



EIS 559

AB019255

Mount Piper ash storage : environmental impact statement



The Electricity Commission of N.S.W.



# Mount Piper Ash Storage

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## Environmental Impact Statement



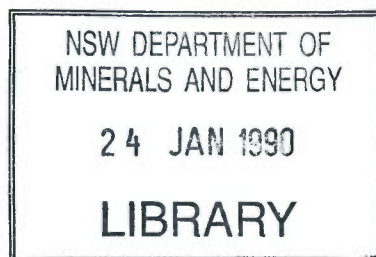
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The Electricity Commission of N.S.W.



# Mount Piper Ash Storage

## Environmental Impact Statement

Prepared By:

ENVIRONMENTAL APPROVALS SECTION  
Planning and Development Group

November 1989

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## SUMMARY

The Environmental Impact Statement (EIS) for Mount Piper Power Station was issued in August, 1980. The proposed method of storing of ash from the power station in the EIS was to pump an ash and water slurry to an ash dam site north east of the station, known as the Neubecks Creek site.

The deferment of the power station construction, due mainly to lower than originally predicted load growths, gave the Commission an opportunity to review the original ash storage proposal.

As a result of its investigations, the Commission now proposes to store the ash at the Western Main Colliery site, adjacent to the power station, using a dry emplacement technique. This technique involves the conditioning of ash with 15-20% water to enhance handling and control dust and placing the ash with conventional earth moving equipment.

The Western Main site is now a feasible proposition for ash storage, as no recoverable coal resources will be sterilised by the time ash will need to be emplaced. Such was not the case when Mount Piper was scheduled to have been operational in the original EIS. Ash emplacement should begin in late 1992, during the initial station proving runs.

The ash will be used initially to complete the filling of an open cut void on the mine site, then the emplacement will be built up in stages, to eventually form a hill. The ash produced over the life of the power station will be stored on the site. The ash emplacement will be revegetated progressively. The final hill will be shaped and vegetated to match the surrounding countryside.

The use of the open-cut mine void for ash storage is subject to a commitment by the mine operator to extract the economic coal reserves from areas prior to them being filled with ash. If a commitment is unable to be gained then an alternative area on the site could be utilised for ash storage.

Based on an economic comparison during tender analysis, the Commission will adopt one of the following options to enable completion of the project:

- a contractor to design, build, own and operate the ash handling plant, transport and emplacement systems;
- a contractor to design and build the

project works, the Commission to own the works and operate the ash handling plant, with a contractor being responsible for ash storage operations.

Irrespective of which option is adopted, the ash storage system will be built and operated in accordance with the requirements set out in this EIS, any conditions of development consent and any further conditions imposed by relevant Government bodies.

The salient environmental issues relating to this proposal are considered to be:

- control of leachates
- control of any airborne dust
- noise
- visual impact
- potential for contamination of surface waters.

These are addressed in this EIS and, with the adoption of the safeguards proposed, it is predicted that environmental impacts from the project will be acceptable. The proposal was also assessed in terms of predicted impacts on geology, soils, mineral resources, land use, heritage, flora, fauna and the social environmental. No environmental impediments were revealed.

As the design of this project is going to be put to tender, it is clear that many engineering details of the project cannot be stated at this time. The environmental assessment of the project given in the EIS relates to feasible ash transport and emplacement alternatives and to the ultimate development. The principles of the environmental safeguards which will apply are clearly set out.

The feasible alternatives for ash storage methods (wet or dry) and sites are discussed in the EIS. The alternative sites are:

- Neubecks Creek (wet and dry)
- Western Main (dry)

The dry storage of ash at the Western Main site is proposed for the following reasons:

- the superiority of dry over wet storage in terms of lower water consumption and better catchment management;
- the proximity of the site to the power station, with the attendant transport cost savings;
- the Western Main site has been largely disturbed by open cut and underground mining and the storage of ash there is seen as a compatible land use;

- the vegetation and shaping of the ultimate landform will provide a long term solution to both the rehabilitation of the mine site and the ash storage area;
- Ben Bullen State Forest and Mudgee Road are not affected, as would have been the case if the Neubecks Creek site were used;
- the site provides for expansion for ash storage purposes, should it be needed;
- the total area required for the power station is reduced;
- no environmental impacts have been predicted which might preclude the development.

# 1. INTRODUCTION

## 1.1 BACKGROUND

Approval was given in 1982 by the then Minister for Environment and Planning for the construction of the 2 x 660 MW Mount Piper Power Station, 7 km west of Wallerawang Power Station. A downturn in demand and the consequent reduction in the forecast annual growth rate led to a re-assessment of the proposed construction programme following the 1983 winter period. Construction proceeded on a stretched programme in accordance with the maximum deferment possible under the contracts. The first unit of the station is scheduled for initial commercial operation in 1993, with the second unit planned for 1994.

A re-assessment of the method and the siting of ash storage originally proposed has taken place since the Mount Piper Project was approved. The Electricity Commission now proposes to implement a dry ash emplacement for the Mount Piper Power Station and not proceed with the wet method originally approved. The original site proposed for ash storage was on Neubecks Creek in the Ben Bullen State Forest. A disturbed mining site (Western Main Colliery) adjacent to the power station will now be available for ash storage by the time ash is being produced. It is proposed to use this site rather than the Neubecks Creek site.

This EIS relates to the modified method of ash emplacement and the storage of the ash at the Western Main site, and refers as well to a contingency storage site adjacent to the one now proposed. A location plan showing the proposed ash storage and contingency areas is given in Figure 1.1.

## 1.2 DEVELOPMENT CONSENT PROCESS

Electricity generating stations, including ash storage facilities, are listed as designated developments in Schedule 3 of the Environmental Planning and Assessment (EPA) Regulation, 1980. For designated developments the EPA Act specifies in Section 77(3)(d) that the development application shall be made to the consent authority, in this case the Council of the City of Greater Lithgow, and be accompanied by an EIS in the prescribed form prepared by or on behalf of the applicant, in this instance the Electricity Commission of New South Wales.

One of the conditions of the consent given in 1982 by the then Minister of the Department of Environment and Planning, now the Department of Planning (DOP), for the Mount Piper Power Station was that the Department should be informed if it were decided not to construct the Neubecks Creek Ash Storage Dam. This will be done formally when this EIS is referred to the Department.

This EIS has been prepared by the Electricity Commission of NSW as the proponent of this development, in accordance with Clauses 34 and 35 of the EPA Regulation, 1980, and the requirements of the Director of the Department of Planning as detailed in Appendix A.

Development consent is being sought for:

- the fly and furnace ash transport systems between the power station and the ash storage area;
- use of the proposed site for ash storage purposes;
- all other necessary engineering works such as drainage systems, construction offices, and workers amenities to enable ash emplacement, as proposed;
- a contingency site adjacent to the proposed site;
- restoration of the site in accordance with the proposed landscape concept.

## 1.3 FORMAT OF ENVIRONMENTAL IMPACT STATEMENT

This EIS comprises a summary, five sections and three appendices. Following the summary and this introduction is Section 2 which describes the ash to be emplaced, the engineering works, construction schedule and facilities and operational characteristics of the proposal.

Section 3 describes the predicted impacts of the development on the existing environment and the measures which will be taken to mitigate adverse impacts. The environment is looked at in terms of geology, soils, mineral resources, land use, heritage, flora and fauna, noise, visual catchment, water and air quality and the socio-economic environment.

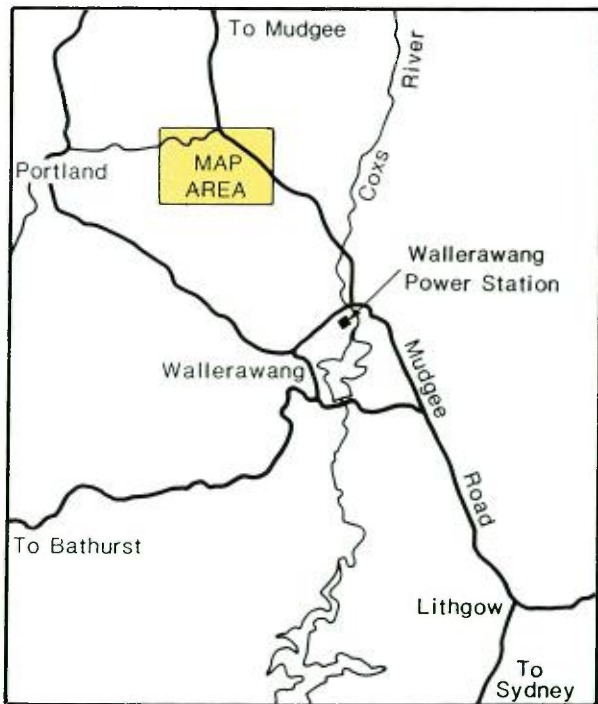
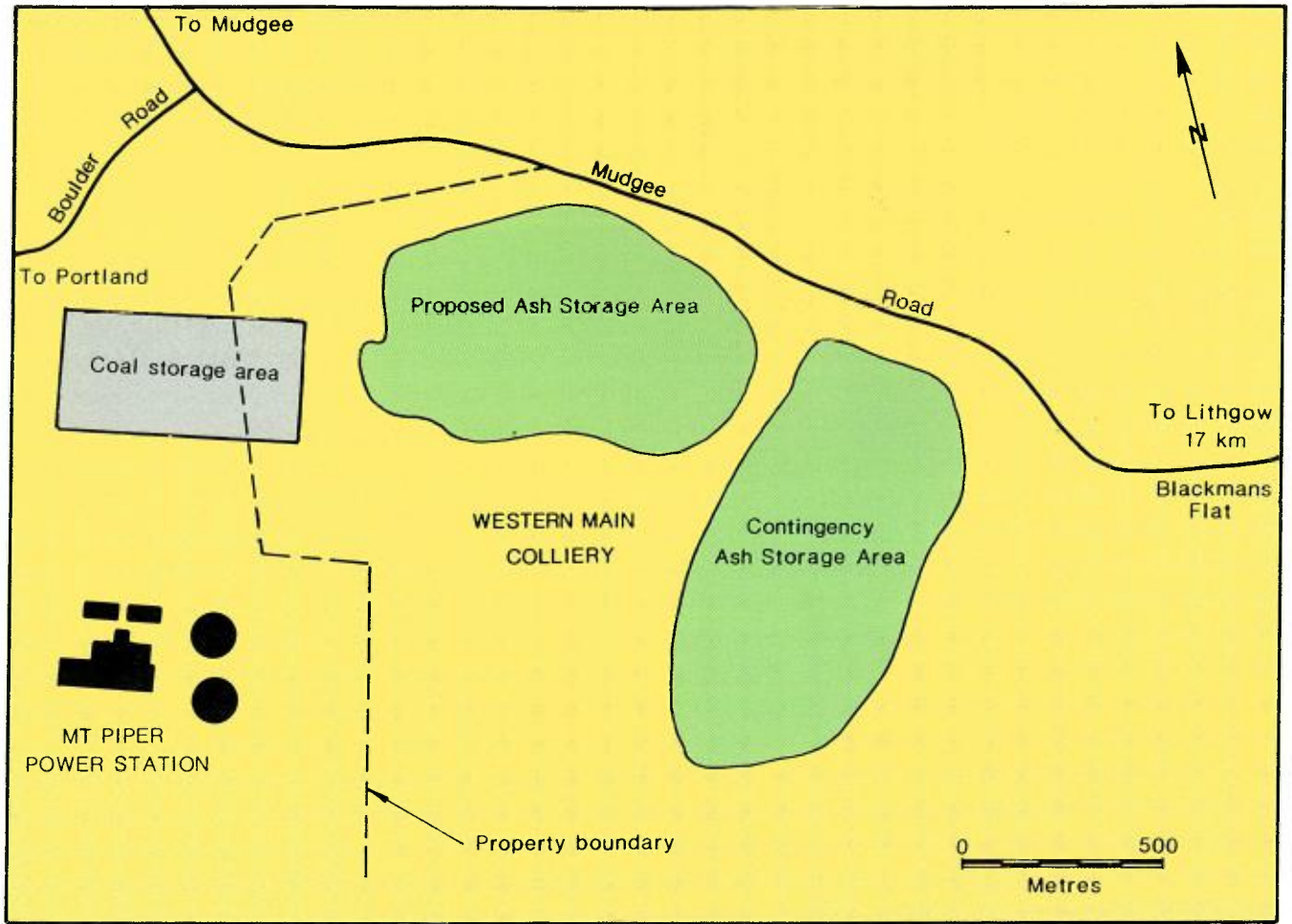
Section 4 discusses the merits of dry versus wet storage, examines the alternative sites that were considered and gives the justification of the project.

References are provided in Section 5.

Appendix A lists the requirements of the Director of Planning, while Appendix B summarises consultations with state and local government bodies. Appendix C comprises the "Form 4 Certificate", as required by the EPA Act. Figures are placed at the end of the section which contains the first reference to them.

#### **1.4 INQUIRIES AND REPRESENTATIONS**

Should a reader have any queries regarding aspects of this EIS please contact Mr Peter Stewart on (02) 268 8305. Any person or organisation may make a submission on this proposed development in writing to the Council of the City of Greater Lithgow. Where a submission by way of objection is made, the grounds of objection to the development should be specified.



MT PIPER POWER STATION ASH STORAGE  
 LOCATION PLAN  
 Figure 1.1

1000

.000001 m.

.0001 m      100  $\mu$ g.      0.1 mm.

.001 m      mm

## 2. THE PROPOSAL

### 2.1 WHAT IS ASH?

Figure 2.1 is a schematic diagram of the operations of a coal fired power station, such as will operate at Mount Piper.

Coal is transported to the power station from underground or open cut mines by rail, road or conveyor. The coal is pulverised and then fed into a boiler where it is burnt. The combustion process produces enormous heat which converts fresh water circulating in the boiler tubes into high pressure steam. The steam is injected into the turbine and turns the fan-like turbine blades mounted along the main drive shaft of the turbine. This shaft continues into the generator end of the turbo-generator where the electricity is produced.

When the coal is burnt there is a residue of ash and a large volume of hot gases produced. The larger ash particles, called furnace ash, fall to the bottom of the boiler and are collected while the finer particles, called fly ash, are caught up in the hot gases. These gases pass through a fly ash collection plant, which removes over 99.9% of the fly ash before the gases pass out of the chimney stack.

The coal mined in the Western Coalfields typically has an ash content of around 20%. This means that although the combustion process is extremely efficient, approximately 20% of the coal entering the boilers is not burnt. The end result is that for every tonne of coal burnt approximately 0.25 m<sup>3</sup> of ash is produced.

Fly ash is a very fine granular material with sizes ranging from less than one micron up to 100 microns and is grey in colour. (A micron is one millionth of a metre). It is composed mainly of silica (or quartz) and oxides of aluminium and iron. These three components typically make up over 90% of the ash, with most of the remainder being oxides of various other metals.

In addition to these constituents, there are a number of other chemical constituents that are present in very small concentrations. These are referred to as trace elements and in total account for less than 2% of the ash. These include chromium, sodium, magnesium, barium, and arsenic. With the exception of aluminium (which can account for approximately 1% of the ash), the concentrations of these substances are measured in parts per thousand and often in parts per million.

### 2.2 ENGINEERING WORKS

The following sections describe the engineering works for ash handling and emplacement. The detailed plant layout will not be known for some time, pending a decision by the Commission on private sector involvement and hence the works described are generally conceptual in nature. Notwithstanding this, the ultimate development will be specified and alternative ash transport arrangements discussed.

An indicative layout of the project works, including the project boundaries, is given in Figure 2.2.

#### 2.2.1 Fly Ash Handling System

A schematic diagram of a typical fly ash handling system is given in Figure 2.3. The fly ash is separated from the flue gas in fabric filters and collected in a dry state in the fabric filter hoppers. Air slides convey the fly ash from the hoppers to a vacuum conveying system and thence to transfer hoppers. The transfer hoppers, one per generating unit, will be located adjacent to the fabric filter plant in the main station area.

From the transfer hoppers the fly ash will be conveyed to two main fly ash storage silos. This is preferably achieved using pneumatic lines (pipes) where the fly ash is blown along the pipes from the transfer hoppers to the main storage silos which are to be located adjacent to the emplacement area. Each main storage silo will be vented to atmosphere through a fabric filter. This will allow the conveying air, after separation from the fly ash, to be vented without the discharge of entrained fly ash. The capacity of each main storage silo will be selected to allow adequate storage on the basis of normal storage of fly ash from the silos.

Fly ash from the main storage silos will be conditioned with 15-20% water prior to discharge for transport to the ash storage area. Water for this purpose will come from a number of sources, namely, the Coxs River Water Supply System, cooling tower blow-down water, and possibly groundwater collected and recycled within the ash storage area.

Should trucks be used to transport the ash to the storage area, the fly ash conditioners will be located at a level below the silos but elevated from ground level to allow the trucks

to be loaded below. The structure will be enclosed to ground level except for the truck entry and exit.

A dry discharge facility may also be provided for loading of dry fly ash into "tanker" type road transport for sale to the cement industry or for other processes, depending on whether there is a demand for ash for these purposes.

