Appendix 8

Subsidence Management Plan and Status Report*

(No. of pages including blank pages = 42)

Note*: A copy of this Appendix is only available on the Project CD

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Abel Mine
Subsidence Management Plan
End of Year Report 2012

31 March 2013

Approved by

Tony Sutherland
Technical Services Manager- UG Operations
Donaldson Coal

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TABLES

ATTACHMENTS

1 INTRODUCTION

This Subsidence Management Plan End of Year Report fulfils the requirements of Condition 19 of the Abel Subsidence Management Plan (SMP) Approval Conditions for Area 1 and Condition 18 of the Approval Conditions for Area 2.

A summary of monitoring results for the period January to December 2012 is presented in this report. Pillar extraction was completed in Panels 6, 7, 8, 15, 20, Tailgate Headings and commenced in East Mains, East Install Headings and Panel 21 during this reporting period.

Subsidence surveys, photographic monitoring and visual inspections were conducted over all pillar extraction areas in accordance with the approved Subsidence Monitoring Programs with the exception of a period where access was unable to be obtained, with environmental monitoring conducted in accordance with the approved Environmental Management Plan.

2 PURPOSE AND SCOPE

The purpose of this document is to comply with the relevant approval condition which states:

"The Leaseholder shall prepare an end of year report. This report shall be submitted to the Director Environmental Sustainability, within the first three months of the subsequent year. The end of year report must:

(a) include a summary of the subsidence and environmental results for the year;

(b) include an analysis of these monitoring results against the relevant;

- *impact assessment criteria;*
- *monitoring results from previous years; and*
- *predictions in the SMP.*

(c) identify any trends in the monitoring results over the life of the activity; and

(d) describe what actions were taken to ensure adequate management of any potential subsidence impacts due to mining."

3 SMP PILLAR EXTRACTION DURING REPORTING PERIOD

Area 1

SMP Approval was granted for Abel Area 1 (Panels 1 to 14 inclusive plus East Mains) on 27 May 2010. Pillar extraction has been conducted in the following order during 2012, completion of Panels 6, 7, and 8, and has commenced in East Mains. A Variation application for SMP Area 1 was submitted on the 8 August 2011 and was approved on the 29 September 2011. This variation was related to Panels 9 – 13 being removed from the SMP approved area.

Area 2

SMP Approval was granted for Abel Area 2 (Panels 14 – 26) on 7 December 2011. A variation was submitted on 19 December 2011 relating to the removal of Panel 14 and the shortening of Panels 15 – 19. The second variation submitted, relating to partial pillar extraction Panel 20 – 22, was approved on the 3 September 2012. A third variation submitted, relating to Panels 19 & 19A, was approved on the 21 December 2012. Pillar extraction was conducted in the following order during

2012, Panel 15, Tailgate Heading and Panel 20. Extraction also commenced in Panel 21 and East Install Headings during this period.

Table 1 below provides approval, plus mining commencement and completion dates for the Panels extracted since approval was granted.

Table 1 – Approval and Extraction Dates

Panel	Approval Date	Extraction Commenced	Extraction Completed
Panel 1	27 May 2010	12 July 2010	22 December 2010
Panel 2	27 May 2010	17 September 2010	12 November 2010
Panel 3	27 May 2010	7 January 2011	19 April 2011
Panel 4	27 May 2010	14 March 2011	20 July 2011
Panel 5	27 May 2010	30 May 2011	24 September 2011
Panel 6	27 May 2010	22 September 2011	2 February 2012
Panel 7	27 May 2010	19 November 2011	31 May 2012
Panel 8	7 December 2011	31 March 2012	17 July 2012
Panel 15	7 December 2011	20 February 2012	26 March 2012
Panel 20	3 September 2012	12 September 2012	3 December 2012
Panel 21	3 September 2012	8 November 2012	
East Mains	27 May 2010	18 July 2012	
East Install Headings	7 December 2011	4 December 2012	
Tailgate Headings	7 December 2011	5 June 2012	10 September 2012

4 SUBSIDENCE AND ENVIRONMENTAL PROGRAMS AND MANAGEMENT PLANS

Subsidence Monitoring Programs consisting of a combination of subsidence surveys, visual inspections and photographic monitoring have been developed in consultation with and approved by the Principal Subsidence Engineer, DTIRIS for all Panels extracted to date. In addition underground monitoring programs have been developed and approved for the partial pillar extraction Panels 20 – 21. All required subsidence monitoring lines have been installed and subsidence surveys completed in accordance with the agreed Subsidence Monitoring Programs with the exception of a period where access was unable to be obtained.

Management Plans have been prepared for the following infrastructure outlined in **Table 2** and have been approved by the Director of Mine Safety Operations.

Table 2 – Approved Management Plans

Infrastructure Owners	Management Plans	Approved
Ausgrid	Ausgrid Powerline Management Plan SMP Area 2 – Tailgate Headings	21 June 2012

Infrastructure Owners	Management Plans	Approved
Ausgrid	Ausgrid Powerline Management Plan SMP Area 2 - Panels 20 - 22	2 November 2012
	Ausgrid Powerline Management Plan SMP Area 1 – East Mains	23 October 2012
Telstra	Telstra Corporation Management Plan SMP Area 2	21 December 2012
TransGrid	TransGrid Towers Management Plan SMP Area 1	22 March 2012
	TransGrid Towers Management Plan SMP Area 2	16 January 2013
Cessnock City Council	Blackhill Road and Taylors Road Management Plan SMP Area 2	7 December 2012
Hunter Water	Hunter Water Corporation Water Pipeline Management Plan SMP Area 2	21 June 2012
	Hunter Water Corporation Water Pipeline Management Plan SMP Area 1 – East Mains	12 December 2012

5 SUMMARY OF SUBSIDENCE IMPACTS

Visual inspections and photographic monitoring of various surface features were conducted throughout the year.

Survey results for subsidence, tilt and strain during the year were general in accordance with predicted levels.

5.1 Impacts on General Surface and Roads / Tracks

Surface cracking has occurred generally as predicted at the surface above Panels 6, 7, 8, 15, 20, 21, Tailgate Headings and East Install Headings, East Mains in both the vegetated areas and sealed access road and access tracks.

Remedial works have been carried out in consultation and agreement with the landholders

5.2 Impacts on Hunter Water Corporation Waterline

Subsidence Impacts

Impacts were within predictions and infrastructure remained in a safe and serviceable condition.

5.3 Impacts on Ausgrid Powerlines

Subsidence Impacts

Impacts were within predictions and infrastructure remained in a safe and serviceable condition.

5.4 Impacts on TransGrid Transmission Towers

Subsidence Impacts

Impacts were within predictions and infrastructure remained in a safe and serviceable condition.

5.5 Notification Under SMP Approval Conditions

No exceedances requiring notification of cracking has been required during this period.

There have been no other observed and/or reported subsidence impacts, incidents, service difficulties, community complaints, or any other relevant information.

Post Mining surveys have revealed one minor exceedance for strain in Panel 6, and tilt exceedances in Panels 5, 6, 7 & 15. These exceedances are highlighted in **Table 4** and are all located at the start positions of the respective panels.

6 SUBSIDENCE SURVEY SUMMARY AND ANALYSIS

A record of all completed subsidence surveys is shown in **Table 3**.

