Telstra Corporation Ltd
Network Integrity

SIMEC Mining
Tahmoor Coal N.S.W.

MANAGEMENT PLAN

LONGWALL MINING (LW W1 & W2)
BENEATH TELSTRA PLANT
@ PICTON N.S.W.

Issue 1 7th October 2019

AUTHORISATION OF MANAGEMENT PLAN

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1.0 Introduction

The Tahmoor Coal Mine (Tahmoor Mine) is an underground coal mine located approximately 80 kilometres (km) south-west of Sydney between the towns of Tahmoor and Bargo, New South Wales (NSW). Tahmoor Mine produces up to three million tonnes of Run of Mine (ROM) coal per annum from the Bulli Coal Seam. Tahmoor Mine produces a primary hard coking coal product and a secondary higher ash coking coal product that are used predominantly for coke manufacture for steel production. Product coal is transported via rail to Port Kembla and Newcastle for Australian domestic customers and export customers.

The Tahmoor Mine has been operated by Tahmoor Coal Pty Ltd (Tahmoor Coal) since Tahmoor Mine commenced in 1979 using board and pillar mining methods and via longwall mining methods since 1987. Tahmoor Coal, trading as Tahmoor Coking Coal Operations, is a wholly owned subsidiary within the SIMEC Mining Division (SIMEC) of the GFG Alliance (GFG).

Tahmoor Coal has previously mined 31 longwalls to the north and west of the Tahmoor Mine's current pit top location. Tahmoor Coal is currently mining Longwall 32 in accordance with Development Consents and Subsidence Management Plan Approval.

Tahmoor Coal proposes to extend underground coal mining to the north-west of the Main Southern Railway (referred to as the 'Western Domain') which will include Longwalls West 1 (LW W1) to West 4 (LW W4) at Picton and Thirlmere. The first two longwalls to be mined are LW W1 and Longwall West 2 (LW W2) (collectively referred to as LW W1-W2), which are the focus of this Extraction Plan. The location of these areas is shown in Plate 1.

As part of the planning for mining LW W1–W2, Tahmoor Coal has identified surface assets which may be affected by the mining operation in the Picton west area. Some of these assets belong to Telstra and are part of Telstra's infrastructure in the area. There are current changes underway to ownership of Telstra's external cable and conduit network. Some of the existing communications infrastructure in the area has been or is progressively being transferred to NBNCo as they establish their new network throughout the area.

Telstra will maintain ownership of their existing cable and conduit network while NBNCo will have ownership over their cable installed from the Node or Pillar to the customer's premises, as well as their own Inter Exchange Network (IEN) optical fibre cable network. Hence ownership of the telecommunications network throughout this area is a composite arrangement essentially with NBNCo owning cables from the Node to the customer and their IEN network with Telstra owning the existing cable and conduit network plus main copper and optical fibre cables.

During the extraction of previous longwalls LW22 to LW32 the mining impacts from mine subsidence on the Telstra network that have occurred have been managed satisfactorily from Telstra's perspective. As mining had continued north of the Tahmoor telephone exchange, the potential for impacts on the major network cable infrastructure had varied with the different types of telecommunications infrastructure exposed to mining. Within the Western Domain, the southern area will influence network along Thirlmere Way and Stonequarry Creek Road and the northern area will influence network into Barkers Lodge Road. The two areas present very similar telecommunications infrastructure for subsidence and ground movement consideration. Main IEN optical fibre cables are present in the south and north as well as Customer Access Network (CAN) optical fibre cables to the RIM's PCTK and PCTJ. Note that the Local cable distribution is now owned by NBNCo in the south and north areas. The Telstra manhole, pit and conduit installations support the Telstra cable network also cover both areas south and north. Therefore, primarily the Telstra cable networks potentially impacted by LW W1-W2 are determined geographically in the northern and southern areas within the 20mm subsidence zone as shown in Plate 1.

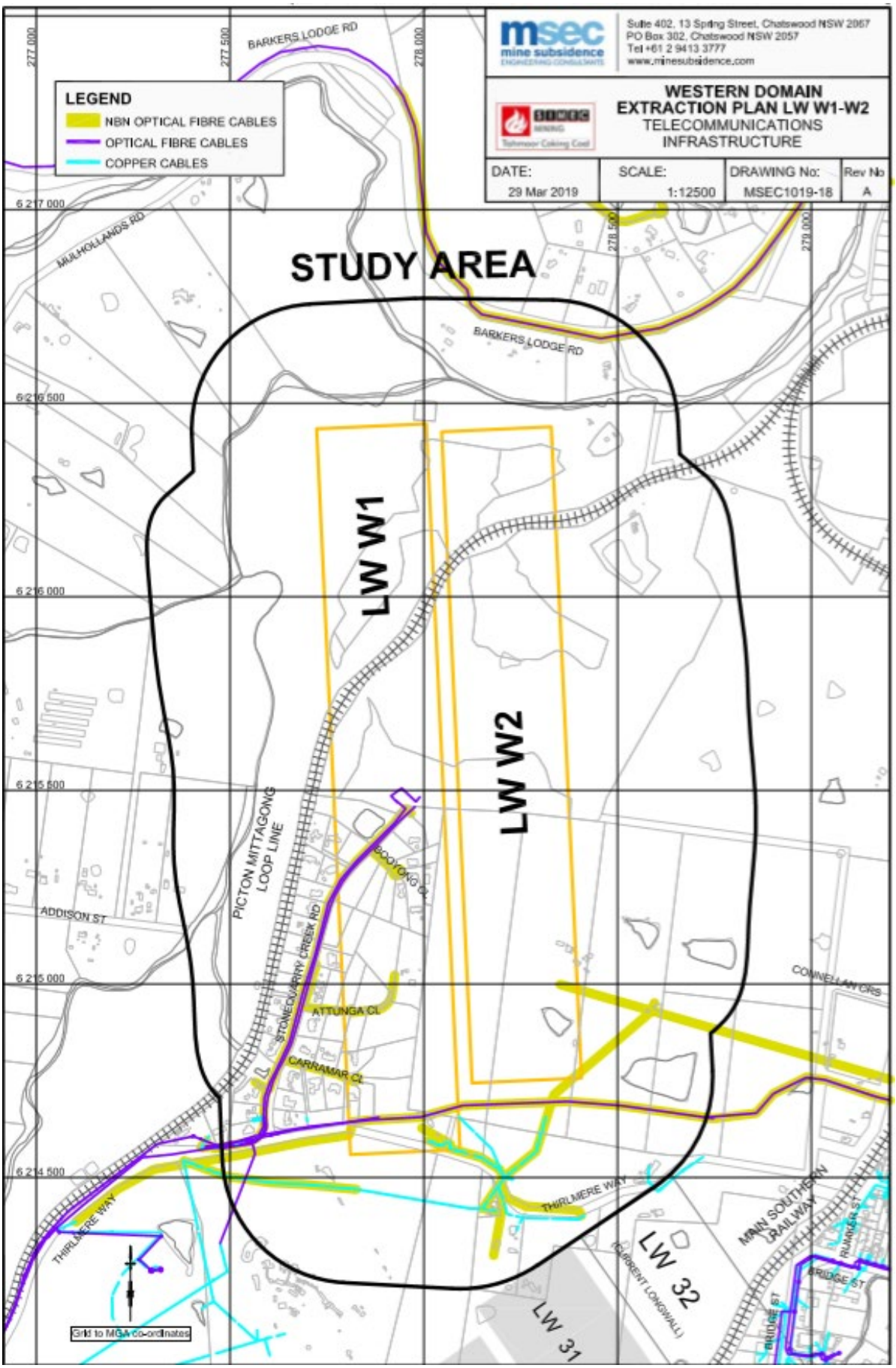


Plate 1:
Telecommunications Infrastructure in Study Area of LW W1-W2 Extraction Plan (MSEC Dwg MSEC1019-18)

1.1) Consultation

1.1.1) Consultation with Telstra

Tahmoor Coal regularly consults with Telstra in relation to mine subsidence effects from mining. This includes consultation during the development of Subsidence Management Plans for previous Longwalls 22 to 32, and regular reporting of subsidence movements and impacts.
Details regarding consultation and engagement are outlined below:

- Meetings with Colin Dove (Comms Network Solutions) in March 2019 to discuss the preparation of the draft Telstra Management Plan for Longwalls LW W1-W2.
- A Risk Assessment was completed by Tahmoor Coal for LW W1-W2 Infrastructure on 26 March 2019, which included the identification of potential risks to Telstra infrastructure.
- Discussions with Telstra Network Integrity regarding completion of Telstra management plan on 15th July 2019 at Parramatta Office

Tahmoor Coal will continue to consult regularly with Telstra during the extraction of LW W1-W2 in relation to progress of longwalls, presentation of survey data and mine subsidence effects from mining.

1.2) Subsidence Predictions (Reference No 1)

The Mine Subsidence Engineering Consultants Pty Ltd Report MSEC1019 Revision A, Reference 1, Section 6.11.4 Telecommunications Services makes the statement that:

> *"TCCO and Telstra have developed and acted in accordance with an agreed risk management plan to manage potential impacts to telecommunications infrastructure during the mining of Longwalls 22 to 31. It is recommended that this management plan is reviewed and updated to incorporate LW W1-W2."*

This management plan for the Telstra network will take into consideration the subsidence predictions for longwall LW W1-W2 as well as utilising the experience gained from the management of the Telstra infrastructure from previous subsidence events due to LW29 to LW32 at Tahmoor Mine.

It is recognised from past experience gained at Tahmoor Mine that the more critical parts of the Telstra network are:

1 Optical Fibre Cable - this is predominantly due to the nature of the cable in that it is only able to sustain relatively low ground compressive and tensile strains before the external sheath transfers the strain to the individual fibres within the cable. When this occurs the individual fibres have limited capacity to tolerate tensile or compressive strains before they cause interruption to or failure of transmission systems. The other concern with optical fibre cables is that they have much larger capacity to carry telephone, data and internet services such that any minor interruption to traffic can cause serious impacts on the overall telecommunications network.

2 Aerial Cable - Aerial cable anchored at adjacent poles or from pole to building can be impacted by ground tilt. Where poles are affected by ground tilt the top of the pole can move such that there is a change in the cable catenary with the potential to either stretch the cable or reduce the ground clearance on the particular cable. There is no aerial cable present in the area subject to mining impacts from LWW1-W2.

Generally, the more extensive Main and Local copper cable network is more robust and able to tolerate reasonable levels of mining induced ground strain. The interaction is complex since the network comprises of very small copper cable of 5mm diameter up to larger and generally more fragile 20mm diameter optical fibre cables, spread diversely in the northern and southern sections of the study areas. As a result, the cables of similar type will be considered together:

a. Local copper cable distribution, direct buried and in conduit in Thirlmere Way, Stonequarry Creek Road and Barkers Lodge Road owned by NBNCo. Not part of Telstra's assets and not considered in this Telstra Management Plan.

b Telstra Optical Fibre Cables

i) Telstra direct buried IEN optical fibre cable crossing the southern end of LW W1 and crossing to the south of LW W2.
ii) Telstra direct buried IEN optical fibre cable crossing the northern end of LW W1 and W2 into the 20mm subsidence zone along Barkers Lodge Road
iii) Telstra CAN optical fibre cable along Stonequarry Creek Road crossing into the western extraction area of LW W1.
iv) Telstra CAN IEN optical fibre cable in conduit, crossing the northern end of LW W1 and W2 into the 20mm subsidence zone along Barkers Lodge Road.

c Two Telstra RIMs (Optical Fibre to Copper Connection)
i) RIM PCTJ – located at the northern end of Stonequarry Creek Road in the western extraction edge of
LW W1 and
ii) RIM PCTK- located within the study area from LWW1-W2 along Barkers Lodge Road

d Cable distribution network consisting of manholes, pits & conduit within the study area supporting both the Telstra cable network.

The total subsidence predictions for these various cable types is as shown below in Table 1extracted from Reference No 1 as included in Appendix A, Sheets 1, 2 & 3.

Table 1

Maximum predicted total vertical subsidence, tilt and curvatures for the optical fibre and copper telecommunications cables

Maximum Predicted Cumulative Subsidence Parameters for LW W1 & W2

Location of Network	Subsidence mm	Tilt mm/m	Curvature (1/km)	Transverse Strain (Applying a factor of 10 to curvature)
IEN Optical fibre & Local direct buried copper cable Crossing LW W1 & south of W2	750	5.5	+0.06, -0.11	0.6mm/m tension 1.1mm/m compression
CAN Optical fibre & Local copper cable Stonequarry Creek Road LW W1	720	2.7	+0.025, -0.05	0.25mm/m tension 0.5mm/m compression
IEN direct buried Optical fibre & Local copper cable Inside 20mm subs zone Barkers Lodge Rd	20	0.0	0.0	0.0mm/m tension 0.0mm/m compression

It is proposed that this management plan will continue the agreement between Telstra and Tahmoor Coal to effectively manage and address the monitoring issues, related to the degree of risk, assessed by Telstra during mining, for the various elements of the Telstra network exposed to mine subsidence from LW W1 and W2 extraction.

1.3) Limitations

The mechanism of mine subsidence and its impact on the Telstra network has now been considered over a large number of longwall mining events in different geographic locations with different types of telecommunications networks present as identified above. The impacts range from undermining of direct buried major interstate optical fibre cables to undermining two pair copper cables servicing one customer. It is known that longwall mining can impact on the transmission characteristics of optical fibre cables, older more brittle lead sheathed cables and aerial cables. In this case since there are two direct buried optical fibre cables located across LW W1, maximum exposure of these two cables is associated with accompanying risk to the Inter Exchange Network. This network carries major internet services, data and telephone traffic between Picton and Tahmoor Exchanges, and are the critical link for maintenance of all services in the Tahmoor – Picton area and beyond through to Bargo and Campbelltown Exchanges.

