THE ELECTRICITY COMMISSION OF NEW SOUTH WALES

MOUNT PIPER POWER STATION

ENVIRONMENTAL IMPACT STATEMENT

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RENAMING OF LILYVALE RESERVOIR TO LYELL RESERVOIR

It will be noted that in this Statement the name "Lilyvale Reservoir" has been used to designate the downstream storage on the Cox's River associated with the water supply system.

The Commission has advised Lithgow City Council and Lithgow Historical Society of its agreement to an eventual change in the name to "Lyell Reservoir".

As, however, the name "Lilyvale" has been widely used by the Commission in the documentation of the project including tenders, drawings, reports and correspondence, it is proposed that it be retained until completion of the work. At that stage an application will be made to the Geographical Names Board for the name change to "Lyell Reservoir".

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THE ELECTRICITY COMMISSION OF NEW SOUTH WALES

MOUNT PIPER POWER STATION

ENVIRONMENTAL IMPACT STATEMENT

AUGUST 1980

SUMMARY

Mount Piper Power Station is to be constructed by The Electricity Commission of New South Wales at a site between Wallerawang and Portland on the western coalfields of New South Wales.

The station is to comprise two 660 MW generating units. One unit is planned to be available for full operational service in 1987 and the second in 1988.

The main plant area which includes the coal storage facilities and switch-yard is located to the south west of the Mudgee Road approximately 8 km north west of Wallerawang and 4 km east of Portland. The proposed ash disposal area is located to the north of Mudgee Road opposite the main station area.

The station will require up to 3.5 million tonnes of coal each year. It is proposed to obtain this coal from two new mines to be developed in the Cox's River Valley north of Lidsdale; from the existing Angus Place Colliery and from private suppliers. An overland conveyor approximately 8 km in length will deliver coal to the station from the mines and private supplies will be delivered by truck to the station.

The station will require approximately 18 000 ML of water for cooling and other purposes. Cooling water will be drawn from the Cox's River Water Supply System which is currently being developed in conjunction with the construction of Wallerawang Unit No. 8. The scheme has been expanded to cater for the needs of Mount Piper Power Station.

Domestic water for the station will be obtained from the Commission's existing allocation from the Fish River Water Supply System.

New transmission lines will be required to connect the station to Wallerawang Power Station and to the existing 330 kV lines between Yass and Dapto near Marulan. Additional transmission lines will be required to connect Mount Piper Power Station to Wellington and Bayswater Power Station in the Hunter Valley to meet local distribution and system requirements.

This Statement presents the comparison of the alternative sites considered prior to the selection of the Mount Piper site and describes in detail the main components of the project including the transmission line required to transmit the station output to the load centres. The characteristics and conditions of the existing environment are described and the changes which the construction and operation of the power station may be expected to bring about to the environment are discussed.

Proposals for the containment of pollutants and preservation of acoustic and visual amenity are presented and include details of the fly ash collection plant and chimney to control emissions from the boiler furnaces; coal handling facilities and controls to minimise coal dust emissions from the transport and handling of coal; process water treatment facilities and principles for the containment of water-bourne pollutants; desalination plant features to achieve maximum use of water and reduction of dissolved salts in the natural water systems; noise abatement measures; and landscaping proposals to achieve an acceptable visual appearance.

The coal mines and transmission line developments other than the Marulan line associated with the project which are still being formulated are identified in this Statement and will be the subject of future environmental assessment in accordance with the established procedures.

It is concluded from the Electricity Commission's investigations that the project will not adversely affect the amenity of the area.

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1 Statement of object of project

1. STATEMENT OF OBJECT OF PROJECT

Approximately 88% of the electrical energy supplied to the public in New South Wales is generated by the Commission's thermal power stations located near the coalfields. The Snowy Mountains Scheme contributes approximately 9% of the State's requirements and the remainder is produced in State-owned hydro-electric stations and privately-owned generating units.

A high voltage transmission system enables the output from the Electricity Commission's power stations and a proportion of the output from the Snowy Mountains Scheme to be combined and supplied to the various distribution authorities.

To ensure that there is sufficient generating capacity to meet the growing needs of the community and to maintain a reliable supply of electricity, the Electricity Commission is continuously involved in a programme of power station construction. The design and construction activities which are currently in hand are aimed at bringing into service the generating plant listed below:

Power Station	Unit No.	Capacity	First Year of Full Operational Service *
Wallerawang	8	500 MW	1981
Eraring	1	660 MW	1982
Eraring	2	660 MW	1983
Eraring	3	660 MW	1983
Eraring	4	660 MW	1984

* Initial commissioning operation will commence approximately 12 months earlier.

Current trends in the growth of the demand for electricity confirm the need for the above generating unit construction programme.

A careful assessment of past trends and likely future community requirements for the period beyond 1985 indicates the need to provide for the addition of at least one new 660 MW generating unit in each of the years 1986-1990 to meet normal increases in demands from both domestic and industrial consumers.

The commitments which have been made in respect of new aluminium smelters in New South Wales make it clear that it will be necessary to further augment electricity generating capacity in 1985, 1986 and 1987.

To satisfy this requirement the Premier of N.S.W. announced on 3rd December, 1979 the intention of the Government to accelerate the construction of the second stage of Bayswater Power Station, the Mount Piper Power Station located near Lithgow, and a water storage project on the Barnard River to provide additional water for Bayswater Power Station.

The accelerated programme for the installation of new generating plant which is required to supply both the general community requirements and new smelter loads is as follows:

Power Station	Unit No.	Capacity	First Year of Full Operational Service
Bayswater	1	660 MW	1985
Bayswater	2	660 MW	1986
Bayswater	3	660 MW	1986
Bayswater	4	660 MW	1987
Mount Piper	1	660 MW	1987
Mount Piper	2	660 MW	1988

The advancement of the four Bayswater units for full operational service in 1986 and 1987 require the development of a further water source to supplement supply from the Hunter River. The new source is planned to be the Barnard River, a tributary of the Manning River.

In the event of a slowing down in the rate of growth of community electricity requirements, or should a decision be made to defer or not proceed with the new smelters, the power station construction programme will be reprogrammed to match actual requirements. The major plant item contracts, which must be awarded approximately six years before full commercial operation, will provide for such deferment.

In the event that the rate of growth of electricity consumption exceeds that expected, every effort will be made to accelerate the construction programme and, if required, gas turbine plant, which can be installed in about half the time required to construct a large coal-fired generating unit, will be installed to meet anticipated deficiencies. This would however put substantial pressure on a limited and valuable energy resource (natural gas) and is not seen as a desirable course if it can be avoided.

The proposed Mount Piper development and its environmental implications are described in detail in this Statement, whilst the Bayswater development is described in a separate Statement (Reference 1).

The location of the Mount Piper site is shown on Figure 1.

2 Alternative developments

2. STATEMENT OF ALTERNATIVE PLANS CONSIDERED

In addition to the normal industrial resources and facilities such as land, manpower, construction materials, domestic water and transport, a large coal-burning power station requires several particular resources. These are:

Coal: A large proven source of coal of suitable quality capable of being mined and delivered to the station at an economic cost.

Condenser circulating water: A large reliable supply of water. In order to condense the steam after it has passed through the turbine, it is necessary to remove the latent heat. This is achieved by transferring heat to water circulating through the condensers. The rejected heat must then be dissipated to the atmosphere with minimum detriment to the environment, either by means of cooling towers or cooling lakes. In both cases, significant quantities of water are lost through evaporation.

Waste disposal: The main waste products at a coal-burning power station are the furnace ash and fly ash remaining after the coal is burnt. It is usual to dispose of this material as land fill and it is therefore necessary to have available suitable areas of land on which to construct storages of sufficient capacity to meet this requirement over the operating life of the power station.

There are relatively few locations within reasonable proximity to the electrical load centres in New South Wales which have proven fuel and water resources of sufficient quantity and quality for a large coal burning power station. It has been demonstrated that these resources are available on the N.S.W. Central Coast, in the Central Hunter between Muswellbrook and Singleton and on the western coalfields between Lithgow and Portland. The Eraring project, currently being built, will utilise coal and water resources available on the Central Coast and the proposed Bayswater and Mount Piper projects will utilise the resources of the other two areas.

The Mount Piper development will comprise two 660 MW units. The first unit is programmed for full operational service in 1987 and the second for 1988.

Construction at Bayswater before Mount Piper has been adopted because of the "tight" programming required to enable a new unit to be in service by 1985. Bayswater can be constructed in a shorter time than Mount Piper as most of the Bayswater site is already owned by the Commmission, many of the facilities existing for Liddell Power Station can be shared and used for Bayswater, and no new transmission lines are required for the Bayswater Units 1 and 2.

The overall programme, comprising the construction of Eraring, Bayswater and Mount Piper provides for a balanced development around the three major electricity generating areas of the State. It is considered that development of power stations in the three areas can be undertaken without stress to the local communities.

Alternative Developments

The existing power station at Wallerawang has been enlarged over recent years and the site is now fully developed. The installation of additional power generating plant on the western coalfields will therefore require the development of a new site.

Investigations of alternative developments included the possibility of constructing a cooling pond for circulating water cooling similar to Liddell Power Station. No cooling pond sites were found which provided the required water surface area and suitable topographic features for dam construction.

Five alternative sites based on the use of cooling towers were subsequently identified as having the necessary potential for development. These are:

Mount Piper
Newnes Plateau
Wallerawang East
Angus Place
Portland

The locations of the five alternatives are shown on Figure 2.

These alternatives have been reviewed in detail and compared below. Based upon the results of the comparisons it has been determined that the most suitable site would be Mount Piper.

Comparison of Alternatives

Each of the alternatives would have a number of common features including:

- the physical dimensions and layout of the main plant.
- the use of cooling towers for the dissipation of reject heat.
- the cooling water supply from Wallerawang and Lilyvale reservoirs.
- the source of domestic water supply.
- the coal supply sources.

The main features of the alternatives which are site dependent are:

- the domestic water supply pipeline route.
- the cooling water supply pipeline route from Wallerawang reservoir.
- the ash disposal facilities.
- the coal transport systems.
- the transmission line routes near the station sites.
- site access.
- local water storages

Mount Piper

Site Location: The site is located near the Mudgee Road approximately 8 km north-west of Wallerawang and approximately 4 km east of Portland.

Access: Access to the site would be provided from the Mudgee Road.

Water Supply: Cooling water make-up would be pumped from Wallerawang Reservoir, a distance of 9 km, to a local storage at the site. A gravity pipeline would connect this storage to the station.

Domestic water would be taken from the Fish River Water Supply Scheme pipelines at Portland. Supply would require the installation of approximately 4 km of new pipelines.

Coal Supply:

The bulk of the coal would come from underground mines in the area to the east of the Upper Cox's River over which the Commission holds mining leases or prospecting authorisations.

Coal would be transported to Angus Place Colliery by a private coal haul road and then to the station by a conveyor system approximately 8 km in length. For part of the route the conveyor would run adjacent to the Mudgee Road and pass close to Wallerawang Colliery.

Coal Alienation:

The main plant site would be located over the abandoned Huon Colliery area where the coal has been largely extracted. Some of the ancillary works would be located over coal bearing areas which have been worked out or are expected to be worked out by the time construction commences. The total commercial coal which would be alienated by the works is estimated to be less than 0.25 million tonnes.

Ash Disposal:

The furnace ash and fly ash would be disposed of in an ash storage constructed either on the north arm of Neubecks Creek approximately 1 km north-east of the station or on the upper reaches of Hunts Creek. The Neubecks Creek site is preferred but its adoption is dependent upon the outcome of detailed site investigation.

Land Ownership:

The site is presently held by the Crown (Ben Bullen State Forest), mining companies and other private owners.

Land Use: The main plant site is largely located in an area already substantially disturbed by earlier open-cut mining activities and is surrounded by operating coal mines. A small part of the site is used for horse raising. It is remote from population centres. Neubecks Creek ash disposal area has been partly cleared and used for grazing and the remainder is undeveloped bushland.

Transmission: A new double-circuit 330 kV transmission line would be required to link Mount Piper and Wallerawang Power Stations. A further transmission line will be required to connect the station to the existing 330 kV transmission lines between Yass and Dapto.

Environmental Factors:

Visual: The main station complex and the ash dam would be seen by travellers on the Mudgee Road. It is considered that when viewed from this location, the station will not be obtrusive and would be in character with existing nearby mining and power generation facilities. The top of the chimney would be seen from Portland but the view would be distant and unobtrusive.

Noise: The site is remote from centres of population. Site boundaries would be selected to avoid noise nuisance at neighbouring properties.

Air: By making appropriate provision in the design of the chimney and particulate collection plant, air pollution levels would be controlled to legal and acceptable levels.

Water: By making appropriate provision in the station and ash disposal facilities, all water pollutants would be contained within the site during all but exceptional flood conditions.

Newnes Plateau

Site Location: The site is located in the Newnes State Forest approximately 25 km north of Newnes Junction. It is bordered on the northern and western sides by the southern escarpment of the Wolgan Valley at distances of 3 to 4 km.

Access: Access to the site would be provided by upgrading the road that connects Lithgow to Newnes Afforestation Camp, a distance of approximately 12 km, and extending that road a distance of 10 km to the power station site.

Water Supply: Cooling water make-up would be pumped from Wallerawang Reservoir a distance of 11 km to a local storage located on the west branch of the Wolgan River. A pipeline would connect this storage to the station.

Domestic water would be taken from the Fish River Water Supply Scheme pipelines at Wallerawang. A 15 km pipeline would be required to supply the new station.

Coal Supply: The bulk of the coal would come from underground mines in the area to the east of the Upper Cox's River over which the Commission holds mining leases or prospecting authorisations.

Coal would be transported to the station by a conveyor system approximately 11 km in length.

Coal Alienation: Approximately 3 million tonnes of coal would be alienated by the main plant area and the local cooling water make-up storage area.

Ash Disposal: The furnace ash and fly ash would be disposed of in an ash storage constructed on the west branch of the Wolgan River approximately 2 km south of the station.

Land Ownership: The site is part of the Newnes State Forest.

Land Use: The site is located in a remote area of mainly undeveloped bushland. The nearby Wolgan Valley has been classified by the National Trust of Australia.

Transmission: A new double-circuit 330 kV transmission line would be required to link the station to Wallerawang Power Station. A further transmission line would be required to connect the station to the existing 330 kV transmission lines between Yass and Dapto.

Environmental Factors:

Visual: The site is in a remote location and would not be visible from centres of population. Distant views of the station would be obtained from the Wolgan Lookout and from within the Wollemi National Park.

Noise: The site is remote from centres of population. Site boundaries would be selected to avoid noise nuisance to possible future neighbours.

Air: By making appropriate provision in the design of the chimney and particulate collection plant, air pollution levels would be controlled to legal and acceptable levels.

Water: By making appropriate provision in the design of the station and ash disposal facilities, all water pollutants would be contained within the site during all but exceptional flood conditions.

Wallerawang East

Site Location: The site is located adjacent to the Mudgee Road approximately 2 km east of Wallerawang Power Station.

Access: Access to the site would be provided from the Mudgee Road.

Water Supply: Cooling water make-up would be pumped from Wallerawang Reservoir a distance of approximately 2 km to a local storage near the site. A pipeline would connect this storage to the station.

Domestic water would be taken from the Fish River Water Supply Scheme pipelines at Wallerawang. A 2 km pipeline would be required to supply the new station.

Coal Supply: The bulk of the coal would come from underground mines in the area to the east of the Upper Cox's River over which the Commission holds mining leases or prospecting authorisations.

Coal would be transported to the station along an extension of the existing Angus Place Colliery - Wallerawang Power Station private haul road. The additional length of road would be approximately 2 km.

Coal Alienation: No significant quantity of coal would be alienated by the project.

Ash Disposal: The furnace ash and fly ash would be disposed of in an ash storage constructed on the upper reaches of Sawyers Swamp Creek approximately 3 km from the station.

Land Ownership: The site is held by private owners.

Land Use: The site is cleared and used mainly for grazing. Its development would require a number of established residences and services, including the 2LT radio station transmitter, to be displaced.

Transmission: A new double-circuit 330 kV transmission line would be required to link the station to Wallerawang Power Station. A further transmission line would be required to connect the station to the existing 330 kV transmission lines between Yass and Dapto.

Environmental Factors:

Visual: The station would be visible from Wallerawang township, the Mudgee Road, the Great Western Highway and the Main Western Railway.

Noise: Site boundaries would be selected to avoid noise nuisance at neighbouring properties

Air: The land to the north of the site rises to elevations approximately 100 m above the site within a distance of 1 km. This would require an exceedingly high chimney to effectively disperse gaseous discharges.

Water: By making appropriate provision in the design of the station and ash disposal facilities, all water pollutants would be contained within the site during all but exceptional flood conditions.

Angus Place

Site Location: The site is located adjacent to the Lidsdale to Newnes Road on the floor of the Cox's River Valley approximately 1.5 km north of the village of Angus Place.

Access: Access to the site would be provided from the Lidsdale to Newnes Road.

Water Supply: Cooling water make-up would be pumped from Wallerawang Reservoir a distance of approximately 11 km to a local storage on the Upper Cox's River. A gravity pipeline would connect this storage to the station.

Domestic water would be taken from the Fish River Water Supply Scheme pipelines at Wallerawang. A 7 km pipeline would be required to supply the new station.

Coal Supply: The bulk of the coal would come from underground mines in the area to the east of the Upper Cox's River over which the Commission holds mining leases or prospecting authorisations.

Coal would be transported to the station by a conveyor system approximately 2 km in length.

Coal Alienation: Approximately 6 million tonnes of coal would be alienated in the main plant area and ash and cooling water make-up storages.

Ash Disposal: The furnace ash and fly ash would be disposed of in an ash storage constructed on a tributary of the Cox's River approximately 1 km west of the station.

Land Ownership: The site is held by private owners, coal companies and the Crown.

Land Use: Part of the area is largely cleared and used for grazing while the remainder is undeveloped bushland.

Transmission: A new double-circuit 330 kV transmission line would be required to link the station to Wallerawang Power Station. A further transmission line would be required to connect the station to the existing 330 kV transmission lines between Yass and Dapto.