Additional surveys have also been conducted on areas within the Catholic Diocese of Maitland – Newcastle land.

A summary of subsidence, strain and tilt results are detailed in **Table 4** with comparison to the SMP predictions.

All required subsidence monitoring lines have been installed and all pre-mining subsidence surveys completed in accordance with the agreed Subsidence Monitoring Programs.

Table 3 – Subsidence Monitoring Survey Dates

Survey / Monitoring Line	Survey / Monitoring Description	Pre – Mining Survey	Survey / Inspection / Monitoring Dates	Post – Mining
Panel 1	*Subsidence survey*	Installation and pre-mining survey 7/07/2010	Weekly Surveys	*11/02/2011* *24/06/2011*
Panel 2	*Subsidence Survey*			*22/12/2010* *21/06/2011*
Panel 3	*Subsidence survey*	*23/12/2010*	Weekly Surveys	*10/06/2011* *25/10/2011* *9/05/2011*
	Visual inspection		Weekly Surveys	
	Photographic monitoring	*23/12/2010*		
Panel 4	*Subsidence survey*	*4/03/2011*	Weekly Surveys	*24/08/2011* *9/05/2011*
	Visual inspection		Weekly Surveys	
	Photographic monitoring	*4/03/2011*		
Panel 5	*Subsidence survey*	*27/05/2011*		*4/11/2011* *2/05/2012*
	Visual inspection		Weekly Surveys	
	Photographic monitoring	*27/05/2011*		
Panel 6	*Subsidence survey*	*14/09/2011*		*1/05/2012*
	Visual inspection		Weekly Surveys	
	Photographic monitoring	*14/09/2011*		
Panel 7	*Subsidence survey*	*8/02/2012*		*2/08/2012*

Survey / Monitoring Line	Survey / Monitoring Description	Pre – Mining Survey	Survey / Inspection / Monitoring Dates	Post – Mining
	Visual inspection		Weekly Surveys	
	Photographic monitoring	*8/02/2012*		
Panel 8	*Subsidence survey*	*13/02/2012*		*31/10/2012*
	Visual inspection		Weekly Surveys	
	Photographic monitoring	*13/02/2012*		
Panel 15	*Subsidence survey*	*9/02/2012*		*27/04/2012*
	Visual inspection		Weekly Surveys	
	Photographic monitoring	*9/02/2012*		
Panel 20	*Subsidence survey*	*29/08/2012*		
	Visual inspection		Weekly Surveys	
	Photographic monitoring	*29/08/2012*		
Panel 21	*Subsidence survey*	*7/11/2012*		
	Visual inspection		Weekly Surveys	
	Photographic monitoring	*7/11/2012*		
East Install Headings	*Subsidence survey*	*14/11/2012*		
	Visual inspection		Weekly Surveys	
	Photographic monitoring	*14/11/2012*		
	Subsidence survey	*18/05/2012*		*19/12/2012*
	Visual inspection		Weekly Surveys	

Survey / Monitoring Line	Survey / Monitoring Description	Pre – Mining Survey	Survey / Inspection / Monitoring Dates	Post – Mining
Tailgate Headings	*Photographic monitoring*	*18/05/2012*		
East Mains Headings	*Subsidence survey*	*9/07/2012*		
	Visual inspection		Weekly Surveys	
	Photographic monitoring	*9/07/2012*		
Hunter Water Corporation pipeline	*Subsidence survey*	*7/07/2010 over P1* *8/09/2010 over P2*	Weekly Surveys	*11/02/2011 & 24/06/2011 Over P1* *22/12/2010 & 21/06/2011 Over P2*
	Visual inspection		Weekly Surveys	
	Photographic monitoring			
Ausgrid Power Poles	*Subsidence survey*	Same date as Panel surveys	Weekly Surveys	
	Visual inspection		Weekly Surveys	
	Photographic monitoring	Same date as Panel surveys		
TransGrid Transmission Towers	*Subsidence survey*	*28/03/2012*	Weekly Surveys	
	Visual inspection		Daily Surveys	
	Photographic monitoring	*28/03/2012*		

Table 4 – Comparison of Subsidence Monitoring Results to SMP Predictions

PANEL 1 (W = 120 m; T = 2.35 - 3.0m)			
>75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	0.95 - 1.25m	0.72 - 1.228m	Measured subsidence < predictions
Tensile Strain	10 - 18 mm/m	4 - 12 mm/m (18 mm/m)	Measured tensile strains < predictions.
Compressive Strain	13 - 23 mm/m	5 - 14 mm/m	Measured compressive strains < predictions
Tilt	22 - 40 mm/m	22 - **46** mm/m	Measured tilts < predictions. One exceedance of 15%.
Other		Cracked Joint to Hunter Water Pipeline Repaired 11kv Power Line	All necessary repairs have been carried out.

PANEL 2 (W= 150m ; T = 2.5 m)			
< 75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	1.30 - 1.38m	0.977 - 1.041 m	Measured subsidence < predictions
Tensile Strain	18 - 31 mm/m	4 - 6 mm/m (5 mm/m)	Measured tensile strains < predictions
Compressive Strain	23 - 40 mm/m	4 - 7 mm/m	Measured compressive strains < predictions
Tilt	40 - 67 mm/m	22 - 32 mm/m	Measured tilts < predictions
Other			
>75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	1.20 - 1.32m	0.94 - 0.966m	Measured subsidence < predictions
Tensile Strain	13 - 20 mm/m	9 mm/m (15 mm/m)	Measured tensile strains < predictions
Compressive Strain	17 - 25 mm/m	6 mm/m	Measured compressive strains < predictions
Tilt	30 - 45 mm/m	27 mm/m	Measured tilts < predictions
Other			

PANEL 3 (W=160.5 m; T = 2.5 m)			
< 75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	1.33 - 1.34 m	1.003 m	Measured subsidence < predictions
Tensile Strain	19 - 31 mm/m	8 - 9 mm/m (26 mm/m)	Measured tensile strains < predictions
Compressive Strain	24 - 40 mm/m	5 - 7 mm/m	Measured compressive strains < predictions
Tilt	42 - 67 mm/m	28 - 39 mm/m	Measured tilts < predictions
Other			
>75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	1.26 - 1.27 m	0.884 - 0.982 m	Measured subsidence < predictions
Tensile Strain	14 - 21mm/m	8 mm/m (10 mm/m)	Measured tensile strains < predictions
Compressive Strain	18 - 27 mm/m	4 mm/m	Measured compressive strains < predictions
Tilt	33 - 49 mm/m	30 mm/m	Measured tilts < predictions
Other			

PANEL 4 (W= 160.5 m; T = 2.5 m)			
< 75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	1.27-1.29m	1.065m	Measured subsidence < predictions
Tensile Strain	19 - 31 mm/m	6 - 10 mm/m (37.5 mm/m)	Measured tensile strains < predictions with 1 exceedance of 20% at clay cap.
Compressive Strain	24 - 40 mm/m	6 - 18 mm/m	Measured compressive strains < predictions
Tilt	42 - 67 mm/m	36 - 60 mm/m	Measured tilts < predictions
Other			
>75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	1.29 - 1.32m	1.054 m	Measured subsidence < predictions
Tensile Strain	14 - 21mm/m	5 mm/m	Measured tensile strains < predictions
Compressive Strain	18 - 27 mm/m	5 mm/m	Measured compressive strains < predictions
Tilt	42 - 67 mm/m	25 - 36 mm/m	Measured tilts < predictions
Other			

