



SIMEC Mining:

## Tahmoor Coal – Longwall W4

The effects of the proposed modification to the commencing end of LW W4 on previous subsidence predictions and impact assessments

## DOCUMENT REGISTER

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Report produced to:- Support an application to modify the commencing end of Tahmoor LW W4 to be submitted to the Department of Planning, Industry and Environment.

Previous reports:- MSEC1112 (Revision A) – Tahmoor Coal - Longwalls W3 and W4 - Subsidence Predictions and Impact Assessments for Natural and Built Features due to the extraction of the proposed Longwalls W3 and W4 in support of the Extraction Plan Application (March 2021)

Background reports available at [www.minesubsidence.com](http://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)

<b>1.0 INTRODUCTION</b>	<b>4</b>
1.1. Background	4
1.2. Mining geometry	4
1.3. Surface and seam	5
<b>2.0 MAXIMUM PREDICTED SUBSIDENCE EFFECTS FOR LW W4</b>	<b>6</b>
2.1. Maximum predicted conventional subsidence effects	6
2.2. Comparison between Observed and Predicted Subsidence during the mining of LW W3	6
<b>3.0 PREDICTIONS AND IMPACT ASSESSMENTS FOR NATURAL AND BUILT FEATURES</b>	<b>8</b>
3.1. The Study Area	8
3.2. Watercourses	8
3.3. Steep Slopes	10
3.4. Main Southern Railway	10
3.5. Roads	11
3.6. Services Infrastructure	11
3.7. Stonequarry Estate Wastewater Treatment Plant and Re-Use Storage Pond	11
3.8. Farm dams	12
3.9. Building Structures	13
3.10. Archaeological Sites	14
3.11. Heritage Sites	14
3.12. Summary	14
<b>APPENDIX A. FIGURES</b>	<b>15</b>
<b>APPENDIX B. DRAWINGS</b>	<b>16</b>

## Tables

Tables are prefixed by the number of the chapter in which they are presented.

<b>Table No.</b>	<b>Description</b>	<b>Page</b>
Table 1.1	Dimensions of LW W4 based on the approved and modified layouts	4
Table 2.1	Maximum Predicted Conventional Subsidence, Tilt and Curvature within the Study Area Resulting from the Extraction of LW27 to LW30	6
Table 3.1	Maximum predicted total vertical subsidence, upsidence and closure for Tributary 1 to Redbank Creek	9
Table 3.2	Closest distances from commencing end of LW W4 to Main Southern Railway structures under the Approved and Modified Layouts	10
Table 3.3	Maximum predicted total vertical subsidence, tilt and curvature for the farm dams within the Study Area due to mining of LW W1-W4 based on the Approved Layout	12
Table 3.4	Maximum predicted total vertical subsidence, tilt and curvature for the farm dams within the Study Area due to mining of LW W1-W4 based on the Modified Layout	12
Table 3.5	Maximum predicted total vertical subsidence, tilt and curvature for the building structures within the Study Area due to mining of LW W1-W4 based on the Approved Layout	13
Table 3.6	Maximum predicted total vertical subsidence, tilt and curvature for the building structures within the Study Area due to mining of LW W1-W4 based on the Modified Layout	13

## Figures

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

<b>Figure No.</b>	<b>Description</b>	<b>Page</b>
Fig. 1.1	Surface and seam levels along the centreline of LW W4	5
Fig. 2.1	Observed Subsidence along Centreline of LW W3	7
Fig. 3.1	Tributary 1 to Redbank Creek within Study Area	9
Fig. A.01	Predicted profiles of vertical subsidence, tilt and curvature along the LW W4 centreline due to LW W4	App. A
Fig. A.02	Predicted profiles of vertical subsidence, tilt and curvature along the Prediction Line 1 due to LW W4	App. A
Fig. A.03	Predicted profiles of vertical subsidence, upsidence and closure along Tributary 1 to Redbank Creek	App. A

## Drawings

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

<b>Drawing No.</b>	<b>Description</b>	<b>Revision</b>
MSEC1236-01	General layout	01
MSEC1236-02	Surface level contours	01
MSEC1236-03	Seam floor	01
MSEC1236-04	Depth of Cover	01
MSEC1236-05	Geology	01
MSEC1236-06	Natural features	01
MSEC1236-07	Railways	01
MSEC1236-08	Surface infrastructure	01
MSEC1236-09	Built features	01
MSEC1236-10	Predicted incremental subsidence contours due to LW W4	01
MSEC1236-11	Predicted total subsidence contours after LW W4	01

## 1.1. Background

Tahmoor Coal (TC) 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 NSW. Tahmoor Coal is a wholly owned entity within the SIMEC Mining Division of the GFG Alliance group.

Mine Subsidence Engineering Consultants (MSEC) was previously commissioned by Tahmoor Coal to undertake subsidence predictions and impact assessments for the proposed Longwalls W3-W4 in the Western Domain area at Tahmoor Mine. Report No. MSEC1112 (Revision A) was issued during March 2021 in support of the Extraction Plan Application for these longwalls. The Department of Planning, Industry and Environment, granted Tahmoor Coal approval for extraction of LW W3-W4 on 13 September 2021. The longwall layout adopted in Report No. MSEC1112 is referred to as the *Approved Layout* in this report.

Tahmoor Coal is currently extracting LW W3 and proposes to shorten the commencing (i.e. northern) end of LW W4 by 282 m from the position that was adopted in Report No. MSEC1112. The longwall layout based on the shortened commencing end of LW W4 is referred to as the *Modified Layout* in this report.

LW W4 has been shortened following initial gas drainage drilling and development and a review of underground mining conditions at the commencing (northern) end of LW W4.

The longwall commencement position was subsequently shifted approximately 282m to the south, with the key drivers for the change being the predicted adverse geological and geotechnical conditions at the commencing (northern) end of the originally proposed longwall panel.

This subsidence report will support the modification application for the shortened commencing end of LW W4, which will be submitted to the Department of Planning, Industry and Environment.

## 1.2. Mining geometry

The locations of the longwalls in the Western Domain are shown in Drawing No. MSEC1236-01, in Appendix B. The commencing (i.e. northing) end of LW W4 based on the Approved and Modified Layouts are shown in magenta and orange, respectively, in this drawing.

A summary of the dimensions of LW W4 for both layouts is provided in Table 1.1.

**Table 1.1 Dimensions of LW W4 based on the approved and modified layouts**

Layout (Report No.)	Longwall	Overall void length including installation heading (m)	Overall void width including first workings (m)	Overall tailgate chain pillar width (m)
Previous Layout (MSEC1112)	LW W4	1004	285	44
Modified Layout (MSEC1236)	LW W4	722	285	44

The commencing end of LW W4 is proposed to be shortened by 282 m from that adopted in the Approved Layout in Report No. MSEC1112. The length of longwall mining (i.e. secondary extraction) is approximately 8 m less than the overall void lengths provided in Table 1.1.

The overall void width and solid chain pillar width are not proposed to be modified. The actual width extracted by longwall mining (i.e. secondary extraction) is approximately 275 m.

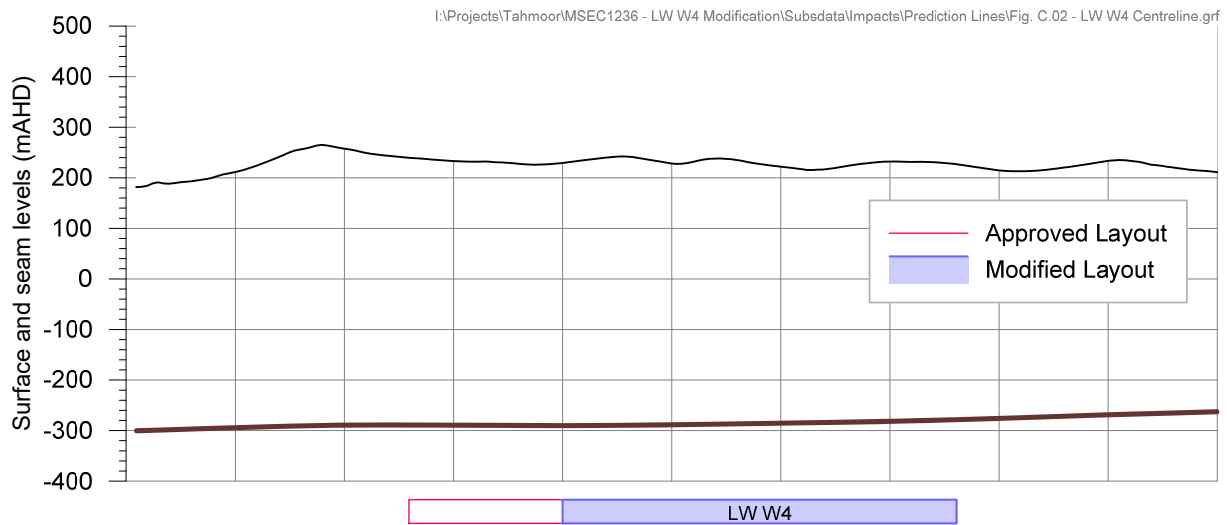
### 1.3. Surface and seam

The Western Domain area at Tahmoor Mine is located northwest of the Main Southern Railway between the townships of Thirlmere and Picton. The surface level above the modified commencing end of LW W4 varies between approximately 254 metres above Australian Height Datum (m AHD) and 220 m AHD. The surface level contours are shown in Drawing No. MSEC1236-02.

The longwalls are proposed to extract coal from the Bulli Seam. Tahmoor Coal proposes to extract a constant height of 2.1 m.

The seam floor contours and depth of cover contours are shown in Drawings Nos. MSEC1236-03 and MSEC1236-04, respectively. The Bulli Seam dips towards the north-east with an average gradient of 5 % (i.e. 1 in 20) across the mining area. The depth of cover directly above the modified commencing end of LW W4 varies between approximately 515 m and 535 m.

The surface and seam levels along the centreline of LW W4 are shown in Fig. 1.1.



**Fig. 1.1 Surface and seam levels along the centreline of LW W4**

### 2.1. Maximum predicted conventional subsidence effects

The Incremental Profile Method was previously used to predict the conventional subsidence parameters resulting from the extraction of the approved LW W3-W4 at Tahmoor, which were provided in Report No. MSEC1112.

The Incremental Profile Method has also been used to predict the conventional subsidence parameters resulting from the extraction of LW W4, based on the *Modified Layout*.

The predicted incremental subsidence contours due to the extraction of LW W4, based on the *Modified Layout*, are shown in Drawing No. MSEC1236-10. The predicted total subsidence contours after the extraction of LW W4, based on the *Modified Layout*, are shown in Drawing No. MSEC1236-11. The predicted total 20 mm subsidence contours, based on the *Approved Layout*, are also shown in the drawings for comparison.

Summaries of the maximum predicted conventional subsidence, tilt and curvature due to the extraction of LW W4 are provided in Table 2.1. The values in this table are the maxima anywhere above the longwall, including those that have previously been extracted.

**Table 2.1 Maximum Predicted Conventional Subsidence, Tilt and Curvature within the Study Area Resulting from the Extraction of LW27 to LW30**

Layout	Maximum Predicted Incremental Subsidence (mm)	Maximum Predicted Incremental Tilt (mm/m)	Maximum Predicted Total Hogging Curvature (km <sup>-1</sup> )	Maximum Predicted Total Sagging Curvature (km <sup>-1</sup> )
Approved Layout	600	4.5	0.05	0.08
Modified Layout	600	4.0	0.05	0.08

It can be seen from the above table, that the predicted maxima, based on the *Modified Layout*, are similar to those based on the *Approved Layout*. The differences in the predicted maximum parameters due to the proposed modification are not considered to be significant.

