

# **Water catchment and dam development, Mt Hampton, South of Southern Cross**

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**Water Authority of Western Australia**

**Report and recommendations  
of the Environmental Protection Authority**

**Environmental Protection Authority  
Perth, Western Australia  
Bulletin 718  
November 1993**

#### 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 report.

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 contents of the assessment report or 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  
12th Floor, Dumas House  
2 Havelock Street  
WEST PERTH WA 6005

#### CLOSING DATE

Your appeal (with the \$10 fee) must reach the Minister's office no later than 5.00 pm on **insert date**

### Environmental Impact Assessment (EIA) Process Timelines in weeks

Date	Timeline commences from receipt of full details of proposal by proponent	Time (weeks)
5/7/93	Proponent Document Released for Public Comment	
2/8/93	Public Comment Period Closed	4
18/8/93	Issues Raised During Public Comment Period Summarised by EPA and Forwarded to the Proponent	2
18/10/93	Proponent response to the issues raised received	9
11/11/93	EPA reported to the Minister for the Environment	3.5

ISBN 0 7309 5649 0  
ISSN 1030-0120  
Assessment No. 802

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## Summary and recommendations

This proposal by the Water Authority of Western Australia is to harvest and store water from a large, high granite outcrop known as Mt Hampton. Mt Hampton is located in a reserve for the purpose of "Water and Conservation of Flora and Fauna" about 60 km south-west of Southern Cross. The proponent has endeavoured to demonstrate to the Environmental Protection Authority that this proposal can be implemented without a significant impact to, or reduction of, conservation values of both the reserve and the flora and fauna at the base of Mt Hampton.

The water harvesting facilities include a rock drain constructed on the rock and a bitumen lined channel on the eastern side of the rock. Stage 1 will include a silt pit and a 20 000 m<sup>3</sup> storage dam. Ultimately the rock drains would be extended and the dam expanded to 30 000 m<sup>3</sup>. The 860 m road into the reserve would be upgraded with gravel.

The reserve is located in a part of the wheatbelt which still has a considerable area of remnant vegetation. There are three other reserves for the purpose of Conservation of Flora and Fauna adjacent to or near Mt Hampton.

Vegetation along the eastern and northern base of Mt Hampton is dominated by Casuarina thicket containing scattered *Acacia* and *Leptospermum* further out. The western side of Mt Hampton is dominated by broombush thicket containing some *Allocasuarina*, *Acacia* and *Melaleuca*. There are approximately 13 ha of Casuarina thicket around the base of the rock.

Approximately 2.2 ha of Casuarina thicket would need to be cleared for the dam and bitumen lined channel.

About 7.3 ha of Casuarina thicket would have a reduced water supply because the drain and channel would divert runoff from the rock into the dam. The proponent and a botanist undertook a visual inspection of a number of existing rock catchments and concluded that the Consultative Environmental Review significantly overstated the potential impacts of reduced water supply on vegetation. The proponent noted that changes to the vegetation such as thinning (ie fewer trees per hectare) were not noticeable below long-established rock drains.

A vegetation survey of the potentially affected area at Mt Hampton in Spring 1993 did not record any Declared Rare Flora.

The vegetation type around the base of Mt Hampton is well represented within 15 km of the reserve (ie on a regional basis) and throughout Western Australia.

The proponent has made a commitment to undertake vegetation monitoring in consultation with the Department of Conservation and Land Management and the Environmental Protection Authority.

All disturbed areas not required for water supply would be rehabilitated with local indigenous species. A botanist would inspect sources of construction materials to ensure dieback and weeds were not introduced.

The proponent prepared a list of fauna likely to occur in the area and conducted a brief fauna survey.

Impacts on fauna in terms of food supply and habitat loss are not likely to be significant given the limited extent of changes to the vegetation noted above. However, the effects of the proposal on fauna with regard to potential changes to the water flow, the movement of fauna across the rock drain and the effects of locating a silt trap and water storage dam in the reserve need to be considered in the context of potential changes to species populations, fauna composition and conservation values of the reserve.

The potential effects of the proposal on frogs and other aquatic fauna was a concern raised in public submissions. The proponent has acknowledged that there may be some decline in the frog population but considers that the decline would not be significant for any particular species. There is a large area in the reserve to the north of Mt Hampton which would provide suitable habitat for frogs and not be affected by this proposal. Concerns were expressed that

frogs could not cross the rock drain. The proponent has made a commitment to provide frog crossing points every 20 m designed in consultation with Department of Conservation and Land Management and the University of WA.

None of the frogs recorded or likely to be present are uncommon or rare.

The effects on other aquatic fauna are not expected to be significant although one of three pools on Mt Hampton would have a reduced water supply as a result of this proposal. The new dam would provide additional habitat.

The silt pit and dam would be fenced and have slopes of 1:3 to ensure small animals could safely move up and down the slopes. Only small animals, aquatic fauna and birds would have access to the storage dam. The Environmental Protection Authority concurs with the proponents view that the silt trap and dam would have only minor effects on species populations and the composition of fauna.

The Environmental Protection Authority considers that;

- the proposal may cause minor changes to the flora and fauna of the reserve;
- the proposal would not cause local extinction of any species of flora or fauna; and
- the changes likely are environmentally acceptable.

Mt Hampton is prominent in the landscape, so its aesthetic values should be protected. The proponent has committed to colouring the drain walls, fences and other materials to blend in with the environment and to screen the silt pit and dam with indigenous vegetation based on plans prepared by a landscape architect.

Construction impacts and operational impacts have been adequately addressed.

## **Recommendation 1**

**The Environmental Protection Authority concludes that the proposal by the Water Authority of Western Australia for the water catchment and dam development, Mt Hampton, South of Southern Cross, is environmentally acceptable.**

**In reaching this conclusion the Environmental Protection Authority identified the main environmental factors requiring detailed consideration as:**

- **conservation significance of the site;**
- **potential impacts on flora and fauna;**
- **construction impacts; and**
- **operational impacts.**

**The Environmental Protection Authority concludes that the environmental factors mentioned above have been addressed adequately by the environmental management commitments given by the proponent.**

**Accordingly, the Environmental Protection Authority recommends that the proposal could proceed subject to the proponents commitments (See Appendix 1).**

# 1. Introduction and background

Mt Hampton is a large, high granite outcrop located in a reserve for the purpose of "Water and Conservation of Flora and Fauna" which has been vested with the National Parks and Nature Conservation Authority since 1974. The reserve is located in the wheatbelt, about 60 km south-west of Southern Cross.

As reflected in the reserve's purpose, proposals to collect and store surface runoff from Mt Hampton have been suggested for many years. Funding for this proposal became available through the State Government's Rural Water Strategy and the proposal was referred to the Environmental Protection Authority in May 1993. A Consultative Environmental Review level of assessment was set.

# 2. Description of the proposal

Figure 1 shows the proposed layout of the proposed rock drain, bitumen lined channel, silt trap and dam.

Figure 2 shows the typical profile and construction of the rock drain, bitumen channel and dam. The rock drain would have gaps every 20 m to permit frogs to cross the drain.

The Water Authority of Western Australia is seeking approval for the ultimate development, which includes the "possible" rock drains and a 30 000 m<sup>3</sup> dam. Stage 1 of the proposal is to construct the "proposed" bitumen lined channel, the "proposed" rock drain, the silt trap, the 20 000 m<sup>3</sup> dam and to upgrade the existing access track through the reserve.

The silt trap and dam would be constructed around an area which is, in part, without trees and currently used as a car park. Material for the access track will be sourced from outside the reserve. The car park which is currently located where the dam is proposed would be relocated to an area already clear of trees.

# 3. Existing environment

The existing environment is described in detail in the Consultative Environmental Review document. Aspects of the existing environment particularly relevant to environmental assessment of the proposal include:

- Vegetation of the eastern and northern base of Mt Hampton is dominated by Casuarina thicket containing scattered *Acacia* and *Leptospermum* further out. The west side of Mt Hampton is dominated by broombush thicket containing some *Allocasuarina*, *Acacia* and *Melaleuca*.
- No rare flora or fauna have been recorded. A survey for rare flora took place in October 1993 and a brief fauna survey took place in April 1993.
- No dieback was recorded during vegetation surveys.
- North of Mt Hampton, but within its associated reserve, is a large area of shallow soils underlain by granite, with occasional low granite outcrops. This area has many pools of water in winter.
- No sites of known European or Aboriginal heritage value were identified within the area to be affected by this proposal.
- The size and height of Mt Hampton give it prominence in the landscape.
- Mt Hampton is a significant distance from any major road or town and few people live around the area.

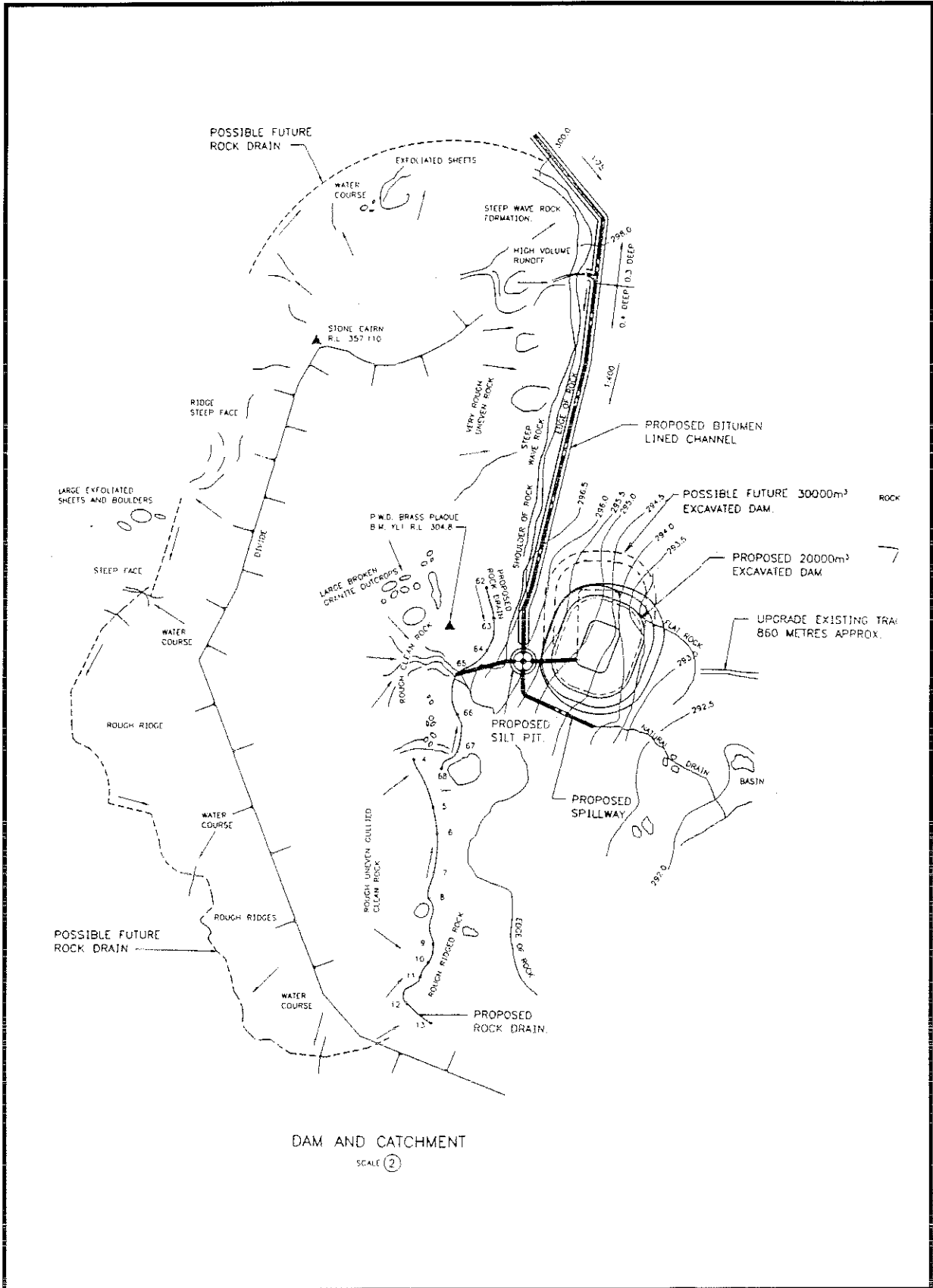


Figure 1: Proposed layout of the proposed rock drains, bitumen lined channel and dam

