EIS 192

AA055927

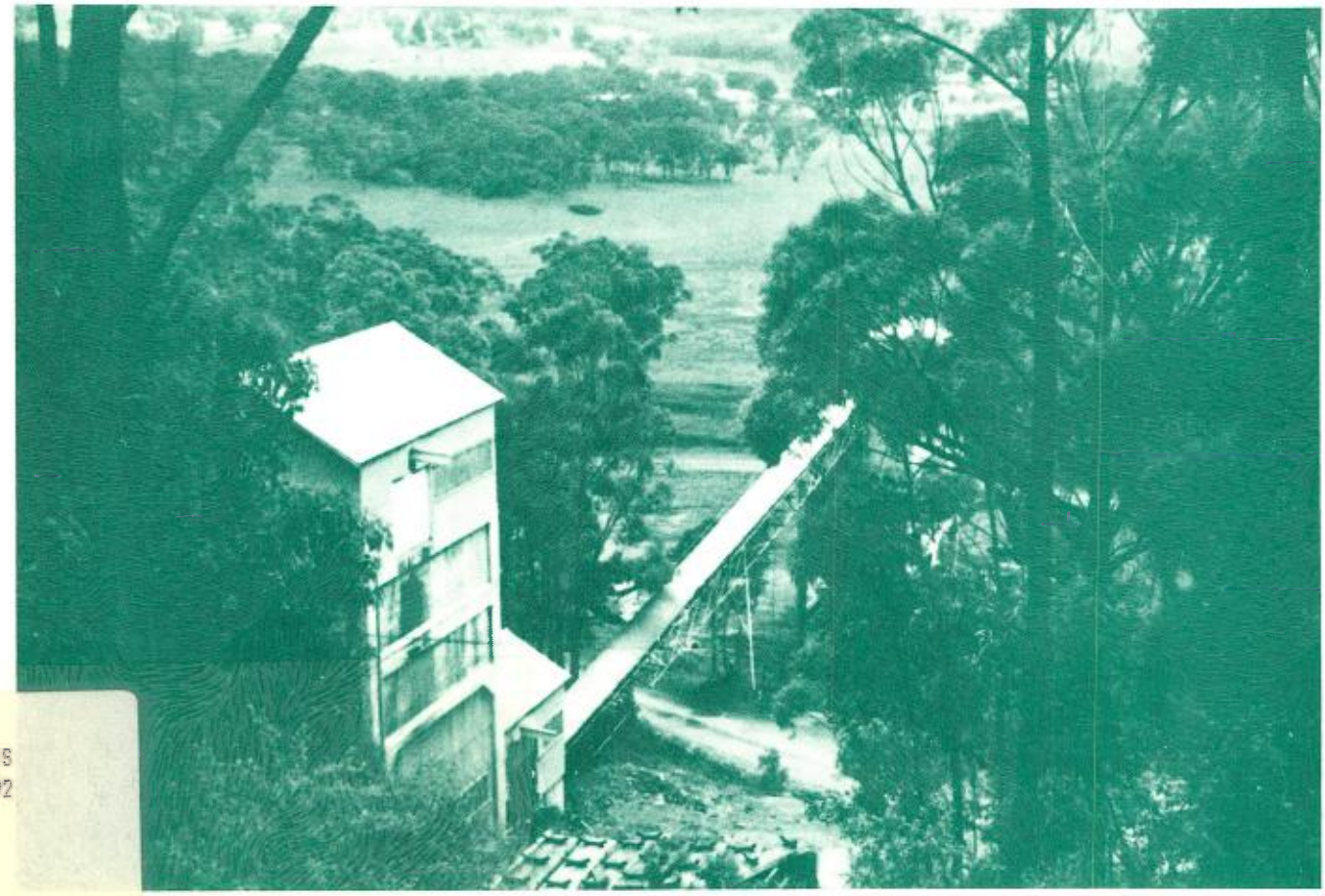
Charbon colliery development : environmental impact statement

BLUE CIRCLE SOUTHERN CEMENT LIMITED

BLUE CIRCLE SOUTHERN

CHARBON COLLIERY DEVELOPMENT

ENVIRONMENTAL IMPACT STATEMENT



Prepared by
BHP ENGINEERING
NORTH SYDNEY
JUNE 1982

BLUE CIRCLE SOUTHERN CEMENT LTD
CHARBON COLLIERY EXPANSION
ENVIRONMENTAL IMPACT STATEMENT

PREPARED BY

THE BROKEN HILL PROPRIETARY
COMPANY LIMITED
BHP ENGINEERING (ENVIRONMENT)
NORTH SYDNEY

JUNE, 1982

ATL:PMR

Doc. 1951a

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ACKNOWLEDGEMENTS

Contributions were made to this report by many individuals and organisations including those listed below. Their assistance is acknowledged and appreciated.

1. State Government

a) Departments

Environment and Planning
Main Roads
Premiers'
Public Works
Youth and Community Services

b) Authorities and Institutions

Australian Museum
Electricity Commission
Forestry Commission
National Parks and Wildlife Service

2. Local Government

Rylstone Shire Council and their consultant Jackson Teece Chesterman Willis and Partners Pty. Ltd.

3. Consultants

Archaeology	Ms. M. Dallas
Architectural Rendering	Ambler and Haycraft
Botany	Ms. B. Rice
Sociology	Natural Systems Research Pty. Ltd.
Zoology	Mr. A. Press

FORM 4

Environmental Planning and Assessment Act, 1979
(Section 77(3)(d)).

ENVIRONMENTAL IMPACT STATEMENT

This Statement has been prepared on behalf of Blue Circle Southern Cement Limited being the applicant making the development application referred to below.

The Statement accompanies the development application made in respect of the development described as follows:-

Expansion of the BCSC Charbon Colliery located near Kandos, N.S.W.

The development application relates to the land described as follows:-

Lot 2 - DP 609409 - Vol 14361 - Fol 62, Por 7 - Vol 7066 - Fol 23, Por 159 - Vol 3857 - Fol 82, Por 17 - Vol 1228 - Fol 179, Lot 3 - DP 593625 - Vol 13552 - Fol 90, ML 22 - Mining Purposes Lease 505 (Act 1906), ML 23 - Mining Purposes Lease 1237 (Act 1906), ML 28 - Mining Purposes Lease 694 (Act 1906), PML 37 - Mining Purposes Lease 889/965 (Act 1906), MPL 160 - Mining Purposes Lease 160 (Act 1973), Mining Purposes Lease Application 203 Orange and Private Agreements with L.T. Cooper (landowner) dated 22.1.82 and 4.2.82, all in the County of Roxburgh.

The contents of this statement, as required by Clause 34 of the Environmental Planning and Assessment Regulation, 1980, are set forth in the accompanying pages.

A. T. Lawson
Superintendent Environmental Engineering
BHP Engineering
169 - 185 Miller Street,
North Sydney, N.S.W., 2060.

Certificate

I, A. T. Lawson, of BHP Engineering hereby certify that the contents of this Statement have been prepared in accordance with Clauses 34 and 35 of the Environmental Planning and Assessment Regulation, 1980.

Superintendent Environmental Engineering,
BHP Engineering
8th July, 1982.

SECTION 1

INTRODUCTION

1. INTRODUCTION

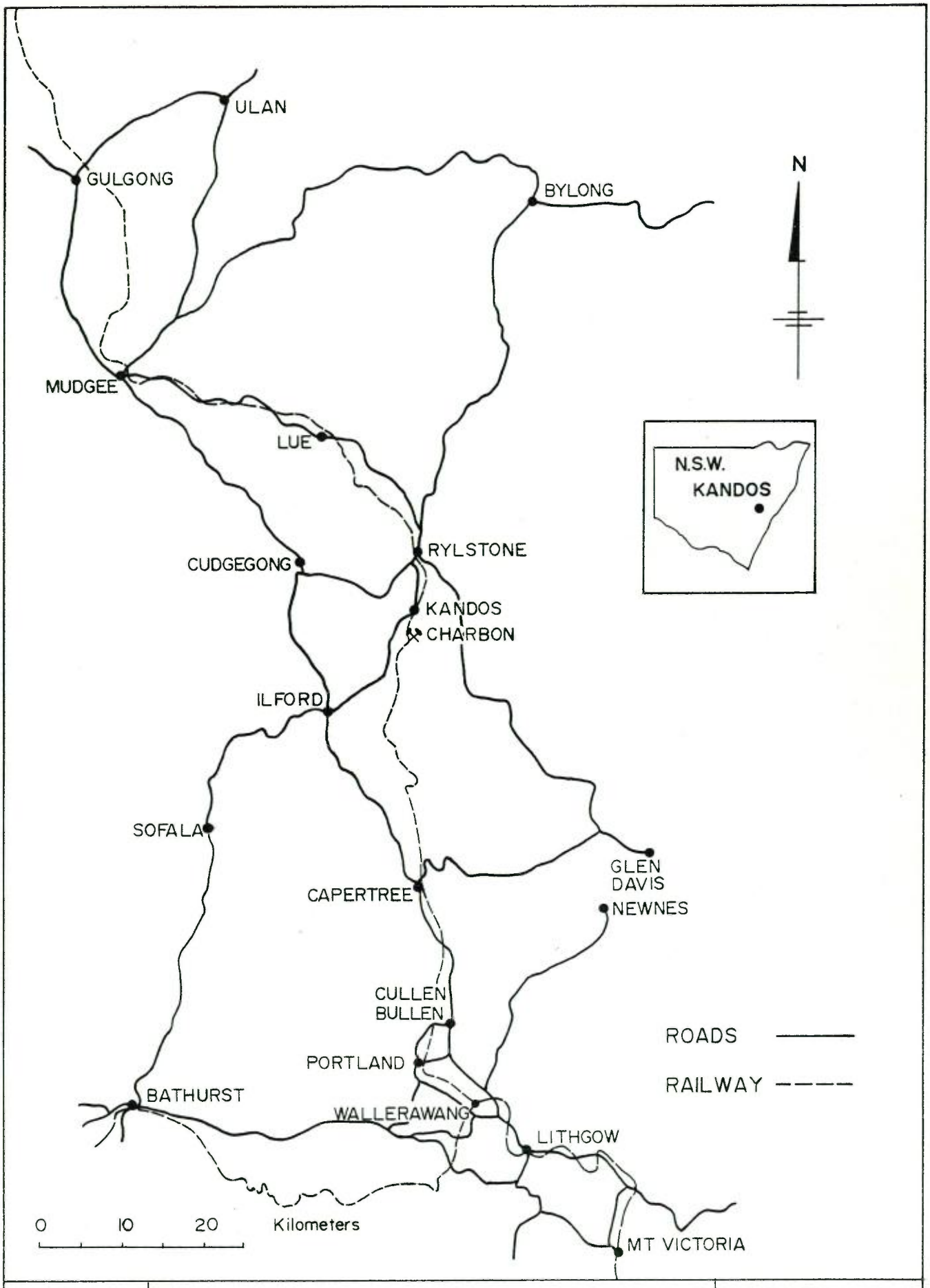
Blue Circle Southern Cement Limited (BCSC) owns and operates Charbon colliery. This colliery previously supplied coal to the former BCSC Charbon Cement Works located nearby. Following closure of the cement works in 1977 BCSC kept the colliery in production to meet the regional demand for steaming coal. Charbon colliery currently supplies coal by road to Wallerawang Power Station, located some 80 kilometres to the south.

Charbon colliery is situated south east of Charbon village and is approximately four kilometres south of Kandos, NSW. The regional location of Charbon is shown in Figure 1.1. The existing colliery pit top and surface coal handling facilities are located adjacent to Church Mountain, which comprises part of the Kandos State Forest.

At present Charbon colliery produces coal at a rate of 286,000 tonnes per annum (t.p.a.) using one continuous mining machine over two shifts per day.

BCSC proposes to increase the colliery's production rate, construct new pit top facilities and modify the existing coal stockpile area. The objectives of the proposed development are to provide new amenities, a new man access closer to the coal working face and expand the colliery operation in two discrete stages.

In Stage I the coal production rate will be increased over 18 months to about 750,000 t.p.a. This will be achieved by introducing of a third shift (63 new personnel) and commissioning a second continuous mining machine. New pit top facilities will be constructed about one kilometre south east of the existing pit top. The existing coal stockpile area will be modified by revising conveyor layouts and constructing a new crusher and screening plant.



CHARBON E.I.S.

LOCATION

FIGURE 1·1

Stage II will involve the construction of a rail loop and additional surface coal handling facilities. This will allow coal to be transported from the colliery by train. No increase in the coal production rate or number of employees is planned for Stage II.

Socio-economic benefits of the proposed development include increased employment opportunities within Rylstone Shire; increased Local, State and Federal revenue derived from personal income tax and company taxes, royalties and other charges, hence increased public sector capacity to provide services, and increased spending power within the local community.

This E.I.S. has been prepared for Stages I and II of the proposed development. Separate Development Applications for Stages I and II will be accompanied by this E.I.S.

It should be noted that as this E.I.S. has been prepared concurrently with the project design, some changes to the specific designs described in this E.I.S. may occur. These changes will not diminish the effectiveness of any of the proposed environmental controls in the current design.

This E.I.S shall be submitted for comment from the Public, Rylstone Shire Council, Department of Environment and Planning, State Pollution Control Commission and other Government Authorities as a statement of predicted environmental impacts of the proposed Stage I and II development.

Blue Circle Southern Cement has contracted the Broken Hill Proprietary Company Limited, BHP Engineering (Environment), to prepare this E.I.S. Natural Systems Research Pty. Ltd. were retained to analyse the socio-economic impact of the proposed development. Dr. Barbara Rice was retained to carry out a vegetation reconnaissance survey in the area of proposed development. Ms. Mary Dallas was retained to carry out an archaeological survey of the area and Mr Tony Press was retained to prepare a species list of mammals and birds known or thought to occur in the vicinity of Charbon.

Blue Circle Southern Cement believes that Charbon Colliery can be developed with a minimum of disturbance to the environment and seeks approval from the Authorities to proceed with Stages I and II of the proposed development.

SECTION 2

SUMMARY

2. SUMMARY

Blue Circle Southern Cement Pty. Ltd. proposes to develop its existing Charbon Colliery in two stages. This will allow coal production to increase from the current rate of 286,000 tonnes per annum (t.p.a.) to approximately 750,000 t.p.a. in Stage I. The Stage II development is associated with surface facility installations and will not alter the coal production rate.

Charbon colliery is located approximately four kilometres south of Kandos, N.S.W. and at present supplies part of Wallerawang Power Station's coal requirements.

Figure 2.1 shows a schematic flow diagram of the proposed Stage I and II development.

Table 2.1 summarises the proposed underground mine development schedules, while Tables 2.2 and 2.3 summarise proposed surface coal handling facility developments for Stages I and II respectively. Numbered items in these tables may be identified in Figure 2.1. Table 2.4 lists facilities proposed for the Number 2 pit entry, to be developed during Stage I.

Stage I will allow run of mine coal to be passed through the existing 100 tonne surge bin and conveyed to a run of mine coal stockpile. From here coal will be reclaimed and transported by conveyor to a new crusher and screening plant, and after crushing, to the existing truck loading bin. Crushed coal will be trucked to the customer as is the current practice.

The coal production rate will also be uprated in Stage I. Initially this will be done by increasing the utilisation of the existing underground mining machine and later by commissioning a second continuous mining machine. Commissioning the second mining machine will allow the colliery to employ 63 additional personnel. When Stage I is fully implemented the coal production rate will be approximately 750,000 t.p.a.

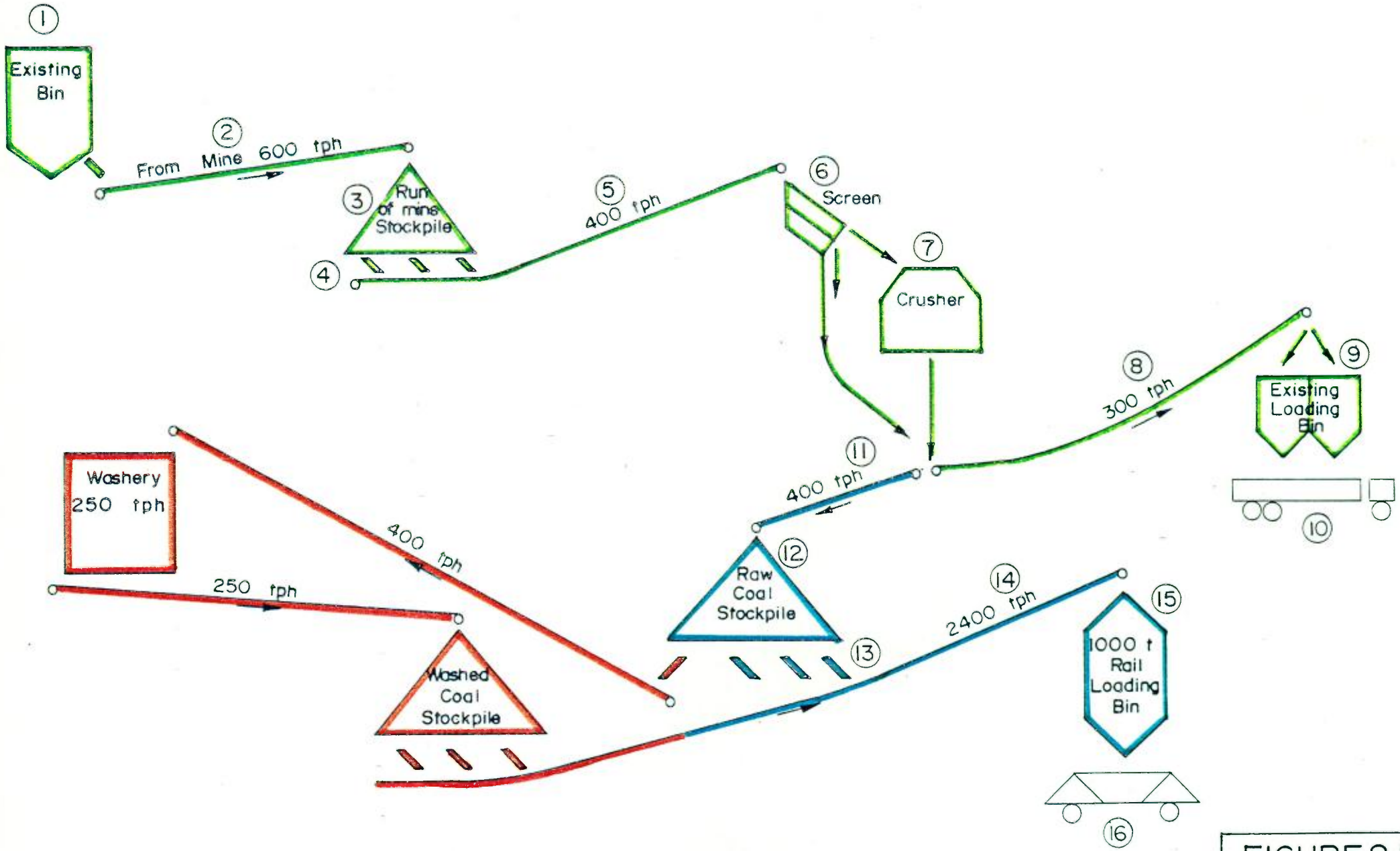


FIGURE 2·1

G 893	BLUE CIRCLE SOUTHERN
MARCH 1982	

Table 2.1 PROPOSED UNDERGROUND MINING OPERATIONS

STAGE	YEAR OF FULL OPERATION	MACHINES	MACHINE UTILISATION	EMPLOYEES	COAL PRODUCTION RATE
EXISTING	1982	1 x CONTINUOUS MINER	2 SHIFTS/DAY	65	286,000 t.p.a.
PROPOSED STAGE I	1984	2 x CONTINUOUS MINER	3 SHIFTS EACH/DAY	128	750,000 t.p.a.
PROPOSED STAGE II	POST 1985	2 x CONTINUOUS MINER	3 SHIFTS EACH/DAY	128	750,000 t.p.a.

Table 2.2 PROPOSED STAGE I SURFACE COAL HANDLING FACILITIES

EQUIPMENT	CAPACITY	DIMENSIONS	ANTICIPATED MAXIMUM CONTINUOUS SOUND LEVEL *** dB(A) AT 15 METRES
1. EXISTING R.O.M.* COAL SURGE BIN	100 TONNES	8 m x 8 m x 15 m	70
2. R.O.M. COAL CONVEYOR	600 t.p.h.**	200 m LONG	68
3. R.O.M. COAL STOCKPILE	15,000 TONNE CONICAL, 30,000 TONNE EXTENDED	64 m x 24 m CONICAL 64 m x 120 m x 24 m EXTENDED	65
4. THREE VIBRATORY COAL RECLAIM FEEDERS	RECLAIM RATE 400 t.p.h.	(BELOW GROUND)	71
5. R.O.M. COAL RECLAIM CONVEYOR	400 t.p.h.	95 m LONG	68
6. VIBRATORY SCREEN 7. CRUSHER	400 t.p.h. (OVERSIZE FED TO CRUSHER) 300 t.p.h. (25-30 mm PRODUCT)	8 m x 8 m x 15 m	75
8. RAW COAL CONVEYOR	300 t.p.h.	160 m LONG	68
9. EXISTING TRUCK LOADING BIN (2)	100 TONNES EACH	8 m x 16 m (TOTAL WIDTH) x 22 m (TOTAL HEIGHT)	70
10. COAL TRUCK FLEET (CONTRACTOR)	24 TONNE LOAD	(MOBILE)	80

*R.O.M.= RUN OF MINE **t.p.h. = TONNES PER HOUR *** BASED ON SIMILAR FACILITIES AT OTHER COLLIERIES

Table 2.3 PROPOSED STAGE II SURFACE COAL HANDLING FACILITIES

EQUIPMENT	CAPACITY	DIMENSIONS	ANTICIPATED MAXIMUM CONTINUOUS SOUND LEVEL *** dB(A) AT 15 METRES
11. RAW* COAL CONVEYOR	400 t.p.h.**	100 m LONG	68
12. RAW COAL STOCKPILE	30,000 TONNES CONICAL 60,000 TONNES EXTENDED	90 m x 24 m CONICAL 90 m x 140 m x 24 m EXTENDED	65
13. RAW COAL RECLAIM FEEDERS	800 t.p.h. EACH	(BELOW GROUND)	71
14. RAW COAL RECLAIM CONVEYOR	2,400 t.p.h.	135 m LONG	68
15. TRAIN LOADING BIN	1,000 TONNES	28 m ABOVE GROUND SURFACE	70
16. RAIL WAGONS (31CHS OR 41 CTS)	2,400 TONNE LOAD (TOTAL)	(MOBILE)	70 (IN CUTTING)

*RAW = SCREENED AND CRUSHED **t.p.h. = TONNES PER HOUR ***BASED ON SIMILAR FACILITIES AT OTHER COLLIERIES

Table 2.4 PROPOSED NUMBER 2 PIT TOP FACILITIES (STAGE I)

BUILDINGS		DESIGNATED AREAS	FACILITIES
OFFICES		ACCESS ROAD 8 m WIDE	MINE WATER HEAD TANK
MAIN OFFICE	6 m x 15 m		
PAY OFFICE	3 m x 6 m	ELECTRICITY SUB-STATION 800 m^2	MINE GAS EXTRACTION FAN
MANAGERS OFFICE	6 m x 6 m		
DEPUTY MANAGERS OFFICE	3 m x 6 m	CABLE COMPOUND 1000 m^2	STORM WATER CATCH DAM
CONFERENCE ROOM	3 m x 6 m		
		MACHINERY STANDAGE 1500 m^2	PACKAGE SEWAGE TREATMENT PLANT
STAFF BATH ROOM	6 m x 9 m	MATERIAL STOCKYARD 5000 m^2	EXTERNAL LIGHTING
PLANNED MAINTENANCE ROOM	3 m x 9 m		
OFFICE STORE	6 m x 3 m	CAR PARK (120 CARS) 4500 m^2	
BATH HOUSE	12 m x 24 m		
"DIRTY" TOILETS	3 m x 12 m	LANDSCAPING 4000 m^2	
CONTROL ROOM	3 m x 12 m		
FIRST AID ROOM	3 m x 12 m		
ADDITIONAL STORE	3 m x 6 m		
ADDITIONAL OFFICE	3 m x 6 m		
UNDERMANAGER AND DEPUTY'S OFFICE	3 m x 12 m		
DEPLOYMENT ROOM	3 m x 9 m		
LAMP ROOM STORE	3 m x 3 m		
LAMP ROOMS (2)	3 m x 12 m		
ENGINEERING WORKSHOP	50 m x 25 m		

In association with Stage I coal handling facility development, a new pit top facility will be constructed approximately one kilometre south of the existing facilities. Stage II of the proposed development will not increase the coal production rate above 750,000 t.p.a. A rail loop, which will be operated by the State Rail Authority (SRA),and a colliery train loading facility will be installed in Stage II. This will allow coal to be delivered by rail to customers with suitable rail receival facilities, as well as by road to customers with truck receival facilities.

Crushed coal will be stockpiled and later reclaimed, conveyed to the train or truck loading bins and finally transported to the customer by rail or road as appropriate.

Possible future development may include a coal washery, clean coal handling facilities and increasing coal recovery rates.

This E.I.S sets out a detailed description of the existing environment, proposed Stage I and II development and predicted environmental impacts of the proposed development. A separate Development Application will be made for the Stage I and II proposals based on this E.I.S.

It is concluded that the proposed Stage I and II developments can be implemented with a minimal environmental impact, based on the data provided in this E.I.S.

SECTION 3

DESCRIPTION OF THE EXISTING ENVIRONMENT

3. DESCRIPTION OF THE EXISTING ENVIRONMENT

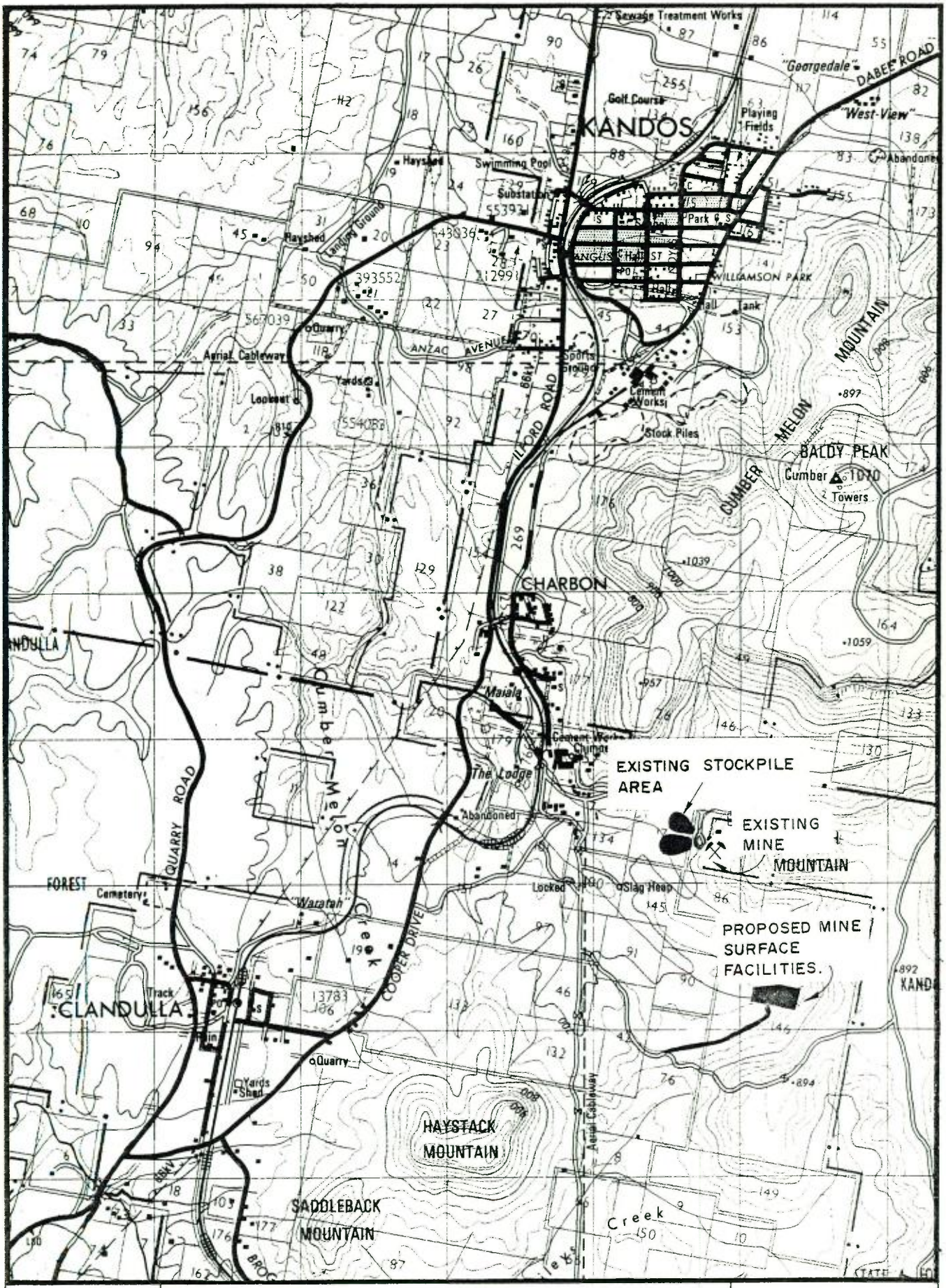
3.1 Location

Charbon colliery is located approximately four kilometres south of Kandos, N.S.W, as shown in Figure 3.1. The twin villages of Kandos and Rylstone are located some 230 km north west of Sydney and are situated on the western boundary of the Great Dividing Range. Kandos and Rylstone are approximately six kilometres apart. Mudgee is approximately 53 km north west of Kandos and Lithgow is about 90 km by road to the south.

3.2 Topography and Site Description

The colliery is situated on the western boundary of Kandos State Forest. Church Mountain, which is within the Forest, rises steeply behind the colliery. This mountain probably derived its name from the appearance of an isolated sandstone outcrop at the summit which has weathered to form an irregular block structure.

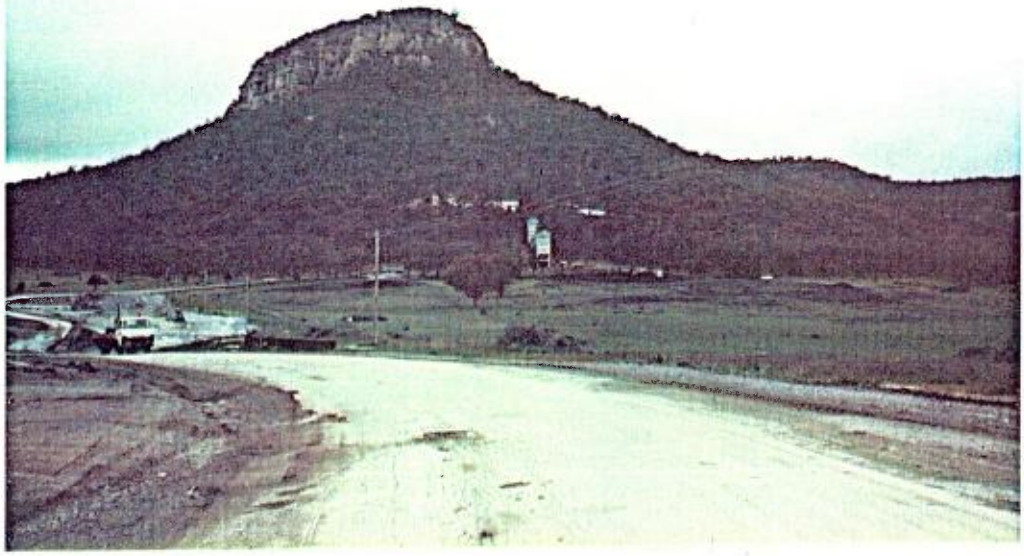
Generally, land in the locality of the colliery has been cleared of natural vegetation and is used for stock grazing. Charbon colliery owns some of this cleared land which is used in part for raw coal stockpiles. This area is shown in Photograph 1 which follows Figure 3.1. Cleared areas extend into valleys of the Great Dividing Range north east and south east of the colliery. The valley extending south east from the colliery is bisected by a central hillock which still retains much of its natural vegetation. The north easterly valley is bounded to the north by a continuation of the Divide mountain system which is known as Cumber Melon Mountain.



LOCATION OF EXISTING AND PROPOSED MINE SURFACE FACILITIES

CHARBON E.I.S.

FIGURE 3·1



PHOTOGRAPH 1 Existing Charbon Colliery surface coal handling facilities.

PHOTOGRAPH 2 Mine ventilation return adit location. This site is proposed to be developed as the Number 2 pit entry

The proposed development will take place at the head of the cleared split valley extending south east from the colliery and in the vicinity of existing raw coal stockpiles located west of the colliery. Figure 3.1 and Photograph 2 show the proposed Number 2 pit entry location. The photograph was taken prior to starting the approved box-cut works described in Section 4.6. Topographic features described above are shown in Figure 3.2.

3.3 Landuse and Zoning

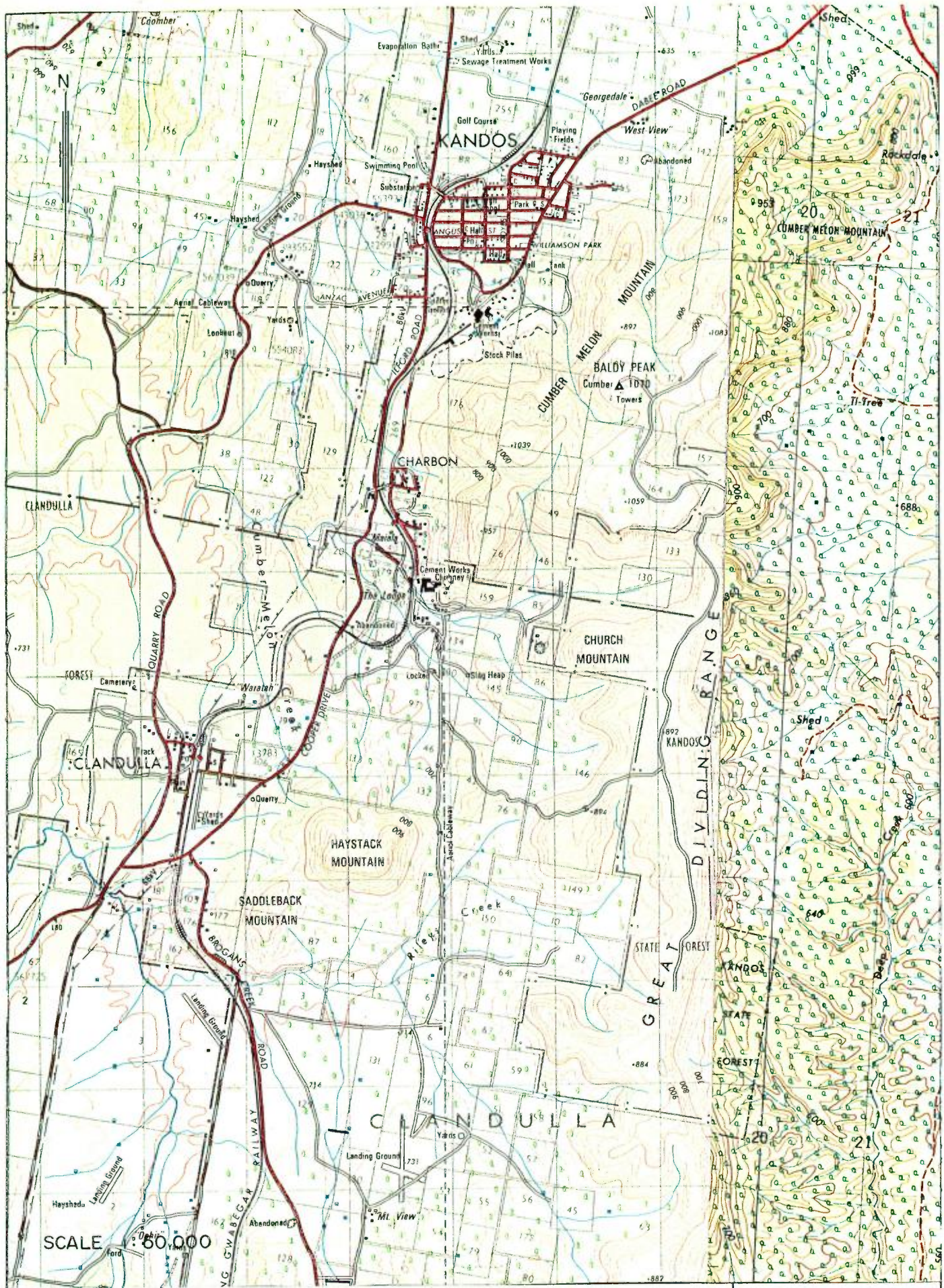
Charbon colliery is located immediately west of the Kandos State Forest. This Forest covers an area of approximately eight square kilometres. Coal from the Lithgow seam, which occurs below the Forest, is mined by the colliery. Generally, land outside the Forest in the vicinity of the colliery has been cleared and is used for stock grazing.

Clandulla State Forest is located to the west of the Wallerawang-Gwabegar railway line. This Forest covers an area of about 12 square kilometres.

Figure 3.3 shows the land use patterns of the area surrounding the colliery.

The old BCSC Charbon Cement Works which was operated until 1977 is located approximately 1.5 km north west of the colliery pit top area. The present owner is dismantling this plant to recover saleable spare parts. A disused aerial cableway passes southward from the old BCSC Charbon Cement Works to a limestone quarry about 15 km away.

