APPENDIX B

Subsidence Predictions and Impact Assessment Amendment Report for Longwalls 101A to 108B

REPORT: SUBSIDENCE PREDICTIONS AND IMPACT ASSESSMENTS

SIMEC Mining:

Tahmoor South Project – Amendment Report for Longwalls 101A to 108B

Subsidence Ground Movement Predictions and Subsidence Impact Assessments for Natural Features and Surface Infrastructure

DOCUMENT REGISTER

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A	Draft Issue	DJK	JB	Sep 19
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Report produced to:- Support the Tahmoor South Project Environmental Impact Statement that is being prepared by AECOM for submission to the NSW Department of Planning, Industry and Environment (DPIE).

Background reports available at *www.minesubsidence.com*:-

Introduction to Longwall Mining and Subsidence (Revision A)

General Discussion of Mine Subsidence Ground Movements (Revision A)

Mine Subsidence Damage to Building Structures (Revision A)

EXECUTIVE SUMMARY

Tahmoor Coal Pty Ltd, (Tahmoor Coal), owns and operates Tahmoor Mine, an existing underground coal mine located approximately 80 km south-west of Sydney in the Southern Coalfield of NSW. Tahmoor Coal is a wholly owned entity within the SIMEC Mining division of the GFG Alliance group.

Tahmoor Coal is seeking development consent for the Tahmoor South Project (the proposed development), which is an extension of the current Tahmoor Mine underground coal mining within the Bulli seam towards to the south of the existing Tahmoor Mine.

The Project Area comprises an area adjacent to, and to the south of, the existing Tahmoor Approved Mining Area and it also overlaps a small area of the Existing Tahmoor Approved Mining Area comprising the surface facilities area, historical workings and other existing mine infrastructure.

Tahmoor Coal submitted an Environmental Impact Statement (EIS) in December 2018 and Mine Subsidence Engineering Consultants (MSEC) was previously commissioned to prepare a subsidence prediction and assessment report as part of the EIS (Report No. MSEC997).

The EIS for the Project was placed on public exhibition by the Department of Planning, Industry and Environment (DPIE) (formerly the Department of Planning and Environment (DPE)) from 23 January 2019 to 5 March 2019.

Key issues raised in submissions included concerns relating to the proposed extent of longwall mining, the magnitude of subsidence impacts and the extent of vegetation clearing required for the expansion of the reject emplacement area (REA). In response to these and other issues raised in Government agency, local Council, stakeholder and community submissions, and as a result of ongoing mine planning, several amendments have been made to the proposed development, so as to also further reduce the predicted environmental impacts of the Tahmoor South Project.

The key amendments to the Project since public exhibition of the EIS, which are relevant to the subsidence assessment, are:

- A revised mine plan, including:
  - an amended longwall panel layout and the removal of LW109;
  - a reduction in the height of extraction within the longwall panels from up to 2.85 metres (m) to up to 2.6 m; and
  - a reduction in the proposed longwall width, from up to 305 m to approximately 285 m.

MSEC has now been commissioned by Tahmoor Coal to prepare a revised report based on an amended mine layout. The extent of the amended mine layout lies within the *Extent of Longwalls*, which was defined in the EIS.

The predicted maximum total conventional subsidence, tilt and curvatures due to the extraction of the Amended Layout are less than the predicted maxima from the EIS Layout by approximately 15%. The reasons are due to both the proposed reduction in panel width and proposed reduction in extraction heights.

This report should be read in conjunction with the Amended Project Report being prepared by AECOM for Tahmoor Coal and in conjunction with the reports from the other specialist consultants engaged by the Tahmoor South Project.

As conducted for the EIS, MSEC has been commissioned to:-

- Study the current amended mine layout,
- Identify the natural features and items of surface infrastructure that are in the vicinity of the proposed longwalls,
- Provide subsidence predictions at each of these natural features and items of surface infrastructure,
- Provide impact assessments, in conjunction with other specialist consultants, for each of these natural features and items of surface infrastructure, and to
- Provide information on the measures that can be implemented to manage potential impacts.

The proposed mining area will affect a broad range of natural features and built infrastructure.

Chapter 1 provides an introduction, outlines the Project, presents the purpose of the report, and provides information on the amended mine layout, surface topography, seam and geological information.

Chapter 2 defines the *Subsidence Study Area* and provides a list of the natural features and items of surface infrastructure that have been identified within the *Subsidence Study Area*.

Chapter 3 includes an overview of conventional and non-conventional subsidence movements and the methods that have been used to predict these movements resulting from the extraction of the proposed longwalls.

Chapter 4	provides the maximum predicted subsidence parameters resulting from the extraction of the amended mine layout.
Chapters 5 to 11	provide descriptions, predictions and impact assessments for each of the natural features and items of surface infrastructure that have been identified within the *Subsidence Study Area*. Recommendations for each of these features are also provided, which have been based on the predictions and impact assessments.

The overall findings of the assessments undertaken by MSEC are that the levels of impact and damage to all identified natural features and built infrastructure are manageable and can be controlled by the preparation and implementation of Subsidence Management Plans (or Extraction Plans), many of which have already been developed and are being successfully implemented during mining at Tahmoor Mine.

These management plans are developed with the owners of infrastructure and are approved by relevant government agencies. The findings in this report should be read in conjunction with all other associated consultant reports.

Recommended management measures generally include monitoring of ground movements and the condition of surface features. Some mitigation measures are recommended to mitigate or avoid the risk of serious consequences should impacts occur to some critical surface features.

It is recommended that Tahmoor Mine continues to develop management plans to manage the potential impacts for the surface features within the future mining areas.

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All figures are prefixed by the number of the chapter or the letter of the appendix in which they are presented.

Drawings

Drawings referred to in this report are included in Appendix F at the end of this report.

1.0 INTRODUCTION

1.1. Background

Tahmoor Coal Pty Ltd, (Tahmoor Coal), owns and operates Tahmoor Mine, an existing underground coal mine that is located approximately 80 km south-west of Sydney in the Southern Coalfield of New South Wales (NSW). Tahmoor Coal is a wholly owned entity within the SIMEC Mining division of the GFG Alliance group.

Tahmoor Coal is seeking development consent for the Tahmoor South Project (the proposed development), which is an extension of the current Tahmoor Mine underground coal mining within the Bulli seam towards the south of the existing Tahmoor Mine.

Access to all underground longwalls for the proposed Tahmoor South Project longwall areas will continue via the existing Tahmoor Mine surface facilities. The proposed development will therefore extend the life of underground mining at Tahmoor Mine and will enable the continued employment of the current workforce for approximately a further 13 years until approximately 2035.

The existing surface facilities for Tahmoor Mine are located between the towns of Tahmoor and Bargo and Tahmoor Mine produces up to three million tonnes per annum of hard coking coal from its existing underground mining operations within the Bulli seam at the Tahmoor Mine under the existing development consents, licences and the conditions of relevant mining leases.

Tahmoor Coal holds Consolidated Coal Lease 747 (CCL 747) and Consolidated Coal Lease 716 (CCL 716), which are shown in Fig. 1.1 and Fig. 1.2, from which it is proposed to extract coal within the Bulli seam using longwall mining methods. The existing and the proposed Project Area for the Tahmoor South Project are shown in Fig. 1.1 and Fig. 1.2 and in Drawing No. MSEC1060-01, which, with all other drawings, is included in Appendix F.

The proposed development will use longwall mining to extract up to 4 million tonnes (Mt) of ROM coal per annum, with extraction of up to 43 Mt of ROM coal over the life of the project.

The Project Area comprises an area adjacent to, and to the south of the Existing Tahmoor Approved Mining Area. It also overlaps a small area of the Existing Tahmoor Approved Mining Area comprising the surface facilities area, historical workings and other existing mine infrastructure. The *Subsidence Study Area* for the purposes of this report is defined in Section 2.1 and is shown in Drawing No. MSEC1060-01.

In accordance with the requirements of the *Environmental Planning and Assessment Act 1979* (EP&A Act), an Environmental Impact Statement (EIS) was prepared to assess the potential environmental, economic and social impacts of the Project. The EIS for the Project was placed on public exhibition by the Department of Planning, Industry and Environment (DPIE) (formerly the Department of Planning and Environment (DPE)) from 23 January 2019 to 5 March 2019.

Key issues raised in submissions included concerns relating to the proposed extent of longwall mining, the magnitude of subsidence impacts and the extent of vegetation clearing required for the expansion of the reject emplacement area (REA). In response to these and other issues raised in Government agency, local Council, stakeholder and community submissions, and as a result of ongoing mine planning, several amendments have been made to the proposed development, so as to also further reduce the predicted environmental impacts of the Tahmoor South Project.

The key amendments to the Project since public exhibition of the EIS are:

- A revised mine plan, including:
    - an amended longwall panel layout and the removal of LW109;
    - a reduction in the height of extraction within the longwall panels from up to 2.85 metres (m) to up to 2.6 m; and
    - a reduction in the proposed longwall width, from up to 305 m to approximately 285 m.
- A reduction in the total amount of Run-of-Mine (ROM) coal to be extracted over the Project life, from approximately 48 million tonnes (Mt) to approximately 43 Mt of ROM coal, comprising;
    - 30 Mt of coking coal product (reduced from 35 Mt);
    - 2 Mt of thermal coal product (reduced from 3.5 Mt)
- A revised extended REA; including:
    - a reduction in the additional capacity required to accommodate the Project;
    - a reduction in the REA extension footprint, from 43 ha to 14 ha;
    - an increase in the final height of the REA (from RL 305 m to RL 310 m).
- Confirmation of the location and footprint of ancillary infrastructure associated with the ventilation shaft sites (e.g. the power connection easement for ventilation shaft site TSC1); and
- A continuation of the use of the existing upcast shaft (T2); although, operation will reduce from two fans during Tahmoor North operations to one fan once the new ventilation shafts and fans (TSC1 and TSC2) are in operation in Tahmoor South.

No amendments have been made to other key aspects of the Project as presented in the EIS, such as the proposed annual coal extraction rate, mining method, traffic movements and employee numbers. A detailed description of the amended development is provided in the Amended Project Report (AECOM 2020).

Mine Subsidence Engineering Consultants (MSEC) was previously commissioned to prepare a subsidence prediction and assessment report as part of the EIS (Report No. MSEC997). MSEC has now been commissioned by Tahmoor Coal to prepare a revised report based on an amended mine layout. The extent of the amended mine layout lies within the *Extent of Longwalls*, which was defined in the EIS.

This report should be read in conjunction with the Amended Project Report (APR) being prepared by AECOM for Tahmoor Coal and in conjunction with the reports from the other specialist consultants engaged by the Tahmoor South Project.

A proposed maximum *Extent of Longwalls* boundary is shown in Drawing No. MSEC1060-01, which encompasses the proposed maximum extent of underground workings, being the proposed longwall panels and mains headings (first workings). Although the longwall layout will continue to be refined within the *Extent of Longwalls* during the detailed design phase of the proposed development, an amended longwall panel layout has been provided. Predictions and impact assessments provided in this report are based on the amended longwall panel layout. It is possible that longwall mining within the *Extent of Longwalls* could extend slightly beyond the amended longwall footprint and potential impacts from longwall mining within the full *Extent of Longwalls* boundary is also provided in this report.

The proposed development seeks to undertake longwall mining in the Bulli seam within the central domain of the available Tahmoor South mining leases, at depths of cover between approximately 365 metres and 410 metres below the surface level. No mining is currently proposed in the eastern or western domains of Tahmoor South. The longwalls in the Subsidence Study Area will be orientated in a south-east / north-west direction and parts of some longwalls are located under the Bargo township area.

Previous workings were extracted for a brief period of time between 1979 and 1981 within the Tahmoor South Project area by the Bargo Joint Venture between Coal & Allied Industries Ltd, Peko Wallsend Limited and BHP Ltd. The Bargo Joint Venture commenced construction on the approved development in May 1979 by sinking a concrete lined six-metre diameter up-shaft to a total depth of 444 metres and by developing some 800 metres of headings and roadways in the Bulli and Wongawilli coal seams in preparation for mining operations. However, following the sinking of the Bargo shaft and this initial heading development, a global economic downturn depressed the coal price thereby impacting on the feasibility of further developing the coal mine and all further work at Bargo Colliery was put on hold in January 1981. The location of these old workings is shown in Drawing No MSEC1060-01.

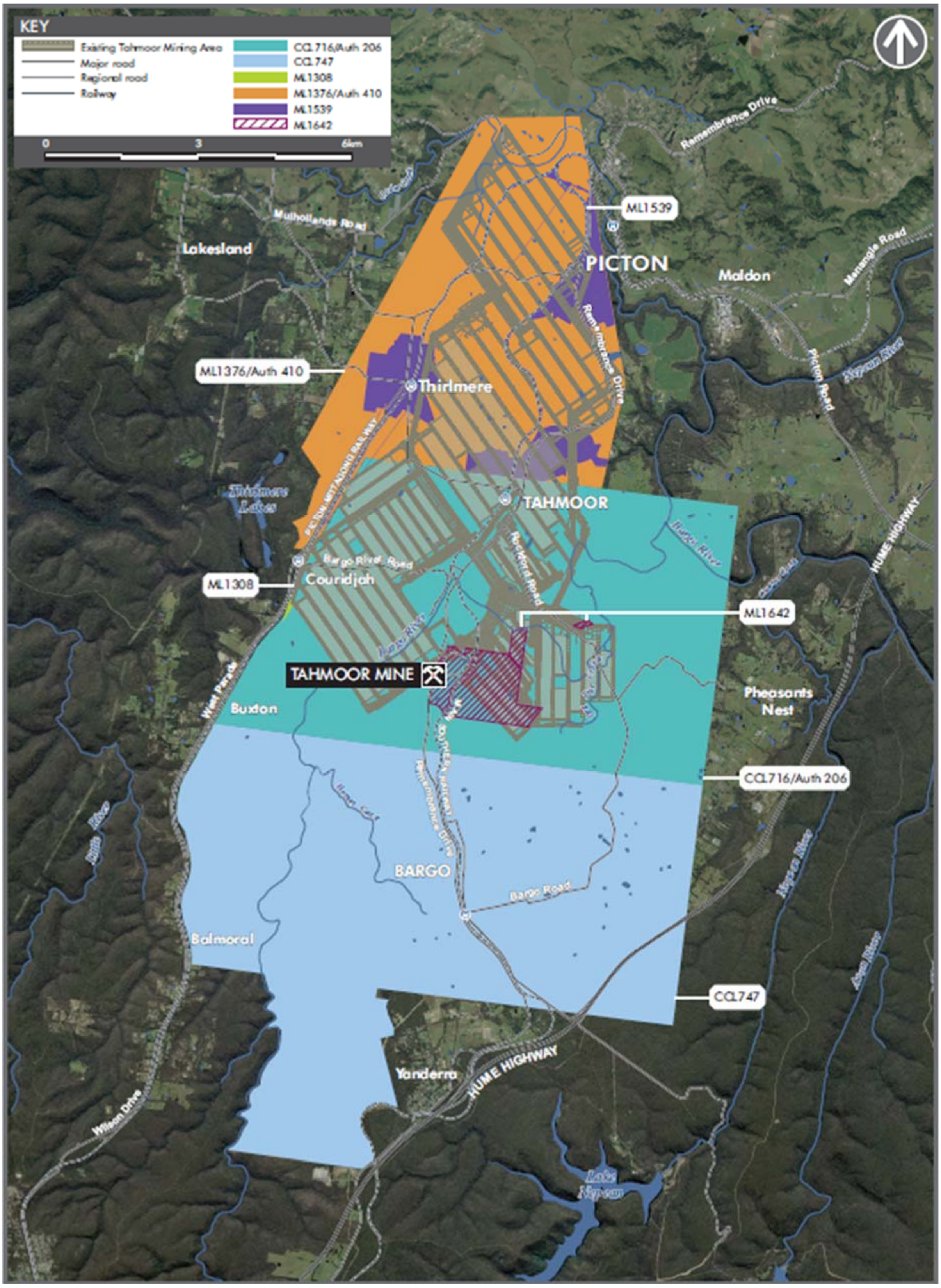


Image courtesy of AECOM, 2020

Fig. 1.1 Existing Tahmoor Approved Mining Area and Mining Tenements

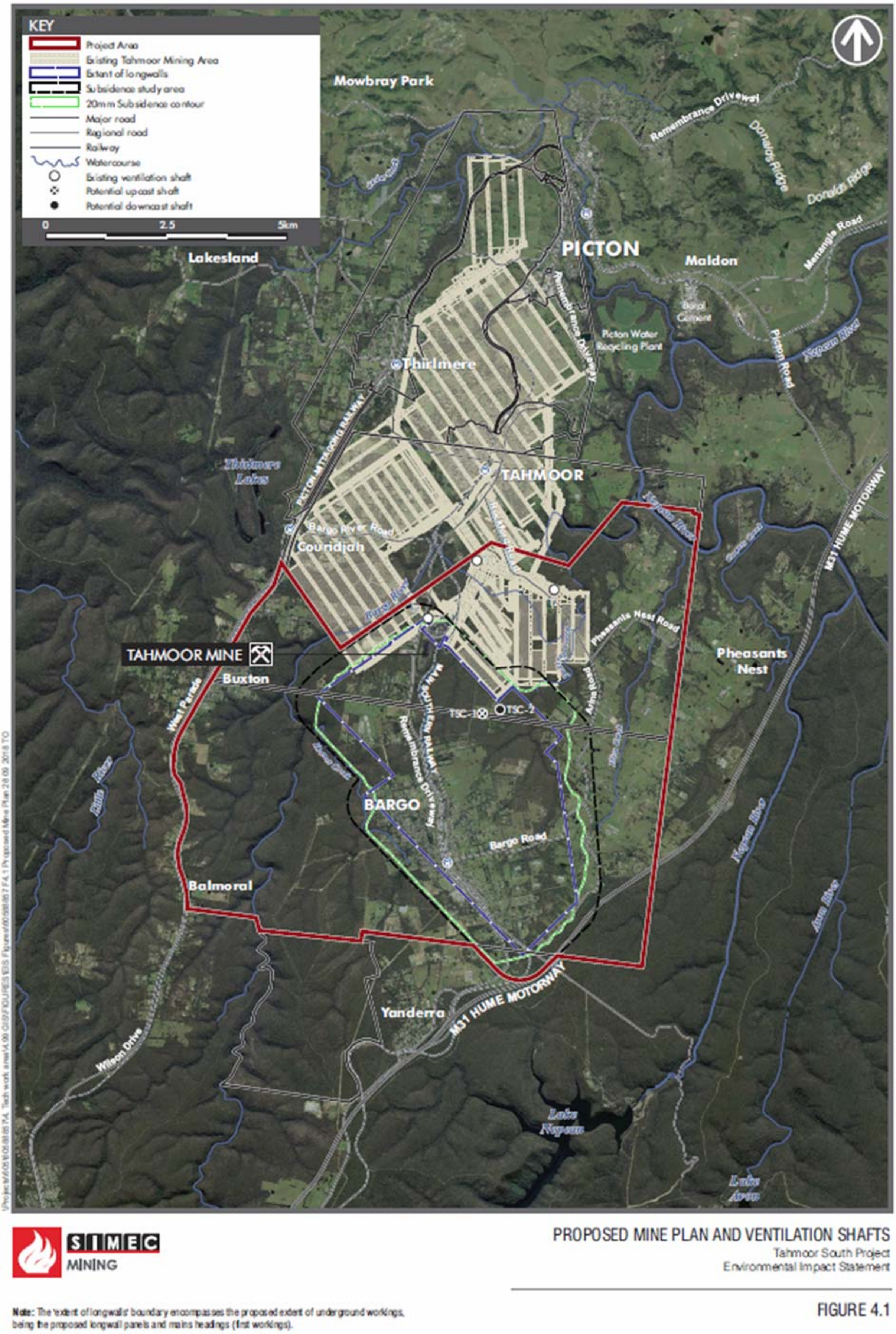


Image courtesy of AECOM, 2020

Fig. 1.2 Proposed Project Area for Tahmoor South Project

1.2. Purpose of the report

1.2.1. Scope of Work and Report structure

MSEC has been commissioned by Tahmoor Coal to:-

- Identify the natural features and items of surface infrastructure that are in the vicinity of the proposed longwalls,
- Provide subsidence predictions at each of these natural features and items of surface infrastructure,
- Provide impact assessments, in conjunction with other specialist consultants, for each of these natural features and items of surface infrastructure, and to
- Provide information on the measures that can be implemented to manage potential impacts.

This report is structured as follows:

Chapter 1	provides an introduction, outlines the Project, presents the purpose of the report, and provides the base information on the mine layout, surface topography, seam and geological information.
Chapter 2	defines the *Subsidence Study Area* and provides a list of the natural features and items of surface infrastructure that have been identified within the *Subsidence Study Area*.
Chapter 3	includes an overview of conventional and non-conventional subsidence movements and the methods that have been used to predict these movements resulting from the extraction of the proposed longwalls.
Chapter 4	provides the maximum predicted subsidence parameters resulting from the extraction of the proposed longwalls.
Chapters 5 to 11	provide descriptions, predictions and impact assessments for each of the natural features and items of surface infrastructure that have been identified within the *Subsidence Study Area*. Recommendations for each of these features are also provided, which have been based on the predictions and impact assessments.

1.2.2. SEARs Requirements

The Department of Planning, Industry and Environment Secretary's Environmental Assessment Requirements (SEARs) in relation to surface subsidence, that were issued for the Tahmoor South Project (SSD 17_8445) on 9 June 2017, have been addressed within this Subsidence Impact Assessment Report. Revised SEARs for the Tahmoor south Project were issued on 20 June 2018.

The key matters, raised by the Secretary for consideration in the Subsidence Impact Assessment, are outlined in Table 1.1.

Table 1.1 SEARs applicable to the Subsidence Impact Assessment

Director-General's Requirement	Comments
The EIS must address the following specific issues: • **Subsidence** – include a detailed assessment of the potential conventional and non-conventional subsidence effects, subsidence impacts and environmental consequences of the development on the natural and built environments, paying particular attention to features that are considered to have significant ecological, economic, social, cultural and environmental value, taking into consideration: – recorded regional and historic subsidence levels, impacts and environmental consequences – the potential extent of fracturing of the strata above the longwall panels; and – the implementation of a comprehensive subsidence monitoring program which is capable of detecting vertical, horizontal and far-field subsidence movements.	This report has been prepared to address this requirement. Refer to separate groundwater assessments in relation to potential extent of sub-surface fracturing. Recommendations have been provided in the report to develop and implement subsidence management plans, which will include subsidence monitoring programs.

• **Water –** including	
– an assessment of the likely impacts of the development on the quantity and quality of surface and groundwater resources, having regard to EPA's, DPI Water's and WaterNSW's requirements and recommendations (see Attachment 2);	Refer Sections 5.2 to 5.3 for rivers and streams. Refer also surface water and groundwater assessments.
– an assessment of the likely impacts of the development on aquifers, watercourses, swamps, riparian land, water supply infrastructure and systems and other water users;	Refer Sections 5.2 to 5.3 for rivers and streams and Section 5.8 for Swamps, Wetlands and Water Related Ecosystems. Refer also surface water and groundwater assessments. Refer Sections 6.6 and 6.11 for water supply infrastructure and systems and other water users.

1.2.3. Subsidence Impact Assessment objectives

This Subsidence Impact Assessment Report contributes to the responses to these and other key matters raised by the Secretary, regarding Land Resources, Water Resources, Biodiversity and Heritage issues.

This report should be read in conjunction with the Amended Project Report being prepared by AECOM for Tahmoor Coal and in conjunction with the reports from the other specialist consultants engaged by the Tahmoor South Project.

1.3. Mining Geometry

During the mine planning process for this proposed development, a constraints analysis, risk assessment and detailed fieldwork was undertaken to identify sensitive natural surface features (such as waterways, cliffs, and Aboriginal heritage sites) and to develop risk management zones (RMZs). Following the completion of the risk assessment process, the initially proposed longwall layout was modified to minimise subsidence impacts to natural features.

Further exploration drilling and seismic surveys would continue to be undertaken within the boundaries of CCL747 and CCL716 throughout the life of the Tahmoor South Project to obtain geological structure and coal quality information. This information would then be used to assist in the detailed mine design process and to further define the coal resource potential within the mining lease areas, particularly across the western and southern domain areas of CCL 747.

The proposed development seeks to extract Longwalls 101A to 108B in the Bulli seam using longwall mining techniques. The proposed longwalls are shown in Drawing No. MSEC1060-01.

A summary of the proposed longwall dimensions is provided in Table 1.2.

The proposed mining sequence is LWs 101A to 103A, then LWs 101B to 108B and then LWs 104A to 106A. The subsidence predictions in this report are based on this mining sequence.

Table 1.2 Geometry and mining sequence of the proposed Longwalls 101A to 108B

Longwall	Overall Void Length Including Installation Heading (m)	Overall Void Width Including First Workings (m)	Overall Tailgate Chain Pillar Width (m)
LW101A	1,715	283	-
LW102A	1,730	283	38
LW103A	1,745	283	38
LW101B	1,515	283	-
LW102B	1,865	283	38
LW103B	2,610	283	38
LW104B	3,095	283	38
LW105B	3.580	283	38
LW106B	3,810	283	38
LW107B	3,845	283	38
LW108B	3,880	283	38
LW104A	1,760	283	38
LW105A	1,800	283	38
LW106A	1,845	283	38

1.4. Surface topography

The surface level contours in the vicinity of the proposed longwalls are shown in Drawing No. MSEC1060-02. They were generated from 2012 and 2013 airborne laser scans of the area.

The ground surface within the *Subsidence Study Area*, as is defined in Section 2.1, is generally undulating with a fall from the south-west to the north-east. The major topographical features within the *Subsidence Study Area* are the Bargo and Nepean River valleys, which are located within the western and northern parts of the *Subsidence Study Area*.

The surface levels near the Subsidence Study Area vary from a low point of approximately 255 metres AHD, in the base of the Dog Trap Creek, downstream from of the proposed Longwall 101B, to a high point of approximately 375 metres AHD, at the southern end of the Subsidence Study Area to the side of the proposed Longwall 108B.

1.5. Seam information

The seam roof contours, seam thickness contours and depth of cover contours, for the Bulli seam, have been provided by Tahmoor Coal and are shown in Drawing Nos. MSEC1060-03, MSEC1060-04 and MSEC1060-05, respectively.

Fig. 1.3 and Fig. 1.4 show the surface, Bulli seam levels and proposed extraction heights across the proposed mining area and along Cross-Sections 1 and 2, respectively. The locations of these sections are shown in Drawing Nos. MSEC1060-02 and MSEC1060-03.

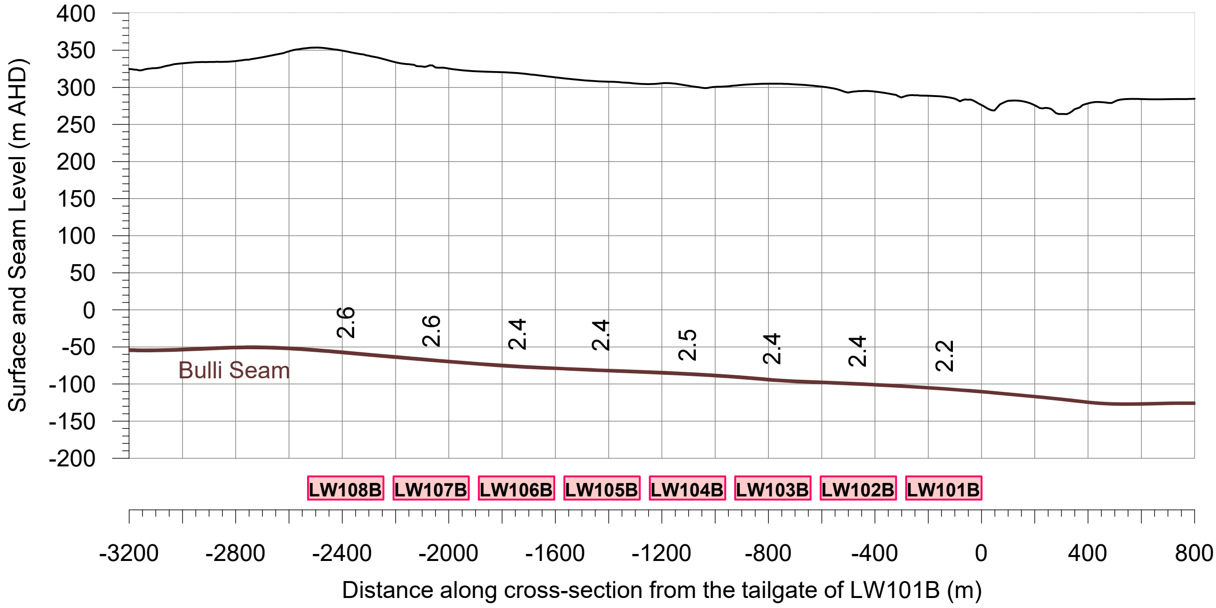


Fig. 1.3 Cross-section 1 through Longwalls 101B to 108B

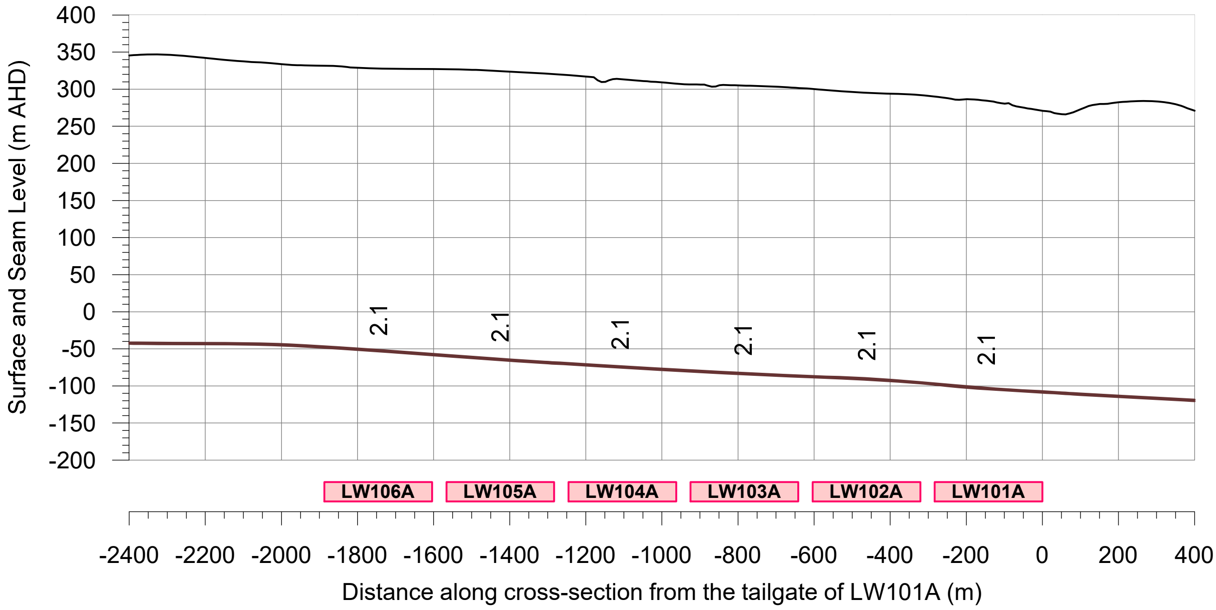


Fig. 1.4 Cross-section 2 through Longwalls 101A to 106A

The Bulli seam within the Subsidence Study Area generally dips from the south-west to the north-east, as shown by the seam roof contours in Drawing No. MSEC1060-03. The seam roof contours show the presence of several major faults which are discussed further in the next section of this report.

The planned Bulli seam extraction heights, i.e. the height of the Bulli seam that is to be mined, vary from a minimum extraction height of 2.1 metres to a maximum extraction height of 2.6 metres, as is shown in Drawing No. MSEC1060-04. Depending on the strength of floor under the longwall chocks, these extraction heights are planned to include parts of the stone roof, a stone band, a shaly coal layer and some stone floor and, as a result, the subsidence calculations in this report have assumed that these stone partings in both the floor and the roof will be extracted. This planned working section, including the stone partings in the floor and roof, is also shown in Fig. 1.5.

The depth of cover contours to the Bulli seam vary from a minimum of 365 metres in Dog Trap Creek directly above the proposed Longwall 105A to a maximum of 410 metres above proposed Longwalls 101A, 101B and 102B as shown in Drawing No. MSEC1060-05.

1.6. Geological details

Tahmoor Mine lies in the southern part of the Permo-Triassic Sydney Basin, within which the main coal bearing sequence is the Illawarra Coal Measures, of Late Permian age. The Illawarra Coal Measures contain four workable seams, the uppermost of which is the Bulli seam, and it is this seam from which coal is proposed to be extracted as part of the proposed development.

The sediments that form the overburden to the Bulli seam belong to the Hawkesbury Tectonic Stage, which comprises three stratigraphic divisions. The lowest division is the Narrabeen Group, which is subdivided into a series of interbedded sandstone and claystone units. It ranges in age from Lower to Middle Triassic and varies in thickness up to 310 metres. Overlying the Narrabeen Group is the Hawkesbury Sandstone Group, which is a series of bedded sandstone units which dates from the Middle Triassic and has a thickness of up to 185 metres. Above the Hawkesbury is the Wianamatta Group, which consists of shales and siltstones and is poorly represented in this region, having a thickness of only a few tens of metres.

A typical stratigraphic section for the Southern Coalfield area is shown in Fig. 1.5, courtesy of McElroy Bryan Geological Services, (MBGS, 2013) and a west to east stratigraphic geological section is shown in Fig. 1.6 below, which is also available courtesy of MBGS.

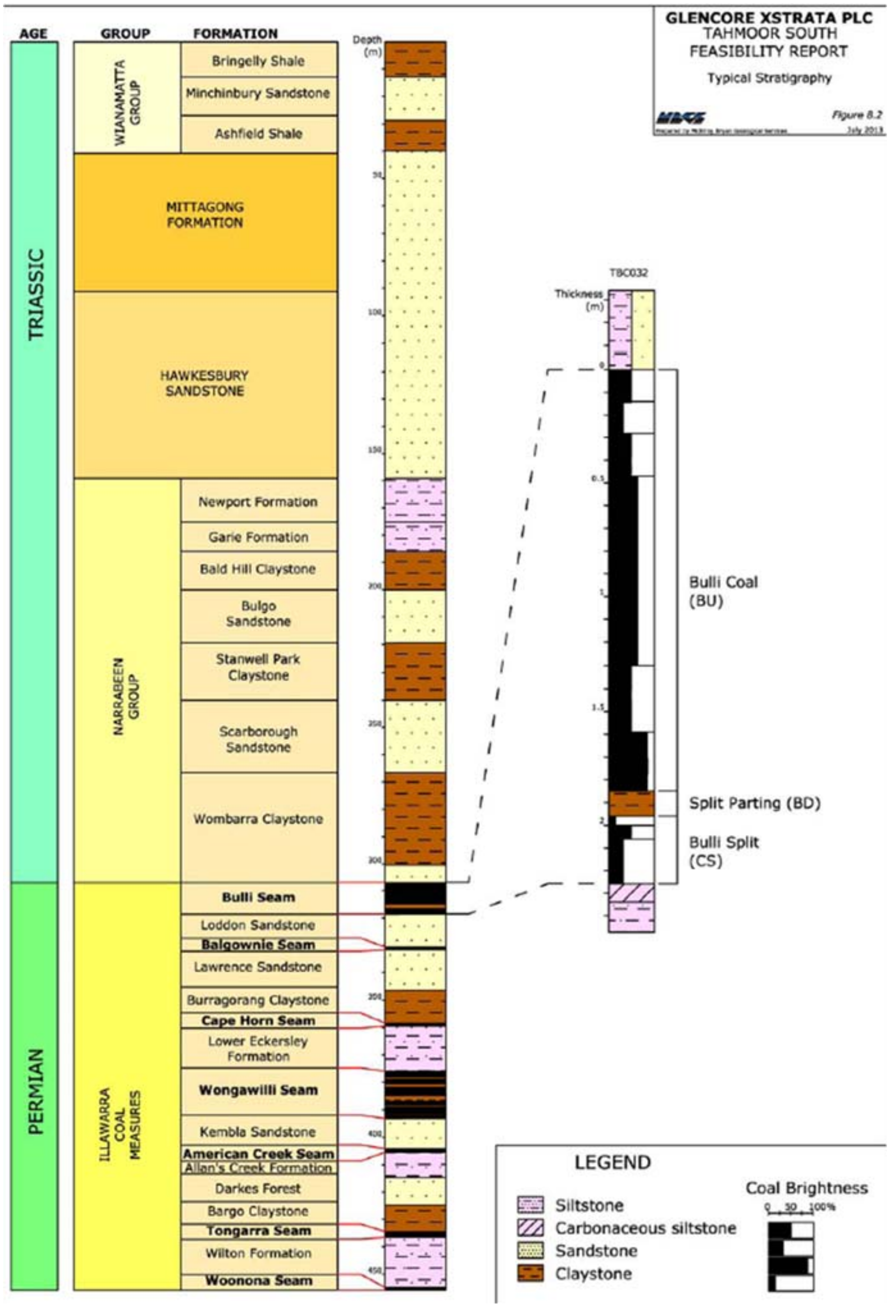


Fig. 1.5 Typical stratigraphic section – Southern Coalfield (MBGS, 2013)

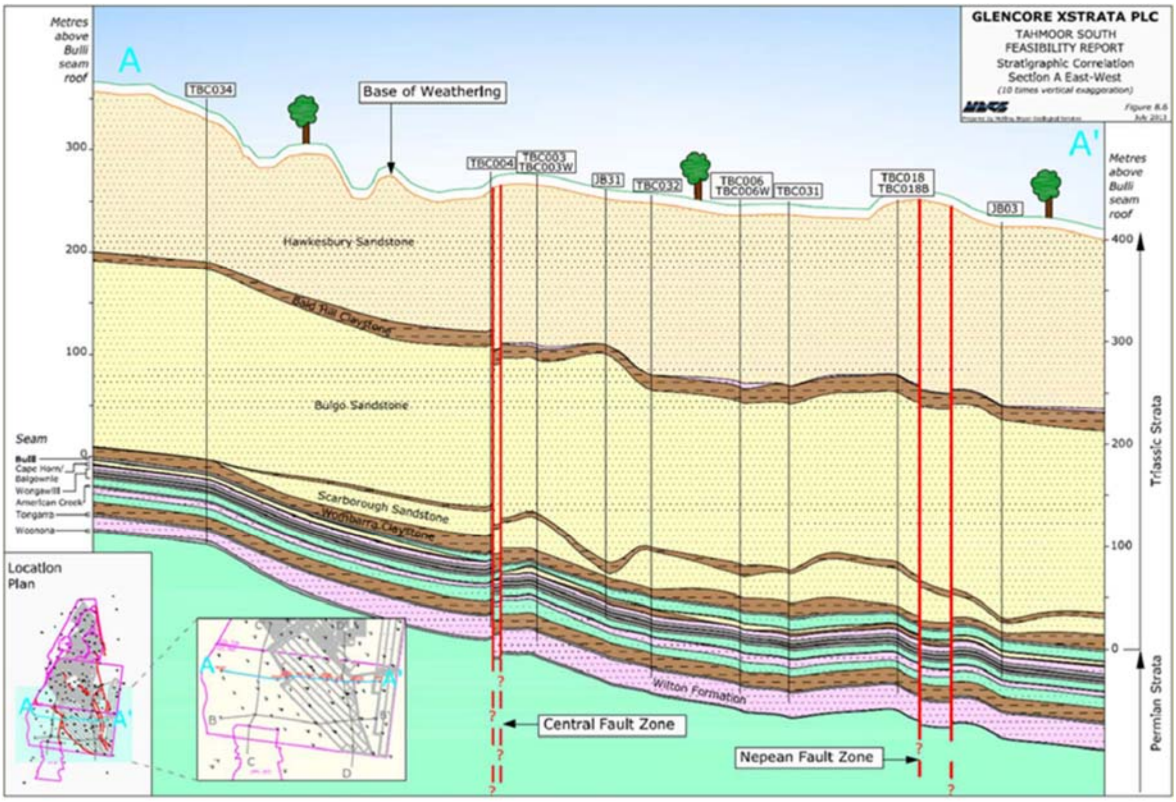


Fig. 1.6 West to east geological cross-section through western, central and eastern domains

The major sandstone units are interbedded with other rocks and, though shales and claystones are quite extensive in places, the sandstone predominates. The major sandstone units are the Scarborough (Narrabeen Group), the Bulgo (Narrabeen Group) and the Hawkesbury Sandstones (Hawkesbury Sandstone Group) and these units vary in thickness from a few metres to as much as 200 metres. The rocks exposed in the river gorges and creek alignments within the *Subsidence Study Area* belong to the Hawkesbury Sandstone Group. The other rocks generally exist in discrete but thinner beds of less than 15 metres thickness or are interbedded as thin bands within the sandstone.

The major claystone unit is the Bald Hill Claystone, which lies above the Bulgo Sandstone and at the base of the Hawkesbury Sandstone. As shown in Fig. 1.6 above, the base of the Bald Hill Claystone is between 180 metres to 220 metres above the Bulli Seam. This claystone unit varies in thickness and is, in some places, more than 25 metres thick. The Bald Hill Claystone has been described in the literature as an aquitard (e.g. the Independent Inquiry report entitled "*Strategic Review of Impacts of Underground Coal Mining on Natural Features in the Southern Coalfield*", (Southern Coalfield Inquiry Report), which was published in July 2008, (NSW DPIE, 2008), and detailed information on this claystone and other claystone and siltstone units within the overburden are provided in the reports by SCT (2013a) and HydroSimulations (2020).

1.7. Geological structures

Tahmoor Mine has undertaken comprehensive geological exploration of the overburden and the Illawarra Coal Measures within the *Subsidence Study Area* using several geological and geotechnical consultants (MBGS, 2013; Gordon Geotechniques, 2013; SCT, 2013a) and a number of geological structures have been identified.

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. These and other identified faults and igneous intrusions are shown in Drawing No. MSEC1060-06. MBGS (2013) reviewed 205 drill holes in the Tahmoor area for Tahmoor Coal of which 72 drill holes were in Tahmoor South. Additionally, an extensive array of seismic survey lines (140 km) were completed over recent years and combined this data provides sufficient data to have a sound understanding of overall deposit geometry, structural features likely to impact on mining, seam gas and raw coal quality characteristics within the Bulli Seam.

The Nepean Fault zone is the major structural feature in the Tahmoor complex and it marks the eastern boundary to the existing mining operations at Tahmoor Mine. The MBGS (2013) advises that the Nepean Fault zone runs in an approximate North-South direction and is a normal fault system which appears to exhibit en echelon style. Seismic surveys indicate the fault zone within the Tahmoor South area comprises many near vertical faults with overall displacement in the order of 10 metres to 15 metres and has a varying width of approximately 350 metres wide. A report by Gordon Geotechniques (2013), quoted two other reports, Lohe, et al., (1992), advising that the Nepean Fault was a high angle westerly dipping reverse fault and SEA, (2002), advising that the Nepean Fault was a series of reverse and normal faults. Gordon Geotechniques noted that the Nepean Fault zone was up to 200 metres wide with the western side of the fault being more disturbed than the eastern side.

The Central Fault zone, which lies to the west and south of the proposed longwalls, was described by MBGS as a normal fault trending northwest with vertical displacement up to 20 metres, east side up. This fault was identified in the 2D seismic lines and was also intercepted in one drill hole (JB06) where the Wongawilli Seam has been displaced. The Gordon Geotechniques report advised that this Central Fault zone was associated with a number of features including a change in Bulli Seam fluidity and thinning of the Balgownie to Bulli Seam interburden. The Central Fault has surface expression which affects Hornes Creek as it flows into the Bargo River.

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. Further discussion on the influence of faulting on mining induced subsidence movements is presented in Chapters 3, 4 and 6.

The surface geology within the Subsidence Study Area, as is defined in Section 2.1, is shown in Fig. 1.7, which presents the proposed longwalls overlaid on Geological Series Sheet 9029-9129, (Geological Survey of NSW, DITRIS, 1985).

It can be seen from Fig. 1.7 that the majority of surface geology within the *Subsidence Study Area* comprises the Hawkesbury Sandstone Group (Rh), with the Wianamatta Group, (Rwa, Rwb and Rwm) located along the tops of ridgelines.

Hawkesbury Sandstone Group (Rh) is exposed along the majority of streams within the *Subsidence Study Area*.

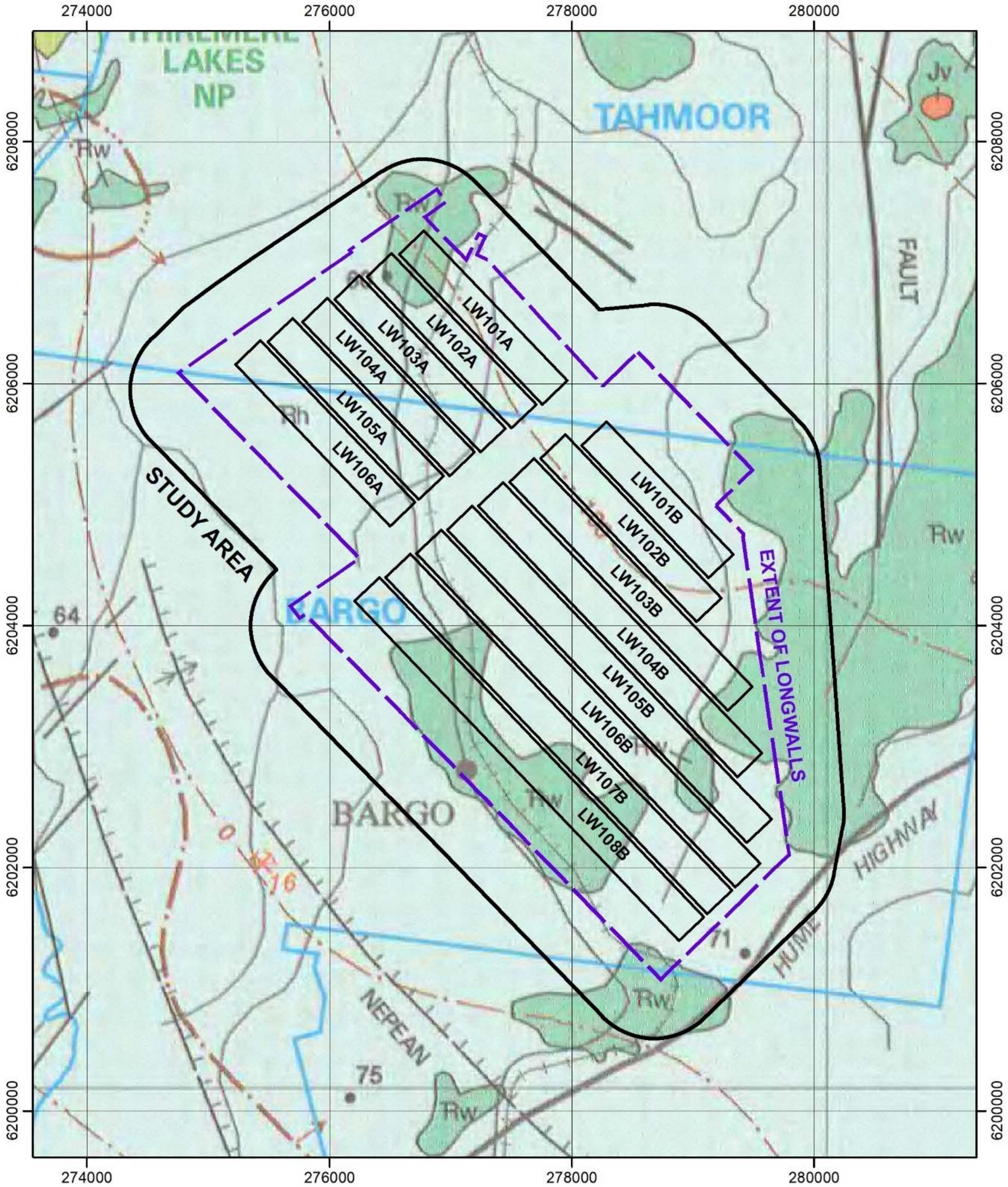


Fig. 1.7 **Surface geology within the Subsidence Study Area (DTIRIS, Geological Series Sheet 9029-9129)**

2.1. Definition of the Subsidence Study Area

The *Subsidence Study Area* is the surface area within which natural surface features and items of infrastructure have been identified and assessed for their potential to experience mine subsidence impacts as a result of the proposed extraction within the *Extent of Longwalls* of the Tahmoor South Project.

The *Extent of Longwalls* boundary, as shown in Drawing No. MSEC1060-01, encompasses the proposed maximum extent of underground workings, being the proposed longwall panels and mains headings (first workings).

The extent of the *Subsidence Study Area* has been conservatively defined by combining the areas bounded by the following limits:-

- The predicted limit of vertical subsidence, taken as the 20 mm subsidence contour, resulting from extraction within the proposed *Extent of Longwalls*.
- A minimum of 600 metres from the nearest edge of longwalls within the proposed *Extent of Longwalls*, as recommended in the independent inquiry report titled “Impacts of Underground Coal Mining on Natural Features in the Southern Coalfield – Strategic Review” (NSW Department of Planning(DoP), 2008).

The predicted limit of vertical subsidence, taken as the predicted total 20 mm subsidence contour, has been determined using the Incremental Profile Method, which is described in Chapter 3. The predicted 20 mm subsidence contour has been calibrated to account for measured subsidence in the northern areas of the existing Tahmoor Mine and the measured values were based on detailed ground surveys that were carried out using remote stable datum points. In some cases, the predicted 20 mm subsidence contour extends to 600 metres from the nearest edge of longwalls.

The extent of the *Subsidence Study Area* has therefore been drawn with a line around the longwalls based on whichever of the above limits extended the furthest from the proposed longwalls. The extent of the *Subsidence Study Area* is shown in all drawings MSEC1060-01 to MSEC1060-21. Additionally, it was found that there may be areas that are outside this line showing the extent of the *Subsidence Study Area* that could experience either far-field movements, or valley-related upsidence and closure movements. Some surface features have been identified that may be sensitive to such movements and, hence, impact assessments have been provided in this report for all the surface features or items of infrastructure that are outside the *Subsidence Study Area* and could be impacted by these far-field movements, or valley-related upsidence and closure movements.

The features that are located beyond the *Subsidence Study Area* that could be sensitive to impacts from such movements are shown in Drawing MSEC1060-01 and are listed below together with their measured distances to the nearest edge of the proposed *Extent of Longwalls* boundary. The details of and impact assessments for each of these natural features or items of infrastructure are provided in later sections of the report:-

- The two sets of M31 Hume Motorway Bridges over the Main Southern Railway at Yanderra, (located up to 2,740 and 1,805 metres from *Extent of Longwalls*),
- Lake Nepean, (located 1,490 metres from *Extent of Longwalls*),
- The Bargo River Road Bridge over Main Southern Railway, (located 1,620 metres from *Extent of Longwalls*),
- The Bargo River Road Bridge over a tributary to Bargo River, (located 1,415 metres from *Extent of Longwalls*),
- The Main Southern Railway viaduct over the Bargo River, (located 1,380 metres from *Extent of Longwalls*),
- The Remembrance Drive Bridge over the Bargo River, (located 1,310 metres from *Extent of Longwalls*),
- The Remembrance Drive Bridge over Main Southern Railway, (located 1,310 metres from *Extent of Longwalls*),
- The Rockford Road Bridge over the Bargo River, (located 1,725 metres from *Extent of Longwalls*),
- Existing Mine Shaft at Bargo Colliery, (located 1,010 metres from *Extent of Longwalls*),
- Existing old workings at Bargo Colliery, (located 750 metres from *Extent of Longwalls*),
- The Picton Weir, (or Bargo Weir), on Bargo River, (located 600 metres from *Extent of Longwalls*),
- Avon Dam Road Bridges over M31 Hume Motorway, (located 520 metres from *Extent of Longwalls*),
- Streams, within the predicted limits of 20 mm total upsidence and 20 mm total closure,
- Groundwater bores, and
- Survey control marks.

2.2. Natural Features and items of surface infrastructure within the Subsidence Study Area

The major natural features and items of surface infrastructure within the *Subsidence Study Area* can be seen in the 1:25,000 Topographic Maps of the area, published by the Central Mapping Authority (CMA), numbered PICTON 9029-4-S and BARGO 9029-3-N. The proposed longwalls and the *Subsidence Study Area* have been overlaid on an extract of this CMA map in Fig. 2.1.

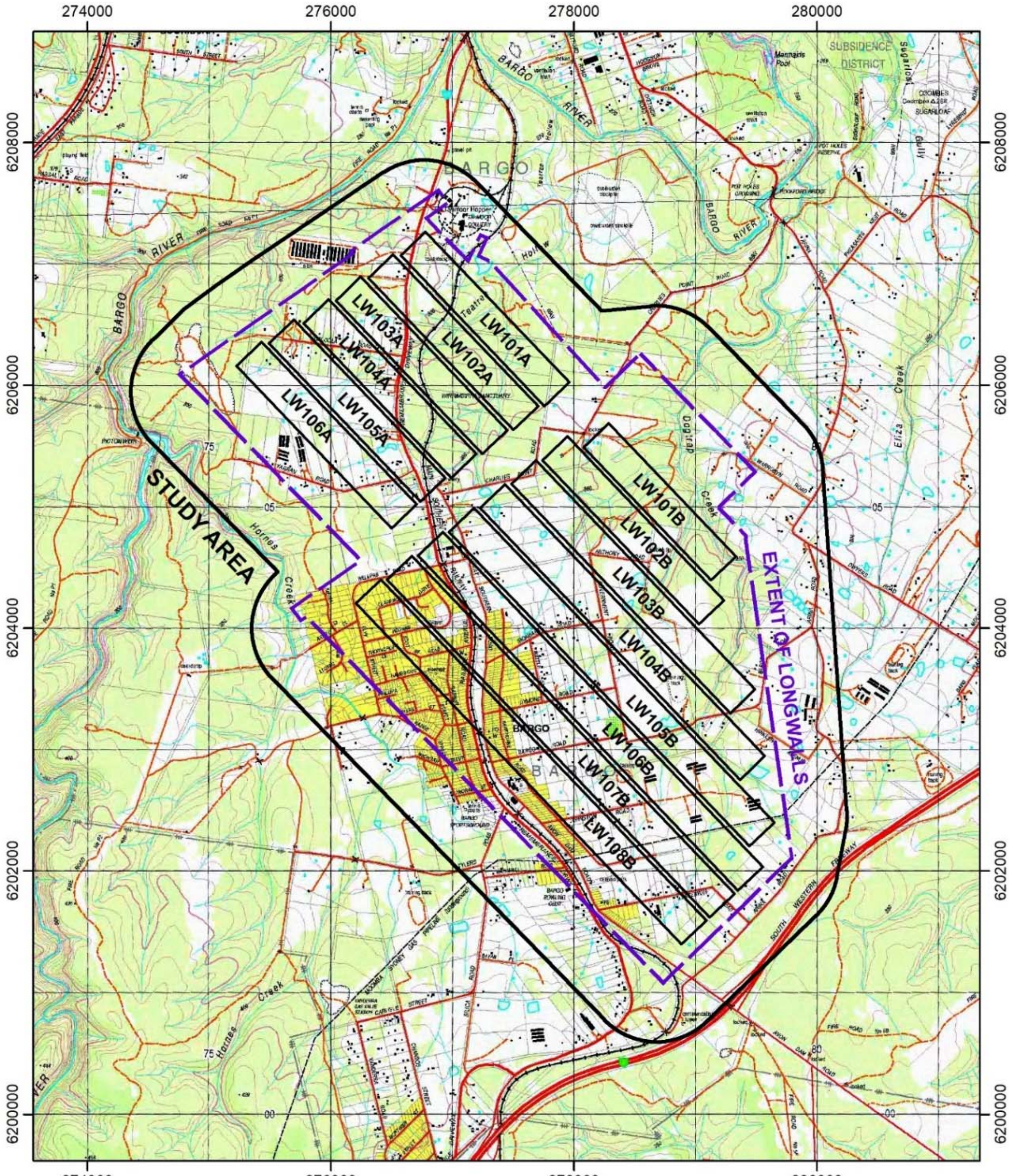


Fig. 2.1 The proposed longwalls and the Subsidence Study Area overlaid on CMA Map No. Bargo 9029-3-N

A summary of the natural features and items of surface infrastructure within the *Subsidence Study Area* is provided in Table 2.1. The locations of these features are shown in Drawing Nos. MSEC1060-07 to MSEC1060-21, in Appendix F.

Descriptions, predictions and impact assessments for the natural features and items of surface infrastructure are provided in Chapters 5 though to 11. The relevant chapter and section number references in this report that address these features and items are provided in Table 2.1.

Table 2.1 Natural features and surface infrastructure

Item	Within *Study Area*	Section Number Reference
NATURAL FEATURES		
Catchment Areas or Declared Special Areas	✓	5.1
Rivers or Creeks	✓	5.2 & 5.3
Aquifers or Known Groundwater Resources	✓	8.11
Springs	×	
Sea or Lake	×	
Shorelines	×	
Natural Dams	×	
Cliffs or Pagodas	✓	5.4
Steep Slopes	✓	0
Escarpments	×	
Land Prone to Flooding or Inundation	✓	5.7
Swamps, Wetlands or Water Related Ecosystems	×	
Threatened or Protected Species	✓	5.9
National Parks	×	
State Forests	×	
State Conservation Areas	✓	5.11
Natural Vegetation	✓	5.12
Areas of Significant Geological Interest	×	
Any Other Natural Features Considered Significant	✓	5.14
PUBLIC UTILITIES		
Railways	✓	6.1
Roads (All Types)	✓	6.2 & 6.3
Bridges	✓	6.4
Tunnels	×	
Culverts	✓	6.1, 6.2 & 6.3
Water, Gas or Sewerage Infrastructure	✓	6.6, 6.7 & 6.8
Liquid Fuel Pipelines	×	
Electricity Transmission Lines or Associated Plants	✓	6.9
Telecommunication Lines or Associated Plants	✓	6.10
Water Tanks, Water or Sewage Treatment Works	✓	6.6
Dams, Reservoirs or Associated Works	✓	6.11
Air Strips	×	
Any Other Public Utilities	×	
PUBLIC AMENITIES		
Hospitals	×	
Places of Worship	✓	7.5
Schools	✓	7.6
Shopping Centres	✓	7.7
Community Centres	✓	7.8
Office Buildings	✓	7.9
Swimming Pools	×	
Bowling Greens	✓	7.11
Ovals or Cricket Grounds	✓	7.12
Race Courses	×	
Golf Courses	×	
Tennis Courts	✓	7.15
Any Other Public Amenities	✓	7.16

Item	Within *Study Area*	Section Number Reference
FARM LAND AND FACILITIES		
Agricultural Utilisation or Agricultural Suitability of Farm Land	✓	8.1
Farm Buildings or Sheds	✓	8.2
Tanks	✓	8.3
Gas or Fuel Storages	✓	8.4
Poultry Sheds	✓	8.5
Glass Houses	×	
Hydroponic Systems	✓	8.7
Irrigation Systems	✓	
Fences	✓	8.9
Farm Dams	✓	8.10
Wells or Bores	✓	8.11
Any Other Farm Features	×	
INDUSTRIAL, COMMERCIAL AND BUSINESS ESTABLISHMENTS	×	
Factories	×	
Workshops	✓	9.1
Business or Commercial Establishments or Improvements	✓	9.1
Gas or Fuel Storages or Associated Plants	✓	9.2
Waste Storages or Associated Plants	✓	9.3
Buildings, Equipment or Operations that are Sensitive to Surface Movements	×	
Surface Mining (Open Cut) Voids or Rehabilitated Areas	×	
Mine Infrastructure Including Tailings Dams or Emplacement Areas	✓	9.4
Any Other Industrial, Commercial or Business Features	×	
AREAS OF ARCHAEOLOGICAL OR HERITAGE SIGNIFICANCE	✓	10.1 & 10.2
ITEMS OF ARCHITECTURAL SIGNIFICANCE	×	
PERMANENT SURVEY CONTROL MARKS	✓	6.12
RESIDENTIAL ESTABLISHMENTS		
Houses	✓	11.1
Flats or Units	✓	11.2
Caravan Parks	✓	0
Retirement or Aged Care Villages	✓	12.4
Associated Structures such as Workshops, Garages, On-Site Waste Water Systems, Water or Gas Tanks, Swimming Pools or Tennis Courts	✓	11.5 11.5.6 9.3 11.5.8
Any Other Residential Features	×	
ANY OTHER ITEM OF SIGNIFICANCE	×	
ANY KNOWN FUTURE DEVELOPMENTS	✓	12.0

2.3. Bargo Mine Subsidence District and the role of Subsidence Advisory NSW

The *Subsidence Study Area* is located within the Bargo Mine Subsidence District as proclaimed in 1975 and 1994.

Subsidence Advisory NSW (SA NSW) is the NSW Government agency responsible for administering the *Coal Mine Subsidence Compensation Act 2017.* SA NSW has two core functions:

1. To provide compensation or manage the provision of compensation where surface developments are damaged by mine subsidence following extraction of coal or shale in NSW;
2. To regulate surface development within mine subsidence districts to reduce the risk of mine subsidence damage.

SA NSW provides expert advice to property owners, government departments, councils, community organisations and industries within coal mining areas of NSW. This advice aims to provide compatibility between surface development and underground mining.

The owners of buildings or other surface improvements damaged by mine subsidence can lodge claims for compensation through SA NSW. Currently, under the Coal Mine Subsidence Compensation Act 2017, any claim for mine subsidence damage needs to be lodged with SA NSW. SA 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 of repairs will be prepared and compensation will be determined.

Proposed development in mine subsidence districts requires SA NSW approval. SA NSW sets building and construction requirements to protect buildings and other surface improvements from subsidence damage. These requirements cover the nature and class of improvements, including height, type of building materials used and the construction method.

SA NSW has the power to issue stop work notices to prevent illegal construction in mine subsidence districts, and any improvements erected without SA NSW's approval, or contrary to an approval are not eligible for compensation.

Further information about SA NSW's services is available at www.subsidenceadvisory.nsw.gov.au.

3.1. Introduction

This chapter provides a brief overview of; longwall mining; the development of mine subsidence and the methods that have been used to predict the mine subsidence movements resulting from the extraction of the longwalls. Further details on longwall mining, the development of subsidence and the methods used to predict mine subsidence movements can be obtained in the background reports entitled *Introduction to Longwall Mining and Subsidence* and *General Discussion on Mine Subsidence Ground Movements* which can be obtained from *www.minesubsidence.com*.

3.2. Overview of longwall mining

The proposed development at Tahmoor Mine is to continue mining coal using the longwall mining method. A typical cross-section at a coal face showing a typical longwall shearer and roof supports and showing typical immediate floor and roof strata, is sketched in Fig. 3.1.

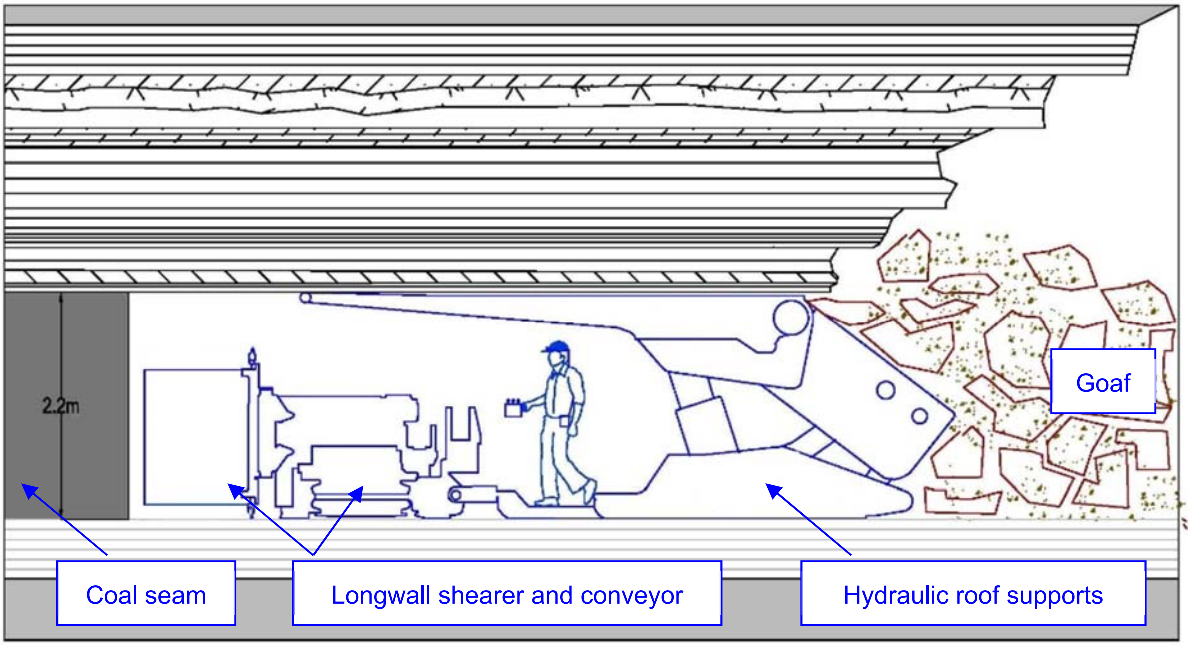


Fig. 3.1 Cross-section along the length of a typical longwall at the coal face

The coal is removed by a shearer, which cuts the coal from the coal face on each pass as it traverses the width of the longwall. The roof at the coal face is supported by a series of hydraulic roof supports, which temporarily hold up the roof strata, and provide a secure working space at the coal face. The coal is then transported by a face conveyor belt which is located behind and beneath the shearer. As the coal is removed from each section of the coal face, the hydraulic supports are stepped forward, and the coal face progresses (retreats) along the length of the longwall.

The strata directly behind the hydraulic supports, immediately above the coal seam, collapses into the void that is left as the coal face retreats. The collapsed zone, often called the goaf, comprises loose blocks and can contain large voids. Immediately above this collapsed zone, the strata remain relatively intact and bends into the goaf, resulting in new vertical factures and the opening up of existing vertical fractures and creation of bed openings or separations. The amount of fracturing, strata sagging and bedding plan separation reduces for the overlying strata that are higher up again that is up towards the surface.

At the surface, the ground subsides vertically and moves horizontally towards the centre of the mined goaf area. The maximum subsidence at the surface varies, depending on a number of factors including longwall geometry, depth of cover, extracted seam thickness, extent and proximity of previously extracted panels and seams and the overburden geology. The maximum subsidence in the Southern Coalfield, within a single seam and for a single panel of supercritical critical width of extraction, that is the panel width is much wider than the depth of cover, is generally about 65 % of the extracted seam thickness.

3.3. Overview of conventional subsidence parameters

The normal ground movements resulting from the extraction of longwalls are referred to as conventional or systematic subsidence movements. These movements are described by the following parameters:-

- **Subsidence** usually refers to vertical displacement of a point, but subsidence of the ground includes both vertical and horizontal displacements. These horizontal displacements in some cases, where the subsidence is small beyond the longwall goaf edges, can be greater than the vertical subsidence.
- Unlike mining induced vertical subsidence, which has a magnitude only, **Horizontal Displacements** have both a magnitude and a direction, i.e. they can be referred to as a vector. Early researchers generally only measured and predicted vertical subsidence and ground strains and rarely measured or predicted the horizontal displacements of points. Subsidence and horizontal movements are usually expressed in units of *millimetres (mm)*.
- **Tilt** is the change in the slope of the ground as a result of differential subsidence and is calculated as the change in subsidence between two points divided by the distance between those points. Tilt is, therefore, the first derivative of the subsidence profile. Tilt is usually expressed in units of *millimetres per metre (mm/m)*. A tilt of 1 mm/m is equivalent to a change in grade of 0.1 %, or 1 in 1000.
- **Curvature** is the bending of the ground as a result of differential subsidence and is calculated as the change in tilt between two adjacent sections of the tilt profile divided by the average length of those sections. Curvature is usually expressed as the inverse of the **Radius of Curvature** with the units of *1/kilometres* (km^{-1}), but the values of curvature can be inverted, if required, to obtain the radius of curvature, which is usually expressed in *kilometres (km)*.
- **Strain** is the relative differential horizontal movements of the ground. **Normal strain** is calculated as the change in horizontal distance between two points on the ground, divided by the original horizontal distance between them. Strain is typically expressed in units of *millimetres per metre (mm/m)*. **Tensile strains** occur where the distance between two points increases and **Compressive strains** occur when the distance between two points decreases. So that ground strains can be compared between different locations, they are typically measured over bay lengths that are equal to the depth of cover between the surface and seam divided by 20. When strains are measured over longer bay lengths lower averaged values are generally observed.

  Whilst mining induced normal strains are measured along monitoring lines, **ground shearing** can also occur both vertically and horizontally across the directions of monitoring lines. Most of the published mine subsidence literature discusses the differential ground movements that are measured along subsidence monitoring lines, however, differential ground movements can also be measured across monitoring lines using 3D survey monitoring techniques.
- **Horizontal shear deformation** across monitoring lines can be described by various parameters including horizontal tilt, horizontal curvature, mid-ordinate deviation, angular distortion and shear index. However, is not possible to determine the horizontal shear strain across a monitoring line using standard 2D or 3D monitoring techniques. High deformations along monitoring lines (i.e. normal strains) are generally measured where high deformations have been measured across the monitoring line (i.e. shear deformations) and vice versa.

High resolution surveying techniques using GPS technology and satellite based differential interferometry are providing far more data and a much better basis for understanding the extent and the mechanics of the mining induced vertical and horizontal ground movements. Modern surveyors now provide the current easting, northing and reduced level of each installed peg from which three-dimensional subsidence and mining induced horizontal movements and directions can be derived for each epoch. Because of these improvements in subsidence surveying our understanding of both the magnitude and direction of mining induced vertical and horizontal ground movements and the lateral extent of these mining induced ground movements has improved substantially.

The **total** subsidence, tilts, curvatures and strains are the accumulated parameters which result from the extraction of a series of longwalls. **Incremental** subsidence, tilts, curvatures and strains are the additional movements due to the extraction of each longwall and are determined from monitored data by subtracting the movements monitored before a longwall was mined from the movements monitored after that longwall was mined. The **travelling** tilts, curvatures and strains are the transient movements as the longwall extraction face mines directly beneath a given point.

Residual subsidence is defined as the additional, time-dependent subsidence that develops after active mining has been completed or has moved sufficiently far enough away from the affected area to no longer have an immediate influence. As the amount of subsidence being measured reduces asymptotically to smaller and smaller levels, the shrinking and swelling of the soil due to changes in moisture content and the survey accuracy can form a large proportion of the measured subsidence.

3.4. Overview of conventional and non-conventional subsidence movements

Some subsidence terms and definitions were first published in an Independent Inquiry report entitled "*Strategic Review of Impacts of Underground Coal Mining on Natural Features in the Southern Coalfield*", (Southern Coalfield Inquiry Report), which was published in July 2008, (NSW DP, 2008). The terms and definitions draw a distinction between subsidence effects, subsidence impacts, environmental consequences, consequences, secondary consequences, conventional effects and non-conventional effects.

Conventional subsidence profiles are typically smooth in shape and can be explained by the expected caving mechanisms associated with overlying strata spanning the extracted void. Normal conventional subsidence movements due to longwall extraction are easy to identify where longwalls are regular in shape, the extracted coal seams are relatively uniform in thickness, the geological conditions are consistent and surface topography is relatively flat.

As a general rule, the smoothness of the profile is governed by the depth of cover and lithology of the overburden, particularly the near surface strata layers. Where the depth of cover is greater than 400 metres, such as the case within the Study Area, the observed subsidence profiles along monitoring survey lines are generally smooth. Where the depth of cover is less than 100 metres, the observed subsidence profiles along monitoring lines are generally irregular. Very irregular subsidence movements are observed with much higher tilts, curvatures and strains at very shallow depths of cover where the collapsed zone above the extracted longwalls extends up to or near to the surface.

Irregular subsidence movements are occasionally observed at the deeper depths of cover along an otherwise smooth subsidence profile. The cause of these irregular subsidence movements can be associated with:-

- sudden or abrupt changes in geological conditions,
- steep topography, and
- valley related mechanisms.

Non-conventional movements due to geological conditions, steep topography and valley related movements are discussed in the following sections.

3.4.1. Non-conventional subsidence movements due to changes in geological conditions

For those sites where the depth of cover is less than 100 metres, the observed subsidence profiles along monitoring lines are generally irregular with much higher tilts, curvatures and strains principally because the collapsed zone has extended up to or near to the surface. Where the depth of cover is around 400 metres, as is the case over most of the *Subsidence Study Area*, the observed subsidence profiles along monitoring survey lines will generally be smooth as is typical in the Southern Coalfields. However, irregular subsidence movements can occasionally be observed at these deeper depths of cover along an otherwise smooth subsidence profile and these localised irregular subsidence movements, that are called non-conventional subsidence movements, are often associated with sudden or abrupt changes in geological conditions, steep topography, and valley related mechanisms.

Accordingly, non-conventional subsidence movements may occur or could be expected within the river and creek valleys, near the major fault zones, near the outcrop of the interface between sandstone and shale strata layers. It is believed that most the unexpected irregular subsidence movements, i.e. the non-conventional ground movements, are a result of the reaction of near surface strata to increased horizontal compressive stresses due to mining operations. Some of the geological conditions that are believed to influence these irregular subsidence movements are the blocky nature of near surface sedimentary strata layers and the possible presence of unknown faults, dykes or other geological structures, cross bedded strata, thin and brittle near surface strata layers and pre-existing natural joints. The presence of these geological features near the surface can result in bumps in an otherwise smooth subsidence profile which are usually accompanied by locally increased tilts, curvatures and strains.

Even though it may be possible to attribute a reason behind many of the observed non-conventional ground movements, there remain some observed irregular ground movements that still cannot be explained with the available geological information. The term "anomaly" is therefore reserved for those non-conventional ground movement cases that were not expected to occur and cannot be explained by any of the above possible causes.

It is not possible to predict the locations and magnitudes of non-conventional anomalous movements. In some cases, approximate predictions for the non-conventional ground movements can be made where the underlying geological or topographic conditions are known in advance. It is expected that these methods will improve as further knowledge is gained through ongoing research and investigation.

In this report, the analyses of non-conventional ground movements have been carried out statistically in the predictions and impact assessments, by basing these on the frequency of past occurrence of both the conventional and non-conventional ground movements and impacts. The analysis of strains provided in Section 4.3 includes those resulting from both conventional and non-conventional anomalous movements.

An analysis of observations during the mining of Tahmoor Longwalls 22 to 31 provides an indication of the spatial frequency of non-conventional movements, which is discussed in Section 4.8. The impact assessments for the natural features and items of surface infrastructure, which are provided in Chapters 5 through to 11, include a discussion of historical impacts resulting from previous longwall mining which have occurred as the result of both conventional and non-conventional subsidence movements.

3.4.2. Non-conventional subsidence movements due to valley related Movements

Valley bulging movements are a natural phenomenon, resulting from the formation and ongoing weathering, erosion and development of valleys, as illustrated in Fig. 3.2. These naturally occurring valley bulging movements include inward movement of the valley sides and the bulging or upwards movement of the valley floor. The potential for these natural movements are influenced by the geomorphology of valleys.

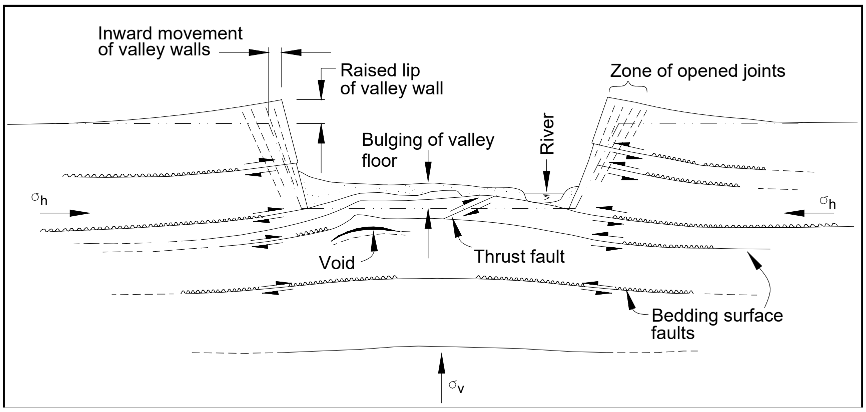


Fig. 3.2 Valley formation in flat-lying sedimentary rocks (after Patton and Hendren 1972)

The streams within the *Subsidence Study Area* may also be subjected to mining induced valley related movements, which result in similar consequences to the naturally occurring valley bulging movements that are discussed above. These mining induced valley closure result in closure movements across the valley and upsidence in the floor of the valley. The potential for these mining induced movements are influenced by the geomorphology of the valleys and the proximity and magnitude of the mining induced subsidence movements. As discussed in Section 3.4 and in the Southern Coalfield Inquiry Report (DPIE 2008), mining induced valley related movements are commonly observed across river and creek alignments in the Southern Coalfield and extensive studies have been carried out to predict the extent of these valley related movements.

As stated in the peer review by SCT (2014), a number of explanations of the mechanics of valley closure have been provided in the literature. Valley related movements are believed to be caused by the mining process through a number of different complex mechanisms and the relative contribution from each mechanism is expected to vary from case to case.

Valley related movements are normally described by the following parameters:-

- **Upsidence** is the reduced subsidence, or the relative uplift within a valley which results from the dilation or buckling of near surface strata at or near the base of the valley. The magnitude of upsidence, which is typically expressed in the units of *millimetres (mm)*, is the difference between the observed subsidence profile within the valley and the conventional subsidence profile which would have otherwise been expected in flat terrain.

- **Closure** is the reduction in the horizontal distances across the valley sides. The magnitude of maximum valley closure, which is typically expressed in the units of *millimetres (mm)* and is defined as the greatest reduction in distance between any two points on the opposing valley sides, is generally measured from pegs located at the top of the sides of the valley, however, sometimes the greatest closure is observed between pegs located in the base of the valley.

- **Compressive valley closure strains** occur within the bases of valleys as a result of valley closure and upsidence movements. **Tensile strains** tend occur in the sides and near the tops of the valleys as a result of valley closure movements. The magnitudes of these strains, which are typically expressed in the units of *millimetres per metre (mm/m)*, are calculated as the changes in horizontal distance over a standard bay length, divided by the original bay length.

The predicted valley related movements resulting from the extraction of the proposed longwalls were made using the empirical method outlined in Australian Coal Association Research Programme (ACARP) Research Project No. C9067 (Waddington and Kay, 2002). Further details can be obtained from the background report entitled *General Discussion on Mine Subsidence Ground Movements* which can be found at *www.minesubsidence.com*.

3.4.3. Non-conventional subsidence movements due to steep topography

Non-conventional movements can also result from slope instability movements where longwalls are extracted beneath steep slopes. In these cases, elevated tensile strains develop near the tops of the steep slopes and elevated compressive strains develop near the bases of the steep slopes. The potential impacts resulting from slope instability movements include the development of tension cracks at the tops and the sides of the steep slopes and compression ridges at the bottoms of the steep slopes. The term 'slope instability movements' is not intended to be confused with horizontal movements in a downslope direction, as correctly raised in the peer review by SCT (2014).

Further discussions on the potential for slope instability movements for the steep slopes within the *Subsidence Study Area* are provided in Section 5.5.

3.5. Far-field movements

The measured horizontal movements at survey marks which are located beyond the longwall goaf edges and over solid unmined coal areas are often much greater than the observed vertical movements at those marks. These movements are often referred to as *far-field movements*.

Far-field horizontal movements tend to be bodily movements towards the extracted goaf area and are accompanied by very low levels of strain. These movements generally do not result in impacts on natural features or surface infrastructure, except where they are experienced by large structures which are very sensitive to differential horizontal movements.

These observed far field horizontal movements appear to occur as a result of a number of mechanisms or components, however, the main mechanism thought to be responsible for the observed far-field movements in flat terrain is the partial relief or relaxation of the in situ horizontal stresses of the immediate strata around the goaf towards the goaf areas. For the strata around the goaf to expand towards the collapsed zone there has to be slippage along some bedding planes. It is agreed with the statements in the peer review by SCT (2014) that the shear horizon or horizons on which movement occurs is not necessarily at the level of the coal seam and may occur at one or many horizons within the overburden.

The extent to which a particular stratum can expand into the goaf is dependent on the height of the void formation, the dilation in the neighbouring strata and the elastic properties of each stratum, and hence, the horizontal expansion varies from stratum to stratum with the greatest expansion occurring near, or just above, seam level. The measured far-field horizontal movements on the surface would, therefore, be expected to increase wherever the in situ compressive stresses are higher and where the height and extent of the goaf is more extensive, i.e. where the mining activity is more extensive.

Where narrow sub-critical panels are being mined and the height of collapse may only extend part of the way up to the surface, the strata that is overlying the collapsed zone may be able accommodate increased horizontal stresses. However, around wide supercritical panels where the cracking and goafing can extend up to the surface, there would be greater disturbance to the strata over the goaf and less stiffness within the collapsed strata to accommodate increased horizontal stresses. It is likely therefore that greater redistribution of in situ horizontal stresses would occur under and around these supercritical panels, greater stress relief and far field movements can occur towards these supercritical panels and these far field movements would extend well beyond a mined area before equilibrium is regained in the rock mass.

An empirical database of observed incremental far-field horizontal movements has been compiled using monitoring data from the NSW Coalfields, but predominately the database includes measurements from the Southern Coalfield. The far-field horizontal movements resulting from longwall mining are generally observed to be orientated towards the extracted longwall. At very low levels of far-field horizontal movements, however, there was a higher scatter in the orientation of the observed movements.

Far-field horizontal movements can be predicted with reasonable accuracy and the method used to predict such movements are described further in Section 4.7.

3.6. The Incremental Profile Method (IPM)

The predicted conventional subsidence parameters due to the extraction of the proposed longwalls were determined using the Incremental Profile Method (IPM), which was developed by MSEC in 1994, when formally known as Waddington Kay and Associates. This method is an empirical model based on a large database of observed subsidence monitoring data from previous mining within the Southern, Newcastle, Hunter and Western Coalfields of New South Wales and the Bowen Basin in Queensland.

The database of detailed subsidence monitoring data from various coalfields includes data from the following Collieries or Mines: Abel, Angus Place, Appin, Ashton, Awaba, Austar, Baal Bone, Bellambi, Beltana, Blakefield South, Bulga, Bulli, Burwood, Carborough Downs, Chain Valley, Clarence, Coalcliff, Cook, Cooranbong, Cordeaux, Corrimal, Crinum, Cumnock, Dartbrook, Delta, Dendrobium, Donaldson, Eastern Main, Ellalong, Elouera, Fernbrook, Glennies Creek, Grasstree, Gretley, Invincible, John Darling, Kenmare, Kemira, Kestrel, Lambton, Liddell, Mandalong, Metropolitan, Moranbah North, Mt. Kembla, Munmorah, Narrabri, Nardell, Newpac, Newstan, Newvale, Newvale 2, NRE Wongawilli, Oaky Creek, Ravensworth, South Bulga, South Bulli, Southern, Springvale, Stockton Borehole, Tasman, Teralba, Tahmoor, Tower, Wambo, Wallarah, Western Main, Ulan, United, West Cliff, West Wallsend, and Wyee.

Observed incremental subsidence profiles show the additional subsidence that resulted from the extraction of an individual longwall panel and these can be derived by subtracting the observed subsidence profiles of points along monitoring lines before mining from the observed subsidence profiles after mining. Reviews of the available incremental and total subsidence profiles showed that, whilst the final observed total subsidence profiles measured over a series of longwalls were irregular, the observed incremental subsidence profiles due to the extraction of individual longwalls were more consistent in both shape and magnitude.

The observed incremental subsidence at a point has been shown to vary according to local geology, depth of cover, panel width, the pillar widths, the extracted seam thickness, the extent and proximity of adjacent previously mined panels in the currently mined seam and/or in the overlying or underlying seams, the stability of the chain pillars, the strength of the coal seams and the overburden strata and a time-related subsidence component.

The regularity in shape between observed incremental subsidence profiles was first noticed whilst carrying out an empirical study in the Southern Coalfields of NSW using monitoring data from more than 72 longwall panels. A prediction model was then developed to predict the incremental subsidence at points for each of the longwalls in a series of longwalls and then adding together the appropriate subsidence values to derive the total subsidence at each point. MSEC then developed standard subsidence prediction curves and shapes of predicted incremental subsidence profiles using observed profiles from monitoring lines with similar mining geometry and overburden geology. This IPM subsidence prediction model has been continually developed, revised and updated since 1994, as the new additional monitoring data became available, to suite specific local geology and conditions.

The prediction of subsidence using the IPM is now fully automated and subsidence predictions can be made anywhere above or outside the extracted longwalls, based on the local surface and seam information. Details as to how this model was developed have been outlined in various published papers, which include information that would allow others to use this method to predict mine subsidence ground movements resulting from underground coal mining operations, based on local observed data. MSEC can use the current IPM model to predict subsidence contours over complex underground mine layouts within days of receiving the necessary data.

MSEC has used this IPM for almost 1,000 studies for proposed mines and numerous comparisons have been provided between the predicted subsidence movements and the subsequently monitored ground movements. The results of these comparisons have been included in many prediction reports, government inquiry reports and end of panel monitoring reports, and these comparisons and reviews confirm the use of this IPM subsidence prediction model provides reasonable, if not, slightly conservative predictions for both single seam and multi-seam conditions in NSW and QLD for those cases where the mining geometry and overburden geology are similar to and within the range of the empirical data from which the IPM model was developed. When the mining geometry and overburden geology are outside the ranges of the empirical data from which the IPM model was developed then additional advice is sought from relevant mathematical models.

For this Tahmoor South Project, the IPM has been based on the Southern Coalfield predictive curves with calibrations for the local conditions, based on the extensive ground monitoring data from Tahmoor Mine as discussed in Section 3.7.

Further details on the IPM are provided in the background report entitled General Discussion on Mine Subsidence Ground Movements which can be obtained from *www.minesubsidence.com*. The following section describes the calibration of the IPM for local single-seam conditions.

3.7. Calibration of Incremental Profile Method, outside the increased subsidence area

The extraction of longwalls at Tahmoor Mine has generally resulted in observed mine subsidence movements that are typical of those observed above other collieries in the Southern Coalfield of NSW at comparable depths of cover. However, during the mining of Longwall 24A at Tahmoor Mine substantially increased subsidence was observed over the predicted subsidence levels and then similar increased subsidence movements were also observed above the southern ends of Longwalls 25 and 26. This was a very unusual event for the Southern Coalfield and is discussed further in Section 3.8.

This section of the report describes the calibration and testing of the IPM above the majority of the previously extracted longwalls at Tahmoor Mine and does not include observations in the areas of increased subsidence, which is addressed separately in Section 3.8.

The IPM was previously refined or calibrated using the extensive monitoring data that had been collected during the extraction of Longwalls 22 to 25 at Tahmoor to predict the subsidence parameters for Longwalls 27 to 30 at Tahmoor Mine, and the details of this calibration were provided in Section 3.6 of Report No. MSEC355 (Revision B, July 2009).

The IPM prediction curves from that report are the latest calibration of the IPM and this model was tested against the latest available subsidence data in the Tahmoor North area, plus, the available subsidence data from monitoring lines above the previously extracted Tahmoor Longwalls 1 to 19 since these later longwalls were located closer to the proposed Tahmoor South longwalls.

The reliability of the IPM prediction curves is illustrated by comparing the observed movements with those predicted for the following monitoring lines, which are shown in Appendix G of this report. The results have been extended to include measured subsidence after the mining of Longwall 30, where they have been measured. The locations of the monitoring lines are shown in Fig. 3.3 :-

- Fig. G.01 – 100-Line for Tahmoor Longwalls 1 and 2,
- Fig. G.02 – 200-Line for Tahmoor Longwall 2,
- Fig. G.03 – 300-Line for Tahmoor Longwalls 3 to 7,
- Fig. G.04 – 800-Line for Tahmoor Longwalls 8 to12,
- Fig. G.05 – 900-Line for Tahmoor Longwalls 10A to 13,
- Fig. G.06 – 1000-Line for Tahmoor Longwalls 14B to 19,
- Fig. G.07 – Brundah Road Line for Tahmoor North Longwalls 23B to 28,
- Fig. G.08 – Castlereagh Street Line for Tahmoor North Longwalls 22 to 28,
- Fig. G.09 – Remembrance Drive Line for Tahmoor North Longwalls 23A to 30,
- Fig. G.10 – Thirlmere Way Line for Tahmoor North Longwalls 23A to 27,
- Fig. G.11 – York Street Line for Tahmoor North Longwalls 24A to 28,
- Fig. G.12 – HRF Line for Tahmoor North Longwalls 23 to 26,
- Fig. G.13 – LW25 XS1 Line for Tahmoor North Longwalls 25 to 26,
- Fig. G.14 – LW24A Draw Line for Tahmoor North Longwalls 24A to 26, and
- Fig. G.15 – LW25 Centreline for Tahmoor North Longwalls 25 to 26.

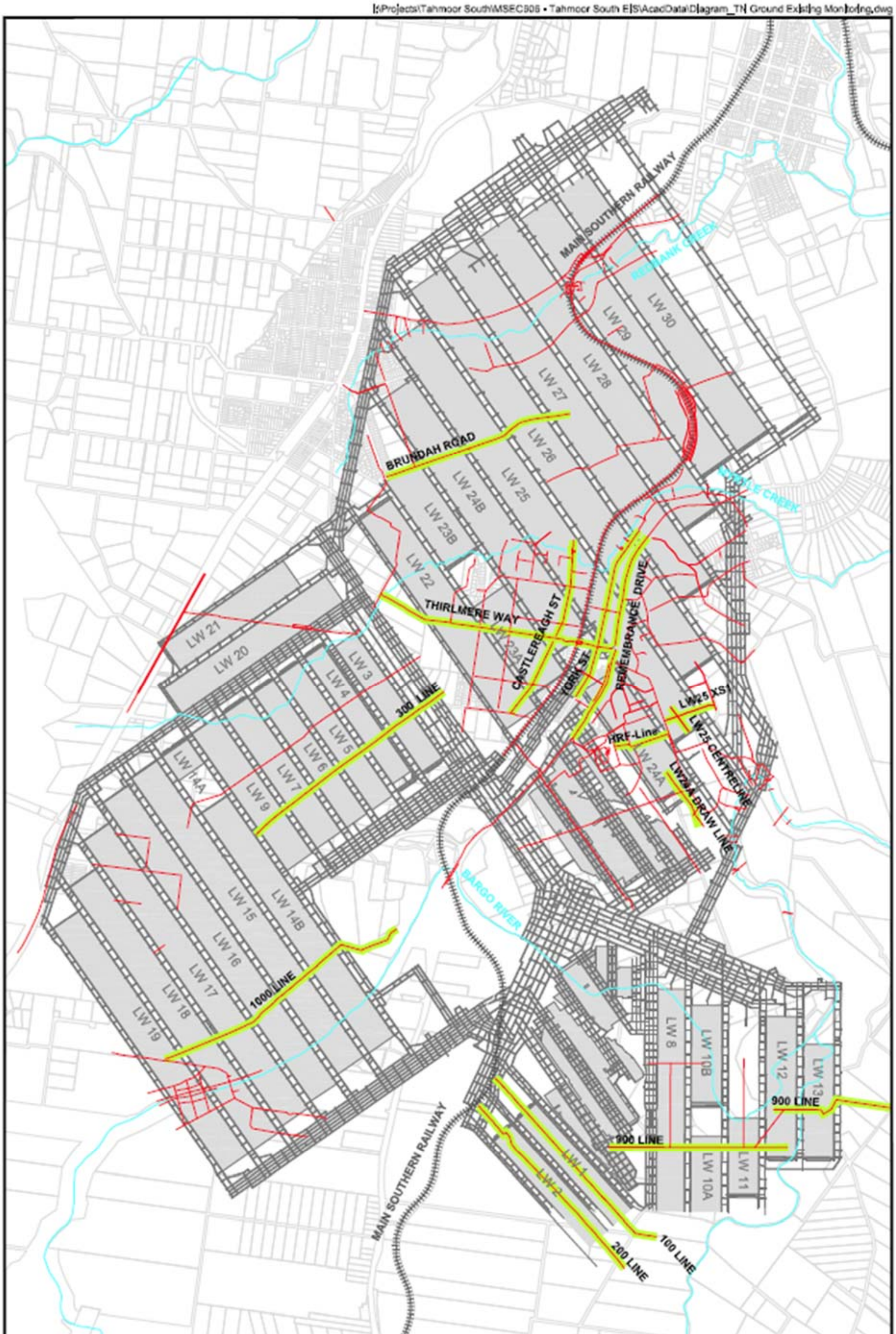


Fig. 3.3 Tahmoor North monitoring lines used in testing calibration of the IPM model

The following observations can be seen from the above figures:

- Predicted maximum subsidence has been greater, for all the monitoring lines over Longwalls 1 to 7, over Longwalls 14 to 23 and over the northern western ends of Longwalls 24B to 26, than the observed maximum subsidence.
- The observed subsidence profiles, for all the monitoring lines over Longwalls 1 to 7, Longwalls 14 to 19, Longwalls 20 to 21 and over Longwalls 21 to 24B, reasonably match those predicted using the calibrated prediction curves with the observed subsidence generally being greater than the observed subsidence. While there is reasonable correlation, it is highlighted that, in some locations away from the points of maxima and, in particular, beyond the longwall goaf edges, the observed subsidence has exceeded that predicted. In these locations beyond the longwall goaf edges, however, the magnitude of subsidence is low and there were very low associated tilts, curvatures and strains.
- Greater maximum subsidence of up to 670 mm has been observed, along some of the lines over Longwalls 24A and above the south eastern ends of Longwalls 25 to 27, than the predicted maximum subsidence as discussed in detail in Section 3.8.
- Greater subsidence was observed compared to predictions along the 800-Line above the centre of Longwall 8 where several small faults and dykes were located. The observed incremental subsidence of 420 mm was 50% greater at that location than the predicted value of 280 mm. The centre of this panel is within 500 metres of the Bargo River, where the valley depth, measured using a one half a depth of cover basis, is 40 metres and this location was within 1,400 m of the Nepean Fault.
- Greater subsidence was observed compared to predictions along the 900-Line above Longwall 13. At this location where the 900-Line crosses Longwall 13 and the Nepean Fault zone, the Nepean Fault zone runs almost parallel to Longwall 13 and the maingate edge of Longwall 13 is within 170 metres of the fault zone. The observed incremental subsidence of 820 mm was approximately 30% greater at that location than the predicted value of 550 mm. The centre of this panel is also within 300 metres of the Bargo River, where the valley depth, measured using a one half a depth of cover basis, is 25 metres and this location was within 300 m of the Nepean Fault.
- Slightly greater subsidence was observed along Castlereagh Street compared to predictions above Longwalls 22 and 23A. This street runs across the south eastern ends of these longwall panels and near the railway corridor.
- Slightly greater subsidence was observed compared to predictions along Remembrance Drive above Longwalls 24A and the southern parts of Longwall 25 and Longwall 26. This area is located on the edge of the zone of increased subsidence.
- Slightly greater subsidence was observed compared to predictions along Thirlmere Way above the southern end of Longwall 24B and the south eastern parts of Longwall 25. This area is located near the zone of increased subsidence.
- Slightly greater subsidence was observed compared to predictions along York Street above Longwalls 24A and the south eastern parts of Longwall 25. This area is located along the edge of the zone of increased subsidence.
- Greater subsidence of up to 600 mm was also observed compared to predictions along the HRF-Line and LW25 XS1 Line, which are within the zone of increased subsidence, as is discussed in more detail in Section 3.8.
- The observed tilt and curvature profiles over all these monitoring lines also reasonably matched the predicted profiles using the calibrated prediction curves. The observed curvatures were derived from the smoothed subsidence profiles, to obtain overall levels of curvature, rather than the localised curvatures at each survey mark. Please see Section 3.7.1 for further discussion on curvature.
- The maximum observed tilts and curvatures were, in most cases, similar to the maximums predicted using the standard Bulli seam prediction curves. The observed tilts and curvatures exceeded those predicted at the tributary crossings, at the locations of the upsidence movements, as the predicted profiles did not include non-conventional valley related movements. There was also some scatter in the observed tilt and curvature profiles.

A comparison between the observed and predicted total subsidence at the individual survey marks from the 100-Line, 200-Line, 300-Line, 800-Line, 900-Line and the 1000-Line after the extraction of Longwalls 1 to 19 at Tahmoor Mine is provided in Fig. 3.4. That is, this analysis includes the occasions when the observed total subsidence exceeded the predicted total subsidence over Longwalls 1 to 19, which were along the 800-Line and 900-Line as shown in Fig. G.04 and Fig. G.05.

The observed subsidence at individual survey pegs, i.e. at a point, for pegs located over Tahmoor Longwalls 1 to 19 exceeded the predicted subsidence by more than +15 % by a small margin at some of the survey marks along the 100-Line, 300-Line, and by much higher margins at surveys marks along the 800-Line and 900-Line. It can be seen from Fig. 3.4 that the observed total subsidence at the other individual survey marks were generally less than the predicted total subsidence plus 15 %, or less than the predicted total subsidence plus 50 mm, which is generally considered acceptable for subsidence prediction methods.

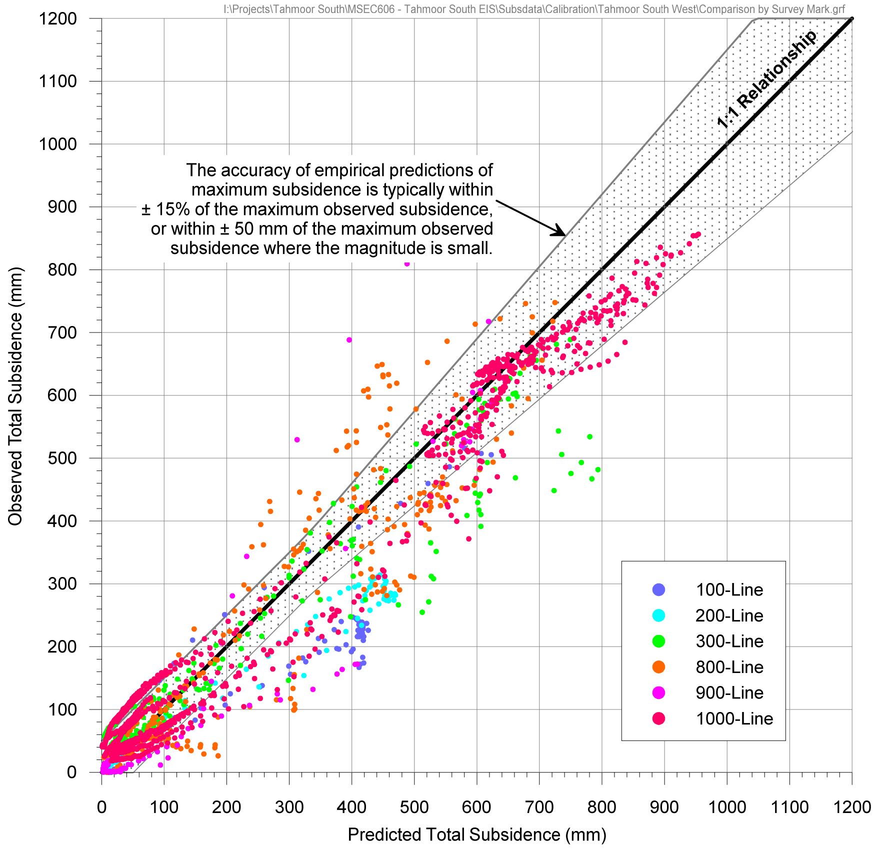


Fig. 3.4 Comparison between observed and predicted total subsidence at individual survey marks for the Tahmoor Longwalls 1 to 19

The further comparison between the observed and predicted total subsidence at all of the individual survey marks over the northern areas of the Tahmoor Mine, at the completion of each of the Longwalls 22 to 26, is provided in Fig. 3.5. These results in Fig. 3.5 have only been provided for the monitoring lines that are located outside the zone of increased subsidence, as is discussed separately in Section 3.8, i.e. these plots do not including pegs located above Longwall 24A and above the south eastern ends of Longwalls 25 and 26. However this analysis does include the monitored data from those parts of Remembrance Drive and Castlereagh Street that are close to or near the zone of increased subsidence, i.e. within a transition zone.

It can be seen from Fig. 3.5, that the observed total subsidence at the individual survey marks at Tahmoor North, due to the extraction of Tahmoor Longwalls 22 to 26, for these monitoring lines that are generally located outside the zone of increased subsidence and outside the transition zone, were generally less than the predicted total subsidence plus 15 %, or less than the predicted total subsidence plus 50 mm, which is generally considered acceptable for subsidence prediction methods. There are several exceedances, however, and these generally occurred along the monitoring lines in those parts of Remembrance Drive and Castlereagh Street that are located close to or near the zone of increased subsidence and from those with lower levels of subsidence.

Instead of plotting the results for all survey marks along a line, a further comparison is provided in Fig. 3.6 between the observed and predicted **maximum** total subsidence along monitoring lines at the northern parts of the Tahmoor Mine for these monitoring lines that are located outside the zone of increased subsidence, due to the extraction of Tahmoor Longwalls 22 to 26.

It can be seen by comparing Fig. 3.4 and Fig. 3.5 that the maximum observed subsidence values anywhere along the whole monitoring lines are generally less than the predicted total subsidence plus 15 %, or less than the predicted total subsidence plus 50 mm, except where the magnitudes are small. There are some exceedances at the Railway Line (2D) and Larkin St, however, these lines are also located close to or near the zone of increased subsidence and are generally occurred along the monitoring lines with lower levels of subsidence.

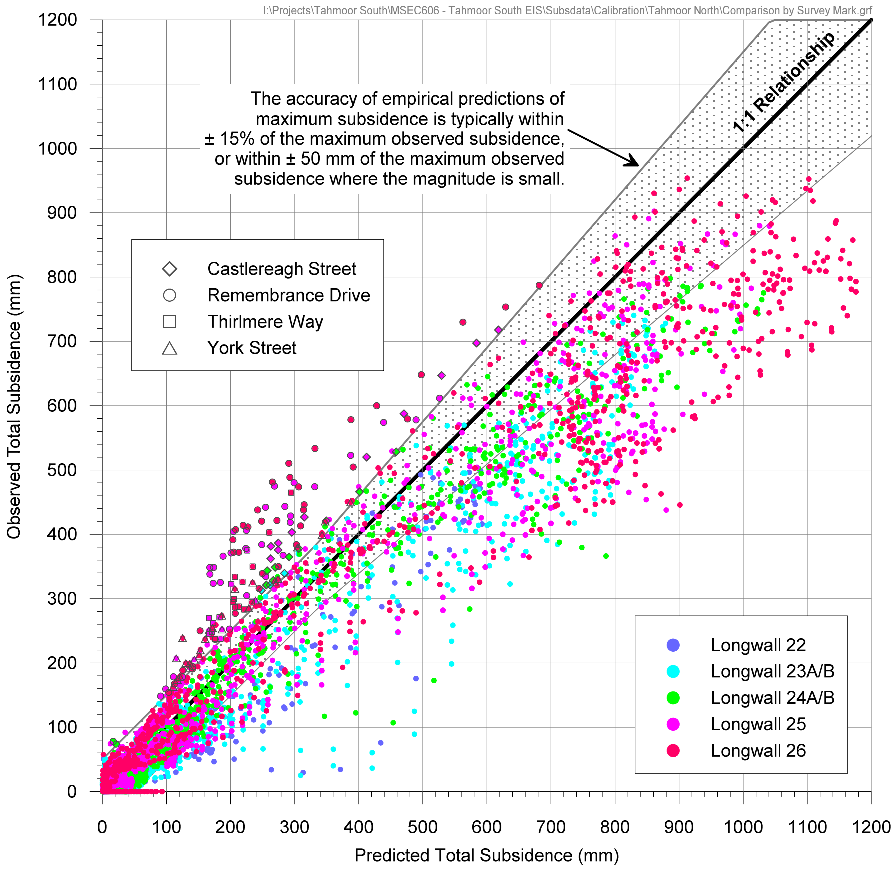


Fig. 3.5 Comparison between observed and predicted total subsidence at individual survey marks for the Tahmoor North longwalls 22 to 26

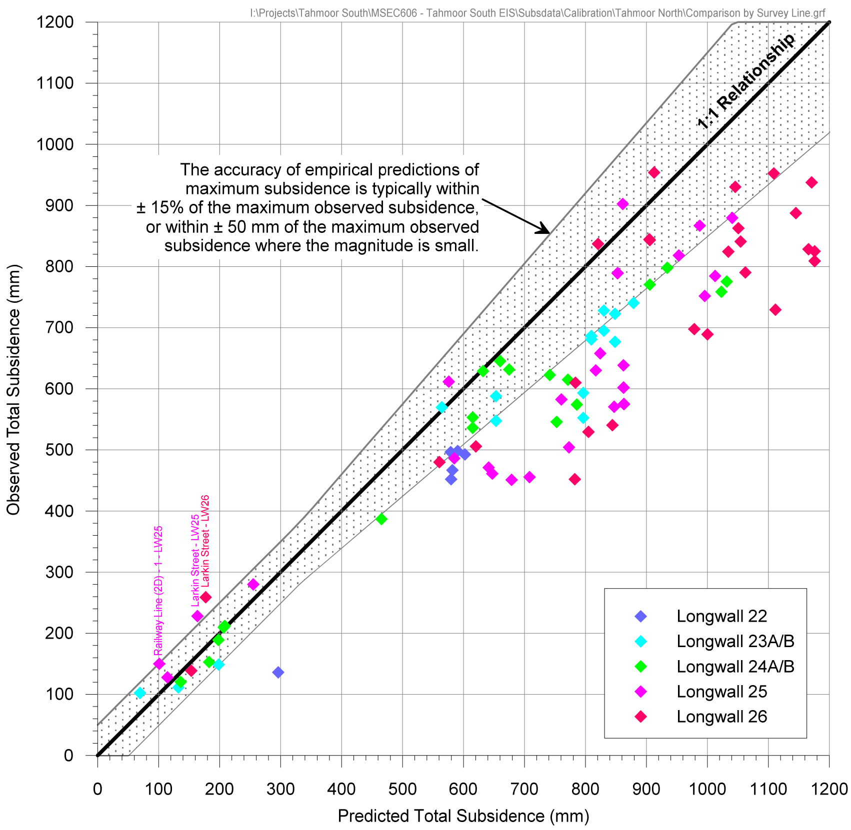


Fig. 3.6 Comparison between observed and predicted maximum total subsidence along whole monitoring lines for the Tahmoor North longwalls 22 to 26

A further statistical review of these maximum subsidence values along monitoring lines has been undertaken. The distribution of the ratio of the maximum observed to maximum predicted total subsidence, for the monitoring lines near Longwalls 22 to 26 located outside the zone of increased subsidence at Tahmoor Mine with maximum values greater than 200 mm, is illustrated in Fig. 3.7 (left). A gamma distribution has been fitted to the results and this is also shown in this figure. The resulting probabilities of exceedance have been determined, based on this gamma distribution, which is shown on the right of Fig. 3.7.

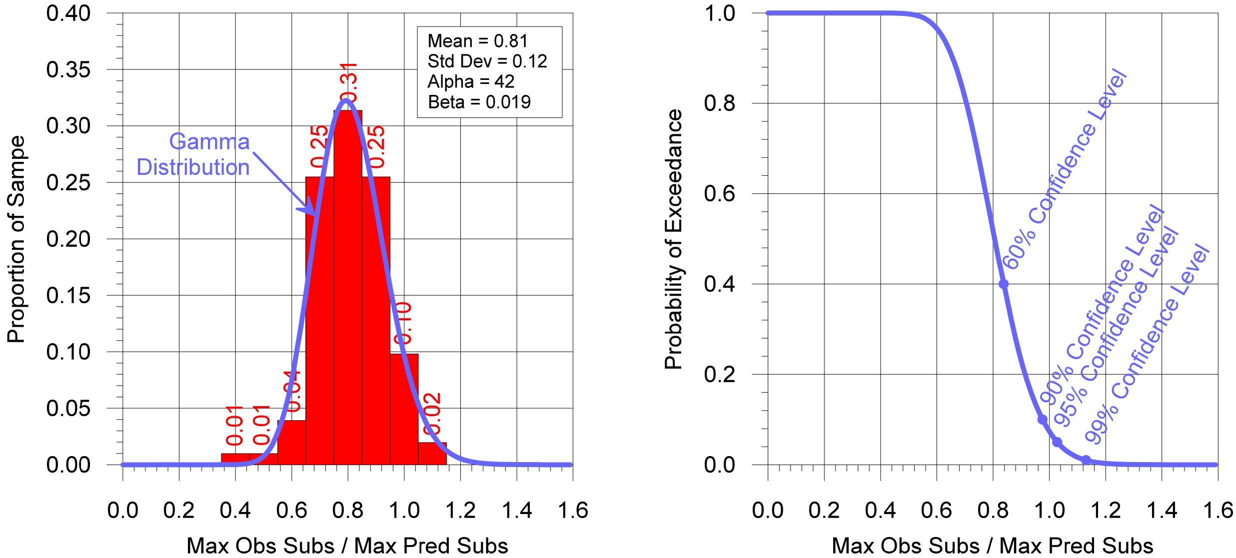


Fig. 3.7 Distribution of the ratio of the maximum observed to maximum predicted total subsidence for monitoring lines at Tahmoor Mine

It can be seen on the left side of the above figure that the maximum observed total subsidence along the monitoring lines at Tahmoor Mine was, on average, 81 % of the maximum predicted total subsidence. The maximum observed total subsidence along the monitoring lines was, at most, 10 % greater than the maximum predicted total subsidence.

It can be seen on the right side of the above figure that, based on the monitoring data, there is approximately a 93 % confidence level that the maximum observed total subsidence would be less than the maximum predicted total subsidence. That is, there is an approximate 7 % probability that the maximum observed total subsidence would exceed the maximum predicted subsidence anywhere along a monitoring line.

The subsidence predictions for the proposed Tahmoor South longwalls using this calibrated IPM model are provided in Section 4.2. Based on the statistical review of the accuracy of this calibrated IPM model, it is expected, therefore, that the calibrated IPM should generally provide reasonable, if not, slightly conservative predictions for conventional subsidence resulting from the extraction of the proposed Tahmoor South longwalls.

However, because of the increased subsidence that has been observed in parts of Tahmoor Mine, consideration should, however, be made for the observed movements exceeding those predicted as the result of anomalous or non-conventional movements, or for increased subsidence which is discussed in Section 3.8.

3.7.1. Comparisons between the observed and predicted tilt and curvature for previously extracted longwalls in the Southern Coalfield

It can be seen from Fig. G.01 to G.11 that there has generally been a reasonable correlation between predicted and observed tilt profiles at Tahmoor Mine. A reasonable correlation has also been found at surrounding collieries in the Southern Coalfield where the depths of cover are similar to those at Tahmoor Mine. Where increased subsidence has been observed at Tahmoor Mine, however, higher than predicted tilts have been observed, and this is discussed further in Section 3.8.

It is difficult to make meaningful comparisons between the profiles of raw observed curvature and predicted conventional curvature. The reason for this is that survey tolerance can be a large proportion of the measured curvatures and hence this can result in very irregular profiles. The survey tolerance for relative vertical movements is typically around ±3 mm, which equates to a survey tolerance for curvature of approximately 0.05 km^{-1} over a 20 metre bay length. This is important when compared to typical magnitudes of curvatures measured in the Southern Coalfield, which are in the order of 0.05 km^{-1} to 0.15 km^{-1}.

To make meaningful curvature comparisons, the observed curvatures have been derived from smoothed observed subsidence profiles, which removes the small deviations resulting from, amongst other things, survey tolerance. The subsidence profile has been smoothed using either the Savitzky-Golay or Loess algorithm, which removes the localised deviations, but does not reduce the overall maxima. This is illustrated in Fig. 3.8 along the Moreton Park Road Line in Area 7, which shows the raw observed subsidence profile, the smoothed subsidence profile, the raw observed curvature profile and the curvature profile derived from the smoothed subsidence.

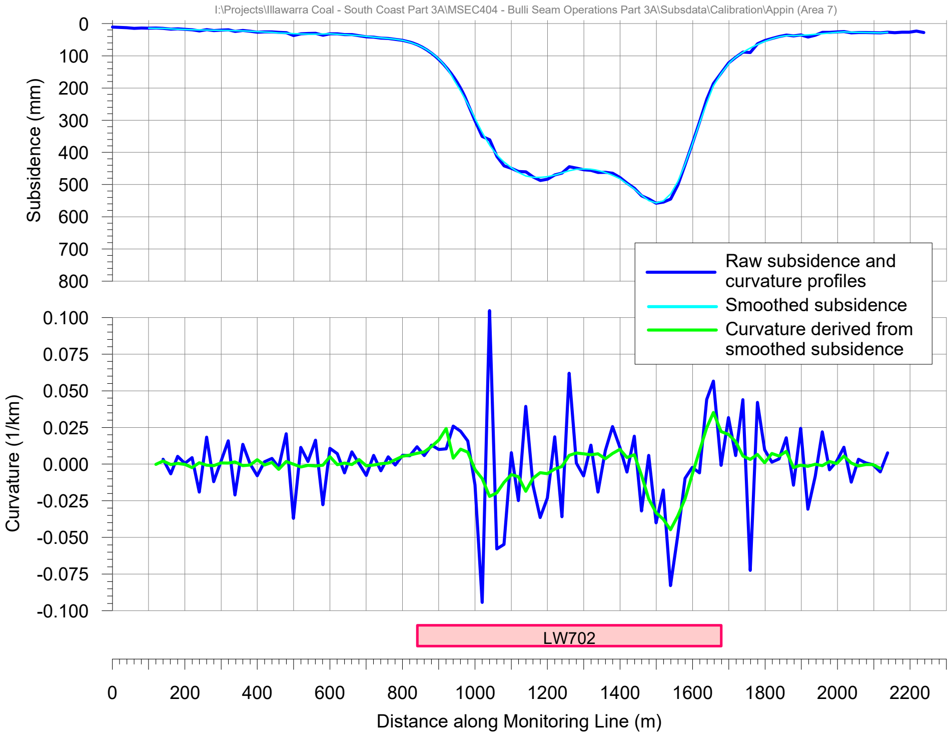


Fig. 3.8 Comparisons of raw observed curvature with curvature derived from smoothed subsidence along the Moreton Park Road line due to Appin Colliery Longwall 702

It can be seen from the above figure, that the smoothed subsidence profile reasonably matches the raw subsidence profile, but the small deviations have been removed. It can also be seen, that the raw observed curvatures are very irregular, due to the small deviations in the raw observed subsidence profile. The curvature derived from the smoothed subsidence profile, however, more clearly shows the locations of overall hogging curvature and overall sagging curvature, rather than the localised curvatures at each mark.

Comparisons between the profiles of observed subsidence, tilt and curvature derived from smoothed subsidence profiles with predicted subsidence, tilt and curvature have been provided along the following monitoring lines at Tahmoor Mine:-

- Fig. G.07 – Brundah Road,
- Fig. G.09 – Remembrance Drive, and
- Fig. G.11 – York Street

The comparisons show that when observed curvature has been derived from smoothed subsidence profiles, a reasonable correlation between predicted and observed profiles can be found. A reasonable correlation has also been found at surrounding collieries in the Southern Coalfield where the depths of cover are similar to those at Tahmoor Mine. Where increased subsidence has been observed at Tahmoor Mine, however, higher than predicted curvatures have been observed, and this is discussed further in Section 3.8.

3.8. Areas where increased subsidence, compared to predictions, have been observed

The extraction of longwalls at Tahmoor Mine has generally resulted in mine subsidence movements that were typical of those observed above other collieries in the Southern Coalfield of NSW at comparable depths of cover.

However, the locations where greater subsidence was observed compared to the predicted values were identified, in Section 3.7, were;

- over Longwalls 24A and the southern parts of Longwalls 25 to 27;
- over the commencing end of Longwall 32; and
- over Longwall 8 and along the 800-Line, and over Longwall 13 and along the 900-Line.

It is not a coincidence that there are many faults and dykes at these locations, that these locations are near the Nepean Fault and these locations are near major river valleys or gorges. The extents of these zones of increased subsidence are discussed in more detail below.

3.8.1. Zone of Increased Subsidence near Nepean Fault and the Bargo River Gorge

During the mining of Longwall 24A at Tahmoor Mine, substantially increased subsidence was observed and further increases in observed subsidence compared to the predicted subsidence was observed in Longwall 25.

These increased levels of subsidence were a very unusual event for the Southern Coalfield and immediate investigations were undertaken to identify why it occurred. The conclusions of these studies were published in 2011 in a paper by W. Gale and I. Sheppard, which advised that the increased levels of subsidence were likely to be associated with the proximity of these areas to the Nepean Fault and the Bargo River Gorge and a recognition of the impact of a weathered zone of joints and bedding planes above the water table, which reduced the spanning capacity of the strata below this highly weathered section. This later recognition was determined after extensive computer modelling of factors that may have caused the increased subsidence.

Further subsidence monitoring has occurred over Longwalls 26 to 32 within and around this zone of increased subsidence since 2011. A summary of the monitoring results over Longwalls 24A to 32 is shown in Table 3.1. It can be noted that the zone of increased subsidence extends over the Longwalls 24A to 27, though the extent of the increase in subsidence has reduced in magnitude as each longwall was extracted as shown in the table below. It can also be noted that the maximum observed subsidence only slightly exceeded the maximum predicted for Longwalls 28 to 31, with the difference being within the accuracy of the subsidence prediction methods. Increased subsidence was measured over the commencing end of Longwall 32.

Table 3.1 Maximum observed and maximum predicted incremental subsidence and the maximum observed and maximum predicted total subsidence within the zones of increased subsidence (Longwall 24A to Longwall 32)

Longwall	Assumed Average Seam Thickness Extracted in Zone (m)	Maximum Observed Incremental Subsidence and Proportion of Seam Thickness (mm)	Maximum Predicted Incremental Subsidence and Proportion of Seam Thickness (mm)	Relative Increase in Incremental Subsidence	Maximum Observed Total Subsidence and Proportion of Seam Thickness (mm)	Maximum Predicted Total Subsidence and Proportion of Seam Thickness (mm)	Relative Increase in Total Subsidence
LW24A	2.20	1169 (53%)	500 (23%)	2.34	1262 (57%)	800 (36%)	1.58
LW25	2.20	1216 (55%)	610 (28%)	2.00	1361 (62%)	900 (41%)	1.51
LW26	2.25	893 (40%)	730 (32%)	1.22	1050 (47%)	900 (40%)	1.17
LW27	2.15	823 (38%)	710 (33%)	1.16	896 (42%)	800 (37%)	1.12
LW28	2.10	755 (36%)	710 (34%)	1.06	827 (39%)	785 (37%)	1.05
LW29	2.10	737 (35%)	700 (33%)	1.05	769 (37%)	725 (35%)	1.06
LW30	2.10	765 (36%)	700 (33%)	1.09	783 (37%)	725 (35%)	1.08
LW31	2.10	776 (37%)	700 (33%)	1.11	811 (39%)	725 (35%)	1.12
LW32	2.10	975 (46%)	700 (33%)	1.39	-	-	-

Maximum total subsidence over Longwall 32 has not been reported in Table 3.1 because the peg above the centreline of Longwall 32 was installed after the completion of Longwall 31 and, therefore, only measured the development of incremental subsidence during the mining of Longwall 32.

Further details of the observed zones of increased and normal subsidence over Longwalls 24A to 27 are shown in longitudinal cross sections along Longwalls 24A to Longwall 32 as Fig. 3.9 to Fig. 3.17 and a discussion on these details is presented below.

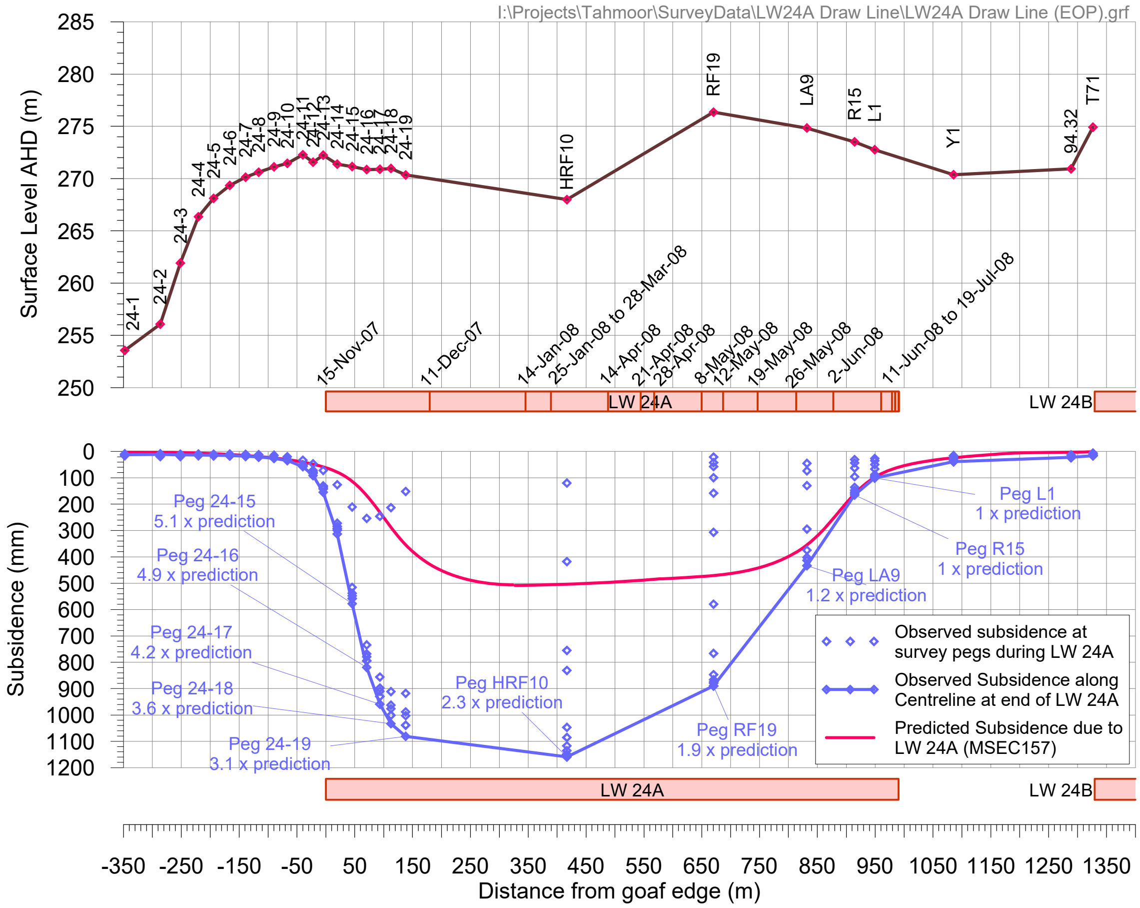


Fig. 3.9 Observed incremental subsidence along centreline of Longwall 24A

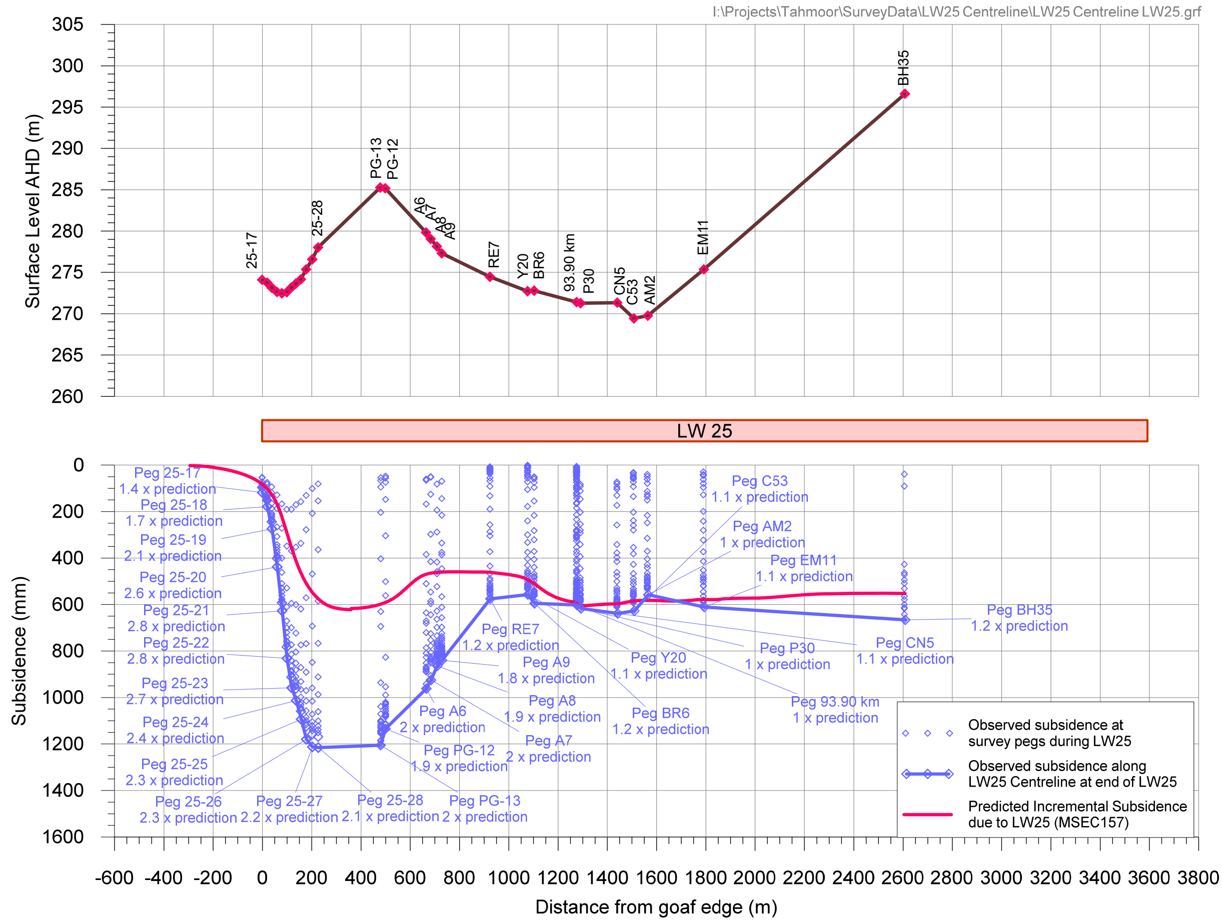


Fig. 3.10 Observed incremental subsidence along centreline of Longwall 25

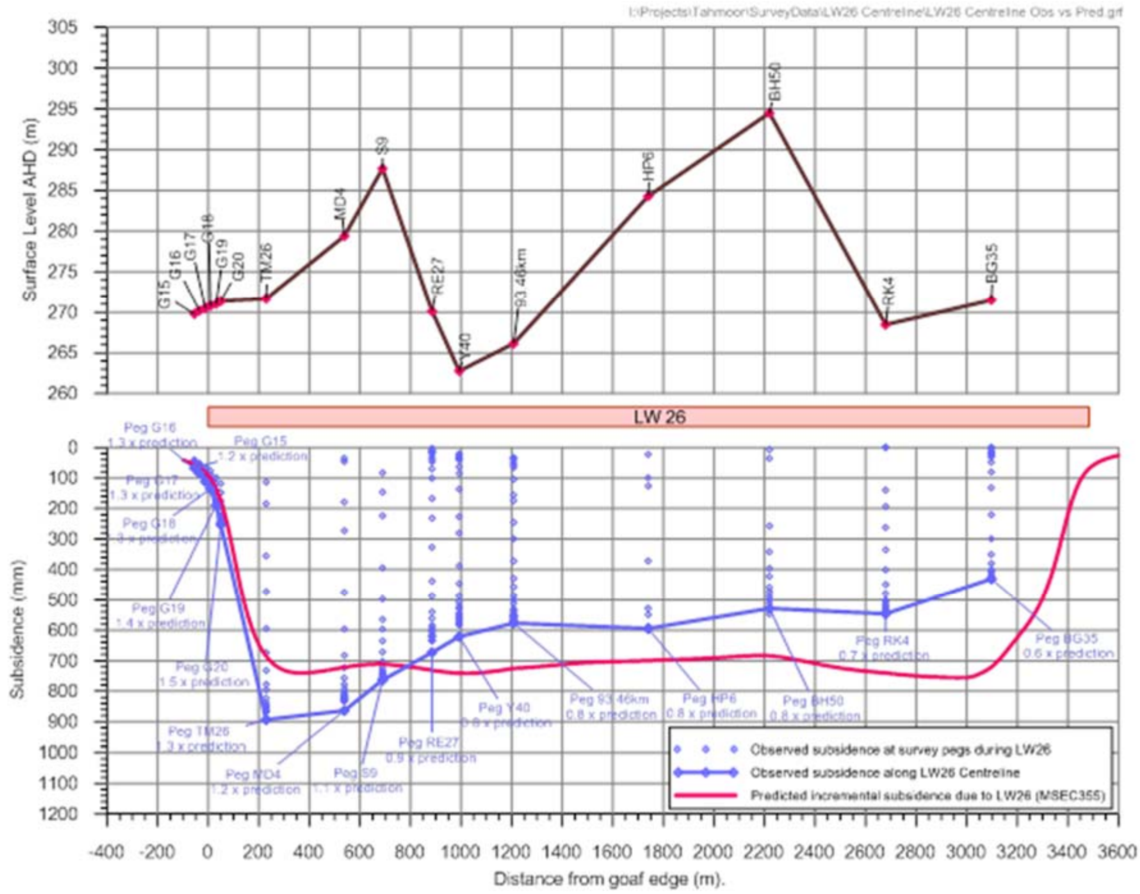


Fig. 3.11 Observed incremental subsidence along centreline of Longwall 26

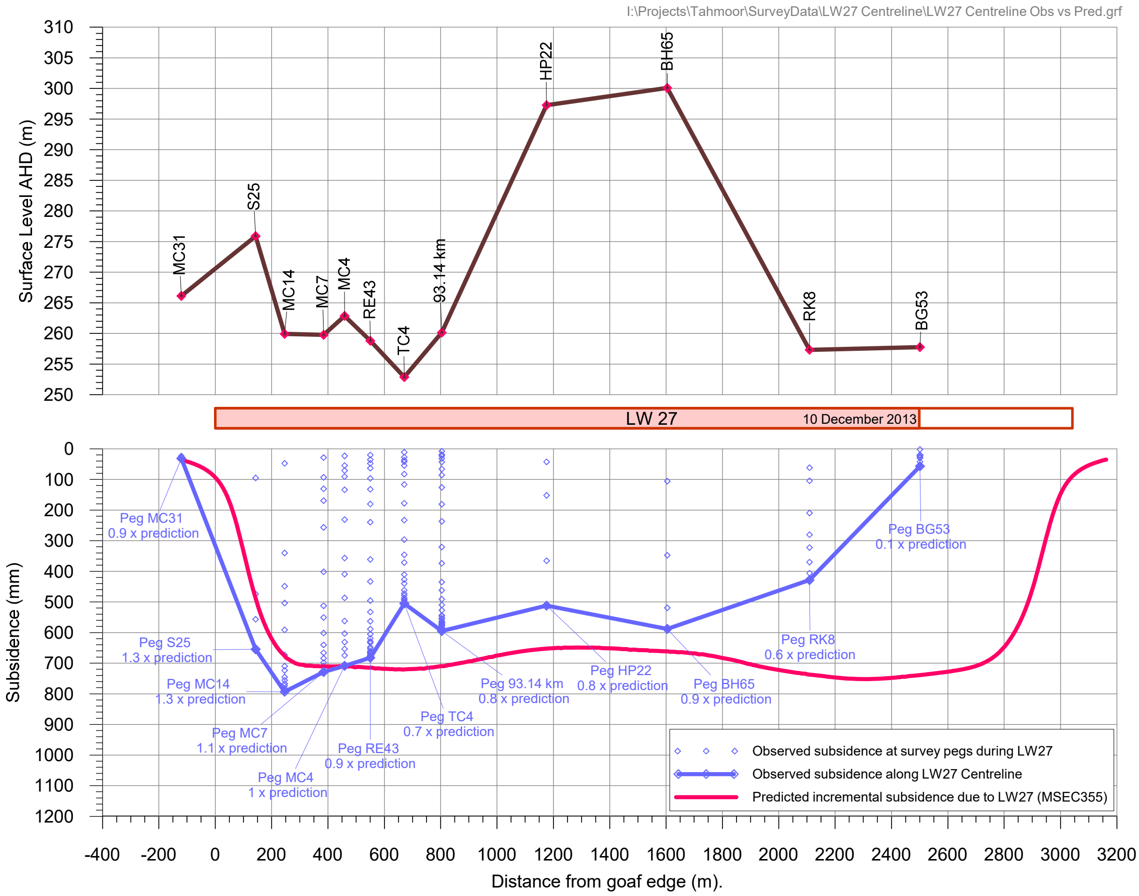


Fig. 3.12 Observed incremental subsidence along centreline of Longwall 27

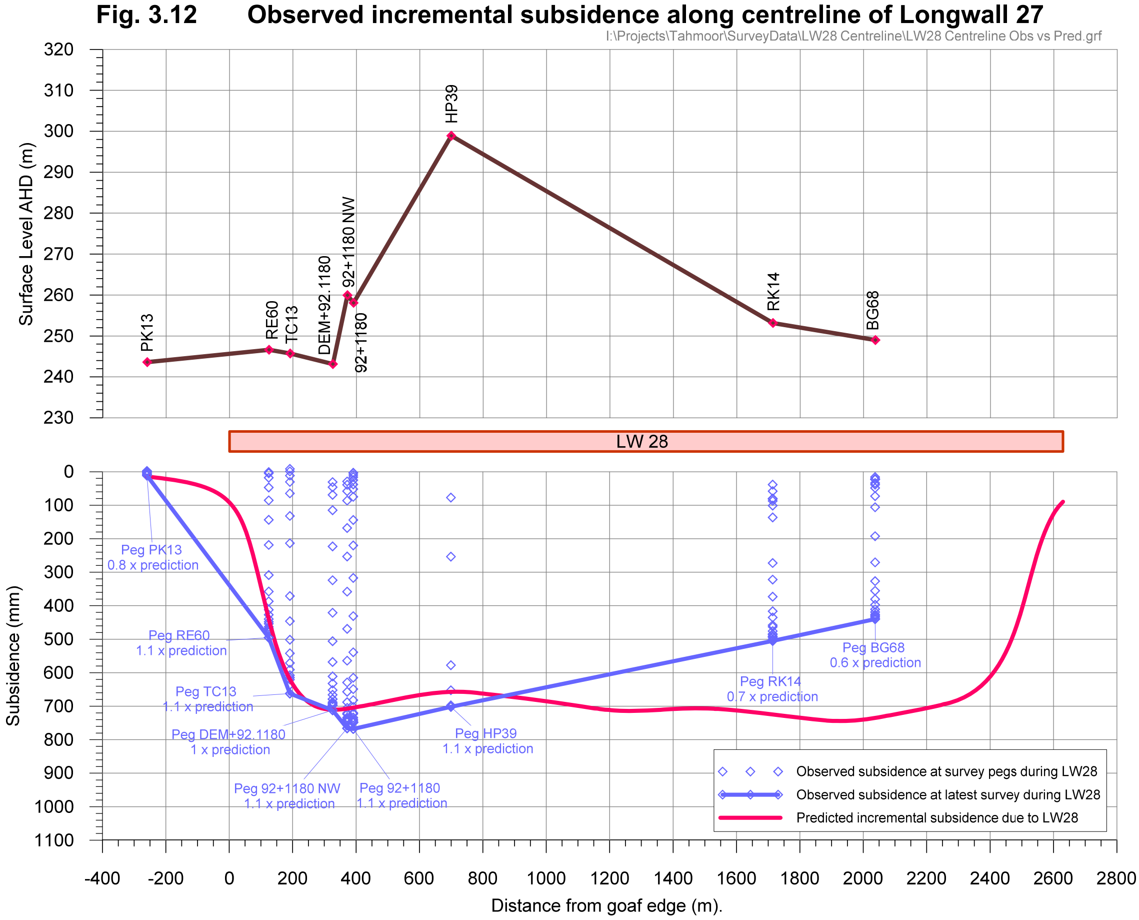


Fig. 3.13 Observed incremental subsidence along centreline of Longwall 28

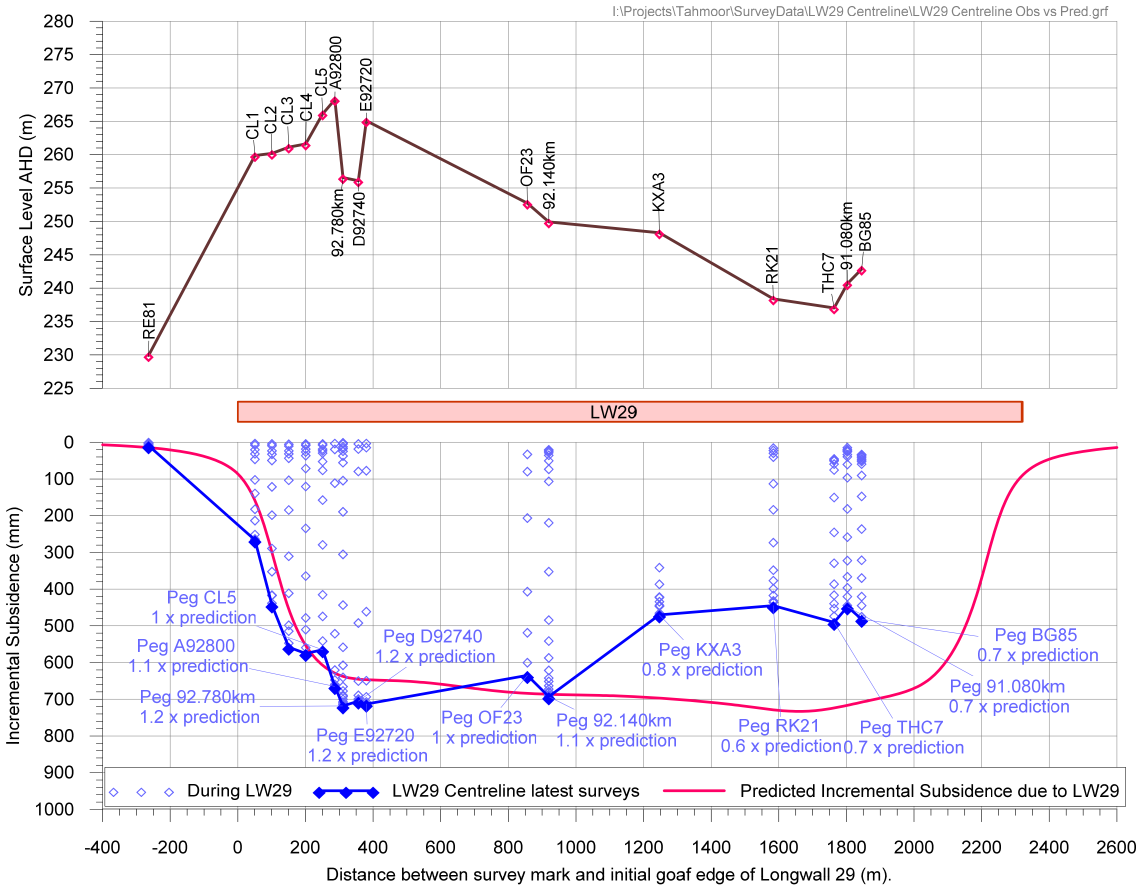


Fig. 3.14 Observed incremental subsidence along centreline of Longwall 29

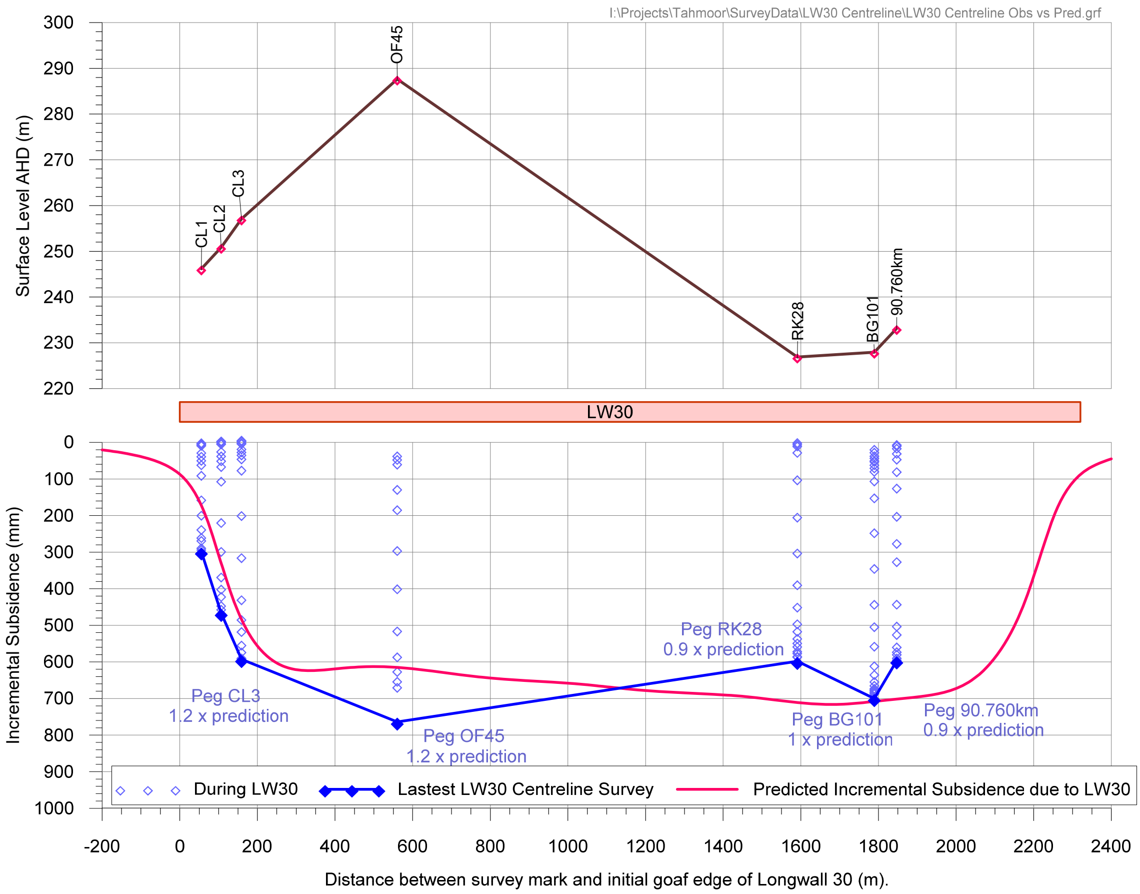


Fig. 3.15 Observed incremental subsidence along centreline of Longwall 30

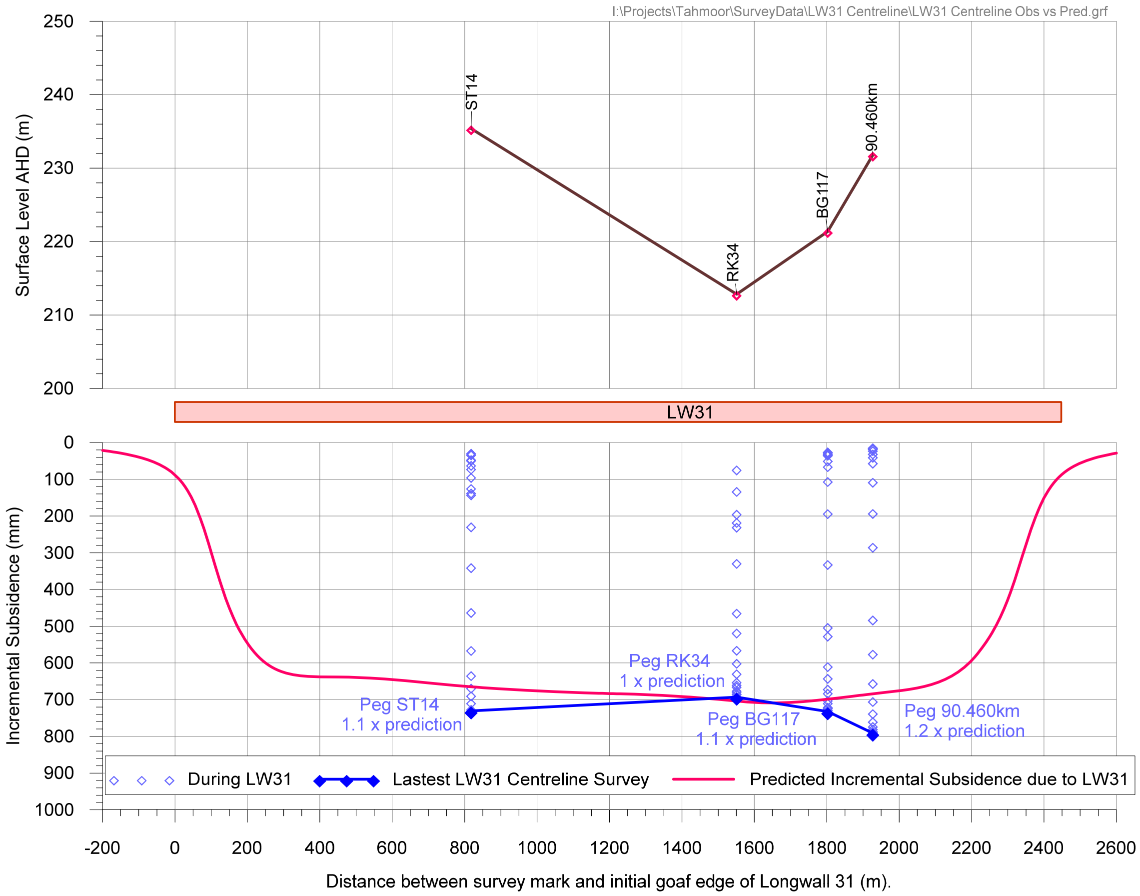


Fig. 3.16 Observed incremental subsidence along centreline of Longwall 31

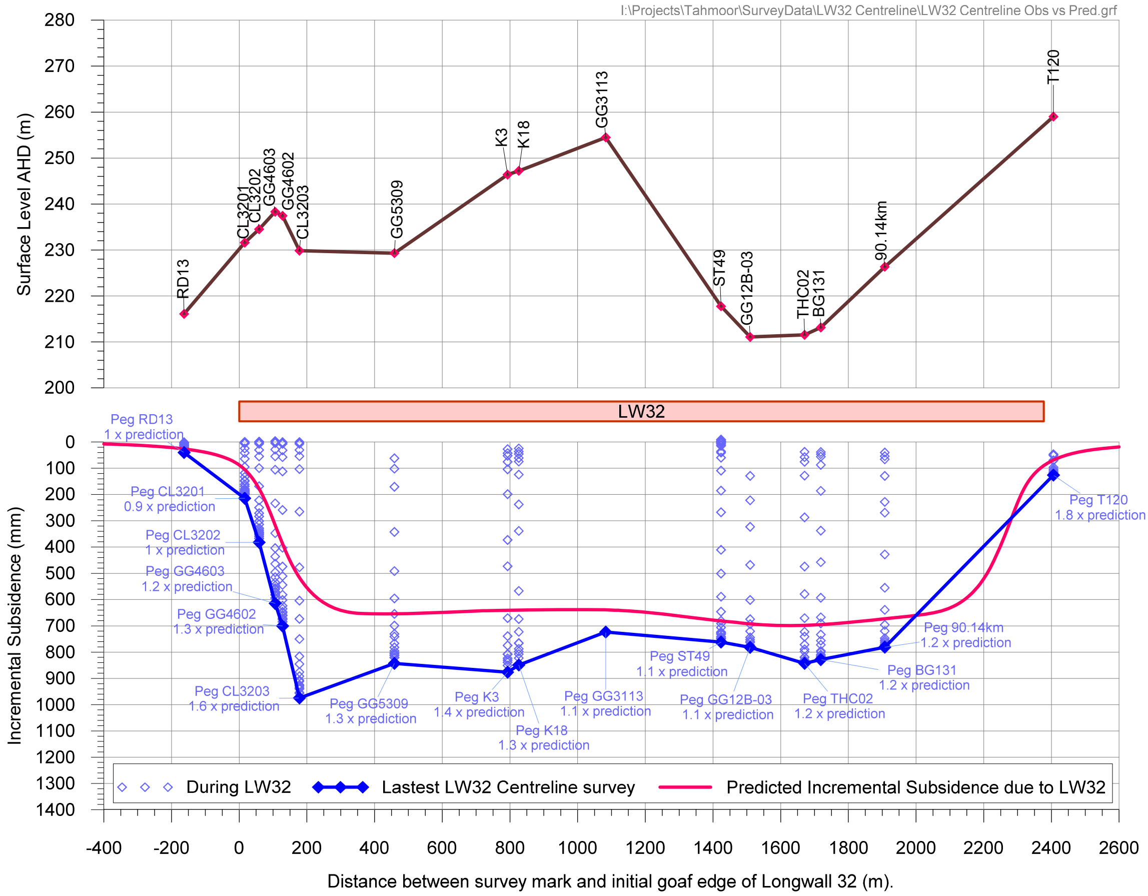


Fig. 3.17 Observed incremental subsidence along centreline of Longwall 32

Observed increased subsidence during the mining of Longwall 24A

- Fig. 3.9 shows the surface levels, the locations of various survey pegs along the centre of Longwall 24A and the observed incremental subsidence profiles at these survey pegs. It can be seen that the area of greatest increase in observed subsidence was in an area above the southern half of Longwall 24A that is closer to the Bargo River Gorge, closer to the Nepean Fault Zone and within 100 metres of a smaller fault zone that, like several other parallel faults, runs off the Nepean Fault in an en echelon style and within 140 metres of previous total extraction workings in the 204 panel. The extent of the increased subsidence then gradually reduced in magnitude towards the northern half of the longwall, which was directly beneath the urban area of Tahmoor.
- It can be seen from Fig. 3.9 that the observed subsidence was similar to the predicted levels near Peg R15 on Remembrance Drive. Survey pegs RF19 and LA9 were located within a transition zone where subsidence gradually reduced from areas of maximum increased subsidence to areas of normal subsidence.

Observed increased subsidence during the mining of Longwall 25

- Fig. 3.10 shows the observed incremental subsidence at survey pegs located along the centreline of Longwall 25. It can be seen that the greatest increase in observed subsidence was in an area above the southern half of Longwall 25 that is closer to the Bargo River Gorge and closer to the Nepean Fault Zone.
- The observed incremental subsidence is similar to but only slightly more than was predicted at Peg RE7 and is similar to the prediction at Peg Y20 and at all pegs located further along the panel. Survey pegs A6, A7, A8 and A9 are located within a transition zone where subsidence has gradually reduced from areas of maximum increased subsidence to areas of normal subsidence.

Observed increased subsidence during the mining of Longwall 26

- Fig. 3.11 shows the observed incremental subsidence at survey pegs located along the centreline of Longwall 26. Increased incremental subsidence was observed during the first stages of mining Longwall 26, but at a reduced magnitude compared to the incremental subsidence observed above Longwalls 24A and 25.
- Observed subsidence reduced along the panel until Peg Y40 on York Street, where it was less than prediction. Survey pegs S9 and RE27 are located within a transition zone where subsidence has gradually reduced from areas of maximum increased subsidence between Pegs TM26 and MD4 to areas of normal subsidence at Peg Y40 and beyond.

Observed increased subsidence during the mining of Longwall 27

- Fig. 3.12 shows the observed incremental subsidence at survey pegs located along the centreline of Longwall 27. Increased incremental subsidence was observed during the first stages of mining Longwall 26, but at a reduced magnitude compared to the incremental subsidence observed above Longwalls 24A, 25 and 26.
- As shown in Fig. 3.12 the observed subsidence reduced along the panel until Peg 93.140 km on the Main Southern Railway. Survey pegs MC4, MC7, RE43 and TC4 are located within a transition zone where subsidence has gradually reduced from areas of maximum increased subsidence between Pegs MC14 and 93.140 km to areas of normal subsidence along the Railway and beyond.

Observed subsidence during the mining of Longwall 28

- Fig. 3.13 shows the observed incremental subsidence at survey pegs located along the centreline of Longwall 28. It can be seen that observed subsidence has returned to normal levels, and within 6% of subsidence predictions.
- As shown in Fig. 3.13, there is a reasonable correlation between the observed and predicted subsidence profile along the centreline of Longwall 28.

Observed Subsidence during the mining of Longwalls 29 to 31

- Tahmoor Mine has completed extraction of Longwalls 29 to 31.
- The experiences observed during this period of time have found that maximum subsidence has continued at a similar level as observed during the mining of Longwall 28.

Observed Subsidence during the mining of Longwall 32

- Fig. 3.17 shows the observed incremental subsidence at survey pegs located along the centreline of Longwall 32. Increased incremental subsidence was observed above the commencing end of the panel and then reduced slightly towards the finishing end. Subsidence along the centreline is at the higher end of the previously observed range.

3.8.2. Analysis and commentary on the zone of increased subsidence over Longwalls 24A to 27

The cause for the increased subsidence was investigated during the extraction of Longwall 25 by Strata Control Technology (SCT) on behalf of Tahmoor Mine, as discussed in the previously referenced paper by Gale and Sheppard (2011).

These investigations concluded that the areas of increased subsidence were consistent with localised weathering of joint and bedding planes above a depressed water table adjacent to an incised gorge. This conclusion was further confirmed in further recent report by Gale W. of SCT (2013a), who confirms that:

> "*Longwall panels 24A and 25 both show increased maximum subsidence to approximately 1.0-1.2m, where predicted subsidence was in the order of 0.5 - 0.8m. In the study by Gale and Sheppard, (2011), it became apparent that the increased subsidence is likely to be due to reduction in joint friction and stiffness due to the weathering process in the strata above the water table where the water table is considerably lower due to the Bargo Gorge. The intact rock properties were not changed, only the properties of the joints were altered.*"

There have been many locations where monitoring near faults has revealed little increase of observed subsidence and there are many locations where monitoring near deep gorges and valleys has revealed little increases in observed subsidence. In summary, it appears that the location of the zones of increased subsidence is linked to both the;

- close proximity and the alignment of the Nepean Fault, which is within 1,000 metres of these zones, and,
- close proximity to the Bargo River Gorge, which is approximately 100 metres deep, within 700 metres of these zones. The presence of the Bargo River Gorge has permitted groundwater flows to weather the joint and bedding plane properties of the surrounding strata.

In light of the above conclusions and observations, three areas or zones have been identified from the observed subsidence monitoring above the extracted Longwalls 24A to 27 at Tahmoor Mine:

- Maximum increased subsidence zone – where the observed vertical subsidence is substantially greater than the predicted subsidence.
- Transition zone – where the subsidence behaviour appears to be transitioned between areas of maximum increased subsidence and normal subsidence.
- Normal subsidence zone – where the observed vertical subsidence is within the normal range and correlates well with predictions.

The locations of the three zones were plotted on a plan using the surveyed pegs that were identified along the centrelines above Longwalls 24A to 32 as a guide. This plan, Fig. 3.18, shows that the transition zone is roughly consistent in width above Longwall 24A, Longwall 25 and Longwall 26 and possibly slightly narrower above Longwall 27. The orientation of the transition zone is also roughly parallel to the Nepean Fault and the magnitude of the increased subsidence above Longwalls 26 and 27 is reduced compared to Longwalls 24A and 25. There was little to no increased subsidence identified above Longwalls 28 to 31.

It can be seen in Fig. 3.18, shows that as the alignment of the Nepean Fault moved further away from the Bargo River gorge and above Longwalls 26 and 27, the magnitude of increased subsidence reduced, indicating that the cause of the movements is clearly linked to the proximity of the Bargo River. This observation confirms the findings of Gale and Sheppard (2011) that the increased subsidence is linked to localised weathering of joint and bedding planes above a depressed water table adjacent to the incised gorge of the Bargo River and the presence of the major fault.

The interpolated location of the Nepean Fault within the Tahmoor North lease has recently been updated for Tahmoor Mine by SCT (2018). The revised mapping describes the Nepean Fault as comprising a series of en echelon faults, rather than one continuous geological structure.

The change in understanding of the Nepean Fault is significant because the finding could provide an alternative explanation for the observed return to normal subsidence above Longwalls 28 to 30, as the fault echelon structure that is linked to increased subsidence above Longwalls 24A to 27 terminated beyond Longwall 29.

Prior to the mining of Longwall 32, it was therefore considered possible that subsidence might return to higher than normal levels during the mining of Longwall 32, as it would mine adjacent to another fault echelon structure. It was noted, however, the observations above previously extracted Longwalls 30 and 31 indicated that subsidence has been developing close to normal levels. Recently received monitoring results during the mining of Longwall 32 show that increased subsidence has developed above the commencing end of Longwall 32 at levels similar to those observed above Longwall 26. The magnitude of subsidence reduces along the panel as the longwall face progressed to the north, as shown in Fig. 3.17 though subsidence was generally at the higher end of the previously observed range.

The observation above the commencing end of Longwall 32 has shown that increased subsidence has developed where mining has occurred close to the mapped first order fault echelon structures. In this case, Peg CL3203 is located approximately 700 metres to the west of the mapped first order fault and the commencing end of the panel is located at the head of a fault ramp, in between two fault echelons. As observed during the mining of Longwalls 24A to 26, the magnitude of subsidence was reduced over the unmined, solid coal side of Longwall 32. Many survey pegs were installed across the mapped first order fault structure and associated second order geological structures to the side of Longwall 32. No increased differential subsidence movements were observed to the side of Longwall 32. More information is provided in Section 3.9.1.

It should be noted that the potential impacts of increased subsidence on the structures and infrastructure within the overlying urban areas of Tahmoor township were successfully managed by Tahmoor Coal through the implementation of effective subsidence management plans.

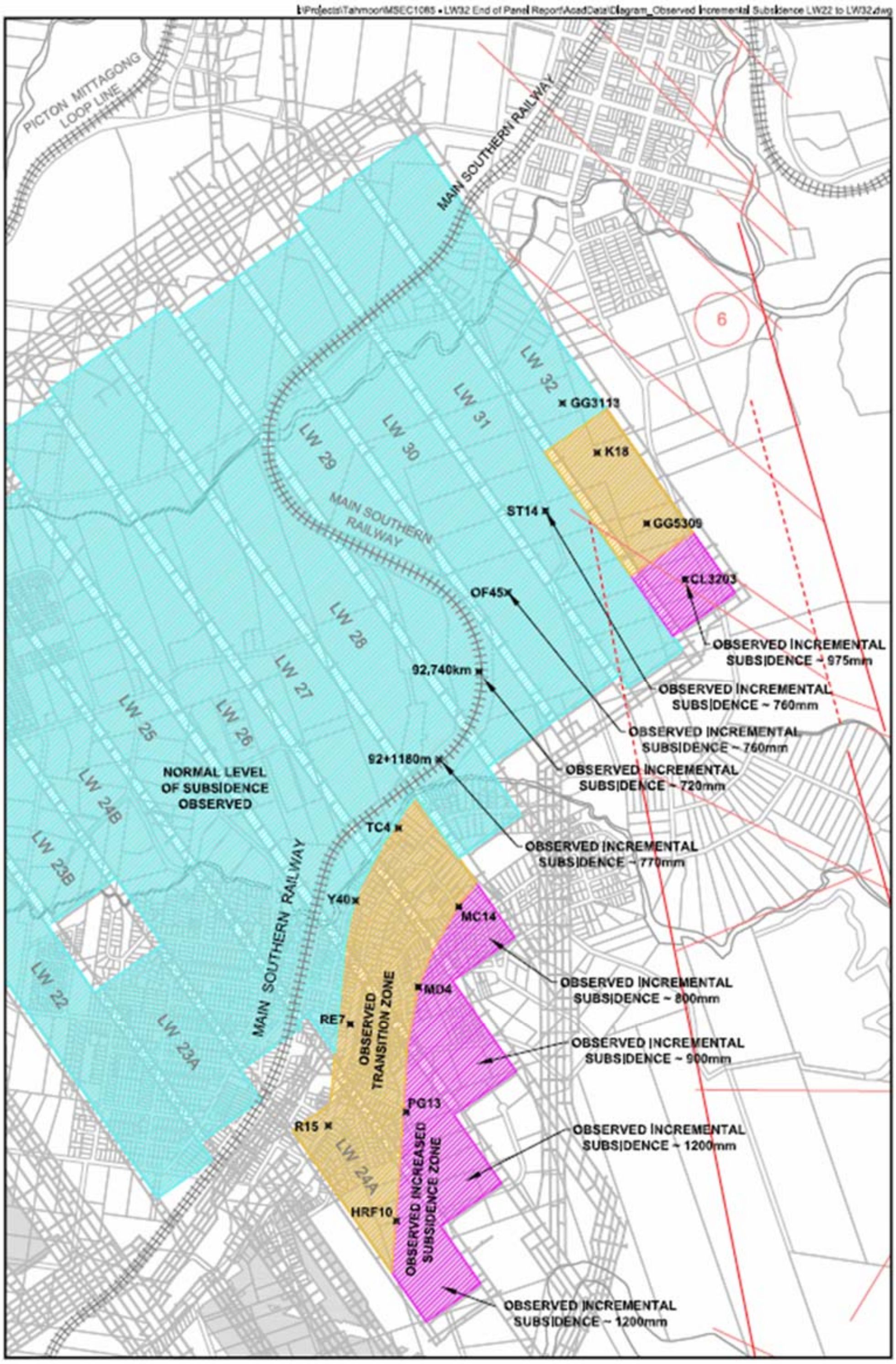


Fig. 3.18 Zones of increased subsidence over Longwalls 22 to 32

3.9. Potential effects of faults on subsidence profiles and subsidence development

The presence or absence of significant massive and competent strata units, variations of in situ horizontal compressive stresses and/or the presence of faults, or, dykes within the overburden above an extracted panel can all result in varying mining conditions and can cause variations in the observed surface subsidence profiles and variations in the rate of subsidence development.

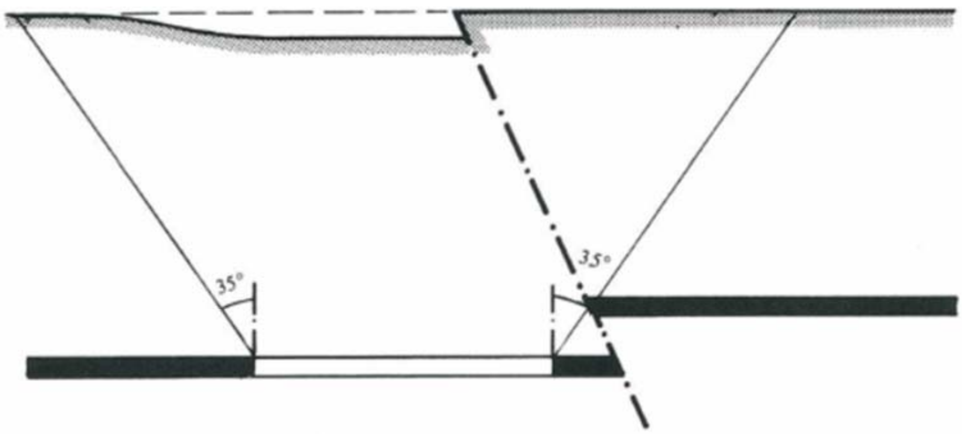
MSEC has undertaken a literature review of published information on the influence of faults on observed subsidence profiles in Australia and overseas and there is a significant body of published papers showing that changes in overburden geology does change the observed profiles of mine subsidence over and near mined panels.

Most mining companies prefer not to mine through significant faults, but, they often mine through small faults. In most cases, the observed subsidence profiles are not significantly altered either at or near the fault location with the observed levels of subsidence not varying much from the levels that were expected. However, changes have occurred in many other cases, for example, in relation to small faults that have been identified in railway cuttings during recent longwall mining at both Tahmoor and Appin Collieries, (Kay, et al., 2017). Whilst differential movements were observed where faults intersected the surface, they have developed gradually over time, with greatest rates of change occurring after they were directly mined beneath.

Lee, A. J. (1966) "*The effect of faulting on mining subsidence*". The Mining Engineer, 71, reported on a study of the effects of faulting on mining subsidence in the UK and Europe. He provided 29 cases of mining induced steps in the subsidence profiles at fault locations with throws of 5 metres to 700 metres. The observed steps ranged in throws 5 cm to 45 cm. The largest steps occurred over mined panels where the observed subsidence at the step was greatest, i.e. over 140 cm. The smallest steps occurred where the observed subsidence was the least.

The study shows that the faults steps could be identified in the early monitoring movements at the position of the fault indicating if good monitoring programmes were set up then there was sufficient time to respond to, mitigate and manage the extra subsidence and horizontal movements. Particular comments of Lee (1966) on the study of the effect of faulting on subsidence were that; most of the steps in the subsidence curve occurred when coal extraction was complete under the fault plane; most of the steps occurred when the fault was located over the panel at about around 0.2 times the depth of cover over the extracted area; the steps decreased rapidly in magnitude at the edges of the mine workings; the most significant steps were observed when coal was extracted underneath the hade of the fault, as shown in the generalised sketches below.

Whittaker & Reddish, (1989), in their text book titled, *"Subsidence - Occurrence, Prediction and Control*", Chapter 14 on "Influence of geological factors on the character of mining subsidence", advised the proximity of the longwall panel to the fault, especially when the panel was extracted under the fault plane, and the fault hade are important factors as shown the three following sketches. Additionally, Whittaker & Reddish advise that the frictional properties of the fault plane and the nature of the loss of constraint of the strata associated with the fault are equally important factors.

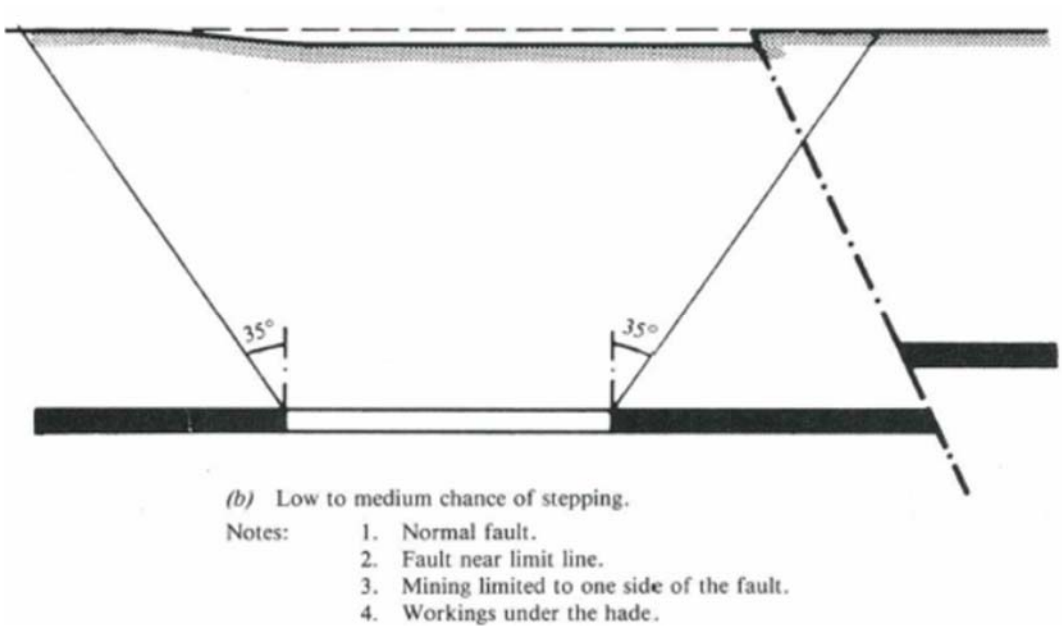


(a) High chance of stepping.

Notes:
1. Normal fault (low friction).
2. Fault close to ribside.
3. Mining limited to one side of the fault.
4. Workings under the hade.

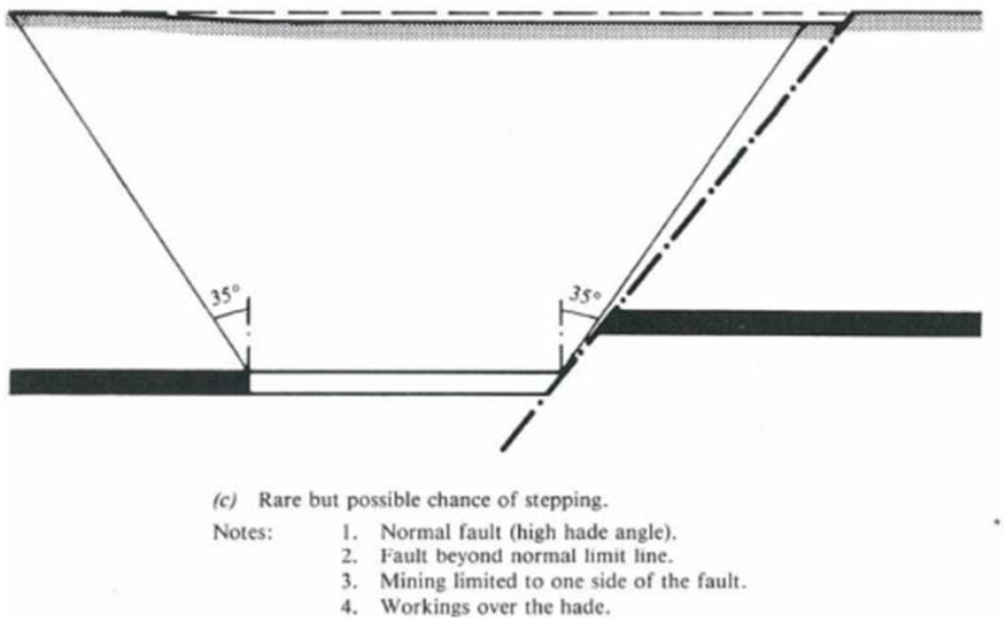
Whittaker & Reddish Figure 192a

Fig. 3.19 Mining and fault situations influencing occurrence of step in subsidence profile



Whittaker & Reddish Figure 192a

Fig. 3.20 Mining and fault situations influencing occurrence of step in subsidence profile.

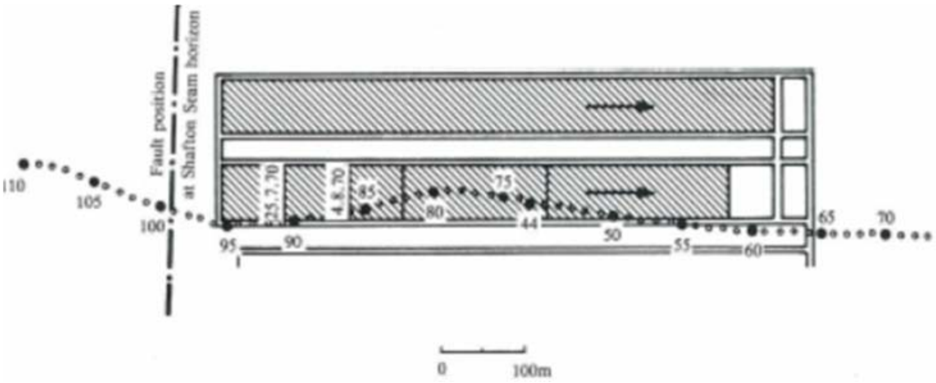


Whittaker & Reddish Figure 192a

Fig. 3.21 Mining and fault situations influencing occurrence of step in subsidence profile.

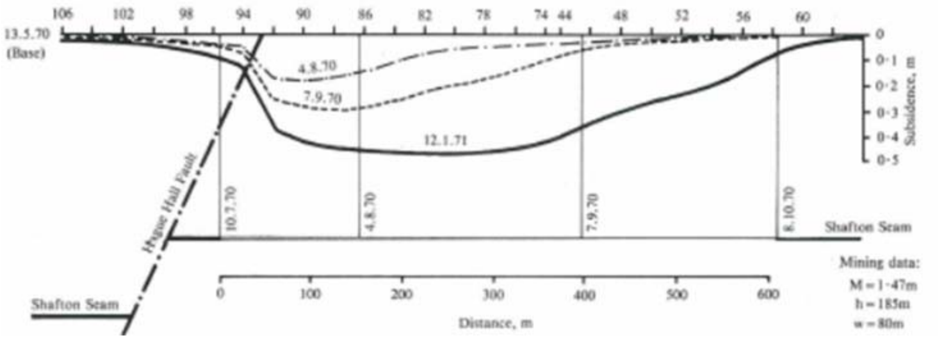
A further example of the effect of a fault on the shape of a subsidence development curve is also shown in the figures below that are also copied from Whittaker and Reddish, (1989). In this case study subsidence was observed at the Riddings Drift Mine in the Yorkshire Coalfield, UK where the Shafton Seam was being worked at a depth of 185m below surface. The positions of the subsidence observation stations relative to the longwall face are shown in Whittaker and Reddish's Figure 188 (a). The base of the fault was positioned outside the mined panel, but, the surface expression of the fault was positioned over the mined panel.

The subsidence development curves clearly show the nature of the irregularity within the profile in the proximity of where the fault intercepts the surface. The position around the fault indicates that it was sensitive to earlier detection of subsidence effects than at other positions along the observation line. High localised strains occur in the proximity of the fault at the surface.



Whittaker & Reddish Figure 188 (a)

Fig. 3.22 Location of subsidence observation stations relative to longwall face position.



Whittaker & Reddish Figure 188 (a)

Fig. 3.23 Subsidence development curves.

Tahmoor Coal has extracted coal from many areas of the Tahmoor Mine close to major faults and has mined through many minor faults. Prior to the extraction of Longwall 32 close to the Nepean Fault, Tahmoor Coal commissioned an engineering geologist from SCT (2018a) to undertake detailed site inspections and mapping of the Nepean Fault.

An important outcome of the exercise is that the Nepean Fault is no longer mapped as a continuous structure but is now mapped as "*an en-echelon distribution of first order faults with major offsets. Ramps are developed between these en-echelon fault surfaces. Numerous first order north-south faults, each of limited extent, step across the area investigated.*" (SCT, 2018a).

SCT (2018a) further advise that the fault, near Longwall 32, is sub-vertical from surface to seam, based on site investigations and geological information gathered by Tahmoor Coal since 2014. In addition to the mapped first order faults, SCT has mapped second order faults, which are described as "*mainly conjugate sets of strike slip faults and splay faults being observed between the en-echelon first order faults*." Fig. 3.24 shows the near vertical alignment of the Nepean Fault near LW32.

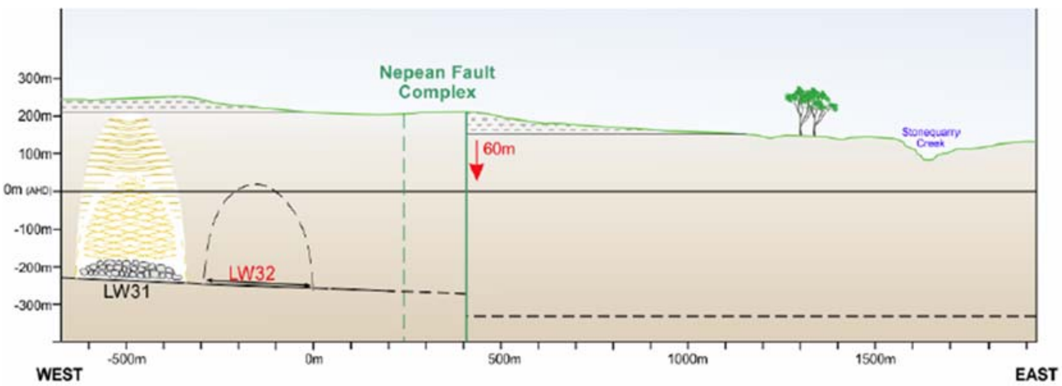


Fig. 3.24 Cross-section of Nepean Fault near Longwall 32 by SCT (2018a)

3.9.1. Experience of subsidence movements at Tahmoor Mine between previously extracted longwalls and Nepean Fault

Tahmoor Coal has surveyed subsidence along many streets during the mining of previous Longwalls 24A to 32. Some of these monitoring lines are located over solid, unmined coal, between the extracted longwalls and the Nepean Fault.

Prior to the mining of Longwall 32, none of the survey lines crossed first order faults, though two survey lines (Stilton Dam Line and Remembrance Drive East Line) cross mapped second order conjugate faults. Many survey lines were installed across the mapped first order faults to the side of Longwall 32.

A study has been completed to ascertain whether irregular subsidence has occurred along the survey lines. The locations of the survey lines relative to the Nepean Fault and associated geological structures are shown in Fig. 3.25.

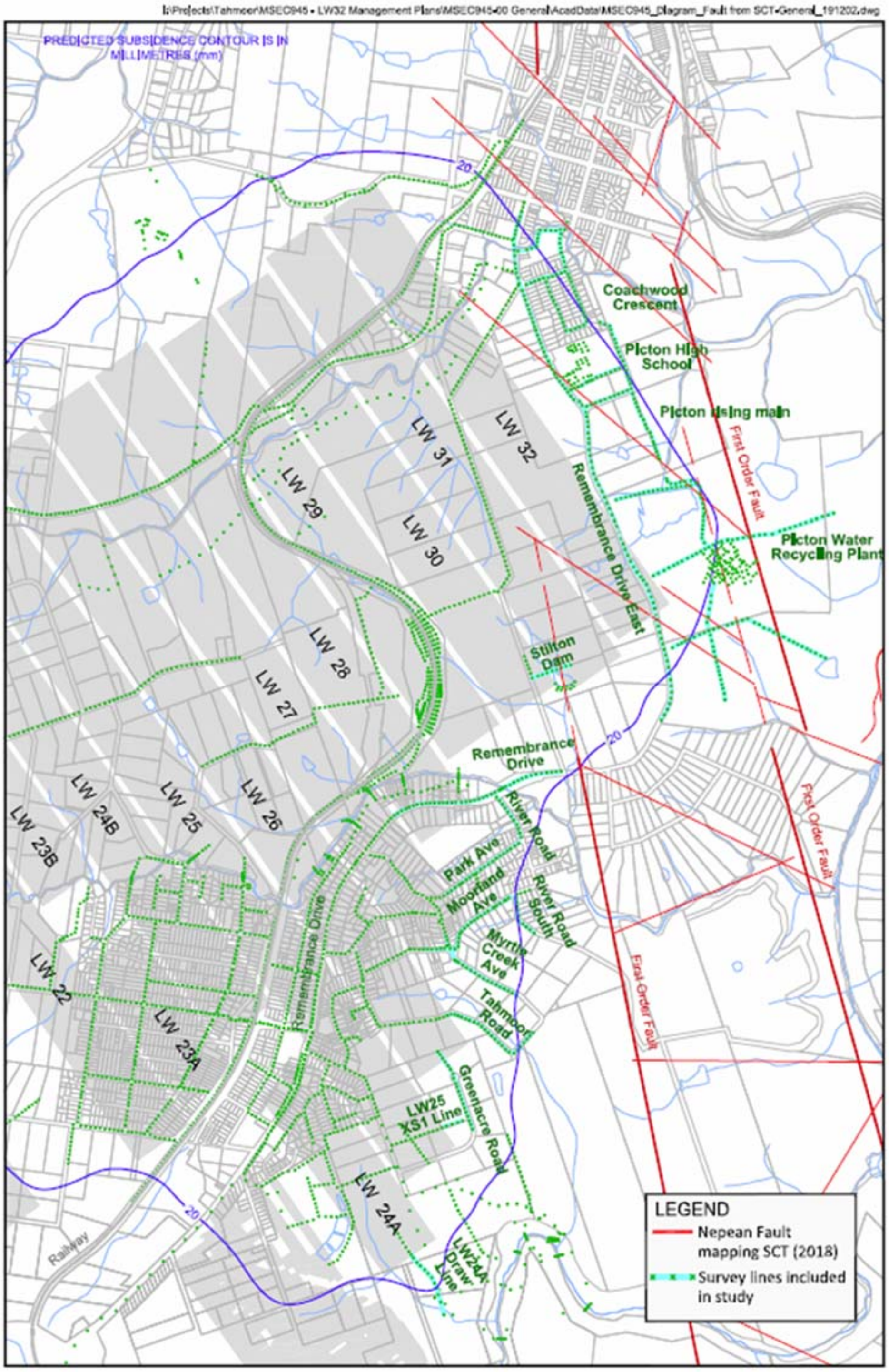


Fig. 3.25 Locations of Tahmoor subsidence monitoring lines in relation to streams and the geological structures that were mapped by SCT (2018a), (MSEC)

This study found no increased subsidence, tilt or strains were measured along the survey lines that were located over unmined, solid coal areas between the extracted longwalls and the Nepean Fault. This includes observations along the survey lines that cross the first order Nepean Fault to the side of Longwall 32.

