Ewington Open Cut Coal Mine, Collie

The Griffin Coal Mining Company Pty Ltd

Report and recommendations
of the Environmental Protection Authority

Environmental Protection Authority
Perth, Western Australia
Bulletin 612
March, 1992

THE PURPOSE OF THIS REPORT

This report contains the Environmental Protection Authority's environmental assessment and recommendations to the Minister for the Environment on the environmental acceptability of the proposal.

Immediately following the release of the report there is a 14-day period when anyone may appeal to the Minister against the Environmental Protection Authority's recommendations.

After the appeal period, and determination of any appeals, the Minister consults with the other relevant ministers and agencies and then issues his decision about whether the proposal may or may not proceed. The Minister also announces the legally binding environmental conditions which might apply to any approval.

APPEALS

If you disagree with any of the assessment report recommendations you may appeal in writing to the Minister for the Environment outlining the environmental reasons for your concern and enclosing the appeal fee of $10.

It is important that you clearly indicate the part of the report you disagree with and the reasons for your concern so that the grounds of your appeal can be properly considered by the Minister for the Environment.

ADDRESS

Hon Minister for the Environment
18th Floor, Allendale Square
77 St George's Terrace
PERTH WA 6000

CLOSING DATE

Your appeal (with the $10 fee) must reach the Minister's office no later than 5.00 p.m. on 20 March 1992.

ISSN 1030-0120
ISBN 0 7309 4700 9
Assessment Number 501

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Summary and recommendations

The Environmental Protection Authority has assessed a proposal by The Griffin Coal Mining Company Pty Ltd (the proponent) to develop an open cut coal mine at the Ewington deposit in the Shotts Sub-Basin of the Collie Coal Basin. The Ewington project area is about 1.5 kilometres east of Collie and consists mainly of State Forest managed by the Department of Conservation and Land Management and partly of freehold land owned by the proponent (Figure 1).

The Ewington Coal Mine is a proposed open cut strip mining operation which is on the same large scale as the Muja mining operation. The mining method will follow the practices being used at the Chicken Creek mine near Muja which uses a dragline excavation technique. The open cut will begin at the north-western end of the Ewington project area and progress southwards and eastwards to eventually cover an area of about 4.5 kilometres by up to 2.5 kilometres in width. Backfilling of the pits will occur but one or more final voids of about five hectares would be left at the eastern edge of the mine. The waste dumps would be shaped to form a low ridge trending north-west-south-east, along the western margin closest to Collie, and the rest of the mine area would be left gently undulating. Further details of the proposal are contained in the proponent's Consultative Environmental Review.

The coal mining operations of The Griffin Coal Mining Company Pty Ltd are controlled under the Collie Coal (Griffin) Agreement Act, 1979, and the Mining Act, 1978, which include many conditions that relate to environmental matters. The result of previous and current land use planning studies for the Collie Coal Basin is that the primary land use has been designated as coal mining. However, full account must be taken of the need for coal mining to be compatible with other diverse land uses such as forestry and the conservation of flora and fauna. The Environmental Protection Authority notes that the conservation needs of the area were addressed in the System Six studies and that the Westralia Management Priority Area has been implemented as a conservation reserve.

Major issues raised

The key environmental issues that were identified involved the following:

- protection of rare fauna;
- integrity of the State Forest estate;
- environmental management of the mining operation;
- noise limits;
- dust limit; and
- the mine dewatering operation.

A summary of the Environmental Protection Authority's conclusions and recommendations on each of the key environmental issues is presented below.

Protection of rare fauna

Fauna surveys conducted for the Consultative Environmental Review identified a population of the gazetted rare fauna *Isoodon obesulus* (the Southern Brown Bandicoot), which inhabits the sedge-shrub wetlands of the project area. The sedge-shrub vegetation type comprises about 10% of the project area in linear belts along drainage lines. Much of this vegetation type is within the proposed mine site and would be destroyed if the proposal proceeds. The disturbance of the fauna and the loss and modification of the habitat in the project area would severely impact upon the fauna population and could cause its local extinction.

The Consultative Environmental Review reports that the sedge-shrub wetland vegetation type is poorly represented throughout the rest of the Collie Basin and concludes that it is important that

some areas of this habitat type are set aside for fauna conservation. However, no commitments or suggestions for suitable areas to be conserved have yet been made by the proponent. Rehabilitation of the habitat type following mining would be feasible in the long term.

The Environmental Protection Authority recommends that the proponent be responsible for ensuring the survival of the local population of the rare fauna, the Southern Brown Bandicoot. The Authority recommends that, before the start of the coal mining operation, the proponent prepare an environmental management programme which details strategies for the protection of the rare fauna (Recommendation 2).

Integrity of the State Forest estate

The coal mining operation will destroy about 400 hectares of uncleared State Forest and 475 hectares of partly cleared State Forest and leave one or more final voids of about five hectares, which would not be rehabilitated. Apart from the voids, the proponent is committed to rehabilitate the rest of the State Forest area which is cleared. The broad land use objective currently set by the Department of Conservation and Land Management for the rehabilitation of the State Forest areas after mining is to restore the State Forest values. The Environmental Protection Authority believes that the objective should include the restoration of the ecological function of the forest. The loss of the flora and fauna conservation values of the State Forest which would be mined has been addressed in the previous land use and conservation studies for the region which set coal mining as the priority land use and established the Westralia Management Priority Area as a conservation reserve.

The Environmental Protection Authority recommends that the impact of the mining operation on the State Forest estate should be minimised by careful planning of the mining operation to minimise the amount of clearing and by rehabilitation of the cleared areas to restore the ecological function of the State Forest. State Forest areas which would never be rehabilitated, such as the final void, should be replaced with areas of equivalent conservation value by the proponent. The proponent would be required to detail appropriate management strategies which address these issues as part of an environmental management programme for the mining operation.

Environmental management of the mining operation

The Ewington coal mine proposal would be a major earth moving operation on the scale of the Muja mining operation and would involve large-scale environmental impacts related to forest clearing, dewatering and land reclamation. The environmental management of the mining operation to minimise the adverse environmental impacts and to rehabilitate the project area to acceptable land uses would require an on-going commitment of resources by the proponent.

The rehabilitation of the mine site to an acceptable final land use is an important aspect of the proposal. The proponent stated its objective of implementing a successful rehabilitation programme and has provided some information on the techniques which would be used to achieve the objective. At this stage the final land use of the 875 hectares of State Forest which would be cleared is the existing land use, State Forest. The proponent has committed to preparing a rehabilitation plan as part of an environmental management programme for the mining operation under Clause 7 of the Agreement Act.

The Environmental Protection Authority considers that, because of the size of the proposed mining operation, the Environmental Management Programme should be comprehensive and should particularly address the protection of the rare fauna, noise, dust and risk impacts on surrounding residents, the mine dewatering operation, the integrity of the State Forest estate, dieback disease management and rehabilitation to an acceptable final land use.

The Environmental Protection Authority recommends that the proponent should prepare an Environmental Management Programme which plans for and

monitors the effects of the Ewington coal mining operation and provides management strategies based on the monitoring results (Recommendation 2).

Noise limits

Numerous submissions raised the issue of the disturbance to residents surrounding the mine site by noise and blasting vibration. Noise modelling studies reported in the Consultative Environmental Review concluded that there should be no adverse impacts from noise on the residents in Collie and other surrounding residents. The proponent is committed to implementing noise mitigation measures if adverse impacts are detected.

The Environmental Protection Authority recommends that the following noise limits would be environmentally acceptable at the residences surrounding the mining operation:

- **40dB(A) slow from 10pm to midnight and from midnight to 7am every day;**
- **45dB(A) slow at times other than those times for which alternative noise levels are specified; and**
- **50dB(A) slow from 7am to 7pm Monday to Friday inclusive, but excluding gazetted public holidays.**

Noise emissions from the premises should not exhibit characteristics such as pronounced tonal components, frequency modulation or impulses which would make the emissions more intrusive.

With regard to noise from blasting, the Authority would set levels of 120dB peak linear for 90% of the blasts and a maximum level of 125dB peak linear for any blast at the curtilage (area surrounding the dwelling) of the surrounding residences, from 9am to 5pm Monday to Friday. The proponent does not expect any adverse impacts from blasting because of the distance and the complex geology between the mine site and the nearest residences in Collie.

The proponent would be required to prepare and implement a noise monitoring programme to demonstrate compliance with the noise limits (Recommendation 3).

Dust limit

Numerous submissions raised the issue of dust from the mine site. The proponent is committed to implementing dust suppression measures, a monitoring programme and to rectifying any problems in a timely manner.

The Environmental Protection Authority recommends that the following dust limit would be environmentally acceptable at the residences surrounding the mining operation:

- **Dust from the mining operation should not cause the short term level of dust at surrounding residences to exceed 1000 micrograms/cubic metre (ug/m^3) when continuously sampled over a 15 minute period.**

The Environmental Protection Authority is investigating the use of long term dust limits and, if applicable, limits would be set under the licensing provisions of Part V of the Environmental Protection Act, 1986. The proponent would be required to prepare and implement a dust monitoring programme to demonstrate compliance with these limits (Recommendation 4).

Mine dewatering

The effects of mine dewatering are predicted to cause a slight lowering of the water level of near surface aquifers and a larger lowering of the deeper aquifers, particularly to the south and east of the mine. Drawdown of the deeper aquifers may affect Shotts borefield. The impacts of mine dewatering relate to the possible effects on existing groundwater users, both private and the State Electricity Commission of WA, and to the disposal of the water.

The Environmental Protection Authority recommends that the proponent should maintain the domestic and stock water supplies of the existing private groundwater users on surrounding properties which are affected by the dewatering operation. The Water Authority has advised that, if necessary, it would possibly set up an advisory committee to attempt to resolve any disputes between the private groundwater users in the area and the proponent. The proponent has previously assisted other water users in the Collie Basin area who have been affected by coal mining.

Under the Agreement Act, the proponent is not responsible for rectifying the impact of the dewatering operation on the State Electricity Commission's borefield at Shotts. However, the Environmental Protection Authority considers that the proponent has a responsibility. On the advice of Government agencies responsible for the groundwater resources of the region, the Authority recommends that the proponent comply with a water management plan prepared by the Water Authority of WA which would deal with the water supplies for the existing and proposed power stations and the disposal of water.

The disposal of the water produced by the dewatering involves several options, including providing it to the power stations and disposing of it into the river. Government agencies are proposing to develop a regional water management plan for the water resources of the region. The Environmental Protection Authority, on advice of these agencies, recommends that the proponent's plans for disposing of the water produced from the dewatering operation should be integrated with the water management plan for the region.

The effect of the dewatering of the existing mining operations on the State Forest areas surrounding those mining operations has not been observed to be significant. The Authority concludes that a significant effect should not occur on the State Forest areas surrounding the Ewington coal deposit.

The Environmental Protection Authority recommends that managing the disposal of the water and the impact of the mine dewatering operation on the groundwater resources of the area, particularly on the users of the resource, is the responsibility of the proponent (Recommendation 5).

