

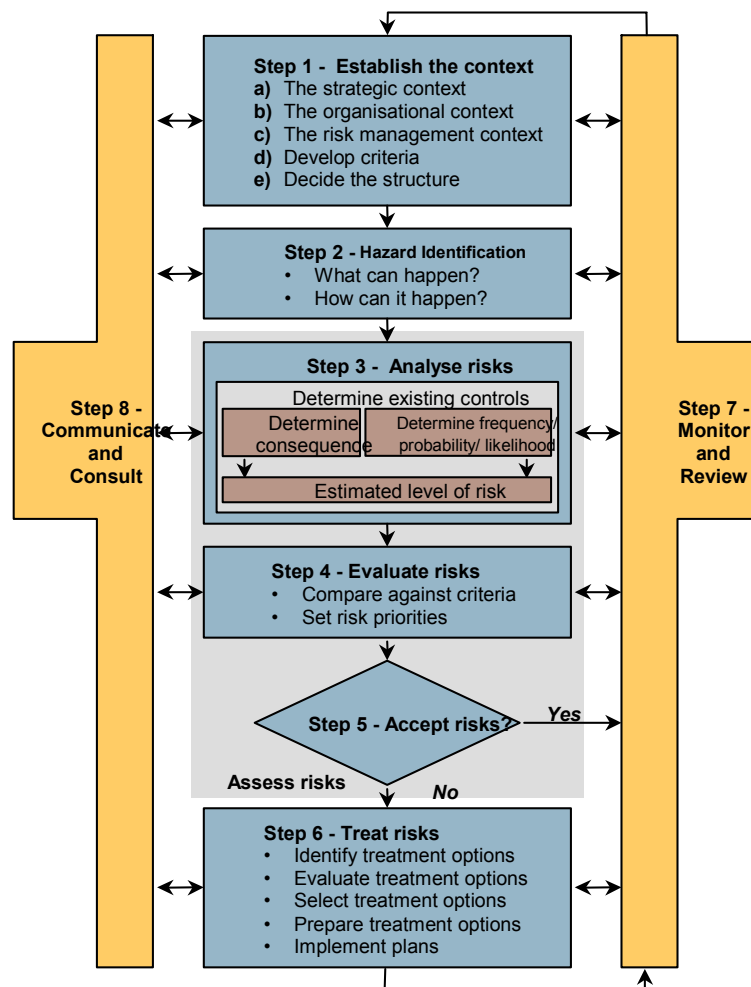
Qualitative Risk Assessment

for

CARDNO FORBES RIGBY

SMP Application

Longwalls 705 - 710 in Area 7 at Appin Colliery



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Section 1. Executive Summary

This analysis was commissioned by Cardno Forbes Rigby Pty Ltd to determine the risks associated with mining Longwalls 705 to 710 at Appin Colliery with the aim of developing the Subsidence Management Plan (SMP) for BHPB Illawarra Coal.

This report details the methods used and the recommendations from the risk assessment which was conducted at the Novotel Northbeach in Wollongong on May 15th of 2008.

Risk ranking was undertaken in accordance the BHP Billiton Enterprise Wide Risk Management (EWRM) Standard which is consistent with AS4360:2004.

In accordance with the scope, high level risk issues were considered and recorded by the risk assessment team. The reader should refer to the sections regarding the Objectives, Scope and Assumption and Limitations of this risk assessment.

Attachment 2 (Analysis Worksheets) identifies all of the hazards, existing controls, risk rankings and any new treatment options and the people responsible for their implementation.

Attachment 5 (Risk Treatment Schedule) provides a format of all the new treatment options and the people responsible for their implementation. In addition a required date and sign off is also provided.

Attachment 3 and 4 (Risk Rank Order and Consequence Order) provides all of the identified hazards and treatment options in order of highest risk to lowest risk and from highest consequence to lowest consequence. The BHPB EWRM standard does not require these reports, however to provide compliance to the Department of Primary Industries MDG1010 and MDG1014 standards they are included.

Section 2. Analysis and Report

This Analysis was facilitated by: Shane Chiddy
The Analysis took place: 15th May 2008

This Analysis has been verified by:
The Verification occurred:

This Report has been compiled by: Shane Chiddy
The Report was compiled: 15th May 2008

Section 3. Participants

The following people participated in the Analysis:

<u>Participant</u>	<u>Participant Role</u>	<u>Relevant Experience</u>
Environmental Session		
Judith Egan	Department Primary Industries	
William Dove	Department of Environment and Climate Change	
Andrew Couldridge	Department of Environment and Climate Change	
Fergus Hancock	Department of Water and Energy	
Scott Carter	Department of Primary Industries - Fisheries	
James Barbato	Mine Subsidence Engineering Consultants (MSEC)	
Matt Richardson	Biosis Reserch Pty Ltd	
Doug Hazell	Ecology Lab	
Matt Harper	Ecology Lab	
Andrew Dawkins	Geoterra	
Steve Short	Ecoengineers	
Peter Chudleigh	Cardno Forbes Rigby	
Nagindar Singh	Cardno Forbes Rigby	
Toni Stevens	Cardno Forbes Rigby	
Marlo Vergara	Sydney Catchment Authority - Dam Safety	
Leigh Spence	Optus	
Bruce Blunden	BHPB Illawarra Coal Manager Environmental Approvals	
Richard Walsh	BHPB Illawarra Coal Manager Approvals	
Adam West	BHPB Illawarra Coal	
Infrastructure Session		
Darren Bullock	Mine Subsidence Board	
Mal Bilaniwskyj	Roads and Traffic Authority	
Peter Meers	Roads and Traffic Authority	
Wayne Wilson	Roads and Traffic Authority	
Marlo Vergara	Sydney Catchment Authority - Dam Safety	
Ray Munt	Telstra	
Leigh Spence	Optus	
Troy Cooper	Sydney Water	
Matt Tyrrell	Australian Rail Track Corporation	
Ross Barber	Australian Rail Track Corporation	

Michael Irons	Australian Rail Track Corporation
James Barbato	Mine Subsidence Engineering Consultants (MSEC)
Peter Chudleigh	Cardno Forbes Rigby
Bruce Blunden	BHPB Illawarra Coal Manager Environmental Approvals
Richard Walsh	BHPB Illawarra Coal Manager Approvals
Adam West	BHPB Illawarra Coal
Hank Pinkster	BHPB Illawarra Coal Manager Rehabilitation and Infrastructure

Section 4. Purpose

In May of 2008 AXYS Consulting was commissioned to facilitate a risk assessment to assist in the development of the Subsidence Management Plan (SMP) for Longwalls 705 - 710 at Appin Colliery, consider the potential risk of impacts to key stakeholders and Illawarra Coal.

This report details the methods used and the recommendations resulting from the risk assessment which was conducted at the Novotel Northbeach in Wollongong.

The aspects included in this SMP includes man made features of importance such as the highway, bridges, electricity transmission lines and the Optus and Telstra fibre optic cables and mobile towers.

Natural features and heritage structure items within the area are also included .

The mining layout will impact several permanent survey control stations.

Houses are situated within the area and, for the purposes of this assessment, include associated structures, such as on-site septic waste systems, sheds, fences etc.

Rural structures located within the SMP Area include farm buildings, fences, farm dams and water bores.

Subsidence predictions have been completed for the application area and the subsidence model predicts vertical movements (subsidence or upsidence), horizontal movements (far field or valley closure), tilts and strains.

Section 5. Objectives

The objectives of this assessment is to assist Appin Colliery in identification and control of risks associated with Longwalls 705 - 710 subsidence in accordance with requirements from:

BHPB Policy and Standards;

State and Commonwealth Legislation;

NSW Department of Primary Industries -
Mineral Resources Guideline for application for Subsidence Management Approvals

Evaluate and record a formal risk assessment in accordance with the BHP Billiton EWRM Standard.

Section 6. Scope

The scope of this report is to identify subsidence risks from all potential sources for Appin Colliery proposed Longwalls 705 - 710.

This risk assessment is to assist in the development of the SMP.

Areas for consideration includes surface and sub-surface features as defined by Process Area List based on the NSW Department of Primary Industries - Mineral Resources Guideline for application for Subsidence Management Approvals - Appendix B.

Specifically, this report is to assess the risks associated with mining Longwalls 705 - 710 at Appin Colliery with the aim of developing the SMP, in accordance with the BHP Billiton EWRM Standard in terms of;

- Health and Safety (HS);
- Estimated Shareholder Value / Material Damage / Financial Loss (FL);
- Project Net Present Value (NPV);
- Natural Environment (NE);
- Social / Cultural / Heritage (SC);
- Community / Government Reputation / Media (R);
- Legal (L).

Section 7. Assumptions

The following assumptions and limitations have been applied to this risk assessment:

1. Subsidence would generally be in accordance with predictions as identified in the report MSEC342 developed by Mine Subsidence Engineering Consultants.
2. Impact would be similar to those previously observed in comparable areas.
3. There may be isolated cases where subsidence will not occur as predicted. These cases will be taken into account in the MSEC342 report and the Impact Assessment and the SMP development.
4. Rigorous monitoring can identify anomalous subsidence which can be used to manage impacts through early intervention strategies.
5. Surface features and land use remains substantially constant during the mining period.
6. BHPB IC will initiate consultation procedures to identify any changes to surface infrastructure in the area that may be impacted.
7. Focus of this risk assessment is for the development of the SMP.
8. Risk evaluation is for the highest most likely impact on the risk being assessed.

Section 8. Facilitator Qualifications

Shane Chiddy holds an Associate Diploma in Engineering (Electrical), is a Graduate Officer of the Institution of Engineers (Australia) and is a member of the Maintenance Engineering Society of Australia (MESA). He has also completed Conveyancing Law through Macquarie University and Establish the Risk Management Systems (Mine 7033 - G3) through Queensland University.

Prior to commencing his consulting career, Shane Chiddy qualified as an electrician and worked underground for 15 years. He then occupied a number of engineering roles within Rio Tinto, including such roles as electrical supervisor, Development Engineer and Senior Production Engineer. This latest role was responsible for the Longwall, underground diesel equipment and conveyors.

Additionally Shane Chiddy has been trained and accredited by John Moubray in the UK as a certified RCM II practitioner, and has conducted a number of extensive Reliability-centred Maintenance II analyses including underground and surface equipment such as Longwalls, Continuous Miners and conveying systems.. He has facilitated RCM II analysis and delivered training in the mining, defence and telecommunications industries.