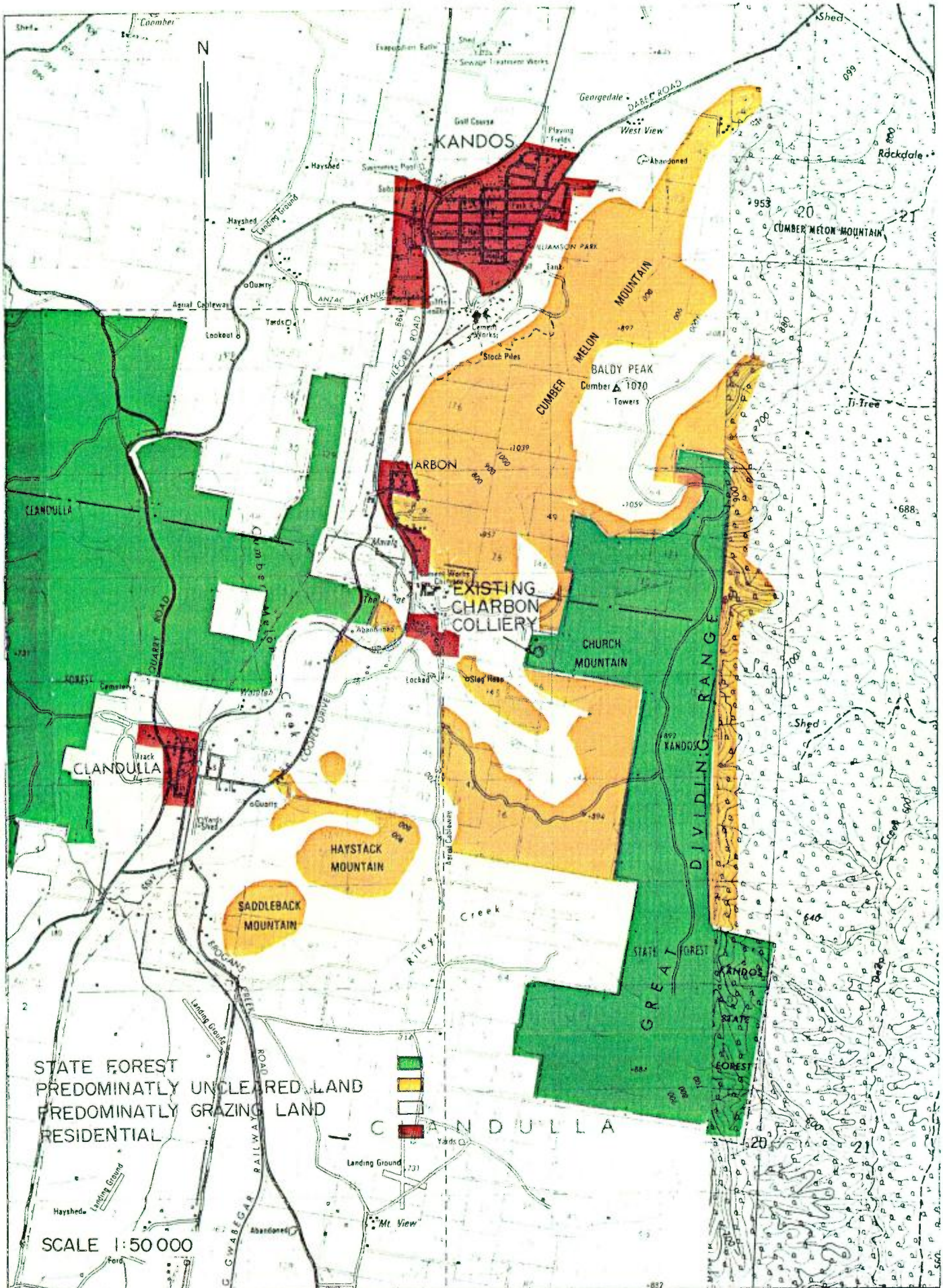
Fourteen houses are located in a small settlement about one kilometre west of the existing colliery. Thirteen of these houses are owned by the colliery. Charbon village is located approximately two kilometres north west of the colliery. Figure 3.4 shows the part of Charbon village which is currently zoned Urban Residential (Village Zoning).



CHARBON E.I.S.

TOPOGRAPHY

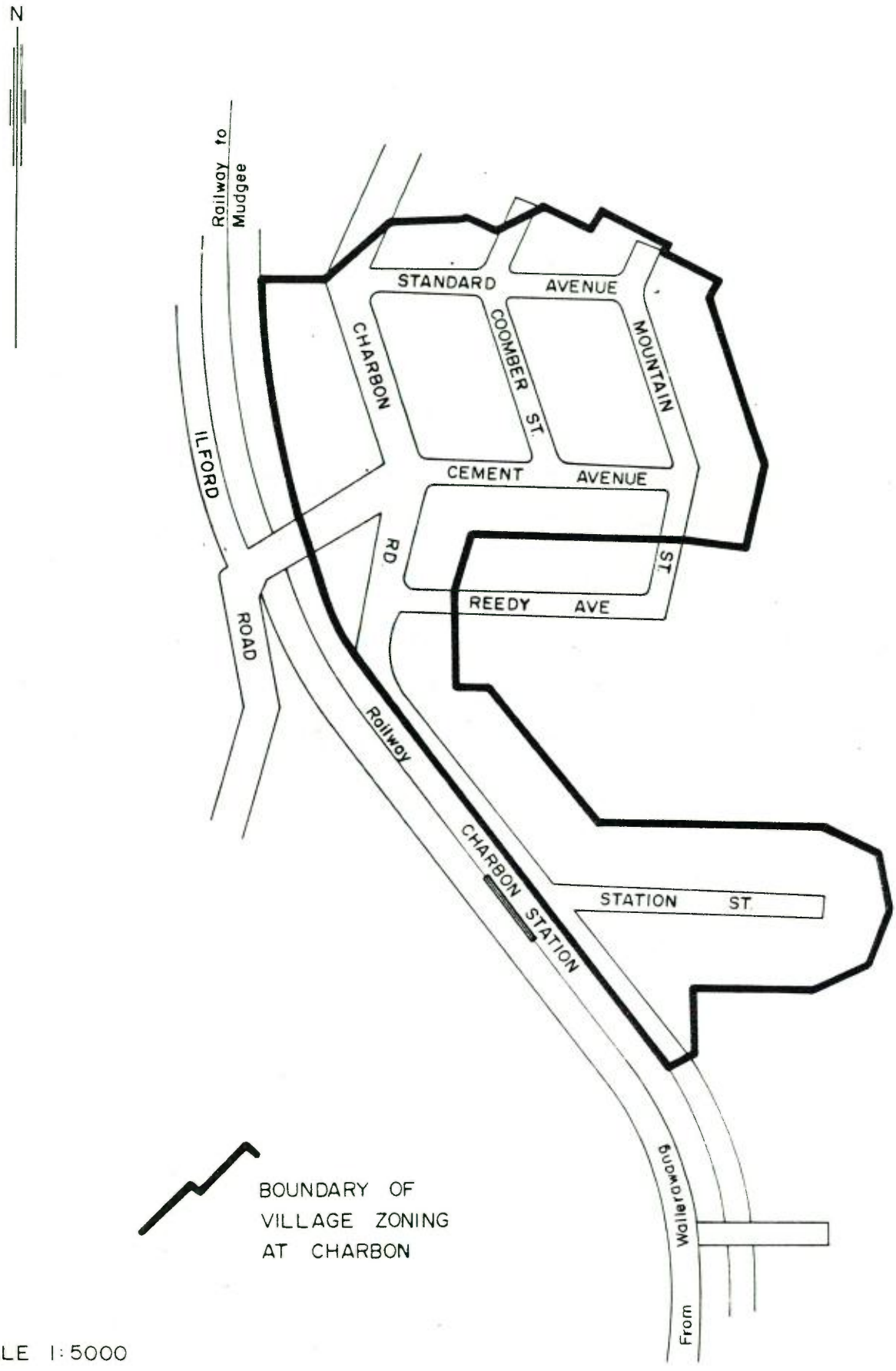
FIGURE 3·2



CHARBON E.I.S.

LANDUSE

FIGURE 3.3



SCALE 1:5000

	BOUNDARY OF VILLAGE ZONING AT CHARBON, N.S.W.	CHARBON E.I.S. FIGURE 3·4

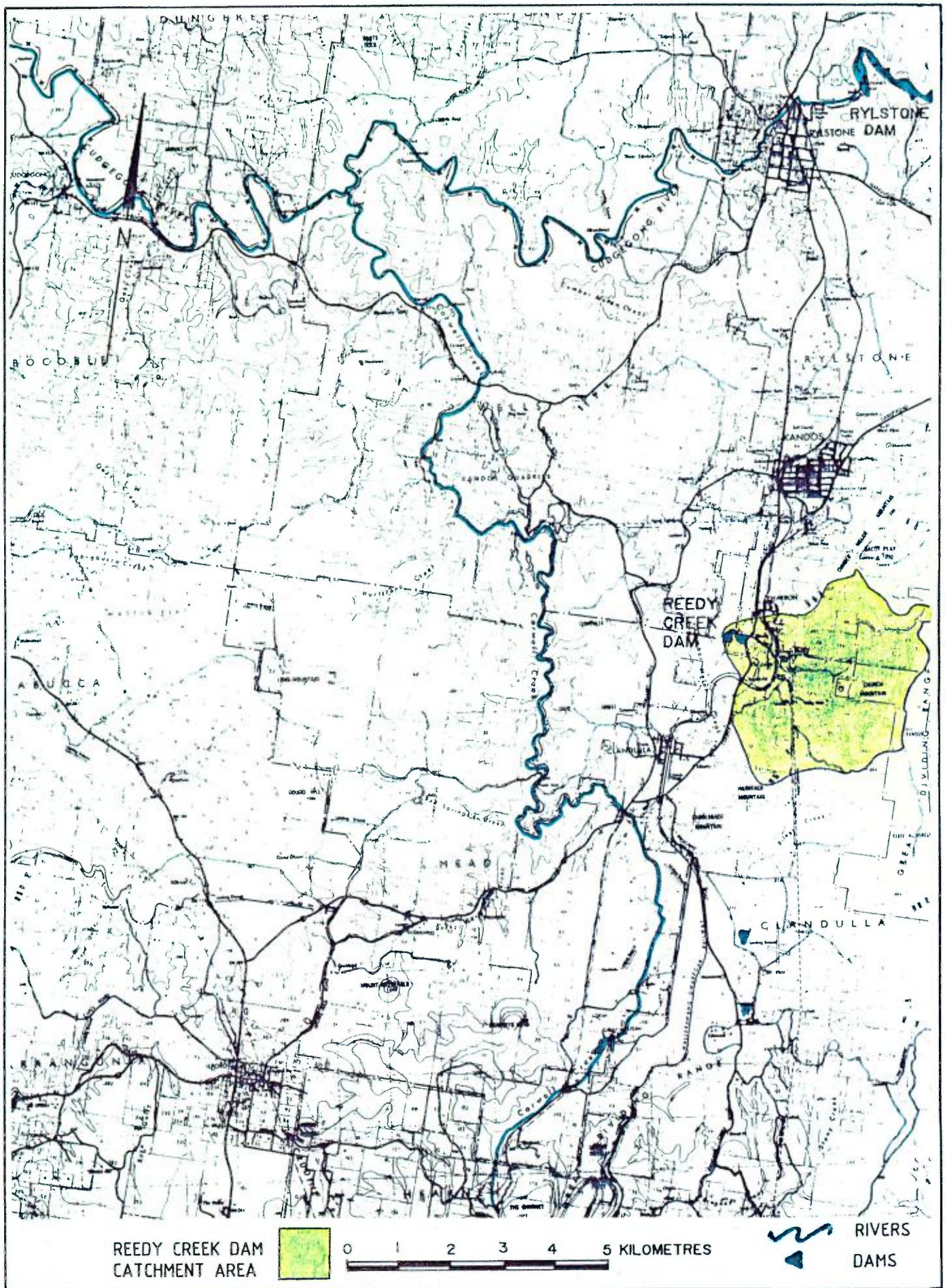
BCSC has recently transferred 139 ha of it's property holdings at Charbon to Rylstone Shire Council, permitting extensions to Charbon village. The number of houses that can be constructed on this land is limited as a proportion of the land is unsuitable for residential development. The usable portion of this land, existing residential land at Charbon outside the current village zone and land which comprises the settlement west of the colliery will need to be rezoned Urban Residential so that additional houses can be constructed.

The Wallerawang-Gwabegar railway line is located approximately 1 km west of the existing pit top, at the railway's closest point, and is adjacent to the settlement of 14 houses. A passenger service operates between Lithgow and Mudgee. Other train movements are associated with movement of freight, including coal and cement.

Rylstone township is located 11 km north of the colliery, and Kandos village is 4 km north of the colliery. The village of Clandulla is located approximately 4 km south west of the colliery.

A N.S.W. Electricity Commission 66 kV power transmission line passes through Clandulla, Charbon, Kandos and Bylong.

Reedy Creek Dam is located approximately two kilometres west of the existing pit top area, and has a capacity of 270 megalitres when full. Several years ago the dam was used in connection with the former cement works' operation. The dam is covered by a mining purposes lease which permits Charbon colliery to pump water as required. Reedy Creek Dam catchment area and locations of other major water storage areas in the region are shown in Figure 3.5. Water from Reedy Creek Dam rarely flows into Cumber Melon Creek and the dam has not been observed to overflow by the current Charbon colliery manager. This is most probably due to the limited catchment area of the dam and the occurrence of porous ground in the catchment. The water in Reedy Creek Dam is known to be "hard". This hardness is caused by calcium salts which have become dissolved in the water.



CHARBON E. I. S.

REGIONAL WATER BODIES

FIGURE 3.5

Except for land within 400 m of Cooper Drive and Brogans Creek Road which is zoned Non-Urban 1B, the majority of land west of the colliery is zoned Non-Urban 1A.

3.4 Climate

The Charbon area experiences warm to hot days and cool nights during the summer months. Frosty mornings followed by sunny days are typical of the cool winters.

Meteorological data is not collected at Charbon, however rainfall data is recorded by Australian Portland Cement at Kandos, some four kilometres north of the colliery. The closest centre recording temperature, relative humidity and wind data is Mudgee, approximately 50 km to the north west and 300 m lower in altitude than Kandos. Meteorological data for Kandos and Mudgee are shown in Appendix 1 of this E.I.S.

a) Rainfall

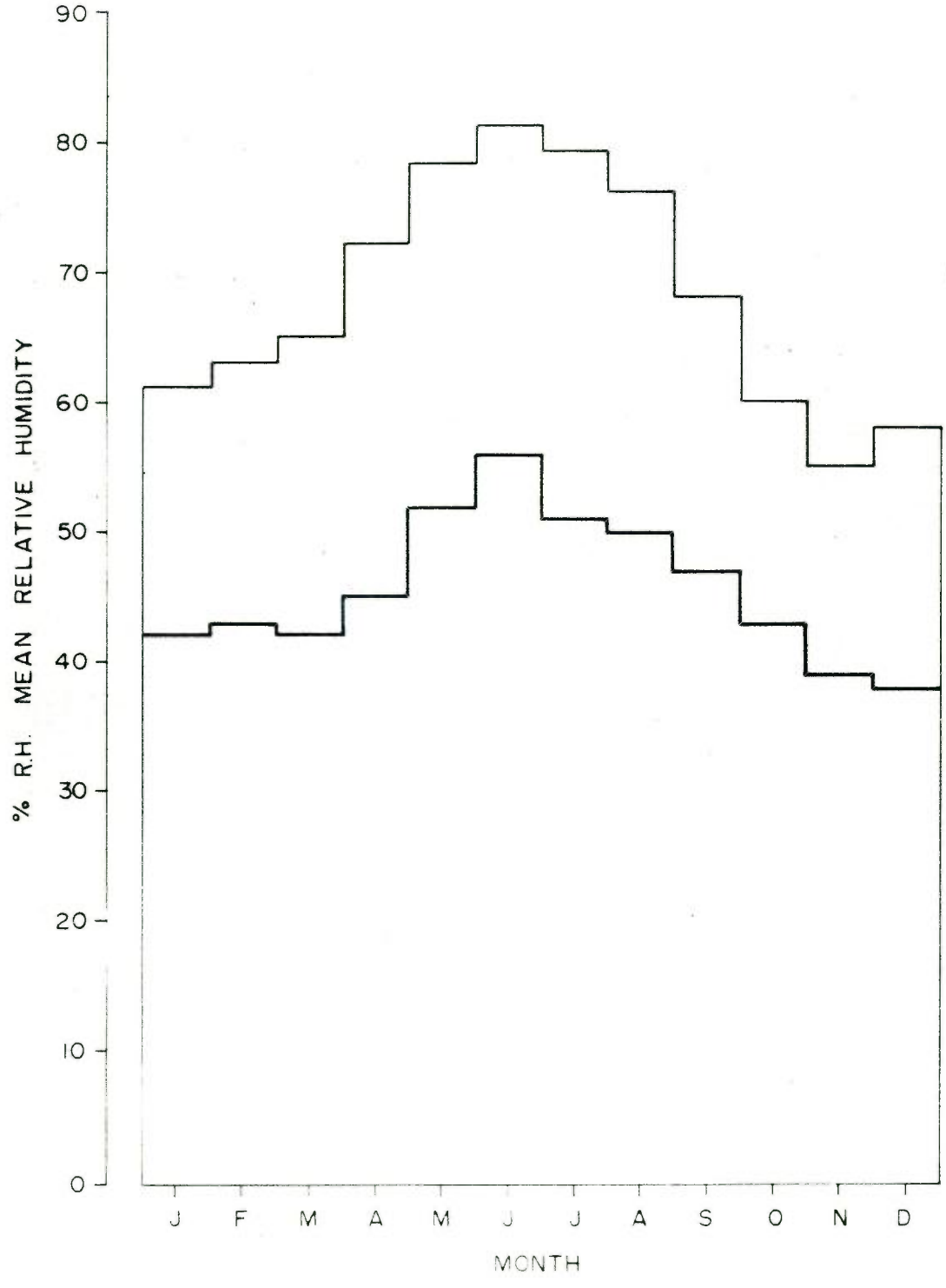
The mean annual rainfall for Kandos is 724 mm, with higher rainfalls occuring in the summer than in winter. Between 1951 and 1978 the wettest year was 1973 which had 1124 mm of rain. The driest year was 1957, which had 370 mm of rain. Figure 3.6 shows the mean monthly rainfall distribution.

b) Temperature

The mean annual daily maximum temperature for Mudgee is 22.6°C and the mean annual daily minimum is 8.4°C. Figure 3.7 shows the mean daily temperature maxima and minima for each month.

c) Relative Humidity

The mean annual 9 am relative humidity for Mudgee is 68% and for 3 pm is 46%. Figure 3.8 shows the mean relative humidities for 9 am and 3 pm for each month.



ANNUAL HUMIDITY VARIATION
AT 0900 AND 1500 HOURS L.S.T.
AT MUDGEE, N.S.W.

CHARBON E.I.S.

FIGURE 3·8

d) Wind

Surface winds at Mudgee are predominantly south-easterly at 9 am throughout the year. At 3 pm north westerly winds occur most frequently throughout the year, however this is only a marginal trend. It is unlikely that the wind pattern at Charbon would closely parallel that observed at Mudgee due to the proximity of the Great Dividing Range to Charbon. The Range would tend to modify winds from the eastern sector at Charbon, while having a lesser effect at Mudgee.

3.5 Noise

The background noise level at the housing settlement located about one kilometre west of the colliery has been calculated using Australian Standard AS1055 - 1978: "Noise Assessment in Residential Areas". The settlement contains 14 houses, 13 of which are owned by the colliery, and is the closest group of houses to the colliery pit top.

Considering the traffic intensity and duration on the adjacent colliery haul road and proximity of the Wallerawang-Gwabegar railway line, the Noise Area Category most appropriate to the settlement is R2. The basis for selecting this category is the description provided in Table 1 of AS 1055. The calculated background level $L_{bg.calc}$ for the settlement is shown in Table 3.1 below. This table is based on Table 1 of AS 1055.

Table 3.1

CALCULATED BACKGROUND SOUND LEVEL AT THE SETTLEMENT WEST OF CHARBON COLLIERY

Noise Area Category	Description of Neighbourhood	Calculated background sound level $L_{bg.calc}$ dB(A)						
		Monday - Friday				Weekends and Public Holidays		
		0600 to 0700	0700 to 1800	1800 to 2200	2200 to 0600	0700 to 1800	1800 to 2200	2200 to 0700
R2	Areas with low density transportation	40	50	40	35	45	40	35

The low woodland and low open-woodland is dominated by Eucalyptus meliodora (Yellow box). Scattered individuals of other Eucalyptus species also occur. Some scattered individuals of the related Angophora genus are also present. Acacia species occur as scattered individuals or occasionally as denser thickets. The woodland understorey is similar floristically to that of the grassland, however the understorey species cover is lower in the woodland than in the grassland.

None of the plants collected or recorded by the consultant during the vegetation reconnaissance survey are considered rare or threatened by Leigh et al (1981). The consultant is, however, unable to conclude absolutely that no rare or threatened plant species occur in the areas of proposed development. This is because ephemeral species, bulbs or winter/spring flowering annuals could not be checked as they would not have been visible, if present, during the summer reconnaissance.

3.7 Fauna

A species list of vertebrate fauna known or thought to occur in the vicinity of Charbon has been prepared. The list is presented in Appendix 3 of this E.I.S.

The vertebrate fauna species list was prepared by collating and reviewing existing data. Mr Tony Press was retained to prepare a list of mammals and birds known or thought to occur in the vicinity of Charbon, based on this data. No fauna field studies were undertaken for this E.I.S. because of the relatively small size of proposed development and restriction of development to previously disturbed grazing land.

Data on mammals was obtained by Mr Press from two reports prepared by The Australian Museum for the Electricity Commission of N.S.W. Additional information was obtained from records of Mr Press' personal observations and The Australian Museum Department of Mammalogy records of skins, skulls and spirit specimens. Data on birds was compiled for Mr Press by the Royal Ornithologists Union.

A list of reptiles and amphibians known or thought to occur in the vicinity of Charbon was copied, with permission, from The Australian Museum Department of Herpetology computer data reports number 141 and 142.

It cannot be assumed that all vertebrate fauna listed in Appendix 3 do occur in the vicinity of Charbon, or that these species are the only vertebrate fauna occuring in the vicinity of Charbon. This qualification is necessary as no quoted data relates specifically to observations at Charbon.

3.8 Archaeology

An archaeological survey of the area of proposed development was carried out by Ms. Mary Dallas. Her report is presented in Appendix 4 of this E.I.S. A summary of the archaeological report prepared by Ms. Dallas is presented below:-

"No previous comprehensive field survey has been conducted in the survey area, although it is part of a region investigated by Dr M. Pearson. His work on European and Aboriginal settlement patterns and land use on the Rylstone Plateau and the Cudgegong River Valley provides a predictive model of Aboriginal site location, and a broader regional context for the archaeology of the area. The results of other archaeological surveys in the region were also used in the assessment of the relics located during this survey.

The survey area is of particular interest as it takes in the western fringes of the eastern Australian uplands and the western slopes and plains which are two separate environmental zones occupied by Aborigines in the past. However, the survey area is limited in size and the extent to which both these zones are represented. The results of the survey therefore represents a selective record of Aboriginal occupation in the general area.

The area contains the upper reaches of tributaries of the Cudgegong River, where although water resources are seasonal, stone resources suitable for stone tool manufacture are plentiful. The agricultural, timber felling and mining activities of the European settlers has however greatly altered the landscape and land use. The likelihood of locating sites in the survey area was considered small given such changes. It was both surprising and rewarding that an open site and two isolated relics were located. These are all in disturbed contexts and the remains of the open site are meagre. Nevertheless, they indicate Aboriginal presence in the area and use of local stone resources most likely on a seasonal basis. The results tend to confirm an Aboriginal site location pattern along and above

water courses where shelter from wind, and flood is afforded. However, more extensive surveys within the region are required to establish the extent and distribution of Aboriginal remains and the pattern of occupation."

3.9 Housing and Services

Rylstone Shire Council administers the villages of Rylstone, Kandos, Charbon and Clandulla. The Council reticulates water to houses in these settlements from Rylstone Dam. Sewage from houses in Charbon and Clandulla is disposed of in individual septic tanks. Sewage from houses in Rylstone and Kandos is piped to a sewage treatment plant in each village. Power is supplied to houses by the Prospect County Council.

Blue Circle Southern Cement owns houses in the village of Charbon and 13 of the 14 houses in a small settlement to the west of Charbon Colliery. Nine of these latter houses are currently occupied by supervisory staff employed at Charbon Colliery. BCSC also owns approximately 60 unserviced residential blocks at Charbon, some of which are located outside the existing designated village zone.

The total number of dwellings in Rylstone Shire was approximately 1678 in 1981. Most of these dwellings were concentrated in the three major urban areas of the Shire, with 244 dwellings (15%) in Rylstone, 640 in Kandos (38%) and 50 in Charbon (3%). The remaining 934 dwellings (44%), including the small settlement containing 13 houses owned by Blue Circle Southern Cement, are distributed throughout the rural areas of the Shire.

Notable changes in the character of the local housing market have occurred in the last 12 to 18 months. There has been a rapid property turnover rate and land and housing values have increased substantially.

Except for the Rylstone, Kandos or Charbon village areas, there is little potential for significant residential development to take place in the Shire. However, the Shire Council is currently considering the establishment of a rural subdivision of one hectare blocks in the vicinity of Rylstone.

Planning consultants Jackson Teece Chesterman Willis and Partners were engaged by Rylstone Shire Council in late January, 1982 to advise on planning matters including provision of additional residential land in the Shire. Results of the consultants' investigation are not expected to be available until mid-1982.

The public water supply from Rylstone Dam currently services 1082 rural and urban premises in the Shire. This reticulation system is now at its design supply capacity and the Bathurst Office of the Public Works Department is at present considering methods of upgrading the system's pumping and reticulation capacity.

The sewage treatment plants which service Rylstone and Kandos have capacity to accomodate a total of 300 additional houses. Utilisation of this capacity would require extensions to the existing mains and the provision of new pumping stations.

A garbage disposal service is available for all urban areas of the Shire.

Medical facilities in the Shire include a baby health centre, a domiciliary nurse and a day care centre for the elderly at Rylstone Hospital, and four doctors. Two of the doctors have a surgery in both Rylstone and Kandos, a third doctor has a surgery in Kandos, and the fourth doctor has a surgery in Rylstone.

Educational facilties within the Shire cater for pre-school, primary and secondary school students. Rylstone, Kandos, Ilford, Clandulla and Bylong each have a primary school, while a secondary school is located at Kandos. A pre-school is located at Rylstone. An evening college for adults is run in association with the Kandos High School. No T.A.F.E. facilities

exist within the Shire. This requires students to travel to either Lithgow or Mudgee. The local Shire library is associated with the Lithgow Regional Library and opens three days per week.

3.10 Roads and Traffic

The major road from Ilford to Mudgee, the Mudgee Road, is Trunk Road 55. The villages of Rylstone, Kandos, Charbon and Clandulla are all located east of the Mudgee Road.

The Sofala Road extends south-westward from Ilford where it intersects the Mudgee Road.

Kandos may be reached from Ilford by Rylstone Road, which intersects the Mudgee Road approximately two kilometres north of Ilford. This road passes through the village of Clandulla and is Main Road 215.

Charbon cannot be reached from Rylstone Road. A separate road to Charbon and Kandos intersects Rylstone Road approximately one kilometre south of Clandulla. This road is known as Cooper Drive south of Charbon and Ilford Road north of Charbon.

Brogans Creek Road joins Cooper Drive approximately 0.75 kilometres east of the Cooper Drive and Rylstone Road intersection. Brogans Creek Road continues southward to Brogans Creek.

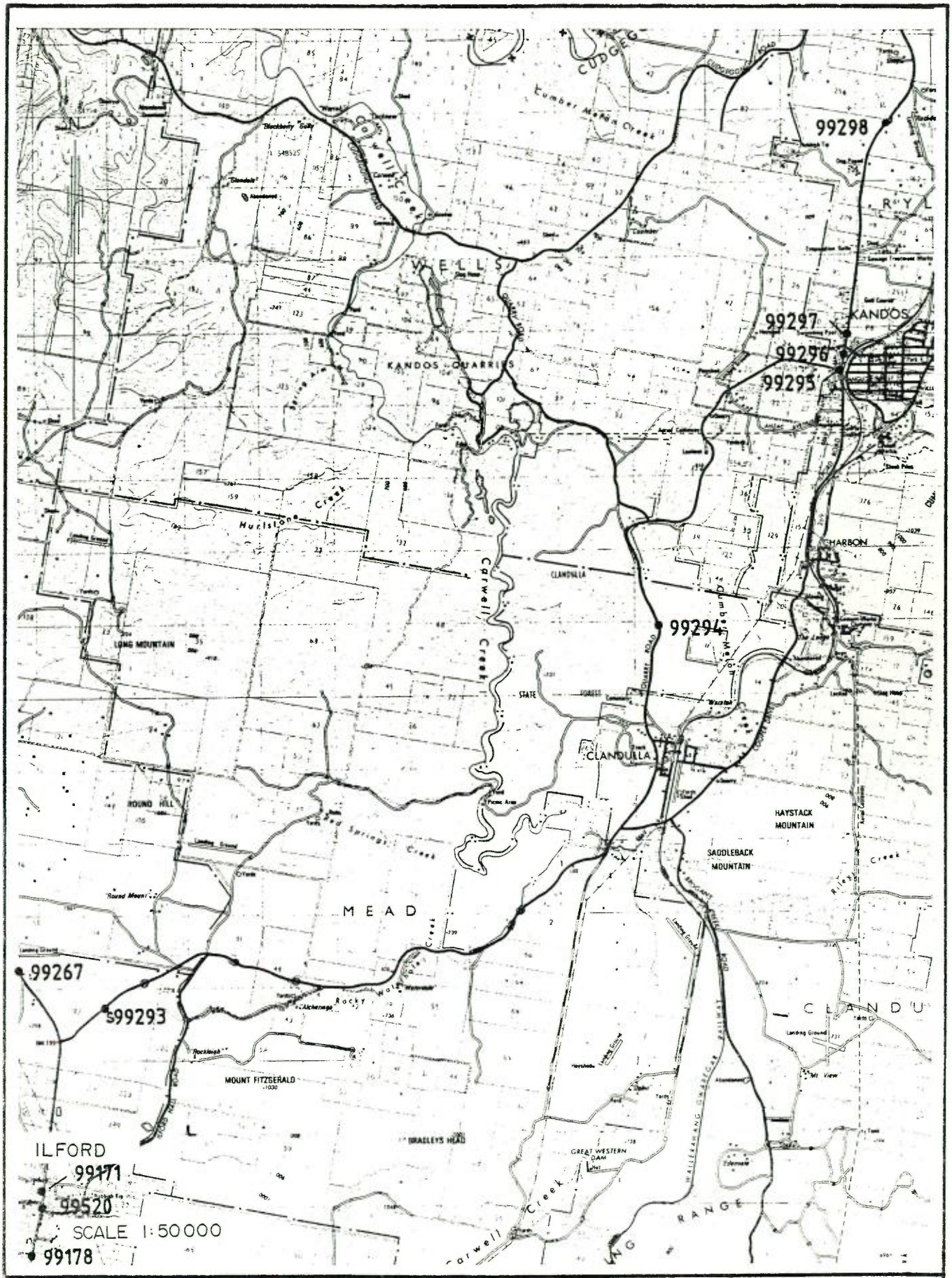
Traffic count data for Rylstone Road (Main road 215) and Mudgee Road (Trunk road 55) has been copied from Department of Main Roads (DMR) provisional 24 hour data for 1980. The DMR also has available data showing the percentage of light and heavy vehicles passing specific points over a 12 hour period during 1976. The 24 hour data represent the annual average daily traffic volumes and are shown in Table 3.2 below. The 12 hour data is for specific days and are shown in Table 3.3 below.

Table 3.2 24 hour traffic data

Station		24 hour counts 1976	1980
	Main Road 215 (Rylstone Road)		
99298	0.7 km S of Glen Davis Rd	1320	1540
99297	Kandos: 0.3 km N of Mason St	1430	1620
99296	Kandos: S of Mason St	1630	2170
99295	Kandos: 0.2 km W of Ilford Rd	980	680
99294	9.5 km E of Ilford Post Office	430	700
S99293	Ilford, 0.8 km E of Mudgee Rd	470	590
	Trunk Road 55 (Mudgee Road)		
P99169	Mudgee, 0.8 km S of level crossing	2100	1980
99170	Mudgee/Rylstone Shire boundary	1240	1160
99267	Ilford, N of Rylstone Rd	930	1020
99171	Ilford, N of Sofala Rd.	1400	1690
99520	Ilford, S of Sofala Rd.	1340	1420
99178	Ilford, 0.8 km S of Sofala Rd	1270	N/A
99179	Rylstone Shire/City of Greater Lithgow boundary	1220	1330
99084	Marangaroo, N of State Highway 5	3330	4060

Data copied from DMR preliminary report for 1980

Figure 3.9 shows the location of various traffic measuring points and roads described above for the 24 hour data. Figure 3.10 shows the location of specific 12 hour data sampling points at Ilford and Kandos.

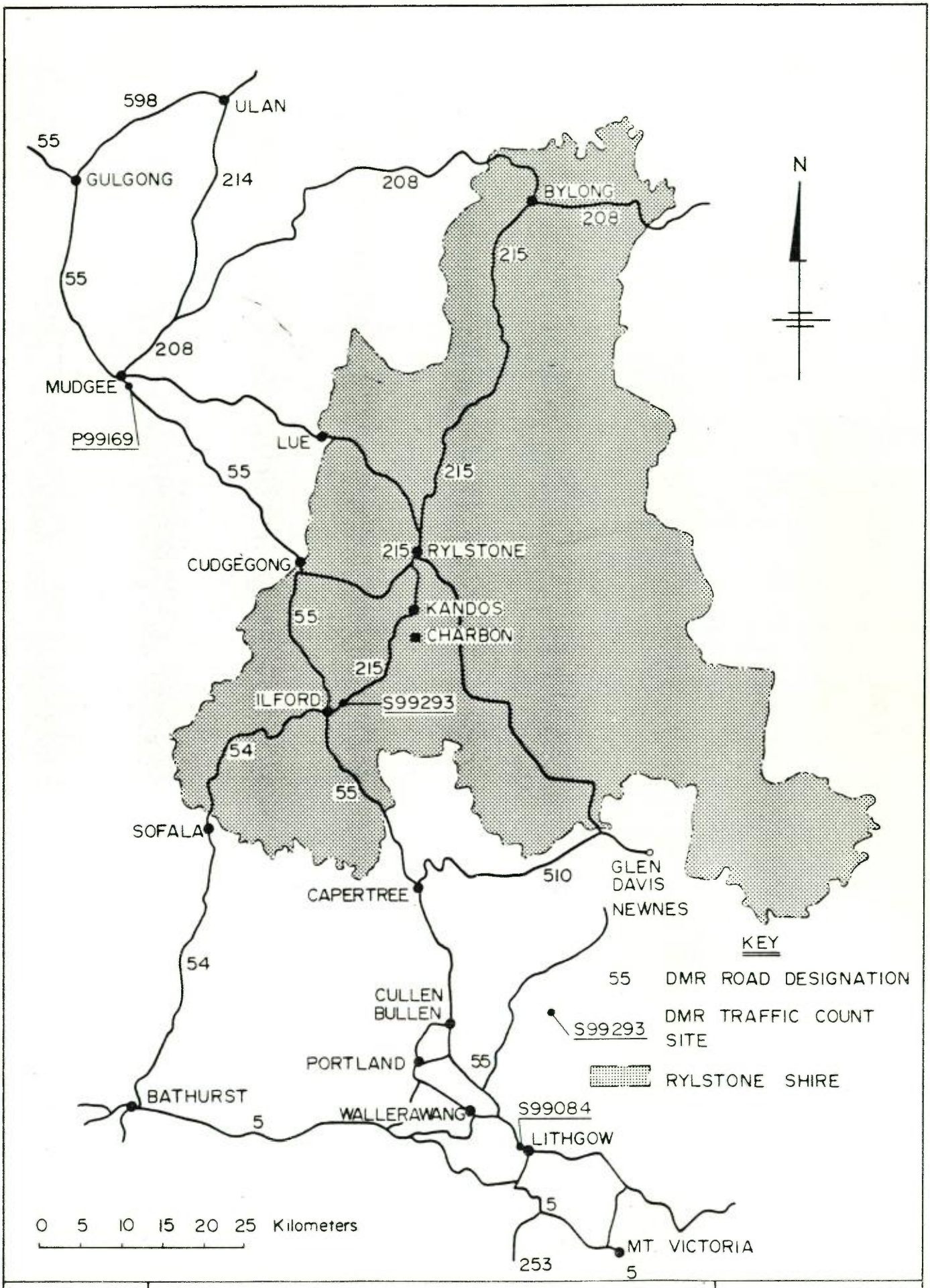


	LOCATION OF D.M.R. 24 HOUR TOTAL TRAFFIC COUNT SITES.	CHARBON E.I.S. FIGURE 3·9

Table 3.3 12 hour segregated traffic data

Station	Location	Date	Light	Heavy	Total	% Heavy Vehicle
	MAIN ROAD 215	9.6.76	208	81	289	28.0
S99293	Ilford, east of Mudgee Rd					
	TRUNK ROAD 55					
S99084	Marrangaroo, north of State Highway 5	13.4.76	1889	336	2225	15.2
P99169	Mudgee, 0.8 km south of level crossing	27.5.76	1020	124	1144	10.8

Data copied from DMR statistics.



REGIONAL ROADS
SHOWING THE LOCATION OF
D.M.R. 12 HOUR LIGHT AND
HEAVY TRAFFIC COUNTS.

CHARBON E.I.S.

FIGURE 3·10

3.11 Employment

Australian Portland Cement Ltd is the largest employer in Rylstone Shire. The APC cement works at Kandos currently employs a total of 260 personnel, including employees at its nearby colliery. The cement works operates around the clock seven days per week. APC envisages expanding their workforce at Kandos by about 10% within the next two years.