Environmental acceptability of proposal

The Environmental Protection Authority's main conclusion is that the proposal is environmentally acceptable.

Recommendation 1

The Environmental Protection Authority concludes that the proposal to mine coal at the Ewington coal deposit near Collie, as described in the proponent's Consultative Environmental Review and Response to Issues (Appendix 2), is environmentally acceptable. In reaching this conclusion, the Environmental Protection Authority identified the main factors requiring detailed consideration as:

- **protection of rare fauna;**
- **integrity of the State Forest estate;**
- **environmental management of the mining operation;**

- noise limits;
- dust limit; and
- the mine dewatering operation.

The Environmental Protection Authority considers that these and other issues can be addressed by either the Recommendations in this report or the proponent's environmental management commitments (Appendix 1).

Recommendation 2

The Environmental Protection Authority recommends that, before the start of each phase of the mining operation, the proponent should prepare and subsequently implement an Environmental Management Programme to plan for and monitor the effects of that phase of the mining operation and provide appropriate management strategies based on the monitoring results. The Programme should address, but not necessarily be limited to, the management, monitoring, auditing and reporting requirements of the following issues:

- protection of the rare fauna, the Southern Brown Bandicoot;
- noise, dust and risk impacts on the surrounding residents;
- impact on the conservation values and area of the State Forest;
- dieback disease management;
- mine dewatering operation; and
- rehabilitation to an acceptable final land use.

The Environmental Management Programme should be prepared to the satisfaction of the Environmental Protection Authority.

Recommendation 3

The Environmental Protection Authority recommends that the proponent should ensure that the noise emissions from the project do not cause or contribute to noise levels in excess of:

- 40dB(A) slow from 10pm to midnight and from midnight to 7am every day;
- 45dB(A) slow at times other than those times for which alternative noise levels are specified; and
- 50dB(A) slow from 7am to 7pm Monday to Friday inclusive, but excluding gazetted public holidays.

Noise emissions from the premises shall be such that they do not exhibit characteristics that would make the emissions more intrusive than they would be in the absence of these characteristics. The proponent shall conduct noise surveys to demonstrate compliance with these limits to the satisfaction of the Environmental Protection Authority.

Recommendation 4

The Environmental Protection Authority recommends that long term dust levels be determined under Part V of the Environmental Protection Act but that the proponent should ensure that surrounding residences should not be exposed to

short term dust levels from the mining operation exceeding 1000 micrograms per cubic metre (ug/m^3) when measured continuously over 15 minutes.

Recommendation 5

The Environmental Protection Authority recommends that, before the start of the mine dewatering operation, the proponent should prepare and subsequently implement a water supply plan, as part of an Environmental Management Programme, which describes measures to maintain the water supplies of any existing private user of the groundwater resource which is being affected by the dewatering operation, to the satisfaction of the Environmental Protection Authority on the advice of the Water Authority of WA.

Recommendation 6

The Environmental Protection Authority also recommends that the proponent should utilise and/or dispose of any water occurring in or collecting on the Mining Lease (including water pumped or drawn from mines) in accordance with a water management plan, which will deal with the supply of water to power stations and other utilities and the disposal of water in an acceptable manner, to the satisfaction of the Ministers for the Environment and Water Resources.

1. Introduction

The Environmental Protection Authority has assessed a proposal by The Griffin Coal Mining Company Pty Ltd (the proponent) to develop an open cut coal mine at the Ewington Deposit in the Shotts Sub-Basin of the Collie Coal Basin (Figure 1). The need for the proposal was justified by the proponent as either the potential supply of coal to the proposed new private power station near Collie or for other industrial customers. The proponent has not been awarded a contract for the supply of coal to the power station, however, it has indicated that the development of the Ewington coal deposit would occur in response to demand, whether such demand is created by further contracts by the proposed baseload power station, an industry specific power station or by an industry requiring coal as a raw material. The proponent would like to reach a stage of approval for the proposal such that it is able to develop the deposit as the circumstances demand.

The proponent's Consultative Environmental Review was available for a four-week public review period finishing on 27 September 1991. A total of seven submissions were received which raised a number of issues and these were copied or summarised and submitted to the proponent for a response. The proponent provided a Response to Issues (Appendix 2) which provided more information on the proposal and, where necessary, made further environmental management commitments to address the issues raised. A list of submittors is in Appendix 3.

The operations of The Griffin Coal Mining Company Pty Ltd are controlled under the Collie Coal (Griffin) Agreement Act, 1979, and the Mining Act, 1978. The Ewington proposal would be incorporated under the Agreement Act with all its conditions, which include many that relate to environmental matters.

The result of previous and current land use planning studies for the Collie Coal Basin is that the primary land use has been designated as coal mining. However, full account must be taken of the need for coal mining to be compatible with other diverse land uses such as forestry and the conservation of flora and fauna. The Environmental Protection Authority notes that the conservation needs of the area were addressed in the System Six studies and that the Westralia Management Priority Area has been implemented as a conservation reserve.

2. The proposal and the existing environment

The Ewington Coal Mine is a proposed open cut coal mining operation which is on the same large scale as the Muja mining operation. The mining method would follow the practices being employed at the Chicken Creek open cut operation near Muja in the Collie Coal Basin (Figure 1). This involves an open cut, strip mining operation using a dragline.

The Collie Basin is a depression within the Archaean basement containing Permian coal-bearing sediments. The Basin covers an area of approximately 274km^2 and supports a variety of land uses other than coal mining, such as agriculture, hardwood milling, pine plantations, wildflower harvesting, seed collection, apiculture, power production, tourism, quarrying and recreation.

The Ewington project area, including infrastructure corridors, which would be disturbed by the mining operation occupies an area of approximately 1003ha. This consists of 400ha of uncleared State Forest, 475ha of partly cleared State Forest and most of the rest is owned freehold by the proponent. The freehold land is generally farmland which is cleared and used for grazing.

The open cut would commence at the northwestern end of the Ewington project area and progress southwards and eastwards to eventually cover an area of about 4.5km by up to 2.5km in width. Backfilling of the pits would occur but one or more final voids of 5ha would be left at the eastern edge of the mine. The waste dumps would be shaped to form a low ridge up to 20m above current topography trending northwest-southeast along the western margin closest to Collie and the rest of the mine area would be left gently undulating.

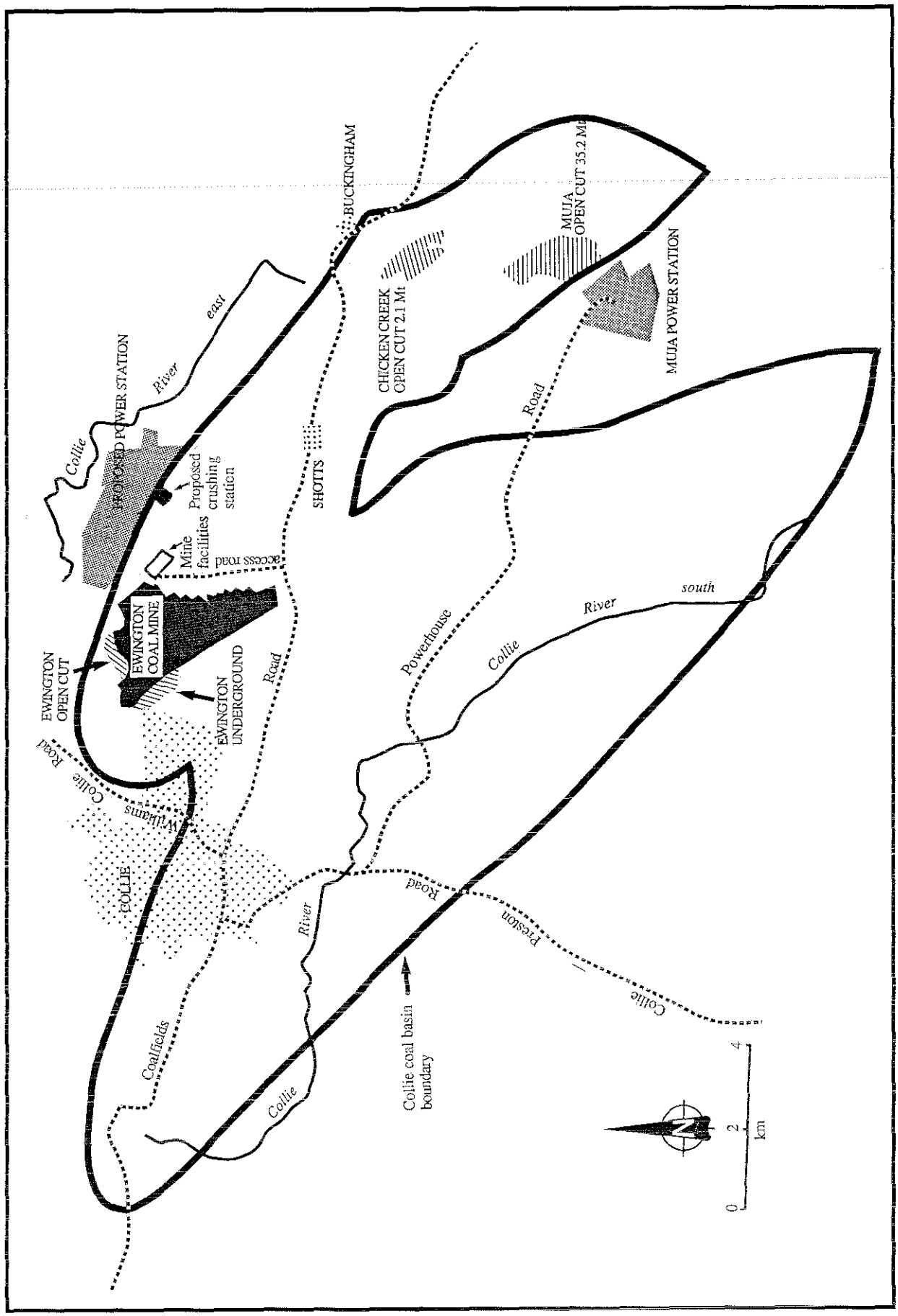

Figure 1: Location of the Ewington Coal Mine, Collie Basin

A mine facilities area of 22ha is planned for the eastern side of the open cut mine and infrastructure corridors for roads and services surround the open cut. With the failure to secure a contract to supply coal to the new power station, the location of a crusher facility is yet to be determined.

A further description of the proposal and the existing environment of the Ewington project area is contained in the proponent's Consultative Environmental Review.

3. Environmental impacts and management

The environmental issues raised in the Environmental Protection Authority's assessment of the proponent's Consultative Environmental Review on the Ewington coal mine proposal and in submissions on the proposal are discussed below. The key issues which were identified are:

- protection of rare fauna;
- integrity of the State Forest estate;
- environmental management of the mining operation;
- noise limits;
- dust limit; and
- the mine dewatering operation.

A discussion of the Environmental Protection Authority's conclusions and recommendations about each of the key issues is presented below.

