



Centennial Tahmoor

**Tahmoor Colliery
Longwalls 24 to 26**

DEPARTMENT OF LANDS

**PERMANENT SURVEY
CONTROL MARKS**

**SURFACE SAFETY AND
SERVICEABILITY MANAGEMENT
PLAN**

REVISION B



**Mine Subsidence Engineering Consultants
Level 1 228 Victoria Avenue – Chatswood – NSW 2067
PO Box 3047 – Willoughby North – NSW 2068
Tel. (02) 9413 3777 Fax. (02) 9413 3822
Email: enquiries@minesubsidence.com**

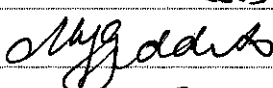
www.minesubsidence.com

August 2006

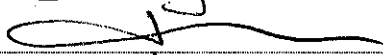
GENERAL

AUTHORISATION OF SURFACE SAFETY AND SERVICEABILITY MANAGEMENT PLAN

Authorised on behalf of Tahmoor Colliery:

Name:	MITCHELL GEDDES
Signature:	
Position:	TECHNICAL SERVICES MANAGER
Date:	16.5.2006.

Authorised on behalf of the Department of Lands:

Name:	Darryl HAWNS.
Signature:	
Position:	Senior Survey - Survey operations - Sydney - St George
Date:	16 - 5 - 2006.

REVIEW

Date	Rev	Comments
09-Mar-06	A	Draft for submission to Department of Lands

REFERENCES

1	AS/NZS 4360:1999 Risk Management.
2	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. (Report MSEC157), prepared by Mine Subsidence Engineering Consultants March 2006, Rev. B.

GENERAL

AUTHORISATION OF SURFACE SAFETY AND SERVICEABILITY MANAGEMENT PLAN

Authorised on behalf of Tahmoor Colliery:

Name:	
Signature:	
Position:	
Date:	

Authorised on behalf of the Department of Lands:

Name:	
Signature:	
Position:	
Date:	

REVIEW

Date	Rev	Comments
09-Mar-06	A	Draft for submission to Department of Lands
07-Aug-06	B	Chapter 1 amended, as agreed in Plan Review Meeting, 7 August 2006

REFERENCES

1	<i>AS/NZS 4360:1999 Risk Management.</i>
2	<i>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. (Report MSEC157), prepared by Mine Subsidence Engineering Consultants March 2006, Rev. B.</i>

TABLE OF CONTENTS

TABLE OF CONTENTS	ii
CHAPTER 1. INTRODUCTION	1
1.1. Background	1
1.2. Current and Proposed Operations	1
1.2.1. Longwall Panels 24 to 26	1
1.3. Predicted Subsidence Movements	1
1.4. Limitations	2
1.5. Objectives	2
1.6. Scope	3
1.7. Proposed Mining Schedule	3
1.8. Definition of Active Subsidence Zone	4
1.9. Ground Monitoring of Streets	5
CHAPTER 2. RISK MANAGEMENT METHOD	7
2.1. General	7
2.1.1. Consequence	7
2.1.2. Likelihood	7
2.1.3. Hazard	7
2.1.4. Risk	7
CHAPTER 3. RISK ASSESSMENT	8
3.1. Risk Assessment	8
CHAPTER 4. RISK CONTROL PROCEDURES	9
CHAPTER 5. GEOLOGICAL STRUCTURES AND ANOMALIES	10
CHAPTER 6. RESOURCES	10
CHAPTER 7. MANAGEMENT PLAN REVIEW MEETINGS	10
CHAPTER 8. AUDIT AND REVIEW	11
CHAPTER 9. RECORD KEEPING	11
CHAPTER 10. CONTACT LIST	12
Appendix A - Glossary of Terms and Definitions	13
Appendix B – Drawings and Illustrations	15
Appendix C – Predictions for Permanent Survey Control Marks	16

Drawings

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

<i>Drawing No.</i>	<i>Description</i>	<i>Rev</i>
MSEC286-0901	Survey Control Marks	B

CHAPTER 1. INTRODUCTION

1.1. Background

Tahmoor Colliery is managed and operated by Tahmoor Coal Pty Limited, a fully owned subsidiary of Austral Coal Limited. Recently, Centennial Coal successfully secured an 85% interest in Austral Coal and as such, management of Tahmoor Colliery. Tahmoor Coal holds coal leases CCL 716, ML 1539 and ML 1376. Permanent survey control marks are located within these areas.

