msec mine subsidence ENGINEERING CONSULTANTS

SIMEC

SIMEC Mining:

Tahmoor South Longwalls S1A to S7A

Management Plan for potential impacts to Endeavour Energy Infrastructure

Endeavour Energy

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References:-

AS/NZS 4360:1999 Risk Management

AS/NZS ISO 31000:2009 Risk Management – Principles and guidelines

MSO (2017) *Managing risks of subsidence – Guide | WHS (Mines and Petroleum Sites) Legislation*, NSW Department of Planning & Environment, Resources Regulator, Mine Safety Operations, February 2017.

MSEC (2022) *Tahmoor South- Longwalls S1A to S6A - Subsidence ground movement predictions and subsidence impact assessments for natural features and surface infrastructure in support of the Extraction Plan Application*. (Report No. MSEC1192, Revision A, May 2022), prepared by Mine Subsidence Engineering Consultants.

MSEC (2024) *Tahmoor South – Modification 3 - Longwall S7A - The effects of the proposed addition of LW S7A on previous subsidence predictions and impact assessments. (Report No. MSEC1348, Revision B, March 2024)*, prepared by Mine Subsidence Engineering Consultants.

Tahmoor Coal (2021) *Risk Assessment Report – Infrastructure*. Tahmoor South – Extraction Plan, Longwalls 101A to 106A, November 2021.

Tahmoor Coal (2025) *Risk Assessment Report – Infrastructure*. Tahmoor South – Extraction Plan, Longwall South 7A, July 2025.

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1.1. Background

Tahmoor Coal Pty Ltd (Tahmoor Coal), owns and operates Tahmoor Mine, an existing underground coal mine located approximately 80 km southwest of Sydney in the Southern Coalfields of New South Wales (NSW). Tahmoor Coal is a wholly owned entity within the SIMEC Mining division of the GFG Alliance group. Tahmoor Coal has extracted 39 longwalls and completed extraction of LW S3A.

Tahmoor Coal received development consent in April 2021 for the Tahmoor South Project, which is an extension of the current Tahmoor Mine underground coal mining within the Bulli seam towards the south of the existing Tahmoor Mine.

Tahmoor Coal received approval for an Extraction Plan for Longwalls South 1A to South 6A (LW S1A-S6A), which are the first longwall panels to be extracted in the Tahmoor South domain. The proposed longwalls are located between Tahmoor's surface facilities to the north and the township of Bargo to the south. Electrical infrastructure owned by Endeavour Energy is located within this area.

In October 2022, Endeavour Energy and Tahmoor Coal developed an agreed Revision B of the Management Plan for the mining of LWs S1A to S6A beneath Endeavour Energy's infrastructure.

Tahmoor Coal subsequently received approval to shorten the commencing (i.e. southern) ends of LWs S3A and S4A by 104 metres from the positions that were approved in the Extraction Plan.

In May 2025, Tahmoor Coal received approval for a Modification to the development consent to extract LW S7A to the side of LW S6A. The proposed LW S7A will extract directly beneath Endeavour Energy infrastructure and will result in additional subsidence effects along Yarran Road where powerlines and power poles are located.

A summary of the dimensions of Longwall S1A-S7A is provided in Table 1.1.

Table 1.1 Longwall dimensions

Longwall	Overall void length including the installation heading (m)	Overall void width including the first workings (m)	Overall tailgate chain pillar width (m)
LW S1A	1,711	283	-
LW S2A	1,768	285	38
LW S3A	1,704	285	36
LW S4A	1,755	285	36
LW S5A	1,949	285	36
LW S6A	1,999	285	36
LW S7A	1,918	285	36

This Management Plan provides detailed information about how the risks associated with mining beneath the infrastructure will be managed by Tahmoor Coal and Endeavour Energy.

The Management Plan is a live document that can be amended at any stage of mining, to meet the changing needs of Tahmoor Coal and Endeavour Energy.

1.2. Endeavour Energy's electrical assets potentially affected by LW S1A-S7A

A map showing the locations of Endeavour Energy's electrical infrastructure in relation to LW S1A-S7A is shown in Drawing No. MSEC1193-07-01.

The electrical infrastructure comprises 66 kV, 11 kV and low voltage powerlines which are located across the Study Area.

The power lines generally comprise aerial copper cables supported on timber poles, but there are also some sections of direct buried cables.

The electrical infrastructure comprises 11 kilovolt (kV) and low voltage powerlines that generally follow the local roads, including Remembrance Driveway, Caloola Road, Yarran Road and Charlies Point Road. The powerlines are located directly above LW S1A-S7A. The total length of powerlines located directly above LW S1A-S7A is approximately 14.3 km. A 66 kV transmission line is located to the northeast of LW S1A servicing the Tahmoor Mine site.

Endeavour Energy completed an audit of critical poles prior to the commencement of LW S1A found the existing assets to be in a good state of repair and in serviceable order. Endeavour Energy's records show that at the time of the last inspection, Pole 624546 on Charlies Point Road was found to have been defective and required replacement. A site inspection has confirmed Endeavour Energy's advice that the previous timber pole has been replaced by a new, steel pole.

1.3. Consultation

1.3.1. Consultation with Endeavour Energy

Tahmoor Coal regularly consults with Endeavour Energy in relation to mine subsidence effects from mining. This includes consultation during the development of subsidence management plans for previous Longwalls 22 to 32 and LW W1 -W4, and regular reporting of subsidence movements and impacts.

Details regarding consultation and engagement are outlined below:

- Advice from Endeavour Energy on critical poles to be surveyed during LWs S1A to S6A on 17 May 2022, with clarification provided on 22 July 2022.
- Meeting with Mehran Azimi (Endeavour Energy), Scott Causer (Endeavour Energy), Chris McGraw (Endeavour Energy), Ross Barber (Tahmoor Coal), Amanda Fitzgerald (Tahmoor Coal), Amanda Bateman (Tahmoor Coal), Daryl Kay (MSEC) on 28 September to discuss the draft Subsidence Management Plan for LWs S1A to S6A.
- Advice from Endeavour Energy on 4 October 2022 confirming current condition of critical poles within a study area that included LW S7A.
- Letter advising planned shortening of LW S3A in March 2024;
- Letter advising planned shortening of LW S4A in November 2024;
- Ongoing reporting of monitoring results during the mining of LWs S1A to S3A.

Tahmoor Coal will continue to consult regularly with Endeavour Energy during the extraction of LWs S1A-S7A in relation to mine subsidence effects from mining.

1.3.2. Consultation with Government Agencies & Key Infrastructure Stakeholders

Government agencies including the NSW Department of Planning & Environment, Resources Regulator, Mine Safety Operations, Subsidence Advisory NSW and key infrastructure stakeholders including Wollondilly Shire Council, Sydney Water, Telstra and Jemena have also been consulted as part of the Subsidence Management Plan (SMP) approval process.

1.4. Limitations

This Management Plan is based on the predictions of the effects of mining on surface infrastructure as provided in Report No. MSEC1192 for LWs S1A to S6A by Mine Subsidence Engineering Consultants (MSEC, 2022) and Report No. MSEC1348 for LW S7A by Mine Subsidence Engineering Consultants (MSEC, 2024). Predictions are based on the planned configuration of LW S1A-S7A at Tahmoor Mine (as shown in Drawing No. MSEC1193-07-01), along with available geological information and data from numerous subsidence studies for longwalls previously mined in the area.

Infrastructure considered in this Plan has been identified from site visits and aerial photographs and from discussions between Tahmoor Coal representatives and Endeavour Energy representatives.

The impacts of mining on surface and sub-surface features have been assessed in detail. It is recognised, however, that the prediction and assessment of subsidence can be relied upon only to a certain extent. The

limitations of the prediction and assessment of mine subsidence are discussed in report MSEC1192 by Mine Subsidence Engineering Consultants.

As discussed in the report, there is a low probability that ground movements and their impacts could exceed the predictions and assessments. However, if these potentially higher impacts are considered prior to mining, they can be managed. This Management Plan will not necessarily prevent impacts from longwall mining, but will limit the impacts by establishing appropriate procedures that can be followed should evidence of increased impacts emerge.

1.5. Objectives

The objectives of this Management Plan are to establish procedures to measure, control, mitigate and repair potential impacts that might occur to electrical infrastructure.

The objectives of the Management Plan have been developed to:

- Ensure the safe and serviceable operation of all surface infrastructure. Public and workplace safety is paramount. Ensure that the health and safety of people who may be present on public property or Endeavour Energy property are not put at risk due to mine subsidence;
- Avoid disruption and inconvenience, or, if unavoidable, keep to minimal levels;
- Monitor ground movements and the condition of infrastructure during mining;
- Initiate action to mitigate or remedy potential significant impacts that are expected to occur on the surface;
- Provide a plan of action in the event that the impacts of mine subsidence are greater than those that are predicted;
- Establish a clearly defined decision-making process to ensure timely implementation of risk control measures for high consequence but low likelihood mine subsidence induced hazards that involve potential serious injury or illness to a person or persons that may require emergency evacuation, entry or access restriction or suspension of work activities;
- Provide a forum to report, discuss and record impacts to the surface. This will involve Tahmoor Coal, Endeavour Energy, relevant government agencies as required, and consultants as required; and
- Establish lines of communication and emergency contacts.

1.6. Scope

The Management Plan is to be used to protect and monitor the condition of the Endeavour Energy infrastructure identified to be at risk due to mine subsidence and to ensure that the health and safety of people who may be present on public property or Endeavour Energy property are not put at risk due to mine subsidence.

The major items at risk are:

- Powerlines; and
- Power poles.

The powerlines and power poles are shown in Drawing No. MSEC1193-07-01.

The Management Plan only covers the electrical infrastructure that is located within the limit of subsidence, which defines the extent of land that may be affected by mine subsidence as a result of mining LWs S1A-S7A only. The management plan does not include other electrical infrastructure owned by Endeavour Energy which lies outside the extent of this area.

1.7. Proposed mining schedule

It is planned that LW S1A-S7A will extract coal working northwest from the southeastern ends. This Management Plan covers longwall mining until completion of mining in LW S7A and for sufficient time thereafter to allow for completion of subsidence effects. The current schedule of mining is shown in Table 1.2.

Table 1.2 Schedule of mining

Longwall	Start Date	Completion Date
LW S1A	October 2022	July 2023
LW S2A	August 2023	April 2024
LW S3A	May2024	December 2024
LW S4A	January 2026	August 2026
LW S5A	September 2026	April 2027
LW S6A	May 2027	December 2027
LW S7A	January 2028	August 2028

Please note the above Schedule is subject to change due to unforeseen impacts on mining progress. Tahmoor Coal will keep Endeavour Energy informed of changes.

1.8. Definition of Active Subsidence Zone

As a longwall progresses, subsidence begins to develop at a point in front of the longwall face and continues to develop after the longwall passes. The majority of subsidence movement typically occurs within an area 150 metres in front of the longwall face to an area 450 metres behind the longwall face.

This is termed the “active subsidence zone” for the purposes of this Management Plan, where surface monitoring is generally conducted. 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 metres in front and 450 metres behind the active longwall face, as shown by Fig. 1.1.

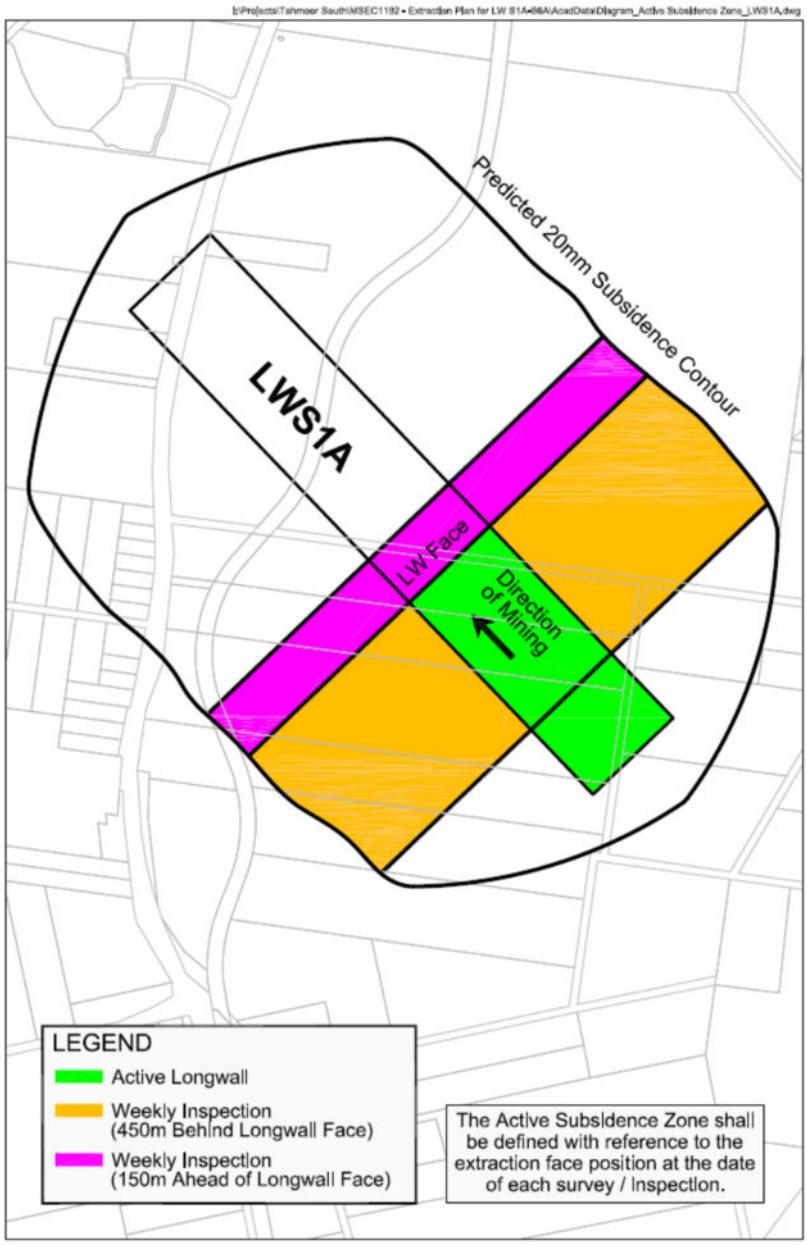

Fig. 1.1 Diagrammatic Representation of Active Subsidence Zone

1.9. Compensation

The *Coal Mine Subsidence Compensation Act 2017* (MSC Act) is administered by Subsidence Advisory NSW (Mine Subsidence Board).

Currently, under the *Coal Mine Subsidence Compensation Act 2017*, any claim for mine subsidence damage needs to be lodged with Subsidence Advisory NSW. Subsidence Advisory NSW staff will arrange for the damage to be assessed by an independent specialist assessor. If the damage is attributable to mine subsidence, a scope will be prepared and compensation will be determined. For further details please refer to *the Approved Procedure – Claiming in active mining areas at* www.nsw.gov.au/departments-and-agencies/subsidence-advisory/claiming-for-mine-subsidence-damage/active-mining-claims.

2.1. NSW Work Health & Safety Legislation

All persons conducting a business or undertaking (PCBUs), including mine operators and contractors, have a primary duty of care to ensure the health and safety of workers they engage, or whose work activities they influence or direct. The responsibilities are legislated in *Work Health and Safety Act 2011* and the *Work Health and Safety (Mines and Petroleum Sites) Act 2013* and associated Regulations (collectively referred to as the 'WHS laws').

The *Work Health and Safety (Mines and Petroleum Sites) Regulation 2014* commenced on 1 February 2015 and contains specific regulations in relation to mine subsidence.

As outlined in the Guide by the NSW Department of Trade & Investment Mine Safety:

"a PCBU must manage risks to health and safety associated with mining operations at the mine by:

- *complying with any specific requirements under the WHS laws*
- *identifying reasonably foreseeable hazards that could give rise to health and safety risks*
- *ensuring that a competent person assesses the risk*
- *eliminating risks to health and safety so far as is reasonably practicable*
- *minimising risks so far as is reasonably practicable by applying the hierarchy of control measures, any risks that it is are not reasonably practical to eliminate*
- *maintaining control measures*
- *reviewing control measures.*

The mine operator's responsibilities include developing and implementing a safety management system that is used as the primary means of ensuring, so far as is reasonably practicable:

- *the health and safety of workers at the mine, and*
- *that the health and safety of other people is not put at risk from the mine or work carried out as part of mining operations."*

Detailed guidelines have also been released by the NSW Department of Planning & Environment, Resources Regulator, Mine Safety Operations (MSO, 2017).