PANEL 5 (W= 160.5 m; T = 2.5 m)			
< 75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	1.27-1.43	1.154m	Measured subsidence < predictions
Tensile Strain	14 - 15 mm/m	10 mm/m	Measured tensile strains < predictions
Compressive Strain	15 - 19 mm/m	4 mm/m	Measured compressive strains < predictions
Tilt	41 - 46 mm/m	68 mm/m	Measured tilts < predictions with 1 minor exceedance
Other			
>75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	1.42 - 1.43m	1.002 m	Measured subsidence < predictions
Tensile Strain	11 - 15 mm/m	2 mm/m	Measured tensile strains < predictions
Compressive Strain	15 - 18 mm/m	13 mm/m	Measured compressive strains < predictions
Tilt	38 - 46 mm/m	29.8 mm/m	Measured tilts < predictions
Other			

PANEL 6 (W= 160.5 m; T = 2.5 m)			
< 75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	1.21 - 1.32m	1.215m	Measured subsidence < predictions
Tensile Strain	14 mm/m	8 mm/m	Measured tensile strains < predictions
Compressive Strain	17 - 18 mm/m	21 mm/m	Measured compressive strains < predictions with 1 minor exceedance
Tilt	39 - 41 mm/m	89.6 mm/m	Measured tilts < predictions with 1 minor exceedance
Other			
>75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	1.32 - 1.42m	1.066 m	Measured subsidence < predictions
Tensile Strain	11 - 14mm/m	9 mm/m	Measured tensile strains < predictions
Compressive Strain	14 - 17 mm/m	7 mm/m	Measured compressive strains < predictions
Tilt	38 - 41 mm/m	30 mm/m	Measured tilts < predictions
Other			

PANEL 7 (W= 160.5 m; T = 2.5 m)			
< 75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	1.27 - 1.32m	0.731m	Measured subsidence < predictions
Tensile Strain	11 - 14 mm/m	4 mm/m	Measured tensile strains < predictions
Compressive Strain	14 - 18 mm/m	2 mm/m	Measured compressive strains < predictions
Tilt	41 mm/m	4 mm/m	Measured tilts < predictions
Other			
>75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	1.32 - 1.43m	1.312 m	Measured subsidence < predictions
Tensile Strain	11 - 15mm/m	22 mm/m	Measured tensile strains < predictions with 1 minor exceedance
Compressive Strain	14 - 18 mm/m	35 mm/m	Measured compressive strains < predictions with 1 minor exceedance
Tilt	41 mm/m	19.1 mm/m	Measured tilts < predictions
Other			

PANEL 8 (W= 160.5 m; T = 2.5 m)			
< 75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	< 1.32m	0.828m	Measured subsidence < predictions
Tensile Strain	14 - 15 mm/m	2 mm/m	Measured tensile strains < predictions
Compressive Strain	17 - 19 mm/m	3 mm/m	Measured compressive strains < predictions
Tilt	42 mm/m	11.4 mm/m	Measured tilts < predictions
Other			
>75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	1.25 - 1.32m	0.835 m	Measured subsidence < predictions
Tensile Strain	10 - 14mm/m	11 mm/m	Measured tensile strains < predictions with 1 minor exceedance
Compressive Strain	13 - 17 mm/m	6 mm/m	Measured compressive strains < predictions with 1 minor exceedance
Tilt	41 mm/m	33.8 mm/m	Measured tilts < predictions
Other			

PANEL 15 (W= 160.5 m; T = 2.5 m)			
>75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	1.17 - 1.23m	1.125m	Measured subsidence < predictions
Tensile Strain	7 - 12mm/m	14 mm/m	Measured tensile strains < predictions
Compressive Strain	9 - 15 mm/m	12 mm/m	Measured compressive strains < predictions
Tilt	19 - 32 mm/m	47 mm/m	Measured tilts < predictions with 2 minor exceedance
Other			

TAILGATE HEADINGS (W= 80.5 m; T = 2.8 m)			
<110mCover	**Predicted**	**Final Measured**	**Comment**
Subsidence	0.88 – 0.99m	0.240m	Measured subsidence < predictions
Tensile Strain	8 - 9mm/m	5 mm/m	Measured tensile strains < predictions
Compressive Strain	8 - 9 mm/m	1 mm/m	Measured compressive strains < predictions
Tilt	18 - 33 mm/m	7 mm/m	Measured tilts < predictions
Other			

7 PHOTOGRAPHIC MONITORING AND VISUAL INSPECTION SUMMARY AND ANALYSIS

Dates of photographic monitoring and visual inspections are shown in **Table 5.** No impacts or changes have been noted in either photographic monitoring or visual inspections and these results have been detailed in the Subsidence Management Status Reports submitted in January, May and September 2012 and January 2013.

No evidence of impacts has been observed or noted during these inspections and monitoring.

Comparison of pre and post mining photographic monitoring did not reveal any evidence of impact.

Table 5 – Surface Inspection and Photographic Monitoring Dates

Monitoring / Inspection	Monitoring / Inspection Description	Pre Mining Inspections / Monitoring	Mining Period Inspections / Monitoring	Post Mining Inspections / Monitoring
		Panel 6		
General Surface	Visual inspection	14/09/2011	Weekly	1/05/2012
Roads / tracks	Visual inspection	14/09/2011	Weekly in active zone	1/05/2012
	Photographic monitoring	14/09/2011	-	
		Panel 7		
General surface	Visual inspection	8/02/2012	Weekly	2/08/2012
Roads / tracks	Visual inspection	8/02/2012	Weekly in active zone	2/08/2012
	Photographic monitoring	8/02/2012	-	
		Panel 8		
General surface–	Visual inspection	13/02/2012	Weekly	31/10/2012
Roads / tracks	Visual inspection	13/02/2012	Weekly in active zone	31/10/2012
	Photographic monitoring	13/02/2012	-	
		Panel 15		
General surface–	Visual inspection	9/02/2012	Weekly	27/04/2012
Roads / tracks	Visual inspection	9/02/2012	Weekly in active zone	27/04/2012
	Photographic monitoring	9/02/2012	-	

Monitoring / Inspection	Monitoring / Inspection Description	Pre Mining Inspections / Monitoring	Mining Period Inspections / Monitoring	Post Mining Inspections / Monitoring
Panel 20				
General surface–	Visual inspection	29/08/2012	Weekly	
Roads / tracks	Visual inspection	29/08/2012	Weekly in active zone	
	Photographic monitoring	29/08/2012	-	
Panel 21				
General surface–	Visual inspection	7/11/2012	Weekly	
Roads / tracks	Visual inspection	7/11/2012	Weekly in active zone	
	Photographic monitoring	7/11/2012	-	
East Install Headings				
General surface–	Visual inspection	14/11/2012	Weekly	
Roads / tracks	Visual inspection	14/11/2012	Weekly in active zone	
	Photographic monitoring	14/11/2012	-	
Tailgate Headings				
General surface–	Visual inspection	18/05/2012	Weekly	19/12/2012
Roads / tracks	Visual inspection	18/05/2012	Weekly in active zone	19/12/2012
	Photographic monitoring	18/05/2012	-	
East Mains Headings				
General surface–	Visual inspection	9/07/2012	Weekly	
Roads / tracks	Visual inspection	9/07/2012	Weekly in active zone	
	Photographic monitoring	9/07/2012	-	

8 ENVIRONMENTAL MONITORING SUMMARY AND ANALYSIS

Groundwater

Monthly monitoring of regional groundwater levels and quality was undertaken throughout the year in accordance with the Site Water Management Plan and Integrated Monitoring Plan.