Environmental Factors:

Visual: The main plant would be visible from Angus Place and Lidsdale villages and from the nearby Lidsdale to Newnes Road. The upper levels of the station structures would be seen from Cullen Bullen and Wallerawang.

Noise: Site boundaries would be selected to avoid noise nuisance at neighbouring properties.

Air: By making appropriate provision in the design of the chimney and particulate collection plant, air pollution levels would be controlled to legal and acceptable levels.

Water: By making appropriate provision in the design of the station and the ash disposal facilities, all water pollutants would be contained within the site during all but exceptional flood conditions.

Portland

Site Location: The site is located approximately 4 km north-east of Portland and approximately 3 km south of Cullen Bullen.

Access: Access to the site would be provided from the Mudgee Road and the Portland to Cullen Bullen Road.

Water Supply: Cooling water make-up would be pumped from Wallerawang Reservoir a distance of approximately 13 km to a local storage on Hunts Creek.

Domestic water would be taken from the Fish River Water Supply Scheme pipelines at Portland. A 2 km long pipeline would be required to supply the new station.

Coal Supply: The bulk of the coal would come from underground mines in the area to the east of the Upper Cox's River over which the Commission holds mining leases or prospecting authorisations.

Coal would be transported to the station by a conveyor system approximately 12 km in length.

Coal Alienation: No coal would be alienated by the project.

Ash Disposal: The furnace ash and fly ash would be disposed of in an ash storage constructed on the north arm of Neubecks Creek approximately 4 km east of the station. This storage is the same as that proposed for the Mount Piper project.

Land Ownership: The site is held by private owners, coal companies and the Crown.

Land Use: The main plant area has been cleared and improved for farming and grazing. The ash disposal area has been partly cleared and used for grazing while the remainder is undeveloped bushland.

Transmission: A new double-circuit 330 kV transmission line would be required to link the station to Wallerawang Power Station. A further transmission line would be required to connect the station to the existing 330 kV transmission lines between Yass and Dapto.

Environmental Factors:

Visual: The station would be clearly visible from Portland and Cullen Bullen.

Noise: The nearest village is Cullen Bullen approximately 3 km to the north and isolated residences exist close to the site. Site boundaries would be selected to avoid noise nuisance at neighbouring properties.

Air: By making appropriate provision in the design of the chimney and particulate collection plant, air pollution levels would be controlled to legal and acceptable levels.

Water: By making appropriate provision in the design of the station and ash disposal facilities, all water pollutants will be contained within the site during all but exceptional flood conditions.

Conclusions

Having regard for the economic, engineering and environmental implications of each of the alternative developments, it has been concluded that Mount Piper is the site which should be developed at this time. It has also been concluded that, subject to the availability of adequate coal reserves and the development of further supplies of water, there are no overriding aspects which would preclude the subsequent development of one or more of the alternatives at some future time. However, present indications are that future power station developments would be more economically viable in other locations in the State rather than the western coalfields.

The Mount Piper, Wallerawang East and Angus Place sites could be developed for approximately the same costs but the costs of developing the Newnes Plateau and Portland sites would be significantly greater.

The environmental assessment of each of the alternatives clearly favours the Mount Piper site. It is located in an area already substantially disturbed by earlier open-cut mining activities and is surrounded by a number of operating mines. The site is remote from population centres and would not present a noise problem. The station would be visible only to travellers along the Mudgee Road.

In respect of air quality, all sites are considered to be equal with the exception of the Wallerawang East site which would require a taller chimney to achieve comparable low ground level concentrations of pollutants.

The Angus Place site could also probably be developed with a minimal environmental impact although not to the same extent as Mount Piper. The major objection to the choice of this site is the alienation of a significant quantity of coal.

The proximity of the Wallerawang East site to the Wallerawang township and the existing Wallerawang Power Station has contributed to the decision against its choice. Wallerawang Power Station was expanded by the commissioning of a 500 MW generating unit (No. 7) in 1978 and a second 500 MW unit (No. 8) is scheduled for operational service in 1981. The further development of a new station close nearby would affect the visual amenity of the area while the impact of additional discharges to the atmosphere

could be better assessed at a later stage after the commissioning of Wallerawang Unit No. 8. A further factor in the consideration of this site was the engineering difficulties foreseen in the development of the ash disposal system on Sawyers Swamp Creek.

The site at Portland, in addition to being significantly more costly than Mount Piper, offers no overall advantages from an environmental viewpoint.

The site at Newnes Plateau is also more expensive to develop than Mount Piper, it is very remote from centres of population and has potential access problems during winter snow conditions. It is also relatively close to the scenic Wolgan Valley.

It has been decided, for these reasons, to adopt the Mount Piper site.

3 Physical description of the proposal

3. PHYSICAL DESCRIPTION OF THE PROPOSAL

Aspects of the proposals set out in this section of the Statement have been discussed, or are currently under discussion, with a number of State and Local Government bodies. These include the State Pollution Control Commission, the Planning and Environment Commission, the Department of Mineral Resources, the Water Resources Commission, the Metropolitan Water Sewerage and Drainage Board, the Department of Main Roads, the State Rail Authority and the Council of the City of Greater Lithgow.

The power station site is located near the Mudgee Road approximately 8 km north-west of Wallerawang and 4 km to the east of Portland. The main plant area, which includes the coal storage facilities and switchyard, lies generally to the south-west of the Mudgee Road while the site of the proposed ash disposal area at Neubecks Creek and the overland coal conveyor route are located to the north of the road. The locations of these works are shown on Figure 3.

The main station area will cover an area of 1180 ha of which 200 ha will be developed for structures, coal storage, water storage and other facilities. The remaining area will form a buffer zone. The Neubecks Creek ash disposal area will require the acquisition of 650 ha of which the dam and storage area will cover 100 ha. The coal conveyor corridor will require the acquisition of 130 ha. Land acquisition will be by negotiation wherever this is possible.

Coal supplies for the station will mainly be obtained from deposits which lie to the east of the Cox's River upstream of Lidsdale.

New transmission lines will be required to connect the station to Wallerawang Power Station and to the existing 330 kV lines between Yass and Dapto to enable the power output from the new station to be supplied to the load centres. The line is discussed further under the sub-heading "Transmission" in this section. Additional transmission lines are required to be connected to Mount Piper Power Station. The additional lines will connect to Wellington and Bayswater Power Station in the Hunter Valley to meet local distribution and system requirements.

The power station will comprise two 660 MW boiler-turbine generating units together with associated coal handling plant, cooling towers and ash disposal facilities. The layout of the main station buildings and structures is shown on Figure 4.

The aerial photograph with accompanying overlay (Figure 5) depicts the main station area and the favoured ash disposal area at Neubecks Creek against the existing development. Although no detailed design work has yet been carried out on buildings and structures, an overall appreciation of the appearance of the station can be gained from the typical station elevations shown on Figure 6.

The function of each major element in the station is shown diagrammatically on Figure 7. Coal from the mines or coal storage area is transported to the boiler bunkers by conveyor, and then fed to the pulverisers to be finely ground before being burned in the boiler furnace. After combustion, the unburnt residue in the form of furnace ash and fly ash is collected and transported to ash disposal areas. The hot gases exhausted from the furnace are discharged via the fly ash collection plant to the atmosphere through a tall chimney. The coal supply and the ash collection and disposal systems are important features of the project and are described in more detail later in this section.

Steam from the boiler is used to drive the turbine which in turn drives the generator. The electricity produced at generator voltage is transformed to system voltage and then fed to the interconnected transmission system via the station switchyard.

The steam from the boiler, after passing through the turbine, will be reconverted to water of high purity in the condenser and returned to the boiler for reheating with the addition of any specially purified water necessary to make up for losses. Heat rejected in the condenser is carried away by the circulating water system and dissipated in the cooling tower.

The power station main plant area and important structures shown on Figures 4 and 5 include the turbine house, boilers, cooling towers, fly ash collection plant, chimney, coal storage area, transformer yard and switchyard. Also shown are several ancillary service facilities including a cooling water desalination plant, waste water treatment plant, oil storage tanks, and workshops, stores, amenities and administration buildings.

The construction phase of the project will involve a variety of temporary works including contractors' offices, storage areas, workshop and amenity facilities and offices for the use of the Commission's construction supervisory staff. Their locations are shown on the abovementioned Figures.

Coal Supply System

The two 660 MW unit Mount Piper Power Station will require up to 3.5 million tonnes of coal per annum. Consumption during the first three years of operation is expected to be less than this figure as it takes some time for large generating units of this type to be "run-in" and operate at full capability. This requirement is in addition to the coal required for Wallerawang Power Station which will consume approximately 2.5 million tonnes per annum when Unit No. 8 is in full operational service.

It is proposed that the coal requirements, totalling approximately 6 million tonnes per annum for the two stations, will come from the Newcom Collieries Pty. Ltd.'s Angus Place mine, from two new mines to be developed in the Cox's River valley at locations yet to be determined but shown tentatively on Figure 3, and from local private mining companies. The new mines will extract coal from areas over which the Commission holds coal leases or exploration permits and, together with the Angus Place mine, will be capable of supplying at the rate of about 5.5 million tonnes per annum. The balance is expected to be obtained from the private mining companies.

Provision will be made to supply coal from each mine to either power station. The private coal haul road from Angus Place Colliery to Newcom Colliery site will be extended to Wallerawang Power Station. This road will be yet further extended to the two new mine sites. A coal conveyor will be constructed from Angus Place Colliery to Mount Piper and provision will be made for transferring coal from trucks to the conveyor at Angus Place. Detailed studies may indicate that the transport link between the

mine in the Upper Cox's River valley and Angus Place should be by conveyor rather than by private haul road. Coal from privately-owned coal mines will be supplied by trucks over public roads as is the present arrangement for Wallerawang Power Station. The road receival facility to be constructed at Mount Piper will be similar to that provided at Wallerawang Power Station. A facility will also be provided to wash all coal trucks leaving the station site after unloading.

The coal handling plant will be planned so that incoming coal can be fed directly to the power station bunkers or deposited in the storage area and recovered for use in the station as required. The storage area, including its associated facilities, will cover approximately 20 ha and will have a capability of storing some 1 million tonnes of coal when stacked to a height of 12 m. This will be sufficient to satisfy the requirements of the station during miners' holidays or to meet other contingencies.

Detailed design of the coal handling plant has yet to be carried out but it is envisaged that the storage will be arranged as shown on Figure 8. Further information regarding the coal handling system is given in the Supplementary Information volume.

Management of the stockpile will be carried out to achieve effective control of dust and to minimise spontaneous combustion. The stockpile will be "dressed" to provide an even surface which will shed rainwater to the drainage system, thereby minimising the ingress of water to the stored coal.

The use of rubber-tyred plant to transport and compact coal is considered essential in order to provide the degree of compaction necessary to prevent spontaneous combustion in the relatively long-term storages which are necessary at power stations. Large rubber-tyred plant is used successfully at all of the Commission's power stations for this purpose but the continual movement of such plant over the storage area to deposit and reclaim coal and to keep it dressed and compacted does not permit the extensive use of bitumen sealing to suppress dust. However, other equally effective measures to contain and suppress dust will be taken. These will include:

- The main receiving bunker will be totally enclosed.

- Conveyors will be semi-enclosed of the type in service at Liddell Power Station and approved for service at Eraring Power Station.

- When required, coal incoming to the station will be sprayed with a bio-degradable agglomerating type wetting agent. Spraying equipment will be automatically activated by belt movement. The high furnace temperatures ensure that suppressant chemical reaching the boilers is destroyed in the combustion process.

- A mobile water tanker will operate whenever necessary to achieve direct dust suppression and to re-activate the dust suppressant where required.

Perimeter drains will collect run-off from rainfall on the storage area and lead it to a settling basin of sufficient size to trap silt and coal particles entrained in the water. Clean water discharge from the settling basin will be directed to Neubecks Creek.

Clean water runoff from areas around the coal storage area will be intercepted before it reaches the stockpile by perimeter drains which will discharge to Neubecks Creek.

The coal storage area will, for the most part, be screened from view of travellers using the Mudgee Road by landscaping mounds and suitably placed tree plantings.

Water Supply System

The 1320 MW installation at Mount Piper will require approximately 18 000 ML of water annually of which 90% is required for make-up to cooling towers, the ash disposal system and other uses which do not require water of a high quality. The balance is required for domestic purposes and boiler make-up requiring water of high quality.

Mount Piper will be supplied with water from the same sources as Wallerawang Power Station. These are:

(i) The Commission's existing allocation of water from the Fish River Water Supply Scheme

(ii) The Cox's River Water Supply Scheme now being constructed in connection with Unit No. 8 at Wallerawang Power Station.

While these sources are together capable of providing the combined requirement for both Wallerawang and Mount Piper Power Stations, there is a considerable variation in the quality of the water from the two sources and the following supply arrangements are proposed for Mount Piper.

Domestic and Boiler Make-up Water

The Commission has an allocation of 8200 ML per annum of water from the Fish River Water Supply Scheme which is currently used to supply the overall water requirements for Units 1 to 7 at Wallerawang Power Station (including cooling water, domestic and boiler make-up). The water is of high quality capable of being used for domestic purposes and boiler make-up without the need for pre-treatment.

The Cox's River water, on the other hand, is of relatively low quality which would require treatment if used for boiler make-up or domestic purposes.

It is therefore planned to use Fish River water at both Wallerawang and Mount Piper Power Stations for domestic and boiler make-up. The allocation is adequate to meet these requirements. The quantity diverted to Mount Piper, which was previously used as cooling water for Units 1 to 7 at Wallerawang, will be replaced by Cox's River water.

The water from the Fish River Scheme for Mount Piper will be delivered by means of a 4 km pipeline from a point on the reticulation system near Portland. The route of the pipeline is shown on Figure 3.

Cooling Water and Other Purposes

Water for cooling and other purposes at Mount Piper will be obtained from the Cox's River Water Supply Scheme which is being constructed to supply water to the current extensions to Wallerawang Power Station. The scheme has been enlarged to provide for the requirements of Mount Piper.

The Scheme comprises two reservoirs on the Cox's River, one located at Wallerawang adjacent to the power station and the other further downstream at Lilyvale. Water for both stations will be drawn directly from the Wallerawang Reservoir with water being transferred from the Lilyvale Reservoir to Wallerawang by pipeline when Wallerawang Reservoir is drawn down during periods of low river flows.

The pumping stations being constructed at Wallerawang and Lilyvale Reservoirs will have provision for the additional pumps required to supply Mount Piper. The pipeline from Lilyvale to Wallerawang has the capacity to supply the water requirements for both stations but a new 9 km pipeline will be required to carry the water from Wallerawang to a local reservoir to be constructed at Mount Piper. The route of the pipeline is shown on Figure 3. All water supply pipelines will be buried for most of their length.

Condenser Circulating Water System

A natural draft cooling tower will be constructed to serve each generating unit. The towers will be located at the eastern end of the turbine house as shown on Figure 4. A pumping station will be located adjacent to the cooling towers and water taken from the tower basins will be pumped through buried conduits to the condensers and back to the towers.

The two towers will be of reinforced concrete and will be of similar type to the one being constructed to serve No. 8 Unit at Wallerawang. They will be hyperbolic in shape, approximately 120 m high with a base diameter of 100 m.

The flow of circulating water will be approximately 16 m^3/s for each 660 MW unit. Water to make up evaporation losses from the cooling towers will be drawn from the local make-up reservoir.

A desalination plant will be provided to treat the condenser circulating water to remove dissolved salts from the system and reduce to a minimum the need, under normal operating conditions, for blowdown from the cooling towers. The saline concentrates from the desalination plant will be discharged to the ash disposal system and the purified water will be returned to the cooling tower basin. The system envisaged is shown schematically on Figure 9.

Fly Ash Collection Plant

Exhaust gases from the furnaces will be cleaned before discharge to the chimney by passing through the fly ash collection plants which will be of the fabric filter type. The designed collection efficiency will be such that the concentration of fly ash in the gases discharged from the chimney will not exceed limits established under the Clean Air Act. The plant will be constructed with sufficient reserve margin to ensure that these standards can be maintained even with sections of the plant out of service for maintenance. The fly ash collection plant will be subject to licensing approval by the State Pollution Control Commission.

Chimney

It is proposed to construct a reinforced concrete chimney approximately 250 m tall to disperse flue gases from the boilers. The chimney will be designed to give a 23 m/s exit velocity when the two units served are on full load.

As with all of the Commission's power station chimneys, the height and exit velocity adopted for Mount Piper will be subject to licensing approval by the State Pollution Control Commission.

Ash Disposal System

The total furnace and fly ash residue from each tonne of coal burnt will be approximately 0.25 m^3 of which up to 90% will be fly ash extracted from the flue gases and the remainder will be ash collected directly from the furnaces. Both types of ash will be mixed with water to form slurries and pumped separately to an ash disposal area located either in the valley formed by the northern arm of Neubecks Creek or on the upper reaches of Hunts Creek as shown on Figure 3.

The Neubecks Creek site is located over coal deposits which could possibly be won by open cut mining methods. The practicability of mining this coal before construction of the dam will be a factor to be considered in determining the adoption of this site. Discussions are being held with the coal company concerned with a view to resolving the matter of recovering the underlying coal in time to meet construction needs. A further factor is that the hills at the sides of the storage area have been mined by underground methods and further investigations have yet to be undertaken to demonstrate that the area is suitable for the construction of a reservoir for the storage of ash.

In the event that it should be decided not to proceed with the Neubecks Creek site, the alternative located on the upper reaches of Hunts Creek would be adopted.

As shown on Figure 9, water used in the ash disposal system normally will be contained in a closed system. Water used to form the slurries will drain from the ash deposits in the disposal area and will be pumped back to the power station where it will be neutralised and held in the ash water return tank for re-use.

The 3 km ash disposal pipeline route to Neubecks Creek site has been carefully selected to avoid low points in the lines and the need for intermediate storages, into which, in order to avoid pipeline blockages, the slurries may be discharged when the pumps cease to operate.

