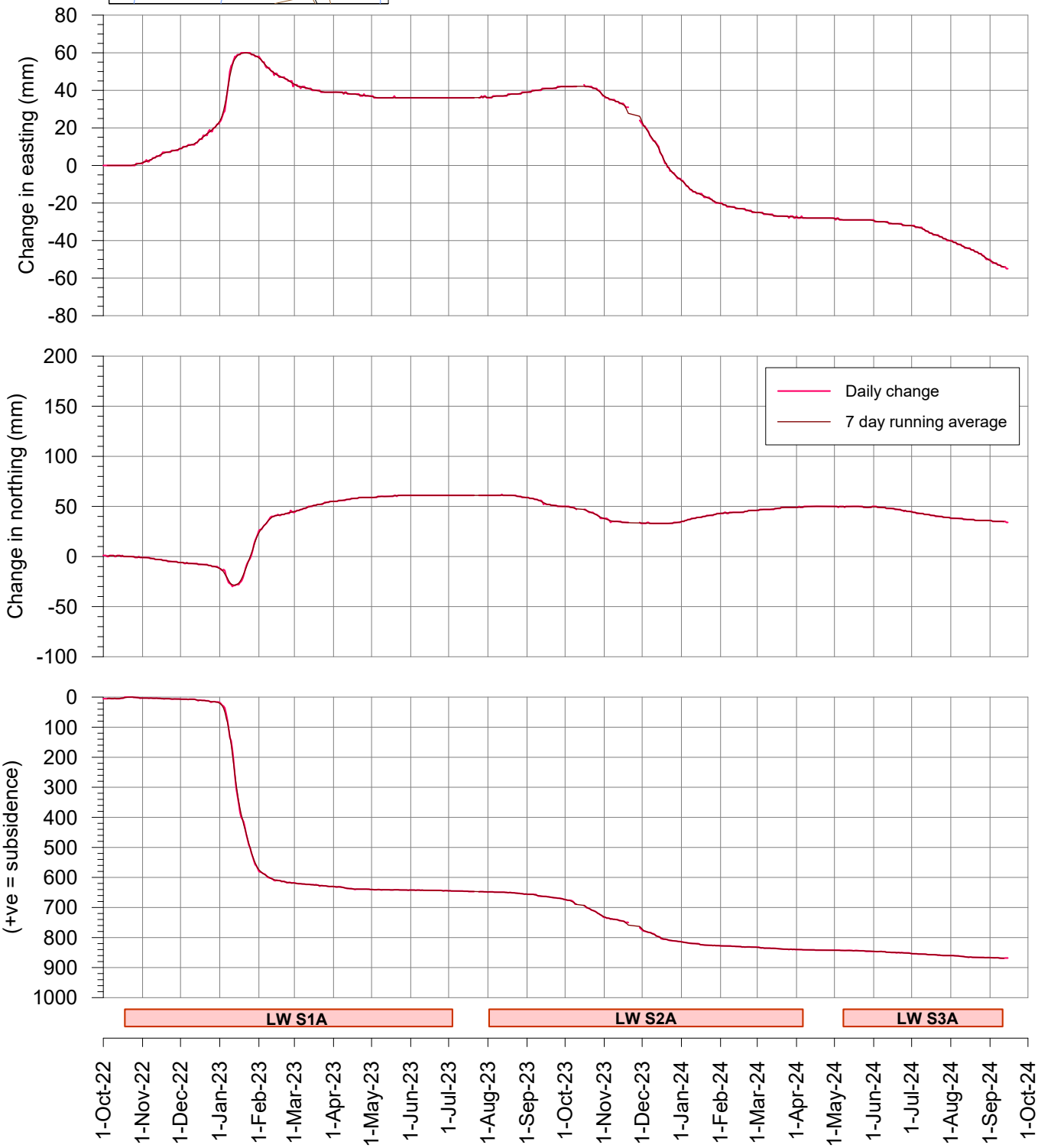

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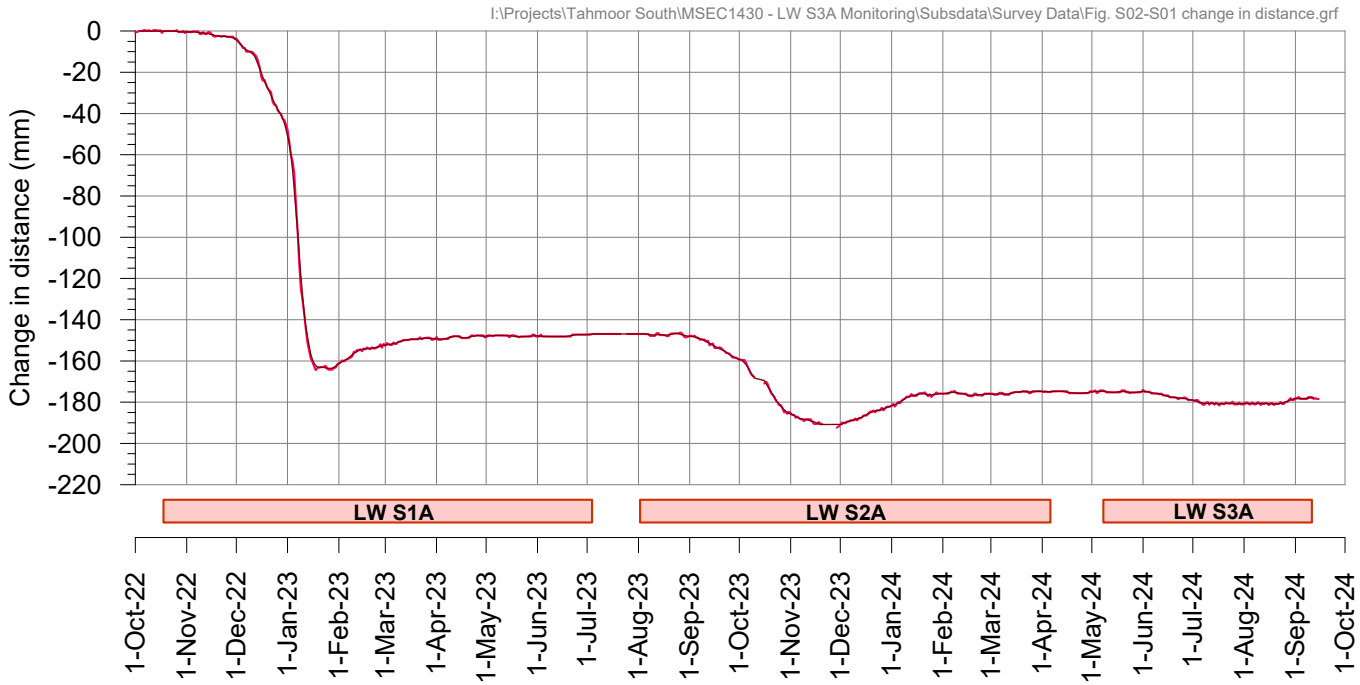
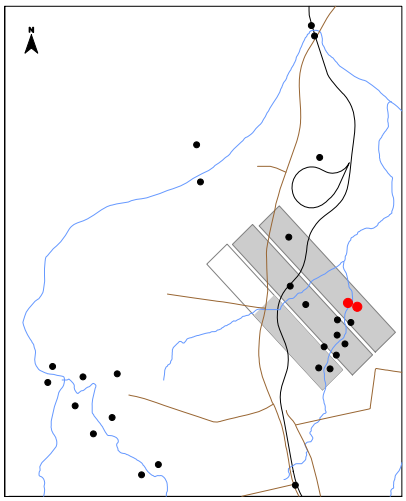
Fig. S02-R16

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek
Sites S01 and S02 above LW S1A





Tahmoor South LW S3A - GNSS Monitoring

Site S03 above LW S1A at Teatree 3

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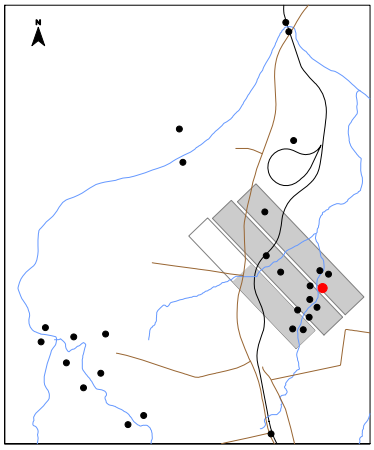
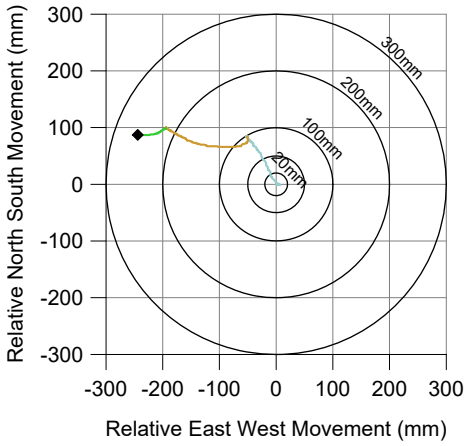


During LW S1A
During LW S2A
During LW S3A



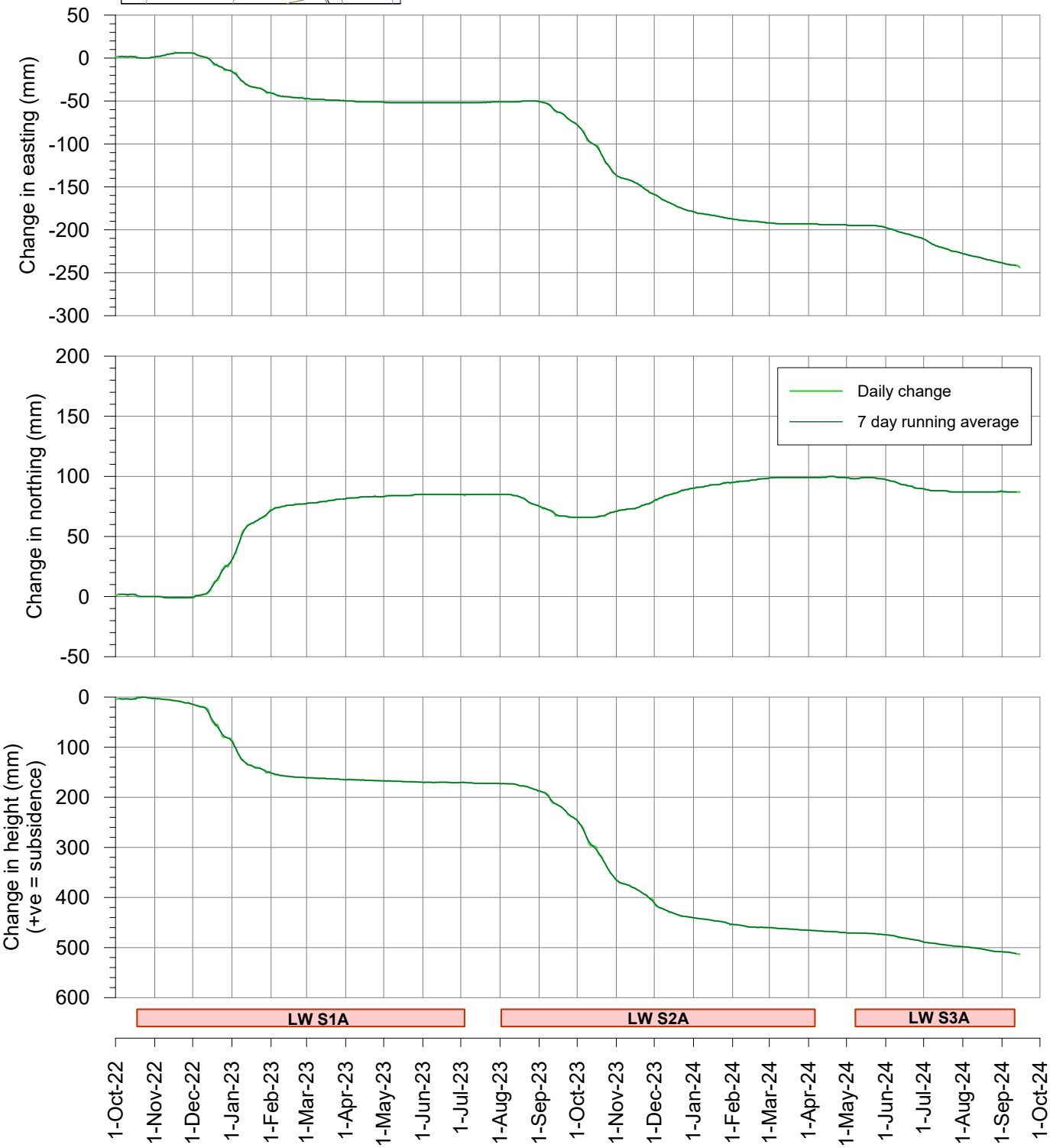


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Fig. S03-R16

Tahmoor South LW S3A - GNSS Monitoring

Site S04 above LW S2A at Teatree 3

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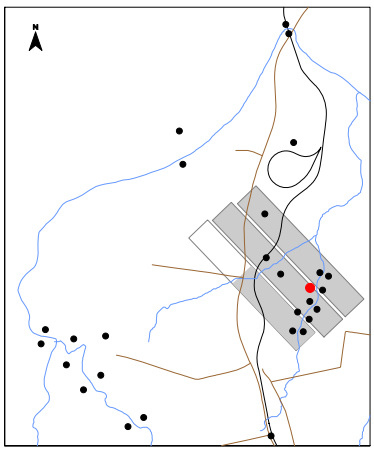
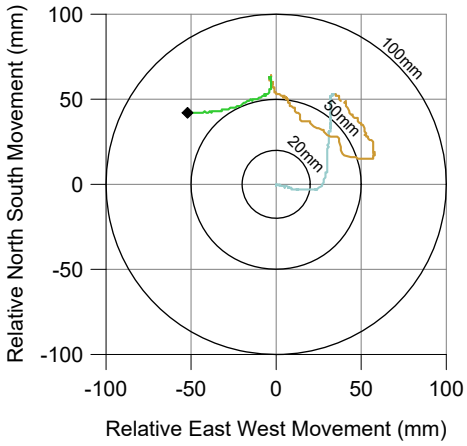
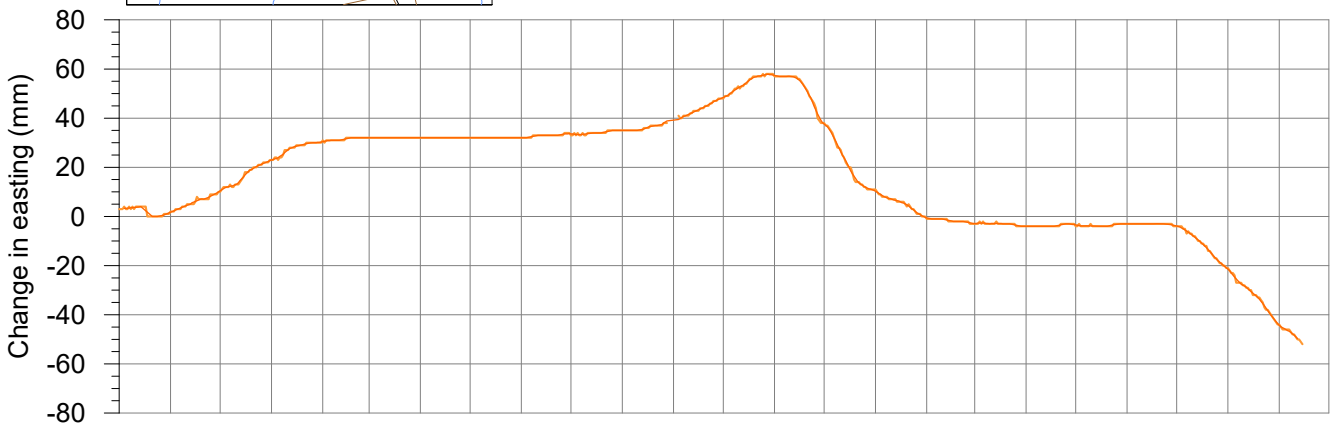
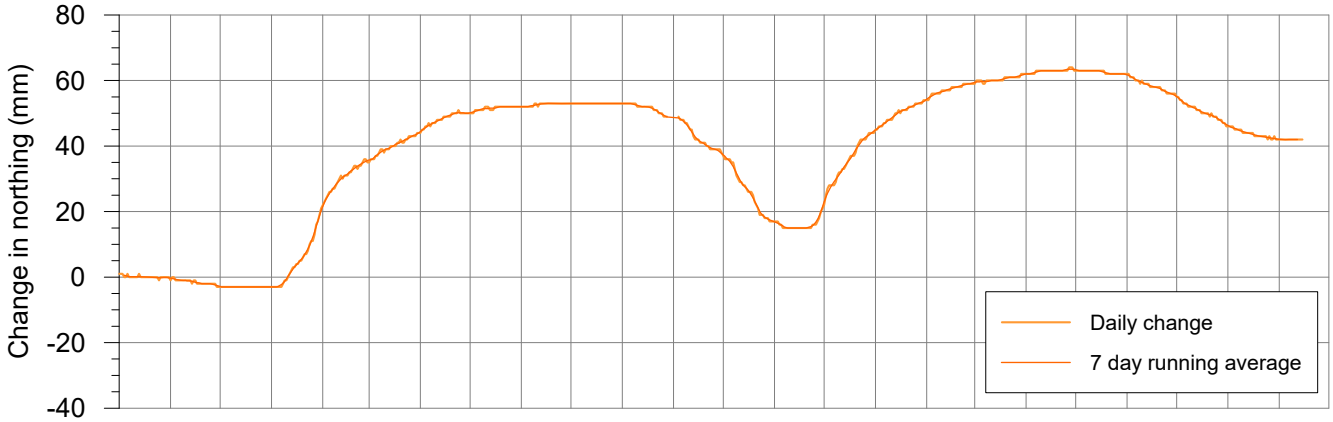
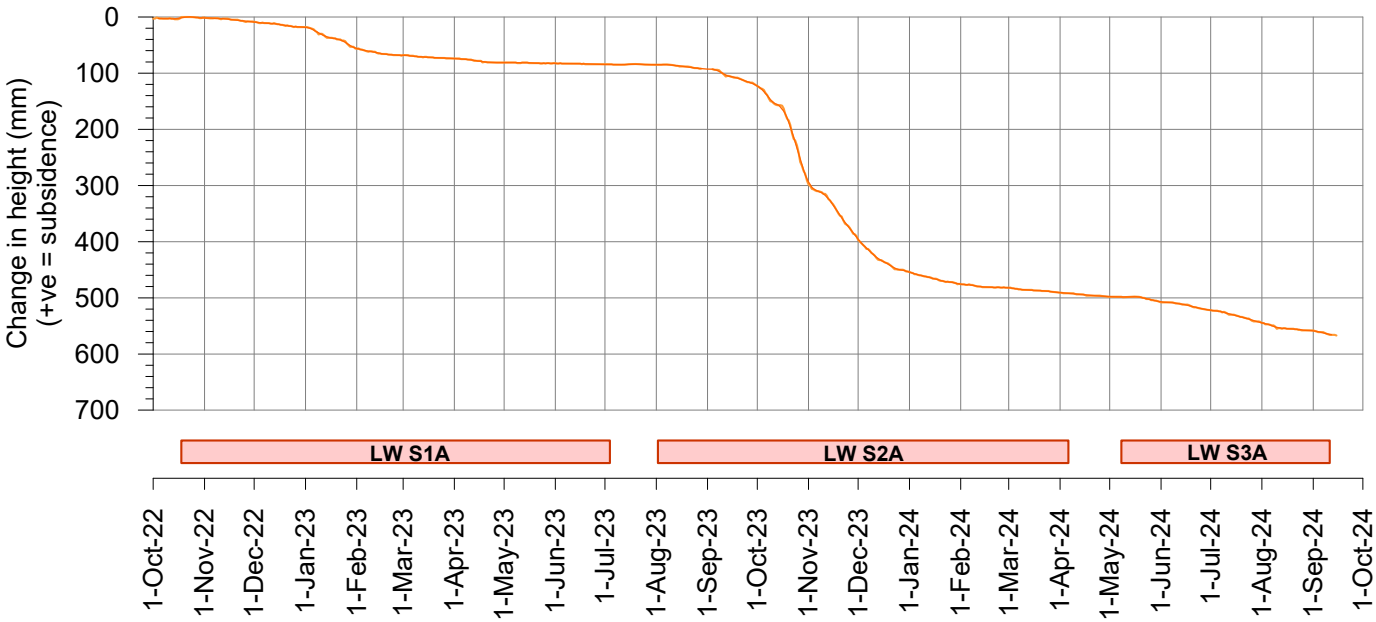


During LW S1A
During LW S2A
During LW S3A







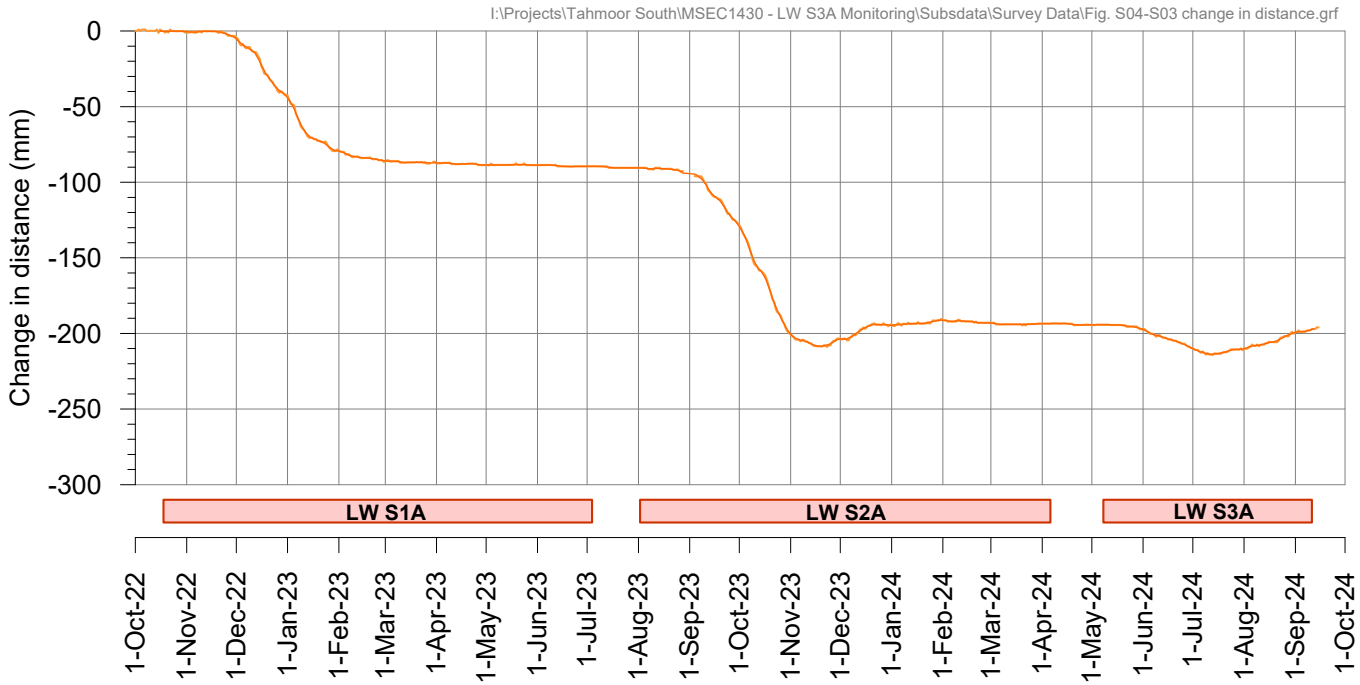


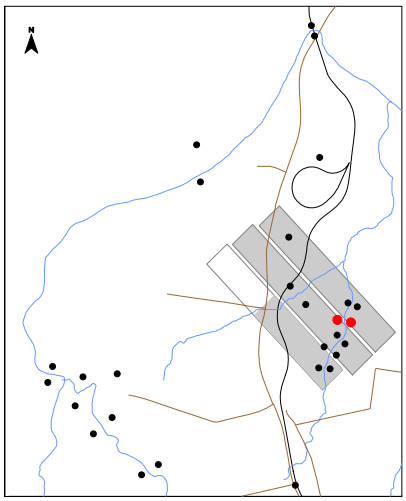
msec

Fig. S04-R16

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek at Teatree 3
Site S03 above LW S1A and Site S04 above LW S2A





Tahmoor South LW S3A - GNSS Monitoring

Site S05 above LW S2A

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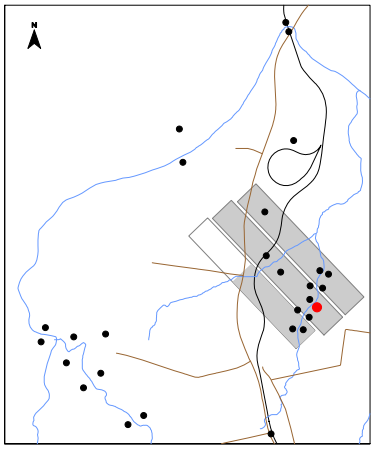
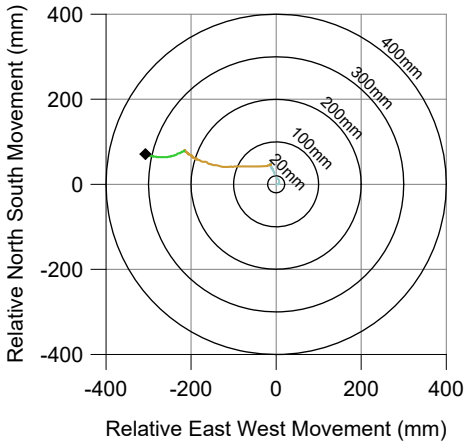
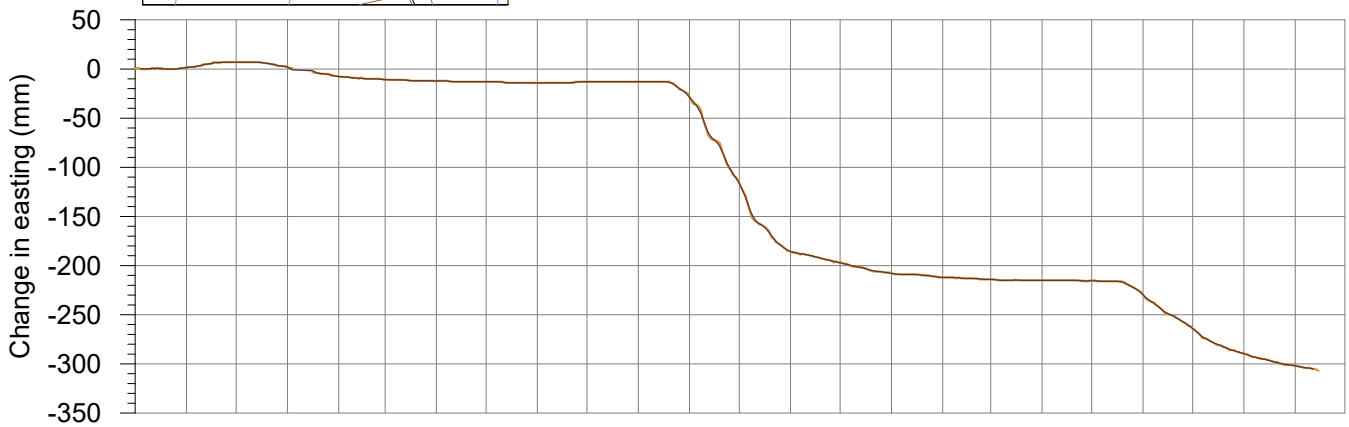
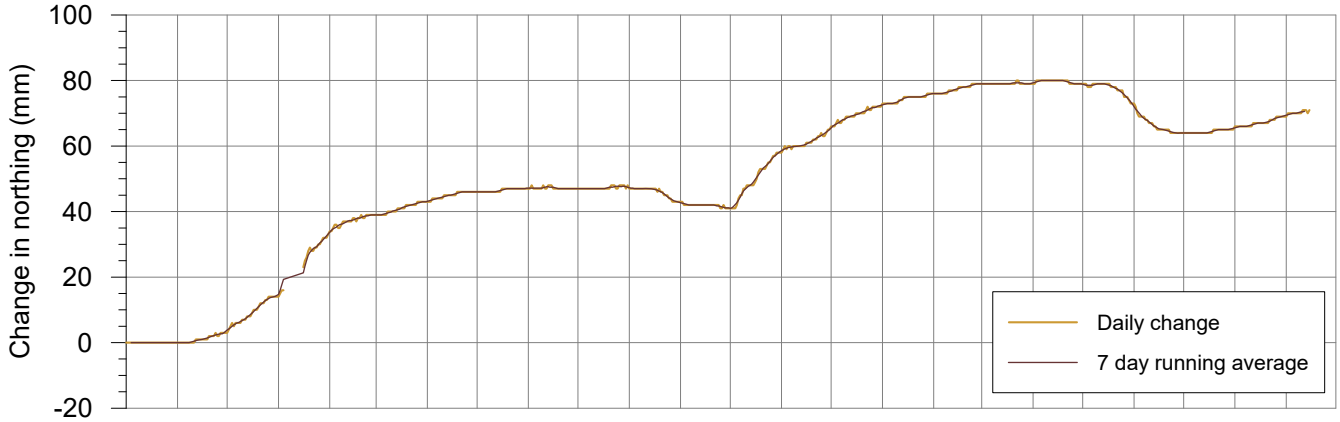
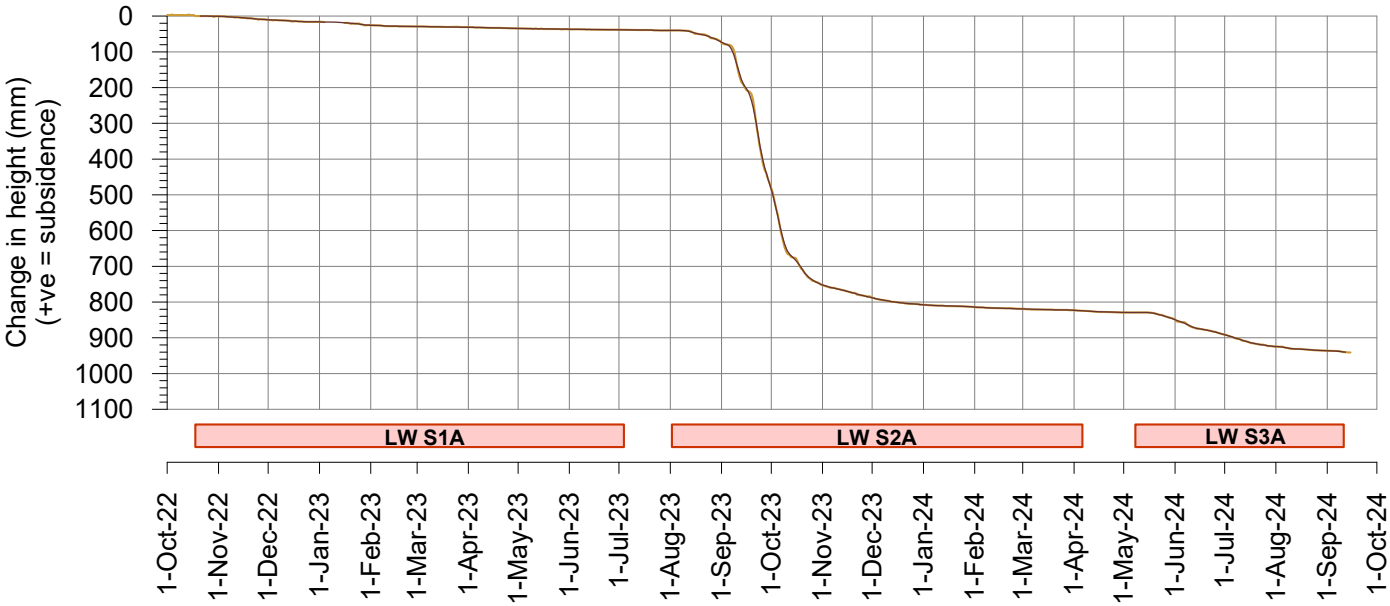


During LW S1A
During LW S2A
During LW S3A









msec

Fig. S05-R16

Tahmoor South LW S3A - GNSS Monitoring

Site S06 above LW S2A

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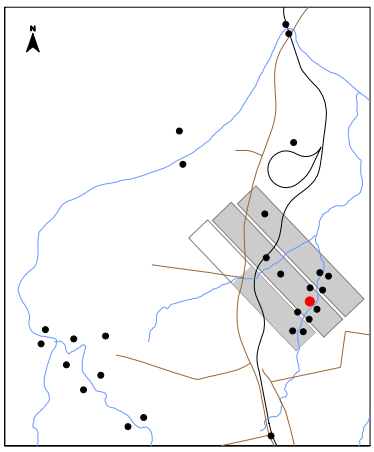
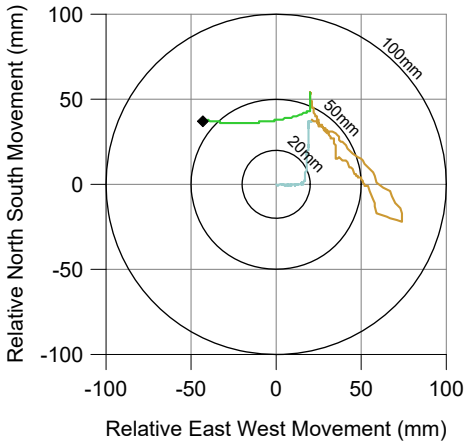
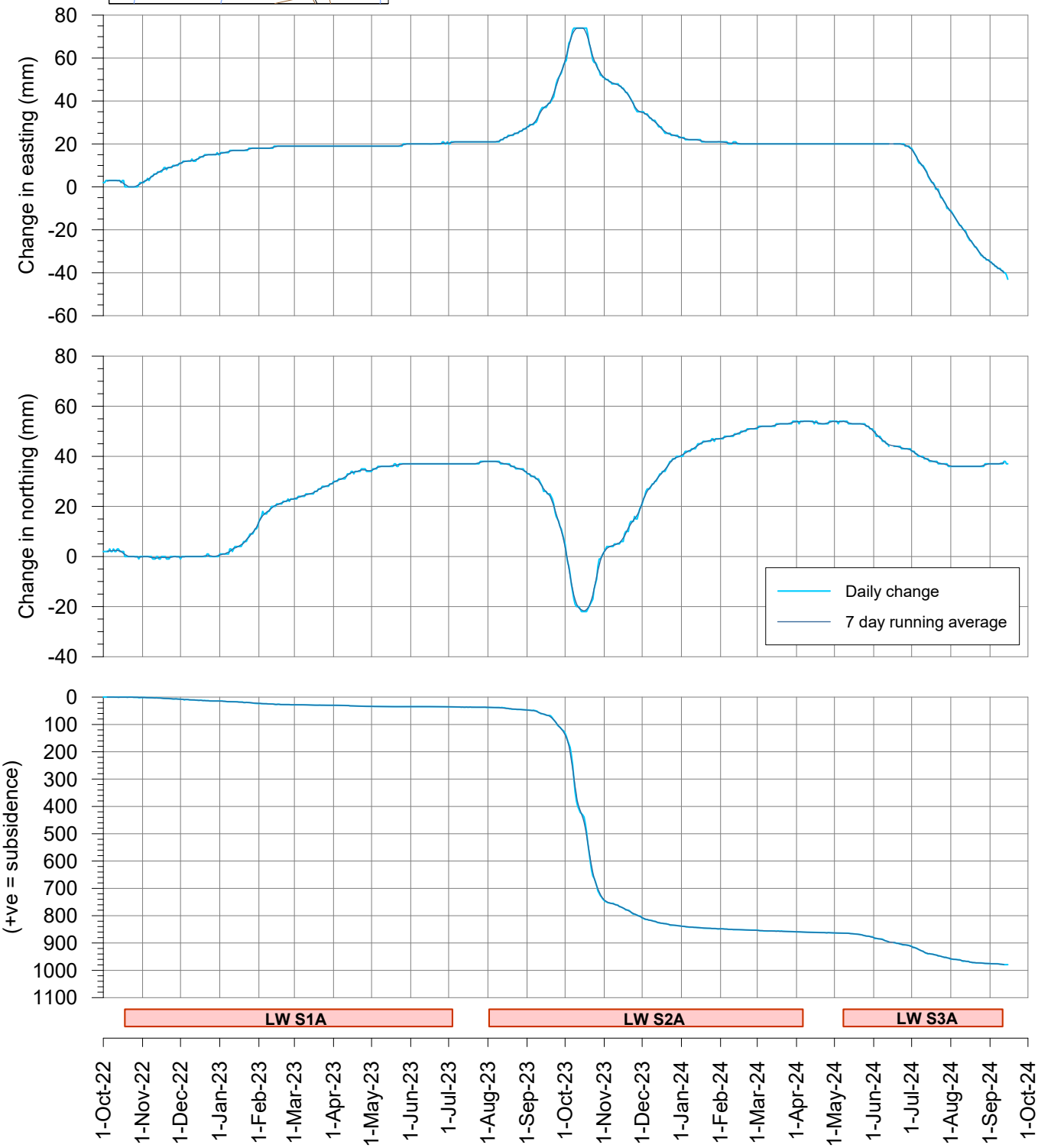