Although the predicted maxima are reasonably similar, the locations of the predicted maximum longitudinal tilts and curvatures above the commencing end of LW W4 change as a result of the proposed modification. This is illustrated in Fig. A.01 in Appendix A, which shows the profiles of the predicted total subsidence, tilt and curvature along the LW W4 Centreline.

It can be seen that the predicted maximum subsidence, based on the *Modified Layout*, is slightly less than those based on the *Approved Layout*. The reduction is because the length of LW W4, based on the *Modified Layout*, is not sufficient to develop full subsidence.

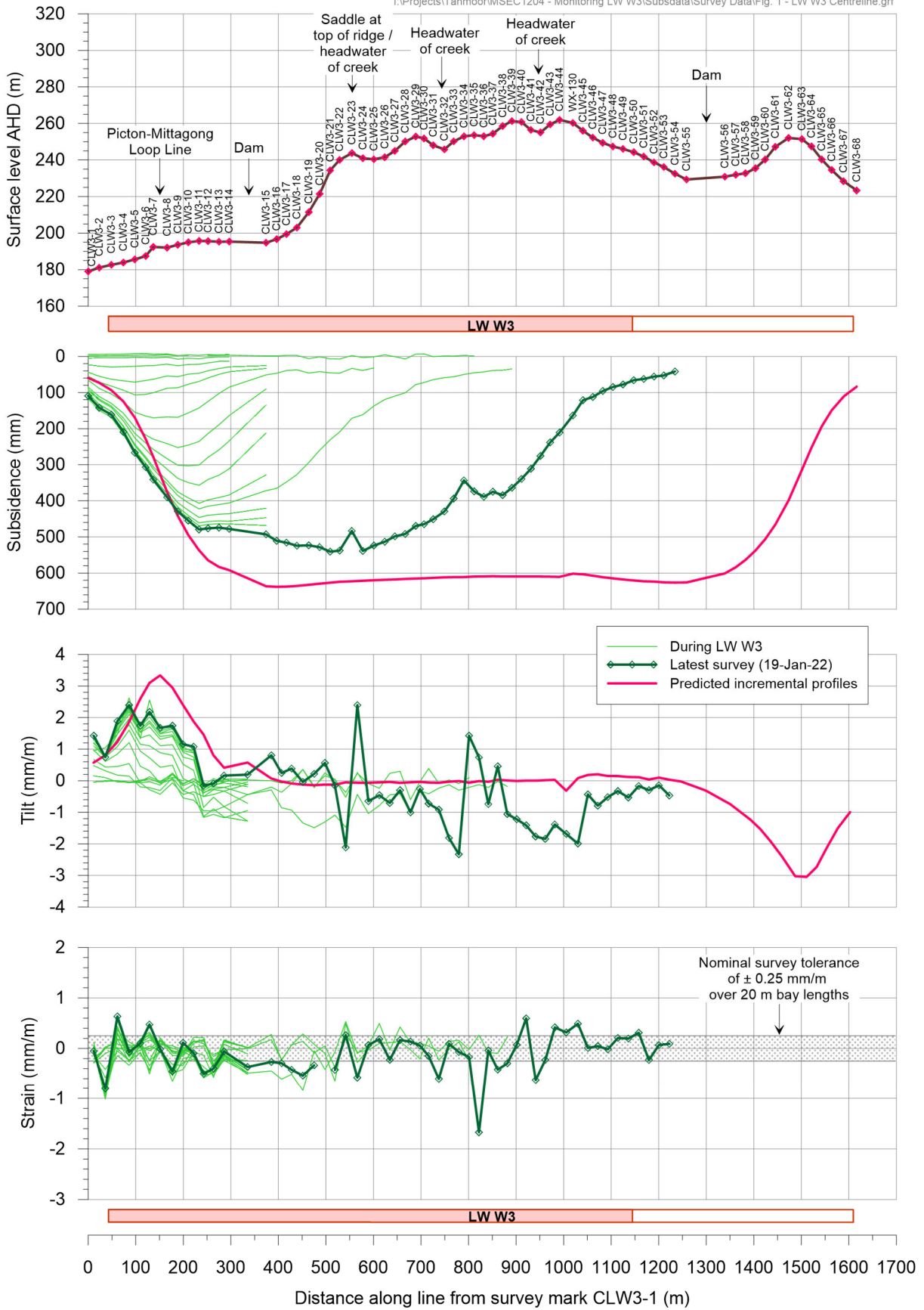
### 2.2. Comparison between Observed and Predicted Subsidence during the mining of LW W3

Extensive monitoring has been undertaken by Tahmoor Coal during the mining of LW W3. Observed incremental subsidence due to the extraction of LW W3 have correlated reasonably well with predictions, as shown in Fig. 2.1. Observed subsidence is currently less than predicted.

Some bumps have developed in the subsidence profile, resulting some higher localised tilts and strains. Their locations appear to align with the headwaters of creeks, with one developing near a saddle along the top of ridge.

Following on from the discussion in Report No. MSEC1112, while observed subsidence above LW W1, LW W2 and also LW W3 has been less than predicted, subsidence due to the extraction of LW W4 may not follow the same pattern and return to normal levels. Subsidence may also be greater than predicted.

As recommended in Report No. MSEC1112, monitoring will be conducted during the early stages of extraction of LW W4 to compare observations with predictions. TC has extensive experience in successfully managing potential subsidence impacts on surface features, even when actual subsidence is substantially greater than the magnitudes that have been predicted above LW W4. It is recommended that subsidence management plans be developed to manage potential impacts that could occur if greater than predicted subsidence occurs.



**Fig. 2.1 Observed Subsidence along Centreline of LW W3**



### 3.1. The Study Area

The *Study Area* has been defined as the zone where the predicted subsidence effects, based on the Modified Layout, are different to those predicted based on the Previous Layout. The Study Area has been based on the following:

- 35° angle of draw line around the commencing (i.e. northern) end of LW W4, based on both the Previous and Modified Layouts; and
- the limit where the change in the predicted incremental vertical subsidence, due to the modified commencing end of LW W4, is greater than 20 mm.

The extent of the Study Area is shown in Drawing No. MSEC1236-01. Surface features that are located within 600 m of the commencing end of LW W4, which will experience valley-related effects and could be sensitive to these effects, have also been included in the assessments provided in this report.

The natural and built features that are located within the Study Area are shown in Drawings Nos. MSEC1236-06 to MSEC1236-09. The surface features that have been included in the assessments provided in this report are:

- First and second order tributaries to Redbank Creek;
- Steep slopes;
- Main Southern Railway, including the Picton Tunnel and Mushroom Tunnel;
- Part of one local road, Star Street;
- 11 kV powerline;
- Stonequarry Estate Wastewater Treatment Plant and Re-use Water Storage Pond;
- Farm dams; and
- Houses and other building structures.

The effects of the proposed shortened commencing end of LW W4 on the subsidence predictions and impact assessments for these features are provided in the following sections.

### 3.2. Watercourses

The locations of the watercourses are shown in Drawing No. MSEC1236-06. The watercourses within the Study Area are ephemeral first or second order drainage lines having shallow incisions into the natural surface soils.

Tributary 1 to Redbank Creek is a first to third order stream that runs directly above and to the side of LW W3-W4. The catchment area is located above LW W3-W4 in predominantly grazing land, with stream flow captured by a number of farm dams. The total length of stream within the Study Area is 1.45 km. Approximately 120 metres of the stream within the Study Area is third order. The closest section of third order stream is approximately 250 metres from the finishing end of LW W4.

It can be seen from Drawing No. MSEC1236-06, that the effect of the proposed modification to LW W4 will be a reduction in the magnitude of subsidence along the creek. Under the *Approved Layout*, LW W4 was planned to extract directly beneath the headwaters of the tributary. Under the *Modified Layout*, LW W4 will only extract under a very short section of stream of approximately 50 metres.



Photograph courtesy Newcastle Geotech

**Fig. 3.1 Tributary 1 to Redbank Creek within Study Area**

The revised predictions of subsidence, upsidence and valley closure are shown in Fig. A.03. It can be seen that the predictions are substantially reduced when compared to the predictions based on the *Approved Layout*. A summary of the maximum predicted values of total vertical subsidence, upsidence and closure for Tributary 1 to Redbank Creek is provided in Table 3.1.

**Table 3.1 Maximum predicted total vertical subsidence, upsidence and closure for Tributary 1 to Redbank Creek**

Layout	Longwall	Maximum predicted total vertical subsidence (mm)	Maximum predicted total upsidence (mm)	Maximum predicted total closure (mm)
Approved Layout	After LW W4	850	375	500
Modified Layout	After LW W4	575	325	400

Accordingly, it is expected that the potential for impacts on the section of Tributary 1 to Redbank Creek near the modified commencing end of LW W4 will be less than previously assessed due to the extraction of the *Approved Layout*.

While the potential for impacts is reduced, Tahmoor Coal will continue to develop and implement measures to manage the potential for impacts on Tributary 1 to Redbank Creek during the extraction of LW W4, as undertaken during the mining of previous LW W1-W2 and current LW W3.

It can be seen from Drawing No. MSEC1236-06 that Stonequarry Creek, including Rockbar SR17 is located approximately 670 metres from the commencing end of LW W4 under the *Approved Layout*. Under the *Modified Layout*, Stonequarry Creek is located approximately 950 metres from the commencing end of LW W4 at its closest point.

While the potential for impacts due to the extraction of Stonequarry Creek is reduced to negligible levels, Tahmoor Coal will continue to monitor Stonequarry Creek, including Rockbar SR17 under the Water Management Plan, Heritage Management Plan and Stonequarry Creek Rockbar Management Plan. The purpose of the monitoring will primarily be to track the gradual effects of residual subsidence due to the extraction of LW W3. The monitoring will, however, also capture change (if any) due to the extraction of LW W4.

### 3.3. Steep Slopes

The locations of the steep slopes are shown in Drawing No. MSEC1236-06. A steep slope was defined in Report No. MSEC1112 as “an area of land having a natural gradient greater than 1 in 3 (i.e. a grade of 33 %, or an angle to the horizontal of 18°)”. Within the Study Area above the commencing end of LW W4, slopes with grades greater than 1 in 3 have been identified on the sides of ridges, where the near surface lithology is part of the Wianamatta Shale group. There are no identified cliffs located within the Study Area.

An analysis of the LiDAR survey has also identified steep slopes that have been constructed, such as dam walls, railway embankments and cutting faces.

The effect of the proposed modification will be a reduction in the magnitude of subsidence of the steep slopes within the Study Area.

While the potential for impacts is reduced, Tahmoor Coal will continue to implement measures to manage the potential for impacts on steep slopes during the extraction of LW W4 under the Land Management Plan, as undertaken during the mining of previous LW W1-W2 and current LW W3.

### 3.4. Main Southern Railway

The location of the Main Southern Railway is shown in Drawings No. MSEC1236-07. It can be seen that LW W4 is located adjacent to the Main Southern Railway.

The proposed shortening of LW W4 will reduce the potential for impacts to not only the sections of railway track that are located near the commencing end of LW W4, but also the railway structures that located near the commencing end of LW W4. This includes the Picton Tunnel, Mushroom Tunnel, the Subway at 88.133 km, the Argyle Street Underbridge, the Pedestrian Overbridges at 85.846 km and 86.010 km and the Picton Viaduct.

The closest distances of LW W4 to railway structures are shown in Table 3.2 and their locations are shown in Drawing No. 1236-07.