The locations of residential structures that reported impacts after the mining of Longwall 31 is shown in Fig. 3.26, overlaid with the mapped locations of the Nepean Fault by SCT (2018a). It can be seen that very few reported impacts have occurred beyond the extracted longwall panel edges, even though there were many structures located between the extracted longwalls and the Nepean Fault.

It is too early to confirm that no impacts have occurred to residential structures between Longwall 32 and the first order fault. It can be confirmed, however, that no impacts were observed to pipelines and built structures that are located between Longwall 32 and the first order fault at the Picton Water Recycling Plant, commercial and industrial properties along Wonga Road, or at existing buildings within the Picton High School (major redevelopment currently underway).

Prior to the extraction of Longwall 32, SCT (2018b) also advised that "*unconventional subsidence unrelated to the Nepean Fault may occur within the subject area during mining of LW32. Unconventional subsidence movements are observed at Tahmoor from time to time and therefore, may occur within the subject area*." MSEC concurs with this view, noting that the observed frequency of impacts beyond the edges of the longwalls have been infrequent and have been relatively slight in nature. Observations during the mining of Longwall 32 did not identify unconventional subsidence beyond the side of Longwall 32. As also advised in the report by SCT (2018b), "*unconventional subsidence movements observed at Tahmoor previously have been identified early and successfully managed with the existing subsidence management plans. This approach is expected to be effective in the subject area as well*."

Whilst the potential for significant differential movements is considered high at sites that are located directly over geological structures, significant differential movements could also occur beyond the mining footprint at sites located near major fault lines, including locations where second order geological structures associated with the Nepean Fault or the Central Fault have been identified. Even though no impacts have been observed beyond the mining footprint of Longwalls 31 and 32 above the first and second order Nepean Fault structures at Tahmoor Mine, differential movements were observed where other geological structures intersected the surface.

One example occurred at a low angle fault that intersected the Main Southern Railway in a railway cutting at Tahmoor, which was located directly above Longwall 29. The site was monitored extensively during the mining of Longwalls 28 to 31. This included three monitoring lines along the railway cutting, and survey prisms along the railway track.

The results of observed changes in vertical alignment of the pegs along the railway cutting are shown in Fig. 3.27. It can be seen that the most significant changes occurred during the mining of Longwall 29.

The changes, however, developed gradually over time, allowing sufficient time for the railway track to be adjusted such that trains could continue to travel through the site.

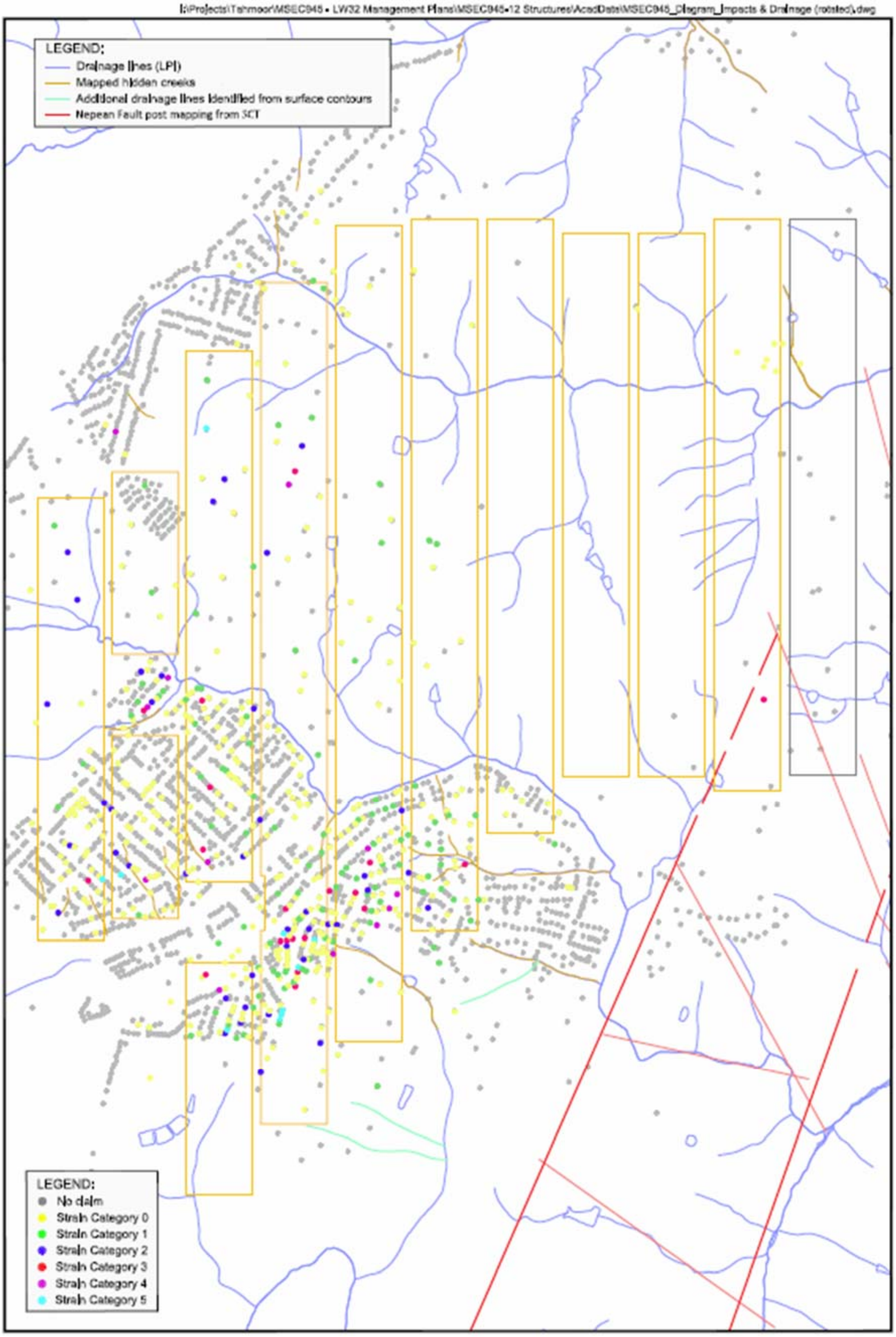


Fig. 3.26 Observed impacts to structures at Tahmoor Longwalls 18 to 31, overlaid with mapped geological structures by SCT (2018a) and creeks (MSEC)

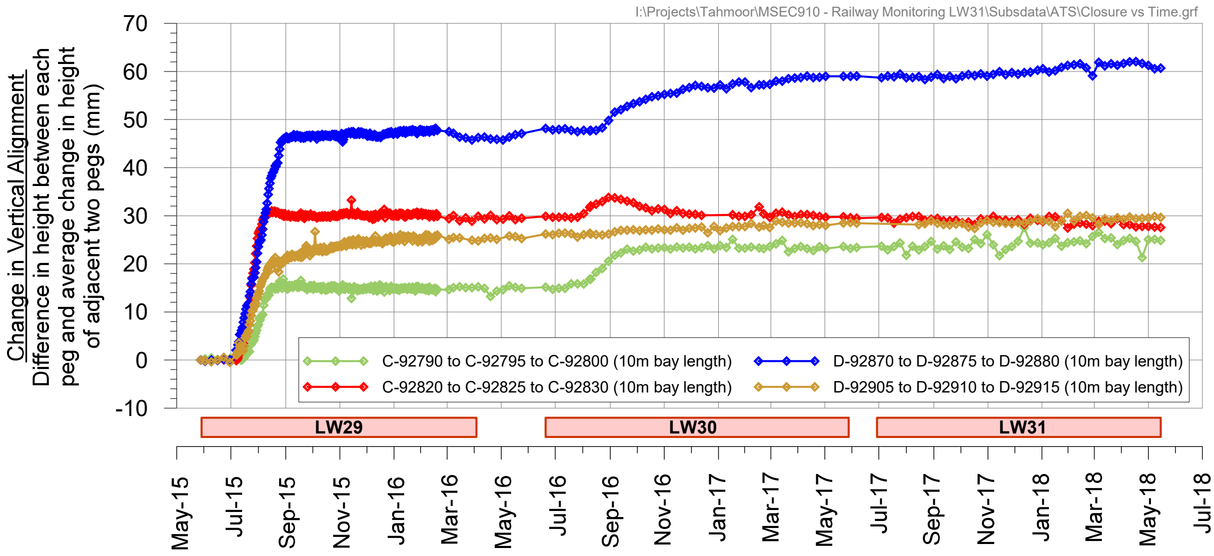


Fig. 3.27 **Changes in vertical alignment across a geological fault within a railway cutting during the mining of Longwalls 29 to 31 at Tahmoor Mine**

The observations of the gradual development of differential movements have been consistently observed during the mining of previous longwalls at Tahmoor Mine. While some sites have experienced severe impacts, the subsidence movements developed gradually, allowing time to repair before they became unsafe.

3.10. Comparisons with observed upsidence and closure across Myrtle Creek and Skew Culvert at Tahmoor Mine Longwalls 22 to 27

Monitoring of subsidence movements across Myrtle Creek at Tahmoor provides a good reference point for the Tahmoor South project. A map of monitoring lines across Myrtle Creek and a small creek that crosses the Main Southern Railway (called the Skew Culvert) is shown in Fig. 3.28.

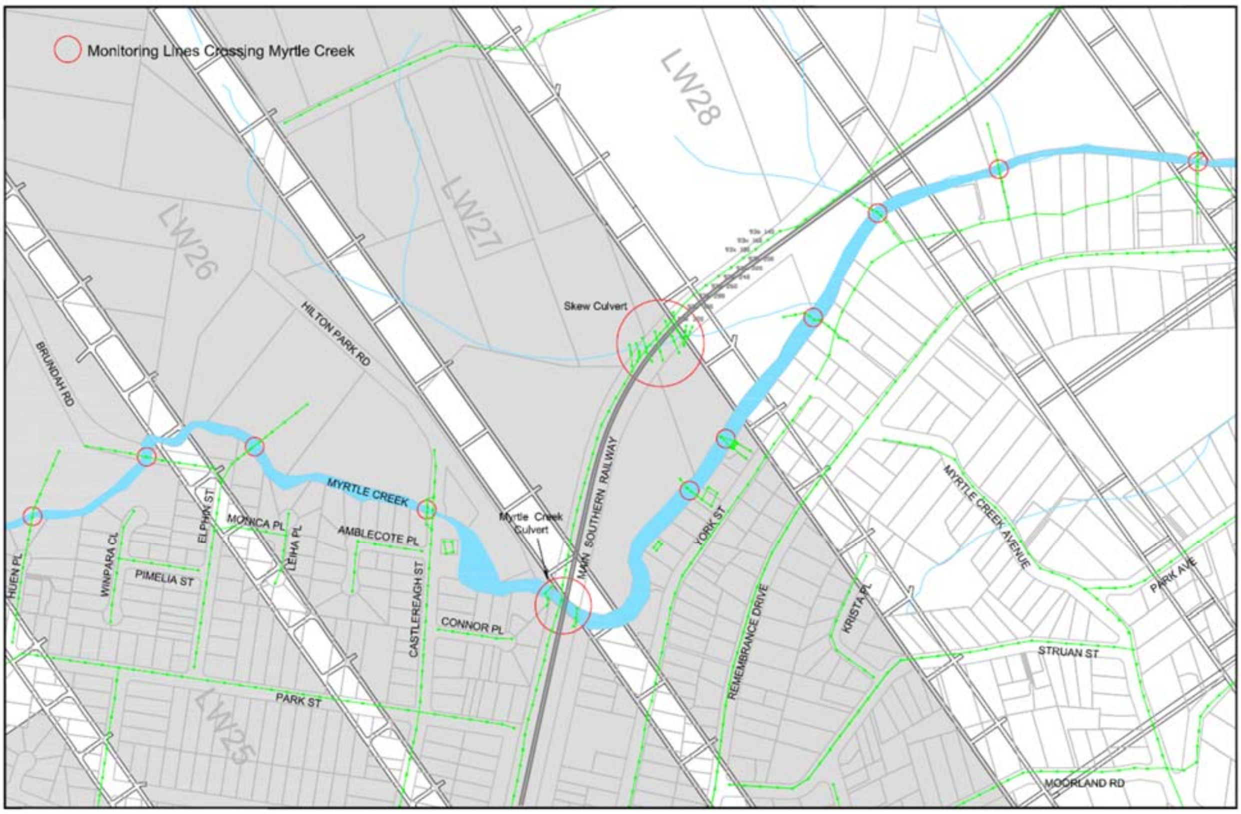


Fig. 3.28 **Monitoring lines across Myrtle Creek and Skew Culvert**

A summary graph showing the development of valley closure across the Myrtle Creek at each monitoring line is shown in Fig. 3.29.

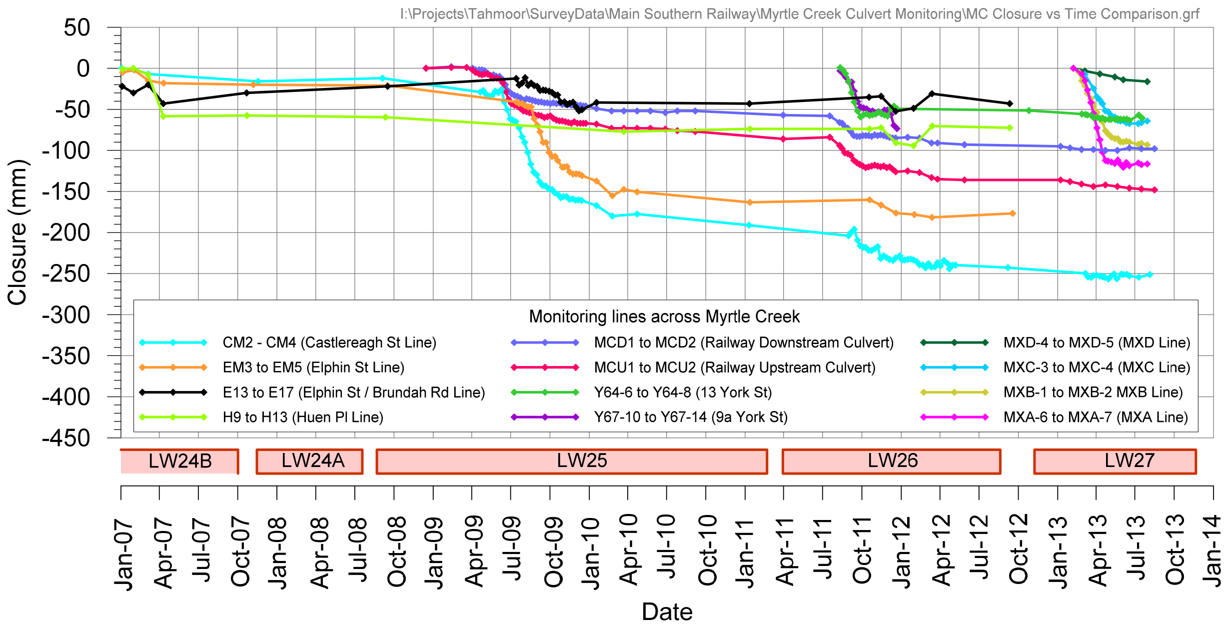


Fig. 3.29 Development of closure across Myrtle Creek during the mining of Longwalls 24B to 27

The development of valley closure across the creek at the Skew Culvert is shown in Fig. 3.30.

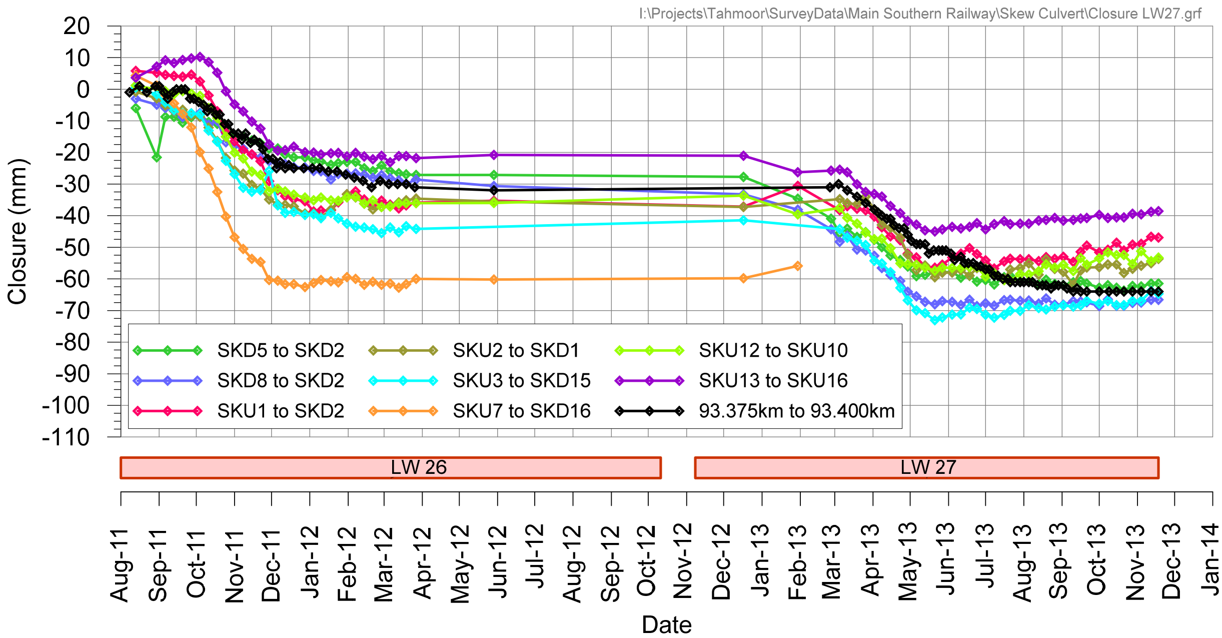


Fig. 3.30 Development of closure across Skew Culvert during the mining of Longwalls 26 and 27

A summary of predicted and observed valley closure across Myrtle Creek is provided in Table 3.2. The predictions are consistent with those provided in Report No. MSEC355, in support of Tahmoor Coal's SMP application to extract longwalls 27 to 30.

Table 3.2 Predicted and observed incremental valley closure at monitoring lines across Myrtle Creek and Skew Culvert

Location	Category	Predicted and Observed Valley Closure due to Mining of Each Longwall (mm)			
		Due to LW24	Due to LW25	Due to LW26	Due to LW27
Castlereagh St (Pegs CM2 to CM4)	Predicted	30	55	45	25
	Observed	12	179	52	8
Elphin-Myrtle (Pegs EM3 to EM5)	Predicted	60	70	40	-
	Observed	21	142	22	-
Elphin St / Brundah Rd (Pegs E13 to E17)	Predicted	75	75	30	-
	Observed	0	21	6	-
Huen Pl (Pegs H9 to H13)	Predicted	60	35	15	-
	Observed	58	15	20	-
Main Southern Railway Upstream (MCU1 to MCU4) Downstream (MCD1 to MCD4)	Predicted	15	30	30	15
	Observed	-	57 (d/s) to 86 (u/s)	36 (d/s) to 50 (u/s)	5 (d/s) to 12 (u/s)
Skew Culvert (8 cross-sections)	Predicted	< 5	10	25	25
	Observed	-	-	21 to 60 (average 36)	8 to 36 (average 21)
13 York St (Pegs Y64-6 to Y64-8)	Predicted	-	-	65	50
	Observed	-	-	51	9
9a York St (Pegs Y67-10 to Y67-14)	Predicted	-	-	85	85
	Observed	-	-	73	No access
MXA Line (Pegs MXA-6 to MXA-7)	Predicted	-	-	-	150
	Observed	-	-	-	116
MXB Line (Pegs MXB-1 to MXB-2)	Predicted	-	-	-	170
	Observed	-	-	-	93
MXC Line (Pegs MXC-3 to MXC-4)	Predicted	-	-	-	150
	Observed	-	-	-	64
MXD Line (Pegs MXD-4 to MXD-5)	Predicted	-	-	-	50
	Observed	-	-	-	16

It can be seen that observed valley closure has substantially exceeded predictions at the Castlereagh Street crossing, at the crossing of the Elphin-Myrtle monitoring line and to a lesser extent the crossing of the Main Southern Railway during the mining of Longwall 25. It is considered that the reason for the differences in observations may be linked to the change in orientation of Myrtle Creek as the three above-mentioned monitoring lines are located along the same stretch of Myrtle Creek. It is noted, however, that substantially less closure has developed at Castlereagh Street than predicted during the mining of Longwall 27.

Observed valley closure across the creek at the Skew Culvert has also slightly exceeded predictions, where the differences between predicted and observed closure are relatively small for most cross sections.

Observed valley closure across Myrtle Creek where it flows directly above Longwall 27 (MXA to MXC lines) have been less than predictions, but greater in magnitude than valley observed across monitoring lines upstream of Longwall 27. This was expected because the valley is deeper compared to sections further upstream.

3.11. Rate of subsidence development and timing required for remedial actions

Monitoring of subsidence movements during the mining of previously extracted longwalls at Tahmoor Mine and other surrounding mines in the Southern Coalfield at similar depths of cover have shown that subsidence movements develop gradually over time, with no obvious indication of large and sudden step changes.

The subsidence effect at a point on the surface can be likened to a form of a wave. This wave moves across the ground at approximately the same speed as the longwall face retreats within the longwall panel but the impact of the surface subsidence wave is modified by the depth of cover and the overburden geology.

When the extraction of coal from a panel first commences, there is no immediate surface subsidence, but as the coal within the panel is extracted and the resulting void increases in size, subsidence develops gradually above the goaf area. As mining approaches and before a point is undermined, subsidence movements start to develop and then, after the longwall face passes beyond the point, the maximum value of subsidence is reached and despite further mining occurring within the panel, this level of subsidence is not exceeded except for some small time based residual movements.

An example of the gradual development of subsidence is shown in Fig. 3.31, which shows the development of subsidence of survey pegs that are located along the centreline of Tahmoor Mine's Longwall 27. The development of subsidence is plotted against the distance of each survey peg to the longwall face at the time of each survey. It shows that subsidence at a point above Longwall 27 typically did not commence until the longwall face had approached to within 200 metres of the point and that the majority of the subsidence movements had developed after the longwall face had passed each point by a distance of approximately 400 to 600 metres. The average extraction rate of Longwall 27 was approximately 40 metres per week, so it can be seen that subsidence typically developed over a period of approximately 15 to 20 weeks.

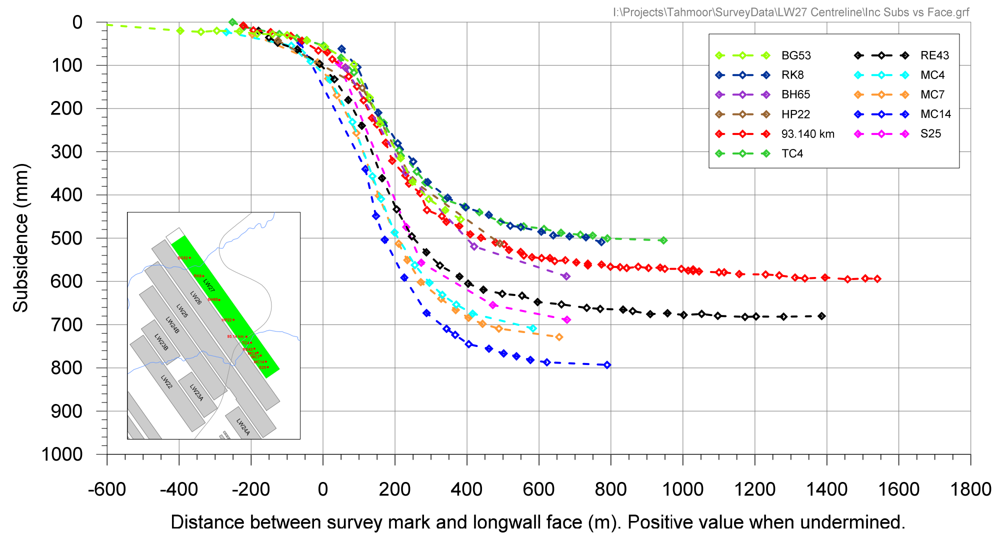


Fig. 3.31 Observed Development of subsidence along Longwall 27 centreline versus distance to longwall face

As further adjacent panels are extracted, additional subsidence can be experienced above the previously mined panel or panels. However, a point is reached where a maximum value of subsidence occurs over the series of panels irrespective of whether more panels are later extracted.

Differential vertical and horizontal subsidence movements, such as tilt, curvature, strain and valley closure and upsidence are also observed to develop gradually as mining progresses.

The gradual development of subsidence movements allows potential impacts on surface features to be managed effectively. This is because with the implementation of an effective monitoring program, unexpected or anomalous subsidence ground movements can be detected early and actions taken in response well before potentially severe impacts occur.

4.1. Introduction

The following sections provide details on the maximum predicted conventional subsidence parameters resulting from the extraction of the proposed amended layout for Longwalls 101A to 108B using the calibrated IPM model.

The predicted subsidence parameters and the impact assessments for the natural features and surface infrastructure are provided in Chapters 5 through to 11.

The predicted subsidence, tilt and curvature have been obtained using the Incremental Profile Method, which was calibrated for local conditions as described in Section 3.7. The predicted strains have been determined by analysing the strains measured during the previous extraction of longwalls at Tahmoor Mine, as well as at other nearby collieries.

The maximum predicted subsidence parameters and the predicted subsidence contours provided in this Chapter describe and show the conventional movements and do not include the valley-related upsidence and closure movements, nor the effects of faults and other geological structures. Such effects have been addressed separately in the impact assessments for each feature provided in Chapter 5 through to 11.

4.2. Maximum predicted conventional subsidence, tilt and curvature (outside the areas with the potential for increased subsidence)

The maximum predicted conventional subsidence parameters resulting from the extraction of the proposed amended longwalls were determined using the calibrated Incremental Profile Method, which was described in Chapter 3. The following provides the maximum predicted subsidence, tilt and curvatures for the proposed longwalls outside the areas with the potential for increased subsidence, which is discussed separately in Section 4.4.

A summary of the maximum predicted values of incremental conventional subsidence, tilt and curvature, due to the extraction of each of the proposed amended longwalls, is provided in Table 4.1. The predicted ground strains are discussed in Section 4.3. 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 4.1 Maximum Predicted Incremental Conventional Subsidence, Tilt and Curvature resulting from the extraction of each of the proposed amended longwalls

Longwall	Maximum Predicted Incremental Conventional Subsidence (mm)	Maximum Predicted Incremental Conventional Tilt (mm/m)	Maximum Predicted Incremental Conventional Hogging Curvature (km^{-1})	Maximum Predicted Incremental Conventional Sagging Curvature (km^{-1})
LW101A	800	7.0	0.08	0.22
LW102A	950	7.5	0.08	0.21
LW103A	950	7.5	0.08	0.21
LW104A	950	8.0	0.09	0.21
LW105A	950	8.0	0.09	0.21
LW106A	950	8.0	0.09	0.22
LW101B	950	8.0	0.09	0.23
LW102B	1,100	9.0	0.10	0.23
LW103B	1,000	8.5	0.10	0.27
LW104B	1,150	10.0	0.11	0.28
LW105B	1,150	10.0	0.11	0.28
LW106B	1,150	9.5	0.11	0.26
LW107B	1,150	9.5	0.11	0.26
LW108B	1,150	9.5	0.11	0.26

The predicted total conventional subsidence contours, using the calibrated IPM model for Tahmoor Mine, resulting from the extraction of the proposed Tahmoor South amended longwalls are shown in Drawing No MSEC1060-22.

A summary of the maximum predicted values of total conventional subsidence, tilt and curvature, after the extraction of each of the proposed amended longwall series, is provided in Table 4.2.

Table 4.2 Maximum predicted total conventional subsidence, tilt and curvature after the extraction of the proposed amended longwall series

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})
LW101A to LW106A	1,350	8.7	0.13	0.23
LW101B to LW108B	1,650	10.5	0.16	0.28

The maximum predicted total subsidence, after the completion of the proposed longwalls, is 1,650 mm which represents around 63 % of the extraction height. The maximum predicted total conventional tilt is 10.5 mm/m (i.e. 1.05 %), which represents a change in grade of 1 in 95. The maximum predicted total conventional curvatures are 0.16 km^{-1} hogging and 0.28 km^{-1} sagging, which represent minimum radii of curvature of 6.3 kilometres and 3.6 kilometres, respectively.

The predicted conventional subsidence parameters vary across the *Subsidence Study Area* as the result of, amongst other factors, variations in the depths of cover, longwall geometry and extraction heights. To illustrate this variation, the predicted profiles of conventional subsidence, tilt and curvature have been prepared along two prediction lines, the locations of which are shown in Drawing No. MSEC1060-22.

The predicted profiles of conventional subsidence, tilt and curvature along Prediction Line 1 and Prediction Line 2, resulting from the extraction of the proposed amended longwalls, are shown in Fig. E.01 and Fig. E.02, respectively, in Appendix E. The predicted incremental profiles, due to the extraction of each of the proposed longwalls, are shown as dashed black lines. The predicted total profile, after the extraction of each of the proposed amended longwalls, are shown as solid blue lines with the final predicted total profiles being shown in a thicker solid blue line. The range of predicted curvatures in any direction to the prediction lines, at any time during or after the extraction of the proposed longwalls, is shown by the grey shading.

The reliability of the predictions of subsidence, tilt and curvature, obtained using the Incremental Profile Method, is discussed in Section 3.4 to Section 3.8 and Section 4.4 to Section 4.7.

4.2.1. Comparison to predictions based on the EIS layout

A comparison between the EIS Layout and the Amended Layout is shown in Fig. 4.1.

The key amendments to the Project since public exhibition of the EIS, which are relevant to the subsidence assessment, are:

- A revised mine plan, including:
    - an amended longwall panel layout and the removal of LW109;
    - a reduction in the height of extraction within the longwall panels from up to 2.85 metres (m) to up to 2.6 m; and
    - a reduction in the proposed longwall width, from up to 305 m to approximately 285 m.

It can also be seen from Fig. 4.1 that the overall longwall footprint has changed.

- Removal of LW109;
- Splitting of panels into two separate longwall groups, LWs 101A to 106A and LWs 101B to 108B, with a central heading accessway. The two groups of panels are separated by approximately 345 metres;
- An extension of the footprint at the northern ends of LWs 101A to 106A within the semi-rural areas north of the Bargo township;
- A shortening of the footprint along the maingate (western side) of LW108, which is predominantly located beneath the urban areas of the Bargo township; and
- Small variations in footprint at the staggered southeastern ends of LWs 101B to 105B.

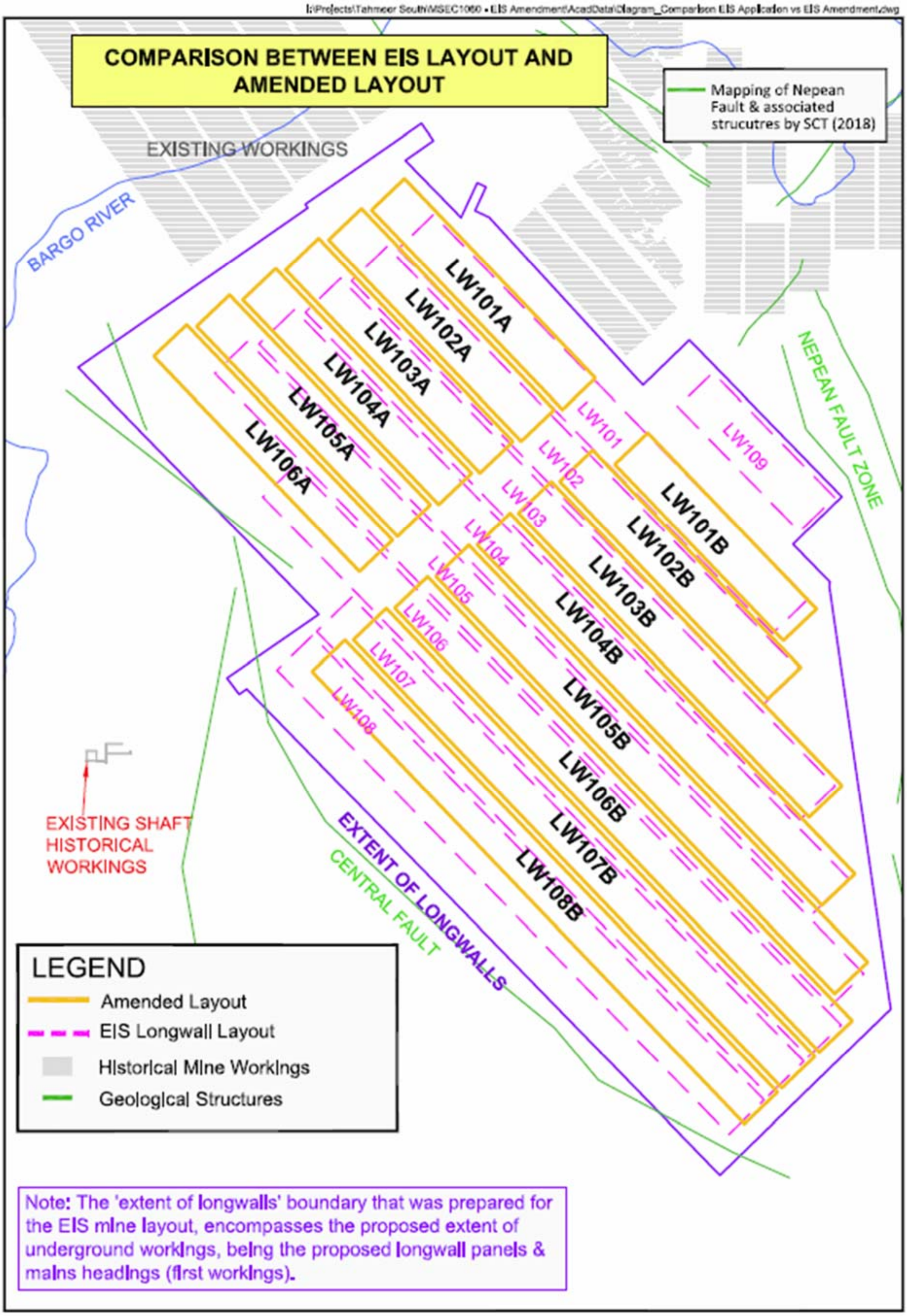


Fig. 4.1 Comparison between EIS Layout and Amended Layout

A comparison between maximum predicted incremental conventional subsidence, tilt and curvature between the EIS Layout and Amended Layout is shown in Table 4.3.

Table 4.3 Maximum Predicted Incremental Conventional Subsidence, Tilt and Curvature resulting from the extraction of the EIS Layout and Amended Layout

Layout	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})
Amended Layout (MSEC1060)	LW101A	800	7.0	0.08	0.22
	LW102A	950	7.5	0.08	0.21
	LW103A	950	7.5	0.08	0.21
	LW104A	950	8.0	0.09	0.21
	LW105A	950	8.0	0.09	0.21
	LW106A	950	8.0	0.09	0.22
	LW101B	950	8.0	0.09	0.23
	LW102B	1,100	9.0	0.10	0.23
	LW103B	1,000	8.5	0.10	0.27
	LW104B	1,150	10.0	0.11	0.28
	LW105B	1,150	10.0	0.11	0.28
	LW106B	1,150	9.5	0.11	0.26
	LW107B	1,150	9.5	0.11	0.26
	LW108B	1,150	9.5	0.11	0.26
EIS Layout (MSEC997)	LW101	1,200	9.5	0.11	0.29
	LW102	1,300	10.0	0.10	0.27
	LW103	1,250	10.5	0.11	0.31
	LW104	1,450	11.5	0.12	0.33
	LW105	1,300	10.5	0.12	0.31
	LW106	1,250	10.5	0.12	0.29
	LW107	1,400	11.5	0.13	0.32
	LW108	1,400	11.5	0.14	0.32
	LW109	1,000	8.0	0.09	0.24

It can be seen from Table 4.3 that the predicted maximum incremental subsidence, tilts and curvatures due to the extraction of each longwall in the Amended Layout is less than the corresponding previously predicted maxima for the EIS Layout. The reductions in predicted maximum predicted vertical subsidence vary between 100 mm and 500 mm per longwall, or between 8% and 24% of the previously predicted values.

The greatest reductions are associated with LWs 101A to 106A but the comparisons are not straight-forward because the extraction heights for the A series panels are between 2.1 metres and 2.2 metres while the previously proposed full length longwalls in the EIS Layout were proposed to be extracted at a maximum extraction height of 2.85 metres, where the B series panels are located.

A comparison between maximum predicted total conventional subsidence, tilt and curvature between the EIS Layout and Amended Layout is shown in Table 4.4.

Table 4.4 Maximum Predicted Total Conventional Subsidence, Tilt and Curvature resulting from the extraction of the EIS Layout and Amended Layout

Layout	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})
Amended Layout (MSEC1060)	LW101A to LW106A	1,350	8.7	0.13	0.23
	LW101B to LW108B	1,650	10.5	0.16	0.28
EIS Layout (MSEC997)	LW101 to LW108	1,900	13.0	0.19	0.33
	LW109	1,000	8.0	0.09	0.24

It can be seen that the predicted maximum total conventional subsidence, tilt and curvatures due to the extraction of the Amended Layout are less than the predicted maxima from the EIS Layout. The reasons are due to both the proposed reduction in panel width and proposed reduction in extraction heights.

- The predicted maximum total subsidence due to the extraction of Amended Layout is 1,650 mm, which is approximately 87% of the previously predicted maximum total subsidence for the EIS Layout.
- The predicted maximum total tilt due to the extraction of Amended Layout is 10.5 mm/m, which is approximately 81% of the previously predicted maximum total tilt for the EIS Layout.
- The predicted maximum total curvatures due to the extraction of Amended Layout is 0.16 km-1 (hogging) and 0.28 km-1 (sagging), which is approximately 84% (hogging) and 85% (sagging) of the previously predicted maximum total curvatures for the EIS Layout.

It should be noted though that, whilst the overall predicted total subsidence, tilt and curvatures have been reduced significantly by changing the longwall widths, extents and seam extraction thicknesses, predictions at points on the surface directly above the longwalls will be greater or less than predictions previously provided for the EIS Layout for the following reasons:

- There are some areas, mainly around the northwestern ends of LWs 101A to 106A, where the longwall footprint has been extended.
- There are some areas, mainly above previously proposed LW109, above the maingate (western) side of previously proposed LW 108, and areas that lie in between the proposed split A and B series panels where the longwall footprint has been reduced.
- As the panel widths have been reduced but pillar widths have remained unchanged, the longwalls in the Amended Layout are staggered in their positions relative to the EIS Layout. It follows, therefore, that the positions of each point on the surface relative to the proposed longwalls has changed. For example, points on the surface above the centrelines of longwalls in the Amended Layout may have been previously located directly above a chain pillar, and vice versa.

Specific subsidence predictions have been provided for identified surface and sub-surface features later in this report. Comparisons to previously provided predictions for the EIS Layout have generally not been provided for reasons of brevity. Detailed comparisons can be made for each feature by comparing this report with our previous Report No. MSEC997, which is included in Appendix F of the EIS.

4.3. Predicted strains

It is important to appreciate that the extraction of coal not only results in subsidence, but, it also induces horizontal ground movements and ground strains, and, unlike subsidence, which is measured vertically, it is important to appreciate that these parameters have both a magnitude and a direction. The magnitude of the measured ground strains can be sensitive to the ground distances over which they were measured, and, both the measured ground strains and horizontal movements are very sensitive to the direction in which they were measured. Hence, strain and horizontal movements are more complex, and they are more difficult to predict than subsidence, tilt and curvature.

The profiles of observed strain along monitoring lines, therefore, were often irregular in shape even when the profiles of observed subsidence, tilt and curvature were relatively smooth.

Early researchers noticed the similarity between the observed curvature and strain profiles and the similarity between the observed tilt and horizontal movement profiles. Hence, it was logical that the early strain prediction methods were based on linear relationships with predicted conventional curvature and the early horizontal ground movement prediction methods were based on linear relationships with predicted conventional tilt.

The locations that are predicted to experience hogging or convex curvature are expected to be net tensile strain zones and the locations that are predicted to experience sagging or concave curvature are expected to be net compressive strain zones and adopting a linear relationship between curvature and strain provided a reasonable prediction for the maximum conventional tensile and compressive strains.

In the Southern Coalfield, it was found that a curvature to conventional strain conversion factor of 15 provided a reasonable relationship between the maximum predicted curvatures and the maximum predicted conventional strains. Similarly, a tilt to conventional horizontal movement conversion factor of 15 was found to provide a reasonable relationship between the maximum predicted tilt and the maximum predicted conventional horizontal movement.

However, it wasn't long before it was noticed that, whilst these correlations were reasonable for the maximum values of these parameters over some areas of the mined panels, they were not as reliable in many other areas, particularly in those locations that were beyond the edges of the mined panels where far field horizontal movements, that were near changes in geological conditions and it was noted that survey tolerance and valley related movements can represent a high proportion of measured ground strains and horizontal displacements.

The limited accuracy of strain and horizontal movement predictions at locations away from the point of maximum strain and horizontal movement was discussed in later subsidence prediction reports where it was stated that the measured strains and horizontal ground movements at a point can vary considerably from the predicted conventional values. It was noted that the locations that were predicted to experience hogging or convex curvature experienced net tensile strain zones and the locations that were predicted to experience sagging or concave curvature experienced net compressive strain zones, but, it was highlighted that the observed strain and horizontal movement profiles along monitoring lines were irregular in shape, with an occasional spike, compared to the observed subsidence, tilt and curvature profiles which were relatively smooth. Hence, it was concluded that, whilst the prediction of vertical subsidence and tilt at a point could be carried out with reasonable accuracy and reliability, the prediction of mining-induced ground strains and horizontal movements at a point was far less accurate, especially when those predictions used linear conversion factors that were based on predicted conventional curvature and tilt.

Furthermore, the horizontal movement predictions at a point were rarely provided and the predictions of ground strains are usually provided based on statistical basis, as is detailed in Section 4.3.1.

However, strain is one of the most important parameters for assessing the likelihood of mine subsidence damage to natural features and built features on the surface. Recent research has resulted in some improved understanding and methods for predicting ground strains and relative horizontal movements in zones across mined panels at the surface, (Barbato, 2016, 2017). These new methods for predicting strain have been developed dependent on the mining geometry, surface topography, surface geology and the likelihood of irregular anomalous movements.

The predicted distribution of strains using this new method also provides guidance on the magnitudes of localised spikes and the likelihoods of exceeding strain thresholds based on previously measured ground monitoring data, (Barbato et al., 2016 and 2017).

The reasons why ground strains and horizontal movements are more complex and difficult to predict than subsidence, tilt and curvature are partly associated with the observation that, while the strata has only one direction to move,(i.e. vertically downwards), it can be moved in two directions horizontally and it has been observed that the ground will move wherever it is easiest to go. Additionally, studies have noted that ground strains and horizontal movements are influenced/affected by many multiple factors and a complex interaction of many mechanisms, including the:

- magnitude of the vertical subsidence, tilt and the depth of cover;
- steepness and direction of the surface topography;
- steepness and direction of the seam dip;
- direction of mining in relation to both the surface and seam slope;
- geology, geomechanical properties and thicknesses of the near surface strata, as well as, all the overburden strata layers, the seam and the strata layers immediately under the seam;
- presence of geological faults, pre-existing natural joints and igneous intrusions;
- magnitude and principal direction of the in situ horizontal compressive stresses in the strata layers around the mined goaf and the surface strata layers;
- presence and proximity of previously extracted panels in the currently mined seam and previously extracted panels in other seams;
- behaviour of blocky sandstone environments where initial ground movements occur predominantly along pre-existing natural joints, the location of which would not be known;
- limited ability of opened joints to close fully during the following compression phases after the initial shearing and tensile movements;

- reversing component that seems to initially move surveyed surface pegs towards the longwall face as the face approaches and, then, after the face extracts under and away from this peg, the surface is moved back towards its initial position and often it is moved further past that position as it follows the mining face; and
- other contributing factors such as the degree of surface roughness and frictional resistance along the bedding planes, survey accuracy or survey tolerance (especially where the strains are of a low order of magnitude), the presence of groundwater flows along the bedding planes and its influence on the slippage along bedding planes, etc.

Nevertheless, it has been concluded that the curvature to conventional strain conversion factor and the tilt to horizontal movement conversion factor can be used to provide a reasonable indication of the maximum conventional strains and horizontal movements over extracted panels.

Using the maximum predicted conventional curvatures of 0.16 km^{-1} hogging and 0.28 km^{-1} sagging curvature and the conventional strain conversion factor of 15, the maximum predicted conventional strains for the proposed Tahmoor South Longwalls 101A to 108B, are approximately 2.4 mm/m tensile and 4.2 mm/m compressive.

At specific points around the mined panels, however, there can be considerable variation from this linear curvature to conventional strain relationship, resulting from non-conventional movements and a wide range of scatter is observed between the predicted and observed 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, MSEC has provided a statistical approach to predict observed strain and hence account for this variability, instead of just providing a single predicted conventional strain.

The range of potential strains above the proposed longwalls has been determined using monitoring data from the previously extracted longwalls at Tahmoor Mine, as well as from other nearby collieries, including Appin and West Cliff, where the regional geology and mining geometries are reasonably similar to that for the proposed longwalls. A summary of the monitoring lines that were used in the strain analysis is provided in Table 4.5 and Table 4.6 shows the mining geometry for the proposed longwalls.

Table 4.5 Monitoring lines used in the strain analysis

Location	Monitoring Lines	Longwall Widths (m)	Depths of Cover (m)	Width-to-Depth Ratios	Extraction Heights (m)
Early longwall areas at Tahmoor Mine	100-Line	190	410	0.47	2.0
	200-Line	190	410	0.46	1.9
	300-Line	190 ~ 240	430	0.47	2.2
	800-Line	235	420	0.56	2.1
	900-Line	235	420	0.56	2.0
	1000-Line	190 ~ 240	400	0.57	1.8
Northern areas over Tahmoor	40 monitoring lines located outside the area of '*increased subsidence*'	285	425 ~ 470 *(440 average)*	0.60 ~ 0.67 *(0.64 average)*	1.7 ~ 2.3 *(2.1 average)*
Appin Area 3	M-Line	260	480 ~ 520 *(500 average)*	0.50 ~ 0.54 *(0.52 average)*	2.6 ~ 3.0 *(2.8 average)*
Appin Area 7	HW2 East, HW2 West, ARTC and Moreton Park Road	305	500 ~ 560 *(530 average)*	0.54 ~ 0.61 *(0.58 average)*	2.8 ~ 3.2 *(3.0 average)*
West Cliff Area 5	B-Line	305	490 ~ 530 *(510 average)*	0.58 ~ 0.62 *(0.60 average)*	2.4 ~ 3.0 *(2.6 average)*

Table 4.6 Mining geometry for the proposed amended longwalls

Location	Longwall Widths (m)	Depths of Cover (m)	Width-to-Depth Ratios	Extraction Heights (m)
LW101A to LW106A	283	370 ~ 415 *(390 average)*	0.68 ~ 0.76 *(0.73 average)*	2.1 ~ 2.2 *(2.1 average)*
LW101B to LW108B	283	370 ~ 410 *(390 average)*	0.69 ~ 0.76 *(0.73 average)*	2.1 ~ 2.6 *(2.5 average)*

It can be seen from the above tables, that the extraction heights for the proposed longwalls vary between 2.1 metres and 2.6 metres, which are greater on average than those for the previously extracted longwalls at Tahmoor Mine, which varied between 1.7 metres and 2.3 metres, but is less on average than those for the previously extracted longwalls at Appin and West Cliff Collieries, which varied between 2.4 metres and 3.2 metres. That is, the extraction heights for the proposed longwalls are within the ranges of those for the previously extracted longwalls at Tahmoor, Appin and West Cliff Collieries.

The width-to-depth ratios for the proposed longwalls varies between 0.68 and 0.76, which are slightly greater than those for the previously extracted longwalls at Tahmoor, Appin and West Cliff Collieries, which varied between 0.46 and 0.67. Unfortunately, there is limited available ground monitoring data from previously extracted longwalls in the Southern Coalfield where the width-to-depth ratios are exactly similar to the proposed longwalls.

There is, however, extensive ground monitoring data available from previously extracted longwalls in the Newcastle, Hunter and Western Coalfields where the width-to-depth ratios were similar and much greater than those for the proposed longwalls. This data was not included in the strain analyses, since the overburden geology is different to that in the Southern Coalfield and since the width-to-depth ratios for the proposed longwalls are only slightly higher than the available Southern Coalfields data that has similar overburden geology.

A review of the available data from the Newcastle, Hunter and Western Coalfields indicates that the observed strains for previously extracted longwalls having width-to-depth ratios between 0.70 and 0.85, i.e. slightly greater when compared to the proposed amended longwalls, were on average, around 20 % to 40 % greater than the observed strains for previously extracted longwalls in the Newcastle, Hunter and Western Coalfields having width-to-depth ratios between 0.50 and 0.70, i.e. similar to Tahmoor North, Appin and West Cliff Collieries.

It could be expected, therefore, that the observed strains resulting from the extraction of the proposed longwalls would be, on average, around 20 % to40 % greater than those previously experienced at Tahmoor, Appin and West Cliff Collieries and, hence, the predicted strains for the proposed longwalls have been determined from the analyses of strain from the previously extracted longwalls at Tahmoor, Appin and West Cliff Collieries, with the magnitudes increased by 20 % to40 % to account for the higher width-to-depth ratios based on the observations from the Newcastle, Hunter and Western Coalfields.

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 movements, which are addressed separately in this report. The strains resulting from damaged or disturbed survey marks have also been excluded.

A number of probability distribution functions were fitted to the empirical monitored strain data. It was found that a *Generalised Pareto Distribution (GPD)* provided a good fit to the raw strain data. Confidence levels have been determined from the empirical strain data using the fitted GPDs. In the cases where survey bays were measured multiple times during a longwall extraction, the maximum tensile strain and the maximum compressive strain were used in the analysis (i.e. single tensile strain and single compressive strain measurement per survey bay).

4.3.1. Analysis of strains measured in survey bays

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

Predictions of strain above goaf

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*".

The 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. 4.2. The probability distribution functions, based on the fitted GPDs, have also been 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.

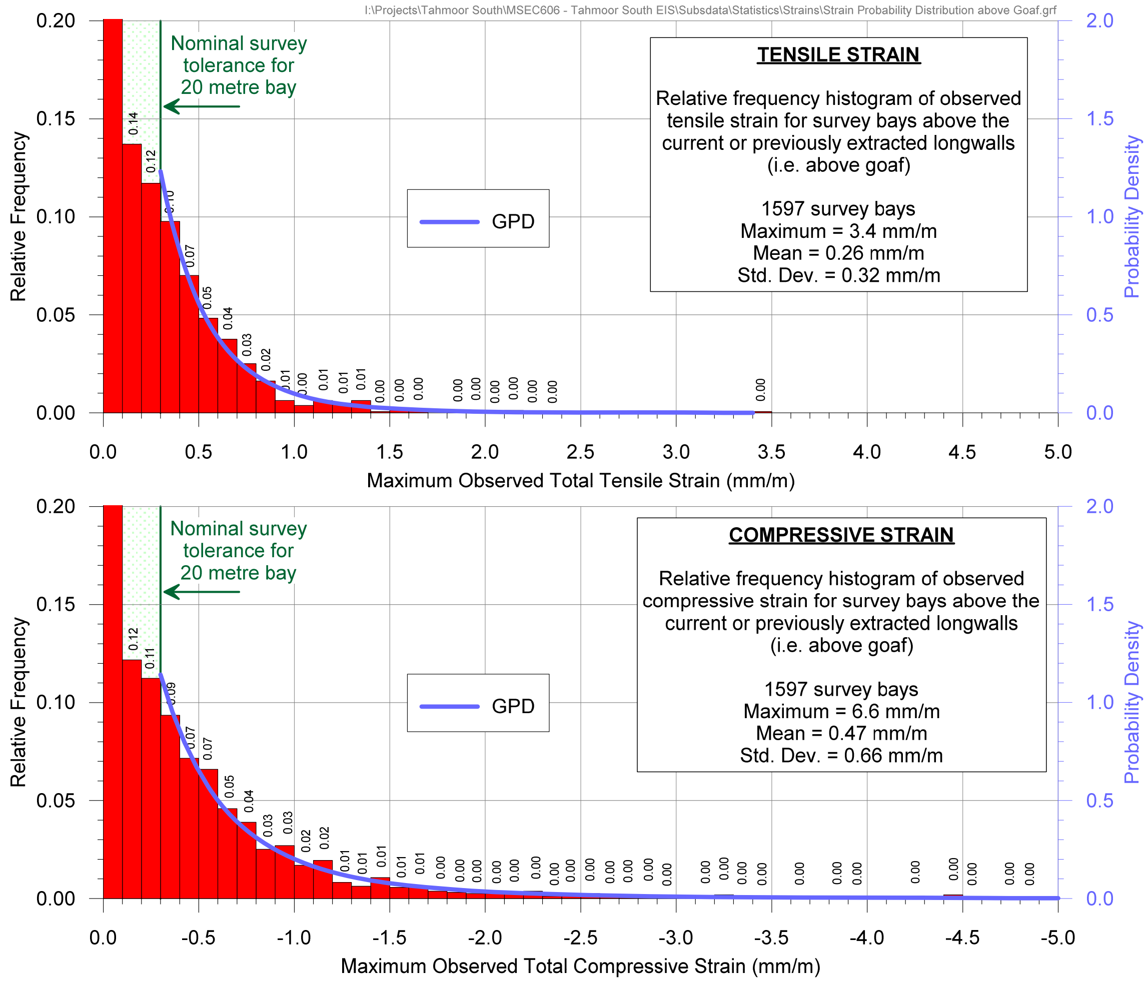


Fig. 4.2 Distributions of the measured maximum tensile and compressive strains for surveys bays located *above goaf* at Tahmoor, Appin and West Cliff Collieries

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*".

The 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. 4.3. The probability distribution functions, based on the fitted GPDs, have also been 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.

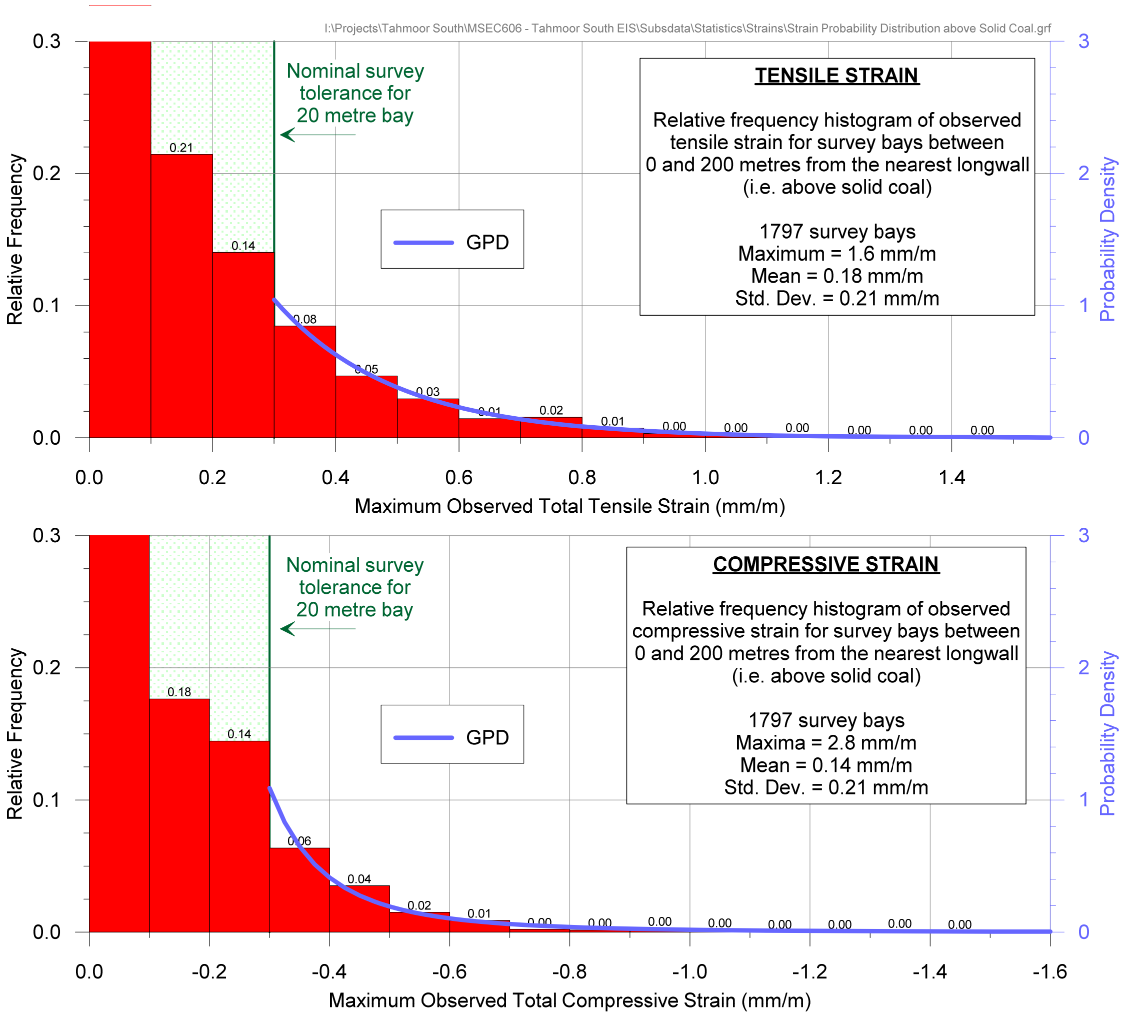


Fig. 4.3 Distributions of the measured maximum tensile and compressive strains for survey bays located *above solid Coal* at Tahmoor, Appin and West Cliff Collieries

4.3.2. Analysis of strains measured along whole monitoring lines

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

The histogram of maximum observed total tensile and compressive strains measured anywhere along the monitoring lines, at any time during or after the extraction of the previous longwalls at Tahmoor, Appin and West Cliff Collieries, is provided in Fig. 4.4.

It can be seen from Fig. 4.4, that 42 of the 52 monitoring lines (i.e. 92 % of the total) at Tahmoor, Appin and West Cliff Collieries had recorded maximum total tensile strains of 2.0 mm/m, or less. The strains for the proposed longwalls are predicted to be 20 % to 40 % greater than those previously observed at these collieries and, therefore, it is expected that 92 % of the monitoring lines above the proposed longwalls would experience maximum tensile strains of 3.0 mm/m, or less.

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

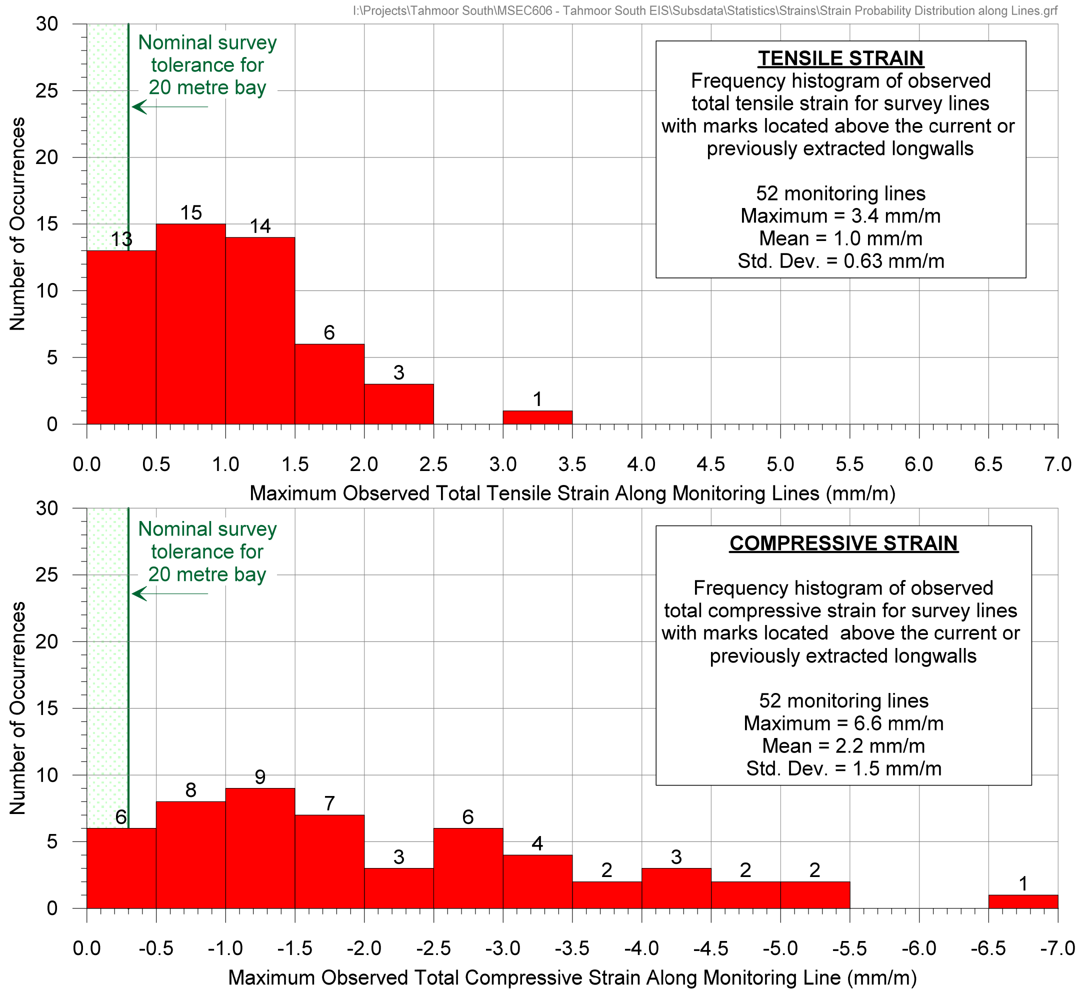


Fig. 4.4 Distributions of measured maximum tensile and compressive strains anywhere along the monitoring lines at Tahmoor, Appin and West Cliff Collieries

4.3.3. Analysis of shear strains

As described in Section 3.3, ground strain comprises two components, being normal strain and shear strain, which can be interrelated using a Mohr's Circle analysis. The magnitudes of the normal strain and shear strain components are, therefore, dependent on the orientation in which they are measured. The maximum normal strains (i.e. principal strains) are those in the direction where the corresponding shear strain is zero.

Normal strains along monitoring lines can be measured using 2D and 3D techniques, by taking the change in horizontal distance between two points on the ground and dividing by the original horizontal distance between them. This provides the magnitude of normal strain along the orientation of the monitoring line but, this strain may not necessarily be the maximum (i.e. principal) strain.

Shear deformations are more difficult to measure, as they are the relative horizontal movements perpendicular to the direction of measurement. However, 3D monitoring techniques provide data on the direction and the absolute displacement of survey marks and, therefore, the shear deformations perpendicular to the monitoring line can be determined. It is possible to gain an understanding of the shear strain along a monitoring line with repeat measurements, but, in accordance with rigorous definitions and the principles of continuum mechanics, (e.g. Jaeger, 1969), it is not possible to accurately determine horizontal shear strains in any direction relative to the monitoring line using 3D monitoring data from a straight line of survey marks.

As described in Section 3.3, shear deformations perpendicular to monitoring lines can be described using various parameters, including horizontal tilt, horizontal curvature, horizontal mid-ordinate deviation, angular distortion and shear index. In this report, horizontal mid-ordinate deviation has been used as the measure for shear deformation, which is defined as the differential horizontal movement of each survey mark, perpendicular to a line drawn between two adjacent survey marks.

The frequency distribution of the maximum total horizontal mid-ordinate deviations measured at survey marks above goaf, for previously extracted longwalls in the Southern Coalfield, is provided in Fig. 4.5. As the typical survey bay length was 20 metres, the calculated mid-ordinate deviations were over a chord length of 40 metres. The probability distribution function, based on the fitted GPD, has also been shown in this figure.

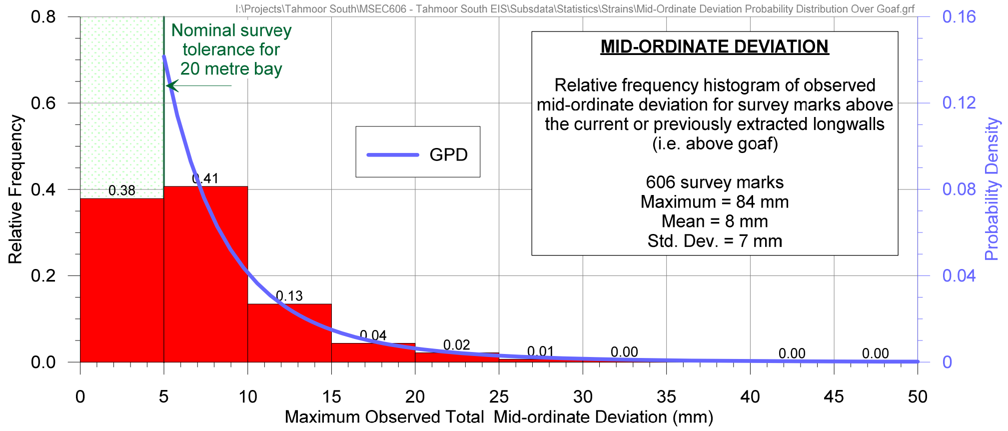


Fig. 4.5 Distribution of measured maximum mid-ordinate deviation during the extraction of previous longwalls in the Southern Coalfield for marks located above goaf

The 95 % and 99 % confidence levels for the maximum total horizontal mid-ordinate deviation that the individual survey marks located above goaf experienced at any time during mining were 20 mm and 35 mm, respectively. The shear deformations for the proposed longwalls are estimated to be 20 % to 40 % greater than those previously observed at Tahmoor, Appin and West Cliff Collieries and, therefore, it is expected that 95 % and 99 % of the horizontal mid-ordinate deviations measured above the proposed longwalls would be less than 30 mm and 50 mm, respectively.

4.4. Potential for increased subsidence

As described in Section 3.7 and Section 3.8, increased subsidence was observed above several previously extracted Longwalls, i.e. Longwall 8, Longwall 13, Longwall 24A and above the commencing ends of Longwalls 24A to 27 and above the commencing end of Longwall 32.

The cause for the increased subsidence over Longwall 24A and above the commencing end of Longwall 25 was investigated by Strata Control Technology on behalf of Tahmoor Coal, (Gale and Sheppard, 2011). The investigations concluded that the increased subsidence is consistent with localised weathering of joint and bedding planes above a depressed water table adjacent to an incised gorge. The continued monitoring of the increased subsidence over Longwalls 26 and 27 confirmed that the extent of the increased subsidence reduced with increasing distance from the Bargo River Gorge and the northern end of a mapped fault echelon structure. The observation above the commencing end of Longwall 32 has shown that increased subsidence has developed where mining has occurred close to another mapped first order fault echelon structure.

It is worthwhile noting that Longwalls 10A, 10B, and 12 are also located near the Nepean Fault and the Bargo River and there was a reasonable correlation between observed and predicted subsidence along the available monitoring lines. Similarly, many longwalls have been extracted close to major river valleys and gorges and there were reasonable correlations between observed and predicted subsidence along all the available monitoring lines. Accordingly, it appears that the location of the zones of increased subsidence is linked to both the;

- close proximity to and the alignment of the Nepean Fault, and
- close proximity to the Bargo River Gorge, which is approximately 100 metres deep, which permitted groundwater flows to weather the joint and bedding plane properties of the surrounding strata.

The proposed Tahmoor South amended Longwalls 101B to 108B run adjacent to the Nepean Fault zone on the western side, i.e. the same high side as previously extracted longwalls at Tahmoor Mine. It is possible that increased subsidence may develop near the commencing ends of the proposed longwall panels, but, this is not certain for the following reasons:

- The Nepean Fault is less defined in the Tahmoor South area compared to the Tahmoor North area, and
- The proposed longwalls are further away from major regional streams such as the Bargo River and the measured groundwater gradients are less than those measured near Longwalls 24A to 26 (HydroSimulations, 2020).

If greater than predicted subsidence was to occur above the proposed longwalls, it is unlikely that the magnitude of this increased subsidence will be much greater than the predictions for the following reasons:

- Predicted maximum incremental subsidence is 1,150 mm, which represents approximately 45 % to 52 % of the proposed extraction height. Maximum observed incremental subsidence above Longwalls 24A to 27 was approximately 55 % of the extraction height.
- Predicted maximum total subsidence is 1,650 mm, which represents approximately 63 % of the proposed extraction height. Maximum observed total subsidence above Longwalls 24A to 27 was approximately 62 % of the extraction height.
- The higher levels of predicted subsidence at Tahmoor South are due to a combination of thicker extraction heights and slightly shallower depths of cover. They are comparable to or just less than the observed increased subsidence above Longwalls 24A to 27 when expressed as a proportion of extraction height.
- In the cases of Longwalls 24A and 25, the observed maximum subsidence was greater than predictions by between 2 to 2.3 times. This was partly because the panels were the first and second in a series of longwalls where reduced subsidence would normally have been expected to develop. Increasing the predicted levels of subsidence by factors of 2 to 2.3 would result in subsidence much greater than the proposed extraction height, which is extremely unlikely to occur.

While the potential exists for increased subsidence to occur above sections of the proposed longwalls adjacent to the Nepean Fault, it is important to note that the potential impacts on surface infrastructure from this extra subsidence can be managed, as it was over Longwalls 24A to 27 and Longwall 32, so that they remain safe and serviceable during and after the mining period with the implementation of effective management measures. When required, these measures would include;

- A detailed pre-mining assessment of the potential impacts of surface infrastructure in the event that increased subsidence occurs.
- Monitoring of subsidence movements above and beyond the proposed mining footprint, including across the projected location of the Nepean Fault on the surface.
- Monitoring of the condition of surface infrastructure during and after the mining period.
- Implementation of planned early intervention measures to further protect the safety and serviceability of surface infrastructure based on pre-determined trigger levels based on monitoring data.
- If increased subsidence were to occur during the mining of a proposed longwall, consideration of whether to continue mining future longwalls at the same commencing and/or finishing ends as proposed or make amendments to avoid future increased subsidence.

4.5. Potential additional settlement above coal barriers between proposed and previous mine workings

Parts of the proposed longwalls are located close or adjacent to the previously extracted Longwall 2, Longwall 14B and Longwalls 15 to 19 with a proposed barrier of unmined coal being left between the previously extracted panels and the proposed workings, (except for development headings). Similar barriers of unmined coal are also proposed to be left between the proposed Longwalls 101A to 106A and Longwalls 101B to 106B.

Slightly increased levels of subsidence over the predicted levels of subsidence were observed within the following areas at Tahmoor, Appin or Tower Collieries that were also located above similar unmined barriers of coal (with some development headings) between previously extracted areas, such as;

- Between Longwall 3 and Longwall 22 at Tahmoor Mine,
- Between Longwall 23A and 23B at Tahmoor Mine,
- Between Longwall 24A and the 200 Panels at Tahmoor Mine,
- Between Longwalls 22 to 24B and Longwall 24A and the 200 Panels and Longwall 25 (i.e. mining on three sides of a corridor of intact coal) at Tahmoor Mine,
- Between Longwalls 8-12, Longwall 18 and Longwall 408 at Appin Colliery, and
- Between Longwalls 14-18, 301-302 and 401 at Appin Colliery.

The amount of increased subsidence in these areas has been generally been between 50 and 150 mm of subsidence above what was predicted using the IPM and generally low levels of tilt and strain were measured within these areas.

These areas of increased subsidence have not always been observed in these situations. For example, it was not observed between Longwalls 3-9 and Longwall 20 at Tahmoor Mine.

While observed subsidence may exceed predictions above the coal barrier between proposed Longwall 101 and previously extracted Longwall 2, between proposed Longwalls 101A to 106A and previously extracted Longwalls 14B to 19 and between proposed Longwalls 101A to 106A and Longwalls 101B to 106B, subsidence monitoring has shown that it is usually accompanied by relatively low systematic tilts, curvature and strains (less than 0.5 mm/m and usually within survey tolerance).

It is noted that the *Subsidence Study Area* encompasses the surface areas located directly above the coal barriers.

4.6. Predicted conventional horizontal movements

Tahmoor Coal commenced surveys of absolute horizontal movement during the mining of Longwall 25. The great majority of the surveys at Tahmoor Mine are now undertaken using 3D surveying techniques, including most of the pegs along the Main Southern Railway and within the monitoring network around the ends of Longwalls 25 to 32.

The maximum measured incremental horizontal movement to date has been 255 mm at Peg RE14 on Remembrance Drive during the mining of Longwall 26. The maximum measured incremental horizontal movement after the completion of Longwall 25 was 175 mm at Peg 25-21 along the Longwall 25 Centreline.

These horizontal movements are within the normal range in the Southern Coalfield at similar depths of cover.

Absolute horizontal movements by themselves do not directly impact on natural and built features, rather impacts occur as the result of differential horizontal movements. Strain is a measure of change of horizontal movement as was discussed in Sections 3.3 and 4.3. The impacts of strain movements on the natural and built features are addressed in the impact assessments for each feature, which have been provided in Chapters 5 through to 11.

4.7. Predicted far-field horizontal movements

As discussed in Section 3.5, in addition to the conventional subsidence movements that have been predicted above and adjacent to the proposed longwalls, far-field horizontal movements will also be experienced during the extraction of the proposed longwalls.

The observed incremental far-field horizontal movements resulting from the extraction of incremental longwall panels, in any location above goaf, i.e. above the currently mined or previously mined panels, or above solid coal, i.e. unmined areas of coal, are provided in Fig. 4.6. The observed incremental far-field horizontal movements above solid coal only, i.e. outside the extents of extracted longwalls, are provided Fig. 4.7. The confidence levels, based on fitted *Generalised Pareto Distributions* (GPDs), have also been shown in these figures to illustrate the spread of the data. It can be seen from Fig. 4.6 and Fig. 4.7 that the magnitude of the observed far-field horizontal movements over solid unmined areas of coal are lower and more consistent than the observed far-field horizontal movements over previously extracted panels.

A far field monitoring program was conducted by Tahmoor Coal during the extraction of Longwall 32 at key civil structures. The observed horizontal movements were within the normal range.

As successive longwalls within a series of longwalls are mined, the magnitudes of the incremental far-field horizontal movements decrease. This is possibly due to the fact that once the in-situ stresses within the strata have been redistributed around the collapsed zones above the first few extracted longwalls, the potential for further movement is reduced. The total far-field horizontal movement may be less, therefore, than the sum of the incremental far-field horizontal movements for the individual longwalls.

The predicted far-field horizontal movements resulting from the extraction of the proposed longwalls are very small and could only be detected by precise surveys. Such movements tend to be bodily movements towards the extracted goaf area, and are accompanied by very low levels of strain, which are generally less than the order of survey tolerance (i.e. less than 0.3 mm/m). The potential impacts of differential far-field horizontal movements on the natural and built features within the vicinity of the proposed longwalls are not expected to be measurable, with possibly the exception of the road and railway bridges, which are discussed in the impact assessments for these features in Chapter 5 through to 11.

No measurable differential movements were observed during the far field monitoring program conducted by Tahmoor Coal during the extraction of Longwall 32 at key civil structures. Some of these structures were located near or across mapped first order faults, including structures within the Picton Water Recycling Plant, the Picton Viaduct, the Victoria Bridge and the Argyle Street Railway Underbridge.

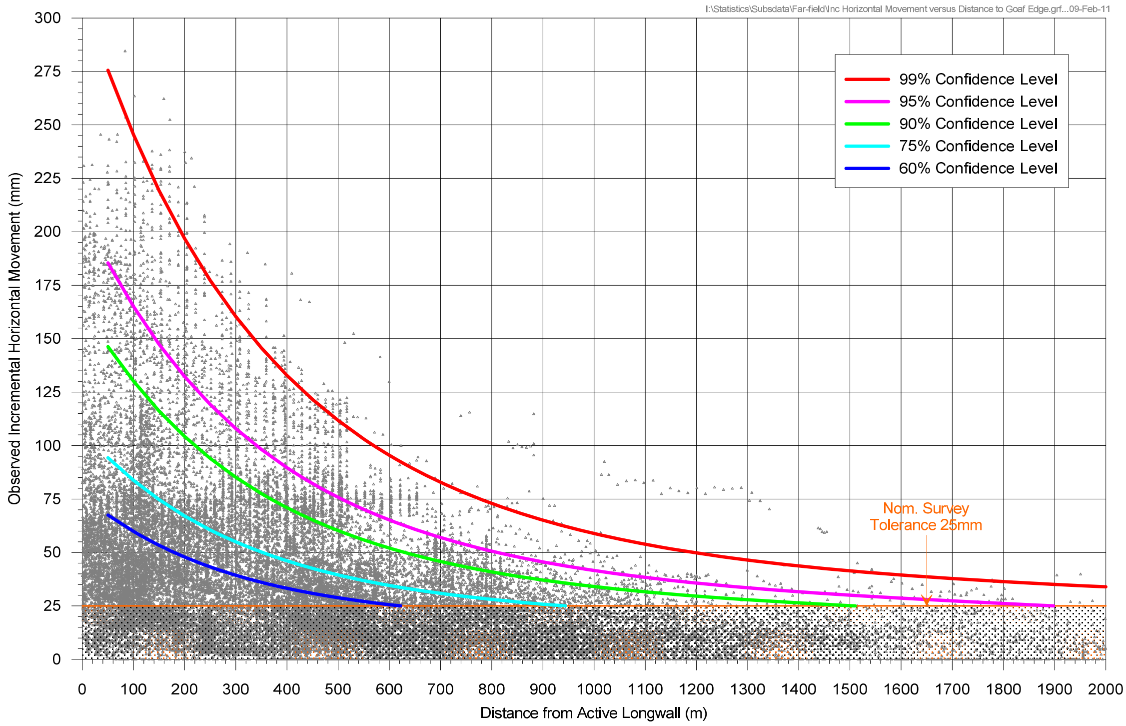


Fig. 4.6 Observed incremental far-field horizontal movements above goaf or solid coal

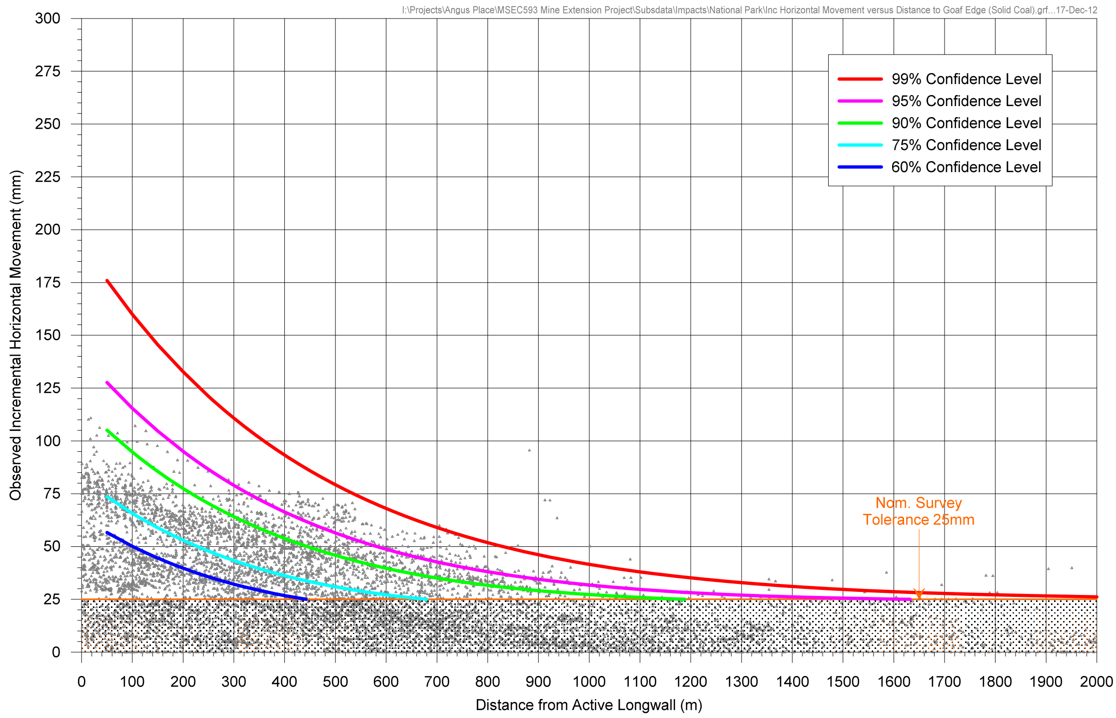


Fig. 4.7 Observed incremental far-field horizontal movements above solid coal only

4.8. Non-conventional ground movements

It is likely non-conventional ground movements will occur within and around the *Subsidence Study Area*, due to near surface geological conditions, steep topography and valley related movements, which were discussed in Section 3.4. These non-conventional movements are often accompanied by elevated tilts, curvatures and strains, which are likely to exceed the conventional predictions.

Specific predictions of upsidence, closure and compressive strain due to the valley related movements are provided for the streams in Section 5.3. The impact assessments for the streams are based on both the conventional and valley related movements. The potential for non-conventional movements associated with steep topography is discussed in the impact assessments for the steep slopes provided in Section 5.5.

In most cases, it is not possible to accurately predict the exact locations or magnitudes of the non-conventional anomalous movements due to near surface geological conditions. For this reason, the strain predictions provided in this report are based on a statistical analysis of measured strains in the Southern Coalfield, including both conventional and non-conventional anomalous strains, which is discussed in Section 4.3. In addition to this, the impact assessments for the natural features and surface infrastructure, which are provided in Chapters 5 through to 11, include historical impacts resulting from previous longwall mining which have occurred as the result of both conventional and non-conventional subsidence movements.

Mining beneath urban and semi-rural areas at Tahmoor and Thirlmere by Tahmoor Mine Longwalls 22 to 27 provides valuable "whole of panel" information. A plot of locations of potential non-conventional movement is shown in Fig. 4.8. The locations were selected based on ground monitoring results or observed impacts that appear to have been caused by non-conventional movement. A total of approximately 46 locations (not including valleys) have been identified over the five extracted longwalls. The surface area directly above the longwalls is approximately 5.2 km^2. This equates to a frequency of 9 sites per square kilometre or one site for every 11.3 hectares. The non- conventional movements were mainly characterised by elevated compressive ground strains that varied up to a maximum of approximately 5 mm/m.

A trend of non- conventional movements may be developing in the transition zone between the zones of maximum increased subsidence and normal subsidence.

The largest known case of non-conventional movement in the Southern Coalfield occurred above Appin Colliery Longwall 408 (Swarbrick, *et al.*, 2007). In this case, a low angle thrust fault was re-activated in response to mine subsidence movements, resulting in differential vertical and horizontal movements across the fault. Observations at the site showed that the non-conventional movements developed gradually over a period of time. Regular ground monitoring across the fault indicated that the rate of differential movement was less than 0.5 mm/day at the time non-conventional movements could first be detected. Subsequently as mining progressed, the rate of differential movement increased to a maximum of 28 mm/week.

A number of geological faults and other geological structures have been identified within the *Subsidence Study Area* and it is possible that non-conventional movements could develop along these geological structures, including the Nepean Fault.

4.9. General discussion on mining induced ground deformations

Longwall mining can result in surface cracking, heaving, buckling, humping and stepping at the surface. The extent and severity of these mining induced ground deformations are dependent on a number of factors, including the mine geometry, depth of cover, overburden geology, locations of natural jointing in the bedrock and the presence of near surface geological structures.

Faults and joints in bedrock develop during the formation of the strata and from subsequent distressing associated with movement of the strata. Longwall mining can result in additional fracturing in the bedrock, which tends to occur in the tensile zones, but fractures can also occur due to buckling of the surface beds in the compressive zones. The incidence of visible cracking at the surface is dependent on the pre-existing jointing patterns in the bedrock as well as the thickness and inherent plasticity of the soils that overlie the bedrock.

Surface cracking in soils as the result of conventional subsidence movements, i.e. away from valleys and steep slopes, is not commonly observed where the depths of cover are, for example, around 400 metres, such as the case within the *Subsidence Study Area*. Surface cracking that has been observed as the result of conventional subsidence movements has generally been relatively isolated and of a minor nature.

Cracking is found more often in the bases of valleys due to the compressive strains associated with upsidence and closure movements, which is discussed in Section 5.3. Cracking can also occur at the tops of steep slopes as the result of downslope movements, which is discussed in Section 5.5.

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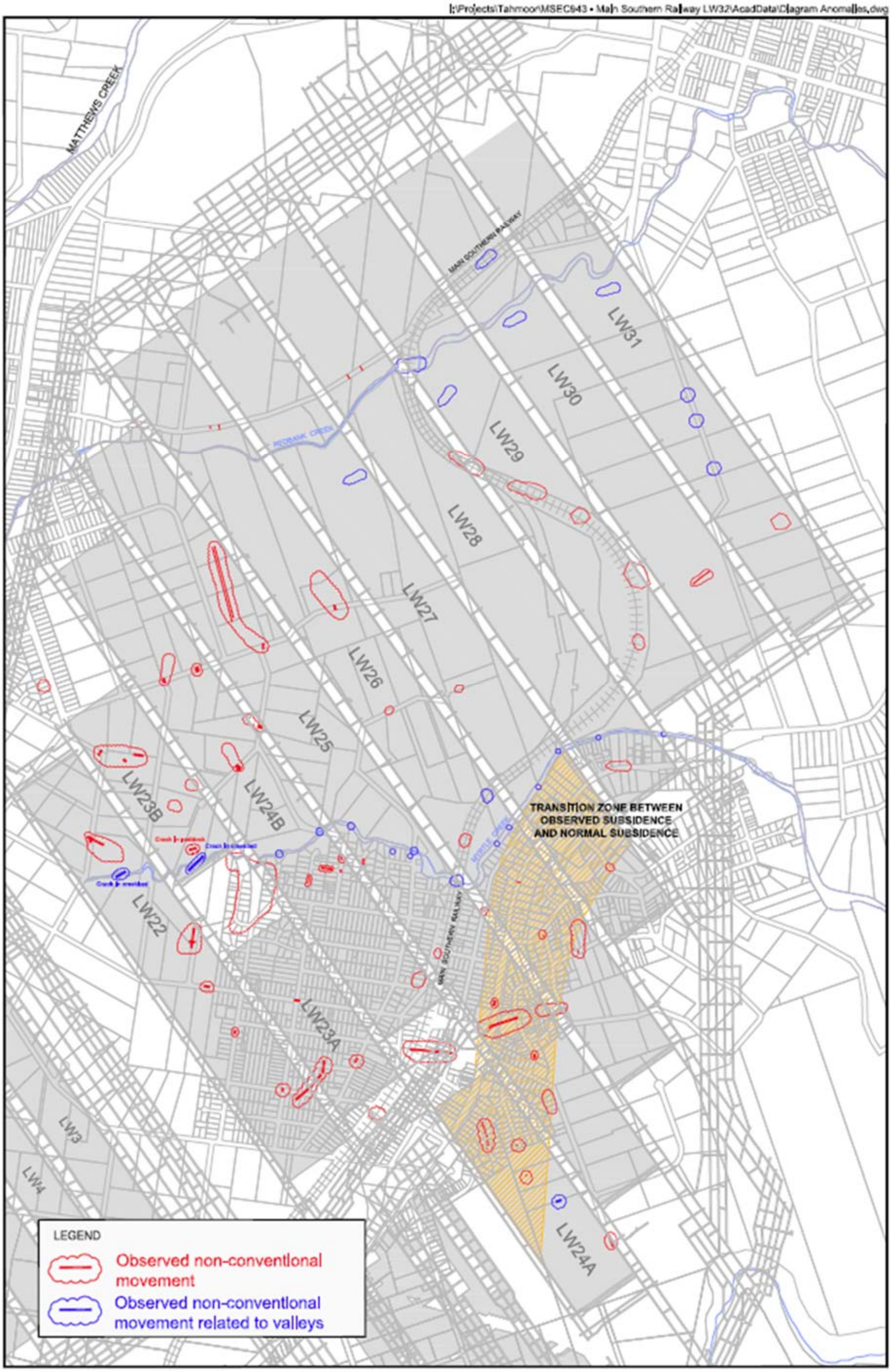


Fig. 4.8 Map showing locations of observed non-conventional movement above Tahmoor Mine Longwalls 22 to 31

Surface cracks are more readily observed in built infrastructure such as compacted road pavements. In many cases, no visible ground deformations can be seen in the natural ground adjacent to the cracks in the road pavements. In rare instances, more noticeable ground deformations, such as humping or stepping of the ground can be observed at thrust faults. Examples of ground deformations previously observed in the Southern Coalfield, where the depths of cover are 400 metres, or greater, are provided in the photographs in Fig. 4.9 to Fig. 4.12 below.

Localised ground buckling and shearing can occur wherever faults, dykes and abrupt changes in geology occur near the ground surface. The identified geological structures within the *Subsidence Study Area* are discussed in Section 3.8 and it is possible that ground deformations could develop where the Nepean Fault daylights on the surface. Discussions on irregular ground movements were provided in Section 4.8.

Fig. 4.9 Surface compression buckling observed in a pavement

Fig. 4.10 Surface tension cracking along the top of a steep slope

Fig. 4.11 Surface tension cracking along the top of a steep slope

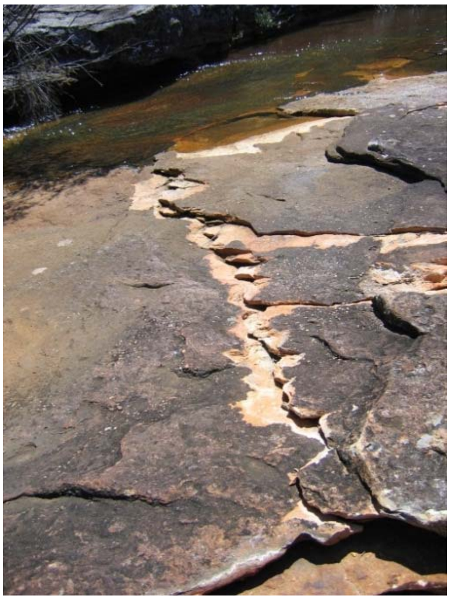


Fig. 4.12 Fracturing and bedding plane slippage in sandstone bedrock in the base of a stream

5.0 DESCRIPTIONS, PREDICTIONS AND IMPACT ASSESSMENTS FOR NATURAL FEATURES WITHIN THE SUBSIDENCE STUDY AREA

The following sections provide descriptions, predictions and impact assessments for natural features that have been identified within the *Subsidence Study Area*. The natural features located outside the *Subsidence Study Area*, which may be subjected to far-field movements or valley related movements and may be sensitive to these movements, have also been included as part of these assessments.

5.1. Catchment Areas or Declared Special Areas

The locations of the Metropolitan Special Area, the proposed amended longwalls, the *Extent of Longwalls* boundary and the *Subsidence Study Area* are shown in Drawing No. MSEC1060-07. The Metropolitan Special Area is a water catchment area that is controlled by WaterNSW.

The Metropolitan Special Area is shown in a light green shading in Drawing No. MSEC1060-07 and it can be seen that all the proposed longwalls are located to the north of and outside the boundary of the Metropolitan Special Area.

The nearest edge of the proposed amended longwalls from the nearest boundary of the Metropolitan Special Area is 255 metres, i.e. from the south west corner of the proposed Longwall LW106B. The minimum distance between of the *Extent of Longwalls* boundary and the boundary of the Metropolitan Special Area is 65 metres.

The water storages in the Metropolitan Special Area are the sole supply for the Macarthur and Illawarra regions and the townships of Bargo, Picton, Thirlmere, Tahmoor, The Oaks, Buxton and Oakdale, and provide approximately 20 % of the supply to the Sydney Metropolitan Area, via the Prospect and Macarthur Water Filtration Plants.

Predictions and impact assessments for natural features and items of infrastructure within these declared special areas are provided separately within this report.

5.2. The Bargo River

The location of the Bargo River is shown in Drawing No. MSEC1060-07. Descriptions, predictions and impact assessments for the river are provided in the following sections.

5.2.1. Description of the Bargo River

The Bargo River commences north of Colo Vale and near the townships of Hill Top and Yerrinbool and flows generally towards the north and to the west of the Bargo township. The Bargo River then flows to the west and north of the proposed Tahmoor South longwalls. The Bargo River then drains into the Nepean River approximately 4.9 kilometres north-east of the proposed Longwall 101A.

Only a 165 metres long length of the Bargo River that is immediately upstream from the Picton Weir is located inside the *Subsidence Study Area.* This length of the river that is within the *Subsidence Study Area* is a 4^{th} order perennial stream as defined by the Strahler Stream Order Method.

The surface water flows in this section of the river are controlled by the Picton Weir, (also called the Bargo Weir) with discharge regulated by a fixed discharge valve. The reservoir is emptied following extended dry periods, but it is quickly filled with the spillway overtopping following large storm events. The following article from the Picton Post, dated 1945, provides some background;

> *"The existing dam was built to T.W.L.912 in 1899, the lowest foundation being at R.L.887, which was a few feet below river bed level. In 1910 the wall was raised to T.W.L.920, giving a storage of 37 m.g."*
>
> *"During the recent drought the water level dropped considerably, and it was ascertained that the dam had silted up. It is understood that the silt level is approximately at R.L.904, which would leave an available storage, if this level were uniform, of 33 m.g. It is quite probable that the silt level in the upper reaches of storage is higher."*

The water stored by the Picton Weir was initially used to supply the nearby communities, but, after pipes were laid from the much larger Nepean Dam, Bargo, Thirlmere, Picton and The Oaks were supplied water from the Nepean Dam (now through the Nepean Water Filtration Plant), and the water from the Picton Weir is no longer used for town water supply.

The reports by Fluvial Systems (2013) and Hydro Engineering and Consulting (2020a) provide a detailed description of the River.

The 165 metre length of the Bargo River that is immediately upstream from the Picton Weir and located inside the *Subsidence Study Area* is approximately 890 metres from the nearest amended longwall panel, i.e. the north west corner of the proposed Longwall LW106A, and this section of the river is also 500 metres from the nearest part of the *Extent of Longwalls* boundary.

Further downstream and to the north of the proposed longwalls, the minimum distance between the other sections of the Bargo River and the proposed amended longwalls is 690 metres, i.e. to the nearest corner of LW102A. A summary of the minimum distances between the river and the proposed longwalls is provided below in Table 5.1.

Table 5.1 Minimum distances of the proposed longwalls from the Bargo River

Longwall	Minimum distance from the centreline of Bargo River (m)
LW101A	740
LW102A	690
LW103A	720
LW101B	1700
LW102B	1990
LW103B	2300
LW104B	2720
LW105B	2490
LW106B	2250
LW107B	2030
LW108B	1850
LW104A	770
LW105A	830
LW106A	890

The overall valley depth of the 165 metre length of the Bargo River that is within the *Subsidence Study Area* and just upstream of the Picton Weir is 90 metres. Further downstream towards the finishing ends of the proposed amended Longwalls 101A to 106A, the overall depth of the Bargo River valley varies from 90 metres down to 50 metres with the steeper sections of the valley comprising cliffs, rock outcrops and talus slopes in a number of locations. As shown in Drawings No. MSEC1060-01 and MSEC1060-07, Tahmoor Mine extracted longwalls LW14 to LW19 under parts of this section of the Bargo River valley.

The river bed that is within the *Subsidence Study Area boundary* and is upstream from the weir is occasionally exposed after extensive dry climate conditions, i.e. when the water levels fall exposing the silted-up river bed. The river bed downstream from the Weir consists of a series of pools, rockbars, riffles and boulder fields. Between the Weir and previously extracted Tahmoor LW19, the river bed falls 15 metres over approximately 2,200 metres, i.e. at an average natural gradient of this section of the river is around 7 mm/m (i.e. <1 %, or 1 in 150).

5.2.2. Predictions and impact assessments for the Bargo River

A summary of the maximum predicted values of total subsidence, upsidence and closure for the Bargo River within the Subsidence Study Area, resulting from the extraction of the proposed amended longwalls, is provided in Table 5.2.

Table 5.2 Maximum predicted total subsidence, upsidence and closure for the lengths of the Bargo River within the Subsidence Study Area due to extraction of the amended longwalls

Location	Longwalls	Maximum predicted subsidence (mm)	Maximum predicted upsidence (mm)	Maximum predicted closure (mm)
Bargo River immediately upstream from Picton Weir	After LW108B	< 20	< 20	< 20

At this distance from the amended longwall panels and with these low predicted ground movements, the river is not expected to experience any noticeable subsidence or upsidence movements.

If the proposed longwalls were to be shifted, reorientated, extended or shortened, it would be expected that the maximum predicted conventional and valley related movements for the Bargo River would be similar to those provided above, provided that the setback distances from the River are similar.

However, if the longwalls were moved closer to boundary of the *Extents of Longwalls,* then, slightly higher subsidence would result at this section of the river, (but still likely to be less than 20 mm) and higher levels of upsidence and valley closure would occur, (but still likely to be less than 100 mm). As the river will still not be mined under, the resulting impacts would still be manageable. It is suggested that, if Tahmoor Coal does move the longwalls closer to the river than is currently shown in the proposed amended longwall plan, then the predictions of subsidence, upsidence and valley closure and the assessments of the resulting impacts on this section of the river should be updated.

There has been a long history of mining directly beneath or near the Bargo River at Tahmoor Mine. While impacts have occurred when various previously extracted longwalls were mined directly beneath the river, (refer Section 5.3.4), impacts have been not observed when mining has been undertaken more than 500 metres away from the river.

Previously extracted Longwall 24A was approximately 340 metres from the river at its closest point and Longwall 25 was approximately 510 metres from the river. Ground surveys measured very little vertical subsidence (less than 20 mm) and closure (less than 10 mm) occurred even though at this section of the river the gorge was 80 metres deep. Impacts to the river were not observed during the extraction of these longwalls.

Based on the previous experience at Tahmoor Mine, it is unlikely, that the extraction of the proposed longwalls would result in any adverse impacts on the river. Even if the predictions and impact assessments were exceeded, the likelihood of pool drainage is considered extremely low given the water flows in the river.

Further detailed discussions on the impacts and consequences of changes in the surface water flows are provided in the report by Hydro Engineering and Consulting (2020a).

5.2.3. Management of potential impacts on the Bargo River

Tahmoor Coal has previously developed Subsidence Management Plans to manage potential impacts on streams during the mining of longwalls, including the Bargo River. The management plans include monitoring and triggered response plans. They include monitoring of the required pre-mining conditions and data collection during mining. Monitoring typically continues for a period following mining.

While the proposed longwalls do not mine directly beneath the Bargo River, it is recommended that Tahmoor Coal monitor changes in the Bargo River during the extraction of proposed Tahmoor South longwalls.

5.3. Streams

5.3.1. Descriptions of the streams

The locations of the streams within the *Subsidence Study Area* are shown in Drawing No. MSEC1060-07. A summary of the major streams within the *Subsidence Study Area* is provided below in Table 5.3.

The reports by Fluvial Systems (2013) and Hydro Engineering and Consulting (2020a) provide a description of the streams.

Table 5.3 Streams within the Subsidence Study Area

Location	Strahler Stream Order	Description
Dog Trap Creek	3rd Order	Located directly above the proposed LW101B, and 103B to LW108B, with a total length of 2.8 kilometres directly mined beneath. LW12 and LW13 have been previously mined beneath a 1.0 kilometre section downstream of LW101B
Hornes Creek	4th Order	Not directly mined beneath, located outside *Extents of Longwalls* and 540 metres south-west of proposed amended LW108B
Teatree Hollow	3rd Order	Located directly above the proposed LW101A to LW106A, with a total length of 2.1 kilometres directly mined beneath. LW1 and LW2 have been previously mined beneath a 0.5 kilometre section downstream of LW101A
Tributary 1 to Dog Trap Creek	2nd Order	Located directly above the proposed LW101B to LW108B, with a total length of 2.6 kilometres directly mined beneath
Tributary 2 to Dog Trap Creek	2nd Order	Located directly above the proposed LW101B to LW107B, with a total length of 2.4 kilometres directly mined beneath
Tributary to Teatree Hollow	3rd Order	Located directly above the proposed LW101A to LW103A, and LW105B to 106B, with a total length of 1.2 kilometres directly mined beneath

The streams have flow controlling features along their alignments that include; rockbars, riffles, knick points and debris accumulations. The locations of pools along the streams were determined by the specialist geomorphology consultant, (Fluvial Systems, 2013), and the locations of the pools are shown in Drawing No. MSEC1060-09 and MSEC1060-10.

Example photographs of the streams within the *Subsidence Study Area* are shown in Fig. 5.1 and Fig. 5.2.

Fig. 5.1 Pool DTC-P32 in Dog Trap Creek directly above proposed Longwall 101B

Fig. 5.2 Pool DTC-P03a in Dog Trap Creek at Bargo Road directly above proposed Longwall 104B

The geomorphology report (Fluvial Systems, 2013) describes the streams' characteristics and extracts from the report are provided below:-

"*The streams of the Project Area were of two main types – headwater and gorge. Being bedrock controlled, they are naturally resilient to geomorphic change. The majority of streams were in a stable, close to natural geomorphic condition. Some streams were impacted by factors that marginally reduced their geomorphic condition. These factors included clearance of riparian trees, licenced discharges, incision, mobile knickpoints, and filamentous algae. Some streams were affected by loss of water to the subsurface over short reaches, and others were impacted by ferruginous seeps and suspended colloids. These factors do not have strong implications for geomorphic condition, but they could have relevance for ecological condition*".

"*A wide range of channel bed materials was observed over the Project Area. Mud was more prevalent in small streams on the plateau, but it was also occasionally present in the lower reaches of tributary streams. Sand, gravel, coble and bedrock were commonly found throughout the Project Area. Bed material dominance showed a spatially variable pattern. Mud (in headwaters), boulder and bedrock were the most common dominant bed materials*".

"*Exposed bedrock was commonly observed in streams throughout the Project Area. Streams with particularly frequent bedrock features in their beds were Lower Eliza Creek and* [two tributaries to the Bargo River]*. The frequency of bedrock features was also high in Dog Trap Creek, Cow Creek and Dry Creek, but less so in Carters Creek, Hornes Creek and Teatree Hollow. The observed frequency of bedrock features in the bed of Bargo River was an underestimate because at the time of sampling, for most of its length the water was too deep to permit observation of the bed*".

"*Knickpoints were common in streams within the Project Area*" and "*Soft knickpoints were found mainly on small, plateau streams running through both cleared and uncleared land. Hard knickpoints were found in steeper streams*".

"*In-channel pools were common in streams within the Project Area. The frequency of pools was highest on Dog Trap Creek, Dry Creek and Cow Creek. Teatree Hollow had a lower frequency of pools compared to other creeks. The pools were of widely varying dimensions, with the largest observed pool being Mermaids Pool. The depth of Mermaids Pool was not measured in the field; its depth of 12 m was reported by National Parks Association Macarthur (2006)*".

"Boulders was the most common type of hydraulic control on pools, with 47% being boulders, 33% rock bars, 12% high points of cohesive material, 8% gravel, cobble or sand bars, and 1% artificial material. The spatial distribution of hydraulic control type was variable".

"Grass cover on the low flow channel was found on all of the small headwater streams of the creeks in the Project Area, but it was uncommon in 2nd order streams and higher. Dry Creek was an exception, but Dry Creek has a small catchment area, so it is a relatively low energy stream".

"Ferruginous seeps in rocks close to stream channels were uncommon in the Project Area. One seep was observed on DT2-1 (Dog Trap Creek), and one on CA2-1 (Carters Creek). The seep on Dog Tap Creek covered a very small area of a few square centimetres, while the seep on Carters Creek was more substantial. The seep on Carters Creek was clearly related to emergence of water to the creek that had seeped through the wall of a farm dam located immediately upstream. The creek water downstream of this ferruginous seep was not discoloured".

5.3.2. Predictions for the streams

The predicted profiles of subsidence, upsidence and closure, using the IPM subsidence model and the 2002 ACARP valley closure prediction model, along the streams within the *Subsidence Study Area* are shown in Figs. E.03 to E.08, in Appendix E. The predictions are based on the extraction of the proposed amended longwalls, as shown in Drawing No. MSEC1060-07. The predicted total profiles along the alignments of the streams, after the completion of each of the proposed amended longwalls, are shown as solid blue lines.

A summary of the maximum predicted values of total subsidence, upsidence and closure for the streams is provided in Table 5.4.

Table 5.4 Maximum predicted total subsidence, upsidence and closure for the streams

Location	Figure no. (Appendix E)	Maximum predicted subsidence (mm)	Maximum predicted upsidence (mm)	Maximum predicted closure (mm)
Dog Trap Creek	E.03	1,550*	575*	425*
Hornes Creek	E.04	20	20	20
Teatree Hollow	E.05	1,350*	375*	250*
Tributary 1 to Dog Trap Creek	E.06	1,600	750	750
Tributary 2 to Dog Trap Creek	E.07	1,575	525	450
Tributary to Teatree Hollow	E.08	1,250	400	350

** Note: downstream sections of Dog Trap Creek and Teatree Hollow have been previously mined beneath by LW12 and LW13 and by LW1 and LW2, respectively, at Tahmoor Mine. The maximum predicted parameters provided in the above table include those resulting from the extraction of these earlier longwalls.*

The streams, which are located directly above the proposed longwalls, could experience the full range of predicted subsidence movements. A summary of the maximum predicted conventional subsidence movements within the *Subsidence Study Area* is provided in Chapter 4.

5.3.3. Predicted changes in stream gradients

The natural and the predicted post mining surface levels and grades along Dog Trap Creek, Hornes Creek and Teatree Hollow are illustrated in Fig. 5.3 to Fig. 5.5 and indicated in Fig. E.05 to E.07. The natural grades along the streams vary between 5 mm/m and 50 mm/m above the proposed longwalls. The predicted maximum tilts, therefore, are similar to the natural grades along the flatter sections of the streams.

The predicted maximum decreasing tilts (i.e. potential for increased ponding) along the streams vary from less than 0.5 mm/m (i.e. 0.05 %, or 1 in 2,000) along Hornes Creek, to 10 mm/m (i.e. 1.0 %, or 1 in 100) along Dog Trap Creek. The predicted increasing tilts (i.e. potential for increased scouring) along the streams vary from less than 0.5 mm/m (i.e. 0.05 %, or 1 in 2,000) along Hornes Creek, to 8 mm/m (i.e. 0.8 %, or 1 in 125) along Dog Trap Creek and Teatree Hollow.

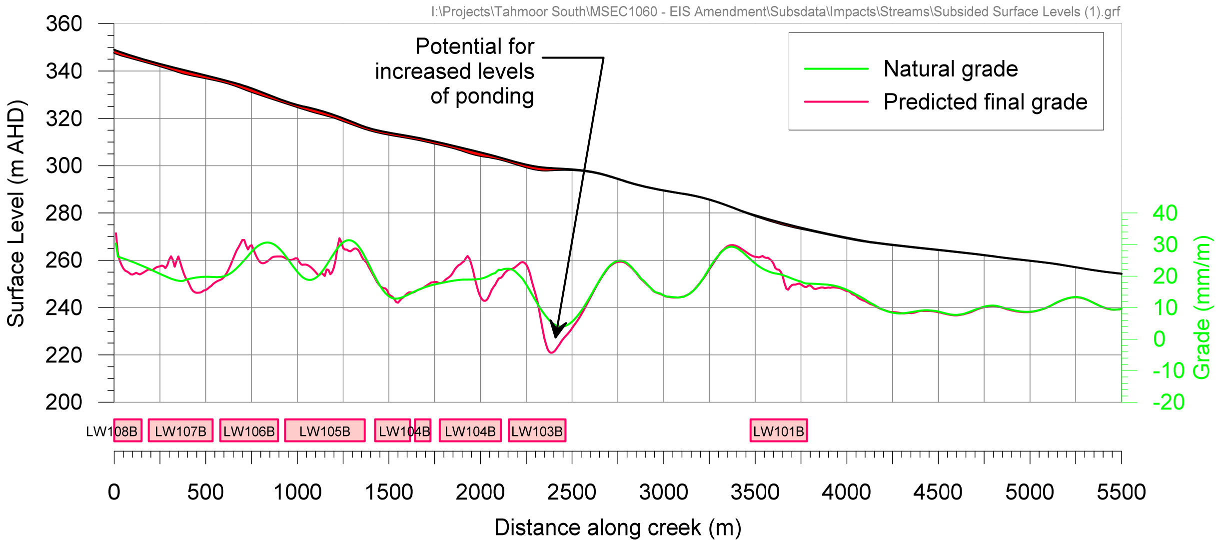


Fig. 5.3 Natural and predicted post mining surface levels along Dog Trap Creek

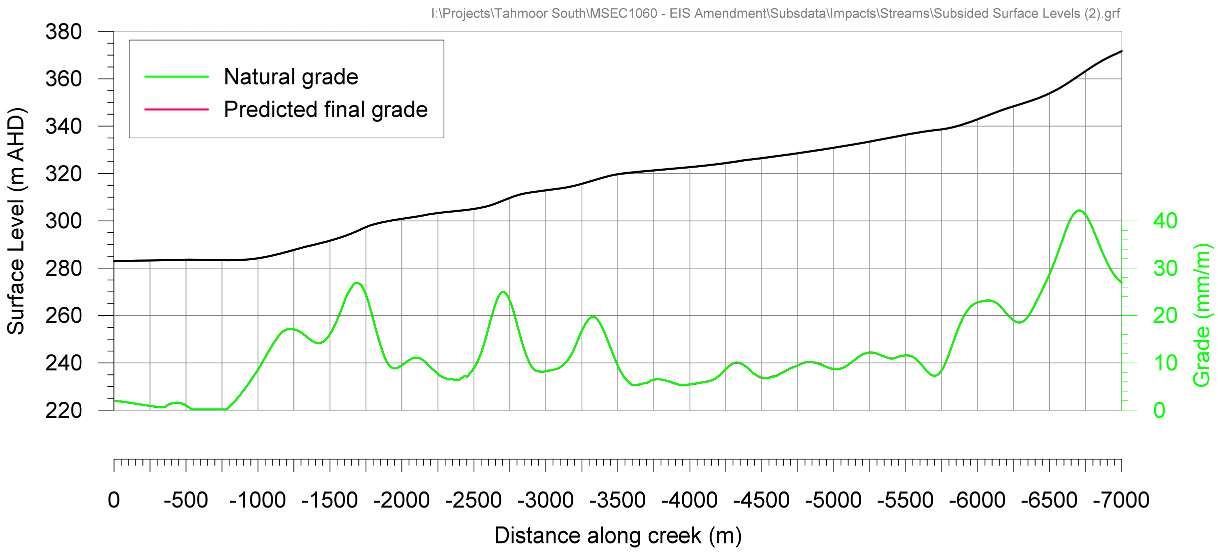


Fig. 5.4 Natural and predicted post mining surface levels along Hornes Creek

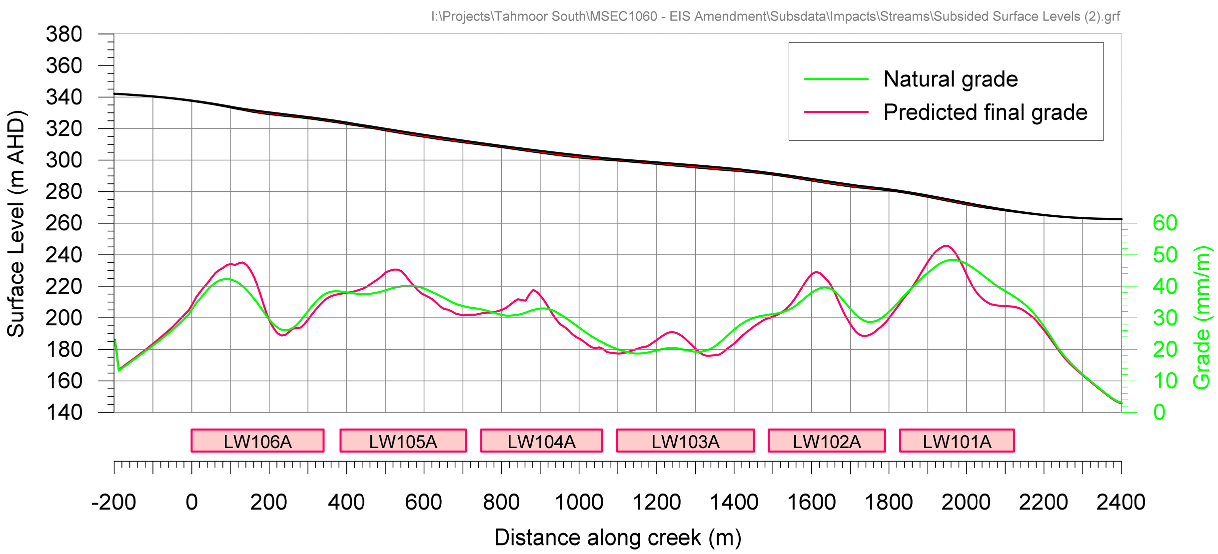


Fig. 5.5 Natural and predicted post mining surface levels along Teatree Hollow

A summary of the maximum predicted changes in grade and the predicted curvatures, due to the conventional subsidence resulting from the extraction of the proposed longwalls, is provided in Table 5.5. The maximum predicted increases in grades occur downstream of the longwall goaf edges, whilst the maximum predicted decreases in grade occur upstream of the longwall goaf edges.

The predicted changes in grade provided in Table 5.5 are the maxima along the alignments of the streams after the extraction of any or all of the proposed longwalls. The predicted curvatures are the maxima in any direction at any time during or after the extraction of the proposed longwalls.

The streams will also experience strains resulting from far field movements and valley related movements and discussions are provided in Section 5.3.4 on the impact assessments from these movements.

The locations of the pools along the streams are shown in Drawing Nos. MSEC1060-09 and MSEC1060-10. A summary of the maximum predicted subsidence, upsidence and closure at the pools is provided in Table D.01, in Appendix D.

Table 5.5 Maximum predicted changes in grade along the streams

Location	Maximum change in grade (mm/m)		Maximum conventional curvature (km^{-1})	
	Increase in grade	Decrease in grade	Hogging curvature	Sagging curvature
Dog Trap Creek	8.0	10.0	0.14	0.28
Hornes Creek	< 0.5	< 0.5	< 0.01	< 0.01
Teatree Hollow	8.0	7.5	0.14	0.22
Tributary 1 to Dog Trap Creek	7.5	8.0	0.12	0.25
Tributary 2 to Dog Trap Creek	7.0	8.0	0.16	0.24
Tributary to Teatree Hollow	7.0	6.5	0.10	0.21

5.3.4. Impact assessments for the streams

The impact assessments for the streams within the *Subsidence Study Area* are provided in the following sections. The assessments provided in this report should be read in conjunction with reports by Hydro Engineering and Consulting (2020a) and Niche (2020a and 2020b), which assess the consequences of the impacts on surface water flows and ecology.

Potential for increased levels of ponding, scouring or desiccation due to mining tilt

Mining can potentially result in increased levels of ponding in locations where the mining induced tilts oppose and are greater than the natural stream gradients that exist before mining. Mining can also potentially result in an increased likelihood of scouring of the stream beds in the locations where the mining induced tilts considerably increase the natural stream gradients that exist before mining.

It can be seen from Fig. 5.3 that there is a predicted reversal of grade along a naturally flat section of Dog Trap Creek, upstream of the tailgate of Longwall 103B. Hence there is increased potential for ponding upstream of this location, which is estimated to be up to 0.2 metres deep and 150 metres long. Elsewhere, there are no other predicted reversals of grade due to the proposed mining.

It is possible that there could be localised areas along the streams which could experience small increases in the levels of ponding, where the predicted maximum tilts occur in the locations where the natural gradients are low. As the predicted changes in grade are typically less than 1 %, however, any localised changes in ponding are expected to be minor and not result in adverse impacts on these streams.

It can also be seen from the above figures that the stream gradients increase where they flow into the predicted subsidence trough near the edges of the proposed longwalls. The streams flow predominantly over Hawkesbury Sandstone, which has a high resilience to scouring. As discussed in the report by Fluvial Systems (2013), mud was commonly found in the channel bed with soft knickpoints in small streams on the plateau. The predicted maximum increases in grade are up to 0.8 %, which are relatively small compared to the natural gradients and, therefore, the potential for increased scouring is not expected to be substantial.

Further discussions on the potential changes in ponding and flooding along the streams and the impacts, consequences and implications of the changes are provided by the specialist surface water consultant in the report by Hydro Engineering and Consulting (2020a).

Potential for fracturing and surface water flow diversion in the streams

Where the longwalls mine directly beneath the streams it is considered likely that fracturing could result in surface water flow diversions. Upsidence and compressive strains due to valley closure are expected to be of sufficient magnitude to cause the underlying strata to buckle and induce cracking at the surface at some locations. This can lead to the diversion of water from the stream beds into the dilated strata beneath it.

It is unlikely, however, that there would be any net loss of water from the catchment since any redirected flow would not intercept any flow path that would allow the water to be diverted into deeper strata or the mine.

Geotechnical and groundwater reports by Strata Control Technology (2013) and HydroSimulations (2020) present further discussions on the impacts, consequences and implications of the changes and potential for hydraulic connectivity from surface to seam.

The maximum predicted conventional curvatures for the streams located directly above the proposed longwalls are 0.16 km^{-1} hogging and 0.28 km^{-1} sagging, which equate to minimum radii of curvature of 6.3 kilometres and 3.6 kilometres, respectively.

The range of non-valley related movement strains above the proposed longwalls is expected to be similar to the range of strains measured during the previously extracted longwalls in the Southern Coalfield, which is described in Section 4.3 and the results illustrated in Fig. 4.4. It is also likely that the streams would experience elevated compressive strains as a result of valley closure movements.

The compressive strains resulting from valley related movements are more difficult to predict than conventional strains. It has been observed in the past, however, that compressive strains due to valley related movements between 10 mm/m and 20 mm/m (over a standard 20 metre bay length) have occurred above previously extracted longwalls at similar depths of cover, where the magnitudes of closure were similar to those predicted for the streams in the *Subsidence Study Area*.

It has been observed in the past, that the depth of buckling and dilation of the uppermost bedrock, resulting from longwall mining, is generally less than 10 metres to 15 metres (Mills 2003, Mills 2007, and Mills and Huuskes 2004).

If substantial fracturing were to occur, partial or complete diversion of surface water and drainage of pools could occur at locations and times where the rate of flow diversion is greater than the rate of incoming surface water. The majority of the streams are ephemeral and so water typically flows during and for a period of time after each rain event. In times of heavy rainfall, most of the runoff would flow over the beds of the streams and would not be diverted into the dilated strata below the stream beds. In times of low flow, however, some or all of the water could be diverted into the strata below the stream beds for those sections of the streams that are located over the mined panels.

While much of the channel beds are exposed bedrock, Fluvial Systems (2013) report that sand, gravel, cobble and mud were also commonly found in the channel beds throughout the Project Area. Where such loose materials occur, it is possible that fracturing in the bedrock would not be seen at the surface. In the event that fracturing of the bedrock occurs in these locations within the alignments of the streams, the fractures may be filled with soil during subsequent flow events reducing the flow through the fractures.

Tahmoor Mine has previously extracted longwalls beneath streams and their ability to naturally fill mining-induced fractures has varied, mainly depending on the availability of sediment.

- Longwalls 1 and 2 were mined in 1987 directly beneath a 500 metre section of Teatree Hollow immediately downstream of the proposed longwalls. Bord and pillar workings with secondary extraction also took place prior to longwall mining directly beneath this stream.

  Substantial fracturing was observed by Fluvial Systems (2013) at one location in a small tributary to Teatree Hollow (Site TT1-18) directly above the bord and pillar workings with secondary extraction. It is likely that this fracturing was mining-induced.

  No flow diversions were reported at this location, nor in other sections of Teatree Hollow located directly above Longwalls 1 and 2. Water flows in the section of Teatree Hollow, which is located above the previously extracted longwalls and secondary extraction workings, were greatly controlled by Tahmoor Mine's licensed discharge LDP4 and this has likely aided in filling the mining-induced fractures.

- Longwalls 8, 10 to 13 were mined between 1991 and 1994 directly beneath a 2.0 kilometre section of the Bargo River and directly beneath a 1.0 kilometre section of Dog Trap Creek.

  These were the first series of longwalls to be mined directly beneath the Bargo River at Tahmoor Mine. Very little monitoring of the river occurred during this time, although extensive protective works were undertaken at the Rockford Road Bridge that was located over Longwall 12.

Surface fracturing of exposed bedrock was observed near to the supporting piers of the Bridge following the extraction of Longwalls 12 and 13. Fractures were also observed in flute holes downstream of the bridge over the goaf edge of Longwall 13, which were first observed during the extraction of Longwall 12 (Holla and Barclay, 2000). The fractures were localised and did not consistently run along the length of the river valley. They appeared to be the result of localised shearing and compressive buckling and some fractures were located where there was noticeable cross bedding within the river bed. There were no reports of impact to water flows along this section of river.

While surface fracturing is still visible in the flute holes that are located on a large, exposed rockbar, surface water diversion is not evident and large pools exist directly above the previously extracted longwalls, as Tahmoor Mine's licensed discharge has contributed a base flow to this section of the Bargo River.

Fig. 5.6 Large pool in the Bargo River, located upstream of Rockford Road Bridge, directly above previously extracted Longwall 12

Very little monitoring of the Dog Trap Creek occurred when Longwalls 12 and 13 mined directly beneath it, although extensive monitoring and works were undertaken at the small Road Bridge over Dog Trap Creek on Arina Road. No surface fractures are visible in the stream at the location, however, and pools are observed to exist. It is noted that this section of Dog Trap Creek contains plenty of sediment that could assist in the filling of fractures.

Fig. 5.7 Ponded water in Dog Trap Creek near bridge over Arina Road above previously extracted Longwall 13

- Longwalls 14 to 19 were mined between 1995 and 2002 directly beneath a 1.7 kilometre section of the Bargo River. As shown in Table 5.1, this section of river is located between 725 metres and 950 metres north-west of the proposed Longwalls 101A to 106A.

  Limited monitoring indicated little impact on the River during the extraction of Longwalls 14 to 17. Fracturing was not observed on the surface, although many sections were concealed by alluvial and talus deposits.

  The first adverse impacts on the river were reported in January 2002, after the extraction of Longwall 18, when residents alerted Tahmoor Mine to reduced pool levels downstream of the mining area. At that time there was very little water in the Picton Weir due to low rainfalls and surface flows from the weir had reduced to a mere trickle. Inspections along the river indicated minor fracturing of rock shelves in the river bed and drainage of some shallow pools.

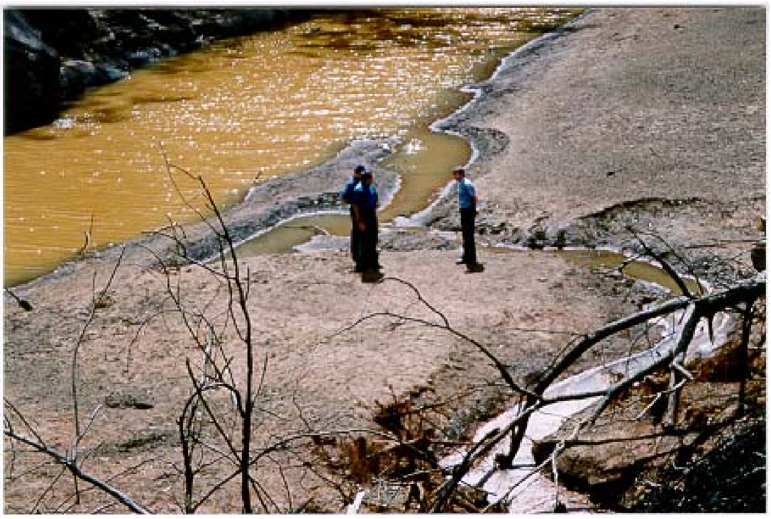


Fig. 5.8 Immediately upstream of Picton Weir – January 2002

Detailed subsidence monitoring of survey pegs within the Bargo River over the centre of Longwall 18 after LW18 was extracted, i.e. in October 2001 had indicated that total upsidence in the base of LW18 was 250 mm, the total valley closure was approximately 400 mm and the maximum measured valley closure strain was 15 mm/m.

The inspections in January 2002 found that the river had been drained directly above Longwall 18 and the length of drainage extended downstream for some distance beyond Longwall 14.

Shortly after this time a large rainfall event occurred, which filled the Weir and restored surface water flows along the River. A dry period followed and by July 2002 the Picton Weir was empty again and the extraction of Longwall 19 was completed. Inspections showed that surface flows ceased again, with the furthest drained pool from the longwalls being located 125 metres upstream of LW19. This coincided with the completion of this longwall.

Detailed subsidence monitoring of survey pegs within the Bargo River over the centre of Longwall 18 after LW19 was extracted indicated that total upsidence in the base of LW18 was 450 mm, the total valley closure was approximately 700 mm and the maximum measured valley closure strain was 18 mm/m.

A further period of heavy rainfall occurred in February 2003 which then refilled the upstream sections of Picton Weir which then overtopped (see Fig. 5.9 and Fig. 5.10).

Fig. 5.9 Picton Weir 1st February 2003

Fig. 5.10 Picton Weir 24th February 2003

After this large storm, it was then observed that the water flows along the surface above the longwalls were progressively restored even during the following drier periods. It is believed that the high sediment load in the river, that was retained by the Picton Weir except when it is overtopped, had been washed down the river and filled in the mining induced fractures in the bedrock reducing the loss of surface water flows.

The extraction of Longwalls 14 to 19 also mined directly beneath small tributaries to the Bargo River. Fluvial Systems (2013) reports fracturing and surface flow diversions in two unnamed tributaries, which are located above previously extracted Longwalls 15 and 19. The stream channel bed in this was exposed bedrock.

- Longwalls 22 to 28 were mined between 2004 and 2014 beneath a 3 kilometre section of Myrtle Creek.

The impacts observed along this creek were localised bed cracking in exposed sandstone areas, surface flow diversions in four locations over Longwalls 22, 23B and 25 as well as cracking in soil within the upper banks and flanks over Longwall 23B. Three areas of isolated cracking of exposed sandstone were also observed in the base or sides of generally dry pools above Longwall 25.

The extraction of Longwalls 26 to 28 has resulted in further mining-induced fractures on exposed bedrock. At times of low flow, pools have been observed to drain.

- Longwalls 25 to 32 have mined, since 2008, beneath a 2.8 kilometre section of Redbank Creek.

  The impacts observed along the creek were cracks along most pools located directly above Longwalls 25 to 32. At times of low flow, pools have been observed to drain. Stream flow re-emerges in a section of the creek downstream from Longwall 32.

Based on the previous experience of mining beneath streams at Tahmoor Mine, it is likely that fracturing and surface flow diversions will occur in the sandstone bedrock along the streams over Tahmoor South, particularly for streams that are located directly above the proposed longwalls. In some of these locations, the fracturing could impact the holding capacity of the standing pools, particularly those located directly above the proposed longwalls. It is unlikely, however, that there would be any net loss of water from the catchment.

Where there are substantial sediment accumulations upstream of these areas, it is expected that some of the fractures would be naturally filled over time with sediment during subsequent flow events, as was observed in the Bargo River. Where little sediment is present, the impacts are likely to remain for longer periods of time and remediation may be required after the completion of mining, which could include sealing these fractures and voids with grout.

With respect to streams or sections of streams located away from the proposed longwalls, the likelihood of fracturing and surface flow diversions reduces substantially compared to stream sections located directly above the proposed longwalls. The furthest known rockbar impact site where fracturing resulted in the diversion of surface water was at Pool F in the Waratah Rivulet that was being affected by a previously extracted longwall on one side and by the end of another longwall, i.e. the rockbar was located over solid unmined coal, but it was located in the corner between two longwalls. This site was located 160 metres to the side of one longwall and 230 metres from the approaching face of the active longwall. Surface water diversions have also been observed at three sites from the sides of longwalls at distances between 125 metres and 100 metres at the Bargo River, Waratah Rivulet and Native Dog Creek. Surface water diversion has only been observed at one site at Pool G1 in the Waratah Rivulet beyond the ends of the longwalls and in this case the closest distance was approximately 75 metres.

Minor and isolated fracturing could also occur outside the extents of the proposed longwalls. The furthest distance of an observed fracture from longwall mining was at the base of Broughtons Pass Weir, which was located approximately 415 metres from Appin Colliery Longwall 401. Another minor fracture was also recorded in the upper Cataract River, approximately 375 metres from Appin Colliery Longwall 301. This fracture occurred in a large rockbar, which was formed in thinly bedded sandstone, which had experienced movements from nearby previously extracted longwalls. These are the furthest most recorded fractures from longwall mining in the NSW Coalfields.

Further discussions on the potential impacts of surface cracking and on changes in surface water flows are provided in the reports by Hydro Engineering and Consulting (2020a) and Niche (2020a and 2020b).

If the proposed amended longwalls were to be shifted or reorientated, it would be expected that the maximum predicted conventional and valley related movements for the streams would be similar to those provided above, provided that the setback distances from the streams are similar. Whilst different sections of the streams would be predicted to experience greater or lesser movements, depending on their locations relative to the positions of the longwalls, the overall levels of movement along the extents of the streams would not be expected to change substantially.

However, if the final position of the proposed longwalls were moved closer to boundary of the *Extents of Longwalls,* then the predicted levels of subsidence along those streams, such as Hornes Creek, would increase and increased levels of upsidence and valley closure would be predicted. As the creek will not be directly mined under and the offset distance from the proposed longwalls to Hornes Creek will be greater than 250 metres, the resulting impacts would still be minor.

It is recommended that if Tahmoor Coal plan to move the proposed longwalls closer towards Hornes Creek than is shown in the currently proposed amended longwall panel layout, then updated calculations of the predicted levels of subsidence, upsidence and valley closure should be prepared to suit the actual longwall dimensions and revised assessments of the resulting impacts on this creek should be undertaken.

Potential for Gas Emissions and Changes to Water Quality

Gas emissions from the sandstone strata have been previously observed above and adjacent to mining areas in the Southern Coalfield, and some gas emissions have also been observed in water bores. Analyses of gas compositions indicate that the Bulli seam is not the direct and major source of the gas and that the most likely source is the Hawkesbury Sandstone (APCRC, 1997).

It is likely that gas emissions will occur as a result of the mining of the longwalls. Gas is often released into rivers and streams as these areas form topographical low points in the landscape. Where these gas releases occur into the water column there is insufficient time for any substantial amount of gas to dissolve into the water. The majority of the gas is released into the atmosphere and is unlikely to have an adverse impact on water quality.

It is possible for substantial gas emissions at the surface to cause localised vegetation die-back. This is a rare event and has only been observed to occur previously on one occasion at Tower Colliery, over small areas in the base of the Cataract Gorge that had been directly mined beneath by Longwalls 10 and 14. These impacts were limited to small areas of vegetation, local to the points of emission, and when the gas emissions declined, the affected areas were successfully restored.

A description of potential water quality impacts, including iron stains, and environmental consequences is presented in the surface water and ecology reports by Gilbert and Associates (2014a) and Niche (2020a and 2020b).

5.3.5. Impact assessments for the streams based on increased predictions

If the actual conventional subsidence movements exceeded those predicted by a factor of 2 times, the maximum tilts along the streams would be 20 mm/m (i.e. 2.0 %, or 1 in 50) along Dog Trap Creek. As a result, increased levels of ponding could occur upstream of the longwall goaf edges and increased levels of scouring could occur downstream of the longwall goaf edges.

This is illustrated in Fig. 5.11, which shows the natural and predicted post mining surface levels and grades along Dog Trap Creek, based on the subsidence exceeding the predictions by a factor of 2.

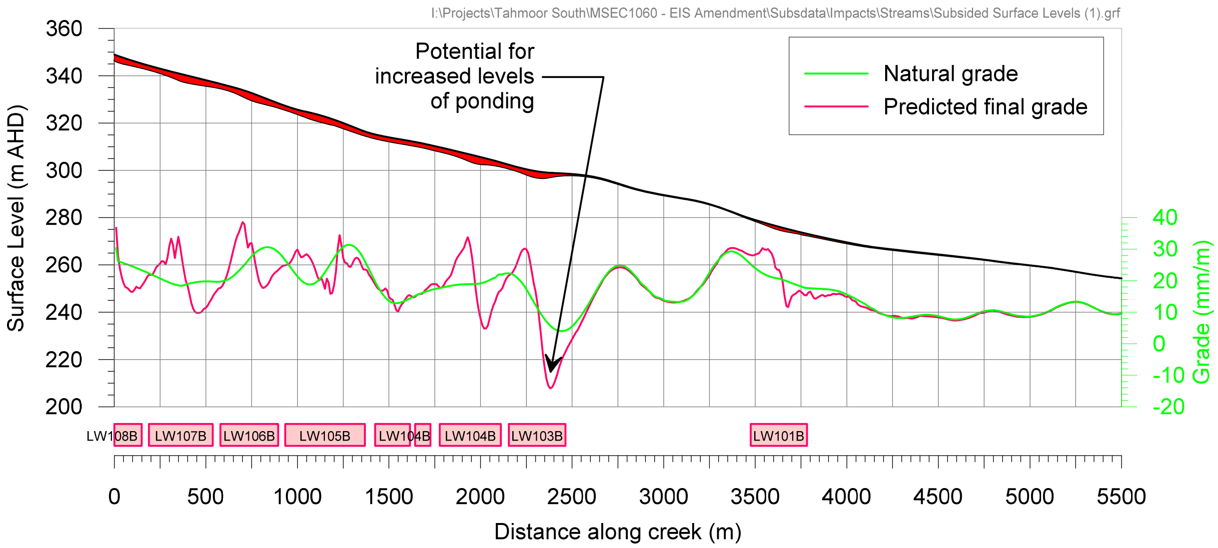


Fig. 5.11 Natural and predicted post mining surface levels along Dog Trap Creek based on subsidence exceeding predictions by a factor of 2

In this case, the potential for increased ponding along Dog Trap Creek, upstream of the tailgate of Longwall 103B, could lead to the formation of a pond of up to 1 metre deep and 250 metres long. Similar levels of increased ponding could also occur along the other streams located directly above the proposed longwalls.

If the actual strains or valley related movements exceeded those predicted by a factor of 2 times, the extent of fracturing in the uppermost bedrock would increase along the streams which are located directly above the proposed longwalls.

While the predicted ground movements are important parameters when assessing the potential impacts on the streams, it is noted that the impact assessments for fracturing and loss of surface water were primarily based on historical observations from previous longwall mining at Tahmoor Mine and other mines operating at similar depths of cover in the Southern Coalfield. The overall levels of impact on the streams, resulting from the extraction of the proposed longwalls, are expected to be similar to those observed where longwalls have previously mined directly beneath streams at the mine.

Further discussions on the potential impacts, consequences and implications of changes along these streams are provided in the surface water and ecology reports by Hydro Engineering and Consulting (2020a) and Niche (2020a and 2020b).

5.3.6. Comparison to predictions and assessments provided based on the EIS Layout

A summary comparison between maximum predicted subsidence, upsidence and closure along the streams between the original EIS Layout and the Amended Layout is shown in Table 5.6.

Table 5.6 Predicted Total Subsidence, Upsidence and Closure along Streams resulting from the extraction of the EIS Layout and Amended Layout

Layout	Location	Maximum predicted total subsidence (mm)	Maximum predicted total upsidence (mm)	Maximum predicted total closure (mm)
Amended Layout (MSEC1060	Dog Trap Creek	1,550	575	425
	Hornes Creek	20	20	20
	Teatree Hollow	1,350*	375*	250*
	Tributary 1 to Dog Trap Creek	1,600	750	750
	Tributary 2 to Dog Trap Creek	1,575	525	450
	Tributary to Teatree Hollow	1,250	400	350
EIS Layout (MSEC997)	Dog Trap Creek	1,850	550	425
	Hornes Creek	50	30	50
	Teatree Hollow	1,400*	400*	275*
	Tributary 1 to Dog Trap Creek	1,850	750	725
	Tributary 2 to Dog Trap Creek	1,800	525	450
	Tributary to Teatree Hollow	1,700	475	400

It can be seen that the predicted maximum total conventional subsidence, upsidence and closure movements due to the extraction of the Amended Layout are less than the predicted maxima from the original EIS Layout. The reasons are due to both the proposed reduction in panel width and proposed reduction in extraction heights.

It should be noted though that, whilst the overall predicted total subsidence, upsidence and closure along the streams have been reduced significantly by changing the longwall widths, extents and seam extraction thicknesses, predictions at points on the surface directly above the longwalls will be greater or less than predictions previously provided for the original EIS Layout for the following reasons:

- There are some areas, mainly around the northwestern ends of LWs 101A to 106A, where the longwall footprint has been extended. Some first order tributaries in the upper reaches of the tributaries to the Bargo River and Teatree Hollow are located in this area.
- There are some streams, mainly above previously proposed LW109, and areas that lie in between the proposed split A and B series panels where the longwall footprint has been reduced. A third order section of Dog Trap Creek, some first order tributaries to Dog Trap Creek, and some first order and second order streams in the upper reaches of the main tributary to Teatree Hollow are located in these areas.
- As the panel widths have been reduced but pillar widths have remained unchanged, the longwalls in the Amended Layout are staggered in their positions relative to the original EIS Layout. It follows, therefore, that the positions of each section of stream on the surface relative to the proposed longwalls has changed. For example, sections of streams on the surface above the centrelines of longwalls in the Amended Layout may have been previously located directly above a chain pillar, and vice versa.

Specific subsidence predictions have been provided for streams in this report. Detailed comparisons can be made for each stream by comparing this report with detailed predictions that were provided in our previous Report No. MSEC997, which is included in Appendix F of the original EIS.

As the streams are generally predicted to experience less subsidence, upsidence and closure due to the Amended Layout compared to the original EIS Layout, it is expected that the overall frequency and severity of impacts would reduce. The potential for physical impacts (i.e. surface cracking and rock fracturing) is not, however, dependent on absolute vertical subsidence. Physical impacts develop due to differential movements, which are described by curvature and strain.

Whilst the predicted strains and valley closure and, hence, the potential for physical impacts decrease with narrower longwall widths, the strains and valley closure due to the extraction of the Amended Layout are predicted to be of sufficient magnitude to result in the fracturing of bedrock.

Based on the above, the potential for impacts on the sections of streams that are proposed to be directly mined beneath due to the extraction of the Amended Layout do not materially change as a result of the reduction in longwall width and reduction in extraction height, even though the overall mining-induced movements and associated frequency and severity of impacts are expected to reduce.

This assessment is supported by the observations of adverse impacts along streams that have been directly mined beneath at nearby collieries at similar depths of cover in the Southern Coalfield, including where longwall void widths are less than those that are proposed in the Amended Layout.

In the case of streams that are not directly mined beneath, the offset distances between the proposed longwalls in the Amended Layout and streams remain sufficiently large such that the impact assessments do not change significantly compared to the assessments that were provided for the original EIS Layout. This includes the fourth and fifth order sections of Hornes Creek and the Bargo River, which are located more than 540 metres and 690 metres, respectively, from the proposed longwalls.

5.3.7. Management of potential impacts on the streams

Tahmoor Coal has previously developed Subsidence Management Plans to manage the potential impacts on streams during the mining of longwalls. The management plans include monitoring and triggered response plans to remediate impacts after they are observed. They include monitoring of pre-mining conditions and data collection during mining. Monitoring typically continues for a period following mining.

It is recommended that similar management strategies will be developed for the streams within the *Subsidence Study Area*.

5.4. Cliffs

5.4.1. Descriptions of the cliffs

A total of 24 cliffs are located within the *Subsidence Study Area*. The locations of the cliffs are shown in Drawing No. MSEC1060-08, and in greater detail in Drawing Nos. MSEC1060-09 and MSEC1060-10.

For the purposes of this report, a cliff has been defined as a continuous rockface having a maximum height greater than 10 metres, a minimum length of 20 metres and a minimum slope of 2 in 1, i.e. having a minimum angle to the horizontal of 63°. The locations and heights of cliffs within the *Subsidence Study Area* were determined by Fluvial Systems based on the results of an airborne laser scan, refer to Fluvial Systems (2013).

The cliffs within the *Subsidence Study Area* are generally located within the valleys of the Bargo River, Dog Trap Creek and the lower reaches of Hornes Creek. A summary of the minimum distances of the cliffs from the proposed longwalls is provided in Table 5.7.

Table 5.7 Minimum distances of the cliffs from the proposed longwalls

Stream Valley	Minimum distance from the proposed longwalls
Bargo River	800 metres south-west of the proposed LW106A
Dog Trap Creek	One cliff directly above the proposed LW103B
Lower Reaches of Hornes Creek	810 metres north-west of the proposed LW108B

The cliffs have formed from the Hawkesbury Sandstone Sedimentary Group. Details of the cliffs that are predicted to experience more than 20 mm of vertical subsidence are provided in Table 5.8.

Table 5.8 Details of cliffs within limit of vertical subsidence

Cliff Ref.	Overall Length (m)	Maximum Height (m)	Stream System	Location relative to proposed longwall mining
C_01080	50	15	Dog Trap Creek	Not directly mined beneath
C_02280	55	10	Dog Trap Creek	Directly above proposed longwall mining area
C_03140	50	15	Dog Trap Creek	Not directly mined beneath
C_04570	20	10	Dog Trap Creek	Not directly mined beneath
C_07100	45	10	Dog Trap Creek	Not directly mined beneath
C_11650	25	15	Dog Trap Creek	Not directly mined beneath

As determined by Fluvial Systems (2013) based on the results of an airborne laser scan, the maximum height of the cliffs that were identified over the proposed longwalls is 15 metres. It should be noted, that the maximum cliff heights, provided in the above table, are less than the overall valley depths. This is because the cliff heights do not include the talus slopes, which are discussed in the next Section of this report, and because the slopes of some rockfaces, though steep, are not considered steep enough to describe them as parts of the cliffs.

Histograms showing the statistical distribution of the cliff heights and lengths within the *Subsidence Study Area* are shown in Fig. 5.12.

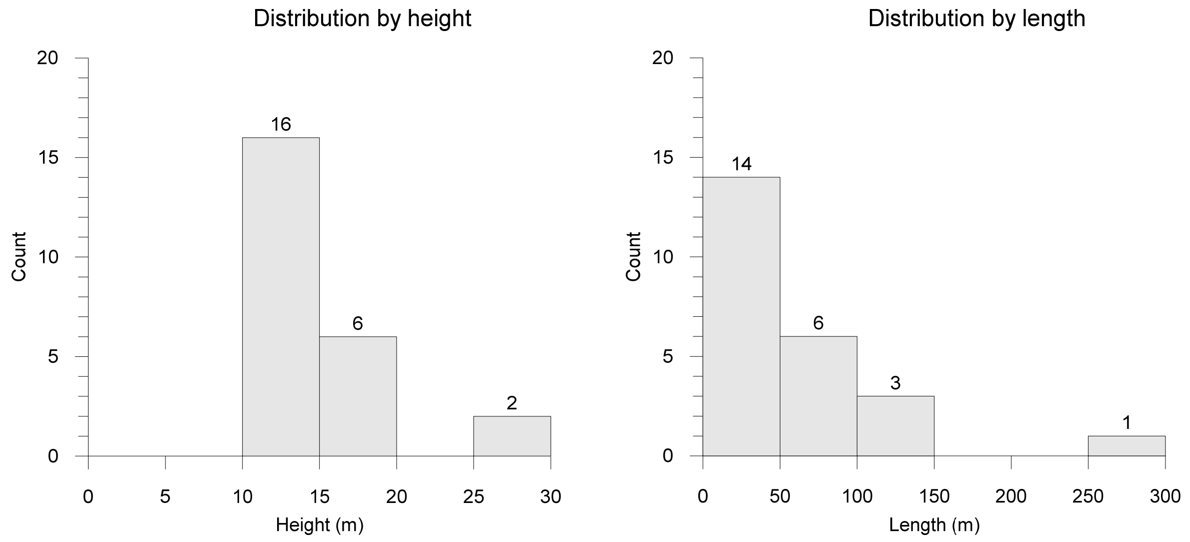


Fig. 5.12 Distribution of cliffs within the subsidence study area by height and length

It can be seen from Fig. 5.12 that the cliffs are commonly between 10 and 20 metres in height and less than 100 metres in length.

In its Project Approval for BHP Billiton Illawarra Coal's Bulli Seam Operations (BSO project) in December 2011 (Minister for Planning, 2011), the Minister for Planning adopted the recommendation by the Planning Assessment Commission for determining which cliffs were of "*special significance*" and prescribed a more stringent performance outcome of "*negligible environmental consequences*" to those cliffs in the Project Approval.

The following definition of "*cliffs of special significance*" was provided:

- Cliffs longer than 200 metres and/or higher than 40 metres; and
- Cliff-like rock faces higher than 5 metres that constitute waterfalls.

There is one cliff longer than 200 metres (4% of total) within the *Subsidence Study Area,* located along the Bargo River valley. No cliffs are higher than 40 metres.

5.4.2. Predictions for the cliffs

Predictions of conventional subsidence, tilt and curvature have been made along each of the cliffs, as well as at points located at a distance of 20 metres from the extents of each of the cliffs located within the *Subsidence Study Area*. A summary of the maximum predicted total conventional subsidence parameters for the cliffs is provided in Table 5.9.

Table 5.9 Maximum predicted total conventional subsidence parameters for the cliffs due to the extraction of the amended longwall layout

Cliff Ref.	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})
C_01080	80	0.5	< 0.01	< 0.01
C_02280	1200	10.0	0.10	0.19
C_03140	125	< 0.5	< 0.01	< 0.01
C_04570	125	1.0	< 0.01	< 0.01
C_07100	100	1.0	< 0.01	< 0.01
C_11650	150	1.5	0.02	< 0.01
Remaining cliffs in Subsidence Study Area	< 20	< 0.5	< 0.01	< 0.01

The maximum predicted conventional strains for the cliffs, based on applying a factor of 15 to the maximum predicted conventional curvatures, are 1.5 mm/m tensile and 3.0 mm/m compressive. Non-conventional movements can also occur as a result of, among other things, anomalous movements. The analysis of strains provided in Chapter 4 includes those resulting from both conventional and non-conventional anomalous movements.

The cliffs are at discrete locations and, therefore, the most relevant distributions of strain are the maximum strains measured in individual survey bays from previous longwall mining. The analysis of strains in survey bays during the mining of previous longwalls in the Southern Coalfield is discussed in Section 4.3.1. The results for survey bays above goaf are provided in Fig. 4.2. The results for survey bays above solid coal are provided in Fig. 4.3.

The cliffs are located along the valleys of the streams and, therefore, could experience valley-related movements. The predicted valley related movements for the Bargo River and the streams were provided in Sections 5.2 and 5.3, respectively.

A summary of the maximum predicted upsidence and closure for the cliffs is provided in Table 5.10.

Table 5.10 Maximum predicted total upsidence and closure for the cliffs due to the extraction of the amended longwall layout

Stream Valley	Figure No.	Maximum predicted upsidence (mm)	Maximum predicted closure (mm)
Bargo River	N/A	< 20	< 20
Dog Trap Creek	Fig. E.03	400	425
Lower Reaches of Hornes Creek	Fig. E.04	< 20	< 20

5.4.3. Impact assessments for cliffs located above solid coal

The great majority of cliffs within the *Subsidence Study Area*, i.e. for 23 out of a total of 24, will not be directly mined beneath by the proposed longwalls. These include the cliffs along the Bargo River and Hornes Creek, which are all located outside the extents of the proposed amended longwalls at minimum distances of 800 metres and 810 metres, respectively. There are also several cliffs located along Dog Trap Creek that will not be directly mined beneath by the proposed longwalls.

The maximum predicted vertical subsidence movements for the cliffs along the Bargo River and Hornes Creek are less than 20 mm. Whilst these cliffs could experience very low levels of vertical subsidence, they are not expected to experience any substantial conventional tilts, curvatures and strains.

The cliffs could also be subjected to valley related upsidence and closure movements resulting from the extraction of the proposed longwalls. The maximum predicted upsidence and valley closure compressive strain occur in the bases of the valleys and these maximum values are unlikely, therefore, to result in impacts on the cliffs, which are located along the valley sides.

Closure movements tend to be bodily movements of the valley sides, however, stresses can be induced in the strata where differential closure movements occur around bends in the river valleys. The maximum predicted closures, based on the proposed amended longwall layout, are less than 20 mm for the cliffs along the Bargo River and 20 mm for the cliffs along Hornes Creek.

It is extremely difficult to assess the likelihood of cliff instabilities based upon predicted ground movements. The likelihood of a cliff becoming unstable is dependent on a number of factors which are difficult to fully quantify. These factors include jointing, inclusions, weaknesses within the rock mass, groundwater pressure and seepage flow behind the rockface. Even if these factors could be determined, it would still be difficult to quantify the extent to which these factors influence the stability of a cliff naturally or when it is exposed to mine subsidence movements. It is possible, therefore, that cliff instabilities may occur during mining that may be attributable to either natural causes, mine subsidence, or both.

The likelihood of cliff instabilities along the Bargo River, Hornes Creek and Dog Trap Creek can be assessed using case studies where previous longwall mining has occurred close to but not directly beneath cliffs. Although very minor rock falls have been observed over solid coal outside the extracted goaf areas of longwall mining in the Southern Coalfield, there have been no recorded large cliff instabilities outside the extracted goaf areas of longwall mining in the Southern Coalfield. This statement is based on the following observations:-

- ***Tahmoor Longwalls 24A to 26***

  Tahmoor Longwalls 24A to 26 were mined near and adjacent to the cliff lines along the Bargo River valley between November 2007 and July 2011. The cliff lines are continuous on both sides of the valley along this section of the river. The cliffs are located at a minimum distance of 300 metres east of Longwall 24A, at their closest point to these longwalls. The whilst the overall valley depths, within one depth of cover of this gorge was over 100 metres, the heights of the cliffs are around 60 metres and are formed within the Hawkesbury Sandstone.

  Tahmoor Longwalls 24A to 26 have void widths of 285 metres, solid chain pillar widths of 35 metres to 40 metres and were extracted from the Bulli seam at a depth of cover of 350 metres at the base of the gorge and 450 metres around the plateau areas. There were no impacts observed on the cliffs along the Bargo River Valley as a result of the extraction of Tahmoor Longwalls 24A to 26.

- ***Appin Longwalls 301 and 302 near the Cataract River***

  Appin Longwalls 301 and 302 were mined adjacent to a number of cliff lines located along the Cataract River valley between October 2006 and September 2007. A total of 68 cliffs were identified within a 35 degree angle of draw from these longwalls. These cliffs had continuous lengths ranging between 5 metres and 230 metres, overall cliff heights ranging between 10 metres and 37 metres, overall valley depths, within one depth of cover of the river, ranging from 50 to 75 metres, and had been formed within the Hawkesbury Sandstone.

  Appin Longwalls 301 and 302 have void widths of 260 metres, solid chain pillar widths of 40 metres and were extracted from the Bulli seam at a depth of cover of 420 metres at the base of the gorge and 490 metres around the plateau areas. These longwalls mined to within 50 metres of the identified locations of the cliffs along the Cataract River valley.

  There were no large cliff instabilities observed as a result of the extraction of Appin Longwalls 301 and 302. There were, however, five minor rock falls or disturbances which occurred during the mining period, of which, three were considered likely to have occurred due to a substantial rainfall event and one was probably a natural instability of the cliff overhang. Nevertheless, the length of cliff line disturbed as a result of the extraction of Appin Longwalls 301 and 302 was, therefore, estimated to be less than 0.5 % of the total face area of the cliff lines within the mining domain.

- ***Tower Longwalls 18 to 20 and Appin Longwalls 701 to 704 near the Nepean River***

  Tower Longwalls 18 to 20 and Appin Longwalls 701 to 704 mined adjacent to a number of cliff lines located along the Nepean River valley. A total of approximately 50 cliffs were identified within a 35 degree angle of draw from these longwalls. The cliffs had continuous lengths ranging between 5 metres and 225 metres, overall heights ranging between 10 metres and 40 metres, overall valley depths, within one depth of cover of the river, ranging from 60 to 80 metres and had been formed within the Hawkesbury Sandstone.

  Tower Longwalls 18 to 20 have void widths of 235 metres, solid chain pillar widths of 40 metres and were extracted from the Bulli seam at a depth of cover of 460 metres at the base of the gorge and 510 metres around the plateau areas. Appin Longwalls 701 to 704 have void widths of 320 metres, solid chain pillar widths of 40 metres and were extracted from the Bulli seam at a depth of cover of 460 metres at the base of the gorge and 510 metres around the plateau areas.

  Tower Longwall 20 was mined directly beneath some cliffs located at the confluence of Elladale Creek and the Nepean River. Appin Longwalls 701 to 704 mined to within 75 metres of the identified locations of the cliffs along the Nepean River valley.

  There were no cliff instabilities observed as a result of the extraction of Tower Longwalls 18 to 20 and Appin Longwalls 701 to 704.

Based on this previous experience of mining at Tahmoor, Appin and Tower Collieries, it is unlikely that cliffs beyond the extent of the longwall panels will experience large instabilities. It is possible that isolated rock falls could occur, particularly at those that have weathered to be marginally stable naturally and at those located closest to previously extracted longwall panels and the proposed longwall mining area. Any impacts are expected to represent less than 0.5 % of the total face area of the cliffs.

While the likelihood of cliff instability is extremely low, some possibility remains and attention must therefore be paid to their proximity to people. There are no structures near any of the cliffs though some walking tracks are located near the cliffs, particularly along the Bargo River.

Tahmoor Coal has previously developed subsidence management plans to manage the potential impacts to the general public that may be visiting or passing by cliffs within the *Subsidence Study Area* during the mining of longwalls. These subsidence management plans should be developed in conjunction with the relevant landowners and should include monitoring of pre-mining conditions, data collection during mining, triggered response plans to remediate impacts after they are observed and may include the erection of warning signs during periods of active mining. Monitoring typically continues for a period following mining. Similar management strategies will be developed for the cliffs within the *Subsidence Study Area*.

The cliffs along Hornes Creek and Bargo River will not be directly mined beneath by the proposed amended longwalls. If the proposed longwalls were extended further to the northwest closer to the boundary of the *Extents of Longwalls*, the offset distances of the longwalls to the cliffs will still be greater than 250 metres.

5.4.4. Impact assessments for the cliffs located directly above proposed longwall mining area

One cliff along Dog Trap Creek is located directly above the proposed amended Longwall 103B. It is expected that this cliff could experience the full range of predicted subsidence movements.

As described previously, it is extremely difficult to assess the likelihood of cliff instabilities based upon predicted ground movements. The likelihood of cliff instabilities along the streams can be assessed using case studies where previous longwall mining has occurred directly beneath cliffs in the Southern Coalfield.

- ***Tahmoor Longwalls 14 to 19 beneath the Bargo River***

  Tahmoor Longwalls 14 to 19 were mined directly beneath the Bargo River between 1995 and 2002. The total length of the cliffs that were directly mined beneath or located within the 35 degree angle of draw from these longwalls was approximately 2.5 kilometres. The overall heights of the cliffs varied between 10 metres and 25 metres, whilst the overall valley depth, within one depth of cover of the river, was 65 metres. The longwalls were extracted from the Bulli seam at depths of cover at the base of the gorge of 310 metres to 360 metres and around the plateaus areas of 380 metres to 400 metres. The cliffs were formed within the Hawkesbury Sandstone Sedimentary Group.

  Tahmoor Longwalls 14 to 19 have void widths of 240 metres and solid chain pillar widths of 37 metres.

  No cliff instabilities were reported during the mining period and a site inspection by SCT (2013b) along 1500 metres of cliff line found that the cliff formations were relatively unaffected by the mining subsidence that occurred in the area. Mining-induced fractures were found in less than 10 % of the cliff lines that were inspected and only 2 minor rockfalls were found, one of which was associated by SCT with mine subsidence but the impacts were minor (SCT, 2013b).

- ***Tower Longwalls 1 to 17 beneath the Cataract and Nepean Rivers***

  Tower Longwalls 1 to 17 mined directly beneath the valleys of the Cataract and Nepean Rivers between 1988 and 2000. The total length of the cliffs that were directly mined beneath or located within the 35 degree angle of draw from these longwalls was greater than 5 kilometres. The overall heights of the cliffs varied between 10 metres and 60 metres, whilst the overall valley depth, within one depth of cover of the river, was 65 to 80 metres. The longwalls were extracted from the Bulli seam at depths of cover at depths of cover at the base of the gorge of 360 metres to 410 metres and around the plateaus areas of 490 metres to 540 metres. The cliffs were formed within the Hawkesbury Sandstone Sedimentary Group.

  Tower Longwalls 1 and 17 have void widths varying between 110 metres and 210 metres and solid chain pillar widths varying between 35 metres and 50 metres.

  Ten cliff instabilities were recorded along the Cataract and Nepean Rivers, as a result of the extraction of Tower Longwalls 1 to 17, all of which occurred after the longwalls were extracted directly beneath the cliffs. The details of the cliff instabilities are provided in Table 5.11.

Table 5.11 Details of recorded cliff instabilities along the Cataract and Nepean River valleys resulting from the extraction of Tower Longwalls 1 to 17

Valley	Longwalls	Number of recorded cliff instabilities due to mining	Total length of recorded cliff instabilities due to mining	Total length of cliff within 0.7 times depth of cover from the longwalls	Observed rate of cliff instabilities due to mining (%)
Cataract River	LW16 and LW17	8	160	3,700	4.3
Nepean River	LW1 to LW17	2	40	1,875	2.1
	Total	**10**	**200**	**5,575**	**3.5**

It can be seen from the above table, that the total length of cliff instabilities, resulting from the extraction of Tower Longwalls 1 to 17, was approximately 3.5 % of the total length of cliffline. It is noted, that all the recorded cliff instabilities occurred after the cliffs were directly mined beneath.

Based on the case study history of mining at Tahmoor and Tower Collieries, there is a moderate to likely probability that rock falls and cliff instabilities will occur somewhere along the clifflines which are directly mined beneath, including the cliff along Dog Trap Creek.

Any impacts on the cliffs within the *Subsidence Study Area*, that are directly mined beneath as a result of the proposed mining are therefore expected to affect between 3% to 5 % of the total length of cliffs that are directly mined beneath.

It is extremely difficult to accurately predict which cliffs will experience impacts. As a general rule, however, cliffs at greater risk of impact are those with large overhangs and those located along concave sections of the creeks.

There are no structures or roads located near the cliffs. There is no public access to the creeks. Tahmoor Coal has previously developed subsidence management plans to manage the potential impacts to the general public that may be visiting or passing by cliffs within the *Subsidence Study Area* during the mining of longwalls.

These subsidence management plans should be developed in consultation with the nearby landowners to manage potential risks to the people who may be visiting or passing by these cliffs during periods of active mining and should include monitoring of pre-mining conditions, data collection during mining, triggered response plans to remediate impacts after they are observed and may include the erection of warning signs during periods of active mining. Monitoring typically continues for a period following mining. Similar management strategies will be developed for the cliffs within the *Subsidence Study Area*.

5.4.5. Impact assessments for the cliffs based on increased predictions

If the actual mine subsidence exceeded those predicted values by a factor of 2 times, the potential for impacts would increase for the cliff that is located directly above the proposed longwalls. The likelihood of impacts for the cliffs that are located well outside the proposed longwalls, particularly those along the Bargo River and along Hornes Creek, the impacts would still be expected to be very low.

While the predicted ground movements are important parameters when assessing the potential impacts on the cliffs, it is noted that the impact assessments for cliff instabilities have primarily been based on historical observations from previous longwall mining in the Southern Coalfield.

5.4.6. Management of potential impacts on the cliffs

Tahmoor Coal has previously developed Management Plans to manage the potential impacts on cliffs during the mining of longwalls. The management plans include consultation with landowners, visual inspections before and after mining and where the public may access the cliffs, erection of warning signs during periods of active mining. It is recommended that similar management strategies will be developed in consultation with the nearby landowners to manage potential risks to the people who may be visiting or passing by these cliffs within the *Subsidence Study Area* during periods of active mining.

5.5. Steep slopes

The purpose of identifying steep slopes for this assessment is to highlight areas in which existing ground slopes may be marginally stable. As a conservative first pass, a steep slope has been defined as an area of land having a gradient greater than 1 in 3 (33 % or 18.3°). The minimum slope of 1 to 3 represents a slope that would generally be considered stable for slopes consisting of rocky soils or loose rock fragments. Clearly the stability of natural slopes varies depending on their soil or rock types, and in many cases, natural slopes are stable at much higher gradients than 1 to 3 (for example, talus slopes in Hawkesbury Sandstone).

The locations of the steep slopes within the *Subsidence Study Area* are shown in Drawing No. MSEC1060-08, with greater detail in Drawing Nos. MSEC1060-09 to MSEC1060-10. The steep slopes were identified by Fluvial Systems from an airborne laser scan supplied by Tahmoor Coal. The steep slopes shown on the drawings can be broadly categorised as:-

a) Steep slopes on the sides of valleys,
b) Batters of road and railway embankments and cuttings,
c) Slopes on Farm dams,
d) Slopes around Tahmoor Mine infrastructure, including spoil heaps, coal piles and dams, and
e) Slopes on Wollondilly Shire Council waste disposal area

Types (b) to (e) are addressed in Chapter 6 of this report.

The steep slopes on the sides of valleys are predominantly found in Hawkesbury Sandstone and consist of a mixture of cliffs and rock outcrops, which are stable at vertical to overhanging, and screed slopes with rocky soils and loose rock fragments. The majority of slopes are stabilised, to some extent, by natural vegetation.

The natural slopes in the upper reaches of the tributaries, which are directly mined beneath, are typically less than 1 in 2. A photograph of a typical steep slope along Dog Trap Creek is shown in Fig. 5.13.

The ranges of predicted subsidence parameters for the steep slopes are similar to those predicted along the streams, which are provided in Section 5.3.2.

There has been extensive experience of mining beneath steep slopes in the Southern Coalfield. These include steep slopes along the Cataract, Nepean, Bargo and Georges Rivers and streams such as Myrtle Creek and Redbank Creek above Tahmoor Mine Longwalls 22 to 32, and slopes on Redback Range above Tahmoor Mine Longwalls 26 and 27. No large-scale slope failures have been observed along these slopes, even where longwalls have been mined directly beneath them. Surface cracking and minor rock falls along clifflines or rock outcrops have been observed, for example, during the mining of Appin Longwalls 301 and 302 adjacent to the Cataract River, however, no large-scale slope failures have been observed.

Potential impacts on steep slopes would generally result from the movement of soils, causing tension cracks to appear at the tops of the slopes and compression ridges to form at the bottoms of the slopes. These movements are consistent with observations of upsidence and closure of creek valleys where compression is developed at the bottoms of the valleys and tension is developed at the tops of the valleys. If tension cracks were left untreated it is possible that soil erosion could occur.

It is possible, therefore, that some remediation might be required to ensure that mining-induced surface cracking does not result in the formation of soil erosion channels. In some cases, erosion protection measures may be needed, such as the planting of additional vegetation in order to stabilise the slopes in the longer term.

While in most cases impacts to slopes are likely to consist of surface cracking, there remains a low probability of large-scale slope slippage. The probability is assessed to be very low for slopes that will not be directly mined beneath by the longwalls. Experience indicates that the probability of mining induced large-scale slippages is extremely low due to the substantial depths of cover within the *Subsidence Study Area*. While the risk is extremely low, some risk remains and attention must therefore be paid to any structures or roads that may be located in the vicinity of steep slopes.

There are very few structures or roads located along the sides of valleys within the *Subsidence Study Area*, except where public and privately-owned roads are crossing the valleys.

5.5.1. Management of potential impacts on steep slopes

Tahmoor Coal has developed subsidence management plans for managing potential impacts on steep slopes during the mining of Longwalls 22 to 32. These management plans include:

- Identification of all structures, dams and roads that are in close proximity to steep slopes,
- Site investigation and landslide risk assessment of structures near slopes by a qualified geotechnical engineer,
- Site investigation and structural assessment of structures where recommended by the geotechnical engineer. This may include recommendations to mitigate against potential impacts,
- Monitoring, including ground survey and visual inspections, and
- Remediation if cracking or slippage occurs.

It is recommended that Tahmoor Coal continue to develop management plans to manage potential impacts on slopes during the mining of the proposed longwalls.

Fig. 5.13 Example of steep slopes within Dog Trap Creek valley above proposed Longwall 101B

5.6. Escarpments

There are no major escarpments within the *Subsidence Study Area*. Discussions on the cliffs are provided in Section 5.4.

5.7. Land prone to flooding and inundation

There are areas prone to flooding or inundation within the *Subsidence Study Area*. The subsidence ground movement predictions determined for the Tahmoor South project have been provided to hydrologist Hydro Engineering and Consulting (2020b), who have undertaken a detailed flood study for the project and provided detailed discussions of the impacts and consequences of the subsidence ground movements on future floods within the *Subsidence Study Area*.

5.8. Swamps, wetlands and water related ecosystems

As discussed in detail in the water ecology assessment report by Niche (2020c) there are some water related ecosystems and wet areas in the headwaters of some streams but there are no upland swamps or wetlands within the *Subsidence Study Area*.

Please refer to the water ecology assessment report by Niche (2020c).

5.9. Threatened, protected species or critical habitats

Please refer to the terrestrial ecology assessment by Niche (2020a).

5.10. National Parks or Wilderness Areas

There are no National Parks, nor any land identified as wilderness under the Wilderness Act 1987 within the *Subsidence Study Area*.

5.11. State Recreational or Conservation Areas

A small portion of the Upper Nepean State Conservation Area (SCA) is located within the *Subsidence Study Area*, as shown in Drawing No. MSEC1060-07. The Upper Nepean SCA is located within the Metropolitan Catchment Area and public access is restricted.

No part of the Upper Nepean SCA will be directly mined beneath by the proposed longwalls. No cliffs, streams, natural features or items of archaeological or heritage significance within the Upper Nepean SCA are within the *Subsidence Study Area.*

The Bargo State Conservation Area is located to the west of the *Subsidence Study Area* and the Bargo River State Conservation Area is located to the south of the *Subsidence Study Area*.

5.12. Natural vegetation

Please refer to the terrestrial and aquatic ecology assessments by Niche (2020a and 2020b).

5.13. Areas of significant geological interest

There are no areas of significant geological interest within the *Subsidence Study Area*.

5.14. Any other natural feature considered significant

The Wirrimbirra Sanctuary is located on Remembrance Drive and is listed as an item of heritage significance (Niche, 2020d). Wirrimbirra Sanctuary covers an area of approximately 95 ha.

Wirrimbirra preserves a part of the original 'Bargo Brush' which was of considerable historical importance in the problems which faced the settlement of the Argyle or Southern Tablelands during the early half of the 1800s. The Sanctuary contains rich and diverse plantings of native plants in formalised gardens, which were developed to provide areas of representative native plants for education and research purposes. Within the 43 established gardens, there are over 1800 native plants representing a resource base for the study of native flora.

The Wirrimbirra Sanctuary is located above Longwalls 103A and 104A near Teatree Hollow and the Main Southern Railway Line and will be directly mined beneath by the proposed longwalls. Predictions and impact assessments for the creeks and structures within the Wirrimbirra Sanctuary are provided separately within this report.

The following sections provide the descriptions, predictions and impact assessments for the Public Utilities within the *Subsidence Study Area*. The public utilities located outside the *Subsidence Study Area*, which may be subjected to far-field movements or valley related movements and may be sensitive to these movements, have also been included as part of these assessments.

6.1. The Main Southern Railway

The location of the Main Southern Railway is shown in Drawing No. MSEC1060-11. Descriptions, predictions and impact assessments for the railway are provided in the following sections.

6.1.1. Description of the Main Southern Railway

The Main Southern Railway is a key national transport route that carries substantial freight and passenger services between Sydney and Melbourne. The Main Southern Railway is leased by Australian Rail Track Corporation (ARTC), who is responsible for maintaining the track.

Approximately 7.9 km of track is located within the *Subsidence Study Area* between kilometrages 105.9 km and 98.0 km. Approximately 3.6 km of track is located directly above proposed Longwalls 101A to 105A, and LW106B to LW108B, between 102.6 km and 98.6 km.

The railway line is a dual track consisting of 60 kg rail on concrete sleepers with a mix of straight and curved track sections within the *Subsidence Study Area*. The maximum speed limits on both tracks are 95 km/h for normal services and 105 km/h for XPT services. A photograph of a section of the railway at Bargo Railway Station is provided in Fig. 6.1.

Fig. 6.1 Main Southern Railway at Bargo Station and pedestrian overbridge at 102.873 km

The railway consists of a number of items of infrastructure within the *Subsidence Study Area* and these are listed below in Table 6.1. Further details on each feature are provided later in this report.

Table 6.1 Major railway structures within the Subsidence Study Area

Approximate Kilometrage	Major structure	Closest distance to extent of amended longwall layout
96.300	Railway Viaduct over Bargo River	1.73 kilometres from the amended longwalls
96.400	Remembrance Drive Bridge over Bargo River and Main Southern Railway	1.65 kilometres from the amended longwalls
98.160	Tahmoor Mine overhead coal conveyor	410 metres from the amended longwalls
101.162	Wellers Road Overbridge	Directly above LW106B
102.873	Bargo Railway Station and pedestrian overbridge	135 metres from the amended longwalls
103.378	Avon Dam Road Overbridge	230 metres from the amended longwalls
105.771	Lupton Road Overbridge	735 metres from the amended longwalls
107.507	M31 Hume Motorway Bridges	2.13 kilometres from the amended longwalls
108.784	M31 Hume Motorway Bridges	3.08 kilometres from the amended longwalls

In addition to the major structures listed in Table 6.1, there are a number of smaller railway structures within the *Subsidence Study Area*. These include:-

- Culverts,
- Cuttings,
- Embankments, and
- Signalling, electrical and telecommunications equipment.

6.1.2. Predictions for the Main Southern Railway

The predicted profiles of conventional subsidence and tilt along the alignment of Main Southern Railway, resulting from the extraction of the proposed longwalls, are shown in Fig. E.09, in Appendix E. The initial and the predicted post mining grade of the track are also shown in this figure. The predictions are based on the extraction of the proposed amended longwall layout, as shown in Drawing No. MSEC1060-11.

A summary of the maximum predicted total conventional subsidence parameters along the alignment of the railway, after the extraction of each of the proposed longwalls, is provided in Table 6.2. The predicted subsidence effects are predominately due to Longwalls 101A to 106A and LW106B to LW108B, which directly mine beneath and adjacent to the railway, and the predicted additional movements due to Longwalls 101B to LW105B are negligible.

Table 6.2 Maximum predicted total conventional subsidence parameters along the alignment of the Main Southern Railway after the extraction of the proposed amended longwalls

Longwall	Maximum predicted total subsidence (mm)	Maximum predicted total tilt along alignment (mm/m)	Maximum predicted total hogging curvature along alignment (km^{-1})	Maximum predicted total sagging curvature along alignment (km^{-1})
After LW101A	775	5.5	0.05	0.12
After LW102A	1000	7.5	0.08	0.20
After LW103A	1150	6.5	0.10	0.20
After LW101B	1150	6.5	0.10	0.20
After LW102B	1150	6.5	0.10	0.20
After LW103B	1150	6.5	0.10	0.20
After LW104B	1150	6.5	0.10	0.20
After LW105B	1150	6.5	0.10	0.20
After LW106B	1150	6.5	0.10	0.20
After LW107B	1150	7.5	0.10	0.20
After LW108B	1500	8.0	0.10	0.20
After LW104A	1500	8.0	0.10	0.20
After LW105A	1500	8.0	0.10	0.20
After LW106A	1500	8.0	0.10	0.20

The maximum predicted conventional strains for the railway, based on applying a factor of 15 to the maximum predicted conventional curvatures, are 1.5 mm/m tensile and 3.0 mm/m compressive. Non-conventional movements can also occur as a result of, among other things, anomalous movements. The analysis of strains provided in Chapter 4 includes those resulting from both conventional and non-conventional anomalous movements.

The railway is a linear feature and, therefore, the most relevant distribution of strain is the maximum strains measured along whole monitoring lines above previous longwall mining. An analysis of strains along whole monitoring lines during the mining of previous longwalls in the Southern Coalfield is discussed in Section 4.3 and the results are provided in Fig. 4.4.

The railway crosses a number of streams within the *Subsidence Study Area* and valley related movements could be experienced in these locations. A summary of the maximum predicted upsidence and closure movements at the stream crossings using the 2002 ACARP Upsidence and Closure Prediction Method is provided in Table 6.3. The locations of the stream crossings are shown in Drawing No. MSEC1060-11.

Table 6.3 Maximum predicted upsidence and closure movements at the larger stream crossings

Stream crossing	Maximum predicted total subsidence (mm)	Maximum predicted total upsidence (mm)	Maximum predicted total closure (mm)
Teatree Hollow	1350	150	150
Tributary to Teatree Hollow	400	150	70

The predicted total closure at each stream crossing is the sum of the valley closure movement calculated using the 2002 ACARP prediction method (Waddington and Kay, 2002) plus the differential conventional horizontal movements within the valley. It is noted, that this provides some additional conservatism, as the 2002 ACARP prediction method also includes some component of the conventional movement.

If the proposed longwalls were to be shifted, reorientated, extended or shortened within the *Extents of Longwalls* boundary, it would be expected that the maximum predicted conventional and valley related movements for the railway would be similar to those provided above.

The section of track between 102.8 km and 105.3 km is located to the side of proposed Longwall 108B. If the amended longwalls were shifted, or were extended to the southwest, this section of track will experience greater subsidence movements, similar to those provided for Longwall 108B in Table 6.2.

Whilst different sections of the railway would be predicted to experience greater or lesser movements, depending on their locations relative to the positions of the longwalls, the overall levels of movement along the extent of the railway would not be expected to change substantially.

6.1.3. Impact assessments for the Main Southern Railway

Tahmoor Coal and the Australian Rail Track Corporation (ARTC) have developed detailed risk management plans for managing potential mine subsidence impacts on the Main Southern Railway due to the extraction of Longwalls 25 to 32 at Tahmoor Mine. South32 Illawarra Coal has also developed similar strategies to manage potential impacts on the railway due to the extraction of Longwalls 702 to 707, and Longwalls 901 and 902 at Appin Colliery.

The management measures described in this plan are similar to those that have been developed in consultation with ARTC and successfully implemented at Tahmoor Mine and Appin Colliery, as described in a paper by Pidgeon, et al. (2011).

Rail Technical Committees have been coordinated to develop the risk management strategies. The Technical Committee includes representatives from ARTC, Tahmoor Mine and specialist consultants in the fields of railway track engineering, geotechnical engineering, structural engineering, track signalling, mine subsidence, risk assessment and project management. The Technical Committee consults with the Resources Regulator and the Office of the National Rail Safety Regulator.

Works by the Rail Technical Committee include:-

- Identification of potential impacts on the railway,
- Undertaking a risk management approach, where identified risks are assessed and risk control measures are implemented, and
- Development of management measures that include mitigation and preventive works, monitoring plans, triggered response plans and communication plans.

It is noted that by the time Tahmoor Mine extracts Longwall 101A beneath the railway, the Technical Committee will have benefited from the collective experiences of mining several longwalls beneath the railway at Tahmoor Mine and Appin Colliery. It is therefore expected that management strategies and plans will be further developed prior to the mining of the proposed Tahmoor South longwalls. This will enable the maximum benefit of knowledge and understanding from the previous experiences to be transferred into the management of this area.

The following sections provide the impact assessments and discuss the proposed strategies to manage the potential impacts on the Main Southern Railway for the proposed Tahmoor South longwalls.

6.1.4. Changes in track geometry

The extraction of the proposed Tahmoor South longwalls will result in changes to track geometry along the Main Southern Railway. Changes to track geometry are described using a number of parameters:-

- Vertical misalignment (top) – vertical deviation of the track from design,
- Horizontal misalignment (line) – horizontal deviation of the track from design,
- Changes in Track Cant – changes in superelevation across the rails of each track from design, and
- Track Twist – changes in superelevation over a length of track from design.

The Australian Rail Track Corporation's National Code of Practice for Track Geometry provides allowable deviations in track geometry. Predictions of conventional subsidence, tilt and horizontal movement have been made at 5 metre intervals along the railway to calculate each track geometry parameters at any stage of mining. The predicted changes in cant and long twist for the railway are shown in Fig. E.10.

A summary of the maximum allowable and maximum predicted changes in geometry are provided in Table 6.4.

Table 6.4 Allowable and predicted maximum changes in track geometry due to conventional subsidence movements

Track Geometry parameter	Description	Value at which speed limit is first applied*	Value at which trains are stopped*	Predicted maximum due to conventional subsidence
Top	Mid-ordinate vertical deviation Design Offset	14 mm over 4m chord 56 mm over 20m chord	16 mm over 4m chord 66 mm over 20m chord	< 5
Line	Mid-ordinate horizontal deviation over a 10 m chord	34 mm	44 mm	< 5
Change in Cant	Deviation from design superelevation across rails spaced 1.435 m apart	20 to 50 mm (depends on whether track is on a straight or curve)	40 to 75 mm (depends on whether track is on a straight or curve)	12
Long Twist	Changes in Cant over a 14 m chord	46 mm	52 mm	< 3

<u>Note</u>: Values have been taken from the trigger levels in the Tahmoor Mine LW27 Railway Management Plan, which were based on the ARTC National Code of Practice.

Table 6.4 shows that the predicted changes in track geometry are an order of magnitude less than the maximum allowable deviations specified in the National Code of Practice, if conventional subsidence occurs. For example, the maximum allowable change in cant is 75 mm over a length of 1.435 metres before the trains are stopped. In mining terminology, this represents a tilt of approximately 50 mm/m, which is substantially greater than the maximum predicted tilt anywhere above the proposed longwalls of 10.5 mm/m.

It is recognised that subsidence predictions in the Southern Coalfield are generally based on the results of surveys marks that are spaced nominally 20 metres apart. The bay lengths used to measure the track geometry parameters, described in Table 6.4, are less than these mark spacings, particularly for changes in track cant and twist. However, confidence in the predictions is gained from the following observations:-

- Monitoring of track geometry at 125 mm intervals along both tracks during the mining of Longwalls 25 to 32 at Tahmoor Mine and Longwalls 703 to 707, and Longwalls 901 and 902 at Appin Colliery have shown that the observed changes compared reasonably well with predictions. The observed changes were very small and an order of magnitude less than the National Code of Practice.
- Monitoring of track geometry during the mining of other longwalls beneath railways has shown that the observed changes to track geometry have been well below ARTC standards, and
- Literature studies of mining beneath railways in NSW (Lea, 1991) and the UK (Grainger, 1993) indicate that mine subsidence results in minimal impacts to track geometry.

It is, however, possible that mine subsidence could result in changes in track geometry that exceed ARTC Standards in the following ways:-

- Track becomes unstable as the result of rail stress, which is discussed in the following section, or
- Track loses support as the result of failure or collapse of culverts or embankment slopes, or
- Development of substantial non-conventional ground movements.