His consulting experience includes the application of Reliability-centred Maintenance II and extensive Risk Management and Project Management assignments. Shane is also experienced in software development and in the development and presentation of training packages.

Section 9. Sub-Systems Analysed:

SUB-SYSTEM		STEP IN PROCESS	
1	Natural Features	A	1.01 Catchment areas and declared Special Areas
		B	1.02 Rivers and creeks (Nepean River, Foot Onslow Creek, Harris Creek, Navigator Creek)
		C	1.03 Aquifers, known groundwater resources
		D	1.04 Springs
		E	1.05 Sea/lake
		F	1.06 Shorelines
		G	1.07 Natural dams
		H	1.08 Cliffs / pagodas
		I	1.09 Steep slopes
		J	1.10 Escarpments
		K	1.11 Land prone to flooding or inundation
		L	1.12 Swamps, wetlands, water related ecosystems
		M	1.13 Threatened and protected species
		N	1.14 National parks
		O	1.15 State recreation areas
		P	1.16 State forests particularly areas zoned FMZ 1, 2 and 3
		Q	1.17 Natural vegetation
		R	1.18 Areas of significant geological interest
		S	1.19 Any other feature considered significant
2	Public Utilities	A	2.01 Railways
		B	2.02 Roads (all types)
		C	2.03 Bridges
		D	2.04 Tunnels (Devines Tunnel - Upper Canal System)
		E	2.05 Culverts
		F	2.06 Water / gas / sewerage pipelines
		G	2.07 High pressure gas pipelines (High pressure gas pipelines Alinta, AGL and Gorodok)
		H	2.08 Electricity transmission lines (overhead/underground) and associated plants
		I	2.09 Telecommunication lines (overhead/underground) and associated plants
		J	2.10 Water tanks, water and sewage treatment works
		K	2.11 Dams, reservoirs and associated works
		L	2.12 Air strips
		M	2.13 SCA infrastructure including Upper Canal, Devines Tunnel, Aqueducts, Bridges and all associated roads, flumes and culverts (Menangle Weir was considered to be beyond the limit of far-field impacts)
N	2.13 RTA Rest Area and ammenties (Sewerage Treatment Works)		
3	Public Amenities	A	3.01 Hospitals

Section 9. Sub-Systems Analysed:

SUB-SYSTEM		STEP IN PROCESS	
3	Public Amenities	B	3.02 Places of worship
		C	3.03 Schools
		D	3.04 Shopping centres
		E	3.05 Community centres
		F	3.06 Office buildings
		G	3.07 Swimming pools
		H	3.08 Bowling greens
		I	3.09 Ovals and cricket grounds
		J	3.10 Race courses
		K	3.11 Golf courses
		L	3.12 Tennis courts
		M	3.13 Any other amenities considered significant
		4	Farm Land and Facilities
B	4.02 Farm buildings / sheds		
C	4.03 Gas and / or fuel storages		
D	4.04 Poultry sheds		
E	4.05 Glass Houses (and plastic igloos)		
F	4.06 Hydroponic systems		
G	4.07 Irrigation systems		
H	4.08 Fences		
I	4.09 Farm dams		
J	4.10 Wells, bores		
K	4.11 Any other feature considered significant		
5	Industrial, Commercial and Business Establishments	A	5.01 Factories
		B	5.02 Workshops
		C	5.03 Business or commercial establishments
		D	5.04 Gas and / or fuel storages and associated plants
		E	5.05 Waste storages and associated plants
		F	5.06 Buildings, equipment and operations that are sensitive to surface movements
		G	5.07 Surface mining (open cut) voids and rehabilitated areas
		H	5.08 Mine infrastructure including tailings dams and emplacement areas
		I	5.09 Any other feature considered significant
6	Areas of Archaeological and/or Heritage significance	A	6.01 Areas of Archaeological and/or Heritage Significance
7	Items of Architectural Significance	A	7.01 Items of Architectural Significance
8	Permanent Survey Control Marks	A	8.01 Permanent Survey Control Marks

Section 9. Sub-Systems Analysed:

SUB-SYSTEM		STEP IN PROCESS	
9	Residential Establishments	A	9.01 Houses
		B	9.02 Flats / Unit
		C	9.03 Caravan parks
		D	9.04 Retirement/aged care villages
		E	9.05 Associated structures such as workshops, garages, on-site waste water systems, water or gas tanks, swimming pools and tennis courts
		F	9.06 Any other feature considered significant

Attachment 1
Definitions and
Risk Ranking Methodology

Consequence

The size and nature of the impact from an event or occurrence.

Hazard

A hazard is the intrinsic potential for an agent, activity or process to lead to an incident, or ongoing condition.

Environment note: The term 'hazard' is essentially equivalent to 'environmental aspect'.

Impact/Effect

Impacts are specific adverse effects resulting from an incident and may be related to people, the environment, plant or property, or a combination of these.

Incident (or ongoing condition)

An incident (or ongoing condition) is any occurrence that has the potential to result in adverse consequences to people, the environment, property/plant, or a combination of these.

Likelihood

The chance of occurrence per unit time (normally per year) In BHP Billiton this term will be used instead of "Frequency" because it helps the user think "is it likely?"

Frequency

The chance of occurrence per unit time (typically, per year).

Probability Factor

Represents the chance of consequences as the specified level of severity occurring when the risk issue occurs (i.e. during the Exposure).

Risk

Risk is defined as the likelihood of an impact on people, the environment, property, or a combination of these.

Risk Rating

The numerical rating applied to a risk calculated as the product of a severity factor, a probability factor, and an exposure factor.

Severity factor

Is a measure of the degree of consequences that are most likely to occur associated with a risk. Those consequences could either negatively impact BHP Billiton, its brand and its stakeholders or be the expected level of unrealised opportunity for gain that could be missed.

PROBABILITY FACTOR

Choose a description that best fits the chance of BHP Billiton or its stakeholders actually incurring (experiencing) impacts of the selected type and level of severity during a “window of opportunity”, taking into account the existing controls.

Given the Site, Company and Industry experience, it:	Factor
Could be incurred once or more during the next year.	10
Could be incurred over the next 1 to 2 year budget period.	3
Could be incurred within the 5 year Strategic Planning period.	1
Could be incurred within a 5 to 10 year time frame.	0.3
Could be incurred in the next 20-30 years.	0.1
For a system failure: This consequence hasn't happened in the industry in the last 50 years. For a natural hazard (earthquake, flood, windstorm, etc.): The predicted return period for an event of this strength/magnitude is 1 in 100 years or longer.	0.03

SEVERITY FACTOR

Choose a description that best fits the most likely degree harm, injury, loss or potential gain. Where there is more than one consequence type possible, look across the table and choose the highest level and corresponding Severity Factor. (Note: ESVA NPV and other terms are as defined in EWRM Standard No. 6)

Severity Level	Change in ESVA	Health and Safety	Natural environment	Social / Cultural heritage	Community / Govt / Reputation / Media	Legal
1000	>US\$ 1B	> 500 fatalities or very serious irreversible injury to 5000 persons.	Very significant impact on highly value species, habitat or eco system.	Irreparable damage to highly valued items of great cultural significance or complete breakdown of social order.	Prolonged international Condemnation.	Potential jail terms for executives and or very high fines for company. Prolonged, multiple litigation
300	US\$ 100M – US\$ 1B	>50 fatalities, or very serious irreversible injury to >500 persons	Significant impact on highly valued species, habitat, or ecosystem.	Irreparable damage to highly valued items of cultural significance or breakdown of social order.	International multi- NGO and media condemnation.	Very significant fines and prosecutions. Multiple litigation
100	US\$ 10M – US\$ 100M	Multiple fatalities, or significant irreversible effects to >50 persons	Very serious, long- term environmental impairment of ecosystem function	Very serious widespread social impacts. . Irreparable damage to highly valued items.	Serious public or media outcry (international coverage).	Significant prosecution and fines. Very serious litigation, including class actions.
30	US\$ 1M – 10M	Single fatality and/ or severe irreversible disability (> 30%) to one or more persons.	Serious medium term environmental effects.	On- going serious social issues. Significant damage to structures/ items of cultural significance.	Significant adverse national media/ public/ NGO attention.	Major breach of regulation. Major litigation.
10	US\$ 100, 000 – 1M	Moderate irreversible disability or impairment (< 30%) to one or more persons.	Moderate, short- term effects but not affecting ecosystem function.	On going social issues. Permanent damage to items of cultural significantants.	Attention from media and/ or heightened concern by local community. Criticism by NGOs	Serious breach of regulation with investigation or report to authority with prosecution and/ or moderate fine possible.
3	US\$ 10, 000 – \$100,000	Objective but reversible disability requiring hospitalisation	Minor effects on biological or physical environment.	Minor medium- term social impacts on local population. Mostly repairable.	Minor, adverse local public or media attention and complaints	Minor legal issues, non-compliances and breaches of regulation
1	<US\$ 10, 000	No medical treatment required	Limited damage to minimal area of low significance.	Low- level repairable damage to commonplace structures.	Public concern restricted to local complaints.	Low- level legal issue.

PRIORITY GUIDE

Once a risk rating has been calculated, the following scheme should be used to assign priority of action. It should be noted that if action is not taken within the time specified, then the continued toleration of the residual 'downside' risk should be explicitly 'signed-off'. The suggested level of seniority for sign-off is as shown below.

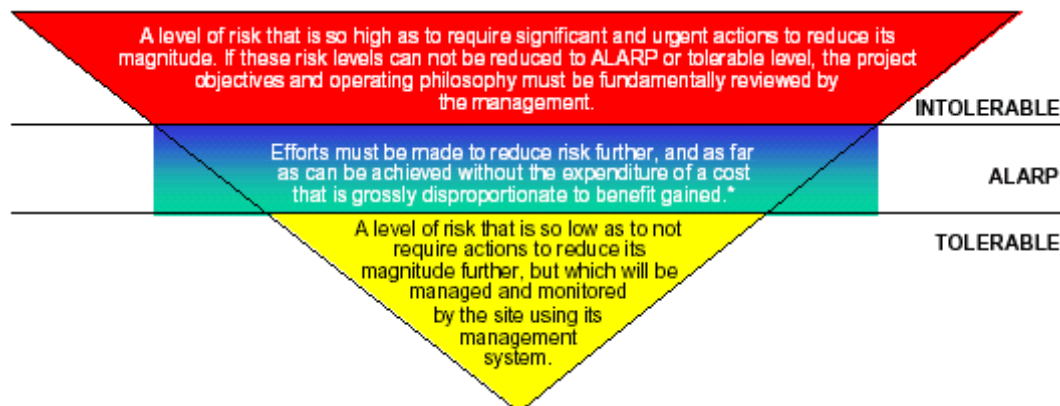
Priority	Risk Rating	Suggested Action	Suggested Timing	Authority for continued toleration of residual risk
1	>300	Cessation until the residual risk is reduced to 300 or below – unless exposure is authorised as indicated.	Immediate	BHP Billiton CEO and Board
2	91 - 300	Take action to reduce residual risk to 90 or below	Short term Normally within 1 month	President CSG
3	31 - 90	Plan to deal with in keeping with business plan.	Medium term, Normally within 3 months	Presidents direct reports
4	11 - 30	Plan in keeping with all other priorities.	Normally within 1 year.	Manager
5	< 10	Low priority. Will still require attention	Ongoing control as part of management system	Manager direct reports

The decision to tolerate a risk should be based on a consideration of:

- Whether the risk is being controlled to a level that is reasonably achievable,
- Whether it would be cost-effective to further control risk,
- The tolerability of the organisation (risk appetite) for risks of that type.

