



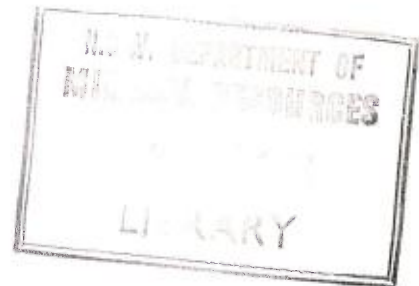
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Exploratory drift on authorisation A.17, Mitchells Flat for Barix
Pty. Limited



T76/2181



ENVIRONMENTAL RESUME

PROPOSED EXPLORATORY DRIFT

TO OBTAIN

BULK COAL SAMPLE,

MITCHELLS FLAT

FOR

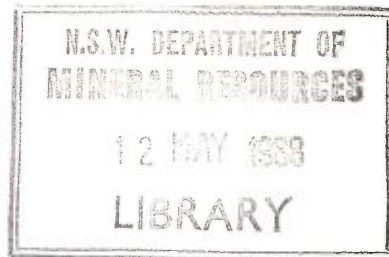
BARIX PTY. LIMITED

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LONGWORTH & MCKENZIE PTY. LIMITED

PNT 232/2
SEPT. 1981



ENVIRONMENTAL RESUME

EXPLORATORY DRIFT ON
AUTHORISATION A.17,
MITCHELLS FLAT

FOR

BARIX PTY. LIMITED

Prepared by

Longworth & McKenzie Pty. Limited

September 1981

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1.0 INTRODUCTION

Barix Pty. Limited which is a wholly owned subsidiary of Pacific Copper Limited, hold Authorisations 17 and 212 for the exploration and proving of coal reserves in the Mitchells Flat area, east of Singleton, N.S.W.

A substantial exploration programme has indicated reserves of steaming and coking coal in Authorisation 17 suitable for extraction by underground mining methods and export to overseas markets. This exploration programme is continuing in order to adequately assess coal reserves and quality and to provide detailed mine planning information.

The Company now plans to develop an exploration drift - a trial inclined underground shaft - to obtain a bulk coal sample of about 10,000 tonnes. This bulk sample is required for a proposed coal testing programme which will include testing of raw coal, testing for coal washing characteristics and determination of yield factors, and testing of washed coal product.

This detailed information is required to enable coal products from a future mine in the area to be sold on the international market.

The purpose of this Environmental Resume is to support the Company's application to develop the exploratory drift by reviewing the environmental factors relevant to the proposal.

As part of the work carried out to obtain information for mine planning purposes and in recognition of the need to determine background or existing environmental conditions in the area, the Company commissioned Longworth & McKenzie Pty. Limited in August 1980, to commence a programme of environmental monitoring.

This programme is continuing and has to date involved the collection of data on water quality, air quality, noise levels,

traffic volumes, estimates of flood levels and studies of the area's ecological and archaeological importance.

A Preliminary Environmental Appraisal for a future colliery on this Authorisation has also been prepared for Barix Pty. Limited by Longworth & McKenzie during 1981.

2.0 PHYSICAL DESCRIPTION OF SITE AREA

The Company intend to establish the exploratory drift in the western part of Authorisation 17, within the valley of West Brook, as shown in Figure 1. The choice of location has been influenced by several factors including geological structure, coal quality and topography.

The area is approximately 11 km east of Singleton and between the Mirannie and Gresford Roads. The site is close to the eastern bank of West Brook and approximately 1 km north-east of "Boonhill" homestead, the nearest residence.

The site is located on land owned by the Trustee of the Hospitaller Brothers of St. John of God, but used for cattle grazing by Singleton Investments Pty. Limited. Agreement has been reached in principle with the landowner and tenants for the establishment of the exploratory drift on this land.

The land in the immediate site area consists of gently-sloping, cleared grazing land with a thin veneer of soil supporting a good grass cover. A thin strip of trees has been left along the banks of West Brook which is incised to a depth of a few metres in this area. West Brook joins Glendon Brook at Mitchells Flat, about 3 km south of the site and Glendon Brook flows into the Hunter River some 5 km further south.

