

# ENVIRONMENTAL IMPACT STATEMENT

## VOLUME 1

### TABLE OF CONTENTS

#### SECTION 1

<b>1.0</b>	<b>INTRODUCTION.....</b>	<b>1</b>
1.1	The Proponent .....	1
1.2	Location.....	2
1.3	Land Description .....	3
1.4	Project Review .....	3
1.5	Structure of the Environmental Impact Statement (EIS).....	4
1.6	How to Read this EIS .....	6
1.7	Study Team.....	6

#### SECTION 2

<b>2.0</b>	<b>PLANNING CONTEXT, APPROVALS AND CONSULTATION.....</b>	<b>1</b>
2.1	Statutory Planning Approval Sought .....	1
2.2	State Environmental Planning Policies .....	2
2.3	Regional Environmental Plans.....	3
	2.3.1 Hunter Regional Environmental Plan 1989 .....	3
	2.3.2 Hunter Regional Environmental Plan - Heritage 1989 .....	4
2.4	Singleton Local Environmental Plan 1996 .....	5
2.5	Development Control Plans (DCP).....	7
	2.5.1 Singleton Erosion and Sediment Control DCP.....	7
	2.5.2 Singleton Car Parking DCP .....	7
2.6	Section 94 Contributions Plan .....	8
2.7	Upper Hunter Cumulative Impact Study and Action Strategy .....	8
2.8	Hunter Valley Railway Programs Task Force .....	8
2.9	Consultation with Government Authorities .....	9
2.10	List of Approvals .....	10
2.11	Community Consultation .....	11
2.12	Newsletters 12	
2.13	Meetings with Residents .....	12
2.14	Public Meetings .....	13
2.15	Singleton Shire Council Briefings .....	13

## SECTION 3

<b>3.0</b>	<b>ANALYSIS OF EXISTING ENVIRONMENT .....</b>	<b>1</b>
3.1	Methodology .....	1
3.2	Regional Setting.....	1
3.3	Climate.....	2
	3.3.1 Temperature and Humidity .....	2
	3.3.2 Rainfall.....	4
	3.3.3 Wind.....	4
	3.3.4 Inversions .....	5
3.4	Air Quality .....	5
	3.4.1 Existing Air Quality in Camberwell .....	5
3.5	Acoustic Environment .....	9
	3.5.1 Ambient Noise Levels.....	9
	3.5.2 Noise and Vibration Criteria.....	10
	3.5.3 Blasting .....	13
3.6	Surface Water.....	14
	3.6.1 Water Quality.....	14
	3.6.2 Bowmans Creek Catchment.....	16
	3.6.3 History of Flooding.....	16
	3.6.4 Predicted Extent of Flooding in the Vicinity of the Ashton Coal Project .....	17
	3.6.5 Geomorphology of Bowmans Creek .....	19
	3.6.6 Surface Drainage.....	19
3.7	Groundwater Systems .....	19
	3.7.1 Coal Measures.....	19
	3.7.2 Alluvium .....	20
	3.7.3 Groundwater Levels and Flow.....	20
	3.7.4 Groundwater Quality.....	20
	3.7.5 Groundwater Use .....	20
3.8	Regional Geology .....	21
3.9	Soils .....	21
	3.9.1 Field Investigation .....	22
	3.9.2 Land Capability.....	22
	3.9.3 Agricultural Suitability .....	23
3.10	Flora, Fauna and Aquatic Habitat .....	24
	3.10.1 Flora Assessment .....	24
	3.10.2 Fauna Assessment.....	26
	3.10.3 Aquatic Assessment .....	26
3.11	Heritage.....	28
	3.11.1 Aboriginal Archaeology.....	28
	3.11.2 Heritage.....	29
3.12	Land Use .....	31
3.13	Social Environment.....	32
	3.13.1 Regional Setting.....	32
	3.13.2 Population and Growth .....	32
	3.13.3 Housing Structure .....	33

3.13.4	Income.....	33
3.13.5	Employment.....	33
3.13.6	Services.....	34
3.14	Economic Environment.....	36
3.14.1	Regional Economy.....	36
3.14.2	Local Economy.....	38
3.15	Transport.....	39
3.15.1	Roads and Traffic.....	39
3.15.2	Rail.....	40
3.16	Visual.....	40
3.16.1	South of the New England Highway.....	41
3.16.2	North of the New England Highway.....	41
3.17	Utility Services.....	42