Trucks used to transport the ash will run along a private haul roads. These trucks will be washed periodically in order to prevent any dust attached to the outside of the trucks from being blown off and causing a dust nuisance.

An alternative means of ash transport is conveyor. It is envisaged that the conveyor would be the fully enclosed type. Scrapers would be used on the conveyor belt after it has discharged its load to prevent any build up of "caked on" ash.

Should additional storage be necessary due to an extended period in which fly ash is not removed from the main storage silos, then conditioned fly ash will need to be stored temporarily in an emergency storage area. A convenient area for this purpose has been identified in the bottom of the open-cut void adjacent to the silo area.

It is envisaged that the conveyor for transport of the conditioned fly ash to the emergency storage area will be fully enclosed to ensure environmentally acceptable conditions between the loading and discharge points. The emergency storage area will be provided with a water spray system so that fly ash temporarily stored in that area can be wetted down. Access will be provided to this area also to allow dump trucks to be loaded from the emergency storage area for final storage in the main storage area.

### 2.2.2 Furnace Ash Handling System

A 'scraper conveyor' system is proposed to extract and initially convey the furnace ash from the boiler. With this method, the ash is retrieved from water filled hoppers at the bottoms of the boilers by a submerged scraper and then taken by a chain conveyor up a dewatering slope to a transfer chute from which the ash is then passed through a clinker grinder to a belt conveyor. Water drained from this coarse ash is returned for reuse.

Feasible methods of furnace ash transport to

the ash storage area are:

- Conveyor to the fly ash storage silo area then truck transport to the final storage area.
- Conveyor to the fly ash storage silo area then conveyor to the final storage area.
- Conveyor direct to the final storage area.
- Truck direct to the final storage area.

### 2.2.3 Proposed Ash Storage Area

It has been estimated that Mount Piper Power Station will produce approximately 15 to 16 million cubic metres of ash during the expected life of the station. It is proposed to use the dry storage method with the ash to complete the filling of the mine void on the Western Main site and to create a new hill.

The hill to be created will be located on the northern end of a major tree-covered ridge line which runs along the eastern edge of Mount Piper Power Station. With a proposed elevation of approximately 980 m RL the hill will be comparable to the ridge which is generally about 1000 m RL elevation.

Slopes on the new hill will generally be approximately one vertical to four horizontal (ie. 1:4) which is comparable to slopes on the adjoining major ridgeline.

The new hill will appear as a natural landform connected to the adjoining ridge. Staging of the ash storage process will aim to create the slopes facing Mudgee Road as soon as possible to minimize the period during which the hill appears to be under construction.

Conditions stipulating rehabilitation measures for the Western Main Mine form part of the mining lease for the mine. With the concurrence of the mining operator, the Commission will utilise the mine site as a dry ash emplacement area. In so doing the ash emplacement will become a major part in the rehabilitation process of the mine.

When the mining operations are finalised the mine void will be over one kilometre long, up to half a kilometre in width, and some 20 metres deep. A screening mound some 20 metres high will be formed by overburden removed during the mining operation. This mound will run approximately parallel to the Mudgee Road and will reduce the visual impact of the ash storage operation to travellers using this road. A maximum slope of 1:3 has been adopted for the mound to ensure stability and allow the establishment of a vegetation cover.

The mounding mentioned above also forms what is known as a toe embankment which will stabilise the base of the ash emplacement, delineate the storage area and protect the ash emplacement from scour in case of overflow of perimeter drains.

The final surface of the emplacement will be contoured, drained and progressively revegetated. The sloping surface will contain berms at vertical intervals of approximately 10 metres to minimise erosion and to facilitate drainage. Figure 2.4 shows a plan view of the ultimate development, whilst Figure 2.5 gives an artist's impression of the same development from a hill to the west of the power station.

#### 2.2.4 Contingency Ash Storage Area

A contingency site is planned in case the proposed site is not available. It is immediately to the south east of the proposed emplacement area and is separated only by a natural drainage way. However, planning is proceeding on the basis that the proposed area will be available.

The need to use the contingency site could arise because the Western Main Colliery is for sale. Any new owner may not continue to operate to the same mining schedule as presently proposed. This present schedule caters for the extraction of coal reserves from areas of the site before being needed for ash storage. The Commission does not propose to use any area for ash storage which would sterilise economic reserves of coal.

The major impact of a change to the contingency site would be on the ash transport system due to the increased transport distance.

#### 2.2.5 Landscaping

The new landform will be revegetated and an open Eucalypt woodland established with a cover pattern similar to other ridges in the surrounding area.

The landscape concept for the site is illustrated in Figure 2.6. The principal landscaping features are:

- The existing landform of the general area includes a series of major tree-covered ridges that are visually prominent; these provide an opportunity for the ash storage process to create a new landform that relates to existing landforms.

- The mining company currently carrying out open-cut and underground coal mining on the site proposes to place overburden in a mound along the northern and north-western edges of the site. The mining company is responsible for the restoration and vegetation of the outer face of the mound. The mound will assist screening of the ash storage operations from Mudgee Road. Construction of this mound will commence by 1990 and will be preceded by tree planting between Mudgee road and the transmission line easement which passes through the north western part of the site. The mound is programmed for completion by 1995. These features will provide additional screening and the mound will be integrated with the surrounding landscape:

- Storage capacity provided by the open-cut void and the mound will mean that some 40% of the total ash volume stored will be below the top of the mound and will be effectively screened from public view.
- The central area of the site which will not be disturbed by open-cut mining will provide a source of soil material for use as a final cover over the ash to allow re-vegetation. Mine spoil will also be utilised as cover material.
- Existing trees along the southern edge of Mudgee Road provide partial screening of the ash storage area.

The landscaping proposed for the ash storage area will be integrated with the landscaping measures that form part of the original power station project. Additional trees will also be established along the Mudgee Road boundary to supplement that screening provided by existing trees in this area. This measure will be initiated at an early stage so that stock will be established and well advanced before the site is actually needed. Early establishment of screening trees also ensures that effective screening is provided as the ash working begins to exceed the mound height.

A landscape concept has also been prepared for the contingency site, as shown in Figure 2.7.

#### 2.2.6 Site Drainage

The following principles will apply to site drainage:

- clean surface water will be diverted around areas which could cause contamination, such as exposed ash areas or disturbed areas. This clean drainage would derive from undisturbed, vegetated land within the

catchment or from parts of the ash emplacement which had been revegetated. Water from this drainage system will be directed to local natural water courses;

- surface water from exposed ash storage areas or disturbed areas will be diverted to settling ponds. These settling ponds, as the name implies, provide sufficient detention capacities to allow entrained particles to settle, before overflow water discharges. Water from this drainage system which has collected in the settling ponds will also be used for ash conditioning or dust control purposes.

The application of these principles to the site is now discussed.

Mudgee Road, which adjoins the northern boundary of the ash storage area, generally runs parallel to the main creek which drains the valley to the south-east. A series of minor gullies drain the site to the north-east passing under Mudgee Road through pipes and culverts. A prominent gully has been created along the eastern edge of the ash storage area by open-cut coal mining which was carried out during the 1950's.

The major drainage line along the southern edge of the proposed site and large ponds near the north-west corner of the proposed site and to the east of the contingency site provide opportunities to establish a drainage system which would direct contaminated run-off into settling ponds.

Storage of ash by the creation of an emplacement will allow surface water run-off to be directed into a series of detention ponds before being discharged from the site. Major components of the drainage system could comprise:

- drainage channels running parallel to the existing haul road at the base of the southern slopes of the ash emplacement to direct run-off to the detention ponds to the east and west;
- additional contour drains to prevent surface erosion- the Soil Conservation Service would need to be consulted to determine the design of these additional drains.

There is already a dam immediately to the south east of the proposed site. The dam was constructed along the natural drainage line between the proposed and contingency sites

and was originally to cater to the mining projects in this area. If marginally enlarged in capacity, this existing dam would form an ideal settling pond for the project.

The final surface drainage of the ash storage emplacement after revegetation will be such as to avoid any high velocity run-off which could initiate scouring and create erosion channels.

The drainage system will change from time to time, as the emplacement progresses. Additionally, the successful contractor will be responsible for the detailed design of the drainage system. Both these considerations preclude the provision of specifics relating to the location of drainage channels and settling ponds. For illustrative purposes, a possible drainage arrangement for the ultimate development is included in Figure 2.3.

### 2.2.7 Groundwater Management

The ash emplacement will be located totally above the groundwater table. At its highest level, the groundwater table in the open cut void will be limited to RL 907 m while the minimum level of the ash emplacement will be at RL 908 m. Thus, no groundwater will come in contact with the ash and hence no leaching of the ash by groundwater will be possible.

A consultant's report indicates that the stored ash would have rain water infiltration rates of from 470 mm/year, for exposed ash, down to 50 mm/year, for the final capped surface with vegetation well established. Under gravity this water would flow to the groundwater table below the ash in the interburden layer at the bottom of the open-cut mine void. The groundwater will drain to a groundwater collection basin and will reach a maximum level of RL 907 m. If the monitoring of the water quality shows it to be acceptable, the water could be allowed to discharge to Neubecks Creek via an overflow drain.

If the quality of water in the pit is such that it would cause the water quality limits in Neubecks Creek to be exceeded then it will be pumped for reuse on site for conditioning or dust control purposes and/or returned to the station to be used for ash system make-up.

A schematic diagram showing the groundwater management system is given in Figure 2.8.

### 2.2.8 Transport Corridors

Ash transport corridors will be established from the furnace and fly ash collection points at the power station to the storage silos and then to the storage areas. Should conveyors become the preferred option for transport of furnace ash to the silos, then apart from the conveyor a maintenance road will be required. The roadway from the storage silos to the storage area will need to be realigned periodically as the actual emplacement site is filled to a finished height and the working area moved to a new location.

Parts of the existing coal haul road may also be used for ash transport with the consent of the colliery. This road was originally established by the colliery and will be maintained until all economic coal reserves have been extracted.

The coal haul road is a private road, as will be the main transport route from the station to the storage silos and the road to the ash emplacement. These roads will not cross any public roads.

Public access to the site office and facilities will be via Boulder Road and then through the power station's internal road system. In the longer term access may be through the Western Main Colliery from its entrance off Mudgee Road, depending on the state of land ownership and mining operations.

### 2.2.9 Workforce Facilities

A number of facilities will be established and utilised throughout the operation of the ash storage area. It is envisaged that these would include workers amenities and an administration office, a storage area, a vehicle compound, a workshop and a vehicle and plant washing facility.

The details of these facilities will depend on the preferences and requirements of the contractor involved and the method of transport of the ash. It may be that the workforce facilities and construction workers' facilities become one and the same.

## 2.3 CONSTRUCTION

### 2.3.1 Construction Schedule

Tenders for the project will be called in early 1990. The tendering process will cater for the design, build, own and operate options set out in the Summary at the front of this EIS. It is expected that a contract would be awarded

in the latter half of 1990, with a site works completion date about August, 1992.

Although commercial operation of the power station is planned for early 1993, the initial station proving runs (steam to set) are to begin late in 1992. This testing will generate some ash which will need to be removed and stored.

### 2.3.2 Construction Facilities

Construction facilities will most likely consist of a construction access road, a site office and amenities building, storage compounds and fuel and water tanks. The road will provide access to the storage area from near the coal handling plant in the power station complex. This access road would become the main haulage route for the ash, should truck transport be used and would provide the maintenance access if conveyors were to be used. Additional tracks to actual dumping areas will, by their nature, be relocated depending upon that part of the emplacement area being worked.

The preferred location of the site office is near the emplacement site and the main ash storage silos. All temporary structures will be removed upon completion of the works and the area rehabilitated. All facilities will comply with the requirements of the Council of the City of Greater Lithgow.

It may eventuate that the construction facilities become the permanent workforce's facilities, depending on the successful contractor's plans.

## 2.4 SYSTEM OPERATION

### 2.4.1 Ash Emplacement

The ash will be placed in layers no greater than 5 metres deep. Subject to this constraint, the actual emplacement method is to be open to the operator, with the Commission and others stipulating environmental safeguards and the ultimate development. The emplacement would be a normal landfill operation, using conventional earth moving equipment. The most probable transport options are:

- pneumatic transport for fly ash from the station to the fly ash storage silos in the storage area, with the final emplacement by either truck transport or conveyor to the storage area;
- furnace ash transport from the station to be either direct to the storage area by conveyor

or to the fly ash storage silo area by conveyor with truck transport to the storage area.

The final spreading and compaction of the ash would be carried out using conventional rubber tyred earth moving machinery such as scrapers, dozers etc.

The emplacement will be built up in stages with working areas kept to a minimum to minimise dust potential. Ash will be placed on top of a layer of interburden that will have been placed by the mining company in the base of the void to a minimum level of RL 908. In emplacing the ash this way, ash will always be above the groundwater level and hence leaching of the ash by groundwater will not be possible. The void will be filled up behind the mound and then above the mound, with the sections of the emplacement facing Mudgee Road being constructed first. This will enable the area facing Mudgee Road to be revegetated as early as possible and a screen to be formed behind which the construction of the emplacement will be hidden.

#### **2.4.2 Dust Control**

Measures to be taken to suppress the risk of airborne dust will include:

- Pneumatic transport of fly ash in pipes (vacuum and pressure systems) from the main station area to the silos.
- Conditioning the ash with water before discharge to trucks for transport to the storage area.
- Using water trucks to wet down haul roads, ramps and working areas.
- Washing down ash storage trucks and mobile plant periodically.
- Keeping the ash storage working area to a minimum.
- Sequencing the location of working areas to minimise exposed areas of ash.
- Utilising the coarser furnace ash as blinding off layers on completion of intermediate placement stages. If necessary, alternative measures including irrigation sprays, bitumen emulsion spraying or agglomerating chemicals will be used to suppress dust.
- Progressively topsoiling and grassing the emplacement face and final ash surfaces.

Airborne dust will be initially monitored using:

- the Electricity Commission's network of 18 particulate deposition gauges which are located within an area of approximately 12 km radius of the Wallerawang Power Station;

- additional gauges which will be installed as part of the development of the Mount Piper Power Station to monitor particulate emissions from that station. The number and location of these gauges will be determined after consultation with the State Pollution Control Commission (SPCC).

The number and location of gauges could be expected to vary over time, depending on monitoring results.

#### **2.4.3 Water Management**

Surface run-off will be controlled by:

- diverting clean run-off to local water courses and avoiding disturbed areas;
- collecting contaminated run-off in settling ponds where solids will settle. Water in the ponds will be used for dust control, conditioning of ash and irrigation purposes.

Groundwater from the ash emplacement will drain into the mine void at which location its quality will be monitored. If acceptable for discharge to Neubecks Creek it will go there, otherwise it will be used on site or returned to the power station. Other groundwater monitoring locations around the site will also be established.

#### **2.4.4 Restoration**

Areas of soil in the portions of the site which will not be disturbed by the current mining operations will provide a source of useful cover material that can be placed over the ash to allow effective revegetation.

The available soils on the site are:

- the Yellow Duplex Soils usually exceeding 1.5 m in depth, with low fertility and high erodability. The Soil Conservation Service survey identifies this soil type as useful for cover material that can be revegetated, provided compaction is avoided and heavy applications of fertilizer are made;
- the Stoney Duplex Soils varying from 0.5 to 1.0 m in depth and underlain by partially weathered bedrock. These soils have low to moderate fertility and high erodability; they will be useful as a cover material for revegetation subject to heavy fertilizing.

A cover of this soil material will progressively be placed over the final ash surface to allow the establishment of a vegetation cover as each portion of the final landform is completed.

Detailed soil testing and co-ordination with the Soil Conservation Service will be required to ensure an effective programme of soil re-use and final surface revegetation is established.

The depth of the soil cover could vary depending upon whether, in accordance with overall landscaping plan, a grass or tree cover is to be established. A deeper cover will be provided where trees are to be established.

Techniques for the successful establishment of an open woodland on the ash storage area will need to be confirmed in consultation with the Soil Conservation Service. However, based on the success of direct seeding techniques used on open-cut coal mines in the Hunter Valley, it is proposed to use similar techniques for the Mount Piper project. Initial planting to be carried out around the perimeter of the area and on the mound will primarily use seedling stock to overcome problems of grass competition.

The Commission has demonstrated the feasibility of revegetating over ash at its Tallawarra site, where the No.1 ash dam had a layer of soil placed over it and was grassed and treed successfully.

## 2.5 ENERGY STATEMENT

It is not appropriate to provide an energy balance statement for the ash storage proposal only, as this project forms an integral and necessary part of the power station. An energy statement which embraces the power station as a total project follows.

A power station is a unique industrial development in that it is designed purely to be an energy converter, i.e. heat from burning of coal to electrical energy. Clearly the input/output ratio relating heat to power produced is much less than unity directly, reflecting the nature of the thermodynamic processes of converting heat energy to mechanical energy, then to electrical energy.