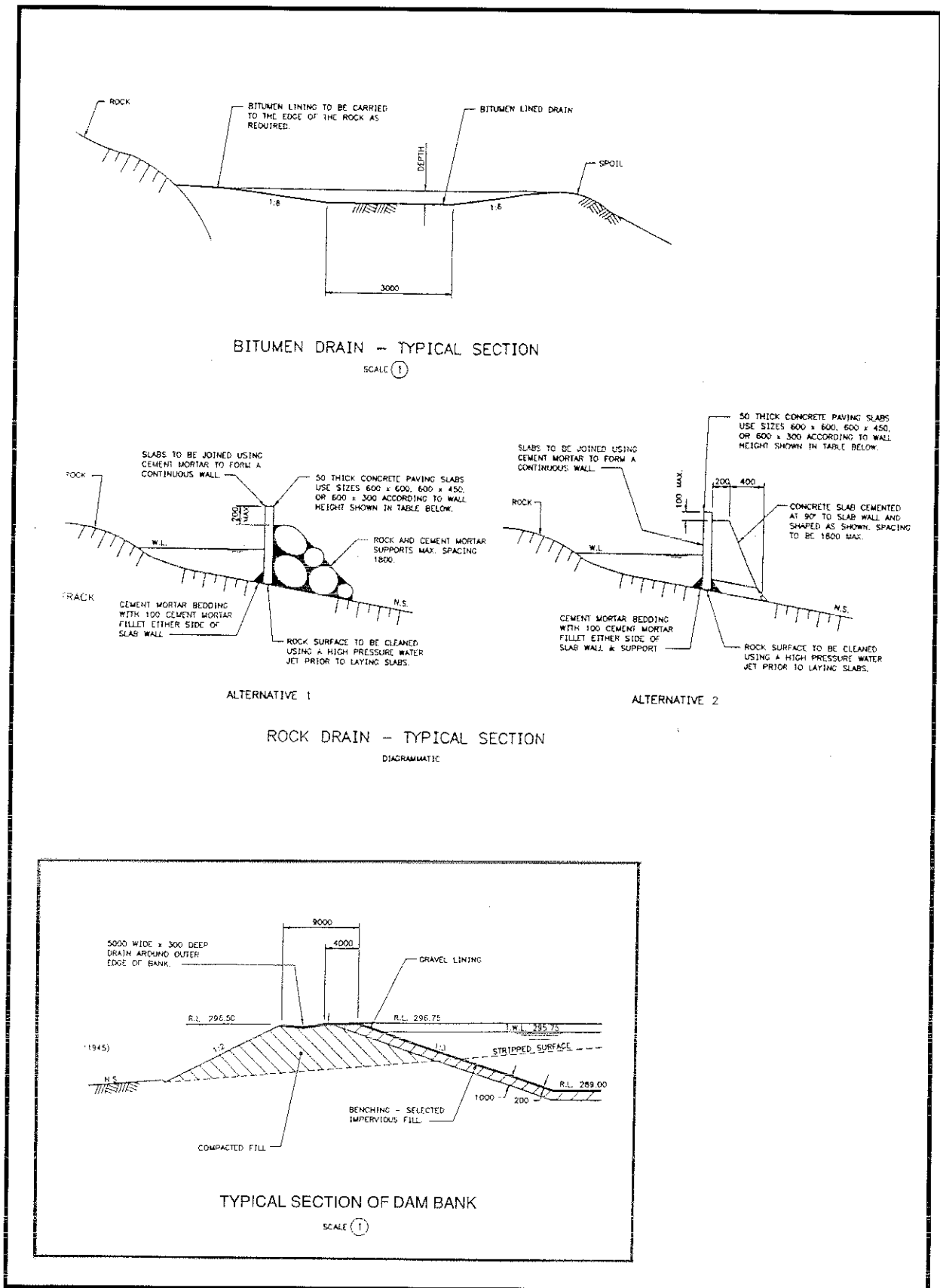


Figure 2: Typical profile and construction of the rock drain, bitumen channel and dam



## **4. Public submissions**

The Environmental Protection Authority required a four week public review period for the Consultative Environmental Review document, which ended on 2 August 1993. The availability of the Consultative Environmental Review document was advertised in the Authority's weekly advertisement in *The West Australian*, in local newspapers, and was circulated to relevant government agencies. Seven submissions were received from State and local government agencies and one joint submission was received from two members of the public.

A detailed summary of the points raised in submissions and the proponent's response to submissions is presented in Appendix 2. In summary, the following topics were raised in submissions:

- the need for and alternatives investigated for the proposal;
- the conservation significance of the reserve;
- adequacy of flora, fauna and aboriginal site surveys;
- the impacts of reduced water supply at the base of Mt Hampton on flora and fauna;
- the impact of the proposal on birds, frogs and invertebrates;
- impact of the proposal on recreational users and aesthetic appreciation;
- source of materials for road and rock drain construction; and
- potential for dieback and weeds to be imported into the reserve.

In response to requests in public submissions, the proponent decided to complete the Spring 1993 flora survey before forwarding the response to submissions to the Environmental Protection Authority.

The proponent made additional commitments in the response to public submissions. The consolidated list of commitments appears in Appendix 1.

## **5. Environmental assessment**

### **5.1 Conservation significance of the site**

The conservation significance ascribed to an area by the community depends on a number of factors. The occurrence of flora and fauna of the area elsewhere in the region and the ability of the area in question to maintain viable populations of the flora and fauna to be protected are key considerations. Other factors, such as uniqueness of landscape features are sometimes considered as criteria in determining the conservation significance of an area.

The conservation value ascribed by the community to the area around the base of Mt Hampton is clearly indicated by the inclusion of "Conservation of Flora and Fauna" in the purpose of the reserve in which Mt Hampton lies. The size and height of the Mt Hampton granite outcrop are features which were considered by one submission to add to the conservation value of the reserve. The overall area of the reserve in which Mt Hampton lies is 2 480 ha if the adjacent reserve for the Conservation of Flora and Fauna is included.

The Environmental Protection Authority and some public submissions sought more information from the proponent regarding the regional significance of both the reserve and the flora and fauna at the base of Mt Hampton potentially affected by the proposal, to assess whether or not regionally significant conservation values would be adversely affected by the proposal.

The proponent's response to submissions regarding the regional significance of the reserve indicates that within 15 km of Mt Hampton about 50% of the land is covered with remnant

vegetation and there are three other reserves for the purpose of Conservation of Flora and Fauna adjacent or nearby (See Appendix 2, Figure 2A).

The regional conservation significance of the flora and fauna at the base of Mt Hampton potentially affected by the proposal is considered in detail in Section 5.2 below.

The purpose of the reserve in which Mt Hampton lies includes "Water" as well Conservation of Flora and Fauna. The Environmental Protection Authority considers that the proponent has demonstrated that water harvesting and storage facilities can be constructed and operated without a significant impact on, or reduction of, the conservation values of the reserve.

## **Recommendation 1**

**The Environmental Protection Authority concludes that the proposal by the Water Authority of Western Australia for the water catchment and dam development, Mt Hampton, South of Southern Cross, is environmentally acceptable.**

**In reaching this conclusion the Environmental Protection Authority identified the main environmental factors requiring detailed consideration as:**

- **conservation significance of the site;**
- **potential impacts on flora and fauna;**
- **construction impacts; and**
- **operational impacts.**

**The Environmental Protection Authority concludes that the environmental factors mentioned above have been addressed adequately by the environmental management commitments given by the proponent.**

**Accordingly, the Environmental Protection Authority recommends that the proposal could proceed subject to the proponents commitments (See Appendix 1).**

## **5.2 Impacts on conservation values**

### **5.2.1 Flora**

The existing conservation values of the reserve in which Mt Hampton lies must be maintained. Any potential change to the vegetation of the reserve needs to be assessed in a local and regional context.

The proponent proposes to clear an area of about 140 x 40 m (0.5 ha) of Casuarina thicket for the bitumen lined channel, 1.6 ha of Casuarina thicket for the silt trap and dam and expects 7.3 ha of Casuarina thicket would experience a reduced water flow. The total area of Casuarina thicket around the base of Mt Hampton is about 13 ha. The proponent has committed to keeping vegetation clearing to a minimum and to clear in consultation with Department of Conservation and Land Management.

In the Consultative Environmental Review document the proponent originally predicted that reduced water flow to the Casuarina thicket would result in the death of some trees (thinning) and a change to grassland for some parts of the thicket. However, as a result of visually inspecting a number of existing rock catchments with a botanist, the proponent now considers that this prediction significantly overestimated likely impacts. The proponent considers that vegetation changes such as thinning were not noticeable in Casuarina thickets below long-established rock drains.

One submission expressed the view that the Casuarina thickets below Mt Hampton were much wider than elsewhere in Western Australia and that this gave them greater conservation significance because a more diverse range of fauna could live in the larger width. However, the Environmental Protection Authority concurs with views expressed by the proponent that Casuarina thickets at the base of granite outcrops are well represented regionally and that Casuarina thickets occur throughout Western Australia in a wide range of soil types.

Concern was expressed in submissions that the rare flora survey proposed for Spring 1993 should be undertaken before environmental impact assessment. On this basis the proponent decided to delay responding to public submissions until the Spring 1993 flora survey had been completed. No Declared Rare Flora were recorded in the Spring 1993 survey.

The Environmental Protection Authority expects that other types of vegetation, such as mosses and *Eucalyptus* species growing beyond the Casuarina thicket would not be significantly affected by changes to the site hydrology.

The proponent has committed to re-locating the car park in an area already clear of Casuarina thicket and to using indigenous species for rehabilitation works.

The proponent has also made a commitment to develop a vegetation monitoring programme in consultation with Department of Conservation and Land Management and the Environmental Protection Authority.

Based on the above information, the Environmental Protection Authority;

- acknowledges that the likely impacts on flora were probably overstated in the Consultative Environmental Review document;
- considers that the proponent's commitments are adequate; and
- considers that the likely change to flora from the proposal is environmentally acceptable.

### **5.2.2 Fauna**

Changes to the fauna populations (ie. increase, decrease or local extinction of species) of the reserve may occur from changes to the vegetation, reduced water flow at the base of the rock, increased water availability to species which are able to access the storage dam and increased levels of human disturbance from farmers collecting water. As indicated above, changes to the vegetation are not expected to be significant. The reduced water flow at the base of the rock could affect frogs and aquatic invertebrate species. As the dam would be fenced, increased water availability could only affect populations of small animals, aquatic fauna and birds. The slope of the sides of the dam and silt pit are 1:3 to ensure small animals can safely move up and down the sides. The increase in human disturbance would only affect a small portion of the reserve.

