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SIMEC

SIMEC Mining:

Tahmoor South Longwalls S1A to S7A

Management Plan for potential impacts to Built Structures

AUTHORISATION OF MANAGEMENT PLAN

Authorised on behalf of Tahmoor Coal:
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Signature:
Position:
Date:

DOCUMENT REGISTER

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Aug-25	MSEC1193-09	C	Draft for LW S1A to S7A

References:

AS/NZS 4360:2004Risk Management

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

Douglas Partners (2022a) *Report on Geotechnical Assessment – Longwalls S1A to S6A, Bargo*, Douglas Partners, Report No. 210597.00, September 2022.

Douglas Partners (2022b) *Report on Geotechnical Investigation – Detailed Slope Stability Assessment, Longwalls S1A to S6A, Bargo*, Douglas Partners, Report No. 210597.02, September 2022.

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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Drawing No.	*Description*	*Revision*
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MSEC1193-09-01	Structures	A

Table A.1

Table A.1 is included in Appendix A at the end of this report.

Table.	*Description*	*Revision*
Table A.1	Hazard identification and engineering controls for LWs S1A to S4A	B

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 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 S1A to S6A (LWs 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 and are shown in Fig. 1.1. Residential and commercial structures and dams are located directly above LWs S1A-S6A.

Tahmoor Coal subsequently received approval to shorten the commencing (i.e. southern) ends of LW S3A and LW 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 residential and commercial structures and dams and will result in additional subsidence effects.

A summary of the dimensions of LW 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

The depths of cover directly above LWs S1A-S7A vary between a minimum of 365 m above the finishing end of LW S5A and a maximum of 410 m above the finishing end LW S1A. The longwalls will mine a height of 2.1 m to 2.2 m.

This Management Plan provides detailed information about how the risks associated with the mining of LWs S1A-S7A beneath and adjacent to structures will be managed by Tahmoor Coal.

The Management Plan is a live document that can be amended at any stage of mining.

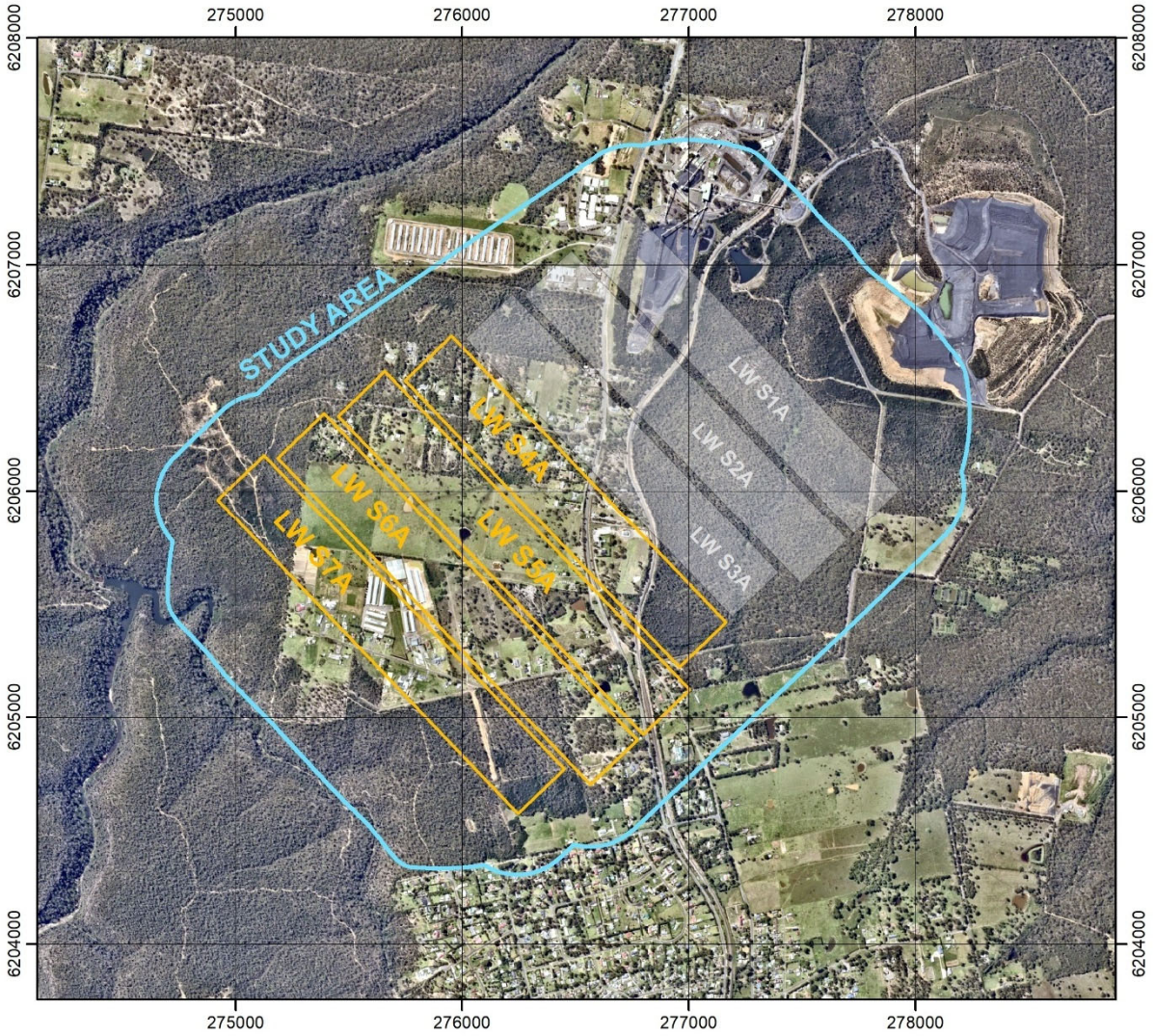


Fig. 1.1 Orthophotograph showing proposed longwalls and the Study Area

1.2. Objectives

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

The objectives of the Management Plan have been developed to:

- Ensure the safety and serviceability of all building structures and infrastructure. Public safety is paramount. Ensure that the health and safety of people who may be present in or near structures 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 conditions of building structures and associated infrastructure during mining;
- Initiate and coordinate action to mitigate or remedy potential significant impacts that are expected to occur to the building structures;
- Provide a plan of action in the event that the impacts of mine subsidence are greater than those that are predicted;
- Establish procedures to measure, monitor, control, mitigate and repair building structures and associated infrastructure;
- 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 at the properties that may require emergency evacuation, entry restriction or suspension of work activities;

- Provide a forum to report, discuss and record impacts to structures. This will involve Tahmoor Coal, the affected landowner and/or resident, relevant government agencies and consultants, as required; and
- Establish lines of communication and emergency contacts.

1.3. Scope

The Management Plan is to be used to protect and monitor the condition of structures identified such that the health and safety of people who may be present at structures are not put at risk due to mine subsidence. The major items at risk are:

- residential establishments;
- non-residential structures;
- commercial establishments; and
- public amenities.

The locations of the structures above and adjacent to LWs S1A-S7A are shown in Drawing No. MSEC1193-09-01, in Appendix A.

This Management Plan describes measures that will be undertaken due to the mining LWs S1A-S7A only.

Separate management plans have been or will be developed for the following structures that are being used for public, industrial, or commercial purposes:

- Australian Wildlife Sanctuary;
- Tahmoor Mine site;
- Wollondilly Anglican College;
- Bargo Petroleum and Hill Top Pit Stop;
- Inghams Bargo Breeder Farm and Inghams Turkey Farm;
- Tahmoor Garden Centre;
- MKD Machinery;
- Bargo Valley Produce; and
- Canine Country Club.

A property with reference of BGR_230 includes a weatherboard structure that is used as a hobby train business (Pamak Hobbies). The SRG agreed that the mine subsidence risks for this property are similar to the risks for other residential structures in the area. The property will, therefore, be managed under the Management Plan rather than developing a separate Property Subsidence Management Plan (PSMP) for the hobby train business. It was further noted that the weatherboard structure is predicted to experience less than 20 mm of vertical subsidence due to the extraction of LWs S1A to S7A.

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 LWs S1A-S7A at Tahmoor Mine (as shown in Drawing No. MSEC1193-09-01), along with available geological information and data from numerous subsidence studies for longwalls previously mined in the area.

The structures and infrastructure considered in this Management Plan have been identified from aerial photographs, site visits and from discussions between Tahmoor Coal and property owners.

The impacts of mining on the building structures and associated infrastructure 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 it will limit the impacts by establishing appropriate procedures that can be followed should evidence of increased impacts emerge.

1.5. Descriptions of the structures

The *Study Area* for the purpose of this management plan has been defined as the surface area that is located within the predicted limit of vertical subsidence, taken as the predicted 20 mm subsidence contour due to the extraction of LWs S1A-S7A or the 35 degree angle of draw, whichever is the greatest. The *Study Area* for LWs S1A-S7A is shown in Drawing No. MSEC1193-09-01, in Appendix A.

The building structures and associated infrastructure that are located within the Study Area include: houses, rural structures and swimming pools. A summary of the structures located within the Study Area for LWs S1A-S7A is provided in Table 1.2.

Table 1.2 Structures located within the Study Area for LWs S1A-S7A

Type	Number of structures		
	Above LW S1A-S7A	Outside LW S1A-S7A	Total within Study Area
Houses	78	32	110
Rural structures	331	140	471
Swimming pools	17	3	20
All structures	**426**	**175**	**601**

A total of 601 structures are located within the Study Area, of which, 426 structures are located directly above LW S1A-S7A.

1.6. Proposed mining schedule

It is planned that LWs 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 1.3.

Table 1.3 Schedule of mining

Longwall	Start Date	Completion Date
LW S1A	October 2022	July 2023
LW S2A	August 2023	April 2024
LW S3A	May 2024	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.

1.7. 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 m in front of the longwall face to an area 450 m 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 m in front and 450 m behind the active longwall face, as shown by Fig. 1.2.

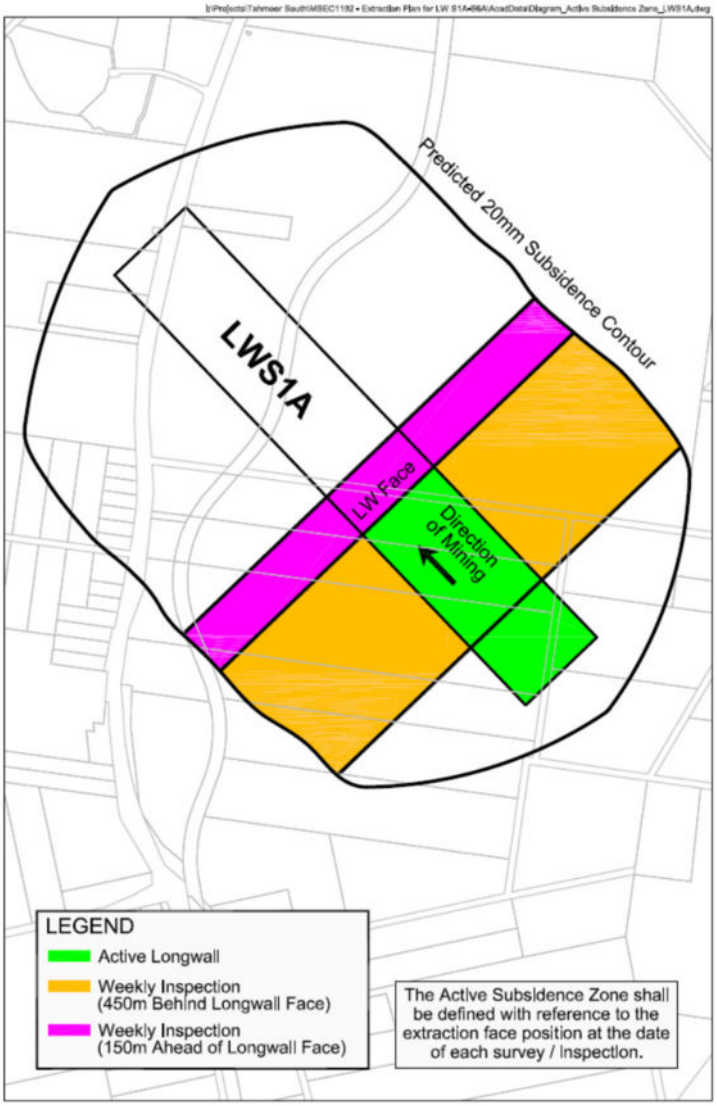


Fig. 1.2 Diagrammatic representation of the active subsidence zone

1.8. Compensation

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

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.

1.9. Subsidence Acquisition Rights

Condition C15 of the Project Approval requires that Tahmoor Coal offer acquisition rights to any landowner on privately owned land where a residence is subject to:

(a) subsidence damage category R4 or R5; and/or

(b) continuous cracking in bricks > 5 mm in width on one or more locations in the total external façade; and/or

(c) slippage along the damp proof course of > 5 mm anywhere in the total external façade; and/or

(d) tilt of greater than 10 mm/m; and/or

(e) subsidence damage category R3 or more and has/will be impacts by more than one longwall,

as a result of the development (i.e. mining-induced movement).

The subsidence damage categories referred to in Condition C15 are defined in Appendix 6 of the Project Approval, which are consistent with the damage categories that were provided in Report No. MSEC1192.

Condition C16 of the Project Approval requires that property acquisition under Condition C15 is to occur under the compensation provisions of the *Coal Mine Subsidence Compensation Act 2017.*

The landowner is not obliged to accept the offer to acquire the property.

2.1. 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 Application for LWs 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 structures (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 2.1. The predicted ground strains are discussed in Section 2.3. 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.

Table 2.1 Maximum predicted incremental conventional subsidence parameters for LWs S1A-S7A

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	1050	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 2.2.

Table 2.2 Maximum predicted total conventional subsidence parameters for LWs S1A-S7A

Longwalls	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, is 1,400 mm. The maximum predicted total conventional tilt is 10 mm/m (i.e. 1.0 %), which represents a change in grade of 1 in 100. The maximum predicted total conventional curvatures are 0.14 km^{-1} hogging and 0.25 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 within the Study Area.

2.2. 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. 2.1 to Fig. 2.6.

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. 2.4, 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. 2.4. 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. 2.2. Whilst observed subsidence along Remembrance Drive has been less than predicted, increased compressive strains have been observed at two locations, as shown in Fig. 2.6.

Monitoring during the mining of LW S3A measured subsidence movements within predictions, as shown in Fig. 2.3. 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. 2.5.

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.

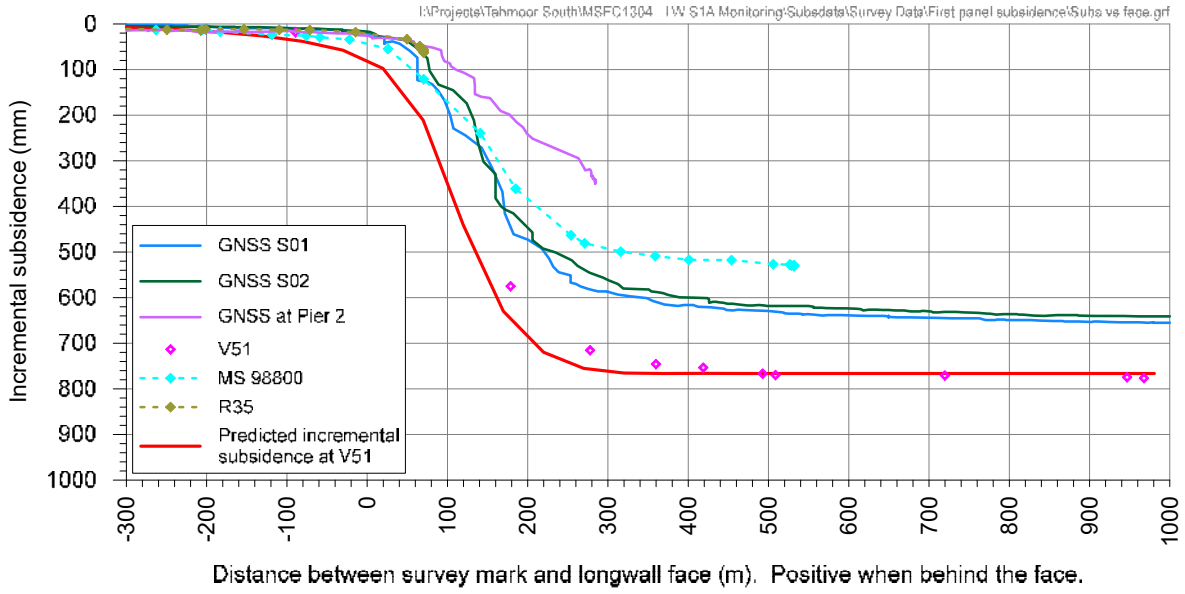


Fig. 2.1 Comparison between predicted and observed subsidence above centreline of LW S1A

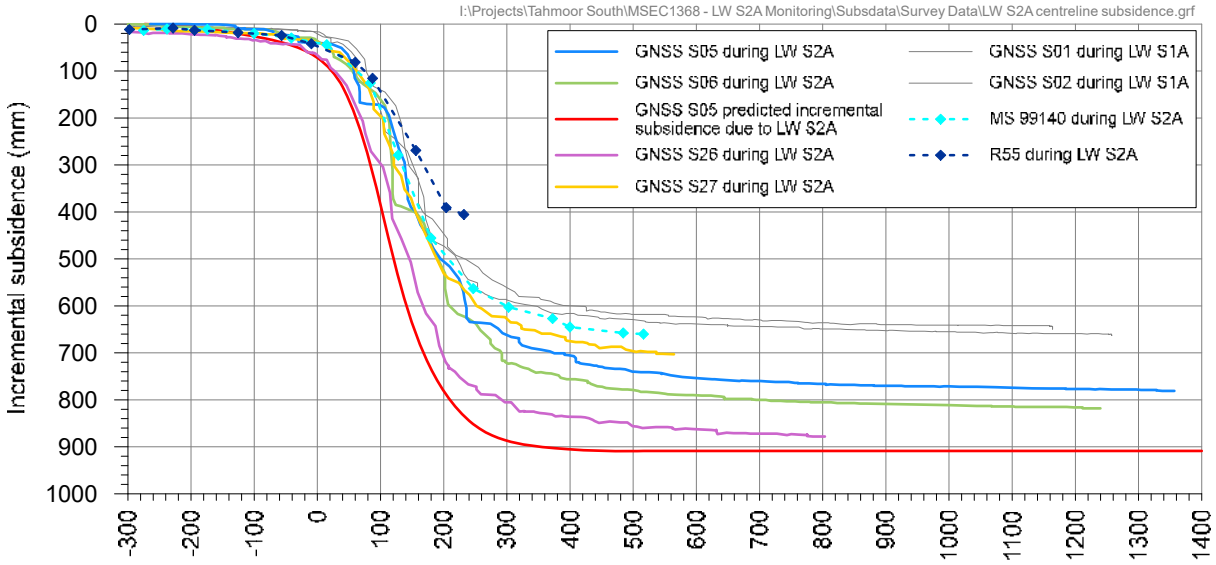


Fig. 2.2 Comparison between precited and observed and predicted subsidence above centreline of LW S2A

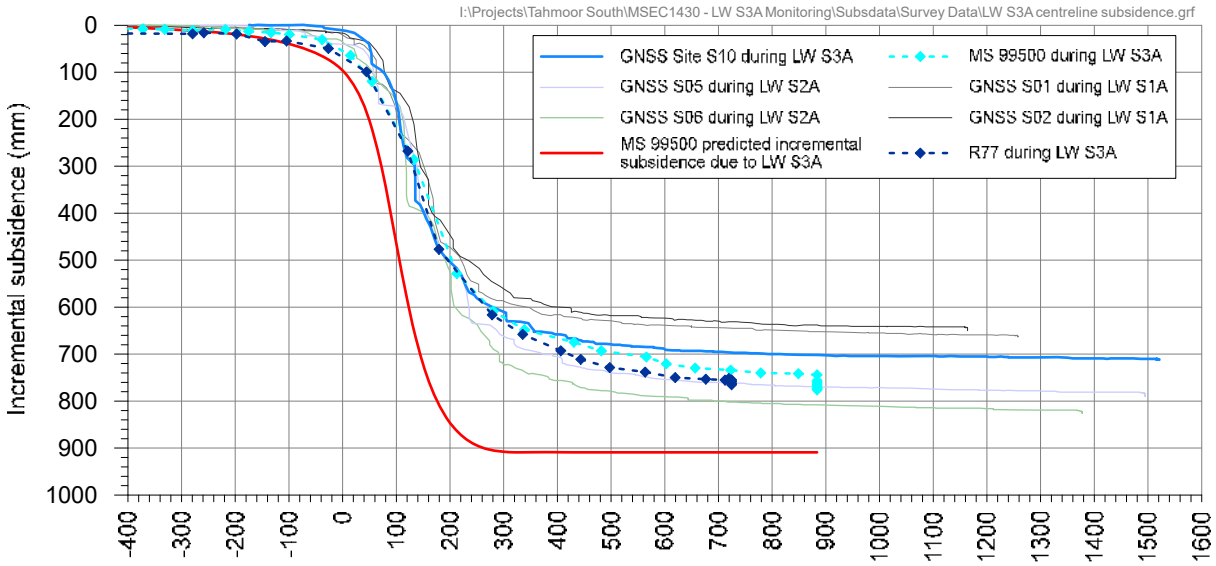


Fig. 2.3 Comparison between predicted and observed subsidence above centreline of LW S3A