Other major employers in the Shire include Rylstone Shire Council, C.A. and D.B. Martin (General Contractors) and the Blue Circle Southern Cement Charbon Colliery.

The BCSC colliery requires a total of 65 employees for its current method of operation. At present three of these positions are vacant and it is expected that these will be filled by mid-1982

3.12 The Existing Charbon Colliery

In 1924 Standard Portland Cement Company Pty. Limited was formed and a cement works established at Charbon. Production commenced in 1926. Coal was supplied for the works from an adjacent colliery owned by a subsidiary, The Kandos-Coomber Mining Company Pty. Limited which had commenced coal mining in 1920.

Reduced demand for cement resulted in the closure of the Charbon Cement Works in July 1977 and 112 personnel became redundant. Other markets for coal were found which enabled the continued employment of 45 personnel at the colliery.

The Charbon colliery lease area and the extent of underground mine workings in July, 1980 are shown in Figure 3.11 on the following page.

LEGEND

- SURFACE CONTOUR
- ROAD
- TRACK
- CLIFF
- CHARBON COLLIERY HOLDING
- CHARBON COLLIERY WORKINGS (July 1980)

CHARBON COLLIERY

SCALE 1:10000

200 100 0 100 200 300 400 500 600 700 800 900 *Metres

FIGURE 3.11

Grid : Intergrated Survey	G
Contour interval 20 metres	AUGUST 1980

BLUE CIRCLE SOUTHERN

At present Charbon colliery produces approximately 286,000 tonnes per annum (t.p.a) of raw coal and requires a complement of 65 personnel. Coal is mined from the Lithgow seam by the bord and pillar method using a single continuous mining machine. At present this machine is operated for two shifts per day. Proven coal reserves within the current lease area are 14,000,000 tonnes and an additional 5,000,000 tonnes are expected from the adjoining lease application area. It will take approximately 65 years to recover these known reserves if the present rate of production is maintained.

Coal is transported underground from the work face to a trunk conveyor which takes coal to the surface at the existing pit top. The trunk conveyor feeds run of mine coal to a 100 tonne surge bin from where it is conveyed to the crusher. The mined coal is broken in a crusher and conveyed to a truck loading bin. Coal is either loaded onto trucks for transport to the customer, or alternatively is stockpiled on colliery land west of the truck loading bin.

Coal stockpiles are constructed using earth moving equipment, and the coal is reclaimed in the same way. Reclaimed coal is loaded directly from the stockpile into transport trucks, and taken by road to the customer.

The pit-top area is situated up-hill of the truck loading bin and east of the crusher building. An office, machinery workshop, bath house, store and carpark are located at the pit-top. Sewage from the pit-top area is treated in a septic tank system located south of the mine offices. Bath house water is treated in a baffle type charifier located approximately 50 m north of the bath house.

Current mine operating procedures require a total of 65 personnel, although three of these positions are vacant at present. As previously indicated it is expected that these vacancies will be filled by mid-1982.

There is no visible evidence of ground subsidence being caused by the mining of coal at Charbon colliery, and no subsidence is known to have been reported.

As the geological strata immediately above and below the coal seam being mined at Charbon colliery are relatively impermeable to water this colliery is a "dry" mine. Hence water only needs to be pumped out of the mine for a few hours each month. This contrasts with a "wet" mine which must continually discharge the water which accumulates due to groundwater seepage. Water which must be disposed of from Charbon colliery, either as discharge from the bath house effluent clarifier or the occasional discharge of mine water, percolates directly into the ground at the disposal point. This is due to the porous nature of the soil at the disposal point and no water flow occurs as a result of mine discharges.

SECTION 4

DESCRIPTION OF THE PROPOSED DEVELOPMENT

4. DESCRIPTION OF THE PROPOSED DEVELOPMENT

4.1 Introduction

The proposed development of Charbon colliery has been planned in two stages.

Stage I is proposed to be implemented immediately and is planned to be fully operational by 1984. The current production rate of 286,000 t.p.a. will be increased progressively to 750,000 t.p.a. by 1984. This increased production rate will be achieved by increasing both the number of personnel employed at the mine and the utilisation of existing and additional mining machinery.

Stage II will not be implemented before 1985, when additional electric power will be made available by the Prospect County Council. Market demands will also affect the timing of Stage II. The dominant feature of Stage II will be the construction of a rail loop and associated train loading facilities.

A summary of the proposed development schedule is shown in Table 4.1 on the next page.

Figure 4.1 shows the layout of proposed surface coal handling facilities for Stages I and II.

4.2 Stage I Development

a) Historical Background to the Number 2 Pit Entry Proposal

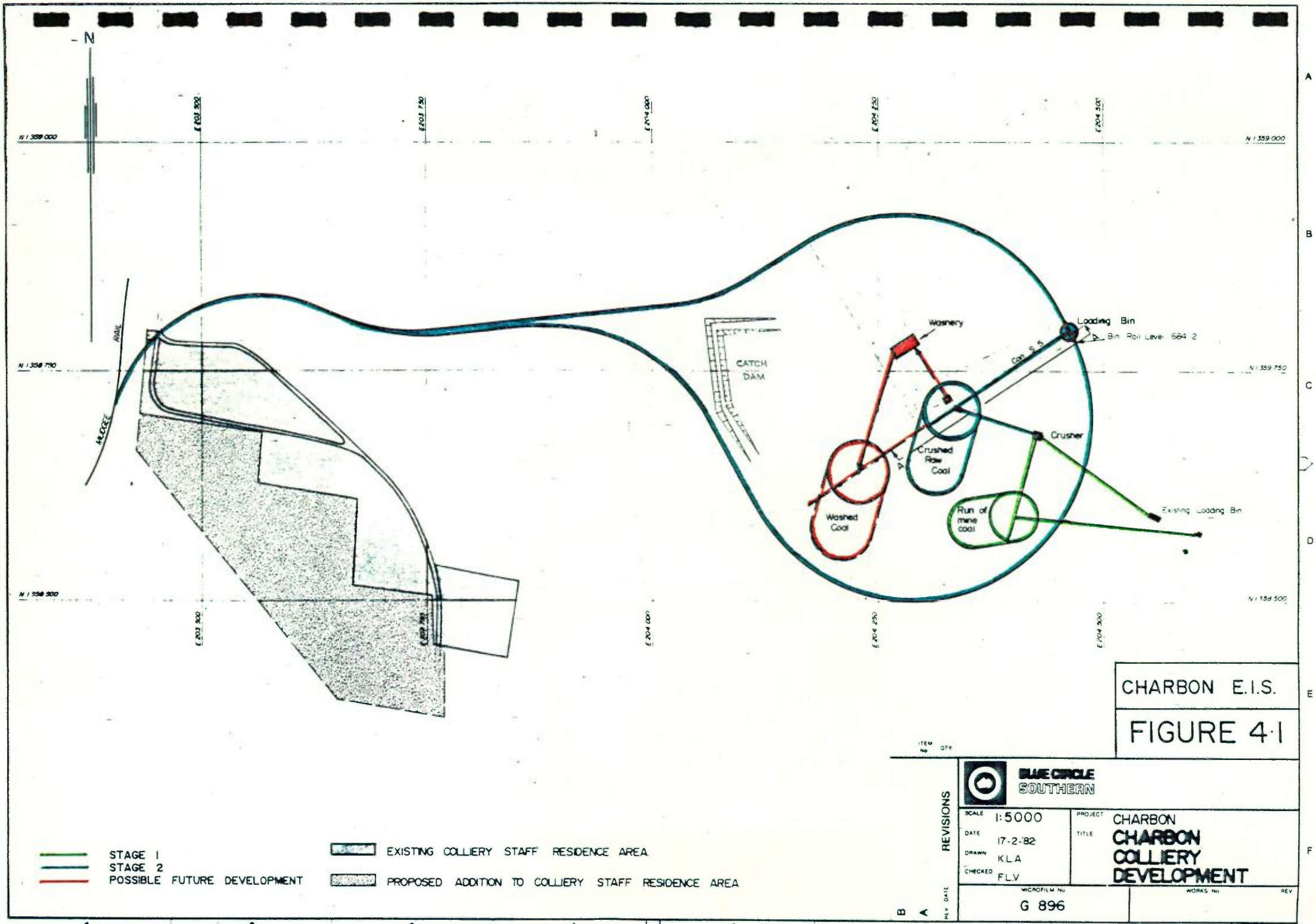
As coal mining proceeded further southward from the Number 1 (existing) pit entry, the need for additional mine ventilation became apparent. In April 1979, following Council and SPCC approval, a new ventilation return adit was constructed. The ventilation return adit is located approximately one kilometre south-southeast of the existing pit top area. Water and power supplies, and an access track have been provided for the adit. This area is covered by the BCSC Mining Purposes Lease (MPL) Number 160, as shown in Figure 4.2.

(Act 1973)
GRANTED 6.12.78.

Table 4.1 SUMMARY OF THE PROPOSED DEVELOPMENT SCHEDULE AT CHARBON COLLIERY

	BASELINE	STAGE I				STAGE II
	EARLY 1982 (CURRENT)	MID 1982 (PROJECTED)	EARLY 1983 (PROJECTED)	MID 1983 (PROJECTED)	1984 (PROJECTED)	1985 (PROJECTED)
NUMBER OF EMPLOYEES	65 (3 POSITIONS VACANT)	65	65	128	128	128
NUMBER OF CONTINUOUS MINING MACHINES	1	1	1	2	2	2
NUMBER OF MINING SHIFTS PER DAY	2	3	3	3	3	3
DAILY SHIFT UTILISATION (MACHINES x SHIFTS)	2	3	3	6	6	6
COAL PRODUCTION RATE (TONNES PER ANNUM)	286,000	286,000	500,000 TOTAL		750,000	750,000
NUMBER OF TRUCK[1] LOADS PRODUCED PER DAY	55	55	95 ANNUAL AVERAGE		143	UP TO 143
NUMBER OF TRAIN LOADS PRODUCED PER WEEK	-	-	-	-	-	DEPENDENT UPON CUSTOMERS
ASSOCIATED DEVELOPMENT	ADITS AT NO.2 ENTRY DRIVEN IN DURING BOX CUTTING	NEW PIT TOP FACILITIES TO BE CONSTRUCTED AT NO.2 ENTRY	NEW CRUSHER, DIVERTED CONVEYORS AND R.O.M. STOCKPILE IN OPERATION	SECOND MINING MACHINE TO BE INSTALLED	TWO MINING MACHINES OPERATING AT FULL PRODUCTION CAPACITY	RAIL LOOP, LOADING BIN AND RAW COAL STOCKPILE IN OPERATION
APPROVALS SOUGHT	APPROVAL GRANTED IN 1981	DEVELOPMENT CONSENT, APPROVAL TO CONSTRUCT AND LICENCES TO OPERATE ALL OF STAGE I AND II ARE SOUGHT BASED INITIALLY ON THE THIS ENVIRONMENTAL IMPACT STATEMENT (E.I.S.)				

1. ASSUMING 24 TONNES PER TRUCK FOR 220 DAYS PER YEAR



CHARBON E.I.S.

FIGURE 4·1

ITEM NO | QTY

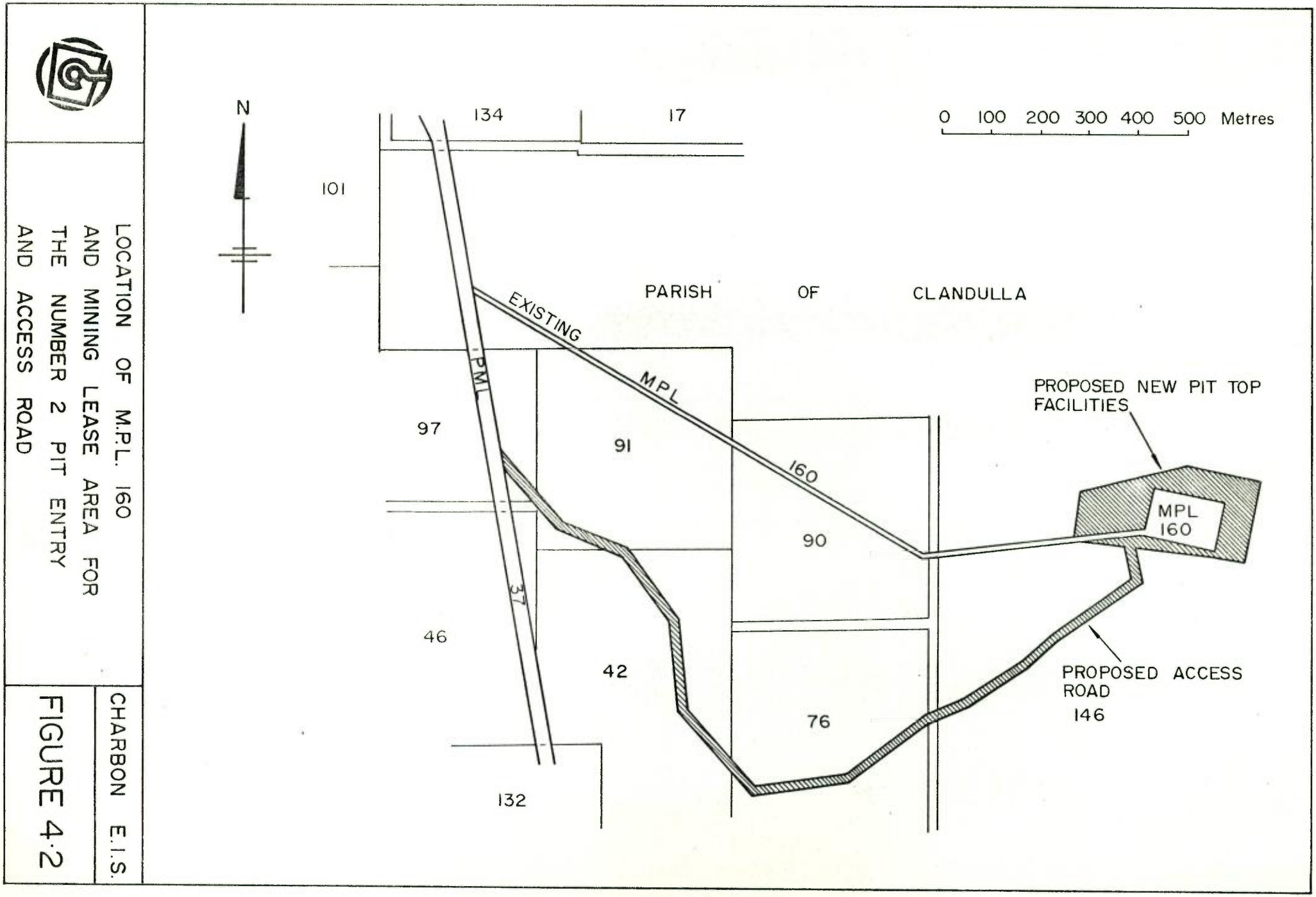
REVISIONS

REV | DATE

B
A

BLUE CIRCLE SOUTHERN

SCALE	1:5000
DATE	17-2-82
DRAWN	K.L.A
CHECKED	F.L.V
PROJECT TITLE	CHARBON **CHARBON COLLIERY DEVELOPMENT**
MICROFILM No	G 896
WORKS No	
REV	



LOCATION OF M.P.L. 160 AND MINING LEASE AREA FOR THE NUMBER 2 PIT ENTRY AND ACCESS ROAD

CHARBON E.I.S.

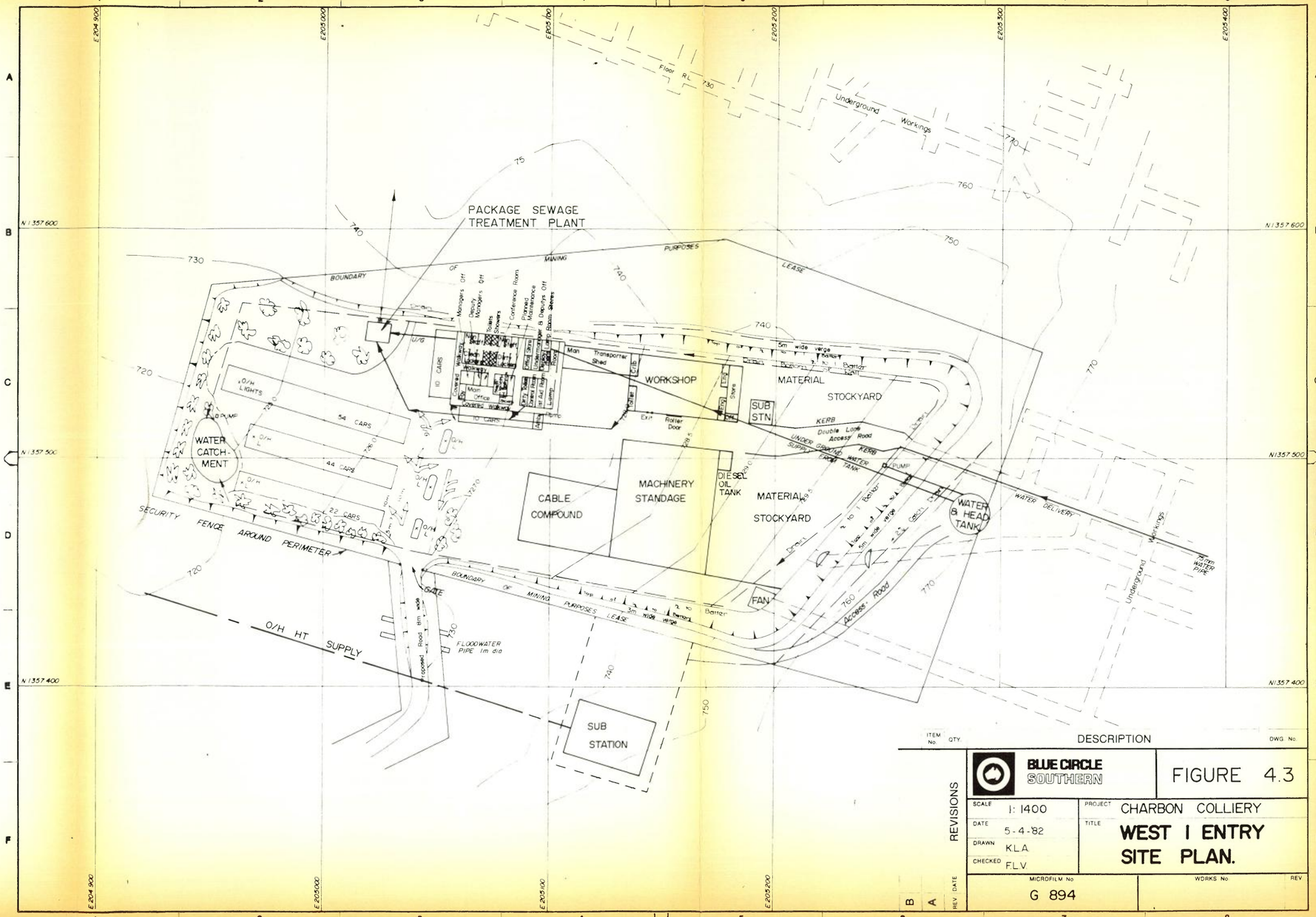
FIGURE 4.2

The subsequent restriction of the ventilation return adit by roof falls has made it impossible for the adit to be routinely inspected or used as an emergency exit, as required by the Coal Mines Regulation Act (1912) as amended. To allow repair of the ventilation return adit, two new adits are being constructed. Construction work involves "box-cutting" into the hillside and driving in two new adits adjacent to the existing ventilation return adit. One adit will temporarily act as a ventilation return adit and the other will be used for access of men and materials to allow the original ventilation return adit to be repaired. Approval for this work was obtained from the Department of Environment and Planning in September 1981 and work was begun in January 1982.

The active mine work area is now located underground near the existing blocked ventilation return and repair adits. This requires miners and machinery to travel underground for about one kilometre south-southeast of the existing mine entrance to reach the work area.

It was determined that mine efficiency would be improved if mine entry and surface facilities were located as close as practical to the active mine work area. It is therefore proposed to develop the two new adits to allow personnel and machinery access, and provide mine surface facilities on the existing box-cut area adjacent to the adit entrance. A new vehicular access road is also proposed which will join the proposed surface facilities to the existing Telecom access road. The vehicular access road has been positioned in accordance with the requirements of the land owner whose property includes the area of proposed development. This will allow the land owner to fully utilise this area for grazing and will ensure mine traffic does not interfere with stock.

New pit top surface facilities will include an office area, crib room, mine machinery maintenance workshop and a bath house. Figure 4.3 shows the proposed new pit top layout. A conceptual sketch showing an oblique aerial view of the new pit top area follows Figure 4.3.



ITEM No.	QTY.	DESCRIPTION	DWG. No.

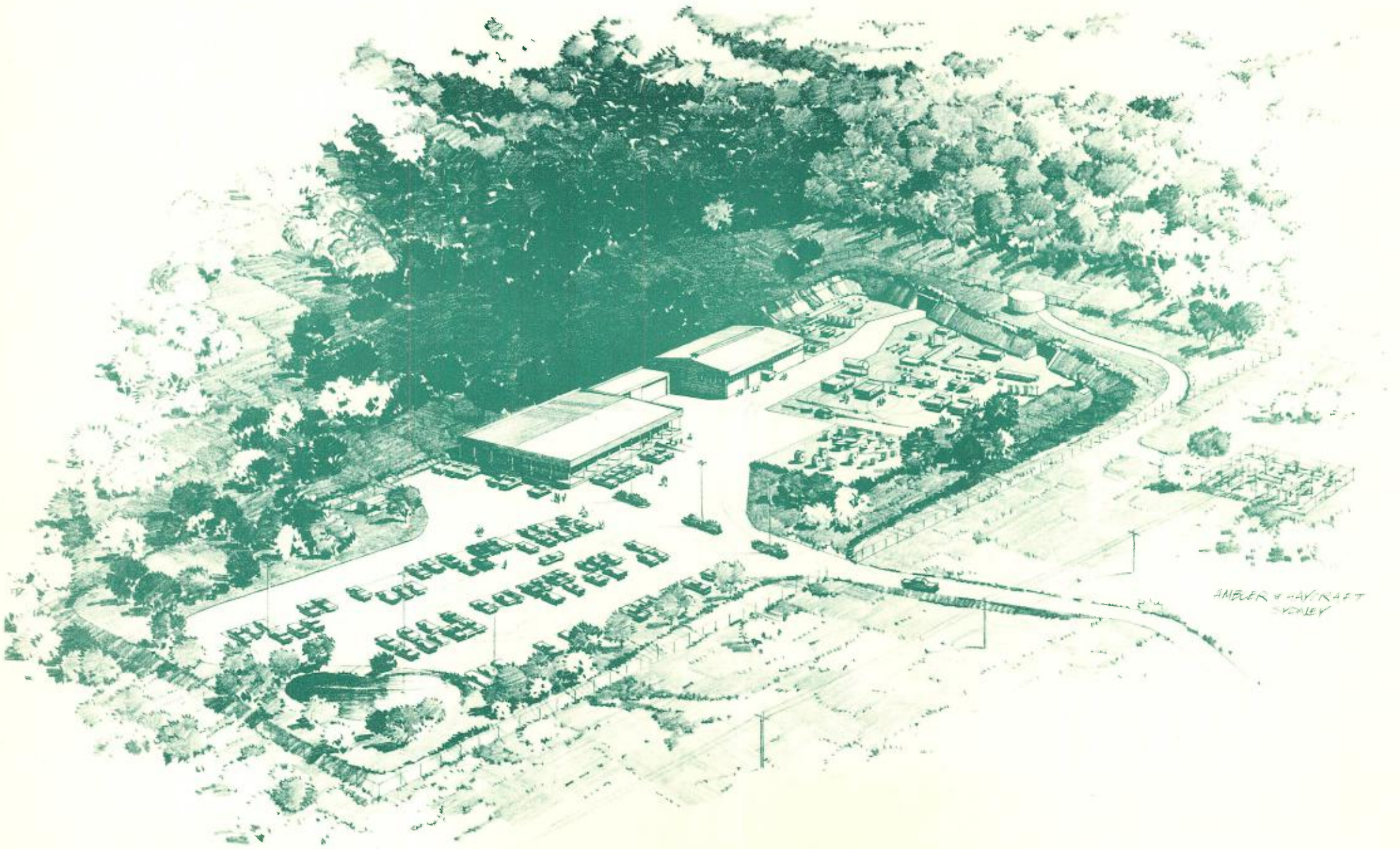
REVISIONS

REV.	DATE
B	
A	

BLUE CIRCLE SOUTHERN

FIGURE 4.3

SCALE	1: 1400
DATE	5-4-82
DRAWN	K.L.A.
CHECKED	F.L.V.
PROJECT	CHARBON COLLIERY
TITLE	WEST 1 ENTRY SITE PLAN.
MICROFILM No.	G 894
WORKS No.	
REV.	



All coal will continue to be conveyed underground to the existing coal exit point. Here it will be crushed and loaded into trucks for transport to Wallerawang Power Station, in a similar manner to that currently practiced. Existing coal stockpile areas will also be maintained.

b) Mining, Production and Personnel

Coal will continue to be mined at Charbon using the bord and pillar method. Coal will be cut from the Lithgow seam using continuous mining machines, as at present.

Currently one continuous mining machine is used for two shifts per day. This enables coal to be produced at a rate of 286,000 tonnes per annum (t.p.a). It is proposed to increase utilisation of this machine to three shifts per day by mid-1982. This will make it possible to achieve a production rate of up to 400,000 t.p.a. However, as personnel training will be continuing, it is expected that the production rate will not exceed 286,000 t.p.a.

Because personnel required to operate the third shift are currently employed at the mine in a training program, production rates of up to 400,000 t.p.a will not require the existing complement of 65 personnel to be increased. Therefore no additional personnel will be required for the proposed development in the immediate future, except those filling the current three mine vacancies.

It is proposed to install a second mining machine by mid-1983. Installation of the second machine will create an additional requirement for 63 personnel at the mine, taking the mine workforce to 128. This will allow the mine to produce coal at a rate of up to 750,000 t.p.a., using two machines for three shifts each per day. However, the new machine will not be fully utilised initially as new employees will be progressing through a training program. A total production of 500,000 tonnes is projected for 1983.

It is projected that both continuous mining machines will be fully utilised over three shifts per day by 1984. This will allow the mine production rate to reach 750,000 t.p.a. This production rate will be attainable then as all miners will be fully trained.

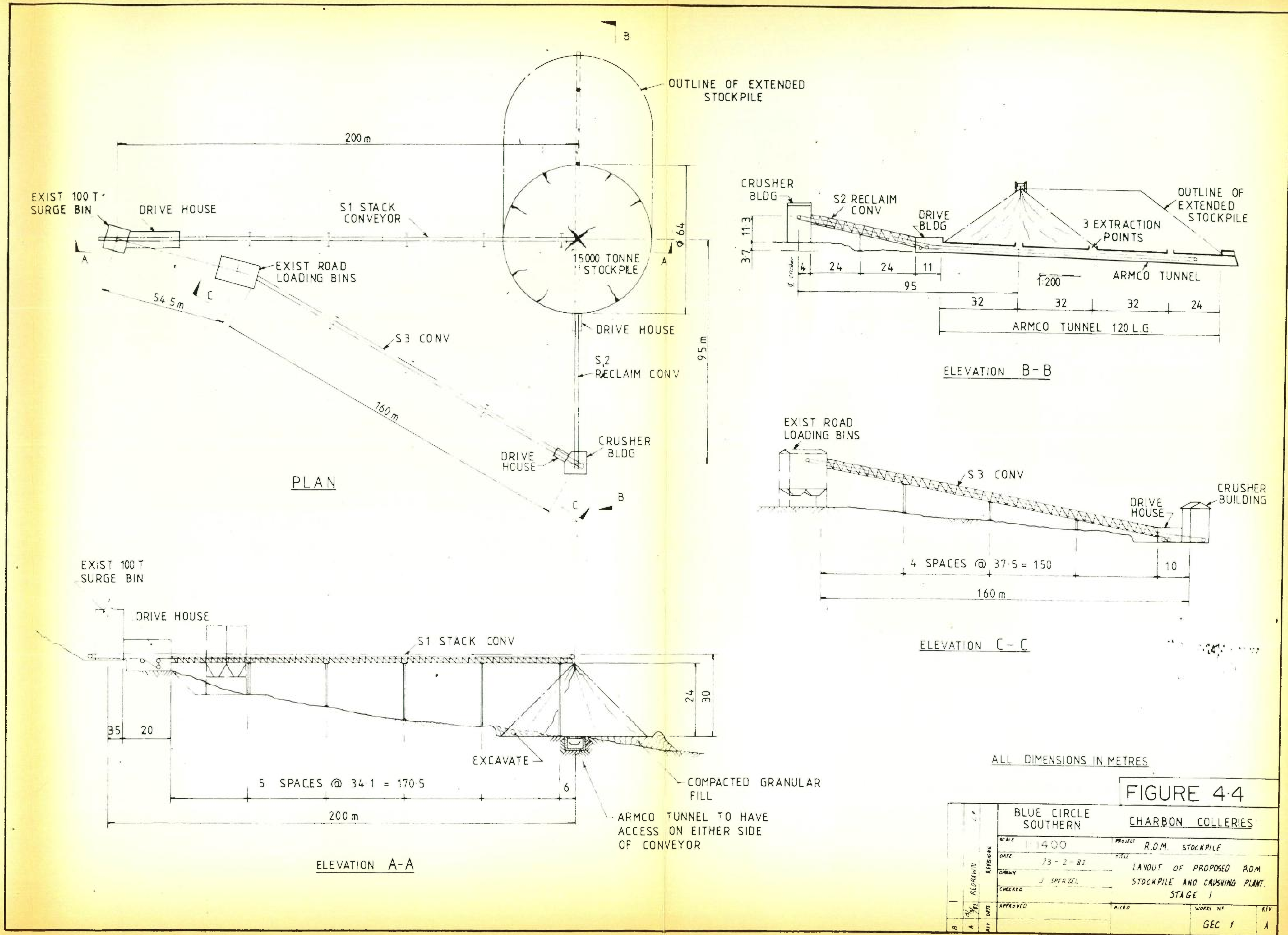
A production rate of 750,000 t.p.a. will allow the coal reserves within the current Charbon colliery lease and the adjoining lease application area to be recovered over a period of approximately 25 years.

c) Surface Coal Handling Facilities

It is proposed to modify the existing surface coal handling facility layout and install new equipment, as shown in Figure 4.4, to cater for the increased production rate. This will improve the efficiency of the coal handling facility by overcoming bottlenecks apparent in the existing layout.

An existing trunk conveyor will feed run of mine coal into an existing 100 tonne surge bin located ahead of the existing crusher buidling. The existing crusher will become redundant. Coal will be fed from the surge bin onto a new conveyor having a maximum capacity of 600 tonnes per hour. This conveyor will be approximately 200 metres long and will by-pass the existing truck loading bin to discharge run of mine coal onto a 15,000 tonne conical stockpile. This stockpile capacity could be increased to 30,000 tonnes by re-shaping, using mobile equipment such as a bulldozer. The stockpile will be constructed over a concrete or steel reclaim tunnel which will house the below-ground section of the reclaim conveyor.

Run of mine coal will be reclaimed from the stockpile via vibratory feeders and deposited on the reclaim conveyor at a rate of up to 400 tonnes per hour. This conveyor will transport coal from under the stockpile to a proposed new crushing and screening plant located about 95 metres north of the stockpile. Here coal will be fed onto a vibratory screen to yield a minus 25 mm product.


OUTLINE OF EXTENDED STOCKPILE
200 m
EXIST 100 T SURGE BIN
DRIVE HOUSE
S1 STACK CONVEYOR
15000 TONNE STOCKPILE
ø 64
EXIST ROAD LOADING BINS
54.5 m
S3 CONV
160 m
DRIVE HOUSE
S2 RECLAIM CONV
95 m
DRIVE HOUSE
CRUSHER BLDG
PLAN
CRUSHER BLDG
S2 RECLAIM CONV
DRIVE BLDG
3 EXTRACTION POINTS
OUTLINE OF EXTENDED STOCKPILE
ARMCO TUNNEL
1:200
11.3
3.7
4
24
24
11
95
32
32
32
24
ARMCO TUNNEL 120 L.G.
ELEVATION B-B
EXIST ROAD LOADING BINS
S3 CONV
DRIVE HOUSE
CRUSHER BUILDING
4 SPACES @ 37.5 = 150
10
160 m
ELEVATION C-C
EXIST 100 T SURGE BIN
DRIVE HOUSE
S1 STACK CONV
24
30
35
20
EXCAVATE
5 SPACES @ 34.1 = 170.5
6
200 m
COMPACTED GRANULAR FILL
ARMCO TUNNEL TO HAVE ACCESS ON EITHER SIDE OF CONVEYOR
ELEVATION A-A
ALL DIMENSIONS IN METRES
FIGURE 4.4
BLUE CIRCLE SOUTHERN
CHARBON COLLERIES
SCALE 1:1400
PROJECT R.O.M. STOCKPILE
DATE 23-2-82
TITLE LAYOUT OF PROPOSED ROM STOCKPILE AND CRUSHING PLANT. STAGE 1
DRAWN J. SPERZEL
CHECKED
APPROVED
MICRO
WORKS No GEC 1
REV A
REDRAWN

Oversize coal will be crushed in a granulator type breaker which will also yield a minus 25 mm product. All product coal from the crushing and screening plant is described as "raw" coal.

Raw coal will be conveyed at a rate of 300 tonnes per hour along a new conveyor to the existing truck loading bin. Here it will be loaded into trucks and transported from the colliery, as is the current practice.

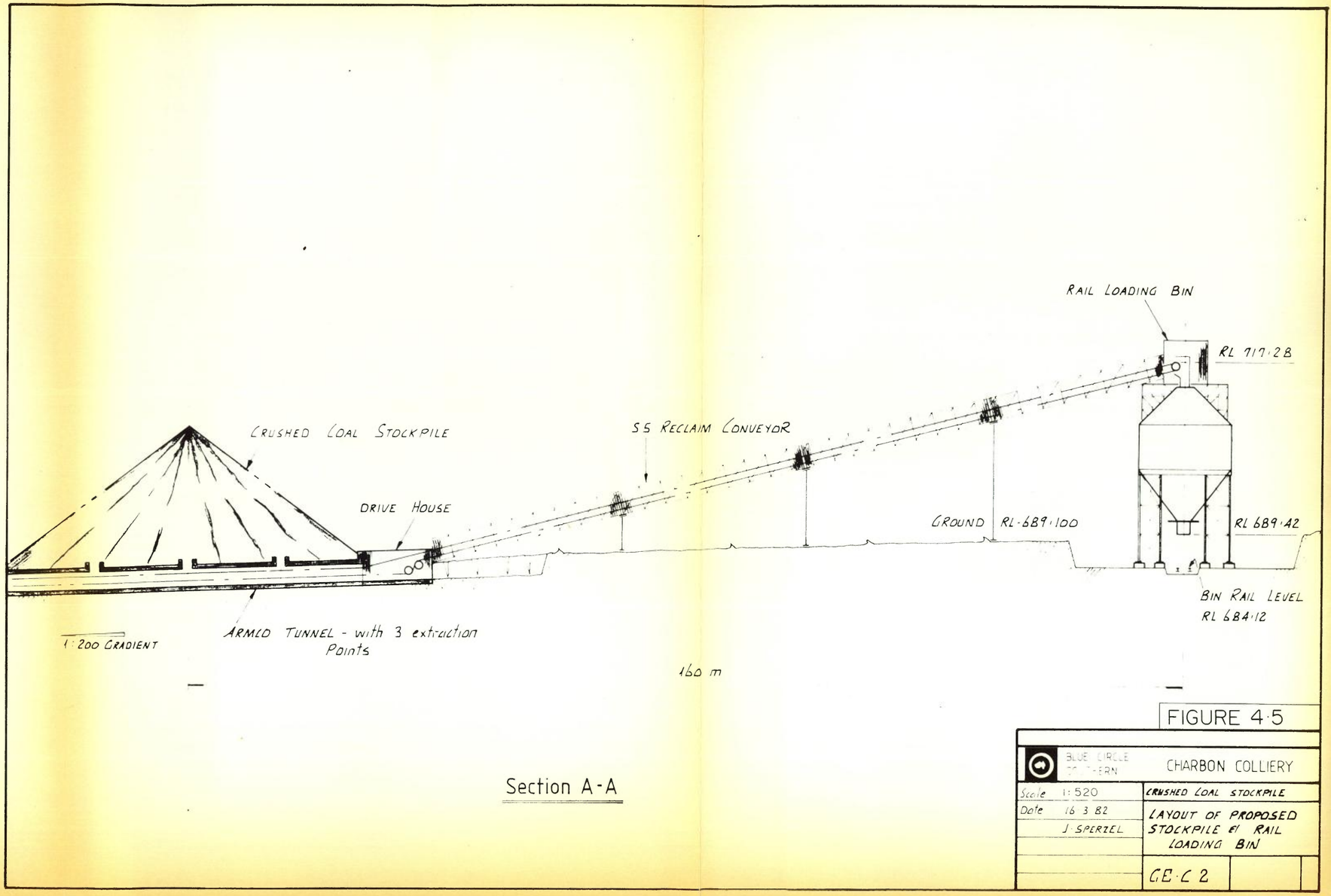
4.3 Stage II Development

Implementation of Stage II of the proposed development will be subject to the availability of additional electric power, granting of Electricity Commission coal contracts, presence of rail unloading facilities at domestic market places or successful negotiation of export contracts. This development cannot occur before 1985 when additional electric power can be made available by Prospect County Council.

Addititonal facilities will comprise a rail loop, train loading bin, raw coal stockpile and additional conveyors, as shown in Figure 4.1 which appeared in Section 4.1. Figure 4.5 shows the cross section A-A indicated in Figure 4.1. The cross section shows the raw coal stockpile, raw coal reclaim conveyor and train loading bin.