1.2. Current and Proposed Operations

Tahmoor Colliery has begun extending its underground coal mining into an area designated “Tahmoor North”, which is located in the Southern Coalfields of NSW.

From 2002, the equipment in use at the mine has been steadily updated, including a new underground longwall mining unit. This longwall has a production capacity of 3,500 tonnes per hour. New high capacity belt conveyors are transferring coal to the surface for treatment at the upgraded Coal Preparation Plant.

Roadway development is carried out using five continuous miner development units. With the introduction of this new equipment and upgraded facilities, the Colliery has increased its productive capacity from 2 million to 3.6 million tonnes per annum.

1.2.1. Longwall Panels 24 to 26

Longwalls 24 to 26 are a continuation of a series of longwalls that extend into the Tahmoor North Lease area, which began with Longwall 22. The longwall panels are located between the Bargo River in the south-east, the township of Thirlmere in the west and Picton in the north. A portion of each longwall is located beneath the urban area of Tahmoor.

A number of surface and sub-surface features have been identified within the vicinity of the longwalls, including a number of permanent survey control marks.

1.3. Predicted Subsidence Movements

Specific predictions of subsidence tilt and strain are provided in Table C.1. A summary of the predicted maximum incremental parameters over the whole subsided area, due to the extraction of each longwall, is shown in Table 1.1.

Table 1.1 Maximum Predicted Incremental Subsidence Parameters

Subsidence Parameter	LW 22	LW 23	LW 24	LW 25	LW 26
Vertical Subsidence (mm)	503	613	596	631	636
Transverse Tilt (mm/m)	3.5	4.9	4.7	5.0	5.1
Longitudinal Tilt (mm/m)	3.0	3.8	3.5	3.7	3.7
Transverse Tensile Strain (mm/m)	0.4	0.7	0.7	0.8	0.8
Longitudinal Tensile Strain (mm/m)	0.6	0.7	0.8	0.8	0.8
Transverse Compressive Strain (mm/m)	0.9	1.6	1.5	1.7	1.7
Longitudinal Compressive Strain (mm/m)	0.6	0.8	0.6	0.6	0.8
Transverse Hogging Curvature (km ⁻¹)	0.03	0.05	0.05	0.05	0.05
Longitudinal Hogging Curvature (km ⁻¹)	0.04	0.05	0.05	0.05	0.05
Transverse Sagging Curvature (km ⁻¹)	0.06	0.11	0.10	0.11	0.11
Longitudinal Sagging Curvature (km ⁻¹)	0.04	0.05	0.04	0.04	0.05

The maximum predicted cumulative subsidence parameters, after the extraction of each longwall, are shown in Table 1.2.

Table 1.2 Maximum Predicted Cumulative Subsidence Parameters

Subsidence Parameter	LW 22	LW 23	LW 24	LW 25	LW 26
Vertical Subsidence (mm)	503	756	850	892	934
Transverse Tilt (mm/m)	3.5	5.0	4.8	5.2	5.2
Longitudinal Tilt (mm/m)	3.0	4.4	4.9	5.1	5.2
Transverse Tensile Strain (mm/m)	0.4	0.7	0.7	1.0	1.3
Longitudinal Tensile Strain (mm/m)	0.6	0.7	0.8	0.9	0.9
Transverse Compressive Strain (mm/m)	0.9	1.6	1.7	1.7	1.8
Longitudinal Compressive Strain (mm/m)	0.6	0.8	0.8	0.8	0.8
Transverse Hogging Curvature (km ⁻¹)	0.03	0.05	0.05	0.07	0.09
Longitudinal Hogging Curvature (km ⁻¹)	0.04	0.05	0.05	0.06	0.06
Transverse Sagging Curvature (km ⁻¹)	0.06	0.11	0.11	0.11	0.12
Longitudinal Sagging Curvature (km ⁻¹)	0.04	0.05	0.05	0.05	0.05

1.4. Limitations

This Management Plan is based on the predictions of the effects of mining on surface infrastructure as provided in Report No. MSEC157 by Mine Subsidence Engineering Consultants. Predictions are based on the planned configuration of longwalls at Tahmoor Colliery (as shown in Drawing No. MSEC286-0901), along with available geological information and data from numerous subsidence studies for longwalls previously mined in the area.