The risk management process has been carried out in accordance with guidelines published by the NSW Department of Planning & Environment, Resources Regulator, Mine Safety Operations (MSO, 2017). The following main steps of subsidence risk management have been and will be undertaken, in accordance with the guidelines:

1. identification and understanding of subsidence hazards
2. assessment of risks of subsidence
3. development and selection of risk control measures
4. implementation and maintenance of risk control measures, and
5. continual improvement and change management.

Each of the above steps have been or will be conducted together with the following processes.

1. consultation, co-operation and co-ordination, and
2. monitoring and review.

This Management Plan documents the risk control measures that are planned to manage risks to health and safety associated with the mining of LW S1A-S7A in accordance with the WHS laws.

2.2. General

The method of assessing potential mine subsidence impacts in the Management Plan is consistent with the Australian/New Zealand Standard for Risk Management. The Standard defines the terms used in the risk management process, which includes the identification, analysis, assessment, treatment and monitoring of potential mine subsidence impacts. In this context:-

2.2.1. Consequence

'The outcome of an event expressed qualitatively or quantitatively, being a loss, injury, disadvantage or gain. There may be a range of possible outcomes associated with an event.'[1] The consequences of a hazard are rated from very slight to very severe.

2.2.2. Likelihood

'Used as a qualitative description of probability or frequency.'[2] The likelihood can range from very rare to almost certain.

2.2.3. Hazard

'A source of potential harm or a situation with a potential to cause loss.'[3]

2.2.4. Method of assessment of potential mine subsidence impacts

The method of assessing potential mine subsidence impacts combines the likelihood of an impact occurring with the consequence of the impact occurring. In this Management Plan, the likelihood and consequence are combined via the SIMEC Risk Matrix to determine an estimated level of risk for particular events or situations (Tahmoor Coal, 2021 for LWs S1A to S6A and Tahmoor Coal, 2025 for LW S7A). A copy of the Risk Matrix is included in the Appendix of this Management Plan.

Endeavour Energy reviewed and agreed with the findings of the risk assessment for LWs S1A to S6A on 28 September 2022. As there is no material difference between the risks to Endeavour Energy infrastructure associated with the extraction of LW S7A compared to the risks associated with the extraction of LWs S1A to S6A, the same risk ratings have been adopted in the risk assessment for LW S7A (Tahmoor Coal, 2025).

[1] AS/NZS 4360:1999 – Risk Management pp2
[2] AS/NZS 4360:1999 – Risk Management pp2
[3] AS/NZS 4360:1999 – Risk Management pp2

3.1. Maximum predicted conventional subsidence parameters

Predicted mining-induced conventional subsidence movements were provided in Report No. MSEC1192, which was prepared in support of Tahmoor Coal's Extraction Plan for LW S1A-S6A. Tahmoor Coal has revised its forecast extraction heights since the previous predictions were provided in Report No. MSEC1192. The changes are generally minor, in the range of 50 to 100 mm greater subsidence than previously forecast.

Revised predicted mining-induced conventional subsidence movements were provided in Report No. MSEC1348, which was prepared in support of Tahmoor Coal's application to extract LW S7A. The predictions do not materially change the assessment of potential impacts on Sydney Water sewer infrastructure (MSEC1348). This Management Plan provides subsidence predictions based on the revised predictions that were provided in Report No. MSEC1348.

A summary of the maximum predicted values of incremental conventional subsidence, tilt and curvature, due to the extraction of LWs S1A-S7A is provided in Table 3.1.

The predicted tilts provided in this table are the maxima after the completion of each of the proposed longwalls. The predicted curvatures are the maxima at any time during or after the extraction of each of the proposed longwalls. The predicted ground strains are discussed in Section 3.3.

Table 3.1 Maximum predicted incremental conventional subsidence, tilt and curvature resulting from the extraction of each of the proposed longwalls

Longwall	Maximum predicted incremental conventional subsidence (mm)	Maximum predicted incremental conventional tilt (mm/m)	Maximum predicted incremental conventional hogging curvature (km^{-1})	Maximum predicted incremental conventional sagging curvature (km^{-1})
LW S1A	825	7.0	0.08	0.23
LW S2A	950	8.0	0.09	0.22
LW S3A	950	8.0	0.09	0.22
LW S4A	975	8.0	0.09	0.22
LW S5A	975	8.0	0.10	0.22
LW S6A	975	8.3	0.09	0.23
LW S7A	1,050	8.9	0.10	0.24

A summary of the maximum predicted values of total conventional subsidence, tilt and curvature, after the extraction of LWs S1A-S7A, is provided in Table 3.2.

Table 3.2 Maximum predicted total conventional subsidence, tilt and curvature resulting from the extraction of each of the proposed longwalls

Longwall	Maximum predicted total conventional subsidence (mm)	Maximum predicted total conventional tilt (mm/m)	Maximum predicted total conventional hogging curvature (km^{-1})	Maximum predicted total conventional sagging curvature (km^{-1})
LW S1A	825	7.0	0.08	0.23
LW S2A	1,050	8.1	0.10	0.23
LW S3A	1,250	8.3	0.11	0.23
LW S4A	1,300	8.7	0.13	0.22
LW S5A	1,350	9.2	0.14	0.23
LW S6A	1,400	9.7	0.14	0.23
LW S7A	1,400	10.0	0.14	0.25

The maximum predicted total subsidence, after the completion of LW S7A, is1,400 mm. The maximum predicted total conventional tilt is10 mm/m (i.e.1.0 %), which represents a change in grade of 1 in100. The

maximum predicted total conventional curvatures are 0.14 km^{-1} hogging and0.25 km^{-1} sagging, which represent minimum radii of curvature of 7 kilometres and 4 kilometres, respectively.

The values provided in the above table are the maximum predicted conventional subsidence parameters which occur above LWs S1A-S7A. The locations of the maximum predicted conventional subsidence parameters do not necessarily coincide with Endeavour Energy's infrastructure. Specific predictions along Endeavour Energy's infrastructure are provided later in this management plan.

3.2. Comparison between observed and predicted subsidence during the mining of Longwalls S1A to S3A

Extensive monitoring has been undertaken by Tahmoor Coal during the mining of LWs S1A to S3A. Observed incremental subsidence due to the extraction of LWs S1A to S3A has correlated reasonably well with predictions, as shown in Fig. 3.1 to Fig. 3.6.

Subsidence was observed to vary in magnitude along the centreline of LW S1A. Maximum subsidence was measured at Peg V51 on the V-Line, which is located between Teatree Hollow and the Tributary to Teatree Hollow. Observed subsidence was reduced in magnitude over the northern half of the longwall panel at the Main Southern Railway and Tahmoor Mine Site (Pier 2).

As shown in Fig. 3.4, observed subsidence at Peg V51 was slightly greater than predicted but within the accuracy of the prediction model of ± 15% (Reports Nos. MSEC1123 and MSEC1192). Observed total subsidence at Peg V51 after the mining of LW S3A is less than predicted, as shown in Fig. 3.4. Observed subsidence values at other locations above LW S1A were less than predicted.

Monitoring during the mining of LW S2A measured subsidence movements within predictions, as shown in Fig. 3.2. Whilst observed subsidence along Remembrance Drive has been less than predicted, increased compressive strains have been observed at two locations, as shown in Fig. 3.6.

Monitoring during the mining of LW S3A measured subsidence movements within predictions, as shown in Fig. 3.3. Maximum subsidence was measured at Peg MS99500 which is located along the Main Southern Railway and above the centreline of LW S3A. Whilst observed subsidence along the Main Southern Railway has been less than predicted, a bump was observed in the subsidence profile along with a corresponding increased compressive strain at one location, as shown in Fig. 3.5.

As recommended in Report Nos. MSEC1192 and MSEC1348, Tahmoor Coal is monitoring during mining to compare observations with predictions. Tahmoor Coal has extensive experience in successfully managing potential subsidence impacts on surface features, even when actual subsidence is substantially greater than the magnitudes that have been predicted above LW S1A-S7A. Subsidence management plans have been developed to manage potential impacts that could occur if greater than predicted subsidence occurs.

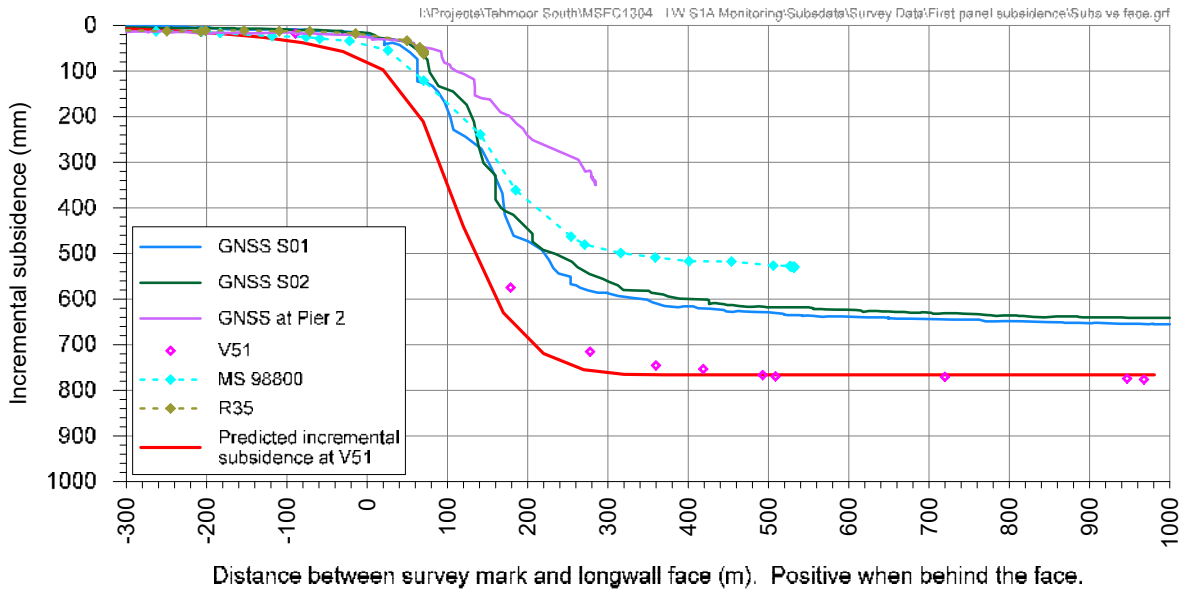

Fig. 3.1 Comparison between predicted and observed subsidence above centreline of LW S1A

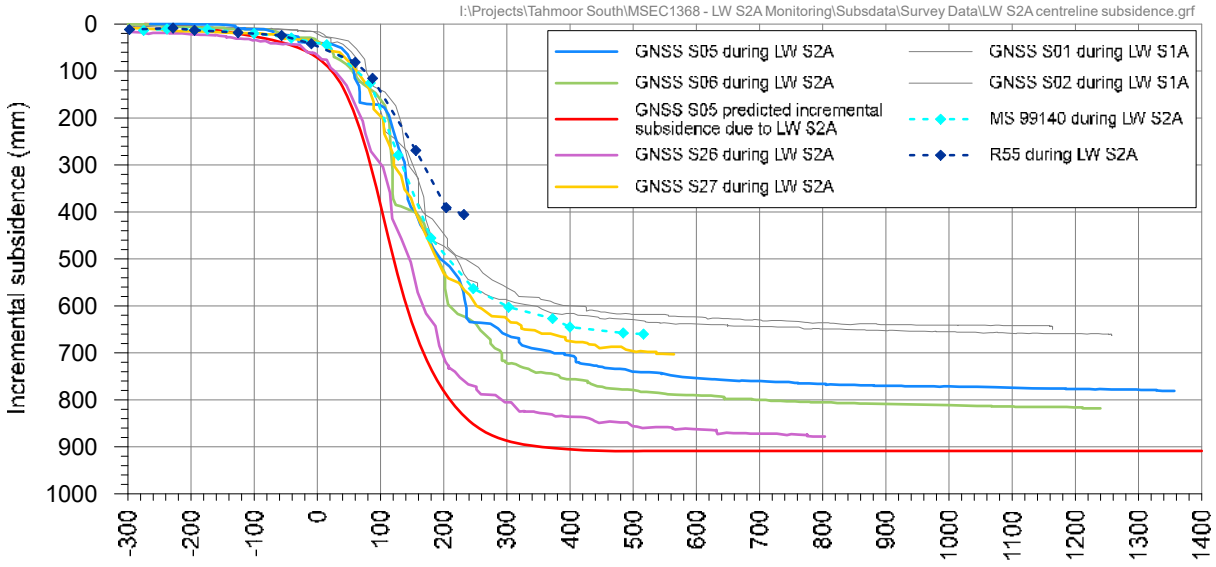

Fig. 3.2 Comparison between predicted and observed subsidence above centreline of LW S2A

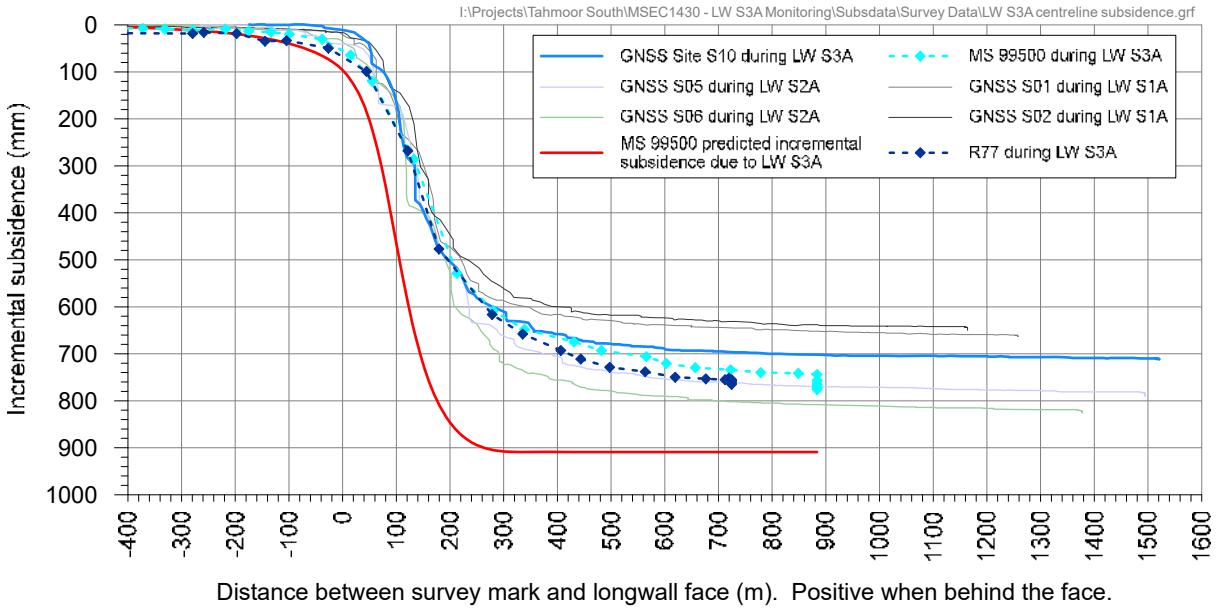

Fig. 3.3 Comparison between predicted and observed subsidence above centreline of LW S3A