Also, as mentioned above there are both, Local copper direct buried cables and cables in conduit which are vulnerable to sheath damage or high tensile loads respectively. Since monitoring has been performed on the network during LW24 through to LW32 subsidence events, there is now some basis for assessing the performance of these networks from past experience. Generally, as mentioned it has been found that the older lead sheathed main, junction, local copper cables, and local aerial copper cable distribution networks are vulnerable to ground movement, particularly during exposure to ground tilting. However, within the subsidence zone for LW W1-W2 there are no older lead copper cables or aerial customer distribution cables.

Once the mine subsidence is initiated there is no method of halting the subsidence event and hence, if the degree of ground movement begins to damage communications plant, then the impact is irreversible and repair work is required. This has been done in the past where, through continuous monitoring, vulnerable plant has been identified to be at risk during the event and action has been taken to minimise the risk of any continuing damage to the network. A management plan for Telstra's assets will not necessarily prevent damage but will limit its impact and put in place actions to be taken, should evidence of significant ground movement indicate the potential for damage to occur.

1.4) Objectives

The objectives of this management plan in relation to the Telstra network within the study area are to put in place procedures to be followed:-

a. Ensure the safe and serviceable operation of all surface infrastructure. Public and workplace safety is paramount. Ensure that the health and safety of people who may be present in the vicinity are not put at risk due to mine subsidence.

b. Disruption and inconvenience should be avoided or, if unavoidable, kept to minimal levels.

c. To audit and assess the relative risk, for each section of the Telstra network exposed to mine subsidence.

d. To monitor the impact of mine subsidence and initiate action to mitigate potential damage to the network infrastructure by recording visible changes or changes in transmission characteristics which may affect plant performance.

e. To provide a plan of action, should the subsidence effects impact on the serviceability or performance of plant.

f. Establish a clearly defined decision-making process to ensure timely implementation of risk control measures for high consequence but low likelihood mine subsidence induced hazards that involve potential serious injury or illness to a person or persons that may require emergency evacuation, entry restriction or suspension of work activities.

g. Provide a forum, *Telstra Response Group* (TRG), to report, discuss and record impacts on Telstra plant and transmission performance. The TRG will involve representatives from Tahmoor Coal, Telstra Network Integrity, Subsidence Advisory NSW, Mine Subsidence Engineering Consultants Pty Ltd, and other consultants as required

1.5) Scope

As broadly identified in 1.2) above, the Local cable reticulation in Thirlmere Way, Stonequarry Creek Road and Barkers Lodge Road is now owned by NBNCo while Telstra retains ownership of main cable, manholes, pits and conduit as identified in 1.2) Parts b), c) and d).

This management plan is to be used to assess and protect the performance of the items of the Telstra network identified to be most at risk, due to mine subsidence impacts and to ensure that the health and safety of people who may be present on public property or Telstra property are not put at risk due to mine subsidence. The major items of Telstra plant are considered, according to their location relative to subsidence impacts from LW W1-W2. These items are listed below as items b) to d) and are referred to in the management plan by these reference numbers as also identified in Section 1.2) above.

a) The Local copper customer distribution cable is owned by NBNCo and not considered as part of this Telstra Management plan.

b) Telstra optical fibre cables:

   i) Telstra direct buried IEN optical fibre cable crossing the southern end of LW W1 and crossing to the south of LW W2

   ii) Telstra direct buried IEN optical fibre cable crossing the northern end of LW W1 and W2 into the 20mm subsidence zone along Barkers Lodge Road

   iii) Telstra CAN optical fibre cable along Stonequarry Creek Road crossing into the western extraction area of LW W1

   iv) Telstra CAN & IEN optical fibre cables in conduit, crossing the northern end of LW W1 and W2 into the 20mm subsidence zone along Barkers Lodge Road

c) Two Telstra RIMs at the northern end of Stonequarry Creek Road in the western extraction edge of LW W1 RIM PCTJ and within the 20mm subsidence Zone from LWW1 and W2 along Barkers Lodge Road RIM PCTK

d) Cable distribution network consisting of manholes, pits and conduit over the SMP area supporting the cable networks identified above.

1.6) Timing

As mentioned above longwall LW32 will be completed in September 2019 and LW W1 is anticipated to commence in November 2019. The longwall LW W1 will then take approximately 10 months to mine, working to the south from the northern extent of the longwall. It is anticipated that LW W2 will then commence extraction around 11 months later in October 2020. Therefore, this management plan covering the longwall mining under Telstra plant at Picton West will continue in operation until completion of mining of LW W2, anticipated towards the middle of 2021 and for sufficient period of time thereafter to allow for completion of subsidence effects.

1.7) Definitions

CAN - Customer Access Network, the cable distribution network which provides communications services direct to customers premises.

Main Cable – Subscriber main copper cable providing pairs of copper conductors between the exchange and the distribution point or cross connect point generally a pillar location, i.e. Pillar P8.

Local Cable – NBNCo customer local copper cable providing pairs of copper conductors between the Pillar or Node distribution point and the customer's premises. This cable may be directly buried or installed in conduit or use aerial distribution to the individual premises.

NI :- Telstra Network Integrity responsible for the protection of the Telstra external plant network.

OTDR :- Optical Time Domain Reflectometer, used to determine loss characteristics for transmission systems on optical fibre cables. General used for testing quality of individual optical fibres with testing at 1625nm at higher frequency than transmission systems, to provide early warning of possible transmission loss in the system.

Pillar – Is the interconnection point between the local cable leading to the customer's premises and the Main cable from the exchange. It provides flexibility within the Customer Access Network to connect new and disconnect cancelled services. The main telephone exchange distribution area is broken up into smaller distribution areas where the individual pillar provides the connection between the exchange and the customer. Note that with the rollout of NBNCo this section of the Telstra cable network will be divested from Telstra to NBNCo.

RIM – This is an external cabinet located generally in the road reserve as a stand-alone cross connect unit which allows improved transmission systems in telephone and data traffic to be provided to generally to rural customers who are located generally more than 5.0 kilometers from their local exchange. The transmission system from the local exchange to more remote locations is provided by optical fibre cable to the RIM and the customer feed is then by traditional Local copper cable distribution from the RIM. From one pair of optical fibres into the RIM up to 560 customers can be remotely connected to the local exchange.

Telstra Response Group: (TRG) Regularly convened forum, to meet as required by Telstra or Tahmoor Coal, to meet via teleconference, to implement this management plan, in regard to the monitoring and performance of the Telstra network during mine subsidence. Participants from Tahmoor Coal, Telstra NI, Mine Subsidence Engineering Consultants Pty Ltd, Subsidence Advisory NSW and consultants as required as identified in the Contact List (Section 10) to be involved in any discussions considered necessary.

1.8) NSW Work Health and Safety Legislation

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

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

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

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

- *Complying with any specific requirements under the WHS laws.*
- *Identifying reasonably foreseeable hazards that could give rise to health and safety risks.*
- *Ensuring that a competent person assesses the risk.*
- *Eliminating risks to health and safety so far as is reasonably practicable.*
- *Minimising risks so far as is reasonably practicable by applying the hierarchy of control measures, any risks that it is are not reasonably practical to eliminate.*
- *Maintaining control measures.*
- *Reviewing control measures.*

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

- *The health and safety of workers at the mine, and*

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

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

1. Identification and understanding of subsidence hazards.
2. Assessment of risks of subsidence.
3. Development and selection of risk control measures.
4. Implementation and maintenance of risk control measures, and
5. Continual improvement and change management.

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

1. Consultation, co-operation and co-ordination, and
2. Monitoring and review.

This management plan documents the risk control measures that are planned to manage risks to health and safety associated with the mining of LW W1-W2 in accordance with the WHS laws.

2.0) Principal Risks Identified

In relation to the assets identified in 1.6) item a) to c) above, the following are the assessed relative risks associated with existing Telstra plant within the study area as shown in Appendix A Sheet 1. The items of plant have been assessed according to the probability of damage and the consequences resulting from that damage, associated with that general category of plant. The Risk Factors, from low to high, are shown in the attached Table 2.

Table 2
Relative Risk Factor for Telstra Plant.

Risk Assessment Matrix		**Consequence**				
		Insignificant	**Minor**	**Moderate**	**Major**	**Catastrophic**
Likelihood	**Almost Certain**	Significant	Significant	High	High	High
	Likely	Moderate	Significant	Significant	High	High
	Moderate	Low	Moderate	Significant	High	High
	Unlikely	Low	Low	Moderate	Significant	High
	Rare	Low	Low	Moderate	Significant	Significant

a) As noted above the Local copper customer distribution cable is owned by NBNCo and not considered as part of this Telstra Management Plan.

b) Telstra optical fibre cables

i) Telstra direct buried IEN optical fibre cables crossing the southern end of LW W1 and crossing to the south of LW W2.

The Telstra cable F PCTN 103 12f SMOF cable is a small diameter standard construction cable that is direct buried through this relatively inaccessible area from public roads. Therefore, since the cable line is not easily accessible for inspection and maintenance and is a relatively old cable it is considered that this cable is vulnerable to direct tensile and compressive ground strains generated across LW W1-W2. The risk factor is assessed to be associated with a likely likelihood, major consequence, and an overall **high** risk**.**

ii) Telstra direct buried IEN optical fibre cable crossing the northern end of LW W1 and W2

This direct buried Telstra cable is installed along the southern side of Barkers Lodge Road just with the study area. It is a similar direct buried optical fibre cable F LKLD 101 18f SMOF to the Telstra cable in i) above. However, since there is no predicted ground strain in this area, the only concern is far field movement and potential damage to the cable. Therefore, the risk factor is assessed to be associated with a rare likelihood, major consequence, and an overall **Significant** risk**.** The consequence is Major due to the fact that if any loss of service was to occur on this cable the area known as Lakesland eight kilometers west of Picton would have their telecommunications services isolated from the surrounding areas. See Plate 3 below.

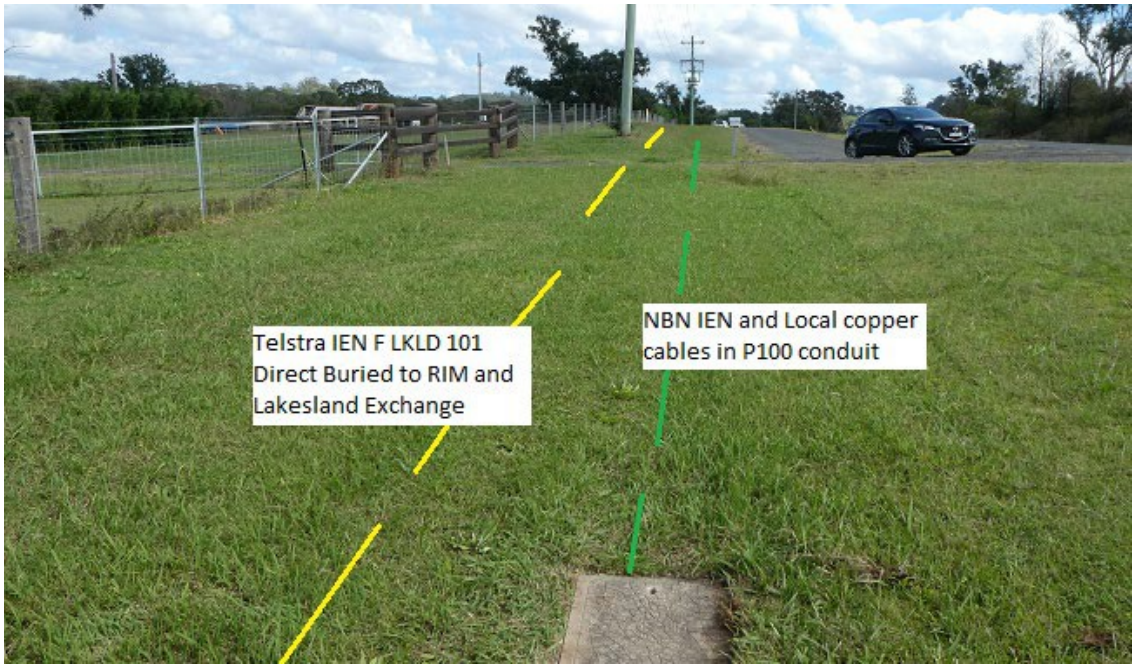


Plate 2:
View of No 6 Pit in Barkers Lodge Road looking west towards RIM showing alignment of direct buried Telstra optical fibre cable F LKLD 101 18f installed along the southern side of the road alignment within the road reserve.

iii) Telstra CAN optical fibre cable along Stonequarry Creek Road.