## SECTION 4

<b>4.0</b>	<b>THE PROPOSAL.....</b>	<b>1</b>
4.1	Overview.....	1
4.1.1	Proposal Objectives.....	2
4.2	Resource Evaluation.....	3
4.2.1	Location.....	3
4.2.2	Geology.....	3
4.2.3	Previous Exploration.....	4
4.2.4	Recent Exploration.....	4
4.2.5	Geological Description.....	5
4.2.6	Coal Resources and Reserves.....	6
4.3	Coal Quality.....	9
4.4	Mining Constraints.....	10
4.5	Mining Method.....	10
4.5.1	Open Cut.....	10
4.5.2	Auguring and Highwall Mining.....	12
4.5.3	Underground.....	13
4.6	Mine Schedule and Equipment.....	14
4.6.1	Open Cut Mine.....	14
4.6.2	Underground.....	15
4.6.3	CHPP.....	15
4.6.4	Mine Production.....	15
4.7	Mine Services.....	16
4.7.1	Ventilation.....	16
4.7.2	Gas Management.....	16
4.7.3	Water Supply.....	16
4.7.4	Electricity.....	17
4.7.5	Underground Mine Dewatering.....	17
4.7.6	Administrative Facilities and Car Parking.....	18
4.8	Rejects Handling and Emplacement.....	18

4.9	Bowmans Creek Diversion .....	19
	4.9.1 Description of the Proposal.....	19
4.10	New England Highway Bridge Underpass .....	22
	4.10.1 Existing Bridge .....	22
	4.10.2 Description of the Proposal.....	23
	4.10.3 Concept Design.....	23
4.11	Water Management.....	23
	4.11.1 Proposed Strategies.....	24
	4.11.2 Surface Water Structures .....	26
	4.11.3 Water Balance.....	27
	4.11.4 Underground Dewatering Facilities.....	28
4.12	Rehabilitation of Disturbed Land.....	28
4.13	Workforce and Working Hours .....	29
4.14	Markets .....	29
4.15	Environmental Monitoring.....	29
4.16	Waste Management.....	30
4.17	Project Energy Sources .....	30

## SECTION 5

<b>5.0</b>	<b>THE LIKELY IMPACT ON THE ENVIRONMENT.....</b>	<b>1</b>
5.1	Subsidence.....	2
	5.1.1 The Nature of Subsidence .....	2
	5.1.2 Subsidence Predictions.....	2
	5.1.3 Impact on Surface Features .....	4
	5.1.4 Impact on Bowmans Creek .....	5
5.2	Air Quality.....	5
	5.2.1 Dispersion Modelling Results .....	6
5.3	Noise and Vibration.....	7
	5.3.1 Operational Noise Impact.....	7
	5.3.2 Rail Noise Impact.....	10
	5.3.3 Construction Noise impact .....	10
	5.3.4 Blasting.....	11
5.4	Surface Water.....	12
	5.4.1 Changes to Catchment Area/Yields .....	12
	5.4.2 Diversion of Bowmans Creek .....	12
	5.4.3 Water Quality .....	12
	5.4.4 Groundwater.....	13
5.5	Mine Water Inflows.....	13
	5.5.1 Groundwater Level Changes .....	14
	5.5.2 Subsidence Effects on Bowmans Creek Alluvium.....	14
	5.5.3 Interaction of Open Cut with Glennies Creek .....	14
	5.5.4 Post Mining Recovery .....	14
	5.5.5 Impacts on Groundwater Users .....	15
5.6	Land Use .....	15
	5.6.1 Land Capability .....	15
	5.6.2 Agricultural Suitability.....	15