The bulk of the heat energy from coal is lost as waste heat to the cooling water. The important consideration though is not the energy input/energy output ratio, but rather the cost per kilowatt hour of electricity produced. In this regard coalfired power stations in New South Wales have a significant advantage over feasible alternatives.

During the construction of Mount Piper Power Station the total energy input is estimated at about  $300 \times 10^6$  Megajoules (MJ).

The Station is estimated to consume up to 70 million tonnes of coal during its lifetime, depending upon the quality of the coal and the station's operating duty. To put these figures into perspective, New South Wales' indicated recoverable reserves of coal are currently estimated to be approximately 12 billion tonnes.

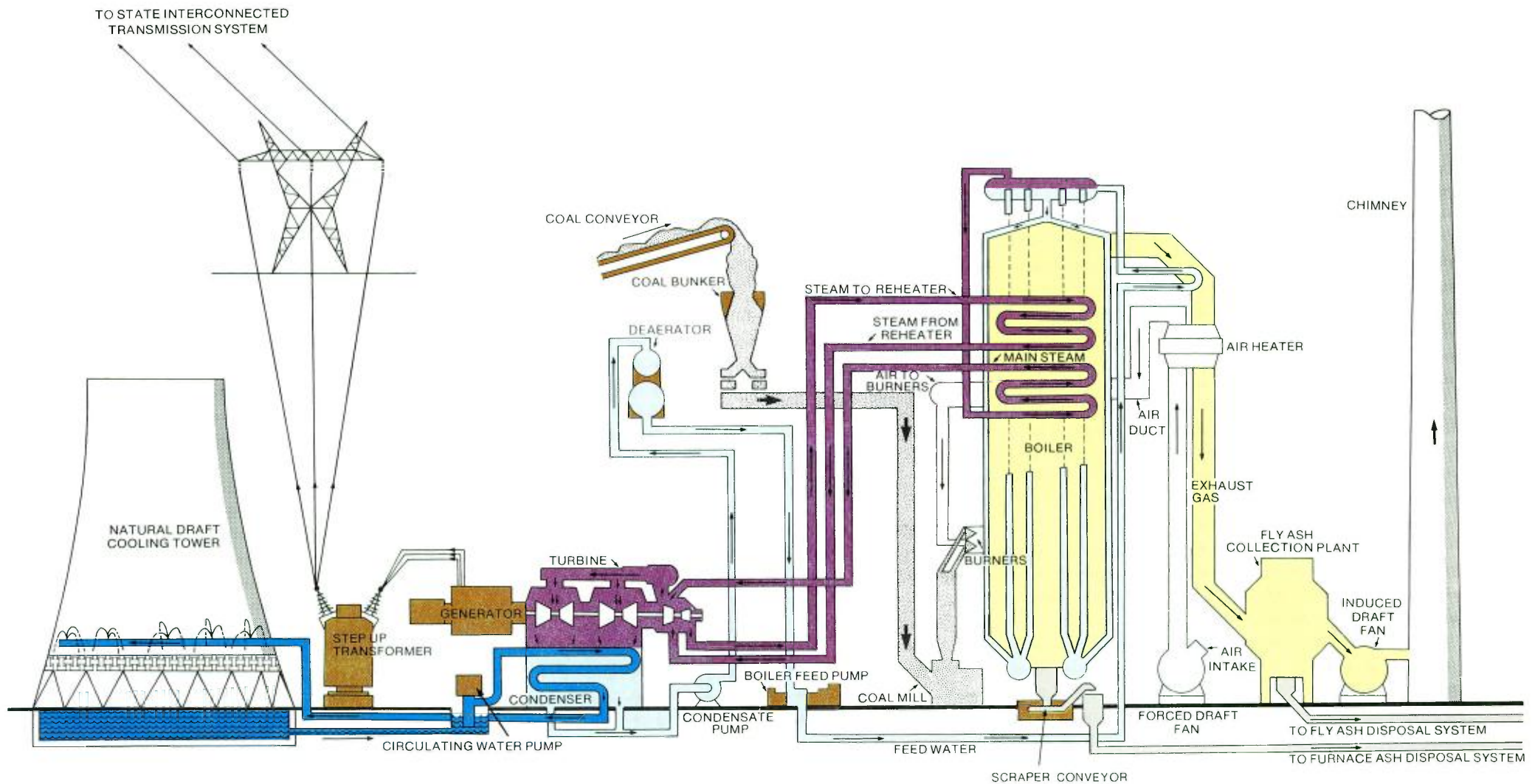
The following annual energy inputs and outputs are estimated to result as a consequence of the operation of the two 660 MW units with a 39% efficiency and 80% availability.

### Input

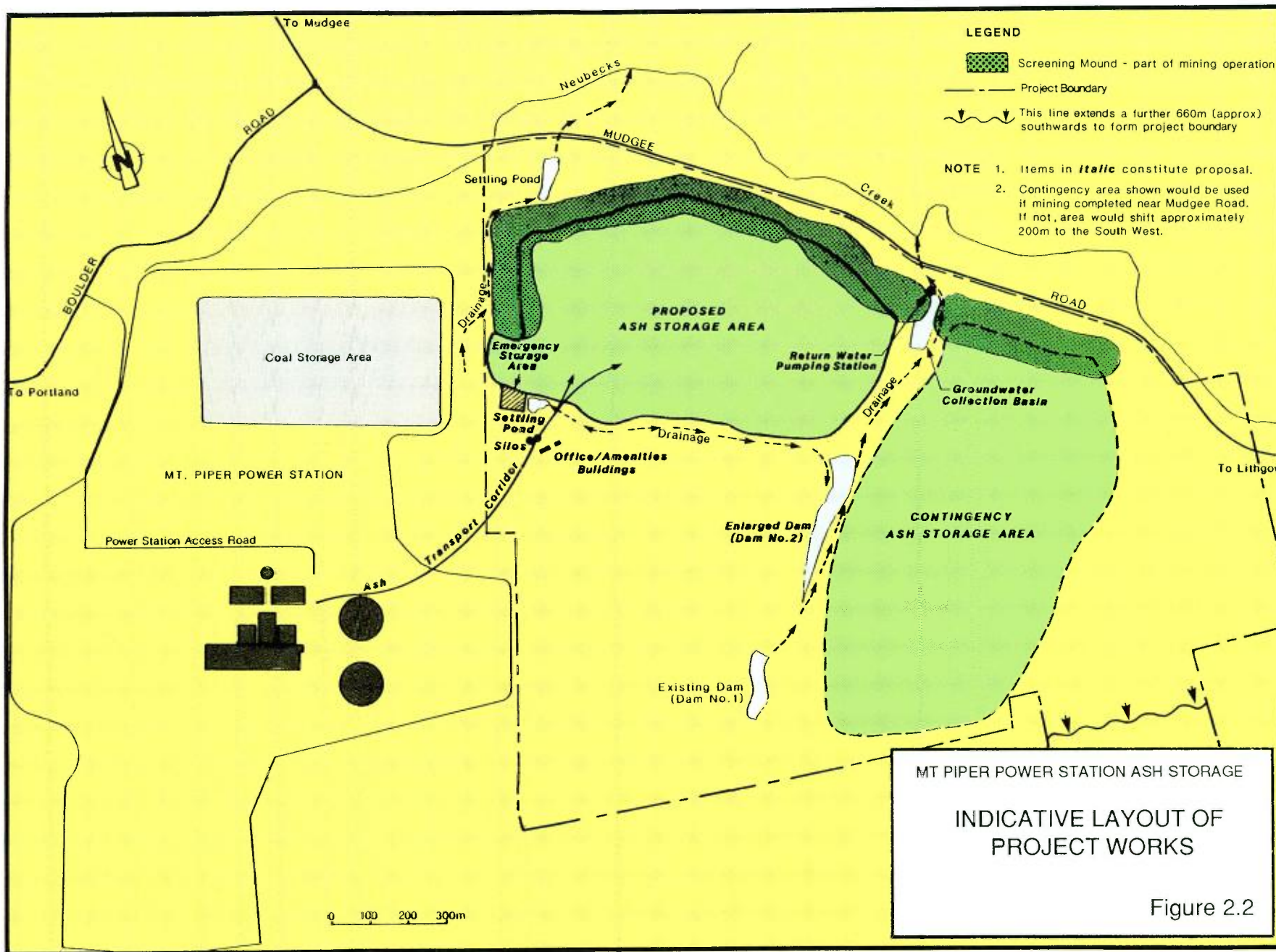
Coal —————	86 400 x 10 <sup>6</sup> MJ
(up to 3.6 million tonnes)	
other operating inputs	700 x 10 <sup>6</sup> MJ

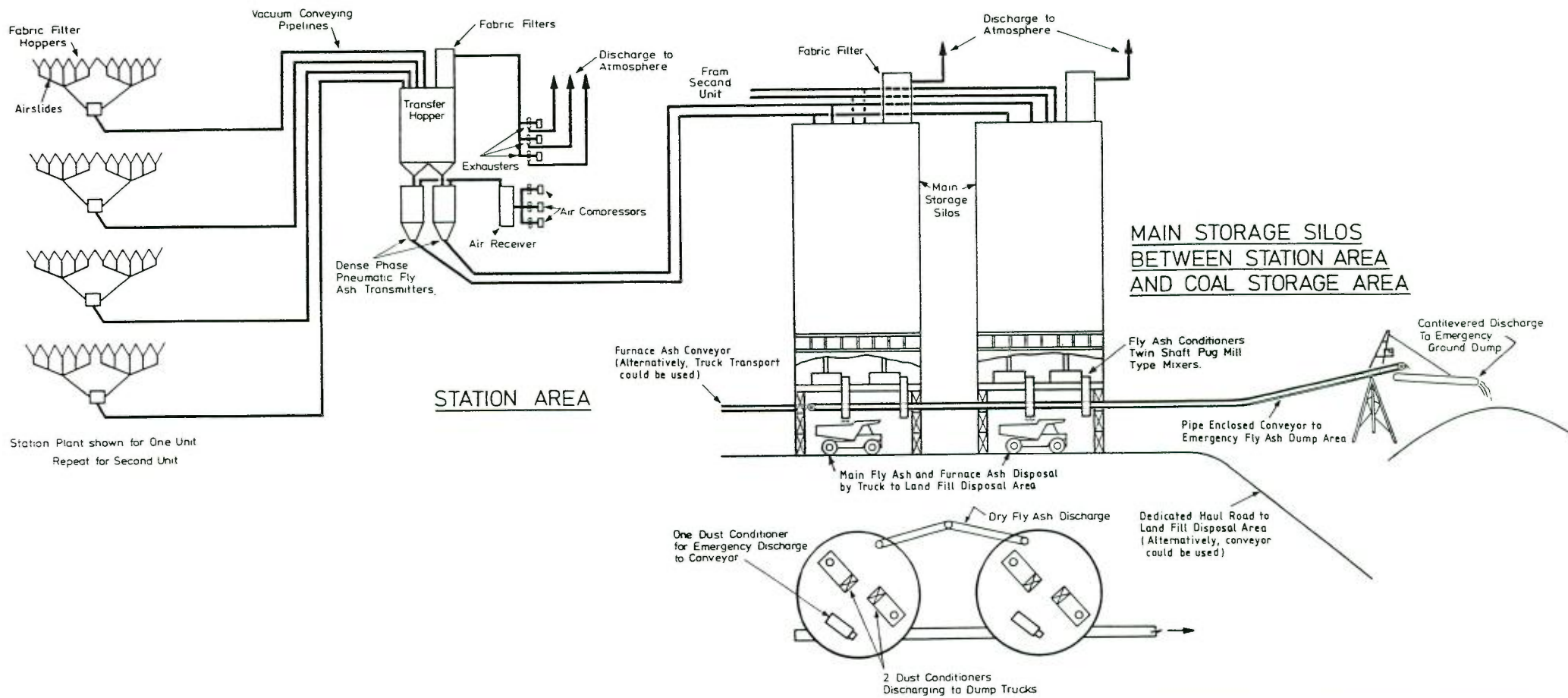
### Output

Electrical (generated)	30 000 x 10 <sup>6</sup> MJ
Waste Heat	47 000 x 10 <sup>6</sup> MJ



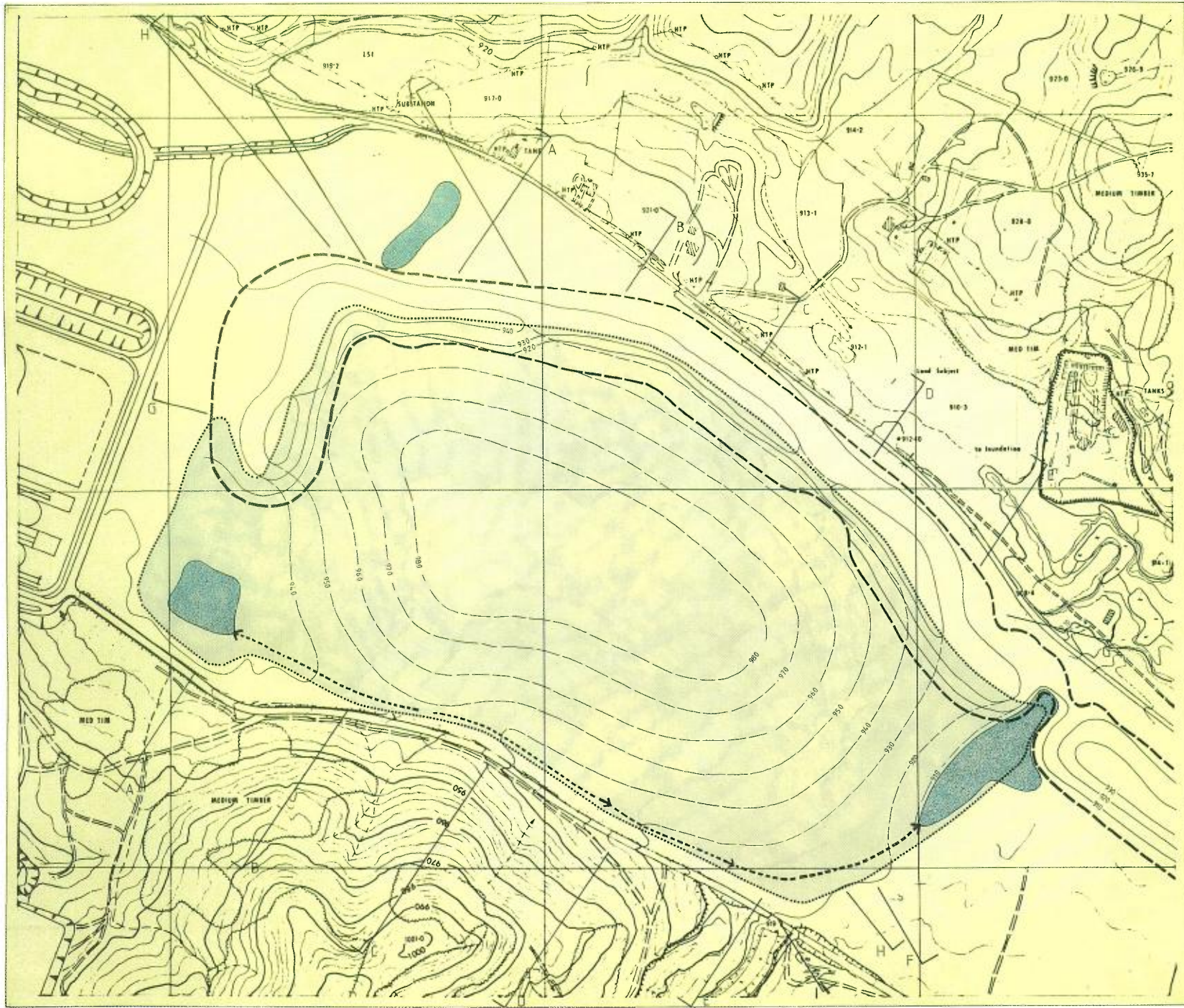
MT PIPER POWER STATION ASH STORAGE  
 SCHEMATIC DIAGRAM OF  
 POWER STATION OPERATIONS  
 Figure 2.1