This cable is installed along the western footpath alignment of Stonequarry Creek Road to the Telstra RIM PCTJ located at the northern end of Stonequarry Creek Road, crossing the LW W1 diagonally from west to east. The Telstra optical fibre cable is installed in conduit but carries the main connections for the Telstra RIM PCTJ at the northern end of Stonequarry Creek Road. This conduit and Telstra cable almost crosses the full width of LW W1 and will be exposed to both travelling and transverse ground strains over a length of around 300m. This exposure combined with the fact that if damage were to occur to the buried conduit, a significant number of customers in and around Stonequarry Creek Road would lose all internet and telephone services, leads to a relatively high-risk factor. Hence the risk factor is assessed to be associated with a moderate likelihood with moderate consequences, and an overall **Significant** risk**.**

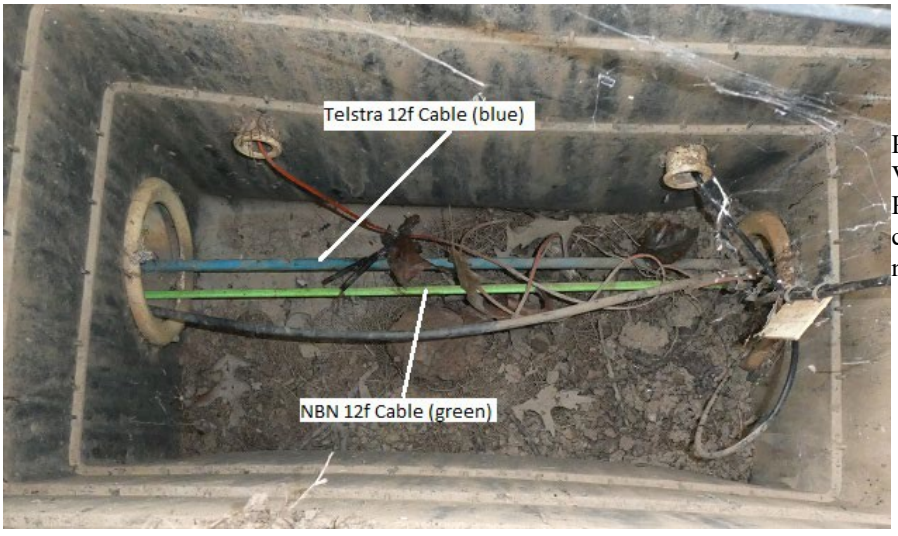


Plate 3:
View of No5 Pit in Stonequarry Creek Road showing the Telstra optical fibre cable (blue) cables to the RIM at the northern end of the road.

iii) Telstra CAN and IEN optical fibre cables in conduit, crossing the northern end of LW W1 and W2

At the RIM PCTK the optical fibre CAN cable is installed in conduit. For the Telstra cable F LKLD 101 AO to PCTJ, the critical issue is that there is no far field impact on the direct buried IEN cable feeding into the RIM. The RIM is fed from a joint on the direct buried IEN cable. Hence there is no specific risk to these cables from far field impacts since they are in conduit, the risk however, is to the Telstra network as identified in section b) ii) above. Therefore, as identified in section b) ii) above the risk factor for the continuous operation of the Telstra RIM PCTK is the same as for the direct buried IEN cable F LKLD 101, and is associated with a rare likelihood, major consequence, and an overall s**ignificant** risk.

a) Two Telstra RIMs at the northern end of Stonequarry Creek Road RIM PCTJ and in Barkers Lodge Road RIM PCTK

The Telstra RIMs function as a Node to provide interconnections between the optical fibre broadband link into the copper cable services to customers. The two RIMs, within the study area of the longwall mining, are located in high and low subsidence areas. The RIM PCTK is just within the LW W1-W2 study area along Barkers Lodge Road and will be subject to relatively low subsidence impacts. The location is shown in Plate 4 below.

Plate 4:
View of RIM PCTK located in the old alignment of Barkers lodge Road just inside the northern boundary of the study area in the low impact area. The RIM is fed by optical fibre out of the direct buried Telstra IEN cable F LKLD 101 from Picton exchange.

This RIM PCTK, due its location with little if any ground movement predicted, is not at risk from mine impacts directly, more so from potential far field impacts on the direct buried optical fibre cable F LKLD 101 providing services to the RIM. Hence as identified in b) ii) above the risk factor is assessed to be associated with a rare likelihood, major consequence, and an overall **significant** risk.

The second RIM PCTJ in the higher subsidence zone is influenced by potential mining impacts since it is located in the eastern extraction area of LW W1 at the northern end of Stonequarry Creek Road. The risk associated with the serviceability of the RIM is that there is mine induced ground tilt or movement in the base slab which may impact on the underground power supply and or optical fibre cable feed into the RIM or copper customer services out of the RIM. Each RIM through the broadband optical fibre cable connection can support up to 480 copper customer services. Hence the maintenance of this network is vital to the overall operation of telecommunications, data and internet services in the area surrounding the RIM. The subsidence predictions for Prediction Line 1, near the end of Stonequarry Creek Road and the RIM location are:-

- Subsidence 700mm
- Tilt +/– 2mm/m
- Ground Strain 0.5mm/m compression to 0.2mm/m tension

There is therefore some risk to the operation of the RIM due to potential mining impacts and the risk factor for the RIM is assessed as moderate likelihood with major consequence since transmission capacity to or from the RIM could be affected by ground movement therefore the risk factor is assessed as **significant.** See Plate 5 below.

Plate 5:
View of RIM PCTJ located at the northern end of Stonequarry Creek Road over the eastern extraction edge of LW W1. This RIM is fed by IEN optical fibre cable F PCTN 103 from Picton exchange with an optical fibre cable spur line along Stonequarry Creek Road from the joint at Thirlmere Way.

b) Manhole, Conduit & Pit Network.

The conduit, manhole and pit network are the critical factor in the performance of the cable network during mine subsidence accepting that there are also direct buried cables in the network not supported by conduit. Although the possibility of differential movement between the components of this network, due to mine subsidence is low, due to the large geographical extent of the network, its lack of homogeneity and its differing age, it is considered to be an important factor in the performance of the entire cable network. The conduit, manholes and pits provide the primary isolation of the cable network from ground movement and strain. In addition, because of the variation in the components of this network it is also the most difficult item of plant to assess for potential risk of damage. The main concern in this network is the performance of the older asbestos pits, however these are only present outside of the direct mining areas along Thirlmere Way and Barkers Lodge Road. The large pits along Stonequarry Creek Road are all HDPE (polyethylene) construction making them far less vulnerable to ground movement impacts than the heavier asbestos or concrete pits located in adjacent areas. Within this extensive geographical area, the conduit network is comprised of varying sized PVC conduit (20-100mm dia.) and pits which are generally considered to be at a low level of risk of damage from ground movement or strain developed across the study area. The risk assessment for the manhole, conduit and pit network is considered to be associated with an unlikely likelihood, minor consequence, and an overall **low** risk.

2.1) Identification of subsidence hazards that could give rise to risks to health and safety

Clause 34 of the *Work Health and Safety Regulation (2017)* requires that the duty holder (in this case Tahmoor Coal), in managing risks to health and safety, must identify reasonably foreseeable hazards that could give rise to risks to health and safety.
This section of the management plan summarises hazards that have been identified which could rise to risks to health and safety of people in the vicinity of Telstra infrastructure.
Mine subsidence hazards have been identified, investigated and analysed in a systematic manner by examining each aspect of the infrastructure, as described in Section 2.0 of this management plan. Each of the aspects below could potentially experience mine subsidence movements that give rise to risks to the health and safety of people:

b) Telstra optical fibre cables

i) Telstra direct buried IEN optical fibre cables crossing the southern end of LW W1 and crossing to the south of LW W2

ii) Telstra direct buried IEN optical fibre cable crossing the northern end of LW W1 and W2 into the 20mm subsidence zone along Barkers Lodge Road

iii) Telstra CAN optical fibre cable along Stonequarry Creek Road crossing into the western extraction area of LW W1

iv) Telstra CAN optical fibre cable in conduit, crossing the northern end of LW W1 and W2 into the 20mm subsidence zone along Barkers Lodge Road

c) Two Telstra RIMs at the northern end of Stonequarry Creek Road RIM PCTJ south and RIM PCTK north

d) Cable distribution network consisting of manholes, pits and conduit over the SMP area supporting the cable networks identified above.

The following mine subsidence hazards were identified that could give rise to risks to health and safety due to the extraction of Longwall LW W1-W2.

- Temporary loss of telecommunication IEN or CAN services.
- Tensile pulling of consumer lines at customer connections.
- Disruption of telecommunication services into or out of RIMs

The identification and risk assessment process took into account the location of infrastructure relative to LW W1-W2 and the associated timing and duration of the subsidence event, as described in this management plan.

Whilst mine subsidence predictions and extensive past experiences from previous mining at Tahmoor Coal were taken into account, the identification and risk assessment process recognised that there are uncertainties in relation to predicting subsidence movements, and uncertainties in how mine subsidence movements may adversely impact Telstra infrastructure. In this case, creeks and geological structures have been mapped that intersect Telstra infrastructure.

Tahmoor Coal has considered the outcomes of the hazard identification and risk assessment process when developing measures to manage potential impacts on the health and safety of people, and potential impacts on Telstra infrastructure in general. These are described below in Section 3 of this management plan and the details of the Tahmoor Coal Risk Assessmemt process are attached as Appendix B and C to this management plan for reference.

3.0) Control Procedure

(Refer also to Appendix B & C for details)

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

1. Eliminate risks to health and safety so far as is reasonably practicable, and

2. If it is not reasonably practicable to eliminate risks to health and safety – minimise those risks so far as is reasonably practicable, by doing one or more of the following:

   (a) Substituting (wholly or partly) the hazard giving rise to the risk with something that gives rise to a lesser risk.

   (b) Isolating the hazard from any person exposed to it.

(c) Implementing engineering controls.

3. If a risk then remains, minimise the remaining risk, so far as is reasonably practicable, by implementing administrative controls.

4. If a risk then remains, the duty holder must minimise the remaining risk, so far as is reasonably practicable, by ensuring the provision and use of suitable personal protective equipment.

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

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

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

Tahmoor Coal considered Method A and Method B risk control measures in relation to managing potential impacts on Telstra infrastructure due to the extraction of LW W1 -W2.

The following considerations have been made by Tahmoor Coal with regards to impact to Telstra infrastructures:

- Elimination - In this instance, no reasonably practicable controls could be identified that would eliminate the identified risks.
- Substitution - In this instance, no reasonably practicable controls could be identified that will change the environment so the hazards could be substituted for hazards with a lesser risk.
- Isolation - In this instance, no reasonably practicable controls could be identified to isolate a hazard from any person exposed to it.
- Engineering Controls - In this instance, no reasonably practicable controls could be identified to put in place a structure or item that prevents or minimises risks.
  Administrative Controls -
- Tahmoor Coal and Telstra have developed and implemented Administrative Controls that will put in place procedures to minimise the potential of impacts on the health and safety of people associated with damage to Telstra infrastructure.

Tahmoor Coal and Telstra have developed a management strategy of detecting early the development of potential adverse subsidence movements in the ground, so that contingency response measures can be implemented before impacts on the safety and serviceability develop. These measures are itemized in **Table 3** of this management plan.

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

With respect to the extraction of LW W1-W2, no potential hazards have been identified that could reasonably give rise to the need for an emergency response. Of the potential hazards identified, only a complete loss of mobile and fixed line services could possibly give rise to the need for an emergency response. The likelihood is considered remote and would require substantial differential subsidence movements at multiple locations to develop before such an event occurs.

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

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

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

3.1) General

As discussed in Item 1.1) above there is now information available on the performance of Telstra plant due to ground subsidence caused by longwall mining operations in the past. The current information available is from experience gained at Appin, Tahmoor - Thirlmere, Helensburgh, West Wallsend, Camberwell and Broke in NSW. The longwall mining operation at Thirlmere / Tahmoor provides a continuing opportunity to gather information on the performance of the network, needed to understand the interaction between ground movement and the Telstra plant, comprising both robust and also relatively sensitive elements of the network.

The general control procedure considered in this management plan is to look at each item of plant described in Section 2.0) Items b) to d) and determine the practical level of monitoring that can be performed according to the assessed risk factor applied. The monitoring described for the plant identified should be completed during the ground subsidence events occurring at the particular location as the longwall progresses. In addition, Table 3, is a summary of recommendations for monitoring procedures and basic actions to be taken during mining, should the potential for damage be indicated by surface impacts, cable testing or from survey data.

Since there are similar types of cable involved and the proposed monitoring methods for each cable type are similar, they have been grouped together below and in Table 3 to simplify the discussion and management of the network during ground subsidence.

b) Telstra optical fibre cable

i) Telstra direct buried IEN optical fibre cable F PCTN 103 crossing the southern end of LW W1 and crossing to the south of LW W2.
Risk Factor is assessed to be associated with a likely likelihood, major consequence, and an overall **high** risk.

This Telstra cable F PCTN 103 12f SMOF cable is a direct buried cable approximately 80m to the south of LW W2 and across the southern end of LW W1 approximately 160m inside the longwall from the commencing end. The cable for the majority of this section of the route is installed across rural undulating grazing land with the cable route across the longwalls to the north by an average of around 150m from Thirlmere Way as shown in Plate 1 and Plate 6 below.

Plate 6:
View of Telstra IEN cable to the south of LW W2 running east west around 150m north of Thirlmere Way.

In this case there is little value in physical inspection of the cable line during mining. Therefore, it is proposed to monitor the Telstra cable through this vulnerable area of the cable route across LW W1 W2.
Due to the importance of these two IEN cables a monitoring regime will be maintained on the cable consisting of :-

- Physical inspection along Thirlmere Way along the accessible section of the cable line,
- Analysis of survey data by Tahmoor Coal surveyors for Thirlmere Way
- Cable monitoring, including testing spare fibres in the cable F PCTN 103 from either Picton or Tahmoor exchanges to identify the relevant section of the cable crossing LW W1 & W2. This OTDR fibre testing across the longwalls will be carried out by Comms Network Solutions Pty Ltd from Picton or Tahmoor exchange through the mining area. This specialized individual fibre testing can confirm that there are no or very low levels of transmission loss present on the cable. The trigger levels and actions for the cable monitoring which will be at 1625nm on individual fibres, to determine any loss characteristics present, will be set as follows:-

In the event of loss being recorded of (+ or –) 0.3 dB then:-

- The point loss or area of loss should be recorded and an investigation carried out of the direct buried cable line at that location to determine if any ground movement is evident, i.e. ground compression / tension along the cable line and analysis of any relevant survey data.
- The loss event should continue to be continuously monitored and should the loss progress to (+ or -) 0.5dB then the cable should be exposed at the recorded location to attempt to relieve pressure or tension/compression on the cable due to ground strain.
- In the event of the loss on the cable continuing excepting that exposure has not relieved or reduced the transmission loss and that loss exceeds 1dB an interruption cable should be laid and pits installed in preparation for cable cutover of the cable if considered necessary.