**Table 3.2 Closest distances from commencing end of LW W4 to Main Southern Railway structures under the Approved and Modified Layouts**

Kilometrage (km)	Description	Distance to LW W4 under the Approved Layout (m)	Distance to LW W4 under the Modified Layout (m)
-	Main Southern Railway track	295 m	460 m
85.420	Picton Viaduct	850 m	850 m (LW W4 now commences roughly square with Viaduct)
85.846	Pedestrian overbridge	685 m	760 m
86.010	Pedestrian overbridge	650 m	780 m
86.160	Argyle Street Underbridge	700 m	880 m
86.838	Ballast top underbridge	910 m	1180 m
87.850	Picton Rail Tunnel	295 m to 320 m	520 m to 560 m
-	Mushroom Tunnel (used for rail access)	370 m	620 m
88.133	Subway	430 m	490 m

Tahmoor Coal and the Australian Rail Track Corporation (ARTC) have implemented extensive measures to manage potential impacts on the Main Southern Railway and the associated railway structures due to the extraction of LW W3-W4, in accordance with a Railway Management Plan.

While the potential for impacts due to the extraction of LW W4 under the *Modified Layout* is reduced, Tahmoor Coal will continue to implement the planned measures to manage the potential for impacts on the Main Southern Railway, as is currently undertaken during the mining of LW W3. It is noted that no impacts have been observed to the Railway and associated railway structures, including the Picton Railway Tunnel and Picton Viaduct during the mining of LW W3.

### 3.5. Roads

The locations of the local roads are shown in Drawing No. MSEC1236-08, where it can be seen that only the last 100 metres of Star Street is located within the Study Area. The effect of the proposed modification to LW W4 will be a reduction in the magnitude of subsidence along Star Street.

Tahmoor Coal and Wollondilly Shire Council have implemented extensive measures to manage potential impacts on local roads and the associated structures due to the extraction of LW W3-W4, in accordance with a subsidence management plan.

While the potential for impacts is reduced, Tahmoor Coal will continue to implement measures to manage the potential for impacts on local roads during the extraction of LW W4, as undertaken during the mining of previous LW W1-W2 and current LW W3.

### 3.6. Services Infrastructure

The location of sewerage, potable water, gas, electrical and telecommunications infrastructure is shown in Drawing No. MSEC1236-08. It can be seen that only electrical services infrastructure is located in the Study Area, which an 11 kV power line owned and operated by Endeavour Energy.

As shown in Drawing No. MSEC1236-10, the 11 kV power line was predicted to experience less than 20 mm incremental subsidence due to the extraction of LW W4 under the *Approved Layout*. The effect of the proposed modification to LW W4 will be a reduction in the magnitude of subsidence along the power line due to LW W4 to negligible levels.

Tahmoor Coal and Endeavour Energy have implemented extensive measures to manage potential impacts on electrical infrastructure due to the extraction of LW W3-W4, in accordance with a subsidence management plan.

While the potential for impacts is reduced, Tahmoor Coal will continue to implement measures to manage the potential for impacts on electrical infrastructure during the extraction of LW W4, as undertaken during the mining of previous LW W1-W2 and current LW W3.

### 3.7. Stonequarry Estate Wastewater Treatment Plant and Re-Use Storage Pond

The Stonequarry Estate Wastewater Treatment Plant and Re-Use Storage Pond is located directly above previously extracted LW W3, as shown in Drawing No. MSEC1236-08.

As shown in Drawing No. MSEC1236-10, the Wastewater Treatment Plant and the Re-Use Storage Pond was predicted to experience less than 20 mm incremental subsidence due to the extraction of LW W4 under the *Approved Layout*. The effect of the proposed modification to LW W4 will be a reduction in the magnitude of incremental subsidence at the site to negligible levels.

Tahmoor Coal and Stonequarry Estate have implemented extensive measures to manage potential impacts on the Wastewater Treatment Plant and the Re-Use Storage Pond due to the extraction of LW W3-W4, in accordance with a subsidence management plan.

While the potential for impacts is reduced, Tahmoor Coal will continue to implement measures to manage the potential for impacts on the infrastructure during the extraction of LW W4, as undertaken during the mining of previous LW W1-W2 and current LW W3.

### 3.8. Farm dams

There are 7 dams located within the Study Area and their locations are shown in Drawing No. MSEC1236-09. Two of these dams are located directly above the commencing end of LW W4 under the *Approved Layout*. These dams will not be directly mined beneath by LW W4 under the *Modified Layout*. The remaining 5 dams are located beyond the footprint of LW W4 under both the *Approved Layout* and *Modified Layout*.

Summaries of the maximum predicted values of total vertical subsidence, tilt and curvature for the farm dams within the Study Area, due to the mining of LW W1-W4, are provided in Table 3.3 for the *Approved Layout* and in Table 3.4 for the *Modified Layout*. The values in these tables are based on the maximum predicted parameters within 20 m of the perimeter of each dam after the completion of all longwalls in the series.

**Table 3.3 Maximum predicted total vertical subsidence, tilt and curvature for the farm dams within the Study Area due to mining of LW W1-W4 based on the Approved Layout**

Reference	Maximum predicted total vertical subsidence (mm)	Maximum predicted total tilt (mm/m)	Maximum predicted total hogging curvature (km <sup>-1</sup> )	Maximum predicted total sagging curvature (km <sup>-1</sup> )
PSC_090_d01	775	5.0	0.02	0.10
PSR_010_d01	80	< 0.5	< 0.01	< 0.01
PSR_010_d02	250	2.5	0.04	< 0.01
PSR_010_d03	675	1.5	0.03	0.02
PSR_010_d04	500	3.5	0.02	0.06
PSR_010_d05	100	1.0	< 0.01	< 0.01
PTH_105_d03	175	1.5	0.02	< 0.01

**Table 3.4 Maximum predicted total vertical subsidence, tilt and curvature for the farm dams within the Study Area due to mining of LW W1-W4 based on the Modified Layout**

Reference	Maximum predicted total vertical subsidence (mm)	Maximum predicted total tilt (mm/m)	Maximum predicted total hogging curvature (km <sup>-1</sup> )	Maximum predicted total sagging curvature (km <sup>-1</sup> )
PSC_090_d01	750	5.0	0.02	0.10
PSR_010_d01	40	< 0.5	< 0.01	< 0.01
PSR_010_d02	125	1.5	0.02	< 0.01
PSR_010_d03	275	1.5	0.03	< 0.01
PSR_010_d04	125	< 0.5	< 0.01	< 0.01
PSR_010_d05	50	< 0.5	< 0.01	< 0.01
PTH_105_d03	150	1.0	0.02	< 0.01

When comparing the results, it can be seen that the farm dams are predicted to experience less vertical subsidence as a result of the proposed modification, as expected. Predicted tilts and curvature under the *Modified Layout* are equal to or less than the predictions under the *Approved Layout*, as expected.

Tahmoor Coal has implemented extensive measures to manage potential impacts on the farm dams due to the extraction of LW W3-W4, in accordance with the Land Management plan.

While the potential for impacts is reduced, Tahmoor Coal will continue to implement measures to manage the potential for impacts on farm dams during the extraction of LW W4, as undertaken during the mining of previous LW W1-W2 and current LW W3.

### 3.9. Building Structures

There are 12 building structures located within the Study Area and their locations are shown in Drawing No. MSEC1236-09. They consist of 2 houses, 8 sheds and 2 tanks.

All of the structures are located to the east of LW W4 and will not be directly mined beneath.

Summaries of the maximum predicted values of total vertical subsidence, tilt and curvature for the building structures within the Study Area, due to the mining of LW W1-W4, are provided in Table 3.3 for the *Approved Layout* and in Table 3.4 for the *Modified Layout*. The values in these tables are based on the maximum predicted parameters within 20 m of the perimeter of each structure after the completion of all longwalls in the series.

**Table 3.5 Maximum predicted total vertical subsidence, tilt and curvature for the building structures within the Study Area due to mining of LW W1-W4 based on the Approved Layout**

Reference	Maximum predicted total vertical subsidence (mm)	Maximum predicted total tilt (mm/m)	Maximum predicted total hogging curvature (km <sup>-1</sup> )	Maximum predicted total sagging curvature (km <sup>-1</sup> )
PSR_010_h01	40	< 0.5	< 0.01	< 0.01
PSR_010_h02	40	< 0.5	< 0.01	< 0.01
PSR_010_r01	40	< 0.5	< 0.01	< 0.01
PSR_010_r02	40	< 0.5	< 0.01	< 0.01
PSR_010_r03	90	< 0.5	< 0.01	< 0.01
PSR_010_r04	90	< 0.5	< 0.01	< 0.01
PSR_010_r05	90	< 0.5	< 0.01	< 0.01
PSR_010_r06	50	< 0.5	< 0.01	< 0.01
PSR_010_r08	50	< 0.5	< 0.01	< 0.01
PSR_010_r09	40	< 0.5	< 0.01	< 0.01
PSR_010_t01	40	< 0.5	< 0.01	< 0.01
PSR_010_t02	40	< 0.5	< 0.01	< 0.01

**Table 3.6 Maximum predicted total vertical subsidence, tilt and curvature for the building structures within the Study Area due to mining of LW W1-W4 based on the Modified Layout**

Reference	Maximum predicted total vertical subsidence (mm)	Maximum predicted total tilt (mm/m)	Maximum predicted total hogging curvature (km <sup>-1</sup> )	Maximum predicted total sagging curvature (km <sup>-1</sup> )
PSR_010_h01	< 20	< 0.5	< 0.01	< 0.01
PSR_010_h02	30	< 0.5	< 0.01	< 0.01
PSR_010_r01	< 20	< 0.5	< 0.01	< 0.01
PSR_010_r02	< 20	< 0.5	< 0.01	< 0.01
PSR_010_r03	30	< 0.5	< 0.01	< 0.01
PSR_010_r04	40	< 0.5	< 0.01	< 0.01
PSR_010_r05	40	< 0.5	< 0.01	< 0.01
PSR_010_r06	30	< 0.5	< 0.01	< 0.01
PSR_010_r08	40	< 0.5	< 0.01	< 0.01
PSR_010_r09	< 20	< 0.5	< 0.01	< 0.01
PSR_010_t01	< 20	< 0.5	< 0.01	< 0.01
PSR_010_t02	< 20	< 0.5	< 0.01	< 0.01

When comparing the results, it can be seen that the building structures are predicted to experience less vertical subsidence as a result of the proposed modification, as expected. Predicted tilts and curvature under the *Modified Layout* are equal to or less than the predictions under the *Approved Layout*, as expected.

Tahmoor Coal has implemented extensive measures to manage potential impacts on building structures due to the extraction of LW W3-W4, in accordance with the Built Features Management plan.

While the potential for impacts is reduced, Tahmoor Coal will continue to implement measures to manage the potential for impacts on building structures during the extraction of LW W4, as undertaken during the mining of previous LW W1-W2 and current LW W3.

### 3.10. Archaeological Sites

There are no archaeological sites located within the Study Area, as shown in Drawing No. MSEC1236-09. A grinding groove site (Ref. 52-2-2068) is located on Rockbar SR17 on Stonequarry Creek.

Site 52-2-2068 is located approximately 690 metres from the commencing end of LW W4 under the *Approved Layout*. Under the *Modified Layout*, Site 52-2-2068 is located approximately 960 metres from the commencing end of LW W4 at its closest point.

While the potential for impacts due to the extraction of Stonequarry Creek is reduced to negligible levels, Tahmoor Coal will continue to monitor Site 52-2-2068 under the Heritage Management Plan and the Stonequarry Creek Rockbar Management Plan. The purpose of the monitoring will primarily be to track the gradual effects of residual subsidence due to the extraction of LW W3. The monitoring will, however, also capture changes at Rockbar SR17 (if any) due to the extraction of LW W4.

### 3.11. Heritage Sites

The Picton Railway Tunnel and the Mushroom Tunnel are items of heritage significance and their locations within the Study Area are shown in Drawing No. MSEC1236-09. The Picton Viaduct, Argyle Street Underbridge and the Pedestrian Overbridge at 86.010 km are items of heritage significance and their locations near the commencing end of LW W4 are shown in Drawing No. MSEC1236-09.