The effects on specific groups of animals is considered in detail below.

To provide information for the Consultative Environmental Review document, the proponent prepared lists of fauna likely to be recorded at Mt Hampton and undertook a brief fauna survey over four days which included a total of 113 trap nights and sampling of aquatic macroinvertebrate fauna. No rare or priority species were recorded during the fauna survey. The rare or priority species which could be present are not species likely to be dependent on granite outcrops and their associated vegetation. The survey of aquatic macroinvertebrate fauna showed that water was present in rock pools on Mt Hampton for some time (ie. months rather than weeks).

Issues raised in public submissions included a concern that the fauna survey was not adequate, that the local and regional significance of fauna recorded or likely to occur at Mt Hampton was not adequately detailed and that some animals recorded were at the edge of their range at Mt Hampton. The proponent acknowledged that the fauna survey was not intended to be comprehensive and believes that a comprehensive survey would require a survey over a number of years. The local and regional significance of fauna likely at Mt Hampton is detailed in the

proponents response to submissions (Appendix 2, pages 24 to 28). The proponent expects that no species or group of species would become locally extinct as a result of the proposal. Although Mt Hampton may be at the edge of a species range, the species may be common locally and within Western Australia.

### *Frogs*

The potential effect of this proposal on frogs was a concern raised in several submissions. The proponent acknowledges that there may be some decline in the frog population but considers that the decline would not be significant for any particular species. None of the frogs recorded or likely to be recorded are uncommon or rare. The proponent reports that frogs still breed in pools above the rock drain at Wave Rock and that one species of frog is known to live in rock drains. The proponent considers that the population size of frogs at Mt Hampton is more likely to be limited by food supply than water availability.

There is a large area to the north of Mt Hampton unaffected by the proposal which consists of shallow soils over granite with many pools during winter providing suitable habitat for a range of frogs.

In response to public submissions expressing concern that the rock drains would present a barrier to frog movement the proponent has made a commitment to provide frog crossing points across the rock drain every 20 m. The crossing points would be designed in consultation with the Department of Conservation and Land Management and the University of Western Australia.

### *Other aquatic fauna*

The report by Dr Jenny Davis in the Consultative Environmental Review document notes that no new species of aquatic macroinvertebrates were collected during her survey and that one of three pools on Mt Hampton would be affected by a reduced water supply. The proponent's response to submissions noted that some aquatic fauna could live in the new dam.

Concerns were expressed in submissions that the chironomid genus *Archaeochlus* would be adversely affected by this proposal and that the alkalinity of waters of the rock could be adversely affected by lime from concrete mortar. The proponents response indicates that the chironomid genus *Archaeochlus* is widely distributed in Western Australia and that the rock drains would not adversely affect the habitat used by this genus. In response to concerns that the pH (ie. acidity or alkalinity) of the waters around the base of Mt Hampton could be changed by the proposed rock drains the proponent responded that precautions would be taken to avoid porous construction so that leaching of lime does not occur.

### *Fauna able to access the dam*

Fauna which are able to access the dam would be limited to small mammals, reptiles and birds. The proponent considers that changes as a result of the proposal to the populations of individual species and to the composition of fauna at the reserve will be minor.

### *Concluding comments*

Based on the above information, the Environmental Protection Authority;

- acknowledges that there may be minor changes to the populations of individual species and to the composition of the fauna;
- considers that the proposal would not cause local extinctions or be of concern in a regional context, and would therefore not significantly affect the conservation value of the reserve around Mt Hampton; and
- considers that the likely extent of changes to fauna populations and composition from the proposal would be environmentally acceptable.

### 5.2.3 Aesthetic values

The size and height of Mt Hampton give it prominence in the landscape. However, as Mt Hampton is a significant distance from any major road or town and few people live in the area because nearby farms are large, it seems likely that little recreational use currently occurs. High recreational use would not be consistent with the current purpose of the reserve. Notwithstanding this, Mt Hampton is probably unique because of its size and height. Therefore the aesthetic values need to be protected.

Public access to the reserve would only be restricted by fencing around the silt pit and dam.

In response to public submissions, the proponent provided additional commitments to colour the rock drain walls, fences and other materials to blend in with the surrounding environment and to screen the dam and silt pit by re-planting local indigenous species in accordance with plans prepared by a landscape architect.

The Environmental Protection Authority considers that these measures proposed by the proponent would adequately minimise aesthetic impacts.

### 5.3 Construction impacts

Potential construction impacts such as bare areas where vegetation has been removed, or the introduction of weeds and diseases, should be minimised to ensure that there are no long-term adverse effects on conservation values of the reserve. The following table identifies issues associated with construction impacts and provides a summary of the proponent's commitments to address the issues of concern.

Issue	Summary of proponents commitments
Mt Hampton and its associated reserve should not be used as a source of construction materials as this would increase the degree of disturbance to flora and fauna.	All clay and gravel will be obtained from Shire borrow pits that are not located in nature reserves. The proponents response to public submissions states that no rocks are to be used from Mt Hampton.
Dieback and weeds may be introduced with imported materials.	A botanist will be required to inspect the sources of construction materials. The site supervisor will ensure all activities are undertaken according to Department of Conservation and Land Management dieback hygiene procedures.
Rare flora may be removed during construction	A rare flora survey has been undertaken and no rare species will be affected.
Noise, dust and vibration	The Environmental Protection Authority does not expect noise to be a problem because the nearest residence is 2.5 km away. Dust control measures will be undertaken as required. Local residents will be advised personally by mail or telephone should blasting be required.
Removal of construction wastes	All construction debris and soil and vegetation which cannot be used in on-site earthworks or for rehabilitation will be removed and disposed of at the nearest Shire of Yilgarn landfill site.
Bare areas need to be rehabilitated	All disturbed areas not required for successful and safe operation of water supply will be rehabilitated with indigenous species in consultation with the Department of Conservation and Land Management.

The Environmental Protection Authority considers that the proponent's commitments would ensure adequate management of construction impacts.

## **5.4 Operational impacts**

Once constructed, the silt pit will need to be cleaned out from time to time. Also, if any vegetation dies around the base of Mt Hampton it would be desirable to remove it for aesthetic reasons. As discussed above (Section 5.2.2) increased human disturbance is not expected to be a significant issue.

In response to concerns raised in submissions the proponent has decided that, rather than distribute silt cleaned out from the silt pit over the car park, it will be removed to the nearest Shire of Yilgarn landfill site.

The Environmental Protection Authority does not consider the proposal is likely to lead to significant tree deaths. Nevertheless, the proponent has committed to ensuring that on-going maintenance includes removal of trees that die (if any) as a result of reduced water flow.

The Environmental Protection Authority considers that the on-going operation of the proposal would have a minimal environmental impact and is therefore environmentally acceptable.

## **6. Conclusions**

The Environmental Protection Authority concludes that the proposal by Water Authority of Western Australia for the water catchment and dam development at Mt Hampton, south of Southern Cross, is environmentally acceptable.

In reaching this conclusion the Environmental Protection Authority identified the main environmental factors requiring detailed consideration as:

- conservation significance of the site;
- potential impacts on flora and fauna;
- construction impacts; and
- operational impacts.

The Environmental Protection Authority concludes that the environmental factors mentioned above have been addressed adequately by the environmental management commitments given by the proponent.

Accordingly, the Environmental Protection Authority recommends that the proposal could proceed subject to the proponents commitments (See Appendix 1).

The Authority has established an implementation and auditing system which requires the proponent to advise the Authority on how it would meet the requirements of the environmental conditions and commitments of the project. The proponent would be required to develop a Progress and Compliance report for this project as a section of the recommended audit programmes.

The Authority's experience is that it is common for details of the proposal to alter through the detailed design and construction phase. In many cases alterations are not environmentally significant or have positive effects on the environmental performance of the project. The Authority believes that such non-substantial changes, and especially those which improve the environmental performance and protection, should be provided for.

The Authority believes that any approval for the proposal based on this assessment should be limited to five years. Accordingly, if the proposal has not been substantially commenced within five years of the date of this report, then such approval should lapse. After that time, further consideration of the proposal should occur only following a new referral to the Authority.

## **7. Recommended environmental conditions**

Based on its assessment of this proposal and recommendations in this report, the Environmental Protection Authority considers that the following Recommended Environmental Conditions are appropriate.

### **WATER CATCHMENT AND DAM DEVELOPMENT, MT HAMPTON, SOUTH OF SOUTHERN CROSS (802)**

#### **1 Proponent Commitments**

The proponent has made a number of environmental management commitments in order to protect the environment.

- 1-1 In implementing the proposal, the proponent shall fulfil the commitments (which are not inconsistent with the conditions or procedures contained in this statement) made in the Consultative Environmental Review and in response to issues raised following public submissions. These commitments are consolidated in Environmental Protection Authority Bulletin YYY as Appendix 1. (A copy of the commitments is attached.)

#### **2 Implementation**

Changes to the proposal which are not substantial may be carried out with the approval of the Minister for the Environment.

- 2-1 Subject to these conditions, the manner of detailed implementation of the proposal shall conform in substance with that set out in any designs, specifications, plans or other technical material submitted by the proponent to the Environmental Protection Authority with the proposal. Where, in the course of that detailed implementation, the proponent seeks to change those designs, specifications, plans or other technical material in any way that the Minister for the Environment determines on the advice of the Environmental Protection Authority, is not substantial, those changes may be effected.

#### **3 Decommissioning**

The satisfactory decommissioning of the project, removal of the plant and installations and rehabilitation of the site and its environs is the responsibility of the proponent.

- 3-1 At least six months prior to decommissioning, the proponent shall prepare a decommissioning and rehabilitation plan.
- 3-2 The proponent shall implement the plan required by condition 3-1.

#### **4 Proponent**

These conditions legally apply to the nominated proponent.

- 4-1 No transfer of ownership, control or management of the project which would give rise to a need for the replacement of the proponent shall take place until the Minister for the Environment has advised the proponent that approval has been given for the nomination of a replacement proponent. Any request for the exercise of that power of the Minister shall be accompanied by a copy of this statement endorsed with an undertaking by the proposed replacement proponent to carry out the project in accordance with the conditions and procedures set out in the statement.

#### **5 Time Limit on Approval**

The environmental approval for the proposal is limited.

- 5-1 If the proponent has not substantially commenced the project within five years of the date of this statement, then the approval to implement the proposal as granted in this statement shall lapse and be void. The Minister for the Environment shall determine any question as to whether the project has been substantially commenced. Any application to extend the period of five years referred to in this condition shall be made before the expiration of that period, to the Minister for the Environment by way of a request for a change in the condition under Section 46 of the Environmental Protection Act. (On expiration of the five year period, further consideration of the proposal can only occur following a new referral to the Environmental Protection Authority.)

## **6 Compliance Auditing**

In order to ensure that environmental conditions and commitments are met, an audit system is required.

- 6-1 The proponent shall prepare periodic "Progress and Compliance Reports", to help verify the environmental performance of this project, in consultation with the Environmental Protection Authority.

### **Procedure**

The Environmental Protection Authority is responsible for verifying compliance with the conditions contained in this statement, with the exception of conditions stating that the proponent shall meet the requirements of either the Minister for the Environment or any other government agency.

If the Environmental Protection Authority, other government agency or proponent is in dispute concerning compliance with the conditions contained in this statement, that dispute will be determined by the Minister for the Environment.