A summary of groundwater and surface water quality is provided in **Tables 6** and **7.**

Table 6 – Summary of Groundwater Quality Monitoring Results

Sampling Site	pH	EC (µS/cm)	TSS (mg/L)
6	7.04 – 7.29	662 - 3320	35 - 6400
7	7.04 – 7.55	1190 - 2820	40 – 240
12	6.12 – 7.42	452 - 9120	22 – 161
13	7.03 – 7.48	3710 - 12400	14 - 108
JRD1	8.05 – 8.63	4120 - 4730	8 – 57
JRD2	6.57 – 8.06	256 - 506	18 - 118

Table 7 – Summary of Surface Water Quality Monitoring Results

Sampling Site	pH	EC (µS/cm)	Turbidity (NTU)	TSS (mg/L)
1	6.96 – 7.29	388 - 1760	9.4 -94.9	<5 - 44
8	7.30 – 7.64	296 – 841	16.5 – 59.2	<5 - 174
9	Not Sampled			
10	7.36 – 7.67	618 - 1750	6.8 – 1750	9 – 106
11	7.1 – 7.67	393 – 2550	21.5 – 140	8 - 108
FMCU	6.89 – 7.40	199 - 624	16.1 – 42.1	6 – 40
FMCD	6.96 – 7.69	142 - 253	4.6 - 193	5 - 228

9 TRENDS IN MONITORING RESULTS

As noted previously monitoring results in subsidence and environmental areas displayed no discernable trends, nor major variances to previous years.

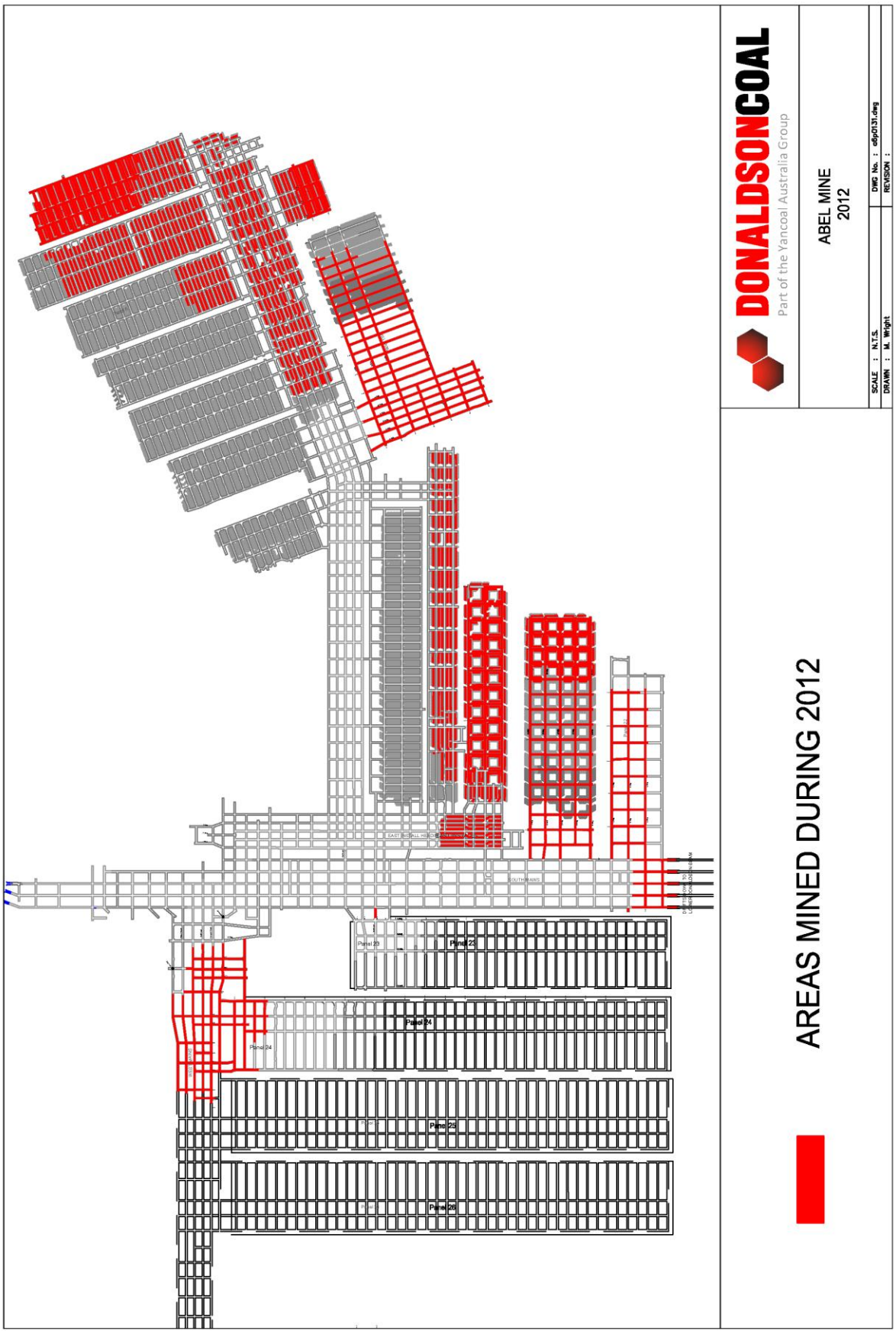
Routine and scheduled monitoring will continue as outlined in the various monitoring and management programs.

10 MANAGEMENT ACTIONS

Actions taken to ensure adequate management of any potential subsidence impacts due to mining include:

- Various monitoring programs, subsidence surveys, visual inspections, photographic monitoring to detect any impact;

- TARPs (Trigger, Action, Response Plans) forming part of approved Public Safety Management Plans and Environmental Monitoring Programs which include mitigation/remediation options and notification procedures relating to subsidence monitoring, surface cracking on both roads / fire trails and vegetated areas and impacts on rock mass / steep slopes and Aboriginal sites.


DONALDSONCOAL
Part of the Yancoal Australia Group
ABEL MINE
2012
SCALE : N.T.S.
DRAWN : M. Wright
DWG No. : abp031.dwg
REVISION :
AREAS MINED DURING 2012
Panel 23
Panel 24
Panel 25
Panel 26

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Abel Mine
Subsidence Management Status Report

Four Monthly Update

31 May 2013

Approved by Tony Sutherland
Technical Services Manager - Underground Operations
Donaldson Coal

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Attachment 2 – Panels 7, 8, 15 & East Mains Survey Results
Attachment 3 – Ausgrid Power Pole Survey Results
Attachment 4 – TransGrid Survey Results
Attachment 5 – Blackhill and Taylors Road Survey Results
Attachment 6 – Summary of Underground Monitoring results

1 INTRODUCTION

This Subsidence Status Management Report fulfils the requirements of Condition 18 of the Abel Subsidence Management Plan (SMP) Approval Conditions for Abel Area 1 dated 27 May 2010 and SMP Area 2 dated 7 December 2011 and subsequent variations.