Survey data for the centre line of the longwalls should also be provided to Telstra at regular intervals to determine the degree of anomalous ground movement.

ii) Telstra direct buried IEN optical fibre cable F LKLD 101 crossing the northern end of LW W1 and W2
The Risk Factor is assessed to be associated with rare likelihood, major consequence, and an overall **significant** risk.

This Telstra cable is installed along the southern side of Barkers Lodge Road just within the study area. It is a similar direct buried standard construction optical fibre cable F LKLD 101 18f SMOF to the F PCTN 103 cable as described in b) i) above. However, since there is no predicted ground strain in this area the only concern is far field movement and potential damage to the cable. Since this is also a Telstra IEN cable there is potential for isolation of the RIM PCTK and Lakesland telephone exchange from Picton and the surrounding areas.
Therefore, as described in b) i) above this cable will be monitored from Picton Exchange during the final 350m of extraction of LW W1-W2. Survey data from Tahmoor Coal surveyors will also be reviewed to determine if more regular cable testing is required or which areas to specifically investigate along the cable route.

iii) Telstra F PCTN 103 AZ-BG optical fibre cable to RIM PCTJ along Stonequarry Creek Road. The risk factor is assessed to be associated with moderate likelihood, moderate consequence, and an overall **significant** risk.

This cable is installed along the western footpath alignment of Stonequarry Creek Road to the Telstra RIM PCTK located at the northern end of Stonequarry Creek Road crossing the LW W1 diagonally from west to east.

The Telstra optical fibre F PCTN 103 AZ-BG is installed in conduit and carries the main connections for the Telstra RIM PCTJ to the northern end of Stonequarry Creek Road and also makes a diagonal crossing of LW W1. This exposure combined with the fact that if damage were to occur to the buried conduit, a significant number of customers in and around Stonequarry Creek Road would lose all internet and telephone services. Hence again as with a) i) and ii) above this cable will be monitored on spare fibre along Stonequarry Creek Road by CNS Pty Ltd using an OTDR at 1625nm with cable testing at regular intervals while extraction is occurring in LW W1 until the longwall extraction is approximately 350m past the northern end of Stonequarry Creek Road. Survey data from Tahmoor Coal surveyors will also be reviewed to determine if more regular cable testing is required or which areas to specifically investigate along the cable route.

iv) Telstra CAN cable F LKLD 101 AO to PCTJ in conduit, crossing the northern end of LW W1
The risk factor is assessed to be associated with rare likelihood, major consequence, and an overall **significant** risk.

At the RIM on Barkers Lodge Road PCTJ, the optical fibre CAN Telstra cable is installed in conduit. For this cable F LKLD 101 AO to PCTJ, the critical issue is that there is no far field impact on the direct buried IEN cable F LKLD 101 to the east, as the RIM is fed from a joint on the direct buried IEN cable. Hence there is no specific risk to this cable from far field impacts, the risk to the Telstra network however, is as identified in section a) ii) above.

Therefore, the cable monitoring regime to cover these two cables is as identified in a) ii) above combined with relevant survey data to be provided to Telstra for the area along Barkers Lodge Road to determine if there is any specific anomalous ground movement that requires investigation.

c) Two Telstra RIMs at the northern end of Stonequarry Creek Road RIM PCTJ and in Barkers Lodge Road RIM PCTK

The Risk Factor is assessed as **significant** for both RIMs due primarily to the risk associated from mining to the direct buried optical fibre cables supplying the broadband links to these RIMs.

The concern from Telstra's perspective for both RIMs is principally anomalous ground movement affecting optical fibre cable broadband services to and from these interconnecting cabinets. Therefore, as outlined above in b) ii), iii) & iv) above the proposed monitoring regime will be to monitor the optical fibre cables supplying services to the RIMs using OTDR monitoring at 1625nm.

The cable monitoring will be combined with analysing survey data supplied by Tahmoor Coal surveyors to Telstra for the two areas along Stonequarry Creek Road and Barkers Lodge Road to determine if more regular cable testing is required to address any issues of anomalous ground movement that may become evident during mining. It is further recommended that survey marks be established on or near the corners of the RIM PCTJ in Stonequarry Creek Road to monitor ground subsidence that will occur at the RIM.

d) Manhole, Conduit & Pit Network.

The Risk Factor is considered to be associated with an unlikely likelihood, minor consequence, and an overall **low** risk.

The cable distribution network is obviously subject to the greatest risk of damage in the areas of maximum subsidence, however in this case for LW W1-W2, there is a relatively small amount of the network exposed to subsidence impacts along the northern end of Stonequarry Creek Road and this network consists of plastic jointing pits and relatively newer uPVC conduit installation. The remainder of the network to the north of Thirlmere Way into the south-eastern side of LW W1 is a combination of pit and conduit and direct buried cable.

For all areas of cable exposure to potential mining impacts it is recommended that the cable routes and pit network be inspected regularly during critical subsidence impacts at each location. This will include inspections along parts of Stonequarry Creek Road and areas off Thirlmere Way at varying times during mining. Additionally, the surface area above the conduit will be "walked over", to note any changes in road pavement or in the footpath area, which may indicate excessive ground strains potentially impacting on the conduit and cable network.

3.2) Surface Subsidence Survey

The control procedure for the Telstra network should be supplemented by ground surveys carried out by Tahmoor Coal at agreed time intervals along agreed base lines of Stonequarry Creek Road, Thirlmere Way and Barkers Lodge Road recording:-

- Initial RL of the surface prior to mining commencing.
- Incremental subsidence over the agreed period.
- Incremental ground strain over the agreed period.
- Incremental ground tilt over the agreed period.

It is also recommended by Telstra that in association with survey marks established along Stonequarry Creek Road that survey marks be established at or near the corners of the RIM PCTJ located to the west of the northern end of Stonequarry Creek Road.

The frequency of the survey and the reporting of the results, to the TPG, are to be agreed by the members of the TPG, at each regular meeting of the group. The initial meeting should agree on the limits of the survey lines and set the initial frequency of the survey work.

Refer to the following table, Table 3, which presents a Summary of the Telstra Plant, Risk Factor, Monitoring and Actions required for items of plant, which may be impacted by mine subsidence. Note that in the Table 3 items of plant have been grouped according to the monitoring technique outlined above and identified by the item numbers previously assigned, items a) to d).

Table 3 - Summary of Monitoring Procedures and Actions

Item of Plant	Risk Factor	Method Levels	Monitoring Details	Frequency	Trigger	Actions and Responsibilities
b) Telstra optical fibre cable i) Telstra (F PCTN 103) direct buried IEN optical fibre cables	High	Base line OTDR Testing.	OTDR Testing @ 1625nm of F PCTN 103 over LW W1 & W2 by CNS P/L from TAMR or PCTN exchange	OTDR test then fortnightly / weekly during critical subsidence events.	OTDR loss on fibre <0.3dB.	CNS P/L (Colin Dove) to report trigger levels to Telstra Response Group (TRG) for decision on action to be taken as considered necessary by Telstra representatives to protect the cable.
b) Telstra optical fibre cable ii) Telstra direct buried IEN optical fibre cable F LKLD 101	Significant	Survey cable line Base line OTDR Testing.	Tahmoor Coal to survey along Barkers Lodge Road. OTDR Testing @ 1625nm of F LKLD 101 by CNS from PCTN Exchange	Initial survey & OTDR test then fortnightly / weekly during critical subsidence events	Ground Strain > 1mm/m, OTDR loss on fibre <0.3dB.	Tahmoor Coal or CNS P/L (Colin Dove) to report trigger levels to TRG for decision on action to be taken as considered necessary by Telstra representatives to protect the cables.
b) Telstra optical fibre cable iii) Telstra CAN optical fibre cable along Stonequarry Creek Road to RIM -PCTJ	Significant	Survey cable line Base line OTDR Testing.	Tahmoor Coal to survey cable line along Stonequarry Creek Rd. OTDR Testing @ 1625nm of F PCTN 103 AZ-BG by CNS PL from RIM south.	Initial survey & OTDR test then fortnightly / weekly during critical subsidence events.	Ground Strain > 1mm/m, OTDR loss on fibre <0.3dB.	Tahmoor Coal or CNS P/L (Colin Dove) to report trigger levels to TRG for decision on action to be taken as considered necessary by Telstra representatives to protect their cable.

Item of Plant	Risk Factor	Method Levels	Monitoring Details	Frequency	Trigger	Actions and Responsibilities
b) Telstra optical fibre cable iv) Telstra CAN optical fibre cable to RIM -PCTK	Significant	Survey cable line Base line OTDR Testing.	Tahmoor Coal to survey cable line along Barkers Lodge Road OTDR Testing @ 1625nm of F LKLD 101 AO-PCTK in area of RIM by CNS PL from RIM to joint west	Initial survey & OTDR test then fortnightly / weekly during critical subsidence events.	Ground Strain > 1mm/m, OTDR loss on fibre <0.3dB.	Tahmoor Coal or CNS P/L (Colin Dove) to report trigger levels to TRG for decision on action to be taken as considered necessary by Telstra representatives to protect their cable.
c) Two Telstra RIMs PCTJ and in Barkers & PCTK	Significant	Survey line to be established at RIM PCTJ Base line OTDR Testing of cables.	Tahmoor Coal to survey cable line along Barkers Lodge & Stonequarry Creek Roads and at both RIM's PCTJ & PCTK OTDR Testing @ 1625nm of F LKLD 101 & F PCTN 103 AZ-BG & F LKLD 101 AO-PCTK by CNS PL as identified in b) parts iii) & iv) above.	Initial survey & OTDR test then fortnightly / weekly during critical subsidence events	Ground Strain > 1mm/m, OTDR loss on fibre <0.3dB.	Tahmoor Coal or CNS P/L (Colin Dove) to report trigger levels to TRG for decision on action to be taken as considered necessary by Telstra representatives to protect operation of and services to both RIMs
d) Conduit, Manhole Pit & Pole Network	Low	Monitor conduit & cable movement in pits and manholes concurrent with cable testing as outlined above.	Monitor conduit & cable movement in Stonequarry Creek & Barkers Lodge Roads during subsidence period from LW W1 & W2 impacting on each particular area.	Prior to mining then as determined by longwall progress and as required by TRG.	Visual check of active section being monitored. If significant surface movement impacting on network check distribution cables in conduit network.	Should surface damage occur or survey data indicate anomalous movement check conduit pit and manhole network in this area. C Dove to advise Telstra & TRG of any damage evident and maintenance or repair work considered necessary.

Item of Plant	Risk Factor	Method Levels	Monitoring Details	Frequency	Trigger	Actions and Responsibilities
Survey Line	Not Applicable	Establish permanent marks at approx. 20 metre intervals along roads & cable lines where network is installed.	Tahmoor Coal to carry out detail survey, (subsidence, strain and tilt recorded) along Stonequarry Creek & Barkers Lodge Roads for LW W1 & W2. Tahmoor Coal to provide survey results to TRG and Telstra representatives concurrent with mine progress.	To be determined by TRG dependent on degree of subsidence occurring and potential hazard to Telstra plant. Nominal weekly surveys through active subsidence areas	Surveyed ground strain compression or tension above 1mm/m	Tahmoor Coal to make survey results available to Telstra or their representative & TRG following each regular survey of active mining area.

4.0) Geological Structures:

There have been extensive drilling investigations to identify geological structures at coal seam level (refer to Section 1.8) Reference No 1). Tahmoor Coal commissioned an engineering geologist from Strata Control Technologies in 2018 (SCT) to undertake site inspections and mapping of the Nepean Fault. This work has provided detailed information on the nature and location of Nepean Fault, and second order geological structures associated with the fault. These structures are located to the east of LW W1-W2, and it was stated by SCT (2018) that *"No significant geological structures have been identified within the Western Domain from underground workings by TCCO"*

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. None of the survey lines cross first order faults, though two survey lines (Stilton Dam Line and Remembrance Drive East Line) cross mapped second order conjugate faults. A study has been completed to ascertain whether irregular subsidence have occurred along the survey lines. The information provides an indication of the likelihood of irregular movements during the extraction of Longwall 32. The 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.

Should any evidence of unpredicted movement or location of geological structures become apparent during final extraction of LW32 or during mining operations for LW W1-W2 this should be reported immediately to Telstra. Also, during future mining development works or should "Regional or Far Field Horizontal Ground Movements" be recorded, this information should also be immediately reported to the TRG for Telstra to consider the impact on their network.

5.0) Resources

Technical resources required to carry out the monitoring as identified In Table 3 are to be provided by Telstra or their consultants as required. The costs associated with the monitoring work required for the networks are to be reported to the TRG and agreement reached as to the responsibility for individual costs. Tahmoor Coal will provide the survey resources required for the line surveys established on the roads around and over LW W1-W2 to determine incremental and total subsidence, strain and tilt during mine subsidence from the longwalls. The initial survey is to follow on from LW32 survey and the frequency of the survey work is to be reviewed at the regular TRG.