# **Appendix 1**

## **PROPONENT'S COMMITMENTS**

**WATER CATCHMENT AND DAM DEVELOPMENT, MT HAMPTON, SOUTH OF  
SOUTHERN CROSS (802)**

**WATER AUTHORITY OF WESTERN AUSTRALIA**

## 8. PROPONENT'S COMMITMENTS

The following commitments are made by the Water Authority with respect to the Mt Hampton project. These commitments take into account the concerns raised in the EPA's summary of submissions.

### 8.1 PRECONSTRUCTION

- 8.1.1 CALM will be notified prior to commencement of construction.
- 8.1.2 To ensure that declared weeds and dieback are not introduced to the reserve a botanist will be required to inspect the sources of construction materials, particularly gravel and clay. All imported clay and gravel will be obtained from Shire borrow pits that are not located in nature reserves and which have been declared dieback free.

### 8.2 DURING CONSTRUCTION

- 8.2.1 Vegetation clearing will be kept to a minimum. Clearing will be restricted to an area of approximately 1.6 ha ( ultimately 2.2 ha ( approximately 16.8 % of the existing *Allocasuarina* thicket ) ) which will allow for the construction and operation of the dam, silt pit and bitumen-lined channel.
- 8.2.2 Vegetation clearing will be conducted in consultation with CALM. No rare flora has been found during the two field visits, however if rare flora is found during construction then the feasibility of making modifications to the rock catchment and dam design would need to be considered.
- 8.2.3 The site supervisor will ensure that all activities are undertaken according to CALM dieback hygiene procedures to prevent the introduction of fungal diseases and weeds into the reserve. This will be done to the satisfaction of CALM.
- 8.2.4 If construction noise levels prove to be a problem on local properties, the Water Authority recognises its obligation to devise corrective action under the noise abatement statutes of Western Australia. This will be to the satisfaction of the EPA.
- 8.2.5 Local residents will be advised personally by mail or telephone should blasting be required.
- 8.2.6 The site supervisor will inform construction workers that any archaeological material encountered during ground disturbance must be reported as outlined under Section 15 of the Aboriginal Heritage Act, 1972-80. This commitment will be carried out to the satisfaction of the site supervisor and the Department of Aboriginal Sites WA Museum.

- 8.2.7 The site supervisor will ensure the Aboriginal site at Mt Hampton will not be disturbed by the Water Authority or its contractors during construction.
- 8.2.8 Dust control measures will be undertaken as required or as directed by the EPA.
- 8.2.9 To minimise the aesthetic impact of the project, rock drain walls, fences and other materials will be coloured to blend in with the surrounding environment.
- 8.2.10 Concrete slabs will be used in the construction of the rock drains. No rocks will be used from Mt Hampton. Narrow gaps ( 600 mm ) will be left in the rock drain walls, enabling the movement of frogs through the walls as well as up and down the sides of the rock. These frog passages will be constructed every 20 m along the walls and will be designed in consultation with CALM and the University of WA.
- 8.2.11 All construction debris, and soil and vegetation which cannot be used in on-site earthworks or for rehabilitation, will be removed and disposed of at the nearest Shire of Yilgarn landfill site. No soil will be deposited within the reserve outside the areas that will be cleared to allow construction activities to occur.
- 8.2.12 The car park facilities at Mt Hampton will be relocated to the east of the proposed dam in an area already clear of *Allocasuarina* thicket. The public car park will be formalised to prevent uncontrolled vehicle access to the reserve. This will be to the satisfaction of CALM.
- 8.2.13 The recreational values of Mt Hampton will not be significantly impacted. Only the silt pit and the dam will be fenced and off limits to the public.
- 8.3 POST CONSTRUCTION**
- 8.3.1 All disturbed areas not required for the successful and safe operation of the water supply will be rehabilitated with local indigenous species in consultation with CALM and in accordance with CALM Policy Statement No 10 on Rehabilitation of Disturbed land ( November 1986 ). Vegetation will be planted to screen the dam and silt pit from the access road and car park. A landscape architect will be employed to develop a landscape master plan of the construction area to reduce the impact of the project.
- 8.3.2 Ongoing maintenance of the water supply at Mt Hampton will be carried out by the Water Authority or local community, dependent on the outcome of negotiations between both parties regarding operation of the water supply. This maintenance will also include the removal of any dead trees in the unlikely event that they die to the nearest Shire of Yilgarn landfill site

- 8.3.3 A vegetation monitoring programme will be developed in consultation with CALM and submitted to the EPA for their consideration and endorsement. Monitoring and reporting of the findings to CALM and the EPA will be conducted on an annual basis for the first three years with the timing of further monitoring determined following discussions with CALM.
- 8.3.4 Wherever possible the results of the monitoring programme will be used to reduce the impact of the project on vegetation. In this respect there is the potential to relocate sections of the rock drain and modify the bitumen channel if there is any significant impact on vegetation. Detailed design of the second stage of development could also be modified to suit the findings of the monitoring programme.
- 8.3.5 Any silt removed from the silt pit will be disposed of at the nearest Shire of Yilgarn landfill site.

(MTIBPACM.DOC)

## **Appendix 2**

### **SUMMARY OF SUBMISSIONS AND PROPONENTS RESPONSE**

**Halpern  
Glick  
Maunsell**



**WATER AUTHORITY OF WESTERN AUSTRALIA**

**RESPONSE TO SUBMISSION**

**MT HAMPTON WATER SUPPLY SOURCE**

**CONSULTATIVE ENVIRONMENTAL REVIEW**

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**WATER AUTHORITY OF WESTERN AUSTRALIA  
RESPONSE TO SUBMISSION  
MT HAMPTON WATER SUPPLY SOURCE  
CONSULTATIVE ENVIRONMENTAL REVIEW**

**1. GENERAL COMMENTS**

- 1.1 *In view of water deficiency problems faced by this area the need for a secure, emergency water supply was strongly endorsed.*

**Response**

Comment noted.

- 1.2 *There was concern that the CER was deficient with respect to investigations into alternative water resources in the broader area and the need for the dam.*

**Response**

See Section 7, Part 4.1 in page 20 of this report.

- 1.3 *The proposal should not proceed until a number of outstanding issues are adequately addressed.*

**Response**

The proponent believes that in light of the information presented in the CER and in these responses to submissions there are no outstanding issues that remain to be addressed.

- 1.4 *Whilst the historical inclusion of water in the purpose of the reserve is recognised the proposal will directly affect the birds and animals that use the Allocasuarina stands and the frog population at the base of the rock.*

**Response**

*Allocasuarina huegeliana* found at the base of the rock is not a rare species neither are any of the frogs which are expected to be found in the reserve.



### *Allocasuarina*

The *Allocasuarina* is found in the southwestern province of Western Australia, in the Avon, Darling, Stirling and Eyre Provinces (Beard, undated). It is therefore widely distributed. This species is locally common around Perth to Merredin and southwards to Albany and Ravensthorpe. Eastwards it is found nearly to Coolgardie, Norseman and in the Israelite Bay area. North of Perth the *Allocasuarina* is not common for 250km, but is then found in several localities as far as the Murchison River Gorge.

The greater part of the distribution of the species is in the warm semi-arid climatic zone, but the belt from Perth to Albany is in the warm sub-humid zone. An apparent disjunct occurrence near Leonora is in the warm arid zone. With the exception of Perth, Albany and Esperance, which have relatively high rainfall, the 50 percentile is 300-500mm and the lowest on record, 175-225mm. The whole area is in a winter rainfall zone with dry to very dry summers (Doran and Hall, 1981).

The *Allocasuarina* typically occurs on and around scattered granite outcrops in the Western Shield, but it is also found on sandplains and on ferruginous banded ironstone. Whilst the *Allocasuarina* is often found on coarse granitic sands, it has been recorded from a wide range of soil types. These range from yellow clay sands to sandy and gravelly loams, sandy clays, sandy types of all gradations and lateritic clays (Doran and Hall, 1981).

The broad vegetation types in which the *Allocasuarina* grows include woodland in the main sheep-wheatbelt areas east of Perth, and woodland in association with grassy open shrub and some heath as well as a little shrubby open scrub over the remaining area. Much of the area of occurrence is rich in species of small shrubs 1-5m tall and there is a wide range of eucalypts (Doran and Hall, 1981).

The predicted impact on the *Allocasuarina* thicket given in the CER is conservative. A recent survey of Merredin Rock, Muntadgin Rock, Mt Roe, Wave Rock and The Humps, which all have rock drains directing water into dams showed healthy *Allocasuarinas*, understorey and groundcover growing beneath rock drains at all these rocks (see photographs in Appendix A). On this basis it is unlikely the vegetation beneath the rock drains at Mt Hampton will be significantly affected by the proposed rock drains to be constructed on Mt Hampton unless the vegetation needs to be cleared to make way for the dam. The dam will occupy an area approximately 140mx120m (for 20,000kL storage) and later, may be expanded another 50mx120m (for 30,000kL storage). Most of the dam site supports *Allocasuarina* apart from 30mx30m of this area which is devoid of vegetation. Approximately 16.8% of the existing *Allocasuarina* stands at Mt Hampton will be cleared to make way for the dam. The *Allocasuarina* which will be undisturbed, contains fewer weeds and the understorey beneath the trees is in better condition than that which will be directly impacted by dam construction.

## Frogs

It is acknowledged that a world-wide concern for frogs has arisen in recent years as a result of a widespread reduction in the number of frogs recorded. In Australia this is particularly obvious in parts of south-eastern Australia. The reasons for frog decline are probably complex but suggestions have included the widespread use of pesticides, draining of swamps for development purposes, widespread clearing, changing land practices and introduced predators.

None of the frogs which are found to occur at Mt Hampton are rare and *Crinia pseudinsignifera*, *Heleioporus albopunctatus*, *Limnodynastes dorsalis*, *Neobatrachus kunapalari*, *Neobatrachus pelobatoides* and *Pseudophryne guentheri* are all widespread in the wheatbelt (Dr J.D. Roberts, University of Western Australia, pers.comm; Tyler, Smith and Johnstone, 1984).

While it is acknowledged there may be some decline in the number of frogs at the base of Mt Hampton as a result of the construction of the dam it is not expected that any species will be significantly impacted by construction.

One species, *Pseudophryne guentheri*, has adapted to rock drains associated with a dam at Yellowdine Rock by living in detritus and accumulated soil inside these walls (Dr J.D. Roberts, University of WA, pers.comm.).

None of the frogs are solely dependent on *Allocasuarina* thicket for survival and all frogs can be found in association with many other plants. In addition, the frogs in the reserve are not restricted to the base of the rock; most are predicted to live throughout the reserve. Numerous rock pools occur 50m or so north-west and north-east of Mt Hampton and these will not be affected by the dam.

*Myobatrachus gouldii* deposits its eggs underground, has no tadpole stage and is not dependent on *Allocasuarina* or rock pools; neither are the other species to be found at the reserve, although most require water for breeding. Pools and puddles are common in the landscape away from granite rocks, and these can be used by frogs for breeding.

Some incidental observations undertaken during the spring rare flora survey of a number of granite outcrops in the area showed the following frogs can be found in rock pools:

Mt Bayly	-	<i>Neobatrachus pelobatoides</i>
		<i>Pseudophryne occidentalis</i>
The Humps	-	<i>Crinia pseudinsignifera</i>
Mt Roe	-	<i>Crinia pseudinsignifera</i>

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This is not a comprehensive list and as habitats at all these rocks are similar to Mt Hampton all the frogs to be found at Mt Hampton are expected to occur at the other rocks.