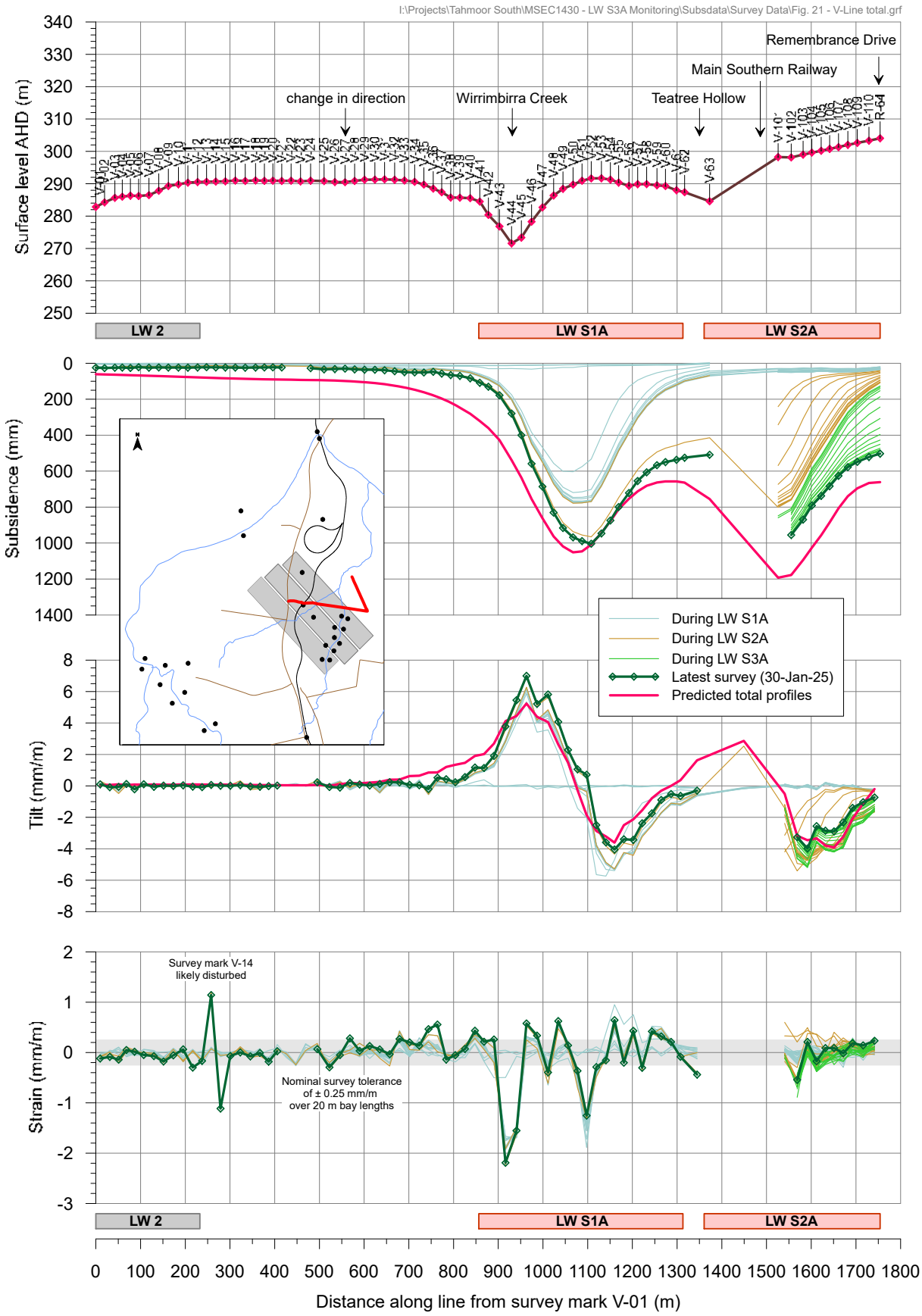


Fig. 2.4 Observed subsidence along V Line during the mining of LW S1A-S3A

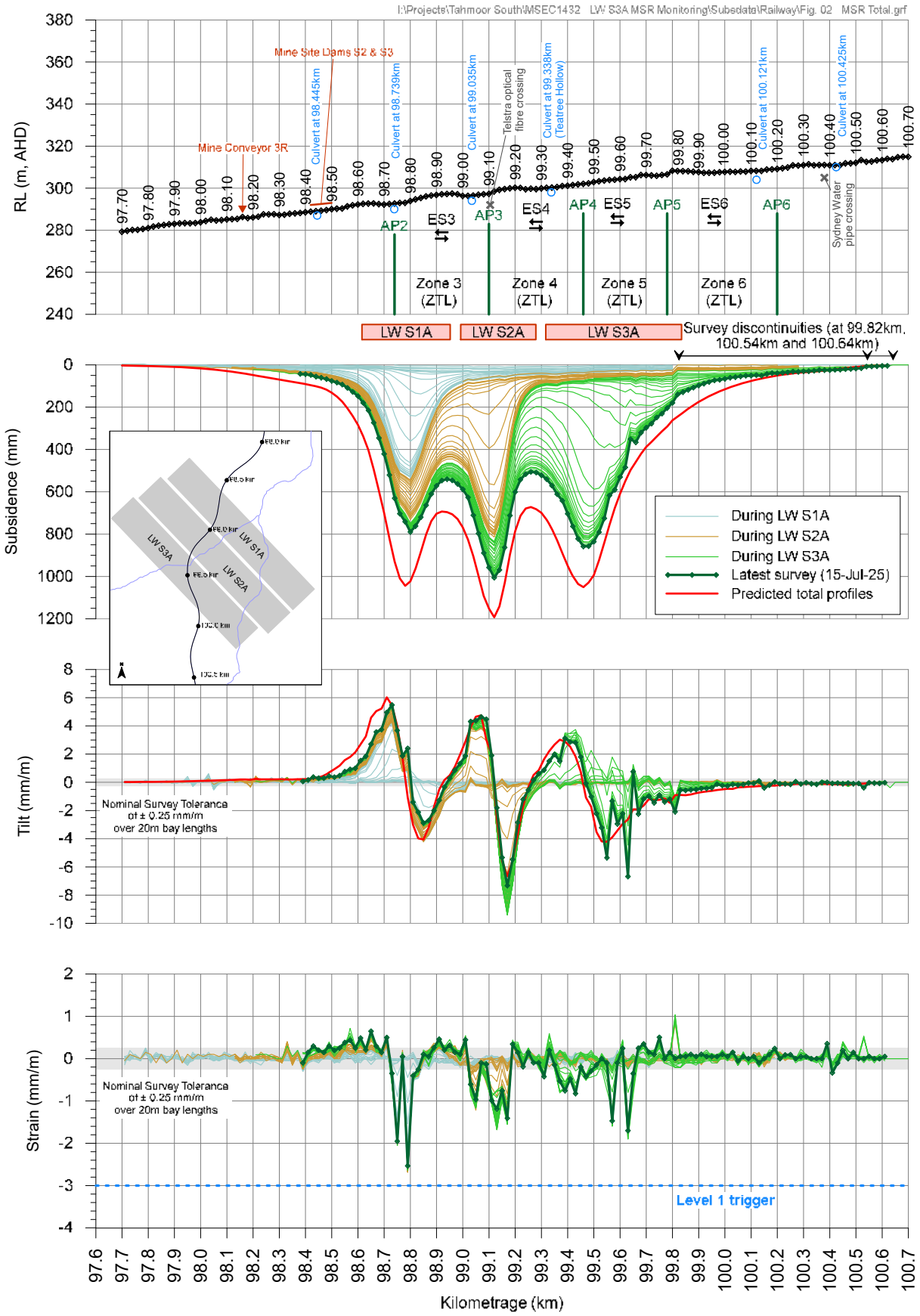


Fig. 2.5 Observed subsidence along Main Southern Railway during the mining of LW S1A-S3A

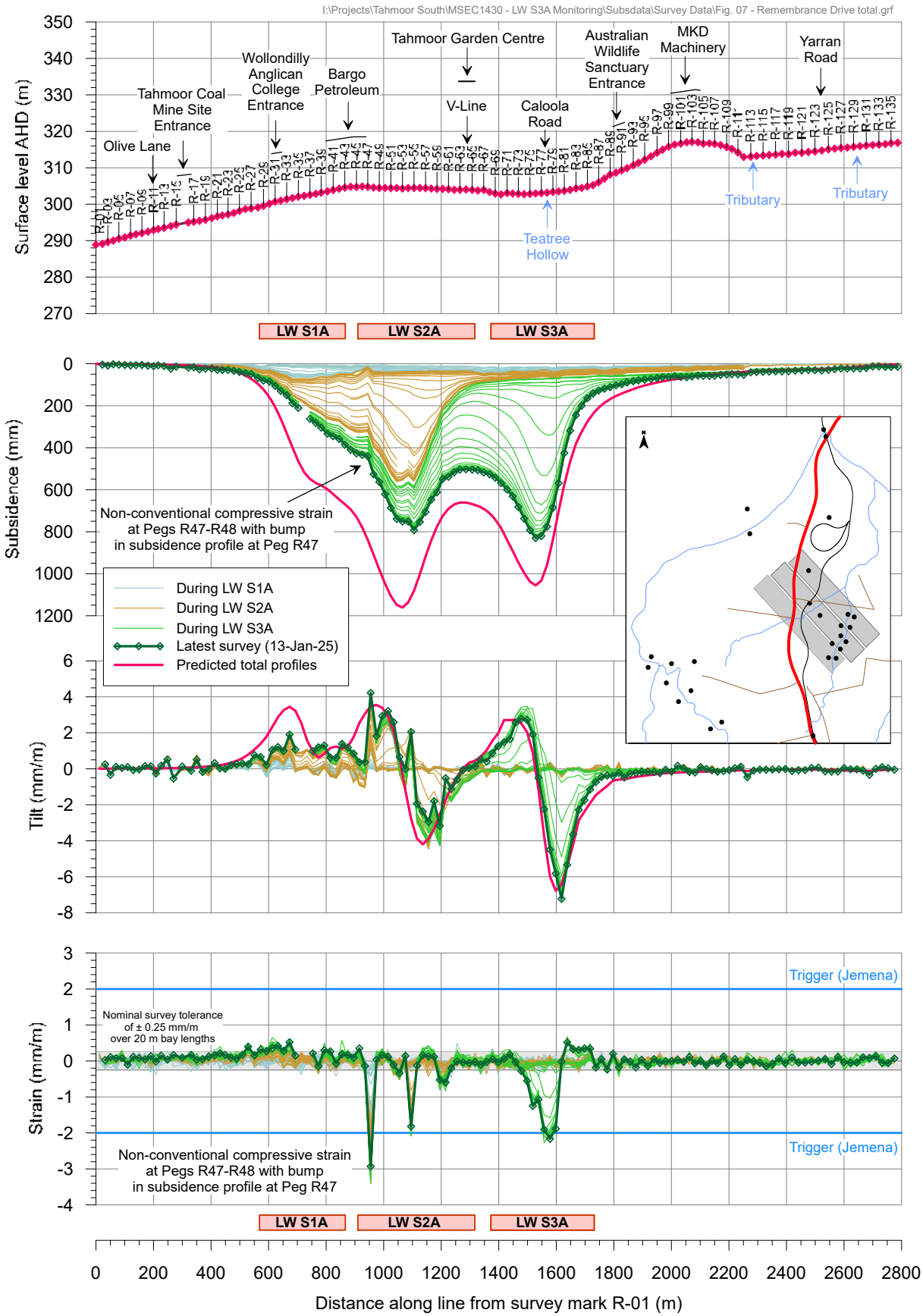


Fig. 2.6 Observed subsidence along Remembrance Drive during the mining of LW S1A-S3A

2.3. 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 addressed separately in this report. The strains resulting from damaged or disturbed survey marks have also been excluded.

2.3.1. Predictions of strain above goaf

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.

The survey database 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 Area and West Cliff Collieries is provided in Fig. 2.7. A number of probability distribution functions were fitted to the empirical data. It was found that a *Generalised Pareto Distribution (GPD)* provided a good fit to the raw strain data, and this is also shown in this figure.

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.

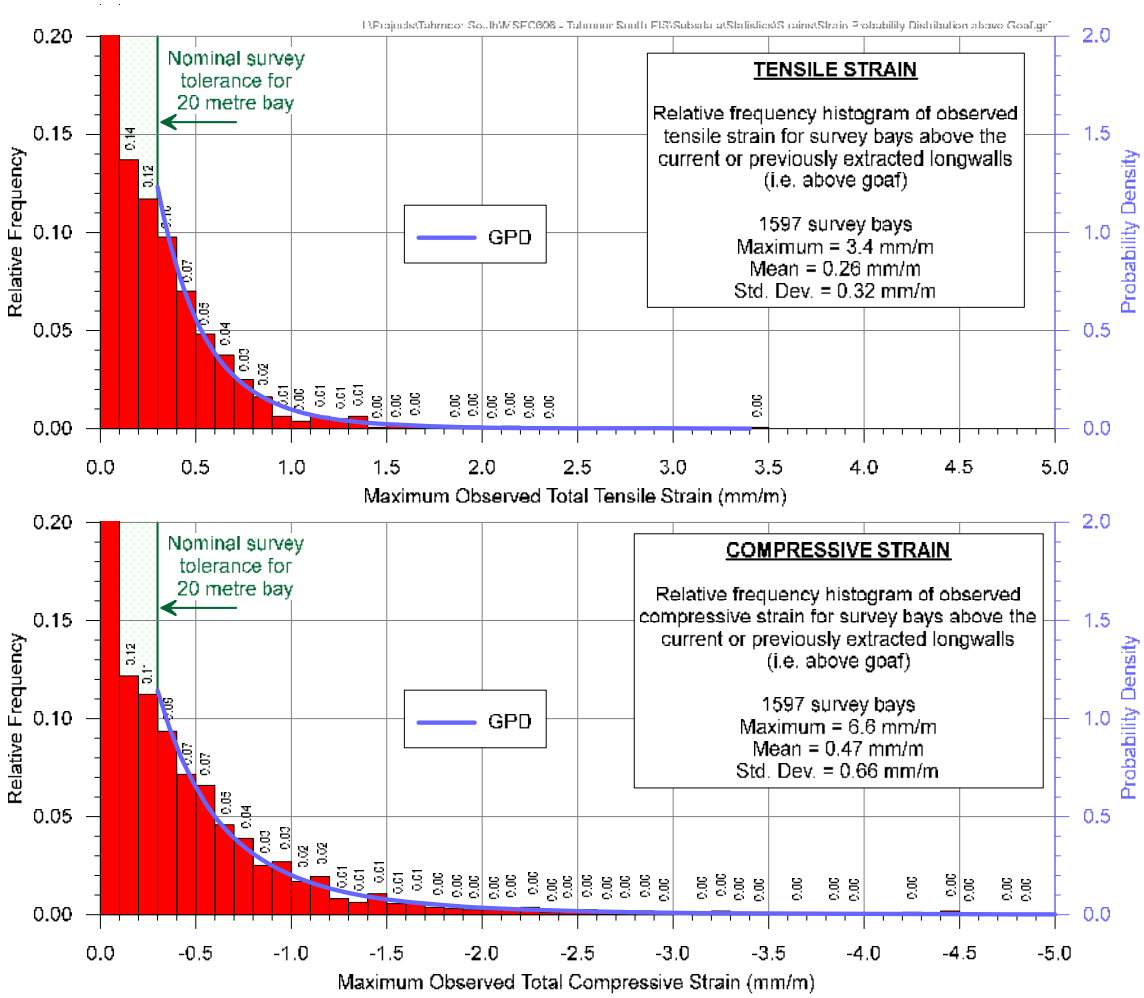


Fig. 2.7 Distributions of the maximum measured tensile and compressive strains for survey bays located above goaf at Tahmoor, Appin and West Cliff Collieries

2.3.2. 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. 2.8. A number of probability distribution functions were fitted to the empirical data. It was found that a *Generalised Pareto Distribution (GPD)* provided a good fit to the raw strain data, and this is also shown in this figure.

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.

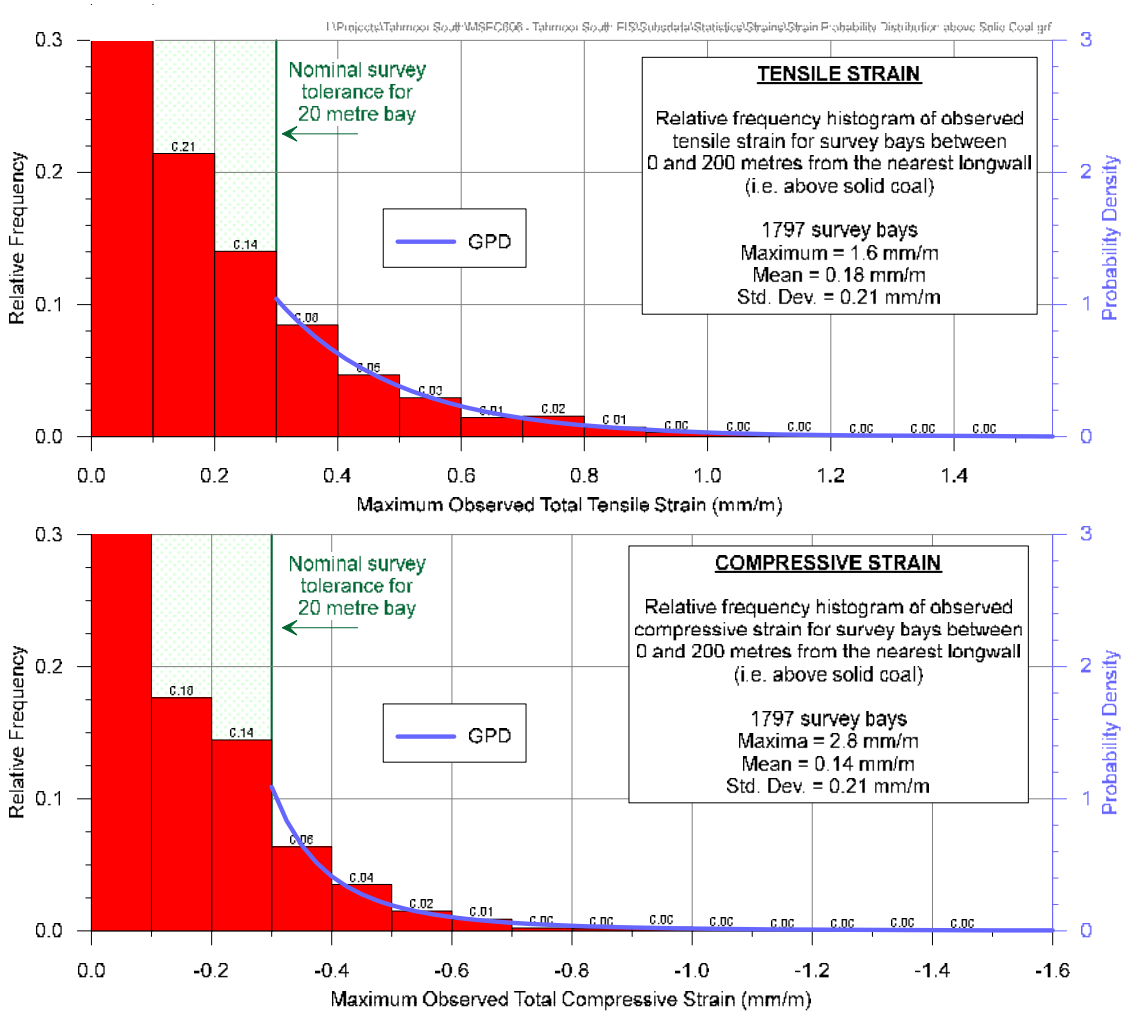


Fig. 2.8 Distributions of the maximum measured tensile and compressive strains for survey bays located above solid coal at Tahmoor, Appin and West Cliff Collieries

3.1. NSW Work Health and 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 directly beneath and adjacent to structures in accordance with the WHS laws.

3.2. General

The method of assessing potential mine subsidence impacts in the Management Plan is consistent with the Australian/New Zealand Standard for Risk Management (AS/NZS ISO 31000:2009). 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:-

3.2.1. 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.' The consequences of a hazard are rated from negligible to catastrophic.

3.2.2. Likelihood

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

3.2.3. Hazard

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

3.2.4. 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.

As there is no material difference between the risks to structures associated with the extraction of LW S7A compared to the risks associated with the extraction of LWs S1A-S6A, the same risk ratings have been adopted in the risk assessment for LW S7A (Tahmoor Coal, 2025).

4.1. Predicted subsidence effects for residential structures

Predicted mining-induced conventional subsidence movements were provided in Report No. MSEC1192, which was prepared in support of Tahmoor Coal's Extraction Plan for LWs 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 structures (MSEC1348). This Management Plan provides subsidence predictions based on the revised predictions that were provided in Report No. MSEC1348.

At the time of preparing Report No. MSEC1192 (MSEC, 2022) in support of the Extraction Plan Application for LWs S1A to S6A, structures were identified from orthophotographs and Nearmap images in July 2021, with structure types identified from Google Street View and kerbside inspections. At the time of preparing Report No. 1348 (MSEC, 2024) in support of LW S7A, an orthophotograph from 2023 was used to review and update the map of identified structures.

There are 110 houses that have been identified within the Study Area for LW S1A-S7A. A total of 78 houses are located directly above the proposed longwalls. The locations of the houses are shown in Drawing No. MSEC1193-09-01. A summary of the number of houses located directly above each of the proposed longwalls is provided in Table 4.1.

Table 4.1 Number of houses located directly above each of the proposed longwalls

Layout	Longwall	Number of houses directly above each proposed longwall
Extraction Plan LW S1A to S7A	LW S1A	0
	LW S2A	1
	LW S3A	14
	LW S4A	21
	LW S5A	20
	LW S6A	11
	LW S7A	11
	Total	**78**

It can be seen that LW S1A did not extract beneath any houses and LW S2A extracted directly beneath one house. LWs S3A to S5A extract directly beneath the majority of the houses within the Study Area. LW S7A will extract directly beneath an additional 11 houses. All of the houses located directly above the proposed LW S7A were already predicted to experience some subsidence movements due to extraction of LWs S1A to S6A.

Whilst five houses on Wellers Road are located within the Study Area for LWs S1A to S7A, they are predicted to experience less than 20 mm of vertical subsidence. The potential for impacts on these houses is negligible.

Distributions of the predicted conventional subsidence and tilt for the houses within the Study Area are illustrated in Fig. 4.1 and Fig. 4.2. The predicted tilts provided in this table are the maxima in any direction after the completion of each of the proposed longwalls.