Non-conventional movements can occur and have occurred in the Southern Coalfield as a result of, among other things, valley upsidence and closure movements and anomalous movements. The impact assessments for the valley related movements at the stream crossings are provided in Section 6.1.12. Discussion on the likelihood and nature of anomalous movements is provided in Sections 3.4 and 4.8.

One example occurred at a low angle fault that intersected the Main Southern Railway in a railway cutting at Tahmoor, which was located directly above Longwall 29. The site was monitored extensively during the mining of Longwalls 28 to 31. This included three monitoring lines along the railway cutting, and survey prisms along the railway track. The results of observed changes in vertical alignment of the pegs along the railway cutting are shown in Fig. 3.27. It can be seen that the most significant changes occurred during the mining of Longwall 29. The changes, however, developed gradually over time, allowing sufficient time for the railway track to be adjusted such that trains could continue to travel through the site.

It is therefore considered that while non-conventional movements may potentially result in changes to track geometry that exceed National Code of Practice, the potential risk to track safety can be managed through early detection via monitoring and early response through the implementation of triggered response plans. It is likely that the following management measures will be used to manage changes in track geometry:-

- Assess pre-mining track condition and adjust track (if necessary) so that pre-mining track geometry is at or close to design prior to the development of subsidence,
- Identify potential sites of non-conventional movement, such as creeks and geological structures,
- Install a monitoring system, which includes, among other things, the monitoring of ground movements, rail stress, rail temperature, switch displacement and track geometry,
- Regularly review and assess the monitoring data,
- Conduct regular visual inspections of the track, and
- Adjust the track in response to monitoring results during mining if required to keep the track well within safety limits.

With an appropriate management plan in place, it is considered that potential impacts to track geometry can be managed for any orientation, extension or shortening of longwalls within the *Extents of Longwalls* boundary, even if actual subsidence movements are greater than the predictions or substantial non-conventional movements occur.

6.1.5. Changes in track grades

The Main Southern Railway climbs steadily in a southbound direction through the *Subsidence Study Area* from Tahmoor to Bargo and Yanderra.

Existing track gradients have been estimated from Curve and Gradient Diagrams provided by ARTC. The maximum gradient along the Main Southern Railway within the *Subsidence Study Area* is 1.4 % (1 in 73), which is located between 101 km and 102 km, above the proposed longwalls. Steeper grades exist regionally along the track, such as 1 in 63 (1.59 % or 15.9 mm/m) between Moss Vale and Exeter.

The predicted changes in track gradient along the Main Southern Railway and the predicted gradients along the track after the completion of mining are shown in Fig. E.09.

It can be seen that the predicted maximum grade after mining is 1.9 % or 1 in53, which is higher than the regional maximum grades.

It should be noted, however, that the locations of high grades exist over short lengths (a couple of hundred metres), which is of less concern as freight trains are many hundreds of metres long. It is expected, however, that track resurfacing will be required to reduce the magnitude of the mining-induced undulations in the track. This work can be undertaken during planned ARTC maintenance weekends.

6.1.6. Changes in rail stress

Mine subsidence will result in changes to rail stress unless preventive measures are implemented. If no action is taken, it is likely that the rails will become unstable as a result of the mining of the proposed longwalls. The maximum predicted change in stress free temperature is approximately 140 degrees if 100 % of predicted ground strains are transferred into the rails. By comparison a change in stress free temperature of approximately 14 degrees is sufficient to warrant immediate preventative action on a track with concrete sleepers.

Management of rail stress during active mine subsidence has been a primary focus of the Rail Technical Committee. Traditionally, rail stress has been managed in Australia and overseas by rail strain or stress monitoring. Once measured changes in rail stress reach defined triggers, the stress is dissipated by unclipping the rails from the sleepers, cutting the rails and adding steel to, or removing steel from the rails as required, followed by re-stressing the rails to their desired stress. This process is effective, but it is labour intensive and very difficult to undertake on busy tracks such as the Main Southern Railway, particularly if the frequency of required rail re-stressing is likely to be more often than weekly, as would be expected during the mining of the proposed longwalls at Tahmoor Mine.

For this reason, the Rail Technical Committee has introduced a combination of rail expansion switches and zero toe load clips to dissipate mining and temperature related rail stress during mining. Rail expansion switches consist of a tapered joint in the track, which allow the rails on each side of the joints to slide independently. Maximum allowable displacements of expansion switches vary between different types of switches and those that have been employed above Tahmoor Mine Longwalls 25 to 32 have a capacity of approximately 310 mm. Expansion switches are standard rail equipment and operate in non-subsidence applications in Australia and overseas to accommodate, for example, differential thermal movements between bridges and natural ground. A rail expansion switch is shown in Fig. 6.2.

Fig. 6.2 Rail expansion switch

Zero toe load clips allow the rails to slide longitudinally along the track while maintaining lateral stability. In combination, the rails are able to expand or contract in response to mine subsidence and thermal loads into and out of the expansion switches. It is estimated that the switches will be spaced between 200 metres and 400 metres apart along the track within the subsidence area.

The combination of expansion switches and zero toe load clips has been successfully employed during the mining of Longwalls 25 to 32 at Tahmoor Mine and Longwalls 703 to 707, and Longwalls 901 and 902 at Appin Colliery.

A substantial advantage of using rail expansion switches and zero toe load clips is that the system is flexible and can be adjusted during mining should the tolerance of the switches reach their design limits. The rails can be cut and steel can be either added or removed as necessary to restore capacity in the switches. The process is substantially faster than conventional re-stressing work as the clips do not have to be removed and reinstated and no stressing work is required. The process can be safely achieved in between the passage of trains without delaying the operation of trains.

It is likely that the following management measures will be used to manage changes in rail stress:-

- Assess pre-mining track condition and adjust track if required so that pre-mining track geometry and sleeper arrangements are at or close to design prior to the development of subsidence,
- Identify potential sites of non-conventional movement, such as creeks and geological structures,
- Assess the required spacing of expansion switches based on the predicted ground movements,
- Install the expansion switches and zero toe load clips,
- Install a monitoring system, which includes, among other things, the monitoring of ground movements, rail stress, rail temperature, switch displacement and track geometry,
- Regularly review and assess the monitoring data,
- Conduct regular visual inspections of the track, switches and clips, and
- Adjust the track in response to monitoring results during mining if required.

With an appropriate management plan in place, it is considered that potential impacts to rail stress can be managed for any orientation, extension or shortening of longwalls within the *Extents of Longwalls* boundary, even if actual subsidence movements are greater than the predictions or substantial non-conventional movements occur.

6.1.7. Potential impacts on Railway Viaduct over Bargo River and Remembrance Drive Bridge over Bargo River and Main Southern Railway

The Railway Viaduct and Remembrance Drive Road Bridge are located more than 1.3 km from the *Extent of Longwalls*. While the Viaduct and Bridges may experience small far field horizontal movements during the extraction of the proposed longwalls, they are not expected to experience impacts.

The Viaduct consists of a series of masonry arches and is an item of Heritage Significance. The Remembrance Drive Bridge is a reinforced concrete deck supported by a series of reinforced concrete piers.

Previous mining at Tahmoor Mine has virtually surrounded the Viaduct and Bridge. The closest distance between the Viaduct and Bridge and the previously extracted Longwalls 4 and 5 is 640 metres. No impacts have been reported at the Viaduct or Bridge during mining at Tahmoor Mine.

6.1.8. Potential impacts on Tahmoor Mine overhead coal conveyor

Tahmoor Mine's overhead coal conveyor crosses over the Main Southern Railway near 98.160 km. It is located approximately 410 metres from the Extent of Longwalls.

The conveyor is supported by a series of steel supports, and is shown in Fig. 6.3

Fig. 6.3 Tahmoor Mine overhead coal conveyor over the Main Southern Railway near 98.160 km

The conveyor is likely to experience far field horizontal movements as a result of the proposed mining, though differential movements are expected to be very small and unlikely to impact on the conveyor.

The supports to the conveyor can be adjusted in the unlikely event that increased differential horizontal movements are observed.

It is therefore recommended that Tahmoor Coal, in consultation with ARTC, study the potential for impacts to the coal conveyor and develop management measures to ensure that the conveyor remains safe and serviceable throughout the mining period. The study would require input from structural engineers and subsidence engineers. The management measures may include a combination of:-

- Installation of a monitoring system, which includes, among other things, the monitoring of ground movements and structure movements and visual inspections,
- Implementation of a response plan, where actions are triggered by monitoring results. This will likely include an adjustment of the conveyor supports if triggered by monitoring results, and
- Implementation of a reporting and communication plan.

6.1.9. Potential impacts on masonry Road Overbridges

The Wellers Road Overbridge is located at Bargo at 101.162 km. A photograph of the Overbridge is shown in Fig. 6.4.

Fig. 6.4 Wellers Road Overbridge at 101.162 km

The Avon Dam Road Overbridge is located at 103.378 km. A photograph of the Overbridge is shown in Fig. 6.5.

Fig. 6.5 Avon Dam Road Overbridge at 103.378 km

The Lupton Road Overbridge is located at 103.378 km. A photograph of the Overbridge is shown in Fig. 6.6.

Fig. 6.6 Lupton Road Overbridge at 105.771 km

The three bridge structures are similar and consist of single spans supported by a concrete arch on masonry abutments with masonry vehicle barrier walls. The concrete arches appear to have been reinforced with old steel rails. The bridges were constructed between 1917 and 1920 and the Wellers Road and Avon Dam Road Overbridges are listed as items of heritage significance.

A summary of the maximum predicted total conventional subsidence for the masonry railway overbridges is provided in Table 6.5. The predicted tilts are the maxima at each bridge after the completion of each of the proposed longwalls. The predicted curvatures are the maxima in any direction at any time during or after the extraction of each of the proposed longwalls.

Table 6.5 Maximum predicted total conventional subsidence and valley related movements for the local road bridges

Bridge	Maximum predicted subsidence (mm)	Maximum predicted tilt along alignment (mm/m)	Maximum predicted hogging curvature in any direction (km^{-1})	Maximum predicted sagging curvature in any direction (km^{-1})
Wellers Road Overbridge at 101.162 km	1275	6.5	0.10	0.06
Avon Dam Road Overbridge at 103.378 km	100	< 0.5	< 0.01	< 0.01
Lupton Road Overbridge at 105.771 km	< 20	< 0.5	< 0.01	< 0.01

If the proposed longwalls were to be shifted, reorientated, extended or shortened within the *Extents of Longwalls* boundary, it would be expected that the maximum predicted conventional movements at the Wellers Road Overbridge would be greater or lesser than the predicted movements provided, depending on its location relative to the final positions of the longwalls.

The Avon Dam Road Overbridge may be directly mined beneath if the longwalls are extended to the southwest. The predicted conventional subsidence movements would be greater under this scenario.

The Lupton Road Overbridge is located outside the extent of the longwall mining area. If the proposed longwalls were shifted, reorientated, extended or shortened within the *Extents of Longwalls* boundary, the predicted vertical subsidence would likely remain less than 20 mm.

The bridges were inspected by structural engineer John Matheson & Associates and details concerning their existing condition are provided in a report (JMA, 2014). In summary, the concrete arches of the Wellers Road Overbridge and Avon Dam Overbridge appear to be in serviceable condition and relatively few cracks have developed in their 95 years of service.

More significant cracking has developed on the Lupton Road Overbridge, primarily in response to truck impacts on the parapet walls, which have propagated down through the spandrel walls. The abutment walls appear to be in serviceable condition. Some spalling and cracking has been identified on the underside of the concrete arch, exposing part of the encased steel rails.

A concern for the bridge structures is that they may not be particularly ductile in nature and if one of the bridges experienced severe differential subsidence movements, there is a chance that it may not be sufficiently ductile to remain serviceable. The potential for impacts is understandably greatest for the Wellers Road Overbridge, which is located directly above the proposed mine layout.

Preliminary numerical analyses by John Matheson & Associates (2014) suggest that the bridges can tolerate some differential ground movements. If differential subsidence movements develop at the bridges, they may result in the development of additional cracking to the masonry elements of the bridge. John Matheson & Associates have suggested a number of methods that could be employed to manage impacts if required. These generally involve repairing cracks or introducing articulation to the structures to maintain their serviceability and to improve their strength and ductility. This allows the bridges to accommodate greater mining-induced movements than they could currently accommodate in their existing condition.

Mining-induced ground movements will develop gradually at the bridges. With the implementation of an effective subsidence management plan, the development of ground movements and impacts can be detected early with time to implement intervention measures before the bridges become unserviceable.

It is recommended that a more detailed and rigorous assessment be undertaken prior to mining to determine the capacity of the existing bridges to tolerate differential subsidence movements and, furthermore, whether it is possible to introduce strengthening measures to improve their strength and ductility (JMA, 2014). This recommendation applies particularly to the Wellers Road Overbridge and also to the Avon Dam Road Overbridge. The future assessments should consider the potential for non-conventional subsidence movements to develop.

Tahmoor Coal has successfully strengthened the Thirlmere Way Overbridge at Tahmoor by reinforcing the existing masonry abutment walls and similar measures could be examined at the Wellers Road Overbridge. If the bridge deck was replaced as part of the mitigation measures, it would be possible to reconstruct a non-structural façade to restore the brickwork and concrete arch appearance of the heritage listed bridge if required. The Rail Technical Committee has successfully improved the ductility to masonry structures by embedding steel bar reinforcement into the brickwork (Leventhal, *et al.*, 2017).

In the case of the Wellers Road Overbridge, which lies directly above the proposed longwalls, the assessment may find that it would be preferable to replace the bridge rather than make modifications to it. If a replacement option is decided, it would be possible to construct a new bridge that can accommodate substantial differential subsidence movements but also closely approximate the visual aesthetic of the original heritage listed bridge (JMA, 2014).

The Lupton Road Overbridge is located well away (approximately 420 metres) from the proposed *Extents of Longwalls* boundary and is extremely unlikely to experience impacts due to the proposed mining. The Bridge may experience differential far field movements and a statistical analysis of potential changes in differential horizontal movements is provided in Fig. 6.9.

It is recommended that Tahmoor Coal, in consultation with ARTC, study the potential for impacts to the bridges and develop management measures to ensure that the bridges remain safe and serviceable throughout the mining period. The study would require input from structural and geotechnical engineers and subsidence engineers. The management measures may include a combination of:-

- Re-assessment of the pre-mining condition of the bridges prior to mining,
- Consideration of mitigation measures prior to mining and implementation if required,
- Installation of a monitoring system, which includes, among other things, the monitoring of ground movements and bridge movements,
- Regular review and assess the monitoring data,
- Regular visual inspections of the bridges, and
- Implementation of planned responses if triggered by monitoring and inspections.

With an appropriate management plan in place, it is considered that potential impacts to the masonry railway overbridges can be managed for any orientation, extension or shortening of the longwalls within the *Extents of Longwalls* boundary, even if actual subsidence movements are greater than the predictions or substantial non-conventional movements occurred.

6.1.10. Potential Impacts on Bargo Railway Station and Pedestrian Overbridge

The Bargo Railway Station and Pedestrian Overbridge is located at Bargo at 102.873 km. A photograph of the station and overbridge is shown in Fig. 6.1.

The railway station consists of a platform on both sides of the track, with station buildings and offices. A fire in 1993 resulted in the loss of almost all of the original structures and new buildings were constructed in 1994 (Niche, 2020d). A small WC remains on the northbound side and this structure is listed as an item of heritage significance, along with the railway platforms. A photograph of the WC and northbound platform is shown in Fig. 6.7.

Photograph courtesy Niche Environment and Heritage

Fig. 6.7 Bargo Station northbound platform and small WC

The railway platforms were originally 7.2 metres long (Niche, 2020d) but have been extended and are currently over 80 metres long. The face of the platform is brick.

The railway station and overbridge are located to the side of proposed Longwall 108B, on the edge of the extent of longwall mining area.

A summary of the maximum predicted subsidence parameters for the railway platforms and structures are provided in Table 6.6. The tilts are the maximum predicted values which occur after the completion of any or all of the proposed longwalls. The curvatures are the maximum predicted values which occur at any time during or after the extraction of each of the proposed Longwalls 101A to 108B.

Table 6.6 Maximum predicted total conventional subsidence parameters for Bargo Railway Station structures

Location	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})
Platform on Up side (Northbound)	< 20	< 0.5	< 0.01	< 0.01
Platform on Down side (Southbound)	< 20	< 0.5	< 0.01	< 0.01
WC (Northbound)	< 20	< 0.5	< 0.01	< 0.01
Main station building (Northbound)	< 20	< 0.5	< 0.01	< 0.01
Main station building (Southbound)	< 20	< 0.5	< 0.01	< 0.01
Office or shed (Southbound)	< 20	< 0.5	< 0.01	< 0.01
Storage shed (Southbound)	< 20	< 0.5	< 0.01	< 0.01

ARTC standards provide for allowable clearances between the track and the railway platforms. As the station platforms are located on the edge of the proposed longwall mining area, it is more likely that the platforms will move slightly apart from each other rather than move slightly closer together. It is possible, though extremely unlikely that differential horizontal movements between the track and platforms will result in an exceedance of ARTC standards. The likelihood is assessed as low as the clearances from ARTC standards between the track and the platforms and between the two tracks are typically orders of magnitude greater than predicted differential movements.

The station platform itself may experience impacts such as pavement or brickwork cracking. Trip hazards may develop on the pavement, which can be readily identified and repaired. The station structures are relatively modern and lightweight in construction and are expected to accommodate substantial differential subsidence movements. Section 10.2 provides a discussion on potential impacts on the heritage significance of the platform and small WC building.

The pedestrian overbridge consists of reinforced concrete ramps and walkways, supported by steel columns that appear to be bolt fixed to reinforced concrete pad footings. While the structure appears able to accommodate differential subsidence movements, it is considered possible to make further adjustments to the structure in the event that it experiences substantial differential movements.

It is recommended that Tahmoor Coal, in consultation with the ARTC, study the potential for impacts to the Station and Pedestrian Overbridge and develop management measures to ensure that the station remains safe and serviceable throughout the mining period. A number of management measures are proposed to manage potential impacts to platform clearances:-

- Assess pre-mining track condition and clearances to the platforms and between the tracks,
- Assess the pre-mining condition of the Pedestrian Overbridge,
- Install a monitoring system, which includes, among other things, the monitoring of platform and centreline clearances and the Overbridge,
- Regularly review and assess the monitoring data,
- Conduct regular visual inspections of the track, platform and station structures and overbridge,
- Adjust the track when triggered by monitoring results to keep the track well within platform clearance limits,
- Repair the platform and station structures, if required to ensure that it remains safe and serviceable, and
- Adjust the Overbridge if required to ensure that it remains safe and serviceable.

With an appropriate management plan in place, it is considered that the potential impacts to the structures, platform clearances and overbridge can be managed for any orientation, extension or shortening of the longwalls within the *Extents of Longwalls* boundary, even if actual subsidence movements are greater than the predictions or substantial non-conventional movements occurred.

6.1.11. Potential impacts on M31 Motorway Overbridges

Please refer to Section 6.2.6 for predictions and measures to manage potential impacts on the Motorway Overbridges over the Main Southern Railway.

6.1.12. Potential impacts on railway culverts at creek crossings

There are a number of railway culverts within the *Subsidence Study Area*. The majority of the culverts are relatively small in size, being 2 metres in diameter or less.

The culverts in the northern part of the proposed longwall mining area above proposed Longwalls 101A to 105A are situated in defined drainage lines that form part of the Teatree Hollow catchment. The culverts are buried beneath small railway embankments. These culverts are expected to experience non-conventional valley related subsidence movements in addition to conventional subsidence movements. Based on knowledge of the culverts beneath the Main Southern Railway at Tahmoor, it is expected that the majority of these are of masonry arch construction.

The culverts in the southern part of the proposed longwall mining extent above proposed Longwalls 106B to 108B are located in less defined drainage lines and are expected to experience mainly conventional subsidence movements. The culverts are typically shallow buried beneath the track and are typically constructed with either small reinforced concrete pipes, or masonry arches or with masonry walls with concrete ballast top bridge.

Given that the maximum predicted tilt within the *Subsidence Study Area* is 10.5 mm/m, which equates to a 1.05% change in grade, it is expected that mining-induced conventional tilts will not substantially impact the drainage flows in the culverts. It is, however, recommended that the culverts be cleared of ballast which has accumulated in the culvert prior to mining.

The main impact identified with the brick arch culverts is the potential for physical impacts to occur. It is possible that these culverts will experience some cracking and spalling of the masonry as a result of mining the longwalls. Cracking may occur in the masonry arch or in the wingwalls and headwalls. The predicted movements are not considered likely to result in collapse of the culvert.

However, given the potentially severe consequences of culvert collapse, the Rail Technical Committee will consider mitigation measures prior to each culvert experiencing subsidence movements. Mitigation works could include, for example, sleeving the masonry arch with new pipes. Alternatively, in the case of small shallow buried culverts, steel baulk structures could be placed above the culvert to prevent impacts on the track in the event of culvert collapse.

More substantial mitigation measures may be required for the larger culverts, which may include substantial strengthening of the culvert, wingwalls and headwalls. Substantial strengthening work has successfully been undertaken at culverts above Longwalls 25 and 29 at Tahmoor Mine (Leventhal, *et al.*, 2011; Leventhal, *et al.*, 2017).

A structural steel liner was successfully installed by Tahmoor Mine in a small culvert above Longwall 26. In this case a small air gap was left between the structural steel liner and the original masonry culvert. It was found that while the masonry culvert has experienced cracking during mining, it has remained safe and serviceable during mining. While providing effective insurance against failure, the structural steel liner has not been required to support the track and maintain the waterway.

It is likely that the following management measures will be used to manage potential impacts on culverts:-

- Assess pre-mining condition of culverts,
- Consider and implement mitigation measures to reduce or avoid the potential for culvert collapse,
- Install a monitoring system, which includes, among other things, the monitoring of ground movements around the culverts and changes in track geometry and rail stress,
- Regularly review and assess the monitoring data,
- Conduct regular visual inspections of the culverts, and
- Provide additional track and/or culvert support in response to actual measurements and observations during mining.

With an appropriate management plan in place, it is considered that the potential impacts on the culverts can be managed for any orientation, extension or shortening of the longwalls within the *Extents of Longwalls* boundary, even if actual subsidence movements are greater than the predictions or substantial non-conventional movements occur.

The predicted valley upsidence and closure movements are also expected to result in changes in track geometry and rail stress. Methods for managing of changes in track geometry and rail stress are provided in Section 6.1.4 and Section 6.1.6.

6.1.13. Potential impacts on railway cuttings

The Main Southern Railway follows a ridgeline within the *Subsidence Study Area* and only small cuttings are present.

The cutting batters consist of weathered shale. In the unlikely event that the faces of these cuttings are impacted by mine subsidence, the failure is likely to be very minor, in the form of small fragments of rock, and likely to fall into the clear area at the base of the cutting, (*the cess*).

Tahmoor Mine has successfully mined directly beneath railway cuttings during the extraction of Longwalls 25 to 32, with only minor impacts observed on cuttings.

The Rail Technical Committee will consider mitigation measures before the cuttings experience subsidence movements. Mitigation works could include, for example, scaling the cutting faces and removing debris from *the cess*. *The cess* will then be maintained during the mining period.

With an appropriate management plan in place, it is considered that the potential impacts on the cuttings can be managed for any orientation, extension or shortening of the longwalls within the *Extents of Longwalls* boundary, even if actual subsidence movements are greater than the predictions or substantial non-conventional movements occurred.

6.1.14. Potential impacts on embankments

The Main Southern Railway crosses relatively small valleys in the *Subsidence Study Area* and the railway embankments are less than 5 metres in height. The majority of the embankments are located above the northern part of the proposed longwall mining area above proposed Longwalls 101A to 105A.

The embankments are typically constructed with local fill material and contain relatively steep batters. The likelihood of impacts on the embankments is considered to be relatively low provided that the culverts remain serviceable and do not become blocked.

The embankments may experience tensile surface cracking during mining, however, these can be readily treated before they develop into a safety hazard. Compressive impacts are less likely as the voids within the embankment can accommodate some compressive movement.

The Rail Technical Committee will consider mitigation measures before each embankment experiences subsidence movements. Mitigation works could include, for example, cleaning out of the culverts and drainage lines beneath the embankments, or the stabilisation of the batters.

With an appropriate management plan in place, it is considered that potential impacts on the embankments can be managed for any orientation, extension or shortening of the longwalls within the *Extents of Longwalls* boundary, even if actual subsidence movements are greater than the predictions or substantial non-conventional movements occurred.

6.1.15. Potential impacts on signalling and communications systems

There are a number of signalling, communications and electrical services along the Main Southern Railway. These include signal boxes, an optical fibre cable and radio towers.

The potential for impacts on cabling and wiring along the track is considered to be very low. Mine subsidence impacts on electrical and telecommunications cabling is historically very low in the Southern Coalfield, as discussed in Section 6.10. It is noted that there are failsafe signalling procedures designed within the track management system that substantially reduce the potential for train collisions.

The single pole radio towers are unlikely to experience adverse physical impacts due to the predicted subsidence movements. This assessment is based on historical experience of very few impacts on power poles during the mining of many longwalls in the Southern Coalfield, as discussed in Section 6.9.

With an appropriate management plan in place, it is considered that the potential impacts on signalling, communications and electrical services can be managed for any orientation, extension or shortening of the longwalls within the *Extents of Longwalls* boundary, even if actual subsidence movements are greater than the predictions or substantial non-conventional movements occurred.

6.2. The M31 Hume Motorway

6.2.1. Description of the M31 Hume Motorway

The location of the M31 Hume Motorway is shown in Drawing No. MSEC1060-12. The Motorway will not be directly mined beneath by the proposed longwalls.

The M31 Hume Motorway is a major road corridor, linking Sydney with Canberra and Melbourne. The Motorway currently carries in excess of 20 million tonnes of road freight annually and current traffic volumes are in excess of 37,000 vehicles per day. The dual carriageway Motorway has been constructed with an asphaltic pavement on a slag road base and stabilised crushed sandstone sub-base.

The Southbound Carriageway of the Motorway, near the *Subsidence Study Area*, is shown in Fig. 6.8.

Fig. 6.8 Southbound carriageway of M31 Hume Motorway near the *Subsidence Study Area*

A summary of the bridges associated with the M31 Hume Motorway which are located in the vicinity of the proposed longwalls is provided in Table 6.7.

Table 6.7 M31 Hume Motorway Bridges located in the vicinity of the proposed amended longwall layout

MSEC Bridge ID	Road	Closest distance to amended longwall layout
M31-BR2	Avon Dam Road Bridge and pipe bridge over the M31 Hume Motorway	650 metres from the amended longwalls
M31-BR3	M31 Hume Motorway over the Main Southern Railway and Remembrance Drive at Railway Ch. 107.507	2.14 kilometres from the amended longwalls
M31-BR4	M31 Hume Motorway over the Main Southern Railway at Railway Ch. 108.784	3.07 kilometres south of the proposed Longwall 108B

In addition to the major structures described above, there are also a number of smaller structures associated with the motorway, including drainage culverts, cuttings, embankments, crossovers, an emergency phone system and road signage.

6.2.2. Predictions for the M31 Hume Motorway

The Motorway is located beyond the predicted limit of subsidence due to the extraction of the proposed Tahmoor South longwalls.

The Motorway follows a natural ridgeline within the *Subsidence Study Area* and, therefore, does not cross valleys in the vicinity of the proposed longwalls. It is unlikely, therefore, that the Motorway would experience substantial valley related movements resulting from the proposed mining.

The predictions for the bridges associated with the M31 Hume Motorway are provided with the impact assessments in Section 6.2.4.

6.2.3. Management of potential impacts to the M31 Hume Motorway

While Tahmoor Mine has not previously mined directly beneath the M31 Hume Motorway, lessons can be learned from South32 Illawarra Coal's operations, which have successfully mined Longwalls 703 to 707 beneath the M31 Hume Motorway. South32 Illawarra Coal and the Roads and Maritime Services of NSW (RMS) have jointly developed detailed risk management strategies for effectively managing potential mine subsidence impacts to the Motorway at Appin Colliery near Douglas Park (Kay, *et al.*, 2011).

The management strategies are developed and implemented by a body, which comprises (Bilaniwskyj, *et al.*, 2011):-

- a Steering Committee chaired by the RMS, with senior representatives from the RMS, IC, Subsidence Advisory NSW, and
- a Technical Committee chaired by the RMS and reporting to the Steering Committee, with representatives from the RMS, IC, and selected specialists as required from the fields of geotechnical engineering, pavements, bridges, traffic management, mine subsidence, risk assessment, modelling and project management. The Technical Committee consults with the Resources Regulator and Subsidence Advisory NSW, who attend as observers.

Works by the Technical Committee include:-

- Identification of all potential mechanisms for impacts to the Motorway,
- Identification of geological structures in the surface geology that may respond in a non-conventional manner as a result of mine subsidence,
- Undertaking a risk management approach, where all identified risks are assessed and risk control measures are implemented, and
- Development of management measures that include mitigation and preventive works, monitoring plans, triggered response plans, traffic plans and communication plans.

It is recommended that an assessment of potential impacts and development of risk management measures be undertaken jointly by the RMS and Tahmoor Coal through a Technical Committee.

With an appropriate management plan in place, it is considered that potential impacts on the pavements can be managed for any orientation, extension or shortening of longwalls within the *Extents of Longwalls* boundary, even if actual subsidence movements are greater than the predictions or substantial non-conventional movements occur.

6.2.4. Predicted mining-induced movements for the M31 Hume Motorway Bridges

The bridges associated with the M31 Hume Motorway are all located outside the *Extents of Longwalls* boundary.

The Avon Dam Road Overbridge over the M31 Hume Motorway is located 520 metres south-east of the *Extents of Longwalls* boundary. Whilst the Bridge could experience some low levels of vertical subsidence, it is not expected to experience substantial conventional tilts, curvatures and strains.

The remaining bridges along the M31 Hume Motorway are located 1.8 kilometres, or greater, from the *Extents of Longwalls* boundary. At these distances, these bridges are not expected to experience measurable conventional subsidence movements.

The bridges could experience small far-field horizontal movements resulting from the proposed mining. It can be seen from Fig. 4.7, that incremental far-field horizontal movements up to 75 mm have been observed at distances around 400 metres from previously extracted longwalls. These far-field horizontal movements reduce with distance and have been observed to be typically in the order of survey tolerance at distances greater than around 1.5 kilometres from previously extracted longwalls.

The potential for mining-induced impacts on bridges do not result from absolute far-field horizontal movements, but rather from differential horizontal movements over the lengths of the structures. Differential horizontal movements along the alignments of the bridges could potentially affect the widths of the expansion joints or the capacities of the support bearings. Differential horizontal movements across the alignments of bridges could potentially induce eccentricities into the structure or affect the capacities of the support bearings.

The potential for differential horizontal movements at the bridges has been assessed by statistically analysing the available 3D monitoring data from the NSW Coalfields. The observed incremental differential longitudinal movements for survey marks spaced at 20 metres ±10 metres, relative to the distance from the active longwall, is shown in Fig. 6.9. The 95 % confidence levels have also been shown in this figure, which are based on *Generalised Pareto Distributions* (GPDs) fitted to the observed data.

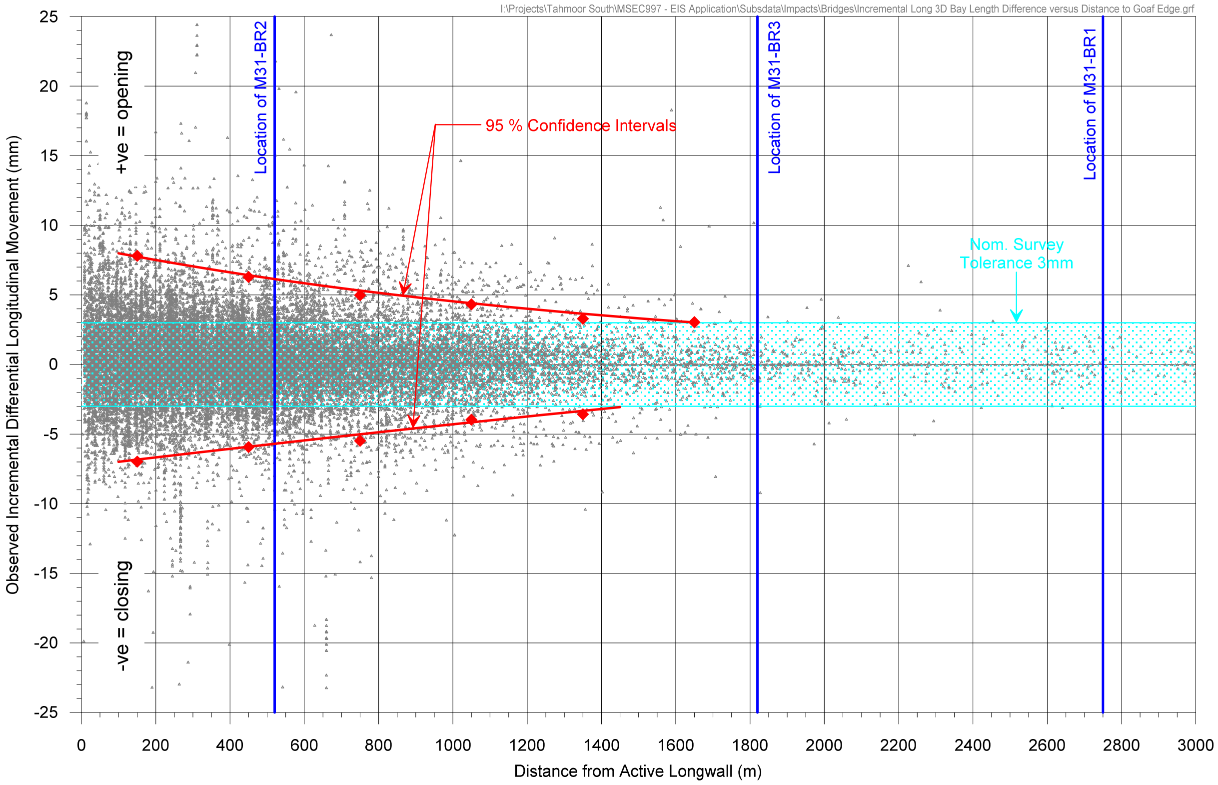


Fig. 6.9 Observed incremental differential horizontal movements versus distance from active longwalls for survey marks spaced at 20 metres ±10 metres

Horizontal mid-ordinate deviation is a measure of differential lateral movement, which is the change in perpendicular horizontal distance from a point to a chord formed by joining points on either side. A schematic sketch showing the horizontal mid-ordinate deviation of a survey mark compared to its adjacent survey marks between two epochs is provided in Fig. 6.10.

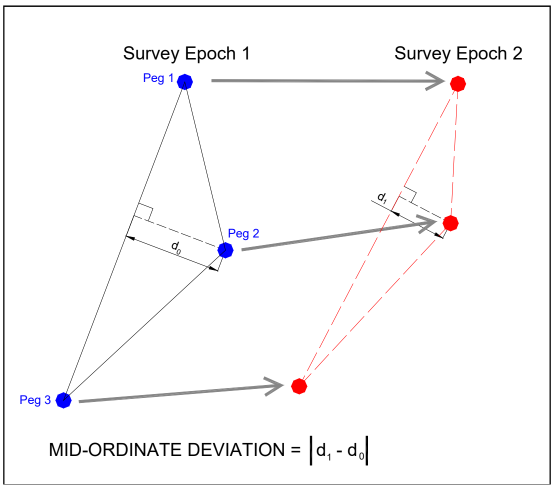


Fig. 6.10 Schematic representation of horizontal mid-ordinate deviation

The distribution of the observed incremental horizontal mid-ordinate deviation for survey marks spaced at 20 metres ±10 metres, relative to the distance from the active longwall, is shown in Fig. 6.11. The 95 % confidence level has also been shown in this figure, which is based on GPD fitted to the observed data.

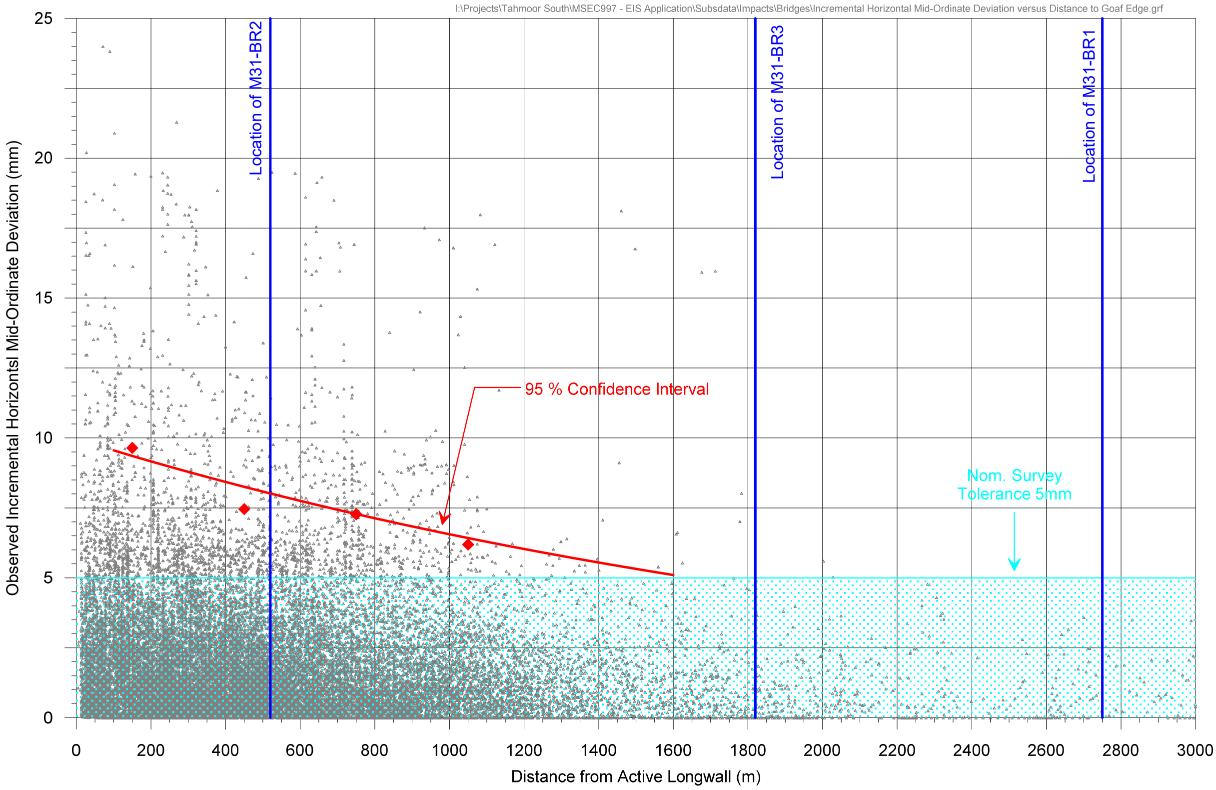


Fig. 6.11 Observed incremental horizontal mid-ordinate deviation versus distance from active longwall for survey marks spaced at 20 metres ±10 metres

A summary of the maximum predicted incremental differential longitudinal movements and incremental horizontal mid-ordinate deviations for the bridges, based on the 95 % confidence intervals for survey marks spaced at 20 metres ±10 metres, is provided in Table 6.8.

Table 6.8 Maximum predicted incremental differential longitudinal movements and horizontal mid-ordinate deviations for the M31 Hume Motorway Bridges

Bridge	Maximum predicted longitudinal opening over a 20 metre Bay (mm)	Maximum predicted longitudinal closure over a 20 metre Bay (mm)	Maximum predicted incremental horizontal mid-ordinate deviation over a 40 metre Bay (mm)
M31-BR2	6	6	8
M31-BR3	< 3	< 3	< 5
M31-BR4	< 3	< 3	< 5

The maximum predicted differential incremental horizontal movements for Bridge M31-BR2 are ±8 mm, or less, based on the 95 % confidence intervals. The maximum predicted differential horizontal movements for the remaining bridges are ±4 mm, or less, based on the 95 % confidence intervals. It is noted, that these movements comprise a large proportion of survey tolerance, which is around ±3 mm.

6.2.5. Impact assessments for the Avon Dam Road Bridge and pipe bridge

The Avon Dam Road Overbridge is located 520 metres south of the *Extents of Longwalls* boundary. A bridge supporting a water pipe is located immediately adjacent to the road bridge. Photographs of the road and pipe bridges are provided in Fig. 6.12 and Fig. 6.13.

Fig. 6.12 Avon Dam Road Bridge over M31 Hume Motorway

Fig. 6.13 Water pipe bridge over M31 Hume Motorway adjacent to Avon Dam Road

The two-lane Avon Dam Road Overbridge consists of a structural steel deck supported on three reinforced concrete piers and abutments. The pipe bridge consists of a structural steel deck supported on three reinforced concrete piers. The concrete abutments are well away from the edge of the road cutting.

While the bridges are predicted to experience low level vertical movements and absolute horizontal movements, differential horizontal movements are expected to be quite small, as discussed in Section 6.2.4. It is noted, however, that the alignment of the Central Fault is close to the location of the Bridges and greater than expected differential movements may develop.

Differential horizontal movements between the concrete decks and supports normally occur as the result of thermal variations. Typical horizontal movements due to temperature, based on a 20 metre structural steel deck span, a coefficient of thermal expansion of 12×10^{-6}/ºC and a temperature variation of 20ºC, are around 5 mm. The predicted differential horizontal movements for the Avon Dam Road Bridge and pipe bridge are of similar orders of magnitude to the movements which result from normal thermal variations.

It is recommended that a review of the bridge structures be undertaken to assess its existing condition. The review should also assess of the bridges to accommodate differential subsidence movements and advise whether preparations should be made prior to mining, so that the bridge deck can be adjusted during mining.

It is recommended that Tahmoor Coal, in consultation with RMS and in the case of the pipe bridge, Sydney Water, study the potential for impacts to the bridges and develop management measures to ensure that they remain safe and serviceable throughout the mining period. The study would require input from structural and geotechnical engineers and subsidence engineers. The management measures may include a combination of:-

- Assess the pre-mining condition of the bridges,
- Investigate the potential for geological structures to exist in the vicinity of the bridges,
- Consider and implement mitigation measures prior to mining (if any) to allow the bridges to accommodate potential differential subsidence movements,
- Installation of a monitoring system, which includes, among other things, the monitoring of ground movements and bridge movements,
- Regularly review and assess the monitoring data,
- Conduct regular visual inspections of the bridges, and
- Implement planned responses if triggered by monitoring and inspections.

With an appropriate management plan in place, it is considered that potential impacts on the bridges can be managed for any orientation, extension or shortening of longwalls within the *Extents of Longwalls* boundary, even if actual subsidence movements are greater than the predictions or substantial non-conventional movements occurred.

6.2.6. Twin Bridges over the Main Southern Railway at Yanderra

There are two sets of twin Motorway bridges over the Main Southern Railway at Yanderra.

In addition to the Railway, the bridges at 107.507 km also pass over an entry road to the Motorway from Remembrance Drive. It consists of reinforced concrete decks, supported by reinforced concrete decks and abutments, as shown in Fig. 6.14

The bridges over the Railway at 108.784 km consist of single span reinforced concrete decks supported by reinforced concrete abutments, as shown in Fig. 6.15.

The bridges are located to the south of the *Subsidence Study Area* and are more than 2 kilometres from the *Extent of Longwalls*.

The bridges may experience extremely small absolute and differential lateral movements close to survey tolerance, as discussed in Section 6.2.4.

It is extremely unlikely that the bridges will experience impacts due to the extraction of the proposed longwalls.

Fig. 6.14 M31 Hume Motorway Overbridge at 107.507 km

Fig. 6.15 M31 Hume Motorway Overbridge at 108.784 km

6.2.7. Potential impacts on Motorway culverts and drainage structures

As the Motorway roughly follows the alignment of a ridgeline, very few culverts and drainage structures are located along the Motorway within the *Subsidence Study Area*. Some drainage structures are used to drain water from the depressed median beneath the pavement and kerbs and gutters are used to drain from along the bases of the cuttings.

Given the offset distance of the proposed longwalls from the Motorway, it is unlikely that the extraction of the proposed longwalls could result in cracking of the reinforced concrete pipes, kerbs and gutters.

The drainage structures can be monitored during mining by ground survey and visual inspections and repairs can be undertaken if impacts occur.

6.3. Local roads

6.3.1. Descriptions of local roads

The locations of local roads within the *Subsidence Study Area* are shown in Drawing No. MSEC1060-12.

The main local road within the *Subsidence Study Area* is Remembrance Drive which runs alongside the western side of the Main Southern Railway and crosses directly above the proposed Longwalls 101A to 105A, and Longwalls 106B to 108B. The road provides a connection between the M31 Hume Motorway and the township of Tahmoor to the north of the *Subsidence Study Area*. Great Southern Road runs alongside the eastern side of the Main Southern Railway and becomes Avon Dam Road, which connects to the M31 Hume Motorway.

The local roads generally consist of two lanes and most are constructed with bitumen seals. A small number of public roads are unsealed. The local roads within the township of Bargo also have concrete kerb and guttering. The local roads are maintained by Wollondilly Shire Council. A photograph of Remembrance Drive near the main centre of Bargo is provided in Fig. 6.16.

Fig. 6.16 Remembrance Drive

A summary of the local road bridges located within the *Subsidence Study Area* is provided in Table 6.9. The bridges associated with the Main Southern Railway and the M31 Hume Motorway are described in Sections 6.1 and 6.2, respectively.

Table 6.9 Local road bridges located in the vicinity of the proposed amended longwalls

MSEC Bridge ID	Road	Location
BR-BR1	Bargo Road over Dog Trap Creek	Directly above amended longwall layout
KS-BR1	Kader Street over Hornes Creek	600 metres south-west from amended longwalls

The local road bridges are generally constructed with reinforced concrete abutments and deck. Most of the bridges could be described as box culverts.

A photograph of the Bargo Road Bridge over Dog Trap Creek is shown in Fig. 6.17. A telecommunications conduit is fixed to the downstream side of the bridge.

Fig. 6.17 Bargo Road Bridge over Dog Trap Creek

6.3.2. Predictions for local roads

Remembrance Drive follows a similar alignment to the Main Southern Railway above the proposed Longwalls 101A to 105A, and Longwalls 106B to 108B. The predicted profiles of conventional subsidence, tilt and curvature along the alignment of the road are, therefore, similar to those along the alignment of the railway, which are shown in Fig. E.09, in Appendix E. The predictions are based on the extraction of the proposed amended longwall layout, as shown in Drawing No. MSEC1060-12.

A summary of the maximum predicted total conventional subsidence parameters for Remembrance Drive, after the extraction of each of the proposed longwalls, is provided in Table 6.10.

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

Table 6.10 Maximum predicted total conventional subsidence parameters for Remembrance Drive due to the extraction of the amended longwall layout

Longwall	Maximum predicted subsidence (mm)	Maximum predicted tilt along alignment (mm/m)	Maximum predicted hogging curvature in any direction (km^{-1})	Maximum predicted sagging curvature in any direction (km^{-1})
LW101A	140	1.0	0.02	< 0.01
LW102A	950	5.0	0.04	0.10
LW103A	1150	6.5	0.06	0.13
LW101B	1150	6.5	0.06	0.13
LW102B	1150	6.5	0.06	0.13
LW103B	1150	6.5	0.06	0.13
LW104B	1150	6.5	0.06	0.13
LW105B	1150	6.5	0.06	0.13
LW106B	1150	6.5	0.06	0.13
LW107B	1175	7.0	0.06	0.13
LW108B	1500	6.5	0.07	0.13
LW104A	1500	6.5	0.09	0.13
LW105A	1500	6.5	0.09	0.13
LW106A	1500	7.5	0.09	0.13

The maximum predicted conventional strains for Remembrance Drive, based on applying a factor of 15 to the maximum predicted conventional curvatures, are 1.4 mm/m tensile and 2.0 mm/m compressive. Non-conventional movements can also occur as a result of, among other things, anomalous movements. The analysis of strains provided in Chapter 4 includes those resulting from both conventional and non-conventional anomalous movements.

The road is a linear feature and, therefore, the most relevant distribution of strain is the maximum strains measured along whole monitoring lines above previous longwall mining. The analysis of strains along whole monitoring lines during the mining of previous longwalls in the Southern Coalfield is discussed in Section 4.3 and the results are provided in Fig. 4.4.

The remaining local roads are located directly above the proposed longwalls and, therefore, could experience the full range of predicted subsidence movements. A summary of the maximum predicted conventional subsidence movements within the *Subsidence Study Area* is provided in Chapter 4.

If the proposed longwalls were to be shifted, reorientated, extended or shortened within the *Extents of Longwalls* boundary, it would be expected that the maximum predicted conventional movements for the local roads would be similar to those provided above. Whilst different sections of the roads would be predicted to experience greater or lesser movements, depending on their locations relative to the positions of the longwalls, the overall levels of movement along the extents of the roads would not be expected to change substantially.

A summary of the maximum predicted total conventional subsidence and valley related movements for local road bridges is provided in Table 6.11. The predicted tilts are the maxima at the bridges after the completion of each of the proposed longwalls. The predicted curvatures are the maxima in any direction at any time during or after the extraction of each of the proposed longwalls.

Table 6.11 Maximum predicted total conventional subsidence and valley related movements for local road bridges

Bridge	Maximum predicted subsidence (mm)	Maximum predicted tilt along alignment (mm/m)	Maximum predicted hogging curvature in any direction (km^{-1})	Maximum predicted sagging curvature in any direction (km^{-1})	Maximum predicted upsidence (mm)	Maximum predicted closure (mm)
BR-BR1	1325	8.0	0.13	0.05	375	300
KS-BR1	< 20	< 0.5	< 0.01	< 0.01	< 20	< 20

If the proposed longwalls were to be shifted, reorientated, extended or shortened within the *Extents of Longwalls* boundary, it would be expected that the maximum predicted conventional movements for the Bargo Road Bridge (BR-BR1) would be greater or lesser than the predicted movements provided, depending on its location relative to the final positions of the longwalls. The Kader Street Bridge may experience greater subsidence movements if the longwalls were extended to the southwest.

6.3.3. Impact assessments for local roads

There is extensive experience of mining directly beneath local roads in the Southern Coalfield which indicates that impacts can be managed with the implementation of suitable management strategies. In all cases the local roads have remained in safe and serviceable condition and have been remediated using normal road maintenance techniques.

Longwalls 22 to 32 at Tahmoor Mine have mined directly beneath more than 30 kilometres of local roads and a total of 54 impact sites have been observed. The observed rate of impact on the local roads equates to an average of one impact for every 550 metres of pavement. In most cases, the impacts were relatively minor and were remediated by locally resurfacing the pavements.

The most severe impacts were located where substantial non-conventional movements had developed. These impact sites were identified using visual and ground monitoring and remediation was undertaken during active subsidence to maintain these roads in safe and serviceable conditions.

Photographs of typical impacts observed on local roads at Tahmoor are provided in Fig. 6.18.

Fig. 6.18 Previously observed impacts on local roads above Tahmoor Mine

As the predicted subsidence parameters for the proposed longwalls are greater than those at Tahmoor North, it is expected that the rates of impact on the local roads within the *Subsidence Study Area* will be greater than experienced at Tahmoor. The impacts, however, can be managed with the implementation of suitable management strategies. Impacts on local roads have been successfully managed elsewhere in the NSW Coalfields, where the predicted subsidence parameters were similar to or greater than those predicted for the proposed longwalls.

6.3.4. Impact assessments for local road bridges

The local road bridges consist of single span reinforced decks supported by reinforced concrete abutments. Three of the bridges are predicted to experience substantial conventional movements and valley closure movements.

Tahmoor Mine has successfully mined directly beneath two local road bridges during the mining of Longwalls 22 to 32.

The Thirlmere Way Overbridge crosses the Main Southern Railway above previously extracted Longwall 24B. As the bridge was constructed with masonry abutments, extensive strengthening works were undertaken prior to mining and no impacts were experienced during mining.

Castlereagh Street Bridge is located across Myrtle Creek above previously extracted Longwall 25. The bridge consists of a single span reinforced deck supported by reinforced concrete abutments. The bridge experienced substantial mine subsidence movements during the mining of Longwalls 24B to 28, including valley closure movements of approximately 240 mm.

Prior to mining, Tahmoor Coal, in consultation with Wollondilly Shire Council assessed the potential impacts on the bridge and undertook mitigation measures prior to mining to minimise potential severity of impacts on the deck and abutments. The bridge was extensively monitored during mining.

During the mining of Longwall 25, the survey results for Castlereagh Street Bridge showed that while the creek sides had closed considerably, the bridge had closed substantially less with the exception of the end of the south-eastern wing wall. The resistance of the bridge structure to closure had resulted in compressive heaving in the road pavement on the southern side of the bridge and damage to the telecommunications conduit at the north-western abutment. Existing cracks on the southern abutment were observed to extend slowly during mining, particularly at the interface between the abutment and south-eastern wing wall.

The southern abutment of the Castlereagh Street Bridge experienced impacts during the mining of Longwall 26. These consisted of vertical cracks on the south-eastern wingwall / abutment junction and a horizontal crack and concrete spalling at roughly 200 mm below the top of the abutment across the width of the abutment. The impacts were successfully managed and the Bridge remained safe and serviceable at all times. Some traffic control restrictions were, however, in place while the Bridge was being repaired and strengthened.

In the case of the local bridges that are located directly above the proposed longwalls, the experiences of mining directly beneath the Castlereagh Street Bridge provide an example of the types of the impacts that might occur. The most likely impacts include cracking of the abutments and increased stresses on the decks, particularly if they are not able to slide relative to the abutments. It is also possible that the pavements on approach to the bridges could heave in compression as the bridge structure initially resists the valley closure movements.

It is recommended that Tahmoor Coal, in consultation with Wollondilly Shire Council, study the potential for impacts on the local road bridges and develop management measures to ensure that they remain safe and serviceable throughout the mining period. It is likely that the following management measures will be used to manage potential impacts on the bridges:-

- Assess and record the pre-mining condition of the bridges,
- Consider and implement mitigation measures prior to mining,
- Installation of a monitoring system, which includes, among other things, the monitoring of ground movements and bridge movements,
- Regularly review and assess the monitoring data,
- Conduct regular visual inspections of the bridges, and
- Implement planned responses if triggered by monitoring and inspections.

With an appropriate management plan in place, it is considered that potential impacts on the bridges can be managed for any orientation, extension, or shortening of longwalls within the *Extents of Longwalls* boundary, even if actual subsidence movements are greater than the predictions or substantial non-conventional movements occur.

6.3.5. Impact assessments for local road culverts

The maximum predicted tilt within the *Subsidence Study Area* is 10.5 mm/m (i.e. 1.05 %), which represents a change in grade of 1 in 95. It is expected that the drainage culverts will generally experience tilts less than the maximum, as the result of the variations in the predicted tilts across the *Subsidence Study Area* and the orientations of the culverts relative to the subsidence troughs.

The predicted changes in grade are small, in the order of 1 % and, therefore, are unlikely to result in any adverse impacts on the serviceability of the drainage culverts. If the flow of water through any drainage culverts were to be adversely affected, as a result of the proposed mining, this could be remediated by re-levelling the affected culverts.

The predicted curvatures and strains could be of sufficient magnitudes to result in cracking in the culverts or the headwalls. It is unlikely, however, that these movements would adversely impact on the stabilities or structural integrities of the culverts. The potential impacts on the drainage culverts could be managed by visual inspection and, where required, any affected culverts can be repaired or replaced.

The drainage culverts are located along drainage lines and could, therefore, experience valley related upsidence and closure movements. The drainage culverts are orientated along the alignments of the drainage lines and, therefore, the upsidence and closure movements are orientated perpendicular the main axes of the culverts and unlikely to result in any adverse impacts.

Previous experience of mining beneath culverts in the NSW Coalfields, at similar depths of cover, indicates that the incidence of impacts is low. Impacts have generally been limited to cracking in the concrete headwalls which can be readily remediated. In some cases, however, cracking in the culvert pipes occurred which required the culverts to be replaced.

6.3.6. Management of potential impacts on local roads

Tahmoor Coal has developed a Subsidence Management Plan in consultation with Wollondilly Shire Council for the existing longwalls at Tahmoor Mine to manage the impacts on the public roads, bridges and culverts.

It is recommended that a similar Subsidence Management Plan be developed in consultation with Wollondilly Shire Council to manage potential impacts on the local roads, bridges and culverts within the *Subsidence Study Area*. With the implementation of these management strategies, it would be expected that the local roads could be maintained in safe and serviceable conditions during and after the extraction of the proposed longwalls.

With an appropriate management plan in place, it is considered that potential impacts on the roads, bridges and culverts can be managed for any orientation, extension, or shortening of longwalls within the *Extents of Longwalls* boundary, even if actual subsidence movements are greater than the predictions or substantial non-conventional movements occur.

6.4. Road bridges

Descriptions, predictions and impact assessments for the road bridges associated with the Main Southern Railway, the M31 Hume Motorway and the local roads are provided in Sections 6.1, 6.2 and 6.3, respectively.

6.5. Tunnels

There are no tunnels within the *Subsidence Study Area*.

6.6. Potable water infrastructure

6.6.1. Descriptions of potable water infrastructure

The locations of the potable water infrastructure within the *Subsidence Study Area* are shown in Drawing No. MSEC1060-13.

The potable water infrastructure includes a Cast Iron Cement Lined (CICL) 450 mm diameter watermain which follows the alignments of Avon Dam Road, Great Southern Road and Remembrance Drive and a consumer distribution network. There is also a secondary 375 mm diameter watermain from Remembrance Drive to a 22-metre diameter reservoir on Radnor Road (MSEC Structure Ref. BRA_109_pu01), which is located directly above the proposed Longwall 108B. A photograph of the reservoir on Radnor Road is shown in Fig. 6.19. Sydney Water has advised that the reservoir has been decommissioned.

Fig. 6.19 Decommissioned Sydney Water Reservoir at Radnor Road, Bargo

A 600 mm diameter steel pipe crosses the M31 Hume Motorway along a pipe bridge located adjacent to the Avon Dam Road Overbridge, as discussed in Section 6.2.5.

A summary of the potable water pipelines within the *Subsidence Study Area* is provided in Table 6.12.

Table 6.12 Potable water pipelines within the Subsidence Study Area

Type	Size (diameter) (mm)	Total length of pipeline within Subsidence Study Area (km)	Total length of pipeline located directly above proposed longwalls (km)
450 mm dia. watermain along Avon Dam Road, Great Southern Road and Remembrance Drive	450	8.3	4.1
Distribution Network	25 to 600	44.2	15.7

The types of pipeline include Ductile Iron Cement Lined (DICL), Cast Iron Cement Lined (CICL), Steel Cement Lined (SCL) and Polyvinyl Chloride (mPVC and uPVC). The water pipelines are owned and operated by Sydney Water.

The distribution of water mains by pipe diameter within the Subsidence Study Area is shown in Table 6.13.

Table 6.13 Distribution of water mains by pipe diameter

Pipe diameter (mm)	Total length within Subsidence Study Area (km)	%
25	0.04	0.1
80	0.01	0.0
100	25.9	49.2
150	11.6	21.9
180	0.03	0.0
200	2.5	4.7
250	3.6	6.8
300	0.6	1.2
375	0.3	0.5
450	8.0	15.2
600	0.2	0.3
Total	**52.8**	**100.0**

The distribution of water mains by type of pipe is shown in Table 6.14.

Table 6.14 Distribution of water mains by pipe type

Pipe diameter (mm)	Total length within Subsidence Study Area (km)	%
CICL	35.0	66.4
Copper	0.04	0.1
DICL	14.0	28.6
mPVC	0.7	1.4
PE	0.03	0.0
SCL	0.3	0.5
uPVC	0.00	0.0
Unknown	2.7	5.1
Total	**52.8**	**100.0**

6.6.2. Predictions for potable water infrastructure

A summary of the maximum predicted total conventional subsidence parameters for the 450 mm diameter watermain along Avon Dam Road, Great Southern Road and Remembrance Drive is provided in Table 6.15.

Table 6.15 Maximum predicted total conventional subsidence parameters for the watermain along Avon Dam Road and Great Southern Road

Location	Maximum predicted subsidence (mm)	Maximum predicted tilt along alignment (mm/m)	Maximum predicted hogging curvature in any direction (km^{-1})	Maximum predicted sagging curvature in any direction (km^{-1})
450 mm dia. watermain along Avon Dam Road, Great Southern Road and Remembrance Drive	1550	7.5	0.13	0.25

The maximum predicted conventional strains for the rising main, based on applying a factor of 15 to the maximum predicted conventional curvatures, are 2.0 mm/m tensile and 3.7 mm/m compressive. Non-conventional movements can also occur as a result of, among other things, anomalous movements. The analysis of strains provided in Chapter 4 includes those resulting from both conventional and non-conventional anomalous movements.

The watermain is a linear feature and, therefore, the most relevant distribution of strain is the maximum strains measured along whole monitoring lines above previous longwall mining. The analysis of strains along whole monitoring lines during the mining of previous longwalls in the Southern Coalfield is discussed in Section 4.3 and the results are provided in Fig. 4.4.

The distribution network is located across the *Subsidence Study Area* and, therefore, could experience the full range of predicted subsidence movements. A summary of the maximum predicted conventional subsidence movements within the *Subsidence Study Area* is provided in Chapter 4.

If the proposed longwalls were to be shifted, reorientated, extended or shortened within the *Extents of Longwalls* boundary, it would be expected that the maximum predicted conventional movements for the water mains would not change. Whilst different sections of the cables would be predicted to experience greater or lesser movements, depending on their locations relative to the positions of the longwalls, the overall levels of movement along the extents of the power lines would not be expected to change substantially.

6.6.3. Impact assessments for potable water pipelines

Longwalls 22 to 32 at Tahmoor Mine have directly mined beneath approximately 5.5 kilometres of ductile iron concrete lined (DICL) pipe and 19.5 kilometres of cast iron concrete lined (CICL) pipe, with only minor impacts recorded to the older CICL pipes. Water leaks were repaired by Sydney Water using normal response procedures.

The predicted systematic curvatures and strains for the water pipelines within the *Subsidence Study Area* are of a similar order of magnitude to those observed and predicted along the pipelines that have been mined directly beneath by previously extracted longwalls in the Southern Coalfield. The overall levels of impacts on the water pipelines in the *Subsidence Study Area*, therefore, are expected to be similar to those observed during the previously extracted longwalls in the Southern Coalfield. Longwalls in the Southern Coalfield have been mined directly beneath water pipelines in the past, and some of these cases are provided in Table 6.16.

Table 6.16 Examples of previous experience of mining beneath water pipelines in the Southern Coalfield

Colliery and Longwalls	Pipelines	Observed movements	Observed impacts
Appin LW301 and LW302	0.6 km of 150 dia. DICL 0.6 km of 300 dia. CICL 0.6 km of 1200 dia. SCL	650 mm Subsidence 4.5 mm/m Tilt 1 mm/m Tensile Strain 3 mm/m Comp. Strain (Measured M & N-Lines)	Leakage of the 150 mm and 300 mm CICL pipelines at a creek crossing, elsewhere no other reported impacts
Tahmoor Mine LW22 to LW32	5.5 km DICL pipes 19.5 km CICL pipes	1200 mm Subsidence 6 to 10 mm/m Tilt 1.5 mm Tensile Strain 2 mm (typ.) and up to 5 mm/m Comp. Strain (Extensive street monitoring)	Impacts occurred to the distribution network at 8 locations and a very small number of minor leaks in the consumer connection pipes
West Cliff LW5A3, LW5A4 & LW29 to LW34	2.8 km of 100 dia. CICL pipe directly mined beneath	1100 mm Subsidence 10 mm/m Tilt 1 mm/m Tensile Strain 5.5 mm/m Comp. Strain (Measured B-Line)	No reported impacts

Based on this experience, it is expected that some minor leakages of the water pipelines could occur at isolated locations, as the result of the extraction of the longwalls, however, the incidence of impacts is expected to be low. Impacts are more likely to occur in the locations of non-systematic movements, and at creek crossings, due to valley related movements.

Any impacts are expected to be of a minor nature which could be easily remediated. It is recommended that Tahmoor Coal develop management strategies, in consultation with Sydney Water, to manage these potential impacts.

With an appropriate management plan in place, it is considered that the potential impacts on the Sydney Water pipelines can be managed for any orientation, extension, or shortening of longwalls within the *Extents of Longwalls* boundary, even if actual subsidence movements are greater than the predictions.

6.6.4. Impact assessments for the pipe bridge over the M31 Hume Motorway

The impact assessment for the pipe bridge located adjacent to the Avon Dam Road Overbridge is provided in Section 6.2.5.

6.6.5. Impact assessments for water infrastructure based on increased predictions

If the predicted movements exceeded those predicted by a factor of 2 times, the likelihood and frequency of impacts would also increase. It is noted that the impact assessments were primarily based on historical observations from previous longwall mining directly beneath potable water infrastructure. The overall levels of impact on the water infrastructure, resulting from the extraction of the proposed longwalls, are expected to be similar to those previously observed in the Southern Coalfield.

6.6.6. Management of potential impacts on water infrastructure

Tahmoor Coal has developed a Subsidence Management Plan in consultation with Sydney Water for the existing longwalls at Tahmoor Mine to manage potential impacts on potable water infrastructure.

It is recommended that a similar Management Plan be developed in consultation with Sydney Water to manage potential impacts on the potable water infrastructure within the *Subsidence Study Area*. With the implementation of these management strategies, it would be expected that the potable water infrastructure could be maintained in safe and serviceable conditions during and after the extraction of the proposed longwalls.

With an appropriate management plan in place, it is considered that potential impacts on the potable water infrastructure can be managed for any orientation, extension, or shortening of longwalls within the *Extents of Longwalls* boundary, even if actual subsidence movements are greater than the predictions or substantial non-conventional movements occur.

6.7. Sewerage pipelines

6.7.1. Descriptions of sewerage pipelines

A *Priority Sewer Program* has been constructed in the township of Bargo in the past decade. The sewer infrastructure includes a pressure main along Remembrance Drive and a consumer reticulation network along the local roads. The locations of the sewerage infrastructure are shown in Drawing No. MSEC1060-14.

The sewerage system was designed to accommodate mine subsidence movements and consists of polyethylene pipelines with diameters up to 630 mm.

A summary of the sewerage pipelines within the *Subsidence Study Area* is provided in Table 6.17.

Table 6.17 Sewerage pipelines within the Subsidence Study Area

Type	Size (diameter) (mm)	Total length of pipeline within Subsidence Study Area (km)	Total length of pipeline located directly above proposed amended longwalls (km)
Pressure Main along Remembrance Drive	180	4.0	3.1
Distribution Network	40 to 630	43.3	14.9

6.7.2. Predictions for sewer infrastructure

The pressure main along Remembrance Drive follows a similar alignment as the Main Southern Railway above the proposed Longwalls 101A to 105A, and Longwalls 106B to 108B. The predicted profiles of conventional subsidence, tilt and curvature along the alignment of the road are, therefore, similar to those along the alignment of the railway, which are shown in Fig. E.09, in Appendix E.

A summary of the maximum predicted total conventional subsidence parameters for the pressure main along Remembrance Drive, after the extraction of each of the proposed longwalls, is provided in Table 6.18.

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

Table 6.18 Maximum predicted total conventional subsidence parameters for sewer pressure main along Remembrance Drive due to the extraction of the amended longwall layout

Location	Longwall	Maximum predicted subsidence (mm)	Maximum predicted tilt along alignment (mm/m)	Maximum predicted hogging curvature in any direction (km^{-1})	Maximum predicted sagging curvature in any direction (km^{-1})
Sewer pressure main along Remembrance Drive	LW101A	140	1.0	0.02	< 0.01
	LW102A	950	5.0	0.04	0.10
	LW103A	1150	6.5	0.06	0.13
	LW101B	1150	6.5	0.06	0.13
	LW102B	1150	6.5	0.06	0.13
	LW103B	1150	6.5	0.06	0.13
	LW104B	1150	6.5	0.06	0.13
	LW105B	1150	6.5	0.06	0.13
	LW106B	1150	6.5	0.06	0.13
	LW107B	1175	7.0	0.06	0.13
	LW108B	1500	6.5	0.07	0.13
	LW104A	1500	6.5	0.09	0.13
	LW105A	1500	6.5	0.09	0.13
	LW106A	1500	7.5	0.09	0.13

The maximum predicted conventional strains for the sewer pressure main, based on applying a factor of 15 to the maximum predicted conventional curvatures, are 1.4 mm/m tensile and 2.0 mm/m compressive. Non-conventional movements can also occur as a result of, among other things, anomalous movements. An analysis of strains provided in Chapter 4 includes those resulting from both conventional and non-conventional anomalous movements.

The pressure main pipeline is a linear feature and, therefore, the most relevant distribution of strain is the maximum strains measured along whole monitoring lines above previous longwall mining. An analysis of strains along whole monitoring lines during the mining of previous longwalls in the Southern Coalfield is discussed in Section 4.3 and the results are provided in Fig. 4.4.

The remaining reticulation network pipelines are located directly above the proposed longwalls and, therefore, could experience the full range of predicted subsidence movements. A summary of the maximum predicted conventional subsidence movements within the *Subsidence Study Area* is provided in Chapter 4.

If the proposed longwalls were to be shifted, reorientated, extended or shortened within the *Extents of Longwalls* boundary, it would be expected that the maximum predicted conventional movements for the sewer pressure main would be similar to those provided in Chapter 4. Whilst different sections of the pipelines would be predicted to experience greater or lesser movements, depending on their locations relative to the positions of the longwalls, the overall levels of movement along the extents of the network would not be expected to change substantially.

6.7.3. Impact assessments for sewer infrastructure

The sewer reticulation network within the Study Area varies from 40 mm diameter to 630 mm diameter welded polyethylene (PE) pipe.

Tahmoor Coal, in consultation with Sydney Water, has successfully mined beneath a sewerage system at Tahmoor and Thirlmere during the mining of Longwalls 22 to 32. The sewerage infrastructure at Tahmoor and Thirlmere are gravity sewers and consist mainly of PVC pipes. While impacts on the sewerage system at Tahmoor have been successfully managed, the pressurised sewerage system at Bargo will be able to accommodate substantially greater differential subsidence movements.

The sewer main transports sewage by hydraulic pressure and does not rely on gravity. While the sewer main will experience changes in grade due to subsidence, the changes will not adversely affect it.

The proposed welded polyethylene (PE) pipes can accommodate substantial deformations without losing their integrity. Only extreme deformations, such as the development of a step in the ground may adversely impact on the pipes.

If the PE pipe experiences severe deformation, the pipe may become blocked. The sewerage system has been designed to store sewage for approximately 8 hours after which time sewage may leak or overflow from the sewerage system. This can be readily repaired by local excavation and repair.

Each house connects to the system via a Sydney Water designed pot that is approximately 2 metres deep and 1 metre in diameter. The pot stores sewage, which is pumped into the reticulation network. The connection between each house and the pot consists of a gravity flow PVC pipe. It is possible that the pot and the house will act as anchors to the ground during subsidence, and that differential horizontal movements between the two structures may result in leakage at the connections. This is similar to the current connections between houses and septic tanks. Experience from mining beneath septic tanks has been that while impacts have previously occurred during, the rate of impact is low. Impacts to the connections can be readily repaired.

A number of valves and chambers are located above the proposed longwalls. These chambers, valves and pipe fittings are small in size and are connected via flange adapters. It is expected that the chambers, valves and fittings will act as anchors to the ground during subsidence, allowing the PE pipe to stretch or compress in response to mining-induced differential horizontal movements. While there is potential for impacts to occur at these locations, many similar structures are located within the Tahmoor sewerage system and no impacts have occurred to chambers, valves and other pipe fittings during mining. There is, however, a remote chance that anomalous ground deformation could occur during extraction of the proposed longwalls.

Any impacts are expected to be of a minor nature which could be easily remediated. It is recommended that Tahmoor Coal develop management strategies, in consultation with Sydney Water, to manage these potential impacts.

With an appropriate management plan in place, it is considered that the potential impacts on the sewer pipelines can be managed for any orientation, extension, or shortening of longwalls within the *Extents of Longwalls* boundary, even if actual subsidence movements are greater than the predictions.

6.7.4. Impact assessments for sewer infrastructure based on increased predictions

If the predicted movements exceeded those predicted by a factor of 2 times, the likelihood and frequency of impacts would also increase. It is noted that the impact assessments were primarily based on historical observations from previous longwall mining directly beneath sewer infrastructure. The overall levels of impact on the sewer infrastructure, resulting from the extraction of the proposed longwalls, are expected to be similar to those previously observed in the Southern Coalfield.

6.7.5. Management of potential impacts on proposed sewerage infrastructure

Tahmoor Coal has developed a Subsidence Management Plan in consultation with Sydney Water for the existing longwalls at Tahmoor Mine to manage potential impacts on sewerage infrastructure.

It is recommended that a similar Subsidence Management Plan be developed in consultation with Sydney Water to manage potential impacts on the sewerage infrastructure within the *Subsidence Study Area*. With the implementation of these management strategies, it would be expected that the sewerage infrastructure could be maintained in safe and serviceable conditions during and after the extraction of the proposed longwalls.

With an appropriate management plan in place, it is considered that potential impacts on the sewer infrastructure can be managed for any orientation, extension, or shortening of longwalls within the *Extents of Longwalls* boundary, even if actual subsidence movements are greater than the predictions or substantial non-conventional movements occur.

6.8. Gas infrastructure

6.8.1. Descriptions of the gas infrastructure

Moomba-Sydney Gas Pipeline and Gorodok Ethane Pipeline

The *Moomba-Sydney Gas Pipeline and Gorodok Ethane Pipeline* crosses above the eastern ends of the proposed Longwalls 105B to 108B. The locations of these pipelines are shown in Drawing No. MSEC1060-15.

The Moomba-Sydney gas pipeline is owned by *East Australian Pipeline Limited* (EAPL, part of the APA Group) and runs from the Cooper Basin gas fields at Moomba in South Australia to the township of Wilton, having a total length of around 1,300 kilometres. This mainline provides gas to the consumer distribution network in Sydney, with other laterals (outside the *Subsidence Study Area*) also providing gas to other consumer distribution networks throughout NSW and the ACT.

The pipeline was completed in 1976. This section comprises a fully welded steel pipeline, 864 mm in diameter, which is laid below ground with a minimum cover of 800 mm. The majority of the pipeline has a wall thickness of 9.2 mm. Some sections of the pipeline where laid beneath roads and railways have a wall thickness of 13.3 mm.

The Ethane Pipeline, which is owned and operated by Gorodok, is a fully welded steel pipeline, 203 mm in diameter, which is laid below ground with a minimum cover of 800 mm. The 1,374 km pipeline runs from Moomba in South Australia to Botany in NSW and transport feedstock ethane to the Qenos Olefines plant. It is a high pressure main with a wall thickness of 8 mm, which operates at a pressure of up to 15 MPa.

The pipelines are located within an easement that passes along the southern outskirts of Bargo through urban and semi-rural areas. The pipelines cross beneath Remembrance Drive and the Main Southern Railway approximately 180 metres to the side of proposed Longwall 108B on the edge of the proposed longwall mining area. It is expected that these sections of the pipelines were directionally bored, at a depth of nominally 1200 mm to 2000 m. A photograph of the underground crossing is shown in Fig. 6.20 and an aerial view is shown in Fig. 6.21.

Fig. 6.20 Warning markers showing position of buried gas and ethane pipelines beneath Remembrance Drive and Main Southern Railway

Fig. 6.21 Aerial photo, marked to show the position of buried gas and ethane pipelines beneath Remembrance Drive and Main Southern Railway

The pipelines cross a number of other local roads, including Arina Road and Dwyers Road. They also traverse a number of small streams and the Nepean Fault near Arina Road. Concrete panels have been buried below the ground surface in the urban area of Bargo township to provide protection against accidental damage from civil works in the area.

Local gas infrastructure

The locations of local gas infrastructure within and adjacent to the *Subsidence Study Area* are shown in Drawing No. MSEC1060-15. The local gas reticulation network consists of 32 mm to 75 mm diameter nylon mains and 63 mm polyethylene mains. There is also a 150 mm diameter steel main, which runs along Remembrance Drive and distributes gas to the townships north of Bargo, including Tahmoor, Thirlmere and Picton.

The take-off point for the local gas infrastructure from the Moomba-Sydney Gas Pipeline is located on Hawthorne Road, as shown in Drawing No. MSEC1060-15. The take-off point consists of a number of buried pits, a pillar box and guard rail. The take-off point is located approximately 20 metres to the side of proposed Longwall 108B.

A summary of the local gas infrastructure within the *Subsidence Study Area* is provided in Table 6.19.

Table 6.19 Summary of the local gas infrastructure within the Subsidence Study Area

Type	Total length of local gas infrastructure within Subsidence Study Area (km)	Total length of local gas infrastructure directly above proposed amended longwalls (km)
32 mm nylon	16.2	6.7
50 mm nylon	5.4	2.6
63 mm polyethylene	1.3	0.4
150 mm steel	6.5	4.1

Fig. 6.22 Gas take-off point on Hawthorne Road

6.8.2. Predictions for gas infrastructure

Moomba-Sydney Gas Pipeline and Gorodok Ethane Pipeline

The predicted profiles of conventional subsidence, tilt and curvature along the alignment of the Moomba-Sydney gas pipeline and Gorodok Ethane Pipeline are shown in Fig. E.12, in Appendix E. The predictions are based on the extraction of the proposed amended longwall layout, as shown in Drawing No. MSEC1060-15. The predicted incremental profiles along the alignment of the pipelines, due to the extraction of each of the proposed longwalls, are shown as dashed black lines. The predicted total profiles along the alignment of the pipelines, after the completion of each of the proposed longwalls, are shown as solid blue lines. The range of predicted curvatures in any direction to the pipelines, at any time during or after the extraction of the proposed longwalls, is shown by the grey shading.

A summary of the maximum predicted total conventional subsidence parameters for the pipelines, after the completion of each of the proposed longwalls, is provided in Table 6.20.

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

Table 6.20 Maximum predicted total conventional subsidence parameters for the gas and ethane pipelines due to the extraction of the amended longwall layout

Location	Longwall	Maximum predicted subsidence (mm)	Maximum predicted tilt along alignment (mm/m)	Maximum predicted hogging curvature in any direction (km^{-1})	Maximum predicted sagging curvature in any direction (km^{-1})
Gas and Ethane Pipelines	After LW104B	< 20	< 0.5	< 0.01	< 0.01
	After LW105B	750	6.5	0.09	0.19
	After LW106B	1250	8.0	0.11	0.26
	After LW107B	1475	8.0	0.12	0.26
	After LW108B	1575	9.0	0.13	0.27

The maximum predicted conventional strains for the gas pipeline, based on applying a factor of 15 to the maximum predicted conventional curvatures, are 2.0 mm/m tensile and 4.1 mm/m compressive. Non-conventional movements can also occur as a result of, among other things, anomalous movements. The analysis of strains provided in Chapter 4 includes those resulting from both conventional and non-conventional anomalous movements.

The gas and ethane pipelines are linear features and, therefore, the most relevant distribution of strain is the maximum strains measured along whole monitoring lines above previous longwall mining. An analysis of strains along whole monitoring lines during the mining of previous longwalls in the Southern Coalfield is discussed in Section 4.3 and the results are provided in Fig. 4.4.

A summary of the maximum predicted total conventional subsidence parameters for the pipelines where they cross beneath the Main Southern Railway and Remembrance Drive, and the take-off point to the Jemena distribution network at Hawthorne Road is provided in Table 6.21.

Table 6.21 Maximum predicted total conventional subsidence parameters for at pipeline crossing at Main Southern Railway and Jemena take-off point

Location	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})
Crossing at Main Southern Railway and Remembrance Drive	100	0.3	< 0.01	< 0.01
Jemena take-off point on Hawthorne Road	275	1.7	0.02	< 0.01

The maximum predicted conventional strains for the gas pipeline at the Main Southern Railway crossing, based on applying a factor of 15 to the maximum predicted conventional curvatures, are less than 0.5 mm/m tensile and compressive.

The maximum predicted conventional strains at the gas take-off point, based on applying a factor of 15 to the maximum predicted conventional curvatures, are less than 0.5 mm/m tensile and compressive.

The pipelines cross a number of streams within the *Subsidence Study Area* and could experience valley related movements in these locations. A summary of the maximum predicted upsidence and closure movements at the larger stream crossings is provided in Table 6.22.

The locations of the stream crossings are shown in Drawing No. MSEC1060-15.

Table 6.22 Maximum predicted upsidence and closure movements at the larger stream crossings

Stream crossing	Location	Maximum predicted total upsidence (mm)	Maximum predicted total closure (mm)
Hornes Creek	810 m south-west of LW108B	< 20	< 20
Tributary to Dog Trap Creek	Directly above LW108B	125	250
Dog Trap Creek	Directly above LW106B	225	250

The predicted total closure at each stream crossing is the sum of the valley related movement calculated using the 2002 ACARP prediction method (Waddington and Kay, 2002) plus the conventional movement within the valley. It is noted, that this provides some additional conservatism, as the 2002 ACARP prediction method also includes some component of the conventional movement.

If the proposed longwalls were to be shifted, reorientated, extended or shortened within the *Extents of Longwalls* boundary, it would be expected that the maximum predicted conventional and valley related movements for the gas pipeline would be similar to those provided above.

The 150 mm steel gas main is located directly above the proposed Longwalls 101A to 105A and Longwalls 106B to 108B. If the longwalls were extended to the southwest, the predicted movements for the gas and ethane pipeline crossing at the Main Southern Railway would extend by a corresponding amount but would be similar in magnitude to the predicted maximum subsidence parameters in Table 6.20.

Whilst different sections of the pipeline would be predicted to experience greater or lesser movements, depending on their locations relative to the positions of the longwalls, the overall levels of movement along the extent of the pipeline would not be expected to change substantially.

Local gas infrastructure

The local gas infrastructure is located across the *Subsidence Study Area* and, therefore, could experience the full range of predicted subsidence movements. A summary of the maximum predicted conventional subsidence movements within the *Subsidence Study Area* is provided in Chapter 4.

The 150 mm diameter steel main along Remembrance Drive generally runs along ridgelines and there are few creek crossings within the *Subsidence Study Area*. The gas main crosses the small valleys within the Teatree Hollow catchment and is predicted to experience between 100 and 200 mm of valley closure and upsidence movements at these locations, as shown in Fig. E.05 and Fig. E.08 in Appendix E.

If the proposed longwalls were to be shifted, reorientated, extended or shortened within the *Extents of Longwalls* boundary, it would be expected that the maximum predicted conventional movements for the local gas infrastructure would not change. Whilst different sections of the pipes would be predicted to experience greater or lesser movements, depending on their locations relative to the positions of the longwalls, the overall levels of movement along the extents of the pipes would not be expected to change substantially.

6.8.3. Impact assessments for gas infrastructure

Moomba-Sydney Gas Pipeline and Gorodok Ethane Pipeline

The *Moomba-Sydney Gas Pipeline* and *Gorodok Ethane Pipeline* are continuous fully welded pipelines which have some flexibility and would be expected to accommodate the normal or conventional subsidence movements that typically occur in the Southern Coalfield. These types of pipelines, however, can potentially be impacted by the localised non-conventional subsidence movements that can occur, such as near the bases of streams due to the valley related upsidence and closure movements. Non-conventional movements may also occur at other locations, such as where the pipelines cross surface expressions of the Nepean Fault, though the likelihood is considered to be low as the proposed longwall mining area is located 400 metres from the crossing at its closest point. Similarly, non-conventional movements may also occur where the pipelines cross surface expressions of the Central Fault, though the likelihood is considered to be low as the proposed longwall mining area is located approximately 300 metres from the crossing at its closest point.

The pipelines are two of three gas pipelines which have been successfully mined beneath by longwalls in Illawarra Coal's Appin Area 2, Appin Area 4 and West Cliff Area 5 mining domains in consultation with the owners of the infrastructure (McGill, 2007). The localised compressive strains in the bases of the larger stream crossings were managed by locally exposing the pipelines and supporting them on sandbags, during the period of active subsidence, to allow them to move independently of the natural ground. Strain gauges were also installed on these pipelines to monitor changes in pipe stresses during mining. Away from large stream crossings, ground surveys were undertaken along the pipeline route and the pipes were locally exposed if measured strains exceeded trigger levels. A summary of the maximum observed movements along these gas pipelines is provided in Table 6.23.

Table 6.23 Examples of previous longwall mining beneath gas pipelines in the Southern Coalfield

Location (longwalls)	Stream crossings	Monitoring lines	Maximum observed movements
Appin Area 2 (LW7 to LW12)	Elladale Creek Ousedale Creek	NG, WW and WX-Lines	850 mm Subsidence 210 mm Upsidence 305 mm Closure 12 mm/m Tilt 2.5 mm/m Tension 13 mm/m Compression
Appin Area 4 (LW401 to LW408)	Creek 2A Rocky Ponds Creek Simpsons Creek	A6000 Line	1200 mm Subsidence 135 mm Upsidence 195 mm Closure 5 mm/m Tilt 3 mm/m Tension 6 mm/m Compression
West Cliff Area 5 (LW30 to LW35)	Unnamed Creek Mallaty Creek Leafs Gully Nepean Creek	J-Line and Mallaty Creek 3D	800 mm Subsidence 110 mm Upsidence 240 mm Closure 8 mm/m Tilt 3 mm/m Tension 17 mm/m Compression

The likelihood of impacts on the pipelines where they cross beneath the Main Southern Railway and Remembrance Drive are considered to be low as the proposed longwalls do not mine directly beneath them and the predicted subsidence, tilts, curvature and strain are relatively low. There is a chance, however, that non-conventional movements could occur and the pipelines may need to be relieved of mining-induced stresses during mining. The potential for impacts at the crossing would increase if the longwalls were extended to the southwest.

A feasible solution for managing the safety and serviceability of the pipelines at the Main Southern Railway and Remembrance Drive crossing has been developed in concept following consultation with APA, Gorodok and the railway operator ARTC.

- Permanent access to the pipelines will need to be constructed prior to the onset of mine subsidence as it will not be possible to, at short notice, locally expose the pipelines without impacting on railway operations or road traffic.
- Permanent access can be constructed during scheduled railway maintenance weekends when trains are not operating. During the course of a maintenance weekend, or series of maintenance weekends, the following work can be undertaken:
    - Locally excavating and exposing the pipelines from the surface.
    - Constructing an accessway in the form of culvert in situ around the sides and above the pipelines at nominally 1200 mm beneath the ground surface, to provide access from both sides of the railway and support to the railway track.
    - Reinstating railway ballast and track prior to the recommencement of train operations.
- It is feasible to undertake the work described above during a maintenance weekend. As an example, Tahmoor Coal has successfully completed projects along the railway on previous railway maintenance weekends. On the weekend of 2 and 3 August 2008, Tahmoor Coal temporarily removed sections of railway track above Myrtle Creek, excavated beneath the track at depths greater than 1.2 metres, installed a large steel baulk structure and reinstated the track by the end of the weekend (refer photographs in Fig. 6.23).
- There are typically 3 to 4 scheduled railway maintenance weekends per year. The mitigation work can be undertaken in stages if required.
- Either one large culvert or two smaller accessways can be constructed because the pipelines are spaced apart by approximately 8 metres. The design of the accessways will be undertaken to the satisfaction of APA, Gorodok and ARTC.
- There is sufficient access to undertake the above described works within the railway corridor, as shown in Fig. 6.21.
- There is sufficient time to design and construct the accessways, as mining in this area is projected to occur after the year 2030.
- Monitoring can be undertaken during mining inside the pipeline accessways. This may include ground surveys, pipeline surveys, pipe stress monitoring and visual inspections.

- Adjustments can be undertaken to the pipelines within the pipeline accessways if required during mining by jacking the pipelines and inserting sandbags or equivalent.

Photographs courtesy Pidgeon Civil Engineering

(Photograph shows the moment when a 700 mm deep structural steel baulk was being installed, after the railway track, sleepers, ballast had been temporarily removed, and earth excavated and prepared)

Photographs courtesy Pidgeon Civil Engineering

(Photograph shows the railway track reinstated on 3 August, after the baulk had been installed, ready for trains to recommence operations.)

Fig. 6.23 Photographs showing work undertaken at Myrtle Creek on the scheduled railway maintenance weekend of 2 and 3 August 2008

Local Gas Infrastructure

Longwalls 22 to 32 have directly mined beneath approximately 19 kilometres of gas pipes and no impacts have been recorded so far. The local nylon and 160 mm polyethylene main along Remembrance Drive are very flexible and have demonstrated that they are able to withstand the full range of subsidence experienced during longwall extraction at Tahmoor Mine to date. While no impacts have been experienced to date, it is acknowledged that the most vulnerable element of the system is the rigid copper pipe connections between the gas mains and houses, which can be readily repaired.

A slight difference between the gas infrastructure at Bargo compared to the gas infrastructure at Tahmoor is the existence of the 150 mm steel gas main at Bargo. This pipe passes through the Bargo township, mainly along Remembrance Drive, in the trenches that include local reticulation nylon pipes that deliver gas to properties in Bargo. As the steel pipe was constructed in 1994, it was designed and constructed in accordance with the requirements of SA NSW. Steel gas pipelines of similar and larger diameter have been successfully mined directly beneath in the past in the Southern Coalfield (McGill, 2007) and Newcastle Coalfield (Robinson, 2007). Being of relatively small diameter, the pipe is expected to withstand considerable deformation.

If observed ground strains or severe ground deformations develop during mining, the pipe can be exposed and adjusted to decouple the pipe from the differential ground movements. This will generally be achievable in the Bargo township except where the pipeline crosses the Main Southern Railway and possibly main local roads. As discussed in relation to the pipeline crossing for the major Moomba to Sydney gas pipelines, it will be feasible to develop management strategies at the rail and road crossings to ensure the safety and serviceability of the gas pipelines, without significant disruption to rail or road traffic. There are more engineering solutions available with the local gas infrastructure when compared to the major pipelines, as the pipes are smaller in diameter and valves are located in the distribution network to temporarily isolate sections of the network.

The gas take-off point on Hawthorne Road may experience impacts as a result of the proposed mining. Differential movements can occur between the pits, placing stress on the pipe connections. The design of the take-off point structures and associated pipework has been designed in accordance with the requirements of SA NSW, such that the infrastructure can accommodate some mine subsidence movements. An engineering assessment will be required to determine appropriate management measures to ensure that it remains safe and serviceable during mining.

6.8.4. Management of potential impacts on gas infrastructure

Moomba-Sydney Gas Pipeline

It is recommended that Tahmoor Coal, in consultation with APA, study the potential for impacts on the *Moomba-Sydney Gas Pipeline* and *Gorodok Ethane Pipeline* and develop management measures to ensure that the pipelines remain safe and serviceable throughout the mining period.

Based on the previous experience of managing potential mine subsidence impacts on gas pipelines in the NSW Coalfields, these management strategies could include:-

- Form a Technical Committee to develop the necessary management strategies, including representatives from the asset owners and the mine, as well as specialist consultants on subsidence and pipeline design,
- Undertake stress analyses of the pipelines based on the predicted conventional subsidence and valley related movements resulting from the proposed longwalls, in addition to the normal operating stresses based on the Maximum Operating Pressure (MOP),
- In the locations where the stress analyses indicate that mining could affect the MOP, such as at the larger stream crossings then these sections of the pipelines could be exposed prior to mining and placed on sandbags to allow it to move independently of the natural ground. These strategies would need to be developed in consultation with the adjacent land owners,
- Develop specific strategies to manage potential impacts where the gas pipeline passes beneath the Main Southern Railway and Remembrance Drive.
- Consider whether additional management measures might be required where the gas pipeline passes near residential structures directly above the proposed longwalls.
- Install strain gauges where required, such as on exposed sections of pipelines to monitor the changes in pipe stresses during mining,
- Install a traditional ground monitoring line along the alignment of the pipeline, so that the observed ground movements can be compared with those predicted during mining,
- Develop a subsidence management plan for the pipelines, in consultation with the asset owners, including defined trigger levels and strategies to reduce the stresses in the pipeline, and
- The technical committee would regularly review the observed movements and make management decisions in accordance with the subsidence management plan. This may include locally exposing the pipelines to relieve them of mining-induced pipe stresses.

Local gas infrastructure

Tahmoor Coal has developed Subsidence Management Plans in consultation with Jemena for the existing longwalls at Tahmoor Mine to manage potential impacts on local gas infrastructure at Tahmoor.

It is recommended that a similar Subsidence Management Plan be developed in consultation with Jemena to manage potential impacts on the local gas infrastructure within the *Subsidence Study Area*. With the implementation of these management strategies, it would be expected that the local gas infrastructure could be maintained in safe and serviceable conditions during and after the extraction of the proposed longwalls.

With an appropriate management plan in place, it is considered that potential impacts on the local gas infrastructure can be managed for any orientation, extension, or shortening of longwalls within the *Extents of Longwalls* boundary, even if actual subsidence movements are greater than the predictions or substantial non-conventional movements occur.

6.9. Electrical Infrastructure

6.9.1. Descriptions of electrical infrastructure

The locations of the electrical infrastructure within the *Subsidence Study Area* are shown in Drawing No. MSEC1060-16.

The electrical infrastructure comprises 66 kV, 11 kV and low voltage powerlines which are located across the *Subsidence Study Area*. There are no transmission lines located within the *Subsidence Study Area*.

A summary of the power lines within the *Subsidence Study Area* is provided in Table 6.24.

Table 6.24 Summary of the electrical infrastructure within the Subsidence Study Area

Type	Total length of powerline within Subsidence Study Area (km)	Total length of powerline directly above proposed longwalls (km)
66 kV Powerlines	2.9	-
11 kV Powerlines	49.7	18.5
Low Voltage Powerlines	101.1	41.1

The power lines generally comprise aerial copper cables supported on timber poles, but there are also some sections of direct buried cables. The power lines are owned and operated by Endeavour Energy.

6.9.2. Predictions for electrical infrastructure

The power lines are located across the *Subsidence Study Area* and, therefore, could experience the full range of predicted subsidence movements. A summary of the maximum predicted conventional subsidence movements within the *Subsidence Study Area* is provided in Chapter 4.

If the proposed longwalls were to be shifted, reorientated, extended or shortened within the *Extents of Longwalls* boundary, it would be expected that the maximum predicted conventional movements for the power lines would not change. Whilst different sections of the cables would be predicted to experience greater or lesser movements, depending on their locations relative to the positions of the longwalls, the overall levels of movement along the extents of the power lines would not be expected to change substantially.

6.9.3. Impact assessments for electrical infrastructure

The aerial power lines will not be directly affected by the ground strains, as the cables are supported by poles above ground level. The cables may, however, be affected by changes in the bay lengths, i.e. the distances between the poles at the levels of the cables, resulting from differential subsidence, horizontal movements, and tilt at the pole locations. The stabilities of the poles may also be affected by conventional tilt, and by changes in the catenary profiles of the cables.

There is extensive experience of mining directly beneath power lines in the Southern Coalfield which indicates that the incidence of impacts is very low and that any impacts are readily repairable. A summary of previous experiences is provided in Table 6.25.

Table 6.25 Previous experience of mining beneath powerlines in the Southern Coalfield

Colliery and LWs	Length of powerlines directly mined beneath (km)	Observed maximum movements at powerlines	Observed impacts
Appin LW1 to LW12	5.2 km of 11 kV 104 power poles	850 mm Subsidence 6 mm/m Tilt (Measured WX-Line)	No significant impacts
Appin LW14 to LW29	1.0 km of 66 kV 4.6 km of 11 kV 76 power poles	1200 mm Subsidence 7 mm/m Tilt (Measured A-Line)	No significant impacts
Appin LW301 and LW302	0.6 km of 66 kV 0.2 km of 11 kV 14 power poles	650 mm Subsidence 4.5 mm/m Tilt (Measured M & N-Lines)	No significant impacts
Appin LW401 to LW408	3.4 km of 66 kV 0.6 km of 33 kV 2.9 km of 11 kV 96 power poles	700 mm Subsidence 5 mm/m Tilt (Measured A-Line)	No significant impacts
Appin LW702	1.5 km of 11 kV 19 power poles	550 mm Subsidence 3.5 mm/m Tilt (Measured MPR-Line)	No significant impacts
Dendrobium LW3 and LW4	0.8 km of 33 kV	1100 mm Subsidence 40 mm/m Tilt (Measured 2000-Line)	No significant impacts
Tahmoor Mine LW22 to LW31	Approx. 41 km of electrical cables and 1060 power poles	1200 mm Subsidence 12 mm/m Tilt (Extensive street monitoring, surveys of critical power poles)	Some minor adjustments to cable catenaries, pole tilts and consumer cables required.
Tower LW1 to LW10	6.0 km of 66 kV 4.3 km of 11 kV 112 power poles	400 mm Subsidence 3 mm/m Tilt (Measured T & TE-Lines)	No significant impacts
West Cliff LW5A3 to LW5A4 & LW29 to LW33	0.8 km of a 66 kV 3.7 km of 11 kV 113 power poles	950 mm Subsidence 5 mm/m Tilt (Measured B-Line)	No significant impacts

Some remedial measures have been required, in the past, which included adjustments to cable catenaries, pole tilts and to consumer cables which connect between the power lines and building structures. It is expected that the mining during the proposed development will result in similar experiences.

6.9.4. Impact assessments for electrical infrastructure based on increased predictions

If the actual subsidence movements exceeded those predicted by a factor of 2 times, the maximum tilt at the power lines would be 21 mm/m (i.e. 2.1 %), or a change in grade of 1 in 48. In this case, the tilts would still be less than the tolerable tilt, which is in the order of 33 mm/m. The incidence of impacts would increase in the locations of greatest tilt, such as adjacent to the active longwall maingate and adjacent to the ends of the proposed longwalls. It would still be expected that any impacts could remediated, including some adjustments of the cable catenaries, pole tilts and the consumer cables, as has been undertaken in the past.

While the predicted ground movements are important parameters when assessing the potential impacts on the power lines, it is noted that the impact assessments were primarily based on historical observations from previous longwall mining in the Southern Coalfield. The overall levels of impact on the power lines, resulting from the extraction of the proposed longwalls, are expected to be similar to those observed where longwalls have previously mined directly beneath power lines in the Southern Coalfield.

6.9.5. Management of potential impacts on electrical infrastructure

Tahmoor Coal has developed Subsidence Management Plans in consultation with Endeavour Energy for the existing longwalls at Tahmoor Mine to manage potential impacts on electrical infrastructure.

It is recommended that a similar Subsidence Management Plan be developed in consultation with Endeavour Energy to manage potential impacts on the electrical infrastructure within the *Subsidence Study Area*. With the implementation of these management strategies, it would be expected that the electrical infrastructure could be maintained in safe and serviceable conditions during and after the extraction of the proposed longwalls.

With an appropriate management plan in place, it is considered that potential impacts on the electrical infrastructure can be managed for any orientation, extension, or shortening of longwalls within the *Extents of Longwalls* boundary, even if actual subsidence movements are greater than the predictions or substantial non-conventional movements occur.

6.10. Telecommunications Infrastructure

6.10.1. Description of telecommunications infrastructure

The locations of the telecommunications infrastructure are shown in Drawing No. MSEC1060-17.

The telecommunications infrastructure within the *Subsidence Study Area* comprises optical fibre cables and copper cables. A summary of the telecommunications cables within the *Subsidence Study Area* is provided in Table 6.26.

Table 6.26 Summary of telecommunications infrastructure within the Subsidence Study Area

Type	Total length of cable within Subsidence Study Area (km)	Total length of cable located directly above proposed longwalls (km)
Copper Cables	107.6	43.3
Telstra Optical Fibre Cables	21.3	7.5
Optus Optical Fibre Cable	1.5	0.0
AAPT Optical Fibre Cable	3.4	1.5
Vocus Optical Fibre Cable	3.7	1.5
National Broadband Network (NBN) Cable	84.3	39.2

Telstra telecommunications infrastructure

The main Telstra Sydney to Melbourne optical fibre cable generally follows the alignment of the M31 Hume Motorway outside the predicted limit of subsidence. Another Telstra optical fibre cable follows the alignment of Remembrance Drive and the Main Southern Railway and crosses directly above the proposed Longwalls 101A to 105A and Longwalls 106B to 108B. A third Telstra optical fibre cable crosses directly above the eastern ends of the proposed Longwalls 103B to 108B along Bargo Road.

The copper telecommunications cables are generally direct buried and follow the alignments of local roads across the *Subsidence Study Area*. The Bargo Exchange (MSEC Structure Ref. BRL_096) is located on Noongah Street near the intersection with Remembrance Drive. The Exchange consists of two demountable steel sheds, as shown in Fig. 6.24. The Exchange is located approximately 170 metres from the edge of the proposed longwall mining area, as shown in Drawing No. MSEC1060-17.

Fig. 6.24 Telstra Exchange at Bargo

Optus telecommunications infrastructure

The main Optus Sydney to Melbourne optical fibre cable generally follows the alignment of the M31 Hume Motorway and is outside the predicted limit of subsidence.

AAPT and Vocus telecommunications infrastructure

The AAPT and Vocus Sydney to Melbourne optical fibre cables generally follow the alignment of the Moomba to Sydney Gas Pipeline.

Mobile Phone Tower

There is a mobile phone tower located on Lupton Road near the M31 Hume Motorway. It connects to both Telstra and Optus optical fibre cables. The mobile phone tower is located approximately 380 metres to the south of the *Extents of Longwalls* boundary and will not be directly mined beneath by the proposed longwalls.

National Broadband Network Cables

The National Broadband Network (NBN) cables comprise both Optical fibre and copper service cables. NBN cables follow the alignment of the M31 Hume Motorway, Remembrance Drive and the connecting local roads within the Study Area. Approximately 39.2 kilometres of cables are located directly above the proposed amended longwalls.

6.10.2. Predictions for telecommunications infrastructure

The main Telstra and Optus Sydney to Melbourne optical fibre cables and NBN cables follow the alignment of the M31 Hume Motorway and are outside the predicted limit of subsidence.

The predicted profiles of conventional subsidence, tilt and curvature along two of the Telstra optical fibre cables are shown in Figs. E.13 and E.14, in Appendix E. The predicted incremental profiles along the alignments of the cables, due to the extraction of each of the proposed longwalls, are shown as dashed black lines. The predicted total profiles along the alignments of the cables, after the completion of each of the proposed longwalls, are shown as solid blue lines. The range of predicted curvatures in any direction to the cables, at any time during or after the extraction of the proposed longwalls, is shown by the grey shading. The predictions are based on the extraction of the proposed amended longwall layout, as shown in Drawing No. MSEC1060-17.

A summary of the maximum predicted total conventional subsidence parameters for the optical fibre cables, after the completion of each of the proposed longwalls, is provided in Table 6.27. The predicted tilts are the maxima along the alignments of the cables after the completion of each of the proposed longwalls. The predicted curvatures are the maxima in any direction at any time during or after the extraction of each of the proposed longwalls.

Table 6.27 Maximum predicted total conventional subsidence parameters for the Telstra optical fibre cables

Optical fibre cable branch	Longwalls	Maximum predicted subsidence (mm)	Maximum predicted tilt along alignment (mm/m)	Maximum predicted hogging curvature in any direction (km^{-1})	Maximum predicted sagging curvature in any direction (km^{-1})
Branch 1 (Remembrance Drive)	LW101A to LW105A LW106B to LW108B	1500	7.5	0.15	0.22
Branch 2 (Bargo Road)	LW103B to LW108B	1650	8.5	0.13	0.27

The AAPT and Vocus Sydney to Melbourne optical fibre cables follow the alignment of the Moomba to Sydney Gas Pipeline and, therefore, are expected to experience subsidence movements similar to this pipeline. The predicted profiles of conventional subsidence, tilt and curvature along the Moomba to Sydney Gas Pipeline are shown in Fig. E.12, in Appendix E. The predictions are based on the extraction of the proposed amended longwall layout, as shown in Drawing No. MSEC1060-17. A summary of the maximum predicted total conventional subsidence parameters for the Moomba to Sydney Gas Pipeline and, hence, the optical fibre cables is provided in Table 6.28.

Table 6.28 Maximum predicted total conventional subsidence parameters for the AAPT and Vocus Sydney to Melbourne optical fibre cables along the Moomba to Sydney gas pipeline

Location	Longwall	Maximum predicted subsidence (mm)	Maximum predicted tilt along alignment (mm/m)	Maximum predicted hogging curvature in any direction (km^{-1})	Maximum Predicted sagging curvature in any direction (km^{-1})
Optical fibre cables	After LW108B	1575	9	0.13	0.27

The optical fibre cables within the gas pipeline easement cross a number of streams within the *Subsidence Study Area* and could experience valley related movements in these locations. A summary of the maximum predicted upsidence and closure movements at the stream crossings is provided in Table 6.29. The locations of the stream crossings are shown in Drawing No. MSEC1060-17.

Table 6.29 Maximum predicted upsidence and closure movements for the optical fibre cables along the Moomba to Sydney Gas Pipeline at the stream crossings

Stream crossing	Location	Maximum predicted total upsidence (mm)	Maximum predicted total closure (mm)
Hornes Creek	850 m south-west of LW108B	< 20	< 20
Tributary to Dog Trap Creek	Directly above LW107B	125	250
Dog Trap Creek	Directly above LW104B	225	250

The predicted total closure at each stream crossing is the sum of the valley related movement calculated using the 2002 ACARP prediction method (Waddington and Kay, 2002) plus the conventional movement within the valley. It is noted, that this provides some additional conservatism, as the 2002 ACARP prediction method also includes some component of the conventional movement.

The maximum predicted conventional strains for the optical fibre cables, based on applying a factor of 15 to the maximum predicted conventional curvatures, are 2.0 mm/m tensile and 4.1 mm/m compressive. Non-conventional movements can also occur as a result of, among other things, anomalous movements. The analysis of strains provided in Chapter 4 includes those resulting from both conventional and non-conventional anomalous movements.

The optical fibre cables are linear features and, therefore, the most relevant distribution of strain is the maximum strains measured along whole monitoring lines above previous longwall mining. An analysis of strains along whole monitoring lines during the mining of previous longwalls in the Southern Coalfield is discussed in Section 4.3 and the results are provided in Fig. 4.4.

The NBN cables and copper telecommunications cables are located across the *Subsidence Study Area* and, therefore, could experience the full range of predicted subsidence movements. A summary of the maximum predicted conventional subsidence movements within the *Subsidence Study Area* is provided in Chapter 4.

If the proposed longwalls were to be shifted, reorientated, extended or shortened within the *Extents of Longwalls* boundary, it would be expected that the maximum predicted conventional and valley related movements for the telecommunications cables would be similar to those provided above. Whilst different sections of the cables would be predicted to experience greater or lesser movements, depending on their locations relative to the positions of the longwalls, the overall levels of movement along the extents of the cables would not be expected to change substantially.

6.10.3. Impact assessments for optical fibre cables

The optical fibre cables are direct buried and could, therefore, potentially be impacted by ground strains. The greatest potential for impacts will occur as the result of localised ground strains due to non-conventional movements or valley related movements.

Tensile strains in the optical fibre cables could be higher than predicted, where the cables connect to the support structures, which may act as anchor points, preventing any differential movements that may have been allowed to occur with the ground. Tree roots have also been known to anchor cables to the ground. The extent to which the anchor points affect the ability of the cables to tolerate the mine subsidence movements depends on the cable size, type, age, installation method and ground conditions.

In addition to this, optical fibre cables contain additional fibre lengths over the sheath lengths, where the individual fibres are loosely contained within tubes. Compression of the sheaths can transfer to the loose tubes and fibres and result in “micro-bending” of the fibres constrained within the tubes, leading to higher attenuation of the transmitted signal. If the maximum predicted compressive strains were to be fully transferred into the optical fibre cables, the strains could be of sufficient magnitude to result in the reduction in capacities of the cables or transmission loss.

Strains transferred into the optical fibre cables can be monitored using Optical Time Domain Reflectometry (OTDR), which can be used to notify the infrastructure owners of strain concentrations due to non-conventional ground movements or valley related movements.

Longwalls in the Southern Coalfield have been successfully mined directly beneath optical fibre cables in the past, with little to no adverse impacts on these cables. A summary of some of these cases is provided in Table 6.30.

Table 6.30 Examples of mining beneath optical fibre cables

Colliery and Longwalls	Length of optical fibre cables directly mined beneath (km)	Observed maximum movements at optical fibre cables	Pre-mining mitigation, monitoring and observed impacts
Appin LW301 and LW302	0.8	650 mm Subsidence 1 mm/m Tensile Strain 3 mm/m Comp. Strain (Measured M & N-Lines)	600 metre aerial cable on standby. Ground survey, visual, OTDR. No reported impacts.
Appin LW703 to LW705	10.0 total for five cables	1200 mm Subsidence 2.1 mm/m Tensile Strain 4.5 mm/m Comp. Strain (Measured HW2, ARTC and MPR Lines)	New cable redirection to avoid potential impacts to old optical fibre cable. Ground survey, visual, OTDR. Strain concentrations detected in three cables, attenuation losses were relieved by locally exposing the cables or by building a bypass cable.
Tahmoor Mine LW22 to LW31	3.2	775 mm Subsidence 0.8 mm/m Tensile Strain 1.9 mm/m Comp. Strain	Ground survey, visual, OTDR, SBS. No reported impacts.
Tower LW1 to LW10	1.7	400 mm Subsidence 3 mm/m Tilt 0.5 mm/m Tensile Strain 1 mm/m Comp. Strain	No reported impacts
West Cliff LW5A3, LW5A4 and LW29 to LW36	3.4	1300 mm Subsidence 1.3 mm/m Tensile Strain 5.5 mm/m Comp. Strain (Measured B-Line)	Survey, visual, OTDR, SBS. No reported impacts.

Note: SBS is a method of monitoring optical fibres and means Stimulated Brillouin Scattering

With an appropriate management plan in place, it is considered that potential impacts on the optical fibre cables can be managed for any orientation, extension, or shortening of longwalls within the *Extents of Longwalls* boundary, even if actual subsidence movements are greater than the predictions or substantial non-conventional movements occur.

6.10.4. Impact assessments for copper telecommunications cables

The copper telecommunications cables are direct buried and could, therefore, potentially be impacted by ground strains. The greatest potential for impacts will occur as the result of localised ground strains due to non-conventional movements or valley related movements.

The copper cables are more likely to be impacted by tensile strains rather than compressive strains. It is possible, that the direct buried cables could experience higher tensile strains where they are anchored to the ground by associated infrastructure, or by tree roots. The cables could also experience higher compressive strains at the creek crossings as the result of valley related movements.

Aerial copper telecommunications cables are generally not affected by ground strains, as they are supported by the poles above ground level. The aerial cables, however, could be affected by the changes in bay lengths, i.e. the distances between the poles at the levels of the cables, which result from mining induced differential subsidence, horizontal ground movements and lateral movements at the tops of the poles due to tilting of the poles. The stabilities of the poles can also be affected by mining induced tilts and by changes in the catenary profiles of the cables.

Longwalls in the Southern Coalfield have been successfully mined directly beneath copper telecommunications cables, where the magnitudes of the predicted mine subsidence movements were similar to those predicted within the *Subsidence Study Area*. Some of these cases have been summarised in Table 6.31.

Table 6.31 Examples of mining beneath copper telecommunications cables

Colliery and Longwalls	Length of copper cables directly mined beneath (km)	Observed maximum movements at the copper cables	Observed impacts
Appin LW301 and LW302	0.8	650 mm Subsidence 1 mm/m Tensile Strain 3 mm/m Comp. Strain (Measured M & N-Lines)	No adverse impacts
Appin LW401 to LW409	4 km of underground cables and 0.8 km of aerial cables	700 mm Subsidence 5 mm/m Tilt 1 mm/m Tensile Strain 2 mm/m Comp. Strain (Measured A6000-Line)	No adverse impacts
Appin LW702 to LW705	8.3	1200 mm Subsidence 2.1 mm/m Tensile Strain 4.5 mm/m Comp. Strain (Measured HW2, ARTC and MPR Lines)	No adverse impacts
Tahmoor Mine LW22 to LW30	43.1 km of underground cables and 4.9 km of aerial cables	1300 mm Subsidence 12 mm/m Tilt 3.2 mm Tensile Strain 2 mm (typ.) and up to 7 mm/m Comp. Strain (Extensive street monitoring)	No adverse impacts to underground cables. Some pole tilts and cable catenaries adjusted. Some consumer cables were re-tensioned as a precautionary measure
West Cliff LW29 to LW36	13.9 km of underground cables	1300 mm Subsidence 1.3 mm/m Tensile Strain 5.5 mm/m Comp. Strain (Measured B-Line)	No adverse impacts

It can be seen from the above table, that there were no reported impacts on the direct buried copper telecommunications cables in the above examples. It is expected that the mining during the proposed development will result in similar experiences.

With an appropriate management plan in place, it is considered that potential impacts on the copper telecommunications cables can be managed for any orientation, extension, or shortening of longwalls within the *Extents of Longwalls* boundary, even if actual subsidence movements are greater than the predictions or substantial non-conventional movements occur. Any minor impacts on these cables would be expected to be relatively infrequent and easily repaired.

6.10.5. Potential impacts on the Telstra Bargo Exchange

A summary of the maximum predicted subsidence parameters for the Telstra Bargo Exchange are provided in Table 6.32. The tilts are the maximum predicted values which occur after the completion of any or all of the proposed longwalls. The curvatures are the maximum predicted values which occur at any time during or after the extraction of each of the proposed longwalls.

Table 6.32 Maximum predicted total conventional subsidence parameters for the telecommunications structures due to the extraction of the amended longwall layout

Location	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})
Telstra Bargo Exchange (BRL_096)	< 20	< 0.5	< 0.01	< 0.01

The maximum predicted conventional strains for the Telstra Exchange, based on applying a factor of 15 to the maximum predicted conventional curvatures, are less than 0.5 mm/m tensile and compressive. Non-conventional movements can also occur as a result of, among other things, anomalous movements. The analysis of strains provided in Chapter 4 includes those resulting from both conventional and non-conventional anomalous movements.

The Bargo Exchange may be directly mined beneath if the longwalls are extended to the southwest. If the longwalls are extended to the southwest, the Exchange will experience greater subsidence movements.

Even if the Bargo Exchange is mined directly beneath by the proposed Tahmoor South longwalls, impacts are unlikely to occur as the demountable structure is lightweight in construction and can be easily adjusted if required. As the Exchange likely holds heavy battery systems, it is recommended that Tahmoor Coal consult with Telstra to assess the potential for impacts and develop a management plan to ensure that the Exchange remains safe and serviceable during the extraction of the proposed longwalls.

6.10.6. Potential impacts on the mobile phone tower sites

There is a mobile phone tower located on Lupton Road near the M31 Hume Motorway. It supports both Telstra and Optus networks. The mobile phone tower is located approximately 600 metres to the south of the proposed longwall mining area and will not be directly mined beneath by the proposed longwalls.

The tower is predicted to experience less than 20 mm of subsidence, with negligible conventional tilts, curvatures and strains.

Tahmoor Coal has managed potential impacts to a Mobile Phone Tower at Tahmoor in consultation with Telstra. The operating tolerances of the antennae are approximately 1° change in tilt. It is therefore very unlikely that the mobile phone tower will be affected by the proposed mining.

6.10.7. Management of potential impacts on telecommunications infrastructure

Tahmoor Coal has developed Subsidence Management Plans in consultation with Telstra for the existing longwalls at Tahmoor Mine to manage potential impacts on electrical infrastructure.

It is recommended that similar Subsidence Management Plans be developed in consultation with Telstra, Optus, AAPT, Vocus, and NBN Co Limited to manage potential impacts on the telecommunications infrastructure within the *Subsidence Study Area*. With the implementation of these management strategies, it would be expected that the telecommunications infrastructure could be maintained in safe and serviceable conditions during and after the extraction of the proposed longwalls.

With an appropriate management plan in place, it is considered that potential impacts on the telecommunications infrastructure can be managed for any orientation, extension, or shortening of longwalls within the *Extents of Longwalls* boundary, even if actual subsidence movements are greater than the predictions or substantial non-conventional movements occur.

6.11. Dams, reservoirs or associated works

The Picton Weir is located on the Bargo River just downstream of the confluence with Hornes Creek. The weir was constructed in the late 19th century and it provided water to the surrounding townships. It is now heavily silted and is no longer used for water supply. Water retained by the weir is released at its base through a seized open valve and outlet pipe. No impacts were reported on the Picton Weir during the mining of previously extracted Longwalls 14 to 19, the closest of which was approximately 1.5 kilometres from the Weir (Longwall 19).

The Picton Weir is located approximately 1.0 kilometre southwest of the proposed amended longwalls. At this distance the Weir could experience very small far-field horizontal movements. While the Weir may experience very small differential horizontal movements as a result of the extraction of the proposed longwalls, it is extremely unlikely that the Picton Weir would be adversely impacted by the proposed mining.

If the longwalls were extending to the southwest closer to the *Extent of Longwalls* boundary, the offset distance between the Picton Weir and the longwalls would be approximately 600 metres. In this case, it would still be unlikely that the weir would experience adverse impacts as a result of the extraction of the proposed longwalls.

It is recommended that Tahmoor Coal, in consultation with relevant government agencies, study the potential for impacts to the Picton Weir and develop management measures to ensure that it remains safe throughout the mining period and that impacts on the Picton Weir do not result in environmental consequences on the Bargo River. The study would require input from structural, geotechnical and subsidence engineers. The management measures may include a combination of:

- Mitigation or strengthening measures prior to mining,
- Installation of a monitoring system, which includes, among other things, the monitoring of ground movements,
- Conduct regular visual inspections of the Picton Weir, and
- Implement planned responses if triggered by monitoring and inspections.

With appropriate management plans in place, it is considered that the Picton Weir will remain safe and serviceable at all times during mining for any orientation, extension or shortening of longwalls within the *Extent of Longwalls* boundary, even if actual subsidence movements were greater than the predictions or substantial non- conventional movements occurred.

6.12. Survey control marks

The locations of the survey control marks in the vicinity of the proposed longwalls are shown in Drawing No. MSEC1060-21. The locations and details of the survey control marks were obtained from Spatial Services using the *SCIMS Online* website (SCIMS, 2013).

The survey control marks are located across the *Subsidence Study Area* and, therefore, are expected to experience the full range of predicted subsidence movements. A summary of the maximum predicted conventional subsidence movements within the *Subsidence Study Area* is provided in Chapter 4.

The survey control marks located outside and in the vicinity of the *Subsidence Study Area* are also expected to experience small amounts of subsidence and small far-field horizontal movements. It is possible that other survey control marks outside the immediate area could also be affected by far-field horizontal movements, up to 3 kilometres outside the *Subsidence Study Area*. Far-field horizontal movements and the methods used to predict such movements are described further in Sections 3.5 and 4.7.

Tahmoor Coal has developed Subsidence Management Plans in consultation with Spatial Services for the existing longwalls at Tahmoor Mine to manage potential impacts on survey marks.

It is recommended that similar Management Plans be developed in consultation with Spatial Services to manage potential impacts on the survey marks within the *Subsidence Study Area*. It will be necessary on the completion of the longwalls, when the ground has stabilised, to re-establish any survey control marks that are required for future use.

7.0 DESCRIPTIONS, PREDICTIONS AND IMPACT ASSESSMENTS FOR THE PUBLIC AMENITIES

A number of public amenities have been identified within the *Subsidence Study Area* and their locations are shown in Drawing No. MSEC1060-20. Many of these structures are located directly above the longwalls.

7.1. Maximum predicted conventional subsidence, tilt and curvature

As shown in Drawing No. MSEC1060-20, the public amenities within the *Subsidence Study Area* are located in or near the Bargo township. A summary of the maximum predicted total conventional subsidence, tilts and curvatures resulting from the extraction of the proposed amended longwalls was provided in Table 4.2., which is reproduced in Table 7.1.

Table 7.1 Maximum predicted total conventional subsidence, tilt and curvature after the extraction of the proposed amended longwalls near public amenities

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})
LW101A to LW106A	1,350	8.7	0.13	0.23
LW101B to LW108B	1,650	10.5	0.16	0.28

The maximum predicted subsidence parameters provided in the above table occur in the locations where the depths of cover are the shallowest or the extraction heights are the greatest. Elsewhere the predicted subsidence parameters are less than these values.

The final orientation and layout of the longwalls within these mining domains could vary from the proposed mine layout provided in this report. A change or shift in orientation, extension, or shortening of longwalls within the *Extents of Longwalls* boundary may result in substantial differences in subsidence movements at each point within the *Subsidence Study Area*. It is expected, however, that the predicted maximum subsidence movements for any alternative layout will be similar to or less than those provided in Table 7.1, provided that the longwall panel and pillar widths are similar.

Any changes to the layout of longwalls would be detailed in the relevant Extraction Plan for consideration and approval by the relevant authorities and would be consistent with the requirements of any Project Approval.

7.2. Predictions and impact assessments for each public amenity

The public amenities within the *Subsidence Study Area* are spread over the proposed longwall mining area. Depending on the final mine layout, the structures will collectively experience a range of subsidence movements varying from very small movements, where longwalls do not mine directly beneath them, to the maximum movements as provided in Table 7.1. In a small proportion of cases, non-conventional subsidence movements will develop on the surface and these may coincide with the structures.

A conservative approach has been adopted when making subsidence predictions for the structures that will be affected by mining within the *Subsidence Study Area*.

For each structure that is located directly above the longwalls, subsidence predictions and impact assessments have been conducted on the assumption that the structure might experience the maximum predicted movements, even though it is known that only some structures will actually experience the maximum movements for any given mine layout.

While keeping the above in mind, maximum predicted values of conventional subsidence, tilt and curvature and probability of impacts for each structure, based on the proposed amended mining layout, are provided in Table D.08, in Appendix D.

Predictions of conventional subsidence, tilt and curvature have been made at the centroid and at points located around the perimeter of each structure, as well as at points located at a distance of 20 metres from the perimeter of each public amenity.

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

For each structure that will not be directly mined beneath by the longwalls, site specific subsidence predictions and impact assessments have been provided.

7.3. Methods of impact assessment

Some public amenities are of similar size and construction to houses and the method of assessment adopted for houses has been applied to these public amenities, the results of which are summarised in Appendix C.

Other public amenities are substantial in size and the method of assessment for houses is not applicable. The potential for impacts to these structures has been assessed on a case by case basis.

7.4. Hospitals

There are no hospitals within the *Subsidence Study Area*.

7.5. Places of worship

There are two places of worship within the *Subsidence Study Area* and their locations are shown in Drawing No. MSEC1060-20.

Bargo District Baptist Church (MSEC Structure Ref. BSI_011) is located approximately 750 metres from Longwall 108B and will not be directly mined beneath by the proposed mining. It is extremely unlikely that the structures will experience impacts from the extraction of the proposed longwalls.

St Paul's Anglican Church (MSEC Structure Ref. BGR_057) is located directly above proposed Longwall 108B. The main structure consists of a single storey, timber framed building with fibro sheets on small brick piers. There is also a single storey metal clad building on piers at the rear of the property. The structures are relatively flexible in nature and are more tolerant to mine subsidence movements than masonry buildings.

It is recommended that Tahmoor Coal continues its current practice of ensuring that structures remain safe and serviceable at all times during mining. The primary risk associated with mining beneath structures is public safety. Occupants of building structures have not been exposed to immediate and sudden safety hazards as a result of impacts that occur due to mining at the depths of cover similar to those within the *Subsidence Study Area*. This includes the recent experience at Tahmoor, where longwall mining has affected more than 2000 houses and civil structures, including five places of worship. Two places of worship also experienced subsidence due to longwall mining at West Cliff Colliery and these remained safe and serviceable during mining.

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 (over a period of months or weeks rather than hours) to relocate occupants. It is recommended that Tahmoor Coal, in consultation with St Paul's Anglican Church, study the potential for impacts on the structures and develop management measures. The study would require input from structural and subsidence engineers. The management measures may include a combination of:-

- Pre-mining hazard identification inspection of each structure by structural engineer,
- Consider the implementation of possible mitigation measures prior to mining to reduce the likelihood of severe impacts,
- Installation of a monitoring system, which includes, among other things, the monitoring of ground movements,
- Conduct regular visual inspections of the church during the periods of active subsidence, and
- Implement planned responses if triggered by monitoring and inspections.

With an appropriate management plan in place, it is considered that St Paul's Anglican Church will remain safe and serviceable at all times during mining for any orientation, extension or shortening of longwalls within the *Extent of Longwalls* boundary, even if actual subsidence movements were greater than the predictions or substantial non-systematic movements occurred.

7.6. Schools

There are two schools within the *Subsidence Study Area* and their locations are shown in Drawing No. MSEC1060-20.

The Wollondilly Anglican College structures were constructed in 2004 and the property is located on Remembrance Drive opposite Tahmoor Mine, to the west of the finishing end of proposed Longwall 101A. The majority of the school structures are predicted to experience less than 100 mm of vertical subsidence. One structure, the Auditorium, is partly located directly above proposed Longwall 101A and it is predicted to experience 250 mm of vertical subsidence.

The majority of the school structures are located directly above the previously extracted main headings that provided access to previously extracted Longwalls 14B to 19 and will not be directly mined beneath by the proposed longwalls. It is possible, however, that the existing main headings could be reused to provide access to the proposed Tahmoor South longwalls, allowing the longwalls to be extended to the northwest. Under this scenario, it is possible that the Auditorium will be directly mined beneath by the proposed longwalls and all of the school structures would experience more than 100 mm of vertical subsidence.

As the Wollondilly Anglican College is adjacent to previously extracted Longwalls 14B to 19, the property may also experience additional subsidence as has been previously observed above similar unmined coal barriers, as discussed in Section 4.5.

Where longwalls have previously been extracted on either side of main headings, the amount of increased subsidence in these areas has been generally been between 50 and 150 mm of subsidence above what was predicted using the prediction model. Subsidence monitoring from previous situations has shown that the additional subsidence is usually accompanied by relatively low conventional tilts, curvatures and strains (less than 0.5 mm/m and usually within survey tolerance).

Bargo Public School (MSEC Structure Ref. BGR_015) is located to the south of Longwall 108B and may experience the maximum predicted subsidence movements for Longwalls 101B to 108B, depending on the final mine layout. It is also possible that non-conventional movements resulting from variations in near surface geology could develop at the site.

The school comprises a total of 14 structures, which appear to be a mixture of masonry and weatherboard buildings with suspended floors supported by strip footings, and demountable buildings. Some of the school buildings are listed as items of heritage significance. One of these buildings is shown in Fig. 7.1. The structures are of a similar size and construction to houses in the area. A method of impact assessment for houses is provided in Appendix C.

Photograph courtesy Niche Environment and Heritage

Fig. 7.1 Bargo Public School building

If impacts occur, they will most likely consist of non-structural cracking of walls, floors or ceilings. There remains a small probability (less than 2 %), however, that a structure may experience severe impacts as result of substantial non-conventional movements. Non-conventional movements are localised in nature and should substantial non- conventional movements develop at the school, it is extremely unlikely that they will affect every structure.

The primary risk associated with mining beneath school structures is public safety. Occupants of building structures have not been exposed to immediate and sudden safety hazards as a result of impacts that occur due to mining at the depths of cover found similar to those within the *Subsidence Study Area*. This includes the recent experience at Tahmoor Mine, where longwall mining has occurred beneath more than 2000 houses and civil structures, including Tahmoor Public School. Appin Public School also experienced subsidence due to longwall mining at West Cliff Colliery and this school remained safe and serviceable during mining.

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 (over a period of months or weeks rather than hours) to relocate occupants.

There are large paved areas and many footpaths within the school grounds and there is a potential for cracks, small steps and trip hazards to develop as a result of mine subsidence movements. These can be readily repaired provided that visual inspections are regularly undertaken and impacts are quickly repaired.

It is recommended that Tahmoor Coal continues its current practice of ensuring that the structures remain safe and serviceable at all times during mining. It is recommended that Tahmoor Coal, in consultation with the Department of Education and Training, study the potential for impacts on the school structures and other infrastructure and develop management measures. The study would require input from structural and subsidence engineers. The management measures may include a combination of:-

- Pre-mining hazard identification inspection of each structure by structural engineer,
- Consider the implementation of possible mitigation measures prior to mining to reduce the likelihood of severe impacts,
- Installation of a monitoring system, which includes, among other things, the monitoring of ground movements,
- Conduct regular visual inspections of the school, and
- Implement planned responses if triggered by monitoring and inspections.

With an appropriate management plan in place, it is considered that the Wollondilly Anglican College and the Bargo Public School will remain safe and serviceable at all times during mining without impacting on the safety of students and staff, or affect the use of the buildings for educational or other purposes, for any orientation, extension or shortening of longwalls within the *Extent of Longwalls* boundary, even if actual subsidence movements were greater than the predictions or substantial non- conventional movements occurred.

7.7. Shopping centres

There are no shopping centres within the *Subsidence Study Area*. There are, however, a number of shops in the township of Bargo, which are located within the *Subsidence Study Area*, some of which are located directly above the proposed longwall mining area.

The locations of the shops are shown in in Drawing No. MSEC1060-20, where it can be seen that the majority are located along Remembrance Drive or Great Southern Road on either side of the Main Southern Railway. Shops on the western side of Remembrance Drive are shown in Fig. 7.2, and the more recently constructed IGA supermarket is shown in Fig. 7.3. Predictions and impact assessments for these establishments are provided in Section 9.1.

Fig. 7.2 Shops on Remembrance Drive at Bargo

Fig. 7.3 IGA supermarket on Remembrance Drive

7.8. Community centres

There is one community centre located within the *Subsidence Study Area,* the Bargo Community Centre (MSEC Structure Ref. BRA_170_pa07), which is located near the sportsground on Radnor Road. The community centre is a single storey brick structure on strip footings and is approximately 27 metres in length. The Bargo Community Centre is located approximately 350 metres from proposed Longwall 108B.

While it is possible that the community centre could experience impacts from the proposed mining, the likelihood is relatively low given the distance between the structure and the proposed amended longwalls.

The Bargo Community Centre is located on the edge of the *Extent of Longwalls* boundary. If the proposed longwalls are extended to the southwest, within the *Extent of Longwalls* boundary, the Bargo Community Centre would experience greater subsidence movements.

The Bargo Sports Club is located on Remembrance Drive, approximately 300 metres to the side of the proposed Longwall 108B. The Sports Club includes two masonry structures.

While it is possible that the Bargo Sports Club could experience impacts from the proposed mining, the likelihood is relatively low given the distance between the structure and the proposed amended longwalls.

The Bargo Sports Club is located on the edge of the *Extent of Longwalls* boundary. If the proposed longwalls are extended to the southwest, within the *Extent of Longwalls* boundary, the Bargo Sports Club would experience greater subsidence movements.

It is recommended that Tahmoor Coal continues its current practice of ensuring that the structures remain safe and serviceable at all times during mining. It is recommended that Tahmoor Coal, in consultation with Wollondilly Shire Council and the Bargo Sports Club, study the potential for impacts on the structures and other infrastructure and develop management measures. The study would require input from structural and subsidence engineers. The management measures may include a combination of:-

- Pre-mining hazard identification inspection of each structure by structural engineer,
- Consider the implementation of possible mitigation measures prior to mining to reduce the likelihood of severe impacts,
- Installation of a monitoring system, which includes, among other things, the monitoring of ground movements,
- Conduct regular visual inspections of the school, and
- Implement planned responses if triggered by monitoring and inspections.

With an appropriate management plan in place, it is considered that the Bargo Community Centre and the Bargo Sports Club will remain safe and serviceable at all times during mining without impacting on the safety of students and staff, or affect the use of the buildings for educational or other purposes, for any orientation, extension or shortening of longwalls within the *Extent of Longwalls* boundary, even if actual subsidence movements were greater than the predictions or substantial non- conventional movements occurred.

Please refer to Section 7.11 with respect to predictions and impact assessments for the bowling greens.

7.9. Office buildings

There are no large commercial office buildings within the *Subsidence Study Area*. Small office buildings within the *Subsidence Study Area* and the predictions and impact assessments for these establishments are provided in Section 9.1.

7.10. Swimming Pools

There are no public swimming pools within the *Subsidence Study Area*.

7.11. Bowling greens

There are two bowling greens within the *Subsidence Study Area*.

The bowling greens (BRE_222_pa04 and BRE_222_pa045) are located at the Bargo Sports Club on Remembrance Drive, approximately 300 metres from Longwall 108B.

A potential concern is whether the predicted subsidence will result in noticeable impacts on the greens. The predicted subsidence contours due to the extraction of the proposed amended longwalls have been overlaid with an aerial photograph in Fig. 7.4 to provide an indication of changes in fall across the bowling green as a result of subsidence.

Fig. 7.4 Predicted subsidence contours at the Bargo Sports Club

It can be seen that the north eastern corners of the bowling greens are predicted to fall approximately 5 to 10 mm relative to their south western corners. As the greens are approximately 35 metres in length direction, the change in grade is approximately 0.3 mm/m or 0.03 %. Slightly greater tilts are predicted to occur at the bowling green located closest to Remembrance Drive as it is slightly closer to the proposed longwall mining area.

The Bargo Sports Club is located on the edge of the *Extent of Longwalls* boundary. If the proposed longwalls are extended to the southwest, within the *Extent of Longwalls* boundary, the bowling greens would experience greater subsidence movements.

As bowling greens are ideally meant to be perfectly flat, it is possible that the greens will need to be relevelled after mining. As the predicted changes in grade are expected to be very small it is expected, however, that the greens can remain playable and it will be possible to repair one green at a time without closing both greens.

The playing surfaces may also experience localised deformations and/or tensile surface cracking as a result of the proposed mining. The likelihood is considered to be low as the great majority of observed surface impacts are located directly above the extracted longwalls. It is recognised, however, that observations are mostly made in natural terrain where subtle changes cannot be detected. As the playing surface is even, with the grass cut very low, it is possible that some changes could be noticed. It is expected that the lawn can be maintained during mining such that minor deformations of the green can be repaired.

While it is possible that the plinths, ditches, banks, kerbs and pavements around the bowling green will experience impacts from the proposed mining, the likelihood is relatively low given the distance between the greens and the proposed longwalls. These can be readily repaired if possible.

It is recommended that Tahmoor Coal consult with the Bargo Sports Club in relation to the assessing potential impacts on the bowling green as a result of the proposed mining and development of a subsidence management plan. Bowling greens are usually re-turfed over time due to wear and tear and it may be possible to schedule such an exercise soon after the bowling greens are subsided.

With an appropriate management plan in place, it is considered that the bowling greens will remain safe and serviceable at all times during mining for any orientation, extension or shortening of longwalls within the extent of the longwall mining areas, even if actual subsidence movements were greater than the predictions or substantial non- conventional movements occurred.

7.12. Ovals or cricket grounds

The Bargo Sportsground is located within the *Subsidence Study Area* and is located 330 metres from the side of the proposed Longwall 108B. At this distance, the oval is predicted to experience between 20 mm and 50 mm of vertical subsidence. The eastern side of the oval is predicted to subside approximately 20 mm more than the western side over a length of approximately 140 metres. This equates to an average change in grade of 0.2 mm/m or 0.02%.

The Bargo Sportsground is located on the edge of the *Extent of Longwalls* boundary. If the proposed longwalls are extended to the southwest, within the *Extent of Longwalls* boundary, the oval would experience greater subsidence movements.

While it is possible that the oval could experience subsidence slightly greater subsidence, it would not be expected to experience any substantial conventional tilts, curvatures or strains. The oval is not expected to experience adverse impacts resulting from the extraction of the proposed longwalls.

A sportsground is also located at the Wollondilly Anglican College. The oval is located 260 metres from the proposed Longwall 102A and it will not be expected to experience impacts as a result of the extraction of the proposed amended longwalls.

As the Wollondilly Anglican College is adjacent to previously extracted Longwalls 14B to 19, the oval may also experience additional subsidence as has been previously observed above similar unmined coal barriers, as discussed in Section 4.5.

Where longwalls have previously been extracted on either side of main headings, the amount of increased subsidence in these areas has been generally been between 50 and 150 mm of subsidence above what was predicted using the prediction model. Subsidence monitoring from previous situations has shown that the additional subsidence is usually accompanied by relatively low systematic tilts, curvature and strains (less than 0.5 mm/m and usually within survey tolerance).

With an appropriate management plan in place, it is considered that the ovals will remain safe and serviceable at all times during mining for any orientation, extension or shortening of longwalls within the extent of the longwall mining areas, even if actual subsidence movements were greater than the predictions or substantial non- conventional movements occurred.

7.13. Racecourses

There are no racecourses within the *Subsidence Study Area*.

7.14. Golf courses

There are no golf courses within the *Subsidence Study Area*.

7.15. Tennis courts

There are two public tennis courts within the *Subsidence Study Area* at the Bargo Sportsground. The courts are located 500 metres from the proposed Longwall 108B.

There are two tennis courts within the *Subsidence Study Area* at the Wollondilly Anglican College. The courts are located 150 metres from the proposed Longwall 101A.

It discussed previously in this Chapter, the Bargo Sportsground and the Wollondilly Anglican College may experience greater subsidence if the longwalls are extended to the northwest or southwest within the *Extents of Longwalls* boundary.

With an appropriate management plan in place, it is considered that the tennis courts will remain safe and serviceable at all times during mining for any orientation, extension or shortening of longwalls within the extent of the longwall mining areas, even if actual subsidence movements were greater than the predictions or substantial non- conventional movements occurred.

7.16. Any other public amenities

Preschool and Child Care Centres

There are currently 3 child care centres and a preschool located within the *Subsidence Study Area*, as shown in Drawing No. MSEC1060-20.

The Wollondilly Mobile Preschool (MSEC Structure Ref. BHW_121) is located adjacent to the maingate of the proposed Longwall 108B. The structure is also an item of Heritage Significance.

The Bargo Child Care Centre is located directly above the proposed Longwall 108B. The Community Kids Bargo Early Education Centre (MSEC Reference Ref. BAV_170) and the Little Elves Child Care Centre (MSEC Structure Ref. BEL_085) are located approximately 200 metres and 60 metres, respectively, to the side of the proposed Longwall 108B.

The preschool and child care centres are typically located within the residential areas and are former residential buildings. A method of impact assessment for houses is provided in Appendix C.

If impacts occur, they will most likely consist of non-structural cracking of walls, floors or ceilings. There remains a small probability (less than 2 %), however, that a structure may experience severe impacts as result of substantial non-conventional movements.

The primary risk associated with mining beneath the preschool and child care centres is public safety. Occupants of building structures have not been exposed to immediate and sudden safety hazards as a result of impacts that occur due to mining at the depths of cover similar to those found within the *Subsidence Study Area*. This includes the recent experience at Tahmoor Mine, where longwall mining has occurred beneath more than 2000 houses and civil structures. Tahmoor Mine has successfully mined directly beneath child centres during the extraction of Longwalls 22 to 32.

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 (over a period of months or weeks rather than hours) to relocate occupants.

It is recommended that Tahmoor Coal continues its current practice of ensuring that structures remain safe and serviceable at all times during mining. It has previously developed a Built Structures Subsidence Management Plan that included the management of potential impacts on child care centres above Longwalls 22 to 32.

It is recommended that a similar Management Plan be developed to manage potential impacts on the preschool and child care centres within the *Subsidence Study Area*. The management measures may include a combination of:-

- Pre-mining hazard identification inspection of each structure by structural engineer,
- Consider the implementation of possible mitigation measures prior to mining to reduce the likelihood of severe impacts,
- Installation of a monitoring system, which includes, among other things, the monitoring of ground movements,
- Conduct regular visual inspections of the preschool and child care centres, and
- Implement planned responses if triggered by monitoring and inspections.

With an appropriate management plan in place, it is considered that the preschool and child care centres will remain safe and serviceable at all times during mining for any orientation, extension or shortening of longwalls within the *Extent of Longwalls* boundary, even if actual subsidence movements were greater than the predictions or substantial non- conventional movements occurred.

Avon Caravan Village

The Avon Caravan Village is located on Avon Dam Road on the side of the proposed amended longwalls. Please refer to Section 11.3 for further details.

Bargo Volunteer Bush Fire Brigade

The Bargo Volunteer Bush Fire Brigade is located on Avon Dam Road, approximately240 metres to the side of proposed Longwall 108B. The structures are located inside the edge of the *Extent of Longwalls* boundary. If the proposed longwalls are extended to the southwest, within the *Extent of Longwalls* boundary, the structures would experience greater subsidence movements.

The fire brigade building is a masonry building that stores the vehicles, equipment and offices. As the building is similar to residential structures, a similar method of impact assessment can be used and this is described in Appendix C.

It is recommended that Tahmoor Coal continues its current practice of ensuring that structures remain safe and serviceable at all times during mining. It has previously developed a Built Structures Subsidence Management Plan that included the management of potential impacts on the Bush Fire Brigade building in Tahmoor.

It is recommended that a similar Management Plan be developed to manage potential impacts on the Brigade building.

With an appropriate management plan in place, it is considered that the Brigade building will remain safe and serviceable at all times during mining for any orientation, extension or shortening of longwalls within the *Extent of Longwalls* boundary, even if actual subsidence movements were greater than the predictions or substantial non-conventional movements occurred.

Bargo Cemetery

The Bargo Cemetery is located at the northern end of Great Southern Road directly above the south-eastern end of the proposed Longwall 105A, as shown in Drawing No. MSEC1060-20. The Cemetery is expected to experience less than the maximum predicted movements as provided in Table 7.1. Non-conventional subsidence movements may also develop at the cemetery.

The small cemetery is surrounded by a plantation of mature trees (Niche, 2020d). The grave sites and tombstones are in various condition and some graves do not have tombstones. The tombstones are generally of low height. The grounds are grassed and well kept. The cemetery is listed as an item of Heritage Significance.

The grave sites consist of isolated concrete and stone structures that are typically placed on the natural ground surface with minimal foundations. Due to their small sizes, the sites are expected to accommodate normal conventional subsidence movements. Impacts may occur, however, if substantial non-conventional movements developed at the cemetery. This may result in cracking of the surrounds or displacement of tombstones relative to the graves. Non-conventional movements are localised in nature and should substantial non- conventional movements develop at the cemetery, it is extremely unlikely that they will affect every grave site.

It is recommended that Tahmoor Coal consult with Bargo Cemetery to develop a subsidence management plan.

With an appropriate management plan in place, it is considered that the grave sites can be maintained at all times during mining for any orientation, extension or shortening of longwalls within the *Extent of Longwalls* boundary, even if actual subsidence movements were greater than the predictions or substantial non-conventional movements occurred.

The following sections provide the descriptions, predictions and impact assessments for the farm land and farm facilities within the *Subsidence Study Area*.

8.1. Agricultural utilisation

The agricultural land classification types within the *Subsidence Study Area* are illustrated in Fig. 8.1.

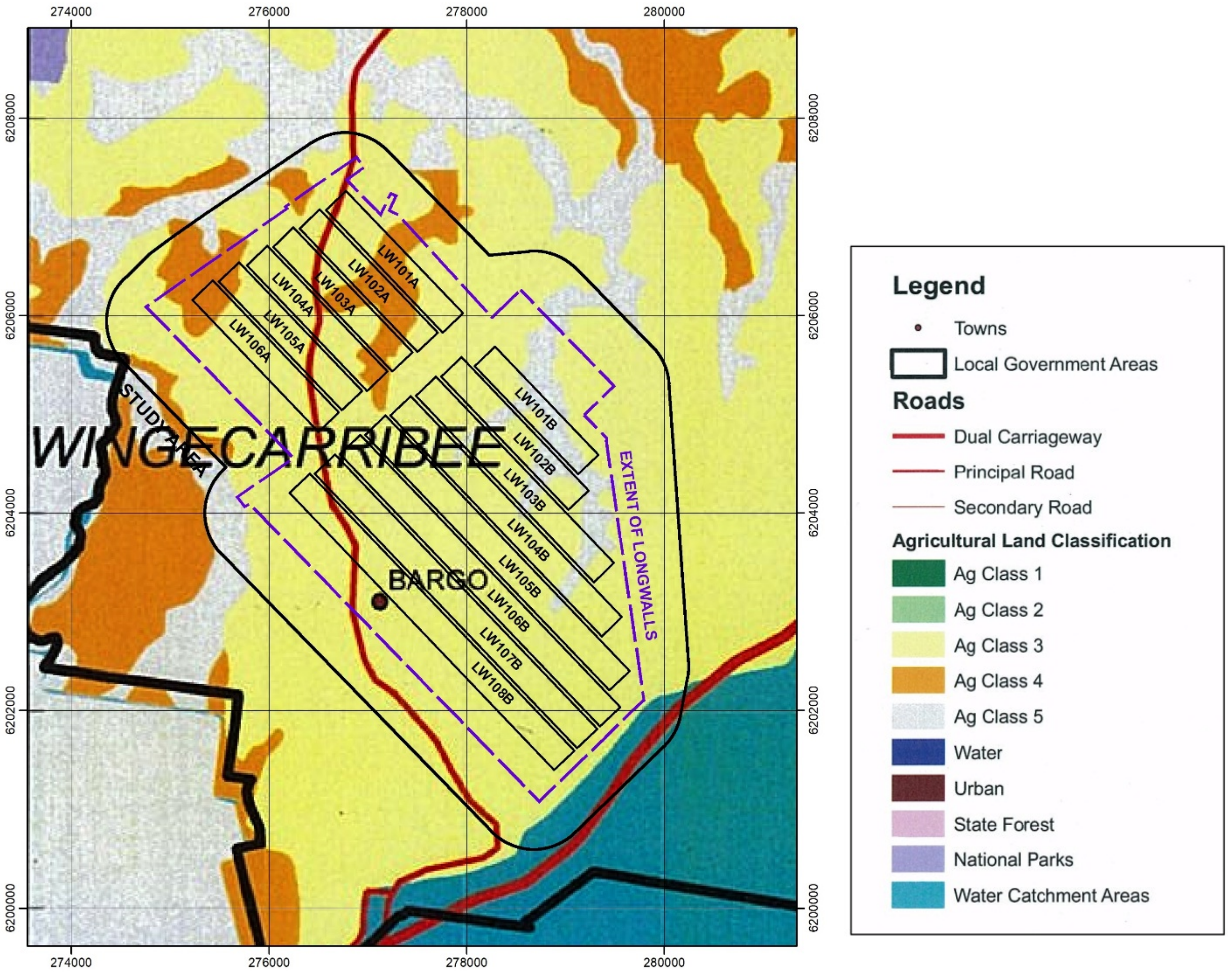


Fig. 8.1 Agricultural Land Classification within the Subsidence Study Area (Source DTIRIS, November 2008)

The above figure shows that there are three main agricultural land classification types within the *Subsidence Study Area*, which are:-

- Class 3 – Grazing land or land well suited to pasture improvement,
- Class 4 – Land suitable for grazing but not for cultivation, and
- Class 5 – Land unsuitable for agriculture, or at best suited only to light grazing.

The flatter areas of land within the *Subsidence Study Area* have been predominately cleared and are used for light agricultural and residential purposes. The deeper valleys within the *Subsidence Study Area* have generally not been cleared of the natural vegetation.

8.2. Rural structures

8.2.1. Descriptions of the rural structures

The locations of the rural structures (Structure Type R) within the *Subsidence Study Area* are shown in Drawing No. MSEC1060-19.

There are 4,232 rural structures which have been identified within the *Subsidence Study Area*, which include sheds, garages, gazebos, pergolas, greenhouses, playhouses, shade structures and other non-residential structures. The locations and sizes of the rural structures were determined from aerial photographs of the area.

8.2.2. Predictions for rural structures

Predictions of conventional subsidence, tilt and curvature have been made at the centroid and at the vertices of each rural structure, as well as at eight equally spaced points placed radially around the centroid and vertices at a distance of 20 metres. In the case of a rectangular shaped structure, predictions have been made at a minimum of 45 points within and around the structure.

A summary of the maximum predicted values of conventional subsidence, tilt and curvature for each rural structure within the *Subsidence Study Area* is provided in Table D.04, in Appendix D. The predictions are based on the extraction of the proposed amended longwall layout, as shown in Drawing No. MSEC1060-19. The predicted tilts provided in this table are the maxima in any direction after the completion of each of the proposed longwalls. The predicted curvatures are the maxima in any direction at any time during or after the extraction of each of the proposed longwalls.

Distributions of the maximum predicted conventional subsidence, tilt and curvature for the rural structures within the *Subsidence Study Area* are illustrated in Fig. 8.2 and Fig. 8.3.

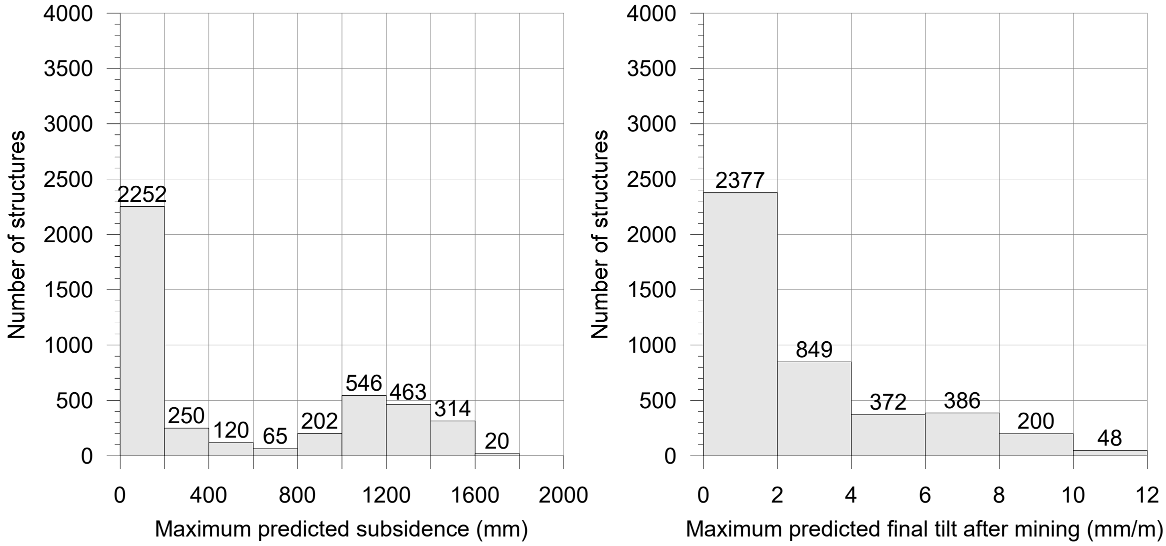


Fig. 8.2 Maximum predicted conventional subsidence and tilt for rural structures within the Subsidence Study Area

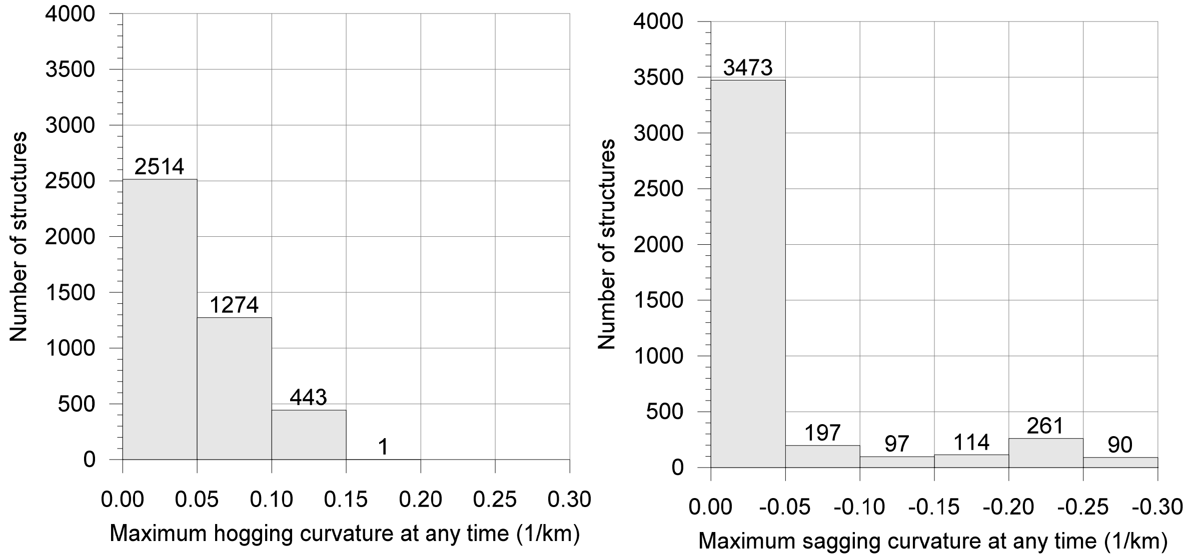


Fig. 8.3 Maximum predicted conventional hogging curvature (left) and sagging curvature (right) for rural structures within the Subsidence Study Area

The maximum predicted conventional strains for the rural structures, based on applying a factor of 15 to the maximum predicted conventional curvatures, are 2.4 mm/m tensile and 4.1 mm/m compressive.

Non-conventional movements can also occur as a result of, among other things, anomalous movements. The analysis of strains provided in Chapter 4 includes those resulting from both conventional and non-conventional anomalous movements.

The rural structures are at discrete locations and, therefore, the most relevant distributions of strain are the maximum strains measured in individual survey bays from previous longwall mining. The analysis of strains in survey bays during the mining of previous longwalls in the Southern Coalfield is discussed in Section 4.3.1. The results for survey bays located above goaf are provided in Fig. 4.2 and the results for survey bays located above solid coal are provided in Fig. 4.3.

If the proposed longwalls were to be shifted or reorientated, extended or shortened within the *Extent of Longwalls* boundary it would be expected that the maximum predicted conventional movements for the rural structures would be similar to those provided above. Whilst individual structures would experience greater or lesser movements, depending on their locations relative to the positions of the longwalls, the overall distribution of movements for the rural structures would not be expected to change substantially. If the longwalls were extended to the southwest within the *Extent of Longwalls* boundary, it would be expected that the overall number of structures affected by the extraction of the proposed longwalls would increase as the extended area is located within the urban areas of the Bargo township.

8.2.3. Impact assessments for rural structures

The maximum predicted tilt for the rural structures is 10 mm/m (i.e. 1.0 %), which represents a change in grade of 1 in 100. The majority of the rural structures within the *Subsidence Study Area* are of lightweight construction and able to tolerate mining-induced tilt. It has been found from past longwall mining experience that tilts of the magnitudes predicted within the *Subsidence Study Area* generally do not result in adverse impacts on rural structures. Some minor serviceability impacts could occur at the higher levels of predicted tilt, including door swings and issues with roof and pavement drainage, all of which can be remediated using normal building maintenance techniques.

The maximum predicted conventional curvatures for the rural structures are 0.16 km^{-1} hogging and 0.27 km^{-1} sagging, which equate to minimum radii of curvature of 6.3 kilometres and 3.7 kilometres, respectively.

There is extensive experience of mining directly beneath rural structures in the Southern Coalfield which indicates that the incidence of impacts on these structures is very low and the structures have remained in safe and serviceable conditions. This is not surprising as rural structures are generally small in size and of light-weight construction, which makes them less susceptible to impact than houses which are typically more rigid.

Tahmoor Mine has mined directly beneath more than 2000 rural structures of similar construction during the mining of Longwalls 22 to 32. It has managed the mining induced impacts with the implementation of suitable management strategies. The structures have remained safe and serviceable during mining.

Whilst the predicted subsidence parameters for the proposed longwalls are greater than those at Tahmoor North, it would still be expected that the rates of impact would be low and could be managed with the implementation of suitable management strategies. Impacts on rural structures have been successfully managed elsewhere in the NSW Coalfields, where the predicted subsidence parameters were similar to or greater than those predicted for the proposed longwalls.

Based on previous experiences, it is expected that the rural structures within the *Subsidence Study Area* would remain safe and serviceable during the mining period, provided that they are in sound existing condition. The risk of impact is clearly greater if the structures are in poor existing condition, though the chances of there being a public safety risk remains very low. A number of rural structures which were in poor existing condition have been directly mined beneath and these structures have not experienced impacts during mining.

Impacts on the rural structures that occur as the result of the extraction of the proposed longwalls are expected to be remediated using well established building techniques. With these remediation measures available, it is unlikely that there would be long term impacts on rural structures resulting from the extraction of the proposed longwalls.

8.2.4. Impact assessments for rural structures based on increased predictions

If the actual tilts exceeded those predicted by a factor of 2 times, the maximum tilt at the rural structures would be 20 mm/m (i.e. 2.0 %), or a change in grade of 1 in50. In this case, the incidence of serviceability impacts, such as door swings and issues with gutter and pavement drainage, would increase in the locations of greatest tilt, such as adjacent to the active longwall maingate and adjacent to the ends of the proposed longwalls. It would still be unlikely that stabilities of these rural structures would be affected by tilts of these magnitudes.

If the actual curvatures exceeded those predicted by a factor of 2 times, the incidence of impacts would increase for the rural structures located directly above the proposed longwalls. Since rural structures are generally small in size and of light-weight construction, they would still be expected to remain safe, serviceable and repairable using normal building maintenance techniques. With the implementation of any necessary remediation measures, it is unlikely that there would be any substantial long-term impacts on the rural structures.

While the predicted ground movements are important parameters when assessing the potential impacts on the rural structures, it is noted that the impact assessments were primarily based on historical observations from previous longwall mining in the Southern Coalfield. The overall levels of impact on the rural structures, resulting from the extraction of the proposed longwalls, are expected to be similar to those observed where longwalls have previously mined directly beneath rural structures in the Southern Coalfield.

8.2.5. Management of potential impacts on rural structures

Tahmoor Coal has developed and acted in accordance with a risk management plan to manage potential impacts to farm buildings during the mining of Longwalls 22 to 32. The management plan provides for identification of buildings in poor pre-mining condition that are hazardous or may become hazardous due to mining, and monitoring of structures during active subsidence. If impacts occur, the structure will be repaired in accordance with the Coal Mine Subsidence Compensation Act 2017.

It is recommended that Tahmoor Coal continue to develop management plans to manage potential impacts on rural structures during the mining of the proposed longwalls.

With an appropriate management plan in place, it is considered that rural structures can be maintained at all times during mining for any orientation, extension or shortening of longwalls within the *Extent of Longwalls* boundary, even if actual subsidence movements were greater than the predictions or substantial non-conventional movements occurred.

8.3. Tanks

8.3.1. Descriptions of the tanks

The locations of the tanks (Structure Type T) within the *Subsidence Study Area* are shown in Drawing No. MSEC1060-19.

There are 299 tanks which have been identified within the *Subsidence Study Area*. The locations and sizes of the tanks were determined from aerial photographs of the area and kerb side inspections. There are also a number of smaller rainwater tanks associated with the houses which are not shown in these drawings.

8.3.2. Predictions for the tanks

Predictions of conventional subsidence, tilt and curvature have been made at the centroid and at points located around the perimeter of each tank, as well as at points located at a distance of 20 metres from the perimeter of each tank.

A summary of the maximum predicted values of conventional subsidence, tilt and curvature for each tank within the *Subsidence Study Area* is provided in Table D.05, in Appendix D. The predictions are based on the extraction of the proposed amended longwall layout, as shown in Drawing No. MSEC1060-19. The predicted tilts provided in this table are the maxima in any direction after the completion of each of the proposed longwalls. The predicted curvatures provided in this table are the maxima in any direction at any time during or after the extraction of each of the proposed longwalls.

Distributions of the maximum predicted conventional subsidence, tilt and curvature for the tanks within the *Subsidence Study Area* are illustrated in Fig. 8.4 and Fig. 8.5.

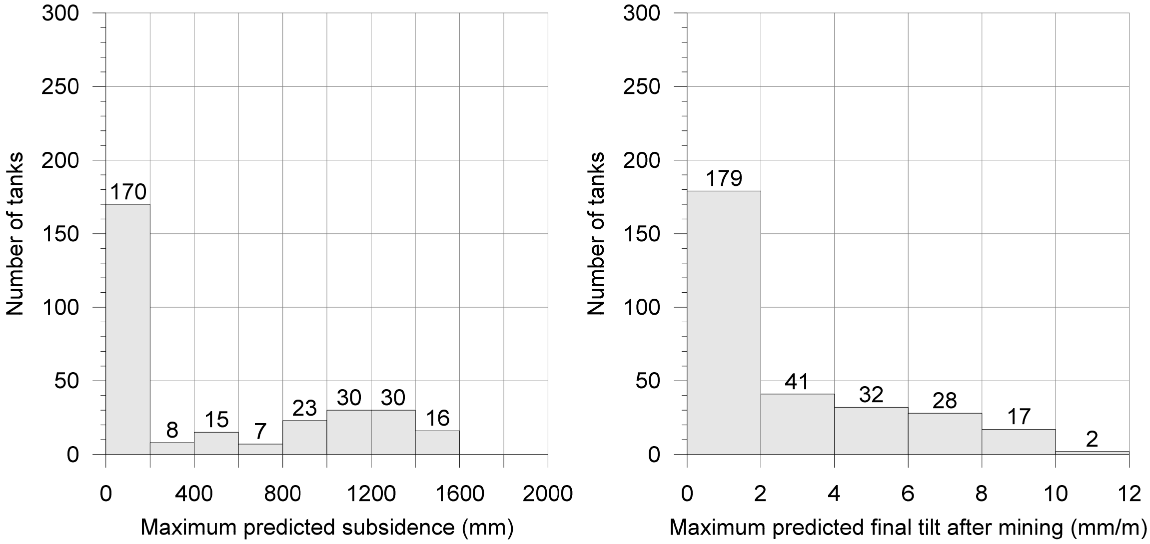


Fig. 8.4 Maximum predicted conventional subsidence and tilt for tanks within the Subsidence Study Area

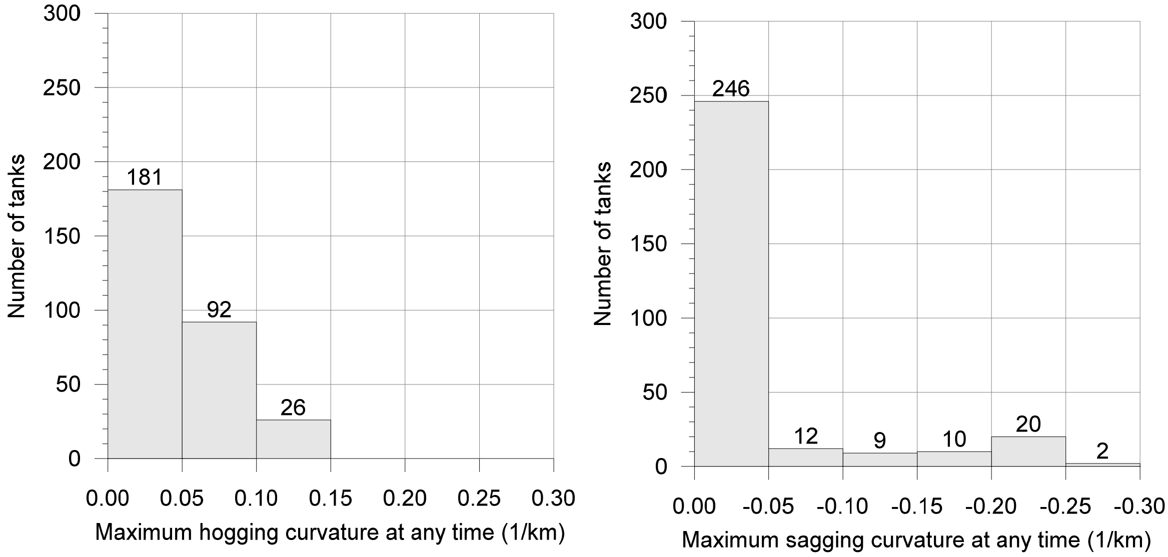


Fig. 8.5 Maximum predicted conventional hogging curvature (left) and sagging curvature (right) for tanks within the Subsidence Study Area

The maximum predicted conventional strains for the tanks, based on applying a factor of 15 to the maximum predicted conventional curvatures, are 2.0 mm/m tensile and 4.1 mm/m compressive. Non-conventional movements can also occur as a result of, among other things, anomalous movements. The analysis of strains provided in Chapter 4 includes those resulting from both conventional and non-conventional anomalous movements.

The tanks are at discrete locations and, therefore, the most relevant distributions of strain are the maximum strains measured in individual survey bays from previous longwall mining. The analysis of strains in survey bays during the mining of previous longwalls in the Southern Coalfield is discussed in Section 4.3.1. The results for survey bays located above goaf are provided in Fig. 4.2 and the results for survey bays located above solid coal are provided in Fig. 4.3.

If the proposed longwalls were to be shifted or reorientated, extended or shortened within the *Extent of Longwalls* boundary it would be expected that the maximum predicted conventional movements for the tanks would be similar to those provided above. Whilst individual structures would experience greater or lesser movements, depending on their locations relative to the positions of the longwalls, the overall distribution of movements for the tanks would not be expected to change substantially. If the longwalls were extended to the southwest within the *Extent of Longwalls* boundary, it would be expected that the overall number of tanks affected by the extraction of the proposed longwalls would increase as the extended area is located within the urban areas of the Bargo township.

8.3.3. Impact assessments for the tanks

Tilt can potentially affect the serviceability of tanks by altering the water levels in the tanks, which can in turn affect the minimum level of water which can be released from the outlets. The maximum predicted conventional tilt for the tanks within the *Subsidence Study Area* is 10 mm/m (i.e. 1.0 %), which represents a change in grade of 1 in 100. The predicted changes in grade are small, in the order of 1 % and unlikely, therefore, to result in any adverse impacts on the serviceability of the tanks.

The tank structures are typically constructed above ground level and, therefore, are unlikely to experience the curvatures and ground strains resulting from the extraction of the proposed longwalls. It is possible, that any buried water pipelines associated with the tanks within the *Subsidence Study Area* could be impacted by the ground strains, if they are anchored by the tanks, or by other structures in the ground.

Any impacts are expected to be of a minor nature, including leaking pipe joints, and could be easily repaired. With these remedial measures in place, it would be unlikely that there would be any adverse impacts on the pipelines associated with the tanks.

8.3.4. Impact assessments for the tanks based on increased predictions

If the actual tilts exceeded those predicted by a factor of 2 times, the maximum tilt at the tanks would be 20 mm/m (i.e. 2.0 %), or a change in grade of 1 in50. In this case, the incidence of serviceability impacts, such as changes in the minimum water levels which can be released from the outlets, could increase in the locations of greatest tilt, such as adjacent to the active longwall maingate and adjacent to the ends of the proposed longwalls. Impacts would be expected to be remediated by relevelling the tanks.

If the actual curvatures exceeded those predicted by a factor of 2 times, the incidence of impacts on the tank structures would not be expected to change substantially, as they are not expected to experience these ground movements. The incidence of impacts on the buried pipelines would, however, be expected to increase in the locations directly above the proposed longwalls. Impacts would still be expected to be of a minor nature which could be easily repaired. With these remediation measures in place, it would be unlikely that there would be long term impacts on the pipelines associated with the tanks.

8.3.5. Management of potential impacts on the tanks

Tahmoor Coal has developed and acted in accordance with a risk management plan to manage potential impacts to tanks during the mining of Longwalls 22 to 32. The management plan provides for identification of tanks in poor pre-mining condition that are hazardous or may become hazardous due to mining, and monitoring of structures during active subsidence. If impacts occur, the structure will be repaired in accordance with the Coal Mine Subsidence Compensation Act 2017.

It is recommended that Tahmoor Coal continue to develop management plans to manage potential impacts on tanks during the mining of the proposed longwalls.

With an appropriate management plan in place, it is considered that tanks can be maintained at all times during mining for any orientation, extension or shortening of longwalls within the *Extent of Longwalls* boundary, even if actual subsidence movements were greater than the predictions or substantial non-conventional movements occurred.

8.4. Gas and fuel storages

A number of the residences within the *Subsidence Study Area* have gas or fuel storages.

The domestic gas and fuel storages are located across the *Subsidence Study Area* and, therefore, are expected to experience the full range of predicted subsidence movements. A summary of the maximum predicted conventional subsidence movements within the *Subsidence Study Area* is provided in Chapter 4.

The storage tanks are generally elevated above ground level and, therefore, are not susceptible to mine subsidence movements. It is possible, however, that any buried gas pipelines associated with the storage tanks within the *Subsidence Study Area* could be impacted by the curvatures and ground strains, if they are anchored by the storage tanks, or by other structures in the ground.

Impacts are expected to be of a minor nature, including minor gas leaks, which could be easily repaired. It is unlikely that there would be any adverse impacts on the pipelines associated with the gas and fuel storage tanks, even if the actual movements exceeded the predictions by a factor of 2 times.

8.5. Poultry sheds

There are 39 poultry sheds within the *Subsidence Study Area*. The poultry sheds are lightweight structures up to 110 metres in length.

A number of large poultry sheds have been previously mined beneath in the Southern Coalfield. West Cliff Longwalls 30 to 33, for example, mined directly beneath 40 poultry sheds and in all cases the structures remained in safe and serviceable condition. This included four sheds which experienced large non-conventional ground movements, due to near surface geological structures, which resulted in impacts to the walls and roofs of the sheds but did not result in the structures becoming unsafe.

It is expected that the predicted mine subsidence movements on the sheds and ancillary building structures can be managed by the implementation of suitable management strategies, which may include visual monitoring during active subsidence. The level of monitoring and management may vary depending on the type and age of bird in the sheds and the level of isolation that is required from the external environment.

It is recommended that Tahmoor Coal continues its current practice of ensuring that the structures remain safe and serviceable at all times during mining and that impacts on business operations are minimised. It is recommended that Tahmoor Coal, in consultation with the owners of the poultry farms, study the potential for impacts on the poultry sheds and other infrastructure and develop management measures. The management measures may include a combination of:-

- Pre-mining hazard identification inspection of each structure by structural engineer,
- Consider the implementation of possible mitigation measures prior to mining to reduce the likelihood of severe impacts,
- Installation of a monitoring system, which includes, among other things, the monitoring of ground movements,
- Conduct regular visual inspections of the poultry farms, and
- Implement planned responses if triggered by monitoring and inspections.

With an appropriate management plan in place, it is considered that poultry farms will remain safe and serviceable at all times during mining for any orientation, extension or shortening of longwalls within the *Extent of Longwalls* boundary, even if actual subsidence movements were greater than the predictions or substantial non- conventional movements occurred.

8.6. Glass houses

No glass houses have been identified within the *Subsidence Study Area*, though there are a number of greenhouses and hothouses. These structures are expected to experience the full range of predicted subsidence movements. As these structures are relatively lightweight in construction, they are usually able to tolerate differential subsidence movements. Impacts can occur, for example, if the roof materials are designed to be slid open or closed to ventilation the greenhouse or hothouse, as substantial differential horizontal movements can cause the frames to rack and prevent sliding of the materials.

It is expected that the predicted mine subsidence movements on the greenhouses and hothouses can be managed by the implementation of suitable management strategies, which may include visual monitoring during active subsidence.

8.7. Hydroponic systems

There are no known hydroponic systems within the *Subsidence Study Area*. However, there are a number of greenhouses and hothouses. These buildings may have hydroponic systems. While the water pipes are usually flexible and able to tolerate differential subsidence movements, the drainage of the systems may require monitoring and adjustment, if necessary.

It is expected that the predicted mine subsidence movements on the hydroponic systems can be managed by the implementation of suitable management strategies, which may include visual monitoring during active subsidence.

8.8. Irrigation systems

Irrigation systems are used on commercial and private properties with agricultural utilisation. The systems are usually constructed from polyethylene pipes which can tolerate ground movements much larger than the predicted mine subsidence movements within the *Subsidence Study Area*.

Elevated strains can occur in the pipelines where they are anchored to the ground, or where they are subjected to non-systematic ground movements. Impacts are expected to be minor, including leaking joints, which could be readily remediated.

8.9. Farm fences

Fences are located across the *Subsidence Study Area* and, therefore, are expected to experience the full range of predicted subsidence movements. A summary of the maximum predicted conventional subsidence movements within the *Subsidence Study Area* is provided in Chapter 4.

The fences are linear features and, therefore, the most relevant distribution of strain is the maximum strains measured along whole monitoring lines above previous longwall mining. The analysis of strains along whole monitoring lines during the mining of previous longwalls in the Southern Coalfield is discussed in Section 4.3 and the results are provided in Fig. 4.4.

Non-conventional movements can also occur and have occurred in the NSW Coalfields as a result of, among other things, anomalous movements. The analysis of strains provided in Chapter 4 includes those resulting from both conventional and non-conventional anomalous movements.

The fences within the *Subsidence Study Area* are constructed in a variety of ways, generally using either timber, brick or metal materials.

Wire fences can be affected by tilting of the fence posts and by changes of tension in the fence wires due to strain as mining occurs. These types of fences are generally flexible in construction and can usually tolerate tilts of up to 10 mm/m and strains of up to 5 mm/m without adverse impacts. It is possible, that some of the wire fences within the *Subsidence Study Area* could be impacted as the result of the extraction of the proposed longwalls. Any impacts on the wire fences are likely to be of a minor nature and relatively easy to remediate by re-tensioning the fencing wire, straightening the fence posts, and if necessary, replacing some sections of fencing.

Colorbond, brick and timber paling fences are more rigid than wire fences and, therefore, are more susceptible to impacts resulting from mine subsidence movements. It is possible that these types of fences could be impacted as the result of the extraction of the proposed longwalls. Any impacts on Colorbond, brick or timber paling fences can be remediated or, where necessary, affected sections of the fences replaced.

It is recommended that Tahmoor Coal continue to develop management plans to manage potential impacts on fences during the mining of the proposed longwalls.

8.10. Farm dams

8.10.1. Descriptions of the farm dams

The locations of the farm dams within the *Subsidence Study Area* are shown in Drawing No. MSEC1060-19. The maximum plan dimensions and plan areas for these dams are provided in Table D.07, in Appendix D.

There are 206 farm dams (Structure Type D) which have been identified within the *Subsidence Study Area*. The locations and sizes of the farm dams were determined from aerial photographs of the area. The distributions of the longest lengths and surface areas of the farm dams within the *Subsidence Study Area* are shown in Fig. 8.6.

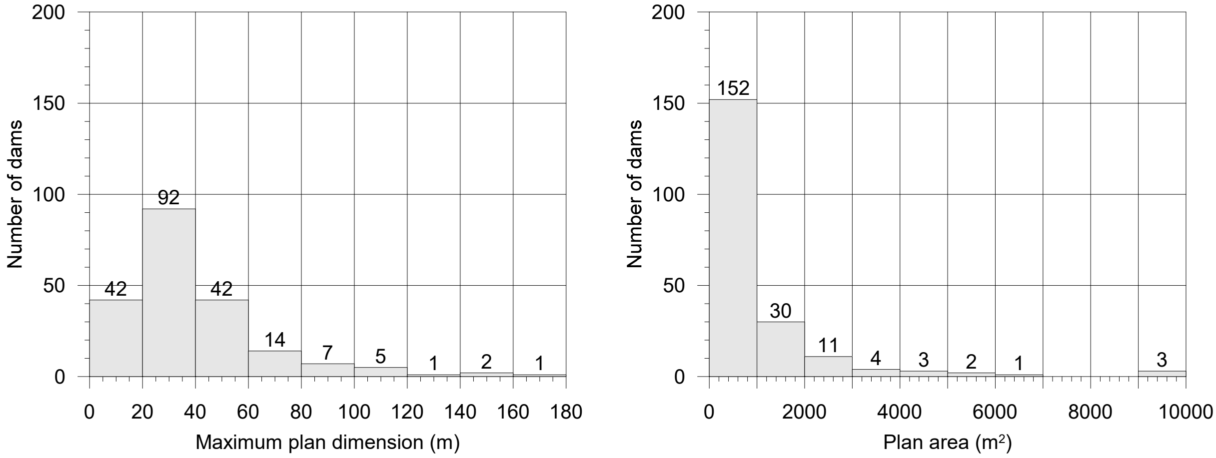


Fig. 8.6 Distributions of longest lengths and surface areas of the farm dams

The longest lengths of the farm dams within the *Subsidence Study Area* vary between 8 metres and 165 metres and the plan areas vary between 30 m^2 and 9,850 m^2.

The dams are typically of earthen construction and have been established by localised cut and fill operations within the natural streams. The farm dams are generally shallow, with the dam wall heights generally being less than 3 metres.

8.10.2. Predictions for the farm dams

Predictions of conventional subsidence, tilt and curvature have been made at the centroid and around the perimeters of each farm dam, as well as at points located at a distance of 20 metres from the perimeter of each dam.

A summary of the maximum predicted values of conventional subsidence, tilt and curvature for each farm dam within the *Subsidence Study Area* is provided in Table D.07, in Appendix D. The predictions are based on the extraction of the proposed amended longwall layout, as shown in Drawing No. MSEC1060-19. The predicted tilts provided in this table are the maxima in any direction after the completion of each of the proposed longwalls. The predicted curvatures are the maxima in any direction at any time during or after the extraction of each of the proposed longwalls.

Distributions of the maximum predicted conventional subsidence, tilt and curvature for the farm dams within the *Subsidence Study Area* are illustrated in Fig. 8.7 and Fig. 8.8.

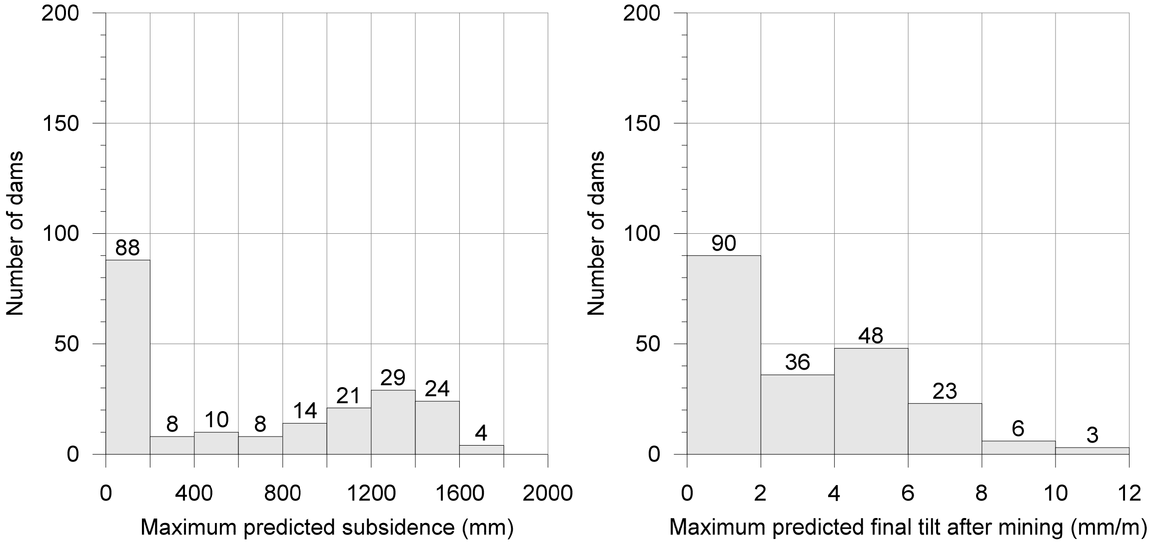


Fig. 8.7 Maximum predicted conventional subsidence and tilt for the farm dams within the Subsidence Study Area

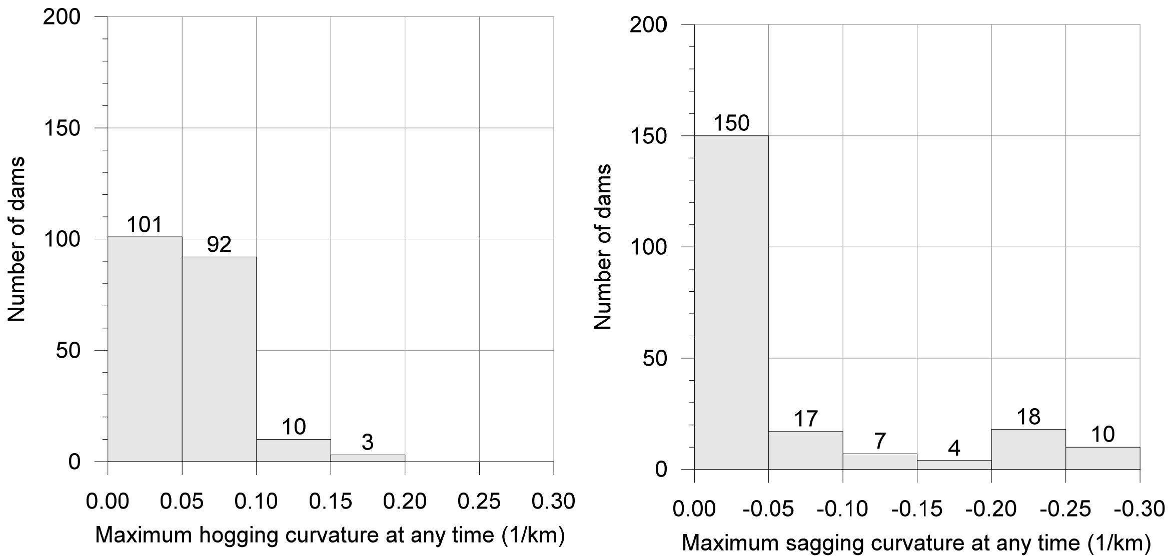


Fig. 8.8 Maximum predicted conventional hogging curvature (left) and sagging curvature (right) for the farm dams within the Subsidence Study Area

The maximum predicted conventional strains for the farm dams, based on applying a factor of 15 to the maximum predicted conventional curvatures, are 2.7 mm/m tensile and 4.1 mm/m compressive. Non-conventional movements can also occur as a result of, among other things, anomalous movements. The analysis of strains provided in Chapter 4 includes those resulting from both conventional and non-conventional anomalous movements.

