

**TELSTRA Corporation Ltd**

Network Integrity Central

**Donaldson Coal Pty. Ltd.**

**Abel Mine**

## **MANAGEMENT PLAN**

For Partial Pillar Extraction, Panels 21 & 22  
Upper Donaldson Seam,  
Beneath Telecommunications Plant  
@ Benwerrin, N.S.W.

**Originator** : Colin Dove  
Consultant Engineer  
(0428 970826)

**Authorised on behalf of Telstra**

*Mark Schneider*  
.....

(Network Integrity Central)



**Authorised on behalf of Donaldson Coal Pty Ltd**

*T. Sutherland 11.12.12*  
.....

(Technical Services Manager,  
Underground Operations)

**Date**: 28<sup>th</sup> November 2012

**Revision No.& Date**:

## TABLE OF CONTENTS

	<b>Page</b>
<b>1.0) Introduction</b>	<b>3</b>
1.1) Subsidence predictions	4
Figure 1 (Extract from Figure 10 Ref 1, Panels 21 & 22)	4
1.1.1) Copper Main & Distribution Cables	4
1.1.2) Pit & Conduit Network	5
1.1.3) Pit & Conduit Network	5
1.2) Limitations	5
1.3) Objectives	6
1.4) Scope	6
1.5) Timing	6
<b>2.0) Principal Risks Identified</b>	<b>7</b>
TABLE 1- Relative Risk factors for Telecommunications Plant	7
2.1) Copper Main and Local Distribution Cables	
Installed along and across Blackhill Road	7
2.2) Pits and Conduit Network	8
<b>3.0) Control Procedure</b>	<b>8</b>
3.1) Copper Main and Local Distribution Cables	
Installed along and across Blackhill Road	8
3.4) Pit and Conduit Network	8
<b>4.0) Geological Fault</b>	<b>9</b>
<b>5.0) Resources Required</b>	<b>9</b>
<b>6.0) Roles &amp; Responsibilities</b>	<b>9</b>
<b>7.0) Audit &amp; Review</b>	<b>10</b>
<b>8.0) Associated Documentation &amp; References</b>	<b>11</b>
8.1) Appendices	11
8.2) References	11
<b>9) Contact List</b>	<b>11</b>
<b>APPENDICES</b>	<b>12</b>
Appendix A – Ditton Geotechnical Services Pty Ltd “Proposed Abel Mine’s SMP Layout, with Partial Pillar Extraction Panels 19-22 (Modified Duncan Method) – Figure 1a” dated 15-7-12.	Sheet 1 of 1
Appendix B – Telstra cables in the immediate area of the Abel Mine. Main & Local Copper Cables Benwerrin Exchange Area. Blackhill Road	Sheet 1 of 1
.....	

## **1.0) Introduction**

Donaldson Coal Pty Ltd, have commenced mining operations at the Abel Mine, located in the lower Hunter Valley, approximately 23 kilometres north west of Newcastle. The current mining area within the lease is generally located between John Renshaw Drive to the north, the F3 Freeway to the east and just below Blackhill Road to the south. The proposal for coal mining at Abel Mine will use continuous miners for pillar type extraction for the partial and total extraction of the proposed panels. There are a series of individual panels identified in the mine plan which is shown attached as Appendix A, Ditton Geotechnical Services Pty Ltd (DgS), “ Proposed Abel Mine’s SMP Layout, with Partial Pillar Extraction Panels 19-22 (Modified Duncan Method) – Figure 1a” dated 15-7-12. This management plan specifically applies to Panels 21 and 22 in the series of panels.

Refer to the full report on the Panel Extraction which has been used for obtaining predicted subsidence parameters for Panels 19 to 22 - DgS, Report No ABL – 002/4 titled - “Subsidence Contour Predictions and Impact Assessment for the Proposed Partial Pillar Extraction of Panels 19 to 22 at the Abel Mine, John Renshaw Drive, Blackhill”, Dated: 19th July 2012, Reference No 1.

First workings at Abel Mine have commenced and extraction has been completed for the majority of panels leaving Panels 19, 19a, 21 and 22 to be extracted. The proposed method of coal extraction for the remaining panels 21-22 is by the Modified Duncan Method (MDM) developed at Tasman Mine with a general extraction height of 2.8 metres of coal in the remaining panels, utilising total and partial extraction of panels. The MDM method requires large first workings pillars to be formed and then reduce the pillar size to leave long term remnant pillars to support the overburden. Maximum pillar subsidence is predicted to be > 150mm and will depend on panel geometry and stiffness of the floor and roof strata.