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

Features

Storage capacity (m^3)	15×10^6
Storage area (ha)	95
Dam volume (m^3)	4.5×10^6
Catchment area (ha) (including storage area)	600
Full supply level (m)	954

The capacity of the storage will be sufficient to contain the expected total quantity of ash produced by the two units during the life of the station.

The ash disposal area will have sufficient flood detention storage to limit the occurrence of spillage to a frequency of no greater than about once in 10 years over the life of the facility. The spillway will be designed to pass the maximum probable flood and will be a conventional chute type. It will be provided with skimming devices to prevent floating material escaping from the pond during the infrequent occasions of spill.

Site Drainage and Water Treatment

Mount Piper Power Station is being planned to achieve (to the greatest extent practicable) zero discharge of waste water from the power station site.

The site drainage and water treatment facilities have been planned to re-use water and to eliminate all waste water discharges from the project works areas during dry periods and periods of normal rainfall. The waste water systems are to be designed with the objective of discharging contaminated waste water at not more than one in 10 year frequency. These planning principles will minimise demands on the water resources of the area and limit the possibility of contamination of local streams.

The various station water systems are shown schematically on Figure 9. One of the principal water conservation measures is the use of a desalination plant using either reverse osmosis or electro-dialysis to treat the condenser circulating water to remove dissolved salts which would otherwise have to be controlled by blowing down to Neubecks Creek. Other measures to

be taken to conserve water include recirculation and treatment of water used for ash disposal purposes and for washing down purposes. The proposed arrangements of the different systems are described below.

Figure 9 shows nine drains from the power station to Neubecks Creek. The overflow from the cooling water make up reservoir, the clean water drains and the overflows from the two settling basins will all discharge clean water. The spillovers shown on the cooling tower basin, the ash water return tank, the holding basin and the overflow on the wash-down water tank will all only discharge infrequently and as a result of some mal-operation of the waste water systems. The remaining drain, the spillway on the ash disposal reservoir, will discharge only as a result of infrequent floods.

(a) Contaminated Water System

Boiler and fly ash collection plant floor areas will be periodically hosed down and any ash, oil or other material that may be present in the effluent will be conveyed to the ash pits and pumped to the ash disposal area. Experience at other stations where similar facilities have been provided has shown that, when disposed of in this manner, the relatively small quantities of foreign material are retained within the furnace ash and fly ash deposits. As described in the ash disposal system, water reclaimed from the ash disposal area will be neutralised and returned to the ash water return tank at the station for re-use in the ash disposal system.

Neutralised effluents from the demineraliser plant, condensate polishing plant and battery rooms will be pumped to the wash-down water tank via a holding basin as shown on Figure 9.

Boiler blowdown and drainage from workshops, electrical service areas and the induced draft fans area, together with drainage from the turbine house floor area, cable tunnels, transformer areas and lift pits will be directed to the wash-down water tank via an oil/solids/water separator and holding basin. Washdown water will be drawn from the wash-down water tank for re-use in the station.

Oil removed from the oil/solids/water separator will be disposed of by an oil reclamation contractor while solids collected will be disposed of in the ash disposal area.

Rainwater draining from the coal storage area will be intercepted by perimeter drains and discharged to Neubecks Creek via a settling basin. Water will be taken from the basin for truck and bulldozer washing. Drainage from these washing facilities will be returned via an oil/solids/water separator to the settling basin for re-use. Solids collected in the settling basin will be periodically removed and transported to the Neubecks Creek ash disposal area.

Rainwater draining from the contractors' storage area will be discharged via a settling basin to Neubecks Creek. Rainwater draining from the large items assembly area will be discharged via a settling basin to Neubecks Creek.

Rainwater from the fuel oil storage bunded area will be discharged via an oil/solids/water separator to Neubecks Creek.

(b) Sewerage System

Sewage will be treated in a Pasveer waste water treatment system. Treated effluent will be disposed of on a sprinkler irrigation area located within the catchment draining to the Neubecks Creek ash disposal area. Run-off or seepage from the irrigation area will be collected in the ash water return system.

(c) Clean Water Drainage

Rainwater draining from the switchyard, coal storage area clean water drains, roof drainage, and paved and open areas will be directed to Neubecks Creek.

Safety Controls for Hazardous Materials

The power station facilities will incorporate measures as required to safely control use of hazardous materials, including oil, hydrogen, sulphuric acid, ammonia, aqueous hydrazine, caustic soda, and chlorine.

Oil

Oil storage capacity of approximately 4000 kL will be provided in steel tanks at the location shown on Figure 4. Replenishment of the storage will require about 10 tanker trips per week.

The oil storage area will be provided with facilities to trap and retain oil spillages and to control fire. The tanks will be located within concrete bund walls which form basins of capacity in excess of the tank capacity. An oil/solids/water separator for the retention of oil spillage in the unloading area, early warning fire detectors, and fresh water and foam fire fighting systems will also be provided.

Hydrogen

Hydrogen is required for cooling the electrical generators. It will be produced on site in open type electrolytic cells and then compressed for storage. The hydrogen plant will be provided with facilities for the detection of leaks and to control fire. The gas will be stored in a fenced open area.

Chlorine

Chlorine is required for the control of organic fouling in the condenser circulating water system. The normal daily consumption will be approximately 150 kg. It will be stored in liquid form in a locked open area. Instrumentation to detect leakage will be provided. The capacity of the storage is about 14 t.

Sulphuric Acid

Sulphuric acid is used in the water treatment plant serving the boiler feed water system, and for the control of pH in the condenser circulating water system. Consumption of sulphuric acid (98%) is expected to be approximately 1 t per day. The total storage capacity is about 100 t. The storage tanks will be enclosed by concrete bund walls which form basins of capacity greater than the tank capacity.

Caustic Soda

Caustic soda is used in the water treatment plant serving the boiler feedwater system. Approximately 1 t per day of 50% caustic soda solution will be required. The total storage capacity required is 100 t. The storage area will be enclosed by concrete bund walls.

Anhydrous Ammonia

Ammonia is used for feedwater treatment. The normal daily requirement will be approximately 65 kg anhydrous ammonia which will be diluted to a 5% aqueous solution for injection into the feedwater.

Anhydrous ammonia will be stored in a 15 t capacity storage tank while the 5% solution will be stored in a number of stainless steel tanks.

Hydrazine - Aqueous

Hydrazine is used for treatment of the boiler feedwater. It will be supplied as a 35% aqueous solution in drums and diluted to approximately 0.5% for injection into the feedwater. Consumption will be approximately 15 kg per day.

In most cases the above materials are entirely consumed in the processes in which they are used. Where this is not the case the chemicals will be neutralised and the water re-used in the ash disposal or station wash down systems.

The provisions which will be adopted in respect of the safe use and storage of all hazardous materials will be in conformity with the Dangerous Goods Act (1975) and any other relevant acts and codes of practice which relate to the handling and storage of such materials.

Noise Control Measures

Power station noise emissions can be controlled by installing items of plant which have low and favourable noise characteristics. Specifications for plant items to be installed at Mount Piper Power Station will include specific clauses which limit noise emission levels.

Items of plant which are major noise sources, such as feed pumps and blow-down vents, will be housed in sound-proofed enclosures so as to ensure that satisfactory levels are achieved within the station and at the station boundaries.

Predictions have been made of the noise levels produced by the station at various locations around the site and the site boundaries have been determined to ensure that present and future neighbours will not be subjected to excessive noise.

Where the route of the conveyor between the Angus Place mine and the power station passes near to housing development, appropriate measures will be taken to limit noise levels at the boundaries.

Transmission

High voltage transmission lines are required to carry the electrical power from the power station to the load centres and to provide system connections to other power stations. While the necessary outlets can be contained in a single corridor for a distance of 1 to 2 km from the station, thereafter it is necessary (for reasons of reliability) that the lines follow different routes. Loose corridoring with easements more than 1 km apart is acceptable. The proposed layout of the Mount Piper Power Station provides land for the near station corridor.

The existing transmission system (as shown on Figure 10) provides for power generated at Wallerawang Power Station in excess of the electricity requirements of the western area of the State to be transmitted to the major load centres over a double-circuit 330 kV transmission line from Wallerawang to Sydney South Substation. This transmission line will not have the capacity to transmit the output of the new Mount Piper Power Station as well as the output of the second 500 MW unit to be commissioned at Wallerawang in 1980.

An additional transmission line will be required to transmit the power output from the new station and it will be directed towards the load centres to the south of Sydney. The new line is to be connected to the existing 330 kV transmission lines between Yass and Dapto Substations with terminal locations near Marulan as shown on Figure 10.

A double-circuit 330 kV transmission line will also be needed to link Mount Piper and Wallerawang Power Stations. This line will be constructed in advance of the Mount Piper project to form a part of a new radial 330 kV transmission line to the Wellington area.

Other transmission lines proposed in the area are:

- The new radial 330 kV line which will strengthen the State transmission system to Wellington. It will connect at Mount Piper and will supply additional loads in the Central West of the State.

- A new double circuit 500 kV line to interconnect Mount Piper and Bayswater Power Stations. This line is required to transmit the output from Bayswater Units Nos. 3 and 4 to the load centres in the southern part of the State via the new line from Mount Piper to Marulan. The line will initially operate at 330 kV.

Further information regarding the transmission line proposals are given in the Transmission volume accompanying this Statement.

Transportation

The project area adjoins the Mudgee Road and the Main Western Railway passes through Wallerawang approximately 8 km to the south-east.

During 1976 the daily average number of vehicles travelling on this section of the road was 2000 of which approximately 500 were heavy trucks.

Based upon experience at other Commission power stations, it is estimated that there could be up to about 1000 vehicle movements per day associated with construction activities on the Mount Piper site. When the station becomes fully operational, the total number of vehicle movements to and from the station will be approximately 600. It is considered that the existing Mudgee Road will be able to handle the additional traffic load without congestion.

Details of coal truck movements delivering coal from private suppliers to the power station are given in the "Coal Supplies" section of the Supplementary Information volume.

The heaviest loads to be transported to Mount Piper will be the generator inner stators (approximately 300 t), which, together with some other heavy loads, will be transported by rail to the area. Special road transport arrangements will be made to move the heavy loads from rail facilities to the power station site.

Construction Materials

The main materials (in terms of quantity and weight) that will be transported to the site for the construction of the station are cement (60 000 t), sand (120 000 t), concrete aggregates (200 000 t) and structural and reinforcing steel (35 000 t). The sources of these materials and their direction and method of transportation will be decided by the contractors selected to supply them. It may be expected that sand and aggregates would be available from existing plants located near Clarence, Marrangaroo and Bathurst; cement is expected to come from Portland or Kandos; while the bulk of the steelwork is expected to be fabricated in Sydney.

Earthworks

Earthworks for the preparation of the power station site, including the switchyard and coal storage area, are estimated to involve 1.5 million m^3 of earth and rock over an area of approximately 175 ha and involving cuts to a maximum depth of 24 m and fills to a depth of 20 m. Excavated material will be used as fill to the greatest extent possible to meet project design requirements and it is expected that cut and fill operations will largely be in balance.

The power station site is located partly on the site of abandoned open cut and underground coal mines and arrangements are being made for the remainder of the coal which can be won economically to be extracted before site preparation works are carried out in the areas of these deposits. An area in the southern portion of the site near the switchyard is coal bearing and contained in a lease area held by Blue Circle Southern Cement Limited. The Company will extract that coal in advance of the construction of the power station. The small quantities of carbonaceous material to be excavated and placed in fills is of insufficient quantity to be a problem.

Embankments materials required for the construction of the Neubecks Creek ash disposal area and the cooling water make-up reservoir are expected to total about 5 million m^3. Borrow areas required as the source of fill material will be located within the storage area wherever possible. All borrow areas located outside of the storage will be drained, sloped and re-vegetated on completion of the works.

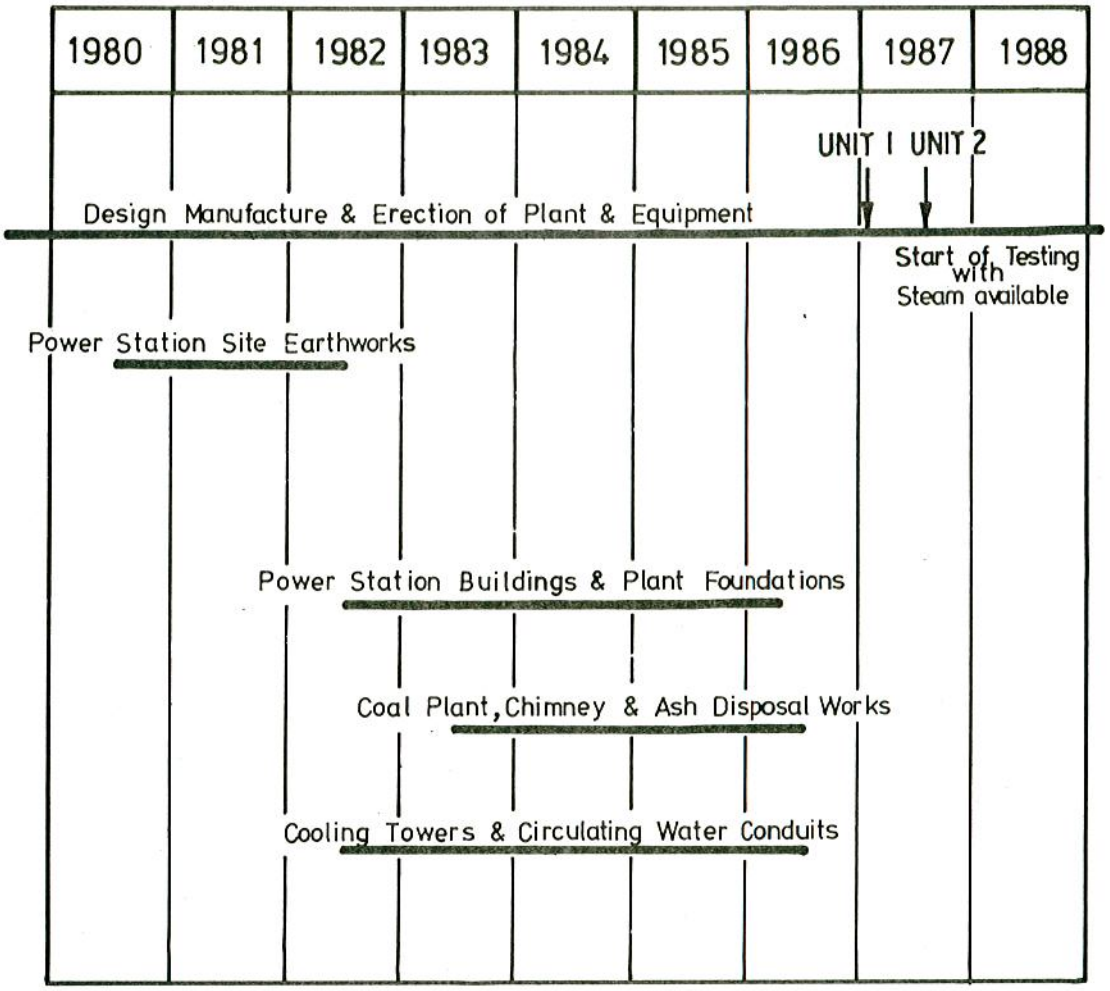
Mobile water tankers will be employed to control dust where required, and settling basins will be provided, where practicable, to minimise contamination of streams by suspended material in runoff from construction areas.

Construction Programme

In accordance with normal Commission practice, almost all of the construction work will be carried out by contract. The construction programme requires the awarding of contracts early in 1980 for the design, manufacture and erection of boilers and turbines. This is necessary to bring the first unit to the stage at which it will be ready for full operational service for 1987.

The broad construction programme is shown below. Other than initial site clearing, the first major work at the site will be earthmoving associated with the site preparation activity commencing early in 1981. The main construction activities away from the power station area will be the coal conveyor construction during 1985, and dam construction from mid 1983 to the end of 1985.

CONSTRUCTION PROGRAMME-UNITS 1&2



Construction Facilities

Temporary facilities required for the construction of a power station include Commission site staff offices, materials testing laboratories, stores, workshops and garage facilities. Offices will be of the pre-fabricated transportable type made largely of metal while the workshops will be of metal frames and galvanised iron sheeting. The buildings will be removed on completion of construction. Space is also required for the contractors' offices and workshops, areas for the storage of equipment, stores and materials and areas for the assembly of large plant and structural items. The location of these areas are shown on Figure 4. The station domestic water supply system and the waste water treatment plant will be constructed at an early date to provide water supply and sewerage facilities during the construction period. Construction electricity supply will probably be provided by means of a new substation located close to the existing 132 kV line which passes to the south of the site.

Employment Opportunity

Site work for Mount Piper will start during 1981 and continue through till 1989. The number of men employed is expected to reach a peak of about 1200 with an average over the construction period of about 500. The Commission's experience with the construction of large works in the Wallerawang area suggests that approximately 40-45% of the construction workforce would be drawn from the surrounding region. It is expected that contractors' "permanent" skilled and semi-skilled staff will be brought to the area from other locations and they mainly will be accommodated in hostels. A number may also be accommodated in commercial caravan parks. Commercial accommodation facilities in the district, including motels and hotels, would be expected to cope with daily peak and itinerant requirements.

The number of permanent employees required for the operation and maintenance of the power station and associated coal mines will be approximately 1200.

It is estimated that while some of the persons employed for the operation of the station will be drawn from the existing local community, the majority will be Commission employees coming from other parts of the State.

The Commission will be co-operating closely with the Council of the City of Greater Lithgow and other Government Departments concerning the steps necessary to provide for the expected growth in population.

Landscaping and Land Use

The site will be landscaped as shown on Figure 11 so as to improve the appearance of the works and to screen (to the greatest extent possible) the station from persons travelling along the Mudgee Road.

Areas of the site not occupied by the station works will be managed to control weeds, other pests and soil erosion.

4 Statement of characteristics and conditions of existing environment

4. STATEMENT OF CHARACTERISTICS AND CONDITION OF EXISTING ENVIRONMENT

The project area is situated wholly within the boundaries of the City of Greater Lithgow and under the provisions of the current Interim Development Order, the area is zoned Non Urban. It is proposed that the project land should be rezoned "Special Industry".