Infrastructure considered in this Plan has been identified from a SCIMS database search.

The impacts of mining on surface and sub-surface features have been assessed in detail. However, it is recognised that the prediction and assessment of subsidence can be relied upon only to a certain extent. The limitations of the prediction and assessment of mine subsidence are discussed in report MSEC157 by Mine Subsidence Engineering Consultants.

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

1.5. Objectives

The objectives of this Surface Safety and Serviceability Management Plan (SSSMP) are to establish procedures to measure, control, and record potential movements that might occur to permanent survey control marks.

The objectives of the SSSMP have been developed to:-

- Ensure the safe and serviceable operation of all surface infrastructure. Public and workplace safety is paramount. Disruption and inconvenience should be kept to minimal levels.
- Monitor ground movements of permanent survey control marks.
- Notify surveyors and other users that the survey marks are potentially affected by subsidence.
- Provide a forum to report, discuss and record impacts to the surface. This will involve Tahmoor Colliery, Department of Lands, Mine Subsidence Board, Department of Mineral Resources, and consultants as required.
- Establish lines of communication and emergency contacts.

1.6. Scope

The SSSMP is to be used to measure, control, and record potential movements that might occur to permanent survey control marks.

The SSSMP only covers infrastructure that is located within the SMP area, which defines the extent of land that may be affected by mine subsidence as a result of mining Longwalls 24 to 26. The management plan does not include other marks managed by the Department of Lands which lies outside the extent of the general application area.

The Plan also applies to persons employed or engaged by Tahmoor Colliery requiring them to carry out activities described by this Plan.

1.7. Proposed Mining Schedule

It is planned that each longwall will extract coal working northwest from the southeastern ends. This SSSMP covers longwall mining until completion of mining in Longwall 26 and for sufficient time thereafter to allow for completion of subsidence effects. It is proposed that the SSSMP will be in operation until June 2010.

The current schedule of mining is shown in Table 1.3.

Table 1.3 Schedule of Mining

Longwall	Start Date	Completion Date
Longwall 24B	August 2006	March 2007
Longwall 24A	May 2007	September 2007
Longwall 25	October 2007	November 2008
Longwall 26	December 2008	December 2009

1.8. Definition of Active Subsidence Zone

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

This is termed the “active subsidence zone” for the purposes of this SSSMP, where surface monitoring is generally conducted. The active subsidence zone for each longwall is defined by the area bounded by the predicted 20 mm subsidence contour for the active longwall and a distance of 150 metres in front and 450 metres behind the active longwall face, as shown by Fig. 1.1.