As discussed in Section 3.4, Tahmoor Coal and ARTC have implemented extensive measures to manage potential impacts on the Main Southern Railway and the associated railway structures due to the extraction of LW W3-W4, in accordance with a Railway Management Plan.

While the potential for impacts due to the extraction of LW W4 under the *Modified Layout* is reduced, Tahmoor Coal will continue to implement the planned measures to manage the potential for impacts on the Main Southern Railway, as is currently undertaken during the mining of LW W3.

Tahmoor Coal has confirmed that there will be no change to planned monitoring frequencies or management measures for the railway structures during the LW W4, as described in the Railway Management Plan.

### 3.12. Summary

The maximum predicted subsidence parameters within the Study Area, based on the *Modified Layout*, are similar to those based on the *Approved Layout*.

The effect of the proposed modification to LW W4 will be a reduction in the magnitude of subsidence for the natural and built features located near the commencing end of this longwall.

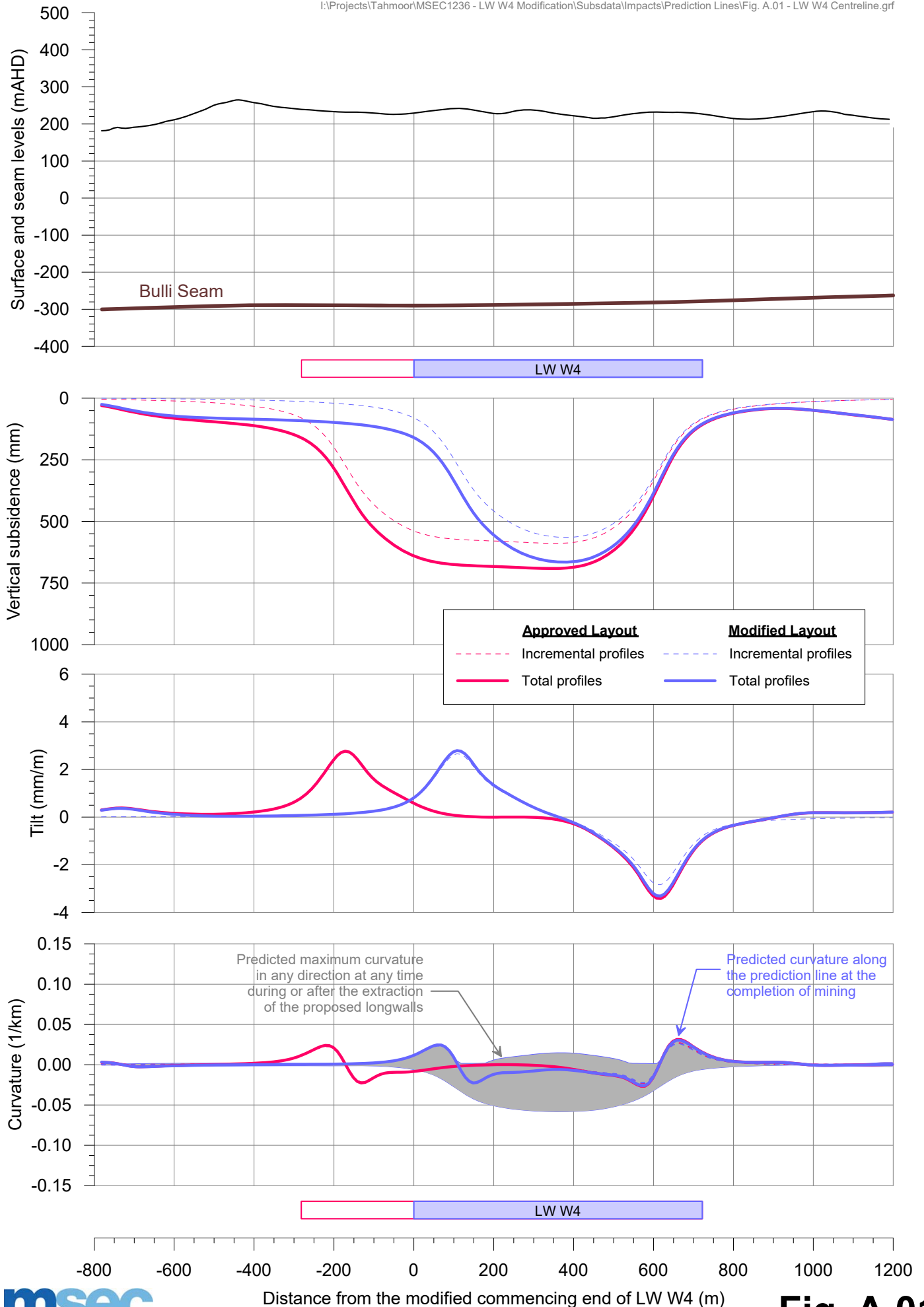
While the potential for impacts is reduced, Tahmoor Coal will continue to develop and implement measures to manage the potential for impacts on natural and built features during the extraction of LW W4, as undertaken during the mining of previous LW W1-W2 and current LW W3.

## APPENDIX A. FIGURES

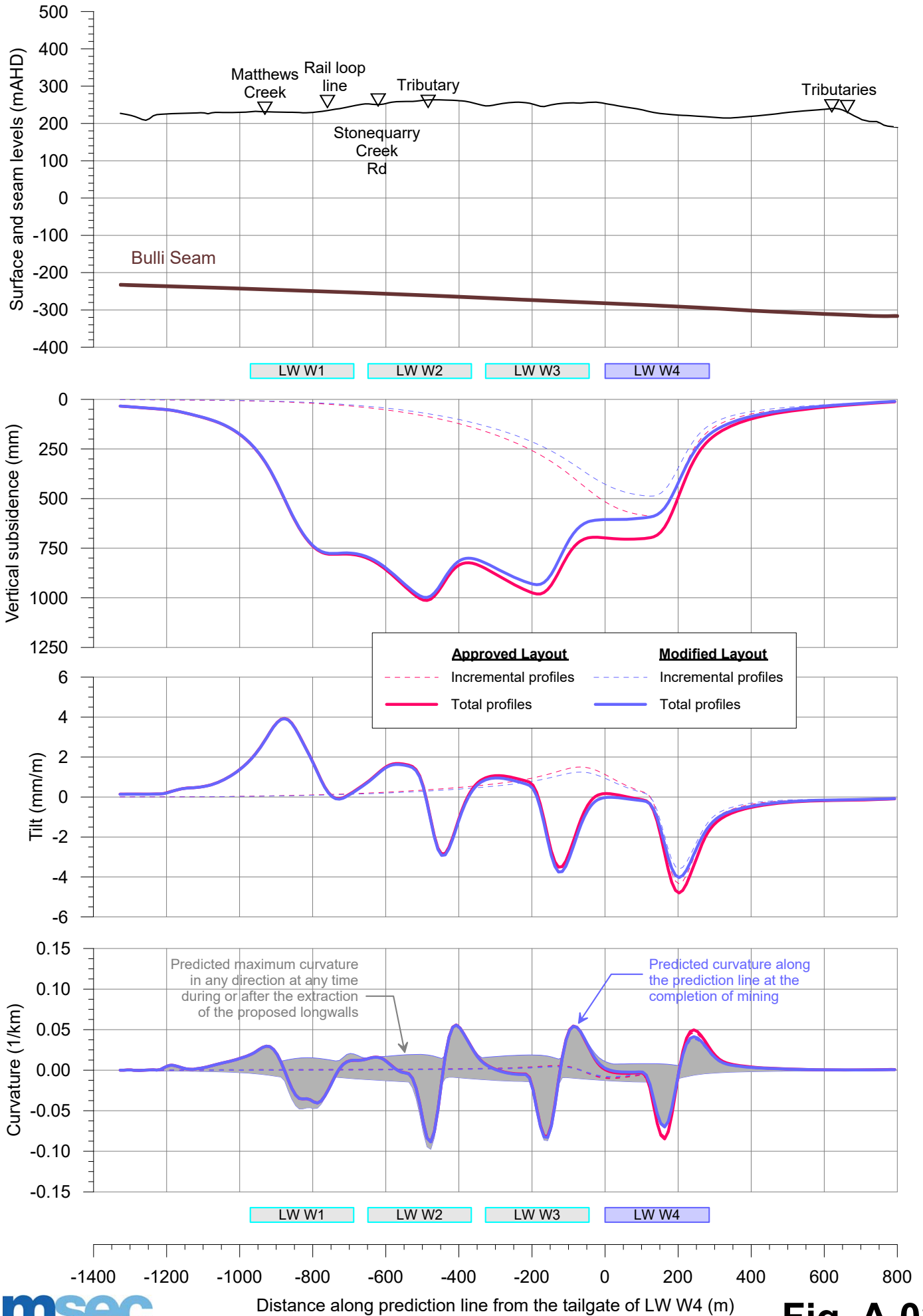


# Predicted profiles of vertical subsidence, tilt and curvature along LW W4 Centreline due to LW W4

I:\Projects\Tahmoor\MSEC1236 - LW W4 Modification\Subsdata\Impacts\Prediction Lines\Fig. A.01 - LW W4 Centreline.grf