For decisions about HSEC Risks, the principles outlines in HSEC Toolkit No. T07 should be followed involving the application of the ALARP criteria given there.

Likelihood or Frequency / Probability	Consequence Severity				
	Low	Minor	Moderate	Major	Critical
Almost Certain	High 100	High 300	Extreme 1,000	Extreme 3,000	Extreme 10,000
Likely	Moderate 30	High 90	High 300	Extreme 900	Extreme 3,000
Possible	Low 10	Moderate 30	High 100	Extreme 300	Extreme 1,000
Unlikely	Low 3	Low 9	Moderate 30	High 90	Extreme 300
Rare	Low 1	Low 3	Moderate 10	High 30	High 100



Attachment 2
Analysis Worksheets

**Qualitative
Risk Analysis.
Analysis Worksheet**



SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: 1
SUB SYSTEM: No: 1	Natural Features	Verified by: Date:		of: 23

STEP IN PROCESS	CAUSE & IMPACT	EXISTING CONTROLS	Sev	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE
A 1.01 Catchment areas and declared Special Areas	1 The area of subsidence under analysis does not include any drinking water catchment areas and declared special areas and did not require further assessment.							
B 1.02 Rivers and creeks (Nepean River, Foot Onslow Creek, Harris Creek, Navigator Creek)	1 Nepean River Water flow and quality changes to Nepean River due to mine subsidence. Environmental impacts result. (loss of water, gas release, change in water quality)	Monitoring programs in place Past mining has not lead to any measurable loss of flow on Nepean River Subsidence predictions have been developed (linkage to environmental impacts are less certain) Flooded river system controlled by Menangle Weir and magnitude of licenced extractions Longwalls offest 180 metres from the edge of the river bank	10	10	100	1	Completed SMP to include consideration of Nepean River and the monitoring programs	BHPB Illawarra Coal - Manager Environment
	2 Foot Onslow Creek, Harris Creek Water flow and quality changes to ephemeral creeks due to mine subsidence. Environmental impacts result.	Monitoring programs in place where access is possible Remediation techniques are available for ephemeral creeks / rivers Past mining has not lead to any significant impacts on ephemeral creeks in Area 4. Subsidence predictions have been developed (linkage to environmental impacts are less certain)	3	10	30	1 2	Completed SMP to include consideration of ephemeral creeks and the monitoring programs Determine the order of streams within Area 7, for third order or greater assess loss of flow and erosion potential	BHPB Illawarra Coal - Manager Environment BHPB Illawarra Coal - Manager Environment
C 1.03 Aquifers, known groundwater resources	1 Ground water level and quality changes due to mine	There are no ecological communities dependant upon the	1	10	10	1	Completed SMP to include consideration of aquifers and the monitoring programs	BHPB Illawarra Coal - Manager Environment

**Qualitative
Risk Analysis.
Analysis Worksheet**



SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: of:	2 23
SUB SYSTEM: No: 1		Verified by: Date:			

STEP IN PROCESS		CAUSE & IMPACT	EXISTING CONTROLS	Sev	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE
D	1.04 Springs	1 subsidence. Existing spring water flow and quality changes, or the creation of new springs due to mine subsidence.	ground water Monitoring programs in place Past mining has not lead to any reported adverse impacts on aquifers in the area. No measured inflows to Appin Mine in the past 42 years. No water inflow along geological features encountered in the workings 8 Licenced bores for stock and domestic use within the area No recognised Ground Water Management areas within Area 7 (DWE) Base line assessment has not yet been completed, one potential spring is in the area. Monitoring programs in place where access is possible Subsidence predictions have been developed Impact assessment is being prepared	3	3	9	1	Completed SMP to include consideration of springs and the monitoring programs	BHPB Illawarra Coal - Manager Environment
E	1.05 Sea/lake	1 The area of subsidence under analysis does not include any seas or lakes and did not require further assessment.							
F	1.06 Shorelines	1 The area of subsidence under analysis does not include any shorelines and did not require further assessment.							

**Qualitative
Risk Analysis.
Analysis Worksheet**



SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: of:	3 23
SUB SYSTEM: No: 1		Verified by: Date:			

STEP IN PROCESS		CAUSE & IMPACT	EXISTING CONTROLS	Sev	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE
G	1.07 Natural dams	1 The area of subsidence under analysis does not include any natural dams and did not require further assessment.							
H	1.08 Cliffs / pagodas	1 Rock falls from cliffs due to mine subsidence. Rock fall causes localised damage to environment and to public safety. (Note: There were no pagodas identified in the area)	Base line assessment has been completed, cliffs are at known locations Monitoring programs in place Subsidence predictions have been developed Small number of cliffs within the area Cliffs will not be undermined	10	0.3	3	1	Completed SMP to include Public Safety and the monitoring programs	BHPB Illawarra Coal - Manager Environment
I	1.09 Steep slopes	1 Mass movement of steep slopes due to mine subsidence. Localised damage to environment.	Base line assessment has been completed, steep slopes are at known locations Monitoring programs in place along the Nepean River Past mining in the Appin / Tower area has not lead to any significant impacts on steep slopes Subsidence predictions have been developed Private land not accessible by the public Nepean River Valley is not undermined	10	1	10	1 2	Completed SMP and the monitoring programs Assess the implications of steep slope movement away from the Nepean River	BHPB Illawarra Coal - Manager Environment BHPB Illawarra Coal - Manager Environment
J	1.10 Escarpments	1 The area of subsidence under analysis does not include any escarpments and did not require further assessment.							

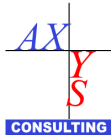
**Qualitative
Risk Analysis.
Analysis Worksheet**



SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: of:	4 23
SUB SYSTEM: No: 1	Natural Features	Verified by: Date:			

STEP IN PROCESS		CAUSE & IMPACT	EXISTING CONTROLS	Sev	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE
K	1.11 Land prone to flooding or inundation	1 The area of subsidence under analysis does not include any land prone to flooding or inundation and did not require further assessment.							
L	1.12 Swamps, wetlands, water related ecosystems	1 The area of subsidence under analysis does not include any swamps, wetlands, water related ecosystems and did not require further assessment. (Note : Creeks have been analysed in 1.02 Rivers and Creeks)							
M	1.13 Threatened and protected species	1 Mine subsidence leads to loss of protected species or their habitat.	<p>Base line assessment has been completed, known species within the area</p> <p>Monitoring programs in place</p> <p>Based on the known aquatic threatened species, significant impacts are considered unlikely</p> <p>Subsidence predictions have been developed (linkage to environmental impacts are less certain)</p> <p>Longwalls offset 180 metres from the edge of the Nepean River bank</p>	3	1	3	1	Completed SMP to include consideration of Threatened and protected species and the monitoring programs	BHPB Illawarra Coal - Manager Environment
N	1.14 National parks	1 The area of subsidence under analysis does not include any National parks and did not require further assessment.							
O	1.15 State recreation areas	1 The area of subsidence under analysis does not include any							

**Qualitative
Risk Analysis.
Analysis Worksheet**



SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: of:	5 23
SUB SYSTEM: No: 1	Natural Features	Verified by: Date:			

STEP IN PROCESS		CAUSE & IMPACT	EXISTING CONTROLS	Sev	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE
P	1.16 State forests particularly areas zoned FMZ 1, 2 and 3	1 State recreation areas and did not require further assessment. The area of subsidence under analysis does not include any State forests particularly areas zoned FMZ 1, 2 and 3 and did not require further assessment.							
Q	1.17 Natural vegetation	1 Mine subsidence leads to damage or loss of Natural vegetation. (including EEC)	Base line assessment has been completed, Natural vegetation is at known locations Past mining in the Appin / Tower area has not lead to any significant impacts on Natural vegetation Subsidence predictions have been developed	3	1	3	1	Completed SMP to include consideration of Natural vegetation and the monitoring programs	BHPB Illawarra Coal - Manager Environment
R	1.18 Areas of significant geological interest	1 The area of subsidence under analysis does not include any areas of significant geological interest and did not require further assessment.							
S	1.19 Any other feature considered significant	1 Mine subsidence leads to release of gas. Possible fire if ignition occurs.	Subsidence predictions have been developed Monitoring programs in place along the Nepean River	3	1	3	1 2	Completed SMP to include consideration for the release of gas and the monitoring programs Property subsidence management plans (PSMP) to include identification of gas release	BHPB Illawarra Coal - Manager Environment BHPB Illawarra Coal - Community Relations Coord.