Prior to commencing any proposed rectification work the Telstra representatives will detail the extent of the work and the associated costs, to the TRG. At that meeting agreement will be reached between Tahmoor Coal, Telstra and the Subsidence Advisory NSW as to the responsibility for the costs of the proposed work. In the event of a dispute as to responsibility for the costs, involving work to secure Telstra's networks, where loss of service to customers or line systems outage is involved, the work will be carried out by Telstra and the dispute referred to the next meeting of the TRG for further discussion and agreement.

6.0) Roles and Responsibilities

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

The monitoring of the Telstra's network in accordance with this management plan is to be carried out by Telstra or their representatives with the ground survey component of the monitoring work completed by Tahmoor Coal. The TRG is to convene the forum for discussion and resolution of issues raised in the operation of the management plan and impacts on the telecommunication network. Meetings or Teleconferences arranged by the TRG need only be convened in the event of trigger levels being reached as set out in Table 3, unpredicted ground movement detected by survey or cable faults or damage being recorded within the Telstra network. Any anomalous ground movement resulting from subsidence over LW W1-W2 and any risk perceived by Tahmoor Coal to the network, due to mining is to be used to prompt an initial meeting of the TRG.

The representatives be involved in the Telstra Response Group are:-

David Talbert – Environment and Community Manager, Tahmoor Coal.
April Hudson – Approvals Co-Ordinator, Tahmoor Coal.
Amanda Fitzgerald – Environment & Community Officer, Tahmoor Coal
Daryl Kay – Mine Subsidence Engineering Consultants Pty Ltd.
Colin Dove – Consultant Telecommunications Engineer.

The telecommunication stakeholders are:
Mark Schneider – Team Leader Telstra Network Integrity.
Matthew Montgomery – Infrastructure Manager Subsidence Advisory NSW.
Ray Ramage – Resources Regulator

When required the TRG is to appoint a minute's secretary responsible for maintaining all documentation presented to the meeting and responsible for circulating minutes and advising participants of future meetings.

The purpose of the reviews is to:

- Assess monitoring data, including the early detection of potential impacts on health and safety and impacts to Telstra infrastructure;
- Verify the risk assessments previously conducted;
- Ensuring the effectiveness and reliability of risk control measures; and
- Supporting continual improvement and change management.

At the TRG meetings, Telstra are to report incidents recorded in relation to the performance of their network plant and a detailed log is to be maintained of each incident reported to the TRG. Full details are to be reported of significant events observed or events which have an impact on the communications networks or the provision of telecommunication services in the area. Tahmoor Coal are to report on the degree of subsidence that has occurred at that time and how closely subsidence is following the predictions made in References No 1.

It is the responsibility of this meeting to determine if the events recorded are due to the impact of mine subsidence and then determine the degree of responsibility each party has, for those events.

Should significant risk be identified then either party may call an emergency TRG, with one day's notice, to discuss proposed action and to keep other parties informed of developments in the monitoring or maintenance of the Telstra network.

7.0) Audit and Review

This management plan has been agreed between parties and can be reviewed and updated to continually improve the risk management systems based on audit, review and learnings from the development of subsidence during mining and manage changes in the nature, likelihood and consequence of subsidence hazards.
The review process will be conducted to achieve the following outcomes;

- Gain an improved understanding of subsidence hazards based on ongoing subsidence monitoring and reviews, additional investigations and assessments as necessary, ongoing verification of risk assessments previously conducted, ongoing verification of assumptions used during the subsidence hazard identification and risk assessment process, ongoing understanding of subsidence movements and identified geological structures at the mine.
- Revise risk control measures in response to an improved understanding of subsidence hazards.
- Gain feedback from stakeholders in relation to managing risks, including regular input from business or property owners.
- Ensure on-going detection of early warnings of changes from the results of risk assessments to facilitate corrective or proactive management actions or the commencement of emergency procedures in a timely manner.

- Ensure timely implementation of a contingency plan in the event that the implemented risk control measures are not effective.

Some examples where review may be applied include:

- Poor performance of the Telstra plant in regard to mine subsidence, such as interruption or loss of services.
- Any trigger levels being reached or exceeded.
- Favourable performance of the Telstra plant in regard to mine subsidence, no observe red or recorded impacts.
- Significant variations between actual and predicted subsidence occurring including variations in ground strain observed from survey data.
- Evidence of significant geological faults or evidence suggesting major "Far field effects" may develop.

It is anticipated that this plan will be in place for approximately two years from the commencement of mining through to completion of LW W1-W2 or for a minimum period of three months following final ground settlement after extraction of LW W2. Should an audit of the Telstra Management Plan be required during that period then a representative is to be appointed by Telstra, Tahmoor Coal and Subsidence Advisory NSW to review the operation of the plan and report amendments to the next scheduled meeting of the *TRG*.

8.0) Record Keeping

As required, when meeting is initiated the minutes secretary of the S*TRG* shall keep minutes from the meetings called and advise participants of any future or emergency meetings to be held. The minutes are to include details as reported on the condition of the individual items of Telstra plant, the assessment of the degree of ground subsidence that has occurred, any agreements reached and a log of any incidents/damage reported to the meeting involving the telecommunications network.

9.0) Associated Documents and References

9.1) Appendices

Appendix A (Drawings Extracted from Reference No 1)

MSEC Fig. C.09 Predicted Profiles of Vertical Subsidence, Tilt and Curvature Along Thirlmere Way Due to LW W1-W2	Sheet 1 of 3
Tahmoor Coal, Western Domain, Extraction Plan LWW1-W2, MSEC Fig. E.20 Predicted Total Subsidence Contours After LW W2 Drawing No MSEC 1019-29	Sheet 2 of 3
Tahmoor Coal, Western Domain, Extraction Plan LWW1-W2, Monitoring, MSEC Drawing MSEC 1019-30	Sheet 3 of 3
Appendix B - Environmental Risk Assessment, Tahmoor Underground Extraction Plan LW W1-W2, Infrastructure	Sheet 1 of 1
Appendix C - Tahmoor Coal Pty Ltd, Risk Assessment Report, Infrastructure Tahmoor North – Western Domain Longwalls West1 & West 2. 26th March 2019	Pages 1 to 20

9.2) References

Reference No 1

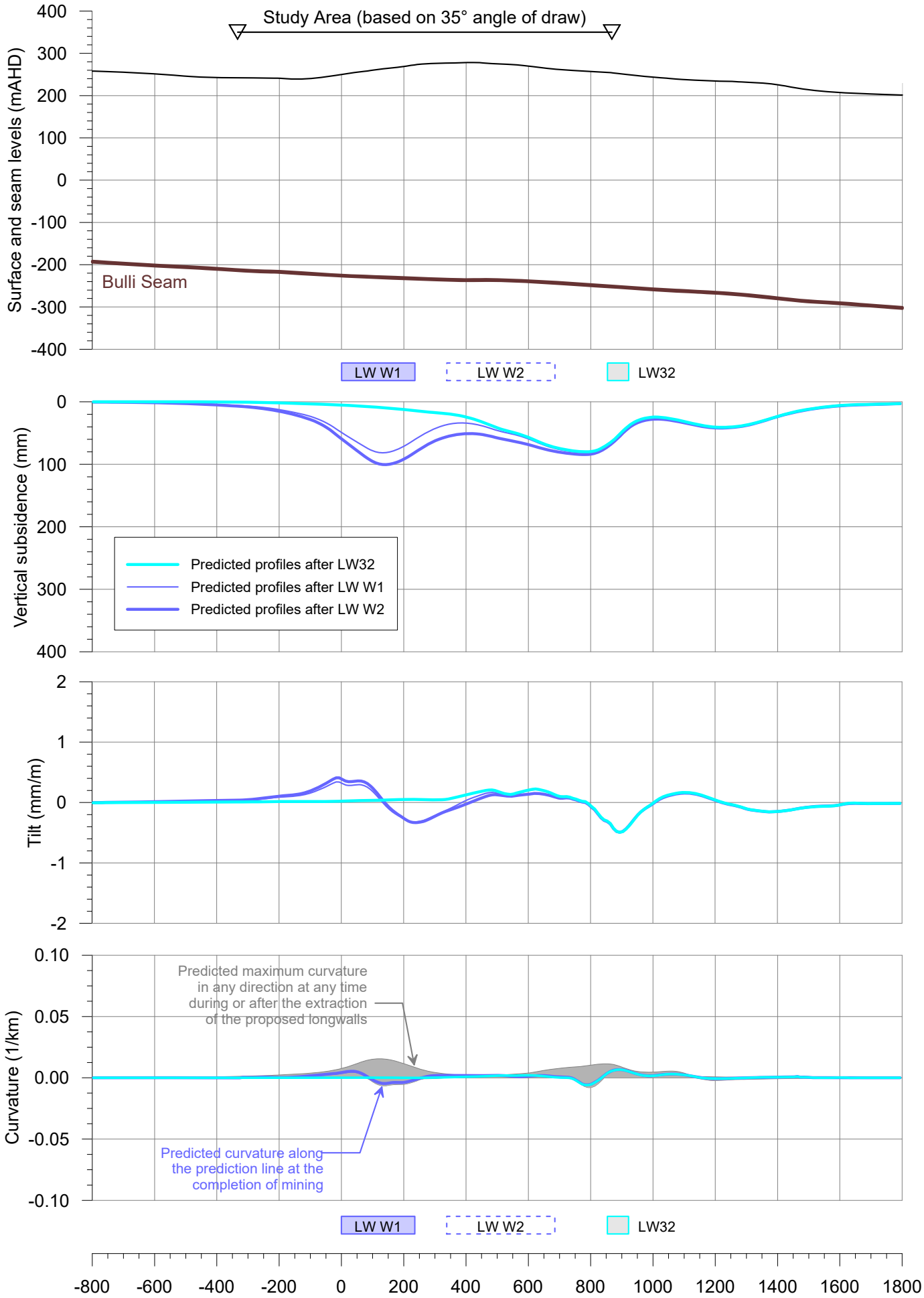
The Report MSEC 1019, Revision A, is titled “SIMEC Mining- Tahmoor Coking Coal Operations - Longwalls W1 and W2- Subsidence Predictions and Impact Assessments for Natural and Built Features due to the Extraction of Proposed Longwalls W1 and W2 in Support of the Extraction Plan Application”

10.0) Contact List.

Contacts of participants involved in *Telstra Response Group*:

Organisation	Contact Name	Title	Postal Address	Telephone / Mobile	Email
Mine Subsidence Engineering Consultants Pty Ltd	Daryl Kay	Director	PO Box 302 Chatswood, NSW, 2057	9413 3777	daryl@minesubsidence.com
Tahmoor Coal	David Talbert	Environment and Community Manager	PO Box 100 Tahmoor NSW	46400 156, 0437 266 998	David. Talbert@ Simecgfg.com
Tahmoor Coal	April Hudson	Approvals Coordinator	PO Box 100 Tahmoor NSW	4640 0022, 0466 380 992	April.Hudson@ simecgfg.com
Tahmoor Coal	Amanda Fitzgerald	Environment and Community Coordinator	PO Box 100 Tahmoor NSW	4640 0133, 0436 331 630	Amanda.Fitzgerald @simecgfg.com
Telstra	Mark Schneider	Project Specialist, Telstra Network Integrity	Locked Bag 5035, Parramatta, 2124, NSW	8842 5185, 0419 242 044	Mark.P.Schneider@ team.telstra.com
Comms Network Solutions Pty Ltd	Colin Dove	Telecommunic-ations Consultant	20 Bowden Cresc Connells Point, 2221	0428 970 826	cdove@commsnet. net.au
Subsidence Advisory NSW	Matthew Montgomery	Infrastructure Manager, Southern Coalfields	PO Box 40 Picton NSW, 2571	4677 1967, 0425 275 567	matthew.montgomery @finance.nsw.gov.au

Predicted profiles of vertical subsidence, tilt and curvature along Thirlmere Way due to LW W1-W2



msec

Fig. C.09

I:\Projects\Tahmoor\MSEC1019 - Extraction Plan for LW W1-W2\AcadData\MSEC1019-29 Pred Total Subs LW W2.dwg

msec mine subsidence ENGINEERING CONSULTANTS
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SIMEC MINING
Tahmoor Coking Coal

WESTERN DOMAIN EXTRACTION PLAN LW W1-W2

PREDICTED TOTAL SUBSIDENCE CONTOURS AFTER LW W2

DATE:	SCALE:	DRAWING No:	Rev No
29 Mar 2019	1:12500	MSEC1019-29	A

NOTE:
The value of the Subsidence Contours, from the outside to the inside of the panels, are 20mm, 50mm, 100mm, 200mm, 300mm and so forth, in 100mm increments.