A summary of monitoring results for the period from 31 January 2013 to 31 May 2013 is presented in this report. Pillar extraction took place in Panels 19, 19A, 21 and 22. Monitoring was conducted as detailed in **Section 7**.

While any adverse impacts will be immediately evident during monitoring and reported, as required under Condition 17, there is approximately a one month lag time in collation and review of some monitoring data.

2 PURPOSE AND SCOPE

The purpose of this document is to report the progress of mining, provide a summary of any subsidence impacts, the implemented management processes and any consultation with relevant stakeholders.

3 FACE POSITIONS OF PANELS 19, 19A, 21 AND 22

The face positions of Panels 19, 19A, 21 and 22 at fortnightly intervals are presented in **Attachment 1**.

Panel Name	Extraction Commenced	Extraction Completed
Panel 19	25th May 2013	Not yet complete
Panel 19A	20th January 2013	25th May 2013
Panel 21	8th November 2012	18th April 2013
Panel 22	19th April 2013	Not yet complete

4 SUBSIDENCE MONITORING AND INSPECTIONS

4.1 Subsidence Monitoring Program

The Subsidence Monitoring Programs are developed in consultation with the Department of Trade and Investment, Regional Infrastructure and Services (DTIRIS). Monitoring programs for the following Panels were developed and approved by the Principal Subsidence Engineer, DTIRIS in accordance with Condition 12.

Panel Name	Approved
Panel 19 & 19A	4th February 2013
Panel 21	5th November 2012
Panel 22	11th April 2013

4.2 Ausgrid Power Poles

A pre-mining subsidence survey has been conducted plus additional pole verticality checks along with post mining surveys.

Visual inspections have been conducted, when required, as detailed in the Management Plan.

4.3 TransGrid Transmission Towers

Pre-mining subsidence survey has been conducted plus weekly surveys.

Daily visual inspections as well as real time tilt monitoring has been conducted, as detailed in the Management Plan.

4.4 Blackhill and Taylors Road

Pre-mining subsidence survey has been conducted plus fortnightly surveys.

Daily visual inspections have been conducted, as detailed in the Management Plan.

5 SUMMARY OF SUBSIDENCE IMPACTS AND MANAGEMENT ACTIONS

Mining operations have continued with minor impacts on the general surface in the form of cracking in the general surface area.

5.1 Impacts on General Surface and Roads / Tracks

Surface cracking has occurred within predictions at the surface above Panel 19A in the vegetated areas, grazing areas, sealed access road and access tracks.

Remedial works have been carried out in relation to cracking over these areas.

5.3 Impacts on Ausgrid Power Poles

Subsidence Impacts

Nil during this period

Notification

Not required during this period

Management Actions

None required during this period

5.4 Impacts on TransGrid Transmission Towers

Subsidence Impacts

Nil during this period

Notification

Not required during this period

Management Actions

None required during this period

5.5 Impacts on Blackhill and Taylors Road

Subsidence Impacts

Nil during this period

Notification

Not required during this period

Management Actions

None required during this period

5.6 Notification under SMP Approval Conditions

No notification relating to cracking has been required during this period.

There have been no other observed and/or reported subsidence impacts, incidents, service difficulties, community complaints, or any other relevant information, that would require notification under the approval conditions.

6 SUMMARY OF COMMENTS, ADVICE AND FEEDBACK FROM CONSULTATION

6.1 Summary of Additional Consultation

Additional consultation was conducted with Ausgrid, Telstra and Cessnock City Council relating to Management Plan development, land remediation and monitoring within this period.

6.2 Approval Condition Compliance Status

Listed below in **Table 1 & 2** is the current status of compliance with the SMP Approval Conditions for Abel Area 1 & 2

Table 1 SMP Approval Conditions Abel Area 1– Compliance Status

Condition No.	Brief Description	Date Required	Current Status
1	Carry out activity strictly in accordance with the SMP Approved Plan	Not specified	Noted and complied with
2	Carry out activity generally in accordance with the SMP; subject to the conditions of the Approval.	Not specified	Noted and complied with
3	Obligation for actions, including remediation of subsidence impacts, to continue until Director General notification that action has been completed to his or her satisfaction	Not relevant at this time	Noted
4	Director General may vary conditions of Approval by notice in writing	At any time by Director General	Noted
5	Director General may suspend or revoke approval	Not specified	Noted
6	Leaseholder must implement the SMP and carry out any additional practicable measures to prevent and/or minimise any harm to the environment	Ongoing	Noted
7	Notice of Approval to be provided within 30 days to DoP, DECC-NOW, DECCW, Council, MSB, local Aboriginal Land Council, owners / operators of infrastructure and landowners		Complete
8	Plans, programs, reports or strategies must be developed having regard to any guidelines adopted by the Director-General	Not specified	Noted and adopted
9	Leaseholder must implement any plan, program or strategy required and approved pursuant to this Approval	Not specified	Noted and adopted
10	Any modifications to plans, programs, reports or strategies already approved must have regard to the matters set out in Condition 7	Not specified	Noted
11	Leaseholder must comply with any written direction given by the Director-General, Director Environmental Sustainability, Director Mine Safety Operations or Principal Subsidence Engineer.	Not specified	Noted
12	Subsidence Monitoring Program for the panels must be submitted for approval to the Principal Subsidence Engineer	Prior to pillar extraction	Panel 1 submitted to Principal Subsidence Engineer, approved 29 June 2010. Panel 2 submitted to Principal Subsidence Engineer,

Condition No.	Brief Description	Date Required	Current Status
			approved 31 August 2010. Panels 3 and 4 submitted to Principal Subsidence Engineer, approved 16 December 2010. Panel 5 submitted to Principal Subsidence Engineer, approved 30 May 2011. Panel 6 submitted to Principal Subsidence Engineer, approved 13 September 2011. Panel 7 submitted 29 September 2011 to Principal Subsidence Engineer, approved 9 November 2011. Panel 8 submitted 15 March 2012 to Principal Subsidence Engineer, approved 27 March 2012. East Mains approved by the Principal Subsidence Engineer 16 July 2012
13	Environmental Monitoring Program to be submitted to Director Environmental Sustainability for approval.	Prior to pillar extraction	Submitted to Director Environmental Sustainability, approved 6 July 2010
14	Prepare and submit for approval to the Director Mine Safety Operations Management Plans for a) Hunter Water Corporation water pipelines; b) Electricity transmission lines c) Optus fibre optic cable d) Any other infrastructure, if required by the Director Mine Safety Operations. Plans must be developed in consultation with the owners of the infrastructure and any Government Agency with a regulatory role for the infrastructure.	Prior to any subsidence impacts	Panel 3 Energy Australia Power line Management Plan was approved 7 February 2011. Ausgrid Panels 5 – 8 management plan was approved on the 7 July 2011. Ausgrid Power line Management Plan East Mains was approved 2 November 2012 TransGrid Power line Management Plan was approved for SMP Area 1 – 22 March 2012 Hunter Water Corporation not required for Panels 3,4,5,6,7 & 8 Optus Fibre Optic Cable was relocated outside the SMP Area.
15	Management review meetings must be convened with the relevant infrastructure owner/operators, the Mine Subsidence Board and the Principal Subsidence Engineer under any of the following circumstances	Prior to the commencement of Panel 4 extraction	Noted. Variation requested and approved (See previous Status Report for details) Meeting held on the 15 September 2011.