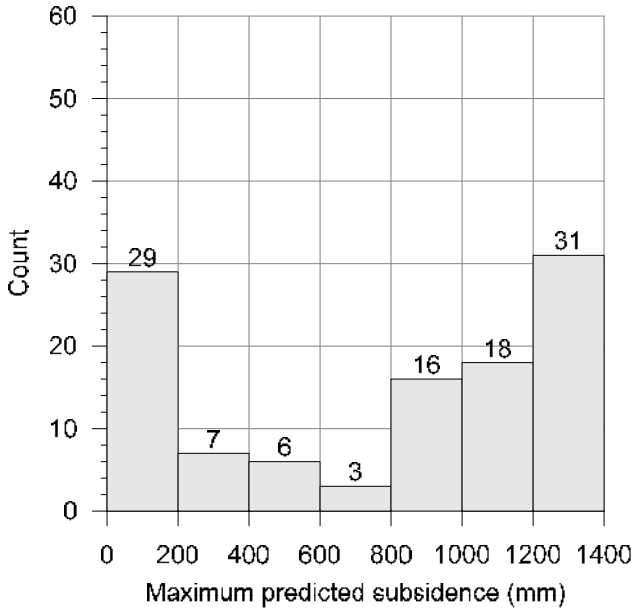


Fig. 4.1 Maximum predicted vertical subsidence for the houses

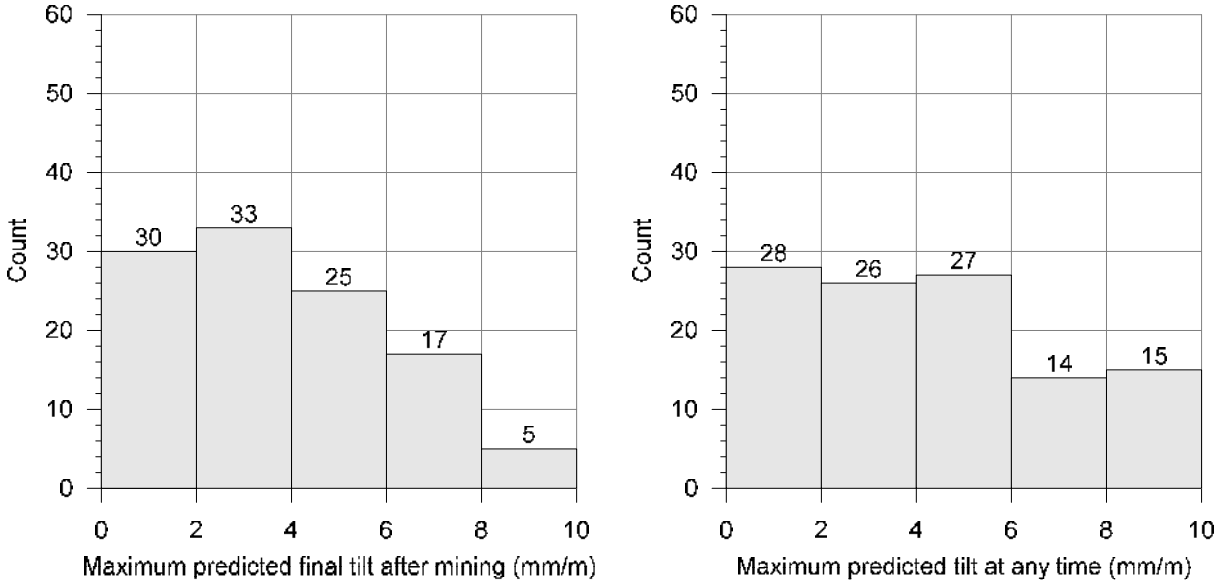


Fig. 4.2 Maximum predicted final tilt (left-side) and transient tilt (right-side) for the houses

The maximum predicted tilt for the houses within the Study Area is 8.5 mm/m (i.e. 0.9 %, or 1 in 118). A total of 8 houses (i.e. 9 % of the total) are predicted to experience tilts greater than 7 mm/m. The potential for serviceability impacts is greater for these houses. In some cases, more substantial remediation measures may be required, such as relevelling of the building structure.

The distribution of predicted final tilts for the houses within the Study Area is provided in Fig. 4.3. The greatest tilts occur at eight houses located directly above LW S6A and S7A.

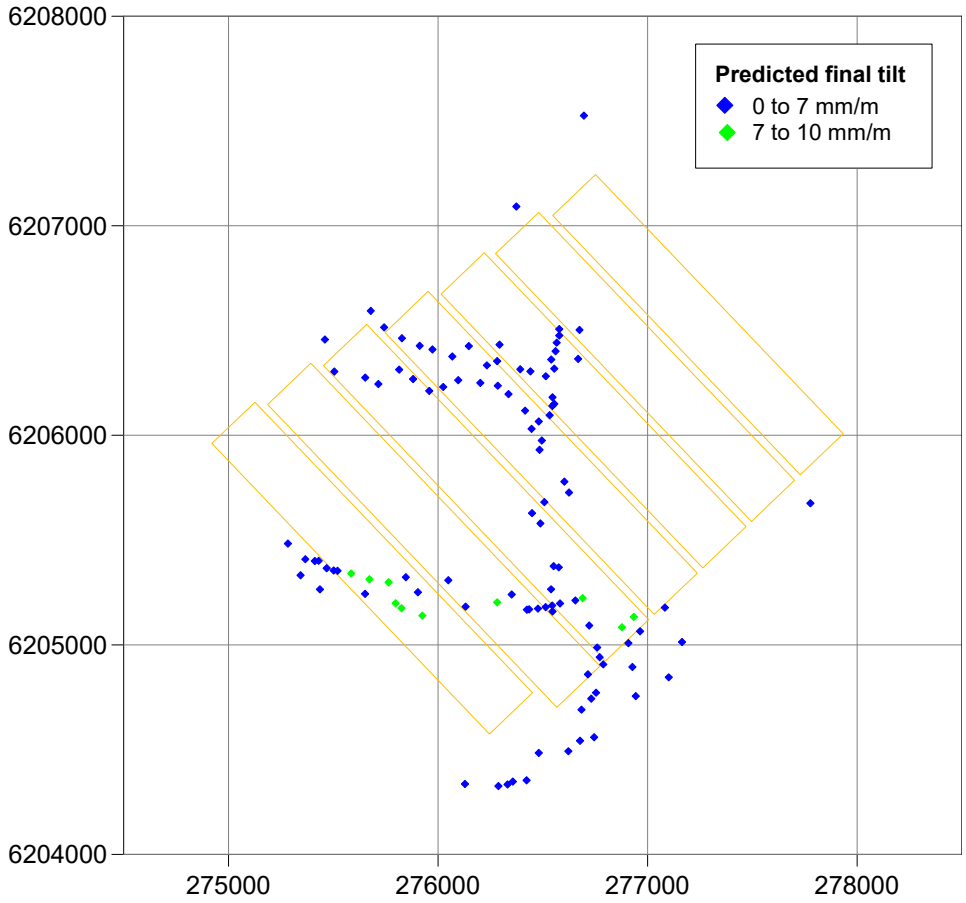


Fig. 4.3 Distribution of predicted final tilts for the houses within the Study Area at the completion of mining

It can be seen from the above figure, that the houses with predicted final tilts greater than 7 mm/m are located above proposed LW S6A and S7A near the commencing ends of the longwalls.

Distributions of the predicted conventional curvature for the houses within the Study Area are illustrated in Fig. 4.4. The predicted curvatures are the maxima in any direction at any time during or after the extraction of each of the proposed longwalls.

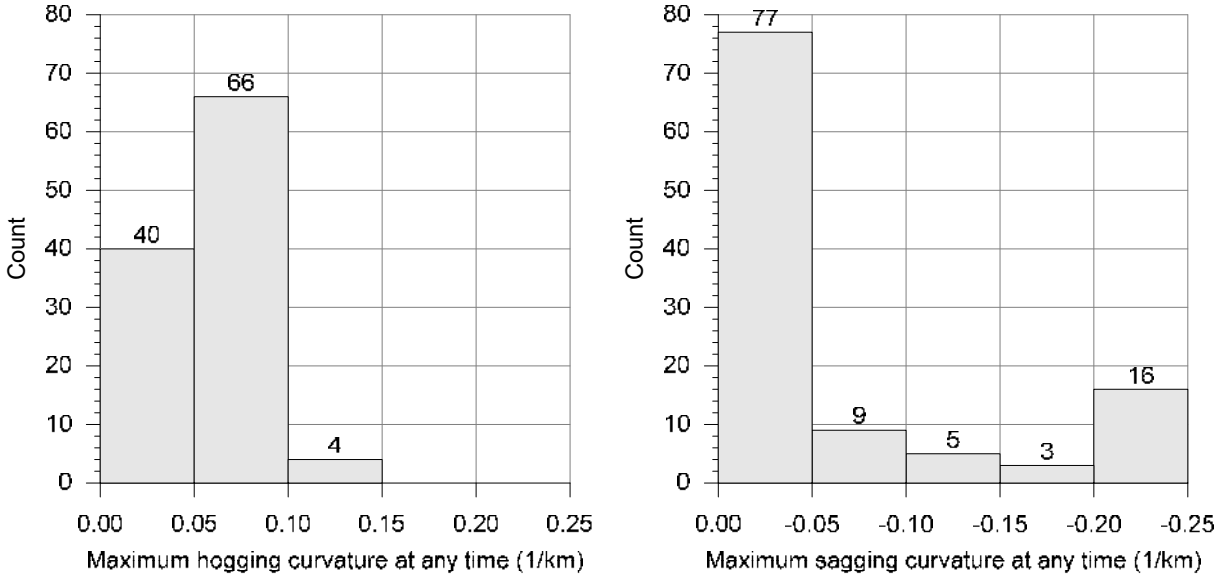


Fig. 4.4 Maximum predicted conventional hogging curvature (left-side) and sagging curvature (right-side) at any time for the houses

The maximum predicted curvatures for the houses within the Study Area are 0.11 km^{-1} hogging and 0.23 km^{-1} sagging, which represent minimum radii of curvature of 8.9 km and 4.3 km, respectively.

The distributions of the maximum predicted curvatures for the houses within the Study Area are provided in Fig. 4.5.

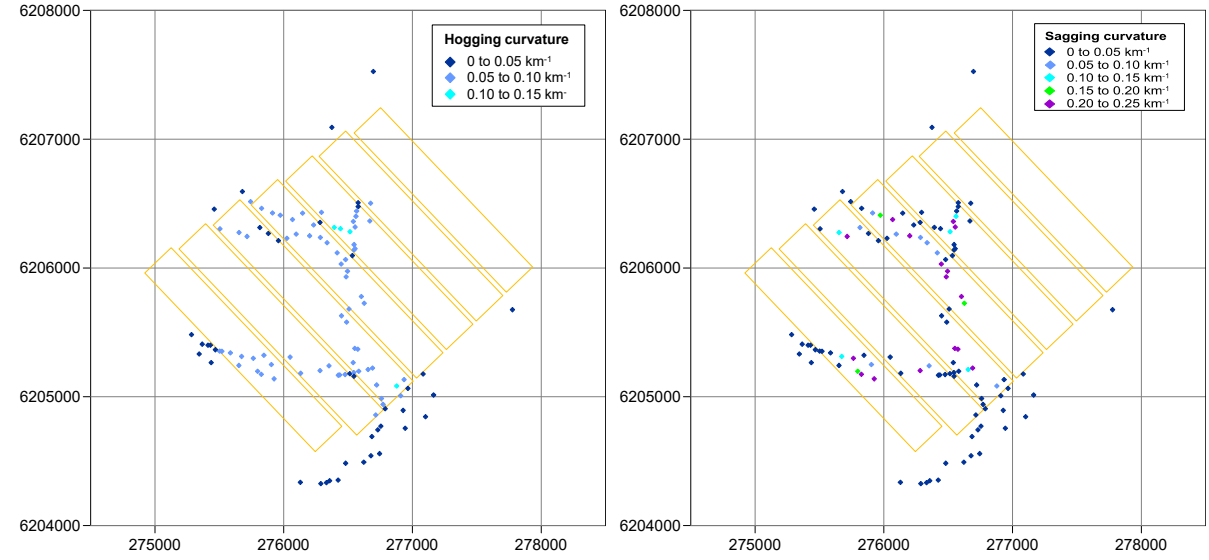


Fig. 4.5 Distributions of maximum predicted total hogging curvature (left-side) and sagging curvature (right-side) for the houses at the completion of mining

The above figure shows that the greatest predicted curvatures occur directly above the proposed longwalls.

The maximum predicted conventional strains for the houses, based on applying a factor of 15 to the maximum predicted conventional curvatures, are 1.7 mm/m tensile and 3.5 mm/m compressive. Higher strains could develop at the houses due to irregular ground movements or topographic effects.

The predicted distributions of strain are described in Report Nos. MSEC1192 (LWs S1A to S6A) and MSEC1348 (LW S7A). The houses are at discrete locations and, therefore, the most relevant distribution of strain is the maximum strains measured in individual survey bays above previous longwall mining. The maximum predicted total strains directly above the proposed longwalls are 1.3 mm/m tensile and 2.2 mm/m compressive based on the 95 % confidence level.

5.1. Experience of mining beneath structures

There is extensive experience of mining beneath building structures at Tahmoor, as well as other mines elsewhere in the Southern Coalfield.

More than 2000 houses, public amenities and commercial and business establishments have experienced subsidence movements at Tahmoor, during the mining of Longwalls 22 to 32 and LW W1-W4. The following observations have been made based on the experiences of mining beneath building structures in the Southern Coalfield:

- Mine subsidence has not directly exposed residents to any immediate or sudden safety hazards;
- Subsidence Advisory NSW had received 547 claims from individual properties (not including refused claims), at the completion of Longwall 30, of which, 489 claims included impacts to main structures. The remaining 58 claims related solely to damage to small improvements such as swimming pools, sheds and pavements;
- The overall claim rate at the completion of Longwall 30 is 489 out of 1955 main structures, or 25 %. In other words, no impacts have been reported for 75 % of the main structures;
- The rate of impact for structures located directly above the longwalls is greater than that based on all structures located within the predicted limit of vertical subsidence. There are 1190 houses, commercial and business establishments and public amenities located directly above Longwalls 22 to 27 (or the pillars between them). A total of 385 claims have been made from this subset, which represents a claim rate of 32 % for structures that are located above goaf;
- A similar rate of impact was observed for houses that have been located directly above LW W1-W4. Of the 26 houses located directly above or immediately adjacent to LW W1-W4, 14 properties have reported impacts, of which 8 relate to damage to the house. This represents a claim rate of 27% for structures that are located above goaf. The impacts to the houses have been very slight to minor and all houses have remained safe and serviceable.

5.2. Managing public safety

The primary risk associated with mining beneath structures 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. Tahmoor Coal 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 inspections by a structural engineer and a geotechnical engineer where structures are located on or near steep slopes. The findings of the assessments are described in this Management Plan in the sections below.

5.2.1. Subsidence impact management process

Tahmoor Coal has developed a *risk management process* to manage potential impacts on structures. This plan has been developed based on the experience of mining beneath and adjacent to structures during the extraction of Longwalls 22 to 32 and LW W1-W4 at Tahmoor North and LW S1A-S3A. This management process has been reviewed and updated based on continuing experiences gained from the mining of longwalls at Tahmoor Mine.

The risk management process for LW S1A-S7A includes the following processes, which are illustrated in the flowchart in Fig. 5.1:

1. Regular consultation, cooperation and coordination with the community before, during and after mining as described in Section 6.3. This includes letters and door knocking to all residents of structures that will soon be affected by subsidence. The letters offer a free pre-mining inspection and hazard identification inspection by a structural engineer;
2. Site-specific investigations, where they are necessary and appropriate, into the conditions of buildings and associated structures and their surrounding environment (where access is allowed). Site-specific investigations have been, and will continue to be undertaken early so that there is adequate time, if required, to arrange additional inspections and/or surveys and implement any mitigation measures before mining-induced impacts are experienced;

   Site-specific investigations have been completed for all houses within the predicted limit of subsidence for LW S1A-S7A.

   As a general rule, site-specific investigations are undertaken before the longwall face approaches to within 300 m of travel prior to directly mining beneath each property. For properties located directly above the first 300 m of the commencing end of a longwall, the investigations are targeted to be undertaken prior to extraction, or at the latest, they will be undertaken prior to the first 200 m of extraction of the longwall.

   Site-specific investigations include the following:

   a) At the time of preparing Report No. MSEC1192 (2022) in support of Tahmoor Coal's Extraction Plan Application, structures were identified from aerial photographs, with structure types identified from kerbside inspections;
   b) Front of house risk and visual screening inspections by Tahmoor Coal in company with a structural engineer for all properties that are predicted to experience more than 20 mm of incremental vertical subsidence due to the extraction of LW S1A-S7A. The purpose of the inspections was to identify potential hazards at an early stage in the risk management process.

      In some cases, particularly in semi-rural and rural areas, it was difficult to inspect a structure that is remote from the street front. Where these cases involve properties that are located directly above LW S1A-S7A, Tahmoor Coal requested access to conduct a pre-mining inspection and hazard identification inspection by a structural engineer;
   c) Tahmoor Coal requested access to conduct pre-mining geotechnical inspections of structures located on or immediately adjacent to steep slopes that are predicted to experience more than 20 mm of incremental vertical subsidence due to the extraction of LW S1A-S7A (refer Section 5.3.1);
   d) Tahmoor Coal requested access to conduct pre-mining hazard identification inspections by a structural engineer (where access is allowed by the landowner) to properties with structures that have been specifically targeted on the basis that they may be more sensitive to mine subsidence movements due to the extraction of LW S1A-S7A. These include:
      i) Commercial and business establishments, public amenities and public utilities that are predicted to experience more than 20 mm of incremental vertical subsidence due to the extraction of LW S1A-S7A;
      ii) Structures of heritage significance that are predicted to experience more than 20 mm of incremental vertical subsidence due to the extraction of LW S1A-S7A (refer Section 5.3.3);
      iii) Structures that are located above hidden creeks that are predicted to experience more than 20 mm of incremental vertical subsidence due to the extraction of LW S1A-S7A (refer Section 5.3.4);
      iv) Structures that are located above mapped geological structures that are predicted to experience more than 20 mm of incremental vertical subsidence due to the extraction of LW S1A-S7A;
      v) Structures that are located on or adjacent to steep slopes or that have been recommended for inspection by a geotechnical engineer;
      vi) Structures that have been identified as being potentially unstable or unsafe by landowners (Item 1), or from the front of house inspections (Item 2b);
      vii) Houses and units estimated to have been constructed prior to the declaration of the Bargo Mine Subsidence District, which was declared in 1975 (refer Section 5.3.6).

3. Implementation of mitigation measures following inspections by the geotechnical engineer and the structural engineer, in consultation and agreement with the landowner. These will be implemented before the longwall face approaches to within 100 m of travel prior to directly mining beneath each property:
4. Surveys and inspections during mining within the active subsidence area (refer Table 6.1 for timing and frequencies):
    i) detailed visual inspections and vehicle-based inspections along the streets;
    ii) ground surveys along the streets;
    iii) baseline ground surveys of pegs installed around semi-rural and rural houses that are remote from local streets and located directly above LW S1A-S7A, or where requested by a landowner;
    iv) specific ground surveys for selected properties, where recommended by the geotechnical engineer or structural engineer due to their proximity to steep slopes or pre-existing condition;
    v) visual inspections of residential structures that are either: located on or adjacent to steep slopes, are in poor existing condition (based on the hazard identification inspections), have previously reported impacts, or where recommended by the Structures Response Group;
    vi) visual inspections of pool fences and gates; and
    vii) visual inspections of commercial establishments and public utilities.

The *subsidence impact management process* has been developed in consideration of the following facts and observations:

1. Australian standards have been available for use in the design of structures since 1948. Approximately half of the structures within the Study Area have been constructed after the declaration of the Bargo Mine Subsidence District in November 1975;
2. There is sufficient redundancy in structural design such that ductile deformation will develop and be noticeable to residents before structural failure occurs;
3. Subsidence movements develop gradually over time at Tahmoor Mine as they have above other previously extracted longwalls at similar depths of cover;
4. Experiences during the mining of Longwalls 22 to 32 and LW W1-W4 have found that the most effective method of managing potential impacts on the safety and serviceability of structures are by way of community consultation. Residents living within the active subsidence zone have often provided early feedback to Tahmoor Coal and/or Subsidence Advisory NSW about impacts developing at their houses or along their local roads. Contact is made well before impacts develop to a level of severity sufficient to become a safety hazard;
5. On the basis of the above, there is sufficient time for residents to notify Tahmoor Coal or SA NSW of significant displacement or deflection well before structural failure will occur; and
6. The conclusions are supported by the observation that residents have not been exposed to immediate and sudden safety hazards as a result of impacts that occur due to mine subsidence movements at Tahmoor and above other previously extracted longwalls at similar depths of cover. This includes the recent experience at Tahmoor during the mining of Longwalls 22 to 32 and LW W1-W4, which have subsided more than 2000 houses and civil structures.

    While severe impacts have developed during the mining of Longwalls 22 to 32, there is sufficient redundancy in structural design such that when structures have experienced severe impacts, they have developed gradually with ample time for residents to notify Tahmoor Coal or Subsidence Advisory NSW to repair the structure and/or relocate residents before structural failure occurs. This conclusion is supported by structural engineer John Matheson & Associates (JMA, 2014).

While the three most important factors in managing risks to public safety are redundancy in structural design, gradual development of subsidence movements and an effective community consultation program, a number of additional management measures have been or will be undertaken including: site-specific investigations, regular surveys and inspections during mining and triggered response measures as detailed in this Management Plan.

A flowchart illustrating the subsidence impact management process prior to, during and after each structure potentially experiencing mine subsidence movements is shown in Fig. 5.1.