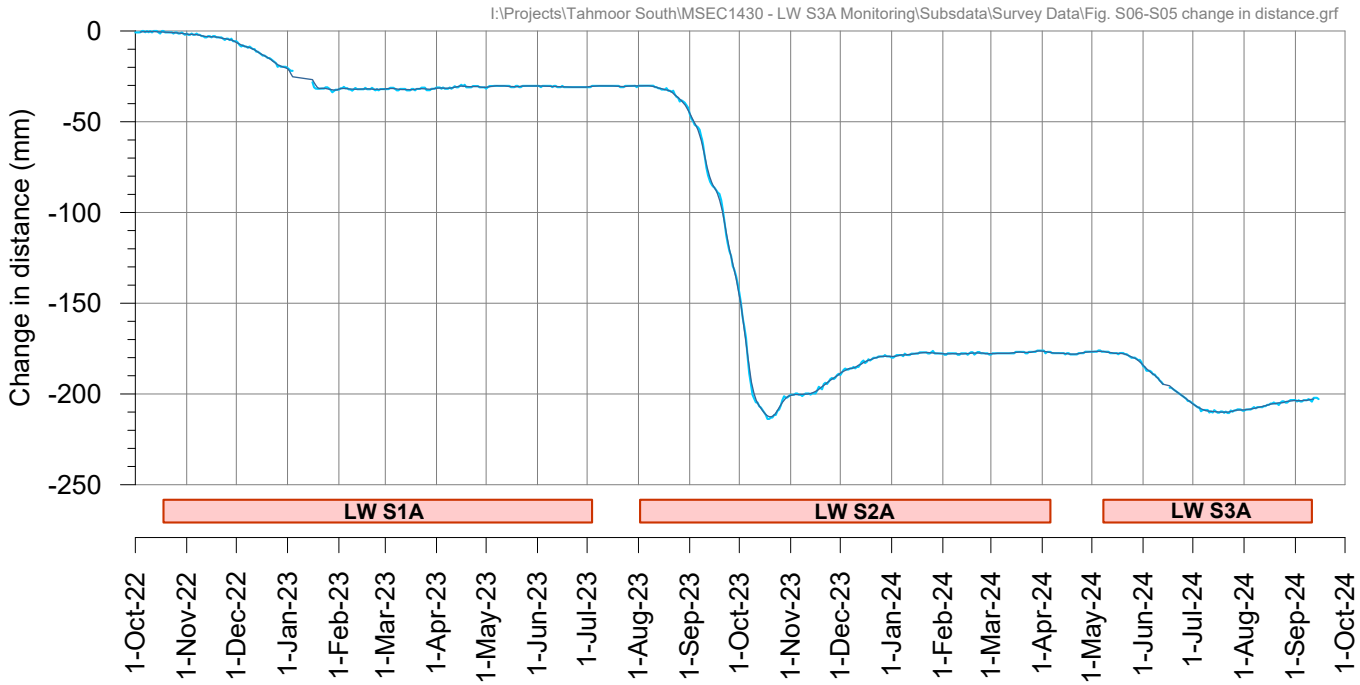


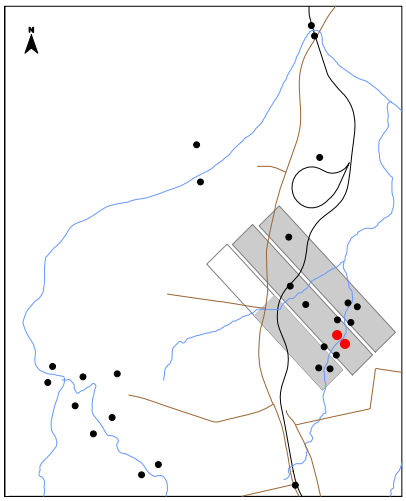
msec

Fig. S06-R16

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek
Sites S05 and S06 above LW S2A





Tahmoor South LW S3A - GNSS Monitoring

Site S07 above LW S2A

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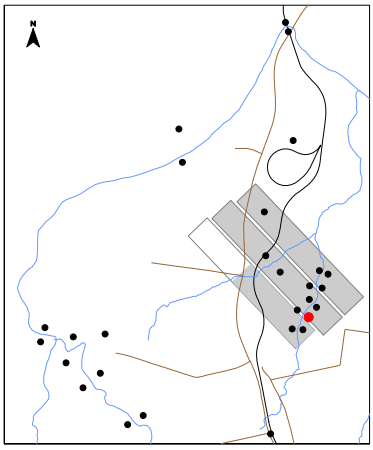
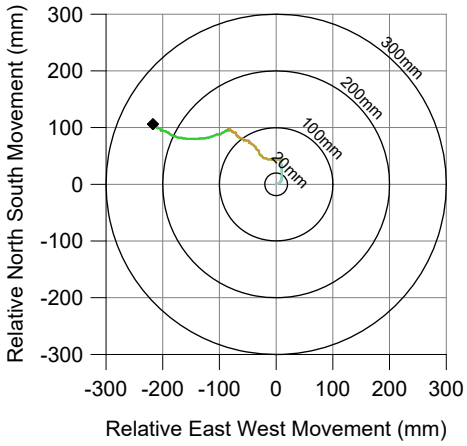
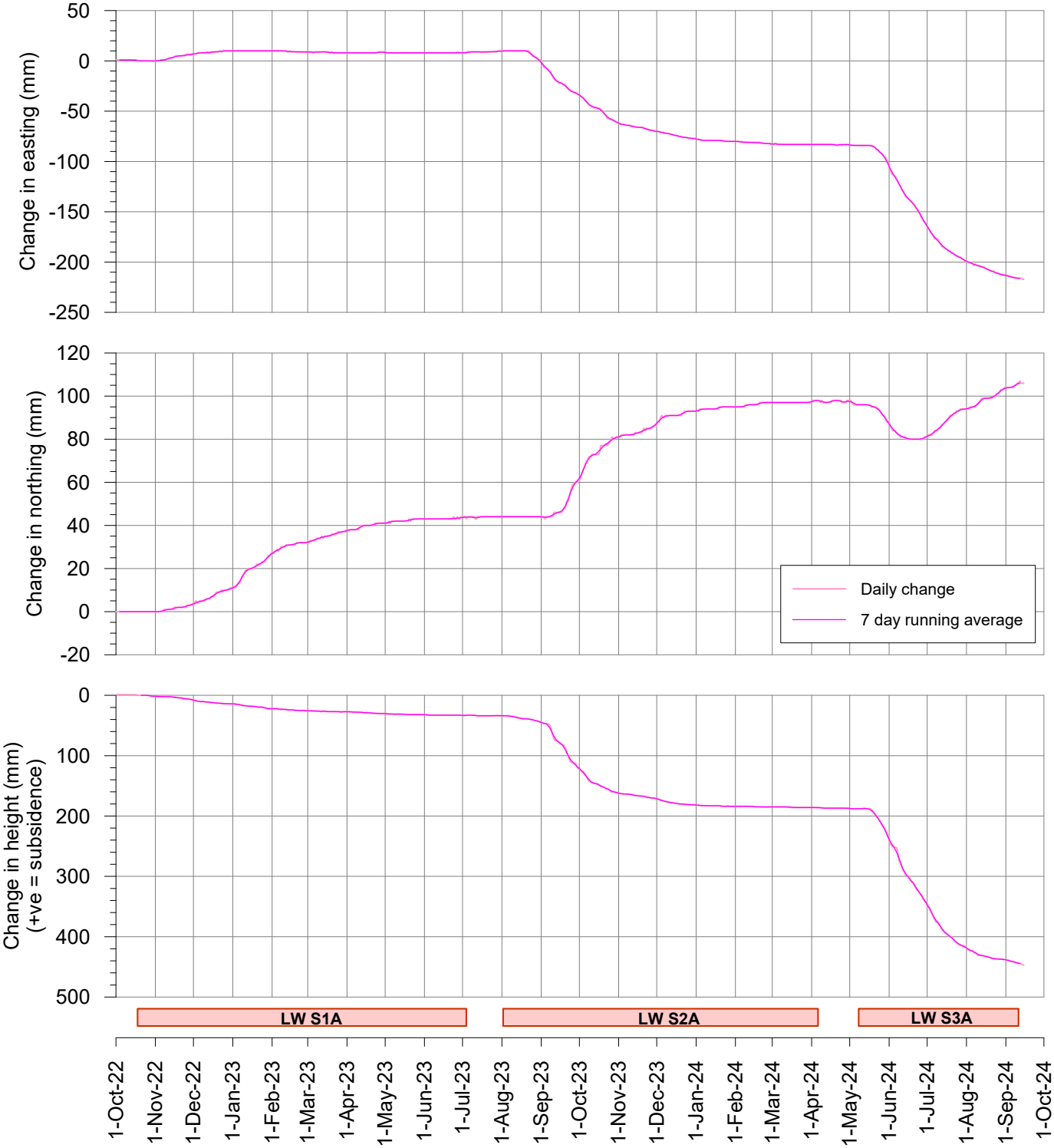


During LW S1A
During LW S2A
During LW S3A





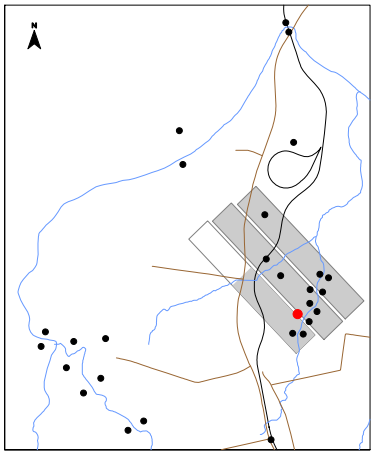
msec

Fig. S07-R16

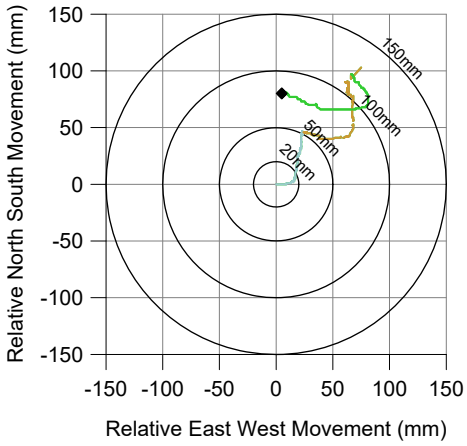
Tahmoor South LW S3A - GNSS Monitoring

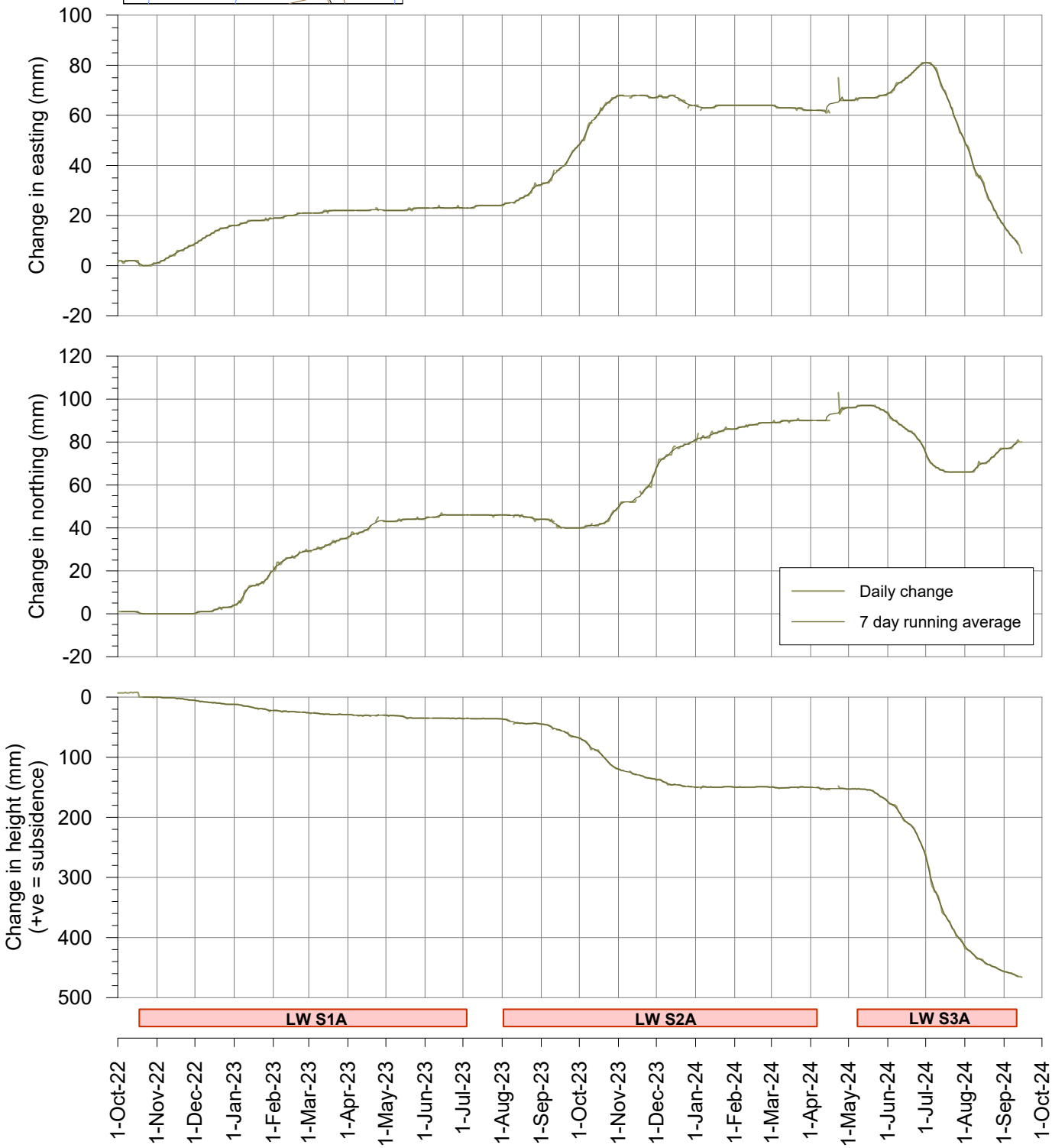
Site S08 between LW S2A and LW S3A

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S08 GNSS.grf







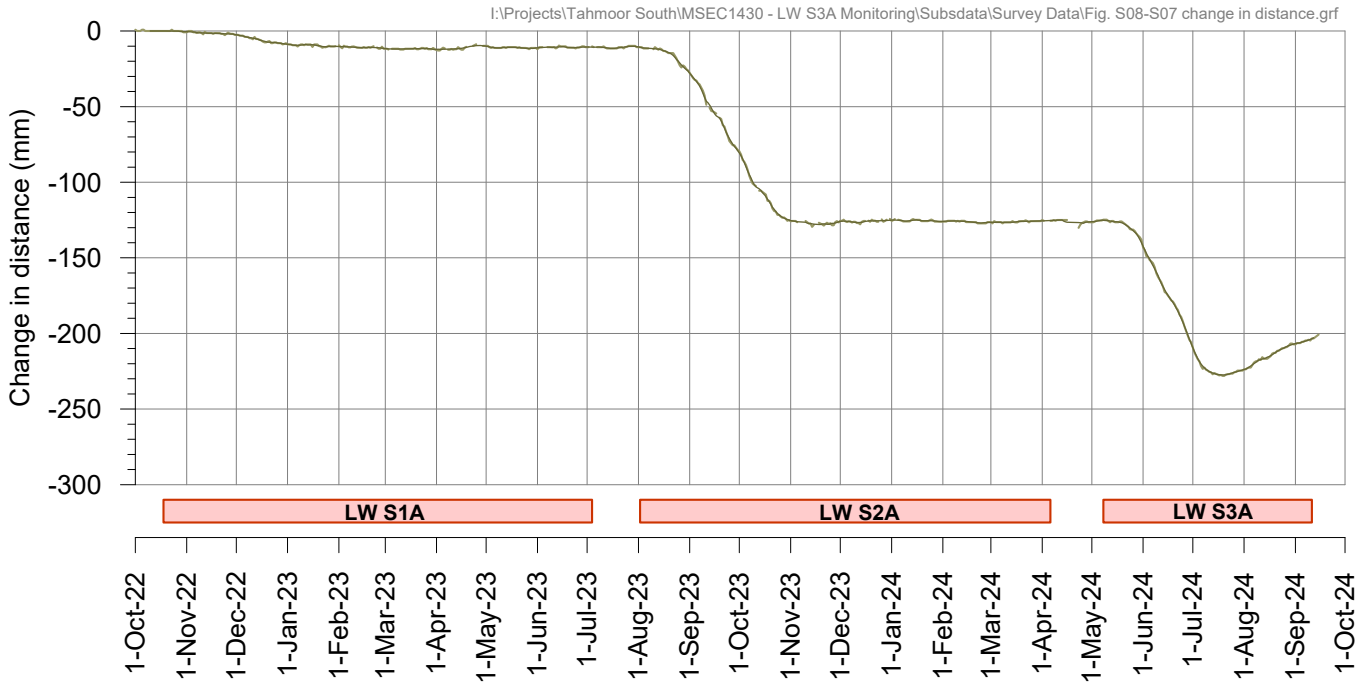


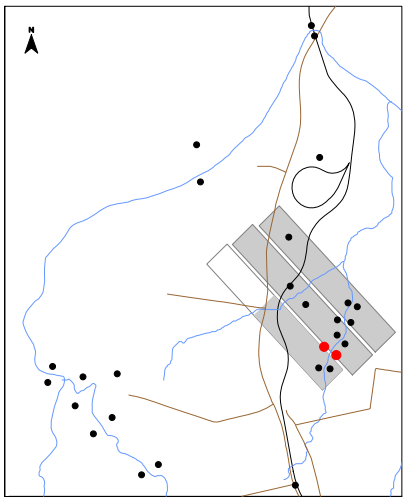
msec

Fig. S08-R16

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek
Site S07 above LW S2A and Site S08 between LW S2A and LW S3A





Tahmoor South LW S3A - GNSS Monitoring

Site S09 above LW S3A at Teatree 2

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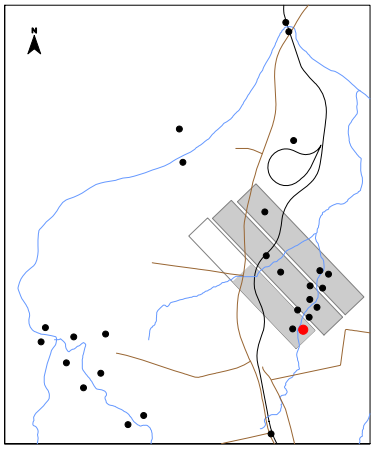
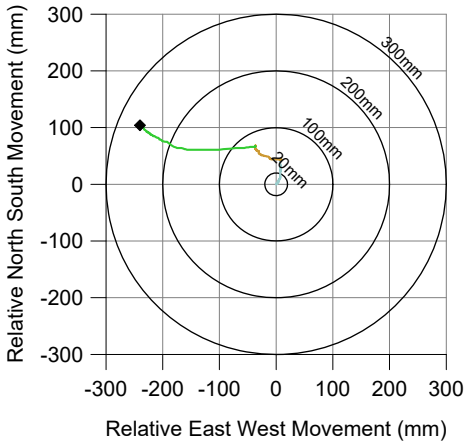
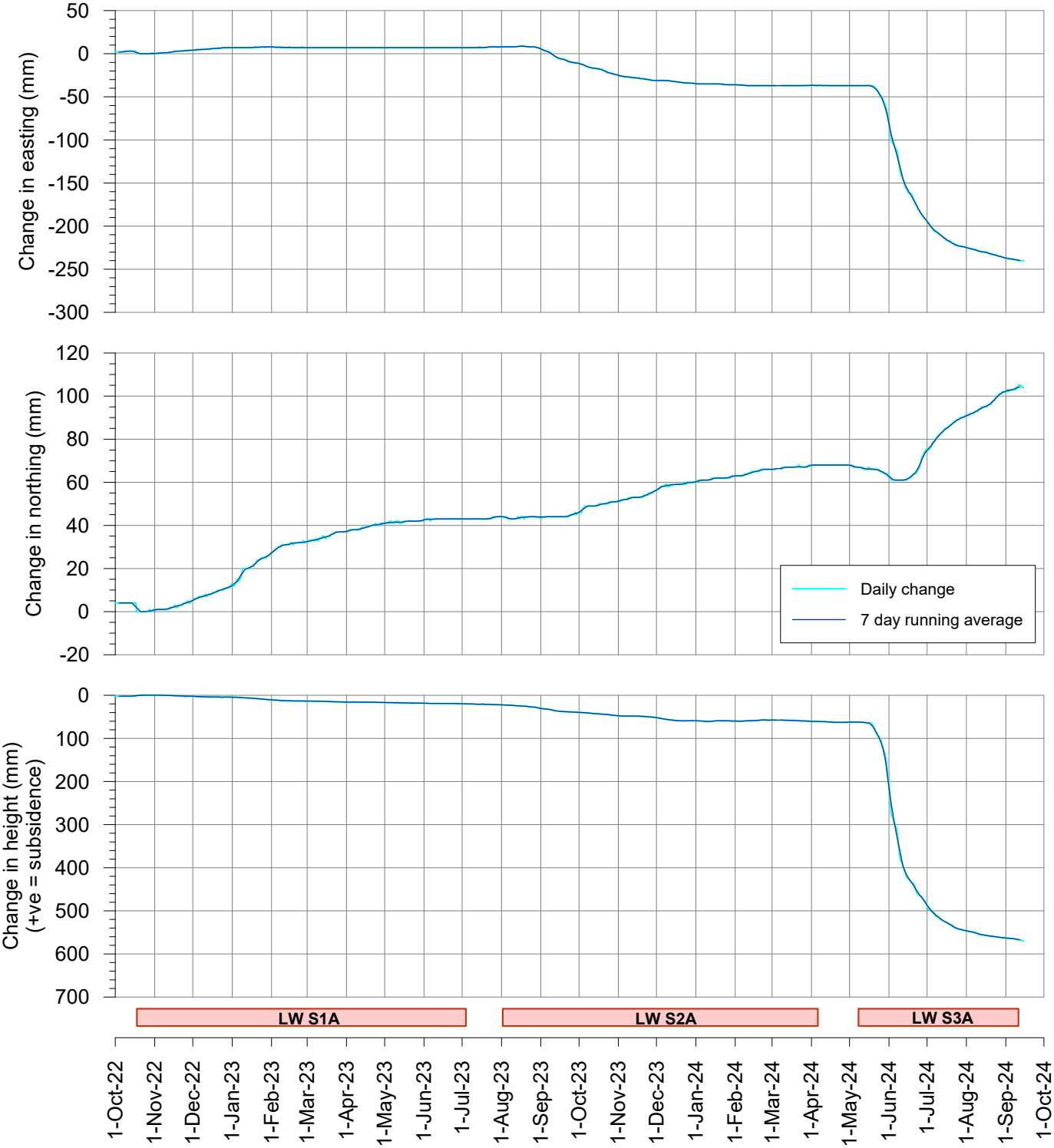


During LW S1A
During LW S2A
During LW S3A





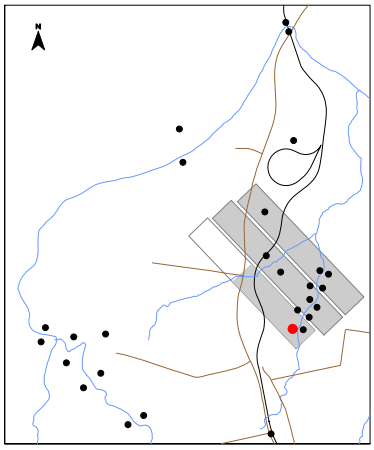
msec

Fig. S09-R16

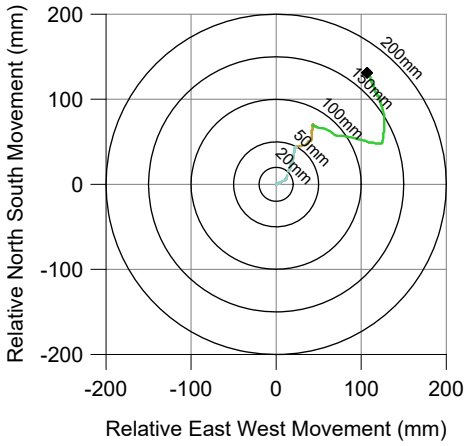
Tahmoor South LW S3A - GNSS Monitoring

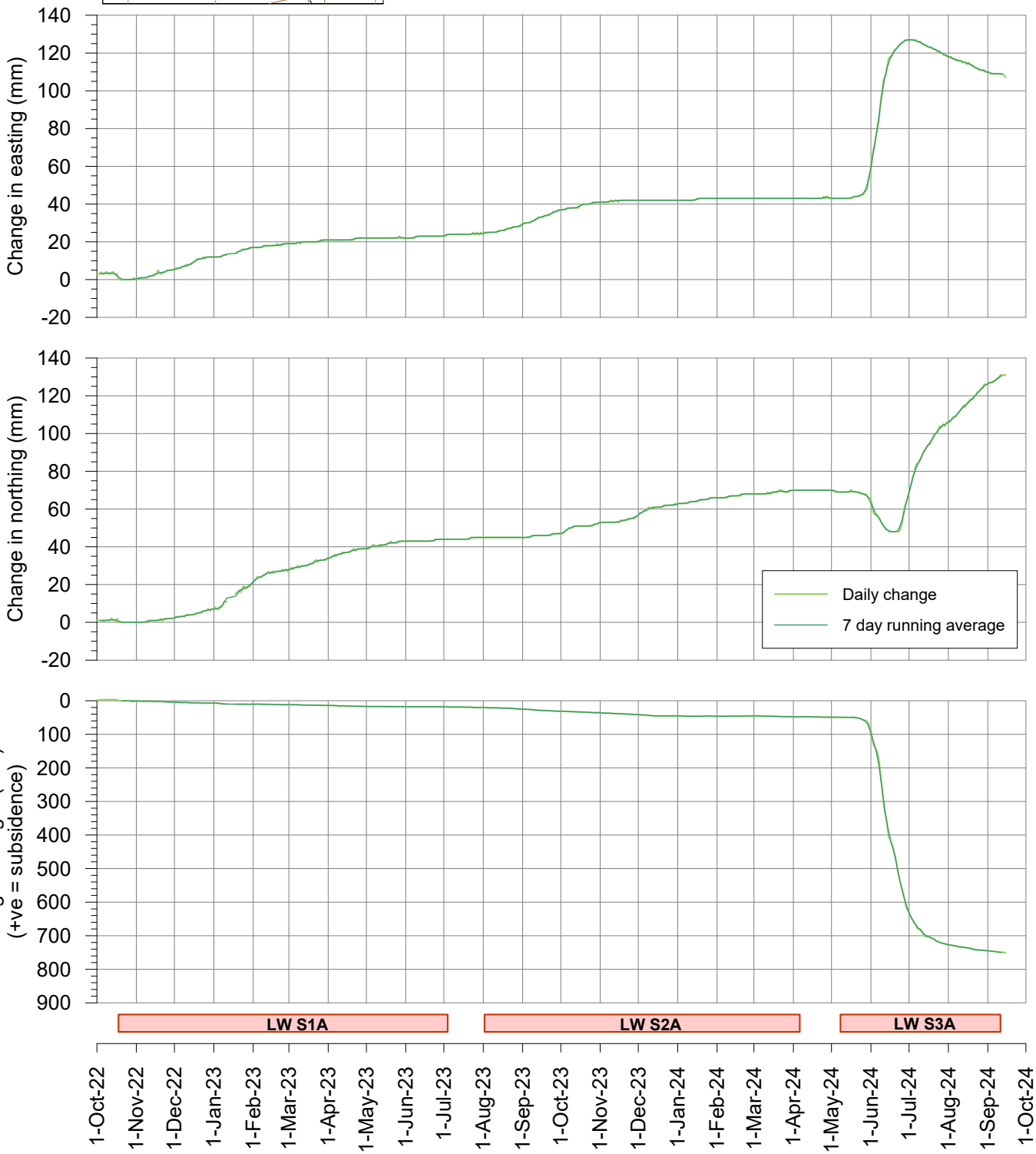
Site S10 above LW S3A at Teatree 2

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S10 GNSS.grf



During LW S1A
During LW S2A
During LW S3A



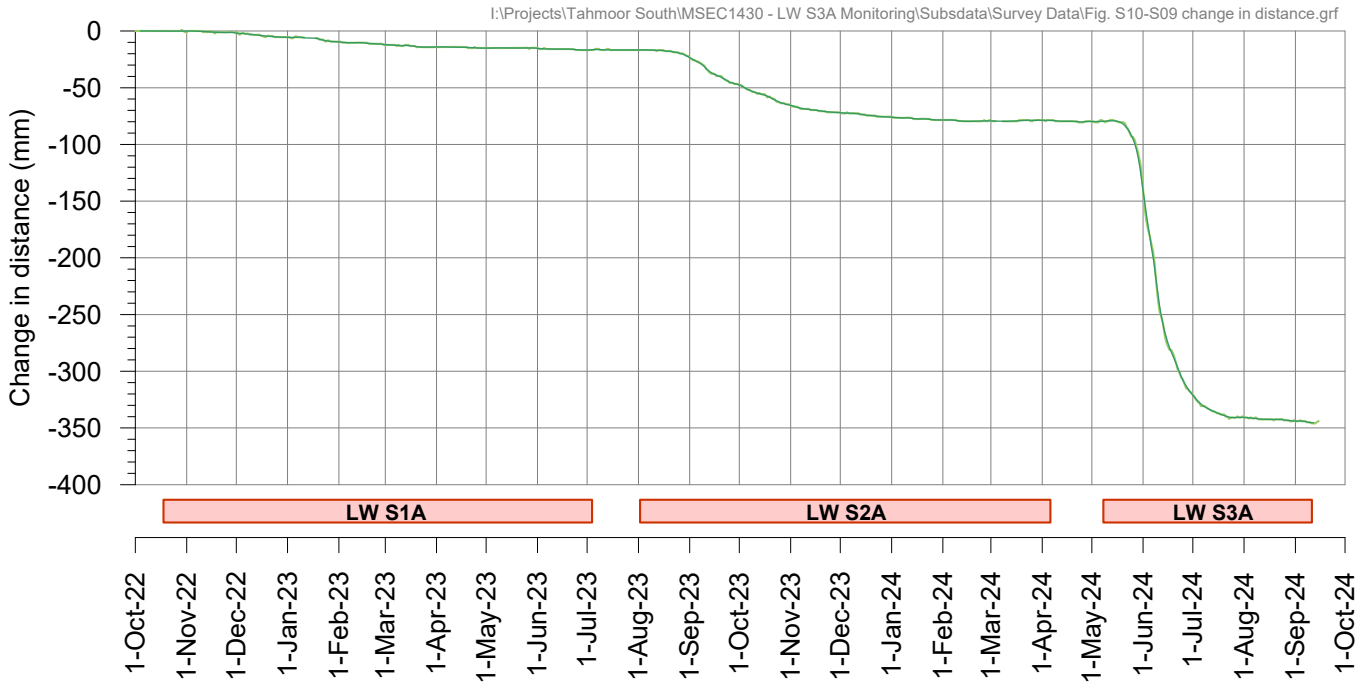


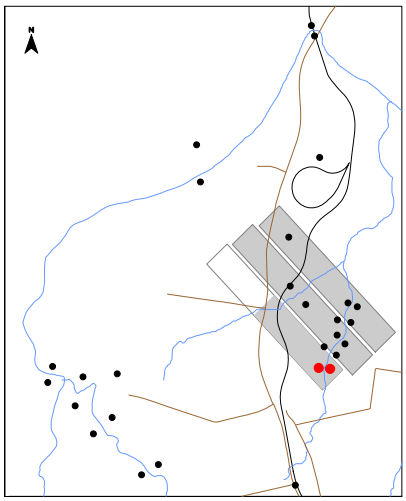
msec

Fig. S10-R16

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek at Teatree 2
Sites S09 and S10 above LW S3A





Tahmoor South LW S3A - GNSS Monitoring

Site S26 above LW S2A

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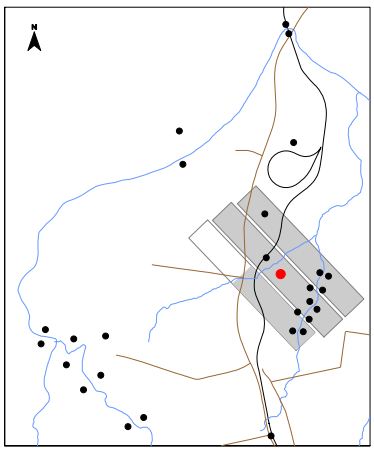
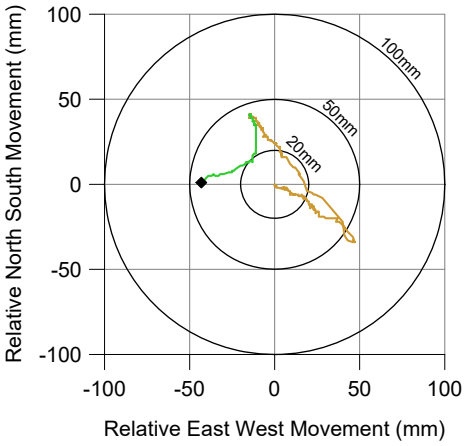
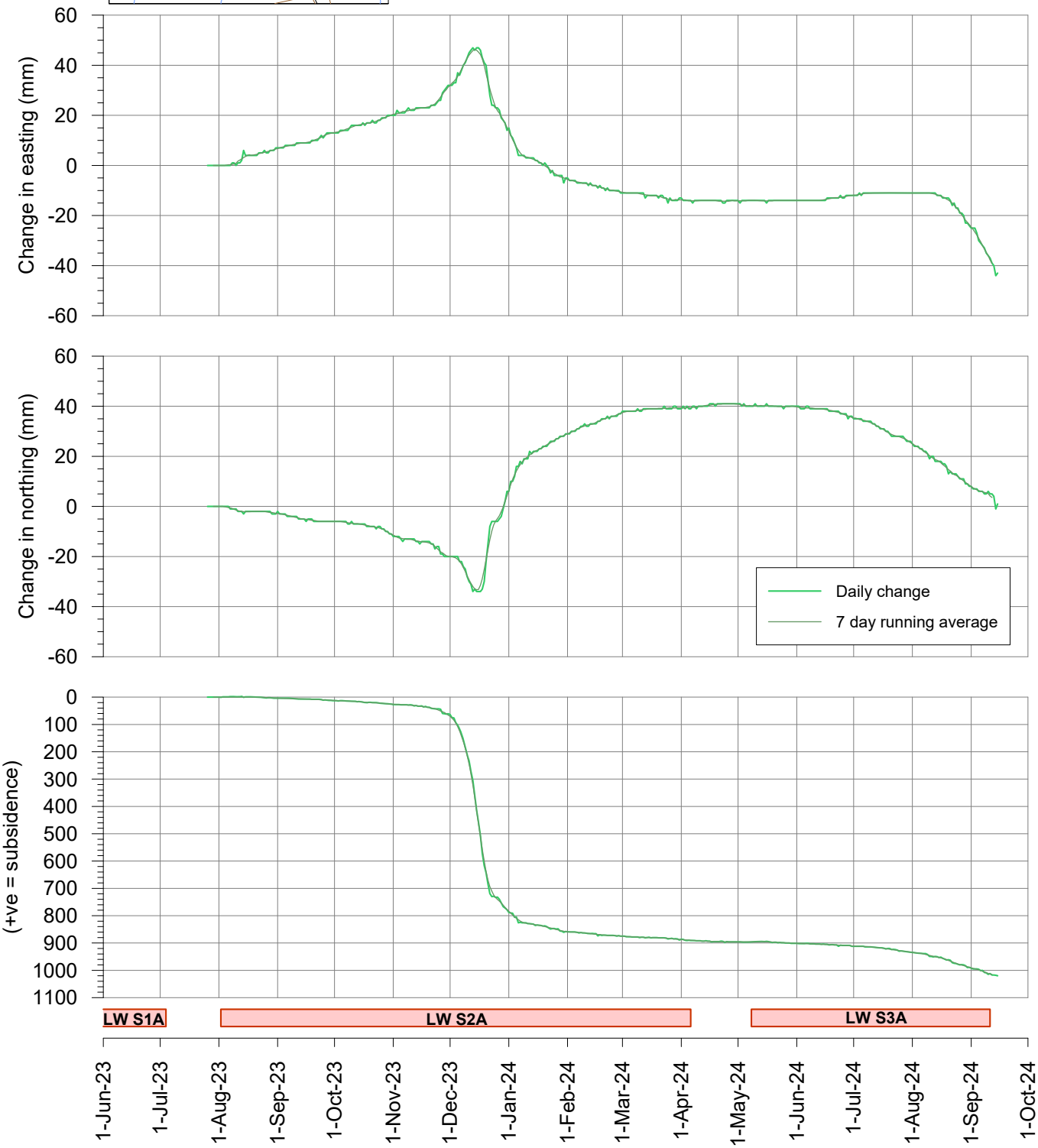