Condition No.	Brief Description	Date Required	Current Status
	i) Prior to the commencement of Panel 4 extraction, and/or ii) When a review is requested by the said infrastructure owners/operators or the Mine Subsidence Board or the Principal Subsidence Engineer		Noted.
16	Public Safety Management Plan must be prepared and implemented to the satisfaction of the Director, Mine Safety Operations	Prior to pillar extraction	SMP Area 1 Submitted to Director Mine Safety Operations, approved 4 June 2010.
17	Incident and Ongoing Management reporting	Ongoing	Noted. Notification provided re – cracking Panel 1, 6 August 2010. Notification provided re – cracking Panel 4, 6 May 2011

Condition No.	Brief Description	Date Required	Current Status
18	Subsidence Management Status Report to be updated every 14 days and provided every 4 months to: Principal Subsidence Engineer, DECC-NSW Office of Water and each operator of infrastructure referred to in Condition 14. Must be provided, as updated from time to time, on request to: Mine Subsidence Board, Director of Environmental Sustainability, Principal Subsidence Engineer, owners/operators of any infrastructure within the application area and any other relevant stakeholders	Update every 14 days. Submitted 27 September 2010 and then every 4 months from Panel 1 approval.	Noted – first report Panel 1 completed 5 October 2010 to provide update to end September 2010. Second report provided for period 30 September 2010 to 31 January 2011. Third report covered 31 January 2011 to 31 May 2011. Fourth report covered 31 May 2011 to 30 September 2011. Fifth report covered 30 September 2011 to 31 January 2012. Sixth report covered 31 January 2012 to 31 May 2012. Seventh report covered 31 May 2012 to 30 September 2012. The latest report covered 30 September to 31 January 2013.
19	End of Year report	By 31 March 2011 By March 2012 By March 2013	Lodged. Lodged. Lodged.
20	Access to information – within 3 months of End of Year Report or approval of any plan, programme or strategy (a) Provide a copy to relevant agencies (b) Ensure copy available at regional office; and (c) Put a copy on website	Various	Noted and provided. Relevant agencies are MSB, DECCW, DECCW_NOW and DoP
21	Survey marks – functionality to be restored	On completion of subsidence	Noted
22	In the event of interruption to potable water supplies, water supplies of equivalent quality and quantity to be provided until such time as affected water supplies are restored		Noted

Table 2 SMP Approval Conditions Abel Areas 2 – Compliance Status

Condition No.	Brief Description	Date Required	Current Status
1	Carry out activity strictly in accordance with the SMP Approved Plan	Not specified	Noted and complied with
2	Carry out activity generally in accordance with the SMP; subject to the conditions of the Approval.	Not specified	Noted and complied with
3	Obligation for actions, including remediation of subsidence impacts, to continue until Director General notification that action has been completed to his or her satisfaction	Not relevant at this time	Noted
4	Director General may vary conditions of Approval by notice in writing	At any time by Director General	Noted
5	Director General may suspend or revoke approval	Not specified	Noted
6	Leaseholder must implement the SMP and carry out any additional practicable measures to prevent and/or minimise any harm to the environment	Ongoing	Noted
7	Notice of Approval to be provided within 30 days to DoP, DECC-NOW, DECCW, Council, MSB, local Aboriginal Land Council, owners / operators of infrastructure and landowners		Complete
8	Plans, programs, reports or strategies must be developed having regard to any guidelines adopted by the Director-General	Not specified	Noted and adopted
9	Leaseholder must implement any plan, program or strategy required and approved pursuant to this Approval	Not specified	Noted and adopted
10	Any modifications to plans, programs, reports or strategies already approved must have regard to the matters set out in Condition 7	Not specified	Noted
11	Leaseholder must comply with any written direction given by the Director-General, Director Environmental Sustainability, Director Mine Safety Operations or Principal Subsidence Engineer.	Not specified	Noted
12	Subsidence Monitoring Program for the panels must be submitted for approval to the Principal Subsidence Engineer	Prior to pillar extraction	Panel 15 submitted to the Principal Subsidence Engineer, approved 15 February 2012. Tailgate Headings submitted to the Principal

Condition No.	Brief Description	Date Required	Current Status
			Subsidence Engineer, approved 4th June 2012 Panel 20 submitted to the Principal Subsidence Engineer, approved 9 November 2012 Panel 21 submitted to the Principal Subsidence Engineer, approved 5 November 2012 Panel 22 submitted to the Principal Subsidence Engineer, approved 11 April 2013 Panel 19 & 19A submitted to the Principal Subsidence Engineer, approved 4 February 2013
13	Environmental Monitoring Program to be submitted to Director Environmental Sustainability for approval.	Prior to pillar extraction	Submitted to Director Environmental Sustainability, approved 15 February 2012
14.1	Prepare and submit for approval to the Director Mine Safety Operations Management Plans for a) Hunter Water Corporation water pipelines; b) Electricity transmission lines c) Telecommunication cables; d) Public roads; e) Any property or infrastructure if required by the Director of Mine Safety Operations.	Prior to any subsidence impacts	An Ausgrid Powerline Management Plan & a Hunter Water Corporation Management Plan was prepared for Tailgate headings and was approved on the 21 June 2012 An Ausgrid Powerline Management Plan was approved for Panels 20 – 22 on 2 November 2012 TransGrid Power line Management Plan was approved for SMP Area 2 – 16 January 2013 Blackhill and Taylors road Management Plan was approved for SMP Area 2 - 16 January 2013
14.2	Management review meetings must be convened with the relevant infrastructure owner/operator, the Mine Subsidence Board and the Principle Subsidence Engineer under any of the following circumstances: i) Allowing sufficient time to implement any required management measures or strategies that may result from	Not specified	Noted.

Condition No.	Brief Description	Date Required	Current Status
	the said review, and/or ii) When a review is requested by the said infrastructure owners/operators or the Mine Subsidence Board or the Principal Subsidence Engineer.		
15	Public Safety Management Plan must be prepared and implemented to the satisfaction of the Director, Mine Safety Operations	Prior to pillar extraction	SMP Area 2 Submitted to the Director Mine Safety Operations, approved 15 January 2012 A variation was approved 16 January 2013
16	Incident and Ongoing Management reporting	Ongoing	Noted.

7 SUMMARY OF SUBSIDENCE DEVELOPMENT

7.1 Subsidence Monitoring Program

All required subsidence monitoring lines have been installed and all pre-mining subsidence surveys completed in accordance with the agreed Subsidence Monitoring Program.

Additional surveys and inspections have also been conducted. Subsidence results to date are:

PANEL 1 (W = 120 m; T = 2.35 - 3.0m)			
>75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	0.95 - 1.25m	0.72 - 1.228m	Measured subsidence < predictions
Tensile Strain	10 - 18 mm/m	4 - 12 mm/m (18 mm/m)	Measured tensile strains < predictions.
Compressive Strain	13 - 23 mm/m	5 - 14 mm/m	Measured compressive strains < predictions
Tilt	22 - 40 mm/m	22 - 46 mm/m	Measured tilts < predictions. One exceedance of 15%.
Other		Cracked Joint to Hunter Water Pipeline Repaired 11kv Power Line	All necessary repairs have been carried out.