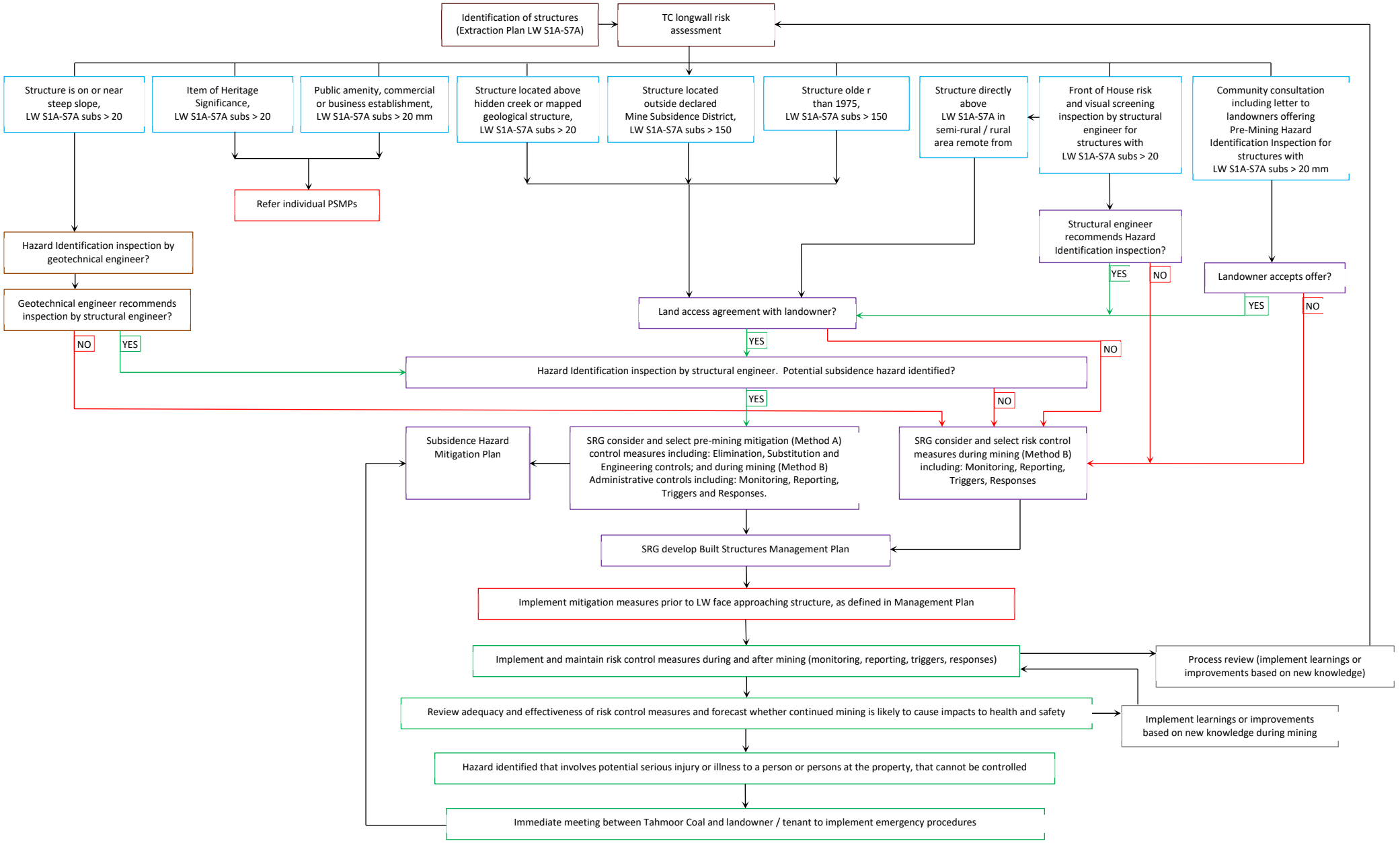


Fig. 5.1 Flowchart for subsidence impact management process for built structures

5.3. Residential structures

A total of 110 houses are located within the Study Area for LW S1A-S7A, of which 78 are located directly above LWs S2A-S7A. No houses are located directly above LW S1A.

Tahmoor Coal has and will continue to request access to conduct pre-mining hazard identification inspections by a structural engineer (where access is allowed by the landowner) to properties with structures that have been specifically targeted on the basis that they may be more sensitive to mine subsidence movements due to the extraction of LWs S1A-S7A, including those outlined in the following sections.

5.3.1. Structures on steep slopes

A steep slope has been defined in this management plan as an area of land having a natural gradient greater than 1 in 3 (i.e. a grade of 33 %, or an angle to the horizontal of 18°). The areas with steep slopes were determined from 1 m surface level contours generated from an airborne laser scan of the area and are shown in Report No. MSEC1192 (MSEC, 2022).

Areas with natural steep slopes have been identified above LWs S1A-S7A. The steep slopes are associated with the valley sides along Teatree Hollow and the Tributary of Teatree Hollow and other drainage lines. There are no structures within the Study Area that are located on or near natural steep slopes, including cliffs.

There are constructed steep slopes within the Study Area. They are located at farm dam walls, and at cuttings and embankments along the alignments of the Remembrance Drive and the Main Southern Railway, and at the mine site.

Houses are located near the base of road embankments along Remembrance Drive. The potential for impacts of embankments and cuttings along Remembrance Drive are managed in consultation with Wollondilly Shire Council in separate Management Plan No. MSEC1193-03.

No structures are located near the embankments and cuttings along the Main Southern Railway.

Structures are located near constructed steep slopes within the mine site and the potential for impacts are managed in separate Management Plan No. MSEC1247.

Hazard identification inspections have been conducted on farm dams by geotechnical engineer Douglas Partners, where access has been provided by the landowner (Douglas Partners, 2022a). The findings are discussed in Section 5.12.

5.3.2. Structures that are located above mapped geological structures

Tahmoor Mine has undertaken comprehensive geological exploration of the overburden and the Illawarra Coal Measures within the Study Area, which are summarised in Report No. MSEC1192 (MSEC, 2022).

Several fault structures were identified and the two main structures that separate the mining domains are the Nepean Fault zone and the Central Fault zone. Mapped geological structures within the Study Area are shown in Drawing No. MSEC1193-09-01. As shown in the drawing, a small number of houses within the Study Area are located in the vicinity of the mapped structures. A minor fault structure has been mapped at seam level beneath Yarran Road to the south of LW S7A.

It is noted that while comprehensive drilling and seismic exploration has been carried out, further in-seam drilling is planned to be undertaken and additional smaller geological structures may be discovered at that time. The mapping in Drawing No. MSEC1193-09-01 will be updated if new information is provided.

It is possible, though unlikely, that houses will experience increased differential movements due to the response of the geological structures near the ground surface due to the proposed extraction of LWs S1A-S7A.

As discussed in Section 5.2, Tahmoor Coal 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 via a subsidence management process. 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.

5.3.3. Structures of heritage significance

There are no residential structures of heritage significance within the Study Area.

Tahmoor Mine is a site of heritage significance and the potential for impacts are managed in separate Management Plan No. MSEC1247.

5.3.4. Structures above 'hidden' creeks

Hidden creeks are defined as natural watercourses that appear to have been covered during development of a property or road. Hidden creeks have been identified from surface contours and historical aerial photographs.

Two hidden creeks have been identified within the Study Area. The creeks were infilled as part of the development of Tahmoor Mine and their locations are shown in Drawing No. MSEC1193-09-01.

No houses within the Study Area have been identified as being directly above a 'hidden' creek.

5.3.5. Houses prone to flooding or inundation

Flood modelling has been undertaken by ATC Williams based on the existing topography as surveyed by LiDAR and predicted subsidence movements. Houses are located near the predicted flood levels for a 1% AEP event (1 in a 100 year) where Teatree Hollow crosses beneath Remembrance Drive at the intersection with Caloola Road above LW S3A. It is possible that subsidence could result in changes to the freeboard of some floor levels relative to the predicted 1% AEP flood level.

Tahmoor Coal will conduct a detailed flood study investigation of Teatree Hollow at the intersection of Caloola Road and Remembrance Drive. The study will include a survey of floor levels of houses that are located near the predicted 1% AEP flood level. The survey will be repeated following the completion of LW S7A, along with a resurvey of surface levels to confirm that post-mining floor levels of houses are not lower than the predicted post-mining 1% AEP flood level.

Tahmoor Coal will also ensure that the culverts beneath Remembrance Drive and the Main Southern Railway remain clear of debris during mining.

5.3.6. Older houses constructed prior to the declaration of the Bargo Mine Subsidence District

The Study Area is located entirely within the Bargo MSD, which was proclaimed in 1975.

House age has been determined by examination of a series of historical aerial photographs provided by Land and Property Information. The photographs that were available over the Subsidence Study Area were taken in 1963, 1975, 1984, 1994, 2002 and Tahmoor Mine commissioned orthophotographs over the Study Area in 2013. A Nearmap image taken in 2017 was used to identify houses with the Study Area at the time MSEC's report in support of the original EIS was submitted. A Nearmap image taken in 2021 was used to identify new houses with the Study Area at the time of preparing the Extraction Plan.

51% of houses in the Study Area have been built since the Bargo Mine Subsidence District was declared in 1975. A map showing the spatial distribution of structures by house age is provided in Fig. 5.3. The older houses are located throughout the *Subsidence Study Area*. A histogram showing the distribution of houses by age is shown in Fig. 5.2.

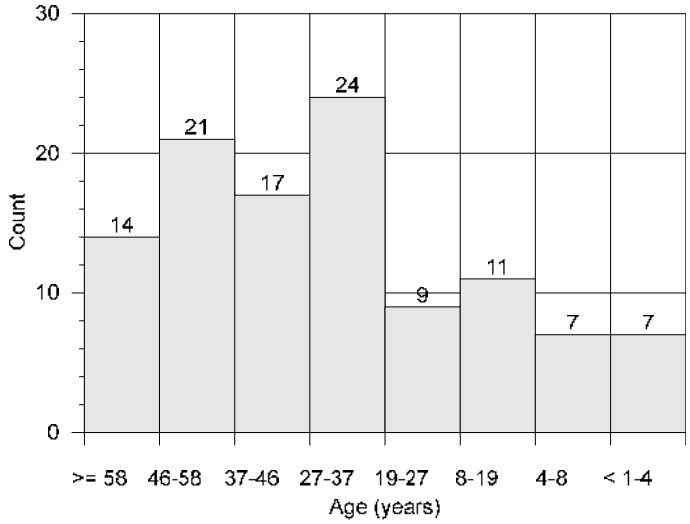


Fig. 5.2 Distribution of Houses by Age as at 2021

It can be seen from Fig. 5.2 that, as at 2021, the greatest proportion of houses were constructed 27 to 58 years prior between 1963 and 1994.

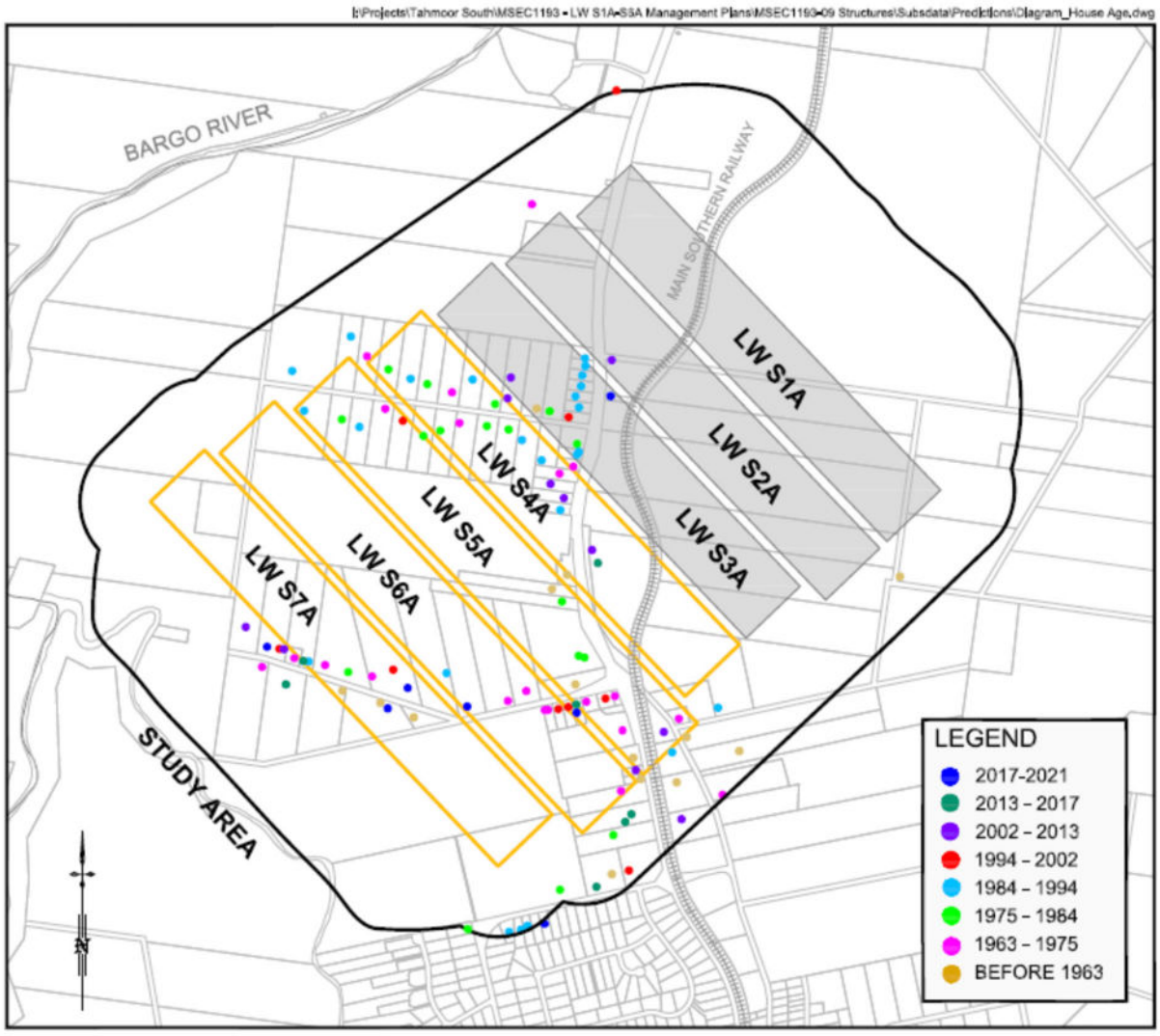


Fig. 5.3 Location of houses by age

The hazard associated with these houses is that they may be less tolerant to mine subsidence movements as their designs have not been checked and approved by Subsidence Advisory NSW. Some old houses may also be in poor condition. Many of the houses are constructed with timber frames and weatherboard panels or fibro sheets.

Analysis of impacts to structures during the mining of Longwalls 22 to 25 in December 2008 did not find any significant trend between the rate of impacts and structure age.

Tahmoor Coal has conducted a hazard identification inspection for houses that were constructed prior to declaration of the Mine Subsidence District and are predicted to experience more than 150 mm of subsidence during the mining of LWs S1A-S7A.

5.3.7. Future house construction

New houses have been identified from aerial photographs captured in 2021. The houses have been mapped and included in Drawing No. MSEC1193-09-01.

LWs S1A-S7A will extract within a semi-rural area. It is possible that additional houses may be constructed that may be affected by the extraction of LWs S1A-S7A. No large-scale developments are currently under construction in this area.

The hazard associated with new houses is considered to be generally low for the following reasons:

- The design for new houses will be approved by Subsidence Advisory NSW; and
- The condition of the houses will generally be good as they are newly constructed.

As described in Section 6.3, Tahmoor Coal attempts to notify landowners at multiple stages during the mining process. New landowners may be contacted in this manner.

For newly constructed houses, Tahmoor Coal will offer a pre-mining hazard identification inspection by a structural engineer and provide an impact assessment and risk analysis to the landowner upon request.

Standard risk control procedures will be applied to new houses, which are provided in this Management Plan.

5.4. Flats or units

There are no flats or units affected by the extraction of LWs S1A-S7A.

5.5. Pools

5.5.1. Pools

A total of 20 pools and one spa are predicted to experience more than 20 mm of incremental vertical subsidence due to the extraction of LWs S1A S7A. The majority of the pools (90%) are in-ground. The majority of the pools are located directly above LWs S4A to S7A.

Observations during the mining of Tahmoor Mine LWs 22 to 32 have shown that pools, particularly in-ground pools, are more susceptible to severe impacts than houses and other structures. Pools cannot be easily repaired and most of the impacted pools need to be replaced.

As of June 2017, a total of 157 pools had experienced mine subsidence movements during the mining of Tahmoor Mine Longwalls 22 to 30, of which 141 were located directly above the extracted longwalls. A total of 36 pools have reported impacts, all of which were located directly above the extracted longwalls. This represents an impact rate of approximately 23 %. A higher proportion of impacts have been observed for in-ground pools, particularly fibreglass pools. The majority of the impacts related to tilt or cracking, though in a small number of cases the impacts were limited to damage to skimmer boxes or the edge coping.

Impacts were reported to 4 pools during the mining of LW W1-W4, with impacts also observed to tile surrounds.

Mining-induced tilts are more noticeable in pools than other structures due to the presence of the water line and small gap to the edge coping, particularly when the pool lining has been tiled. Skimmer boxes are also susceptible to being lifted above the water line due to mining tilt. The Australian Standard AS2783-1992 (Use of reinforced concrete for small swimming pools) requires that pools be constructed level within ± 15 mm. This represents a tilt of approximately 3.3 mm/m for pools that are 10 metres in length. Australian Standard AS/NZS 1839:1994 (Swimming pools – Pre-moulded fibre-reinforced plastics – Installation) also requires that pools be constructed with a tilt of 3 mm/m or less.

There are 11 pools within the Study Area (i.e. 50 % of the total) which are predicted to experience final tilts of 3 mm/m or less, at the completion of the proposed longwalls, which is similar to or less than the Australian Standard.

There are 9 pools (i.e. 41 % of the total) predicted to experience final tilts between 3 mm/m and 7 mm/m and 2 pools (i.e. 9 % of the total) predicted to experience final tilts greater than 7 mm/m. The maximum predicted final tilt for the pools is 9 mm/m (i.e. 0.9 %), which represents a change in grade of 1 in 111. It is likely that a number of these pools would require some remediation of the pool copings.

If impacts occur to pools, the pools will be repaired or replaced in accordance with the *Coal Mine Subsidence Compensation Act 2017*.

5.5.2. Pool gates

The hazard to pool gates is that they may not close due to mine subsidence impacts, even if they are spring-loaded. A number of pool gates have been impacted by mine subsidence due to mining in the Southern Coalfield. While the gates can be easily repaired, the consequence of breaching the pool fence integrity is considered to be severe.

Consultation with pool owners is considered to be the most effective method of managing potential impacts on pool gates. Tahmoor Coal will inspect pool fences and gates on a weekly basis during the active subsidence period, where access is permitted. Pool owners will monitor the pool gates where Tahmoor Coal has not been provided with access to the property. Any damage to pool fences and gates caused by mine subsidence will be repaired immediately.

5.6. Septic tanks

The properties within the Study Area are not connected to Sydney Water's sewerage network and manage sewage via a septic tank system.

The risk to septic tanks is that they could be damaged and/or rendered unserviceable from mine subsidence impacts. There are two types of potential damage to septic tanks:

- compressive ground strains could cause cracking and leaking of the tanks; and
- shearing could also occur at joints connecting sewerage pipes to septic tanks, as sewerage pipes are generally able to slide as the ground moves horizontally beneath them, while the septic tanks are fixed and unable to slide relative to the sewerage pipes.

Given that tanks are quite small (usually less than 3 m in diameter), constructed of reinforced concrete and are usually bedded in sand and backfilled, the likelihood of cracking to septic tanks is assessed as low. It is noted that no impacts to septic tanks have been reported during the mining of Longwalls 22 to 32 and LW W1-W4.

Pipe joints are usually flexible and consist of relatively short lengths, due to the proximity of septic tanks to houses. However, given that both the house and septic tank are effective ground anchors, it is possible that pipe joints can pull out or shear as a result of subsidence. Subsidence Advisory NSW reports that this has been observed in a small number of cases during the mining of Longwalls 22 to 32. This impact is relatively easy to repair.

Subsidence Advisory NSW also report that on two occasions during the mining of Longwalls 22 to 26, the grade of the sewer pipe to the septic tank has reversed. The impacts are considered to have been partially due to very low pre-mining grades. In both cases, the repairs were straightforward, where the pipes were re-laid at an improved fall, entering the septic tank at a slightly lower level.

5.7. Sheds and other associated structures

A total of 471 sheds and associated structures are predicted to experience more than 20 mm of incremental vertical subsidence due to the extraction of LWs S1A to S7A. The risk to sheds and other associated structures is that they could be damaged and/or rendered unserviceable from mine subsidence impacts. The structures include garages, sheds, carports, shade structures and tanks.

These structures are able to withstand greater subsidence movements than houses as they are generally lighter, more flexible in construction, and smaller in size. The risk of damage to sheds and other domestic structures is therefore considerably less when compared to houses.

Impacts were reported to a small number of sheds and other domestic structures during the mining of Longwalls 22 to 32 and LW W1-W4, all of which were considered to be relatively minor and easy to repair.

5.8. General services

There are many services on the properties within the Study Area for LWs S1A to S7A. These services include potable water pipes, wastewater pipes, stormwater pipes, gas pipes, electrical services and communications services.

Pipes and ducts are generally flexible and will be able to withstand the mine subsidence movements that are predicted to occur. Water, wastewater, stormwater and gas pipes have been directly mined beneath in many locations in Tahmoor and other locations within the Southern Coalfield and very few impacts have been observed, all of which have been minor.

Cables are extremely flexible and will be able to withstand the mine subsidence movements that are predicted to occur. Very few impacts have been observed to cables as a result of previous mining.

5.9. Private roads and walking trails close to steep slopes

A steep slope has been defined in this management plan as an area of land having a natural gradient greater than 1 in 3 (i.e. a grade of 33 %, or an angle to the horizontal of 18°). The areas with steep slopes were determined from 1 m surface level contours generated from an airborne laser scan of the area and are shown in Report No. MSEC1192 (MSEC, 2022).

Areas with natural steep slopes have been identified above LWs S1A-S7A. The steep slopes are associated with the valley sides along Teatree Hollow and the Tributary of Teatree Hollow and other drainage lines.

It is possible that tension cracks may form at the tops or sides of the slopes and compression ridges may form at the bottoms of the slopes. These impacts may coincide with the private driveways and walking rails.

If the tension cracks are left untreated, these may cause erosion to occur, which may further damage driveways. It is unlikely that large-scale slope failure will occur.

Tahmoor Mine has constructed roads that cross the steep slopes along the steep slopes along Teatree Hollow, downstream of LW S1A. The potential for impacts on the internal roads on the mine site are managed in separate Management Plan No. MSEC1247.

Walking trails are located within the Australian Wildlife Sanctuary that cross natural steep slopes, particularly along the Tributary of Teatree Hollow. The potential for impacts on the walking trails are managed in separate Management Plan No. MSEC1074.

5.10. Access and mobility

It is possible that cracks or steps might form in the natural ground or external pavements that might affect access to properties. Any impacts that adversely affect access and mobility will be repaired immediately.

5.11. Risks associated with existing structural condition

The existing condition of structures varies within the general mining area. This is a function of age, structural design, construction workmanship and maintenance. Tahmoor Coal has undertaken pre-mining hazard identification inspections of structures during the mining of Longwalls 22 to 32 and LW W1-W4. Pre-mining hazard identification inspections have identified elements of structures that did not appear to comply fully with Australian Standards, in regard to design and construction. In a small number of cases, the existing structural condition has been considered unsafe and Tahmoor Coal has undertaken measures to repair the defect or has informed the landowner of the hazard.

There is a remote possibility that the comparatively small additional contribution of mine subsidence movements could be sufficient to result in the structures that do not meet Australian Standards to become potentially unsafe. While the warnings appear dire, it should be noted that the likelihood of structural failure is still considered to be remote as no structures have collapsed as a result of mine subsidence movements in the Southern Coalfield.

The experience from the mining of Longwalls 22 to 32 and LW W1-W4, affecting more than 2000 structures shows that residents have not been exposed to immediate and sudden safety hazards as a result of impacts that occur due to mine subsidence movements. 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 relocate residents.