**Qualitative
Risk Analysis.
Analysis Worksheet**



SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: of:	6 23
SUB SYSTEM: No: 2	Public Utilities	Verified by: Date:			

STEP IN PROCESS		CAUSE & IMPACT	EXISTING CONTROLS	Sev	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE	
A	2.01 Railways	1 Damage to railway due to mine subsidence. Railways require repair.	Subsidence predictions have been developed	100	0.1	10	1	Perform a specific assessment of the effects of the mine subsidence on the railway system	BHPB Illawarra Coal - Manager R&I	
							2	Completed SMP to include consideration of subsidence effects on the railway infrastructure and monitoring programs	BHPB Illawarra Coal - Manager R&I	
							3	Develop and implement railway management plan	BHPB Illawarra Coal - Manager R&I	
							4	Implement railway works deed	BHPB Illawarra Coal - Manager R&I	
B	2.02 Roads (all types)	1 Damage to roads due to mine subsidence. Requirement to be repaired and rebuild on completion.	Subsidence predictions have been developed Deed of agreement between RTA and BHPB	100	1	100	1	Completed SMP to include consideration of Roads (all types) and the monitoring programs	BHPB Illawarra Coal - Manager R&I	
							2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	BHPB Illawarra Coal - Manager R&I	
							3	Review existing RTA Road management plan for Area 7	BHPB Illawarra Coal - Manager R&I	
		2	Delays to traffic slowed during mitigation works.	Subsidence predictions have been developed Deed of agreement between RTA and BHPB	30	10	300	1	Completed SMP to include consideration of Roads (all types) and the monitoring programs	BHPB Illawarra Coal - Manager R&I
								2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	BHPB Illawarra Coal - Manager R&I
								3	Review existing RTA Road management plan for Area 7	BHPB Illawarra Coal - Manager R&I
3	Accident due to mine subsidence and related pavement damage.	Subsidence predictions have been developed Deed of agreement between RTA and BHPB	100	0.1	10	1	Completed SMP to include consideration of Roads (all types) and the monitoring programs	BHPB Illawarra Coal - Manager R&I		
						2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	BHPB Illawarra Coal - Manager R&I		

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SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: of:	7 23
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STEP IN PROCESS		CAUSE & IMPACT	EXISTING CONTROLS	Sev	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE
C	2.03 Bridges	1 Damage to bridges due to mine subsidence. Bridge require repair.	Known bridges within the area Subsidence predictions have been developed Experience with mining near bridges in the area	30	0.1	3	3	Review existing RTA Road management plan for Area 7	BHPB Illawarra Coal - Manager R&I
							1	Completed SMP to include consideration of bridges (all types) and the monitoring programs	BHPB Illawarra Coal - Manager R&I
							2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	BHPB Illawarra Coal - Manager R&I
D	2.04 Tunnels (Devines Tunnel - Upper Canal System)	1 Damage to tunnel due to mine subsidence. Tunnel requires repair.	Base line assessment has been completed, known tunnels within the area Subsidence predictions have been developed Monitoring programs in place Master agreement has been developed between BHPB IC and SCA	3	0.3	1	1	Completed SMP to include consideration of tunnels and the monitoring programs	BHPB Illawarra Coal - Manager R&I
							2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	BHPB Illawarra Coal - Manager R&I
							3	Revise the Management Plan to include Longwalls 705-710	BHPB Illawarra Coal - Manager R&I
							4	Master agreement to be extended to include Appin Area 7	BHPB Illawarra Coal - Community Relations Coord.
E	2.05 Culverts	1 The group considered that Culverts are associated with either roads or the Upper Canal and did not require further analysis (See Roads Section 2.02 and Canals 2.13)							
F	2.06 Water / gas / sewerage pipelines	1 There is no public reticulated sewerage and gas pipelines within the area. The sewerage and gas pipelines that are within in the area are those associated with domestic use. See Houses in Section 9.01							

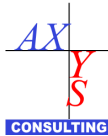
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STEP IN PROCESS	CAUSE & IMPACT	EXISTING CONTROLS	Sev	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE	
G	2.07 High pressure gas pipelines (High pressure gas pipelines Alinta, AGL and Gorodok)	1					1	None Identified	
H	2.08 Electricity transmission lines (overhead/underground) and associated plants	1					1	Completed SMP to include consideration of Electricity power lines and the monitoring programs	BHPB Illawarra Coal - Manager R&I
			3	0.3	1		2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	BHPB Illawarra Coal - Manager R&I
							3	Asset owners to develop internal impact assessments	
I	2.09 Telecommunication lines (overhead/underground) and associated plants	1					1	Completed SMP to include consideration of Telecommunication lines and the monitoring programs	BHPB Illawarra Coal - Manager R&I
			3	0.3	1		2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	BHPB Illawarra Coal - Manager R&I
							3	Revise the Management Plan to include Longwalls 705-710	BHPB Illawarra Coal - Manager R&I
		2					1	Completed SMP to include consideration of Telecommunication lines and the monitoring programs	BHPB Illawarra Coal - Manager R&I
			30	0.3	9		2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	BHPB Illawarra Coal - Manager R&I
							3	Revise the Management Plan to include Longwalls 705-710	BHPB Illawarra Coal - Manager R&I
		3					1	Completed SMP to include consideration of Telecommunication lines and the monitoring programs	BHPB Illawarra Coal - Manager R&I
			30	0.3	9				

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SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: 9
SUB SYSTEM: No: 2	Public Utilities	Verified by: Date:		of: 23

STEP IN PROCESS	CAUSE & IMPACT	EXISTING CONTROLS	Sev	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE
	require repair.	Draft Optus management plan for Longwalls 701-704				2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	BHPB Illawarra Coal - Manager R&I
						3	Revise the Management Plan to include Longwalls 705-710	BHPB Illawarra Coal - Manager R&I
	4 Damage to Telstra and Optus Network towers. Towers require repair.	Subsidence predictions have been developed	10	0.3	3	1	Completed SMP to include consideration of Telecommunication towers and the monitoring programs	BHPB Illawarra Coal - Manager R&I
						2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	BHPB Illawarra Coal - Manager R&I
						3	Develop a Management Plan for the Telstra and Optus towers for Longwall 705-710	BHPB Illawarra Coal - Manager R&I
	5 Damage to Powertel Fibre Network telecommunication lines due to mine subsidence. Telecommunication lines require repair.	Subsidence predictions have been developed Draft Powertel management plan for Longwalls 701-704	30	0.3	9	1	Completed SMP to include consideration of Telecommunication lines and the monitoring programs	BHPB Illawarra Coal - Manager R&I
						2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	BHPB Illawarra Coal - Manager R&I
						3	Revise the Powertel Management Plan to include Longwalls 705-710	BHPB Illawarra Coal - Manager R&I
	6 Damage to NextGen Fibre Network telecommunication lines due to mine subsidence. Telecommunication lines require repair.	Subsidence predictions have been developed Draft NextGen management plan for Longwalls 701-704	30	0.3	9	1	Completed SMP to include consideration of Telecommunication lines and the monitoring programs	BHPB Illawarra Coal - Manager R&I
						2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	BHPB Illawarra Coal - Manager R&I
						3	Revise the NextGen Management Plan to include Longwalls 705-710	BHPB Illawarra Coal - Manager R&I
J 2.10	Water tanks, water and	1 There are no public water tanks,						

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SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: 10
SUB SYSTEM: No: 2	Public Utilities	Verified by: Date:		of: 23

STEP IN PROCESS		CAUSE & IMPACT	EXISTING CONTROLS	Sev	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE
	sewage treatment works	water and sewage treatment works within the area. The assets that are within in the area are those associated with domestic use. See Houses in Section 9.01							
K	2.11 Dams, reservoirs and associated works	1 There are no Dams, reservoirs and associated works within the area. The assets that are within in the area are those associated with rural use. See Houses in Section 9.01							
L	2.12 Air strips	1 The area of subsidence under analysis does not include any air strips and did not require further assessment.							
M	2.13 SCA infrastructure including Upper Canal, Devines Tunnel, Aqueducts, Bridges and all associated roads, flumes and culverts (Menangle Weir was considered to be beyond the limit of far-field impacts)	1 Damage to the SCA infrastructure including Upper Canal due to mine subsidence. Resulting in - reduced or loss of supply - reduced water quality - damage to heritage structures, repairs required	Subsidence predictions have been developed Master agreement has been developed between BHPB IC and SCA Management Plan for West Cliff Longwalls 31-33 Monitoring programs in place Successful mitigation techniques have been used in the past Upper Canal is outside the SMP area Mitigation has been performed on the Upper Canal, Mallaty, Ousdale Creeks wrought iron Aqueducts, C and D Concrete Aqueducts	30	0.3	9	1 2 3 4 5	Completed SMP to include consideration of SCA infrastructure including Upper Canal and the monitoring programs Impact assessment to be prepared and monitoring and mitigation programs to be developed. Revise the Management Plan to include Longwalls 705-710 Perform structural analysis of the wrought iron Aqueducts Perform mitigation works on Ousdale and Mallaty Creek access bridges	BHPB Illawarra Coal - Manager R&I BHPB Illawarra Coal - Manager R&I BHPB Illawarra Coal - Manager R&I BHPB Illawarra Coal - Manager R&I BHPB Illawarra Coal - Community Relations Coord.

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SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: of:	11 23
SUB SYSTEM: No: 2		Verified by: Date:			

STEP IN PROCESS		CAUSE & IMPACT	EXISTING CONTROLS	Sev	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE
N	2.13 RTA Rest Area and ammenties (Sewerage Treatment Works)	1 Damage to RTA Rest Area and ammenties due to mine subsidence. RTA Rest Area and ammenties requires repairs.	Subsidence predictions have been developed Buildings and STW designed for subsidence MSB approved	3	0.3	1	1	Completed SMP to include consideration of RTA Rest Area and ammenties and the monitoring programs	BHPB Illawarra Coal - Manager R&I

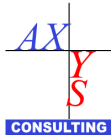
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SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: 12
SUB SYSTEM: No: 3	Public Amenities	Verified by: Date:		of: 23

STEP IN PROCESS		CAUSE & IMPACT	EXISTING CONTROLS	Sev	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE
A	3.01 Hospitals	1 The area of subsidence under analysis does not include any Hospitals and did not require further assessment.							
B	3.02 Places of worship	1 The area of subsidence under analysis does not include any Places of worship and did not require further assessment.							
C	3.03 Schools	1 The area of subsidence under analysis does not include any Schools and did not require further assessment.							
D	3.04 Shopping centres	1 The area of subsidence under analysis does not include any Shopping centres and did not require further assessment.							
E	3.05 Community centres	1 The area of subsidence under analysis does not include any Community centres and did not require further assessment.							
F	3.06 Office buildings	1 The area of subsidence under analysis does not include any Office buildings and did not require further assessment.							
G	3.07 Swimming pools	1 The area of subsidence under analysis does not include any public swimming pools and did not require further assessment. Any pools that are within in the area are those associated with domestic use. See Houses in Section 9.01							

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SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: 13
SUB SYSTEM: No: 3	Public Amenities	Verified by: Date:		of: 23

STEP IN PROCESS		CAUSE & IMPACT	EXISTING CONTROLS	Sev	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE
H	3.08 Bowling greens	1 The area of subsidence under analysis does not include any Bowling greens and did not require further assessment.							
I	3.09 Ovals and cricket grounds	1 The area of subsidence under analysis does not include any Ovals and cricket grounds and did not require further assessment.							
J	3.10 Race courses	1 The area of subsidence under analysis does not include any Race courses and did not require further assessment.							
K	3.11 Golf courses	1 The area of subsidence under analysis does not include any Golf courses and did not require further assessment.							
L	3.12 Tennis courts	1 The area of subsidence under analysis does not include any Tennis courts and did not require further assessment.							
M	3.13 Any other amenities considered significant	1 No other public amenities were Identified							