#### Birds

It is unlikely the dam will have a severe negative impact on birds. There are many trees and mallee in the reserve and no bird species would be entirely dependent on the *Allocasuarina* in the dam site for survival. Some birds will benefit from the project as they will have a continuous supply of drinking water throughout the year.

*Allocasuarina* can grow beneath rock drains and as revealed in the survey it is anticipated that the *Allocasuarina* which remains uncleared after dam construction will continue to support birds and other animals (see photographs Appendix A).

- 1.5 *Minor errors in referencing. Beard 1972 is an authority on vegetation, not geology and Gee 1972 is an authority on geology, not soils.*

#### Response

While it is true that Beard is primarily an authority on vegetation, he also reports the geology of the project area in the publication referenced. There is every reason to believe that Beard's description is based on sound research. Similarly, while Gee is acknowledged to be an expert on geology, he also provides information on soils in the area.

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## 2. CONSERVATION SIGNIFICANCE OF THE SITE

### 2.1 General Comments

2.1.1 *For good decision making, the importance of Mt Hampton needs to be established in the broader context, eg the extent of nature reserves in the area, the extent of agricultural clearing and existing and potential land degradation, etc. This could be assessed within the context of Natural Resource Zones for the South West Land Division identified by the Western Australian Department of Agriculture and the EPA.*

#### Response

Figure 2A developed from information supplied by the Department of Agriculture, illustrates the amount of vacant Crown land near Mt Hampton and this land is considerable even within 15km of the reserve. This provides the opportunity to create more reserves for the conservation of flora and fauna in the vicinity of Mt Hampton.

The following reserves exist within 15km of Mt Hampton:

- . Reserve 28323 (Mt Bayly) Conservation of flora and fauna vested in NPNCA with an area of 1179.8306ha.
- . Reserve 32995 (adjacent to Mt Hampton) Conservation of flora and fauna vested in NPNCA with an area of 1886.0468ha;
- . Reserve 34776 (Neendojer Reserve) Conservation of flora and fauna vested in NPNCA with an area of 249.0636ha.

Other reserves within the close vicinity of the rock, but further than 15km, include:

- . Reserve 20212 Dulyalbin Rock, water reserve vested in the Minister for Water Resources with an area of over 637.2155ha.

Over 50% of land within 15km of Mt Hampton has been cleared for agriculture however within this land, strips and patches of remnant vegetation are common.

Few signs of land degradation are evident in the area and the Department of Agriculture, Merredin reports there is little land lost to salinity at present but that there is a possibility of this occurring in the future. Some water erosion is evident in a few areas and there is a potential for wind erosion in the future. However, careful management of the agricultural land will ensure that land degradation will not become a problem. There is little sign of land degradation in Mt Hampton Reserve. Some erosion has occurred on the access track to the reserve but this will be repaired as part of the development of the Mt Hampton water supply.

- 2.1.2 *Affecting 20ha of a 594ha reserve is unlikely to have a significant impact on the vertebrate fauna of the reserve.*

**Response**

The comment is noted.

- 2.1.3 *Sites like this with a reliable salt-free water supply and large area of native vegetation are essential to the long term persistence of amphibians in the eastern wheatbelt. Amphibians world-wide are currently in decline. In WA, research on one species indicates salinisation is a key factor - this is probably true for other frogs. Fragmentation may also be a factor. Mt Hampton is a relatively large vegetation remnant close to the eastern limit of distribution of seven of the nine species found or likely to occur there. This development has the potential to severely impair the conservation value of Mt Hampton for amphibians.*

**Response**

As discussed in 1.4 and 2.1.1, impacts on the vegetation and rock pools are not likely to be particularly significant, either in a local or regional context. For this reason the conservation value of Mt Hampton for amphibians is unlikely to be severely impaired.

Rock pools on the main rock outcrop will be unaffected by the development whilst those immediately below the rock drain will fill largely through direct rainfall and will not fill as quickly.

In addition there are a number of (at least 14) large rock pools on Mt Hampton which occur on the granite outcrops to the north-east and north-west of the main rock. These will definitely be unaffected by the rock drains and will continue to support frogs such as *Neobatrachus pelobatoides* and other frogs and tadpoles found in the reserve.

As mentioned previously the world-wide decline of frogs has been documented (Blaustein and Wake, 1990) and Mt Hampton is an important frog habitat. However it is but one of many other similar granite outcrops that occur in the area. For instance:

- . Mt Bayly surrounded by a nature reserve;
- . Sandalwood Rock;
- . Neendojer Reserve
- . Northonopine Rock;
- . Borayukkin Rock; and
- . many small rock outcrops surrounding Mt Hampton to the north-west and north-east.

They are also important habitats for frogs.

- 
- 2.1.4 *Granite outcrops are a unique feature of the south-west of WA, have aesthetic and recreational values and provide habitat for ancient primitive organisms and plants, some of which are restricted to granite areas. The State Government should be looking at ways to return dammed rock catchments to near original conditions rather than continuing to wall them for water harvesting. Mt Hampton is the most elevated and spectacular granite between Southern Cross and Hyden with a reasonable reserve of native vegetation surrounding it, and for these reasons should be left undisturbed.*

**Response**

Detailed design of the project will attempt to minimise the aesthetic impact on the granite outcrop, by the use of appropriate construction materials which will blend in with the natural landscape.

Recreation values of the outcrop will not be affected particularly as access will remain to the rock and surrounding area. Only the silt pit and dam will be fenced off.

The habitat for organisms and plants on and around the granite outcrop is likely not to be significantly impacted as discussed in 1.4 and 2.1.1

The proposal, as discussed in the CER and modified in the enclosed response to public submissions, achieves a balance between conservation and the need to provide an emergency supply of water to the local farming community.

The impact on the native vegetation is discussed in detail further in the proponent's response.

- 2.1.5 *An article in Landscape (Winter 1992, pp50 to 53) details the conservation significance of granite outcrops.*

**Response**

This article argues that a balance should be struck between the use of granite rocks as water harvesters and their conservation value.

The proponent acknowledges the conservation value of granite rocks but points out that Mt Hampton will still have conservation value if the dam is constructed. Mossfields, shrubs, groundcovers and fresh rock pools will still exist on the rock after dam construction. *Drosera graniticola* and *Verticordia pulchella*, the priority listed flora recorded in the area, have not been found in the project area.

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A photograph of Pingaring Rock in Dr Bayly's Landscape article, shows native shrubs and groundcovers, including sedges, successfully growing in the shadow of rock drains at the base of that rock. This tends to confirm that the existing vegetation in the shadow of the proposed Mt Hampton rock drains is unlikely to be significantly impacted.

The reason some plants growing in the reserve are not found at the immediate base of Mt Hampton is very likely that they are unable to withstand the extensive soil waterlogging which occurs at the base of Mt Hampton after rain. *Allocasuarina* on the other hand, appears able to withstand this waterlogging.

Mt Hampton water supply will not involve the encircling of patches of vegetation growing on the rock with rock drains as mentioned in Dr Bayly's article. This practice is no longer carried out.

The freshwater rock pools will still exist on the rock and invertebrates will still have the opportunity to live and reproduce there successfully. Few of these pools will be affected by the rock drains. The pools will still fill with rainwater, however, it is acknowledged some pools will fill more slowly.

Dr Bayly refers to the strong aesthetic appeal of many of the granite rocks in the wheatbelt. Every effort will be made during design construction and rehabilitation to blend the Mt Hampton water supply infrastructure into the natural environment. A screen of natural vegetation will be established around the dam to reduce its aesthetic impacts.

## 2.2 Specific Fauna

- 2.2.1 *Concerned that the frog *Myobatrachus gouldii*, which is at the limits of its range here may be adversely affected by soil moisture loss and loss of *Casuarina* stands.*

### Response

See response to 2.1.3. *Myobatrachus gouldii* is widespread in the wheatbelt and is not rare. Its eggs are deposited underground in sand and it has no tadpole stage (Roberts, 1981). There is no evidence that *Myobatrachus gouldii* requires runoff from granite rocks for successful reproduction. Indeed, the frog has been found living great distances from waterbodies and appears able to survive away from surface water supplies. The frog has not been found in the wettest areas of Western Australia, ie along the Darling Range east of Perth and in the extreme south-west of the state. There are no records in areas with less than 300mm mean annual rainfall and its distribution does not extend into the desert.

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The whole of the known range is in areas with a winter rainfall maximum. It is believed breeding occurs from September to February. Roberts (1981) reports that the species is confined to primarily sandy soils with reliable winter rainfall. Roberts believes terrestrial breeding in this species may have evolved as a response to an absence of freestanding surface water in an otherwise moist environment.

Consequently, it appears that *Myobatrachus gouldii* is not dependent on runoff from granite outcrops to provide sufficient soil moisture for breeding. Instead, it is apparent that the frog is dependent on moderate winter rainfall. This rainfall will still be available to *Myobatrachus gouldii* over the entire project area except, of course, in the area where the dam is constructed.

2.2.2 *Stage 1 acceptable but future rock drains to north should not proceed since larvae of a second species of the ancient Chironomid genus Archaeochlus occurs in winter in seepages to the north.*

#### Response

*Archaeochlus* sp.nov. is not restricted to Mt Hampton but occurs in many other locations as well. *Archaeochlus* sp.nov. occurs from north of Mt Magnet to north of Ravensthorpe and from east of Geraldton and Perth to east of Norseman and Menzies. The construction of the Mt Hampton dam will not result in the extinction of *Archaeochlus* and the impact on *Archaeochlus* sp.nov. will not be significant, either at a local or regional level.

As it occurs in rock seepages that contain soil, it is not expected that these invertebrates will be adversely affected by rock drains built to direct water into the dam. These areas will still become moist and seep even if the rock drains are built.



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3. **FLORA SURVEY**

- 3.1 *Detailed descriptions of the vegetation quadrats should have been provided in the public document, not just an unpublished Water Authority report.*

**Response**

It was felt that the descriptions of quadrats was far too detailed for a CER. The information can be found in Appendix B of this report if required.

- 3.2 *The flora survey proposed for Spring 1993 should be undertaken by an experienced botanist.*

**Response**

The survey has been completed recently and was undertaken by a professionally trained botanist with extensive experience in flora survey work in the south-west region of Western Australia, including Mt Hampton Reserve. The rare flora survey did not find any rare flora adjacent to the main granite outcrop at Mt Hampton.

The rare flora survey was carried out over four days and included a survey of rock catchments at Merredin Rock, Muntadgin Rock, Mt Roe, Wave Rock and The Humps at Hyden, to assess the likely impact on the vegetation. The findings are detailed throughout the proponent's response. Photographs are contained in Appendix A.

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#### 4. FAUNA

##### 4.1 General Comments

4.1.1 *The standard of assessment of the biological environment is of concern:*

- the number of trap nights is inadequate to document the small mammal fauna of the area, and*
- the number of reptile and bird species is low reflecting small sampling effort.*

##### Response

It is acknowledged that the number of trap nights was inadequate to document the small mammal fauna of the area comprehensively, however the fauna trapping programme was never intended to achieve this. This would require a survey period spanning a number of years. That is why a list of fauna which could be expected to occur at the reserve was compiled. The trapping programme was conducted in the hope that some relevant and/or unusual findings would result.

The fauna survey was carried out in May and it is likely that this was one of the reasons why fewer reptile and bird species were found than expected. Conditions were unfavourable for detections. Heavy rain was recorded on two of the four days. In addition the project area is only small in area. Once again the list of possible reptiles and bird species was included to give an indication of the species which might be expected to occur at the reserve as well as those species which have been recorded in the region in previous survey work.