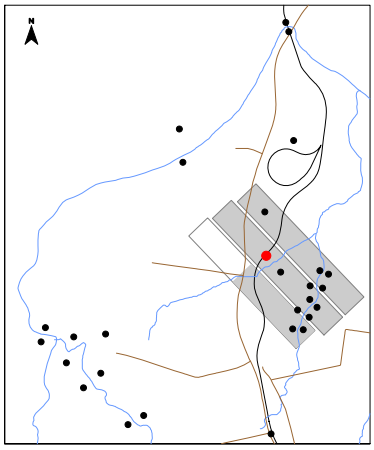
msec

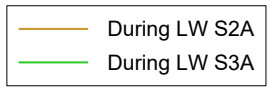
Fig. S26-R16

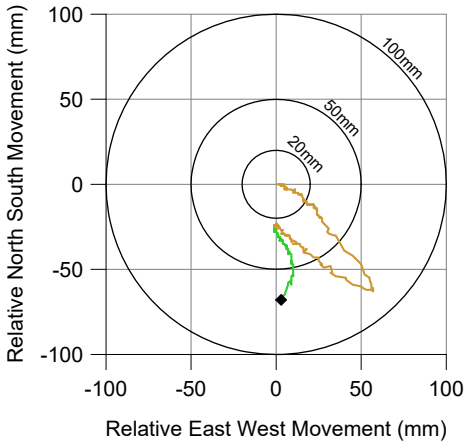
Tahmoor South LW S3A - GNSS Monitoring

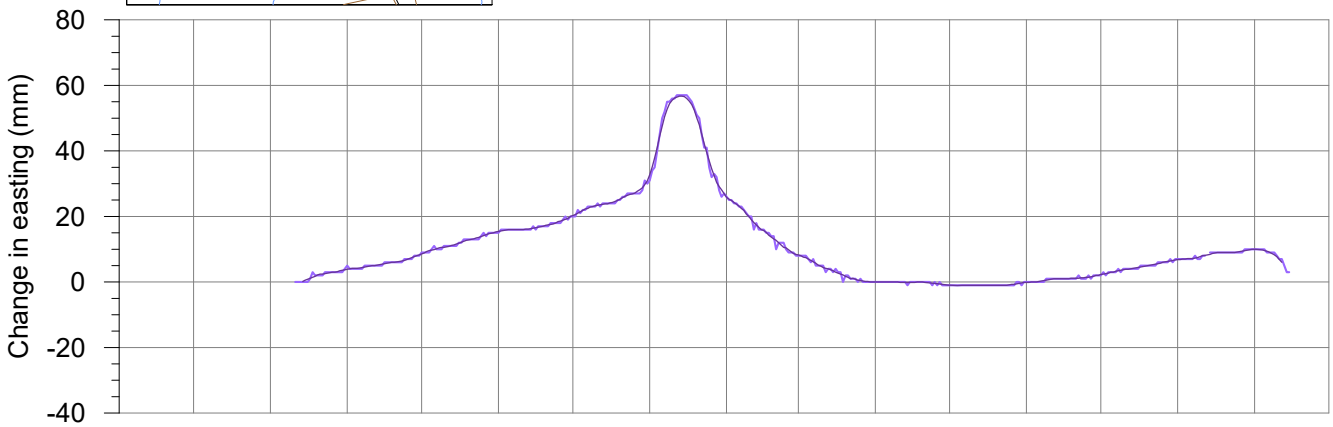
Site S27 on railway embankment above LW S2A

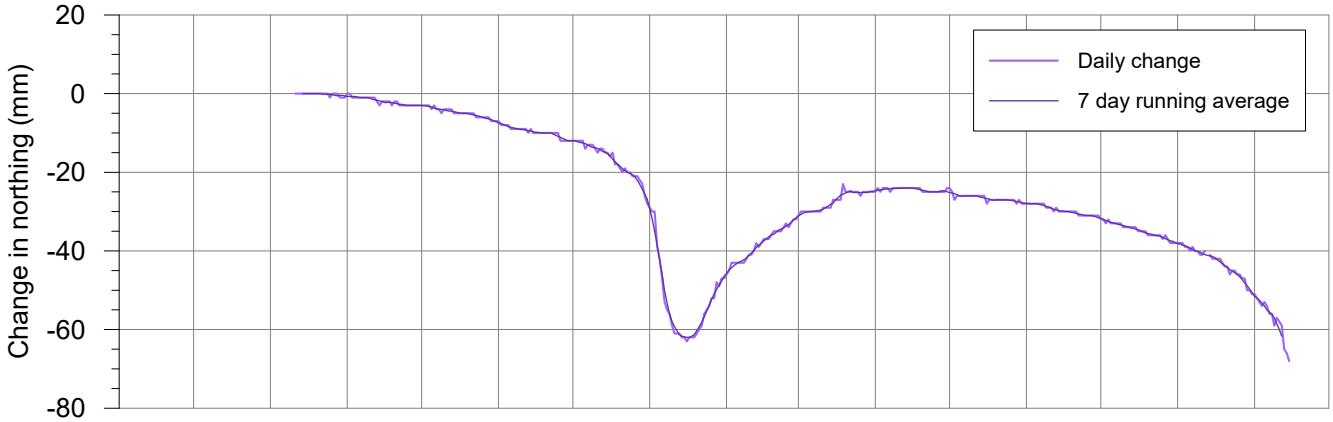
I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S27 GNSS.grf

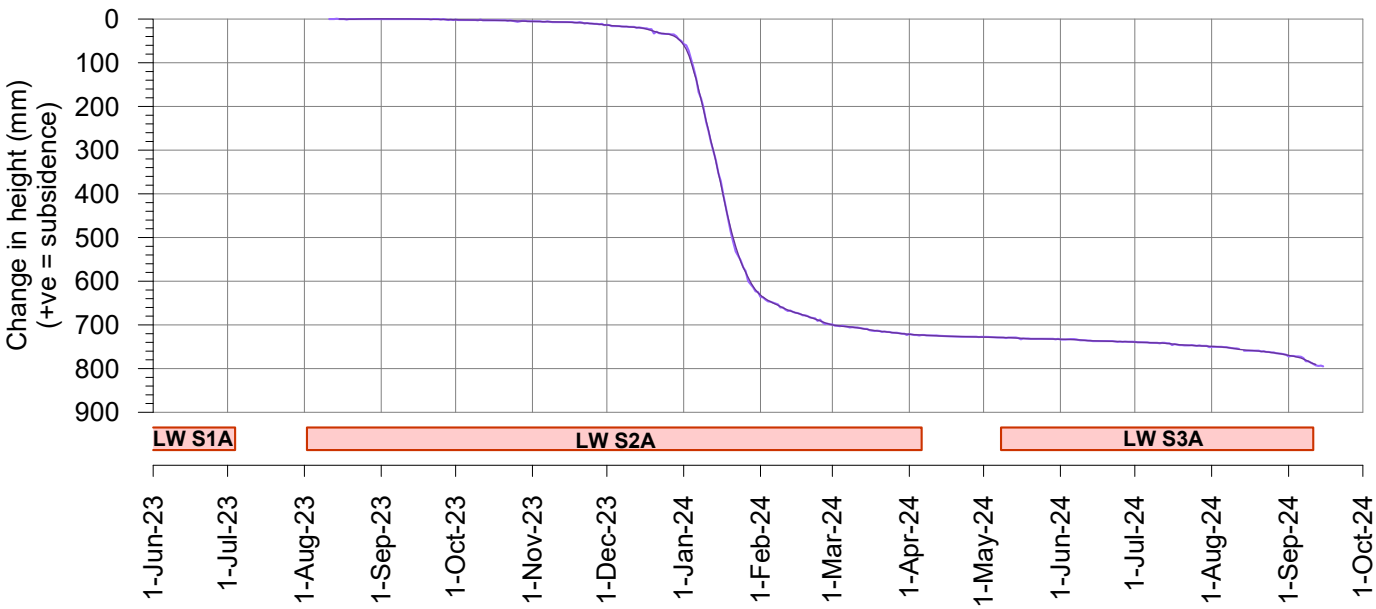










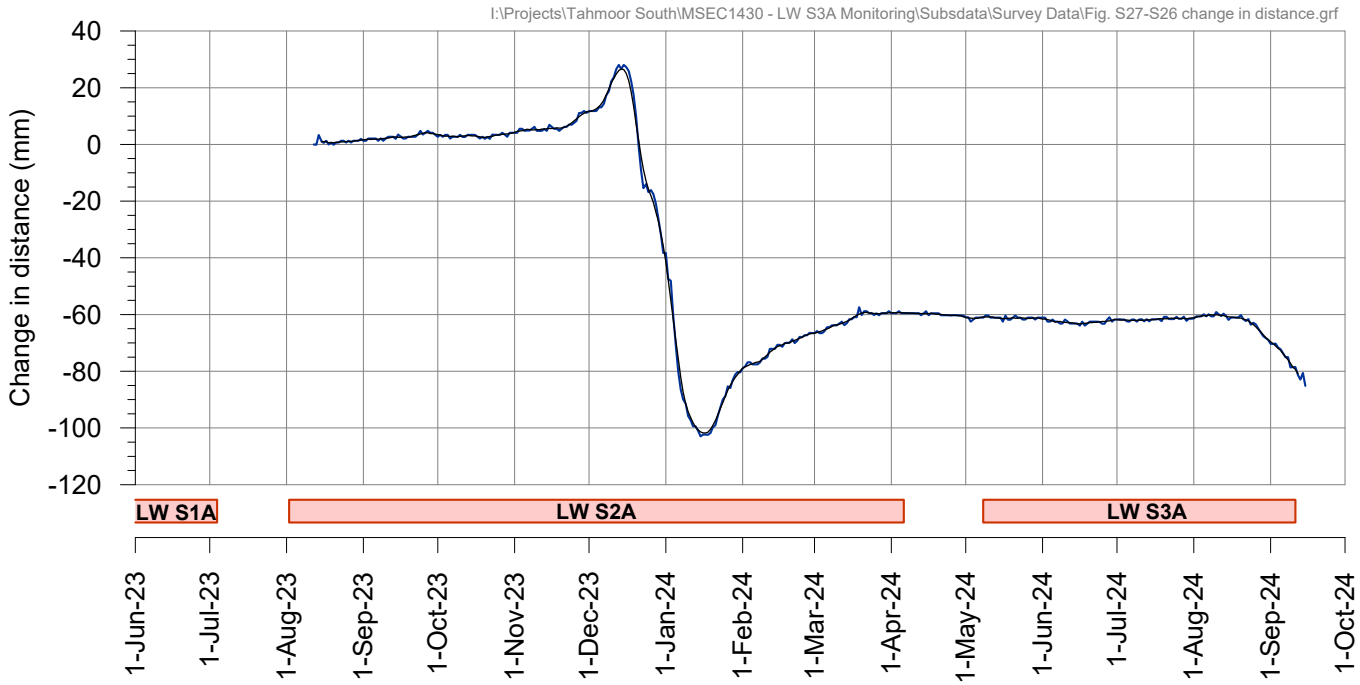


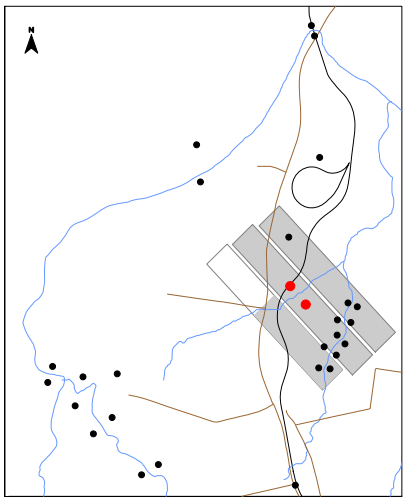
msec

Fig. S27-R16

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Teatree Hollow above LW S2A
Sites S26 and S27





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msec mine subsidence ENGINEERING CONSULTANTS
Suite 402, 13 Spring Street, Chatswood NSW 2067
PO Box 302, Chatswood NSW 2057
Tel +61 2 9413 3777
www.minesubsidence.com

SIMEC

TAHMOOR SOUTH - LWS3A

AUSTRALIAN WILDLIFE SANCTUARY

OBSERVED INCREMENTAL SUBSIDENCE DUE TO LW S3A

DATE:	SCALE:	DRAWING No:	Rev No
17 Sep 2024	1:10000	MSEC1431-02	16

LW S3A Started : 8-May-2024

All Subsidence in mm (0, 20, 50, 100, 200, 300, 400, 500, 600, 700, 800, 900, 1000)

LW S3A

LW S2A

LW S1A

LW S4A

LW S5A

LW S6A

Australian Wildlife Sanctuary

11-Sep-2024

LW S3A Started : 8-May-2024

FIRE ROAD NO P1

BARGO R

OLIVE LANE

REMEMBRANCE DR

MAIN SOUTHERN RAILWAY

DT LINE

V LINE

Hidden creek

TEATREE HOLLOW

TRIBUTARY OF TEA TREE HOLLOW

CALOOLA RD

YARRAN ROAD

GREAT SOUTHERN ROAD

CHARLIES POINT RD

I:\Projects\Tahmoor South\MSEC1431 - LW S3A AWS Monitoring\AcadData\MSEC1431-03 Total Subs.dwg

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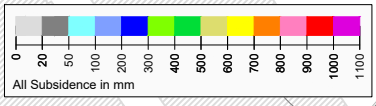
TAHMOOR SOUTH - LWS3A

AUSTRALIAN WILDLIFE SANCTUARY

OBSERVED TOTAL SUBSIDENCE SINCE START OF LW S1A

DATE:	SCALE:	DRAWING No:	Rev No
17 Sep 2024	1:10000	MSEC1431-03	16



LW S3A Started : 8-May-2024

LW S3A

LW S2A

LW S1A

LW S4A

LW S5A

LW S6A

Australian Wildlife Sanctuary

FIRE ROAD NO P1

BARGO R

OLIVE LANE

REMEMBRANCE DR

Hidden creek

MAIN SOUTHERN RAILWAY

TEATREE HOLLOW

TRIBUTARY OF TEA TREE HOLLOW

CALOOLA RD

YARRAN ROAD

GREAT SOUTHERN ROAD

CHARLIES POINT RD

11-Sep-2024

LW S3A Started : 8-May-2024

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TAHMOOR SOUTH - LWS3A

AUSTRALIAN WILDLIFE SANCTUARY
CHANGE IN SUBSIDENCE
SINCE PREVIOUS SURVEY

DATE:	SCALE:	DRAWING No:	Rev No
17 Sep 2024	1:10000	MSEC1431-04	16

LW S3A Started : 8-May-2024

All Subsidence in mm
0 20 50 100 200 300 400 500 600 700 800 900 1000

FIRE ROAD NO P1
BARGO R
OLIVE LANE
REMEMBRANCE DR
Hidden creek
MAIN SOUTHERN RAILWAY
TEATREE HOLLOW
CALOOLA RD
LW S3A
LW S2A
LW S1A
LW S4A
LW S5A
LW S6A
Australian Wildlife Sanctuary
TRIBUTARY OF TEA TREE HOLLOW
YARRAN ROAD
GREAT SOUTHERN ROAD
CHARLIES POINT RD
11-Sep-2024
5-Sep-2024
LW3A Started : 8-May-2024
1700m 1600m 1500m 1400m 1300m 1200m 1100m 1000m 900m 800m 700m 600m 500m 400m 300m 200m 100m 0m

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TAHMOOR SOUTH - LW S3A

AUSTRALIAN WILDLIFE SANCTUARY

GROUND MONITORING

DATE:	SCALE:	DRAWING No:	Rev No
17 Sep 2024	as shown	MSEC1431-05	16

Relative Origin AWS~11
(Relative Orientation 90°00' to AWS~8)

LW S3A Started : 8-May-2024

Latest Survey 11-Sep-2024

- mm — Total subsidence
- mm — Incremental subsidence since 28 Aug 2024

Horizontal displacement of survey marks during LW S2A

mm

Horizontal displacement of survey marks since 28 Aug 2024

mm — Vector & magnitude of observed horizontal movement (mm)

Change in horizontal distance between survey marks

mm	Closure	mm	Closure	since 28 Aug 2024
mm	Opening	mm	Opening	

FLT
CRCK
CRCK2
CRCK3
CRCK4
CRCK5
CRCK7
LWS3A
0m 5m 10m
SCALE
AWS-1
AWS-2
AWS-3
AWS-4
AWS-5
AWS-6
AWS-7
AWS-8
AWS-9
AWS-10
AWS-11
AWS-12
AWS-13
AWS-14
AWS-15
AWS-16
AWS-17
AWS-18
AWS-19
AWS-20
HOUSE
COTTAGE 1
ANIMAL ENCLOSURE
BIRD ENCLOSURE
ANIMAL ENCLOSURE
ENCLOSURE
VISITORS CENTRE
GLASS HOUSE
NURSERY
SHED
NS line
EW line
Gate not closing
Gate not closing
Fence buckling
Fence buckling
Tassie Devil Enclosures
Fenced Enclosures
Railway Tracks
N

TAHMOOR COAL: Longwall S3A

Australian Wildlife Sanctuary Subsidence Status Report No. 17

(Please note the report numbers are aligned with the LW S3A monitoring report numbers for ease of comparison. Accordingly, there are no Report Nos. 1 and 2 for LW S3A)

Reporting Period	14 September 2024 to 20 September 2024	
Length of extraction of LW S3A	1059 m	On 19 September 2024 LW S3A commenced extraction on 8 May 2024
Length of extraction remaining of LW S3A	645 m	
Distance travelled by LW since previous report	69 m	Since 12 September 2024
Closest distance of LW S3A face to AWS property	30 m	LW face beyond northwest corner of property
Closest distance of LW S3A face to AWS structures	305 m	To visitor centre, with LW face moving away
Maximum incremental subsidence since start of LW S3A	702 mm 313 mm	GNSS Site S10 on 19 September 2024 AWS-2 (N corner of house)
Maximum total subsidence since start of LW S1A S3A	1028 mm 330 mm	GNSS Site S26 on 19 September 2024 AWS-2 (N corner of house)
Maximum increase in subsidence since previous report S3A	263 mm 46 mm	Main Southern Railway since 9 September AWS-2 (N corner of house) since 11 Sep

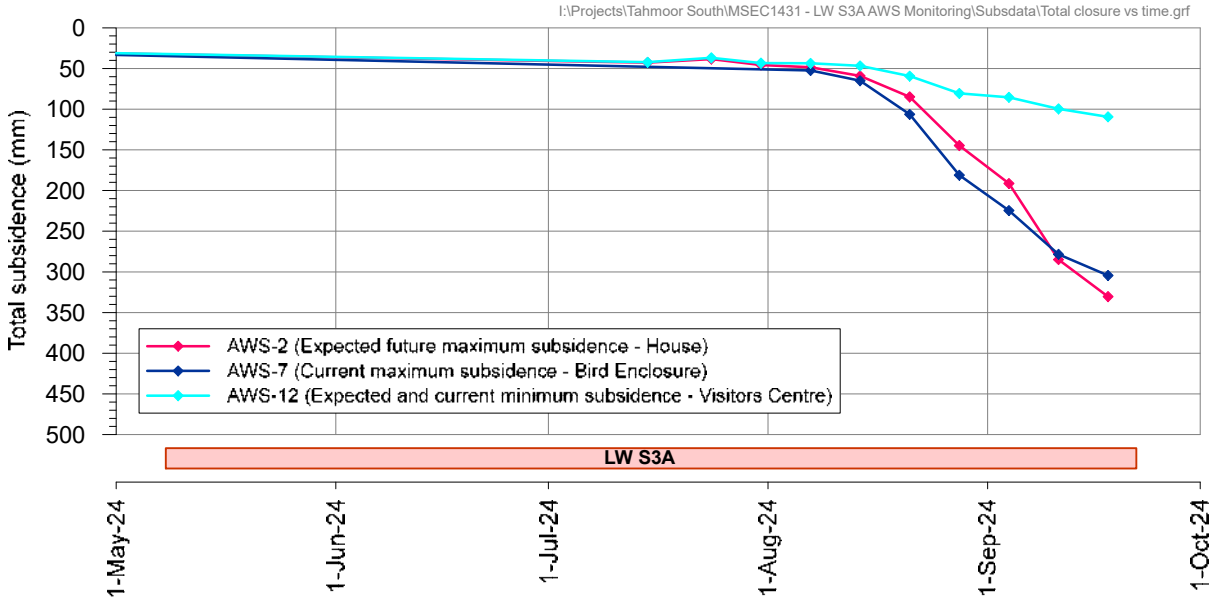
Summary of monitoring and inspections

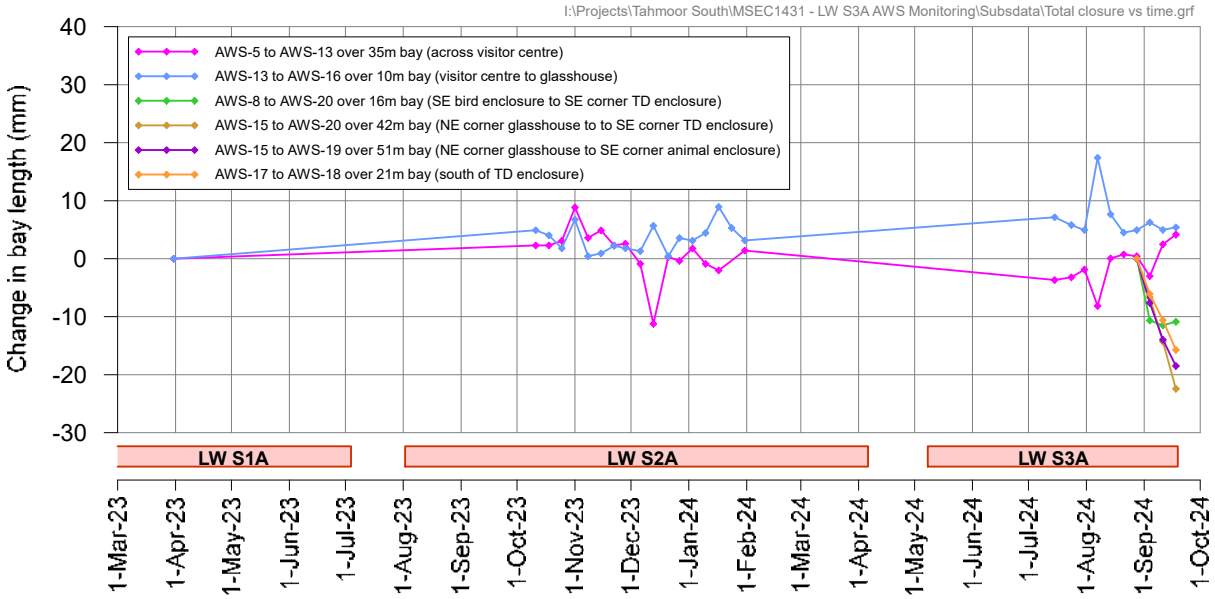
Monitoring Activity	Date	Current Frequency	Highest Trigger	Comments
GNSS units				
Site S01 to S10, 26 & 27	Continuous		N/A	Subsidence increasing, particularly at Site 26 on AWS property above LW S3A and Site 27.
Valley closure across Wirrimbirra Creek as measured by GNSS units				
Sites S01 and S02 above LW S1A	Continuous		N/A	Closure has gradually developed, up to 178 mm. Very minor changes since start of LW S3A.
Sites S03 and S04 at Ockenden Pool	Continuous		N/A	Closure has gradually developed, up to 196 mm Minor changes since start of LW S3A.
Sites S05 and S06 above LW S2A	Continuous		N/A	Closure has gradually developed, up to 201 mm. Small changes since start of LW S3A.
Sites S07 and S08 above LW S2A	Continuous		N/A	Approximately 199 mm closure developed. Closure increasing since start of LW S3A. Rates of change reducing.
Sites S09 and S10 at the Big Pool	Continuous		N/A	Approximately 346 mm closure developed. Closure increasing since start of LW S3A. Rates of change reducing.
Valley closure across Teatree Hollow as measured by GNSS units				
Sites S26 and S27 above LW S2A	Continuous		N/A	Valley closure gradually developed during LW S2A, up to approximately 100 mm by mid-January 2024, with closure reducing as the LW face moved away. Closure increasing as the longwall moves beyond Site S27.
Main Southern Railway				
Ground surveys	17 Sep	Weekly	N/A	Subsidence increasing.
Local streets				
Ground survey along Charlies Point Road	-	Monthly	N/A	Last survey 29 July. Minor changes since the end of LW S2A.
Ground survey along Remembrance Drive	16 Sep	Weekly	N/A	Monthly 3D survey on 9 September measured minor changes, including previously observed non-conventional compressive strains and bumps in the observed subsidence profiles between Pegs R47 and R48, and between Pegs R54 and R55. Small changes this week.

Monitoring Activity	Date	Current Frequency	Highest Trigger	Comments
Local streets (continued)				
Visual inspections along local roads	16 Sep	Weekly		No significant changes observed along Remembrance Drive.
Natural features				
Ground survey across Wirrimbirra Creek	-	End of LW	N/A	Closure and upsidence observed along TT2 line, upstream of Pool TT2 during LW S2A.
Water level and water quality monitoring	Continuous	Download monthly	Level 4	While the observed rates of water level recession at Pool TT2 are consistent with previously observed rates and consistent with evaporation rates, surface and ground water assessments have found that the low water levels are atypical than what would be considered 'normal' conditions and are likely due to mining-induced reduction in groundwater baseflow into the pool.
Visual inspections of streams and small cliffs	-	Monthly	Level 4	Latest inspection 20 August. Localised fracturing and loss of surface water has been observed, exceeding the Level 4 trigger level in the AWS Management Plan at Pool TT2 during the mining of LW S2A. Tahmoor Coal will develop a CMAP in consultation with AWS as required under the Management Plan. Temporary water supply continues to be maintained since installed on 25 July 2023. An inspection on 20 August observed reduced surface flows continuing along the full length of the Tributary to Teatree Hollow since the previous inspection on 17 July after a period of dry weather. Surface water stopped at K64, re-emerging upstream of Pool TT2, which holds water. Surface water then stops downstream of Pool TT2, re-emerging at K71, upstream of the confluence with Teatree Hollow. New fracture observed on 17 July in Tributary at Pool TT2, approximately 6 metres long. Visual inspection of rock shelter on 19 June 2024 found the creek flowing and no impacts to rock shelter.
Structures				
Local 3D surveys	18 Sep	Weekly	N/A	Subsidence increasing, with rates of change reduced this week. Minor closure measured across the building structures. Closure measured across Tassie Devil enclosures where impacts have been observed.
Visual inspections	18 Sep	Weekly	N/A	Cracks observed in adjacent railway cutting on 25 August have extended into AWS property, where a compression hump has developed to the northeast and through the new Tassie Devil enclosures. No new evidence of compression this week.
Asbestos air monitoring	18 Sep	Weekly	N/A	All results are below the lowest detectable limit.
Visual inspections				
Dingo Sanctuary	18 Sep	Weekly	N/A	No immediate issues of concern observed.
Farm dam	18 Sep	Weekly	N/A	No immediate issues of concern observed.
External pavements, fences and gates	18 Sep	Weekly	Impacts obs'd to gates and fences	A new timber and steel-framed gate between animal enclosures is out of alignment and cannot be properly closed. Three additional gates found to be not closing. All four gates repaired 27 August. Ground movement observed in this location and Colorbond fences buckling. Two previously repaired gates jammed and were repaired 5 September. Trip hazards formed in gravel footpaths have been repaired. Northern gate at Tassie Devil enclosure was found to be catching this week and has been repaired. All other gates are functioning correctly. Minor buckling of Colorbond fence between enclosures.
Walking trails	18 Sep	Weekly	N/A	No immediate issues of concern observed.

Management Actions	
Other management actions since previous report: ● Repair of northern corridor gate at Tassie Devil enclosure	
Any additional and/or outstanding management actions: ● Tahmoor Coal will develop a CMAP in consultation with National Trust and AWS after effects of mining	
Consultation with stakeholders since previous report: ● Weekly reports will be issued during the mining of LW S3A	
Forecast whether continued longwall mining is likely to cause impacts on the health and safety of people who may be present at the property due to the extraction of LW S3A: Based on monitoring results to date, and the controls implemented and available under the LW S3A Management Plan, no triggers under this Management Plan are expected to be exceeded in the next week.	
Certified by Tahmoor Coal	
Name	Ross Barber
Position	Project Manager
Signature	*Ross Barber*
Date	24 September 2024

Copy of Report to:
John Alcock and David Burdon, National Trust of Australia (NSW)
Brad Wilson, Managing Director, Australian Wildlife Sanctuary
Luci Ellem, Managing Director, Bargo Dingo Sanctuary
Australian Native Dog Conservation Society
Clint Mason, Production Manager, Tahmoor Mine
Ray Ramage, Principal Inspector – Subsidence, Mine Safety Inspectorate, Resources Regulator


I:\Projects\Tahmoor South\MSEC1431 - LW S3A AWS Monitoring\Subsdata\Total closure vs time.grf
Total subsidence (mm)
0
50
100
150
200
250
300
350
400
450
500
AWS-2 (Expected future maximum subsidence - House)
AWS-7 (Current maximum subsidence - Bird Enclosure)
AWS-12 (Expected and current minimum subsidence - Visitors Centre)
LW S3A
1-May-24
1-Jun-24
1-Jul-24
1-Aug-24
1-Sep-24
1-Oct-24


I:\Projects\Tahmoor South\MSEC1431 - LW S3A AWS Monitoring\Subsdata\Total closure vs time.grf
Change in bay length (mm)
40
30
20
10
0
-10
-20
-30
AWS-5 to AWS-13 over 35m bay (across visitor centre)
AWS-13 to AWS-16 over 10m bay (visitor centre to glasshouse)
AWS-8 to AWS-20 over 16m bay (SE bird enclosure to SE corner TD enclosure)
AWS-15 to AWS-20 over 42m bay (NE corner glasshouse to to SE corner TD enclosure)
AWS-15 to AWS-19 over 51m bay (NE corner glasshouse to SE corner animal enclosure)
AWS-17 to AWS-18 over 21m bay (south of TD enclosure)
LW S1A
LW S2A
LW S3A
1-Mar-23
1-Apr-23
1-May-23
1-Jun-23
1-Jul-23
1-Aug-23
1-Sep-23
1-Oct-23
1-Nov-23
1-Dec-23
1-Jan-24
1-Feb-24
1-Mar-24
1-Apr-24
1-May-24
1-Jun-24
1-Jul-24
1-Aug-24
1-Sep-24
1-Oct-24

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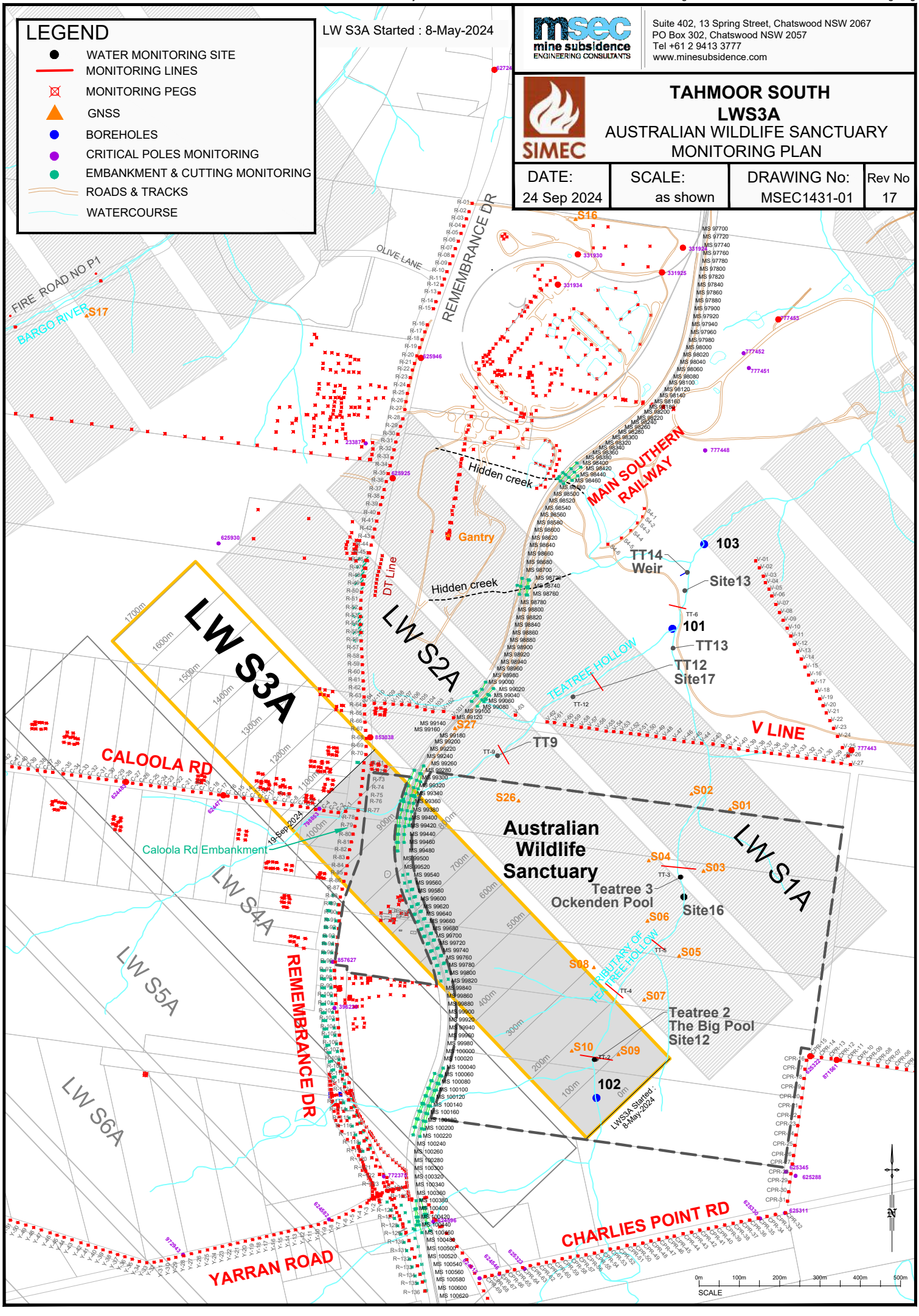
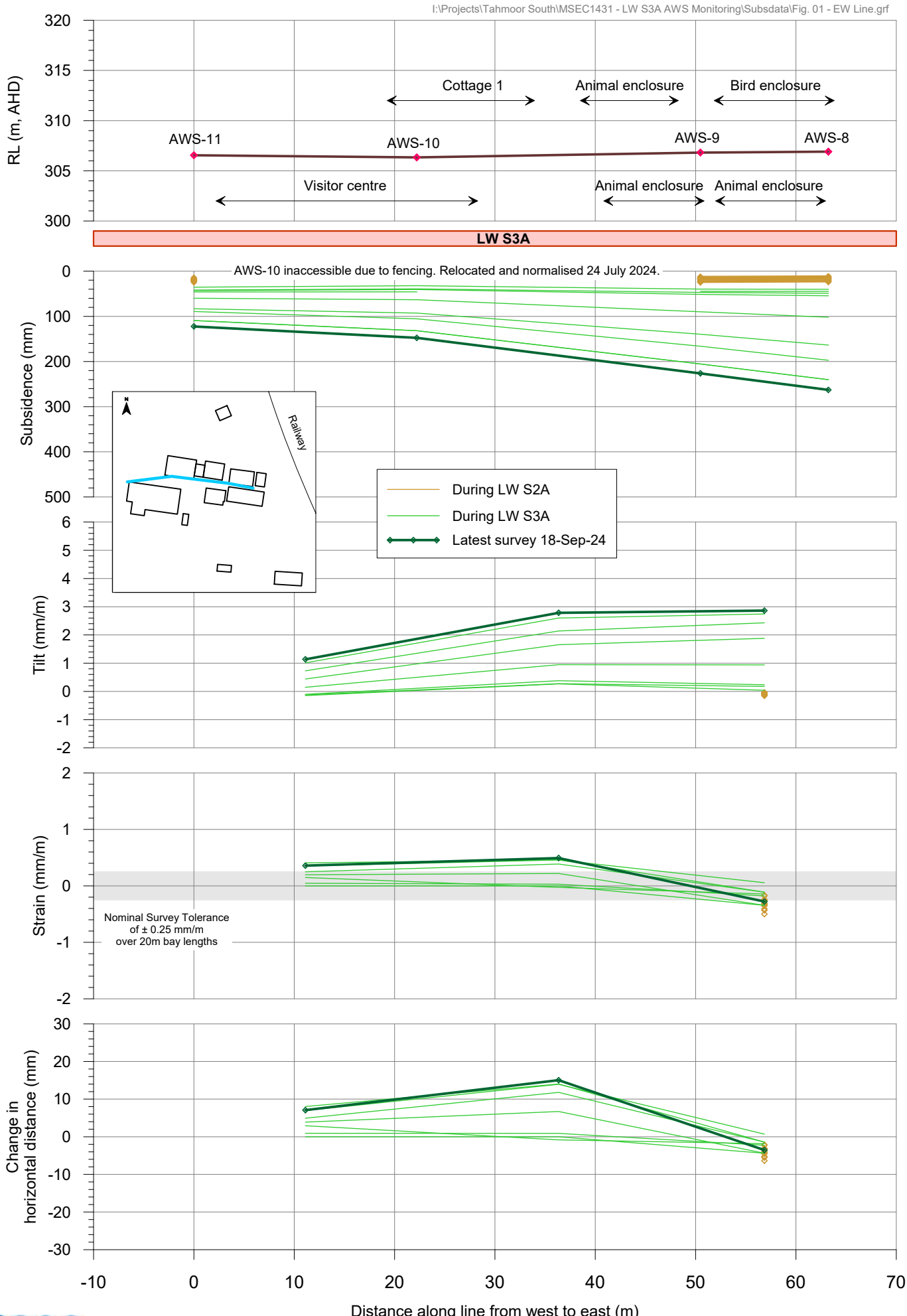