5.7	Flora, Fauna and Aquatic Habitat.....	16
5.7.1	Flora and Fauna Impacts .....	16
5.7.2	Aquatic Impacts.....	17
5.8	Cultural Heritage .....	18
5.8.1	Aboriginal Archaeological Heritage.....	18
5.8.2	Non Indigenous Heritage.....	21
5.9	Social Impacts .....	21
5.9.1	Impacts on the Provision of Services .....	21
5.9.2	Housing Impacts.....	22
5.9.3	Employment .....	23
5.10	Economic Impacts .....	23
5.11	Transportation .....	25
5.11.1	Roads and Traffic .....	25
5.11.2	Rail .....	26
5.12	Visual .....	27
5.12.1	Underground Operations .....	27
5.12.2	Western Emplacement and Haul Roads .....	27
5.12.3	Open Cut Operations and Surface Infrastructure .....	28
5.12.4	Eastern Emplacement.....	28
5.12.5	Night Lighting.....	29
5.13	Hazards.....	29
5.13.1	Open-Cut Mining .....	30
5.13.2	Pit Top Facilities .....	30
5.14	Greenhouse Gas Emissions .....	31
5.15	Cumulative Impacts.....	32
5.15.1	Air Quality.....	32
5.15.2	Noise.....	32
5.15.3	Water .....	33
5.15.4	Visual .....	33

## SECTION 6

<b>6.0</b>	<b>MEASURES PROPOSED TO MITIGATE ADVERSE IMPACTS ON THE ENVIRONMENT .....</b>	<b>1</b>
6.1	Subsidence Control and Amelioration.....	1
6.2	Air Quality.....	2
6.3	Noise and Vibration.....	3
6.4	Diversion of Bowmans Creek .....	5
6.5	Surface Water.....	5
6.6	Groundwater.....	6
6.7	Rehabilitation of the Site .....	6
6.7.1	Topsoil Handling.....	7
6.7.2	Cleared Vegetation .....	7
6.7.3	Weeds .....	7
6.7.4	Revegetation.....	8
6.7.5	Final Void.....	8
6.8	Flora, Fauna and Aquatic .....	9
6.8.1	Flora and Fauna.....	9
6.8.2	Aquatic .....	9

6.9	Transportation .....	10
6.10	Visual .....	11
6.11	Hazards.....	12
	6.11.1 Hazardous Goods Storage and Handling.....	12
	6.11.2 Chemical Usage.....	12
	6.11.3 Fire .....	12
	6.11.4 Earthquake.....	13
6.12	Spontaneous Combustion .....	13
6.13	Community Relations.....	14
6.14	Monitoring Programme .....	14
6.15	Greenhouse Gas Emission.....	14
6.16	Landfill .....	14

## SECTION 7

<b>7.0</b>	<b>ANALYSIS OF FEASIBLE ALTERNATIVES .....</b>	<b>1</b>
7.1	Mining Method.....	1
7.2	Mine Plan .....	2
7.3	Coal Transport.....	3
7.4	Mine Design and Infrastructure.....	3
7.5	Reject Disposal Methods.....	4
7.6	Coal Preparation .....	5
7.7	Consequences of Not Proceeding.....	5

## SECTION 8

<b>8.0</b>	<b>PROJECT JUSTIFICATION .....</b>	<b>1</b>
8.1	Methodology .....	1
8.2	Project Findings.....	2
	8.2.1 Biophysical Environment.....	2
	8.2.2 Human and Community Environment.....	4
8.3	Ecological Sustainable Development .....	5
	8.3.1 General .....	5
	8.3.2 The Precautionary Principle .....	5
	8.3.3 Social Equity including Intergenerational Equity .....	6
	8.3.4 Conservation of Biodiversity and Ecological Integrity .....	7
	8.3.5 Improved Valuation and Pricing of Resources.....	7
8.4	Project Benefits .....	8
	8.4.1 Economic Benefit.....	8
8.5	Project Justification .....	9

## SECTION 9

<b>9.0</b>	<b>REFERENCES .....</b>	<b>1</b>
------------	-------------------------	----------