3.0 SUMMARY OF PROPOSAL

3.1 General

The exploratory drift will consist of two underground entries about 30m apart with grades of 1 in 4.3 initially but levelling out with decreasing seam dip. The two entries are necessary for adequate ventilation and safety.

The entrance to each drift shall be into the back face of a small open-cut of maximum depth 8 metres, as shown in Figure 2. A total length of approximately 750m of underground workings will be required to obtain the bulk sample, including 190m through weathered unusable coal.

Topsoil stripped to a depth of 0.3 metres from the open cuts will be stockpiled for future rehabilitation use. Other material excavated from the open cuts will be used to construct an earth bank for the settling pond.

All surface facilities including bath-house, office, workshop, water tanks and other equipment will be mobile and demountable. The total life of the operation to obtain the bulk sample is expected to be no longer than 12 weeks. After this time, the entries will be closed, all temporary facilities removed and the area rehabilitated as described in Section 4.10.

The operation is expected to require a workforce of 12 men on a single daytime shift. It is, however, possible that a second shift employing an additional 6 men may be needed. In any case, the hours of operation will not extend beyond 6 am to 11 pm.

3.2 Site Facilities

The layout of surface facilities at the site of the exploratory drift is shown in Figure 2. The workshop, bath-house, office, toilets, water tanks, transformer and compressor will all be mobile units which will remain at the site for the duration of the operation only. An area of approximately 5 ha will be affected by the surface facilities.

Earthworks required at the site include excavation of the two small open-cuts, the access track, construction of the settling pond, runoff catch dam and bund-wall and levelling of the coal stockpile area. These will be graded, sown and revegetated at the completion of activities, though the settling pond may be left for farm use if the water quality is suitable.

The access road will be unsealed and will follow the existing farm track which joins the Gresford Road as indicated in Figure 1.

Electric power will be provided by constructing a power line from the site to the existing main Branxton-Westbrook supply line, at a distance of less than 1km to the west.

3.3 Coal Handling and Transportation

It is planned to remove coal from the drift by using underground shuttle cars though it may be necessary to use a conveyor for the initial steep section near the surface.

Raw coal will be stored at the stockpile area indicated and will be loaded from here by front-end loader into 25 tonne capacity coal trucks for transport to the selected coal washing plant. This plant is likely to be the coal washery at Ayrfield Colliery, 2 km south of Branxton.

In any case, the trucks will travel 2km eastwards on the Gresford Road then south on the Branxton Road to the New England Highway. The Branxton Road is already heavily used by coal trucks from Great Greta Mine. From Branxton, the trucks will travel approximately 2km south on the Cessnock Road to Ayrfield Colliery.

4.0 ENVIRONMENTAL CONSIDERATIONS

4.1 Water Management

4.1.1 Existing Water Quality

The site of the proposed exploratory drift drains naturally to West Brook which has flow rates which vary greatly according to local rainfall conditions. During the drought conditions experienced in the second half of 1980, West Brook ceased to flow and shrank to a series of stagnant pools. A monitoring programme over the past 12 months has provided information on the water quality in this stream under the varying flow conditions.

The results indicate that these surface waters are quite saline during low flow conditions, having high levels of chlorides but being fairly low in sulphates at these times. Levels of pH vary from neutral to slightly alkaline and hardness is also high when flows are small. Levels of iron are generally quite low, except under stagnant conditions. In general, water quality is much higher when substantial flows occur following high rainfall.

The monitoring programme will continue and further testing will be carried out to ensure the quality of water in West Brook remains unaffected by the development.

An application for a licence under the Clean Waters Act will be made and any discharge from the operation will be within the conditions imposed. There is no reason to believe that water quality in West Brook will suffer as a result of the proposed coal extraction.

4.1.2 Water Supply

A licence will be obtained from the Water Resources Commission to enable water to be drawn from West Brook for bath-house and dust suppression use. This will be supplemented by settled water from the underground workings, as described in Section 4.1.2. One 220,000 litre tank will be kept for fire fighting purposes.