The Community

The closest major population centre in the region is Lithgow (population approximately 13 000 at the 1976 census) located about 18 km to the south-east of the project area, while Bathurst (population 22 000) is located approximately 40 km to the west. Other population centres within reasonable proximity to the power station site are Portland (population approximately 1880) about 4 km to the west, and Wallerawang (population approximately 1650) about 10 km to the south-east. Smaller centres are located at Cullen Bullen (population approximately 230) about 6 km to the north, Lidsdale (population approximately 150) about 6 km to the south-east, with small settlements at Blackmans Flat about 3 km to the east and Angus Place about 7 km to the north-east.

In an area characterised by a mixture of industrial and rural activity, coal mining, power generation and cement production are the important industries, providing employment opportunities for a significant proportion of the population. In recent years the output of the Wallerawang Power Station has more than doubled with the commissioning of a 500 MW generating unit. A further 500 MW unit is now under construction at the station.

Close to the new power station site, Wallerawang and Portland are centres for commercial and community services. The larger and more distant centres at Lithgow and Bathurst supply a full range of commercial and administrative services, employment opportunities and social and educational facilities.

Land and Land Use

The Mount Piper site is located on the upper reaches of Neubecks Creek, a western tributary of the Cox's River. The main station area is located in the valley of the western arm while the ash storage area is in the valley of the northern arm. The main divide which separates the eastern flowing Cox's River from the westward flowing Turon River, is located approximately 1 km to the west of the main station area.

The elevation of the station site ranges from 925 to 960 m above sea level while the hills surrounding the site rise to elevations of about 1000 m at distances approximately 3 km to the north, and 1 km to the south, east and west.

Coal was found under shallow cover around the floor of Neubecks Creek valley and extracted by open-cut methods over 30 years ago. As a result the land is substantially disturbed. Much of the coal under deeper cover has been extracted by underground mining methods but there is some potential for reworking some of these areas by open cut using modern earthmoving equipment. The main station site is located largely in areas which were non-coal bearing or have been previously worked by open cut methods. A portion of the valley floor is presently being used for grazing purposes.

The floor of the valley of the north arm of Neubecks Creek (the proposed ash disposal site) has been cleared for grazing, while the steeper slopes at the sides of the valley remain in a natural bush state. Coal under the higher country surrounding the valley has been extracted by underground workings and there is potential for extracting coal from under the floor of the valley by open cut prior to the construction of the dam.

A generalised land use plan of the district is shown on Figure 12. The residential areas of Lithgow, Portland, Lidsdale and ribbon development along Mudgee Road at Blackmans Flat are surrounded by areas used mainly for mining purposes with some grazing and commercial forestry activities. The existing Wallerawang Power Station is located approximately 7 km to the south east. The Portland cement works are located 4 km to the west.

Operating coal mines close to the site are:

- Ivanhoe Colliery located 1 km to the north-west of the site.
- Wallerawang Colliery located 2 km to the east of the site, north of Mudgee Road.
- Western Main Colliery working areas 0.5 km and 2 km east of the site, south of Mudgee Road.
- Angus Place Colliery located 6 km to the north-east of the site.
- Invincible Colliery - 4 km north west.

Most of the land required for the project is owned by three coal mining companies. The balance is held by the Crown and about 10 to 12 private owners.

The Commission's 132 kV Wallerawang - Beryl transmission line, passes through the project area together with two Hartley County Council feeder lines.

Soils and Geology

The region is located on the western margin of the Permo-Triassic Sydney Basin of east central New South Wales. Where undisturbed by previous mining activities, the Mount Piper site has a thin alluvial cover of sandy clay derived from the Narrabeen Group. Below are the Illawarra coal measures comprising a mixture of interbedded shales, sandstones and coal seams. The coal seams found at the site are the Wolgan (Irondale) (approximately 1 m thick), Lidsdale (approximately 1 m thick) and Lithgow Seams (approximately 2 m thick). The Lithgow seam is the lowest and is the most important commercially. The Shoalhaven Group sediments which underlay the coal consist of Marrangaroo conglomerate and very fine grained sandstone with varying percentages of finely interbedded siltstone.

The Wallerawang Power Station is also located on the Marrangaroo conglomerate. Several small faults, including the Ivanhoe fault, cross the Mount Piper site but these will not create difficulties during power station construction.

Climatic and Flooding Conditions

Climatic data for the area has been recorded at Wallerawang Power Station since 1964. This data has been summarised in Electricity Commission Report No. C.I.54/1 (Reference 2).

Selected information follows:

Rainfall (1965-1977 period)

Average annual	736 mm
Average annual number of rain days	86
Maximum recorded daily rainfall	93 mm (January 1970)

Dry Bulb Temperature (1964-1977 period)

Mean	11.6°C
Maximum	37.2°C (January 1973)
Minimum	-11.6°C (July 1965; August 1968)

Wet Bulb Temperature (1965-1977 period)

Mean	8.8°C

Evaporation (Class A Pan, 1971-1977 period)

Average annual	1261 mm

Wind (recorded 82 m above ground level, 1968-1977 period)

Seasonal and annual wind roses for the above period are given on Figure 13 and the seasonal wind roses are summarised as follows:

Spring	SW16.1% 19% calms	NW16.0%	W15.1%
Summer	NE20.5% 23% calms	E16.5%	N13.7%
Autumn	NW14.7% 31% calms	SW13.4%	W13.0%
Winter	SW20.8% 27% calms	W16.5%	S12.5%

The wind direction is well distributed with a tendency for south-west to north-west to dominate.

The catchment area draining to the power station site is small and flooding will not be a problem.

Aboriginal Relics

Associate Professor R. Wright of the Department of Anthropology, Sydney University, has examined the project area from the archaeological viewpoint.

His report reference is:

Wright R.V.S., 1979 - "Letter to E.C. of N.S.W. dated 28th March, 1979 from Dept. of Anthropology, the University of Sydney".

Associate Professor Wright did not find aboriginal relics or artifacts of archaeological importance in the main station area or the ash disposal area.

Flora and Fauna

The flora of the area under review has been studied by Mr. D. Benson of the Royal Botanic Gardens and National Herbarium, Sydney.

His report references is:

Benson D.H., 1979 - "Vegetation Survey of Proposed Power Station Site - Western Coalfields".

The report indicates that the vegetation in parts of the area has already been grossly disturbed by human activities and that no rare or endangered species are present within the overall area.

Benson suggests the preservation of the vegetation on the escarpment to the south of the power station area and on the rocky outcrops and canyons in the north of the ash disposal area.

The fauna of the area has been studied by the Australian Museum.

The report reference is:

The Australian Museum, 1979 - "Faunal Survey of the Mount Piper Area".

The report indicates that none of the animal species found in the study area are rare or endangered except for two species of birds which were nominated as fairly rare.

Existing Acoustic Environment

The general area in which the Mount Piper Power Station site and conveyor route is located can be described as generally rural in appearance but with significant coal mining developments and traversed by a well trafficked roadway.

In considering the existing acoustic environment of the area likely to be affected by noise from the new power station, the site can be divided as follows:

(i) The main station plant and sections of the coal conveyor from Angus Place will be located in areas which are not subject to noise from existing developments. These areas would fall into category R1 of Australian Standard 1055-1978 "Noise Assessment in Residential Areas". The background noise level for this category at nighttime is 30 dB(A).

(ii) Sections of the coal conveyor from Angus Place will be located near the Mudgee Road and remote from mine developments. These areas would fall into Category R2 of AS 1055-1978. The background noise level for this category at nighttime is 35 dB(A).

(iii) Sections of the coal conveyor from Angus Place will be located near the Mudgee Road and mine developments. These areas would fall into Category R3 of AS 1055-1978 where the background noise level at nighttime is 40 dB(A).

In assessing the acceptability of noise emanating from the Mount Piper Power Station and conveyor it is proposed to adopt the above levels as representative of the existing background levels.

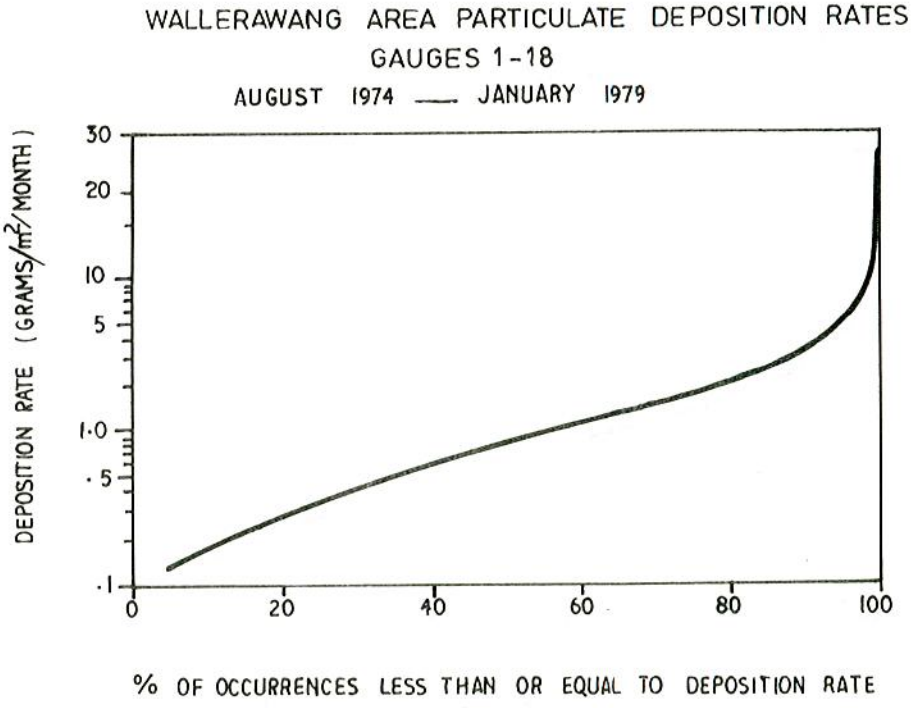
Existing Air Quality

(a) Particulate Deposition

The Electricity Commission operates a network of 18 particulate deposition gauges which are located within an area of approximately 12 km radius of the Wallerawang Power Station. Nine of the gauges were installed in August 1974 and the remaining nine gauges were installed in April 1977. The locations of the gauges are shown on Figure 14.

The contents of the gauges have been collected and analysed and used to estimate deposition rates.

The results are represented below:



The average deposition rate in the area is 1 g/m^2/month and 5% of the recorded deposition rates exceed 5 g/m^2/month.

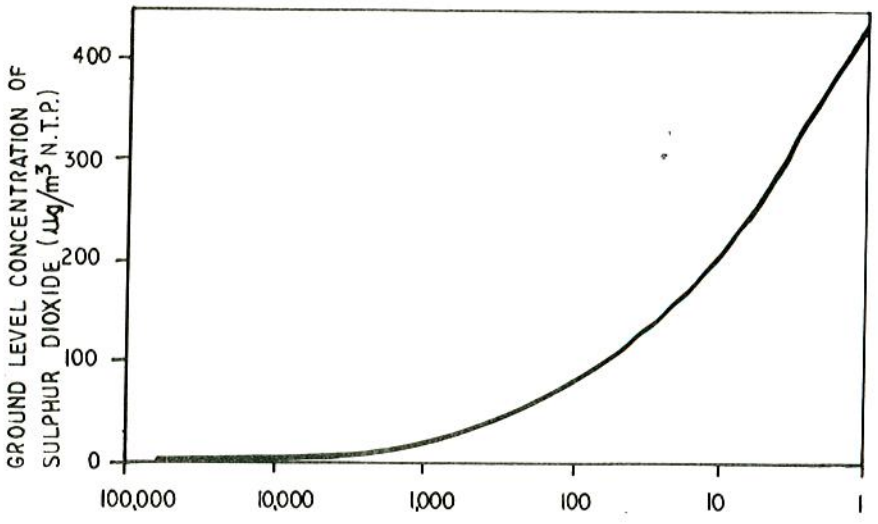
(b) Sulphur Dioxide

The Electricity Commission operates two continuous recording sulphur dioxide monitors in the Wallerawang area. One monitor was installed in 1974 at a location 4 km east of Wallerawang Power Station and the other monitor was installed in 1975 at a location 5 km south of Wallerawang Power Station. The locations of the monitors are shown on Figure 14.

Sulphur dioxide levels recorded by the instruments have been averaged for half-hourly intervals and are represented below:

WALLERAWANG AREA AMBIENT SULPHUR DIOXIDE

MAY 1974 —— MAY 1979



The maximum half-hourly average sulphur dioxide concentration recorded to date is 430 ug/m^3 (N.T.P.). This maximum was recorded at the Lidsdale monitor during a major bushfire in 1979. The maximum recorded half-hourly average sulphur dioxide concentration excluding the bushfire event is 257 ug/m^3 (N.T.P.), and only 44 of 74 000 readings have been greater than 100 ug/m^3 (N.T.P.).

Existing Water Quality

Water quality in the Wallerawang area has been monitored by the Electricity Commission since 1966.

The calculated values of the total soluble salt concentrations in the Upper Cox's River, the Cox's River at Wallerawang dam site and the Cox's River at Lyell's Crossing average 109, 152 and 99 mg/L respectively, with maximum values of 588, 275 and 138 mg/L respectively.

With the exception of the high maximum value of 588 mg/L for the Cox's River where it meets Neubecks Creek, the water qualities all fall into Class 1 "low salinity water" of the classification of irrigation water given in the Australian Water Resources Council Technical Paper No. 7 "A Compilation of Australian Water Criteria (1974)".

The high maximum value for the Cox's River mentioned above occurred in earlier sampling and was attributed to mining activities around the Lower Neubecks Creek at the time. More recent samplings show much lower values, as evidenced by the total average values for the period.

5 Statement of interactions between the project and the environment

5. INTERACTIONS BETWEEN THE PROJECT AND THE ENVIRONMENT

This section of the Statement describes the changes which the construction and operation of the power station may be expected to bring about.

The Community

Construction of Mount Piper Power Station will bring about a significant increase in the number of jobs available in the Lithgow, Wallerawang and Portland area during construction and operation. The 1200 permanent workers required for the operation of the station and associated mines can be expected to increase the population of the local towns by some 3000 persons. The need for extension of the local community facilities to meet the additional demands is recognised and the Commission will be co-operating closely with the local Councils and other Government agencies responsible for the providing of essential services on steps necessary to absorb the growth. The need for additional community facilities is the subject of a study by the Planning and Environment Commission's Advisory Co-ordinating Committee's Sub-Committee on Urban Expansion in the Coal Development Regions of New South Wales.

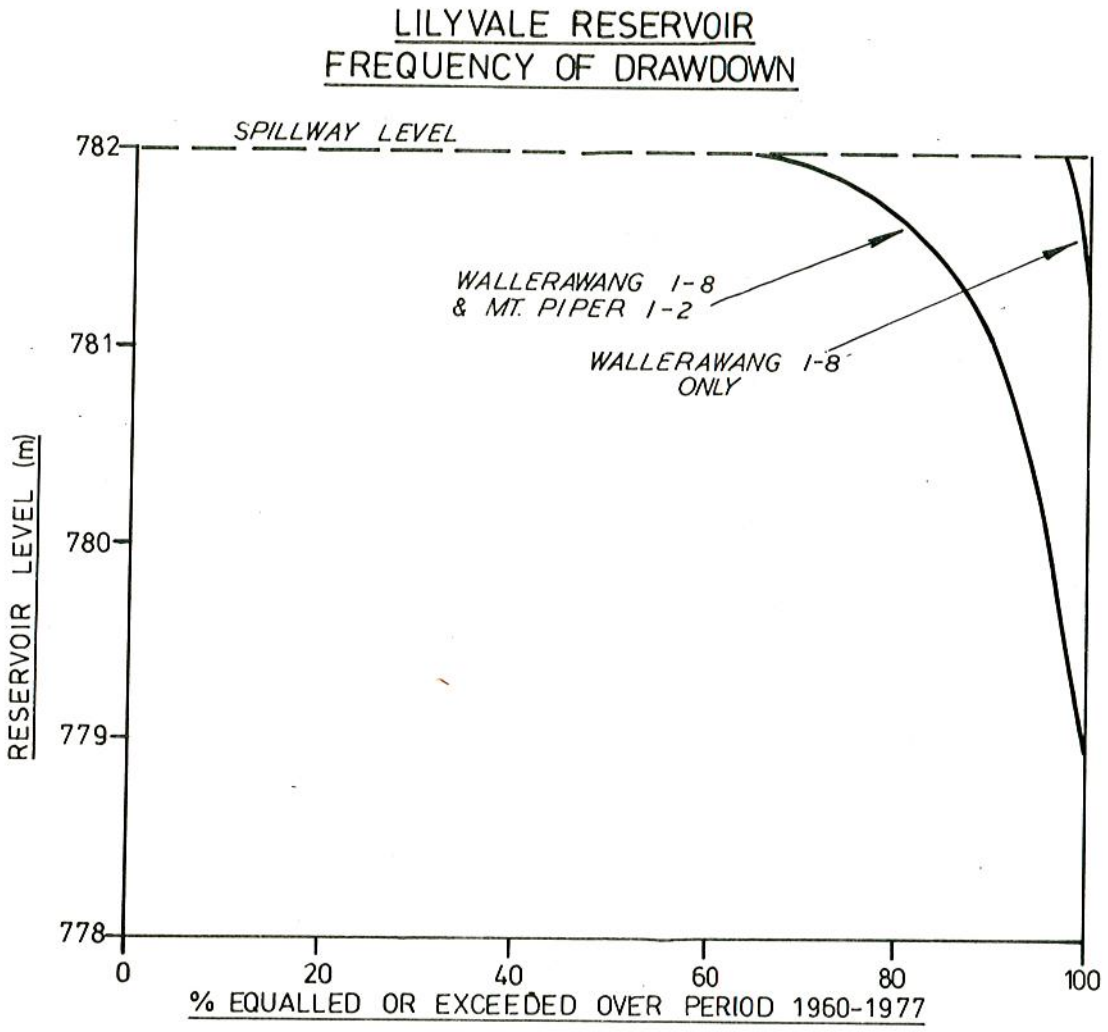
Land and Land Use

Apart from a small farm, the station is situated on the site of previously abandoned underground or open-cut mine workings. The area is historically associated with the coal mining industry and it is considered that the installation of a coal-fired power station is consistent with the previous land use.