A raw coal conveyor will transport coal from the crushing and screening plant to a new raw coal stockpile located some 100 metres west of the crusher building. This conveyor will have a capacity of 400 tonnes per hour.

The raw coal stockpile will be conical in shape and have a free capacity of 30,000 tonnes. This can be extended to 60,000 tonnes by re-shaping using mobile equipment. A single steel or concrete reclaim tunnel will be constructed below the stockpile to house the below-ground section of the reclaim conveyor.



Section A-A

FIGURE 4·5

BLUE CIRCLE SOUTHERN	CHARBON COLLIERY
Scale 1:520	CRUSHED COAL STOCKPILE
Date 16 3 82	LAYOUT OF PROPOSED STOCKPILE & RAIL LOADING BIN
J. SPERZEL	
	GE·C 2

Three vibratory feeders will deposit coal onto the reclaim conveyor at a rate of up to 800 tonnes per hour each. The reclaim conveyor will deliver coal to a 1000 tonne capacity rail loading bin located some 150 metres north east of the stockpile. The exact location of the rail loading bin will depend upon State Rail Authority requirements.

Coal will be loaded into train wagons from the train loading bin by gravity feed. To allow this gravity feeding, the top of the bin will be elevated some 33 metres above the railway line level. However, the railway line will be in a 5.3 metre deep cutting at the bin position. Therefore the total height of the rail loading bin above the general land surface will be approximately 28 metres.

Following Stage II development the coal production rate will remain at 750,000 t.p.a. The major change in operations will be a decrease in the number of trucks required to haul coal to the customer, although the exact proportion of coal transported by truck or train will be dependent upon customer requirements.

4.4 Future Development

As coal markets develop and increased production or improved coal quality is demanded, the colliery may increase its coal production rate by installing a third continuous mining machine and improve coal quality by constructing a washery. A clean coal stockpile would be required when the washery became operational. An additional 45 mining personnel may be required if the third machine is commissioned and new employment opportunities would also be created in the coal treatment plant.

The colliery could supply either raw or clean coal when the washery was installed.

The likely layout of these additional facilities is shown in Figure 4.1 in Section 4.1. This possible future development will be described in a separate E.I.S. which will be prepared at the appropriate time.

4.5 Product Transportation

Coal is currently transported from the colliery to customers by truck. Road transportation is used as the major customer, the N.S.W. Electricity Commissions' Wallerwang Power Station, is unable to accept coal deliveries by rail.

If the Electricity Commission decides in the future to provide rail facilities for accepting coal, either at Wallerawang or at other nearby coal fired power stations, the colliery will provide a rail loop so that coal can be transported to the power stations by rail. In the mean time coal will continue to be transported to these power stations by road.

The colliery is aware that road transport may be considered undesirable, for example because of potential traffic hazards and road deterioration. However the provision of customer rail receival facilities is beyond the colliery's control. As the major concern of Rylstone Shire Council is the damage additional coal truck traffic will cause to their roads, the colliery has offered to make a contribution towards Council road maintenance costs that can be attributed to increased coal truck traffic associated with the expanded operation of Charbon colliery.

It is anticipated that some new customers may be able to receive raw coal by rail in the future. This will allow a rail loop to be installed at the colliery independently of road haulage committments to Wallerawang Power Station. A reduction in the number of coal trucks used for product transport will result when customer rail receival facilities become available. When export markets for clean coal are identified the colliery will transport clean coal by rail to the Port Kembla Coal Loader. The export market could constitute a partial or possibly a total replacement of the current power station demand.

Table 4.2 shows the anticipated customer, customer location and mode of coal transportation for the maximum annual tonnages of coal which will be produced by Charbon colliery.

Table 4.2

MAXIMUM ANNUAL TONNAGES

Year	Tonnage	Customer	Customer Location	Mode of Transport
1982	20 000	Austen & Butta	Lidsdale	Road
	266 000	Electricity Commission	Wallerawang	Road
1983	40 000	Austen & Butta	Lidsdale	Road
	20 000	Blue Circle Southern Cement	Portland	Road
	440 000	Electricity Commission	Wallerawang	Road
1984	90 000	Austen & Butta	Lidsdale	Road
	20 000	Blue Circle Southern Cement	Portland	Road
	640 000	Electricity Commission	Wallerawang	Road
1985	20 000	Blue Circle Southern Cement	Portland	Road
	250 000	Electricity Commission	Wallerawang	Road
	480 000	Export	Via Port Kembla	Rail

None of the above tonnages are firm and will be dependent on market negotiations.

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4.6 Earthworks and Excavations

a) Pit Top Area

The pit top area excavation has been approved under the repair adit construction Development Approval. Excavation work involves "box-cutting" into the hillside as shown conceptually in Figure 4.6. This excavation will allow the two new adits to be driven into the coal seam. Work on the box-cut excavation is now well under way.

The floor of the box-cut will be graded, to ensure proper drainage, and extended to provide sufficient area for the proposed office, bath house, workshop, employee car park, etc.

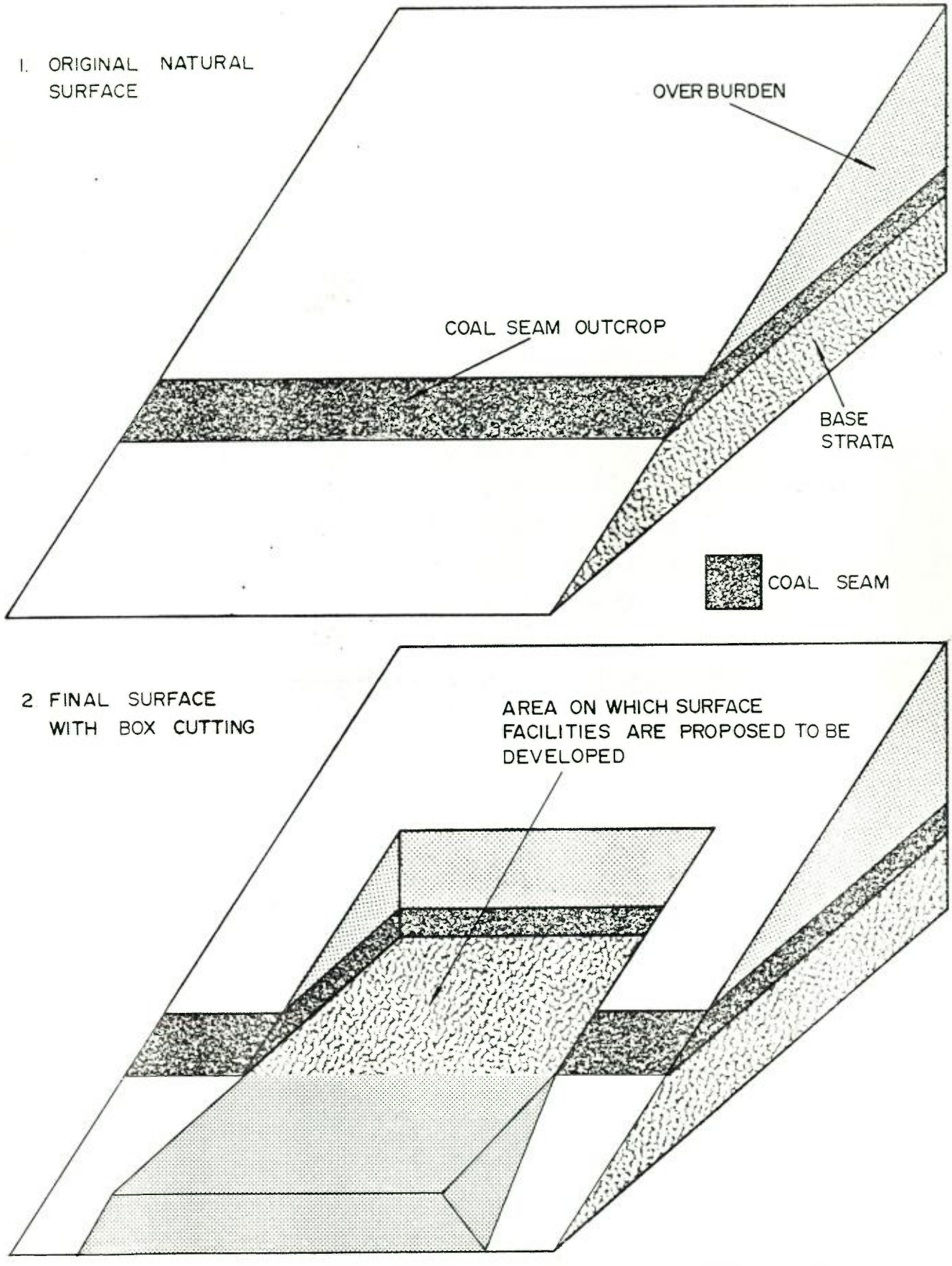
Batter slopes of the box-cut walls will be stabilised by grass and shrub cover.

b) Access Road

Access to the new pit top area will be via a short road from the existing Telecom facilities access road. This access road will be constructed by cutting and grading the ground to produce a road base. The graded surface will be compacted as required by engineering criteria to produce the desired car access road. This road will be designed to ensure rainfall runoff flows along defined drains, preventing erosion of the road or adjacent land surface. This road will have a gravel surface to permit all-weather use. Figure 4.2 in Section 4.2 (a) shows the location of this access road.

c) Coal Stockpile Area

The coal stockpile area will be graded as required to permit the proposed conveyors and crusher and screening plant building to be correctly aligned and to provide stable foundations.



CONCEPTUAL DIAGRAM OF THE LAND SURFACE BEFORE AND AFTER BOX CUTTING.

CHARBON E.I.S.

FIGURE 4-6

Coal stockpiles will be constructed over steel or concrete reclaim tunnels, which require excavations to the correct depth prior to installation.

A catch dam below the 680 m contour will be excavated to provide a design volume of approximately 3.6 Ml. This dam will ensure that "dirty" water which runs off from the stockpile area does not contaminate the natural water course and will retain runoff from a one in ten year return period one hour duration storm. Material which has been excavated for the dam construction and stockpile reclaim tunnels will be utilised to produce the bund walls surrounding the rail loop and for a component of the catch dam wall. The catch dam wall will be constructed from excavated earth and other material, such as rock fill, as required by engineering design.

4.7 Road Construction and Standards

The existing sealed coal truck haul road which leads to the truck loading bin is showing some deterioration due to mine traffic and will be restored to good condition. The existing service road for the disused aerial cable way (PML 37), which will be used for vehicle access to the new pit top area, will also be reconditioned. This road will have a gravel surface to allow all-weather use. The new mine access road shown in Figure 4.2 will be constructed to a similar standard, as described in Section 4.6.

4.8 Buildings, Structures and Facilities

a) Mine Office

The mine office will be constructed from pre-fabricated sections set on elevated concrete foundations. The building will be a steel framed structure clad with pre-painted steel sheeting. The flat roof will be covered with bright galvanised steel sheeting to ensure reflectance and hence reduce internal temperatures during summer. Fibreglass will be used as an insulation material throughout the building.

Windows will be provided for each office and sky lights will be provided for the toilet areas. The building will contain six offices created by partitions.

A covered walkway will be provided around the office buildings allowing easy access to the bath house, lamp room, stores etc.

b) Bath House

The bath house will be constructed from pre-fabricated sections set on elevated concrete foundations at the same level as the mine office building. The bath house will be designed to have "clean" and "dirty" sides separated by showers. Its external appearance will be similar to that of the mine office.

The building will be a steel framed structure clad with pre-painted galvanised steel sheeting. Translucent windows and roof skylights will be provided at regular intervals to ensure adequate natural lighting.

The roof will be clad with bright galvanised steel sheeting to help reduce internal temperatures during summer and the building will be insulated throughout.

Shower, toilet and change room facilities will be provided in the bath house. Bath house facilities will be utilised on a roster basis during shift change-over periods. Individual lockers will be provided for all employees.

c) Additional Buildings

Additional buildings such as the office store, first aid room, deputy's office, deployment room and lamp rooms will be incorporated into the office/bath house building area, as shown in Figure 4.3. These buildings will be constructed from pre-fabricated sections and will be similar externally to the mine office and bath house.

d) Mine Maintenance Workshop

A workshop will be constructed on a concrete slab approximately 50 m long by 25 m wide. The building will be a steel framed structure clad with pre-painted steel sheeting. To allow the operation of a beam mounted electric hoist, the workshop will have a peaked roof. The hoist will be used as required during mine machinery maintenance work. The roof will not be bright galvanised steel as reflectance from the peaked roof could be visually obtrusive. Roof cladding will be supplied in the same colour as the external walls.

Sections of the workshop roof and walls will include translucent sheeting, permitting natural lighting of the workshop.

All vehicular entry to the workshop will be via a six metre by six metre roller shutter door on the southern face of the building.

A section of the workshop will be used for an office, crib room and spares store. These areas will be free standing structures within the workshop building.

An oil separator shall be installed on the drainage outlet of the workshop to collect any oil or grease which might be spilt in the workshop.

e) Parking Shed for Underground Man Transporter Vehicles

A parking shed will be provided for the man and provisions underground transport vehicles. This shed will be constructed adjacent to the mine lamp room and will be a steel framed structure clad with pre-painted steel sheeting. A gravel covered compacted earth floor will be used, rather than a concrete slab, although concrete foundations will be provided for the vertical building frame members. The shed will have a flat roof as a hoist will not be required in this area.

All underground transport vehicles will be diesel powered.

f) Design Standards

All materials specified for use in the construction of the proposed facilities shall comply with standards prescribed in the Coal Mines Regulation Act (1912) as amended. Approval of designs for these facilities shall be sought from the Minister prior to construction commencing.

4.9 Mine Services

a) Water

The proposed development of Charbon colliery will increase the colliery's requirement for water. Water will be used for underground mining equipment, dust suppression, fire protection, the bath house and drinking (potable) water.

Current mine water consumption is approximately 15,600 litres per day. This potable supply is obtained from Rylstone Dam on a single supply line. At present there is no segregation of water usage into potable or process water.

The proposed development will have both a potable and a process water supply system. Rylstone Dam has a limited supply capacity and hence it is proposed to use this potable water only in the bath house and mine office. This would permit the existing potable water supply from Rylstone Dam to also supply new houses which will be constructed as a result of increased employment opportunities at the colliery.

Process water will be obtained by pumping from Reedy Creek Dam which is owned by BCSC. This dam is located some two kilometres north west of the existing pit top area, just west of Cooper Drive. The storage capacity of this dam will be increased by implementing a controlled deepening program. In addition, process water could also be obtained in the future from ground water resources which are thought to occur less than one kilometre north of the existing pit top. Groundwater reserves will be investigated with bore hole sampling as the need arises.

An existing pumping system taking water from Reedy Creek Dam to the colliery coal handling facilities will be upgraded as part of the Stage I development.

By utilising two water supply systems, the potable water consumption rate from Rylstone Dam will change as shown in Table 4.3. The corresponding process water requirements are also shown.

Table 4.3 Anticipated Water Consumption

Year	Production (t.p.a.)	Colliery Personnel	Potable Water(l/day)	Process Water (l/day)
1982	286,000	65	5,200	23,400
1983	500,000	65	5,200	40,900
1984	750,000	128	10,240	61,300

Process water will be required for continuous mining machines, fire protection and dust suppression. Potable water will be required for both the bath house and the office.

b) Dust Suppression

Water sprays will be installed at the run of mine coal conveyor transfer point above the run of mine coal stockpile and at the crusher discharge point prior to coal leaving the crusher building. The sprays will be supplied with high-pressure process water containing a surface active agent (surfactant) additive. The surfactant will reduce the water surface tension and improve the wetting efficiency of the spray system. The surfactant will be a proven proprietary formula and will be introduced into the process water via an automatic proportioning unit.

The run of mine and raw coal stockpiles will be provided with water sprays to keep the stockpile surface moist. The surfactant added to run of mine coal will generally remain on the coal through the crushing process. Additional surfactant will be added to the crushed coal prior to discharge onto the

raw coal stockpile feed conveyor. This will enhance the dust suppression efficiency of the raw coal stockpile water spray system. Spraying frequency and the volume of water applied will depend on local weather conditions.

Runoff water from dust suppression sprays will be minimised by controlled water applications. However, should runoff occur it will be collected in the catch dam downslope of the stockpile area. This catch dam will also retain rainfall runoff from the stockpile area.

The vehicular access road to the new pit-top facilities will have a gravel surface. This road will be sprayed with process water from a water tanker to prevent dust being generated by vehicle movements. Spraying will be done as required, depending on local weather conditions.

Pit top car park areas and areas surrounding the new pit top buildings will be gravel paved where appropriate to stabilise these areas against erosion.

Shrubs and lawns will be planted in landscaped areas to enhance the visual appearance of the new pit-top area and stablise the soil, further reducing the potential for dust to be generated. The conceptual sketch which appeared in Section 4.2 shows the location of these landscaped areas.

c) Sewerage

An in-ground package sewage treatment plant will be installed adjacent to the bath house area. The treatment plant will treat all sewage generated at the new pit top area. Effluent from the treatment plant will be chlorinated and disposed of by spray irrigation on the forested hill about 100 metres north of the proposed mine surface facility area.

d) Compressed Air

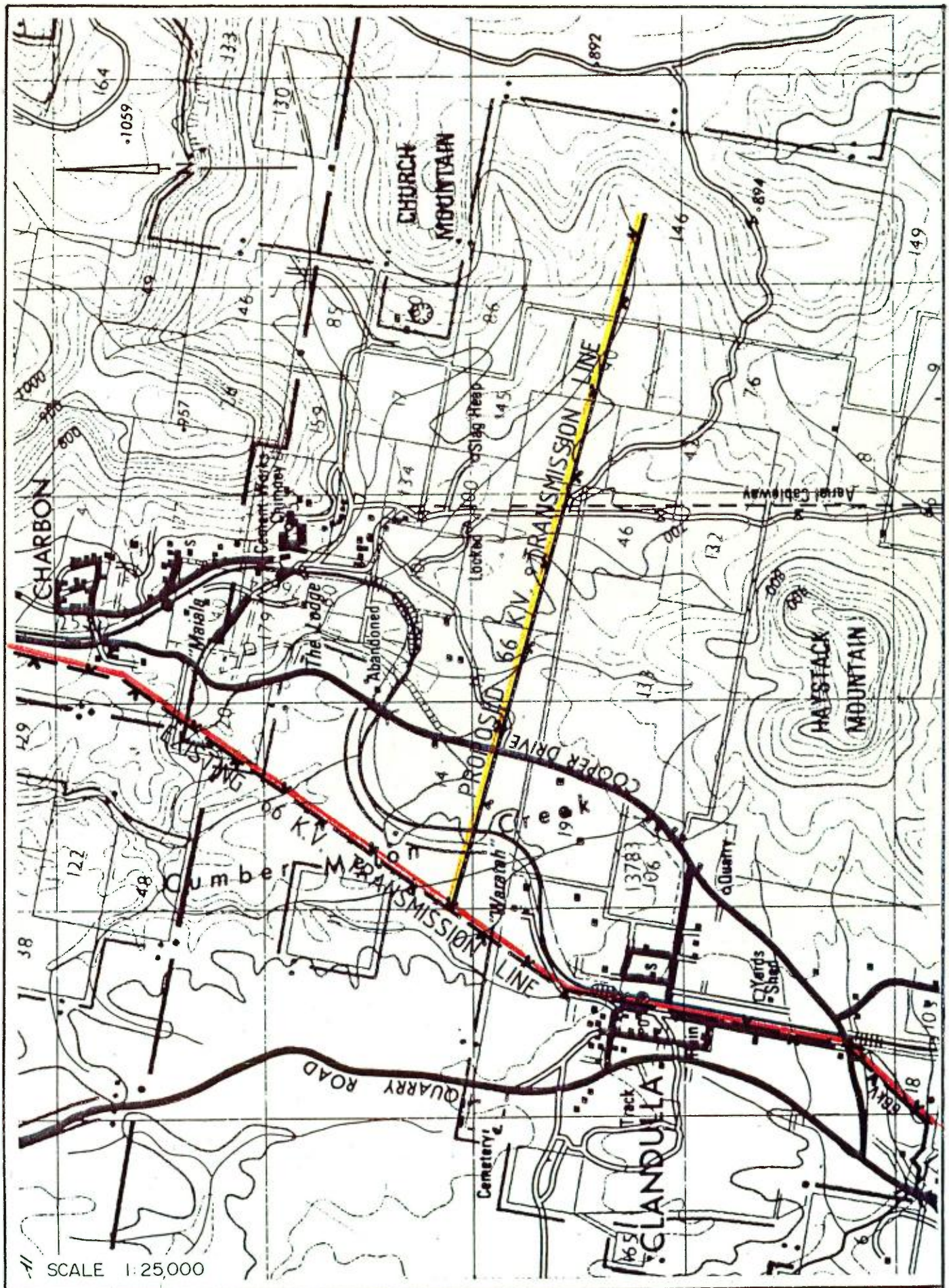
Some underground mining machinery, such as drills, utilise compressed air as an energy source. The mine machinery maintenance workshop also requires compressed air to operate air-powered hand tools, inflate pneumatic tyres and run equipment such as painting or de-greasing sprays.

A compressor station exists adjacent to the present maintenance workshop at the current pit top area. This compressor station has sufficient capacity to supply the compressed air needs of the proposed Stage I and II developments. Rotary screw compressors are in use because of their high efficiency and low noise emissions. Compressed air will be reticulated to the new pit top via existing pipelines which are located within the mine.

e) Electricity

An electricity supply was provided to the original ventilation return adit as part of its development in 1979. This included a wooden pole supported supply line, terminating at a transformer adjacent to the adit entrance.

The electricity supply will be uprated to serve the new pit top facilities and the expanded underground mining operation. A new supply line will terminate in a switchyard just south of the new pit top facilities. Underground cables will carry power to two small transformers adjacent to the workshop building. The existing transformer will be replaced by uprated equipment which will be enclosed within a "Cyclone" wire fence switchyard safety area. Figure 4.7 shows the location of the new 66 kV electricity supply line. The conceptual sketch which appeared in Section 4.2 also shows the new switchyard location.



LOCATION OF PROPOSED
66 K.V. TRANSMISSION LINE TO
THE NUMBER 2 PIT ENTRY

CHARBON E.I.S.

FIGURE 4-7

f) Lighting, Air Conditioning and Mine Ventilation

Lighting will be provided in all new pit top buildings, and for the pit top surface area and car park. The underground mine will be provided with standard lighting. The mine office building and bath house will be air conditioned and heated using domestic reverse cycle air conditioning units.

Underground mine workings will be ventilated by a single centrifugal fan located at the south eastern corner of the box cut area. The fan will remove air from the underground mine and comply with the Coal Mines Regulation Act (1912) as amended. The ventilation fan will run continuously to maintain underground mine safety. A sound level of 73 dB(A) at 15 metres is anticipated for the fan. Centrifugal fan noise has generally been found to be broad-spectrum with no dominant tonal components.

4.10 Environmental Safeguards

a) Air Quality

The potential effect on air quality that could be caused by the proposed development is the generation of coal dust during coal handling operations, or from stockpiles. Control of dust from these sources has been accounted for when designing the coal handling facilities. Fully enclosed conveyors have been specified where practical and all conveyors will be equipped with efficient belt scrapers to minimise potential dust generation. All coal will be sprayed with water containing a surfactant to reduce water surface tension and hence improve dust suppression water spray wetting efficiency.

An efficient water spray system will be incorporated into the coal stockpile design. These sprays will be manually controlled. Spraying will be done when weather conditions that are likely to cause the generation of dust, for example hot windy periods, are experienced.

b) Water Quality

A catch dam will be constructed downslope of the coal stockpile area to intercept runoff from the stockpiles. This dam will have a capacity of approximately 3.6 Ml and retain all water from a one in 10 year return period one hour duration storm.

All sewage from the mine facilities will be treated in a package treatment plant which will ensure that water pollution problems do not arise.

A runoff retention pond will be installed at the south-western edge of the new pit top area. This dam will have a capacity of approximately 1.2 Ml and retain all runoff from the proposed pit top area during a one in 10 year return period one hour duration storm. An oil separator at the mine maintenance workshop will prevent oil and grease entering the pond from this source. Collected oil will be disposed of in an acceptable manner.

Clean water from above the stockpile area and the new pit top facilities will be diverted around these areas by spoon drains. This uncontaminated water will be allowed to enter the natural drainage channels downstream of the colliery development.

c) Noise

Major noise sources of the proposed development that could affect local residents are the coal crusher and screening plants. To minimise noise emissions from this source, the crusher and screening plant building will be a steel framed structure clad with pre-painted steel sheeting. The sound level of this source is anticipated to be 75 dB(A) at 15 metres from the building. A further description and analysis of noise sources at the new coal handling facility area and new pit top is presented in Section 6.

4.11 Housing

Blue Circle Southern Cement will provide housing for the six additional supervisory staff to be employed at the colliery as part of the Stage I development. The Company is planning to construct three houses, and the three other supervisory staff will occupy existing company houses which are shortly to be vacated.

It is proposed to construct the houses in an existing settlement west of the colliery. At present there are 14 houses in this area, 13 of which are owned by BCSC. Nine of the BCSC houses are currently occupied by colliery staff.

An additional 57 non-supervisory personnel will be employed when the Stage I proposal is fully implemented. It is expected that some of these non-supervisory employees may travel from outside the Shire and some may be housed in existing residences while others may seek board in the area, and not require individual houses.

Some non-supervisory personnel may require new houses and desire to live close to their work. These employees will therefore seek housing in Rylstone Shire. All non-supervisory personnel housing is expected to be supplied by private enterprise, and will require the provision of serviced blocks of land.

Natural Systems Research Pty. Ltd. (NSR) were retained to report on the socio-economic issues associated with the proposed development. The NSR report is presented in Appendix 5 of this E.I.S. NSR have suggested that the most appropriate Type I multiplier for projected increased colliery employment is 1.5, indicating that for each new job in the mine 0.5 jobs will be created in the community.

A further 32 houses may be required in the Rylstone Shire after allowing for the predicted multiplier effect of increased employment at the colliery. These additional houses will be required for people in service industries who would be expected to settle in the Rylstone area as a result of greater demands for services in the region caused by increased numbers of employees at the mine.

4.12 Alternatives to the Proposed Development

a) Introduction

This analysis of feasible alternatives to the proposed development is based upon several criteria, the most dominant being economic viability. The alternatives are mainly associated with the implementation of various stages of the proposed development at different times.

At present the colliery has a contract obligation to supply coal to Wallerawang power station till the end of 1983. A further five year contract between BCSC and the Electricity Commission is currently being negotiated. This new contract, if agreed, may account for approximately 40 percent of the 750,000 t.p.a. production rate proposed for the Stage I Charbon colliery development. Supply of raw coal to other local customers is also anticipated. Development of power stations in the general region of the colliery, for example Mt. Piper, will also create additional demands for raw coal. The colliery will aspire to supply a proportion of the Mt. Piper power station's coal requirements.

In addition, Charbon colliery anticipates entering the export coal market in the future. As the export coal market primarily requires cleaned coal, the colliery may need to install a coal washery at this time. The Port Kembla coal loader, which is the anticipated port of export, has train unloading facilities and hence the proposed Stage II rail loading facilities at the colliery will allow export coal to be transported by rail.

b) The Preferred Project

The preferred option is to develop the colliery in stages. Stage I will increase the run of mine coal production rate to 750,000 t.p.a. Product (raw) coal will be transported to domestic customers by road. Stage II development will follow after 1985 and include the provision of a rail loop and rail loading facility. This will minimise the volume of coal trucked to customers. Future development may include a coal washery and increased coal production rates.

This preferred staged development allows the colliery to take advantage of existing and anticipated demands for raw and washed coal respectively, while maintaining development costs within acceptable economic limits. It also allows the colliery to accommodate factors beyond its control, such as the availability of customer rail receival facilities.

c) Alternatives

The range of feasible alternatives to the preferred development proposal include the following:-

i) Enter the export coal market immediately, and hence install a coal washery and a rail loop at the colliery as part of the initial development.

While entrance to the coal export market is desirable, this entry can only take place following lengthy negotiations with customers; it would be unwise for the colliery to install both a washery and rail loop at this stage, solely based upon an anticipated market. Other factors, such as the availability of additional power supplies, preclude this combined development from occurring immediately.

ii) Train unloading facilities being provided by the Electricity Commission at Wallerawang power station, allowing BCSC to install a rail loop at the colliery in Stage I.

This would be an environmentally acceptable alternative as it would allow the coal supplied to the power station to be transported by rail. However, the colliery is not in a position to influence Electricity Commission policies. Therefore the colliery must continue trucking coal to Wallerawang, or to other local power stations, until these customers install rail receival facilities.

iii) Install a rail loop at Charbon colliery as part of the Stage I development and take coal by rail to an intermediate stockpile close to Wallerawang power station. From here coal may be transported over a relatively short distance to the power station by truck or conveyor.

Charbon colliery would incur heavy economic penalties if it implemented this alternative. These penalties would be associated with both multiple-handling and transportation costs, and capital expenditure on the second rail loop and associated coal handling facilities.

In addition, the provision of an intermediate coal stockpile and rail unloading facilities may occur as part of anticipated local power station development. Charbon colliery will install a rail loop and train loading facilities at the colliery when this development occurs, assuming other factors have not required the rail loop to be installed at an earlier time.

iv) Postpone the proposed development.

Coal would continue to be trucked to Wallerawang at the current rate, and no colliery expansion would occur at the present time.

v) Not develop the colliery at all.

This "no action" alternative would preclude development of the mine operation and penalise the viability of the present operation. This penalty would be incurred through the loss of projected economies of scale, and hence competitive advantage, in current and future markets.

There would also be a loss of employment opportunities and possibly some reduction in employment if the positions for which men are in training do not eventuate.

4.13 Energy Requirements

The existing maximum demand for electricity at Charbon colliery is 0.83 MVA and the electricity consumption is 6.0 kWh/t of coal produced. The Stage I development can be accommodated within the 2.6 MVA maximum demand which is currently available in high voltage supply lines to the area, subject to reduced voltage starting of electric motors which are rated at 220 kW or above. The additional energy will be required for the duplication of underground mining equipment, enlarged conveyor systems, coal crushing equipment and amenities and other services.

There will be insufficient power available to operate the additional conveyors associated with train loading, which forms part of the proposed Stage II development, until the Ilford bulk supply point and high voltage transmission line to the Kandos sub-station are established in about three years.

It is envisaged that a total electricity demand of about 3.0 MVA will be required for operating Stages I and II.

Total colliery energy consumption, including liquid fuels, is anticipated to be about one percent of the energy contained in product coal.

SECTION 5

DESCRIPTION OF THE ENVIRONMENTAL EFFECTS DURING THE CONSTRUCTION PHASE OF THE PROPOSED DEVELOPMENT

5. DESCRIPTON OF THE ENVIRONMENTAL EFFECTS DURING THE CONSTRUCTION PHASE OF THE PROPOSED DEVELOPMENT

5.1 Air, Water and Noise

a) Introduction

Construction activities associated with the proposed development will take place in two discrete areas which are approximately one kilometre apart. These are the existing coal stockpile area and the existing ventilation return adit area.

A single house located on the eastern side of the disused aerial cable way is the closest residential building to the areas of proposed development. This house is approximately one kilometre west of the existing pit top and two kilometres north west of the existing ventilation adit. Thirteen other houses located west of the colliery pit top are at a similar distance from the areas of proposed development.

Excavation and grading of the box-cut area adjacent to the existing ventilation return adit, and construction of two repair adits, is being carried out under previously obtained development approvals. Excavation, levelling and cutting for the rail loop in the general area of the existing coal stockpiles is subject to approval under the Stage II Development Application which shall be accompanied by this E.I.S.

b) Air

Dust generation in the area of the new box-cut and adits has not been observed to cause a problem during current excavation and grading operations. It is unlikely that winds will transport dust from the box-cut area towards the residential area. This is attributed to the adjacent mountain range acting as a wind break against south-easterly winds experienced over the general region, for example at Mudgee.

Because of the position of residential areas in relation to the existing coal stockpile area it is unlikely that generation of dust during excavation and levelling works associated with new structures and the rail loop will cause annoyance. This prediction is based on previous observations by colliery staff of coal handling operations in the stockpile area and observed local wind patterns. If required, water sprays will be used in this area to suppress dust generation. Unsealed road areas will be sprayed regularly from a mobile water tanker as necessary to minimise the generation of dust by construction vehicle movements.

c) Water

Natural drainage channels in the vicinity of the two proposed construction areas lead into Reedy Creek Dam, located some two kilometres west of the existing pit top area.

Water flows in natural drainage channels downslope of the existing stockpile area are minimal, due to the capture of upslope runoff by an aquifer above the pit top area. In the past only very small quantities of coal fines have been washed down slope from the stockpile areas following rainfall. Generally coal fines which become entrained in runoff are prevented from entering Reedy Creek Dam by vegetation in grassed paddock areas downslope of the stockpiles. Based upon this observation of minimal coal fines transportaion it is unlikely that excavation work in the stockpile and rail loop area will cause any significant increase in sediment transport rates into Reedy Creek Dam. However, should sediment be carried into Reedy Creek Dam the dam will act as a sedimentation basin and prevent downstream effects.

Similarly, the area currently being excavated for the box-cut and repair adits has not been observed to significantly increase the rate of sediment transport into Reedy Creek Dam when compared to previous rates of transportation.

d) Noise

The houses located approximately one kilometre west of the existing colliery pit top area are, except for one, owned by Blue Circle Southern Cement. These houses have been established as part of previous colliery development. The most westerly house of this group of fourteen residences is located less than 100 metres away from the main Mudgee railway line. The most easterly house is approximately 500 metres from the railway line. These houses are also within 200 metres of the colliery haul road. On average, a loaded coal truck passes these houses every 15 minutes each week day during the daytime.

Residents have also been accustomed to noise from train movements on the adjacent railway line and general noises associated with the existing colliery operation.

Due to their distance from the construction activities it is unlikely that the residents of the houses will be affected by noise generated during the construction phase of the proposed colliery development.

Machinery operations will normally be restricted to between 7 a.m. and 6 p.m. on week days. Any blasting required will be done at scheduled times of the day and all residents will be made aware of proposed blasting schedules.

5.2 Flora and Fauna

Excavations for the box-cut made it necessary to remove approximately five hectares of pasture grass land and a few scattered trees.

The small area of pasture which has been removed during the box-cut excavation is representative of the surrounding grazing land. Its loss is therefore not significant when compared to the extent of surrounding grazing land. Removal of the small number of trees is also insignificant when compared with the abundant resource of natural forest in the adjacent Kandos State Forest. The hillock to the west of the box cut area also retains much of its original vegetation.

Existing coal stockpile areas have been constructed on colliery land adjacent to the existing pit top area. This land is occasionally grazed by local stock. The proposed development of the stockpile area and rail loop will also be on this land. It is unlikely that any trees will have to be removed to allow the proposed stockpile or rail loop development to proceed. Land disturbance during construction of the proposed development will be minimised by good site management practices. This will ensure that the surrounding land is not degraded visually or physically, for example by soil erosion.

Animal species dependent on the availability of pasture areas will not have their habitat restricted to any significant extent as similar habitat is available in abundance close by.

5.3 Employment

Construction of the proposed development will take place in two stages. Currently, the approved box-cut excavation work is well advanced. The Stage I development will involve expanding this box-cut area and constructing an office, workshop, bath house and mine vehicle parking shed. Existing coal handling facilities will also be modified as part of the Stage I development. Further modification of coal handling facilities and construction of a rail loop will occur in Stage II.

It is expected that the number of construction personnel required for the development will be similar to that found necessary at other colliery development sites. A Stage I peak of 50

construction personnel may be required at Charbon. This peak will be reached during dismantling and re-aligning the existing run of mine surge bin coal reclaim conveyor and installing the proposed new run of mine coal handling facilities in the existing coal stockpile area. Stage II development will also require a similar number of construction personnel. Stages I and II are expected to take six months each to complete.

The construction workforce will be recruited by the construction contractor. These personnel are expected to commute to the site from as far as Lithgow. The source of these personnel will depend on the skills required and personnel availability. Local construction personnel will also have an opportunity to be employed during the construction phases of the proposed development.

As the construction workforce is expected to commute daily to the site a construction camp for these personnel will not be required.

5.4 Land Zoning

Proposed Stage I expansion of Charbon Colliery will require up to 63 new personnel at the mine by mid 1983. Of these, approximately six personnel will hold supervisory staff positions. Blue Circle Southern Cement will provide housing for the six supervisory staff. However, the remaining 57 personnel will need to find their own housing.

Some 139 ha of land at Charbon was recently transferred to Rylstone Shire Council by Blue Circle Southern Cement for use as a residential area. This area will need to be rezoned Urban Residential if it is to be used for housing.

Blue Circle Southern Cement proposes to expand the small settlement of 13 supervisory staff houses and one private house, located west of the colliery, to 17 dwellings. This area will be used for housing additional colliery supervisory personnel. Rezoning to Urban Residential of approximately eight hectares of land embracing this settlement and proposed extensions to it, as shown in Figure 4.1 in Section 4.2, will also need to be obtained. The rezoning of this established settlement, including the proposed extension, would be timely. Supervisory personnel from the colliery have chosen to live in this area because of its amenity to them. As they are sometimes required to attend the colliery at odd hours or short notice it is also convenient to them.

Approximately 95 additional houses may be required in the Rylstone Shire, after accounting for the multiplier effect of employing 63 additional personnel at Charbon Colliery. Allowing for the three houses to be built by Blue Circle Southern Cement for three supervisory staff and three other new supervisory staff occupying existing houses, approximately 89 new homes may need to be constructed by private enterprise assuming all personnel will require new housing. Additional land to that recently transferred to the Council may also need to be rezoned Urban Residential to accomodate the projected housing demand.

Planning consultants Jackson Teece Chesterman Willis and Partners have been engaged by Rylstone Shire Council to identify factors, for example land zoning, relevant to preparing a Local Environmental Plan for the Shire. BCSC has discussed their proposed development plans with the consultants who will account for the above land zoning requirements when advising Council.