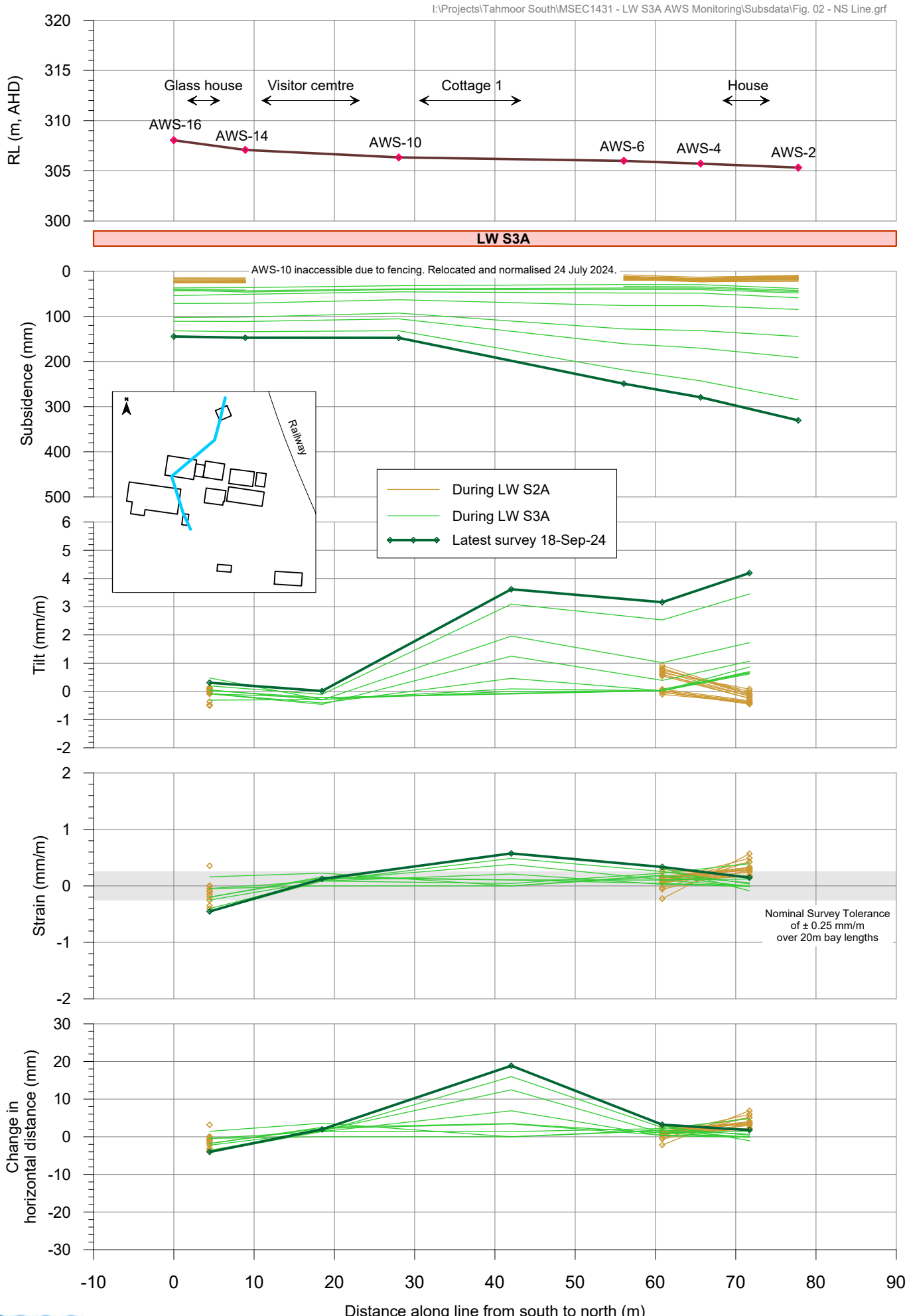
Tahmoor South LW S3A - AWS
Total subsidence profiles along East-West cross line



msec

Fig. 1-R17

Tahmoor South LW S3A - AWS
Total subsidence profiles along North-South cross line



msec

Fig. 2-R17

Tahmoor South LW S3A
Incremental subsidence profiles along Remembrance Drive

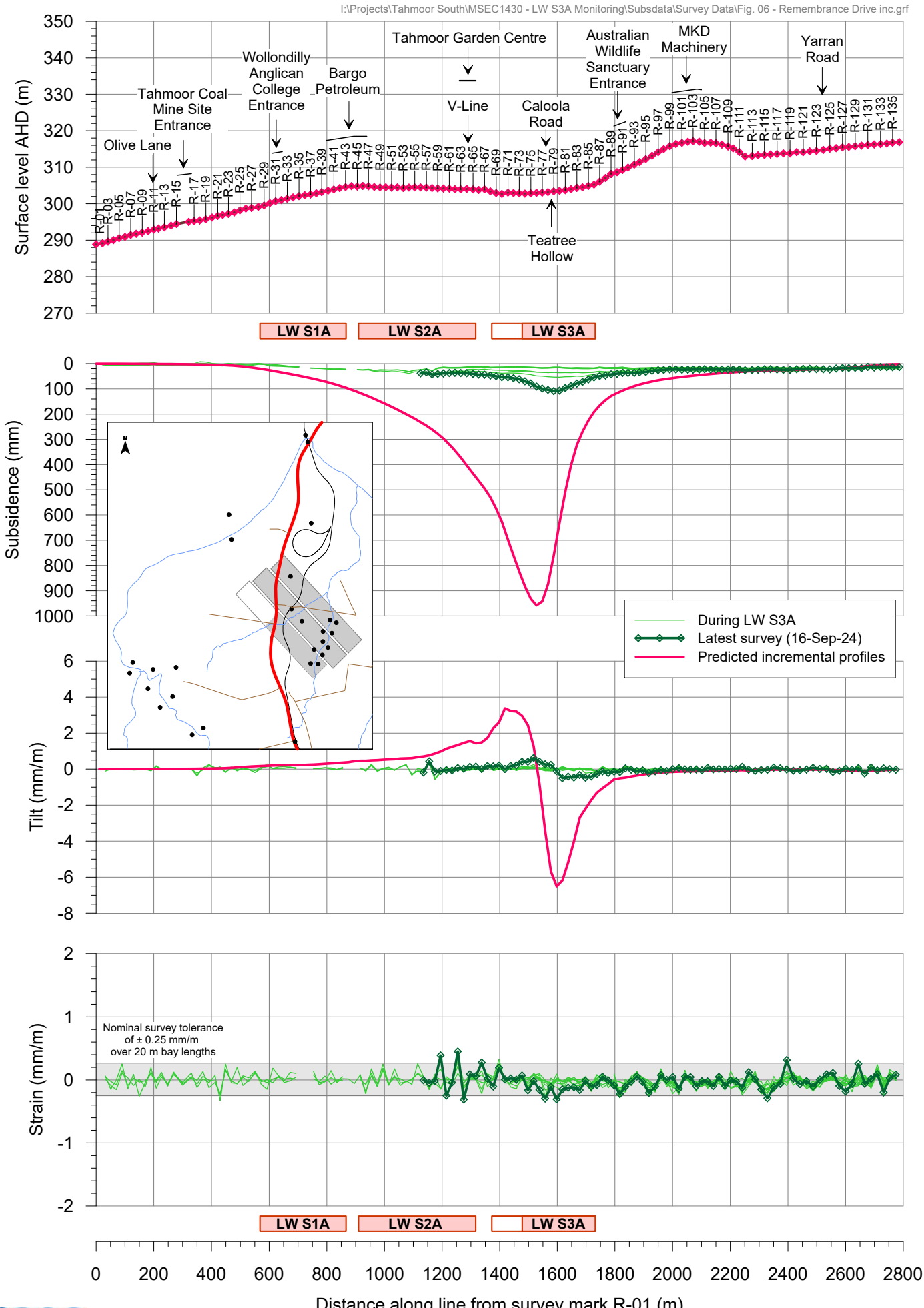


Fig. 6-R17

Tahmoor South LW S3A
Total subsidence profiles along Remembrance Drive

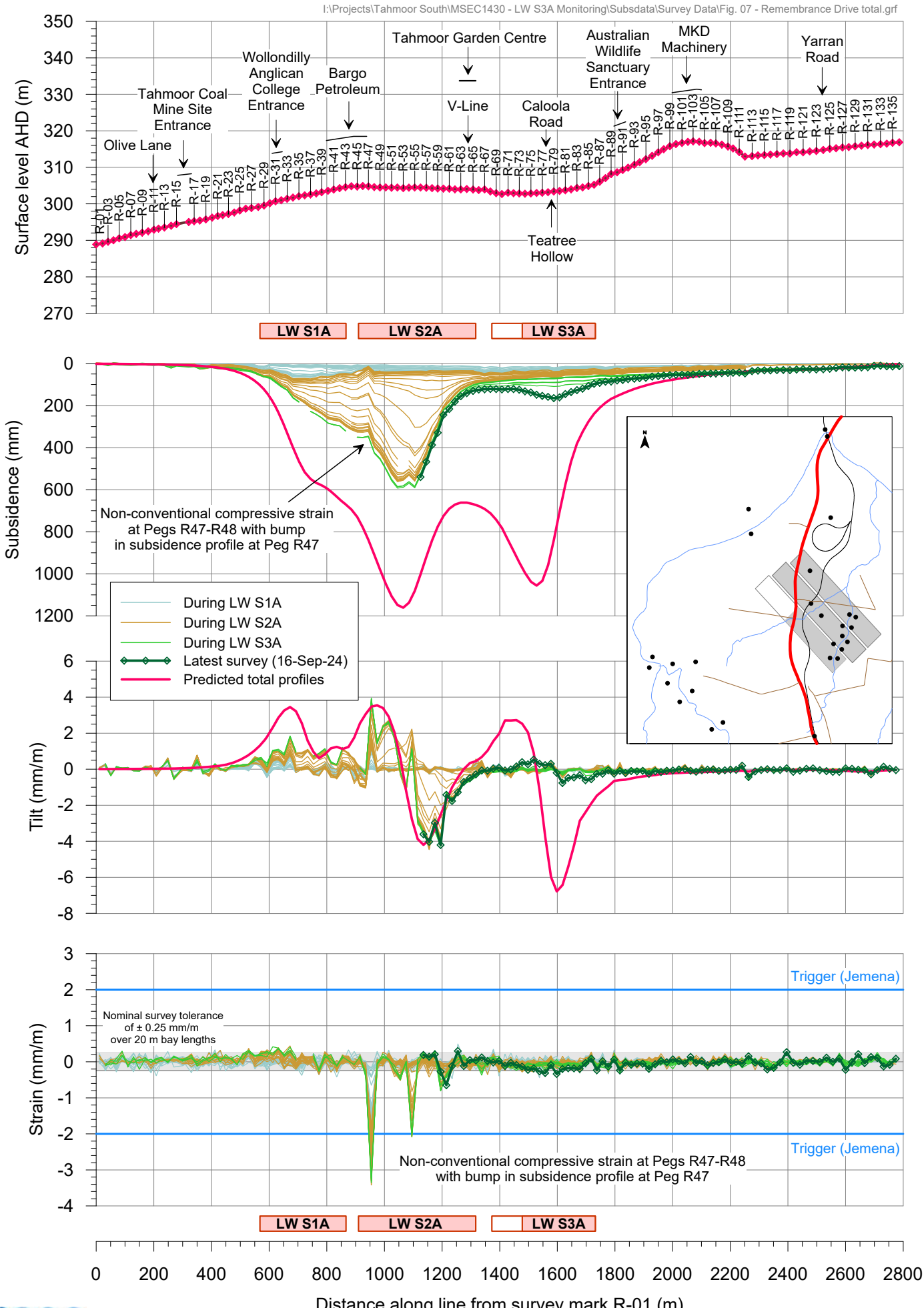
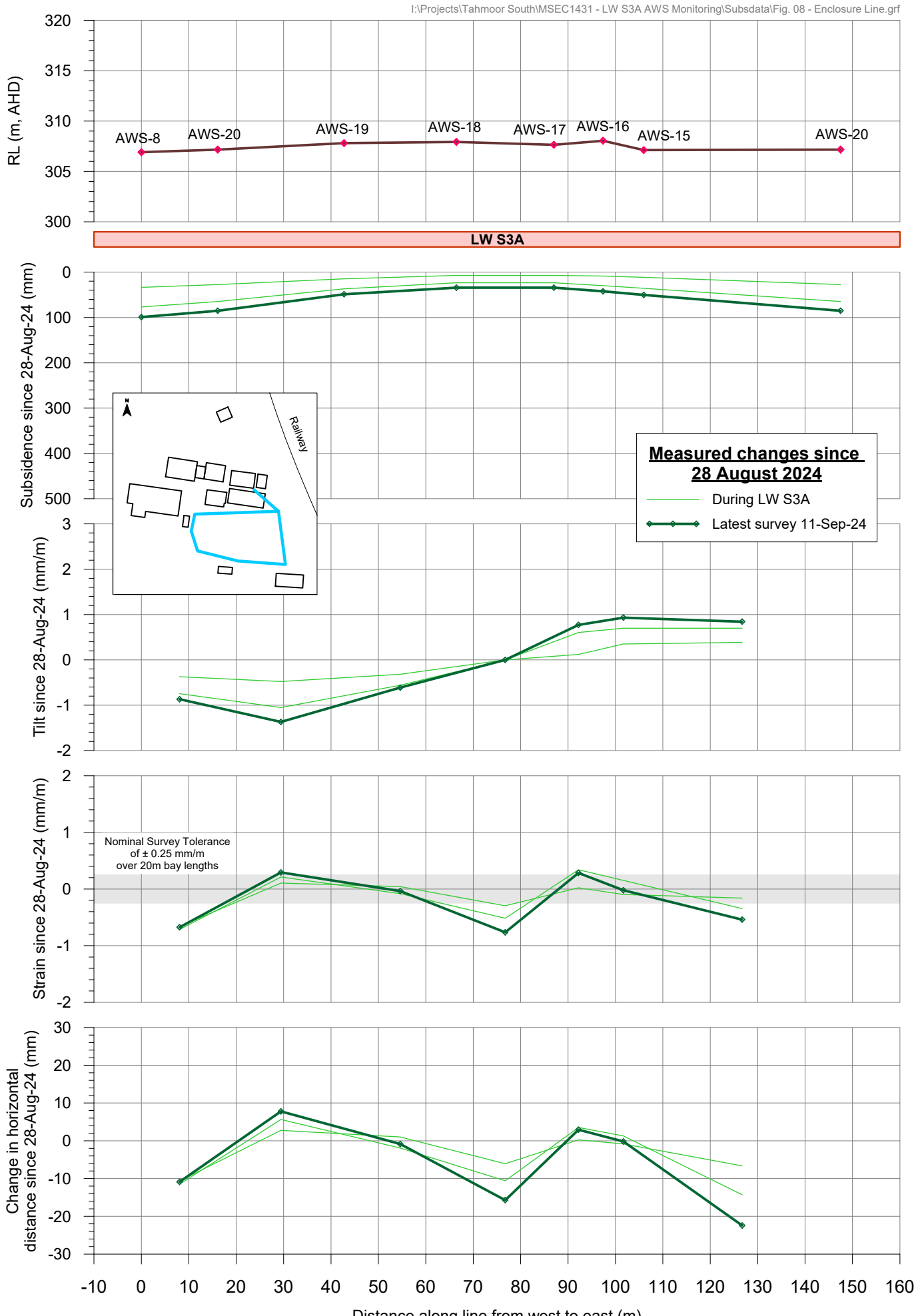


Fig. 7-R17

Tahmoor South LW S3A - AWS
Incremental subsidence profiles along enclosure fence line



msec

Fig. 8-R17

Tahmoor South LW S3A - GNSS Monitoring

Site S01 above LW S1A

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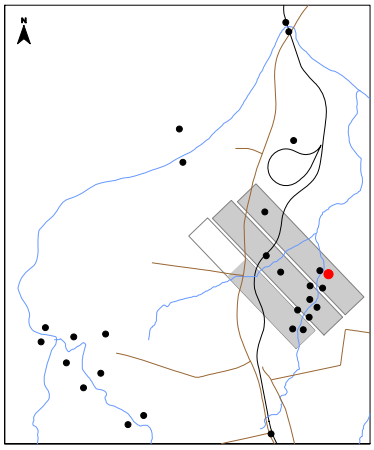



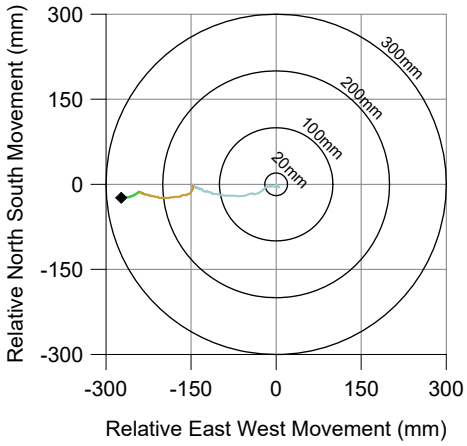

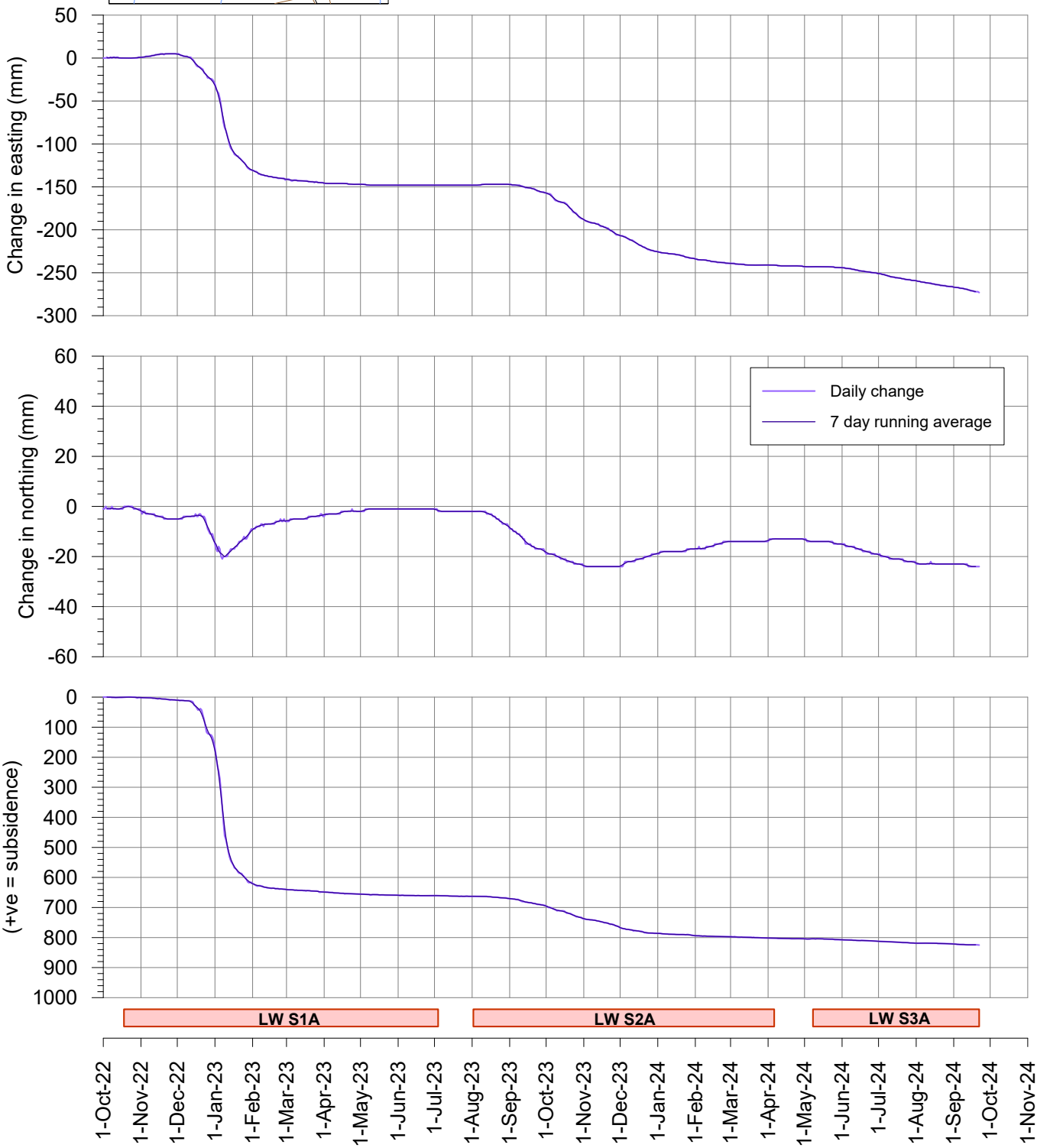

msec

Fig. S01-R17

Tahmoor South LW S3A - GNSS Monitoring

Site S02 above LW S1A

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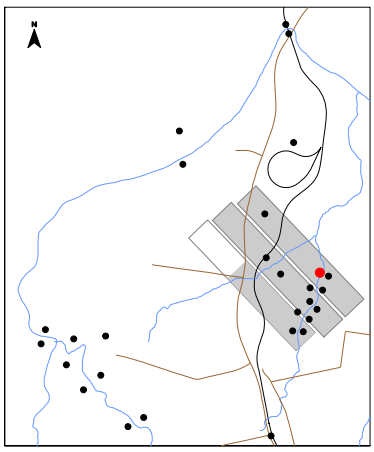
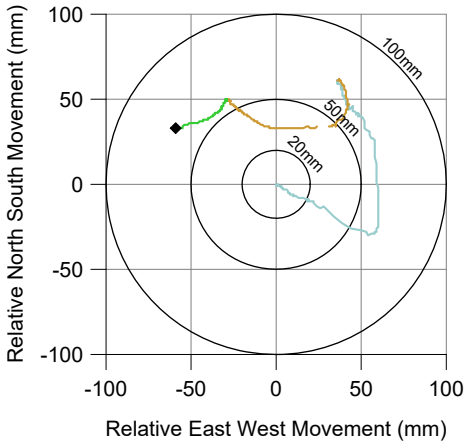
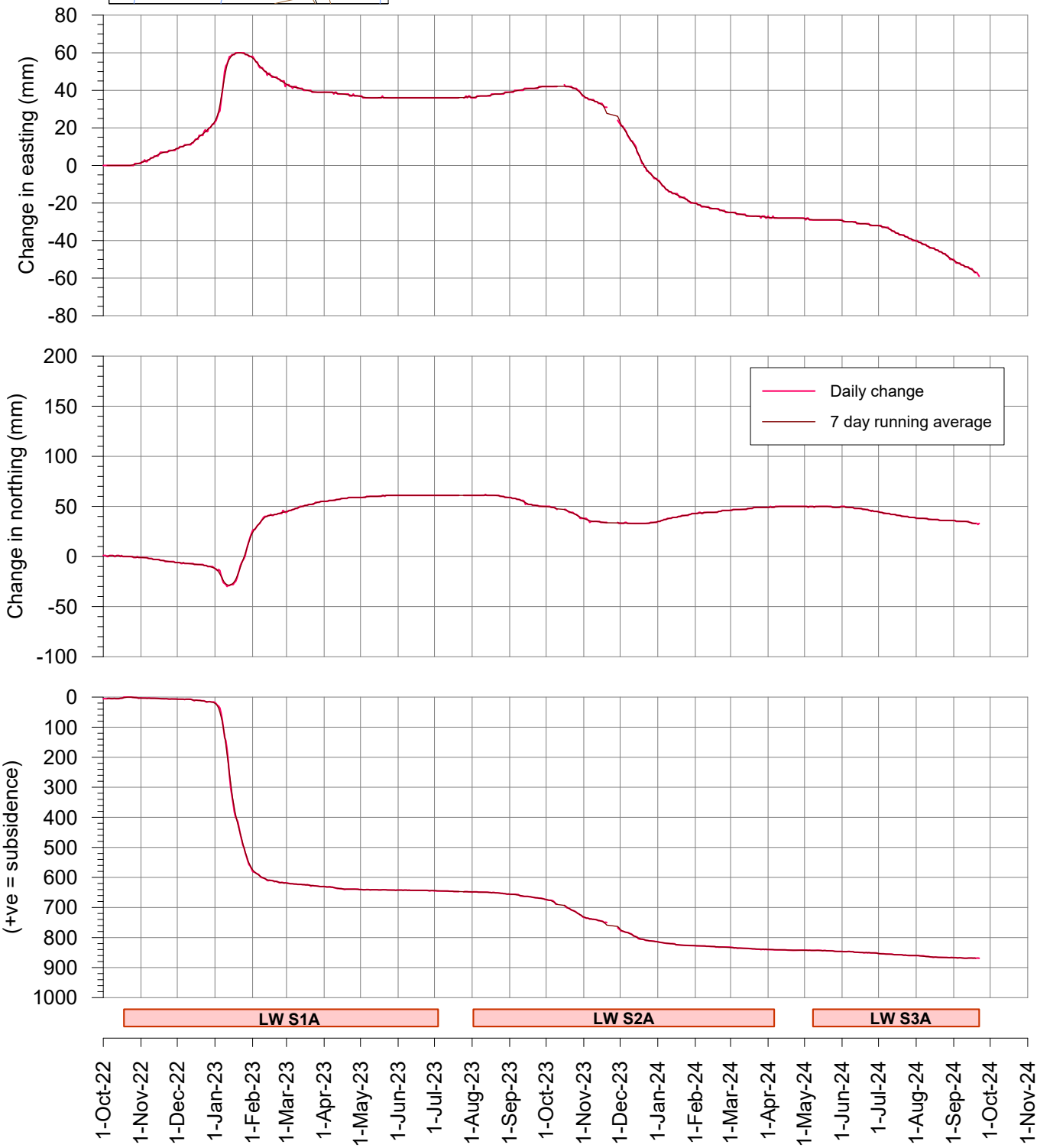






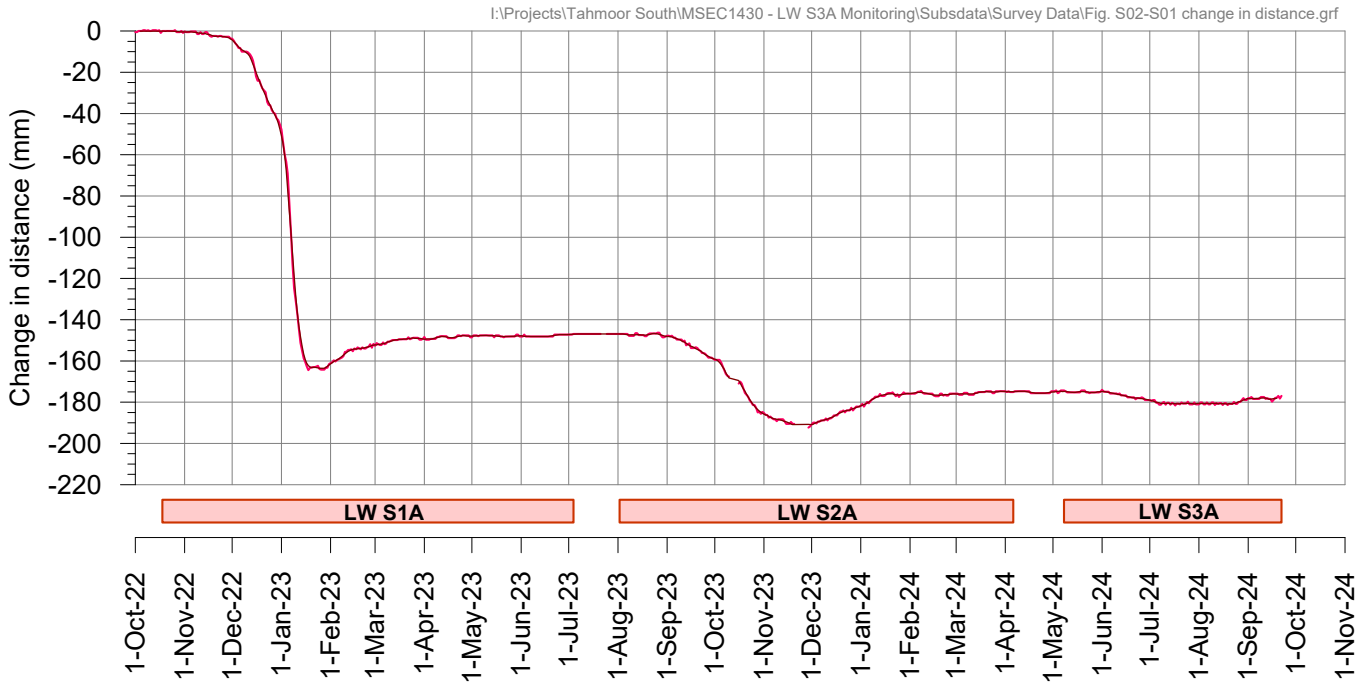


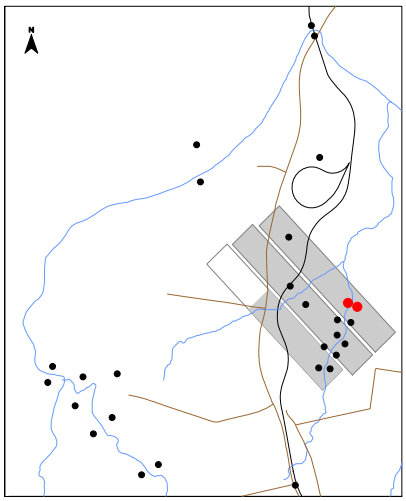
msec

Fig. S02-R17

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek
Sites S01 and S02 above LW S1A





Tahmoor South LW S3A - GNSS Monitoring

Site S03 above LW S1A at Teatree 3

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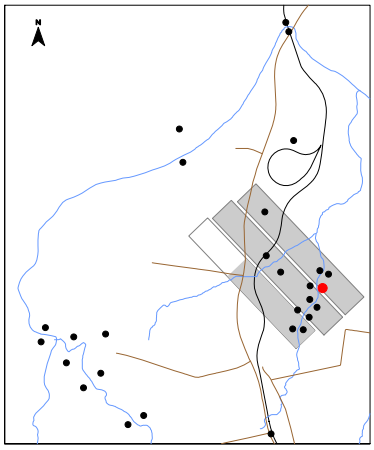



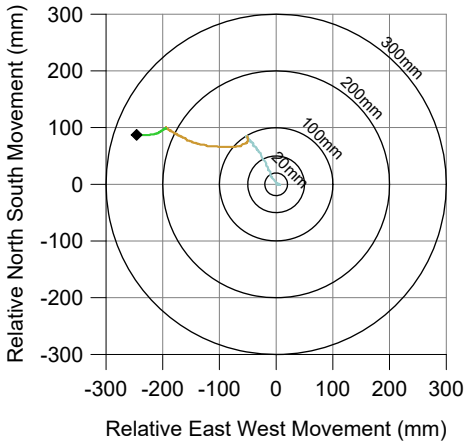

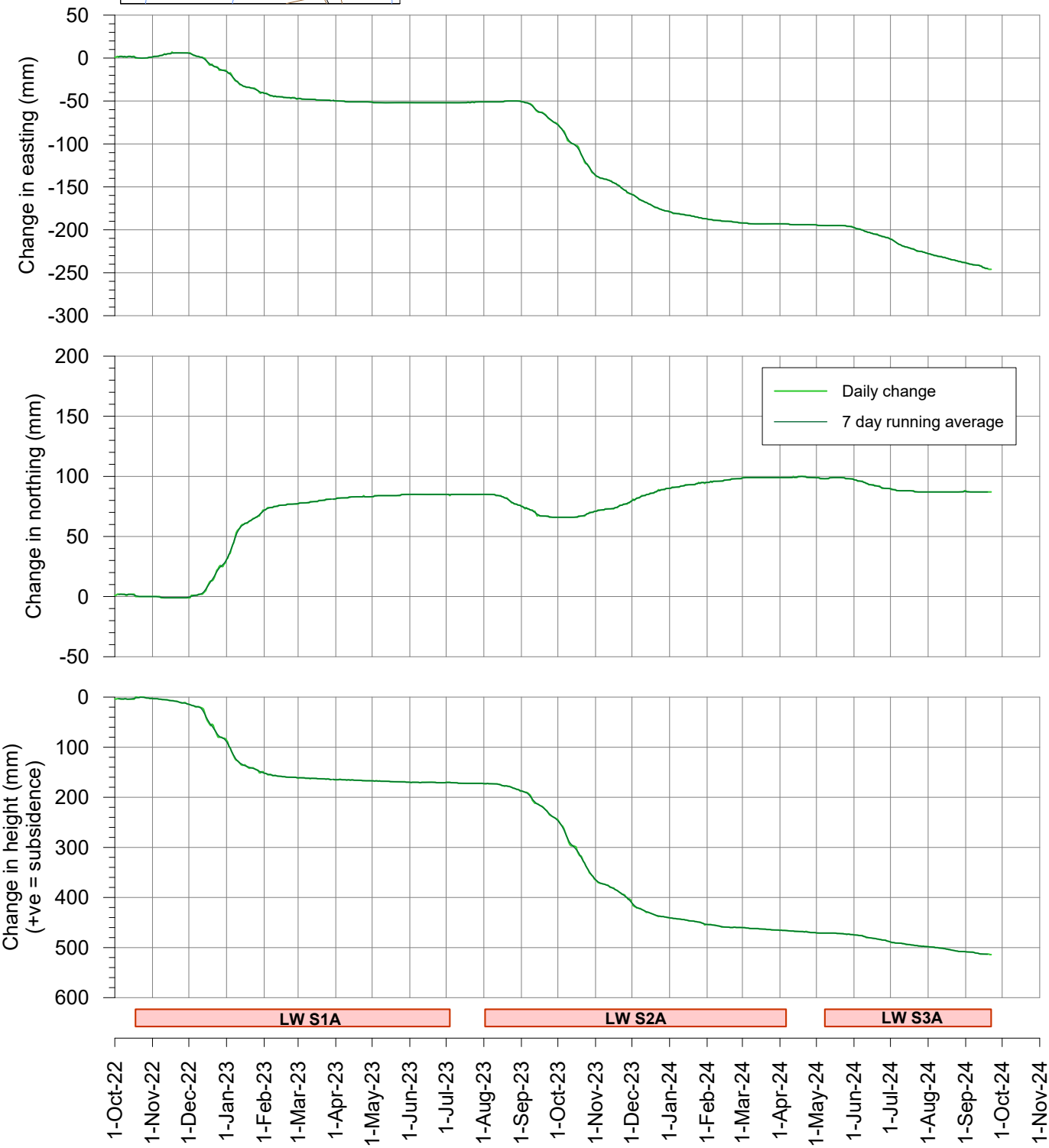

msec

Fig. S03-R17

Tahmoor South LW S3A - GNSS Monitoring

Site S04 above LW S2A at Teatree 3

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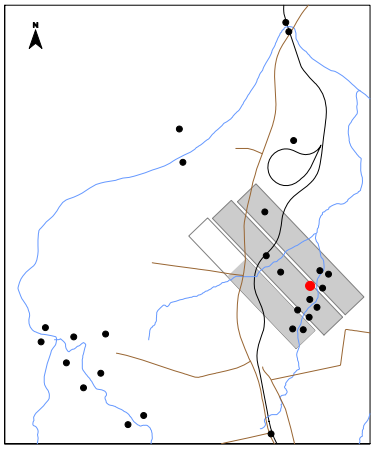
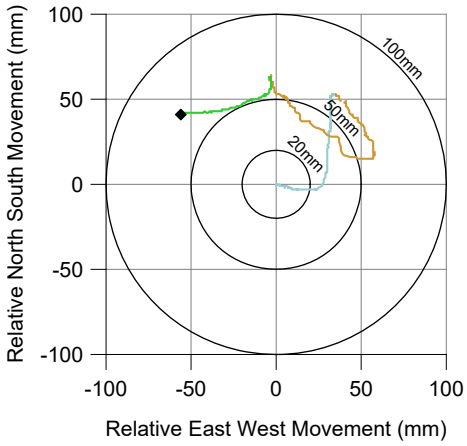
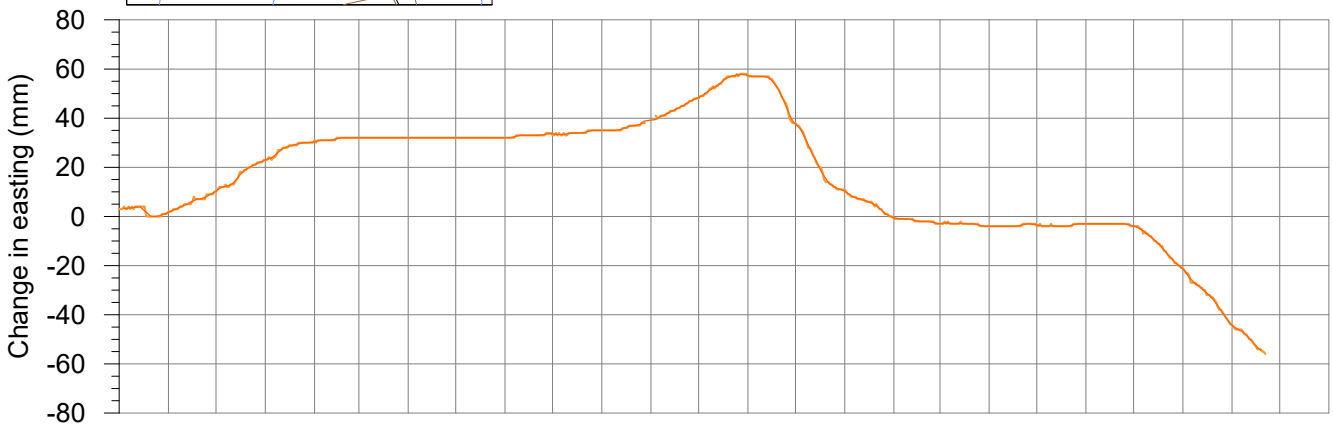
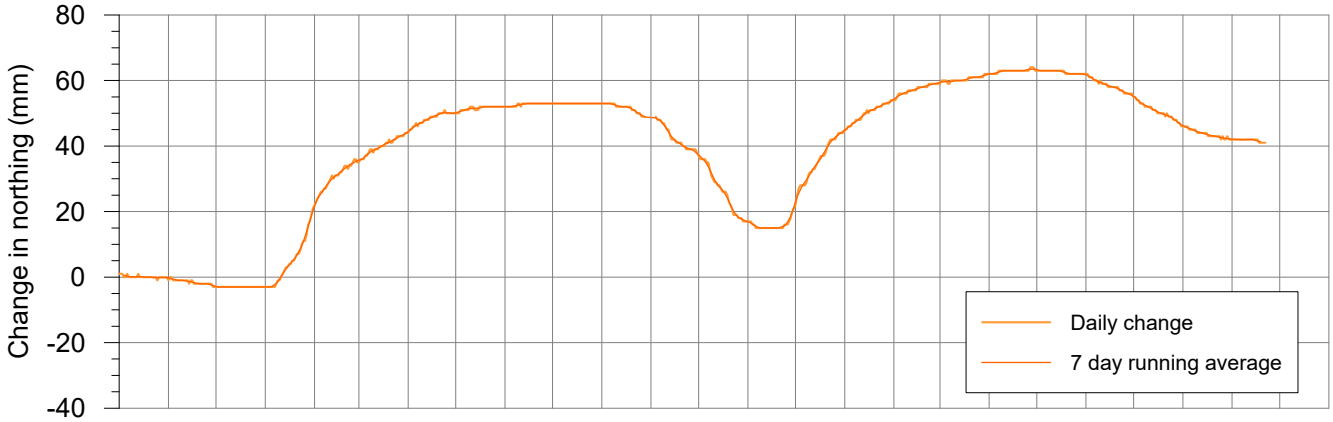
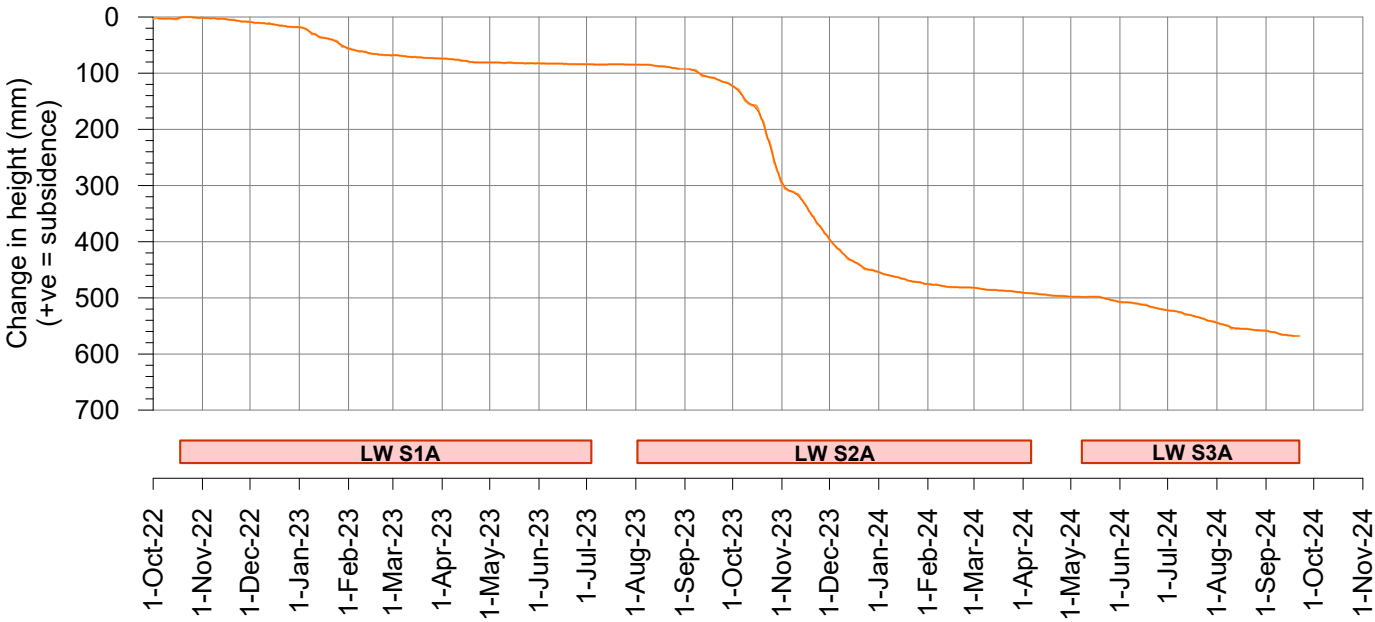