Water Resources

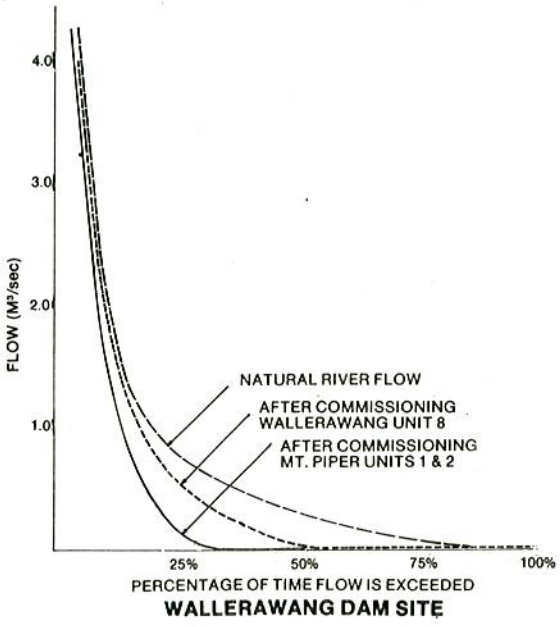
The extraction of water from the Cox's River for Mount Piper Power Station is subject to the issue of Water Licences by the Water Resources Commission under the Water Act.

The environmental impact of constructing Wallerawang and Lilyvale Reservoirs was reviewed in the Environmental Impact Statement prepared in connection with Wallerawang Power Station Unit No. 8. Supply of additional water from these reservoirs to Mount Piper Power Station will increase the incidence of drawdown of Lilyvale Reservoir as shown on the diagram below.

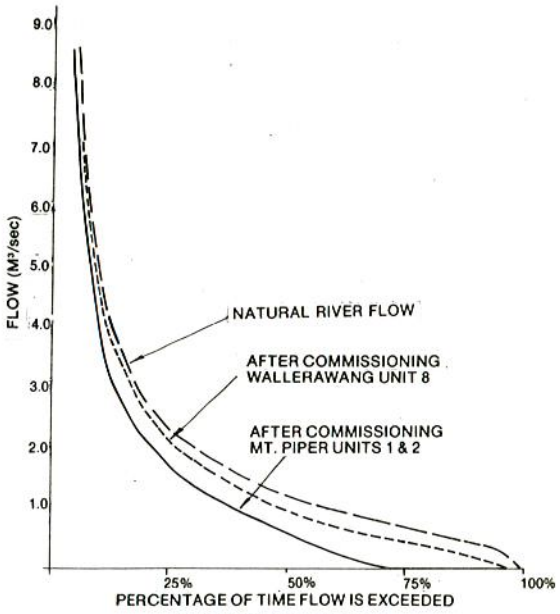


It will be seen from the figure that for the period of records analysed, the effect of Mount Piper Power Station is to increase the predicted duration of drawdown from about 2% of the time to about 38% of the time and that the predicted maximum drawdown is increased from about 0.5 m to 3 m.

The effects of the additional draw on the reservoirs for Mount Piper on flows in the river at locations downstream of the dams are shown on the diagrams below.



WALLERAWANG DAM SITE

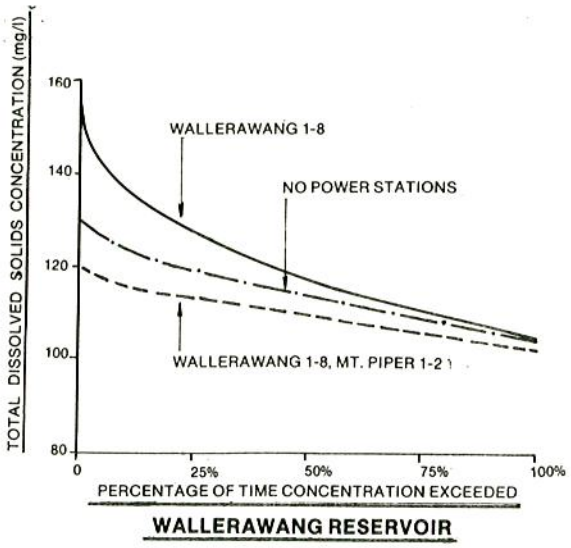


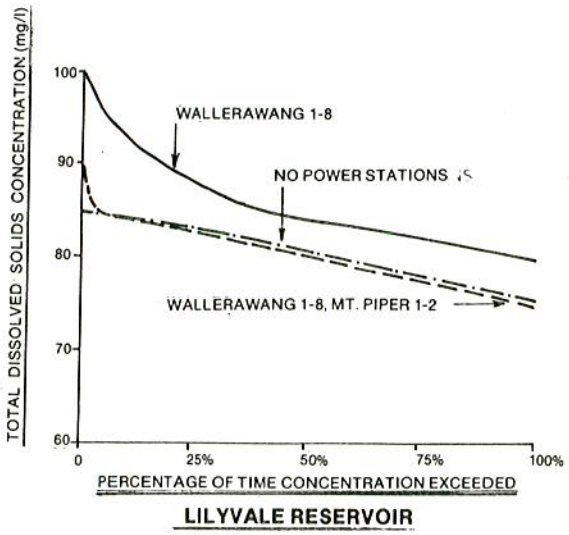
LILYVALE DAM SITE

In carrying out the studies to determine the flow duration diagrams given above, it has been assumed that the Water Licences for the works will require flows of 1.25 ML/day and 2.45 ML/day (for Wallerawang and Lilyvale Reservoirs respectively) or the reservoir inflows, whichever is the least, to be discharged from the reservoirs.

It will be seen from the diagrams that the effects of supply to Mount Piper are to increase the durations of minimum riparian flows downstream of Wallerawang Dam from about 50% to about 70% of the time and to increase the durations for the same conditions downstream of Lilyvale Dam from about 10% to 30% of the time.

The effect of the additional draw for Mount Piper on water quality in both reservoirs is shown on the diagrams below. The quality of the water in the river downstream of the reservoirs can be assumed to be that of the water in the reservoirs.





It will be seen from the figures that the effect of draw for Mount Piper is to significantly improve the quality of the water in Wallerawang Reservoir and to produce a marginal improvement of the water quality in Lilyvale Reservoir. The improvements result from the role of the desalination plant in the Mount Piper cooling water system which effectively withdraws dissolved salts from the river system.

Aboriginal Relics

Development of the site will not destroy any known aboriginal relics.

Flora and Fauna

Development of the site will not destroy important or rare plants or animal habitats.

Care will be taken to cause minimal disturbance to the vegetation on the escarpment to the south of the power station site and to the north of the proposed ash disposal area.

Noise Emissions

The power station site is remote from major residential areas. The site is shielded to the north, west and south by high land and the predicted sound levels generated by the station fall off to negligible values beyond the ridges. To the east of the site, the boundaries will be determined to ensure that the station will not be a nuisance.

Where the conveyor route between the station and Angus Place mine passes residential development, earth mounds or other control measures will be constructed where necessary to ensure that noise from the conveyor will not constitute a nuisance.

Atmospheric Discharges

(a) Gaseous Emissions from the Chimney

Detailed studies have been carried out to assess the average annual ground level concentrations of sulphur dioxide which would be produced when Mount Piper and Wallerawang Power Stations are operated on the following annual capacity factors:

Mount Piper Units 1 and 2	70%
Wallerawang Units 7 and 8	65%
Wallerawang Units 5 and 6	10%

These figures are considered to be high estimates of the future operating mode of the units and accordingly their use in the calculations produce conservatively high estimates of ground level concentrations.

It will be noted that Wallerawang Units Nos. 1 to 4 have not been included in the studies. It is considered that by the time the two 660 MW units at Mount Piper are commissioned and have achieved mature availability, Units Nos. 1 to 4 at Wallerawang will be relegated to a standby role.

The results indicate that, at the point of predicted maximum annual average, the ground level concentration is of the order of 1.2 ug/m^3 N.T.P. and the average value within a 20 km radius of Mount Piper Power Station would be 0.6 ug/m^3 N.T.P. This figure for annual average ground level concentration is far below even the most stringent published standards. For example, the World Health Organisation has set a recommended long-term goal for the annual mean sulphur dioxide concentration at a maximum of 60 ug/m^3 N.T.P. (Reference 3).

Estimates of maximum three-minute concentration of sulphur dioxide have been prepared on the assumption that Mount Piper units and Wallerawang Units Nos. 5 to 8 are operating at their maximum continuous rating. This approach is conservative and leads to conservatively high estimates of ground level concentrations.

The maximum three-minute ground level concentration for Mount Piper Power Station alone is estimated to be 290 ug/m^3 N.T.P. In the case where the wind direction causes Mount Piper emissions to combine with those from Wallerawang, the maximum three-minute concentration is estimated to be 480 ug/m^3 N.T.P.

Measurements of the concentrations of nitrogen oxides and sulphur dioxide in the flue gases at Wallerawang Power Station shows that the concentrations of nitrogen oxides (expressed as ug/m^3 N.T.P. NO_2) are generally 0.85 times that of sulphur dioxide (expressed as ug/m^3 N.T.P. SO_2).

By extending the data given above for sulphur dioxide, it is estimated that the maximum value of the average annual ground level concentration of nitrogen oxides will be about 1.0 ug/m^3 N.T.P. and the average concentration within 20 km of the site will be about 0.5 ug/m^3 N.T.P. These predicted values are low by comparison with the standard of 100 ug/m^3 N.T.P. adopted by the United States Environmental Protection Agency.

Based upon these conservative estimates it is considered that gaseous emissions from Mount Piper Power Station will be environmentally acceptable.

(b) Particulate Emissions from the Chimney

Estimates have been made of particulate deposition rates when the units of Mount Piper and Wallerawang Power Stations are operated at the same capacity factors as were adopted for the SO_2 and NO_x gaseous dispersion studies. The results show a maximum deposition rate of 0.18 g/m^2/month at a location 3 km south-west of Mount Piper Power Station and an annual average deposition rate within about 20 km of the site of approximately 0.05 g/m^2/month.

Measurements taken by the Electricity Commission show that in areas unaffected by power station operations, the naturally occurring deposition rates range from 0.7 to 1.7 g/m^2/month. On this basis, Mount Piper Power Station will not cause any appreciable increase in these background levels.

(c) Coal Dust

The methods adopted to control dust from the coal conveying and storage facilities have been employed successfully at other Commission stations and will ensure that coal dust will not be a nuisance at the Mount Piper site.

(d) Cooling Tower Discharges

Warm, moist air is discharged from the top of the cooling tower. Under most atmospheric conditions the moist air leads to a visible plume of vapour extending from the top of the tower. The effects of the cooling tower discharges are summarised below:

(i) Visible Cooling Tower Water Vapour Plume

It is expected that for 75% of daylight hours the visible plume will be less than 300 m long. Under certain meteorological conditions the plume may extend for longer distances downwind, but at any location further than 900 m from the power station the duration of an overhead plume will be less than 12% of daylight hours. The water vapour plume has no adverse environmental effect other than the visual aspect.

(ii) Fogs and Rainfall

The rate at which water will be lost from each cooling tower by evaporation and drift will average 0.18 m^3/s and the maximum rate will be 0.30 m^3/s.

The plume of warm, moist air leaving the tower has a potential for forming fogs but due to the height of the towers the plume rarely reaches the ground. Extensive overseas experience shows that natural draft cooling towers do not produce fogs.

The heat and water vapour in the plume can create cumulus clouds and there is the possibility that these clouds would trigger existing atmospheric instability and cause rainfall. This condition has been described by overseas investigators as "extremely rare" and it is considered that these apparently "man made" clouds only occur in conditions immediately preceding the formation of natural clouds. (Reference 4).

A small proportion of the cooling tower water (called drift and estimated at approximately 0.005 m^3/s) will be carried from the tower without being evaporated. Studies of drift from natural draft cooling towers in the United Kingdom show the maximum short-term precipitation to be approximately 0.01 mm/h at about 300 m from the tower tailing off to one-tenth of that value at 2 km. These levels are too low to be detected as rain or drizzle and should be compared with an average figure for surface evaporation in the Mount Piper area of about 0.15 mm/h. Overseas studies show that wetting of the

ground is unlikely to occur except when the relative humidity exceeds 98%, and natural precipitation is likely to occur. Measurable changes in rainfall in the vicinity of natural draft cooling towers have not been recorded. (Reference 5).

(iii) Blow-out

High wind velocities can cause "blow-out" of cooling water droplets from the base of cooling towers. This effect is caused by suction arising from the low pressure zone created in the lee of the tower. The effect of blow-out is normally confined to an area extending no more than 50-100 m downwind from the tower. Operating experience in the United Kingdom has shown that difficulties from blow-out occur very infrequently and, in the case of Mount Piper, any affected area will be within the Commission's property.

Water Discharge

The design proposals and water treatment principles described in Section 3 and shown schematically on Figure 9 will ensure that drainage effluents from the station will have negligible effect on the surrounding environment and at the same time provide the greatest possible economy of water usage. Desalination of condenser circulating water and the design of the station with the objective of achieving zero discharge of waste water during normal periods will ensure that there will be no deterioration of the water quality of the Cox's River.

The zero discharge concept will produce only infrequent discharge of waste water from the station. The main source of waste water discharged to the Cox's River will be via the ash pond on Neubecks Creek during exceptionally heavy rainfalls. Under these conditions, the fresh water runoff from the ash dam catchment and from the surface of the ash deposits will form a layer over the top of the more saline liquid normally stored in the ash pond. The flood water will spill over a chute type spillway and this will discharge predominantly the relatively fresh surface water layer.

The ash pond will be designed to store the runoff from the 1 in 10 year storm at the end of its operating life without spilling. (Storage capacity in the earlier years of the facility's life will be appreciably larger.) When discharge from the ash pond does occur as a result of runoff from storms of less frequent occurrence, the runoff from surrounding catchments affords appreciable dilution. For example, the 1 in 20 year 24 hour storm is estimated to produce a runoff volume of 650 ML. On the assumption that it is all spilled and diluted with the runoff which is generated from the Wallerawang Dam catchment for the same storm, the salt concentration of the spilled water is estimated to be diluted 30 times. Concentrations of this magnitude are considered to be of no significance.

The quality of the water in the streams downstream of the ash disposal area will be monitored and should it be found that the storage is causing a deterioration in water quality, appropriate action will be taken to control seepage of water from the reservoir. This will be done by carrying out additional grouting or blanketing to make the storage "water tight" or by collecting and treating seepage and returning it to the ash disposal system.

Visual Impact

The Mount Piper site is located on the upper reaches of Neubecks Creek and is surrounded by hills which effectively shield the works from the major residential areas. Figure 15 shows views of the power station as it will appear after construction, from Portland, Blackmans Flat and Mudgee Road.

The station will be prominent from sections of the Mudgee Road. The view shown is without benefit of the landscaping works and tree plantings shown on the landscaping diagram (Figure 11). These will reduce the visual impact from the road.

The ash dam will be visible from the Mudgee Road. The downstream face will be grassed in a manner similar to that followed at other Commission projects. Figure 16 shows a view of the Liddell ash dam and the proposed Mount Piper ash dam will have a similar appearance. The ash deposits will not be visible from areas frequented by the public and the dam wall will be seen only by travellers on the Mudgee Road over a 2 km long section of the road.

The power station building complex is being designed as a unit with attention being given to visual balance wherever practicable. External wall treatment of individual buildings will be chosen to blend together and with the background.

The boiler and turbine houses will be sheeted with coloured metal sheeting to improve the appearance and to eliminate glare.

All water supply pipelines will be buried while the ash disposal pipelines will be above ground.

The coal conveyor will have a low profile and where appropriate will be screened by embankments and trees.

6 Assessment of environmental impact

6. ASSESSMENT OF ENVIRONMENTAL IMPACT

The two main elements of the Mount Piper Power Station project comprising the power station building complex and the ash disposal area, need to be considered separately from the viewpoint of visual effect. Although the power station buildings will be prominent from the Mudgee Road, it is considered that they will not be out of character with the existing mining and power station developments in the district. The alternative ash disposal storages will not be visible from public areas and the grassing of the ash dam embankment will ensure that the adopted structure will blend with the existing landforms.

Noise will not be a problem at the power station site because of its remoteness from local residential areas, the favourable topography surrounding the site and the extensive buffer zones to be provided. The only noise sources away from the station site are the coal conveyors and special noise abatement works will be carried out where necessary to ensure that noise levels from the conveyor are not a nuisance at residences along its route.

The project will not destroy any rare or endangered species of flora or fauna nor any important archaeological sites.

The facilities which will be provided for power station drainage, including full recirculation of water used for ash disposal purposes and for washdown, and desalination of blowdown from circulating cooling water system will avoid the need for discharges to local streams or the Cox's River except under exceptionally wet conditions. The recirculation arrangements and desalination facility will ensure maximum utilisation of the water resources of the Upper Cox's River.

Discharges to the atmosphere will be controlled within statutory and acceptable limits. Ground level concentrations of sulphur dioxide and oxides of nitrogen will be increased in the area surrounding the site. Analysis on the basis of one chimney 250 m high serving the two units with the station operated at design rating show that even with Wallerawang Station in service, the combined concentration levels will not be environmentally harmful. Atmospheric effects of an intermittent nature such as dust created by the movement of mobile plant and discharges to the atmosphere

from the cooling towers are not considered to be significant factors at this site.

The methods to be adopted at Mount Piper for the disposal of ash will not create environmental hazards.

The programme of landscaping, including tree planting in the area between the Mudgee Road and the station will improve the appearance of the area.

The project will provide new employment opportunities in the district. The numbers of additional transient and permanent employees required for the construction, operation and maintenance of Mount Piper Power Station will place demands on the services available in the local communities. Arrangements will be made for the provision of the required services through the responsible local Council and Statutory Authorities.