As part of the planning for the proposed partial and total extraction of the panels in the above Panel areas, Abel Mine has identified surface assets which may be affected by the mining operation. Some of these assets belong to Telstra and are part of Telstra’s infrastructure in the area to be potentially impacted by mine subsidence, principally along Blackhill Road. This management plan will consider the impact of the ground surface movements, contributed by the partial and total extraction of the panels, on Telstra’s assets located in the area. Refer to Reference 1 and Appendix A “ Figure 1a.

From an examination of Telstra’s Cable Plan Records (CPR) the following components of the Telstra network are present in the immediate area of mining impact along Blackhill Road:-

- a) Copper Main Cable 100 Pr C3 M1-100
- b) Copper Main Cable 20 Pr C3 M91-100
- c) Copper Main Cable 50 Pr C3 M51-100
- d) Local distribution cables various sizes.
- e) Pit and conduit network supporting Telstra cables in the area along and across Blackhill Road.

Refer to Appendix B Sheet 1 showing details of the Telstra cables in the immediate area of the Abel Panels 21 and 22.

For the four groups of cables described above it appears that mine subsidence will potentially impact primarily on the main copper cable a) along the southern side of Blackhill Road and on b) & c) where these cables cross Blackhill Road. The local distribution cables are primarily impacted at the southern end of Panel 21 and near the centre of Panel 22.

## 1.1) Subsidence Predictions

As mentioned above Abel Mine has commissioned a Geotechnical Assessment by DgS Pty Ltd for predicted subsidence in the area of Panels 21 and 22, Reference No1. From the DgS report ABL-002/04 predictions have been made for subsidence impacts from the proposed Panel 21 & 22 extraction.

See Figure 1 below which is an extract from Figure 10 Reference 1, “Predicted Final Worst Case Horizontal Strain Contours above the Proposed Modified Duncan and Total Extraction Panels at the Abel Mine” showing Panel 21 & 22 ground strain contours.