PANEL 2 (W= 150m ; T = 2.5 m)			
< 75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	1.30 - 1.38m	0.977 - 1.041 m	Measured subsidence < predictions
Tensile Strain	18 - 31 mm/m	4 - 6 mm/m (5 mm/m)	Measured tensile strains < predictions
Compressive Strain	23 - 40 mm/m	4 - 7 mm/m	Measured compressive strains < predictions
Tilt	40 - 67 mm/m	22 - 32 mm/m	Measured tilts < predictions
Other			
>75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	1.20 - 1.32m	0.94 - 0.966m	Measured subsidence < predictions
Tensile Strain	13 - 20 mm/m	9 mm/m (15 mm/m)	Measured tensile strains < predictions
Compressive Strain	17 - 25 mm/m	6 mm/m	Measured compressive strains < predictions
Tilt	30 - 45 mm/m	27 mm/m	Measured tilts < predictions
Other			

PANEL 3 (W=160.5 m; T = 2.5 m)			
< 75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	1.33 - 1.34 m	1.003 m	Measured subsidence < predictions
Tensile Strain	19 - 31 mm/m	8 - 9 mm/m (26 mm/m)	Measured tensile strains < predictions
Compressive Strain	24 - 40 mm/m	5 - 7 mm/m	Measured compressive strains < predictions
Tilt	42 - 67 mm/m	28 - 39 mm/m	Measured tilts < predictions
Other			
>75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	1.26 - 1.27 m	0.884 - 0.982 m	Measured subsidence < predictions
Tensile Strain	14 - 21mm/m	8 mm/m (10 mm/m)	Measured tensile strains < predictions
Compressive Strain	18 - 27 mm/m	4 mm/m	Measured compressive strains < predictions
Tilt	33 - 49 mm/m	30 mm/m	Measured tilts < predictions
Other			

PANEL 4 (W= 160.5 m; T = 2.5 m)			
< 75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	1.27-1.29m	1.065m	Measured subsidence < predictions
Tensile Strain	19 - 31 mm/m	6 - 10 mm/m (37.5 mm/m)	Measured tensile strains < predictions with 1 exceedance of 20% at clay cap.
Compressive Strain	24 - 40 mm/m	6 - 18 mm/m	Measured compressive strains < predictions
Tilt	42 - 67 mm/m	36 - 60 mm/m	Measured tilts < predictions
Other			
>75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	1.29 - 1.32m	1.054 m	Measured subsidence < predictions
Tensile Strain	14 - 21mm/m	5 mm/m	Measured tensile strains < predictions
Compressive Strain	18 - 27 mm/m	5 mm/m	Measured compressive strains < predictions
Tilt	42 - 67 mm/m	25 - 36 mm/m	Measured tilts < predictions
Other			

PANEL 5 (W= 160.5 m; T = 2.5 m)			
< 75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	1.27-1.43	1.154m	Measured subsidence < predictions
Tensile Strain	14 - 15 mm/m	10 mm/m	Measured tensile strains < predictions
Compressive Strain	15 - 19 mm/m	4 mm/m	Measured compressive strains < predictions
Tilt	41 - 46 mm/m	68 mm/m	Measured tilts < predictions with 1 minor exceedance
Other			
>75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	1.42 - 1.43m	1.002 m	Measured subsidence < predictions
Tensile Strain	11 - 15 mm/m	2 mm/m	Measured tensile strains < predictions
Compressive Strain	15 - 18 mm/m	13 mm/m	Measured compressive strains < predictions
Tilt	38 - 46 mm/m	29.8 mm/m	Measured tilts < predictions
Other			

PANEL 6 (W= 160.5 m; T = 2.5 m)			
< 75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	1.21 - 1.32m	1.215m	Measured subsidence < predictions
Tensile Strain	14 mm/m	8 mm/m	Measured tensile strains < predictions
Compressive Strain	17 - 18 mm/m	21 mm/m	Measured compressive strains < predictions with 1 minor exceedance
Tilt	39 - 41 mm/m	89.6 mm/m	Measured tilts < predictions with 1 minor exceedance
Other			
>75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	1.32 - 1.42m	1.066 m	Measured subsidence < predictions
Tensile Strain	11 - 14mm/m	9 mm/m	Measured tensile strains < predictions
Compressive Strain	14 - 17 mm/m	7 mm/m	Measured compressive strains < predictions
Tilt	38 - 41 mm/m	30 mm/m	Measured tilts < predictions
Other			

PANEL 7 (W= 160.5 m; T = 2.5 m)			
< 75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	1.27 - 1.32m	0.771m	Measured subsidence < predictions
Tensile Strain	11 - 14 mm/m	5 mm/m	Measured tensile strains < predictions
Compressive Strain	14 - 18 mm/m	2 mm/m	Measured compressive strains < predictions
Tilt	41 mm/m	12 mm/m	Measured tilts < predictions
Other			
>75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	1.32 - 1.43m	1.336 m	Measured subsidence < predictions
Tensile Strain	11 - 15mm/m	23 mm/m	Measured tensile strains < predictions with 1 minor exceedance
Compressive Strain	14 - 18 mm/m	36 mm/m	Measured compressive strains < predictions with 1 minor exceedance
Tilt	41 mm/m	42.5 mm/m	Measured tilts < predictions with 1 minor exceedance
Other			

PANEL 8 (W= 160.5 m; T = 2.5 m)			
< 75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	< 1.32m	0.830m	Measured subsidence < predictions
Tensile Strain	14 - 15 mm/m	2 mm/m	Measured tensile strains < predictions
Compressive Strain	17 - 19 mm/m	3 mm/m	Measured compressive strains < predictions
Tilt	42 mm/m	11.4 mm/m	Measured tilts < predictions
Other			
>75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	1.25 - 1.32m	0.845 m	Measured subsidence < predictions
Tensile Strain	10 - 14mm/m	11 mm/m	Measured tensile strains < predictions with 1 minor exceedance
Compressive Strain	13 - 17 mm/m	6 mm/m	Measured compressive strains < predictions with 1 minor exceedance
Tilt	41 mm/m	33.8 mm/m	Measured tilts < predictions
Other			

PANEL 15 (W= 160.5 m; T = 2.5 m)			
>75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	1.17 - 1.23m	1.164m	Measured subsidence < predictions
Tensile Strain	7 - 12mm/m	15 mm/m	Measured tensile strains < predictions
Compressive Strain	9 - 15 mm/m	13 mm/m	Measured compressive strains < predictions
Tilt	19 - 32 mm/m	49 mm/m	Measured tilts < predictions with 2 minor exceedance
Other			

PANEL 20 (W= 128 m; T = 2.7 m)			
>75m Cover	**Predicted**	**Final Measured**	**Comment**
Subsidence	150 mm	42 mm	Measured subsidence < predictions
Tensile Strain	2 mm/m	1 mm/m	Measured tensile strains < predictions
Compressive Strain	2 mm/m	1 mm/m	Measured compressive strains < predictions
Tilt	3 mm/m	2.5 mm/m	Measured tilts < predictions
Other			