During LW S1A
During LW S2A
During LW S3A







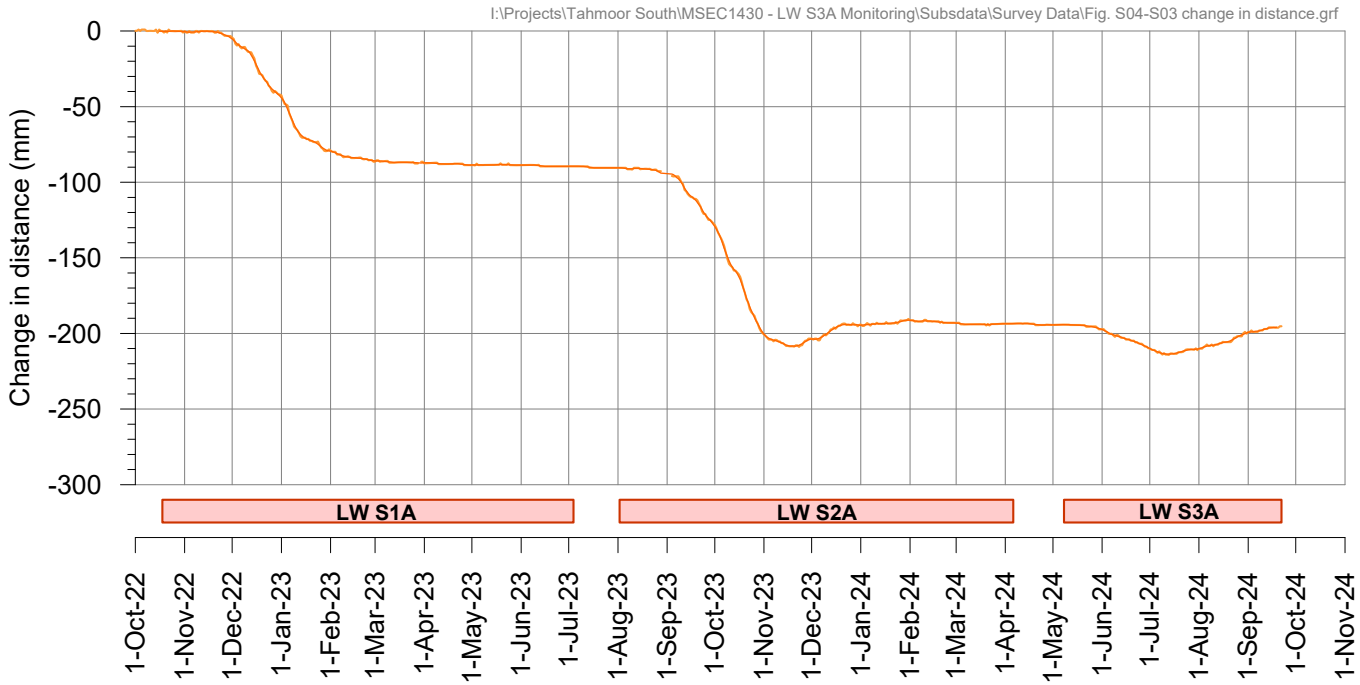


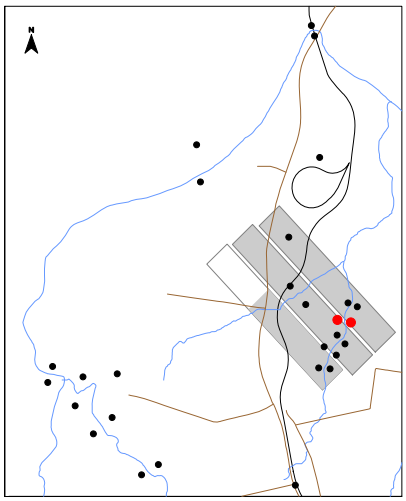
msec

Fig. S04-R17

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek at Teatree 3
Site S03 above LW S1A and Site S04 above LW S2A





Tahmoor South LW S3A - GNSS Monitoring

Site S05 above LW S2A

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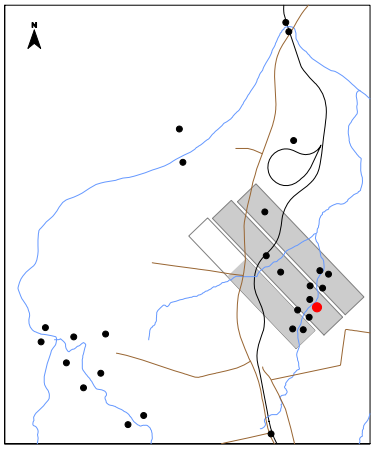
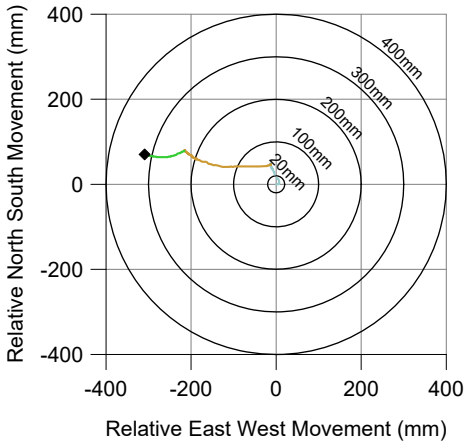
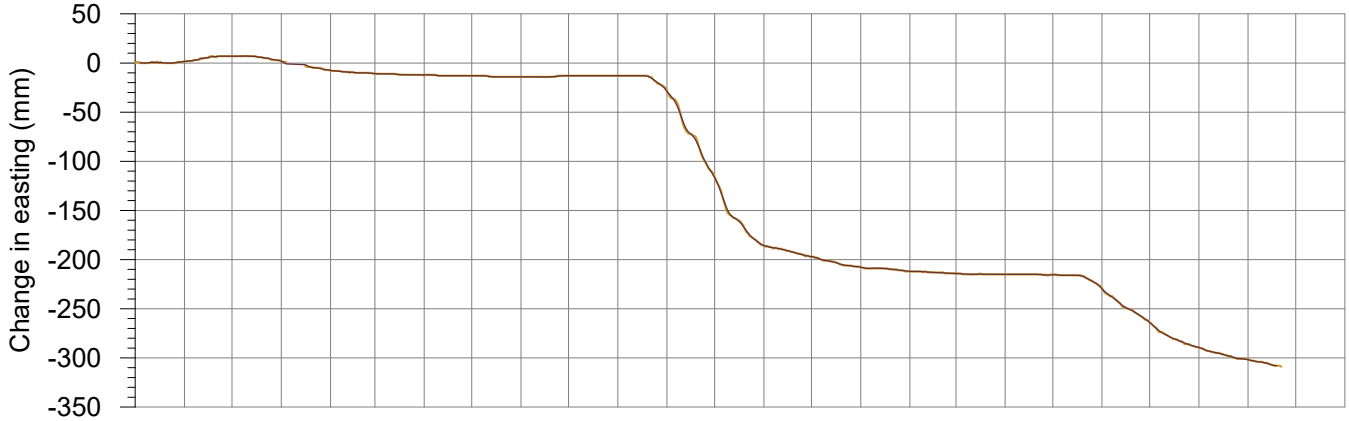
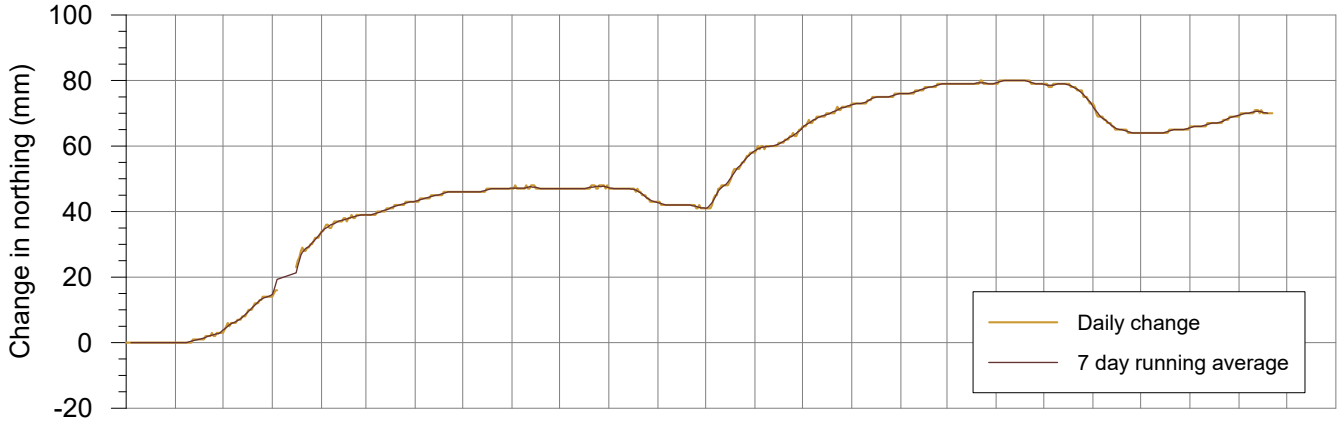
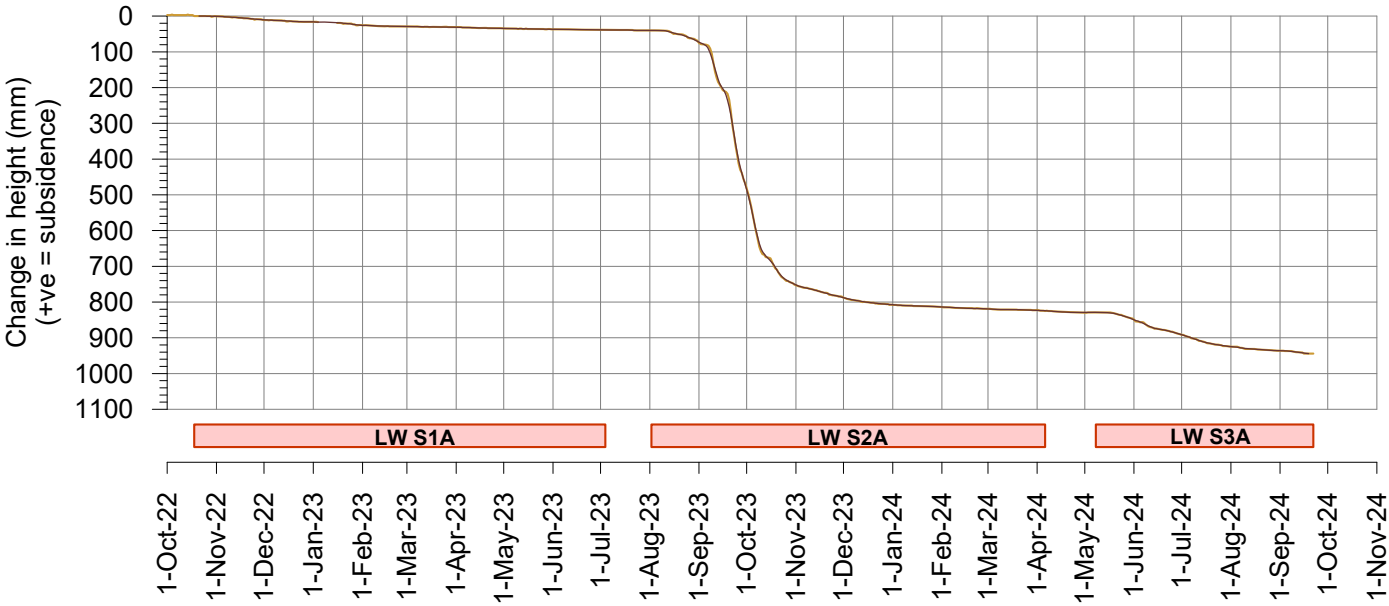


During LW S1A
During LW S2A
During LW S3A









msec

Fig. S05-R17

Tahmoor South LW S3A - GNSS Monitoring

Site S06 above LW S2A

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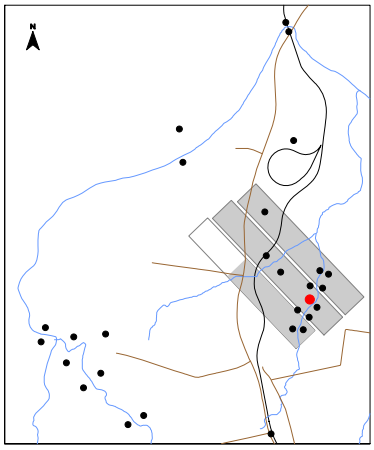
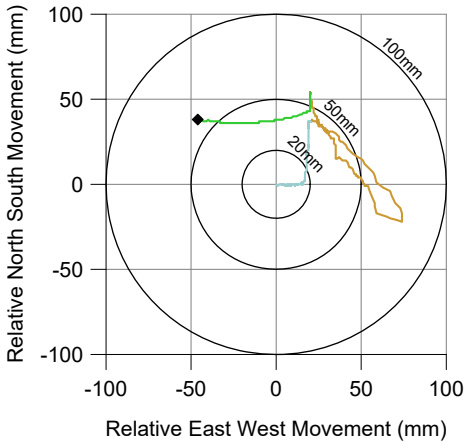
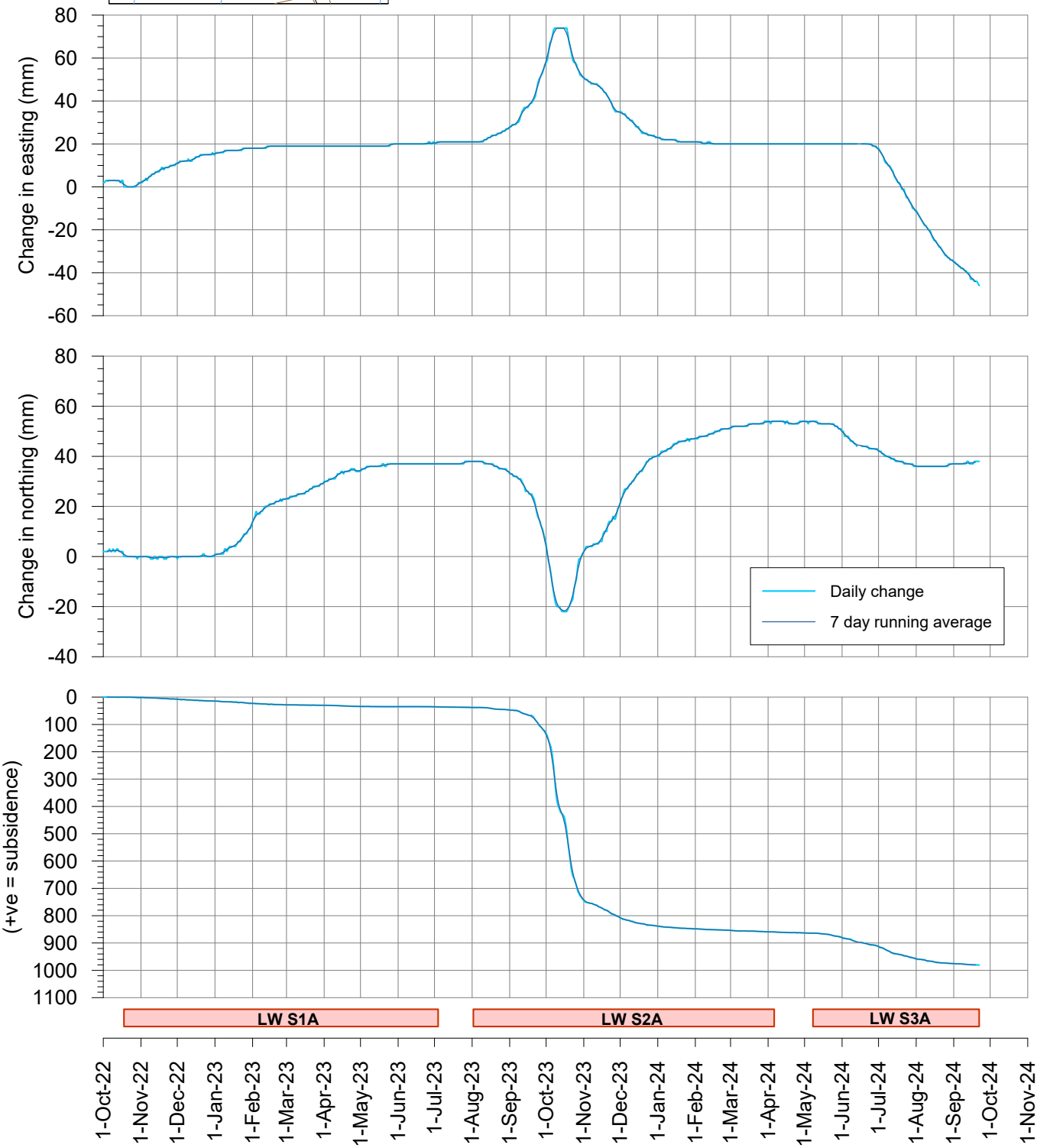


During LW S1A
During LW S2A
During LW S3A



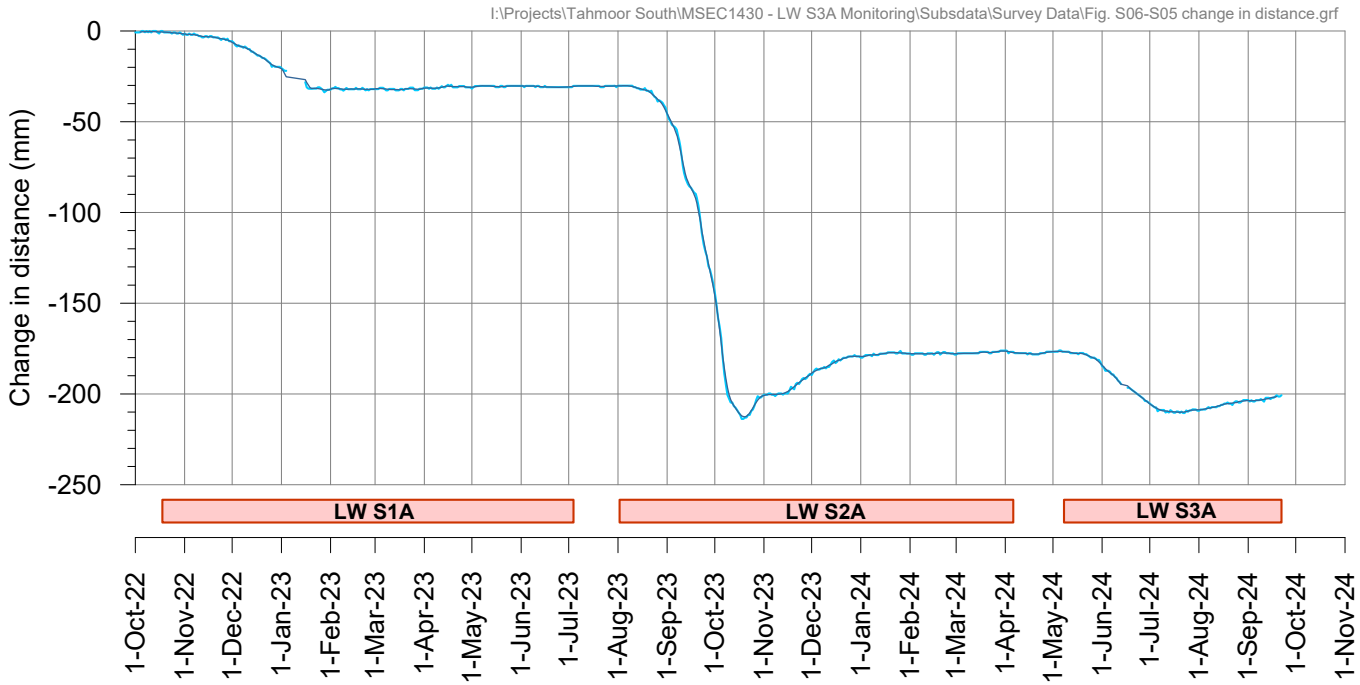


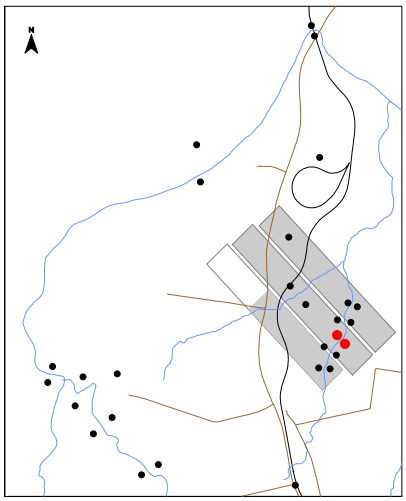
msec

Fig. S06-R17

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek
Sites S05 and S06 above LW S2A





Tahmoor South LW S3A - GNSS Monitoring

Site S07 above LW S2A

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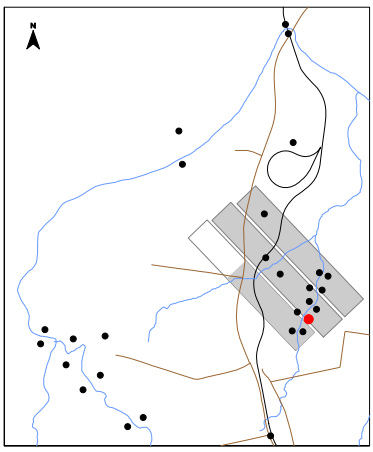
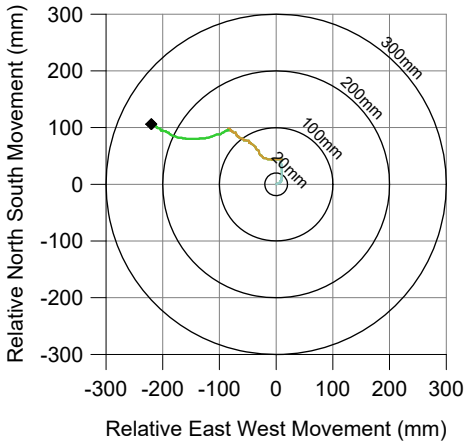
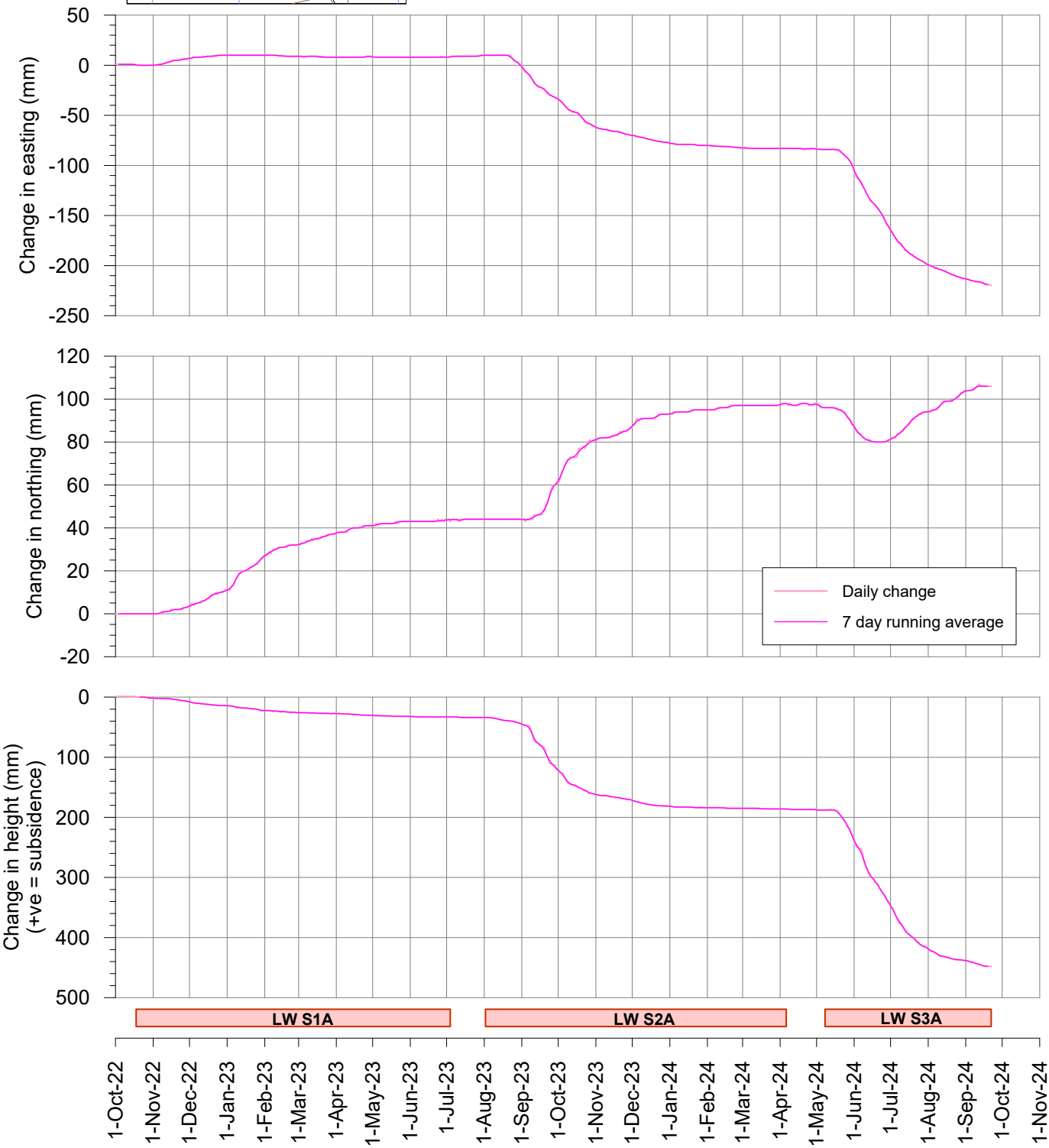


During LW S1A
During LW S2A
During LW S3A





msec

Fig. S07-R17

Tahmoor South LW S3A - GNSS Monitoring

Site S08 between LW S2A and LW S3A

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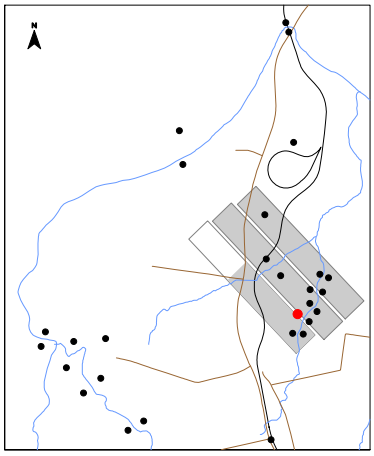
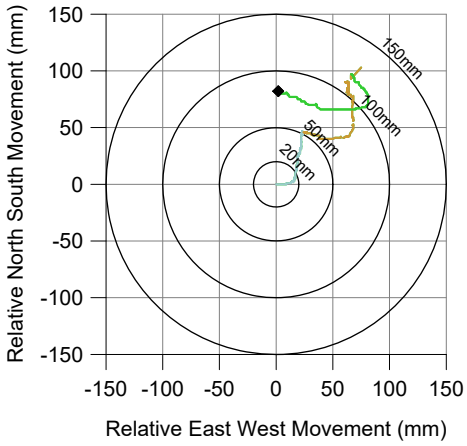
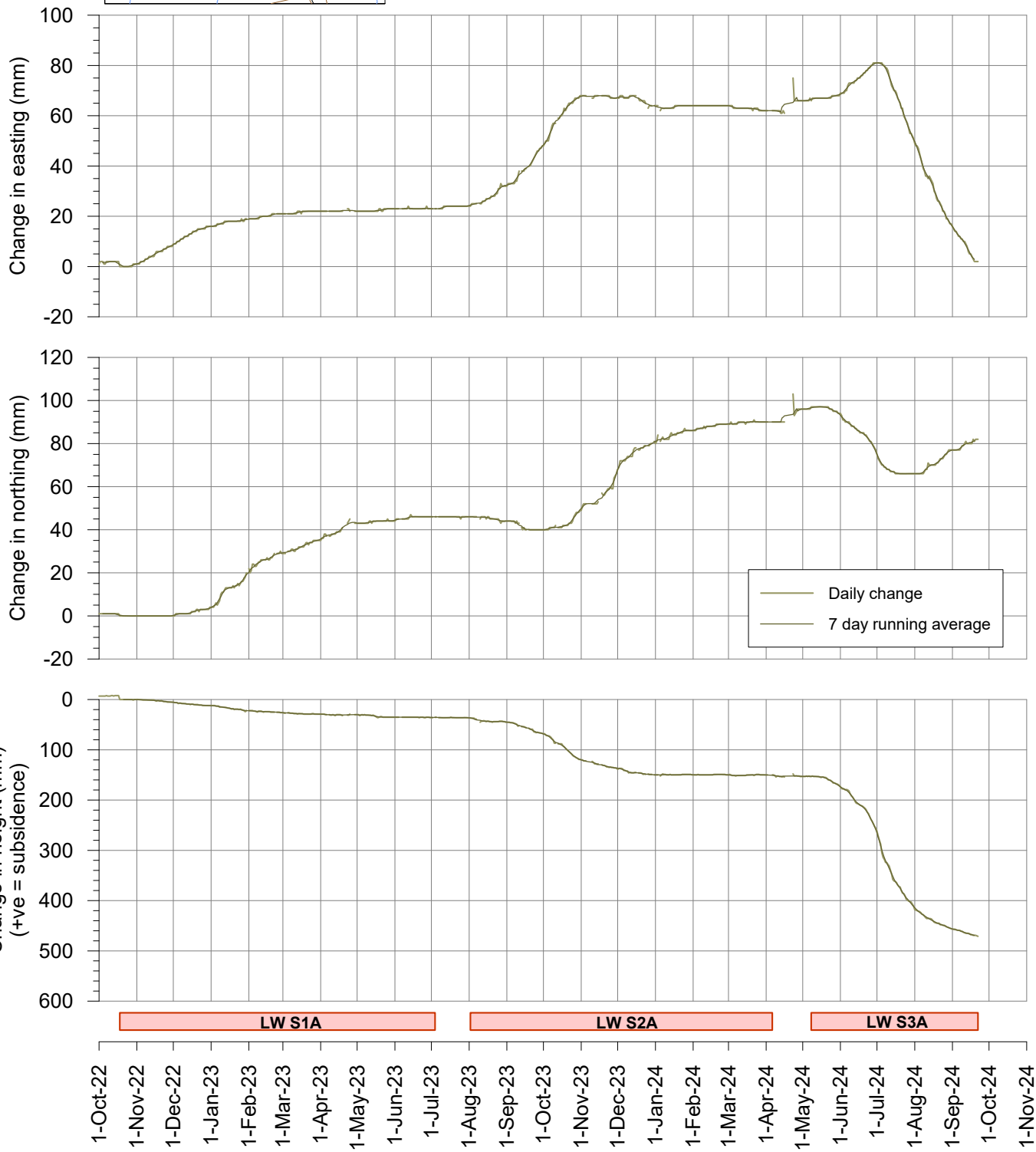