SECTION 6

DESCRIPTION OF THE ENVIRONMENTAL EFFECTS OF OPERATING THE PROPOSED DEVELOPMENT

6. DESCRIPTION OF THE ENVIRONMENTAL EFFECTS OF OPERATING THE PROPOSED DEVELOPMENT

6.1 Air, Water and Noise

a) Air

Prevention of coal dust generation and emission from the colliery has been an important design parameter for the proposed changes to the existing coal handling facilities.

All conveyors and conveyor transfer points, except at the run of mine conveyor discharge point where it is operationally impractical, will be enclosed. Water sprays will be provided on the run of mine coal conveyor which feeds onto the run of mine coal stockpile. A hood will be provided at the run of mine conveyor discharge point to ensure coal falls vertically onto the stockpile, minimising the possibility of dust becoming entrained during windy conditions.

Efficient belt scrapers will be fitted to all conveyors to reduce the amount of coal dust adhering to the return side of the belt, further reducing the potential for dust generation.

Coal stockpiles will be provided with water sprays to prevent dust being transported from stockpile areas by wind. These water sprays will be manually activated when potential dust generation situations occur, for example in dry and windy conditions.

Run of mine coal will be sprayed with a surface active agent (surfactant) as necessary to assist in binding fine dust to coal fragments and promote stockpile surface crusting after stacking and shaping the stockpiles. The surfactant acts primarily by reducing the spray water surface tension, and hence greatly improves the spray wetting efficiency. The surfactant will be re-activated by the water sprays used for dust suppression in the coal stockpiles, and will allow efficient control of dust emissions from the stockpile area.

Water sprays, which also contain surfactant, will be provided to wet the coal prior to its departure from the crusher building, further reducing dust generation.

Coal stockpile sizes will be the minimum practical size compatible with proposed colliery operations. This minimal size reduces the time that stockpiles are left unworked, and hence minimises the potential for temperatures to increase and cause spontaneous combustion. During extended shut downs of stockpile reclaiming operations temperatures in the stockpiles will be monitored. Should a temperature rise be noted, bulldozers will be used to move the coal, allowing it to cool, and re-shape the stockpile. Prevention of spontaneous combustion will minimise the already low potential for bushfires to occur as a result of colliery operations.

From previous experience of well managed colliery operations and taking into account the efficient air pollution control measures to be employed at the colliery, it is considered that the effect on air quality of operating the expanded colliery will be minimal.

b) Water

Safeguards to be utilised at the colliery will ensure that no "dirty" water is discharged into natural drainage channels at either the new pit top area or the expanded coal handling facilities. These safeguards will minimise the emission of contaminants such as coal fines or oil.

All sewage from the proposed new pit top facilities will be treated in a standard package sewage treatment plant. Chlorinated effluent from this plant will be disposed of by spray irrigation on a hill located some 100 metres north of the proposed pit top area. Due to local sub-soil conditions, a package plant is preferable to a septic tank for sewage treatment at the new colliery pit top facility.

Oil will be collected by a separator at the mine maintenance workshop. A stormwater catch dam will be located on the western edge of the new mine surface facilities lease area as shown on Figure 4.3 which appeared in Section 4.2 (b). This dam will have a capacity of approximately 1.2 Ml and retain all water from a one in 10 year return period one hour duration storm.

All "clean" water runoff from upslope of the new pit top facility and the expanded coal handling facilities will be diverted around these areas by spoon drains.

Runoff from the expanded stockpile area, generated by both rainfall and the dust suppression sprays, will be collected by a catch dam within the area proposed for the Stage II rail loop. This catch dam, which is shown in Figure 4.1 of Section 4.1, will have a capacity of approximately 3.6 Ml and ensure that coal fines do not enter natural drainage channels.

Based on the above water pollution control measures it is concluded that the proposed development will not cause any significant variation in the water quality of natural drainage channels or Reedy Creek Dam.

c) Noise

The crusher and screening plants are the potentially dominant noise sources of the proposed Stage I development. These facilities will be housed in a single building which will be located approximately 650 metres from the closest residence. Operation of the crusher and screening plants will be restricted to between 7 a.m. and 6 p.m. on week days.

To minimise sound transmission from the crusher and screening plant to nearby residences, the crusher and screening plant building will be a steel framed structure clad with pre-painted steel sheeting.

Cladding will ensure that the maximum sound level transmitted will not exceed 75 dB(A) at 15 metres from the building walls. Allowing for the effect of distance, a typical outdoor sound level of 42 dB(A) is expected at the nearest residence due to noise emissions from the crusher and screening plant. Typical indoor sound levels caused by this source will be about 30 to 35 dB(A) depending upon the type of housing construction, window area, etc.

Table 6.1

Expected outdoor sound level perceived at the nearest residence due to Stage I Surface Coal Handling Facility stationary noise sources.

SOURCE	EXPECTED MAX. CONTINUOUS SOUND LEVEL dB(A) AT 15 m	DISTANCE TO NEAREST RESIDENCE (m)	EXPECTED OUTDOOR SOUND LEVEL dB(A) AT NEAREST RESIDENCE
1	70	812	35.3
2	68	725	34.3
3	65	612	32.8
4	71	621	38.6
5	68	638	35.4
6) 7)	75	658	42.2
8	68	718	34.4
9	70	765	35.8

The total expected outdoor sound level at the nearest residence, based upon stationary sources 1 to 9, will be 46.2 dB(A). These sources are as follows:

1. Existing R.O.M. Coal Surge Bin
2. R.O.M. Coal Conveyor
3. R.O.M. Coal Stockpile
4. Three Vibratory Coal Reclaim Feeders
5. R.O.M. Coal Reclaim Conveyor
6. Vibratory Screen
7. Crusher
8. Raw Coal Conveyor
9. Existing Truck Loading Bin

(N.B. Numbers relate to Table 2.2 and Figure 2.1)

Table 6.1 shows anticipated sound levels at the nearest residence due to various Stage I surface coal handling facility stationary sources. Operation of the crusher and screening plant in combination with other equipment in the new surface coal handling facility area, such as the vibratory feeders and conveyors, will result in a combined sound level of approximately 46 dB(A) being perceived at the nearest residence. This operational sound level of 46 dB(A) will be below the 50 dB(A) calculated background daytime sound level (AS 1055 category R2) when the proposed Stage I development is implemented.

Plant and machinery at the proposed Stage I new pit top area will not cause any increase in the sound level predicted at the nearest residence when surface coal handling facilities are in operation. For example the centrifugal ventilation fan required for mine ventilation will be the only continuous noise source at the new pit top. This fan is expected to emit a sound level of no more than 73 dB(A) at 15 metres. Fan noise attenuated over the two kilometres distance between it and the nearest residence will be perceived at the residence as only approximately 30 dB(A) and will have no measureable effect on ambient sound levels.

Future operation of coal trains transporting coal from the colliery during Stage II will not cause any greater disturbance to residents than existing train movements on the adjacent Gwabegar-Wallerawang railway line. Train arrivals will be on a regular basis, as scheduled by the State Rail Authority. Trains will move with reduced speed around the rail loop, load coal and depart at low speed to eventually join the main line. Train loading will take place in a five metre deep cutting, as shown in Figure 4.5 which appeared in Section 4.3. This feature will have a positive attenuation effect on noise generated during train loading operations resulting in a sound level of approximately 36 dB(A) being perceived at the nearest residence. The total sound level due to Stage II surface coal handling facility stationary sources will be perceived as approximately 43 dB(A) at the nearest residence.

Table 6.2

Expected sound level perceived at the nearest residence due to the Stage II component of Surface Coal Handling Facility stationary noise sources.

SOURCE	EXPECTED MAX. CONTINUOUS SOUND LEVEL dB(A) AT 15 m	DISTANCE TO NEAREST RESIDENCE (m)	EXPECTED SOUND LEVEL dB(A) AT NEAREST RESIDENCE
11	68	622	35.6
12	65	578	33.3
13	71	602	38.9
14	68	670	35
15	70	734	36.2

Total expected sound level at the nearest residence, based upon stationary sources 11 to 15, will be 43.2 dB(A). Therefore the combined sound level at the nearest residence due to Stage I and II stationary sources will be 48 dB(A). Stage II sources are as follows:

11. Raw coal conveyor
12. Raw coal stockpile
13. Raw coal reclaim feeders
14. Raw coal reclaim conveyor
15. Train loading bin

(NB. Numbers relate to Table 2.3 and Figure 2.1)

Table 6.2 shows the expected Stage II component of surface coal handling facility stationary source sound levels. The combined sound level due to Stage I and II surface coal handling facility stationary sources will be perceived as 48 dB(A) at the nearest residence.

This level is below the calculated background sound level of 50 dB(A) for daytime (0700 - 1800 hrs) in noise area category R2 as defined in AS 1055 - 1978.

6.2 Aesthetics

Proposed new pit top facilities for the Stage I development will be visible from both Cooper Drive and the Gwabegar-Wallerawang railway line. The pit top will not be easily visible from the 14 house settlement located west of the existing Charbon colliery pit top.

Pit top buildings such as the bath house, office and workshop will be clad with pre-painted steel sheeting. The colour of this sheeting will be selected from the standard range so that these buildings do not form a conspicuous landscape feature.

Although it is stated in Section 4.8 that the office and bath house will have bright galvanised steel roofs to help reduce internal building temperatures during summer, these flat roofs will not be visible from normal viewing positions. Reflectance from these roofs will not therefore be observable from the railway line, Cooper Drive or the 14 house settlement.

The roof of the workshop building will be peaked to allow a hoist to be used. The workshop roof will be clad with pre-painted steel sheeting which is the same colour as the building's external walls, thus reducing the potential for reflectance to cause a visual intrusion.

The western side of the new pit top facilites will be landscaped with trees, shrubs and lawns. This landscaping will further reduce the potential visual intrusion of pit top facilites when viewed from the normal observation positions described above. Landscaping at the pit top area will also contribute to maintaining a tidy work place and minimise the potential for soil erosion.

An oblique conceptual sketch of the proposed new pit top facilites, which appeared in Section 4.2, demonstrates the minimal intrusion these facilites will have on the existing visual environment.

Modifications to existing surface coal handling facilities will also be designed so that colliery structures do not visually intrude upon the existing aesthetic environment. The proposed Stage I development will see construction of a new crusher and screening plant building, new conveyors and modifications to existing coal stockpile arrangements.

The crusher and screening plant building cladding and cladding of the enclosed conveyors will be prepainted in a standard colour which will ensure these structures are not visually obtrusive against the high mountain background.

Raw coal is currently stored in two stockpile areas downslope of the truck loading bin. This arrangement will be modified as part of the Stage I development so that a single run of mine coal stockpile will be located south of the new crusher and screening plant building. This single stockpile will be managed by re-shaping with earth moving equipment to ensure a minimum size conistent with prevailing mine operations.

The proposed Stage II development will entail the construction of a rail balloon loop, train loading bin, additional enclosed conveyors and the provision of a raw coal stockpile.

The train loading bin and additional enclosed conveyors will be painted in a similar colour to the new crusher and screening plant building and other facilities existing at the time the proposed Stage II development is implemented. This will ensure these facilites do not intrude unduly on the visual environment. The raw coal stockpile will be managed in a similar way to the Stage I run of mine coal stockpile, ensuring the stockpile is maintained at a minimum size consistent with mine operations.

6.3 Socio-Economics

a) Housing

Except for the six supervisory staff who will be employed at Charbon colliery as part of the proposed Stage I development, all other new employees taken on at this stage will need to find their own housing.

The six supervisory staff will be housed in the existing settlement area west of the existing Charbon colliery pit top. Three of the supervisory staff will be accommodated in existing dwellings owned by Blue Circle Southern Cement. These dwellings are soon to be vacated by the current temporary tennants. Three additional dwellings will therefore need to be constructed in the settlement area by BCSC.

Rezoning of the above settlement area to Urban Residential will be sought by Rylstone Shire Council to allow the required three additional houses to be constructed in this area by BCSC.

Private enterprise will supply up to 57 additional houses in the Shire for the non-supervisory staff proposed to be employed when the Stage I development is implemented.

In January 1982 only two building contractors were based in Rylstone Shire. It is therefore likely that contractors from outside the Shire, based for example in Lithgow or Mudgee, may meet the assumed housing demand. These two alternative building contractor sources are about 90 minutes and 50 minutes travelling time from Rylstone respectively. This travelling time is not considered excessive, as builders normally have to travel some distance to various construction areas on which they work.

Based on the socio-economic analysis carried out by Natural Systems Research Pty. Ltd. (NSR), which is presented in Appendix 5, it is believed that up to 32 additional employment opportunities may be generated in Rylstone Shire through the multiplier effect of employing 63 new personnel at Charbon colliery as part of the proposed Stage I development. This implies that up to 32 more houses may be required in the Shire, in addition to the 57 houses possibly required for new non-supervisory mine employees. Anticipated housing requirements due to the multiplier effect could provide further opportunities for the regional building industry.

b) Urban Services

The NSR evaluation of existing services in Rylstone Shire has shown that water supply and sewage treatment facilities will be adequate to serve all the projected Stage I employees and their families, as well as those personnel who move into the Shire as a result of the multiplier effect, if these people choose to live only in Kandos or Rylstone. However, if new colliery employees choose to live in Charbon, as predicted by NSR, the existing water supply and sewerage system will require upgrading.

Existing garbage disposal facilites have adequate capacity to assimilate the anticipated increased demands caused by the 10 percent population increase predicted by NSR.

Rylstone Shire Council may seek to recover the cost of upgrading water supply and sewerage services by revising its rating schedule for new housing blocks. Alternatively, the Council may seek to enter into some form of loan guarantee arrangement with Blue Circle Southern Cement to ensure that the Council's immediate financial committment necessary for upgrading urban services can be met.

The capacity of the Shire's recreational facilities to cater for the projected population increase was also evaluated by NSR. The consultant believes that Windemere Dam will partly meet the increased demand for outdoor recreational facilities. It was determined that indoor sporting and recreational facilites may experience significantly higher demand pressures as a result of population increases associated with the Stage I expansion at Charbon colliery.

NSR has determined that the existing welfare services will be adequate to cater for the projected minimal increase in demand. However, the number of rented dwellings in the Shire may disguise a potential difficulty for low income renters to cope with rent payments as the rental market becomes more competitive.

c) Educational Facilities

NSR has determined that up to 143 children of school age or younger could come into the Shire as a result of direct and indirect employment associated with the proposed Stage I development at Charbon colliery. School age children will be placed at the Kandos or Rylstone primary Schools, or Kandos High School.

Based upon current student/teacher ratios it is predicted by NSR that up to eight additional school teachers will be required in the Shire.

It is also anticipated that Kandos Primary School will need to be relocated to the site which has been allocated for this purpose when the anticipated expansion becomes necessary.

There is one pre-school, located at Kandos, currently operating in Rylstone Shire. This pre-school is operated by a community based committee and caters for children between three and five years old. The pre-school is licensed to take up to 20 children per session and can run up to eight half-day sessions per week. Rylstone Shire Council owns and maintains the pre-school building and the pre-school receives a State government subsidy towards operating expenses.

Advice from the Deparment of Youth and Community Services Early Childhood Adviser (Central West Region) located at Bathurst suggests that the existing pre-school could cater for predicted increased demands, if up to one third of the 143 new children were to require pre-school education. Should demand be greater, the pre-school would need to expand.

Due to current building alteration restrictions, any expansion of the pre-school would have to be accompanied by major renovations. If expansion was neccessary, finance was available and demand was sufficient the pre-school could convert to a Neighbourhood Children's Centre. Such a centre would provide crèche facilities, long day care, occasional care, pre-school education, before and after school care and school holiday care.

At present there are no formal crèche facilities for working mothers in the Shire. However, no demand for such services has been identified as the number of working mothers is very small.

d) Health Services

The NSR study has shown that existing ambulance, domiciliary care and day care facilites have an adequate capacity to absorb additional demands brought about by direct and indirect population increases associated with the development of Charbon colliery.

NSR has determined that an additional three beds may be required at Rylstone Hospital unless a nursing home is established in the Shire.

Additional general practioners may also be required in the Shire to cater for the predicted population increase. The NSR report did not specify the number of additional practitioners.

No significant increase in demand for services for the elderly is expected as a result of expansion at Charbon colliery. The consultant has qualified this assessment as it is not known what proportion of people living in rented accommodation are elderly and therefore contributing to a demand for existng services.

e) Employment

The proposed Stage I expansion of Charbon colliery will create a demand for 63 new personnel at the mine. This is approximately half the number of personnel laid off by BCSC in 1977 when their Charbon Cement Works was closed. This closure was the result of a general downturn in the cement industry. BCSC regards the new employment opportunities at Charbon colliery as a partial recovery of the previous retrenchments. Up to 32 other employment opportunities could arise indirectly within Rylstone Shire as a result of the predicted multiplier effect associated with direct employment at the colliery.

These 63 direct and 32 indirect employment opportunities could result in the Shire's population increasing by up to 333 people by mid-1983. This number assumes each of the 95 newly employed people will desire to live in the Shire and have a spouse and 1.5 children of school age or younger.

Based on the analysis undertaken by Natural Systems Research (NSR) it is possible that many new vacancies at Charbon colliery could be filled by people already employed within the Shire who are attracted by higher earnings offered by the coal industry. New people coming into the Shire may therefore be filling vacancies created by the transfer of personnel from existing employers to the colliery. The above predicted increase in the Shire's population will, however, be approximately correct whether new residents are employed by BCSC or other local employers.

NSR has noted that if BCSC policy was to preferentially employ local personnel, this may have a substantial impact upon other employers in the Shire. This may result in other employers within the Shire developing a less than favourable attitude towards the proposed Stage I development.

In December 1981 the Commonwealth Employment Service (CES) office reported that 81 adult males were unemployed in Rylstone Shire. This represents approximately two percent of the Shire's population. Of 136 applications for employment already received by the colliery from people anticipating the colliery's requirement for additional personnel, only 28 people were unemployed at the time of making their application. NSR does not expect that the proposed expansion of the Charbon colliery workforce will directly affect the number of unemployed people within the Shire.

Final selection of employees to be taken on at the colliery as part of the Stage I expansion will be made on criteria such as coal industry experience, current skills and stability of employment.

Whether the colliery decides to employ local people already living in the Shire or new people from outside the Shire will depend upon an analysis of the costs and benefits of these two alternatives. Factors to be considered will include the colliery's relationship with other employers, stability of the workforce, employee industrial attitudes, community attitudes and availability of suitable personnel.

New personnel taken on at Charbon colliery will be trained by BCSC so that by 1984 the colliery could be producing up to 750,000 t.p.a. of coal. The total coal production of 500,000 tonnes projected for 1983 has been calculated on the basis that new personnel will be undergoing training at this time, and will therefore not have all necessary skills to achieve the higher production rate projected for 1984. The tonnage produced in 1983 will also be influenced by the timing of proposed expansion, for example commissioning the second continuous miner.

In addition to employment opportunities at the colliery or in service industries within the Shire additional opportunities outside the Shire for people such as trucking contractors will also be created. These employment opportunities have been considered when determining the indirect employment multiplier effects of the proposed colliery expansion.

6.4 Traffic

a) Stage I

The most recent Department of Main Roads (DMR) data available for roads in Rylstone Shire is provisional Annual Average Daily Traffic (AADT) data for 1980. This data includes the AADT count for a full 24 hour period but does not differentiate between cars and trucks or week days and weekends. AADT count data for Mudgee Road (Trunk Road 55) and Rylstone Road (Main Road 215) was presented in Table 3.2 of Section 3.10 and the location of the relevant DMR monitoring positions was shown in Figure 3.9 in the same section.

Charbon colliery currently produces coal at a rate of 286,000 t.p.a., which is about twice its 1980 production rate. Current production rates result in an average of 55 truck loads of coal being produced by the colliery each week day, based on a 24 tonne truck capacity and 220 working days per year. Therefore 110 heavy vehicle movements per day over 220 working days are attributable to coal trucks currently taking coal from Charbon colliery to Wallerawang power station and returning to the colliery. On an annual average daily basis these traffic movements are equivalent to 67 per day, calculated as follows:

$$\frac{(110 \text{ Truck Movements/Day}) \times (220 \text{ Days/Year})}{(365 \text{ Days/Year})}$$

$$= 66.3 \text{ Truck Movements/Day AADT}$$

(i.e. 67, as fractions must be counted as single trucks).

The provisional 1980 AADT count for Rylstone Road (Main Road 215) at DMR monitoring position S99293, located 0.8 kilometres east of the Mudgee Road (Trunk Road 55), is 590 vehicle movements. This figure includes approximately 34 AADT truck movements associated with Charbon colliery in 1980.

The proposed Stage I development at Charbon colliery will increase the coal production rate to 750,000 t.p.a. by 1984. This will result in an average of 143 truck loads of coal being produced by the colliery each working day. Additional two-way coal truck traffic will result in the total AADT count increasing by only 30 percent above the existing level.

While this increase may be considered significant in terms of potential road maintenance costs to Rylstone Shire Council, due to the effect of additional heavy traffic, Blue Circle Southern Cement considers this economic impact can be reduced to a level acceptable to the Council. BCSC has already held preliminary discussions with Rylstone Shire Council regarding Company contributions to the Council's future road maintenance costs attributed to proposed additional heavy vehicle traffic from Charbon colliery. At this stage no formal agreement has been reached between the Council and BCSC.

Trucks travelling between Charbon colliery and Wallerawang power station also use roads within the Greater Lithgow Shire Council area. Additional traffic in this local government area will be insignificant as only major roads will be utilised. For example at the DMR traffic measuring station near Marangaroo, station number 99084, a provisional AADT count of 4060 was obtained for 1980. The additional truck traffic discussed above represents only four percent of this 1980 annual average daily traffic volume.

Rylstone Shire Council has indicated its concern for safety aspects associated with coal truck traffic. These aspects include ensuring that coal truck axle loadings do not exceed gazetted regulatory standards and that trucks do not exceed road speed limits.

It is expected that the coal will be trucked by haulage contractors whose actions are essentially remote from BCSC influence. However, when BCSC selects haulage contractors for transporting additional coal to Wallerawang, the colliery will seek to engage a reputable contracting company whose employees will observe axle loading regulations and road speed limits. In addition, BCSC will only pay a haulage contractor for the load of coal able to be carried legally by his truck. This will remove the incentive for haulage contractors to overload their vehicles and ensure that truck axle loading regulations are observed.

As well as heavy vehicle traffic, an increase in private vehicle traffic is also anticipated due to new colliery employees driving to work. The 57 non-supervisory staff to be employed as part of the Stage I development will be expected to live in Rylstone, Kandos or Charbon as discussed previously in Section 6.3. This traffic will cause very little additional wear on the roads in Rylstone Shire when compared to multiple axle heavy vehicle traffic.

b) Stage II

The proposed Stage II development involves constructing a rail loop at the colliery. This will allow a proportion of the colliery's coal to be transported to customers by rail.

Coal production will be maintained at 750,000 t.p.a. following implemetation of the Stage II development. Therefore the number of trucks required to transport coal to customers will decrease in proportion to the tonnage transported by rail.

Stage II development may be implemented after 1985, but this will depend on customer requirements. Because of the uncertainty about customer requirements, and the tonnages which could be transported by rail, it is not possible at present to predict the volume of coal truck traffic which may need to be maintained for Stage II operations.

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APPENDIX 1

METEOROLOGICAL DATA:

WIND, TEMPERATURE, RELATIVE HUMIDITY AND RAINFALL DATA FOR MUDGEE, N.S.W. AND RAINFALL DATA FOR KANDOS, N.S.W.

BUREAU OF METEOROLOGY

SURFACE WIND ANALYSIS FOR MUDGEE, N.S.W.

PERCENTAGE OCCURRENCE OF SPEED VERSUS DIRECTION

BASED ON SIXTEEN YEARS OF RECORDS

STATION: 062021 MUDGEE P.O. 32°35'S, 149°35'E ELEVATION 454.2m

SUMMER

DECEMBER — 0900 HOURS LST — SPEED (km/hr)

CALM 25

DIRECTION	1 TO 5	6 TO 10	11 TO 20	21 TO 30	31 TO 40	41 TO 50	51 TO UP	ALL
N	2	*	*	-	-	-	-	3
NE	8	3	*	*	-	-	-	11
E	5	3	2	1	1	-	-	11
SE	10	7	4	2	1	*	-	25
S	1	*	1	-	-	-	-	2
SW	3	3	1	*	*	-	-	8
W	1	1	1	*	*	-	-	4
NW	6	2	2	1	*	*	-	11
ALL	38	19	11	4	3	*	-	

NUMBER OF OBSERVATIONS = 458

JANUARY — 0900 HOURS LST — SPEED (km/hr)

CALM 25

DIRECTION	1 TO 5	6 TO 10	11 TO 20	21 TO 30	31 TO 40	41 TO 50	51 TO UP	ALL
N	1	1	-	-	*	-	-	3
NE	6	2	1	*	-	-	-	9
E	5	6	3	1	*	-	-	16
SE	15	7	7	3	1	*	1	33
S	1	1	-	*	-	-	-	2
SW	2	1	1	*	-	-	-	3
W	1	*	1	-	-	-	-	2
NW	3	2	1	-	*	-	*	7
ALL	34	20	13	4	2	*	1	

NUMBER OF OBSERVATIONS = 460

FEBRUARY — 0900 HOURS LST — SPEED (km/hr)

CALM 27

DIRECTION	1 TO 5	6 TO 10	11 TO 20	21 TO 30	31 TO 40	41 TO 50	51 TO UP	ALL
N	1	1	*	*	-	-	-	2
NE	4	1	*	*	-	-	-	6
E	6	5	3	1	*	*	-	16
SE	15	13	5	5	2	*	-	39
S	2	1	*	*	*	-	-	3
SW	1	1	-	-	*	-	-	1
W	1	1	-	-	-	-	-	2
NW	2	1	1	-	*	-	-	4
ALL	32	23	10	6	2	*	-	

NUMBER OF OBSERVATIONS = 449

DECEMBER — 1500 HOURS LST — SPEED (km/hr)

CALM 12

DIRECTION	1 TO 5	6 TO 10	11 TO 20	21 TO 30	31 TO 40	41 TO 50	51 TO UP	ALL
N	2	1	*	*	-	-	-	3
NE	4	4	1	1	1	-	-	10
E	2	3	2	1	1	-	-	8
SE	5	5	3	2	1	-	-	16
S	*	2	*	-	-	-	-	3
SW	3	5	4	1	1	*	-	15
W	3	4	2	1	2	*	-	13
NW	8	7	3	1	1	1	*	21
ALL	28	31	16	7	5	2	*	

NUMBER OF OBSERVATIONS = 452

JANUARY — 1500 HOURS LST — SPEED (km/hr)

CALM 16

DIRECTION	1 TO 5	6 TO 10	11 TO 20	21 TO 30	31 TO 40	41 TO 50	51 TO UP	ALL
N	3	1	*	-	-	-	-	4
NE	5	5	2	*	-	-	*	13
E	3	3	3	1	1	-	-	10
SE	6	5	3	2	1	1	*	19
S	1	2	*	-	-	-	-	3
SW	3	2	3	1	*	*	-	10
W	3	5	2	-	*	-	*	9
NW	7	5	2	1	*	-	-	16
ALL	30	28	15	6	3	1	1	

NUMBER OF OBSERVATIONS = 451

FEBRUARY — 1500 HOURS LST — SPEED (km/hr)

CALM 15

DIRECTION	1 TO 5	6 TO 10	11 TO 20	21 TO 30	31 TO 40	41 TO 50	51 TO UP	ALL
N	3	1	1	-	-	-	-	5
NE	8	4	1	1	*	-	-	14
E	3	5	2	1	*	-	-	12
SE	7	8	5	3	1	*	-	25
S	1	1	*	*	-	-	-	3
SW	2	3	2	1	*	*	-	8
W	2	1	1	*	*	-	-	5
NW	5	4	2	1	*	*	-	13
ALL	32	27	14	8	3	1	-	

NUMBER OF OBSERVATIONS = 444

* = OCCURRED, BUT LESS THAN 0.5 PERCENT

LST = LOCAL STANDARD TIME

MARCH — 0900 HOURS LST — SPEED (km/hr)

CALM 31

DIRECTION	1 TO 5	6 TO 10	11 TO 20	21 TO 30	31 TO 40	41 TO 50	51 TO UP	ALL
N	1	*	-	-	-	-	-	1
NE	3	1	1	-	-	*	-	5
E	4	6	2	1	1	-	-	14
SE	17	10	5	3	1	-	*	37
S	2	1	*	-	-	-	-	3
SW	*	1	*	*	-	-	-	2
W	2	*	-	*	*	-	-	2
NW	1	2	*	*	-	-	-	3
ALL	31	21	9	4	2	2	*	

NUMBER OF OBSERVATIONS = 490

APRIL — 0900 HOURS LST — SPEED (km/hr)

CALM 37

DIRECTION	1 TO 5	6 TO 10	11 TO 20	21 TO 30	31 TO 40	41 TO 50	51 TO UP	ALL
N	1	*	-	-	-	-	-	1
NE	2	1	*	*	-	-	-	4
E	5	4	1	*	*	-	-	11
SE	19	9	4	1	1	*	*	35
S	2	1	*	-	*	-	-	3
SW	1	1	1	*	*	*	*	3
W	1	*	*	1	-	*	*	3
NW	2	1	1	*	*	-	-	4
ALL	32	17	7	3	2	1	1	

NUMBER OF OBSERVATIONS = 443

MAY — 0900 HOURS LST — SPEED (km/hr)

CALM 39

DIRECTION	1 TO 5	6 TO 10	11 TO 20	21 TO 30	31 TO 40	41 TO 50	51 TO UP	ALL
N	1	1	*	-	-	-	-	2
NE	2	1	-	-	-	-	-	3
E	3	2	*	*	-	-	-	6
SE	18	8	3	1	*	*	*	31
S	1	*	*	-	-	-	-	1
SW	2	2	1	-	*	*	*	6
W	3	1	1	-	-	-	-	5
NW	3	1	1	*	*	-	*	6
ALL	34	15	7	2	1	*	1	

NUMBER OF OBSERVATIONS = 459

MARCH — 1500 HOURS LST — SPEED (km/hr)

CALM 15

DIRECTION	1 TO 5	6 TO 10	11 TO 20	21 TO 30	31 TO 40	41 TO 50	51 TO UP	ALL
N	2	1	-	-	-	-	-	3
NE	5	4	*	-	-	-	-	9
E	3	5	2	1	1	*	-	11
SE	7	6	6	2	2	1	-	25
S	*	1	*	*	-	-	-	1
SW	6	3	1	-	*	-	-	10
W	3	3	2	1	*	*	-	10
NW	6	6	2	1	*	*	-	16
ALL	31	28	14	6	4	2	-	

NUMBER OF OBSERVATIONS = 480

APRIL — 1500 HOURS LST — SPEED (km/hr)

CALM 22

DIRECTION	1 TO 5	6 TO 10	11 TO 20	21 TO 30	31 TO 40	41 TO 50	51 TO UP	ALL
N	2	*	*	-	-	*	-	3
NE	4	1	1	*	-	-	-	6
E	2	3	1	*	*	-	-	7
SE	7	6	3	1	1	-	*	18
S	1	1	*	*	-	-	-	3
SW	6	4	1	1	1	*	*	13
W	4	3	2	1	1	*	*	11
NW	8	5	2	1	1	*	-	17
ALL	34	23	10	6	3	1	1	

NUMBER OF OBSERVATIONS = 433

MAY — 1500 HOURS LST — SPEED (km/hr)

CALM 20

DIRECTION	1 TO 5	6 TO 10	11 TO 20	21 TO 30	31 TO 40	41 TO 50	51 TO UP	ALL
N	1	1	-	-	-	-	-	1
NE	4	2	*	*	-	-	-	7
E	2	2	1	*	-	-	-	4
SE	5	6	2	3	*	-	-	16
S	2	1	*	*	-	-	-	3
SW	4	4	2	1	*	-	*	12
W	5	5	5	1	*	-	-	17
NW	11	5	3	1	1	*	-	20
ALL	34	25	13	6	2	*	*	

NUMBER OF OBSERVATIONS = 457

* = OCCURRED, BUT LESS THAN 0.5 PERCENT

LST = LOCAL STANDARD TIME

WINTER

JUNE — 0900 HOURS LST — SPEED (km/hr)

CALM 42

DIRECTION	1 TO 5	6 TO 10	11 TO 20	21 TO 30	31 TO 40	41 TO 50	51 TO UP	ALL
N	1	*	-	-	-	-	-	1
NE	5	-	-	-	-	-	-	5
E	2	1	*	*	*	*	-	4
SE	17	7	4	1	*	*	-	29
S	1	1	*	-	-	-	-	2
SW	2	2	1	-	-	*	-	5
W	1	1	1	-	*	*	-	4
NW	4	2	*	*	*	*	-	7
ALL	34	14	7	2	1	1	-	

NUMBER OF OBSERVATIONS = 447

JULY — 0900 HOURS LST — SPEED (km/hr)

CALM 42

DIRECTION	1 TO 5	6 TO 10	11 TO 20	21 TO 30	31 TO 40	41 TO 50	51 TO UP	ALL
N	1	*	-	-	-	-	-	1
NE	3	1	-	*	-	-	-	4
E	4	*	*	*	*	-	-	5
SE	16	3	1	1	1	*	*	22
S	2	1	*	-	*	-	-	3
SW	2	3	2	1	*	-	-	8
W	1	1	1	1	*	*	-	5
NW	6	3	*	*	*	-	-	10
ALL	35	12	5	3	2	1	*	

NUMBER OF OBSERVATIONS = 461

AUGUST — 0900 HOURS LST — SPEED (km/hr)

CALM 39

DIRECTION	1 TO 5	6 TO 10	11 TO 20	21 TO 30	31 TO 40	41 TO 50	51 TO UP	ALL
N	2	1	-	-	*	-	-	3
NE	3	*	-	-	-	-	-	4
E	2	1	*	-	*	-	-	3
SE	16	5	1	*	1	*	-	23
S	1	1	*	-	-	-	-	3
SW	2	2	3	1	*	*	*	9
W	3	1	1	2	1	*	*	7
NW	5	2	1	*	1	-	-	9
ALL	35	13	7	3	2	1	*	

NUMBER OF OBSERVATIONS = 494

JUNE — 1500 HOURS LST — SPEED (km/hr)

CALM 15

DIRECTION	1 TO 5	6 TO 10	11 TO 20	21 TO 30	31 TO 40	41 TO 50	51 TO UP	ALL
N	1	1	-	-	-	-	-	2
NE	3	1	*	*	-	-	-	4
E	3	1	2	*	*	-	-	7
SE	6	6	5	1	1	-	-	18
S	2	1	*	-	-	-	-	3
SW	6	8	3	1	*	*	*	19
W	4	6	2	1	*	-	-	14
NW	10	3	2	*	1	1	-	17
ALL	35	28	14	3	3	1	*	

NUMBER OF OBSERVATIONS = 436

JULY — 1500 HOURS LST — SPEED (km/hr)

CALM 12

DIRECTION	1 TO 5	6 TO 10	11 TO 20	21 TO 30	31 TO 40	41 TO 50	51 TO UP	ALL
N	2	*	-	-	-	-	-	2
NE	5	*	-	-	-	-	-	5
E	2	1	*	-	*	-	-	3
SE	5	1	2	*	1	1	*	10
S	2	2	1	-	-	-	-	5
SW	5	7	3	1	1	*	-	18
W	7	6	4	3	1	*	-	21
NW	10	7	2	1	1	1	-	23
ALL	38	25	13	6	4	2	*	

NUMBER OF OBSERVATIONS = 452

AUGUST — 1500 HOURS LST — SPEED (km/hr)

CALM 14

DIRECTION	1 TO 5	6 TO 10	11 TO 20	21 TO 30	31 TO 40	41 TO 50	51 TO UP	ALL
N	3	1	*	*	-	-	-	4
NE	2	1	1	-	-	-	-	4
E	1	2	1	-	-	-	-	3
SE	4	3	1	-	-	*	-	8
S	2	1	*	*	-	-	-	3
SW	6	7	3	2	1	*	*	20
W	4	7	2	3	1	1	1	19
NW	9	9	3	2	1	1	*	25
ALL	30	30	12	7	3	2	1	

NUMBER OF OBSERVATIONS = 477

* = OCCURRED, BUT LESS THAN 0.5 PERCENT

LST = LOCAL STANDARD TIME

SEPTEMBER — 0900 HOURS LST — SPEED (km/hr)

CALM 36

DIRECTION	1 TO 5	6 TO 10	11 TO 20	21 TO 30	31 TO 40	41 TO 50	51 TO UP	ALL
N	2	*	-	*	-	-	-	2
NE	4	*	-	*	-	-	-	5
E	4	1	1	*	-	*	-	6
SE	12	5	4	1	1	-	-	22
S	2	1	*	*	*	-	-	3
SW	3	3	1	*	1	1		9
W	1	2	2	1	*	*	-	7
NW	5	2	1	*	*	*	-	9
ALL	33	14	8	4	2	2	-	

NUMBER OF OBSERVATIONS = 477

OCTOBER — 0900 HOURS LST — SPEED (km/hr)

CALM 27

DIRECTION	1 TO 5	6 TO 10	11 TO 20	21 TO 30	31 TO 40	41 TO 50	51 TO UP	ALL
N	2	1	*	-	*	-	-	3
NE	5	2	*	*	-	-	-	7
E	3	3	1	1	-	-	-	8
SE	12	5	2	2	1	-	-	22
S	2	*	-	-	*	-	-	2
SW	2	3	2	1	1	*	-	10
W	2	1	2	1	1	*	*	6
NW	9	3	1	1	*	*	-	15
ALL	36	18	9	6	3	1	*	

NUMBER OF OBSERVATIONS = 493

NOVEMBER — 0900 HOURS LST — SPEED (km/hr)

CALM 23

DIRECTION	1 TO 5	6 TO 10	11 TO 20	21 TO 30	31 TO 40	41 TO 50	51 TO UP	ALL
N	3	1	*	-	*	-	-	4
NE	6	2	*	*	-	-	-	8
E	2	2	2	1	*	-	-	7
SE	11	6	3	1	1	*	-	22
S	2	1	*	*	*	*	-	4
SW	5	4	3	1	*	*	-	13
W	1	2	1	*	1	1	-	6
NW	6	2	2	1	*	*	*	12
ALL	36	19	12	5	3	2	*	

NUMBER OF OBSERVATIONS = 444

SEPTEMBER — 1500 HOURS LST — SPEED (km/hr)

CALM 12

DIRECTION	1 TO 5	6 TO 10	11 TO 20	21 TO 30	31 TO 40	41 TO 50	51 TO UP	ALL
N	2	1	*	*	-	-	-	4
NE	3	2	*	*	-	-	-	6
E	1	1	1	1	-	-	-	4
SE	3	2	2	1	-	-	-	8
S	1	1	*	*	-	-	-	3
SW	5	7	3	1	1	1	-	19
W	5	6	5	1	1	1	-	19
NW	9	9	3	2	1	1	-	25
ALL	30	30	15	7	3	3	-	

NUMBER OF OBSERVATIONS = 470

OCTOBER — 1500 HOURS LST — SPEED (km/hr)

CALM 10

DIRECTION	1 TO 5	6 TO 10	11 TO 20	21 TO 30	31 TO 40	41 TO 50	51 TO UP	ALL
N	2	2	1	*	*	-	-	5
NE	4	2	1	-	-	-	-	8
E	2	1	1	-	*	-	-	4
SE	4	2	2	*	1	*	-	11
S	1	1	-	-	*	-	-	2
SW	4	4	5	1	2	*	-	15
W	4	4	2	1	2	1	*	15
NW	12	8	4	3	1	1	*	30
ALL	33	25	17	5	7	2	1	

NUMBER OF OBSERVATIONS = 485

NOVEMBER — 1500 HOURS LST — SPEED (km/hr)

CALM 11

DIRECTION	1 TO 5	6 TO 10	11 TO 20	21 TO 30	31 TO 40	41 TO 50	51 TO UP	ALL
N	1	2	1	*	-	*	-	4
NE	4	1	1	1	*	-	-	7
E	2	1	1	*	-	*	-	5
SE	4	5	3	1	*	-	-	14
S	2	*	1	*	*	-	-	4
SW	6	7	4	2	1	*	-	21
W	4	4	5	2	1	1	-	16
NW	6	6	2	1	1	2	*	19
ALL	28	27	18	8	5	3	1	

NUMBER OF OBSERVATIONS = 439

* = OCCURRED, BUT LESS THAN 0.5 PERCENT

LST = LOCAL STANDARD TIME

TEMPERATURE AND HUMIDITY DATA

BUREAU OF METEOROLOGY TEMPERATURE AND RELATIVE HUMIDITY DATA

STATION : 062021 MUDGEE POST OFFICE 32° 36's, 149° 35'E ELEVATION = 454.2 m

0900 HOURS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
MEAN DRY BULB °C	22.6	22.2	19.8	15.6	10.4	7.7	6.1	8.5	12.3	16.7	19.7	21.6	15.3
MEAN RELATIVE HUMIDITY % R.H.	61	63	65	72	78	81	79	76	68	60	55	58	68
1500 HOURS													
MEAN DRY BULB °C	28.5	28.2	26.2	22.6	17.2	14.6	13.5	14.8	18.0	21.6	24.8	27.1	21.4
MEAN RELATIVE HUMIDITY % R.H.	42	43	42	45	52	56	51	50	47	43	39	38	46
MEAN DAILY MAXIMUM TEMPERATURE °C	29.9	29.5	27.3	23.5	18.2	15.5	14.5	15.9	19.2	22.9	26.0	28.4	22.6
MEAN DAILY MINIMUM TEMPERATURE °C	15.4	15.3	13.1	8.4	5.1	2.9	1.1	2.9	4.8	8.2	10.5	13.6	8.4
MEAN RAINFALL (mm)	66	64	48	44	49	58	50	54	51	59	59	65	667
MEDIAN RAINFALL (mm)	58	47	38	35	40	47	45	50	44	47	51	54	655
NUMBER OF RAINDAY OBSERVATIONS	6	6	5	5	6	8	8	8	7	7	6	6	78

RAINFALL DATA

BUREAU OF METEOROLOGY REPORT OF MONTHLY AND YEAR RAINFALL BY M.I.S.S. 10/8/79

STATION : 062017 KANDOS : AUSTRALIAN PORTLAND CEMENT 32° 52'S, 149° 58'E ELEVATION = 762.0 m

MEANS AND MEDIANS OF RAINFALL FOR THE PERIOD 1951 to 1978 USING ALL AVAILABLE DATA .