3.1 Protection of rare fauna

Fauna surveys conducted for the Consultative Environmental Review identified a population of the gazetted rare fauna *Isoodon obesulus* (the Southern Brown Bandicoot), which inhabits the sedge-shrub wetlands of the project area. The sedge-shrub vegetation type comprises about 10% of the project area in linear belts along drainage lines. Much of the vegetation type is within the proposed mine site and would be destroyed if the proposal proceeds. The disturbance of the fauna and the loss and modification of the habitat in the project area would severely impact upon the fauna population and could cause its local extinction.

The Consultative Environmental Review reports that the sedge-shrub wetland vegetation type is poorly represented throughout the rest of the Collie Basin and concludes that it is important that some areas of this habitat type are set aside for fauna conservation. No commitments or suggestions for suitable areas to be conserved have yet been made by the proponent. Rehabilitation of the habitat type following mining would be feasible in the long term.

Rare fauna are protected under the Wildlife Conservation Act, 1950, section 14 (2) which protects fauna that are likely to become extinct or is rare or in need of special protection. The Southern Brown Bandicoot was gazetted under this section in November 1990. There are no provisions to protect the habitat of rare fauna under current legislation.

The Department of Conservation and Land Management has advised the Environmental Protection Authority that, because of the distribution of the bandicoots habitat within and adjacent to the mine site, and because of the staging of the strip mining operation, it may be possible to protect the local population.

The Environmental Protection Authority recommends that the proponent is responsible for ensuring the survival of the local population of the rare fauna, the Southern Brown Bandicoot. The Authority recommends that, before the start of the coal mining operation, the proponent prepare an environmental management programme for the protection of the rare fauna, the Southern Brown Bandicoot, to the satisfaction of the Environmental Protection Authority on advice from the Department of Conservation and Land Management (Recommendation 2).

3.2 Integrity of the State Forest estate

The coal mining operation will destroy about 400ha of uncleared State Forest and 475ha of partly cleared State Forest and leave one or more final voids of about 5ha, which would not be rehabilitated. Apart from the voids the proponent is committed to rehabilitate the rest of the State Forest area which is cleared. The broad land use objective currently set by the Department of Conservation and Land Management for the rehabilitation of the State Forest areas after mining is to restore the State Forest values. The Environmental Protection Authority believes that the objective should include the restoration of the ecological function of the forest. The loss of the flora and fauna conservation values of the State Forest which would be mined has been addressed in the previous land use and conservation studies for the region which set coal mining as the priority land use and established the Westralia Management Priority Area as a conservation reserve.

The Environmental Protection Authority recommends that the integrity of the State Forest estate should be maintained by the proponent replacing the area and conservation values of the forest cleared. Compensatory arrangements to replace areas and conservation values of the State Forest where the land cannot or would not be rehabilitated to forest (for example, the final void) need to be examined by the proponent. For example, some of the cleared freehold land could be rehabilitated to forest and returned to the State.

In the Consultative Environmental Review, the proponent reported the details of the floral and faunal surveys conducted. The floral surveys identified the vegetation systems of the project area at a detailed level which were based on the vegetation complexes originally described by the Department of Conservation and Land Management. The fauna surveys were not carried out at the optimal time (Autumn) and it is expected that a survey in Spring would identify an increase in species diversity and abundance in the project area. Nonetheless the surveys did provide a good basis for evaluating the conservation values of the State Forest in the project area.

The information on the conservation values of the State Forest would assist mine planning, for example, to relocate any rare fauna and avoid, as much as possible, direct impacts on particular habitats or rare flora and, also, to assist rehabilitation planning to restore habitats of any rare fauna.

The Environmental Protection Authority recommends that the impact of the mining operation on the State Forest estate should be minimised by careful planning of the mining operation to minimise the amount of clearing and by rehabilitation of the cleared areas to restore the ecological function of the State Forest. State Forest areas which would never be rehabilitated, such as the final void, should be replaced with areas of equivalent conservation value by the proponent. The proponent would be required to detail appropriate management strategies which address these issues as part of an environmental management programme for the mining operation (Recommendation 2).

3.3 Environmental management of the mining operation

The Ewington open cut coal mining operation would affect an area of about 10km^2, including 8.75km^2 of State Forest, and result in one or more final voids of 5ha. A waste dump forming a low ridge up to 20m above current topography trending northwest-southeast along the western margin closest to Collie would be formed and the rest of the area would be left gently undulating to the east up to the final void. The proposal is a major earth moving operation on the scale of the Muja mining operation and involves large-scale environmental impacts related to forest clearing, dewatering and land reclamation. The environmental management of the mining operation to minimise the impacts and to achieve the objective of rehabilitating the land would require an on-going commitment of resources by the proponent.

The Environmental Protection Authority considers that the standard of land reclamation at the former and existing mining operations in the Collie Coal Basin has generally not achieved contemporary standards for similar scale earthmoving operations. There has been some

encouraging rehabilitation results, such as at Western Collieries' Collieburn mine, but the long-term success of the land reclamation is yet to be established. The Authority is not convinced that the potential environmental problems of long-term acid mine drainage, salinisation of water supplies, spread of dieback disease, unsuccessful land reclamation or disturbance of other surrounding land uses have been satisfactorily addressed by any of the mining operations in the Collie Coal Basin.

The rehabilitation of the mine site to an acceptable final land use is an important aspect of the proposal. The proponent stated its objective of implementing a successful rehabilitation programme and has provided some information on the techniques which would be used to achieve the objective. At this stage the final land use of the 875ha of State Forest which would be cleared is the existing land use, State Forest, though the completion criteria for the rehabilitation to this land use has not been defined. The proponent has committed to preparing a rehabilitation plan as part of an environmental management programme for the mining operation under Clause 7 of the Agreement Act.

The Environmental Protection Authority considers that, because of the size of the proposed mining operation, a comprehensive Environmental Management Programme is required. The Authority recommends that the Environmental Management Programme should plan for and monitor the effects of the Ewington coal mining operation and provide management strategies based on the monitoring results (Recommendation 2). The Programme should particularly address the protection of the rare fauna, noise, dust and risk impacts on surrounding residents, the mine dewatering operation, the integrity of the State Forest estate, dieback disease management and rehabilitation to an acceptable final land use.

The potential noise and dust impacts on surrounding residents would be managed by the limits to be set by the Minister for the Environment which are discussed below. The issue related to risk relates mainly to the risk of fly rock from blasting operations, but also relates to the increase in heavy traffic and dangerous goods transport and storage: this issue would need to be addressed in the Environmental Management Programme. The issues related to the protection of the rare fauna, the integrity of the State Forest estate and the mine dewatering operation are discussed in sections 3.1, 3.2 and section 3.6 respectively. The issues related to rehabilitation and dieback disease management are discussed below.

Rehabilitation

The Environmental Protection Authority considers that the rehabilitation of the Ewington lease area should be planned to replace the present function of the mined area as much as possible. At this stage the final land use and rehabilitation objective of the 875ha of State Forest which would be cleared is to restore the State Forest values.

The proponent is conducting rehabilitation and research on the old and existing coal mining operations within the Collie Basin with some encouraging results. Also, materials handling and land reclamation procedures are in place for the existing mines and similar techniques could be used, with site specific modifications as necessary. The proponent is committed to preparing a rehabilitation plan with the basic objective of rehabilitating the area to "local native species" for State Forest areas and to landowners' requirements for freehold areas. The Collie Coal Mining Rehabilitation Committee is currently defining the completion criteria and would continue to work under the provisions of the Collie Coal (Griffin) Agreement Act to implement the rehabilitation objective.

The rehabilitation plan should identify the suitability of the soil types in the area for use in rehabilitation, identify any soils or overburden components which are unsuitable for use in rehabilitation and identify any soil or overburden which might give rise to pollution of surface or ground waters or other undesirable effects (Recommendation 2). Land reclamation procedures can then be developed utilising this information.

Dieback disease management

Dieback disease is the common term for the effect of the fungal pathogen *Phytophthora* sp., which infects the root systems of many native plants and may kill them through induced water stress. The seven species of *Phytophthora* are known to attack at least 1000 plant species, some of which are rare. Hence, the objectives for the control of dieback in the State Forest are to prevent the introduction of the disease into currently dieback-free areas and to minimise its spread from infected areas. The control of the disease is important in order to allow successful rehabilitation and to maintain the nature conservation values of the State Forest areas affected by the mining operation.

The proponent is committed to cooperating with the Department of Conservation and Land Managment in the mangement of dieback but has not defined a comprehensive dieback management programme. The Environmental Protection Authority recommends that a defined dieback hygiene programme be required as part of the Environmental Management Programme (Recommendation 2).

3.4 Noise limits

Numerous submissions raised the issue of the disturbance to residents surrounding the mine site by noise and blasting vibration. Noise modelling studies reported in the Consultative Environmental Review concluded that there should be no adverse impacts from noise on the residents in Collie and other surrounding residents.

The proponent is committed to minimising the extent, opportunity and duration of the periods when a significant impact from noise would occur and, also, to conducting an on-going monitoring programme. The Environmental Protection Authority recommends (Recommendation 3) that the following noise limits would be environmentally acceptable at the residences surrounding the mining operation:

- 40dB(A) slow from 10pm to midnight and from midnight to 7am every day;
- 45dB(A) slow at times other than those times for which alternative noise levels are specified; and
- 50dB(A) slow from 7am to 7pm Monday to Friday inclusive, but excluding gazetted public holidays;

when measured:

(1) at any point on or adjacent to other premises not occupied by the proponent and used for residential or other noise-sensitive purposes; and

(2) at a height between 1.2 and 1.5 metres above ground level and at a distance greater than 3.5 metres from any reflecting surface other than the ground.

Where the combined level of the noise emissions from the project and the normal ambient noise exceeds the levels previously specified, this condition shall be considered to be contravened only when the following criteria are also met at the measurement point:

- the noise emissions from the premises are considered to be audible by the Environmental Protection Authority; and
- the noise emissions from the premises are identifiable by the Environmental Protection Authority as emanating from the project.

Noise emissions from the premises shall be such that they do not exhibit characteristics that would make the emissions more intrusive than they would be in the absence of these characteristics.

With regard to noise from blasting, the Authority would set levels of 120dB peak linear for 90% of the blasts and a maximum level of 125dB peak linear for any blast at the curtilage (area surrounding the dwelling) of the surrounding residences, from 9am to 5pm Monday to Friday.

The proponent would be required to prepare and implement a noise monitoring programme to demonstrate compliance with the noise limits (Recommendation 2).

The Authority is aware of a potential problem from the intrusive noise of the reversing signal from large trucks. The proponent is liaising with the Department of Mines to resolve the issue which is a safety requirement under the Mining Act 1978 and Regulations.

The proponent has committed to assessing compensation on a case by case basis if there are any incidents of damage from blasting vibration. However, because of the separation distance and the complex geology, the proponent does not expect any impact on surrounding residents. In addition, the proponent is committed to liaising with local residents, blasting only in normal awake hours and to the use of noiseless initiation systems. The details of the proponent's blast monitoring programme and compliance standards would be set under the licencing provisions of Part V of the Environmental Protection Act, 1986.