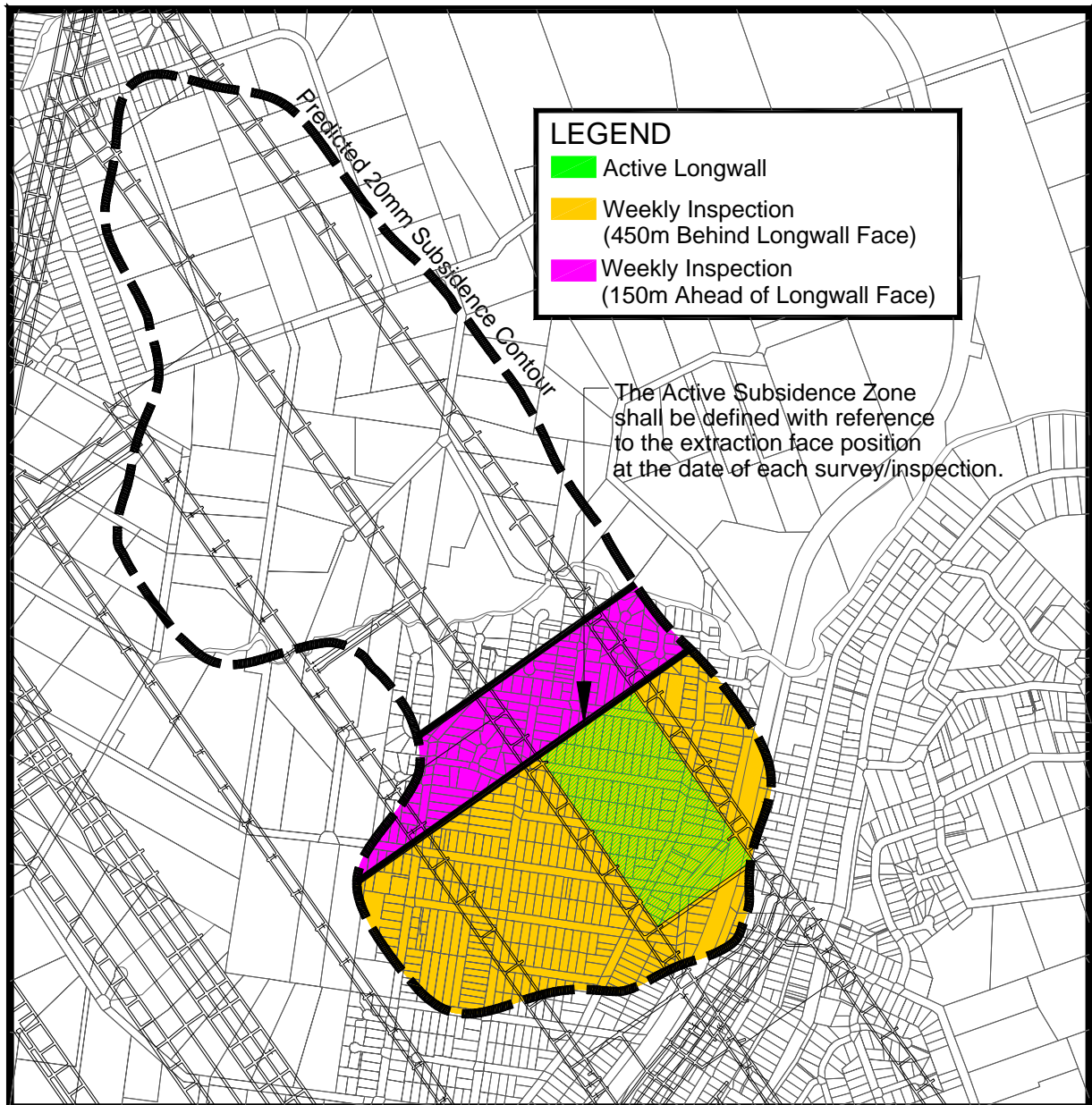


Fig. 1.1 Diagrammatic Representation of Active Subsidence Zone

1.9. Ground Monitoring of Streets

A plan showing the timing of ground monitoring along streets during mining of Longwalls 24 to 26 is shown in Fig. 1.2.

As a general guide, the frequency of ground monitoring within urban areas is every 200 metres of longwall extraction. The timing of surveys within rural areas is determined by the location of street monitoring lines, where a survey has been scheduled to occur when the longwall face has passed each monitoring line by approximately 200 metres.

During the extraction of each longwall, surveys of marks along streets will be undertaken at the scheduled face positions as shown in Fig. 1.2 for all survey marks that are located within the active subsidence zone.

At the completion of each longwall, surveys will be undertaken along the full length of each monitoring line, which is expected to have experienced some subsidence movements as a result of mining the longwall.