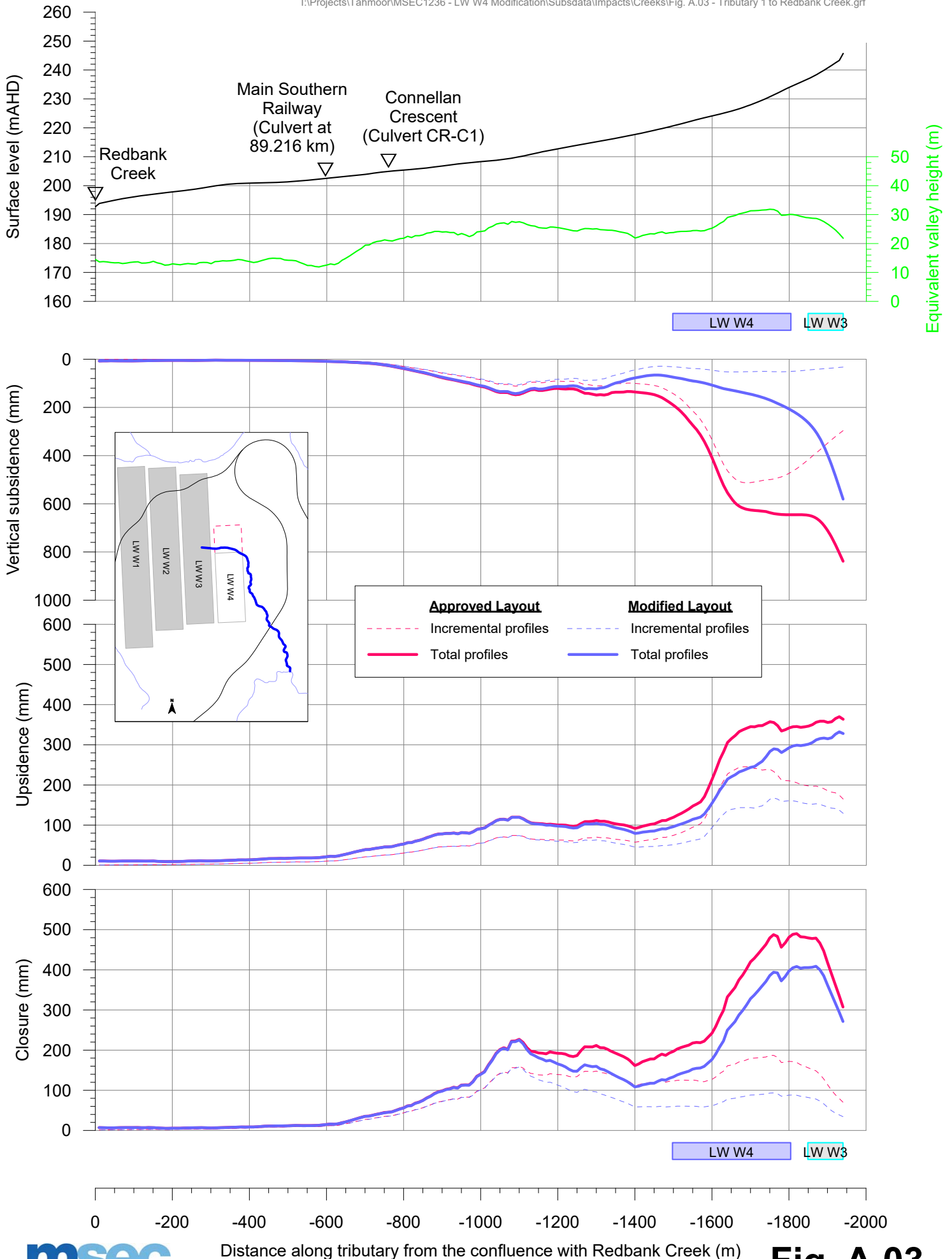


# Predicted profiles of vertical subsidence, tilt and curvature along Prediction Line 1 due to LW W4

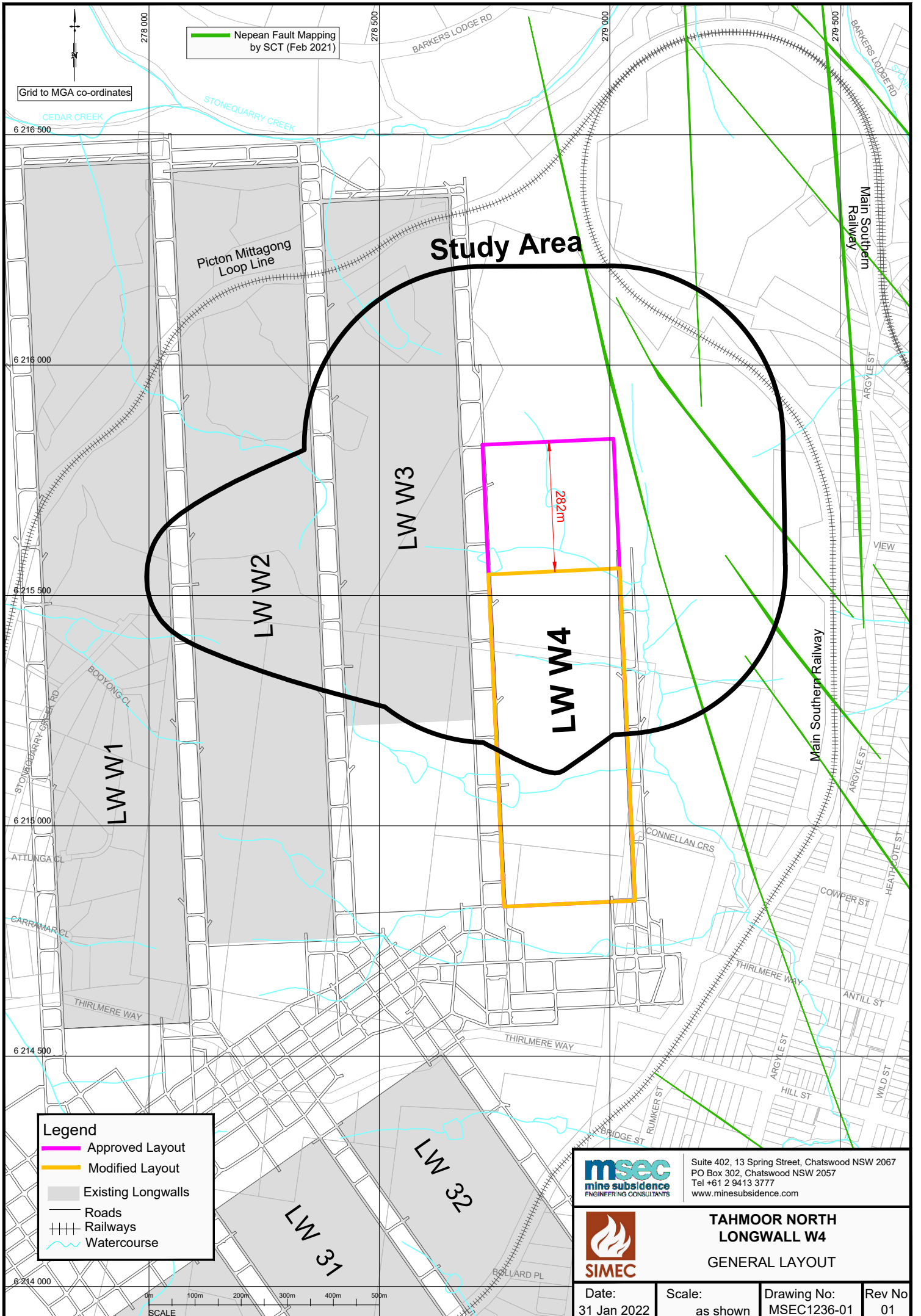


# Predicted profiles of vertical subsidence, upsidence and closure along Tributary 1 to Redbank Creek due to the extraction of LW W4

I:\Projects\Tahmoor\MSEC1236 - LW W4 Modification\Subsdata\Impacts\Creeks\Fig. A.03 - Tributary 1 to Redbank Creek.grf



## **APPENDIX B. DRAWINGS**



Nepean Fault Mapping by SCT (Feb 2021)

Grid to MGA co-ordinates

**Study Area**

Picton Mittagong Loop Line

LW W2

LW W3

LW W4

282m

LW W1

LW 32

LW 31

**Legend**

- Approved Layout
- Modified Layout
- Existing Longwalls
- Roads
- Railways
- ~ Watercourse



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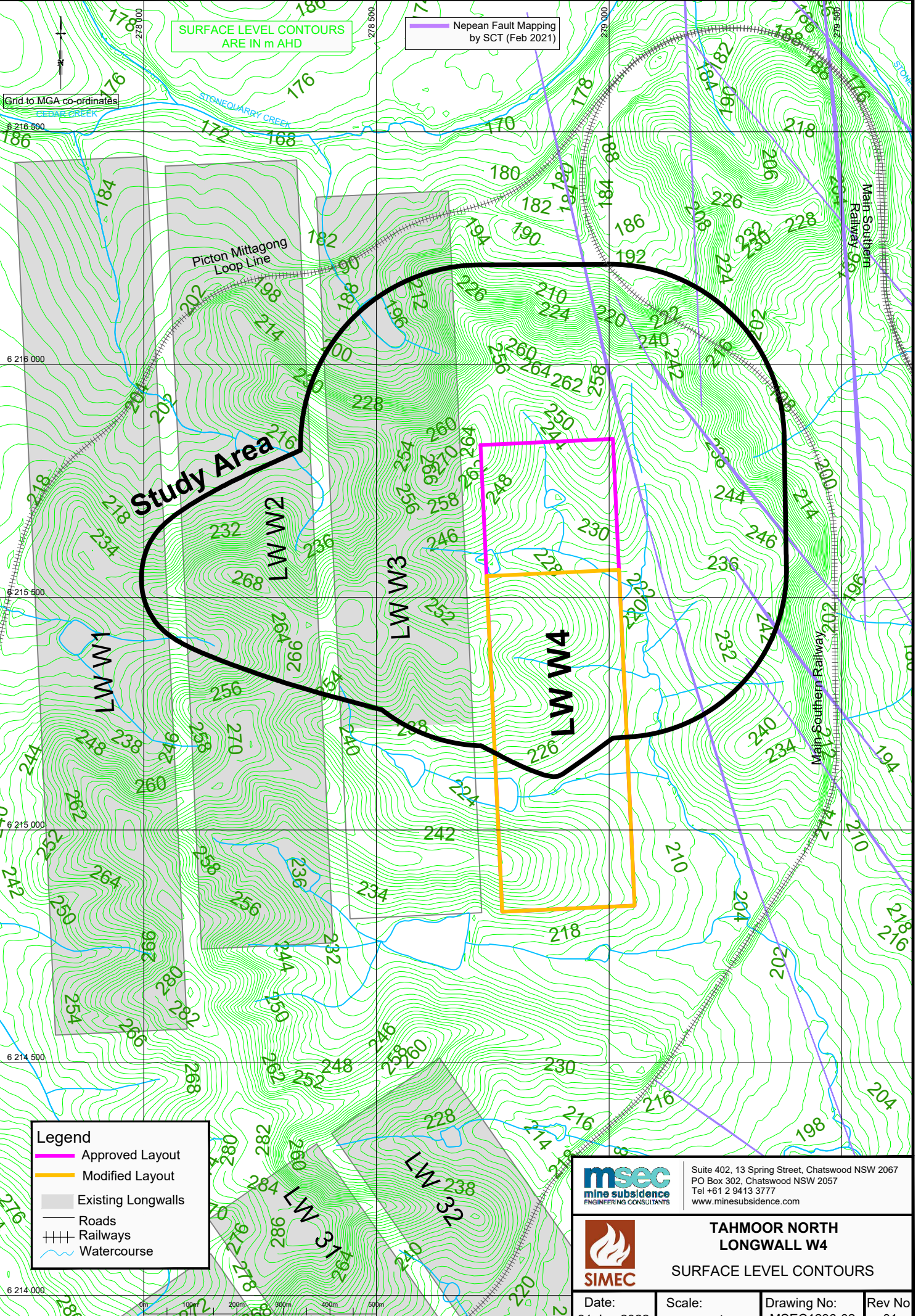
**TAHMOOR NORTH  
 LONGWALL W4  
 GENERAL LAYOUT**

Date: 31 Jan 2022	Scale: as shown	Drawing No: MSEC1236-01	Rev No 01
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**SURFACE LEVEL CONTOURS  
ARE IN m AHD**

Nepean Fault Mapping  
by SCT (Feb 2021)

Grid to MGA co-ordinates



**Study Area**

LW W1

LW W2

LW W3

LW W4

Picton Mittagong  
Loop Line

Main Southern  
Railway

Main Southern Railway

**Legend**

- Approved Layout
- Modified Layout
- Existing Longwalls
- Roads
- + + + + Railways
- ~ Watercourse

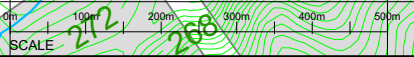


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**TAHMOOR NORTH  
LONGWALL W4  
SURFACE LEVEL CONTOURS**

Date: 31 Jan 2022	Scale: as shown	Drawing No: MSEC1236-02	Rev No: 01
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SEAM FLOOR CONTOURS ARE IN m AHD

Nepean Fault Mapping by SCT (Feb 2021)

Grid to MGA co-ordinates

CEDAR CREEK

STONEQUARRY CREEK

Study Area

Picton Mittagong Loop Line

Main Southern Railway

Main Southern Railway

LW W1

LW W2

LW W3

LW W4

LW 32

LW 31

**Legend**

- Approved Layout
- Modified Layout
- Existing Longwalls
- Roads
- Railways
- Watercourse