The management strategy described in Section 5.2 includes measures to identify potentially ‘unstable structures. The residential properties that are located within the predicted 20 mm subsidence contour due to LWs S1A-S7A have been offered a hazard identification inspection by a structural engineer. These inspections have specifically targeted the structures that could have increased risks due to their existing structural conditions, including the older structures that were constructed prior to the declaration of the Bargo Mine Subsidence District in 1975.

Details are provided in Table A.1, which is included in the Appendix.

5.12. Farm dams

A total of 45 dams are located within the Study Area for LWs S1A-S7A, of which 32 dams are located directly above LWs S2A to S7A. The locations of the dams are shown in Fig. 5.4.

There is extensive experience of mining directly beneath farm dams in the Southern Coalfield, which indicates that the incidence of impacts on these features is very low. Farm dams are commonly constructed with cohesive materials in the bases and walls which can absorb the conventional subsidence movements typically experienced in the Southern Coalfield without the development of substantial cracking. Non-conventional movements can result in localised cracking and deformations at the surface and, where coincident with farm dams, could result in adverse impacts.

Tahmoor Coal has mined LW22 to LW32 and LW W1-W4 beneath approximately 112 dams. While a small number of landowners have advised of impacts, there has been one claim to Subsidence Advisory NSW for impacts on farm dams at the time of the report. The farm dam is located directly above previously extracted Longwall 27. This represents an impact rate of less than 1%. The dataset includes some large water treatment dams above Longwall 24A and water storage pond above LW W3. Similarly, South32 Illawarra Coal has mined directly beneath more than 200 farm dams in Appin Area 3, Appin Area 4, Appin Area 7, Appin Area 9 and West Cliff Area 5. Loss of water was reported for one dam in Appin Area 7, however, it was noted that this dam was of poor, shallow construction and seepage was observed at the base of the dam wall prior to mining.

The dams have been inspected by geotechnical engineer Douglas Partners (2022a), where access has been provided by landowners. Access was not granted to 17 dams (FD4, 12-14, 18-21, 23-26, 28, 29, 34, 37, 38 and 42). The farm dams are of earth fill construction, with maximum wall heights estimated to be up to 3.5 metres, with capacities between < 0.1 ML to approximately 7 ML.

The dams are typically constructed from cohesive soils with reasonably high clay contents. The walls of the farm dams should be capable of withstanding tensile strains of up to 3 mm/m without significant impacts, because of their inherent plasticity. Douglas Partners advise, however, that Farm Dams FD8, 19, 23, 27, 29-31, 38 and 42 appear to have been constructed from sandy soil and crushed sandstone, which could be more susceptible to mining-induced erosion and cracking. Further geotechnical assessments will be conducted prior to the influence of subsidence at these dams.

Tahmoor Coal will visually inspect the dams during periods of active subsidence (where landowners permit access) for signs of distress. The likelihood of leakage of a dam wall or floor due to subsidence is considered to be rare. If impacts occur, however, Tahmoor Coal will supply water to the landowner on a temporary basis until the dam is repaired.

From a public safety point of view, there are structures located immediately downstream of Dam FD8, which is located on Remembrance Drive above LW S3A. Dam FD29 is located immediately upstream of an embankment on Remembrance Drive above LW S5A. Dam FD13 is located upstream of Inghams poultry sheds beyond LW S4A. Farm Dams FD29 to 31 are located close together, such that greater impacts could occur if they failed in a cascading manner. Douglas Partners (2022a) advise, however, that given the relatively low volumes, however, failure of these dams is unlikely to impact public safety.

Geotechnical engineer Douglas Partners have completed dam break analyses for eight farm dams since Revision B of the Management Plan was developed. The assessments indicated that the dam walls would not be adversely impacted by the proposed longwall mining and no hazard reduction works will be required to protect the farm dams from mine subsidence impacts. In the unlikely event of a failure of the dam walls, it is considered that the impacts downstream would be relatively minor.

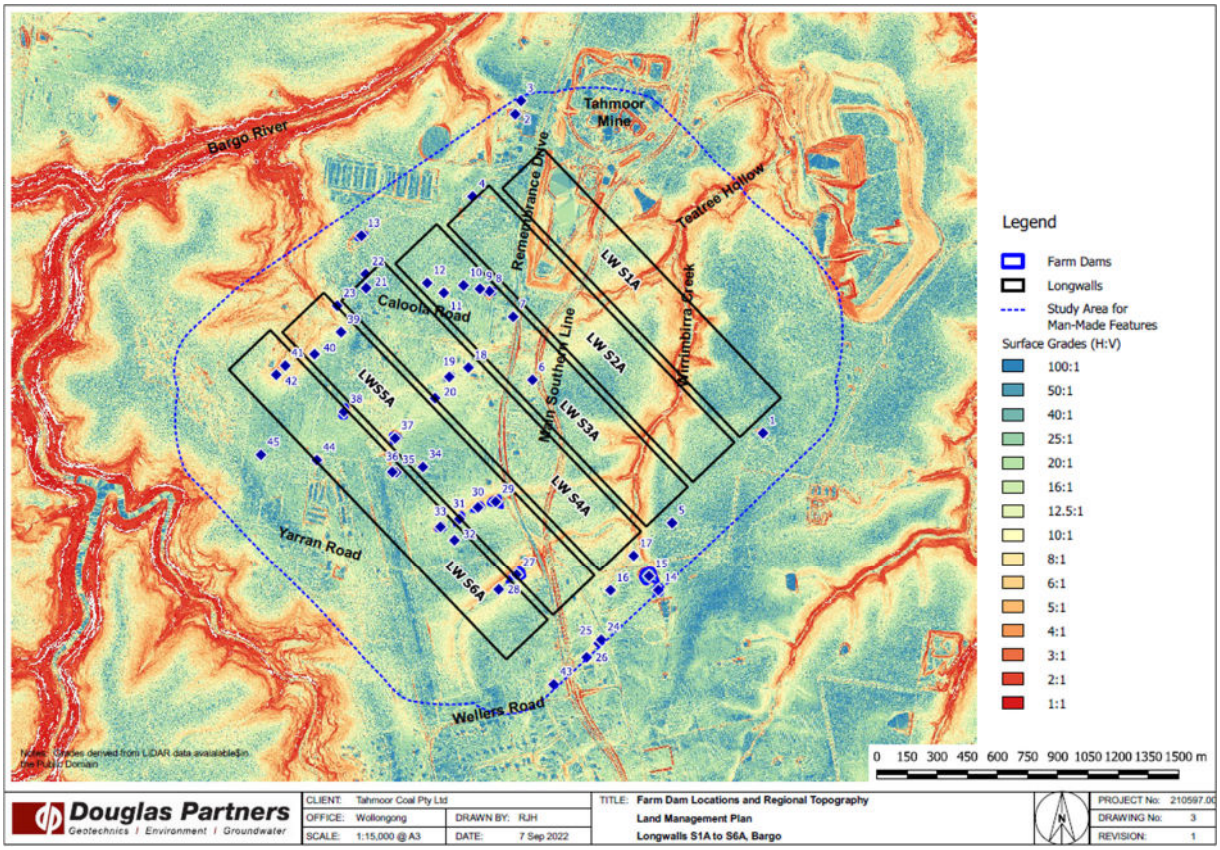


Fig. 5.4 Locations of dams (courtesy Douglas Partners, 2022a)

5.13. Summary of potential impacts

A summary of the assessed levels of potential impacts on building structures is provided in Table 5.1. The summary is consistent with the risk assessment undertaken by Tahmoor Coal (2021), which is included in Appendix A. The assessment has been based on the credible worst case, with the implementation of the proposed management strategies and preventive measures outlined in this plan.

Table 5.1 Summary of potential mine subsidence impacts on building structures

Risk	Likelihood	Consequence	Level of potential impact
Residences			
Impacts on health and safety	RARE	MODERATE	LOW
Damage to structures	UNLIKELY	MODERATE	MEDIUM
Pools			
Impacts on health and safety due to damage to pool gate	RARE	MAJOR	MEDIUM
Damage to pools	POSSIBLE	MINOR	MEDIUM
Septic Tanks			
Damage to tanks	UNLIKELY	NEGLIGIBLE	LOW
Farm dams			
Leak of dam water / dam failure, cascading dam failure	UNLIKELY	MINOR	LOW
Impacts on health and safety due to damage to farm dams	RARE	MODERATE	LOW

As there is no material difference between the risks to structures 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).

5.14. 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 for structures which could give rise to risks to health and safety of people.

Using the processes described in Section 5.2 of this Management Plan, mine subsidence hazards have been identified, investigated and analysed in a systematic manner by examining each aspect of the property, as described in Sections 5.3 to 5.12 of this Management Plan. Each of the built features below could potentially experience mine subsidence movements that could give rise to risks to the health and safety of people:

- building structure(s);
- services to properties, including pipes, cables, fire protection, security, access and mobility;
- items noted during inspections by structural or geotechnical engineer;
- finishes; and
- external pavements, fences and gates.

The following mine subsidence hazards were identified that could give rise to risks to health and safety in respect to structures due to the extraction of LWs S1A to S7A:

- potential mine subsidence damage to building structures (refer Sections 5.3 and 5.7);
- steep slopes (refer to Sections 5.3.1 and 5.9);
- potential damage to pools and pool gates (refer Section 5.5);
- potential damage or loss of services to properties (refer Section 5.8);
- potential development of trip hazards on internal floors and external pavements (refer Section 5.10); and
- potential flooding of properties in the event of dam break (refer Section 5.12),

As shown in Table 5.1 the Structures Response Group assessed the likelihood of the above hazards affecting health and safety, and the severity of potential health and safety consequences during the risk assessment as a group, based on the assessed worst-case consequence. The results of the risk assessment are included in Appendix A.

The identification and risk assessment process took into account the location of the structures relative to LW S1A-S7A and the associated timing and duration of the subsidence events, as described in Section 1.7 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 properties, as discussed in Section 1.4 and Chapter 2 of this Management Plan.

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 properties in general. These are described in Chapter 6 of this Management Plan.

6.1. Structures Response Group (SRG)

The Structures Response Group (SRG) is responsible for taking the necessary actions required to manage the risks that are identified for structures. The SRG's key members are:

- Tahmoor Coal;
- Building inspection (Tahmoor Coal); and
- Mine subsidence engineer (MSEC).

Subsidence Advisory NSW may also participate in SRG meetings as observers when available.

The SRG may invite other specialist consultants from time to time, including structural and geotechnical engineers where issues relate to structural stability, slope stability and farm dams.

6.2. Mitigation measures

Mitigation measures have been or will be undertaken where recommended by the structural engineer based on hazard identification inspections.

Mitigation measures were recommended at one property prior to the influence of LW S1A, where the structural engineer recommends that additional timber packing be placed beneath a water tank to provide additional support to a water tank.

Three termite damaged sheds will also be enclosed with orange bunting to prevent access to the sheds of another property prior to the influence of LW S1A.

Details are provided in Table A.1, which is included in Appendix A of this Management Plan.

6.3. Community consultation, co-operation and co-ordination

Experiences during the mining of Longwalls 22 to 32 and LW W1-W4 have found that the most effective method of managing potential impacts on the safety and serviceability of structures are by way of community consultation. Residents living within the active subsidence zone have often provided early feedback about impacts developing at their houses or along their local roads. Contact is made well before impacts develop to a level of severity sufficient to become a safety hazard.

Community consultation commenced before Tahmoor Coal applied for development consent to mine. Tahmoor Coal continued to develop its mine plans after development approval was received. These plans were discussed with the Tahmoor Colliery Community Consultative Committee (TCCCC), which was set up in accordance with the conditions of development consent. Tahmoor Coal has progressively increased the level of communication with the community as preparations are made to extract longwalls.

The approaches adopted by Tahmoor Coal are listed below:

- *Undertake conservative predictions and impact assessments*

  Tahmoor Coal and MSEC have adopted a conservative approach to predicting subsidence and assessing impacts. This reduces the likelihood of under-stating the predicted impacts. For example, predictions for each structure have been made by predicting the maximum subsidence, tilt and strain within a 20 m radius around each structure;

- *Undertake detailed predictions and impact assessments*

  By undertaking detailed subsidence predictions, Tahmoor Coal is able to provide residents with predictions for their own structures. Individual assessments provide some comfort to concerned residents. This is particularly helpful for residents that live beyond the extent of mining and are expected to experience only small movements;

- *Community information days*

  A number of advertised information days are held by Tahmoor Coal throughout the year. The information days allow members of the community to directly meet Tahmoor Coal representatives and its consultants. Subsidence Advisory NSW is also invited to present on information days to answer questions;

  The information exchanged at information days also assists Tahmoor Coal, as members of the community sometimes provide information about particular surface features or impacts that Tahmoor Coal might not have been aware of;

- *Tahmoor Colliery Community Consultative Committee*

  The committee meets at regular (quarterly) intervals. Meetings allow Tahmoor Coal to present information to the committee and receive feedback. The committee is committed to ensuring that the concerns of the community are well understood by Tahmoor Coal. Many of the members have been part of the committee for several years, and this facilitates informed discussion;

- *Letters to residents and door knocking*

  Tahmoor Coal sends letters to the community advising of imminent longwall mining in their area. By continuing to engage with residents at each stage of mining, Tahmoor Coal is able to find new residents who might not have been aware that mining was taking place. The letters include:

  - Notification of preparation of Extraction Plan applications for LW S1A-S6A and LW S7A and notification of lodgement of Extraction Plan applications. The notification letter attached a Subsidence Information Pack, which included information on longwall mining and mine subsidence, the claims process with Subsidence Advisory NSW, recommendations to undertake pre-mining hazard identification inspections, and a list of emergency contact numbers and point of contact at Tahmoor Coal;
  - Notification of imminent commencement of each longwall. The newsletter is sent to all landowners whose properties are located directly above the active longwall panel plus landowners whose properties are located directly above the next longwall panel. The letter encourages landowners to undertake pre-mining hazard identification inspections;
  - For properties where pre-mining hazard identification inspections have been or will be undertaken in accordance with this Management Plan, Tahmoor Coal have or will make direct contact to arrange access with the landowner by mail, letterbox drop, phone and/or door knocking;
  - Door knocking of houses located directly above the active longwall:
    - This exercise is an attempt to directly engage with residents and will be undertaken before the longwall face approaches within 300 m of each property, so that there is adequate time, if required, to arrange additional inspections and/or surveys and implement any mitigation measures if required before mining-induced impacts are experienced.

- *Individual meetings with residents*

  Many members of the community prefer to meet with Tahmoor Coal representatives face to face. Tahmoor Coal has held many individual meetings with concerned residents to explain how mine subsidence develops and what the impacts might be. This is a time consuming but rewarding process for residents and Tahmoor Coal;

- *Newspaper advertisements*

  Tahmoor Coal places advertisements in the newspaper from time to time to advise the community at large about consultation opportunities, including community information days;

- *Regular reporting*

  Tahmoor Coal provides regular updates on the progress of mining in the area. This is conducted mainly by community newsletter by mail, email, website and notice boards for any member of the community who wishes to be regularly informed. The updates advise the current position of the longwall and any impacts that have been observed;

- *Prompt response to reported impacts*

  Tahmoor Coal responds quickly to impacts that are reported by the community. If a severe impact is reported, Tahmoor Coal checks neighbouring properties to see whether the incident is localised or part of a larger potential issue;

- *Ongoing monitoring if impacts occur*

  Where impacts have been reported, Tahmoor Coal offers to continue monitoring the property.

6.4. Development and selection of risk control measures

Tahmoor Coal has developed and selected risk control measures in consultation, co-ordination and co-operation with landowners 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.
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 Sections 6.5 to 6.11. 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 due to the extraction of LW S1A-S7A.

6.5. Avoidance and mitigation measures

Based on its own assessments, and the assessments by the structural engineer and geotechnical engineer, Tahmoor Coal considered Method A and B risk control measures, in accordance with the process described in Section 6.4.

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

Hazard identification inspections by structural engineer JMA Solutions have identified elements that are in poor existing condition or elements that could be susceptible to mine subsidence movements. The structural engineer has recommended engineering controls and monitoring to minimise risk.

A summary of the inspections, engineering controls and monitoring that have been recommended by the structural engineer, to date, are provided in Table A.1, in Appendix A. The engineering controls will be implemented prior to the structure experiencing active subsidence from LW S1A-S7A, i.e. before the longwall face approaches to within 100 m of travel of mining beneath the structure.

Hazard identification inspections have been completed for all houses that are predicted to experience more than 20 mm of subsidence due to the extraction LW S1A, where access has been provided by the landowner. Hazard identification inspections have also been completed for the majority of the houses that are predicted to experience more than 20 mm of subsidence due to the extraction of LWs S1A-S7A.

Additional engineering controls may be developed as further hazard identification inspections are completed by the structural engineer. The hazard identification inspections will be undertaken before the longwall face approaches to within 300 m of travel of mining beneath each property.

Administrative controls

The following administrative Controls were identified and selected that will put in place procedures to minimise the potential of impacts on health and safety:

- Implementation of a Monitoring Plan and Trigger Action Response Plan (TARP). As described in Table 6.1, the SRG has developed and implemented a management strategy of detecting early the development of potential adverse subsidence movements, so that contingency response measures can be implemented before impacts on safety and serviceability develop. The TARP includes the following:
    - ground monitoring and visual inspections along streets in the active subsidence zone;
    - baseline ground surveys of pegs installed around semi-rural and rural houses that are remote from local streets and located directly above LW S1A-S7A, or where requested by landowners (where land access is granted by owners);
    - specific ground surveys for selected properties, where recommended by the geotechnical engineer or structural engineer due to their proximity to steep slopes or pre-existing condition;
    - visual inspections of residential structures that are either: located on or adjacent to steep slopes, are in poor existing condition (based on the hazard identification inspections), have previously reported impacts, or where recommended by the Structures Response Group;
    - visual inspections of pool fences and gates;
    - visual inspections of public utilities;
    - visual inspection of commercial establishments;
    - additional surveys and inspections, if required, such as regular recording of widths of any new cracks that might appear;
    - repair of impacts that create a serious public safety hazard;
    - repair of impacts that impair any essential services;
    - repair of impacts that impair access and mobility to properties, even if further impacts are anticipated; and
    - in the worst case, as a last resort, advise landowners to restrict entry to part of the property or emergency evacuate the premises.

With the implementation of the above management strategies, Tahmoor Coal will ensure that the health and safety of people on properties will not be put at risk due to differential mine subsidence movements due to the extraction LW S1A-S7A.

6.6. Site-specific structure inspection plan

6.6.1. Pre-mining front of house inspections by structural engineer

At the time of preparing Report No. MSEC1192 (MSEC, 2022) in support of the Extraction Plan Application for LWs S1A to S6A, structures were identified from orthophotographs and Nearmap images in July 2021, with structure types identified from Google Street View and kerbside inspections.

Front of house risk and visual screening inspections have been carried out by a structural engineer for the properties that are predicted to experience more than 20 mm of incremental vertical subsidence due to the extraction of LWs S1A-S7A, where they were visible from the street. The purpose of these inspections was to identify structures that are in poor existing condition or elements that could be sensitive to mine subsidence movements.

In some cases, particularly in semi-rural and rural areas, it is difficult to inspect a structure that is remote from the street front. Where these cases involve properties that are located directly above LWs S1A-S7A Tahmoor Coal have requested access to conduct a pre-mining inspection and hazard identification inspection by a structural engineer.

The locations of residential structures where Front of House risk and visual screening inspections have been completed by a structural engineer prior to commencement of LW S1A-S4A are shown in Fig. 6.1.

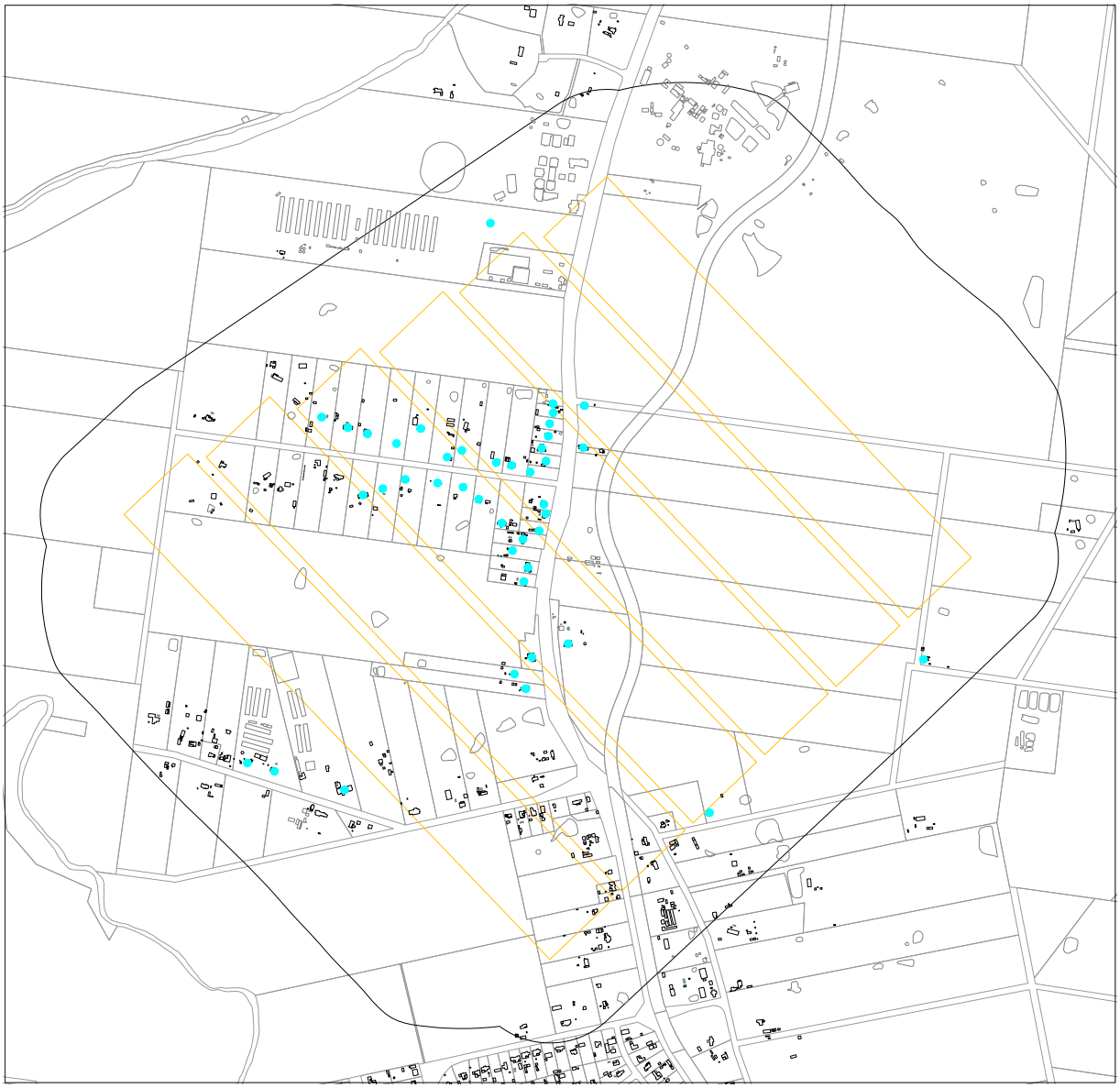


Fig. 6.1 Residential structures where front of house risk and visual screening inspections have been completed prior to commencement of LW S1A-S4A

6.6.2. Pre-mining hazard identification inspections by geotechnical engineer

A qualified geotechnical engineer (Douglas Partners) has inspected farm dams within the Study Area for LWs S1A-S7A, where access has been provided by landowners. Access was not granted to 17 dams (FD4, 12-14, 18-21, 23-26, 28, 29, 34, 37, 38 and 42).