MT PIPER POWER STATION ASH STORAGE  
SCHEMATIC DIAGRAM OF  
FLY ASH HANDLING  
OPERATIONS

Figure 2.3



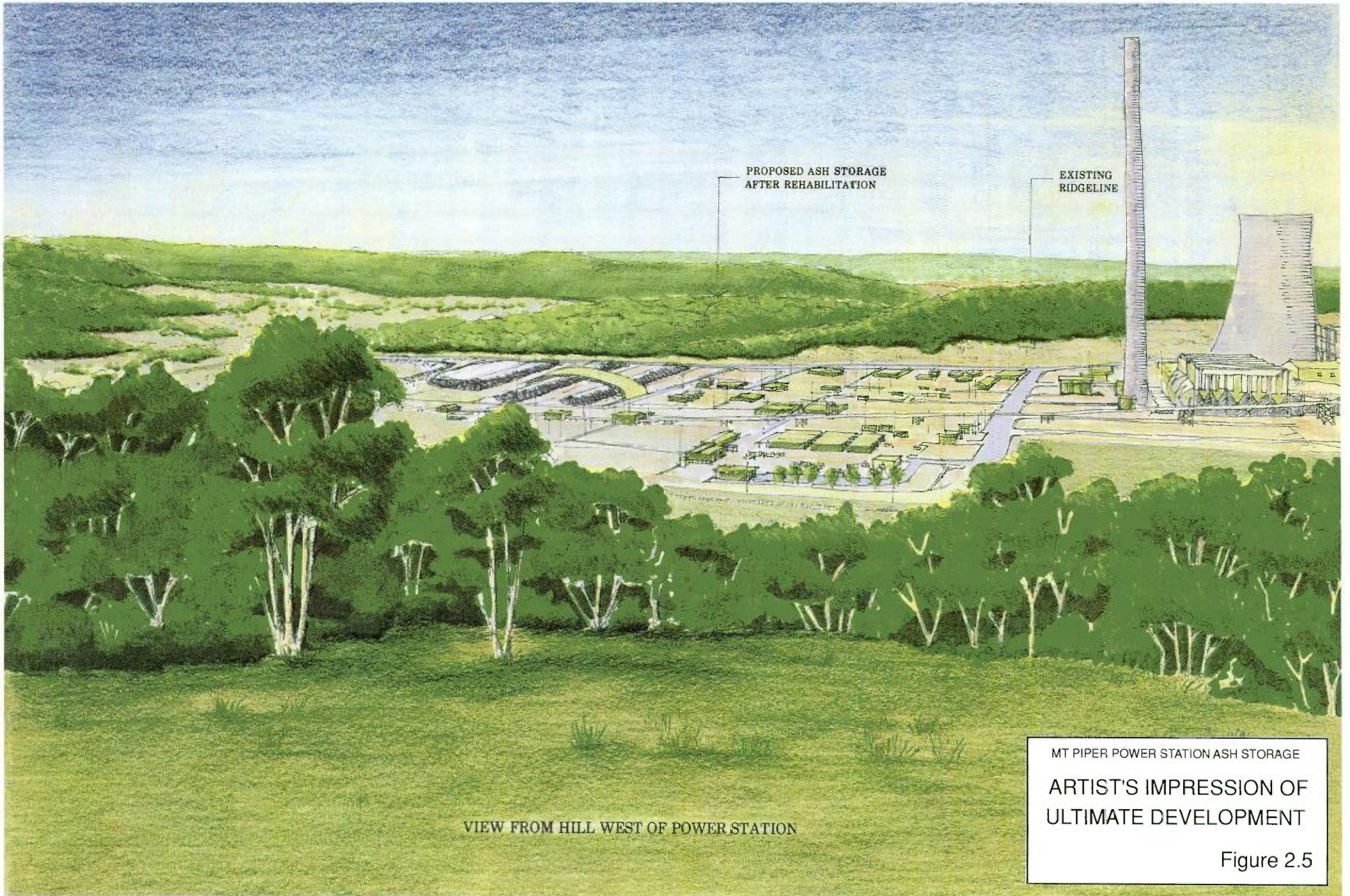
# ULTIMATE DEVELOPMENT

- ..... EXTENT OF ASH DISPOSAL
- EXTENT OF PERIMETER BUND
- PROPOSED CONTOURS
- EXISTING CONTOURS
- DRAINAGE CHANNELS
- DETENTION POND
- SECTION

MT PIPER POWER STATION ASH STORAGE

ULTIMATE DEVELOPMENT CONTOURS  
PROPOSED SITE

Figure 2.4



PROPOSED ASH STORAGE  
AFTER REHABILITATION

EXISTING  
RIDGELINE

VIEW FROM HILL WEST OF POWER STATION

MT PIPER POWER STATION ASH STORAGE  
ARTIST'S IMPRESSION OF  
ULTIMATE DEVELOPMENT  
Figure 2.5



# LANDSCAPE CONCEPT

- PROPOSED ASH DISPOSAL AREA
- PERIMETER SCREEN PLANTING
- PLANTING ON BUND
- PLANTING ON ASH DUMP
- EXISTING VEGETATION
- EXISTING CONTOURS
- 950 — PROPOSED CONTOURS
- C L — SECTION

MT PIPER POWER STATION ASH STORAGE

LANDSCAPE CONCEPT  
PROPOSED SITE

Figure 2.6

SCALE 1 : 3000    SEPT 1989    DWG 11

$1.6 \text{ Km} \times 800 \text{ Km} = 1.28 \text{ km}^2$



# LANDSCAPE CONCEPT (CONTINGENCY AREA)

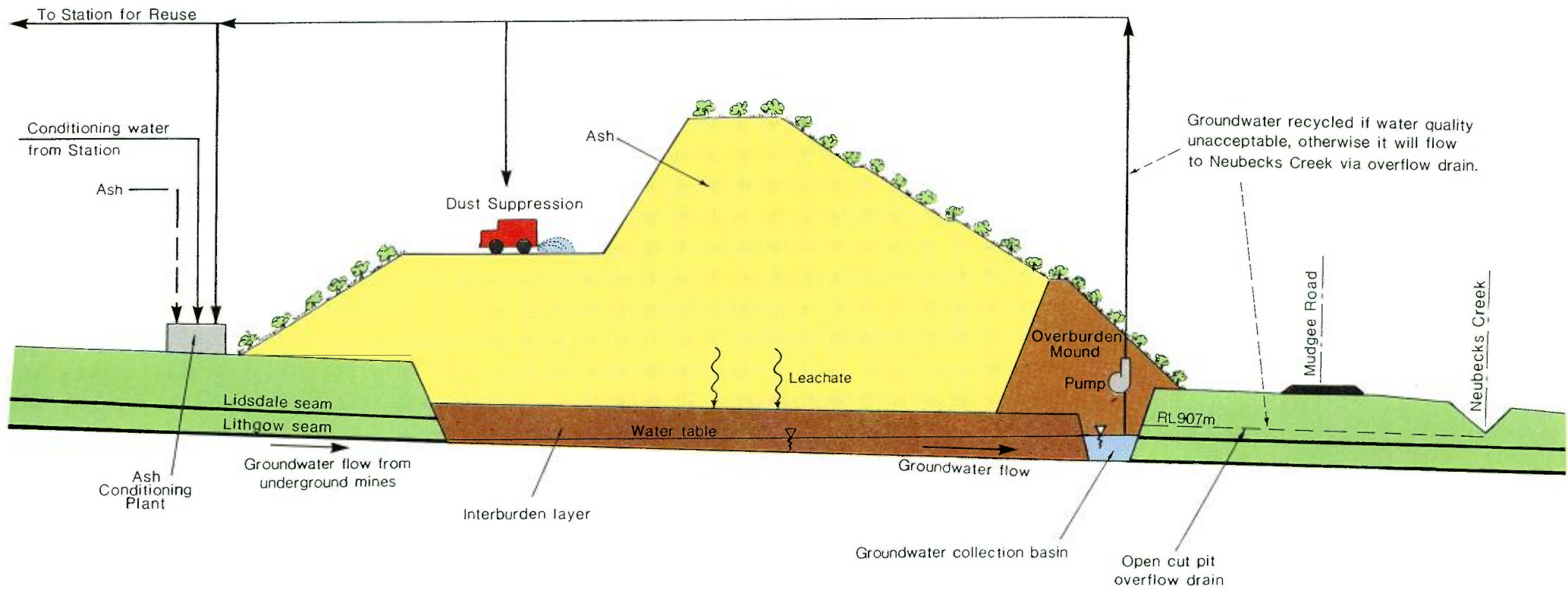
-  PERIMETER SCREEN PLANTING
-  PLANTING ON BUND
-  PLANTING ON ASH DUMP
-  EXISTING VEGETATION  
RETAINED
-  EXISTING CONTOURS
-  PROPOSED CONTOURS
-  MAINTENANCE ACCESS ROAD
-  DETENTION PONDS
-  FRESH WATER POND
-  DRAINAGE CHANNEL ALONG  
TOE OF ASH DUMP
-  SECTION
-  CONTINGENCY DISPOSAL AREA

MT PIPER POWER STATION ASH STORAGE

LANDSCAPE CONCEPT  
CONTINGENCY SITE

Figure 2.7

SCALE 1 : 4000    SEPT 1986    DWG 13



NOTE: THIS DRAWING IS NOT TO SCALE

MT PIPER POWER STATION ASH STORAGE  
 SCHEMATIC DIAGRAM OF  
 GROUNDWATER MANAGEMENT  
 Figure 2.8

### 3. ENVIRONMENTAL IMPACTS AND SAFEGUARDS

The salient environmental issues relating to this proposal are considered to be as follows:

- the control of leachates from the ash;
- the potential for ash being carried by rainwater run-off into natural water courses;
- noise created by the earth-moving machinery, trucks and possibly conveyors;
- the visual impact of the development;
- the control of any airborne dust nuisance.

All of these issues are discussed in the context of the existing environment in the following sections, along with the measures to be taken to mitigate or completely avoid the impacts.

The impacts of the proposal on geology, soils, mineral resources, land use, heritage, flora, fauna, and the socio-economic impact are also discussed.

#### 3.1 GEOLOGY, SOILS, AND MINERAL RESOURCES

##### 3.1.1 Regional Geology

The emplacement area is located geologically on the western margin of the Permo-Triassic Sydney Basin of east central New South Wales. In those few areas where the site is undisturbed by mining the ground is covered by a layer of sandy clay.

In the surrounding areas only the land along the river and creek flats is suitable for occasional cultivation. In the emplacement area that land not disturbed is generally not suitable for cultivation on any regular basis owing to limitations of slope, soil erosion, shallowness, or rocks or a combination of these factors.

Within the ash storage area(s), the major coal seams mined are known as the Irondale, Lidsdale, and Lithgow seams. The Irondale seam is usually very close to the surface. Indeed over most of the original landform this seam had been exposed and naturally eroded before the area was worked. The remaining seams are the Lidsdale (1.2 m thick) and the Lithgow which is about 2 to 2.5 m thick.

The material excavated from the open cut mine consists mainly of mudstones, sandstones, and claystones, which may contain thin conglomerate beds in some parts of the area and the coal. This excavation layer is some 20 to 30 m deep, including the coal seams. The interseam interval (the interburden) between the Lidsdale and the lower

Lithgow seam comprises tough sandstones and siltstones and the Blackmans Flat conglomerate which forms a roof to the Lithgow seam. This interburden material is being bulldozed back from the actual working face and dumped into areas from where the lower Lithgow seam has been extracted. The overburden is being stockpiled and will be used to form the screening mounds along the Mudgee Road and as an outer surface for the ash emplacement.

##### 3.1.2 Soils

The open cut mining operation affecting the area is extensive with surface and subsurface disturbance embracing nearly all of the site. As a result, most of the area is devoid of soil. There are small patches on the eastern side of the site where the area is undisturbed. The soils here are stony duplex and yellow duplex soils, up to 2 m deep. The Soil Conservation Service has carried out an extensive study of the area on behalf of the Commission and has advised that there is a high susceptibility to erosion. The soil distribution is shown in Figure 3.1.

Because of the scarcity of suitable topdressing material at this site, it is intended to borrow and stockpile for later topdressing any available soil on the actual emplacement area. By doing this, the soil is used productively rather than covered with ash.

##### 3.1.3 Mineral Resources

All economic coal resources will have been extracted from emplacement areas prior to any area being used for ash storage. There are no other known mineral resources affected by the development.

#### 3.2 LAND USE

The site is located in the valley of the western arm of the upper reaches of Neubecks Creek, a tributary of the Coxs River. Key factors to be considered with respect to land use are the zoning, ownership, current land uses and possible future land uses.

##### 3.2.1 Land Zoning

The project area falls within the City of Greater Lithgow local government area and the bulk of the land is zoned Non-urban 1(a) with the exception of a strip within 400 m of the Mudgee Road which is zoned Non-urban 1(b). The proposed use of the land is permissible with Council consent.

### 3.2.2 Current Land Ownership

The land required for the project comprises land currently owned by BP Coal Development Australia Pty Ltd, as part of their Western Main Colliery holding and land owned by the Electricity Commission, with the exception of one portion within the colliery which is Crown Land.

The Colliery holdings of BP Coal Development Australia were for sale at the time of preparation of this document. The acquisition of the Colliery holdings by the Commission is proposed to take place incrementally.

### 3.2.3 Current Land Uses

The predominant use of the site at present is for underground and open cut coal mining operations, while some other areas have been significantly disturbed as the result of previous mining activities.

Those areas not affected by mining are predominantly grassland with some areas of open woodland. Ben Bullen State Forest is located immediately to the south of the proposal.

The land is adjacent to the site of the Mount Piper Power Station itself. Land use is indicated in Figure 3.2.

### 3.2.4 Possible Future Land Use

There are some small areas which are unaffected by mining operations and may be able to be utilised for grazing purposes concurrently with the operation of the ash storage area. These areas would need active management encompassing stock control, the application of fertilizers, and some pasture improvement before permanent pasture could be successfully established. These areas would form part of the power station buffer zone and managed as part of the overall buffer zone management program.

As the ash surface is stabilised and rehabilitated, it is anticipated that the area will be able to be progressively put to other uses. Experience at other locations has shown that such ash deposits can be successfully revegetated. Possible uses for the land during the life of the project will be investigated at the appropriate time. It could be that revegetated land is not used for any purpose other than as power station buffer zone land.

The Commission will consider any reasonable suggestions or requests for the subsequent use of the entire site once the area is no longer required for ash storage.

## 3.3 HERITAGE, FLORA AND FAUNA

### 3.3.1 Heritage

Late in 1988 an archaeological field inspection of the area was carried out. It was concluded that the bulk of the site had obviously suffered severe surface and subsurface disturbance and therefore the likelihood of extant (still existing) Aboriginal relics occurring is extremely limited. For this reason no further archaeological work is deemed necessary for this site.

### 3.3.2 Flora

The flora of much of this area was considered at the time the original EIS for the power station was prepared. That study concluded that no rare or endangered species were present.

Studies carried out for this proposal noted that the bulk of the site has been cleared as the result of mining operations. The vegetation of the cleared area not affected by mining consists of a few scattered trees amongst a cover of mainly introduced grasses and herbs.

No rare or endangered plant species were found on the ash storage site during the vegetation survey.

The use of this site for ash storage will have only a minor impact on vegetation as much of the site is already cleared. The impact will be further reduced by concentrating storage onto already disturbed areas. The vegetation distribution of the site is shown in Figure 3.3.

The planned distribution of vegetation on the site for the ultimate development is shown in Figure 2.5.

### 3.3.3 Fauna

A fauna survey was carried out in conjunction with the abovementioned flora study. Because of the cleared nature of the area it was not necessary to implement detailed surveys. Instead animals were observed during walking and vehicle traverses of the area, including nocturnal spotlighting surveys. Previous surveys of this and adjoining areas, along with indirect evidence (calls, tracks, droppings etc.), were also taken into account.

The number of faunal species located within the survey area was relatively low. Forty-one native species were located on the site. Counts exceeding 100 species would be expected in less disturbed areas of similar size nearby. The main reason for these differences is the lack of native vegetation, particularly tree cover, within the site. Few woodland species were located. The major groups of native animals were those occupying the water bodies in the area and those utilizing the open grasslands.

Eastern grey kangaroos were observed grazing on the open grassed areas during the evenings. These animals utilize the timbered habitats as shelter during the day. The presence of wombats and echidnas was also noted within the cleared areas, whilst the common brushtail possum was observed in the trees in the small area of remaining native vegetation. There were many signs of occupation by introduced mammals e.g. dogs, foxes.

Only 30 bird species were located on the site, whereas the original site (largely undisturbed) yielded 80 bird species. Most bird species located were those usually associated with human occupation e.g. starling, or were able to co-exist with humans in disturbed areas e.g. magpie, raven, willie wagtail. Small woodland birds such as thornbills and wrens were located within the patches of shrubby understory associated with the woodland in the southern part of the area. Few frogs were located and these were associated with the water-filled open cut mine voids. The reptiles located were those commonly associated with disturbed areas.

None of the faunal species located within the survey area can be considered of conservation importance. All have a population status within the region of moderately common to abundant. There is little potential for other species which could be considered of conservation importance to be located within the area.

The use of the Western Main Colliery site for ash storage will have a minor impact on the status of fauna found in the area. As much of the site is already cleared there is limited area of natural habitat supporting wildlife. The species located are all commonly found throughout the region and are well represented within conservation areas.

Once the site has been revegetated, faunal species and diversity, similar to that in surrounding vegetated areas, could be expected within the site.

### 3.4 NOISE

The SPCC has established a methodology and criteria for the assessment of proposed developments upon the acoustic environment. Assessment requires an understanding of the existing environment and of the nature, duration and times of the noise sources of the development. To this end, background noise levels at the residence nearest the ash storage area have been established and a noise model used to predict noise levels at this residence for the "worst case" (acoustically) of ash transport and storage operations.

#### 3.4.1 Background Noise Levels

The nearest residences are at Blackmans Flat on the Mudgee Road, 3 km to the east of the Mount Piper Power Station and along the Mudgee Road between Blackmans Flat and Lidsdale.