The farm dams are at discrete locations and, therefore, the most relevant distributions of strain are the maximum strains measured in individual survey bays from previous longwall mining. The analysis of strains in survey bays during the mining of previous longwalls in the Southern Coalfield is discussed in Section 4.3.1. The results for survey bays located above goaf are provided in Fig. 4.2 and the results for survey bays located above solid coal are provided in Fig. 4.3.

The farm dams have typically been constructed within the streams and, therefore, may be subjected to valley related movements resulting from the extraction of the proposed longwalls. The equivalent valley heights at the dams are very small and it is expected, therefore, that the predicted valley related upsidence and closure movements at the dam walls would be much less than the predicted conventional subsidence movements and would not be substantial.

If the proposed longwalls were to be shifted or reorientated, extended or shortened within the *Extent of Longwalls* boundary it would be expected that the maximum predicted conventional movements for the tanks would be similar to those provided above. Whilst individual structures would experience greater or lesser movements, depending on their locations relative to the positions of the longwalls, the overall distribution of movements for the tanks would not be expected to change substantially. If the longwalls were extended to the northwest within the *Extent of Longwalls* boundary, it would be expected that the overall number of tanks affected by the extraction of the proposed longwalls would increase as the extended area is located within the rural areas of Bargo.

8.10.3. Impact Assessments for the farm dams

The maximum predicted tilt for the farm dams is 10 mm/m (i.e. 1.0 %), which represents a change in grade of 1 in 100. Mining induced tilts can affect the water levels around the perimeters of farm dams, with the freeboard increasing on one side, and decreasing on the other. Tilt can potentially reduce the storage capacity of farm dams, by causing them to overflow, or can affect the stability of the dam walls.

The predicted changes in freeboard at the farm dams within the *Subsidence Study Area* were determined by taking the difference between the maximum predicted subsidence and the minimum predicted subsidence anywhere around the perimeter of each farm dam. The predicted maximum changes in freeboard at the farm dams within the *Subsidence Study Area*, after the completion of the proposed longwalls, are provided in Table D.07, in Appendix D, and are illustrated in Fig. 8.9.

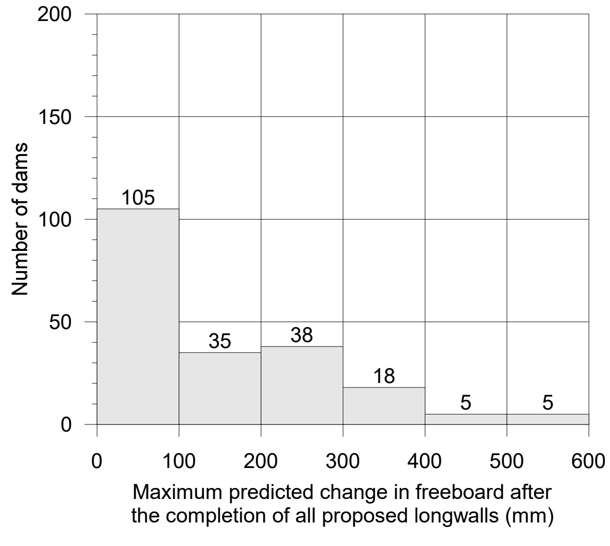


Fig. 8.9 Predicted changes in freeboards for the farm dams within the Subsidence Study Area

It can be seen from the above figure, that the predicted changes in freeboard are less than 300 mm at 178 dams within the *Subsidence Study Area* (i.e. 86 % of the total) and less than 500 mm at 201 dams (i.e. 98 % of the total). It is unlikely that the majority of the farm dams within the *Subsidence Study Area* would experience adverse impacts on the storage capacities due to these small changes in freeboard.

The predicted changes in freeboard are greater than 500 mm at 5 dams within the *Subsidence Study Area* (i.e. 2 % of the total), with the maximum predicted change in freeboard being 600 mm. It is possible, that some of these dams could experience reduced storage levels, however, these could be remediated by increasing the heights of the affected dam walls.

The maximum predicted conventional curvatures for farm dams are 0.16 km^{-1} hogging and 0.27 km^{-1} sagging, which represent minimum radii of curvature of 6.3 kilometres and 3.7 kilometres, respectively. The predicted curvatures and strains could be sufficient to result in cracking in the bases and walls of some farm dams within the *Subsidence Study Area*.

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.

A total of 103 dams have experienced subsidence movements during the mining of Longwalls 22 to 32 at Tahmoor Mine. While a small number of landowners have advised of impacts, there has been one claim to SA NSW for impacts on farm dams at the time of the report.

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.

Whilst the predicted subsidence parameters for the proposed longwalls are greater than those at Tahmoor North and at Appin and West Cliff Collieries, it would still be expected that the rates of impact on the farm dams would be very low and could be managed with the implementation of suitable management strategies.

Any substantial cracking in the dam bases or walls could be repaired by reinstating with cohesive materials. If any farm dams were to lose water as a result of mining, the mine would provide an alternative water source until the completion of repairs in accordance with the Coal Mine Subsidence Compensation Act 2017.

8.10.4. Impact assessments for the farm dams based on increased predictions

If the actual tilts exceeded those predicted by a factor of 2 times, the maximum tilt at the farm dams, at the completion of mining, would be 20 mm/m (i.e. 2.0 %), or a change in grade of 1 in 50. In this case, there would be 42 dams within the *Subsidence Study Area* (i.e. 20 % of the total) where the predicted change in freeboard was greater than 500 mm. In some cases, the tilts could be sufficient to reduce the capacities of the farm dams below acceptable levels, however, these could be remediated by increasing the heights of the affected dam walls

If the actual curvatures or strains exceeded those predicted by a factor of 2 times, the likelihood and extent of cracking would increase for the farm dams located directly above the proposed longwalls. Any surface cracking would still be expected to be of a minor nature and could be readily repaired by reinstating with cohesive materials. If any farm dams were to lose water as a result of mining, the mine would provide an alternative water source until the completion of repairs in accordance with the Coal Mine Subsidence Compensation Act 2017.

8.10.5. Management of potential impacts on the farm dams

Tahmoor Coal has developed and acted in accordance with a risk management plan to manage potential impacts to dams during the mining of Longwalls 22 to 32. This includes an assessment of potential environmental or safety consequences as a result of dam breach. The management plan provides for visual monitoring of dams immediately prior to and after active subsidence at each dam. If impacts occur to the dams, Tahmoor Coal will supply water to the landowner on a temporary basis until the dam is repaired in accordance with the Coal Mine Subsidence Compensation Act 2017.

It is recommended that Tahmoor Coal continue to develop management plans to manage potential impacts on dams during the mining of the proposed longwalls.

With an appropriate management plan in place, it is considered that dams can be maintained at all times during mining for any orientation, extension or shortening of longwalls within the *Extent of Longwalls* boundary, even if actual subsidence movements were greater than the predictions or substantial non-conventional movements occurred.

8.11. Groundwater bores

The Groundwater Impact Assessment (HydroSimulations, 2020) provides an assessment on groundwater bores.

9.0 DESCRIPTIONS, PREDICTIONS AND IMPACT ASSESSMENTS FOR THE INDUSTRIAL, COMMERICAL AND BUSINESS ESTABLISHMENTS

9.1. Industrial, commercial and business establishments in general

There is a total of 58 structures within the *Subsidence Study Area* that are used for industrial, commercial or business purposes. The establishments include the Bargo Hotel, Post Office, petrol stations, automotive repair workshops, a grocery store, restaurants and a variety of retail businesses. They also include mine infrastructure owned and operated by Tahmoor Mine.

As shown in Drawing No. MSEC1060-20, most of the structures are located in the township of Bargo along either Remembrance Drive or Great Southern Road. Many of the structures in this area are located directly above or adjacent to the proposed longwall mining area.

Predictions of conventional subsidence, tilt and curvature have been made at the centroid and around the perimeters of each structure, as well as at points located at a distance of 20 metres from the perimeter of each structure.

A summary of the maximum predicted values of conventional subsidence, tilt and curvature and impact assessments for each structure within the *Subsidence Study Area* is provided in Table D.10, in Appendix D. The predicted tilts provided in this table are the maxima in any direction after the completion of each of the proposed longwalls. The predicted curvatures are the maxima in any direction at any time during or after the extraction of each of the proposed longwalls.

Tahmoor Coal has previously developed and acted in accordance with risk management plans to successfully manage potential impacts to industrial, commercial and business establishments during the mining of Longwalls 22 to 32, including a turkey processing plant, a large shopping centre and a variety of shops.

Each business is unique in terms of the structures on the property and the activities that are conducted on each property.

Due to the unique nature of each business, it is recommended that individual subsidence management plans be developed in consultation with the owners of each business within the *Subsidence Study Area*. The management strategy for each business would include:

- Consultation with the owner of each business
- Pre-mining hazard identification inspection of each structure by structural engineer
- Identification and assessment of potential impacts to the operation of each business and safety of workers and the general public
- Consideration of mitigation measures to reduce risk prior to the commencement of subsidence movements
- Consideration of appropriate monitoring measures
- Consideration of appropriate triggered responses during mining
- Development of an agreed detailed subsidence management plan between Tahmoor Coal and the owners of each business

Each management plan would be reviewed periodically by Tahmoor Coal and the owners of each business.

9.1.1. Future new businesses

Given the long-term nature of the proposed mining activity, it is likely that there will be a turnover of businesses over time. Given that many of the structures are located directly above and adjacent to the proposed Longwall 108B, it is likely that some existing businesses will not be present at the time of active subsidence or will be replaced by new businesses. Existing businesses may purchase new equipment that is sensitive to differential movement. Some of the buildings are currently vacant and new tenants may be present at the time of mining.

It is therefore recommended that Tahmoor Coal consult with industrial, business establishments prior to experiencing mine subsidence to identify their needs and concerns.

With appropriate management plans in place, it is considered that the industrial, commercial and business establishments will remain safe and serviceable at all times during mining for any orientation, extension or shortening of longwalls within the *Extent of Longwalls* boundary, even if actual subsidence movements were greater than the predictions or substantial non- conventional movements occurred.

The following sections provide the descriptions, predictions and impact assessments for key industrial, commercial and business establishments within the *Subsidence Study Area*.

9.2. Gas or fuel storages and associated plant

There are two petrol stations within the *Subsidence Study Area* though neither is located directly above the proposed longwall mining area.

The Shell Service Station (MSEC Structure Ref. BRE_040) is located on Remembrance Drive near the Wollondilly Anglican College. It is located approximately directly above the north-western end of proposed Longwall 102A.

The BP Service Station (MSEC Structure Ref. BRL_121) is located on Remembrance Drive in the township of Bargo. It is located approximately 240 metres to the side of proposed Longwall 108B.

There is limited history of longwall mining beneath petrol stations in the Southern Coalfield. Appin Longwall 1 mined directly beneath a petrol station in the 1970's and no information on impacts on this operation is known.

West Cliff Longwall 5A3 mined directly beneath a petrol station at Appin. A flexible coupling was installed prior to mining to ensure that ground movement between pumps, tanks and the connecting pipes could be accommodated. A monitoring line (B-Line) was installed directly outside the petrol station. Substantial non-conventional movements were observed in the vicinity of the petrol station, including a bulge in the road directly outside it. The monitoring line indicated that total subsidence of 140 mm to 290 mm developed during the mining of Longwalls 5A1 to 5A4, with observed compressive ground strain of 3.7 mm/m, which is substantial.

The MSB (now SA NSW) reported that no impacts were observed to the petrol tank, though some impacts were observed to the anti-flood valve and some lines connecting the petrol tank to the bowsers and fill points. There were also some impacts to the shop and concrete pavement. The impacts did not present an immediate public safety hazard.

Tahmoor Mine Longwall 25 mined adjacent to but not directly beneath a petrol station located at Thirlmere Way at Tahmoor. The petrol station experienced approximately 250 mm of subsidence during the mining of Longwalls 22 to 25. While no impacts were observed to the petrol tanks, some impacts were observed to the concrete slabs and kerbs. The structural steel columns to the awning were also observed to bend as a result of differential subsidence movements.

Predictions for the petrol stations are provided in Table D.10, in Appendix D, where it can be seen that the Shell and BP service stations are predicted to experience approximately 1000 mm and less than 20 mm, respectively. The predictions are based on the extraction of the amended longwall layout, as shown in Drawing No. MSEC1060-20.

The BP Service Station could be directly mined beneath if the longwalls were extended to the southwest within the *Extent of Longwalls* boundary. Subsidence predictions would increase if the longwalls were extended.

It is possible the petrol stations could experience impacts to the petrol tanks and fuel lines, the hardstand areas or the building and awning structures as a result of the proposed mining of the proposed Tahmoor South longwalls within the *Extent of Longwalls* boundary.

It is recommended that Tahmoor Coal, in consultation with the owners of the petrol stations, develop management measures to ensure that the petrol stations remain safe and serviceable throughout the mining period. The management measures may include a combination of:

- Engineering inspections of existing condition of the petrol stations, including the buried tanks,
- Pre-mining hazard identification inspection of each structure by structural engineer,
- Mitigation or strengthening measures prior to mining, particularly to the petrol tanks and fuel lines,
- Installation of a monitoring system, which includes, among other things, the monitoring of ground movements and integrity of the petrol tanks and fuel lines,
- Conduct regular visual inspections of the petrol station, and
- Implement planned responses if triggered by monitoring and inspections.

With appropriate management plans in place, it is considered that the petrol stations will remain safe and serviceable at all times during mining for any orientation, extension or shortening of longwalls within the *Extent of Longwalls* boundary, even if actual subsidence movements were greater than the predictions or substantial non- conventional movements occurred.

9.3. Bargo Waste Management Centre

The Bargo Waste Management Centre (BWMC) is located on Anthony Road, Bargo. It is located directly above the proposed Longwall 102B, as shown in Drawing No. MSEC1060-20.

The BWMC is operated by Wollondilly Council and accepts waste that is free of food and putrescible material. The BWMC consists of a main administration building (MSEC Ref. BAN_040), landfill areas and surface water treatment ponds. The site has been used for non-putrescible waste disposal since the 1970s and is licensed by the NSW Environment Protection Authority (EPA) as a Solid Waste Class 2 Landfill. Based on current fill rates, the site will reach capacity by mid-2021 but Wollondilly Council is reviewing options to extend its operational life by up to 10 years. The eastern side of the landfill site is adjacent to a tributary to Dog Trap Creek. A photograph of the entrance to the BWMC is shown in Fig. 9.1.

The BWMC is expected to experience the full range of predicted subsidence movements. A summary of the maximum predicted conventional subsidence movements within the *Subsidence Study Area* is provided in Chapter 4. In addition, the landfill areas may experience greater subsidence due to additional settlement of the fill.

Fig. 9.1 Bargo Waste Management Centre

Predictions for the public amenities are provided in Table D.08, in Appendix D. The predictions are based on the extraction of the proposed amended longwall layout, as shown in Drawing No. MSEC1060-20.

Mining directly beneath the BWMC may potentially result in impacts on the slopes of the landfill. Tahmoor Coal has commissioned geotechnical engineering consultant Douglas Partners to conduct a visual inspection of the site in October 2019. The landfill comprises compacted non-putrescible material, which is covered with approximately 150 mm of clay and topped with woodchips at the end of each day, to prevent runoff seeping into the landfill.

The planned maximum height of the landfill is approximately 25 metres. It is noted from Wollondilly Council's Pollution Incident Response Management Plan (2016) that a minor landslip occurred in 2005 during a major rain event. The construction of a new surface water treatment pond and changes to contours at the landfill has reduced the likelihood of further landslips and none have occurred since 2005. The target slope is 1 in 3 (V:H) and while the slope on the eastern side is steeper, it is understood that the landfill is planned to be regraded.

Whilst the likelihood of slope instability due to mining-induced is considered to be low, potential impacts can be controlled by selecting and implementing a range of feasible measures, depending on the nature and condition of the slopes prior to mining, in consultation with Wollondilly Shire Council.

- Ensuring the slopes are well compacted with drainage structures well maintained prior to and during mining;
- Constructing additional strengthening measures, such as gabion walls, or geotextile mats, if required;
- Revegetation of permanent slopes, if required;
- Monitoring during periods of active subsidence, including visual inspections and ground surveys of the landfill slopes and the natural valley slopes adjacent to the landfill site;
- Providing additional support to the slopes in the unlikely event that instability is observed, including recompaction of material, reshaping the batter slopes and placement of geotextile mats, if required.

It is possible that surface cracking could occur on BWMC land. It is further recommended that visual inspections and gas monitoring be conducted during mining to identify the development of surface cracks within the capping layers and seal them as required to prevent the ingress of surface water into the landfill material and the emission of excessive gases that may potentially be within the landfill into the atmosphere.

While the cracks themselves are unlikely to impact on the safety and serviceability of the BWMC, it is recommended that an assessment be undertaken of the potential for leakage of polluted water into the near surface groundwater system. Leachate from within the landfill material is currently collected by an unlined surface trench that runs along the boundary of the landfill site. Monitoring of leachate generated from within the landfill is conducted by Wollondilly Shire Council and Tahmoor Coal has not been provided with monitoring results at this stage. Wollondilly Shire Council plans to install a leachate interception system along the toe of the eastern batter, to capture leachate from entering the stream. It is recommended that Tahmoor Coal continue to consult with Council to ensure that the system is designed to accommodate differential subsidence movements and be repairable in the event that it experiences adverse impacts due to mining.

The surface water treatment ponds may potentially experience impacts as a result of the proposed mining. The likelihood of impacts is considered low based experience of mining beneath farm dams and other wastewater treatment ponds during the mining of Longwalls 22 to 32 at Tahmoor Mine. Despite the low likelihood, it is recognised that the BWMC is located in close proximity to a tributary to Dog Trap Creek. It is recommended that Tahmoor Coal assess the potential for impacts on the surface water treatment pond in consultation with Wollondilly Shire Council prior to the BWMC experiencing mine subsidence movements due to the extraction of the proposed longwalls. The consequences of leakage from the pond can be minimised by dewatering the pond prior to active subsidence and the likelihood of impacts could be reduced by installing a flexible waterproof liner in the pond.

There are a number of storage containers in the BWMC that are used for storing waste liquids such as engine oil. These structures are considered likely to be flexible and can most likely tolerate differential subsidence movements. It is nevertheless recommended that Tahmoor Coal assess the potential for impacts on the liquid waste containers in consultation with Wollondilly Shire Council prior to the BWMC experiencing mine subsidence movements due to the extraction of the proposed longwalls. A number of management measures could be introduced to minimise the potential for impacts.

A new weighbridge is currently being designed by Council. Wollondilly Shire Council have advised that it is important that the weighbridge be functioning properly during and after mining. Tahmoor Coal has extensive experience in managing potential subsidence impacts on sensitive equipment. The weighbridge may experience adverse impacts due to mining-induced strains and/or tilts. The steel weighbridge platform may experience mining-induced ground curvature, causing the platform to unevenly distribute the vehicle loads onto the supports and load cells. The foundations supporting the weighbridge could also experience cracking due to mining-induced ground strains. Whilst the likelihood is considered to be low due to the small footprint of the weighbridge, potential impacts can be managed by selecting and implementing a range of feasible measures, in consultation with Wollondilly Shire Council.

- Conducting a maintenance inspection prior to, during and after the weighbridge experiences periods of active subsidence;
- Regularly monitoring mining-induced subsidence movements at the weighbridge;
- Regularly monitoring the condition of the weighbridge during mining, including monitoring for non-planar subsidence of the platform supports;
- Adjusting the supports to the weighbridge, if required;
- Recalibrating the load cells on the weighbridge during mining, if required; and
- Repairing the weighbridge foundations, if required.

It is recommended that Tahmoor Coal, in consultation with Wollondilly Council, study the potential for impacts to the BWMC and develop management measures to ensure that the BWMC remains safe and serviceable and throughout the mining period and that impacts on the BWMC do not result in environmental consequences on the adjacent Dog Trap Creek catchment. The study would require input from structural, geotechnical and subsidence engineers. The management measures may include a combination of:

- Mitigation or strengthening measures prior to mining, particularly to the landfill slopes and surface water treatment ponds,
- Installation of a monitoring system, which includes, among other things, the monitoring of ground movements, and condition of the landfill slopes, leachate collection system, the storage ponds, storage containers and the weighbridge;
- Conduct regular visual inspections of the BWMC, and
- Implement planned responses if triggered by monitoring and inspections.

With appropriate management plans in place, it is considered that the BWMC will remain safe and serviceable at all times during mining for any orientation, extension or shortening of longwalls within the *Extent of Longwalls* boundary, even if actual subsidence movements were greater than the predictions or substantial non- conventional movements occurred.

9.4. Mine infrastructure including tailings dams or emplacement areas

Surface facilities at Tahmoor Mine are partially located within the *Subsidence Study Area*, as shown in Drawing No. MSEC1060-20. The majority of the facilities will not be directly mined beneath but a small number of structures are located within the *Extent of Longwalls* boundary. These include:

- A coal conveyor,
- Plant associated with the coal conveyor,
- The southern coal stockpile area,
- Small sheds,
- Dams or reservoirs, and
- Unsealed access roads.

The coal conveyor and associated plant and equipment is predicted to subside approximately 1000 mm. The end of the conveyor is predicted to subside relative to the northern end by approximately 600 mm. The predicted movements would increase if the proposed longwalls are extended to the northeast within the *Extent of Longwalls* boundary.

While it is recommended that Tahmoor Coal study potential impacts on the conveyor structure, it is considered that potential issues can be managed to ensure the safe and serviceable operation of the conveyor.

The southern coal stockpile area and associated small sheds are predicted to experience subsidence up to 1200 mm as a result of the extraction of the proposed longwalls. Depending on the size of the stockpile at the time of active subsidence, there is a potential for impacts to occur on the stockpile. It is recommended that Tahmoor Coal study potential impacts on the stockpile and implement measures to ensure that the work site and work activities remain safe during the period of active subsidence.

The southern end of coal reject emplacement area and unsealed access roads will experience low level subsidence movements as a result of the proposed longwall extraction. While the potential for impacts is considered to be low, it is recommended that Tahmoor Coal study potential impacts on the emplacement area and implement measures, if required, to ensure that the work site and work activities remain safe during the period of active subsidence.

A number of water dams or reservoirs are located within the *Extent of Longwalls* boundary and above proposed Longwall 101B, as shown in Drawing No. MSEC1060-19. As discussed in Section 8.10, the likelihood of impacts on dams is very low. Despite the low likelihood, it is recognised that the dams are located in close proximity to a tributary to Dog Trap Creek. The consequences of leakage from the pond can be minimised by dewatering the pond prior to active subsidence and the likelihood of impacts could be reduced by installing a flexible waterproof liner in the pond.

It is recommended that Tahmoor Coal, develop management measures to ensure that they remain safe and serviceable throughout the mining period and that impacts on the facilities do not result in environmental consequences on the adjacent Dog Trap Creek catchment. The study would require input from structural, geotechnical and subsidence engineers. The management measures may include a combination of:

- Mitigation or strengthening measures prior to mining, particularly in relation to the coal conveyor and dams,
- Installation of a monitoring system, which includes, among other things, the monitoring of ground movements,
- Conduct regular visual inspections of the surface facilities, and
- Implement planned responses if triggered by monitoring and inspections.

With appropriate management plans in place, it is considered that the surface facilities at Tahmoor Mine will remain safe and serviceable at all times during mining for any orientation, extension or shortening of longwalls within the extent of the longwall mining areas, even if actual subsidence movements were greater than the predictions or substantial non-conventional movements occurred.

10.0 DESCRIPTIONS, PREDICTIONS AND IMPACT ASSESSMENTS FOR AREAS OF ARCHAEOLOGICAL AND HERITAGE SIGNIFICANCE

Descriptions, predictions and impact assessments for the archaeological and heritage sites within the *Subsidence Study Area* are provided in the following sections. The sites located outside the *Subsidence Study Area*, which may be subjected to far-field movements or valley related movements and may be sensitive to these movements, have also been included as part of these assessments.

10.1. Archaeological sites

There are no lands within the *Subsidence Study Area* declared as an Aboriginal Place under the *National Parks and Wildlife Act 1974*. There are 27 archaeological sites which have been identified within the *Subsidence Study Area*. A summary of these sites is provided in Table D.11, in Appendix D, based on information provided by (Niche, 2020c). They consist mainly of rock shelter sites, with some open camp sites, grinding groove sites and a scarred tree. Detailed descriptions of the archaeological sites within the *Subsidence Study Area* are provided by Niche (2020c).

10.1.1. Predictions for the archaeological sites

The predicted conventional subsidence, tilts and curvatures for the archaeological sites within the *Subsidence Study Area* are provided in Table D.11, in Appendix D. The predictions are based on the extraction of the proposed amended longwall layout, as shown in Drawing No. MSEC1060-18. A summary of the maximum predicted conventional subsidence parameters for the archaeological sites is provided in Table 10.1. The predicted tilts are the maxima after the completion of any or all of the proposed longwalls. The predicted curvatures are the maxima at any time during or after the extraction of the proposed longwalls.

Table 10.1 Maximum Predicted Total Conventional Subsidence Parameters for the Archaeological Sites

Site Type	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})
Open Camp Sites and Isolated Finds	1050	6.0	0.09	0.03
Scarred Tree	70	< 0.5	< 0.01	< 0.01
Grinding Groove Sites	1550	5.5	0.09	0.22
Rock Shelter Sites	1350	10.0	0.10	0.07

The maximum predicted conventional strains for the archaeological sites, based on applying a factor of 15 to the maximum predicted conventional curvatures, are 1.5 mm/m tensile and 3.3 mm/m compressive. Non-conventional movements can also occur as a result of, among other things, anomalous movements. The analysis of strains provided in Chapter 4 includes those resulting from both conventional and non-conventional anomalous movements.

The archaeological sites are at discrete locations and, therefore, the most relevant distributions of strain are the maximum strains measured in individual survey bays from previous longwall mining. The analysis of strains in survey bays during the mining of previous longwalls in the Southern Coalfield is discussed in Section 4.3.1. The results for survey bays above goaf are provided in Fig. 4.2. The results for survey bays above solid coal are provided in Fig. 4.3.

The grinding groove sites and rock shelters are located along the valleys of the streams and, therefore, could experience valley related movements. A summary of the maximum predicted upsidence and closure movements for the streams in the locations of these sites is provided in Table 10.2.

Table 10.2 Maximum predicted total upsidence and closure for the archaeological sites

Site Type	Location	Maximum predicted total upsidence (mm)	Maximum predicted total closure (mm)
Grinding Groove Sites	52-2-3921	125	275
	52-2-4194	250	150
	52-2-4395	175	150
Rock Shelters	Dog Trap Creek (52-2-1532 to 52-2-1521)	450	425
	Tributary of Teatree Hollow (52-2-4471)	300	325
	Tributary 1 of Dog Trap Creek (52-2-1538)	500	600
	Tributary 2 of Dog Trap Creek (52-2-1540)	300	375

10.1.2. Impact assessments for the open sites

There are 4 open sites (Open Camp Sites and Isolated Finds) located within the *Subsidence Study Area*.

The maximum predicted final tilt for the open camp sites is 6.0 mm/m (i.e. 0.6 %), which represents a change in grade of 1 in 167. It is unlikely that these sites would experience any adverse impacts resulting from the mining induced tilts.

The maximum predicted curvatures for the open camp sites are 0.09 km^{-1} hogging and 0.03 km^{-1} sagging, which represent minimum radii of curvature of 11 kilometres and 33 kilometres, respectively. The maximum predicted conventional strains for these sites, based on applying a factor of 15 to the maximum predicted conventional curvatures, are 1.4 mm/m tensile and 0.5 mm/m compressive.

These open camp sites can potentially be affected by cracking of the surface soils as a result of mine subsidence movements. It is unlikely, however, that the scattered artefacts or isolated finds themselves would be impacted by surface cracking. It is possible, however, that if any remediation of the surface was required after mining, that these works could potentially impact the open camp sites.

If the proposed longwalls were to be shifted, reorientated, extended or shortened within the *Extents of Longwalls* boundary, the predicted subsidence movements would change. The impact assessments are, however, unlikely to change substantially and the same management measures would apply.

Further assessments of the potential impacts on the open sites are provided in the aboriginal heritage report by Niche (2020c).

10.1.3. Impact assessments for the scarred tree

There is one scarred tree (Site Ref. 52-2-1530) within the *Subsidence Study Area*, which is located 125 metres east of the proposed Longwall 102B.

It has been found, from past longwall mining experience, that the incidence of impacts on trees is extremely rare. Impacts on trees have only been previously observed where the depths of cover are very shallow, in the order of 100 metres or less, or on very steeply sloping terrain, in the order of 1 in 1 or greater.

Even if the proposed longwalls were to be shifted, reorientated, extended or shortened within the *Extents of Longwalls* boundary, the scarred tree within the *Subsidence Study Area* will be located away from the proposed longwalls. It is unlikely, therefore, that this site would be adversely impacted by the proposed mining.

Further assessments of the potential impacts on the scarred tree are provided in a report by Niche (2020c).

10.1.4. Impact assessments for the grinding groove sites

There are three grinding groove sites located within the *Subsidence Study Area*. A summary of the locations of these sites is provided in Table 10.3.

Table 10.3 Locations of the grinding groove sites

Site Ref.	Location
52-2-3921	Near the junction of Dog Trap Creek and Tributary 1 to Dog Trap Creek. Located approximately 160 metres to the east of proposed LW101B
52-2-4194	Along Tributary 1 to Dog Trap Creek Located above Longwall 104B
52-2-4395	Along Tributary 2 to Dog Trap Creek. Located above Longwall 103B

The predicted maximum tilt for the grinding groove sites is 5.5 mm/m (i.e. 0.6 %), which represents changes in grade of 1 in 180. It is unlikely that these sites would experience any adverse impacts resulting from the mining induced tilt.

The predicted maximum curvatures at the grinding groove sites are 0.09 km^{-1} hogging and 0.22 km^{-1} sagging, which represent minimum radii of curvature of 11 kilometres and 4.5 kilometres, respectively. The maximum predicted conventional strains for these sites, based on applying a factor of 15 to the maximum predicted conventional curvatures, are 1.4 mm/m tensile and 3.3 mm/m compressive.

Fracturing in bedrock has been observed in the past, as a result of longwall mining, where tensile strains were greater than 0.5 mm/m or where compressive strains were greater than 2 mm/m. The predicted conventional strains are of sufficient magnitude to potentially result in fracturing of the bedrock.

The predicted closures at the grinding groove sites vary between 150 mm and 275 mm. The compressive strains resulting from valley related movements are more difficult to predict than conventional strains but based on the predicted magnitude of valley closure, it is possible that fracturing could occur in the bedrock in the vicinity of the grinding groove sites as a result of the proposed mining. Minor and isolated fracturing has been observed along streams up to around 400 metres outside previously extracted longwalls in the Southern Coalfield.

Preventive measures could be implemented at the grinding groove sites located nearest to the proposed longwalls, if required, including slotting of the bedrock around the sites to isolate them from the ground curvatures and strains. It is possible, however, that the preventive measures could result in greater impacts on the sites than those which would have occurred as a result of mine subsidence movements.

Further assessments of the potential impacts on the grinding groove site are provided in a report by Niche (2020c).

If the proposed longwalls were to be shifted, reorientated, extended or shortened within the *Extents of Longwalls* boundary, the predicted subsidence movements would change. The impact assessments are, however, unlikely to change substantially and the same management measures would apply.

10.1.5. Impact assessments for the rock shelters

There are 19 rock shelters identified within the *Subsidence Study Area*, with the majority of these sites located along Dog Trap Creek, to the east of the proposed Longwalls 101B and 102B.

The maximum predicted tilt for the rock shelters is 10.0 mm/m (i.e. 1.0 %), which represents a change in grade of 1 in 100. It is unlikely that these sites would experience any adverse impacts resulting from the mining induced tilt.

The maximum predicted curvatures for the rock shelters are 0.10 km^{-1} hogging and 0.07 km^{-1} sagging, which represent minimum radii of curvature of 10 kilometres and 14 kilometres, respectively. The maximum predicted conventional strains for these sites, based on applying a factor of 15 to the maximum predicted conventional curvatures, are 1.5 mm/m tensile and 1 mm/m compressive. The predicted closures at the rock shelter sites vary between 325 mm and 600 mm.

It is extremely difficult to assess the likelihood of instabilities for the rock shelters based upon predicted ground movements. The likelihood of the shelters becoming unstable is dependent on a number of factors which are difficult to fully quantify. These factors include jointing, inclusions, weaknesses within the rockmass, groundwater pressure and seepage flow behind the rockface. Even if these factors could be determined, it would still be difficult to quantify the extent to which these factors may influence the stability of the shelter naturally or when it is exposed to mine subsidence movements.

The predicted conventional and valley related movements at the rock shelters are similar to the typical movements in the Southern Coalfield, where there is extensive experience of mining beneath rock shelters. It has been reported that, where longwall mining has previously been carried out in the Southern Coalfield, beneath 52 shelters, that approximately 10 % of the shelters have been affected by fracturing of the strata or shear movements along bedding planes and that none of the shelters have collapsed (Sefton, 2000).

The experience from the Southern Coalfield indicates that the likelihood of substantial physical impacts on rock shelters within the *Subsidence Study Area* is relatively low. Further assessments of the potential impacts on the rock shelters are provided in a report by Niche (2020c) and SCT (2013b).

For the sites that are located directly above the proposed longwalls, if the proposed longwalls were to be shifted, reorientated, extended or shortened within the *Extents of Longwalls* boundary, the predicted subsidence movements would change. The impact assessments are, however, unlikely to change substantially and the same management measures would apply.

The sites along the section of Dog Trap Creek between Sites 52-2-1533 to 52-2-3960 are not directly mined beneath by the proposed longwalls in the amended longwall layout. These sites will not be mined directly beneath even if the proposed Tahmoor South longwalls were shifted, reorientated, extended or shortened within the *Extents of Longwalls* boundary. It is possible, however, that the offset distances between individual sites and the longwalls could reduce due to the staggered nature of the layout.

10.1.6. Impact assessments for the sites of high significance

Niche (2020c) advise that there are four rock shelter sites with artwork that are of high archaeological significance located along Dog Trap Creek (Site Ref. 52-2-1523, 52-2-1525, 52-2-1528 and 52-2-1529). The sites are located beyond the end of Longwall 102B and side of Longwall 103B and will not be directly mined beneath by Tahmoor Mine.

The closest distance of Site 52-2-1523 to Longwall 103B is 135 metres. The closest distance of Site 52-2-1525 to Longwall 102B is approximately 230 metres. The closest distance of Site 52-2-1528 to Longwall 103B is 210 metres. The closest distance of Site 52-2-1529 to Longwall 102B is 125 metres.

The sites are predicted to experience between 90 and 150 mm of vertical subsidence due to the extraction of the proposed longwalls (refer Table D.11). As shown in Drawing No. MSEC1060-22, the predicted conventional subsidence contours are more widely spaced around the staggered ends of the proposed longwalls and, as a result, the predicted conventional differential movements of tilt and curvature are very low at the sites. The predicted valley closure in the section of Dog Trap Creek where the sites are located is in the order of 250 mm.

The sites are located along small cliffs and a detailed visual inspection has been undertaken by Strata Control Technology (SCT, 2013b). The small cliffs are oriented in a roughly north-south direction and consist of relatively short lengths of intact rock faces (less than 50 metres).

Given the setback distances of the proposed longwalls to the sites, it is considered that the likelihood of impacts is low. It is extremely unlikely that major cliff instabilities will occur based on experiences of mining near cliffs at similar depths of cover in the Southern Coalfield. It is possible, however, that minor deformations of the cliff faces could occur. For example, bedding planes could slide relative to each other as the valley closes. While the chances are very low, some impacts could occur to an archaeological site if a sliding bedding plane was to coincide with where the artwork is located.

Please also refer to the impact assessment by SCT (2013b) for the sites.

The sites of high archaeological significance will not be mined directly beneath even if the proposed Tahmoor South longwalls were shifted, reorientated, extended or shortened within the *Extents of Longwalls* boundary. For the reasons discussed in Section 10.1.5, while the offset distances and predicted movement would change, the impact assessments are unlikely to change substantially and the same management measures would apply.

10.1.7. Impact assessments for the archaeological sites based on increased predictions

If the actual tilts exceeded those predicted by a factor of 2 times, the maximum tilts would be 12 mm/m (i.e. 1.2 %, or 1 in 83) for the open camp sites, 0.5 mm/m (i.e. 0.05 %, or 1 in 2,000) for the scarred tree, 11 mm/m (i.e. 1.1 %, or 1 in 91) for the grinding groove sites and 20 mm/m (i.e. 2.0 %, or 1 in 50) for the rock shelters. These types of archaeological sites are not adversely affected by tilt and, therefore, the likelihoods of impact would not be expected to increase.

If the actual curvatures or strains at the open camp sites exceeded those predicted by a factor of 2 times, the likelihoods and extents of cracking in the surface soils would also increase. It would still be unlikely that the artefacts themselves would be impacted by the surface cracking and the methods of subsidence management would not be expected to change.

If the actual curvatures or strains at the grinding groove and shelter sites exceeded those predicted by a factor of 2 times, the likelihoods and extents of fracturing in the bedrock would also increase. Whilst the observed curvatures could exceed those predicted, the experience from the Southern Coalfield indicates that the likelihood of substantial impacts on shelters is relatively low, particularly when they are not directly mined beneath. Preventive measures could be implemented at the grinding groove sites, however, the preventive measures could result in greater impacts on the site than those which would have occurred as a result of mine subsidence movements.

It is recognised that the archaeological sites along Dog Trap Creek are located near the Nepean Fault and increased subsidence could occur directly above the commencing ends of the proposed Longwalls 101B to 103B. The majority of the sites, however, are not proposed to be directly mined beneath, including the four sites of high significance. Whilst increased subsidence could affect the sites located directly above the proposed longwalls, the observations of ground movements beyond Longwalls 24A to 26 where increased subsidence occurred was that vertical subsidence was less than predicted and differential subsidence movements were relatively low. This includes the observation of almost no measurable valley closure across the Bargo River, which was much less than predicted.

10.1.8. Management of potential impacts on the archaeological sites

Tahmoor Coal has previously modified the mine layout for the proposed development to reduce subsidence movements and subsidence impacts at various archaeological sites and has previously developed Subsidence Management Plans to manage the potential impacts on archaeological sites. The management plans include monitoring and triggered response plans.

It is recommended that Tahmoor Coal continue to develop management plans to manage potential impacts on archaeological sites during the mining of the proposed longwalls.

While the likelihood of impacts is assessed to be low, the possibility of impacts cannot be ruled out. It is recommended that adaptive management techniques be applied. In the case of the sites of high archaeological significance along Dog Trap Creek, it will be possible to monitor ground movements and the condition of the sites during the mining of Longwalls 101B and 102B. If monitoring detects the early development of potentially severe differential movements at the archaeological sites, the commencing position of Longwall 103B could be shortened.

10.2. Heritage sites

10.2.1. Descriptions of the heritage sites

There are 24 heritage sites which have been identified within or near the *Subsidence Study Area* and their locations are shown in Drawing Nos. MSEC1060-18. Brief descriptions of the heritage sites are provided below in Table 10.4, and more detailed descriptions are provided in the report by Niche (2020d).

Table 10.4 Heritage sites within the Subsidence Study Area

Niche ID	MSEC Structure Ref No.	Name	Description	Closest distance to extent of longwall mining area
1	N/A	Bargo Cemetery	Grave sites	Directly above longwall mining area
2	BGR_235	Kalinya Gardens and landscape	1 storey weatherboard house	Directly above longwall mining area
3	BGR_147	Old Coomeroo Homestead, Silo and Shed	1 storey weatherboard house	Directly above longwall mining area
4	BGR_281	Homestead	1 storey brick house	Directly above longwall mining area
5	BGR_061	Bargo Post office	1 storey weatherboard structure	Directly above longwall mining area
6	BGR_041	Bargo Hotel	2 storey painted brick structure	Directly above longwall mining area
7	BGR_033	Bargo Rural Trading Building	2 storey brick structure	Directly above longwall mining area
8	BGR_027	Commercial Building	1 storey brick structure	Directly above longwall mining area
9	BGR_015	Bargo Public School	1 storey brick structure	Directly above longwall mining area
10	BHW_327	Cottage	1 storey weatherboard house	Directly above longwall mining area
11	BHW_117	House	1 storey weatherboard house	Directly above longwall mining area
12	BHW_121	Bargo Public School Residence	1 storey weatherboard structure	Directly above longwall mining area
13	BHW_297 BHW_299 BHW_301	Railway Cottages	Three single storey weatherboard houses	Directly above longwall mining area
14	BHW_141	Hawthorne	1 storey weatherboard house	Directly above longwall mining area
15	BRL_160	Bargo Railway Station and Toilet Block	Face brick platform and painted brick toilet block	Directly above longwall mining area
16	BNN_047	House	1 storey weatherboard house	~130 m from extent of LW mining area
17	BRL_082	Bargo Surgery	1 storey brick and timber structure	Directly above longwall mining area
18	BRL_150	Cottage	1 storey weatherboard house	~80 m from extent of LW mining area
19	BRE_580	Wirrimbirra Sanctuary	Native gardens	Directly above longwall mining area
20	N/A	Avon Dam Road Railway Overbridge	Masonry overbridge with and concrete arch	~100 metres from the extent of LW mining area
21	N/A	Wellers Road Railway Overbridge	Masonry overbridge with and concrete arch	Directly above longwall mining area
24	N/A	Tahmoor Mine	Coal mine and coal handling preparation plant	Centre of surface facilities ~500 m from extent of LW mining area
25	N/A	Anderson's Inn	Inn no longer exists	N/A
29	N/A	Great Southern Road	Little evidence of original fabric as road has been upgraded many times	Directly above longwall mining area

10.2.2. Predictions and impact assessments for heritage sites previously discussed

Predictions and impact assessments have been provided previously in this report for some of the heritage sites:

- Bargo cemetery (Section 7.16);
- Bargo Public School (Section 7.6);
- Railway station and WC (Section 6.1.10);
- Wirrimbirra Sanctuary (Section 5.14);
- Railway bridges (Section 6.1.7) ;
- Bargo River Road Bridge (Section 6.1.7); and
- Tahmoor Mine (Section 9.4).

The predictions and impact assessments for the remaining heritage sites within the *Subsidence Study Area* are provided in the following sections.

10.2.3. Bargo Hotel and Bargo Rural Trading Building

The Bargo Hotel is a two-storey painted brick structure (MSEC Structure Ref. BGR_041) and it is located 100 metres southwest of the proposed Longwall 108B. A photograph is shown in Fig. 10.1.

The Bargo Rural Trading Building is a two-storey painted brick structure (MSEC Structure Ref. BGR_033) and it is also located100 metres southwest of the proposed Longwall 108B.

The predicted conventional subsidence, tilts and curvatures for the heritage building structures within the *Subsidence Study Area* are provided in Table D.12, in Appendix D.

The heritage sites are at discrete locations and, therefore, the most relevant distributions of strain are the maximum strains measured in individual survey bays from previous longwall mining. The analysis of strains in survey bays during the mining of previous longwalls in the Southern Coalfield is discussed in Section 4.3.1. The results for survey bays located above goaf are provided in Fig. 4.2 and the results for survey bays located above solid coal are provided in Fig. 4.3.

The Bargo Hotel and Bargo Rural Trading Building are predicted to experience less than 20 mm of vertical subsidence. It is unlikely that these structures would experience adverse impacts based on the amended longwalls. However, these structures could experience greater subsidence if the longwalls are extended to the southwest within the *Extents of Longwalls* boundary. In any case, it is expected that the Bargo Hotel and Bargo Rural Trading Building would only experience minor impacts.

If impacts occur to the painted masonry walls, there are opportunities to repair the heritage fabric of the buildings by patching and repainting the walls. If substantial ground deformations are observed at any of the buildings, temporary and permanent repairs can be undertaken to maintain the heritage value of the building.

It is recommended that Tahmoor Coal consult with the building owners and develop management measures to ensure that the buildings remain safe and serviceable throughout the mining period. The management measures may include a combination of:

- Inspections and recording of the condition of the structures and identification of heritage values,
- Mitigation or strengthening measures prior to mining, that are sensitive to cultural heritage
- Installation of a monitoring plan, which includes, among other things, the monitoring of ground movements and building movements,
- Conduct regular visual inspections of the buildings, and
- Implement planned responses if triggered by monitoring and inspections.

If the proposed longwalls were to be shifted, reorientated, extended or shortened within the *Extents of Longwalls* boundary, the predicted subsidence movements would change. The impact assessments are, however, unlikely to change substantially and the same management measures would apply.

Fig. 10.1 Bargo Hotel

10.2.4. Heritage houses and other structures

Many items of heritage significance within the *Subsidence Study Area* are single storey houses or other structures, the majority of which are constructed with timber frames and weatherboard cladding.

The predicted conventional subsidence, tilts and curvatures for the heritage building structures within the *Subsidence Study Area* are provided in Table D.12, in Appendix D.

The heritage sites are at discrete locations and, therefore, the most relevant distributions of strain are the maximum strains measured in individual survey bays from previous longwall mining. The analysis of strains in survey bays during the mining of previous longwalls in the Southern Coalfield is discussed in Section 4.3.1. The results for survey bays located above goaf are provided in Fig. 4.2 and the results for survey bays located above solid coal are provided in Fig. 4.3.

A probabilistic assessment is provided in Table D.03, where it can be seen that the most likely outcome from mining is that no impact or very minor impacts will occur to these structures. The method of assessment is based on observations of impacts to houses and is applicable to the above buildings as they are of similar construction. It is noted, however, that with the implementation of effective management strategies to preserve or restore the heritage value of each item, the likelihood of severe impacts on items of heritage significance will be substantially reduced and the probabilities of Repair Categories R3 to R5, as provided in Table D.03, are not applicable.

Observations of impacts to building structures have found that masonry structures are more likely to experience impacts than timber-framed weatherboard or fibro structures. Please refer to Appendix C of this report for details on the method of assessment for houses.

From a heritage perspective, the ability to restore the heritage value of exposed masonry walled structures is substantially more difficult compared to restoration of painted walls, and in particular, flexible linings such as weatherboard panels. If substantial ground deformations are observed at any of the buildings, temporary and permanent repairs can be undertaken to maintain the heritage value of the building.

Tahmoor Mine has mined directly beneath two weatherboard houses of heritage significance during the mining of Longwalls 22 to 31 (Bellefield and Tahmoor House), and one masonry house of heritage significance (Koorana House) and successfully managed potential impacts on building elements that are of heritage value. While minor impacts have been observed, the heritage fabric of the structure has been maintained.

It is recommended that Tahmoor Coal continue to develop specific heritage management plans in consultation with the building owners for each item of heritage significance that will experience subsidence due to the extraction of the proposed longwalls. The study would require input from structural engineers, subsidence engineers and heritage consultants. The management measures may include a combination of:

- Mitigation or strengthening measures prior to mining, that are sensitive to cultural heritage,
- Installation of a monitoring plan, which includes, among other things, the monitoring of ground movements and building movements,
- Conduct regular visual inspections of the buildings, and
- Implement planned responses if triggered by monitoring and inspections.

If the proposed longwalls were to be shifted, reorientated, extended or shortened within the *Extents of Longwalls* boundary, the predicted subsidence movements would change. The Bargo Railway Station and WC, a weatherboard cottage on Railside Avenue (Item 18) and the Avon Dam Road Bridge over the Main Southern Railway may be directly mined beneath if the longwalls are extended to the southwest. The impact assessments are, however, unlikely to change substantially and the same management measures would apply.

10.2.5. Potential impacts on heritage sites that are not building structures

The Great Southern Road will experience the full range of predicted subsidence movements and impacts may occur. As the road has been upgraded many times, there is little evidence of the original heritage fabric. While impacts may occur to the road, repairs will not impact on the heritage value of the road, which is generally related to its alignment and this will not be affected by the proposed mining.

10.2.6. Management of potential impacts on heritage sites

Tahmoor Coal has previously developed Management Plans to manage the potential impacts on heritage sites. The management plans include pre-mining assessments by structural engineers and heritage consultants, monitoring and triggered response plans. Monitoring typically continues for a period following mining.

It is recommended that Tahmoor Coal continue to develop management plans to manage potential impacts on heritage sites in consultation with each landowner during the mining of the proposed longwalls.

10.3. Items of architectural significance

There are no items of architectural significance within the *Subsidence Study Area*.

11.1. Houses

11.1.1. Descriptions of the houses

There are 1,458 houses that have been identified within the *Subsidence Study Area*. The locations of the houses are shown in Drawing No. MSEC1060-19 and details are provided in Table D.02, in Appendix D.

The locations, sizes, and construction details of the houses were determined from orthophotographs of the area in 2017, kerbside inspections in 2013 and *Google Street View®* in December 2009. In some cases, the houses were inspected at the request or consent of the landowners.

Given the long-term nature of the proposed mining activity, it is likely that there will be a growth and renewal of houses over time. It is likely the total number of houses affected by the extraction of the proposed longwalls will be greater than currently identified.

The following provides further discussions on the details of the houses within the *Subsidence Study Area*.

Locations

The main township of Bargo is located in the southern part of the *Subsidence Study Area*. There are 571 houses located directly above the proposed longwalls (i.e. 39 % of the total number of houses within the *Subsidence Study Area*). A summary of the number of houses located directly above each of the proposed longwalls is provided in Table 11.1. A large proportion of houses are located directly above proposed Longwalls 107B and 108B.

Table 11.1 Number of houses located directly above each of the proposed longwalls

Longwall	Number of houses directly above each proposed longwall	Percentage of the total number of houses within the Subsidence Study Area
LW101A	0	0.0 %
LW102A	1	0.1 %
LW103A	8	0.5 %
LW104A	22	1.5 %
LW105A	16	1.1 %
LW106A	8	0.5 %
LW101B	0	0.0 %
LW102B	0	0.0 %
LW103B	2	0.1 %
LW104B	10	0.7 %
LW105B	20	1.4 %
LW106B	56	3.8 %
LW107B	167	11.5 %
LW108B	261	17.9 %
Total	571	39.2 %

Maximum plan dimension, plan area and height

Distributions of the maximum plan dimensions and plan areas of the houses within the *Subsidence Study Area* are provided in Fig. 11.1. The majority of the houses are between 10 metres and 30 metres in length, with an average of around 18 metres. The majority of the houses have plan areas between 100 m^2 and 400 m^2, with an average of around 210 m^2.

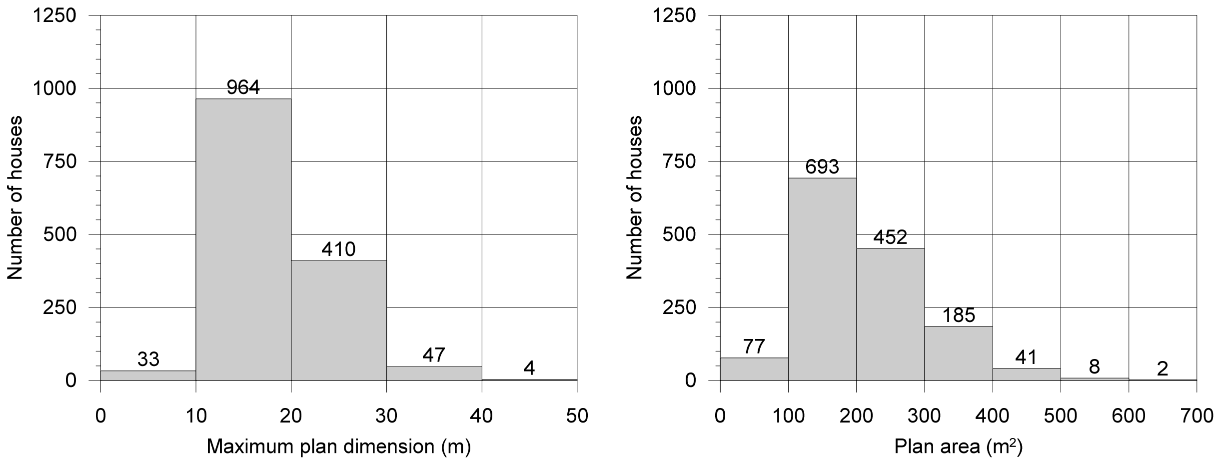


Fig. 11.1 Distribution of houses by maximum plan dimension and plan area

The houses have been categorised into four groups, on the basis of their maximum plan dimension and the number of stories. A summary of these house type categories is provided in Table 11.2 below. It is noted that two-storey houses include split-level houses.

Table 11.2 House type categories

House type	Description	Number	Percentage
H1	Single-storey with maximum plan dimension less than 30 metres	1378	95 %
H2	Single-storey with maximum plan dimension of 30 metres or greater	49	3 %
H3	Two-storey with maximum plan dimension less than 30 metres	30	2 %
H4	Two-storey with maximum plan dimension of 30 metres or greater	1	≈ 0 %

It can be seen from the above table that the majority of houses within the *Subsidence Study Area* are single-storey with a maximum plan dimension less than 30 metres (i.e. Type H1), and there is only one two-storey house with a maximum plan dimension greater than 30 metres (i.e. Type H4) identified within the *Subsidence Study Area*.

The distribution of house heights within the *Subsidence Study Area* at this point in time has been compared to the distribution of house types in the township of Tahmoor, which have previously experienced mine subsidence movements. Of the 1458 houses within the *Subsidence Study Area*, 1378 houses (95 %) are single-storey houses with maximum plan dimension less than 30 metres. In 2006, (Report No. MSEC157), it was reported that of the 1493 houses that would be affected by the mining of Longwalls 24 to 26 at Tahmoor Mine, coincidentally 1400 houses were also recorded as single-storey houses with maximum plan dimension less than 30 metres. In other words, the distribution of house heights within the *Subsidence Study Area* is very similar to the distribution at Tahmoor township.

It is recognised that the information on house heights has been undertaken using *Google Street View®* images. It is likely that some houses will be renovated or rebuilt before the proposed longwalls are extracted. Approximately 9 % of houses could not be viewed from the street and, therefore, the building heights could not be ascertained.

Type of construction

Distributions of the wall and footing construction of the houses within the *Subsidence Study Area* are provided in Fig. 11.2. The majority of the houses within the *Subsidence Study Area* are of brick or brick-veneer construction. There are reasonably similar numbers of houses with slab on ground and strip footings, with a smaller number of houses on piered footings.

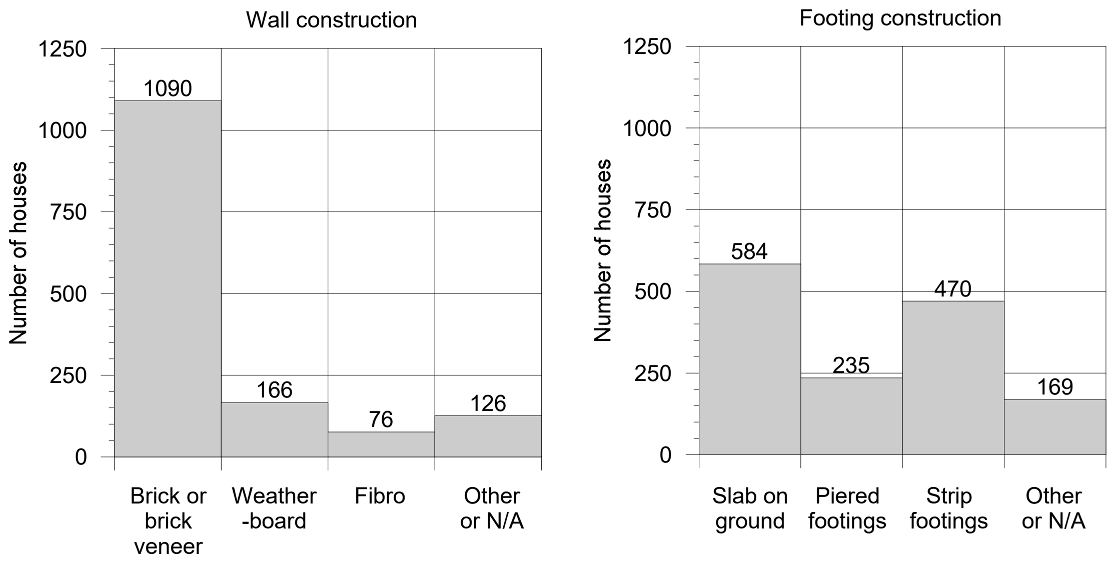


Fig. 11.2 Distributions of wall and footing construction for houses within the Subsidence Study Area

Following a review of impacts to houses during the mining of Tahmoor Mine Longwalls 22 to 25, it was found that there was a noticeable difference in structural performance in response to mine subsidence movements between the following construction types:-

- Brick or brick-veneer houses constructed on a ground slab,
- Brick or brick-veneer houses constructed on strip footings, and
- Weatherboard or fibro houses constructed on either ground slabs or strip footings

The distribution of houses by construction type is provided in Table 11.3. Approximately 9 % of houses could not be viewed from the street and, therefore, their construction types could not be ascertained.

Table 11.3 Distribution of houses by construction type

Description	Number of houses	Percentage of houses
Brick or brick-veneer houses constructed on a ground slab	579	40 %
Brick or brick-veneer houses constructed on strip footings	510	35 %
Weatherboard or fibro houses constructed on either ground slabs or strip footings or other	243	17 %
Cannot be identified from kerbside inspections	126	9 %

Of the 1332 houses whose construction type could be identified from the street within the *Subsidence Study Area*, 1089 houses (75 %) are brick or brick-veneer houses. In 2006, (Report No. MSEC157), it was reported that of the 1493 houses that would be affected by the mining of Longwalls 24 to 26 at Tahmoor Mine, 1213 houses (81 %) were also recorded as brick or brick-veneer houses. The roughly equal distribution of houses on ground slabs and strip footings is similarly observed at Tahmoor. The distribution of construction types within the *Subsidence Study Area* is, therefore, very similar to the distribution at Tahmoor township.

A map showing the spatial distribution of structures by construction type is provided in Fig. 11.3. It can be seen that weatherboard or fibro houses are generally located in older parts of the town and newer houses in the outskirts of the town have generally been constructed on ground slabs.

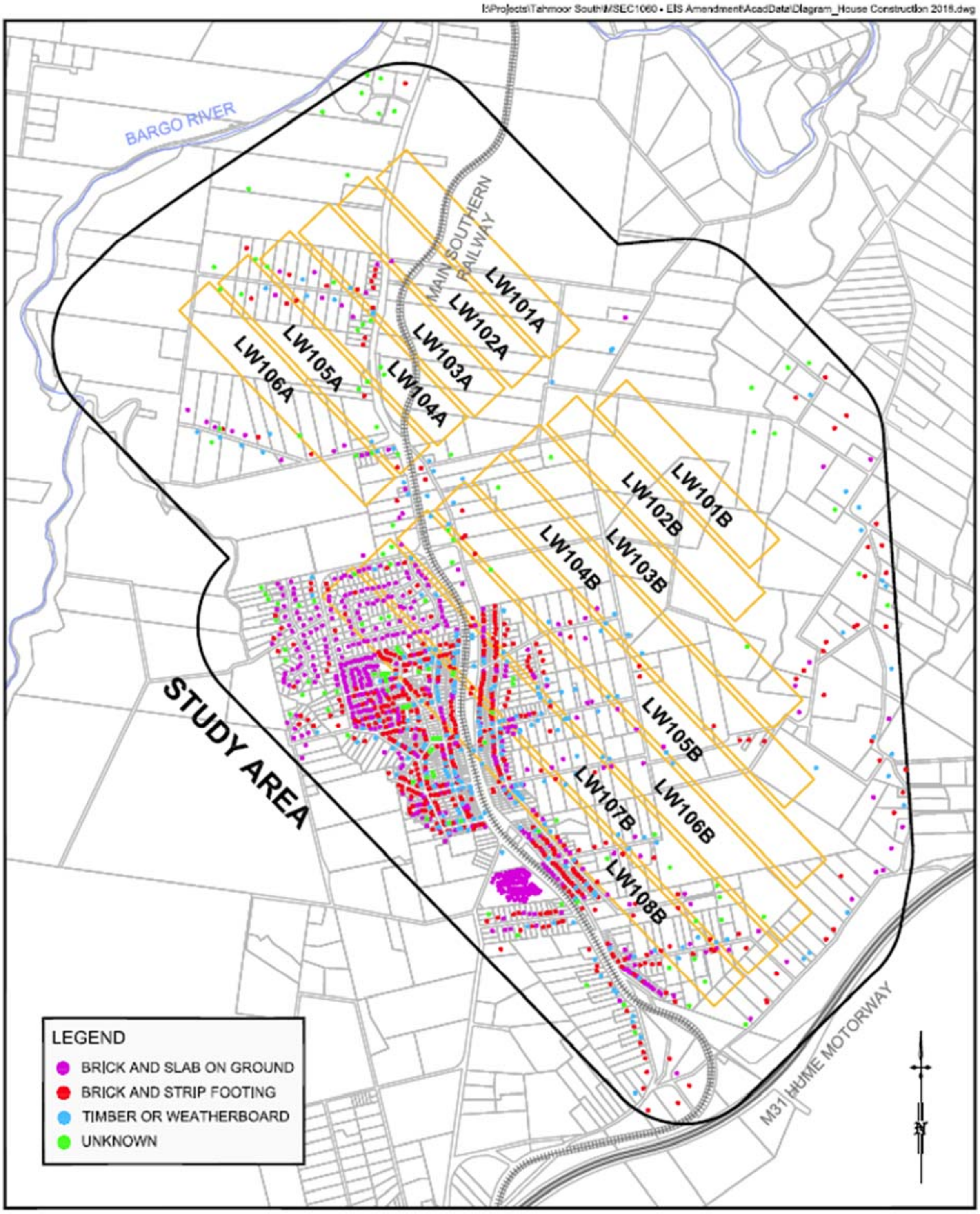


Fig. 11.3 Location of houses by construction type

The information on construction types has been undertaken using *Google Street View®* images. It is likely that some houses will be renovated or rebuilt before the proposed longwalls are extracted. As shown in Table 11.2, construction types of approximately 9 % of houses could not be determined from the street.

As discussed in Section 11.1.3 and in Appendix C, construction type is an input parameter to the probabilistic method of assessment of impacts. Where the construction type could not be determined from the street, impact assessments have been undertaken with houses assigned as brick or brick-veneer constructed on strip footings. This is a conservative approach as houses on strip footings have been observed to be more susceptible to impacts than other construction types, as discussed in Appendix C.

Age of houses

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 *Subsidence Study Area* in 2013. A Nearmap image taken in 2017 was used to identify new houses with the *Subsidence Study Area*.

A map showing the spatial distribution of structures by house age is provided in Fig. 11.5. The older houses are generally located near the Bargo Railway Station.

A histogram showing the distribution of houses by age is shown in Fig. 11.4.

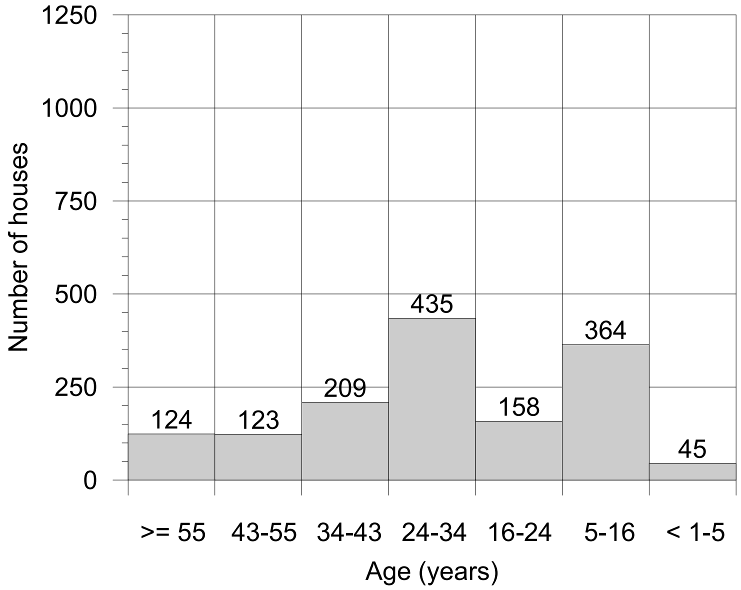


Fig. 11.4 Distribution of Houses by Age as at 2017

It can be seen from Fig. 11.4 that, as at 2017, the greatest proportion of houses were constructed 24 to 34 years prior between 1984 and 1994, and 5 to 16 years prior between 2002 and 2013.

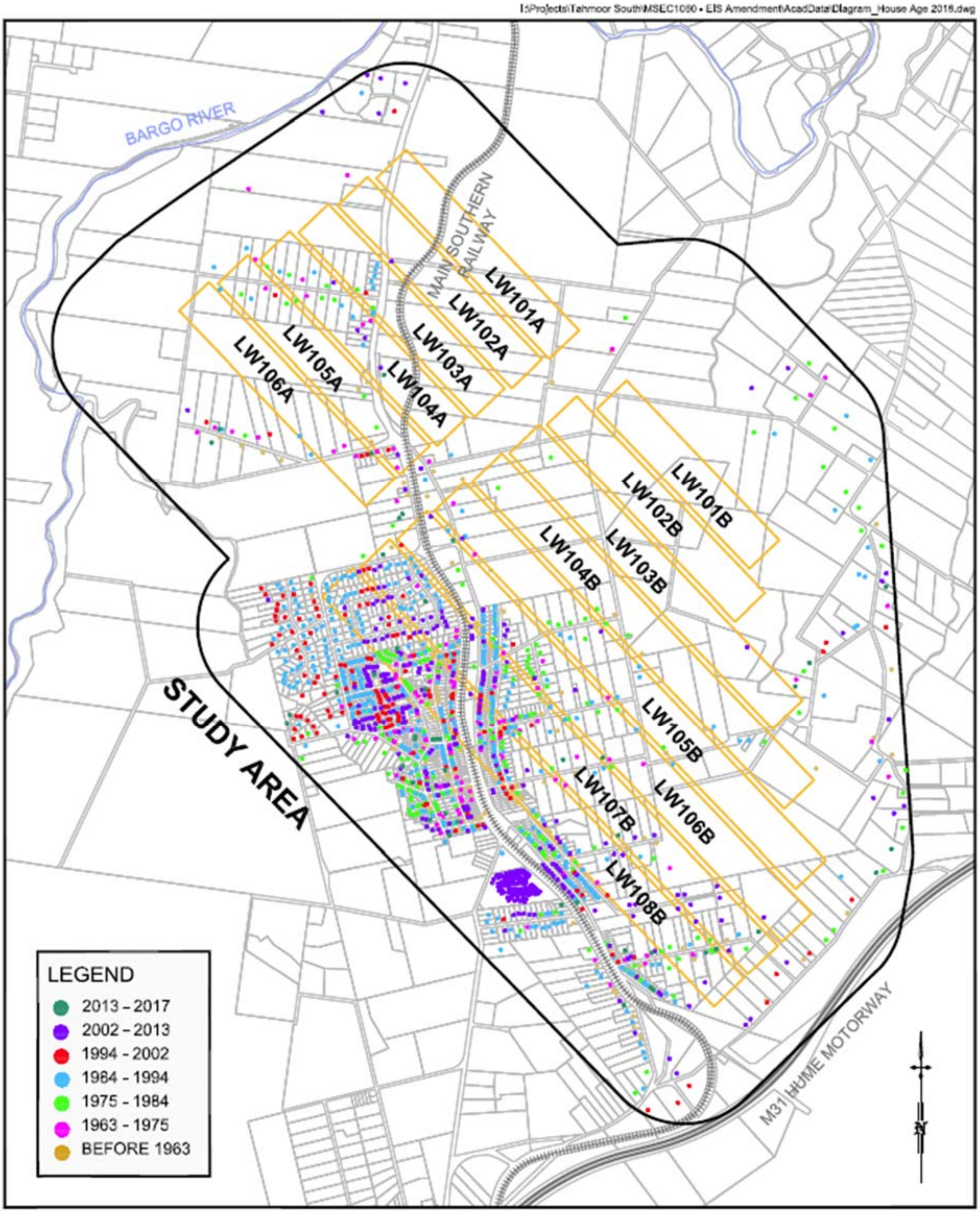


Fig. 11.5 Location of houses by age

11.1.2. Predictions for the houses

Predictions of conventional subsidence, tilt and curvature have been made at the centroid and at the vertices of each house, as well as eight equally spaced points placed radially around the centroid and vertices at a distance of 20 metres. In the case of a rectangular shaped structure, predictions have been made at a minimum of 45 points within and around the structure.

A summary of the maximum predicted values of conventional subsidence, tilt and curvature for each house within the *Subsidence Study Area*, resulting from the extraction of the proposed longwalls, is provided in Table D.03, in Appendix D. The predictions are based on the extraction of the proposed amended longwall layout, as shown in Drawing No. MSEC1060-19. The predicted tilts provided in this table are the maxima in any direction after the completion of each of the proposed longwalls. The predicted curvatures are the maxima in any direction at any time during or after the extraction of each of the proposed longwalls.

Distributions of the predicted conventional subsidence parameters for the houses within the *Subsidence Study Area* are illustrated in Fig. 11.6, Fig. 11.7 and Fig. 11.8 below.

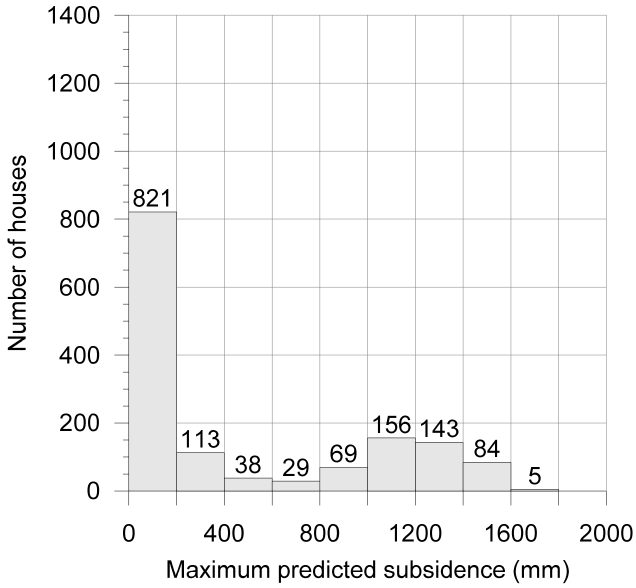


Fig. 11.6 Maximum predicted conventional subsidence for the houses within the Subsidence Study Area

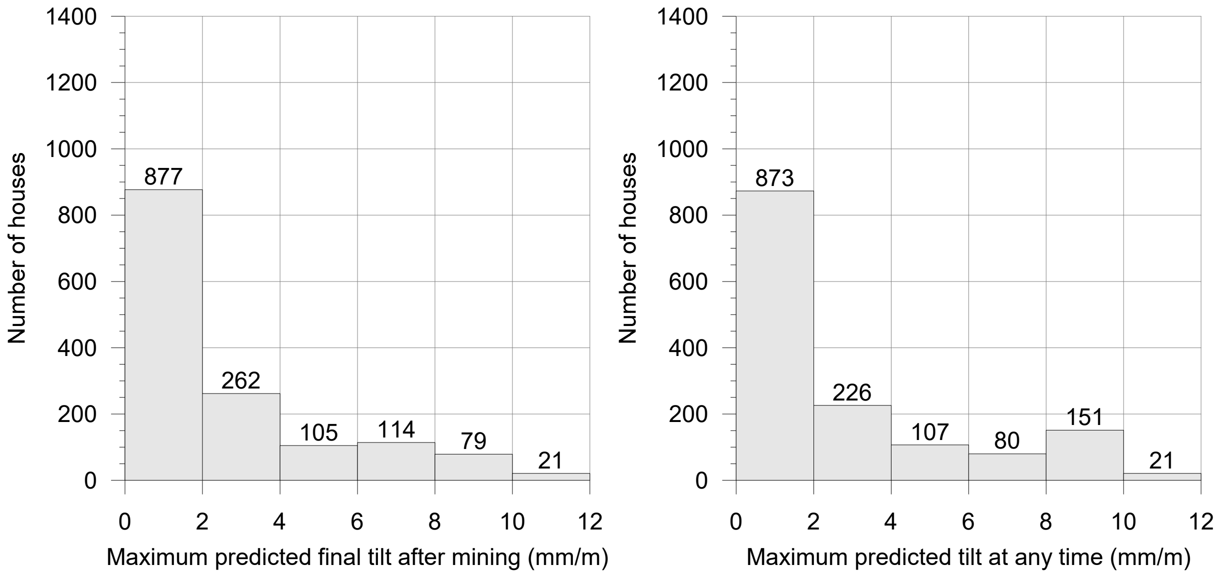


Fig. 11.7 Maximum predicted conventional tilts after the extraction of all longwalls (left) and maximum predicted conventional tilts after the extraction of any longwall (right)

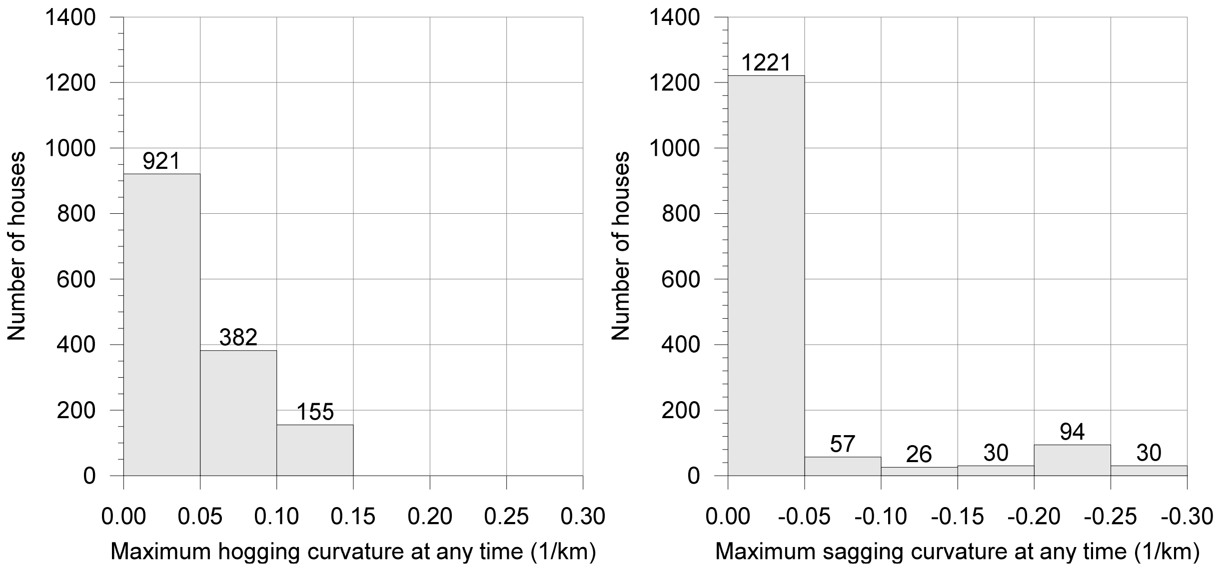


Fig. 11.8 Maximum predicted conventional hogging curvature (left) and sagging curvature (right) for the houses within the Subsidence Study Area

The maximum predicted conventional strains for the houses, based on applying a factor of 15 to the maximum predicted conventional curvatures, are 2.0 mm/m tensile and 4.2 mm/m compressive. Non-conventional movements can also occur as a result of, among other things, anomalous movements. The analysis of strains provided in Chapter 4 includes those resulting from both conventional and non-conventional anomalous movements.

The houses are at discrete locations and, therefore, the most relevant distributions of strain are the maximum strains measured in individual survey bays from previous longwall mining. An analysis of strains in survey bays during the mining of previous longwalls in the Southern Coalfield is discussed in Section 4.3.1. The results for survey bays located above goaf are provided in Fig. 4.2 and the results for survey bays located above solid coal are provided in Fig. 4.3.

If the longwalls were shifted to the north, south, east or west, or reorientated to varying angles, the predicted movements for each house would increase or decrease, depending on their position relative to the longwalls, but the overall levels of movement at the houses across the *Subsidence Study Area* would generally not change dramatically. An exception would be if the longwalls are shifted southwest within the *Extent of Longwalls* boundary, as the proposed longwall mining area partially mines directly beneath the township of Bargo. Shifting the longwall mining area in this direction would increase the total number of houses that are directly mined beneath.

11.1.3. Impact assessments for the houses

The following sections provide the impact assessments for the houses within the *Subsidence Study Area*.

Potential impacts resulting from vertical subsidence

Vertical subsidence does not directly affect the stability or serviceability of houses. The potential for impacts on houses is affected by differential subsidence, which includes tilt, curvature and strain, and the impact assessments based on these parameters are described in the following sections.

Vertical subsidence in this case, however, could affect the heights of some the houses above the flood level. The potential impacts on the houses resulting from the changes in flood level from the proposed mining has been assessed as part of the flood model, which is described in the surface water report by Hydro Engineering and Consulting (2020a).

Potential impacts resulting from tilt

It has been found from past longwall mining experience that tilts of less than 7 mm/m generally do not result in any substantial impacts on houses. Some minor serviceability impacts can occur at these levels of tilt, including door swings and issues with roof gutter and wet area drainage, all of which can be remediated using normal building maintenance techniques. Tilts greater than 7 mm/m can result in greater serviceability impacts which may require more substantial remediation measures, including the relevelling of wet areas or, in some cases, the relevelling of the building structure.

The predicted maximum tilts are less than 7 mm/m at 1299 of the houses within the *Subsidence Study Area* (i.e. 89 % of the total) at the completion of mining. It is expected that only minor serviceability impacts would occur at these houses, as the result of tilt, which could be remediated using normal building techniques.

The predicted maximum tilts are between 7 mm/m and 10 mm/m at 138 houses (i.e. 9 % of the total) and are approximately 10 mm/m at 21 houses (i.e. 1 % of the total) at the completion of mining. The maximum predicted tilt for the houses is 10 mm/m (i.e. 1.0 %, or 1 in 100). 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 *Subsidence Study Area* is provided in Fig. 11.9.

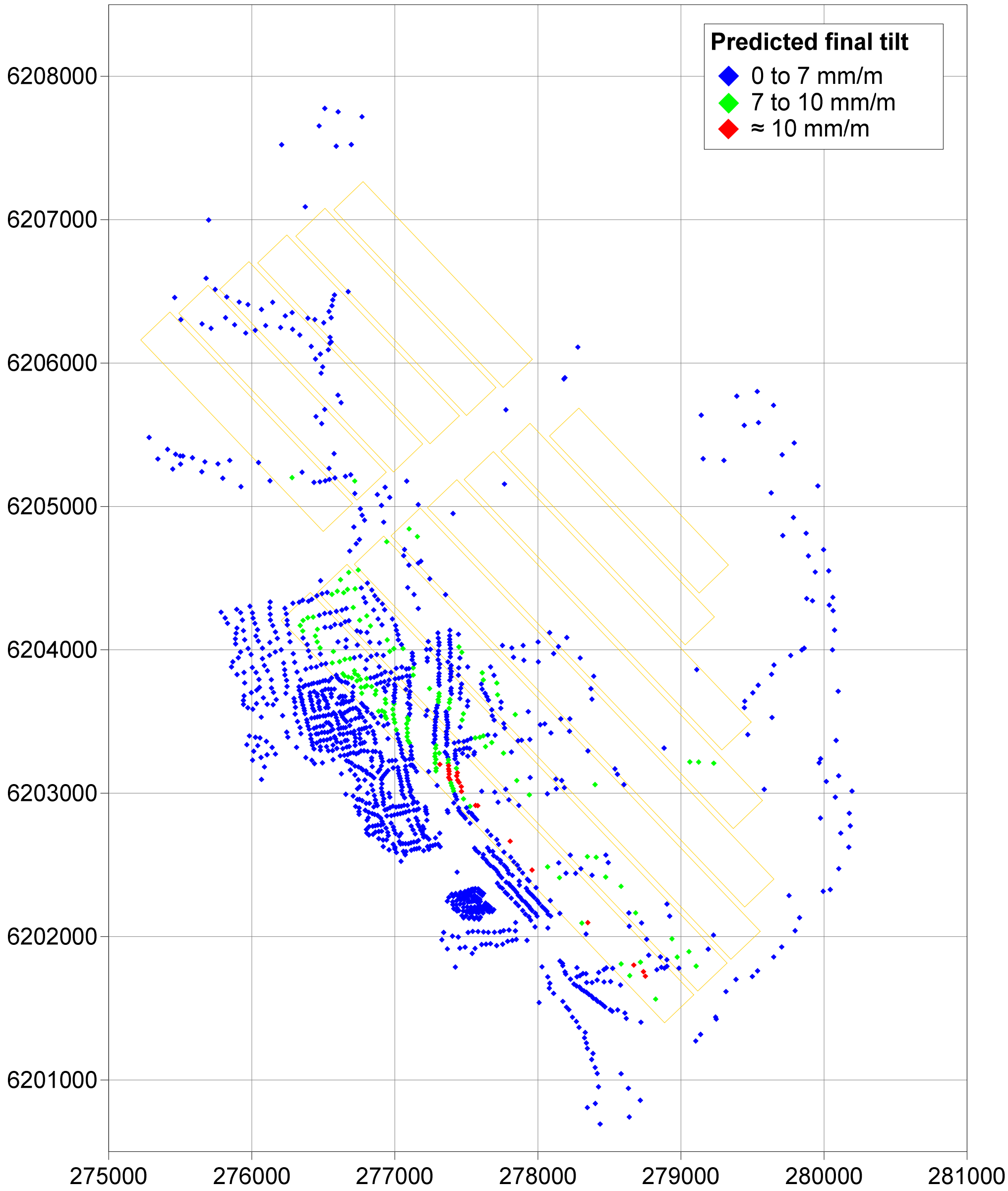


Fig. 11.9 Distribution of predicted final tilts for the houses at the completion of mining

It can be seen from the above figure, that the greatest predicted final tilts occur adjacent to the maingates of the proposed Longwalls 107B and 108B. In this case, there are nine longwalls which will be extracted prior to the extraction of these two longwalls, which will provide the opportunity to review the observed versus predicted tilts.

Houses located above previously extracted longwalls at Tahmoor have experienced mining-induced tilts within the predicted range for the Amended Layout. This includes tilts at magnitudes of 10 mm/m and greater, which were observed above Tahmoor Mine Longwall 24A and above the south-eastern ends of Longwalls 25 and 26, in the areas of increased subsidence. To date, there have been very few claims to SA NSW for impacts on houses as a result of mining induced tilt. Claims in these areas have mainly been based on impacts resulting from mining induced curvatures or strains.

The distribution of measured tilts for the survey bays located in the area of increased subsidence above Longwalls 24B, 25 and 26, is provided in Fig. 11.10. A gamma function has also been fitted to the observed data which is shown by the blue curve.

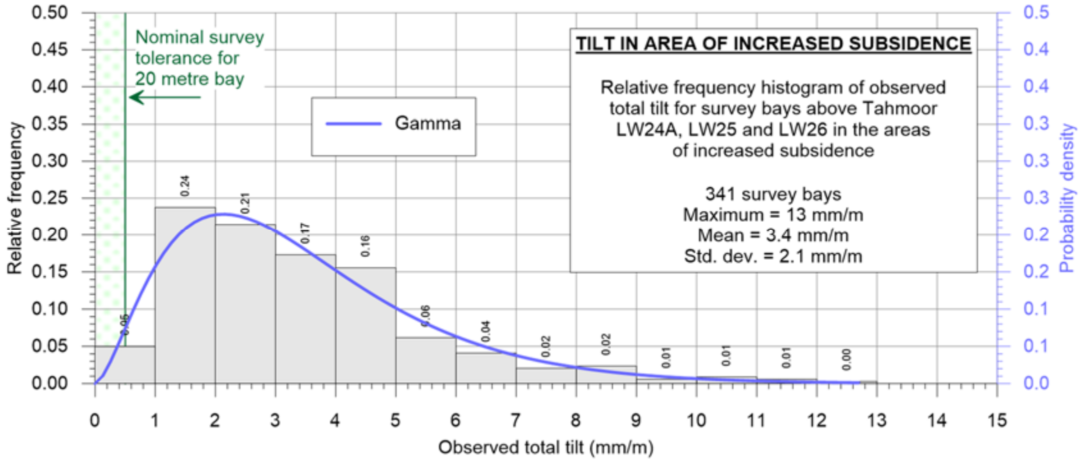


Fig. 11.10 Distribution of measured tilts for survey bays located in the areas of increased subsidence above Tahmoor Mine longwalls 24A, 25 and 26

It can be seen from the above figure, that the maximum observed total tilt for the survey bays in the areas of increased subsidence was 13 mm/m, which is greater than the maximum predicted tilt at the houses within the *Subsidence Study Area*. Similarly, the average observed tilt for the survey bays was 3.4 mm/m, which is greater than the average predicted final tilt for the houses within the *Subsidence Study Area* of 2.3 mm/m.

The standard deviation of the observed tilt for the survey bays in the areas of increased subsidence was 2.1 mm/m, which is less than the standard deviation of the predicted final tilt for the houses within the *Subsidence Study Area* of 2.8 mm/m. This is predominantly due to a high proportion of the predicted tilts for the houses within the *Subsidence Study Area* are at the low end, i.e. less than 2 mm/m, as these include the houses located outside the extents of the proposed longwalls.

The range of predicted tilts for the houses within the *Subsidence Study Area*, therefore, is similar to that observed above previously extracted longwalls at Tahmoor Mine, including Longwall 24A and above the south-eastern ends of Longwalls 25 and 26, in the areas of increased subsidence. It is expected that the incidence of claims for impacts resulting from the mining induced tilt would be low, due to the extraction of the proposed longwalls, as was previously experienced in the areas of increased subsidence.

It is expected that, in all cases, the houses within the *Subsidence Study Area* will remain in safe and serviceable conditions as the result of the mining induced tilts as tilts by themselves rarely impact on the stability of building structures at the levels that are predicted to occur.

Potential impacts resulting from curvature and strain

It has been found from past longwall mining experience that the majority of mining-induced impacts on houses are a result of curvature and strain.

There are 1303 houses within the *Subsidence Study Area* (i.e. 89 % of the total) that are predicted to experience hogging curvatures less than 0.10 km^{-1} and 1278 houses (i.e. 88 % of the total) that are predicted to experience sagging curvatures less than 0.10 km^{-1}, which represent minimum radii of curvature of 10 kilometres.

The maximum predicted curvatures for the houses within the *Subsidence Study Area* are 0.13 km^{-1} hogging and 0.28 km^{-1} sagging, which represent minimum radii of curvature of 7.7 kilometres and 3.6 kilometres, respectively.

The distribution of predicted curvatures for the houses within the *Subsidence Study Area* is provided in Fig. 11.11.

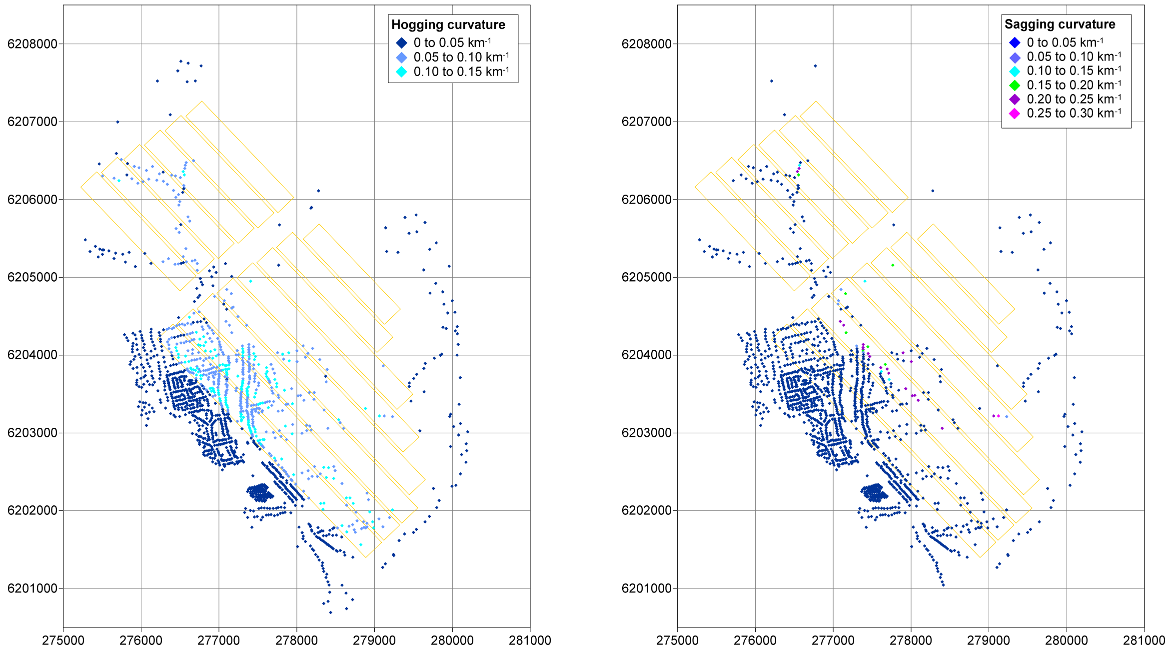


Fig. 11.11 Distribution of predicted hogging curvatures (left) and sagging curvatures (right) for houses at the completion of mining

The above figure shows that the greatest predicted curvatures occur directly above the proposed Longwalls 107B and 108B. In this case, there are nine longwalls which will be extracted prior to the extraction of these two longwalls, which will provide the opportunity to review the observed versus predicted curvatures and associated impacts.

Houses located above previously extracted longwalls at Tahmoor have experienced mining-induced curvatures within the predicted range for the Amended Layout. This includes curvatures greater than 0.10 km^{-1}, which were observed above Tahmoor Mine Longwall 24A and above the south-eastern ends of Longwalls 25 and 26, in the areas of increased subsidence. The distributions of measured hogging and sagging curvatures for the survey bays located in the area of increased subsidence above Longwall 24A, Longwalls 25 and 26, is provided in Fig. 11.12. Generalised Pareto Distributions (GDPs) have also been fitted to the observed data which are shown by the blue curves.

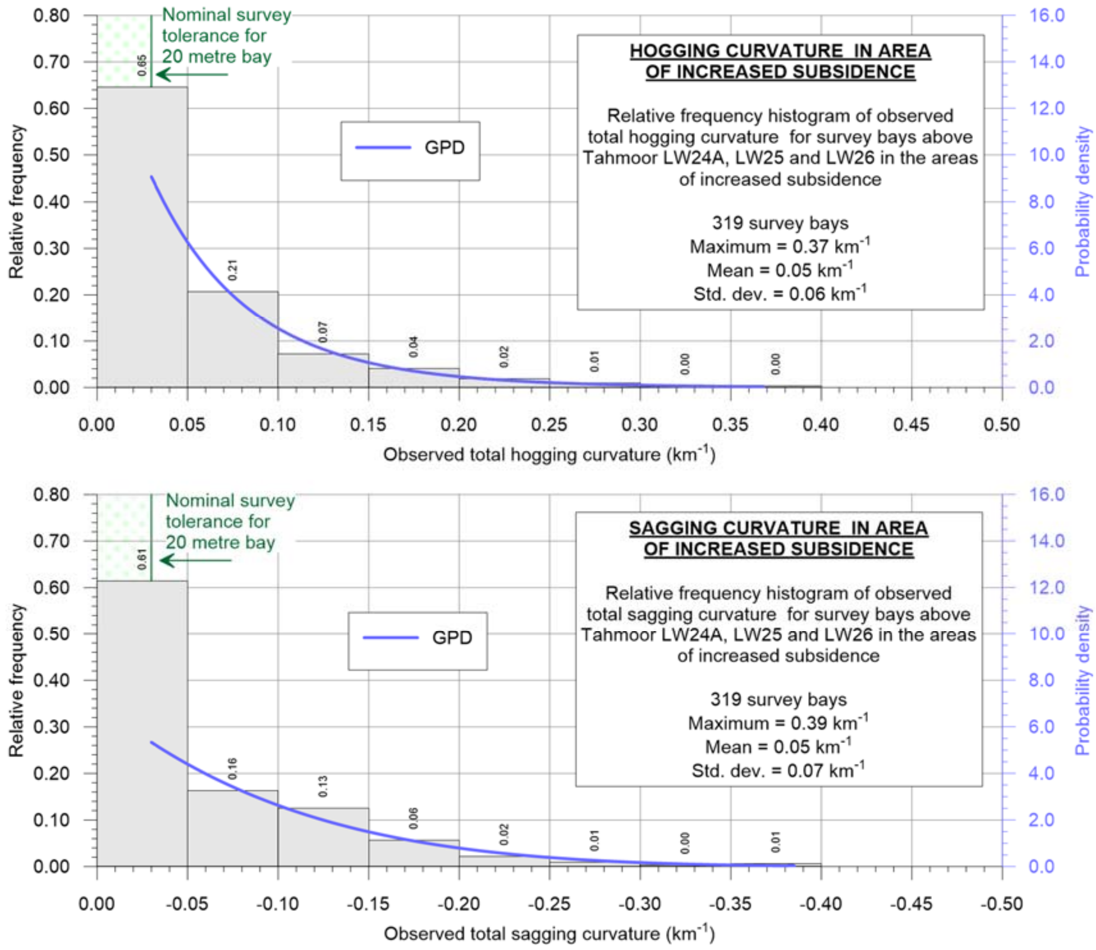


Fig. 11.12 Distributions of measured curvatures for survey bays located in the areas of increased subsidence above Tahmoor Mine longwalls 24A, 25 and 26

It can be seen from the above figure, that the maximum observed total curvatures for the survey marks in the areas of increased subsidence were 0.37 km^{-1} hogging and 0.39 km^{-1} sagging, which are greater than the maximum predicted curvatures at the houses within the *Subsidence Study Area* of 0.13 km^{-1} hogging and 0.28 km^{-1} sagging. The average observed curvatures for the survey marks was 0.05 km^{-1} for both hogging and sagging, which is greater than the average predicted curvatures for the houses within the *Subsidence Study Area* of 0.03 km^{-1} hogging and 0.04 km^{-1} sagging.

It can also be seen from the above figure, that the standard deviations of the observed curvatures for the survey marks in the areas of increased subsidence were 0.06 km^{-1} hogging and 0.07 km^{-1} sagging, which are similar to or greater than the standard deviations of the predicted curvatures for the houses within the *Subsidence Study Area* of 0.03 km^{-1} hogging and 0.04 km^{-1} sagging.

The range of predicted curvatures for the houses within the *Subsidence Study Area*, therefore, are similar to those observed above previously extracted longwalls at Tahmoor Mine, including Longwall 24A and above the eastern ends of Longwalls 25 and 26 in the areas of increased subsidence. It is expected, therefore, that the incidence of claims for impacts resulting from the mining induced curvature and strain for the proposed longwalls would be similar to those previously experienced in the areas of increased subsidence. The methods for predicting and assessing impacts on building structures have developed over time as knowledge and experience has grown. MSEC has provided predictions and impact assessments for the houses within the *Subsidence Study Area* using the latest methods available at the time of writing.

Building structures have been directly mined beneath at a number of collieries throughout the NSW Coalfields. The experience gained has provided substantial information that has been used to continually development of the methods of impact assessment for houses. The assessments provided in this report are based on the latest research, which is summarised in Appendix C.

Trend analyses following the mining of Tahmoor Mine Longwalls 22 to 29 indicate that the chance of impact is higher for the following houses:-

- Houses predicted to experience higher strains and curvatures,
- Houses with masonry walls,
- Masonry walled houses that are constructed on strip footings,
- Larger houses, and
- Houses with variable foundations, such as those with extensions added.

The probabilities of impacts for each house within the *Subsidence Study Area* have been assessed using the method developed as part of ACARP Research Project C12015 (Waddington, 2009) and it has been updated based on observations of impacts at Tahmoor up to 2016 when the extraction of Longwall 29 was completed. This method uses the primary parameters of ground curvature and type of construction and is described in Appendix C. The parameter of strain is indirectly used in this method due to its relationship with curvature. A summary of the predicted movements and the assessed impacts for each house within the *Subsidence Study Area* is provided in Table D.03, in Appendix D.

The overall distribution of the assessed impacts for the houses within the *Subsidence Study Area* is provided in Table 11.4. The assessed impacts have been determined based on the existing construction type of each house, as described in Section 11.1.1. The construction type could not be determined from the street for approximately 9 % of houses within the *Subsidence Study Area*. In these cases, impact assessments have been undertaken with houses assigned as brick or brick-veneer construction on strip footings. This is a conservative approach as houses on strip footings have been observed to be more susceptible to impacts than other construction types, as discussed in Appendix C.

Table 11.4 Assessed impacts for houses within the *Subsidence Study Area*

Group	Repair category			
	No Claim or R0	R1 or R2	R3 or R4	R5
All houses (total of 1,458)	1118 (77 %)	234 (16 %)	86 (6 %)	20 1 %)
Directly above proposed longwalls (total of 571)	308 (54 %)	172 (30 %)	73 (13 %)	18 (3 %)
Directly above solid coal (total of 887)	810 (91 %)	62 (7 %)	13 (1 %)	2 (< 0.5 %)

In comparison, extensive data has come from the extraction of Tahmoor Mine Longwalls 22 to 29, where approximately 1,900 houses have experienced mine subsidence movements. A summary of the observed distribution of impacts for all houses within a 35° angle of draw of previously extracted Longwalls 22 to 29 as at 2016 is provided in Table 11.5.

Table 11.5 Observed frequency of impacts for building structures resulting from the extraction of Tahmoor Mine longwalls 22 to 29

Group	Repair category			
	No Claim or R0	R1 or R2	R3 or R4	R5
All houses within 35 degree angle of draw of LWs 22 to 29 (total of 1890)	1430 (76 %)	329 (17 %)	111 (6 %)	20 (1 %)
All houses, located directly above LWs 24A to 27 in Zone of Increased Subsidence (total of 432)	235 (54 %)	128 (30 %)	55 (13 %)	14 (3 %)

Whilst the overall assessed distribution of impacts within the *Subsidence Study Area* are similar to those previously experienced during the mining of Longwalls 22 to 29, the comparison is not straight-forward because a large number of houses within the *Subsidence Study Area* are located to the side of proposed Longwall 108B.

As discussed previously, the range of predicted curvatures for the houses within the *Subsidence Study Area* are similar to or less than those observed above Tahmoor Mine Longwalls 24A to 27 within the observed zone of increased subsidence.

When the assessed distribution of impacts for the houses located directly above the proposed longwalls (second row of Table 11.4) are compared with the observed distribution of impacts of houses and major civil structures located directly above Longwalls 24A to 27 within the zone of increased subsidence (bottom row of Table 11.5), it can be seen that these are reasonably similar.

As mentioned earlier, the assessed impacts have been undertaken based on the existing construction type of each house. It is recognised that houses may be rebuilt in the future before the proposed mining occurs. The proportion of houses impacted by mining would, for example, increase if a greater proportion of houses are constructed directly above the proposed longwalls, or if a greater proportion of houses are constructed with brick walls rather than timber-framed weatherboard style structures.

The most vulnerable style of house affected by mine subsidence movements above Tahmoor Mine Longwalls 22 to 29 were constructed as brick or brick-veneer houses on strip footings. In a hypothetical scenario that all houses directly above the proposed longwalls were constructed with brick walls on strip footings, the assessed proportion of houses requiring repairs would increase by approximately 8 % when compared to the assessment based on the existing structure types. The proportion of houses assessed to require Category R1 or R2 repairs would increase from 30 % to 33 %, Category R3 or R4 repairs would increase from 13 % to 15 % and Category R5 repairs would increase from 3 % to 6 %.

Severe impacts have previously occurred as a result of substantial non-conventional movements and in plateau areas away from incised valleys, such as where the houses are located within the *Subsidence Study Area.* The precise location of non-conventional movements cannot be predicted prior to mining. The impacts, however, develop gradually such that they can be detected early and repairs can be undertaken incrementally to ensure that the houses remain safe and serviceable during mining.

As noted in Appendix C, at the time of writing ACARP Research Project C12015 (Waddington, 2009), the observed proportion of houses where the Mine Subsidence Board (MSB, now SA NSW) and affected landowners had agreed to rebuild rather than repair, i.e. Category R5 impacts was less than 0.5 %. Since the publication of the research report, the proportion of houses where a decision has been made to rebuild has increased to approximately 1.1 % overall and 3.2 % above Longwalls 24A to 27 within the observed zone of increased subsidence.

The observed proportion of houses with Category R1 to R4 impacts have also increased since the original ACARP study. This is partly due to the time lag effect between the mining impact, when damage is claimed by residents and when the nature and level of the damage requiring repairs is assessed in detail by SA NSW. The latest review includes observations up to the end of Longwall 29 in 2016, which was approximately two years after the completion of Longwall 27 and one year after the completion of Longwall 28, which was the last panel to directly mine beneath the urban areas of Tahmoor.

The primary risk associated with mining beneath houses is public safety. Residents have not been exposed to immediate and sudden safety hazards as a result of impacts that occur due to mine subsidence movements in the NSW Coalfields, where the depths of cover were greater than 350 metres, such as the case above the proposed longwalls. This includes the recent experience at Tahmoor Mine, which has affected more than 1,950 houses, and the experiences at Appin, Teralba, West Cliff and West Wallsend Collieries, which have affected around 500 houses.

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 temporarily relocate residents.

All houses within the *Subsidence Study Area* are expected to remain safe and repairable throughout the mining period, provided that effective management measures are adopted during mining and these are described in Section 11.1.7.

11.1.4. Future development of houses within the *Subsidence Study Area*

Wollondilly Shire Council (2011) has planned for future urban expansion at Bargo township in the order of an additional 2000 dwellings prior to 2036. The proposed areas of expansion are provided in a report by Council and a map is reproduced in Fig. 11.13.

It is noticed that the majority of the planned areas of expansion are located directly above the proposed longwall mining area.

A simulation exercise has been undertaken to forecast the potential impacts if an additional 2000 houses are present when the proposed longwalls are extracted. The locations of the 2000 additional houses are shown in Fig. 11.14, of which 1930 are located within the *Subsidence Study Area* and 1509 are located directly above the proposed longwall mining area.

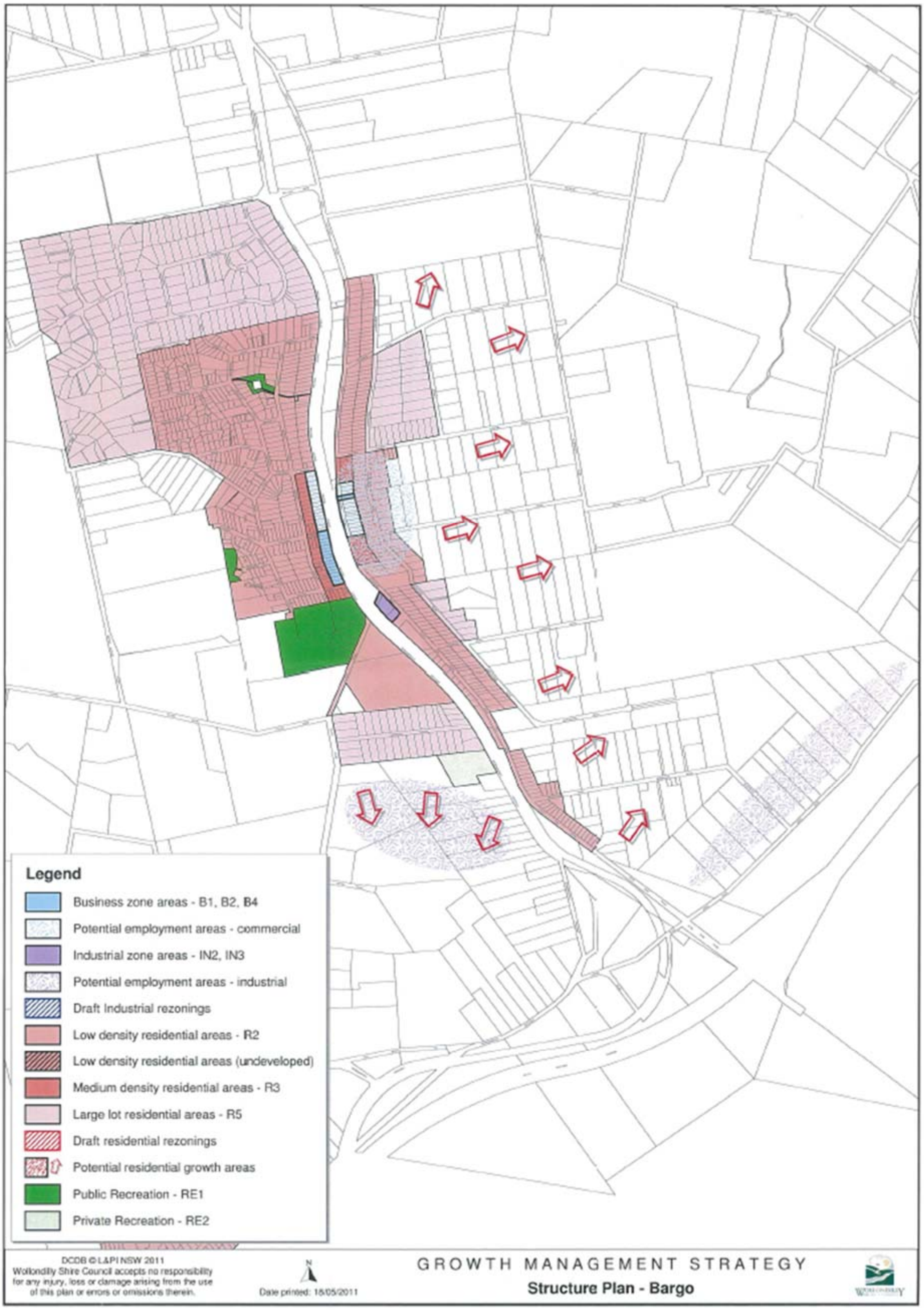
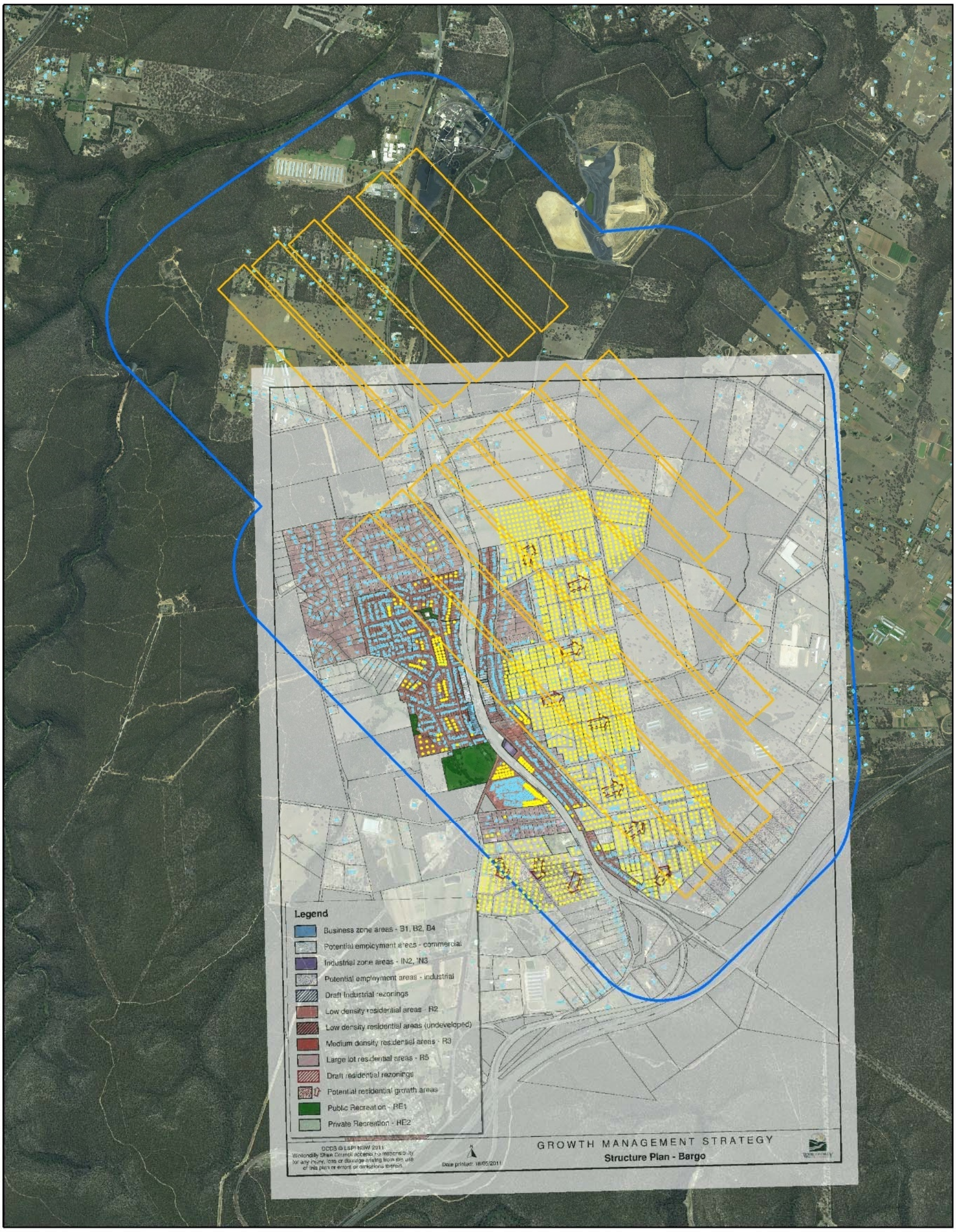


Fig. 11.13 Wollondilly Shire Council Growth Management Strategy



Photograph courtesy Tahmoor Coal

Note: Additional houses are shown as yellow dots on the above image.

Fig. 11.14 Map showing locations of additional houses included as part of simulation exercise

Distributions of the predicted conventional subsidence parameters for the 2000 additional houses in the simulation are illustrated in Fig. 11.15, Fig. 11.16 and Fig. 11.17 below.

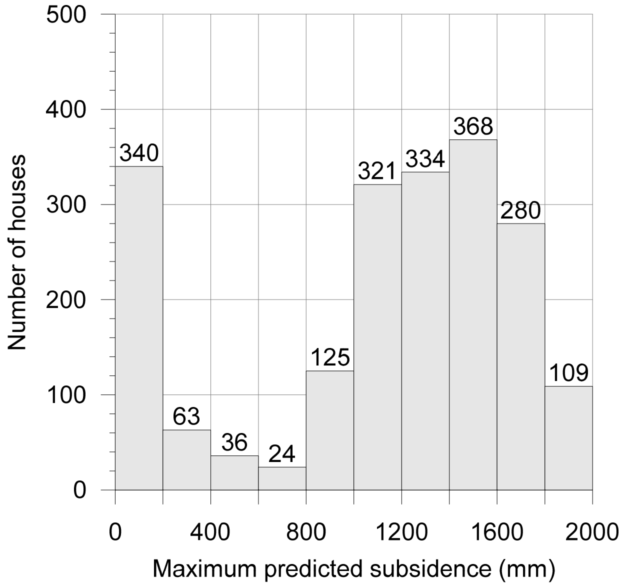


Fig. 11.15 Maximum predicted conventional subsidence for the simulated additional future houses

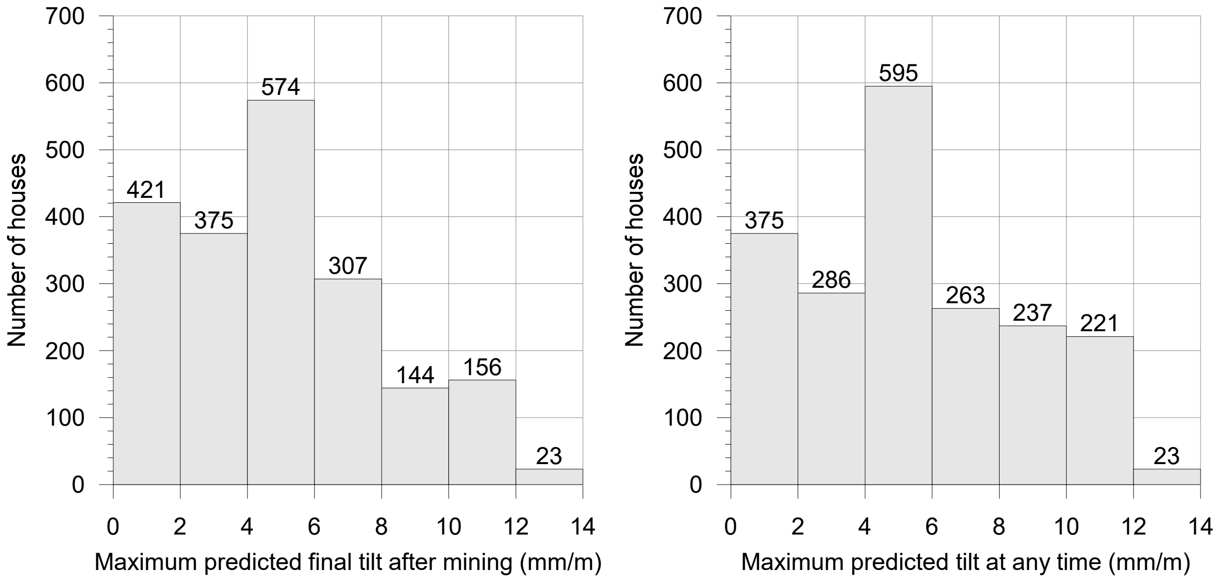


Fig. 11.16 Maximum predicted conventional tilts after the extraction of all longwalls (left) and maximum predicted conventional tilts after the extraction of any longwall (right) for the simulated additional future houses

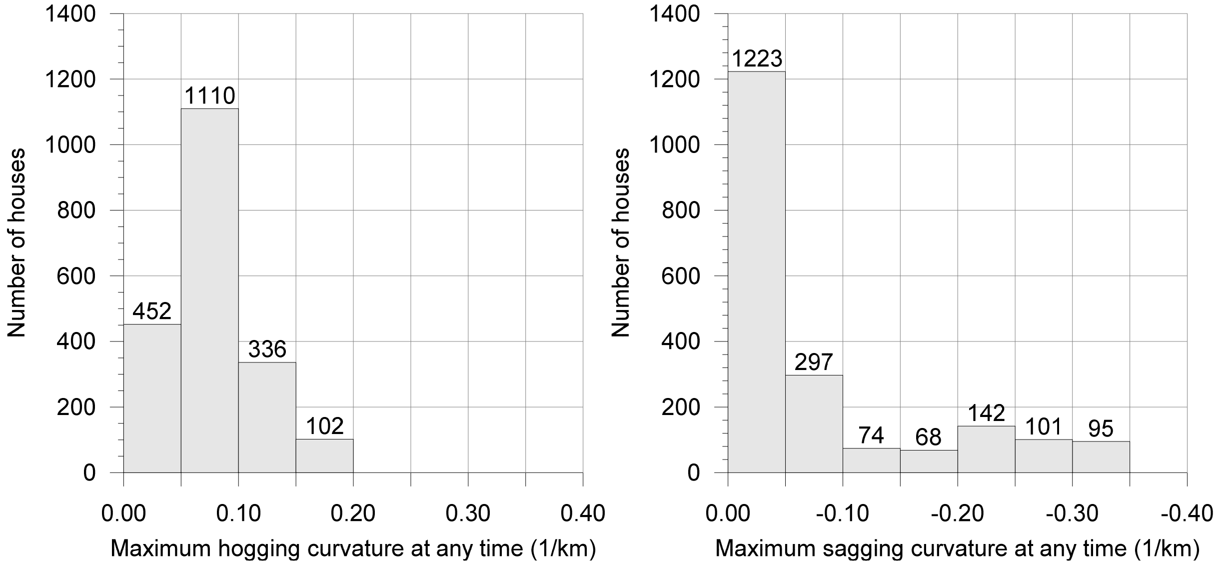


Fig. 11.17 Maximum predicted conventional hogging curvature (left) and sagging curvature (right) for the simulated additional future houses

The probabilities of impacts for each additional house in the simulation have been assessed using the method developed as part of ACARP Research Project C12015 (Waddington, 2009), and updated based on the observations of impacts at Tahmoor up to 2016, which is described in Appendix C.

The overall distribution of the assessed impacts for the additional 2000 houses in the simulation is provided in Table 11.6. The assessed impacts have been undertaken with all houses assigned as brick on strip footings. This is a conservative approach as houses on strip footings have been observed to be more susceptible to impacts than other construction types, as discussed in Appendix C.

Table 11.6 Assessed impacts for the additional houses in the simulation of Growth Management Strategy

Group	Repair Category			
	No Claim or R0	R1 or R2	R3 or R4	R5
All additional houses (total of 2.000)	1153 (58 %)	525 (26 %)	236 (12 %)	86 (4 %)
Additional houses directly above proposed longwalls (total of 1509)	707 (47 %)	490 (32 %)	228 (15 %)	85 (6 %)
Additional houses above solid coal (total of 491)	446 (91 %)	35 (7 %)	9 (2 %)	1 (< 0.5 %)

If the additional 2000 houses are added to the existing houses within the Subsidence Study Area, the overall distribution of assessed impacts would be as shown in Table 11.7.

Table 11.7 Combined assessed impacts for the existing houses and additional houses in the simulation of Growth Management Strategy

Group	Repair category			
	No Claim or R0	R1 or R2	R3 or R4	R5
All additional houses (total of 3458)	2271 (66 %)	759 (22 %)	322 (9 %)	106 (3 %)
Additional houses directly above proposed longwalls (total of 2080)	1015 (49 %)	662 (32 %)	301 (14 %)	103 (5 %)
Additional houses above solid coal (total of 1378)	1256 (91 %)	97 (7 %)	21 (2 %)	3 (< 0.5 %)

It can be seen from Table 11.7 that the overall distribution of impacts within the Subsidence Study Area will increase if additional houses are constructed in accordance with the current Growth Management Strategy. This is because there is a greater proportion of potential future houses that are located directly above the proposed longwall mining area within the Subsidence Study Area than currently exists.

11.1.5. Impact assessments for the houses based on increased predictions

If the actual tilts exceeded those predicted by a factor of 2 times, the maximum tilts would be less than 7 mm/m at 1064 of the houses within the *Subsidence Study Area* (i.e. 73 % of the total) at the completion of mining. It would still be expected that only minor serviceability impacts would occur at these houses, as the result of tilt, which could be remediated using normal building techniques.

The maximum tilts would be between 7 mm/m and 10 mm/m at 134 houses (i.e. 9 % of the total) and would be greater than 10 mm/m at 260 houses (i.e. 18 % of the total) at the completion of mining. It would be expected that greater serviceability impacts would occur at these houses which would require more substantial remediation measures including, in some cases, relevelling of the building structures.

It is expected that, in all cases, the houses within the *Subsidence Study Area* would remain in safe conditions as the result of the mining induced tilts.

If the actual curvatures exceeded those predicted by a factor of 2 times, then 915 houses within the *Subsidence Study Area* (i.e. 63 % of the total) would be expected to experience hogging curvatures no greater than 0.10 km^{-1} and experience sagging curvatures no greater than 0.15 km^{-1}. The range of curvatures at these houses, therefore, would still be similar to that observed above Tahmoor Mine Longwalls 22 to 29, outside the areas of increased subsidence.

If the actual curvatures exceeded those predicted by a factor of 2 times, then 1332 houses within the *Subsidence Study Area* (i.e. 91 % of the total) would be expected to experience hogging curvatures no greater than 0.37 km^{-1} and experience sagging curvatures no greater than 0.39 km^{-1}. The range of predicted curvatures at these houses, therefore, would still be similar to that observed for the houses above Tahmoor Mine Longwalls 24A to 27 within the observed zone of increased subsidence.

The increased curvatures and strains would result in a greater proportion of houses being impacted and greater levels of impact. Based on previous experience, it would still be expected that the houses would remain in safe conditions. The impacts will develop gradually such that they can be detected early and repairs can be undertaken incrementally to ensure that the houses remain safe and serviceable during mining.

11.1.6. Comparison to predictions and assessments provided based on the EIS Layout

A summary comparison between maximum predicted conventional subsidence, tilt and curvature at houses between the EIS Layout and Amended Layout is shown in Table 11.8.

Table 11.8 Maximum Predicted Total Conventional Subsidence, Tilt and Curvature at Houses resulting from the extraction of the EIS Layout and Amended Layout

Layout	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})
Amended Layout (MSEC1060)	1,650	10	0.13	0.28
EIS Layout (MSEC997)	1,900	13	0.17	0.33

It can be seen that the predicted maximum total conventional subsidence, tilt and curvatures due to the extraction of the Amended Layout are less than the predicted maxima from the EIS Layout. The reasons are due to both the proposed reduction in panel width and proposed reduction in extraction heights.

It should be noted though that, whilst the overall predicted total subsidence, tilt and curvatures at the houses have been reduced significantly by changing the longwall widths, extents and seam extraction thicknesses, predictions at points on the surface directly above the longwalls will be greater or less than predictions previously provided for the EIS Layout for the following reasons:

- There are some houses, mainly around the northwestern ends of LWs 101A to 106A, where the longwall footprint has been extended.

- There are some houses, mainly above the maingate (western) side of previously proposed LW 108, and areas that lie in between the proposed split A and B series panels where the longwall footprint has been reduced.
- As the panel widths have been reduced but pillar widths have remained unchanged, the longwalls in the Amended Layout are staggered in their positions relative to the EIS Layout. It follows, therefore, that the positions of each house on the surface relative to the proposed longwalls has changed. For example, houses on the surface above the centrelines of longwalls in the Amended Layout may have been previously located directly above a chain pillar, and vice versa.

Specific subsidence predictions have been provided for identified houses later in Table D.03 of this report. Detailed comparisons can be made for each house by comparing this report with Table D.03 in our previous Report No. MSEC997, which is included in Appendix F of the EIS.

A summary comparison between the overall distribution of the assessed impacts at houses between the EIS Layout and Amended Layout is shown in Table 11.9.

Table 11.9 Assessed impacts for houses resulting from the extraction of the EIS Layout and Amended Layout

Layout	Group	Repair Category			
		No Claim or R0	R1 or R2	R3 or R4	R5
Amended Layout (MSEC1060)	All houses (total of 1,458)	1118 (77 %)	234 (16 %)	86 (6 %)	20 1 %)
	Directly above proposed longwalls (total of 571)	308 (54 %)	172 (30 %)	73 (13 %)	18 (3 %)
	Directly above solid coal (total of 887)	810 (91 %)	62 (7 %)	13 (1 %)	2 (< 0.5 %)
EIS Layout (MSEC997)	All Houses (total of 1,458)	1019 (70 %)	296 (20 %)	115 (8 %)	28 (2%)
	Directly above proposed longwalls (total of 751)	391 (52 %)	234 (31 %)	100 (13 %)	26 (3%)
	Directly above Solid Coal (total of 707)	628 (89 %)	62 (9 %)	15 (2 %)	2 (<0.5%)

It can be seen from Table 11.9 that the overall distribution of impacts under the Amended Layout has reduced compared to the assessments previously provided for the EIS Layout. The main reason for the reduction is that the mining footprint has been amended such that 180 fewer houses will be directly mined beneath. The majority of these houses are located above previously proposed LWs 107 and 108 within the urban areas of Bargo township.

As the houses are generally predicted to experience less subsidence, tilt and curvature due to the Amended Layout compared to the EIS Layout, it is expected that the overall frequency and severity of impacts would reduce. When a comparison is made in Table 11.9 between the assessed distributions of impacts for houses that will be directly mined beneath, the distributions are slightly less for the Amended Layout compared to the EIS Layout as the predicted subsidence movements are reduced. The differences between the assessed distributions between the Amended and EIS layouts are slight because the magnitude of movements are sufficient to result in a similar outcome. This is best illustrated by the probability curves that have been adopted for this assessment (refer Fig. C.4 in Appendix C of this report), where it can be seen that reductions in predicted curvature by 10 to 20% result in slight changes for houses where predicted curvatures are greater than approximately 0.1 km^{-1}.

Whilst the predicted subsidence movements and assessed distribution of impacts are reduced for the Amended Layout, the recommendations for managing potential impacts to residential structures are unchanged, so that Tahmoor Coal continues its current practice of ensuring that built structures remain safe and serviceable at all times during mining. This is discussed in the next section of this report.

11.1.7. Management of potential impacts on the houses

Tahmoor Mine has extensive experience of mining beneath urban areas. It has developed and acted in accordance with a risk management process to manage potential impacts to residential structures during the mining of Longwalls 22 to 32.

The Subsidence 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. The great majority of structures at Tahmoor and Thirlmere (approximately 80 %) 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 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 Mine and/or SA 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 Mine or SA NSW of significant displacement or deflection well before structural failure will occur.
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 Mine and above other previously extracted longwalls at similar depths of cover. This includes the recent experience at Tahmoor Mine during the mining of Longwalls 22 to 32, which have affected 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 Mine or SA NSW to repair the structure and/or relocate residents before structural failure occurs.

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 undertaken, including site specific investigations, regular surveys and inspections during mining and triggered response measures. The method of management would not change if additional houses are constructed in the future as described in Section 11.1.4.

It is recommended that Tahmoor Coal continues its current practice of ensuring that built structures remain safe and serviceable at all times during mining. It is recommended that Tahmoor Coal, in consultation with landowners, study the potential for impacts on the structures and other infrastructure and develop management measures. The study would require input from structural and subsidence engineers. The risk management process includes the following processes:-

1. Regular consultation, cooperation and coordination with the community before, during and after mining. 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). The 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;

   For properties located directly above the first 300 metres 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 metres of extraction of the longwall.

   The site-specific investigations include the following:

   a) Identification of structures from aerial photographs and 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 each upcoming longwall. The purpose of the inspections is to identify hazards where access has not been granted by the landowner.

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 a longwall, Tahmoor Coal will request access to conduct a pre-mining inspection and hazard identification inspection by a structural engineer;

c) Tahmoor Coal will request 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 each longwall;

d) Tahmoor Coal will 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 may be more sensitive to mine subsidence movements. These include:

   i) Commercial and business establishments, public amenities and public utilities;

   ii) Structures of heritage significance;

   iii) Structures that are located above hidden creeks;

   iv) Structures that are located above mapped geological structures;

   v) Structures that are located on or adjacent to steep slopes or that have been recommended for structural inspection by the 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 located outside the declared Mine Subsidence Districts; and

   viii) Houses and units estimated to have been constructed prior to the declaration of the Bargo Mine Subsidence District (in November 1975).

3. Implementation of pre-mining mitigation measures following inspections by the geotechnical engineer and the structural engineer, in consultation and agreement with the landowner.

4. Surveys and inspections during mining within the active subsidence area:

   a) detailed visual inspections and vehicle-based inspections along the streets;

   b) ground surveys along the streets;

   c) 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;

   d) 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;

   e) visual inspections of pool fences and gates; and

   f) visual inspections of commercial, industrial and business establishments, public amenities and public utilities.

With appropriate management plans in place, it is considered that the houses will remain safe and serviceable at all times during mining for any orientation, extension or shortening of longwalls within the *Extent of Longwalls* boundary, even if actual subsidence movements were greater than the predictions or substantial non- conventional movements occurred.

11.2. Flats or units

There are five unit buildings within the *Subsidence Study Area*. The predictions and impact assessments for the flats and units have been included in the above section on houses. Tahmoor Mine has previously mined directly beneath a number of flats and units during the mining of Longwalls 22 to 32 and the rate of impacts has been similar to those for houses.

11.3. Caravan parks

The Avon Caravan Village is located on Avon Dam Road on the side of the proposed Longwall 108B, as shown in Drawing No. MSEC1060-20.

The Village consists of main office, reception and residential structures and a main amenities block. Many of the sites in the village include permanent and semi-permanent structures such demountable cabins and caravans with secondary metal roofs. There is also a swimming pool in the village.

The structures at the Avon Caravan Village are predicted to experience up to 175 mm of vertical subsidence. If the proposed longwalls are extended to the southwest, within the *Extent of Longwalls* boundary, the structures would experience greater subsidence movements.

Impacts may occur to structures in the Village during mining, particularly to the main structures, pool and external pavements. The demountable cabins and permanent caravans are less susceptible to subsidence movements and can be readily adjusted if required.

With an appropriate management plan in place, it is considered that the Avon Caravan Village will remain safe and serviceable at all times during mining for any orientation, extension or shortening of longwalls within the *Extent of Longwalls* boundary, even if actual subsidence movements were greater than the predictions or substantial non- conventional movements occurred.

11.4. Retirement or aged care villages

There is one retirement village within the *Subsidence Study Area*. Waratah Highlands Retirement Village comprises almost one hundred villas. The retirement village is located approximately 300 metres to the side of the proposed Longwall 108B and the potential for impacts to these structures is considered to be very low.

The Retirement Village is located on the edge of the *Extent of Longwalls* boundary. If the proposed longwalls are extended to the southwest, within the *Extent of Longwalls* boundary, the Bargo Sports Club would experience greater subsidence movements.

Predictions and impact assessments are included with those provided for houses.

11.5. Swimming pools

11.5.1. Descriptions of the swimming pools

The locations of the private swimming pools within the *Subsidence Study Area* are shown in Drawing No. MSEC1060-19.

There are 299 privately owned swimming pools which have been identified within the *Subsidence Study Area*. The locations and sizes of the pools were determined from orthophotographs of the area.

11.5.2. Predictions for the swimming pools

Predictions of conventional subsidence, tilt and curvature have been made at the centroid and at points located around the perimeter of each pool, as well as at points located at a distance of 20 metres from the perimeter of each pool.

A summary of the maximum predicted values of conventional subsidence, tilt and curvature for each pool within the *Subsidence Study Area* is provided in Table D.06, in Appendix D. The predictions are based on the proposed amended longwall layout, as shown in Drawing No. MSEC1060-19. The predicted tilts provided in this table are the maxima in any direction after the completion of each of the proposed longwalls. The predicted curvatures are the maxima in any direction at any time during or after the extraction of each of the proposed longwalls.

Distributions of the maximum predicted conventional subsidence, tilt and curvature for the pools within the *Subsidence Study Area* are illustrated in Fig. 11.18 and Fig. 11.19.

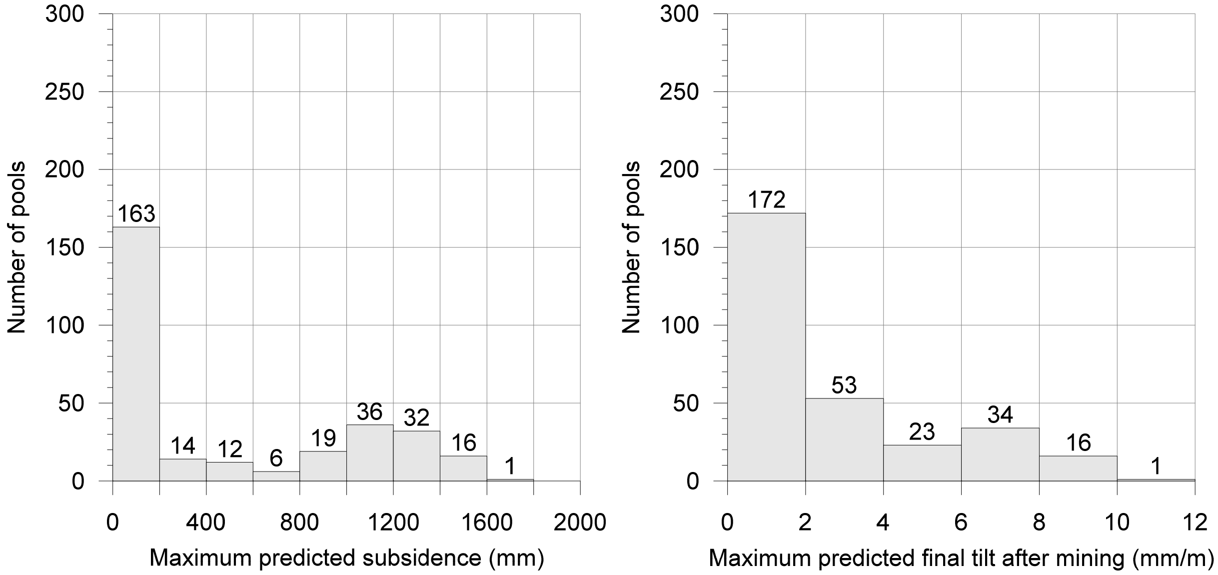


Fig. 11.18 Maximum predicted conventional subsidence and tilt for pools within the Subsidence Study Area

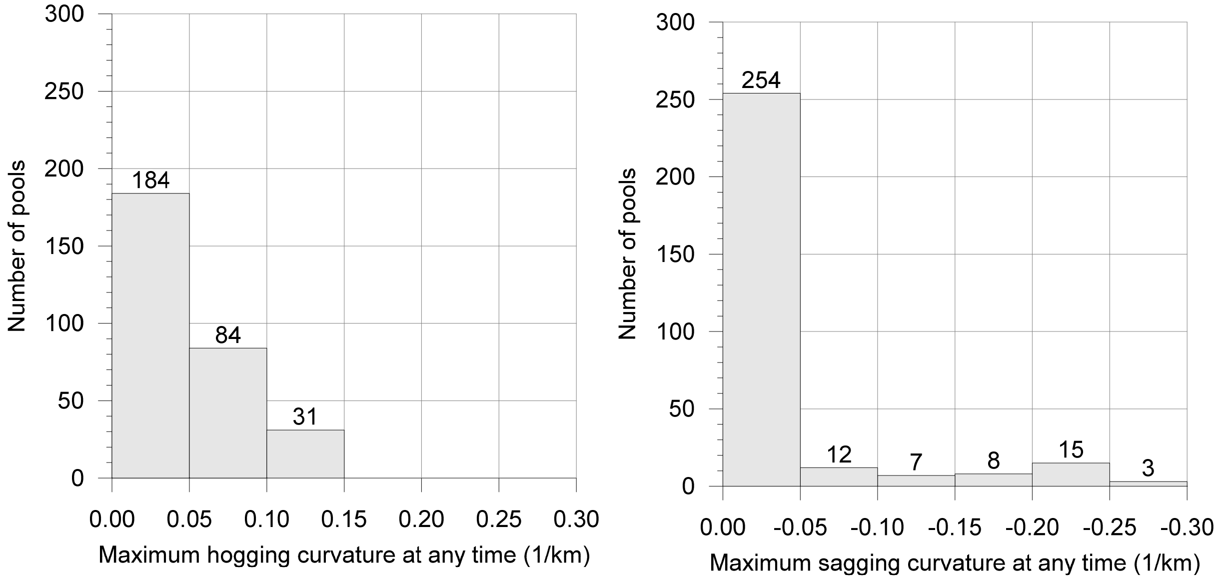


Fig. 11.19 Maximum predicted conventional hogging curvature (left) and sagging curvature (right) for the pools within the Subsidence Study Area

The maximum predicted conventional strains for the pools, based on applying a factor of 15 to the maximum predicted conventional curvatures, are 2.0 mm/m tensile and 3.9 mm/m compressive. Non-conventional movements can also occur as a result of, among other things, anomalous movements. The analysis of strains provided in Chapter 4 includes those resulting from both conventional and non-conventional anomalous movements.

The pools are at discrete locations and, therefore, the most relevant distributions of strain are the maximum strains measured in individual survey bays from previous longwall mining. The analysis of strains in survey bays during the mining of previous longwalls in the Southern Coalfield is discussed in Section 4.3.1. The results for survey bays located above goaf are provided in Fig. 4.2 and the results for survey bays located above solid coal are provided in Fig. 4.3.

If the proposed longwalls were to be shifted or reorientated, extended or shortened within the *Extent of Longwalls* boundary it would be expected that the maximum predicted conventional movements for the pools would be similar to those provided above. Whilst individual structures would experience greater or lesser movements, depending on their locations relative to the positions of the longwalls, the overall distribution of movements for the pools would not be expected to change substantially. If the longwalls were extended to the southwest within the *Extent of Longwalls* boundary, it would be expected that the overall number of pools affected by the extraction of the proposed longwalls would increase as the extended area is located within the urban areas of the Bargo township.

11.5.3. Impact assessments for the swimming pools

Mining-induced tilts are more noticeable in pools than other structures due to the presence of the water line and the small gap to the edge coping, particularly when the pool lining has been tiled. Skimmer boxes are also susceptible of 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 ± 15 mm from one end to the other. 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 194 pools within the *Subsidence Study Area* (i.e. 65 % 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 73 pools (i.e. 24 % of the total) predicted to experience final tilts between 3 mm/m and 7 mm/m and 32 pools (i.e. 11 % of the total) predicted to experience final tilts greater than 7 mm/m. The maximum predicted final tilt for the pools is 10 mm/m (i.e. 1.0 %), which represents a change in grade of 1 in 100. It is likely that a number of these pools would require some remediation of the pool copings.

The maximum predicted conventional curvatures for the pools are 0.13 km^{-1} hogging and 0.26 km^{-1} sagging, which equate to minimum radii of curvature of 7.7 kilometres and 3.8 kilometres, respectively. Whilst the predicted subsidence parameters for the proposed longwalls are greater than those at Tahmoor North, it would still be expected that the rates of impact on pools at Tahmoor North would provide a reasonable guide to the likely levels of impact.

Observations during the mining of Tahmoor Mine Longwalls 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 have 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.

It is expected that the rate of impact on the pools within the *Subsidence Study Area* would be similar, but, slightly greater than those previously experienced at Tahmoor North. Impacts to the pools would be repaired or, if required the pool would be replaced in accordance with the Coal Mine Subsidence Compensation Act 2017.

11.5.4. Impact assessments for the swimming pools based on increased predictions

If the actual tilts exceeded those predicted by a factor of 2 times, the final tilts would still be 3 mm/m or less at 163 pools within the *Subsidence Study Area* (i.e. 55 % of the total) at the completion of mining. In this case, there would be 44 pools (i.e. 15 % of the total) predicted to experience final tilts between 3 mm/m and 7 mm/m and 92 pools (i.e. 30 % of the total) predicted to experience final tilts greater than 7 mm/m. It is possible that approximately half the pools within the *Subsidence Study Area* would require some remediation of the coping due to the mining induced tilt, if the actual tilts exceeded those predicted by a factor of 2 times.

If the actual curvatures exceeded those predicted by a factor of 2 times, the incidence of impacts would increase for the pools located directly above the proposed longwalls. While the predicted ground movements are important parameters when assessing the potential impacts on the pools, it is noted that the impact assessments were primarily based on observed rate of impact from Tahmoor North. The overall levels of impact on the pools, resulting from the extraction of the proposed longwalls, are expected to be similar to, but, slightly greater than those observed at Tahmoor North.

11.5.5. Management of potential impacts on the swimming pools

Tahmoor Coal has developed and acted in accordance with a risk management plan to manage potential impacts to pools during the mining of Longwalls 22 to 32. The management plan is reviewed periodically by Tahmoor Coal. It is recommended that Tahmoor Coal continue to develop management plans to manage potential impacts during the mining of the proposed longwalls.

While not strictly related to the pool structure, a number of pool gates have been impacted as the result of the previous extraction of longwalls beneath pools. While the gates can be easily repaired, the worst-case consequence of breaching pool fence integrity could be severe. As a result, Tahmoor Coal inspects the integrity of pool fences once a week for pools that are experiencing active subsidence during mining.

With an appropriate management plan in place, it is considered that pools and pool fences can be maintained at all times during mining for any orientation, extension or shortening of longwalls within the *Extent of Longwalls* boundary, even if actual subsidence movements were greater than the predictions or substantial non- conventional movements occurred.

11.5.6. Tennis courts

There are 5 privately owned tennis courts which have been identified within the *Subsidence Study Area*, of which, 3 have concrete or Astroturf surfaces and 2 have a grass or clay surface. The locations and sizes of the tennis courts were determined from orthophotographs of the area.

The tennis courts are located across the *Subsidence Study Area* and, therefore, are expected to experience the full range of predicted subsidence movements. A summary of the maximum predicted conventional subsidence movements within the *Subsidence Study Area* is provided in Chapter 4.

It is possible that the maximum predicted ground strains could result in minor cracking in the tennis courts with grass or clay surfaces, however, any cracking would be expected to be minor and easily repairable. It is expected, that the predicted ground strains would arch around the concrete tennis courts and not be fully transferred into the pavements. It is possible, that some minor surface cracking could occur in the concrete surfaces but would be expected to be of a minor nature and easily repairable.

11.5.7. On-site waste water systems

The Bargo township and surrounding areas has recently been connected to a sewerage system. At the time of the proposed mining, the number of houses with operational on-site waste water systems above the proposed longwalls is likely, therefore, to be less than there are at present.

The on-site waste water system tanks are generally small, typically less than 3 metres in diameter, are constructed from reinforced concrete, and are usually bedded in sand and backfilled. It is unlikely, therefore, that the maximum predicted curvatures and strains would be fully transferred into the tank structures.

It is possible, however, that the buried pipelines associated with the on-site waste water tanks could be impacted by the strains if they are anchored by the tanks or other structures in the ground. Any impacts are expected to be of a minor nature, including leaking pipe joints, and could be readily repaired. With the implementation of these remedial measures, it would be unlikely that there would be any adverse impacts on the pipelines associated with the on-site waste water systems.

11.5.8. Rigid external pavements

Adverse impacts on rigid external pavements are often reported to SA NSW in the NSW Coalfields. This is because pavements are typically thin relative to their length and width. The design of external pavements is also not regulated by Council or SA NSW.

A study by MSEC of 120 properties at Tahmoor and Thirlmere indicated that 98 % of the properties with external concrete pavements demonstrated some form of cracking prior to mining. These cracks are sometimes difficult to distinguish from cracks caused by mine subsidence. It is therefore uncertain how many claims for damage can be genuinely attributed to mine subsidence impacts.

Residential concrete pavements are typically constructed with tooled joints which do not have the capacity to absorb compressive movements. It is possible that some of the smaller concrete footpaths or pavements within the *Subsidence Study Area*, in the locations of the larger compressive strains, could buckle upwards if there are insufficient movement joints in the pavements. It is expected, however, that the buckling of footpaths and pavements would not be common, given the magnitudes of the predicted ground strains, and could be easily repaired.

11.6. Fences

Predictions and impact assessments for fences are provided in Section 8.9.

11.7. Any other residential feature

There are no other substantial residential features within the *Subsidence Study Area*.

12.0 ANY KNOWN FUTURE DEVELOPMENTS

Given the long-term nature of the proposed mining activity, it is likely that there will be many future developments within the *Subsidence Study Area* over time. In addition to houses, this may include industrial, commercial and business establishments.

13.0 CONCLUSIONS

Mine Subsidence Engineering Consultants (MSEC) has studied the current mining proposals and identified the natural features and items of surface infrastructure that are in the *Subsidence Study Area*.

Predictions of subsidence movements have been provided for each of these natural features and items of surface infrastructure. The predictions have been produced using a model that has been calibrated from observations of previous movements during the extraction of previous longwalls at Tahmoor Mine and more broadly from observations of previous movements during the extraction of previous longwalls at similar depths of cover at nearby mines in the Southern Coalfield.

The maximum predicted total subsidence, after the completion of the proposed longwalls, is 1, 650 mm which represents around 63 % of the extraction height.

While a reasonable correlation between predicted and observed subsidence movements has been found, increased subsidence movements have been observed above the commencing ends of Longwalls 24A to 27. This was a very unusual event in the Southern Coalfield and it appears that the location of zones of increased subsidence is linked to a depressed water table adjacent to an incised gorge and the Nepean Fault.

Based on the above experience, consideration has been made as to where increased subsidence may develop within the *Subsidence Study Area*. While it is considered that the potential for increased subsidence to develop within the *Subsidence Study Area* alongside the Nepean Fault is low, it is important to note that the potential impacts on surface infrastructure from this extra subsidence can be managed so that they remain safe and serviceable during and after the mining period with the implementation of effective management measures. This was undertaken successfully before, during and after the extraction of Longwalls 24A to 32.

Impact assessments have been undertaken based on the predicted subsidence movements, consultation with infrastructure owners and experiences gained during the extraction of previous longwalls at Tahmoor Mine and more broadly from experiences during the extraction of previous longwalls at similar depths of cover at nearby mines in the Southern Coalfield.

The overall findings of the assessments undertaken by MSEC are that the levels of impact and damage to all identified natural features and built infrastructure are manageable and can be controlled by the preparation and implementation of Subsidence Management Plans (or Extraction Plans), many of which have already been developed and are being successfully implemented during mining at Tahmoor Mine. These management plans are developed with the owners of infrastructure and are approved by relevant government agencies. The findings in this report should be read in conjunction with all other associated consultant reports.

Recommended management measures generally include monitoring of ground movements and the condition of surface features. Some mitigation measures are recommended to mitigate or avoid the risk of serious consequences should impacts occur to some critical surface features.

It is recommended that Tahmoor Coal continues to develop management plans to manage the potential impacts for the surface features within the future mining areas.

APPENDIX A. GLOSSARY OF TERMS AND DEFINITIONS

Glossary of Terms and Definitions

Some of the more common mining terms used in the report are defined below:-

Angle of draw	The angle of inclination from the vertical of the line connecting the goaf edge of the workings and the limit of subsidence (which is usually taken as 20 mm of subsidence).
Chain pillar	A block of coal left unmined between the longwall extraction panels.
Cover depth (H)	The depth from the surface to the top of the seam. Cover depth is normally provided as an average over the area of the panel.
Closure	The reduction in the horizontal distance between the valley sides. The magnitude of closure, which is typically expressed in the units of *millimetres (mm)*, is the greatest reduction in distance between any two points on the opposing valley sides. It should be noted that the observed closure movement across a valley is the total movement resulting from various mechanisms, including conventional mining induced movements, valley closure movements, far-field effects, downhill movements and other possible strata mechanisms.
Critical area	The area of extraction at which the maximum possible subsidence of one point on the surface occurs.
Curvature	The change in tilt between two adjacent sections of the tilt profile divided by the average horizontal length of those sections, i.e. curvature is the second derivative of subsidence. Curvature is usually expressed as the inverse of the **Radius of Curvature** with the units of *1/kilometres (km-1)*, but the value of curvature can be inverted, if required, to obtain the radius of curvature, which is usually expressed in *kilometres (km)*. Curvature can be either **hogging** (i.e. convex) or **sagging** (i.e. concave).
Extracted seam	The thickness of coal that is extracted. The extracted seam thickness is thickness normally given as an average over the area of the panel.
Effective extracted seam thickness (T)	The extracted seam thickness modified to account for the percentage of coal left as pillars within the panel.
Face length	The width of the coalface measured across the longwall panel.
Far-field movements	The measured horizontal movements at pegs that are located beyond the longwall panel edges and over solid unmined coal areas. Far-field horizontal movements tend to be bodily movements towards the extracted goaf area and are accompanied by very low levels of strain.
Goaf	The void created by the extraction of the coal into which the immediate roof layers collapse.
Goaf end factor	A factor applied to reduce the predicted incremental subsidence at points lying close to the commencing or finishing ribs of a panel.
Horizontal displacement	The horizontal movement of a point on the surface of the ground as it settles above an extracted panel.
Inflection point	The point on the subsidence profile where the profile changes from a convex curvature to a concave curvature. At this point the strain changes sign and subsidence is approximately one half of S max.
Incremental subsidence	The difference between the subsidence at a point before and after a panel is mined. It is therefore the additional subsidence at a point resulting from the excavation of a panel.
Panel	The plan area of coal extraction.
Panel length (L)	The longitudinal distance along a panel measured in the direction of mining from the commencing rib to the finishing rib.
Panel width (Wv)	The transverse distance across a panel, usually equal to the face length plus the widths of the roadways on each side.
Panel centre line	An imaginary line drawn down the middle of the panel.
Pillar	A block of coal left unmined.
Pillar width (Wpi)	The shortest dimension of a pillar measured from the vertical edges of the coal pillar, i.e. from rib to rib.

Shear deformations	The horizontal displacements that are measured across monitoring lines and these can be described by various parameters including; horizontal tilt, horizontal curvature, mid-ordinate deviation, angular distortion and shear index.
Strain	The change in the horizontal distance between two points divided by the original horizontal distance between the points, i.e. strain is the relative differential displacement of the ground along or across a subsidence monitoring line. Strain is dimensionless and can be expressed as a decimal, a percentage or in parts per notation. **Tensile Strains** are measured where the distance between two points or survey pegs increases and **Compressive Strains** where the distance between two points decreases. Whilst mining induced **strains** are measured **along** monitoring lines, ground **shearing** can occur both vertically, and horizontally **across** the directions of the monitoring lines.
Sub-critical area	An area of panel smaller than the critical area.
Subsidence	The vertical movement of a point on the surface of the ground as it settles above an extracted panel, but, 'subsidence of the ground' in some references can include both a vertical and horizontal movement component. The vertical component of subsidence is measured by determining the change in surface level of a peg that is fixed in the ground before mining commenced and this vertical subsidence is usually expressed in units of *millimetres (mm)*. Sometimes the horizontal component of a peg's movement is not measured, but in these cases, the horizontal distances between a particular peg and the adjacent pegs are measured.
Super-critical area	An area of panel greater than the critical area.
Tilt	The change in the slope of the ground as a result of differential subsidence, and is calculated as the change in subsidence between two points divided by the horizontal distance between those points. Tilt is, therefore, the first derivative of the subsidence profile. Tilt is usually expressed in units of *millimetres per metre (mm/m)*. A tilt of 1 mm/m is equivalent to a change in grade of 0.1 %, or 1 in 1000.
Uplift	An increase in the level of a point relative to its original position.
Upsidence	Upsidence results from the dilation or buckling of near surface strata at or near the base of the valley. The magnitude of upsidence, which is typically expressed in the units of *millimetres (mm)*, is the difference between the observed subsidence profile within the valley and the conventional subsidence profile which would have otherwise been expected in flat terrain.

APPENDIX B. REFERENCES

References

AECOM (2020). Tahmoor South Project – Environmental Impact Statement. AECOM, 2020.

APCRC (1997). *Geochemical and isotopic analysis of soil, water and gas samples from Cataract Gorge*. George, S. C., Pallasser, R. and Quezada, R. A., APCRC Confidential Report No. 282, June 1997.

Australian Standards Association, AS 2870 - 1996, *Residential Slabs and Footings – Construction.*

Barbato, J., et al. (2016). "*Prediction of horizontal movement and strain at the surface due to longwall coal mining*". International Journal of Rock Mechanics & Mining Sciences. Vol 84, April 2016, pp 105-118.

Barbato, J., et al. (2017). *Development of Predictive Methods for Horizontal Movement and Strain at the Surface due to Longwall Mining.* Mining Technology, October 2017

Bilaniwskyj, et al. (2011). *Interacting with Mining Companies in Relation to Mine Subsidence - Approach by the Roads and Traffic Authority of NSW, Southern Region.* Mine Subsidence Technological Society, Proceedings of the 8th Triennial Conference on Mine Subsidence, 2011, (pp. 257-266).

DPIE (2008a). *Impacts of Underground Coal Mining on Natural Features in the Southern Coalfield – Strategic Review.* Department of Planning, Industry and Environment, 2008.

DPIE (2008b). *Strategic Review of Impacts of Underground Coal Mining on Natural Features in the Southern Coalfield.* Department of Planning, Industry and Environment, 2008.

DPIE (2011). *Major Project Assessment: Bulli Seam Operations Project*, Director-General's Environmental Assessment Report Section 75I of the Environmental Planning and Assessment Act 1979. Department of Planning, Industry and Environment, December 2011.

Fluvial Systems (2013). *Tahmoor South Project – Geomorphology*. Fluvial Systems Pty Ltd, 2013.

Gale, W., Sheppard, I. (2011). *Investigation into Abnormal Increased Subsidence above Longwall Panels at Tahmoor Colliery NSW*.

Gale, W., Page,J. (2004). *Mining and the Bargo River, Presentation to MSTS*.

Gilbert & Associates, 2014, *Tahmoor South Project Surface Water Baseline Study*

Gilbert & Associates, 2014, *Tahmoor South Project Water Management System and Site Water Balance, J1210-1*

Gordon Geotechniques (2013). *Feasibility Geotechnical Assessment – Tahmoor South Project. Gordon Geotechniques*. Report No. TahmoorSth13 – R1, July 2013.

Grainger, M.A. (1993). *Effects of mining on railway infrastructure and developments in their control*. Proceedings of the Institution of Civil Engineers, Transport, 100, May, pp. 83-93.

Holla, L. and Armstrong, M., (1986). *Measurement of Sub-Surface Strata Movement by Multi-wire Borehole Instrumentation*. Proc. Australian Institute of Mining and Metallurgy, 291, pp. 65-72.

Holla, L. (1991). *Reliability of Subsidence Prediction Methods for Use in Mining Decisions in New South Wales.* Conference on Reliability, Production and Control in Coal Mines, Wollongong.

Holla, L. and Barclay, E. (2000). *Mine Subsidence in the Southern Coalfield, NSW, Australia.* Published by the Department of Mineral Resources, NSW.

Hydro Engineering and Consulting (2020a). *Tahmoor South Project Surface Water Baseline Study*. Hydro Engineering and Consulting, 2020.

Hydro Engineering and Consulting (2020b). *Tahmoor South Project Flood Study*. Hydro Engineering and Consulting, 2020.

HydroSimulations (2020). *Tahmoor South Project Environmental Impact Study: Groundwater Assessment for Tahmoor Coal Pty Ltd*. HydroSimulations, 2020.

Jaegar, J.C. 1969. *Elasticity, fracture and Flow.*

JMA (2014). *Bridges over Main Southern Rail, Bargo*. John Matheson & Associates Pty Ltd, Report No. R0237, May 2014.

Kapp (1982). *Subsidence from Deep Longwall Mining of Coal Overlain by Massive Sandstones*. Kapp, W.A. Proc. Australasian Ins. Min. Met., 7/1 – 7/9.

Kay, et al. (2011) *Management of the Hume Highway Pavement for Subsidence Impacts from Longwall Mining.* Kay, D., Buys, H.G., Donald, G.S., Howard, M.D., and Pells, P.J.N. Mine Subsidence Technological Society, Proceedings of the 8th Triennial Conference on Mine Subsidence, 2011 (pp. 247 to 256)

Kay, D.J., et al. (2017). *Experiences from Longwall Mining beneath Railway Cuttings*

Kratzsch, H. (1983). *Mining Subsidence Engineering*, Published by Springer - Verlag Berlin Heidelberg New York.

Lea, K.R. (1991). *Technical Considerations with respect to Longwall Mining beneath Railways in particular panels 9 & 10 from Teralba Colliery*. Report to State Rail Authority of New South Wales, Cityrail.

Lee, A. J. (1966) *The effect of faulting on mining subsidence*.

Leventhal, et al. (2011). *Management of Mine Subsidence Impact upon Mainline Railway Infrastructure - The Flirtation of Tahmoor Longwall 25 with Myrtle Creek Culvert*. Leventhal, A., Matheson, J., Kay, D., Christie, D., Hull, T., Steindler, A., Robinson, G., Sheppard, I. Mine Subsidence Technological Society Eighth Triennial Conference, May 2011.

Leventhal, et al. (2017). *Valley Closure - How Much Can a Culvert Bear?* Leventhal, A.; Matheson, J.; Hull, A.; Steindler, A.; Sheppard, I. Mine Subsidence Technological Society Tenth Triennial Conference, November 2017.

Lohe, E.M. et al. (1992). Sydney Basin – Geological Structure and Mining Conditions, Assessment for Mine Planning. NERDDC Project No. 1239.

McElroy Bryan Geological Services, (2013). *Tahmoor South Project Feasibility Study Section 8: Geology and Coal Resources*. McElroy Bryan Geological Services Pty Ltd. August 2013.

Minister for Planning (2011). *Project Approval for Bulli Seam Operations Project*, Application Number 08_0150, Minister for Planning and Infrastructure, 22 December 2011.

McGill (2007). *Mitigating the Effects of Mine Subsidence Due to Coal Mining on Major Infrastructure Assets Critical to Sydney*. Proceedings of the MSTS Mine Subsidence Technological Society 7th Triennial Conference on Mine Subsidence, 26th to 27th November 2007.

Mills, K. (2003). *WRS1 monitoring results* – End of Longwall 9. SCT Operations Report: MET2659.

Mills, K. (2007). *Subsidence Impacts on River Channels and Opportunities for Control*. SCT Operations Report: MET2659.

Mills, K. and Huuskes, W. (2004). *The Effects of Mining Subsidence on Rockbars in the Waratah Rivulet at Metropolitan Colliery*. Proc. 6th Triennial Conference, Subsidence Management Issues, Mine Subsidence Technological Society, Maitland.

MSEC (2002). "WKA - *Handbook on the Undermining of Cliffs, gorges and River*. ACARP Project No. C8005 & C9067

MSEC (2006). *Tahmoor Colliery Longwalls 24 to 26 - The Prediction of Subsidence Parameters and the Assessment of Mine Subsidence Impacts on Surface and Sub-Surface Features due to mining Longwalls 24 to 26 at Tahmoor Colliery in support of an SMP Application.* Mine Subsidence Engineering Consultants, Report MSEC157, Revision C, March 2006.

MSEC (2009). *Tahmoor Colliery Longwalls 27 to 30 - The Prediction of Subsidence Parameters and the Assessment of Mine Subsidence Impacts on Natural Features and Items of Surface Infrastructure due to mining Longwalls 27 to 30 at Tahmoor Colliery in support of the SMP Application.* Mine Subsidence Engineering Consultants, Report MSEC355, Revision B, July 2009.

MSEC (2012). BHP Billiton Illawarra Coal – Appin Colliery Longwall 704 End of Panel Subsidence Monitoring Report for Appin Longwall 704, Mine Subsidence Engineering Consultants, Report No. MSEC583, Revision B, 2012.

MSEC (2017). *Tahmoor Mine – Tahmoor South Project Longwalls 101 to 206 – 2017 Mine Plan*. Mine Subsidence Engineering Consultants, 14 December 2017.

Niche (2020a). *Tahmoor South Project – Terrestrial Ecology Assessment.* Niche Environment and Heritage, 2020.

Niche (2020b). *Tahmoor South Project – Aquatic Ecology Assessment.* Niche Environment and Heritage, 2020.

Niche (2020c). *Tahmoor South Project – Aboriginal Cultural Heritage Assessment*. Niche Environment and Heritage, 2020.

Niche (2020d). *Tahmoor South Project – Historical Heritage Assessment*. Niche Environment and Heritage, 2020.

NRAtlas (2010). *Natural Resource Atlas* website, viewed 23rd April 2010. The Department of Natural Resources. http://nratlas.nsw.gov.au/

Patton and Hendren (1972). *General Report on Mass Movements*. Patton F.D. & Hendren A.J. Proc. 2nd Intl. Congress of International Association of Engineering Geology, V-GR1-V-GR57.

Reid, P. (1991). *Coal Mining Beneath Dams in NSW Australia.* 1991 ASDSO Annual Conference, September 1991, San Diego, USA pp 240-245.

Robinson, M. (2007). *West Wallsend Colliery - A Coordinated Approach to Managing Subsidence Impacts on Multiple High Risk Sensitive Surface Features: LW27 Case Study*. Robinson, M. Proceedings of the MSTS Mine Subsidence Technological Society 7th Triennial Conference on Mine Subsidence, Nov 2007 (pp. 11-22).

SEA (2002). *A Review of the Likely Ground Conditions and the Appropriate Controls which need to be Considered as Part of the Mine Design Process in Tahmoor North*. Report No. 97083 (TAH)-23a.

Sefton (2000). *Overview of the Monitoring of Sandstone Overhangs for the Effects of Mining Subsidence Illawarra Coal Measures, for Illawarra Coal.* C.E. Sefton Pty Ltd, 2000.

SCIMS (2010). *SCIMS Online* website, viewed 23rd April 2010. The Land and Property Management Authority. http://www.lands.nsw.gov.au/survey_maps/scims_online

SCI (2008). *Inquiry into the Impacts of Underground Coal Mining on Natural Features in the Southern Coalfield Strategic Review*, Southern Coalfield Inquiry, July 2008.

SCT (2013a). *Review of the Hydraulic Conductivity and Geotechnical Characteristics of the Overburden at Tahmoor South*. Strata Control Technologies. Report No. TAH4083, Revision 1, December 2013.

SCT (2013b). *Subsidence Impact Assessment for Selected Archaeological Heritage Sites at Tahmoor South Project*. Strata Control Technologies. Report No. TAH4090, December 2013.

SCT (2013c). *Assessment of Potential Mining Impacts at Eliza Creek Waterfall*. Strata Control Technologies. Letter dated 5 December 2013.

SCT (2014). *Peer Review of Tahmoor South Subsidence Assessment*. Strata Control Technologies. Letter dated 24 March 2014.

SCT (2017). *Peer Review of Tahmoor South Preferred Project Layout Subsidence Assessment*. Strata Control Technologies. Letter dated 11 December 2017.

SCT (2018a). *Investigation into the Potential Impact of the Nepean Fault on Subsidence Adjacent to LW32*. Strata Control Technologies. TAH4851, 2 May 2018.

SCT (2018b). *Structural Determinations of the Nepean Fault Adjacent to Tahmoor Mine*. Strata Control Technologies. TAH4817, 2 May 2018.

Swarbrick, et al., (2007). *Subsidence Monitoring at Cataract Tunnel Portal: Lessons Learnt*. Swarbrick, G., Vergara, M., Pinkster, H., and Landon-Jones, I. Proceedings of the MSTS Mine Subsidence Technological Society 7th Triennial Conference on Mine Subsidence, Wollongong, 2007, pp 43-51.

Waddington, A.A (2009). *MSEC276 - The Prediction of Mining Induced Movements in Building Structures and the Development of Improved Methods of Subsidence Impact Assessment (ACARP C12015)*. ACARP Project C12015 (Australian Coal Association Research Program). pp 1-207.

Waddington, A.A. and Kay, D.R. (2002). *Management Information Handbook on the Undermining of Cliffs, Gorges and River Systems*. ACARP Research Projects Nos. C8005 and C9067, September 2002.

Whittaker and Reddish (1989). *Subsidence – Occurrence, Prediction and Control.* Whittaker, B.N. and Reddish, D.J. Elsevier.

WSC (2011). *Growth Management Strategy*. Wollondilly Shire Council, 2011.

APPENDIX C. METHOD OF IMPACT ASSESSMENTS FOR HOUSES

APPENDIX C METHOD OF IMPACT ASSESSMENT FOR HOUSES

C.1. Introduction

The methods for predicting and assessing impacts on building structures have developed over time as knowledge and experience has grown. MSEC has provided predictions and impact assessments for the building structures within the *Subsidence Study Area* using the latest methods available at this time.

Longwall mining has occurred directly beneath building structures at a number of collieries in the Southern Coalfield, including Appin, West Cliff, Tower and Tahmoor Mines. The most extensive data has come from extraction of Tahmoor Mine Longwalls 22 to 29, where approximately 2000 houses have experienced subsidence movements. The experiences gained during the mining of these longwalls, as well as longwalls at other collieries in the Southern and Newcastle Coalfields, have provided substantial additional information that has been used to further develop the methods.

The information was initially collected during the mining of Tahmoor Mine Longwalls 22 to 24A and reviewed in two parallel studies, one as part of a funded ACARP Research Project C12015 (Waddington, 2009), and the other at the request of Industry and Investment NSW (now the Department of Planning, Industry and Environment – Resources Regulator).

The outcomes of these studies include:-

- Review of the performance of the previous method,
- Recommendations for improving the method of Impact Classification, and
- Recommendations for improving the method of Impact Assessment.

Additional information was collected in 2016 after the completion of Longwall 29 and impact assessments for the houses in this report have been based on the updated information provided. A summary is provided in the following sections.

C.2. Review of the Performance of the Previous Method

The previous method of impact assessment applied predictions of curvature on the overall length of each house to predict a crack width in the external walls that was classified based primarily in accordance with Table C1 of Australian Standard 2870-1996. This method did not include impacts to other elements, finishes or services.

Extensive data on house impacts has come from extraction of Tahmoor Mine Longwalls 22 to 25 and a comparison between predicted and observed impacts is provided in Table C.1. The comparison is based on pre-mining predictions that were provided in SMP Applications for these longwalls and the observations of impacts using the previous method of impact classification. The comparison is based on information up to 30 November 2008. At that point in time, the length of extraction of Longwall 25 was 611 metres.

A total of 1037 houses and civil structures were affected by subsidence due to the mining of Tahmoor Mine Longwalls 22 to 25 at that time. A total of 175 claims had been received by the MSB, now SA NSW (not including claims that were refused) of which 14 claims did not relate to the main residence or civil structure.

Table C.1 Summary of Comparison between Observed and Predicted Impacts for each Structure

Strain Impact Category	Total No. of Observed Impacts for Structures predicted to be Strain Impact Category 0	Total No. of Observed Impacts for Structures predicted to be Strain Impact Category 1	Total No. of Observed Impacts for Structures predicted to be Strain Impact Category 2	Total
No impact	483	373	20	876
Cat 0	31	70	6	107
Cat 1	8	9	1	18
Cat 2	7	11	2	20
Cat 3	2	2	0	4
Cat 4	3	5	0	8
Cat 5	3	1	0	4
Total	537	471	29	1037
% claim	**10 %**	**21 %**	**31 %**	16 %
% Obs > Pred	**4 %**	**4 %**	**0 %**	-
% Obs <= Pred	**96 %**	**96 %**	**100 %**	-

Note: Predicted impacts due to conventional subsidence only, as described in the SMP Application.

Given that observed impacts are less than or equal to predicted impacts in 96 % of cases, it is considered that the previous methods are generally conservative even though non-conventional movements were not taken into account in the predictions and assessments. However, when compared on a house by house basis, the predictions have been substantially exceeded in a small proportion of cases.

The majority, if not all, of the houses that have experienced Category 3, 4 or 5 impacts are considered to have experienced substantial non-conventional subsidence movements. The consideration is based on nearby ground survey results, where localised bumps are observed in subsidence profiles and high localised strain is observed. The potential for impact from non-conventional movements were discussed generally and not included in the specific impact assessments for each structure.

The inability to specify the number or probability of impacts due to the potential for non-conventional movements is a shortcoming of the previous method. It was considered that there was substantial room for improvement in this area and recommendations are provided to improve the previous method.

The comparison shows a favourable observation that the overall proportion of claims increased for increasing observed ground movements. This suggests that the main parameters currently used to make impact assessments (namely predicted conventional curvature and maximum plan dimension of each structure) are credible. Please note that we have stated predicted conventional curvature rather than strain, as predictions of strain were directly based on predictions of conventional curvature.

A substantial over-prediction is observed at the low end of the spectrum of impacts (Category 0 and 1). A number of causes and/or possible causes for the deviations have been identified:

- Construction methods and standards may mitigate against small differential ground movements.
- The impacts may have occurred but the residents have not made a claim for the following reasons:-
  - All structures contain some existing, pre-mining defects. A pre-mining field investigation of 119 structures showed that it is very rare for all elements of a building to be free of cracks. Cracks up to 3 mm in width are commonly found in buildings. Cracks up to 1 mm in width are very common. There is a higher incidence of cracking in brittle forms of construction such as masonry walls and tiled surfaces.
  - In light of the above, additional very slight Category 0 and 1 impacts may not have been noticed by residents. A forensic investigation of all structures before or after mining may reveal that the number of actual impacts is greater than currently known.
  - Similarly, impacts have been noticed but some residents may consider them to be too trivial to make a claim. While difficult to prove statistically, it is considered that the frequency of claims from tenanted properties is less than the frequency of claims from owner-occupied properties.
- The impacts have been noticed but some residents are yet to make a claim at this stage. It has been observed that there is a noticeable time lag between the moment of impact and the moment of making a claim. At the time of the original study in 2008, more claims were therefore expected to be received in the future within areas that have already been directly mined beneath. This has been confirmed by the findings of the most recent study based on information received in 2016. It has also been found that as assessments and repairs were progressively determined at each house, the level of impacts at each house has generally been greater than was originally reported.
- The predictive method is deliberately conservative in a number of ways.
  - Predicted subsidence movements for each structure are based on the maximum predicted subsidence movements within 20 metres of the structure.
  - An additional 0.2 mm/m of strain was added
  - Maximum strains were applied to the maximum plan dimension, regardless of the maximum predicted strain orientation.
  - The method of impact assessment does not provide for “nil impacts”. The minimum assessed level of impact is Category 0.
  - The impact data was based on double-storey full masonry structures in the UK.

Finally, it is considered that the previous method impact classification has masked the true nature and extent of impacts. It is recommended that an improved method of classification be adopted before embarking on any further analysis. This is discussed in the next chapter of this report.

C.3. Method of Impact Classification

C.3.1. Previous Method

The impacts to structures were previously classified in accordance with Table C1 of Australian Standard 2870-1996, but the table has been extended by the addition of Category 5 and is reproduced below.

Table C.2 Classification of Damage with Reference to Strain

Impact Category	Description of typical damage to walls and required repair	Approximate crack width limit
0	Hairline cracks.	< 0.1 mm
1	Fine cracks which do not need repair.	0.1 mm to 1.0 mm
2	Cracks noticeable but easily filled. Doors and windows stick slightly	1 mm to 5 mm
3	Cracks can be repaired and possibly a small amount of wall will need to be replaced. Doors and windows stick. Service pipes can fracture. Weather-tightness often impaired	5 mm to 15 mm, or a number of cracks 3 mm to 5 mm in one group
4	Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows. Window or door frames distort. Walls lean or bulge noticeably. Some loss of bearing in beams. Service pipes disrupted.	15 mm to 25 mm but also depends on number of cracks
5	As above but worse, and requiring partial or complete rebuilding. Roof and floor beams lose bearing and need shoring up. Windows broken with distortion. If compressive damage, severe buckling and bulging of the roof and walls.	> 25 mm

Note 1 of Table C1 states that *"Crack width is the main factor by which damage to walls is categorized. The width may be supplemented by other factors, including serviceability, in assessing category of damage.*

Impacts relating to tilt were classified according to matching impacts with the description in Table C.3, not the observed actual tilt. This is because many houses that had experience tilts greater than 5 mm had not made a claim to the MSB (now SA NSW).

Table C.3 Classification of Damage with Reference to Tilt

Impact Category	Tilt (mm/m)	Description
A	< 5	Unlikely that remedial work will be required.
B	5 to 7	Adjustment to roof drainage and wet area floors might be required.
C	7 to 10	Minor structural work might be required to rectify tilt. Adjustments to roof drainage and wet area floors will probably be required and remedial work to surface water drainage and sewerage systems might be necessary.
D	> 10	Considerable structural work might be required to rectify tilt. Jacking to level or rebuilding could be necessary in the worst cases. Remedial work to surface water drainage and sewerage systems might be necessary.

C.3.2. Need for Improvement to the Previous Method of Impact Classification

It is very difficult to design a method of impact classification that covers all possible scenarios and permutations. The application of any method is likely to find some instances that do not quite fit within the classification criteria.

Exposure to a large number of affected structures has allowed the mining industry to appreciate where improvements can be made to all aspects including the identification of areas for improvement in the previous method of impact classification.

A number of difficulties have been experienced with the previous method during the mining period. The difficulty centres on the use of crack width as the main classifying factor, as specified in Table C1 of Australian Standard 2870-1996.

A benefit of using crack width as the main factor is that it provides a clear objective measure by which to classify impact. However, experience has shown that crack width is a poor measure of the overall impact and extent of repair to a structure. The previous method of impact classification may be useful for assessing impact to newly built structures in a non-subsidence environment but further improvement and clarification is recommended before it can be effectively applied to houses impacted by mine subsidence.

The following aspects highlight areas where the previous classification system could be improved.-

- *Slippage on Damp Proof Course*

  Many houses have experienced slippage along the damp proof course in Tahmoor. Slippage on some houses is relatively small (less than 10 mm) though substantial slippage has been observed in a number of cases, such as shown in Fig. C.1 below.

Fig. C.1 Example of slippage on damp proof course

Under the previous classification method, the “crack” width of the slippage may be very small (Category 1) but the distortion in the brickwork is substantial. Moreover, the extent of work required to repair the impact is substantial as it usually involves re-lining the whole external skin of the structure. Such impacts would be considered Category 4 based on extent of repair but only Category 1 or 2 based on maximum crack width.

There is no reference to slippage of damp proof course in the previous method of impact classification. However, if the extent of repair was used instead of using crack width as the main factor, the impact category would be properly classified as either Category 4 or Category 5.

It was recommended that slippage of damp proof courses be added to the previous impact classification table.

- *Cracks to brickwork*

  In some cases, cracks are observed in mortar only. For example, movement joints in some structures have been improperly filled with mortar instead of a flexible sealant, as shown in Fig. C.2. In these situations, the measured crack width may be substantial but the impact is relatively simple to repair regardless of the crack width.

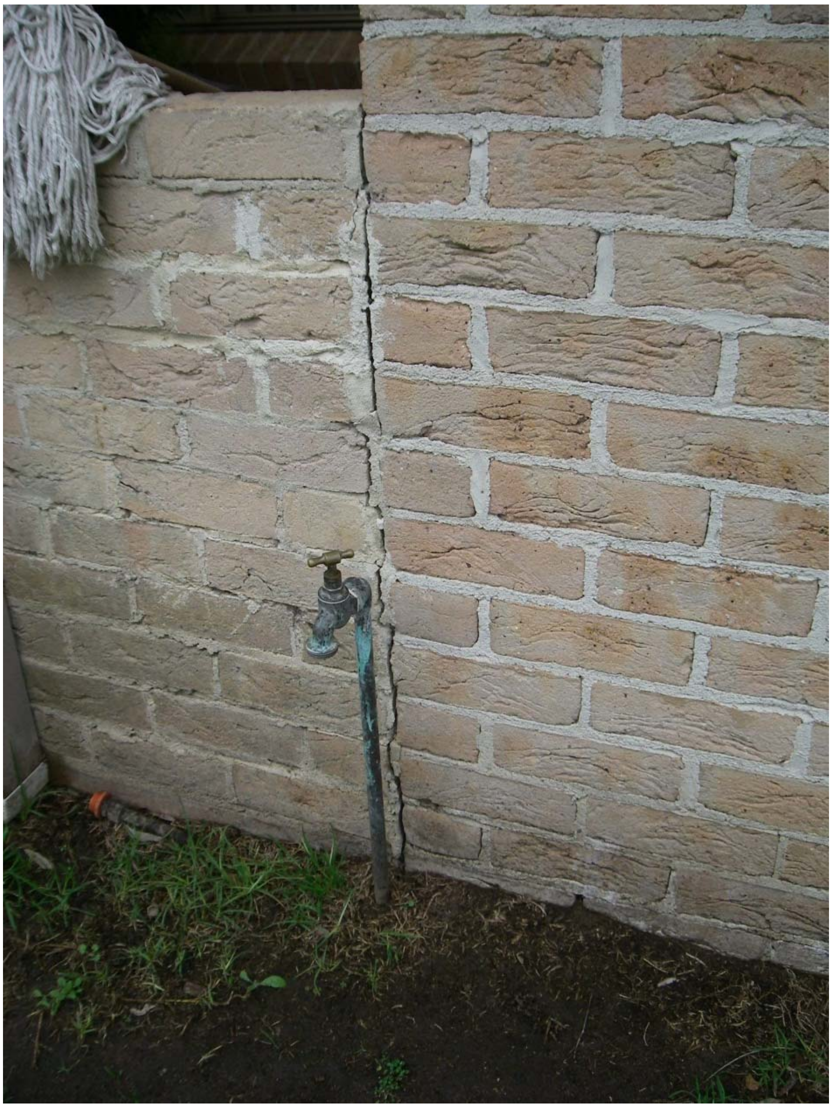


Fig. C.2 Example of crack in mortar only

In other cases, a small number of isolated bricks have been observed to crack or become loose. This is usually straightforward to repair. Under the previous impact classification method, a completely loose brick could be strictly classified as Category 5 as the crack width is infinitely large. This is clearly not the intention of the previous method but clarification is recommended to avoid confusion.

If a panel of brickwork is cracked, the method of repair is the same regardless of the width. While it is considered reasonable to classify large and severe cracks by its width, it is recommended that cracks less than 5 mm in width be treated the same rather than spread across Categories 0, 1 and 2.

If a brick lined structure contains many cracks of width less than 3 mm, the impact would be classified as no more than Category 2 under the previous method of impact classification. The extent of repair may be substantially more than a house that has experienced only one single 5 mm crack. However, it is recognised that it is very difficult to develop a simple method of classifying impacts based on multiple cracks in wall panels. How many cracks are needed to justify an increase in impact category?

- *Structures without masonry walls*

  Timber framed structures with lightweight external linings such weatherboard panels and fibro sheeting are not referenced in the previous classification table. If crack widths were strictly adopted to classify impacts, it may be possible to classify movement in external wall linings beyond Category 3 when in reality the repairs are usually minor.

  It was recommended that the impact classification table be extended to include structures with other types of external linings.

- *Minor impacts such as door swings*

  Experience has shown that one of the earliest signs of impact is the report of a sticking door. In some instances, the only observed impact is one or two sticking doors. It takes less than half an hour to repair a sticking door and impact is considered negligible.

  Such an impact would be rightly classified as Category 0 based on the previous method of impact classification as there is no observed crack. However, the previous classification table suggests that sticking doors and windows occur when Category 2 crack widths develop. It was recommended that the impact classification table be amended in this respect.

C.3.3. Broad Recommendations for Improvement of Previous Method of Impact Classification

It was recommended that crack width no longer be used as the main factor for classifying impacts. This does not mean that the use of crack width should be abandoned altogether. Crack width remains a good indicator of the severity of impacts and should be used to assist classification, particularly for impacts that are moderate or greater.

By focussing on crack width, the previous impact classification table appears to be classifying impacts from a structural stability perspective. It was recommended that a revised impact classification table be more closely aligned with all aspects of a building, including its finishes and services. Residents who are affected by impacts are concerned as much about impacts to internal linings, finishes and services as they are about cracks to their external walls and a revised impact classification method should reflect this.