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
MEAN RAINFALL (mm)	90	89	57	41	55	45	43	55	49	69	61	70	724
MEDIAN RAINFALL (mm)	88	68	45	34	43	35	42	52	42	60	43	60	696
NUMBER OF RAINDAY OBSERVATIONS	28	28	28	28	27	27	27	28	28	28	28	28	27
MEAN NUMBER OF RAINDAYS	8	9	7	5	5	7	7	6	7	8	8	6	83
NUMBER OF RAINDAY OBSERVATIONS	8	8	6	6	8	8	7	7	8	8	8	8	-

APPENDIX 2

VEGETATION RECONNAISSANCE

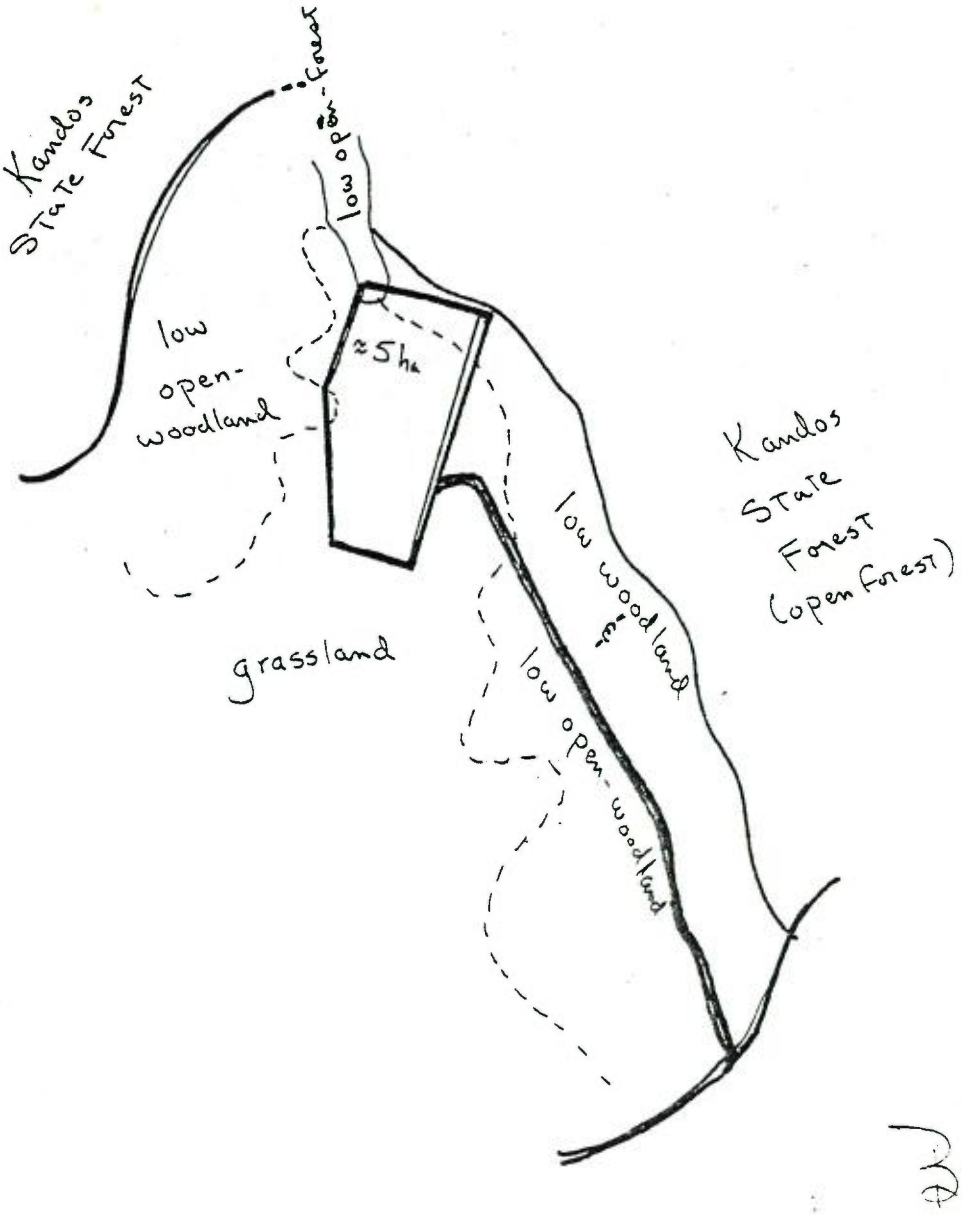
SURVEY

Report on Flora and Vegetation of a Site near Charbon, N.S.W.

By
Barbara Rice
12 Douglas St.
Putney, N.S.W.

For
Broken Hill Proprietary Company Ltd.
169-185 Miller St.
North Sydney, N.S.W.

Rough sketch of proposed development areas in relation to the vegetation types mentioned in report. All boundaries are approximate.



Introduction

At the request of Broken Hill Proprietary Company Ltd. a vegetation reconnaissance was undertaken for an area near Charbon, N.S.W. (map reference 8832- II & III Rylstone GD 794552). A site of approximately 5 ha is proposed for development to provide surface facilities for a new pit entrance into existing coal workings. The facilities are to be served by existing roads, plus a new section of road about 1 km length, to enter the site from the south. The 5 ha surface facility site, the new access route and their immediate surroundings were to be covered in the vegetation reconnaissance.

By the date agreed for the vegetation survey the central 2 - 2.5 ha of the 5 ha facility are had been stripped of all vegetation and topsoil. As a result these central 2 ha are specifically excluded from comments made in this report with respect to the vegetation. There is no reason to assume that the stripped zone differed, botanically speaking, in any way from the rest of the area, but I have no personal knowledge of what was there.

Methods

The reconnaissance was carried out on January 12 & 13, 1982 by myself, assisted by Danny Prokop from BHP. The season (mid-summer) was past the optimal for vegetation work. Because of the time of year, and as the area proposed for development is small and mostly lies on partially cleared pasture lands, only qualitative methods were used in the survey.

The proposed new access route was walked and searched for plant species, as was the periphery and remaining un-stripped area of the 5 ha facility site. Species were either recorded on the site (if common and well known) or collected and pressed for identification. Plants I identified myself were verified at the Macquarie University herbarium and the remainder identified by the staff at the N.S.W. herbarium, Royal Botanic Gardens, Sydney.

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Vegetation on the Proposed Development Site

The site lies in an open-ended valley, and is bounded on the east, north and south by a steep sandstone ridge which is part of Kandos State Forest. The original vegetation would have been Eucalyptus woodland(1) or Eucalyptus open-forest, with a sparse understorey of shrubs and/or graminoids. Such a layered type of vegetation is still present in Kandos State Forest, albeit somewhat modified by fire management and very restricted timber cutting operations.

The vegetation on the proposed development areas has been considerably modified for many years by removal of shrubs and most trees. The present land use is grazing for mixed stock.

On the areas to be affected by development there are 2 major vegetation types, both modified:

1) grassland, with scattered trees (pasture land), and

2) low woodland to low open-woodland, with grassy understorey and few shrubs.

These two types differ mainly in the presence or absence of trees; there is little floristic (species composition) difference between the understorey of the types. A third type,

3) low open-forest, with shrubby understorey, impinges on the Northeast corner of the area. Dominated by Acacia falciformis (Broad-leaf Hickory), it is restricted to a rocky gully cut into the ridge behind the 5 ha site. The lower end is infested with Rubus sp. (Bramble). A number of vines

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(1) These terms for structural vegetation types follow Specht (1970), and are based on the life form and height of the dominant (usually the tallest) stratum and the projective foliage cover of that stratum. The technical definitions of the terms used here are:

1) Grassland: grasses dominant, with a mid-dense foliage cover of 30%-70%.

2) Low woodland: trees dominant, with a height range from 5 - 10 m, and sparse foliage cover of 10% - 30%; and,

   Low open-woodland: as for low woodland, but with a very sparse foliage cover of less than 10%.

3) Low open-forest: trees dominant, from 5 - 10 m in height, with foliage cover from 30% - 70% (Open-forest differs only in that trees are 10 - 30 m tall).

(Clematis, Eustrephus, Geitonoplesium) and ferns (Adiantum, Doodia) are present here and not elsewhere on the site.

The grassland is dominated by native grasses such as Stipa (Spear grasses), Danthonia (Wallaby grasses), Botriochloa and Chloris truncata. Native herbs present include Desmodium, Wahlenbergia stricta, Rumex brownii, Asperula conferta, and Daucus glochidiatus. Many introduced species, some weedy, are mixed with the pasture species, eg. Anagallis arvensis (Scarlet pimpernel), Trifolium arvense (Haresfoot clover), Petrorhagia nanteuilii, Sherardia arvensis, Carthamnus lanatus (Saffron thistle), Carduus sp. (thistle), Cirsium vulgare (Spear thistle), and Senecio. For the most part these species have not formed large patches to the exclusion of more palatable species or native grasses and herbs. There were several small (up to 5 m diameter) monospecific patches of Pteridium esculentum (Bracken) and Rubus sp. (Bramble).

Scattered trees present, some of which reach 15 - 20 m height, included Brachychiton populneus (Kurrajong) and Eucalyptus melliodora (Yellow Box). Total vegetation cover in the grassland was 80% to 95% (estimated by eye)with grasses making up 50% or more of this. There was no evidence of scalding or erosion.

The low woodland and low open-woodland vegetation is dominated by Eucalyptus melliodora , with scattered individuals of E. macrorhyncha ssp. cannonii, E. eugenioides , Angophora floribunda (Rough-barked Apple), and Eucalyptus ~~sp. (a red gum)~~ tereticornis . Acacia falciformis (Broad-leaf Hickory) and A. implexa (Hickory) are present as scattered individuals and occasionally as denser thickets. The woodland understorey consists of many of the same pasture species found in the grassland, but in lower densities. There is a tendency for broad-leaved herbs to be less important where tree cover is greater, and for monocots such as Lomandra longifolia, Lepidosperma laterale and Lomandra glauca to appear in the ground cover. The occasional individual

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of the shrub Bursaria longisepala is also present near the State Forest boundary fence.

Most of the access route runs through woodland type vegetation. Photographs of the route taken during the reconnaissance may give a mistaken impression of open-ness, as many of the larger trees were cut along the survey line.

Approximately midway along the proposed access road there is an old, apparently stabilized, erosion gully running at an angle to the slope. It indicates that there is potential for gully erosion along the shoulder of the ridge.

Rare and Threatened Plant Species

Leigh et al. (1981) list, and give a conservation status for, a number of rare and threatened species for the Central Tablelands and Central Western Slopes phytogeographic areas. These two areas have long been extensively cleared for pastoral and agricultural purposes, with consequent loss of species populations over large areas. This makes the preservation of isolated populations or even individuals of threatened species of concern to proposed developments.

Charbon falls within the Central Tablelands region, but is very near the Central Western Slopes boundary. Many of the species listed by Leigh et al. for the area are trees or shrubs and it was therefore possible to collect material (even if sterile) for identification and then check the species' conservation status. Ephemeral species, bulbs or winter/spring flowering annuals could not be checked as they would not have been visible (if present) during the summer reconnaissance. No comment can be made either as to presence or absence of such species.

None of the plants collected during the vegetation reconnaissance are considered rare or threatened by Leigh et al. Table 1 lists the species collected on January 12 & 13.

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Effect of Proposed Development on Flora of Area

The proposed development will involve the total loss of all vegetation over most of 5 ha, and the total loss of vegetation on the narrow band of the 1 km of the proposed access road.

The vegetation on the areas to be affected is already greatly modified from its original condition. The loss of flora and vegetation has to be considered as affecting grazing lands, rather than well-maintained natural habitats. Although pastures and open woodland used for grazing are often good habitat for the larger marsupials (Kangaroos, Wallabies), they are not habitats in short supply in the region.

No rare or threatened species were found during the survey, although the time of year was not optimal for finding all such species, and a portion of the area to be investigated had been stripped before the survey was undertaken.

It is my opinion, on the basis of this reconnaissance, that the proposed development at Charbon will not have appreciable adverse impact on the flora or vegetation of the region.

This opinion is qualified by the assumption that impact will be restricted to the 5 ha facility site and the 1 km new access route, and that efforts will be made to minimize vegetation and topsoil disturbance on the edges of these developments; construction debris should also be removed so as not to harbour weed populations on its edges. There is some threat of gully erosion on the site if proper engineering precautions are not observed in grading the road route, and stabilizing and rehabilitating slopes.

6... BRR

Further Considerations

Following the January site visit I was asked to provide an opinion on an additional area being considered for possible development and which lay north of the surveyed site on similar country. The new area lies downslope from the present Charbon coal stockpile and (judging from aerial photos) is grazing land structurally equivalent to the grassland type described in this report. I would not expect that area to differ floristically much from the rest of the nearby pastures — but one couldn't say for sure without looking at the area itself. As far as species composition is concerned, much would depend on whether any runoff from the stockpiles had influenced the vegetation. As with the site I did survey, I would think the main concern would be to confine disturbances so as to minimize soil erosion beyond the boundaries of the actual developments.

Acknowledgements

I thank Australian Portland Cement for the use of aerial photography covering the Charbon site.

BLR

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Leigh, J., J. Briggs and W. Hartley. 1981. Rare or Threatened Australian Plants. Australian National Parks and Wildlife Service Special Pub. 7.

Specht, R.L. 1970. Vegetation. In "The Australian Environment". 4th Edn. (Ed. G.W. Leeper.) pp. 44-67. CSIRO-Melbourne Univ. Press, Melbourne.

Table 1. Plants collected on January 12 - 13, 1982 vegetation reconnaissance at Charbon, N.S.W. Plant names follow Beadle, Evans & Carolin (1973). * indicates a naturalized species (a non-native species); these designations are taken from Jacobs & Pickard (1981). Species are arranged in alphabetical order by family.

Ferns

ADIANTACEAE

Adiantum aethiopicum L.

BLECHNACEAE

Doodia aspera R. Br.

DENNSTAEDTIACEAE

Pteridium esculentum (Forst. f.) Cockayne

Monocotyledons

CYPERACEAE

Lepidosperma laterale R. Br.

JUNCACEAE

Juncus homalocaulis F. Muell. ex Benth.

LILIACEAE

Tricoryne elatior R. Br.

PHILESIACEAE

Eustrephus latifolius R. Br.
Geitonoplesium cymosum (R. Br.) A. Cunn. ex Hook.

POACEAE

Botriochloa macra (Steud.) S.T. Blake
Chloris truncata R. Br.
Cynodon dactylon (L.) Pers.
Danthonia laevis Vickery
Danthonia racemosa R. Br.
Echinopogon ovatus (Forst. f.) Beauv.
Eragrostis sp.
Panicum sp.
Sorghum leiocladum (Hack.) C.E. Hubbard
Stipa nervosa Vickery
Themeda australis (R. Br.) Stapf.

XANTHORRHOEACEAE

Lomandra glauca (R. Br.) Ewart
Lomandra longifolia Labill.

Dicotyledons

APIACEAE

Daucus glochidiatus (Labill.) Fisch., C.A. Meyer & Avé-Lall.

Table 1. Continued..

ASTERACEAE

*Carthamus lanatus L.
*Carduus sp.
Cassinia quinquefaria R. Br.
*Cirsium vulgare (Savi) Ten.
Gnaphalium involucratum Forst. f.
*Leontodon taraxacoides (Vill.) Mérat
Senecio minimus Poir.
Vittadenia triloba (Gaudich.) DC.
Vittadenia species G (cf. Jacobs & Pickard 1981)

BORAGINACEAE

Cynoglossum suaveolens R. Br.

CAMPANULACEAE

Wahlenbergia stricta Sweet

CARYOPHYLLACEAE

*Petrorhagia nanteuilii (Burnat) P.W. Ball & Heywood

CONVOLVULACEAE

Convolvulus erubescens Sims

EUPHORBIACEAE

Poranthera microphylla Brongn.

FABACEAE

Acacia falciformis DC.
Acacia implexa Benth.
Desmodium varians (Labill.) Endl.
*Trifolium arvense L.

GENTIANACEAE

*Centaurium erythraea Rafn.

GERANIACEAE

Geranium potentilloides L'Hérit. ex DC.

GOODENIACEAE

Scaevola albida (Sm.) Druce

LINACEAE

*Linum trigynum L.

LORANTHACEAE

Amyema miquelii (Lehm. ex Miq.) Tieghem

BRR

Table 1. Continued...

MYRTACEAE

Angophora floribunda (Sm.) Sweet
Eucalyptus eugenioides Sieber ex Spreng.
Eucalyptus macrorhyncha F. Muell. ex Benth. ssp. cannonii (R.T. Bak.) L.A.S. Johnson & Blaxell
Eucalyptus mannifera Mudie
Eucalyptus melliodora A. Cunn. ex Schauer
Eucalyptus tereticornis Sm.

PITTOSPORACEAE

Busaria longisepala Domin

PLANTAGINACEAE

Plantago varia R. Br.

POLYGONACEAE

Rumex brownii Campd.

PRIMULACEAE

*Anagallis arvensis L.

RANUNCULACEAE

Clematis ?aristata R. Br. ex DC.

ROSACEAE

Acaena anserinifolia (Forst. et f.) Druce
*Rosa rubiginosa L.
Rubus sp.

RUBIACEAE

Asperula conferta Hook. f.
*Sherardia arvensis L.

SOLANACEAE

Solanum stelligerum Sm.

STERCULIACEAE

Brachychiton populneus (Schott.) R. Br.

URTICACEAE

Urtica incisa Poir.

VIOLACEAE

Hybanthus vernonii (F. Muell.) F. Muell.

BPR

APPENDIX 3

LIST OF FAUNA SPECIES KNOWN OR THOUGHT TO OCCUR IN THE VICINITY OF KANDOS, N.S.W.

MAMMALS

The MAMMALS listed in Table A were recorded or listed from the following sources:

(1) FAUNAL SURVEY OF THE NEWNES PLATEAU/COLO RIVER AREA, carried out for the ELECTRICITY COMMISSION OF N.S.W. by THE AUSTRALIAN MUSEUM, SYDNEY.

Dr. T. J. Kingston
Mr. I. F. Pulsford
Dr. P. Smith

(2) FAUNAL SURVEY OF THE MOUNT PIPER AREA, carried out for the Electricity Commission of N.S.W. by the AUSTRALIAN MUSEUM, SYDNEY.

Dr. T. J. Kingston

(3) THE AUSTRALIAN MUSEUM MAMMAL RECORDS of skins, skulls and spirit specimens.

The third source was used to check on species which were not recorded in the first two sources. An area surrounding Kandos bounded by 32^{o} 30'S, 33^{o} 30'S, 149^{o} 30'E, 150^{o} 30'E was chosen. This area is approximately bounded by Mudgee, Widden, Bathurst and Bilpin.

Those mammals listed under "Personal Observation" were recorded by A.J. PRESS while conducting fauna surveys at various locations in the area described under (3).

The following list (TABLE A) is not necessarily a complete list, nor can it be assumed that all species listed will occur in the vicinity of Charbon.

TABLE A

SPECIES		SOURCE (1)	(2)	(3)	Personal Observation
MONOTREMATA					
ORNITHORHYNCHIDAE					
Platypus	Ornithorhyncus anatinus	+			
MARSUPIALIA					
DASYURIDAE					
Brown Antechinus	Antechinus stuartii	+	+		+
Dusky Antechinus	A. swainsonii	+			
Yellow-footed Antechinus	A. flavipes	+			
Common Dunnart	Sminthopsis murina	+			
Tiger Quoll	Dasyurus maculatus	+			
PERAMELIDAE					
Unknown species		+			
PHALANGERIDAE					
Brush-tailed Possum	Trichosurus vulpecula	+	+		+
BURRAMYIDAE					
Eastern Pigmy Possum	Cercartetus nanus	+	+		
Pigmy Glider	Acrobates pygmaeus			+	
PETAURIDAE					
Sugar Glider	Petaurus breviceps	+	+		
Squirrel Glider	P. norfolcensis			+	
Yellow-bellied Glider	P. australis			+	
Greater Glider	Petauroides volans	+			+
Common Ring-tail	Pseudocheirus perigrinus	+	+		+

SPECIES	SOURCE (1)	(2)	(3)	Personal Observation
MACROPODIDAE				
Brush-tailed Rock Wallaby *Petrogale penicillata*	+	+		+
Eastern Grey Kangaroo *Macropus giganteus*	+	+		
Euro *M. robustus*	+	+		
Red-necked Wallaby *M. rufogrisesus*	+	+		
Swamp Wallaby *Wallabia bicolor*	+	+		+
PHASCOLARCTIDAE				
Koala *Phascolarctos cinereus*	+			
VOMBATIDAE				
Common Wombat *Vombatus ursinus*	+	+		+
CHIROPTERA				
VESPERTILIONIDAE				
Gould's Wattled Bat *Chalinolobus gouldii*	+			
Chocolate Bat *C. morio*	+			
Little Bat *Eptesicus pumilus*	+			
Greater Broad-nosed Bat *Nycticeius rueppellii*	+			
Lesser Long-eared Bat *Nyctophilus geoffroyi*				
Greater Long-eared Bat *N.timoriensis*				
Tasmanian Pipistrelle *Pipistrellus tasmaniensis*	+			
MOLOSSIDAE				
White-striped Bat *Tadarida australis*	+			

SPECIES		SOURCE (1)	(2)	(3)	Personal Observation
RODENTIA					
MURIDAE					
New Holland Mouse	*Pseudomys novaehollandiae*	+			+
Bush Rat	*Rattus fuscipes*	+			+
Swamp Rat	*R. lutreolus*	+			
Black Rat	*R. rattus*	+	+		
House Mouse	*Mus musculus*				
Water Rat	*Hydromys chrysogaster*			+	
LAGOMORPHA					
LEPORIDAE					
Rabbit	*Oryctolagus cuniculus*	+	+		+
CARNIVORA					
CANIDAE					
Feral dog or dingo	*Canis familiaris* or *C.f. dingo*	+	+		+
Red Fox	*Vulpes vulpes*	+	+		+
FELIDAE					
Feral Cat	*Felis catus*	+			+
ARTIODACTYLA					
BOVIDAE					
Cattle	*Bos taurus*	+			
Goat	*Capra hircus*	+			
CERVIDAE					
Red deer	*Cervus elaphus*	+			
SUIDAE					
Pig	*Sus scrofa*	+			

BIRDS

The following list of birds was complied by the ROYAL AUSTRALIAN ORNITHOLOGISTS UNION, recorded during the ATLAS OF AUSTRALIAN BIRDS in the 1^{o} block around Kandos (1.1.77 to 31.12.81). The boundaries are $32^{o}30'S$ and $149^{o}30'E$.

Common names only are used.
O denotes birds observed
B denotes birds recorded breeding in the area.

The following list (Table B) is not necessarily a complete list, nor can it be assumed that all species listed will occur in the vicinity of Charbon.

TABLE B

NON PASSERINE

001	Emu	B
062	Hoary-headed Grebe	O
061	Little Grebe	B
106	Pelican	O
101	Darter	O
099	Pied Cormorant	O
100	Little Pied Cormorant	O
096	Black Cormorant	O
097	Little Black Cormorant	O
189	White-necked Heron	O
188	White-faced Heron	B
187	Large Egret	O
186	Plumed Egret	O
192	Night-Heron	O
178	Glossy Ibis	O
179	White Ibis	O
180	Straw-necked Ibis	B
181	Royal Spoonbill	O
182	Yellow-billed Spoonbill	O
205	Plumed Tree-duck	O
203	Black Swan	O
208	Black Duck	B
211	Grey Teal	B
212	Shoveller	O
213	Pink-eared Duck	O
215	White-eyed Duck	O
202	Wood Duck	B
217	Musk Duck	O
232	Black-shouldered Kite	O
230	Square-tailed Kite	B
228	Whistling Kite	B
221	Brown Goshawk	B
222	Sparrowhawk	O
226	White-breasted Sea-eagle	O
224	Wedge-tailed Eagle	B

225	Little Eagle	B
218	Spotted Harrier	O
238	Black Falcon	O
237	Peregrine Falcon	O
235	Little Falcon	O
239	Brown Falcon	B
240	Nankeeen Kestrel	B
009	Stubble Quail	B
010	Brown Quail	B
014	Painted Button-quail	O
018	Little Button-quail	B
019	Red-chested Button-quail	B
046	Land Rail	O
056	Dusky Moorhen	B
058	Swamphen	O
059	Coot	O
174	Bush Stone-curlew	O
133	Masked Plover	B
135	Banded Plover	B
132	Red-kneed Dotterel	O
144	Black-fronted Dotterel	B
146	Pied Stilt	O
158	Greenshank	O
168	Japanese Snipe	O
125	Silver Gull	O
027	Topknot Pigeon	O
957	Domestic Pigeon	O
030	Peaceful Dove	O
031	Diamond Dove	O
032	Bar-shouldered Dove	O
034	Common Bronzewing	B
043	Crested Pigeon	B
044	Wonga Pigeon	O
265	Glossy Black-Cockatoo	O
267	Yellow-tail Black-Cockatoo	O
268	Gang-gang Cockatoo	O
273	Galah	B
269	Sulphur-crested Cockatoo	O
258	Musk Lorikeet	O

260	Little Lorikeet	B
281	King Parrot	O
280	Red-winged Parrot	O
274	Cockatiel	O
310	Budgerygah	O
282	Crimson Rosella	B
288	Eastern Rosella	B
295	Red-rumped Parrot	B
297	Blue Bonnet	O
302	Turquoise Parrot	O
337	Pallid Cuckoo	O
339	Brush Cuckoo	O
338	Fan-tailed Cuckoo	O
341	Black-eared Cuckoo	O
342	Rufous-tailed Bronze-cuckoo	B
344	Shining Bronze-cuckoo	O
348	Channel-billed cuckoo	O
248	Powerful Owl	O
242	Boobook Owl	B
246	Barking Owl	O
249	Barn Owl	O
313	Tawny Frogmouth	B
317	Owlet Nightjar	B
330	White-throated Nightjar	O
334	Spine-tailed Swift	O
319	Azure Kingfisher	O
322	Kookaburra	B
325	Red-backed Kingfisher	O
326	Sacred Kingfisher	B
329	Rainbow Bee-eater	B
318	Dollarbird	B

Passerines

350	Superb Lyrebird	O
648	Singing Bushlark	B
358	White-backed Swallow	O
357	Welcome Swallow	B
359	Tree Martin	B
360	Fairy Martin	B

647	Richard's Pipit	B
424	Black-faced Cuckoo-shrike	B
425	White-bell Cuckoo-shrike	B
429	Cicadabird	O
423	Ground Cuckoo-shrike	B
430	White-winged Triller	B
991	Common Blackbird	O
384	Rose Robin	O
382	Flame Robin	O
380	Scarlet Robin	B
381	Red-capped Robin	O
385	Hooded Robin	B
392	Eastern Yellow Robin	B
416	Shrike-tit	O
398	Golden Whistler	O
401	Rufous Whistler	B
408	Grey Shrike-thrush	B
377	Jacky Winter	B
365	Leaden Flycatcher	B
369	Restless Flycatcher	B
362	Rufous Fantail	O
361	Grey Fantail	O
364	Willie Wagtail	B
436	Spotted Quailthrush	B
443	Grey-crowned Babbler	O
445	White-browed Babbler	B
524	Clamorous Reed Warbler	O
522	Little Grassbird	O
525	Golden-headed Cisticola	O
509	Rufous Songlark	B
508	Brown Songlark	O
529	Superb Blue Wren	B
532	Splendid Wren	O
505	Rock Warbler	B
488	White-browed Scrubwren	B
498	Chestnut-rumped Hylacola	O
504	Speckled Warbler	B
465	Weebill	O
463	Western Warbler	O
453	White-throated Warbler	O

475	Brown Thornbill	O
476	Broad-tailed Thornbill	O
484	Buff-rumped Thornbill	B
486	Yellow-rumped Thornbill	B
471	Yellow Thornbill	B
470	Striated Thornbill	B
466	Southern Whiteface	B
549	Varied Sittella	B
558	White-throated Treecreeper	B
560	Red-browed Treecreeper	O
555	Brown Treecreeper	B
638	Red Wattlebird	B
640	Spiny-cheeked Honeyeater	O
585	Striped Honeyeater	B
645	Noisy Friarbird	B
646	Little Friarbird	O
603	Regent Honeyeater	B
641	Blue-faced Honeyeater	O
634	Noisy Miner	B
635	Yellow-throated Miner	O
614	Yellow-faced Honeyeater	O
617	White-eared Honeyeater	B
619	Yellow-tufted Honeyeater	B
613	Fuscous Honeyeater	O
625	White-plumed Honeyeater	B
580	Black-chinned Honeyeater	B
583	Brown-headed Honeyeater	O
578	White-naped Honeyeater	B
598	Painted Honeyeater	B
631	New Holland Honeyeater	O
591	Eastern Spinebill	O
449	Crimson Chat	O
450	Orange Chat	B
448	White-fronted Chat	O
564	Mistletoebird	B
565	Spotted Pardalote	B
976	Striated Pardalote	B
574	Silvereye	O
996	Goldfinch	B

995	House Sparrow	B
662	Red-browed Firetail	B
652	Diamond Firetail	B
653	Zebra Finch	B
655	Double-barred Finch	B
661	Plum-headed Finch	B
983	Nutmeg Mannikin	O
999	Common Starling	B
671	Olive-backed Oriole	B
679	Satin Bowerbird	O
693	White-winged Chough	B
675	Apostlebird	O
415	Magpie Lark	B
544	Masked Woodswallow	O
545	White-browed Woodswallow	B
546	Black-faced Woodswallow	B
547	Dusky Woodswallow	B
702	Grey Butcherbird	B
700	Pied Butcherbird	B
705	Australian Magpie	B
694	Pied Currawong	B
697	Grey Currawong	B
930	Australian Raven	B
954	Little Raven	O

O = Observed

B = Breeding

HERPETOFAUNA

Herpetofauna possibly occuring in the vicinity of Kandos, NSW (32° 52'S, 149° 58'E)

Amphibolurus barbatus	Bearded Dragon
Amphibolurus muricatus	Jacky Lizard
Anomalopus lentiginosus	Legless Lizard
Carlia foliorum	Skink
Carlia tetradactyla	Skink
Cryptoblepharus virgatus	Skink
Cryptophis pallidiceps	Northern Small-eyed Snake
Ctenotus robustus	Skink
Ctenotus taeniolatus	Copper-tailed Skink
Egernia cunninghami	Cunningham's Skink
Lampropholis delicata	Skink
Lampropholis guichenoti	Skink
Lampropholis mustelina	Skink
Leiolopisma platynotum	Skink
Lerista bougainvillii	Skink
Limnodynastes tasmaniensis	Spotted Grass Frog
Litoria latopalmata	Frog
Menetia greyii	Skink
Morethia boulengeri	Skink
Pseudechis porphyriacus	Red-bellied Black Snake
Pseudophryne bibronii	Brown Toadlet
Pseudophryne coriacea	Red-backed Toadlet
Ranidella signifera	Frog
Typhlina proxima	Blind Snake
Underwoodisaurus milii	Thick-tailed Gecko
Unechis gouldii	Black-headed Snake
Uperoleia marmorata	Yellow-spotted Toadlet

The above species names have been copied, with permission, from the Australian Museum Department of Herpetology computer data reports 141 and 142. Common names have been taken from Cogger (1979) when available. It can not be assumed that all the above species do occur in the vicinity of Charbon, or that the above species are the only herpetofauna occuring in the vicinity of Charbon. No herpetofauna field studies have been undertaken for this E.I.S.

APPENDIX 4

ARCHAEOLOGICAL SURVEY OF

THE AREA OF PROPOSED DEVELOPMENT

AN ARCHAEOLOGICAL SURVEY OF THE AREAS OF PROPOSED EXPANSION OF BLUE CIRLE SOUTHERN CEMENT COLLIERY AT CHARBON

Mary Dallas
April 1982

Contents

1. Introduction

The archaeological survey was commissioned by BHP Central Engineering (Environment) as part of an Environmental Impact Statement for the proposed expansion of the Blue Circle Southern Cement (BCSC) Colliery at Charbon.

The proposed colliery development would affect two areas:

1. an area extending westward from the BCSC colliery entrance to the Wallerawang Gwabegar Railway line. Proposed developments in this area are: the expansion of existing coal storage areas, the construction of a rail loop, and further residential development. This area is approx. 1.3 kms x .5 kms.

2. 5 hectare site approx. 1 km SE of the main colliery around the proposed mine entrance, an access road to the site and a 66 kV power line connecting the installation with the 66 kV power lines 4 kms west in Clandulla State Forest.

The field survey of these two areas, the access road and the power line route was carried out between April 7 and 8, 1982.

2. Survey Aims

The aim of the survey was to locate and record Aboriginal relics within the areas to be affected by the colliery expansion and to advise and make recommendations on the protection and management of any such relics located.

3. Survey Methods

Maps and colour aerial photographs (by courtesy of Australian Portland Cement) showing the areas to be surveyed were provided by Peter Rey of BHP Central Engineering (Environment) for use in the field (see Map 1).