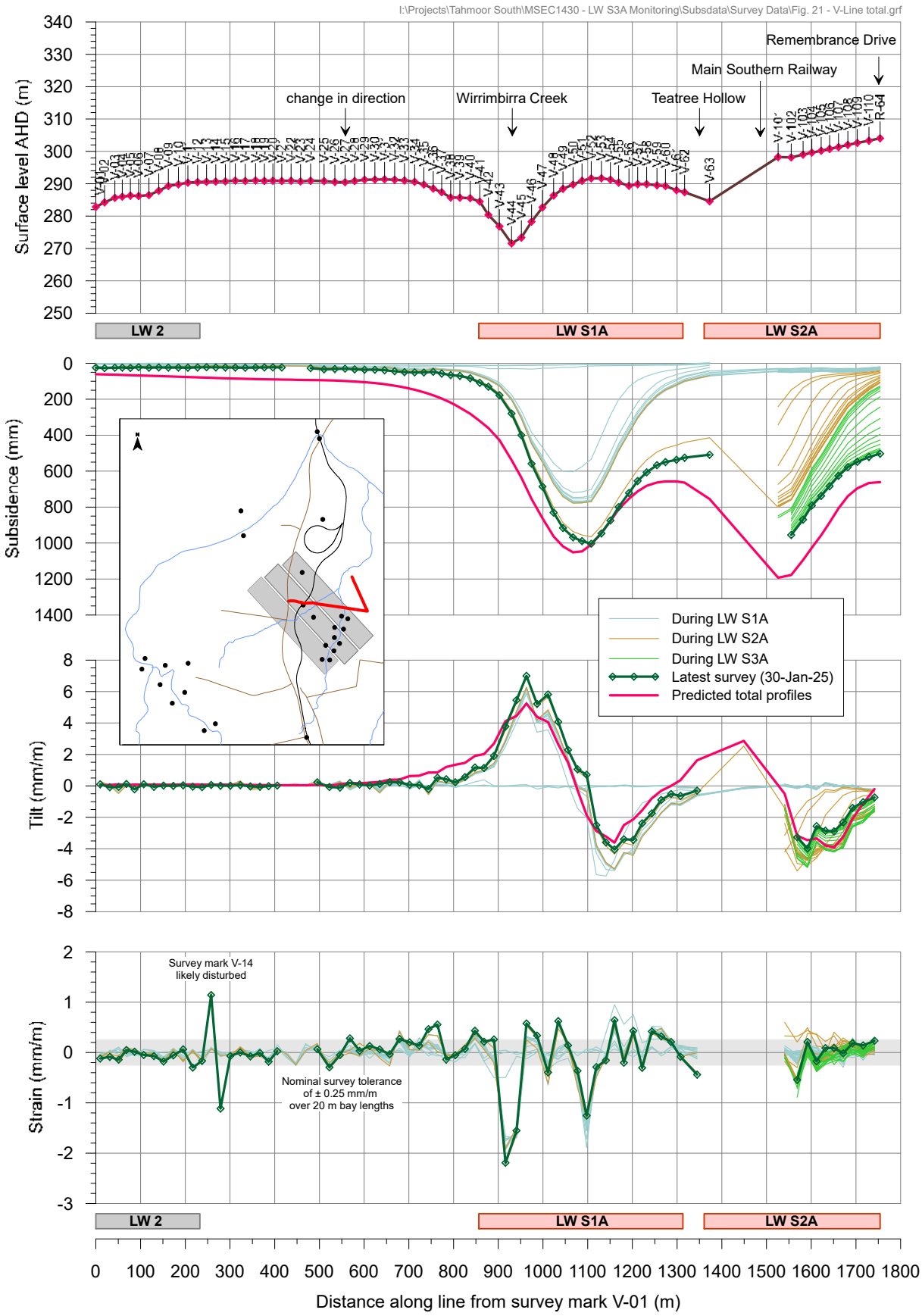

Fig. 3.4 Observed subsidence along V-Line during the mining of LW S1A-S3A

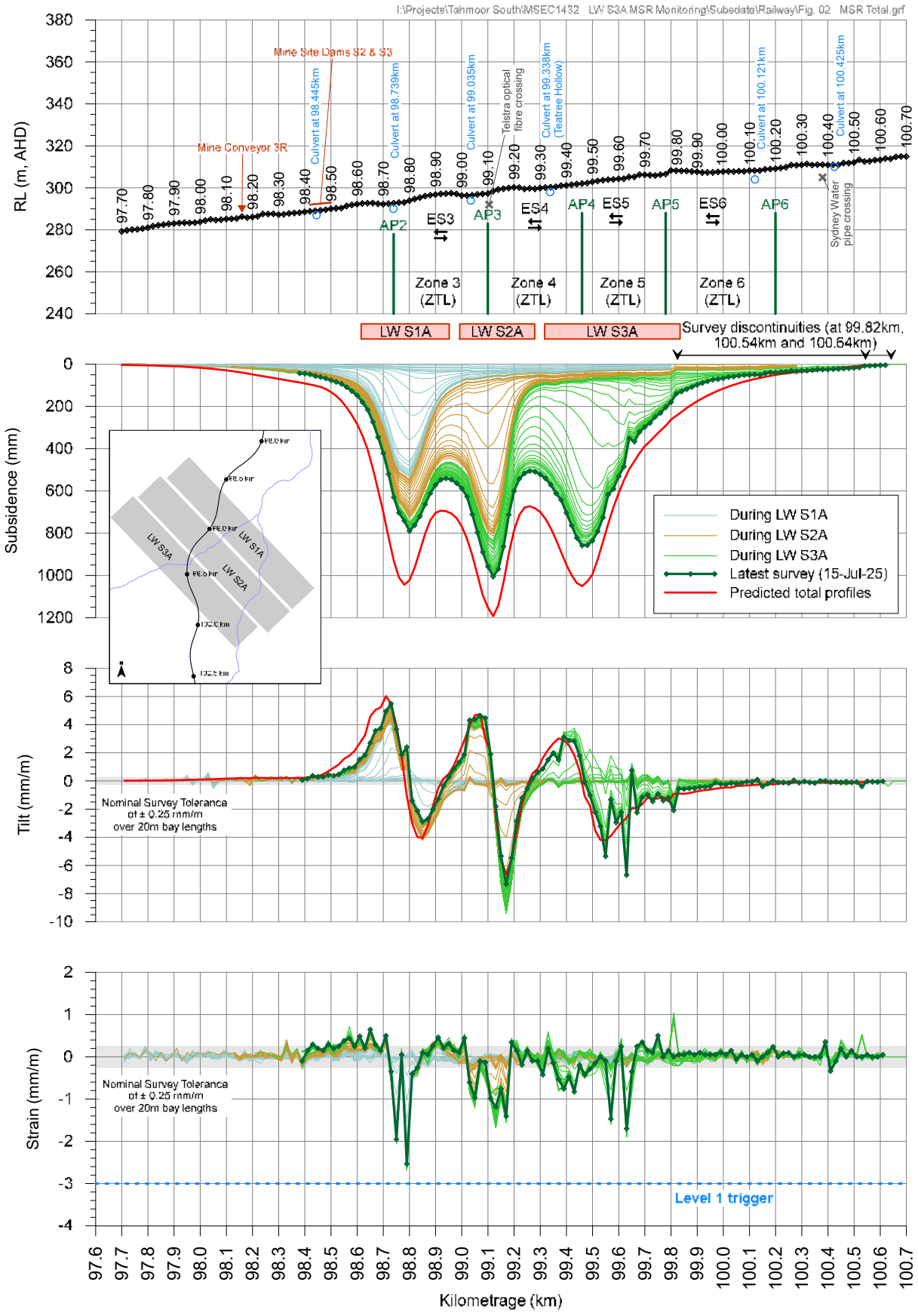

Fig. 3.5 Observed subsidence along Main Southern Railway during the mining of LW S1A-S3A

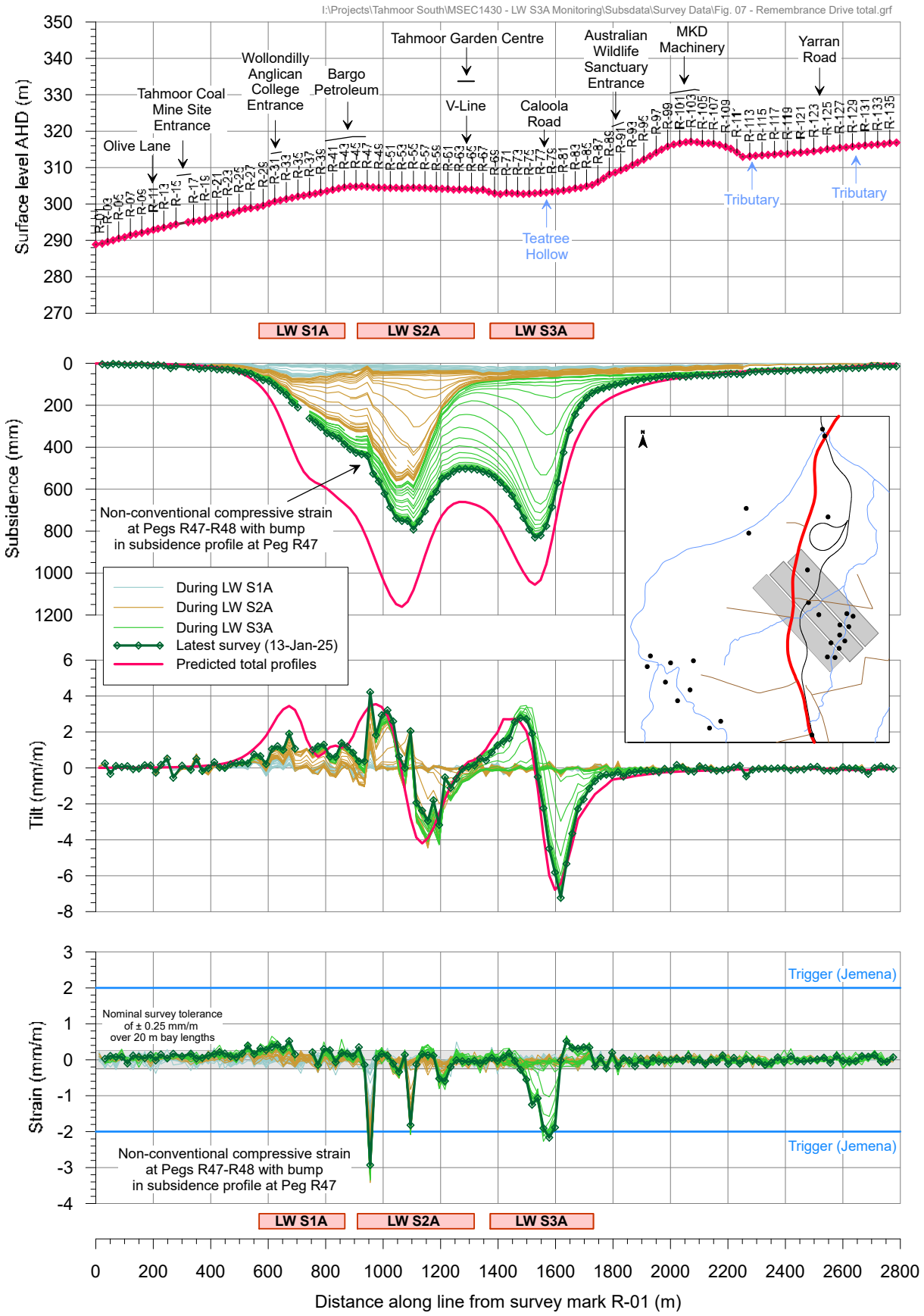

Fig. 3.6 Observed subsidence along Remembrance Drive during the mining of LW S1A-S3A

3.3. Predicted strain

The prediction of strain is more difficult than the predictions of subsidence, tilt and curvature. The reason for this is that strain is affected by many factors, including ground curvature and horizontal movement, as well as local variations in the near surface geology, the locations of pre-existing natural joints at bedrock, and the depth of bedrock. Survey tolerance can also represent a substantial portion of the measured strain, in cases where the strains are of a low order of magnitude. The profiles of observed strain, therefore, can be irregular even when the profiles of observed subsidence, tilt and curvature are relatively smooth.

In previous MSEC subsidence reports, predictions of conventional strain were provided based on the best estimate of the average relationship between curvature and strain. Similar relationships have been proposed by other authors. The reliability of the strain predictions was highlighted in these reports, where it was stated that measured strains can vary considerably from the predicted conventional values.

Adopting a linear relationship between curvature and strain provides a reasonable prediction for the conventional tensile and compressive strains. The locations that are predicted to experience hogging or convex curvature are expected to be net tensile strain zones and locations that are predicted to experience sagging or concave curvature are expected to be net compressive strain zones. In the Southern Coalfield, it has been found that a factor of 15 provides a reasonable relationship between the predicted maximum curvatures and the predicted maximum conventional strains.

At a point, however, there can be considerable variation from the linear relationship, resulting from non-conventional movements or from the normal scatters which are observed in strain profiles. When expressed as a percentage, observed strains can be many times greater than the predicted conventional strain for low magnitudes of curvature. In this report, therefore, we have provided a statistical approach to account for the variability, rather than providing a single predicted conventional strain.

The data used in the analysis of observed strains included those resulting from both conventional and non-conventional anomalous movements, but did not include those resulting from valley-related effects, which are discussed separately in the impact assessments for the natural and built features provided in Chapters 5 and 6. The strains resulting from damaged or disturbed survey marks have also been excluded.

3.3.1. Analysis of strains measured in survey bays

For features that are in discrete locations, such as building structures, farm dams and archaeological sites, it is appropriate to assess the frequency of the observed maximum strains for individual survey bays.

Predictions of strain above goaf

A database of survey data has been analysed to extract the maximum tensile and compressive strains that have been measured at any time during the extraction of the previous longwalls at Tahmoor, Appin and West Cliff Collieries, for survey bays that were located directly above goaf or the chain pillars that are located between the extracted longwalls, which has been referred to as "*above goaf*".

A histogram of the maximum observed total tensile and compressive strains measured in survey bays above goaf, for monitoring lines at Tahmoor, Appin and West Cliff Collieries is provided in Fig. 3.7. Probability distribution functions, based on fitted *Generalised Pareto Distributions (*GPDs), have also been shown in this figure.

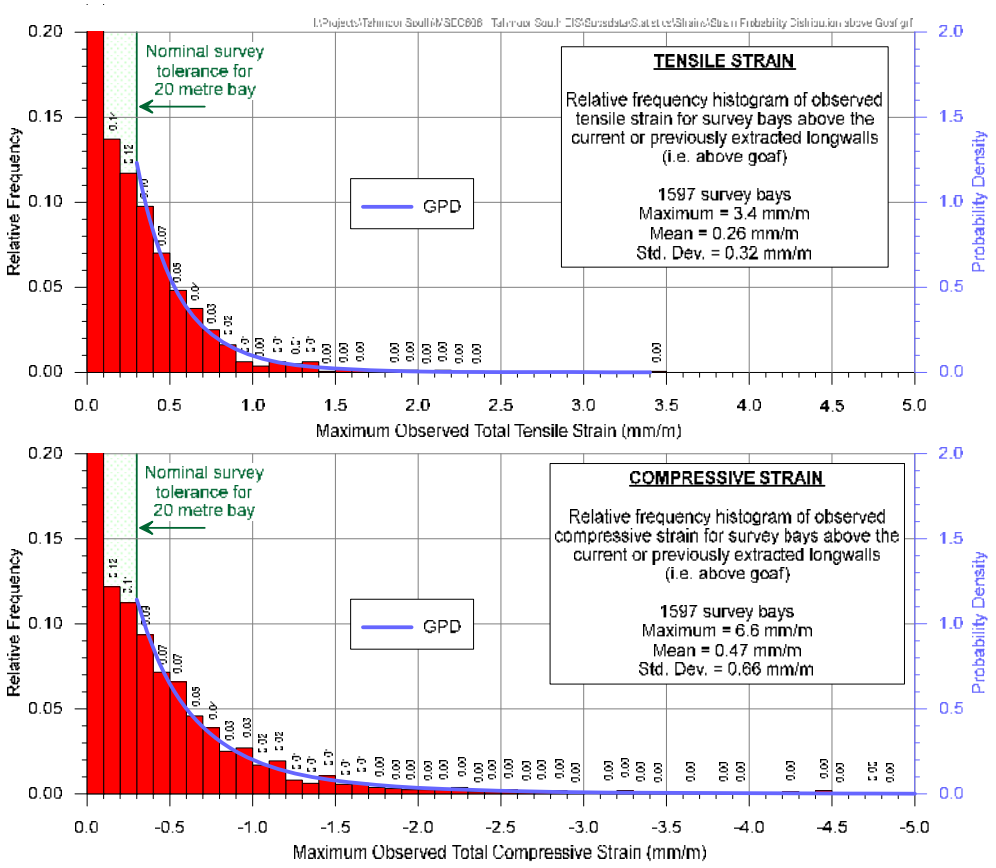

Fig. 3.7 Distributions of the maximum measured tensile and compressive strains for survey bays located above goaf at Tahmoor, Appin and West Cliff Collieries

The 95 % confidence levels for the maximum total strains that the individual survey bays *above goaf* experienced at any time during mining at Tahmoor, Appin and West Cliff Collieries were 0.9 mm/m tensile and 1.6 mm/m compressive. The strains for the proposed longwalls are predicted to be 20 % to 40 % greater than those previously observed at these collieries and, therefore, it is expected that 95 % of the strains measured *above goaf* would be less than 1.3 mm/m tensile and 2.2 mm/m compressive.

The 99 % confidence levels for the maximum total strains that the individual survey bays *above goaf* experienced at any time during mining at Tahmoor, Appin and West Cliff Collieries were 1.4 mm/m tensile and 3.1 mm/m compressive. Similarly, it is expected that 99 % of the strains measured *above goaf* for the proposed longwalls would be less than 2.0 mm/m tensile and 4.3 mm/m compressive.

Predictions of strain above solid coal

The survey database has also been analysed to extract the maximum tensile and compressive strains that have been measured at any time during the extraction of the previous longwalls at Tahmoor, Appin and West Cliff Collieries, for survey bays that were located beyond the goaf edges of the mined panels and positioned on unmined areas of coal, i.e. outside panels but within 200 metres of the nearest longwall goaf edge, which has been referred to as "*above solid coal*".