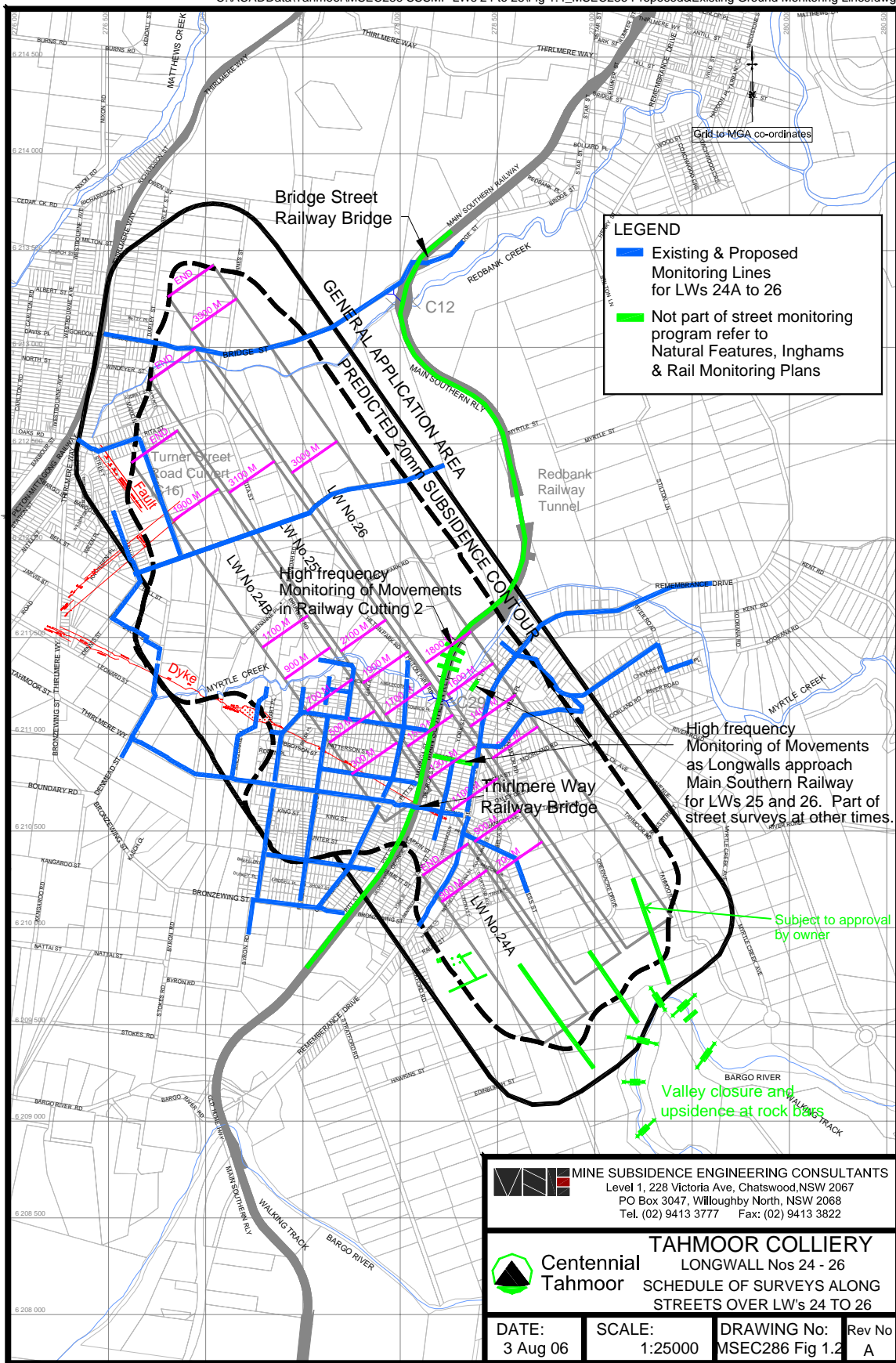


Fig. 1.2 Ground Monitoring along Streets over Longwalls 24 to 26

CHAPTER 2. RISK MANAGEMENT METHOD

2.1. General

The Australian/New Zealand standard for Risk Management defines the terms used in the risk management process, which includes the identification, analysis, assessment, treatment and monitoring of risk. In this context:-

2.1.1. Consequence

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

2.1.2. Likelihood

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

2.1.3. Hazard

‘A source of potential harm or a situation with a potential to cause loss.’³

2.1.4. Risk

‘The chance of something happening that will have an impact upon objectives. It is measured in terms of consequences and likelihood.’⁴ The risk combines the likelihood of an impact occurring with the consequence of the impact occurring. The risk is rated from very low to extreme. In this study, the likelihood and consequence are combined via the qualitative risk analysis matrix shown in Table 2.1, to determine an estimated level of risk for particular events or situations.

The Risk Analysis Matrix is similar to the example provided in AS/NZS 4360:1995, Appendix D, p.25.