Drinking water will be brought to the site in trailer-mounted tanks.

4.1.3 Underground Water

Drilling has indicated that considerable quantities of ground water will be encountered in the drift. This water, which is expected to be acidic, will be pumped into the main settling pond, as shown in Figure 2.

Water in the settling pond may be used for dust suppression at the site and will be partly returned underground. During overflow conditions only clean settled water will be allowed to pass from here to West Brook, in accordance with State Pollution Control Commission requirements.

4.1.4 Runoff Control

Runoff from within the site area will be prevented from passing directly to West Brook by the bund-wall around the lower part of the coal stockpile area, as shown in Figure 2. This will direct all surface drainage to the small catch dam as shown, from which it will be pumped up into the main mine water settling pond.

4.1.5 Bath-house Effluent

Effluent from the temporary bath-house and portable toilet facilities will be collected in a septic system installed at the site.

4.2 Flood Estimations

Hydrological work to established flood heights within the West Brook Valley has been undertaken to facilitate the safe siting of any mine facilities.

The lack of available site specific data from both the Bureau of Meteorology and Water Resources Commission has meant the adoption of a synthetic unit hydrograph (Cordery-Webb) approach to flood estimation.

For a catchment area above the proposed site of 109 sq. km the Cordery-Webb method gives a peak flood discharge of 540 m³/sec for a one in one hundred year recurrence interval. This figure was checked against a flood frequency analysis of a similar, better documented catchment nearby, and then corrected for the differing catchment areas. The flood frequency analysis was carried out on the 18 years of stream flow record from the Glennies Creek (Middle Folbrook) gauging station, and from this the median value of flow for a one in one hundred year flood at West Brook was calculated as 460 m³/sec. This value is in general agreement with the result of the synthetic unit hydrograph method.

Because the consequences of mine site inundation are serious a more cautious design criteria than that of a one in one hundred year flood was thought worthy of investigation. Therefore further analysis was undertaken with the object of determining maximum probable flood

discharges. The work of C.J. Wiesner* was used to calculate maximum probable precipitation depths for varying storm durations and these values were used in the derivation of synthetic hydrographs. The flood discharge so determined was 1030 m³/sec. This value was comparable to the one in one hundred year flood frequency analysis 5% confidence limit, value, 1360 m³/sec.

The conversion of discharges to flood heights was obtained by use of the Slope-Area Method, and the stage-discharge values are shown below:

Discharge		Flood Level (RL)
540 m ³ /sec	[1 in 100 yr Flood Cordery-Webb Method]	40.1 m
1030 m ³ /sec	[Max. Probable Flood Cordery-Webb Method]	41.3 m
1350 m ³ /sec	[1 in 100 yr Flood Flood Frequency Analysis 5% Confidence - Limit]	41.8 m

The flood heights have been calculated for a stream section which has been surveyed and is located 500 metres downstream of the proposed site. At this section the Cordery-Webb one in one hundred year flood level is approximately at bank full height with some inundation of the eastern flood plain likely, where the area slopes away from the stream. The maximum probable flood level of 41.3 metres would mean the inundation of the flood plain and 20 metres beyond. The upper value of flood discharge of 1350 m³/sec results in a

* Wiesner C.J., Hydrometeorology, 1970

flood height of 0.5 metres above the maximum probable flood (Cordery-Webb analysis) but only a marginal increase in the areal extent of flooding.

For the purposes of siting the temporary mine facilities the use of the flood height estimates downstream are reasonable and therefore as the location of these facilities are above the 42 metre contour this would place them above any anticipated flooding. The coal stockpiles will be below this level but will be protected from flooding by a bund wall, which also serves as a water pollution control measure. The short duration of the works (12 weeks) will mean the likelihood of substantial flooding is in any case remote. Further, after completion of the mining operation the site will be rehabilitated as outlined in Section 4.10 and therefore contamination of West Brook in the event of flooding in the future will not occur.