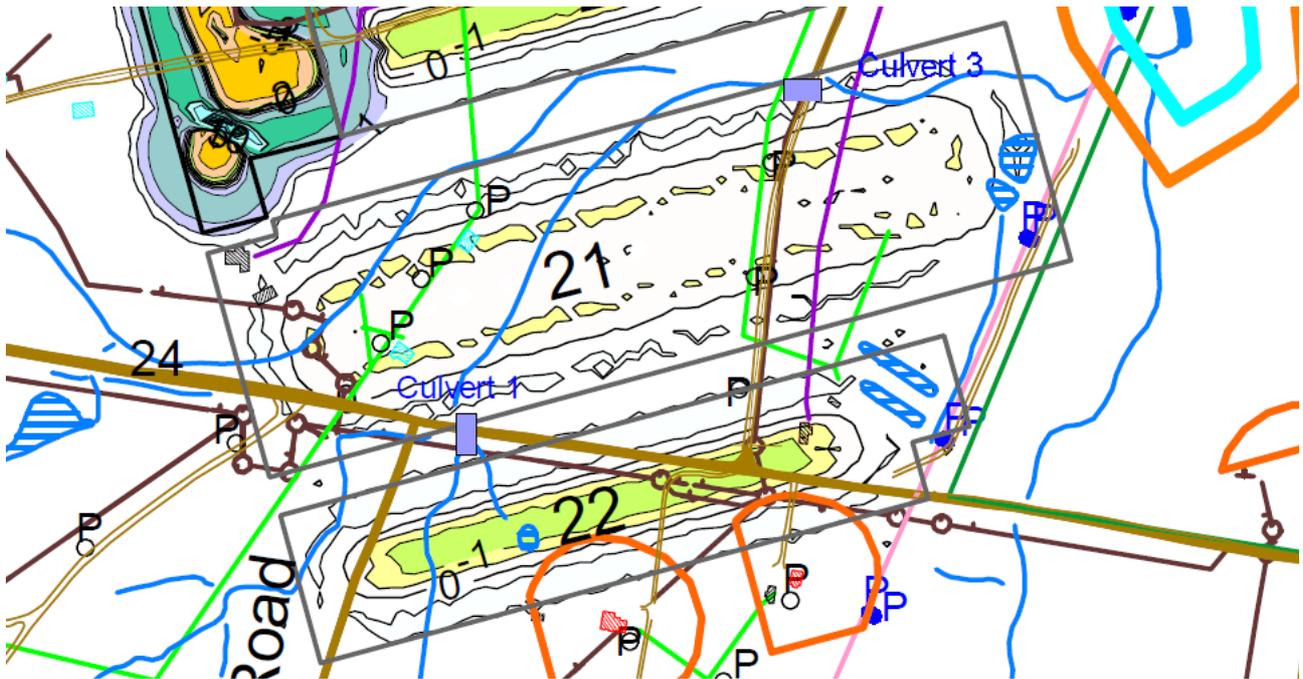


Figure 1 (Extract from Figure 10 Ref 1, Panels 21 & 22)

The above strain contours show that the maximum predicted strain along and across the Telstra cables (shown in brown in Figure 1) are compressive strains of between 1 and 2mm /metre and tensile strains up to 1mm/ metre. Additionally Reference 1 in Section “5.3) Worst Case Subsidence, Tilt and Strain Profile Contour Predictions” – states

- Maximum Subsidence; <150mm
- Maximum Horizontal Strain <2mm/m (compressive and tensile)
- Maximum Horizontal Displacements <30mm

### 1.1.1) Copper Main and Local Cables

The Main Copper Cables feed is along the southern side of Blackhill Road from Benwerrin telephone exchange located to the west along Blackhill Road, through to the Emergency Telephone Network on the F3 Freeway and across to customers on the eastern side of the Freeway. From the detail provided in Reference 1, Figure 10 and Section 5.3 the predicted impacts on these copper cables are relatively low for these reasonably robust copper cables at a maximum of <2mm/metre tension or compression.



Plate 1:

View east along Blackhill Road at Taylors Road showing location of Telstra main copper cable along southern side of Blackhill Road and approximate location of Panels 21 and 22 crossing near the intersection.

1.1.2) Pit & Conduit Network

There is some risk to the main copper cable due to differential movement of the cable at jointing pits installed along the cable line. However in the immediate vicinity of the mining area there are only ten pits and small sized conduit with significant sections of the main cable being direct buried. The most vulnerable pits to ground movement are the old asbestos cement pits which have not been replaced along the cable route. Some of the more recently installed pits are lighter more flexible high density polyethylene pits which can accommodate ground movement more readily than the rigid asbestos cement pits.

**1.2) Limitations**

It must be understood that the mechanism of mine subsidence and its impact on the telecommunications network has only been studied recently in some detail. In this instance the network is installed across the south western end of Panel 21 and diagonally across Panel 22 as the panel crosses Blackhill Road. Panel 22 is therefore likely to have a greater potential impact on the cables however for the majority of the route the cable is a reasonably robust direct buried cable 20 to 100 pair cellular insulated filled copper cable. This cable is grease filled and is reasonably able to sustain the relatively low levels of predicted ground strain.

Once the mine subsidence is initiated there is no method of halting the subsidence event. Hence if the degree of ground movement begins to affect Telstra plant then there are limited options available to mitigate the impacts. This management plan for Telstra's assets will not prevent damage, but may limit subsidence impacts affecting service levels and put in cable monitoring procedures, should evidence of potential damage emerge, during the ground subsidence events.

### **1.3) Objectives**

The objectives of this management plan in relation to Telstra's plant are to put in place procedures to be followed:-

- a) Firstly to monitor the affects of mine subsidence and initiate action to mitigate any potential damage to telecommunications plant by recording physical changes in the ground surface around the cable line.
- b) Secondly to provide a plan of action should the subsidence affect impact on the serviceability or performance of the Telstra network.
- c) Provide a forum to report, discuss and record impacts on telecommunications plant and transmission performance. This will involve Abel Mine, Telstra Network Integrity Services, the Mine Subsidence Board and consultants who have a direct interest in monitoring the subsidence events.

### **1.4) Scope**

This plan is to be used to protect and monitor the performance of Telstra's plant identified to be at some risk due to mine subsidence. The major items of plant to be considered are:-

- a) The main and local distribution cable installed along Blackhill Road and feeding customers on the northern and southern sides of the road
- b) Pit & Conduit Network supporting the above cables.