For the purpose of this assessment only the impact of the proposed ash storage operations on the residences at Blackmans Flat has been considered. This is because other residences are further from the proposed development and any impact at them will be less than at Blackmans Flat.

Existing noise sources near the proposed ash storage site include the following:

- road traffic noise from the nearby Mudgee Road located 200 metres away. Road traffic density is over 2800 vehicle movements per day;
- mine noise involving breaking, crushing and conveying coal from the Ivanhoe underground Colliery 1 km west of the site;
- noise from the nearby Western Main open cut and underground colliery and its associated coal washery and preparation plant.

Background noise measurements had been carried out in the area for noise assessment purposes for the Mount Piper Power Station EIS. These were established as 38 dB(A) day-time and 34 dB(A) night-time.

"Spot" noise measurements taken in 1989 indicate that the background noise levels used for the Mount Piper noise assessment are

appropriate for the current study and consequently the levels used for that assessment have been used in the current assessment.

**3.4.2 Noise Predictions**

A noise model was used to calculate noise levels at Blackmans Flat as a result of ash storage works. The model includes noise attenuation as a result of spherical spreading, ground absorption, barrier effects and atmospheric absorption. Various ash transport options in combination with the ash emplacement operations were assessed in terms of predicted noise levels at Blackmans Flat.

The following noise sources were used:

- fleet of ash trucks reversing, with flashing light and audio alarm, and dumping ash in five minutes and returning. (77 dB(A) at 10 m);
- belt conveyors for the transporting of ash (70 dB(A) at 5 m);
- bulldozer (silenced) involved in grading/ compacting and capping ash (79 dB(A) at 10 m);
- water tanker truck, (77 dB(A) at 10 m).

Three bulldozers(silenced) were assumed to be used in ash emplacement operations, together with a water truck, at a level 52m above existing ground level. The modelling assumptions used are considered to present worst-case conditions, as it is unlikely that three bulldozers will be required for ash placement, and for much of the time and machinery will be located below the 50 m above ground level assumed in this assessment.

The predicted noise levels at Blackmans Flat for the worst-case scenario are shown in Figure 3.4

**3.4.3 Acoustic Assessment**

The SPCC Environmental Noise Control Manual specifies that when considering the environmental consequences of noise from a specific source, any increase in the background sound pressure level, which exceeds 5 dB(A) may be offensive.

This specification allows establishment of a noise criteria from the proposed ash storage operations as follows:

- Day-time operation 43 dB(A); and
- All other times 39 dB(A).

The table below compares predicted and background noise levels at the nearest residence to Blackmans Flat for the ash transport options and ash emplacement operations described earlier.

Examination of the noise comparison table shows that, apart from when the north-eastern section of the contingency site was being worked, all daytime and night time operations could take place at either site with acceptable noise impacts.

Should the contingency site be adopted for ash storage, the Commission, in consultation with the SPCC, will devise site management strategies to ensure acceptable noise levels at Blackmans Flat. Such strategies might include

**PREDICTED AND BACKGROUND NOISE LEVELS AT BLACKMANS FLAT**

ASH EMPLACEMENT LOCATION *		BACKGROUND NOISE LEVELS		PREDICTED NOISE LEVELS		
		Daytime dB(A)	Night time dB(A)	Trucks dB(A)	Conveyors dB(A)	Conveyors & Trucks dB(A)
Proposed Site	A	38	34	38	35	37
	B	38	34	33	30	32
	C	38	34	29	26	27
Contingency Site	D	38	34	42	40	42
	E	38	34	37	33	37
	F	38	34	32	28	32

\* Refer to Figure 3.4 for these locations which were used in the noise model to assess the acoustic impact on Blackmans Flat of ash transport to and ash emplacement at these locations.

restrictions on times of operation, the use of noise attenuated plant and restrictions on the amount of plant being used at a given time.

As regards construction noise, fixed plant associated with the ash storage proposal will be located within or close to existing the power station boundaries. As the power station to date has been constructed with acceptable noise impacts, it is assumed that the construction of the ash storage plant would similarly occur.

### 3.5 VISUAL CATCHMENT AND LANDSCAPING

An extensive study of the visual catchment (areas from where the project can be seen, See Figure 3.5) along with the landscaping requirements for the proposed and contingency sites was undertaken by consultants. Their report documents the process of site analysis and landscape planning carried out for the proposal. Extracts of the report are incorporated in this EIS.

Non-distributed parks of the proposed ash storage area are generally covered by grass-land dominated by native grass species such as Kangaroo Grass (*Themeda australis*), Tussock Grass (*Poa spp*) and White Top (*Donthonia spp*) with *Paspalum dilatatum* occurring in some wet areas and along drainage lines. Scattered trees include Yellow Box (*Eucalyptus melliodora*), Red Stringybark (*E. macroryncha*) and Scribbly Gum (*E. rossii*). These generally occur in the southern portion of the proposed storage area with scattered remnant trees adjoining Mudgee Road, along the northern edge of the site. Natural regeneration of these remnant Eucalypt trees will provide partial screening of the ash emplacement operations from Mudgee Road.

Weed species, including Blackberry and St John's Wort, occur over areas disturbed by previous open-cut mining in the eastern sector of the site.

It is important to note the relationship between landform and vegetation, with open woodland generally occurring on the major ridges and spurs surrounding the site while the lower slopes are generally covered by grass-land with scattered trees.

The primary opportunity for public views of the proposed ash storage area is from Mudgee Road. However, as this public road is located

down-slope of the site, views to the site are generally blocked by landform and vegetation. The most significant view to the site from Mudgee Road is from a section north of the Mount Piper Power Station turn-off. This section of road is at a higher elevation than the site and it provides views into it. Figure 3.6 shows a view to the proposed site from this section of road and the overlay gives an artist's impression of how the site will look from the same viewing point at the ultimate development stage. The new hill will appear as a natural landform related to the adjoining ridge.

The contingency site is partly screened by existing landforms when viewed from the north. However when viewed from near the Western Main Colliery entrance, an ash emplacement would be visible, especially in the latter years of operation when the height of the ash storage is near its final limit. Screening vegetation placed along the Mudgee Road near the Colliery entrance will substantially mitigate this impact.

The screening effect of roadside tree planting which will be established along the northern edge of the ash emplacement will block the views of the ash emplacement from the adjacent Mudgee Road. The cooling tower structures at the power station will also be effectively screened from these same viewing areas.

The landscape planning process for this project has been aimed primarily at measures to minimize the visual and physical landscape impact of the proposed ash storage process.

While the measures to be taken are discussed separately below they are interrelated and require an integrated approach to their implementation.

The hill to be created by the ash storage process will be located on the northern end of a major tree-covered ridge line which runs along the eastern edge of Mount Piper Power Station. With a proposed elevation of approximately 980 metres the hill will be comparable to the ridge which is generally about 1000 metres elevation. Alternatively, should the contingency site be needed, the hill would be similar but would be located adjacent to and south-east of the proposed site. Landscape concepts for the sites are shown in Figures 2.6 and 2.7.

14°  
SLOPES

Slopes on the new hill will generally be approximately one vertical to four horizontal (ie. 1:4) which is comparable to slopes on the adjoining major ridgeline.

Most of the views will be screened by the following landscape measures:

- Perimeter tree planting along the southern edge of Mudgee Road and along the western boundary of the site adjoining the Mount Piper Power Station coal storage area.
- Construction of a mound along the northern and north-western edges as part of the open-cut coal mining operations by BP Coal which will assist the Commission in this proposal.
- Phasing the ash storage operations to create the final slopes facing Mudgee Road as soon as possible in order to allow re-vegetation and to block views of the final stages of ash storage.

As discussed previously, it is proposed to create a new hill by the ash storage process which relates to the existing major ridgeline immediately to the south. As this ridge and other ridges in the general area are covered by an open Eucalypt woodland it is proposed to establish a similar vegetation on the rehabilitated ash storage hill. This approach will maintain the relationship between landform and vegetation which currently exists in the general area and ensure the new hill will appear as a natural component of the existing landscape.

Techniques for the successful establishment of an open woodland on the ash storage area will need to be confirmed in consultation with the Soil Conservation Service. However, based on the success of direct seeding techniques used on open cut coal mines in the Hunter Valley, it is proposed to use similar techniques for the Mount Piper project. Initial planting to be carried out around the perimeter of the area and on the mound, will primarily use seedling stock to overcome problems of grass competition.

### 3.6 WATER QUALITY

The Commission engaged a consultant to conduct an extensive study on the water quality implications of the proposal. The consultant has assessed the interaction between the proposed ash storage scheme and the surrounding hydrogeochemical environment. Much of the information which follows was extracted from the consultant's report.

#### 3.6.1 Existing Water Courses and Water Quality

Mount Piper Power Station and the proposed Western Main ash storage area are within the catchment of the headwaters of Neubecks Creek, a tributary of the Coxs River, which it joins about 3.5 km downstream from the ash storage area.

The Neubecks Creek catchment upstream of the ash storage area covers about 19 km<sup>2</sup> and can broadly be viewed as two sub-catchments, each about 3 km long by 3.5 km wide, to the north east and south west of the main creek course which parallels Mudgee Road. The north eastern catchment is mainly cleared or lightly wooded alluvial flats surrounded by moderate to steep wooded slopes surmounted by sandstone cliffs at the north eastern end. This part of the catchment is largely unaffected by surface mining activities but there has been extensive underground mining beneath parts of the area.

The south western part of the catchment containing the ash storage area has a larger proportion of undulating terrain adjacent to Mudgee Road, but the upper parts of the catchment are broadly similar to those to the north east. Much of the south western catchment has been affected by previous open cut mining, by the site works associated with Mount Piper Power Station and by underground mining associated with the Ivanhoe and Western Main Collieries.

The proposed ash storage areas in general slope to the north east from approximately RL 940 m along the southern boundary of the storage area to approximately RL 915 m at the Mudgee-Lithgow Road. The area was originally drained by a number of north east to north trending gullies.

The eastern boundary of the proposed site is located within an area known as the Lidsdale No. 6 Open Cut. Following extraction of coal in the 1940's in this area, the central part of the open cut was backfilled with spoil to a height of approximately RL 923 m, leaving drainage ditches on either side of the open cut.

The western corner of the ash storage site is presently being mined by open cut methods down to depths of 20 to 25 m. The shape of the open cut is continually changing with the eastward advance of mining operations.

Several relatively shallow open cuts extracting shallow coal seams are located throughout the area.

Water quality in the Wallerawang area has been monitored by the Electricity Commission since 1966. However, a more extensive sampling programme covering the Coxs River below Wallerawang and Neubecks Creek was commenced in August, 1979. This Neubecks Creek programme has been further expanded to include a wide range of elements in 1989, and the results from this programme are used in the assessment of the existing water quality.

The quality of water in Neubecks Creek is variable, depending both upon the time and place of sampling. The recent Commission data, up to August 1989, for a site adjacent to the proposed ash storage site gave the following average measurements; pH(6.7), sulphate (60mg/L), chloride (8mg/L), conductivity (20 000 $\mu$ S/m), calcium (14mg/L) and magnesium (9mg/L). The maximum sulphate value and conductivity value recorded at this site was 90mg/L and conductivity 30 000 $\mu$ S/m. The mean sulphate concentrations observed at the various sampling sites in Neubecks Creek over the period ranged from 12mg/L to 130mg/L and the highest sulphate concentration recorded was 260mg/L.

The estimated concentrations of the total dissolved solids based on electricity conductivity measurements taken between 1979 and 1989 in the upper Coxs River, Wallerawang Reservoir, the Coxs River at Lyell Reservoir and in the lower Coxs River average 274, 324, 203 and 220 mg/L respectively. The maximum values recorded at these locations were 559, 405, 397, and 587 mg/L respectively.

With the exception of the high maximum values of 559 for the upper Coxs River and 587 for the lower Coxs River, the water qualities all fall into either Class 1 or Class 2 classification of irrigation water given in the Australian Water Resources Council Technical Paper No. 7 "A Compilation of Australian Water Quality Criteria (1974)". The Lyell Reservoir site falls into Class 1 "low salinity water". The other sites on the Coxs River fall into Class 2 "medium salinity water".

The salinity of the water is attributed to mining activity in the general area.

Monitoring of the quality of the ground water in this area also indicates extensive variability in space and time. It is apparent from the available data that the groundwater is already affected by metals and sulphate, presumably also as a result of mining activities in the area. Consequently, any consideration of leachate effects from the ash placement will relate more to the creek waters than the groundwater itself.

### 3.6.2 Groundwater Flows

Prior to coal mining in the area it could be expected that the main hydrological features of the catchment would have been:

- significant runoff from the steep parts of the catchment;
- significant infiltration in the lower parts of the catchment;
- a ground water table typically 5 - 10 m below natural surface on the valley slopes, rising to close to the natural surface adjacent to water courses. However, coal mining which has taken place in the area has significantly altered this hydrological regime.

Open cut mining breaks the horizontal continuity of strata and can allow subsurface water to enter the surface water system. Overburden and seam interburden is broken up by the mining operation and can have an adverse effect on the quality of groundwater passing through this material. Runoff, infiltration and evapotranspiration (natural evaporation and evaporation from vegetation) rates are altered. The affected area may not be free draining, resulting in ponding of both surface and groundwater. This normally would provide a head for the ponded water to re-enter the groundwater system further downstream.

Underground mining further complicates the system. It affects the permeability (hydraulic conductivity) in the area, provides interconnection for groundwater flows and may also provide connection to surface waters.

Subsidence resulting from pillar extraction of coal can change the flow of surface streams.

It is estimated that on average about 15 L/sec of groundwater will flow into the open cut in the absence of ash storage if the barrier between the open cut and the underground

workings to the south is mined. If the present barrier remains intact this figure could be reduced to about 7 L/sec.

### 3.6.3 Water Quality Impacts and Safeguards

Water quality impacts of the project are examined below according to the two water control systems which will operate at the site: surface water and groundwater.

#### Surface Water

The emplacement of ash will be a continuous process with the landform changing with time. The drainage system will be altered from time to time to match the drainage requirements of the site as it is developed.

During periods of heavy rain, run-off can be expected from both uncovered ash and vegetated areas. Run-off from the uncovered ash will occur relatively infrequently (during heavy rainfall events) because of the ash's capacity to take in water, whereas run-off from revegetated areas would be typical of other similar areas in the vicinity. The consultant's model indicated that in a modelling period of three years, only one run-off occurrence from the bare ash was predicted, when the precipitation was 38 mm in a period of 45 minutes.

Run-off from uncovered ash areas will be directed by drainage systems into settling ponds where solid particles will settle. The water so collected will be used for dust control, conditioning of ash and irrigation purposes.

Clean run-off water from the vegetated areas, including surface run-off from catchment areas around the site, will be diverted around the site into the natural watercourses which discharge to Neubecks Creek.

With this system of diversion of clean water and interception of dirty water, water quality from surface run-off should be satisfactory.

#### Groundwater

It was concluded in the consultant's report that, based on data currently available, the influence of ash storage on groundwater outflows in terms of quantity and quality is complex and subject to some uncertainty. The Commission has therefore adopted a cautious approach, aimed at ensuring the

acceptability of the impact of the proposal on groundwater quality. It is expected that the quality will be suitable for discharge to Neubecks Creek but a return water system will be installed to return the water for reuse on site if water quality limits are not met.

Ash contains a number of substances which can be leached out by water passing through the ash. Leaching studies suggest that the principal elements of concern are sulphate, chloride, iron, magnesium, selenium and boron. The monitoring and control of leachates represent the focus of groundwater quality control.

The ash emplacement will be located totally above the groundwater table. At its highest level, the groundwater table in the open cut void will be limited to RL 907 m while the minimum level of the ash emplacement will be at RL 908 m. Thus, no groundwater will come in contact with the ash and hence no leaching of the ash by groundwater will be possible.

The consultant's report indicates that the stored ash would have infiltration rates of from 470 mm/year, for exposed ash, down to 50 mm/year, with vegetation well established. Under gravity this water would flow to the groundwater table below the ash in the interburden layer at the bottom of the pit. The groundwater will drain to a pond in the north eastern corner of the site and will reach a maximum level of RL 907 m in the pond. If the monitoring of the water quality shows it to be acceptable, the water will be allowed to discharge from the pit to Neubecks Creek via an overflow drain.

If the quality of water in the pit is such that it would cause unacceptable water quality in Neubecks Creek, then it will be pumped for reuse on site for conditioning or dust control purposes and/or returned to the station to be used for ash system make-up. Water quality criteria will be discussed with the SPCC in the context of existing water quality in Neubecks Creek, other sources of pollution and the uses made of Neubecks Creek water.

Whilst it is feasible to recycle any contaminated groundwater when the power station is producing ash, once the power station ceases to operate, continuing pumping is not considered a realistic long term solution.

If investigations, monitoring and modelling do not lead to the conclusion that the longer term leaching of the ash is acceptable, a possible solution would be to increase the impermeability of the capping layer on the emplacement. The use of clay capping, if a suitable local source could be located, or alternatively a plastic membrane could be considered. A decision will not need to be made regarding this membrane until about 5-6 years into the project, when the first area reaches a level for final rehabilitation.