The flood height estimates have ignored backwater from a flooded Hunter River, as the mine site is above the affected reaches of West Brook and the flood peaks of the Hunter and West Brook are unlikely to coincide.

4.3 Air Pollution Control

The existing air quality in the study area is assumed to be quite good as a result of its essentially rural character and the absence of any substantial urban or industrial developments in the vicinity. Dust is often raised by vehicles using unsealed roads and property tracks during dry conditions. During drought conditions in the latter part of 1980, property owners reported severe dust storms in the area, most of which approached from the west.

No information on measured levels of airborne particulate material is available for this area so a monitoring programme

has been established in order to obtain this background information. This consists of a series of dust deposit gauges installed in the area. Preliminary results indicate that in the Westbrook and 'Boonhill' areas, dust deposition is generally less than $1 \text{ g/m}^2/\text{month}$. However in other areas such as on Killyfuddy Hill, deposition rates as high as $9 \text{ g/m}^2/\text{month}$ have been recorded.

Though the access track to the site will be unsealed, a water spray cart will be used to minimise dust generation. Similarly, irrigation sprays will be used to ensure that coal stockpiles do not become a source of dust emissions. These dust suppression measures will utilize the underground water held in the main settling pond.

Coal trucks leaving the site will be required to use covers to prevent coal dust blowing from the loads.

It is considered that the proposed exploratory drift and associated coal handling need not contribute to any deterioration in air quality in this area.

4.4 Noise

4.4.1 Ambient Noise Levels

Background noise levels in the Mitchells Flat area are quite low, reflecting the rural character of the area and the absence of any heavily trafficked highways or railways in the vicinity. The dominant source of noise in the area is traffic using the three main roads: the Singleton-Gresford Road in the south, the Branxton - Gresford Road in the east and to a lesser extent, the Singleton-Mirannie Road in the north.

In order to determine levels of background noise in the study area, a preliminary ambient noise level survey was carried out in February, 1981. Three sets of noise readings were made at six points in the area both during daytime and late at night. Levels were also measured at a point on the road towards Branxton. The results of this survey are given in Table I and the location of the sampling points shown in Figure 1.

The results of the survey indicate that background levels in the area rarely fall below 30 dBA and are often much higher as a result of insects, birds and frogs.

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TABLE I BACKGROUND NOISE LEVELS, MITCHELLS FLAT AREA

(Levels are L₉₀, in dBA)

Station No.	Location	12.2.81	13.2.81	13.2.81	Comments
		11.00p.m.-12.30a.m.	8.00a.m.-9.30a.m.	2.00p.m.-3.00p.m.	
1.	Entrance to "Studleigh"	31	37*	44	Insect noise dominant
2.	Near houses close to Mundawah Creek	35	64*	67	Intense insect noise
3.	Near "Boonhill"	30	33	33	
4.	Near new houses on Singleton-Gresford Road	37	34	35	Noise from insects and frogs dominates
5.	Rise on Singleton-Gresford Road	31	28	32	
6.	On Gresford Road, near houses south of Killyfuddy Road	34	32	35	Insect noise major contributor
7.	On Branxton Road, Corner Glendon Lane	29	30	30	

* Noise levels affected by drill rig

4.4.2 Expected Noise Impact

During excavation of the two open-cuts, construction noise from earthmoving equipment will be substantial but this will be for a short time period only.

For the 12 weeks or so that coal will be mined from the exploratory drift, the main sources of noise will be the operation of a front-end loader at the stockpile area, the loading and movement of coal trucks and the compressor.

The dominant source of noise is likely to be the loading and truck moving activities and for the purpose of estimating noise impact a maximum operational level of 80 dBA at 15 m is assumed for the site. Using the theoretical rate of attenuation with distance, this suggests a maximum noise level of 44 dBA at the nearest residence, "Boonhill", approximately 1 km distant. This does not include the effects of ground or atmospheric absorption which would further attenuate the noise. However, it indicates that the operation will be heard to a minor degree at "Boonhill" for the short period of its life.