277 000
277 500
278 000
278 500
279 000
6 217 000
6 216 500
6 216 000
6 215 500
6 215 000
6 214 500

PREDICTED SUBSIDENCE CONTOURS ARE IN MILLIMETRES (mm)

Stonequarry Creek
Cedar Creek
Mathews Creek

20
50
100
200
300
400
500
600
700

LW W1
LW W2

PREDICTION LINE 1
PREDICTION LINE 2

PICTON MITTAGONG LOOP LINE
MAIN SOUTHERN RAILWAY

LW 32 (CURRENT LONGWALL)
LW 31

Grid to MGA co-ordinates

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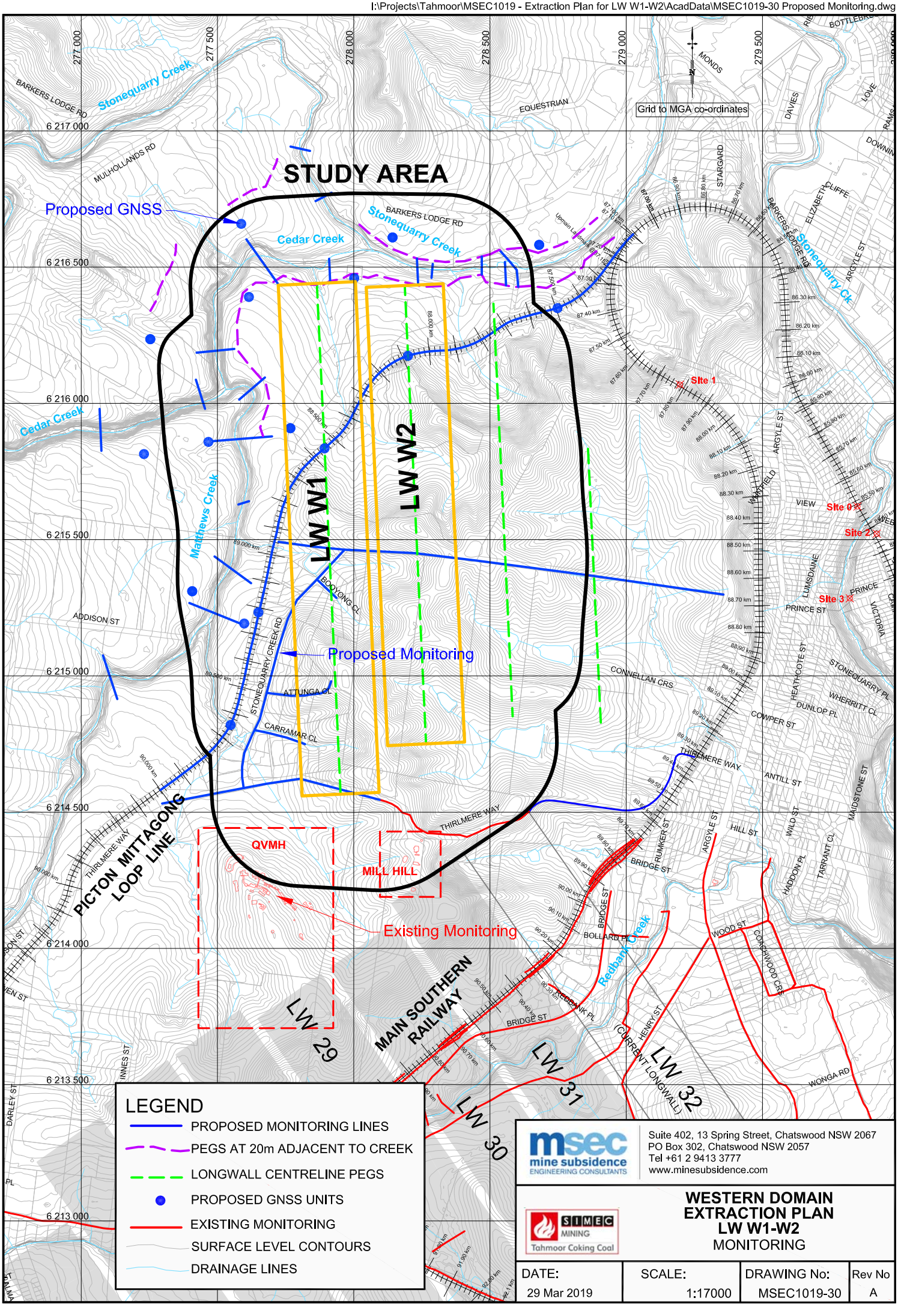

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SIMEC MINING Tahmoor Coking Coal

WESTERN DOMAIN EXTRACTION PLAN LW W1-W2 MONITORING

DATE:	SCALE:	DRAWING No:	Rev No
29 Mar 2019	1:17000	MSEC1019-30	A

Environmental Risk Assessment: Tahmoor Underground - Extraction Plan LW W1-W2 - Infrastructure

	Step 2: Assess Type; Key Elements-These change depending on TYPE of Risk Assessment			Step 3: Identify the risks, causes and potential consequences				Step 4: Identify the existing controls to manage the identified risks			Step 5: Determine RCE	Steps 6, 7 & 8: Determine the Expected Consequence / Likelihood applicable to the Expected Consequence / Current level of risk				Step 10: PMC		Step 11: Treat the Risks			
☑ Appendix B Site	Type of Risk Assessment	Key Element (CURA Context/Category)	Sub Key Element (If applicable)	Risk Description - Something happens.....	Consequence - resulting in:	Causes - Caused by	Risk Owner	Existing Control Description	Control Owner (Contact)	Fatal Hazard Protocol (as applicable)	Risk Control Effectiveness	Expected Consequence Category	Expected Risk Consequence	Risk Likelihood	Current Risk Rating	Potential Maximum Consequence	Potential Maximum Category	Treatment plans/tasks (Description)	Task Owner	Due Date	Comments
Tahmoor Underground	Environmental		Telstra / NBN infrastructure	Damage to copper local cable	Loss of serviceability, emergency repair or replacement of cable	Subsidence		Telecommunications Management Plan for LW W1-W2 to be prepared and will contain the following controls to manage subsidence (as per previous Management Plans for LW32) (AC): * Ground surveys to be conducted along streets * Visual inspections - weekly * TARP including repair of cable, relocation if required * Analysis and reporting * Consultation, coordination and cooperation with Telstra / NBN			2	Property Damage	1	D	2	1	Property Damage	Develop Telecommunications Management Plan including TARP	April Hudson	10-Oct-19	
Tahmoor Underground	Environmental		Telstra / NBN infrastructure	Damage to conduit, manhole, pit and pole network	Loss of serviceability, emergency repair or replacement of cable	Subsidence		Telecommunications Management Plan for LW W1-W2 to be prepared and will contain the following controls to manage subsidence (as per previous Management Plans for LW32) (AC): * Ground surveys to be conducted along streets * Visual inspections - weekly * TARP including repair of cable, relocation if required * Analysis and reporting * Consultation, coordination and cooperation with Telstra / NBN			2	Property Damage	1	E	1	1	Property Damage	Develop Telecommunications Management Plan including TARP	April Hudson	10-Oct-19	
Tahmoor Underground	Environmental		Telstra / NBN infrastructure	Damage to optical fibre cables	Loss of serviceability, emergency repair or replacement of cable	Subsidence		Telecommunications Management Plan for LW W1-W2 to be prepared and will contain the following controls to manage subsidence (as per previous Management Plans for LW32) (AC): * Ground surveys to be conducted along streets * Visual inspections - weekly * TARP including repair of cable, relocation if required * Analysis and reporting * Consultation, coordination and cooperation with Telstra / NBN			2	Property Damage	2	D	5	2	Property Damage	Develop Telecommunications Management Plan including TARP	April Hudson	10-Oct-19	
	3			3	3	Subtotal CountA (ignoring hidden values)					3				3	3					
Tahmoor Underground	Broad Brush														#N/A						
Tahmoor Underground	Life of Mine														#N/A						
Tahmoor Underground	Business																				
Tahmoor Underground	Major Project														#N/A						
Tahmoor Underground	Environmental/Health/Process														#N/A						
Tahmoor Underground	Equipment														#N/A						

SIMEC

MEMBER OF GFG ALLIANCE

Tahmoor Coal Pty Ltd

RISK ASSESSMENT REPORT - INFRASTRUCTURE

Tahmoor North – Western Domain Longwalls West 1 and West 2

Date Held: 26 March 2019

April 2019

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Document Control

DOCUMENT TITLE:	Tahmoor North – Western Domain LW W1-W2 – Infrastructure Risk Assessment
PUBLICATION DATE:	April 2019
DOCUMENT STATUS:	Final (Version 1)
PREPARED BY:	April Hudson Approvals Coordinator Tahmoor Coking Coal Operations – SIMEC Mining
APPROVED BY:	Ron Bush Environment and Community Manager Tahmoor Coking Coal Operations – SIMEC Mining

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1 Introduction

1.1 Background

Tahmoor Coal is located approximately 80 kilometres south-west of Sydney in the township of Tahmoor NSW. It is managed and operated by SIMEC Mining. Tahmoor Coal has previously mined 31 longwalls to the north and west of the mine's current pit top location. It is currently mining Longwall 32, in accordance with current Development Consent (DA 67/98) and Subsidence Management Plan Approval for the extraction of Longwall 32.

Tahmoor Coal proposes to extend underground coal mining to the north-west of the Main Southern Railway, which will include Longwalls West 1 to West 4 (**LW W1-W4**) at Picton (refer to **Figure 1-1**). Mining of Longwalls West 1 and West 2 (**LW W1-W2**) is expected to commence in November 2019, and first workings of development headings for LW W1 have commenced.

Under Condition 13H of the Development Consent (DA 67/980, as modified, an Extraction Plan is required for all second workings from LW W1 and subsequent longwalls. The first Extraction Plan to be prepared will cover LW W1-W1, which are located in the Tahmoor North Lease area. The Extraction Plans will be required to be approved by the NSW Department of Planning and Environment (**DPE**), and relevant Infrastructure Management Plans are required to be approved by the relevant infrastructure owners.

The Extraction Plan shall address the Study Area for LW W1-W2, which is comprised of both the predicted 20 mm Total Subsidence Contour and the 35° Angle of Draw Line (refer to **Figure 1-1**).

The Extraction Plan will provide detailed information on how the risks associated with mining under the Study Area will be managed by Tahmoor Coal during and following the extraction of LW W1-W2.

A Risk Assessment Workshop was held at the Administration Building at the Tahmoor Coking Coal Operations (**TCCO**) site on 26 March 2019 to determine the major infrastructure risks associated with LW W1-W2 that may impact on achieving timely approval for the commencement of LW W1-W2 extraction, as well as the completion of extraction of LW W1-W2.

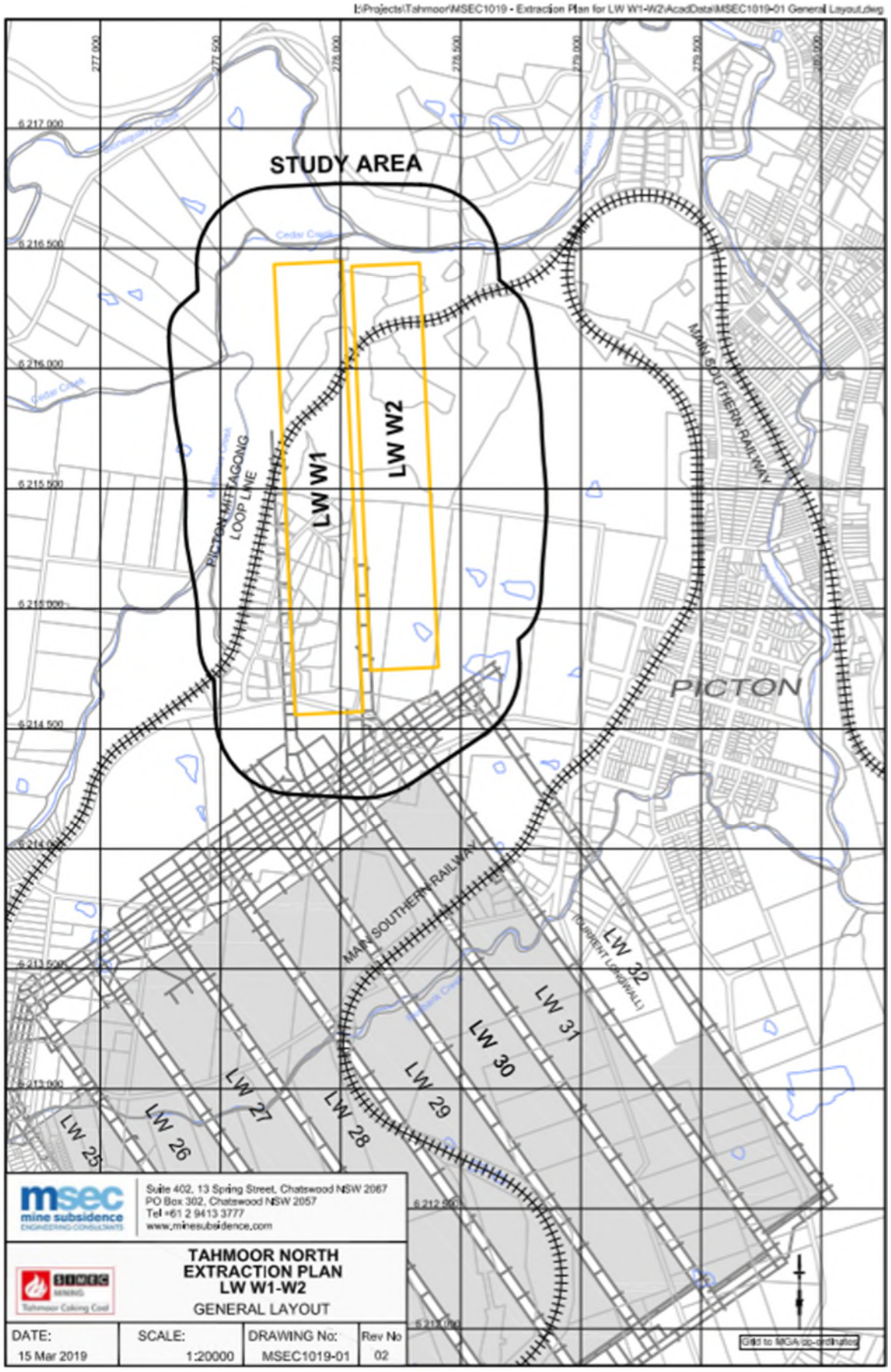


Figure 1-1 Study Area for LW W1-W2

1.2 Methodology

This risk assessment was completed using the Workplace Risk Assessment and Control methodology (**WRAC**).