Table 2.1 Qualitative Risk Analysis Matrix

LIKELIHOOD	CONSEQUENCES				
	Very Slight	Slight	Moderate	Severe	Very Severe
Almost Certain	Low	Moderate	High	Extreme	Extreme
Likely	Low	Moderate	High	Very High	Extreme
Moderate	Low	Low	Moderate	High	Very High
Unlikely	Very Low	Low	Moderate	High	High
Rare	Very Low	Very Low	Low	Moderate	High
Very Rare	Very Low	Very Low	Low	Moderate	Moderate

This SSSMP adopts a common system of nomenclature to summarise each risk analysis, which is **“LIKELIHOOD / CONSEQUENCE → LEVEL OF RISK”**.

For example, if the likelihood of a risk is assessed as **“UNLIKELY”**, and the consequence of a risk is assessed as **“SEVERE”**, the risk analysis would be summarised as **“UNLIKELY / SEVERE → HIGH”**.

¹ AS/NZS 4360:1999 – Risk Management pp2

² AS/NZS 4360:1999 – Risk Management pp2

³ AS/NZS 4360:1999 – Risk Management pp2

⁴ AS/NZS 4360:1999 – Risk Management pp3

CHAPTER 3. RISK ASSESSMENT

There are 40 Permanent Survey Marks and State Survey Marks located within the general application area, and these will be affected by mine subsidence. The predicted subsidence parameters for these survey marks at the completion of Longwalls 22 to 26 are provided in Table C.1.

There are numerous other survey control marks that lie outside the general application area which are likely to experience either small amounts of subsidence and/or some small regional horizontal displacements as the proposed longwalls are mined. It is possible that other marks that are located up to 3 kilometres outside the general application area will also be affected by regional horizontal displacements.

The risks associated with survey marks are listed below.

- Movement of survey control marks horizontally and vertically; and
- Use of survey control marks by general surveyors, during and after mining prior to recalibration.

3.1. Risk Assessment

It is likely that survey control marks will move horizontally and vertically and require recalibration after the impacts of mine subsidence are finished.

Table 3.1 Risk Assessment for Permanent Survey Control Marks

Hazard / Impact	Consequence	Likelihood	Risk
Movement of Survey Control Marks	SLIGHT	ALMOST CERTAIN	MODERATE
Use of Survey Control Marks by General Surveyors – during and after mining, prior to re-calibration (IF NOT IN SCIMS)	SEVERE	LIKELY	VERY HIGH
Use of Survey Control Marks by General Surveyors – during and after mining, prior to re-calibration (NOTATION IN SCIMS TO INDICATE THAT SURVEY MARKS ARE SUBJECT TO SUBSIDENCE)	SEVERE	VERY RARE	MODERATE
Use of Survey Control Marks by General Surveyors – after re-calibration	NO RISK		

CHAPTER 4. RISK CONTROL PROCEDURES

Infrastructure	Hazard / Impact	Risk	Trigger	Control Procedure/s	Frequency	By Whom?	Updated Risk (including Control Procedure)
Survey Control Marks	Movement of Survey Control Marks	MODERATE	None	Notify Land and Property Information Service of predicted subsidence impacts to permanent survey marks	Before mining – Complete	Tahmoor Colliery - COMPLETE	C = Slight L = Almost Certain R = MODERATE
	Use of Survey Control Marks by General Surveyors – during and after mining, affecting results (prior to re-calibration)	VERY HIGH	None	Provide Longwall update	Weekly	Tahmoor Colliery	C = Severe L = Very Rare R = MODERATE
				Provide survey information	As survey results become available	Tahmoor Colliery	
				Notation in SCIMS that Survey Control Marks are subject to Subsidence.	Before mining	Land and Property Information Service - COMPLETE	
				Notify Land and Property Information Service subsidence has completed	After mining and subsidence are complete	Tahmoor Colliery	
Permanent Survey Marks – re-surveyed	After mining and subsidence are complete	Land and Property Information Service	NEGLIGIBLE RISK				

CHAPTER 5. GEOLOGICAL STRUCTURES AND ANOMALIES

Should any geological structures be discovered or unexpected movement occur on the surface during mining operations, this information should immediately be reported to stakeholders to consider the implications on permanent survey control marks.