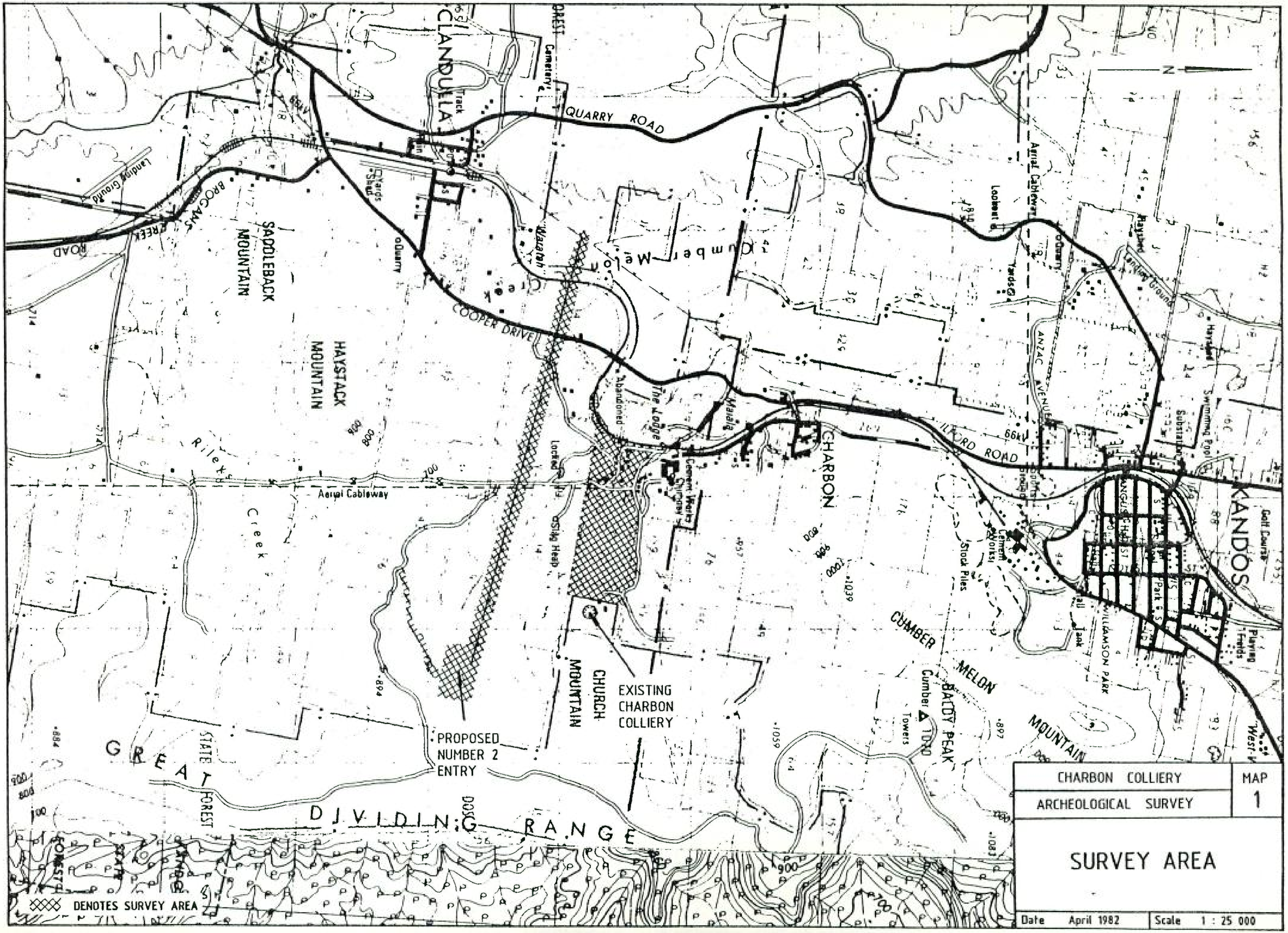
Both the area between the colliery and the Wallerawang Gwabegar Railway Line and the proposed #2 mine entry, its access road and power line route were surveyed on foot. The limits of the area west of the colliery were clearly discernable as roads, boundary fences and railway line. The position of the proposed #2 mine entry, its access road and power line route were transferred from maps provided to aerial photographs (the power line route was not pegged). The excavated soils of the box cut adjacent to the #2 mine entry, and a 5 metre strip around its perimeter were inspected. The access road had been prepared by the time of the survey. The bulldozed strip was inspected and undisturbed land up to 5 metres above and below the roadway was inspected since gullies running perpendicular to the road would necessitate the use of drainage pipes.

There is a small residential settlement at the western end of the area between the colliery and rail line. The residential blocks were not inspected, however, any visible sections and denuded areas within this area were investigated.

Surface visibility varied over the survey area. The creeks and their flood plains were largely covered by clover, paspalam and thistle. The slopes and hilltops above the creeks had reasonable to good visibility. Clearing and ringbarking over these areas has caused extensive erosion and ground exposure. Surface visibility in the western section of the power line route, inside Clandulla State Froest was limited largely by leaf litter and compost.

Trees over the survey area did not appear old enough to bear the scars or engravings made by the Aborigines on their trunks.

Finally, the NPWS Site Register and associated literature were inspected to determine site types and site location patterns known for the area and/or surrounding areas (see Section 4:3).


CHARBON COLLIERY
ARCHEOLOGICAL SURVEY
MAP
1
SURVEY AREA
Date April 1982
Scale 1 : 25 000
DENOTES SURVEY AREA
PROPOSED
NUMBER 2
ENTRY
EXISTING
CHARBON
COLLIERY
CLANDULLA
CHARBON
KANDOS
QUARRY ROAD
COOPER DRIVE
ILFORD ROAD
BROGANS CREEK ROAD
SADDLEBACK MOUNTAIN
HAYSTACK MOUNTAIN
CHURCH MOUNTAIN
CUMBER MELON MOUNTAIN
BALDY PEAK
GREAT DIVIDING RANGE
STATE FOREST
Aerial Cableway
Rileys Creek
Cumber Melon Creek
ANZAC AVENUE
WILLIAMSON PARK
Cement Works
Stock Piles
Landing Ground
Cemetery
Golf Course
Playing Fields
Swimming Pool
Substation
Towers
Abandoned
The Lodge
Slag Heap

4. The Survey Area

4:1 Topographic information

Charbon is situated south of Kandos and the Cudgegong River Valley between the Great Dividing Range and the western slopes and plains. The Blue Circle Southern Cement Colliery is SE of Charbon at the foot of Church Mountain. A series of creeks, tributaries of Cumber Melon Creek which feeds into the Cudgegong River, cross the survey area from Church Mountain in the east and from Haystack Mountain in the south. In the east the ranges rise sharply and the creeks cross broad flats. From the south the creeks cross through more undulating terrain.

Aspects of the geology, landforms and water resources relate to Aboriginal occupation of the area and are relevant to site location. Limestone deposits occur adjacent to the survey area and the creeks appear to drain quickly providing little other than a seasonal water supply for the Aboriginal occupants. Soak holes might also have provided water in some creeks. The geological formations in the areas belong to the Narrabean Group of sandstones and mudstones and the Illawarra Coal Measures. West of the Great Dividing Range there are shales, sandstone and siltstones of the Shoalhaven Group. Basalt and Dolerite are present at Haystack Mountain to the south and on Cumber Melon Mountain in the north. Suitable stones used in tool manufacture are therefore locally available.

4:2 Land use and modification

The European settlement of the river systems north of Bathurst and the western fringes of the Great Dividing Range north to Mudgee began in the 1820s as grazing lands became scarce around Bathurst. Aboriginal occupation of these areas was quickly taken over by agriculturalists and pastoralists. The discovery of gold in the 1850s led to a further influx of settlers. Mudgee grew as a result of the gold rush and became a supply centre for these activities. By this time not only had the major river valleys been settled but so had the flat lands of their tributaries. Later limestone and coal deposits were discovered along the edges of the Great Dividing Range leading to small mining towns such as Kandos and Charbon.

Most of the river valleys and tributary flats have been cleared and ploughed in the past. Much of these areas are no longer ploughed but used as grazing land. The land around the BCSC colliery fits into this pattern (M. Cooper, pers.comm.). If Aboriginal artefacts had been ploughed up by the earlier farmers, this would have occurred so long ago that the information would have been lost and the farmers no longer living. Relatively recent ploughing of small paddocks adjacent to the survey area had not unearthed Aboriginal artefacts according to the landowner (M. Cooper, pers.comm.).

Timber clearance, ring barking and animal grazing has caused considerable erosion on the hilltops and slopes above the tributaries. A number of dirt roads and tracks providing access to the farms and the colliery cross through the survey area.

Disturbances to the natural vegetation and land forms in the survey area has been caused by activities associated with the now abandoned cement works. These include limestone discard dumps and road cuttings. Access to the abandoned cement works and the BCSC Colliery and its proposed #2 entry is by dirt roads which at points cut into the sides of Cumber Melon Mountain and Church Mountain at elevations which could have provided sandstone shelters above the creeks for the Aboriginal occupants.

4:3 Existing archaeological information

There have been no previous archaeological investigations of the survey area and no sites were known for the area.

Although the survey area is very small it takes in the western fringe of the Blue Mountains and the upper reaches of tributaries of the Cudgegong River. The Rylstone Plateau and the Cudgegong River Valley is part of a region investigated by Dr M. Pearson (1981). His work on European and Aboriginal settlement pattern and land use provides a basis for site prediction and a broader regional view. Upland occupation in eastern Australia has been reviewed by Bowdler (1981). Shelter sites at Capertee and Glen Davis have been excavated and show early occupations dated to around 12,000 BP followed by a hiatus. This was followed by a more intensive occupation at 3-4,000 years ago associated with the Small Tool

Tradition. There is strong evidence that this later intensification is associated with macrozamia exploitation. There is a likelihood of shelter and/or art sites along Cumber Melon Mountain and Church Mountain, however the survey area extended up these mountains a maximum of 20 ms. In each case that it did so existing development had disturbed or destroyed the sandstone outcrops.

A few comprehensive archaeological surveys have been conducted in the region (Haglund, 1979; Attenbrow, 1977) and these confirm Pearson's statements on site types and distribution. The site types predominant in the region are open camp sites distinguishable as surface scatters of artefacts, and painting sites most of which contain red hand stencils. Other known sites include axe-grinding grooves and scarred trees. The distribution of known sites is more likely a reflection of the small number of archaeological surveys and not Aboriginal occupation pattern. Major factors affecting site distribution and location in the region are the availability of water and food resources, and suitable stone material and sufficient height above the creeks to gain shelter from wind, cold or frost and to avoid floods. Sites expected in the survey area were open camp sites, quarry sites, where suitable sandstone occurred axe-grinding grooves and scarred trees. They were expected to be along the creeks and above the flood levels on low ridges and slopes overlooking the creeks. Given the relatively early European occupation in the area and its effects there is little likelihood of locating extensive undisturbed sites.

5. The Survey

Sites located

One Aboriginal site and two isolated finds (ISF) were located during the survey. All are located on disturbed and denuded ground. The location of these relics is given on Map 2. Appendix A is a photographic record of the relics and gives some locational views.

Site 1. Map Ref: Rylstone 1:50000 7838 6532

This site is a surface scatter of four artefacts on a dirt track on the north side of a ridge apprx. 0.5 kms west of the BCSC Colliery entrance.

(see Photographs 1,2,4). The aspect of the site is NE across the flood plain of two tributaries of Cumber Melon Creek which converge further to the west. The track and several areas on the ridge has exposed the site and ground above the site. Visibility was limited by light timber regrowth and patches of brambles. Despite a careful search of the hill no further artefactual remains were located. The visible ground surface is rocky and there is little soil accumulation which might contain subsurface artefactual material. The hill has been cleared in the past and the slope on which the site occurs is likely to have been ploughed in the past. There is little likelihood of undisturbed subsurface material remains. The artefacts were scattered over an area of 50 x 50 cms. They consist of:

1. quartz flake 23 x 17 x 3 mms* with edge damage on right margin.
2. quartz (milky) flaked piece 31 x 19 x 13 mms triangular shaped with steep sides and possible use wear on one edge measuring 10 mms in lengths.
3. cream chert secondary flake 29 x 20 x 4 mms; small area of cortex or dorsal side; broken tip; use wear along right margin.
4. grey mudstone secondary flake 40 x 23 x 9 mms edge damage on right margin; use wear on shallow left margin.

All the materials used in the manufacture of these artefacts are available locally in surface lumps along the creeks and on the hills and slopes overlooking the creeks.

ISF1. Map Ref: Rylstone 1:50,000 7870 5630

This is a single flake located on a track around a dam approx. 200 m SW from the BCSC Colliery entrance. The flake was on the edge of an ant-hill. The area had been disturbed by the dam wall construction and underground telephone cables. The artefact is a dark grey mudstone secondary flake with edge damage on the right margin. It measures 29 x 24 x 6 mms (see Photographs 3 and 4).

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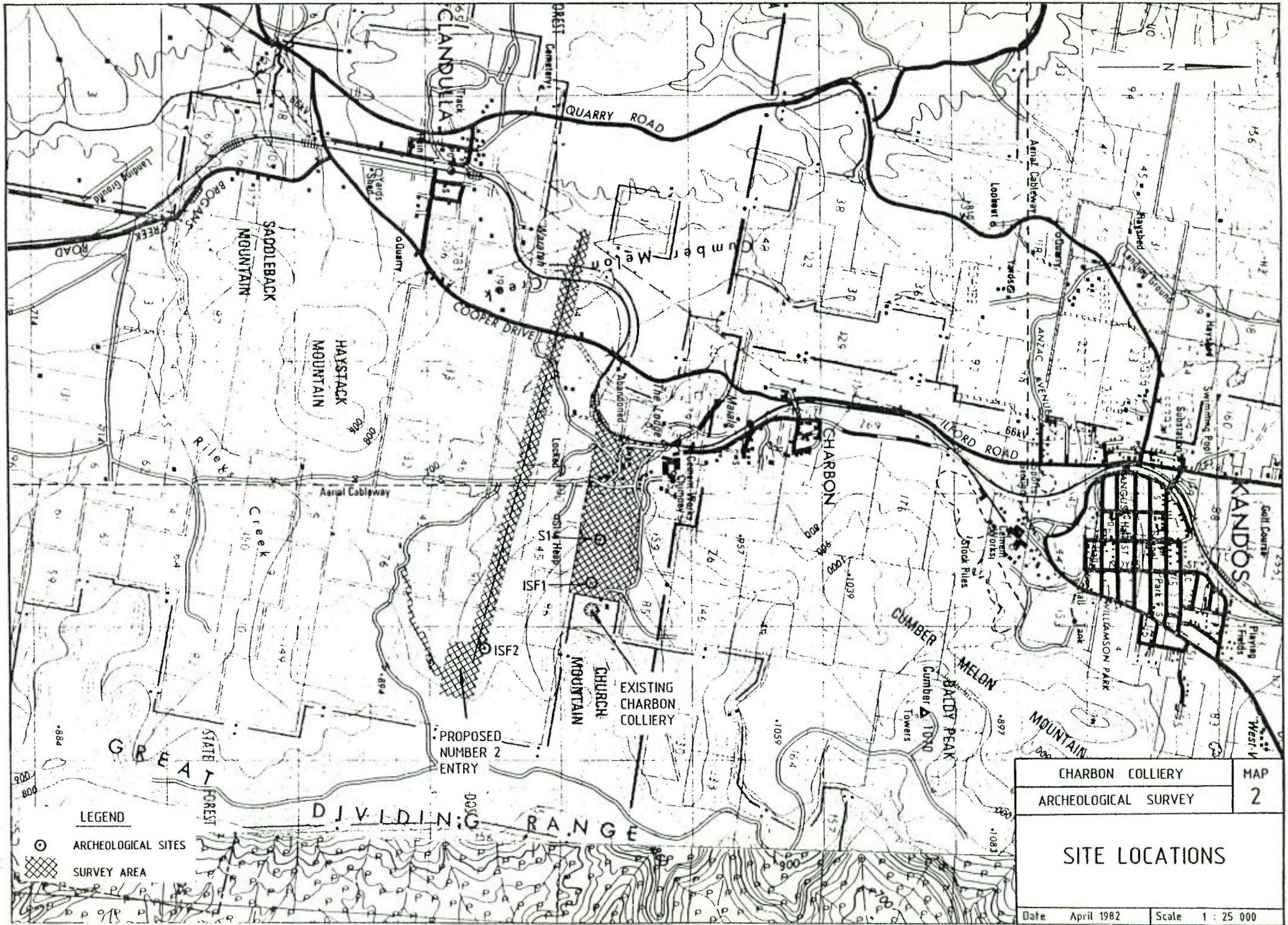
*maximum length x maximum width x maximum thickness.


QUARRY ROAD
COOPER DRIVE
ILFORD ROAD
CLANDULLA
CHARBON
KANDOS
SADDLEBACK MOUNTAIN
HAYSTACK MOUNTAIN
Riley's Creek
Aerial Cableway
S1
ISF1
ISF2
EXISTING CHARBON COLLIERY
PROPOSED NUMBER 2 ENTRY
CHURCH MOUNTAIN
CUMBER MELON
BALDY PEAK
GREAT DIVIDING RANGE
LEGEND
ARCHEOLOGICAL SITES
SURVEY AREA
CHARBON COLLIERY
ARCHEOLOGICAL SURVEY
MAP 2
SITE LOCATIONS
Date April 1982
Scale 1 : 25 000

ISF2. Map Ref: Rylstone 1:50,000 7918 5538

This is an edge-ground hatchet located on a scarred area of a ridge overlooking a tributary of Cumber Melon Creek. The ridge at this point is lightly timbered and grassed. Visibility of ground surfaces was reasonable to good with many denuded patches and animal tracks. Despite an intensive search no other artefactual material was located. The hatchet is 80 x 47 x 26 mms. and is made on dark grey-green basalt. The ground edge is 43 mms in length and between 22 and 15 mms behind the cutting edge. Two areas of polish, possibly the result of hafting occur 60 and 62 mms back from the cutting edge (see photographs 7 and 8).

Given that no other archaeological remains were located in the vicinity, that the location is within the power line easement and that the hatchet is a rare find for the area it was collected and lodged with the Australian Museum, Sydney.

6. Conclusions and Recommendations

In the areas to be affected by the proposed BCSC Colliery expansion the Aboriginal relics fit the pattern of site type and location of similar areas to the north and west (Haglund, 1981; Pearson, 1981). The artefacts are similar in size and range of raw materials to others located at Ulan and along the Cudgegong River Valley. The density of the material located is likely to be a reflection of the limited size of the survey area, early disturbances to the landscape and relatively scarce water sources. Until a comprehensive investigation is conducted that covers both the upland fringes and the whole creek and tributary systems the material remains located during this survey must remain a selective record of Aboriginal occupation of the area. Other sites outside the immediate survey area, but along or above the tributaries and creeks that pass through it are likely to be present.

Both the site and the isolated finds would be affected by the proposed expansions. The location of Site 1 is directly in the line of the proposed rail loop for the colliery and planned residential construction on the hill above the site would have an indirect affect (A. Vaughan, pers.comm.).

ISF1 on the edge of the dam next to the colliery would continue to be to be affected by traffic and trampage to and from the dam. Before collection ISF2 would have been disturbed by the power line construction to the ventilation adit at the proposed #2 mine entry. No recommendations will be made with respect to the management of the isolated finds (however, see Recommendation #2). Site 1 is in a disturbed context with very little likelihood of undisturbed subsurface material remaining. Given the paucity of artefacts and their similarity to artefacts elsewhere in the region I do not consider this site constitutes an archaeological constraint to the planned colliery expansion (see Recommendation #3).

If any further sites are located in the survey area during construction or development, NPWS should be notified.

Aboriginal interest in the area

Glen Morris, Wayne Cooke, Aboriginal Site Officers of NPWS and Ray Kelly were contacted with respect to locating local Aborigines who might have knowledge of the survey area or interest in the sites located.

The traditional Aboriginal owners of the area belonged to the Wiradjeri linguistic group which consisted of several large clans. These were probably divided into several communities one of which exploited the Mudgee-Rylstone area and would have used the Cudgegong River and its tributaries (Pearson, 1981). Aborigines living in the area at the time of European contact strongly objected to the white settlement and fighting occurred (Haglund, 1981). In the early 1820s massacres and relocation of surviving Aborigines took place. Very few remained to work on the stations. Aborigines living in the area at present have moved there from outside (Wayne Cooke, pers.comm.) and would not have traditional knowledge of the area. Jim Carter now living in Armidale but who had lived in Kandos in the past was contacted by Wayne Cooke from NPWS Armidale Office. He had no traditional knowledge of the area nor did he express any interest in the relics located. He recollects two part-Aboriginal families who lived at Kandos in the 1940s. These are the Rogers and the Carters. So far attempts to locate these families have failed and it is likely they have moved away. However, Glen Morris of the NPWS Muswellbrook Office will continue efforts to find these families to determine their interest in and knowledge of the area.

Recommendations

1. Under the National Parks and Wildlife Service Act it is illegal to destroy, deface or damage an Aboriginal relic without the written consent of the Director of the NPWS.

2. The two isolated finds located during the survey have been fully recorded and their associations with nearby and regional sites noted. ISF2 has been collected and lodged with the Australian Museum. ISF1 was not collected but no further recording or management is required. However, it will be necessary to apply for a permit from the Director of NPWS to destroy or disturb this isolated find.

3. The artefacts at Site 1 do not warrant altering the route of the proposed rail loop given the number found, previous disturbance to the land and their similarity to artefacts from other surface or open compsites in the region. A permit will be required to destroy this site.

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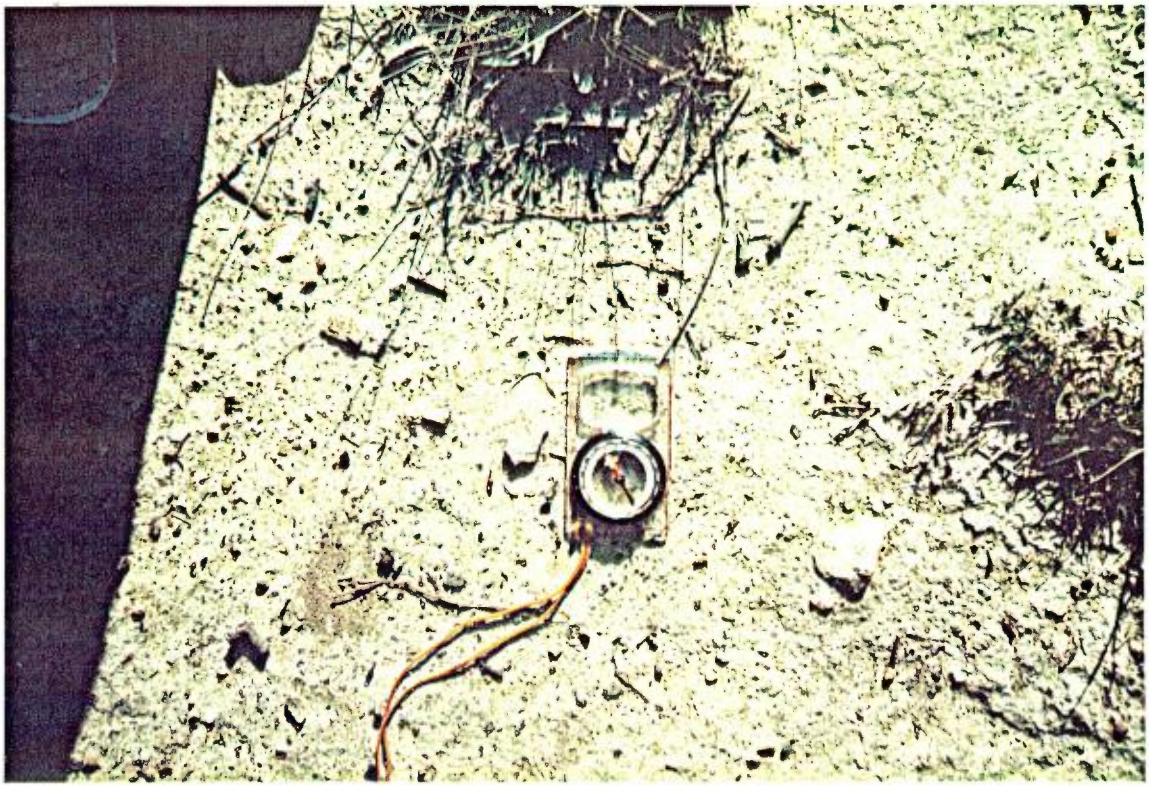
Individuals Consulted

Michael Cooper	Landowner, Charbon
Dr Asad Zulfacar & Peter Rey	BHP Central Engineering (Environment)
Adrian Vaughan	Manager, BCSC Colliery Charbon
Glyn MacDonald	Assistant Manager, BCSC Colliery Charbon
Ray Kelly	Senior Aboriginal Site Officer, NPWS Head Office, Sydney
Glen Morris	Aboriginal Site Officer, NPWS Muswellbrook Office
Wayne Cooke	Aboriginal Site Officer, NPWS Armidale Office
Laila Haglund	Consulting Archaeologist

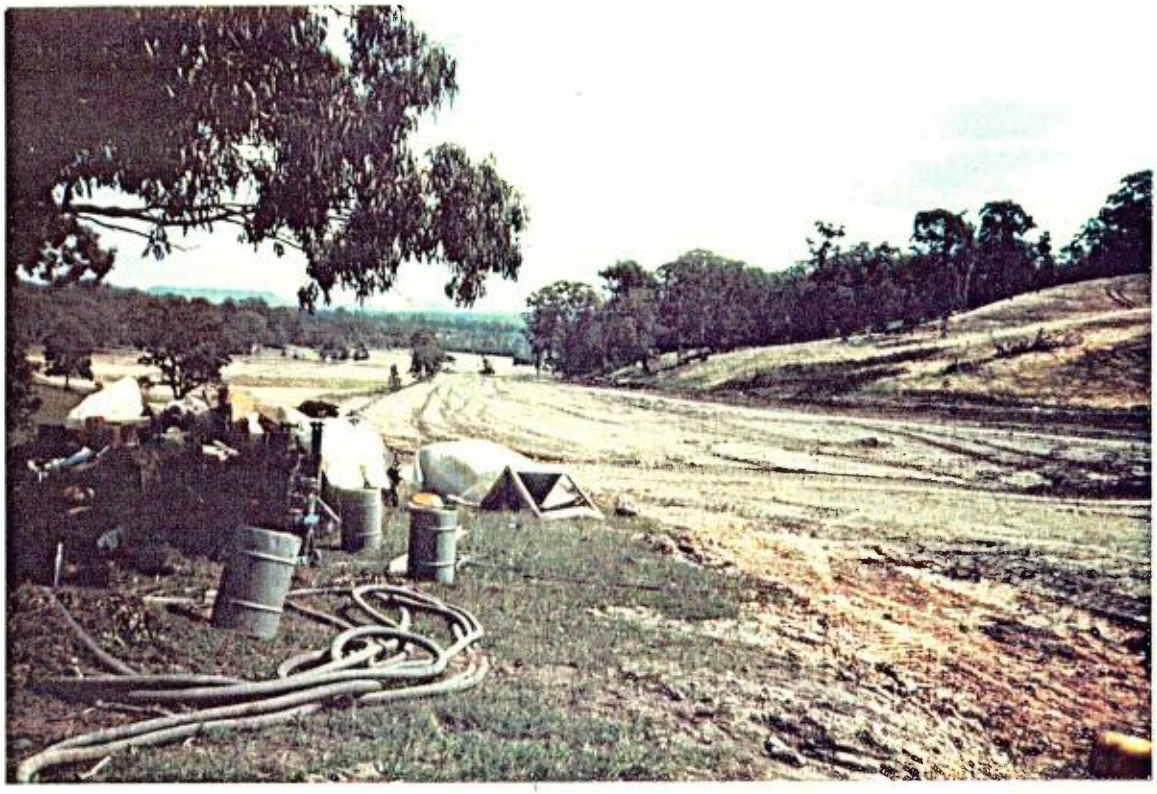
1. Site 1: Artefacts

2. Site 1: View ENE to BCSC Colliery entrance

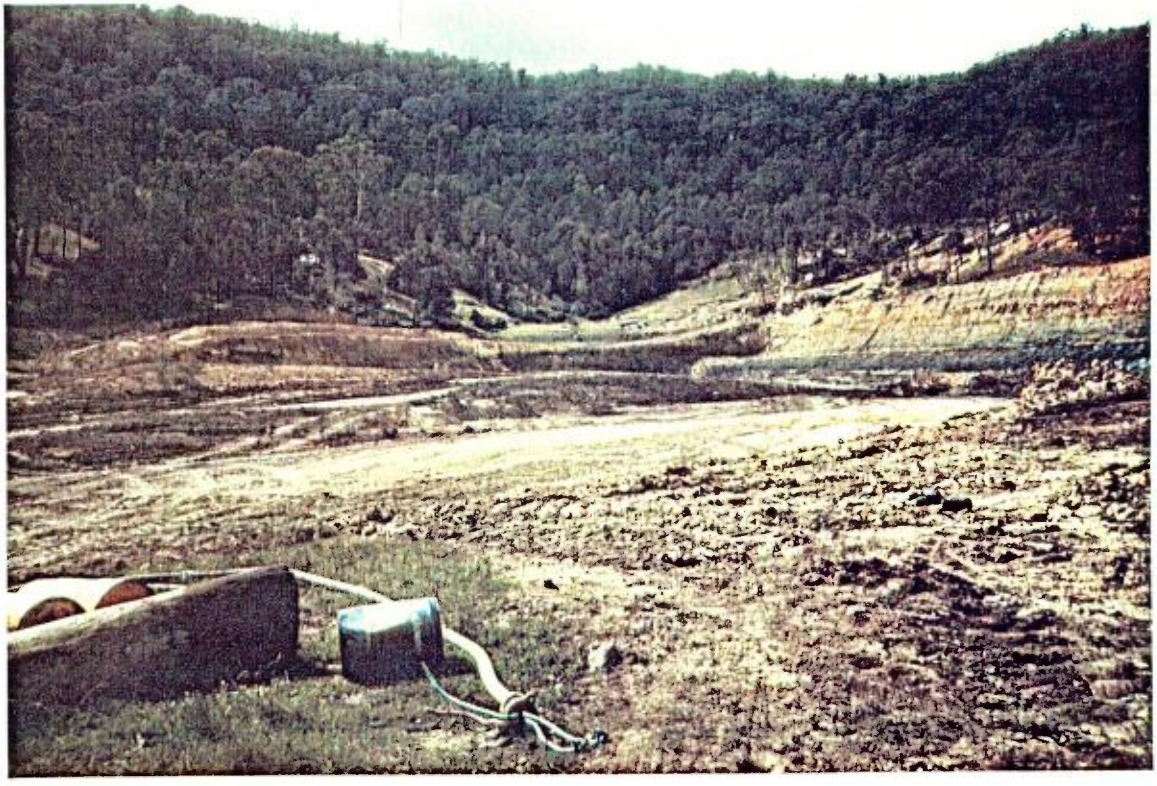


3. ISF 2

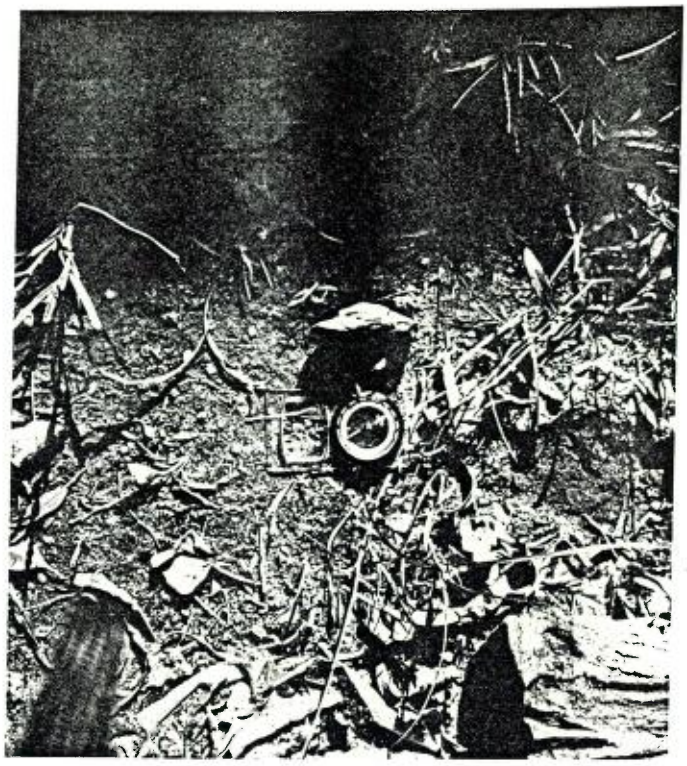
4. View west to Site from ISF1



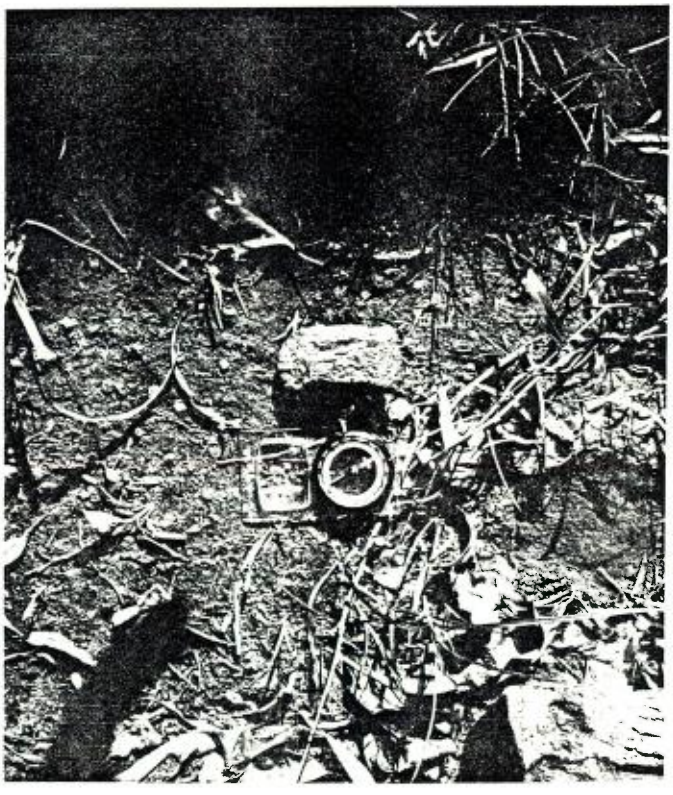
5. Existing box-cut adjacent to the proposed #2 mine entry: view to west



6. Existing box-cut adjacent to the proposed #2 mine entry: view to east



7. ISF2: Edge ground Hatchet



8. ISF2: Edge ground Hatchet

APPENDIX 5

SOCIO-ECONOMIC ASPECTS OF

THE PROPOSED DEVELOPMENT

CHARBON COLLIERY EXPANSION

E.I.S.

SOCIO-ECONOMIC ISSUES

Prepared by : Natural Systems Research
Pty. Ltd.
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to : B.H.P. Co. Ltd. Central
Engineering Division
for : Blue Circle Southern
Cement Pty. Ltd.

date : March 1982

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FIGURE

TABLES

1.0 INTRODUCTION

Blue Circle Southern Cement Pty. Ltd. propose to expand the production of coal from Charbon Colliery, and the corresponding E.I.S. requires consideration of the proposal's socio-economic implications. This is the subject of this report for which Natural Systems Research Pty. Ltd. have been commissioned in accordance with their response to Invitation to Quote CED 1430.

1.1 Objectives

The objectives of the present study can be summarised as follows:

> 'To describe the implications of the proposed expansion of Charbon Colliery, in terms of the present socio-economic and demographic setting, regional development trends, public sector planning, the direct, indirect and induced population increase brought about by the project and consequential demand for land, housing and services'.

1.2 Information Base

Compared to other parts of N.S.W., such as the Hunter Valley, existing information, on which this analysis can be based, is limited. Although the Rylstone Shire Council has initiated a planning study for the shire, its results will post-date the present study; 1976 Census data has been outdated by the effects of major economic changes in the Shire since then; and 1981 Census data is not available. However, interviews with major employers and the Shire Council in particular, and with other informants in general, plus case study data on the employment and population effects of similar projects, have allowed a reasonable composite picture of the existing socio-economic setting and the project's implications to be drawn.

Detailed population projections by the N.S.W. Department of Environment and Planning have been made.

1.3 Study Team

The study was carried out by Mr John Collins, Department of Community Programmes, University of Newcastle and Mr Alastair Sharp-Paul, Director of Natural Systems Research Pty Ltd, who has been responsible overall for the direction and content of the work.

2.0 SUMMARY

The Western Coalfields District of N.S.W. is of rapidly growing size and importance.

Rylstone Shire is part of this district and is experiencing significant recent growth after several years of economic stagnation.

Indications of recent growth in and around Rylstone Shire include: shortages of serviced residential land and housing and rapidly rising prices for existing stocks; shortages of skilled labour in existing industries other than coal mining; and a three-fold increase in completed authorised dwellings in the period 1978/79 to 1980/81.

Apart from housing and serviced land the Shire is well placed to accept increased population associated with the proposed expansion of Charbon Colliery. Excess capacities in most municipal services, favourable attitudinal regimes and satisfactory levels of provision of State level services bode well for generally easy assimilation of increased population.

A solution to the most serious present inadequacy - serviced residential land - is one aspect of land use planning at present under study by consultants to the Shire Council.

The proposal by Blue Circle Southern Cement Pty. Ltd. (B.C.S.C.) to expand operations at Charbon Colliery involves the addition of approximately 108 male workers in two roughly equal increments in mid-1983 (Stage I) and post 1985 (Stage III). The intervening Stage II development sustained by the Stage I workforce.

Whether or not recruitment of new workers is from existing Shire residents, it is likely, assuming a workforce multiplier of 1.5 and that each new recruit has a wife and 1 or 2 children, that by some time after 1985 162 new families or 567 new people will reside in the Shire.