It was compiled by a team of specialist personnel including:

- Compliance Officer and Risk Assessment Facilitator, Tahmoor Coal: Diana Harris;
- Environment and Community Manager, Tahmoor Coal: Ron Bush;
- Approvals Coordinator, Tahmoor Coal: April Hudson;
- Subsidence Engineer, MSEC: Daryl Kay;
- Structural Engineer, JMA Solutions: John Matheson; and
- Building Inspector, Building Inspection Services: Adam Walker.

The 12 step Risk Management process which forms part of the Tahmoor Coking Coal Operations Risk Management Standard has been adhered to in this risk assessment.

The risk matrix has been used to prioritise risk treatments.

Prior to this risk assessment any previous risk assessments, safety alerts and High Potential Risk incidents have been sourced and put forward for consideration within the risk assessment workshop.

1.3 Outcome

This risk assessment identified a total of 29 risks / hazards (refer to **Figure 1-2**), which included:

- 13 medium risks and 16 low risks;
- One risk that was satisfactory and did not require any further risk control, and 28 risks that required further improvement;
- Risk consequences included:
    - Two risks with environmental impact consequences;
    - Seven risks with health and safety consequences; and
    - 20 risks with property damage consequences.

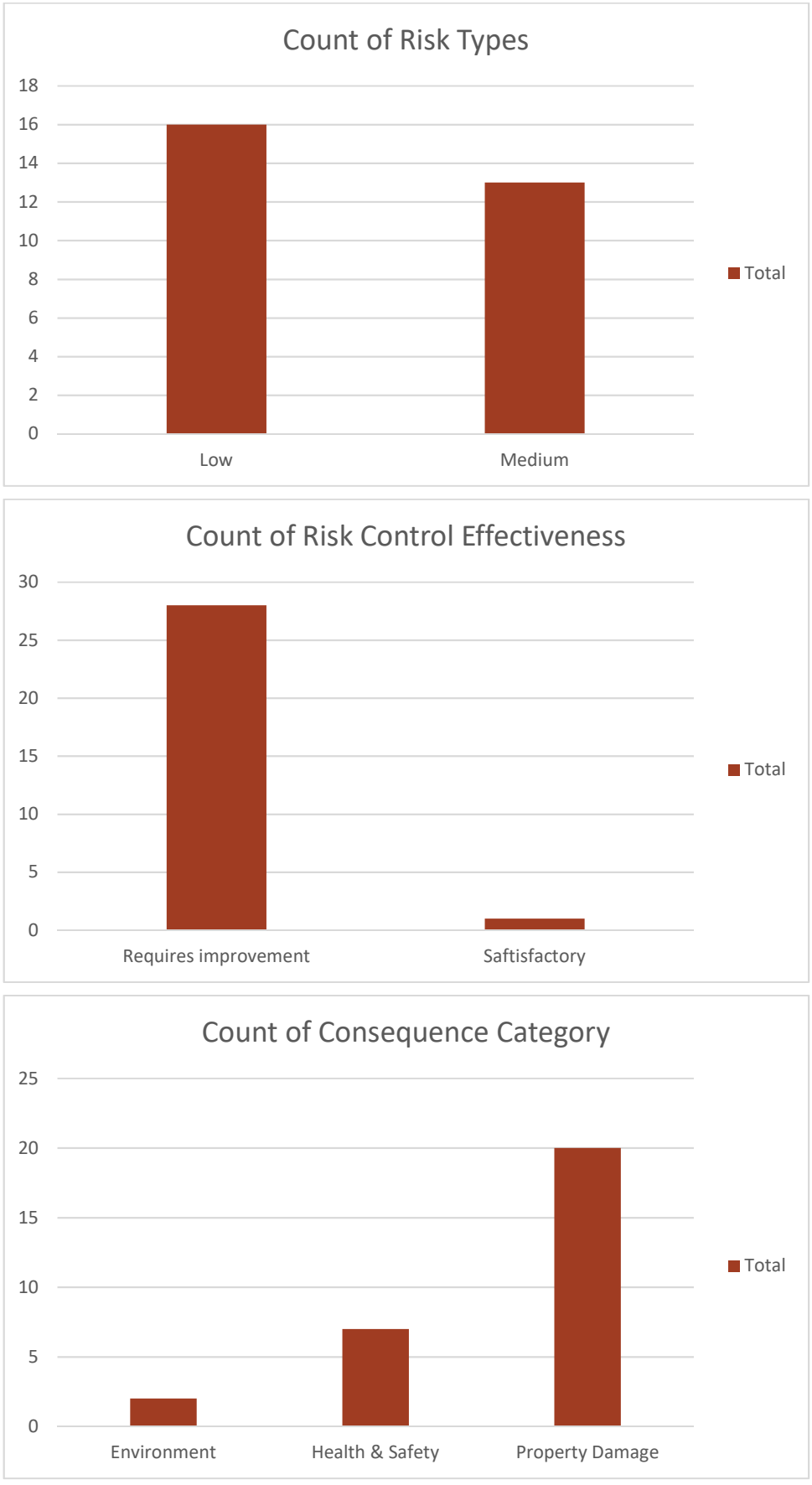


Figure 1-2 Graphs of Risk Type, Risk Control Effectiveness and Consequence Category

1.4 Further Actions

Further actions as identified in the Risk Assessment are identified in **Table 1-1**.

Table 1-1 Table of Further Actions

Treatment plans/tasks	Task Owner	Due Date
Develop Endeavour Energy Management Plan including TARP	April Hudson	10-Oct-2019
Endeavour Energy to complete Critical Poles Audit	April Hudson	10-Oct-2019
SMEC to complete survey of critical poles	April Hudson	10-Oct-2019
Building Inspection Services to complete baseline tilt measurement of poles	April Hudson	10-Oct-2019
Develop Sydney Water Potable Water Management Plan including TARP	April Hudson	10-Oct-2019
Develop Stonequarry Creek Estate Water Management Plan including TARP	April Hudson	10-Oct-2019
Develop Jemena Management Plan including TARP and contact details for Jemena	April Hudson	10-Oct-2019
Complete baseline gas detection survey (Macarthur Gas)	April Hudson	10-Oct-2019
Develop Telecommunications Management Plan including TARP	April Hudson	10-Oct-2019
Develop Wollondilly Shire Council Management Plan including TARP	April Hudson	10-Oct-2019
Develop traffic control plan for emergency repairs	April Hudson	10-Oct-2019
Develop Spatial Services Management Plan including TARP	April Hudson	10-Oct-2019
Notify Spatial Services via POSI application of predicted subsidence movements of the permanent survey control marks	April Hudson	10-Oct-2019
Ongoing monitoring and review of far field monitoring network, including GNSS network	April Hudson	10-Oct-2019
Develop Built Structures Management Plan including TARP for emergency evacuation procedures	April Hudson	10-Oct-2019
Prepare QVMH Management Plan including TARP	April Hudson	10-Oct-2019
Consultation plan to be developed	Samantha Beresford	10-Oct-2019
Prepare Mill Hill Management Plan including TARP	April Hudson	10-Oct-2019

2 Objective

The purpose of the Risk Assessment was to:

- Ensure the required infrastructure management plans for the proposed longwalls are approved and in place in a timely manner to manage infrastructure impacts during mining;
- Ensure the safe and serviceable operation of all surface infrastructure and structures in the Study Area;
- Ensure that the health and safety of people who may be present in the Study Area are not put at risk due to mine subsidence; and
- Assist in the establishment of procedures to measure, monitor, control, mitigate and repair infrastructure in the Study Area.

The Risk Assessment will also be used to:

- Develop, review and improve the treatment plans / tasks identified as a result of the identified risks;
- Provide a basis to determine whether the identified risk management measures are sufficient to address the identified risks;
- Meet the statutory requirements of legislation and regulation that relate to impacts to infrastructure; and
- Identify those processes requiring a more detailed level of risk assessment due to the Potential Maximum Consequence (**PMC**) level of risk.

3 Context

3.1 Scope

The risk assessment considered the areas below:

- Management of infrastructure owned by Endeavour Energy (electrical), Sydney Water (potable water only), Stonequarry Creek Estate Sewerage Plant (sewer), Jemena (gas), Telstra (telecommunications), NBN (telecommunications), Wollondilly Shire Council (roads, culverts and bridges), Spatial Services (survey control marks);
- Impacts to rural properties and structures such as built structures, pools, septic tanks, and farm dams; and
- Historical heritage buildings including Queen Victoria Memorial Home and Mill Hill.

3.2 Internal Context

This risk assessment was conducted for the Environment and Community Department of Tahmoor Coal to help identify the risks to infrastructure associated with LW W1-W2.

The risk assessment was conducted in accordance with the Risk Management Standard, utilising a cross-section of site personnel, relevant civil works experts, and an internal facilitator.

3.3 External Context

The risk assessment process is completed to satisfy Tahmoor Coking Coals requirements in relation to WHS and in compliance to Mining regulations and conditions and is completed in consultation with key stakeholders.

Key Stakeholders include:

- Tahmoor Coking Coal management;
- NSW Department of Planning and Environment (Planning, Resources and Geoscience);
- Resources Regulator (Subsidence, Environment);
- NSW Office of Environment and Heritage;
- Subsidence Advisory NSW;
- NSW Environment Protection Authority;
- NSW Department of Primary Industries (Agriculture);
- Dam Safety Committee;
- Crown Lands Division;
- NSW Roads and Maritime Services;
- WaterNSW;
- NSW State Emergency Services;
- Wollondilly Shire Council;
- Other utility providers including Endeavour Energy (electrical), Sydney Water (potable water only), Stonequarry Creek Estate Sewerage Plant (sewer), Jemena (gas), Telstra (telecommunications), NBN (telecommunications), Wollondilly Shire Council (roads, culverts and bridges), Spatial Service (survey control marks);
- Heritage stakeholders; and
- Landowners.

The external context for this Risk Management Process included consideration of:

- NSW Department of Planning and Environment as the approver of the Extraction Plan;
- NSW *Work Health and Safety (Mines and Petroleum Sites) Regulations 2014*;
- AS/NZS ISO 31000:2009 Risk Management - Principles and Guidelines; and
- Risk Management Handbook for the Mining Industry (MDG1010).

3.4 Exclusions / Assumptions

The participants in the risk assessment agreed to the following exclusions:

- Community effects will be managed as per Tahmoor Coal procedures and EMS (dust, lighting and noise);
- A detailed risk assessment for rail operational risks associated with LW W1-W2 will be conducted separately; and
- A broad risk assessment focusing on approvals, environmental and general infrastructure risks has been completed for LW W1-W2 on 12 February 2019 (CMO ID 201902202). Consideration of infrastructure risks addressed in this previously completed risk assessment were excluded. These considerations included:
    - Infrastructure Owner do not approve Infrastructure Management Plan;
    - Failure to implement Infrastructure Management Plan actions;
    - Greater than predicted subsidence in Study Area;
    - Stress to landowner/business owner;
    - Formation of Community Action Group; and
    - Land owners do not sign Land Access Agreements.

The participants in the risk assessment agreed to the following assumptions:

- All plant and equipment is fit for purpose;
- Personnel are competent and authorised;
- Inspection systems are in place and effective;
- People (employees, contractors) do present themselves fit for work;
- The appropriate PPE is utilised where required; and
- Observations and learnings from Longwall 32.

4 Issue / Reason for Review

The risk assessment was completed to identify significant implications relating to approval, environmental and infrastructure risks, and to identify the controls necessary to effectively manage these risks.

5 Risk Analysis Method

5.1 Risk Management Standard

All risk assessments are conducted in accordance with Tahmoor Coking Coal Operations Risk Management Standard.

The Tahmoor Coking Coal Operations Risk Management Standard is based on the ***ISO31000:2009 Risk Management – Principles and Guidelines International Standard.***

5.2 Risk Management Process

The risk management process is set out in the 12 Steps Risk Management Process (refer to **Figure 5-1**).

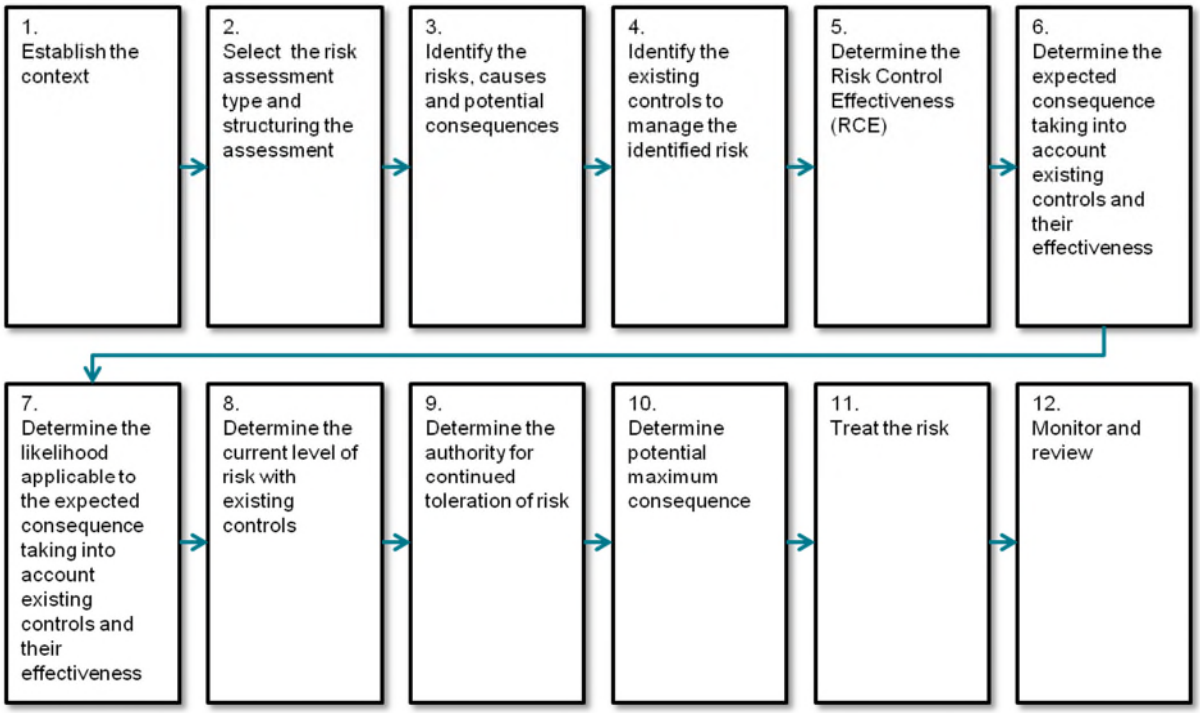


Figure 5-1 The 12 Steps Risk Management Process

5.3 Risk Matrix

The analyses of the risks identified in the workshop have undergone categorisation by the use of the risk matrix outlined within the Tahmoor Coking Coal Operations Risk Management Standard.