There are no structures within the Study Area that are located on or near natural steep slopes, including cliffs.

6.6.3. Pre-mining hazard identification inspections by structural engineer

Tahmoor Coal has contacted residents of properties that are located within the predicted 20 mm subsidence contour due to LWs S1A to S4A, offering a pre-mining hazard identification inspection by a structural engineer.

In addition, Tahmoor Coal has requested access to conduct pre-mining hazard identification inspections at properties with structures that have been specifically targeted on the basis that they may be more sensitive to mine subsidence movements due to the extraction of LWs S1A-S4A, as outlined in Section 5.2.

The hazard identification inspections required to be completed will be undertaken before the longwall face approaches to within 300 m of travel prior to directly mining beneath each property. Where access is not granted by the landowner, inspections are limited to Front of House inspections where the structures are visible from the street.

The locations of residential structures where hazard identification inspections have been completed by a structural engineer prior to commencement of LWs S1A-S4A are shown in Fig. 6.2.

Hazard identification inspections have been completed for all houses that are predicted to experience more than 20 mm of subsidence due to the extraction LWs S1A to S3A, where access has been provided by the landowner.

Hazard identification inspections have also been completed for all but one of the houses that are predicted to experience more than 20 mm of subsidence due to the extraction of LWs S1A-S4A. A pre-mining hazard identification inspection is planned to be conducted at 1 property on Yarran Road prior to the influence of LW S4A, pending approval from the landowner.

A total of 9 properties have either refused or not responded to Tahmoor Coal's requests to conduct a pre-mining hazard identification inspection. The locations of these properties are also shown in Fig. 6.2.

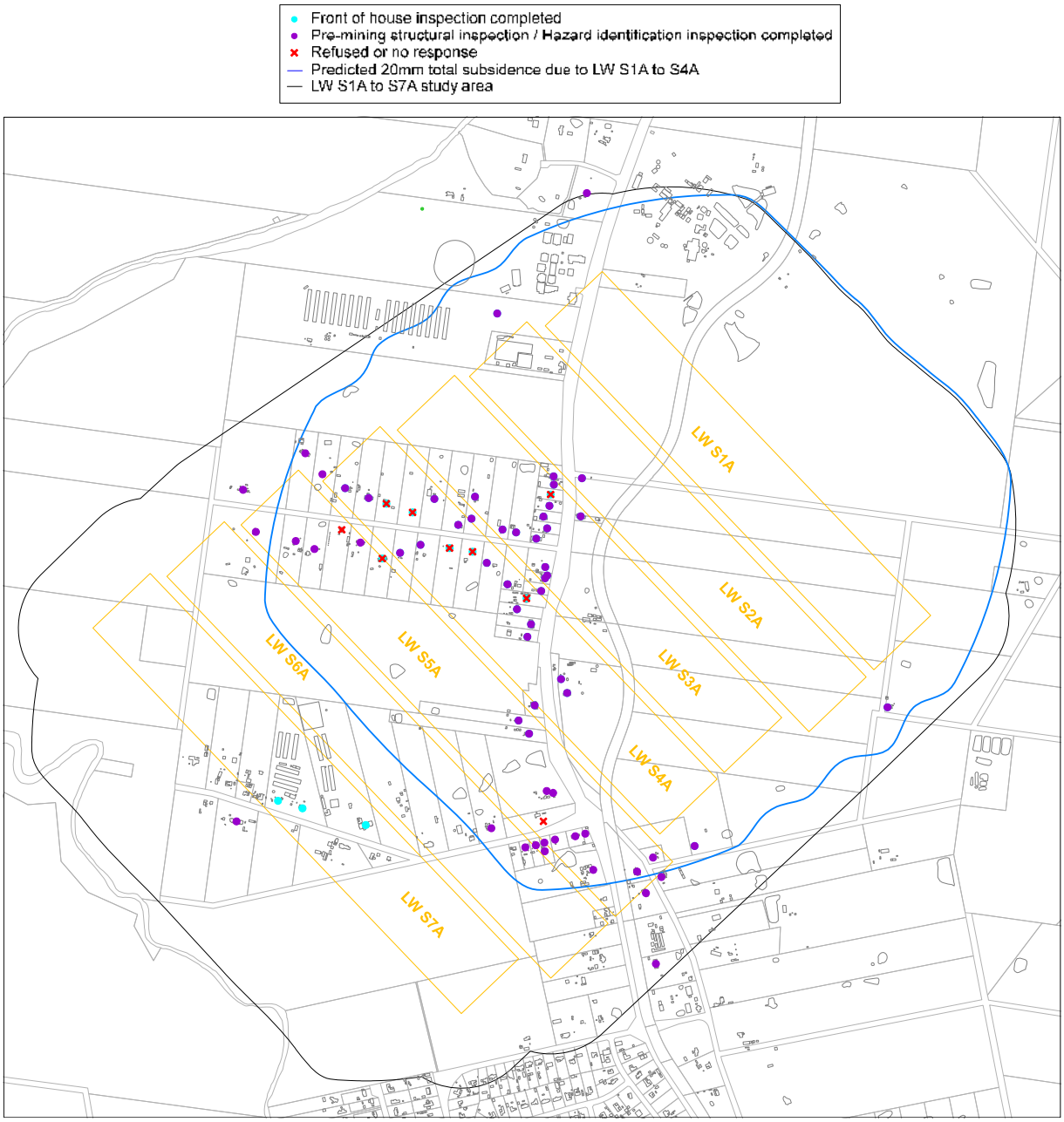
Prior to influence of LW S3A on houses, the Structures Response Group (SRG) met on 29 August 2024 to review the findings from the pre-mining hazard inspections by John Matheson & Associates, using the Pre-Mining Inspection Reports as a record of the inspection.

A summary of the findings and recommendations from the hazard identification inspections is provided in Revision B of Table A.1, which is included in Appendix A of this Management Plan.

The SRG noted that two residential properties include a retail operation.

a) As noted in Table A.1, one room in Structure BRE_167_h01 is used for a florist business. The SRG agreed that the mine subsidence risks for this property are similar to the risks for other residential structures in the area. The property will, therefore, be managed under the Management Plan rather than developing a separate Property Subsidence Management Plan (PSMP) for the florist business.
b) As noted in Table A.1, a property with reference of BGR_230 includes a weatherboard structure that is used as a hobby train business. The SRG agreed that the mine subsidence risks for this property are similar to the risks for other residential structures in the area. The property will, therefore, be managed under the Management Plan rather than developing a separate Property Subsidence Management Plan (PSMP) for the hobby train business. It was further noted that the weatherboard structure is predicted to experience less than 20 mm of vertical subsidence due to the extraction of LWs S1A to S7A.

Hazard identification inspections will be completed prior to the influence of LWs S1A-S7A for all houses within the Study Area, where access has been provided by the landowner. Tahmoor Coal will review and update Table A.1 prior to the commencement of each longwall. The hazard identification inspections will be undertaken before the longwall face approaches to within 300 m of travel of mining beneath each property.



Note: all properties that are predicted to experience more than 20 mm of incremental subsidence have been offered a pre-mining hazard identification inspection.

Fig. 6.2 Residential structures where hazard identification inspections have been completed prior to commencement of LW S1A-S4A

6.6.4. Pre-mining inspections by Subsidence Advisory NSW

From 1 July 2025, a mandatory pre-mining inspection is required for properties that are located in a mandatory pre-mining inspection zone. The pre-mining inspections are coordinated by Subsidence Advisory NSW and conducted by either Subsidence Advisory NSW or a nominated consultant. Subsidence Advisory NSW will undertake future pre-mining inspections above LWs S5A-S7A. Subsidence Advisory NSW has not required mandatory pre-mining inspections for properties that may be affected by LW S4A.

6.6.5. Visual kerbside inspections during mining

Detailed visual inspections will be undertaken along streets on a weekly basis within the active subsidence area from the commencement of LWs S1A-S7A. Vehicle-based inspections will also be undertaken once a week within the active subsidence area during the mining of LWs S1A-S7A, commencing after 200 m of extraction.

The frequency of inspections can be increased, if required, based on actual observations.

6.6.6. Visual inspections of structures during mining

Weekly visual inspections will be conducted for the following structures, when they are located within the active subsidence zone, where access is provided by the landowner:

- residential structures located on or adjacent to steep slopes, where recommended by the geotechnical or structural engineer;
- residential structures where recommended by the structural engineer, based on the hazard identification inspections;
- residential structures that have experienced impacts as a result of mining previous longwalls, or where recommended by the SRG; and
- pool fences and gates.

Weekly visual inspections planned to be conducted during active subsidence of LW S1A-S4A are illustrated in Fig. 6.3. The active subsidence zone is described in Section 1.7, with the weekly inspections of the houses carried out from when they are 150 m in front of the longwall face to 450 m behind the longwall face.

Weekly inspections for the structures located near the longwall commencing end will start after the first 200 m of longwall extraction.

In light of the assessment by Douglas Partners, Tahmoor Coal updated Version 5 of the Land Management Plan (Tahmoor Coal, 2024). The monitoring program in the Land Management Plan included a change to monitoring of farm dams from monthly by a geotechnical engineer and weekly by a building inspector during the period of active subsidence for each dam, to monthly by a geotechnical engineer during the period of active subsidence for each dam only. Additional inspections can be conducted by either the geotechnical engineer or building inspector as required if impacts are observed.

The change in monitoring procedures represents the only change to Table 6.1 Risk control procedures in the Management Plan. The change to monitoring was described in the Land Management Plan, which was approved by the Department of Planning, Housing and Infrastructure on 14 August 2024.

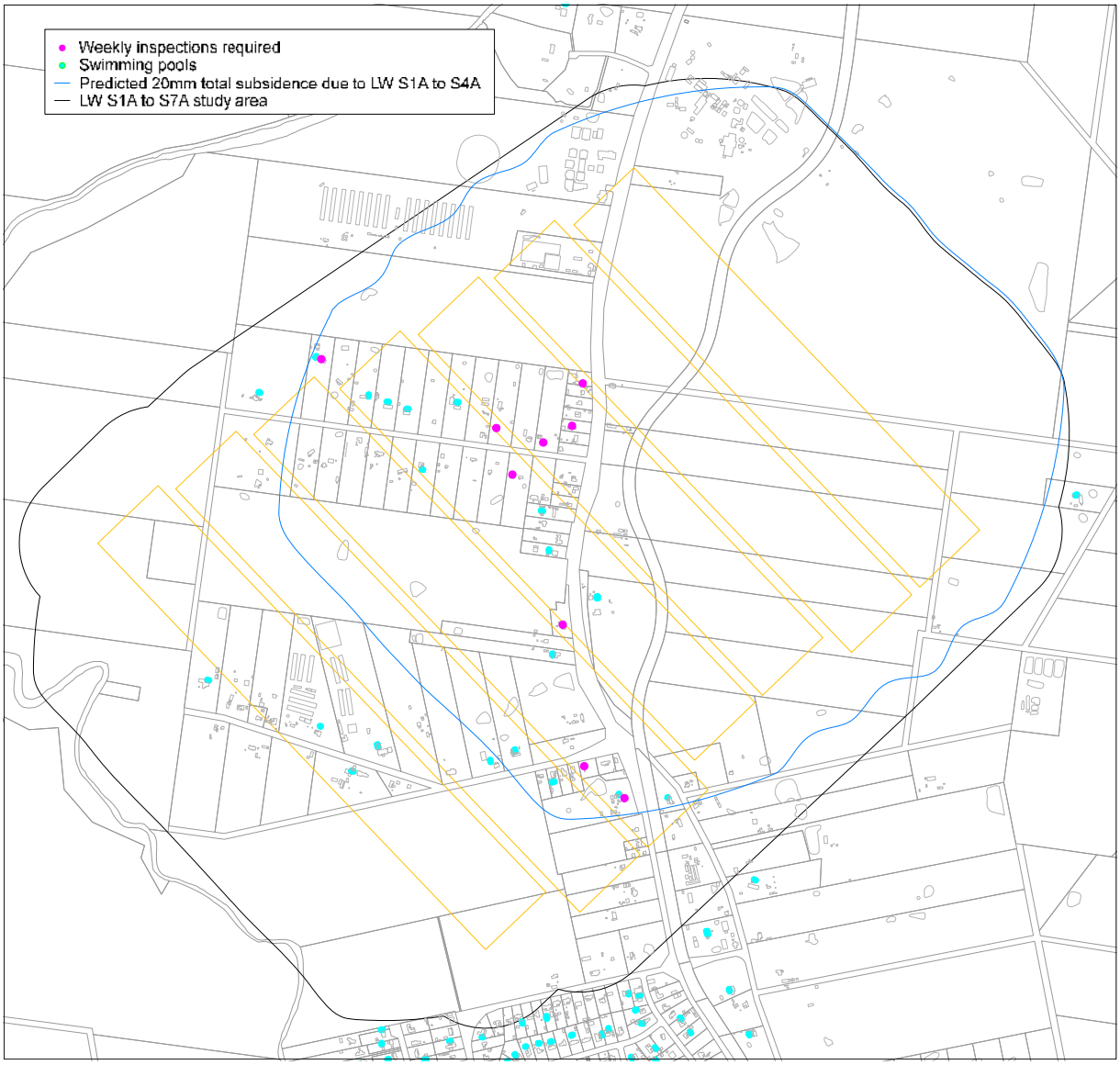


Fig. 6.3 Inspections during active subsidence

6.7. Ground and structure monitoring plan

6.7.1. Ground surveys along the streets

Survey marks have been installed along streets above and adjacent to LWs S1A to S7A, as shown in Drawing No. MSEC1193-01-01. The survey pegs will be surveyed during the period of active subsidence of these features during the extraction of LWs S1A to S7A.

6.7.2. Specific structure surveys

Tahmoor Coal will offer to install ground survey marks around residential structures that are located directly above LWs S1A to S7A, particularly for semi-rural and rural structures that are remote from streets where survey lines are installed. Tahmoor Coal will particularly encourage landowners to agree to install survey pegs for selected properties, where recommended by the geotechnical engineer or structural engineer due to their proximity to steep slopes or pre-existing condition.

Where landowners have agreed to install survey marks, Tahmoor Coal will offer to conduct at least one survey when the properties are experiencing active subsidence during the extraction of each relevant longwall. Additional surveys will also be undertaken following completion of each longwall or if impacts or high tilts are observed.

Tahmoor Coal will place permanent ground survey marks around each subject building. Tahmoor Coal will endeavour to place marks at each external and internal corner of the building, and one mark at the centre of each external side of reasonable length (this will depend on the overall size of the building, but is approximately 10 m).

Tahmoor Coal will record the reduced levels of each mark, as well as the relative horizontal position between each mark around the perimeter of the building (local 3D survey). The survey information will provide subsidence, tilt, curvature and strain information on the ground around the building. This general surveying scheme is illustrated in Fig. 6.4. It is recognised that in some cases, it will not be possible to gain access and suitable lines of sight to the entire perimeter of the building, and in some cases, the number of survey pegs may be reduced. However, as a minimum, survey marks will be placed at every corner of the building.

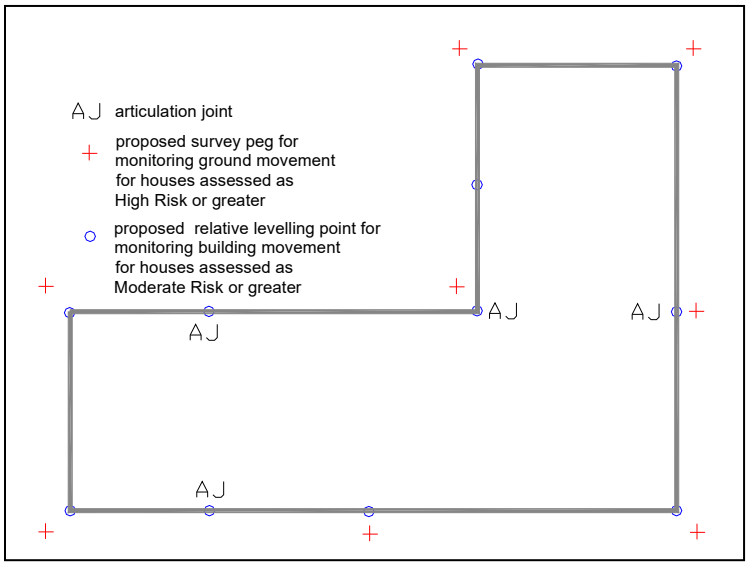


Fig. 6.4 Schematic layout for ground movement and building level surveys around a typical building

The properties where landowners have requested or agreed with Tahmoor Coal to install survey pegs are shown in Fig. 6.5.

Survey marks will be installed and baseline surveyed at the properties prior to the active longwall face approaching within 400 metres of each property.

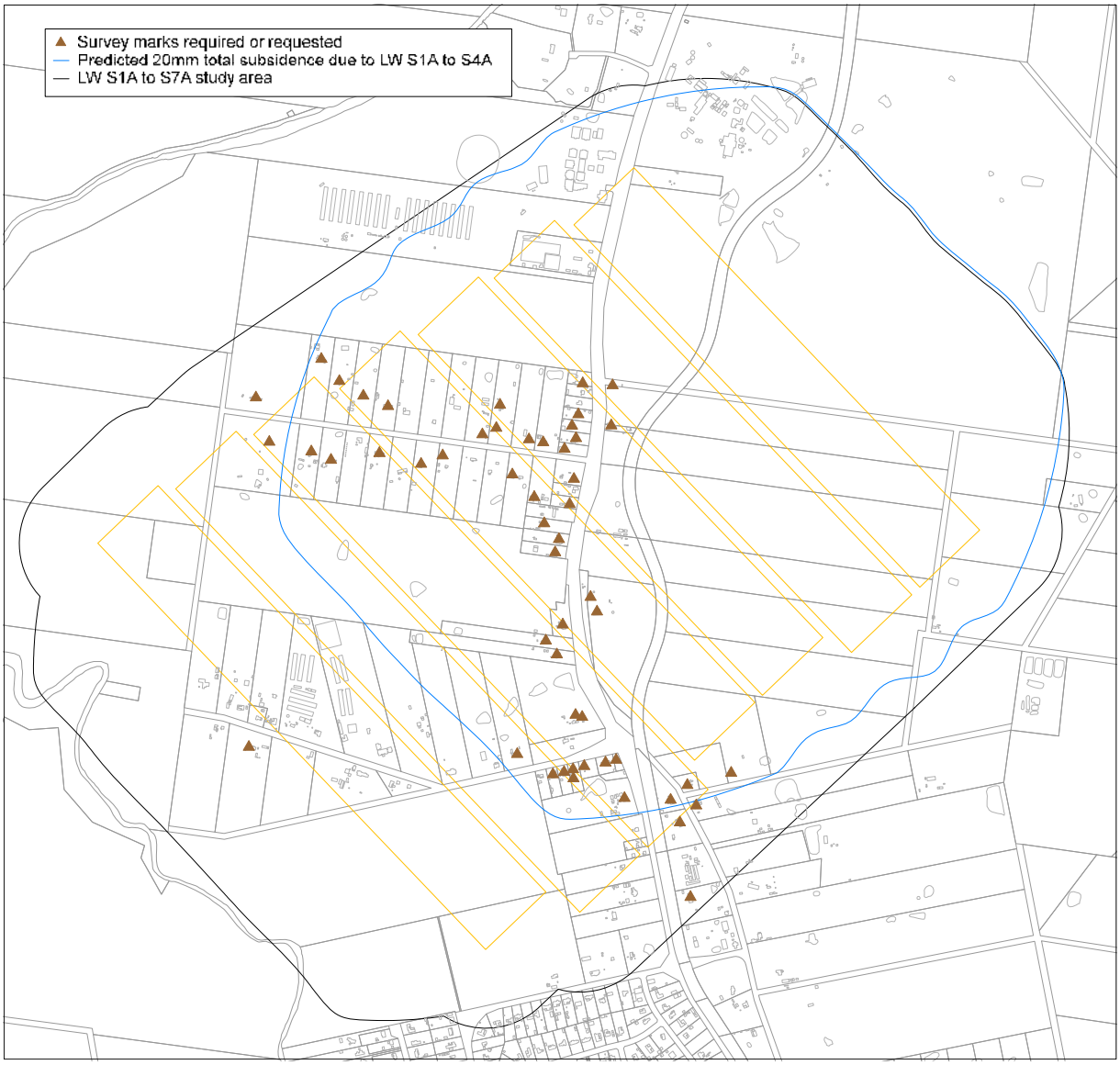


Fig. 6.5 Properties for which survey marks are required or have been requested

6.8. Schedule of inspections and surveys

A schedule of inspections and surveys will be maintained by Tahmoor Coal.

6.9. Inspection and survey register

A register will be kept by Tahmoor Coal, recording when inspections and surveys are conducted. Tahmoor Coal can, at any time, provide a copy of the register to the Resources Regulator.

6.10. Triggers and responses

Trigger levels have been developed by Tahmoor Coal based on observed ground movements or impacts. Trigger levels for each monitoring parameter are described in the risk control procedures in Table 6.1. Structural inspections will be undertaken for any structure where ground tilt is observed to exceed 7 mm/m or curvature is observed to exceed 0.2 km^{-1}.

Tahmoor Coal will coordinate and ensure that building contractors are on standby for immediate call out and service in the event of impacts occurring. Temporary alternative accommodation will also be arranged by Tahmoor Coal in the unlikely event that a residence becomes unsafe as a result of mine subsidence impacts.