### **1.5) Timing**

First workings have commenced on Panel 21 and work will continue into Panel 22 following completion of Panel 21.

This management plan covering the pillar extraction within the area of the Telstra network, will continue in operation until completion of mining of these two Panels 21 & 22 and for a sufficient period of time thereafter to allow for completion of subsidence affects.

## 2.0) Principal Risks Identified

In relation to the assets identified in 1.0) and 1.1) above, the following are the assessed relative risks associated with existing Telstra Plant within and around the mine subsidence zone. The two items of plant have been assessed according to the probability of damage and the consequences resulting from that damage, associated with the general category of plant. The Risk Factors are shown in the attached Table 1.

Table 1

Relative Risk Factor (**RF**) for Telecommunications Plant

Risk Assessment Matrix		Consequence				
		Insignificant	Minor	Moderate	Major	Catastrophic
Likelihood	<u>Almost Certain</u>	Significant	Significant	High	High	High
	<u>Likely</u>	Moderate	Significant	Significant	High	High
	<u>Moderate</u>	Low	Moderate	Significant	High	High
	<u>Unlikely</u>	Low	Low	Moderate	Significant	High
	<u>Rare</u>	Low	Low	Moderate	Significant	Significant

### 2.1) Copper Main and Local Distribution Cables installed along and across Blackhill Road

The tapering main cable C3 M1-100 is installed in various sections of the impact area as 100, 50 and 20 pair /0.64 cables. The main cable supplies services to customers along Blackhill Road with lateral 10 and 2 pair distribution cable services provided from the main backbone cable. Some cables are installed in 50mm or 35 mm conduit but the majority of installed cable across the panels is direct buried.

Since the cables are directly buried their degree of freedom to adjust to changes in ground movement is impacted by a number of factors:-

- Varying soil loading on the cable dependent on the degree of compaction that has occurred with time, along the length of the cable, since installation. In this case the cables would have been installed within the last say 20 to 30 years.
- The degree of freedom of the cable is also impacted by the materials that it is in contact with at the base of the trench line, such as sharp rock and tree roots.
- Geological faults, which may cause ground movement of significant magnitude over relatively short distances or cause FFD Impacts which may affect the cable.

Reference 1 makes the comment that “To date, the mine has avoided the significant geological structure, but where it has been encountered, barrier pillars have been left in the workings directly beneath them due to poor roof conditions”. Hence it can be assumed if geological features are encountered suitable barrier pillars will be left in-situ and Telstra will be advised by Abel Mine of the presence and location of these structures.

Since the cables are direct buried are reasonably robust and grease filled to assist in preventing damage to the cables and accepting that the level of ground strain and subsidence are relatively low

, the likelihood of damage is Unlikely and the consequence resulting from damage is considered Moderate. The risk factor is therefore assessed as **MODERATE** (Unlikely event with Moderate consequence).

### 2.2) Pits and Conduit Network

The most vulnerable pits as mentioned above are the old asbestos cement pits located along Blackhill Road. However since there are only ten pits in total the risk factor is assessed as **LOW** (Unlikely event with Minor consequence)

### **3.0) Control Procedure**

The general control procedure considered in this management plan is to look at the two items of plant according to their assessed exposure risk and determine methods of monitoring the plant during the ground subsidence event. In addition there is a recommendation for setting in place some basic actions to be taken, should the potential for damage be observed, during the mine subsidence period.

#### 3.1) Copper Main and Local Distribution Cables installed along and across Blackhill Road (Risk Factor MODERATE)

As discussed there is a main tapering copper cable direct buried along the southern side of Blackhill Road crossing the south western corner of Panel 21 and installed diagonally across Panel 22. The risk to the main cable and local distribution cable is mitigated over Panel 21 due to the length of exposure and lower ground strain while the risk is higher across Panel 22. As a result it is proposed that Abel Mine establish a subsidence survey monitoring line to be surveyed pre, during and post mining for Panels 21 and 22 along Blackhill Road. The surveyed subsidence monitoring should include monitoring of subsidence, tilt and strain along the southern side of Blackhill Road. Physical inspection of cable line and pits should be completed by qualified personnel at critical stages of subsidence impacts along Blackhill Road. Additionally any incidence of fault activity on the network will be noted during physical inspections or investigated due to anomalous survey results. Faults will be investigated by Telstra Network Integrity to determine responsibility for any cable damage that may occur.