A copy of the risk matrix from Tahmoor Coking Coal Operations Risk Management Standard is provided in **Appendix A.**

5.4 Hierarchy of Controls

During the risk management process additional treatments and controls have been categorised using the hierarchy of controls table (refer to **Figure 5-2**).

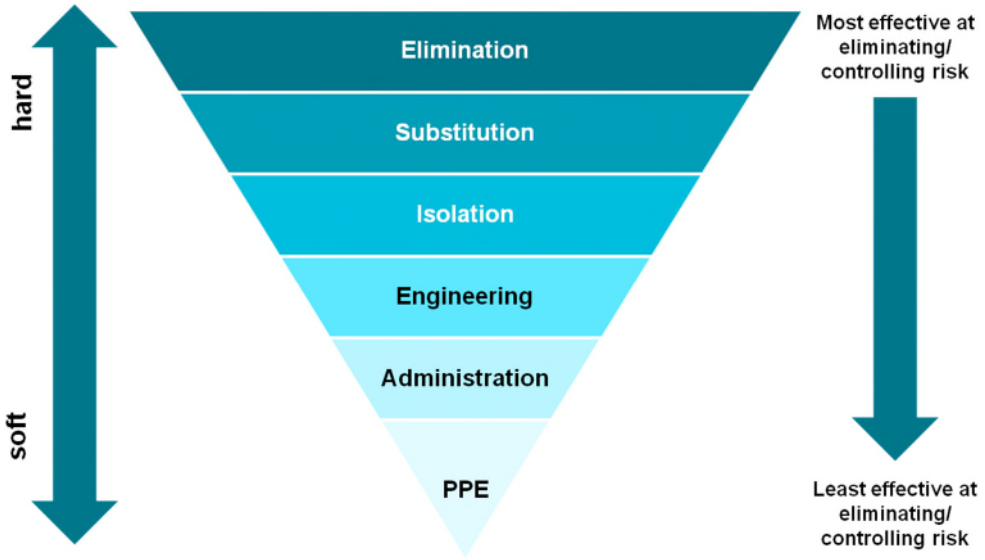


Figure 5-2 Hierarchy of Controls

5.5 Risk Assessment Team Members

Participating risk assessment team members are listed in **Table 5-1.**

Table 5-1 Participating Risk Assessment Team Members

Name	Position	Organisation	Qualifications	Related Experience
Ron Bush	Environment & Community Manager	SIMEC	BSc (Geol), GCEng, GD GW, MPlan, MProDev, MEng	30yrs
Diana Harris	Facilitator – Compliance Officer	SIMEC	Cert IV OH&S, G3 Risk Management	4yrs
April Hudson	Approvals Coordinator	SIMEC	B Env Sci (Hons)	9yrs
John Matheson	Structural Engineer	JMA Solutions	BE Struct (Hons)	20yrs
Daryl Kay	Subsidence Engineer	MSEC	BE, LLB	16yrs
Adam Walker	Building Inspector	Building Inspection Services	Cert IV Building	30yrs

A copy of the signed attendance sheet is attached in **Appendix B**.

6 Risk Assessment Register

The Risk Assessment Register is attached within **Appendix C**.

7 Treatment Plan

A treatment plan is provided in **Section 1.4.1**.

8 Risk Assessment Review Period

A review period for the risk assessment has not been identified.

Appendix A – Risk Matrix

RISK MATRIX

CONSEQUENCE [potential foreseeable outcome of the event]

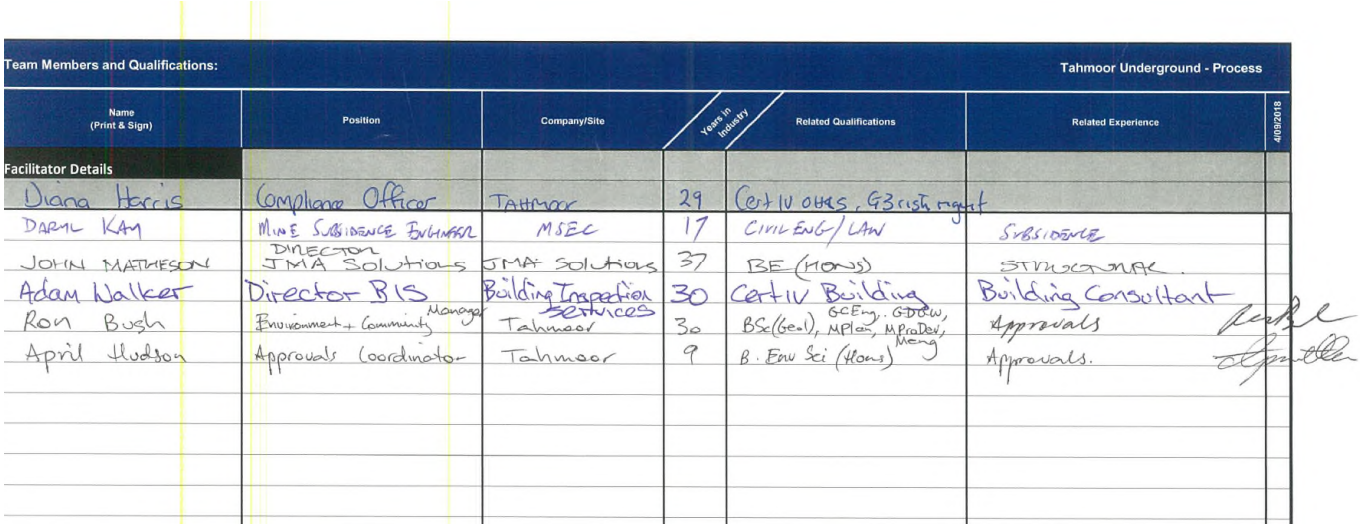
	Health & Safety	Environment	Financial Impact	Image & Reputation / Community	Legal & Compliance
5 Catastrophic	• Multiple fatalities (5 or more fatalities in a single incident) • Multiple cases (5 or more) of Permanent Damage Injuries or Diseases that result in permanent disabilities in a single incident	• Unconfined and widespread • Environmental damage or effect (permanent; >10 years) • Requires major remediation	• >$600M investment return • >$100M operating profit • >$20M property damage	• Loss of multiple major customers or large proportion of sales contracts • Sustained campaign by one or more international NGOs resulting in physical impact on the assets or loss of ability to operate • Security incident resulting in multiple fatalities or major equipment damage • Formal expression of significant dissatisfaction by government • Grievance from internal or external stakeholder alleging human rights violation resulting in multiple fatalities	• Major litigation / prosecution at SIMEC corporate level • Nationalisation / loss of licence to operate
4 Major	• Single incident resulting in: Less than 5 Fatalities • Permanent Damage Injury or Disease that results in a permanent disability- less than 5 cases in a single incident	• Long-term (2 to 10 years) impact • Requires significant remediation	• $60-600M investment return • $20-100M operating profit • $2-20M property damage	• Security/ stakeholder incident resulting in single loss of life or equipment damage • Grievance from internal or external stakeholder alleging human rights violation resulting in single fatality or serious injuries • Topic of broad societal concern and criticism • Negative media coverage at international level resulting in a Corporate statement within 24 hours • Investigation from government and/ or international (or high-profile) NGOs • Complaints from multiple "final" customers • Loss of major customer • Negative impact on share price	• Major litigation / prosecution at Department level
3 Moderate	• Lost Time Injury (LTI) • Lost Time Disease (LTD) • Permanent Disabling Injury (PDI) • Permanent Disabling Disease (PDD) • Single incident that results in multiple medical treatments	• Medium-term (<2 years) impact (typically within a year) • Requires moderate remediation	• $6-60M investment return • $2-20M operating profit • $200K-2M property damage	• Negative media coverage at national level over more than one day • Complaint from a "final" customer • Off-spec product • Local Stakeholder action resulting in national societal scrutiny	• Major litigation / prosecution at Operation level
2 Minor	• Medical Treatment Injury (MTI) • Medical Treatment Disease (MTD) • Restricted Work Injury (RWI) • Restricted Work Disease (RWD)	• Near source • Short-term impact (typically <week) • Requires minor remediation	• $600K-6M investment return • $200K-2M operating profit • $10-200K property damage	• Negative local/ regional media coverage • Complaint received from an internal or external stakeholder	• Regulation breaches resulting in fine or litigation
1 Negligible	• First Aid Injury (FAI) or illness (not considered disease or disorder)	• Near source and confined • No lasting environmental damage or effect (typically <day) • Requires minor or no remediation	• <$600K investment return • <$200K operating profit • <$10K property damage	• Negligible media interest	• Regulation breaches without fine or litigation

LIKELIHOOD [of the event occurring <u>with that consequence</u>]

Basis of Rating	E - Rare	D - Unlikely	C - Possible	B - Likely	A – Almost Certain
LIFETIME OR PROJECT OR TRIAL OR FIXED TIME PERIOD OR NEW PROCESS / PLANT / R&D	Unlikely to occur during a lifetime OR Very unlikely to occur OR No known occurrences in broader worldwide industry	Could occur about once during a lifetime OR More likely <u>NOT</u> to occur than to occur OR Has occurred at least once in broader worldwide industry	Could occur more than once during a lifetime OR As likely to occur as not to occur OR Has occurred at least once in the mining / commodities trading industries	May occur about once per year OR More likely to occur than not occur OR Has occurred at least once within Tahmoor Mine	May occur several times per year OR Expected to occur OR Has occurred several times within Tahmoor Mine
5 Catastrophic	**15 (M)**	**19 (H)**	**22 (H)**	**24 (H)**	**25 (H)**
4 Major	**10 (M)**	**14 (M)**	**18 (H)**	**21 (H)**	**23 (H)**
3 Moderate	**6 (L)**	**9 (M)**	**13 (M)**	**17 (H)**	**20 (H)**
2 Minor	**3 (L)**	**5 (L)**	**8 (M)**	**12 (M)**	**16 (M)**
1 Negligible	**1 (L)**	**2 (L)**	**4 (L)**	**7 (M)**	**11 (M)**

Consequence Category	Consequence Type	Ownership	Action
Cat. 5	**Catastrophic Hazard**	Department / Functional / Operational / Asset Leadership	• Quantitative or semi-quantitative risk assessment required. • Capital expenditure will be justified to achieve ALARP ('As Low As Reasonably Practicable'). • Catastrophic Hazard Management Plans (CHMP) must be implemented where practical, Crisis Management Plans (CMP) tested and Catastrophic Event Recovery Plans (CERP) developed.
Cat. 4 (Health & Safety consequence)	**Fatal Hazard**	Department / Functional / Operational / Asset Leadership	• Fatal Hazard Protocols or appropriate management plans must be applied. • Capital expenditure will be justified to achieve ALARP.
Risk Rank	**Risk Rating**	**Ownership**	**Action**
17 to 25	**High Risk**	Department / Functional / Operational / Asset Leadership	• Install additional HARD and SOFT controls to achieve ALARP. • Capital expenditure will be justified to achieve ALARP.
7 to 16	**Medium Risk**	Operational / Asset Leadership	• install additional HARD and SOFT controls if necessary to achieve ALARP. • Capital expenditure may be justified.
1 to 6	**Low Risk**	Operational / Asset Leadership	• Install additional controls if necessary to achieve ALARP. • Capital expenditure is not usually justified.

Appendix B – Risk Assessment Attendance Sheet



Team Members and Qualifications:					Tahmoor Underground - Process	
Name (Print & Sign)	Position	Company/Site	Years in Industry	Related Qualifications	Related Experience	4/09/2018
Facilitator Details						
Diana Harris	Compliance Officer	Tahmoor	29	Cert IV OHES, G3 risk mgmt		
DARYL KAM	MINE SUBSIDENCE ENGINEER	MSEC	17	CIVIL ENG/LAW	SUBSIDENCE	
JOHN MATHESON	DIRECTOR JMA Solutions	JMA Solutions	37	BE (HONS)	STRUCTURAL	
Adam Walker	Director BIS	Building Inspection Services	30	Cert IV Building	Building Consultant	
Ron Bush	Environment + Community Manager	Tahmoor	30	BSc(Geol), GCEng, GDipEnv, MPlan, MProDev, MEng	Approvals	
April Hudson	Approvals Coordinator	Tahmoor	9	B. Env Sci (Hons)	Approvals.	

Appendix C – Risk Assessment Register