During LW S1A
During LW S2A
During LW S3A



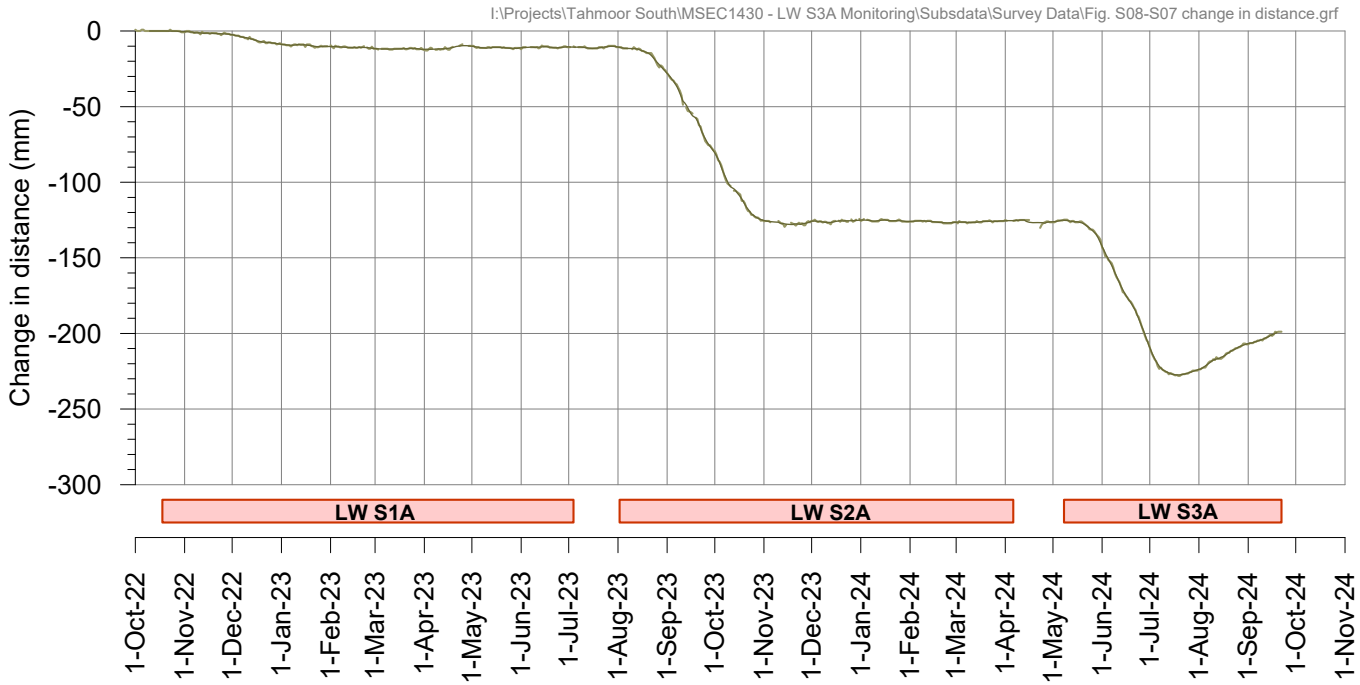


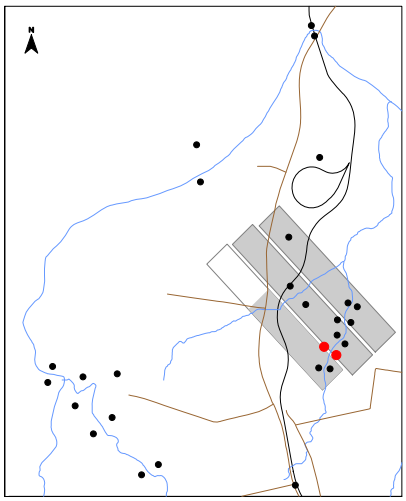
msec

Fig. S08-R17

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek
Site S07 above LW S2A and Site S08 between LW S2A and LW S3A





Tahmoor South LW S3A - GNSS Monitoring

Site S09 above LW S3A at Teatree 2

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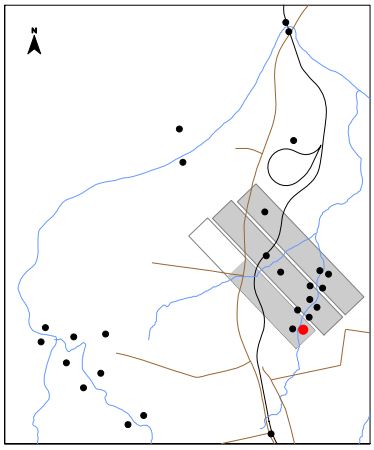
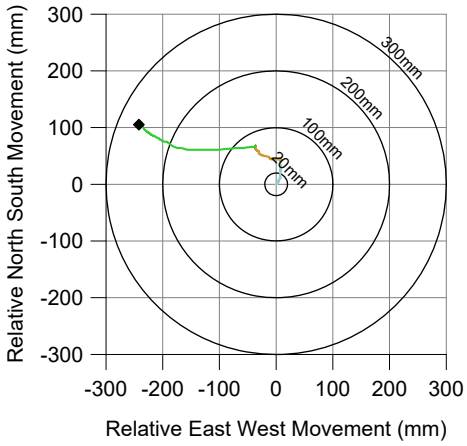
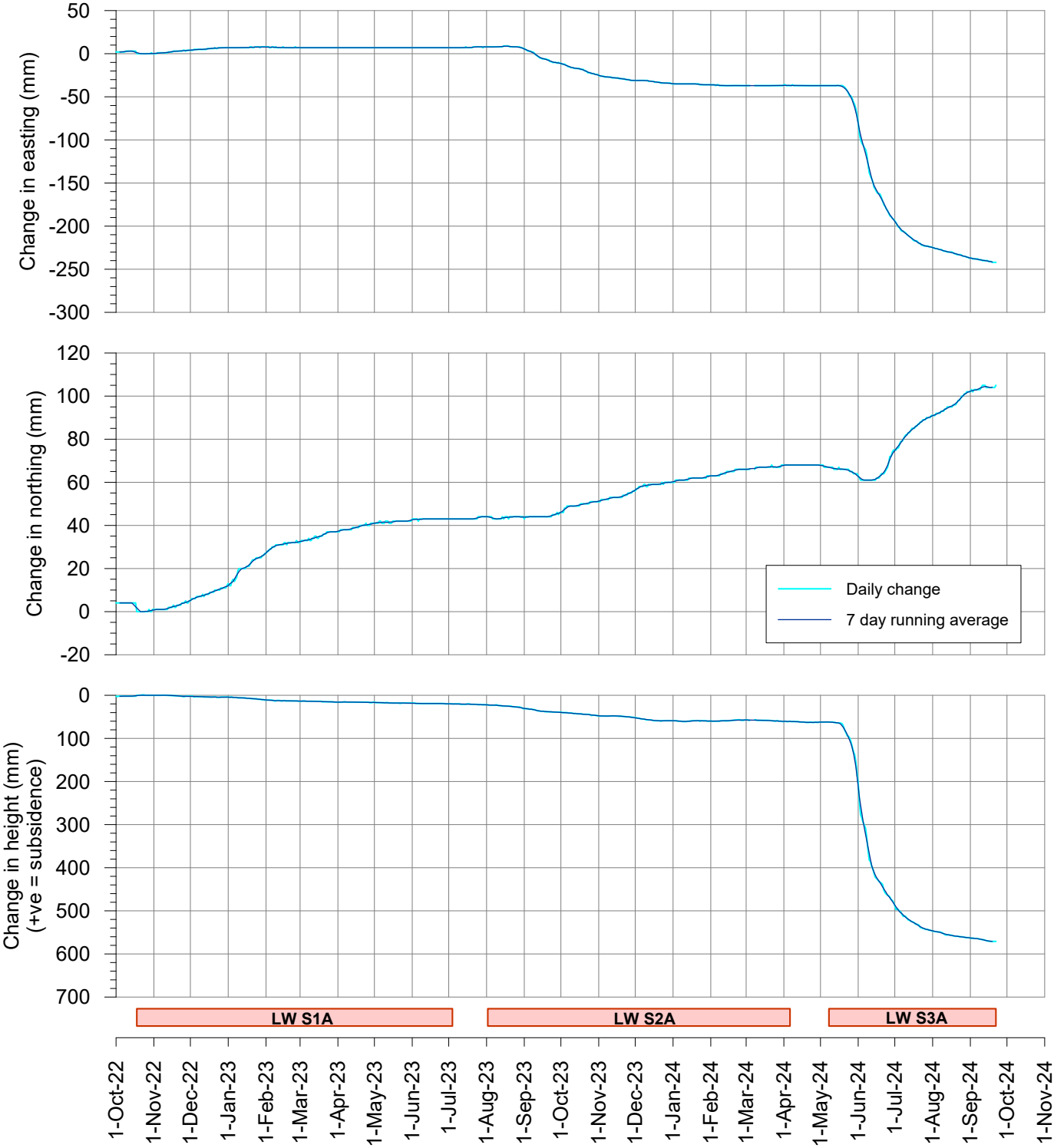


During LW S1A
During LW S2A
During LW S3A





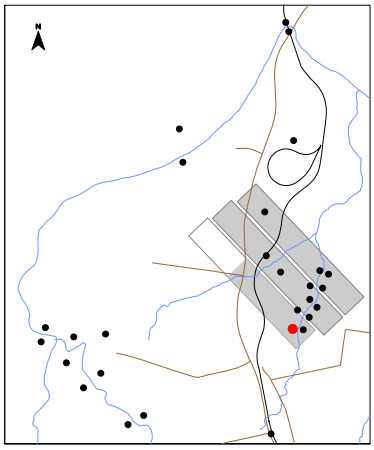
msec

Fig. S09-R17

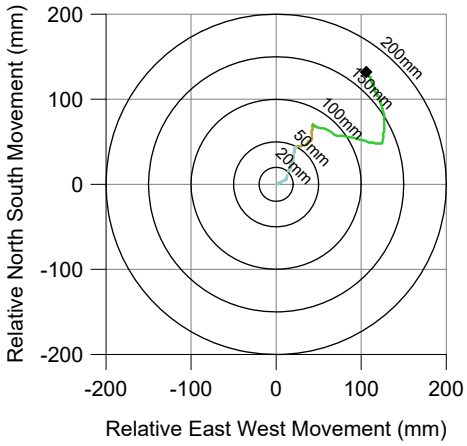
Tahmoor South LW S3A - GNSS Monitoring

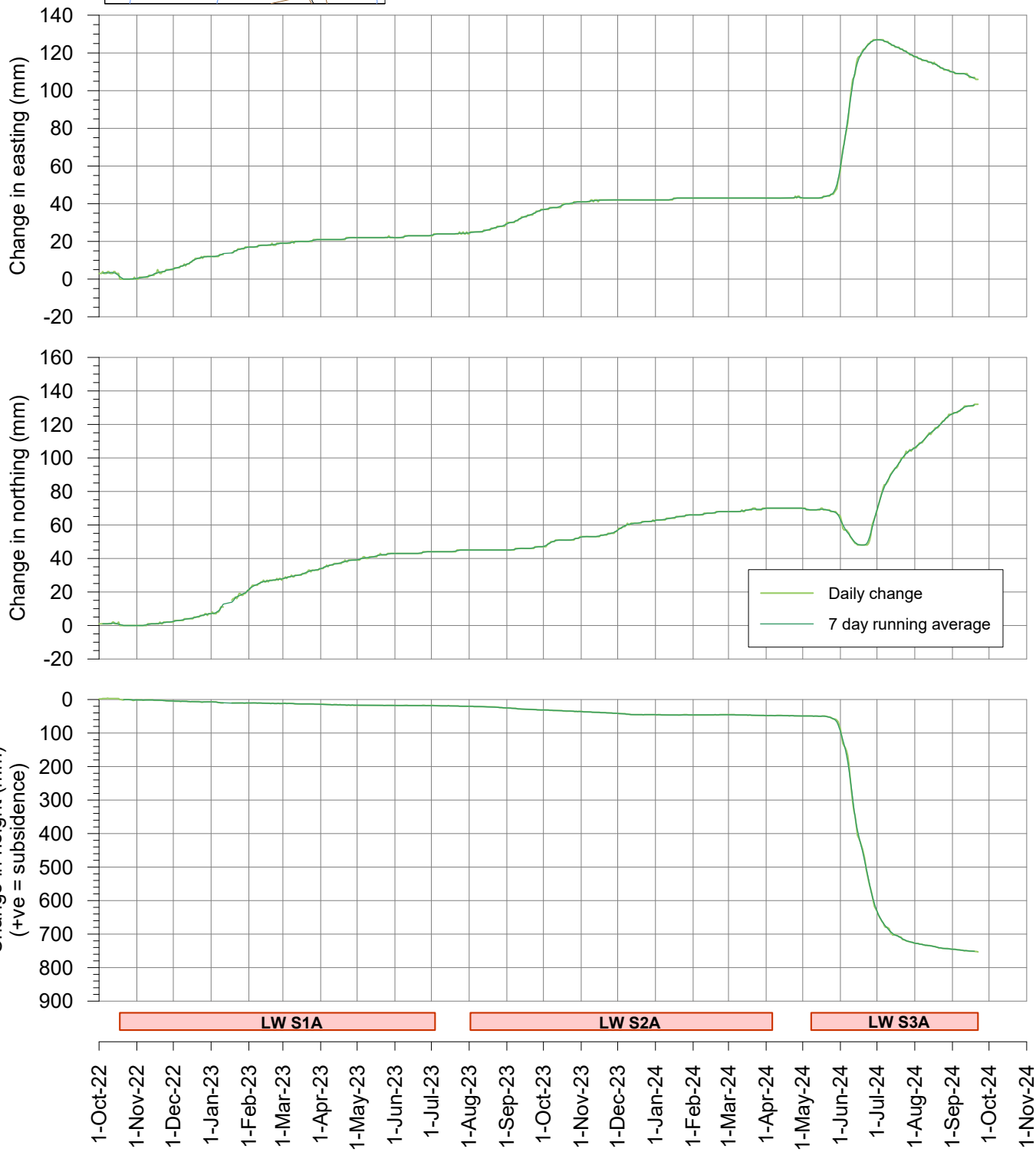
Site S10 above LW S3A at Teatree 2

I:\Projects\Tahmoor South\MSEC1430 - LW S3A Monitoring\Subsdata\Survey Data\Fig. S10 GNSS.grf



During LW S1A
During LW S2A
During LW S3A



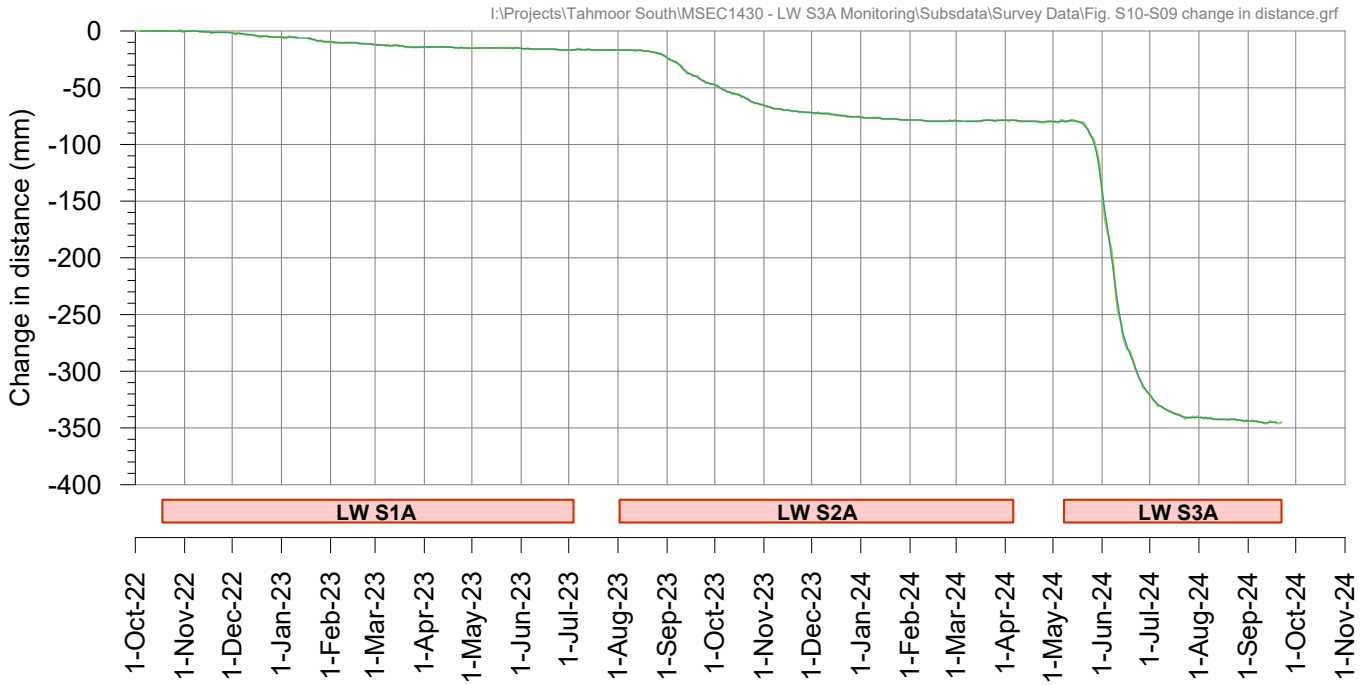


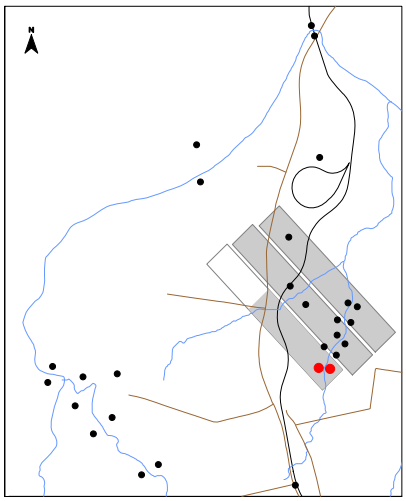
msec

Fig. S10-R17

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Wirrimbirra Creek at Teatree 2
Sites S09 and S10 above LW S3A





Tahmoor South LW S3A - GNSS Monitoring

Site S26 above LW S2A

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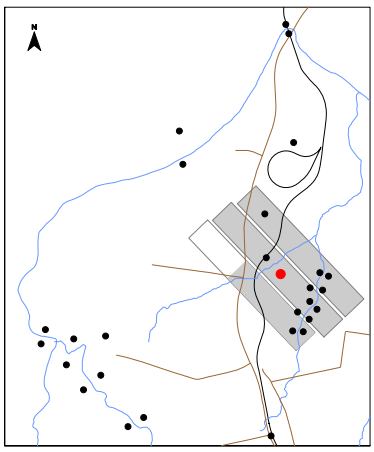



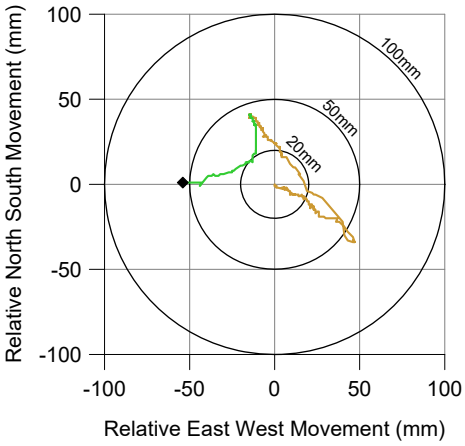

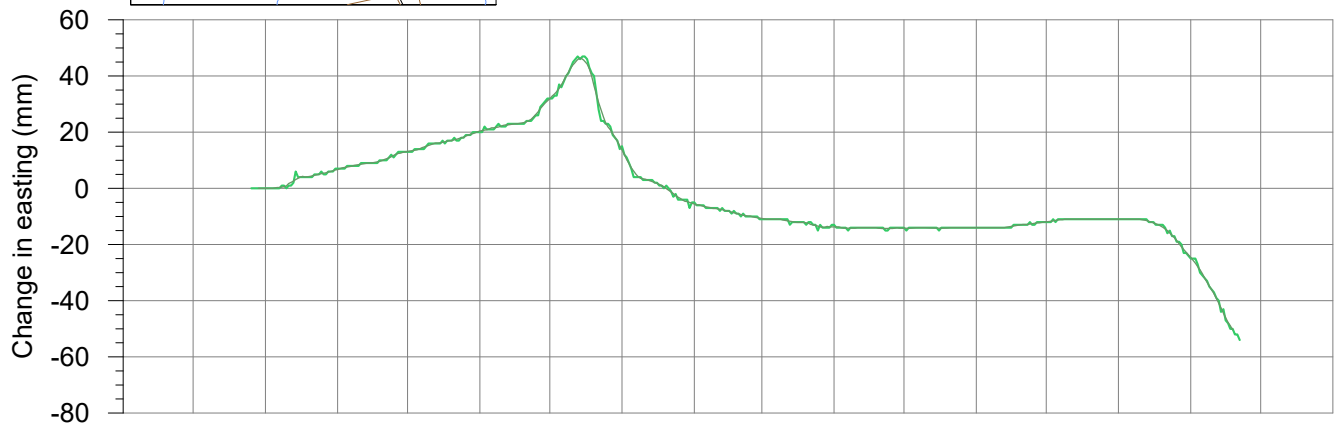

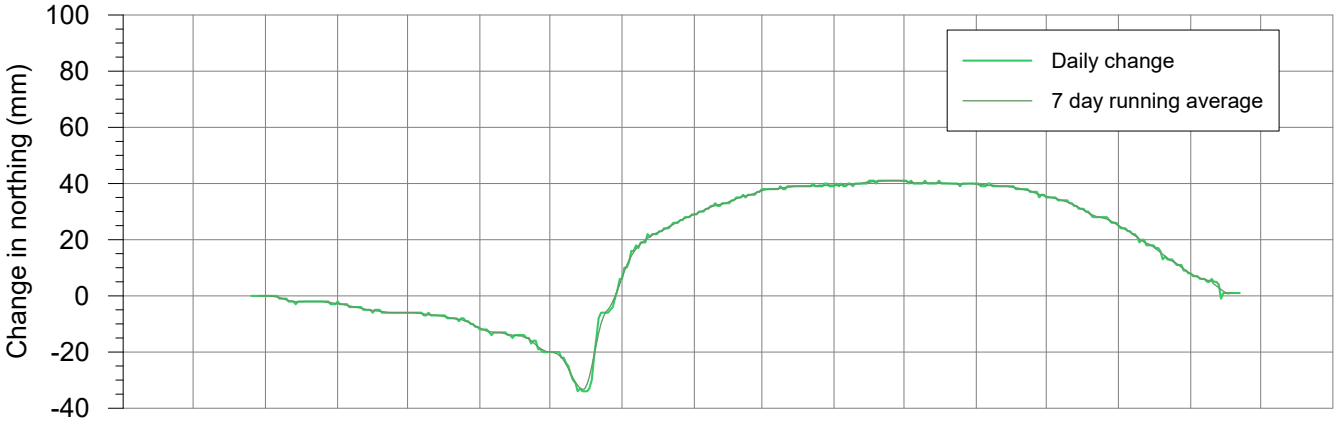

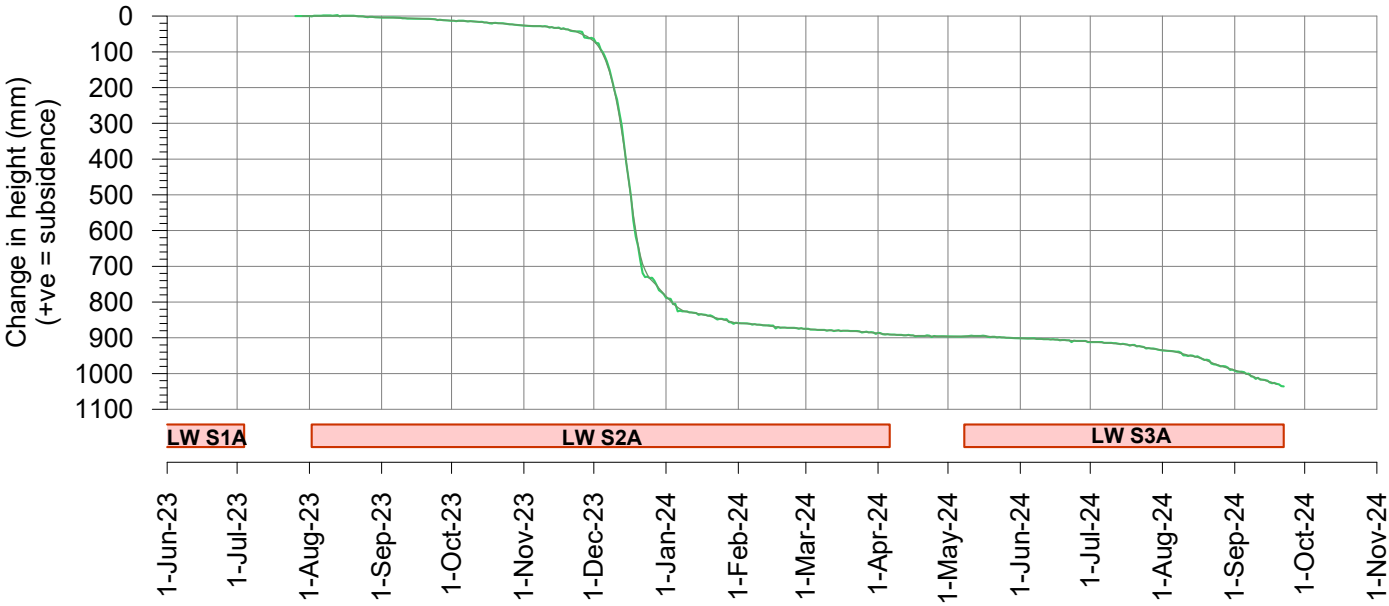

msec

Fig. S26-R17

Tahmoor South LW S3A - GNSS Monitoring

Site S27 on railway embankment above LW S2A

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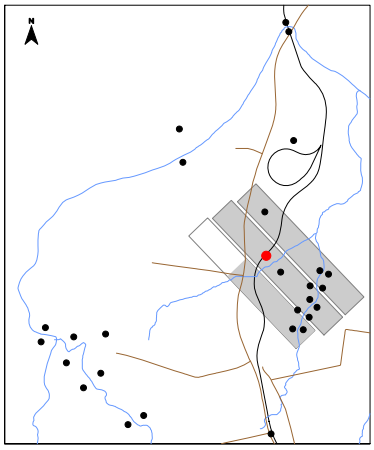
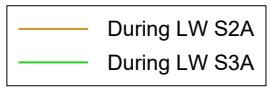
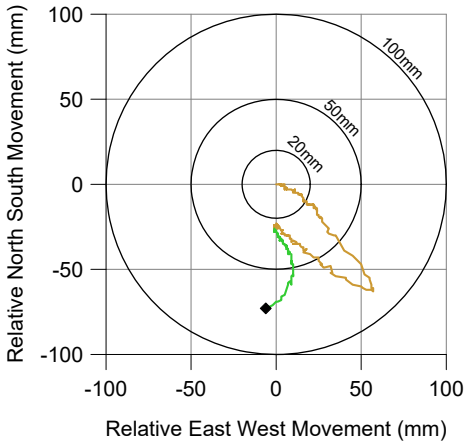
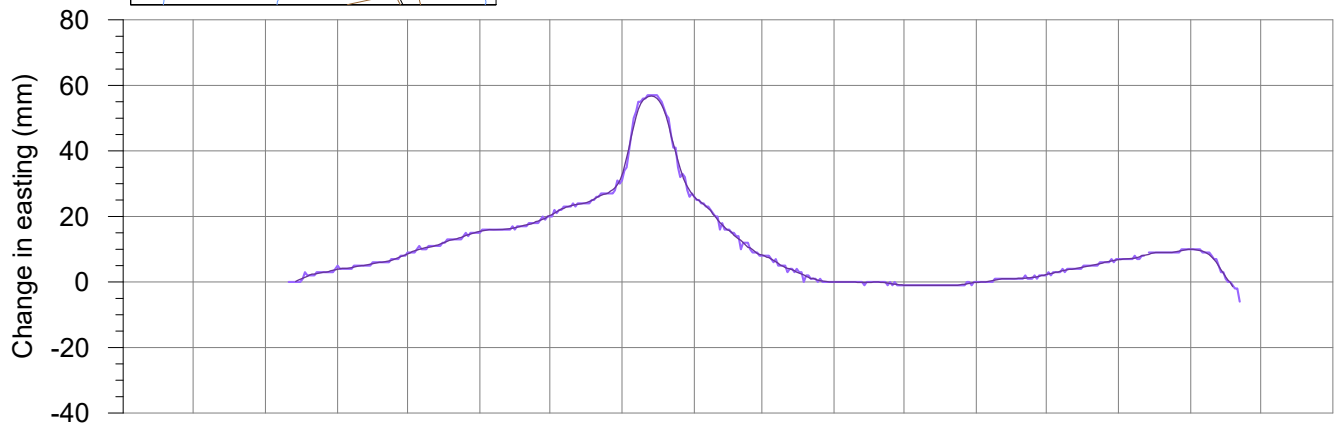
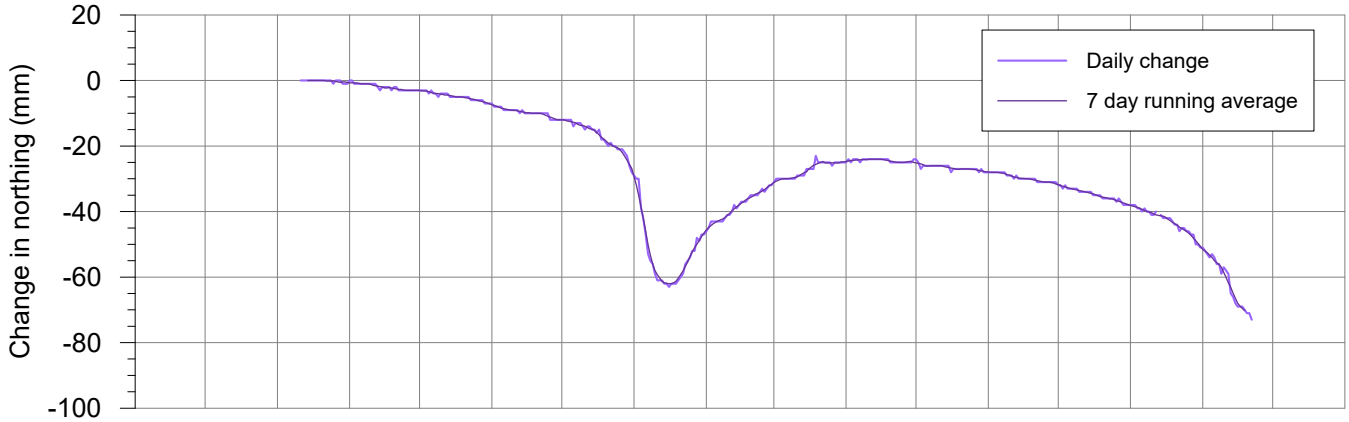
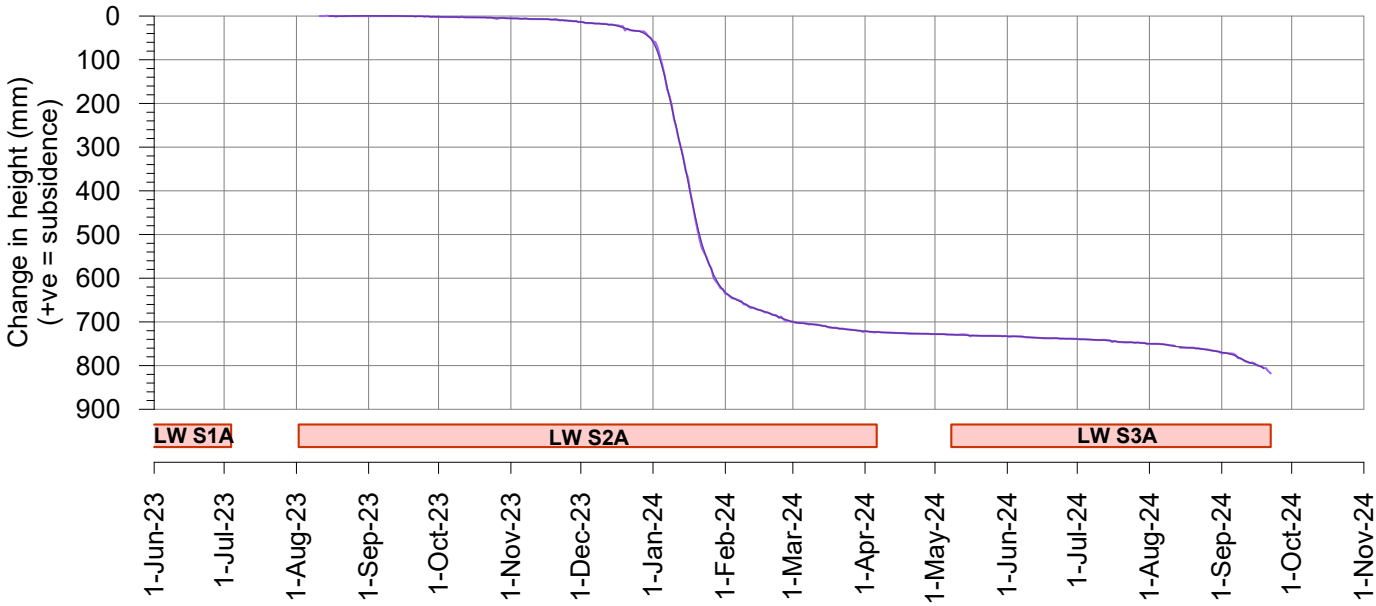










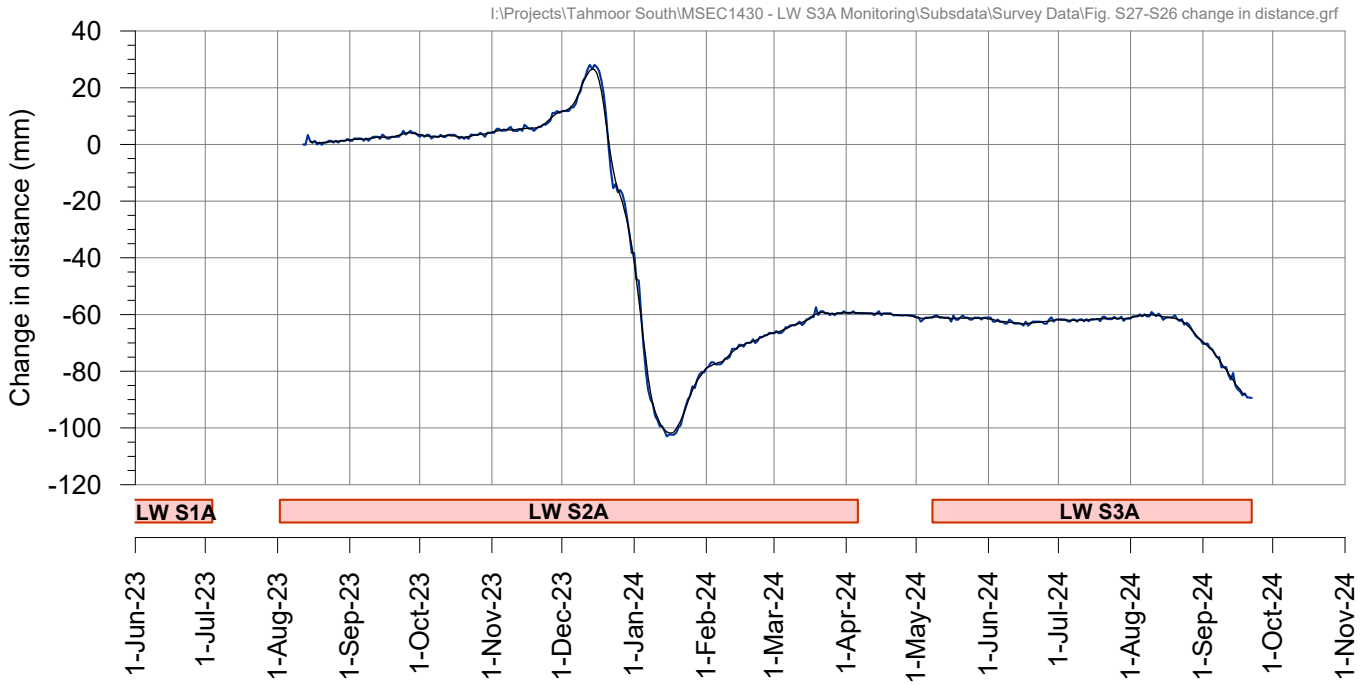


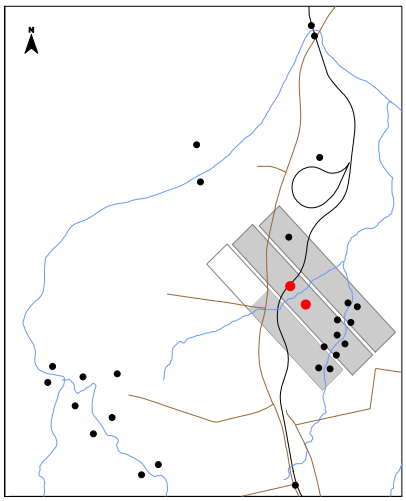
msec

Fig. S27-R17

Tahmoor South LW S3A - GNSS Monitoring

Change in distance across Teatree Hollow above LW S2A
Sites S26 and S27





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Suite 402, 13 Spring Street, Chatswood NSW 2067
PO Box 302, Chatswood NSW 2057
Tel +61 2 9413 3777
www.minesubsidence.com

SIMEC

TAHMOOR SOUTH - LWS3A

AUSTRALIAN WILDLIFE SANCTUARY

OBSERVED INCREMENTAL SUBSIDENCE DUE TO LW S3A

DATE:	SCALE:	DRAWING No:	Rev No
24 Sep 2024	1:10000	MSEC1431-02	17

LW S3A Started : 8-May-2024

All Subsidence in mm (0, 20, 50, 100, 200, 300, 400, 500, 600, 700, 800, 900, 1000)

LW S3A
LW S2A
LW S1A
LW S4A
LW S5A
LW S6A
1700m
1600m
1500m
1400m
1300m
1200m
1100m
1000m
900m
800m
700m
600m
500m
400m
300m
200m
100m
0m
LW S3A Started : 8-May-2024
19-Sep-2024

FIRE ROAD NO P1
BARGO R
OLIVE LANE
REMEMBRANCE DR
MAIN SOUTHERN RAILWAY
Hidden creek
DT LINE
V LINE
TEATREE HOLLOW
TRIBUTARY OF TEA TREE HOLLOW
CALOOLA RD
YARRAN ROAD
GREAT SOUTHERN ROAD
CHARLIES POINT RD
Australian Wildlife Sanctuary
Gantry
Dam S2
Dam S3
Dam S4