4.1.2 *A large number of errors occur in the fauna lists including spelling, incorrect genus, one bird (Little Woodswallow) and three reptiles out of known range and common species are missing from the list.*

##### Response

The southern limit of the range of the Little Woodswallow as documented in Blakers et al. (1984) lies very close to Southern Cross. In general species whose distributional limits lay close to Mt Hampton were included in the species list as a cautionary measure.

The species list was compiled using those species recorded in previous surveys conducted by other researchers in the region. It is, therefore, possible that some species which occur in the area were not found in previous surveys and are, therefore, absent from the lists. As few published surveys have been conducted close to Mt Hampton, some of the species on the list may not actually ever be found at Mt Hampton.

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The fauna species list was primarily a guide to the possible fauna of the area. Particular attention was given to identifying any rare species which might occur in the project area.

4.2 Frogs

4.2.1 *There is no detailed assessment of where frogs breed, making assessment of impacts difficult. Key questions which need a response include:*

*do any species breed in pools on top of the rock? - this happens elsewhere so the Water Authority needs to check top of rock for tadpoles; and*

*where do the frogs around the rock actually breed and what alternatives exist for frogs in the area.*

Response

*Crinia pseudinsignifera* was heard calling from rock pools on Mt Hampton during the field survey and it is very likely that this species breeds in rock pools on Mt Hampton.

*Neobatrachus pelobatoides* is an explosive breeder and deposits eggs in water. Dale Roberts of the University of WA has observed these frogs breeding in pools on rocky outcrops north of Trayning and south-east of Southern Cross. Tadpoles of this species were found in rock pools on Mt Hampton and adjacent rocks during a recent visit to the reserve.

*Heleioporus albopunctatus* deposits eggs in dry borrows and has a free swimming tadpole stage. It is very likely to breed in the sandy areas in the reserve. Dr Dale Roberts reports *Neobatrachus albipes* and *Neobatrachus kunapalari* lay their eggs in water. *Pseudophryne guentheri* and *Pseudophryne occidentalis* deposit their eggs in borrows in moist soil and have a free swimming tadpole. These frogs very likely breed in the soil near pools formed beneath the rock near drainage lines after rain. *Neobatrachus albipes*, *Pseudophryne guentheri* and *Pseudophryne occidentalis* probably occur close to other granite outcrops in the area.

Rock pools will still exist on Mt Hampton and the adjacent rocks if the dam development proceeds and so those frogs dependent on rock pools for reproduction will still be able to breed. Similarly pools will still form at the base of Mt Hampton after rain and these pools will continue to be used by frogs for breeding. As mentioned previously there is no reason to believe that any of the frog species which occur at the Mt Hampton Reserve at present will be significantly reduced. There may be a reduction in the total number of frogs if water availability is a factor limiting population size, but population size is more likely to be limited by food availability.

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The frogs which can be found at Mt Hampton can be found over a wide range. Section 1.4 mentions frogs found at other rock outcrops in the area during the spring rare flora survey. Excellent habitat occurs at Mt Bayly just 1km from the Mt Hampton Reserve boundary. Many rock pools occur on this rock also.

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5. ABORIGINAL HERITAGE

- 5.1 i. *No informant appears to have been present during the archaeological survey.*

**Response**

There is no requirement for an informant to be present during the archaeological survey.

- ii. *The outcome of discussions with the Aboriginal spokesperson regarding site S2680 is not documented.*

**Response**

Following a request from the archaeologist, the anthropologist discussed site S2680 with the Aboriginal spokesperson. It was stated by the Aboriginal consultant that the original inhabitants of the area had died out in the distant past and had not passed on any traditional information regarding the significance of this site. The opinion of the Aboriginal consultant is detailed on Page 9, Part 1, of the report.

- iii. *More detail than four paragraphs is required regarding the actual field survey.*

**Response**

There is no requirement for a specific number of paragraphs. In this case, sufficient information is given on survey procedure and results.

- iv. *Reference needs to be made to the geographical extent of the survey.*

**Response**

Page 1, Part 2, contains all relevant information in conjunction with the maps. The ethnographic survey covered a wider area than this, as is usual.

- v. *It is not possible to determine if site S2680 will not be impacted.*

**Response**

Page 7, Part 2, states that the site will not be affected based on plans available at the time of the survey. It is recommended that the site be preserved, Page 9, Part 2. Site S2680 will not be impacted by the development of Mt Hampton water supply.

- 5.2 *It is the Water Authority's responsibility to ensure compliance with the Aboriginal Heritage Act 1972, particularly with respect to site S2680. Further work may be required.*

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### **Response**

The Water Authority is obviously aware of their responsibilities because they commissioned the survey. The recommendations in the report, Page 9, Part 2, provide information about the site and appropriate courses of action.

6. ASSESSMENT AND MANAGEMENT OF ENVIRONMENTAL IMPACTS

- 6.1 *The use of concrete slabs and cement mortar will change the freshwater environment to alkaline. The effect of alkalinity on the aquatic fauna should be addressed.*

**Response**

It is unlikely that the pH in the rock pools will alter as a result of the construction of rock drains above them as precautions will be taken to avoid porous construction of slabs and cement mortar which could have resulted in leaching of lime.

- 6.2 *Existing designs (Figure 3 CER) prevent frog movements. Alternative 1 could be modified to allow movement onto, but not off the rock. The broad, shallow bitumen drains would not affect frog movements.*

**Response**

Alternative 1 will be modified to allow frog movements off the rock.

Narrow gaps (600mm) will be left in the rock wall drains, enabling the movement of frogs through the walls as well as up and down the sides of the rock. These frog passages will be constructed every 20m along the walls and will be designed in consultation with CALM and the University of WA.

- 6.3 *The silt trap and dam should be modified by reducing the slope of the outer wall, reducing the slope on the inner wall to mean water level, planting fringing vegetation at least to maximum water level, confining silt removal to one side and installing logs as noted in the CER.*

**Response**

The slopes of the inner and outer walls of the silt pit and dam have been designed with the objective of minimising vegetation clearing, but at the same time enabling animals which fall into the water bodies to climb out. The slopes have been kept as steep as possible to minimise the area that needs to be cleared. A fence will be erected around the silt pit and dam to keep out the larger animals.

The inner bank of the silt pit will be lined with sandbags, with logs placed strategically around the pit, and the dam will be lined with gravel at a slope of 1:3. This will enable any animals to climb out of the water bodies.

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The Water Authority keeps vegetation clear from catchment areas to avoid a build up of rotting organic matter, which leads to a deterioration in the water quality. As a result, planting fringing vegetation around the dam would not be acceptable to the Authority.

- 6.4 *The feasibility and environmental implications of shifting the storage dam and car park facilities (eg to cleared land) should be investigated because these developments would have a major impact on the biological resources and values of the reserve.*

**Response**

Refer to CALM submission, response 5.1.

- 6.5 *In view of the local availability of gravel and clay reserves, these resources should not be extracted from the reserve.*

**Response**

Refer to CALM submission, response 5.8.



## 7. CALM SUBMISSION

### CER Section

#### 2.3 Scope of Project

*If the Water Authority and the Department of Agriculture have estimated a demand of 7,000kL per year, why is the proposal for a dam of initially 20,000kL and ultimately 30,000kL? Will the potential availability of this water discourage other "on farm" alternatives to the use of the nature reserve? What is the evaporation rate predicted? How often during a 20 year cycle will the dam be dry?*

#### Response

To obtain 7,000kL pa 9 years out of 10, using a rock catchment of 12.7ha, a dam with a capacity of 20,000kL is required. This allows for yearly fluctuations in rainfall, and evaporation and seepage losses. Enlargement of dam capacity would only be required if demand increased well beyond 7,000kL pa. Maximum yield would be achieved by development of the total 18.3ha of potential rock catchment at Mt Hampton. This would require a dam of 30,000kL capacity and would provide a reliable yield of 11,500kL pa, 9 years in 10. However with the aim of the Farm Water Strategy Group (FWSG) to encourage "on-farm" supplies it is likely that this will not be required.

The availability of water at Mt Hampton is not considered likely to affect the future development of "on-farm" supplies. The aim of the policy the FWSG is currently preparing is to continue to encourage farmers to develop "on-farm" supplies. A copy of the September 1993 FWSG newsletter is attached (see Appendix C).

Evaporation = 2.05mpa.

During a 20 year cycle, assuming a demand of 7,000kL pa, the dam will be dry for 2 years on average. This would occur when the area was drought affected and it is likely that the area would be declared water deficient by the WA Drought Consultative Committee (DCC). On these occasions, stocks of water at the dam would be replenished from the G&AWS main, funded by the Government.

### CER Section

#### 3.1 Project Justification

*The proponent has not provided a cost/benefit analysis for the proposal.*

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## Response

A full cost/benefit analysis for the Mt Hampton project was not carried out, as it is extremely difficult to determine the actual cost/benefits to the region, associated with the construction of the Mt Hampton dam. The main reason is that it is difficult to predict whether or not the farmers will increase their stock numbers or the area of land under cultivation or both, as a result of Mt Hampton, particularly in light of the current economic circumstances. Other factors include the fluctuating prices for sheep and wheat, and climatic conditions.

The project has been justified on the grounds that it is Government policy to provide an emergency water supply to farmers within 40km. This is part of the Farm Water Strategy. There are a number of farmers who are further than 40km away from the existing emergency sources at Mt Roe and the Goldfields main. A letter from the FWSG outlining its role as the Government body responsible for drought alleviation initiatives, its policy on emergency water supplies and its view on the Mt Hampton proposal, is contained in Appendix C.

Improvement of "on-farm" supplies cannot provide adequate, across the board security for drought situations and cannot therefore be considered as viable options for emergency water supply. Only "off-farm" supplies can provide adequate drought security and of the options considered (refer to Table 1), a rock catchment at Mt Hampton proved the cheapest solution whilst meeting the 40km maximum carting distance.

A present worth analysis was not carried out for a source at Dulyalbin since it did not meet the FWSG's policy of providing water to farmers within 40km and would only provide a fraction of the required yield as discussed in 4.1, page 20.

**TABLE 1  
MT HAMPTON ROCK SOURCE OPTIONS**

Description of Options	Present Worth Cost (\$000s)	Probability of Success
1. Construct 20,000kL capacity dam, with 12.7ha rock catchment at Mt Hampton as shown in Appendix 1	550	100%
2. Construct two 15,000kL capacity dams, using two different rock catchments in the Mt Hampton district	900	0%
3. Development of a groundwater source at Mt Hampton with a 200m <sup>3</sup> storage tank	450	20%
4. Expand Dulyalbin Rock source to meet farmers requirements	N.A.	0%
5. Construct a pump station at the Goldfields main at Moorine Rock and pump through 55km of 90mm MDPE pipe into a 200m <sup>3</sup> storage tank at Hampton Rock	1,800	100%
6. Construct a 12.6ha bitumen catchment with a 20,000kL capacity dam	2,300	100%
7. Construct a 35ha roaded catchment with a 20,000kL capacity dam	900	100%

Note:

All the options have been designed to provide a safe yield of 7,000kL annually

CER Section

4.1 Alternative Sources of Water

*The proponent:*

- i) *has not detailed the cost of upgrading the Dulyalbin Rock water source. How much of the current yield of Dulyalbin is being used, and for what purposes?*
- ii) *has not detailed the results of the promotion of "on-farm" storage, in terms of actual increased storage and trends towards reduced "off-farm" demand;*

- 
- iii) has eliminated two options on the grounds that they currently lie outside policy without discussing the potential for policy change; and
  - iv) while offering a range of single case options, has not discussed integrated options such as a combination of the Dulyalbin and "on-farm" options.
  - v) Is there any potential for roofed catchments?