#### 3.2) Pit and Conduit Network. (Risk Factor- **LOW**)

Physical survey of pits and conduit locations in the immediate area of the Panel development, concurrent with above cable inspections, should be completed by qualified personnel to ensure there are no observable impacts on the pit conduit network. The inspections should be timed to utilise survey results to identify anomalous ground movement to assist in the monitoring process. Any observed damage to the network will be reported and Telstra Network Integrity will investigate to determine responsibility.

It should be noted that for Tasman Mine at Mount Sugarloaf further south Telstra cables were undermined by partial extraction of panels without impact. The predicted ranges of subsidence and strain for the cables across Panels 2 & 3 South were as follows:-

- *Maximum Subsidence* < 150 mm
- *Maximum strain* < 1.5 mm/m

These predictions are similar to the predictions for Abel Mine Panels 21 and 22 giving confidence to the performance of the cables along Blackhill Road during subsidence impacts from Panels 21 & 22.

#### **4.0) Geological fault:**

No specific fault lines have been identified crossing the copper main cables along Blackhill Road. However as referred to in Section 2.1) above should faults be encountered at seam level it is recommended by DgS that larger barrier pillars be left in-situ to control the potential for increased subsidence and strain. During the Pillar extraction process, should Abel Mine discover any evidence which indicates the potential for adverse surface impacts from geological faults, identified during the mining process, they are to immediately advise Telstra of the potential impact area. The advice should be provided through the Plan Review Meeting which is to review the evidence presented and take action to protect Telstra's assets if there is a reasonable probability that cable damage may result from the fault at surface level.

Responsibility for the various aspects of any pro-active protection work to be carried out by Telstra to protect the Telstra network is to be determined and agreed to by the Plan Review Meeting.

#### **5.0) Resources Required**

Resources required to carry out the monitoring as identified in Section 3 are to be provided by Abel Mine and Telstra NI on a cost recovery basis. The costs associated with the physical monitoring work required for the cables are to be met by Abel Mine on an agreed basis, prior to the work being carried out.

Prior to commencing any proposed rectification or protection work the Telstra representative will detail the extent of the work and the estimated costs, to the Plan Review Meeting. At that meeting agreement will be reached between Abel Mine, Telstra and the Mine Subsidence Board 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 the telecommunications network, where loss of service to subscribers or line systems outage is involved, the work shall be carried out by Telstra and the dispute referred to the next meeting of the Plan Review Meeting for further discussion and resolution.

#### **6.0) Roles and Responsibilities**

The monitoring of the telecommunications network determined by this management plan is to be carried out by Telstra and Abel Mine. The method of implementing the management plan is through meetings when and if required, known as **Plan Review Meetings**, to be arranged between Telstra Network Integrity, Abel Mine, Mine Subsidence Board and consultants as required. Should any party wish to convene a Plan Review Meeting, a chair and a minutes secretary are to be appointed who will be responsible for maintaining all documentation presented to the meeting. The initial and survey data is to be made available to Telstra and the results of surveys completed by Abel Mine are also to be made available to members of the Plan Review Meetings. Prior to commencement of mining the Management Plan shall be signed off by both parties, Donaldson Coal Pty Ltd, Abel Mine and Telstra Corporation Ltd. This approved management plan will then form the basis for the management of the telecommunications network during coal extraction from Panels 21 to 22.

Should a Plan Review Meeting be called by either party regarding damage or potential damage to the Telstra Network, Telstra is to report any incidents recorded in relation to the performance of the telecommunications plant and a detailed log is to be maintained of each incident reported. Full details are to be reported of significant events observed or events which may have an impact on the provision of telecommunications services in the area. Abel Mine are to report on the degree of

ground subsidence and strain 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 on the Network are due to the impact of mine subsidence and then determine the degree of responsibility of each party, for the events recorded. Should significant risk be identified, then either party may call an emergency Plan Review Meeting, with one day's notice, to discuss proposed action and to keep other parties informed of developments in relation to the telecommunications plant potentially affected.