PANEL 21 (W= 212 m; T = 2.7 m)			
125m Cover	Predicted	Final Measured	Comment
Subsidence	150 mm	58 mm	Measured subsidence < predictions
Tensile Strain	2 mm/m	1 mm/m	Measured tensile strains < predictions
Compressive Strain	2 mm/m	1 mm/m	Measured compressive strains < predictions
Tilt	3 mm/m	2.1 mm/m	Measured tilts < predictions
Other			

TAILGATE HEADINGS (W= 80.5 m; T = 2.8 m)			
<110mCover	Predicted	Final Measured	Comment
Subsidence	0.88 – 0.99m	0.240m	Measured subsidence < predictions
Tensile Strain	8 - 9mm/m	5 mm/m	Measured tensile strains < predictions
Compressive Strain	8 - 9 mm/m	1 mm/m	Measured compressive strains < predictions
Tilt	18 - 33 mm/m	7 mm/m	Measured tilts < predictions
Other			

EAST INSTALL HEADINGS (W= 105m; T = 2.7 m)			
100m Cover	Predicted	Final Measured	Comment
Subsidence	0.9m	1.19m	Measured subsidence > predictions
Tensile Strain	13 – 19 mm/m	11 mm/m	Measured tensile strains < predictions
Compressive Strain	16 - 24 mm/m	8 mm/m	Measured compressive strains < predictions
Tilt	24 - 35 mm/m	44 mm/m	Measured tilts > predictions
Other			

EAST MAINS HEADINGS (W= 125m; T = 2.7 m)			
100m Cover	Predicted	Final Measured	Comment
Subsidence	1.59m	1.408m	Measured subsidence < predictions
Tensile Strain	10 - 16 mm/m	11 mm/m	Measured tensile strains < predictions
Compressive Strain	13 - 20 mm/m	15 mm/m	Measured compressive strains < predictions
Tilt	49 mm/m	48.6 mm/m	Measured tilts < predictions
Other			

Table 2 - Subsidence Monitoring Survey Dates

Survey / Monitoring Line	Survey / Monitoring Description	Pre – Mining Survey	Survey / Inspection / Monitoring Dates	Post – Mining
Panel 1	*Subsidence survey*	Installation and pre-mining survey 7/07/2010	Weekly Surveys	11/02/2011 24/06/2011
Panel 2	*Subsidence Survey*			22/12/2010 21/06/2011
Panel 3	*Subsidence survey*	*23/12/2010*	Weekly Surveys	*10/06/2011* *25/10/2011* *9/05/2011*
	Visual inspection		Weekly Surveys	
	Photographic monitoring	*23/12/2010*		
Panel 4	*Subsidence survey*	*4/03/2011*	Weekly Surveys	*24/08/2011* *9/05/2011*
	Visual inspection		Weekly Surveys	
	Photographic monitoring	*4/03/2011*		
Panel 5	*Subsidence survey*	*27/05/2011*		*4/11/2011* *2/05/2012*
	Visual inspection		Weekly Surveys	
	Photographic monitoring	*27/05/2011*		
Panel 6	*Subsidence survey*	*14/09/2011*		*1/05/2012*
	Visual inspection		Weekly Surveys	
	Photographic monitoring	*14/09/2011*		
Panel 7	*Subsidence survey*	*8/02/2012*		*2/08/2012*
	Visual inspection		Weekly Surveys	
	Photographic monitoring	*8/02/2012*		

Survey / Monitoring Line	Survey / Monitoring Description	Pre – Mining Survey	Survey / Inspection / Monitoring Dates	Post – Mining
Panel 8	*Subsidence survey*	*13/02/2012*		*31/10/2012*
	Visual inspection		Weekly Surveys	
	Photographic monitoring	*13/02/2012*		
Panel 15	*Subsidence survey*	*9/02/2012*		*27/04/2012*
	Visual inspection		Weekly Surveys	
	Photographic monitoring	*9/02/2012*		
Panel 20	*Subsidence survey*	*29/08/2012*		*10/01/2013*
	Visual inspection		Weekly Surveys	
	Photographic monitoring	*29/08/2012*		
Panel 19	*Subsidence survey*	*1/05/2013*		
	Visual inspection		Weekly Surveys	
	Photographic monitoring	*1/05/2013*		
Panel 19A	*Subsidence survey*	*7/01/2013*		
	Visual inspection		Weekly Surveys	
	Photographic monitoring	*7/01/2013*		
Panel 21	*Subsidence survey*	*7/11/2012*		*16/05/2013*
	Visual inspection		Weekly Surveys	
	Photographic monitoring	*7/11/2012*		
Panel 22	*Subsidence survey*	*11/04/2013*		
	Visual inspection		Weekly Surveys	
	Photographic monitoring	*11/04/2013*		
East Install Headings	*Subsidence survey*	*14/11/2012*		*23/01/2013*
	Visual inspection		Weekly Surveys	
	Photographic monitoring	*14/11/2012*		

Survey / Monitoring Line	Survey / Monitoring Description	Pre – Mining Survey	Survey / Inspection / Monitoring Dates	Post – Mining
Tailgate Headings	*Subsidence survey*	*18/05/2012*		*19/12/2012*
	Visual inspection		Weekly Surveys	
	Photographic monitoring	*18/05/2012*		
East Mains Headings	*Subsidence survey*	*9/07/2012*		*30/05/2013*
	Visual inspection		Weekly Surveys	
	Photographic monitoring	*9/07/2012*		
Blackhill Road	*Subsidence survey*	*19/02/2013*		*Fortnightly Surveys*
	Visual inspection		*Daily Surveys*	
	Photographic monitoring	*19/02/2013*		
Hunter Water Corporation pipeline	*Subsidence survey*	7/07/2010 over P1 8/09/2010 over P2	Weekly Surveys	*11/02/2011 & 24/06/2011 Over P1* *22/12/2010 & 21/06/2011 Over P2*
	Visual inspection		Weekly Surveys	
	Photographic monitoring			
Ausgrid Power Poles	*Subsidence survey*	Same date as Panel surveys	Weekly Surveys	Same date as Panel surveys
	Visual inspection		Weekly Surveys	
	Photographic monitoring	Same date as Panel surveys		
TransGrid Transmission Towers	*Subsidence survey*	28/03/2012		*Weekly Surveys*
	Visual inspection		Daily Surveys	
	Photographic monitoring	28/03/2012		

8 SUMMARY OF UNDERGROUND MONITORING

A summary of the underground monitoring that has been completed during this period can be found in **Attachment 6**.

9 ADEQUACY, QUALITY AND EFFECTIVENESS

The adequacy, quality, effectiveness of the implemented management processes based on monitoring, consultation and remediation is considered to be satisfactory to date.

10 PROPOSED MANAGEMENT ACTIONS

To date, no additional management actions are required beyond the procedures already implemented, relating to additional visual inspections and subsidence surveys, nor is there any need for early responses or emergency procedures to be undertaken as there have been no subsidence impacts due to the extraction of the subject Panels which have not been managed under the current TARPS and Management Plans.

11 CONCLUSIONS

Some additional visual inspections and subsidence surveys have been introduced due to impacts. However there is no requirement to undergo additional consultation as impacts from subsidence to date have been generally within predictions and consultation with infrastructure owners and the landholder are ongoing.

Minor impacts have been remediated by Abel, in the case of general surface or the relevant infrastructure owners following consultation.

All required Management Plans and Programs have been developed and submitted. Additional and revised Management Plans are being developed for future Panels.