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SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: of:	14 23
SUB SYSTEM: No: 4		Verified by: Date:			

STEP IN PROCESS		CAUSE & IMPACT	EXISTING CONTROLS	Sev	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE
A	4.01 Agricultural utilisation or agricultural suitability of farm land	1 Changes to Agricultural utilisation due to mine subsidence. Subsidence considered highly unlikely to affect grazing in the area. No further analysis required.							
B	4.02 Farm buildings / sheds	1 Damage to Farm buildings / sheds due to mine subsidence. Farm buildings / sheds require repair.	Subsidence predictions have been developed Low density of Farm buildings / sheds	1	0.3	0	1	Completed SMP to include consideration of Farm buildings / sheds and the monitoring programs	BHPB Illawarra Coal - Community Relations Coord.
							2	Land owner review of Property Subsidence Management Plans (PSMP) and issue final documents	BHPB Illawarra Coal - Community Relations Coord.
							3	Monitoring and manage throughout mining as per the Property Subsidence Management Plans (PSMP)	BHPB Illawarra Coal - Community Relations Coord.
							4	Structural inspections of Farm buildings / sheds to be conducted as required	BHPB Illawarra Coal - Community Relations Coord.
C	4.03 Gas and / or fuel storages	1 The area of subsidence under analysis does not include any significant Gas and / or fuel storages and did not require further assessment. Small gas and / or fuel storage are covered in the Property Subsidence Management Plans (PSMP)							
D	4.04 Poultry sheds	1 The area of subsidence under analysis does not include any poultry sheds and did not require further assessment.							
E	4.05 Glass Houses (and plastic igloos)	1 The area of subsidence under analysis does not include any Glass Houses and did not require further assessment.							

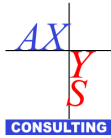
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Analysis Worksheet**



SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: 15
SUB SYSTEM: No: 4	Farm Land and Facilities	Verified by: Date:		of: 23

STEP IN PROCESS		CAUSE & IMPACT	EXISTING CONTROLS	Sev	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE
		These items are covered in the Property Subsidence Management Plans (PSMP)							
F	4.06 Hydroponic systems	1 The area of subsidence under analysis does not include any Hydroponic systems and did not require further assessment.							
G	4.07 Irrigation systems	1 The area of subsidence under analysis does not include any Irrigation systems and did not require further assessment.							
H	4.08 Fences	1 Damage to fences due to mine subsidence. Fences require repair. This will be analysed under Houses 9.01.							
I	4.09 Farm dams	1 Damage to Farm dams due to mine subsidence. Farm dams require repair.	Dams have been identified and are at known locations Subsidence predictions have been developed (linkage to environmental impacts are less certain) Past mining in the Appin / Tower / West Cliff area has not lead to any significant impacts on farm dams	1	1	1	1 2	Completed SMP to include consideration of farm dams and the monitoring programs Property subsidence management plans to be developed with land owners	BHPB Illawarra Coal - Manager Environment BHPB Illawarra Coal - Community Relations Coord.
J	4.10 Wells, bores	1 Damage to Wells, bores due to mine subsidence. Wells, bores require repair. This will be analysed under Houses 9.01.							
K	4.11 Any other feature	1 No other Farm Land and							

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SUB SYSTEM: No: 4	Farm Land and Facilities	Verified by: Date:			

STEP IN PROCESS	CAUSE & IMPACT	EXISTING CONTROLS	Sev	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE
considered significant	Facilities were Identified							

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SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: 17
SUB SYSTEM: No: 5	Industrial, Commercial and Business Establishments	Verified by: Date:		of: 23

STEP IN PROCESS		CAUSE & IMPACT	EXISTING CONTROLS	Sev	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE
A	5.01 Factories	1 The area of subsidence under analysis does not include any Factories and did not require further assessment.							
B	5.02 Workshops	1 The area of subsidence under analysis does not include any Workshops and did not require further assessment.							
C	5.03 Business or commercial establishments	1 The area of subsidence under analysis does not include any Business or commercial establishments and did not require further assessment.							
D	5.04 Gas and / or fuel storages and associated plants	1 The area of subsidence under analysis does not include any Gas and / or fuel storages and associated plants and did not require further assessment.							
E	5.05 Waste storages and associated plants	1 The area of subsidence under analysis does not include any Waste storages and associated plants and did not require further assessment.							
F	5.06 Buildings, equipment and operations that are sensitive to surface movements	1 The area of subsidence under analysis does not include any Buildings, equipment and operations that are sensitive to surface movements and did not require further assessment.							
G	5.07 Surface mining (open cut) voids and rehabilitated areas	1 Damage to open cut shale quarry due to mine subsidence. Localised rock falls.	Feature identified	30	0.1	3	1	Property subsidence management plans (PSMP) to include open cut shale quarry due	BHPB Illawarra Coal - Community Relations Coord.

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STEP IN PROCESS		CAUSE & IMPACT	EXISTING CONTROLS	Sev	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE
H	5.08 Mine infrastructure including tailings dams and emplacement areas	1 The area of subsidence under analysis does not include any Mine infrastructure including tailings dams and emplacement areas and did not require further assessment.							
I	5.09 Any other feature considered significant	1 No other Industrial, Commercial and Business Establishments were Identified							

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SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: of:	19 23
SUB SYSTEM: No: 6		Verified by: Date:			

STEP IN PROCESS		CAUSE & IMPACT	EXISTING CONTROLS	Sev	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE
A	6.01 Areas of Archaeological and/or Heritage Significance	1 Damage to Archaeological Significant sites due to mine subsidence. (aboriginal sites)	<p>Longwalls offset 180 metres from the edge of the Nepean River bank</p> <p>Base line assessment has been completed, known sites within the area</p> <p>Subsidence predictions have been developed</p> <p>Similar mining operations at Appin and Tower has not lead to any significant impacts in the area.</p>	10	1	10	1	Completed SMP to include consideration of Areas of Archaeological Significance and the monitoring programs	BHPB Illawarra Coal - Manager Environment
		2 Damage to Historic Heritage Significant sites due to mine subsidence. (Heritage aspects of the Upper Canal are dealt with in Section 2.13)	<p>Base line assessment has been completed, known sites within the area</p> <p>Subsidence predictions have been developed</p> <p>Similar mining operations at Appin and Tower has not lead to any significant impacts in the area.</p>	3	1	3	<p>1 Completed SMP to include consideration of Areas of Historic Heritage Significance and the monitoring programs</p> <p>2 Confirm the location of the oldest house in the Menangle area</p>	<p>BHPB Illawarra Coal - Manager Environment</p> <p>BHPB Illawarra Coal - Manager Environment</p>	

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SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: of:	20 23
SUB SYSTEM: No: 7		Verified by: Date:			

STEP IN PROCESS		CAUSE & IMPACT	EXISTING CONTROLS	Sev	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE
A	7.01 Items of Architectural Significance	1 The area of subsidence under analysis does not include any Items of Architectural Significance and did not require further assessment.							

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SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: of:	21 23
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STEP IN PROCESS		CAUSE & IMPACT	EXISTING CONTROLS	Sev	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE
A	8.01 Permanent Survey Control Marks	1 Movement of Permanent Survey Control Marks due to mine subsidence. Surveyors rely on false location of the marks.	Subsidence predictions have been developed Base line assessment has been completed, known sites of the survey control marks within the area	1	0.3	0	1 2	Completed SMP to include consideration of Permanent Survey Control Marks and the monitoring programs Liase with Land and Property Information (LPI) untill mining has ceased and Permanent Survey Control Marks can be re-established	BHPB Illawarra Coal - Manager R&I BHPB Illawarra Coal - Manager R&I

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SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: of:	22 23
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STEP IN PROCESS		CAUSE & IMPACT	EXISTING CONTROLS	Sev	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE
A	9.01 Houses	1 Damage to Houses and property improvements due to mine subsidence. Houses and property improvements require repair. Owners emotional stress associated with uncertainty of events.	Subsidence predictions and damage assessments have been developed Low density of Houses and property improvements Pre mining inspections (if requested by the property owner) Individual consultation with property owners BHPB IC Social management plan Other man made improvements associated with the house/farm are included within the Property Subsidence Management Plan (PSMP)	30	0.3	9	1 2 3 4	Completed SMP to include consideration of Houses and the monitoring programs Complete the Property subsidence management plans (PSMP) Land owner review of Property Subsidence Management Plans (PSMP) and issue final documents Monitoring and manage throughout mining as per the Property Subsidence Management Plans (PSMP)	BHPB Illawarra Coal - Community Relations Coord. BHPB Illawarra Coal - Community Relations Coord. BHPB Illawarra Coal - Community Relations Coord. BHPB Illawarra Coal - Community Relations Coord.
B	9.02 Flats / Unit	1 The area of subsidence under analysis does not include any Flats / Units and did not require further assessment. (Granny flats were assumed to be covered under Houses 9.01)							
C	9.03 Caravan parks	1 The area of subsidence under analysis does not include any Caravan parks and did not require further assessment.							
D	9.04 Retirement/aged care villages	1 The area of subsidence under analysis does not include any Retirement/aged care villages and did not require further assessment.							
E	9.05 Associated structures such as workshops, garages, on-site waste water systems, water or	1 The area of subsidence under analysis does not include any associated structures such as							

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Analysis Worksheet**





SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: of:	23 23
SUB SYSTEM: No: 9	Residential Establishments	Verified by: Date:			


STEP IN PROCESS		CAUSE & IMPACT	EXISTING CONTROLS	Sev	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE
F	9.06 Any other feature considered significant	1 workshops, garages, on-site waste water systems, water or gas tanks and did not require further assessment. (Assumed to be covered under Houses 9.01) No other Residential Establishments features were Identified							

Attachment 3

Risk Treatment Schedule (Risk Rank Order)