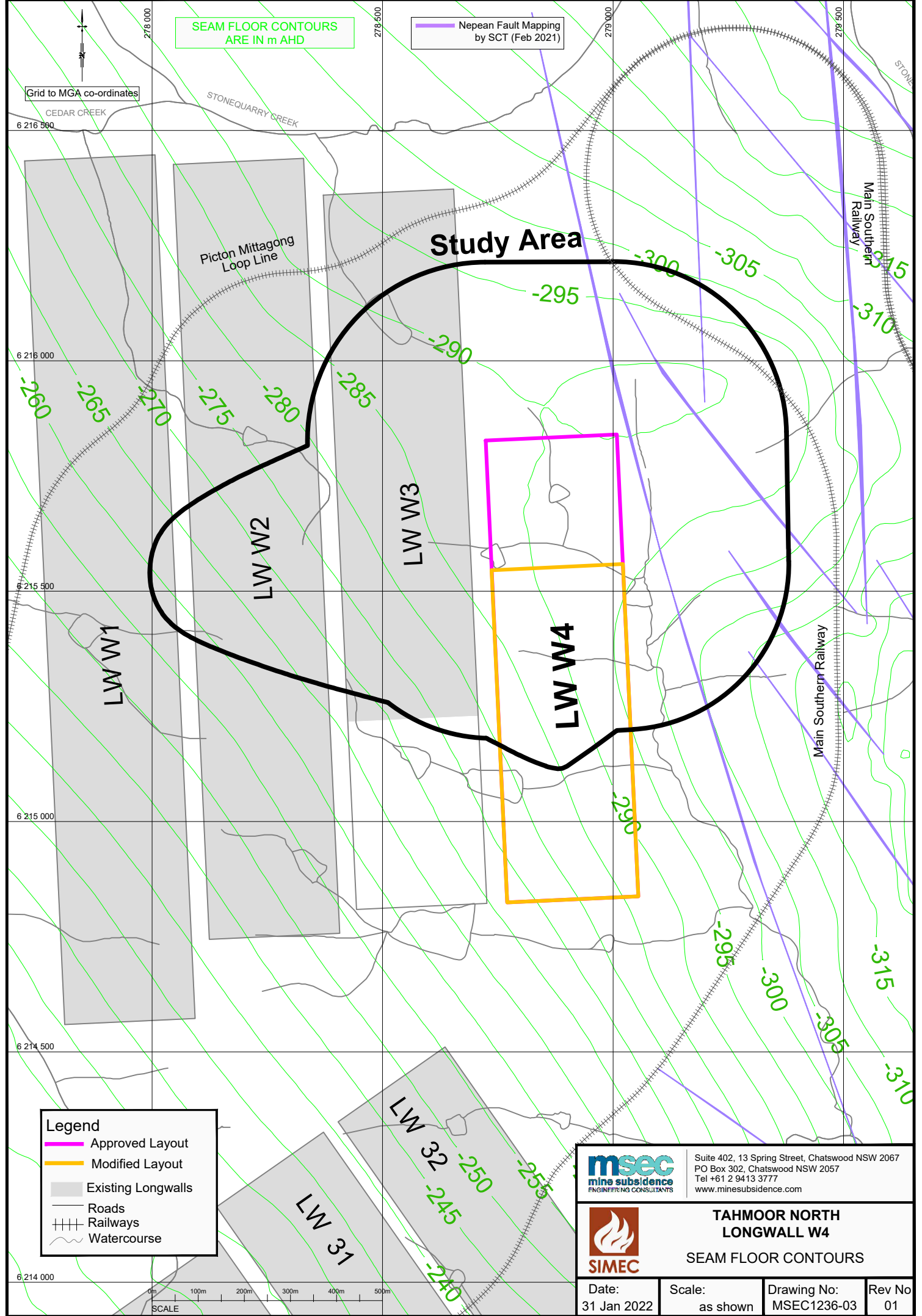
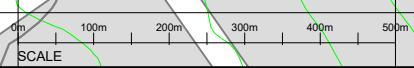


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**TAHMOOR NORTH  
 LONGWALL W4  
 SEAM FLOOR CONTOURS**

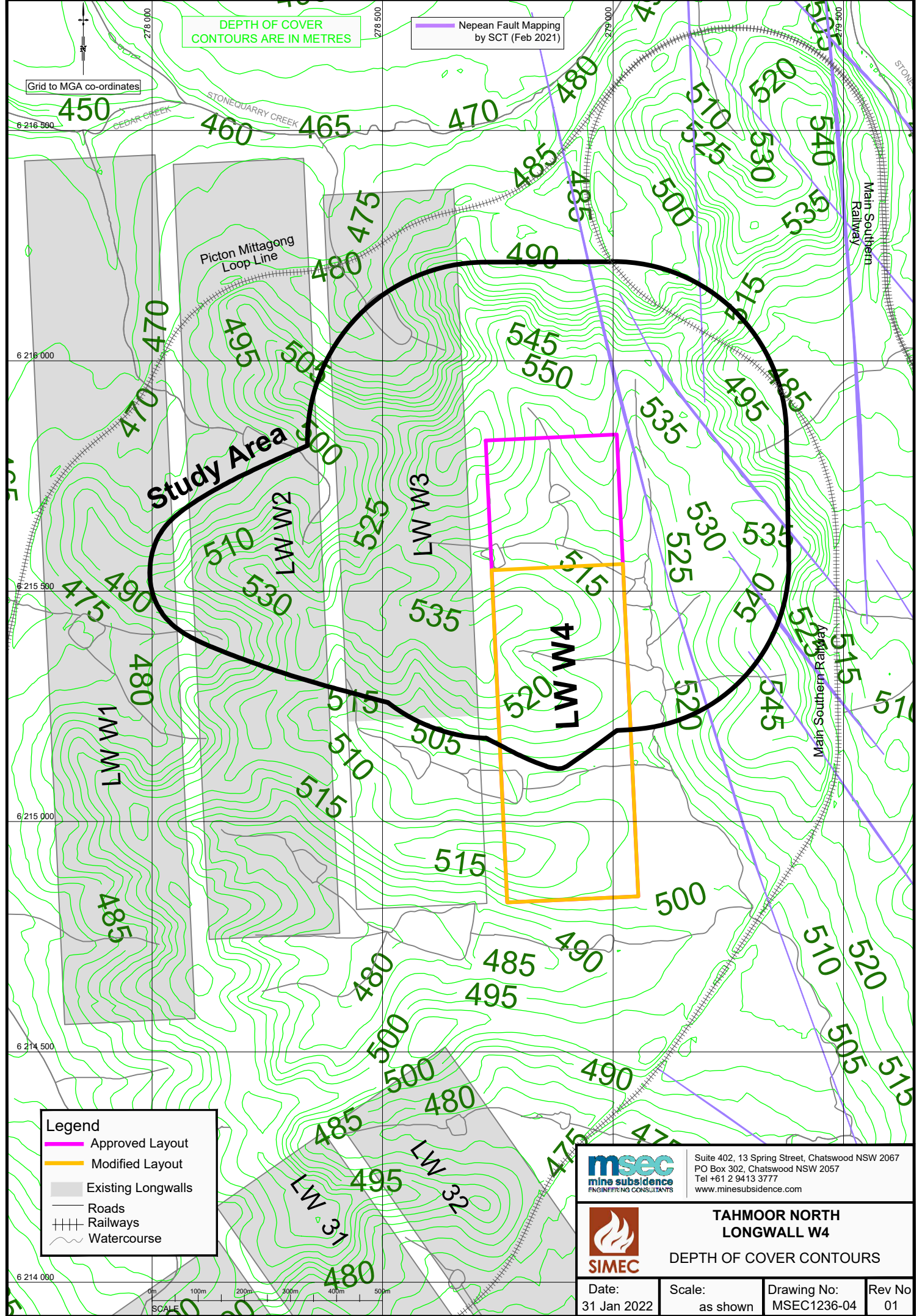
Date: 31 Jan 2022	Scale: as shown	Drawing No: MSEC1236-03	Rev No: 01
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DEPTH OF COVER  
CONTOURS ARE IN METRES

Nepean Fault Mapping  
by SCT (Feb 2021)

Grid to MGA co-ordinates



- Legend**
- Approved Layout
  - Modified Layout
  - Existing Longwalls
  - Roads
  - Railways
  - Watercourse



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**TAHMOOR NORTH  
LONGWALL W4**  
 DEPTH OF COVER CONTOURS

Date: 31 Jan 2022	Scale: as shown	Drawing No: MSEC1236-04	Rev No: 01
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Mapping of Nepean Fault & associated structures by SCT (FEB 2021)

Grid to MGA co-ordinates

**Study Area**

LW W1

LW W2

LW W3

LW W4

LW 31

LW 32

Picton Mittagong Loop Line

Main Southern Railway

Main Southern Railway

**Legend**

- Approved Layout
- Modified Layout
- Existing Longwalls
- Roads
- Railways
- Watercourse



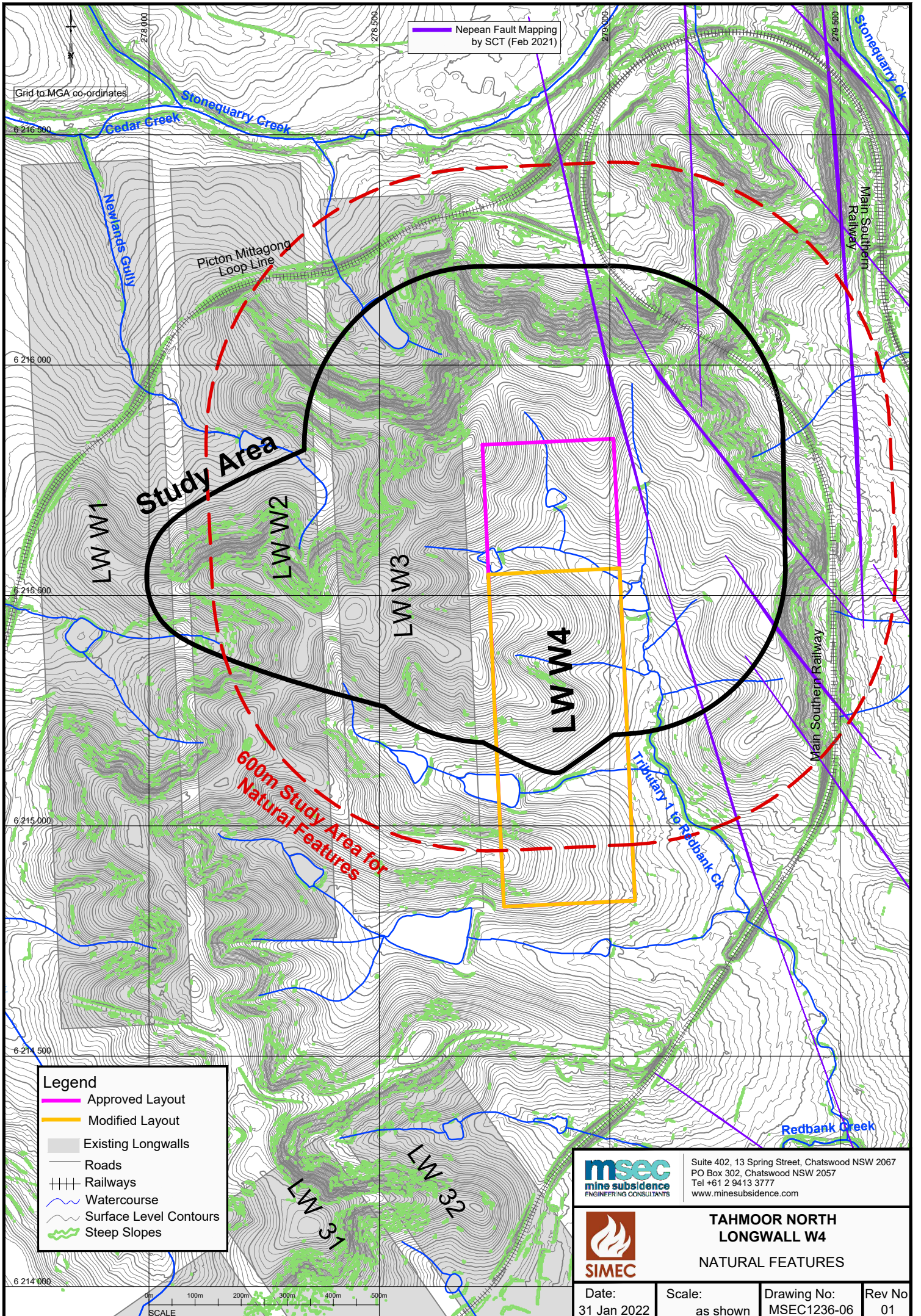
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**TAHMOOR NORTH  
 LONGWALL W4  
 GEOLOGICAL STRUCTURES**