A histogram of the maximum observed tensile and compressive strains measured in survey bays above solid coal, for monitoring lines at Tahmoor, Appin and West Cliff Collieries is provided in Fig. 3.8. The probability distribution functions, based on fitted *Generalised Pareto Distributions* (GPDs), have also been shown in this figure.

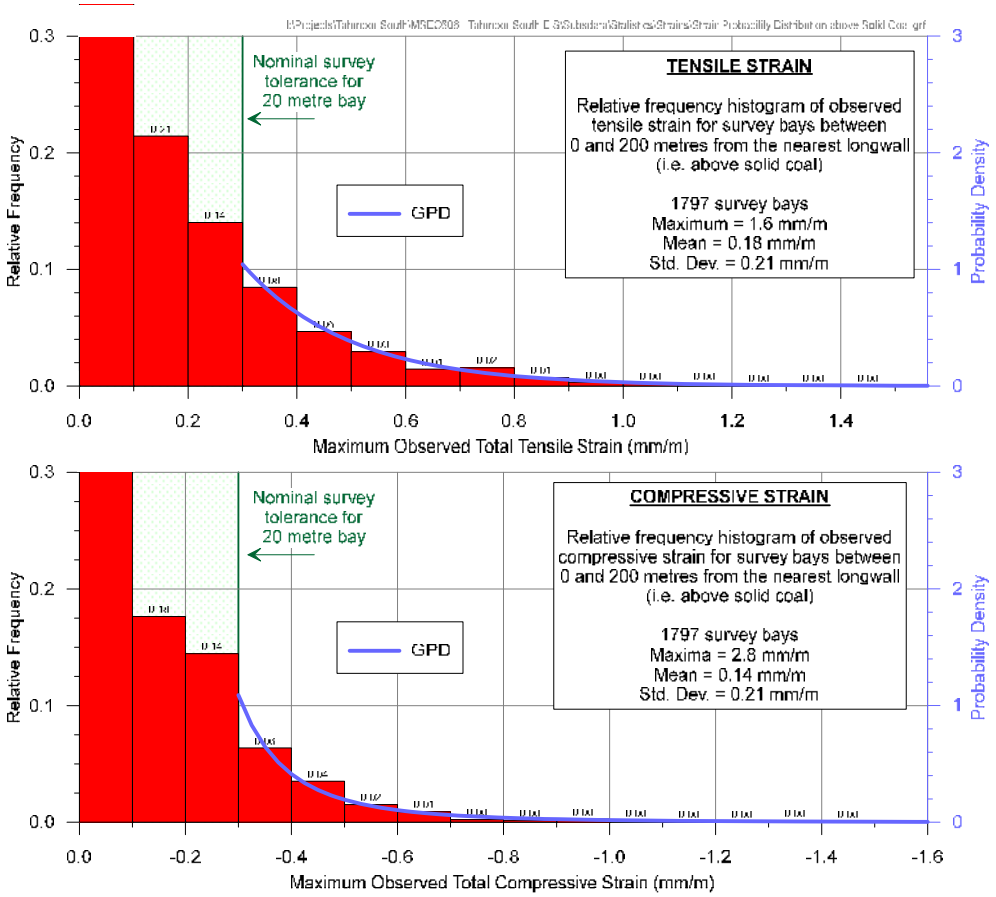

Fig. 3.8 Distributions of the maximum measured tensile and compressive strains for survey bays located above solid coal at Tahmoor, Appin and West Cliff Collieries

The 95 % confidence levels for the maximum total strains that the individual survey bays *above solid coal* experienced at any time during mining at Tahmoor, Appin and West Cliff Collieries were 0.6 mm/m tensile and 0.5 mm/m compressive. The strains for the proposed longwalls are predicted to be 20 % to 40 % greater than those previously observed at these collieries and, therefore, it is expected that 95 % of the strains measured *above solid coal* would be less than 1.0 mm/m tensile and compressive.

The 99 % confidence levels for the maximum total strains that the individual survey bays *above solid coal* experienced at any time during mining at Tahmoor, Appin and West Cliff Collieries were 0.9 mm/m tensile and compressive. Similarly, it is expected that 99 % of the strains measured *above solid coal* adjacent to the proposed longwalls would be less than 1.5 mm/m tensile and compressive.

3.3.2. Analysis of strains measured along whole monitoring lines

For linear features such as roads, cables and pipelines, it is more appropriate to assess the frequency of the maximum strains measured along whole monitoring lines, rather than for individual survey bays. That is, an analysis of the maximum strains measured anywhere along the monitoring lines, regardless of where the strain occurs.

A histogram of maximum observed total tensile and compressive strains measured anywhere along the monitoring lines, at any time during or after the extraction of the previous longwalls Tahmoor, Appin and West Cliff Collieries, is provided in Fig. 3.9.

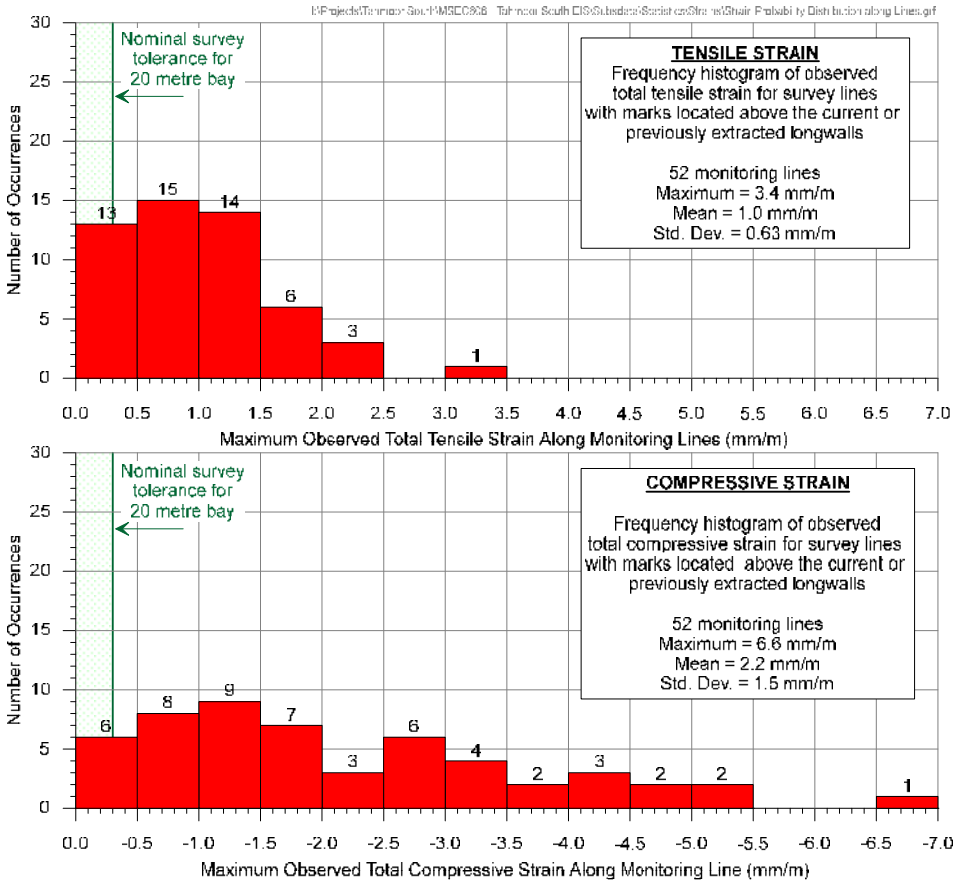

Fig. 3.9 Distributions of measured maximum tensile and compressive strains anywhere along the monitoring lines at Tahmoor, Appin and West Cliff Collieries

It can be seen from the above figure, that 42 of the 52 monitoring lines (i.e. 92 % of the total) at Tahmoor, Appin and West Cliff Collieries had recorded maximum total tensile strains of 2.0 mm/m, or less. The strains for the proposed longwalls are predicted to be 20 % to 40 % greater than those previously observed at these collieries and, therefore, it is expected that 92 % of the monitoring lines above the proposed longwalls would experience maximum tensile strains of 3.0 mm/m, or less.

It can also be seen, that 45 of the 52 monitoring lines (i.e. 87 % of the total) at Tahmoor, Appin and West Cliff Collieries had recorded maximum total compressive strains of 4.0 mm/m, or less. The strains for the proposed longwalls are predicted to be 20 % to 40 % greater than those previously observed at these collieries and, therefore, it is expected that 87 % of the monitoring lines above the proposed longwalls would experience maximum compressive strains of 5.5 mm/m, or less.

3.4. Managing public safety

The primary risk associated with mining beneath Endeavour Energy infrastructure is public safety. Tahmoor Coal has previously directly mined beneath or adjacent to more than 2000 houses and civil structures, commercial and retail properties, the Main Southern Railway and local roads and bridges. It has implemented extensive measures prior to, during and after mining to ensure that the health and safety of people have not been put at risk due to mine subsidence. People have not been exposed to immediate and sudden safety hazards as a result of impacts that have occurred due to mine subsidence movements.

Emphasis is placed on the words “immediate and sudden” as in rare cases, some structures have experienced severe impacts, but the impacts did not present an immediate risk to public safety as they developed gradually with ample time to repair the structure.

In the case of this Subsidence Management Plan, the potential for impacts on public safety has been assessed on a case by case basis. The assessments include identification of critical assets by Endeavour Energy prior to the commencement of LW S1A.

3.4.1. Subsidence Impact Management Process for Infrastructure

Tahmoor Coal has developed and acted in accordance with agreed subsidence management plans to manage potential impacts during the mining of LWs 22 to 32 and LW W1-W4 at Tahmoor North and LWs S1A to S3A. The management strategy has been reviewed and updated based on experiences gained during the mining of these longwalls and the strategy for LW S1A-S7A includes the following process:

1. Regular consultation with Endeavour Energy before, during and after mining;
2. Site-specific investigations;
3. Implementation of mitigation measures following inspections by Endeavour Energy; and
4. Surveys and inspections during mining within the active subsidence area:
   - Detailed visual inspections and vehicle-based inspections along the streets;
   - Ground surveys along streets; and
   - Specific surveys of critical power poles as identified by Endeavour Energy.

A flowchart illustrating the subsidence impact management process prior to, during and after Endeavour Energy infrastructure experiences mine subsidence movements is shown in Fig. 3.10.

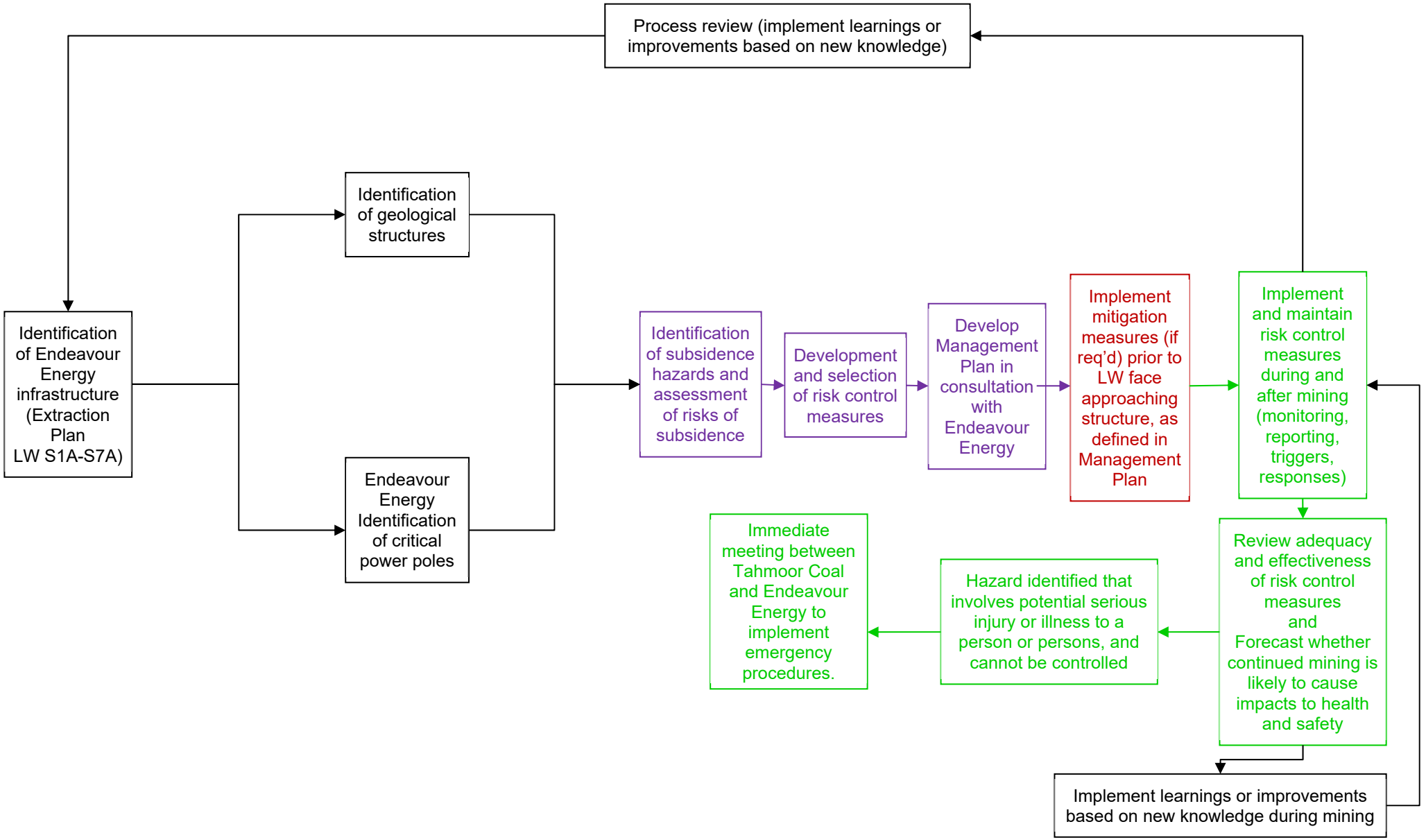

Fig. 3.10 Flowchart for Subsidence Impact Management Process

3.5. Summary of potential impacts

A summary of potential impacts on Endeavour Energy's infrastructure is provided in Table 3.3. The summary is consistent with the risk assessment undertaken by Tahmoor Coal (2021). Endeavour Energy reviewed and agreed with the findings of the risk assessment on 28 September 2022.

Table 3.3 Summary of potential mine subsidence impacts

Risk	Likelihood	Consequence	Level of Potential Impact
Tahmoor Coal Assessment			
Adverse impacts power poles	UNLIKELY	MINOR	LOW
Adverse impacts on consumer cables to houses	UNLIKELY	MINOR	LOW

Additional information on each potential impact is provided below.

3.6. Identification of subsidence hazards that could give rise to risks to health and safety

Clause 34 of the Work Health and Safety Regulation (2017) requires that the duty holder (in this case Tahmoor Coal), in managing risks to health and safety, must identify reasonably foreseeable hazards that could give rise to risks to health and safety.

This section of the Management Plan summarises hazards that have been identified in Chapter 3, which could give rise to risks to health and safety of people in the vicinity of electrical infrastructure.

Using the processes described in Section 3.4 of this Management Plan, mine subsidence hazards have been identified, investigated and analysed in a systematic manner by examining each aspect of the infrastructure, as described in Section 3.7 of this Management Plan. Each of the aspects below could potentially experience mine subsidence movements that give rise to risks to the health and safety of people:

- 66kV transmission line;
- 11kV powerlines along streets; and
- Low voltage powerlines.

The following mine subsidence hazards were identified that could give rise to risks to health and safety due to the extraction of LW S1A-S7A:

- Loss of conductor clearance below Endeavour Energy standards (refer Section 3.7); and
- Tensile pulling of consumer lines at house connections (refer Section 3.7).

The identification and risk assessment process took into account the location of infrastructure relative to LW S1A-S7A and the associated timing and duration of the subsidence event, as described in Section 1.8 of this Management Plan.

Whilst mine subsidence predictions and extensive past experiences from previous mining at Tahmoor Mine were taken into account, the identification and risk assessment process recognised that there are uncertainties in relation to predicting subsidence movements, and uncertainties in how mine subsidence movements may adversely impact Endeavour Energy infrastructure, as discussed in Section 1.4 and Chapter 3 of this Management Plan. In this case, creeks have been mapped that intersect powerlines.

Tahmoor Coal has considered the outcomes of the hazard identification and risk assessment process when developing measures to manage potential impacts on the health and safety of people, and potential impacts on Endeavour Energy infrastructure in general. These are described in Chapter 4 of this Management Plan.