## TABLES

TABLE 1.1	Property Description
TABLE 3.1	Jerrys Plains, Weather Station Climatic Data
TABLE 3.2	Liddell Power Station, Weather Station Climatic Data
TABLE 3.3	Health Based Air Quality Standards/Goals For Particulate matter Concentrations
TABLE 3.4	NSW EPA Amenity Based Criteria For Dust Fallout
TABLE 3.5	24-Hour Pm10 Concentrations In Central Camberwell
TABLE 3.6	Annual Average Dust Deposition at Camberwell
TABLE 3.7	Dust Deposition Data from Ashton Coal Project Monitoring Network
TABLE 3.8	Measured Ambient Noise Levels
TABLE 3.9	EPA Recommended Leq Noise Levels from Industrial Sources
TABLE 3.10	Combined Noise Levels from Existing and Approved Mines dB(A)Leq
TABLE 3.11	EPA Criteria for Operational Noise Levels
TABLE 3.12	Blasting Criteria to Limit Damage to Buildings
TABLE 3.13	Background Water Quality Data for Bowmans Creek (W1), Glennies Creek (W2), Hunter River (W3)
TABLE 3.14	Hunter River Flood Levels
TABLE 3.15	Predicted Peak Flood Levels Along Bowmans Creek
TABLE 3.16	Land Capability Classification
TABLE 3.17	Freshwater Fish Species Recorded from Glennies Creek and Locality
TABLE 3.18	Hunter Valley Exports – Port of Newcastle 1997 – 2000
TABLE 3.19	Hunter Primary Production 1995/96 to 1999
TABLE 4.1	Summary of In Situ Coal
TABLE 4.2	Summary of Underground Coal Resources
TABLE 4.3	Open Cut Coal Resources
TABLE 4.4	Summary of Recoverable Underground Reserves
TABLE 4.5	Summary of Recoverable Open Cut Reserves
TABLE 4.6	Open Cut Mine Equipment
TABLE 4.7	Estimated Car Parking Requirements
TABLE 4.8	Examples Of Vegetation Species to be used in Stream Rehabilitation Works
TABLE 5.1	Predicted Day/Evening Operational Noise Levels – Db(A),LeqCpp + Train Loading + Barrett Pit + Dumping On East Dump At Rl 1258
TABLE 5.2	Predicted Day/Evening Operational Noise Levels – Db(A),Leq Cpp + Train Loading + Barrett Pit + Dumping On West Dump At Rl 105
TABLE 5.3	Predicted Maximum Noise Levels – Db(A),Lmax Reverse Beepers On East And West Dump Environmental Bunds
TABLE 5.4	Predicted Construction Noise Levels – Db(A),L10 Initial Earthworks And Construction Of Environmental Bunds
TABLE 5.5	Predicted Blast Overpressure Levels
TABLE 5.6	Predicted Blast Vibration Levels
TABLE 5.7	Predicted Underground Inflows From Proposed Mining
TABLE 5.8	Predicted Seepage Rates From Aluvium During Proposed Mining Operations
TABLE 5.9	Changes In Seepage Across The Bedrock/ Alluvium Interface
TABLE 5.10	Significance Assessment Of Archaeological Sites

TABLE 5.11	Indicative Industry Employment Multiplier
TABLE 5.12	Indicative Industry Output Multiplier
TABLE 5.13	Consequence Analysis
TABLE 5.14	Combined Noise Levels From Existing And Approved Mines, Db(A)Leq