CHAPTER 6. RESOURCES

The Risk Control Procedures indicate which party is responsible for each risk control procedure. A contact list is provided in Chapter 10.

CHAPTER 7. MANAGEMENT PLAN REVIEW MEETINGS

The monitoring of natural surface features and surface infrastructure which forms an integral part of this Management Plan will be carried out by Tahmoor Colliery. Management Plan Review Meetings will be held between Tahmoor Colliery, the Department of Lands, the Mine Subsidence Board and / or the Department of Mineral Resources for discussion and resolution of issues raised in the operation of the Management Plan. The frequency of the Plan Review Meetings will be monthly unless agreed otherwise between representatives of each Plan Review Meeting.

A secretary will be appointed at the Plan Review Meeting. All documentation, distribution of meeting minutes and organising of meeting times will be undertaken by the secretary.

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

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

In the event that a significant risk is identified for a particular surface feature, any party may call an emergency Plan Review Meeting, with one day's notice, to discuss proposed actions and to keep other parties informed of developments in the monitoring of the surface feature.

CHAPTER 8. AUDIT AND REVIEW

All Management Plans within this document have been agreed between parties. The Management Plan will be reviewed following extraction of each longwall.

Should an audit of the Management Plan be required during that period, an auditor shall be appointed by the Tahmoor Colliery to review the operation of the Management Plan and report at the next scheduled Plan Review Meeting.

Other factors that may require a review of the Management Plan are:-

- Observation of greater impacts on surface features due to mine subsidence than was previously expected.
- Observation of significant variation between observed and predicted subsidence.

CHAPTER 9. RECORD KEEPING

The secretary will keep and distribute regular minutes of each Plan Review Meeting for each surface feature. The minutes will include reports on the condition of the relevant surface feature, the progress of mining, the degree of mine subsidence that has occurred, comparisons between observed and predicted ground movements, agreements reached between parties, and a log of incidents that have occurred on the surface feature.

CHAPTER 10. CONTACT LIST

Organisation	Contact	Phone	Email / Mail	Fax
Department Primary Industries (Mineral Resources Division)	Phil Steuart	(02) 4942-2300	phil.steuart@minerals.nsw.gov.au	(02) 4942-2323
Department Primary Industries (Mineral Resources Division)	Gang Li	(02) 4942-2300 (0409) 227 986	gang.li@minerals.nsw.gov.au	(02) 4942-2323
Land and Property Information (NSW) – Manager – Survey	Les Gardner		PO Box 143 Bathurst NSW 2795	
Mine Subsidence Board	Darren Bullock	(02) 45771967	d.bullock@minesub.nsw.gov.au	(02) 4677-2040
Mine Subsidence Engineering Consultants (MSEC)	Arthur Waddington Daryl Kay	(02) 99791723	enquiries@minesubsidence.com	(02) 99791726
Tahmoor Colliery	David Clarkson	(02) 46400133	david.clarkson@centennialcoal.com.au	(02) 46400140
Tahmoor Colliery (Senior Mine Surveyor)	Mark Rundle	(02) 46400155	mark.rundle@centennialcoal.com.au	(02) 46400140

Appendix A - Glossary of Terms and Definitions


Glossary of Terms and Definitions

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.
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.
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.
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.
Overlap adjustment factor	A factor that defines the ratio between the maximum incremental subsidence of a panel and the maximum incremental subsidence of that panel if it were the first panel in a series.
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.
Strain	The change in the horizontal distance between two points divided by the original horizontal distance between the points.
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.
Super-critical area	An area of panel greater than the critical area.
Tilt	The difference in subsidence between two points divided by the horizontal distance between the points.
Uplift	An increase in the level of a point relative to its original position.
Upsidence	A reduction in the expected subsidence at a point, being the difference between the predicted subsidence and the subsidence actually measured.