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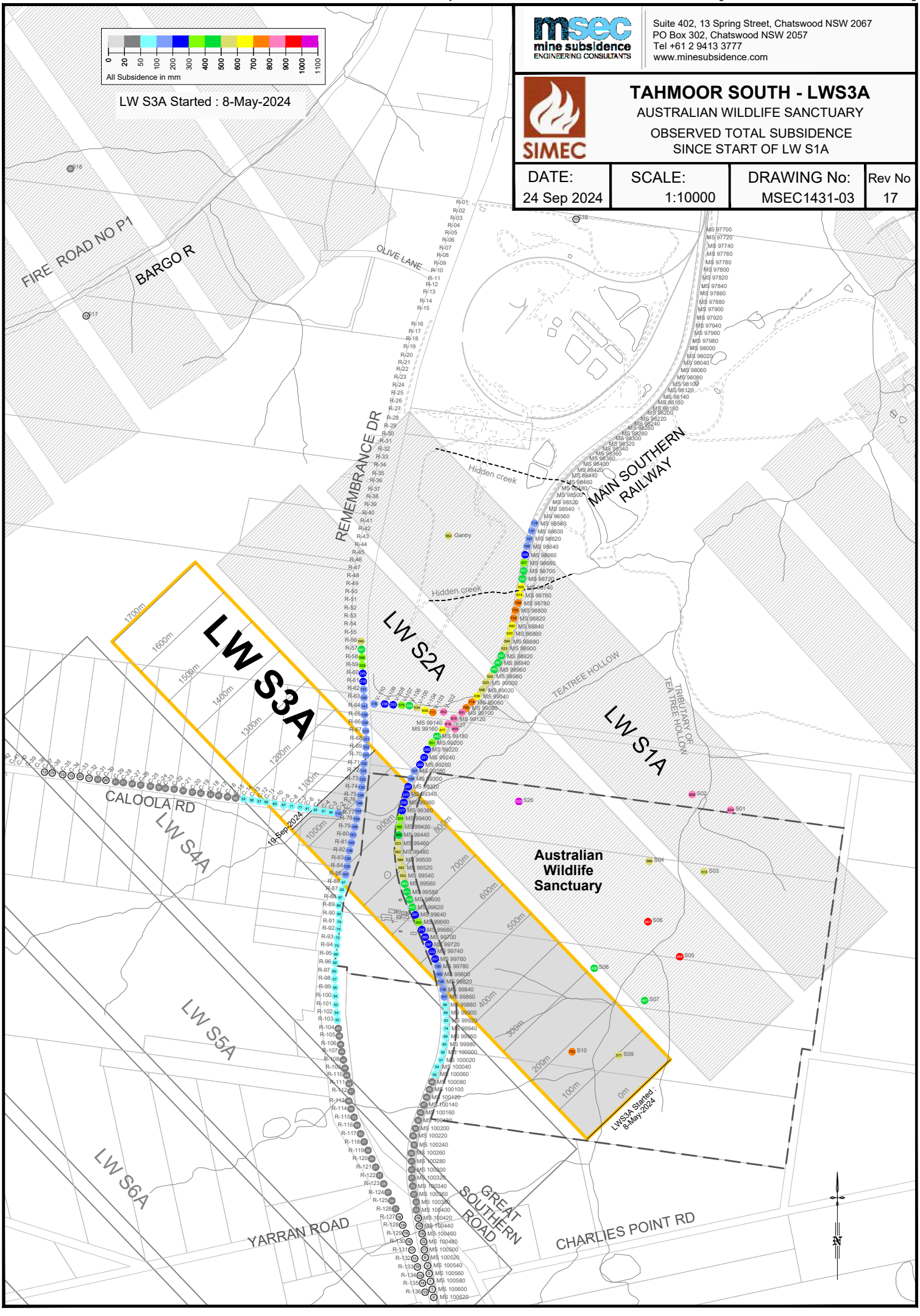

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Suite 402, 13 Spring Street, Chatswood NSW 2067
PO Box 302, Chatswood NSW 2057
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TAHMOOR SOUTH - LWS3A

AUSTRALIAN WILDLIFE SANCTUARY

OBSERVED TOTAL SUBSIDENCE SINCE START OF LW S1A

DATE:	SCALE:	DRAWING No:	Rev No
24 Sep 2024	1:10000	MSEC1431-03	17

I:\Projects\Tahmoor South\MSEC1431 - LW S3A AWS Monitoring\AcadData\MSEC1431-04 Change in Subs.dwg

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Suite 402, 13 Spring Street, Chatswood NSW 2067
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TAHMOOR SOUTH - LWS3A

AUSTRALIAN WILDLIFE SANCTUARY
CHANGE IN SUBSIDENCE
SINCE PREVIOUS SURVEY

DATE:	SCALE:	DRAWING No:	Rev No
24 Sep 2024	1:10000	MSEC1431-04	17

LW S3A Started : 8-May-2024

All Subsidence in mm
0 20 50 100 200 300 400 500 600 700 800 900 1000

LW S3A
LW S2A
LW S1A
LW S4A
LW S5A
LW S6A
1700m
1600m
1500m
1400m
1300m
1200m
1100m
1000m
900m
800m
700m
600m
500m
400m
300m
200m
100m
0m
11-Sep-2024
18-Sep-2024
LW S3A Started : 8-May-2024
Australian Wildlife Sanctuary
REMEMBRANCE DR
MAIN SOUTHERN RAILWAY
FIRE ROAD NO P1
BARGO R
OLIVE LANE
Hidden creek
TEATREE HOLLOW
TRIBUTARY OF TEATREE HOLLOW
CALOOLA RD
YARRAN ROAD
GREAT SOUTHERN ROAD
CHARLIES POINT RD
Gantry
S01 S02 S03 S04 S05 S06 S07 S08 S09 S10 S17 S26 S27

I:\Projects\Tahmoor South\MSEC1431 - LW S3A AWS Monitoring\AcadData\MSEC1431-05 AWS Ground Survey.dwg

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Suite 402, 13 Spring Street, Chatswood NSW 2067
PO Box 302, Chatswood NSW 2057
Tel +61 2 9413 3777
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TAHMOOR SOUTH - LW S3A

AUSTRALIAN WILDLIFE SANCTUARY

GROUND MONITORING

DATE:	SCALE:	DRAWING No:	Rev No
24 Sep 2024	as shown	MSEC1431-05	17

Relative Origin AWS~11
(Relative Orientation 90°00' to AWS~8)

LW S3A Started : 8-May-2024

Latest Survey 18-Sep-2024

- mm — Total subsidence
- mm — Incremental subsidence since 28 Aug 2024
- Horizontal displacement of survey marks during LW S2A — mm
- Horizontal displacement of survey marks since 28 Aug 2024
- mm — Vector & magnitude of observed horizontal movement (mm)
- Change in horizontal distance between survey marks
  - mm Closure / mm Closure since 28 Aug 2024
  - mm Opening / mm Opening

SCALE 0m 5m 10m

FLT
CRCK
CRCK2
CRCK3
CRCK4
CRCK5
LWS3A
NS line
EW line
AWS-1
AWS-2
AWS-3
AWS-4
AWS-5
AWS-6
AWS-7
AWS-8
AWS-9
AWS-10
AWS-11
AWS-12
AWS-13
AWS-14
AWS-15
AWS-16
AWS-17
AWS-18
AWS-19
AWS-20
CRCK7
HOUSE
COTTAGE 1
ANIMAL ENCLOSURE
BIRD ENCLOSURE
ENCLOSURE
VISITORS CENTRE
GLASS HOUSE
Gate not closing
Fence buckling
Tassie Devil Enclosures
Railway Tracks
NURSERY
SHED
Fenced Enclosures

Appendix I – Tahmoor Mine Site Monitoring Reports

Summary Report - UAV Inspection of Raw Coal 1200t Bins

Date: 05/12/2024.

Overview

Raw coal bins tiltmeter data September 2024 indicated a change in the tilt delta at the twin 1200t raw coal bins. Rod Sweeting (Sweeting Consulting) advised that with the increase in temperature the North-South the tilt delta is also increasing (figure 1). The change has resulted from a drop in the tilt of the western sensors with the differential reaching 0.4mm/m.

John Matheson (Structural Engineer) reviewed the data and recommended a monthly review of the data, and a UAV inspection as soon as could be arranged. The review of the tilt meter data for October 24 has revealed a reduction and stabilisation of the tilt delta indicating the change is most likely temperature related (figure 2).

UAV inspection (06/11/2024) revealed a new vertical crack on the surface of the northern unreinforced concrete element (web) that connects the two silos together. The vertical crack appears to extend from approximately 3-metres above external ground surface level to approximately 5-metres below the top of the silo wall. No change in cracking was detected on the southern web.

This report provides a photo summary of the UAV Inspection and comments and recommendations from Structural Engineer John Matheson (JMA) following an additional onsite inspection 15 Nov 2024.



Figure 1: Sept 2024 Raw Coal Bins monitoring data (MSEC1402)

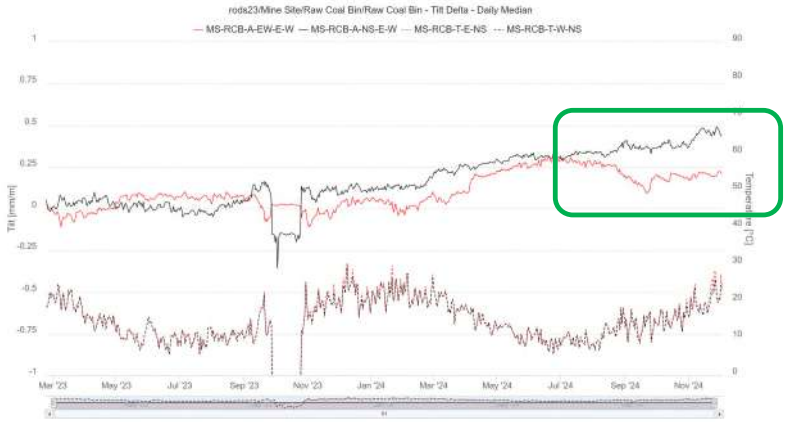


Figure 2: Raw Coal Bins monitoring data to Dec 2024 (Sweeting Consulting))

SIMEC MINING

Site address :

Tahmoor Coal Pty Limited ABN 97 076 663 968

PO box 100, Tahmoor, NSW 2573, Australia

T: +61 (02) 46 400 100

E: contact@simecgfg.com

simecgfg.com

MEMBER OF GFG ALLIANCE

Results

A UAV (drone) inspection was completed on the 1200t raw coal bins southern and northern concrete web elevations on the 06/11/ 2024. For the southern web, particular attention was given to a comparison of three (3) reference graduated crack gauges installed as follows;

a) lower (approx. 4m from base of bins),
b) mid (approx. 10m) and
c) upper (approx. 5m from top).

Southern web elevation:

Due to the location of the refuse discharge pipe, close approach by the drone (limited to approx. 2m) and square on access to the southern elevation was compromised. However, video and still photos of crack gauges positioned on reference cracking was achieved.

- A review of the crack gauges indicated no major change in the reference cracks (refer Appendix A).
- Video scans of the entire web from base to top also indicated no obvious new cracking.

North web elevation:

There are no crack gauges installed on the northern web. Close and square on review by the UAV was achieved.

Inspection revealed a new vertical crack on the surface of the northern facing unreinforced concrete element (web) that connects the two silos together, see comparative figures 3 and 4. JMA confirms the vertical crack appears to extend from approximately 3-metres above external ground surface level to approximately 5-metres below the top of the silo wall, see figure 5. The width of the crack appears to vary in width ranging from hairline to circa 1.5mm (as viewed from the bin access ladder platforms).

Comparative photos



Figure 3: Northen Web ¾ height May 24



Figure 4: Northen Web ¾ height Nov24

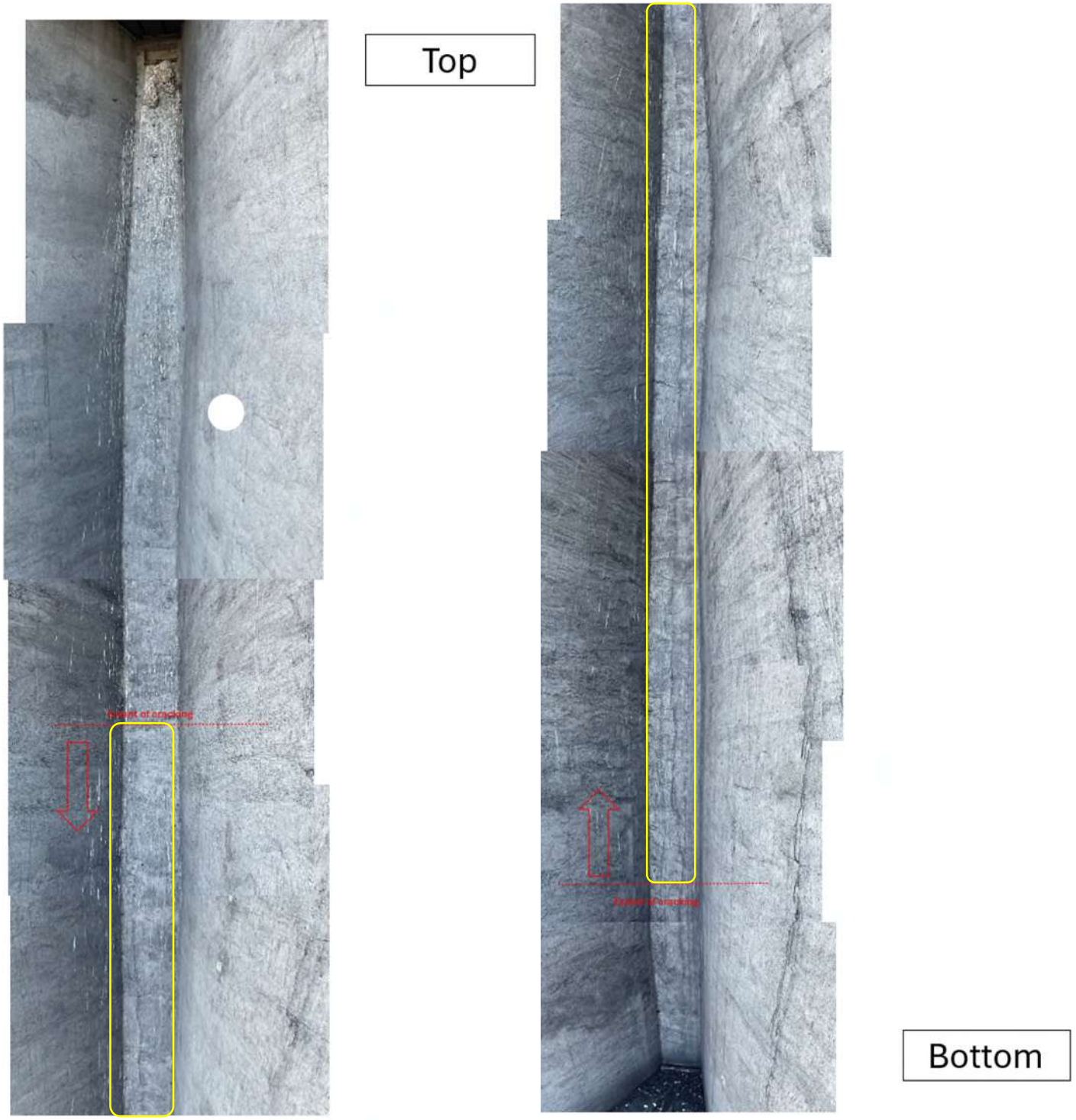


Figure 5: Northern web showing extent of cracking – 06/11/2024.

Structural Engineer Review

JMA commented that it is not known how active the vertical crack is noting that ground movements due to subsidence are levelling-off on the mine site and, therefore, crack growth could be easing. Comparative ground survey was completed by SMEC surveyors in November 2024 including changes in bin elevation with no measurable change detected.

In relation to other pre-existing horizontal and vertical cracks on the adjoining silo walls, no noticeable change in external crack width or development of new cracks were observed nor was any new cracking observed on the lower perimeter surfaces of the external silo walls or the limited extent of the internal surface of the walls that could be inspected within the silos.

However, it is possible that a slight increase of pre-existing off-vertical cracks on the internal walls (observed at ground level) could have occurred (refer Appendix B JMA Solutions 20241101: Raw Feed Bin Inspection Report).

Structural Engineer Recommendations

JMA recommends the following:

- An EWP should be provided on site to enable the upper and lower extent of the crack to be paint-marked.
- Crack gauges to be installed at agreed locations along the crack for ongoing monitoring, possibly at ¼, ½ & ¾ times crack height and crack width measured at these locations and/or where observed crack width is greatest.
- A pair of crack gauges should also be installed across the pair of cracks observed on the internal walls (JMA figures 21 & 23) and across any other cracks that are observed within the silo structure when access is available.
- Ultrasonic testing (if practicable) to assess crack depth and diamond core drilling to track the direction of the crack and determine whether the crack was pre-existing should be considered.

Inspection photos are contained in appendix A and detailed photographs and video can be found at the following location:

W:\E&C\8 Subsidence\22. LW S2A\5. IMG\Raw Coal Bins\RCB\Nov 24

If you require further information, please do not hesitate to contact me 0414 905 565.

David Talbert
Mine Subsidence Project Manager

Appendix A



Figure A1: Silo general view showing crack gauge location – southern elevation.



Figure A2: Crack Gauge lower location May 24.

.



Figure A3: Crack Gauge lower location Nov 24.



Figure A4: Crack Gauge mid location May 24.



Figure A5: Crack Gauge mid location Nov 24

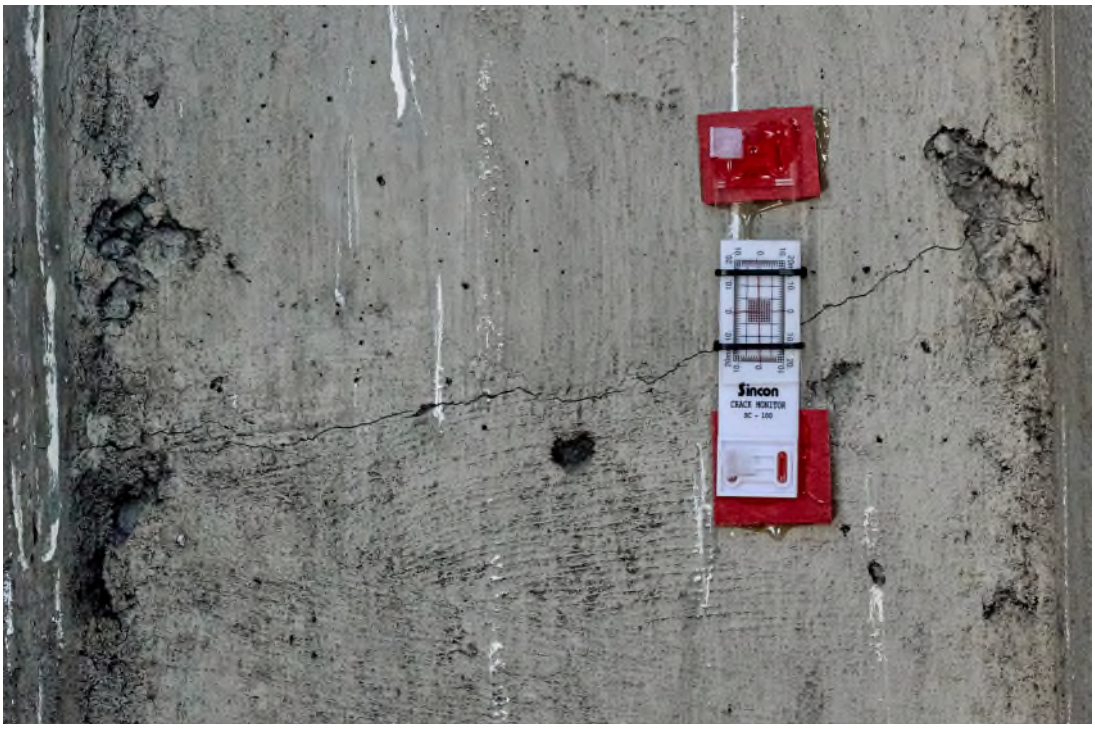


Figure A6: Crack Gauge top location.



Figure A7: Crack Gauge top location.



Figure A8: Raw Coal bins northern elevation.

Tahmoor Coal Pty Ltd
2975 Remembrance Drive, Bargo
PO Box 100, Tahmoor NSW 2573

Our Ref: J M A Solutions 20241101: Raw Feed Bin inspection report

A site visit was attended by Mr. John Matheson from this office in the company of Mr. David Talbert from Simec. The purpose of the visit was to observe what appears to be a new vertical crack on the surface of the unreinforced concrete element that connects the two silos together, see **Figure 1**. The vertical crack appeared to be less visible when viewed looking upwards from each platform than it was when viewed looking downwards. The vertical crack appears to extend from approximately 3-metres above external ground surface level to approximately 5-metres below the top of the silo wall, see **Figure 2**. The width of the crack appears to vary in width ranging from hairline to circa 1.5mm, estimated from a distance of approximately 3 to 4-metres.

It is not known how active the vertical crack is noting that ground movement due to subsidence are levelling-off on the mine site and, therefore, crack growth could be easing. In relation to other pre-existing horizontal and vertical cracks on the adjoining silo walls, no noticeable change in external crack width or development of new cracks were observed nor was any new cracking observed on the lower perimeter surfaces of the external silo walls or the limited extent of the internal surface of the walls that could be inspected within the silos. However, it is possible that a slight increase of pre-existing off-vertical cracks on the internal walls (observed at ground level) could have occurred, see **Figures 21 & 23**, where crack widths of circa w=0.4mm and w=0.6mm were measured by steel rule, see **Figures 24 & 25**.

It is recommended that an EWP should be provided on site to enable the upper and lower extent of the crack to be paint-marked and crack gauges to be installed at agreed locations along the crack for ongoing monitoring, possibly at ¼, ½ & ¾ times crack height and crack width measured at these locations and/or where observed crack width is greatest. A pair of crack gauges should also be installed across the pair of cracks observed on the internal walls (**Figures 21 & 23**) and across any other cracks that are observed within the silo structure when access is available. Ultrasonic testing to assess crack depth and diamond core drilling to track the direction of the crack and determine whether the crack was pre-existing should be considered.

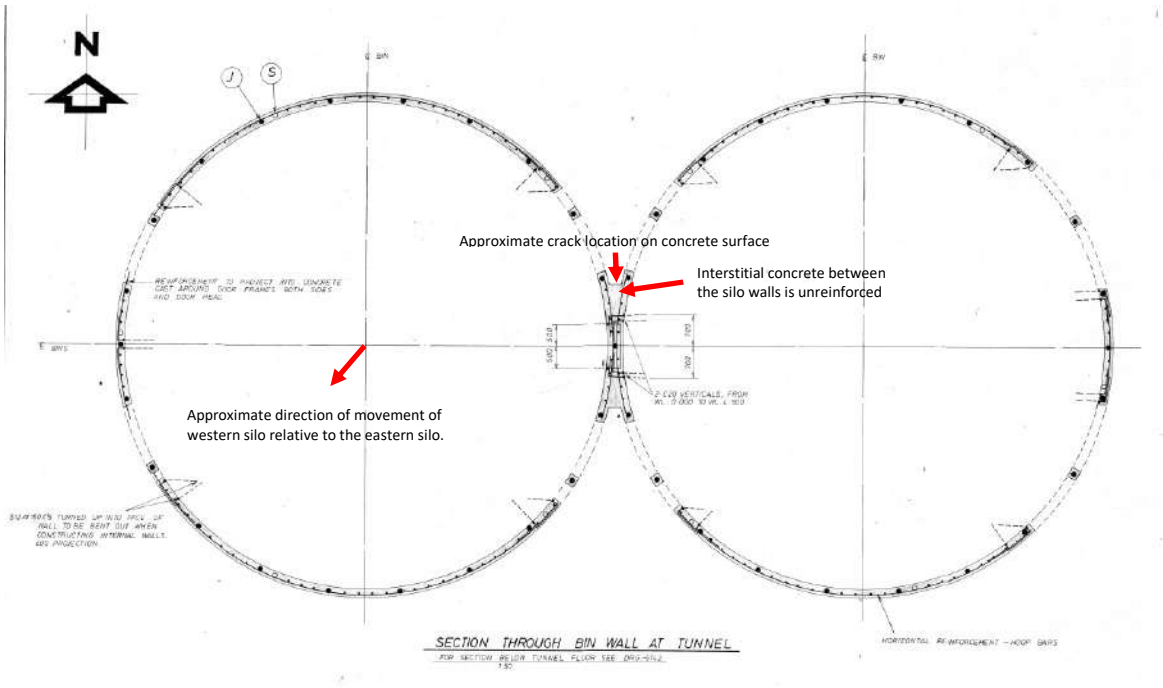


Figure 1 Silo plans showing the connecting concrete elements.

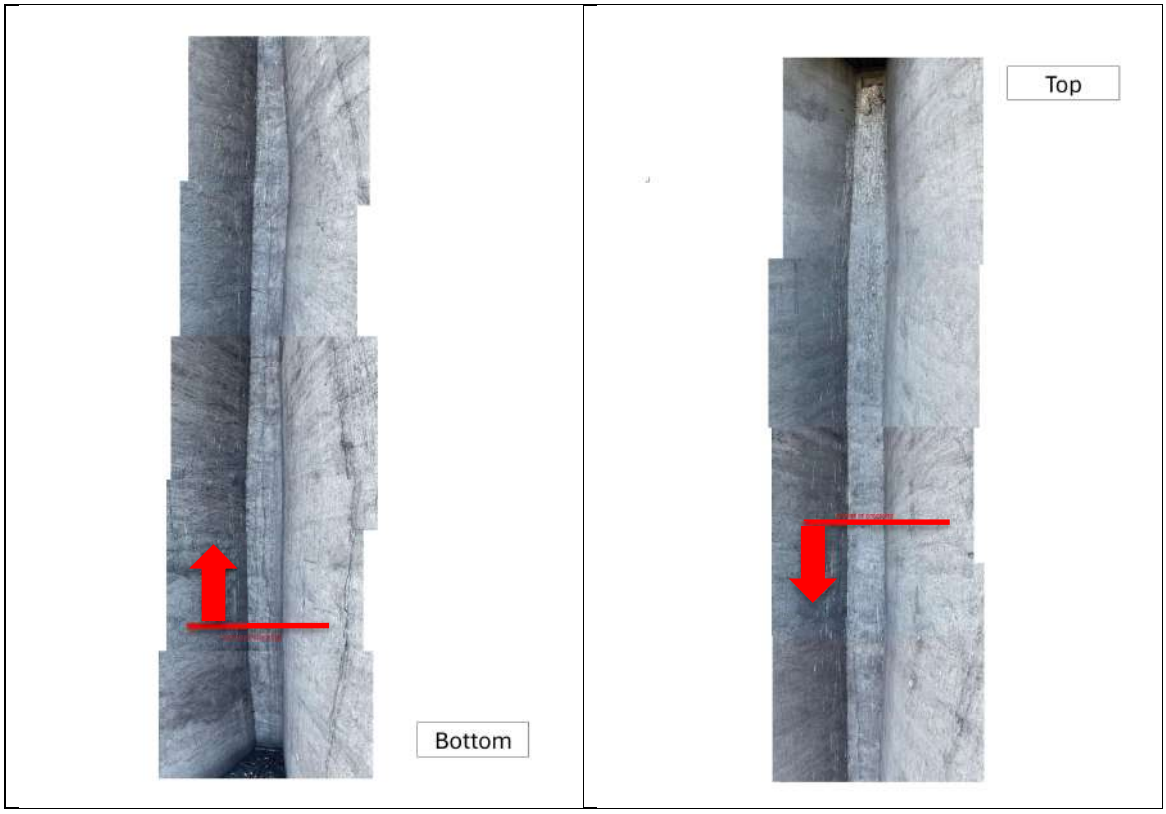


Figure 2 Vertical crack in web extends from approximately 3-metres above external ground surface level to approximately 5-metres below the top of the silo.

Yours faithfully,



John Matheson
Managing Director

Appendix A: Lower external surface of silo wall



Figure 3: IMG_5901



Figure 4: IMG_5902



Figure 5: IMG_5903



Figure 6: IMG_5904



Figure 7: IMG_5905



Figure 8: IMG_5906

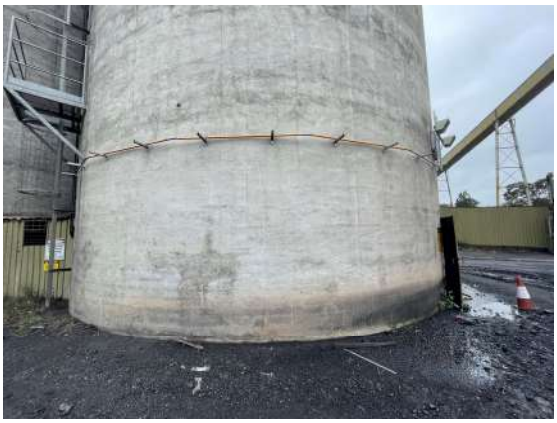


Figure 9: IMG_5907



Figure 10: IMG_5908



Figure 11: IMG_5909



Figure 12: IMG_5910



Figure 13: IMG_5911



Figure 14: IMG_5912



Figure 15: IMG_5913



Figure 16: IMG_5914



Figure 17: IMG_5915



Figure 18: IMG_5916



Figure 19: IMG_5917



Figure 20: IMG_5918

Appendix B:



Figure 21: IMG_5920 Existing crack, see Figure 27



Figure 22: IMG_5921 See Figure 27



Figure 23: IMG_5922 Exiting crack see Figure 26



Figure 24: IMG_5923 See Figure 26



Figure 25: IMG_5924



Figure 26: M002K_220315_Mine site inspection_061 2
Pre-existing crack was identified in pre-mining image.



Figure 27: M002K_220315_Mine site inspection_061

Appendix J – Tahmoor Garden Centre Monitoring Reports

TAHMOOR COAL: LW S3A

Subsidence Management Status Report No. 06
Tahmoor Garden Centre

Reporting Period	19 October 2024 to 25 October 2024	
Length of extraction of LW S3A	1412 m	On 24 October 2024 LW S3A commenced extraction on 8 May 2024
Length of extraction remaining of LW S3A	292 m	
Distance travelled by LW since previous report	69 m	Since 17 October 2024
Closest distance of LW S3A face to property	150 m	LW face beyond western boundary of property
Closest distance of LW S3A face to café and gift shop	152 m	LW face beyond café and moving away
Maximum incremental subsidence since start of LW S3A	258 mm	at Peg GC-13 at SE corner of residence on 23 October 2024
Maximum total subsidence since start of LW S1A	336 mm	at Peg GC-13 at SE corner of residence on 23 October 2024
Maximum increase in subsidence since previous report	70 mm	at Peg GC-6 at SW corner of cafe (17 October to 23 October)

Summary of monitoring and inspections

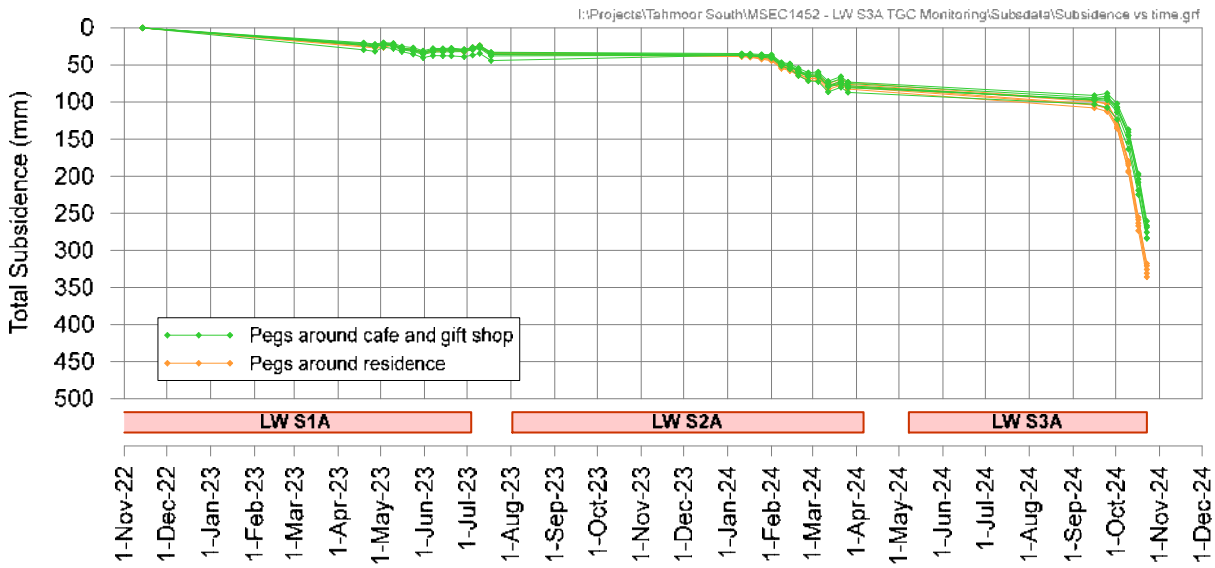
Monitoring Activity	Date	Current Frequency	Highest Trigger	Comments
Remembrance Driveway				
Ground survey	21 Oct	Abs. Mthly Rel. Weekly	N/A	Monthly 3D survey on 9 October measured small changes, including previously observed non-conventional compressive strains and bumps in the observed subsidence profiles between Pegs R47 and R48, and between Pegs R54 and R55. Remembrance Drive above LW S3A is experiencing the most active period of subsidence. Compressive strain developing above LW S3A.
Visual inspection	22 Oct	Weekly	N/A	No significant changes observed this week. Crack observed in southbound shoulder opposite Tahmoor Garden Centre.
Structures				
Local 3D survey	23 Oct	Weekly	N/A	Tahmoor Garden Centre is currently experiencing most active period of subsidence. Measured mining-induced ground tilts have reduced slightly this week. The maximum tilts around the building structures are 0.9 mm/m, which is less than construction tolerances. Measured mining-induced ground strains are 0.9 mm/m tensile and 0.6 mm/m compressive, which are close to survey tolerance. The weekly changes are currently minor.
Visual inspections	22 Oct	Weekly	Impacts obs'd	No significant issues observed to structures. Approximate 15 mm gap in decking and 3 mm opening and 5 mm step at expansion joint in café floor observed this week. Temporary repair of the epoxy coating along the expansion joint has been completed. A freestanding brick wall adjacent to the carpark has been knocked down by a vehicle. The wall has been removed. Timber paling fence between residence and yard that was leaning against racking has been braced with star pickets and steel brackets. It is recommended that the landowner install additional posts concreted into the ground to support the fence.
Outdoor storage racks				
Tilt measurements	-	End of LW S3A	N/A	No issues reported on 18 September. Tilt measurements will be taken at the completion of LW S3A. No issues reported.