3.5 Dust limit

Numerous submissions raised the issue of dust from the mine site. The proponent is committed to monitoring dust levels and to implementing reasonable dust mitigation measures as necessary, which would be to the satisfaction of the Minister for the Environment.

The Environmental Protection Authority advises that details of sampling techniques, the monitoring programme and compliance standards would be set under the provisions of Part V of the Environmental Protection Act, 1986. The proponent would be required to prepare and implement a dust monitoring programme to demonstrate compliance with this limit, as part of the Environmental Management Programme (Recommendation 2).

The Environmental Protection Authority is investigating the use of long term dust limits and, if applicable, limits would be set under the licencing provisions of Part V of the Environmental Protection Act, 1986. The limits being investigated are that, over the long term, dust from the mining operation should not exceed an annual mean of 90 ug/m^3 or a maximum of 260 ug/m^3 over 24 hours (using high volume samples). The Authority also notes that interstate regulatory agencies sometimes use a dust limit of four grams per square metre per month (using deposit gauges) for residences surrounding existing coal mining areas. A dust limit of 2 g/m^2/month is used for residences surrounding new coal mining areas. The Authority will be evaluating these sampling methods and limits as long term dust limits.

Nevertheless, the Environmental Protection Authority recommends that the following dust limit would be environmentally acceptable at the residences surrounding the mining operation:

- Dust from the mining operation should not cause the short term level of dust at surrounding residences to exceed 1000 micrograms/cubic metre (ug/m^3) when continuously sampled over a 15 minute period (Recommendation 4).

3.6 The mine dewatering operation

The effects of the dewatering are predicted to result in a lowering of the water level of near surface aquifers by up to 0.1 metres at about 2.5 kilometres from the Ewington coal deposit. The proponent does not consider that this would have a significant effect on private bores surrounding the mine site. The deeper aquifers are predicted to have a greater lowering of water level, about 10 metres extending at least 2 kilometres particularly to the south and east of the mine. Smaller drawdowns would extend further and the drawdown may affect Shotts borefield, which provides water to the State Electricity Commission of WA's Muja power station.

The impacts of the dewatering operation relate to the possible effects on existing groundwater users, both private and the State Electricity Commission of WA, on potential groundwater users such as the proposed private power station and to the disposal of the water. The Environmental Protection Authority has been advised by the Water Authority of WA that a regionally focussed water management plan would be developed for the Collie Coal Basin in order to cater for the

needs of the coal mining companies, the existing and proposed power stations and private users.

The Environmental Protection Authority, on advice of the Water Authority of WA, recommends that the proponent should maintain the domestic and stock water supplies of the existing private groundwater users on surrounding properties which are impacted by the dewatering operation. The Water Authority has advised that, if necessary, it would possibly set up an advisory committee to attempt to resolve disputes between the private groundwater users in the area and the proponent. The proponent has previously assisted other water users in the Collie Basin area which have been affected by the coal mining operations.

Under the Agreement Act, the proponent is not responsible for rectifying the impact of the dewatering operation on the State Electricity Commission's borefield at Shotts. However, the Environmental Protection Authority considers that the proponent has a responsibility. On the advice of Government agencies responsible for the groundwater resources of the region, the Authority recommends that the proponent comply with a water management plan prepared by the Water Authority of WA which would deal with the water supplies for the existing and proposed power stations and the disposal of water.

The management of the water produced by the dewatering involves several options, including providing it to the power stations, both existing and proposed, and disposing of it into the river. Government agencies are proposing to develop an overall plan for the management of the water resources of the region. The Environmental Protection Authority, on advice of these agencies, recommends that the proponent's plans for managing the water produced from the dewatering operation should be integrated with the water management plan for the region.

The effect of the dewatering of the existing mining operations on the State Forest areas surrounding those mining operations has not been observed to be significant. The Authority concludes that a significant effect should not occur on the State Forest areas surrounding the Ewington coal deposit. However, should a significant effect occur, the Authority considers that it would be the responsibility of the proponent to mitigate the impact, if the Department of Conservation and Land Management consider it to be necessary.

The Environmental Protection Authority recommends that managing the disposal of the water and the impact of the mine dewatering operation on the groundwater resource of the area, particularly on the users of the resource, is the responsibility of the proponent. The Authority recommends that the proponent prepare an environmental management programme which addresses the maintenance of the water supply of private users (Recommendation 2 and Recommendation 5) and complies with a water management plan to be developed by the Water Authority of WA regarding the disposal of water (Recommendation 6).

3.7 Other issues

Other issues raised during the assessment process involved matters related to the impacts of the mining operation on surface water drainage, diesel equipment fumes and concerns of inhabitants surrounding the project area with regard to noise, dust and blasting.

The proponent provided a response to these and other issues, which was taken into account in the assessment of the proposal. The Environmental Protection Authority considers that the proponent's Response to Issues (Appendix 2), the Recommendations in this report, the proponent's commitments (Appendix 1) and the environmental conditions under the Agreement Act adequately address the issues.

4. Conclusions and recommendations

The Environmental Protection Authority's main conclusion is that the proposal is environmentally acceptable.

The environmental issues raised in the Environmental Protection Authority's assessment of the proponent's Consultative Environmental Review on the Ewington coal mine proposal and in submissions on the proposal have been evaluated and the key issues which were identified are:

- protection of rare fauna;
- integrity of the State Forest estate;
- environmental management of the mining operation;
- noise limits;
- dust limit; and
- the mine dewatering operation.

The proponent provided a response to these and other issues, which was taken into account in the assessment of the proposal. The Environmental Protection Authority considers that the issues are adequately addressed by the proponent's Response to Issues (Appendix 2), the Recommendations in this report and the proponent's environmental management commitments (Appendix 1).

Recommendations

Recommendation 1

The Environmental Protection Authority concludes that the proposal to mine coal at the Ewington coal deposit near Collie, as described in the proponent's Consultative Environmental Review and Response to Issues (Appendix 2), is environmentally acceptable. In reaching this conclusion, the Environmental Protection Authority identified the main factors requiring detailed consideration as:

- **protection of rare fauna;**
- **integrity of the State Forest estate;**
- **environmental management of the mining operation;**
- **noise limits;**
- **dust limit; and**
- **the mine dewatering operation.**

The Environmental Protection Authority considers that these and other issues can be addressed by either the Recommendations in this report or the proponent's environmental management commitments (Appendix 1).

Recommendation 2

The Environmental Protection Authority recommends that, before the start of each phase of the mining operation, the proponent should prepare and subsequently implement an Environmental Management Programme to plan for and monitor the effects of that phase of the mining operation and provide appropriate management strategies based on the monitoring results. The Programme should address, but not necessarily be limited to, the management, monitoring, auditing and reporting requirements of the following issues:

- **protection of the rare fauna, the Southern Brown Bandicoot;**
- **noise, dust and risk impacts on the surrounding residents;**
- **impact on the conservation values and area of the State Forest;**

- dieback disease management;
- mine dewatering operation; and
- rehabilitation to an acceptable final land use.

The Environmental Management Programme should be prepared to the satisfaction of the Environmental Protection Authority.

Recommendation 3

The Environmental Protection Authority recommends that the proponent should ensure that the noise emissions from the project do not cause or contribute to noise levels in excess of:

- 40dB(A) slow from 10pm to midnight and from midnight to 7am every day; and
- 45dB(A) slow at times other than those times for which alternative noise levels are specified; and
- 50dB(A) slow from 7am to 7pm Monday to Friday inclusive, but excluding gazetted public holidays.

Noise emissions from the premises shall be such that they do not exhibit characteristics that would make the emissions more intrusive than they would be in the absence of these characteristics. The proponent shall conduct noise surveys to demonstrate compliance with these limits to the satisfaction of the Environmental Protection Authority.

Recommendation 4

The Environmental Protection Authority recommends that long term dust levels be determined under Part V of the Environmental Protection Act but that the proponent should ensure that surrounding residences should not be exposed to short term dust levels from the mining operation exceeding 1000 micrograms per cubic metre (ug/m^3) when measured continuously over 15 minutes.

Recommendation 5

The Environmental Protection Authority recommends that, before the start of the mine dewatering operation, the proponent should prepare and subsequently implement a water supply plan, as part of an Environmental Management Programme, which describes measures to maintain the water supplies of any existing private user of the groundwater resource which is being affected by the dewatering operation, to the satisfaction of the Environmental Protection Authority on the advice of the Water Authority of WA.

Recommendation 6

The Environmental Protection Authority also recommends that the proponent should utilise and/or dispose of any water occurring in or collecting on the Mining Lease (including water pumped or drawn from mines) in accordance with a water management plan, which will deal with the supply of water to power stations and other utilities and the disposal of water in an acceptable manner, to the satisfaction of the Ministers for the Environment and Water Resources.

Appendix 1

The Griffin Coal Mining Company Pty Ltd

Environmental Management Commitments

CONSULTATIVE ENVIRONMENTAL REVIEW
EWINGTON OPEN-CUT MINE

PROPONENT'S COMMITMENTS
(CONSOLIDATED FROM THE CER AND RESPONSES)

REPORT E8788A

JANUARY 1992

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Griffin undertakes to fulfil the following commitments in accordance with the applicable State laws and regulations and with standards and procedures agreed with the State.

1. VEGETATION CLEARING

- Site clearing during construction and minesite operation will only be undertaken in accordance with prior approvals obtained from WAWA.

- The prime management objective will be to minimise vegetation removal. There will be no disturbance of vegetation outside those areas designated for clearing. Designated areas for clearing will be restricted to those required for efficient cost-effective operation of the minesite.

- Clearing for infrastructure will be kept to an absolute minimum and will follow existing easements where practicable. Wherever it is practical and feasible, Griffin will endeavour to nest utilities sited in State Forest.

- Vegetation clearing ahead of mining will be restricted to the minimum required for safe working practices.

- Cemented laterite will be sourced from the area to be mined. If there is a shortfall in suitable material, Griffin will import suitable roadmaking material. Griffin gives assurance that this shortfall will not be sourced from State Forest excepting that from existing gravel pits located in State Forest.

2. RARE FLORA

- Griffin will conduct a flora study for the location and mapping of rare and vulnerable plant populations. The timing of this study will be determined through discussion with CALM. Research into the propagation characteristics of these species will be undertaken with a view to their incorporation into the rehabilitation programme.

- Any rare plants within proposed mining areas will only be removed after Ministerial approval.

- Where feasible, rare plants to be removed as part of the mining operations will be transplanted into rehabilitated areas, used as a source of seed for rehabilitation purposes or used as nursery stock.

3. DIEBACK

. A detailed dieback hazard map of the minesite will be produced and regularly updated.

. Access to the mine construction site will be strictly controlled, and all vehicles will be subject to strict dieback hygiene control. A construction phase dieback management plan will be prepared, in consultation with CALM, prior to the commencement of construction.

. An operational phase dieback management plan will be developed in consultation with CALM prior to the commencement of mining.