With crack width no longer used as the main factor, it was recommended that the wording of the descriptions of impact in the classification table be extended to cover impacts to more elements of buildings. In keeping with the previous method of assessment, the level of impact should distinguish between cosmetic, serviceability and stability related impacts:-

- Low impact levels should relate to cosmetic impacts that do affect the structural integrity of the building and are relatively straight-forward to repair,
- Mid-level impact categories should relate to impacts to serviceability and minor structural issues, and
- High level impacts should be reserved for structural stability issues and impacts requiring extensive repairs.

C.3.4. Revised Method of Impact Classification

The following revised method of impact classification has been developed.

Table C.4 Revised Classification based on the Extent of Repairs

Repair Category	Extent of Repairs
Nil	No repairs required
R0 **Adjustment**	One or more of the following, where the damage does not require the removal or replacement of any external or internal claddings or linings:- - **Door** or **window** jams or swings, or - Movement of **cornices**, or - Movement at external or internal **expansion joints**.
R1 **Very Minor Repair**	One or more of the following, where the damage can be repaired by filling, patching or painting without the removal or replacement of any external or internal brickwork, claddings or linings:- - Cracks in **brick mortar** only, or isolated cracked, broken, or loose **bricks** in the external façade, or - Cracks or movement < 5 mm in width in any external or internal wall **claddings**, **linings**, or **finish**, or - Isolated cracked, loose, or drummy floor or wall **tiles**, or - Minor repairs to any **services** or **gutters**.
R2 **Minor Repair**	One or more of the following, where the damage affects a small proportion of external or internal claddings or linings, but does not affect the integrity of external brickwork or structural elements:- - Continuous cracking in **bricks** < 5 mm in width in one or more locations in the total external façade, or - Slippage along the **damp proof course** of 2 to 5 mm anywhere in the total external façade, or - Cracks or movement ≥ 5 mm in width in any external or internal wall **claddings**, **linings**, **finish**, or - Several cracked, loose or drummy floor or wall **tiles**, or - Replacement of any **services**.
R3 **Substantial Repair**	One or more of the following, where the damage requires the removal or replacement of a large proportion of external brickwork, or affects the stability of isolated structural elements:- - Continuous cracking in **bricks** of 5 to 15 mm in width in one or more locations in the total external façade, or - Slippage along the **damp proof course** of 5 to 15 mm anywhere in the total external façade, or - Loss of bearing to isolated walls, piers, columns, or other load-bearing elements, or - Loss of stability of isolated structural elements.
R4 **Extensive Repair**	One or more of the following, where the damage requires the removal or replacement of a large proportion of external brickwork, or the replacement or repair of several structural elements:- - Continuous cracking in **bricks** > 15 mm in width in one or more locations in the total external façade, or - Slippage along the damp proof course of 15 mm or greater anywhere in the total external façade, or - Relevelling of building, or - Loss of stability of several structural elements.
R5 **Re-build**	Extensive damage to house where the MSB (now SA NSW) and the owner have agreed to rebuild as the cost of repair is greater than the cost of replacement.

As discussed at the start of this chapter, it is very difficult to design a method of impact classification that covers all possible scenarios and permutations. While the method has been floated among some members of the mining industry, it is recommended that this table be reviewed broadly.

The recommended method has attempted to follow the current Australian Standard in terms of the number of impact categories and crack widths for Categories 3 and 4. The method is based on the extent of repairs required to repair the physical damage that has occurred, and does not include additional work that is occasionally required because replacement finishes cannot match existing damaged ones. It is therefore likely that the actual cost of repairs will vary greatly between houses depending on the nature of the existing level and type of finishes used.

The impacts experienced at Tahmoor have been classified in accordance with the revised method of classification with good results. The method allowed clearer trends to be found when undertaking statistical analyses.

A comparison between the previous and revised methods is shown in Fig. C.3.

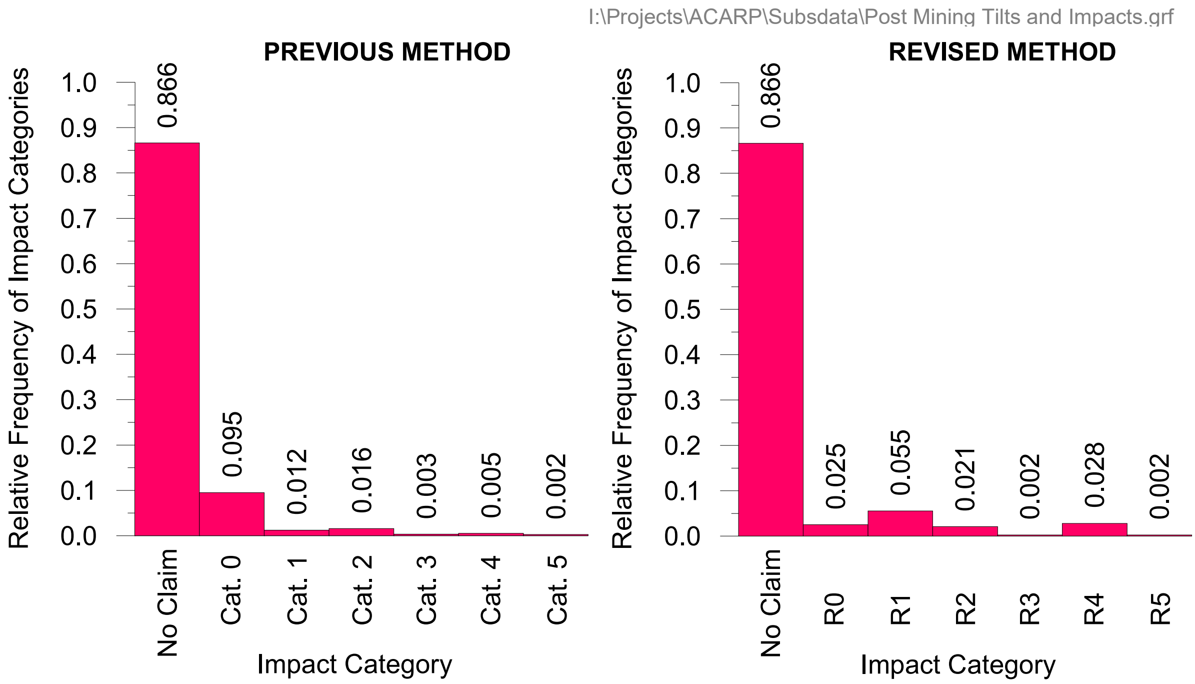


Fig. C.3 Comparison between Previous and Revised Methods of Impact Classification

It can be seen that there was an increased proportion in the higher impact categories using the revised method. This is brought about mainly by the recorded slippage on damp proof courses, which are classified as either Category 3 or Category 4 when they were previously classified as Category 1 or 2.

There was also a noticeable reduction in proportion of Category 0 impacts and noticeable increase in proportion of Category 1 impacts using the revised method. This is because the revised method reserves Category 0 impacts for impacts that did not result in cracking any linings, while the previous method allows hairline cracking to occur.

The consistent low proportion of Category 3 impacts under both the previous and current methods raises questions as to whether this category should be merged with Category 4.

C.4. Method of Impact Assessment

C.4.1. Need for Improvement of the Previous Method

The previous method of impact assessment provided specific quantitative predictions based on predicted conventional subsidence movements and general qualitative statements concerning the potential for impacts due to non-conventional movements. These non-conventional movements are additional to the predicted conventional movements.

This message was quite complex and created the potential for confusion and misunderstanding among members of the community who may easily focus on numbers and letters in a table that deal specifically with their house and misunderstand the message contained in the accompanying words of caution about the low level of reliability concerning predictions of conventional strain and potential for non-conventional movements.

This was unfortunately a necessary shortcoming of the previous method at the time as there was very little statistical information available to quantify the potential for impacts due to non-conventional movement. However, a great deal of statistical information was available following the mining of Tahmoor Mine Longwalls 22 to 24A at the time of the 2009 ACARP study and the method and message to the community could be improved. Additional statistical information was collected in 2016, which was approximately two years after the completion of Longwall 27 and one year after the completion of Longwall 28, which was the last panel to directly mine beneath the urban areas of Tahmoor. The timing of the data is such that it accounts for much of the time lag effect that occurs between the time of impact, when damage is claimed by residents and when the nature and level of the damage requiring repairs is assessed in detail by SA NSW.

While additional statistical information is now available, there remains limited knowledge at this point in time to accurately predict the locations of non-conventional movement. Substantial gains are still to be made in this area.

In the meantime, therefore, a probabilistic method of impact assessment has been developed. The method combines the potential for impacts from both conventional and non-conventional subsidence movement.

C.4.2. Factors that Could be Used to Develop a Probabilistic Method of Prediction

Trend analyses have highlighted a number of factors that could be used to develop a probabilistic method. The trends examined were:-

- *Ground tilt*

  This was found to be an ineffective parameter at Tahmoor Mine as ground tilts have been relatively benign and a low number of claims have been made solely in relation to tilt.

- *Ground strain*

  There appears to be a clear link between ground strain and impacts, particularly compressive strain. The difficulty with adopting ground strain as a predictive factor lies in the ability to accurately predict ground strain at a point.

  Another challenge with using strain to develop a probabilistic method is that there is limited information that links maximum observed strains with observed impacts at a structure. Horizontal strain is a two-dimensional parameter and it has been measured along survey lines that are oriented in one direction only.

  The above issues are less problematic for curvature and the statistical analysis on the relationship between strain and curvature shows that the observed frequency of high strains increased with increasing observed curvature.

- *Ground curvature*

  Curvature appears to be the most effective subsidence parameter to develop a probabilistic method. The trend analysis showed that the frequency of impacts increased with increasing observed curvature.

  It should be noted that we are referring to conventional curvature and not curvatures that have developed as a result of non-conventional subsidence behaviour. This is because conventional curvature can be readily predicted with reasonable correlation with observations. It is also a relatively straight-forward exercise to estimate the observed smoothed or “conventional” mining-induced curvature that has previously been experienced at houses provided some ground monitoring is undertaken across and along extracted longwalls.

  Non-conventional curvature cannot be predicted prior to mining and is accounted for by using a probabilistic method of impact assessment.

  It has also been shown that the observed frequency of high strains increased with increasing observed curvature.

- *Position of structure relative to longwall*

  A clear trend was understandably found that structures located directly above goaf were substantially more likely to experience impact. The calculated probabilities may be applicable for mining conditions that are similar to those experienced at Tahmoor Mine but will be less applicable for other mining conditions. An effective probabilistic method should create a link between the magnitude of differential subsidence movements and impact.

- *Construction type*

  Two trends have been observed. Not surprisingly, structures constructed with lightweight flexible external linings are able to accommodate a far greater range of subsidence movements than brittle inflexible linings such as masonry. The analyses merely quantified what was already well known. The second observation was that houses constructed with strip footings were noticeably more likely to experience impacts than houses constructed with a ground slab, particularly in relation to higher levels of impact. This is because houses with strip footings are more susceptible to slippage along the damp proof course.

- *Structure size*

  Trend analysis showed that larger structures attract a higher likelihood of impact. This is understandable as the chance of impacts increases with increasing footprint area. However, it is noted that the probability of severe impacts was not substantially greater for larger structures even though this would be expected if considering probabilities theoretically rather than empirically. It may be worthwhile including structure size as a factor in the development of a probabilistic method, though it is considered that it is a third order effect behind subsidence movements and construction type.

- *Structure age*

  The trend analysis for structure age did not reveal any noticeable trends.

- *Extensions, variable foundations and building joints*

  There is a clear trend of a higher frequency of impacts for structures that include extensions, variable foundations and building joints. The increased frequency appears to be related mainly to lower impact categories.

- *Urban or rural setting*

  While trends were observed, it is considered that they can be explained by other factors. However, consideration can be made to provide a more conservative estimate of probabilities in rural areas if structure size has not been taken into account.

C.4.3. Revised Method of Impact Assessment

A revised method of impact assessment has been developed, based on information received in 2016 at a time when the extraction of Longwall 29 had been completed. The method is probabilistic and currently includes conventional ground curvature and construction type as input factors.

At the time of the original 2009 ACARP study, the trends in the data were difficult to determine within small ranges of curvature because of the relatively low number of buildings that reported damage at this time. A decision was therefore taken to analyse the data in a limited number of curvature ranges, so that where possible a reasonable sample size would be available in each range. The ranges of curvature originally chosen were 5 to 15 kilometres, 15 to 50 kilometres and greater than 50 kilometres.

Additional information provided in 2016 has demonstrated that the proportion of houses reporting impacts has increased. This has allowed statistical analyses to be conducted using narrower bands of observed curvatures though some inconsistencies remain in some bands due to the sample sizes. The ranges of curvature provided in this report are 2.5 to 15 kilometres, 15 to 50 kilometres and greater than 50 kilometres.

Because the incidence of damage for different construction types showed strong trends and because the sample size was reasonable for each type of structure, the data were analysed to determine the effect of radius of curvature on the incidence of damage for each of the three structure types and for each of the three curvature ranges.

The following probabilities are proposed in Table C.5.

Table C.5 Probabilities of Impact based on Curvature and Construction Type based on the Revised Method of Impact Classification

R (km)	Repair Category			
	No Repair or R0	R1 or R2	R3 or R4	R5
Brick or brick-veneer houses with Slab on Ground				
> 50	90 ~ 95 %	3 ~ 10 %	1 %	< 0.5 %
15 to 50	70 ~ 75 %	20 ~ 25 %	5 ~ 10 %	< 0.5 %
2.5 to 15	45 ~ 65 %	25 ~ 35 %	10 ~ 15 %	1 ~ 3 %
Brick or brick-veneer houses with Strip Footing				
> 50	85 ~ 90 %	5 ~ 15 %	1 ~ 3 %	< 2 %
15 to 50	60 ~ 75 %	20 ~ 30 %	5 ~ 15 %	1 ~ 3 %
2.5 to 15	45 ~ 65 %	25 ~ 30 %	5 ~ 15 %	5 ~ 10 %
Timber-framed houses with flexible external linings of any foundation type				
> 50	90 ~ 95 %	3 ~ 10 %	1 %	< 0.5 %
15 to 50	75 ~ 85 %	10 ~ 20 %	5 ~ 10 %	< 0.5 %
2.5 to 15	70 ~ 80 %	20 ~ 25 %	7 ~ 12 %	< 0.5 %

The results have been expressed as a range of values rather than a single number, recognising that the data had considerable scatter within each curvature range. While structure size and building extensions have not been included in the predictive tables, it is recommended to adopt percentages at the higher end of the range for larger structures or those with building extensions.

The percentages stated in each table are the percentages of building structures of that type that would be likely to be damaged to the level indicated within each curvature range. The levels of damage in the tables are indicated with reference to the repair categories described in the damage classification given in Table C.4.

To place these values in context, Table C.6 shows the actual percentages recorded at Tahmoor Mine for all buildings within the sample.

Table C.6 Observed Frequency of Impacts observed for all buildings at Tahmoor Mine

R (km)	Repair Category			
	No Claim or R0	R1 or R2	R3 or R4	R5
> 50	91 %	7 %	2 %	0 %
15 to 50	72 %	20 %	7 %	1 %
5 to 15	59 %	27 %	14 %	3 %

It can be seen that the proposed probabilities for the higher impact categories have been increased compared to those observed to date. These have been deliberately increased, because it has been noticed that some of the claims for damage have been submitted well after the event and it is possible that the numbers damaged in this category could be increased as further claims are received and investigated. These numbers are sensitive to change. In light of the above, it is recommended that the probabilities be revisited in the future as mining progresses.

The ranges provided in Table C.5 have been converted into a set of probability curves to remove artificial discontinuities that are formed by dividing curvatures into three categories. These are shown in Fig. C.4. The probability curves are applicable for all houses and civil structures.

At the time of writing ACARP Research Project C12015 (Waddington, 2009), the observed proportion of houses where the MSB (now SA NSW) and affected landowners had agreed to rebuild rather than repair (Category R5) impacts was less than 0.5 %. Since the publication of the research report, the proportion of houses where a decision has been made to rebuild has increased to approximately 1.1 % overall and 3.2 % above Longwalls 24A to 27 within the observed zone of increased subsidence. The decision to rebuild rather than repair a house is based on a variety of factors.

Whilst acknowledging the significance of a decision to rebuild compared to repair a house, all houses previously impacted at Tahmoor could have been repaired rather than replaced, including those where a decision has been made to rebuild them. This does not diminish the significance of this category from a social and economic impact point of view and it is important to continue recording the number of instances where a decision has been made to rebuild a house.

C.4.4. Review of Observed Probabilities as mining continues

Reviews of observed probabilities are continually undertaken as Tahmoor Mine and other mines continue to extract beneath houses. The provision of additional information on impact on houses in 2016 has improved the level of understanding on the nature and frequency of impacts during the mining of Longwalls 22 to 29 compared to the information that was collected for the previous 2009 ACARP study, which was conducted after the mining of Longwalls 22 to 24A.

Additional statistical information was collected in 2016, which was approximately two years after the completion of Longwall 27 and one year after the completion of Longwall 28, which was the last panel to directly mine beneath the urban areas of Tahmoor.

A finding from the additional information is that the proportion of houses that have experienced impacts has increased over time. The reasons for the increase are due to the time lag effect that occurs between the mining impact, when damage is claimed by residents and when the nature and level of the damage requiring repairs is assessed in detail by SA NSW.

In light of the above, it is recommended that the probabilities be revisited in the future.

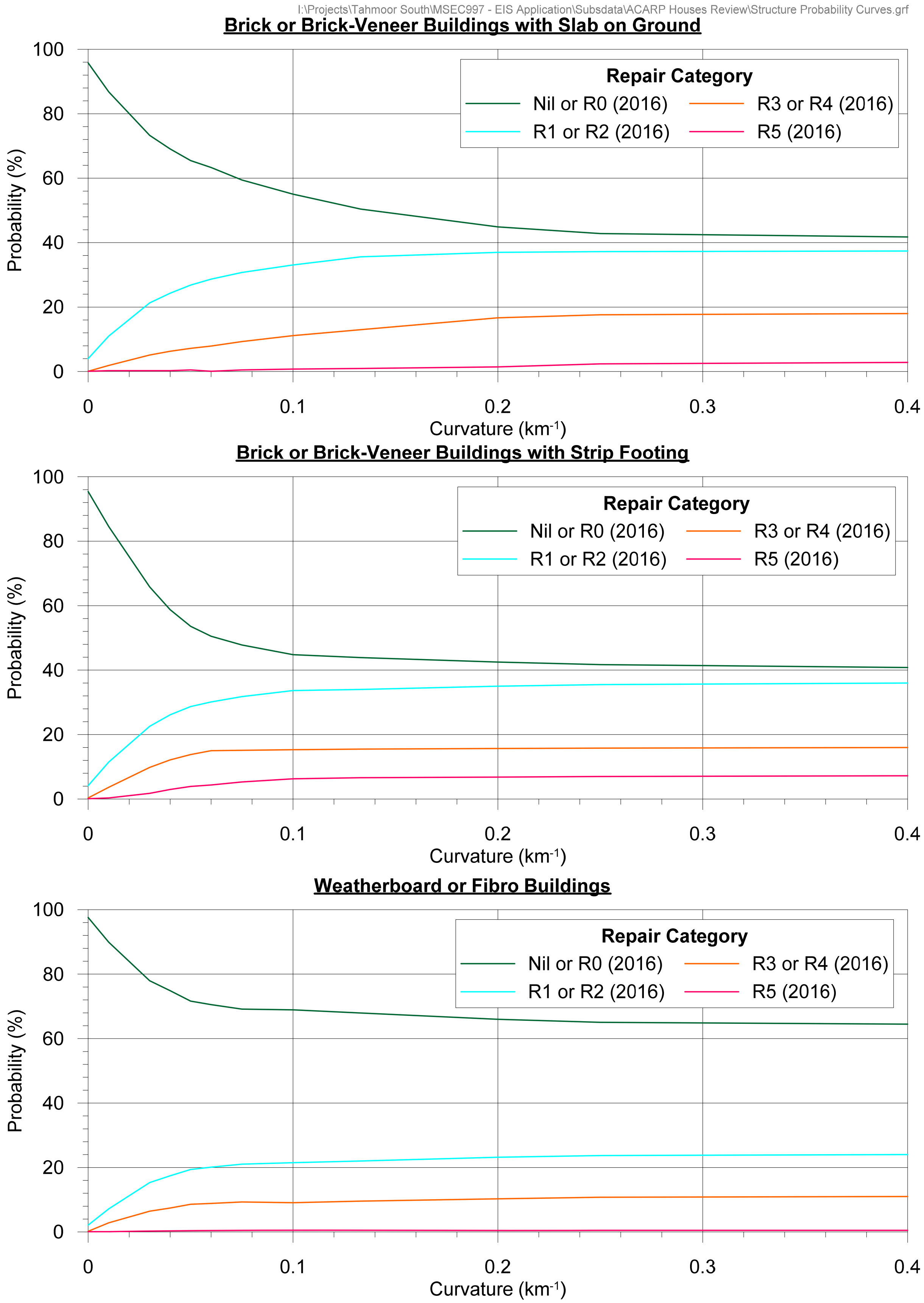


Fig. C.4 Probability Curves for Impacts to Buildings (based on observations up to Longwall 29)

APPENDIX D. TABLES

Table D.01 - Tahmoor South - Predictions for Stream Pools

Stream	Pool	Predicted Total Subsidence after all Longwalls (mm)	Predicted Total Upsidence after all Longwalls (mm)	Predicted Total Closure after all Longwalls (mm)
Dog Trap Creek	DTC-P01	850	225	225
	DTC-P02	900	225	225
	DTC-P03	900	225	250
	DTC-P03a	1100	275	275
	DTC-P04	1550	425	300
	DTC-P05	1500	375	325
	DTC-P06	1250	325	350
	DTC-P07	1000	300	375
	DTC-P08	900	325	375
	DTC-P09	850	325	400
	DTC-P10	950	400	400
	DTC-P11	1250	550	425
	DTC-P12	1350	600	425
	DTC-P13	1350	600	425
	DTC-P14	1100	475	425
	DTC-P15	650	300	400
	DTC-P16	600	275	400
	DTC-P17	375	250	375
	DTC-P18	225	200	350
	DTC-P19	175	175	300
	DTC-P20	125	200	275
	DTC-P21	100	125	225
	DTC-P22	90	125	225
	DTC-P23	80	125	225
	DTC-P24	80	125	225
	DTC-P25	70	250	200
	DTC-P26	70	250	200
	DTC-P27	70	250	175
	DTC-P28	70	250	175
	DTC-P29	70	200	175
	DTC-P30	80	125	175
	DTC-P31	125	200	225
	DTC-P32	550	300	400
	DTC-P33	475	275	400
	DTC-P34	400	250	400
	DTC-P35	225	175	350
	DTC-P36	200	175	350
	DTC-P37	200	150	325
	DTC-P38	125	125	250
	DTC-P39	125	125	250
	DTC-P40	125	125	275
	DTC-P41	100	90	200
	DTC-P42	90	60	125
	DTC-P43	30	20	30
	DTC-P44	< 20	20	< 20
	DTC-P45	< 20	< 20	< 20
	DTC-P46	< 20	< 20	< 20
	DTC-P47	< 20	< 20	< 20
	DTC-P48	< 20	< 20	< 20
	DTC-P49	< 20	< 20	< 20
	DTC-P50	< 20	< 20	< 20
	DTC-P51	< 20	< 20	< 20
	DTC-P52	< 20	< 20	< 20
	DTC-P53	< 20	< 20	< 20
	DTC-P54	< 20	< 20	< 20
	DTC-P55	< 20	< 20	< 20
	DTC-P56	< 20	< 20	< 20
	DTC-P57	< 20	< 20	< 20
	DTC-P58	< 20	< 20	< 20
	DTC-P59	< 20	< 20	< 20

Table D.01 - Tahmoor South - Predictions for Stream Pools

Stream	Pool	Predicted Total Subsidence after all Longwalls (mm)	Predicted Total Upsidence after all Longwalls (mm)	Predicted Total Closure after all Longwalls (mm)
Hornes Creek	HC-P01	< 20	< 20	< 20
	HC-P02	< 20	< 20	< 20
	HC-P03	< 20	< 20	< 20
	HC-P04	< 20	< 20	< 20
	HC-P05	< 20	< 20	< 20
	HC-P06	< 20	< 20	< 20
	HC-P07	< 20	< 20	< 20
	HC-P08	< 20	< 20	< 20
	HC-P09	< 20	< 20	< 20
	HC-P10	< 20	< 20	< 20
	HC-P11	< 20	< 20	< 20
	HC-P12	< 20	< 20	< 20
	HC-P13	< 20	< 20	< 20
	HC-P14	< 20	< 20	< 20
	HC-P15	< 20	< 20	< 20
	HC-P16	< 20	< 20	< 20
Teatree Hollow	TH-P01	1250	275	200
	TH-P02	1050	375	250
	TH-P03	125	100	200
	TH-P04	100	90	175
	TH-P05	80	50	125
	TH-P06	< 20	< 20	< 20
	TH-P07	< 20	< 20	< 20
	TH-P08	< 20	< 20	< 20
Tributary 1 of Dog Trap Creek	T1DTC-P01	1300	225	225
	T1DTC-P02	1300	550	450
	T1DTC-P03	1400	600	475
	T1DTC-P04	1450	600	500
	T1DTC-P05	1450	600	550
	T1DTC-P06	1100	475	700
	T1DTC-P07	1050	650	750
	T1DTC-P08	1250	700	650
	T1DTC-P09	550	300	475
Tributary 2 of Dog Trap Creek	T2DTC-P01	1000	225	250
	T2DTC-P02	950	325	425
	T2DTC-P03	950	350	450
Tributary of Teatree Hollow	TTH-P01	90	125	90
	TTH-P02	950	225	200
	TTH-P03	1000	300	300
	TTH-P04	850	300	325
	TTH-P05	250	150	250

Table D.02 - Tahmoor South - Details of Houses

House Ref.	Maximum Plan Dimension (m)	Plan Area (m2)	Number of Storeys	Wall Construction	Footing Construction	Wall and Footing Construction	Roof Constructfion	House Located Above Goaf	House Located Above Solid Coal
BAN_001_h01	12	101	1	N/A	N/A	N/A	N/A	1	
BAR_001_h01	13	351	1	N/A	N/A	N/A	N/A		1
BAR_010_h01	23	268	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAR_020_h01	16	166	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAR_020_h02	11	83	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAR_040_h01	28	380	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BAR_050_h01	21	443	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BAR_060_h01	15	117	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BAR_070_h01	18	242	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BAR_090_h01	21	190	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAR_100_h01	24	209	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAR_110_h01	12	114	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled		1
BAR_120_h01	19	245	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAR_130_h01	28	415	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BAR_140_h01	17	206	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAR_140_h02	12	135	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BAR_150_h01	31	495	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BAR_160_h01	14	120	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAR_165_h01	13	355	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAR_170_h01	15	170	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BAR_175_h01	19	185	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAR_177_h01	19	218	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAR_185_h01	16	236	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BAR_185_h02	13	122	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAR_195_h01	18	311	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BAR_195_h02	18	241	1	N/A	N/A	N/A	N/A		1
BAR_205_h01	20	225	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BAR_210_h01	16	228	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled		1
BAR_230_h01	14	168	1	N/A	N/A	N/A	Metal		1
BAR_235_h01	20	179	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BAR_245_h01	19	233	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAR_475_h01	17	216	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BAR_480_h01	27	323	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAR_485_h01	32	403	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BAR_490_h01	10	84	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BAR_490_h02	17	120	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BAR_495_h01	21	253	1	N/A	N/A	N/A	N/A		1
BAR_505_h01	10	325	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BAR_510_h01	14	174	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BAR_530_h01	36	407	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAR_535_h01	11	86	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BAR_550_h01	14	348	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BAS_001_h01	24	224	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BAS_005_h01	22	368	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Metal		1
BAS_007_h01	13	314	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAS_009_h01	27	318	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Tiled		1
BAS_015_h01	21	244	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAS_017_h01	31	301	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAS_019_h01	20	246	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAS_021_h01	21	293	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAS_023_h01	33	366	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAS_025_h01	16	350	1	N/A	N/A	N/A	Metal		1
BAS_027_h01	19	325	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Metal		1
BAV_001_h01	19	244	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAV_003_h01	19	179	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAV_005_h01	12	119	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAV_007_h01	43	458	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAV_009_h01	18	236	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAV_011_h01	14	171	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAV_013_h01	15	163	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAV_015_h01	14	139	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BAV_017_h01	21	238	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAV_019_h01	14	159	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAV_021_h01	23	269	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BAV_023_h01	24	274	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BAV_025_h01	15	156	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAV_027_h01	16	155	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAV_031_h01	13	132	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAV_033_h01	14	175	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAV_035_h01	18	211	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAV_037_h01	16	155	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAV_039_h01	17	134	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAV_041_h01	13	141	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BAV_043_h01	14	109	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAV_045_h01	12	102	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAV_047_h01	19	210	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAV_049_h01	19	232	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAV_053_h01	17	270	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAV_087_h01	14	126	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAV_089_h01	29	317	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAV_091_h01	11	76	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BAV_093_h01	24	311	2	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BAV_099_h01	17	170	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAV_101_h01	13	109	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAV_105_h01	23	322	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAV_107_h01	16	181	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAV_109_h01	13	105	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAV_111_h01	18	189	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAV_113_h01	15	177	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAV_115_h01	15	167	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAV_117_h01	18	211	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAV_119_h01	20	198	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAV_121_h01	13	145	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled		1
BAV_123_h01	13	103	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAV_125_h01	14	136	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAV_127_h01	14	130	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAV_129_h01	14	143	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAV_131_h01	21	243	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BAV_133_h01	21	270	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BAV_145_h01	23	261	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAV_147_h01	22	308	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAV_149_h01	21	371	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1

Table D.02 - Tahmoor South - Details of Houses

House Ref.	Maximum Plan Dimension (m)	Plan Area (m2)	Number of Storeys	Wall Construction	Footing Construction	Wall and Footing Construction	Roof Construcftion	House Located Above Goaf	House Located Above Solid Coal
BAV_155_h01	17	208	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAV_159_h01	18	189	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAV_173_h01	17	276	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BAV_175_h01	18	199	1	N/A	N/A	N/A	Metal		1
BAV_176_h01	20	166	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BAV_177_h01	18	206	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BAV_178_h01	28	313	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BAV_179_h01	25	234	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BAV_180_h01	18	169	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAV_181_h01	17	167	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BAV_182_h01	15	194	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAV_183_h01	26	251	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BAV_184_h01	23	237	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BAV_185_h01	20	252	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BAV_186_h01	11	188	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BBA_010_h01	26	644	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BBA_015_h01	19	188	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BBA_020_h01	22	309	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BBA_025_h01	26	282	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BBA_030_h01	15	257	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled	1	
BBA_040_h01	28	118	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BBA_050_h01	14	166	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BBA_070_h01	12	128	1	Fibro	Suspended on Piers	Timber Framed	Metal	1	
BBA_070_h02	14	215	2	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BBA_090_h01	22	243	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Metal	1	
BBA_100_h01	23	316	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BBA_120_h01	12	143	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BBA_120_h02	32	583	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BBA_130_h01	26	288	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BBA_130_h02	13	154	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BBA_150_h01	24	343	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BBA_150_h02	12	111	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BBA_155_h01	15	150	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BBA_165_h01	19	202	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BBA_175_h01	13	161	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BBA_190_h01	22	439	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BBA_202_h01	15	204	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BBA_204_h01	14	130	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BBA_215_h01	20	295	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BBA_220_h01	13	140	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BBA_230_h01	15	131	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BBA_240_h01	23	341	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BBA_250_h01	17	164	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BBA_255_h01	30	359	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BBA_260_h01	14	130	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled	1	
BBA_270_h01	12	71	1	Fibro	Suspended on Piers	Timber Framed	Metal	1	
BBA_280_h01	20	218	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BBA_290_h01	15	144	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled	1	
BBA_300_h01	23	281	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BBA_300_h02	12	92	1	Fibro	Suspended on Piers	Timber Framed	Metal	1	
BBA_305_h01	12	104	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BBA_307_h01	19	249	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BBE_001_h01	17	155	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BBE_003_h01	17	157	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BBE_004_h01	15	131	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BBE_005_h01	15	195	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BBI_001_h01	20	241	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BBI_002_h01	17	285	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BBI_004_h01	19	153	2	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BBI_005_h01	16	188	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BBI_006_h01	14	240	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BBI_007_h01	19	181	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BBI_008_h01	18	245	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Metal		1
BBI_009_h01	18	244	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Metal		1
BBI_010_h01	20	213	2	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BBI_011_h01	21	209	2	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BBI_012_h01	13	114	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled		1
BBI_015_h01	20	222	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BBI_016_h01	21	234	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BBI_017_h01	14	180	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BBI_018_h01	18	198	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BBI_019_h01	17	164	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BBI_022_h01	19	206	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled		1
BBI_024_h01	16	153	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BBI_026_h01	18	170	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BBI_028_h01	21	235	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BBI_030_h01	11	105	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BBI_032_h01	12	97	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BBI_034_h01	13	152	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BBI_035_h01	13	219	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BBN_001_h01	16	221	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BBN_002_h01	14	150	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BBN_003_h01	15	166	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BBN_004_h01	13	123	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BBN_005_h01	17	150	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BBN_006_h01	19	159	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BBN_012_h01	16	151	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BBN_013_h01	17	217	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BBN_014_h01	14	123	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BBN_015_h01	16	129	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BBN_016_h01	18	160	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BBN_017_h01	14	125	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BCA_001_h01	21	234	1	N/A	N/A	N/A	Metal	1	
BCA_010_h01	24	252	1	N/A	N/A	N/A	Tiled	1	
BCA_015_h01	18	227	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Metal	1	
BCA_020_h01	17	151	1	Weatherboard	N/A	Timber Framed	Metal	1	
BCA_025_h01	18	298	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BCA_030_h01	32	291	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Tiled	1	
BCA_035_h01	17	181	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Tiled	1	
BCA_040_h01	11	85	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BCA_045_h01	18	122	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BCA_050_h01	10	71	2	Fibro	Suspended on Piers	Timber Framed	Metal	1	

Table D.02 - Tahmoor South - Details of Houses

House Ref.	Maximum Plan Dimension (m)	Plan Area (m2)	Number of Storeys	Wall Construction	Footing Construction	Wall and Footing Construction	Roof Constructfion	House Located Above Goaf	House Located Above Solid Coal
BCA_055_h01	21	239	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BCA_060_h01	20	350	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BCA_065_h01	23	337	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Tiled	1	
BCA_070_h01	19	194	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BCA_075_h01	15	106	1	N/A	N/A	N/A	Metal	1	
BCA_080_h01	14	170	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Tiled	1	
BCA_085_h01	22	241	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BCA_090_h01	11	105	1	Fibro	Suspended on Piers	Timber Framed	Tiled	1	
BCA_095_h01	23	265	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Tiled	1	
BCA_100_h01	31	370	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BCA_105_h01	22	196	1	N/A	N/A	N/A	Tiled	1	
BCA_110_h01	23	175	1	N/A	N/A	N/A	N/A		1
BCA_115_h01	32	282	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Metal		1
BCA_120_h01	14	179	1	N/A	N/A	N/A	Tiled		1
BCL_001_h01	22	260	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BCL_003_h01	19	304	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BCL_005_h01	18	209	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Metal	1	
BCL_007_h01	35	324	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BCL_009_h01	18	199	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BCL_011_h01	19	228	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BCL_013_h01	25	283	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BCL_015_h01	17	195	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Tiled	1	
BCL_017_h01	25	286	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BCL_019_h01	18	277	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BCL_021_h01	25	341	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BCL_023_h01	26	329	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BCL_025_h01	28	393	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BCL_027_h01	23	310	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BCL_029_h01	27	280	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BCL_033_h01	30	315	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Tiled	1	
BCL_035_h01	23	304	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BCL_037_h01	11	348	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BCL_039_h01	22	333	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BCL_041_h01	20	329	1	N/A	N/A	N/A	N/A	1	
BCL_043_h01	25	266	1	N/A	N/A	N/A	N/A	1	
BCL_045_h01	18	300	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BCL_047_h01	16	367	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BCL_049_h01	20	274	2	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BCL_051_h01	18	306	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BCL_053_h01	33	441	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BCL_055_h01	39	573	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BCL_059_h01	23	230	1	N/A	N/A	N/A	Metal	1	
BCL_061_h01	23	242	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BCM_001_h01	11	103	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BCM_002_h01	19	231	2	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BCM_004_h01	17	211	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BCM_005_h01	23	258	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BCM_006_h01	24	255	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BCM_007_h01	20	314	2	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BCM_008_h01	14	156	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BCM_013_h01	22	169	1	N/A	N/A	N/A	Tiled		1
BCM_014_h01	18	167	1	N/A	N/A	N/A	Tiled		1
BCM_015_h01	18	163	1	N/A	N/A	N/A	Tiled		1
BCM_016_h01	22	175	1	N/A	N/A	N/A	Tiled		1
BCM_017_h01	23	254	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BCM_018_h01	13	108	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BCM_019_h01	10	235	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BCM_020_h01	14	114	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BCM_022_h01	11	181	2	Weatherboard	Strip Footing	Timber Framed	Metal		1
BCM_024_h01	21	249	2	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BCM_026_h01	12	107	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BCM_027_h01	15	165	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BCM_029_h01	15	178	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BCM_031_h01	17	187	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BCM_033_h01	15	126	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled		1
BCM_035_h01	21	243	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BCM_036_h01	12	111	1	Fibro	Suspended on Piers	Timber Framed	Tiled		1
BCM_038_h01	16	150	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BCM_040_h01	13	138	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BCM_042_h01	13	121	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BCM_044_h01	13	151	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BCM_046_h01	23	320	1	N/A	N/A	N/A	Metal		1
BCM_048_h01	24	260	1	N/A	N/A	N/A	Metal		1
BCM_058_h01	16	212	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BCM_062_h01	21	200	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BCM_064_h01	14	154	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BCM_066_h01	12	121	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BCM_068_h01	19	165	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BCM_070_h01	19	156	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BCM_072_h01	16	151	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BCP_010_h01	10	124	1	N/A	N/A	N/A	N/A		1
BCP_040_h01	14	98	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BCP_050_h01	5	32	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BCP_050_h02	11	98	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BCP_060_h01	30	343	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BCP_075_h01	28	324	1	N/A	N/A	N/A	N/A	1	
BDA_001_h01	25	366	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BDA_003_h01	35	578	1	N/A	N/A	N/A	N/A		1
BDA_005_h01	19	260	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BDA_007_h01	22	220	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BDA_009_h01	19	212	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BDA_011_h01	21	289	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BDA_013_h01	30	284	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BDW_070_h01	14	120	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BDY_001_h01	11	110	1	Fibro	Suspended on Piers	Timber Framed	Tiled	1	
BDY_004_h01	10	99	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BDY_007_h01	14	154	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BDY_010_h01	27	300	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BDY_013_h01	24	211	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled	1	
BDY_016_h01	13	162	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BDY_019_h01	21	168	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BDY_022_h01	17	219	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	

Table D.02 - Tahmoor South - Details of Houses

House Ref.	Maximum Plan Dimension (m)	Plan Area (m2)	Number of Storeys	Wall Construction	Footing Construction	Wall and Footing Construction	Roof Constructfion	House Located Above Goaf	House Located Above Solid Coal
BDY_025_h01	22	271	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BDY_031_h01	10	77	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BDY_037_h01	14	138	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BDY_047_h01	22	254	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BDY_050_h01	19	175	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BDY_060_h01	16	174	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BDY_070_h01	16	197	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BDY_080_h01	12	101	1	Fibro	Suspended on Piers	Timber Framed	Tiled	1	
BDY_090_h01	14	122	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BDY_100_h01	36	392	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BDY_110_h01	15	163	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled	1	
BDY_130_h01	17	294	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BDY_140_h01	17	162	1	Fibro	Suspended on Piers	Timber Framed	Metal	1	
BDY_140_h02	15	141	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BDY_150_h01	16	125	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BDY_160_h01	13	164	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BDY_170_h01	11	75	1	Fibro	Suspended on Piers	Timber Framed	Metal	1	
BDY_180_h01	12	131	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BDY_190_h01	11	80	1	Fibro	Suspended on Piers	Timber Framed	Tiled	1	
BDY_190_h02	11	81	1	Fibro	Suspended on Piers	Timber Framed	Tiled	1	
BDY_200_h01	30	371	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BDY_210_h01	16	188	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BDY_212_h01	13	131	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BDY_214_h01	17	164	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BDY_216_h01	14	147	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BDY_218_h01	19	209	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BDY_220_h01	10	73	1	Fibro	Suspended on Piers	Timber Framed	Metal	1	
BDY_224_h01	14	147	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BEL_001_h01	19	293	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BEL_003_h01	24	254	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Metal		1
BEL_005_h01	35	356	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Tiled		1
BEL_007_h01	19	133	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BEL_009_h01	19	194	1	N/A	N/A	N/A	Tiled		1
BEL_011_h01	24	263	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BEL_013_h01	22	390	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BEL_017_h01	27	313	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BEL_019_h01	33	356	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BEL_021_h01	23	216	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BEL_023_h01	21	248	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BEL_025_h01	26	277	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BEL_027_h01	27	371	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BEL_029_h01	13	143	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BEL_031_h01	19	182	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BEL_033_h01	17	223	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BEL_035_h01	15	164	1	N/A	N/A	N/A	Tiled		1
BEL_036_h01	28	478	1	N/A	N/A	N/A	N/A		1
BEL_037_h01	22	276	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BEL_043_h01	25	216	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BEL_045_h01	30	300	1	N/A	N/A	N/A	Tiled		1
BEL_047_h01	25	309	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BEL_049_h01	27	338	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BEL_051_h01	20	265	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BEL_052_h01	24	304	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BEL_053_h01	16	179	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BEL_054_h01	18	227	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BEL_055_h01	19	213	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BEL_056_h01	16	165	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BEL_057_h01	19	178	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BEL_058_h01	12	248	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BEL_059_h01	15	124	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BEL_061_h01	15	150	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BEL_063_h01	21	164	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BEL_065_h01	12	147	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BEL_067_h01	14	107	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BEL_069_h01	20	220	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BEL_071_h01	12	99	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BEL_073_h01	14	119	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BEL_075_h01	19	209	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BEL_076_h01	19	277	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BEL_077_h01	22	324	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BEL_079_h01	26	290	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BEL_081_h01	23	373	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Tiled		1
BEL_087_h01	20	307	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BEL_089_h01	21	363	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BEL_091_h01	21	215	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BEL_093_h01	19	237	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BEL_095_h01	17	162	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Tiled		1
BFL_001_h01	16	180	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BFL_003_h01	31	321	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BFL_005_h01	23	310	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BFL_007_h01	19	216	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BFL_009_h01	27	292	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BGL_001_h01	23	426	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BGL_010_h01	18	173	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BGL_015_h01	16	111	1	N/A	N/A	N/A	Tiled		1
BGL_045_h01	16	193	1	N/A	N/A	N/A	Metal		1
BGL_050_h01	16	235	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BGO_035_h01	13	137	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BGO_040_h01	18	307	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BGO_050_h01	13	131	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BGO_055_h01	21	282	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BGR_001_h01	17	177	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BGR_003_h01	15	235	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BGR_005_h01	15	178	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BGR_007_h01	14	140	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BGR_009_h01	17	95	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BGR_035_h01	44	363	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BGR_035_h02	44	381	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BGR_053_h01	13	101	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BGR_063_h01	15	120	1	Fibro	Suspended on Piers	Timber Framed	Metal	1	
BGR_065_h01	20	216	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BGR_067_h01	13	138	1	N/A	N/A	N/A	Metal	1	

Table D.02 - Tahmoor South - Details of Houses

House Ref.	Maximum Plan Dimension (m)	Plan Area (m2)	Number of Storeys	Wall Construction	Footing Construction	Wall and Footing Construction	Roof Construcftion	House Located Above Goaf	House Located Above Solid Coal
BGR_069_h01	12	101	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BGR_071_h01	27	295	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BGR_073_h01	13	118	1	Fibro	Suspended on Piers	Timber Framed	Metal	1	
BGR_075_h01	17	169	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BGR_077_h01	21	242	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BGR_079_h01	19	210	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BGR_081_h01	11	75	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled	1	
BGR_083_h01	16	123	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BGR_085_h01	22	275	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BGR_087_h01	15	151	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BGR_089_h01	16	205	1	Fibro	Suspended on Piers	Timber Framed	Metal	1	
BGR_091_h01	21	254	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BGR_093_h01	20	219	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BGR_095_h01	22	252	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BGR_097_h01	13	139	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BGR_099_h01	21	269	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BGR_101_h01	18	179	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BGR_103_h01	12	120	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BGR_105_h01	16	181	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BGR_107_h01	21	235	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BGR_109_h01	25	272	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BGR_111_h01	26	246	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BGR_113_h01	22	290	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BGR_115_h01	22	256	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BGR_117_h01	14	135	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BGR_119_h01	13	116	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled	1	
BGR_121_h01	14	140	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BGR_123_h01	15	200	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BGR_125_h01	20	218	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BGR_129_h01	25	208	2	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BGR_131_h01	27	280	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BGR_133_h01	18	160	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BGR_135_h01	14	125	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BGR_137_h01	21	249	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BGR_139_h01	18	165	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BGR_141_h01	16	202	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BGR_143_h01	14	176	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BGR_145_h01	20	247	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BGR_147_h01	18	134	1	N/A	N/A	N/A	N/A	1	
BGR_157_h01	18	244	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BGR_167_h01	13	177	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BGR_167_h02	22	258	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BGR_177_h01	36	452	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BGR_180_h01	12	203	1	Fibro	Suspended on Piers	Timber Framed	Tiled	1	
BGR_183_h01	25	290	1	N/A	N/A	N/A	N/A	1	
BGR_193_h01	16	244	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BGR_203_h01	12	185	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BGR_213_h01	17	122	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BGR_218_h01	16	245	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BGR_221_h01	26	330	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BGR_225_h01	11	108	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BGR_230_h01	32	432	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BGR_230_h02	12	129	1	Fibro	Suspended on Piers	Timber Framed	Metal	1	
BGR_235_h01	31	609	2	N/A	N/A	N/A	N/A	1	
BGR_235_h02	23	278	1	N/A	N/A	N/A	N/A	1	
BGR_240_h01	15	301	1	N/A	N/A	N/A	N/A	1	
BGR_245_h01	18	195	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BGR_250_h01	18	180	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BGR_255_h01	22	231	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BGR_260_h01	12	127	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BGR_261_h01	15	161	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BGR_263_h01	17	161	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BGR_268_h01	15	220	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BGR_278_h01	17	154	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled	1	
BGR_281_h01	23	409	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BGR_281_h02	10	252	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BGR_301_h01	15	132	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BGW_001_h01	16	168	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BGW_011_h01	22	272	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BHA_001_h01	16	108	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BHA_003_h01	12	113	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHA_005_h01	14	164	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHA_007_h01	15	152	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BHA_009_h01	19	235	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHA_011_h01	27	243	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BHA_013_h01	21	230	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHA_015_h01	16	173	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BHA_017_h01	14	121	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHA_018_h01	21	280	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHA_019_h01	18	236	1	N/A	N/A	N/A	Metal		1
BHA_021_h01	20	233	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHA_023_h01	14	150	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BHA_025_h01	19	272	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHA_026_h01	20	250	2	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BHA_030_h01	20	229	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHA_033_h01	10	223	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHA_034_h01	13	103	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BHA_035_h01	16	157	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BHA_036_h01	22	228	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHA_039_h01	15	168	1	N/A	N/A	N/A	N/A	1	
BHA_040_h01	15	149	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHA_041_h01	12	95	1	Fibro	Suspended on Piers	Timber Framed	Metal	1	
BHA_042_h01	18	152	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHA_043_h01	13	140	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHA_045_h01	11	107	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BHA_046_h01	20	199	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BHA_047_h01	22	233	2	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BHA_048_h01	18	165	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHA_049_h01	13	99	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHA_050_h01	13	118	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BHA_051_h01	18	185	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BHA_052_h01	17	133	1	Brick or Brick-Veneer	Suspended on Piers	Timber Framed	Metal	1	

Table D.02 - Tahmoor South - Details of Houses

House Ref.	Maximum Plan Dimension (m)	Plan Area (m2)	Number of Storeys	Wall Construction	Footing Construction	Wall and Footing Construction	Roof Constructfion	House Located Above Goaf	House Located Above Solid Coal
BHA_054_h01	18	132	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHA_056_h01	14	155	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHA_058_h01	16	223	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BHA_061_h01	24	224	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHA_064_h01	18	188	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BHA_067_h01	16	180	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled	1	
BHA_070_h01	13	190	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHA_072_h01	14	147	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BHA_076_h01	15	123	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHA_078_h01	14	177	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHA_080_h01	19	163	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHA_082_h01	14	173	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHA_084_h01	11	120	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHA_087_h01	23	335	1	N/A	N/A	N/A	N/A	1	
BHA_088_h01	13	102	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BHA_089_h01	20	264	1	N/A	Slab on Ground	N/A	Tiled	1	
BHA_090_h01	26	301	1	N/A	Slab on Ground	N/A	Tiled	1	
BHA_091_h01	15	162	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHA_092_h01	13	203	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHA_093_h01	19	450	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHA_098_h01	12	102	1	Fibro	Suspended on Piers	Timber Framed	Metal	1	
BHA_100_h01	14	163	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BHA_101_h01	20	214	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHA_102_h01	23	242	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHA_104_h01	14	153	1	N/A	N/A	N/A	N/A		1
BHA_105_h01	14	147	1	N/A	N/A	N/A	N/A		1
BHA_106_h01	14	105	1	N/A	N/A	N/A	N/A		1
BHA_106_h02	14	112	1	N/A	N/A	N/A	N/A		1
BHA_106_h03	14	108	1	N/A	N/A	N/A	N/A		1
BHA_106_h04	14	121	1	N/A	N/A	N/A	N/A		1
BHA_109_h01	18	171	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHA_111_h01	10	89	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BHA_116_h01	17	154	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BHA_117_h01	20	291	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHD_001_h01	19	183	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHD_002_h01	14	327	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHD_003_h01	22	185	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHD_004_h01	19	158	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHD_005_h01	17	288	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHD_006_h01	23	253	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHD_007_h01	14	179	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHD_008_h01	19	346	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHD_009_h01	22	288	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHD_010_h01	23	314	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHD_011_h01	20	259	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BHD_012_h01	23	279	1	N/A	N/A	N/A	N/A		1
BHI_001_h01	12	103	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled		1
BHI_005_h01	20	432	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BHI_010_h01	17	262	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BHO_001_h01	24	322	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BHO_002_h01	21	303	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHO_003_h01	23	294	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHO_004_h01	17	258	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHO_005_h01	22	291	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHO_006_h01	15	179	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHO_008_h01	22	320	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BHO_009_h01	21	283	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHO_010_h01	19	188	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHO_011_h01	18	274	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHO_012_h01	26	288	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHO_013_h01	22	257	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHO_014_h01	14	348	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHO_015_h01	20	258	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHO_017_h01	15	257	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BHO_019_h01	10	396	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BHO_021_h01	18	257	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHO_023_h01	18	281	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHO_025_h01	20	260	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHO_027_h01	13	321	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHO_029_h01	12	268	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHO_031_h01	26	317	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHO_033_h01	23	277	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHO_035_h01	36	421	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHO_036_h01	11	358	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHO_037_h01	19	240	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHO_039_h01	27	291	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BHO_041_h01	31	375	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BHO_043_h01	28	251	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHO_045_h01	20	565	2	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BHO_047_h01	41	566	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BHO_048_h01	22	218	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BHO_051_h01	34	333	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHO_053_h01	27	357	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BHO_055_h01	16	382	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHO_057_h01	21	233	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHO_059_h01	28	225	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BHO_061_h01	26	323	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Metal	1	
BHO_065_h01	26	351	1	N/A	N/A	N/A	N/A	1	
BHO_067_h01	20	367	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BHO_069_h01	20	193	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Tiled	1	
BHO_071_h01	20	232	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BHO_073_h01	19	189	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHR_001_h01	30	291	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHR_003_h01	28	296	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHR_005_h01	10	302	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHR_007_h01	15	133	1	N/A	N/A	N/A	N/A		1
BHR_009_h01	19	277	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHW_001_h01	17	173	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_003_h01	22	226	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_005_h01	19	210	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_007_h01	16	215	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_009_h01	18	179	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	

Table D.02 - Tahmoor South - Details of Houses

House Ref.	Maximum Plan Dimension (m)	Plan Area (m2)	Number of Storeys	Wall Construction	Footing Construction	Wall and Footing Construction	Roof Constructfion	House Located Above Goaf	House Located Above Solid Coal
BHW_011_h01	18	260	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_013_h01	17	248	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_015_h01	17	191	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_017_h01	20	255	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BHW_019_h01	14	138	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_021_h01	16	137	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_023_h01	16	143	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_025_h01	18	197	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_027_h01	21	242	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_029_h01	17	152	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_031_h01	16	179	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_033_h01	16	200	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHW_035_h01	13	106	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHW_039_h01	20	252	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_041_h01	27	291	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_045_h01	14	108	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BHW_047_h01	18	204	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BHW_049_h01	20	197	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_051_h01	20	213	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Tiled	1	
BHW_053_h01	18	201	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_055_h01	15	133	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHW_057_h01	18	219	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_059_h01	14	147	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_061_h01	22	243	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_063_h01	14	153	1	N/A	N/A	N/A	Tiled	1	
BHW_065_h01	22	252	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BHW_067_h01	17	218	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_069_h01	16	157	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHW_071_h01	20	178	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BHW_073_h01	17	232	2	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_075_h01	17	153	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BHW_077_h01	14	158	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_079_h01	15	127	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_081_h01	11	97	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BHW_083_h01	17	170	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_085_h01	17	165	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHW_087_h01	16	121	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_089_h01	15	182	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_091_h01	23	273	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHW_093_h01	17	208	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHW_095_h01	20	218	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHW_097_h01	25	329	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHW_099_h01	15	170	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_101_h01	14	154	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_103_h01	14	141	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BHW_105_h01	13	108	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_107_h01	15	129	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BHW_109_h01	16	192	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_111_h01	19	225	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHW_113_h01	17	171	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BHW_115_h01	13	124	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BHW_117_h01	14	161	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BHW_119_h01	20	256	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHW_123_h01	12	104	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BHW_139_h01	18	228	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BHW_141_h01	15	151	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BHW_141_h02	11	81	1	N/A	N/A	N/A	N/A		1
BHW_145_h01	22	292	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHW_147_h01	17	231	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BHW_149_h01	12	118	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BHW_151_h01	22	249	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BHW_153_h01	19	229	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHW_155_h01	20	255	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BHW_157_h01	17	139	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BHW_159_h01	18	132	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BHW_161_h01	16	183	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHW_163_h01	14	127	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BHW_165_h01	15	138	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BHW_167_h01	22	195	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BHW_169_h01	20	213	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BHW_171_h01	16	140	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BHW_173_h01	12	112	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BHW_175_h01	16	136	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BHW_177_h01	12	115	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BHW_179_h01	15	162	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BHW_181_h01	18	170	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BHW_183_h01	17	255	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BHW_185_h01	11	154	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled		1
BHW_187_h01	21	219	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BHW_189_h01	19	181	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BHW_205_h01	28	312	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BHW_209_h01	19	506	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_215_h01	33	547	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHW_221_h01	38	484	1	N/A	N/A	N/A	N/A	1	
BHW_227_h01	16	377	1	N/A	N/A	N/A	N/A	1	
BHW_233_h01	26	290	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BHW_239_h01	15	199	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_243_h01	13	378	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BHW_243_h02	17	353	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BHW_247_h01	16	204	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHW_251_h01	21	235	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BHW_255_h01	24	309	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BHW_259_h01	13	97	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled	1	
BHW_259_h02	9	70	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BHW_261_h01	22	306	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHW_263_h01	23	220	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHW_265_h01	27	289	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BHW_267_h01	17	277	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BHW_269_h01	25	349	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_271_h01	15	162	1	Fibro	Suspended on Piers	Timber Framed	Metal	1	
BHW_279_h01	11	286	1	N/A	N/A	N/A	Tiled	1	
BHW_285_h01	8	263	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	

Table D.02 - Tahmoor South - Details of Houses

House Ref.	Maximum Plan Dimension (m)	Plan Area (m2)	Number of Storeys	Wall Construction	Footing Construction	Wall and Footing Construction	Roof Construcftion	House Located Above Goaf	House Located Above Solid Coal
BHW_287_h01	17	215	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHW_289_h01	16	173	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_291_h01	16	196	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHW_297_h01	12	103	1	Fibro	Suspended on Piers	Timber Framed	Metal	1	
BHW_299_h01	12	117	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled	1	
BHW_301_h01	12	105	1	Fibro	Suspended on Piers	Timber Framed	Metal	1	
BHW_303_h01	12	117	2	Weatherboard	Suspended on Piers	Timber Framed	Tiled	1	
BHW_305_h01	12	109	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled	1	
BHW_307_h01	16	148	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_311_h01	27	342	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHW_313_h01	24	275	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHW_315_h01	15	138	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_317_h01	15	150	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_319_h01	13	147	1	Fibro	Suspended on Piers	Timber Framed	Tiled	1	
BHW_321_h01	22	290	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHW_323_h01	20	209	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BHW_325_h01	21	282	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHW_327_h01	13	111	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BHW_329_h01	14	149	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_331_h01	14	141	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_335_h01	22	234	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_337_h01	28	357	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BHW_339_h01	15	298	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_341_h01	23	203	1	N/A	N/A	N/A	N/A	1	
BHW_343_h01	13	143	1	N/A	N/A	N/A	N/A	1	
BHW_345_h01	20	237	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHW_347_h01	18	228	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHW_349_h01	23	176	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BHW_351_h01	14	149	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BHW_353_h01	12	112	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BHW_355_h01	18	212	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_357_h01	18	256	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BHW_361_h01	27	370	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_365_h01	16	154	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BHW_367_h01	11	89	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled	1	
BIR_001_h01	20	230	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BIR_017_h01	13	96	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled	1	
BIR_027_h01	17	221	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BIR_037_h01	30	408	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BIR_047_h01	29	324	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BIR_057_h01	37	456	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BIR_067_h01	14	159	1	Fibro	Suspended on Piers	Timber Framed	Metal	1	
BIR_077_h01	19	148	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BIR_087_h01	32	467	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BIR_097_h01	16	164	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BIR_107_h01	14	213	2	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BIR_117_h01	18	234	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BJA_001_h01	13	205	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BJA_002_h01	17	186	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BJA_003_h01	23	225	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BJA_004_h01	24	337	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BJA_005_h01	25	341	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BJA_006_h01	24	327	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BJA_007_h01	21	269	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BJA_008_h01	27	237	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BJA_009_h01	21	249	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BJO_005_h01	11	283	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BJO_010_h01	19	187	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BJO_020_h01	17	307	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BJO_030_h01	30	140	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BJO_050_h01	21	256	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BJO_060_h01	24	131	1	Fibro	Suspended on Piers	Timber Framed	Tiled	1	
BJO_070_h01	21	219	1	N/A	N/A	N/A	N/A	1	
BJO_080_h01	22	343	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BJO_090_h01	22	480	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BJO_100_h01	14	106	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BJO_110_h01	20	359	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BJO_120_h01	28	280	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BJO_130_h01	15	192	1	N/A	N/A	N/A	Metal	1	
BJO_150_h01	14	192	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled	1	
BJO_150_h02	16	141	1	N/A	N/A	N/A	N/A	1	
BJU_001_h01	19	207	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BJU_002_h01	21	259	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BJU_003_h01	18	253	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BJU_004_h01	14	156	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BJU_005_h01	18	208	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BJU_006_h01	12	89	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BJU_007_h01	14	130	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BJU_008_h01	14	138	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BJU_009_h01	13	141	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BJU_010_h01	14	121	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BJU_011_h01	23	188	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BJU_012_h01	11	168	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BJU_013_h01	18	193	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BJU_014_h01	16	181	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BKA_001_h01	24	198	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BKA_003_h01	21	286	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BKA_005_h01	18	292	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BKA_007_h01	23	384	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BKA_009_h01	21	197	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BKA_011_h01	17	173	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BKA_017_h01	23	272	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BKA_018_h01	13	356	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BKA_019_h01	15	123	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BKA_021_h01	13	119	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BKA_022_h01	11	103	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BKA_024_h01	12	125	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BKA_026_h01	13	89	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BKA_030_h01	17	177	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BKA_032_h01	18	194	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BKA_034_h01	13	132	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BKA_036_h01	17	183	1	Weatherboard	Slab on Ground	Timber Framed	Metal		1

Table D.02 - Tahmoor South - Details of Houses

House Ref.	Maximum Plan Dimension (m)	Plan Area (m2)	Number of Storeys	Wall Construction	Footing Construction	Wall and Footing Construction	Roof Construcftion	House Located Above Goaf	House Located Above Solid Coal
BKA_038_h01	17	168	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BKA_040_h01	20	193	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BKA_042_h01	18	205	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BKA_044_h01	16	120	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BKA_046_h01	9	81	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BKA_049_h01	18	211	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BKA_052_h01	21	319	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BKA_055_h01	22	342	1	Weatherboard	Strip Footing	Timber Framed	Metal		1
BKA_055_h02	9	71	1	N/A	N/A	N/A	Tiled		1
BKA_058_h01	16	134	1	N/A	N/A	N/A	Metal		1
BKA_059_h01	14	152	1	N/A	N/A	N/A	Metal		1
BKA_060_h01	17	144	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BKA_062_h01	15	133	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BKA_064_h01	19	151	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BKA_066_h01	16	122	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BKA_068_h01	17	144	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BKA_070_h01	16	199	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BKA_071_h01	20	246	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BKA_072_h01	16	142	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled		1
BKA_074_h01	10	68	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BKA_074_h02	10	80	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BKA_075_h01	19	185	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BKA_102_h01	13	138	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BKA_112_h01	17	153	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BKA_113_h01	8	46	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BKA_114_h01	21	170	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BKA_115_h01	14	127	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BKA_119_h01	19	246	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BKA_121_h01	17	153	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BKA_122_h01	10	88	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BKA_123_h01	16	184	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BKA_124_h01	14	156	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BKA_125_h01	18	197	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BKA_126_h01	15	113	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BKA_127_h01	16	148	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BKA_129_h01	14	147	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BKA_131_h01	14	159	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BKA_133_h01	13	134	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BKA_135_h01	20	202	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BKA_137_h01	21	240	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BKA_138_h01	20	217	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BKA_139_h01	11	98	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BKA_140_h01	21	278	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BKA_144_h01	20	206	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BKA_147_h01	22	313	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BKA_150_h01	10	81	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BKA_155_h01	22	270	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BKA_165_h01	10	62	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BKA_170_h01	22	240	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BKA_180_h01	15	181	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BKA_185_h01	17	133	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BKA_190_h01	30	409	1	N/A	N/A	N/A	Metal		1
BLA_001_h01	20	198	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BLA_002_h01	17	176	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BLA_003_h01	24	243	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BLA_004_h01	16	208	2	Weatherboard	Strip Footing	Timber Framed	Metal		1
BLA_005_h01	15	160	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BLA_006_h01	20	179	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BLA_007_h01	16	239	2	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BLA_008_h01	19	247	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BLA_009_h01	23	265	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BLA_010_h01	24	216	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BLA_011_h01	18	182	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BLA_012_h01	16	188	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BLA_013_h01	19	231	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BLA_014_h01	19	216	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BLL_001_h01	28	285	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BLL_003_h01	25	337	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BLL_005_h01	27	277	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BLL_007_h01	21	236	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BLL_009_h01	30	307	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BLL_011_h01	20	324	1	N/A	N/A	N/A	N/A		1
BLL_013_h01	24	335	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Tiled		1
BLL_015_h01	22	247	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BLL_017_h01	15	171	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BLL_019_h01	20	177	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BLL_021_h01	21	234	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BLL_023_h01	22	234	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BLL_025_h01	15	166	2	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BLL_027_h01	26	279	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BLL_029_h01	27	284	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BLL_031_h01	21	248	1	N/A	N/A	N/A	Tiled		1
BLL_033_h01	21	267	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BLL_035_h01	29	288	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Tiled		1
BLU_001_h01	31	403	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BLU_005_h01	14	133	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BLU_010_h01	28	304	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BLU_015_h01	10	108	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BMA_001_h01	21	249	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BMA_003_h01	18	174	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BMA_007_h01	21	188	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BMA_009_h01	24	246	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BMA_011_h01	12	314	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BMA_013_h01	17	257	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BMA_015_h01	17	322	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BMA_017_h01	25	123	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BMA_019_h01	18	181	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BMA_021_h01	20	326	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BMA_023_h01	15	136	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BMA_027_h01	14	323	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BMA_029_h01	23	212	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BMA_031_h01	21	323	1	N/A	N/A	N/A	N/A		1

Table D.02 - Tahmoor South - Details of Houses

House Ref.	Maximum Plan Dimension (m)	Plan Area (m2)	Number of Storeys	Wall Construction	Footing Construction	Wall and Footing Construction	Roof Construcftion	House Located Above Goaf	House Located Above Solid Coal
BMA_033_h01	17	210	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BMA_035_h01	20	262	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BMA_037_h01	15	179	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BMA_039_h01	18	229	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BMA_055_h01	16	311	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BMA_057_h01	25	345	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BMA_059_h01	15	143	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled		1
BMA_061_h01	19	184	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BMA_063_h01	16	178	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BMI_001_h01	16	138	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BMI_003_h01	16	147	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BNN_001_h01	18	187	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNN_005_h01	13	123	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BNN_007_h01	25	212	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNN_009_h01	25	280	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNN_011_h01	18	181	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNN_013_h01	14	147	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNN_015_h01	20	110	1	N/A	N/A	N/A	Metal		1
BNN_017_h01	18	153	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNN_018_h01	13	154	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNN_019_h01	15	122	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNN_021_h01	10	88	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BNN_023_h01	22	281	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BNN_025_h01	13	157	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNN_027_h01	14	152	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNN_029_h01	15	159	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BNN_031_h01	15	265	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BNN_033_h01	10	91	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BNN_035_h01	16	138	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNN_037_h01	16	101	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BNN_039_h01	13	108	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BNN_041_h01	16	112	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BNN_043_h01	13	134	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNN_045_h01	15	197	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BNN_047_h01	11	123	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BNN_049_h01	18	166	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNN_051_h01	16	138	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BNN_053_h01	18	197	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNN_055_h01	16	148	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BNN_057_h01	20	207	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNN_059_h01	17	195	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNN_061_h01	15	131	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNN_063_h01	14	147	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BNN_065_h01	15	144	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNN_067_h01	19	185	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNN_069_h01	16	189	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNN_071_h01	16	176	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNN_073_h01	15	139	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNN_075_h01	13	181	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNO_001_h01	25	359	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BNO_003_h01	27	296	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BNO_005_h01	31	366	1	N/A	N/A	N/A	N/A		1
BNO_007_h01	25	306	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BNO_009_h01	20	244	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Tiled		1
BNO_015_h01	28	246	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BNO_021_h01	19	300	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BNO_023_h01	22	226	1	N/A	N/A	N/A	Tiled		1
BNO_025_h01	11	217	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BNO_027_h01	17	468	1	N/A	N/A	N/A	N/A		1
BNO_031_h01	31	315	1	N/A	N/A	N/A	Tiled		1
BNO_035_h01	18	212	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BNO_037_h01	22	269	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BNO_039_h01	13	313	1	N/A	N/A	N/A	Tiled		1
BNO_043_h01	22	385	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BNO_045_h01	31	316	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BNO_047_h01	22	265	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BNO_049_h01	20	351	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BNO_051_h01	21	252	1	N/A	N/A	N/A	Tiled		1
BNO_053_h01	24	277	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BNO_055_h01	39	456	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BNO_057_h01	21	485	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BNR_001_h01	16	146	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNR_001_h02	17	142	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNR_003_h01	10	92	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BNR_005_h01	24	309	1	N/A	Slab on Ground	N/A	Tiled		1
BNR_007_h01	15	126	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNR_009_h01	16	164	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BNR_011_h01	24	91	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BNR_013_h01	14	142	1	N/A	N/A	N/A	Tiled		1
BNR_015_h01	21	143	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BNR_019_h01	18	165	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BNR_020_h01	16	145	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNR_021_h01	18	204	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNR_023_h01	17	196	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BNR_025_h01	14	133	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BNR_027_h01	21	325	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BNR_029_h01	13	117	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BNR_031_h01	15	137	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BNR_033_h01	12	106	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BNR_035_h01	17	201	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BNR_039_h01	12	137	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BNR_041_h01	13	117	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BOL_001_h01	21	240	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BOL_010_h01	33	377	N/A	N/A	N/A	N/A	N/A		1
BOL_120_h01	24	453	N/A	N/A	N/A	N/A	N/A		1
BOL_130_h01	30	381	N/A	N/A	N/A	N/A	N/A		1
BOL_140_h01	13	133	1	N/A	N/A	N/A	N/A		1
BOL_150_h01	23	261	N/A	N/A	N/A	N/A	Tiled		1
BPA_001_h01	20	198	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BPA_007_h01	15	146	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BPA_010_h01	23	324	1	N/A	N/A	N/A	N/A		1
BPA_012_h01	19	272	1	N/A	N/A	N/A	N/A		1

Table D.02 - Tahmoor South - Details of Houses

House Ref.	Maximum Plan Dimension (m)	Plan Area (m2)	Number of Storeys	Wall Construction	Footing Construction	Wall and Footing Construction	Roof Construcftion	House Located Above Goaf	House Located Above Solid Coal
BPA_014_h01	18	209	1	N/A	N/A	N/A	N/A		1
BPH_001_h01	16	157	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BPH_002_h01	16	156	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BPH_003_h01	16	140	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BPH_004_h01	14	176	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BPH_005_h01	22	262	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BPH_006_h01	23	262	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BPH_007_h01	12	111	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BPH_008_h01	24	261	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BPH_009_h01	14	141	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BPH_010_h01	17	166	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BPH_011_h01	18	173	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BPH_012_h01	14	142	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BPH_013_h01	20	119	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BPH_014_h01	16	170	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BPP_001_h01	20	235	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BPP_010_h01	17	246	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BPP_011_h01	21	290	1	N/A	N/A	N/A	N/A		1
BPP_012_h01	19	253	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BRA_001_h01	14	114	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BRA_002_h01	16	121	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BRA_003_h01	11	89	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BRA_005_h01	12	103	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BRA_005_h02	23	199	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BRA_007_h01	16	120	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRA_008_h01	17	120	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRA_009_h01	17	143	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRA_011_h01	15	171	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BRA_012_h01	15	145	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BRA_013_h01	15	152	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BRA_014_h01	15	153	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BRA_015_h01	9	125	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BRA_017_h01	21	225	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRA_019_h01	8	81	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRA_023_h01	15	148	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BRA_025_h01	14	113	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BRA_027_h01	15	108	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BRA_030_h01	16	147	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRA_032_h01	16	180	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRA_034_h01	14	161	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRA_036_h01	12	116	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRA_038_h01	13	129	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BRA_040_h01	12	109	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRA_042_h01	15	167	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRA_044_h01	20	280	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BRA_046_h01	11	244	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRA_047_h01	28	239	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRA_049_h01	16	129	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BRA_050_h01	20	205	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRA_052_h01	14	166	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRA_054_h01	21	269	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BRA_056_h01	19	224	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BRA_058_h01	27	312	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BRA_060_h01	24	288	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BRA_062_h01	27	227	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BRA_066_h01	11	113	1	Fibro	Suspended on Piers	Timber Framed	Metal	1	
BRA_068_h01	13	105	1	Fibro	Suspended on Piers	Timber Framed	Tiled	1	
BRA_070_h01	19	209	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BRA_074_h01	15	129	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BRA_078_h01	13	101	2	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BRA_080_h01	15	128	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BRA_082_h01	21	252	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BRA_084_h01	14	148	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled	1	
BRA_086_h01	11	100	1	Fibro	Suspended on Piers	Timber Framed	Metal	1	
BRA_088_h01	16	198	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BRA_090_h01	14	107	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled	1	
BRA_092_h01	12	106	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BRA_096_h01	10	160	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BRA_097_h01	16	172	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled	1	
BRA_099_h01	18	171	1	N/A	N/A	N/A	N/A	1	
BRA_104_h01	18	222	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BRA_106_h01	12	278	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BRA_111_h01	15	178	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BRA_111_h02	10	92	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BRA_112_h01	24	279	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BRA_113_h01	20	196	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BRA_114_h01	22	252	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BRA_115_h01	16	210	2	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BRA_122_h01	15	121	2	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRA_136_h01	13	131	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BRA_138_h01	16	169	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRA_140_h01	18	191	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BRA_142_h01	18	209	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BRA_144_h01	18	194	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BRA_146_h01	15	185	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRA_148_h01	20	218	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BRA_150_h01	22	216	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRA_152_h01	25	151	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BRA_154_h01	14	141	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled		1
BRA_156_h01	19	181	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BRA_160_h01	18	233	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRA_164_h01	16	168	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRA_166_h01	11	114	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BRA_168_h01	13	133	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BRE_016_h01	15	106	1	N/A	N/A	N/A	N/A		1
BRE_030_h01	17	140	1	N/A	N/A	N/A	Tiled		1
BRE_030_h02	17	145	N/A	N/A	N/A	N/A	Tiled		1
BRE_057_h01	13	127	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BRE_059_h01	19	189	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Tiled	1	
BRE_061_h01	18	197	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Tiled	1	
BRE_063_h01	22	349	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Tiled	1	
BRE_065_h01	22	256	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Tiled	1	

Table D.02 - Tahmoor South - Details of Houses

House Ref.	Maximum Plan Dimension (m)	Plan Area (m2)	Number of Storeys	Wall Construction	Footing Construction	Wall and Footing Construction	Roof Construcftion	House Located Above Goaf	House Located Above Solid Coal
BRE_067_h01	15	172	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BRE_070_h01	18	175	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Tiled	1	
BRE_075_h01	18	172	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BRE_075_h02	10	95	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BRE_077_h01	10	96	1	N/A	N/A	N/A	Metal	1	
BRE_080_h01	29	260	1	N/A	N/A	N/A	Tiled	1	
BRE_083_h01	10	252	2	N/A	N/A	N/A	Metal	1	
BRE_086_h01	14	409	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Metal	1	
BRE_089_h01	18	285	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Tiled	1	
BRE_140_h01	20	212	1	N/A	N/A	N/A	Metal	1	
BRE_143_h01	17	176	1	N/A	N/A	N/A	Metal	1	
BRE_148_h01	20	303	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Tiled	1	
BRE_154_h01	19	174	1	N/A	N/A	N/A	Metal	1	
BRE_165_h01	11	72	1	N/A	N/A	N/A	N/A	1	
BRE_167_h01	19	160	2	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Tiled	1	
BRE_177_h01	13	158	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BRE_187_h01	13	396	2	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BRE_189_h01	11	94	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BRE_191_h01	15	134	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Tiled		1
BRE_195_h01	30	372	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BRE_195_h02	14	146	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BRE_201_h01	22	272	1	N/A	N/A	N/A	Metal		1
BRE_212_h01	22	294	1	N/A	N/A	N/A	Metal		1
BRE_216_h01	17	260	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BRE_218_h01	22	170	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BRE_232_h01	29	281	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BRE_236_h01	12	105	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BRE_246_h01	11	120	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BRE_255_h01	28	303	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRE_260_h01	17	190	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BRE_265_h01	18	225	1	N/A	N/A	N/A	N/A		1
BRE_275_h01	13	105	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRE_285_h01	14	117	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BRE_290_h01	12	105	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BRE_295_h01	26	421	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BRE_305_h01	13	97	1	N/A	N/A	N/A	Metal		1
BRE_315_h01	22	234	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BRE_320_h01	11	78	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BRE_325_h01	14	136	1	Fibro	Suspended on Piers	Timber Framed	Tiled		1
BRE_335_h01	12	117	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BRE_345_h01	14	430	1	N/A	N/A	N/A	Metal		1
BRE_350_h01	10	84	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BRE_355_h01	25	356	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRE_365_h01	21	313	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRE_375_h01	20	234	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BRE_385_h01	38	443	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BRE_390_h01	21	262	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BRE_395_h01	19	220	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BRE_505_h01	21	259	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRE_515_h01	14	195	1	N/A	N/A	N/A	Metal	1	
BRE_515_h02	26	401	1	N/A	N/A	N/A	N/A	1	
BRE_665_h01	22	273	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BRL_015_h01	16	135	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BRL_017_h01	17	170	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BRL_019_h01	10	82	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled	1	
BRL_021_h01	10	133	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BRL_022_h01	23	192	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BRL_024_h01	15	163	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BRL_026_h01	12	102	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BRL_028_h01	10	89	2	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BRL_030_h01	14	136	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BRL_032_h01	21	262	1	N/A	N/A	N/A	N/A	1	
BRL_034_h01	21	274	1	N/A	N/A	N/A	N/A	1	
BRL_038_h01	13	130	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BRL_040_h01	15	119	1	Fibro	Strip Footing	Timber Framed	Metal	1	
BRL_042_h01	13	103	1	Fibro	Suspended on Piers	Timber Framed	Tiled	1	
BRL_044_h01	12	95	1	Fibro	Suspended on Piers	Timber Framed	Metal	1	
BRL_046_h01	19	158	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BRL_047_h01	19	148	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BRL_048_h01	18	252	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BRL_050_h01	14	159	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BRL_052_h01	16	186	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BRL_054_h01	20	230	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BRL_056_h01	18	178	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BRL_058_h01	14	145	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BRL_060_h01	18	157	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BRL_062_h01	18	135	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BRL_064_h01	17	326	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BRL_066_h01	17	198	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BRL_068_h01	11	107	1	Fibro	Suspended on Piers	Timber Framed	Metal	1	
BRL_069_h01	19	121	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BRL_069_h02	18	123	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BRL_069_h03	18	118	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BRL_070_h01	18	154	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRL_072_h01	15	135	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BRL_098_h01	11	115	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BRL_099_h01	10	87	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled		1
BRL_101_h01	14	133	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRL_103_h01	10	74	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BRL_109_h01	12	89	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRL_125_h01	11	109	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BRL_150_h01	9	77	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BRS_002_h01	15	143	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRS_004_h01	23	242	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BRS_006_h01	26	317	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BRS_009_h01	22	218	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BRS_010_h01	9	112	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRS_030_h01	17	162	1	Weatherboard	Slab on Ground	Timber Framed	Metal		1
BRS_030_h02	18	346	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BRS_040_h01	17	201	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BRS_050_h01	34	357	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BRS_070_h01	16	151	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	

Table D.02 - Tahmoor South - Details of Houses

House Ref.	Maximum Plan Dimension (m)	Plan Area (m2)	Number of Storeys	Wall Construction	Footing Construction	Wall and Footing Construction	Roof Construcftion	House Located Above Goaf	House Located Above Solid Coal
BRS_080_h01	30	348	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BRS_090_h01	14	169	1	Fibro	Suspended on Piers	Timber Framed	Metal	1	
BRS_100_h01	17	195	1	N/A	N/A	N/A	Metal	1	
BRS_110_h01	18	157	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BRS_120_h01	10	78	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BRS_130_h01	22	284	1	N/A	N/A	N/A	Tiled	1	
BRS_140_h01	10	85	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BRS_150_h01	18	218	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BRS_160_h01	19	190	1	N/A	N/A	N/A	Tiled	1	
BRS_160_h02	13	140	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BRS_180_h01	16	139	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BRS_185_h01	22	258	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BRS_190_h01	16	169	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BRS_191_h01	15	156	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BRS_192_h01	16	154	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BRS_193_h01	33	84	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BRS_203_h01	15	426	1	N/A	N/A	N/A	N/A	1	
BRS_208_h01	20	209	1	N/A	N/A	N/A	N/A	1	
BRS_218_h01	16	167	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BRS_220_h01	16	138	1	Fibro	Suspended on Piers	Timber Framed	Tiled	1	
BRS_230_h01	24	234	1	N/A	N/A	N/A	Metal		1
BRS_240_h01	22	328	1	N/A	N/A	N/A	Metal		1
BRS_250_h01	21	229	1	Brick or Brick-Veneer	Suspended on Piers	Brick with Unknown Footings	Metal		1
BRS_253_h01	28	330	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BRS_256_h01	18	213	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRS_259_h01	13	105	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BRS_262_h01	15	132	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BSC_003_h01	16	151	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BSC_005_h01	14	147	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BSC_007_h01	14	169	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BSC_009_h01	14	130	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BSC_011_h01	15	161	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BSC_013_h01	16	151	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BSC_019_h01	17	177	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BSC_020_h01	15	151	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BSC_021_h01	15	181	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BSC_022_h01	16	178	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BSI_003_h01	21	276	1	N/A	N/A	N/A	Metal		1
BSI_005_h01	25	273	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal		1
BSI_007_h01	27	302	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BSI_013_h01	22	460	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Metal		1
BTH_001_h01	24	316	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTH_003_h01	18	151	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTH_005_h01	18	254	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTH_007_h01	18	213	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTH_009_h01	17	143	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTH_011_h01	14	104	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTH_013_h01	18	236	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTH_015_h01	19	198	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTH_017_h01	13	82	2	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BTH_019_h01	19	246	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTH_021_h01	17	186	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_001_h01	12	84	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BTY_005_h01	21	449	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h02	21	439	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h03	24	311	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h04	9	152	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h05	24	309	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h06	9	153	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h07	30	321	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h08	10	160	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h09	16	176	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h10	24	309	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h11	16	175	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h12	9	169	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h13	10	169	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h14	14	169	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h15	8	165	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h16	14	164	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h17	12	182	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h18	12	186	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h19	14	166	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h20	14	165	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h21	14	167	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h22	14	196	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h23	14	166	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h24	15	201	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h25	14	168	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h26	24	300	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h27	21	450	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h28	10	168	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h29	31	346	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h30	16	164	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h31	15	166	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h32	16	170	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h33	30	333	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h34	10	162	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h35	8	160	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h36	15	361	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h37	8	165	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h38	14	325	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h39	16	197	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h40	10	161	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h41	14	145	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h42	14	149	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h43	15	148	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h44	22	189	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h45	22	192	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h46	22	197	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h47	23	193	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h48	24	292	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h49	24	290	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1

Table D.02 - Tahmoor South - Details of Houses

House Ref.	Maximum Plan Dimension (m)	Plan Area (m2)	Number of Storeys	Wall Construction	Footing Construction	Wall and Footing Construction	Roof Construcftion	House Located Above Goaf	House Located Above Solid Coal
BTY_005_h50	24	307	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h51	12	172	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h52	12	162	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h53	24	293	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h54	10	166	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h55	12	163	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h56	23	294	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h57	24	310	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h58	24	316	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h59	24	316	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h60	14	140	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h61	13	142	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h62	14	153	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h63	15	219	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h64	15	359	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h65	14	340	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h66	12	198	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h67	15	180	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h68	15	178	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h69	12	201	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h70	23	207	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h71	12	199	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h72	15	216	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h73	15	216	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h74	23	218	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h75	15	350	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h76	15	387	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h77	14	210	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h78	14	211	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h79	15	177	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h80	14	156	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h81	14	142	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h82	14	150	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h83	15	163	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h84	14	148	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h85	14	152	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h86	14	154	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h87	19	174	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h88	19	178	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h89	24	299	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h90	16	204	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h91	31	341	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h92	24	319	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h93	30	337	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h94	24	305	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h95	30	341	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h96	15	188	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h97	30	336	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BTY_005_h98	16	174	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BWA_001_h01	16	129	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BWA_005_h01	22	238	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BWA_010_h01	15	201	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BWA_015_h01	23	212	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BWA_020_h01	14	174	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BWA_025_h01	20	230	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BWA_030_h01	14	92	1	Fibro	Suspended on Piers	Timber Framed	Metal	1	
BWA_035_h01	14	119	2	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BWA_040_h01	12	94	1	Fibro	Suspended on Piers	Timber Framed	Metal	1	
BWA_045_h01	12	111	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BWA_050_h01	14	149	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BWA_055_h01	22	264	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BWA_060_h01	19	165	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BWA_063_h01	14	289	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BWA_066_h01	26	351	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BWA_069_h01	22	246	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Metal	1	
BWA_072_h01	22	234	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled	1	
BWA_075_h01	19	200	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BWE_001_h01	26	456	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Metal	1	
BWE_003_h01	18	225	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BWE_005_h01	19	185	1	N/A	N/A	N/A	Metal	1	
BWE_007_h01	18	182	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Metal	1	
BWE_009_h01	18	297	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BWE_011_h01	22	299	1	Weatherboard	N/A	Timber Framed	Metal	1	
BWE_013_h01	18	386	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BWE_015_h01	18	383	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BWE_017_h01	14	409	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal	1	
BWE_019_h01	23	250	1	N/A	N/A	N/A	Tiled	1	
BWE_021_h01	22	177	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BWE_023_h01	11	285	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BWE_025_h01	18	225	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BWE_027_h01	18	208	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BWE_029_h01	25	322	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Metal		1
BWE_031_h01	16	143	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BWE_041_h01	11	96	1	N/A	N/A	N/A	N/A	1	
BWE_041_h02	31	412	1	N/A	N/A	N/A	N/A	1	
BWE_051_h01	15	201	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BWI_001_h01	13	126	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BWI_002_h01	14	129	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BWI_003_h01	22	232	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BWI_004_h01	22	274	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BWI_005_h01	15	191	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BWI_006_h01	27	315	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BWI_007_h01	14	128	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BWI_008_h01	13	130	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BWI_009_h01	15	182	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BWI_010_h01	21	224	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BWI_011_h01	19	230	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BWI_012_h01	15	210	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BWI_013_h01	14	123	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BWR_001_h01	16	143	1	N/A	N/A	N/A	Tiled		1
BWR_010_h01	16	194	1	N/A	N/A	N/A	Tiled		1
BWR_020_h01	29	366	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1

Table D.02 - Tahmoor South - Details of Houses

House Ref.	Maximum Plan Dimension (m)	Plan Area (m2)	Number of Storeys	Wall Construction	Footing Construction	Wall and Footing Construction	Roof Construcftion	House Located Above Goaf	House Located Above Solid Coal
BWR_030_h01	16	166	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BWR_040_h01	15	416	1	Brick or Brick-Veneer	Strip Footing	Brick with Strip Footings	Tiled		1
BWR_050_h01	19	221	1	N/A	N/A	N/A	Metal		1
BYR_001_h01	10	70	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled	1	
BYR_005_h01	22	165	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BYR_015_h01	16	232	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BYR_025_h01	20	207	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Metal		1
BYR_035_h01	10	76	1	N/A	N/A	N/A	N/A	1	
BYR_045_h01	18	152	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BYR_055_h01	19	275	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Tiled		1
BYR_065_h01	18	245	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BYR_065_h02	15	131	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BYR_075_h01	21	284	1	Brick or Brick-Veneer	N/A	Brick with Unknown Footings	Tiled		1
BYR_075_h02	18	55	1	N/A	N/A	N/A	N/A		1
BYR_084_h01	13	171	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BYR_085_h01	15	200	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BYR_095_h01	21	591	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Metal		1
BYR_105_h01	11	87	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BYR_115_h01	9	84	1	Fibro	Suspended on Piers	Timber Framed	Metal		1
BYR_115_h02	24	281	1	N/A	N/A	N/A	N/A		1
BYR_125_h01	18	156	1	Weatherboard	Suspended on Piers	Timber Framed	Metal		1
BYR_135_h01	14	141	1	Weatherboard	Suspended on Piers	Timber Framed	Tiled		1
BYR_145_h01	21	215	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled		1
BYR_150_h01	12	102	1	N/A	N/A	N/A	Tiled	1	
BYR_152_h01	20	257	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BYR_154_h01	26	327	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BYR_156_h01	19	233	1	N/A	N/A	N/A	N/A	1	
BYR_158_h01	13	89	1	Weatherboard	Suspended on Piers	Timber Framed	Metal	1	
BYR_160_h01	15	285	1	Brick or Brick-Veneer	Slab on Ground	Brick with Slab on Ground	Tiled	1	
BYR_162_h01	15	126	1	Weatherboard	N/A	Timber Framed	Metal	1	

Table D.03 - Tahmoor South - Predictions for Houses

House Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)	Predicted Probability of Nil or Category R0 Impact (%)	Predicted Probability of Category R1 or R2 Impact (%)	Predicted Probability of Category R3 or R4 Impact (%)	Predicted Probability of Category R5 Impact (%)
BAN_001_h01	550	5.5	5.5	0.08	0.02	74.1	15.6	10.2	< 0.5
BAR_001_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.4	1.1	< 0.1
BAR_010_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BAR_020_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.4	1.1	< 0.1
BAR_020_h02	30	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.5	1.1	< 0.1
BAR_040_h01	70	0.5	0.5	< 0.01	< 0.01	92.4	6.3	1.3	< 0.1
BAR_050_h01	60	0.5	0.5	< 0.01	< 0.01	93.2	5.5	1.2	< 0.1
BAR_060_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BAR_070_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BAR_090_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BAR_100_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BAR_110_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.4	1.1	< 0.1
BAR_120_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.6	4.3	1.0	< 0.1
BAR_130_h01	50	1.0	1.0	0.01	< 0.01	90.7	7.7	1.5	< 0.1
BAR_140_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BAR_140_h02	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.8	4.1	1.0	< 0.1
BAR_150_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.8	4.2	1.0	< 0.1
BAR_160_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.7	4.2	1.0	< 0.1
BAR_165_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.8	4.2	1.0	< 0.1
BAR_170_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BAR_175_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.7	4.2	1.0	< 0.1
BAR_177_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.8	4.2	1.0	< 0.1
BAR_185_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.7	4.3	1.0	< 0.1
BAR_185_h02	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.7	4.3	1.0	< 0.1
BAR_195_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BAR_195_h02	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BAR_205_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	95.0	4.0	1.0	< 0.1
BAR_210_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	95.0	4.0	1.0	< 0.1
BAR_230_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.6	4.4	1.1	< 0.1
BAR_235_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.8	4.1	1.0	< 0.1
BAR_245_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BAR_475_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BAR_480_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	95.0	4.0	1.0	< 0.1
BAR_485_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	95.0	4.0	1.0	< 0.1
BAR_490_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BAR_490_h02	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BAR_495_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.7	4.2	1.0	< 0.1
BAR_505_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.8	4.2	1.0	< 0.1
BAR_510_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BAR_530_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.7	4.2	1.0	< 0.1
BAR_535_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BAR_550_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.7	4.3	1.0	< 0.1
BAS_001_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BAS_005_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.5	1.1	< 0.1
BAS_007_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BAS_009_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BAS_015_h01	40	0.5	0.5	0.01	< 0.01	90.8	7.6	1.5	< 0.1
BAS_017_h01	100	1.0	1.0	< 0.01	< 0.01	92.0	6.6	1.4	< 0.1
BAS_019_h01	80	1.0	1.0	< 0.01	< 0.01	92.5	6.2	1.3	< 0.1
BAS_021_h01	60	0.5	0.5	< 0.01	< 0.01	93.0	5.7	1.2	< 0.1
BAS_023_h01	50	0.5	0.5	< 0.01	< 0.01	92.8	6.0	1.3	< 0.1
BAS_025_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	93.6	5.2	1.2	< 0.1
BAS_027_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.1	1.2	< 0.1
BAV_001_h01	150	1.0	1.0	< 0.01	< 0.01	92.2	6.4	1.3	< 0.1
BAV_003_h01	150	1.0	1.0	< 0.01	< 0.01	92.3	6.4	1.3	< 0.1
BAV_005_h01	150	0.5	0.5	< 0.01	< 0.01	92.3	6.3	1.3	< 0.1
BAV_007_h01	175	1.0	1.0	< 0.01	< 0.01	91.6	7.0	1.4	< 0.1
BAV_009_h01	150	1.0	1.0	< 0.01	< 0.01	92.1	6.5	1.4	< 0.1
BAV_011_h01	150	1.0	1.0	< 0.01	< 0.01	92.1	6.5	1.4	< 0.1
BAV_013_h01	150	1.0	1.0	< 0.01	< 0.01	92.2	6.4	1.3	< 0.1
BAV_015_h01	150	1.0	1.0	< 0.01	< 0.01	92.2	6.4	1.3	< 0.1
BAV_017_h01	150	1.0	1.0	< 0.01	< 0.01	92.1	6.6	1.4	< 0.1
BAV_019_h01	150	1.0	1.0	< 0.01	< 0.01	92.0	6.6	1.4	< 0.1
BAV_021_h01	150	1.0	1.0	< 0.01	< 0.01	92.0	6.7	1.4	< 0.1
BAV_023_h01	150	1.0	1.0	< 0.01	< 0.01	91.9	6.7	1.4	< 0.1
BAV_025_h01	150	1.0	1.0	< 0.01	< 0.01	92.0	6.6	1.4	< 0.1
BAV_027_h01	150	1.0	1.0	< 0.01	< 0.01	92.1	6.5	1.4	< 0.1
BAV_031_h01	150	1.0	1.0	< 0.01	< 0.01	92.2	6.5	1.4	< 0.1
BAV_033_h01	150	1.0	1.0	< 0.01	< 0.01	92.1	6.5	1.4	< 0.1
BAV_035_h01	150	1.0	1.0	< 0.01	< 0.01	92.2	6.5	1.4	< 0.1
BAV_037_h01	150	1.0	1.0	< 0.01	< 0.01	92.1	6.5	1.4	< 0.1
BAV_039_h01	150	1.0	1.0	< 0.01	< 0.01	92.1	6.5	1.4	< 0.1
BAV_041_h01	150	1.0	1.0	< 0.01	< 0.01	92.2	6.5	1.4	< 0.1
BAV_043_h01	150	0.5	0.5	< 0.01	< 0.01	92.3	6.4	1.3	< 0.1
BAV_045_h01	150	0.5	0.5	< 0.01	< 0.01	92.3	6.4	1.3	< 0.1
BAV_047_h01	150	1.0	1.0	< 0.01	< 0.01	92.2	6.4	1.3	< 0.1
BAV_049_h01	150	1.0	1.0	< 0.01	< 0.01	92.3	6.4	1.3	< 0.1
BAV_053_h01	150	0.5	0.5	< 0.01	< 0.01	92.4	6.3	1.3	< 0.1
BAV_087_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.3	5.5	1.2	< 0.1
BAV_089_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.2	5.6	1.2	< 0.1
BAV_091_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.3	5.5	1.2	< 0.1
BAV_093_h01	125	0.5	0.5	< 0.01	< 0.01	92.8	5.9	1.3	< 0.1
BAV_099_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.4	5.4	1.2	< 0.1
BAV_101_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.5	5.3	1.2	< 0.1
BAV_105_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.5	5.3	1.2	< 0.1
BAV_107_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.5	5.3	1.2	< 0.1
BAV_109_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.6	5.3	1.2	< 0.1
BAV_111_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.5	5.3	1.2	< 0.1
BAV_113_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.5	5.3	1.2	< 0.1
BAV_115_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.5	5.3	1.2	< 0.1
BAV_117_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.4	5.4	1.2	< 0.1
BAV_119_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.4	5.4	1.2	< 0.1
BAV_121_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.4	5.4	1.2	< 0.1
BAV_123_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.4	5.4	1.2	< 0.1
BAV_125_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.3	5.5	1.2	< 0.1
BAV_127_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.3	5.5	1.2	< 0.1
BAV_129_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.3	5.5	1.2	< 0.1
BAV_131_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.2	5.6	1.2	< 0.1
BAV_133_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.2	5.6	1.2	< 0.1
BAV_145_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.1	5.7	1.2	< 0.1
BAV_147_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.1	5.7	1.2	< 0.1
BAV_149_h01	125	0.5	0.5	< 0.01	< 0.01	92.9	5.9	1.3	< 0.1
BAV_155_h01	125	0.5	0.5	< 0.01	< 0.01	92.5	6.2	1.3	< 0.1

Table D.03 - Tahmoor South - Predictions for Houses

House Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)	Predicted Probability of Nil or Category R0 Impact (%)	Predicted Probability of Category R1 or R2 Impact (%)	Predicted Probability of Category R3 or R4 Impact (%)	Predicted Probability of Category R5 Impact (%)
BAV_159_h01	125	0.5	0.5	< 0.01	< 0.01	92.4	6.3	1.3	< 0.1
BAV_173_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.0	5.8	1.3	< 0.1
BAV_175_h01	100	0.5	0.5	< 0.01	< 0.01	92.9	5.8	1.3	< 0.1
BAV_176_h01	125	0.5	0.5	< 0.01	< 0.01	92.9	5.9	1.3	< 0.1
BAV_177_h01	125	0.5	0.5	< 0.01	< 0.01	92.8	5.9	1.3	< 0.1
BAV_178_h01	125	0.5	0.5	< 0.01	< 0.01	92.8	5.9	1.3	< 0.1
BAV_179_h01	125	0.5	0.5	< 0.01	< 0.01	92.8	5.9	1.3	< 0.1
BAV_180_h01	125	0.5	0.5	< 0.01	< 0.01	92.8	5.9	1.3	< 0.1
BAV_181_h01	125	0.5	0.5	< 0.01	< 0.01	92.8	5.9	1.3	< 0.1
BAV_182_h01	125	0.5	0.5	< 0.01	< 0.01	92.8	5.9	1.3	< 0.1
BAV_183_h01	125	0.5	0.5	< 0.01	< 0.01	92.8	5.9	1.3	< 0.1
BAV_184_h01	125	0.5	0.5	< 0.01	< 0.01	92.8	5.9	1.3	< 0.1
BAV_185_h01	125	0.5	0.5	< 0.01	< 0.01	92.8	5.9	1.3	< 0.1
BAV_186_h01	125	0.5	0.5	< 0.01	< 0.01	92.8	5.9	1.3	< 0.1
BBA_010_h01	1300	5.0	5.0	0.07	0.27	68.0	20.0	12.0	< 0.5
BBA_015_h01	1200	3.5	3.5	0.06	0.05	75.4	14.8	9.8	< 0.5
BBA_020_h01	1000	2.5	3.5	0.08	0.04	74.3	15.5	10.2	< 0.5
BBA_025_h01	1400	8.5	9.5	0.12	0.14	71.3	17.6	11.0	< 0.5
BBA_030_h01	1550	4.5	5.5	0.07	0.25	68.0	20.0	12.0	< 0.5
BBA_040_h01	1200	3.5	3.5	0.06	0.04	75.8	14.6	9.6	< 0.5
BBA_050_h01	1100	2.5	3.5	0.08	0.04	74.3	15.5	10.2	< 0.5
BBA_070_h01	1150	3.0	3.5	0.09	0.03	73.6	16.0	10.4	< 0.5
BBA_070_h02	1100	2.5	4.5	0.10	0.03	73.2	16.3	10.5	< 0.5
BBA_090_h01	1150	5.5	8.0	0.13	0.03	71.7	17.3	10.9	< 0.5
BBA_100_h01	200	1.0	1.0	0.02	< 0.01	87.5	10.5	1.9	< 0.1
BBA_120_h01	225	2.0	2.0	0.02	0.01	87.6	10.5	1.9	< 0.1
BBA_120_h02	300	3.0	3.0	0.04	0.02	81.4	12.4	6.2	< 0.2
BBA_130_h01	150	1.0	1.0	0.01	< 0.01	89.8	8.6	1.7	< 0.1
BBA_130_h02	125	0.5	0.5	< 0.01	< 0.01	92.4	6.2	1.3	< 0.1
BBA_150_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BBA_150_h02	20	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BBA_155_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	93.9	4.9	1.1	< 0.1
BBA_165_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.3	5.5	1.2	< 0.1
BBA_175_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	92.9	5.8	1.3	< 0.1
BBA_190_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.2	5.6	1.2	< 0.1
BBA_202_h01	1100	9.5	9.5	0.10	0.07	73.3	16.2	10.5	< 0.5
BBA_204_h01	1450	8.0	10.0	0.11	0.23	68.0	20.0	12.0	< 0.5
BBA_215_h01	1500	7.0	8.0	0.08	0.28	68.0	20.0	12.0	< 0.5
BBA_220_h01	1200	3.5	3.5	0.06	0.04	76.0	14.5	9.5	< 0.4
BBA_230_h01	1650	7.0	8.5	0.07	0.25	68.0	20.0	12.0	< 0.5
BBA_240_h01	1200	3.5	3.5	0.06	0.04	75.6	14.7	9.7	< 0.5
BBA_250_h01	1350	4.0	4.0	0.06	0.05	75.9	14.5	9.5	< 0.5
BBA_255_h01	1550	4.0	4.0	0.07	0.25	68.0	20.0	12.0	< 0.5
BBA_260_h01	1300	8.5	9.5	0.13	0.04	71.6	17.4	11.0	< 0.5
BBA_270_h01	1000	2.5	2.5	0.06	0.04	76.4	14.3	9.3	< 0.4
BBA_280_h01	1050	3.0	3.0	0.05	0.04	77.0	14.0	9.0	< 0.4
BBA_290_h01	1250	3.5	3.5	0.07	0.06	74.8	15.1	10.0	< 0.5
BBA_300_h01	1150	10.0	10.0	0.11	0.16	70.2	18.4	11.4	< 0.5
BBA_300_h02	950	10.0	10.0	0.11	0.04	72.7	16.7	10.7	< 0.5
BBA_305_h01	650	8.5	8.5	0.11	0.03	72.7	16.7	10.7	< 0.5
BBA_307_h01	500	6.0	6.0	0.11	0.02	72.9	16.5	10.6	< 0.5
BBE_001_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.4	1.1	< 0.1
BBE_003_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.4	1.1	< 0.1
BBE_004_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.6	4.4	1.1	< 0.1
BBE_005_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.4	1.1	< 0.1
BBI_001_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BBI_002_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BBI_004_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.9	4.9	1.1	< 0.1
BBI_005_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.0	1.1	< 0.1
BBI_006_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.1	1.2	< 0.1
BBI_007_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.5	5.3	1.2	< 0.1
BBI_008_h01	125	0.5	0.5	< 0.01	< 0.01	93.0	5.8	1.3	< 0.1
BBI_009_h01	125	0.5	0.5	< 0.01	< 0.01	93.1	5.6	1.2	< 0.1
BBI_010_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.3	5.5	1.2	< 0.1
BBI_011_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.2	5.6	1.2	< 0.1
BBI_012_h01	125	0.5	0.5	< 0.01	< 0.01	93.1	5.7	1.2	< 0.1
BBI_015_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.4	5.4	1.2	< 0.1
BBI_016_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.3	5.5	1.2	< 0.1
BBI_017_h01	125	0.5	0.5	< 0.01	< 0.01	92.9	5.8	1.3	< 0.1
BBI_018_h01	125	0.5	0.5	< 0.01	< 0.01	93.0	5.7	1.2	< 0.1
BBI_019_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.3	5.5	1.2	< 0.1
BBI_022_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.4	5.4	1.2	< 0.1
BBI_024_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.5	5.3	1.2	< 0.1
BBI_026_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.6	5.2	1.2	< 0.1
BBI_028_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.1	1.2	< 0.1
BBI_030_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.1	1.2	< 0.1
BBI_032_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.0	1.1	< 0.1
BBI_034_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BBI_035_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BBN_001_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.5	1.1	< 0.1
BBN_002_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.4	1.1	< 0.1
BBN_003_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.6	4.4	1.1	< 0.1
BBN_004_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.6	4.3	1.0	< 0.1
BBN_005_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.7	4.3	1.0	< 0.1
BBN_006_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.7	4.3	1.0	< 0.1
BBN_012_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.6	4.3	1.0	< 0.1
BBN_013_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.6	4.4	1.1	< 0.1
BBN_014_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.4	1.1	< 0.1
BBN_015_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.4	1.1	< 0.1
BBN_016_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BBN_017_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BCA_001_h01	425	5.5	5.5	0.06	0.02	76.0	14.5	9.5	< 0.4
BCA_010_h01	850	5.5	7.0	0.09	0.05	74.0	15.7	10.3	< 0.5
BCA_015_h01	1100	7.0	8.0	0.11	0.07	72.9	16.5	10.6	< 0.5
BCA_020_h01	1200	3.5	3.5	0.05	0.06	76.9	14.1	9.1	< 0.4
BCA_025_h01	1200	3.5	3.5	0.05	0.05	77.4	13.8	8.8	< 0.4
BCA_030_h01	1200	3.5	3.5	0.05	0.04	77.3	13.9	8.9	< 0.4
BCA_035_h01	950	3.0	3.0	0.05	0.03	77.4	13.8	8.8	< 0.4
BCA_040_h01	1000	4.5	7.0	0.09	0.02	74.0	15.7	10.3	< 0.5
BCA_045_h01	1300	6.5	8.0	0.08	0.21	68.0	20.0	12.0	< 0.5
BCA_050_h01	1350	4.0	4.0	0.06	0.21	68.0	20.0	12.0	< 0.5
BCA_055_h01	1350	4.0	4.0	0.06	0.21	68.0	20.0	12.0	< 0.5
BCA_060_h01	1350	4.0	4.0	0.06	0.21	68.0	20.0	12.0	< 0.5

Table D.03 - Tahmoor South - Predictions for Houses

House Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)	Predicted Probability of Nil or Category R0 Impact (%)	Predicted Probability of Category R1 or R2 Impact (%)	Predicted Probability of Category R3 or R4 Impact (%)	Predicted Probability of Category R5 Impact (%)
BCA_065_h01	900	2.0	4.5	0.10	0.03	73.5	16.1	10.4	< 0.5
BCA_070_h01	950	3.0	3.0	0.06	0.03	75.9	14.6	9.6	< 0.5
BCA_075_h01	1150	4.0	4.0	0.05	0.04	78.0	13.5	8.5	< 0.4
BCA_080_h01	1300	4.0	4.0	0.06	0.10	73.3	16.2	10.5	< 0.5
BCA_085_h01	1300	4.0	4.0	0.06	0.09	73.9	15.8	10.3	< 0.5
BCA_090_h01	1300	6.5	8.0	0.09	0.19	68.5	19.6	11.9	< 0.5
BCA_095_h01	1050	5.5	7.5	0.08	0.04	74.2	15.6	10.2	< 0.5
BCA_100_h01	850	3.5	5.0	0.08	0.05	74.5	15.3	10.1	< 0.5
BCA_105_h01	700	5.0	5.0	0.03	0.04	80.2	12.7	7.1	< 0.3
BCA_110_h01	400	5.5	5.5	0.06	< 0.01	75.4	14.8	9.8	< 0.5
BCA_115_h01	100	1.5	1.5	0.03	< 0.01	84.1	11.7	4.2	< 0.2
BCA_120_h01	70	0.5	0.5	< 0.01	< 0.01	91.3	7.2	1.5	< 0.1
BCL_001_h01	300	2.5	2.5	0.04	0.01	79.0	13.0	8.0	< 0.3
BCL_003_h01	400	4.5	4.5	0.08	0.02	74.3	15.5	10.2	< 0.5
BCL_005_h01	400	5.0	5.0	0.09	0.02	74.0	15.7	10.3	< 0.5
BCL_007_h01	550	7.5	7.5	0.09	0.04	73.5	16.1	10.4	< 0.5
BCL_009_h01	500	7.5	7.5	0.08	0.04	74.1	15.6	10.3	< 0.5
BCL_011_h01	700	8.5	8.5	0.07	0.11	72.9	16.5	10.6	< 0.5
BCL_013_h01	950	8.5	8.5	0.06	0.20	68.3	19.8	11.9	< 0.5
BCL_015_h01	1050	8.5	8.5	0.02	0.20	68.0	20.0	12.0	< 0.5
BCL_017_h01	1050	7.0	7.0	0.02	0.08	74.4	15.4	10.2	< 0.5
BCL_019_h01	1050	5.5	5.5	0.03	0.07	74.9	15.1	10.0	< 0.5
BCL_021_h01	1000	4.5	4.5	0.04	0.06	75.9	14.5	9.5	< 0.5
BCL_023_h01	950	3.0	3.0	0.08	0.05	74.3	15.5	10.2	< 0.5
BCL_025_h01	950	3.5	5.5	0.10	0.05	73.5	16.1	10.4	< 0.5
BCL_027_h01	1100	5.5	8.5	0.10	0.05	73.3	16.2	10.5	< 0.5
BCL_029_h01	1400	7.5	9.5	0.11	0.14	71.0	17.9	11.2	< 0.5
BCL_033_h01	1500	7.5	9.5	0.10	0.23	68.0	20.0	12.0	< 0.5
BCL_035_h01	1200	7.0	9.0	0.11	0.03	73.0	16.4	10.6	< 0.5
BCL_037_h01	1000	2.5	3.0	0.08	0.04	74.1	15.6	10.3	< 0.5
BCL_039_h01	1100	3.0	3.0	0.05	0.05	77.6	13.7	8.7	< 0.4
BCL_041_h01	1200	3.0	3.0	0.06	0.05	75.8	14.6	9.6	< 0.5
BCL_043_h01	1250	4.0	4.0	0.06	0.24	68.0	20.0	12.0	< 0.5
BCL_045_h01	1150	3.0	3.0	0.05	0.06	76.9	14.0	9.0	< 0.4
BCL_047_h01	1250	3.0	3.0	0.06	0.09	73.8	15.8	10.3	< 0.5
BCL_049_h01	1250	3.5	3.5	0.06	0.24	68.0	20.0	12.0	< 0.5
BCL_051_h01	1200	9.5	9.5	0.05	0.24	68.0	20.0	12.0	< 0.5
BCL_053_h01	1000	10.0	10.0	0.11	0.12	72.3	16.9	10.8	< 0.5
BCL_055_h01	900	10.0	10.0	0.11	0.04	72.9	16.5	10.6	< 0.5
BCL_059_h01	700	8.5	8.5	0.11	0.03	72.9	16.5	10.6	< 0.5
BCL_061_h01	500	6.5	6.5	0.11	0.02	73.0	16.5	10.6	< 0.5
BCM_001_h01	225	1.5	1.5	0.02	< 0.01	88.0	10.1	1.9	< 0.1
BCM_002_h01	225	1.5	1.5	0.02	< 0.01	88.7	9.5	1.8	< 0.1
BCM_004_h01	200	1.5	1.5	0.01	< 0.01	89.0	9.2	1.7	< 0.1
BCM_005_h01	175	1.0	1.0	0.01	< 0.01	90.2	8.2	1.6	< 0.1
BCM_006_h01	175	1.0	1.0	< 0.01	< 0.01	91.5	7.1	1.4	< 0.1
BCM_007_h01	150	0.5	0.5	< 0.01	< 0.01	92.7	6.0	1.3	< 0.1
BCM_008_h01	200	1.5	1.5	0.01	< 0.01	89.6	8.8	1.7	< 0.1
BCM_013_h01	125	0.5	0.5	< 0.01	< 0.01	92.8	5.9	1.3	< 0.1
BCM_014_h01	150	0.5	0.5	< 0.01	< 0.01	92.6	6.1	1.3	< 0.1
BCM_015_h01	150	1.0	1.0	< 0.01	< 0.01	92.0	6.6	1.4	< 0.1
BCM_016_h01	175	1.0	1.0	< 0.01	< 0.01	91.2	7.3	1.5	< 0.1
BCM_017_h01	200	1.0	1.0	0.01	< 0.01	89.7	8.7	1.7	< 0.1
BCM_018_h01	150	1.0	1.0	< 0.01	< 0.01	92.2	6.5	1.4	< 0.1
BCM_019_h01	200	1.0	1.0	0.01	< 0.01	90.3	8.1	1.6	< 0.1
BCM_020_h01	175	1.0	1.0	< 0.01	< 0.01	91.2	7.4	1.5	< 0.1
BCM_022_h01	150	1.0	1.0	< 0.01	< 0.01	91.9	6.7	1.4	< 0.1
BCM_024_h01	150	1.0	1.0	< 0.01	< 0.01	92.3	6.4	1.3	< 0.1
BCM_026_h01	125	0.5	0.5	< 0.01	< 0.01	92.8	6.0	1.3	< 0.1
BCM_027_h01	125	0.5	0.5	< 0.01	< 0.01	92.8	5.9	1.3	< 0.1
BCM_029_h01	125	0.5	0.5	< 0.01	< 0.01	92.9	5.8	1.3	< 0.1
BCM_031_h01	125	0.5	0.5	< 0.01	< 0.01	93.0	5.8	1.3	< 0.1
BCM_033_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.2	5.6	1.2	< 0.1
BCM_035_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.5	5.3	1.2	< 0.1
BCM_036_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.4	5.4	1.2	< 0.1
BCM_038_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.5	5.3	1.2	< 0.1
BCM_040_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.6	5.2	1.2	< 0.1
BCM_042_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.5	5.3	1.2	< 0.1
BCM_044_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.4	5.4	1.2	< 0.1
BCM_046_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.2	5.5	1.2	< 0.1
BCM_048_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.1	5.7	1.2	< 0.1
BCM_058_h01	300	2.5	2.5	0.04	0.01	79.1	13.0	7.9	< 0.3
BCM_062_h01	325	3.0	3.0	0.05	0.01	78.0	13.5	8.5	< 0.3
BCM_064_h01	325	3.0	3.0	0.06	0.01	76.9	14.1	9.1	< 0.4
BCM_066_h01	300	2.5	2.5	0.04	0.01	79.1	13.0	7.9	< 0.3
BCM_068_h01	325	3.0	3.0	0.06	0.01	76.8	14.1	9.1	< 0.4
BCM_070_h01	325	3.0	3.0	0.05	0.01	77.9	13.5	8.5	< 0.4
BCM_072_h01	325	3.0	3.0	0.05	0.01	77.3	13.9	8.9	< 0.4
BCP_010_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.0	5.8	1.3	< 0.1
BCP_040_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.5	5.3	1.2	< 0.1
BCP_050_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BCP_050_h02	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BCP_060_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BCP_075_h01	1200	4.0	4.0	0.04	0.17	69.7	18.8	11.5	< 0.5
BDA_001_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BDA_003_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BDA_005_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.8	4.1	1.0	< 0.1
BDA_007_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.8	4.2	1.0	< 0.1
BDA_009_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.8	4.2	1.0	< 0.1
BDA_011_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BDA_013_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BDW_070_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	95.0	4.0	1.0	< 0.1
BDY_001_h01	1100	3.0	3.0	0.05	0.04	77.2	13.9	8.9	< 0.4
BDY_004_h01	1000	2.5	2.5	0.06	0.04	75.4	14.8	9.8	< 0.5
BDY_007_h01	950	2.5	4.5	0.10	0.03	73.4	16.1	10.5	< 0.5
BDY_010_h01	1050	5.0	7.0	0.10	0.03	73.1	16.3	10.5	< 0.5
BDY_013_h01	1250	6.5	9.5	0.10	0.03	73.1	16.4	10.5	< 0.5
BDY_016_h01	1350	7.5	9.5	0.10	0.09	73.1	16.3	10.5	< 0.5
BDY_019_h01	1550	8.0	9.5	0.09	0.25	68.0	20.0	12.0	< 0.5
BDY_022_h01	1550	8.0	9.5	0.07	0.25	68.0	20.0	12.0	< 0.5
BDY_025_h01	1550	5.5	6.5	0.07	0.25	68.0	20.0	12.0	< 0.5
BDY_031_h01	1550	4.0	4.0	0.07	0.08	74.2	15.6	10.2	< 0.5
BDY_037_h01	1400	7.5	9.5	0.12	0.04	72.3	16.9	10.8	< 0.5

Table D.03 - Tahmoor South - Predictions for Houses

House Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)	Predicted Probability of Nil or Category R0 Impact (%)	Predicted Probability of Category R1 or R2 Impact (%)	Predicted Probability of Category R3 or R4 Impact (%)	Predicted Probability of Category R5 Impact (%)
BDY_047_h01	1600	5.5	7.0	0.07	0.25	68.0	20.0	12.0	< 0.5
BDY_050_h01	1600	6.0	7.5	0.07	0.25	68.0	20.0	12.0	< 0.5
BDY_060_h01	1600	4.0	4.0	0.07	0.20	68.0	20.0	12.0	< 0.5
BDY_070_h01	1250	4.0	4.0	0.05	0.04	77.6	13.7	8.7	< 0.4
BDY_080_h01	1100	2.0	4.5	0.09	0.03	73.7	15.9	10.4	< 0.5
BDY_090_h01	1300	4.0	4.0	0.05	0.04	77.5	13.7	8.7	< 0.4
BDY_100_h01	1350	4.0	4.0	0.06	0.04	76.8	14.1	9.1	< 0.4
BDY_110_h01	1600	4.0	5.0	0.07	0.25	68.0	20.0	12.0	< 0.5
BDY_130_h01	1150	4.0	7.0	0.10	0.03	73.1	16.4	10.6	< 0.5
BDY_140_h01	1200	3.5	3.5	0.05	0.04	77.0	14.0	9.0	< 0.4
BDY_140_h02	1150	3.0	3.0	0.07	0.04	74.7	15.2	10.1	< 0.5
BDY_150_h01	1550	4.0	4.0	0.07	0.10	73.5	16.1	10.4	< 0.5
BDY_160_h01	1550	7.0	8.0	0.07	0.26	68.0	20.0	12.0	< 0.5
BDY_170_h01	1550	7.5	8.5	0.07	0.26	68.0	20.0	12.0	< 0.5
BDY_180_h01	1450	8.0	9.5	0.10	0.15	70.8	18.0	11.2	< 0.5
BDY_190_h01	950	2.0	4.5	0.10	0.03	73.5	16.1	10.4	< 0.5
BDY_190_h02	950	2.0	3.5	0.08	0.04	74.4	15.4	10.2	< 0.5
BDY_200_h01	1100	3.0	3.0	0.06	0.04	76.8	14.1	9.1	< 0.4
BDY_210_h01	950	2.0	4.0	0.09	0.03	73.8	15.9	10.3	< 0.5
BDY_212_h01	1000	2.0	3.0	0.07	0.04	74.6	15.3	10.1	< 0.5
BDY_214_h01	1050	3.0	3.0	0.06	0.04	76.7	14.2	9.2	< 0.4
BDY_216_h01	1150	3.0	3.0	0.06	0.05	76.5	14.3	9.3	< 0.4
BDY_218_h01	1100	3.0	3.0	0.06	0.04	76.7	14.1	9.1	< 0.4
BDY_220_h01	1200	3.0	3.0	0.06	0.05	75.9	14.5	9.5	< 0.5
BDY_224_h01	1250	9.5	9.5	0.07	0.25	68.0	20.0	12.0	< 0.5
BEL_001_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BEL_003_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BEL_005_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BEL_007_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.1	1.2	< 0.1
BEL_009_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	92.1	6.5	1.4	< 0.1
BEL_011_h01	40	1.0	1.0	0.01	< 0.01	89.1	9.2	1.7	< 0.1
BEL_013_h01	80	1.0	1.0	0.01	< 0.01	89.5	8.8	1.7	< 0.1
BEL_017_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	92.8	5.9	1.3	< 0.1
BEL_019_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.3	5.5	1.2	< 0.1
BEL_021_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.6	5.2	1.2	< 0.1
BEL_023_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.2	1.2	< 0.1
BEL_025_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.1	1.2	< 0.1
BEL_027_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BEL_029_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BEL_031_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BEL_033_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BEL_035_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BEL_036_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BEL_037_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BEL_043_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BEL_045_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.4	1.1	< 0.1
BEL_047_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.6	4.4	1.1	< 0.1
BEL_049_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BEL_051_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BEL_052_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.6	1.1	< 0.1
BEL_053_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BEL_054_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BEL_055_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BEL_056_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BEL_057_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.7	1.1	< 0.1
BEL_058_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BEL_059_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BEL_061_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.9	4.9	1.1	< 0.1
BEL_063_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BEL_065_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.0	1.1	< 0.1
BEL_067_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.0	1.1	< 0.1
BEL_069_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.1	1.2	< 0.1
BEL_071_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.1	1.2	< 0.1
BEL_073_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.6	5.2	1.2	< 0.1
BEL_075_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.6	5.3	1.2	< 0.1
BEL_076_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.5	5.3	1.2	< 0.1
BEL_077_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.1	5.6	1.2	< 0.1
BEL_079_h01	125	0.5	0.5	< 0.01	< 0.01	92.6	6.1	1.3	< 0.1
BEL_081_h01	150	1.0	1.0	< 0.01	< 0.01	91.5	7.1	1.4	< 0.1
BEL_087_h01	175	1.5	1.5	0.01	0.01	89.9	8.4	1.6	< 0.1
BEL_089_h01	175	2.0	2.0	0.02	0.01	87.3	10.7	2.0	< 0.1
BEL_091_h01	125	2.0	2.0	0.03	< 0.01	82.8	12.1	5.2	< 0.2
BEL_093_h01	100	2.0	2.0	0.04	< 0.01	81.6	12.3	6.0	< 0.2
BEL_095_h01	80	1.5	1.5	0.02	< 0.01	85.6	11.3	3.0	< 0.1
BFL_001_h01	1400	7.5	9.0	0.10	0.12	72.2	17.0	10.8	< 0.5
BFL_003_h01	1100	5.5	8.0	0.10	0.03	73.1	16.4	10.6	< 0.5
BFL_005_h01	950	3.0	4.5	0.10	0.03	73.1	16.3	10.5	< 0.5
BFL_007_h01	950	2.0	4.0	0.10	0.03	73.2	16.3	10.5	< 0.5
BFL_009_h01	950	2.5	4.5	0.10	0.03	73.4	16.2	10.5	< 0.5
BGL_001_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.0	1.0	< 0.1
BGL_010_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	95.0	4.0	1.0	< 0.1
BGL_015_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	95.0	4.0	1.0	< 0.1
BGL_045_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BGL_050_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BGO_035_h01	1100	3.5	6.0	0.08	0.03	74.0	15.7	10.3	< 0.5
BGO_040_h01	1050	2.5	5.5	0.09	0.03	74.0	15.7	10.3	< 0.5
BGO_050_h01	1250	4.0	4.0	0.05	0.04	77.9	13.5	8.5	< 0.4
BGO_055_h01	1450	4.0	4.0	0.06	0.05	76.4	14.3	9.3	< 0.4
BGR_001_h01	150	1.0	1.0	< 0.01	< 0.01	92.3	6.4	1.3	< 0.1
BGR_003_h01	150	1.0	1.0	< 0.01	< 0.01	91.8	6.8	1.4	< 0.1
BGR_005_h01	150	1.0	1.0	< 0.01	< 0.01	92.3	6.4	1.3	< 0.1
BGR_007_h01	150	1.0	1.0	< 0.01	< 0.01	92.3	6.4	1.3	< 0.1
BGR_009_h01	150	1.0	1.0	< 0.01	< 0.01	92.3	6.4	1.3	< 0.1
BGR_035_h01	200	1.5	1.5	0.01	< 0.01	89.8	8.5	1.6	< 0.1
BGR_035_h02	200	1.5	1.5	0.01	< 0.01	89.1	9.1	1.7	< 0.1
BGR_053_h01	300	2.5	2.5	0.04	0.01	80.0	12.8	7.3	< 0.3
BGR_063_h01	600	7.5	7.5	0.11	0.02	72.8	16.6	10.6	< 0.5
BGR_065_h01	750	9.5	9.5	0.11	0.03	72.8	16.6	10.6	< 0.5
BGR_067_h01	1100	10.0	10.0	0.11	0.13	71.5	17.5	11.0	< 0.5
BGR_069_h01	850	10.0	10.0	0.11	0.04	72.8	16.5	10.6	< 0.5
BGR_071_h01	1150	10.0	10.0	0.11	0.21	68.0	20.0	12.0	< 0.5
BGR_073_h01	1150	10.0	10.0	0.10	0.20	68.0	20.0	12.0	< 0.5
BGR_075_h01	1250	10.0	10.0	0.07	0.25	68.0	20.0	12.0	< 0.5

Table D.03 - Tahmoor South - Predictions for Houses

House Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)	Predicted Probability of Nil or Category R0 Impact (%)	Predicted Probability of Category R1 or R2 Impact (%)	Predicted Probability of Category R3 or R4 Impact (%)	Predicted Probability of Category R5 Impact (%)
BGR_077_h01	1250	9.5	9.5	0.07	0.25	68.0	20.0	12.0	< 0.5
BGR_079_h01	1250	7.0	7.0	0.07	0.25	68.0	20.0	12.0	< 0.5
BGR_081_h01	1250	5.5	5.5	0.07	0.25	68.0	20.0	12.0	< 0.5
BGR_083_h01	1250	2.5	2.5	0.07	0.18	69.2	19.1	11.7	< 0.5
BGR_085_h01	1250	3.0	3.0	0.07	0.09	73.8	15.8	10.3	< 0.5
BGR_087_h01	1250	3.0	3.0	0.07	0.05	75.2	14.9	9.9	< 0.5
BGR_089_h01	1200	3.0	3.0	0.06	0.05	75.7	14.6	9.6	< 0.5
BGR_091_h01	1150	3.0	3.0	0.06	0.05	76.2	14.4	9.4	< 0.4
BGR_093_h01	1150	3.0	3.0	0.06	0.04	76.7	14.2	9.2	< 0.4
BGR_095_h01	1100	3.0	3.0	0.05	0.04	77.4	13.8	8.8	< 0.4
BGR_097_h01	1050	2.5	2.5	0.06	0.04	76.8	14.1	9.1	< 0.4
BGR_099_h01	1000	2.0	3.5	0.09	0.04	73.7	15.9	10.4	< 0.5
BGR_101_h01	950	2.5	4.0	0.11	0.03	72.9	16.5	10.6	< 0.5
BGR_103_h01	950	3.0	4.5	0.11	0.03	72.8	16.6	10.6	< 0.5
BGR_105_h01	1050	4.5	7.0	0.11	0.03	72.7	16.7	10.7	< 0.5
BGR_107_h01	1150	6.0	8.5	0.11	0.03	72.7	16.7	10.7	< 0.5
BGR_109_h01	1250	7.5	9.5	0.11	0.04	72.7	16.7	10.7	< 0.5
BGR_111_h01	1400	7.5	9.5	0.10	0.10	73.2	16.3	10.5	< 0.5
BGR_113_h01	1500	7.5	9.5	0.10	0.21	68.0	20.0	12.0	< 0.5
BGR_115_h01	1550	7.5	9.5	0.09	0.24	68.0	20.0	12.0	< 0.5
BGR_117_h01	1550	5.5	7.0	0.07	0.23	68.0	20.0	12.0	< 0.5
BGR_119_h01	1550	3.5	4.5	0.07	0.23	68.0	20.0	12.0	< 0.5
BGR_121_h01	1550	3.5	3.5	0.07	0.22	68.0	20.0	12.0	< 0.5
BGR_123_h01	1550	4.0	4.0	0.07	0.11	72.9	16.5	10.6	< 0.5
BGR_125_h01	1500	4.0	4.0	0.06	0.05	75.3	14.8	9.8	< 0.5
BGR_129_h01	1400	4.0	4.0	0.06	0.05	76.1	14.5	9.5	< 0.4
BGR_131_h01	1350	4.0	4.0	0.06	0.04	76.7	14.1	9.1	< 0.4
BGR_133_h01	1250	3.5	3.5	0.05	0.04	77.4	13.8	8.8	< 0.4
BGR_135_h01	1150	3.5	3.5	0.06	0.04	75.3	14.8	9.8	< 0.5
BGR_137_h01	1150	3.0	3.5	0.10	0.03	73.2	16.3	10.5	< 0.5
BGR_139_h01	1100	3.5	5.5	0.11	0.03	72.6	16.7	10.7	< 0.5
BGR_141_h01	1150	4.0	7.0	0.11	0.03	72.5	16.8	10.7	< 0.5
BGR_143_h01	1250	5.0	8.0	0.12	0.03	72.5	16.8	10.7	< 0.5
BGR_145_h01	1400	6.0	8.5	0.09	0.09	73.7	16.0	10.4	< 0.5
BGR_147_h01	1100	3.0	3.0	0.07	0.03	74.6	15.3	10.1	< 0.5
BGR_157_h01	1100	3.0	3.0	0.07	0.03	74.7	15.2	10.1	< 0.5
BGR_167_h01	1050	2.5	3.0	0.08	0.04	74.1	15.6	10.3	< 0.5
BGR_167_h02	1050	2.5	5.0	0.09	0.03	73.8	15.9	10.3	< 0.5
BGR_177_h01	1250	8.5	8.5	0.09	0.18	69.3	19.1	11.6	< 0.5
BGR_180_h01	650	8.5	8.5	0.10	0.06	73.4	16.1	10.5	< 0.5
BGR_183_h01	1100	7.0	7.0	0.12	0.11	72.4	16.9	10.7	< 0.5
BGR_193_h01	175	2.0	2.5	0.04	< 0.01	78.9	13.0	8.0	< 0.3
BGR_203_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	92.1	6.6	1.4	< 0.1
BGR_213_h01	125	0.5	0.5	0.01	< 0.01	89.6	8.7	1.7	< 0.1
BGR_218_h01	125	1.0	1.0	0.02	0.01	88.7	9.5	1.8	< 0.1
BGR_221_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.0	5.8	1.3	< 0.1
BGR_225_h01	100	1.0	1.0	0.01	< 0.01	89.3	9.0	1.7	< 0.1
BGR_230_h01	550	7.5	7.5	0.09	< 0.01	73.8	15.9	10.3	< 0.5
BGR_230_h02	950	5.0	5.0	0.05	0.06	76.5	14.2	9.2	< 0.4
BGR_235_h01	1150	5.0	5.0	0.04	0.06	76.2	14.4	9.4	< 0.4
BGR_235_h02	1250	4.0	4.0	0.04	0.05	78.3	13.4	8.4	< 0.3
BGR_240_h01	1500	6.0	8.0	0.06	0.21	68.0	20.0	12.0	< 0.5
BGR_245_h01	1500	6.0	8.0	0.06	0.21	68.0	20.0	12.0	< 0.5
BGR_250_h01	1450	6.0	8.5	0.09	0.17	69.6	18.9	11.5	< 0.5
BGR_255_h01	1150	3.0	3.0	0.10	0.03	73.4	16.1	10.4	< 0.5
BGR_260_h01	1300	3.5	3.5	0.05	0.04	77.4	13.8	8.8	< 0.4
BGR_261_h01	1200	3.5	3.5	0.05	0.04	77.6	13.7	8.7	< 0.4
BGR_263_h01	1450	3.5	3.5	0.06	0.05	76.2	14.4	9.4	< 0.4
BGR_268_h01	1500	3.5	3.5	0.06	0.05	75.7	14.6	9.6	< 0.5
BGR_278_h01	1450	7.5	9.5	0.10	0.13	71.6	17.4	11.0	< 0.5
BGR_281_h01	1150	3.0	3.0	0.06	0.04	76.7	14.1	9.1	< 0.4
BGR_281_h02	1050	2.5	2.5	0.06	0.04	75.5	14.7	9.7	< 0.5
BGR_301_h01	350	3.5	3.5	0.06	0.01	75.4	14.8	9.8	< 0.5
BGW_001_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BGW_011_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	95.0	4.0	1.0	< 0.1
BHA_001_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.9	4.9	1.1	< 0.1
BHA_003_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BHA_005_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.1	1.2	< 0.1
BHA_007_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.1	1.2	< 0.1
BHA_009_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.6	5.2	1.2	< 0.1
BHA_011_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.6	5.3	1.2	< 0.1
BHA_013_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.4	5.4	1.2	< 0.1
BHA_015_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.3	5.5	1.2	< 0.1
BHA_017_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.2	5.6	1.2	< 0.1
BHA_018_h01	125	0.5	0.5	< 0.01	< 0.01	92.9	5.9	1.3	< 0.1
BHA_019_h01	150	0.5	0.5	< 0.01	< 0.01	92.6	6.1	1.3	< 0.1
BHA_021_h01	150	1.0	1.0	< 0.01	< 0.01	91.9	6.7	1.4	< 0.1
BHA_023_h01	175	1.0	1.0	0.01	< 0.01	90.7	7.8	1.5	< 0.1
BHA_025_h01	200	1.5	1.5	0.01	< 0.01	89.5	8.8	1.7	< 0.1
BHA_026_h01	225	1.5	1.5	0.02	< 0.01	88.4	9.7	1.8	< 0.1
BHA_030_h01	650	8.0	8.0	0.10	0.02	73.1	16.3	10.5	< 0.5
BHA_033_h01	850	9.5	9.5	0.10	0.03	73.1	16.4	10.5	< 0.5
BHA_034_h01	950	9.5	9.5	0.10	0.09	73.1	16.3	10.5	< 0.5
BHA_035_h01	1150	9.5	9.5	0.10	0.21	68.0	20.0	12.0	< 0.5
BHA_036_h01	1200	9.5	9.5	0.06	0.23	68.0	20.0	12.0	< 0.5
BHA_039_h01	1150	9.5	9.5	0.09	0.21	68.0	20.0	12.0	< 0.5
BHA_040_h01	1200	9.5	9.5	0.06	0.23	68.0	20.0	12.0	< 0.5
BHA_041_h01	1200	5.5	5.5	0.06	0.23	68.0	20.0	12.0	< 0.5
BHA_042_h01	1200	2.5	2.5	0.06	0.13	71.8	17.3	10.9	< 0.5
BHA_043_h01	1200	2.5	2.5	0.06	0.04	76.7	14.1	9.1	< 0.4
BHA_045_h01	1100	2.5	2.5	0.05	0.04	77.4	13.8	8.8	< 0.4
BHA_046_h01	1050	2.5	2.5	0.05	0.04	77.8	13.6	8.6	< 0.4
BHA_047_h01	1000	2.5	2.5	0.09	0.03	73.7	15.9	10.4	< 0.5
BHA_048_h01	950	3.0	4.0	0.13	0.03	71.9	17.2	10.9	< 0.5
BHA_049_h01	1050	4.0	6.0	0.13	0.03	71.8	17.3	10.9	< 0.5
BHA_050_h01	1150	5.5	8.0	0.13	0.03	71.8	17.3	10.9	< 0.5
BHA_051_h01	1300	7.0	9.0	0.10	0.03	73.2	16.3	10.5	< 0.5
BHA_052_h01	1450	7.0	9.0	0.10	0.19	68.7	19.5	11.8	< 0.5
BHA_054_h01	1350	7.0	9.0	0.10	0.05	73.2	16.3	10.5	< 0.5
BHA_056_h01	1200	6.5	8.5	0.11	0.03	72.8	16.5	10.6	< 0.5
BHA_058_h01	1150	5.5	8.0	0.12	0.03	72.1	17.1	10.8	< 0.5
BHA_061_h01	1000	3.5	5.0	0.12	0.03	72.1	17.1	10.8	< 0.5
BHA_064_h01	1000	2.5	2.5	0.06	0.03	76.1	14.4	9.4	< 0.4

Table D.03 - Tahmoor South - Predictions for Houses

House Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)	Predicted Probability of Nil or Category R0 Impact (%)	Predicted Probability of Category R1 or R2 Impact (%)	Predicted Probability of Category R3 or R4 Impact (%)	Predicted Probability of Category R5 Impact (%)
BHA_067_h01	1100	2.5	2.5	0.05	0.04	77.8	13.6	8.6	< 0.4
BHA_070_h01	1150	2.5	2.5	0.06	0.04	76.9	14.0	9.0	< 0.4
BHA_072_h01	1100	2.5	2.5	0.05	0.04	77.6	13.7	8.7	< 0.4
BHA_076_h01	1200	2.5	2.5	0.06	0.05	76.4	14.3	9.3	< 0.4
BHA_078_h01	1200	2.5	2.5	0.06	0.19	68.4	19.7	11.9	< 0.5
BHA_080_h01	1200	2.0	2.0	0.06	0.20	68.2	19.9	12.0	< 0.5
BHA_082_h01	1200	6.5	6.5	0.06	0.23	68.0	20.0	12.0	< 0.5
BHA_084_h01	1200	9.0	9.0	0.06	0.23	68.0	20.0	12.0	< 0.5
BHA_087_h01	1200	9.5	9.5	0.09	0.24	68.0	20.0	12.0	< 0.5
BHA_088_h01	1100	9.5	9.5	0.09	0.17	69.5	18.9	11.6	< 0.5
BHA_089_h01	1150	9.5	9.5	0.10	0.23	68.0	20.0	12.0	< 0.5
BHA_090_h01	1150	9.5	9.5	0.10	0.22	68.0	20.0	12.0	< 0.5
BHA_091_h01	900	9.5	9.5	0.10	0.04	73.1	16.4	10.6	< 0.5
BHA_092_h01	550	7.0	7.0	0.10	0.02	73.1	16.4	10.5	< 0.5
BHA_093_h01	375	4.0	4.0	0.07	0.01	74.6	15.3	10.1	< 0.5
BHA_098_h01	300	2.5	2.5	0.04	0.01	79.7	12.8	7.5	< 0.3
BHA_100_h01	275	2.0	2.0	0.03	< 0.01	84.4	11.7	4.0	< 0.2
BHA_101_h01	225	1.5	1.5	0.02	< 0.01	88.7	9.5	1.8	< 0.1
BHA_102_h01	200	1.5	1.5	0.01	< 0.01	89.3	9.0	1.7	< 0.1
BHA_104_h01	175	1.0	1.0	< 0.01	< 0.01	91.0	7.5	1.5	< 0.1
BHA_105_h01	175	1.0	1.0	0.01	< 0.01	90.4	8.0	1.6	< 0.1
BHA_106_h01	225	1.5	1.5	0.02	< 0.01	87.7	10.3	1.9	< 0.1
BHA_106_h02	200	1.5	1.5	0.02	< 0.01	88.9	9.3	1.8	< 0.1
BHA_106_h03	200	1.0	1.0	0.01	< 0.01	89.8	8.6	1.7	< 0.1
BHA_106_h04	175	1.0	1.0	0.01	< 0.01	90.7	7.7	1.5	< 0.1
BHA_109_h01	150	1.0	1.0	< 0.01	< 0.01	91.8	6.8	1.4	< 0.1
BHA_111_h01	150	0.5	0.5	< 0.01	< 0.01	92.6	6.1	1.3	< 0.1
BHA_116_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.2	5.6	1.2	< 0.1
BHA_117_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.3	5.5	1.2	< 0.1
BHD_001_h01	125	0.5	0.5	< 0.01	< 0.01	93.1	5.7	1.2	< 0.1
BHD_002_h01	125	0.5	0.5	< 0.01	< 0.01	93.0	5.8	1.3	< 0.1
BHD_003_h01	125	0.5	0.5	< 0.01	< 0.01	92.9	5.8	1.3	< 0.1
BHD_004_h01	125	0.5	0.5	< 0.01	< 0.01	92.9	5.9	1.3	< 0.1
BHD_005_h01	125	0.5	0.5	< 0.01	< 0.01	92.8	5.9	1.3	< 0.1
BHD_006_h01	125	0.5	0.5	< 0.01	< 0.01	92.7	6.0	1.3	< 0.1
BHD_007_h01	150	1.0	1.0	< 0.01	< 0.01	92.2	6.5	1.4	< 0.1
BHD_008_h01	175	1.0	1.0	< 0.01	< 0.01	91.3	7.3	1.5	< 0.1
BHD_009_h01	175	1.0	1.0	0.01	< 0.01	90.5	7.9	1.6	< 0.1
BHD_010_h01	200	1.5	1.5	0.01	< 0.01	89.0	9.2	1.7	< 0.1
BHD_011_h01	150	1.0	1.0	< 0.01	< 0.01	91.8	6.8	1.4	< 0.1
BHD_012_h01	150	1.0	1.0	< 0.01	< 0.01	92.2	6.5	1.4	< 0.1
BHI_001_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.7	4.3	1.0	< 0.1
BHI_005_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	93.5	5.3	1.2	< 0.1
BHI_010_h01	150	1.5	1.5	0.02	< 0.01	86.4	11.1	2.4	< 0.1
BHO_001_h01	1150	5.0	5.0	0.05	0.06	75.9	14.6	9.6	< 0.5
BHO_002_h01	1250	4.0	4.0	0.04	0.05	77.4	13.8	8.8	< 0.4
BHO_003_h01	1300	4.0	4.0	0.05	0.05	77.6	13.7	8.7	< 0.4
BHO_004_h01	1350	4.0	4.0	0.05	0.05	77.1	14.0	9.0	< 0.4
BHO_005_h01	1300	3.5	3.5	0.05	0.04	77.1	13.9	8.9	< 0.4
BHO_006_h01	1350	3.5	3.5	0.06	0.04	76.6	14.2	9.2	< 0.4
BHO_008_h01	1400	3.5	3.5	0.06	0.05	76.1	14.4	9.4	< 0.4
BHO_009_h01	1450	3.5	3.5	0.06	0.05	75.8	14.6	9.6	< 0.5
BHO_010_h01	1500	3.5	3.5	0.06	0.08	74.3	15.5	10.2	< 0.5
BHO_011_h01	1500	3.5	3.5	0.06	0.18	69.0	19.3	11.7	< 0.5
BHO_012_h01	1500	5.5	7.0	0.06	0.23	68.0	20.0	12.0	< 0.5
BHO_013_h01	1500	6.0	8.0	0.06	0.22	68.0	20.0	12.0	< 0.5
BHO_014_h01	1500	7.0	9.0	0.06	0.22	68.0	20.0	12.0	< 0.5
BHO_015_h01	1450	7.5	9.0	0.10	0.17	69.8	18.7	11.5	< 0.5
BHO_017_h01	1250	7.0	9.0	0.11	0.03	72.7	16.6	10.7	< 0.5
BHO_019_h01	1000	3.5	5.5	0.11	0.03	72.6	16.7	10.7	< 0.5
BHO_021_h01	1000	2.5	3.0	0.09	0.03	73.9	15.8	10.3	< 0.5
BHO_023_h01	1100	2.5	2.5	0.05	0.04	77.6	13.7	8.7	< 0.4
BHO_025_h01	1200	2.5	2.5	0.06	0.05	76.4	14.3	9.3	< 0.4
BHO_027_h01	1200	3.0	3.0	0.06	0.05	76.0	14.5	9.5	< 0.5
BHO_029_h01	1250	3.0	3.0	0.06	0.23	68.0	20.0	12.0	< 0.5
BHO_031_h01	1250	8.5	8.5	0.06	0.24	68.0	20.0	12.0	< 0.5
BHO_033_h01	1200	9.5	9.5	0.07	0.24	68.0	20.0	12.0	< 0.5
BHO_035_h01	1000	10.0	10.0	0.11	0.10	72.9	16.5	10.6	< 0.5
BHO_036_h01	650	8.0	8.0	0.11	0.02	72.9	16.5	10.6	< 0.5
BHO_037_h01	400	4.0	4.0	0.08	0.01	74.4	15.5	10.2	< 0.5
BHO_039_h01	325	3.0	3.0	0.05	0.01	77.8	13.6	8.6	< 0.4
BHO_041_h01	225	1.5	1.5	0.02	< 0.01	87.0	11.0	2.0	< 0.1
BHO_043_h01	200	1.0	1.0	0.01	< 0.01	90.0	8.4	1.6	< 0.1
BHO_045_h01	150	1.0	1.0	< 0.01	< 0.01	91.9	6.7	1.4	< 0.1
BHO_047_h01	125	0.5	0.5	< 0.01	< 0.01	93.0	5.8	1.3	< 0.1
BHO_048_h01	250	2.0	2.0	0.03	0.01	84.6	11.6	3.8	< 0.2
BHO_051_h01	1200	10.0	10.0	0.11	0.24	68.0	20.0	12.0	< 0.5
BHO_053_h01	1250	2.5	2.5	0.06	0.23	68.0	20.0	12.0	< 0.5
BHO_055_h01	1150	3.0	3.0	0.06	0.04	76.9	14.1	9.1	< 0.4
BHO_057_h01	950	3.0	4.5	0.11	0.03	72.9	16.5	10.6	< 0.5
BHO_059_h01	1150	6.0	8.5	0.11	0.03	72.9	16.5	10.6	< 0.5
BHO_061_h01	1500	7.5	9.0	0.10	0.22	68.0	20.0	12.0	< 0.5
BHO_065_h01	1500	6.5	8.0	0.06	0.23	68.0	20.0	12.0	< 0.5
BHO_067_h01	1500	5.0	6.5	0.06	0.23	68.0	20.0	12.0	< 0.5
BHO_069_h01	1500	3.5	3.5	0.06	0.18	68.8	19.4	11.8	< 0.5
BHO_071_h01	1500	3.5	3.5	0.06	0.22	68.0	20.0	12.0	< 0.5
BHO_073_h01	1500	4.0	4.0	0.06	0.13	71.7	17.3	10.9	< 0.5
BHR_001_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BHR_003_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BHR_005_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BHR_007_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BHR_009_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BHW_001_h01	1500	4.5	6.5	0.06	0.21	68.0	20.0	12.0	< 0.5
BHW_003_h01	1500	6.5	8.5	0.07	0.21	68.0	20.0	12.0	< 0.5
BHW_005_h01	1500	6.5	8.5	0.08	0.21	68.0	20.0	12.0	< 0.5
BHW_007_h01	1450	6.5	9.0	0.09	0.15	70.4	18.3	11.3	< 0.5
BHW_009_h01	1400	6.5	9.0	0.09	0.09	73.5	16.0	10.4	< 0.5
BHW_011_h01	1300	6.5	9.0	0.10	0.03	73.3	16.2	10.5	< 0.5
BHW_013_h01	1200	5.0	8.5	0.10	0.03	73.2	16.3	10.5	< 0.5
BHW_015_h01	1100	3.5	6.0	0.10	0.03	73.3	16.2	10.5	< 0.5
BHW_017_h01	1150	3.0	3.5	0.09	0.04	73.9	15.8	10.3	< 0.5
BHW_019_h01	1150	3.0	3.0	0.08	0.03	74.4	15.4	10.2	< 0.5
BHW_021_h01	1200	3.5	3.5	0.06	0.04	76.9	14.0	9.0	< 0.4

Table D.03 - Tahmoor South - Predictions for Houses

House Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)	Predicted Probability of Nil or Category R0 Impact (%)	Predicted Probability of Category R1 or R2 Impact (%)	Predicted Probability of Category R3 or R4 Impact (%)	Predicted Probability of Category R5 Impact (%)
BHW_023_h01	1250	3.5	3.5	0.05	0.04	77.7	13.6	8.6	< 0.4
BHW_025_h01	1300	4.0	4.0	0.05	0.04	77.1	13.9	8.9	< 0.4
BHW_027_h01	1350	4.0	4.0	0.06	0.05	76.5	14.3	9.3	< 0.4
BHW_029_h01	1400	4.0	4.0	0.06	0.05	75.9	14.5	9.5	< 0.5
BHW_031_h01	1500	4.0	4.0	0.07	0.08	74.4	15.4	10.2	< 0.5
BHW_033_h01	1550	4.0	4.0	0.07	0.19	68.6	19.5	11.8	< 0.5
BHW_035_h01	1550	3.5	3.5	0.07	0.22	68.0	20.0	12.0	< 0.5
BHW_039_h01	1550	7.5	9.5	0.07	0.24	68.0	20.0	12.0	< 0.5
BHW_041_h01	1550	8.0	9.5	0.09	0.25	68.0	20.0	12.0	< 0.5
BHW_045_h01	1450	8.0	9.5	0.10	0.17	69.8	18.7	11.5	< 0.5
BHW_047_h01	1250	7.0	9.5	0.11	0.04	73.0	16.5	10.6	< 0.5
BHW_049_h01	1150	6.0	8.5	0.11	0.03	73.0	16.4	10.6	< 0.5
BHW_051_h01	1100	5.5	8.0	0.10	0.03	73.0	16.4	10.6	< 0.5
BHW_053_h01	1050	4.5	6.5	0.10	0.03	73.0	16.4	10.6	< 0.5
BHW_055_h01	1000	3.5	5.5	0.10	0.03	73.0	16.4	10.6	< 0.5
BHW_057_h01	950	2.5	4.5	0.10	0.03	73.1	16.4	10.5	< 0.5
BHW_059_h01	1000	2.0	3.5	0.09	0.04	74.0	15.7	10.3	< 0.5
BHW_061_h01	1050	3.0	3.0	0.06	0.04	76.1	14.5	9.5	< 0.4
BHW_063_h01	1100	3.0	3.0	0.05	0.04	77.2	13.9	8.9	< 0.4
BHW_065_h01	1150	3.0	3.0	0.06	0.05	76.4	14.3	9.3	< 0.4
BHW_067_h01	1150	3.0	3.0	0.06	0.05	76.2	14.4	9.4	< 0.4
BHW_069_h01	1200	3.0	3.0	0.06	0.05	75.7	14.6	9.6	< 0.5
BHW_071_h01	1250	3.0	3.0	0.06	0.05	75.3	14.8	9.8	< 0.5
BHW_073_h01	1250	4.0	4.0	0.07	0.25	68.0	20.0	12.0	< 0.5
BHW_075_h01	1250	3.0	3.0	0.07	0.25	68.0	20.0	12.0	< 0.5
BHW_077_h01	1250	6.0	6.0	0.07	0.25	68.0	20.0	12.0	< 0.5
BHW_079_h01	1300	7.5	7.5	0.07	0.25	68.0	20.0	12.0	< 0.5
BHW_081_h01	1250	9.5	9.5	0.07	0.26	68.0	20.0	12.0	< 0.5
BHW_083_h01	1250	10.0	10.0	0.07	0.26	68.0	20.0	12.0	< 0.5
BHW_085_h01	1250	10.0	10.0	0.09	0.26	68.0	20.0	12.0	< 0.5
BHW_087_h01	1200	10.0	10.0	0.10	0.22	68.0	20.0	12.0	< 0.5
BHW_089_h01	1100	10.0	10.0	0.11	0.15	70.8	18.0	11.2	< 0.5
BHW_091_h01	1000	10.0	10.0	0.11	0.05	72.7	16.6	10.7	< 0.5
BHW_093_h01	900	10.0	10.0	0.11	0.04	72.7	16.7	10.7	< 0.5
BHW_095_h01	800	10.0	10.0	0.11	0.03	72.7	16.7	10.7	< 0.5
BHW_097_h01	750	9.5	9.5	0.11	0.03	72.7	16.7	10.7	< 0.5
BHW_099_h01	650	8.5	8.5	0.11	0.03	72.7	16.7	10.7	< 0.5
BHW_101_h01	550	7.5	7.5	0.11	0.02	72.7	16.7	10.7	< 0.5
BHW_103_h01	500	6.0	6.0	0.10	0.02	73.0	16.4	10.6	< 0.5
BHW_105_h01	475	5.5	5.5	0.10	0.02	73.3	16.2	10.5	< 0.5
BHW_107_h01	425	4.5	4.5	0.09	0.02	73.9	15.8	10.3	< 0.5
BHW_109_h01	325	3.0	3.0	0.05	0.01	78.0	13.5	8.5	< 0.4
BHW_111_h01	325	3.0	3.0	0.05	0.01	78.2	13.4	8.4	< 0.3
BHW_113_h01	300	2.5	2.5	0.04	0.01	81.2	12.5	6.4	< 0.2
BHW_115_h01	275	2.0	2.0	0.03	0.01	82.8	12.0	5.1	< 0.2
BHW_117_h01	275	2.5	2.5	0.04	0.01	81.8	12.3	5.9	< 0.2
BHW_119_h01	275	2.0	2.0	0.03	0.01	82.6	12.1	5.3	< 0.2
BHW_123_h01	275	2.0	2.0	0.03	0.01	83.2	11.9	4.8	< 0.2
BHW_139_h01	225	1.5	1.5	0.02	< 0.01	87.7	10.4	1.9	< 0.1
BHW_141_h01	200	1.5	1.5	0.01	< 0.01	89.1	9.2	1.7	< 0.1
BHW_141_h02	225	1.5	1.5	0.02	< 0.01	87.5	10.5	1.9	< 0.1
BHW_145_h01	225	1.5	1.5	0.02	< 0.01	87.8	10.3	1.9	< 0.1
BHW_147_h01	225	1.5	1.5	0.02	< 0.01	88.3	9.8	1.8	< 0.1
BHW_149_h01	225	1.5	1.5	0.02	< 0.01	87.8	10.3	1.9	< 0.1
BHW_151_h01	225	1.5	1.5	0.02	< 0.01	87.9	10.2	1.9	< 0.1
BHW_153_h01	225	1.5	1.5	0.02	< 0.01	87.9	10.2	1.9	< 0.1
BHW_155_h01	225	1.5	1.5	0.02	< 0.01	87.9	10.2	1.9	< 0.1
BHW_157_h01	225	1.5	1.5	0.02	< 0.01	88.9	9.4	1.8	< 0.1
BHW_159_h01	200	1.5	1.5	0.01	< 0.01	89.4	8.9	1.7	< 0.1
BHW_161_h01	225	1.5	1.5	0.02	< 0.01	88.5	9.7	1.8	< 0.1
BHW_163_h01	225	1.5	1.5	0.02	< 0.01	88.0	10.2	1.9	< 0.1
BHW_165_h01	200	1.5	1.5	0.01	< 0.01	89.9	8.5	1.6	< 0.1
BHW_167_h01	225	1.5	1.5	0.02	< 0.01	87.9	10.2	1.9	< 0.1
BHW_169_h01	225	1.5	1.5	0.02	< 0.01	88.0	10.2	1.9	< 0.1
BHW_171_h01	225	1.5	1.5	0.02	< 0.01	88.1	10.1	1.9	< 0.1
BHW_173_h01	225	1.5	1.5	0.02	< 0.01	88.1	10.0	1.9	< 0.1
BHW_175_h01	225	1.5	1.5	0.02	< 0.01	88.2	10.0	1.9	< 0.1
BHW_177_h01	225	1.5	1.5	0.02	< 0.01	88.4	9.8	1.8	< 0.1
BHW_179_h01	225	1.5	1.5	0.02	< 0.01	88.4	9.7	1.8	< 0.1
BHW_181_h01	225	1.5	1.5	0.02	< 0.01	88.2	9.9	1.8	< 0.1
BHW_183_h01	225	1.5	1.5	0.02	< 0.01	88.2	10.0	1.9	< 0.1
BHW_185_h01	225	1.5	1.5	0.02	< 0.01	88.4	9.8	1.8	< 0.1
BHW_187_h01	200	1.5	1.5	0.02	< 0.01	88.8	9.4	1.8	< 0.1
BHW_189_h01	200	1.5	1.5	0.02	< 0.01	88.8	9.4	1.8	< 0.1
BHW_205_h01	475	6.0	6.0	0.10	0.02	73.1	16.4	10.5	< 0.5
BHW_209_h01	1100	3.5	3.5	0.06	0.05	76.3	14.3	9.3	< 0.4
BHW_215_h01	1150	6.5	9.0	0.12	0.03	72.1	17.0	10.8	< 0.5
BHW_221_h01	1500	5.0	5.0	0.07	0.07	74.9	15.1	10.0	< 0.5
BHW_227_h01	1250	5.0	5.0	0.06	0.04	76.0	14.5	9.5	< 0.4
BHW_233_h01	1250	7.5	9.5	0.12	0.04	72.2	17.0	10.8	< 0.5
BHW_239_h01	1000	4.5	6.5	0.12	0.03	72.4	16.9	10.8	< 0.5
BHW_243_h01	1100	10.0	10.0	0.11	0.13	71.8	17.3	10.9	< 0.5
BHW_243_h02	800	10.0	10.0	0.11	0.04	72.6	16.7	10.7	< 0.5
BHW_247_h01	350	3.0	3.0	0.06	0.01	76.7	14.1	9.1	< 0.4
BHW_251_h01	400	4.0	4.0	0.08	0.02	74.5	15.4	10.2	< 0.5
BHW_255_h01	350	3.5	3.5	0.07	0.01	75.0	15.0	10.0	< 0.5
BHW_259_h01	325	3.0	3.0	0.05	0.01	77.1	13.9	8.9	< 0.4
BHW_259_h02	325	3.0	3.0	0.06	0.01	77.0	14.0	9.0	< 0.4
BHW_261_h01	400	4.5	4.5	0.08	0.02	74.3	15.5	10.2	< 0.5
BHW_263_h01	375	3.5	3.5	0.07	0.01	74.9	15.0	10.0	< 0.5
BHW_265_h01	400	4.5	4.5	0.08	0.02	74.1	15.7	10.3	< 0.5
BHW_267_h01	400	4.5	4.5	0.08	0.02	74.3	15.5	10.2	< 0.5
BHW_269_h01	450	5.0	5.0	0.09	0.02	73.6	16.0	10.4	< 0.5
BHW_271_h01	375	4.0	4.0	0.07	0.01	74.8	15.1	10.1	< 0.5
BHW_279_h01	1050	10.0	10.0	0.11	0.11	72.5	16.8	10.7	< 0.5
BHW_285_h01	425	4.5	4.5	0.09	0.02	74.0	15.7	10.3	< 0.5
BHW_287_h01	475	6.0	6.0	0.10	0.02	73.1	16.3	10.5	< 0.5
BHW_289_h01	425	5.0	5.0	0.09	0.02	73.8	15.8	10.3	< 0.5
BHW_291_h01	450	5.0	5.0	0.09	0.02	73.5	16.1	10.4	< 0.5
BHW_297_h01	450	5.5	5.5	0.10	0.02	73.4	16.1	10.4	< 0.5
BHW_299_h01	450	5.5	5.5	0.10	0.02	73.5	16.1	10.4	< 0.5
BHW_301_h01	450	5.5	5.5	0.10	0.02	73.5	16.1	10.4	< 0.5
BHW_303_h01	475	5.5	5.5	0.10	0.02	73.2	16.3	10.5	< 0.5

Table D.03 - Tahmoor South - Predictions for Houses

House Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)	Predicted Probability of Nil or Category R0 Impact (%)	Predicted Probability of Category R1 or R2 Impact (%)	Predicted Probability of Category R3 or R4 Impact (%)	Predicted Probability of Category R5 Impact (%)
BHW_305_h01	425	5.0	5.0	0.09	0.02	73.7	15.9	10.4	< 0.5
BHW_307_h01	700	9.0	9.0	0.11	0.03	72.6	16.7	10.7	< 0.5
BHW_311_h01	950	10.0	10.0	0.11	0.04	72.6	16.7	10.7	< 0.5
BHW_313_h01	1200	10.0	10.0	0.11	0.21	68.0	20.0	12.0	< 0.5
BHW_315_h01	1200	10.0	10.0	0.10	0.24	68.0	20.0	12.0	< 0.5
BHW_317_h01	1250	10.0	10.0	0.10	0.25	68.0	20.0	12.0	< 0.5
BHW_319_h01	1300	10.0	10.0	0.07	0.27	68.0	20.0	12.0	< 0.5
BHW_321_h01	1300	10.0	10.0	0.07	0.26	68.0	20.0	12.0	< 0.5
BHW_323_h01	1300	8.0	8.0	0.07	0.26	68.0	20.0	12.0	< 0.5
BHW_325_h01	1300	3.0	3.0	0.07	0.23	68.0	20.0	12.0	< 0.5
BHW_327_h01	1250	3.0	3.0	0.07	0.13	71.7	17.4	11.0	< 0.5
BHW_329_h01	1250	3.0	3.0	0.07	0.05	75.0	15.0	10.0	< 0.5
BHW_331_h01	1250	3.0	3.0	0.07	0.05	75.2	14.9	9.9	< 0.5
BHW_335_h01	1200	6.5	9.0	0.11	0.03	72.9	16.5	10.6	< 0.5
BHW_337_h01	1500	7.5	9.5	0.10	0.23	68.0	20.0	12.0	< 0.5
BHW_339_h01	1550	7.5	9.5	0.07	0.25	68.0	20.0	12.0	< 0.5
BHW_341_h01	1550	4.0	4.0	0.07	0.10	73.1	16.3	10.5	< 0.5
BHW_343_h01	1450	4.0	4.0	0.06	0.05	75.3	14.8	9.8	< 0.5
BHW_345_h01	1550	4.0	4.0	0.07	0.11	72.6	16.7	10.7	< 0.5
BHW_347_h01	1450	4.0	4.0	0.07	0.05	75.3	14.9	9.9	< 0.5
BHW_349_h01	1350	4.0	4.0	0.06	0.05	76.3	14.4	9.4	< 0.4
BHW_351_h01	1250	4.0	4.0	0.05	0.04	77.3	13.8	8.8	< 0.4
BHW_353_h01	1150	3.0	3.0	0.07	0.04	75.3	14.9	9.9	< 0.5
BHW_355_h01	1100	3.0	5.5	0.09	0.03	73.5	16.1	10.4	< 0.5
BHW_357_h01	1300	7.0	9.0	0.11	0.04	72.7	16.7	10.7	< 0.5
BHW_361_h01	1550	7.0	9.0	0.11	0.23	68.0	20.0	12.0	< 0.5
BHW_365_h01	1550	7.0	9.0	0.11	0.23	68.0	20.0	12.0	< 0.5
BHW_367_h01	1500	3.5	3.5	0.06	0.19	68.4	19.7	11.9	< 0.5
BIR_001_h01	1300	6.5	9.0	0.12	0.04	72.3	16.9	10.8	< 0.5
BIR_017_h01	1050	3.0	5.5	0.09	0.03	73.7	16.0	10.4	< 0.5
BIR_027_h01	1200	5.5	8.5	0.12	0.03	72.4	16.8	10.7	< 0.5
BIR_037_h01	1500	6.5	8.5	0.12	0.22	68.0	20.0	12.0	< 0.5
BIR_047_h01	1400	3.5	3.5	0.06	0.04	76.8	14.1	9.1	< 0.4
BIR_057_h01	1050	2.5	4.5	0.08	0.03	74.1	15.6	10.2	< 0.5
BIR_067_h01	1200	5.5	7.5	0.09	0.03	73.9	15.8	10.3	< 0.5
BIR_077_h01	1100	3.0	3.0	0.06	0.03	75.8	14.6	9.6	< 0.5
BIR_087_h01	1300	4.0	4.0	0.05	0.04	77.4	13.8	8.8	< 0.4
BIR_097_h01	1500	6.5	8.5	0.08	0.21	68.0	20.0	12.0	< 0.5
BIR_107_h01	1200	5.0	8.0	0.11	0.03	72.7	16.7	10.7	< 0.5
BIR_117_h01	1050	2.5	5.5	0.09	0.03	73.8	15.8	10.3	< 0.5
BJA_001_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.6	1.1	< 0.1
BJA_002_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BJA_003_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BJA_004_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.8	1.1	< 0.1
BJA_005_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BJA_006_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BJA_007_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BJA_008_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BJA_009_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BJO_005_h01	800	10.0	10.0	0.11	0.04	72.6	16.7	10.7	< 0.5
BJO_010_h01	1300	9.0	9.0	0.07	0.27	68.0	20.0	12.0	< 0.5
BJO_020_h01	1250	3.5	3.5	0.07	0.06	74.8	15.1	10.1	< 0.5
BJO_030_h01	950	2.5	4.5	0.10	0.04	73.5	16.1	10.4	< 0.5
BJO_050_h01	1300	8.5	10.0	0.12	0.04	72.3	16.9	10.8	< 0.5
BJO_060_h01	1600	8.5	10.0	0.11	0.26	68.0	20.0	12.0	< 0.5
BJO_070_h01	1600	4.5	4.5	0.07	0.22	68.0	20.0	12.0	< 0.5
BJO_080_h01	1350	8.5	10.0	0.11	0.06	73.0	16.5	10.6	< 0.5
BJO_090_h01	1000	3.5	5.5	0.10	0.03	73.2	16.3	10.5	< 0.5
BJO_100_h01	950	2.0	3.0	0.07	0.04	74.8	15.1	10.0	< 0.5
BJO_110_h01	1150	3.5	3.5	0.06	0.05	76.0	14.5	9.5	< 0.4
BJO_120_h01	1250	3.5	3.5	0.07	0.06	74.8	15.2	10.1	< 0.5
BJO_130_h01	1300	7.0	7.0	0.07	0.27	68.0	20.0	12.0	< 0.5
BJO_150_h01	1600	6.5	7.5	0.07	0.25	68.0	20.0	12.0	< 0.5
BJO_150_h02	1550	8.5	10.0	0.08	0.26	68.0	20.0	12.0	< 0.5
BJU_001_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.1	1.2	< 0.1
BJU_002_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.1	1.2	< 0.1
BJU_003_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.6	5.2	1.2	< 0.1
BJU_004_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.5	5.3	1.2	< 0.1
BJU_005_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.5	5.3	1.2	< 0.1
BJU_006_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.4	5.4	1.2	< 0.1
BJU_007_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.3	5.5	1.2	< 0.1
BJU_008_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.1	5.6	1.2	< 0.1
BJU_009_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.1	5.7	1.2	< 0.1
BJU_010_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.2	5.6	1.2	< 0.1
BJU_011_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.2	5.5	1.2	< 0.1
BJU_012_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.4	5.4	1.2	< 0.1
BJU_013_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.5	5.4	1.2	< 0.1
BJU_014_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.5	5.3	1.2	< 0.1
BKA_001_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BKA_003_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BKA_005_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BKA_007_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.8	4.2	1.0	< 0.1
BKA_009_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.8	4.2	1.0	< 0.1
BKA_011_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.6	4.3	1.0	< 0.1
BKA_017_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BKA_018_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BKA_019_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BKA_021_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BKA_022_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.8	1.1	< 0.1
BKA_024_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BKA_026_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BKA_030_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.9	4.9	1.1	< 0.1
BKA_032_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BKA_034_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BKA_036_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.1	1.2	< 0.1
BKA_038_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.0	1.1	< 0.1
BKA_040_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.1	1.2	< 0.1
BKA_042_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.1	1.2	< 0.1
BKA_044_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.1	1.2	< 0.1
BKA_046_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.1	1.2	< 0.1
BKA_049_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.0	1.1	< 0.1
BKA_052_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BKA_055_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1

Table D.03 - Tahmoor South - Predictions for Houses

House Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)	Predicted Probability of Nil or Category R0 Impact (%)	Predicted Probability of Category R1 or R2 Impact (%)	Predicted Probability of Category R3 or R4 Impact (%)	Predicted Probability of Category R5 Impact (%)
BKA_055_h02	70	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.1	1.2	< 0.1
BKA_058_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.0	1.1	< 0.1
BKA_059_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BKA_060_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BKA_062_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BKA_064_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BKA_066_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BKA_068_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.7	1.1	< 0.1
BKA_070_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BKA_071_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BKA_072_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BKA_074_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BKA_074_h02	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BKA_075_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.4	1.1	< 0.1
BKA_102_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.4	1.1	< 0.1
BKA_112_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.5	1.1	< 0.1
BKA_113_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.5	1.1	< 0.1
BKA_114_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.6	4.4	1.1	< 0.1
BKA_115_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BKA_119_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BKA_121_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BKA_122_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.6	1.1	< 0.1
BKA_123_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.6	1.1	< 0.1
BKA_124_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BKA_125_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BKA_126_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BKA_127_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BKA_129_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BKA_131_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BKA_133_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BKA_135_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BKA_137_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BKA_138_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BKA_139_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.8	1.1	< 0.1
BKA_140_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BKA_144_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BKA_147_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BKA_150_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BKA_155_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BKA_165_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BKA_170_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.5	1.1	< 0.1
BKA_180_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.6	4.4	1.1	< 0.1
BKA_185_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.6	4.4	1.1	< 0.1
BKA_190_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.6	4.3	1.0	< 0.1
BLA_001_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.6	5.2	1.2	< 0.1
BLA_002_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.1	1.2	< 0.1
BLA_003_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BLA_004_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.9	4.9	1.1	< 0.1
BLA_005_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BLA_006_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BLA_007_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.2	1.2	< 0.1
BLA_008_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.6	5.2	1.2	< 0.1
BLA_009_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.4	5.4	1.2	< 0.1
BLA_010_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.3	5.5	1.2	< 0.1
BLA_011_h01	125	0.5	0.5	< 0.01	< 0.01	93.1	5.7	1.2	< 0.1
BLA_012_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.2	5.6	1.2	< 0.1
BLA_013_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.3	5.5	1.2	< 0.1
BLA_014_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.4	5.4	1.2	< 0.1
BLL_001_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	93.5	5.3	1.2	< 0.1
BLL_003_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.5	5.3	1.2	< 0.1
BLL_005_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BLL_007_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BLL_009_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.6	4.4	1.1	< 0.1
BLL_011_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.6	4.3	1.0	< 0.1
BLL_013_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.7	4.3	1.0	< 0.1
BLL_015_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.7	4.3	1.0	< 0.1
BLL_017_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.7	4.3	1.0	< 0.1
BLL_019_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.6	4.3	1.0	< 0.1
BLL_021_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.6	4.4	1.1	< 0.1
BLL_023_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BLL_025_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.6	1.1	< 0.1
BLL_027_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BLL_029_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BLL_031_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BLL_033_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BLL_035_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	93.4	5.4	1.2	< 0.1
BLU_001_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	95.0	4.0	1.0	< 0.1
BLU_005_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	95.0	4.0	1.0	< 0.1
BLU_010_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	95.0	4.0	1.0	< 0.1
BLU_015_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.7	4.3	1.0	< 0.1
BMA_001_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.7	4.2	1.0	< 0.1
BMA_003_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.7	4.3	1.0	< 0.1
BMA_007_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.4	1.1	< 0.1
BMA_009_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BMA_011_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.6	1.1	< 0.1
BMA_013_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BMA_015_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BMA_017_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BMA_019_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BMA_021_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BMA_023_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BMA_027_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.7	4.2	1.0	< 0.1
BMA_029_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.7	4.3	1.0	< 0.1
BMA_031_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.7	4.3	1.0	< 0.1
BMA_033_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.6	4.3	1.0	< 0.1
BMA_035_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.4	1.1	< 0.1
BMA_037_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BMA_039_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BMA_055_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BMA_057_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BMA_059_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BMA_061_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BMA_063_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	93.9	4.9	1.1	< 0.1

Table D.03 - Tahmoor South - Predictions for Houses

House Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)	Predicted Probability of Nil or Category R0 Impact (%)	Predicted Probability of Category R1 or R2 Impact (%)	Predicted Probability of Category R3 or R4 Impact (%)	Predicted Probability of Category R5 Impact (%)
BMI_001_h01	475	5.5	5.5	0.10	0.02	73.5	16.1	10.4	< 0.5
BMI_003_h01	350	3.5	3.5	0.06	0.01	75.6	14.7	9.7	< 0.5
BNN_001_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.4	1.1	< 0.1
BNN_005_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BNN_007_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BNN_009_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.6	1.1	< 0.1
BNN_011_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BNN_013_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BNN_015_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BNN_017_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BNN_018_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BNN_019_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BNN_021_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BNN_023_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BNN_025_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BNN_027_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.1	1.2	< 0.1
BNN_029_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.1	1.2	< 0.1
BNN_031_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.6	5.2	1.2	< 0.1
BNN_033_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.5	5.3	1.2	< 0.1
BNN_035_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.3	5.5	1.2	< 0.1
BNN_037_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.2	5.6	1.2	< 0.1
BNN_039_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.1	5.7	1.2	< 0.1
BNN_041_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.2	5.6	1.2	< 0.1
BNN_043_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.3	5.4	1.2	< 0.1
BNN_045_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.4	5.4	1.2	< 0.1
BNN_047_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.6	5.2	1.2	< 0.1
BNN_049_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.1	1.2	< 0.1
BNN_051_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.0	1.1	< 0.1
BNN_053_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BNN_055_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BNN_057_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BNN_059_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BNN_061_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BNN_063_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BNN_065_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BNN_067_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BNN_069_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BNN_071_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BNN_073_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.5	1.1	< 0.1
BNN_075_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.4	1.1	< 0.1
BNO_001_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	92.8	5.9	1.3	< 0.1
BNO_003_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BNO_005_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.8	4.1	1.0	< 0.1
BNO_007_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.7	4.2	1.0	< 0.1
BNO_009_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BNO_015_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BNO_021_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BNO_023_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BNO_025_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BNO_027_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BNO_031_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BNO_035_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.8	4.2	1.0	< 0.1
BNO_037_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.8	4.2	1.0	< 0.1
BNO_039_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BNO_043_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.7	4.2	1.0	< 0.1
BNO_045_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.8	4.2	1.0	< 0.1
BNO_047_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.8	4.2	1.0	< 0.1
BNO_049_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.7	4.2	1.0	< 0.1
BNO_051_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BNO_053_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.7	1.1	< 0.1
BNO_055_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	92.6	6.1	1.3	< 0.1
BNO_057_h01	30	0.5	0.5	< 0.01	< 0.01	91.8	6.8	1.4	< 0.1
BNR_001_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BNR_001_h02	30	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BNR_003_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BNR_005_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BNR_007_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BNR_009_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.7	1.1	< 0.1
BNR_011_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BNR_013_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.8	1.1	< 0.1
BNR_015_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BNR_019_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.6	5.2	1.2	< 0.1
BNR_020_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.6	5.2	1.2	< 0.1
BNR_021_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.1	1.2	< 0.1
BNR_023_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.1	1.2	< 0.1
BNR_025_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BNR_027_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BNR_029_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BNR_031_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.7	1.1	< 0.1
BNR_033_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BNR_035_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BNR_039_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BNR_041_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BOL_001_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	95.0	4.0	1.0	< 0.1
BOL_010_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	95.0	4.0	1.0	< 0.1
BOL_120_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	95.0	4.0	1.0	< 0.1
BOL_130_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BOL_140_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.8	4.2	1.0	< 0.1
BOL_150_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BPA_001_h01	125	0.5	0.5	< 0.01	< 0.01	92.7	6.0	1.3	< 0.1
BPA_007_h01	275	2.0	2.0	0.03	0.01	83.6	11.9	4.6	< 0.2
BPA_010_h01	175	1.0	1.0	< 0.01	< 0.01	91.6	7.0	1.4	< 0.1
BPA_012_h01	150	1.0	1.0	< 0.01	< 0.01	92.3	6.3	1.3	< 0.1
BPA_014_h01	150	0.5	0.5	< 0.01	< 0.01	92.5	6.2	1.3	< 0.1
BPH_001_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BPH_002_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BPH_003_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.9	4.9	1.1	< 0.1
BPH_004_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BPH_005_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.1	1.2	< 0.1
BPH_006_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.2	1.2	< 0.1
BPH_007_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.2	1.2	< 0.1
BPH_008_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.1	1.2	< 0.1
BPH_009_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.0	1.1	< 0.1

Table D.03 - Tahmoor South - Predictions for Houses

House Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)	Predicted Probability of Nil or Category R0 Impact (%)	Predicted Probability of Category R1 or R2 Impact (%)	Predicted Probability of Category R3 or R4 Impact (%)	Predicted Probability of Category R5 Impact (%)
BPH_010_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.9	4.9	1.1	< 0.1
BPH_011_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BPH_012_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BPH_013_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BPH_014_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BPP_001_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.6	4.4	1.1	< 0.1
BPP_010_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.6	4.4	1.1	< 0.1
BPP_011_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.4	1.1	< 0.1
BPP_012_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.5	1.1	< 0.1
BRA_001_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BRA_002_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BRA_003_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.1	1.2	< 0.1
BRA_005_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.0	1.1	< 0.1
BRA_005_h02	60	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.1	1.2	< 0.1
BRA_007_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.1	1.2	< 0.1
BRA_008_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.1	1.2	< 0.1
BRA_009_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.1	1.2	< 0.1
BRA_011_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.1	1.2	< 0.1
BRA_012_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.6	5.2	1.2	< 0.1
BRA_013_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.6	5.3	1.2	< 0.1
BRA_014_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.1	1.2	< 0.1
BRA_015_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.2	1.2	< 0.1
BRA_017_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.6	5.3	1.2	< 0.1
BRA_019_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.6	5.2	1.2	< 0.1
BRA_023_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.1	5.7	1.2	< 0.1
BRA_025_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.1	5.7	1.2	< 0.1
BRA_027_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.0	5.7	1.2	< 0.1
BRA_030_h01	125	0.5	0.5	< 0.01	< 0.01	92.9	5.9	1.3	< 0.1
BRA_032_h01	125	0.5	0.5	< 0.01	< 0.01	92.8	5.9	1.3	< 0.1
BRA_034_h01	125	0.5	0.5	< 0.01	< 0.01	92.7	6.0	1.3	< 0.1
BRA_036_h01	125	0.5	0.5	< 0.01	< 0.01	92.7	6.1	1.3	< 0.1
BRA_038_h01	150	0.5	0.5	< 0.01	< 0.01	92.5	6.2	1.3	< 0.1
BRA_040_h01	150	1.0	1.0	< 0.01	< 0.01	92.4	6.3	1.3	< 0.1
BRA_042_h01	150	1.0	1.0	< 0.01	< 0.01	92.0	6.7	1.4	< 0.1
BRA_044_h01	175	1.0	1.0	< 0.01	< 0.01	91.3	7.3	1.5	< 0.1
BRA_046_h01	200	1.0	1.0	0.01	< 0.01	90.6	7.9	1.6	< 0.1
BRA_047_h01	225	1.5	1.5	0.02	< 0.01	86.7	11.1	2.2	< 0.1
BRA_049_h01	225	1.5	1.5	0.02	< 0.01	87.4	10.6	1.9	< 0.1
BRA_050_h01	250	2.0	2.0	0.03	< 0.01	85.2	11.4	3.3	< 0.1
BRA_052_h01	275	2.5	2.5	0.03	0.01	82.4	12.1	5.4	< 0.2
BRA_054_h01	350	3.0	3.0	0.06	0.01	76.7	14.1	9.1	< 0.4
BRA_056_h01	375	4.0	4.0	0.07	0.01	74.8	15.2	10.1	< 0.5
BRA_058_h01	425	4.5	4.5	0.08	0.02	74.1	15.7	10.3	< 0.5
BRA_060_h01	500	6.0	6.0	0.10	0.02	73.2	16.3	10.5	< 0.5
BRA_062_h01	600	7.5	7.5	0.10	0.02	73.1	16.4	10.6	< 0.5
BRA_066_h01	800	9.5	9.5	0.10	0.03	73.1	16.4	10.5	< 0.5
BRA_068_h01	900	9.5	9.5	0.10	0.04	73.1	16.3	10.5	< 0.5
BRA_070_h01	1100	9.5	9.5	0.10	0.19	68.7	19.5	11.8	< 0.5
BRA_074_h01	1200	9.5	9.5	0.06	0.23	68.0	20.0	12.0	< 0.5
BRA_078_h01	1200	7.5	7.5	0.06	0.23	68.0	20.0	12.0	< 0.5
BRA_080_h01	1200	5.5	5.5	0.06	0.23	68.0	20.0	12.0	< 0.5
BRA_082_h01	1200	2.0	2.0	0.06	0.19	68.5	19.7	11.9	< 0.5
BRA_084_h01	1200	2.5	2.5	0.06	0.12	71.9	17.2	10.9	< 0.5
BRA_086_h01	1200	2.5	2.5	0.06	0.04	76.7	14.1	9.1	< 0.4
BRA_088_h01	1150	2.5	2.5	0.05	0.04	77.1	14.0	9.0	< 0.4
BRA_090_h01	1100	2.5	2.5	0.05	0.04	77.4	13.8	8.8	< 0.4
BRA_092_h01	1100	2.5	2.5	0.05	0.04	77.6	13.7	8.7	< 0.4
BRA_096_h01	1200	2.5	2.5	0.06	0.04	76.7	14.1	9.1	< 0.4
BRA_097_h01	1200	2.0	2.0	0.06	0.20	68.0	20.0	12.0	< 0.5
BRA_099_h01	1200	5.0	5.0	0.06	0.22	68.0	20.0	12.0	< 0.5
BRA_104_h01	1200	9.5	9.5	0.06	0.22	68.0	20.0	12.0	< 0.5
BRA_106_h01	1200	9.5	9.5	0.08	0.22	68.0	20.0	12.0	< 0.5
BRA_111_h01	800	9.5	9.5	0.10	0.03	73.2	16.3	10.5	< 0.5
BRA_111_h02	700	8.5	8.5	0.10	0.03	73.2	16.3	10.5	< 0.5
BRA_112_h01	550	7.0	7.0	0.10	0.02	73.2	16.3	10.5	< 0.5
BRA_113_h01	500	6.5	6.5	0.10	0.02	73.2	16.3	10.5	< 0.5
BRA_114_h01	700	8.5	8.5	0.10	0.03	73.2	16.3	10.5	< 0.5
BRA_115_h01	650	8.0	8.0	0.10	0.02	73.2	16.3	10.5	< 0.5
BRA_122_h01	250	2.0	2.0	0.02	< 0.01	86.0	11.2	2.7	< 0.1
BRA_136_h01	150	0.5	0.5	< 0.01	< 0.01	92.4	6.3	1.3	< 0.1
BRA_138_h01	125	0.5	0.5	< 0.01	< 0.01	92.6	6.1	1.3	< 0.1
BRA_140_h01	125	0.5	0.5	< 0.01	< 0.01	92.7	6.0	1.3	< 0.1
BRA_142_h01	125	0.5	0.5	< 0.01	< 0.01	92.8	5.9	1.3	< 0.1
BRA_144_h01	125	0.5	0.5	< 0.01	< 0.01	92.9	5.9	1.3	< 0.1
BRA_146_h01	125	0.5	0.5	< 0.01	< 0.01	93.0	5.8	1.3	< 0.1
BRA_148_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.1	5.7	1.2	< 0.1
BRA_150_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.2	5.6	1.2	< 0.1
BRA_152_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.3	5.5	1.2	< 0.1
BRA_154_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.4	5.4	1.2	< 0.1
BRA_156_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.4	5.4	1.2	< 0.1
BRA_160_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.0	1.1	< 0.1
BRA_164_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BRA_166_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	93.9	4.9	1.1	< 0.1
BRA_168_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	93.9	4.9	1.1	< 0.1
BRE_016_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.8	4.2	1.0	< 0.1
BRE_030_h01	90	1.0	1.0	0.01	< 0.01	90.9	7.6	1.5	< 0.1
BRE_030_h02	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BRE_057_h01	1200	4.5	4.5	0.05	0.04	77.5	13.8	8.8	< 0.4
BRE_059_h01	1350	4.5	4.5	0.06	0.13	71.6	17.4	11.0	< 0.5
BRE_061_h01	1350	4.0	5.5	0.06	0.22	68.0	20.0	12.0	< 0.5
BRE_063_h01	1350	7.0	8.5	0.11	0.22	68.0	20.0	12.0	< 0.5
BRE_065_h01	1300	7.0	8.5	0.12	0.19	68.4	19.7	11.9	< 0.5
BRE_067_h01	950	4.0	6.5	0.10	0.02	73.4	16.1	10.5	< 0.5
BRE_070_h01	900	2.0	3.5	0.09	0.03	74.0	15.7	10.3	< 0.5
BRE_075_h01	950	2.5	2.5	0.06	0.03	75.5	14.8	9.8	< 0.5
BRE_075_h02	950	3.0	3.0	0.04	0.03	78.8	13.1	8.1	< 0.3
BRE_077_h01	1100	4.0	4.0	0.05	0.04	78.2	13.4	8.4	< 0.3
BRE_080_h01	1350	4.0	4.0	0.06	0.16	69.9	18.6	11.4	< 0.5
BRE_083_h01	1350	6.5	7.5	0.06	0.21	68.0	20.0	12.0	< 0.5
BRE_086_h01	1350	6.0	8.0	0.06	0.20	68.0	20.0	12.0	< 0.5
BRE_089_h01	1300	6.0	8.0	0.08	0.17	69.8	18.7	11.5	< 0.5
BRE_140_h01	1050	3.0	3.0	0.05	0.04	78.5	13.3	8.3	< 0.3
BRE_143_h01	1250	3.0	3.0	0.06	0.18	69.2	19.1	11.7	< 0.5