3.7. Powerlines

There are a number of powerlines that are located directly above or adjacent to LW S1A-S7A, as shown in Drawing No. MSEC1193-07-01.

As shown in Drawing No. MSEC1193-07-01, electrical infrastructure comprises 11 kilovolt (kV) and low voltage powerlines that generally follow the local roads, including Remembrance Driveway, Caloola Road, Yarran Road and Charlies Point Road.

A 66 kV transmission line is located to the northeast of LW S1A servicing the Tahmoor Mine site.

3.7.1. Predicted subsidence movements

The powerlines located above and adjacent to LW S1A-S7A generally follow the alignments of the local roads.

The predicted profiles of conventional subsidence, tilt and curvature for the powerlines along Remembrance Driveway are shown in Fig. 3.11.

A summary of the maximum predicted total conventional subsidence parameters for Remembrance Drive, after the extraction of each of the proposed longwalls, is provided in Table 3.4.

The predicted tilts are the maxima along the alignment of the road after the completion of each of the proposed longwalls. The predicted curvatures are the maxima in any direction at any time during or after the extraction of each of the proposed longwalls.

Table 3.4 Maximum predicted total conventional subsidence parameters for Remembrance Drive due to the extraction of LW S1A to S7A

Longwall	Maximum predicted subsidence (mm)	Maximum predicted tilt along alignment (mm/m)	Maximum predicted tilt across alignment (mm/m)	Maximum predicted hogging curvature in any direction (km^{-1})	Maximum predicted sagging curvature in any direction (km^{-1})
LW S1A	325	2.5	5.0	0.06	0.06
LW S2A	1000	5.0	5.5	0.08	0.20
LW S3A	1200	6.5	5.5	0.10	0.21
LW S4A	1300	6.0	6.0	0.12	0.21
LW S5A	1350	6.5	5.5	0.12	0.21
LW S6A	1375	7.5	5.5	0.12	0.21
LW S7A	1400	7.5	5.0	0.12	0.21

The maximum predicted conventional strains for Remembrance Drive, based on applying a factor of 15 to the maximum predicted conventional curvatures, are1.9 mm/m tensile and 3.2 mm/m compressive. Non-conventional movements can also occur as a result of, among other things, anomalous movements. The analysis of strains provided in Chapter 4 includes those resulting from both conventional and non-conventional anomalous movements.

The road is a linear feature and, therefore, the most relevant distribution of strain is the maximum strains measured along whole monitoring lines above previous longwall mining. The analysis of strains along whole monitoring lines during the mining of previous longwalls in the Southern Coalfield is discussed in Section 3.3.2 and the results are provided in Fig. 3.9.

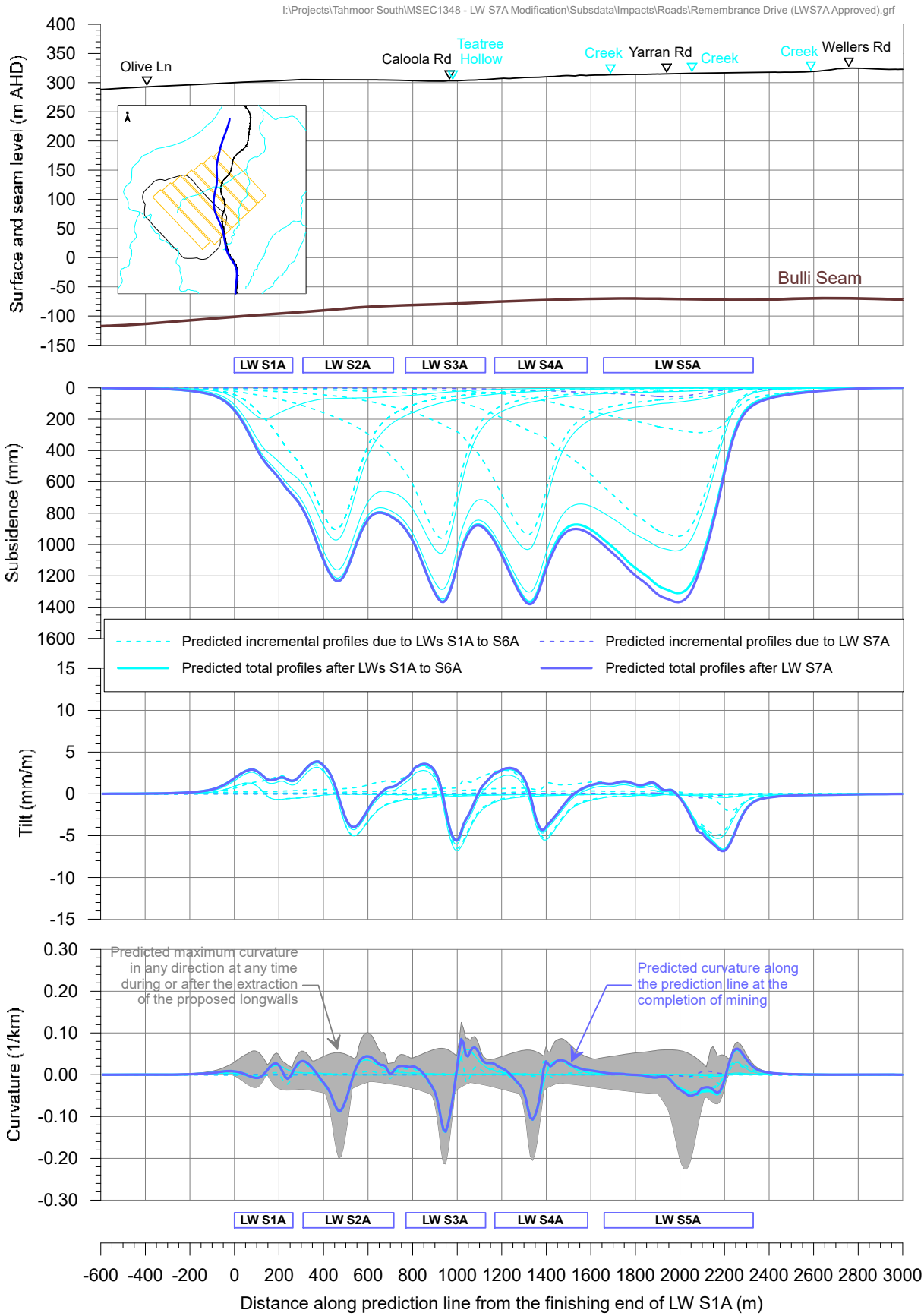

Fig. 3.11 Predicted profiles of total subsidence, tilt and curvature for the powerlines along Remembrance Driveway after the mining of LW S1A-S7A

Caloola Road is located directly above LWs S3A to S5A and, therefore, could experience the full range of predicted subsidence movements. The predicted profiles of conventional subsidence and tilt along the alignment of Caloola Road, resulting from the extraction of the proposed longwalls, are shown in Fig. 3.12.

A summary of the maximum predicted total conventional subsidence parameters for Caloola Road, after the extraction of each of the proposed longwalls, is provided in Table 3.5.

The predicted tilts are the maxima along the alignment of the road after the completion of each of the proposed longwalls. The predicted curvatures are the maxima in any direction at any time during or after the extraction of each of the proposed longwalls.

Table 3.5 Maximum predicted total conventional subsidence parameters for Caloola Road due to the extraction of LW S1A to S7A

Longwall	Maximum predicted subsidence (mm)	Maximum predicted tilt along alignment (mm/m)	Maximum predicted tilt across alignment (mm/m)	Maximum predicted hogging curvature in any direction (km^{-1})	Maximum predicted sagging curvature in any direction (km^{-1})
LW S1A	20	< 0.5	< 0.5	< 0.01	< 0.01
LW S2A	80	< 0.5	< 0.5	< 0.01	< 0.01
LW S3A	875	5.5	6.0	0.09	0.09
LW S4A	1150	5.0	6.5	0.11	0.20
LW S5A	1300	6.0	5.5	0.11	0.20
LW S6A	1350	6.5	6.0	0.12	0.20
LW S7A	1400	6.5	6.5	0.12	0.20

Yarran Road is located directly above LWs S5A and S7A and, therefore, could experience the full range of predicted subsidence movements. The predicted profiles of conventional subsidence and tilt along the alignment of Yarran Road, resulting from the extraction of the proposed longwalls, are shown in Fig. 3.13.

A summary of the maximum predicted total conventional subsidence parameters for Yarran Road, after the extraction of each of the proposed longwalls, is provided in Table 3.6.

The predicted tilts are the maxima along the alignment of the road after the completion of each of the proposed longwalls. The predicted curvatures are the maxima in any direction at any time during or after the extraction of each of the proposed longwalls.

Table 3.6 Maximum predicted total conventional subsidence parameters for Yarran Road due to the extraction of LW S1A to S7A

Longwall	Maximum predicted subsidence (mm)	Maximum predicted tilt along alignment (mm/m)	Maximum predicted tilt across alignment (mm/m)	Maximum predicted hogging curvature in any direction (km^{-1})	Maximum predicted sagging curvature in any direction (km^{-1})
LW S1A	< 20	< 0.5	< 0.5	< 0.01	< 0.01
LW S2A	< 20	< 0.5	< 0.5	< 0.01	< 0.01
LW S3A	20	< 0.5	< 0.5	< 0.01	< 0.01
LW S4A	100	< 0.5	< 0.5	< 0.01	< 0.01
LW S5A	1050	8.0	2.0	0.09	0.20
LW S6A	1300	7.0	4.0	0.09	0.20
LW S7A	1350	6.5	7.5	0.10	0.20

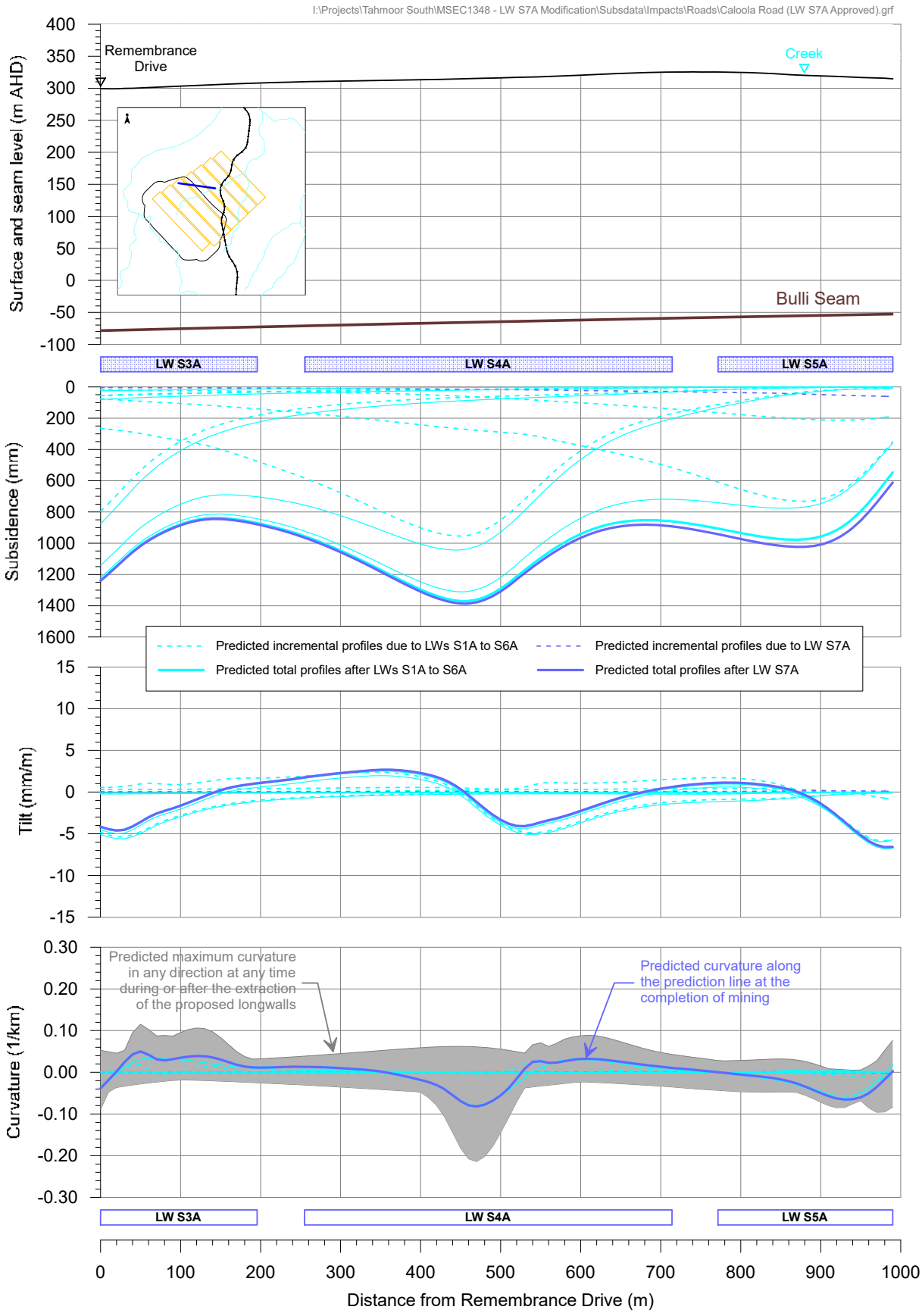

Fig. 3.12 Predicted profiles of total subsidence, tilt and curvature for the powerline along Caloola Road after the mining of LW S1A-S7A

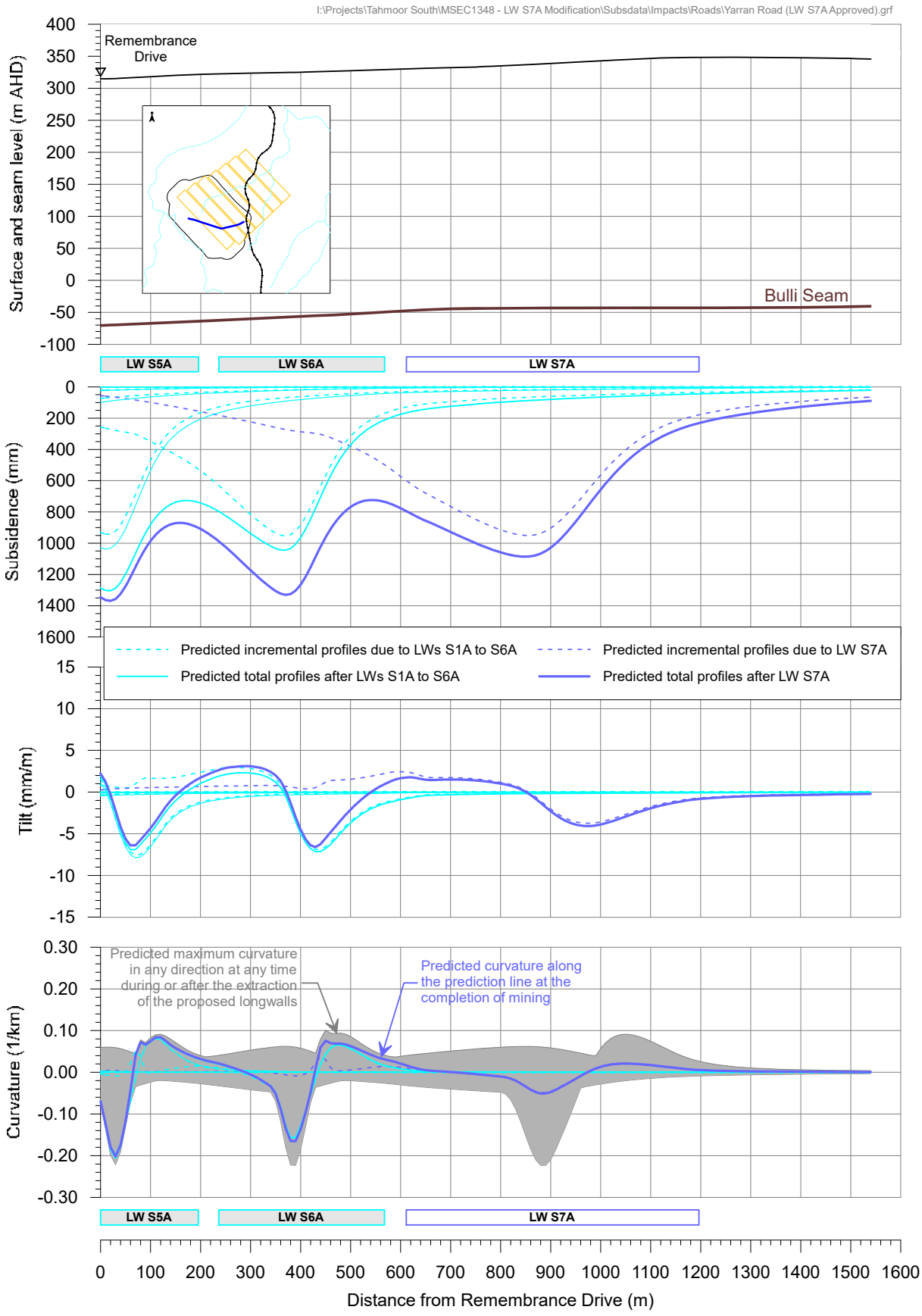

Fig. 3.13 Predicted profiles of total subsidence, tilt and curvature for the powerline along Yarran Road after the mining of LW S1A-S7A

Charlies Point Road is generally located beyond the commencing ends of LWs S1A to S5A and is expected to experience minor subsidence movements. The predicted profiles of conventional subsidence and tilt along the alignment of Charlies Point Road, resulting from the extraction of the proposed longwalls, are shown in Fig. 3.14.