Qualitative Risk Analysis Risk Treatment Schedule		ANALYSIS NUMBER: AR0566	ANALYSIS SITE AND NAME Cardno Forbes Rigby SMP Application		Sheet: 1 of: 3
Ref	Risk	Hazard	TID	Treatment Options	
2B2	300	Delays to traffic slowed during mitigation works.	1	Completed SMP to include consideration of Roads (all types) and the monitoring programs	
			2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	
			3	Review existing RTA Road management plan for Area 7	
1B1	100	Nepean River Water flow and quality changes to Nepean River due to mine subsidence. Environmental impacts result. (loss of water, gas release, change in water quality)	1	Completed SMP to include consideration of Nepean River and the monitoring programs	
2B1	100	Damage to roads due to mine subsidence. Requirement to be repaired and rebuild on completion.	1	Completed SMP to include consideration of Roads (all types) and the monitoring programs	
			2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	
			3	Review existing RTA Road management plan for Area 7	
1B2	30	Foot Onslow Creek, Harris Creek Water flow and quality changes to ephemeral creeks due to mine subsidence. Environmental impacts result.	1	Completed SMP to include consideration of ephemeral creeks and the monitoring programs	
			2	Determine the order of streams within Area 7, for third order or greater assess loss of flow and erosion potential	
1C1	10	Ground water level and quality changes due to mine subsidence.	1	Completed SMP to include consideration of aquifers and the monitoring programs	
111	10	Mass movement of steep slopes due to mine subsidence. Localised damage to environment.	1	Completed SMP and the monitoring programs	
			2	Assess the implications of steep slope movement away from the Nepean River	
2A1	10	Damage to railway due to mine subsidence. Railways require repair.	1	Perform a specific assessment of the effects of the mine subsidence on the railway system	
			2	Completed SMP to include consideration of subsidence effects on the railway infrastructure and monitoring programs	
			3	Develop and implement railway management plan	
			4	Implement railway works deed	
2B3	10	Accident due to mine subsidence and related pavement damage.	1	Completed SMP to include consideration of Roads (all types) and the monitoring programs	
			2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	
			3	Review existing RTA Road management plan for Area 7	
6A1	10	Damage to Archaeological Significant sites due to mine subsidence. (aboriginal sites)	1	Completed SMP to include consideration of Areas of Archaeological Significance and the monitoring programs	
1D1	9	Existing spring water flow and quality changes, or the creation of new springs due to mine subsidence.	1	Completed SMP to include consideration of springs and the monitoring programs	
2I2	9	Damage to Telstra Fibre Network telecommunication lines due to mine subsidence. Telecommunication lines require repair.	1	Completed SMP to include consideration of Telecommunication lines and the monitoring programs	
			2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	
			3	Revise the Management Plan to include Longwalls 705-710	
2I3	9	Damage to Optus Fibre Network telecommunication lines due to mine subsidence. Telecommunication lines require repair.	1	Completed SMP to include consideration of Telecommunication lines and the monitoring programs	
			2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	
			3	Revise the Management Plan to include Longwalls 705-710	

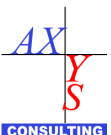
Qualitative Risk Analysis Risk Treatment Schedule		ANALYSIS NUMBER: AR0566	ANALYSIS SITE AND NAME Cardno Forbes Rigby SMP Application			Sheet: 2 of: 3
Risk Rank Order						
Ref	Risk	Hazard	TID	Treatment Options		
2I5	9	Damage to Powertel Fibre Network telecommunication lines due to mine subsidence. Telecommunication lines require repair.	1	Completed SMP to include consideration of Telecommunication lines and the monitoring programs		
			2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.		
			3	Revise the Powertel Management Plan to include Longwalls 705-710		
2I6	9	Damage to NextGen Fibre Network telecommunication lines due to mine subsidence. Telecommunication lines require repair.	1	Completed SMP to include consideration of Telecommunication lines and the monitoring programs		
			2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.		
			3	Revise the NextGen Management Plan to include Longwalls 705-710		
2M1	9	Damage to the SCA infrastructure including Upper Canal due to mine subsidence. Resulting in - reduced or loss of supply - reduced water quality - damage to heritage structures, repairs required	1	Completed SMP to include consideration of SCA infrastructure including Upper Canal and the monitoring programs		
			2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.		
			3	Revise the Management Plan to include Longwalls 705-710		
			4	Perform structural analysis of the wrought iron Aquaducts		
			5	Perform mitigation works on Ousdale and Mallaty Creek access bridges		
9A1	9	Damage to Houses and property improvements due to mine subsidence. Houses and property improvements require repair. Owners emotional stress associated with uncertainty of events.	1	Completed SMP to include consideration of Houses and the monitoring programs		
			2	Complete the Property subsidence management plans (PSMP)		
			3	Land owner review of Property Subsidence Management Plans (PSMP) and issue final documents		
			4	Monitoring and manage throughout mining as per the Property Subsidence Management Plans (PSMP)		
1H1	3	Rock falls from cliffs due to mine subsidence. Rock fall causes localised damage to environment and to public safety. (Note: There were no pagodas identified in the area)	1	Completed SMP to include Public Safety and the monitoring programs		
1M1	3	Mine subsidence leads to loss of protected species or their habitat.	1	Completed SMP to include consideration of Threatened and protected species and the monitoring programs		
1Q1	3	Mine subsidence leads to damage or loss of Natural vegetation. (including EEC)	1	Completed SMP to include consideration of Natural vegetation and the monitoring programs		
1S1	3	Mine subsidence leads to release of gas. Possible fire if ignition occurs.	1	Completed SMP to include consideration for the release of gas and the monitoring programs		
			2	Property subsidence management plans (PSMP) to include identification of gas release		
2C1	3	Damage to bridges due to mine subsidence. Bridge require repair.	1	Completed SMP to include consideration of bridges (all types) and the monitoring programs		
			2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.		
			3	Develop RTA Bridge management plan for Area 7		
2I4	3	Damage to Telstra and Optus Network towers. Towers require repair.	1	Completed SMP to include consideration of Telecommunication towers and the monitoring programs		
			2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.		
			3	Develop a Management Plan for the Telstra and Optus towers for Longwall 705-710		
5G1	3	Damage to open cut shale quarry due to mine subsidence. Localised rock falls.	1	Property subsidence management plans (PSMP) to include open cut shale quarry due		


Qualitative Risk Analysis Risk Treatment Schedule		ANALYSIS NUMBER: AR0566	ANALYSIS SITE AND NAME Cardno Forbes Rigby SMP Application		Sheet: 3 of: 3
Ref	Risk	Hazard	TID	Treatment Options	
6A2	3	Damage to Historic Heritage Significant sites due to mine subsidence. (Heritage aspects of the Upper Canal are dealt with in Section 2.13)	1	Completed SMP to include consideration of Areas of Historic Heritage Significance and the monitoring programs	
			2	Confirm the location of the oldest house in the Menangle area	
2D1	1	Damage to tunnel due to mine subsidence. Tunnel requires repair.	1	Completed SMP to include consideration of tunnels and the monitoring programs	
			2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	
			3	Revise the Management Plan to include Longwalls 705-710	
			4	Master agreement to be extended to include Appin Area 7	
2H1	1	Damage to Electricity power lines due to mine subsidence. Power lines requires repair. (66kV, 11kV and low voltage)	1	Completed SMP to include consideration of Electricity power lines and the monitoring programs	
			2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	
			3	Asset owners to develop internal impact assessments	
2I1	1	Damage to Telstra Local Network telecommunication lines due to mine subsidence. Telecommunication lines require repair.	1	Completed SMP to include consideration of Telecommunication lines and the monitoring programs	
			2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	
			3	Revise the Management Plan to include Longwalls 705-710	
2N1	1	Damage to RTA Rest Area and amenities due to mine subsidence. RTA Rest Area and amenities requires repairs.	1	Completed SMP to include consideration of RTA Rest Area and amenities and the monitoring programs	
4I1	1	Damage to Farm dams due to mine subsidence. Farm dams require repair.	1	Completed SMP to include consideration of farm dams and the monitoring programs	
			2	Property subsidence management plans to be developed with land owners	
4B1	0	Damage to Farm buildings / sheds due to mine subsidence. Farm buildings / sheds require repair.	1	Completed SMP to include consideration of Farm buildings / sheds and the monitoring programs	
			2	Land owner review of Property Subsidence Management Plans (PSMP) and issue final documents	
			3	Monitoring and manage throughout mining as per the Property Subsidence Management Plans (PSMP)	
			4	Structural inspections of Farm buildings / sheds to be conducted as required	
8A1	0	Movement of Permanent Survey Control Marks due to mine subsidence. Surveyors rely on false location of the marks.	1	Completed SMP to include consideration of Permanent Survey Control Marks and the monitoring programs	
			2	Liase with Land and Property Information (LPI) until mining has ceased and Permanent Survey Control Marks can be re-established	

Attachment 4

Risk Treatment Schedule (Consequence Order)

Qualitative Risk Analysis Risk Treatment Schedule		ANALYSIS NUMBER: AR0566	ANALYSIS SITE AND NAME Cardno Forbes Rigby SMP Application		Sheet: 1 of: 3
Ref	Cons	Hazard	TID	Treatment Options	
2A1	100	Damage to railway due to mine subsidence. Railways require repair.	1	Perform a specific assessment of the effects of the mine subsidence on the railway system	
			2	Completed SMP to include consideration of subsidence effects on the railway infrastructure and monitoring programs	
			3	Develop and implement railway management plan	
			4	Implement railway works deed	
2B1	100	Damage to roads due to mine subsidence. Requirement to be repaired and rebuild on completion.	1	Completed SMP to include consideration of Roads (all types) and the monitoring programs	
			2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	
			3	Review existing RTA Road management plan for Area 7	
2B3	100	Accident due to mine subsidence and related pavement damage.	1	Completed SMP to include consideration of Roads (all types) and the monitoring programs	
			2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	
			3	Review existing RTA Road management plan for Area 7	
2B2	30	Delays to traffic slowed during mitigation works.	1	Completed SMP to include consideration of Roads (all types) and the monitoring programs	
			2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	
			3	Review existing RTA Road management plan for Area 7	
2C1	30	Damage to bridges due to mine subsidence. Bridge require repair.	1	Completed SMP to include consideration of bridges (all types) and the monitoring programs	
			2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	
			3	Develop RTA Bridge management plan for Area 7	
2I2	30	Damage to Telstra Fibre Network telecommunication lines due to mine subsidence. Telecommunication lines require repair.	1	Completed SMP to include consideration of Telecommunication lines and the monitoring programs	
			2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	
			3	Revise the Management Plan to include Longwalls 705-710	
2I3	30	Damage to Optus Fibre Network telecommunication lines due to mine subsidence. Telecommunication lines require repair.	1	Completed SMP to include consideration of Telecommunication lines and the monitoring programs	
			2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	
			3	Revise the Management Plan to include Longwalls 705-710	
2I5	30	Damage to Powertel Fibre Network telecommunication lines due to mine subsidence. Telecommunication lines require repair.	1	Completed SMP to include consideration of Telecommunication lines and the monitoring programs	
			2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	
			3	Revise the Powertel Management Plan to include Longwalls 705-710	
2I6	30	Damage to NextGen Fibre Network telecommunication lines due to mine subsidence. Telecommunication lines require repair.	1	Completed SMP to include consideration of Telecommunication lines and the monitoring programs	
			2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	
			3	Revise the NextGen Management Plan to include Longwalls 705-710	
2M1	30	Damage to the SCA infrastructure including Upper Canal due to mine subsidence. Resulting in - reduced or loss of supply - reduced water quality	1	Completed SMP to include consideration of SCA infrastructure including Upper Canal and the monitoring programs	
			2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	