Date: 31 Jan 2022	Scale: as shown	Drawing No: MSEC1236-05	Rev No: 01
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Nepean Fault Mapping  
by SCT (Feb 2021)

Grid to MGA co-ordinates

**Study Area**

Picton Mittagong  
Loop Line

LW W1

LW W2

LW W3

LW W4

600m Study Area for  
Natural Features

Tributary to  
Redbank Crk

Main Southern Railway

Redbank Creek

LW 31

LW 32

**Legend**

- Approved Layout
- Modified Layout
- Existing Longwalls
- Roads
- Railways
- Watercourse
- Surface Level Contours
- Steep Slopes



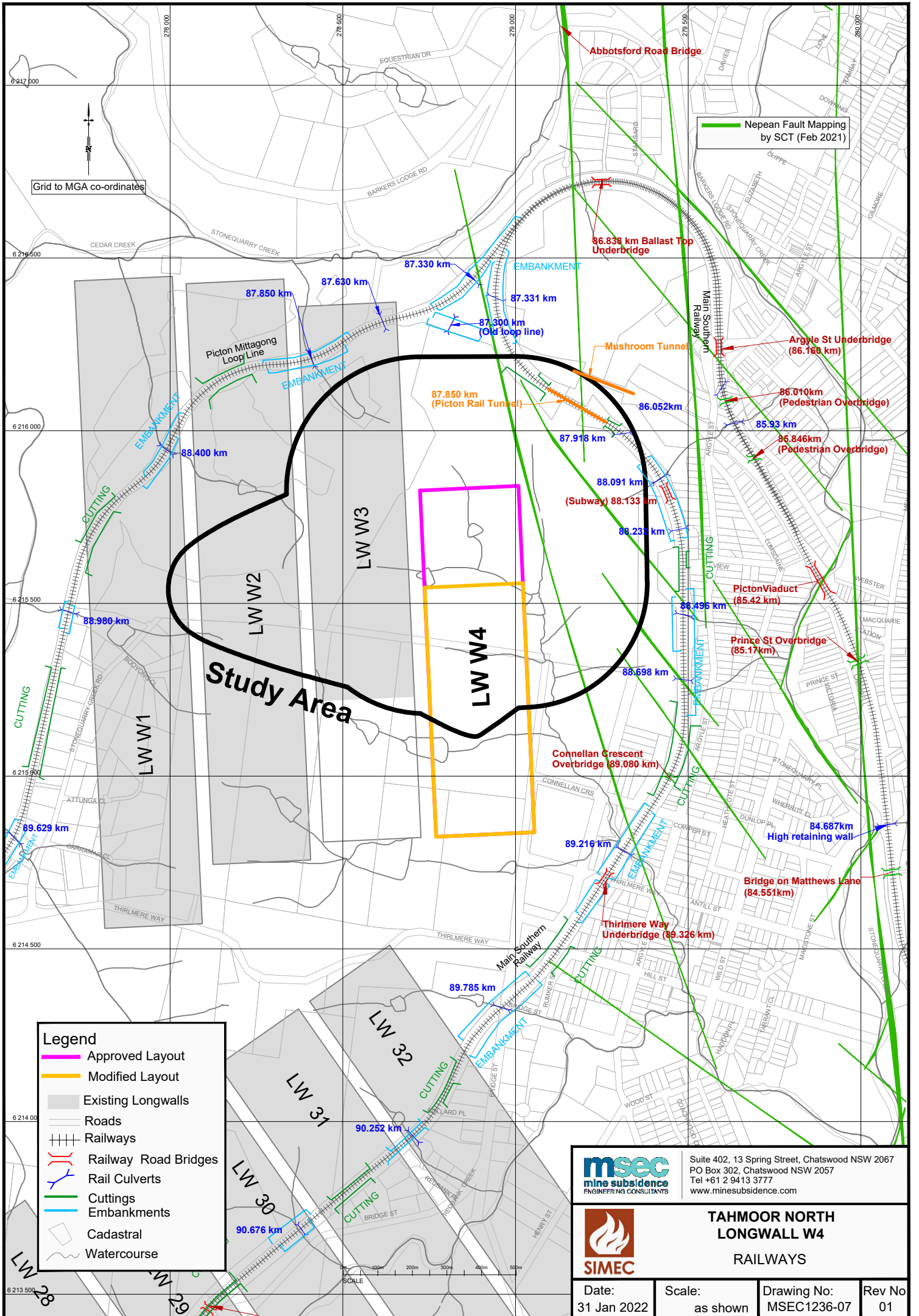
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**TAHMOOR NORTH  
LONGWALL W4  
NATURAL FEATURES**

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Nepean Fault Mapping by SCT (Feb 2021)

Grid to MGA co-ordinates

Study Area

**Legend**

- Approved Layout
- Modified Layout
- Existing Longwalls
- Roads
- Railways
- Railway Road Bridges
- Rail Culverts
- Cuttings
- Embankments
- Cadastral
- Watercourse

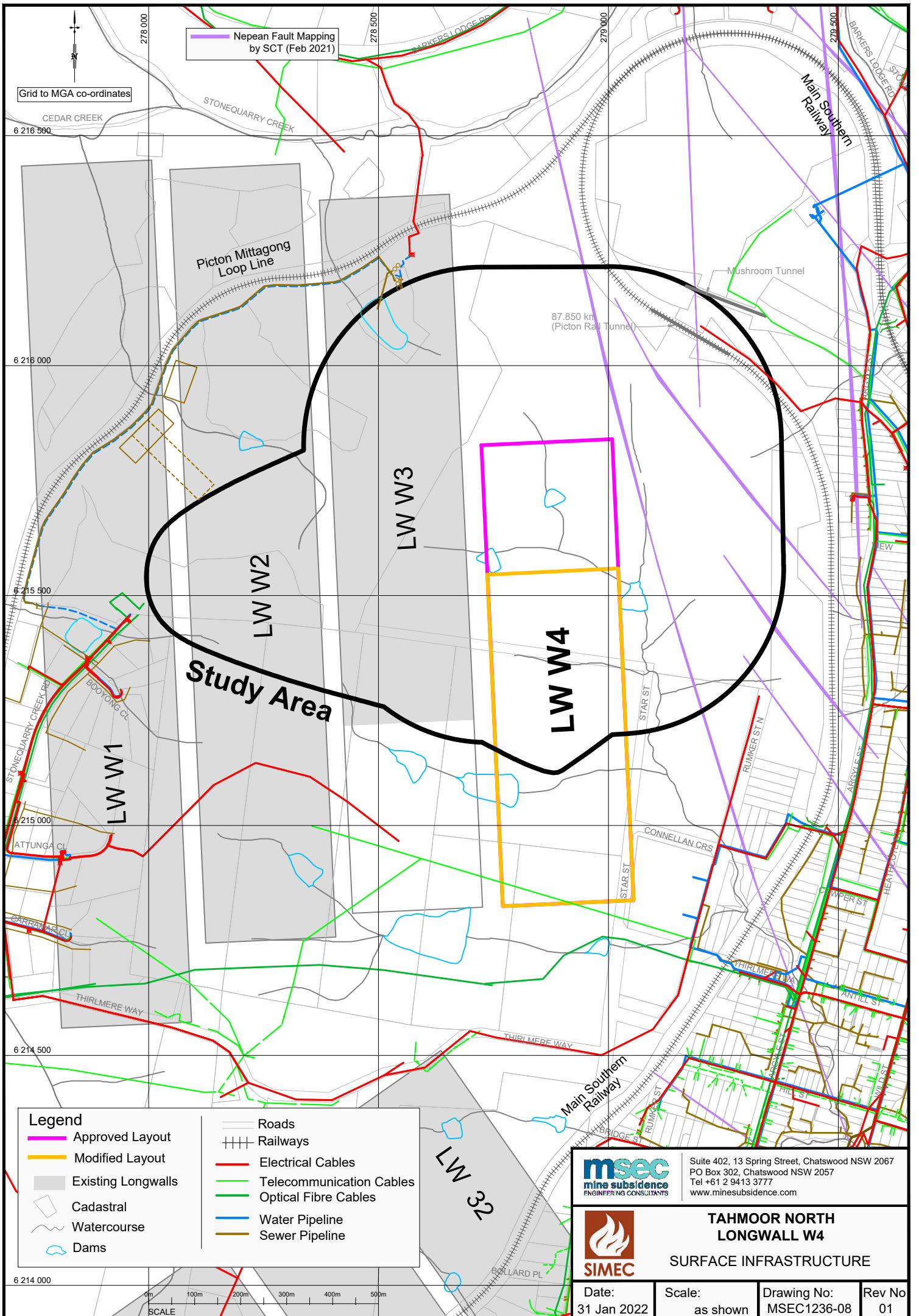


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**TAHMOOR NORTH  
 LONGWALL W4  
 RAILWAYS**

Date: 31 Jan 2022	Scale: as shown	Drawing No: MSEC1236-07	Rev No: 01
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Grid to MGA co-ordinates

Nepean Fault Mapping by SCT (Feb 2021)

Picton Mittagong Loop Line

87.850 km (Picton Rail Tunnel)

Study Area

LW W1

LW W2

LW W3

LW W4

LW 32

**Legend**

- Approved Layout
- Modified Layout
- Existing Longwalls
- Cadastral
- ~ Watercourse
- Dams
- Roads
- +++ Railways
- Electrical Cables
- Telecommunication Cables
- Optical Fibre Cables
- Water Pipeline
- Sewer Pipeline