## **7.0) Audit and Review**

It is anticipated that this plan will initially be in place for approximately two years from the commencement of mining operations in Panel 21. Following extraction of Panel 21 the management plan could then be reviewed, if required, prior to commencement of mining in Panel 22. This would ensure that the management plan reflects current mining operations and surface impacts recorded along the cable line following the initial extraction. Should an audit of the management plan be required during the period of its operation then a representative is to be appointed by Telstra, Abel Mine and the Mine Subsidence Board to review the operation of the plan and report to the Plan Review Meeting on any proposed changes to the management plan.

Other factors which may require the management plan to be reviewed are:-

- Poor performance of telecommunications plant in regard to mine subsidence, such as loss of service or continuing transmission problems.
- Favourable performance of telecommunications plant in regard to mine subsidence, no observed or recorded impacts.
- Significant variations from predicted ground subsidence and surface strains becoming evident.
- Presence of geological faults observed during the progress of mining operations or from investigative drilling.

## **8.0) Associated Documents and References**

### **8.1) Appendices**

Appendix A – Ditton Geotechnical Services Pty Ltd  
“Proposed Abel Mine’s SMP Layout,  
with Partial Pillar Extraction Panels 19-22  
(Modified Duncan Method) – Figure 1a” dated 15-7-12.

Sheet 1 of 1

Appendix B – Telstra cables in the immediate area of the Abel Mine.  
Main & Local Copper Cables  
Benwerrin Exchange Area.  
Blackhill Road

Sheet 1 of 1

### **8.2) References**

Reference No 1.

DgS, Report No ABL – 002/4 titled -

“Subsidence Contour Predictions and Impact Assessment for the Proposed Partial Pillar  
Extraction of Panels 19 to 22 at the Abel Mine, John Renshaw Drive, Blackhill”,

Dated: 19th July 2012,

## **9.0) Contact List.**

Contacts of Participants involved in Plan Review Meetings:

Tony Sutherland, Technical Services Manager, Underground Operations,  
Donaldson Coal Pty Ltd,  
Abel Mine, PO Box 2275 Greenhills NSW, 2335  
Mobile 0407 239 820,  
Telephone: 4015 1105, Fax: 4015 1199  
Email: tony.sutherland@gcl.com.au

Paul Grey, District Inspector,  
Mine Subsidence Board,  
PO Box 488G, Newcastle, NSW, 2300  
Email: p.grey@minesub.nsw.gov.au  
Telephone 4908 4300, Mobile 0425 275 572

Telstra  
Mark Schneider, Project Specialist,  
Telstra Network Integrity Central,  
Locked Bag 5035, Parramatta, 2124, NSW,  
Telephone: 8851 2297, Mobile 0419 242 044, Fax: 9218 8558,  
E-mail: Mark.P.Schneider@team.telstra.com