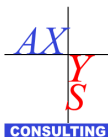
Qualitative Risk Analysis Risk Treatment Schedule		ANALYSIS NUMBER: AR0566	ANALYSIS SITE AND NAME Cardno Forbes Rigby SMP Application		Sheet: 2 of: 3
Consequence Order					
Ref	Cons	Hazard	TID	Treatment Options	
5G1	30	- damage to heritage structures, repairs required	3	Revise the Management Plan to include Longwalls 705-710	
			4	Perform structural analysis of the wrought iron Aquaducts	
			5	Perform mitigation works on Ousdale and Mallaty Creek access bridges	
9A1	30	Damage to Houses and property improvements due to mine subsidence. Houses and property improvements require repair. Owners emotional stress associated with uncertainty of events.	1	Property subsidence management plans (PSMP) to include open cut shale quarry due	
			1	Completed SMP to include consideration of Houses and the monitoring programs	
			2	Complete the Property subsidence management plans (PSMP)	
			3	Land owner review of Property Subsidence Management Plans (PSMP) and issue final documents	
1B1	10	Nepean River Water flow and quality changes to Nepean River due to mine subsidence. Environmental impacts result. (loss of water, gas release, change in water quality)	1	Completed SMP to include consideration of Nepean River and the monitoring programs	
			1	Completed SMP to include Public Safety and the monitoring programs	
1H1	10	Rock falls from cliffs due to mine subsidence. Rock fall causes localised damage to environment and to public safety. (Note: There were no pagodas identified in the area)	1	Completed SMP to include consideration of Nepean River and the monitoring programs	
111	10	Mass movement of steep slopes due to mine subsidence. Localised damage to environment.	1	Completed SMP and the monitoring programs	
2I4	10	Damage to Telstra and Optus Network towers. Towers require repair.	2	Assess the implications of steep slope movement away from the Nepean River	
			1	Completed SMP to include consideration of Telecommunication towers and the monitoring programs	
			2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	
6A1	10	Damage to Archaeological Significant sites due to mine subsidence. (aboriginal sites)	3	Develop a Management Plan for the Telstra and Optus towers for Longwall 705-710	
			1	Completed SMP to include consideration of Areas of Archaeological Significance and the monitoring programs	
1B2	3	Foot Onslow Creek, Harris Creek Water flow and quality changes to ephemeral creeks due to mine subsidence. Environmental impacts result.	1	Completed SMP to include consideration of ephemeral creeks and the monitoring programs	
			2	Determine the order of streams within Area 7, for third order or greater assess loss of flow and erosion potential	
1D1	3	Existing spring water flow and quality changes, or the creation of new springs due to mine subsidence.	1	Completed SMP to include consideration of springs and the monitoring programs	
1M1	3	Mine subsidence leads to loss of protected species or their habitat.	1	Completed SMP to include consideration of Threatened and protected species and the monitoring programs	
1Q1	3	Mine subsidence leads to damage or loss of Natural vegetation. (including EEC)	1	Completed SMP to include consideration of Natural vegetation and the monitoring programs	
1S1	3	Mine subsidence leads to release of gas. Possible fire if ignition occurs.	1	Completed SMP to include consideration for the release of gas and the monitoring programs	
			2	Property subsidence management plans (PSMP) to include identification of gas release	
2D1	3	Damage to tunnel due to mine subsidence. Tunnel requires repair.	1	Completed SMP to include consideration of tunnels and the monitoring programs	

Qualitative Risk Analysis Risk Treatment Schedule		ANALYSIS NUMBER: AR0566	ANALYSIS SITE AND NAME Cardno Forbes Rigby SMP Application		Sheet: 3 of: 3
Ref	Cons	Hazard	TID	Treatment Options	
2H1	3	Damage to Electricity power lines due to mine subsidence. Power lines requires repair. (66kV, 11kV and low voltage)	2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	
			3	Revise the Management Plan to include Longwalls 705-710	
			4	Master agreement to be extended to include Appin Area 7	
			1	Completed SMP to include consideration of Electricity power lines and the monitoring programs	
			2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	
			3	Asset owners to develop internal impact assessments	
2I1	3	Damage to Telstra Local Network telecommunication lines due to mine subsidence. Telecommunication lines require repair.	1	Completed SMP to include consideration of Telecommunication lines and the monitoring programs	
			2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	
			3	Revise the Management Plan to include Longwalls 705-710	
2N1	3	Damage to RTA Rest Area and ammenties due to mine subsidence. RTA Rest Area and ammenties requires repairs.	1	Completed SMP to include consideration of RTA Rest Area and ammenties and the monitoring programs	
6A2	3	Damage to Historic Heritage Significant sites due to mine subsidence. (Heritage aspects of the Upper Canal are dealt with in Section 2.13)	1	Completed SMP to include consideration of Areas of Historic Heritage Significance and the monitoring programs	
			2	Confirm the location of the oldest house in the Menangle area	
1C1	1	Ground water level and quality changes due to mine subsidence.	1	Completed SMP to include consideration of aquifers and the monitoring programs	
4B1	1	Damage to Farm buildings / sheds due to mine subsidence. Farm buildings / sheds require repair.	1	Completed SMP to include consideration of Farm buildings / sheds and the monitoring programs	
			2	Land owner review of Property Subsidence Management Plans (PSMP) and issue final documents	
			3	Monitoring and manage throughout mining as per the Property Subsidence Management Plans (PSMP)	
			4	Structural inspections of Farm buildings / sheds to be conducted as required	
4I1	1	Damage to Farm dams due to mine subsidence. Farm dams require repair.	1	Completed SMP to include consideration of farm dams and the monitoring programs	
			2	Property subsidence management plans to be developed with land owners	
8A1	1	Movement of Permanent Survey Control Marks due to mine subsidence. Surveyors rely on false location of the marks.	1	Completed SMP to include consideration of Permanent Survey Control Marks and the monitoring programs	
			2	Liase with Land and Property Information (LPI) until mining has ceased and Permanent Survey Control Marks can be re-established	

Attachment 5

Risk Treatment Schedule and Action Plan

**Qualitative
Risk Analysis
Treatment Schedule**



SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: 1
SUB SYSTEM: No: 1	Natural Features	Verified by: Date:		of: 10

ID	HAZARD & EFFECTS	TID	TREATMENT	DATE REQUIRED	RESPONSIBLE OFFICER	DATE COMPLETED
1B1	Nepean River Water flow and quality changes to Nepean River due to mine subsidence. Environmental impacts result. (loss of water, gas release, change in water quality)	1	Completed SMP to include consideration of Nepean River and the monitoring programs	Monday, 30 June 2008	BHPB Illawarra Coal - Manager Environment	
1B2	Foot Onslow Creek, Harris Creek Water flow and quality changes to ephemeral creeks due to mine subsidence. Environmental impacts result.	1	Completed SMP to include consideration of ephemeral creeks and the monitoring programs	Monday, 30 June 2008	BHPB Illawarra Coal - Manager Environment	
		2	Determine the order of streams within Area 7, for third order or greater assess loss of flow and erosion potential	Monday, 30 June 2008	BHPB Illawarra Coal - Manager Environment	
1C1	Ground water level and quality changes due to mine subsidence.	1	Completed SMP to include consideration of aquifers and the monitoring programs	Monday, 30 June 2008	BHPB Illawarra Coal - Manager Environment	
1D1	Existing spring water flow and quality changes, or the creation of new springs due to mine subsidence.	1	Completed SMP to include consideration of springs and the monitoring programs	Monday, 30 June 2008	BHPB Illawarra Coal - Manager Environment	
1H1	Rock falls from cliffs due to mine subsidence. Rock fall causes localised damage to environment and to public safety. (Note: There were no pagodas identified in the area)	1	Completed SMP to include Public Safety and the monitoring programs	Monday, 30 June 2008	BHPB Illawarra Coal - Manager Environment	
1I1	Mass movement of steep slopes due to mine subsidence. Localised damage to environment.	1	Completed SMP and the monitoring programs	Monday, 30 June 2008	BHPB Illawarra Coal - Manager Environment	
		2	Assess the implications of steep slope movement away from the Nepean River	Monday, 30 June 2008	BHPB Illawarra Coal - Manager Environment	
1M1	Mine subsidence leads to loss of protected species or their habitat.	1	Completed SMP to include consideration of Threatened and protected species and the monitoring programs	Monday, 30 June 2008	BHPB Illawarra Coal - Manager Environment	
1Q1	Mine subsidence leads to damage or loss of Natural vegetation. (including EEC)	1	Completed SMP to include consideration of Natural vegetation and the monitoring programs	Monday, 30 June 2008	BHPB Illawarra Coal - Manager Environment	
1S1	Mine subsidence leads to release of gas. Possible fire if ignition occurs.	1	Completed SMP to include consideration for the release of gas and the monitoring programs	Monday, 30 June 2008	BHPB Illawarra Coal - Manager Environment	
		2	Property subsidence management plans (PSMP) to include identification of gas release	Wednesday, 30 July 2008	BHPB Illawarra Coal - Community Relations Coord.	