TABLE 6.1	Suggested Air Quality Management Protocol
-----------	---

## FIGURES

1.1	LOCATION PLAN
1.2	DEVELOPMENT APPLICATION AREA
1.3	ASHTON COAL PROJECT LAYOUT
3.1	ANNUAL AND SEASONAL WIND ROSES FOR CAMBERWELL MINE FOR YEAR 2000
3.2	ANNUAL AND SEASONAL WIND ROSES FOR GLENDELL WEATHER STATION FOR YEAR 1987
3.3	MONITORING LOCATIONS (AIR, NOISE, WATER)
3.4	EXTENT OF INUNDATION ACROSS SITE DURING 1955 FLOOD
3.5	PREDICTED FLOOD EXTENTS ALONG BOWMANS CREEK
3.6	BOWMANS CREEK AND HUNTER RIVER ALLUVIUM
3.7	GROUNDWATER BORES/PIEZOMETER LOCATIONS
3.8	SOIL SAMPLE SITES, LANDSCAPES AND EROSION
3.9	PRE-MINING LAND CAPABILITY
3.10	AGRICULTURAL SUITABILITY
3.11	VEGETATION COMMUNITIES, FLORA AND FAUNA SURVEY INVESTIGATION LOCATIONS
3.12	ARCHAEOLOGICAL SITES AND LANDFORM UNITS
3.13	LAND OWNERSHIP SURROUNDING DISTRICT
3.14	LAND OWNERSHIP CAMBERWELL VILLAGE
3.15	CAMBERWELL COLLECTOR DISTRICT
4.1	GEOLOGICAL CROSS SECTION THROUGH OPEN CUT RESERVE
4.2	GEOLOGICAL CROSS SECTION THROUGH UNDERGROUND RESERVE
4.3	COAL SEAM SUBCROPS AND BOREHOLE LOCATIONS
4.4	PROPOSED DEVELOPMENT STAGE 1 – 6 MONTHS
4.5	PROPOSED DEVELOPMENT STAGE 2 – 18 MONTHS
4.6	PROPOSED DEVELOPMENT STAGE 3 – YEAR 4
4.7	PROPOSED DEVELOPMENT STAGE 4 – YEAR 7
4.8	ROM CONVEYOR SYSTEM CROSS SECTION
4.9	CPP AND PRODUCT HANDLING SYSTEM DIAGRAM
4.10	CONCEPTUAL BATH HOUSE AND ADMINISTRATION OFFICE LAYOUT
4.11	CONCEPTUAL CARPARK LAYOUT
4.12	PROPOSED ALIGNMENT FOR BOWMANS CREEK DIVERSION
4.13	TYPICAL SECTION FOR PROPOSED CHANNEL DIVERSION
4.14	PREDICTED 100 YEAR FLOOD EXTENT WITH STREAM DIVERSION IN PLACE
4.15	TYPICAL DETAILS FOR PROPOSED BOWMANS CREEK DROP STRUCTURES
4.16	PROPOSED STREAM DIVERSION STABILISATION TREATMENTS
4.17	HAUL ROAD BENEATH BOWMANS CREEK BRIDGE
4.18	SURFACE WATER MANAGEMENT FOR OPEN CUT AND WESTERN EMPLACEMENT AREA

- 4.19 SURFACE WATER MANAGEMENT FOR EASTERN EMPLACEMENT AREA
- 4.20 WATER BALANCE FLOW SCHEMATIC
- 4.21 FINAL LANDFORM AND VEGETATION PATTERNS
- 5.1 PREDICTED POST SUBSIDENCE TOPOGRAPHY – PIKES GULLY SEAM
- 5.2 PREDICTED POST SUBSIDENCE TOPOGRAPHY – UPPER LIDDELL SEAM
- 5.3 PREDICTED POST SUBSIDENCE TOPOGRAPHY – UPPER LOWER LIDDELL SEAM
- 5.4 PREDICTED POST SUBSIDENCE TOPOGRAPHY – BARRETT SEAM
- 5.5 PREDICTED CUMULATIVE SUBSIDENCE CONTOURS
- 5.6 PREDICTED PM<sub>10</sub>
- 5.7 PREDICTED TSP
- 5.8 PREDICTED DUST DEPOSITION
- 5.9 PREDICTED OPERATIONAL NOISE LEVELS – CONSTRUCTION
- 5.10 PREDICTED OPERATIONAL NOISE LEVELS – DUMPING AT RL 110 ON EASTERN EMPLACEMENT
- 5.11 PREDICTED OPERATIONAL NOISE LEVELS – DUMPING AT RL 125 ON EASTERN EMPLACEMENT
- 5.12 PREDICTED OPERATIONAL NOISE LEVELS – DUMPING AT RL 90 ON WESTERN EMPLACEMENT
- 5.13 PREDICTED OPERATIONAL NOISE LEVELS – DUMPING AT RL 105 ON WESTERN EMPLACEMENT
- 5.14 FINAL LAND CAPABILITY
- 5.15 VISUAL SIGHT LINE FROM CAMBERWELL VILLAGE TO WESTERN EMPLACEMENT
- 5.16 VISUAL SIGHT LINE FROM McINERNEY ROAD TO WESTERN EMPLACEMENT
- 5.17 VISUAL SIGHT LINE FROM CAMBERWELL VILLAGE TO BARRETT PIT
- 5.18 HAZARDOUS INCIDENTS CONSEQUENCE CONTOURS