It is concluded from this review that the proposal for the construction of Mount Piper Power Station can be undertaken in a manner which is environmentally acceptable.

7 References

7. REFERENCES

1. Electricity Commission of N.S.W. (1979) "Environmental Impact Statement - Bayswater Power Station".

2. Electricity Commission of N.S.W. (1971) "Dataset No. C.I. 54/1 - Wallerawang Area - Climatic Data" (as amended).

3. World Health Organisation : Technical Report No. 506 (1972) "Air Quality Criteria and Guide for Urban Air Pollutants".

4. Spurs G. (1974) "Meteorology and Cooling Tower Operation" Atmospheric Environment 8 : 321 - 324.

5. Martin A. & Barber F.R. (1974) "Measurement of Precipitation Downwind of Cooling Towers" Atmospheric Environment 8 : 373 - 387.

8 Figures

MOUNT PIPER POWER STATION

Site Location

0 1 2 3 4 5

Kilometres

POWER STATIONS

N

To Mudgee

To Newnes

Coxs River

PORTLAND

MOUNT PIPER

Neubecks Creek

Pipers Flat Creek

Wallerawang Power Station
Ash Disposal Area

WALLERAWANG

NEWNES
AFFORESTATION
CAMP

WALLERAWANG

Wallerawang Dam
(Under Construction)

Marangaroo Creek

To Bathurst

GREAT WESTERN HIGHWAY

Coxs River

MAIN WESTERN RAILWAY

LITHGOW

MAIN WESTERN RAILWAY

To Sydney

Farmers Creek

Lilyvale Dam
(Under Construction)

GREAT WESTERN HIGHWAY

To Sydney

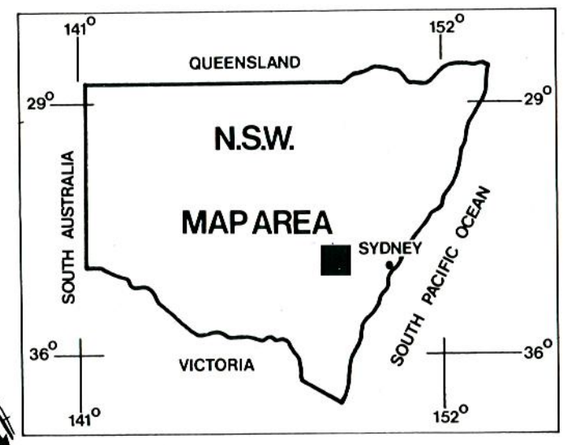


FIGURE 1

MOUNT PIPER POWER STATION

Alternative Sites

0 1 2 3 4

Kilometres

N

To Mudgee

To Newnes

Wolgan River

Cullen Creek

Cullen Creek

CULLEN-BULLEN

Portland Cooling Water Make-up Reservoir

Dulhuntys Creek

PORTLAND SITE

Hunts Creek

Williwa Creek

PORTLAND

Angus Place Cooling Water Make-up Reservoir

Angus Place Ash Disposal Area

Coxs River

ANGUS PLACE SITE

Lambs Creek

Mt. Piper & Portland Ash Disposal Area

Neubecks Creek

MOUNT PIPER SITE

Mt. Piper Cooling Water Make-up Reservoir

BLACKMANS FLAT

Angus Place Colliery

Kangaroo Creek

NEWNES PLATEAU SITE

Newnes Plateau Ash Disposal Area

Newnes Plateau Cooling Water Make-up Reservoir

Carne Creek

WALLERAWANG — GWABEGAR RAILWAY

Pipers Flat Creek

Pipers Flat Creek

Sawyers Swamp Creek

LIDSDALE

Wallerawang East Ash Disposal Area

Wallerawang Power Station Ash Disposal Area

Wallerawang Power Station

WESTERN HIGHWAY

Wallerawang East Cooling Water Make-up Reservoir

Thompsons Creek

Elizabeth Vale Creek

WALLERAWANG

Wallerawang Reservoir

WALLERAWANG EAST SITE

RAILWAY

MAIN

To Bathurst

To GREAT WESTERN HIGHWAY

Marangaroo Creek

To Lithgow

LEGEND

MT. PIPER PROJECT

ALTERNATIVE PROJECTS

FIGURE 2

MOUNT PIPER POWER STATION

Project Works Arrangement

0 1 2 3

Kilometres

N

To Mudgee

Coxs River

Possible Site of New Mine

Newnes

Lambs Creek

ANGUS PLACE

Angus Place Colliery

Kangaroo Creek

Wolgan River

Marangaroo Creek

Possible Site of New Mine

Williwa Creek

Duluntys Creek

Hunts Creek

PORTLAND

Existing Pipeline from Fish River Water Supply

Domestic Water Supply Pipeline

MT. PIPER POWER STATION

Disposal Pipelines

Ash

Neubecks Creek Ash Disposal Area

Coal Conveyor

Neubecks Creek

BLACKMANS FLAT

Cooling Water Make-up Reservoir

Cooling Water

Mudgee Road

Coal Haul Road

Make-up

Coxs

Pipeline

Sawyers Swamp Creek

LIDSDALE

River

Wallerawang Power Station Ash Disposal Area

WALLERAWANG — GWABEGAR RAILWAY

Flat Creek

Pipers Flat Creek

Thompsons Creek

Vale Creek

Elizabeth

WALLERAWANG POWER STATION

WALLERAWANG

Wallerawang Reservoir

To Bathurst

GREAT WESTERN HIGHWAY

To Lithgow

FIGURE 3

MOUNT PIPER POWER STATION

Station Arrangement

0 100 200 300 400 500

Metres

N

To Mudgee

Fly Ash Disposal Pipeline

Furnace Ash Disposal Pipeline

Waste Water Treatment Plant

Neubecks Creek Ash Disposal Area

Ash Water Return Pumping Station

Return Water Pipeline

Ash Conveyor

Coal

Cooling Water Make-up Pipeline

Coal Conveyor

To Lithgow

To Portland

Domestic Water Pipeline

Domestic Water Storage Tanks

Access Road

Settling Basin

Coal Storage Area

Contractors Storage Area

Commission & Contractors Offices & Construction Facilities

Stores

Work Shops

Chimney

Ash Water Return Tank

Large Items Assembly Area

Fly Ash Collection Plant

Boilers 2 1

Coal Bunkers

Auxiliary Turbine Bay

Transformer Yard

House

Cooling Tower

Cooling Water Desalination Plant

Cooling Tower

Construction Water Supply Tank

Switchyard

Transmission line

Cooling Water Make-up Pipeline

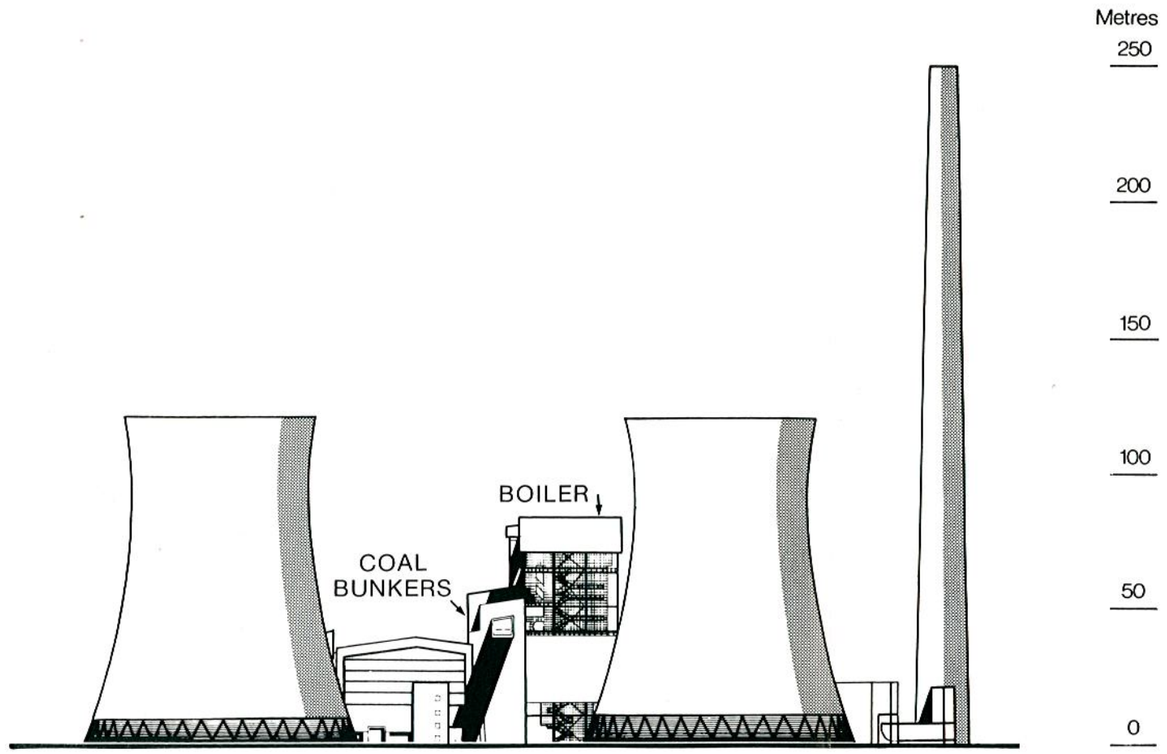
Access Road

Oil Storage Tanks

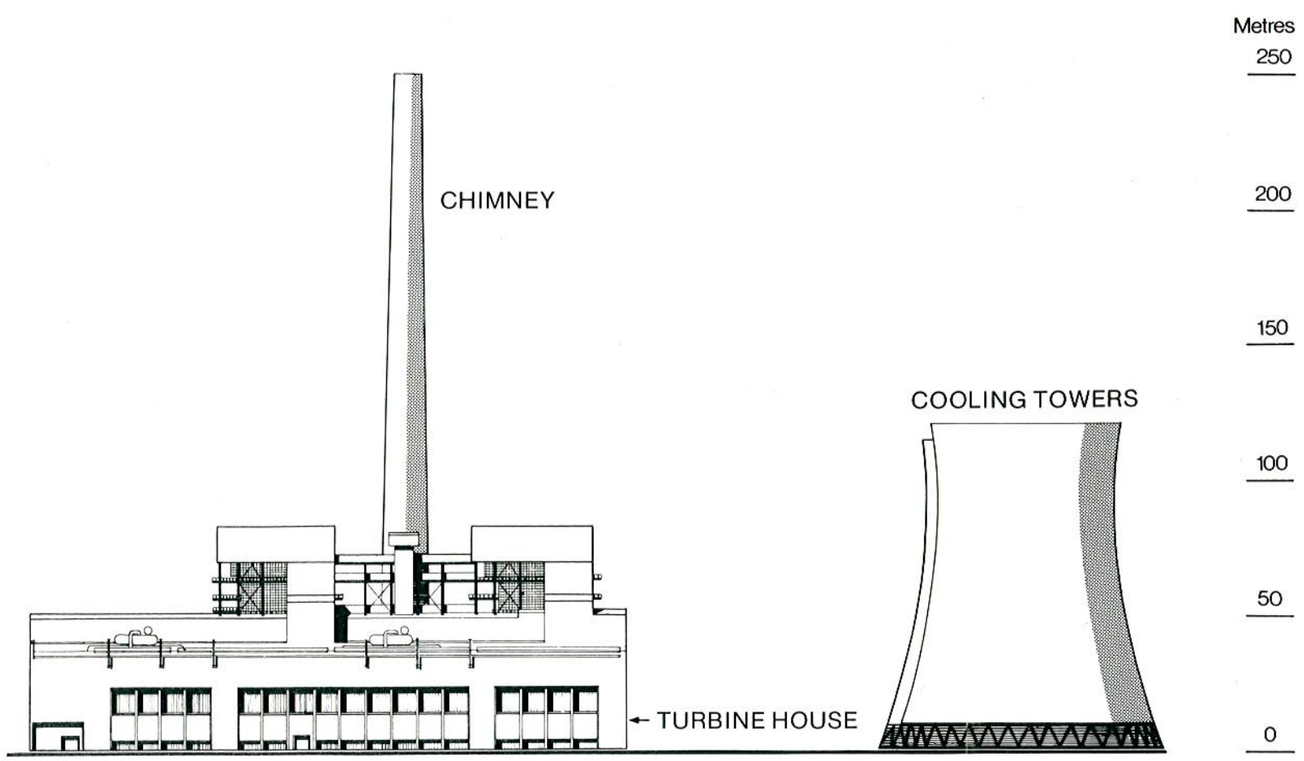
FIGURE 4


MOUNT PIPER POWER STATION
Aerial Presentation of Site
0
250
500
750
1000
Metres
N
Waste Water Treatment Plant
Ash Disposal Area
Access Road
Coal Storage Area
Coal
Mudgee
Conveyor
Road
Contractors Storage Area
Construction Offices
Large Items Assembly Area
Access
Road
Switchyard
Cooling Water Make-up Reservoir

FIGURE 5



END ELEVATION



FRONT ELEVATION

MOUNT PIPER POWER STATION

Typical Station Elevations

0 20 40 60 80 100

Metres

FIGURE 6

Electricity Generation
Functions of Principal Elements

(NOT TO SCALE)