A schematic diagram showing the groundwater management system is given in Figure 2.7.

### 3.7 AIR QUALITY

The Electricity Commission operates a network of particulate deposition gauges which are located within an area of approximately 12 km radius around the Wallerawang and Mount Piper Power Stations. This network has operated now for some fifteen years. One gauge in this network is located adjacent to Neubecks Creek and just east of the proposed ash storage. This gauge is well located to detect any local dust problem. Other gauges are positioned around the Wallerawang area and some of these are positioned approximately on the alignment from Mount Piper to the residential areas around Lithgow. This particular group is well located to monitor any degradation of air quality, if any, due to the ash storage.

The contents of the gauges have been collected, analysed and used to calculate deposition rates. The average deposition rate in the area is 1g/m<sup>2</sup>/month and 5% of the recorded deposition rates exceed 5g/m<sup>2</sup>/month. Examination of the material collected shows that it is mainly natural material, such as clay and sand. The figures give an indication of the existing air quality in the project area.

The average deposition rate in the area is lower than the SPCC interim criteria of 4g/m<sup>2</sup>/month considered as the "inconsistent" level at which a loss of amenity would first be perceived, and well below the "unacceptable" level of 10g/m<sup>2</sup>/month.

Provided the environmental safeguards detailed in Section 2.4.2 are maintained, the project should cause negligible degradation to the existing air quality. These safeguards are reiterated here.

- Pneumatic transport of fly ash in pipes

(vacuum and pressure systems) from the main station area to the silos.

- Conditioning the ash with water before discharge to trucks for transport to the storage area.
- Using water trucks to wet down haul roads, ramps and working areas.
- Washing down ash storage trucks and mobile plant periodically.
- Keeping the ash storage working area to a minimum.
- Sequencing the location of working areas to minimise exposed areas of ash.
- Utilising the coarser furnace ash as blinding off layers on completion of intermediate placement stages. If necessary, alternative measures including irrigation sprays, bitumen emulsion spraying or agglomerating chemicals will be used to suppress dust.
- Progressively topsoiling and grassing the emplacement face and final ash surfaces.

The distribution of sulphur dioxide concentrations, which are continuously recorded at five monitoring sites in the area, has not been considered in this EIS, as the ash storage would not contribute to these concentrations.

It is not possible to quantify predictions of any changes to air quality which might arise from the proposed ash handling and storage. Should monitoring data or visual appraisal indicate a problem, the measures taken to control fugitive ash will be reviewed and remedial actions implemented.

### 3.8 SOCIO-ECONOMIC EFFECTS

A study of the socio-economic effects of this proposal was initiated by the Commission early in 1989. The area primarily affected by the proposal would be the Greater Lithgow Local Government area, which takes in the communities of Urban Lithgow, Wallerawang, Portland and people in smaller townships such as Rydal, as well as those living on rural properties. The following comments apply mainly to these communities.

The construction workforce for the proposal is anticipated to number about 40 workers and will comprise mainly tradesmen and labourers.

It is expected that a contract for the project would be awarded in the latter half of 1990. Construction of the engineering works associated with the project, such as silos and transport corridors, should be completed by about August 1992.

The impact of the construction workforce for an ash storage area for Mount Piper Power Station will not be considered here, as it has already been accounted for in the Mount Piper EIS as part of the total construction workforce. However, unlike the ash storage proposal in the Mount Piper EIS, the current proposal will require an operational workforce. An assessment of the impact of this workforce follows.

Based on the ash placement and transport arrangements described earlier and on a two shift roster for placing ash, the operating workforce is expected to number approximately 28. It will comprise mainly truck drivers, labourers and plant operators. If conveyors are used to transport the ash, the employment figures would be expected to be lower. An estimated breakdown of the workforce according to occupation is given in the table below.

<b>OPERATING WORKFORCE ACCORDING TO OCCUPATION</b>	
<b>Occupation</b>	<b>Number</b>
Supervisor	1
Truck Drivers	12
Mobile Plant Operators	6
Mechanics	4
Labourers	4
Administrative Staff	1
<b>TOTAL</b>	<b>28</b>

In addition to placing and transporting the ash, the operating workforce would progressively carry out the following work as required: land clearing and topsoil stripping, any additions or alterations to drainage works and haul roads, and revegetation and screening of the ash emplacement.

It is reasonable to expect that most of the workforce would come from within Greater Lithgow, as the construction and transport industries are major employers in the area and unemployment levels for plant operators and labourers are high.

The project would also generate indirect employment and it is anticipated that much of this would be taken up by the local labour market since predominantly local services and material supplies would be utilised and the operating workforce would probably be resident in the region.

No estimate of the magnitude of the indirect employment generated has been made, as no suitable multipliers are available. However, considering the small size of the operation workforce it is expected that the size of the induced labour force would be small.

Materials and services that would be required for the operation of the storage area such as topsoil, grass, fuel and maintenance services would help stimulate local industries.

Given that the project is not expected to cause a discernible population increase, any increase in demand for accommodation, transport, community services and recreational facilities would be absorbed comfortably.

In conclusion, it is expected that the project would have a beneficial impact on the socio-economic environment of Greater Lithgow. It would provide permanent employment for about 28 people and also generate some indirect employment. Most of the employment provided would be expected to be filled by persons residing in the area. Also, the project would provide additional wealth to the community through personal incomes and would stimulate local industries.



# SOILS

- A YELLOW DUPLEX SOILS
- B STONEY DUPLEX SOILS
- C ORANGE DUPLEX SOILS
- D SKELETAL SOILS ON SANDSTONE
- E SOILS OF ACTIVE AND ABANDONED OPEN CUTS
- EXTENT OF SCS SURVEY
- PROPOSED ASH DISPOSAL AREA
- CONTINGENCY DISPOSAL AREA

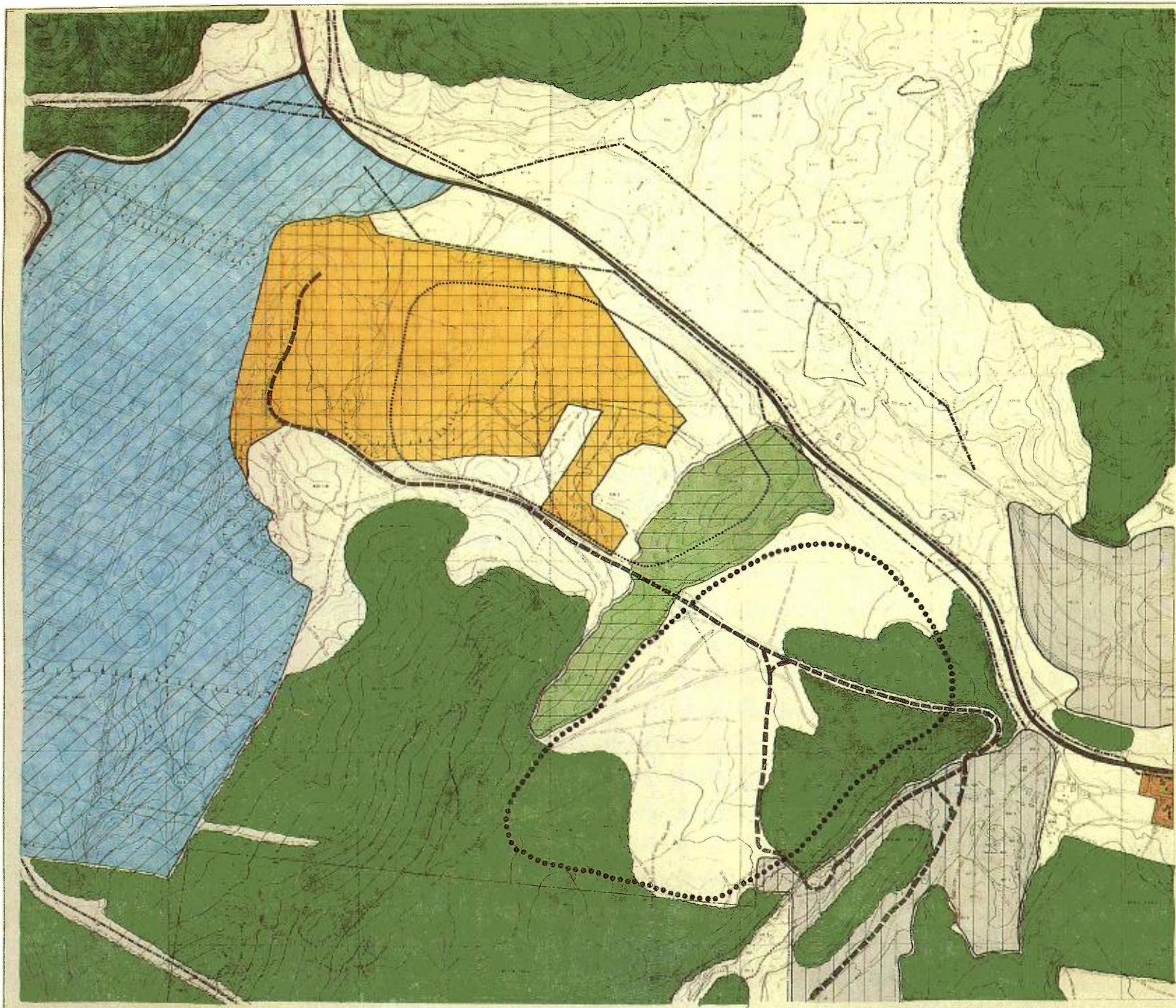
NOTE : BASED ON SOIL CONSERVATION SERVICE MAPPING  
DECEMBER 1988

MT PIPER POWER STATION ASH STORAGE

SOILS

Figure 3.1

SCALE 1 : 4000      SEPT 1989      DWG 3



# LANDUSE

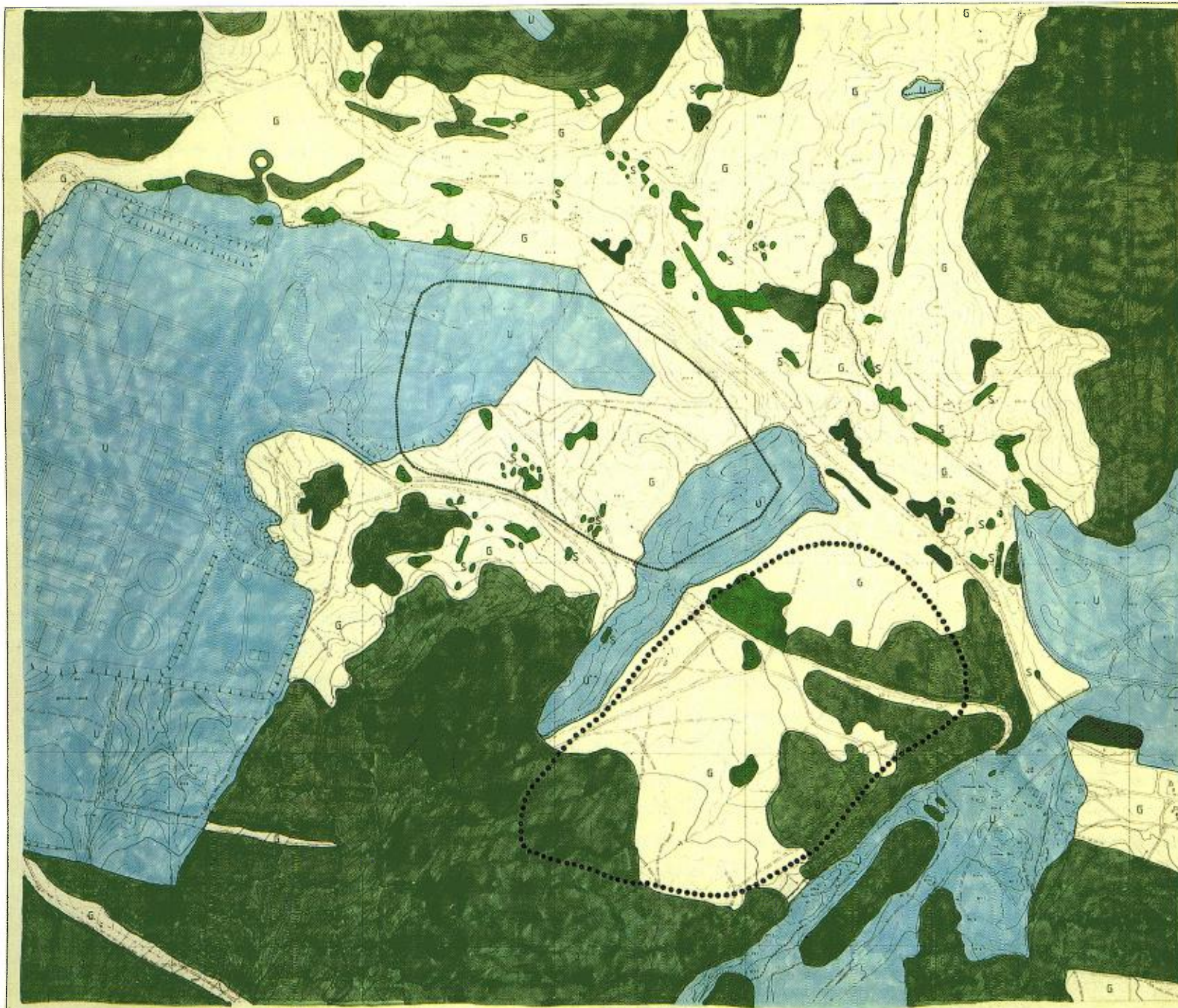
-  POWER STATION
-  OPEN CUT MINE (CURRENT)
-  AREA DISTURBED BY PREVIOUS OPEN CUT MINING
-  UNDERGROUND MINING FACILITIES AREA (PIT HEAD/ COAL STORAGE ETC)
-  PUBLIC ROAD (SEALED)
-  HAUL ROAD (UNSEALED)
-  OVERHEAD POWERLINES
-  OPEN WOODLAND
-  GRASSLAND
-  PROPOSED ASH DISPOSAL AREA
-  CONTINGENCY DISPOSAL AREA
-  STATE FORESTRY BOUNDARY
-  RESIDENTIAL AREA

MT PIPER POWER STATION ASH STORAGE

LANDUSE

Figure 3.2

SCALE 1 : 4000    SEPT 1989    DWG 4



## VEGETATION

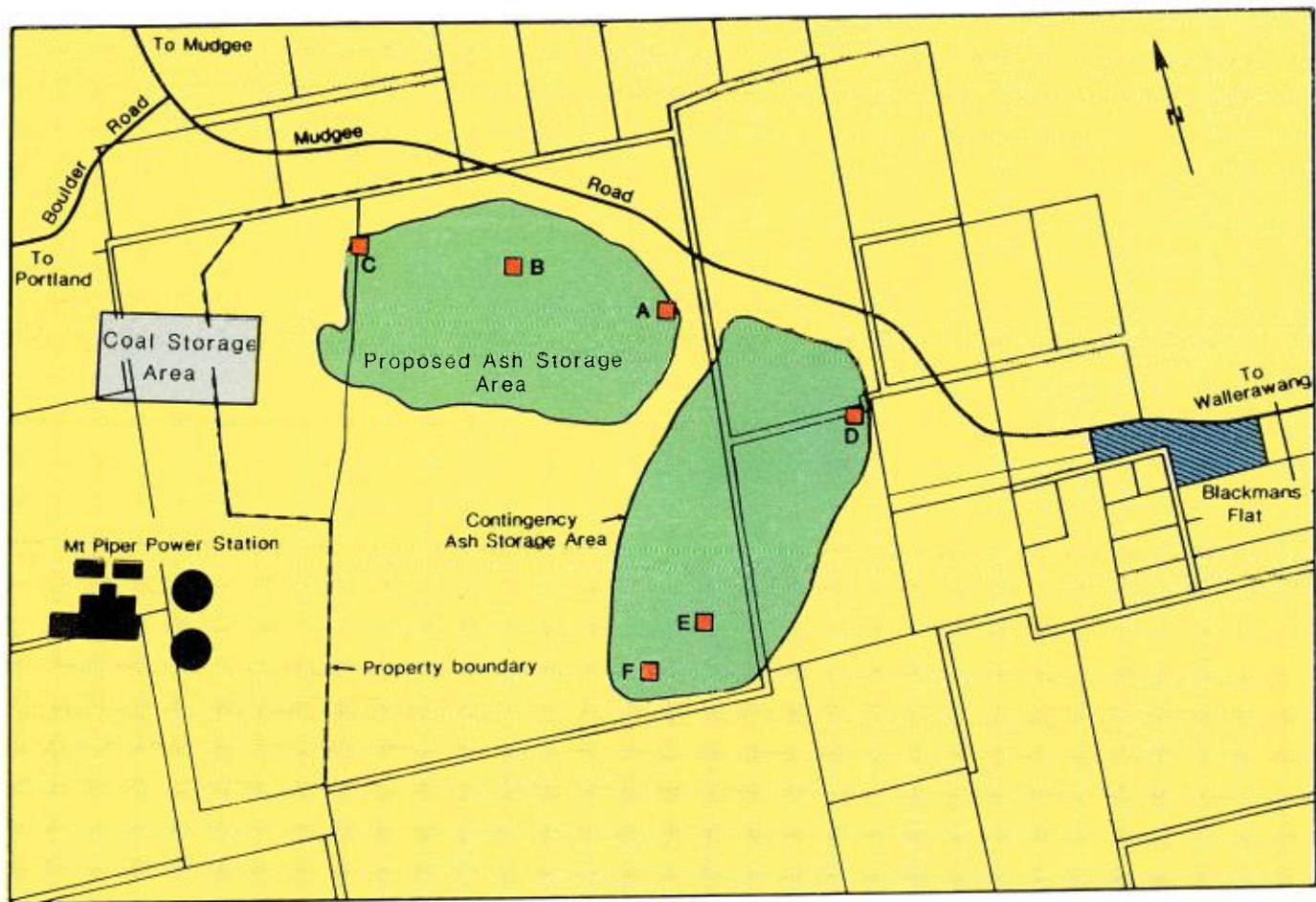
- OPEN WOODLAND
- SCATTERED TREES
- GRASSLAND
- UNVEGETATED
- PINE
- PROPOSED ASH DISPOSAL AREA
- CONTINGENCY DISPOSAL AREA