A summary of the maximum predicted total conventional subsidence parameters for Charlies Point Road, after the extraction of each of the proposed longwalls, is provided in Table 3.7.

The predicted tilts are the maxima along the alignment of the road after the completion of each of the proposed longwalls. The predicted curvatures are the maxima in any direction at any time during or after the extraction of each of the proposed longwalls.

Table 3.7 Maximum predicted total conventional subsidence parameters for Charlies Point Road due to the extraction of LW S1A to S7A

Longwall	Maximum predicted subsidence (mm)	Maximum predicted tilt along alignment (mm/m)	Maximum predicted tilt across alignment (mm/m)	Maximum predicted hogging curvature in any direction (km^{-1})	Maximum predicted sagging curvature in any direction (km^{-1})
LW S1A	< 20	< 0.5	< 0.5	< 0.01	< 0.01
LW S2A	40	< 0.5	< 0.5	< 0.01	< 0.01
LW S3A	40	< 0.5	< 0.5	< 0.01	< 0.01
LW S4A	50	< 0.5	< 0.5	0.01	< 0.01
LW S5A	200	2.0	2.5	0.08	< 0.01
LW S6A	250	2.5	3.5	0.10	< 0.01
LW S7A	275	2.5	3.5	0.10	< 0.01

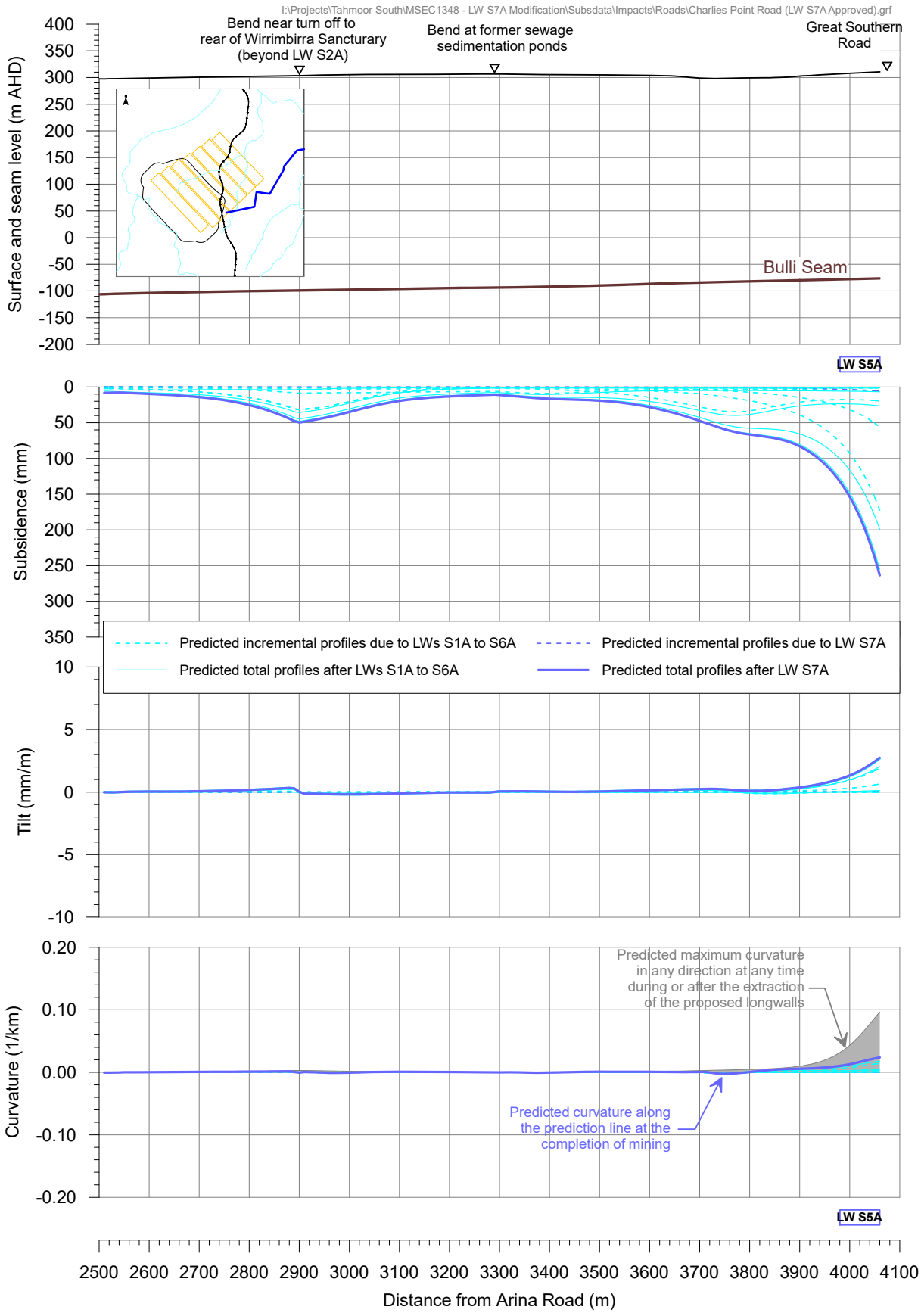

Fig. 3.14 Predicted profiles of total subsidence, tilt and curvature for the powerline along Charlies Point Road after the mining of LW S1A-S7A

3.7.2. Potential subsidence impacts on powerlines

Longwalls 22 to 32 have directly mined beneath approximately 44 km of electrical cables and over 1100 power poles and no significant impacts have been recorded. Whilst no impacts have been recorded, minor changes in tension of some aerial cables has been observed. LW W1-W4 have mined directly beneath buried powerlines with no impacts observed.

No impacts have been recorded to Endeavour Energy infrastructure during the extraction of LWs S1A to S3A. It is possible, but unlikely, that minor adverse impacts could occur to the electrical infrastructure that is located directly above or immediately adjacent to LW S4A-S7A. It is expected that the impacts would be relatively minor and that these could be readily repaired.

Tahmoor Coal has developed and selected risk control measures in consultation, co-ordination and co-operation with Endeavour Energy in accordance with WHS legislation. The controls have been successfully implemented during the mining of LWs 22 to 32, LW W1-W4 and LWs S1A to S3A.

In this instance, there are no reasonably practicable controls which could eliminate, substitute or isolate the identified risks, nor engineering controls that could put in place a structure or item that prevents or minimises risks. Tahmoor Coal has identified controls that will manage potential issues associated with damage to electrical infrastructure during the extraction of LW S1A-S7A by implementing the following measures:

- Regular ground surveys along streets located within the active subsidence zone;
- Regular surveys of critical power poles identified by Endeavour Energy;
- Regular visual inspections along streets and electrical infrastructure located within the active subsidence zone;
- Regular consultation with the community to report potential impacts;
- Adjustment of powerlines to rectify adverse tilts or reduction in conductor clearance heights if triggered by monitoring results;
- Repair of buried powerlines if damaged; and
- In the worst case, repair of damaged powerlines.

3.7.3. Power poles

An assessment of power poles located within the mining area for LW S1A-S6A was conducted by Endeavour Energy in May 2022. The assessment included power poles that are located directly above LW S7A. Experience has shown that power poles have remained safe and serviceable during and after mining of previous longwalls at Tahmoor Mine. Endeavour Energy has, however, identified critical poles in the network to monitor during and after mining of LW S1A-S7A, including poles directly above LW S7A.

The poles recommended for monitoring during LW S1A-S7A are listed in Table 3.8, and are shown in Drawing No. MSEC1193-07-02.

Table 3.8 Summary of poles recommended for monitoring during LW S1A-S7A

Pole Number	Transformer Number	Switch Number	Location	Type	Position relative to LW S1A-S6A
625946	12308	-	Remembrance Dr	11kV/LV	North of LW S1A
-	23387	-	Off Remembrance Dr	11kV/LV	Northwest of LW S1A
627248	10238	-	Remembrance Dr	11kV/LV	North of LW S1A
625930	11519	-	Off Remembrance Dr	11kV/LV	Northwest of LW S2A
853038	11271	-	Remembrance Dr	11kV/LV	Between LW S2A and LW S3A
798853	27438	-	Caloola Rd	11kV/LV	Above LW S3A
624483	10339	-	Caloola Rd	11kV/LV	Above LW S4A
624494	11335	-	Caloola Rd	11kV/LV	Above LW S5A
396228	10240	-	Remembrance Dr	11kV/LV	Above LW S4A
624582	11273	-	Yarran Rd	11kV/LV	Above LW S5A
972943	35474	-	Yarran Rd	11kV/LV	Above LW S6A
624477	10171	-	Yarran Rd	11kV/LV	Above LW S7A
876611	11948	-	Remembrance Dr	11kV/LV	South of LW S5A
625323	12333	-	Charlies Point Rd	11kV/LV	Southeast of LW S4A
625306	11060	-	Great Southern Rd	11kV/LV	Southeast of LW S5A
624542	12319	-	Hogans Dr	11kV/LV	Southeast of LW S6A
736471	19018	-	Claremont Dr	11kV/LV	Southeast of LW S7A
624496	12357	-	Wellers Rd	11kV/LV	South of LW S7A
625330	4771	-	Charlies Point Rd	11kV/LV	Southeast of LW S3A
871561	11723	-	Charlies Point Rd	11kV/LV	Southeast of LW S2A
625329	9919	-	Charlies Point Rd	11kV/LV	Southeast of LW S1A
625319	11940	-	Charlies Point Rd	11kV/LV	East of LW S1A
759261	36311	-	Charlies Point Rd	11kV/LV	Northeast of LW S1A
777448	-	-	Tahmoor Mine Site	66kV/HV	Northeast of LW S1A
777452	-	-	Tahmoor Mine Site	66kV/HV	Northeast of LW S1A
777451	-	-	Tahmoor Mine Site	66kV/HV	Northeast of LW S1A
331924	-	-	Tahmoor Mine Site	66kV/HV	Northeast of LW S1A
331925	-	-	Tahmoor Mine Site	66kV/HV	Northeast of LW S1A
331930	-	-	Tahmoor Mine Site	66kV/HV	Northeast of LW S1A
331934	-	-	Tahmoor Mine Site	66kV/HV	Northeast of LW S1A
777453	-	-	Tahmoor Mine Site	66kV/HV	Northeast of LW S1A
777443	-	-	Tahmoor Mine Site	11kV/LV	Northeast of LW S1A

Pole Number	Transformer Number	Switch Number	Location	Type	Position relative to LW S1A-S6A
625288	-	-	Charlies Point Rd	11kV/LV	Southeast of LW S3A
625311	-	-	Charlies Point Rd	11kV/LV	Southeast of LW S3A
624512	-	-	Great Southern Rd	11kV/LV	Above LW S5A
624471	-	73378	Caloola Rd	11kV/LV	Above LW S4A
857627	-	93253	Remembrance Dr	11kV/LV	Above LW S4A
624546	-	H950	Charlies Point Rd	11kV/LV	Above LW S5A
624528	-	H948	Remembrance Dr	11kV/LV	Above LW S5A
624527	-	16715	Remembrance Dr	11kV/LV	Southeast of LW S6A
759259	-	48543	Charlies Point Rd	11kV/LV	Southeast of LW S1A
A777436	-	53606	Charlies Point Rd	11kV/LV	Northeast of LW S1A
981715	-	-	Great Southern Rd	11kV/LV	Above LW S5A
625345	-	-	Charlies Point Rd	11kV/LV	Southeast of LW S3A
625322	-	-	Charlies Point Rd	11kV/LV	Southeast of LW S2A
759257	-	-	Charlies Point Rd	11kV/LV	Southeast of LW S1A
625333	-	-	Great Southern Rd	11kV/LV	Southeast of LW S5A
625300	-	-	Great Southern Rd	11kV/LV	Southeast of LW S5A
624558	-	-	Remembrance Dr	11kV/LV	Southeast of LW S6A
624553	-	-	Hogans Dr	11kV/LV	Southeast of LW S6A
624497	-	-	Wellers Rd	11kV/LV	South of LW S7A
624422	-	-	Claremont Dr	11kV/LV	Southeast of LW S7A
772375	-	-	Remembrance Dr	11kV/LV	Above LW S5A
625925	-	-	Remembrance Dr	11kV/LV	Above LW S1A

4.1. Infrastructure Management Group (IMG)

The Infrastructure Management Group (IMG) is responsible for taking the necessary actions required to manage the risks that are identified from monitoring the infrastructure and to ensure that the health and safety of people who may be present on public property or Endeavour Energy property are not put at risk due to mine subsidence. The IMG develops and reviews this management plan, collects and analyses monitoring results, determines potential impacts and provides advice regarding appropriate actions. The members of the IMG are highlighted in Chapter 8.

4.2. Development and selection of risk control measures

Tahmoor Coal has developed and selected risk control measures in consultation, co-ordination and co-operation with the infrastructure owner in accordance with WHS legislation. In accordance with Clauses 35 and 36 in Part 3.1 of the Work Health and Safety regulation (2017) and the guidelines (MSO, 2017), a hierarchy of control measures has been considered and selected where reasonably practicable, using the following process:

1. Eliminate risks to health and safety so far as is reasonably practicable, and
2. If it is not reasonably practicable to eliminate risks to health and safety – minimise those risks so far as is reasonably practicable, by doing one or more of the following:
   (a) substituting (wholly or partly) the hazard giving rise to the risk with something that gives rise to a lesser risk;
   (b) isolating the hazard from any person exposed to it;
   (c) implementing engineering controls;
3. If a risk then remains, minimise the remaining risk, so far as is reasonably practicable, by implementing administrative controls; and
4. If a risk then remains, the duty holder must minimise the remaining risk, so far as is reasonably practicable, by ensuring the provision and use of suitable personal protective equipment.

A combination of the controls set out in this clause may be used to minimise risks, so far as is reasonably practicable, if a single control is not sufficient for the purpose.

There are primarily two different methods to control the risks of subsidence, namely:

- Method A – Selection of risk control measures to be implemented prior to the development of subsidence, (Items 1 and 2 above), and
- Method B – Selection of risk control measures to be implemented during the development of subsidence (Items 3 and 4 above).

Method A and B risk control measures are described in Section 4.3 to Section 4.6. Prior to selecting Method B risk control measures, Tahmoor Coal has investigated and confirmed that the measures are feasible and effective for the site-specific conditions during the extraction of LW S1A-S7A.

4.3. Selection of risk controls for electrical infrastructure

Based on the above assessments, Tahmoor Coal considered Method A risk control measures, in accordance with the process described in Section 4.2.

Elimination

In this instance, no reasonably practicable controls could be identified that would eliminate the identified risks.

Substitution

In this instance, no reasonably practicable controls could be identified that will change the environment so the hazards could be substituted for hazards with a lesser risk.

Isolation

In this instance, no reasonably practicable controls could be identified to isolate a hazard from any person exposed to it.

Engineering Controls

In this instance, no reasonably practicable engineering controls could be identified to put in place a structure or item that prevents or minimises risks.

Administrative Controls

The following Administrative Controls were identified and selected that will put in place procedures on site to minimise the potential of impacts on the health and safety of people in relation to mining-induced damage to electrical infrastructure:

- Implementation of a Monitoring Plan and Trigger Action Response Plan (TARP)
  As described in the Management Plan, Tahmoor Coal and Endeavour Energy have developed and implemented a management strategy of detecting early the development of potential adverse subsidence movements in the ground, so that contingency response measures can be implemented before impacts on safety and serviceability develop. The TARP includes the following:
    - Identification of critical power poles to be monitored prior to the commencement of LW S1A-S7A (complete);
    - Local 2D surveys along local roads as shown in Drawing No. MSEC1193-01-01. These include streets along which powerlines and power poles are located, including Remembrance Driveway, Caloola Road, Yarran Road, Charlies Point Road and Great Southern Road;
    - Surveys of critical power poles within the active subsidence zone;
    - Visual inspections along the streets, including poles, conductors, conductor clearances and house connections within the active subsidence zone;
    - Additional surveys and/or inspections, if triggered by monitoring results;
    - Regular consultation with the community to report potential impacts; and
    - Follow Endeavour Energy procedures to monitor and respond to impacts.