#### Response

- i) As detailed in the Authority's report WP188, Section 4.3, during drought years the Dulyalbin tank empties. Based on previous records over 4,000kL pa is taken from the tank, during an average rainfall year. However only an estimated 3,600kL pa is available 9 years in 10. This could be increased by an additional 2,400kL pa if the rock catchment was extended further, however this is not sufficient to meet the additional 7,000kL pa required for emergency water supplies - there would still be a shortfall of 4,600kL pa. Since the upgrading of Dulyalbin Rock is not an alternative option, no present worth analysis was carried out. The water is used for livestock, crop spraying, domestic and garden use, the same as that envisaged at Mt Hampton.
- ii) The other problem with Dulyalbin is that it would not be suitable as an emergency source as some of the farmers would still be further away than 40km.
- iii) No survey has been carried out to assess the results of the promotion of "on-farm" supplies by the Department of Agriculture.

It is not Water Authority policy to cart water on a routine basis to storages not connected to the G&AWS Scheme. If this occurred it could set a precedent in other rural areas. Carting water does not comply with the policy currently being developed by the FWSG. Carting water would be undertaken as a non-routine measure to replenish stocks at Mt Hampton on average one year in ten when the dam is likely to run dry (see 2.3 item 4 above). Cartage costs would be funded by the Government as discussed in 2.3, page 18. This cost would vary depending on the severity of the drought, but would be in the order of \$20,000 to \$40,000.

- iv) Upgrading the water supply at Dulyalbin is not a suitable emergency supply for farmers to the east of Mt Hampton. It is also likely that not all the farmers would be able to improve their supplies sufficiently to provide an emergency source for drought periods. The emergency source at Mt Hampton would still need to be constructed.

The possibility of using two smaller rock catchments was investigated, however maps, aerial photos and a subsequent field inspection revealed no suitable rock outcrops in the area. This option was also more expensive than providing a single water supply.

- v) The Department of Agriculture has been promoting roofed catchments, however unless the proposal was adopted universally and proved successful in all cases in providing secure drought proof supplies, the Government would still be obliged to provide its emergency water supplies at strategic locations to safeguard those farmers who were unable to develop adequate "on-farm" supplies (refer to FWSG letter in Appendix C outlining reasons why farmers may not be increasing their "on-farm" supplies, indicating that they need to be looked into).

CER Section  
5.1 Layout

*The proponent's intention to use an already disturbed area is noted. However, the area of the car park has not been stated and the impact, in terms of the additional areas of disturbance resulting from the replacement of this asset (ie construction of a replacement car park), is not discussed. Why can't the dam be located well away from the rockface on cleared areas or on private property?*

Response

The area of the existing car park is about 30mx30m. The new car park would be constructed in an area which is clear of vegetation, to the east of the proposed dam site.

The location of the dam was based on drilling work that was undertaken in 1971, which indicated that the depth to rock in the proposed location was up to 10m in depth. Elsewhere drilling indicated that depths to rock were much less.

The possibility of locating the dam in cleared areas was investigated. However the field inspection revealed that the cleared areas were located where surface rock occurred. This would have required extensive blasting. Constructing the dam in private property would require a channel or drain pipe about 1km long to extend to the other side of South Moorine Road, this would have involved blasting a trench to the dam. The other option would have been to construct a pumping station and lay a pipeline above ground into the dam, which would have made this option more expensive. The construction of a pumping station would also require ongoing maintenance.

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However one of the requirements of these emergency water supplies is to ensure they require minimal maintenance. The soil conditions on the other side of the road are also unknown. Both of these options are more expensive than the proposed option. It should be noted that the eastern side of the dam (approximately 150mx50m) is in open space, as the belt of vegetation only extends about 80m from the edge of the rock.

CER Section

5.7 Operation

*The dumping of silt in the car park is not acceptable. It is likely to lead to muddy conditions which will discourage the public's use of it in preference to other, dryer areas of the nature reserve.*

*It is recommended that the proponent identify a site for disposal off the nature reserve.*

**Response**

Silt will be removed to the nearest Shire of Yilgarn landfill site.

CER Section

5.8 Source of Materials

*There are currently two disused gravel pits within Nature Reserve 20526. CALM is generally opposed to the extraction of gravel in such Wheatbelt Nature Reserves and CALM's view therefore is that these two pits should not be accessed for the gravel required for construction of the access road and dam.*

*The proponent should make an additional commitment that no clay or gravel extracted from any nature reserve will be used in the construction or subsequent maintenance of the access road or the dam.*

**Response**

All imported clay and gravel will be obtained from Shire borrow pits that are not located in nature reserves and which have been declared dieback free.

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CER Section

6.2.1.2 Vegetation Associations

*The proponent has not explained how the different vegetation associates have been classified. This has ramifications for the subsequent discussion of the local and regional significance of the nature reserve. The vegetation at the base of granite outcrops can be quite variable.*

*The vegetation classification methodology should be detailed.*

**Response**

The main vegetation associations were identified, by the proponent's consultants, from a 1983 black and white aerial photograph of Mt Hampton Reserve at 1:50,000. The distribution of these associations had changed little since Beard's work in 1972. Consequently, the associations identified were classified in the same manner, because dominant species recognised by Beard were also present as dominants in the major associations in the reserve. Two transects were defined, radiating out from Mt Hampton on the east side of the rock and the quadrats of vegetation along these transects were analysed in detail.

It is interesting to note that Beard did not distinguish the *Allocasuarina* thicket at the base of the rock from the sclerophyll woodland which occurs further out.

The vegetation associations identified in the reserve by both Beard and HGM appear to have been widespread in the area before clearing for agriculture took place. Large areas of uncleared vegetation still remain in the area and the broombush thicket vegetation is well represented in uncleared remnants in the area. The *Eucalyptus salmonophloia* and *Eucalyptus loxophlebia* sclerophyll woodland is not so well represented, but the impact of the dam on this vegetation association should be minimal.

CER Section

6.2.3 Conservation Significance

*The proponent has stated that the nature reserve's principal local and regional significance lies in the size of the Mt Hampton tor and the width of the Allocasuarina woodlands around its eastern base. However, it is clear from subsequent statements that the significance of other values needs to be addressed.*

*The proponent has referred, in subsequent statements on the impacts of the development, to the loss of frog breeding pools and the likelihood of a decline in the frog populations around the base of the rock. However, no explanation of the local and regional significance of the Mt Hampton frog populations has been provided.*

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Given the likelihood of a significant impact, this issue should have been addressed. I am advised that researchers at the University of WA have addressed the issue of impacts on frogs as well as macro-invertebrates in their submission to the EPA.

Probable impacts on the mammal fauna have also been detailed but, as in the case of the frog populations, no information on local and regional significance, has been provided. Also, no consideration has been given to impacts on birds which may be affected, such as the Western Yellow Robin and Golden Whistler.

The proponent has stated that "in isolation many of these (isolated wheatbelt) reserves are too small for conserving representative samples of natural wheatbelt vegetation" and that "concern has arisen for the viability of the plants and animals in these areas". While these statements are generally true, the situation at Mt Hampton has not been adequately explained. The proponent should provide information which sets the conservation values of Mt Hampton in context, eg by providing the following information for the area within 15km of Mt Hampton:

- . how much of the area is contained in nature reserves;
- . how much of the remainder has been cleared; and
- . what level of linkage, by vegetation corridors, exists between Mt Hampton and the other nature reserves and private property remnants?

The proponent has made the statement that "it is unlikely that any fauna species are reliant on this (Allocasuarina) vegetation association...". From what little is known about the fauna on this reserve it would have been more accurate to say that "it is not known whether any fauna species are reliant on this vegetation association". In later discussion of the probable impacts of the development on the fauna, the proponent recognises that with the decline of the vegetation association's cover, small mammals may be subject to greater predation. Clearly then, there is a suggestion of some reliance on this habitat.

While important information is absent, that which is stated about the significance of the Allocasuarina woodland makes it clear that the proposed development will have a severe impact on this vegetation association, given that out of a total area of 13ha of Allocasuarina woodland, 2.7ha will be cleared and 7.3ha will be adversely affected.



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## Response

### Frogs

Summarising the discussion in 1.4 and 2.1.3, it is unlikely that the construction of the rock drains and dam at Mt Hampton will have a significant impact on the frog population, both locally and regionally.

There have been no long term detailed studies into the local and regional conservation significance of the Mt Hampton frog populations. However, as mentioned previously, the frogs which inhabit the rock have a wide distribution and frogs are known to occur in large numbers at other granite outcrops in the region (Typer et al. 1984). None of the frogs are rare.

It is recognised that the frogs found at Mt Hampton may move up to 2.5km from the rock. Suitable habitat for breeding within this radius includes rock pools and other habitat in Mt Hampton Reserve which will not be impacted by the dam, Mt Bayly Reserve, to the east of Mt Hampton, and only 1km from Mt Hampton Reserve boundary. Other rocky outcrops, including Sandalwood Rock and large areas of uncleared Crown land, also occur in the vicinity of Mt Hampton, although not all the remnants contain granite rock outcrops. These all provide suitable undisturbed habitat for frogs and should be the subject of a programme to convert the vesting of this land to CALM for flora and fauna protection. Streams flowing north-east from Sandalwood Rock and other rocks in the locality would also provide suitable habitat for frogs.

Consequently, the development should not severely impair the frog conservation value of Mt Hampton Reserve. There could be some decline in frog numbers but this is not certain, and no species will be significantly impacted as a result of the dam. Frogs still breed in the rock pools above the rock drains at Wave Rock. There is good reason to believe that frogs will continue to breed in the rock pools above the rock drains at Mt Hampton if the development proceeds, and there are other rock pools in close proximity, that will not be affected by the development, which frogs will continue to use. Frog crossings will also ensure frog breeding above the rock drains takes place.

### Invertebrates

As mentioned previously, the invertebrate chironomid *Archaeo-chlus* species, which is reported by the University of WA to occur in rock seepages to the north of the rock, also occurs at other locations. As it occurs in rock seepages that contain soil it is not expected that these invertebrates will be adversely affected by rock drains built to direct water into the dam. These areas will still become moist and seep even if the rock drains are built.

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### Mammals

No long term detailed analysis of the conservation significance of the mammals and reptiles of Mt Hampton Reserve has been undertaken. However, no rare species of mammals and birds were found in the reserve during the survey which was conducted in preparation for the CER.

It is acknowledged that the Western Quoll and Crested Shrike-tit could occur here. Neither of these species are dependent on granite outcrops nor their fringing vegetation for survival, so the construction of Mt Hampton Dam should have minimal impact on these species. The Crested Shrike-tit lives in eucalypt woodland, the Western Quoll in a wide variety of habitats.

Three priority species, Carnaby's Black Cockatoo, Ramsay's Python and the Carpet Python are also expected to occur at the reserve. None of these are dependent on granite rocks nor on their fringing vegetation, so the development of Mt Hampton Dam should not significantly affect these species.

### Birds

The Western Yellow Robin and the Golden Whistler are both very widely distributed and neither is gazetted under the Wildlife Conservation Act. The impact of the dam on these two species is not known but it is likely that habitat fragmentation and widespread clearing has had a far greater impact on these two species than rock catchment dams. There is no evidence to suggest that either species will become extinct in the reserve as a result of dam construction. The Golden Whistler was recently heard calling at The Humps, a granite rock which has been used as a rock catchment for many years, in a similar manner to that proposed for Mt Hampton.