MT PIPER POWER STATION ASH STORAGE

VEGETATION

Figure 3.3

SCALE 1 : 4000      SEPT 1989      DWG 2



0 500  
Metres



Residences

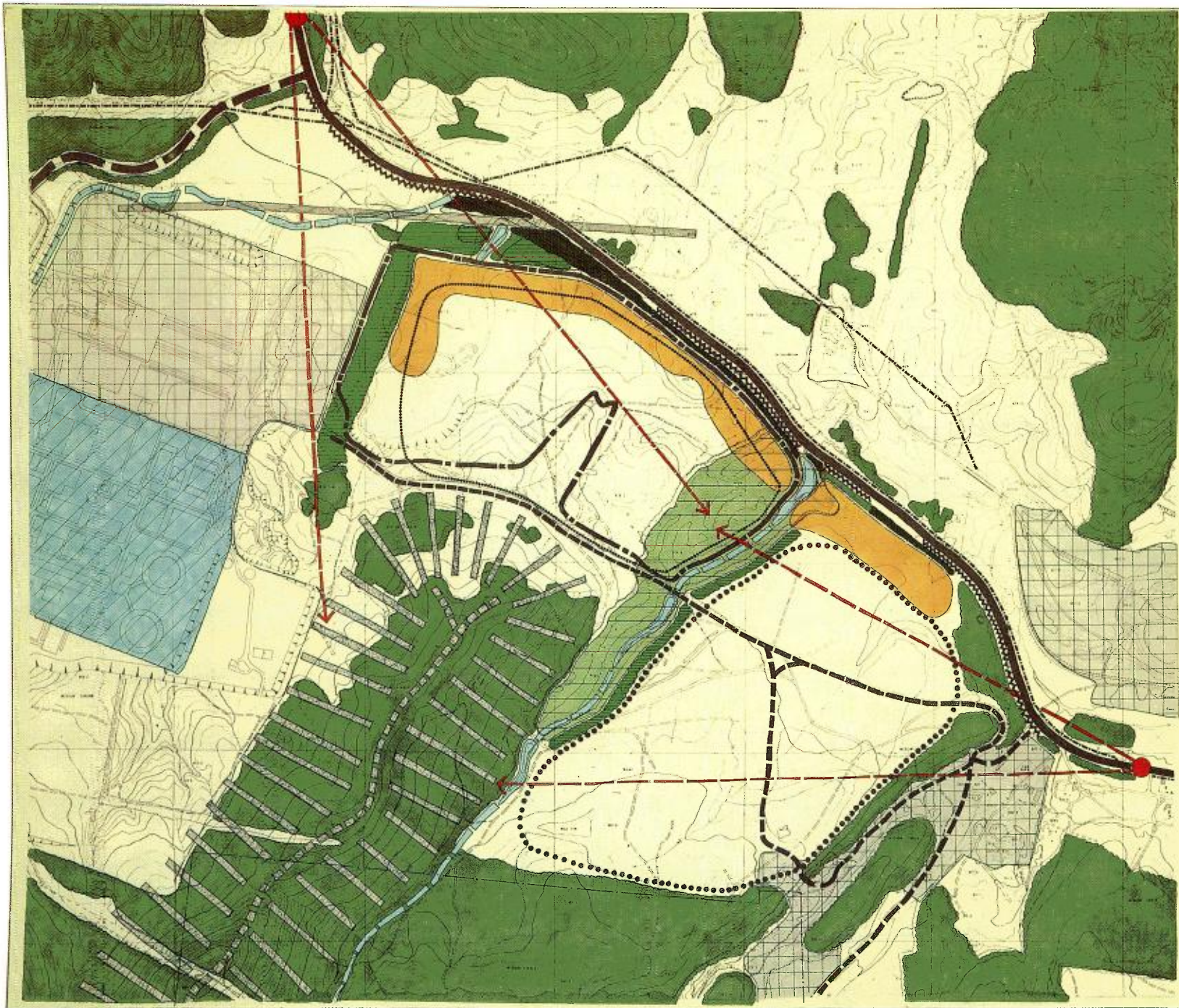


A Location of ash emplacement operations used in modelling exercise.

Noise Modelling Location	Predicted Noise Levels dB(A) <sup>+</sup>
A	38
B	33
C	29
D	42
E	37
F	32

<sup>+</sup> Noise levels predicted for nearest residence at Blackmans Flat, based on worst case operating conditions and transport mode

MT PIPER POWER STATION ASH STORAGE  
PREDICTED NOISE LEVELS  
Figure 3.4



# CONSTRAINTS & OPPORTUNITIES

- PROPOSED ASH DISPOSAL AREA
- ..... CONTINGENCY DISPOSAL AREA
- POWER STATION AND ASSOCIATED STRUCTURES
- COAL HANDLING AREA
- AREA DISTURBED BY PREVIOUS OPEN CUT MINE
- PROPOSED PERIMETER BUND TO SCREEN ASH DISPOSAL OPERATIONS
- PROPOSED ROADSIDE MOUNDING
- EXISTING STAND OF TREES TO BE RETAINED
- POTENTIAL ROADSIDE SCREEN PLANTING
- POTENTIAL SCREEN PLANTING ZONE
- PONDS (EXISTING AND PROPOSED)
- MAJOR DRAINAGE LINE
- MUDGEE ROAD
- PORTLAND ROAD
- COAL HAUL ROADS
- PROPOSED ROAD REALIGNMENT
- PROPOSED COAL CONVEYOR
- EXISTING POWERLINES
- BOUNDARY TO POWER STATION
- STATE FOREST BOUNDARY
- EXTENT OF PROPOSED OPEN CUT COAL MINING
- ~ VIEWS FROM MUDGEE ROAD BLOCKED BY EXISTING LANDFORM AND VEGETATION
- POTENTIAL MAJOR VIEW OF PROPOSED ASH DISPOSAL LANDFORM
- VISUALLY PROMINANT RIDGELINE

MT PIPER POWER STATION ASH STORAGE

CONSTRAINTS AND OPPORTUNITIES

Figure 3.5



EXISTING VIEW



FUTURE VIEW

MT PIPER POWER STATION ASH STORAGE  
EXISTING AND FUTURE VIEWS  
FROM MUDGEE ROAD

Figure 3.6

## 4. THE ALTERNATIVES

### 4.1 DRY VERSUS WET ASH STORAGE

The main advantages of dry ash storage are:

- lower water consumption when compared with wet systems;
- management of a smaller catchment simplifies drainage and water control measures;
- more suitable sites are possible, including relatively flat terrain sites, due to more flexible topographic constraints.

These are now discussed in more detail.

#### Water Consumption

Wet storage requires large volumes of water for mixing with the ash for transport. This water then ponds on top of the ash at the ash dam and considerable water is lost through evaporation before it is returned for reuse at the power station. This loss through evaporation and other losses such as groundwater infiltration and dam leakage could be as much as 650 ML of water per year at a power station the size of Mount Piper.

In contrast, the dry ash storage system proposed is estimated to have an annual water consumption of around 400 ML per year for ash conditioning, dust control and vegetation maintenance. Dry ash storage therefore has advantages in the conservation of water.

This is significant at an inland power station where water supply is more expensive and there is demand for local water resources. The preference for dry storage at Mount Piper was influenced by this consideration.

#### Catchment Management

Ash dams by their very nature will impound water which flows into them from upstream. While this may be desirable in terms of making up water losses from the system due to evaporation, it may be undesirable from the point of view of downstream water users if streamflows are decreased by interception by the dam.

If, on the other hand, incoming water is allowed to pass through the ash dam in an uncontrolled manner then there is the risk of water downstream becoming contaminated with ash. It is therefore desirable for uncontaminated water to bypass the dam. This is achieved through the construction of catch drains upstream of the dam which divert any clean water around the dam. This can be complex and expensive if the terrain upstream of the dam is difficult.

With dry ash storage the control of surface waters is much simpler as the ash can be placed in locations which do not impede the flow of water along natural watercourses.

#### Site Flexibility

Wet ash is retained in a storage area by constructing an embankment, such as a dam across a valley or a turkey's nest type structure. Both arrangements require areas in which the ash can settle out so that the water can be returned to the power station for re-use or, if salt water is used, it may be returned directly to its source after decanting from the ash pond.

Locations for these ash storage areas are very much terrain dependent and consequently suitable sites are limited in number.

With dry storage on the other hand, a wider range of sites is available as the storage can be built up into large mounds requiring only a small toe embankment. Dry ash can just as easily be placed on an area of flat land as in a valley.

This is an important consideration in an area such as Mount Piper where many valleys suitable for wet storage are heavily vegetated and there are environmental penalties in using them for ash storage. Furthermore there are several areas which have been disturbed by surface mining and which are not suitable for any other land use but would be suitable for dry ash emplacement.

Another important consideration in the Mount Piper area is the extent of underground mining and the risk of mine subsidence. A dam structure cannot be safely constructed in an area which is significantly affected by subsidence, while dry ash storage is not constrained by this consideration.

It can therefore be seen that in terms of site selection, dry ash storage offers significantly greater flexibility and offers greater potential for avoiding landuse conflicts.

## 4.2 ALTERNATIVE SITES

### 4.2.1 Neubecks Creek Wet Storage

The Mount Piper Power Station EIS showed the Neubecks Creek area, located to the northeast of the station (see Figure 4.1) as the preferred location for the ash storage site.

Some 600 ha of Ben Bullen State Forest would need to have been acquired to accommodate the ash storage arrangements.

Another site, known as Hunts Creek, was nominated in the EIS as an alternative site to Neubecks Creek. Hunts Creek was to have been used if later work on Neubecks Creek showed that Neubecks Creek was unsuitable for damming because of nearby underground mines or if coal deposits would have been sterilised by its adoption. Neubecks Creek was subsequently shown to be a satisfactory site.

The approved ash storage system comprised a conventional wet system in which ash would be pumped as a slurry to the ash dam, the ash would settle in the ash dam and the decant water recycled. Both furnace ash and fly ash were to be stored in the ash dam in this way.

The salient features and dimensions of the Neubecks Creek ash storage area are given below:

**Features**

Storage capacity (m <sup>3</sup> )	15 x 10 <sup>6</sup>
Storage area (ha)	95
Dam volume (m <sup>3</sup> )	4.5 x 10 <sup>6</sup>
Catchment area (ha) (including storage area)	600

The capacity of the storage was sufficient to contain the expected total quantity of ash produced by the two units of the Mount Piper Power Station during the first life of the station.

The ash storage area was to have sufficient flood detention storage to limit the occurrence of spillage to one in ten years on average. The spillway was designed to pass the maximum probable flood and was to have been a conventional chute type.

In addition to the ash slurry the ash dam was to receive the saline concentrate from the power station's desalination plant and the clean drainage water from the station's fuel oil storage area.

**Dry Storage**

Following a review of ash storage systems, the method of storage was changed from a 'wet' to a 'dry' system. In the light of this decision, a review of available sites was carried out.

The Neubecks Creek site remained the preferred site of those available at that time. The site at Hunts Creek had a number of disadvantages, the primary one being a conflict with the site for a possible rail loop to be used for coal supply to the power station. In addition to this, Hunts Creek would involve a considerably longer transport route for the ash and the use of a catchment otherwise unaffected by the operations of the power station.

The dry ash storage system formulated for Neubecks Creek was located at the same site as the original wet storage system developed for that site. The option involved the use of separate storage areas for the fly ash and furnace ash, with the ash being transported to the storage areas by trucks along a private haul road.

The vegetation was to be cleared from the storage areas, the topsoil removed and stockpiled, and the ash placed as land fill in 10m deep layers (or stages), with each stage being compacted and stabilised before commencing the next stage. A 5metre wide berm would be left between stages and progressively grassed. Runoff from the ash would be collected and treated in settling ponds.

In order to accommodate the mining activities, it was proposed to develop the fly ash storage in two distinct stages, with the initial stage operating concurrently with the open cut mining, and the second stage commencing upon completion of mining. This would necessitate the construction of a temporary settling pond for stage one, followed by a second pond for the whole storage area.

The site would be visible from Mudgee Road. Tree planting would reduce the visual impact and finished surfaces would be rehabilitated and grassed.

**4.2.2 Western Main Site**

A potential dry ash storage site was identified in an area immediately east of the power station, being mined by the Western Main Colliery. This area was not considered originally because of mining operations, but the delay in commissioning Mount Piper now permits the adoption of this area. Whilst

mining will still be in progress within the colliery when ash storage starts, all economic coal resources will have been extracted from those areas proposed for ash emplacement at that time.

As the site is adjacent to the power station, ash transportation costs, both capital and operating, would be relatively low.

The Colliery site has been, and is subject to, open cut mining operations. Much of the site is disturbed land. In ordinary circumstances, the mining company would be responsible for the rehabilitation of the site. However the Commission's need for an ash storage site and the suitability of the Western Main site for this purpose has led to the Commission proposing to use the site and be responsible for the rehabilitation of those parts of the mine site that will be used for ash storage. The one rehabilitation process for both a defunct mine and an ash storage site is seen by the Commission as being both operationally and environmentally advantageous.

The volume of ash produced over the life of the power station can be stored on the Western Main site, by partially filling the open cut mine void and building a hill on top of the filled void.

#### 4.3 THE NO ACTION ALTERNATIVE

This is not a feasible alternative, as the power station will be producing ash which will have to be stored.

#### 4.4 PROJECT JUSTIFICATION

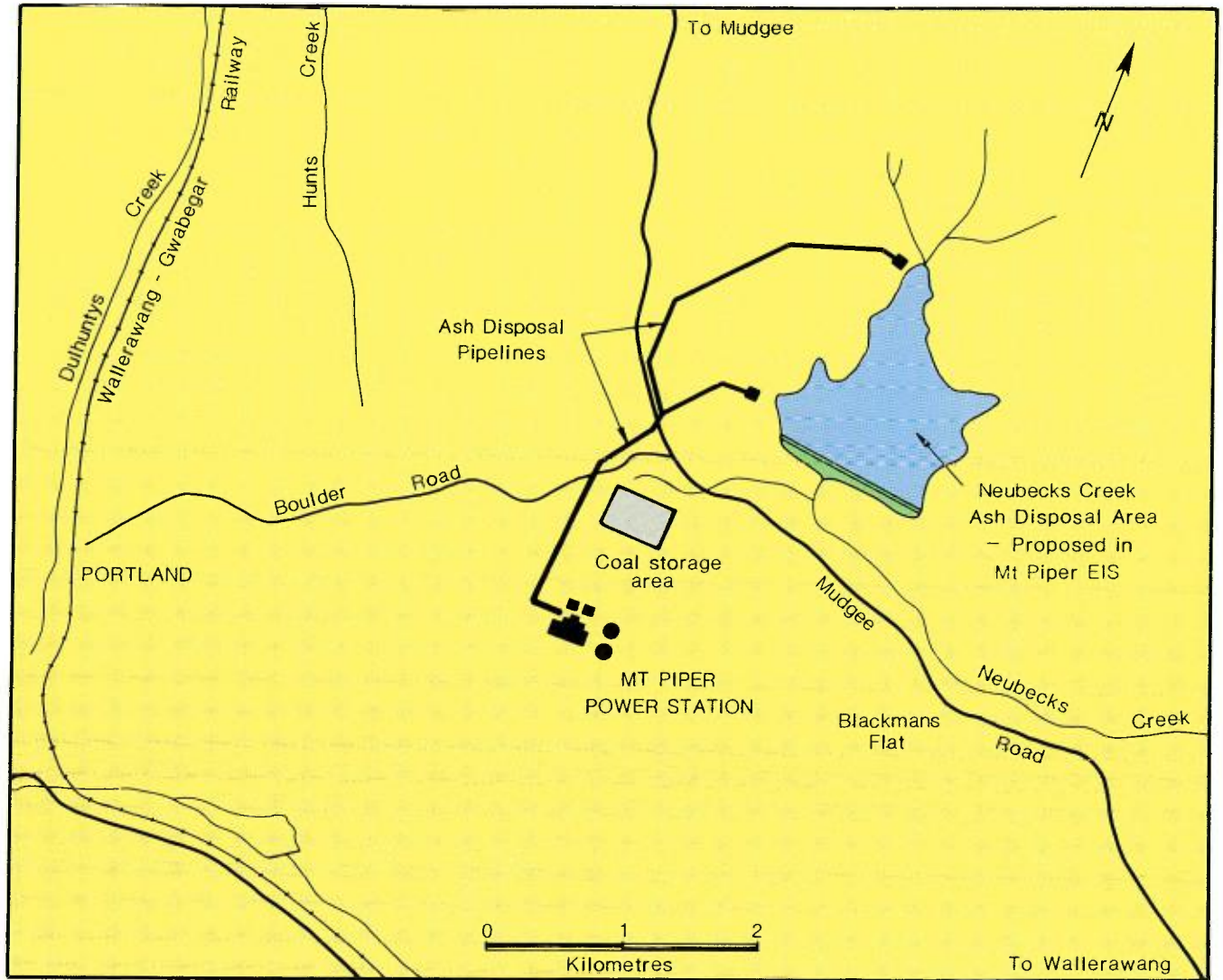
The reasons for adopting dry rather than wet ash storage were given in Section 4.1.