4.4. Monitoring measures

A number of monitoring measures will be undertaken during mining.

4.4.1. Continuous GNSS Monitoring

Global Navigation Satellite System (GNSS) units are fixed survey stations that continuously measure their absolute horizontal and vertical positions in real time.

The locations of GNSS units are shown in Drawings No. MSEC1193-01-01. The GNSS units along the centrelines of LWs S1A to S3A are relevant to managing Endeavour Energy infrastructure. The GNSS units are located in bushland within the Australian Wildlife Sanctuary. The units are proposed to track the development of subsidence and horizontal movements above the commencing ends of the longwalls. The monitoring data will provide the first subsidence results for each panel to compare against subsidence predictions. Conventional survey lines are not possible in this area due to thick vegetation, preventing lines of sight.

GNSS 28 has been installed where the rail corridor is located directly above the centreline of LW S5A at approximate rail kilometrage of 100.52 km. The purpose of the GNSS unit is to detect the initial development of subsidence and trigger the commencement of regular ground surveys.

4.4.2. Early warning survey lines

LW S1A Tahmoor Mine Boundary

A survey line has been installed along the southern boundary of Tahmoor Mine's property, as shown in Drawing No. MSEC1193-01-01. The survey line has been installed with pegs spaced nominally 20 metres apart. The survey line commences at the south-eastern end at the end of an unsealed road that is accessed from Charlies Point Road. The line terminates at the top of Teatree Hollow due to thick vegetation.

The purpose of the survey line is to measure the subsidence profile across the width of LW S1A prior to experiencing significant subsidence along the Main Southern Railway and Remembrance Drive. It is planned to survey the line once a month during the period of active subsidence of LW S1A. Additional surveys can be conducted, if required.

Main Southern Railway

LWs S1A to S5A will extract directly beneath the Main Southern Railway prior to mining directly beneath Remembrance Drive and Caloola Road.

A survey line has been installed along the Main Southern Railway, as shown in Drawing No. MSEC1193-01-01. The survey line has been installed with pegs spaced nominally 20 metres apart.

Surveys along the Railway will provide an early warning of the magnitude of subsidence that is likely to develop. The surveys will also detect the development of non-conventional subsidence movements along the Railway and provide an opportunity to project locations where potential non-conventional subsidence movements may occur along Remembrance Drive. The IMG can assess the monitoring results and assess whether any additional monitoring and management measures may be required to manage potential impacts to Endeavour Energy infrastructure along Remembrance Drive, Caloola Road, Great Southern Road and Yarran Road.

It is planned to survey the line weekly during periods of active subsidence. Additional surveys can be conducted, if required.

4.4.3. Ground surveys along streets

Survey lines have been installed along Remembrance Drive, Caloola Road, Yarran Road, Charlies Point Road and Great Southern Road, as shown in Drawing No. MSEC1193-01-01.

The survey lines consist of pegs spaced nominally every 20 metres. 2D surveys will measure levels and horizontal distances between adjacent pegs. Survey pegs along Remembrance Drive will be surveyed in 2D and 3D (level, eastings and northings). The purpose of the 3D surveys is primarily to assist with monitoring potential impacts on pipelines that run along the road.

4.4.4. Surveys of critical power poles

Fifty-four power poles were identified by Endeavour Energy on 4 October 2022 for surveys during the mining of LW S1A-S6A. The assessment by Endeavour Energy covered an area that was greater than the subsidence study area for LWs S1A-S6A and includes the additional study area for LW S7A. Their locations are shown in Drawing No. MSEC1193-07-02, where it can be seen that the extent critical poles exceeds the combined Study Area for LWs S1A-S7A. One critical power pole is located directly above LW S7A. The power poles will be surveyed for level at the base and vertical offset (tilt).

4.4.5. Visual inspections

Visual inspections will be undertaken during the period of active subsidence by an experienced inspector appointed by Tahmoor Coal who is familiar with mine subsidence impacts. The inspector will undertake the following:

- Visual inspections along streets within the active subsidence zone; and
- Visual inspections of power poles, changes in tension or sag of conductors, conductor clearances and house connections.

4.4.6. Changes to monitoring frequencies

Monitoring frequencies will continue while Endeavour Energy infrastructure is experiencing active subsidence due to the extraction of LW S1A-S7A. As a general guide, monitoring is likely to continue until the longwall has moved away from the property by a distance of approximately 450 metres. Monitoring, however, may continue if ongoing adverse impacts are observed.

4.5. Triggers and responses

Trigger levels have been developed by Tahmoor Coal based on engineering assessments and consultation with Endeavour Energy.

Trigger levels for each monitoring parameter are described in the risk control procedures in Table 4.1.

Immediate responses, if triggered by monitoring results, may include:

- Increase in survey and inspection frequencies if required by the IMG;
- Additional surveys and inspections; and
- Repair of impacts that create a serious public safety hazard.

The risk control measures described in this Management Plan have been developed to ensure that the health and safety of people in the vicinity of electrical infrastructure are not put at risk due to mine subsidence. It is also an objective to avoid disruption to services, or if unavoidable, keep disruption and inconvenience to minimal levels.

With respect to the extraction of LW S1A-S7A, no potential hazards have been identified that could reasonably give rise to the need for an emergency response. Of the potential hazards identified in Section 3.6, only a reduction in conductor clearance height could possibly give rise to the need for an emergency response. The likelihood is considered extremely remote and would require substantial differential subsidence movements to develop before such an event occurs.

As discussed in Section 3.1, mine subsidence movements will develop gradually and there will be ample time to identify the development of potentially adverse differential subsidence movements early, consider whether any additional management measures are required, and repair or adjust affected surface features, in close consultation with Endeavour Energy.

As documented in Section 4.6, Tahmoor Coal and the IMG will review and assess monitoring reports and consider whether any additional management measures are required on a weekly basis. If potentially adverse differential subsidence movements are detected, it is anticipated that a focussed inspection will be undertaken in the affected area, and a decision will likely be made to increase the frequency of surveys and/or inspections. Additional management measures may also be implemented. It is therefore expected that, as a potential adverse situation escalates, Tahmoor Coal will be present on site on a more frequent basis to survey or inspect the affected site, and that Endeavour Energy will be consulted on a more frequent basis.

Notwithstanding the above, if a hazard has been identified that involves potential serious injury or illness to a person or persons on public property or in the vicinity of electrical infrastructure, and cannot be controlled, the immediate response is to remove people from the hazard. If such a situation is observed or is forecast to occur by either Tahmoor Coal or by people on public property, Tahmoor Coal and Endeavour Energy will immediately meet and implement emergency procedures.

4.6. Subsidence Impact Management Procedures

The procedures for the management of potential impacts are provided in Table 4.1.

Table 4.1 Risk Control Procedures during the extraction of Tahmoor LW S1A-S7A

INFRASTRUCTURE	HAZARD / IMPACT	RISK	TRIGGER	CONTROL PROCEDURE/S	FREQUENCY	BY WHOM?
Electrical Infrastructure	Impacts to infrastructure	Low	None	Continuous GNSS monitoring as shown in Drawing No. MSEC1193-01-01	GNSS units installed Continuous readings, with data averaged over 24 hours and recorded once per day until end of LW S7A.	Tahmoor Coal (Unit Zero)
				2D survey line along Tahmoor Mine property boundary	Pegs installed. Baseline survey complete. Monthly survey during LW S1A between 200m and 1300m extraction, and continue if ongoing adverse movements are observed (complete). End of LW S1A (complete).	Tahmoor Coal (SMEC)
				Conduct visual inspections of power poles, conductors, conductor clearances, house connections and local roads within active subsidence zone	Weekly for areas within the active subsidence zone during LWs S1A to S7A and continue if ongoing adverse movements or impacts are observed until one month after the extraction of each LW.	Tahmoor Coal
				Conduct 2D / Absolute 3D surveys along Main Southern Railway in accordance with Railway Management Plan	Monthly 3D / Weekly 2D surveys for pegs within active subsidence zone during LWs S1A to S7A	Tahmoor Coal (SRS)
				Conduct 2D survey along Charlies Point Road	Pegs installed from eastern end survey line to bend at No. 80 Charlies Point Road. Baseline survey prior to start of LW S1A. Extend line and baseline survey to intersection of Great Southern Road prior to start of LW S2A. Monthly survey during LWs S1A-S5A between 200m and 800m extraction, and continue if ongoing adverse movements are observed. End of LW S1A-S7A.	Tahmoor Coal (SMEC)
				Conduct 2D / Absolute 3D surveys along Remembrance Drive	Pegs installed. Baseline survey complete. Extend line and baseline survey pegs within predicted limit of incremental subsidence of each active LW, prior to active LW face approaching within 600 metres of survey line. Monthly 3D / Weekly 2D surveys for pegs within active subsidence zone commencing as per below: LW S1A: start after 1300m extraction (complete) LW S2A: start after 900m extraction (complete) LW S3A: start after 500m extraction (complete) LW S4A: start after 200m extraction LW S5A: start after GNSS 28 subsides more than 20 mm due to LW S5A or 200m extraction, whichever occurs first LW S6A: start after GNSS 28 subsides more than 20 mm due to LW S6A or 200m extraction LW S7A: start after 200m extraction Continue surveys until outside active subsidence zone or one month after end of LW and continue further if ongoing adverse movements are observed. End of LW S1A-S7A.	Tahmoor Coal (SMEC)
				Conduct 2D surveys along Caloola Road	Pegs installed. Baseline survey prior to 900m extraction of LW S1A. Survey at end of LW S1A. Weekly 2D surveys for pegs within active subsidence zone commencing as per below: LW S2A: start after 900m extraction LW S3A: start after 800m extraction LW S4A: start after 800m extraction LW S5A: start after 900m extraction LW S6A: start after 900m extraction Continue surveys until outside active subsidence zone or one month after end of LW and continue further if ongoing adverse movements are observed. End of LW S2A-S7A.	Tahmoor Coal (SMEC)

INFRASTRUCTURE	HAZARD / IMPACT	RISK	TRIGGER	CONTROL PROCEDURE/S	FREQUENCY	BY WHOM?
				Conduct 2D surveys along Yarran Road	Install and baseline prior to start of LW S3A (complete). Survey at end of LW S3A (complete). Weekly 2D surveys for pegs within active subsidence zone commencing as per below: LW S4A: start after 200m extraction LW S5A: start after 200m extraction LW S6A: start after 200m extraction LW S7A: start after 200m extraction Continue if ongoing adverse movements are observed. End of LW S4A-S7A.	Tahmoor Coal (SMEC)
				Conduct 2D surveys along Great Southern Road	Install and baseline prior to start of LW S3A (complete). Survey at end of LW S3A (complete). Weekly 2D surveys for pegs within active subsidence zone commencing as per below: LW S4A: start after 200m extraction LW S5A: start after 200m extraction LW S6A: start after 200m extraction Continue if ongoing adverse movements are observed. End of LW S4A-S7A.	Tahmoor Coal (SMEC)
				Conduct pole surveys measuring subsidence at base and vertical offset or tilt of selected critical poles as shown in Table 3.8. * Note: It is noted that some critical poles are located just outside the predicted limit of subsidence for LW S1A-S7A. Tahmoor Coal will these survey poles during the mining of the longwall panel that is closest to them, as if they were in the active subsidence zone (i.e. when each pole is located within a distance of 150 metres in front and 450 metres behind the active longwall face).	Baseline survey of poles identified for by Endeavour Energy for LW S1A-S7A for poles within the predicted limit of incremental subsidence of each active longwall*, prior to active longwall approaching within 600 metres of pole. Monthly for each pole within active subsidence zone and for following three months after leaving active subsidence zone* End of LW S1A-S7A for all poles within predicted limit of incremental subsidence of each active longwall*.	Tahmoor Coal (SMEC)
				Analyse and report results to IMG, including information on the position of the longwall face.	Weekly during LW S1A-S7A after the length of the extraction exceeds 200 metres.	Tahmoor Coal
			Impacts observed to power poles, buried cables or conductor clearance heights	Notify all stakeholders, including Endeavour Energy, Tahmoor Coal, Subsidence Advisory NSW and Resources Regulator	Within 24 hours	Tahmoor Coal
				Repair impact.	As per Endeavour Energy procedures	Endeavour Energy
				Infrastructure Management Group (IMG) meets to consider whether any additional management measures should be undertaken, including: - increasing the frequency of surveys and visual inspections in vicinity of impact site; - investigating for potential of damage occurring to nearby Endeavour Energy infrastructure.	As agreed between Tahmoor Coal and Endeavour Energy	IMG
Electrical Infrastructure	Impacts to infrastructure	Low	A hazard has been identified that involves potential serious injury or illness to a person or persons on public property or, or in vicinity of electrical infrastructure and cannot be controlled	IMG, Tahmoor Coal and Endeavour Energy meet to decide whether any additional management measures are required, including: - emergency evacuation of hazardous area - demarcation to prevent people entering hazardous area	Immediately	Tahmoor Coal and Endeavour Energy
				Notify IMG of trigger exceedance and any management decisions undertaken (incl Subsidence Advisory NSW, Resources Regulator)	Within 24 hours of decision	Tahmoor Coal

5.1. Consultation, co-operation and co-ordination

Substantial consultation, co-operation and co-ordination has taken place between Tahmoor Coal and Endeavour Energy prior to the development of this Management Plan, as detailed in Section 1.3.1.

The following procedures will be implemented during and after active subsidence of the property to ensure the continued effective consultation, co-operation and co-ordination of action with respect to subsidence between Tahmoor Coal and Endeavour Energy:

- Reporting of observed impacts to Tahmoor Coal either during the weekly visual inspection or at any time directly to Tahmoor Coal;
- Distribution of monitoring reports, which will provide the following information on a weekly basis during active subsidence:
    - Position of longwall;
    - Summary of management actions since last report;
    - Summary of consultation with Endeavour Energy since last report;
    - Summary of observed or reported impacts, incidents, service difficulties, complaints;
    - Summary of subsidence development;
    - Summary of adequacy, quality and effectiveness of management process;
    - Any additional and/or outstanding management actions; and
    - Forecast whether there will be any subsidence impacts to the health and safety of people due to the continued extraction of LW S1A-S7A.
- Convening of meetings between Tahmoor Coal and Endeavour Energy at any time as required, as discussed in Section 5.2;
- Arrangements to facilitate timely repairs, if required; and
- Immediate contact between Tahmoor Coal and Endeavour Energy if a mine subsidence induced hazard has been identified that involves potential serious injury or illness to a person or persons on public property or Endeavour Energy property and may require emergency evacuation, entry restriction or suspension of work activities.

5.2. IMG meetings

The IMG undertakes reviews and, as necessary, revises and improves the risk control measures to manage risks to health and safety, and potential impacts to Infrastructure.

The reviews are undertaken weekly during the period of active subsidence based on the results of the weekly surveys and visual inspections and summarised in the monitoring reports, as described in Section 5.1.

The purpose of the reviews are to:

- Detect changes, including the early detection of potential impacts on health and safety and impacts to Endeavour Energy infrastructure;
- Verify the risk assessments previously conducted;
- Ensure the effectiveness and reliability of risk control measures; and
- Support continual improvement and change management.

IMG meetings may be held between Tahmoor Coal and Endeavour Energy for discussion and resolution of issues raised in the operation of the Management Plan. The frequency of IMG Meetings will be as agreed between Tahmoor Coal and Endeavour Energy.

IMG Meetings will discuss any incidents reported in relation to the relevant infrastructure, the progress of mining, the degree of mine subsidence that has occurred, and comparisons between observed and predicted ground movements.

It will be the responsibility of the meeting representatives to determine whether the incidents reported are due to the impacts of mine subsidence, and what action will be taken in response.

In the event that a significant mine subsidence impact is observed, any party may call an emergency IMG Meeting, with one day's notice, to discuss proposed actions and to keep other parties informed of developments in the monitoring of the infrastructure.

6.0 AUDIT AND REVIEW

This Management Plan has been agreed between parties and can be reviewed and updated to continually improve the risk management systems based on audit, review and learnings from the development of subsidence during mining and manage changes in the nature, likelihood and consequence of subsidence hazards.