Immediate responses will be undertaken by Tahmoor Coal for the following impacts:

- impacts that create a serious public safety hazard;
- impacts to all entry and exit doors, and all other doors that must remain operational for security and fire egress reasons, even if further impacts are anticipated;
- impacts that impair any essential services;
- impacts to sensitive equipment, even if further impacts are anticipated; and
- in the worst case, restriction on entry to part of the property and the provision of alternative accommodation for the resident.

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

With respect to the extraction of LWs S1A to S7A, no potential hazards have been identified that could reasonably give rise to the need for an emergency response for structures that will be affected by LWs S1A to S7A. It is noted that pool gates can malfunction during the period of active subsidence and any impacts will be repaired immediately. It is possible that irregular ground movements could cause a severe impact on a building structure or farm dam; however, this will develop gradually allowing the risk to be managed.

Mine subsidence movements 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 landowners.

Tahmoor Coal and the SRG will review and assess monitoring reports and consider whether any additional management measures are required on a weekly basis. If irregular movements or adverse impacts are detected, it is anticipated that a focussed inspection will be undertaken for the affected property, 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 property, and that the landowner will be consulted on a more frequent basis.

Given the gradual development of subsidence movements, it is extremely unlikely that a situation will arise where observations change from a benign scenario to an emergency scenario within one week. Tahmoor Coal will also brief landowners on what signs to look for to detect the development of potential impacts.

Notwithstanding the above, if a hazard has been identified that involves potential serious injury or illness to a person or persons at a property, and it 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 at the property, Tahmoor Coal and the landowner will immediately meet and implement emergency procedures.

The implementation of emergency procedures may include any or a combination of the following:

- restriction of access to the hazardous area; and/or
- in the worst case, the relocation of residents to alternative accommodation until the hazard is rectified.

6.11. Risk control procedures for LWs S1A to S7A

Risk control procedures for the management of potential impacts to residential, commercial and business establishments, and public amenities and utilities are provided in Table 6.1.

Table 6.1 Risk control procedures for built structures for LWs S1A-S7A

Infrastructure	Hazard / impact	Risk	Trigger	Control procedure/s	Timing and frequency	By whom?
Items of heritage significance, public amenities, commercial, business and industrial establishments predicted to experience more than 20 mm of subsidence due to the extraction of LWs S1A-S7A				Refer separate Property Subsidence Management Plans		
Residential structures that will experience mine subsidence effects due to the mining of LWs S1A-S7A	Impacts occur	Low to Moderate	Prior to mining	Community consultation, including letters to landowners offering a Pre-Mining Inspection and Hazard Identification inspection for structures predicted to experience more than 20 mm of subsidence due to the extraction of LWs S1A-S7A.	Complete	Tahmoor Coal
				Front of house screening inspection to identify any potentially unstable structures, for structures predicted to experience more than 20 mm of subsidence due to the extraction of LWs S1A-S7A.	Complete	Tahmoor Coal
				Conduct pre-mining hazard identification inspection and assessment by geotechnical engineer of structures on or near steep slopes to check whether there is any potential for slope instability prior to, during or after mining, for structures predicted to experience more than 20 mm of subsidence due to the extraction of LWs S1A--S7A.	No structures located on or near natural steep slopes within Study Area	-
				Conduct pre-mining hazard identification inspection and assessment by structural engineer, including: • structures requested for inspection by landowner during community consultation • structures directly above LWs S1A-S7A in semi-rural / rural areas remote from street front, where front of house screening is not practicable • structures that have been recommended for structural inspection by the geotechnical engineer • structures that have been recommended for structural inspection during front of house screening inspections • structures built prior to declaration of the Bargo Mine Subsidence District (1975) that are predicted to experience more than 150 mm of subsidence due to the extraction of LWs S1A-S7A • structures above potential hidden creeks that are predicted to experience more than 20 mm of subsidence due to the extraction of LWs S1A-S7A • structures above mapped geological structures that are predicted to experience more than 20 mm of subsidence due to the extraction of LWs S1A-S7A	Complete for LWs S1A-S3A All but one complete for LW S4A Complete remainder prior to active LW face approaching within 300 m of each property	Tahmoor Coal
				Installation of additional monitoring measures or mitigation/strengthening measures as recommended by structural engineer.	Prior to active LW face approaching within 100 m of each property	Tahmoor Coal
				Install ground monitoring lines on streets above LWs S1A-S7A and baseline survey initial levels and strain distances (as shown in Drawing No. MSEC1193-01-01).	Complete Complete within predicted limit of incremental subsidence of each active LW, prior to active LW face approaching within 600 metres of survey line.	Tahmoor Coal (SMEC)
				Install ground pegs for structures as requested by or agreed with landowners	Complete prior to active LW face approaching within 400 m of each property	Tahmoor Coal (SMEC)
				Confirm arrangements for building contractors to remain on standby for immediate call out and service in the event of impacts affecting safety or serviceability.	Complete	Tahmoor Coal
			Discovery of potential structural issue prior to mining	Conduct structural hazard identification inspection and assessment and consider: - any mitigation / strengthening measures to improve the existing structural condition - any management measures that should be undertaken prior to or during mining - any monitoring and inspection measures, triggers and responses during mining	Within 1 week of discovery	Tahmoor Coal
				Advise property owner, Subsidence Advisory NSW and Resources Regulator of findings of structural engineer.	Prior to active LW face approaching within 300 m of each property	Tahmoor Coal
				Undertake mitigation / strengthening measures if decided by SRG.	Prior to active LW face approaching to within 100 m of structure	Tahmoor Coal

Infrastructure	Hazard / impact	Risk	Trigger	Control procedure/s	Timing and frequency	By whom?
Residential structures that will experience mine subsidence effects due to the mining of LWs S1A-S7A	Impacts occur	Low to Moderate	During the mining of LWs S1A-S7A	Surveys of street survey lines within active subsidence area, including Charlies Point Road, Remembrance Drive, Caloola Road, Yarran Road and the Great Southern Road	Weekly for pegs located within active subsidence zone after the length of the extraction exceeds 200 metres (except monthly for pegs along Charlies Point Road)	Tahmoor Coal (SMEC)
				Conduct kerbside visual inspection of streets and structures	Detailed inspection once a week Vehicle based inspection once a week within active subsidence area	Tahmoor Coal
				Conduct inspections during mining for following structures (where access is granted): a) Structures that have previously experienced mine subsidence impacts, where recommended by the SRG b) Pool gates and fences c) Any other structures recommended for regular inspections and/or structure surveys by geotechnical or structural engineer following pre-mining hazard identification inspection and assessment	Weekly within active subsidence zone after the length of the extraction exceeds 200 metres, or as required by geotechnical or structural engineer	Tahmoor Coal
				Conduct ground surveys for structures as requested by or agreed with landowners	One survey per longwall when house is within active subsidence zone, targeted to occur when LW face has passed house between 100 and 200 metres.	Tahmoor Coal (SMEC)
				Analyse and report results of monitoring and inspections to SRG	Weekly during LWs S1A-S7A after the length of the extraction of each LW exceeds 200 metres.	Tahmoor Coal (MSEC)
				SRG discuss results and consider whether any additional management measures are required	Weekly during LWs S1A-S7A after the length of the extraction of each LW exceeds 200 metres.	SRG
			Observed tilts are greater than 7 mm/m or observed curvatures are greater than 0.2 km^{-1} near structure	Conduct inspection of building and provide photographic survey and impact report	Within one week	Tahmoor Coal
				Consider structural inspection/additional monitoring and/or mitigation/strengthening measures	Immediately after building inspection	Tahmoor Coal
			Significant non-conventional movement occurs or Impacts observed to any surface infrastructure (not just structures) or Slope slippage observed	Consider whether any additional management measures are required in light of observations, including additional geotechnical or structural inspections, increase frequency of surveys and inspections, additional community consultation	As required by SRG	SRG
				Notify landowner, Tahmoor Coal, Subsidence Advisory NSW and MSO	Within one week	Tahmoor Coal

Infrastructure	Hazard / Impact	Risk	Trigger	Control procedure/s	Timing and frequency	By whom?
Residential establishments that will experience mine subsidence movements due to the mining of LW S1A-S7A	Impacts occur	Low to Moderate	Any impact occurs to structure	As information can come from many possible sources: If not already done, notify landowner, Tahmoor Coal, Subsidence Advisory NSW	Within 24 hours	Tahmoor Coal
				Inspect impact of subsidence on building	As soon as possible	Tahmoor Coal
				Inspect condition of building by structural engineer, where recommended by the SRG based on feedback from Subsidence Advisory NSW	As recommended by SRG with active subsidence area or as agreed with owner	Tahmoor Coal
				Rectify any adverse impacts that impair upon: - the safety, access and mobility, security or fire egress - any essential services - sensitive equipment	As soon as possible at any stage during mining	Tahmoor Coal
				Repair damage to structure	When subsidence impacts cease	Tahmoor Coal
			Observed impacts meet the criteria under Condition C15 of the Project Approval (refer Section 1.9)	Offer landowner the option to acquire property in accordance with the *Coal Mine Subsidence Compensation Act 2017*.	As soon as possible	Tahmoor Coal
			Observed impacts are greater than predicted impacts	Investigate cause(s) for greater impacts, including possibility of non-conventional or anomalous movements, type of structure. Investigate spatial trends in data to identify any pattern.	Within one week of observation	Tahmoor Coal
			Structure has become or is likely to be become hazardous as a result of subsidence	Notify landowner, Tahmoor Coal, Subsidence Advisory NSW and Resources Regulator	Within 24 hours	Tahmoor Coal
				Inspect structural condition of building.	Within two days and then as recommended by structural engineer	Tahmoor Coal
				Reassess final level of damage based upon likelihood of further damage and structural condition.	Immediately after structural re-inspection.	SRG
				Consider additional monitoring and/or mitigation/strengthening measures	Immediately after structural re-inspection.	SRG
			A hazard has been identified that involves potential serious injury or illness to a person or persons at the property, and cannot be controlled	Provide temporary accommodation for residents in coordinate with Subsidence Advisory NSW	Immediately	Tahmoor Coal
				Notify MSO	Within 24 hours	Tahmoor Coal
				Offer landowner the option to acquire property in accordance with the *Coal Mine Subsidence Compensation Act 2017*.	Immediately	Tahmoor Coal
			Property owner does not accept acquisition	Temporarily relocate residents until building is repaired	Immediately	Tahmoor Coal
Houses	House subsides below 1% AEP flood level	Moderate	Prior to Mining	Conduct flood study to assess potential for floor levels of houses near Teatree Hollow at intersection of Caloola Road and Remembrance Drive to fall below 1% AEP flood level due to mine subsidence	Complete	Tahmoor Coal
				Conduct pre-subsidence survey of surface topography and floor levels of houses near predicted 1% AEP flood level.	LiDAR survey complete Floor level surveys prior to 800m extraction of LW S1A	Tahmoor Coal (SMEC)
			During Mining	Ensure culverts along Teatree Hollow at Remembrance Drive and Main Southern Railway are clear of debris	Ongoing	Tahmoor Coal
			Completion of Mining	Conduct post-mining survey of surface topography and floor levels of houses	End of LW S7A	Tahmoor Coal (SMEC)
				Conduct post-mining flood study to assess whether any houses has subsided below 1% AEP flood level	End of LW S7A	Tahmoor Coal
			House(s) subside below 1% AEP flood level	Raise house(s) or upgrade drainage structures so that floor level(s) are above 1% AEP flood level	As required	Tahmoor Coal
Houses	Impacts to future houses	Low to Moderate	Prior to mining each LW	Contact residents to inform them of commencement of mine subsidence. Request owners for information on whether any new houses have been constructed in the last year.	Prior to subsidence occurring	Tahmoor Coal
			Owner notifies of new house	Conduct subsidence predictions, impact assessment and pre-mining hazard identification inspection, if access provided by landowner	Prior to subsidence occurring	Tahmoor Coal
				Follow risk control procedures, as for other houses	Immediately	Tahmoor Coal (MSEC)

Infrastructure	Hazard / impact	Risk	Trigger	Control procedure/s	Timing and frequency	By whom?
Swimming pools and pool gates	Damage to pool	Low	None	Notify owner of potential impacts to pool	Before mine subsidence impacts occur	Tahmoor Coal
	Pool gate – won't shut	High	None	Notify owner of potential impact to pool gate and fence	Before mine subsidence impacts occur	Tahmoor Coal
				Visually inspect pool gate to check that it is operating properly	Weekly when each pool is within active subsidence zone, and at completion of each longwall	Tahmoor Coal
			Pool gate won't close	Notify resident and/or landowner, contact Subsidence Advisory NSW to repair gate	Immediately	Tahmoor Coal
				Repair gate	As soon as possible	Tahmoor Coal
Farm dams	Loss of water storage due to leakage of dam wall or floor	Low	During mining	Visual inspection of dam by geotechnical engineer, including recording of water levels	Monthly during period of active subsidence at each dam for each LW Quarterly for minimum of 12 months after completion of LW S7A	Tahmoor Coal
			Cracks > 10mm wide observed in dam wall (i.e. other than natural desiccation cracking) AND/OR Isolated seepage without suspended solids (e.g. clear water) from the face or toe of the farm dam embankment	Notify SRG	Within 24 hours	Tahmoor Coal
				Conduct geotechnical inspection of dam to assess cause and determine need for further action / investigation	Within 48 hours	Tahmoor Coal
				SRG meet and review latest monitoring information for the dam, inspections by geotechnical engineer and building inspector, and latest weather forecasts. SRG consider whether any additional management measures are required, which may include: - backfill cracks and/or regrade drainage line - increase monitoring frequency and reporting procedures - arrange additional monitoring locations to monitor potential displacement of dam wall material - lower water level of dam (if relevant) - consider potential consequence of dam break and whether any other management measures are required.	Within 24 hours of geotechnical inspection	SRG
				Notify landowner, Tahmoor Coal, Subsidence Advisory NSW and Resources Regulator	Within 24 hours	Tahmoor Coal
			Persistent longitudinal or arcuate cracking > 20 mm wide observed within dam wall AND Seepage with suspended solids (e.g. turbid water) from the face or toe of the farm dam embankment	Notify SRG	Within 24 hours	Tahmoor Coal
				Conduct geotechnical inspection of dam to assess cause and determine need for further action / investigation	Within 24 hours	Tahmoor Coal
				SRG meet and review latest monitoring information for the dam, inspections by geotechnical engineer and building inspector, and latest weather forecasts. SRG consider whether any additional management measures are required, which may include: - backfill cracks and/or regrade drainage line - increase monitoring frequency and reporting procedures - arrange additional monitoring locations to monitor potential displacement of dam wall material - lower water level of dam (if relevant) - consider potential consequence of dam break and whether any other management measures are required.	Within 24 hours of geotechnical inspection	SRG
				Notify landowner, Tahmoor Coal, Subsidence Advisory NSW and Resources Regulator	Within 24 hours	Tahmoor Coal
			Loss of water supply due to leakage of dam wall or floor	Supply water to landowner	As required	Tahmoor Coal

7.0 SRG REVIEW MEETINGS

The SRG undertakes reviews and, as necessary, revises and improves the risk control measures to manage risks to health and safety and potential impacts to building structures. The reviews are undertaken regularly during the period of active subsidence based on the results of surveys and visual inspections and summarised in regular monitoring reports, as described in Section 6.3.

The purpose of the reviews is to:

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

SRG meetings will be held for discussion and resolution of issues raised in the operation of the Management Plan. The frequency of meetings shall be as agreed by the parties.

SRG meetings will discuss any incidents reported in relation to structures, the progress of mining, the extent 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 risk is identified for a particular structure or surface feature, any member of the SRG may call an emergency SRG Meeting, with one day's notice, to discuss proposed actions and to keep other parties informed of developments in the monitoring of the structure or surface feature.

8.0 AUDIT AND REVIEW

This Management plan 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 property and business 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 structures or 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.

9.0 RECORD KEEPING

Tahmoor Coal will keep and distribute minutes of SRG meetings.

10.0 CONTACT LIST

Organisation	Contact	Phone	Email
NSW Department of Planning and Environment – Resources Regulator (RR)	Alan Blakeney	0473 461 118	alan.blakeney@regional.nsw.gov.au
	Ray Ramage	(02) 4063 6485 0442 551 293	ray.ramage@regional.nsw.gov.au
Subsidence Advisory NSW	-	4908 4300	subsidenceadvisory@customerservice.nsw.gov.au
Mine Subsidence Engineering Consultants (MSEC)	Daryl Kay*	(02) 9413 3777 0416 191 304	daryl@minesubsidence.com
Pells Sullivan Meynink (PSM)	Gareth Swarbrick	0439 352 896	Gareth.Swarbrick@psm.com.au
SIMEC Mining Tahmoor Coal Project Manager	Ross Barber*	(02) 4640 0028 0419 466 143	ross.barber@simecgfg.com
SIMEC Mining Tahmoor Coal Community Liaison Specialist	Amanda Bateman	(02) 4640 0025 0429 442 811	amanda.bateman@simecgfg.com
SIMEC Mining Tahmoor Coal Environment and Community Officer	Amanda Fitzgerald*	(02) 4640 0057 0429 442 811	amanda.fitzgerald@simecgfg.com
Tahmoor Coal	Tahmoor Coal Control 24 hour contact	1800 154 415	-

* denotes member of Structures Response 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
MSEC1193-09-01	Structures	B

Tables

Table A.1	Hazard Identification and Engineering Controls	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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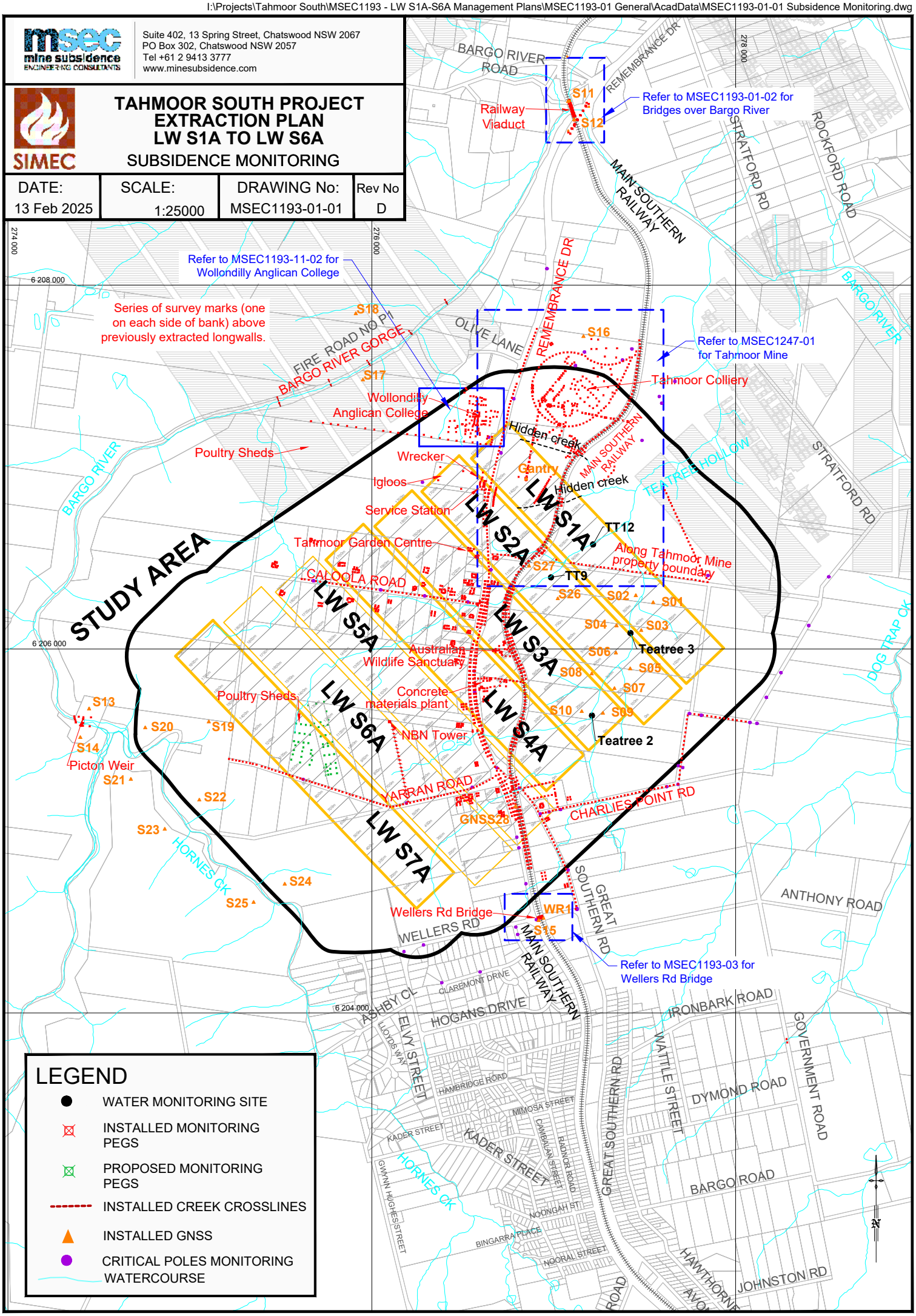
SIMEC

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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SIMEC

TAHMOOR SOUTH PROJECT MANAGEMENT PLAN LW S1A TO LW S6A

BUILDINGS & DAMS

DATE:	SCALE:	DRAWING No:	Rev No
15 Jul 2025	1:25000	MSEC1193-09-01	02

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

- HOUSES
- RURAL STRUCTURES
- HERITAGE STRUCTURES
- COMMERCIAL STRUCTURES
- PUBLIC AMENITIES & UTILITIES
- POOLS
- TANKS
- DAMS
- GEOLOGICAL STRUCTURES

Grid to MGA co-ordinates

Table A.1 - Hazard Identification and Engineering Controls for LWs S1A to S4A
Revision B