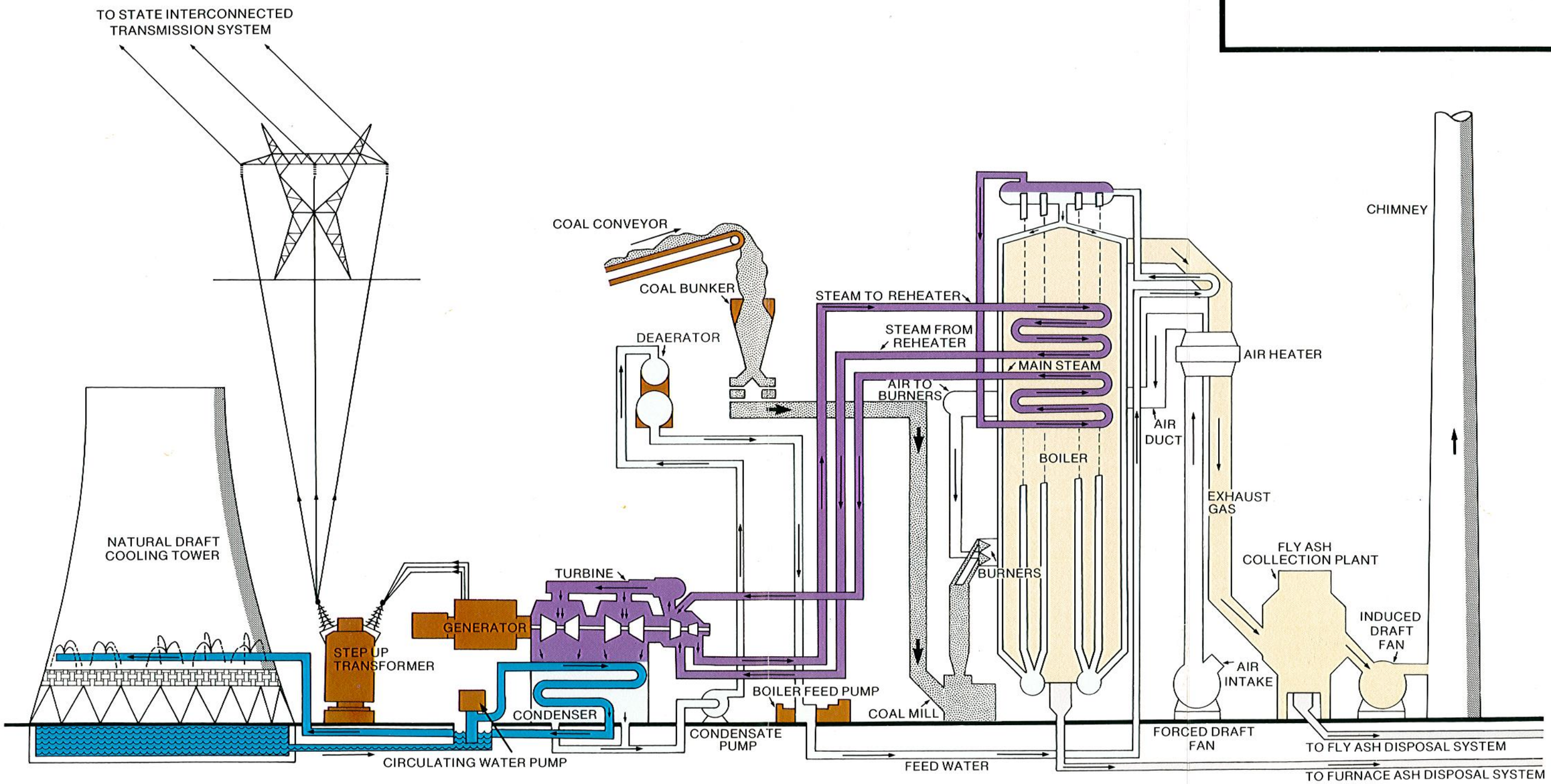


FIGURE 7

MOUNT PIPER POWER STATION

Coal Storage Area
Diagrammatic Arrangement

UPPLY
EYOR

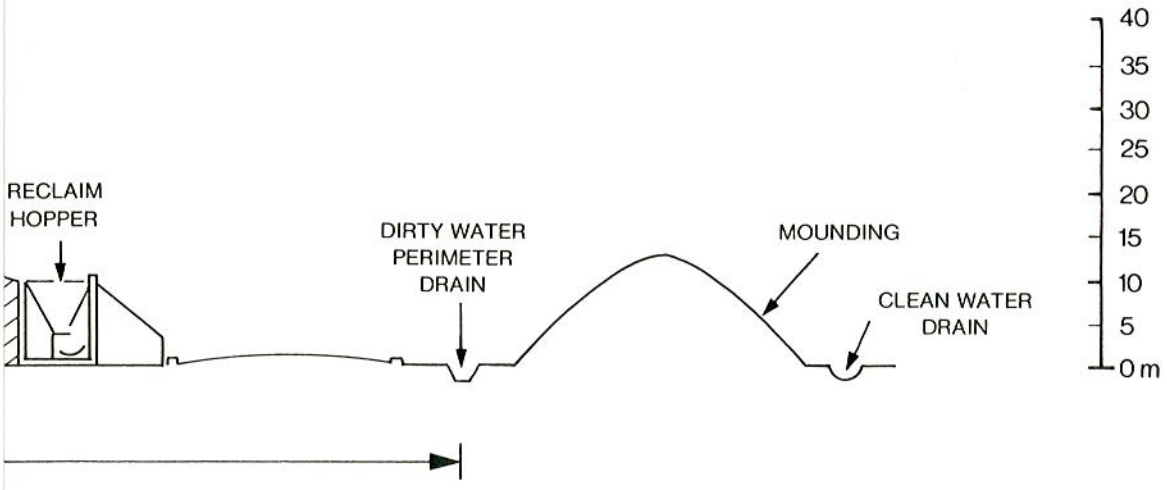
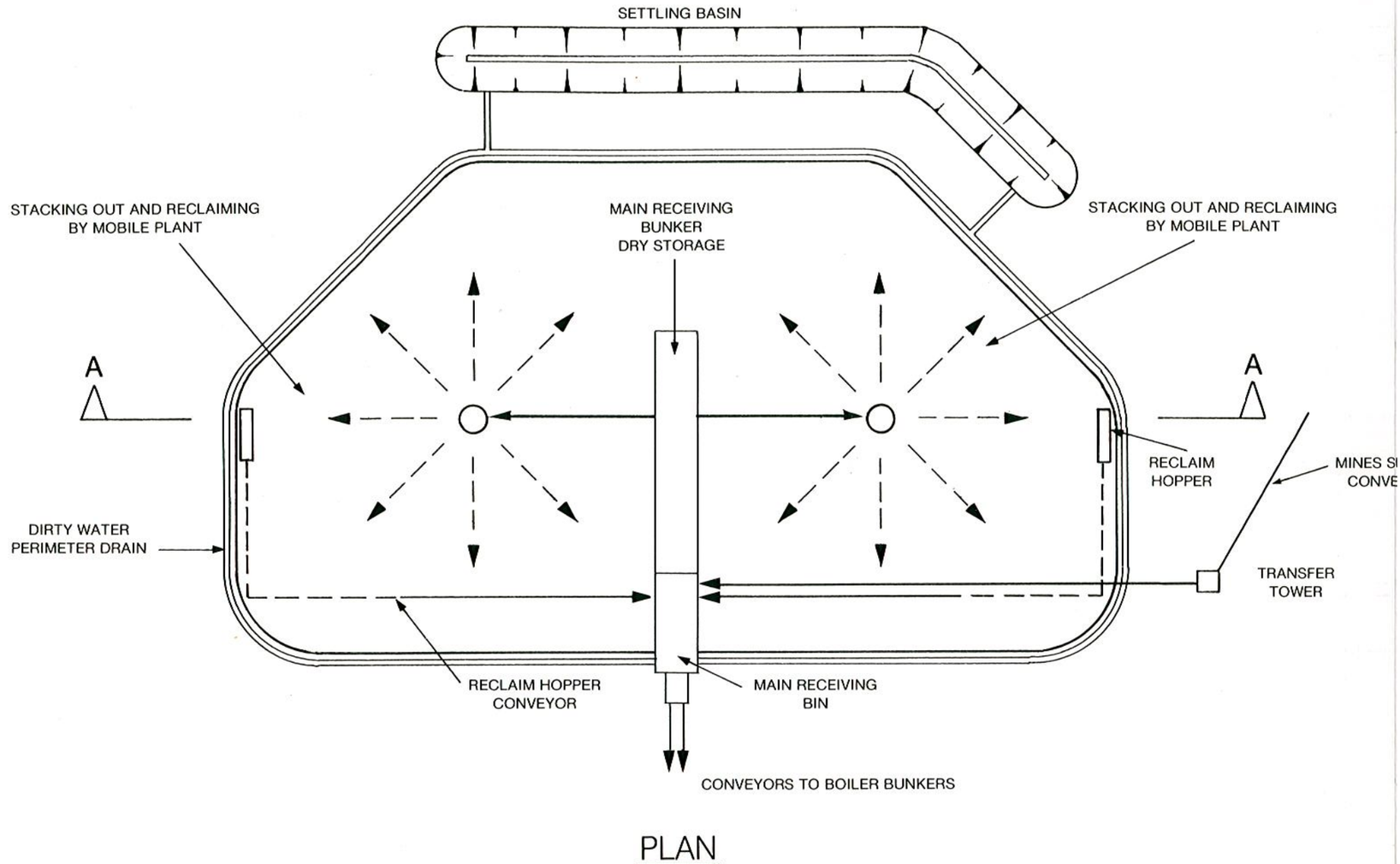
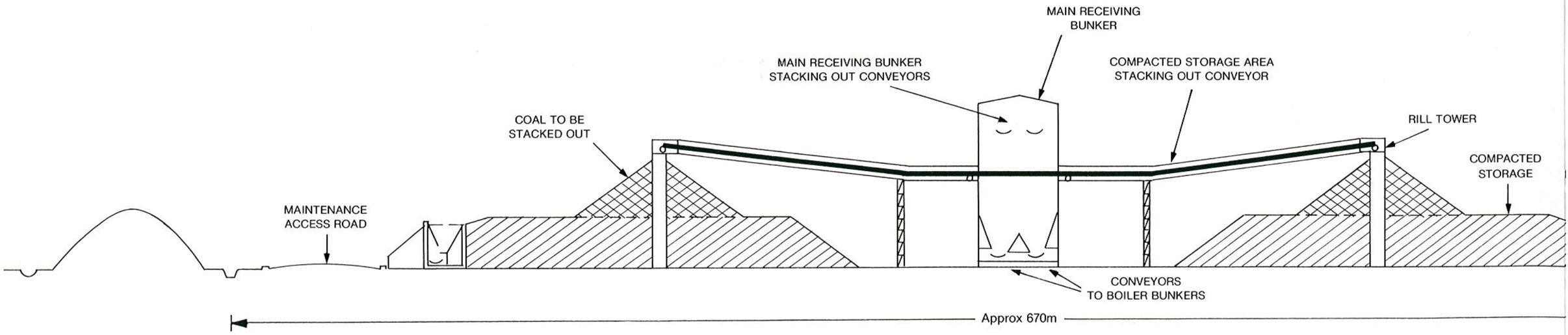


FIGURE 8



PLAN



SECTION A-A

MOUNT PIPER POWER STATION

Water Supply Drainage & Water Treatment Principles

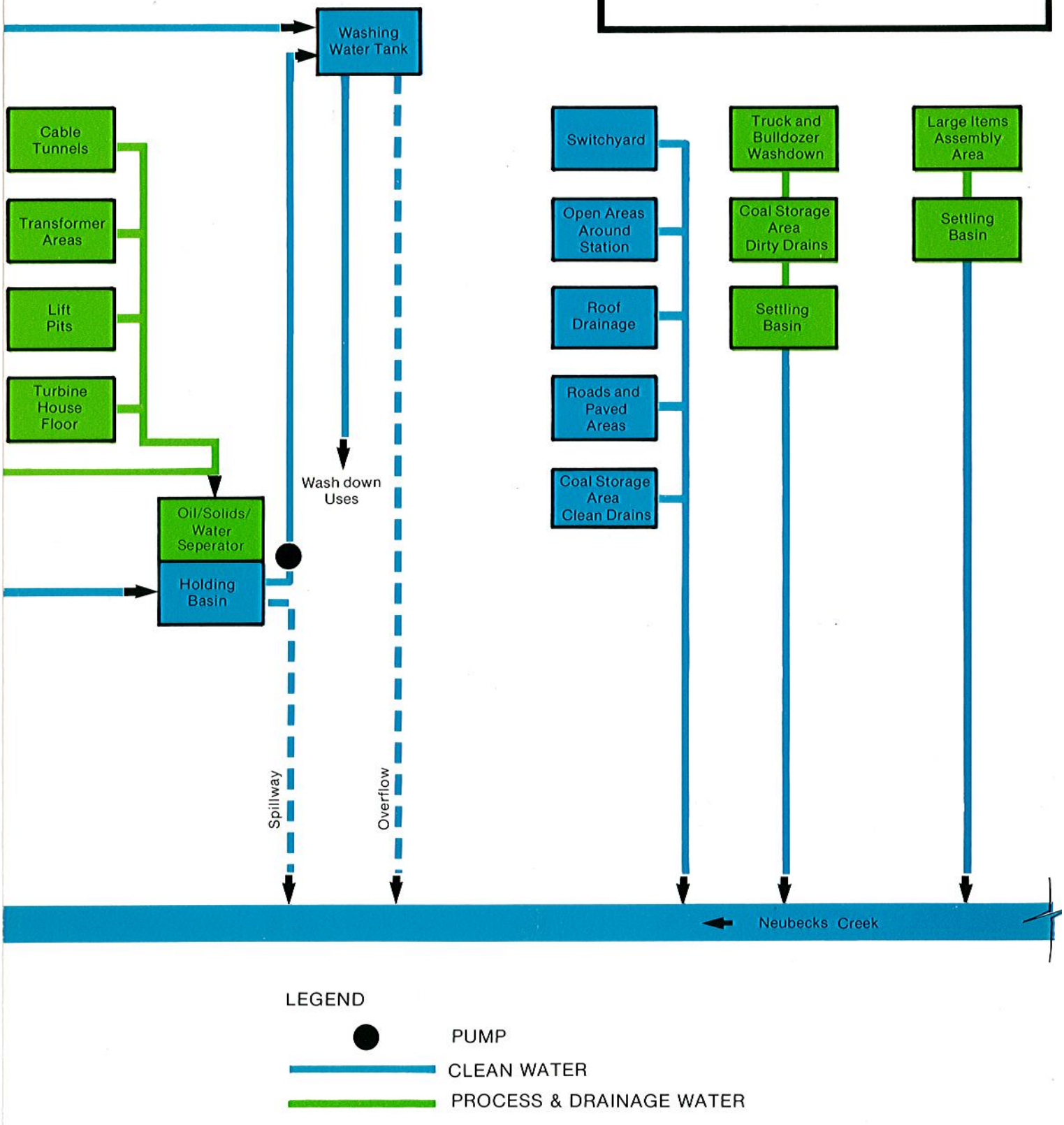
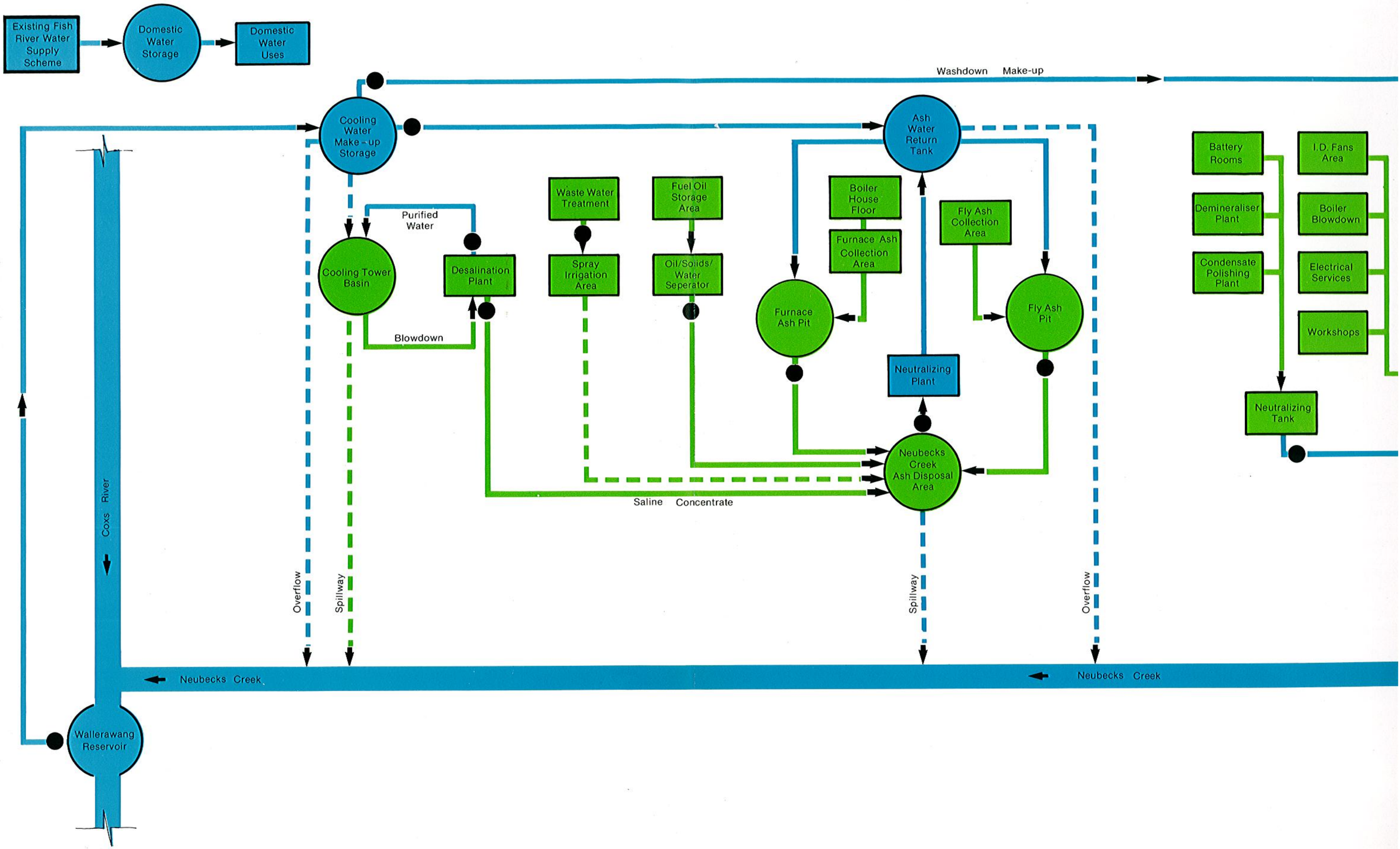


FIGURE 9


Existing Fish River Water Supply Scheme
Domestic Water Storage
Domestic Water Uses
Washdown
Make-up
Cooling Water Make-up Storage
Ash Water Return Tank
Purified Water
Cooling Tower Basin
Desalination Plant
Blowdown
Waste Water Treatment
Spray Irrigation Area
Fuel Oil Storage Area
Oil/Solids/ Water Seperator
Boiler House Floor
Furnace Ash Collection Area
Furnace Ash Pit
Fly Ash Collection Area
Fly Ash Pit
Neutralizing Plant
Neubecks Creek Ash Disposal Area
Saline Concentrate
Battery Rooms
I.D. Fans Area
Demineraliser Plant
Boiler Blowdown
Condensate Polishing Plant
Electrical Services
Workshops
Neutralizing Tank
Coxs River
Overflow
Spillway
Spillway
Overflow
Neubecks Creek
Neubecks Creek
Wallerawang Reservoir

LEGEND

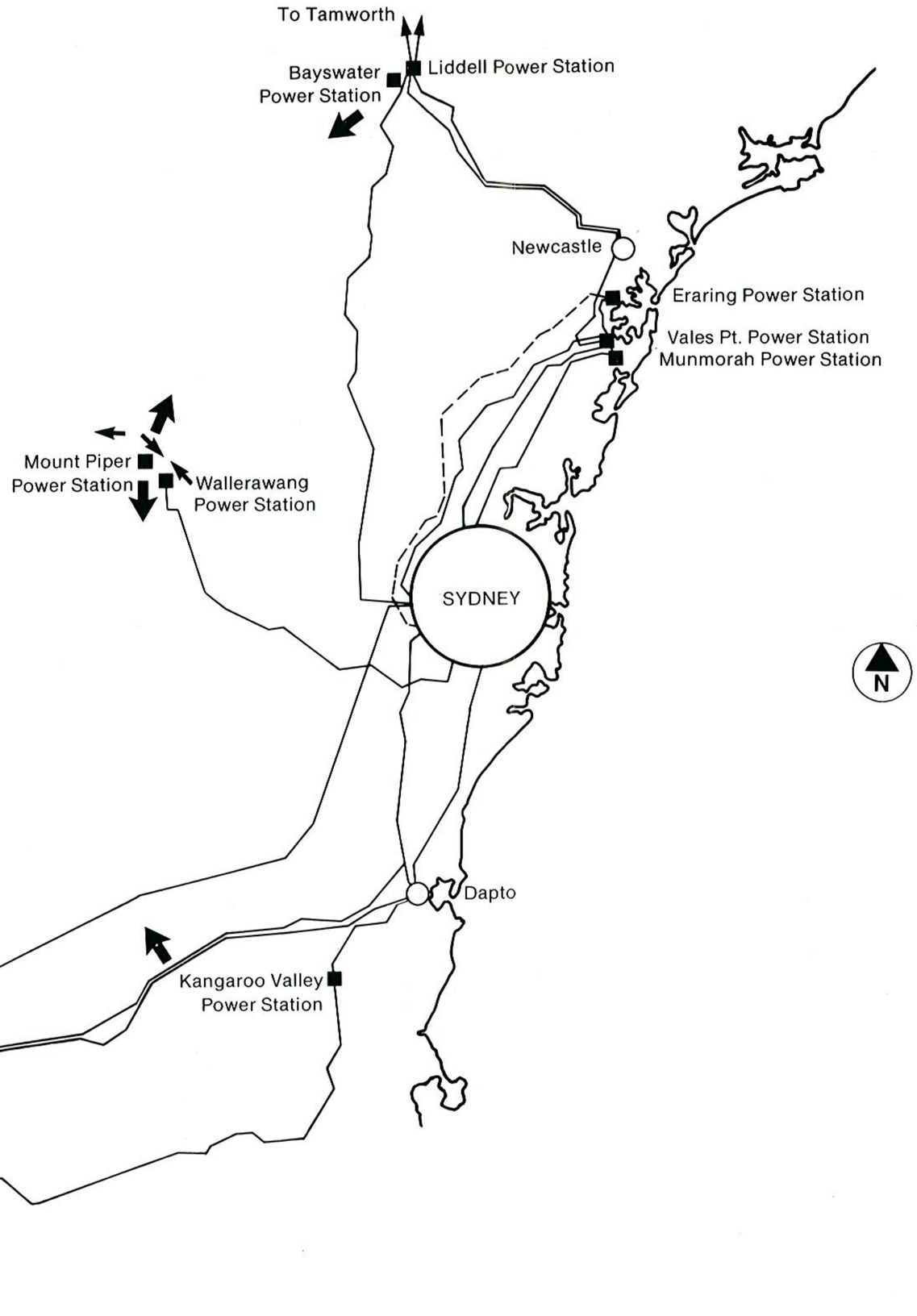
500 kV Transmission Line (Under Construction)