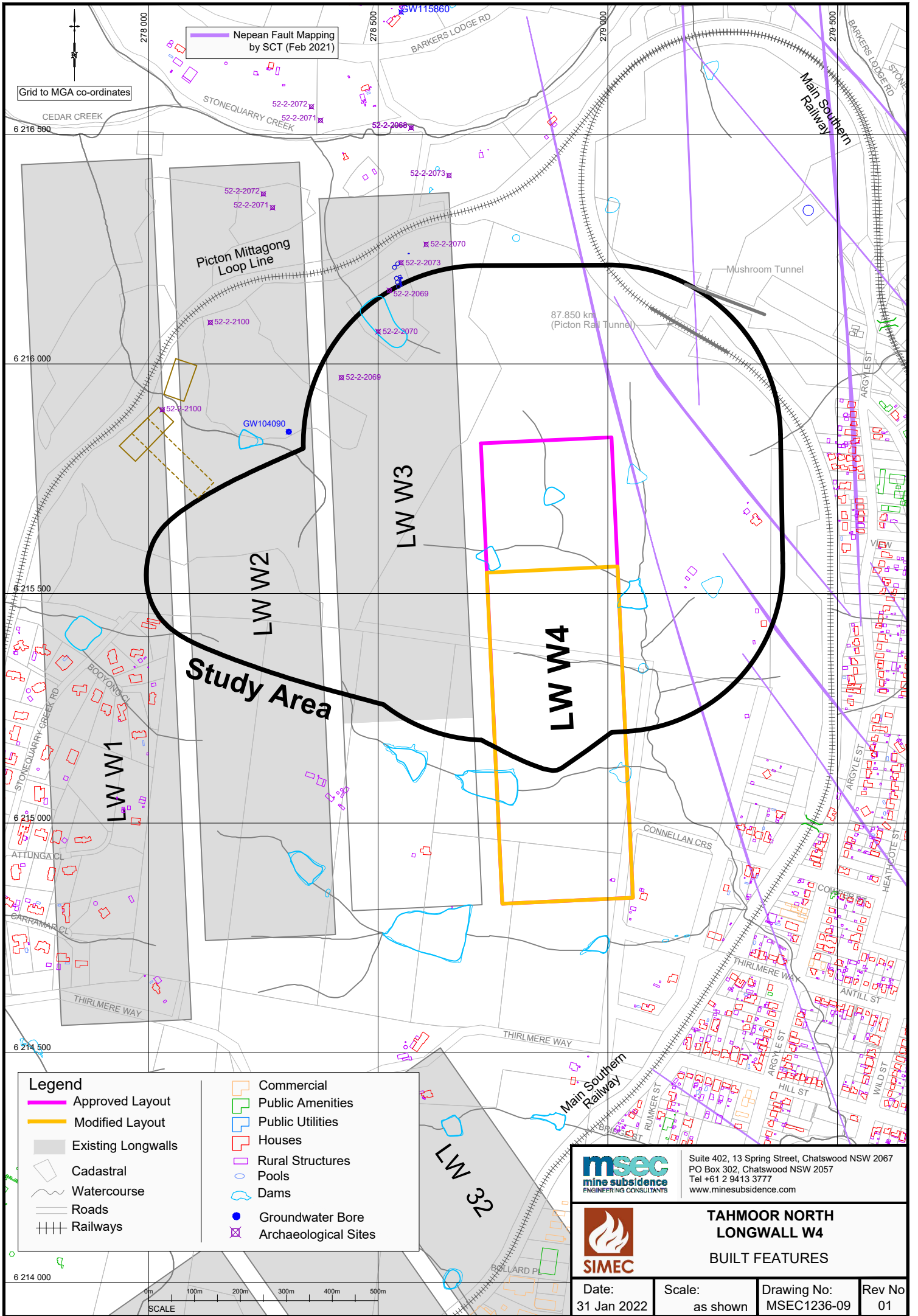
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**TAHMOOR NORTH  
 LONGWALL W4  
 SURFACE INFRASTRUCTURE**

Date: 31 Jan 2022	Scale: as shown	Drawing No: MSEC1236-08	Rev No: 01
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**Legend**

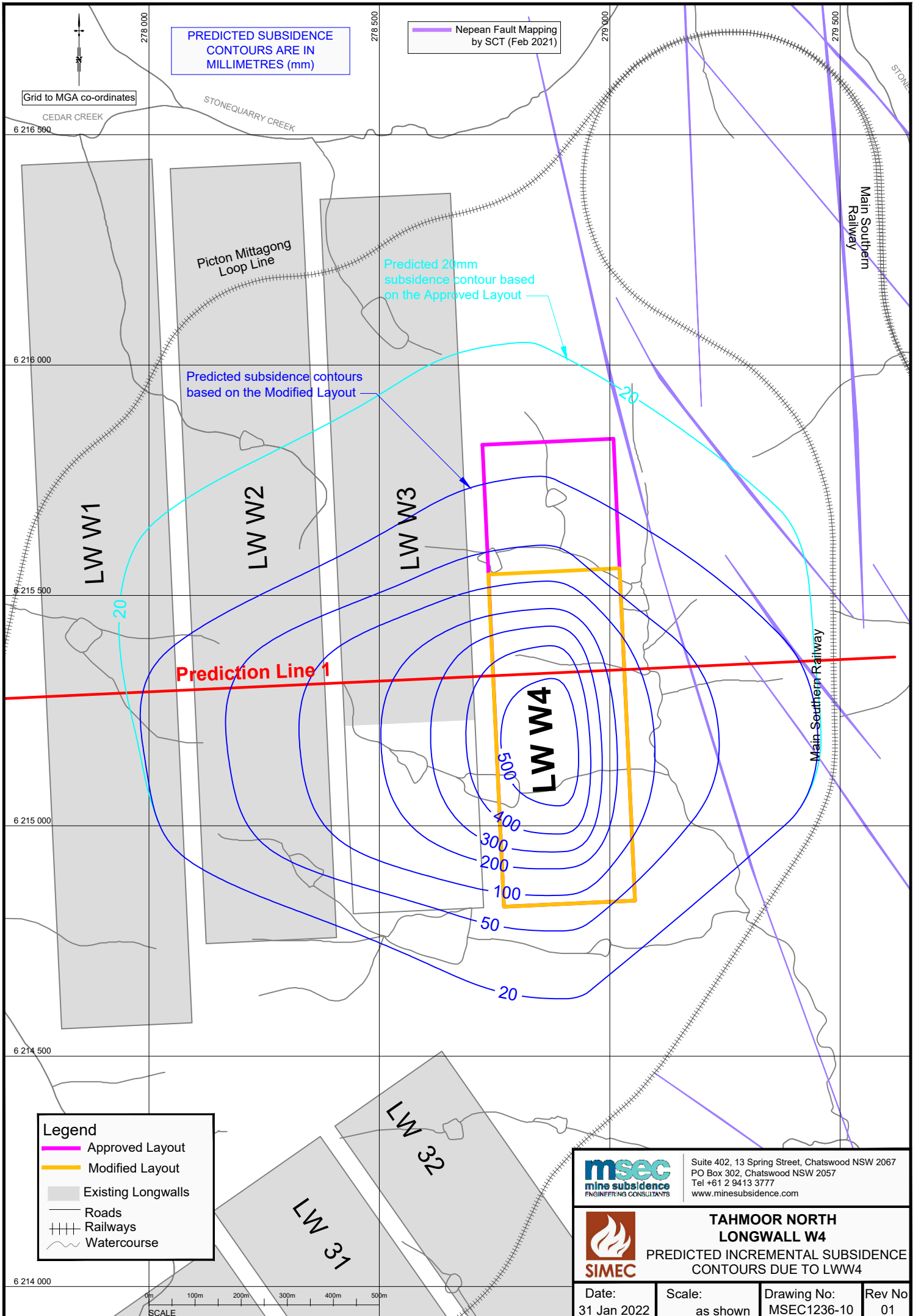
Approved Layout	Commercial
Modified Layout	Public Amenities
Existing Longwalls	Public Utilities
Cadastral	Houses
Watercourse	Rural Structures
Roads	Pools
Railways	Dams
	Groundwater Bore
	Archaeological Sites

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**SIMEC**  
**TAHMOOR NORTH LONGWALL W4**  
**BUILT FEATURES**

Date: 31 Jan 2022	Scale: as shown	Drawing No: MSEC1236-09	Rev No: 01
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PREDICTED SUBSIDENCE  
CONTOURS ARE IN  
MILLIMETRES (mm)

Nepean Fault Mapping  
by SCT (Feb 2021)

Grid to MGA co-ordinates

Predicted 20mm  
subsidence contour based  
on the Approved Layout

Predicted subsidence contours  
based on the Modified Layout

Prediction Line 1

**Legend**

- Approved Layout
- Modified Layout
- Existing Longwalls
- Roads
- Railways
- Watercourse



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**TAHMOOR NORTH  
LONGWALL W4  
PREDICTED INCREMENTAL SUBSIDENCE  
CONTOURS DUE TO LWW4**

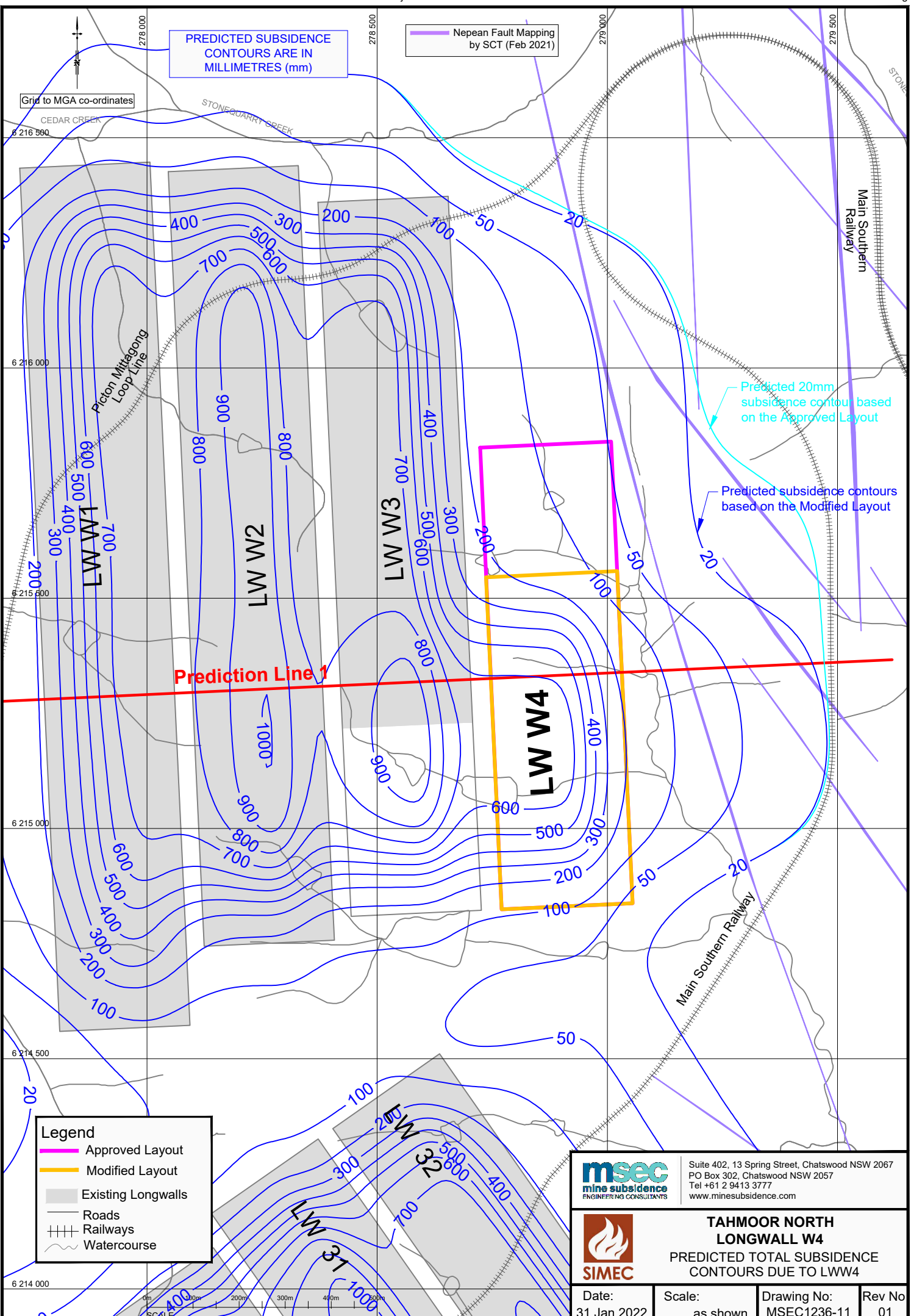
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PREDICTED SUBSIDENCE  
CONTOURS ARE IN  
MILLIMETRES (mm)

Nepean Fault Mapping  
by SCT (Feb 2021)

Grid to MGA co-ordinates



Predicted 20mm  
subsidence contour based  
on the Approved Layout

Predicted subsidence contours  
based on the Modified Layout

Prediction Line 1

**Legend**

- Approved Layout
- Modified Layout
- Existing Longwalls
- Roads
- Railways
- Watercourse



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**TAHMOOR NORTH  
LONGWALL W4  
PREDICTED TOTAL SUBSIDENCE  
CONTOURS DUE TO LWW4**

Date: 31 Jan 2022	Scale: as shown	Drawing No: MSEC1236-11	Rev No: 01
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