The operation may also be audible as a distant feature at one or two other houses to the south (near sample point 4). Trucks using the access track to the site will be heard in this area also and may cause minor disturbance to some houses in the Gresford Road area. However, the expected 20 truck movements per day should cause only minimal impact.

4.5 Transportation

All raw coal removed from the exploratory drift will be loaded from the stockpiles into 25 tonne capacity trucks for transport to a selected coal washery. This will require haulage to Branxton and then probably to Ayrfield coal Washery, 2km south as described in Section 3.3.

A total bulk sample of 10,000 tonnes over a 12 week period suggests less than 10 truck-loads per day, or a maximum of 20 truck movements per day. This is considered to be minor and should have no adverse impact on the road system, particularly as the Branxton Road currently experiences a high level of coal truck usage from Great Greta Mine at Glendonbrook.

To monitor existing traffic volumes on these roads, automatic traffic counters were installed at points on the Singleton-Gresford Road, west of the Branxton Road intersection, and on the Branxton Road south of this intersection.

The results, which are a little higher than the latest Department of Main Roads figures for 1976, indicate Average Annual Daily Traffic Counts of around 300 for both these roads. This confirms that the additional truck traffic proposed will have only minor effect on current traffic volumes.

4.6 Visual Amenity

The surface facilities associated with the exploratory drift, though not of substantial size, will be visible from "Boonhill" homestead at a distance of 1 km. They may also be visible as a distant feature (over 2 km) from the Gresford Road to the south and possibly from the Mirannie Road area to the north.

However these distances, together with the short period of activity at the site, will ensure that the aesthetic impact of the operation is minor. The rehabilitative measures outlined below will ensure that no lasting visual intrusion occurs.

4.7 Vegetation

The area selected for the siting of the proposed entry and facilities has been entirely cleared of trees and shrubs, with the exception of a thin strip of trees along the banks of West Brook.

These trees will not be removed and only the grass cover will be affected by the clearing and excavation for the drift entries and other facilities. These areas will be revegetated as outlined in Section 4.10 when the operation is complete.

4.8 Fauna

A preliminary inspection of Authorisation A.17 has been made by an ecologist. This examination indicated that as the land in the vicinity of West Brook has been extensively cleared and grazed it does not represent a likely habitat for native fauna.

The only stand of timber in the area is found on the south-eastern side of Killyfuddy Hill and some evidence of common mammals was found here. Patterns of movement of native fauna would be between this patch and the extensive areas of natural bushland to the south-east.

There is no reason to expect any rare or endangered species of birds, reptiles or mammals would be found in the site area

or that the proposed mining activities would cause any ecological dislocation.

4.9 Archaeology

The area of Authorisation 17 has been inspected briefly by an archaeologist in order to assess the likely presence of aboriginal relics and to identify areas where further detailed examination is required.