330 kV Transmission Line

Start and Finish of New Transmission Lines

Power Stations

Sub Stations



Main Transmission System

0 15 30 45 60 75

Kilometres

FIGURE 10

MOUNT PIPER POWER STATION

Landscaping Plan

0 100 200 300 400 500

Metres

LEGEND

TREE PLANTINGS

N

To Mudgee

To Portland

To Lithgow

Neubecks Creek
Ash Disposal Area

Coal Storage Area

POWER STATION

Coal Conveyor

1000

950

FIGURE 11

MOUNT PIPER POWER STATION

Land Use

0 1 2 3 4 5 6

Kilometres

N

To Mudgee

To Newnes

Coxs

River

Lambs

Creek

Angus Place

Kangaroo

Creek

Creek

Hunts

Creek

Dulhuntys

WALLERAWANG – GWABEGAR RAILWAY

Wilwa

Creek

PORTLAND

Neubecks

Creek

BLACKMANS FLAT

Coal

Haul

Road

Sawyers

Swamp

Creek

River

LIDSDALE

Coxs

To Bathurst

Creek

Flat

Pipers

Pipers

Flat

Creek

WALLERAWANG – GWABEGAR RAILWAY

Thompsons Creek

Creek

Vale

Elizabeth

WALLERAWANG

MAIN

WESTERN

RAILWAY

Coxs

River

To Bathurst

GREAT WESTERN HIGHWAY

To Lithgow

RAILWAY

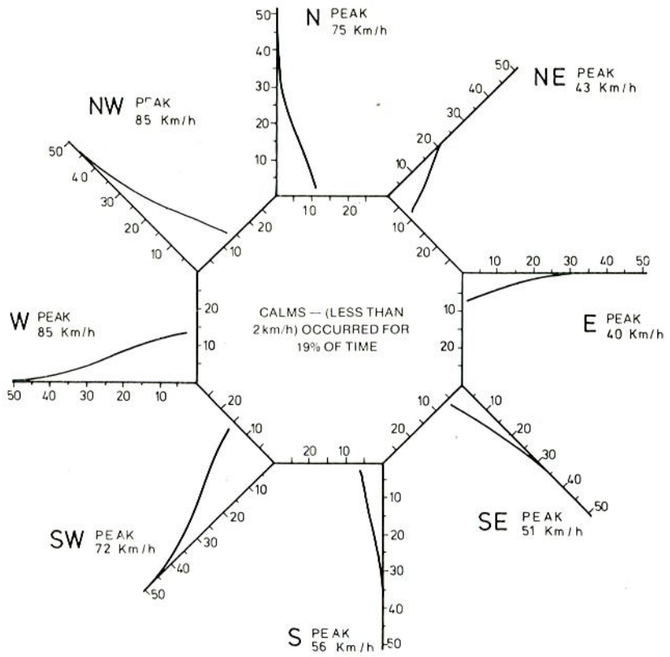
Marangaroo

Creek

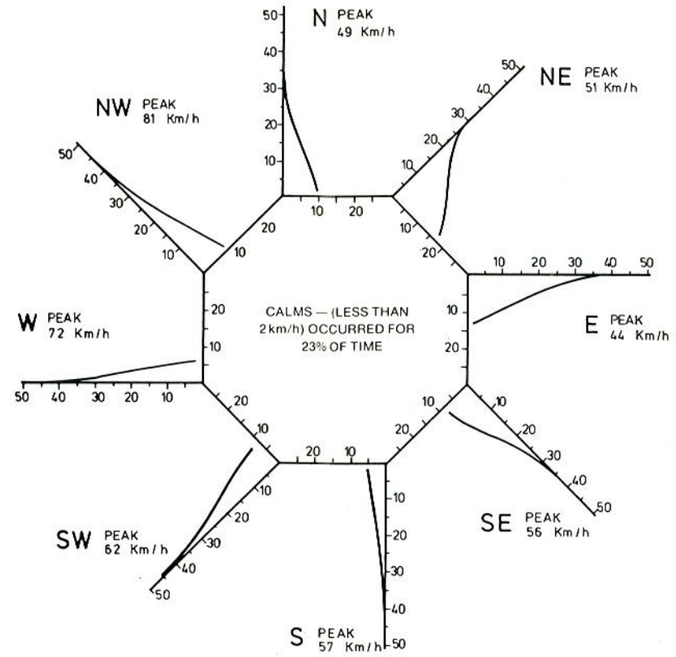
LEGEND

- STATE FORESTS & TIMBER RESERVES
- FARMING & GRAZING
- MINING
- POWER GENERATION
- CEMENT MANUFACTURE
- URBAN — TOWNSHIP
- URBAN — RURAL SETTLEMENT
- COLLIERY

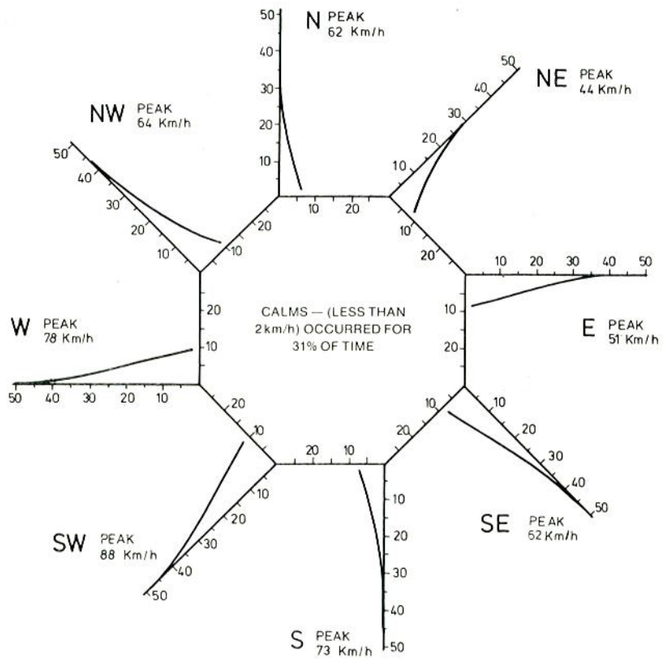
FIGURE 12



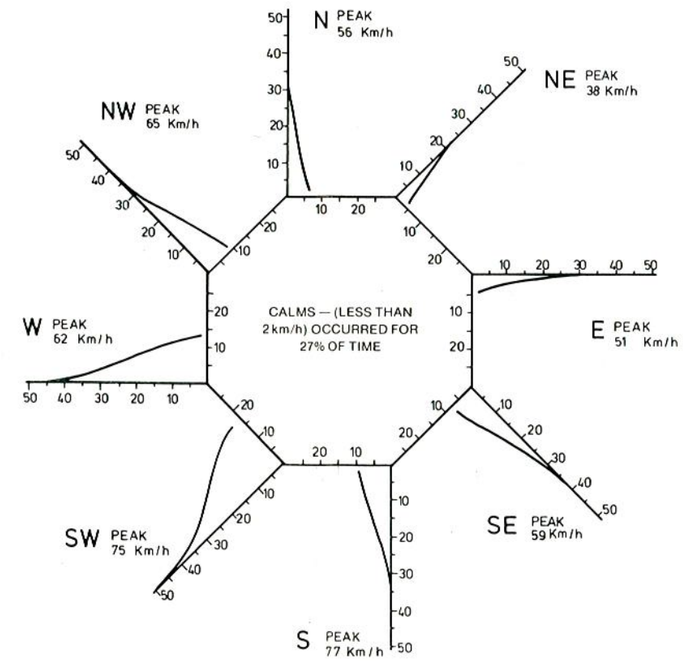
SPRING



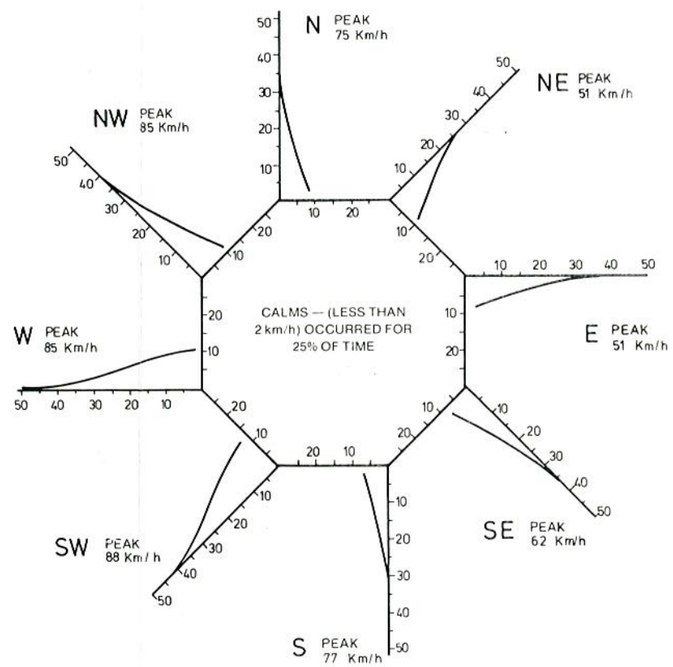
SUMMER



AUTUMN



WINTER



ANNUAL

MOUNT PIPER POWER STATION

Wind Roses

NOTE:

Wind data from anemometer located 82 m above ground level at Wallerawang Power Station. Scale on octagon axes is percentage of time.

FIGURE 13

MOUNT PIPER POWER STATION

Location of Air Quality Monitoring Stations

0 1 2 3 4

Kilometres

N

CULLEN BULLEN

To Mudgee

To Newnes

Wolgan River

Cullen Creek

Dulhunty's Creek

Hunts Creek

Williwa Creek

Coxs River

Lambs Creek

Angus Place Colliery

Kangaroo Creek

Carne Creek

PORTLAND

MT. PIPER POWER STATION

Neubecks Creek

BLACKMANS FLAT

Sawyers Swamp Creek

Wallerawang Power Station Ash Disposal Area

LIDSDALE

WALLERAWANG POWER STATION

WALLERAWANG

Wallerawang Reservoir

MAIN WESTERN RAILWAY

GREAT WESTERN HIGHWAY

To Bathurst

To Lithgow

WALLERAWANG – GWABEGAR RAILWAY

Pipers Flat Creek

Pipers Flat Creek

Thompsons Creek

Elizabeth Vale Creek

Marangaroo Creek

5 km South

1 km South

¾ km South

LEGEND

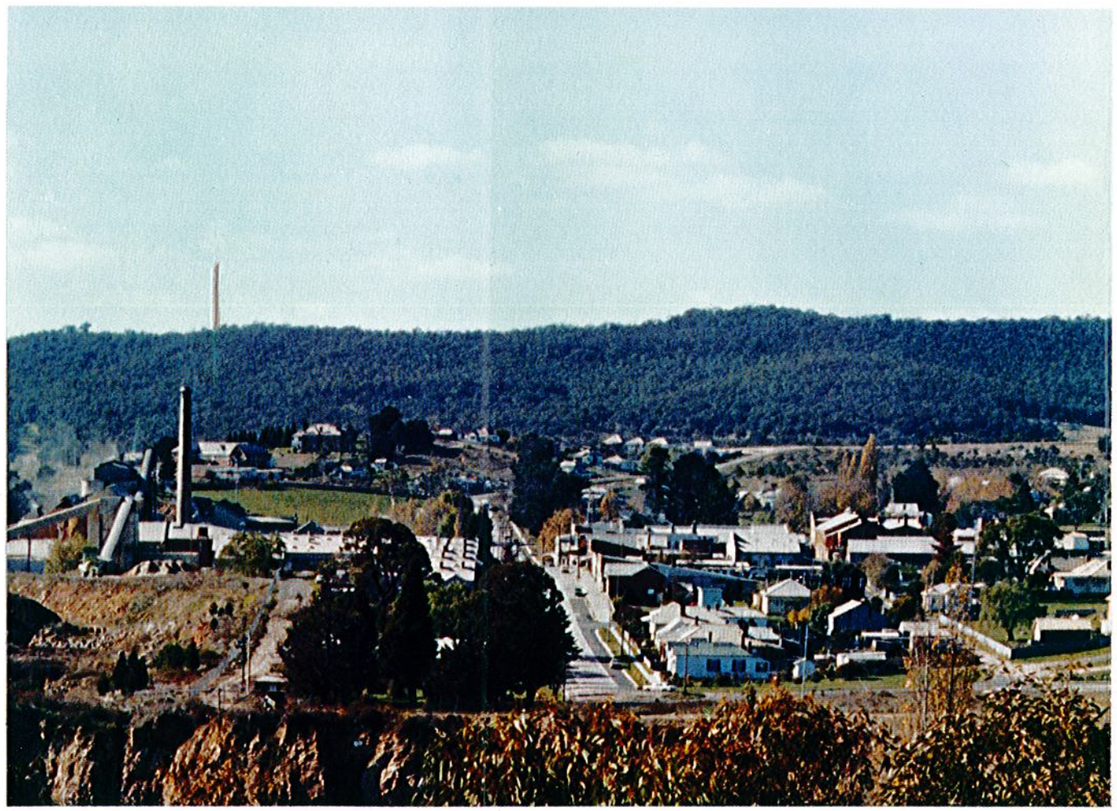
⑧ PARTICULATE DEPOSITION GAUGES

☒ AMBIENT SULPHUR DIOXIDE MONITORS

FIGURE 14



Ⓐ From Mudgee Road at Blackmans Flat



Ⓑ From Portland

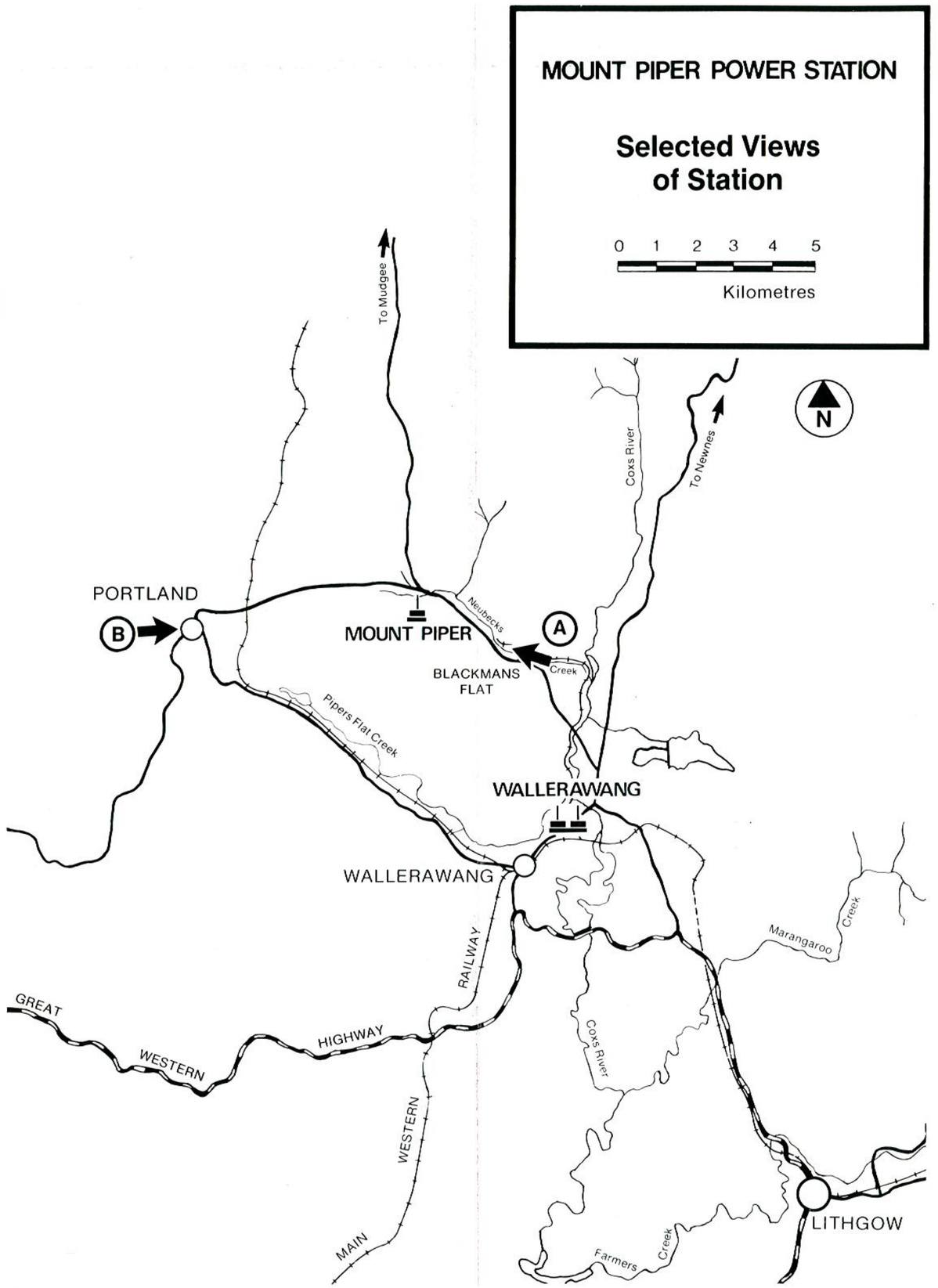


FIGURE 15

View of
Liddell
Ash Dam

FIGURE 16