Saunders (1989) examined changes in the avifauna as a result of fragmentation of native vegetation in the wheatbelt and has shown that there have been widespread and extensive changes over the region during the last 80 years. He attributed these changes to fragmentation and massive decline in the extent of native vegetation through clearing for agriculture, the provision of standing water and new food resources in the form of grains and weed seeds.

The proposed dam at Mt Hampton does not involve massive clearing of vegetation nor the provision of new food resources such as grains. Few tree deaths resulting from dam construction are anticipated except those which need to be cleared to make way for the dam and its overflow. All possible measures will be taken to prevent the introduction and spread of weeds into the reserve. The dam will provide freestanding water which will be available to birds for most of the year.

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### Context of Conservation Values

The proponent maintains that it is unlikely any fauna species present in the reserve is totally reliant on the *Allocasuarina* thickets as animals found in the reserve are also found elsewhere where *Allocasuarina* is absent.

Additional information which has become available in regard to the impact of rock catchment dams on the surrounding vegetation, indicates the impact of catching water in rock drains on surrounding vegetation, particularly *Allocasuarina*, has been over-emphasised in the CER. The proponent conducted a survey of the vegetation surrounding rocks where similar rock catchments have been operating for some time, in order to assess the vegetation capable of existing in these areas. It has been found that *Allocasuarina* can survive beneath these rock drains (refer to the photographs in Appendix A). There does not even appear to be a slight thinning of *Allocasuarina* stands. The understorey and groundcover species found growing above the rock drains was also found growing beneath the rock drains. Where rock drains bisected a stand of vegetation there appeared to be little difference in vegetation on the other side of the rock drain. Groundcover species tended to be absent close to the rock drain on either side possibly as a result of direct disturbance during construction. As rock drains at Mt Hampton will be constructed in areas with little vegetation the impact of the rock drains on vegetation should be minimal.

See Section 2.1.1. As there are extensive uncleared areas of Crown land in the vicinity of Mt Hampton perhaps some consideration should be given to extending the reserve system in this area.

As mentioned in Section 2.1.1 the following nature reserves occur within 15km of Mt Hampton:

. Mt Bayly	1179.8306ha
. Reserve 32995 adjacent to Mt Hampton	1886.0468ha
. Neendojer Reserve	2249.0636ha

Approximately 50% of the land within 15km of Mt Hampton has been cleared for agriculture and within this land strips and patches of remnant vegetation which serve as corridors for wildlife are common. Figure 2A clearly shows the corridors linking Mt Hampton with other areas. Road corridors link Mt Hampton with Mt Bayly and Neendojer Reserve. Similarly road vegetation corridors link Mt Hampton with many of the remnant vegetation on farms nearby and Crown land.

#### 7.2.1 Vegetation Clearing for Stage 1 Development

*The proponent has stated that Ministerial permission would be obtained prior to the removal of any Declared Rare Flora. Elsewhere the proponent makes a commitment to conduct a rare flora survey during spring 1993. If rare flora are found and the proposal would*

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*require their "taking", then a decision as to whether permission would be given under the Wildlife Conservation Act for the taking of that rare flora would be made in the light of available information on the species in question. It cannot be presumed that Ministerial approval to take rare flora would be given.*

*How does the proponent propose to deal with this possibility?*

**Response**

The rare flora survey was proposed to be carried out during mid September allowing sufficient time for Ministerial approval to take into consideration the findings of the survey. The spring survey has since been conducted and no rare flora was identified. However, if rare flora is found during construction then the feasibility of making modifications to the rock catchment and dam design would need to be seriously considered. It is also worth noting that CALM's rare flora database has been consulted and there are no records of declared rare flora at Mt Hampton, a reserve that has been under the control of CALM for over 20 years.

**Comment Introduction of Dieback and Weeds**

*The proponent's statement and subsequent commitment in relation to dieback are inadequate. Dieback and related diseases in these sites frequently have poor visual expression. Samples of soil and root material must therefore be assessed by laboratory methods. The sites of gravel and clay extraction must also be assessed for environmental and declared weeds.*

**Response**

A general map prepared by the Northern Sandplain Working Party on dieback shows that the project is too far east to be affected by dieback. *Allocasuarina* can be affected by dieback but at present these trees appear healthy in the reserve. It is unlikely that dieback could take hold in the reserve because the climate in the area is not favourable.

However, as a precaution, the Water Authority using CALM hygiene methods, plans to wash down all construction equipment and vehicles prior to entry to the reserve and after leaving the reserve, to prevent introduction of dieback and weeds to the reserve or spread of plant diseases from the reserve to other areas.

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Comment Reduction in Water Available to Vegetation

*The explanation of the probable impact on the vegetation indicates that the Allocasuarina vegetation association will be severely impacted. Of the existing 13ha of this vegetation type, only 3ha will be unaffected. This is accepted as an accurate interpretation of the likely outcome.*

**Response**

As mentioned previously, there is now strong evidence that the impact of the rock drains on the *Allocasuarina* will not be nearly as severe as suggested in the CER (refer to photographs in Appendix A).

Comment *From Section 6.2.3 it is clear that Allocasuarina vegetation is not common regionally and the occurrence at Mt Hampton is regionally distinct in terms of its extent (ie width).*

**Response**

The *Allocasuarina* is widespread in the south-west of Western Australia. It is usually found in association with granite particularly granite outcrops. Although it has been reported that *Allocasuarina* is not common regionally, no survey to determine the occurrence of this species in the region had been undertaken when the CER was prepared. The proponent has recently conducted a survey of granite rocks in the region. *Allocasuarina* was found to occur in considerable numbers at Merredin Rock, Mt Roe, Mt Bayly, Tandegin Rock, Muntadgin Rock, Mt Cramphorne and Wave Rock. As mentioned previously it is interesting to note that Doran and Hall (1981) report that this species is locally common around Perth to Merredin and southwards to Albany and Ravensthorpe. Eastwards it is found nearly to Coolgardie, Norseman and in the Israelite Bay area. North of Perth the *Allocasuarina* is not common for 250km, but is then found in several localities as far as the Murchison River Gorge.

Comment *The proponent's commitments in relation to DRF surveys and to monitoring impacts on vegetation are noted. However, in relation to the latter, the proponent has made no reference to using the monitoring programme to subsequently modify the dam and drains, or second stage development, if impacts greatly exceed those that are expected.*

## Response

Wherever possible the results of the monitoring programme will be used to reduce the impact of the project on vegetation. In this respect there is the potential to relocate sections of the rock drain and modify the bitumen channel if there is any significant impact on vegetation. Detailed design of the second stage of development could also be modified to suit the findings of the monitoring programme.

## Comment Impacts on Terrestrial and Aquatic Fauna

*The anticipated impacts on the fauna are largely accepted. The provision of a more substantial and permanent water source may, however, encourage endemic disturbance opportunist fauna to the detriment, by competition for other resources, of species already present.*

*Anticipated impacts, in the absence of information on the local and regional significance of the area's fauna, should be evaluated.*

## Response

The presence of a more permanent water supply may alter the fauna community composition. However this change should not be highly significant as no new food source will be introduced to the reserve. The impact of the new arrivals (if there are any) on the indigenous animals will be minor. Many Australian animals do not need a permanent water source, obtaining water from food such as insects and nectar, although many bird species will benefit from the luxury of a more permanent water supply. The opportunistic birds include galahs but as there are few tall trees in the reserve with hollows this species should not become a pest within the reserve. Most of the changes in fauna composition which has occurred in the wheatbelt has resulted from vegetation clearing and replacement with grain fields. As the rehabilitation programme will use only local indigenous flora and will mimic the natural community vegetation structure the number of new arrivals should be minimal.

During the recent survey of granite rocks in the region between Merredin and Hyden the bird fauna occurring around the dammed rocks appeared little different to undammed rocks.

## Comment Impacts on Recreational Users and on Aesthetic Appreciation

*The commitment to develop an alternative car park and to rehabilitate the construction site are noted.*

*The proponent has not explained how the rehabilitation of the site may be used to ameliorate the impact on aesthetic values. Additional comment would be beneficial.*

### Response

Disturbed areas not required for use after construction will be rehabilitated in consultation with CALM and in accordance with CALM Policy Statement No 10 on Rehabilitation of Disturbed Land (November 1986) (see Appendix D). A landscape architect will be employed to develop a landscape master plan for these areas and to reduce the aesthetic impact of the dam. Vegetation will be planted to screen the dam from the access road and car park. Rock drain walls, fences and other materials used in construction will be coloured to blend in with the surrounding environment. All rehabilitation will be undertaken using direct seeding to obtain a natural plant distribution rather than planting seedlings by hand unless the Water Authority is directed otherwise by CALM.

### Comment Disposal of Silt

*Disposal in the car park is not acceptable. Alternatives must be identified.*

### Response

Refer to response to CALM 5.7.

### General Comments

Figure 2 *Where are the 28 farmers (ie those destined to benefit from the water supply) located? This information would assist in showing the "centre of gravity" of need.*

### Response

The Shire has indicated that there are in fact up to 60 farmers who would benefit from the development of a water supply at Mt Hampton. Without using the 40km radii too literally, the "centre of gravity" of need is approximately 10-15km east of Mt Hampton (refer to Figure 2A). As mentioned in the CER there are a number of rock outcrops in the surrounding area, however none of them are suitable as a rock catchment. The most suitable rock to the east of Mt Hampton (past My Bayly) appears to be Skeleton Rock, however it is about 40km away and there would still be several farms (5-10km north of Mt Hampton) that would have to cart water from more than 40km away, if this site was developed.

Figure 3 *Where will the rocks for the wall be obtained? From Mt Hampton itself?*

### Response

No rocks to be used from Mt Hampton. The proposal is to use concrete slabs.

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*The Spring survey for rare flora is proposed after approval is given for construction. This is an inappropriate sequence of events.*

**Response**

Refer to response to CALM 7.2.1. Approval to construction would only be given once the appeal period on the proponent's response was completed. This deadline was initially scheduled by the EPA for October 8, 1993 which would have given an opportunity for the findings of the rare flora survey (to be carried out mid September) to be reviewed and included in the submissions.

*The CER suggests (page 27) substantial deaths of *Allocasuarina* thickets leading to "a grassland association containing fewer trees". The only commitment is to monitor this (page 31, 8.3.3). It is suggested (page 2) that this will be useful to predict impacts of future developments. As a number of such developments have already occurred, why are there no data already available for the Water Authority to base predictions?*

**Response**

Verbal feedback from several of the Water Authority's Operations Managers who have a number of rock catchments in their Districts have made the comment that construction of rock drains at the base of rocks did not appear to have had a significant impact on the vegetation. Unfortunately no vegetation quadrats for ongoing monitoring purposes were set up as most were constructed more than 20 years ago. However, as part of the rare flora survey, a number of rock catchments were visited, as mentioned in 1.4. This survey revealed that there would not be a significant impact on the *Allocasuarina* as previously predicted (refer to photographs in Appendix A). In fact these observations support an opinion expressed by Frank Batini, of the Department of Conservation and Land Management, that he considered the *Allocasuarina* to be quite drought resistant vegetation and did not think the impact would be as great as indicated in the CER report.



## **Appendix 3**

### **LIST OF SUBMISSIONS**

Department of Conservation and Land Management

Department of Minerals and Energy

National Parks and Nature Conservation Authority

Western Australian Museum

Western Australian Museum Department of Aboriginal Sites

Western Australian Department of Agriculture

Shire of Yilgarn

Dr D H Edward

Dr J D Roberts