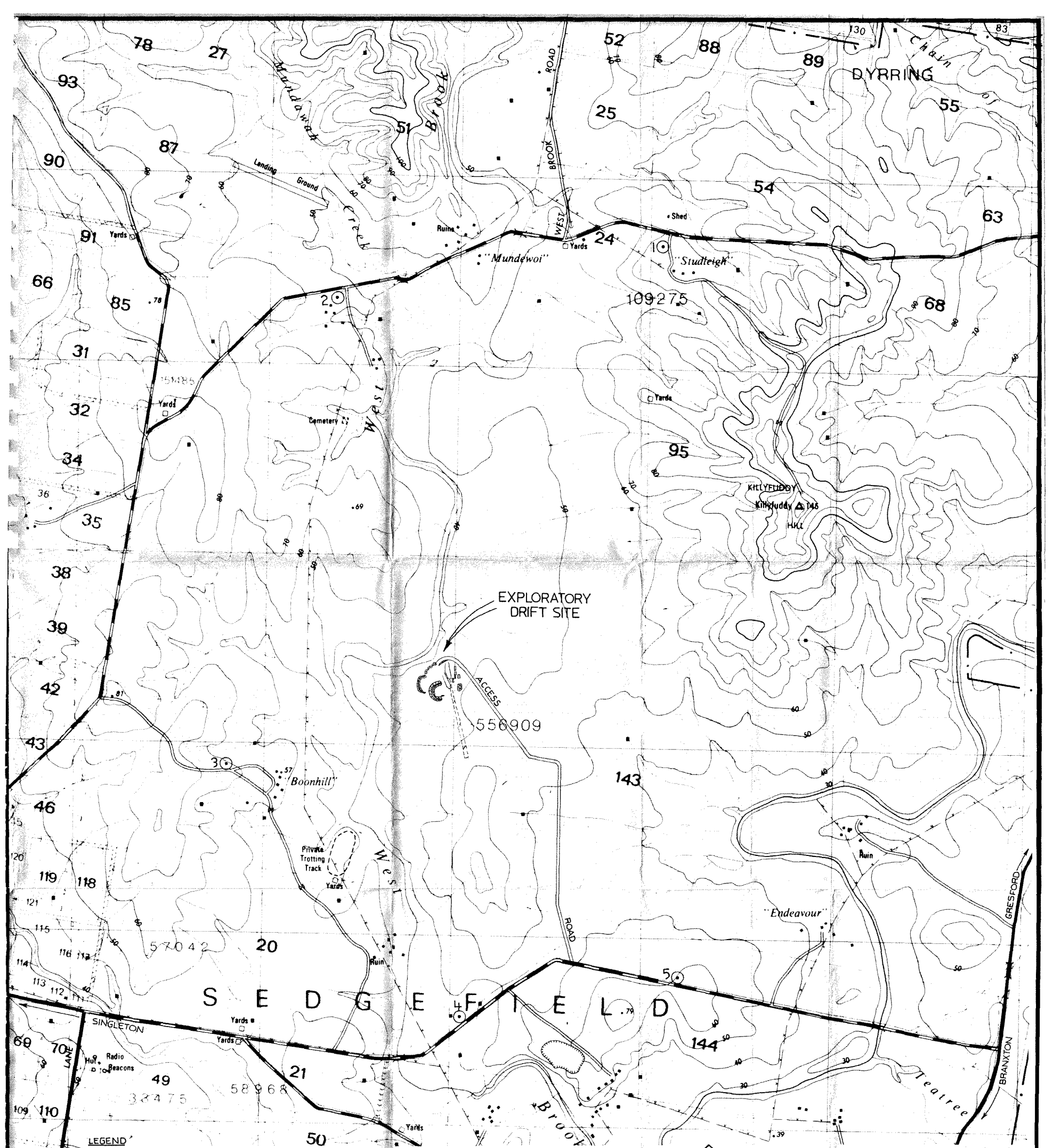
It is felt that some nearby high points to the east may contain rock shelters though these are not present in Authorisation 17. Campsite relics may occur on the extensive flats and spurs bordering Glendon Brook and West Brook and artefacts were found within the loop of Glendon Brook north of "Endeavour" homestead. Both the creeks meander and form waterholes which may show evidence of aboriginal activity in the form of grinding grooves on rock surfaces.

In general, it is considered that the eastern half of the area appears more likely to contain artefacts than the western, where the exploratory incline is planned. Accordingly, it is most unlikely that operations will cause disturbance to any significant archaeological sites.

4.10 Rehabilitation

Final use of the exploratory drift site depends on several factors including:

- final land ownership and utilization;
- possible use of the site for permanent mine entries following approval for a mining lease;
- any requirements for further coal sampling.