Table D.03 - Tahmoor South - Predictions for Houses

House Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)	Predicted Probability of Nil or Category R0 Impact (%)	Predicted Probability of Category R1 or R2 Impact (%)	Predicted Probability of Category R3 or R4 Impact (%)	Predicted Probability of Category R5 Impact (%)
BRE_148_h01	1250	3.0	3.0	0.06	0.21	68.0	20.0	12.0	< 0.5
BRE_154_h01	1200	7.0	8.0	0.10	0.13	71.6	17.4	11.0	< 0.5
BRE_165_h01	650	7.5	7.5	0.06	0.06	75.7	14.6	9.6	< 0.5
BRE_167_h01	275	4.5	4.5	0.07	< 0.01	75.0	15.0	10.0	< 0.5
BRE_177_h01	90	0.5	0.5	0.01	< 0.01	90.5	8.0	1.6	< 0.1
BRE_187_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	92.3	6.4	1.3	< 0.1
BRE_189_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.1	5.7	1.2	< 0.1
BRE_191_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	91.5	7.1	1.4	< 0.1
BRE_195_h01	125	1.0	1.0	0.02	0.01	89.0	9.3	1.8	< 0.1
BRE_195_h02	125	1.0	1.0	0.02	< 0.01	89.0	9.3	1.8	< 0.1
BRE_201_h01	100	1.0	1.0	0.02	< 0.01	87.1	10.9	2.0	< 0.1
BRE_212_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.5	5.3	1.2	< 0.1
BRE_216_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.1	1.2	< 0.1
BRE_218_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.1	1.2	< 0.1
BRE_232_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BRE_236_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BRE_246_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BRE_255_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BRE_260_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BRE_265_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.4	1.1	< 0.1
BRE_275_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BRE_285_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BRE_290_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BRE_295_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BRE_305_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BRE_315_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BRE_320_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BRE_325_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BRE_335_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BRE_345_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.5	1.1	< 0.1
BRE_350_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BRE_355_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BRE_365_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BRE_375_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BRE_385_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.5	1.1	< 0.1
BRE_390_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BRE_395_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BRE_505_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	95.0	4.0	1.0	< 0.1
BRE_515_h01	1150	6.0	7.5	0.08	0.05	74.2	15.6	10.2	< 0.5
BRE_515_h02	1050	5.0	7.5	0.08	0.03	74.1	15.6	10.3	< 0.5
BRE_665_h01	900	2.5	2.5	0.05	0.03	77.9	13.6	8.6	< 0.4
BRL_015_h01	1500	3.0	4.0	0.06	0.22	68.0	20.0	12.0	< 0.5
BRL_017_h01	1500	5.5	7.5	0.06	0.22	68.0	20.0	12.0	< 0.5
BRL_019_h01	1500	7.0	9.0	0.06	0.22	68.0	20.0	12.0	< 0.5
BRL_021_h01	1500	7.0	9.0	0.06	0.22	68.0	20.0	12.0	< 0.5
BRL_022_h01	1000	4.0	5.0	0.13	0.03	71.8	17.3	10.9	< 0.5
BRL_024_h01	1000	3.5	4.5	0.13	0.03	71.8	17.3	10.9	< 0.5
BRL_026_h01	950	2.0	3.5	0.13	0.03	71.8	17.3	10.9	< 0.5
BRL_028_h01	1050	2.5	2.5	0.05	0.04	77.8	13.6	8.6	< 0.4
BRL_030_h01	1000	2.5	2.5	0.06	0.03	75.8	14.6	9.6	< 0.5
BRL_032_h01	1050	2.5	2.5	0.05	0.04	78.1	13.5	8.5	< 0.3
BRL_034_h01	1100	2.5	2.5	0.05	0.04	77.6	13.7	8.7	< 0.4
BRL_038_h01	1200	2.5	2.5	0.06	0.04	76.7	14.2	9.2	< 0.4
BRL_040_h01	1150	2.5	2.5	0.06	0.04	76.8	14.1	9.1	< 0.4
BRL_042_h01	1200	2.5	2.5	0.06	0.05	76.3	14.3	9.3	< 0.4
BRL_044_h01	1200	2.5	2.5	0.06	0.17	69.6	18.8	11.5	< 0.5
BRL_046_h01	1250	4.5	4.5	0.06	0.23	68.0	20.0	12.0	< 0.5
BRL_047_h01	1250	7.5	7.5	0.06	0.23	68.0	20.0	12.0	< 0.5
BRL_048_h01	1250	8.5	8.5	0.06	0.24	68.0	20.0	12.0	< 0.5
BRL_050_h01	1200	9.5	9.5	0.06	0.24	68.0	20.0	12.0	< 0.5
BRL_052_h01	1100	9.5	9.5	0.10	0.19	68.8	19.4	11.8	< 0.5
BRL_054_h01	1000	10.0	10.0	0.11	0.08	73.0	16.4	10.6	< 0.5
BRL_056_h01	750	9.5	9.5	0.11	0.03	72.9	16.5	10.6	< 0.5
BRL_058_h01	650	8.0	8.0	0.11	0.03	72.9	16.5	10.6	< 0.5
BRL_060_h01	650	8.0	8.0	0.11	0.03	72.9	16.5	10.6	< 0.5
BRL_062_h01	550	6.5	6.5	0.11	0.02	72.9	16.5	10.6	< 0.5
BRL_064_h01	425	5.0	5.0	0.09	0.02	73.9	15.8	10.3	< 0.5
BRL_066_h01	350	3.5	3.5	0.06	0.01	75.5	14.7	9.7	< 0.5
BRL_068_h01	300	2.5	2.5	0.04	0.01	79.8	12.8	7.4	< 0.3
BRL_069_h01	250	1.5	1.5	0.02	< 0.01	86.4	11.2	2.5	< 0.1
BRL_069_h02	225	1.5	1.5	0.02	< 0.01	87.1	10.9	2.0	< 0.1
BRL_069_h03	225	1.5	1.5	0.02	< 0.01	87.9	10.2	1.9	< 0.1
BRL_070_h01	225	1.5	1.5	0.02	< 0.01	86.9	11.0	2.0	< 0.1
BRL_072_h01	225	1.5	1.5	0.02	< 0.01	87.9	10.2	1.9	< 0.1
BRL_098_h01	125	0.5	0.5	< 0.01	< 0.01	92.9	5.9	1.3	< 0.1
BRL_099_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	92.9	5.8	1.3	< 0.1
BRL_101_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.0	5.7	1.2	< 0.1
BRL_103_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.1	5.7	1.2	< 0.1
BRL_109_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.3	5.5	1.2	< 0.1
BRL_125_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.5	5.3	1.2	< 0.1
BRL_150_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.2	5.5	1.2	< 0.1
BRS_002_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.2	5.6	1.2	< 0.1
BRS_004_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.0	5.7	1.2	< 0.1
BRS_006_h01	125	0.5	0.5	< 0.01	< 0.01	92.8	5.9	1.3	< 0.1
BRS_009_h01	125	0.5	0.5	< 0.01	< 0.01	92.7	6.0	1.3	< 0.1
BRS_010_h01	175	1.0	1.0	0.01	< 0.01	90.9	7.6	1.5	< 0.1
BRS_030_h01	275	2.0	2.0	0.03	0.01	84.7	11.6	3.7	< 0.2
BRS_030_h02	225	1.5	1.5	0.02	< 0.01	87.1	10.9	2.0	< 0.1
BRS_040_h01	350	3.5	3.5	0.05	0.01	77.0	14.0	9.0	< 0.4
BRS_050_h01	800	10.0	10.0	0.11	0.04	72.7	16.6	10.7	< 0.5
BRS_070_h01	1250	10.0	10.0	0.09	0.26	68.0	20.0	12.0	< 0.5
BRS_080_h01	1300	7.5	7.5	0.07	0.26	68.0	20.0	12.0	< 0.5
BRS_090_h01	1200	4.0	4.0	0.06	0.05	75.4	14.8	9.8	< 0.5
BRS_100_h01	1000	2.5	3.5	0.09	0.04	74.0	15.7	10.3	< 0.5
BRS_110_h01	1000	3.0	3.0	0.05	0.04	77.4	13.8	8.8	< 0.4
BRS_120_h01	950	2.0	3.5	0.09	0.04	73.8	15.8	10.3	< 0.5
BRS_130_h01	1550	8.5	10.0	0.13	0.26	68.0	20.0	12.0	< 0.5
BRS_140_h01	1100	7.0	9.0	0.12	0.04	72.0	17.1	10.9	< 0.5
BRS_150_h01	1500	8.0	9.0	0.07	0.26	68.0	20.0	12.0	< 0.5
BRS_160_h01	850	3.5	5.0	0.11	0.04	72.6	16.7	10.7	< 0.5
BRS_160_h02	1000	6.5	6.5	0.06	0.08	74.4	15.4	10.2	< 0.5
BRS_180_h01	1150	10.0	10.0	0.07	0.19	68.6	19.5	11.8	< 0.5
BRS_185_h01	850	3.5	5.5	0.11	0.05	72.7	16.6	10.7	< 0.5

Table D.03 - Tahmoor South - Predictions for Houses

House Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)	Predicted Probability of Nil or Category R0 Impact (%)	Predicted Probability of Category R1 or R2 Impact (%)	Predicted Probability of Category R3 or R4 Impact (%)	Predicted Probability of Category R5 Impact (%)
BRS_190_h01	1000	3.5	3.5	0.05	0.05	77.4	13.8	8.8	< 0.4
BRS_191_h01	1100	4.0	4.0	0.06	0.05	77.0	14.0	9.0	< 0.4
BRS_192_h01	1150	4.0	4.0	0.06	0.05	76.1	14.5	9.5	< 0.4
BRS_193_h01	1300	4.0	4.0	0.07	0.08	74.2	15.6	10.2	< 0.5
BRS_203_h01	750	9.0	9.0	0.11	0.06	72.9	16.5	10.6	< 0.5
BRS_208_h01	1300	10.0	10.0	0.08	0.26	68.0	20.0	12.0	< 0.5
BRS_218_h01	1300	10.0	10.0	0.07	0.26	68.0	20.0	12.0	< 0.5
BRS_220_h01	650	8.5	8.5	0.11	0.03	72.7	16.6	10.7	< 0.5
BRS_230_h01	100	1.0	1.0	< 0.01	0.01	90.4	8.0	1.6	< 0.1
BRS_240_h01	250	2.0	2.0	0.03	0.01	85.2	11.5	3.4	< 0.1
BRS_250_h01	200	1.5	1.5	0.01	< 0.01	89.1	9.2	1.7	< 0.1
BRS_253_h01	175	1.0	1.0	< 0.01	< 0.01	91.3	7.2	1.5	< 0.1
BRS_256_h01	150	0.5	0.5	< 0.01	< 0.01	92.4	6.3	1.3	< 0.1
BRS_259_h01	125	0.5	0.5	< 0.01	< 0.01	92.8	5.9	1.3	< 0.1
BRS_262_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.1	5.7	1.2	< 0.1
BSC_003_h01	425	5.0	5.0	0.09	0.02	73.8	15.9	10.3	< 0.5
BSC_005_h01	400	4.5	4.5	0.08	0.01	74.2	15.6	10.2	< 0.5
BSC_007_h01	350	3.5	3.5	0.07	0.01	75.1	14.9	9.9	< 0.5
BSC_009_h01	350	3.5	3.5	0.06	0.01	76.3	14.3	9.3	< 0.4
BSC_011_h01	325	3.0	3.0	0.06	0.01	76.6	14.2	9.2	< 0.4
BSC_013_h01	350	3.5	3.5	0.07	0.01	75.1	14.9	9.9	< 0.5
BSC_019_h01	600	8.0	8.0	0.11	0.02	73.0	16.4	10.6	< 0.5
BSC_020_h01	550	7.0	7.0	0.10	0.02	73.0	16.4	10.6	< 0.5
BSC_021_h01	700	8.5	8.5	0.10	0.03	73.0	16.4	10.6	< 0.5
BSC_022_h01	800	9.5	9.5	0.10	0.03	73.0	16.4	10.6	< 0.5
BSI_003_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.8	4.2	1.0	< 0.1
BSI_005_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.8	4.2	1.0	< 0.1
BSI_007_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.8	4.1	1.0	< 0.1
BSI_013_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BTH_001_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.3	5.5	1.2	< 0.1
BTH_003_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.2	5.6	1.2	< 0.1
BTH_005_h01	125	0.5	0.5	< 0.01	< 0.01	93.1	5.7	1.2	< 0.1
BTH_007_h01	125	0.5	0.5	< 0.01	< 0.01	92.8	5.9	1.3	< 0.1
BTH_009_h01	125	0.5	0.5	< 0.01	< 0.01	92.8	6.0	1.3	< 0.1
BTH_011_h01	150	0.5	0.5	< 0.01	< 0.01	92.5	6.2	1.3	< 0.1
BTH_013_h01	150	1.0	1.0	< 0.01	< 0.01	91.9	6.7	1.4	< 0.1
BTH_015_h01	175	1.0	1.0	0.01	< 0.01	90.6	7.8	1.5	< 0.1
BTH_017_h01	200	1.0	1.0	0.01	< 0.01	89.8	8.6	1.7	< 0.1
BTH_019_h01	225	1.5	1.5	0.02	< 0.01	88.1	10.1	1.9	< 0.1
BTH_021_h01	275	2.0	2.0	0.03	< 0.01	83.7	11.8	4.4	< 0.2
BTY_001_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BTY_005_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BTY_005_h02	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.6	1.1	< 0.1
BTY_005_h03	40	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BTY_005_h04	30	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BTY_005_h05	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BTY_005_h06	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BTY_005_h07	40	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BTY_005_h08	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BTY_005_h09	40	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BTY_005_h10	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.8	1.1	< 0.1
BTY_005_h11	50	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BTY_005_h12	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BTY_005_h13	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BTY_005_h14	60	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BTY_005_h15	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BTY_005_h16	60	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.0	1.1	< 0.1
BTY_005_h17	60	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BTY_005_h18	60	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.1	1.2	< 0.1
BTY_005_h19	70	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.1	1.2	< 0.1
BTY_005_h20	70	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.1	1.2	< 0.1
BTY_005_h21	60	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.1	1.2	< 0.1
BTY_005_h22	70	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.2	1.2	< 0.1
BTY_005_h23	60	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.1	1.2	< 0.1
BTY_005_h24	70	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.2	1.2	< 0.1
BTY_005_h25	60	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.1	1.2	< 0.1
BTY_005_h26	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.6	1.1	< 0.1
BTY_005_h27	30	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BTY_005_h28	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BTY_005_h29	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BTY_005_h30	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BTY_005_h31	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BTY_005_h32	40	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BTY_005_h33	50	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BTY_005_h34	50	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BTY_005_h35	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BTY_005_h36	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BTY_005_h37	50	< 0.5	< 0.5	< 0.01	< 0.01	93.9	4.9	1.1	< 0.1
BTY_005_h38	60	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BTY_005_h39	60	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BTY_005_h40	50	< 0.5	< 0.5	< 0.01	< 0.01	93.9	4.9	1.1	< 0.1
BTY_005_h41	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BTY_005_h42	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BTY_005_h43	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BTY_005_h44	50	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BTY_005_h45	40	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BTY_005_h46	40	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BTY_005_h47	40	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.7	1.1	< 0.1
BTY_005_h48	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BTY_005_h49	30	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BTY_005_h50	30	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BTY_005_h51	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BTY_005_h52	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BTY_005_h53	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BTY_005_h54	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BTY_005_h55	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BTY_005_h56	30	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BTY_005_h57	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BTY_005_h58	40	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BTY_005_h59	40	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BTY_005_h60	50	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BTY_005_h61	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BTY_005_h62	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1

Table D.03 - Tahmoor South - Predictions for Houses

House Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)	Predicted Probability of Nil or Category R0 Impact (%)	Predicted Probability of Category R1 or R2 Impact (%)	Predicted Probability of Category R3 or R4 Impact (%)	Predicted Probability of Category R5 Impact (%)
BTY_005_h63	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BTY_005_h64	60	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BTY_005_h65	60	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.0	1.1	< 0.1
BTY_005_h66	60	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.1	1.2	< 0.1
BTY_005_h67	60	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BTY_005_h68	60	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BTY_005_h69	60	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.1	1.2	< 0.1
BTY_005_h70	60	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.1	1.2	< 0.1
BTY_005_h71	60	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.1	1.2	< 0.1
BTY_005_h72	60	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.0	1.1	< 0.1
BTY_005_h73	50	< 0.5	< 0.5	< 0.01	< 0.01	93.9	5.0	1.1	< 0.1
BTY_005_h74	50	< 0.5	< 0.5	< 0.01	< 0.01	93.9	4.9	1.1	< 0.1
BTY_005_h75	50	< 0.5	< 0.5	< 0.01	< 0.01	93.9	4.9	1.1	< 0.1
BTY_005_h76	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BTY_005_h77	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BTY_005_h78	50	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BTY_005_h79	40	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BTY_005_h80	40	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BTY_005_h81	40	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BTY_005_h82	40	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.7	1.1	< 0.1
BTY_005_h83	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BTY_005_h84	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BTY_005_h85	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BTY_005_h86	40	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.7	1.1	< 0.1
BTY_005_h87	30	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BTY_005_h88	30	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BTY_005_h89	30	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BTY_005_h90	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BTY_005_h91	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BTY_005_h92	30	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BTY_005_h93	30	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BTY_005_h94	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BTY_005_h95	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BTY_005_h96	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BTY_005_h97	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BTY_005_h98	40	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BWA_001_h01	1600	4.0	4.0	0.07	0.19	68.4	19.7	11.9	< 0.5
BWA_005_h01	1600	4.5	6.0	0.07	0.25	68.0	20.0	12.0	< 0.5
BWA_010_h01	1600	7.5	9.5	0.07	0.25	68.0	20.0	12.0	< 0.5
BWA_015_h01	1450	7.5	9.5	0.12	0.11	72.2	17.0	10.8	< 0.5
BWA_020_h01	1300	6.5	9.5	0.11	0.03	72.6	16.7	10.7	< 0.5
BWA_025_h01	1150	4.5	7.5	0.10	0.03	73.2	16.3	10.5	< 0.5
BWA_030_h01	1200	3.5	3.5	0.06	0.04	76.3	14.4	9.4	< 0.4
BWA_035_h01	1250	4.0	4.0	0.05	0.04	77.4	13.8	8.8	< 0.4
BWA_040_h01	1300	4.0	4.0	0.05	0.04	77.1	13.9	8.9	< 0.4
BWA_045_h01	1250	3.5	3.5	0.05	0.04	77.6	13.7	8.7	< 0.4
BWA_050_h01	1150	3.0	3.0	0.07	0.04	74.8	15.1	10.1	< 0.5
BWA_055_h01	1100	2.5	5.5	0.09	0.03	73.5	16.1	10.4	< 0.5
BWA_060_h01	1100	2.5	5.5	0.10	0.03	73.4	16.2	10.5	< 0.5
BWA_063_h01	1100	4.0	6.5	0.10	0.03	73.1	16.3	10.5	< 0.5
BWA_066_h01	1150	4.5	7.5	0.10	0.03	73.1	16.4	10.5	< 0.5
BWA_069_h01	1200	5.5	8.5	0.10	0.03	73.1	16.4	10.5	< 0.5
BWA_072_h01	1450	7.5	9.5	0.12	0.11	72.1	17.1	10.8	< 0.5
BWA_075_h01	1550	7.5	9.5	0.13	0.24	68.0	20.0	12.0	< 0.5
BWE_001_h01	1300	6.0	6.0	0.03	0.08	74.4	15.4	10.2	< 0.5
BWE_003_h01	1350	7.5	7.5	0.03	0.12	72.3	16.9	10.8	< 0.5
BWE_005_h01	1300	9.5	9.5	0.02	0.19	68.5	19.6	11.8	< 0.5
BWE_007_h01	1250	9.5	9.5	0.09	0.19	68.3	19.8	11.9	< 0.5
BWE_009_h01	900	9.5	9.5	0.08	0.10	73.4	16.2	10.5	< 0.5
BWE_011_h01	700	7.5	7.5	0.06	0.05	75.3	14.8	9.8	< 0.5
BWE_013_h01	450	6.0	6.5	0.08	< 0.01	74.5	15.4	10.1	< 0.5
BWE_015_h01	375	5.5	5.5	0.08	< 0.01	74.4	15.4	10.2	< 0.5
BWE_017_h01	350	6.0	6.0	0.08	< 0.01	74.1	15.7	10.3	< 0.5
BWE_019_h01	350	6.0	6.0	0.09	< 0.01	73.6	16.0	10.4	< 0.5
BWE_021_h01	325	5.5	5.5	0.10	< 0.01	73.5	16.1	10.4	< 0.5
BWE_023_h01	200	3.0	3.0	0.07	0.01	74.7	15.2	10.1	< 0.5
BWE_025_h01	200	3.0	3.0	0.07	0.02	74.9	15.0	10.0	< 0.5
BWE_027_h01	125	1.5	1.5	0.03	0.02	83.6	11.9	4.6	< 0.2
BWE_029_h01	70	1.0	1.0	0.01	< 0.01	89.6	8.7	1.7	< 0.1
BWE_031_h01	650	7.5	7.5	0.08	0.03	74.4	15.4	10.2	< 0.5
BWE_041_h01	500	7.5	7.5	0.10	< 0.01	73.4	16.2	10.5	< 0.5
BWE_041_h02	600	9.0	9.0	0.11	0.06	72.8	16.6	10.6	< 0.5
BWE_051_h01	125	1.5	1.5	0.04	< 0.01	81.7	12.3	6.0	< 0.2
BWI_001_h01	125	0.5	0.5	< 0.01	< 0.01	93.0	5.8	1.3	< 0.1
BWI_002_h01	125	0.5	0.5	< 0.01	< 0.01	93.0	5.7	1.2	< 0.1
BWI_003_h01	125	0.5	0.5	< 0.01	< 0.01	93.0	5.7	1.2	< 0.1
BWI_004_h01	125	0.5	0.5	< 0.01	< 0.01	93.0	5.7	1.2	< 0.1
BWI_005_h01	125	0.5	0.5	< 0.01	< 0.01	93.1	5.7	1.2	< 0.1
BWI_006_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.3	5.5	1.2	< 0.1
BWI_007_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.4	5.4	1.2	< 0.1
BWI_008_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.5	5.3	1.2	< 0.1
BWI_009_h01	90	< 0.5	< 0.5	< 0.01	< 0.01	93.6	5.2	1.2	< 0.1
BWI_010_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.4	5.4	1.2	< 0.1
BWI_011_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.3	5.5	1.2	< 0.1
BWI_012_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.3	5.5	1.2	< 0.1
BWI_013_h01	100	< 0.5	< 0.5	< 0.01	< 0.01	93.2	5.6	1.2	< 0.1
BWR_001_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.1	1.2	< 0.1
BWR_010_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BWR_020_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BWR_030_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BWR_040_h01	< 20	< 0.5	< 0.5	< 0.01	< 0.01	94.9	4.1	1.0	< 0.1
BWR_050_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.6	4.4	1.1	< 0.1
BYR_001_h01	800	1.5	3.0	0.07	0.03	75.3	14.9	9.9	< 0.5
BYR_005_h01	1100	5.0	5.0	0.06	0.22	68.0	20.0	12.0	< 0.5
BYR_015_h01	900	8.5	8.5	0.09	0.12	72.1	17.1	10.8	< 0.5
BYR_025_h01	225	2.0	2.0	0.03	< 0.01	85.1	11.5	3.4	< 0.1
BYR_035_h01	275	2.5	2.5	0.05	0.01	78.3	13.3	8.3	< 0.3
BYR_045_h01	125	0.5	0.5	< 0.01	< 0.01	92.9	5.9	1.3	< 0.1
BYR_055_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.5	5.3	1.2	< 0.1
BYR_065_h01	60	< 0.5	< 0.5	< 0.01	< 0.01	93.8	5.1	1.2	< 0.1
BYR_065_h02	50	< 0.5	< 0.5	< 0.01	< 0.01	94.0	4.9	1.1	< 0.1
BYR_075_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BYR_075_h02	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1

Table D.03 - Tahmoor South - Predictions for Houses

House Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)	Predicted Probability of Nil or Category R0 Impact (%)	Predicted Probability of Category R1 or R2 Impact (%)	Predicted Probability of Category R3 or R4 Impact (%)	Predicted Probability of Category R5 Impact (%)
BYR_084_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BYR_085_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.2	4.7	1.1	< 0.1
BYR_095_h01	30	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BYR_105_h01	20	< 0.5	< 0.5	< 0.01	< 0.01	94.5	4.5	1.1	< 0.1
BYR_115_h01	40	< 0.5	< 0.5	< 0.01	< 0.01	94.3	4.6	1.1	< 0.1
BYR_115_h02	30	< 0.5	< 0.5	< 0.01	< 0.01	94.4	4.5	1.1	< 0.1
BYR_125_h01	50	< 0.5	< 0.5	< 0.01	< 0.01	94.1	4.8	1.1	< 0.1
BYR_135_h01	70	< 0.5	< 0.5	< 0.01	< 0.01	93.7	5.1	1.2	< 0.1
BYR_145_h01	80	< 0.5	< 0.5	< 0.01	< 0.01	93.4	5.4	1.2	< 0.1
BYR_150_h01	1100	2.5	2.5	0.06	0.21	68.0	20.0	12.0	< 0.5
BYR_152_h01	1050	3.0	3.0	0.05	0.05	77.1	14.0	9.0	< 0.4
BYR_154_h01	1000	3.0	3.0	0.05	0.05	77.9	13.6	8.6	< 0.4
BYR_156_h01	900	3.0	3.0	0.04	0.05	78.5	13.2	8.2	< 0.3
BYR_158_h01	800	2.5	2.5	0.05	0.04	77.7	13.7	8.7	< 0.4
BYR_160_h01	800	5.0	6.5	0.08	0.06	74.3	15.5	10.2	< 0.5
BYR_162_h01	900	7.0	7.0	0.08	0.07	74.4	15.4	10.2	< 0.5
Maxima:	**1650**	**10.0**	**10.0**	**0.13**	**0.28**				

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BAN_001_r01	550	5.5	5.5	0.08	0.02
BAN_001_r02	550	6.0	6.0	0.09	0.02
BAN_001_r03	550	5.5	5.5	0.08	0.02
BAN_001_r04	650	7.5	7.5	0.09	0.02
BAR_001_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_001_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_001_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_010_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BAR_010_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BAR_010_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BAR_010_r04	40	< 0.5	< 0.5	< 0.01	< 0.01
BAR_010_r05	40	< 0.5	< 0.5	< 0.01	< 0.01
BAR_010_r06	40	< 0.5	< 0.5	< 0.01	< 0.01
BAR_020_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BAR_020_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BAR_020_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BAR_030_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BAR_030_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BAR_030_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BAR_030_r04	30	< 0.5	< 0.5	< 0.01	< 0.01
BAR_040_r01	80	0.5	0.5	< 0.01	< 0.01
BAR_050_r01	80	0.5	0.5	< 0.01	< 0.01
BAR_050_r02	80	0.5	0.5	< 0.01	< 0.01
BAR_050_r03	70	0.5	0.5	< 0.01	< 0.01
BAR_060_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BAR_060_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BAR_060_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BAR_060_r04	30	< 0.5	< 0.5	< 0.01	< 0.01
BAR_070_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BAR_070_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BAR_070_r03	90	1.0	1.0	0.01	< 0.01
BAR_070_r04	40	< 0.5	< 0.5	< 0.01	< 0.01
BAR_070_r05	50	< 0.5	< 0.5	< 0.01	< 0.01
BAR_070_r06	50	< 0.5	< 0.5	< 0.01	< 0.01
BAR_070_r07	60	< 0.5	< 0.5	< 0.01	< 0.01
BAR_070_r08	50	< 0.5	< 0.5	< 0.01	< 0.01
BAR_080_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BAR_080_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BAR_090_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BAR_090_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BAR_090_r03	30	< 0.5	< 0.5	< 0.01	< 0.01
BAR_090_r04	30	< 0.5	< 0.5	< 0.01	< 0.01
BAR_090_r05	30	< 0.5	< 0.5	< 0.01	< 0.01
BAR_090_r06	30	< 0.5	< 0.5	< 0.01	< 0.01
BAR_090_r07	30	< 0.5	< 0.5	< 0.01	< 0.01
BAR_090_r08	40	< 0.5	< 0.5	< 0.01	< 0.01
BAR_090_r09	40	< 0.5	< 0.5	< 0.01	< 0.01
BAR_090_r10	40	< 0.5	< 0.5	< 0.01	< 0.01
BAR_090_r11	30	< 0.5	< 0.5	< 0.01	< 0.01
BAR_100_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_100_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_100_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_100_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_100_r05	20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_100_r06	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_100_r07	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_100_r08	< 20	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BAR_110_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_110_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_110_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_110_r04	20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_110_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_120_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_120_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_120_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_120_r04	20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_120_r05	20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_120_r06	20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_120_r07	20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_120_r08	20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_120_r09	30	< 0.5	< 0.5	< 0.01	< 0.01
BAR_120_r10	30	< 0.5	< 0.5	< 0.01	< 0.01
BAR_120_r11	30	< 0.5	< 0.5	< 0.01	< 0.01
BAR_120_r12	90	1.0	1.0	0.01	< 0.01
BAR_130_r01	40	0.5	0.5	< 0.01	< 0.01
BAR_140_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_140_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_150_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_150_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_160_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_160_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_160_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_160_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_160_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_160_r06	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_165_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_165_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_165_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_165_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_170_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_170_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_175_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_175_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_175_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_175_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_177_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_177_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_177_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_177_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_177_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_177_r07	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_177_r08	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_177_r09	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_177_r10	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_177_r11	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_185_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_185_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_185_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_185_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_185_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_185_r06	20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_185_r07	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_185_r08	20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_185_r09	30	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BAR_195_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_195_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_195_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_195_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_195_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_195_r06	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_195_r07	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_195_r08	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_195_r09	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_195_r10	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_195_r11	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_195_r12	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_195_r13	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_195_r14	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_205_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_205_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_205_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_205_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_205_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_205_r06	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_205_r07	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_205_r08	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_210_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_210_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_230_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_235_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_235_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_235_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_235_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_235_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_235_r06	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_235_r07	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_235_r08	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_235_r09	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_235_r10	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_235_r11	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_235_r12	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_245_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_245_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_245_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_245_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_245_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_475_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_475_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_475_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_475_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_475_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_475_r06	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_475_r07	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_475_r08	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_475_r09	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_475_r10	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_475_r11	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_475_r12	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_475_r13	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_475_r14	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_475_r15	< 20	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BAR_475_r16	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_480_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_480_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_480_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_480_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_485_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_485_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_485_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_485_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_490_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_490_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_490_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_490_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_490_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_495_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_495_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_495_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_495_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_495_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_495_r06	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_495_r07	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_495_r10	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_495_r11	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_495_r13	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_505_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_510_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_510_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_510_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_510_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_510_r06	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_530_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_530_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_530_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_530_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_530_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_535_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_535_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_535_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_535_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_535_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_535_r06	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_535_r07	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_545_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_545_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_545_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_545_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_550_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_550_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAS_001_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAS_001_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAS_001_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAS_001_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAS_005_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAS_007_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAS_007_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAS_007_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAS_009_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BAS_009_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAS_015_r01	40	0.5	0.5	0.01	< 0.01
BAS_015_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BAS_017_r01	100	0.5	0.5	< 0.01	< 0.01
BAS_017_r02	100	0.5	0.5	< 0.01	< 0.01
BAS_017_r03	90	1.0	1.0	< 0.01	< 0.01
BAS_019_r01	80	0.5	0.5	< 0.01	< 0.01
BAS_019_r02	80	0.5	0.5	< 0.01	< 0.01
BAS_019_r03	90	1.0	1.0	< 0.01	< 0.01
BAS_019_r04	80	0.5	0.5	< 0.01	< 0.01
BAS_019_r05	90	0.5	0.5	< 0.01	< 0.01
BAS_019_r06	90	< 0.5	< 0.5	< 0.01	< 0.01
BAS_021_r01	60	0.5	0.5	< 0.01	< 0.01
BAS_021_r02	70	0.5	0.5	< 0.01	< 0.01
BAS_021_r03	70	0.5	0.5	< 0.01	< 0.01
BAS_021_r04	70	< 0.5	< 0.5	< 0.01	< 0.01
BAS_021_r05	60	0.5	0.5	< 0.01	< 0.01
BAS_023_r01	60	0.5	0.5	< 0.01	< 0.01
BAS_023_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BAS_023_r03	60	0.5	0.5	< 0.01	< 0.01
BAS_025_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAS_027_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAV_001_r01	150	1.0	1.0	< 0.01	< 0.01
BAV_001_r02	150	1.0	1.0	< 0.01	< 0.01
BAV_001_r03	150	1.0	1.0	< 0.01	< 0.01
BAV_001_r04	150	1.0	1.0	< 0.01	< 0.01
BAV_001_r05	150	1.0	1.0	< 0.01	< 0.01
BAV_001_r06	150	1.0	1.0	< 0.01	< 0.01
BAV_001_r07	150	1.0	1.0	< 0.01	< 0.01
BAV_001_r08	175	1.0	1.0	< 0.01	< 0.01
BAV_001_r09	175	1.0	1.0	< 0.01	< 0.01
BAV_001_r10	175	1.0	1.0	< 0.01	< 0.01
BAV_003_r01	150	0.5	0.5	< 0.01	< 0.01
BAV_003_r02	150	0.5	0.5	< 0.01	< 0.01
BAV_003_r03	150	1.0	1.0	< 0.01	< 0.01
BAV_005_r01	150	1.0	1.0	< 0.01	< 0.01
BAV_005_r02	150	0.5	0.5	< 0.01	< 0.01
BAV_005_r03	150	0.5	0.5	< 0.01	< 0.01
BAV_005_r04	150	1.0	1.0	< 0.01	< 0.01
BAV_007_r01	175	1.0	1.0	< 0.01	< 0.01
BAV_007_r02	150	1.0	1.0	< 0.01	< 0.01
BAV_007_r03	125	0.5	0.5	< 0.01	< 0.01
BAV_009_r01	150	1.0	1.0	< 0.01	< 0.01
BAV_011_r01	150	0.5	0.5	< 0.01	< 0.01
BAV_011_r02	150	1.0	1.0	< 0.01	< 0.01
BAV_011_r03	150	1.0	1.0	< 0.01	< 0.01
BAV_013_r01	175	1.0	1.0	< 0.01	< 0.01
BAV_013_r02	175	1.0	1.0	< 0.01	< 0.01
BAV_013_r03	175	1.0	1.0	< 0.01	< 0.01
BAV_015_r01	150	1.0	1.0	< 0.01	< 0.01
BAV_015_r02	175	1.0	1.0	< 0.01	< 0.01
BAV_015_r03	150	1.0	1.0	< 0.01	< 0.01
BAV_015_r04	150	1.0	1.0	< 0.01	< 0.01
BAV_015_r05	150	1.0	1.0	< 0.01	< 0.01
BAV_015_r06	150	0.5	0.5	< 0.01	< 0.01
BAV_017_r01	175	1.0	1.0	< 0.01	< 0.01
BAV_019_r01	175	1.0	1.0	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BAV_021_r01	175	1.0	1.0	< 0.01	< 0.01
BAV_021_r02	150	1.0	1.0	< 0.01	< 0.01
BAV_023_r01	150	1.0	1.0	< 0.01	< 0.01
BAV_023_r02	175	1.0	1.0	< 0.01	< 0.01
BAV_023_r03	175	1.0	1.0	< 0.01	< 0.01
BAV_025_r01	175	1.0	1.0	< 0.01	< 0.01
BAV_025_r02	150	1.0	1.0	< 0.01	< 0.01
BAV_027_r01	150	1.0	1.0	< 0.01	< 0.01
BAV_027_r02	150	1.0	1.0	< 0.01	< 0.01
BAV_027_r03	150	1.0	1.0	< 0.01	< 0.01
BAV_031_r01	150	1.0	1.0	< 0.01	< 0.01
BAV_031_r02	175	1.0	1.0	< 0.01	< 0.01
BAV_031_r03	175	1.0	1.0	< 0.01	< 0.01
BAV_031_r04	175	1.0	1.0	< 0.01	< 0.01
BAV_033_r01	150	0.5	0.5	< 0.01	< 0.01
BAV_035_r01	150	0.5	0.5	< 0.01	< 0.01
BAV_035_r02	150	1.0	1.0	< 0.01	< 0.01
BAV_035_r03	150	1.0	1.0	< 0.01	< 0.01
BAV_035_r04	175	1.0	1.0	< 0.01	< 0.01
BAV_037_r01	150	1.0	1.0	< 0.01	< 0.01
BAV_037_r02	150	1.0	1.0	< 0.01	< 0.01
BAV_041_r01	150	0.5	0.5	< 0.01	< 0.01
BAV_041_r02	175	1.0	1.0	< 0.01	< 0.01
BAV_041_r03	175	1.0	1.0	< 0.01	< 0.01
BAV_043_r01	150	1.0	1.0	< 0.01	< 0.01
BAV_043_r02	150	1.0	1.0	< 0.01	< 0.01
BAV_043_r03	150	1.0	1.0	< 0.01	< 0.01
BAV_043_r04	175	1.0	1.0	< 0.01	< 0.01
BAV_045_r01	150	1.0	1.0	< 0.01	< 0.01
BAV_045_r02	175	1.0	1.0	< 0.01	< 0.01
BAV_045_r04	150	1.0	1.0	< 0.01	< 0.01
BAV_045_r05	150	1.0	1.0	< 0.01	< 0.01
BAV_045_r06	150	1.0	1.0	< 0.01	< 0.01
BAV_047_r01	150	0.5	0.5	< 0.01	< 0.01
BAV_047_r02	175	1.0	1.0	< 0.01	< 0.01
BAV_047_r03	175	1.0	1.0	< 0.01	< 0.01
BAV_047_r04	175	1.0	1.0	< 0.01	< 0.01
BAV_049_r01	150	1.0	1.0	< 0.01	< 0.01
BAV_049_r02	175	1.0	1.0	< 0.01	< 0.01
BAV_053_r01	150	1.0	1.0	< 0.01	< 0.01
BAV_053_r02	150	1.0	1.0	< 0.01	< 0.01
BAV_053_r03	150	0.5	0.5	< 0.01	< 0.01
BAV_087_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BAV_087_r02	90	< 0.5	< 0.5	< 0.01	< 0.01
BAV_087_r03	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_087_r04	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_087_r05	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_087_r06	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_089_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_089_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_091_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BAV_091_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BAV_091_r03	90	< 0.5	< 0.5	< 0.01	< 0.01
BAV_099_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BAV_101_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BAV_101_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BAV_101_r03	80	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BAV_105_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BAV_107_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BAV_107_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BAV_107_r03	80	< 0.5	< 0.5	< 0.01	< 0.01
BAV_107_r04	80	< 0.5	< 0.5	< 0.01	< 0.01
BAV_109_r01	70	< 0.5	< 0.5	< 0.01	< 0.01
BAV_109_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BAV_109_r03	80	< 0.5	< 0.5	< 0.01	< 0.01
BAV_109_r04	90	< 0.5	< 0.5	< 0.01	< 0.01
BAV_111_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BAV_111_r02	70	< 0.5	< 0.5	< 0.01	< 0.01
BAV_111_r03	80	< 0.5	< 0.5	< 0.01	< 0.01
BAV_111_r04	80	< 0.5	< 0.5	< 0.01	< 0.01
BAV_113_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BAV_115_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BAV_115_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BAV_115_r03	90	< 0.5	< 0.5	< 0.01	< 0.01
BAV_117_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BAV_117_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BAV_117_r03	80	< 0.5	< 0.5	< 0.01	< 0.01
BAV_117_r04	90	< 0.5	< 0.5	< 0.01	< 0.01
BAV_117_r05	90	< 0.5	< 0.5	< 0.01	< 0.01
BAV_119_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BAV_119_r02	90	< 0.5	< 0.5	< 0.01	< 0.01
BAV_119_r03	90	< 0.5	< 0.5	< 0.01	< 0.01
BAV_119_r04	90	< 0.5	< 0.5	< 0.01	< 0.01
BAV_119_r05	90	< 0.5	< 0.5	< 0.01	< 0.01
BAV_121_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BAV_121_r02	90	< 0.5	< 0.5	< 0.01	< 0.01
BAV_123_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BAV_123_r03	90	< 0.5	< 0.5	< 0.01	< 0.01
BAV_123_r04	90	< 0.5	< 0.5	< 0.01	< 0.01
BAV_123_r05	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_125_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BAV_125_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_125_r03	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_127_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BAV_127_r02	90	< 0.5	< 0.5	< 0.01	< 0.01
BAV_127_r03	90	< 0.5	< 0.5	< 0.01	< 0.01
BAV_127_r04	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_127_r05	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_127_r06	90	< 0.5	< 0.5	< 0.01	< 0.01
BAV_127_r07	90	< 0.5	< 0.5	< 0.01	< 0.01
BAV_129_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_129_r02	125	0.5	0.5	< 0.01	< 0.01
BAV_133_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_133_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_145_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_145_r02	100	0.5	0.5	< 0.01	< 0.01
BAV_147_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_147_r02	90	< 0.5	< 0.5	< 0.01	< 0.01
BAV_149_r01	125	0.5	0.5	< 0.01	< 0.01
BAV_149_r02	125	0.5	0.5	< 0.01	< 0.01
BAV_149_r03	125	0.5	0.5	< 0.01	< 0.01
BAV_155_r01	125	0.5	0.5	< 0.01	< 0.01
BAV_155_r02	125	0.5	0.5	< 0.01	< 0.01
BAV_155_r03	125	0.5	0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BAV_159_r01	125	0.5	0.5	< 0.01	< 0.01
BAV_159_r02	100	0.5	0.5	< 0.01	< 0.01
BAV_159_r03	125	0.5	0.5	< 0.01	< 0.01
BAV_159_r04	100	1.0	1.0	< 0.01	< 0.01
BAV_159_r07	100	1.0	1.0	< 0.01	< 0.01
BAV_159_r08	100	1.0	1.0	< 0.01	0.01
BAV_159_r09	100	1.0	1.0	< 0.01	0.01
BAV_159_r10	100	1.0	1.0	< 0.01	0.01
BAV_173_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_173_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_177_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_177_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_177_r03	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_180_r01	125	0.5	0.5	< 0.01	< 0.01
BAV_180_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_181_r01	125	0.5	0.5	< 0.01	< 0.01
BAV_181_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_181_r03	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_181_r04	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_182_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_183_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_183_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_183_r03	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_184_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_184_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_184_r03	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_184_r04	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_185_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_185_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_185_r03	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_186_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_186_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BBA_015_r01	1150	3.5	3.5	0.06	0.05
BBA_015_r02	1100	3.5	3.5	0.06	0.05
BBA_015_r03	1100	3.5	3.5	0.06	0.05
BBA_015_r04	1050	3.0	3.0	0.05	0.04
BBA_015_r05	1000	3.0	3.0	0.05	0.04
BBA_015_r06	1100	3.5	3.5	0.06	0.05
BBA_015_r07	1100	3.5	3.5	0.06	0.04
BBA_020_r01	950	3.0	5.5	0.10	0.03
BBA_020_r02	900	1.5	3.5	0.08	0.03
BBA_020_r03	950	2.5	4.5	0.09	0.03
BBA_020_r04	1050	3.0	3.0	0.05	0.04
BBA_025_r01	1550	8.5	9.5	0.11	0.25
BBA_030_r01	1550	8.5	9.5	0.13	0.25
BBA_030_r02	1550	6.0	7.0	0.07	0.25
BBA_030_r03	1550	3.5	3.5	0.07	0.23
BBA_030_r04	1550	4.0	5.0	0.07	0.25
BBA_030_r05	1550	4.0	4.0	0.07	0.17
BBA_030_r06	1550	4.0	4.0	0.07	0.14
BBA_030_r07	1550	4.0	4.0	0.07	0.16
BBA_030_r08	1550	4.0	4.0	0.07	0.22
BBA_030_r09	1450	4.0	4.0	0.06	0.05
BBA_040_r01	1100	2.5	4.0	0.08	0.03
BBA_040_r02	1200	3.5	3.5	0.05	0.04
BBA_040_r03	1100	3.5	6.5	0.10	0.03
BBA_040_r04	1250	4.0	4.0	0.05	0.04

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BBA_040_r05	1150	3.0	3.0	0.06	0.04
BBA_050_r01	1050	2.0	4.5	0.09	0.03
BBA_050_r02	1100	2.5	5.0	0.10	0.03
BBA_050_r03	1100	1.5	4.5	0.09	0.03
BBA_050_r04	1100	3.0	5.5	0.10	0.03
BBA_050_r05	1100	2.0	3.5	0.08	0.03
BBA_050_r06	1100	2.0	4.0	0.08	0.03
BBA_050_r07	1100	3.5	6.0	0.10	0.03
BBA_050_r08	1550	7.5	9.5	0.11	0.19
BBA_050_r09	1100	2.0	4.0	0.09	0.03
BBA_050_r10	1150	4.5	7.0	0.10	0.03
BBA_050_r11	1100	3.5	6.0	0.10	0.03
BBA_050_r12	1100	2.5	5.0	0.10	0.03
BBA_060_r01	1600	7.5	9.5	0.07	0.24
BBA_060_r02	1600	7.5	9.5	0.09	0.24
BBA_070_r01	1350	8.0	9.5	0.16	0.04
BBA_070_r02	1100	2.5	3.5	0.10	0.03
BBA_070_r03	1100	3.5	6.0	0.11	0.03
BBA_070_r04	1100	3.5	6.5	0.11	0.03
BBA_070_r05	1150	3.0	3.0	0.07	0.03
BBA_070_r06	1150	4.0	7.0	0.10	0.03
BBA_070_r07	1100	2.0	4.0	0.10	0.03
BBA_090_r01	1000	2.5	5.5	0.12	0.03
BBA_090_r02	1150	6.0	8.0	0.13	0.03
BBA_090_r03	1350	7.5	9.5	0.13	0.06
BBA_090_r04	1450	7.5	9.5	0.13	0.16
BBA_090_r05	1150	6.0	8.5	0.13	0.03
BBA_090_r06	1200	7.0	9.0	0.13	0.03
BBA_090_r07	1100	4.0	7.0	0.13	0.03
BBA_090_r08	1450	7.5	9.5	0.12	0.15
BBA_090_r09	1250	7.0	9.0	0.13	0.04
BBA_090_r10	1450	7.0	9.0	0.12	0.15
BBA_090_r11	1500	7.0	9.0	0.09	0.22
BBA_090_r12	1450	7.5	9.5	0.11	0.18
BBA_100_r01	200	1.0	1.0	0.02	< 0.01
BBA_100_r02	225	1.5	1.5	0.02	0.01
BBA_100_r03	250	2.0	2.0	0.04	0.02
BBA_100_r04	225	2.0	2.0	0.03	< 0.01
BBA_100_r05	225	1.5	1.5	0.03	< 0.01
BBA_100_r06	225	1.5	1.5	0.03	< 0.01
BBA_120_r01	250	2.0	2.0	0.02	0.02
BBA_120_r02	275	2.5	2.5	0.03	0.02
BBA_120_r03	250	2.0	2.0	0.02	0.01
BBA_120_r04	225	2.0	2.0	0.02	0.01
BBA_120_r05	200	1.5	1.5	0.02	0.01
BBA_120_r07	350	3.5	3.5	0.05	0.02
BBA_120_r08	400	4.0	4.0	0.06	0.02
BBA_130_r01	150	1.0	1.0	0.01	< 0.01
BBA_130_r02	150	1.0	1.0	0.01	< 0.01
BBA_130_r03	150	1.0	1.0	0.01	< 0.01
BBA_130_r04	125	0.5	0.5	< 0.01	< 0.01
BBA_150_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BBA_150_r02	20	< 0.5	< 0.5	< 0.01	< 0.01
BBA_150_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBA_150_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBA_150_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBA_150_r06	< 20	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BBA_150_r07	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBA_150_r08	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBA_150_r09	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBA_150_r10	20	< 0.5	< 0.5	< 0.01	< 0.01
BBA_150_r11	20	< 0.5	< 0.5	< 0.01	< 0.01
BBA_150_r12	20	< 0.5	< 0.5	< 0.01	< 0.01
BBA_150_r13	20	< 0.5	< 0.5	< 0.01	< 0.01
BBA_155_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BBA_155_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BBA_155_r03	30	< 0.5	< 0.5	< 0.01	< 0.01
BBA_155_r08	50	< 0.5	< 0.5	< 0.01	< 0.01
BBA_155_r09	50	< 0.5	< 0.5	< 0.01	< 0.01
BBA_155_r10	50	< 0.5	< 0.5	< 0.01	< 0.01
BBA_155_r11	50	< 0.5	< 0.5	< 0.01	< 0.01
BBA_155_r12	40	< 0.5	< 0.5	< 0.01	< 0.01
BBA_165_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BBA_165_r02	70	< 0.5	< 0.5	< 0.01	< 0.01
BBA_165_r03	70	< 0.5	< 0.5	< 0.01	< 0.01
BBA_165_r04	70	< 0.5	< 0.5	< 0.01	< 0.01
BBA_165_r05	70	< 0.5	< 0.5	< 0.01	< 0.01
BBA_165_r06	70	< 0.5	< 0.5	< 0.01	< 0.01
BBA_175_r01	80	0.5	0.5	< 0.01	< 0.01
BBA_175_r02	70	0.5	0.5	< 0.01	< 0.01
BBA_175_r03	80	< 0.5	< 0.5	< 0.01	< 0.01
BBA_175_r04	80	< 0.5	< 0.5	< 0.01	< 0.01
BBA_180_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBA_190_r01	70	< 0.5	< 0.5	< 0.01	< 0.01
BBA_190_r02	70	< 0.5	< 0.5	< 0.01	< 0.01
BBA_190_r03	60	< 0.5	< 0.5	< 0.01	< 0.01
BBA_190_r04	70	< 0.5	< 0.5	< 0.01	< 0.01
BBA_190_r05	70	< 0.5	< 0.5	< 0.01	< 0.01
BBA_190_r06	70	< 0.5	< 0.5	< 0.01	< 0.01
BBA_190_r07	60	< 0.5	< 0.5	< 0.01	< 0.01
BBA_190_r08	70	< 0.5	< 0.5	< 0.01	< 0.01
BBA_190_r09	50	< 0.5	< 0.5	< 0.01	< 0.01
BBA_190_r10	70	< 0.5	< 0.5	< 0.01	< 0.01
BBA_202_r01	850	9.0	9.0	0.10	0.03
BBA_202_r02	1300	9.5	9.5	0.07	0.23
BBA_202_r03	1300	9.5	9.5	0.07	0.24
BBA_202_r04	1250	9.5	9.5	0.06	0.19
BBA_202_r05	1150	9.5	9.5	0.09	0.09
BBA_202_r06	1300	9.5	9.5	0.07	0.24
BBA_204_r01	1450	8.0	10.0	0.11	0.21
BBA_204_r02	1400	8.0	10.0	0.12	0.12
BBA_204_r03	1400	8.0	9.5	0.11	0.17
BBA_204_r04	1350	8.0	9.5	0.12	0.10
BBA_204_r05	1250	8.0	9.5	0.13	0.04
BBA_204_r06	950	4.5	6.5	0.12	0.02
BBA_204_r07	950	4.0	6.0	0.12	0.02
BBA_204_r08	950	5.0	7.0	0.12	0.02
BBA_204_r09	1050	6.5	8.5	0.12	0.03
BBA_215_r01	1450	7.0	7.0	0.08	0.27
BBA_215_r02	1350	7.5	9.0	0.07	0.22
BBA_215_r03	1450	6.0	8.0	0.08	0.27
BBA_220_r01	1350	5.0	5.0	0.06	0.05
BBA_220_r02	1250	4.0	4.0	0.05	0.04
BBA_220_r03	1200	4.0	4.0	0.05	0.04

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BBA_220_r04	1100	2.5	3.5	0.10	0.03
BBA_220_r05	1450	5.0	5.0	0.06	0.05
BBA_220_r06	1300	4.5	4.5	0.05	0.04
BBA_220_r07	1450	5.0	5.0	0.06	0.05
BBA_230_r01	1650	7.0	8.5	0.07	0.25
BBA_230_r02	1650	7.5	9.0	0.07	0.25
BBA_230_r03	1650	8.0	9.5	0.07	0.25
BBA_230_r04	1550	8.0	9.5	0.09	0.21
BBA_240_r01	1150	3.5	3.5	0.06	0.04
BBA_240_r02	1350	4.0	4.0	0.06	0.05
BBA_240_r03	1250	4.0	4.0	0.05	0.04
BBA_240_r04	1200	3.5	3.5	0.06	0.04
BBA_240_r05	1250	3.5	3.5	0.05	0.04
BBA_250_r01	1400	4.0	4.0	0.06	0.05
BBA_250_r02	1400	4.0	4.0	0.06	0.05
BBA_250_r03	1550	4.0	4.0	0.07	0.14
BBA_255_r01	1550	5.5	6.5	0.07	0.25
BBA_255_r02	1550	8.0	9.0	0.07	0.25
BBA_255_r03	1550	6.0	7.0	0.07	0.25
BBA_255_r05	1550	6.5	7.5	0.07	0.25
BBA_255_r06	1550	3.5	3.5	0.07	0.23
BBA_255_r07	1550	4.0	4.0	0.07	0.10
BBA_255_r10	1550	8.5	10.0	0.13	0.26
BBA_260_r01	1300	8.0	9.5	0.13	0.04
BBA_260_r02	1150	6.5	9.0	0.10	0.03
BBA_260_r03	1100	6.0	8.5	0.10	0.03
BBA_260_r04	1050	5.0	7.5	0.10	0.03
BBA_260_r05	1050	4.5	7.0	0.10	0.03
BBA_260_r06	1050	4.5	7.0	0.10	0.03
BBA_270_r01	1050	3.0	3.0	0.05	0.04
BBA_280_r01	1100	3.0	3.0	0.06	0.04
BBA_290_r01	1300	3.0	3.0	0.07	0.18
BBA_290_r02	1300	4.5	4.5	0.07	0.26
BBA_300_r01	850	10.0	10.0	0.11	0.04
BBA_300_r02	850	10.0	10.0	0.11	0.04
BBA_300_r04	850	10.0	10.0	0.11	0.04
BBA_300_r05	850	10.0	10.0	0.11	0.04
BBA_305_r01	800	9.5	9.5	0.11	0.03
BBA_305_r02	500	6.5	6.5	0.11	0.02
BBA_307_r01	475	6.0	6.0	0.10	0.02
BBA_307_r02	500	6.0	6.0	0.10	0.02
BBA_307_r03	550	7.5	7.5	0.11	0.02
BBA_307_r04	500	6.0	6.0	0.11	0.02
BBE_001_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BBE_001_r02	20	< 0.5	< 0.5	< 0.01	< 0.01
BBE_001_r03	20	< 0.5	< 0.5	< 0.01	< 0.01
BBE_001_r04	30	< 0.5	< 0.5	< 0.01	< 0.01
BBE_001_r05	30	< 0.5	< 0.5	< 0.01	< 0.01
BBE_003_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BBE_003_r02	20	< 0.5	< 0.5	< 0.01	< 0.01
BBE_003_r03	20	< 0.5	< 0.5	< 0.01	< 0.01
BBE_004_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BBE_005_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BBI_001_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BBI_002_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BBI_002_r02	60	< 0.5	< 0.5	< 0.01	< 0.01
BBI_002_r03	60	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BBI_004_r01	70	< 0.5	< 0.5	< 0.01	< 0.01
BBI_005_r01	70	< 0.5	< 0.5	< 0.01	< 0.01
BBI_005_r02	70	< 0.5	< 0.5	< 0.01	< 0.01
BBI_005_r03	70	< 0.5	< 0.5	< 0.01	< 0.01
BBI_005_r04	70	< 0.5	< 0.5	< 0.01	< 0.01
BBI_006_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BBI_008_r01	125	0.5	0.5	< 0.01	< 0.01
BBI_008_r02	125	0.5	0.5	< 0.01	< 0.01
BBI_009_r02	125	0.5	0.5	< 0.01	< 0.01
BBI_012_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BBI_012_r02	125	0.5	0.5	< 0.01	< 0.01
BBI_012_r03	125	0.5	0.5	< 0.01	< 0.01
BBI_012_r04	125	0.5	0.5	< 0.01	< 0.01
BBI_012_r05	125	0.5	0.5	< 0.01	< 0.01
BBI_012_r06	125	0.5	0.5	< 0.01	< 0.01
BBI_012_r07	125	0.5	0.5	< 0.01	< 0.01
BBI_015_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BBI_015_r02	90	< 0.5	< 0.5	< 0.01	< 0.01
BBI_016_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BBI_017_r01	125	0.5	0.5	< 0.01	< 0.01
BBI_017_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BBI_017_r03	125	0.5	0.5	< 0.01	< 0.01
BBI_018_r01	125	< 0.5	< 0.5	< 0.01	< 0.01
BBI_018_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BBI_019_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BBI_019_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BBI_019_r03	100	< 0.5	< 0.5	< 0.01	< 0.01
BBI_019_r04	100	< 0.5	< 0.5	< 0.01	< 0.01
BBI_022_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BBI_022_r02	90	< 0.5	< 0.5	< 0.01	< 0.01
BBI_022_r03	90	< 0.5	< 0.5	< 0.01	< 0.01
BBI_024_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BBI_024_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BBI_024_r03	80	< 0.5	< 0.5	< 0.01	< 0.01
BBI_024_r04	80	< 0.5	< 0.5	< 0.01	< 0.01
BBI_026_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BBI_026_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BBI_026_r03	80	< 0.5	< 0.5	< 0.01	< 0.01
BBI_026_r04	80	< 0.5	< 0.5	< 0.01	< 0.01
BBI_028_r01	70	< 0.5	< 0.5	< 0.01	< 0.01
BBI_030_r01	70	< 0.5	< 0.5	< 0.01	< 0.01
BBI_030_r02	70	< 0.5	< 0.5	< 0.01	< 0.01
BBI_030_r03	70	< 0.5	< 0.5	< 0.01	< 0.01
BBI_032_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BBI_032_r03	70	< 0.5	< 0.5	< 0.01	< 0.01
BBI_034_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BBI_035_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BBI_035_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BBN_001_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BBN_001_r03	20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_002_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_002_r02	20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_002_r03	20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_003_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_003_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_004_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_004_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01

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Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BBN_004_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_004_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_004_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_004_r06	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_005_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_005_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_005_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_005_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_005_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_005_r06	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_005_r07	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_005_r08	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_005_r09	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_006_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_006_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_012_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_012_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_012_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_012_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_012_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_012_r06	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_013_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_013_r02	20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_013_r03	20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_013_r04	20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_014_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_014_r02	20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_014_r03	20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_014_r04	20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_015_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_015_r02	20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_015_r03	20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_015_r04	20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_016_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BBN_017_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BBN_017_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BCA_001_r01	350	5.0	5.0	0.06	< 0.01
BCA_001_r02	850	6.5	6.5	0.02	0.06
BCA_001_r03	900	4.5	4.5	0.03	0.06
BCA_001_r04	950	4.5	4.5	0.03	0.18
BCA_001_r05	700	7.0	7.0	0.06	0.16
BCA_001_r06	275	5.0	5.0	0.09	0.06
BCA_001_r07	475	6.0	6.0	0.07	0.02
BCA_010_r01	750	4.0	5.5	0.08	0.04
BCA_010_r02	650	2.5	3.0	0.07	0.04
BCA_010_r03	700	2.0	4.0	0.07	0.04
BCA_010_r04	800	4.0	6.0	0.08	0.04
BCA_010_r05	800	4.5	6.5	0.08	0.04
BCA_015_r01	900	5.0	7.0	0.08	0.03
BCA_015_r02	900	5.5	7.5	0.09	0.03
BCA_015_r03	800	4.0	6.0	0.08	0.03
BCA_020_r01	1200	4.0	4.0	0.05	0.06
BCA_020_r02	1250	3.5	3.5	0.05	0.09
BCA_020_r03	1250	3.5	3.5	0.05	0.12
BCA_020_r04	1250	3.0	3.0	0.05	0.21
BCA_020_r06	1250	3.5	4.0	0.06	0.21
BCA_020_r07	1200	3.5	3.5	0.05	0.05

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BCA_025_r01	1200	3.5	3.5	0.05	0.05
BCA_025_r03	1250	3.5	3.5	0.06	0.09
BCA_025_r04	1250	3.5	3.5	0.06	0.11
BCA_030_r01	1100	3.5	3.5	0.05	0.04
BCA_030_r02	1250	3.0	3.0	0.06	0.16
BCA_030_r03	1200	3.5	3.5	0.05	0.04
BCA_035_r01	950	3.0	3.0	0.05	0.03
BCA_035_r02	1150	3.5	3.5	0.05	0.04
BCA_035_r03	1200	3.5	3.5	0.06	0.04
BCA_040_r01	950	4.0	6.5	0.09	0.02
BCA_040_r02	900	3.5	5.5	0.09	0.02
BCA_040_r03	900	2.5	5.0	0.09	0.02
BCA_040_r04	850	2.0	4.5	0.08	0.02
BCA_040_r05	850	2.0	4.0	0.08	0.03
BCA_040_r06	900	2.0	3.0	0.07	0.03
BCA_045_r01	1300	6.5	8.0	0.08	0.19
BCA_045_r02	1350	6.5	8.0	0.06	0.21
BCA_045_r03	1350	6.5	8.0	0.06	0.21
BCA_045_r04	1300	6.5	8.0	0.08	0.19
BCA_045_r07	1050	6.0	8.0	0.09	0.03
BCA_050_r01	1350	6.5	8.0	0.06	0.21
BCA_050_r02	1350	5.5	6.5	0.06	0.21
BCA_055_r01	1350	4.0	4.0	0.06	0.21
BCA_055_r02	1350	4.0	4.0	0.06	0.13
BCA_055_r03	1300	4.0	4.0	0.06	0.09
BCA_055_r04	1350	4.0	4.0	0.06	0.17
BCA_055_r05	1350	4.0	4.0	0.06	0.19
BCA_055_r06	1250	6.5	8.0	0.08	0.13
BCA_060_r01	1300	4.0	4.0	0.06	0.06
BCA_060_r02	1300	4.0	4.0	0.06	0.06
BCA_060_r03	1300	4.0	4.0	0.06	0.08
BCA_060_r04	1300	4.0	4.0	0.06	0.09
BCA_060_r05	1300	4.0	4.0	0.06	0.08
BCA_060_r06	1350	4.0	4.0	0.06	0.18
BCA_060_r07	1350	3.5	3.5	0.06	0.21
BCA_065_r01	850	2.0	4.0	0.09	0.02
BCA_065_r02	850	2.5	4.5	0.09	0.02
BCA_065_r03	850	1.5	4.0	0.09	0.03
BCA_065_r04	850	2.0	4.0	0.09	0.02
BCA_065_r05	1000	5.5	7.5	0.12	0.03
BCA_065_r06	1000	6.0	7.5	0.12	0.03
BCA_065_r07	1350	5.0	6.5	0.06	0.21
BCA_070_r01	950	2.5	3.0	0.08	0.03
BCA_070_r02	900	2.5	2.5	0.07	0.03
BCA_075_r01	950	2.5	3.0	0.08	0.03
BCA_075_r02	900	2.0	2.5	0.06	0.03
BCA_075_r03	950	2.5	2.5	0.05	0.03
BCA_075_r04	1150	7.0	8.0	0.14	0.03
BCA_080_r01	1300	4.0	4.0	0.06	0.06
BCA_080_r02	1200	4.0	4.0	0.05	0.04
BCA_080_r03	1100	4.0	4.0	0.05	0.04
BCA_080_r06	1000	3.5	3.5	0.04	0.03
BCA_080_r07	1000	3.0	3.0	0.05	0.03
BCA_085_r01	1300	4.0	4.0	0.05	0.07
BCA_085_r02	1200	4.0	4.0	0.05	0.05
BCA_090_r01	1300	6.0	7.5	0.05	0.20
BCA_090_r02	1250	6.5	8.0	0.08	0.16

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BCA_090_r03	1250	6.5	8.0	0.08	0.15
BCA_090_r04	1300	3.5	3.5	0.05	0.19
BCA_090_r05	1300	3.5	3.5	0.04	0.20
BCA_090_r06	1200	5.0	5.0	0.03	0.12
BCA_095_r01	1050	7.0	7.0	0.05	0.16
BCA_095_r02	950	4.5	7.0	0.08	0.05
BCA_100_r01	700	3.5	4.0	0.06	0.04
BCA_100_r02	700	4.0	4.0	0.06	0.04
BCA_105_r01	900	5.5	5.5	0.02	0.06
BCA_105_r02	475	5.0	5.0	0.04	0.03
BCA_110_r01	375	5.5	5.5	0.07	< 0.01
BCA_110_r02	375	5.0	5.0	0.05	< 0.01
BCA_110_r03	425	5.0	5.0	0.05	0.02
BCA_110_r04	325	4.5	4.5	0.05	< 0.01
BCA_110_r05	125	1.5	1.5	0.03	< 0.01
BCA_110_r06	150	2.0	2.0	0.04	< 0.01
BCA_115_r01	60	0.5	0.5	< 0.01	< 0.01
BCA_115_r02	60	0.5	0.5	< 0.01	< 0.01
BCA_115_r03	60	0.5	0.5	< 0.01	< 0.01
BCA_120_r01	70	0.5	0.5	0.01	< 0.01
BCA_120_r02	70	0.5	0.5	0.01	< 0.01
BCA_120_r03	70	0.5	0.5	0.01	< 0.01
BCA_120_r04	40	< 0.5	< 0.5	< 0.01	< 0.01
BCL_001_r01	250	2.0	2.0	0.02	0.01
BCL_001_r02	225	1.5	1.5	0.02	0.01
BCL_001_r03	250	2.0	2.0	0.03	0.01
BCL_001_r04	275	2.5	2.5	0.03	0.01
BCL_003_r01	250	2.0	2.0	0.03	0.01
BCL_005_r01	300	3.0	3.0	0.05	0.02
BCL_005_r02	300	3.0	3.0	0.05	0.02
BCL_005_r03	350	4.0	4.0	0.07	0.02
BCL_009_r01	550	8.0	8.0	0.09	0.05
BCL_009_r02	500	8.0	8.0	0.08	0.04
BCL_009_r03	300	5.0	5.0	0.07	0.02
BCL_009_r04	250	4.0	4.0	0.05	0.02
BCL_009_r05	375	6.0	6.0	0.08	0.03
BCL_009_r06	325	6.0	6.0	0.06	< 0.01
BCL_009_r07	325	5.0	5.0	0.07	0.03
BCL_011_r01	600	8.5	8.5	0.07	0.05
BCL_011_r02	275	5.5	5.5	0.08	< 0.01
BCL_013_r01	850	8.5	8.5	0.05	0.18
BCL_013_r02	550	8.5	8.5	0.10	0.11
BCL_015_r02	950	8.5	8.5	0.05	0.18
BCL_015_r03	1050	7.5	7.5	0.02	0.18
BCL_017_r01	1000	8.0	8.0	0.01	0.08
BCL_017_r02	1050	7.0	7.0	0.02	0.08
BCL_019_r01	850	6.5	6.5	0.03	0.06
BCL_021_r01	850	5.0	5.0	0.05	0.06
BCL_021_r02	800	5.0	5.0	0.05	0.06
BCL_023_r01	850	3.0	4.0	0.09	0.05
BCL_023_r02	850	4.5	4.5	0.09	0.06
BCL_025_r01	950	5.0	6.5	0.09	0.06
BCL_025_r02	950	4.0	6.0	0.10	0.05
BCL_025_r03	1000	5.0	7.0	0.10	0.05
BCL_027_r01	1150	6.0	9.0	0.10	0.04
BCL_027_r02	1200	6.5	9.0	0.10	0.04
BCL_027_r03	1100	6.0	8.5	0.10	0.05

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BCL_027_r04	1200	7.0	9.0	0.11	0.04
BCL_027_r05	1200	7.5	9.0	0.10	0.08
BCL_027_r06	1250	7.5	9.0	0.10	0.09
BCL_029_r01	1250	7.5	9.0	0.11	0.04
BCL_029_r02	1250	7.5	9.0	0.11	0.04
BCL_029_r04	1400	7.5	9.5	0.11	0.17
BCL_033_r01	1500	7.5	9.0	0.06	0.23
BCL_033_r02	1500	7.5	9.0	0.06	0.23
BCL_033_r03	1500	7.5	9.0	0.06	0.23
BCL_033_r04	1450	7.5	9.0	0.10	0.20
BCL_033_r05	1400	7.5	9.0	0.11	0.14
BCL_035_r01	1350	7.5	9.5	0.11	0.09
BCL_035_r02	1150	6.0	8.5	0.10	0.03
BCL_035_r03	1350	7.5	9.5	0.11	0.09
BCL_035_r04	1350	7.5	9.5	0.11	0.08
BCL_035_r05	1350	7.5	9.5	0.11	0.07
BCL_037_r01	1000	2.5	2.5	0.06	0.04
BCL_037_r02	1050	3.0	3.0	0.05	0.04
BCL_037_r03	1000	2.5	2.5	0.05	0.04
BCL_037_r04	1100	3.0	3.0	0.05	0.04
BCL_039_r01	1100	3.0	3.0	0.05	0.04
BCL_039_r02	1050	3.0	3.0	0.05	0.04
BCL_041_r01	1150	3.0	3.0	0.06	0.05
BCL_043_r01	1200	10.0	10.0	0.06	0.25
BCL_043_r02	1250	10.0	10.0	0.06	0.25
BCL_043_r03	1250	4.5	4.5	0.06	0.25
BCL_043_r04	1200	10.0	10.0	0.06	0.25
BCL_043_r05	1250	2.5	2.5	0.06	0.20
BCL_043_r06	1250	5.5	5.5	0.06	0.25
BCL_045_r01	1250	3.0	3.0	0.06	0.10
BCL_045_r02	1200	3.0	3.0	0.06	0.05
BCL_045_r03	1200	3.0	3.0	0.06	0.05
BCL_045_r04	1250	2.5	2.5	0.06	0.18
BCL_047_r01	1250	7.0	7.0	0.06	0.25
BCL_047_r02	1200	3.0	3.0	0.06	0.06
BCL_049_r01	1250	6.5	6.5	0.06	0.25
BCL_049_r02	1250	3.5	3.5	0.06	0.24
BCL_051_r01	1200	8.0	8.0	0.05	0.24
BCL_051_r02	1200	9.5	9.5	0.05	0.24
BCL_051_r03	1250	8.0	8.0	0.06	0.25
BCL_053_r01	1200	10.0	10.0	0.06	0.24
BCL_055_r01	1150	10.0	10.0	0.10	0.20
BCL_055_r02	950	10.0	10.0	0.11	0.06
BCL_059_r01	700	9.0	9.0	0.11	0.03
BCL_059_r02	1050	10.0	10.0	0.11	0.11
BCL_059_r03	950	10.0	10.0	0.11	0.06
BCL_059_r04	800	9.5	9.5	0.11	0.03
BCL_059_r05	950	10.0	10.0	0.11	0.04
BCL_059_r06	700	9.0	9.0	0.11	0.03
BCL_061_r01	800	9.5	9.5	0.11	0.03
BCL_061_r02	850	10.0	10.0	0.11	0.04
BCM_001_r01	200	1.5	1.5	0.02	< 0.01
BCM_001_r02	225	1.5	1.5	0.02	< 0.01
BCM_001_r03	225	1.5	1.5	0.02	< 0.01
BCM_002_r01	200	1.5	1.5	0.01	< 0.01
BCM_002_r02	175	1.0	1.0	0.01	< 0.01
BCM_004_r01	200	1.5	1.5	0.02	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BCM_004_r02	200	1.0	1.0	0.01	< 0.01
BCM_005_r01	175	1.0	1.0	0.01	< 0.01
BCM_006_r01	150	1.0	1.0	< 0.01	< 0.01
BCM_008_r01	200	1.0	1.0	0.01	< 0.01
BCM_013_r01	125	0.5	0.5	< 0.01	< 0.01
BCM_013_r02	125	0.5	0.5	< 0.01	< 0.01
BCM_014_r01	150	0.5	0.5	< 0.01	< 0.01
BCM_015_r01	150	1.0	1.0	< 0.01	< 0.01
BCM_015_r02	150	0.5	0.5	< 0.01	< 0.01
BCM_016_r01	175	1.0	1.0	< 0.01	< 0.01
BCM_016_r02	175	1.0	1.0	< 0.01	< 0.01
BCM_017_r01	200	1.0	1.0	0.01	< 0.01
BCM_019_r01	175	1.0	1.0	< 0.01	< 0.01
BCM_019_r02	175	1.0	1.0	< 0.01	< 0.01
BCM_019_r03	150	1.0	1.0	< 0.01	< 0.01
BCM_020_r01	150	0.5	0.5	< 0.01	< 0.01
BCM_020_r02	150	1.0	1.0	< 0.01	< 0.01
BCM_020_r03	150	1.0	1.0	< 0.01	< 0.01
BCM_020_r04	150	1.0	1.0	< 0.01	< 0.01
BCM_020_r05	150	1.0	1.0	< 0.01	< 0.01
BCM_022_r01	150	1.0	1.0	< 0.01	< 0.01
BCM_022_r02	150	1.0	1.0	< 0.01	< 0.01
BCM_022_r03	150	0.5	0.5	< 0.01	< 0.01
BCM_024_r01	125	0.5	0.5	< 0.01	< 0.01
BCM_026_r01	125	0.5	0.5	< 0.01	< 0.01
BCM_026_r02	125	0.5	0.5	< 0.01	< 0.01
BCM_026_r03	125	0.5	0.5	< 0.01	< 0.01
BCM_027_r01	125	0.5	0.5	< 0.01	< 0.01
BCM_027_r02	125	0.5	0.5	< 0.01	< 0.01
BCM_027_r03	125	0.5	0.5	< 0.01	< 0.01
BCM_027_r04	100	< 0.5	< 0.5	< 0.01	< 0.01
BCM_029_r01	125	0.5	0.5	< 0.01	< 0.01
BCM_029_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BCM_029_r03	100	< 0.5	< 0.5	< 0.01	< 0.01
BCM_029_r04	100	< 0.5	< 0.5	< 0.01	< 0.01
BCM_031_r01	125	0.5	0.5	< 0.01	< 0.01
BCM_031_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BCM_031_r03	100	< 0.5	< 0.5	< 0.01	< 0.01
BCM_031_r04	100	< 0.5	< 0.5	< 0.01	< 0.01
BCM_033_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BCM_035_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BCM_035_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BCM_035_r03	80	< 0.5	< 0.5	< 0.01	< 0.01
BCM_035_r04	80	< 0.5	< 0.5	< 0.01	< 0.01
BCM_035_r05	70	< 0.5	< 0.5	< 0.01	< 0.01
BCM_035_r06	90	< 0.5	< 0.5	< 0.01	< 0.01
BCM_036_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BCM_036_r02	90	< 0.5	< 0.5	< 0.01	< 0.01
BCM_036_r03	90	< 0.5	< 0.5	< 0.01	< 0.01
BCM_036_r05	90	< 0.5	< 0.5	< 0.01	< 0.01
BCM_038_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BCM_038_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BCM_038_r03	80	< 0.5	< 0.5	< 0.01	< 0.01
BCM_040_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BCM_040_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BCM_040_r03	80	< 0.5	< 0.5	< 0.01	< 0.01
BCM_040_r04	80	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BCM_040_r05	80	< 0.5	< 0.5	< 0.01	< 0.01
BCM_040_r06	90	< 0.5	< 0.5	< 0.01	< 0.01
BCM_040_r07	90	< 0.5	< 0.5	< 0.01	< 0.01
BCM_040_r08	90	< 0.5	< 0.5	< 0.01	< 0.01
BCM_040_r09	90	< 0.5	< 0.5	< 0.01	< 0.01
BCM_042_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BCM_042_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BCM_042_r03	90	< 0.5	< 0.5	< 0.01	< 0.01
BCM_042_r04	90	< 0.5	< 0.5	< 0.01	< 0.01
BCM_042_r05	80	< 0.5	< 0.5	< 0.01	< 0.01
BCM_042_r06	80	< 0.5	< 0.5	< 0.01	< 0.01
BCM_044_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BCM_044_r02	90	< 0.5	< 0.5	< 0.01	< 0.01
BCM_044_r03	90	< 0.5	< 0.5	< 0.01	< 0.01
BCM_044_r04	90	< 0.5	< 0.5	< 0.01	< 0.01
BCM_046_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BCM_046_r02	90	< 0.5	< 0.5	< 0.01	< 0.01
BCM_048_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BCM_048_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BCM_048_r03	100	< 0.5	< 0.5	< 0.01	< 0.01
BCM_060_r01	325	3.0	3.0	0.06	0.01
BCM_060_r02	325	3.0	3.0	0.06	0.01
BCM_060_r03	350	3.5	3.5	0.07	0.01
BCM_062_r01	350	3.5	3.5	0.06	0.01
BCM_062_r02	400	4.5	4.5	0.08	0.01
BCM_064_r01	375	4.0	4.0	0.07	0.01
BCM_064_r02	350	3.5	3.5	0.06	0.01
BCM_064_r03	425	5.0	5.0	0.09	0.01
BCM_064_r04	400	4.5	4.5	0.08	0.01
BCM_066_r01	300	2.5	2.5	0.04	0.01
BCM_066_r02	300	2.5	2.5	0.05	0.01
BCM_066_r03	350	3.5	3.5	0.07	0.01
BCM_068_r01	300	2.5	2.5	0.04	< 0.01
BCM_068_r02	350	3.5	3.5	0.06	0.01
BCM_068_r03	350	3.5	3.5	0.06	0.01
BCM_068_r04	425	4.5	4.5	0.09	0.01
BCM_070_r01	325	3.0	3.0	0.05	0.01
BCM_070_r02	400	4.5	4.5	0.08	0.01
BCM_072_r01	325	3.0	3.0	0.06	0.01
BCP_010_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BCP_040_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BCP_040_r02	60	< 0.5	< 0.5	< 0.01	< 0.01
BCP_040_r03	60	< 0.5	< 0.5	< 0.01	< 0.01
BCP_040_r04	60	< 0.5	< 0.5	< 0.01	< 0.01
BCP_040_r05	60	< 0.5	< 0.5	< 0.01	< 0.01
BCP_040_r06	60	< 0.5	< 0.5	< 0.01	< 0.01
BCP_050_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BCP_050_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BCP_050_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BCP_050_r04	20	< 0.5	< 0.5	< 0.01	< 0.01
BCP_050_r05	20	< 0.5	< 0.5	< 0.01	< 0.01
BCP_050_r06	20	< 0.5	< 0.5	< 0.01	< 0.01
BCP_050_r07	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BCP_050_r08	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BCP_050_r09	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BCP_060_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BCP_060_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BCP_060_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BCP_060_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BCP_075_r01	1250	4.0	4.0	0.04	0.14
BCP_075_r02	1200	4.0	4.0	0.04	0.05
BCP_075_r03	1200	5.0	7.0	0.04	0.17
BCP_075_r04	1250	3.5	5.0	0.04	0.17
BCP_075_r05	1250	3.0	4.5	0.04	0.17
BCP_075_r06	1200	3.5	4.0	0.04	0.17
BCP_075_r07	1250	3.5	3.5	0.04	0.16
BCP_075_r08	1200	5.0	7.0	0.04	0.17
BCP_125_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDA_005_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDA_005_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDA_005_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDA_007_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDA_007_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDA_007_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDA_009_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDA_009_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDA_009_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDA_009_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDA_009_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDA_009_r06	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDA_009_r07	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDA_009_r08	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDA_011_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDA_011_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDA_011_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDA_011_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDA_013_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDA_013_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDA_013_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDA_013_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDA_013_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDW_070_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDW_070_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDW_070_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDW_070_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDW_070_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDW_070_r06	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDW_070_r07	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDW_070_r08	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDW_070_r09	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDY_001_r01	1050	2.5	2.5	0.05	0.04
BDY_001_r02	1050	3.0	3.0	0.05	0.04
BDY_001_r03	1050	2.5	2.5	0.05	0.04
BDY_001_r04	1050	3.0	3.0	0.05	0.04
BDY_004_r01	1050	2.5	2.5	0.06	0.04
BDY_004_r02	1000	2.5	2.5	0.06	0.04
BDY_007_r01	950	2.0	3.5	0.09	0.03
BDY_007_r02	950	1.5	3.5	0.08	0.03
BDY_007_r03	950	2.5	4.5	0.10	0.03
BDY_007_r04	950	2.5	4.5	0.10	0.03
BDY_007_r05	1100	5.0	7.0	0.11	0.03
BDY_010_r01	1050	4.0	6.0	0.10	0.03
BDY_010_r02	1100	5.5	8.0	0.10	0.03
BDY_013_r01	1250	6.5	9.5	0.10	0.04

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BDY_019_r01	1550	7.5	9.5	0.08	0.24
BDY_022_r01	1550	7.5	9.0	0.07	0.25
BDY_022_r02	1550	7.5	8.5	0.07	0.25
BDY_022_r03	1550	3.5	4.5	0.07	0.24
BDY_022_r04	1550	3.5	3.5	0.07	0.19
BDY_025_r01	1550	3.5	3.5	0.07	0.24
BDY_025_r02	1550	4.0	4.0	0.07	0.12
BDY_025_r03	1500	4.0	4.0	0.07	0.05
BDY_025_r04	1550	4.0	5.0	0.07	0.25
BDY_028_r04	1500	4.0	4.0	0.07	0.06
BDY_028_r05	1500	4.0	4.0	0.07	0.05
BDY_028_r08	1450	4.0	4.0	0.06	0.05
BDY_031_r01	1500	4.0	4.0	0.07	0.05
BDY_031_r02	1450	4.0	4.0	0.06	0.05
BDY_031_r03	1500	4.0	4.0	0.07	0.05
BDY_031_r06	1500	4.0	4.0	0.07	0.05
BDY_031_r07	1450	4.0	4.0	0.06	0.05
BDY_037_r01	1400	7.5	9.5	0.12	0.06
BDY_037_r02	1500	7.5	9.5	0.12	0.14
BDY_037_r03	1350	7.5	9.5	0.12	0.04
BDY_047_r01	1600	4.0	5.5	0.07	0.25
BDY_047_r02	1600	7.0	8.5	0.07	0.25
BDY_047_r03	1600	7.0	8.5	0.07	0.25
BDY_047_r04	1600	3.5	4.5	0.07	0.25
BDY_047_r05	1600	3.5	4.0	0.07	0.25
BDY_050_r01	1600	7.5	9.0	0.07	0.25
BDY_050_r02	1600	5.0	6.5	0.07	0.25
BDY_050_r03	1600	4.0	4.0	0.07	0.20
BDY_050_r04	1600	7.0	8.5	0.07	0.25
BDY_060_r01	1500	4.5	4.5	0.07	0.05
BDY_060_r02	1450	4.5	4.5	0.06	0.05
BDY_070_r01	1300	4.0	4.0	0.06	0.04
BDY_070_r02	1250	4.0	4.0	0.05	0.04
BDY_070_r03	1250	4.0	4.0	0.05	0.04
BDY_070_r04	1250	3.5	3.5	0.05	0.04
BDY_070_r05	1100	2.0	4.0	0.09	0.03
BDY_070_r06	1200	3.0	3.0	0.06	0.04
BDY_070_r07	1150	3.0	3.0	0.06	0.04
BDY_080_r01	1100	1.5	4.5	0.09	0.03
BDY_080_r02	1100	2.0	5.0	0.09	0.03
BDY_080_r03	1100	2.5	5.0	0.09	0.03
BDY_080_r04	1350	7.0	9.0	0.11	0.07
BDY_080_r05	1100	3.0	6.0	0.09	0.03
BDY_080_r06	1100	2.5	5.5	0.09	0.03
BDY_090_r01	1300	4.0	4.0	0.05	0.04
BDY_090_r03	1400	4.5	4.5	0.06	0.05
BDY_100_r01	1400	4.0	4.0	0.06	0.05
BDY_100_r02	1200	3.5	3.5	0.05	0.04
BDY_110_r01	1600	7.0	8.5	0.07	0.25
BDY_110_r02	1600	7.5	9.0	0.07	0.25
BDY_110_r03	1600	8.0	9.5	0.12	0.25
BDY_110_r04	1600	3.5	4.0	0.07	0.25
BDY_110_r05	1600	8.0	9.5	0.07	0.25
BDY_110_r06	1600	5.5	7.0	0.07	0.25
BDY_110_r07	1600	5.5	7.0	0.07	0.25
BDY_120_r01	1350	7.5	9.5	0.12	0.04
BDY_120_r02	1250	5.5	8.5	0.10	0.03

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BDY_120_r03	1250	6.5	9.5	0.11	0.03
BDY_130_r01	1100	2.5	4.0	0.09	0.03
BDY_130_r02	1150	4.5	7.0	0.10	0.03
BDY_130_r03	1150	4.5	7.0	0.10	0.03
BDY_140_r01	1200	3.5	3.5	0.05	0.04
BDY_140_r02	1200	4.0	4.0	0.05	0.04
BDY_140_r03	1150	3.0	3.0	0.07	0.04
BDY_140_r04	1150	3.0	3.0	0.06	0.04
BDY_140_r05	1200	3.5	3.5	0.05	0.04
BDY_140_r06	1200	3.5	3.5	0.06	0.04
BDY_140_r07	1200	3.5	3.5	0.05	0.04
BDY_140_r08	1200	3.5	3.5	0.05	0.04
BDY_140_r09	1200	3.5	3.5	0.05	0.04
BDY_140_r10	1200	3.5	3.5	0.05	0.04
BDY_140_r11	1250	4.0	4.0	0.05	0.04
BDY_140_r12	1250	4.0	4.0	0.05	0.04
BDY_140_r13	1250	4.0	4.0	0.05	0.04
BDY_140_r14	1250	4.0	4.0	0.05	0.04
BDY_140_r15	1250	4.0	4.0	0.06	0.04
BDY_140_r16	1150	3.5	3.5	0.06	0.04
BDY_150_r01	1500	4.0	4.0	0.07	0.05
BDY_150_r02	1550	4.0	4.0	0.07	0.10
BDY_150_r03	1550	4.0	4.0	0.07	0.26
BDY_150_r04	1550	3.5	3.5	0.07	0.26
BDY_160_r01	1550	8.5	9.5	0.07	0.26
BDY_160_r02	1550	8.5	9.5	0.07	0.26
BDY_160_r03	1550	6.5	7.0	0.07	0.26
BDY_160_r04	1550	8.5	9.5	0.08	0.26
BDY_170_r01	1550	7.5	8.5	0.07	0.26
BDY_170_r02	1450	8.5	9.5	0.09	0.19
BDY_170_r03	1550	8.5	9.5	0.09	0.26
BDY_170_r04	1550	7.5	8.5	0.07	0.26
BDY_170_r05	1550	5.0	6.0	0.07	0.26
BDY_170_r06	1500	8.0	9.5	0.09	0.24
BDY_180_r01	1400	8.0	9.5	0.10	0.10
BDY_180_r02	1150	6.5	8.5	0.10	0.03
BDY_180_r03	1100	6.0	8.5	0.10	0.03
BDY_180_r04	1100	5.5	8.0	0.10	0.03
BDY_180_r05	1100	5.5	8.0	0.11	0.03
BDY_180_r06	950	2.0	4.0	0.09	0.03
BDY_180_r07	1150	6.5	9.0	0.11	0.03
BDY_190_r01	950	1.5	4.0	0.09	0.03
BDY_190_r02	950	2.0	3.5	0.08	0.03
BDY_190_r03	950	1.5	4.0	0.09	0.03
BDY_190_r04	950	2.5	5.0	0.10	0.03
BDY_190_r05	950	2.0	4.5	0.09	0.03
BDY_190_r06	950	3.0	5.0	0.10	0.03
BDY_190_r07	950	2.5	5.0	0.10	0.03
BDY_190_r08	1000	2.5	2.5	0.06	0.04
BDY_200_r01	1150	3.0	3.0	0.06	0.05
BDY_200_r02	1050	3.0	3.0	0.05	0.04
BDY_210_r01	950	2.0	3.5	0.08	0.04
BDY_210_r02	1000	2.0	3.0	0.07	0.04
BDY_210_r03	1000	2.0	3.0	0.07	0.04
BDY_210_r04	950	2.0	3.5	0.08	0.04
BDY_212_r01	1000	2.5	2.5	0.06	0.04
BDY_214_r01	1000	2.5	2.5	0.06	0.04

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BDY_214_r02	1050	3.0	3.0	0.05	0.04
BDY_214_r03	1000	2.5	2.5	0.05	0.04
BDY_214_r04	1050	3.0	3.0	0.05	0.04
BDY_216_r01	1100	3.0	3.0	0.06	0.04
BDY_216_r02	1150	3.0	3.0	0.06	0.05
BDY_216_r04	1150	3.0	3.0	0.06	0.05
BDY_218_r01	1100	3.0	3.0	0.06	0.04
BDY_220_r01	1150	3.0	3.0	0.06	0.05
BDY_220_r02	1150	3.0	3.0	0.06	0.05
BDY_224_r01	1250	8.0	8.0	0.07	0.25
BDY_224_r02	1250	9.5	9.5	0.07	0.25
BDY_224_r03	1250	7.0	7.0	0.07	0.25
BEL_001_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_001_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_001_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_001_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_003_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_003_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_003_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_003_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_003_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_005_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_005_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_007_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_007_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_007_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_007_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_007_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_007_r06	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_007_r07	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_009_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_011_r01	40	0.5	0.5	0.01	< 0.01
BEL_011_r02	40	0.5	0.5	0.01	< 0.01
BEL_011_r03	40	0.5	0.5	0.01	< 0.01
BEL_011_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_011_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_011_r06	20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_013_r01	60	1.0	1.0	0.01	< 0.01
BEL_013_r02	40	0.5	0.5	0.01	< 0.01
BEL_017_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BEL_017_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BEL_019_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BEL_019_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BEL_019_r03	80	< 0.5	< 0.5	< 0.01	< 0.01
BEL_019_r04	70	< 0.5	< 0.5	< 0.01	< 0.01
BEL_021_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BEL_021_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BEL_021_r03	80	< 0.5	< 0.5	< 0.01	< 0.01
BEL_021_r04	80	< 0.5	< 0.5	< 0.01	< 0.01
BEL_021_r05	80	< 0.5	< 0.5	< 0.01	< 0.01
BEL_021_r06	70	< 0.5	< 0.5	< 0.01	< 0.01
BEL_023_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BEL_023_r02	70	< 0.5	< 0.5	< 0.01	< 0.01
BEL_023_r03	70	< 0.5	< 0.5	< 0.01	< 0.01
BEL_023_r04	70	< 0.5	< 0.5	< 0.01	< 0.01
BEL_023_r05	70	< 0.5	< 0.5	< 0.01	< 0.01
BEL_023_r06	70	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BEL_025_r01	70	< 0.5	< 0.5	< 0.01	< 0.01
BEL_025_r02	60	< 0.5	< 0.5	< 0.01	< 0.01
BEL_025_r03	60	< 0.5	< 0.5	< 0.01	< 0.01
BEL_027_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BEL_029_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BEL_029_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BEL_029_r03	60	< 0.5	< 0.5	< 0.01	< 0.01
BEL_031_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BEL_031_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BEL_031_r03	50	< 0.5	< 0.5	< 0.01	< 0.01
BEL_031_r04	50	< 0.5	< 0.5	< 0.01	< 0.01
BEL_031_r05	50	< 0.5	< 0.5	< 0.01	< 0.01
BEL_033_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BEL_033_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BEL_033_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BEL_033_r04	40	< 0.5	< 0.5	< 0.01	< 0.01
BEL_033_r05	30	< 0.5	< 0.5	< 0.01	< 0.01
BEL_033_r06	40	< 0.5	< 0.5	< 0.01	< 0.01
BEL_035_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BEL_035_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BEL_036_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BEL_037_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BEL_037_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BEL_043_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BEL_043_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BEL_045_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BEL_045_r02	20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_047_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_047_r02	20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_049_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BEL_049_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BEL_051_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BEL_051_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BEL_052_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BEL_052_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BEL_052_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BEL_053_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BEL_053_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BEL_053_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BEL_053_r04	40	< 0.5	< 0.5	< 0.01	< 0.01
BEL_054_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BEL_054_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BEL_054_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BEL_055_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BEL_055_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BEL_056_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BEL_056_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BEL_056_r03	50	< 0.5	< 0.5	< 0.01	< 0.01
BEL_056_r04	50	< 0.5	< 0.5	< 0.01	< 0.01
BEL_057_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BEL_057_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BEL_058_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BEL_058_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BEL_059_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BEL_059_r02	60	< 0.5	< 0.5	< 0.01	< 0.01
BEL_061_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BEL_061_r02	60	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BEL_063_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BEL_063_r02	60	< 0.5	< 0.5	< 0.01	< 0.01
BEL_063_r03	70	< 0.5	< 0.5	< 0.01	< 0.01
BEL_065_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BEL_065_r02	70	< 0.5	< 0.5	< 0.01	< 0.01
BEL_065_r03	70	< 0.5	< 0.5	< 0.01	< 0.01
BEL_067_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BEL_067_r02	70	< 0.5	< 0.5	< 0.01	< 0.01
BEL_069_r01	70	< 0.5	< 0.5	< 0.01	< 0.01
BEL_069_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BEL_069_r03	80	< 0.5	< 0.5	< 0.01	< 0.01
BEL_073_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BEL_073_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BEL_073_r03	80	< 0.5	< 0.5	< 0.01	< 0.01
BEL_073_r04	80	< 0.5	< 0.5	< 0.01	< 0.01
BEL_073_r05	80	< 0.5	< 0.5	< 0.01	< 0.01
BEL_075_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BEL_075_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BEL_075_r03	80	< 0.5	< 0.5	< 0.01	< 0.01
BEL_076_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BEL_076_r02	90	< 0.5	< 0.5	< 0.01	< 0.01
BEL_077_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BEL_077_r02	150	0.5	0.5	< 0.01	< 0.01
BEL_077_r03	125	0.5	0.5	< 0.01	< 0.01
BEL_079_r01	125	0.5	0.5	< 0.01	< 0.01
BEL_079_r02	150	1.0	1.0	< 0.01	< 0.01
BEL_079_r03	125	0.5	0.5	< 0.01	< 0.01
BEL_081_r01	200	1.0	1.0	0.01	< 0.01
BEL_081_r02	200	1.5	1.5	0.01	0.01
BEL_081_r03	200	1.5	1.5	0.02	0.01
BEL_081_r04	150	1.0	1.0	< 0.01	< 0.01
BEL_087_r01	175	2.0	2.0	0.02	0.01
BEL_087_r02	175	1.5	1.5	0.01	0.01
BEL_087_r03	150	1.5	1.5	0.01	0.01
BEL_089_r01	175	2.0	2.0	0.02	0.01
BEL_089_r02	150	2.5	2.5	0.02	< 0.01
BEL_089_r03	200	3.0	3.0	0.03	0.01
BEL_089_r04	200	3.0	3.0	0.04	0.02
BEL_089_r05	225	3.5	3.5	0.05	0.02
BEL_091_r01	150	2.5	2.5	0.03	< 0.01
BEL_093_r01	100	2.0	2.0	0.04	< 0.01
BEL_093_r02	80	1.5	1.5	0.03	< 0.01
BEL_093_r03	125	2.0	2.0	0.04	< 0.01
BEL_095_r01	80	1.5	1.5	0.02	< 0.01
BEL_095_r03	80	1.5	1.5	0.02	< 0.01
BFL_001_r01	1350	7.5	9.0	0.10	0.08
BFL_001_r02	1300	7.5	9.0	0.10	0.04
BFL_001_r03	1250	7.5	9.0	0.10	0.04
BFL_001_r04	1400	7.5	9.0	0.10	0.14
BFL_001_r05	1450	7.5	9.0	0.10	0.20
BFL_001_r06	1350	7.5	9.0	0.10	0.09
BFL_003_r01	950	3.0	4.5	0.10	0.03
BFL_003_r02	950	2.5	4.0	0.10	0.03
BFL_003_r03	950	1.5	3.0	0.09	0.03
BFL_003_r04	950	2.5	4.0	0.10	0.03
BFL_003_r05	1000	3.5	5.0	0.11	0.03
BFL_003_r06	950	2.0	3.5	0.10	0.03

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BFL_005_r01	950	2.5	4.0	0.10	0.03
BFL_005_r02	950	2.0	4.0	0.10	0.03
BFL_007_r01	950	2.0	3.0	0.09	0.03
BFL_007_r02	1050	3.0	3.0	0.05	0.04
BFL_007_r03	1100	3.0	3.0	0.05	0.04
BFL_009_r01	1000	2.5	2.5	0.07	0.04
BFL_009_r02	950	2.0	2.5	0.07	0.03
BFL_009_r03	950	2.0	4.0	0.10	0.03
BGL_001_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_001_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_001_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_001_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_001_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_001_r06	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_010_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_010_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_010_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_010_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_010_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_010_r06	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_015_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_015_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_045_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_045_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_045_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_045_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_045_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_045_r06	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_045_r07	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_045_r08	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_050_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_050_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_050_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_050_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_050_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_050_r07	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGO_025_r01	1400	5.0	6.5	0.06	0.20
BGO_025_r02	1400	4.5	6.5	0.06	0.20
BGO_035_r01	1150	4.5	7.5	0.09	0.03
BGO_035_r04	1100	4.0	6.5	0.09	0.02
BGO_040_r01	1100	3.5	6.5	0.09	0.03
BGO_040_r02	1400	6.0	8.5	0.10	0.16
BGO_040_r03	1200	5.5	8.0	0.09	0.03
BGO_040_r04	1400	6.0	8.5	0.11	0.17
BGO_040_r05	1050	2.0	4.5	0.08	0.03
BGO_050_r01	1300	4.0	4.0	0.05	0.04
BGO_050_r02	1250	4.0	4.0	0.05	0.04
BGO_050_r03	1300	4.0	4.0	0.05	0.04
BGO_050_r04	1250	4.0	4.0	0.05	0.04
BGO_050_r05	1200	3.5	3.5	0.05	0.04
BGO_050_r06	1150	3.5	3.5	0.05	0.03
BGO_050_r07	1150	3.0	3.0	0.06	0.03
BGO_050_r08	1150	3.5	3.5	0.05	0.03
BGO_055_r01	1400	4.5	4.5	0.06	0.04
BGO_055_r02	1400	4.5	4.5	0.05	0.04
BGO_060_r01	1450	4.0	4.0	0.06	0.05
BGO_060_r02	1400	4.0	4.0	0.06	0.05

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BGO_060_r03	1500	4.0	4.0	0.06	0.11
BGR_001_r01	150	0.5	0.5	< 0.01	< 0.01
BGR_001_r02	150	1.0	1.0	< 0.01	< 0.01
BGR_001_r03	175	1.0	1.0	< 0.01	< 0.01
BGR_003_r01	150	1.0	1.0	< 0.01	< 0.01
BGR_003_r02	175	1.0	1.0	< 0.01	< 0.01
BGR_003_r03	175	1.0	1.0	< 0.01	< 0.01
BGR_005_r01	150	1.0	1.0	< 0.01	< 0.01
BGR_005_r02	150	1.0	1.0	< 0.01	< 0.01
BGR_005_r03	175	1.0	1.0	< 0.01	< 0.01
BGR_005_r04	175	1.0	1.0	< 0.01	< 0.01
BGR_007_r01	150	1.0	1.0	< 0.01	< 0.01
BGR_007_r02	150	0.5	0.5	< 0.01	< 0.01
BGR_009_r01	150	1.0	1.0	< 0.01	< 0.01
BGR_009_r02	150	1.0	1.0	< 0.01	< 0.01
BGR_009_r03	150	1.0	1.0	< 0.01	< 0.01
BGR_053_r01	300	2.5	2.5	0.04	0.01
BGR_053_r02	350	3.5	3.5	0.06	0.01
BGR_063_r01	600	8.0	8.0	0.11	0.03
BGR_065_r01	750	9.5	9.5	0.11	0.03
BGR_065_r02	1000	10.0	10.0	0.11	0.08
BGR_065_r03	850	10.0	10.0	0.11	0.04
BGR_065_r04	800	9.5	9.5	0.11	0.03
BGR_067_r01	1050	10.0	10.0	0.11	0.13
BGR_069_r01	950	10.0	10.0	0.11	0.04
BGR_069_r02	950	10.0	10.0	0.11	0.04
BGR_069_r03	1000	10.0	10.0	0.11	0.08
BGR_071_r01	1100	10.0	10.0	0.11	0.17
BGR_071_r02	1250	10.0	10.0	0.07	0.25
BGR_071_r03	1250	10.0	10.0	0.07	0.25
BGR_073_r01	1100	10.0	10.0	0.10	0.15
BGR_073_r02	1050	10.0	10.0	0.10	0.13
BGR_073_r03	1250	10.0	10.0	0.07	0.25
BGR_075_r01	1200	10.0	10.0	0.09	0.24
BGR_075_r02	1200	10.0	10.0	0.06	0.25
BGR_077_r01	1250	2.5	2.5	0.07	0.22
BGR_077_r02	1250	2.5	2.5	0.07	0.19
BGR_079_r01	1250	4.0	4.0	0.07	0.25
BGR_079_r02	1250	7.0	7.0	0.07	0.25
BGR_081_r01	1250	2.5	2.5	0.07	0.21
BGR_083_r01	1250	2.5	2.5	0.07	0.17
BGR_083_r02	1250	3.0	3.0	0.07	0.10
BGR_083_r03	1250	3.0	3.0	0.06	0.05
BGR_085_r01	1200	3.0	3.0	0.06	0.05
BGR_085_r02	1200	3.0	3.0	0.06	0.05
BGR_085_r03	1200	3.0	3.0	0.06	0.05
BGR_085_r04	1250	3.0	3.0	0.06	0.05
BGR_087_r01	1200	3.0	3.0	0.06	0.05
BGR_087_r02	1200	3.0	3.0	0.06	0.05
BGR_087_r03	1200	3.0	3.0	0.06	0.05
BGR_087_r04	1200	3.0	3.0	0.06	0.05
BGR_087_r05	1150	3.0	3.0	0.06	0.05
BGR_089_r01	1150	3.0	3.0	0.06	0.05
BGR_093_r01	1100	3.0	3.0	0.05	0.04
BGR_093_r03	1050	3.0	3.0	0.05	0.04
BGR_095_r01	1050	3.0	3.0	0.05	0.04
BGR_095_r02	1000	2.0	2.5	0.07	0.04

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BGR_097_r01	1000	2.5	2.5	0.06	0.04
BGR_101_r01	950	1.5	3.5	0.10	0.03
BGR_101_r02	950	2.5	4.5	0.11	0.03
BGR_101_r03	1000	3.0	5.0	0.11	0.03
BGR_103_r01	950	2.5	4.5	0.11	0.03
BGR_103_r02	1000	3.0	5.0	0.11	0.03
BGR_103_r03	1000	3.0	5.0	0.11	0.03
BGR_103_r04	1050	4.5	6.5	0.11	0.03
BGR_103_r05	1100	5.5	8.0	0.11	0.03
BGR_103_r06	1200	6.0	9.0	0.11	0.03
BGR_103_r07	950	2.5	4.5	0.11	0.03
BGR_105_r01	1100	5.0	7.5	0.11	0.03
BGR_107_r01	1150	5.5	8.5	0.11	0.03
BGR_107_r02	1350	7.5	9.5	0.10	0.07
BGR_107_r03	1350	7.5	9.5	0.10	0.04
BGR_109_r01	1400	7.5	9.5	0.10	0.11
BGR_109_r02	1300	7.5	9.5	0.10	0.04
BGR_111_r01	1400	7.5	9.5	0.10	0.10
BGR_111_r02	1550	7.5	9.5	0.09	0.24
BGR_111_r03	1550	7.5	9.5	0.09	0.23
BGR_113_r01	1450	7.5	9.5	0.09	0.17
BGR_113_r02	1550	7.5	9.0	0.07	0.24
BGR_113_r03	1550	7.5	9.5	0.07	0.24
BGR_113_r04	1550	7.5	9.5	0.07	0.24
BGR_115_r01	1550	7.5	9.0	0.07	0.24
BGR_115_r02	1550	7.0	8.5	0.07	0.24
BGR_117_r01	1550	3.5	3.5	0.07	0.23
BGR_117_r02	1550	4.0	4.0	0.07	0.14
BGR_117_r03	1550	3.0	4.0	0.07	0.23
BGR_117_r04	1550	3.5	3.5	0.07	0.19
BGR_119_r01	1550	3.5	5.0	0.07	0.23
BGR_119_r02	1550	3.5	3.5	0.07	0.23
BGR_119_r03	1550	4.0	4.0	0.07	0.10
BGR_121_r01	1550	4.0	4.0	0.07	0.12
BGR_121_r02	1550	3.5	3.5	0.07	0.15
BGR_121_r03	1450	4.0	4.0	0.06	0.05
BGR_121_r04	1550	3.5	3.5	0.07	0.16
BGR_123_r01	1500	4.0	4.0	0.07	0.05
BGR_125_r01	1350	4.0	4.0	0.06	0.05
BGR_127_r01	1400	4.0	4.0	0.06	0.05
BGR_129_r01	1350	4.0	4.0	0.06	0.05
BGR_129_r02	1250	3.5	3.5	0.05	0.04
BGR_131_r01	1300	4.0	4.0	0.05	0.04
BGR_131_r02	1200	3.5	3.5	0.05	0.04
BGR_131_r03	1150	3.0	3.0	0.06	0.04
BGR_131_r04	1150	3.0	3.0	0.05	0.04
BGR_131_r05	1200	3.5	3.5	0.05	0.04
BGR_133_r01	1200	3.5	3.5	0.05	0.04
BGR_133_r02	1250	3.5	3.5	0.05	0.04
BGR_133_r03	1150	3.0	3.0	0.05	0.04
BGR_133_r04	1100	2.5	2.5	0.07	0.03
BGR_135_r01	1200	3.5	3.5	0.05	0.04
BGR_135_r02	1200	3.5	3.5	0.06	0.04
BGR_135_r03	1150	3.0	3.0	0.07	0.04
BGR_137_r01	1100	2.5	3.5	0.10	0.03
BGR_137_r02	1050	2.0	4.5	0.10	0.03
BGR_137_r03	1100	3.5	5.5	0.11	0.03

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BGR_139_r01	1100	3.0	5.0	0.11	0.03
BGR_139_r02	1100	3.0	5.0	0.11	0.03
BGR_139_r03	1050	2.5	4.5	0.11	0.03
BGR_139_r04	1150	3.5	6.5	0.11	0.03
BGR_141_r01	1200	4.5	7.5	0.11	0.03
BGR_141_r02	1150	4.0	7.0	0.11	0.03
BGR_141_r03	1150	3.5	6.5	0.11	0.03
BGR_141_r04	1300	6.0	8.5	0.09	0.03
BGR_141_r05	1300	6.0	8.5	0.09	0.03
BGR_141_r06	1200	5.0	8.0	0.11	0.03
BGR_141_r07	1200	5.0	8.0	0.10	0.03
BGR_141_r08	1250	5.0	8.0	0.10	0.03
BGR_141_r09	1250	5.0	8.5	0.09	0.03
BGR_143_r01	1250	5.0	8.0	0.11	0.03
BGR_143_r02	1250	5.0	8.0	0.11	0.03
BGR_143_r03	1350	6.0	8.5	0.09	0.05
BGR_145_r01	1350	6.0	8.5	0.09	0.03
BGR_145_r02	1350	6.0	8.5	0.09	0.06
BGR_145_r03	1500	6.0	8.5	0.08	0.17
BGR_147_r02	1100	4.0	7.0	0.10	0.02
BGR_157_r01	1050	2.5	2.5	0.08	0.03
BGR_157_r02	1050	2.5	2.5	0.08	0.03
BGR_157_r03	1150	3.5	3.5	0.07	0.03
BGR_157_r04	1050	2.5	2.5	0.08	0.03
BGR_157_r05	1050	2.5	3.0	0.09	0.03
BGR_157_r06	1050	2.0	3.0	0.09	0.03
BGR_157_r07	1050	2.0	4.0	0.10	0.03
BGR_157_r09	1150	3.5	3.5	0.05	0.03
BGR_157_r10	1150	3.5	3.5	0.05	0.03
BGR_157_r11	1150	3.5	3.5	0.05	0.03
BGR_167_r01	1050	2.0	3.5	0.09	0.03
BGR_167_r02	1000	2.0	4.0	0.09	0.03
BGR_167_r03	1050	2.5	5.0	0.09	0.03
BGR_167_r05	1100	3.5	6.0	0.09	0.03
BGR_167_r07	1100	3.0	3.0	0.06	0.04
BGR_177_r01	950	7.0	7.5	0.09	0.07
BGR_177_r02	1100	8.5	9.0	0.02	0.15
BGR_177_r04	1300	6.5	6.5	0.02	0.18
BGR_177_r05	1350	5.5	6.0	0.03	0.19
BGR_177_r06	1400	5.0	6.5	0.04	0.19
BGR_177_r07	1400	4.0	5.0	0.04	0.20
BGR_177_r08	1400	4.0	4.0	0.04	0.19
BGR_177_r09	1350	5.0	5.0	0.03	0.17
BGR_177_r10	1300	6.0	6.0	0.03	0.11
BGR_177_r11	1250	7.0	7.0	0.02	0.08
BGR_180_r01	700	9.0	9.0	0.10	0.07
BGR_183_r01	1150	6.0	7.5	0.12	0.10
BGR_183_r02	1200	6.0	7.5	0.12	0.13
BGR_183_r03	1250	5.5	7.5	0.11	0.16
BGR_183_r04	1100	4.5	7.0	0.08	0.03
BGR_193_r01	225	3.5	3.5	0.06	< 0.01
BGR_193_r02	225	3.5	3.5	0.06	< 0.01
BGR_193_r03	275	4.0	4.0	0.07	< 0.01
BGR_193_r04	250	4.0	4.0	0.06	< 0.01
BGR_203_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BGR_203_r02	90	< 0.5	< 0.5	< 0.01	< 0.01
BGR_203_r03	90	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BGR_203_r04	80	< 0.5	< 0.5	< 0.01	< 0.01
BGR_203_r05	90	< 0.5	< 0.5	< 0.01	< 0.01
BGR_203_r06	90	< 0.5	< 0.5	< 0.01	< 0.01
BGR_203_r08	600	6.0	6.0	0.05	0.03
BGR_213_r01	125	1.0	1.0	0.02	< 0.01
BGR_213_r02	125	1.0	1.0	0.01	< 0.01
BGR_213_r03	100	1.0	1.0	0.01	< 0.01
BGR_213_r04	100	0.5	0.5	0.01	< 0.01
BGR_218_r01	100	0.5	0.5	0.01	< 0.01
BGR_218_r02	125	1.0	1.0	0.01	< 0.01
BGR_218_r03	90	0.5	0.5	< 0.01	< 0.01
BGR_221_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BGR_221_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BGR_221_r03	80	< 0.5	< 0.5	< 0.01	< 0.01
BGR_221_r04	80	< 0.5	< 0.5	< 0.01	< 0.01
BGR_225_r01	100	1.0	1.0	0.02	< 0.01
BGR_225_r02	125	1.0	1.0	0.02	< 0.01
BGR_225_r03	125	1.0	1.0	0.02	< 0.01
BGR_225_r04	125	1.0	1.0	0.02	< 0.01
BGR_225_r05	125	1.0	1.0	0.02	< 0.01
BGR_225_r06	150	1.5	1.5	0.03	< 0.01
BGR_225_r07	175	2.0	2.0	0.04	< 0.01
BGR_225_r08	200	2.5	2.5	0.05	< 0.01
BGR_225_r09	225	3.5	3.5	0.06	< 0.01
BGR_225_r10	250	3.5	3.5	0.07	< 0.01
BGR_230_r01	300	4.5	4.5	0.08	< 0.01
BGR_230_r02	900	6.5	6.5	0.04	0.06
BGR_230_r03	850	6.0	6.0	0.05	0.06
BGR_235_r01	1150	3.5	3.5	0.04	0.05
BGR_235_r02	1200	4.0	4.0	0.04	0.05
BGR_235_r03	1400	6.5	6.5	0.04	0.20
BGR_235_r04	1350	7.5	7.5	0.02	0.15
BGR_235_r05	1150	9.5	9.5	0.05	0.11
BGR_235_r06	1350	4.0	4.0	0.05	0.06
BGR_235_r07	1150	4.0	4.0	0.04	0.05
BGR_235_r08	1350	5.5	5.5	0.03	0.07
BGR_235_r09	1200	5.5	5.5	0.02	0.07
BGR_240_r01	1450	6.5	8.5	0.08	0.16
BGR_245_r01	1500	6.0	8.0	0.06	0.21
BGR_245_r02	1500	6.5	8.5	0.08	0.21
BGR_245_r03	1500	6.5	8.5	0.08	0.21
BGR_245_r04	1500	6.5	8.5	0.08	0.21
BGR_245_r05	1500	6.5	8.5	0.07	0.21
BGR_250_r01	1450	6.0	8.5	0.07	0.17
BGR_250_r02	1450	6.0	8.5	0.09	0.13
BGR_250_r03	1400	6.0	8.5	0.09	0.09
BGR_250_r05	1250	5.5	8.5	0.09	0.03
BGR_250_r06	1150	4.0	7.0	0.10	0.03
BGR_255_r01	1100	2.5	3.5	0.10	0.03
BGR_255_r02	1200	3.5	3.5	0.06	0.04
BGR_255_r03	1200	3.5	3.5	0.05	0.04
BGR_255_r04	1200	3.5	3.5	0.05	0.04
BGR_255_r05	1200	3.5	3.5	0.05	0.04
BGR_261_r01	1250	3.5	3.5	0.05	0.04
BGR_261_r02	1250	3.5	3.5	0.05	0.04
BGR_263_r01	1450	3.5	3.5	0.06	0.05
BGR_263_r02	1450	3.5	3.5	0.06	0.05

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BGR_263_r03	1400	3.5	3.5	0.06	0.05
BGR_263_r04	1450	3.5	3.5	0.06	0.05
BGR_268_r01	1500	3.5	3.5	0.06	0.14
BGR_268_r02	1500	3.5	3.5	0.06	0.16
BGR_278_r01	1300	7.5	9.5	0.10	0.04
BGR_278_r02	1400	7.5	9.5	0.10	0.10
BGR_281_r01	1100	3.0	3.0	0.05	0.04
BGR_281_r02	1150	3.0	3.0	0.06	0.04
BGR_281_r03	1000	2.0	2.5	0.06	0.03
BGR_281_r04	1000	2.5	2.5	0.06	0.04
BGR_281_r05	1000	2.5	2.5	0.05	0.04
BGR_281_r06	1000	2.5	2.5	0.05	0.04
BGR_281_r07	1050	2.5	2.5	0.05	0.04
BGR_281_r08	1050	2.5	2.5	0.05	0.04
BGR_281_r09	1100	2.5	2.5	0.05	0.04
BGR_281_r10	1100	2.5	2.5	0.05	0.04
BGR_281_r11	1000	3.5	5.0	0.12	0.03
BGR_301_r01	375	4.0	4.0	0.07	0.01
BGR_301_r02	300	2.5	2.5	0.04	0.01
BGW_001_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGW_001_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGW_011_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGW_011_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGW_021_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGW_021_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGW_021_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGW_021_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGW_021_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGW_021_r06	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGW_043_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BHA_001_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BHA_003_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BHA_005_r01	70	< 0.5	< 0.5	< 0.01	< 0.01
BHA_005_r02	70	< 0.5	< 0.5	< 0.01	< 0.01
BHA_007_r01	70	< 0.5	< 0.5	< 0.01	< 0.01
BHA_007_r02	70	< 0.5	< 0.5	< 0.01	< 0.01
BHA_007_r03	70	< 0.5	< 0.5	< 0.01	< 0.01
BHA_007_r04	70	< 0.5	< 0.5	< 0.01	< 0.01
BHA_009_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BHA_009_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BHA_009_r03	70	< 0.5	< 0.5	< 0.01	< 0.01
BHA_011_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BHA_011_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BHA_013_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BHA_013_r02	90	< 0.5	< 0.5	< 0.01	< 0.01
BHA_013_r03	90	< 0.5	< 0.5	< 0.01	< 0.01
BHA_015_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BHA_015_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BHA_015_r03	90	< 0.5	< 0.5	< 0.01	< 0.01
BHA_018_r01	125	0.5	0.5	< 0.01	< 0.01
BHA_019_r01	125	0.5	0.5	< 0.01	< 0.01
BHA_019_r02	150	0.5	0.5	< 0.01	< 0.01
BHA_021_r01	150	1.0	1.0	< 0.01	< 0.01
BHA_023_r01	175	1.0	1.0	< 0.01	< 0.01
BHA_023_r02	175	1.0	1.0	< 0.01	< 0.01
BHA_023_r03	150	1.0	1.0	< 0.01	< 0.01
BHA_023_r04	175	1.0	1.0	0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BHA_023_r05	175	1.0	1.0	0.01	< 0.01
BHA_025_r01	175	1.0	1.0	0.01	< 0.01
BHA_025_r02	200	1.0	1.0	0.01	< 0.01
BHA_030_r01	650	8.5	8.5	0.10	0.02
BHA_030_r02	850	9.5	9.5	0.10	0.03
BHA_034_r01	950	9.5	9.5	0.10	0.07
BHA_035_r01	1100	9.5	9.5	0.09	0.19
BHA_036_r01	1150	9.5	9.5	0.06	0.23
BHA_036_r02	1200	9.5	9.5	0.06	0.23
BHA_041_r01	1200	4.0	4.0	0.06	0.23
BHA_042_r01	1200	3.5	3.5	0.06	0.23
BHA_042_r02	1200	2.0	2.0	0.06	0.15
BHA_042_r03	1200	2.0	2.0	0.06	0.12
BHA_043_r01	1200	2.5	2.5	0.06	0.06
BHA_043_r02	1200	2.5	2.5	0.06	0.04
BHA_043_r03	1200	2.5	2.5	0.06	0.04
BHA_045_r01	1150	2.5	2.5	0.05	0.04
BHA_046_r01	1000	2.5	2.5	0.06	0.03
BHA_046_r02	1050	2.5	2.5	0.05	0.04
BHA_046_r03	1050	2.5	2.5	0.05	0.04
BHA_046_r04	1100	2.5	2.5	0.05	0.04
BHA_046_r05	1100	2.5	2.5	0.05	0.04
BHA_047_r01	1000	2.5	2.5	0.07	0.03
BHA_047_r02	1000	2.0	2.0	0.06	0.03
BHA_047_r03	950	2.0	3.0	0.11	0.03
BHA_048_r01	950	2.5	3.5	0.12	0.03
BHA_048_r02	950	1.5	3.0	0.12	0.03
BHA_048_r03	1000	2.0	2.5	0.07	0.03
BHA_049_r01	1000	4.0	5.5	0.13	0.03
BHA_049_r02	950	2.5	3.5	0.13	0.03
BHA_049_r03	950	3.0	4.0	0.13	0.03
BHA_050_r01	1050	4.0	6.0	0.13	0.03
BHA_050_r02	1100	4.5	7.0	0.13	0.03
BHA_050_r03	1100	4.5	7.0	0.13	0.02
BHA_051_r01	1150	6.0	8.0	0.12	0.03
BHA_051_r02	1150	5.5	8.0	0.13	0.03
BHA_052_r01	1400	7.0	9.0	0.10	0.11
BHA_052_r02	1350	7.0	9.0	0.10	0.08
BHA_052_r03	1450	7.0	9.0	0.09	0.18
BHA_056_r01	1150	5.5	8.0	0.11	0.03
BHA_056_r02	1200	6.5	9.0	0.10	0.03
BHA_056_r03	1350	7.0	9.0	0.10	0.05
BHA_056_r04	1350	7.0	9.0	0.10	0.08
BHA_058_r01	1150	6.0	8.0	0.10	0.03
BHA_058_r02	1200	6.5	9.0	0.10	0.03
BHA_061_r01	1000	3.5	5.0	0.12	0.03
BHA_061_r02	1100	4.5	7.0	0.12	0.02
BHA_064_r01	1000	2.5	2.5	0.06	0.03
BHA_064_r02	950	2.0	2.5	0.07	0.03
BHA_064_r03	950	1.5	3.0	0.10	0.03
BHA_064_r04	950	2.0	2.5	0.07	0.03
BHA_064_r05	950	2.0	3.0	0.10	0.03
BHA_067_r01	1100	2.5	2.5	0.05	0.04
BHA_067_r02	1050	2.5	2.5	0.05	0.04
BHA_067_r03	1050	2.5	2.5	0.05	0.04
BHA_067_r04	1000	2.5	2.5	0.05	0.03
BHA_067_r05	1000	2.5	2.5	0.04	0.03

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BHA_070_r01	1150	2.5	2.5	0.06	0.04
BHA_070_r02	1100	2.5	2.5	0.05	0.04
BHA_070_r03	1150	2.5	2.5	0.05	0.04
BHA_072_r01	1100	2.5	2.5	0.05	0.04
BHA_072_r02	1100	2.5	2.5	0.05	0.04
BHA_072_r03	1000	2.5	2.5	0.05	0.04
BHA_074_r01	1150	2.5	2.5	0.06	0.04
BHA_076_r01	1200	2.5	2.5	0.06	0.05
BHA_078_r01	1200	2.0	2.0	0.06	0.20
BHA_078_r02	1200	2.5	2.5	0.06	0.05
BHA_078_r03	1200	2.0	2.0	0.06	0.16
BHA_078_r04	1200	2.0	2.0	0.06	0.13
BHA_078_r05	1200	2.0	2.0	0.06	0.15
BHA_080_r01	1200	2.5	2.5	0.06	0.09
BHA_080_r02	1200	2.5	2.5	0.06	0.12
BHA_080_r03	1200	2.5	2.5	0.06	0.10
BHA_080_r04	1200	2.0	2.0	0.06	0.19
BHA_084_r01	1200	9.0	9.0	0.06	0.24
BHA_084_r02	1200	9.0	9.0	0.06	0.23
BHA_084_r03	1200	8.5	8.5	0.06	0.23
BHA_087_r01	900	9.5	9.5	0.10	0.04
BHA_088_r01	1100	9.5	9.5	0.07	0.19
BHA_088_r02	1150	9.5	9.5	0.06	0.22
BHA_088_r03	1050	9.5	9.5	0.09	0.15
BHA_088_r04	1000	9.5	9.5	0.10	0.10
BHA_089_r01	1100	9.5	9.5	0.09	0.17
BHA_090_r01	1000	9.5	9.5	0.10	0.08
BHA_090_r02	950	9.5	9.5	0.10	0.07
BHA_091_r01	750	9.0	9.0	0.10	0.03
BHA_091_r02	850	9.5	9.5	0.10	0.03
BHA_092_r01	450	5.5	5.5	0.09	0.02
BHA_092_r02	400	4.5	4.5	0.08	0.01
BHA_093_r01	300	2.5	2.5	0.04	0.01
BHA_098_r01	250	2.0	2.0	0.02	< 0.01
BHA_098_r02	275	2.0	2.0	0.03	< 0.01
BHA_100_r01	275	2.0	2.0	0.03	< 0.01
BHA_100_r02	250	2.0	2.0	0.02	< 0.01
BHA_100_r03	225	1.5	1.5	0.02	< 0.01
BHA_100_r04	225	1.5	1.5	0.02	< 0.01
BHA_101_r01	225	1.5	1.5	0.02	< 0.01
BHA_101_r02	225	1.5	1.5	0.02	< 0.01
BHA_104_r01	175	1.0	1.0	< 0.01	< 0.01
BHA_105_r01	175	1.0	1.0	0.01	< 0.01
BHA_106_r01	175	1.0	1.0	< 0.01	< 0.01
BHA_109_r01	150	1.0	1.0	< 0.01	< 0.01
BHA_109_r02	175	1.0	1.0	< 0.01	< 0.01
BHA_111_r01	125	0.5	0.5	< 0.01	< 0.01
BHA_116_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BHA_117_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BHA_117_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BHA_117_r03	100	< 0.5	< 0.5	< 0.01	< 0.01
BHD_001_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BHD_002_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BHD_002_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BHD_003_r01	125	0.5	0.5	< 0.01	< 0.01
BHD_003_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BHD_004_r01	125	0.5	0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BHD_005_r01	125	0.5	0.5	< 0.01	< 0.01
BHD_005_r02	125	0.5	0.5	< 0.01	< 0.01
BHD_006_r01	125	0.5	0.5	< 0.01	< 0.01
BHD_006_r02	125	0.5	0.5	< 0.01	< 0.01
BHD_007_r01	150	0.5	0.5	< 0.01	< 0.01
BHD_007_r02	150	1.0	1.0	< 0.01	< 0.01
BHD_007_r03	150	1.0	1.0	< 0.01	< 0.01
BHD_007_r04	150	1.0	1.0	< 0.01	< 0.01
BHD_011_r01	175	1.0	1.0	0.01	< 0.01
BHD_012_r01	175	1.0	1.0	0.01	< 0.01
BHI_001_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BHI_001_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BHI_001_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BHI_001_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BHI_001_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BHI_005_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BHI_005_r02	20	< 0.5	< 0.5	< 0.01	< 0.01
BHI_005_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BHI_010_r01	200	2.0	2.0	0.03	< 0.01
BHI_010_r02	200	2.0	2.0	0.03	< 0.01
BHI_010_r03	300	2.0	2.0	0.03	< 0.01
BHO_001_r01	1200	4.0	4.0	0.04	0.06
BHO_001_r02	1150	4.0	4.0	0.04	0.05
BHO_001_r03	1150	4.0	4.0	0.04	0.05
BHO_001_r05	1050	2.5	3.0	0.07	0.05
BHO_002_r01	1200	4.0	4.0	0.04	0.05
BHO_002_r02	1100	3.0	3.0	0.09	0.04
BHO_003_r01	1250	4.0	4.0	0.05	0.05
BHO_003_r02	1100	3.0	3.0	0.08	0.04
BHO_003_r03	1050	2.0	3.5	0.09	0.04
BHO_004_r01	1300	4.0	4.0	0.05	0.04
BHO_004_r02	1300	4.0	4.0	0.05	0.04
BHO_004_r03	1250	3.5	3.5	0.05	0.04
BHO_004_r04	1150	3.5	3.5	0.05	0.04
BHO_005_r01	1250	3.5	3.5	0.05	0.04
BHO_005_r02	1100	2.5	3.0	0.08	0.03
BHO_005_r03	1100	2.5	3.0	0.09	0.03
BHO_005_r04	1100	3.0	3.0	0.07	0.03
BHO_005_r05	1150	3.0	3.0	0.06	0.04
BHO_005_r06	1250	3.5	3.5	0.05	0.04
BHO_005_r07	1200	3.5	3.5	0.05	0.04
BHO_005_r08	1100	2.5	3.0	0.08	0.03
BHO_006_r01	1250	3.5	3.5	0.05	0.04
BHO_006_r02	1350	3.5	3.5	0.06	0.04
BHO_008_r01	1350	3.5	3.5	0.06	0.05
BHO_008_r02	1350	3.5	3.5	0.06	0.04
BHO_008_r03	1300	3.5	3.5	0.05	0.04
BHO_008_r04	1300	3.5	3.5	0.05	0.04
BHO_009_r01	1400	3.5	3.5	0.06	0.05
BHO_009_r02	1300	3.5	3.5	0.06	0.04
BHO_010_r01	1400	3.5	3.5	0.06	0.05
BHO_010_r02	1450	3.5	3.5	0.06	0.05
BHO_010_r03	1400	3.5	3.5	0.06	0.05
BHO_010_r04	1450	3.5	3.5	0.06	0.05
BHO_011_r01	1500	3.5	3.5	0.06	0.06
BHO_011_r02	1500	3.5	3.5	0.06	0.14
BHO_011_r03	1450	3.5	3.5	0.06	0.05

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BHO_011_r04	1400	3.5	3.5	0.06	0.05
BHO_012_r01	1500	3.0	3.0	0.06	0.22
BHO_012_r02	1450	3.5	3.5	0.06	0.05
BHO_012_r03	1500	3.5	3.5	0.06	0.10
BHO_012_r04	1500	3.5	3.5	0.06	0.12
BHO_012_r05	1500	3.5	3.5	0.06	0.13
BHO_012_r06	1500	3.0	3.0	0.06	0.15
BHO_012_r07	1500	3.5	3.5	0.06	0.06
BHO_013_r01	1500	4.5	6.0	0.06	0.22
BHO_013_r02	1500	4.0	5.5	0.06	0.22
BHO_013_r03	1500	3.5	3.5	0.06	0.10
BHO_013_r04	1500	3.5	3.5	0.06	0.15
BHO_014_r01	1500	5.0	6.5	0.06	0.22
BHO_014_r02	1500	4.0	6.0	0.06	0.22
BHO_014_r03	1500	3.0	3.5	0.06	0.22
BHO_014_r04	1500	3.0	3.0	0.06	0.16
BHO_015_r01	1450	7.0	9.0	0.10	0.18
BHO_015_r02	1200	7.0	9.0	0.10	0.03
BHO_017_r01	1100	5.0	7.5	0.12	0.03
BHO_017_r02	1100	5.0	7.5	0.11	0.03
BHO_019_r01	950	2.0	3.0	0.09	0.03
BHO_021_r01	1000	2.5	2.5	0.05	0.03
BHO_021_r02	1050	2.5	2.5	0.05	0.04
BHO_023_r01	1100	2.5	2.5	0.05	0.04
BHO_023_r02	1100	2.5	2.5	0.05	0.04
BHO_025_r01	1200	2.5	2.5	0.06	0.05
BHO_025_r02	1150	2.5	2.5	0.06	0.05
BHO_025_r03	1200	2.5	2.5	0.06	0.05
BHO_027_r01	1200	2.5	2.5	0.06	0.15
BHO_027_r02	1200	3.0	3.0	0.06	0.05
BHO_029_r01	1200	8.0	8.0	0.06	0.24
BHO_029_r02	1250	3.5	3.5	0.06	0.24
BHO_031_r01	1200	9.5	9.5	0.06	0.24
BHO_031_r02	1250	7.5	7.5	0.06	0.24
BHO_033_r01	1200	9.5	9.5	0.06	0.24
BHO_033_r02	1150	9.5	9.5	0.06	0.23
BHO_033_r03	1200	9.5	9.5	0.06	0.24
BHO_035_r01	750	9.5	9.5	0.11	0.03
BHO_035_r02	950	9.5	9.5	0.11	0.07
BHO_035_r03	800	9.5	9.5	0.11	0.03
BHO_035_r04	1000	9.5	9.5	0.10	0.11
BHO_037_r01	400	4.5	4.5	0.08	0.01
BHO_037_r02	375	4.0	4.0	0.07	0.01
BHO_037_r03	350	3.5	3.5	0.07	0.01
BHO_038_r01	500	6.0	6.0	0.10	0.02
BHO_038_r02	500	6.0	6.0	0.10	0.02
BHO_039_r01	300	2.5	2.5	0.04	0.01
BHO_039_r03	225	1.5	1.5	0.02	< 0.01
BHO_039_r04	250	2.0	2.0	0.03	< 0.01
BHO_041_r01	200	1.0	1.0	0.01	< 0.01
BHO_041_r02	175	1.0	1.0	0.01	< 0.01
BHO_041_r03	175	1.0	1.0	< 0.01	< 0.01
BHO_041_r04	175	1.0	1.0	< 0.01	< 0.01
BHO_041_r05	200	1.5	1.5	0.01	< 0.01
BHO_041_r06	200	1.5	1.5	0.01	< 0.01
BHO_041_r07	225	1.5	1.5	0.02	< 0.01
BHO_041_r08	200	1.5	1.5	0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BHO_041_r09	200	1.5	1.5	0.01	< 0.01
BHO_041_r10	200	1.0	1.0	0.01	< 0.01
BHO_043_r01	200	1.0	1.0	0.01	< 0.01
BHO_043_r02	175	1.0	1.0	0.01	< 0.01
BHO_043_r03	175	1.0	1.0	< 0.01	< 0.01
BHO_045_r01	150	0.5	0.5	< 0.01	< 0.01
BHO_045_r02	125	0.5	0.5	< 0.01	< 0.01
BHO_047_r01	125	0.5	0.5	< 0.01	< 0.01
BHO_047_r02	125	0.5	0.5	< 0.01	< 0.01
BHO_047_r03	125	0.5	0.5	< 0.01	< 0.01
BHO_048_r01	275	2.0	2.0	0.03	0.01
BHO_048_r02	250	2.0	2.0	0.02	< 0.01
BHO_048_r03	250	2.0	2.0	0.02	< 0.01
BHO_051_r01	1150	10.0	10.0	0.09	0.22
BHO_051_r02	1000	10.0	10.0	0.11	0.09
BHO_053_r01	1200	3.0	3.0	0.06	0.05
BHO_053_r02	1250	5.0	5.0	0.06	0.24
BHO_053_r03	1250	4.0	4.0	0.06	0.24
BHO_053_r04	1200	2.5	2.5	0.06	0.06
BHO_053_r05	1200	3.0	3.0	0.06	0.05
BHO_055_r01	1150	3.0	3.0	0.06	0.04
BHO_055_r02	1100	3.0	3.0	0.05	0.04
BHO_057_r01	1100	5.0	7.5	0.11	0.03
BHO_057_r02	1050	4.0	6.5	0.11	0.03
BHO_057_r03	950	2.5	4.0	0.11	0.03
BHO_059_r01	1100	5.5	8.0	0.11	0.03
BHO_059_r02	1200	7.0	9.0	0.10	0.03
BHO_059_r03	1350	7.5	9.0	0.10	0.08
BHO_061_r01	1500	7.5	9.0	0.10	0.21
BHO_061_r02	1400	7.5	9.0	0.10	0.14
BHO_061_r03	1400	7.5	9.0	0.10	0.13
BHO_065_r01	1500	5.5	7.0	0.06	0.23
BHO_067_r01	1500	7.5	8.5	0.06	0.23
BHO_067_r02	1500	4.5	6.0	0.06	0.23
BHO_067_r03	1500	7.5	9.0	0.06	0.23
BHO_069_r01	1500	6.0	7.0	0.06	0.23
BHO_069_r02	1500	4.5	5.5	0.06	0.23
BHO_069_r03	1500	3.5	3.5	0.06	0.19
BHO_071_r01	1500	6.0	7.0	0.06	0.23
BHO_071_r02	1500	3.5	3.5	0.06	0.21
BHO_073_r01	1500	4.0	4.0	0.05	0.10
BHO_073_r02	1500	7.0	8.0	0.06	0.23
BHO_073_r03	1500	3.5	5.0	0.06	0.23
BHR_001_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BHR_001_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BHR_003_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BHR_003_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BHR_005_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BHR_005_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BHR_005_r04	30	< 0.5	< 0.5	< 0.01	< 0.01
BHR_005_r05	30	< 0.5	< 0.5	< 0.01	< 0.01
BHR_007_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BHR_007_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BHR_007_r03	20	< 0.5	< 0.5	< 0.01	< 0.01
BHR_007_r04	20	< 0.5	< 0.5	< 0.01	< 0.01
BHR_009_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BHR_009_r02	30	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BHW_001_r01	1500	5.0	7.0	0.06	0.21
BHW_001_r02	1500	5.5	7.5	0.06	0.21
BHW_005_r01	1500	6.5	8.5	0.08	0.18
BHW_005_r02	1350	6.5	8.5	0.09	0.06
BHW_007_r01	1400	6.5	9.0	0.09	0.08
BHW_007_r02	1350	6.5	8.5	0.09	0.03
BHW_007_r03	1300	6.0	8.5	0.09	0.03
BHW_009_r01	1400	6.5	9.0	0.09	0.07
BHW_009_r02	1350	6.5	9.0	0.09	0.03
BHW_009_r03	1250	5.0	8.5	0.09	0.03
BHW_011_r01	1250	5.5	8.5	0.10	0.03
BHW_011_r02	1150	4.0	6.5	0.10	0.03
BHW_011_r03	1150	4.0	7.0	0.10	0.03
BHW_011_r04	1250	5.5	8.5	0.10	0.03
BHW_011_r05	1250	5.5	8.5	0.10	0.03
BHW_013_r01	1150	4.0	7.0	0.10	0.03
BHW_013_r02	1100	3.0	5.5	0.10	0.03
BHW_013_r03	1050	2.5	4.5	0.10	0.03
BHW_015_r01	1100	2.0	3.5	0.09	0.03
BHW_015_r02	1100	3.0	3.0	0.07	0.03
BHW_015_r03	1100	2.5	3.0	0.08	0.03
BHW_017_r01	1150	3.5	3.5	0.06	0.04
BHW_017_r02	1200	3.5	3.5	0.06	0.04
BHW_017_r03	1150	3.0	3.0	0.06	0.04
BHW_017_r04	1100	3.0	3.0	0.07	0.03
BHW_019_r01	1150	3.5	3.5	0.05	0.04
BHW_019_r02	1100	3.0	3.0	0.07	0.03
BHW_021_r01	1200	3.5	3.5	0.05	0.04
BHW_021_r02	1300	4.0	4.0	0.05	0.04
BHW_021_r03	1250	4.0	4.0	0.05	0.04
BHW_023_r01	1200	3.5	3.5	0.05	0.04
BHW_023_r02	1200	3.5	3.5	0.05	0.04
BHW_023_r03	1250	3.5	3.5	0.05	0.04
BHW_023_r04	1250	4.0	4.0	0.05	0.04
BHW_023_r05	1300	4.0	4.0	0.05	0.04
BHW_025_r01	1300	4.0	4.0	0.06	0.04
BHW_025_r02	1350	4.0	4.0	0.06	0.05
BHW_027_r01	1300	4.0	4.0	0.06	0.04
BHW_027_r02	1450	4.0	4.0	0.06	0.05
BHW_027_r03	1450	4.0	4.0	0.06	0.05
BHW_029_r01	1400	4.0	4.0	0.06	0.05
BHW_029_r02	1450	4.0	4.0	0.06	0.05
BHW_031_r02	1550	3.5	3.5	0.07	0.16
BHW_031_r03	1550	3.5	3.5	0.07	0.21
BHW_033_r01	1550	3.5	5.0	0.07	0.24
BHW_035_r01	1550	3.5	3.5	0.07	0.22
BHW_035_r02	1550	3.5	4.5	0.07	0.24
BHW_035_r03	1550	5.0	6.5	0.07	0.24
BHW_035_r04	1550	6.5	8.0	0.07	0.24
BHW_035_r05	1550	6.5	7.5	0.07	0.24
BHW_035_r06	1550	7.0	8.5	0.07	0.24
BHW_035_r07	1550	6.0	7.5	0.07	0.24
BHW_039_r01	1550	7.5	9.5	0.07	0.24
BHW_041_r01	1550	8.0	9.5	0.09	0.24
BHW_041_r02	1400	8.0	9.5	0.10	0.11
BHW_041_r03	1400	7.5	9.5	0.10	0.13
BHW_045_r01	1350	8.0	9.5	0.10	0.05

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BHW_045_r02	1300	7.5	9.5	0.11	0.04
BHW_045_r03	1450	8.0	9.5	0.10	0.18
BHW_045_r04	1300	7.5	9.5	0.10	0.04
BHW_045_r05	1400	8.0	9.5	0.10	0.08
BHW_047_r01	1400	8.0	9.5	0.10	0.10
BHW_047_r02	1200	6.5	9.0	0.11	0.03
BHW_051_r01	1050	5.0	7.0	0.10	0.03
BHW_051_r02	1050	4.5	7.0	0.10	0.03
BHW_051_r03	1000	3.0	5.0	0.10	0.03
BHW_053_r01	1000	3.5	5.5	0.10	0.03
BHW_057_r01	1000	2.0	3.5	0.09	0.03
BHW_057_r02	1050	2.5	2.5	0.05	0.04
BHW_057_r03	1050	2.5	2.5	0.05	0.04
BHW_057_r04	1000	2.5	2.5	0.05	0.04
BHW_059_r01	1000	2.0	3.0	0.07	0.04
BHW_059_r02	1050	2.5	2.5	0.05	0.04
BHW_059_r03	1050	3.0	3.0	0.05	0.04
BHW_059_r04	1050	3.0	3.0	0.05	0.04
BHW_059_r05	1000	2.0	2.5	0.07	0.04
BHW_059_r06	1050	3.0	3.0	0.05	0.04
BHW_059_r07	1100	3.0	3.0	0.05	0.04
BHW_061_r01	1050	2.5	2.5	0.05	0.04
BHW_061_r02	1050	3.0	3.0	0.05	0.04
BHW_063_r01	1100	3.0	3.0	0.05	0.04
BHW_065_r01	1150	3.0	3.0	0.06	0.04
BHW_065_r02	1150	3.0	3.0	0.06	0.05
BHW_065_r03	1200	3.0	3.0	0.06	0.05
BHW_065_r04	1200	3.0	3.0	0.06	0.05
BHW_067_r01	1200	3.0	3.0	0.06	0.05
BHW_067_r02	1200	3.0	3.0	0.06	0.05
BHW_067_r03	1200	3.0	3.0	0.06	0.05
BHW_067_r04	1250	3.0	3.0	0.06	0.05
BHW_069_r01	1150	3.0	3.0	0.06	0.05
BHW_069_r02	1200	3.0	3.0	0.06	0.05
BHW_069_r03	1250	3.0	3.0	0.06	0.05
BHW_071_r01	1200	3.0	3.0	0.06	0.05
BHW_071_r02	1250	2.5	2.5	0.07	0.11
BHW_073_r01	1250	2.5	2.5	0.07	0.13
BHW_073_r02	1250	5.0	5.0	0.07	0.25
BHW_073_r03	1250	6.0	6.0	0.07	0.25
BHW_073_r04	1250	5.5	5.5	0.07	0.25
BHW_073_r05	1250	4.5	4.5	0.07	0.25
BHW_075_r01	1250	8.0	8.0	0.07	0.25
BHW_079_r01	1250	8.0	8.0	0.07	0.26
BHW_079_r02	1250	9.5	9.5	0.07	0.25
BHW_079_r03	1250	9.5	9.5	0.07	0.25
BHW_081_r01	1250	10.0	10.0	0.07	0.26
BHW_081_r02	1250	10.0	10.0	0.07	0.26
BHW_081_r03	1250	10.0	10.0	0.07	0.25
BHW_081_r04	1200	10.0	10.0	0.07	0.24
BHW_083_r01	1250	10.0	10.0	0.07	0.26
BHW_083_r02	1200	10.0	10.0	0.10	0.22
BHW_083_r03	1100	10.0	10.0	0.10	0.15
BHW_083_r04	1000	10.0	10.0	0.11	0.08
BHW_085_r01	1250	10.0	10.0	0.07	0.26
BHW_085_r02	1200	10.0	10.0	0.08	0.22
BHW_085_r03	1050	10.0	10.0	0.11	0.10

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BHW_085_r04	950	10.0	10.0	0.11	0.04
BHW_085_r05	850	10.0	10.0	0.11	0.03
BHW_087_r01	1050	10.0	10.0	0.11	0.10
BHW_087_r02	850	10.0	10.0	0.11	0.04
BHW_089_r01	1000	10.0	10.0	0.11	0.06
BHW_091_r01	900	10.0	10.0	0.11	0.04
BHW_091_r02	900	10.0	10.0	0.11	0.04
BHW_093_r01	750	9.5	9.5	0.11	0.03
BHW_093_r02	500	6.0	6.0	0.10	0.02
BHW_095_r01	700	9.0	9.0	0.11	0.03
BHW_095_r03	475	6.0	6.0	0.10	0.02
BHW_097_r01	400	4.5	4.5	0.08	0.02
BHW_099_r01	550	7.5	7.5	0.11	0.02
BHW_099_r02	450	5.0	5.0	0.09	0.02
BHW_099_r03	425	4.5	4.5	0.09	0.02
BHW_099_r05	425	5.0	5.0	0.09	0.02
BHW_101_r01	500	6.0	6.0	0.10	0.02
BHW_101_r02	450	5.0	5.0	0.09	0.02
BHW_103_r01	425	5.0	5.0	0.09	0.02
BHW_103_r02	400	4.0	4.0	0.08	0.02
BHW_103_r03	350	3.5	3.5	0.06	0.01
BHW_105_r01	400	4.0	4.0	0.08	0.02
BHW_107_r01	375	4.0	4.0	0.07	0.02
BHW_107_r02	350	3.5	3.5	0.06	0.01
BHW_109_r01	275	2.5	2.5	0.03	0.01
BHW_109_r02	275	2.0	2.0	0.03	0.01
BHW_111_r01	300	2.5	2.5	0.04	0.01
BHW_111_r02	275	2.0	2.0	0.03	0.01
BHW_111_r03	250	2.0	2.0	0.03	0.01
BHW_111_r04	250	2.0	2.0	0.03	0.01
BHW_113_r01	300	2.5	2.5	0.04	0.01
BHW_113_r02	225	1.5	1.5	0.02	< 0.01
BHW_115_r01	225	1.5	1.5	0.02	< 0.01
BHW_117_r01	250	2.0	2.0	0.03	0.01
BHW_117_r02	250	2.0	2.0	0.02	< 0.01
BHW_117_r03	250	1.5	1.5	0.02	< 0.01
BHW_119_r01	275	2.0	2.0	0.03	0.01
BHW_119_r02	225	1.5	1.5	0.02	< 0.01
BHW_123_r03	225	1.5	1.5	0.02	< 0.01
BHW_123_r05	250	2.0	2.0	0.02	< 0.01
BHW_123_r06	275	2.0	2.0	0.03	0.01
BHW_123_r07	225	1.5	1.5	0.02	< 0.01
BHW_123_r08	250	2.0	2.0	0.02	< 0.01
BHW_137_r01	200	1.5	1.5	0.01	< 0.01
BHW_137_r02	200	1.5	1.5	0.01	< 0.01
BHW_137_r03	175	1.0	1.0	0.01	< 0.01
BHW_137_r08	175	1.0	1.0	0.01	< 0.01
BHW_139_r04	175	1.0	1.0	0.01	< 0.01
BHW_139_r05	175	1.0	1.0	0.01	< 0.01
BHW_139_r06	175	1.0	1.0	0.01	< 0.01
BHW_139_r07	175	1.0	1.0	0.01	< 0.01
BHW_141_r01	200	1.0	1.0	0.01	< 0.01
BHW_141_r02	175	1.0	1.0	0.01	< 0.01
BHW_141_r03	225	1.5	1.5	0.02	< 0.01
BHW_145_r01	200	1.5	1.5	0.01	< 0.01
BHW_145_r02	200	1.0	1.0	0.01	< 0.01
BHW_147_r01	200	1.0	1.0	0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BHW_147_r02	200	1.5	1.5	0.01	< 0.01
BHW_149_r01	200	1.5	1.5	0.02	< 0.01
BHW_149_r02	200	1.0	1.0	0.01	< 0.01
BHW_149_r05	175	1.0	1.0	< 0.01	< 0.01
BHW_149_r06	175	1.0	1.0	0.01	< 0.01
BHW_149_r07	175	1.0	1.0	0.01	< 0.01
BHW_149_r08	175	1.0	1.0	< 0.01	< 0.01
BHW_151_r01	200	1.0	1.0	0.01	< 0.01
BHW_151_r02	200	1.5	1.5	0.01	< 0.01
BHW_151_r03	175	1.0	1.0	0.01	< 0.01
BHW_151_r04	175	1.0	1.0	0.01	< 0.01
BHW_151_r05	200	1.0	1.0	0.01	< 0.01
BHW_153_r02	175	1.0	1.0	0.01	< 0.01
BHW_155_r01	225	1.5	1.5	0.02	< 0.01
BHW_155_r02	200	1.0	1.0	0.01	< 0.01
BHW_155_r03	175	1.0	1.0	0.01	< 0.01
BHW_155_r04	175	1.0	1.0	< 0.01	< 0.01
BHW_155_r05	175	1.0	1.0	0.01	< 0.01
BHW_157_r01	200	1.5	1.5	0.01	< 0.01
BHW_157_r02	225	1.5	1.5	0.02	< 0.01
BHW_157_r03	200	1.5	1.5	0.01	< 0.01
BHW_157_r04	200	1.0	1.0	0.01	< 0.01
BHW_157_r05	175	1.0	1.0	0.01	< 0.01
BHW_157_r06	175	1.0	1.0	0.01	< 0.01
BHW_159_r01	225	1.5	1.5	0.02	< 0.01
BHW_159_r03	175	1.0	1.0	0.01	< 0.01
BHW_161_r01	200	1.5	1.5	0.01	< 0.01
BHW_161_r02	175	1.0	1.0	0.01	< 0.01
BHW_161_r03	175	1.0	1.0	0.01	< 0.01
BHW_163_r01	225	1.5	1.5	0.02	< 0.01
BHW_163_r02	225	1.5	1.5	0.02	< 0.01
BHW_165_r01	200	1.0	1.0	0.01	< 0.01
BHW_165_r02	200	1.0	1.0	0.01	< 0.01
BHW_165_r04	175	1.0	1.0	< 0.01	< 0.01
BHW_165_r05	175	1.0	1.0	< 0.01	< 0.01
BHW_167_r01	225	1.5	1.5	0.02	< 0.01
BHW_167_r02	225	1.5	1.5	0.02	< 0.01
BHW_167_r03	200	1.5	1.5	0.01	< 0.01
BHW_167_r04	200	1.0	1.0	0.01	< 0.01
BHW_167_r05	200	1.0	1.0	0.01	< 0.01
BHW_169_r01	225	1.5	1.5	0.02	< 0.01
BHW_169_r02	200	1.0	1.0	0.01	< 0.01
BHW_169_r03	175	1.0	1.0	0.01	< 0.01
BHW_171_r01	225	1.5	1.5	0.02	< 0.01
BHW_171_r02	175	1.0	1.0	0.01	< 0.01
BHW_173_r01	200	1.5	1.5	0.01	< 0.01
BHW_173_r02	200	1.0	1.0	0.01	< 0.01
BHW_173_r03	225	1.5	1.5	0.02	< 0.01
BHW_175_r01	200	1.5	1.5	0.01	< 0.01
BHW_175_r02	200	1.5	1.5	0.01	< 0.01
BHW_175_r03	200	1.0	1.0	0.01	< 0.01
BHW_175_r04	225	1.5	1.5	0.02	< 0.01
BHW_175_r05	200	1.0	1.0	0.01	< 0.01
BHW_175_r06	175	1.0	1.0	< 0.01	< 0.01
BHW_177_r01	200	1.0	1.0	0.01	< 0.01
BHW_179_r01	200	1.5	1.5	0.01	< 0.01
BHW_179_r02	225	1.5	1.5	0.02	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BHW_179_r03	200	1.5	1.5	0.01	< 0.01
BHW_179_r04	175	1.0	1.0	0.01	< 0.01
BHW_179_r05	200	1.0	1.0	0.01	< 0.01
BHW_179_r06	175	1.0	1.0	< 0.01	< 0.01
BHW_181_r01	225	1.5	1.5	0.02	< 0.01
BHW_181_r02	200	1.5	1.5	0.01	< 0.01
BHW_181_r03	175	1.0	1.0	0.01	< 0.01
BHW_183_r01	200	1.5	1.5	0.01	< 0.01
BHW_183_r02	200	1.5	1.5	0.01	< 0.01
BHW_185_r01	200	1.5	1.5	0.01	< 0.01
BHW_185_r02	200	1.0	1.0	0.01	< 0.01
BHW_185_r04	200	1.5	1.5	0.01	< 0.01
BHW_185_r05	200	1.0	1.0	0.01	< 0.01
BHW_187_r01	225	1.5	1.5	0.02	< 0.01
BHW_189_r01	200	1.5	1.5	0.02	< 0.01
BHW_189_r02	200	1.5	1.5	0.01	< 0.01
BHW_189_r04	175	1.0	1.0	0.01	< 0.01
BHW_189_r05	175	1.0	1.0	< 0.01	< 0.01
BHW_205_r01	350	3.5	3.5	0.06	0.01
BHW_205_r02	425	5.0	5.0	0.09	0.02
BHW_209_r01	1050	3.5	3.5	0.06	0.04
BHW_209_r02	1050	3.0	3.0	0.05	0.04
BHW_209_r03	1100	3.5	3.5	0.06	0.04
BHW_209_r04	1200	3.5	3.5	0.07	0.05
BHW_215_r01	1000	2.5	3.5	0.08	0.04
BHW_215_r02	950	2.0	3.5	0.08	0.04
BHW_215_r03	1050	5.0	7.0	0.12	0.03
BHW_215_r04	1150	6.5	9.0	0.12	0.03
BHW_215_r05	1000	2.5	3.0	0.06	0.04
BHW_215_r06	1250	8.0	9.5	0.11	0.04
BHW_215_r07	1350	8.0	9.5	0.11	0.07
BHW_221_r01	1250	5.0	5.0	0.06	0.04
BHW_227_r01	1250	4.5	4.5	0.06	0.04
BHW_227_r02	1150	4.0	4.0	0.06	0.04
BHW_227_r03	1050	3.0	3.0	0.06	0.03
BHW_233_r01	1350	8.0	9.5	0.11	0.05
BHW_233_r02	1450	8.0	9.5	0.08	0.17
BHW_239_r01	950	2.5	5.0	0.11	0.03
BHW_239_r02	1000	4.0	6.5	0.12	0.03
BHW_243_r01	1000	10.0	10.0	0.11	0.06
BHW_243_r02	950	10.0	10.0	0.11	0.04
BHW_243_r03	750	9.5	9.5	0.11	0.03
BHW_243_r04	800	10.0	10.0	0.11	0.03
BHW_247_r01	375	4.0	4.0	0.07	0.02
BHW_251_r01	375	4.0	4.0	0.07	0.01
BHW_251_r02	375	4.0	4.0	0.07	0.02
BHW_251_r03	375	4.0	4.0	0.07	0.02
BHW_251_r04	425	5.0	5.0	0.09	0.02
BHW_251_r05	475	5.5	5.5	0.10	0.02
BHW_251_r06	550	7.0	7.0	0.11	0.02
BHW_255_r01	425	4.5	4.5	0.09	0.02
BHW_259_r01	400	4.0	4.0	0.08	0.02
BHW_261_r01	350	3.5	3.5	0.06	0.01
BHW_261_r02	550	7.0	7.0	0.11	0.02
BHW_263_r01	325	3.0	3.0	0.06	0.01
BHW_263_r02	550	6.5	6.5	0.11	0.02
BHW_263_r03	500	6.0	6.0	0.11	0.02

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BHW_263_r04	550	7.0	7.0	0.11	0.02
BHW_263_r05	375	4.0	4.0	0.07	0.02
BHW_265_r01	550	7.5	7.5	0.11	0.02
BHW_265_r02	400	4.5	4.5	0.08	0.02
BHW_265_r03	500	6.0	6.0	0.10	0.02
BHW_267_r01	400	4.0	4.0	0.08	0.02
BHW_267_r02	475	5.5	5.5	0.10	0.02
BHW_267_r03	475	6.0	6.0	0.10	0.02
BHW_269_r01	425	4.5	4.5	0.09	0.02
BHW_269_r02	650	8.5	8.5	0.11	0.03
BHW_269_r03	550	7.0	7.0	0.11	0.02
BHW_271_r01	325	3.0	3.0	0.06	0.01
BHW_273_r01	650	8.5	8.5	0.11	0.03
BHW_273_r02	1100	10.0	10.0	0.11	0.13
BHW_279_r01	1250	10.0	10.0	0.07	0.26
BHW_285_r01	600	7.5	7.5	0.11	0.02
BHW_285_r02	700	9.0	9.0	0.11	0.03
BHW_285_r03	550	7.0	7.0	0.11	0.02
BHW_285_r04	425	4.5	4.5	0.09	0.02
BHW_285_r05	550	7.0	7.0	0.11	0.02
BHW_285_r06	550	7.0	7.0	0.11	0.02
BHW_285_r07	550	7.0	7.0	0.11	0.02
BHW_287_r01	500	6.0	6.0	0.10	0.02
BHW_287_r02	550	6.5	6.5	0.11	0.02
BHW_287_r03	550	7.0	7.0	0.11	0.02
BHW_289_r01	375	4.0	4.0	0.07	0.01
BHW_289_r02	450	5.5	5.5	0.10	0.02
BHW_291_r01	400	4.5	4.5	0.08	0.02
BHW_291_r02	425	4.5	4.5	0.09	0.02
BHW_291_r03	450	5.5	5.5	0.10	0.02
BHW_291_r04	475	6.0	6.0	0.10	0.02
BHW_291_r05	650	8.5	8.5	0.11	0.03
BHW_297_r01	600	8.0	8.0	0.11	0.03
BHW_299_r01	550	7.0	7.0	0.11	0.02
BHW_301_r01	475	5.5	5.5	0.10	0.02
BHW_301_r02	750	9.5	9.5	0.11	0.03
BHW_303_r01	650	8.5	8.5	0.11	0.03
BHW_305_r01	750	9.5	9.5	0.11	0.03
BHW_305_r02	500	6.5	6.5	0.11	0.02
BHW_311_r01	1250	10.0	10.0	0.08	0.27
BHW_313_r01	1150	10.0	10.0	0.10	0.19
BHW_313_r02	1250	10.0	10.0	0.08	0.27
BHW_315_r01	1150	10.0	10.0	0.11	0.16
BHW_315_r02	1300	8.0	8.0	0.07	0.27
BHW_317_r01	1300	8.5	8.5	0.07	0.27
BHW_319_r01	1300	10.0	10.0	0.07	0.27
BHW_321_r01	1300	3.0	3.0	0.07	0.24
BHW_323_r01	1300	5.5	5.5	0.07	0.26
BHW_323_r02	1300	3.0	3.0	0.07	0.24
BHW_323_r03	1300	3.0	3.0	0.07	0.15
BHW_325_r01	1300	3.0	3.0	0.07	0.13
BHW_325_r02	1300	3.0	3.0	0.07	0.16
BHW_325_r03	1250	3.0	3.0	0.07	0.05
BHW_327_r01	1300	3.0	3.0	0.07	0.13
BHW_327_r02	1250	3.0	3.0	0.07	0.13
BHW_327_r03	1250	3.0	3.0	0.07	0.07
BHW_327_r04	1250	3.0	3.0	0.07	0.05

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BHW_327_r05	1250	3.0	3.0	0.07	0.05
BHW_327_r06	1250	3.0	3.0	0.07	0.08
BHW_327_r07	1250	3.0	3.0	0.07	0.10
BHW_329_r01	1200	3.0	3.0	0.06	0.05
BHW_335_r01	1150	6.0	8.0	0.11	0.03
BHW_335_r02	1300	7.0	9.5	0.10	0.04
BHW_335_r03	1300	7.0	9.5	0.10	0.04
BHW_335_r04	1450	7.5	9.5	0.10	0.18
BHW_335_r07	1400	7.5	9.5	0.10	0.13
BHW_337_r01	1550	7.5	9.5	0.07	0.25
BHW_337_r02	1550	7.5	9.5	0.07	0.24
BHW_339_r01	1550	7.5	9.0	0.07	0.25
BHW_339_r02	1550	7.5	9.0	0.07	0.25
BHW_339_r03	1550	6.5	7.5	0.07	0.25
BHW_339_r04	1550	5.0	6.0	0.07	0.25
BHW_339_r05	1550	3.5	4.0	0.07	0.25
BHW_339_r06	1550	3.5	4.0	0.07	0.25
BHW_339_r07	1550	3.5	3.5	0.07	0.24
BHW_339_r08	1550	3.5	3.5	0.07	0.21
BHW_341_r01	1500	4.0	4.0	0.07	0.06
BHW_341_r02	1500	4.0	4.0	0.07	0.05
BHW_341_r03	1500	4.0	4.0	0.07	0.06
BHW_341_r04	1500	4.0	4.0	0.07	0.05
BHW_341_r05	1450	4.0	4.0	0.06	0.05
BHW_343_r01	1400	4.0	4.0	0.06	0.05
BHW_345_r01	1550	4.0	4.0	0.07	0.09
BHW_345_r02	1500	4.0	4.0	0.07	0.05
BHW_345_r03	1450	4.0	4.0	0.07	0.05
BHW_349_r01	1300	4.0	4.0	0.06	0.04
BHW_349_r02	1350	4.0	4.0	0.06	0.05
BHW_349_r03	1300	4.0	4.0	0.06	0.04
BHW_351_r01	1200	3.5	3.5	0.05	0.04
BHW_351_r02	1150	3.0	3.0	0.06	0.04
BHW_353_r01	1150	3.0	3.0	0.06	0.04
BHW_353_r02	1100	2.5	2.5	0.07	0.03
BHW_353_r03	1100	2.5	2.5	0.06	0.03
BHW_353_r04	1100	2.5	3.0	0.07	0.03
BHW_353_r05	1100	3.0	6.0	0.10	0.03
BHW_353_r06	1150	4.0	7.0	0.10	0.03
BHW_355_r01	1050	2.5	5.0	0.09	0.03
BHW_355_r02	1100	2.5	5.5	0.09	0.03
BHW_355_r03	1150	4.5	7.5	0.10	0.03
BHW_355_r04	1200	5.0	8.5	0.10	0.03
BHW_355_r05	1250	6.0	9.0	0.10	0.03
BHW_355_r06	1350	7.0	9.0	0.12	0.04
BHW_355_r07	1200	5.0	8.5	0.10	0.03
BHW_357_r01	1500	7.0	9.0	0.11	0.16
BHW_357_r02	1550	6.5	8.0	0.07	0.24
BHW_361_r01	1500	7.0	9.0	0.11	0.20
BHW_361_r02	1550	7.0	9.0	0.11	0.23
BHW_361_r03	1550	7.0	9.0	0.11	0.23
BHW_361_r04	1550	7.0	8.5	0.06	0.23
BHW_365_r01	1500	7.0	9.0	0.11	0.21
BHW_367_r01	1500	4.0	4.0	0.06	0.11
BIR_001_r01	1300	6.5	9.0	0.12	0.04
BIR_001_r02	1500	7.5	9.5	0.12	0.20
BIR_001_r06	1500	7.5	9.5	0.12	0.21

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BIR_001_r07	1350	7.0	9.0	0.12	0.04
BIR_003_r01	1550	7.5	9.0	0.07	0.24
BIR_003_r02	1550	7.0	9.0	0.07	0.24
BIR_003_r03	1550	7.0	8.5	0.07	0.24
BIR_017_r01	1050	2.0	4.0	0.08	0.03
BIR_017_r02	1050	2.0	5.0	0.09	0.03
BIR_017_r03	1050	1.5	4.5	0.09	0.03
BIR_017_r04	1150	5.0	8.0	0.10	0.03
BIR_017_r05	1350	7.0	9.0	0.11	0.06
BIR_017_r06	1400	7.0	9.0	0.11	0.13
BIR_027_r01	1200	5.5	8.5	0.10	0.03
BIR_027_r02	1250	6.5	8.5	0.11	0.03
BIR_027_r03	1300	7.0	8.5	0.11	0.04
BIR_027_r04	1350	7.0	8.5	0.11	0.08
BIR_027_r05	1500	7.0	8.5	0.11	0.22
BIR_027_r06	1500	7.0	8.5	0.10	0.22
BIR_027_r07	1500	7.0	8.5	0.06	0.22
BIR_027_r08	1350	7.0	8.5	0.11	0.06
BIR_027_r09	1350	7.0	9.0	0.11	0.09
BIR_027_r10	1400	7.0	8.5	0.11	0.11
BIR_037_r01	1500	6.5	8.5	0.12	0.22
BIR_037_r02	1500	6.5	8.5	0.06	0.22
BIR_037_r03	1500	3.0	3.5	0.06	0.22
BIR_037_r04	1500	3.5	4.0	0.06	0.22
BIR_037_r05	1500	6.5	7.5	0.06	0.22
BIR_047_r01	1300	3.5	3.5	0.05	0.04
BIR_047_r02	1400	3.5	3.5	0.06	0.04
BIR_047_r03	1400	3.5	3.5	0.06	0.05
BIR_047_r04	1450	3.5	3.5	0.06	0.13
BIR_047_r05	1350	3.5	3.5	0.05	0.04
BIR_057_r01	1050	2.5	3.0	0.07	0.03
BIR_057_r02	1000	1.5	4.0	0.08	0.03
BIR_057_r03	1000	2.5	4.5	0.08	0.03
BIR_057_r04	1100	4.0	6.5	0.09	0.02
BIR_067_r01	1250	6.0	8.0	0.09	0.05
BIR_077_r01	1150	3.5	3.5	0.04	0.04
BIR_077_r02	1150	3.5	3.5	0.04	0.04
BIR_077_r03	1100	3.0	3.0	0.06	0.03
BIR_077_r04	1050	2.5	2.5	0.05	0.03
BIR_087_r01	1500	4.0	4.0	0.06	0.13
BIR_087_r02	1500	6.5	8.5	0.09	0.22
BIR_087_r03	1500	6.5	8.5	0.06	0.22
BIR_087_r04	1500	6.5	8.5	0.12	0.21
BIR_087_r05	1450	6.5	8.5	0.12	0.18
BIR_087_r06	1450	3.5	3.5	0.06	0.14
BIR_087_r07	1350	4.0	4.0	0.05	0.04
BIR_087_r08	1500	3.5	3.5	0.06	0.18
BIR_097_r01	1500	6.0	7.5	0.06	0.21
BIR_097_r02	1450	6.5	8.5	0.09	0.21
BIR_097_r03	1350	6.5	8.5	0.11	0.06
BIR_107_r01	1100	3.0	6.0	0.09	0.03
BIR_107_r02	1100	3.0	6.0	0.09	0.03
BIR_107_r03	1100	2.5	3.0	0.08	0.03
BIR_117_r01	1050	2.0	4.5	0.09	0.03
BIR_117_r02	1100	2.5	3.0	0.07	0.03
BIR_117_r03	1100	2.0	3.5	0.08	0.03
BIR_117_r04	1100	2.5	3.0	0.07	0.03

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BJA_001_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BJA_001_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BJA_002_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BJA_002_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BJA_003_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BJA_003_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BJA_003_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BJA_004_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BJA_005_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BJA_005_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BJA_006_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BJA_006_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BJA_007_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BJA_007_r02	60	< 0.5	< 0.5	< 0.01	< 0.01
BJA_007_r03	60	< 0.5	< 0.5	< 0.01	< 0.01
BJA_007_r04	60	< 0.5	< 0.5	< 0.01	< 0.01
BJA_008_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BJA_008_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BJA_008_r03	60	< 0.5	< 0.5	< 0.01	< 0.01
BJA_008_r04	50	< 0.5	< 0.5	< 0.01	< 0.01
BJA_009_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BJA_009_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BJA_009_r03	50	< 0.5	< 0.5	< 0.01	< 0.01
BJA_009_r04	40	< 0.5	< 0.5	< 0.01	< 0.01
BJA_009_r05	50	< 0.5	< 0.5	< 0.01	< 0.01
BJO_005_r01	950	10.0	10.0	0.11	0.04
BJO_010_r01	1300	4.0	4.0	0.07	0.27
BJO_020_r01	1250	3.5	3.5	0.07	0.05
BJO_020_r03	1150	3.5	3.5	0.06	0.05
BJO_030_r01	1000	2.5	2.5	0.06	0.04
BJO_030_r02	1100	6.5	8.5	0.11	0.03
BJO_030_r03	900	1.5	4.0	0.09	0.03
BJO_050_r01	1350	8.5	10.0	0.12	0.08
BJO_050_r02	1300	8.5	10.0	0.12	0.04
BJO_050_r03	1200	8.0	9.5	0.12	0.04
BJO_060_r01	1600	8.5	9.0	0.07	0.26
BJO_060_r02	1600	4.0	4.0	0.07	0.24
BJO_070_r01	1500	4.5	4.5	0.07	0.06
BJO_080_r01	1150	6.0	8.5	0.11	0.03
BJO_080_r02	1050	5.0	7.0	0.11	0.03
BJO_080_r03	1050	4.5	7.0	0.11	0.03
BJO_080_r04	1250	7.5	10.0	0.11	0.04
BJO_080_r05	1200	7.0	9.5	0.11	0.03
BJO_080_r06	1150	6.5	8.5	0.11	0.03
BJO_080_r07	1000	3.0	5.5	0.10	0.03
BJO_080_r08	1050	4.5	6.5	0.11	0.03
BJO_080_r09	950	3.0	5.0	0.10	0.03
BJO_080_r10	950	2.0	4.5	0.09	0.03
BJO_080_r11	1000	2.5	3.0	0.07	0.04
BJO_080_r12	1000	2.5	2.5	0.06	0.04
BJO_080_r13	1050	3.0	3.0	0.05	0.04
BJO_080_r14	1050	3.0	3.0	0.05	0.04
BJO_090_r01	1000	3.0	3.0	0.05	0.04
BJO_090_r02	1050	3.0	3.0	0.05	0.04
BJO_100_r01	1000	2.5	3.0	0.06	0.04
BJO_100_r02	1100	3.5	3.5	0.06	0.05
BJO_100_r03	1200	3.5	3.5	0.06	0.05

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BJO_100_r04	1200	3.5	3.5	0.06	0.05
BJO_100_r05	1250	3.5	3.5	0.07	0.05
BJO_100_r06	1200	3.5	3.5	0.07	0.05
BJO_100_r07	1200	3.5	3.5	0.07	0.05
BJO_100_r08	1050	3.0	3.0	0.05	0.04
BJO_110_r01	1150	3.5	3.5	0.06	0.05
BJO_110_r02	1200	3.5	3.5	0.07	0.05
BJO_110_r03	1250	3.5	3.5	0.07	0.05
BJO_110_r04	1250	3.5	3.5	0.07	0.05
BJO_120_r01	1250	3.5	3.5	0.07	0.05
BJO_120_r02	1300	7.5	7.5	0.07	0.27
BJO_120_r03	1300	6.0	6.0	0.07	0.27
BJO_130_r01	1300	8.5	8.5	0.07	0.27
BJO_130_r02	1300	9.5	9.5	0.07	0.27
BJO_130_r03	1300	10.0	10.0	0.07	0.27
BJO_150_r01	1600	4.0	4.0	0.07	0.25
BJO_150_r02	1600	5.5	6.5	0.07	0.25
BJO_150_r05	1550	4.5	4.5	0.07	0.09
BJO_150_r06	1450	4.5	4.5	0.07	0.05
BJO_150_r07	1350	4.5	4.5	0.06	0.05
BJO_150_r08	1100	3.0	6.0	0.10	0.03
BJO_150_r09	1650	8.0	10.0	0.12	0.26
BJO_150_r10	1650	8.0	10.0	0.11	0.26
BJO_150_r11	1550	7.5	9.5	0.13	0.26
BJO_150_r12	1500	7.5	9.5	0.13	0.21
BJO_150_r13	1450	7.5	9.5	0.12	0.14
BJO_150_r14	1550	7.5	9.5	0.07	0.26
BJO_150_r15	1550	7.5	9.5	0.10	0.26
BJO_150_r16	1550	7.5	9.5	0.10	0.25
BJO_150_r17	1450	7.5	9.5	0.13	0.15
BJO_150_r18	650	8.0	8.0	0.10	0.03
BJO_150_r19	800	9.5	9.5	0.10	0.03
BJO_150_r20	950	9.5	9.5	0.10	0.04
BJO_150_r21	1050	9.5	9.5	0.10	0.10
BJO_150_r22	1150	10.0	10.0	0.08	0.14
BJO_150_r23	1100	10.0	10.0	0.10	0.12
BJO_150_r24	1100	10.0	10.0	0.09	0.09
BJO_150_r25	1100	10.0	10.0	0.10	0.12
BJO_150_r26	1100	10.0	10.0	0.10	0.09
BJO_150_r27	1550	7.5	9.5	0.10	0.25
BJO_150_r28	1550	7.5	9.5	0.07	0.25
BJO_150_r29	1550	7.5	9.5	0.07	0.25
BJO_150_r30	1550	8.0	9.5	0.09	0.25
BJO_150_r31	1600	6.0	6.5	0.07	0.26
BJO_150_r32	1600	4.5	4.5	0.07	0.20
BJO_150_r33	1600	4.5	4.5	0.07	0.23
BJO_150_r34	1600	4.5	4.5	0.07	0.25
BJO_150_r35	1600	4.5	5.0	0.08	0.26
BJO_150_r36	1600	5.0	5.5	0.08	0.26
BJO_150_r37	1600	7.5	8.5	0.08	0.26
BJO_150_r38	1600	6.5	7.5	0.08	0.26
BJO_150_r39	1600	4.5	4.5	0.08	0.26
BJO_150_r40	1600	4.5	4.5	0.07	0.22
BJO_150_r41	1600	8.0	9.0	0.07	0.26
BJO_150_r42	1550	8.0	10.0	0.08	0.23
BJO_150_r43	1550	8.5	10.0	0.07	0.26
BJU_001_r01	70	< 0.5	< 0.5	< 0.01	< 0.01