**Qualitative
Risk Analysis
Treatment Schedule**



SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: of:	2 10
SUB SYSTEM: No: 2	Public Utilities	Verified by: Date:			

ID	HAZARD & EFFECTS	TID	TREATMENT	DATE REQUIRED	RESPONSIBLE OFFICER	DATE COMPLETED
2A1	Damage to railway due to mine subsidence. Railways require repair.	1	Perform a specific assessment of the effects of the mine subsidence on the railway system	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		2	Completed SMP to include consideration of subsidence effects on the railway infrastructure and monitoring programs	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		3	Develop and implement railway management plan	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		4	Implement railway works deed	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
2B1	Damage to roads due to mine subsidence. Requirement to be repaired and rebuild on completion.	1	Completed SMP to include consideration of Roads (all types) and the monitoring programs	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		3	Review existing RTA Road management plan for Area 7	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
2B2	Delays to traffic slowed during mitigation works.	1	Completed SMP to include consideration of Roads (all types) and the monitoring programs	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		3	Review existing RTA Road management plan for Area 7	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
2B3	Accident due to mine subsidence and related pavement damage.	1	Completed SMP to include consideration of Roads (all types) and the monitoring programs	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		3	Review existing RTA Road management plan for Area 7	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
2C1	Damage to bridges due to mine subsidence. Bridge require repair.	1	Completed SMP to include consideration of bridges (all types) and the monitoring programs	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		3	Develop RTA Bridge management plan for Area 7	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
2D1	Damage to tunnel due to mine subsidence. Tunnel requires repair.	1	Completed SMP to include consideration of tunnels and the monitoring programs	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	

**Qualitative
Risk Analysis
Treatment Schedule**



SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: of:	3 10
SUB SYSTEM: No: 2	Public Utilities	Verified by: Date:			

ID	HAZARD & EFFECTS	TID	TREATMENT	DATE REQUIRED	RESPONSIBLE OFFICER	DATE COMPLETED
2D1	Damage to tunnel due to mine subsidence. Tunnel requires repair.	2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		3	Revise the Management Plan to include Longwalls 705-710	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		4	Master agreement to be extended to include Appin Area 7	Wednesday, 30 July 2008	BHPB Illawarra Coal - Community Relations Coord.	
2G1	There is no public reticulated High pressure gas pipelines within the area.	1	None Identified			
2H1	Damage to Electricity power lines due to mine subsidence. Power lines requires repair. (66kV, 11kV and low voltage)	1	Completed SMP to include consideration of Electricity power lines and the monitoring programs	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		3	Asset owners to develop internal impact assessments			
211	Damage to Telstra Local Network telecommunication lines due to mine subsidence. Telecommunication lines require repair.	1	Completed SMP to include consideration of Telecommunication lines and the monitoring programs	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		3	Revise the Management Plan to include Longwalls 705-710	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
212	Damage to Telstra Fibre Network telecommunication lines due to mine subsidence. Telecommunication lines require repair.	1	Completed SMP to include consideration of Telecommunication lines and the monitoring programs	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		3	Revise the Management Plan to include Longwalls 705-710	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
213	Damage to Optus Fibre Network telecommunication lines due to mine subsidence. Telecommunication lines require repair.	1	Completed SMP to include consideration of Telecommunication lines and the monitoring programs	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	

**Qualitative
Risk Analysis
Treatment Schedule**



SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: 4
SUB SYSTEM: No: 2	Public Utilities	Verified by: Date:		of: 10

ID	HAZARD & EFFECTS	TID	TREATMENT	DATE REQUIRED	RESPONSIBLE OFFICER	DATE COMPLETED
213	Damage to Optus Fibre Network telecommunication lines due to mine subsidence. Telecommunication lines require repair.	2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		3	Revise the Management Plan to include Longwalls 705-710	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
214	Damage to Telstra and Optus Network towers. Towers require repair.	1	Completed SMP to include consideration of Telecommunication towers and the monitoring programs	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		3	Develop a Management Plan for the Telstra and Optus towers for Longwall 705-710	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
215	Damage to Powertel Fibre Network telecommunication lines due to mine subsidence. Telecommunication lines require repair.	1	Completed SMP to include consideration of Telecommunication lines and the monitoring programs	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		3	Revise the Powertel Management Plan to include Longwalls 705-710	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
216	Damage to NextGen Fibre Network telecommunication lines due to mine subsidence. Telecommunication lines require repair.	1	Completed SMP to include consideration of Telecommunication lines and the monitoring programs	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		3	Revise the NextGen Management Plan to include Longwalls 705-710	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
2M1	Damage to the SCA infrastructure including Upper Canal due to mine subsidence. Resulting in - reduced or loss of supply - reduced water quality - damage to heritage structures, repairs required	1	Completed SMP to include consideration of SCA infrastructure including Upper Canal and the monitoring programs	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		2	Impact assessment to be prepared and monitoring and mitigation programs to be developed.	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	

**Qualitative
Risk Analysis
Treatment Schedule**



SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: 5
SUB SYSTEM: No: 2	Public Utilities	Verified by: Date:		of: 10

ID	HAZARD & EFFECTS	TID	TREATMENT	DATE REQUIRED	RESPONSIBLE OFFICER	DATE COMPLETED
2M1	Damage to the SCA infrastructure including Upper Canal due to mine subsidence. Resulting in - reduced or loss of supply - reduced water quality - damage to heritage structures, repairs required	3	Revise the Management Plan to include Longwalls 705-710	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		4	Perform structural analysis of the wrought iron Aqueducts	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		5	Perform mitigation works on Ousdale and Mallaty Creek access bridges	Wednesday, 30 July 2008	BHPB Illawarra Coal - Community Relations Coord.	
2N1	Damage to RTA Rest Area and ammenties due to mine subsidence. RTA Rest Area and ammenties requires repairs.	1	Completed SMP to include consideration of RTA Rest Area and ammenties and the monitoring programs	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	

**Qualitative
Risk Analysis
Treatment Schedule**



SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: 6
SUB SYSTEM: No: 4	Farm Land and Facilities	Verified by: Date:		of: 10

ID	HAZARD & EFFECTS	TID	TREATMENT	DATE REQUIRED	RESPONSIBLE OFFICER	DATE COMPLETED
4B1	Damage to Farm buildings / sheds due to mine subsidence. Farm buildings / sheds require repair.	1	Completed SMP to include consideration of Farm buildings / sheds and the monitoring programs	Wednesday, 30 July 2008	BHPB Illawarra Coal - Community Relations Coord.	
		2	Land owner review of Property Subsidence Management Plans (PSMP) and issue final documents	Wednesday, 30 July 2008	BHPB Illawarra Coal - Community Relations Coord.	
		3	Monitoring and manage throughout mining as per the Property Subsidence Management Plans (PSMP)	Wednesday, 30 July 2008	BHPB Illawarra Coal - Community Relations Coord.	
		4	Structural inspections of Farm buildings / sheds to be conducted as required	Wednesday, 30 July 2008	BHPB Illawarra Coal - Community Relations Coord.	
4I1	Damage to Farm dams due to mine subsidence. Farm dams require repair.	1	Completed SMP to include consideration of farm dams and the monitoring programs	Monday, 30 June 2008	BHPB Illawarra Coal - Manager Environment	
		2	Property subsidence management plans to be developed with land owners	Wednesday, 30 July 2008	BHPB Illawarra Coal - Community Relations Coord.	

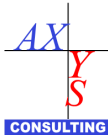
**Qualitative
Risk Analysis
Treatment Schedule**



SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: 7
SUB SYSTEM: No: 5	Industrial, Commercial and Business Establishments	Verified by: Date:		of: 10

ID	HAZARD & EFFECTS	TID	TREATMENT	DATE REQUIRED	RESPONSIBLE OFFICER	DATE COMPLETED
5G1	Damage to open cut shale quarry due to mine subsidence. Localised rock falls.	1	Property subsidence management plans (PSMP) to include open cut shale quarry due	Wednesday, 30 July 2008	BHPB Illawarra Coal - Community Relations Coord.	

**Qualitative
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Treatment Schedule**



SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: of:	8 10
SUB SYSTEM: No: 6		Verified by: Date:			

ID	HAZARD & EFFECTS	TID	TREATMENT	DATE REQUIRED	RESPONSIBLE OFFICER	DATE COMPLETED
6A1	Damage to Archaeological Significant sites due to mine subsidence. (aboriginal sites)	1	Completed SMP to include consideration of Areas of Archaeological Significance and the monitoring programs	Monday, 30 June 2008	BHPB Illawarra Coal - Manager Environment	
6A2	Damage to Historic Heritage Significant sites due to mine subsidence. (Heritage aspects of the Upper Canal are dealt with in Section 2.13)	1	Completed SMP to include consideration of Areas of Historic Heritage Significance and the monitoring programs	Monday, 30 June 2008	BHPB Illawarra Coal - Manager Environment	
		2	Confirm the location of the oldest house in the Menangle area	Monday, 30 June 2008	BHPB Illawarra Coal - Manager Environment	

**Qualitative
Risk Analysis
Treatment Schedule**



SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: of:	9 10
SUB SYSTEM: No: 8		Verified by: Date:			

ID	HAZARD & EFFECTS	TID	TREATMENT	DATE REQUIRED	RESPONSIBLE OFFICER	DATE COMPLETED
8A1	Movement of Permanent Survey Control Marks due to mine subsidence. Surveyors rely on false location of the marks.	1	Completed SMP to include consideration of Permanent Survey Control Marks and the monitoring programs	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	
		2	Liase with Land and Property Information (LPI) until mining has ceased and Permanent Survey Control Marks can be re-established	Friday, 1 January 2010	BHPB Illawarra Coal - Manager R&I	

**Qualitative
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Treatment Schedule**



SYSTEM: AR0566	Cardno Forbes Rigby SMP Application	Compiled by: Date:	Shane Chiddy 15th May 2008	Sheet: of:	10 10
SUB SYSTEM: No: 9		Verified by: Date:			

ID	HAZARD & EFFECTS	TID	TREATMENT	DATE REQUIRED	RESPONSIBLE OFFICER	DATE COMPLETED
9A1	Damage to Houses and property improvements due to mine subsidence. Houses and property improvements require repair. Owners emotional stress associated with uncertainty of events.	1	Completed SMP to include consideration of Houses and the monitoring programs	Wednesday, 30 July 2008	BHPB Illawarra Coal - Community Relations Coord.	
		2	Complete the Property subsidence management plans (PSMP)	Wednesday, 30 July 2008	BHPB Illawarra Coal - Community Relations Coord.	
		3	Land owner review of Property Subsidence Management Plans (PSMP) and issue final documents	Wednesday, 30 July 2008	BHPB Illawarra Coal - Community Relations Coord.	
		4	Monitoring and manage throughout mining as per the Property Subsidence Management Plans (PSMP)	Wednesday, 30 July 2008	BHPB Illawarra Coal - Community Relations Coord.	

Attachment 9
Revisions

Document Revision History

Revision	Date	Modification Description
1	16-May-08	Initial release
2	28-May-08	Minor word changes and date changes