Management Actions	
Other management actions since previous report: ● Temporary repair of epoxy flooring in café on 24October	
Any additional and/or outstanding management actions: ● Nil	
Consultation with stakeholders since previous report: ● Weekly reports will be issued during the mining of LW S3A	
Forecast whether continued longwall mining is likely to cause impacts on the health and safety of people who may be present at the property due to the extraction of LW S3A: Based on monitoring results to date, and the controls implemented and available under the LW S3A Management Plan, no triggers under this Management Plan are expected to be exceeded in the next week.	
Certified by Tahmoor Coal	
Name	Ross Barber
Position	Project Manager
Signature	*Ross Barber*
Date	29 October 2024

Copy of Report to:

Tahmoor Garden Centre

Ray Ramage, Principal Inspector – Subsidence, Mine Safety Inspectorate, Resources Regulator



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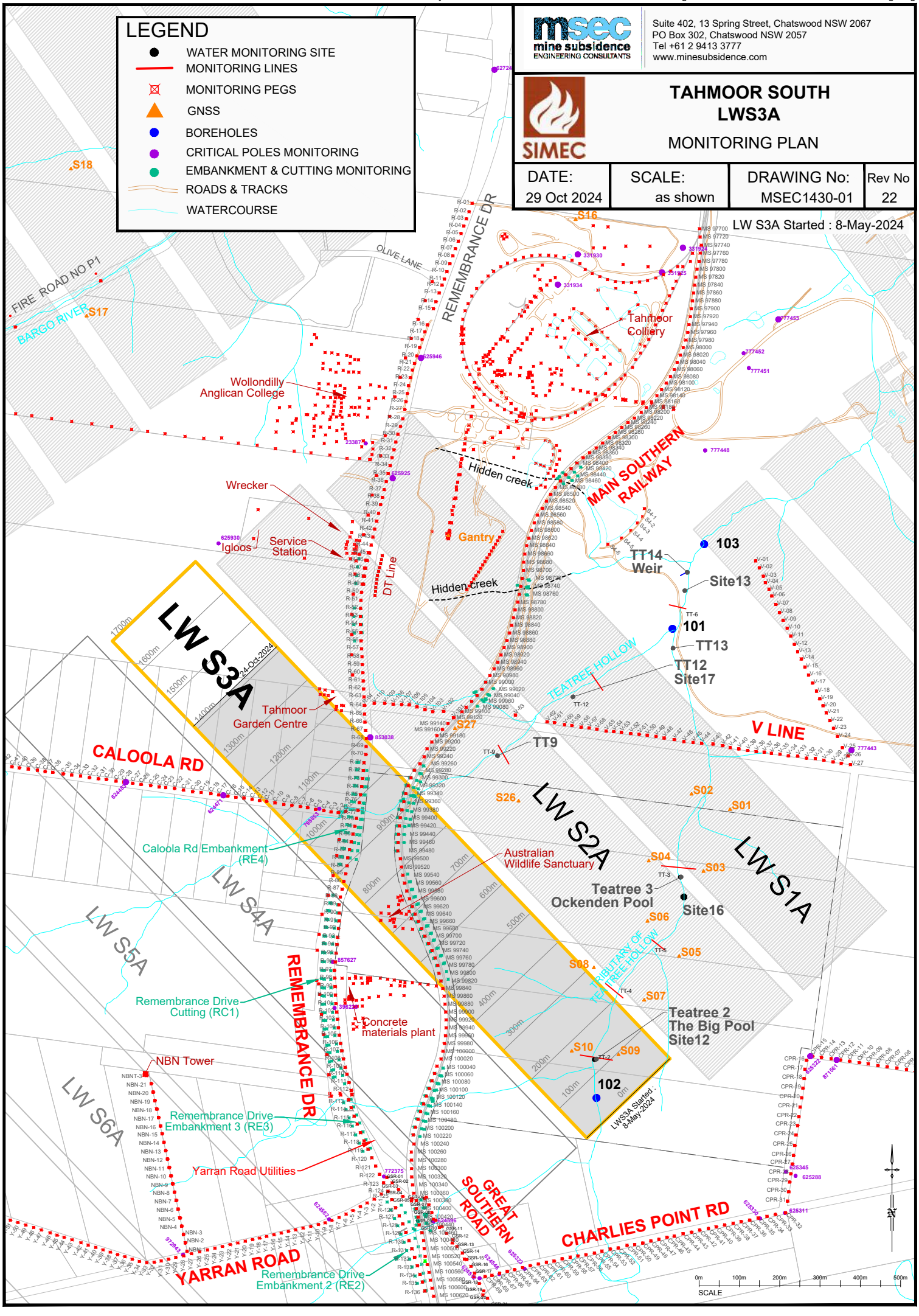

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Relative Origin GC~6 (Relative Orientation 100°00' to GC~4)

0m 5m 10m
SCALE

LWS2A

GC-1 7 -7 9 GC-2 +6 +3 Cafe & gift shop +13 12 GC-3

GC-6 -4 4 GC-5 -0 4 GC-4

GC-6

GC-4

Shop

LWS3A

Shed

Shade structure

GC-11 GC-12 GC-10 Residence GC-14 GC-13

GC-14

N

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TAHMOOR SOUTH LW S3A

TAHMOOR GARDEN CENTRE MONITORING - CAFE

DATE:	SCALE:	DRAWING No:	Rev No
29 Oct 2024	as shown	MSEC1452-01	06

Latest Survey 23-Oct-2024

mm Total Subsidence

Horizontal displacement of survey marks since start of LW S1A

mm Nominal Survey Accuracy Relative ± 5mm

Change in horizontal distance between survey marks

mm Closure

mm Opening

LWS3A Started : 8-May-2024



LW S3A LOCATION PLAN

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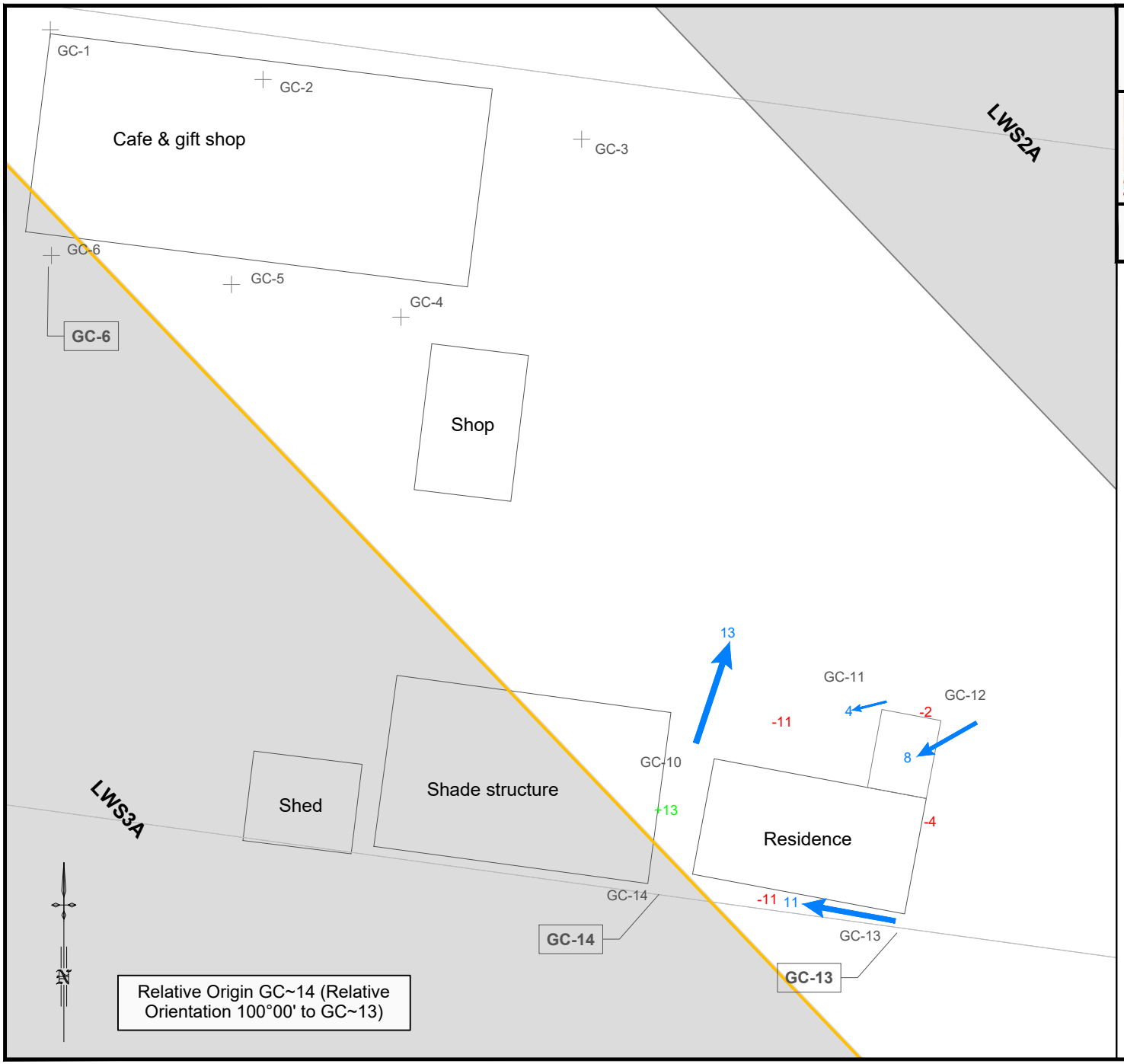

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TAHMOOR SOUTH LW S3A

TAHMOOR GARDEN CENTRE MONITORING - RESIDENCE

DATE:	SCALE:	DRAWING No:	Rev No
29 Oct 2024	as shown	MSEC1452-02	06

Latest Survey 23-Oct-2024

mm Total Subsidence

Horizontal displacement of survey marks since start of LW S1A

mm Nominal Survey Accuracy Relative ± 5mm

Change in horizontal distance between survey marks

mm Closure

mm Opening

LWS3A Started : 8-May-2024

Tahmoor South LW S3A
Incremental subsidence profiles along Remembrance Drive

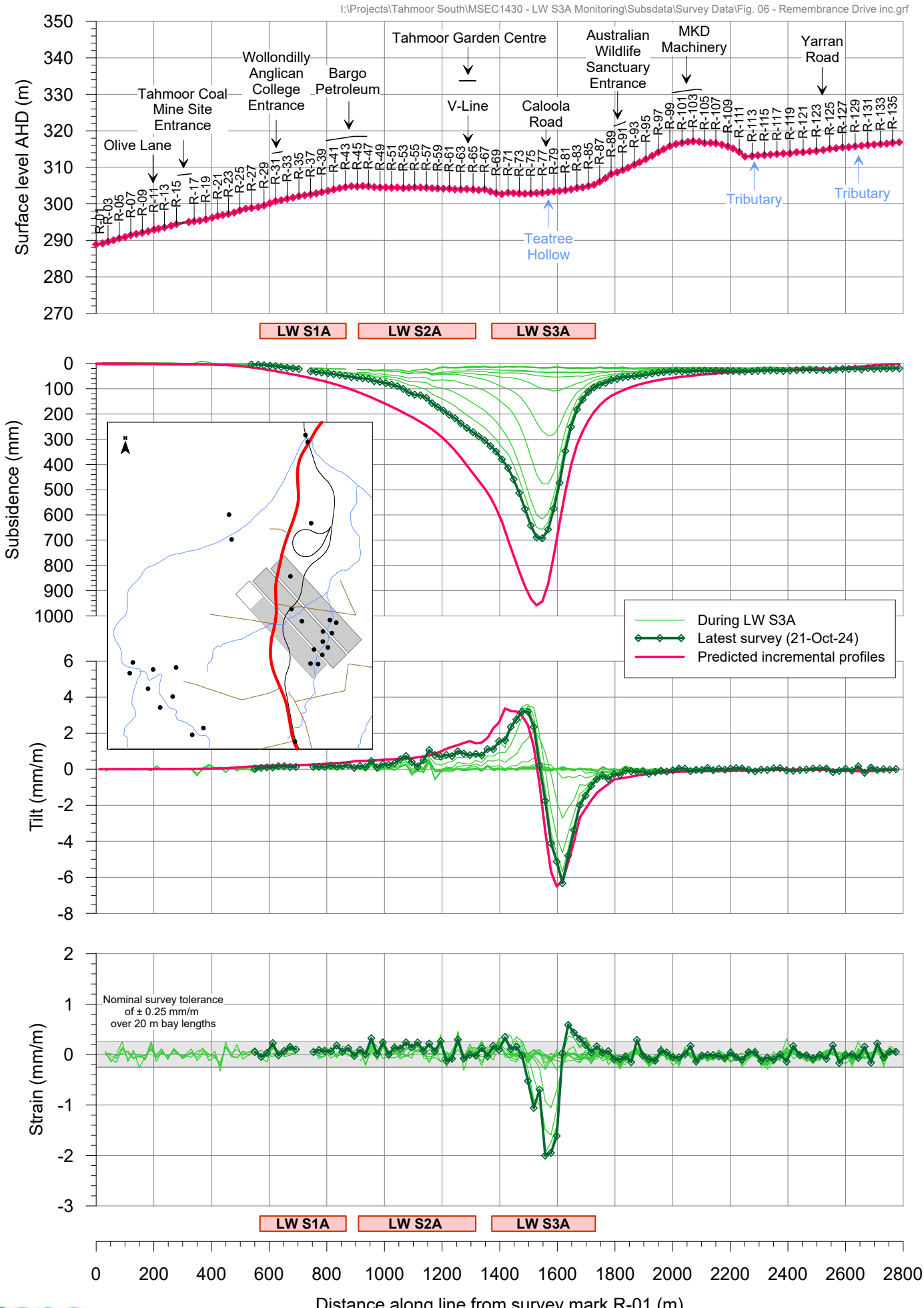


Fig. 6-R22

Tahmoor South LW S3A
Total subsidence profiles along Remembrance Drive

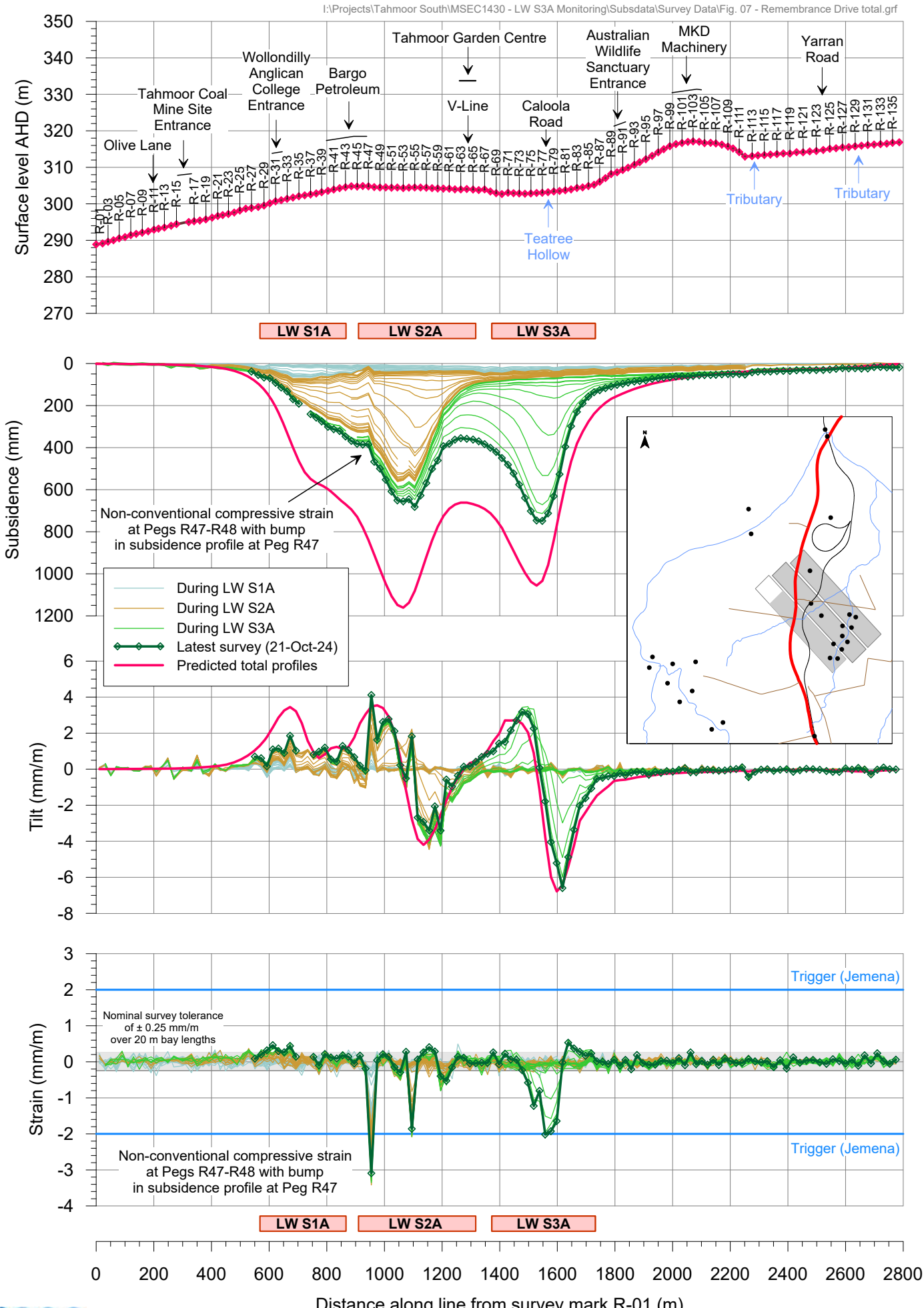


Fig. 7-R22

TAHMOOR COAL: LW S3A

Subsidence Management Status Report No. 10
Tahmoor Garden Centre

Reporting Period	16 November 2024 to 22 November 2024	
Length of extraction of LW S3A	1625 m	On 21 November 2024 LW S3A commenced extraction on 8 May 2024
Length of extraction remaining of LW S3A	79 m	
Distance travelled by LW since previous report	59 m	Since 14 November 2024
Closest distance of LW S3A face to property	363 m	LW face beyond western boundary of property
Closest distance of LW S3A face to café and gift shop	365 m	LW face beyond café and moving away
Maximum incremental subsidence since start of LW S3A	413 mm	at Peg GC-14 at SW corner of residence on 19 November 2024
Maximum total subsidence since start of LW S1A	486 mm	at Peg GC-14 at SW corner of residence on 19 November 2024
Maximum increase in subsidence since previous report	38 mm	at Peg GC-1 at NW corner of cafe (12 November to 19 November)

Summary of monitoring and inspections

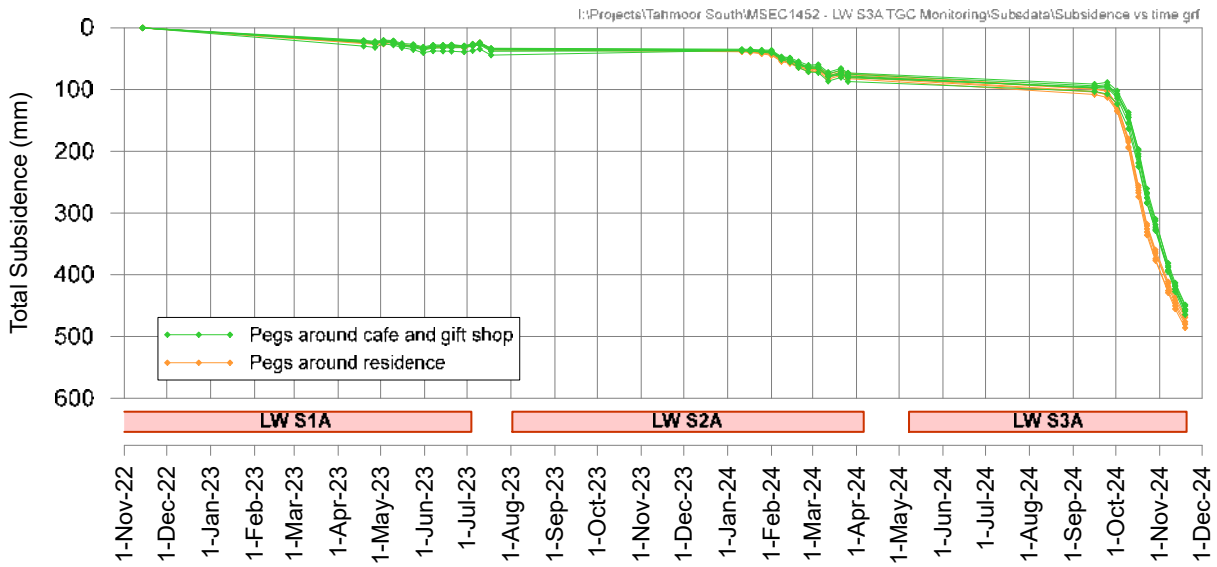
Monitoring Activity	Date	Current Frequency	Highest Trigger	Comments
Remembrance Driveway				
Ground survey	18 Nov	Abs. Mthly Rel. Weekly	N/A	Monthly 3D survey on 4 November measured small changes, including previously observed non-conventional compressive strains and bumps in the observed subsidence profiles between Pegs R47 and R48, and between Pegs R54 and R55. Remembrance Drive above LW S3A has experienced the most active period of subsidence. Compressive strain developing above LW S3A.
Visual inspection	19 Nov	Weekly	N/A	No significant changes observed this week. No change to crack observed in southbound shoulder opposite Tahmoor Garden Centre.
Structures				
Local 3D survey	19 Nov	Weekly	N/A	Tahmoor Garden Centre is currently experiencing most active period of subsidence. The maximum tilts around the building structures are 0.8 mm/m, which is less than construction tolerances. Measured mining-induced ground strains are 1 mm/m tensile and 0.3 mm/m compressive, which are close to survey tolerance. Minor changes this week.
Visual inspections	19 Nov	Weekly	Impacts obs'd	No significant issues observed to structures. Potential widening and lengthening of pre-existing cracks in café cornice and ceiling. No change to approximate 15 mm gap in decking and 3 mm opening and 5 mm step at expansion joint in café floor, first observed 22 October. Temporary repair of epoxy coating along the expansion joint completed. Further temporary repair planned 26 November. No change to 1 mm crack in western end of slab and three gaps in floorboards in main shed observed this week. Temporary repair of cracked epoxy flooring in café wet area completed. Timber paling fence between residence and yard that was leaning against racking has been braced with star pickets and steel brackets. It is recommended that the landowner install additional posts concreted into the ground to support the fence.
Outdoor storage racks				
Tilt measurements	-	End of LW S3A	N/A	No issues reported on 18 September. Tilt measurements will be taken at the completion of LW S3A. No issues reported.

Management Actions	
Other management actions since previous report: ● Nil	
Any additional and/or outstanding management actions: ● Further repair scheduled for the expansion joint – planned for 26 November.	
Consultation with stakeholders since previous report: ● Weekly reports will be issued during the mining of LW S3A	
Forecast whether continued longwall mining is likely to cause impacts on the health and safety of people who may be present at the property due to the extraction of LW S3A: Based on monitoring results to date, and the controls implemented and available under the LW S3A Management Plan, no triggers under this Management Plan are expected to be exceeded in the next week.	
Certified by Tahmoor Coal	
Name	Ross Barber
Position	Project Manager
Signature	*Ross Barber*
Date	26 November 2024

Copy of Report to:

Tahmoor Garden Centre

Ray Ramage, Principal Inspector – Subsidence, Mine Safety Inspectorate, Resources Regulator



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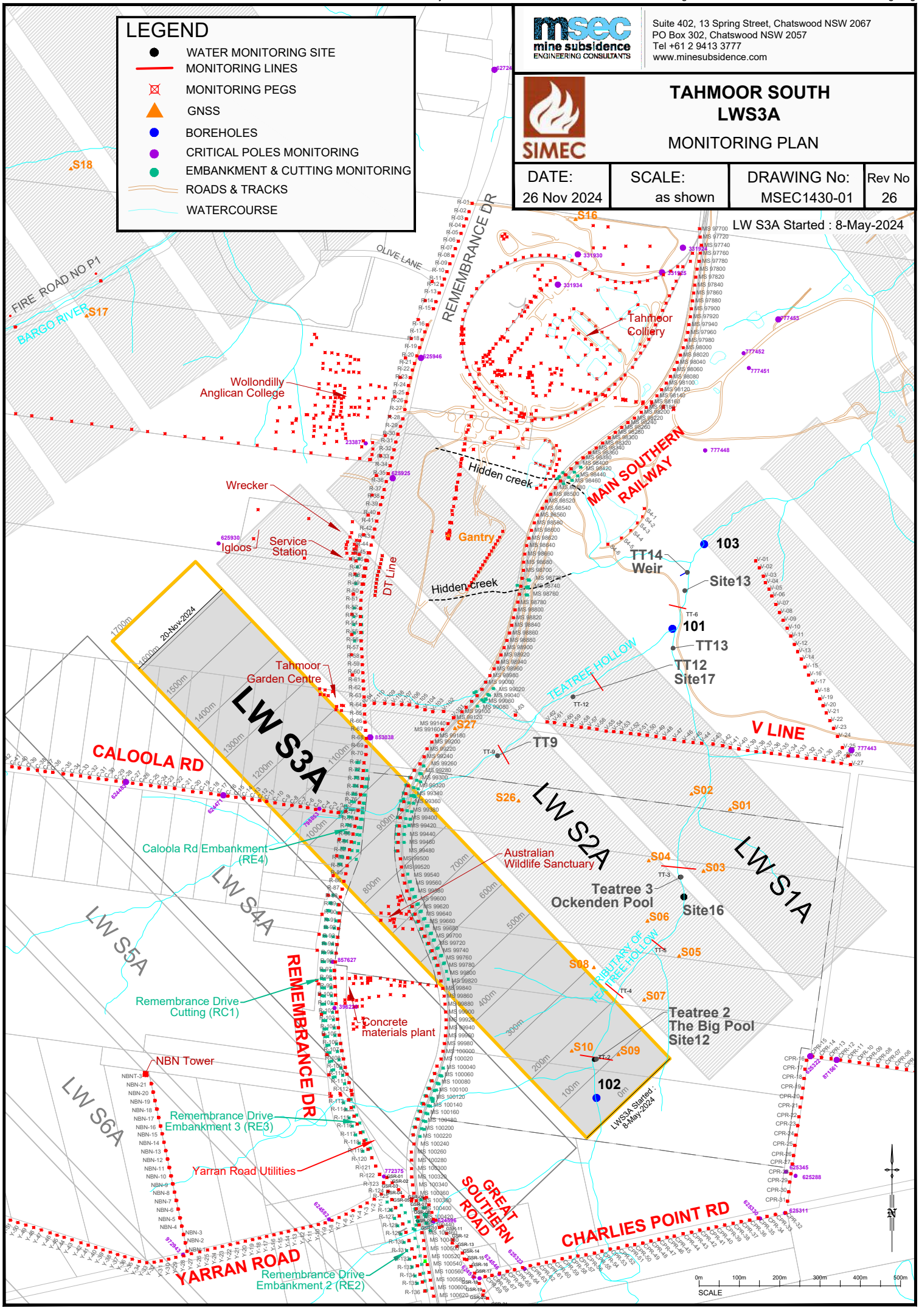

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Relative Origin GC~6 (Relative Orientation 100°00' to GC~4)

0m 5m 10m
SCALE

LWS2A

GC-1 457 13
-4
449 GC-2 9
+9
450 GC-3 18
+4
Cafe & gift shop
+8
+16
464 GC-6
+0
459 GC-5
2
+1
GC-4
456
1
GC-6
GC-4
Shop

LWS3A

Shed
Shade structure
GC-11
GC-12
GC-10
Residence
GC-14
GC-13
GC-14

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TAHMOOR SOUTH LW S3A

TAHMOOR GARDEN CENTRE MONITORING - CAFE

DATE:	SCALE:	DRAWING No:	Rev No
26 Nov 2024	as shown	MSEC1452-01	10

Latest Survey 19-Nov-2024

mm Total Subsidence

Horizontal displacement of survey marks since start of LW S1A

mm Nominal Survey Accuracy Relative ± 5mm

Change in horizontal distance between survey marks

mm Closure

mm Opening

LWS3A Started : 8-May-2024



LW S3A LOCATION PLAN

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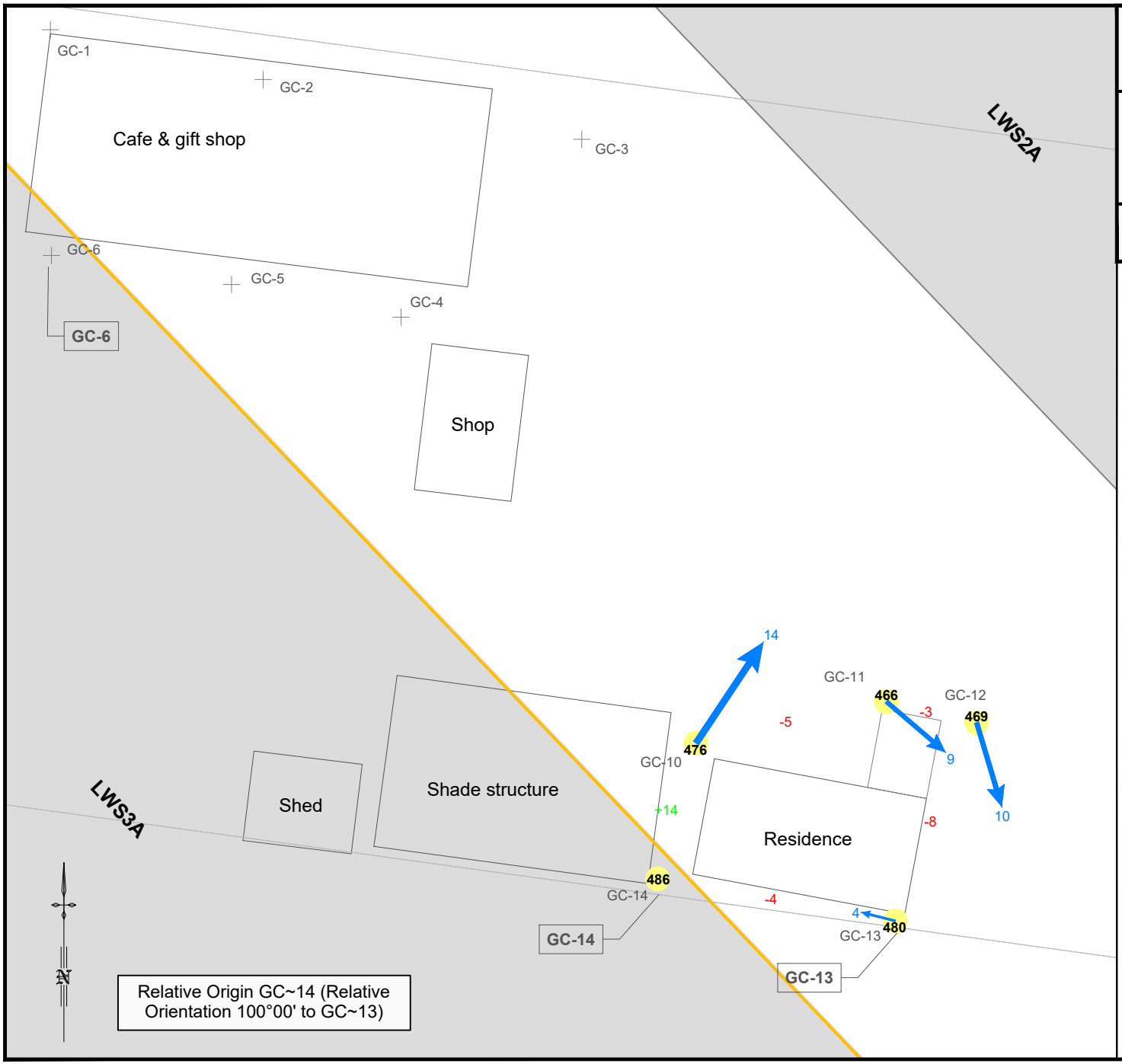

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TAHMOOR SOUTH LW S3A

TAHMOOR GARDEN CENTRE MONITORING - RESIDENCE

DATE:	SCALE:	DRAWING No:	Rev No
26 Nov 2024	as shown	MSEC1452-02	10

Latest Survey 19-Nov-2024

mm Total Subsidence

Horizontal displacement of survey marks since start of LW S1A

mm Nominal Survey Accuracy Relative ± 5mm

Change in horizontal distance between survey marks

mm Closure

mm Opening

LWS3A Started : 8-May-2024

Tahmoor South LW S3A
Incremental subsidence profiles along Remembrance Drive

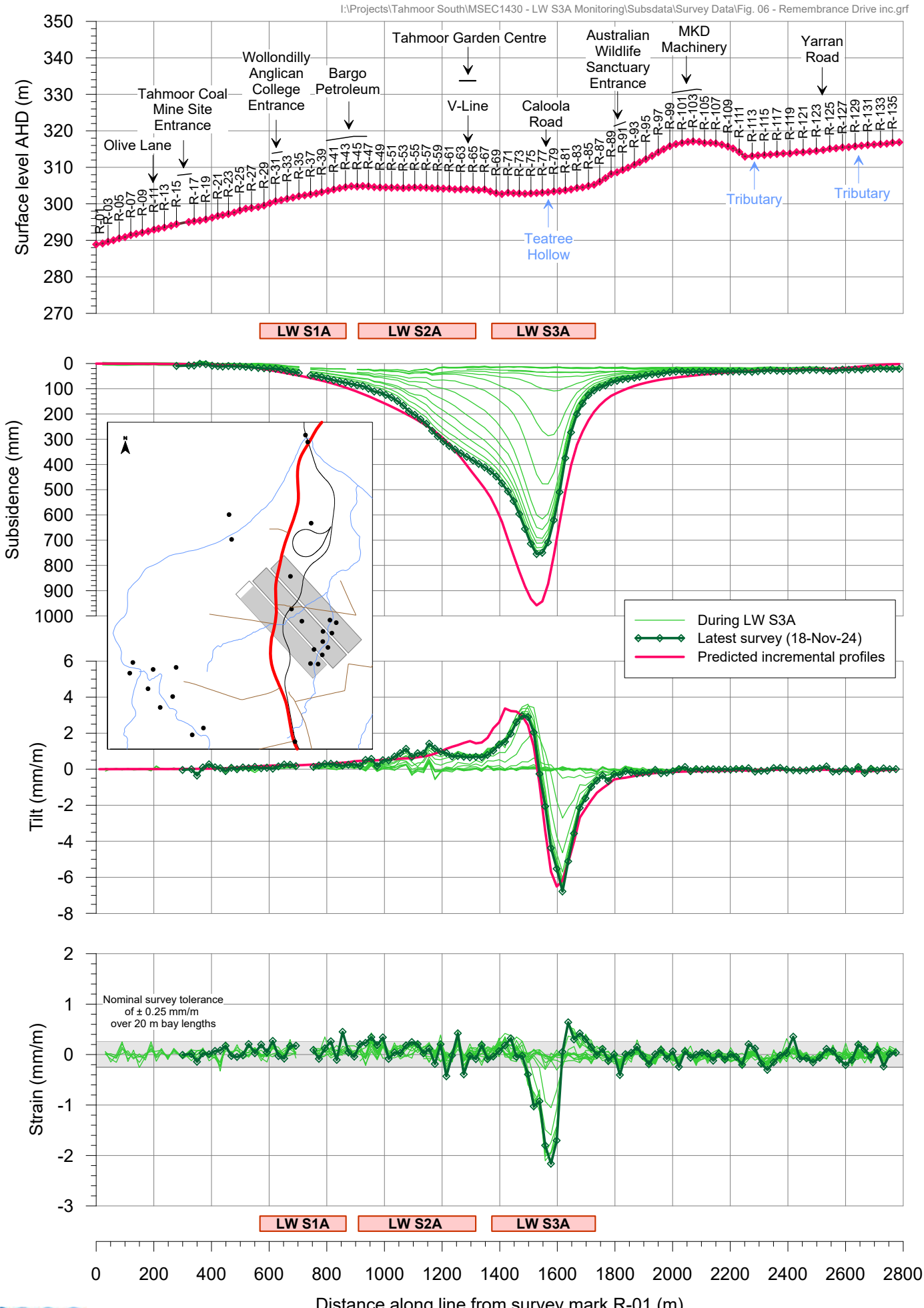

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Fig. 6-R26

Tahmoor South LW S3A
Total subsidence profiles along Remembrance Drive

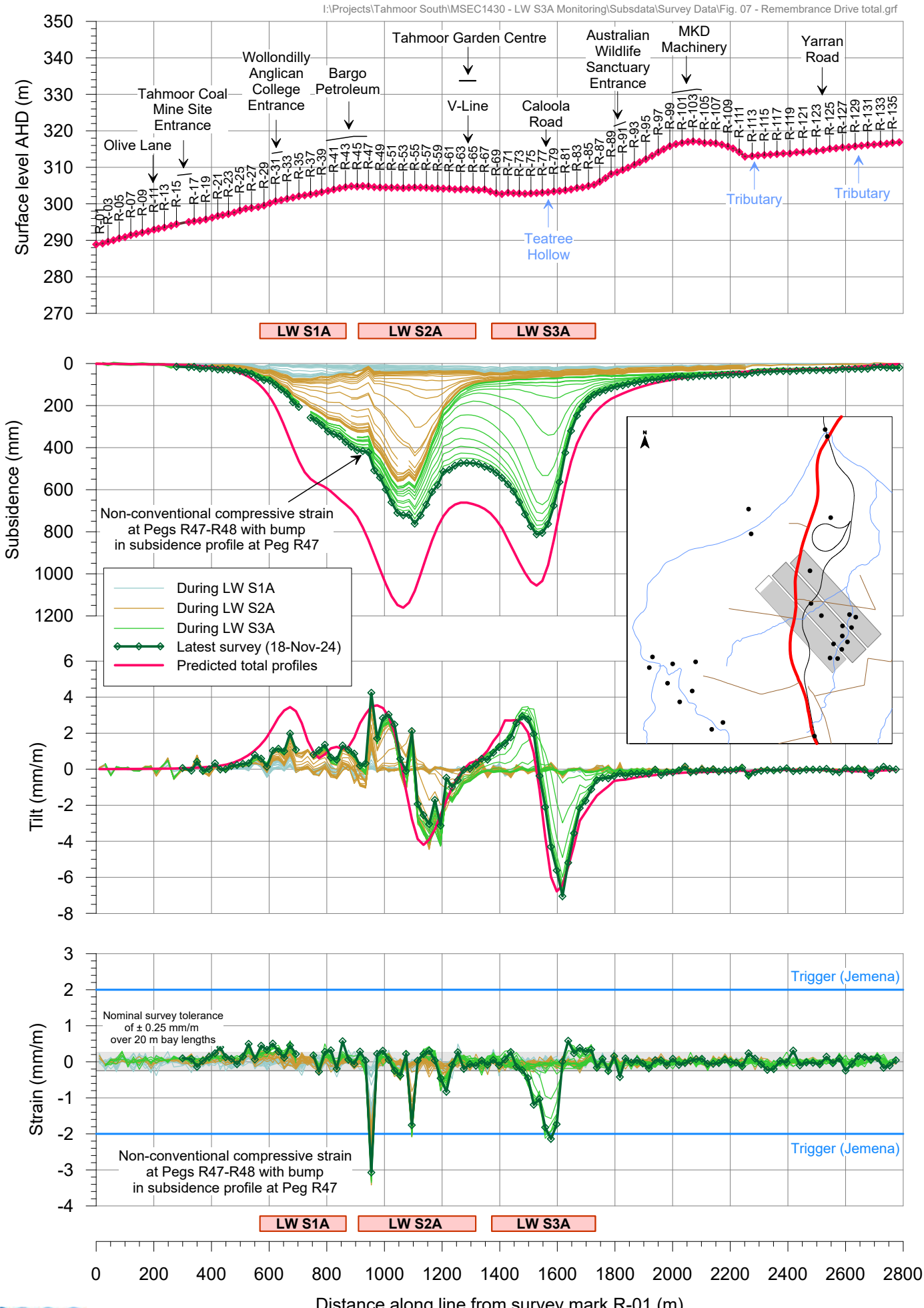

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Fig. 7-R26