Structure Reference	Structure Type	Description	Hazard identification and recommendations by structural engineer	Hazard identification and recommendations by geotechnical engineer	Mine operator's management actions in response to engineers' recommendations	Requirement for a Subsidence Hazard Mitigation Plan	Expected active subsidence period affecting property
BCA_010_h01	H	House	No issues identified.	Not required.	No additional management actions required.	No	LW S4A: Aug-26 to Oct-26
BCA_015_h01	H	House	No issues identified.	Not required.	No additional management actions required.	No	LW S4A: Jul-26 to Oct-26
BCA_020_h01	H	House	No response from owner to requests to inspect property to date.	Not required.	Continue to request inspection of property.	No	LW S4A: Jul-26 to Oct-26
BCA_025_h01	H	House	No issues identified.	Not required.	No additional management actions required.	No	LW S4A: Jul-26 to Oct-26
BCA_030_h01	H	House	No response from owner to requests to inspect property to date.	Not required.	Continue to request inspection of property.	No	LW S4A: Jun-26 to Oct-26
BCA_035_h01	H	House	No issues identified. A fenced pool is on the property.	Not required.	No additional management actions required. Inspect pool fence and gates during active subsidence.	No	LW S4A: Jun-26 to Oct-26
BCA_040_h01	H	House	No issues identified.	Not required.	No additional management actions required.	No	LW S4A: Jun-26 to Oct-26
BCA_045_h01	H	House	No response from owner to requests to inspect property to date.	Not required.	Continue to request inspection of property.	No	LW S4A: Jun-26 to Aug-26
BCA_050_h01	H	House	Owner refused PMI	Not required.	Continue to request inspection of property.	No	LW S4A: May-26 to Aug-26
BCA_055_h01	H	House	No issues identified. An automatic sliding gate is on the property.	Not required.	Baseline survey sliding entry gate completed. Impacts observed during LW S3A to sliding gate and driveway. Inspect weekly during LW S4A.	No	LW S4A: May-26 to Aug-26
BCA_060_h01	H	House	No issues identified.	Not required.	No additional management actions required.	No	LW S4A: May-26 to Jul-26
BCA_065_h01	H	House	A free-standing brick wall is located between the main residence and the double garage. It is recommended that the wall be monitored for tilt during periods of active subsidence.	Not required.	Monitor tilt of free-standing brick wall during periods of active subsidence.	No	LW S4A: May-26 to Aug-26
BCA_070_h01	H	House	No issues identified.	Not required.	No additional management actions required.	No	LW S4A: May-26 to Aug-26
BCA_075_h01	H	House	A timber-framed patio awning is bolted to the brick veneer wall along the eastern elevation of the house.	Not required.	Property owner will not allow further access. Monitor the bolts connecting the patio awning to the brick veneer wall along the eastern elevation of the house.	No	LW S4A: Jun-26 to Sep-26
BCA_075_h02	H	House	No issues identified.	Not required.	No additional management actions required. Property owner will not allow further access.	No	LW S4A: Jun-26 to Oct-26
BCA_080_h01	H	House	No issues identified.	Not required.	No additional management actions required.	No	LW S4A: Jun-26 to Sep-26
BCA_085_h01	H	House	No issues identified.	Not required.	No additional management actions required.	No	LW S4A: Jun-26 to Oct-26
BCA_090_h01	H	House	No response from owner to requests to inspect property to date.	Not required.	Continue to request inspection of property.	No	LW S4A: Jul-26 to Oct-26
BCA_095_h01	H	House	No response from owner to requests to inspect property to date.	Not required.	Continue to request inspection of property.	No	LW S4A: Jul-26 to Oct-26
BCA_100_h01	H	House	No issues identified. A fenced pool is on the property.	Not required.	No additional management actions required. Inspect pool fence and gates during active subsidence.	No	LW S4A: Jul-26 to Oct-26
BCA_105_h01	H	House	No issues identified other some drummy / displaced tiles in the ensuite bathroom. A fenced pool is on the property.	Not required.	No additional management actions required. Inspect pool fence and gates during active subsidence.	No	LW S4A: Aug-26 to Oct-26
BCA_110_h01	H	House	No issues identifed. A severely dilapidated above-ground pool is on the property (not in use). An old shed is planned to be demolished by owner. There is a vehicle hoist in one of the sheds.	Not required.	Baseline survey vehicle hoist prior to subsidence.	No	LW S4A: Aug-26 to Oct-26
BCA_115_h01	H	House	No issues identified other some drummy / displaced tiles in the ensuite bathroom. Brick chimney. A fenced pool is on the property.	Not required.	Monitor chimney tilts and inspect pool fence and gates during active subsidence during LW S5A.	No	-
BCA_120_h01	H	House	No issues identified. Small step / trip hazard in pavers into a side walkway. Aviary on property. Cantilevered steel soldier and concrete block retaining wall. A fenced pool is on the property.	Not required.	No additional management actions required for LW S4A.	No	-
BCP_010_h01	H	House	No issues identified.	Not required.	No additional management actions required.	No	LW S4A: Jan-26 to Feb-26
BCP_040_h01	H	House	Significant termite damage to timber framing of three (3) timber-framed, corrugated metal-clad sheds observed. These structures are possibly more at risk because of wind load than subsidence impacts. Access to these sheds should be prevented by enclosing the sheds with orange bunting with suitable notification. Asbestos sheeting on walls and roof of house.	Not required.	House is vacant and is planned to be demolished.		House is predicted to experience less than 20 mm due to LW S4A
BGR_213_h01	H	House	No issues identified for the house.	Not required.	No additional management actions required for the house.	No	LW S4A: Jan-26 to Feb-26
BGR_218_h01	H	House	No issues identified. Above-ground pool identified without surrounding pool fence.	Not required.	No additional management actions required for the house.	No	LW S4A: Jan-26 to Feb-26
BGR_221_h01	H	House	No issues identified for the house. Vehicle hoist at rear of property	Not required.	Baseline survey vehicle hoist prior to subsidence.	No	-
BGR_230_h01	H	House	No issues identified for the house. Small weatherboard shop building with external brick chimney.	Not required.	The property is predicted to experience less than 20mm of vertical subsidence due to the extraction of LW S4A. While a weatherboard structure is used for retail hobby train business, the mine subsidence risks are similar to risks for other residential structures. The hobby shop structure is also predicted to experience less than 20mm vertical subsidence due to the mining of LWs S1A to S7A. The property will, therefore, be managed under the Built Structures Management Plan (i.e. no separate PSMP). Monitor cracks and tilt of brick chimney during active subsidence due to extracton of B series longwalls.	No	-

Table A.1 - Hazard Identification and Engineering Controls for LWs S1A to S4A
Revision B

Structure Reference	Structure Type	Description	Hazard identification and recommendations by structural engineer	Hazard identification and recommendations by geotechnical engineer	Mine operator's management actions in response to engineers' recommendations	Requirement for a Subsidence Hazard Mitigation Plan	Expected active subsidence period affecting property
-	-	-					-
BRE_030_h01	H	House	No issues identified for the house.	Not required.	No additional management actions required for the house.	Separate Property Subsidence Management Plan (Inghams).	House is predicted to experience less than 20 mm due to LW S4A
BRE_055_h01	H	House	The main dwelling is of single-storey clad timber-framed construction and is currently not occupied. The house has been impacted by termite activity and the owner advised that the sewer had blocked and flooded the dwelling, causing it to be evacuated. It is recommended that this structure be rehabilitated by the owner before being re-occupied.	Not required.	Reinspect house after it is re-occupied.	Separate Property Subsidence Management Plan (Tahmoor Garden Centre).	LW S4A: May-26 to Aug-26
BRE_057_h01	H	House	Property is currently being renovated and another inspection will be arranged once complete.	Not required.	No additional management actions required for the house.	No	LW S4A: May-26 to Aug-26
BRE_059_h01	H	House	No response from owner to requests to inspect property to date.	Not required.	Continue to request inspection of property.	No	LW S4A: May-26 to Aug-26
BRE_061_h01	H	House	No issues identified for the house.	Not required.	Confirm use of buried tanks beneath the shed slab.		LW S4A: May-26 to Aug-26
BRE_063_h01	H	House	Vehicle hoist is located in a shed. The hoist was measured to be level but may be adversely affected during mining. A fenced pool has been removed from the property.		Baseline survey vehicle hoist (complete) and monitor tilt of legs during active subsidence.	No	LW S4A: May-26 to Aug-26
BRE_065_h01	H	House	No issues identified.	Not required.	No additional management actions required. Notified owner of timber rot on pergola.	No	LW S4A: May-26 to Aug-26
BRE_067_h01	H	House	No issues identified.	Not required.	No additional management actions required.	No	LW S4A: May-26 to Aug-26
BRE_070_h01	H	House	No issues identified. Property is currently being renovated and another inspection will be arranged once complete.	Not required.	No additional management actions required.	No	LW S4A: Apr-26 to Jul-26
BRE_075_h01	H	House	No issues identified. A fenced pool is on the property but not in use.	Not required.	No additional management actions required. Inspect pool fence and gates during active subsidence if it is in use.	No	LW S4A: Apr-26 to Jul-26
BRE_075_h02	H	House	No issues identified. A fenced pool is on the property.	Not required.	No additional management actions required. Inspect pool fence and gates during active subsidence.	No	LW S4A: Apr-26 to Jul-26
BRE_077_h01	H	House	No issues identified. Very old, dilapidated weatherboard house occupied by elderly resident. Sister has moved into a caravan on property to care for him.	Not required.	No additional management actions required.	No	LW S4A: Apr-26 to Jul-26
BRE_080_h01	H	House	No response from owner to requests to inspect property to date.	Not required.	Continue to request inspection of property.	No	LW S4A: Apr-26 to Jul-26
BRE_083_h01	H	House	No issues identified.	Not required.	No additional management actions required.	No	LW S4A: Apr-26 to Jul-26
BRE_086_h01	H	House	No issues identified.	Not required.	No additional management actions required.	No	LW S4A: Apr-26 to Jul-26
BRE_089_h01	H	House	No issues identified. A fenced pool is on the property.	Not required.	No additional management actions required. Inspect pool fence and gates during active subsidence.	No	LW S4A: Apr-26 to Jun-26
BRE_140_h01	H	House	Restaurant no longer operating on property. Large 17-18mm wide crack in brickwork in female WC.	Not required.	Placed film over window above cracked brickwork to avoid cracking. Installed crack gauges as recommended by structural engineer and will inspect weekly during active subsidence.	No	LW S4A: Mar-26 to Jun-26
BRE_143_h01	H	House	Very old weatherboard house with external, low height deck partially collapsed and in a dilapidated state. Internal brick chimney.	Not required.	Baseline survey chimney tilt prior to influence of LW S4A.	No	LW S4A: Mar-26 to Jun-26
BRE_148_h01	H	House	No issues identified. A fenced pool is on the property.	Not required.	No additional management actions required. Inspect pool fence and gates during active subsidence if access is permitted.	No	LW S4A: Mar-26 to May-26
BRE_154_h01	H	House	No issues identified.	Not required.	No additional management actions required.	No	LW S4A: Feb-26 to Apr-26
BRE_154_h02	H	House	No issues identified.	Not required.	No additional management actions required.	No	LW S4A: Feb-26 to Apr-26
BRE_167_h01	H	House	One room used for florist business. Rear brick retaining wall has cracked and tilted outwards. It is recommended that the wall be monitoring during active subsidence. A fenced pool is on the property.	Not required.	As only one room used for retail florist business, the mine subsidence risks are similar to risks for other residential structures. The property will, therefore, be managed under the Built Structures Management Plan (i.e. no separate PSMP). Crack gauges have been installed on the brick retaining wall. The retaining wall and pool will be inspected weekly during active subsidence.	No	LW S4A: Jan-26 to Mar-26
BRE_515_h01	H	House	No issues identified for the house. A pool is located on the property.	Not required.	No additional management actions required for the house. Inspect pool fence and gates during active subsidence.	Separate Property Subsidence Management Plan (MKD Machinery).	LW S4A: Mar-26 to Jun-26
BRE_515_h02	H	House	No issues identified for the house. A pool is located on the property.	Not required.	No additional management actions required for the house. Inspect pool fence and gates during active subsidence.	Separate Property Subsidence Management Plan (MKD Machinery).	LW S4A: Mar-26 to May-26
BRE_644_h01	H	House	No issues identified.	Not required.	No additional management actions required.	No	LW S4A: May-26 to Jul-26
BRE_665_h01	H	House	The water tank is mounted on a light galvanised steel frame, which could sway sideways in response to mining-induced tilt. It is recommended to install timber packing below each frame to provide supplementary support to the tank.	Not required.	Install timber packing below each frame to provide support to the water tank prior to the influence of LW S1A.	No	LW S4A: May-26 to Aug-26
BYR_001_h01	H	House	No response from owner to requests to inspect property to date.	Not required.	Continue to request inspection of property.	No	LW S4A: Jan-26 to Apr-26

Table A.1 - Hazard Identification and Engineering Controls for LWs S1A to S4A
Revision B

Structure Reference	Structure Type	Description	Hazard identification and recommendations by structural engineer	Hazard identification and recommendations by geotechnical engineer	Mine operator's management actions in response to engineers' recommendations	Requirement for a Subsidence Hazard Mitigation Plan	Expected active subsidence period affecting property
BYR_005_h01	H	House	No issues identified for the house. A pool is located on the property.	Not required.	No additional management actions required for the house. Inspect pool fence and gates during active subsidence.	No	LW S4A: Feb-26 to May-26
BYR_015_h01	H	House	The house will be inspected prior to the influence of LW S5A.	Not required.	No additional management actions required.	No	House is predicted to experience less than 20 mm due to LW S4A
BYR_150_h01	H	House	The house will be inspsected prior to the influence of LW S4A.	Not required.		No	LW S4A: Jan-26 to Apr-26
BYR_150_h02	H	House	The house will be inspsected prior to the influence of LW S4A.	Not required.		No	LW S4A: Jan-26 to Apr-26
BYR_152_h01	H	House	No issues identified for the house. A pool is located on the property, which is has pre-mining tilt.	Not required.	No additional management actions required for the house. Inspect pool fence and gates during active subsidence.	No	LW S4A: Jan-26 to Apr-26
BYR_154_h01	H	House	No issues identified.	Not required.	No additional management actions required.	No	LW S4A: Jan-26 to Apr-26
BYR_156_h01	H	House	No issues identified.	Not required.	No additional management actions required.	No	LW S4A: Jan-26 to Apr-26
BYR_156_h02	H	House	No issues identified.	Not required.	No additional management actions required.	No	LW S4A: Jan-26 to Apr-26
BYR_158_h01	H	House	Significant tilting of sub-floor piers up to 66 mm/m at the southeast corner of the dwelling. It is recommended to provide supplementary support to the suspended timber floor during periods of active subsidence.	Not required.	Provide supplementary support (props) to the suspended timber floor prior to the influence of subsidence, as recommended by structural engineer. Inspect house during active subsidence.	No	LW S4A: Jan-26 to Apr-26
BYR_160_h01	H	House	House fire on 5 September 2024 has been assessed as a full knock down and rebuild.	Not required.	No additional management actions required. Reinspect once new house has been built.	No	LW S4A: Jan-26 to Apr-26
BYR_162_h01	H	House	Pier in subfloor area tilting generally downhill towards the south by up 33mm/m. Significant tilt of verandah post at the the northwest corner ot the bathroom.	Not required.	No additional management actions required during the mining of LW S4A. It is planned to monitor tilts weekly during active subsidence during the mining of LW S5A.	No	LW S4A: Jan-26 to Mar-26

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	Community Engagement	Rural residences	Damage to infrastructure or buildings	Health and Safety	Subsidence	* Built Structures Management Plan (AC) * Infrastructure Management Plans (AC) * Previous history of managing properties and infrastructure (AC) * Consultation and engagement with residents (AC) * Weekly subsidence meetings attended by Environmental and Community Team members and External Consultants (AC) * Survey monitoring (EC) * Subsidence Monitoring reports (EC) * Pre Mining Inspections and Hazard Inspections offered to all land owners (AC) * Front of house pre mining inspections (EC) * Weekly visual inspections conducted by building inspector (AC) * Draft monitoring plan issued for discussion (AC)	3	Health & Safety	2	C	8	3	Health & Safety				
Tahmoor Underground	Major Project	Built Infrastructure	Built Structures	Impact on health and safety of people	Injury to person	Subsidence resulting in failure of a structural element	* Management Plans prepared for previous longwalls (AC) * Previous ground survey and visual inspection as part of LW 22-W4 management (AC) * Previous consultation, coordination and cooperation with residents (AC) * Completion of Pre-mining and subsidence hazard inspections (EC)	2	Health & Safety	3	E	6	3	Health & Safety	Complete Built Structures Management Plan including TARP	April Hudson	01-Jul-22	
Tahmoor Underground	Major Project	Built Infrastructure	Built Structures	Damage to structures	Repair of structures	Subsidence	* Management Plans prepared for previous longwalls (AC) * Previous ground survey and visual inspection as part of LW 22-W4 management (AC) * Previous consultation, coordination and cooperation with residents (AC) * Completion of Pre-mining and subsidence hazard inspections (EC) * SANSW Claims Process (AC)	2	Property Damage	3	D	9	3	Property Damage	Complete Built Structures Management Plan including TARP for emergency evacuation procedures	April Hudson	01-Jul-22	
Tahmoor Underground	Major Project	Built Infrastructure	Pools	Impact on health and safety of people	Injury to person / single fatality	Subsidence causing damage to pool gate or fence	* Management Plans prepared for previous longwalls (AC) * Previous ground survey and visual inspection as part of LW 22-W4 management (AC) * Previous consultation, coordination and cooperation with residents (AC) * Completion of Pre-mining and subsidence hazard inspections (EC)	2	Health & Safety	4	E	10	4	Health & Safety	Complete Built Structures Management Plan including TARP for emergency evacuation procedures	April Hudson	01-Jul-22	
Tahmoor Underground	Major Project	Built Infrastructure	Pools	Damage to pools	Repair of pools or plant	Subsidence	* Management Plans prepared for previous longwalls (AC) * Previous ground survey and visual inspection as part of LW 22-W4 management (AC) * Previous consultation, coordination and cooperation with residents (AC) * Completion of Pre-mining and subsidence hazard inspections (EC)	2	Property Damage	2	C	8	2	Property Damage	Complete Built Structures Management Plan including TARP for emergency evacuation procedures	April Hudson	01-Jul-22	
Tahmoor Underground	Major Project	Built Infrastructure	Septic tanks	Damage to septic tanks	Repair of tanks	Subsidence	* Management Plans prepared for previous longwalls (AC) * Previous ground survey and visual inspection as part of LW 22-W4 management (AC) * Previous consultation, coordination and cooperation with residents (AC) * Completion of Pre-mining and subsidence hazard inspections (EC)	2	Property Damage	1	D	2	1	Property Damage	Complete Built Structures Management Plan including TARP for emergency evacuation procedures	April Hudson	01-Jul-22	
Tahmoor Underground	Major Project	Landscape features	Farm dams	Damage to farm dams	Leak of dam water / dam failure, cascading dam failure	Subsidence	* Management Plans prepared for previous longwalls (AC) * Previous ground survey and visual inspection as part of LW 22-W4 management (AC) * Previous consultation, coordination and cooperation with residents (AC)	2	Property Damage	2	D	5	2	Property Damage	Complete Land Management Plan for landscape features (including farm dams), including TARP	April Hudson	01-Mar-22	
Tahmoor Underground	Major Project	Landscape features	Farm dams	Damage to farm dams	Personnel injury	Subsidence	* Management Plans prepared for previous longwalls (AC) * Previous ground survey and visual inspection as part of LW 22-W4 management (AC) * Previous consultation, coordination and cooperation with residents	2	Health & Safety	3	E	6	3	Health & Safety	Complete Land Management Plan for landscape features (including farm dams), including TARP	April Hudson	01-Mar-22	

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	Built Structures	Impact on health and safety of people	Injury to person	Subsidence resulting in failure of a structural element	* Management Plans prepared for previous longwalls * Previous ground survey and visual inspection as part of LW 22-W4 management and LW S1A to S3A * Previous consultation, coordination and cooperation with residents * Completion of Pre-mining (SANSW) and subsidence hazard inspections (by Tahmoor Coal if approved by landowner)	2	Health & Safety	3	E	6	3	Health & Safety	Review and update Built Structures Management Plan including TARP	Ross Barber	01-Mar-27	SANSW conducting PMI from start of LW S5A
Built Infrastructure	Built Structures	Damage to structures	Repair of structures	Subsidence	* Management Plans prepared for previous longwalls * Previous ground survey and visual inspection as part of LW 22-W4 management and LW S1A to S3A * Previous consultation, coordination and cooperation with residents * Completion of Pre-mining (SANSW) and subsidence hazard inspections (by Tahmoor Coal if approved by landowner) * SANSW Claims Process	2	Property Damage	3	D	9	3	Property Damage	Review and update Built Structures Management Plan including TARP	Ross Barber	01-Mar-27	Unknown effects of the legislation and Tahmoor access to the property - SANSW conducting PMI from start of LW S5A
Built Infrastructure	Pools	Impact on health and safety of people	Injury to person / single fatality	Subsidence causing damage to pool gate or fence	* Management Plans prepared for previous longwalls * Previous ground survey and visual inspection as part of LW 22-W4 management and LW S1A to S3A * Previous consultation, coordination and cooperation with residents * Completion of Pre-mining (SANSW) and subsidence hazard inspections (by Tahmoor Coal if approved by landowner)	2	Health & Safety	4	E	10	4	Health & Safety	Review and update Built Structures Management Plan including TARP	Ross Barber	01-Mar-27	Unknown effects of the legislation and Tahmoor access to the property - SANSW conducting PMI from start of LW S5A
Built Infrastructure	Pools	Damage to pools	Repair of pools or plant	Subsidence	* Management Plans prepared for previous longwalls * Previous ground survey and visual inspection as part of LW 22-W4 management and LW S1A to LW S3A * Previous consultation, coordination and cooperation with residents * Completion of Pre-mining (SANSW) and subsidence hazard inspections (by Tahmoor Coal if approved by landowner)	2	Property Damage	2	C	8	2	Property Damage	Review and update Built Structures Management Plan including TARP	Ross Barber	01-Mar-27	Unknown effects of the legislation and Tahmoor access to the property - SANSW conducting PMI from start of LW S5A
Landscape features	Farm dams	Damage to farm dams	Leak of dam water / dam failure, cascading dam failure	Subsidence	* Management Plans prepared for previous longwalls * Previous ground survey and visual inspection as part of LW 22-W4 management and LWS1A to LWS3A management * LW 7SA modification report completed * Previous consultation, coordination and cooperation with residents	2	Property Damage	2	D	5	2	Property Damage	Completed geotechnical assessment for LWS7A study area for Dam Review and update Land Management Plan for landscape features (including farm dams), including TARP	NLB	07-Oct-25	
Landscape features	Farm dams	Damage to farm dams	Personnel injury	Subsidence	* Management Plans prepared for previous longwalls * Previous ground survey and visual inspection as part of LW 22-W4 management and LWS1A to LWS3A management * LW 7SA modification report completed * Previous consultation, coordination and cooperation with residents	2	Health & Safety	2	E	3	2	Health & Safety	Completed geotechnical assessment for LWS7A study area for natural features Review and update Land Management Plan for landscape features (including farm dams), including TARP	NLB	07-Oct-25	
6		6	6	Subtotal CountA (ignoring hidden values)		6				6	6					