. Griffin will identify dieback infected areas before topsoil stripping and stockpile the infected soil separately. It will be replaced low in the reconstructed landscape.

. As part of the management plan the following control measures will be taken:

- a washdown area for dieback hygiene purposes will be established before commencement of works. Its location and design will be determined in consultation with CALM;
- all heavy machinery to be introduced for site work will be washed down,
- the work areas will be monitored for dieback disease, and if it is found, assistance and advice on the most appropriate procedures will be obtained from CALM;
- regular surveys will be undertaken to assess the effectiveness of the control measures.

4. WEEDS

. The introduction of weed seeds will be minimised by the rigorous dieback disease hygiene procedures.

. Weeds that become established will be controlled by regular site inspection and, where necessary, eradication programmes.

5. FIRE

. Fire control will be implemented by:

- education of all personnel in fire prevention requirements;
- provision of trained firefighting crews at all times;
- maintenance of firebreaks around and within the minesite area.

A fire management plan will be developed in conjunction with CALM, the Bush Fires Board and the local Bushfire Brigades.

. Following construction of the roading network, if fire risk is significantly greater than the existing situation, Griffin will discuss implementation of appropriate fire control measures with CALM.

. Griffin undertakes to ensure that no waste coal will be left uncovered. All material with the potential to ignite will be buried deeply in the overburden dumps. At the completion of mining, the exposed coal face will be covered with overburden.

6. REHABILITATION

. A rehabilitation management plan will be prepared prior to the commencement of mining to the satisfaction of the EPA. Whether services are located on Griffin's land, private property or State Forest, Griffin is obliged to undertake progressive rehabilitation to the satisfaction of the EPA.

. Griffin will strip topsoil in two parts from cleared areas to be mined. The details of this procedure will be outlined in the rehabilitation management plan.

. Rehabilitation trials will be undertaken.

. Rehabilitation to local native species will be undertaken progressively throughout the life of the mine.

. Species selected for rehabilitation will meet the following criteria:

- species which occur naturally in the development area;
- species known to be able to readily establish themselves will be favoured;
- species which have proved suitable for rehabilitation purposes in the Collie Basin will be favoured.

. Seedlings will be obtained from a certified disease-free nursery which will raise native seedlings from locally collected seed. Introduced seed will be obtained from commercial seed suppliers.

. Rehabilitation monitoring will be undertaken in accordance with the management plan.

. Griffin will liaise with the appropriate authorities to develop completion criteria.

7. NATIVE FAUNA

. Griffin will undertake discussions with CALM with regard to further survey and monitoring for rare and endangered fauna in the Ewington area.

. Griffin recognises the status of *I. obesulus* and will undertake discussions with CALM to determine further measures to protect it from local extinction.

. Griffin will undertake further consultation and/or survey to ascertain the presence of *M. eugenii*.

. If *D. geoffroii*, *P. calura* or *M. fasciatus* are found to be present in the Ewington area during further surveys, Griffin will undertake discussion with CALM to determine suitable management for these species.

. Native fauna will be protected by the following actions:

- minimisation of vegetation disturbance;
- prohibition of firearms and pets on the minesite.

. Griffin currently incorporates habitat reconstruction criteria into ongoing rehabilitation at its existing mining operations in the Collie Basin. This practice will be continued and further refined for rehabilitation following mining at Ewington.

8. FERAL ANIMALS

. The introduction of potential feral species will be prevented by the banning of all pets from the project area.

. Feral fauna will be monitored on a regular basis and appropriate control programmes implemented where necessary, in consultation with the Agriculture Protection Board Pest Control Division and CALM.

9. SURFACE WATER

- A surface water management plan will be developed, prior to the commencement of mining, in consultation with the appropriate authorities.

- Prior to the commencement of mining activities in any area, drainage structures will be constructed to control water movement and divert runoff from undisturbed areas around the proposed mining area.

- Mine water will be managed to meet effluent discharge quality criteria consistent with achieving the water quality objectives defined in the Draft Water Resources Management Strategy for the Collie Coal Basin and the EPA Pollution Control Licence.

- If the EPA and WAWA recommend that SECWA takes additional groundwater from Griffin's Ewington minesite, then Griffin will undertake negotiations with SECWA with regard to making dewatering waters available to Muja Power Station via the existing pipeline.

- Monitoring of the various effluent streams will be undertaken in accordance with the programme developed in the management plan and results reported to the appropriate authorities.

- Runoff management and drainage will be undertaken so that uncontaminated runoff from outside mining areas does not impinge on the operations. Contaminated water will be retained within the operational area and only discharged to the natural environment after treatment to a suitable quality.

- All waste oil and lubricants from workshops and servicing facilities will be collected and either recycled or taken off-site for disposal or resale.

- Griffin will monitor the surface water supplies of riparian users to the north-west of the mine which would possibly be at risk of reduced surface water flows.

  In the event of surface water supply to riparian users being adversely affected, investigation will be conducted to determine the appropriate action to ameliorate the problem. If there is no feasible alternative, Griffin will arrange with affected individuals to supplement their surface water supply to fulfil required needs.

  Griffin would only consider itself liable to supplement surface water supplies of users if water usage from the affected source does not increase over the lifetime of the mine and the reduced supply cannot be attributable to seasonal effects.

10. GROUNDWATER

. Griffin will commission a bore survey of all bores within the calculated 0.5m drawdown contour for the shallow aquifer and selected private bores within the 0.1m drawdown contour prior to the commencement of dewatering. Griffin will then undertake to monitor selected bores as part of the overall mine dewatering monitoring programme.

If the groundwater monitoring programme indicates that dewatering is adversely affecting the supply of water from private bores, Griffin will investigate options to ameliorate the drawdown by modification to the dewatering programme. If this is not feasible, Griffin will arrange with private bore owners to supplement their groundwater supply to fulfil required needs, providing usage has not significantly increased.

. Griffin will undertake discussions with CALM to determine the need for monitoring for groundwater drawdown effects on the forest ecosystem and appropriate monitoring and management programmes.

11. NOISE

. Further noise modelling studies will be conducted during detailed mine planning to confirm the potential degree of impact, particularly with regard to potential adverse noise impacts under certain atmospheric conditions.

. General mine noise will be managed by specifying noise emission limits on all mining equipment purchased.

. A noise monitoring programme will be implemented under a range of operational and meteorological conditions. If monitoring identifies any significant adverse impact on nearby residents, remedial action will be taken to reduce noise emissions. Such action will involve application of engineering expertise to specific problem areas such as providing acoustic enclosures and use of noise suppressors and silencers.

12. VIBRATION

. Blasting noise and vibration will comply with the appropriate licence standards issued by the EPA and will be controlled by:

- ensuring that explosion gases are essentially devoid of energy by the time they emerge into the atmosphere;
- firing blasts when there is a low probability of an atmospheric inversion being present;
- firing blasts during daylight hours at regular times and wherever possible between the hours of 10.30am and 3.30pm;
- using fire delays and detailed blast hole loading design.

. Regular monitoring will be undertaken to develop a blast prediction model.

. Griffin will undertake discussion with CALM and other users of the Collie airstrip to develop an internal management plan for operation of the Collie airstrip with respect to blasting on the Ewington minesite.

. If damage to property does occur due to blasting on the Ewington minesite, applications for compensation will be considered on a case-by-case basis.

13. DUST

. Dust will be managed to the satisfaction of the EPA by:

- the use of water sprays on stockpiles;
- the watering of haul roads in dry conditions;
- the early and progressive implementation of rehabilitation.

. A comprehensive dust monitoring programme will be implemented, so that any problems may be readily identified and rectified.

. The dust monitoring programme will include rotation of a static dust sampler (dust deposit gauge) between two locations, one on the downwind boundary of the minesite, the second a few kilometres upwind of the minesite. A second dust sampler will be rotated between selected residences nearest to and downwind of the minesite. Samples will be collected quarterly from all locations. If dust levels become significantly elevated above baseline levels, action will be taken to control the source.

14. LANDFORM

. Final pit design will ensure that the highwall is left at a stable angle, as determined in conjunction with the Department of Mines.

. In contouring the final void, Griffin will take into consideration guidelines prescribed by the Department of Mines publication "Guidelines on Safety Bund Walls Around Abandoned Open Pits, January 1991".

. Overburden dumping will be conducted in accordance with the overburden management programme developed prior to the commencement of mining. Overburden will be selectively dumped so that overburden materials likely to inhibit successful rehabilitation are buried at depth.

. The visual impact of mining will be minimised by:

- designing overburden dumps so that wherever possible they are no higher than the natural topographic high points;
- progressive rehabilitation;
- screening from view where appropriate and practical.

15. PUBLIC CONSULTATION

. Griffin's staff will be available to respond to queries and problems raised by the local community. Every effort will be made to resolve any issues which may arise and records will be kept of all enquiries and complaints to facilitate this.

16. REPORTING

. Griffin will report to the appropriate Government authorities regarding environmental management matters in accordance with the requirements of the Collie Coal (Griffin) Agreement Act, 1979.

. Griffin will submit an annual report to the Water Authority on the performance of the groundwater systems and the impact on other users.

17. ADDITIONAL PROPOSALS

. Additional proposals under Clause 10 of the Collie Coal (Griffin) Agreement Act will be submitted as necessary.

Appendix 2

The Griffin Coal Mining Company Pty Ltd

Response to issues

1. INTRODUCTION

This document contains responses by The Griffin Coal Mining Company Pty Ltd (Griffin) to submissions on the Ewington Open-Cut Mine Consultative Environmental Review (CER) by Government organisations and the general public.

Whilst the CER is comprehensive there are some issues on which definitive impact assessments and conclusions cannot be given. On groundwater, for example, there is no way of knowing exactly the response to minesite dewatering until it takes place.

The final operational details of the various mining activities will be dependent upon the results of further detailed evaluation of the mine area, geologically and environmentally. The final detailed planning of mining operations will be on the basis of achieving the most efficient and costeffective means of mining the coal while at the same time providing for the achievement of high quality environmental control and management.

In the absence of absolute guarantees, the aim is to minimise risk by detailed evaluation studies and by commitment to prudent management programmes in consultation with the relevant authorities.

Griffin has adopted a very conservative approach to its assessments and studies. At all times a "worst case" situation was adopted to assess impacts, with the aim of ensuring that if impacts were acceptable under these circumstances they would be more than acceptable under normal operating conditions.

Griffin has made many commitments in respect to the coal mine and social impacts and will be under obligation to fulfil them once negotiations have been completed with the relevant parties concerned.

2. RESPONSES TO GOVERNMENT SUBMISSIONS

2.1 WATER AUTHORITY OF WESTERN AUSTRALIA

W a): *Griffin will be obliged to implement control systems to deal with waste oils and lubricants from servicing facilities and washdown bays. These may include dissolved air flotation units, chemical coagulation or plate separators. Wastes recovered shall be either recycled or disposed of offsite. Only clarified waters may be used for dust suppression.*

Response: All waste oil and lubricants from workshops and servicing facilities will be collected and either recycled or taken offsite for disposal or re-sale (Section 9.12, p107).