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BJU_001_r02	70	< 0.5	< 0.5	< 0.01	< 0.01
BJU_001_r03	70	< 0.5	< 0.5	< 0.01	< 0.01
BJU_002_r01	70	< 0.5	< 0.5	< 0.01	< 0.01
BJU_002_r02	70	< 0.5	< 0.5	< 0.01	< 0.01
BJU_003_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BJU_003_r02	70	< 0.5	< 0.5	< 0.01	< 0.01
BJU_003_r03	70	< 0.5	< 0.5	< 0.01	< 0.01
BJU_003_r04	70	< 0.5	< 0.5	< 0.01	< 0.01
BJU_004_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BJU_004_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BJU_004_r03	70	< 0.5	< 0.5	< 0.01	< 0.01
BJU_006_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BJU_006_r02	90	< 0.5	< 0.5	< 0.01	< 0.01
BJU_006_r03	80	< 0.5	< 0.5	< 0.01	< 0.01
BJU_007_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BJU_007_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BJU_008_r01	125	0.5	0.5	< 0.01	< 0.01
BJU_008_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BJU_009_r01	125	0.5	0.5	< 0.01	< 0.01
BJU_009_r02	125	0.5	0.5	< 0.01	< 0.01
BJU_010_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BJU_010_r02	100	0.5	0.5	< 0.01	< 0.01
BJU_010_r03	125	0.5	0.5	< 0.01	< 0.01
BJU_011_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BJU_011_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BJU_011_r03	100	< 0.5	< 0.5	< 0.01	< 0.01
BJU_012_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BJU_012_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BJU_013_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BJU_013_r02	90	< 0.5	< 0.5	< 0.01	< 0.01
BJU_014_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BJU_014_r02	90	< 0.5	< 0.5	< 0.01	< 0.01
BJU_014_r03	90	< 0.5	< 0.5	< 0.01	< 0.01
BKA_001_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_001_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_001_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_003_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_003_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_003_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_005_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_005_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_005_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_007_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_007_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_007_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_009_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_009_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_009_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_011_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_011_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_011_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_011_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_011_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_017_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BKA_017_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BKA_019_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BKA_019_r02	50	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BKA_019_r03	50	< 0.5	< 0.5	< 0.01	< 0.01
BKA_020_r03	50	< 0.5	< 0.5	< 0.01	< 0.01
BKA_021_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BKA_021_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BKA_022_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BKA_022_r02	60	< 0.5	< 0.5	< 0.01	< 0.01
BKA_022_r03	60	< 0.5	< 0.5	< 0.01	< 0.01
BKA_024_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BKA_024_r02	70	< 0.5	< 0.5	< 0.01	< 0.01
BKA_024_r03	70	< 0.5	< 0.5	< 0.01	< 0.01
BKA_026_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BKA_026_r02	60	< 0.5	< 0.5	< 0.01	< 0.01
BKA_026_r03	60	< 0.5	< 0.5	< 0.01	< 0.01
BKA_030_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BKA_030_r02	70	< 0.5	< 0.5	< 0.01	< 0.01
BKA_030_r03	60	< 0.5	< 0.5	< 0.01	< 0.01
BKA_030_r04	60	< 0.5	< 0.5	< 0.01	< 0.01
BKA_034_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BKA_034_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BKA_036_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BKA_036_r02	70	< 0.5	< 0.5	< 0.01	< 0.01
BKA_038_r01	70	< 0.5	< 0.5	< 0.01	< 0.01
BKA_040_r01	70	< 0.5	< 0.5	< 0.01	< 0.01
BKA_042_r01	70	< 0.5	< 0.5	< 0.01	< 0.01
BKA_042_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BKA_044_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BKA_046_r01	70	< 0.5	< 0.5	< 0.01	< 0.01
BKA_046_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BKA_046_r04	80	< 0.5	< 0.5	< 0.01	< 0.01
BKA_049_r01	70	< 0.5	< 0.5	< 0.01	< 0.01
BKA_049_r02	70	< 0.5	< 0.5	< 0.01	< 0.01
BKA_049_r03	70	< 0.5	< 0.5	< 0.01	< 0.01
BKA_049_r04	70	< 0.5	< 0.5	< 0.01	< 0.01
BKA_049_r05	80	< 0.5	< 0.5	< 0.01	< 0.01
BKA_052_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BKA_052_r02	60	< 0.5	< 0.5	< 0.01	< 0.01
BKA_052_r03	70	< 0.5	< 0.5	< 0.01	< 0.01
BKA_055_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BKA_055_r02	60	< 0.5	< 0.5	< 0.01	< 0.01
BKA_055_r03	70	< 0.5	< 0.5	< 0.01	< 0.01
BKA_055_r04	70	< 0.5	< 0.5	< 0.01	< 0.01
BKA_055_r05	70	< 0.5	< 0.5	< 0.01	< 0.01
BKA_058_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BKA_058_r02	60	< 0.5	< 0.5	< 0.01	< 0.01
BKA_058_r03	60	< 0.5	< 0.5	< 0.01	< 0.01
BKA_058_r04	70	< 0.5	< 0.5	< 0.01	< 0.01
BKA_058_r05	70	< 0.5	< 0.5	< 0.01	< 0.01
BKA_060_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BKA_060_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BKA_060_r03	60	< 0.5	< 0.5	< 0.01	< 0.01
BKA_060_r04	50	< 0.5	< 0.5	< 0.01	< 0.01
BKA_062_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BKA_062_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_066_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_066_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_066_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_068_r02	40	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BKA_069_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BKA_070_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BKA_070_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_072_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BKA_072_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_072_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_072_r04	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_075_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_075_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_075_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_100_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_112_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_113_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_113_r02	20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_113_r03	20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_114_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_114_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_114_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_115_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_115_r02	20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_119_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BKA_119_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BKA_119_r03	20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_119_r04	20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_121_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BKA_121_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BKA_122_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BKA_122_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BKA_122_r03	30	< 0.5	< 0.5	< 0.01	< 0.01
BKA_122_r05	30	< 0.5	< 0.5	< 0.01	< 0.01
BKA_122_r06	30	< 0.5	< 0.5	< 0.01	< 0.01
BKA_124_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BKA_125_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BKA_125_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BKA_125_r03	30	< 0.5	< 0.5	< 0.01	< 0.01
BKA_126_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_126_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_126_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_127_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_127_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_127_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_127_r04	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_129_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_129_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_129_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_129_r04	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_129_r05	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_129_r06	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_129_r07	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_129_r08	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_131_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_131_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_131_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_131_r04	50	< 0.5	< 0.5	< 0.01	< 0.01
BKA_133_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_133_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_135_r01	50	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BKA_135_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BKA_135_r03	50	< 0.5	< 0.5	< 0.01	< 0.01
BKA_135_r04	50	< 0.5	< 0.5	< 0.01	< 0.01
BKA_137_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BKA_137_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BKA_137_r03	60	< 0.5	< 0.5	< 0.01	< 0.01
BKA_138_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BKA_138_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_139_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BKA_139_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BKA_139_r03	50	< 0.5	< 0.5	< 0.01	< 0.01
BKA_139_r04	50	< 0.5	< 0.5	< 0.01	< 0.01
BKA_139_r05	50	< 0.5	< 0.5	< 0.01	< 0.01
BKA_140_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_144_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_144_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_144_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_144_r04	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_144_r05	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_144_r06	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_144_r07	50	< 0.5	< 0.5	< 0.01	< 0.01
BKA_144_r08	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_147_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_150_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_150_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_150_r03	30	< 0.5	< 0.5	< 0.01	< 0.01
BKA_155_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BKA_155_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BKA_155_r03	30	< 0.5	< 0.5	< 0.01	< 0.01
BKA_170_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BKA_170_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BKA_170_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_180_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_180_r02	20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_180_r03	20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_180_r04	20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_180_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_185_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_185_r02	20	< 0.5	< 0.5	< 0.01	< 0.01
BLA_001_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BLA_001_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BLA_001_r03	80	< 0.5	< 0.5	< 0.01	< 0.01
BLA_002_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BLA_002_r02	70	< 0.5	< 0.5	< 0.01	< 0.01
BLA_003_r01	70	< 0.5	< 0.5	< 0.01	< 0.01
BLA_003_r02	70	< 0.5	< 0.5	< 0.01	< 0.01
BLA_003_r03	70	< 0.5	< 0.5	< 0.01	< 0.01
BLA_003_r04	70	< 0.5	< 0.5	< 0.01	< 0.01
BLA_004_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BLA_004_r02	60	< 0.5	< 0.5	< 0.01	< 0.01
BLA_005_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BLA_005_r02	60	< 0.5	< 0.5	< 0.01	< 0.01
BLA_005_r03	60	< 0.5	< 0.5	< 0.01	< 0.01
BLA_005_r04	60	< 0.5	< 0.5	< 0.01	< 0.01
BLA_006_r01	70	< 0.5	< 0.5	< 0.01	< 0.01
BLA_006_r02	70	< 0.5	< 0.5	< 0.01	< 0.01
BLA_007_r01	80	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BLA_007_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BLA_008_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BLA_009_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BLA_009_r02	90	< 0.5	< 0.5	< 0.01	< 0.01
BLA_009_r03	100	< 0.5	< 0.5	< 0.01	< 0.01
BLA_009_r04	90	< 0.5	< 0.5	< 0.01	< 0.01
BLA_009_r05	90	< 0.5	< 0.5	< 0.01	< 0.01
BLA_010_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BLA_010_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BLA_010_r03	100	< 0.5	< 0.5	< 0.01	< 0.01
BLA_011_r01	125	0.5	0.5	< 0.01	< 0.01
BLA_011_r02	125	0.5	0.5	< 0.01	< 0.01
BLA_011_r03	125	0.5	0.5	< 0.01	< 0.01
BLA_013_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BLA_013_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BLA_014_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BLL_001_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BLL_001_r02	60	< 0.5	< 0.5	< 0.01	< 0.01
BLL_001_r03	50	< 0.5	< 0.5	< 0.01	< 0.01
BLL_003_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BLL_003_r02	60	< 0.5	< 0.5	< 0.01	< 0.01
BLL_003_r03	60	< 0.5	< 0.5	< 0.01	< 0.01
BLL_003_r04	50	< 0.5	< 0.5	< 0.01	< 0.01
BLL_003_r05	60	< 0.5	< 0.5	< 0.01	< 0.01
BLL_005_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BLL_005_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BLL_005_r03	60	< 0.5	< 0.5	< 0.01	< 0.01
BLL_005_r04	60	< 0.5	< 0.5	< 0.01	< 0.01
BLL_007_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BLL_009_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_009_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_009_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_009_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_011_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_011_r02	20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_011_r03	20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_011_r04	20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_011_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_011_r06	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_011_r07	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_013_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_015_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_015_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_017_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_017_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_017_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_017_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_017_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_019_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_019_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_019_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_019_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_021_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_021_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_023_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_023_r02	20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_023_r03	20	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BLL_025_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BLL_027_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BLL_027_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BLL_031_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_031_r02	20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_031_r03	20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_033_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BLL_033_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BLL_033_r03	30	< 0.5	< 0.5	< 0.01	< 0.01
BLL_035_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_035_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BLL_035_r03	20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_039_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BLU_001_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLU_001_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLU_001_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLU_001_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLU_001_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLU_005_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLU_005_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLU_005_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLU_010_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLU_010_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLU_015_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLU_015_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLU_015_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLU_015_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_001_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_001_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_001_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_001_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_003_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_003_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_003_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_003_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_005_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_005_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_007_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_009_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_009_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BMA_011_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BMA_011_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BMA_011_r03	30	< 0.5	< 0.5	< 0.01	< 0.01
BMA_011_r04	30	< 0.5	< 0.5	< 0.01	< 0.01
BMA_011_r05	30	< 0.5	< 0.5	< 0.01	< 0.01
BMA_011_r06	30	< 0.5	< 0.5	< 0.01	< 0.01
BMA_011_r07	30	< 0.5	< 0.5	< 0.01	< 0.01
BMA_013_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BMA_015_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BMA_015_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BMA_015_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BMA_017_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BMA_017_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BMA_017_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BMA_017_r04	40	< 0.5	< 0.5	< 0.01	< 0.01
BMA_019_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BMA_019_r02	50	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BMA_019_r03	50	< 0.5	< 0.5	< 0.01	< 0.01
BMA_019_r04	50	< 0.5	< 0.5	< 0.01	< 0.01
BMA_023_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BMA_025_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_025_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_025_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_027_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_027_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_027_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_027_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_029_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_029_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_029_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_031_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_033_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_035_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_035_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_037_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_039_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BMA_055_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BMA_055_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BMA_055_r03	30	< 0.5	< 0.5	< 0.01	< 0.01
BMA_057_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BMA_057_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BMA_057_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BMA_057_r04	40	< 0.5	< 0.5	< 0.01	< 0.01
BMA_057_r05	40	< 0.5	< 0.5	< 0.01	< 0.01
BMA_057_r06	40	< 0.5	< 0.5	< 0.01	< 0.01
BMA_057_r07	40	< 0.5	< 0.5	< 0.01	< 0.01
BMA_057_r08	30	< 0.5	< 0.5	< 0.01	< 0.01
BMA_057_r09	30	< 0.5	< 0.5	< 0.01	< 0.01
BMA_059_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BMA_059_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BMA_059_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BMA_059_r04	40	< 0.5	< 0.5	< 0.01	< 0.01
BMA_059_r05	40	< 0.5	< 0.5	< 0.01	< 0.01
BMA_059_r06	40	< 0.5	< 0.5	< 0.01	< 0.01
BMA_061_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BMA_061_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BMA_063_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BMA_063_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BMA_063_r03	50	< 0.5	< 0.5	< 0.01	< 0.01
BMA_063_r04	50	< 0.5	< 0.5	< 0.01	< 0.01
BMA_063_r05	50	< 0.5	< 0.5	< 0.01	< 0.01
BMA_063_r06	50	< 0.5	< 0.5	< 0.01	< 0.01
BMA_063_r07	40	< 0.5	< 0.5	< 0.01	< 0.01
BMA_063_r08	50	< 0.5	< 0.5	< 0.01	< 0.01
BMA_063_r09	50	< 0.5	< 0.5	< 0.01	< 0.01
BMI_001_r01	400	4.5	4.5	0.08	0.01
BMI_001_r02	475	5.5	5.5	0.10	0.02
BMI_001_r04	500	6.0	6.0	0.10	0.02
BMI_003_r01	375	3.5	3.5	0.07	0.01
BMI_003_r02	375	4.0	4.0	0.07	0.01
BMI_003_r03	425	5.0	5.0	0.09	0.02
BNN_001_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_001_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_001_r03	30	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BNN_001_r04	20	< 0.5	< 0.5	< 0.01	< 0.01
BNN_001_r05	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_005_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_005_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_005_r03	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_005_r04	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_007_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_007_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_007_r03	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_007_r04	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_009_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_009_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_011_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_011_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_011_r03	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_011_r04	40	< 0.5	< 0.5	< 0.01	< 0.01
BNN_011_r05	40	< 0.5	< 0.5	< 0.01	< 0.01
BNN_013_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_013_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_013_r03	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_013_r04	40	< 0.5	< 0.5	< 0.01	< 0.01
BNN_013_r05	40	< 0.5	< 0.5	< 0.01	< 0.01
BNN_013_r06	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_013_r07	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_017_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BNN_017_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BNN_017_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BNN_017_r04	40	< 0.5	< 0.5	< 0.01	< 0.01
BNN_019_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BNN_021_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BNN_021_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BNN_021_r03	50	< 0.5	< 0.5	< 0.01	< 0.01
BNN_023_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BNN_023_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BNN_023_r03	60	< 0.5	< 0.5	< 0.01	< 0.01
BNN_023_r04	60	< 0.5	< 0.5	< 0.01	< 0.01
BNN_025_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BNN_025_r02	60	< 0.5	< 0.5	< 0.01	< 0.01
BNN_027_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BNN_029_r01	70	< 0.5	< 0.5	< 0.01	< 0.01
BNN_029_r02	70	< 0.5	< 0.5	< 0.01	< 0.01
BNN_031_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BNN_033_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BNN_033_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BNN_033_r03	80	< 0.5	< 0.5	< 0.01	< 0.01
BNN_037_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BNN_037_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BNN_037_r03	100	< 0.5	< 0.5	< 0.01	< 0.01
BNN_039_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BNN_041_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BNN_043_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BNN_043_r02	90	< 0.5	< 0.5	< 0.01	< 0.01
BNN_045_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BNN_045_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BNN_045_r03	80	< 0.5	< 0.5	< 0.01	< 0.01
BNN_045_r04	80	< 0.5	< 0.5	< 0.01	< 0.01
BNN_047_r01	70	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BNN_047_r02	70	< 0.5	< 0.5	< 0.01	< 0.01
BNN_047_r03	70	< 0.5	< 0.5	< 0.01	< 0.01
BNN_049_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BNN_049_r02	60	< 0.5	< 0.5	< 0.01	< 0.01
BNN_051_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BNN_051_r02	60	< 0.5	< 0.5	< 0.01	< 0.01
BNN_051_r03	50	< 0.5	< 0.5	< 0.01	< 0.01
BNN_053_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BNN_055_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BNN_057_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BNN_057_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BNN_059_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BNN_059_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BNN_059_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BNN_059_r04	40	< 0.5	< 0.5	< 0.01	< 0.01
BNN_061_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BNN_061_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BNN_061_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BNN_063_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_063_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_063_r03	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_063_r04	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_063_r05	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_064_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BNN_064_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BNN_064_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BNN_064_r04	40	< 0.5	< 0.5	< 0.01	< 0.01
BNN_064_r05	40	< 0.5	< 0.5	< 0.01	< 0.01
BNN_065_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_065_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_065_r03	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_065_r04	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_065_r05	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_067_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_067_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_067_r03	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_069_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_069_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_071_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_071_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BNN_073_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BNN_073_r02	20	< 0.5	< 0.5	< 0.01	< 0.01
BNN_075_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BNN_075_r02	20	< 0.5	< 0.5	< 0.01	< 0.01
BNN_075_r03	20	< 0.5	< 0.5	< 0.01	< 0.01
BNN_075_r04	20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_001_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_003_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_003_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_003_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_003_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_005_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_005_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_005_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_005_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_005_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_005_r07	< 20	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BNO_005_ro6	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_007_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_007_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_007_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_007_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_009_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_015_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_015_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_021_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_021_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_021_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_023_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_023_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_023_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_023_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_023_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_023_r06	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_023_r07	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_023_r08	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_025_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_025_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_025_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_027_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_031_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_031_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_035_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_035_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_035_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_037_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_037_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_039_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_039_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_043_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_043_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_043_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_043_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_045_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_047_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_047_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_047_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_049_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_049_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_051_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_051_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_053_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_053_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_053_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_053_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_055_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_055_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_055_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_055_r04	20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_055_r05	30	< 0.5	< 0.5	< 0.01	< 0.01
BNO_055_r06	20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_057_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_057_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BNR_003_r01	30	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BNR_003_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BNR_003_r03	30	< 0.5	< 0.5	< 0.01	< 0.01
BNR_007_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BNR_009_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BNR_009_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BNR_013_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BNR_013_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BNR_015_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BNR_015_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BNR_015_r03	50	< 0.5	< 0.5	< 0.01	< 0.01
BNR_015_r04	50	< 0.5	< 0.5	< 0.01	< 0.01
BNR_019_r01	70	< 0.5	< 0.5	< 0.01	< 0.01
BNR_019_r02	70	< 0.5	< 0.5	< 0.01	< 0.01
BNR_019_r03	70	< 0.5	< 0.5	< 0.01	< 0.01
BNR_019_r04	70	< 0.5	< 0.5	< 0.01	< 0.01
BNR_019_r05	70	< 0.5	< 0.5	< 0.01	< 0.01
BNR_019_r06	60	< 0.5	< 0.5	< 0.01	< 0.01
BNR_020_r01	70	< 0.5	< 0.5	< 0.01	< 0.01
BNR_020_r02	70	< 0.5	< 0.5	< 0.01	< 0.01
BNR_020_r03	70	< 0.5	< 0.5	< 0.01	< 0.01
BNR_021_r01	70	< 0.5	< 0.5	< 0.01	< 0.01
BNR_021_r02	60	< 0.5	< 0.5	< 0.01	< 0.01
BNR_021_r03	70	< 0.5	< 0.5	< 0.01	< 0.01
BNR_021_r04	60	< 0.5	< 0.5	< 0.01	< 0.01
BNR_023_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BNR_025_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BNR_025_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BNR_025_r05	50	< 0.5	< 0.5	< 0.01	< 0.01
BNR_027_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BNR_029_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BNR_029_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BNR_029_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BNR_031_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BNR_031_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BNR_033_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BNR_033_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BNR_033_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BNR_035_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BNR_035_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BNR_039_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BNR_039_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BNR_041_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BNR_041_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BOL_001_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BOL_001_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BOL_001_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BOL_001_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BOL_001_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BOL_001_r06	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BOL_001_r07	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BOL_001_r08	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BOL_001_r09	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BOL_001_r10	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BOL_010_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BOL_120_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BOL_130_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BOL_150_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BOL_150_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BOL_150_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BPA_001_r01	125	0.5	0.5	< 0.01	< 0.01
BPA_001_r02	125	0.5	0.5	< 0.01	< 0.01
BPA_007_r01	275	2.0	2.0	0.03	0.01
BPA_010_r01	175	1.0	1.0	< 0.01	< 0.01
BPA_012_r01	150	1.0	1.0	< 0.01	< 0.01
BPA_012_r02	175	1.0	1.0	< 0.01	< 0.01
BPA_014_r01	150	1.0	1.0	< 0.01	< 0.01
BPH_001_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BPH_001_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BPH_001_r03	50	< 0.5	< 0.5	< 0.01	< 0.01
BPH_001_r04	50	< 0.5	< 0.5	< 0.01	< 0.01
BPH_002_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BPH_002_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BPH_002_r03	60	< 0.5	< 0.5	< 0.01	< 0.01
BPH_002_r04	50	< 0.5	< 0.5	< 0.01	< 0.01
BPH_003_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BPH_003_r02	60	< 0.5	< 0.5	< 0.01	< 0.01
BPH_003_r03	60	< 0.5	< 0.5	< 0.01	< 0.01
BPH_003_r04	60	< 0.5	< 0.5	< 0.01	< 0.01
BPH_004_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BPH_004_r02	60	< 0.5	< 0.5	< 0.01	< 0.01
BPH_005_r01	70	< 0.5	< 0.5	< 0.01	< 0.01
BPH_005_r02	70	< 0.5	< 0.5	< 0.01	< 0.01
BPH_005_r03	70	< 0.5	< 0.5	< 0.01	< 0.01
BPH_005_r04	70	< 0.5	< 0.5	< 0.01	< 0.01
BPH_005_r05	70	< 0.5	< 0.5	< 0.01	< 0.01
BPH_006_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BPH_006_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BPH_006_r03	90	< 0.5	< 0.5	< 0.01	< 0.01
BPH_007_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BPH_007_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BPH_007_r03	80	< 0.5	< 0.5	< 0.01	< 0.01
BPH_007_r04	90	< 0.5	< 0.5	< 0.01	< 0.01
BPH_008_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BPH_009_r01	70	< 0.5	< 0.5	< 0.01	< 0.01
BPH_009_r02	60	< 0.5	< 0.5	< 0.01	< 0.01
BPH_010_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BPH_010_r02	60	< 0.5	< 0.5	< 0.01	< 0.01
BPH_010_r03	60	< 0.5	< 0.5	< 0.01	< 0.01
BPH_011_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BPH_012_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BPH_012_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BPH_012_r03	50	< 0.5	< 0.5	< 0.01	< 0.01
BPH_013_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BPH_013_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BPH_013_r03	50	< 0.5	< 0.5	< 0.01	< 0.01
BPH_014_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BPH_014_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BPH_014_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BPP_001_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BPP_010_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BPP_010_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BPP_011_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BRA_001_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BRA_001_r02	50	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BRA_001_r03	50	< 0.5	< 0.5	< 0.01	< 0.01
BRA_002_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BRA_003_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BRA_007_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BRA_007_r02	60	< 0.5	< 0.5	< 0.01	< 0.01
BRA_009_r01	70	< 0.5	< 0.5	< 0.01	< 0.01
BRA_009_r02	70	< 0.5	< 0.5	< 0.01	< 0.01
BRA_014_r01	70	< 0.5	< 0.5	< 0.01	< 0.01
BRA_017_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BRA_023_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BRA_023_r02	125	0.5	0.5	< 0.01	< 0.01
BRA_023_r03	125	0.5	0.5	< 0.01	< 0.01
BRA_025_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BRA_025_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BRA_027_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BRA_027_r02	125	0.5	0.5	< 0.01	< 0.01
BRA_030_r01	125	0.5	0.5	< 0.01	< 0.01
BRA_032_r01	125	0.5	0.5	< 0.01	< 0.01
BRA_032_r02	125	0.5	0.5	< 0.01	< 0.01
BRA_032_r03	125	0.5	0.5	< 0.01	< 0.01
BRA_032_r04	125	0.5	0.5	< 0.01	< 0.01
BRA_032_r05	125	0.5	0.5	< 0.01	< 0.01
BRA_034_r01	125	0.5	0.5	< 0.01	< 0.01
BRA_034_r02	125	0.5	0.5	< 0.01	< 0.01
BRA_034_r03	125	0.5	0.5	< 0.01	< 0.01
BRA_034_r04	125	0.5	0.5	< 0.01	< 0.01
BRA_036_r01	150	0.5	0.5	< 0.01	< 0.01
BRA_036_r02	125	0.5	0.5	< 0.01	< 0.01
BRA_038_r01	150	0.5	0.5	< 0.01	< 0.01
BRA_038_r02	150	0.5	0.5	< 0.01	< 0.01
BRA_038_r03	150	0.5	0.5	< 0.01	< 0.01
BRA_040_r01	150	1.0	1.0	< 0.01	< 0.01
BRA_040_r02	150	1.0	1.0	< 0.01	< 0.01
BRA_040_r03	175	1.0	1.0	< 0.01	< 0.01
BRA_042_r01	150	1.0	1.0	< 0.01	< 0.01
BRA_042_r02	150	1.0	1.0	< 0.01	< 0.01
BRA_042_r03	175	1.0	1.0	0.01	< 0.01
BRA_042_r04	150	1.0	1.0	< 0.01	< 0.01
BRA_044_r01	175	1.0	1.0	< 0.01	< 0.01
BRA_046_r01	200	1.0	1.0	0.01	< 0.01
BRA_049_r01	250	2.0	2.0	0.02	< 0.01
BRA_049_r02	225	1.5	1.5	0.02	< 0.01
BRA_049_r03	250	2.0	2.0	0.02	< 0.01
BRA_050_r01	250	2.0	2.0	0.03	< 0.01
BRA_050_r02	275	2.0	2.0	0.03	< 0.01
BRA_050_r03	275	2.5	2.5	0.03	0.01
BRA_050_r04	250	2.0	2.0	0.03	< 0.01
BRA_052_r01	325	3.0	3.0	0.05	0.01
BRA_052_r02	325	3.0	3.0	0.05	0.01
BRA_054_r01	325	3.0	3.0	0.05	0.01
BRA_054_r02	350	3.5	3.5	0.06	0.01
BRA_056_r01	350	3.5	3.5	0.06	0.01
BRA_056_r02	425	4.5	4.5	0.08	0.02
BRA_056_r03	450	5.0	5.0	0.09	0.02
BRA_058_r01	450	5.0	5.0	0.09	0.02
BRA_058_r02	500	6.0	6.0	0.10	0.02
BRA_058_r03	450	5.0	5.0	0.09	0.02

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BRA_060_r01	425	5.0	5.0	0.09	0.02
BRA_060_r02	500	6.5	6.5	0.10	0.02
BRA_060_r03	600	7.5	7.5	0.10	0.02
BRA_060_r04	750	9.0	9.0	0.10	0.03
BRA_060_r05	475	6.0	6.0	0.10	0.02
BRA_062_r01	600	7.5	7.5	0.10	0.02
BRA_066_r01	750	9.0	9.0	0.10	0.03
BRA_066_r02	900	9.5	9.5	0.10	0.04
BRA_066_r03	1000	9.5	9.5	0.10	0.10
BRA_066_r04	1050	9.5	9.5	0.10	0.14
BRA_068_r01	800	9.5	9.5	0.10	0.03
BRA_068_r02	950	9.5	9.5	0.10	0.05
BRA_068_r03	900	9.5	9.5	0.10	0.03
BRA_068_r04	950	9.5	9.5	0.10	0.08
BRA_070_r01	1050	9.5	9.5	0.10	0.13
BRA_070_r02	1100	9.5	9.5	0.08	0.18
BRA_070_r03	1050	9.5	9.5	0.09	0.16
BRA_070_r04	1100	9.5	9.5	0.07	0.19
BRA_070_r05	1050	9.5	9.5	0.08	0.16
BRA_072_r01	1200	7.5	7.5	0.06	0.23
BRA_074_r01	1150	9.5	9.5	0.06	0.21
BRA_074_r02	1150	9.5	9.5	0.06	0.23
BRA_078_r01	1200	6.0	6.0	0.06	0.23
BRA_078_r02	1200	4.0	4.0	0.06	0.23
BRA_080_r01	1200	2.0	2.0	0.06	0.11
BRA_080_r02	1200	2.0	2.0	0.06	0.13
BRA_080_r03	1150	2.5	2.5	0.06	0.04
BRA_080_r04	1200	2.0	2.0	0.06	0.20
BRA_082_r01	1200	2.0	2.0	0.06	0.13
BRA_082_r02	1200	2.5	2.5	0.06	0.07
BRA_082_r03	1200	2.5	2.5	0.06	0.04
BRA_084_r01	1150	2.5	2.5	0.06	0.04
BRA_086_r01	1150	2.5	2.5	0.06	0.04
BRA_086_r02	1150	2.5	2.5	0.06	0.04
BRA_086_r03	1100	2.5	2.5	0.05	0.04
BRA_086_r04	1100	2.5	2.5	0.05	0.04
BRA_086_r05	1100	2.5	2.5	0.05	0.04
BRA_086_r06	1200	2.5	2.5	0.06	0.05
BRA_088_r01	1050	2.5	2.5	0.05	0.04
BRA_088_r02	1000	2.5	2.5	0.04	0.03
BRA_088_r03	1150	2.5	2.5	0.05	0.04
BRA_090_r01	1100	2.5	2.5	0.05	0.04
BRA_090_r02	1100	2.5	2.5	0.05	0.04
BRA_090_r03	1000	2.5	2.5	0.05	0.03
BRA_092_r01	1100	2.5	2.5	0.05	0.04
BRA_092_r02	1050	2.5	2.5	0.05	0.04
BRA_092_r03	1050	2.5	2.5	0.05	0.04
BRA_092_r04	1050	2.5	2.5	0.05	0.04
BRA_096_r01	1150	2.5	2.5	0.06	0.04
BRA_097_r01	1200	2.0	2.0	0.06	0.15
BRA_097_r02	1200	2.5	2.5	0.06	0.21
BRA_097_r03	1200	2.5	2.5	0.06	0.21
BRA_097_r04	1200	7.5	7.5	0.06	0.23
BRA_099_r01	1200	9.0	9.0	0.06	0.22
BRA_099_r02	1200	8.0	8.0	0.06	0.22
BRA_101_r01	1200	9.0	9.0	0.06	0.22
BRA_101_r02	1200	9.5	9.5	0.06	0.22

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BRA_101_r03	1200	7.5	7.5	0.06	0.22
BRA_101_r04	1200	8.0	8.0	0.06	0.22
BRA_104_r01	1150	9.5	9.5	0.06	0.22
BRA_104_r02	1150	9.5	9.5	0.06	0.22
BRA_104_r03	1200	9.5	9.5	0.06	0.22
BRA_104_r04	1150	9.5	9.5	0.08	0.21
BRA_104_r05	1150	9.5	9.5	0.06	0.22
BRA_106_r01	1100	9.5	9.5	0.09	0.19
BRA_106_r02	1000	9.5	9.5	0.10	0.13
BRA_106_r03	1050	9.5	9.5	0.10	0.14
BRA_106_r04	1050	9.5	9.5	0.08	0.17
BRA_111_r01	700	9.0	9.0	0.10	0.03
BRA_111_r02	700	8.5	8.5	0.10	0.03
BRA_111_r03	600	7.5	7.5	0.10	0.02
BRA_112_r01	550	7.0	7.0	0.10	0.02
BRA_114_r01	600	8.0	8.0	0.10	0.02
BRA_114_r02	475	5.5	5.5	0.10	0.02
BRA_115_r01	400	4.5	4.5	0.08	0.01
BRA_122_r01	250	2.0	2.0	0.02	< 0.01
BRA_136_r01	150	0.5	0.5	< 0.01	< 0.01
BRA_136_r02	150	0.5	0.5	< 0.01	< 0.01
BRA_136_r03	125	0.5	0.5	< 0.01	< 0.01
BRA_138_r01	150	0.5	0.5	< 0.01	< 0.01
BRA_138_r02	125	0.5	0.5	< 0.01	< 0.01
BRA_138_r03	125	0.5	0.5	< 0.01	< 0.01
BRA_138_r04	125	0.5	0.5	< 0.01	< 0.01
BRA_140_r01	125	0.5	0.5	< 0.01	< 0.01
BRA_140_r02	125	0.5	0.5	< 0.01	< 0.01
BRA_140_r03	100	< 0.5	< 0.5	< 0.01	< 0.01
BRA_140_r04	125	0.5	0.5	< 0.01	< 0.01
BRA_142_r01	125	0.5	0.5	< 0.01	< 0.01
BRA_142_r02	125	0.5	0.5	< 0.01	< 0.01
BRA_144_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BRA_144_r02	125	0.5	0.5	< 0.01	< 0.01
BRA_144_r03	100	< 0.5	< 0.5	< 0.01	< 0.01
BRA_144_r04	90	< 0.5	< 0.5	< 0.01	< 0.01
BRA_146_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BRA_146_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BRA_146_r03	100	< 0.5	< 0.5	< 0.01	< 0.01
BRA_146_r04	90	< 0.5	< 0.5	< 0.01	< 0.01
BRA_148_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BRA_150_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BRA_150_r02	90	< 0.5	< 0.5	< 0.01	< 0.01
BRA_152_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BRA_152_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BRA_154_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BRA_154_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BRA_154_r03	80	< 0.5	< 0.5	< 0.01	< 0.01
BRA_156_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BRA_156_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BRA_156_r03	90	< 0.5	< 0.5	< 0.01	< 0.01
BRA_160_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BRA_160_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BRA_160_r03	50	< 0.5	< 0.5	< 0.01	< 0.01
BRA_162_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BRA_164_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BRA_164_r02	50	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BRA_164_r03	50	< 0.5	< 0.5	< 0.01	< 0.01
BRA_166_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BRA_168_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BRE_016_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_016_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_016_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_016_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_016_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_016_r06	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_r01	60	0.5	0.5	< 0.01	< 0.01
BRE_030_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_r03	50	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_r04	40	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_r05	40	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_r06	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_r07	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_r08	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_r09	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_r10	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_r11	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_r12	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_r13	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_r14	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_r15	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_r16	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_r17	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_r18	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_r19	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_r20	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_r21	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_r22	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_r23	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_r24	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_r25	20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_r26	20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_r27	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_r28	20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_040_r01	1100	4.5	4.5	0.03	0.17
BRE_040_r02	1100	5.5	5.5	0.02	0.17
BRE_040_r03	1050	6.5	6.5	0.02	0.17
BRE_040_r04	600	6.5	6.5	0.06	0.04
BRE_040_r05	500	5.5	5.5	0.06	< 0.01
BRE_055_r01	1150	4.5	4.5	0.05	0.04
BRE_055_r02	1100	4.5	4.5	0.05	0.04
BRE_055_r03	1200	4.5	4.5	0.05	0.04
BRE_055_r04	1100	4.5	4.5	0.05	0.04
BRE_055_r05	1050	4.0	4.0	0.05	0.03
BRE_057_r01	1150	4.5	4.5	0.05	0.04
BRE_057_r02	1100	4.5	4.5	0.05	0.04
BRE_057_r03	1100	4.5	4.5	0.05	0.04
BRE_057_r04	1150	4.5	4.5	0.05	0.04
BRE_057_r05	1300	4.5	4.5	0.06	0.08
BRE_057_r06	1200	4.5	4.5	0.05	0.04
BRE_057_r07	1150	4.5	4.5	0.05	0.04
BRE_059_r01	1350	3.5	4.5	0.06	0.21
BRE_059_r02	1350	4.0	5.0	0.06	0.21
BRE_059_r03	1350	4.0	5.5	0.06	0.21

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BRE_061_r02	1350	4.0	4.5	0.06	0.21
BRE_061_r03	1350	5.0	6.5	0.06	0.21
BRE_061_r04	1350	6.5	8.0	0.06	0.21
BRE_063_r01	1250	7.0	8.5	0.12	0.14
BRE_063_r02	1350	7.0	8.5	0.06	0.22
BRE_063_r03	1350	7.0	8.5	0.08	0.20
BRE_063_r04	1300	7.0	8.5	0.10	0.18
BRE_065_r01	1200	7.0	8.5	0.13	0.07
BRE_065_r02	1000	6.0	8.0	0.12	0.03
BRE_065_r03	1200	7.0	8.5	0.12	0.10
BRE_070_r01	900	2.0	3.5	0.09	0.03
BRE_070_r02	900	2.0	3.0	0.08	0.03
BRE_070_r03	950	3.0	3.0	0.04	0.03
BRE_070_r04	950	3.0	3.0	0.04	0.03
BRE_070_r05	950	2.5	2.5	0.04	0.03
BRE_075_r01	1100	4.0	4.0	0.05	0.04
BRE_075_r02	950	3.0	3.0	0.04	0.03
BRE_075_r03	1000	3.5	3.5	0.04	0.03
BRE_077_r01	1150	4.0	4.0	0.05	0.04
BRE_077_r02	1150	4.0	4.0	0.05	0.04
BRE_077_r03	1200	4.0	4.0	0.05	0.04
BRE_077_r04	1200	4.0	4.0	0.05	0.04
BRE_080_r01	1350	3.5	5.0	0.06	0.21
BRE_080_r02	1300	4.0	4.0	0.06	0.06
BRE_080_r03	1350	4.0	4.0	0.06	0.20
BRE_083_r01	1300	6.5	8.0	0.08	0.20
BRE_083_r02	1300	6.5	8.0	0.08	0.19
BRE_083_r03	1250	6.5	8.0	0.08	0.14
BRE_083_r04	1350	6.5	7.5	0.06	0.21
BRE_089_r01	1200	6.0	8.0	0.08	0.09
BRE_089_r02	1100	5.5	8.0	0.08	0.03
BRE_089_r03	1050	5.0	7.5	0.08	0.03
BRE_090_r01	1250	3.0	3.0	0.06	0.16
BRE_140_r01	1050	3.0	3.0	0.05	0.04
BRE_140_r02	1100	3.0	3.0	0.05	0.04
BRE_143_r01	1250	3.0	3.0	0.06	0.19
BRE_143_r02	1250	3.0	3.5	0.06	0.21
BRE_143_r03	1250	2.5	3.0	0.06	0.21
BRE_148_r01	1250	3.0	3.5	0.06	0.21
BRE_148_r02	1250	4.5	5.0	0.06	0.21
BRE_148_r03	1250	7.0	7.5	0.06	0.21
BRE_148_r04	1250	3.0	3.0	0.06	0.16
BRE_154_r01	1100	7.0	8.0	0.10	0.06
BRE_154_r02	1000	6.5	8.0	0.10	0.03
BRE_154_r03	1100	7.0	8.0	0.10	0.04
BRE_154_r04	950	5.5	7.5	0.09	0.03
BRE_154_r05	900	4.5	6.5	0.09	0.02
BRE_154_r06	850	4.0	6.0	0.09	0.02
BRE_154_r07	900	4.5	6.5	0.09	0.02
BRE_165_r01	550	7.0	7.0	0.06	0.04
BRE_167_r01	350	5.0	5.0	0.07	< 0.01
BRE_167_r02	375	5.0	5.0	0.07	< 0.01
BRE_167_r03	375	5.0	5.0	0.07	< 0.01
BRE_167_r04	425	5.5	5.5	0.07	0.02
BRE_167_r05	275	4.5	4.5	0.08	< 0.01
BRE_167_r06	350	5.5	5.5	0.07	< 0.01
BRE_167_r07	325	5.0	5.0	0.07	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BRE_167_r08	300	4.5	4.5	0.07	< 0.01
BRE_167_r09	275	4.5	4.5	0.07	< 0.01
BRE_167_r10	250	4.0	4.0	0.07	< 0.01
BRE_167_r11	200	3.5	3.5	0.07	< 0.01
BRE_167_r12	250	4.0	4.0	0.07	< 0.01
BRE_167_r13	250	4.0	4.0	0.07	< 0.01
BRE_167_r14	275	4.5	4.5	0.07	< 0.01
BRE_167_r15	250	4.0	4.0	0.08	< 0.01
BRE_167_r16	275	4.5	4.5	0.08	< 0.01
BRE_167_r17	400	6.0	6.0	0.09	< 0.01
BRE_187_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BRE_187_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BRE_189_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BRE_189_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BRE_189_r03	80	< 0.5	< 0.5	< 0.01	< 0.01
BRE_191_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BRE_191_r02	90	< 0.5	< 0.5	< 0.01	< 0.01
BRE_195_r01	100	0.5	0.5	< 0.01	< 0.01
BRE_195_r02	100	< 0.5	0.5	< 0.01	< 0.01
BRE_195_r03	90	< 0.5	0.5	< 0.01	< 0.01
BRE_195_r04	100	0.5	0.5	< 0.01	< 0.01
BRE_201_r01	125	1.0	1.0	0.02	< 0.01
BRE_210_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BRE_210_r02	70	< 0.5	< 0.5	< 0.01	< 0.01
BRE_216_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BRE_216_r02	60	< 0.5	< 0.5	< 0.01	< 0.01
BRE_216_r03	70	< 0.5	< 0.5	< 0.01	< 0.01
BRE_218_r01	70	< 0.5	< 0.5	< 0.01	< 0.01
BRE_232_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BRE_232_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BRE_232_r03	50	< 0.5	< 0.5	< 0.01	< 0.01
BRE_236_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BRE_236_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BRE_246_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BRE_246_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BRE_246_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BRE_246_r04	40	< 0.5	< 0.5	< 0.01	< 0.01
BRE_255_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BRE_255_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BRE_255_r03	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_255_r04	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_260_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BRE_260_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_260_r03	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_265_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_265_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_265_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_275_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BRE_275_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BRE_275_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BRE_275_r04	20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_275_r06	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_285_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BRE_285_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BRE_285_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BRE_285_r04	40	< 0.5	< 0.5	< 0.01	< 0.01
BRE_285_r05	40	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BRE_285_r06	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_285_r07	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_290_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_295_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_295_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_295_r03	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_295_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_305_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_305_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_305_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_315_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_315_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_315_r05	20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_315_r06	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_320_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_320_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_320_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BRE_325_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_325_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_325_r03	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_325_r04	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_335_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_335_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_335_r03	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_335_r04	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_335_r05	20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_345_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_350_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_350_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_355_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_355_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_355_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_355_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_365_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_365_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_365_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_365_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_375_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_375_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_375_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_375_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_375_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_375_r06	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_375_r07	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_385_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_385_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_385_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_390_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_390_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_390_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_390_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_395_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_395_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_400_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_505_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_505_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_505_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BRE_505_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_505_r07	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_505_r08	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_644_r01	1250	4.5	4.5	0.05	0.04
BRE_644_r02	1200	4.5	4.5	0.05	0.04
BRL_015_r01	1500	4.0	6.0	0.06	0.22
BRL_015_r02	1500	5.0	6.5	0.06	0.22
BRL_017_r01	1500	7.0	8.5	0.06	0.22
BRL_017_r02	1500	7.0	9.0	0.06	0.22
BRL_017_r03	1450	7.0	9.0	0.10	0.16
BRL_019_r01	1500	7.0	9.0	0.06	0.22
BRL_019_r02	1500	7.0	9.0	0.06	0.22
BRL_019_r04	1400	7.0	9.0	0.10	0.12
BRL_019_r05	1350	7.0	9.0	0.10	0.06
BRL_021_r01	1400	7.0	9.0	0.10	0.13
BRL_022_r01	1000	4.0	5.5	0.13	0.03
BRL_022_r02	1000	4.0	5.0	0.13	0.03
BRL_022_r03	950	1.5	3.0	0.11	0.03
BRL_024_r01	950	2.0	3.5	0.13	0.03
BRL_024_r02	950	1.5	3.5	0.12	0.03
BRL_026_r01	950	1.5	3.0	0.11	0.03
BRL_026_r02	950	2.0	3.0	0.10	0.03
BRL_026_r03	1000	2.5	2.5	0.06	0.03
BRL_028_r01	1050	2.5	2.5	0.05	0.04
BRL_028_r02	1050	2.5	2.5	0.05	0.04
BRL_028_r03	1000	2.5	2.5	0.04	0.03
BRL_030_r01	1050	2.5	2.5	0.06	0.04
BRL_030_r02	1100	2.5	2.5	0.05	0.04
BRL_030_r04	1100	2.5	2.5	0.05	0.04
BRL_030_r05	1050	2.5	2.5	0.05	0.04
BRL_032_r01	1150	2.5	2.5	0.05	0.04
BRL_034_r01	1100	2.5	2.5	0.05	0.04
BRL_036_r07	1150	2.5	2.5	0.05	0.04
BRL_036_r09	1200	2.5	2.5	0.06	0.04
BRL_038_r01	1150	2.5	2.5	0.06	0.04
BRL_038_r02	1200	2.5	2.5	0.06	0.04
BRL_038_r03	1200	2.5	2.5	0.06	0.05
BRL_038_r04	1200	2.5	2.5	0.06	0.04
BRL_038_r05	1200	2.5	2.5	0.06	0.08
BRL_038_r06	1200	2.5	2.5	0.06	0.06
BRL_040_r01	1150	2.5	2.5	0.06	0.04
BRL_040_r02	1200	2.5	2.5	0.06	0.05
BRL_040_r03	1200	2.5	2.5	0.06	0.05
BRL_040_r08	1200	2.5	2.5	0.06	0.04
BRL_042_r01	1200	2.5	2.5	0.06	0.05
BRL_042_r02	1200	2.5	2.5	0.06	0.05
BRL_042_r03	1200	2.5	2.5	0.06	0.05
BRL_042_r04	1200	2.5	2.5	0.06	0.08
BRL_042_r05	1200	2.0	2.0	0.06	0.10
BRL_042_r06	1200	2.0	2.0	0.06	0.14
BRL_044_r01	1200	2.5	2.5	0.06	0.09
BRL_047_r01	1200	8.5	8.5	0.06	0.23
BRL_048_r01	1250	9.0	9.0	0.06	0.24
BRL_050_r01	1200	9.5	9.5	0.06	0.23
BRL_050_r02	1000	9.5	9.5	0.10	0.10
BRL_050_r03	1050	9.5	9.5	0.09	0.15
BRL_052_r01	1150	9.5	9.5	0.09	0.20

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BRL_052_r02	1150	9.5	9.5	0.09	0.20
BRL_052_r03	1100	9.5	9.5	0.10	0.16
BRL_052_r04	1050	9.5	9.5	0.09	0.13
BRL_052_r05	1050	9.5	9.5	0.10	0.12
BRL_054_r01	1000	10.0	10.0	0.10	0.10
BRL_054_r02	900	9.5	9.5	0.11	0.04
BRL_054_r03	800	9.5	9.5	0.11	0.03
BRL_054_r04	800	9.5	9.5	0.10	0.03
BRL_054_r05	700	9.0	9.0	0.10	0.03
BRL_056_r01	800	9.5	9.5	0.11	0.03
BRL_056_r02	800	9.5	9.5	0.11	0.03
BRL_056_r03	700	9.0	9.0	0.11	0.03
BRL_056_r04	650	8.0	8.0	0.11	0.03
BRL_058_r01	550	6.5	6.5	0.11	0.02
BRL_060_r01	550	7.0	7.0	0.11	0.02
BRL_060_r02	550	7.0	7.0	0.11	0.02
BRL_062_r01	475	5.5	5.5	0.10	0.02
BRL_062_r02	500	6.0	6.0	0.10	0.02
BRL_062_r04	450	5.0	5.0	0.09	0.02
BRL_062_r05	400	4.5	4.5	0.08	0.02
BRL_064_r01	375	4.0	4.0	0.08	0.01
BRL_066_r01	300	2.5	2.5	0.04	0.01
BRL_066_r02	325	3.0	3.0	0.05	0.01
BRL_068_r01	350	3.0	3.0	0.06	0.01
BRL_070_r01	225	1.5	1.5	0.02	< 0.01
BRL_070_r02	200	1.5	1.5	0.01	< 0.01
BRL_070_r03	175	1.0	1.0	0.01	< 0.01
BRL_072_r01	200	1.0	1.0	0.01	< 0.01
BRL_072_r02	175	1.0	1.0	0.01	< 0.01
BRL_072_r03	200	1.0	1.0	0.01	< 0.01
BRL_098_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BRL_098_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BRL_098_r03	100	< 0.5	< 0.5	< 0.01	< 0.01
BRL_098_r04	100	< 0.5	< 0.5	< 0.01	< 0.01
BRL_098_r05	100	< 0.5	< 0.5	< 0.01	< 0.01
BRL_098_r06	100	< 0.5	< 0.5	< 0.01	< 0.01
BRL_099_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BRL_099_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BRL_099_r03	100	< 0.5	< 0.5	< 0.01	< 0.01
BRL_099_r04	100	< 0.5	< 0.5	< 0.01	< 0.01
BRL_099_r05	100	< 0.5	< 0.5	< 0.01	< 0.01
BRL_101_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BRL_103_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BRL_109_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BRL_125_r01	70	< 0.5	< 0.5	< 0.01	< 0.01
BRL_125_r02	70	< 0.5	< 0.5	< 0.01	< 0.01
BRL_125_r03	70	< 0.5	< 0.5	< 0.01	< 0.01
BRL_150_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BRL_150_r02	90	< 0.5	< 0.5	< 0.01	< 0.01
BRL_150_r03	90	< 0.5	< 0.5	< 0.01	< 0.01
BRS_002_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BRS_002_r02	90	< 0.5	< 0.5	< 0.01	< 0.01
BRS_002_r04	90	< 0.5	< 0.5	< 0.01	< 0.01
BRS_004_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BRS_004_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BRS_004_r03	100	< 0.5	< 0.5	< 0.01	< 0.01
BRS_006_r01	125	0.5	0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BRS_006_r02	125	0.5	0.5	< 0.01	< 0.01
BRS_006_r03	125	0.5	0.5	< 0.01	< 0.01
BRS_009_r01	125	0.5	0.5	< 0.01	< 0.01
BRS_009_r02	125	0.5	0.5	< 0.01	< 0.01
BRS_010_r01	175	1.0	1.0	< 0.01	< 0.01
BRS_010_r03	200	1.0	1.0	0.01	< 0.01
BRS_010_r04	125	0.5	0.5	< 0.01	< 0.01
BRS_010_r05	150	1.0	1.0	< 0.01	< 0.01
BRS_010_r06	175	1.0	1.0	0.01	< 0.01
BRS_040_r01	350	3.5	3.5	0.06	0.01
BRS_040_r02	300	2.5	2.5	0.04	0.01
BRS_040_r03	325	3.0	3.0	0.05	0.01
BRS_040_r04	300	2.5	2.5	0.04	0.01
BRS_040_r05	375	4.0	4.0	0.07	0.02
BRS_040_r06	500	6.0	6.0	0.10	0.02
BRS_050_r01	1200	10.0	10.0	0.10	0.20
BRS_050_r02	1100	10.0	10.0	0.10	0.14
BRS_050_r03	800	9.5	9.5	0.11	0.03
BRS_050_r04	800	10.0	10.0	0.11	0.04
BRS_070_r01	1150	10.0	10.0	0.10	0.17
BRS_070_r02	1200	10.0	10.0	0.08	0.22
BRS_070_r03	1250	10.0	10.0	0.07	0.25
BRS_070_r04	1250	10.0	10.0	0.07	0.26
BRS_080_r01	1300	8.5	8.5	0.07	0.26
BRS_080_r02	1300	8.0	8.0	0.07	0.26
BRS_080_r03	1300	4.0	4.0	0.07	0.12
BRS_080_r04	1250	3.5	3.5	0.07	0.05
BRS_090_r01	1300	4.0	4.0	0.07	0.12
BRS_090_r02	1300	4.0	4.0	0.07	0.09
BRS_090_r03	1150	4.0	4.0	0.06	0.05
BRS_090_r04	1200	4.0	4.0	0.06	0.05
BRS_090_r05	1150	4.0	4.0	0.06	0.05
BRS_100_r01	1000	2.5	3.0	0.06	0.04
BRS_100_r02	1000	2.5	3.0	0.07	0.04
BRS_110_r01	1000	3.0	3.0	0.05	0.04
BRS_110_r02	1000	3.0	3.0	0.05	0.04
BRS_110_r03	1000	3.0	3.0	0.05	0.04
BRS_110_r04	950	2.0	3.5	0.09	0.03
BRS_110_r05	1000	3.0	3.0	0.05	0.04
BRS_120_r01	900	2.0	4.0	0.10	0.03
BRS_120_r02	900	1.5	4.0	0.11	0.03
BRS_120_r03	900	2.0	3.5	0.09	0.04
BRS_130_r01	1550	8.5	10.0	0.07	0.26
BRS_130_r02	1550	6.5	8.0	0.07	0.26
BRS_140_r01	1150	8.0	9.5	0.13	0.04
BRS_140_r02	1300	8.5	10.0	0.14	0.05
BRS_140_r03	1550	8.5	10.0	0.07	0.26
BRS_140_r04	1300	8.5	10.0	0.14	0.05
BRS_140_r05	1100	6.5	9.0	0.13	0.03
BRS_140_r06	1550	5.0	6.0	0.07	0.26
BRS_150_r01	1500	7.0	8.0	0.07	0.26
BRS_150_r02	1500	6.0	6.0	0.07	0.25
BRS_150_r03	1500	6.0	6.0	0.07	0.22
BRS_150_r04	1500	6.0	6.0	0.07	0.20
BRS_150_r05	1500	6.0	6.0	0.07	0.18
BRS_150_r06	1350	6.0	6.0	0.06	0.05
BRS_150_r07	1200	6.0	6.0	0.06	0.05

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BRS_160_r01	1000	8.0	8.0	0.06	0.09
BRS_160_r02	900	7.5	7.5	0.05	0.08
BRS_160_r03	900	3.0	3.0	0.07	0.04
BRS_180_r01	1200	9.5	9.5	0.03	0.20
BRS_180_r02	850	8.5	8.5	0.09	0.08
BRS_180_r03	700	8.0	8.0	0.09	0.07
BRS_180_r04	1000	9.5	9.5	0.09	0.10
BRS_185_r01	850	2.5	2.5	0.05	0.05
BRS_190_r01	1000	3.5	3.5	0.05	0.05
BRS_190_r02	1000	3.5	3.5	0.05	0.04
BRS_191_r01	1100	4.0	4.0	0.05	0.05
BRS_191_r02	1050	4.0	4.0	0.05	0.05
BRS_192_r03	1200	4.5	4.5	0.06	0.06
BRS_192_r04	1150	4.0	4.0	0.06	0.05
BRS_193_r01	1300	4.5	4.5	0.07	0.09
BRS_193_r03	1250	4.5	4.5	0.06	0.06
BRS_193_r05	1300	4.0	4.0	0.07	0.10
BRS_203_r01	800	9.5	9.5	0.10	0.07
BRS_203_r02	600	8.0	8.0	0.10	0.05
BRS_203_r03	350	5.5	5.5	0.07	0.04
BRS_203_r04	225	3.5	3.5	0.04	0.02
BRS_203_r05	225	3.5	3.5	0.04	0.02
BRS_208_r01	1200	10.0	10.0	0.09	0.22
BRS_208_r02	900	10.0	10.0	0.11	0.04
BRS_208_r03	1100	10.0	10.0	0.11	0.12
BRS_208_r04	1150	10.0	10.0	0.10	0.18
BRS_218_r01	1300	10.0	10.0	0.07	0.26
BRS_218_r02	1250	10.0	10.0	0.07	0.26
BRS_218_r03	1300	10.0	10.0	0.07	0.26
BRS_218_r05	1300	9.0	9.0	0.07	0.26
BRS_220_r01	500	6.0	6.0	0.10	0.02
BRS_220_r02	500	6.5	6.5	0.10	0.02
BRS_220_r03	650	8.5	8.5	0.11	0.03
BRS_220_r04	550	7.0	7.0	0.11	0.02
BRS_220_r05	900	10.0	10.0	0.11	0.04
BRS_220_r07	500	6.0	6.0	0.10	0.02
BRS_220_r11	325	3.0	3.0	0.05	0.01
BRS_220_r13	500	6.5	6.5	0.11	0.02
BRS_220_r14	475	5.5	5.5	0.10	0.02
BRS_220_r15	425	4.5	4.5	0.08	0.02
BRS_220_r16	400	4.5	4.5	0.08	0.02
BRS_220_r17	375	4.0	4.0	0.07	0.02
BRS_220_r18	375	3.5	3.5	0.06	0.02
BRS_230_r01	100	1.0	1.0	< 0.01	0.01
BRS_230_r02	125	1.5	1.5	0.02	0.01
BRS_230_r03	100	1.5	1.5	0.01	< 0.01
BRS_230_r04	100	1.5	1.5	0.02	< 0.01
BRS_230_r05	100	1.0	1.0	< 0.01	0.01
BRS_230_r06	100	1.0	1.0	< 0.01	0.01
BRS_240_r01	250	2.0	2.0	0.02	< 0.01
BRS_240_r02	250	1.5	1.5	0.02	< 0.01
BRS_240_r03	250	2.0	2.0	0.02	< 0.01
BRS_250_r01	200	1.0	1.0	0.01	< 0.01
BRS_250_r02	175	1.0	1.0	0.01	< 0.01
BRS_250_r03	175	1.0	1.0	0.01	< 0.01
BRS_253_r01	150	1.0	1.0	< 0.01	< 0.01
BRS_253_r02	125	0.5	0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BRS_253_r03	150	0.5	0.5	< 0.01	< 0.01
BRS_256_r01	150	0.5	0.5	< 0.01	< 0.01
BRS_256_r02	150	1.0	1.0	< 0.01	< 0.01
BRS_256_r03	125	0.5	0.5	< 0.01	< 0.01
BRS_256_r04	125	0.5	0.5	< 0.01	< 0.01
BRS_256_r05	125	0.5	0.5	< 0.01	< 0.01
BRS_259_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BRS_259_r02	100	0.5	0.5	< 0.01	< 0.01
BRS_259_r03	100	< 0.5	< 0.5	< 0.01	< 0.01
BRS_259_r04	100	< 0.5	< 0.5	< 0.01	< 0.01
BRS_259_r05	100	< 0.5	< 0.5	< 0.01	< 0.01
BRS_259_r06	100	< 0.5	< 0.5	< 0.01	< 0.01
BRS_259_r07	100	< 0.5	< 0.5	< 0.01	< 0.01
BRS_259_r08	100	< 0.5	< 0.5	< 0.01	< 0.01
BRS_262_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BRS_262_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BRS_262_r03	100	< 0.5	< 0.5	< 0.01	< 0.01
BRS_262_r04	90	< 0.5	< 0.5	< 0.01	< 0.01
BSC_001_r01	350	3.5	3.5	0.07	0.01
BSC_001_r02	375	4.0	4.0	0.07	0.01
BSC_001_r03	375	4.0	4.0	0.07	0.01
BSC_001_r05	500	6.5	6.5	0.10	0.02
BSC_003_r01	375	4.0	4.0	0.08	0.01
BSC_003_r02	350	3.5	3.5	0.06	0.01
BSC_005_r01	300	2.5	2.5	0.04	0.01
BSC_005_r05	350	3.5	3.5	0.06	0.01
BSC_005_r06	300	2.5	2.5	0.04	0.01
BSC_009_r01	325	3.0	3.0	0.06	0.01
BSC_009_r02	325	3.0	3.0	0.05	0.01
BSC_009_r03	300	2.5	2.5	0.04	0.01
BSC_013_r01	325	3.0	3.0	0.05	0.01
BSC_013_r02	350	3.5	3.5	0.07	0.01
BSC_019_r01	550	7.0	7.0	0.11	0.02
BSC_019_r02	600	7.5	7.5	0.11	0.02
BSC_020_r01	550	7.5	7.5	0.10	0.02
BSC_020_r02	600	8.0	8.0	0.10	0.02
BSC_020_r03	800	9.5	9.5	0.10	0.03
BSC_021_r01	700	9.0	9.0	0.10	0.03
BSC_021_r02	850	9.5	9.5	0.10	0.03
BSC_022_r01	800	9.5	9.5	0.10	0.03
BSC_022_r02	850	9.5	9.5	0.10	0.03
BSC_022_r03	700	9.0	9.0	0.10	0.03
BSI_001_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BSI_007_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BSI_013_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BSI_013_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BSI_013_r04	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BSI_013_r05	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BSI_018_r09	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BTH_001_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BTH_003_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BTH_003_r02	90	< 0.5	< 0.5	< 0.01	< 0.01
BTH_005_r01	100	0.5	0.5	< 0.01	< 0.01
BTH_005_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BTH_007_r01	125	0.5	0.5	< 0.01	< 0.01
BTH_009_r01	125	0.5	0.5	< 0.01	< 0.01
BTH_011_r01	125	0.5	0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BTH_011_r02	150	0.5	0.5	< 0.01	< 0.01
BTH_011_r03	125	0.5	0.5	< 0.01	< 0.01
BTH_011_r04	125	0.5	0.5	< 0.01	< 0.01
BTH_013_r01	150	1.0	1.0	< 0.01	< 0.01
BTH_013_r02	150	0.5	0.5	< 0.01	< 0.01
BTH_015_r01	175	1.0	1.0	< 0.01	< 0.01
BTH_015_r02	150	1.0	1.0	< 0.01	< 0.01
BTH_015_r03	150	1.0	1.0	< 0.01	< 0.01
BTH_017_r01	175	1.0	1.0	0.01	< 0.01
BTH_019_r01	200	1.5	1.5	0.01	< 0.01
BTH_021_r01	250	2.0	2.0	0.02	< 0.01
BTH_021_r02	275	2.5	2.5	0.03	< 0.01
BTY_001_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BTY_100_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BTY_100_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BWA_001_r01	1550	4.0	4.0	0.07	0.09
BWA_005_r01	1600	3.5	4.5	0.07	0.25
BWA_005_r02	1600	4.0	4.0	0.07	0.17
BWA_005_r03	1600	4.0	4.0	0.07	0.11
BWA_005_r04	1500	4.0	4.0	0.07	0.05
BWA_010_r01	1600	7.5	9.5	0.07	0.25
BWA_010_r02	1600	5.5	7.0	0.07	0.25
BWA_010_r03	1600	3.5	5.0	0.07	0.24
BWA_010_r04	1600	3.5	3.5	0.07	0.23
BWA_010_r05	1600	4.0	4.0	0.07	0.24
BWA_015_r01	1500	7.5	9.5	0.12	0.16
BWA_015_r02	1600	7.5	9.5	0.12	0.24
BWA_015_r03	1600	7.5	9.5	0.07	0.24
BWA_015_r04	1600	7.0	9.0	0.07	0.24
BWA_015_r05	1400	7.5	9.5	0.12	0.07
BWA_020_r01	1250	6.0	9.0	0.10	0.03
BWA_020_r02	1400	7.5	9.5	0.11	0.05
BWA_020_r03	1550	7.5	9.5	0.11	0.21
BWA_020_r04	1600	7.5	9.5	0.10	0.24
BWA_020_r05	1600	7.5	9.5	0.07	0.24
BWA_020_r06	1300	7.0	9.5	0.11	0.04
BWA_020_r07	1300	6.5	9.5	0.11	0.03
BWA_025_r01	1150	4.0	7.0	0.10	0.03
BWA_025_r02	1300	6.0	9.0	0.10	0.03
BWA_025_r03	1300	6.0	9.0	0.11	0.03
BWA_025_r04	1300	6.5	9.5	0.11	0.03
BWA_030_r01	1150	3.0	3.0	0.07	0.04
BWA_030_r02	1100	2.5	3.0	0.08	0.03
BWA_030_r03	1100	2.5	3.5	0.08	0.03
BWA_030_r04	1150	3.0	3.0	0.06	0.04
BWA_035_r01	1200	3.5	3.5	0.05	0.04
BWA_040_r01	1300	4.0	4.0	0.06	0.04
BWA_040_r02	1350	4.0	4.0	0.06	0.05
BWA_045_r01	1250	3.5	3.5	0.05	0.04
BWA_045_r02	1300	4.0	4.0	0.05	0.04
BWA_045_r03	1400	4.0	4.0	0.06	0.05
BWA_050_r01	1250	3.5	3.5	0.05	0.04
BWA_050_r02	1150	3.0	3.0	0.06	0.04
BWA_050_r03	1150	3.0	3.0	0.07	0.03
BWA_055_r01	1050	1.5	4.5	0.09	0.03
BWA_055_r02	1100	2.0	3.5	0.09	0.03
BWA_055_r03	1150	3.0	3.0	0.07	0.04

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BWA_055_r04	1150	3.0	3.0	0.06	0.04
BWA_055_r05	1150	3.0	3.0	0.05	0.04
BWA_055_r06	1250	3.5	3.5	0.05	0.04
BWA_055_r07	1400	4.0	4.0	0.06	0.05
BWA_060_r01	1050	2.0	5.0	0.10	0.03
BWA_060_r02	1100	2.0	4.5	0.09	0.03
BWA_060_r03	1300	4.0	4.0	0.06	0.04
BWA_060_r04	1100	2.5	3.5	0.08	0.03
BWA_063_r01	1100	2.5	5.5	0.10	0.03
BWA_063_r02	1100	2.5	5.0	0.10	0.03
BWA_063_r03	1050	2.0	4.5	0.09	0.03
BWA_063_r04	1100	2.5	5.5	0.10	0.03
BWA_066_r01	1100	3.5	6.5	0.10	0.03
BWA_066_r02	1100	2.5	4.0	0.09	0.03
BWA_069_r01	1200	5.5	8.5	0.10	0.03
BWA_069_r02	1050	2.0	4.5	0.10	0.03
BWA_072_r01	1250	6.0	9.0	0.10	0.03
BWA_072_r02	1200	5.5	8.5	0.10	0.03
BWA_075_r01	1550	7.5	9.5	0.13	0.24
BWA_075_r02	1500	7.5	9.5	0.12	0.15
BWA_075_r03	1450	7.5	9.5	0.12	0.11
BWA_075_r04	1400	7.5	9.5	0.13	0.05
BWA_075_r05	1250	6.0	9.0	0.12	0.03
BWA_075_r06	1350	7.5	9.5	0.13	0.04
BWE_001_r01	1400	4.5	4.5	0.04	0.07
BWE_001_r02	1400	6.0	6.0	0.04	0.08
BWE_001_r03	1200	5.5	5.5	0.03	0.07
BWE_003_r01	1450	5.5	5.5	0.04	0.22
BWE_003_r02	1450	5.0	5.0	0.04	0.22
BWE_007_r01	1200	9.5	9.5	0.03	0.19
BWE_007_r02	1200	9.5	9.5	0.08	0.19
BWE_009_r01	850	9.0	9.0	0.08	0.06
BWE_009_r02	900	5.5	6.0	0.08	0.06
BWE_011_r01	850	5.5	5.5	0.08	0.06
BWE_011_r02	650	6.5	6.5	0.06	0.04
BWE_013_r01	475	6.0	6.0	0.07	< 0.01
BWE_013_r02	600	6.0	6.0	0.05	0.04
BWE_013_r03	600	6.0	6.0	0.04	0.04
BWE_013_r04	650	6.0	6.0	0.04	0.05
BWE_015_r01	375	6.0	6.0	0.08	< 0.01
BWE_015_r02	500	6.5	6.5	0.08	0.02
BWE_015_r03	600	7.0	7.0	0.07	0.04
BWE_015_r04	550	6.5	6.5	0.07	0.02
BWE_017_r01	325	5.5	5.5	0.09	< 0.01
BWE_017_r02	500	7.0	7.0	0.08	< 0.01
BWE_019_r01	450	7.0	7.0	0.09	< 0.01
BWE_019_r03	700	8.0	8.0	0.09	0.05
BWE_021_r01	425	7.0	7.0	0.10	0.03
BWE_021_r03	650	8.5	8.5	0.10	0.03
BWE_023_r01	200	3.0	3.0	0.07	0.02
BWE_023_r02	300	5.0	5.0	0.10	0.04
BWE_023_r03	250	4.0	4.0	0.09	0.01
BWE_025_r01	150	2.0	2.0	0.04	0.02
BWE_025_r02	200	3.0	3.0	0.07	0.03
BWE_025_r03	375	7.0	7.0	0.10	0.07
BWE_025_r04	125	1.5	1.5	0.02	0.02
BWE_027_r01	125	2.0	2.0	0.03	0.02

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BWE_027_r02	125	1.5	1.5	0.03	0.01
BWE_027_r03	150	2.5	2.5	0.05	0.02
BWE_027_r04	150	2.5	2.5	0.05	0.02
BWE_027_r05	175	3.0	3.0	0.06	0.02
BWE_027_r06	175	3.0	3.0	0.06	0.03
BWE_027_r07	175	2.5	2.5	0.05	0.02
BWE_027_r08	100	1.5	1.5	0.02	0.01
BWE_029_r01	80	1.0	1.0	0.01	< 0.01
BWE_029_r02	100	1.5	1.5	0.03	< 0.01
BWE_029_r03	60	0.5	0.5	< 0.01	< 0.01
BWE_031_r01	700	7.5	7.5	0.07	0.04
BWE_031_r02	650	7.0	7.0	0.07	0.03
BWE_031_r03	600	7.5	7.5	0.08	< 0.01
BWE_031_r04	275	4.5	4.5	0.07	< 0.01
BWE_041_r01	275	4.5	4.5	0.09	< 0.01
BWE_041_r02	300	5.0	5.0	0.09	< 0.01
BWE_041_r03	450	7.5	7.5	0.11	0.05
BWE_051_r01	175	3.0	3.0	0.06	< 0.01
BWE_051_r02	150	2.5	2.5	0.05	< 0.01
BWE_051_r03	125	2.0	2.0	0.04	< 0.01
BWE_051_r04	125	1.5	1.5	0.03	< 0.01
BWE_051_r05	125	1.5	1.5	0.03	< 0.01
BWE_051_r06	125	1.5	1.5	0.03	< 0.01
BWE_051_r07	150	2.0	2.0	0.04	< 0.01
BWI_001_r01	125	0.5	0.5	< 0.01	< 0.01
BWI_001_r02	125	0.5	0.5	< 0.01	< 0.01
BWI_002_r01	125	0.5	0.5	< 0.01	< 0.01
BWI_002_r02	125	0.5	0.5	< 0.01	< 0.01
BWI_002_r03	125	0.5	0.5	< 0.01	< 0.01
BWI_003_r01	125	0.5	0.5	< 0.01	< 0.01
BWI_003_r02	125	0.5	0.5	< 0.01	< 0.01
BWI_004_r01	125	0.5	0.5	< 0.01	< 0.01
BWI_006_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BWI_006_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BWI_007_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BWI_008_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BWI_008_r02	90	< 0.5	< 0.5	< 0.01	< 0.01
BWI_008_r03	80	< 0.5	< 0.5	< 0.01	< 0.01
BWI_009_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BWI_010_r01	80	< 0.5	< 0.5	< 0.01	< 0.01
BWI_010_r02	90	< 0.5	< 0.5	< 0.01	< 0.01
BWI_011_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BWI_011_r02	90	< 0.5	< 0.5	< 0.01	< 0.01
BWI_012_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BWI_012_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BWI_013_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BWR_001_r06	70	< 0.5	< 0.5	< 0.01	< 0.01
BWR_010_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BWR_010_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BWR_010_r03	50	< 0.5	< 0.5	< 0.01	< 0.01
BWR_010_r04	50	< 0.5	< 0.5	< 0.01	< 0.01
BWR_010_r05	40	< 0.5	< 0.5	< 0.01	< 0.01
BWR_010_r06	50	< 0.5	< 0.5	< 0.01	< 0.01
BWR_020_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BWR_030_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BWR_030_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BWR_030_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BWR_040_r01	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BWR_040_r02	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BWR_050_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BWR_050_r02	20	< 0.5	< 0.5	< 0.01	< 0.01
BWR_050_r03	30	< 0.5	< 0.5	< 0.01	< 0.01
BWR_050_r04	20	< 0.5	< 0.5	< 0.01	< 0.01
BYR_001_r01	800	2.0	4.0	0.08	0.03
BYR_001_r02	800	2.0	3.0	0.07	0.03
BYR_001_r03	800	2.0	4.0	0.08	0.03
BYR_001_r04	800	1.5	2.5	0.06	0.03
BYR_005_r01	1100	6.0	6.0	0.06	0.22
BYR_005_r02	1050	5.0	5.0	0.06	0.22
BYR_005_r03	1100	4.0	4.0	0.06	0.22
BYR_005_r04	1100	6.0	6.0	0.06	0.22
BYR_015_r01	1050	8.5	8.5	0.06	0.22
BYR_015_r02	950	8.5	8.5	0.09	0.13
BYR_015_r03	850	8.5	8.5	0.09	0.06
BYR_015_r04	950	8.5	8.5	0.09	0.17
BYR_015_r05	1000	8.5	8.5	0.07	0.22
BYR_015_r06	1050	7.0	7.0	0.06	0.22
BYR_025_r01	200	1.5	1.5	0.02	< 0.01
BYR_025_r02	175	1.0	1.0	0.01	< 0.01
BYR_025_r03	175	1.0	1.0	0.01	< 0.01
BYR_025_r04	175	1.0	1.0	0.01	< 0.01
BYR_025_r05	225	2.0	2.0	0.03	< 0.01
BYR_025_r06	550	7.0	7.0	0.09	0.02
BYR_025_r07	225	2.0	2.0	0.03	< 0.01
BYR_035_r01	225	2.0	2.0	0.03	< 0.01
BYR_035_r02	275	2.5	2.5	0.04	0.01
BYR_035_r03	275	2.5	2.5	0.04	0.01
BYR_035_r04	300	3.0	3.0	0.05	0.01
BYR_035_r05	350	4.0	4.0	0.07	0.01
BYR_035_r06	375	4.5	4.5	0.08	0.02
BYR_035_r07	450	5.5	5.5	0.09	0.02
BYR_035_r08	350	4.0	4.0	0.07	0.01
BYR_035_r09	325	4.0	4.0	0.07	0.01
BYR_035_r10	350	4.0	4.0	0.07	0.01
BYR_035_r11	300	3.5	3.5	0.06	0.01
BYR_035_r12	275	3.0	3.0	0.05	0.01
BYR_055_r01	100	< 0.5	< 0.5	< 0.01	< 0.01
BYR_055_r02	100	< 0.5	< 0.5	< 0.01	< 0.01
BYR_055_r04	90	< 0.5	< 0.5	< 0.01	< 0.01
BYR_055_r05	125	0.5	0.5	< 0.01	< 0.01
BYR_055_r06	150	1.0	1.0	< 0.01	< 0.01
BYR_055_r07	175	1.5	1.5	0.01	< 0.01
BYR_055_r08	225	1.5	1.5	0.02	< 0.01
BYR_055_r09	425	5.5	5.5	0.09	0.02
BYR_065_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BYR_065_r02	60	< 0.5	< 0.5	< 0.01	< 0.01
BYR_065_r03	50	< 0.5	< 0.5	< 0.01	< 0.01
BYR_065_r04	50	< 0.5	< 0.5	< 0.01	< 0.01
BYR_065_r05	70	< 0.5	< 0.5	< 0.01	< 0.01
BYR_065_r06	70	< 0.5	< 0.5	< 0.01	< 0.01
BYR_065_r07	80	< 0.5	< 0.5	< 0.01	< 0.01
BYR_065_r08	90	< 0.5	< 0.5	< 0.01	< 0.01
BYR_065_r09	90	< 0.5	< 0.5	< 0.01	< 0.01
BYR_065_r10	90	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BYR_065_r11	80	< 0.5	< 0.5	< 0.01	< 0.01
BYR_065_r12	125	0.5	0.5	< 0.01	< 0.01
BYR_065_r13	125	0.5	0.5	< 0.01	< 0.01
BYR_065_r14	150	1.0	1.0	< 0.01	< 0.01
BYR_075_r01	50	< 0.5	< 0.5	< 0.01	< 0.01
BYR_075_r02	50	< 0.5	< 0.5	< 0.01	< 0.01
BYR_075_r03	50	< 0.5	< 0.5	< 0.01	< 0.01
BYR_075_r04	60	< 0.5	< 0.5	< 0.01	< 0.01
BYR_075_r05	40	< 0.5	< 0.5	< 0.01	< 0.01
BYR_075_r06	40	< 0.5	< 0.5	< 0.01	< 0.01
BYR_075_r07	50	< 0.5	< 0.5	< 0.01	< 0.01
BYR_084_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BYR_084_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BYR_085_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BYR_085_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BYR_085_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BYR_085_r04	40	< 0.5	< 0.5	< 0.01	< 0.01
BYR_085_r05	40	< 0.5	< 0.5	< 0.01	< 0.01
BYR_085_r06	50	< 0.5	< 0.5	< 0.01	< 0.01
BYR_085_r07	40	< 0.5	< 0.5	< 0.01	< 0.01
BYR_085_r08	40	< 0.5	< 0.5	< 0.01	< 0.01
BYR_095_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BYR_095_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BYR_105_r01	20	< 0.5	< 0.5	< 0.01	< 0.01
BYR_105_r02	20	< 0.5	< 0.5	< 0.01	< 0.01
BYR_105_r03	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BYR_105_r04	20	< 0.5	< 0.5	< 0.01	< 0.01
BYR_105_r05	20	< 0.5	< 0.5	< 0.01	< 0.01
BYR_105_r06	20	< 0.5	< 0.5	< 0.01	< 0.01
BYR_105_r07	20	< 0.5	< 0.5	< 0.01	< 0.01
BYR_105_r08	20	< 0.5	< 0.5	< 0.01	< 0.01
BYR_105_r09	20	< 0.5	< 0.5	< 0.01	< 0.01
BYR_105_r10	20	< 0.5	< 0.5	< 0.01	< 0.01
BYR_115_r01	30	< 0.5	< 0.5	< 0.01	< 0.01
BYR_115_r02	30	< 0.5	< 0.5	< 0.01	< 0.01
BYR_115_r03	30	< 0.5	< 0.5	< 0.01	< 0.01
BYR_115_r04	30	< 0.5	< 0.5	< 0.01	< 0.01
BYR_115_r05	20	< 0.5	< 0.5	< 0.01	< 0.01
BYR_115_r06	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BYR_115_r07	30	< 0.5	< 0.5	< 0.01	< 0.01
BYR_115_r08	30	< 0.5	< 0.5	< 0.01	< 0.01
BYR_125_r01	40	< 0.5	< 0.5	< 0.01	< 0.01
BYR_125_r02	40	< 0.5	< 0.5	< 0.01	< 0.01
BYR_125_r03	40	< 0.5	< 0.5	< 0.01	< 0.01
BYR_135_r01	60	< 0.5	< 0.5	< 0.01	< 0.01
BYR_135_r02	60	< 0.5	< 0.5	< 0.01	< 0.01
BYR_135_r03	60	< 0.5	< 0.5	< 0.01	< 0.01
BYR_135_r04	50	< 0.5	< 0.5	< 0.01	< 0.01
BYR_135_r05	50	< 0.5	< 0.5	< 0.01	< 0.01
BYR_135_r06	50	< 0.5	< 0.5	< 0.01	< 0.01
BYR_135_r07	50	< 0.5	< 0.5	< 0.01	< 0.01
BYR_135_r08	40	< 0.5	< 0.5	< 0.01	< 0.01
BYR_135_r09	50	< 0.5	< 0.5	< 0.01	< 0.01
BYR_135_r10	60	< 0.5	< 0.5	< 0.01	< 0.01
BYR_145_r01	90	< 0.5	< 0.5	< 0.01	< 0.01
BYR_145_r02	80	< 0.5	< 0.5	< 0.01	< 0.01
BYR_145_r03	100	< 0.5	< 0.5	< 0.01	< 0.01

Table D.04 - Tahmoor South - Predictions for Rural Structures

Structure Ref.	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BYR_145_r04	70	< 0.5	< 0.5	< 0.01	< 0.01
BYR_150_r01	1100	3.0	3.0	0.06	0.23
BYR_150_r02	1100	2.5	2.5	0.06	0.22
BYR_150_r03	1100	2.5	2.5	0.06	0.22
BYR_150_r04	1100	6.0	6.0	0.06	0.23
BYR_152_r01	1000	3.0	3.0	0.05	0.05
BYR_152_r02	1050	3.0	3.0	0.05	0.05
BYR_152_r03	1050	3.0	3.0	0.05	0.06
BYR_152_r04	1100	2.5	2.5	0.05	0.19
BYR_152_r05	1100	2.5	2.5	0.05	0.21
BYR_152_r06	1100	3.0	3.0	0.05	0.22
BYR_154_r01	1000	3.0	3.0	0.05	0.05
BYR_158_r01	800	2.5	2.5	0.04	0.04
BYR_160_r01	700	6.0	6.0	0.07	0.06
Maxima:	**1650**	**10.0**	**10.0**	**0.16**	**0.27**

Table D.05 - Tahmoor South - Predictions for Tanks

Structure Ref.	Maximum Plan Dimension (m)	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BAN_001_t01	0	600	7.0	7.0	0.09	0.02
BAN_040_t01	0	1450	6.0	8.5	0.06	0.22
BAR_120_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_120_t02	0	20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_140_t01	3	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_140_t02	3	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_150_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_150_t02	3	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_160_t01	2	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_160_t02	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_170_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_170_t02	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_177_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_177_t02	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_177_t03	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_185_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_195_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_195_t02	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_210_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_210_t02	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_235_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_480_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_480_t02	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_490_t02	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_495_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_510_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAS_009_t01	3	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAS_015_t01	0	40	0.5	0.5	< 0.01	< 0.01
BAS_023_t01	0	60	0.5	0.5	< 0.01	< 0.01
BAV_013_t01	0	175	1.0	1.0	< 0.01	< 0.01
BAV_047_t01	0	175	1.0	1.0	< 0.01	< 0.01
BAV_159_t01	0	100	1.0	1.0	< 0.01	< 0.01
BAV_185_t01	2	100	< 0.5	< 0.5	< 0.01	< 0.01
BBA_020_t01	0	950	3.5	5.5	0.10	0.03
BBA_030_t01	0	1550	4.0	4.0	0.07	0.14
BBA_030_t02	0	1550	4.0	4.0	0.07	0.09
BBA_040_t01	2	1100	2.0	4.0	0.08	0.03
BBA_090_t01	7	1500	7.5	9.5	0.10	0.19
BBA_100_t01	0	200	1.0	1.0	0.01	< 0.01
BBA_130_t01	0	150	1.0	1.0	0.01	< 0.01
BBA_202_t01	0	1100	9.5	9.5	0.10	0.06
BBA_202_t02	0	1300	9.5	9.5	0.07	0.22
BBA_202_t03	0	1250	9.5	9.5	0.06	0.21
BBA_204_t01	0	1400	8.0	10.0	0.12	0.12
BBA_204_t02	0	1350	8.0	10.0	0.12	0.09
BBA_240_t01	0	1250	4.0	4.0	0.05	0.04
BBA_240_t02	0	1200	3.5	3.5	0.05	0.04
BBI_010_t01	0	100	< 0.5	< 0.5	< 0.01	< 0.01
BBI_012_t01	0	125	0.5	0.5	< 0.01	< 0.01
BBI_016_t01	2	90	< 0.5	< 0.5	< 0.01	< 0.01
BBI_016_t02	2	90	< 0.5	< 0.5	< 0.01	< 0.01
BCA_001_t01	0	200	3.5	3.5	0.07	< 0.01
BCA_001_t02	0	425	5.0	5.0	0.05	0.02
BCA_001_t03	0	425	5.0	5.0	0.05	0.02
BCA_015_t01	0	1100	7.0	8.0	0.11	0.10
BCA_015_t02	0	850	4.0	6.0	0.09	0.02
BCA_015_t03	0	850	4.5	6.5	0.08	0.03
BCA_025_t01	0	1150	3.5	3.5	0.05	0.04
BCA_045_t01	3	1300	6.5	8.0	0.06	0.21
BCA_060_t01	0	1250	4.0	4.0	0.06	0.04
BCA_075_t01	0	900	2.0	3.0	0.08	0.03
BCL_001_t01	0	275	2.5	2.5	0.03	0.01
BCL_023_t01	0	850	3.5	4.0	0.09	0.05
BCL_023_t02	0	850	4.5	4.5	0.08	0.06
BCL_037_t01	0	950	1.5	3.0	0.08	0.04
BCL_037_t02	0	950	1.5	3.0	0.08	0.04
BCL_039_t01	0	1100	3.0	3.0	0.05	0.04
BCL_043_t01	0	1150	10.0	10.0	0.06	0.22
BCL_043_t02	0	1150	10.0	10.0	0.06	0.23
BCL_045_t01	0	1250	2.5	2.5	0.06	0.13
BCL_047_t01	0	1250	3.0	3.0	0.06	0.24
BCL_049_t01	0	1250	5.5	5.5	0.06	0.25
BCL_059_t01	3	750	9.0	9.0	0.11	0.03

Table D.05 - Tahmoor South - Predictions for Tanks

Structure Ref.	Maximum Plan Dimension (m)	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BCL_059_t02	3	800	9.5	9.5	0.11	0.03
BCM_029_t01	0	125	< 0.5	< 0.5	< 0.01	< 0.01
BCM_046_t02	0	100	< 0.5	< 0.5	< 0.01	< 0.01
BCP_040_t01	0	60	< 0.5	< 0.5	< 0.01	< 0.01
BCP_050_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BCP_050_t02	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BCP_060_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BCP_075_t01	0	1200	4.0	4.0	0.04	0.17
BCP_075_t02	0	1200	4.0	4.0	0.03	0.16
BDA_009_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDA_009_t02	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDY_010_t01	0	1100	5.5	7.5	0.11	0.03
BDY_150_t01	2	1550	3.0	4.0	0.07	0.26
BEL_007_t01	2	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_011_t01	2	60	1.0	1.0	0.02	< 0.01
BEL_011_t02	2	60	1.0	1.0	0.02	< 0.01
BEL_011_t03	1	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_017_t01	3	70	< 0.5	< 0.5	< 0.01	< 0.01
BEL_035_t01	0	30	< 0.5	< 0.5	< 0.01	< 0.01
BFL_001_t01	0	1350	7.5	9.0	0.10	0.10
BFL_001_t02	0	1400	7.5	9.0	0.10	0.10
BFL_009_t01	0	950	2.0	4.0	0.10	0.04
BFL_009_t02	0	950	2.0	4.0	0.10	0.04
BFL_009_t03	0	1000	2.5	2.5	0.05	0.04
BGL_001_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_010_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_010_t02	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_015_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_045_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_045_t02	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGL_050_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGO_050_t01	0	1150	3.5	3.5	0.05	0.03
BGO_050_t02	0	1200	3.5	3.5	0.05	0.04
BGO_050_t03	0	1250	4.0	4.0	0.05	0.04
BGO_055_t01	0	1400	4.0	4.0	0.06	0.04
BGO_055_t02	0	1400	4.0	4.0	0.05	0.04
BGR_095_t01	0	1000	2.0	3.0	0.07	0.03
BGR_131_t01	3	1150	3.5	3.5	0.05	0.04
BGR_225_t01	0	150	2.0	2.0	0.04	< 0.01
BGR_225_t02	0	150	2.0	2.0	0.04	< 0.01
BGR_225_t03	0	150	1.5	1.5	0.03	< 0.01
BGR_245_t01	0	1500	3.5	5.5	0.06	0.21
BGW_011_t01	5	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGW_011_t02	2	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGW_011_t03	3	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BHA_009_t01	0	70	< 0.5	< 0.5	< 0.01	< 0.01
BHA_030_t01	0	850	9.5	9.5	0.10	0.03
BHA_034_t01	0	900	9.5	9.5	0.10	0.04
BHA_034_t02	0	950	9.5	9.5	0.10	0.05
BHA_056_t01	0	1250	7.0	9.0	0.10	0.03
BHA_076_t01	0	1200	2.5	2.5	0.06	0.04
BHI_005_t01	0	20	< 0.5	< 0.5	< 0.01	< 0.01
BHI_010_t01	0	125	1.0	1.0	0.02	< 0.01
BHO_006_t01	0	1250	3.5	3.5	0.05	0.04
BHO_008_t01	0	1300	3.5	3.5	0.05	0.04
BHO_011_t01	0	1450	3.5	3.5	0.06	0.05
BHO_011_t02	0	1450	3.5	3.5	0.06	0.05
BHO_013_t01	0	1500	3.0	3.0	0.06	0.18
BHO_013_t02	0	1500	3.0	3.0	0.06	0.18
BHO_017_t01	0	1050	4.0	6.5	0.12	0.03
BHO_029_t01	0	1200	7.0	7.0	0.06	0.24
BHO_031_t01	0	1200	9.5	9.5	0.06	0.24
BHO_033_t01	0	1200	9.5	9.5	0.06	0.24
BHO_037_t01	0	375	4.0	4.0	0.07	0.01
BHO_037_t02	0	375	3.5	3.5	0.07	0.01
BHO_038_t01	0	475	6.0	6.0	0.10	0.02
BHO_039_t01	0	200	1.5	1.5	0.01	< 0.01
BHO_071_t01	0	1500	6.0	7.0	0.06	0.23
BHW_061_t01	0	1100	3.0	3.0	0.05	0.04
BHW_243_t01	0	1150	10.0	10.0	0.09	0.19
BHW_243_t02	0	850	10.0	10.0	0.11	0.04
BHW_269_t01	3	500	6.0	6.0	0.10	0.02
BHW_269_t02	3	475	5.5	5.5	0.10	0.02

Table D.05 - Tahmoor South - Predictions for Tanks

Structure Ref.	Maximum Plan Dimension (m)	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BHW_269_t03	3	450	5.5	5.5	0.10	0.02
BHW_321_t01	0	1300	3.0	3.0	0.07	0.17
BJA_007_t01	0	60	< 0.5	< 0.5	< 0.01	< 0.01
BJO_080_t01	0	950	2.0	4.0	0.09	0.03
BJO_080_t02	0	1350	8.5	10.0	0.10	0.07
BJO_090_t01	0	1050	3.0	3.0	0.05	0.04
BJO_120_t01	0	1200	3.5	3.5	0.06	0.05
BJO_120_t02	0	1300	6.0	6.0	0.07	0.27
BJO_150_t01	0	1250	6.5	9.5	0.11	0.03
BJO_150_t02	0	1400	7.5	9.5	0.12	0.11
BJO_150_t04	0	950	10.0	10.0	0.10	0.04
BJO_150_t05	0	1200	9.5	9.5	0.04	0.20
BJO_150_t06	0	1500	7.5	9.5	0.09	0.23
BJO_150_t07	3	1550	7.5	9.5	0.07	0.25
BJO_150_t08	3	1400	7.5	9.5	0.13	0.07
BJU_006_t01	0	90	< 0.5	< 0.5	< 0.01	< 0.01
BJU_014_t01	0	80	< 0.5	< 0.5	< 0.01	< 0.01
BKA_001_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_003_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_003_t02	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_005_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_005_t02	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_005_t03	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_005_t04	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_007_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_022_t01	0	60	< 0.5	< 0.5	< 0.01	< 0.01
BKA_075_t01	0	20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_135_t01	0	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_139_t01	0	50	< 0.5	< 0.5	< 0.01	< 0.01
BKA_139_t02	0	50	< 0.5	< 0.5	< 0.01	< 0.01
BKA_150_t01	0	30	< 0.5	< 0.5	< 0.01	< 0.01
BKA_150_t02	0	30	< 0.5	< 0.5	< 0.01	< 0.01
BKA_155_t01	0	30	< 0.5	< 0.5	< 0.01	< 0.01
BLL_019_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLU_005_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLU_005_t02	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLU_010_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLU_010_t02	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLU_015_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLU_015_t02	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLU_015_t03	2	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLU_015_t04	2	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLU_015_t05	2	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLU_015_t06	2	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_007_t01	0	20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_009_t01	0	20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_009_t02	0	30	< 0.5	< 0.5	< 0.01	< 0.01
BMA_009_t03	0	30	< 0.5	< 0.5	< 0.01	< 0.01
BMA_011_t02	0	30	< 0.5	< 0.5	< 0.01	< 0.01
BMA_011_t03	0	30	< 0.5	< 0.5	< 0.01	< 0.01
BMA_023_t01	0	60	< 0.5	< 0.5	< 0.01	< 0.01
BNO_005_t01	2	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_005_t02	2	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_005_t03	2	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_007_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_027_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_027_t02	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_037_t01	2	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_053_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_053_t02	2	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BOL_001_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BOL_150_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BOL_150_t02	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BOL_150_t03	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BOL_150_t04	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRA_003_t01	0	60	< 0.5	< 0.5	< 0.01	< 0.01
BRA_056_t01	0	400	4.5	4.5	0.08	0.02
BRA_082_t01	0	1150	2.5	2.5	0.06	0.04
BRA_099_t01	2	1200	8.0	8.0	0.06	0.23
BRA_138_t01	2	125	0.5	0.5	< 0.01	< 0.01
BRA_138_t02	2	125	0.5	0.5	< 0.01	< 0.01
BRA_150_t01	0	90	< 0.5	< 0.5	< 0.01	< 0.01
BRA_170_t01	0	50	< 0.5	< 0.5	< 0.01	< 0.01

Table D.05 - Tahmoor South - Predictions for Tanks

Structure Ref.	Maximum Plan Dimension (m)	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BRA_170_t02	0	50	< 0.5	< 0.5	< 0.01	< 0.01
BRA_170_t03	0	50	< 0.5	< 0.5	< 0.01	< 0.01
BRE_020_t01	0	50	< 0.5	< 0.5	< 0.01	< 0.01
BRE_020_t02	0	50	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_t02	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_t03	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_030_t04	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_040_t01	3	550	6.0	6.0	0.06	0.01
BRE_083_t01	0	1350	4.5	5.5	0.06	0.20
BRE_154_t01	0	1200	7.0	8.0	0.10	0.14
BRE_216_t01	0	70	< 0.5	< 0.5	< 0.01	< 0.01
BRE_218_t01	0	60	< 0.5	< 0.5	< 0.01	< 0.01
BRE_218_t02	0	60	< 0.5	< 0.5	< 0.01	< 0.01
BRE_355_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_375_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_400_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_515_t01	0	1250	6.0	7.5	0.08	0.13
BRE_515_t02	6	1250	6.0	7.5	0.08	0.13
BRL_040_t01	0	1100	2.5	2.5	0.05	0.04
BRL_040_t02	0	1100	2.5	2.5	0.05	0.04
BRL_121_t01	0	80	< 0.5	< 0.5	< 0.01	< 0.01
BRS_004_t01	0	100	0.5	0.5	< 0.01	< 0.01
BRS_040_t01	0	325	3.0	3.0	0.05	0.01
BRS_090_t01	0	1150	4.0	4.0	0.06	0.05
BRS_110_t01	0	950	2.5	2.5	0.05	0.04
BRS_120_t01	0	900	1.5	4.0	0.10	0.03
BRS_120_t02	0	900	1.5	4.0	0.10	0.03
BRS_150_t01	0	1450	6.0	6.0	0.07	0.20
BRS_150_t02	0	1300	6.0	6.0	0.06	0.05
BRS_150_t03	0	1250	6.0	6.0	0.06	0.05
BRS_220_t01	0	475	5.5	5.5	0.10	0.02
BRS_220_t02	0	475	5.5	5.5	0.10	0.02
BRS_230_t01	0	100	1.5	1.5	0.02	< 0.01
BSI_003_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BWA_010_t01	0	1600	5.0	6.5	0.07	0.25
BWE_013_t01	0	500	6.0	6.0	0.07	0.01
BWE_013_t02	0	500	6.0	6.0	0.07	< 0.01
BWE_013_t03	0	650	6.0	6.0	0.04	0.05
BWE_013_t04	0	650	6.0	6.0	0.04	0.05
BWE_015_t01	0	400	6.0	6.0	0.08	< 0.01
BWE_015_t02	0	425	6.0	6.0	0.08	< 0.01
BWE_015_t03	0	600	7.0	7.0	0.06	0.04
BWE_015_t04	0	600	7.0	7.0	0.05	0.04
BWE_017_t01	0	350	5.5	6.0	0.08	< 0.01
BWE_017_t02	0	350	6.0	6.0	0.08	< 0.01
BWE_031_t01	0	700	7.5	7.5	0.06	0.04
BWE_031_t02	0	225	3.5	4.0	0.07	< 0.01
BWE_041_t01	3	600	9.0	9.0	0.11	0.02
BWI_003_t01	0	125	0.5	0.5	< 0.01	< 0.01
BWR_001_t01	0	70	< 0.5	< 0.5	< 0.01	< 0.01
BWR_001_t02	0	70	< 0.5	< 0.5	< 0.01	< 0.01
BWR_001_t03	0	70	< 0.5	< 0.5	< 0.01	< 0.01
BWR_010_t01	0	40	< 0.5	< 0.5	< 0.01	< 0.01
BWR_010_t02	0	40	< 0.5	< 0.5	< 0.01	< 0.01
BWR_010_t03	0	50	< 0.5	< 0.5	< 0.01	< 0.01
BWR_020_t01	0	30	< 0.5	< 0.5	< 0.01	< 0.01
BWR_030_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BWR_030_t02	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BWR_040_t01	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BWR_040_t02	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BWR_040_t03	0	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BWR_040_t04	14	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BWR_050_t01	0	20	< 0.5	< 0.5	< 0.01	< 0.01
BWR_050_t02	0	30	< 0.5	< 0.5	< 0.01	< 0.01
BYR_005_t01	0	1050	5.5	5.5	0.06	0.22
BYR_015_t01	0	950	8.5	8.5	0.07	0.16
BYR_035_t01	0	375	4.5	4.5	0.08	0.02
BYR_055_t01	0	90	< 0.5	< 0.5	< 0.01	< 0.01
BYR_065_t01	0	50	< 0.5	< 0.5	< 0.01	< 0.01
BYR_065_t02	5	90	< 0.5	< 0.5	< 0.01	< 0.01
BYR_085_t01	3	50	< 0.5	< 0.5	< 0.01	< 0.01
BYR_085_t02	3	60	< 0.5	< 0.5	< 0.01	< 0.01

Table D.05 - Tahmoor South - Predictions for Tanks

Structure Ref.	Maximum Plan Dimension (m)	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BYR_115_t01	0	30	< 0.5	< 0.5	< 0.01	< 0.01
BYR_115_t02	0	30	< 0.5	< 0.5	< 0.01	< 0.01
BYR_115_t03	0	20	< 0.5	< 0.5	< 0.01	< 0.01
BYR_145_t01	0	80	< 0.5	< 0.5	< 0.01	< 0.01
BYR_145_t02	2	80	< 0.5	< 0.5	< 0.01	< 0.01
BYR_145_t03	0	90	< 0.5	< 0.5	< 0.01	< 0.01
BYR_152_t01	0	1050	3.5	3.5	0.05	0.22
	Maxima:	**1600**	**10.0**	**10.0**	**0.13**	**0.27**

Table D.06 - Tahmoor South - Predictions for Pools

Structure Ref.	Maximum Plan Dimension (m)	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BAR_090_p01	7	30	< 0.5	< 0.5	< 0.01	< 0.01
BAR_150_p01	8	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_165_p01	11	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_175_p01	7	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_177_p01	9	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_245_p01	8	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_475_p01	10	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_480_p01	9	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_495_p01	9	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_505_p01	9	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAR_530_p01	11	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAS_001_p01	10	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAS_015_p01	9	40	0.5	0.5	0.01	< 0.01
BAS_019_p01	10	90	0.5	0.5	< 0.01	< 0.01
BAS_027_p01	10	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAV_013_p01	8	150	1.0	1.0	< 0.01	< 0.01
BAV_015_p01	6	150	1.0	1.0	< 0.01	< 0.01
BAV_021_p01	8	175	1.0	1.0	< 0.01	< 0.01
BAV_035_p01	9	150	1.0	1.0	< 0.01	< 0.01
BAV_049_p01	7	150	0.5	0.5	< 0.01	< 0.01
BAV_075_p01	12	150	0.5	0.5	< 0.01	< 0.01
BAV_089_p01	10	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_111_p01	7	80	< 0.5	< 0.5	< 0.01	< 0.01
BAV_147_p01	7	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_181_p01	7	125	0.5	0.5	< 0.01	< 0.01
BAV_183_p01	8	100	< 0.5	< 0.5	< 0.01	< 0.01
BBA_010_p01	10	1300	3.5	3.5	0.07	0.09
BBA_020_p01	9	950	2.0	3.5	0.08	0.03
BBA_070_p01	8	1100	2.5	4.0	0.10	0.03
BBA_090_p01	11	1200	6.5	9.0	0.13	0.03
BBA_120_p01	9	250	2.0	2.0	0.02	0.01
BBA_130_p01	9	150	1.0	1.0	0.01	< 0.01
BBA_150_p01	12	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBA_202_p01	9	1150	9.5	9.5	0.09	0.12
BBA_204_p01	8	1300	8.0	9.5	0.13	0.07
BBA_220_p01	11	1250	4.5	4.5	0.05	0.04
BBA_240_p01	9	1150	3.0	3.0	0.06	0.04
BBI_002_p01	10	60	< 0.5	< 0.5	< 0.01	< 0.01
BBI_006_p01	8	80	< 0.5	< 0.5	< 0.01	< 0.01
BBI_035_p01	8	50	< 0.5	< 0.5	< 0.01	< 0.01
BBN_004_p01	7	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_012_p01	8	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BBN_015_p01	7	20	< 0.5	< 0.5	< 0.01	< 0.01
BCA_035_p01	7	950	3.0	3.0	0.04	0.03
BCA_095_p01	10	1050	5.5	7.5	0.08	0.04
BCA_100_p01	10	800	3.5	5.0	0.07	0.05
BCA_105_p01	9	700	4.0	4.0	0.04	0.03
BCA_115_p01	7	80	1.0	1.0	0.01	< 0.01
BCA_120_p01	9	60	0.5	0.5	< 0.01	< 0.01
BCL_001_p01	9	275	2.0	2.0	0.03	0.01
BCL_007_p01	7	400	5.5	5.5	0.08	0.03
BCL_009_p01	10	350	6.5	6.5	0.06	0.02
BCL_011_p01	10	550	8.5	8.5	0.07	0.05
BCL_013_p01	7	750	8.5	8.5	0.09	0.16
BCL_015_p01	8	900	8.5	8.5	0.03	0.12
BCL_017_p01	9	950	7.5	7.5	0.01	0.08
BCL_021_p01	9	900	5.0	5.0	0.04	0.06
BCL_025_p01	9	1000	4.5	6.5	0.10	0.05
BCL_027_p01	8	1150	6.5	8.5	0.10	0.05
BCL_033_p01	8	1500	7.5	8.5	0.06	0.23
BCL_035_p01	10	1100	5.5	8.0	0.10	0.03
BCL_037_p01	10	1000	2.5	2.5	0.06	0.04
BCL_039_p01	8	1100	3.0	3.0	0.05	0.04
BCL_041_p01	8	1100	3.0	3.0	0.05	0.04
BCL_047_p01	8	1250	3.0	3.0	0.06	0.11
BCL_051_p01	11	1250	9.5	9.5	0.06	0.25
BCL_059_p01	8	800	9.5	9.5	0.11	0.03
BCM_020_p01	7	175	1.0	1.0	< 0.01	< 0.01
BCM_027_p01	8	125	0.5	0.5	< 0.01	< 0.01
BCM_031_p01	10	100	< 0.5	< 0.5	< 0.01	< 0.01
BCM_048_p01	6	100	< 0.5	< 0.5	< 0.01	< 0.01

Table D.06 - Tahmoor South - Predictions for Pools

Structure Ref.	Maximum Plan Dimension (m)	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BCM_062_p01	8	350	3.5	3.5	0.07	0.01
BCM_068_p01	9	375	4.0	4.0	0.07	0.01
BCP_060_p01	10	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDA_003_p01	8	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDA_005_p01	10	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDA_013_p01	11	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BDY_007_p01	8	1000	3.0	5.0	0.10	0.03
BDY_010_p01	9	1050	4.0	6.5	0.10	0.03
BDY_025_p01	9	1550	3.5	3.5	0.07	0.22
BDY_037_p01	5	1400	7.5	9.5	0.12	0.06
BDY_050_p01	8	1600	4.0	5.5	0.07	0.25
BDY_070_p01	9	1200	3.5	3.5	0.05	0.04
BEL_005_p01	8	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_011_p01	11	30	0.5	0.5	0.01	< 0.01
BEL_013_p01	9	60	1.0	1.0	0.01	< 0.01
BEL_017_p01	8	90	< 0.5	< 0.5	< 0.01	< 0.01
BEL_019_p01	8	80	< 0.5	< 0.5	< 0.01	< 0.01
BEL_021_p01	7	80	< 0.5	< 0.5	< 0.01	< 0.01
BEL_025_p01	9	50	< 0.5	< 0.5	< 0.01	< 0.01
BEL_035_p01	9	30	< 0.5	< 0.5	< 0.01	< 0.01
BEL_037_p01	10	40	< 0.5	< 0.5	< 0.01	< 0.01
BEL_043_p01	7	30	< 0.5	< 0.5	< 0.01	< 0.01
BEL_045_p01	7	20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_047_p01	8	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BEL_051_p01	7	40	< 0.5	< 0.5	< 0.01	< 0.01
BEL_052_p01	8	40	< 0.5	< 0.5	< 0.01	< 0.01
BEL_054_p01	9	40	< 0.5	< 0.5	< 0.01	< 0.01
BEL_055_p01	8	40	< 0.5	< 0.5	< 0.01	< 0.01
BEL_056_p01	7	50	< 0.5	< 0.5	< 0.01	< 0.01
BEL_059_p01	6	60	< 0.5	< 0.5	< 0.01	< 0.01
BEL_061_p01	12	70	< 0.5	< 0.5	< 0.01	< 0.01
BEL_063_p01	8	70	< 0.5	< 0.5	< 0.01	< 0.01
BEL_079_p01	8	150	0.5	0.5	< 0.01	< 0.01
BEL_089_p01	9	250	3.0	3.0	0.04	0.02
BFL_001_p01	8	1450	7.5	9.0	0.10	0.19
BFL_003_p01	11	1100	5.0	7.5	0.10	0.03
BGL_050_p01	5	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGO_055_p01	7	1350	4.0	4.0	0.05	0.04
BGR_095_p01	8	1000	2.0	3.0	0.07	0.04
BGR_115_p01	9	1550	7.5	9.5	0.08	0.24
BGR_119_p01	11	1550	3.5	3.5	0.07	0.18
BGR_129_p01	8	1300	4.0	4.0	0.05	0.04
BGR_133_p01	7	1200	3.5	3.5	0.05	0.04
BGR_137_p01	10	1100	2.5	5.0	0.11	0.03
BGR_139_p01	7	1100	3.5	5.5	0.11	0.03
BGR_141_p01	8	1250	5.0	8.0	0.10	0.03
BGR_143_p01	7	1250	5.5	8.5	0.09	0.03
BGR_145_p01	9	1300	6.0	8.5	0.09	0.03
BGR_177_p01	9	1150	9.0	9.0	0.02	0.16
BGR_235_p01	14	1300	6.0	6.5	0.03	0.08
BGR_240_p01	9	1500	6.0	8.0	0.06	0.21
BGR_250_p01	9	1350	6.0	8.5	0.09	0.03
BGR_278_p01	8	1250	7.0	9.0	0.10	0.03
BGR_281_p02	8	1050	2.5	2.5	0.05	0.04
BGW_011_p01	9	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BHA_009_p01	9	80	< 0.5	< 0.5	< 0.01	< 0.01
BHA_011_p01	10	80	< 0.5	< 0.5	< 0.01	< 0.01
BHA_019_p01	8	150	0.5	0.5	< 0.01	< 0.01
BHA_021_p01	6	150	1.0	1.0	< 0.01	< 0.01
BHA_023_p01	9	150	1.0	1.0	< 0.01	< 0.01
BHA_025_p01	7	200	1.0	1.0	0.01	< 0.01
BHA_026_p01	5	225	1.5	1.5	0.02	< 0.01
BHA_047_p01	8	1000	2.5	2.5	0.05	0.03
BHA_048_p01	5	950	1.5	3.0	0.12	0.03
BHA_064_p01	6	950	2.0	2.5	0.07	0.03
BHA_067_p01	10	1050	2.5	2.5	0.05	0.04
BHA_109_p01	8	175	1.0	1.0	< 0.01	< 0.01
BHD_002_p01	6	100	< 0.5	< 0.5	< 0.01	< 0.01
BHI_005_p01	11	20	< 0.5	< 0.5	< 0.01	< 0.01
BHO_005_p01	9	1250	3.5	3.5	0.05	0.04
BHO_006_p01	8	1300	3.5	3.5	0.05	0.04

Table D.06 - Tahmoor South - Predictions for Pools

Structure Ref.	Maximum Plan Dimension (m)	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BHO_014_p01	11	1500	3.0	5.0	0.06	0.22
BHO_019_p01	9	950	2.0	2.5	0.08	0.03
BHO_031_p01	11	1250	8.0	8.0	0.06	0.24
BHO_035_p01	11	1000	9.5	9.5	0.10	0.11
BHO_036_p01	9	425	5.0	5.0	0.09	0.02
BHO_037_p01	9	400	4.5	4.5	0.08	0.02
BHO_043_p01	9	175	1.0	1.0	0.01	< 0.01
BHO_047_p01	11	125	0.5	0.5	< 0.01	< 0.01
BHO_048_p01	10	225	1.5	1.5	0.02	< 0.01
BHO_057_p01	9	1000	3.5	5.0	0.11	0.03
BHO_059_p01	7	1150	6.0	8.5	0.10	0.03
BHO_065_p01	9	1500	7.5	9.0	0.06	0.23
BHO_071_p01	10	1500	3.5	5.0	0.06	0.23
BHO_073_p01	8	1500	4.0	4.0	0.05	0.18
BHR_003_p01	9	40	< 0.5	< 0.5	< 0.01	< 0.01
BHR_005_p01	9	30	< 0.5	< 0.5	< 0.01	< 0.01
BHW_003_p01	9	1450	6.0	8.5	0.08	0.17
BHW_007_p01	8	1350	6.5	8.5	0.09	0.03
BHW_019_p01	8	1150	3.0	3.0	0.06	0.04
BHW_023_p01	7	1250	4.0	4.0	0.05	0.04
BHW_029_p01	11	1150	3.5	3.5	0.06	0.05
BHW_041_p01	8	1450	8.0	9.5	0.09	0.17
BHW_053_p01	10	950	1.5	4.0	0.10	0.03
BHW_065_p01	6	1200	3.0	3.0	0.06	0.05
BHW_073_p01	9	1250	7.0	7.0	0.07	0.25
BHW_091_p01	7	700	9.0	9.0	0.11	0.03
BHW_093_p01	8	650	8.5	8.5	0.11	0.03
BHW_101_p01	8	450	5.5	5.5	0.10	0.02
BHW_145_p01	8	200	1.0	1.0	0.01	< 0.01
BHW_147_p01	9	200	1.0	1.0	0.01	< 0.01
BHW_149_p01	8	200	1.0	1.0	0.01	< 0.01
BHW_171_p01	7	200	1.0	1.0	0.01	< 0.01
BHW_175_p01	9	200	1.0	1.0	0.01	< 0.01
BHW_181_p01	11	200	1.0	1.0	0.01	< 0.01
BHW_215_p01	10	1000	4.0	6.5	0.12	0.03
BHW_227_p01	11	1150	4.0	4.0	0.06	0.04
BHW_243_p01	11	1050	10.0	10.0	0.11	0.09
BHW_261_p01	9	375	3.5	3.5	0.07	0.01
BHW_265_p01	10	425	4.5	4.5	0.09	0.02
BHW_287_p01	6	550	6.5	6.5	0.11	0.02
BHW_291_p01	8	500	6.0	6.0	0.11	0.02
BHW_335_p01	11	1350	7.5	9.5	0.10	0.06
BHW_351_p01	5	1200	3.5	3.5	0.05	0.04
BHW_355_p01	7	1100	3.5	6.5	0.10	0.03
BHW_361_p01	12	1550	7.0	9.0	0.10	0.23
BIR_027_p01	9	1200	5.5	8.5	0.11	0.03
BIR_047_p01	12	1300	3.5	3.5	0.05	0.04
BJA_006_p01	7	60	< 0.5	< 0.5	< 0.01	< 0.01
BJA_007_p01	7	60	< 0.5	< 0.5	< 0.01	< 0.01
BJA_008_p01	7	50	< 0.5	< 0.5	< 0.01	< 0.01
BJA_009_p01	7	40	< 0.5	< 0.5	< 0.01	< 0.01
BJO_009_p01	7	125	0.5	0.5	< 0.01	< 0.01
BJO_020_p01	7	1200	3.5	3.5	0.07	0.05
BJO_110_p01	8	1150	3.5	3.5	0.06	0.05
BJU_014_p01	7	90	< 0.5	< 0.5	< 0.01	< 0.01
BKA_001_p01	8	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_005_p01	10	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BKA_034_p01	12	70	< 0.5	< 0.5	< 0.01	< 0.01
BKA_049_p01	9	70	< 0.5	< 0.5	< 0.01	< 0.01
BKA_055_p01	4	60	< 0.5	< 0.5	< 0.01	< 0.01
BKA_064_p01	9	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_125_p01	8	30	< 0.5	< 0.5	< 0.01	< 0.01
BKA_126_p01	11	40	< 0.5	< 0.5	< 0.01	< 0.01
BKA_133_p01	12	40	< 0.5	< 0.5	< 0.01	< 0.01
BLA_005_p01	7	60	< 0.5	< 0.5	< 0.01	< 0.01
BLA_007_p01	9	80	< 0.5	< 0.5	< 0.01	< 0.01
BLA_009_p01	8	100	< 0.5	< 0.5	< 0.01	< 0.01
BLA_011_p01	5	125	0.5	0.5	< 0.01	< 0.01
BLL_003_p01	7	60	< 0.5	< 0.5	< 0.01	< 0.01
BLL_005_p01	8	60	< 0.5	< 0.5	< 0.01	< 0.01
BLL_013_p01	8	< 20	< 0.5	< 0.5	< 0.01	< 0.01

Table D.06 - Tahmoor South - Predictions for Pools

Structure Ref.	Maximum Plan Dimension (m)	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BLL_015_p01	7	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_021_p01	9	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_027_p01	9	30	< 0.5	< 0.5	< 0.01	< 0.01
BLL_031_p01	9	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BLL_035_p01	11	20	< 0.5	< 0.5	< 0.01	< 0.01
BLR_007_p01	8	50	< 0.5	< 0.5	< 0.01	< 0.01
BLU_001_p01	10	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_003_p01	8	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_013_p01	5	30	< 0.5	< 0.5	< 0.01	< 0.01
BMA_027_p01	9	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_035_p01	7	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BMA_063_p01	8	50	< 0.5	< 0.5	< 0.01	< 0.01
BNN_057_p01	8	50	< 0.5	< 0.5	< 0.01	< 0.01
BNN_069_p01	6	30	< 0.5	< 0.5	< 0.01	< 0.01
BNO_003_p01	8	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_015_p01	9	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_021_p01	9	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_023_p01	15	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_025_p01	8	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_027_p01	9	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_035_p01	8	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_037_p01	9	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_049_p01	10	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_055_p01	8	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNO_057_p01	9	20	< 0.5	< 0.5	< 0.01	< 0.01
BNR_003_p01	5	30	< 0.5	< 0.5	< 0.01	< 0.01
BNR_009_p01	8	40	< 0.5	< 0.5	< 0.01	< 0.01
BNR_039_p01	6	30	< 0.5	< 0.5	< 0.01	< 0.01
BOL_120_p01	10	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BPH_002_p01	6	60	< 0.5	< 0.5	< 0.01	< 0.01
BPH_006_p01	8	80	< 0.5	< 0.5	< 0.01	< 0.01
BRA_034_p01	8	150	0.5	0.5	< 0.01	< 0.01
BRA_054_p01	7	375	3.5	3.5	0.07	0.01
BRA_060_p01	8	550	7.0	7.0	0.10	0.02
BRA_090_p01	7	1050	2.5	2.5	0.05	0.04
BRA_106_p01	7	1150	9.5	9.5	0.06	0.22
BRA_114_p01	6	600	7.5	7.5	0.10	0.02
BRA_115_p01	7	500	6.0	6.0	0.10	0.02
BRA_146_p01	7	100	< 0.5	< 0.5	< 0.01	< 0.01
BRA_152_p01	10	80	< 0.5	< 0.5	< 0.01	< 0.01
BRA_160_p01	9	50	< 0.5	< 0.5	< 0.01	< 0.01
BRE_063_p01	7	1300	7.0	8.5	0.12	0.17
BRE_080_p01	10	1350	3.5	3.5	0.06	0.21
BRE_148_p01	9	1250	3.0	3.0	0.06	0.21
BRE_216_p01	9	70	< 0.5	< 0.5	< 0.01	< 0.01
BRE_315_p01	6	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_375_p01	11	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_385_p01	12	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_395_p01	11	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_505_p01	10	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_515_p01	10	1200	6.0	7.5	0.08	0.11
BRL_019_p01	8	1500	7.0	9.0	0.06	0.22
BRS_004_p01	9	100	< 0.5	< 0.5	< 0.01	< 0.01
BRS_030_p01	9	250	2.0	2.0	0.02	< 0.01
BRS_050_p01	8	750	9.5	9.5	0.11	0.03
BRS_080_p01	9	1300	3.5	3.5	0.07	0.13
BRS_100_p01	9	1000	3.0	3.0	0.05	0.04
BRS_110_p01	8	950	2.5	2.5	0.06	0.04
BRS_130_p01	10	1550	8.0	9.0	0.07	0.26
BRS_140_p01	7	1150	8.0	9.5	0.13	0.04
BRS_203_p01	8	550	7.0	7.0	0.10	0.04
BRS_253_p01	8	150	1.0	1.0	< 0.01	< 0.01
BRS_256_p01	8	125	0.5	0.5	< 0.01	< 0.01
BSC_020_p01	7	650	8.5	8.5	0.10	0.03
BSI_003_p01	9	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BSI_007_p01	9	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BSI_013_p01	10	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BTH_005_p01	8	100	< 0.5	< 0.5	< 0.01	< 0.01
BTH_019_p01	9	200	1.0	1.0	0.01	< 0.01
BTH_021_p01	7	225	1.5	1.5	0.02	< 0.01
BWA_063_p01	10	1050	2.0	4.5	0.10	0.03

Table D.06 - Tahmoor South - Predictions for Pools

Structure Ref.	Maximum Plan Dimension (m)	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BWA_066_p01	10	1100	2.0	4.0	0.09	0.03
BWA_072_p01	9	1400	7.5	9.5	0.12	0.05
BWE_001_p01	8	1350	5.0	5.0	0.04	0.07
BWE_003_p01	7	1350	6.5	6.5	0.03	0.09
BWE_017_p01	12	475	7.0	7.0	0.09	< 0.01
BWE_023_p01	9	275	5.0	5.0	0.10	0.02
BWI_006_p01	9	100	< 0.5	< 0.5	< 0.01	< 0.01
BWR_040_p01	7	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BWR_050_p01	7	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BYR_005_p01	10	1050	3.0	3.0	0.06	0.22
BYR_015_p01	9	800	8.5	8.5	0.09	0.04
BYR_055_p01	8	80	< 0.5	< 0.5	< 0.01	< 0.01
BYR_065_p01	6	70	< 0.5	< 0.5	< 0.01	< 0.01
BYR_135_p01	10	60	< 0.5	< 0.5	< 0.01	< 0.01
BYR_152_p01	12	1100	3.0	3.0	0.05	0.12
	Maxima:	**1600**	**10.0**	**10.0**	**0.13**	**0.26**

Table D.07 - Tahmoor South - Predictions for Farm Dams

Dam Ref.	Maximum Length (m)	Plan Area (m2)	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)	Predicted Change in Freeboard (mm)
BAN_001_d01	29	405	1300	4.5	7.5	0.06	0.22	150
BAN_001_d02	20	191	1350	7.5	7.5	0.06	0.22	300
BAN_040_d01	28	229	1450	6.0	8.5	0.07	0.23	250
BAN_040_d02	34	624	1100	5.0	7.5	0.10	0.03	200
BAR_001_d01	28	428	60	1.0	1.0	0.01	< 0.01	< 50
BAR_010_d01	27	367	175	2.5	2.5	0.05	0.02	100
BAR_030_d01	31	515	20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BAR_040_d01	17	167	200	3.0	3.0	0.06	0.02	100
BAR_050_d01	30	471	30	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BAR_070_d01	22	266	175	2.5	2.5	0.06	< 0.01	100
BAR_090_d01	20	190	70	1.0	1.0	< 0.01	< 0.01	< 50
BAR_120_d01	38	713	80	1.0	1.0	0.01	< 0.01	< 50
BAR_120_d02	22	247	125	1.5	1.5	0.01	< 0.01	50
BAR_140_d01	28	386	50	0.5	0.5	< 0.01	< 0.01	< 50
BAR_150_d01	13	78	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BAR_165_d01	13	71	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BAR_177_d01	49	1141	30	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BAR_195_d01	58	1462	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BAR_195_d02	67	2266	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BAR_195_d03	71	2305	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BAR_195_d04	93	4486	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BAR_210_d01	37	748	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BAR_210_d02	21	237	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BAR_210_d03	41	885	100	0.5	0.5	< 0.01	< 0.01	< 50
BAR_230_d01	26	332	30	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BAR_235_d01	62	1892	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BAR_245_d01	20	210	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BAR_475_d01	47	1090	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BAR_475_d02	70	2167	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BAR_475_d03	8	30	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BAR_495_d01	20	204	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BAR_510_d01	15	128	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BAR_535_d01	140	9838	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BAR_535_d03	12	76	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BAR_535_d04	23	261	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BAV_070_d01	32	521	200	1.5	1.5	0.02	< 0.01	50
BBA_015_d01	18	175	1000	3.0	3.0	0.06	0.04	100
BBA_020_d01	41	724	1550	6.5	7.0	0.07	0.26	100
BBA_040_d01	17	191	1200	3.5	3.5	0.06	0.04	150
BBA_070_d01	165	9089	1650	5.5	5.5	0.07	0.25	600
BBA_070_d02	14	115	1600	6.0	7.5	0.07	0.25	100
BBA_070_d03	16	135	1300	5.0	5.0	0.06	0.04	200
BBA_070_d04	22	249	1150	4.5	8.0	0.09	0.03	150
BBA_070_d05	27	299	1400	6.0	8.5	0.09	0.18	350
BBA_070_d06	14	111	1550	8.0	9.5	0.16	0.22	350
BBA_070_d08	14	613	1250	6.5	9.0	0.18	0.04	200
BBA_090_d01	23	232	1550	7.5	9.0	0.07	0.26	200
BBA_090_d02	22	244	1400	5.0	5.0	0.06	0.08	300
BBA_100_d01	32	475	450	4.5	4.5	0.09	0.05	200
BBA_120_d01	37	708	975	9.0	9.0	0.09	0.10	550
BBA_120_d02	27	322	425	4.5	4.5	0.07	0.02	200
BBA_130_d01	47	797	150	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BBA_155_d01	26	347	40	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BBA_180_d01	40	802	30	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BBA_190_d03	82	3144	30	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BBA_190_d04	72	2427	40	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BBA_202_d01	21	227	600	6.0	6.0	0.09	0.02	250
BBA_220_d01	32	209	1600	5.0	5.0	0.07	0.13	250
BBA_220_d02	15	130	1500	5.0	5.0	0.07	0.05	250
BBA_240_d01	30	487	1150	4.0	7.0	0.10	0.03	100
BBA_250_d01	17	163	1500	4.0	4.0	0.07	0.05	250
BBA_260_d01	16	159	1550	8.5	9.5	0.13	0.25	350
BBA_270_d01	17	161	950	3.0	5.0	0.10	0.03	< 50
BBA_300_d01	19	204	1000	10.0	10.0	0.11	0.07	500
BBY_001_d02	21	242	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BCA_001_d01	28	345	950	5.5	5.5	0.03	0.20	250
BCA_010_d01	22	251	725	2.5	2.5	0.06	0.04	100
BCA_015_d01	28	370	1200	4.5	5.0	0.04	0.21	150
BCA_060_d01	43	751	1250	6.5	8.0	0.09	0.13	400
BCA_065_d01	57	1424	1350	4.5	4.5	0.06	0.17	350
BCA_070_d01	21	231	1350	4.5	4.5	0.06	0.21	150
BCA_075_d01	15	124	1350	7.0	8.0	0.05	0.21	250
BCA_080_d01	33	555	925	3.5	6.0	0.09	0.03	100
BCA_085_d01	13	96	850	2.5	3.0	0.07	0.04	100
BCA_105_d01	13	86	475	5.0	5.0	0.06	0.01	200
BCA_105_d02	30	418	300	4.0	4.0	0.04	0.02	200
BCP_010_d01	28	397	90	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BCP_020_d01	33	515	80	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BCP_040_d01	43	882	80	0.5	0.5	< 0.01	< 0.01	< 50
BCP_050_d01	22	338	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BCP_060_d01	32	572	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BCP_065_d01	25	317	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BCP_090_d01	62	1768	600	4.5	5.0	0.06	0.06	350
BCP_090_d02	61	1694	475	3.0	3.5	0.06	0.02	300
BCP_090_d03	56	1366	375	2.0	2.0	0.04	< 0.01	250
BCP_090_d04	59	1437	325	2.0	2.0	0.02	0.01	200
BCP_090_d05	55	1067	525	2.0	2.0	0.04	0.01	250
BCP_090_d06	35	577	650	3.0	3.0	0.05	0.03	200

Table D.07 - Tahmoor South - Predictions for Farm Dams

Dam Ref.	Maximum Length (m)	Plan Area (m2)	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)	Predicted Change in Freeboard (mm)
BCP_090_d07	27	362	725	4.0	4.0	0.05	0.03	200
BCP_090_d08	25	262	800	4.5	4.5	0.05	0.03	200
BCP_090_d09	11	53	800	4.5	4.5	0.05	0.03	200
BCP_090_d10	42	483	750	4.5	4.5	0.05	0.03	350
BCP_090_d11	26	204	775	5.0	5.0	0.05	0.03	300
BCP_125_d01	18	171	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BDY_070_d01	33	326	1100	2.5	5.0	0.09	0.03	50
BDY_080_d01	21	218	1500	7.0	9.0	0.11	0.23	300
BDY_090_d01	15	138	1400	4.5	4.5	0.06	0.05	200
BDY_110_d01	55	1597	1550	4.0	4.0	0.07	0.07	350
BDY_150_d01	29	421	1600	7.5	9.0	0.07	0.25	150
BDY_150_d02	23	283	1250	4.0	4.0	0.05	0.04	150
BGL_001_d01	33	587	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BGL_010_d01	22	276	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BGL_045_d01	30	443	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BGO_005_d01	60	1836	1350	4.5	4.5	0.05	0.04	350
BGO_015_d01	117	6330	1500	5.0	6.5	0.06	0.21	450
BGO_025_d01	81	3012	1100	4.0	7.0	0.09	0.03	150
BGO_040_d01	66	2076	1450	6.5	8.5	0.09	0.21	250
BGO_060_d01	22	156	1300	4.0	4.0	0.05	0.04	250
BGR_147_d01	34	507	1300	4.0	4.0	0.05	0.04	200
BGR_157_d01	50	839	1500	6.5	8.5	0.06	0.21	200
BGR_157_d02	32	455	1250	6.0	8.5	0.09	0.03	250
BGR_157_d03	49	826	1500	6.5	8.5	0.07	0.21	250
BGR_167_d01	23	277	1200	4.0	4.0	0.05	0.04	200
BGR_167_d02	44	1006	1400	4.0	4.0	0.06	0.05	300
BGR_167_d03	12	85	1450	4.0	4.0	0.06	0.14	150
BGR_183_d01	101	3816	950	8.0	8.0	0.12	0.10	500
BGR_183_d02	103	4386	1100	4.0	4.0	0.05	0.03	250
BGR_193_d01	60	1738	500	7.0	7.0	0.09	0.03	350
BGR_203_d01	108	5078	275	3.5	4.0	0.07	0.02	200
BGR_235_d01	31	494	1450	4.0	4.0	0.05	0.09	250
BGR_235_d02	16	164	1100	6.0	6.0	0.03	0.07	250
BGR_250_d01	18	161	1250	5.0	8.0	0.11	0.03	150
BHI_001_d01	33	533	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BHI_005_d01	55	1526	60	0.5	0.5	< 0.01	< 0.01	< 50
BHI_005_d02	27	340	60	0.5	0.5	< 0.01	< 0.01	< 50
BHI_010_d01	151	9656	350	3.0	3.0	0.07	0.03	250
BHW_247_d01	15	113	475	5.5	5.5	0.10	0.02	200
BHW_273_d01	36	583	1300	10.0	10.0	0.07	0.27	350
BHW_343_d01	17	153	1550	4.0	4.0	0.07	0.12	200
BHW_351_d01	22	143	1100	2.5	4.0	0.09	0.03	50
BHW_367_d01	10	58	1450	4.0	4.0	0.06	0.04	200
BIR_007_d01	74	1707	1550	4.0	4.0	0.07	0.08	400
BIR_017_d01	26	337	1100	3.0	3.0	0.07	0.03	100
BIR_017_d02	9	52	1150	4.5	8.0	0.10	0.03	150
BIR_027_d01	52	1156	1500	7.0	8.5	0.06	0.23	150
BIR_037_d01	44	1018	1300	4.0	4.0	0.06	0.04	250
BIR_057_d01	32	441	1100	3.5	6.0	0.09	0.03	100
BJO_030_d01	17	164	1600	9.0	10.0	0.12	0.27	400
BJO_070_d01	28	415	1450	4.5	4.5	0.07	0.05	250
BJO_150_d01	9	39	1550	5.0	5.0	0.07	0.07	200
BKA_076_d01	42	788	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BLU_010_d01	27	400	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BLU_015_d01	28	400	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BLU_015_d02	21	195	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BNO_015_d01	20	228	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BOL_001_d01	24	335	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BOL_010_d01	45	956	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BOL_130_d01	18	87	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BOL_140_d01	23	237	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BRE_016_d01	35	601	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BRE_020_d01	47	1172	20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BRE_045_d01	56	1253	50	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BRE_061_d01	56	55	1300	4.5	4.5	0.06	0.08	200
BRE_090_d01	62	1807	800	2.5	3.5	0.07	0.03	100
BRE_090_d02	23	280	1000	3.5	3.5	0.05	0.04	150
BRE_090_d03	64	1801	1050	2.5	2.5	0.06	0.07	250
BRE_090_d04	34	538	900	8.0	8.0	0.07	0.20	450
BRE_143_d01	33	576	775	2.0	3.0	0.06	0.03	50
BRE_148_d01	37	717	1050	2.5	2.5	0.06	0.12	150
BRE_148_d02	22	189	1050	2.5	2.5	0.06	0.15	100
BRE_154_d01	83	2706	1300	7.0	8.0	0.09	0.22	400
BRE_154_d02	51	1160	975	6.5	8.0	0.09	0.03	250
BRE_167_d01	94	2367	850	6.5	6.5	0.04	0.07	500
BRE_195_d01	20	176	175	1.5	2.0	0.03	0.01	50
BRE_236_d01	60	1328	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BRE_275_d01	42	900	30	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BRE_275_d02	12	73	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BRE_295_d01	34	426	20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BRE_335_d01	45	1010	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BRE_355_d01	87	3151	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BRE_600_d01	25	323	1000	5.0	7.5	0.15	0.03	150
BRE_685_d01	125	5509	150	1.0	1.0	0.01	< 0.01	50
BRS_010_d01	29	442	225	1.5	1.5	0.02	< 0.01	50
BRS_070_d01	22	226	1300	5.5	5.5	0.07	0.26	100
BRS_110_d01	14	94	975	4.0	6.0	0.12	0.03	50
BRS_120_d01	19	159	1300	8.5	10.0	0.15	0.04	350

Table D.07 - Tahmoor South - Predictions for Farm Dams

Dam Ref.	Maximum Length (m)	Plan Area (m2)	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)	Predicted Change in Freeboard (mm)
BRS_150_d01	26	337	1300	5.0	5.0	0.06	0.05	300
BRS_160_d01	43	954	1400	8.5	8.5	0.07	0.27	350
BRS_193_d01	18	149	1200	4.5	4.5	0.06	0.06	250
BRS_193_d02	11	65	1300	4.0	4.0	0.07	0.23	150
BRS_208_d01	24	296	1250	10.0	10.0	0.11	0.25	600
BRS_220_d01	30	469	475	5.5	5.5	0.10	0.02	200
BSI_013_d01	59	1164	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BSI_018_d01	110	4903	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BSI_150_d01	77	2029	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BTY_005_d01	47	1064	20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BTY_005_d02	26	130	30	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BWE_031_d01	43	930	750	7.0	7.0	0.07	0.05	400
BWR_001_d01	31	518	90	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BWR_010_d01	46	1081	80	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BWR_010_d02	64	2155	90	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BWR_010_d03	29	416	30	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BWR_010_d04	26	354	30	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BWR_010_d05	30	588	125	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BWR_020_d01	45	951	20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BWR_030_d01	74	2766	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BWR_030_d02	33	549	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BWR_040_d01	43	649	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BWR_040_d02	29	339	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BWR_040_d03	23	234	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BWR_050_d01	86	2402	< 20	< 0.5	< 0.5	< 0.01	< 0.01	< 50
BYR_001_d01	12	49	900	3.0	3.0	0.04	0.04	100
BYR_005_d01	28	404	1050	3.0	3.0	0.06	0.22	100
BYR_005_d02	58	1350	950	3.0	3.0	0.05	0.04	250
BYR_015_d01	53	1415	1050	7.0	7.0	0.06	0.23	150
BYR_065_d01	42	777	225	2.0	2.0	0.03	< 0.01	100
		Maxima:	**1650**	**10.0**	**10.0**	**0.18**	**0.27**	**600**

Table D.08 - Tahmoor South - Predictions for Public Amenities

Structure Ref.	Maximum Plan Dimension (m)	Description	Structure Type	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BAN_040_pa01	6	Rubbish Tip	Shed	1450	6.0	8.5	0.07	0.22
BAV_075_pa01	6	Avon Caravan Village	Amenities / Laundry	125	0.5	0.5	< 0.01	< 0.01
BAV_075_pa02	6	Avon Caravan Village	Office / Kiosk	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_075_pa03	7	Avon Caravan Village	Building	125	0.5	0.5	< 0.01	< 0.01
BAV_075_pa04	7	Avon Caravan Village	Shed	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_075_pa05	7	Avon Caravan Village	Cabin	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_075_pa06	7	Avon Caravan Village	Cabin	90	< 0.5	< 0.5	< 0.01	< 0.01
BAV_075_pa07	8	Avon Caravan Village	Cabin	90	< 0.5	< 0.5	< 0.01	< 0.01
BAV_075_pa08	8	Avon Caravan Village	Cabin	90	< 0.5	< 0.5	< 0.01	< 0.01
BAV_075_pa09	8	Avon Caravan Village	Cabin	90	< 0.5	< 0.5	< 0.01	< 0.01
BAV_075_pa10	11	Avon Caravan Village	Cabin	90	< 0.5	< 0.5	< 0.01	< 0.01
BAV_075_pa11	8	Avon Caravan Village	Cabin	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_075_pa12	7	Avon Caravan Village	Cabin	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_075_pa13	9	Avon Caravan Village	Cabin	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_075_pa14	9	Avon Caravan Village	Cabin	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_075_pa15	6	Avon Caravan Village	Cabin	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_075_pa16	5	Avon Caravan Village	Cabin	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_075_pa17	5	Avon Caravan Village	Cabin	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_075_pa18	5	Avon Caravan Village	Cabin	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_075_pa19	6	Avon Caravan Village	Cabin	125	0.5	0.5	< 0.01	< 0.01
BAV_075_pa20	8	Avon Caravan Village	Cabin	125	0.5	0.5	< 0.01	< 0.01
BAV_075_pa21	9	Avon Caravan Village	Cabin	125	0.5	0.5	< 0.01	< 0.01
BAV_075_pa22	6	Avon Caravan Village	Cabin	125	0.5	0.5	< 0.01	< 0.01
BAV_075_pa23	5	Avon Caravan Village	Cabin	125	0.5	0.5	< 0.01	< 0.01
BAV_075_pa24	7	Avon Caravan Village	Cabin	125	0.5	0.5	< 0.01	< 0.01
BAV_075_pa25	4	Avon Caravan Village	Awning	125	0.5	0.5	< 0.01	< 0.01
BAV_075_pa26	13	Avon Caravan Village	Building	150	1.0	1.0	< 0.01	< 0.01
BAV_075_pa27	7	Avon Caravan Village	Cabin	150	0.5	0.5	< 0.01	< 0.01
BAV_075_pa28	6	Avon Caravan Village	Cabin	125	0.5	0.5	< 0.01	< 0.01
BAV_075_pa29	4	Avon Caravan Village	Cabin	125	0.5	0.5	< 0.01	< 0.01
BAV_075_pa30	6	Avon Caravan Village	Cabin	125	0.5	0.5	< 0.01	< 0.01
BAV_075_pa31	7	Avon Caravan Village	Cabin	150	1.0	1.0	< 0.01	< 0.01
BAV_075_pa32	6	Avon Caravan Village	Cabin	150	1.0	1.0	< 0.01	< 0.01
BAV_075_pa33	6	Avon Caravan Village	Cabin	150	1.0	1.0	< 0.01	< 0.01
BAV_075_pa34	6	Avon Caravan Village	Cabin	150	1.0	1.0	< 0.01	< 0.01
BAV_075_pa35	6	Avon Caravan Village	Cabin	150	1.0	1.0	< 0.01	< 0.01
BAV_075_pa36	7	Avon Caravan Village	Cabin	175	1.0	1.0	< 0.01	< 0.01
BAV_075_pa37	10	Avon Caravan Village	Cabin	175	1.0	1.0	< 0.01	< 0.01
BAV_075_pa38	9	Avon Caravan Village	Cabin	175	1.0	1.0	< 0.01	< 0.01
BAV_075_pa39	8	Avon Caravan Village	Cabin	150	1.0	1.0	< 0.01	< 0.01
BAV_075_pa40	6	Avon Caravan Village	Cabin	125	0.5	0.5	< 0.01	< 0.01
BAV_075_pa41	6	Avon Caravan Village	Cabin	125	0.5	0.5	< 0.01	< 0.01
BAV_075_pa42	5	Avon Caravan Village	Cabin	125	0.5	0.5	< 0.01	< 0.01
BAV_075_pa43	6	Avon Caravan Village	Cabin	150	1.0	1.0	< 0.01	< 0.01
BAV_075_pa44	5	Avon Caravan Village	Cabin	150	0.5	0.5	< 0.01	< 0.01

Table D.08 - Tahmoor South - Predictions for Public Amenities

Structure Ref.	Maximum Plan Dimension (m)	Description	Structure Type	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BAV_075_pa45	6	Avon Caravan Village	Cabin	150	0.5	0.5	< 0.01	< 0.01
BAV_075_pa46	7	Avon Caravan Village	Cabin	125	0.5	0.5	< 0.01	< 0.01
BAV_075_pa47	6	Avon Caravan Village	Cabin	125	0.5	0.5	< 0.01	< 0.01
BAV_075_pa48	5	Avon Caravan Village	Cabin	150	1.0	1.0	< 0.01	< 0.01
BAV_075_pa49	6	Avon Caravan Village	Cabin	150	1.0	1.0	< 0.01	< 0.01
BAV_075_pa50	9	Avon Caravan Village	Cabin	150	1.0	1.0	< 0.01	< 0.01
BAV_075_pa51	7	Avon Caravan Village	Cabin	150	0.5	0.5	< 0.01	< 0.01
BAV_075_pa52	8	Avon Caravan Village	Cabin	175	1.0	1.0	< 0.01	< 0.01
BAV_075_pa53	7	Avon Caravan Village	Cabin	175	1.0	1.0	< 0.01	< 0.01
BAV_075_pa54	10	Avon Caravan Village	Cabin	175	1.0	1.0	< 0.01	< 0.01
BAV_075_pa55	11	Avon Caravan Village	Cabin	150	1.0	1.0	< 0.01	< 0.01
BAV_075_pa56	6	Avon Caravan Village	Cabin	125	0.5	0.5	< 0.01	< 0.01
BAV_075_pa57	4	Avon Caravan Village	Shed	150	0.5	0.5	< 0.01	< 0.01
BAV_075_pa58	4	Avon Caravan Village	Cabin	150	1.0	1.0	< 0.01	< 0.01
BAV_103_pa01	18	Bargo Volunteer Bush Fire Brigade	Building	80	< 0.5	< 0.5	< 0.01	< 0.01
BAV_103_pa02	3	Bargo Volunteer Bush Fire Brigade	Tank	80	< 0.5	< 0.5	< 0.01	< 0.01
BAV_170_pa01	14	Community Kids Bargo Early Education Centre	Centre	100	< 0.5	< 0.5	< 0.01	< 0.01
BAV_170_pa02	4	Community Kids Bargo Early Education Centre	Shed	90	< 0.5	< 0.5	< 0.01	< 0.01
BEL_085_pa01	36	Little Elves Child Care Centre	Child Care Centre	175	1.0	1.0	0.01	0.01
BEL_085_pa02	11	Little Elves Child Care Centre	Pergola	175	1.0	1.0	0.01	0.01
BEL_085_pa03	5	Little Elves Child Care Centre	Shed	150	1.0	1.0	< 0.01	0.01
BGR_015_pa01	28	Bargo Public School	Classrooms	150	1.0	1.0	< 0.01	< 0.01
BGR_015_pa02	7	Bargo Public School	Classrooms	200	1.0	1.0	0.01	< 0.01
BGR_015_pa03	7	Bargo Public School	Classrooms	150	1.0	1.0	< 0.01	< 0.01
BGR_015_pa04	7	Bargo Public School	Classrooms	175	1.0	1.0	< 0.01	< 0.01
BGR_015_pa05	7	Bargo Public School	Classrooms	175	1.0	1.0	< 0.01	< 0.01
BGR_015_pa06	9	Bargo Public School	Classrooms	175	1.0	1.0	< 0.01	< 0.01
BGR_015_pa07	9	Bargo Public School	Classrooms	250	2.0	2.0	0.03	< 0.01
BGR_015_pa08	9	Bargo Public School	Classrooms	250	1.5	1.5	0.02	< 0.01
BGR_015_pa10	8	Bargo Public School	Classrooms	250	1.5	1.5	0.02	< 0.01
BGR_015_pa11	8	Bargo Public School	Classrooms	225	1.5	1.5	0.02	< 0.01
BGR_015_pa12	9	Bargo Public School	Classrooms	225	1.5	1.5	0.02	< 0.01
BGR_015_pa13	8	Bargo Public School	Classrooms	300	2.5	2.5	0.04	0.01
BGR_015_pa14	8	Bargo Public School	Classrooms	275	2.0	2.0	0.03	0.01
BGR_015_pa15	11	Bargo Public School	Classrooms	225	1.5	1.5	0.02	< 0.01
BGR_015_pa16	30	Bargo Public School	Basketball Court	200	1.0	1.0	0.01	< 0.01
BGR_057_pa01	6	St Pauls Anglican Church Bargo	Church	425	4.5	4.5	0.09	0.02
BGR_057_pa02	6	St Pauls Anglican Church Bargo	Shed	550	7.0	7.0	0.11	0.02
BHW_121_pa01	18	Bargo Public School Residence (Bonnie House)	Preschool	275	2.5	2.5	0.03	0.01
BHW_121_pa02	18	Bargo Public School Residence (Bonnie House)	Shed	250	2.0	2.0	0.02	< 0.01
BHW_121_pa03	18	Bargo Public School Residence (Bonnie House)	Shed	250	2.0	2.0	0.02	< 0.01
BHW_309_pa01	27	Bargo Child Care Centre	Building	800	10.0	10.0	0.11	0.04
BHW_309_pa02	9	Bargo Child Care Centre	Carport	700	8.5	8.5	0.11	0.03
BHW_309_pa03	8	Bargo Child Care Centre	Pergola	800	10.0	10.0	0.11	0.04
BHW_309_pa04	11	Bargo Child Care Centre	Pergola	850	10.0	10.0	0.11	0.04

Table D.08 - Tahmoor South - Predictions for Public Amenities

Structure Ref.	Maximum Plan Dimension (m)	Description	Structure Type	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BHW_309_pa05	4	Bargo Child Care Centre	Shed	950	10.0	10.0	0.11	0.04
BHW_309_pa06	4	Bargo Child Care Centre	Shed	1000	10.0	10.0	0.11	0.05
BHW_309_pa07	6	Bargo Child Care Centre	Shed	1050	10.0	10.0	0.11	0.11
BHW_309_pa08	6	Bargo Child Care Centre	Shed	1000	10.0	10.0	0.11	0.04
BRA_170_pa02	6	Bargo Sportsground	Shed	40	< 0.5	< 0.5	< 0.01	< 0.01
BRA_170_pa03	6	Bargo Sportsground	Shed	30	< 0.5	< 0.5	< 0.01	< 0.01
BRA_170_pa04	6	Bargo Sportsground	Shed	30	< 0.5	< 0.5	< 0.01	< 0.01
BRA_170_pa05	6	Bargo Sportsground	Shed	30	< 0.5	< 0.5	< 0.01	< 0.01
BRA_170_pa06	7	Bargo Sportsground	Tennis Court	30	< 0.5	< 0.5	< 0.01	< 0.01
BRA_170_pa07	9	Bargo Community Centre	Building	50	< 0.5	< 0.5	< 0.01	< 0.01
BRA_170_pa08	6	Bargo Sportsground	Shed	20	< 0.5	< 0.5	< 0.01	< 0.01
BRA_170_pa09	6	Bargo Sportsground	Shed	30	< 0.5	< 0.5	< 0.01	< 0.01
BRA_170_pa10	8	Bargo Sportsground	Shed	50	< 0.5	< 0.5	< 0.01	< 0.01
BRA_170_pa11	9	Bargo Sportsground	Toilet block	50	< 0.5	< 0.5	< 0.01	< 0.01
BRA_170_pa12	10	Bargo Sportsground	Shed	50	< 0.5	< 0.5	< 0.01	< 0.01
BRA_170_pa13	21	Bargo Sportsground	Sports Oval	40	< 0.5	< 0.5	< 0.01	< 0.01
BRE_020_pa01	5	Wollondilly Anglican College	Building	300	4.0	4.0	0.05	0.01
BRE_020_pa02	6	Wollondilly Anglican College	Building	125	1.5	1.5	0.02	< 0.01
BRE_020_pa03	5	Wollondilly Anglican College	Building	90	1.0	1.0	0.01	< 0.01
BRE_020_pa04	8	Wollondilly Anglican College	Building	90	1.0	1.0	0.01	< 0.01
BRE_020_pa05	6	Wollondilly Anglican College	Building	100	1.5	1.5	0.02	< 0.01
BRE_020_pa06	9	Wollondilly Anglican College	Building	70	0.5	0.5	0.01	< 0.01
BRE_020_pa07	4	Wollondilly Anglican College	Building	50	< 0.5	< 0.5	< 0.01	< 0.01
BRE_020_pa08	5	Wollondilly Anglican College	Building	60	0.5	0.5	< 0.01	< 0.01
BRE_020_pa09	7	Wollondilly Anglican College	Building	90	1.0	1.0	0.01	< 0.01
BRE_020_pa10	13	Wollondilly Anglican College	Building	40	< 0.5	< 0.5	< 0.01	< 0.01
BRE_020_pa11	5	Wollondilly Anglican College	Shed	20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_020_pa12	6	Wollondilly Anglican College	Tennis Court	40	< 0.5	< 0.5	< 0.01	< 0.01
BRE_020_pa13	7	Wollondilly Anglican College	Tennis Court	50	< 0.5	< 0.5	< 0.01	< 0.01
BRE_020_pa14	27	Wollondilly Anglican College	Building	50	< 0.5	< 0.5	< 0.01	< 0.01
BRE_020_pa15	15	Wollondilly Anglican College	Sports Oval	30	< 0.5	< 0.5	< 0.01	< 0.01
BRE_020_pa16	15	Wollondilly Anglican College	Building	80	0.5	0.5	0.01	< 0.01
BRE_020_pa17	15	Wollondilly Anglican College	Building	60	0.5	0.5	< 0.01	< 0.01
BRE_222_pa01	16	Bargo Sports Club	Club	50	< 0.5	< 0.5	< 0.01	< 0.01
BRE_222_pa02	25	Bargo Sports Club	Building	50	< 0.5	< 0.5	< 0.01	< 0.01
BRE_222_pa03	13	Bargo Sports Club	Shed	60	< 0.5	< 0.5	< 0.01	< 0.01
BRE_222_pa04	36	Bargo Sports Club	Bowling Green	50	< 0.5	< 0.5	< 0.01	< 0.01
BRE_222_pa05	36	Bargo Sports Club	Bowling Green	60	< 0.5	< 0.5	< 0.01	< 0.01
BRE_222_pa06	36	Bargo Sports Club	Building	50	< 0.5	< 0.5	< 0.01	< 0.01
BRE_222_pa07	36	Bargo Sports Club	Building	50	< 0.5	< 0.5	< 0.01	< 0.01
BRE_580_pa01	17	Wirrimbirra Sanctuary	Building	1200	3.5	3.5	0.05	0.04
BRE_580_pa02	14	Wirrimbirra Sanctuary	Building	1250	3.5	3.5	0.05	0.04
BRE_580_pa03	8	Wirrimbirra Sanctuary	Building	1300	3.5	3.5	0.06	0.15
BRE_580_pa04	14	Wirrimbirra Sanctuary	Building	1300	3.5	3.5	0.06	0.19
BRE_580_pa05	8	Wirrimbirra Sanctuary	Building	1000	3.0	3.0	0.05	0.03

Table D.08 - Tahmoor South - Predictions for Public Amenities

Structure Ref.	Maximum Plan Dimension (m)	Description	Structure Type	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BRE_600_pa01	5	Wirrimbirra Sanctuary	Building	1000	3.0	3.0	0.06	0.03
BRE_600_pa02	14	Wirrimbirra Sanctuary	Building	950	2.0	3.0	0.07	0.03
BRE_600_pa03	7	Wirrimbirra Sanctuary	Building	900	2.0	3.0	0.07	0.03
BRL_082_pa01	7	Bargo Surgery	Surgery	175	1.0	1.0	< 0.01	< 0.01
BRL_082_pa02	6	Bargo Surgery	Shed	150	1.0	1.0	< 0.01	< 0.01
BRL_082_pa03	9	Bargo Surgery	Shed	150	1.0	1.0	< 0.01	< 0.01
BRL_130_pa01	5	Amenities	Public Toilets	225	1.5	1.5	0.02	< 0.01
BSI_011_pa01	35	Bargo District Baptist Church	House	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BSI_011_pa02	12	Bargo District Baptist Church	Shed	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BSI_011_pa03	3	Bargo District Baptist Church	Shed	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BTY_005_pa01	5	Waratah Highlands Retirement Village	Communal Building	20	< 0.5	< 0.5	< 0.01	< 0.01
BTY_005_pa02	35	Waratah Highlands Retirement Village	Shed	20	< 0.5	< 0.5	< 0.01	< 0.01
			Maxima:	**1450**	**10.0**	**10.0**	**0.11**	**0.22**

Table D.09 - Tahmoor South - Predictions for Public Utilities

Structure Ref.	Location	Description	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BAV_235_pu01	Mobile Phone Tower	Shed	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAV_235_pu02	Mobile Phone Tower	Shed	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BAV_235_pu03	Mobile Phone Tower	Mobile Phone Tower	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BHW_400_pu01	Jemena Gas Infrastructure	Gas take-off pit	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BHW_400_pu02	Jemena Gas Infrastructure	Gas take-off pit	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BHW_400_pu03	Jemena Gas Infrastructure	Gas Pillar	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BNI_144_pu01	AAPT Regeneration Building	Telephone Exchange	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRA_109_pu01	Reservoir	Tank	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_096_pu01	Bargo Telephone Exchange	Telephone Exchange	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_096_pu02	Bargo Telephone Exchange	Shed	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_160_pu01	Bargo Railway Station	Shelter	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_160_pu02	Bargo Railway Station	Shelter	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_160_pu03	Bargo Railway Station	Demountable	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_160_pu04	Bargo Railway Station	WC - Heritage	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_160_pu05	Bargo Railway Station	Shed	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_160_pu06	Bargo Railway Station	Platfrom	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_160_pu07	Bargo Railway Station	Platform	< 20	< 0.5	< 0.5	< 0.01	< 0.01
		Maxima:	**< 20**	**< 0.5**	**< 0.5**	**< 0.01**	**< 0.01**

Table D.10 - Tahmoor South - Predictions for Commercial and Business Establishments

Structure Ref.	Maximum Plan Dimension (m)	Description	Structure Type	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BGR_027_c01	11.6	Commercial Building	Commercial	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGR_029_c01	20.0	Building	Business	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGR_029_c02	30.7	Shed	Business	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGR_033_c01	17.5	Bargo Rural Trading & Hardware	Retail	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGR_033_c02	16.8	Shed	Shed	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGR_041_c01	28.2	Hotel Bargo	Business	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGR_041_c02	13.8	Hotel Bargo	Shed	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGR_041_c03	6.1	Hotel Bargo	Shed	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGR_045_c01	26.9	Commercial Building	Retail	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGR_051_c01	28.3	Bargo Business Centre	Retail	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGR_055_c01	29.4	Martial Arts Fitness Centre	Business	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGR_059_c01	18.1	Bargo Beauty Corner & Solarium	Retail	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGR_059_c02	6.1	Bargo Beauty Corner & Solarium	Shed	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGR_061_c01	28.8	Post Office & Residence	Business	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGR_061_c02	10.7	Post Office & Residence	Pergola	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGR_061_c03	20.3	Post Office & Residence	Shed	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGR_061_c04	4.5	Post Office & Residence	Shed	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGR_305_c01	60.8	Commercial Building	Shed	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGR_307_c01	12.1	Shed	Shed	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BGR_307_c02	11.9	Shed	Shed	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_040_c01	13.6	Mark's Landscape Supplies	Shed	750	5.0	5.0	0.05	0.05
BRE_040_c02	28.3	Wreck 1 Auto Dismantlers	Shed	850	6.5	6.5	0.02	0.07
BRE_040_c03	17.4	Shell Petrol Station	Awning	1000	4.5	4.5	0.04	0.05
BRE_040_c04	26.0	Shell Petrol Station	Petrol Station	1000	5.0	5.0	0.04	0.05
BRE_040_c05	12.8	Picton Auto Service	Shed	1050	4.5	4.5	0.03	0.09
BRE_218_c01	23.5	Workshop	Shed	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_218_c02	19.0	Roadhouse	Business	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_218_c03	10.6	Roadhouse	Business	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_218_c04	9.3	Roadhouse	Business	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_218_c05	15.5	Roadhouse	Business	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_220_c01	10.8	Bargo Motor Inn	Building	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_220_c02	26.3	Bargo Motor Inn	Business	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_220_c03	17.2	Bargo Motor Inn	Building	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRE_220_c04	15.6	Bargo Motor Inn	Building	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_069_c01	22.6	Commercial Building	Business	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_074_c01	18.8	Shops	Retail	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_078_c01	34.7	Bargo Supermarket and Shops	Retail	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_080_c01	13.6	Physio Clinic & Residence	Business	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_080_c02	6.1	Physio Clinic & Residence	Shed	< 20	< 0.5	< 0.5	< 0.01	< 0.01

Table D.10 - Tahmoor South - Predictions for Commercial and Business Establishments

Structure Ref.	Maximum Plan Dimension (m)	Description	Structure Type	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
BRL_080_c03	7.4	Physio Clinic & Residence	Shed	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_080_c04	4.5	Physio Clinic & Residence	Shed	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_080_c05	5.8	Physio Clinic & Residence	Shed	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_084_c01	12.8	Restaurant	Business	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_084_c02	5.6	Restaurant	Shed	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_086_c01	24.7	Commercial Building	Retail	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_088_C01	48.1	Khan's Supa IGA	Retail	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_092_c01	30.1	Shops	Retail	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_094_C01	14.3	Shops	Retail	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_107_c01	23.6	Workshop	Business	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_113_c01	18.1	Automotive Repairs	Business	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_113_c02	4.6	Automotive Repairs	Business	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_115_c01	9.3	Bargo Motors	Business	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_115_c02	9.5	Bargo Motors	Business	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_115_c03	7.6	Bargo Motors	Business	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_115_c04	7.6	Bargo Motors	Business	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_121_c01	34.2	BP Service Station	Retail	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_121_c02	23.9	BP Service Station	Awning	< 20	< 0.5	< 0.5	< 0.01	< 0.01
BRL_121_c03	3.3	BP Service Station	Shed	< 20	< 0.5	< 0.5	< 0.01	< 0.01
			Maxima:	**1050**	**6.5**	**6.5**	**0.05**	**0.09**

Table D.11 - Tahmoor South - Predictions for the Archaeological Sites

Site ID	Type	Significance	Predicted Total Subsidence after all Longwalls (mm)	Predicted Total Tilt after all Longwalls (mm/m)	Predicted Total Hogging Curvature after all Longwalls (1/km)	Predicted Total Sagging Curvature after all Longwalls (1/km)
52-2-1520	Shelter with art	Low	700	8.5	0.10	0.03
52-2-1521	Shelter with art	Low	1000	10.0	0.10	0.04
52-2-1522	Shelter with art	Low	200	1.0	0.02	< 0.01
52-2-1523	Shelter with art and deposit	High, Local	150	0.5	0.01	< 0.01
52-2-1524	Shelter with art and axe grinding grooves	Moderate, Local	50	0.5	< 0.01	< 0.01
52-2-1525	Shelter with art	High, Local	100	< 0.5	< 0.01	< 0.01
52-2-1526	Shelter with art	Low	90	< 0.5	< 0.01	< 0.01
52-2-1527	Shelter with art	Moderate, Local	80	< 0.5	< 0.01	< 0.01
52-2-1528	Shelter with art	High, Local	125	< 0.5	< 0.01	< 0.01
52-2-1529	Shelter with deposit and axe grinding groove	High, Local	90	< 0.5	< 0.01	< 0.01
52-2-1530	Scarred Tree	Low	70	< 0.5	< 0.01	< 0.01
52-2-1532	Shelter with art	Low	< 20	< 0.5	< 0.01	< 0.01
52-2-1533	Shelter with art	Low	800	8.0	0.08	0.04
52-2-1534	Shelter with art	Low	425	5.5	0.07	0.03
52-2-1538	Shelter with art and deposit	Low	1350	5.5	0.06	0.07
52-2-1539	Shelter with art and axe grinding groove	Low	1300	5.5	0.06	0.05
52-2-1540	Shelter with art	Low	1250	4.5	0.05	0.04
52-2-3872	Isolated find	Low	< 20	< 0.5	< 0.01	< 0.01
52-2-3921	Axe grinding grooves	Low	125	< 0.5	< 0.01	< 0.01
52-2-3968	Isolated find	Low	600	6.0	0.06	0.02
52-2-3971	Shelter with art	Low	70	0.5	< 0.01	< 0.01
52-2-3960	Shelter with art	Low	200	1.5	0.02	< 0.01
52-2-4194	Axe grinding grooves	Low	1550	5.5	0.06	0.22
52-2-4195	Open camp site	Low	1050	2.5	0.09	0.03
52-2-4034	Isolated find	Low	< 20	< 0.5	< 0.01	< 0.01
52-2-4395	Axe grinding grooves	Low	1100	4.0	0.09	0.02
52-2-4471	Shelter with art and deposit	Low	1100	5.0	0.05	0.04
48-2-0275	Isolated find	Low	80	< 0.5	< 0.01	< 0.01
		Maxima:	**1550**	**10.0**	**0.10**	**0.22**

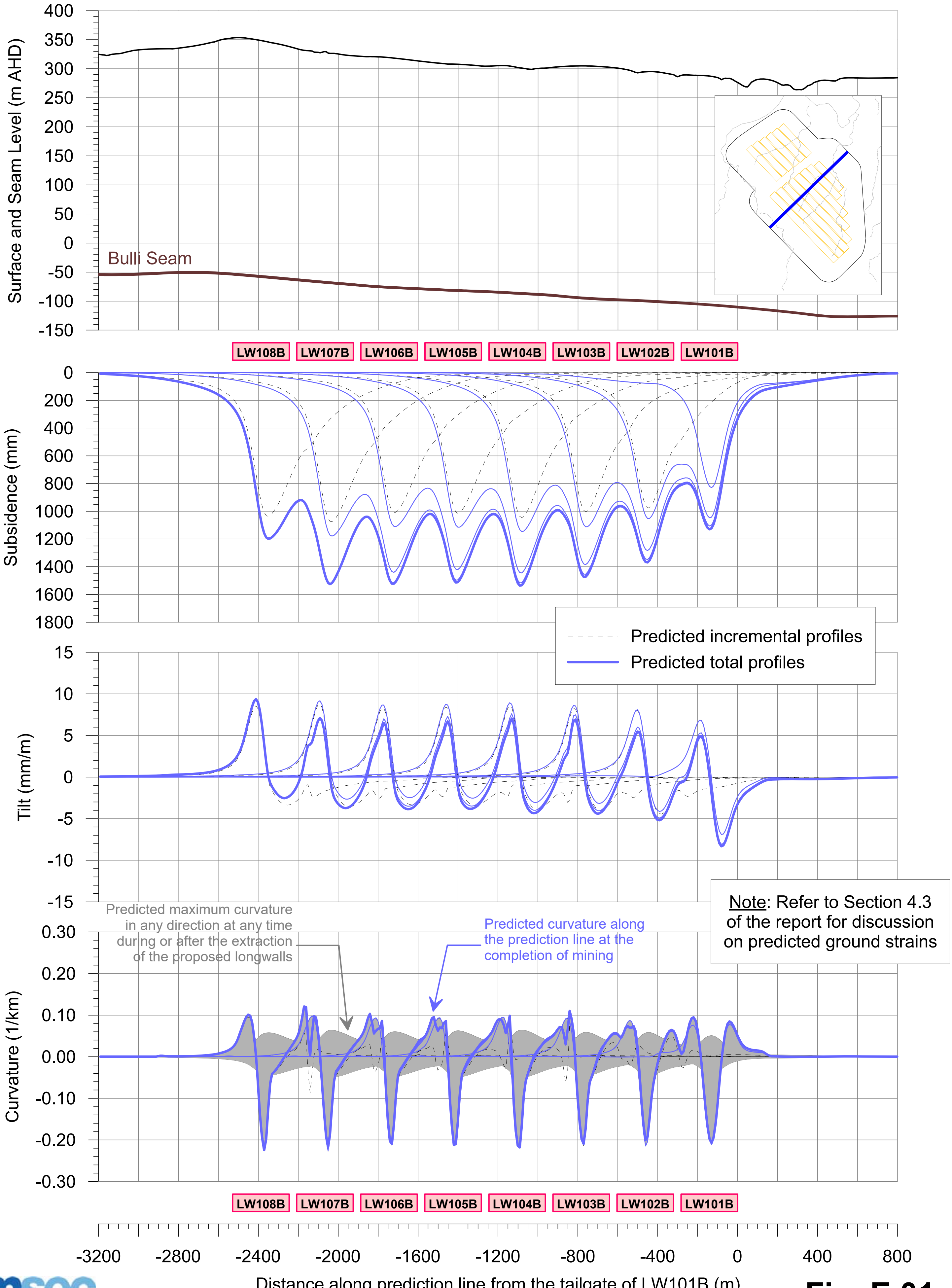
Table D.12 - Tahmoor South - Predictions for Heritage Structures

Niche Ref.	MSEC Structure Ref.	Description	Predicted Total Subsidence (mm)	Predicted Final Tilt after all Longwalls (mm/m)	Predicted Maximum Tilt after any Longwall (mm/m)	Predicted Total Hogging Curvature (1/km)	Predicted Total Sagging Curvature (1/km)
9	BGR_015_pa03	Bargo Public School	150	1.0	1.0	< 0.01	< 0.01
8	BGR_027_c01	Commercial Building	150	0.5	0.5	< 0.01	< 0.01
7	BGR_033_c01	Bargo Rural Trading & Hardware	150	1.0	1.0	< 0.01	< 0.01
6	BGR_041_c01	Hotel Bargo	225	1.5	1.5	0.02	< 0.01
5	BGR_061_c01	Post Office & Residence	500	6.5	6.5	0.11	0.02
3	BGR_147_h01	Old Coomeroo Homestead	1100	3.0	3.0	0.07	0.03
2	BGR_235_h01	Kalinya	1150	5.0	5.0	0.04	0.06
4	BGR_281_h02	Homestead	1050	2.5	2.5	0.06	0.04
11	BHW_117_h01	House	275	2.5	2.5	0.04	0.01
12	BHW_121_h01	Bargo Public School Residence	275	2.5	2.5	0.03	0.01
14	BHW_141_h02	Hawthorne	225	1.5	1.5	0.02	< 0.01
13	BHW_297_h01	Railway Cottage	450	5.5	5.5	0.10	0.02
13	BHW_299_h01	Railway Cottage	450	5.5	5.5	0.10	0.02
13	BHW_301_h01	Railway Cottage	450	5.5	5.5	0.10	0.02
10	BHW_327_h01	Cottage	1250	3.0	3.0	0.07	0.13
16	BNN_047_h01	House	70	< 0.5	< 0.5	< 0.01	< 0.01
19	BRE_580_pa01	Wirrimbirra Sanctuary	1200	3.5	3.5	0.05	0.04
19	BRE_580_pa02	Wirrimbirra Sanctuary	1250	3.5	3.5	0.05	0.04
19	BRE_580_pa03	Wirrimbirra Sanctuary	1300	3.5	3.5	0.06	0.15
19	BRE_580_pa04	Wirrimbirra Sanctuary	1300	3.5	3.5	0.06	0.19
19	BRE_580_pa05	Wirrimbirra Sanctuary	1000	3.0	3.0	0.05	0.03
19	BRE_600_pa01	Wirrimbirra Sanctuary	1000	3.0	3.0	0.06	0.03
19	BRE_600_pa02	Wirrimbirra Sanctuary	950	2.0	3.0	0.07	0.03
19	BRE_600_pa03	Wirrimbirra Sanctuary	900	2.0	3.0	0.07	0.03
17	BRL_082_pa01	Bargo Surgery	175	1.0	1.0	< 0.01	< 0.01
18	BRL_150_h01	House	90	< 0.5	< 0.5	< 0.01	< 0.01
15	BRL_160_pu04	Bargo Railway Station WC	125	0.5	0.5	< 0.01	< 0.01
15	BRL_160_pu06	Bargo Railway Station Platforom	150	0.5	0.5	< 0.01	< 0.01
15	BRL_160_pu07	Bargo Railway Station Platforom	150	1.0	1.0	< 0.01	< 0.01
		Maxima:	**1300**	**6.5**	**6.5**	**0.11**	**0.19**

APPENDIX E. FIGURES SHOWING PREDICTED SUBSIDENCE PARAMETERS OVER THE TAHMOOR SOUTH PROJECT

Predicted profiles of conventional subsidence, tilt and curvature along Prediction Line 1 resulting from the extraction of Longwalls 101B to 108B

I:\Projects\Tahmoor South\MSEC1060 - EIS Amendment\Subsdata\Impacts\Prediction Lines\Fig. E.01 - Prediction Line 1.grf



msec

Fig. E.01

Predicted profiles of conventional subsidence, tilt and curvature along Prediction Line 2 resulting from the extraction of Longwalls 101A to 106A

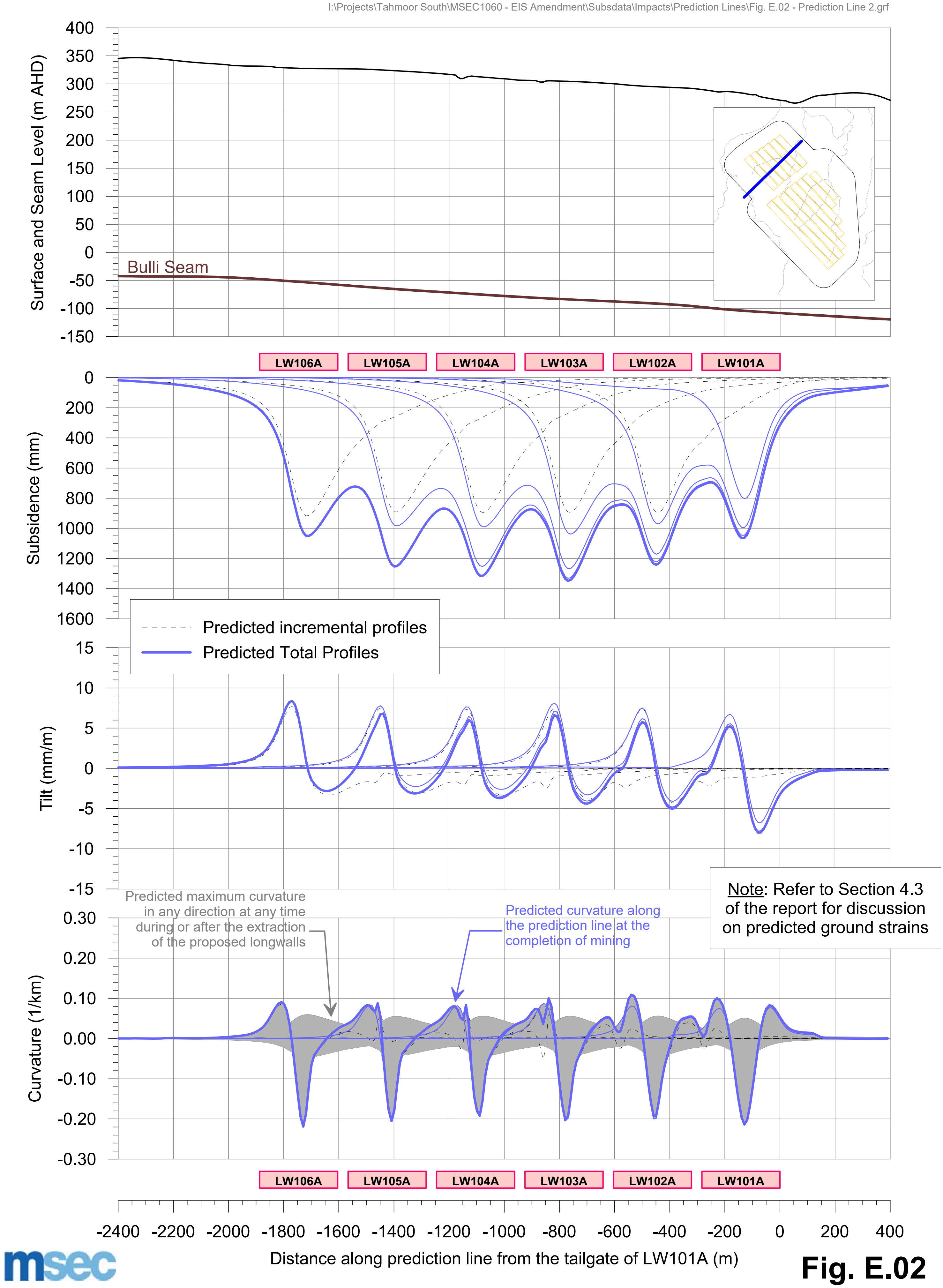


Fig. E.02

Predicted profiles of subsidence, upsidence and closure along Dog Trap Creek resulting from the extraction of Longwalls 101A to 108B

I:\Projects\Tahmoor South\MSEC1060 - EIS Amendment\Subsdata\Impacts\Streams\Fig. E.03 - Dog Trap Creek.grf

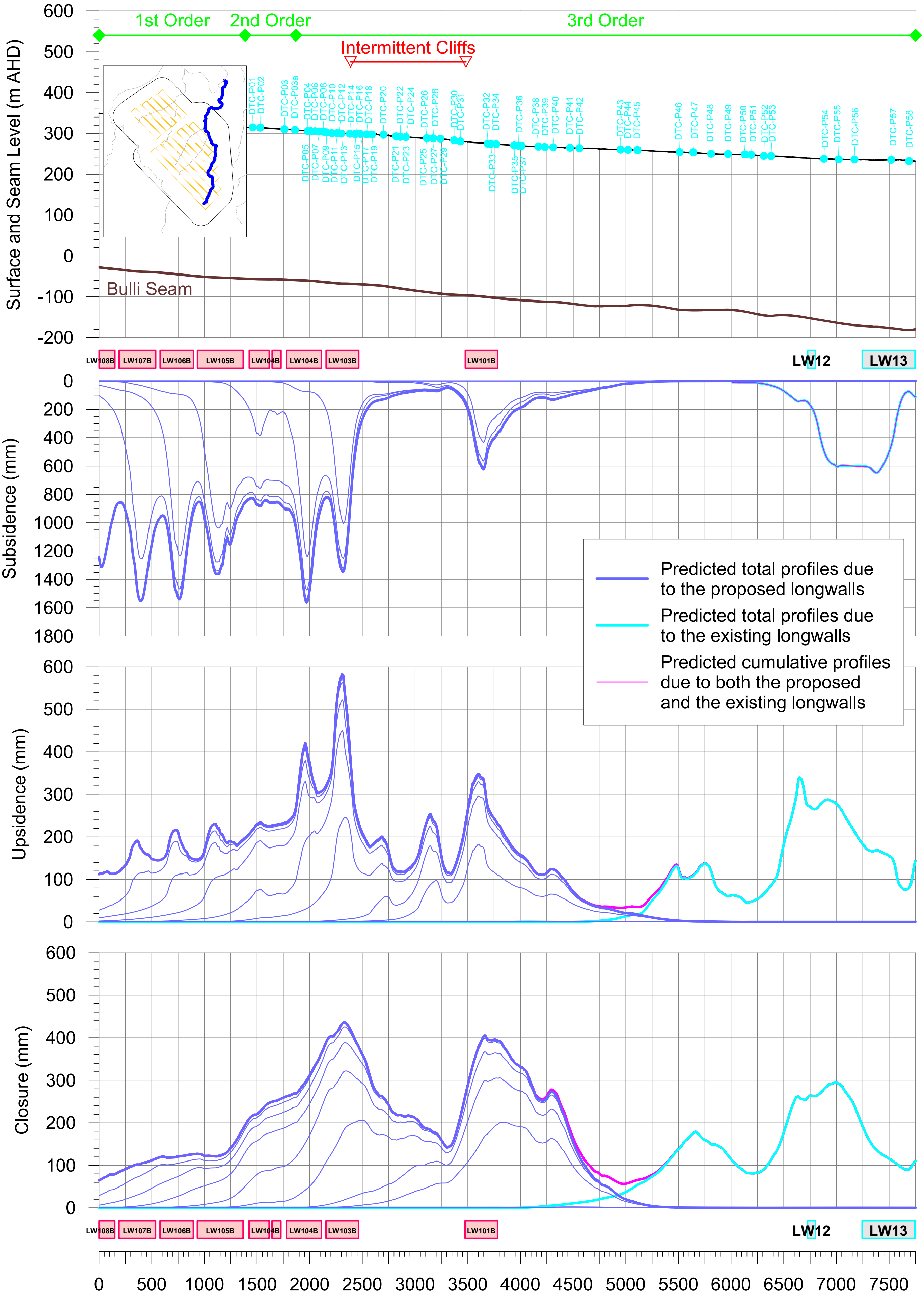


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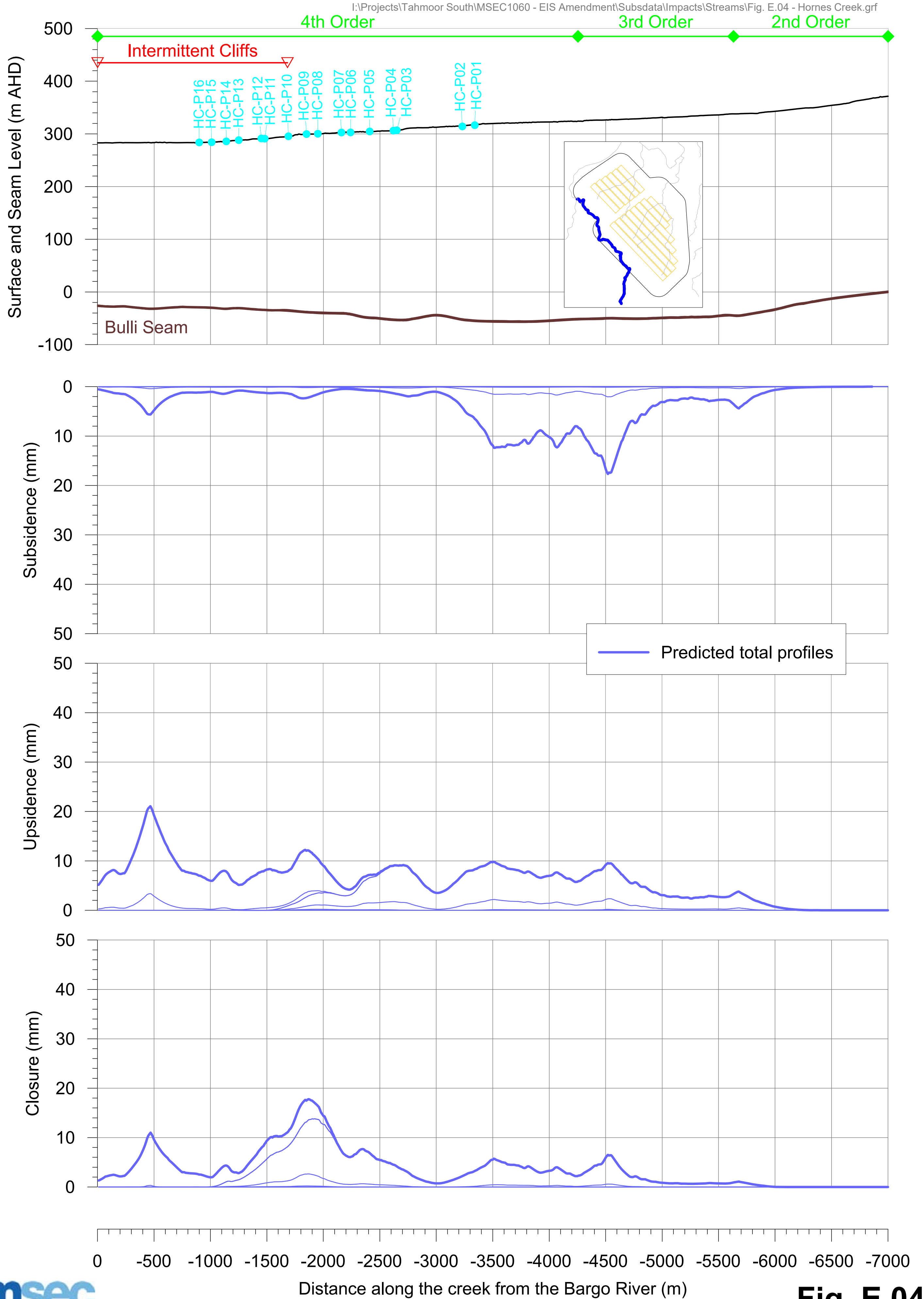
Fig. E.03

Predicted profiles of subsidence, upsidence and closure along Hornes Creek resulting from the extraction of Longwalls 101A to 108B



msec

Fig. E.04

Predicted profiles of subsidence, upsidence and closure along Teatree Hollow resulting from the extraction of Longwalls 101A to 108B

I:\Projects\Tahmoor South\MSEC1060 - EIS Amendment\Subsdata\Impacts\Streams\Fig. E.05 - Teatree Hollow.grf

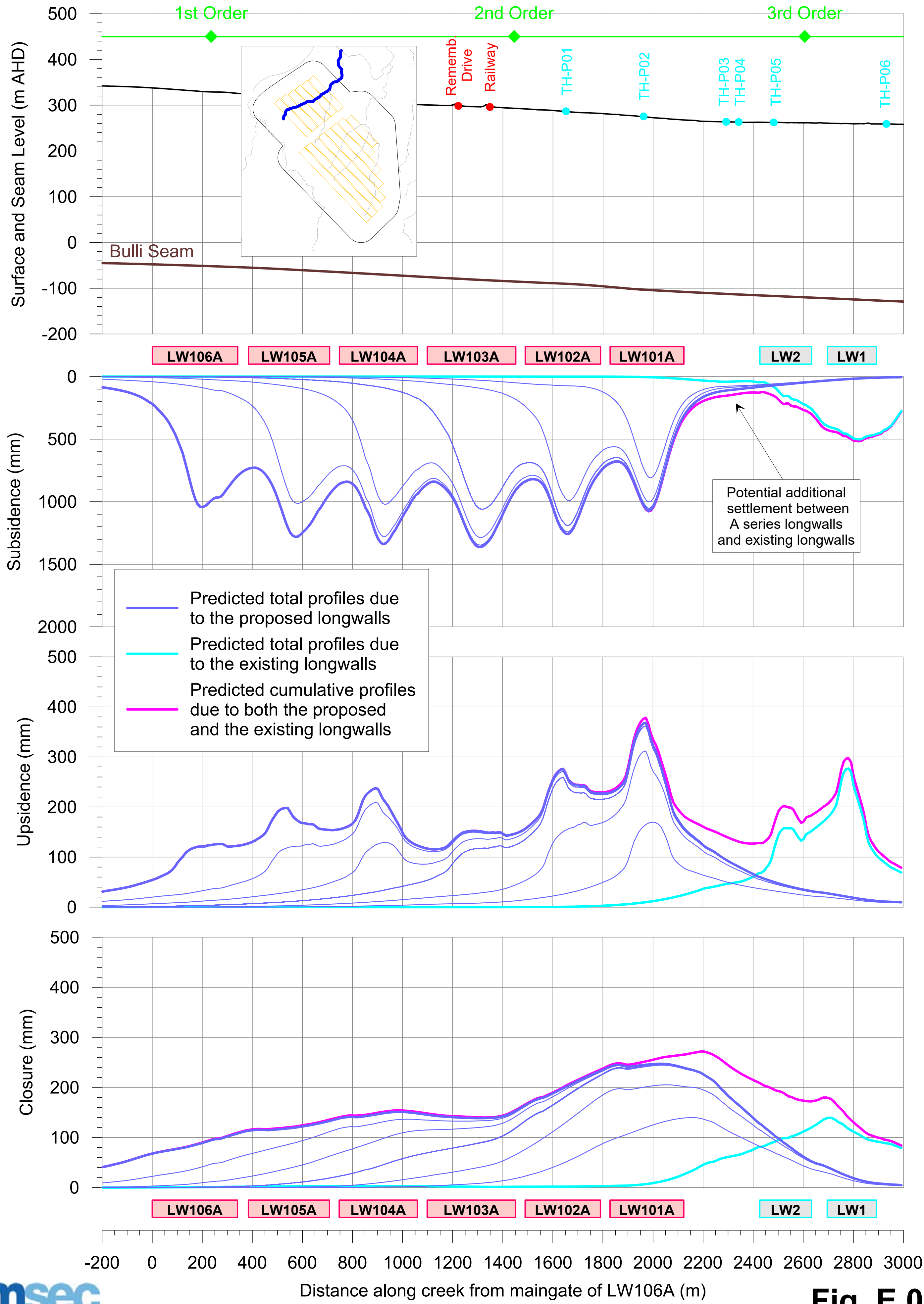


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Fig. E.05

Predicted profiles of subsidence, upsidence and closure along Tributary 1 of Dog Trap Creek resulting from the extraction of Longwalls 101A to 108B