Apart from serviced residential land, this report finds no socio-economic factor in limiting the expansion of the mine's operations, according to the proposal current in January 1982.

There are, however, two issues for sensitive consideration by B.C.S.C. The first concerns recruitment of workers. The second concerns the transport of coal from the mine.

There is little doubt that the great majority of new employees required by the proposed expansion could be recruited from existing Shire residents presently employed by other public and private organisations. To do so may, however, court at least short term hostility from those other employers, some of whom, in the public sector, could be less than enthusiastic supporters of the expansion programme.

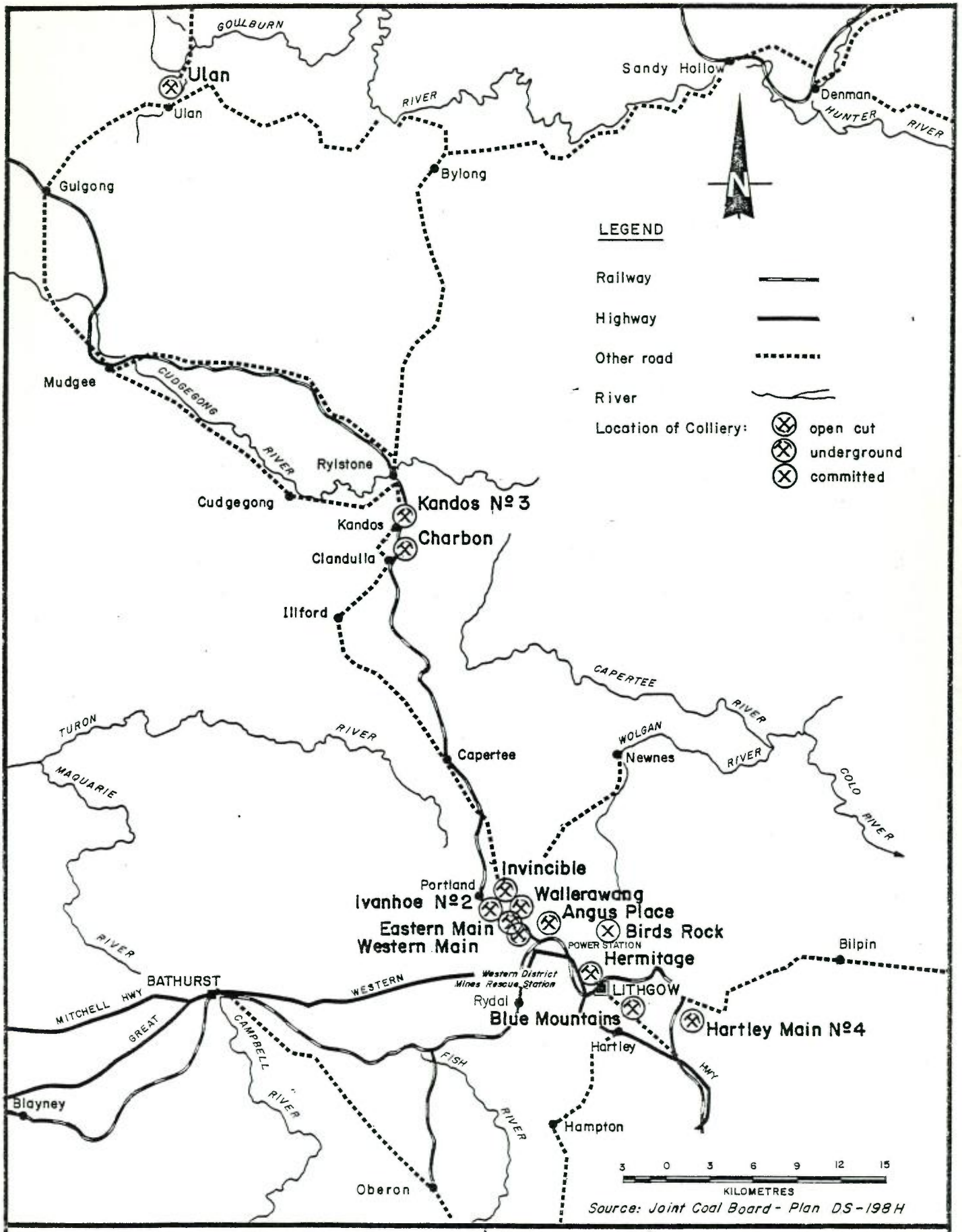
On the other hand, it can be argued equally that:

1. The proponent has no right to restrict the free and voluntary movement of workers between employers.

2. The costs to the proponent of importing labour, especially labour of less dependable industrial attitudes than exhibited by local workers, are likely to be greater than the potential costs of short term hostility from other local employers.

3. The importation of a colliery workforce, especially from overseas sources, in order to find favour with other local employees is likely to create sociological and perhaps industrial problems which may remain with the community and the proponent for a considerable time.

The second issue is the road transport of coal. Some disquiet has been expressed by the Shire Council about the effects of present tonnages on road surfaces and safety. At present an average working day at the colliery generates approximately 50 truck loads of coal, although at times up to 80 loads are carried. A quadrupling of output must lead to a quadrupling of truck loads unless other forms of transport, presumably rail, are adopted. An increase in colliery-generated road traffic of this magnitude will undoubtedly lead to demands for some form of road maintenance compensation from the Shire Council.



Natural Systems Research Pty. Ltd.
Environmental Consultants

TO: B.H.P. CO. LTD. - CENTRAL ENGINEERING
FOR: BLUE CIRCLE SOUTHERN CEMENT

CHARBON COLLIERY EXPANSION E.I.S.

LOCATION OF WESTERN DISTRICT COLLIERIES, N.S.W.

Compiled by: J.C.B.
Date: Feb 1982

Figure 1

3.0 PROJECT CONTEXT

3.1 Western Coalfields Region

All but three of the thirteeen existing mines (January 1982) making up the Western District Coalfields of N.S.W. are to be found in close proximity to the City of Lithgow. The three more remote mines include two at Kandos (including the mine under consideration in this Report) and one at Ulan.

The importance of the Western District coalfields is expanding rapidly. Capital expenditure is growing. The high volatile coals produced are used predominantly for steaming purposes although the domestic and overseas (especially Japan) steel industries also provide markets.

Man/shift productivity in the Western District has been higher than in comparable areas of the State.

Figure 1 shows the distribution of collieries throughout the Western District and Table 1 shows the growth in markets for coal production from the Western District in the 5 years to 1979/80.

TABLE 1

Markets for Western District Coal Production

	1975/56 - 1979/80 ('000 tonnes)	1975/76
BHP	147	31
N.S.W. Electricity Commission	516	1 372
N.S.W. Public Transport Commission and Municipal Gas Companies	1	-
N.S.W. Cement Industry	359	232
Miscellaneous Consumers	254	328
Australian Consumers	1 277	1 963
Overseas Consumers	1 822	2 685

Source: Joint Coal Board, Black coal in Australia 1979-80 March, 1981

3.2 Rylstone Shire

3.2.1 Recent Socio-Economic History

The employment base of Rylstone Shire suffered severely from the 1977 closure of the Blue Circle Southern Cement Charbon Works. That experience dominated all socio-economic life in the Shire for almost four years. Impacts on employment and real estate values were dramatic, and as recently as early 1981, serviced urban blocks in Kandos and Rylstone were sold for less than $1000.

Table 2 shows the record of dwelling completions in various parts of the Shire during the 1970's and in 1980-81, and illustrates the urban slump which followed the closure of the cement works.

TABLE 2

Dwelling Completions, Shire of Rylstone, 1973-81

	Rural Areas	Rylstone	Kandos	Total Urban Area	Total Shire
1973	7	7	3	10	17
1974	8	3	3	6	14
1975	13	4	3	7	20
1976	9	2	1	3	12
1977	8	4	1	5	13
1978	7	-	1	1	8
1979	12	2	-	2	14
1980	11	1	5	6	17
1981	23	7	14	21	44

(Source: Rylstone Shire Council)

In 1980 and 1981 several developments occurred in and near the Shire which have rallied economic confidence, and which are reflected in the threefold increase in dwellings completed in 1978-9 and 1980-1. The developments include:

(a) Serious construction began in 1981 of Windemere Dam between Rylstone and Mudgee. This project will employ about 230 men on site and will continue until 1983. The dam's operational workforce is expected to be only 10 men, but the water storage will back up to within 12km of Rylstone and make it both the nearest urban area and the nearest urban area on the Sydney side of the dam. A major recreation area is being planned by the National Parks and Wildlife Service for the Water Resources Commission and significant employment related to tourism can be expected within the Shire.

(b) Construction of the Sandy Hollow railroad reached Bylong, to the north of Rylstone Shire, generating significantly increased economic activity in the Shire.

(c) There was increased tourism and construction activity associated with hobby farms and rural retreats in the Shire. Table 3 shows the record of rural subdivisions and new (authorized) country dwellings completed within the Shire since 1975.

(d) Exploration for coal was carried out by Austen and Butta in the Bylong area, and by Genders Mining Pty. Ltd. and by Western Colliery in the Running Stream area.

(e) The end, in 1981, of a prolonged and severe drought led to renewed employment prospects for farm workers and for employees in industries associated with the rural sector.

(f) High real estate and rental market prices in coastal and larger urban areas of N.S.W. encouraged (especially) retired people to relocate to cheaper towns such as Rylstone.

TABLE 3

Rural Subdivisions and Rural Dwellings
Completed 1975 - 81
Rylstone Shire

	Subdivision	Dwellings
1975	6	13
1976	7	19
1977	14	8
1978	26	7
1979	30	12
1980	28	11
1981	37	23

(Source: Rylstone Shire Council)

3.2.2 Population Demography and Settlement

Table 4 shows the population of Rylstone Shire 1971, 1976 and 1980.

TABLE 4

Population of Rylstone Shire, 1971-80

Year	Source	Population	Percent Change
1971	(Census Data)	4436	
1976	(Census Data)	4124	- 1.45
1980	(D.E.P. Estimates)	3950	- 0.02

Table 4 shows that between 1976 and 1980, outmigration from the Shire all but ceased. As the Charbon Cement Works closed in 1977, after the 1976 census, it must be assumed that within the last 2 years in migration has replaced out migration as the dominant process.

Because the closure of the Charbon Cement Works occurred after the 1976 Census, it is not considered worthwhile producing more detailed breakdowns of the demographic structure of the Shire. The economic effect of the closure will have affected differently people in different categories of age, sex, marital status, educational qualifications and so on, and to reproduce 1976 demographic profiles would imply a specious certainty.

Discussions with the Shire Council indicate that of the 3950 population estimated for the Shire in 1980, 2000 people (50% of the Shire total) reside in Kandos, with 800 people (20% of the Shire total) in Rylstone, leaving 30% of the population distributed throughout the remainder of the Shire. Of this 30%, probably a fifth reside in the Charbon area, so that about 1000 people reside in truly rural areas of the Shire.

Council records and observation allow greater certainty about the settlement pattern within the Shire. In June 1976, the Shire contained 1575 dwellings, of which 267 were unoccupied. Since then, a total of 103 dwellings have been completed, of which 66 are in rural areas, 15 in Rylstone and 22 in Kandos. The 1981 total number of dwellings is thus about 1678. In 1981, 244 dwellings in Rylstone, 640 dwellings in Kandos and 50 dwellings in Charbon constituted the 3 major urban areas, leaving 934 dwellings in rural areas (including 13 staff dwellings west of the colliery site).

All three urban areas are within 12 km of the colliery.

3.2.3 Land, Housing and Infrastructure

Three gazetted villages exist within the Shire. These are Rylstone, Kandos and Charbon.

Rylstone, Kandos and Charbon all have urban services connected, but only Rylstone and Kandos are sewered.

In January 1982, residential blocks were vacant as shown in Table 5.

TABLE 5

Vacant Urban Residential Blocks, Shire of Rylstone, January 1982

	Serviced & Flood-Free	Unserviced or Floodprone	Total
Kandos	15	35	50
Rylstone	5	10	15
Charbon	0	20	20
	20	185	205

(Source: Rylstone Shire Council)

Most of the vacant blocks do not have formed roads, electricity, water or sewerage connected and some of the blocks in Rylstone are located on floodplain leaving 20 vacant, fully serviced flood free residential blocks in January 1982 unconstrained and able to be developed privately at short notice.

In addition to the totals shown in Table 5, the N.S.W. Lands Department has land sufficient for approximately 120 residential blocks, including 20 in Rylstone. It is understood that the Shire Council have requested the subdivision of this land, but when this could occur is not known.

Little opportunity exists for significant residential development in areas of the Shire other than Kandos/Rylstone/Charbon, although Council is considering changing zoning to allow for the establishment of a rural subdivision of (say) 1 hectare blocks in the vicinity of Rylstone.

Some 1700 dwellings occur in the Shire. 15% (244) occur in Rylstone, 38% (640) in Kandos, and 3% (50) occur in Charbon. A cursory roadside survey indicates that a significant percentage (say, up to 10%) of existing dwellings are of diminutive dimensions and/or in extremely dilapidated condition.

In January 1982, three urban dwellings came onto the market in Rylstone Shire, and all were sold within a week of being notified to real estate agents.

At present, 1082 rural and urban premises are connected to the public water supply, which is assured for the urban areas from a small dam on the Cudgegong River. However, the system of reticulation is now at design capacity. The Public Works Department's Bathurst office is at present engaged on a conceptual study to upgrade the system's pumping and treatment capacity. When this upgrading occurs, it is possible that the water supply will be extended to the village of Clandulla.

Greater surplus capacity exists in the sewerage system. Another 300 houses could be catered for, although such increased usage would require mains extensions and new pumping stations. Charbon is at present unsewered, and sullage water disposal is reported by the Shire Engineer to be a serious odour problem in that village.

All urban areas of the Shire have access to a garbage disposal service.

It is difficult to comment on home ownership and rental rates, as changes since the 1976 Census will have been significant, with the intervening closure of the Charbon Cement Works in 1977.

3.2.4 Social Services and Facilities

(a) Health and Medical

The Shire hosts 3 general practitioners (2 in a practice at Rylstone with a second surgery at Kandos; 1 at Kandos), 1 baby health centre, 1 part time domiciliary nurse and 1 day care centre for the elderly.

This latter facility is housed at the Rylstone Hospital a facility of 29 beds. Unfortunately, the lack of a local nursing home for the aged leads to all but 6 or 7 beds being available for acute cases. The nearest nursing home is at Mudgee. X-ray services are available two days per week, and surgery and pathology services are each available one day per week. A social worker based in Lithgow covers the Shire.

An ambulance station with four vehicles is situated in Kandos.

The nearest regional hospital is at Lithgow, 80 km from Rylstone.

A rescue squad operates from Rylstone.

(b) Law

2 police are stationed at each of Rylstone and Kandos. The Shire hosts one solicitor.

(c) Education

One pre-school exists in the Shire (Kandos).
Primary schools exist at Rylstone (140 students), Kandos (290 students), Ilford, Clandulla and Bylong.
A secondary school is at Kandos (300 students).
An evening college for adults is run in association with Kandos High School.
No T.A.F.E. facilities exist in the Shire.
All students (including apprentices) wishing to take advantage of T.A.F.E. facilities must travel either to Lithgow or Mudgee, 90 & 50 minutes drive away, respectively.
The local shire library is associated with the Lithgow Regional Library, and opens 3 days per week.

(d) Recreation

. Olympic Pool - Kandos
. Golf - 9 hole course with sand greens at Rylstone; 18 hole course with grass greens at Kandos
. Squash - private courts as part of the Rylstone Club facilities
. Tennis 4 courts exist at both Rylstone and Kandos
. Bowls RSL Club, Kandos, and Rylstone Club
. Water Sports - including fishing, sailing etc. will be available on Windemere Dam after 1983.
. Wollemi National Park edges much of the Eastern boundary of the Shire, but until a Park Management Plan is adopted it is not known what active recreational opportunities will be provided.
. Glider Club, Rlystone airport

(e) Clubs and Societies

The following list has been provided by Council.

Apex
Brownies and Guides Chamber of Commerce
Combined Pensioners
Progress Associations (Clandulla, Glen Alice)
Community Services Liaison Committee
Bylong Ratepayers Association
Historical Society
Pony Club
Show Society
Hospital Auxiliary
Red Cross
Legacy
Meals on Wheels
Rotary
Tourist Promotion
Soaring Club
Rugby League

3.2.5 Investment and Employment

The largest employer in the Shire is the Kandos Cement Works (Australian Portland Cement Ltd.).

In January 1982 this enterprise employed 260 people, including 60 staff and 40 in its nearby colliery. The plant operates on a 7 day week continuous shift mode. Few opportunities exist for female employment. The workforce is evenly distributed across the working age range.

Wage rates in the plant are approximately 30% below those in N.S.W. collieries.

Kandos Cement Works is anticipating that because of new industrial awards incorporating shorter working weeks and other factors, a workforce expansion of the order of 10% is likely during the next 2 years.

Some other major employers include:

(a) Rylstone Shire Council (65 employees, including 5 senior staff)

(b) C.A. and D.B. Martin, General Contractors (40 employees).

(c) Reg G. Betts (7 tradesmen)

3.2.6 Public Sector Planning

(a) Land Use Planning

Planning control was introduced by Rylstone Council in 1970 by Interim Development Order. In January 1982, its provisions divide the Shire into three zonings:

(i) Kandos, Rylstone and Charbon constitute 3 village areas.
(ii) Land within 400 metres of all main, and trunk roads and the Glen Alice Road is zoned Non-Urban 1(b). The purpose of this zoning is to inhibit ribbon development.
(iii) All remaining areas of the Shire are zoned Non-Urban 1(a).

Non-Urban 1(a) and 1(b) effectively preclude residential development.

Rylstone Shire Council in late January, 1982, engaged planning consultants to provide advice on the provision of additional residential land, including prospects of a small-acre rural subdivision in the vicinity of Rylstone village. Results from this study are not expected before June 1982.

(b) Water Supply

The Public Works Department (Bathurst office) is preparing a conceptual study for the upgrading of the water reticulation system to the 3 Shire villages of Rylstone, Kandos and Charbon, with the possibility of extending water reticulation to the settlement of Clandulla.

(c) Land Rates and Council Finances

The average land rate in the Shire has risen 24% over two years. Council expects to receive in 1982 $481,000 in rate payments out of a total general fund income of $3,058,531 (i.e. rates contribute about 16% of Shire revenue).

In 1981, rating of collieries contributed 0.9% of total rate revenue. In 1982, payments of interest and repayments of principal on income free loans is expected to comprise $46,660 or 9.7% of Council's rate revenue.

(d) State Government Matters

The Department of Education has plans for the relocation of Kandos Primary School to a nearby site set aside for that purpose. Execution of those plans are apparently contingent upon firm plans for the expansion of Charbon Colliery or other employment growth in the Shire.

Health matters are at present in a state of reorganisation. Expansion of facilities is not a likely outcome of the discussions and some, especially hospital based, services may well be reduced.

3.2.7 Attitudes and Values

Although no formal investigations into attitudes and values have been undertaken, informal discussions with a wide variety of people and interest groups yield the following information:

(a) The community in general seems in favour of increased economic activity in the area. The community still remembers the effects of the closing of the Charbon Cement Works in 1977.

No antipathy towards coal mining or coal miners is evident.

(b) Nevertheless there exist some reservations about proposed expansion. Major employers in the Shire are concerned at the prospect of existing employees being "pirated" by the coal mining industry. There is strong feeling that not a little effort and expense has been incurred in order to retain employees during the period of economic recession in the 1970s and/or in providing training opportunities for local youths. On several occasions employers lamented that:

(i) they were likely to lose good workers to the mine;
(ii) the colliery was unlikely to provide training opportunities for local residents*; and

(iii) it would prove difficult for smaller employers to replace labour lost to the mines because of the tight land and housing market in the Shire.

(c) Apprehension has also been expressed regarding increased traffic and greater expenditure on road maintenance should the expansion of the colliery not be accompanied by rail haulage of coal to Wallerawang Power Station.

(d) The problem of finding sufficient residential land for an expanding population is a problem anticipated by Council, real estate agents, builders and other employers.

(e) The problem of financing capital works (especially those works related to servicing residential precincts) is anticipated by Council on behalf of its ratepayers. The problem is seen in the context of a backlog of capital works (e.g. water supply upgrading, sewerage service to Charbon), recent significant increases in rate burdens, and unpalatably high interest rates.

* In fact, normal colliery staffing and operation would include apprenticeships.

4.0 PROPOSED ACTION

4.1 Existing Operation

Blue Circle Southern Cement owns and operates the Charbon Mine. Originally, output from Charbon fueled the adjacent cement works, but since their closure in 1977, the mine has developed new markets and now supplies steaming coal to the Wallerawang Power Station, owned and operated by the Electricity Comission of N.S.W. Other mines owned and operated by the company are at Ivanhoe and Berrima.

The Charbon mine operation requires 65 personnel; however, 9 of these positions are vacant at present (January 1982). The current vacancy of 9 positions in the mine workforce is due mainly to the closure in late 1981 of the Miners Federation membership books.

Production is about 270,000 t.p.a. from underground workings on the northern fringes of the Lithgow seam. Physical working conditions at the mine are considered excellent with safe roof conditions and few gas problems.

The operations are carried out in 3 shifts. Two production shifts and a third maintenance shift each involve about 30 men, and a fourth capital development shift employs about 6 men.

The present workforce is considered by management to be stable and productive with a good safety and industrial relations record. It is a slightly younger workforce than normally found in N.S.W. underground operations. Average weekly earnings with bonuses in 1981 are comparable to the N.S.W. state average for underground mines of $549. All workers are resident within Rylstone Shire, and most live within the three village areas of Rylstone, Kandos or Charbon. Several staff members live on the mine site in company houses. No employees commute more than 20 minutes.

Coal produced at the mine is transported by a fleet of trucks to Wallerawang, 80 kms distant. Charbon Colliery is the supply mine farthest from the customer power station.

The route taken by the truck fleet includes 14 km of Shire roads to the Mudgee-Lithgow Road at Ilford. Disquiet has been expressed by the local council at the impact of this traffic on the road surface, and any increase in coal traffic is likely to encourage greater criticism from this source, probably with demands for compensatory action or payment from the Colliery.

4.2 Proposed Expansion

It has been proposed that Charbon Colliery should, over the next 2 to 5 years, quadruple its output in 3 stages. This proposal involves commissioning 1 new production unit in Stage I, employing about 35 men. New employment in addition to the second production unit would occur because of necessary additions to supervising staff - about 6 people in total and other ancillary employees. A total of 63 new people would be employed at the mine when the Stage I development was fully implemented. A second new production unit would be commissioned during Stage III of the proposed development, as would the introduction of open cut mining. This would require a total of 45 additional people. No additional employees would be required for the Stage II development.

By mid-1983, it is anticipated (January 1982) that the Colliery will employ about 128 men with a subsequent increase to 173 if production is expanded to 1 million tonnes per year (Stage III). The Stage III development would not occur before 1985.

Part of the Stage I proposal is that up to 3 houses will be built by the Colliery for new supervisory staff members. It is anticipated that, given council permission, these will be built on the Colliery property at Charbon where existing staff accommodation is now provided.

In January 1982 it is considered that all increased production will be carried by road transport to its destination at Wallerawang. No rail facilities exist at either the colliery or the power station, although a rail spur which once served the now abandoned Blue Circle Southern Cement Charbon Works comes within a kilometer of the colliery and studies are being carried out to have the rail spur extended or a balloon loop constructed to enable coal haulage by rail.

4.3 Workforce Increment and Timing

In January 1982 the following recruitment is envisaged:

(a) Current vacancies: Immediately Federation membership books are opened : 1 fitter and 8 miners to be employed (total : 9), filling the current vacancies.

(b) Stage I: (April-May 1983) a second mining unit to be established. (total 63).

(c) Stage III: (post 1985) a third underground mining unit to be established and open cut mining commenced (total : 45).

No additional employees will be required for the Stage II development.

Total employment with Stage III operational : 173

As the current E.I.S. is being written for Stage I and II developments only the Stage III development will not be discussed further in this chapter. B.C.S.C. will prepare a supplementary E.I.S. for the Stage III development at the appropriate time.

The numbers of new employees shown above are approximate minima for each stage of the proposed expansion. It is anticipated that by late 1983, the present workforce requirement of 65 will have grown to about 128 men. The remainder of this report assumes a late 1983 workforce of 128, not including those engaged in trucking operations.

4.4 Origin of New Workers

In January 1982, the Colliery held a file of 136 application forms from people seeking employment at the mine. The applications are a fair indication of the desire ambient in the area to obtain work in the coal industry - they are not the result of any call for applications.

9 of the applicants were aged under 20 years
96 of the applicants were aged 20-35 years.
8 of the applicants were aged 35-39 years
18 of the applicants were aged 40-49 years
5 of the applicants were aged over 49 years

78 applicants were able to claim a special skill or qualification other than a Class 1 driver's licence in support of their application.

Only 12 applicants were resident outside Rylstone Shire. As only 40% of the application forms on file had been received in late 1981, it can be assumed that many applications were not current in January 1982.

On the basis of these applications there seems to be little difficulty in manning the bulk of the mine's expansion from local residents. There are certain advantages associated with such a policy. Local residents are by definition already housed and established in the existing community. The area is not noted for its industrial militancy, and the existing mine workforce, and the employees of other firms contacted in the area, are considered generally to be good workers by their managers.

There are however considerations other than expediency which could influence staffing policies adopted during the expansion of Charbon Colliery. Table 6 shows which "Present or Last Employer" was cited on the application forms.

TABLE 6

"Present or Last Employer" Cited by Male Applicants for Employment at Charbon Colliery

Australian Portland Cement	25 (11% of workforce)
Kandos Colliery	5 (12% of workforce)
CA and DB Martin	8
Rylstone Shire Council	10
Prospect County Council	7
Unemployed	28

Note : Local employers only shown

If Charbon Colliery were to adopt the simple policy of employing local applicants as and where possible, the impact on other employers in the Shire would be substantial, and the reaction to this impact could conceivably be expressed as less than co-operative actions by the community on such matters as road haulage of coal, developmental consent for the provision of staff housing and so on.

The provision of work for those currently unemployed in the area, although a significant problem, is one factor which is not likely to be affected directly by expansion of the Charbon Colliery workforce.

Only 28 of the file of 136 current applicants were unemployed at the time of making their application. Other employers in the area comment upon the low qualifications and poor motivation of those seeking work in their own establishments, quoting their own training programmes as efforts made to upgrade the skills of the local workforce. Of the 28 unemployed at time of making application, only 7 could claim any skill or qualification in addition to a Class 1 driver's licence.

In December 1981, the C.E.S. Office quotes 81 adult males as being unemployed in the Shire.

4.5 Numbers and Demography of Incremental Population

4.5.1 Direct Population

The Charbon Colliery workforce is likely to expand from the current level of 65 to 128 employees by mid 1983. Except for senior staff, these 63 additional employees required for Stage I are likely to be males in their twenties or thirties, in the expansionary stage of their family cycles.

If it is assumed that on average, each new employee brings with him a wife and 1.5 children, and that all new employees will take up residence in the Shire, then the Shire's population will expand by 221 persons, as a direct result of new employment at the mine during Stage I.

This figure is likely to be essentially correct whether new workers are recruited from within the Shire or from elsewhere. Should employee pirating occur, it is unlikely that other large firms will go out of business, but will themselves have to recruit new employees from outside the Shire. These new employees will not differ substantially in demographic characteristics from mine employees recruited from outside the Shire. However, the coal mining union's demands regarding employment procedures could modify this.

4.5.2 Indirect and Induced Population

No previous published work exists on employment multipliers within Rylstone Shire, and the task of developing them is not within the scope of this study. However work by various researchers in the nearby Hunter Valley has been reviewed for a comparable situation to Rylston, from which suitable employment multipliers could be borrowed.

(a) In 1969, McCalden estimated 2 multipliers for Muswellbrook Municipality. His Type 1 multiplier (i.e. new direct employment and new indirect employment/ new direct employment) was estimated to be 1.58.

His Type 2 multiplier (i.e. New direct employment and new indirect employment and induced employment/new direct employment was estimated to be 2.51.

(b) In 1980, Unisearch Ltd. developed McCalden's input - output studies to provide multipliers for coal mining in the whole Hunter Region :

Type 1	1.45
Type 2	2.43

(c) In 1981, Dames and Moore estimated an employment multiplier of 1.4 for the Drayton Colliery District.

(d) In 1981 Jackson Teece Chesterman Willis and Partners Pty. Ltd. estimated Type 2 multipliers for the following communities:

Scone (Township)	1.35
Aberdeen, Denman (Village)	1.25
Singleton Shire	1.60
Muswellbrook (Town)	1.60

Recent Type 2 multipliers for various Hunter Valley communities thus range from 2.43 to 1.25 but the lower figures relate to villages without significant administrative functions such as Shire headquarters. It should also be noted that the Jackson study took into account the fact that significant numbers of existing jobs and residents would be physicaly displaced by coal mining-related activities in the area.

Such displacement is unlikely to occur in Rylstone as the development there is to be underground, and minor compared to the regionally extensive proposals for the Upper Hunter.

Therefore it is proposed to use an imputed coal employment multiplier towards the upper end of the range quoted for the Hunter, say, 1.5. This means that for every two new colliery jobs, one new other job will be created within Rylstone Shire.

Thus for the 63 new mine employees in Stage I, a further 32 other employees will be required in the Shire, due to indirect and induced impacts.

If each of these other new employees also brings a spouse and 1.5 children, the indirect population addition will be 112.

Total new employment (direct, and indirect and induced) will thus be about 95 by mid -1983. This will mean a population increase of about 333 persons, of whom 190 will be adults and 143 children of school age or younger.

Of the 95 new families in the Shire by mid-1983, 66% will be earning incomes significantly higher than the average now earned by existing Shire residents.

No further employees will be required at the mine until after 1985 when the Stage III development may be implemented.

4.6 Demand Projections

The expansion proposed for Charbon Colliery will increase demands for the labour services of 20 - 40 year old male workers with a particular range of skills.

Figures for areas within daily commuting distance of Charbon Colliery in December 1981 show that 81 adult males were registered as unemployed. Advice from existing employers in the Shire, and the results of analysis of the file of applicants for employment at the Colliery indicate that few persons currently unemployed are likely to prove suitable colliery workers as expansion proceeds over the next 2 to 5 years. Put another way, no significant pool of unemployed prospective coal miners exists within easy commuting distance of the Colliery.

As expansion of the Colliery proceeds, workers with the level of skills required by the Colliery will be in increasing demand from sources other than the Colliery. Some of this other demand will come through the response of others to the Colliery expansion programme, such as the Shire Council, trucking firms and engineering contractors upgrading their facilities and workforces, in order to service the larger mine. Much of this extra demand is reflected in the figures for indirect and induced employment discussed in Section 4.5 above.

Some of the other demand will be associated with forces quite independent of the mine's expansion : Kandos Cement expects to increase its workforce by about 10% in the near future due mainly to changes imminent in industrial awards, including a shorter working week for its employees; and one other colliery is likely to begin recruiting workers in the Shire before the period of expansion of Charbon Colliery is completed.

In local government areas adjacent to Rylstone Shire, other significant colliery developments are occurring or are anticipated in the near future. New mines or extensions to existing mines are likely soon to be established at Ulan, Gulgong and Bylong. Within the Greater City of Lithgow, 10 new or expanding mines employing up to 2600 men are expected to begin recruitment within the next few years.

These developments will place heavy demands on the supply of suitable labour over the whole Western Coal Fields region.

5.0 ISSUES, EFFECTS AND COMMITMENTS

5.1 Matters for Prediction and Planning

5.1.1 Demand for Land and Housing

The proposed expansion of Charbon Colliery can be expected to exert the following demands on land and houses within Rylstone Shire (Table 7)

TABLE 7

Demand for Land and Housing Units Associated Directly and Indirectly with the Expansion of Charbon Colliery

Development Stage	1982	I 1983	II 1985	III Post 1985
Direct Demand	Current	63	0	45
Indirect and Induced Demand	"	32	0	23
Total Demand (not cumulative)	"	95	0	68
Total Demand (cumulative)	"	95	95	163

In January 1982 only 2 building contractors were based in the Shire. Expansion of the housing stock will therefore require new builders, the use of outside contractors, or a heavy reliance on prefabricated housing.

5.1.2 Demand for Urban Services

If the increased population can be housed in Kandos and Rylstone, then existing sewerage, water and garbage services will be sufficient, given the excess capacity in sewerage and current plans to upgrade the water reticulation service. It is, however, extremely unlikely that the increased population will be contained within Rylstone and Kandos, and additions to (especially) sewerage to include the village of Charbon will be necessary at an early stage of the expansion.

Extra demands on outdoor recreational facilities are likely to be met at least partly by the Windemere Dam project, although indoor sporting and recreational facilities may experience significantly increased pressures.

Welfare services appear to be adequate for increased demands, but the lack of reliable information about the number of rented dwellings in the Shire may disguise a potential problem for low income renters, as the rental market becomes more competitive.

Water supplies are unlikely to require augmentation due to expansion of the Colliery, and although upgrading of the reticulation system is necessary, this is essentially independent of the Colliery expansion, except that the proposed expansion makes upgrading more urgent.

The existing sewerage system requires considerable upgrading by way of extensions to mains and extra pumping stations. This upgrading is similarly independent of the proposed expansion of the Colliery, but is nevertheless made more urgent.

The existing garbage disposal service and dumping area is considered capable of the 10% expansion, which will be required as up to 95 new dwellings are added to the existing total of 934 dwellings in the 3 villages of Rylstone, Kandos and Charbon.

5.1.3 Demand for State Services

Education

It has been assumed that each new household in Rylstone Shire will contain on average 1.5 children of school age or younger (see 4.5*). If this assumption is correct, by 1984, roughly 143 extra school children are likely to require places at the 2 primary schools at Rylstone and Kandos and at the Kandos High School. An additional 8 teachers will be required if current teacher/student ratios are to be maintained. Kandos Primary School will require relocation to the nearby site set aside for that purpose.

There is likely to be increased pressure for pre-school facilities in the main urban areas of the Shire.

Health and Medical

Existing ambulance, domiciliary care and day care facilities can be considered adequate to meet the 14% population increase associated with the expansion of Charbon Colliery. Hospital capacity will require expansion by 3 beds, unless a nursing home is established in the Shire.

It is unlikely that the existing three general practitioners will be adequate to service the increased population.

No significant extra demands are likely to be placed on existing services for the elderly as a result of the population expansion unless elderly residents at present constitute a significant proportion of that unknown number of people living in rented accommodation. If this is the case, then rent increases because of anticpated higher demands for dwellings of all types is likely to lead to a demand for more dwellings for the aged.

5.2 Unavoidable Short Term Impacts

5.2.1 Employment

Expansion of Charbon Colliery will lead to heightened demand for employees of all qualifications. Demand will be greatest for young adult males, and especially for those with technical skills.

This demand will be compounded by the establishment or expansion of other collieries in Rylstone and nearby shires, and by the expansion of the workforces of other industries in and near Rylstone Shire which seek similarly skilled workers.

The severity of the increased demand for workers with technical skills is likely to be, at the local level, at least as great as in the Hunter Valley towns of Singleton and Muswellbrook, where some automobile repair shops and agricultural machine engineering firms have gone out of business because of the difficulty of finding and retaining suitable labour.

5.2.2 Roads and Traffic

The expansion of the Charbon Colliery workforce will require the extension of village streets, but the major impact will occur on the 14 km of road between the Colliery and Ilford, where tonnages carried will increase to 750,000 t.p.a. by 1984 and where there will be an appreciable increase in traffic, especially heavy traffic. The developer should anticipate that the Shire Council will seek some form of compensation for degradation of road surfaces.

6.0 REFERENCES

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Joint Coal Board
Black Coal in Australia: A Statistical Year Book

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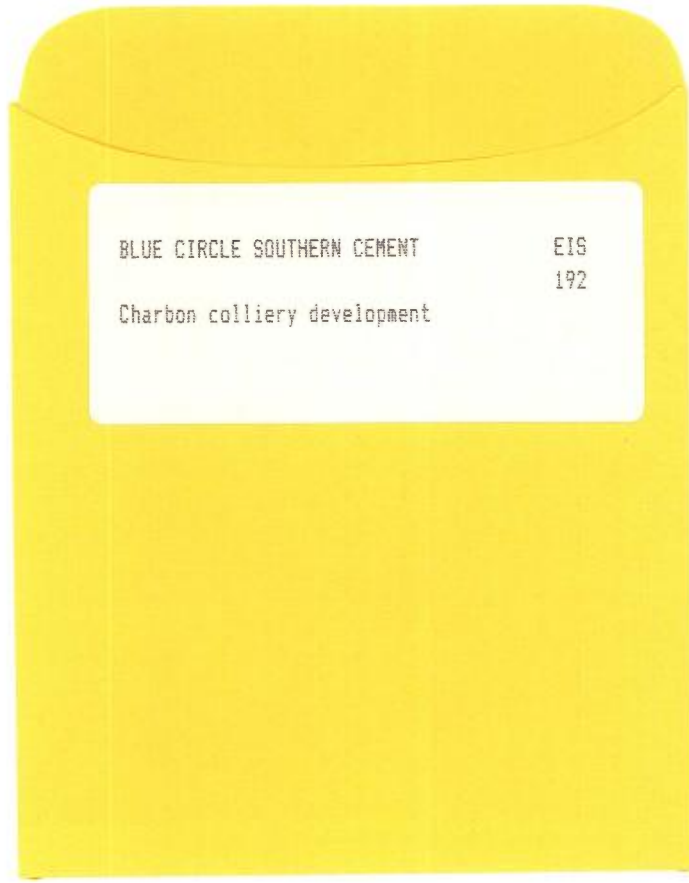
Charbon colliery development

Borrower's name	Date	Ext

RAECO

RAECO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