Water which is possibly contaminated by oil will be collected by the water truck filling station for use on haul roads for dust suppression. This is a current and accepted practice at both the Chicken Creek and Muja operations and has been shown to be an effective method of dust suppression.

The water truck filling station will also source water from dewatering, therefore oily wastewater will form a very minor proportion of the water used for dust suppression.

W b): *Sewerage wastes from employee amenities will require treatment to achieve biological stability and effective disinfection prior to disposal.*

Response: Reference Section 7.8.4 p66.

GW1: *Predicted drawdown in the superficial aquifer will not affect other users of the resource, however, experience at Cardiff shows that substantially greater drawdowns may occur. Griffin's commitment to monitor groundwater in the vicinity of the mine (Section 9.4, p99) is noted. They should include a survey of all private bores in the area that could possibly be affected, discuss with owners what could be done in the unlikely event that their bores were affected and commence monitoring the most susceptible bores as early as possible to determine normal levels.*

Response: Griffin will commission a bore survey of all bores within the calculated 0.5m drawdown contour for the shallow aquifer (refer Figure 8.1) and selected private bores within the 0.1m drawdown contour prior to the commencement of dewatering. The purpose of the bore survey will be to establish the condition of all bores and pumps and to confirm their productivity.

Subject to confirmation that the bores and their associated equipment are in good condition and establishment of their productive capacity Griffin will undertake to monitor selected bores as part of the overall mine dewatering monitoring programme.

If the groundwater monitoring programme indicates that dewatering is adversely affecting the supply of water from private bores, Griffin will investigate options to ameliorate the drawdown by modification to the dewatering programme. If this is not feasible, Griffin will arrange with private bore owners to supplement their groundwater supply to fulfil required needs, providing usage has not significantly increased.

GW2: *Prior to the commissioning of the new power station, dewatering waters should be made available to SECWA via the existing pipeline in preference to SECWA pumping its Shotts borefield.*

GW3: *After commissioning of the new power station, or in the event of Griffin not being contracted to supply coal to the station, any additional groundwater should continue to be made available to SECWA (estimated to average 8Ml/day).*

Response: If the Environmental Protection Authority (EPA) and WAWA recommend that SECWA takes additional groundwater from Griffin's Ewington minesite, then Griffin will undertake negotiations with SECWA with regard to making dewatering waters available to Muja Power Station via the existing pipeline.

GW4: *Any additional water could be discharged to the river without treatment, providing it met discharge criteria as will be detailed in Part B of a pollution control licence issued by the EPA. Griffin will be required to monitor both the quality and quantity of dewatering discharges to the satisfaction of the Water Authority.*

Response: Griffin recognises the need to monitor both the quality and quantity of dewatering discharges to the Collie River and is committed to ensuring that they meet the discharge criteria detailed in the EPA pollution control licence (Commitment 10, p114).

GW5: *Griffin will be required to submit an annual report to the Water Authority on the performance of the groundwater systems and the impact on other users.*

Response: Commitment 14, p116. Griffin will comply with this requirement.

GW6: *Statement that Collie town water supply is from a borefield within the Coal Basin (Water Supply, p23) is incorrect.*

Response: The error is acknowledged. The Collie town water supply is currently sourced from the Wellington and Mungalup dams. However, this does not affect the impacts or management requirements identified in the CER.

SW1: *Griffin's commitment to develop a surface water management programme to the satisfaction of the Water Authority (Section 9.2, p95) is noted.*

Response: No response required.

SW2: ***Griffin has highlighted the possibility of reduced surface water flows due to dewatering etc, particularly to the north-west. Their commitment to investigate the discharge of excess water to alleviate any problems which occur (p95) is not sufficient. They may have to make good supplies to anyone adversely affected by their operations.***

Response: Griffin will monitor the surface water supplies of riparian users to the north-west of the mine which would possibly be at risk of reduced surface water flows.

Griffin's commitment (p95) has been worded to indicate that in the event of surface water supply to riparian users being adversely affected, investigation will be conducted to determine the appropriate action to ameliorate the problem. If there is no feasible alternative, Griffin will arrange with affected individuals to supplement their surface water supply to fulfil required needs.

Griffin would only consider itself liable to supplement surface water supplies of users if water usage from the affected source does not increase over the lifetime of the mine and the reduced supply cannot be attributable to seasonal effects.

SW3: *Clarification is requested of the ability of swamplands to ameliorate salt concentrations (Section 7.5.4, Biological Filtration).*

Response: Swamplands would be expected to exhibit only very limited biological uptake of TDS. However, through alteration of pH, it is thought possible that associated precipitation of some dissolved salts could result in reduced TDS concentration.

Specialist consultants GRC-Dames & Moore, state in their report to Griffin:

"Analysis of water quality parameters after throughflow within the Westralian Sands Limited (WSL) biological filter showed that substantial reductions in heavy metals and TDS concentrations are achievable and pH approaches neutral levels."

However, it is possible that the substantial reduction in TDS concentration is particular to WSL's wastewater stream.

2.2 DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT (CALM)

Griffin would like to draw attention to the fact that the area in which it proposes to develop the Ewington Open-Cut Mine, while State Forest, is significantly degraded due to past utilisation and physiological damage. Specialist botanical consultant, E.M. Mattiske & Associates, state in their report to Griffin:

"A significant level of stress was recorded in the Ewington deposit survey area, Collie. The stress related to the damage of previous fires ... , the presence of insects .... and the apparent regular presence of the dieback fungal disease *Phytophthora cinnamomi* in the plant communities on the lower to mid slopes ....."

The report also states that "the majority of the forested areas have been logged at least twice in the Ewington deposit survey area".

Specialist zoological consultants, Ecologia, consider "the area loss from the development is insignificant in comparison to the ecological habitat - vegetation units represented within the region. The area is already of a degraded nature due to historical forestry practices".

Therefore, it can be concluded that both specialists consider the Ewington area to have limited local or regional conservation value apart from particular isolated elements.

It is also appropriate to note that the Government has clearly identified that the principal land use within the Collie Coal Basin is coal mining although this must occur within the competing framework of other competing land uses and environmental demands. The recently published Draft Collie Basin Structure Plan has been prepared as a basis of achieving maximum recovery of the only commercially mineable coal resource in Western Australia consistent with these other considerations.

Griffin has prepared the CER relating to Ewington to be consistent with the Draft Collie Basin Structure Plan and consistent with minimisation of broad scale environmental impacts. However, localised impacts arising from the mining operation are largely unavoidable.

The following responses given to the specific comments by CALM are framed in the context of the above general observations and comments.

C1: *The department uses the airstrip constantly during daylight hours throughout the fire season (October-May).*

The CER (pp21, 72, 92) recognises the airstrip as an entity that may be affected by the mine development. They have not alluded to any impact of operations by dust or blasting air shock. Are these a potential hazard? If so, how will Griffin manage them?

Response: Advice from the Civil Aviation Authority (CAA) is that dust emission from the Ewington minesite will not present a potential hazard to operation of the airstrip. Numerous airstrips operating in the Goldfields are located in the midst of mining operations and the CAA is unaware of any problems arising from dust impacts (reference Response P2). However, air shock and flyrock resulting from blasting may present a potential hazard to aeroplanes operating from the airstrip. If the airstrip was licensed, the CAA would designate a danger zone over the mine-site which would be shown on pilot's charts, restricting flight over the minesite during periods of blasting to specified minimum heights. However, the Collie airstrip is unlicensed and therefore the CAA cannot designate a danger zone with respect to the Ewington minesite.

The CAA recommends development of an internal management arrange-ment between Griffin and CALM whereby Griffin restricts blasting to mutually agreed times each day. If CALM requires emergency use of the airstrip during this period, CALM should advise Griffin to delay blasting whilst the airstrip is in use. Griffin will undertake discussion with CALM to develop an internal management arrangement along these lines. A similar arrangement will be made with other users of the airstrip whereby Griffin's regular blasting times are advised to users who will restrict their use of the airstrip to periods outside the blasting times. Emergency use of the airstrip would follow the same arrangement as that required for CALM.

The Collie Basin structure plan proposes future relocation of the airstrip to an area of State Forest north of Collie in order to avoid coal resource areas and noise and risk to the Collie townsite.

C2: *The Proponent states several times in the CER that "the prime management objective will be to minimise vegetation removal". At numerous points in the CER proposes clearing on State Forest with no explanatory justification.*

Response: Griffin has prepared a mine development plan which will enable it to extract coal from the Ewington deposit in the most efficient and cost-effective way possible. The mine development plan also reflects other development in the Collie Coal Basin, namely major power installations, the new Collie Power Station and Griffin's undeveloped Premier deposit and existing coal mining operations.

While coal mining is one of the primary land uses within the Collie Coal Basin, Griffin believes that the Ewington mine should not necessarily cause substantial adverse effects to other existing land uses. Therefore the prime management objective will be to minimise vegetation removal. There will be no disturbance of vegetation outside those areas designated for clearing (Section 8.9.1, p84).

Designated areas for clearing will be restricted to those required for efficient cost-effective operation of the proposed mine. Clearing for infrastructure will be kept to an absolute minimum for the facility. Reticulation for electrical supply, pipeline and road system will follow existing easements where practicable, however the development of the mine (using an electric dragline, electric drills, pit lighting, electric dewatering pumps etc.) precludes in many cases nesting of these services.

Whether services are located on Griffin's land, private property or State Forest, Griffin is obliged to undertake progressive rehabilitation to the satisfaction of the EPA.

C2 i): *The location of the main access road across State Forest from the Coalfields Road. This utility is more appropriately placed on Griffin's own cleared land (Bluewater Farm) to the north of the mine and accessed from Williams Road.*

Response: The main traffic corridor through Collie is via the Coalfields Road (reference Section 5.3, p22). Locating the main access road from the Coalfields Road will keep minesite construction and operating traffic away from local and secondary roads . The proposed location has been sited to follow topographical contours and thus minimise the amount of cut and fill earthworks required with their associated significant disturbance.

The Collie-Williams Road is a secondary road. If the main minesite access road was located from this road, heavy traffic would be generated on this secondary road and also local roads through the Collie townsite. This prospect was raised by a number of people at the open day as a source of concern. Apart from traversing SECWA land, the main access road would also intersect and interfere with the minesite's 11kV transmission line and north haul road and both SECWA's 66kV and 330kV transmission lines. SECWA requires its utilities to be intersected perpendicularly, which would be difficult in these locations.

The proposed location of the main access road would intersect the 330kV transmission line and the southern haul road only once with consequently significantly less disruption to minesite traffic, given the possible modification and installation of utilities required for the new power station and proposed heavy industrial site.

C2 ii): *The location of the minesite complex is more appropriately placed on Griffin's own land. This would require moving it north some 500m from its presently planned location. This should not greatly affect its strategic location but will reduce the clearing on public land.*

Response: Relocating the minesite complex 500m north of the proposed site would put the complex on SECWA land (reference Figure 5.3). It would also be in close proximity to the north haul road and SECWA's 66kV transmission line, causing conflict and interference respectively.