The Western Main site is proposed for the following reasons:

- the area is adjacent to the power station site thereby offering significant transport advantages because of its proximity;
- significant disturbance of the site has already occurred as a result of mining activities, thus ash storage would be a compatible land use. No significant natural areas will be alienated if this site is developed for ash storage;
- Ben Bullen State Forest is not affected, and access across public roads is not required, as would have been the case if the Neubecks Creek site were adopted;

- sufficient area is available to accommodate ash from the existing 2 x 660 MW station for its anticipated economic life (25-30 years);
- additional land adjacent to the proposed site and also significantly disturbed by mining operations, is available should the station be expanded to a four unit station or should the expected economic life of the station be doubled by unit refurbishment;
- adoption of this site will bring about a net reduction in the area of land required for the power station.
- no environmental impacts have been predicted which might preclude the development.

Accordingly the Commission proposes to use the Western Main site for the dry storage of ash produced from its Mount Piper Power Station.



MT PIPER POWER STATION ASH STORAGE  
 NEUBECKS CREEK SITE

Figure 4.1

## 5. REFERENCES

The reference material used for this EIS comprises reports of studies and considerations of various specialised disciplines as they relate to the proposal. In general the studies have been initiated by this Commission for the evaluation of the proposal and have been undertaken by recognised experts and specialists within the respective disciplines.

The main reference studies and considerations are listed below:

- Flora and Fauna Survey for a Proposed Ash Storage Site for Mount Piper Power Station-Mount King Ecological Surveys
- EIS for Mount Piper Power Station (August 1980) - Electricity Commission
- Archaeological Survey - Electricity Commission
- Noise Impact Assessment - Western Main Ash Storage Project - Electricity Commission
- Hydrogeological Studies - Western Main Ash Storage - Coffey Partners International
- Visual and Landscaping Study - Western Main Ash Storage Area - Tract Consultants
- Reconnaissance Land Resource Study - Mount Piper Ash Storage Site - Soil Conservation Service (SCS).
- Community Impact Study - Electricity Commission

## APPENDIX A

### REQUIREMENTS OF THE DIRECTOR OF PLANNING



# Department of Planning

The Secretary  
Electricity Commission of NSW  
GPO Box 5257  
SYDNEY 2001 200

Remington Centre  
175 Liverpool Street, Sydney 2000  
Box 3927 G.P.O. Sydney 2001  
D.X. 15 Sydney

Telephone: (02) 266 7111 Ext. 7235  
Fax No: (02) 266 7599

Contact: V Thomson

Our reference: 80/10060

Your reference: 47223 P&D/GPP/MW

Dear Sir,

Proposed Ash Disposal System  
Mt Piper Power Station, City of Greater Lithgow

---

Thank you for your letter of 28 March 1989 indicating that you are consulting with the Director with regard to the preparation of an environmental impact statement (EIS) for the above development.

2. As development consent is required for the proposal and it is a designated development within the meaning of Schedule 3 of the Environmental Planning and Assessment Regulation, 1980, as amended, an EIS must accompany the development application to the Greater Lithgow City Council. The EIS shall be prepared in accordance with clause 34 of the Regulation and shall bear a certificate required by clause 26(1)(b) of the Regulation (see Attachment No. 1).

3. In addition, pursuant to clause 35 of the Regulation, the Director requires that the following matters be specifically addressed in the EIS:

- . Matters set out in our letter of 23 November 1987;
- . Summary of geology of the disposal site, including subsurface geology;
- . Environmental implications of provision of earth and rock construction materials for the proposed works.
- . Presentation of air pollution control measures.

5. In preparing your EIS you should approach the Greater Lithgow City Council and take into account any comments Council considers may apply to its determination of the proposal.

6. Should you require any further information regarding this matter please do not hesitate to contact us again.

Yours faithfully,

*B Adams 1/5/89*

Barbara Adams  
Manager, Assessments Branch  
As Delegate for the Director.

DEPARTMENT OF ENVIRONMENT AND PLANNING  
ATTACHMENT No.1

STATUTORY REQUIREMENTS FOR ENVIRONMENTAL IMPACT STATEMENTS.

In accordance with Part IV of the Environmental Planning and Assessment Act, 1979, an environmental impact statement (EIS) must meet the following requirements:

Pursuant to clause 34 of the Environmental Planning and Assessment Regulation, 1980, as amended, the contents of an EIS shall include the following matters:

- (a) full description of the designated development proposed by the development application;
- (b) a statement of the objectives of the proposed designated development;
- (c) a full description of the existing environment likely to be affected by the proposed designated development, if carried out;
- (d) identification and analysis of the likely environmental interactions between the proposed designated development and the environment;
- (e) analysis of the likely environmental impacts or consequences of carrying out the proposed designated development (including impacts for use and conservation of energy);
- (f) justification of the proposed designated development in terms of environmental, economic and social considerations,
- (g) measures to be taken in conjunction with the proposed designated development to protect the environment and an assessment of the likely effectiveness of those measures;
- (g1) details of energy requirements of the proposed development and measures to be taken to conserve energy;
- (h) any feasible alternatives to the carrying out of the proposed designated development and reasons for choosing the latter; and
- (i) consequences of not carrying out the proposed development.

The EIS must also take into account any matters required by the Director of Environment and Planning pursuant to clause 35 of the Regulation, which may be included in the attached letter.

The EIS must bear a certificate as required by clause 26(1)(b) of the Regulation.



# Council of the City of Greater Lithgow

180 Mort Street, Lithgow, N.S.W., 2790. Telephone: (063) 52 1077

Your Reference:

Our Reference:

Contact:

MM/LH/0735B 84/1/1016D  
Mr. M. Mason.

21st July, 1989.

Electricity Commission of NSW.,  
Hyde Park Tower,  
G.P.O. Box 5257,  
SYDNEY. N.S.W. 2001.

ATTENTION: Mr. Merv Watts.

Dear Sir,

Re: Mt. Piper Power Station - Alternative Ash Disposal.

I refer to your letter dated 28th May, 1989, and would advise the following.

I reaffirm Council's view that the following issues will need to be examined in detail in your E.I.S.:-

- \* Dust control on ash dumps and roadways
- \* Water quality and site run-off
- \* Visual screening and rehabilitation.

It should be noted, of course, all provisions of Section 90 of the Environmental Planning and Assessment Act will need to be addressed in the E.I.S. and Council's Planning Department will be better placed to indicate specific concerns after perusal of the Draft E.I.S. document.

Bearing the above in mind, I look forward to receiving the Draft E.I.S. and further discussions in this matter.

Any inconvenience caused as a result of this delayed correspondence is regretted.

Yours faithfully,

(S.W. McPHERSON)  
TOWN CLERK.

PER: 

## Department of Environment and Planning



The Secretary,  
Electricity Commission of N.S.W.,  
G.P.O. Box 5257,  
SYDNEY. N.S.W. 2001 00

Berrington Centre  
175 Liverpool Street, Sydney 2000  
Box 3927 G.P.O. Sydney 2001  
DX 15 Sydney

Telephone: (02) 266 7111 Ext 7235  
Telex: DEP NSW 176826  
Fax No: 266 7599

Contact: V. Thomson

Our reference: 80/10060

Your reference: 47223 D/PS

Dear Sir,

RE: PROPOSED ASH DISPOSAL FACILITIES FOR MT. PIPER POWER  
STATION

Thank you for your letter dated 26 October 1987 indicating that you are consulting with the Director with regard to the preparation of an environmental impact statement (EIS) for the above development.

2. As development consent is required for the proposal and it is a designated development within the meaning of Schedule 3 of the Environmental Planning and Assessment Regulation, 1980, as amended, an EIS must accompany the development application to the Greater Lithgow City Council. The EIS shall be prepared in accordance with clause 34 of the Regulation and shall bear a certificate required by clause 26(1)(b) of the Regulation (see Attachment No.1).

3. In addition, pursuant to clause 35 of the Regulation, the Director requires that the following matters be specifically addressed in the EIS:

- . water quality management and leachate controls at the emplacement sites;
- . stabilization of the ash after emplacement and final revegetation and rehabilitation proposals (including maintenance);
- . outline of rehabilitation of Western Main Colliery adjoining the proposed emplacement sites;
- . visual impact and landscaping considerations;
- . transportation arrangements to deliver the ash to the disposal sites at Western Main Colliery and pertinent environmental controls;
- . environmental monitoring proposals for the disposal activities and post emplacement.
- . interaction with any underground coal mining in the vicinity.

4. In preparing your EIS you should approach Greater Lithgow City Council and take into account any comments Council considers may apply to its determination of the proposal.

5. Should you require any further information regarding this matter please do not hesitate to contact us again.

CENTRAL RECORDS  
SECTION  
FILE No. 47223

Yours faithfully,

*B. Adams 23/11/87*

B. Adams  
Manager, Environmental Assessments Branch  
As Delegate for the Director

DEPARTMENT OF ENVIRONMENT AND PLANNING  
ATTACHMENT No.1

STATUTORY REQUIREMENTS FOR ENVIRONMENTAL IMPACT STATEMENTS.

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- (g) measures to be taken in conjunction with the proposed designated development to protect the environment and an assessment of the likely effectiveness of those measures;
- (g1) details of energy requirements of the proposed development and measures to be taken to conserve energy;
- (h) any feasible alternatives to the carrying out of the proposed designated development and reasons for choosing the latter; and
- (i) consequences of not carrying out the proposed development.

The EIS must also take into account any matters required by the Director of Environment and Planning pursuant to clause 35 of the Regulation, which may be included in the attached letter.

The EIS must bear a certificate as required by clause 26(1)(b) of the Regulation.

## APPENDIX B

### CONSULTATION WITH GOVERNMENT BODIES

## CONSULTATION WITH GOVERNMENT BODIES

In October, 1987, a discussion day was held at Mt Piper Power Station to present the dry ash emplacement and storage proposal to state and local government bodies which may have had an interest in the development.

Written comments were sought from each organisation represented on the day and, where appropriate, some matters have been the subject of further consultation.

The Commission will continue to liaise with other government bodies throughout the course of the project. The following is a summary of issues raised by government bodies in correspondence to date and the Commission's response to these.

### Department of Planning

*Comments:* The comments from the DOP (formerly Department of Environment and Planning) are incorporated within the Directors Requirements which comprise Appendix A of this document.

*Response:* The Commission has included in the EIS, reference to all of the issues raised by the DOP.

### Lithgow City Council (LCC)

*Comments:* No adverse issues were raised when LCC considered the proposal which by filling existing open cut areas is seen by LCC as a positive step.

The issues seen as important and which need to be covered in the EIS are:

- Dust control on the ash dump and roadway
- Water quality and run-off from site
- Visual screening
- Revegetation, particularly along the Mudgee Road frontage.

*Response:* The Commission initiated an extensive series of studies which included studies on noise, air quality, water management and quality, and on visual impact, screening and revegetation.

All points raised by LCC are addressed in the EIS.

### Department of Mineral Resources (DMR)

*Comments*

- Proposal should not sterilise coal reserves and hence the DMR offer no objection. However the EIS should address all mineral resources in the area, not just coal.

- The DMR prefer the use of an internal private road rather than the use of Mudgee Road for ash transport.

*Response:* Apart from the coal, no other economic mineral resources have been identified on the site. No proposed ash transport route crosses the Mudgee Road.

### Department of Agriculture (DOA)

*Comments:* The development proposal will result in a net enhancement of environmental management and control in so far as the DOA is concerned.

*Response:* None required.

### Department of Water Resources(DWR)

*Comments:*

- The EIS should include a Water Management and Rehabilitation Plan and should ensure the proper management of run-off and sediment movement.
- Rehabilitation works should be carried out progressively in stages and not left to completion of project.
- The EIS should outline the proposed water quality monitoring to be undertaken on Neubecks Creek and should specify precautions to be taken to minimise pollution problems should they be detected.

*Response:* In the initial evaluation of this proposal the Commission appreciated that a likely major issue would be water and air quality. Hence special attention is paid to the necessary environmental safeguards in the specification and design of the installation.

All the points raised by DWR are addressed in the EIS.

### Forestry Commission(FC)

*Comments:* The FC is pleased that a large area of the Ben Bullen State Forest is now not required for ash storage.

*Response:* None required

### Public Works Department (PWD)

*Comments:* The proposal which ultimately results in the rehabilitation of old open cut mine workings is applauded. It also has the benefit of having a lower water requirement than the original proposal.

*Response:* No response required.

### **Soil Conservation Service(SCS)**

*Comments:* The SCS provided comprehensive comments on the proposal which is seen as a most desirable and practical method for ash storage and a means of mine rehabilitation.

Special consideration should be given to maintenance, screening, and rehabilitation.

The following erosion control principles and design criteria need to apply:

- Final land use should be planned prior to commencement of development.
- Disturbed areas should be kept to a minimum.
- Proper planning of access track location and drainage.
- Sowing of temporary cover crops on disturbed areas if development delays occur.
- Any available on-site topsoil should be stripped and stockpiled for layer use. Some topsoil could be obtained from other Commission developments.
- Clay sealing may be required to seal ponds to prevent leachate escape.
- Existing drainage lines should remain undisturbed.
- Design should be on a whole catchment basis and should consider settling basins for control of erosion during construction.
- Safe final storage of water into drainage lines should be planned.
- Maintenance of revegetation is required.
- Temporary revegetation may be necessary.
- Progressive rehabilitation should be planned, use appropriate seed mixes and allow for continuing maintenance.

*Response:* The SCS was engaged as a consultant for the project and all erosion protection and restoration works will be undertaken in accordance with their advice.

### **State Pollution Control Commission (SPCC)**

*Comments:*

- . The SPCC are in agreement with the proposed environmental controls incorporated in the project.
- . The premises are scheduled under the Clean Air Act, 1961, and considered as works in accordance with Section 19(1) (a) (iii) of the Clean Waters Act. Accordingly approval under Section 17K of the State Pollution Control Commission Act is required.

*Response:* The Electricity Commission is continuing to liaise with the SPCC.

### **Water Board (WB)**

*Comments:* The proposal is considered environmentally sound and should not present any significant problems nor have any adverse effect on the water quality in the Coxs River system if carried out in accordance with the method outlined in the discussion document. The Board will monitor the operation to ensure that pollution and siltation of the Warragamba Storage is minimised.

*Response:* No response required.

**APPENDIX C**

**FORM 4 CERTIFICATE PURSUANT TO EPA ACT**

## Form 4

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

### ENVIRONMENTAL IMPACT STATEMENT

This statement has been prepared by **The Electricity Commission of NSW** 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:

**The transport to and storage of ash on the Western Main Colliery Site, and restoration of affected lands.**

The development application relates to the land described as follows:

No. **N/A** Street **N/A**

Locality/Suburb **Approximately 17 kms north west of Lithgow on the Mudgee Road.**

Real property description: **Portions 19 (remainder), 67, 42, 35, 30, Part Portion 3 (south of Mudgee Rd.) all in the Parish of Cox, County of Cook, Portions 13 and 357 - both in Parish of Lidsdale, County of Cook**

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.

Name, Qualifications and Address of person  
who prepared Environmental Impact Statement

**Peter Stewart, B.E. (Chem)**  
**Electricity Commission of NSW**  
**PO Box 5257 GPO, Sydney 2001**

#### *Certificate.*

I, **Peter Stewart**, of **The Electricity Commission of N.S.W.**

hereby certify that I have prepared the contents of this Statement in accordance with clauses 34 and 35 of the Environmental Planning and Assessment Regulation, 1980.



.....  
Signature

*November, 1989*

.....  
Date



ENVIRONMENTAL APPROVALS SECTION,

EIS

Environmental impact statement -  
Mount Piper ash storage

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