Appendix B – Drawings and Illustrations



 MINE SUBSIDENCE ENGINEERING CONSULTANTS
 1/1767 Pittwater Road - P O Box 1421, Mona Vale NSW 1660
 Tel. (02) 9979 1723 Fax: (02) 9979 1726

 Centennial Tahmoor
TAHMOOR COLLIERY
 LONGWALL Nos 24 - 26
 SURVEY CONTROL MARKS

DATE: 09 Mar 06	SCALE: 1:25000	DRAWING No: MSEC286-0901	Rev No B
--------------------	-------------------	-----------------------------	-------------

Appendix C – Predictions for Permanent Survey Control Marks

Table C.1 - Identification and Subsidence Predictions for Survey Marks

Survey Mark	Easting MGA	Northing MGA	Location to LWS	Subsidence after LW22 (mm)	Subsidence after LW23 (mm)	Subsidence after LW24 (mm)	Subsidence after LW25 (mm)	Subsidence after LW26 (mm)
PM 46899	276459	6212885	Not directly above LWS. Near end of LW25.	0	0	0	0	0
PM 46900	276495	6213160	Not directly above LWS. Near end of LW25.	0	0	0	0	0
PM 46911	277585	6210710	Not directly above LWS. Near end of LW24B.	18	617	861	903	914
PM 46912	278362	6210586	Above LW25.	0	0	3	378	526
PM 46936	278280	6210288	Above LW24A.	0	0	240	379	406
PM 59411	277736	6211085	Above LW24B.	0	10	533	773	820
PM 60506	277857	6210200	Not directly above LWS. Near end of LW24A.	6	36	38	38	38
PM 60507	278094	6210629	Not directly above LWS. Between LW24A and LW24B.	0	11	69	124	141
PM 60508	278252	6211414	Above LW26.	0	0	0	27	633
PM 66479	277405	6213010	Not directly above LWS. Near side of LW26.	0	0	0	0	70
PM 82399	278933	6211108	Not directly above LWS. Near side of LW26.	0	0	0	0	17
SS 103706	277962	6210755	Above LW24B.	0	23	507	724	781
SS 105415	278000	6210987	Above LW25.	0	5	103	578	718
SS 105417	277486	6211175	Above LW24B.	0	5	216	273	279
SS 118551	278447	6210123	Above LW 24A.	0	0	453	779	845
SS 118559	277561	6210577	Not directly above LWS. Near end of LW24B.	65	575	709	735	741
SS 118916	278908	6211189	Not directly above LWS. Near side of LW26.	0	0	0	0	13
SS 118922	278537	6210973	Above LW26.	0	0	0	25	618
SS 121578	278417	6211078	Above LW26.	0	0	1	44	628
SS 122436	277958	6210284	Not directly above LWS. Near end of LW24A.	1	28	33	34	35
SS 130434	277344	6210727	Not directly above LWS. Near side of LW24B.	239	547	606	616	616
SS 133467	278760	6211114	Not directly above LWS. Near side of LW26.	0	0	0	0	56
SS 141049	278051	6211254	Above LW25.	0	0	11	496	804
SS 149216	277746	6211278	Above LW24B.	0	1	211	574	646
SS 1907	278313	6210290	Above LW 24A.	0	0	267	475	515
SS 38015	278005	6210424	Not directly above LWS. Between LW24A and LW24B.	0	15	30	34	35
SS 41446	278310	6210211	Above LW 24A.	0	0	388	598	636
SS 41447	278192	6210129	Above LW 24A.	0	0	109	152	156
SS 41448	278323	6210081	Above LW 24A.	0	0	358	489	510
SS 41449	278266	6209976	Not directly above LWS. Near end of LW24A.	0	0	93	133	136
SS 41450	278145	6209896	Not directly above LWS. Near end of LW24A.	0	0	11	16	16
SS 41451	278114	6209997	Not directly above LWS. Near end of LW24A.	0	0	18	26	26
SS 54834	278345	6210590	Above LW25.	0	0	3	344	474
SS 54835	278425	6210450	Above LW25.	0	0	15	345	472
SS 54839	278575	6210370	Above LW25.	0	0	20	610	889
SS 58554	278025	6211170	Above LW25.	0	0	27	637	874
SS 67669	276466	6212912	Not directly above LWS. Near end of LW25.	0	0	0	0	0
SS 81039	278605	6210700	Above LW26.	0	0	0	97	592
SS 81040	278525	6210680	Above LW25.	0	0	0	263	683
SS 91898	276450	6212139	Not directly above LWS. Near end of LW24B.	0	0	0	0	0