The proposed location of the complex is strategic in the long term as it could also service Griffin's Premier coal deposit located to the south (reference Figures 5.2 and 7.4).

Relocation of the complex south onto Griffin's land would sterilise a large proportion of this deposit.

C2 iii): *The cable laydown area could be moved into that part of the mine to be disturbed in the future.*

Response: The proposed location of the cable laydown area could possibly be changed. This will be investigated by Griffin during detailed mine planning. The intention behind the proposed location was to site the laydown area as close as possible to the power supply and also to avoid future relocation. If the cable laydown area was moved into the area to be mined in the future, it would still require relocation to the proposed location in the long term. This would involve the same area of vegetation to be cleared.

C2 iv): *Power reticulation around the site should utilise existing easements wherever possible. The Proponent does not seem to have attempted to nest the 11kV, 66kV or the 132kV lines or pipelines to existing or proposed easements.*

Response: The proposed minesite power reticulation follows the outer edge of the mine development as a permanent fixture and temporarily into the pit to service the mine and workings of the dragline and dewatering pumps. The existing 330kV transmission line easement cannot be utilised due to electro-magnetic interference in the vicinity of this structure.

It should be noted that Griffin has nested the 11kV and 66kV lines. However, there may be scope to integrate this easement with that required for the dewatering group III pipelines. This will be investigated during detailed mine planning.

C2 v): *It is not clear if the dewatering pipeline will utilise any existing easements. It is assumed to follow the haul road to the crushing facility.*

Response: The dewatering delivery pipeline network follows the outer edge of the mine development as a permanent fixture, with a central collector pipe within the pit workings. The main water discharge pipeline will follow the southern haul road to the new power station receival point as assumed. It would be difficult for this utility to follow any existing easements to reach this receival point.

C2 vi): *The eastern surge pond should be located on private property to the south.*

Response: There is already a sump south of the mine development. The proposed location of the eastern surge pond is central to the dewatering operations and is situated on the shortest route to the new power station water receival point.

The water treatment plant will also be located at the surge pond. This facility will be "nested" with the cable laydown area and power reticulation.

The location of the eastern surge pond, treatment plant and main water discharge pipeline may change if SECWA agrees to Muja Power Station taking this water. If this eventuates, location of these facilities on Griffin's land to the south might be appropriate.

C2 vii): *The coal crusher should be on private property at the power station.*

Response: The crushing station will be located on the new Collie power station site.

C2 viii): *All other ancillary facilities (p66) should be concentrated on Griffin's own land.*

Response: All other ancillary facilities will be part of or adjacent to the minesite complex [reference Response C2 ii)].

C3 i): *The Proponent identified the limitations of a flora survey carried out in January. Will the Proponent sponsor spring surveys in the future before major clearing projects are undertaken? Will these surveys include the clarification of the significance of the Baeckea, Restio, Calytrix, Hibbertia and Lachnostachya species in the Collie region?*

Response: Commitment 2, p112. This flora study will clarify the significance of rare and vulnerable flora in the Ewington area to be affected by the mining operation. The timing of this study will be determined through discussion with CALM.

C3 ii): *The unique geomorphology of the Coal Basin and the associated variation in vegetation complexes, coupled with a long history of disturbance and the prediction of further industrial disturbance prompts the department to again call for the absolute minimum amount of clearing associated with this project.*

Response: Reference Section 9.8.1, p103 and Commitment 2, p112

C4 i): *The poor conditions at the time of survey and the fact that the survey was undertaken in summer detracts from the validity of the result, particularly when known or suspected populations of rare fauna are involved. The department would encourage the Proponent to establish an ongoing survey and monitoring programme that will establish a much more confident database on which to plan.*

Response: Reference Section 9.9, p106. Griffin notes CALM's comments above and it is intended that these will form the basis of discussions with CALM with regard to further survey and monitoring for rare and endangered fauna in the Ewington area.

C4 ii) a: *Habitat destruction is the major cause of fauna population decline. The extensive industrial disturbance in the Coal Basin makes the conservation status of its fauna all the more critical. The Proponent should give an undertaking to identify and avoid habitat of Isoodon obesulus.*

Response: Reference Section 9.9, p106. The proposed mine pit has been designed to enable efficient and cost-effective mining of the Ewington deposit. There is no scope for its modification to avoid habitat of *I. obesulus*. There may, however, be some scope for relocating ancillary facilities and utilities to avoid its habitat. This will be investigated during detailed mine planning.

C4 ii) b: *The Proponent should give undertakings to identify and enhance existing or potential habitat of Macropus eugenii, Dasyurus geoffroii, Phascogale calura, Myrmecobius fasciatus and I. obesulus on its leases and in surrounding areas.*

Response: Reference Responses C4 i) and C4 ii). Despite intensive survey of the Ewington minesite, *M. eugenii* was not found (Section 8.10.2, p90). Griffin recognises that further consultation and/or survey is required to ascertain the presence of *M. eugenii*. If this is the case, Response C4 ii) will also apply to this species.

If *D. geoffroii, P. calura* or *M. fasciatus* are found to be present in the Ewington area during further surveys, Griffin will undertake discussion with CALM to determine suitable management for these species.

C4 ii) c: *The Proponent should give undertakings to fund research into the study of I. obesulus so that Griffin can minimise its impact on the local population.*

Response: Reference Section 9.9, p106. The major impact on the local population of *I. obesulus* of the proposed development is largely unavoidable due to location of the mine pit over the economic coal deposit. Therefore, Griffin believes there can be no benefit in undertaking research to reduce this impact.

C4 ii) d: *The Proponent should give undertakings to include habitat reconstruction criteria into their rehabilitation prescriptions.*

Response: Griffin currently incorporates habitat reconstruction criteria into ongoing rehabilitation at its existing mining operations in the Collie Basin, comprising restoration of similar landforms, vegetation structure and flora composition. This practice will be continued and further refined for rehabilitation following mining at Ewington.

C4 iii): *The CER states that 1003ha of clearing is "insignificant". The department strongly disagrees with this statement.*

Response: Reference specialist zoologist's report Section 6, Appendix F.

C4 iv): *The CER states that "modification" of rare fauna habitat is only significant at the "local level". Local impacts on rare fauna lead to regional or total extinctions. Reducing the habitat available to the Southern Brown Bandicoot may make the population reproductively untenable. Displacement of individuals will lead to death. There is not the opportunity to "migrate" to other areas of suitable habitat as this is either too distant or fully occupied by other individuals. The impact of this proposal could cause the local extinction of a known rare species.*

Response: Reference specialist zoologist's report Section 6, Appendix F. Although the points raised by CALM in the above statement are recognised by Griffin, the issue of rare and endangered fauna has to be seen in context of the accepted primary land use of the Collie Basin, which is coal mining. Any move by Griffin to avoid destruction of *I. obesulus* habitat will sterilise very significant quantities of coal.

Griffin recognises the status of this species and will undertake discussions with CALM to determine further measures to protect it from local extinction.

C5 i): *To enable the replacement of topsoil, overburden and inter-burden in the correct sequence in the early stages of mining will require the stockpiling and double handling of a large amount of material. The CER does not explain how or where this operation will be achieved.*

Response: Double handling of large amounts of material is necessary in the early stages of mining in order to facilitate progressive rehabilitation. The handling, stockpiling and replacement of the various classes of materials will involve a complex series of earthmoving procedures which Griffin successfully carries out in its existing Muja operation.

C5 ii): *Double stripping of topsoil has proved beneficial in every other mining rehabilitation project in Western Australia. This practice should be mandatory at Ewington. The Proponent should describe how and to what specifications double stripping will take place.*

Response: Reference Section 7.3.2, p47. Griffin will strip topsoil in two parts from cleared areas to be mined. The details of this procedure will be outlined in the management plan for rehabilitation which will be prepared prior to the commencement of mining (Section 9.7.1, p103).

C5 iii): *Fauna habitat reconstruction should be incorporated in the rehabilitation programme. This will involve landforming, supply of den/nest sites such as logs and rock rubble and the establishment of appropriate species, landform, hydrology and fire interactions.*

Response: Reference Response C4 ii) d.

C5 iv): *The Proponent is depending on its performance to date in other mines to justify its proposals at this mine. There should be agreed-to completion criteria for rehabilitation that signify at what stage Griffin's responsibility for rehabilitation ceases.*

Response: Reference Section 7.11.1, p68.

C5 v): *The Proponent proposes to deep bury all dieback infested topsoil and overburden. CALM would prefer that Griffin identify diseased areas before topsoil and overburden stripping. Infected soil to be stockpiled separately and replaced on overburden heaps low in the reconstructed landscape. It is CALM's view that infected topsoil is better than no topsoil.*

Response: Griffin will identify dieback infected areas before topsoil stripping (Section 9.8.5, p106) and stockpile the infected soil separately. It will be replaced low in the reconstructed landscape.

C5 vi): *Will the Proponent be using the technique of "moonscaping" the slopes of overburden dumps? If not, why not?*

Response: Griffin's experience at its other coal mining operations in the Collie Basin has shown that there is no need to "moonscape" overburden stockpiles or rehabilitation areas for the purpose of slope stability.

If problems with slope stability are experienced at Ewington, "moonscaping" will be investigated as a possible solution in the rehabilitation trials.

C5 vii): *The Proponent places emphasis on revegetation using endemic natives. CALM is fully supportive of this option, however, Table 7.4 includes many exotic species or non-endemic species.*

Response: Reference Section 7.6.5, p63. Table 7.4 presents a list of species which have been successfully re-established on Griffin's rehabilitation programmes for its existing mining operations. However, rehabilitation at Ewington will be required to be as close as possible to the pre-existing State Forest therefore this list will need to be substantially refined to comprise only endemic natives for long term revegetation. However, some short-lived herbaceous plants such as introduced legumes and grasses may be included to provide rapid short term vegetative cover and stabilisation.

C5 viii): *The Proponent intends to rehabilitate with native plants. Where and how will the seed be attained? Where will seedlings be attained and will this source be certified as a dieback-free source?*

Response: Reference Section 7.6.5, p64. Seedlings will be obtained from a certified disease-free nursery which will raise native seedlings from locally collected seed. Introduced seed will be obtained from commercial seed suppliers.

C5 ix): *Grazing/browsing control may be required if the Proponent intends to use anti-erosion cover crops.*

Response: Griffin's experience with use of anti-erosion cover crops and existing revegetation areas suggests that grazing/browsing will not be a problem at Ewington. However, if there is a problem, possible controls will be investigated and implemented if appropriate.

C5 x): *Page 64. It is not clear what is meant by "vulnerable species". It is assumed vulnerable equates to rare or endangered and not to Phytophthora resistance.*

Response: Reference Section 6.10.2, p35. Under current listings the flora species *Restio ustulatus* and *Hibbertia silvestris* are regarded as vulnerable. They are under consideration for declaration as rare flora but are in need of further survey.