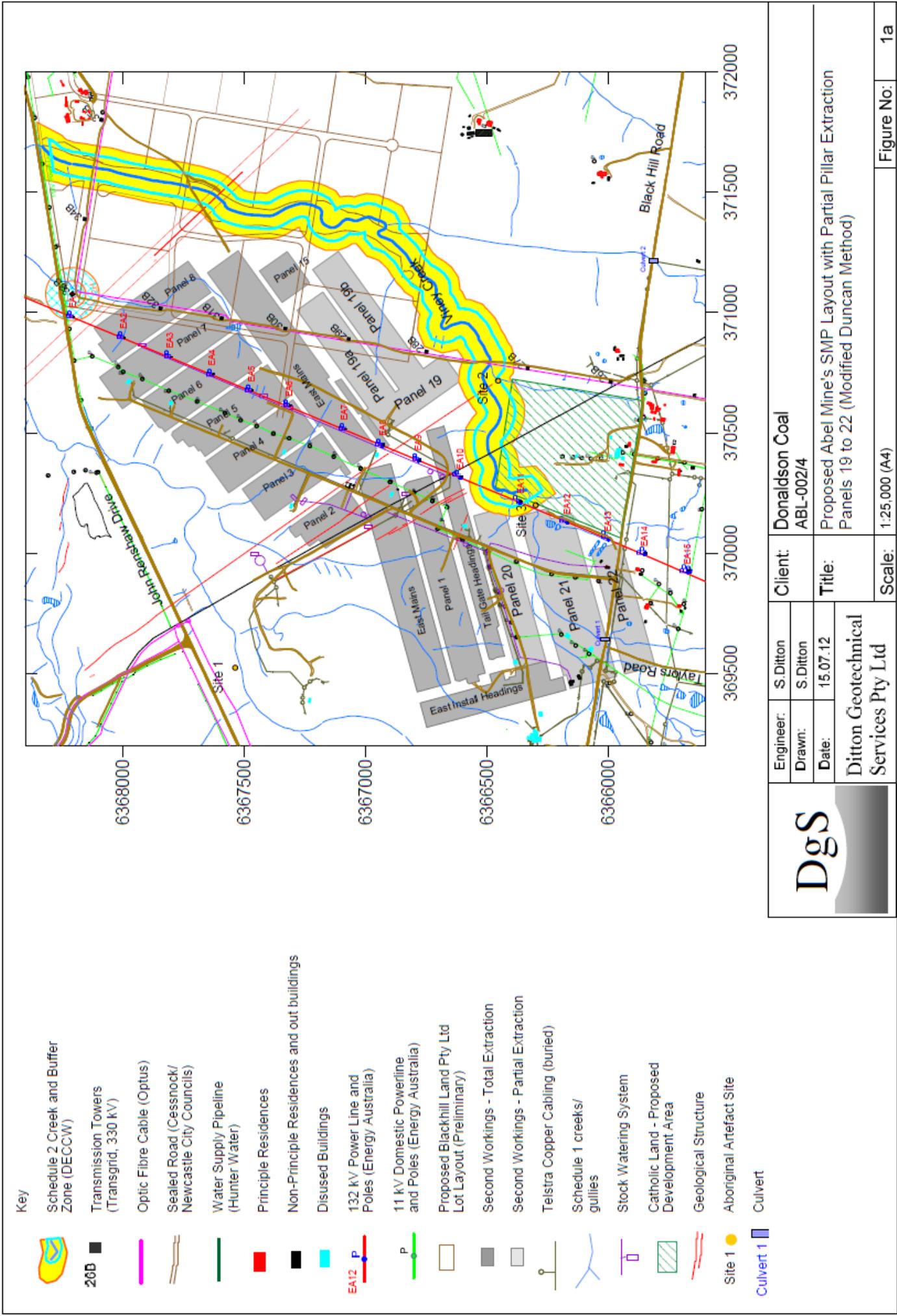
Colin Dove, Telecommunications Consultant, External Plant,  
Comms Network Solutions Pty Ltd  
Mobile 0428 970 826, Fax 9546 6713,  
E-mail cdove@bigpond.com,

## **APPENDICES**

Appendix A – Ditton Geotechnical Services Pty Ltd  
“Proposed Abel Mine’s SMP Layout,  
with Partial Pillar Extraction Panels 19-22  
(Modified Duncan Method) – Figure 1a” dated 15-7-12. Sheet 1 of 1

Appendix B – Telstra cables in the immediate area of the Abel Mine.  
Main & Local Copper Cables  
Benwerrin Exchange Area.  
Blackhill Road Sheet 1 of 1

.....



- Key**
- Schedule 2 Creek and Buffer Zone (DECCW)
  - 20D
  - Transmission Towers (Transgrid, 330 kV)
  - Optic Fibre Cable (Optus)
  - Sealed Road (Cessnock/ Newcastle City Councils)
  - Water Supply Pipeline (Hunter Water)
  - Principle Residences
  - Non-Principle Residences and out buildings
  - Disused Buildings
  - 132 kV Power Line and Poles (Energy Australia)
  - 11 kV Domestic Powerline and Poles (Energy Australia)
  - Proposed Blackhill Land Pty Ltd Lot Layout (Preliminary)
  - Second Workings - Total Extraction
  - Second Workings - Partial Extraction
  - Telstra Copper Cabling (buried)
  - Schedule 1 creeks/ gullies
  - Stock Watering System
  - Catholic Land - Proposed Development Area
  - Geological Structure
  - Site 1
  - Aboriginal Artefact Site
  - Culvert

	Engineer:	S. Ditton	Client:	Donaldson Coal	Scale: 1:25,000 (A4)	Figure No: 1a
	Drawn:	S. Ditton	Title:	ABL-002/4		
	Date:	15.07.12	Proposed Abel Mine's SMP Layout with Partial Pillar Extraction Panels 19 to 22 (Modified Duncan Method)			
Ditton Geotechnical Services Pty Ltd						

Appendix A: Figure 1a Reference No 1)