LEGEND
 2 ⊙ NOISE SAMPLE POINTS



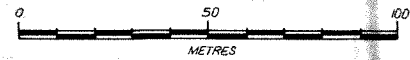
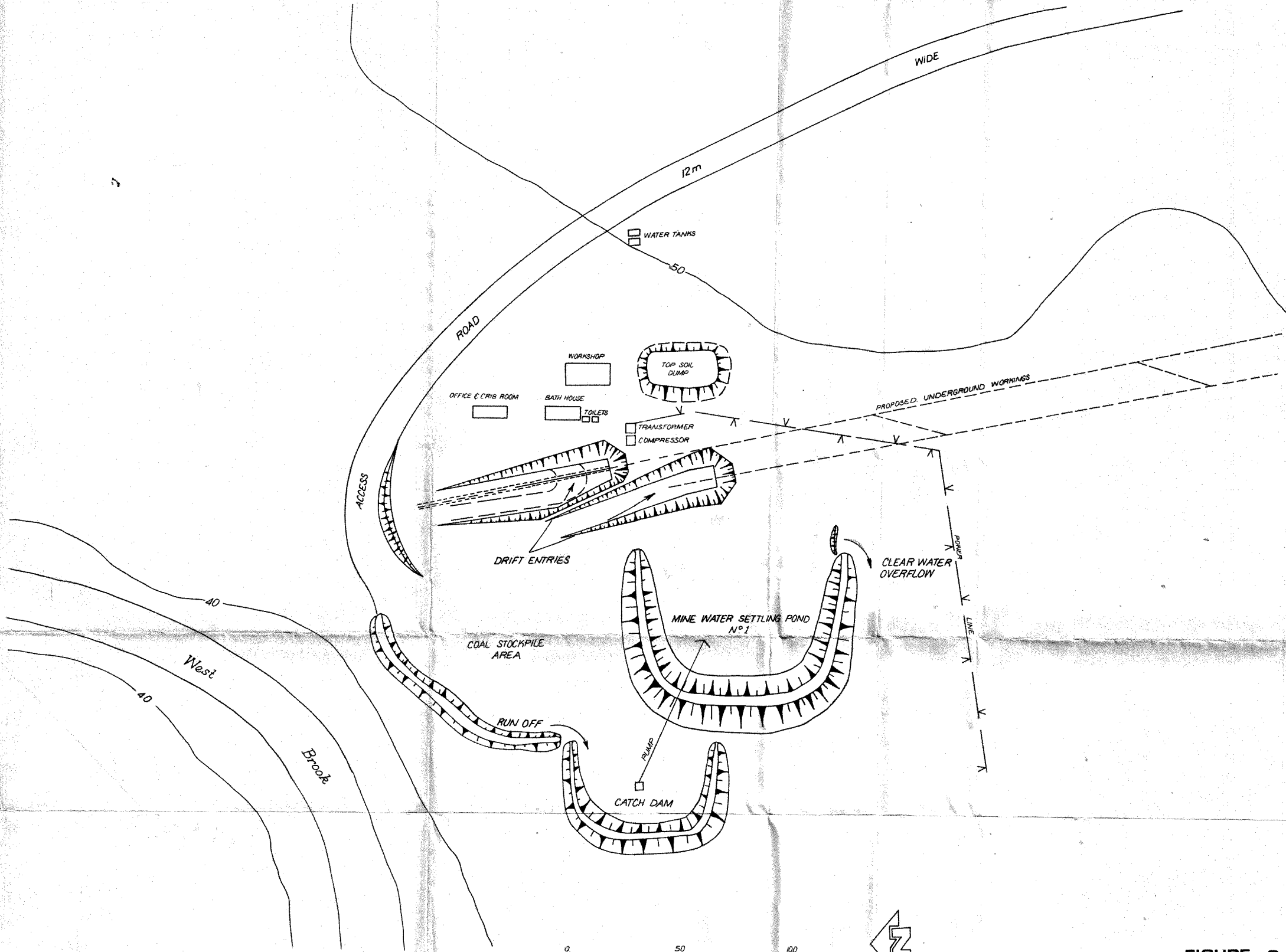


FIGURE 2
SITE LAYOUT

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Proposed exploratory drift to obtain
a bulk coal sample

Notwithstanding these possibilities, it is intended that on completion of the bulk sample extraction the two entries will be secured and locked and all temporary buildings and facilities removed.

All disturbed areas and earthworks will be graded, seeded and re-vegetated. The main settling dam will be left as a source of farm water if water quality is suitable.