C5 xi): *The forested area between the mine and the Collie townsite is being depended on to screen or ameliorate many of Griffin's impacts. How does Griffin intend to contribute to its management to ensure its integrity and effectiveness.*

Response: Reference Section 8.2, p71. The natural ridge of high ground between the Collie townsite and the minesite will mask the majority of the proposed development. The forest on the ridge will offer very little additional masking effect to the minesite. Therefore Griffin does not intend to contribute to its management.

C6 i): *There is no discussion in the CER as to how dieback disease will be catered for in the alignment, construction and maintenance of the roading network.*

Response: Reference Section 9.8.5, p105. Griffin will develop a dieback management plan in consultation with CALM. All aspects of the roading network will be accounted for in this plan.

C6 ii): *There is some discussion in the CER as to where the gravel will come from to build the roading network for the mine. It is assumed, that in part at least, gravel will be won from the area to be mined. Is this sufficient for Griffin's needs? If not, how much and where is it proposed to acquire the balance.*

Response: Cemented laterite will be sourced from the area to be mined. Griffin is confident that the available material will be sufficient to fully construct the roading network. However, if there is a shortfall in suitable material, Griffin will import suitable roadmaking material. Griffin gives assurance that this shortfall will not be sourced from State Forest excepting that from existing gravel pits located in State Forest.

C6 iii): *As stated earlier the impact of clearing for roading should be kept to private property or nested with other utilities on Crown Land.*

Response: To minimise clearing, wherever it is practical and feasible, Griffin will endeavour to nest utilities sited in State Forest.

C7: *CALM would prefer that the final void be contoured to natural slopes and rehabilitated. This will require landforming to slopes less than 10^{o} from the horizontal rather than a "stable angle". It must be safe for access by people, vehicle and fauna and not present a coal fire hazard in future.*

Response: The proposed mining operation at Ewington will extract up to 60.8 million tonnes of coal during its expected life of 31 years (Section 7.1, p44). A comparatively large final void will remain following progressive backfill and rehabilitation of the mine pit. To contour this void to natural slopes less than 10^{o} would require large quantities of fill to be imported, the cost of which would not be feasible to Griffin.

Also, backfilling the final void would also restrict access to the remaining coal resource which may be required in the future. Reference Section 7.11.1, p68 and Response C11 ii).

In contouring the final void, Griffin will take into consideration guidelines prescribed by the Department of Mines publication "Guidelines on Safety Bund Walls Around Abandoned Open Pits, January 1991".

C8 i): *Although many shrub and understorey species do not depend on access to the water table in times of summer drought, many of the tree species do. The CER predicts water table effects up to 2.5km from the mine.*

Response: The calculated drawdown in the shallow aquifer is expected to be only 10cm up to 2.5km from the Ewington mine. This predicted drawdown is similar to those currently experienced around Griffin's Muja and Chicken Creek operations. Therefore, although dewatering of the deep aquifer will be extensive, the effect of this dewatering on the shallow aquifer will be minimal due to its high permeability. Reference Sections 8.6.2, p79 and 8.9.2, p85.

C8 ii): *There is also a confusing reference to minimal effects on sedgelands close to the mine and effects on semi-aquatic plants further afield being more significant. These vegetation types have already been identified in the CER as important bandicoot habitat.*

Response: The sedgelands in the vicinity of the minesite depend on seasonal rainfall which supplies a perched water table created by underlying clay sediments. The dewatering bores will extract water from the deep aquifers. This will result in limited drawdown in the superficial aquifer (reference Response C8 i). The perched water table would not be expected to experience drawdown as this water source is not directly connected to the superficial aquifer (Section 8.9.2, p85).

The reference to areas with semi-aquatic swamp plants further afield relates to small tributaries which may become influent due to drawdown, with streamflow infiltrating to the groundwater. Therefore the semi-aquatic plants relying on these tributaries may well experience drawdown (Section 8.6.2, p79). If it occurred, this drawdown would be expected to result in gradual changes in the vegetation associations to those not directly dependent on the water table.

C8 iii): *No attempt has been made to identify the impact of this effect on forest ecosystems. How will this be monitored and what can be done to ameliorate any detrimental effect?*

Response: Griffin's previous experience with the forest ecosystem surrounding the Muja and Chicken Creek operations indicates that limited drawdown in the surface aquifer will not have detrimental effects on the forest in the vicinity of Ewington.

Griffin will undertake discussions with CALM to determine the need for monitoring for groundwater drawdown effects on the forest ecosystem and appropriate monitoring and management programmes.

C9: *Coal dust in particular can seriously affect the growth and survival of rehabilitation. How does Griffin intend to manage dust accumulation on the photosynthetic surfaces of rehabilitation.*

Response: Griffin believes that coal dust will be largely restricted to within the mine pit. However, dust generation and emission by the minesite operations will be minimised by standard methods of dust control (Section 9.5, p100).

Experience shows that dust which may accumulate on plant photo-synthetic surfaces will be removed by seasonal rainfall.

C10 i): *On pages 86 and 87, reference is made to the spread of Phytophthora by wind. CALM has no evidence to suggest this is possible and it is generally accepted by workers in the field as not representing an infection vector.*

Response: Advice obtained from Hart Simpson & Associates, specialists in dieback survey and identification, indicates that the minor risk of dieback spores being spread by wind cannot be discounted. The two species of *Phytophthora* commonly found to occur in jarrah forest ecosystems, *P. cinnamomi* and *P. citricola* each form resistant chlamydospores and oospores respectively. Both types of spores would survive surface exposure and desiccation, and therefore could be transported by wind.

C10 ii): *Various comments made by the Proponent regarding the biology, spread and likelihood of infection being present in swamps leads the Department to believe that the Proponent has a limited under-standing of the disease and its management. A detailed dieback management plan should be produced so that disease management is fully integrated.*

Response: Reference specialist botanist's report Section 4.3, Appendix E. Griffin has specific experience with regard to management of dieback at the Chicken Creek operation. However CALM's dieback expertise is recognised and Griffin intends to prepare a dieback management plan in close conjunction with CALM. Reference Commitment 3.

C11 i): *The requirement for hand burns in and around the minesite represents a significant increase in the cost of managing this land. Does Griffin propose to cover this added cost?*

Response: Reference Commitment 6, p113. Griffin intends to develop a Fire Management Plan in conjunction with CALM, the Bush Fires Board and the local bushfire brigade.

Until final planning of the proposed minesite is underway, it is not possible to determine the extent of the development's impact on existing fire management in the Ewington area and the level of increased fire risk. Following construction of the roading network, if fire risk is significantly greater than the existing situation, Griffin will discuss implementation of appropriate fire control measures with CALM.

C11 ii): *Burning surface coal is a significant public risk in the coal basin. Griffin intends not to allow any waste to contain coal that can ignite. What responsibility has Griffin got to ensure this does not happen and what action will they take if it does?*

Response: The Ewington operation will produce waste which contains coal. However Griffin undertakes to ensure that no waste coal will be left uncovered. All material with the potential to ignite will be buried deeply in the overburden dumps (Section 8.9.6, p88). At the completion of mining, the exposed coal face will be covered with overburden to prevent spontaneous combustion of the coal seams (Section 7.11.1, p68).

These are well established practices at Griffin's existing mining operations. It would be counter-productive to Griffin's environmental management and rehabilitation efforts to allow material with the potential to ignite to remain exposed at the surface.

C12: *CALM fully supports the concept of this filtering system. It does not however believe it should be established on CALM managed land.*

Response: CALM's response with regard to possible utilisation of a bio-filter to treat the wastewater prior to disposal is noted. Consideration will be given to locating this facility on private land if practical and feasible to the mine plan.

C13: *The document does not adequately address the management of the visual resource in the establishment and development of the mine. Some attention is given to the ridge between the mine and the townsite but no comment is made on how the Proponent intends to minimise the visual intrusion of mine infrastructure and utilities. The degree to which this is necessary is dependent on the current value and condition of the present landscape components. An inventory of these may be necessary.*

Response: Reference Section 8.2.2, p72. The proposed Ewington minesite is not expected to cause significant visual impact. However Griffin will endeavour to minimise those impacts which do occur by earthworks and establishment of vegetation.

3. RESPONSES TO PUBLIC SUBMISSIONS

P1 i): *The noise modelling studies may require further investigation in order to confirm the potential degree of impact.*

Response: Further noise modelling studies will be conducted during detailed mine planning to confirm the potential degree of impact, particularly with regard to potential adverse noise impacts under certain atmospheric conditions.

P1 ii): *More detail is needed on the definition of the monitoring programme, quantification of an "adverse impact on nearby residents" and what remedial actions are possible.*

Response: Reference Section 9.6.1, p100 and Commitment 11, p115. An adverse impact on nearby residents can be quantified as that which exceeds acceptable levels specified in the Noise Abatement (Neighbourhood Annoyance) Regulations, 1979 and the Environmental Noise Management Procedure.

If noise levels are unacceptable, Griffin will implement remedial action to reduce noise emissions. Such action will involve application of engineering expertise to specific problem areas such as providing acoustic enclosures and use of noise suppressors and silencers. Truck drivers will also be encouraged to modify their speeds when approaching and exiting the mine pit.

P2: *More details are needed on the dust monitoring programme, specifically to do with how will problems be identified and rectified.*

Response: Commitment 5, p113. A static dust sampler (dust deposit gauge) will be rotated between two locations, one on the downwind boundary of the minesite, the second a few kilometres upwind of the minesite. A second dust sampler will be rotated between selected residences nearest to and downwind of the minesite. Samples will be collected quarterly from all locations. If dust levels become significantly elevated above baseline levels, action will be taken to control the source.

There are various methods by which dust emission can be reduced, including vegetative windbreaks and filters to reduce wind velocities and impede airborne dust; enclosing dusty machines; and regular watering of roads and active stockpiles. If dust control is necessary, the method appropriate to control at the source will be implemented.

P3: *Despite the prediction that there would be minimal, if any, effect on surrounding groundwater users, what arrangements would the Company consider if the effect is greater than predicted and is significant?*

Response: Reference Response GW1.

P4: *More detail is needed on the possible effects and mitigation measures for the impacts of blasting, including compensation if damage does occur.*

Response: Reference Section 9.6.2, p101 and Commitment 11, p115. The impact of blasting is difficult to predict due to the area's complex geology which is expected to result in high attenuation of vibration and therefore minimal impact.

If damage to property does occur due to blasting on the Ewington minesite, applications for compensation will be considered on a case-by-case basis.

Appendix 3

List of submittors

1. Shire Clerk
   Shire of Collie
   Throssel St
   Collie WA 6225

2. Water Authority of WA
   PO Box 305
   Bunbury WA 6230

3. Mr J Harvey
   18 Davis Rd
   Collie WA 6225

4. Mr S Mathews
   21 Palmer Rd
   Collie WA 6225

5. Executive Director
   Department of Conservation and Land Management
   North Boyanup Rd
   Bunbury WA 6230

6. Chief Executive Officer
   Department of State Development
   PO Box 7234
   Cloisters Square
   Perth WA 6850

7. Assistant Director
   Coal Mining
   Department of Mines
   100 Plain St
   East Perth WA 6004