The review process will be conducted to achieve the following outcomes:

- Gain an improved understanding of subsidence hazards based on ongoing subsidence monitoring and reviews, additional investigations and assessments as necessary, ongoing verification of risk assessments previously conducted, ongoing verification of assumptions used during the subsidence hazard identification and risk assessment process, ongoing understanding of subsidence movements and identified geological structures at the mine;
- Revise risk control measures in response to an improved understanding of subsidence hazards;
- Gain feedback from stakeholders in relation to managing risks, including regular input from business or property owners;
- Ensure on-going detection of early warnings of changes from the results of risk assessments to facilitate corrective or proactive management actions or the commencement of emergency procedures in a timely manner; and
- Ensure timely implementation of a contingency plan in the event that the implemented risk control measures are not effective.

Some examples where review may be applied include:

- Observation of greater impacts on surface features due to mine subsidence than was previously expected;
- Observation of fewer impacts or no impacts on surface features due to mine subsidence than was previously expected; and
- Observation of significant variation between observed and predicted subsidence.

Should an audit of the Management Plan be required during that period, an auditor shall be appointed by Tahmoor Coal to review the operation of the Management Plan and report at the next scheduled Plan Review Meeting. The Management Plan shall be audited for compliance with ISO 31000, or alternative standard agreed with Endeavour Energy.

7.0 RECORD KEEPING

Tahmoor Coal will keep and distribute minutes of any IMG Meeting.

8.0 CONTACT LIST

Organisation	Contact	Phone	Email / Mail
NSW Department of Planning and Environment – Resources Regulator	Ray Ramage	(02) 4063 6485 0442 551 293	ray.ramage@regional.nsw.gov.au
	Alan Blakeney	0473 461 118	alan.blakeney@regional.nsw.gov.au
Subsidence Advisory NSW	-	(02) 4908 4300	subsidenceadvisory@customerservice.nsw.gov.au
Mine Subsidence Engineering Consultants (MSEC)	Daryl Kay*	(02) 9413 3777 0416 191 304	daryl@minesubsidence.com
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SIMEC Mining Tahmoor Coal Environment and Community Officer	Amanda Fitzgerald*	(02) 4640 0057 0414 848 213	amanda.fitzgerald@simecgfg.com
SIMEC Mining Tahmoor Coal Community Liaison Specialist	Amanda Bateman	(02) 4640 0025 0429 442 811	amanda.bateman@simecgfg.com
Endeavour Energy	Emergency Contact	131 003	
Endeavour Energy	Mehran Azimi* (Senior Transmission Engineer)	(02) 9853 7065 0403 168 466	mehran.azimi@endeavourenergy.com.au
Endeavour Energy	Scott Causer* (Mains Design Delivery Manager)	-	scott.causer@endeavourenergy.com.au
Endeavour Energy	Chris McGraw Mains Design Officer	-	chris.mcgraw@endeavourenergy.com.au

* denotes member of Infrastructure Management Group

APPENDIX A. Drawings and Supporting Documentation

The following supporting documentation is provided in Appendix A.

Drawings

Drawing No.	*Description*	*Revision*
MSEC1193-01-01	Monitoring plan	D
MSEC1193-07-01	Electrical Infrastructure	B
MSEC1193-07-02	Critical power poles	B

Supporting Documentation

Tahmoor Coal (2021)	*Risk Assessment Report – Infrastructure*. Tahmoor South – Extraction Plan, Longwalls 101A to 106A, November 2021.
Tahmoor Coal (2025)	*Risk Assessment Report – Infrastructure*. Tahmoor South – Extraction Plan, Longwall South 7A, July 2025.

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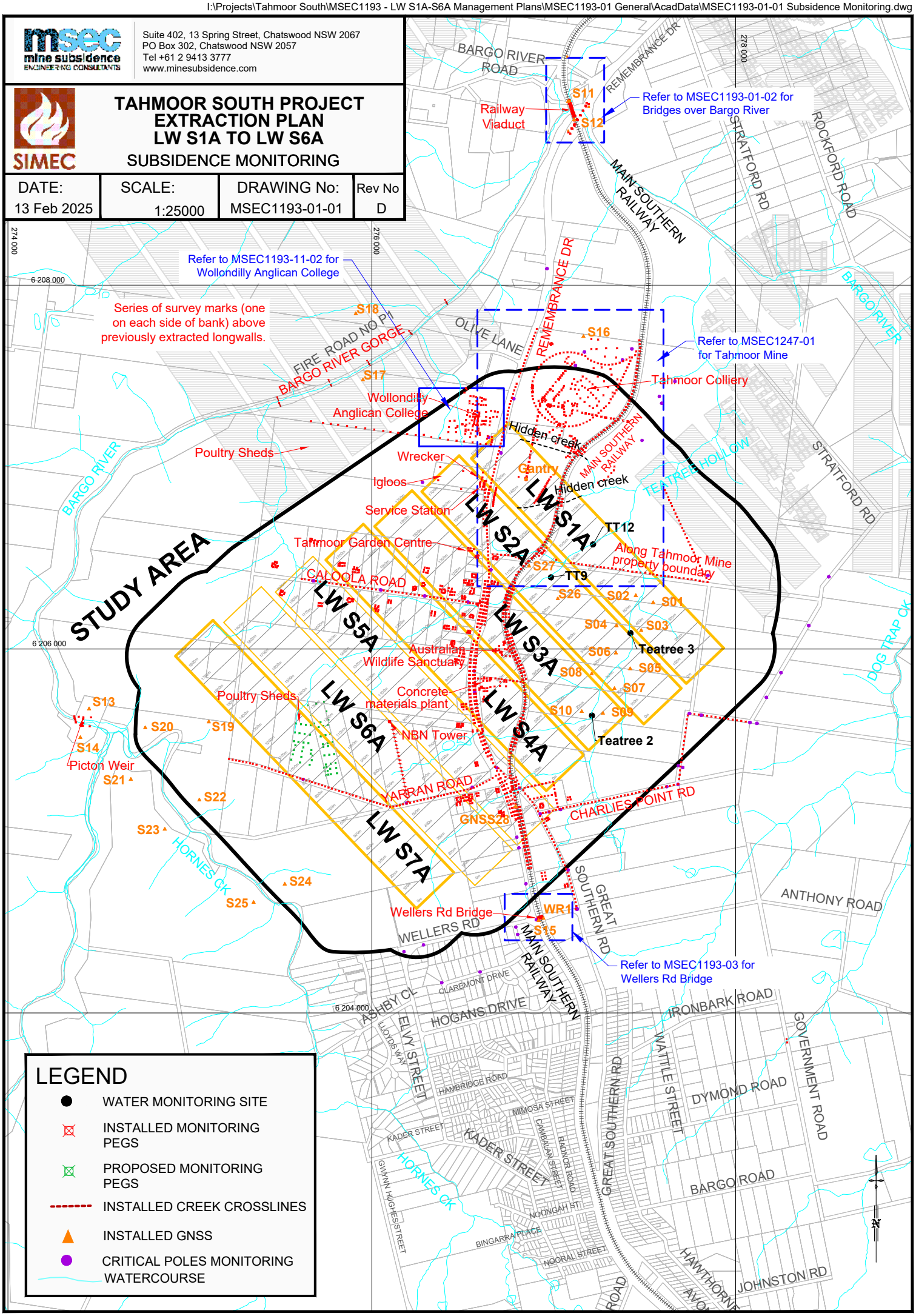
SIMEC

TAHMOOR SOUTH PROJECT EXTRACTION PLAN LW S1A TO LW S6A

SUBSIDENCE MONITORING

DATE:	SCALE:	DRAWING No:	Rev No
13 Feb 2025	1:25000	MSEC1193-01-01	D



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TAHMOOR SOUTH PROJECT MANAGEMENT PLAN LW S1A TO LW S6A

ELECTRICAL INFRASTRUCTURE

DATE:	SCALE:	DRAWING No:	Rev No
23 Oct 2024	1:25000	MSEC1193-07-01	B

276 000

278 000

6 208 000

6 206 000

6 204 000

BARGO RIVER

Hidden Creek

Hidden Creek

STUDY AREA

LW S1A

LW S2A

LW S3A

LW S4A

LW S5A

LW S6A

LW S7A

LEGEND:

- Transmission Lines
- Low Voltage
- 11 kV
- 66 kV
- Substation
- Power Poles

N

Grid to MGA co-ordinates

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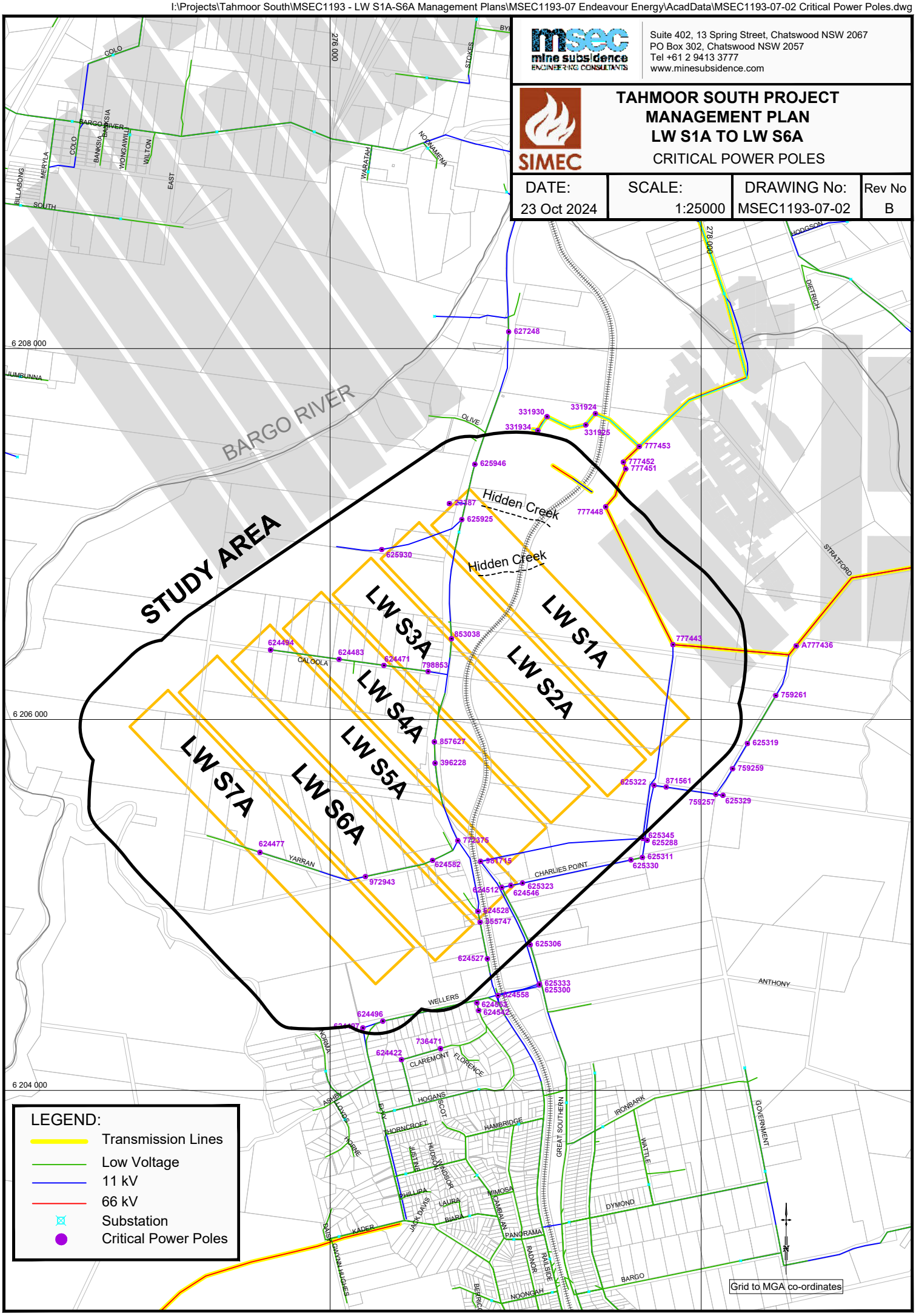
TAHMOOR SOUTH PROJECT MANAGEMENT PLAN LW S1A TO LW S6A

CRITICAL POWER POLES

DATE:	SCALE:	DRAWING No:	Rev No
23 Oct 2024	1:25000	MSEC1193-07-02	B



Major Project Risk Assessment: Tahmoor Underground - Extraction Plan Longwalls 101A to 106A

	Step 2: Assess Type; Key Elements-These change depending on TYPE of Risk Assessment			Step 3: Identify the risks, causes and potential consequences			Step 4: Identify the existing controls to manage the identified risks	Step 5: Determine RCE	Steps 6, 7 & 8: Determine the Expected Consequence / Likelihood applicable to the Expected Consequence / Current level of risk				Step 10: PMC		Step 11: Treat the Risks			
Appendix B																		
Site	Type of Risk Assessment	Key Element (CURA Context/Category)	Sub Key Element (If applicable)	Risk Description - Something happens……	Consequence - resulting in:	Causes - Caused by	Existing Control Description	Risk Control Effectiveness	Expected Consequence Category	Expected Risk Consequence	Risk Likelihood	Current Risk Rating	Potential Maximum Consequence	Potential Maximum Category	Treatment plans/tasks (Description)	Task Owner	Due Date	Comments
Tahmoor Underground	Major Project	Built Infrastructure	Endeavour Energy Infrastructure	Adverse impacts to power poles	Reduction in clearance heights and / or excessive tilting of power poles	Subsidence	* Successful completion of management plan for LW 22-W4 (AC) * Previous ground survey, pole survey and visual inspection as part of LW 22 - W4 management (AC) * Previous consultation, coordination and cooperation with Endeavour Energy (AC)	2	Health & Safety	2	D	5	2	Health & Safety	Complete and implement Endeavour Energy Management Plan including TARP	Ross Barber	01-Jul-22	
Tahmoor Underground	Major Project	Built Infrastructure	Endeavour Energy Infrastructure	Adverse impacts to consumer cables to houses	Loss of serviceability, emergency repair of powerline	Subsidence	* Management Plans prepared for previous longwalls (AC) * Previous ground survey, pole survey and visual inspection as part of LW 22-W4 management (AC) * Previous consultation, coordination and cooperation with Endeavour Energy (AC)	2	Property Damage	2	D	5	2	Property Damage	Complete Endeavour Energy Management Plan including TARP	Ross Barber	01-Jul-22	
	2	2		2	2	Subtotal CountA (ignoring hidden values)		2				2	2					
Tahmoor Underground	Broad Brush											#N/A						
Tahmoor Underground	Life of Mine											#N/A						
Tahmoor Underground	Business																	
Tahmoor Underground	Major Project											#N/A						
Tahmoor Underground	Environmental/Health/Process											#N/A						
Tahmoor Underground	Equipment											#N/A						

Major Project Risk Assessment: Tahmoor Underground - Extraction Plan Update to include Longwall South 7A

Step 2: Assess Type; Key Elements-These change depending on TYPE of Risk Assessment	Step 3: Identify the risks, causes and potential consequences	Step 4: Identify the existing controls to manage the identified risks	Step 5: Determine RCE	Steps 6, 7 & 8: Determine the Expected Consequence / Likelihood applicable to the Expected Consequence / Current level of risk	Step 10: PMC	Step 11: Treat the Risks

☑ Appendix B

Key Element (CURA Context/Category)	Sub Key Element (If applicable)	Risk Description - Something happens……	Consequence - resulting in:	Causes - Caused by	Existing Control Description	Risk Control Effectiveness	Expected Consequence Category	Expected Risk Consequence	Risk Likelihood	Current Risk Rating	Potential Maximum Consequence	Potential Maximum Category	Treatment plans/tasks (Description)	Task Owner	Due Date	Comments
Built Infrastructure	Endeavour Energy Infrastructure	Adverse impacts to power poles	Reduction in clearance heights and / or excessive tilting of power poles	Subsidence	* Successful completion of management plan for LW 22-W4 and LW S1A to S3A * Previous ground survey, pole survey and visual inspection as part of LW 22 - W4 management and LW S1A to S3A management * Previous consultation, coordination and cooperation with Endeavour Energy	2	Health & Safety	2	D	5	2	Health & Safety	Update Endeavour Energy Management Plan including TARP to include additional critical poles	Ross Barber	01-Mar-27	
Built Infrastructure	Endeavour Energy Infrastructure	Adverse impacts to consumer cables to houses	Loss of serviceability, emergency repair of powerline	Subsidence	* Management Plans prepared for previous longwalls * Previous ground survey, pole survey and visual inspection as part of LW 22-W4 management and LW S1A to S3A management * Previous consultation, coordination and cooperation with Endeavour Energy	2	Property Damage	2	D	5	2	Property Damage	Update Endeavour Energy Management Plan including TARP to include additional connections	Ross Barber	01-Mar-27	