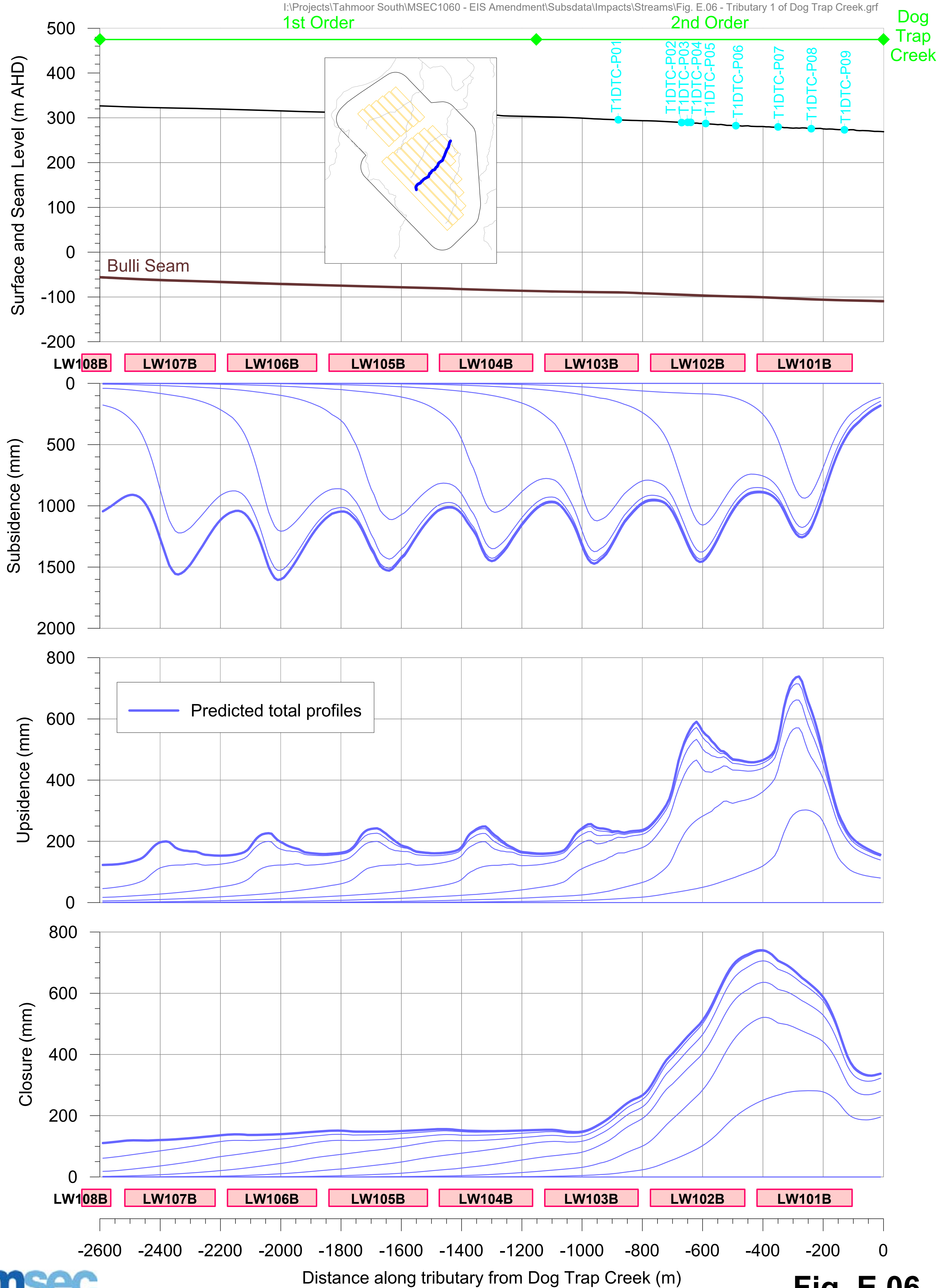

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Fig. E.06

Predicted profiles of subsidence, upsidence and closure along Tributary 2 of Dog Trap Creek resulting from the extraction of Longwalls 101A to 108B

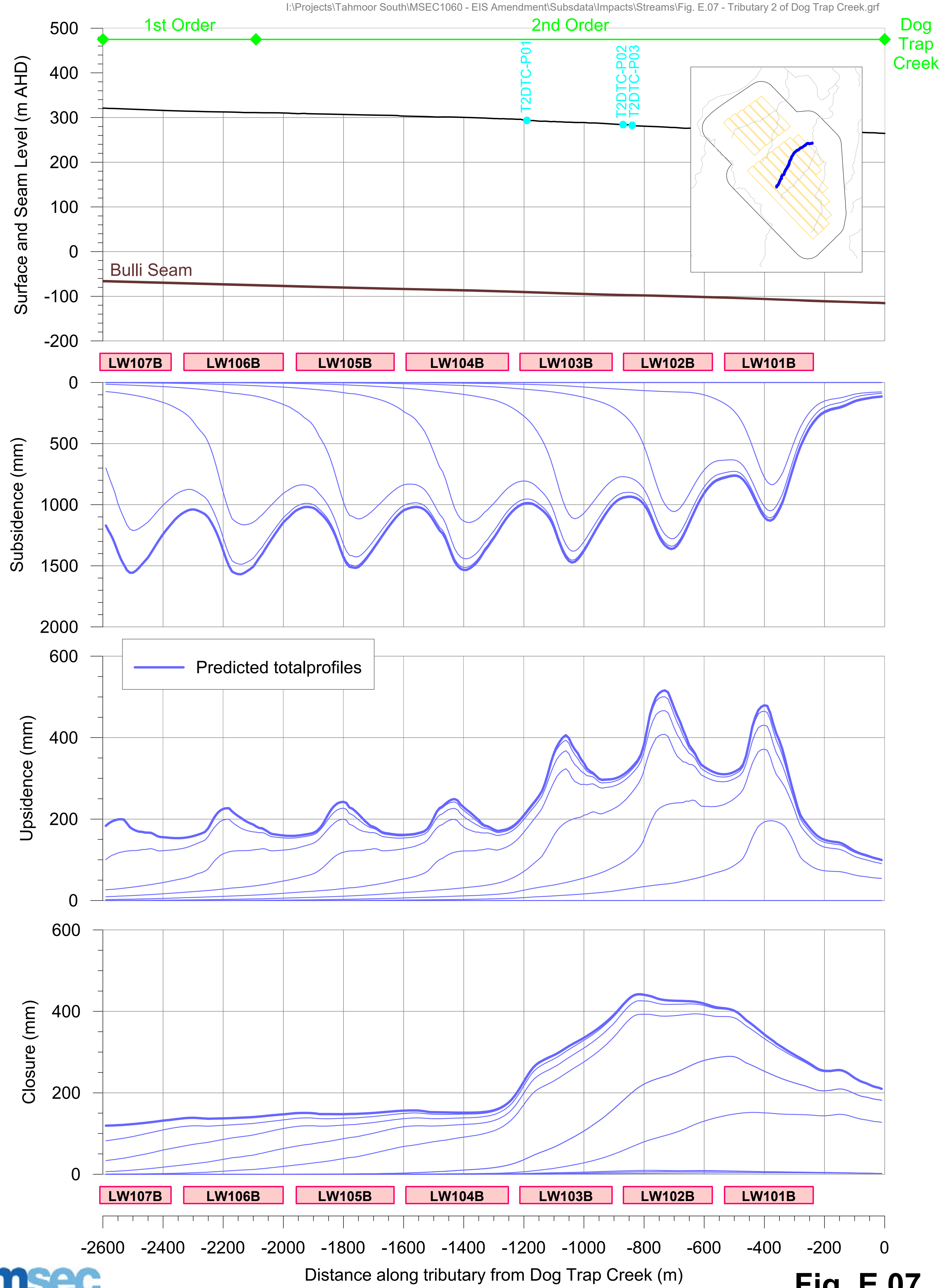

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Fig. E.07

Predicted profiles of subsidence, upsidence and closure along the Tributary of Teatree Hollow resulting from the extraction of Longwalls 101A to 108B

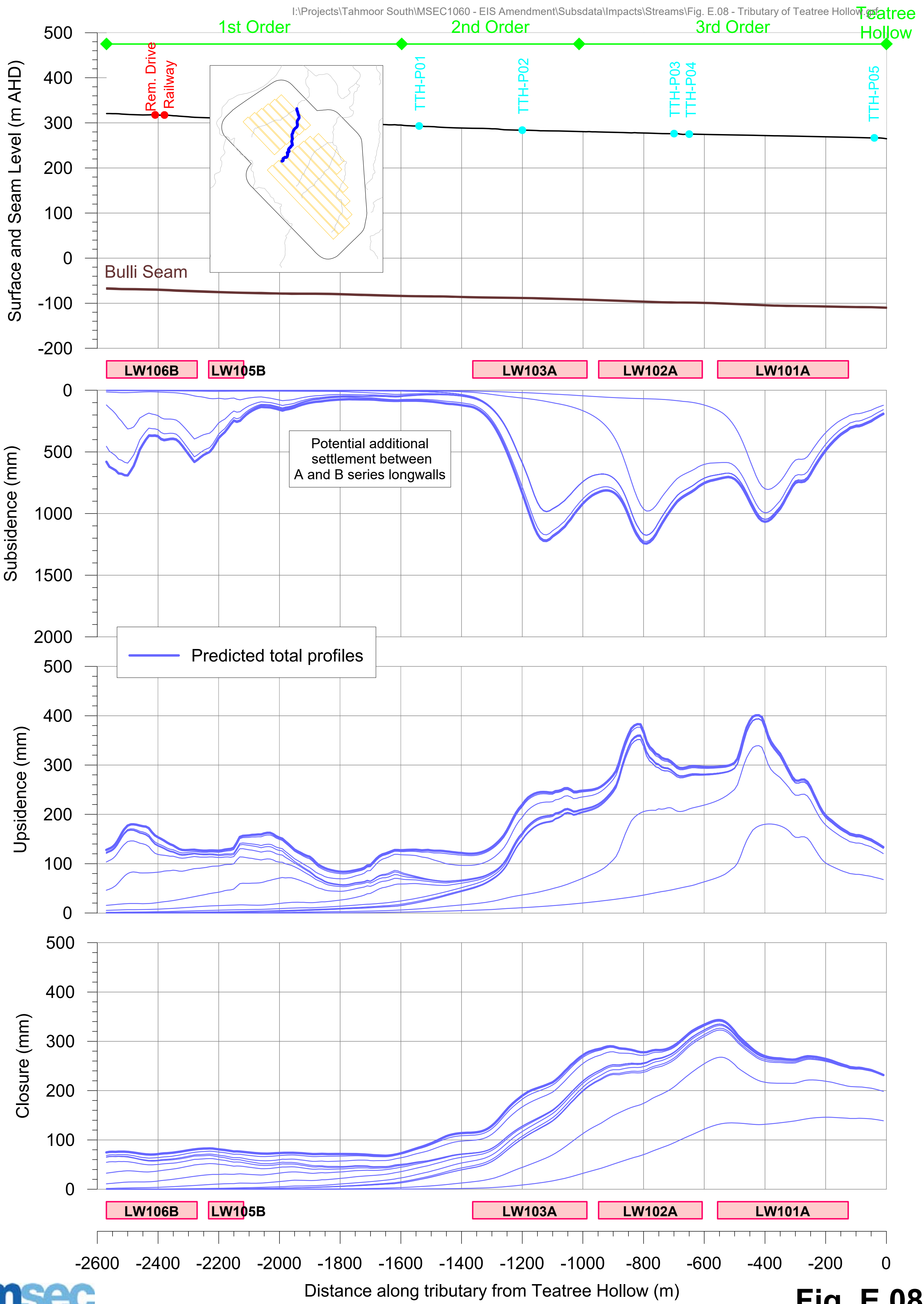

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Fig. E.08

Predicted profiles of conventional subsidence, tilt and change in grade along the Main Southern Railway due to the extraction of Longwalls 101A to 108B

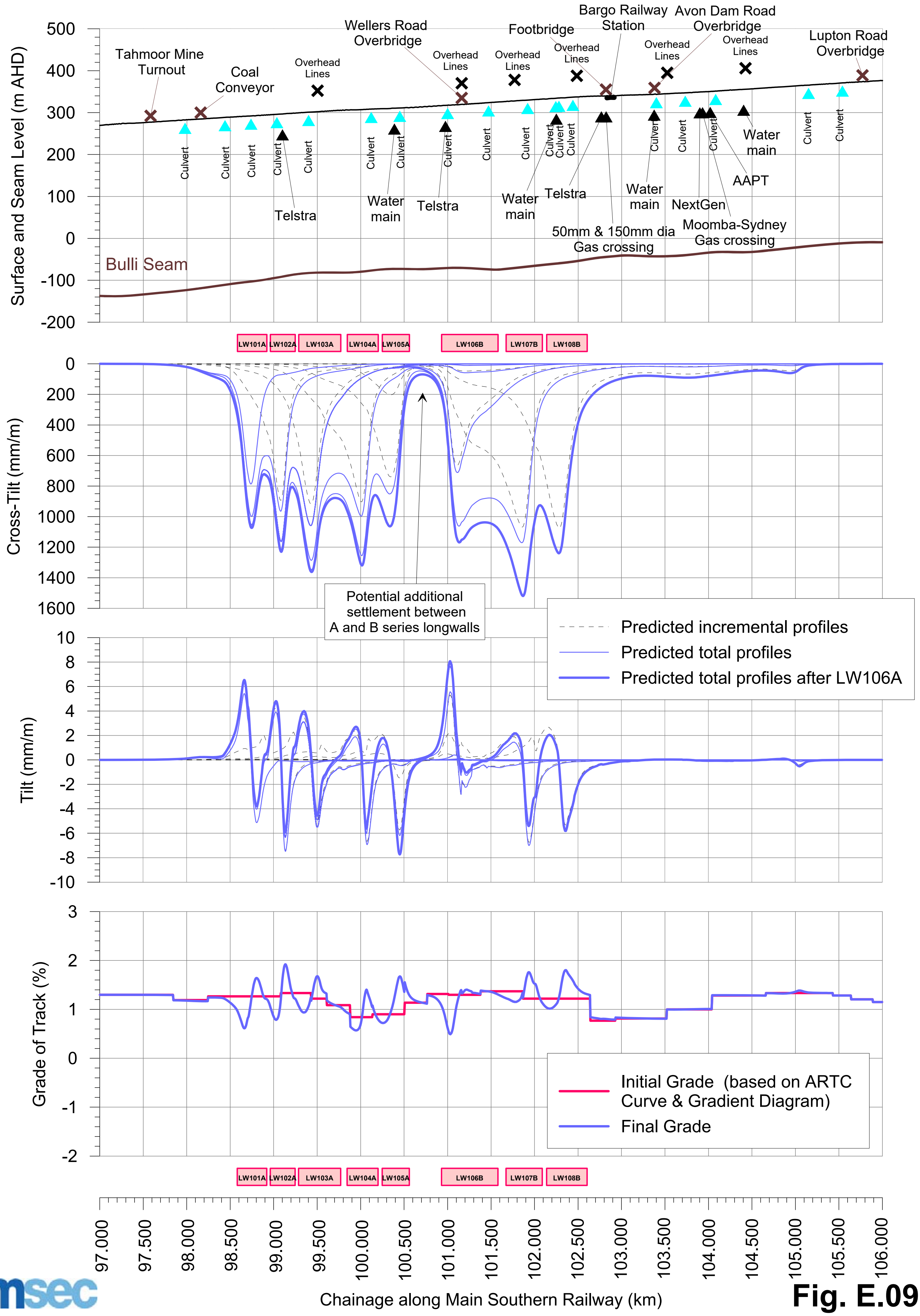

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Fig. E.09

Predicted profiles of conventional cross tilt, change in track cant and long twist along the Main Southern Railway due to the extraction of Longwalls 101A to 108B

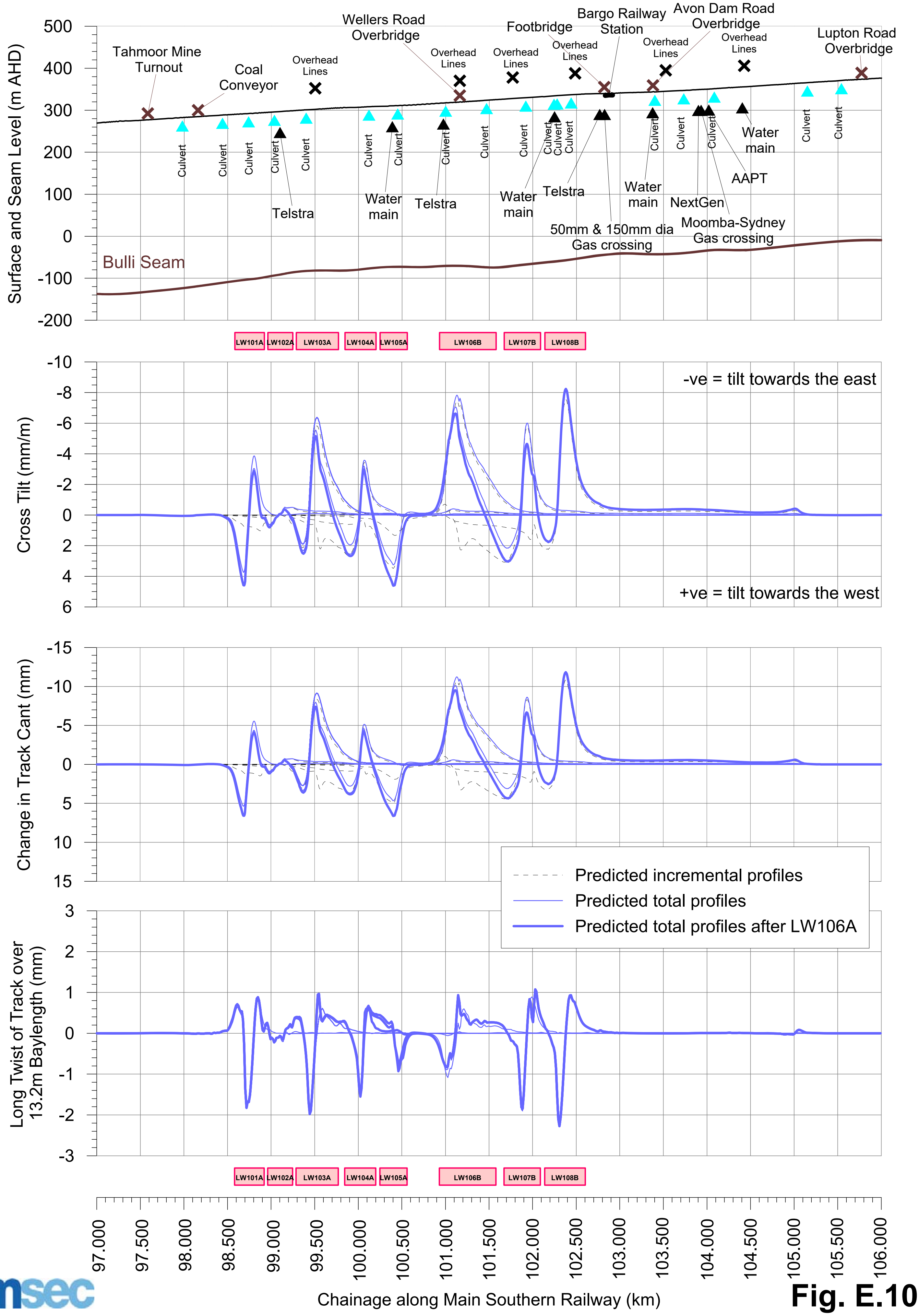
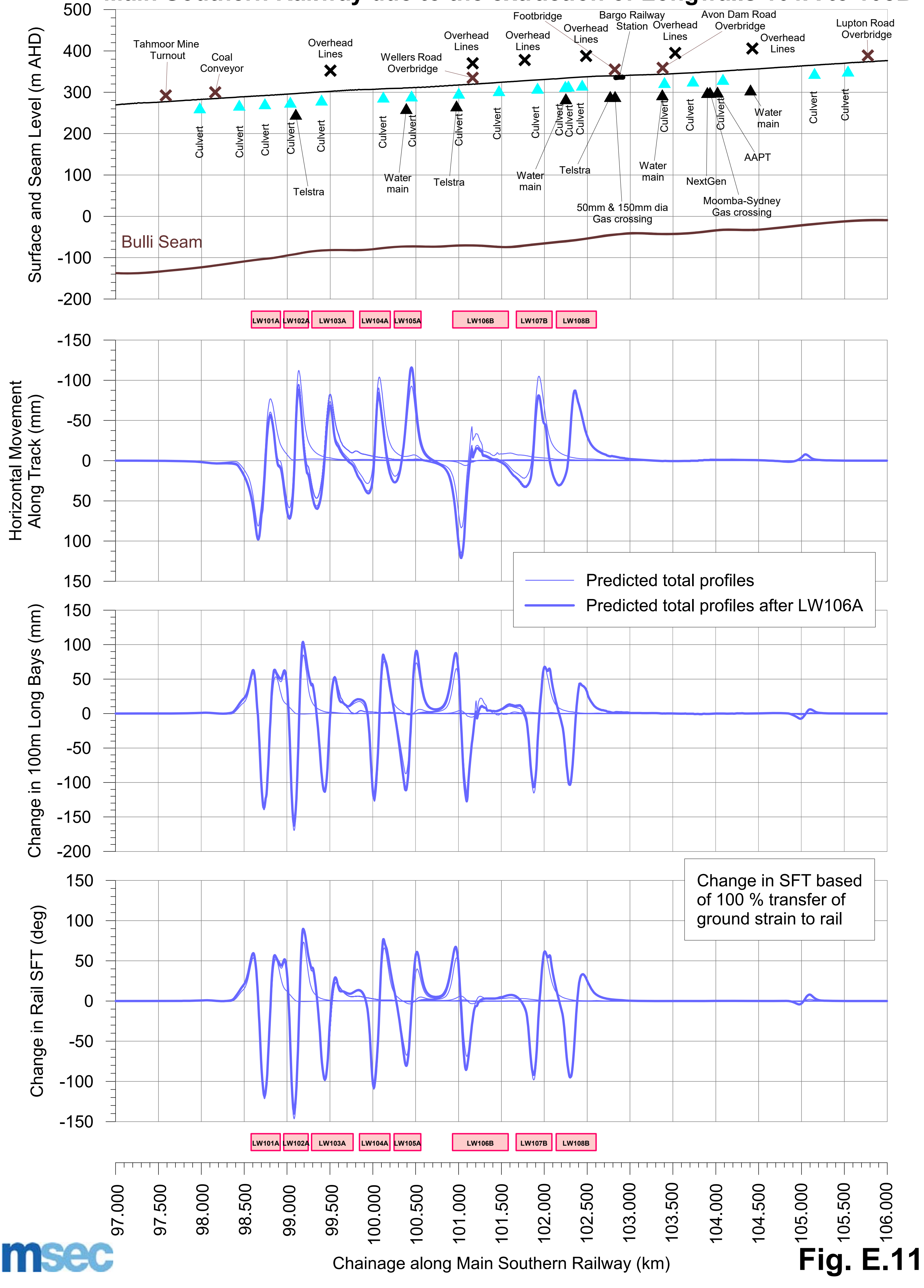


Fig. E.10

Predicted profiles of conventional horizontal movement along track, change in 100 metre long bay length and change in SFT for the Main Southern Railway due to the extraction of Longwalls 101A to 108B

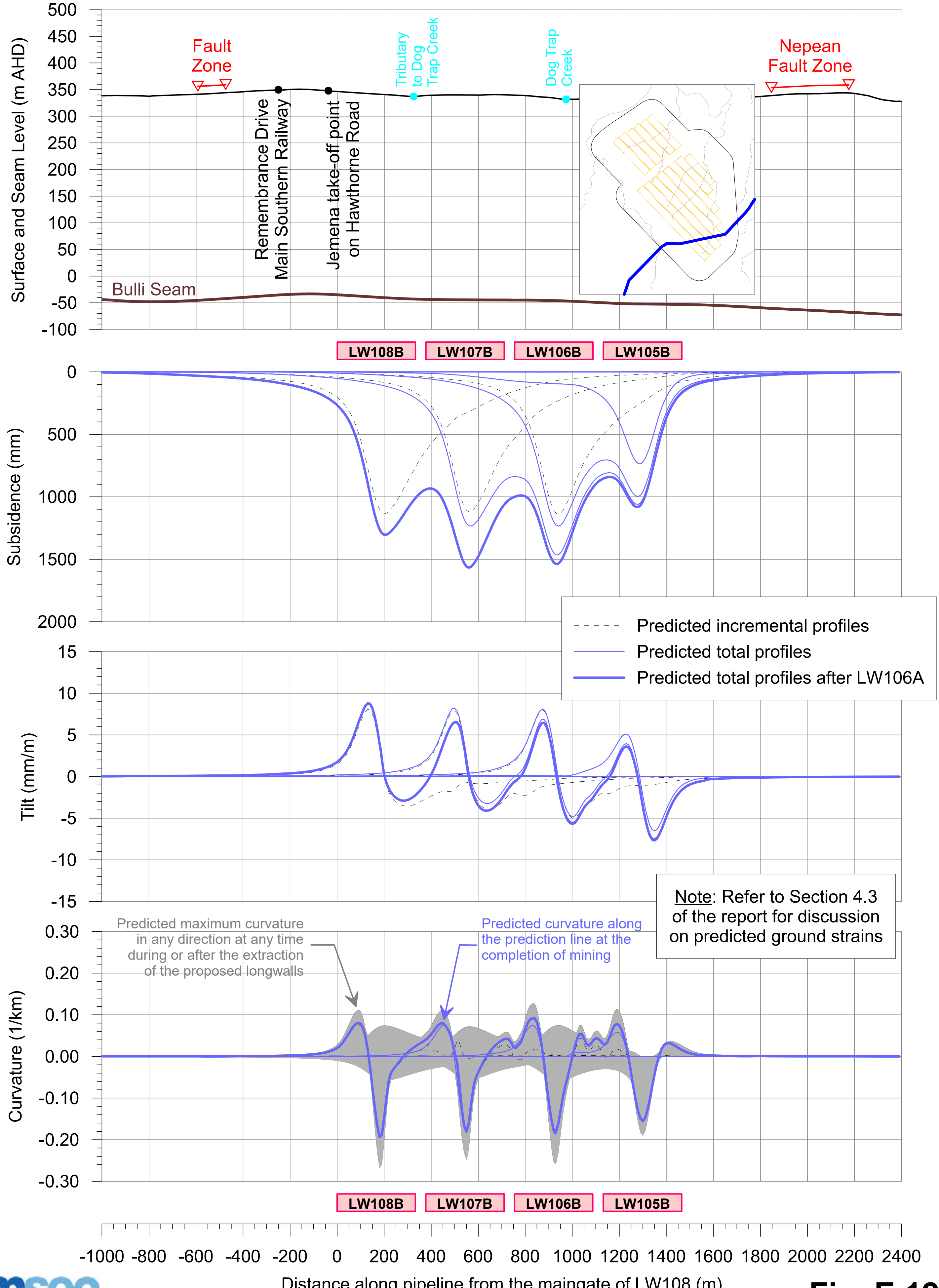


msec

Fig. E.11

Predicted profiles of conventional subsidence, tilt & curvature along the gas and ethane pipelines resulting from the extraction of LWs 101A to 108B

I:\Projects\Tahmoor South\MSEC1060 - EIS Amendment\Subsdata\Impacts\Gas\Fig. E.12 - Gas Pipeline.grf

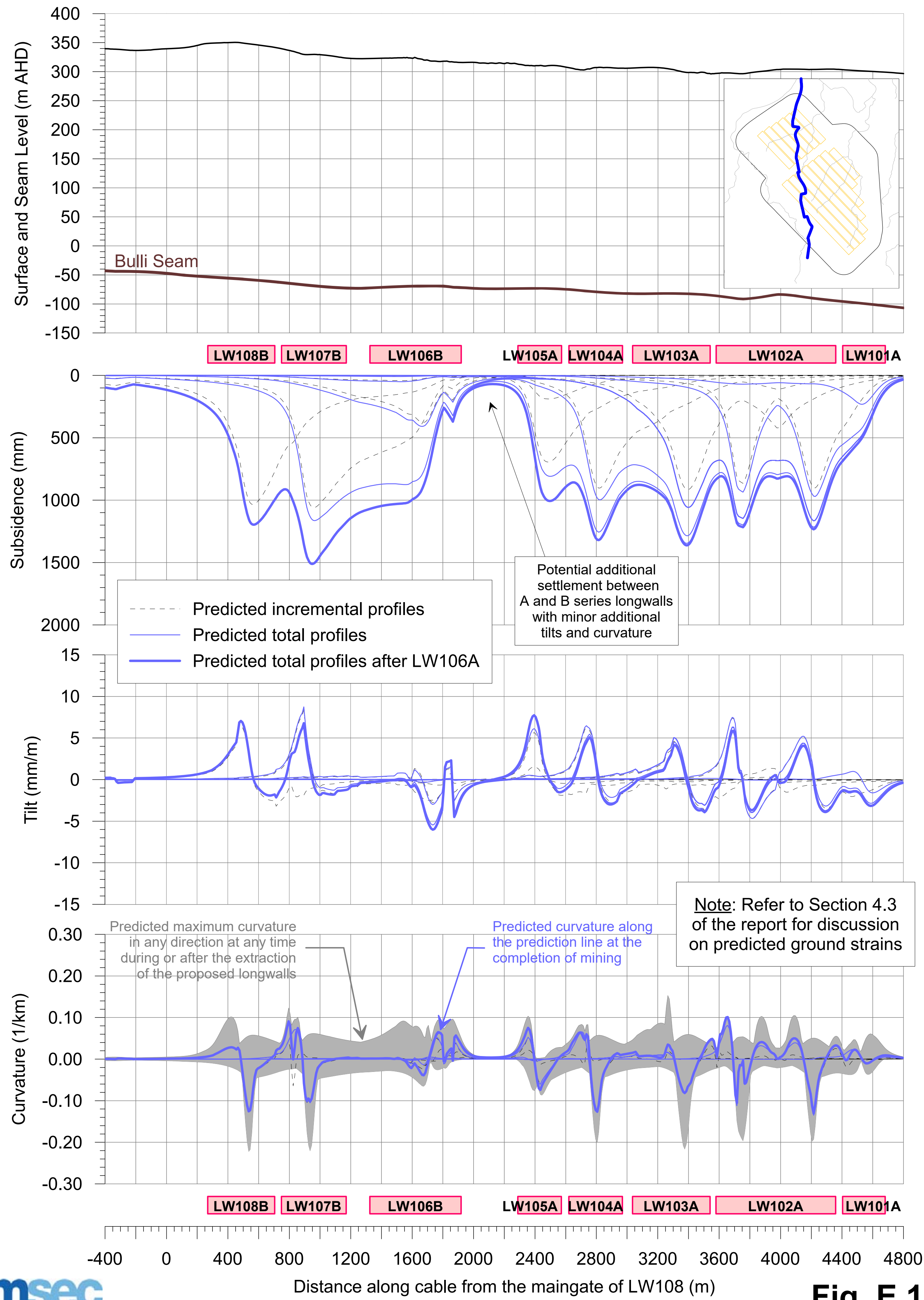


msec

Fig. E.12

Predicted profiles of conventional subsidence, tilt and curvature along Optical Fibre Cable (1) resulting from the extraction of Longwalls 101A to 108B

I:\Projects\Tahmoor South\MSEC1060 - EIS Amendment\Subsdata\Impacts\Telecommunications\Fig. E.13 - Optical Fibre Cable 1.grf



msec

Fig. E.13

Predicted profiles of conventional subsidence, tilt and curvature along Optical Fibre Cable (2) resulting from the extraction of Longwalls 101A to 108B

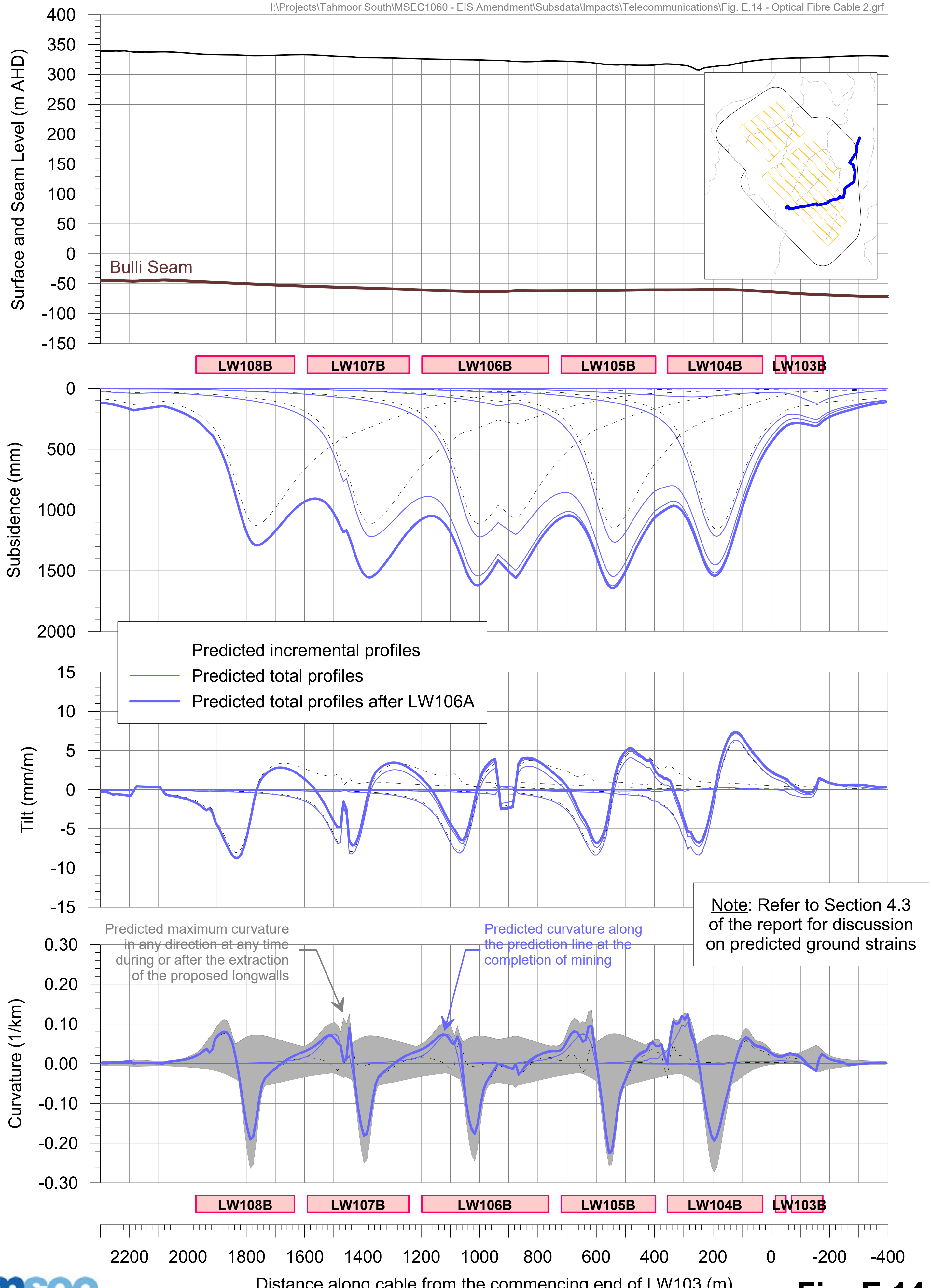


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Fig. E.14

APPENDIX F. DRAWINGS

I:\Projects\Tahmoor South\MSEC1060 - EIS Amendment\AcadData\MSEC1060-01 General Layout.dwg

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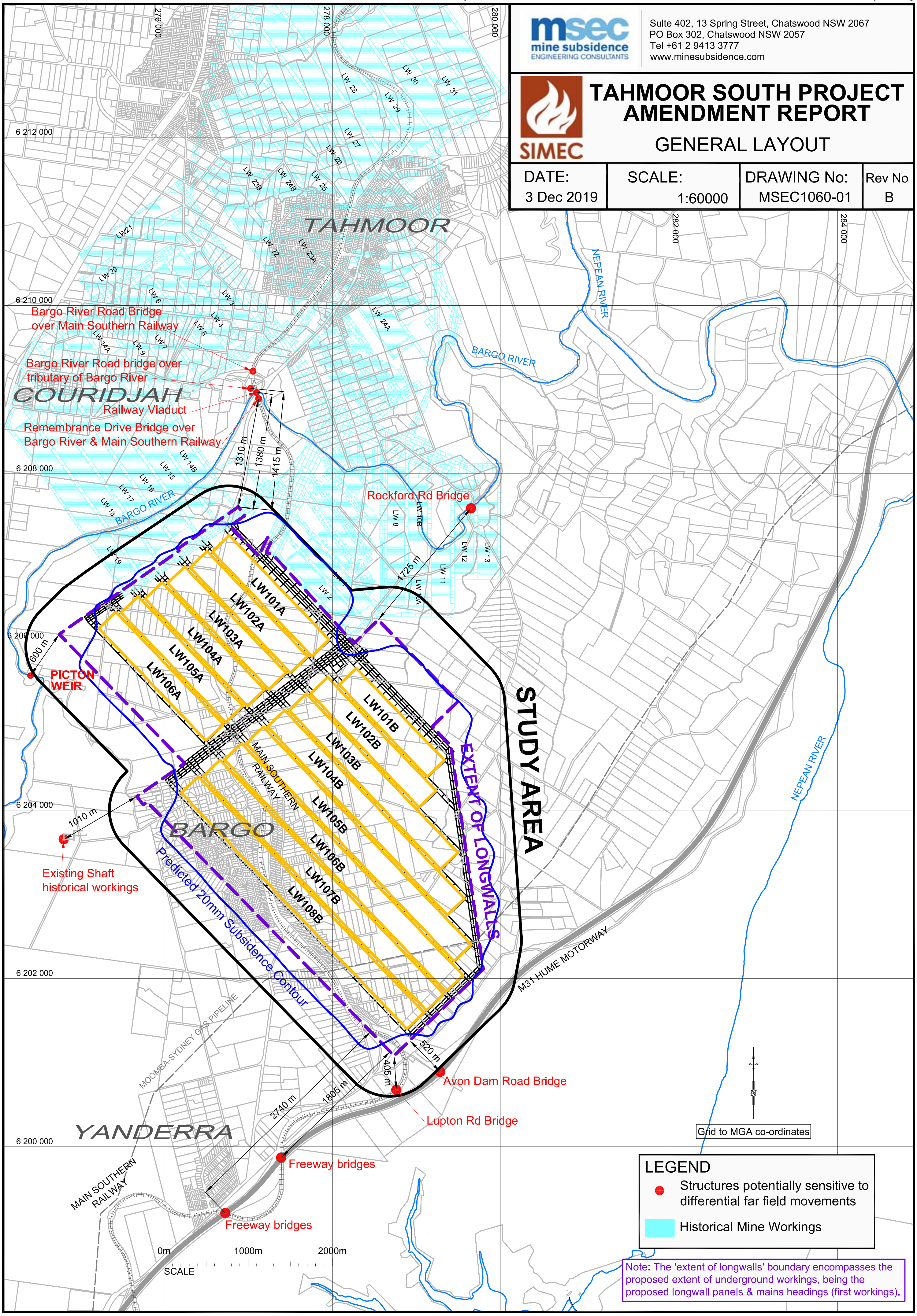
TAHMOOR SOUTH PROJECT AMENDMENT REPORT

GENERAL LAYOUT

DATE:	SCALE:	DRAWING No:	Rev No
3 Dec 2019	1:60000	MSEC1060-01	B



LEGEND
- Structures potentially sensitive to differential far field movements
- Historical Mine Workings

Note: The 'extent of longwalls' boundary encompasses the proposed extent of underground workings, being the proposed longwall panels & mains headings (first workings).

I:\Projects\Tahmoor South\MSEC1060 - EIS Amendment\AcadData\MSEC1060-02 Surface Level Contours.dwg

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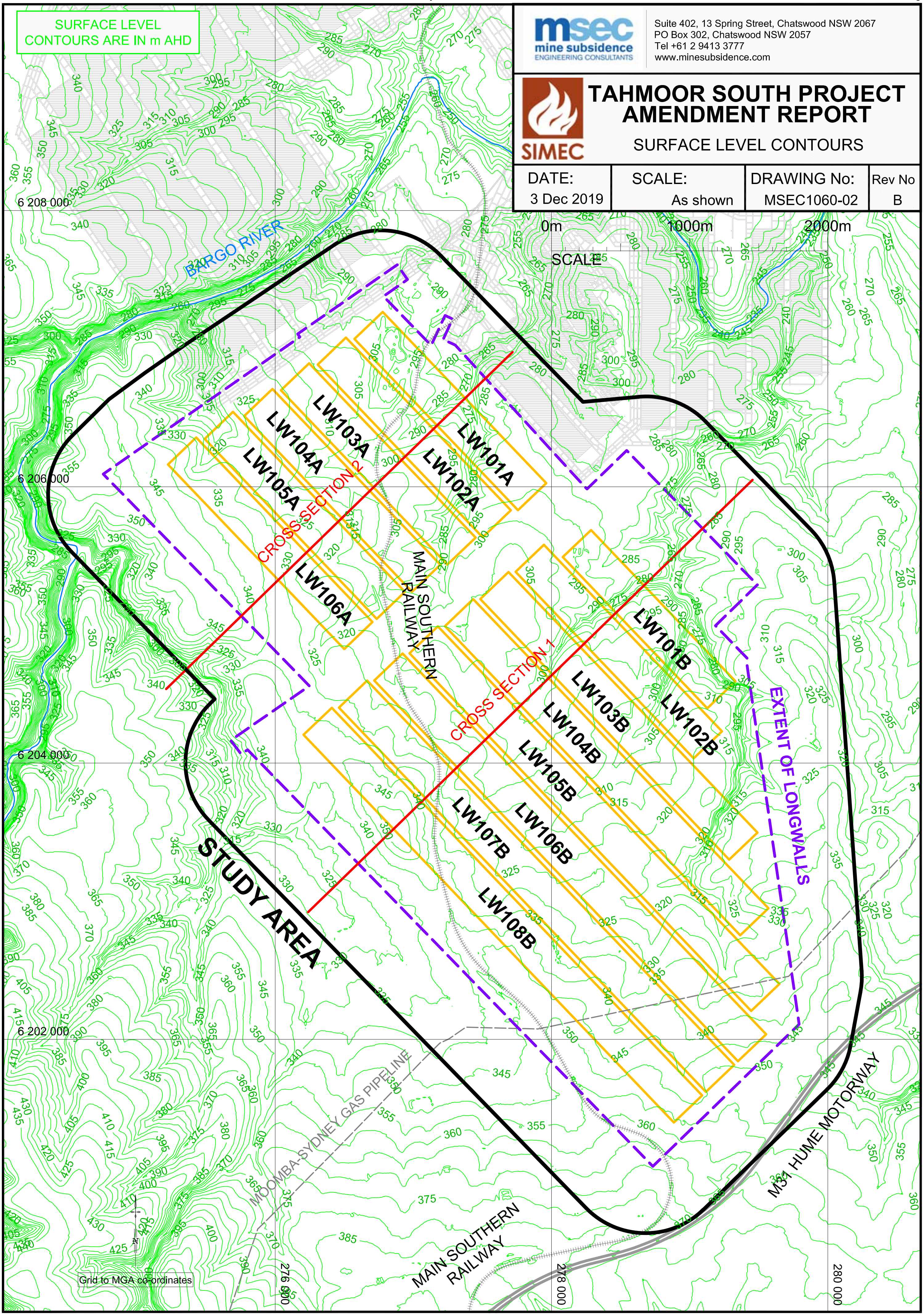

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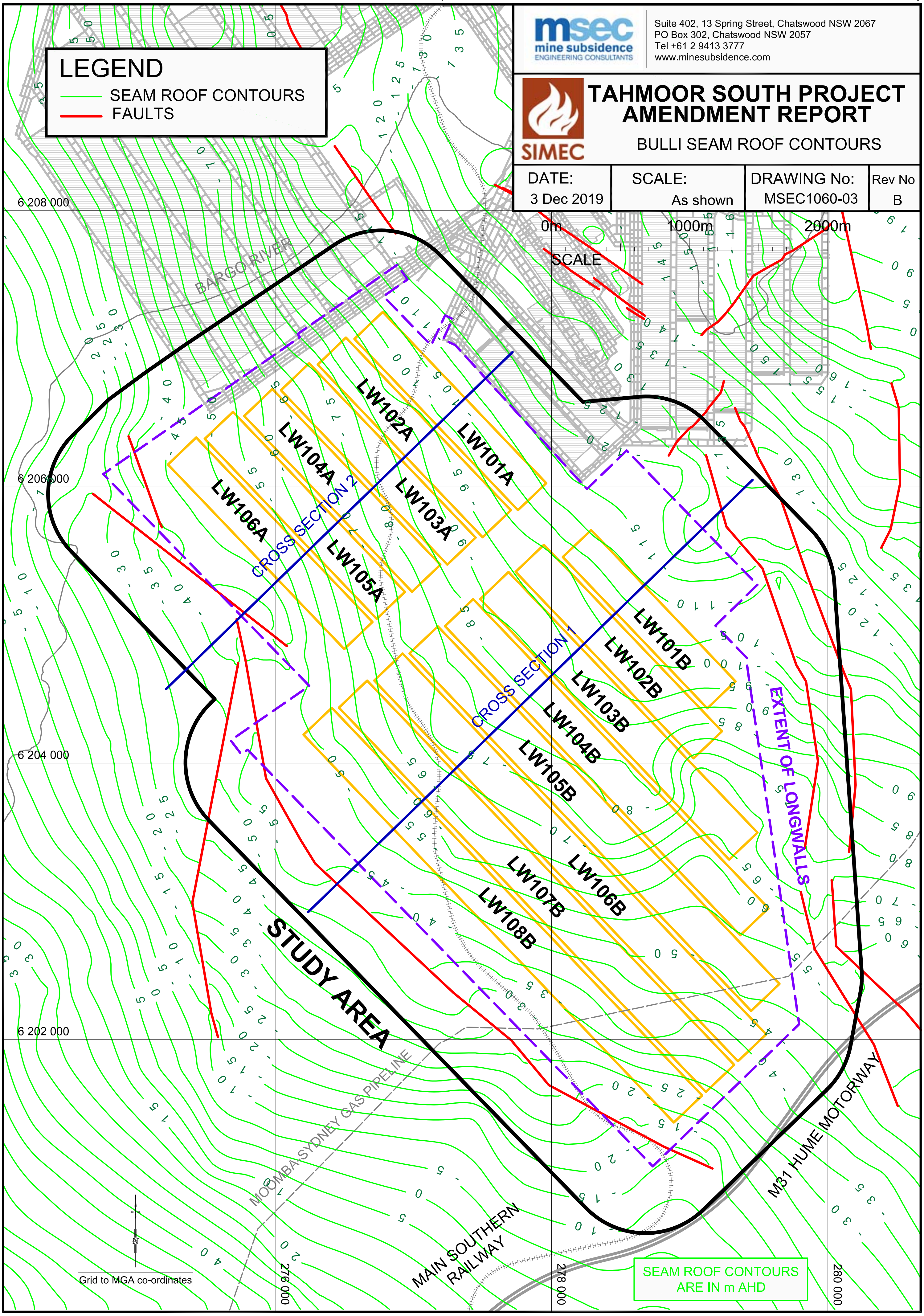

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EXTRACTION HEIGHT

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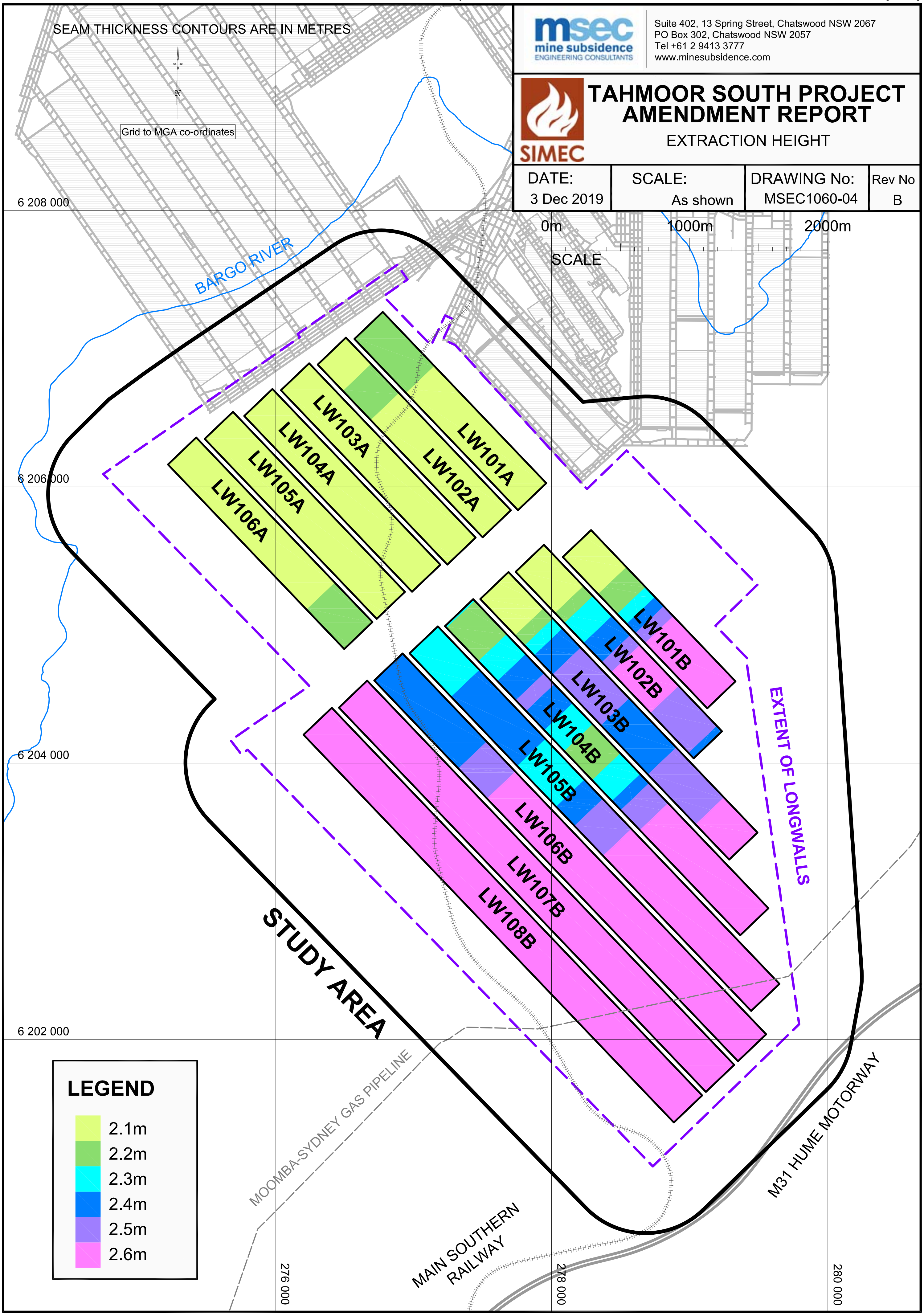

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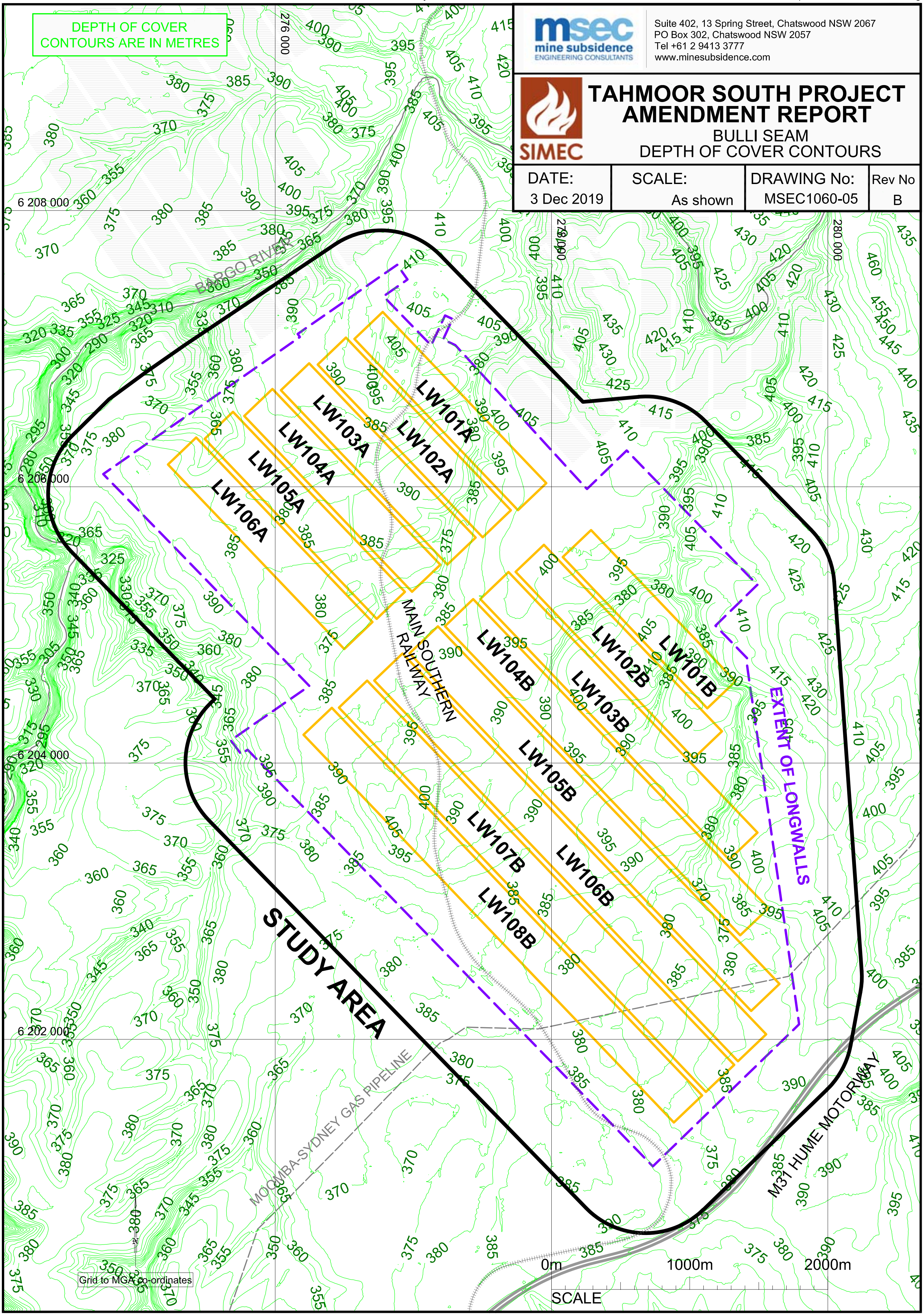

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BULLI SEAM
DEPTH OF COVER CONTOURS

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I:\Projects\Tahmoor South\MSEC1060 - EIS Amendment\AcadData\MSEC1060-06 Geological Structures.dwg

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GEOLOGICAL STRUCTURES AT BULLI SEAM LEVEL

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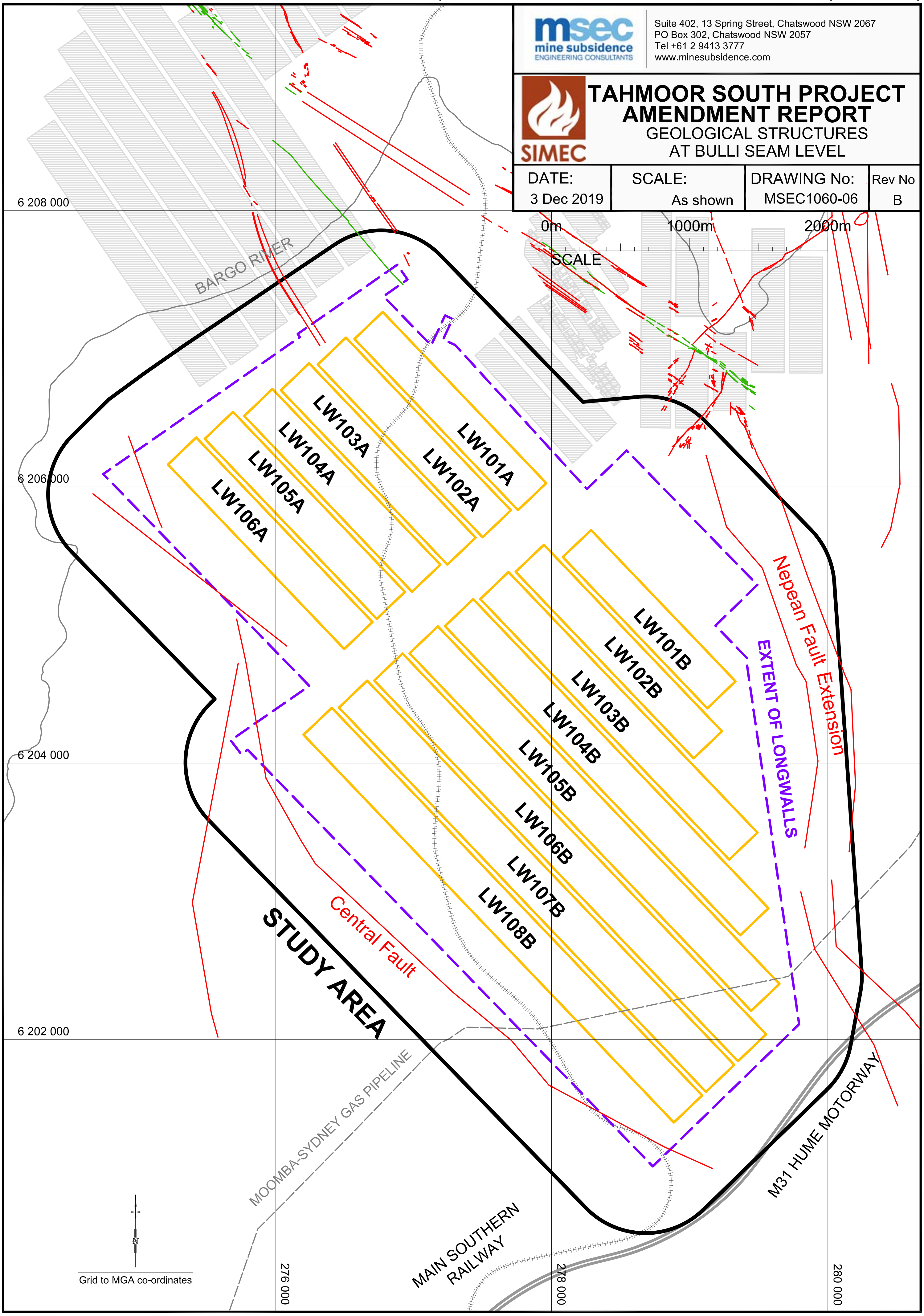

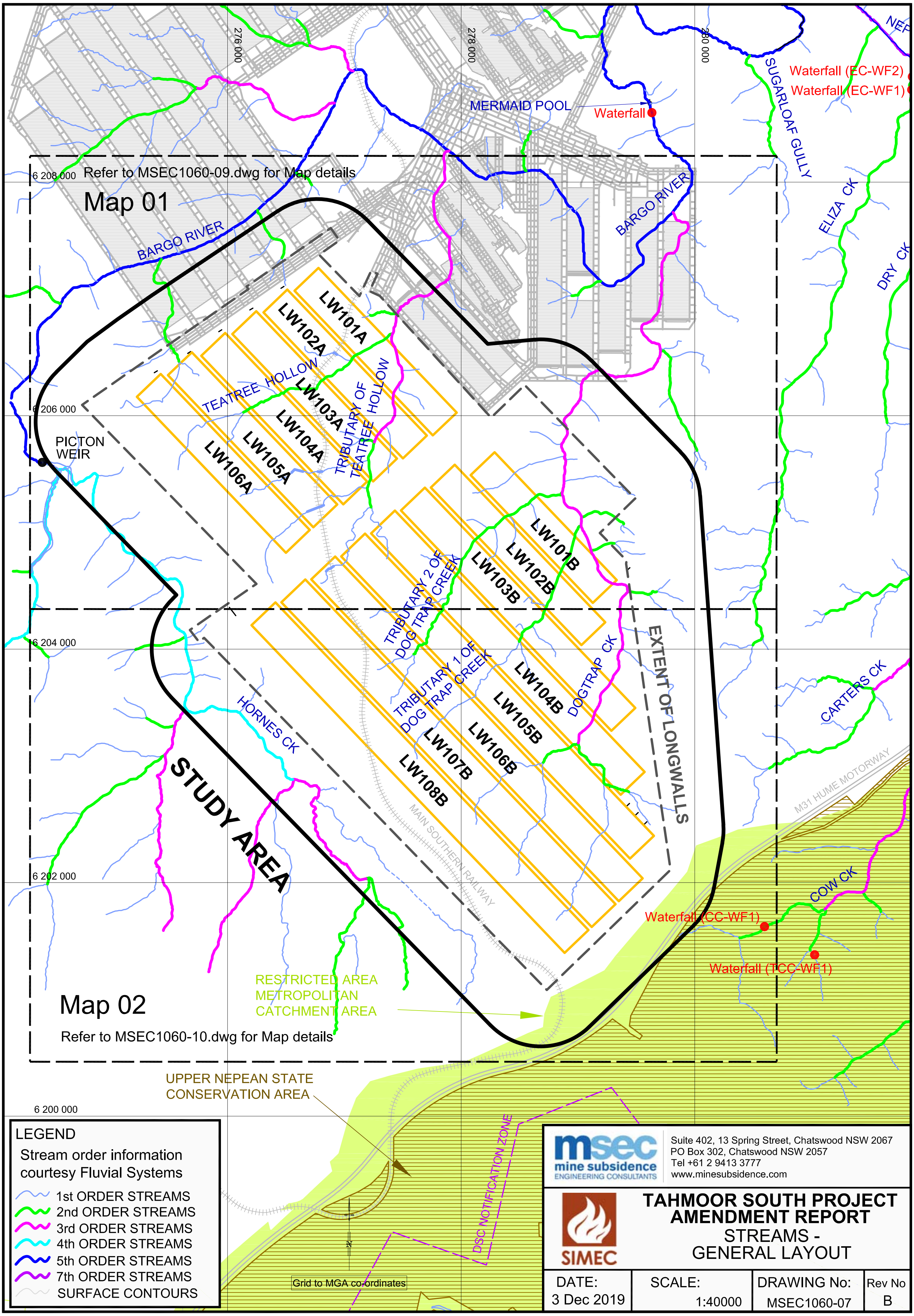

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STREAMS - GENERAL LAYOUT

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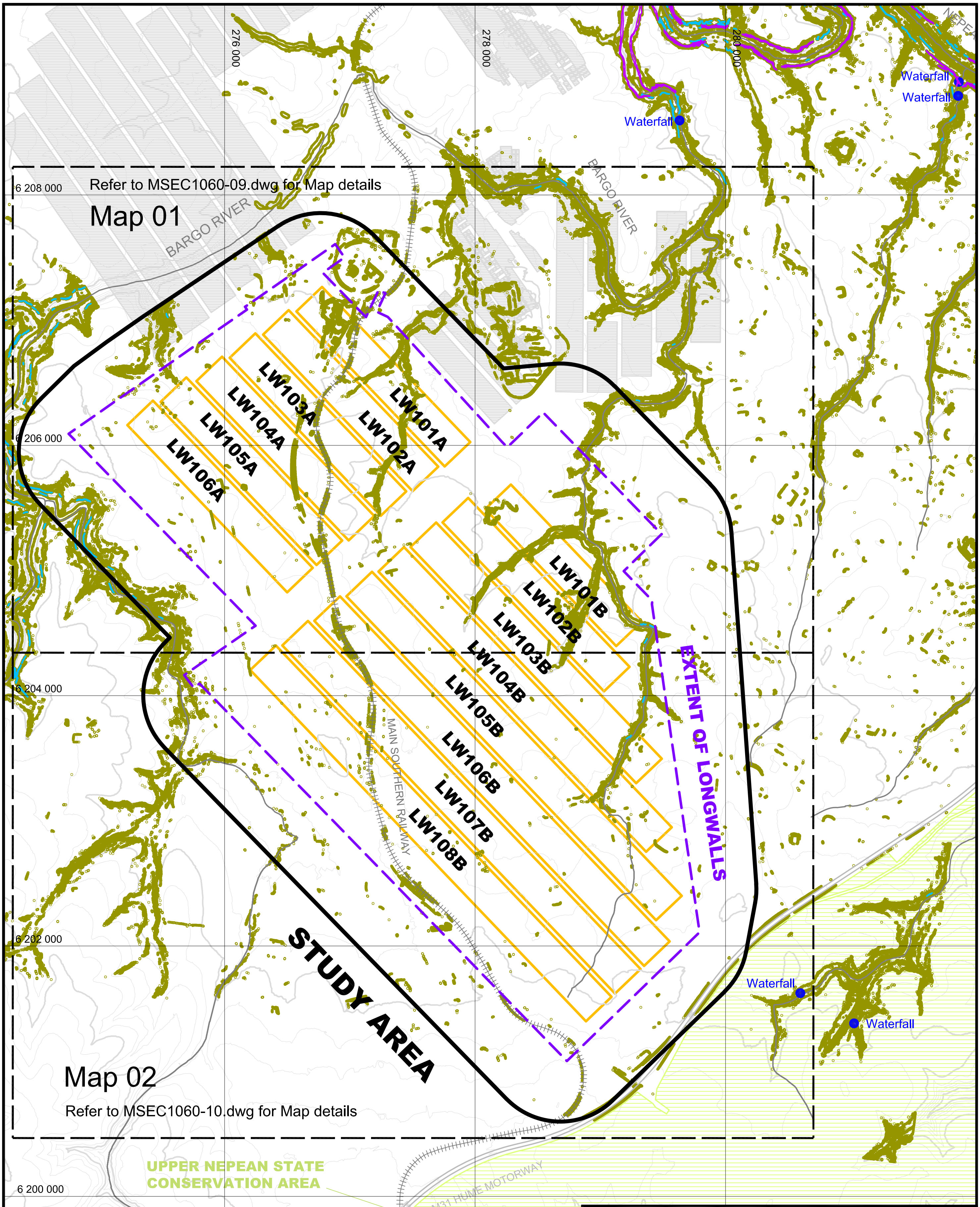

LEGEND

- WATERFALL > 5m IN HEIGHT
- CLIFFS
- CLIFFS LONGER THAN 20m, HIGHER THAN 10m &/OR HIGHER THAN 40m
- STEEP SLOPES
- WATERCOURSE

Pool locations, cliffs and steep slopes were identified courtesy Fluvial Systems

Grid to MGA co-ordinates

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CLIFFS & STEEP SLOPES - GENERAL LAYOUT

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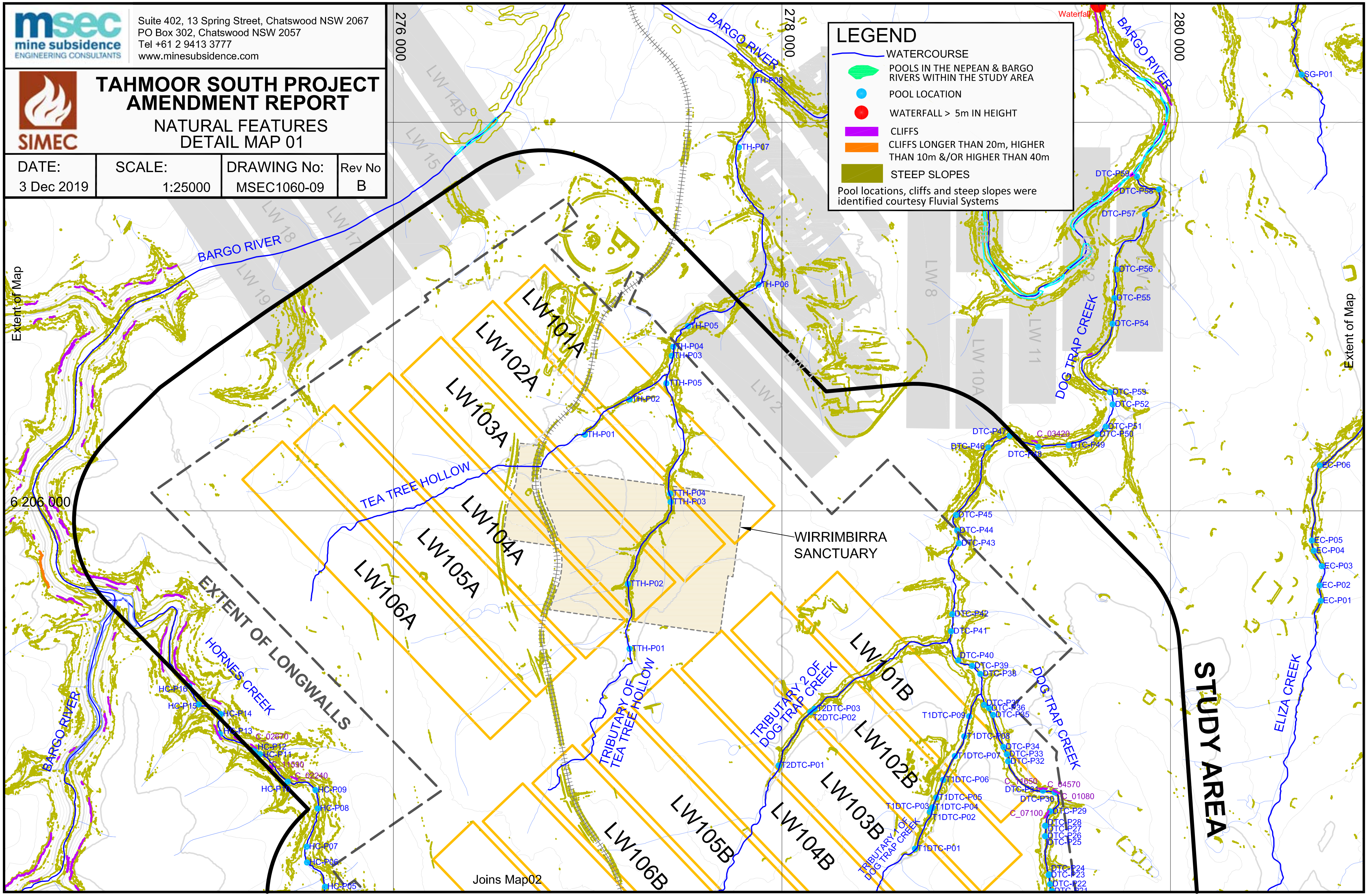

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NATURAL FEATURES DETAIL MAP 01

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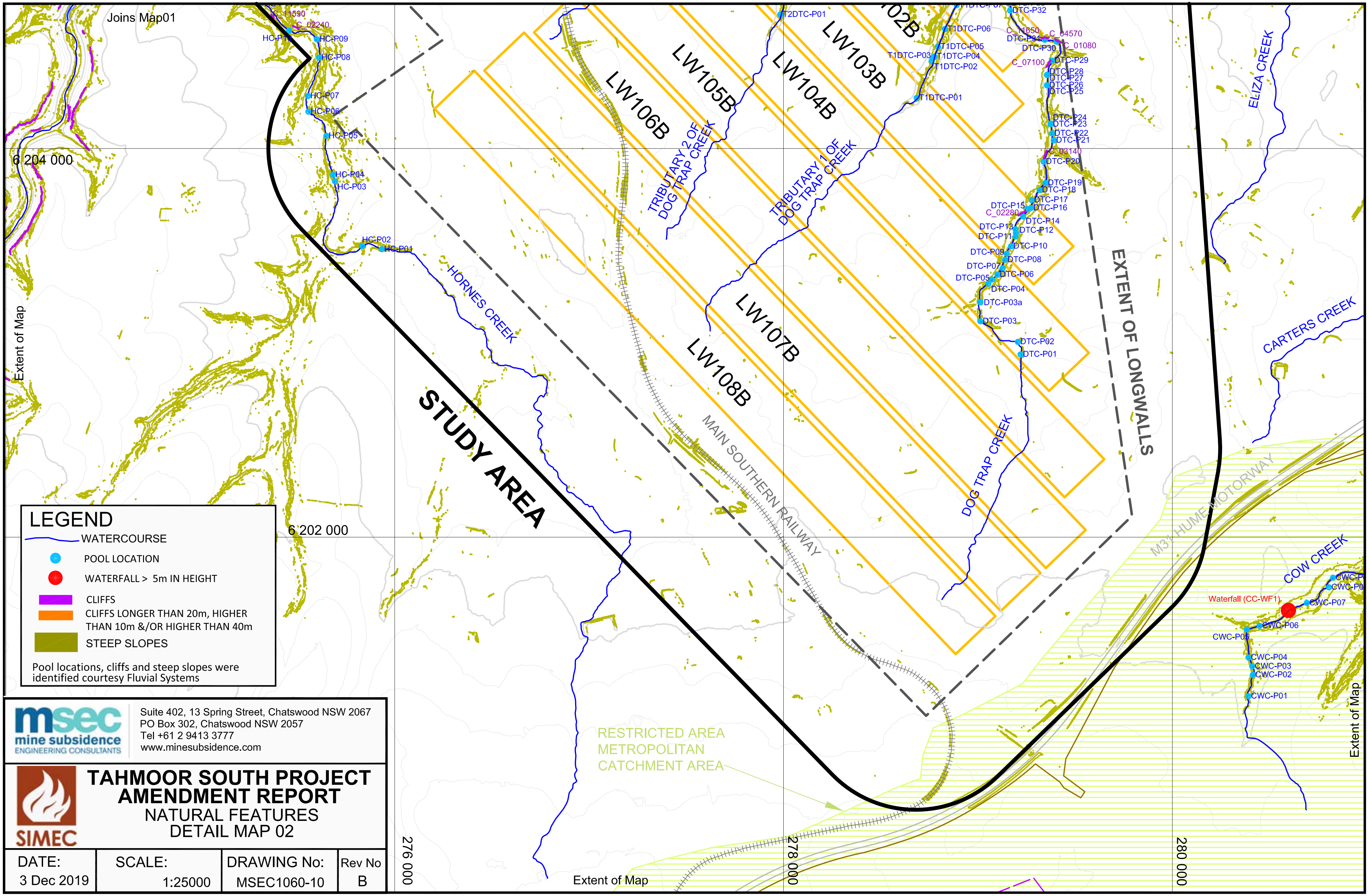

LEGEND

- WATERCOURSE
- POOL LOCATION
- WATERFALL > 5m IN HEIGHT
- CLIFFS
- CLIFFS LONGER THAN 20m, HIGHER THAN 10m &/OR HIGHER THAN 40m
- STEEP SLOPES

Pool locations, cliffs and steep slopes were identified courtesy Fluvial Systems

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NATURAL FEATURES DETAIL MAP 02

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I:\Projects\Tahmoor South\MSEC1060 - EIS Amendment\AcadData\MSEC1060-11 Rail.dwg

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RAILWAY & ASSOCIATED INFRASTRUCTURE

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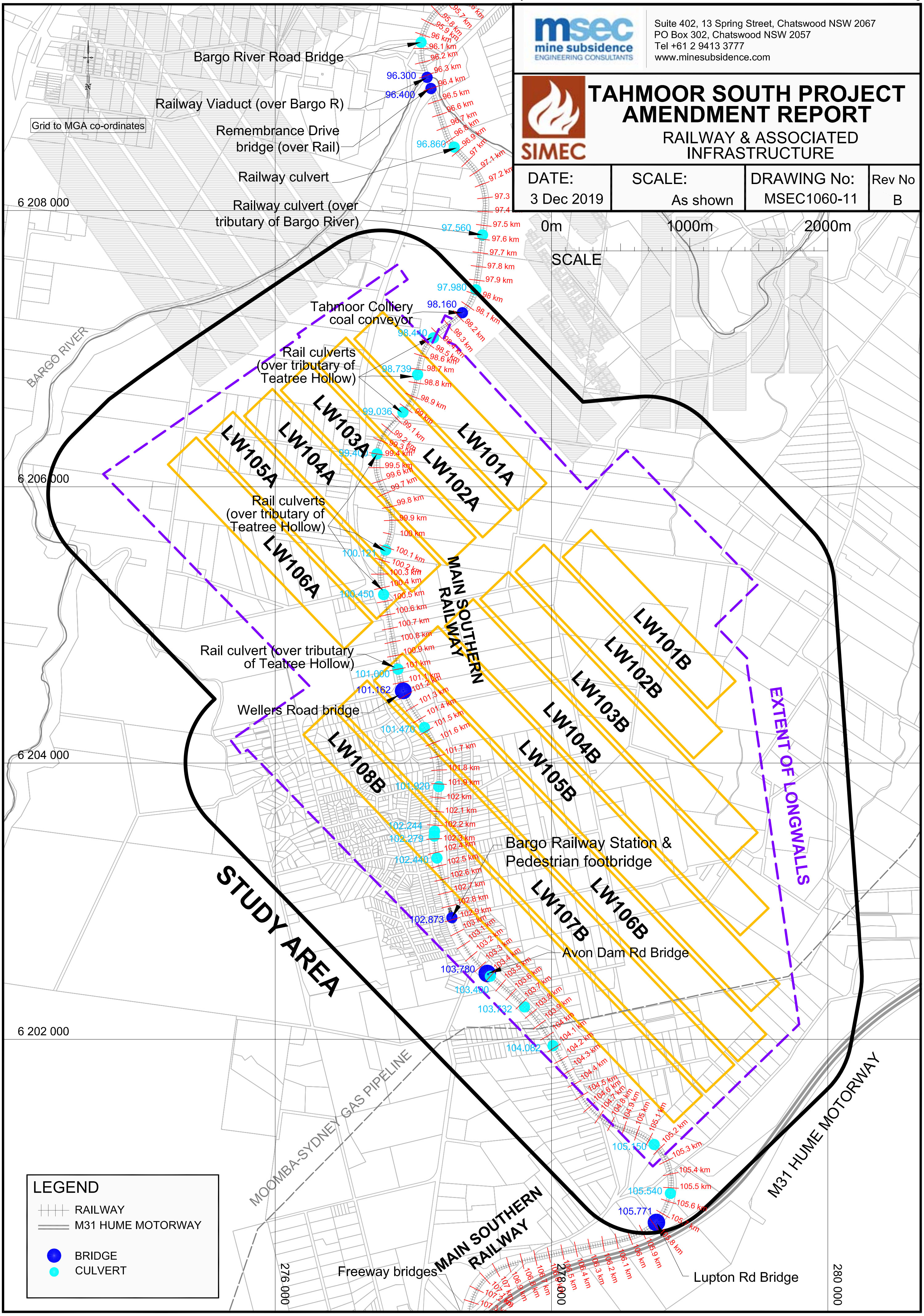

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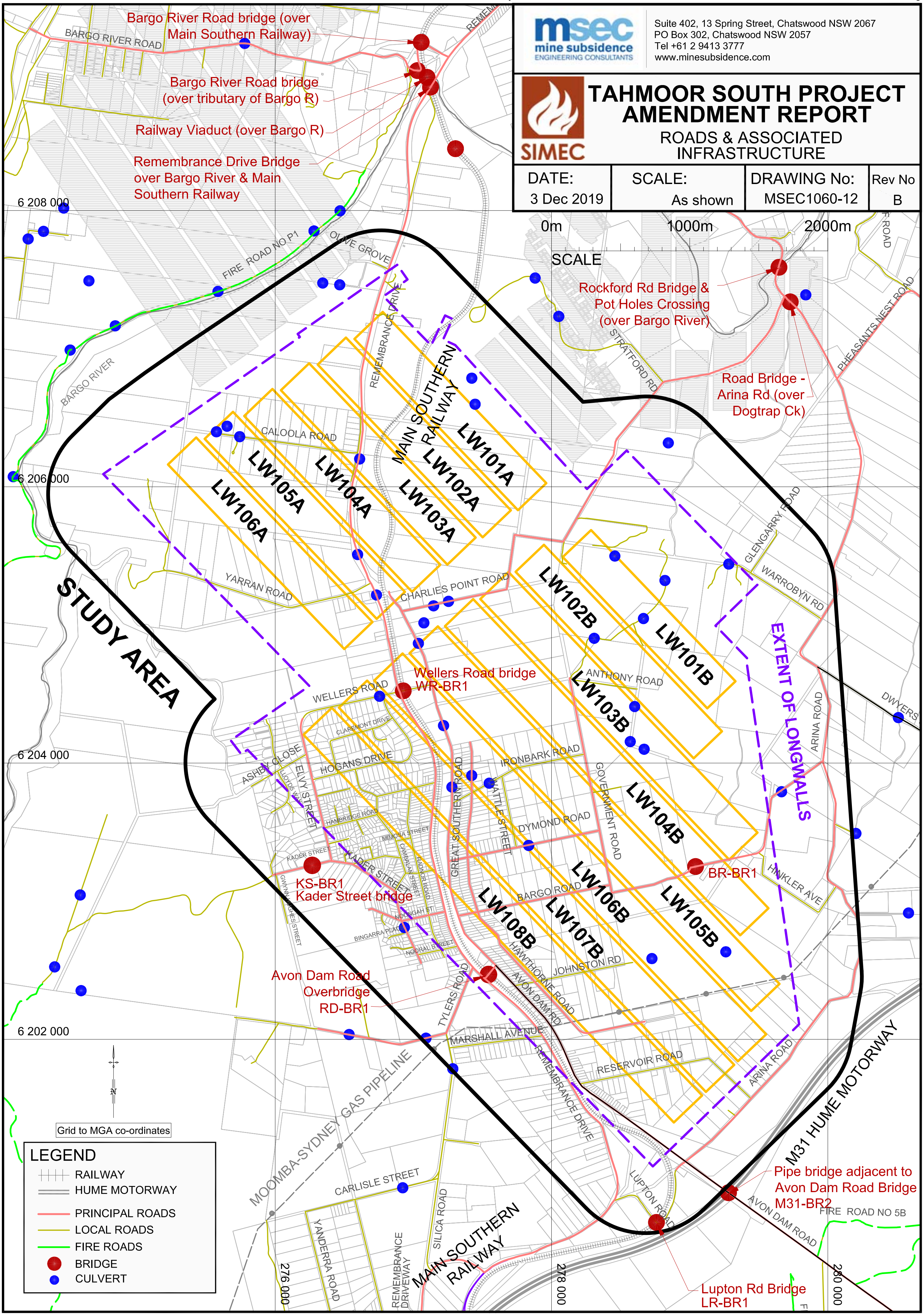

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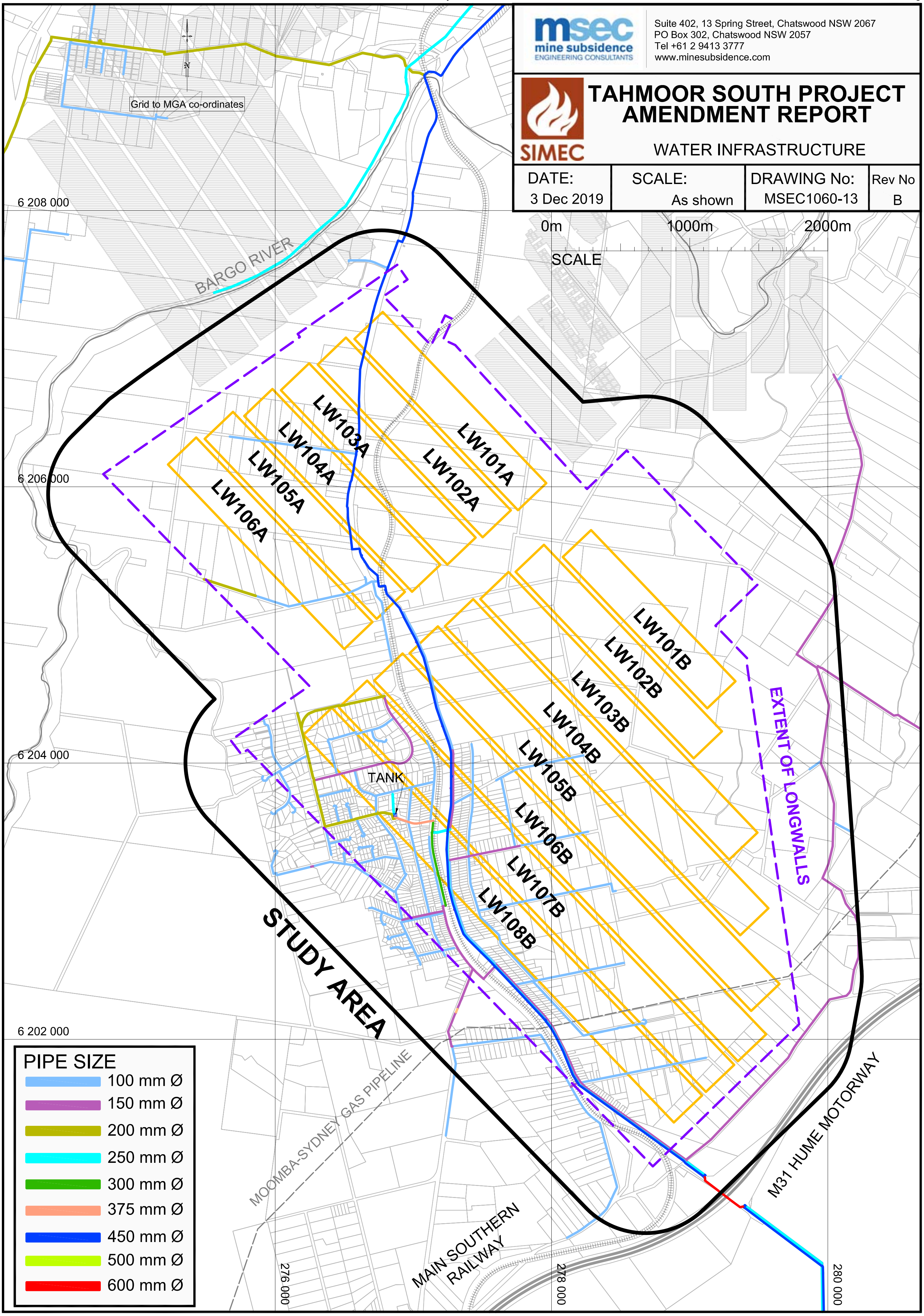

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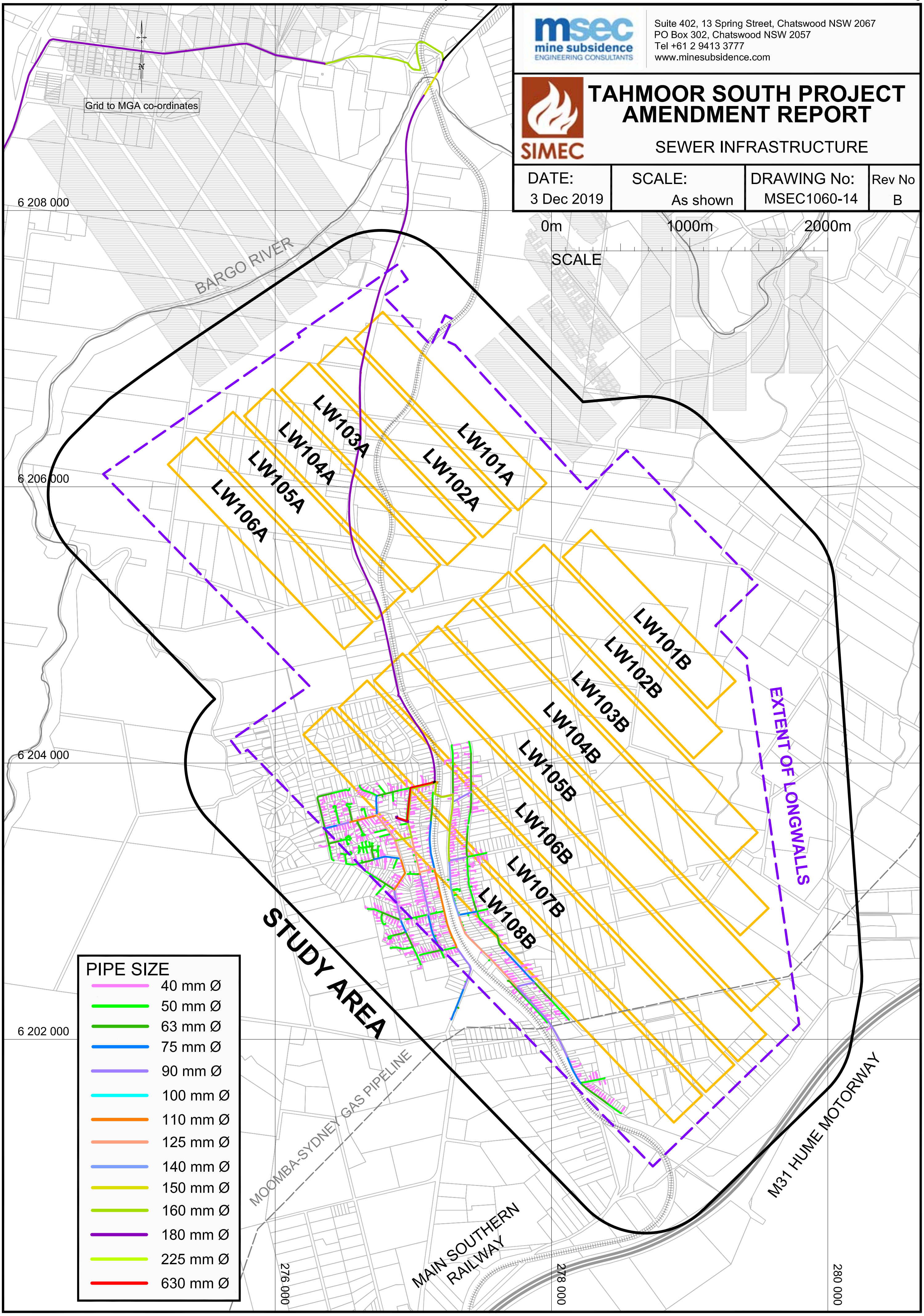

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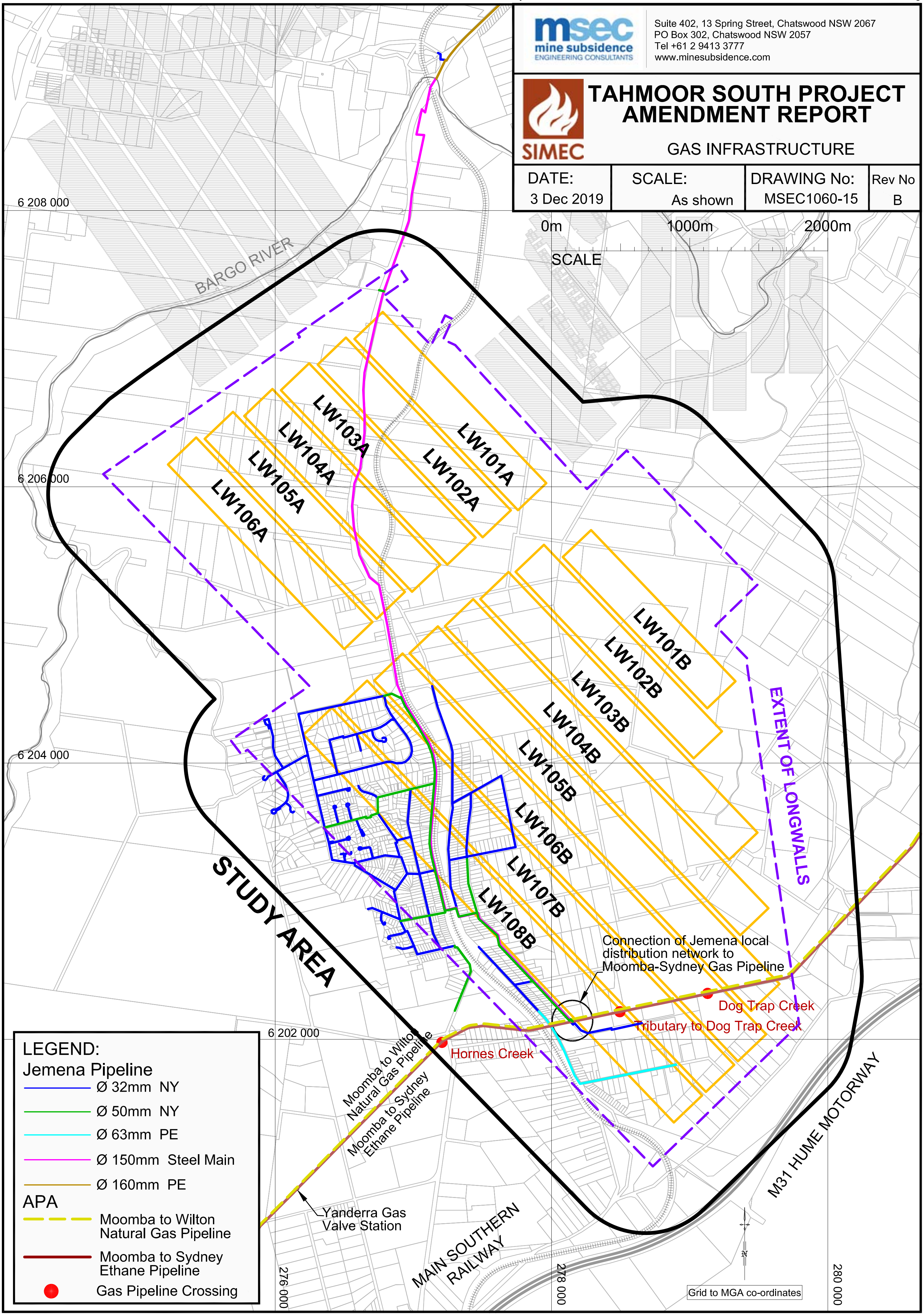

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ELECTRICAL INFRASTRUCTURE

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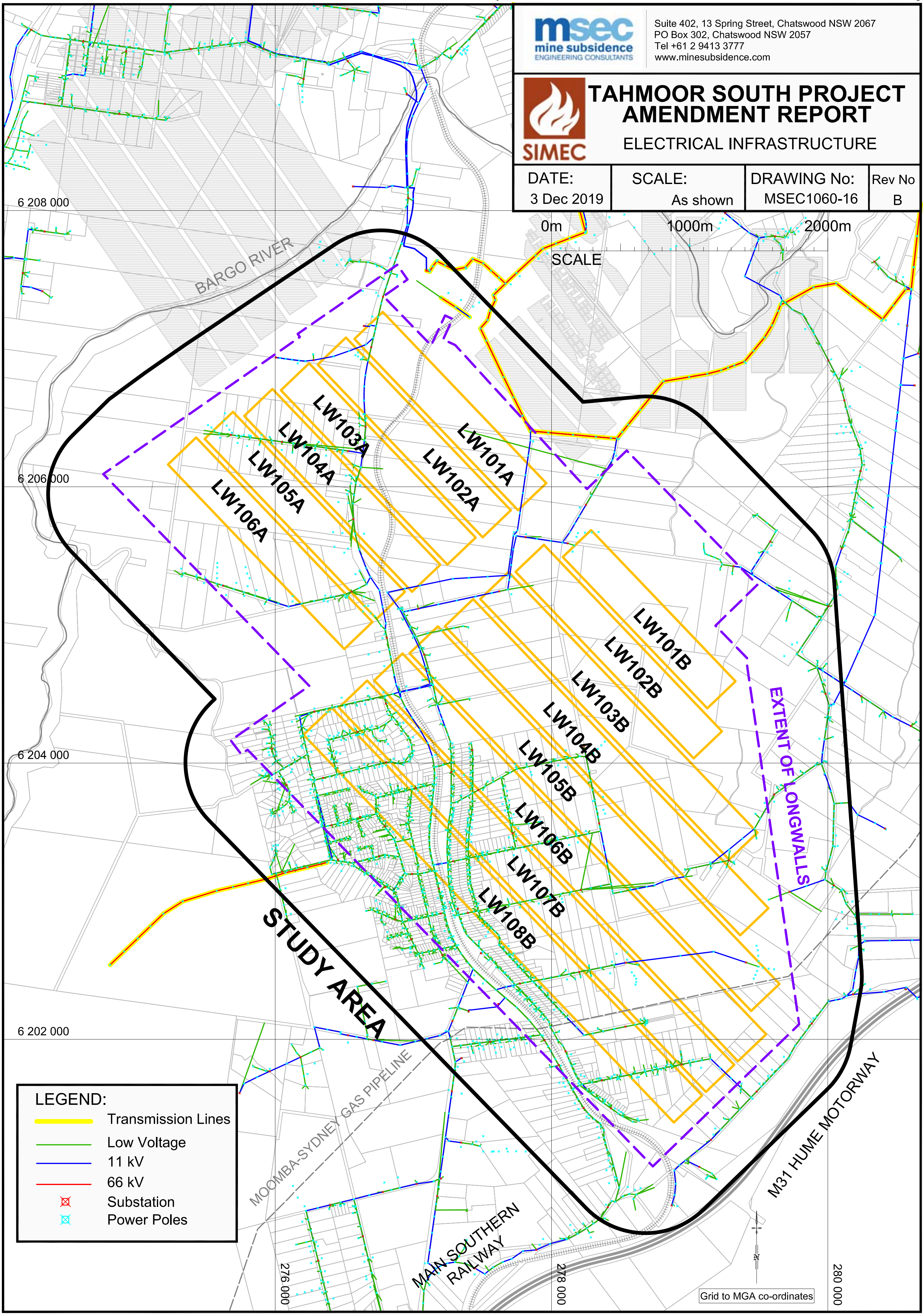

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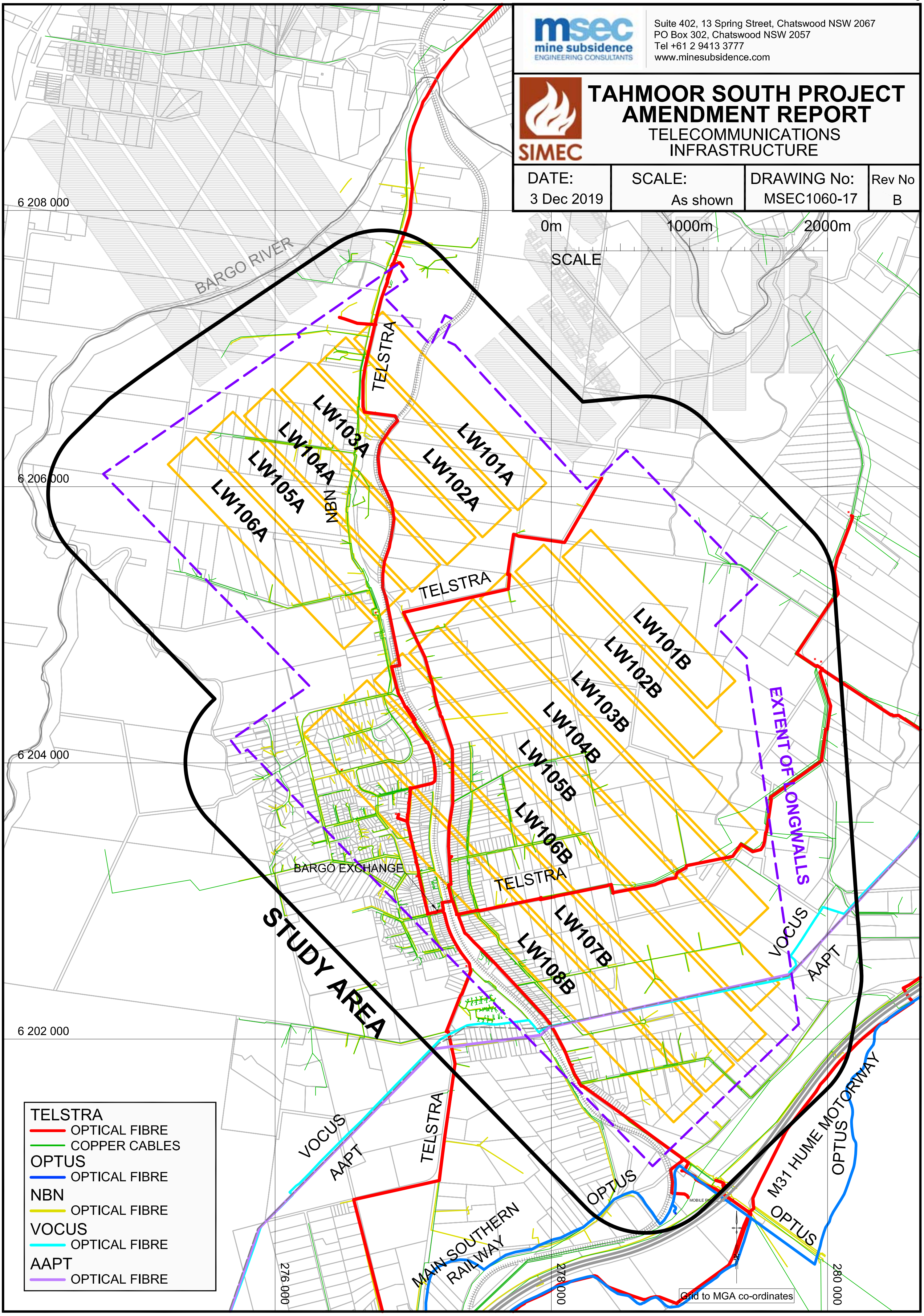

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ARCHEOLOGICAL & HERITAGE SITES

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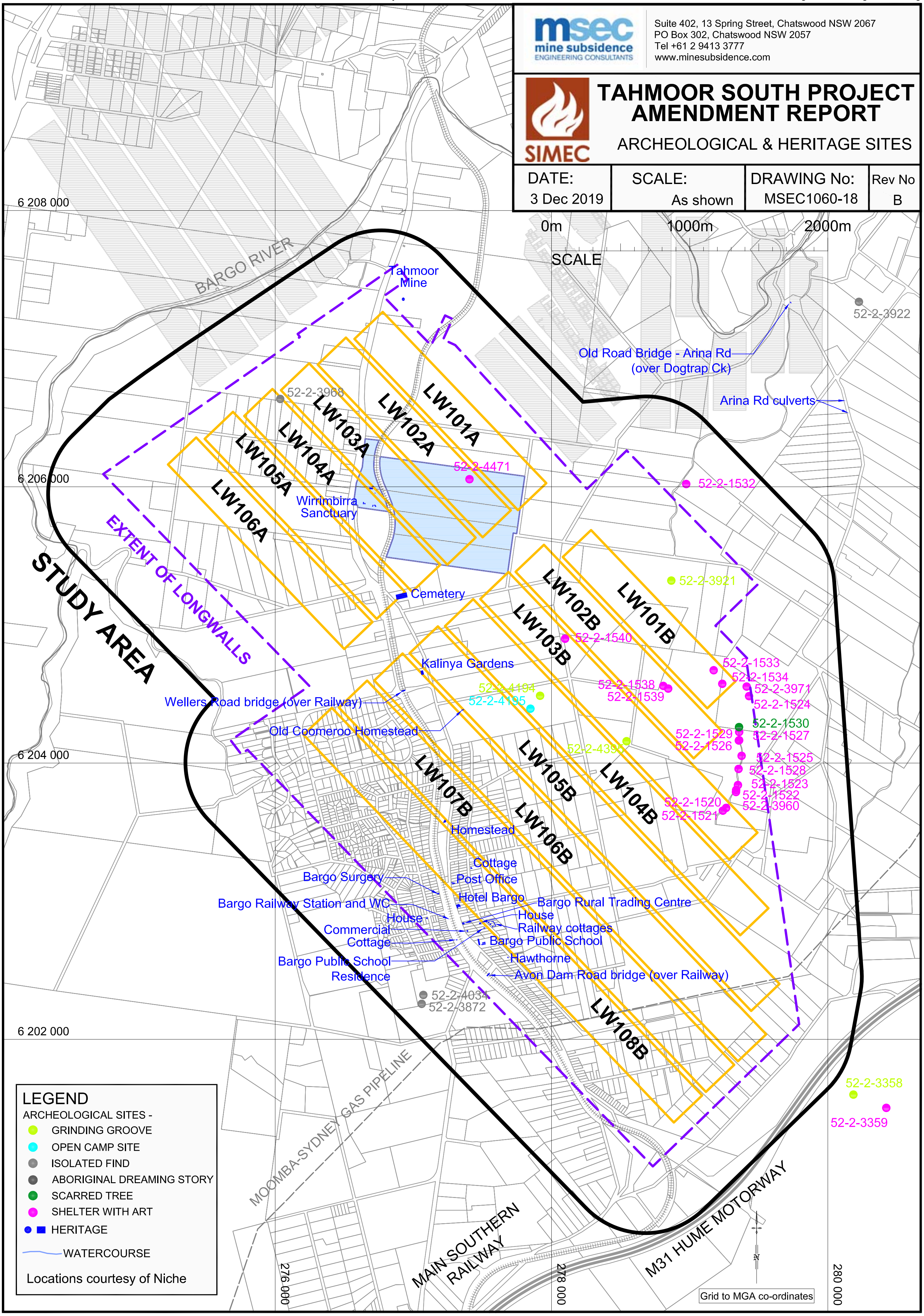

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TAHMOOR SOUTH PROJECT AMENDMENT REPORT

BUILDINGS & DAMS

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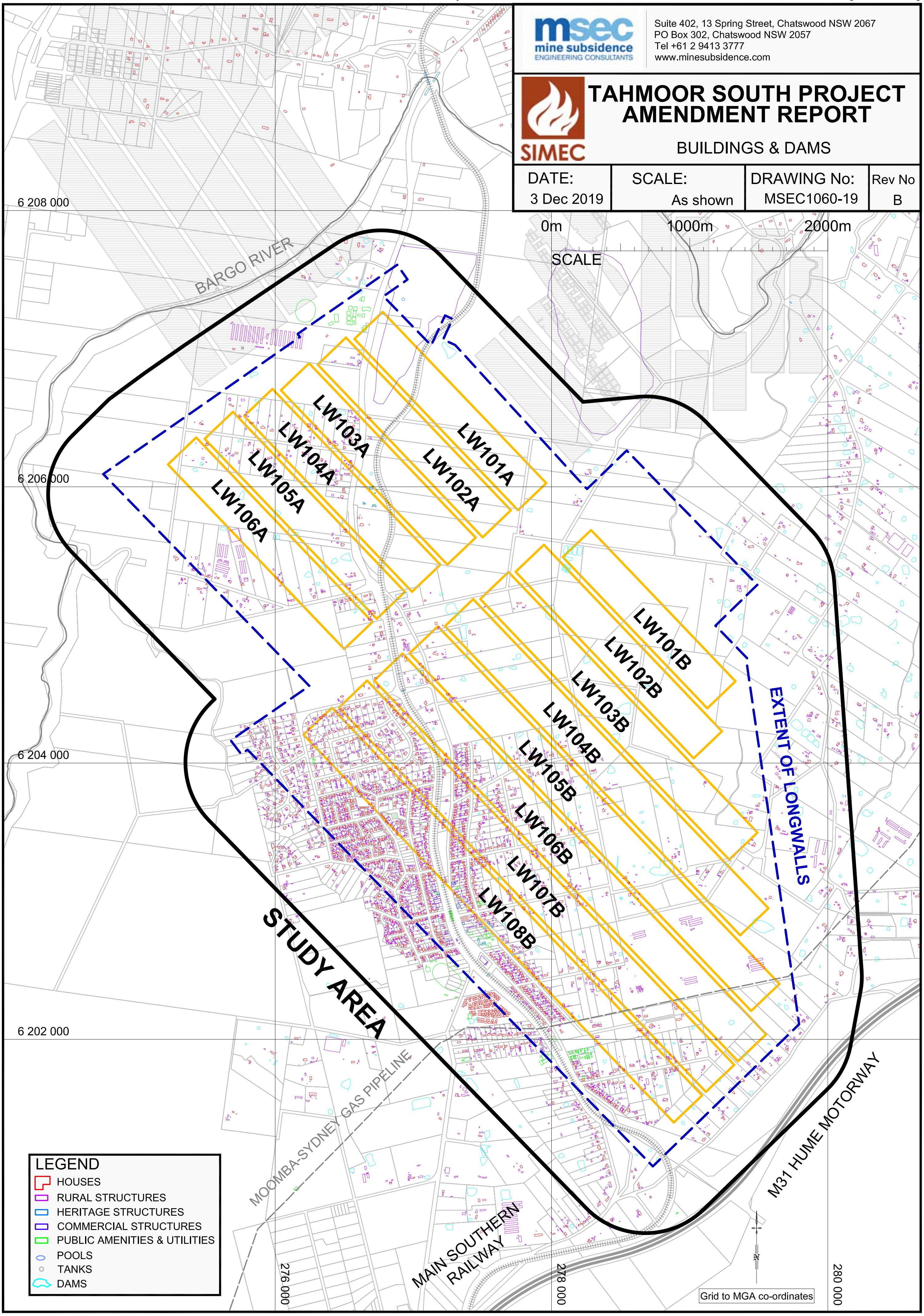

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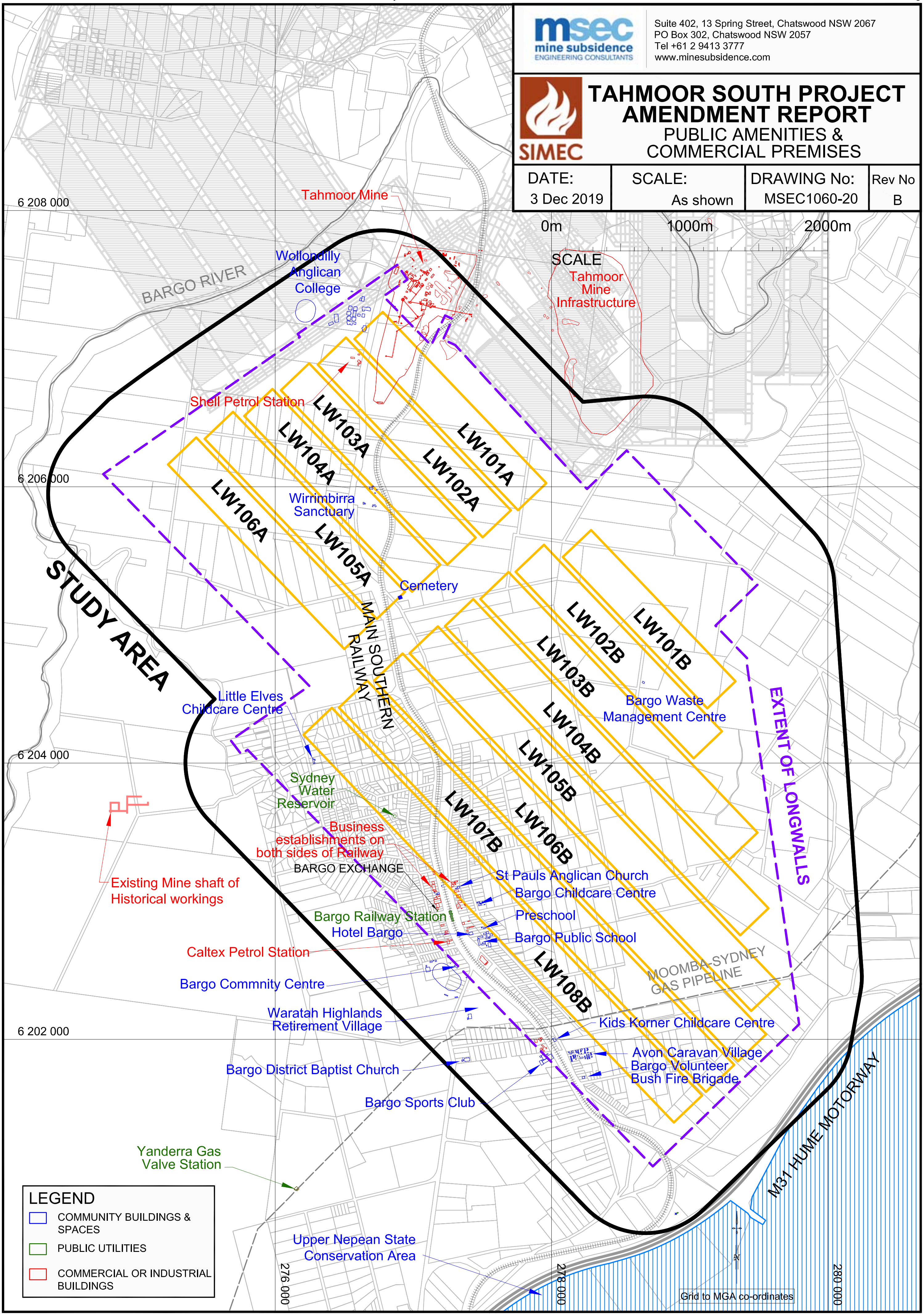

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TAHMOOR SOUTH PROJECT AMENDMENT REPORT

PUBLIC AMENITIES & COMMERCIAL PREMISES

DATE:	SCALE:	DRAWING No:	Rev No
3 Dec 2019	As shown	MSEC1060-20	B

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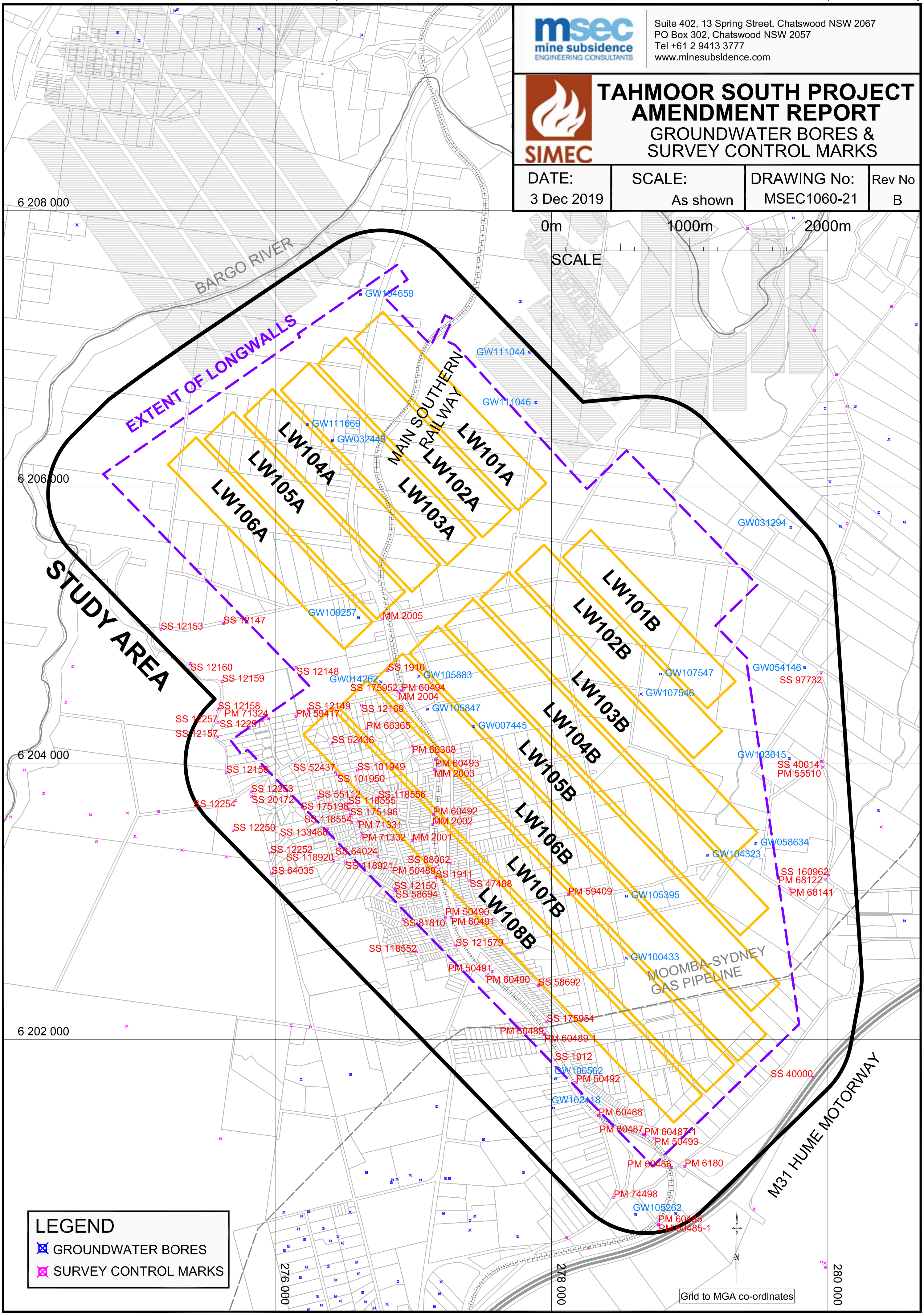

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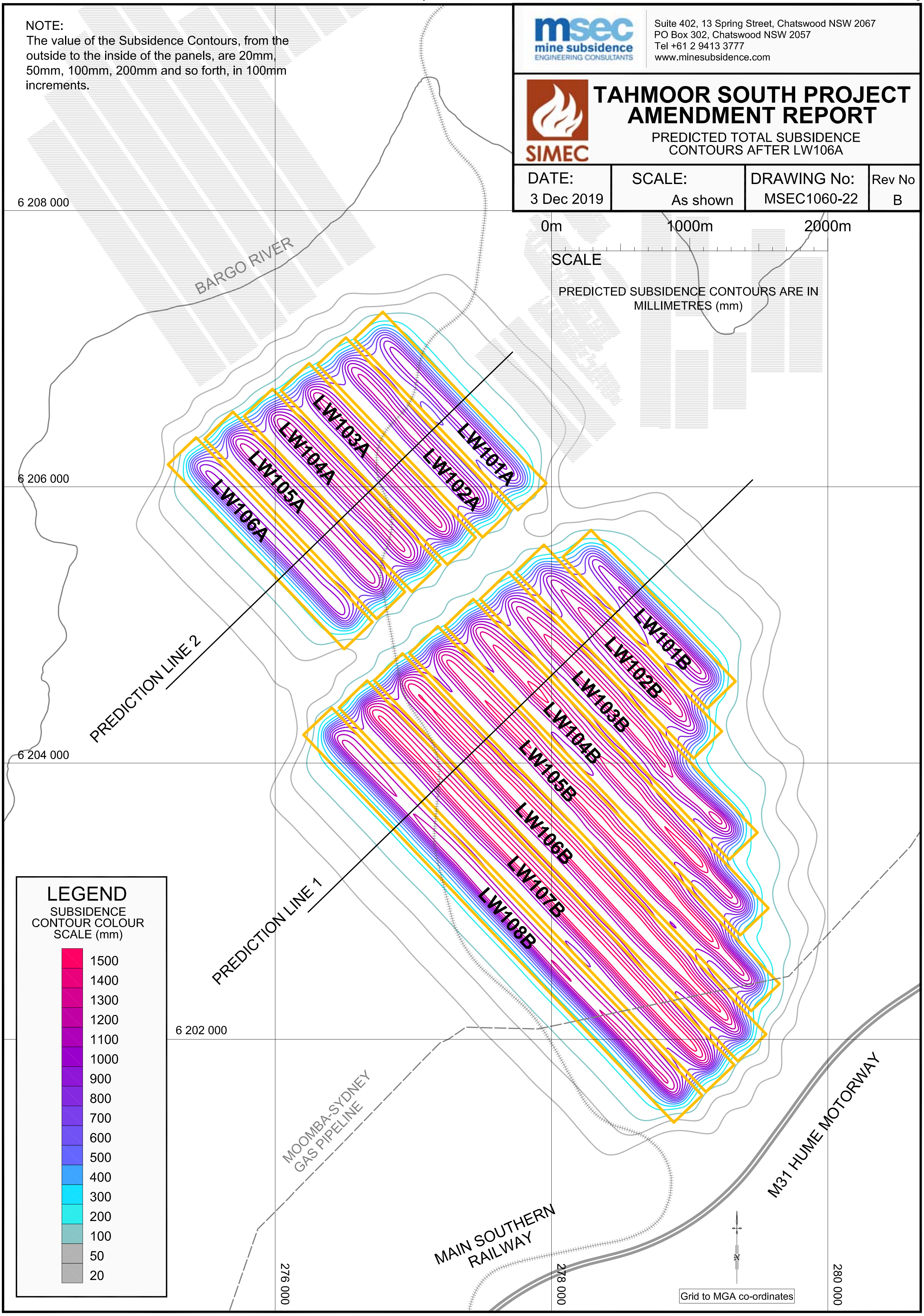
TAHMOOR SOUTH PROJECT AMENDMENT REPORT

PREDICTED TOTAL SUBSIDENCE CONTOURS AFTER LW106A

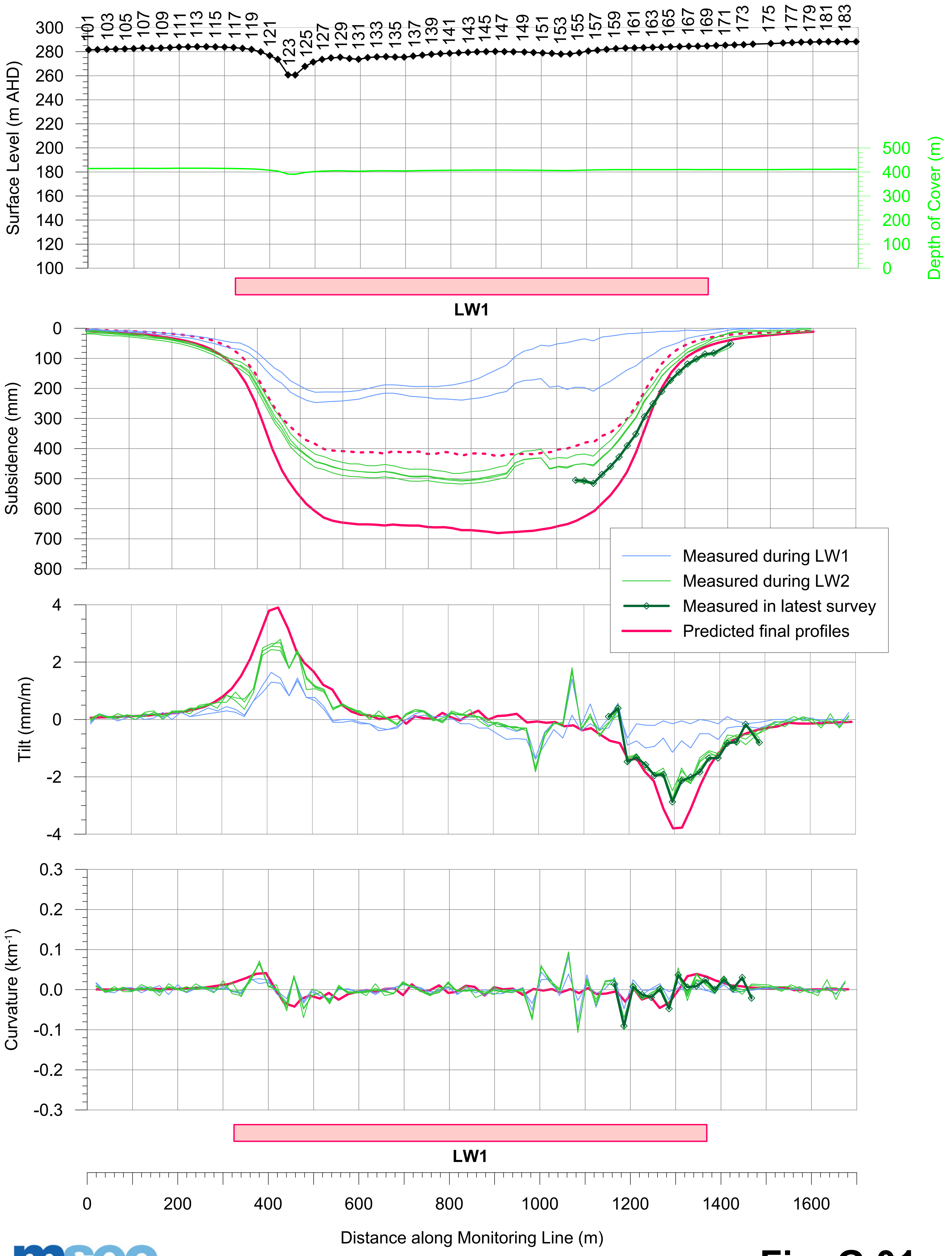
DATE:	SCALE:	DRAWING No:	Rev No
3 Dec 2019	As shown	MSEC1060-22	B

NOTE:
The value of the Subsidence Contours, from the outside to the inside of the panels, are 20mm, 50mm, 100mm, 200mm and so forth, in 100mm increments.



APPENDIX G. FIGURES COMPARING OBSERVED AND PREDICTED SUBSIDENCE PARAMETERS OVER PREVIOUSLY EXTRACTED LONGWALLS AT TAHMOOR MINE

Observed and Predicted Profiles of Total Subsidence, Tilt and Curvature along the 100-Line due to Tahmoor LW1 and LW2



msec

Fig. G.01

Observed and Predicted Profiles of Total Subsidence, Tilt and Curvature along the 200-Line due to Tahmoor LW2

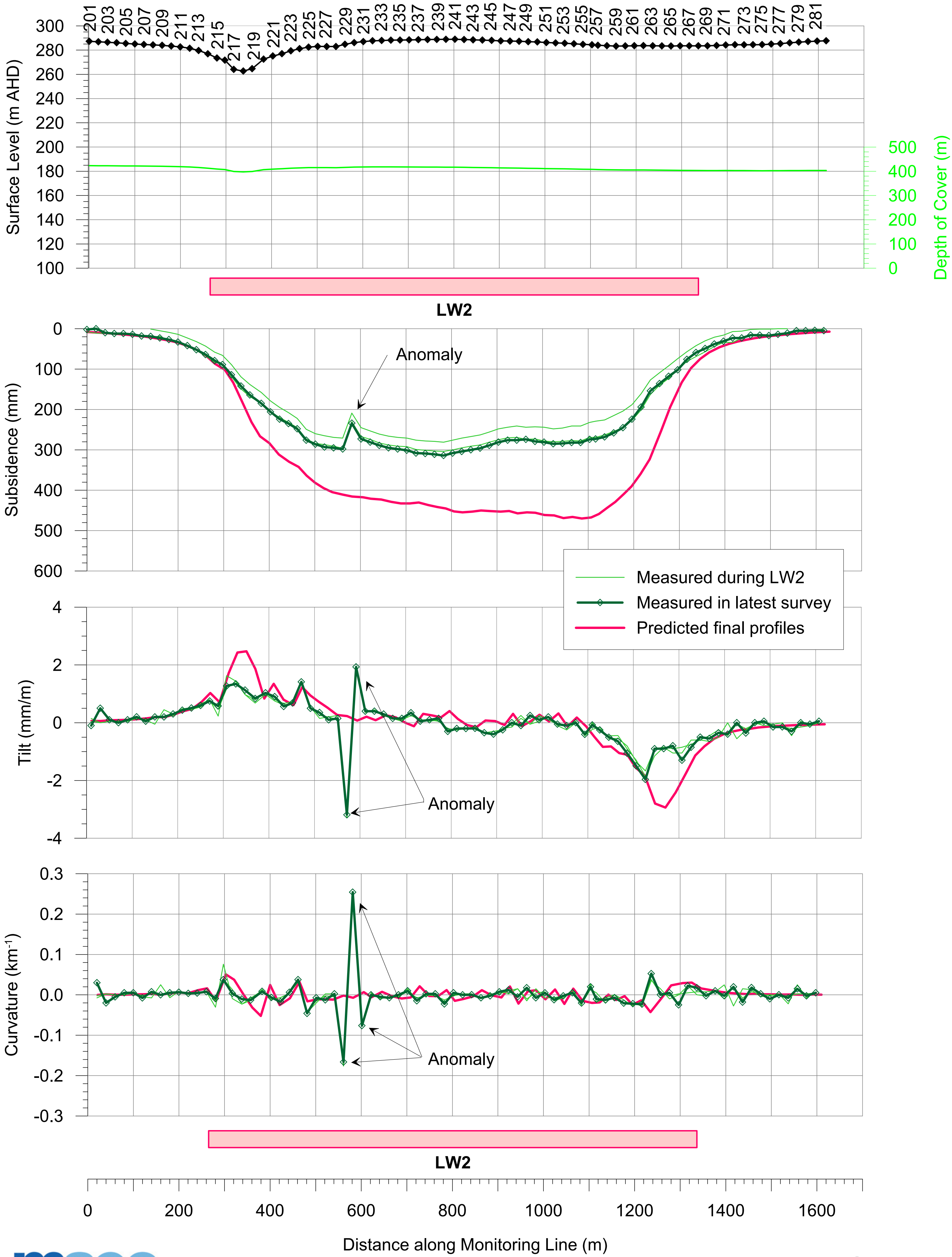


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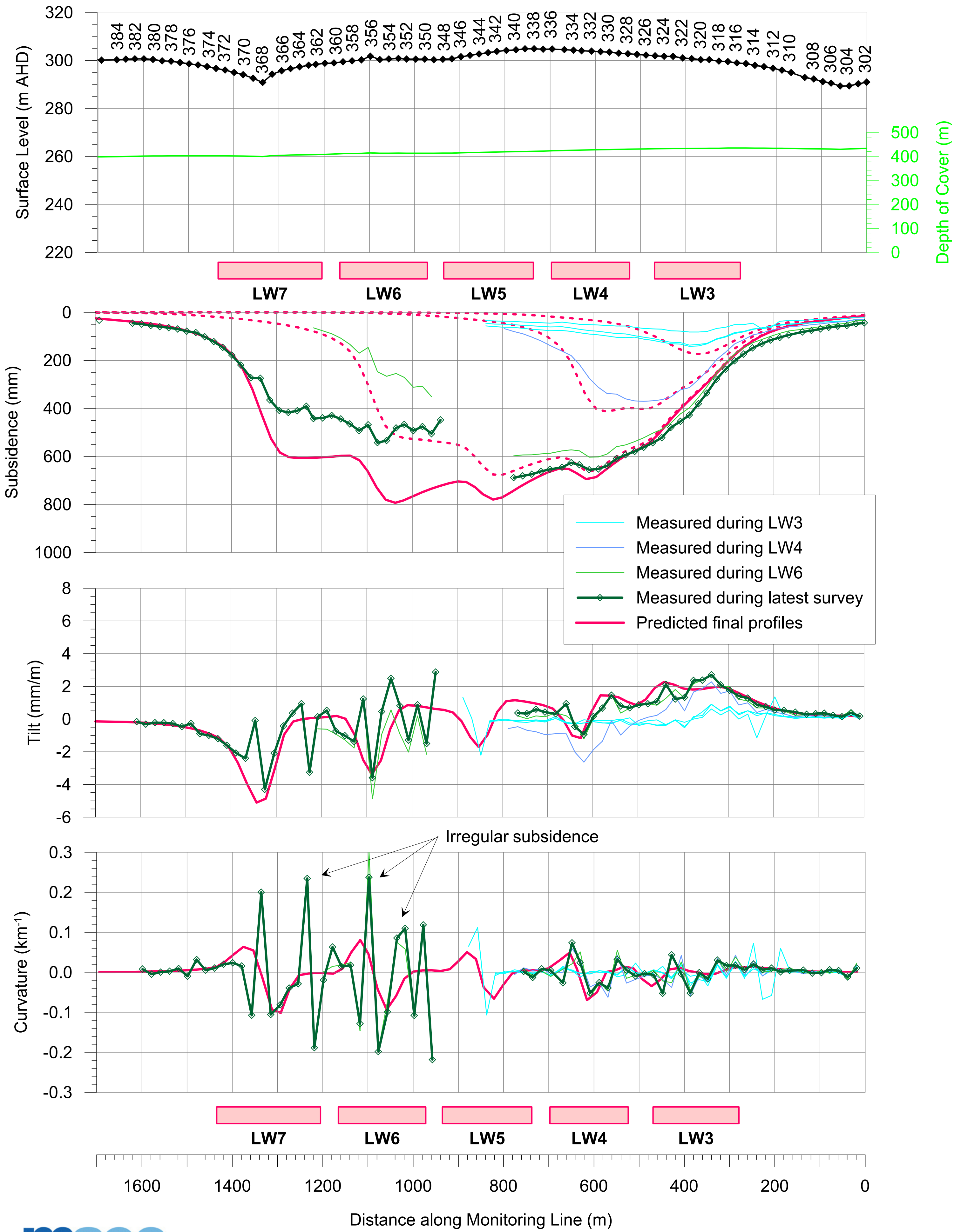
Fig. G.02

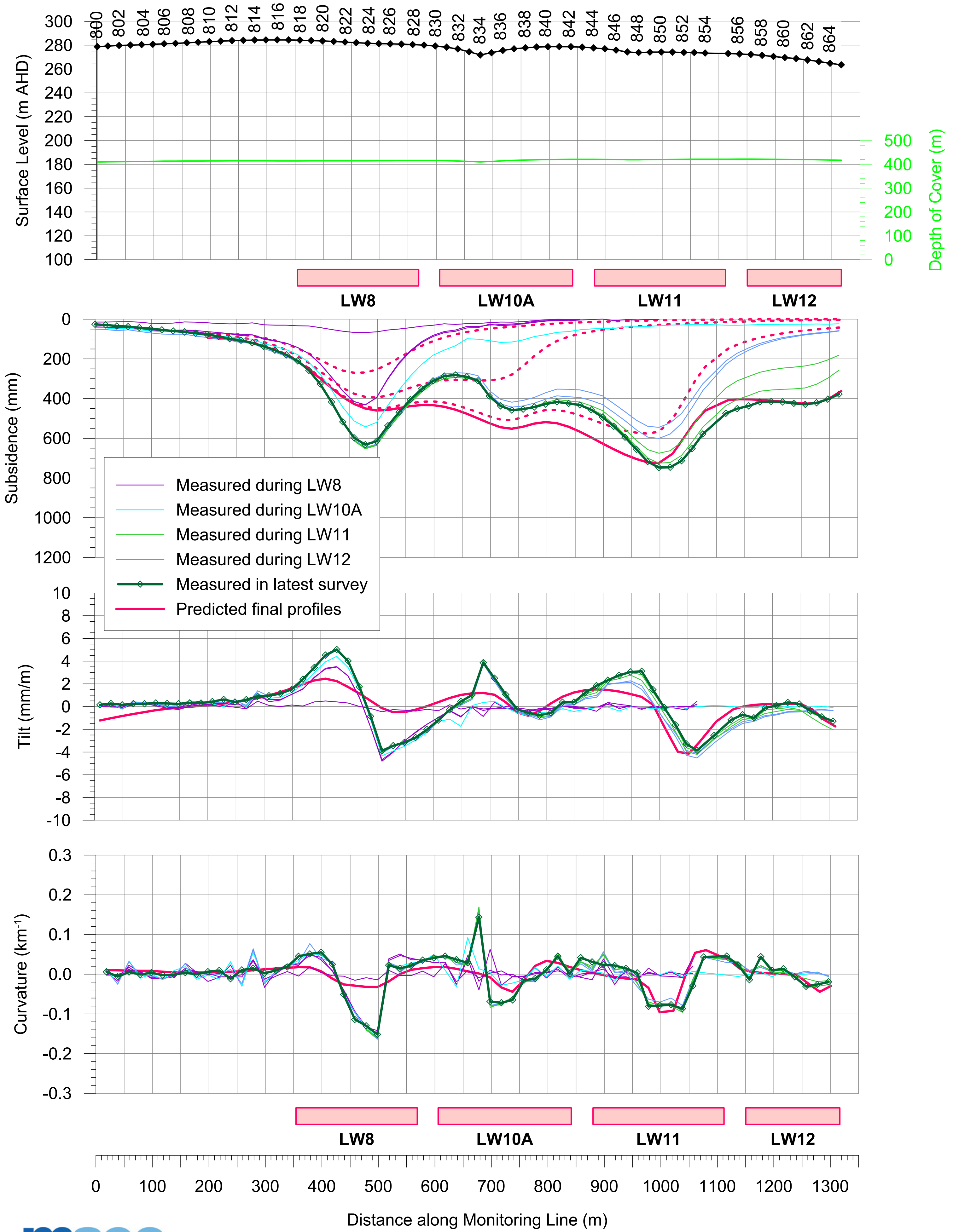
Observed and Predicted Profiles of Total Subsidence, Tilt and Curvature along the 300-Line due to Tahmoor LW3 to LW7



msec

Fig. G.03

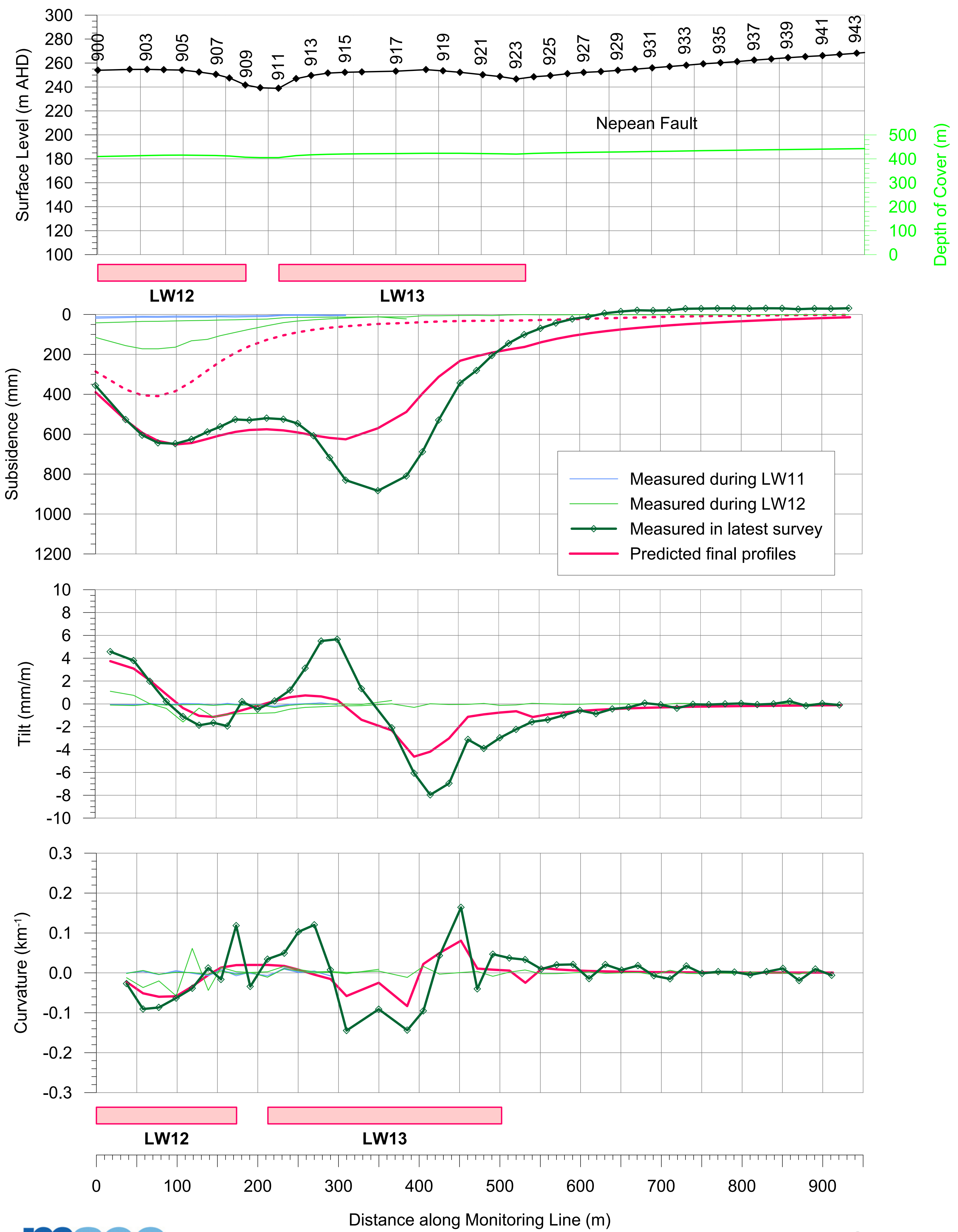
Observed and Predicted Profiles of Total Subsidence, Tilt and Curvature along the 800-Line due to Tahmoor LW8 to LW12



msec

Fig. G.04

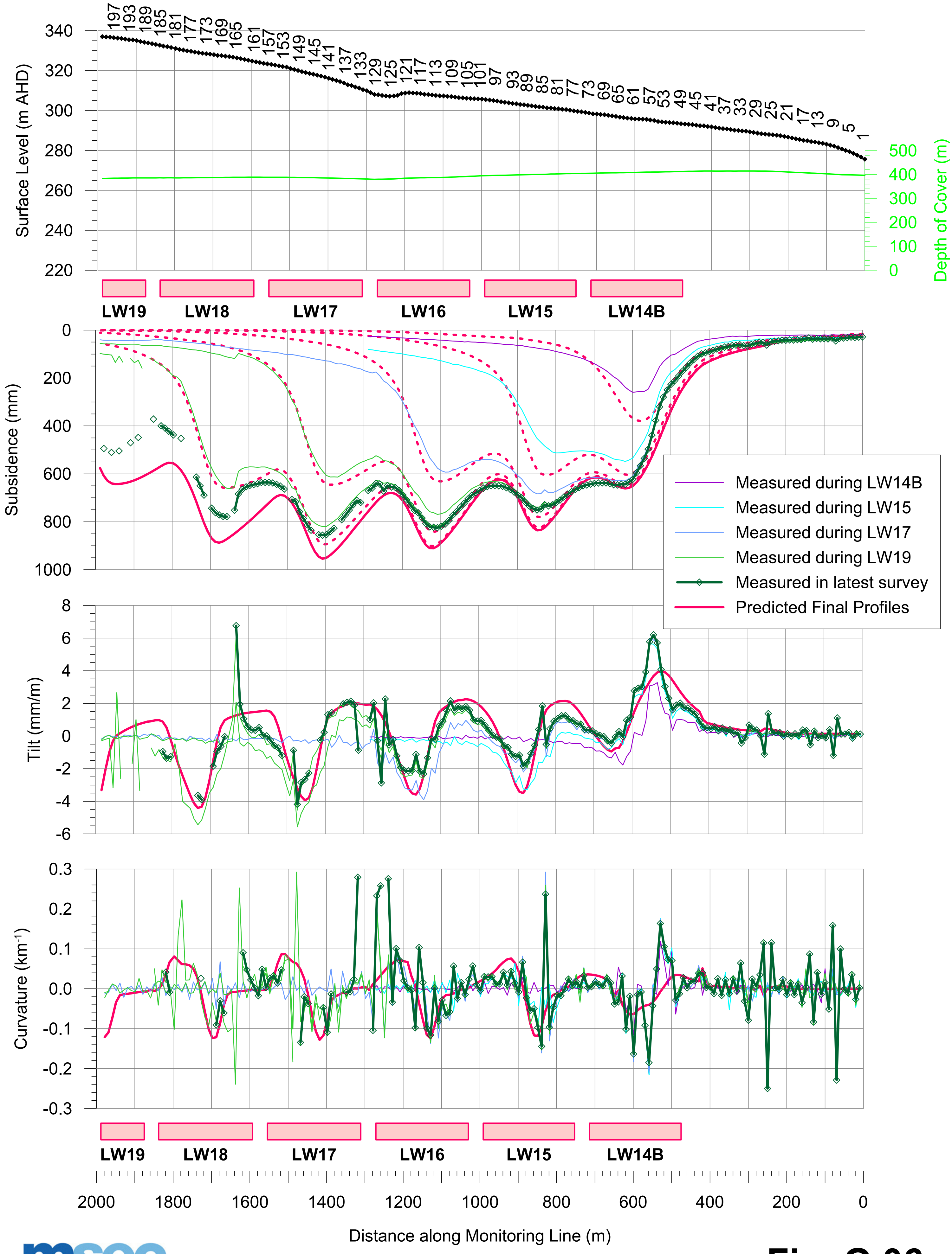
Observed and Predicted Profiles of Total Subsidence, Tilt and Curvature along the 900-Line due to Tahmoor LW10A to LW13



msec

Fig. G.05

Observed and Predicted Profiles of Total Subsidence, Tilt and Curvature along the 1000-Line due to Tahmoor LW14B to LW19



msec

Fig. G.06

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Observed and Predicted Profiles of Total Subsidence, Tilt and Curvature along the Brundah Road Line due to Tahmoor North LW23B to LW28

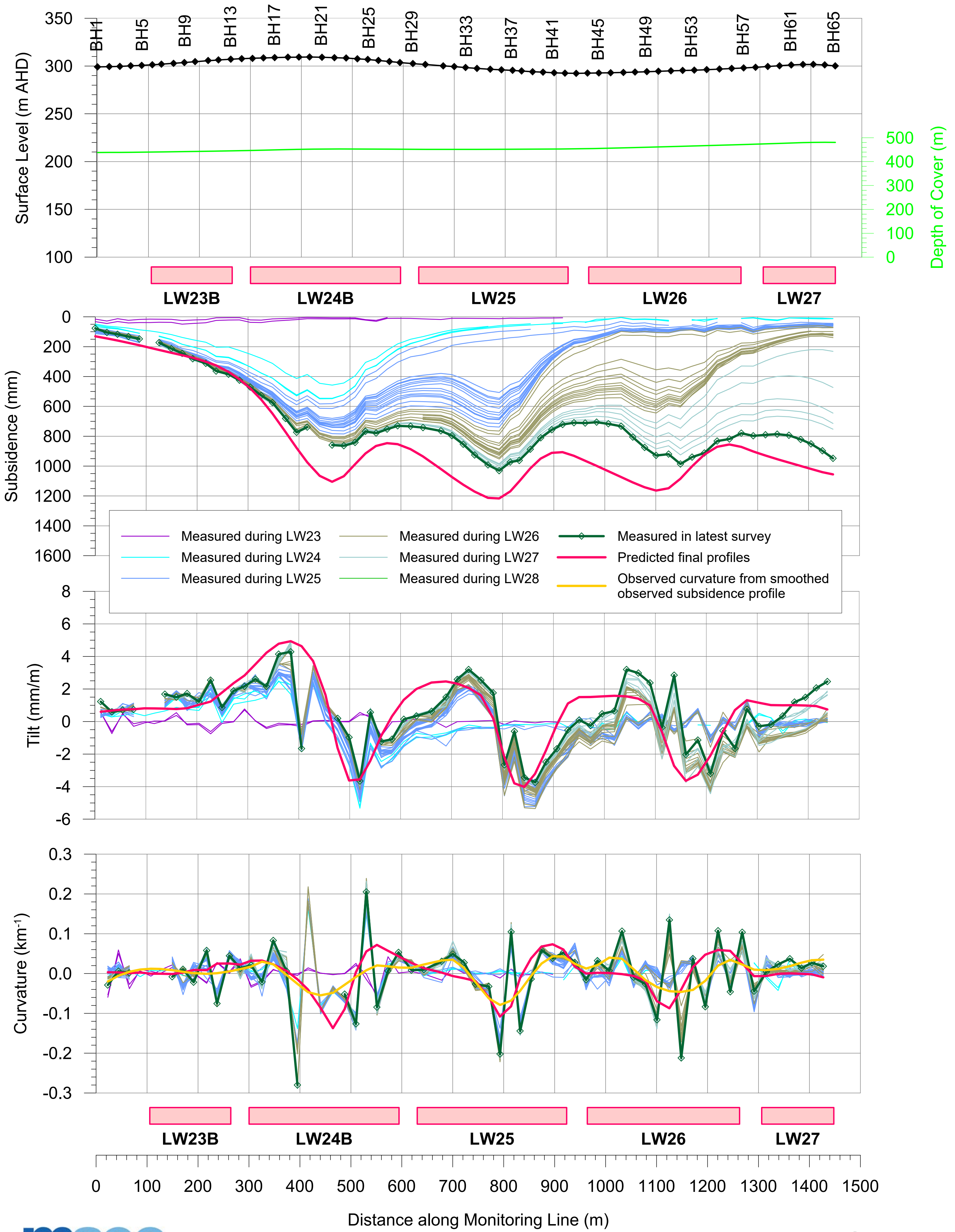

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Fig. G.07

Observed and Predicted Profiles of Total Subsidence, Tilt and Curvature along the Castlereagh Street Line due to Tahmoor North LW22 to LW28

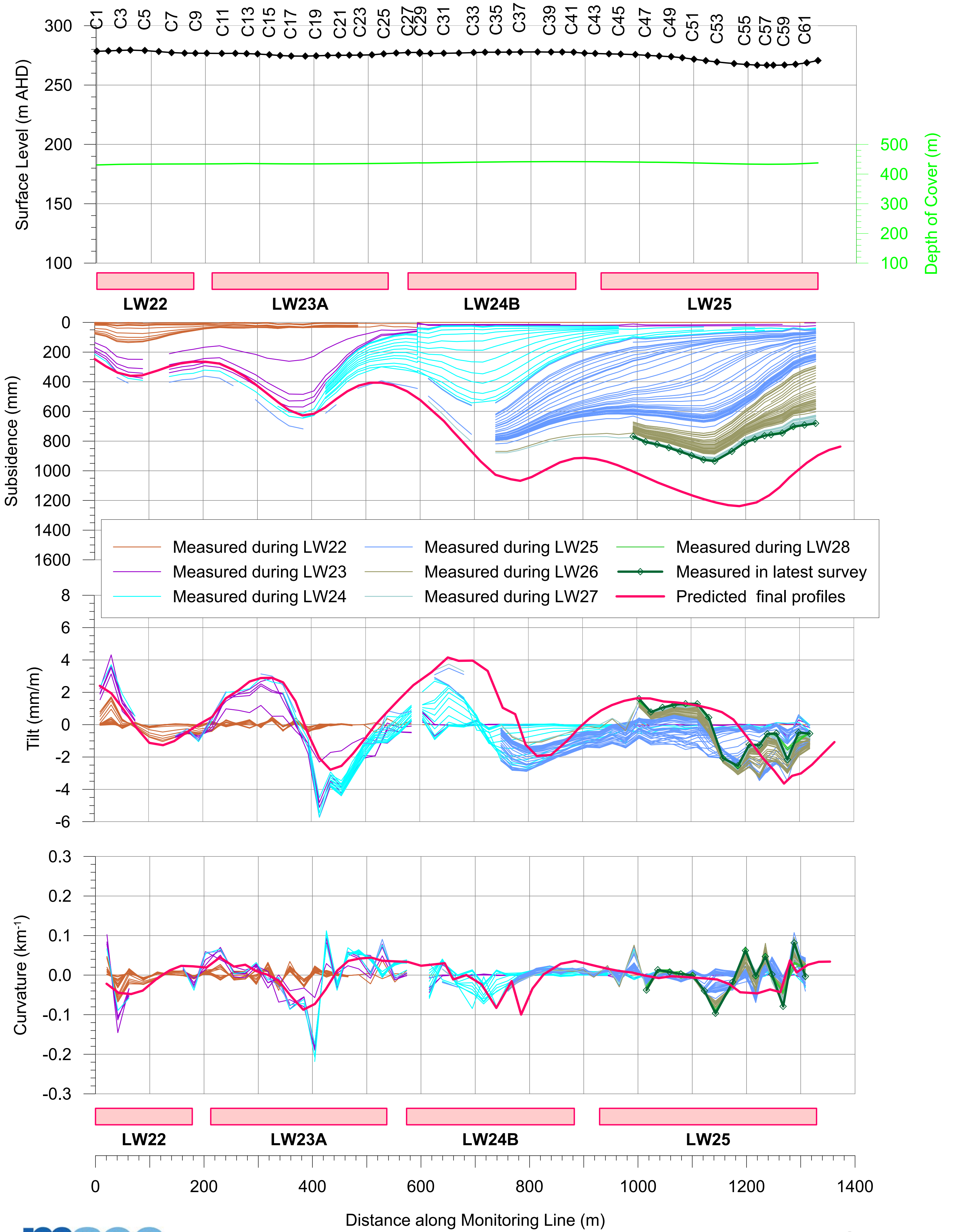

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Fig. G.08

Observed and Predicted Profiles of Total Subsidence, Tilt and Curvature along the Remembrance Drive Line due to Tahmoor North LW23A to LW30

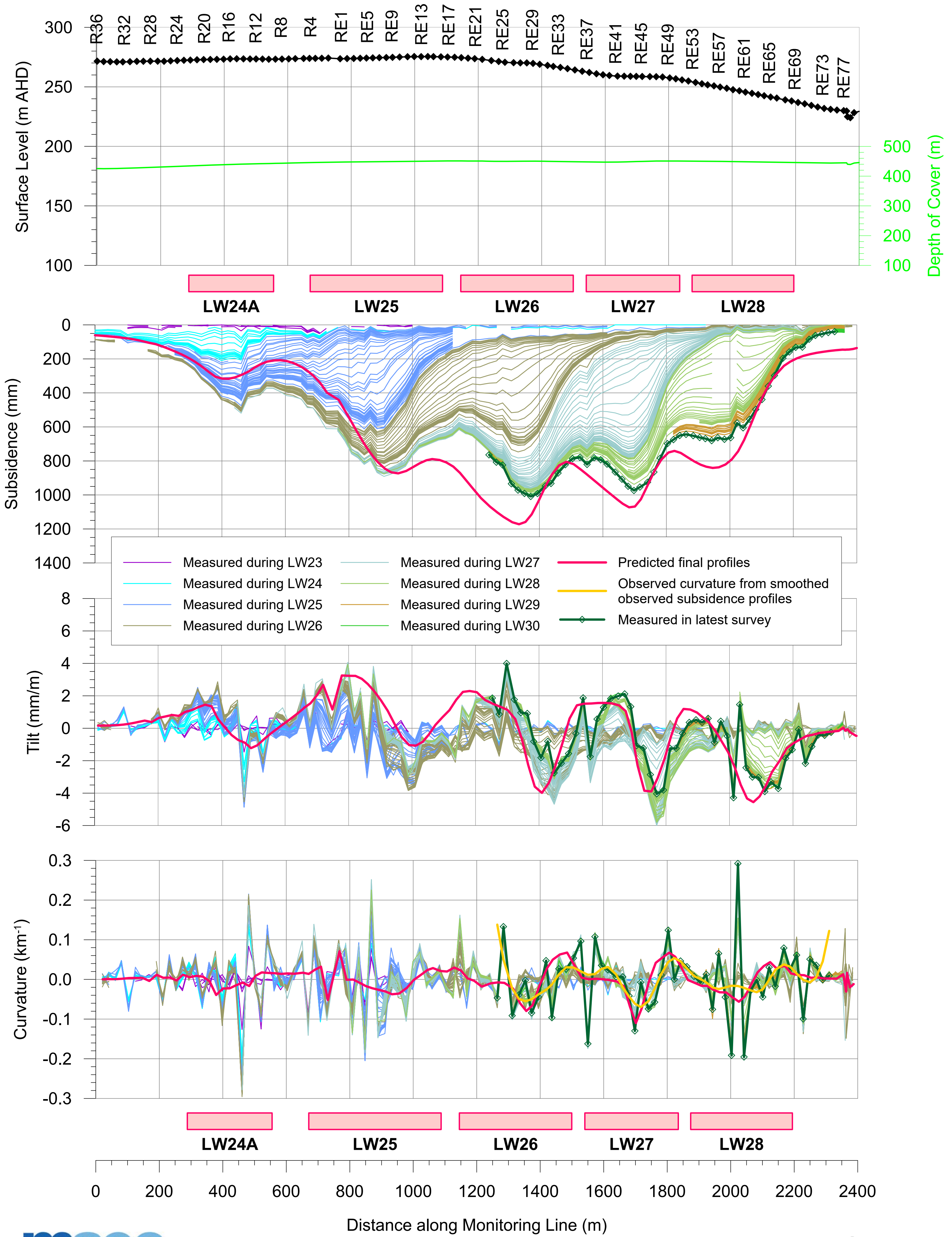

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Fig. G.09

Observed and Predicted Profiles of Total Subsidence, Tilt and Curvature along the Thirlmere Way Line due to Tahmoor North LW22 to LW27

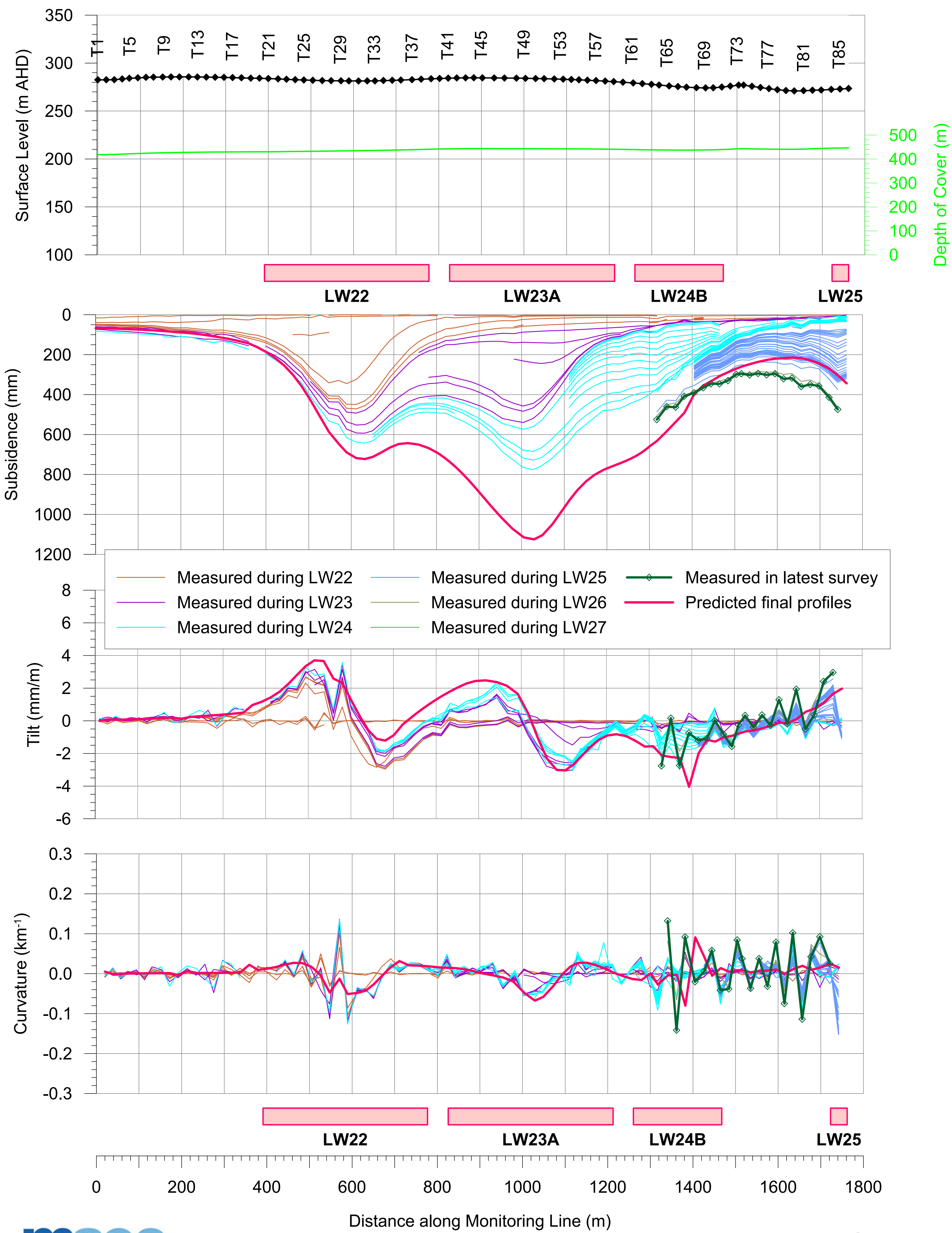

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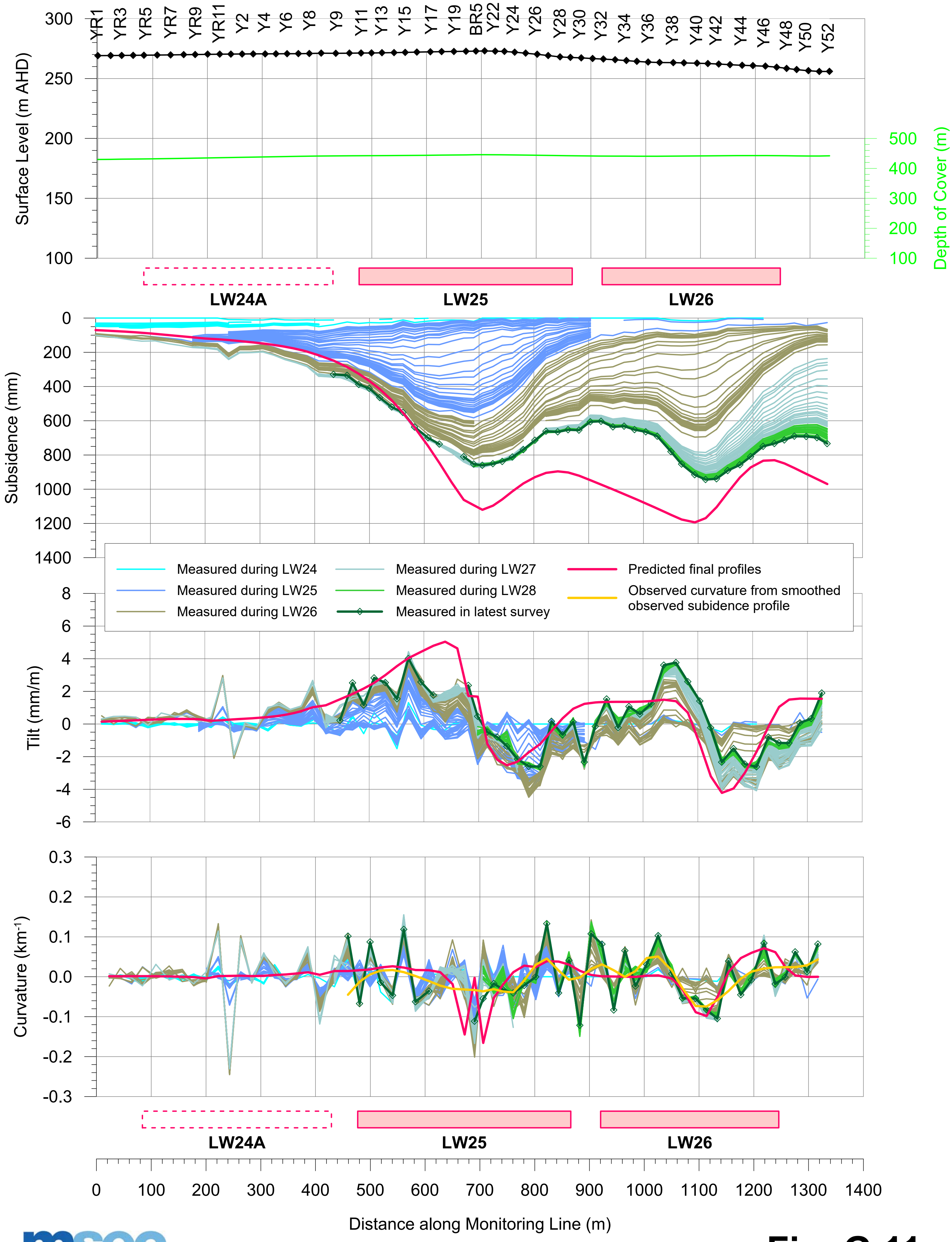
Fig. G.10

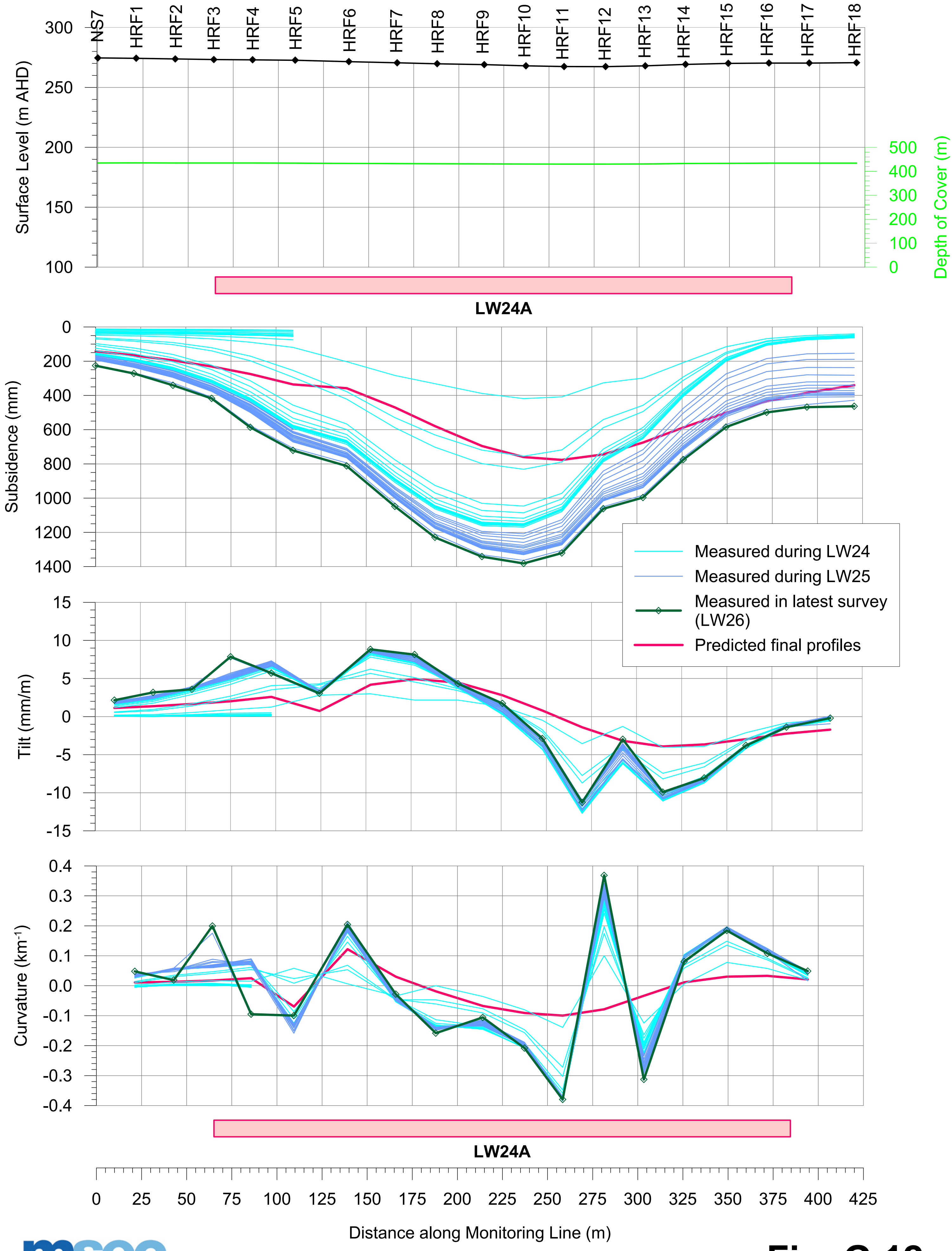
Observed and Predicted Profiles of Total Subsidence, Tilt and Curvature along the York Street Line due to Tahmoor North LW24A to LW28



msec

Fig. G.11

Observed and Predicted Profiles of Total Subsidence, Tilt and Curvature along the HRF Line due to Tahmoor North LW24A and LW25



msec

Fig. G.12

Observed and Predicted Profiles of Total Subsidence, Tilt and Curvature along the LW25 XS1 Line due to Tahmoor North LW25

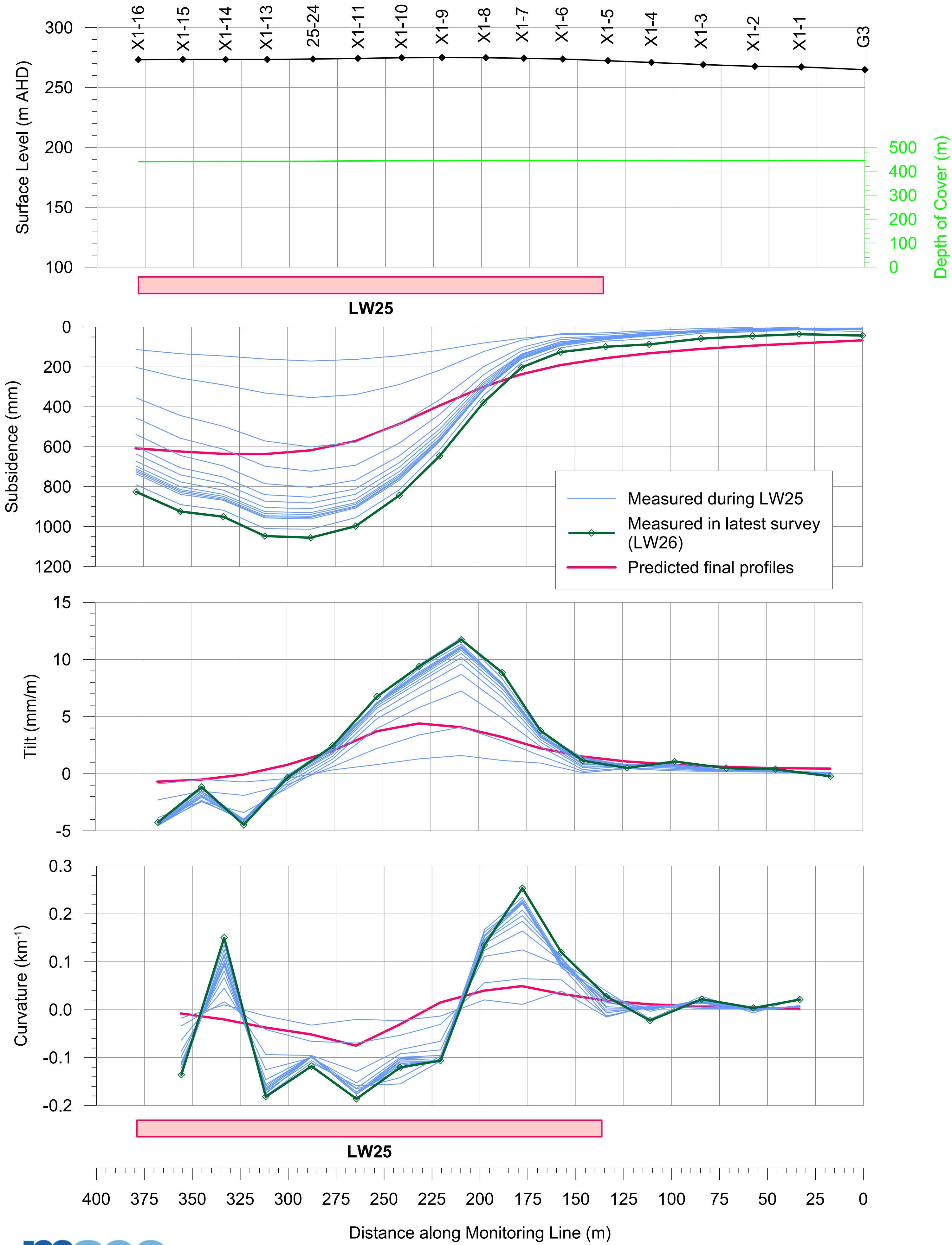


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Fig. G.13

Observed and Predicted Profiles of Total Subsidence, Tilt and Curvature along the LW24A Draw Line due to Tahmoor North LW24A and LW25

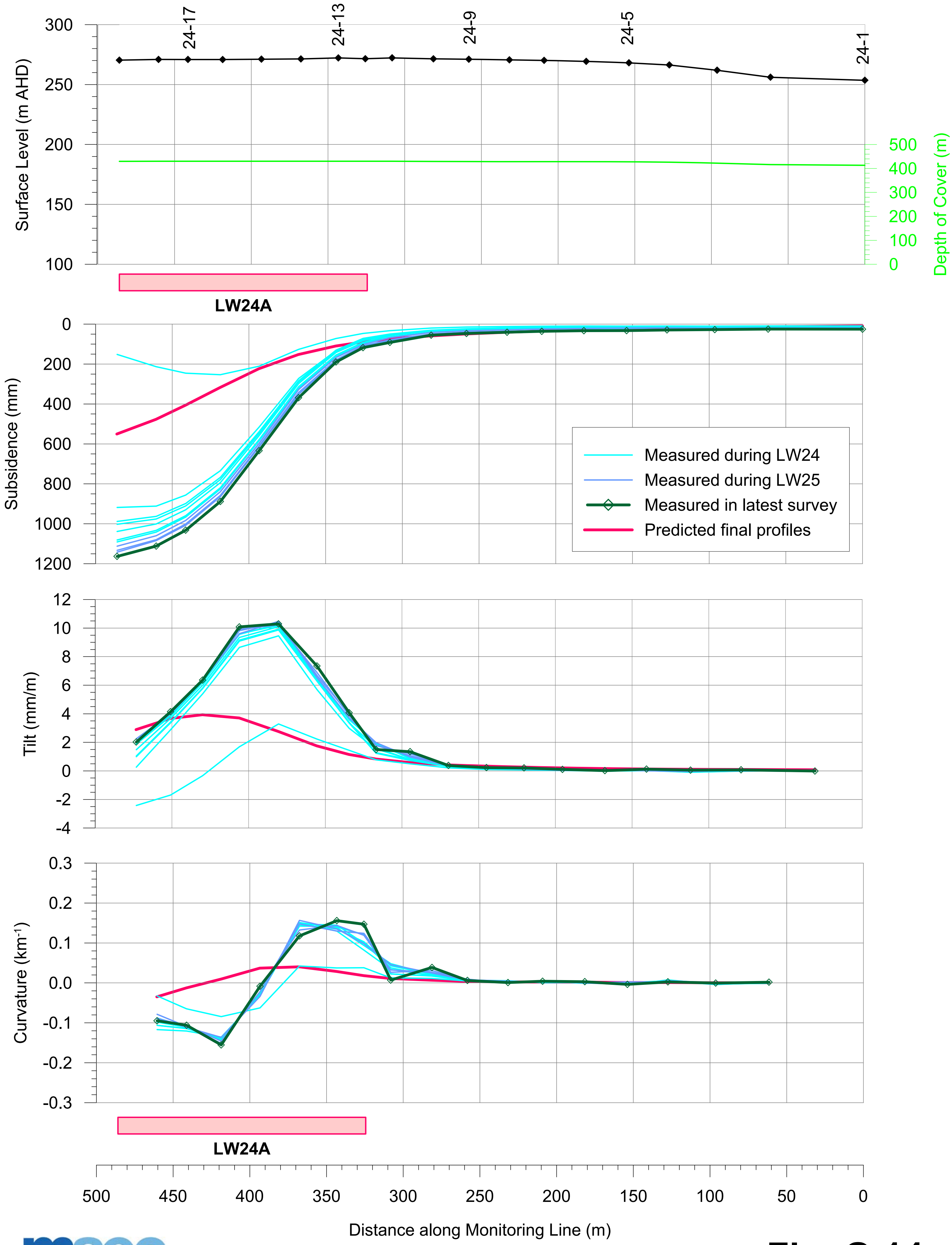

Fig. G.14

Observed and Predicted Profiles of Total Subsidence, Tilt and Curvature along the LW25 Centreline due to Tahmoor North LW25

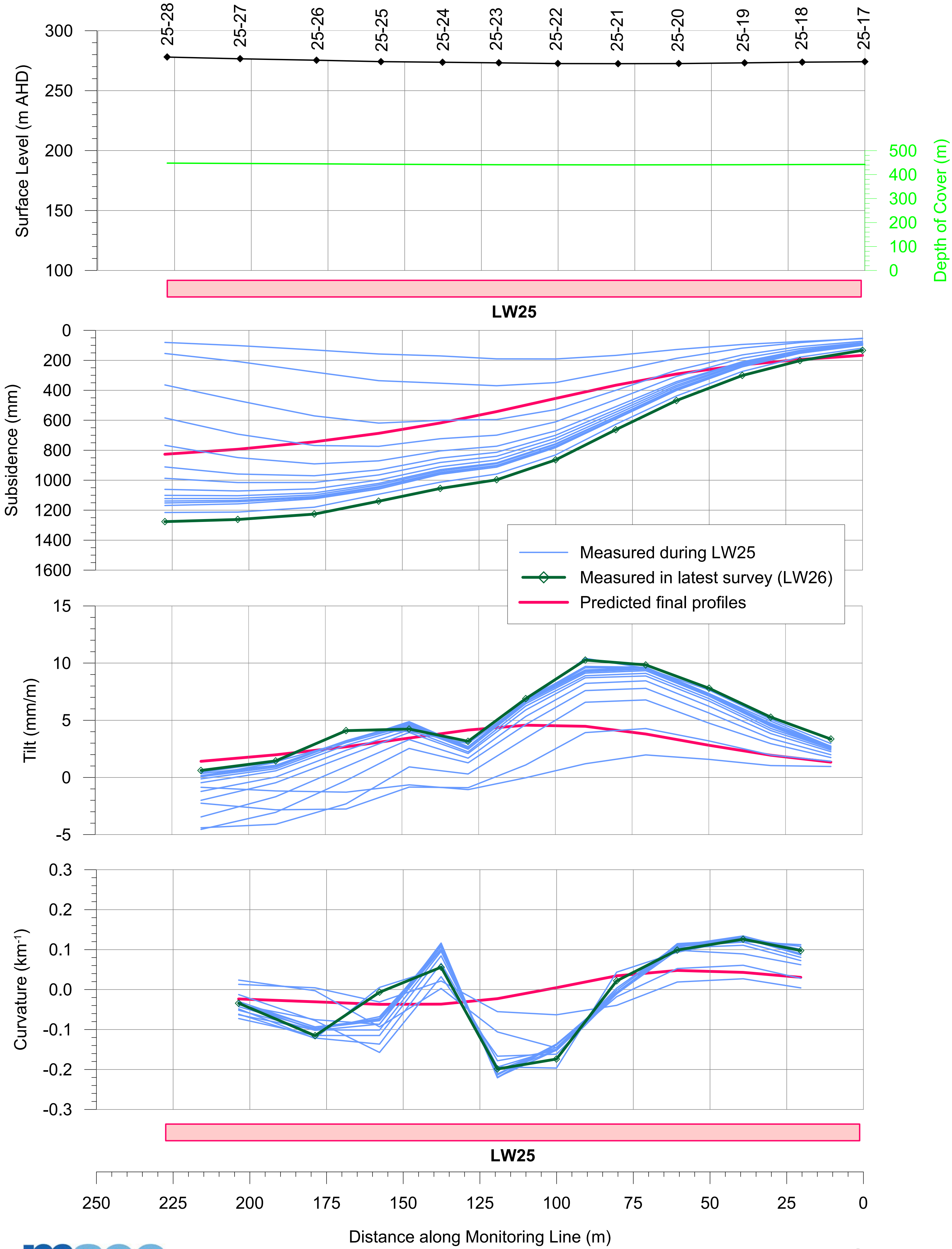

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Fig. G.15